Semiannual water column monitoring report

July - December 2001

Massachusetts Water Resources Authority

Environmental Quality Department
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SEMIANNUAL WATER COLUMN MONITORING REPORT

July – December 2001

Submitted to

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EXECUTIVE SUMMARY

The Massachusetts Water Resources Authority (MWRA) has collected water quality data in Massachusetts and Cape Cod Bays for the Harbor and Outfall Monitoring (HOM) Program since 1992. This monitoring is in support of the HOM Program mission to assess the environmental effects of the relocation of effluent discharge from Boston Harbor to Massachusetts Bay, which occurred on September 6, 2000. From 1992 to September 2000, data were collected to establish baseline water quality conditions. The current outfall monitoring is expected to provide the means to detect significant departure from that baseline. The surveys have been designed to evaluate water quality on both a high-frequency basis for a limited area in the vicinity of the bay outfall site (nearfield) and a low-frequency basis over an extended area throughout Boston Harbor, Massachusetts Bay, and Cape Cod Bay (farfield). This semi-annual report summarizes water column monitoring results for the ten surveys conducted from July to December 2001.

Over the course of the HOM program, a general trend in water quality events has emerged from the data collected in Massachusetts and Cape Cod Bays. The trends are evident even though the timing and year-to-year manifestations of these events are variable. The summer is generally a period of strong stratification, depleted nutrients, and a relatively stable mixed-assemblage phytoplankton community. In the fall, stratification breaks down supplying nutrients to surface waters that often results in the development of a fall phytoplankton bloom. The lowest dissolved oxygen concentrations are usually observed in the nearfield in October prior to the fall overturn of the water column. By late fall or early winter, the water column is usually well mixed and has returned to winter conditions. In 2001, there was a delay in the deterioration of stratification as the water column remained at least weakly stratified until late December and this led to the development of a late fall/early winter bloom and a seasonal peak in production rates and chlorophyll concentrations in early December.

The delay in the overturn of the water column and the return to winter conditions was the primary physical characteristic of this period. In the nearfield, mooring data indicated that there was a strong mixing event in late September, but by early October both the mooring and nearfield monitoring data indicated the water column had restratified. A weak density gradient continued to be observed from late October to early December. The water column finally returned to well-mixed winter conditions over the entire nearfield in late December. Mild meteorological conditions contributed to the lingering stratification into early December.

The general trend in nutrient concentrations during July to December 2001 was similar to previous baseline monitoring years. Nutrients were depleted in the surface waters during the summer due to biological utilization and increased in concentration with weakening stratification and increased mixing. The extended period of weak stratification from October to December provided a source of nutrients to the surface waters due to weak mixing and allowed for phytoplankton to bloom. The combination of limited mixing and the late fall/early winter bloom kept surface water nutrient concentrations relatively low until the water column became well mixed in late December. Ammonium continued to be an excellent tracer of the effluent plume in the nearfield although it is not a conservative tracer due to biological utilization. In August 2001, salinity and NH_4 data suggested the effluent plume was advected from the nearfield to the south. A comparison of NH_4 and chlorophyll concentrations in the vicinity of the plume suggest this source of nitrogen may have contributed to localized increases in chlorophyll concentrations.

Overall, chlorophyll concentrations were relatively low during the second half of 2001, but reached atypically high levels during the late fall/winter bloom in early December. Fall 2001 was a departure from the trend observed during the two previous years. During September and October of 1999 and

2000, substantial and prolonged fall blooms were observed, but in 2001 there was a minor fall bloom in September and then a more prolonged and substantial bloom was observed from late October thru early December. SeaWiFS imagery confirmed that elevated surface concentrations of chlorophyll were present from October to early December in the bays and throughout the western Gulf of Maine. The high chlorophyll concentrations in early December were coincident with high POC concentrations and seasonal peak areal production rates (>3250 mg C m^{-2} d^{-1}). This was relatively late for the peak production rates and chlorophyll concentrations to be observed. These were the highest December values observed since baseline monitoring began in 1992.

Total phytoplankton abundances in the whole water samples were highest in late July and generally decreased through December. The decrease in phytoplankton abundance from fall to early winter is typical for this time of year. However, in comparison to previous years the late fall and early winter abundance levels were relatively high. Levels of >10^6 cells L^{-1} in the nearfield (mostly centric diatoms) from October to early December were coincident with high chlorophyll concentrations and primary production rates. Zooplankton abundance and community structure followed typical patterns for the summer to early winter period.

September 6, 2000 marked the end of the baseline period, completing the data set for MWRA to calculate the threshold values used to compare monitoring results to baseline conditions. The water quality parameters included as thresholds are annual and seasonal chlorophyll levels in the nearfield, dissolved oxygen concentrations and percent saturation in bottom waters of the nearfield and Stellwagen Basin, and nuisance algae (*Alexandrium*, *Phaeocystis*, and *Pseudo-nitzschia*). Even with elevated chlorophyll concentrations from late October to early December the fall nearfield mean areal chlorophyll value was about half (85 mg m^{-2}) that of the fall threshold value (161 mg m^{-2}). This continued a trend of relatively low chlorophyll concentrations that had been noted for the first half of 2001. The low concentrations from February to December resulted in summer and annual mean areal chlorophyll values (45 and 67 mg m^{-2}) that were also well below threshold levels (80 and 107 mg m^{-2}). The DO concentration and percent saturation survey mean minima for the fall of 2001 were well above the threshold levels for both the nearfield and Stellwagen Basin. Although *Alexandrium* and *Pseudo-nitzschia* were observed intermittently and at very low abundance, there were no confirmed blooms of harmful or nuisance algae in Massachusetts and Cape Cod Bays for July – December 2001.

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1.0 INTRODUCTION

1.1 Program Overview

The Massachusetts Water Resources Authority (MWRA) has implemented a long-term Harbor and Outfall Monitoring (HOM) Program for Massachusetts and Cape Cod Bays. The objective of the HOM Program is to (1) test for compliance with NPDES permit requirements; (2) test whether the impact of the discharge on the environment is within the bounds projected by the SEIS; and (3) test whether change within the system exceeds the Contingency Plan thresholds. A detailed description of the monitoring and its rationale is provided in the Effluent Outfall Monitoring Plan developed for the baseline period and the post discharge monitoring plan (MWRA, 1997).

To monitor water quality conditions with respect to nutrients, water properties, phytoplankton and zooplankton, and water-column respiration and productivity, the MWRA conducts ambient water quality surveys in Massachusetts and Cape Cod Bays. The surveys have been designed to evaluate water quality on both a high-frequency basis for a limited area (nearfield) and a low-frequency basis for an extended area (farfield). The nearfield stations are located in the vicinity of the Massachusetts Bay outfall site (Figure 1-1) and the farfield stations are located throughout Boston Harbor, Massachusetts Bay, and Cape Cod Bay (Figure 1-2). The stations for the farfield surveys have been further separated into regional groupings according to geographic location to simplify regional data comparisons. This semiannual report summarizes water column monitoring results for the ten surveys conducted from July through December 2001 (Table 1-1).

Table 1-1. Water Quality Surveys for WF018-WN01H July to December 2001

Survey #	Type of Survey	Survey Dates
WN018	Nearfield	July 12
WN019	Nearfield	July 25
WN01A	Nearfield	August 9
WF01B	Nearfield/Farfield	August 27-30
WN01C	Nearfield	September 17
WN01D	Nearfield	October 9
WF01E	Nearfield/Farfield	October 19-22, 25-27
WN01F	Nearfield	October 29
WN01G	Nearfield	December 7
WN01H	Nearfield	December 19

The bay outfall became operational on September 6, 2000. The ten surveys conducted during this semiannual period are the first summer surveys and second fall-winter surveys conducted after discharge of secondary treated effluent from the outfall began. The data evaluated and discussed in this report focus on characterization of spatial and temporal trends for July to December 2001. Preliminary comparison against baseline data are discussed and appropriate threshold values presented. A detailed evaluation of 2001 versus the baseline period (1992-2000) will be presented in the 2001 annual water column report.

Initial data summaries, along with specific field information, are available in individual survey reports submitted immediately following each survey. In addition, nutrient data reports (including calibration information, sensor and water chemistry data), plankton data reports, and productivity and respiration data reports are each submitted four times annually. Raw data summarized within this or any of the other reports are available from MWRA in hard copy and electronic formats.

1.2 Organization of the Semiannual Report

The scope of the semiannual report is focused primarily towards providing an initial compilation of the water column data collected during the reporting period. Secondarily, integrated physical and biological results are discussed for key water column events and potential areas for expanded discussion in the annual water column report are recommended. The report first provides a summary of the survey and laboratory methods (Section 2). The bulk of the report, as discussed in further detail below, presents results of water column data from the last ten surveys of 2001 (Sections 3-5). Finally, the major findings of the semiannual period are summarized in Section 6.

Section 3 includes data summary tables that present the major numeric results of water column surveys in the semiannual period by survey. A description of data selection, integration information, and summary statistics are included with that section.

Sections 4 (Results of Water Column Measurements) and 5 (Productivity, Respiration, and Plankton Results) include preliminary interpretation of the data with selected graphic representations of the horizontal and vertical distribution of water column parameters in both the farfield and nearfield. The horizontal distribution of physical parameters is presented through regional contour plots. The vertical distribution of water column parameters is presented using time-series plots of averaged surface and bottom water column parameters and along vertical transects in the survey area (Figure 1-3). The time-series plots utilize average values of the surface water sample (the "A" depth, as described in Section 3), and the bottom water collection depth (the "E" depth). Examining data trends along four farfield transects (Boston-Nearfield, Cohasset, Marshfield and Nearfield-Marshfield), and one nearfield transect, allows three-dimensional presentation of water column conditions during each survey. One offshore transect (Boundary) enables analysis of results in the outer most boundary of the survey area during farfield surveys.

Results of water column physical, nutrient, chlorophyll, and dissolved oxygen data are provided in Section 4. Survey results were organized according to the physical characteristics of the water column during the semiannual period. The timing of water column vertical stratification, and the physical and biological status of the water column during stratification, significantly affects the temporal response of the water quality parameters, which provide a major focus for assessing effects of the outfall. This report describes the horizontal and vertical characterization of the water column during the summer stratification period (WN018 – WF01E), the prolonged duration of weakly stratified conditions (WN01F – WN01G), and the eventual return to winter conditions in late December (WN01H). Time-series data are commonly provided for the entire semiannual period for clarity and context of the data presentation.

Productivity, respiration, and plankton measurements, along with corresponding discussion of chlorophyll and dissolved oxygen results, are provided in Section 5. Discussion of the biological processes and trends during the semiannual period is included in this section. A summary of the major water column events and unusual features of the semiannual period is presented in Section 6. References are provided in Section 7.

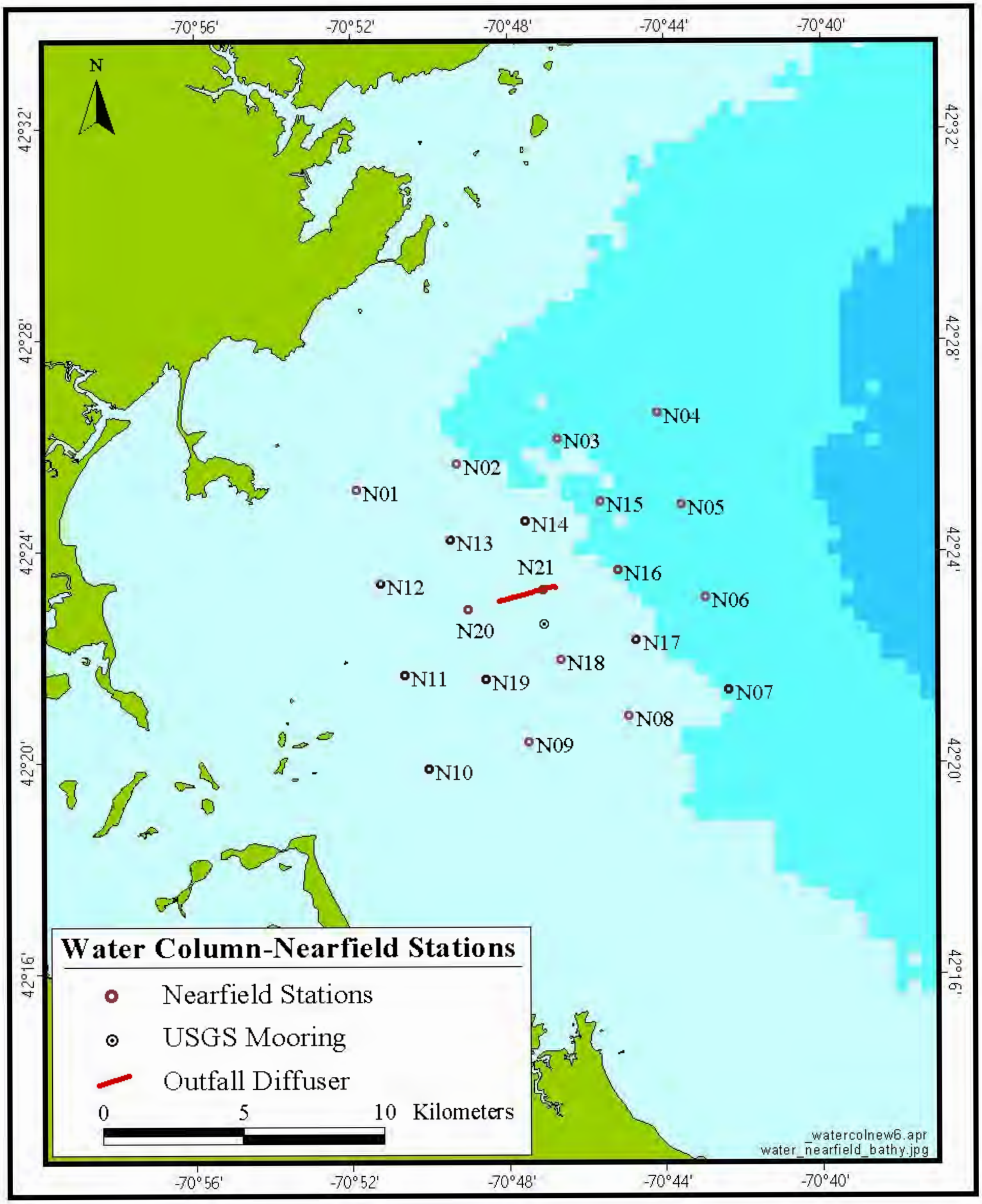


Figure 1-1. Locations of MWRA Offshore Outfall, Nearfield Stations and USGS Mooring

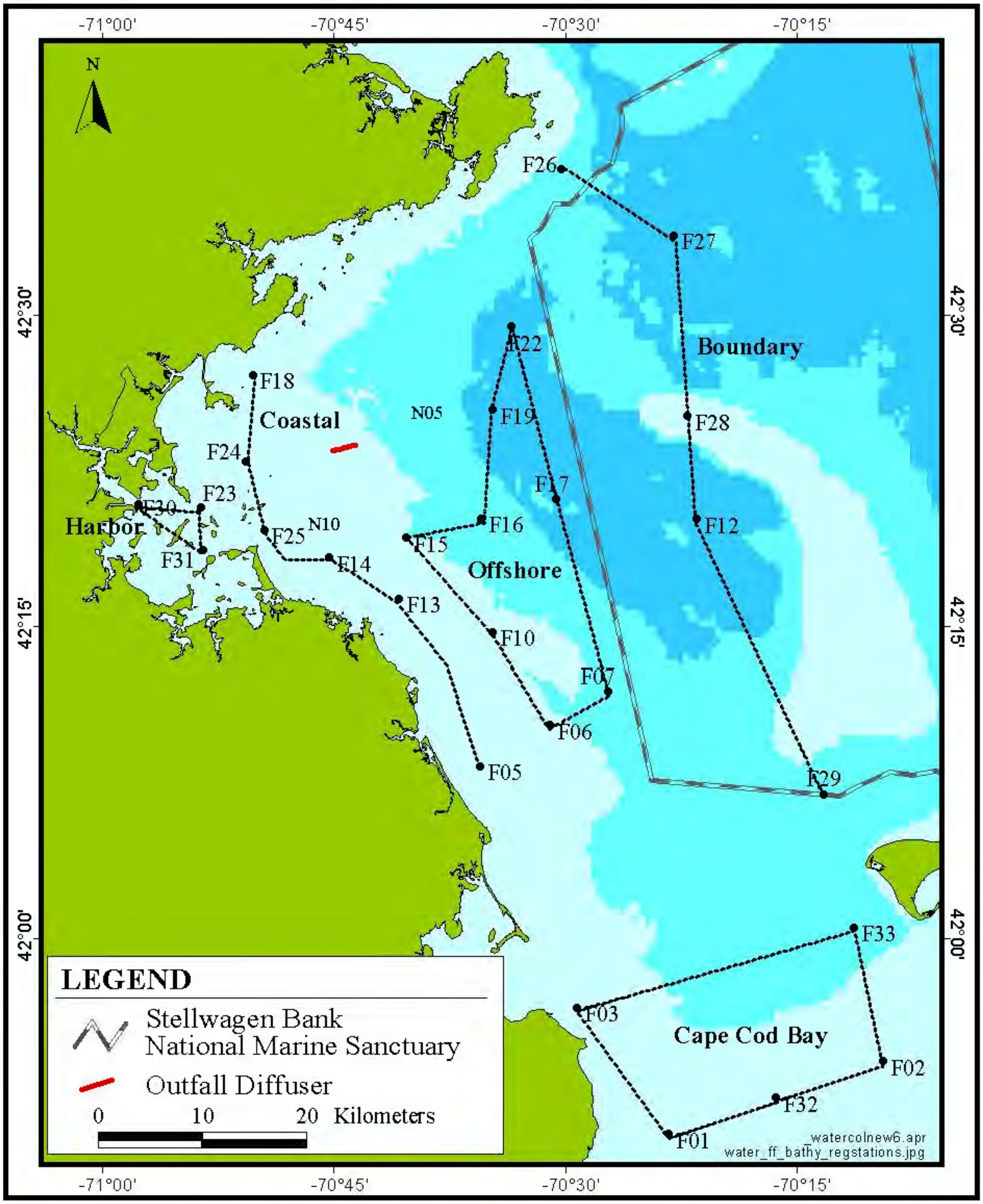


Figure 1-2. Locations of Farfield Stations and Regional Station Groupings

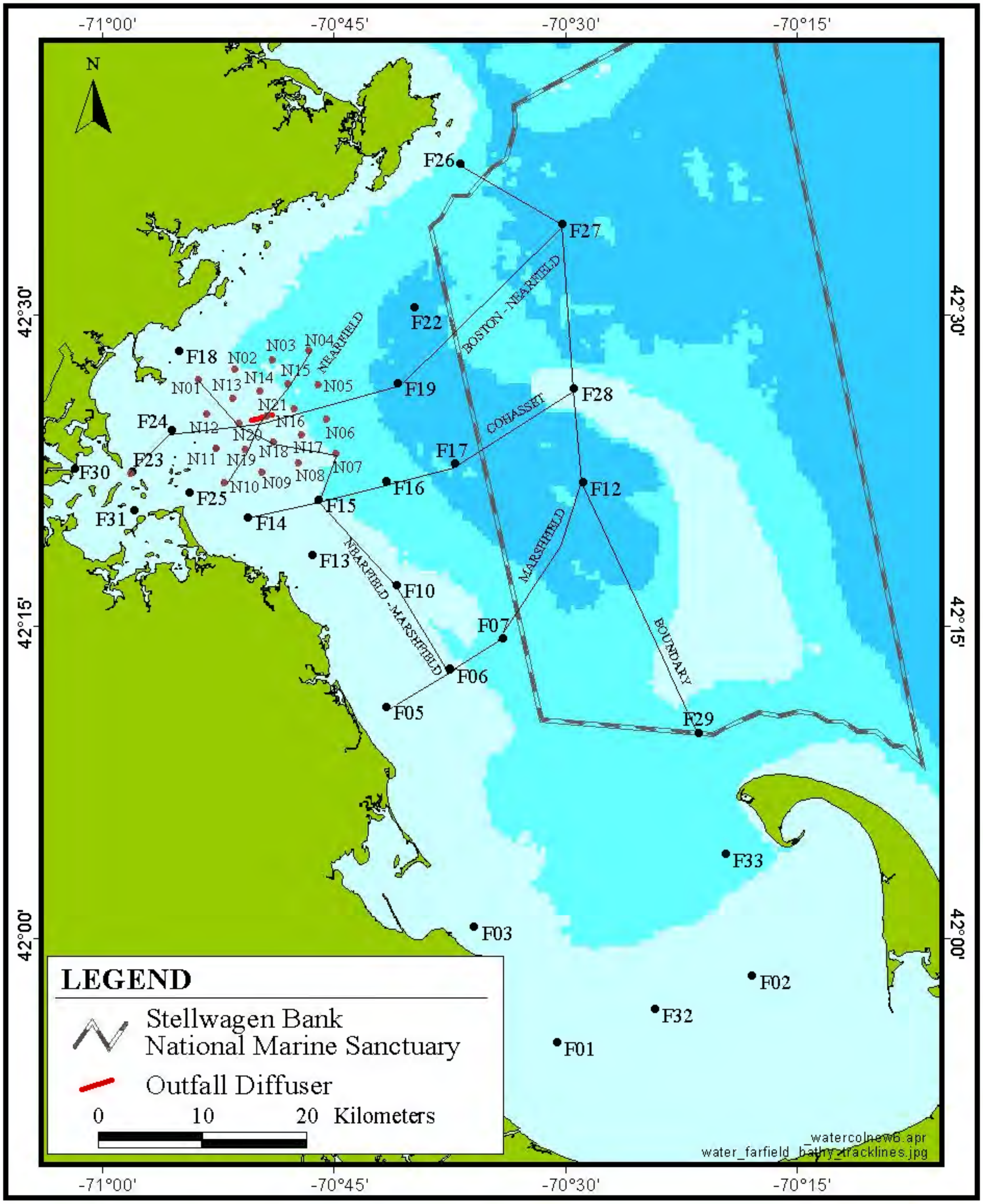


Figure 1-3. Locations of Stations and Selected Transects

2.0 METHODS

This section describes general methods of data collection and sampling for the last ten water column monitoring surveys of 2001. Section 2.1 describes data collection methods, including survey dates, sampling platforms, and analyses performed. Section 2.2 describes the sampling schema undertaken, and Section 2.3 details specific operations for the last 2001 semi-annual period. Specific details of field sampling and analytical procedures, laboratory sample processing and analysis, sample handling and custody, calibration and preventative maintenance, documentation, data evaluation, and data quality procedures are discussed in the Water Quality Monitoring CW/QAPP (Albro *et al.*, 2002). Details on productivity sampling procedures and analytical methods are also available in Appendix A.

2.1 Data Collection

The farfield and nearfield water quality surveys for 2001 represent a continuation of the water quality monitoring conducted from 1992 - 2000. On September 6, 2000, the offshore outfall went online and began discharging effluent. The baseline monitoring period includes surveys from February 1992 to September 1, 2000. The last 5 fall 2000 surveys represented the beginning of the outfall discharge monitoring period, which continued in 2001. The data collected during outfall discharge monitoring are evaluated internally and against baseline data. Data collection methods and schema have not changed from the baseline to the outfall discharge water quality monitoring periods.

Water quality data for this report were collected from the sampling platforms *R/V Aquamonitor* and *F/V Andrea J*. Continuous vertical profiles of the water column and discrete water samples were collected using a CTD/Go-Flo Bottle Rosette system. This system includes a deck unit to control the system, display *in situ* data, and store the data, and an underwater unit comprised of several environmental sensors, including conductivity, temperature, depth, dissolved oxygen, transmissometry, irradiance, and fluorescence. These measurements were obtained at each station by deploying the CTD; in general, one cast was made at each station. Water column profile data were collected during the downcast, and water samples were collected during the upcast by closing the Go-Flo bottles at selected depths, as discussed below.

Water samples were collected at five depths at each station, except at stations F30, F31, F32, and F33. Stations F30 and F31 are shallow and require only three depths while only zooplankton samples are collected at F32 and F33 (winter/spring surveys only). These depths were selected during CTD deployment based on positions relative to the pycnocline or subsurface chlorophyll maximum. The bottom depth (within 5 meters of the sea floor) and the surface depth (within 3 meters of the water surface) of each cast remained constant and the mid-bottom, middle and mid-surface depths were selected to represent any variability in the water column. In general, the selected middle depth corresponded with the chlorophyll maximum or pycnocline. When the chlorophyll maximum occurred significantly below or above the middle depth, the mid-bottom or mid-surface sampling event was substituted with the mid-depth sampling event and the "mid-depth" sample was collected within the maximum. In essence, the "mid-depth" sample in these instances was not collected from the middle depth, but shallower or deeper in the water column to capture the chlorophyll maximum layer. These nomenclature semantics result from a combination of field logistics and scientific relevance. In the field, the switching of the "mid-depth" sample with the mid-surface or mid-bottom was transparent to everyone except the NAVSAM operator who observed the subsurface chlorophyll structure and marked the events. The samples were processed in a consistent manner and a more comprehensive set of analyses was conducted for the surface, mid-depth/chlorophyll maximum, and bottom samples.

Samples from each depth at each station were collected by subsampling from the Go-Flo bottles into the appropriate sample container. Analyses performed on the water samples are summarized in Table 2-1. Samples for dissolved inorganic nutrients (DIN), dissolved organic carbon (DOC), total dissolved nitrogen (TDN) and phosphorus (TDP), particulate organic carbon (POC) and nitrogen (PON), biogenic silica, particulate phosphorus (PP), chlorophyll *a* and phaeopigments, total suspended solids (TSS), urea, and phytoplankton (screened and rapid assessment) were filtered and preserved immediately after obtaining water from the appropriate Go-Flo bottles. Whole water phytoplankton samples (unfiltered) were obtained directly from the Go-Flo bottles and immediately preserved. Zooplankton samples were obtained by deploying a zooplankton net overboard and making an oblique tow of the upper two-thirds of the water column but with a maximum tow depth of 30 meters. Productivity samples were collected from the Go-Flo bottles, stored on ice and transferred to University of Rhode Island (URI) employees. Incubation was started no more that six hours after initial water collection at URI's laboratory. Respiration samples were collected from the Go-Flo bottles at four stations (F19, F23, N04, and N18). Incubations of the dark bottles were started within 30 minutes of sample collection. The dark bottle samples were maintained at a temperature within 2°C of the collection temperature for five to seven days until analysis.

2.2 Sampling Schema

A synopsis of the sampling schema for the analyses described above is outlined in Tables 2-1, 2-2, and 2-3. Station designations were assigned according to the type of analyses performed at that station (see Table 2-1). Productivity and respiration analyses were also conducted at certain stations and represented by the letters P and R, respectively. Table 2-1 lists the different analyses performed at each station. Tables 2-2 (nearfield stations) and 2-3 (farfield stations) provide the station name and type, and show the analyses performed at each depth. Station N16 is considered both a nearfield station (where it is designated as type A) and a farfield station (where it is designated a type D). Stations F32 and F33 are occupied during the first three farfield surveys of each year and collect zooplankton samples and hydrocast data only (designated as type Z).

Table 2-1. Station Types and Numbers (Five Depths Collected Unless Otherwise Noted)

Station Type	A	D	E	F	G[1]	P	R[4]	Z
Number of Stations	6	10	24	2	2	3	1	2
Analysis Type								
Dissolved inorganic nutrients (NH_4, NO_3, NO_2, PO_4, and SiO_4)	●	●	●	●	●	●		
Other nutrients (DOC, TDN, TDP, PC, PN, PP, Biogenic Si)[1]	●	●			●	●		
Chlorophyll [1]	●	●			●	●		
Total suspended solids [1]	●	●			●	●		
Dissolved oxygen	●	●		●	●	●		
Phytoplankton, urea [2]		●			●	●		
Zooplankton[3]		●			●	●		●
Respiration [1]						●	●	
Productivity, DIC						●		

[1]Samples collected at three depths (bottom, mid-depth, and surface)
[2]Samples collected at two depths (mid-depth and surface)
[3]Vertical tow samples collected
[4]Respiration samples collected at type A station F19

2.3 Operations Summary

Field operations for water column sampling and analysis during the last 2001 semi-annual period were conducted as described above. Deviations from the CW/QAPP for surveys WN018, WN019, WN01D, WF01E, WN01F, WN01G and WN01H had no effect on the data or data interpretation. During survey WN01C, instrument problems were noted with the DO sensor. The instrumentation problem was corrected in the field for WN01C, but when investigated it was determined that all of the *in situ* DO data from WN01A and WF01B were suspect. For additional information about a specific survey, the individual survey reports may be consulted.

Table 2-2. Nearfield Water Column Sampling Plan (3 Pages)

Nearfield Water Column Sampling Plan

StationID	Depth (m)	Station Type	Depths	Total Volume at Depth (L)	Number of 9-L GoFlos	Dissolved Inorganic Nutrients	Dissolved Organic Carbon	Total Dissolved Nitrogen and Phosphorous	Particulate Organic Carbon and Nitrogen	Particulate Phosphorous	Biogenic silica	Chlorophyll a	Total Suspended Solids	Dissolved Oxygen	Rapid Analysis Phytoplankton	Whole Water Phytoplankton	Screened Water Phytoplankton	Zooplankton	Urea	Respiration	Photosynthesis by carbon-14	Dissolved Inorganic Carbon
			Protocol Code			IN	OC	NP	PC	PP	BS	CH	TS	DO	RP	WW	SW	ZO	UR	RE	AP	IC
			Volume (L)			1	0.1	0.1	1	0.6	0.3	0.5	1	1	4	1	4	1	0.1	1	1	1
			1_Bottom	8.5	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
N01	30	A	3_Mid-Depth	10	2	2	1	1	2	2	2	2	2	1								
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	8.5	2	1	1	1	2	2	2	1	2	1								
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N02	40	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N03	44	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	15.5	2	1	1	1	2	2	2	1	2							6	1	1
			2_Mid-Bottom	4.5	1	1						1		1							1	1
N04	50	D+	3_Mid-Depth	22.1	2	2	1	1	2	2	2	2	2			1	1		1	6	1	1
		R+	4_Mid-Surface	4.5	1	1						1		1							1	1
		P	5_Surface	20.6	2	1	1	1	2	2	2	1	2			1	1		1	6	1	1
			6_Net Tow															1				
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N05	55	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N06	52	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	10.5	2	1	1	1	2	2	2	1	2	3								
			2_Mid-Bottom	2.5	1	1						1		1								
N07	52	A	3_Mid-Depth	10	2	2	1	1	2	2	2	2	2	1								
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	10.5	2	1	1	1	2	2	2	1	2	3								
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N08	35	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																

Nearfield Water Column Sampling Plan

StationID	Depth (m)	Station Type	Depths	Total Volume at Depth (L)	Number of 9-L GoFlos	Dissolved Inorganic Nutrients	Dissolved Organic Carbon	Total Dissolved Nitrogen and Phosphorous	Particulate Organic Carbon and Nitrogen	Particulate Phosphorous	Biogenic silica	Chlorophyll a	Total Suspended Solids	Dissolved Oxygen	Rapid Analysis Phytoplankton	Whole Water Phytoplankton	Screened Water Phytoplankton	Zooplankton	Urea	Respiration	Photosynthesis by carbon-14	Dissolved Inorganic Carbon
			Protocol Code			IN	OC	NP	PC	PP	BS	CH	TS	DO	RP	WW	SW	ZO	UR	RE	AP	IC
			5_Surface	1	1	1																
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N09	32	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	8.5	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
N10	25	A	3_Mid-Depth	10	2	2	1	1	2	2	2	2	2	1								
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	8.5	2	1	1	1	2	2	2	1	2	1								
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N11	32	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N12	26	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N13	32	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N14	34	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N15	42	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	8.5	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
N16	40	A	3_Mid-Depth	10.2	2	2	2	2	2	2	2	2	2	1								
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	8.5	2	1	1	1	2	2	2	1	2	1								
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N17	36	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																

Nearfield Water Column Sampling Plan

StationID	Depth (m)	Station Type	Depths	Total Volume at Depth (L)	Number of 9-L GoFlos	Dissolved Inorganic Nutrients	Dissolved Organic Carbon	Total Dissolved Nitrogen and Phosphorous	Particulate Organic Carbon and Nitrogen	Particulate Phosphorous	Biogenic silica	Chlorophyll a	Total Suspended Solids	Dissolved Oxygen	Rapid Analysis Phytoplankton	Whole Water Phytoplankton	Screened Water Phytoplankton	Zooplankton	Urea	Respiration	Photosynthesis by carbon-14	Dissolved Inorganic Carbon
			Protocol Code			IN	OC	NP	PC	PP	BS	CH	TS	DO	RP	WW	SW	ZO	UR	RE	AP	IC
			5_Surface	1	1	1																
			1_Bottom	15.5	2	1	1	1	2	2	2	1	2							6	1	1
		D+	2_Mid-Bottom	4.5	1	1						1		1							1	1
N18	30	R+	3_Mid-Depth	26.1	3	1	1	1	2	2	2	2	2		1	1	1		1	6	1	2
		P	4_Mid-Surface	4.5	1	1						1		1							1	1
			5_Surface	20.6	2	1	1	1	2	2	2	1	2			1	1		1	6	1	1
			6_Net Tow															1				
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N19	24	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
			1_Bottom	8.5	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
N20	32	A	3_Mid-Depth	10	2	2	1	1	2	2	2	2	2	1								
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	8.5	2	1	1	1	2	2	2	1	2	1								
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
N21	34	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1																
				Totals		111	22	22	42	42	42	42	42	33	1	4	4	2	4	36	10	11
Blanks A									1	1	1	1	1									

Table 2-3. Farfield Water Column Sampling Plan (3 Pages)

Farfield Water Column Sampling Plan

StationID	Depth (m)	Station Type	Depths	Total Volume at Depth (L)	Number of 9-L GoFlos	Dissolved Inorganic Nutrients	Dissolved Organic Carbon	Total Dissolved Nitrogen and	Particulate Organic Carbon	Particulate Phosphorous	Biogenic silica	Chlorophyll a	Total Suspended Solids	Dissolved Oxygen	Secchi Disk Reading	Whole Water Phytoplankton	Screened Water Phytoplankton	Zooplankton	Urea	Respiration	Photosynthesis by carbon-14	Dissolved Inorganic Carbon
			Protocol Code			IN	OC	NP	PC	PP	BS	CH	TS	DO	SE	WW	SW	ZO	UR	RE	AP	IC
			Volume (L)			1	0.1	0.1	1	0.3	0.3	0.5	1	1	0	1	4	1	0.1	1	1	1
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	3								
			2_Mid-Bottom	2.5	1	1						1		1								
F01	27	D	3_Mid-Depth	14	2	1	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	3	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
F02	33	D	3_Mid-Depth	15	2	2	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	1	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F03	17	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F05	18	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	3								
			2_Mid-Bottom	2.5	1	1						1		1								
F06	35	D	3_Mid-Depth	15	2	2	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	3	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F07	54	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F10	30	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	4	1	1								1								
			2_Mid-Bottom	2	1	1								1								
F12	90	F	3_Mid-Depth	2	1	1								1								
			4_Mid-Surface	2	1	1								1								
			5_Surface	4	1	1								1	1							
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
F13	25	D	3_Mid-Depth	15	2	2	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								

Farfield Water Column Sampling Plan

StationID	Depth (m)	Station Type	Depths	Total Volume at Depth (L)	Number of 9-L GoFlos	Dissolved Inorganic Nutrients	Dissolved Organic Carbon	Total Dissolved Nitrogen and	Particulate Organic Carbon	Particulate Phosphorous	Biogenic silica	Chlorophyll a	Total Suspended Solids	Dissolved Oxygen	Secchi Disk Reading	Whole Water Phytoplankton	Screened Water Phytoplankton	Zooplankton	Urea	Respiration	Photosynthesis by carbon-14	Dissolved Inorganic Carbon
			Protocol Code			IN	OC	NP	PC	PP	BS	CH	TS	DO	SE	WW	SW	ZO	UR	RE	AP	IC
			5_Surface	13	2	1	1	1	2	2	2	1	2	1	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F14	20	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F15	39	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F16	60	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F17	78	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F18	24	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	7	2	1	1	1	2	2	2	1	2							6		
			2_Mid-Bottom	2	1	1						1		1								
F19	81	A	3_Mid-Depth	7	2	1	1	1	2	2	2	2	2							6		
		+R	4_Mid-Surface	2	1	1						1		1								
			5_Surface	7	2	1	1	1	2	2	2	1	2		1					6		
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	3								
			2_Mid-Bottom	2.5	1	1						1		1								
F22	80	D	3_Mid-Depth	14	2	1	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	3	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	18	3	1	1	1	2	2	2	1	2							6	1	1
		D	2_Mid-Bottom	8.5	1	1						1		1							1	2
F23	25	+R	3_Mid-Depth	24	3	1	1	1	2	2	2	2	2			1	1		1	6	1	1
		+P	4_Mid-Surface	7.5	1	1						1		1							1	1
			5_Surface	23	3	1	1	1	2	2	2	1	2		1	1	1		1	6	1	1
			6_Net Tow															1				
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	3								
			2_Mid-Bottom	2.5	1	1						1		1								
F24	20	D	3_Mid-Depth	14	2	1	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	3	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	9.9	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								

Farfield Water Column Sampling Plan

StationID	Depth (m)	Station Type	Depths	Total Volume at Depth (L)	Number of 9-L GoFlos	Dissolved Inorganic Nutrients	Dissolved Organic Carbon	Total Dissolved Nitrogen and	Particulate Organic Carbon	Particulate Phosphorous	Biogenic silica	Chlorophyll a	Total Suspended Solids	Dissolved Oxygen	Secchi Disk Reading	Whole Water Phytoplankton	Screened Water Phytoplankton	Zooplankton	Urea	Respiration	Photosynthesis by carbon-14	Dissolved Inorganic Carbon
			Protocol Code			IN	OC	NP	PC	PP	BS	CH	TS	DO	SE	WW	SW	ZO	UR	RE	AP	IC
F25	15	D	3_Mid-Depth	15	2	2	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	15	2	1	1	1	2	2	2	1	2	3	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
F26	56	D	3_Mid-Depth	15	2	1	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	1	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	7.9	2	1	1	1	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
F27	108	D	3_Mid-Depth	15	2	2	1	1	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	1	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	1	1	1																
			2_Mid-Bottom	1	1	1																
F28	33	E	3_Mid-Depth	1	1	1																
			4_Mid-Surface	1	1	1																
			5_Surface	1	1	1									1							
			1_Bottom	2	1	1								1								
			2_Mid-Bottom	2	1	1								1								
F29	66	F	3_Mid-Depth	2	1	1								1								
			4_Mid-Surface	2	1	1								1								
			5_Surface	2	1	1								1	1							
			1_Bottom	9.9	2	1	1	1	2	2	2	1	2	3								
			3_Mid-Depth	14	2	1	1	1	2	2	2	2	2	1		1	1		1			
F30	15	G	5_Surface	15	2	1	1	1	2	2	2	1	2	3	1	1	1		1			
			6_Net Tow															1				
			1_Bottom	9.9	2	1	1	1	2	2	2	1	2	3								
			3_Mid-Depth	14	2	1	1	1	2	2	2	2	2	1		1	1		1			
F31	15	G	5_Surface	15	2	1	1	1	2	2	2	1	2	3	1	1	1		1			
			6_Net Tow															1				
F32	30	Z	5_Surface												1							
			6_Net Tow															1				
F33	30	Z	5_Surface												1							
			6_Net Tow															1				
			1_Bottom	8.1	2	1	2	2	2	2	2	1	2	1								
			2_Mid-Bottom	2.5	1	1						1		1								
N16	40	D	3_Mid-Depth	15	2	2	2	2	2	2	2	2	2	1		1	1		1			
			4_Mid-Surface	2.5	1	1						1		1								
			5_Surface	13	2	1	1	1	2	2	2	1	2	1	1	1	1		1			
			6_Net Tow															1				
					Totals	132	44	44	84	84	84	80	84	96	28	26	26	15	26	36	5	6
			Blanks B						1	1	1	1	1									
			Blanks C						1	1	1	1	1									
			Blanks D						1	1	1	1	1									

3.0 DATA SUMMARY PRESENTATION

Data from each survey were compiled from the HOM Program 2001 database and organized to facilitate regional comparisons between surveys, and to allow a quick evaluation of results for evaluating monitoring thresholds (Table 3-1 Method Detection Limits and Survey Data Tables 3-2 through 3-11). Each table provides summary data from one survey. A discussion of which parameters were selected, how the data were grouped and integrated, and the assumptions behind the calculation of statistical values (average, minimum, and maximum) is provided below. Individual data summarized in this report are available from MWRA either in hard copy or electronic format.

The spatial pattern of data summary follows the sample design over major geographic areas of interest in Massachusetts Bay, Cape Cod Bay, and Boston Harbor (Section 3.1). Compilation of data both horizontally by region and vertically over the entire water column was conducted to provide an efficient way of assessing the status of the regions during a particular survey. Regional compilations of nutrient and biological water column data were conducted first by averaging individual laboratory replicates, followed by field duplicates, and then by station visit within a survey. Prior to regional compilation of the sensor data, the results were averaged by station visit. Significant figures for average values were selected based on precision of the specific data set. Detailed considerations for individual data sets are provided in the sections below.

3.1 Defined Geographic Areas

The primary partitioning of data is between the nearfield and farfield stations (Figures 1-1 and 1-2). Farfield data were additionally segmented into five geographic areas: stations in Boston Harbor (F23, F30, and F31), coastal stations (F05, F13, F14, F18, F24, F25), offshore stations (F06, F07, F10, F15, F16, F17, F19, and F22), boundary region stations (F12, F26, F27, F28, F29), and Cape Cod Bay stations (F01, F02, and F03; and F32 and F33 as appropriate). These regions are shown in Figure 1-2.

The data summary tables include data derived from all of the station data collected in each region. Average, maximum, and minimum values are reported from the cumulative horizontal and vertical dataset as described for each data type below.

3.2 Sensor Data

Six CTD profile parameters provided in the data summary tables include temperature, salinity, density (σ_t), fluorescence (chlorophyll a), transmissivity, and dissolved oxygen (DO) concentration. Statistical parameters (maximum, minimum, and average) were calculated from the sensor readings collected at five depths through the water column (defined as A-E). These depths were sampled on the upcast of the hydrographic profile. The five depth values, rather than the entire set of profile data, were selected to reduce the statistical weighting of deep-water data at the offshore and boundary stations. Generally, the samples were collected in an even depth-distributed pattern. The mid-depth sample (C) was typically located at the subsurface fluorescence (chlorophyll) peak in the water column, depending on the relative depth of the chlorophyll maximum. Details of the collection, calibration, and processing of CTD data are available in the Water Column Monitoring CW/QAPP (Albro *et al.,* 2002), and are summarized in Section 2.

Following standard oceanographic practice, patterns of variability in water density are described using the derived parameter sigma-*t* ($\sigma_{t,}$), which is calculated by subtracting 1,000 kg/m^3 from the recorded density. During this semi-annual period, density varied from 1021.8 to 1025.5, meaning σ_t varied from 21.8 to 25.5.

Fluorescence data were calibrated using concomitant extracted chlorophyll *a* data from discrete water samples collected at a subset of the stations (see CW/QAPP or Tables 2-1, 2-2, 2-3). The calibrated fluorescence sensor values were used for all discussions of chlorophyll in this report. The concentrations of phaeopigments are included in the summary data tables as part of the nutrient parameters.

In addition to DO concentration, the derived percent saturation was also provided. Percent saturation was calculated prior to averaging station visits from the potential saturation value of the water (a function of the physical properties of the water) and the calibrated DO concentration (see CW/QAPP).

Finally, the derived beam attenuation coefficient from the transmissometer ("transmittance") was provided on the summary tables. Beam attenuation is calculated from the natural logarithm of the ratio of light transmission relative to the initial light incidence, over the transmissometer path length, and is provided in units of m^{-1}.

3.3 Nutrients

Analytical results for dissolved and particulate nutrient concentrations were extracted from the HOM database, and include: ammonia (NH_4), nitrite (NO_2), nitrate + nitrite (NO_3+NO_2), phosphate (PO_4), silicate (SiO_4), biogenic silica (BSI), dissolved and particulate organic carbon (DOC and POC), total dissolved and particulate organic nitrogen (TDN and PON), total dissolved and particulate phosphorous (TDP and PP), and urea. Total suspended solids (TSS) data are provided as a baseline for total particulate matter in the water column. Dissolved inorganic nutrients (NH_4, NO_2, NO_3+NO_2, PO_4, and SiO_4) were measured from water samples collected from each of the five (A-E) depths during CTD casts. The dissolved organic and particulate constituents were measured from water samples collected from the surface (A), mid-depth (C), and bottom (E) sampling depths (see Tables 2-1, 2-2, and 2-3 for specific sampling depths and stations).

3.4 Biological Water Column Parameters

Four productivity parameters have been presented in the data summary tables. Areal production, which is determined by integrating the measured productivity over the photic zone, and depth-averaged chlorophyll-specific production are included for the productivity stations (F23 representing the Harbor, and N04 and N18, representing the nearfield). Because areal production is already depth-integrated, averages were calculated only among productivity stations for the two regions sampled. The derived parameters α $[mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}]$ and Pmax ($mgCm^{-3}h^{-1}$) are also included. The productivity parameters are discussed in detail in Appendix A.

Respiration rates were averaged over the respiration stations [the same Harbor and nearfield stations as productivity, and additionally one offshore station (F19)], and over the three water column depths sampled (surface, mid-depth and bottom). The respiration samples were collected concurrently with the productivity samples except at Station F19. Detailed methods of sample collection, processing, and analysis are available in the CW/QAPP (Albro *et al.,* 2002).

3.5 Plankton

Plankton results were extracted from the HOM database and include whole water phytoplankton, screened phytoplankton, and zooplankton. Phytoplankton samples were collected for whole-water and screened measurements during the water column CTD casts at the surface (A) and mid-depth (C) sampling events. As discussed in Section 2.1, when a subsurface chlorophyll maximum is observed, the mid-depth sampling event is associated with this layer. The screened phytoplankton samples were filtered through 20-μm Nitrex mesh to retain and concentrate larger dinoflagellate species. Zooplankton samples were collected by oblique tows using a 102-μm mesh at all plankton stations. Detailed methods of sample collection, processing, and analysis are available in the CW/QAPP (Albro *et al.*, 2002).

Final plankton values were derived from each station by first averaging analytical replicates, and then averaging station visits. Regional results were summarized for total phytoplankton, total centric diatoms, nuisance algae (*Alexandrium tamarense, Phaeocystis pouchetii*, and *Pseudo-nitzschia pungens*), and total zooplankton (Tables 3-2 through 3-10).

Results for total phytoplankton and centric diatoms reported in Tables 3-2 through 3-10 are restricted to whole water surface samples. Results of the nuisance species *Phaeocystis pouchetii* and *Pseudo-nitzschia pungens* include the maximum of both whole water and screened analyses, at both the surface and mid-depth. Although the size and shape of both taxa might allow them to pass through the Nitex screen, both have colonial forms that in low densities might be overlooked in the whole-water samples. For *Alexandrium tamarense*, only the screened sample data were reported.

3.6 Additional Data

Two additional data sources were utilized during interpretation of HOM Program semi-annual water column data. Sea surface temperature and SeaWiFS chlorophyll *a* satellite images collected near survey dates were preliminarily interpreted for evidence of surface water events, including intrusions of surface water masses from the Gulf of Maine, upwelling, and regional blooms (Appendix I). U.S. Geological Service continuous temperature and salinity data were collected from a mooring located between nearfield stations N21 and N18 (Figure 1-1). Hourly temperature and salinity data from mid-surface (6 m), mid-depth (13 m), mid-bottom (20 m) and near-bottom (1 m above bottom, 27 m) are plotted in Figure 3-1. Chlorophyll *a* data (as measured by *in situ* fluorescence) from the MWRA WetStar sensor mounted at mid-depth (13 m below surface) on the nearfield USGS mooring are plotted in Figure 3-2. Data from stations N18 and N21 are included in both figures for comparison.

Due to instrument failure, data from the 1-meter above bottom (27 m) array are only available through July 24, 2001. Data from all instruments from October 23 to December 2001 are not yet available, but will be included in the 2001 annual water column report.

Table 3-1. Method Detection Limits

Analysis	MDL
Dissolved ammonia (NH_4)	0.02 µM
Dissolved inorganic nitrate (NO_3)	0.01 µM
Dissolved inorganic nitrite (NO_2)	0.01 µM
Dissolved inorganic phosphorus (PO_4)	0.01 µM
Dissolved inorganic silicate (SIO_4)	0.02 µM
Dissolved organic carbon (DOC)	20 µM
Total dissolved nitrogen (TDN)	1.43 µM
Total dissolved phosphorus (TDP)	0.04 µM
Particulate carbon (POC)	5.27 µM
Particulate nitrogen (PON)	0.75 µM
Particulate phosphorus (PARTP)	0.04 µM
Biogenic silica (BIOSI)	0.32 µM
Urea	0.2 µM
Chlorophyll *a* and phaeophytin	0.036 µg L^{-1}
Total suspended solids (TSS)	0.1 mg L^{-1}

Table 3-2. Nearfield Survey WN018 (Jul 01) Data Summary

Region		Nearfield		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	5.55	15.26	9.02
Salinity	PSU	30.6	31.7	31.3
Sigma _T		22.7	25.0	24.2
Beam Attenuation	m^{-1}	0.51	2.41	0.96
DO Concentration	mgL^{-1}	9.03	11.63	9.95
DO Saturation	PCT	89.9	124.1	105.4
Fluorescence	μgL^{-1}	0.02	11.56	1.73
Chlorophyll a	μgL^{-1}	0.02	5.53	1.96
Phaeopigment	μgL^{-1}	0.02	1.73	0.59
Nutrients				
NH4	μM	0.25	22.01	3.44
NO2	μM	0.01	0.43	0.15
NO2+NO3	μM	0.04	3.18	0.96
PO4	μM	0.07	1.28	0.52
SIO4	μM	0.54	8.27	3.26
BIOSI	μM	0.80	2.50	1.53
DOC	μM	159.4	401.9	233.6
PARTP	μM	0.06	0.42	0.27
POC	μM	7.14	61.5	32.08
PON	μM	1.31	7.50	4.42
TDN	μM	11.5	28.3	17.5
TDP	μM	0.39	1.18	0.65
TSS	mgL^{-1}	0.38	1.50	0.83
Urea	μM	0.10	0.37	0.25
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.003	0.069	0.0432
Pmax	$mgCm^{-3}h^{-1}$	0.43	11.00	4.64
Areal Production	$mgCm^{-2}d^{-1}$	893.4	1,447.8	1,170.6
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	11.9	27.7	19.8
Respiration	μMO_2h^{-1}	0.021	0.224	0.132
Plankton				
Total Phytoplankton	10^6Cells L^{-1}	0.985	2.217	1.644
Centric diatoms	10^6Cells L^{-1}	0.156	0.587	0.342
Alexandrium spp.	Cells L^{-1}	2.6	2.6	2.6
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	ND	ND	ND
Total Zooplankton	Individuals m^{-3}	19,692	29,624	24,658

Table 3-3. Nearfield Survey WN019 (Jul 01) Data Summary

Region		Nearfield		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	5.47	19.12	9.09
Salinity	PSU	31.2	32.5	31.6
Sigma _T		22.1	25.5	24.4
Beam Attenuation	m^{-1}	0.49	3.80	0.96
DO Concentration	mgL^{-1}	8.98	11.16	9.75
DO Saturation	PCT	90.0	124.7	103.7
Fluorescence	μgL^{-1}	0.02	7.55	1.49
Chlorophyll a	μgL^{-1}	0.15	2.20	1.28
Phaeopigment	μgL^{-1}	0.02	1.39	0.49
Nutrients				
NH4	µM	0.20	23.33	3.15
NO2	µM	0.01	0.35	0.10
NO2+NO3	µM	0.01	3.95	1.17
PO4	µM	0.14	1.44	0.57
SIO4	µM	0.26	7.60	3.01
BIOSI	µM	0.60	1.90	1.32
DOC	µM	153.7	417.7	235.6
PARTP	µM	0.06	0.37	0.22
POC	µM	2.64	35.30	18.67
PON	µM	0.81	5.90	3.04
TDN	µM	13.1	76.0	22.8
TDP	µM	0.46	1.02	0.73
TSS	mgL^{-1}	0.16	0.95	0.70
Urea	µM	0.10	0.33	0.24
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.003	0.037	0.023
Pmax	$mgCm^{-3}h^{-1}$	0.15	4.97	2.64
Areal Production	$mgCm^{-2}d^{-1}$	311.8	666.6	489.2
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	5.2	18.2	11.7
Respiration	μMO_2h^{-1}	0.031	0.13	0.074
Plankton				
Total Phytoplankton	10^6Cells L^{-1}	1.726	4.493	3.290
Centric diatoms	10^6Cells L^{-1}	0.135	0.356	0.230
Alexandrium spp.	Cells L^{-1}	2.5	2.5	2.5
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	0.0014	0.0014	0.0014
Total Zooplankton	Individuals m^{-3}	15,270	45,356	30,313

Table 3-4. Nearfield Survey WN01A (Aug 01) Data Summary

Region		**Nearfield**		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	5.81	20.40	10.46
Salinity	PSU	31.1	31.8	31.5
Sigma _T		21.8	25.0	24.0
Beam Attenuation	m^{-1}	0.56	1.53	0.92
DO Concentration	mgL^{-1}			
DO Saturation	PCT			
Fluorescence	μgL^{-1}	0.02	2.75	0.86
Chlorophyll a	μgL^{-1}	0.10	2.38	0.84
Phaeopigment	μgL^{-1}	0.19	0.87	0.42
Nutrients				
NH4	µM	0.21	19.78	3.58
NO2	µM	0.01	0.48	0.13
NO2+NO3	µM	0.01	5.20	1.34
PO4	µM	0.19	1.39	0.61
SIO4	µM	1.01	7.05	3.46
BIOSI	µM	0.50	7.80	1.44
DOC	µM	167.3	550.6	332.6
PARTP	µM	0.07	0.36	0.18
POC	µM	7.42	40.50	19.90
PON	µM	1.24	5.11	3.03
TDN	µM	13.9	78.4	25.1
TDP	µM	0.39	1.64	0.82
TSS	mgL^{-1}	0.30	1.00	0.58
Urea	µM	0.60	1.69	1.08
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.002	0.069	0.026
Pmax	$mgCm^{-3}h^{-1}$	0.19	5.10	2.30
Areal Production	$mgCm^{-2}d^{-1}$	727.1	748.6	737.9
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	17.0	34.8	25.9
Respiration	μMO_2h^{-1}	0.021	0.174	0.072
Plankton				
Total Phytoplankton	10^6Cells L^{-1}	0.801	2.184	1.645
Centric diatoms	10^6Cells L^{-1}	0.039	0.086	0.057
Alexandrium spp.	Cells L^{-1}	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	ND	ND	ND
Total Zooplankton	Individuals m^{-3}	47,276	50,494	48,885

Table 3-5. Combined Farfield/Nearfield Survey WF01B (Aug 01) Data Summary

		Farfield								
Region		**Boundary**			**Cape Cod Bay**			**Coastal**		
Parameter	**Unit**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**
In Situ										
Temperature	°C	4.88	18.66	9.57	7.08	19.05	12.63	9.12	18.06	14.01
Salinity	PSU	31.3	32.2	31.8	31.3	31.7	31.5	31.2	31.6	31.4
Sigma _T		22.4	25.4	24.4	22.2	24.8	23.7	22.4	24.5	23.3
Beam Attenuation	m^{-1}	0.60	1.49	0.95	0.84	1.96	1.46	0.88	2.34	1.62
DO Concentration	mgL^{-1}									
DO Saturation	PCT									
Fluorescence	μgL^{-1}	0.02	4.45	0.91	0.27	6.95	2.63	0.54	6.33	2.96
Chlorophyll a	μgL^{-1}	0.05	2.26	1.04	0.36	2.51	1.43	0.64	3.96	2.35
Phaeopigment	μgL^{-1}	0.12	1.54	0.81	0.40	2.07	1.11	1.17	4.24	1.91
Nutrients										
NH4	µM	0.15	3.38	0.94	0.12	4.75	1.32	0.09	3.10	1.43
NO2	µM	0.01	0.37	0.18	0.01	0.24	0.09	0.01	0.23	0.08
NO2+NO3	µM	0.02	9.77	4.39	0.02	2.29	0.70	0.02	2.24	0.68
PO4	µM	0.22	1.16	0.71	0.07	0.95	0.47	0.20	0.73	0.47
SIO4	µM	1.11	14.37	6.29	1.01	11.34	3.96	1.01	6.76	3.31
BIOSI	µM	0.50	1.30	0.95	0.40	1.70	1.12	1.40	3.80	2.76
DOC	µM	127.4	278.3	218.5	137.6	172.0	154.5	156.5	257.3	196.8
PARTP	µM	0.07	0.23	0.15	0.18	0.35	0.27	0.13	0.44	0.31
POC	µM	11.90	29.90	24.78	22.10	41.00	33.32	20.80	42.20	33.82
PON	µM	2.26	6.04	4.18	3.89	5.26	4.78	3.24	6.66	5.18
TDN	µM	13.2	18.9	15.9	11.7	15.5	13.1	13.5	17.3	15.0
TDP	µM	0.54	1.08	0.76	0.53	0.99	0.80	0.54	0.85	0.72
TSS	mgL^{-1}	0.26	0.89	0.55	0.68	1.07	0.84	0.80	1.87	1.26
Urea	µM	0.10	0.40	0.25	0.10	0.37	0.17	0.10	0.68	0.35
Productivity										
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$									
Pmax	$mgCm^{-3}h^{-1}$									
Areal Production	$mgCm^{-2}d^{-1}$									
Depth-averaged Chlorophyll-specific Production	$mgC(mg Chla)^{-1}d^{-1}$									
Respiration	μMO_2h^{-1}									
Plankton										
Total Phytoplankton	10^6Cells L^{-1}	0.874	1.941	1.214	1.932	2.986	2.415	0.674	3.837	2.394
Centric diatoms	10^6Cells L^{-1}	0.025	0.374	0.146	0.150	0.455	0.301	0.037	1.239	0.741
Alexandrium spp.	Cells L^{-1}	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND	ND	ND	ND	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Zooplankton	Individuals m^{-3}	23,941	77,075	50,508	60,863	79,389	70,126	32,589	62,987	49,807

Table 3-5. Combined Farfield/Nearfield Survey WF01B (Aug 01) Data Summary (continued)

Region		Farfield								
		Harbor			Offshore			Nearfield		
Parameter	Unit	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
In Situ										
Temperature	°C	11.94	17.85	15.06	5.68	19.10	10.02	6.14	18.40	12.03
Salinity	PSU	30.6	31.5	31.2	31.3	32.1	31.7	31.3	32.0	31.6
Sigma _T		21.9	23.8	23.0	22.2	25.3	24.3	22.4	25.1	23.9
Beam Attenuation	m^{-1}	1.50	2.34	1.87	0.59	2.09	1.00	0.58	2.24	1.10
DO Concentration	mgL^{-1}									
DO Saturation	PCT									
Fluorescence	μgL^{-1}	0.11	3.39	2.29	0.02	5.01	1.28	0.02	8.21	1.55
Chlorophyll a	μgL^{-1}	1.79	4.56	3.12	0.08	2.59	1.11	0.15	4.94	1.44
Phaeopigment	μgL^{-1}	1.01	2.66	1.92	0.16	1.90	0.84	0.34	2.72	1.06
Nutrients										
NH4	µM	0.67	4.06	1.61	0.20	7.20	1.72	0.11	12.04	1.89
NO2	µM	0.09	0.16	0.12	0.01	0.49	0.19	0.01	0.65	0.26
NO2+NO3	µM	0.10	1.27	0.62	0.02	9.74	4.24	0.02	7.71	2.05
PO4	µM	0.51	0.66	0.61	0.12	0.99	0.66	0.16	0.97	0.56
SIO4	µM	2.65	8.57	4.06	0.76	8.19	4.72	0.01	15.32	4.73
BIOSI	µM	3.00	4.80	3.92	0.40	1.30	0.91	0.16	4.40	1.09
DOC	µM	166.4	284.8	208.3	122.0	221.7	159.0	127.6	457.1	193.9
PARTP	µM	0.27	0.43	0.36	0.08	0.31	0.18	0.07	0.43	0.23
POC	µM	22.80	34.60	30.27	8.08	35.30	19.65	7.38	49.00	23.45
PON	µM	3.92	6.06	5.32	1.30	5.38	3.01	1.32	7.50	3.80
TDN	µM	11.3	17.5	15.2	11.2	20.6	15.2	12.1	23.5	15.5
TDP	µM	0.72	0.96	0.82	0.41	1.06	0.78	0.40	1.07	0.75
TSS	mgL^{-1}	1.27	3.16	2.01	0.30	1.26	0.57	0.22	3.16	0.77
Urea	µM	0.10	0.61	0.22	0.33	0.47	0.40	0.10	1.03	0.38
Productivity										
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.076	0.117	0.098				0.019	0.124	0.047
Pmax	$mgCm^{-3}h^{-1}$	7.81	20.93	13.52				1.43	12.82	3.99
Areal Production	$mgCm^{-2}d^{-1}$			1998.6				608.3	1534.4	1071.4
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$			23.0				12.4	55.7	34.1
Respiration	μMO_2h^{-1}	0.075	0.159	0.120	0.090	0.248	0.170	0.085	0.152	0.123
Plankton										
Total Phytoplankton	$10^6 Cells\ L^{-1}$	1.440	2.835	2.399	1.393	2.266	1.835	0.600	2.603	1.624
Centric diatoms	$10^6 Cells\ L^{-1}$	0.420	1.266	0.929	0.022	0.230	0.126	0.013	0.254	0.119
Alexandrium spp.	$Cells\ L^{-1}$	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phaeocystis pouchetii	$10^6 Cells\ L^{-1}$	ND	ND	ND	ND	ND	ND	ND	ND	ND
Psuedo-nitzschia pungens	$10^6 Cells\ L^{-1}$	ND	ND	ND	ND	ND	ND	0.0011	0.0011	0.0011
Total Zooplankton	$Individuals\ m^{-3}$	33,280	74,165	53,053	58,623	74,175	66,399	40,583	104,237	63,145

Table 3-6. Nearfield Survey WN01C (Sep 01) Data Summary

Region		**Nearfield**		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	6.67	17.21	12.51
Salinity	PSU	31.3	32.2	31.7
Sigma _T		22.9	25.2	23.9
Beam Attenuation	m^{-1}	0.43	1.90	1.00
DO Concentration	mgL^{-1}	7.58	9.47	8.43
DO Saturation	PCT	77.1	114.1	97.0
Fluorescence	μgL^{-1}	0.02	5.86	1.61
Chlorophyll a	μgL^{-1}	0.18	4.27	1.97
Phaeopigment	μgL^{-1}	0.21	2.50	0.89
Nutrients				
NH4	µM	0.20	24.31	3.07
NO2	µM	0.01	0.32	0.13
NO2+NO3	µM	0.01	9.87	4.01
PO4	µM	0.11	1.77	0.76
SIO4	µM	0.60	10.25	5.11
BIOSI	µM	0.80	4.70	2.33
DOC	µM	111.9	226.8	157.1
PARTP	µM	0.09	0.50	0.30
POC	µM	6.29	54.80	29.97
PON	µM	0.91	6.96	4.37
TDN	µM	10.2	37.6	16.3
TDP	µM	0.41	1.57	0.90
TSS	mgL^{-1}	0.31	2.98	1.20
Urea	µM	0.10	0.22	0.13
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.003	0.107	0.040
Pmax	$mgCm^{-3}h^{-1}$	0.27	10.48	3.12
Areal Production	$mgCm^{-2}d^{-1}$	593.1	1030.2	811.7
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	11.4	57.6	34.5
Respiration	μMO_2h^{-1}	0.012	0.160	0.097
Plankton				
Total Phytoplankton	$10^6Cells\ L^{-1}$	0.778	1.673	1.288
Centric diatoms	$10^6Cells\ L^{-1}$	0.144	0.396	0.288
Alexandrium spp.	$Cells\ L^{-1}$	ND	ND	ND
Phaeocystis pouchetii	$10^6Cells\ L^{-1}$	ND	ND	ND
Psuedo-nitzschia pungens	$10^6Cells\ L^{-1}$	0.0032	0.0051	0.0044
Total Zooplankton	$Individuals\ m^{-3}$	31,230	36,776	34,003

Table 3-7. Nearfield Survey WN01D (Oct 01) Data Summary

Region		**Nearfield**		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	7.81	13.47	11.98
Salinity	PSU	31.3	32.2	31.9
Sigma _T		23.6	25.1	24.1
Beam Attenuation	m^{-1}	0.63	1.56	1.02
DO Concentration	mgL^{-1}	7.22	9.30	8.39
DO Saturation	PCT	74.6	108.3	96.4
Fluorescence	μgL^{-1}	0.01	6.79	2.68
Chlorophyll a	μgL^{-1}	0.28	5.57	2.71
Phaeopigment	μgL^{-1}	0.38	2.24	1.05
Nutrients				
NH4	µM	0.26	10.84	1.63
NO2	µM	0.01	0.29	0.11
NO2+NO3	µM	0.01	9.71	2.59
PO4	µM	0.22	1.78	0.61
SIO4	µM	1.45	9.77	3.84
BIOSI	µM	0.38	3.49	1.73
DOC	µM	120.0	203.9	156.2
PARTP	µM	0.10	0.33	0.23
POC	µM	8.92	41.00	24.11
PON	µM	1.66	6.00	3.97
TDN	µM	10.3	85.9	20.4
TDP	µM	0.64	1.19	0.85
TSS	mgL^{-1}	0.36	1.57	0.82
Urea	µM	0.10	0.32	0.18
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.016	0.189	0.126
Pmax	$mgCm^{-3}h^{-1}$	2.03	17.96	12.49
Areal Production	$mgCm^{-2}d^{-1}$	2699.9	2713.6	2706.8
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	15.2	35.6	25.4
Respiration	μMO_2h^{-1}	0.047	0.193	0.125
Plankton				
Total Phytoplankton	10^6Cells L^{-1}	1.097	2.416	1.837
Centric diatoms	10^6Cells L^{-1}	0.181	0.366	0.267
Alexandrium spp.	Cells L^{-1}	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	0.0014	0.0359	0.0122
Total Zooplankton	Individuals m^{-3}	14,719	17,684	16,201

Table 3-8. Combined Farfield/Nearfield Survey WF01E (Oct 01) Data Summary

		Farfield								
Region		**Boundary**			**Cape Cod Bay**			**Coastal**		
Parameter	**Unit**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**
In Situ										
Temperature	°C	6.98	12.58	10.57	10.95	13.61	12.69	8.52	12.08	10.68
Salinity	PSU	30.9	32.6	32.0	30.6	32.6	31.6	31.8	32.6	32.1
Sigma _T		23.4	25.5	24.5	22.9	24.8	23.8	24.1	25.0	24.6
Beam Attenuation	m^{-1}	0.38	1.05	0.69	0.64	1.37	1.03	0.66	2.15	1.16
DO Concentration	mgL^{-1}	7.56	9.40	8.54	7.61	8.87	8.52	7.24	10.61	8.33
DO Saturation	PCT	77.5	108.0	94.3	84.3	102.7	97.9	77.3	118.6	92.1
Fluorescence	μgL^{-1}	0.12	4.60	1.54	0.75	4.73	2.61	0.43	11.03	2.89
Chlorophyll a	μgL^{-1}	0.06	3.49	1.66	1.04	3.21	2.14	0.74	4.69	2.14
Phaeopigment	μgL^{-1}	0.18	1.70	0.78	0.56	2.21	1.22	0.48	1.89	1.13
Nutrients										
NH4	µM	0.13	1.55	0.82	0.44	1.86	1.19	0.50	6.00	1.76
NO2	µM	0.01	0.21	0.10	0.01	0.23	0.11	0.16	0.39	0.30
NO2+NO3	µM	0.01	11.03	3.88	0.02	3.36	1.38	1.53	9.47	5.39
PO4	µM	0.28	1.09	0.62	0.25	0.65	0.46	0.48	1.09	0.81
SIO4	µM	2.85	11.14	5.33	2.09	6.86	4.30	4.37	10.01	7.14
BIOSI	µM	0.67	1.65	1.11	0.77	2.99	1.31	1.48	2.78	2.27
DOC	µM	113.5	209.1	147.0	180.3	263.2	213.0	120.2	214.9	146.7
PARTP	µM	0.07	0.27	0.18	0.25	0.30	0.27	0.15	0.27	0.19
POC	µM	5.76	32.60	24.34	19.40	33.30	26.40	13.70	31.10	18.56
PON	µM	1.06	4.66	3.75	2.97	4.99	4.23	2.19	4.54	3.05
TDN	µM	9.94	20.83	14.79	13.63	89.47	40.08	16.90	22.18	19.57
TDP	µM	0.65	1.22	0.90	0.58	1.01	0.77	1.02	1.36	1.19
TSS	mgL^{-1}	0.23	0.82	0.49	0.51	1.28	0.74	0.65	1.70	1.18
Urea	µM	0.10	0.10	0.10	0.10	0.25	0.14	0.10	0.10	0.10
Productivity										
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$									
Pmax	$mgCm^{-3}h^{-1}$									
Areal Production	$mgCm^{-2}d^{-1}$									
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$									
Respiration	μMO_2h^{-1}									
Plankton										
Total Phytoplankton	10^6Cells L^{-1}	1.478	1.994	1.666	1.194	1.887	1.559	0.831	1.775	1.247
Centric diatoms	10^6Cells L^{-1}	0.234	0.362	0.299	0.109	0.226	0.178	0.272	0.739	0.417
Alexandrium spp.	Cells L^{-1}	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND	ND	ND	ND	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	0.0035	0.0086	0.0061	0.0021	0.0084	0.0045	0.0004	0.0045	0.0024
Total Zooplankton	Individuals m^{-3}	18,085	28,073	23,079	31,810	76,747	54,279	16,051	48,407	32,349

Table 3-8. Combined Farfield/Nearfield Survey WF01E (Oct 01) Data Summary (continued)

		Farfield								
Region		**Harbor**			**Offshore**			**Nearfield**		
Parameter	**Unit**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**
In Situ										
Temperature	°C	10.72	12.18	11.56	7.10	13.09	10.05	7.15	12.38	10.07
Salinity	PSU	30.6	32.1	31.5	31.6	32.5	32.0	31.7	32.4	32.0
Sigma _T		23.2	24.5	24.0	23.9	25.4	24.6	24.2	25.3	24.6
Beam Attenuation	m^{-1}	1.13	1.84	1.63	0.42	1.56	0.85	0.50	1.63	0.97
DO Concentration	mgL^{-1}	8.02	8.40	8.21	7.35	9.72	8.34	7.21	9.78	8.27
DO Saturation	PCT	88.4	93.5	92.1	75.0	110.3	91.1	74.7	111.5	90.4
Fluorescence	μgL^{-1}	1.49	2.18	1.66	0.01	6.97	2.20	0.14	7.99	2.09
Chlorophyll a	μgL^{-1}	1.51	2.28	1.97	0.09	4.79	2.17	0.15	6.04	2.12
Phaeopigment	μgL^{-1}	0.90	1.60	1.19	0.18	2.44	1.20	0.27	3.18	1.16
Nutrients										
NH4	µM	1.15	5.13	3.18	0.19	3.54	0.95	0.18	26.73	1.62
NO2	µM	0.01	0.37	0.26	0.01	0.34	0.13	0.01	0.37	0.23
NO2+NO3	µM	5.16	6.75	5.63	0.02	11.34	5.15	0.02	11.77	6.17
PO4	µM	0.83	1.35	1.01	0.39	1.62	0.80	0.45	2.31	0.86
SIO4	µM	6.83	10.68	7.82	2.76	13.32	7.06	2.84	13.26	7.12
BIOSI	µM	2.53	4.05	3.21	0.66	2.17	1.46	1.01	2.74	1.87
DOC	µM	133.2	208.7	166.5	98.7	223.6	148.6	103.6	297.9	153.6
PARTP	µM	0.22	0.38	0.29	0.10	0.38	0.24	0.09	0.40	0.22
POC	µM	16.20	29.10	21.77	7.96	42.50	25.01	8.28	48.90	23.97
PON	µM	3.23	4.19	3.73	1.61	5.86	3.99	1.32	7.21	3.76
TDN	µM	16.73	24.20	20.69	10.32	21.09	14.70	9.57	21.13	16.15
TDP	µM	1.23	1.52	1.35	0.73	1.30	0.94	0.69	1.41	1.06
TSS	mgL^{-1}	1.65	2.77	2.12	0.32	2.20	0.82	0.50	1.31	0.89
Urea	µM	0.10	0.25	0.18	0.10	0.10	0.10	0.10	0.10	0.10
Productivity										
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.064	0.106	0.090				0.010	0.245	0.123
Pmax	$mgCm^{-3}h^{-1}$	9.58	10.65	10.33				1.19	23.81	11.14
Areal Production	$mgCm^{-2}d^{-1}$			702.9				1469.2	1922.1	1695.7
Depth-averaged Chlorophyll-specific Production	$mgC(mg Chla)^{-1}d^{-1}$			13.2				9.9	21.4	15.6
Respiration	μMO_2h^{-1}	0.016	0.175	0.093	0.045	0.095	0.070	0.014	0.110	0.069
Plankton										
Total Phytoplankton	10^6Cells L^{-1}	0.812	1.368	1.183	1.344	2.612	2.121	1.200	2.236	1.823
Centric diatoms	10^6Cells L^{-1}	0.243	0.422	0.307	0.263	0.479	0.391	0.235	0.799	0.471
Alexandrium spp.	Cells L^{-1}	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND	ND	ND	ND	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	0.0007	0.0112	0.0047	0.0030	0.0124	0.0062	0.0045	0.0090	0.0072
Total Zooplankton	Individuals m^{-3}	9,120	17,884	14,920	33,430	46,820	40,125	20,114	33,106	26,349

Table 3-9. Nearfield Survey WN01F (Oct 01) Data Summary

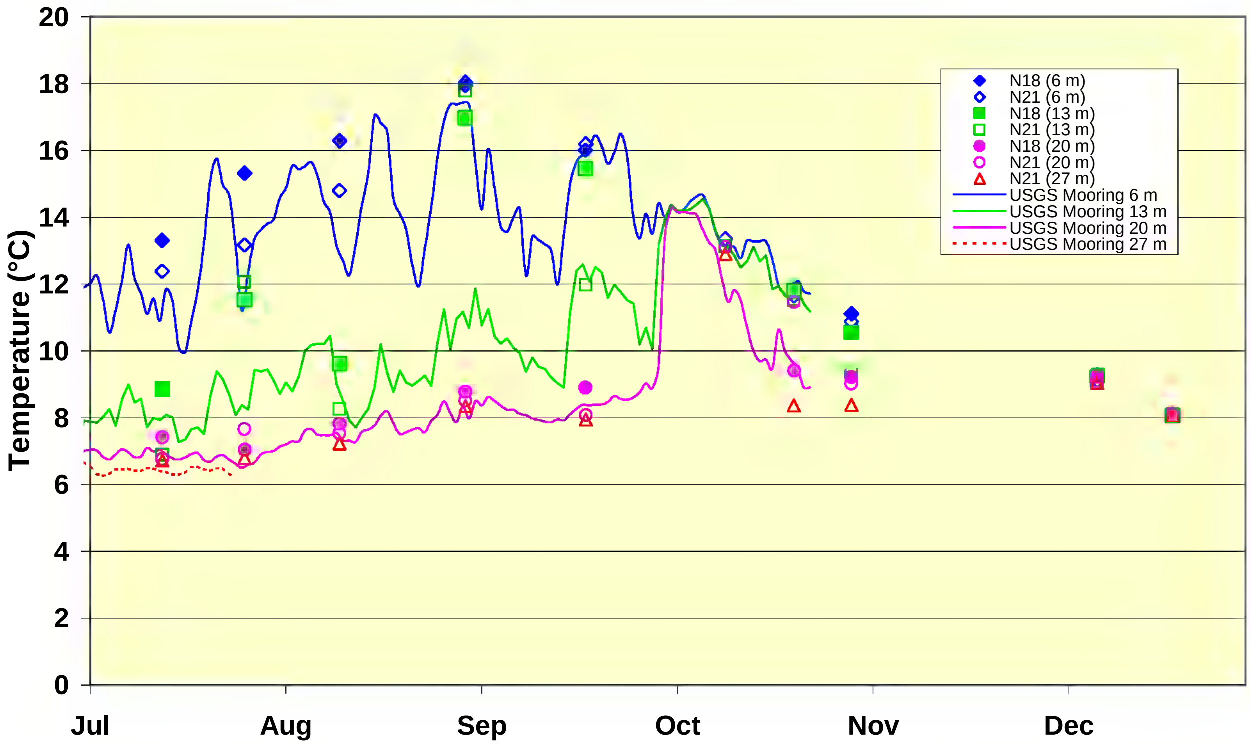
Region		Nearfield		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	7.78	11.92	10.01
Salinity	PSU	30.9	32.5	32.0
Sigma _T		23.8	25.4	24.6
Beam Attenuation	m^{-1}	0.46	1.54	1.06
DO Concentration	mgL^{-1}	7.03	10.04	8.84
DO Saturation	PCT	73.1	111.6	96.4
Fluorescence	μgL^{-1}	0.00	6.36	2.98
Chlorophyll a	μgL^{-1}	0.14	5.08	3.29
Phaeopigment	μgL^{-1}	0.31	5.18	2.20
Nutrients				
NH4	µM	0.08	13.94	1.82
NO2	µM	0.01	0.41	0.19
NO2+NO3	µM	0.05	11.18	4.68
PO4	µM	0.30	1.56	0.77
SIO4	µM	3.52	12.17	7.29
BIOSI	µM	1.13	3.41	2.08
DOC	µM	140.9	242.4	174.6
PARTP	µM	0.07	0.40	0.28
POC	µM	6.74	46.20	30.25
PON	µM	1.19	7.06	4.92
TDN	µM	10.7	49.5	24.7
TDP	µM	0.75	1.38	0.98
TSS	mgL^{-1}	0.62	1.27	0.93
Urea	µM	0.10	0.10	0.10
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.004	0.270	0.113
Pmax	$mgCm^{-3}h^{-1}$	0.30	23.71	9.84
Areal Production	$mgCm^{-2}d^{-1}$	1525.0	2360.1	1942.6
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	11.1	23.7	17.4
Respiration	μMO_2h^{-1}	0.038	0.147	0.111
Plankton				
Total Phytoplankton	10^6Cells L^{-1}	1.351	3.257	2.439
Centric diatoms	10^6Cells L^{-1}	0.197	0.860	0.397
Alexandrium spp.	Cells L^{-1}	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	0.0026	0.0082	0.0051
Total Zooplankton	Individuals m^{-3}	22,930	34,651	28,790

Table 3-10. Nearfield Survey WN01G (Dec 01) Data Summary

Region		**Nearfield**		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	8.23	9.43	8.93
Salinity	PSU	31.1	32.7	32.2
Sigma _T		24.1	25.4	25.0
Beam Attenuation	m^{-1}	0.79	1.49	1.18
DO Concentration	mgL^{-1}	6.99	10.09	8.89
DO Saturation	PCT	73.3	108.4	94.5
Fluorescence	μgL^{-1}	0.02	11.15	4.44
Chlorophyll a	μgL^{-1}	0.19	11.20	4.86
Phaeopigment	μgL^{-1}	0.23	12.59	1.74
Nutrients				
NH4	μM	0.27	20.90	3.84
NO2	μM	0.10	0.55	0.30
NO2+NO3	μM	0.24	11.82	5.09
PO4	μM	0.45	1.57	0.89
SIO4	μM	0.57	14.67	5.30
BIOSI	μM	1.00	6.10	4.16
DOC	μM	109.3	233.7	161.4
PARTP	μM	0.10	0.39	0.28
POC	μM	14.8	88.3	44.8
PON	μM	1.49	8.93	5.37
TDN	μM	11.9	45.0	21.9
TDP	μM	0.68	1.87	1.05
TSS	mgL^{-1}	0.85	2.19	1.35
Urea	μM	0.28	0.39	0.32
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.009	0.334	0.244
Pmax	$mgCm^{-3}h^{-1}$	1.18	30.60	22.35
Areal Production	$mgCm^{-2}d^{-1}$	3250.4	3263.5	3257.0
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	15.3	22.5	18.9
Respiration	μMO_2h^{-1}	0.019	0.128	0.081
Plankton				
Total Phytoplankton	10^6Cells L^{-1}	1.225	2.086	1.671
Centric diatoms	10^6Cells L^{-1}	0.479	1.096	0.849
Alexandrium spp.	Cells L^{-1}	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	0.0056	0.0078	0.0067
Total Zooplankton	Individuals m^{-3}	23,515	43,055	33,285

Table 3-11. Nearfield Survey WN01H (Dec 01) Data Summary

Region		**Nearfield**		
Parameter	**Unit**	**Min**	**Max**	**Avg**
In Situ				
Temperature	°C	7.65	8.26	8.05
Salinity	PSU	32.0	32.4	32.1
Sigma _T		24.9	25.2	25.0
Beam Attenuation	m^{-1}	0.79	1.19	0.96
DO Concentration	mgL^{-1}	8.25	9.84	9.59
DO Saturation	PCT	86.4	101.5	99.8
Fluorescence	μgL^{-1}	0.50	3.70	1.96
Chlorophyll a	μgL^{-1}	0.80	2.94	2.01
Phaeopigment	μgL^{-1}	0.34	2.53	0.71
Nutrients				
NH4	μM	0.55	6.57	2.59
NO2	μM	0.18	0.39	0.26
NO2+NO3	μM	4.45	9.24	5.26
PO4	μM	0.68	1.09	0.90
SIO4	μM	3.56	9.44	4.83
BIOSI	μM	1.20	2.60	1.60
DOC	μM	119.5	249.7	170.6
PARTP	μM	0.15	0.27	0.21
POC	μM	11.9	28.3	19.1
PON	μM	2.24	5.16	3.02
TDN	μM	14.7	44.3	20.1
TDP	μM	1.04	1.33	1.17
TSS	mgL^{-1}	0.66	1.37	0.99
Urea	μM	0.10	0.42	0.18
Productivity				
Alpha	$mgCm^{-3}h^{-1}(\mu Em^{-2}s^{-1})^{-1}$	0.047	0.091	0.067
Pmax	$mgCm^{-3}h^{-1}$	4.93	8.65	6.91
Areal Production	$mgCm^{-2}d^{-1}$	621.3	780.9	701.1
Depth-averaged Chlorophyll-specific Production	$mgC(mg\ Chla)^{-1}d^{-1}$	8.9	23.0	15.9
Respiration	μMO_2h^{-1}	0.028	0.087	0.071
Plankton				
Total Phytoplankton	10^6Cells L^{-1}	0.491	0.784	0.662
Centric diatoms	10^6Cells L^{-1}	0.155	0.234	0.205
Alexandrium spp.	Cells L^{-1}	ND	ND	ND
Phaeocystis pouchetii	10^6Cells L^{-1}	ND	ND	ND
Psuedo-nitzschia pungens	10^6Cells L^{-1}	0.0026	0.0146	0.0076
Total Zooplankton	Individuals m^{-3}	15,801	30,539	23,170



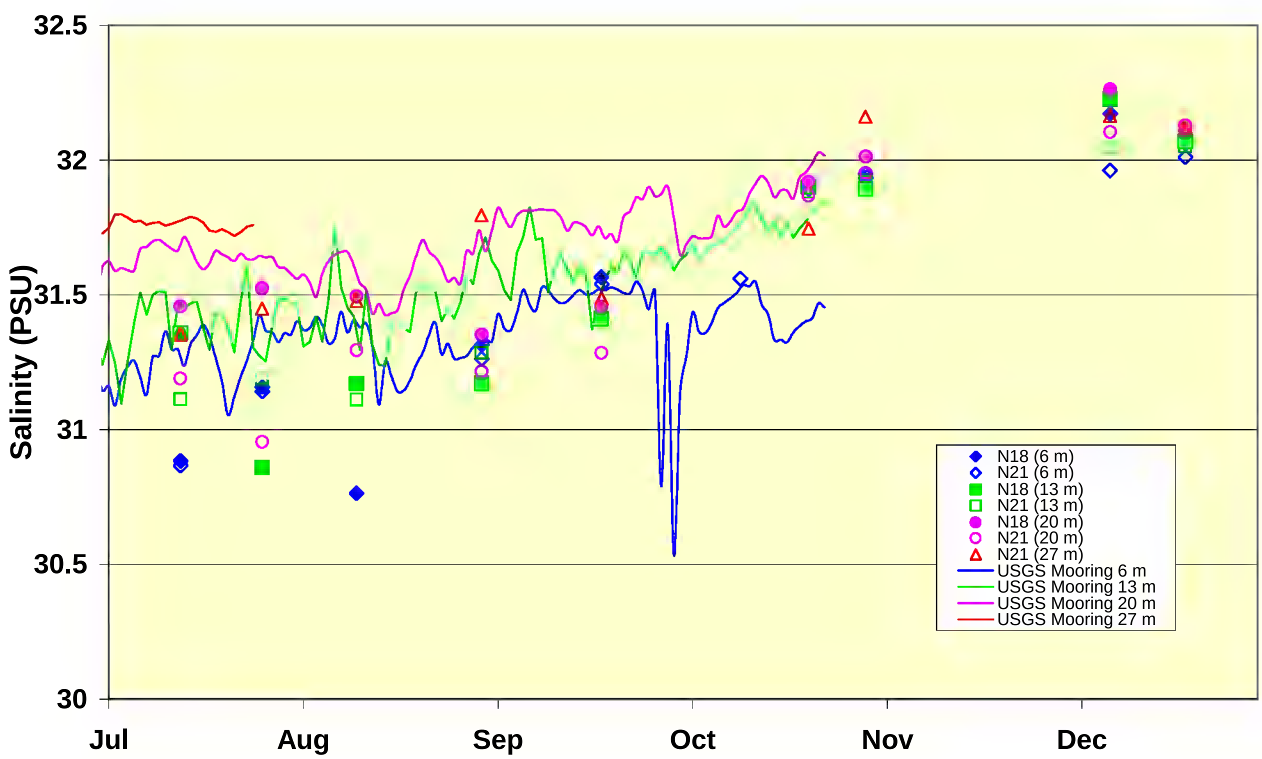


Figure 3-1. USGS Temperature and Salinity Mooring Data Compared with Stations N18 and N21 data at comparable depths

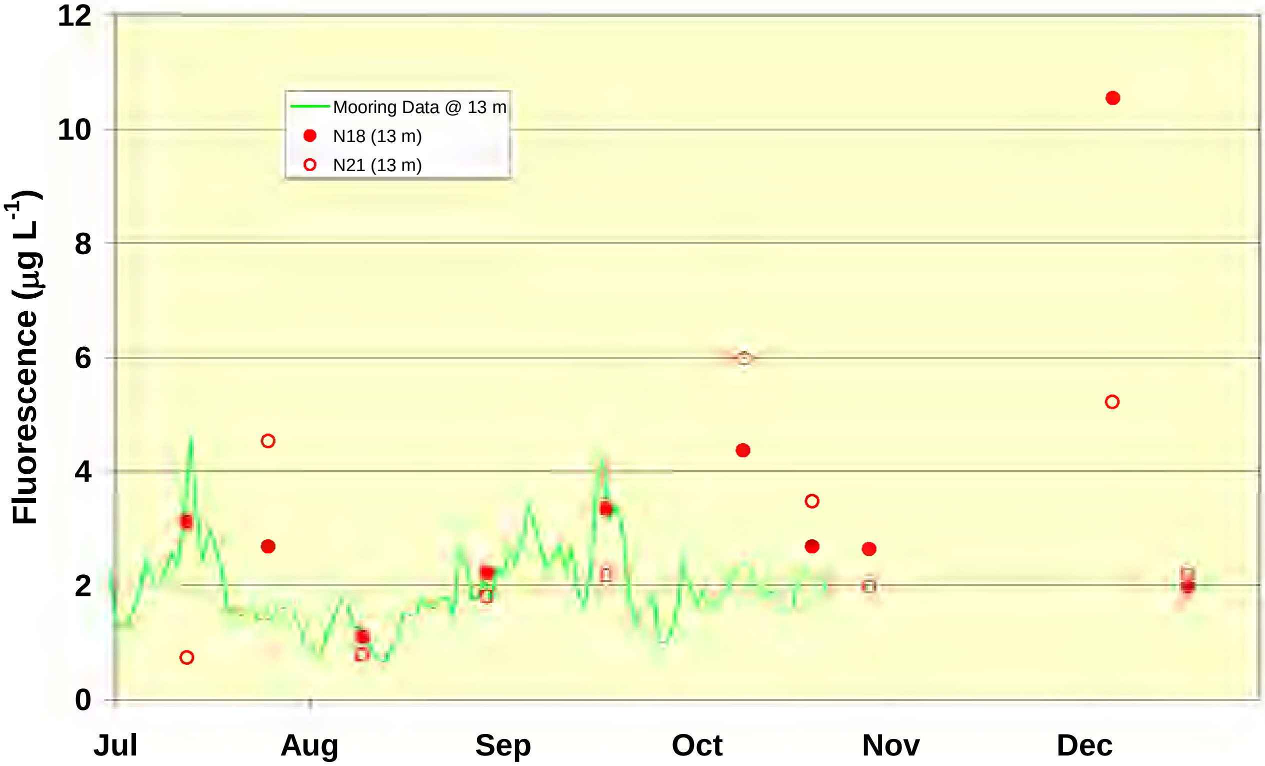


Figure 3-2. MWRA and Battelle *In Situ* Wetstar Fluorescence Data (MWRA Data Acquired at ~13 m on USGS Mooring and Battelle Data Acquired at 13 m at Stations N18 and N21)

4.0 RESULTS OF WATER COLUMN MEASUREMENTS

Data presented in this section are organized by type of data and survey. Physical data, including temperature, salinity, density, and beam attenuation are presented in Section 4.1. Nutrients, chlorophyll a, and dissolved oxygen are discussed in Section 4.2. Water quality measurements for chlorophyll a and dissolved oxygen are compared against Contingency Plan thresholds in Section 4.3. Finally, a summary of the major results for these water column measurements is provided in Section 4.4.

Two of the ten surveys conducted during this semi-annual period were combined farfield/nearfield surveys. In August during the first combined survey of this period (WF01B), seasonal stratification conditions existed throughout the bays. Stratification was relatively weak in tidally mixed Boston Harbor as normally observed. By October (WF01E), the density gradient had weakened across the bays and the water column was no longer stratified at the coastal and Boston Harbor stations. The change from stratified to well mixed conditions in the nearfield is illustrated in Figure 4-1. In the nearfield, stratification had weakened by early October, but a weak density gradient still existed until December when the water column finally returned to well-mixed winter conditions over the entire nearfield.

Data collected during the farfield surveys were evaluated for trends in regional water masses throughout Boston Harbor, Massachusetts Bay, and Cape Cod Bay. The variation of regional surface water properties is presented using contour plots of surface water parameters, derived from the surface (depth A) water sample. Classifying data by regions allows comparison of the horizontal distribution of water mass properties over the farfield area.

The vertical distribution of water column parameters is presented in the following sections along five transects (Boston-Nearfield, Cohassett, Marshfield, Boundary, and Nearfield-Marshfield) in the farfield survey area and one transect across the Nearfield (Figure 1-3). Examining data trends along transects provides a three-dimensional perspective of water column conditions during each survey. Nearfield surveys were conducted more frequently than farfield surveys, allowing better temporal resolution of the changes in water column parameters and destabilization of stratified conditions. In addition to the nearfield vertical transect (Figure 1-3), vertical variability in nearfield data is examined and presented by comparing surface and bottom water concentrations (A and E depths) and by plotting individual parameters with depth in the water column. A complete set of the surface contour maps, vertical transect plots, and parameter scatter plots is provided in Appendices B, C, and D, respectively.

4.1 Physical Characteristics

4.1.1 Temperature\Salinity\Density

The breakdown of vertical stratification in the fall indicates the change from summer to winter conditions (Figure 4-2). This destabilization of the water column significantly affects a number of water quality parameters during this time period. From early September through October, the water column becomes less stratified and nutrients from the bottom waters are available to phytoplankton in the surface and mid-water depths. This often leads to the development of a fall bloom. Phytoplankton production and further mixing of the water column also serve to increase bottom water dissolved oxygen concentrations, which tend to decrease from early June through October.

The pycnocline weakens as surface water temperature declines and late fall/early winter storms increase wind-forced mixing. As mentioned above, the surface and bottom water density data collected during the combined surveys indicated that seasonal stratification had begun to weaken throughout the region by the October survey. Nearfield survey activities provide a more detailed evaluation of the fall/winter overturn of the water column. For the purposes of this report, vertical stratification is defined by the presence of a pycnocline with a density (σ_t) gradient of greater than 1.0 over a relatively narrow depth range (~10 m). Using this definition, the data indicate that the pycnocline began to break down in the western nearfield in October, but the water column was not well mixed until December (Figure 4-2). USGS mooring data indicated that there was a strong mixing event in late September, but that by early October the water column was once again stratified (see Figure 3-1).

4.1.1.1 Horizontal Distribution

Over the course of the three nearfield surveys conducted in July and early August (WN018, WN019, and WN01A), there was an ~5°C increase in surface temperature across the nearfield area. In early July, surface water temperatures were cooler (<14°C) at nearshore stations N01 and N10 and relatively consistent (14.5 to 15°C) throughout the rest of the nearfield. In late July, there was a large gradient in temperature across the nearfield with the coolest temperatures in the northwest corner (12.2°C at station N01) and the warmest to the south (19.1°C at station N09). This does not appear to be a function of sampling time as cool surface waters were observed later in the day to the north (stations N12 and N13) and warm surface waters were observed earlier in the day to the south (stations N08, N17 and N18). By early August, surface water temperatures had warmed to >17.5°C in the nearfield with the coolest temperatures inshore and warmest offshore (17.6°C at station N11 to 20.4°C at station N07). Surface salinity was lower (~0.5 PSU) in early July in comparison to the two subsequent surveys. During all three surveys, however, there was little variation in surface salinity (30.6 to 31.0 PSU during WN018 and 31.1 to 31.5 for WN019 and WN01A) with the surface waters at inshore stations slightly less saline than at the offshore stations.

In August (WF01B), surface water temperatures were coolest (<16°C) in Boston Harbor and at boundary stations F26 and F27 off of Cape Ann (Figure 4-3). Elevated surface temperatures (>18°C) were found in Cape Cod Bay and at a few nearfield and offshore stations. The warmer temperatures at nearfield (N09, N19, and N20) and offshore (F15 and F16) stations was due to diurnal warming as these stations were sampled late in the day – rather than a spatial difference in surface water temperatures. Surface water salinity was homogeneous across the bays ranging from 31.2 PSU at outer Boston Harbor stations F23 and F31 to 31.5 PSU at station F12 in Stellwagen basin. Surface salinity was slightly lower at inner harbor station F30 (30.6 PSU). No clear upwelling signal of cooler more saline waters was observed for the surface data in the coastal waters in August 2001. Local climatological data from the National Weather Service station at Logan Airport indicated wind speeds were below normal and the direction of prevailing winds was inconsistent in August. Stronger winds and instances of prevailing southwesterly winds in July led to upwelling favorable conditions in July. This will be presented in more detail in the annual report.

During the nearfield survey conducted in September (WN01C), surface temperatures ranged from a low of 14.1°C at station N10 to a high of 17.2°C at station N03 and a trend of increasing surface temperature from southwest to northeast was observed across the nearfield. Nearfield surface salinity was homogeneous in September (31.5 PSU). By early October, surface temperatures had decreased to 13 to 13.5°C across the nearfield and salinity ranged from 32 PSU nearshore to 31.5 PSU offshore. There was a relatively large increase in flow in the Merrimack River in late September (Figure 4-4) that may have contributed to lower offshore salinities. It is unclear how much of an effect this increase in river flow would have had in Massachusetts Bay as even though the Merrimack River reached peak flow on September 27th for this July to December time period, the flow was only

5,000 cfs, which is usually the minimum flow recorded (see Libby *et al*. 2001a). The low flows were correlated with very little precipitation, as there were no rain events in September to December that totaled an inch or more during this very mild, sunny and dry fall of 2001. The low flows measured for both the Charles and Merrimack Rivers and the drought conditions during the fall of 2001 will be discussed in more detail in the 2001 annual report.

The October combined survey (WF01E) was conducted over the course of nine days, but there did not appear to be any relationship between the sampling date and the trends in temperature and salinity (Figures 4-5 and 4-6). There was a clear north to south gradient of increasing temperature from a minimum surface temperature of 10.7°C at station N01 and a maximum of 13.6 at Cape Cod Bay station F02. Cooler waters were located in the northern nearfield, Boston Harbor and along the North Shore from the harbor to Cape Ann. Surface water salinity in most of Massachusetts Bay was 32 PSU with values decreasing to the south into Cape Cod Bay (<31 PSU at stations F02 and F03) and Boston Harbor where the lowest surface salinity was measured at station F31. The slightly fresher waters were likely due to the October 16th rain event. The cooler, yet not fresher, surface waters at coastal and nearfield stations were the result of cooler atmospheric temperatures and increased mixing between surface and deeper waters. In late October during the nearfield survey (WN01F), temperature and salinity increased from minimum values at station N01 (10.1°C and 30.9 PSU) to maximum values to the southeast at stations N07 (11.9°C) and N16 (32.0 PSU). It is unclear as to the source of the fresher, cooler waters (no apparent meteorological factors), but it likely due to a more regional inshore to offshore trend and not a surfacing of the effluent plume as the nearfield was still slightly stratified (see Figure 4-2).

During the December nearfield surveys (WN01G and WN01H), lower temperatures and lower salinity were observed in the surface waters along the western nearfield. Surface temperatures decreased to 8.5 to 9.4 °C in early December and were about a degree cooler (7.6-8.2 °C) by the late December survey. Surface salinity exhibited a relatively wide range of values in early December (from 31 PSU at station N01 to 32.3 PSU at station N06), but by late December there was a relatively small inshore to offshore gradient (32-32.2 PSU).

4.1.1.2 Vertical Distribution

Farfield. The water column was stratified throughout the bays during the summer of 2001, but remained relatively well mixed in Boston Harbor. By October, stratified conditions had begun to deteriorate in coastal waters although it did not become well mixed until December in the nearfield and likely in the other offshore waters of Massachusetts and Cape Cod Bays. As suggested previously, the density gradient ($\Delta\sigma_t$), representing the difference between the bottom and surface water σ_t, can be used as a relative indicator of a mixed or vertically stratified water column. During the August farfield survey (WF01B), the $\Delta\sigma_t$ between surface and bottom waters was >1 throughout the region except at the Boston Harbor stations (Figure 4-7). These stations are shallow and subject to strong tidal mixing. Surface water densities had increased by the October survey across the region and the water column was only well mixed at the harbor and coastal stations, as $\Delta\sigma_t$ had decreased to <1. At the Cape Cod Bay, offshore and boundary area stations, stratification had weakened, but the density difference between bottom and surface waters was still >1. During both of the combined surveys, there was little variation in salinity over the water column in the harbor, coastal, offshore and boundary areas (≤0.5 PSU). In Cape Cod Bay, the salinity gradient was 0.2 PSU in August and increased to >1 PSU by October, which contributed to the continued density gradient of >1 in October. For the offshore and boundary stations, the density difference was driven by the continued gradient in temperature over the water column. Temperatures had decreased in the surface waters, but there was still a 3-4°C gradient at these deeper stations.

The temporal and spatial variability during the seasonal return to well-mixed winter conditions is also observed in the vertical contour plots of temperature, salinity, and sigma-*t* for the Boston-Nearfield, Cohassett, and Marshfield transects (Appendix C). In August, the water column was strongly stratified along each of the transects ($\Delta\sigma_t$ >2; Figure 4-8) and a sharp pycnocline was observed at 15-20 m. The gradient was weaker at the inshore stations along each of the transects and $\Delta\sigma_t$ was <1 at Boston Harbor station F23. The density gradient was driven by temperature, which exhibited a >8°C difference between the surface and bottom layers at all but the nearshore stations along each transect (Figure 4-9). There was only a small increase in salinity from surface to bottom waters, as salinity remained >31 PSU over each of the transects. An upwelling signature of cooler, more saline water extending from the bottom waters into the surface or near surface waters was not evident in the temperature and salinity contours. By October, stratification had weakened throughout the region. As mentioned above, $\Delta\sigma_t$ between surface and bottom waters was <1 at the nearshore stations and ~1 further offshore where the water column continued to be weakly stratified (Figure 4-10). The decrease in $\Delta\sigma_t$ was driven by changes in surface and bottom water temperatures. Decreasing air temperatures and mixing cooled the surface waters, while bottom waters continued to be warmed due to mixing with warmer mid-depth waters.

The return to winter conditions and the change in temperature relative to salinity can also be seen by examining the temperature-salinity (T-S) relationship for the region. In Figure 4-11, the T-S plots for the August and October surveys are presented. In August (WF01B), the T-S pattern is indicative of the vertical stratification that exists in the bays during the summer season. Surface water temperatures were generally 17-19°C and there was a strong thermal gradient (8-12°C) between surface and bottom water temperatures across the bays. Salinity varied over a relatively narrow range (31.2-32.2 PSU) except for slightly lower salinity at the shallow Boston Harbor stations. There was a negative relationship between the parameters as an increase in salinity with depth was coincident with a decrease in temperature. By October (WF01E), the range in temperatures had decreased (7 to 14°C) as temperatures had decreased in the surface waters and increased in the bottom waters. The range in salinity remained about the same though salinity had increased by ~0.3 throughout Massachusetts Bay (31.5-32.5 PSU). The T-S pattern at the offshore, boundary, and nearfield areas continued to exhibit the summer signature of increasing salinity corresponding to decreasing temperature from the surface to the bottom waters. In Boston Harbor and Cape Cod Bay, the T-S pattern was shifting towards the characteristics of a well-mixed winter water column – with minimal variation in temperature although there was a relatively wide range in salinity in these areas. In Boston Harbor, the salinity variability was due to spatial and temporal differences – the lower salinity values were measured at station F31 about a week after measurements were made at stations F23 and F30. In Cape Cod Bay, salinity decreased from north (station F03) to south (stations F01 and F02), but there was also a relatively large gradient in salinity between the surface and bottom waters. The prolonged period of weak stratification continued to be observed following the October survey at the nearfield stations and it is expected that similar conditions were present in offshore Massachusetts and Cape Cod Bay waters.

Nearfield. The gradual breakdown of seasonal stratification in 2001 and the eventual return to winter conditions can be observed more clearly from the data collected in the nearfield area. The nearfield surveys are conducted on a more frequent basis and later into the winter and thus provide a more detailed picture of the physical characteristics of the water column. In Figure 4-1, it was suggested that the breakdown of stratification proceeded from the shallow inshore stations to the deeper offshore stations. In late October, the inner nearfield stations (N10 and N11) exhibited a small density gradient ($\Delta\sigma_t$ ~0.5), while in Broad Sound (N01) and the outer nearfield stations (N04, N07, N16, and N20) the water column was still stratified ($\Delta\sigma_t \geq 1$). By early December (WN01G), the inner nearfield was well mixed and only a weak density gradient ($\Delta\sigma_t$ ~0.5) was observed in the outer nearfield. At station N01, the water column continued to be stratified due to lower salinity surface waters. By late December, the entire nearfield area was well mixed and had finally returned to winter conditions. Figures 4-12 and 4-13 present sigma-*t* along the nearfield transect (see Figure 1-3) from mid September to late December showing the progression in the destabilization of the water column during the fall of 2001. In September, stratified conditions were present along the entire nearfield transect and the pycnocline was observed at 15 m though it was not as clearly defined as during the August surveys (see Figure 4-9). USGS mooring data showed a sharp increase in temperature at 13 and 20 m and uniformity in temperature from 6 to 20 m (14° C, see Figure 3-1). This was coincident with a sharp decrease in surface salinity (6m). Thus, it is likely that the density gradient persisted from September to early October. By early October mooring data indicated a gradient from 6 to 20 m in both temperature and salinity was present. The early October (WN01D) monitoring data showed that the density gradient had decreased and fairly well mixed conditions were observed in the western nearfield, while in the eastern nearfield the water column was still stratified with a deep pycnocline near 30 m. During the mid and late October surveys (WF01E and WN01F), the water column continued to be fairly well mixed in the eastern nearfield and exhibited a density gradient of ~1 at the eastern nearfield stations. By early December, winter physical characteristics were present along the nearfield transect except furthest offshore at station N04 where there was still a gradient in density ($\Delta\sigma_t$ >0.5) between the surface and deep waters. During the final survey of 2001, the water column was well mixed throughout the nearfield.

The vertical gradient in density is predominantly driven by temperature during the fall in Massachusetts and Cape Cod Bays, as was the case in 2001. In September, there was a very strong temperature gradient (8-10°C) between surface and bottom waters and a sharp thermocline at 15 m along the nearfield transect (Figure 4-14). By early October, increased mixing of surface and deeper waters led to a decrease in surface water temperatures (13-15°C) and warmer water temperatures at depth (>11°C down to 30 m thermocline). Over the course of the month of October, surface water temperatures continued to decrease due to atmospheric cooling and mixing and by the end of the month there was only a 2-3°C gradient between surface and bottom waters. A weak temperature gradient persisted into December, but by the late December survey water temperatures were 7.6-8.3°C throughout the nearfield.

In addition to the harbor, coastal and offshore influences on nearfield physical conditions, MWRA effluent has been discharged directly into the nearfield area since the transfer from the harbor outfall to the bay outfall on September 6, 2000. Plume tracking studies and monitoring data have indicated that the region of rapid initial dilution is tightly constrained to the local area around the diffuser. Even so, the salinity data shows an effluent derived influence albeit at very high dilutions. The salinity signal of the discharge was more clearly seen during the summer period from July into September in part due to strong stratification and confinement of the plume below the pycnocline than later in the fall (Figure 4-15). Increased mixing and the lack of rain that resulted in very low effluent flow rates led to a less defined salinity signal for the plume during the fall of 2001. Note, however, that the lower flow rates did not necessarily equate to lower nutrient loading as the nutrient concentrations in the effluent increased as flow decreased and the nutrient signature of the plume was clearly observed throughout the fall of 2001 (see Section 4.2.1). During both the late August and September surveys (WF01B and WN01C), a core of lower salinity water was observed below the pycnocline at station N21 directly over the diffuser and the vertical contours of the data suggest that the salinity signature of the plume extended to nearby nearfield stations. This is also shown in contour plots along the Boston-Nearfield and Nearfield-Marshfield transects (Figure 4-16). Along the E-W Boston-Nearfield transect, there are boluses of lower salinity water both to the east and west of station N21. It is unclear if the effluent plume actually extended to the harbor at station F23 or if this is a convergence of outfall and harbor lower salinity water. The more interesting salinity trend is the extension of lower salinity water from the nearfield (station N18 is 2 km south of the diffuser) to the south along the Nearfield-Marshfield transect. A similar trend was observed in the ammonium data (see Figure 4-27). The transport of highly diluted effluent discharge south of the nearfield area was predicted by the modeling studies.

4.1.2 Transmissometer Results

Water column beam attenuation was measured synoptically with the other *in situ* measurements at all nearfield and farfield stations. The transmissometer determines beam attenuation by measuring the percent transmission of light over a given path length in the water. The beam attenuation coefficient (m^{-1}) is indicative of particulate concentration in the water column. The two primary sources of particles in coastal waters are biogenic material (plankton or detritus) and suspended sediments. Beam attenuation data is often evaluated in conjunction with fluorescence data to ascertain the source of the particulate materials (phytoplankton versus detritus or suspended sediments).

In August (WF01B), surface water beam attenuation ranged from 1.1 m^{-1} at station F22 in northern Stellwagen Basin to 2.3 m^{-1} at station F30 in Boston Harbor (Figure 4-17). As is normally observed, elevated beam attenuation measurements were found at the harbor stations. An inshore to offshore decrease in beam attenuation was evident. A similar inshore to offshore decrease in surface water beam attenuation was observed during the October farfield survey (Figure 4-18). The highest value was measured at station F18 (2.2 m^{-1}) in the coastal waters off of Nahant and the lowest value was observed at station F29 off of Provincetown (0.7 m^{-1}). During both of the farfield surveys, the elevated beam attenuation values at the inshore nearfield and coastal stations were coincident with higher surface fluorescence and both parameters exhibited very similar patterns (see Figures 4-32 and 4-34). In October, the highest and lowest surface fluorescence values were observed at stations F18 and F29, respectively.

In general, the vertical and horizontal trends in beam attenuation are dependent upon the input of particulate material from terrestrial sources (inshore stations) and the distribution of chlorophyll/phytoplankton (offshore stations). Figure 4-19 presents beam attenuation data along the Boston-Nearfield transect in August and October. These contour plots clearly show the harbor signature of high beam attenuation (station F23) and its influence on nearshore stations. The beam attenuation signal further offshore during each survey is likely due to phytoplankton as the elevated beam attenuation values are coincident with higher chlorophyll concentrations (see Figures 4-36 and 4-37). During high-resolution plume tracking studies in 2001, a clear signature of elevated beam attenuation was associated with the effluent plume. This was not evident in the lower resolution sampling conducted during the water quality monitoring studies.

4.2 Biological Characteristics

4.2.1 Nutrients

Nutrient data were initially analyzed using scatter plots of nutrient depth distribution, nutrient/nutrient relationships, and nutrient/salinity relationships (Appendix D). As observed with the physical characteristics, surface water contour maps (Appendix B) and vertical contours of nutrient data from select transects (Appendix C) were also produced to illustrate the spatial variability of these parameters.

The general trend in nutrient concentrations during the 2001 July to December period was similar to previous baseline monitoring years. Seasonal stratification led to the persistent nutrient depleted conditions in the surface and mid-depth waters and ultimately to an increase in nutrient concentrations in bottom waters due to increased rates of respiration (see Section 5.2) and remineralization of organic matter. In the fall, nutrient concentrations began to increase with the breakdown of stratification and possibly an early September upwelling event. Concentrations decreased in early October during the initiation of a fall bloom, but rebounded by late October due to continued weak mixing supplying nutrients to the surface waters and a decrease in biological utilization. In early December, nutrient concentrations had decreased again as the water column remained weakly stratified and production rates and chlorophyll concentrations peaked at both of the productivity stations during the late fall/winter bloom. By late December, nutrient concentrations returned to more typical winter values as the water column became well mixed.

Elevated concentrations of ammonium (NH_4) continued to be measured within the nearfield due to the diversion of flow from the harbor outfall to the bay outfall on September 6, 2000. The NH_4 plume signature both within and extending out of the nearfield continued to be observed and is one of the main focuses of this section.

4.2.1.1 Horizontal Distribution

In August (WF01B), surface water nutrient concentrations were low throughout the bays. The highest nutrient concentrations were found in the nearfield [dissolved inorganic nitrogen (DIN) = 1.86 μM and NH_4 = 1.38 μM at station N10) and Boston Harbor [nitrate (NO_3) = 0.54 μM and phosphate (PO_4) = 0.64 μM at station F23]. Surface water DIN and NH_4 concentrations were elevated in the vicinity of Boston Harbor and decreased further offshore (Figure 4-20). Surface NO_3 and PO_4 concentrations were depleted throughout Massachusetts and Cape Cod Bays. Silicate (SiO_4) concentrations were variable with elevated surface values measured in the nearfield, Boston Harbor and northern Massachusetts Bay, while lower concentrations (<2 μM) were found over southern Massachusetts Bay and Cape Cod Bay (Appendix B).

By October (WF01E), surface nutrient concentrations had increased to relatively high levels in Boston Harbor and western Massachusetts Bay. The highest surface nutrient concentrations were observed in Boston Harbor (DIN = 9.77 μM, NH_4 = 4.33 μM and PO_4 = 1.35 μM at station F30 and (SiO_4 = 8.54 μM) at station F31) and at coastal station F24 (NO_3 = 6.24 μM). The pattern in surface NO_3 concentrations was typical of the other nutrients (Figure 4-21). Higher nutrient concentrations were measured in the surface waters of Boston Harbor and along the north and south shore. There was a gradient of decreasing concentrations from the northwest to the southeast corner of the nearfield. Surface nutrients continued to be present at low to depleted levels in this corner of the nearfield (stations N06, N07, N08, and N09), further offshore in Massachusetts Bay, and in southern Cape Cod Bay (see Appendix B). The elevated concentrations at coastal and nearfield stations were coincident with cooler surface temperatures and, as suggested in Section 4.1, likely the result of increased mixing of surface and deeper waters.

Although elevated nutrient concentrations continue to be measured in Boston Harbor in 2001, the concentrations were substantially lower than the concentrations measured during August and October surveys during baseline years. This is obviously due to the diversion of MWRA effluent from the harbor outfall to the bay outfall. The usefulness of NH_4 as a tracer of the effluent plume has been clearly established in previous reports (Libby *et al*., 2001a, 2001b, and 2002). Although it is not a conservative tracer due to biological utilization, NH_4 concentration does provide a good tracer of the effluent plume especially in low light conditions where biological activity is minimal (i.e. below the pycnocline during stratified conditions and during the winter). A comparison of NH_4 concentrations in August 2000 and 2001 illustrates just how remarkable a change it was (Figures 4-22 and 4-23). Surface water NH_4 concentrations were high in the harbor in 2000 and low in 2001. At mid-depth, NH_4 concentrations were high in the harbor and low in the bays in 2000, while concentrations were low in the harbor, high in the nearfield in the vicinity of the outfall, and elevated concentrations appeared to extend south of the nearfield in 2001. Since the water column was strongly stratified in August 2001, the elevated NH_4 concentrations associated with the effluent discharge into the bay were not observed in the surface waters, but rather were contained below the pycnocline. As suggested in Section 4.1, the effluent plume appeared to be advected to the south during the late August survey and the extent of the plume (as indicated by elevated NH_4 concentrations) to the south of the outfall was clearly observed in both mid-depth and mid-bottom waters (Figure 4-24).

The distribution of NH_4 concentrations at each sampling depth across the nearfield under stratified and well-mixed conditions is presented in Figure 4-25. In late July, the water column was strongly stratified and high NH_4 concentrations were measured at deeper depths, while in December, after stratification had weakened, the effluent plume had reached the surface and extended over much of the nearfield. Ammonium concentrations continue to be an excellent tracer of the effluent plume and provide valuable information on plume location and spatial (vertical and horizontal) distribution. The use of NH_4 concentration data measured for both the effluent discharged from the Deer Island Treatment Plant and in Massachusetts Bay to estimate dilution rates will be explored in the 2001 annual water column report.

4.2.1.2 Vertical Distribution

Farfield. The vertical distribution of nutrients was evaluated using vertical contours of nutrient data collected along the farfield transects (Figure 1-3; Appendix C). In late August (WF01B), nutrient concentrations were low in the surface waters and increased with depth. As observed along the Boston-Nearfield transect (Figure 4-26), NO_3, PO_4, and SiO_4 concentrations were low in the surface waters and increased near the pycnocline and closer to Boston Harbor. Nitrate was depleted (<1 μM) at the surface and only reached concentrations of >3 μM below a depth of 20 m. The vertical pattern for PO_4 and SiO_4 was similar to that of NO_3, but the concentrations were not as depleted in the surface layer. As is usually the case, the summer pattern of depleted nutrients in the surface waters was concomitant with low chlorophyll concentrations and a sub-surface chlorophyll maximum was observed near the pycnocline and associated available nutrients (see Section 4.2.2.2).

The vertical distribution of NH_4 concentrations extending from the nearfield to the south that was mentioned previously is evident in the vertical contours along both the Boston-Nearfield and Nearfield-Marshfield transects (Figure 4-27). High NH_4 concentrations (5-13 μM) were measured over all but the surface waters at station N21 and elevated concentrations (>3 μM) extended both west and east along the Boston-Nearfield transect. Elevated NH_4 concentrations also extended from the nearfield to station F06 along the Nearfield-Marshfield transect suggesting advection of the plume to the south. Within this advected plume, NH_4 was measured at higher concentrations than NO_3 and was the main source of nitrogen for phytoplankton in these waters.

In October (WF01E), NO_3 concentrations were still depleted in the surface waters at the offshore stations along each of the transects and increased with depth (Figure 4-28 and Appendix C). Although PO_4 and SiO_4 data exhibited a similar trend decreasing from inshore to offshore in the surface waters, concentrations of these nutrients were not as depleted as NO_3 (Figure 4-28). Elevated nutrient concentrations were present over the entire water column at the harbor, coastal and western nearfield stations, which had become relatively well mixed. Higher nutrient concentrations were also found in the bottom water at these inshore stations (relative to the August survey), which suggests an influx of bottom waters perhaps due to regeneration, upwelling, or advection. The availability of nutrients in the surface waters was coincident with and contributed to elevated chlorophyll concentrations. One clear feature of the PO_4 distribution was the elevated concentrations located above the diffuser at station N21 (Figure 4-28b). This was coincident with very high NH_4 concentrations (>17 μM) that were present in the effluent plume (Figure 4-29). Both of these nutrients are enriched in the effluent in comparison to background concentrations in the nearfield. Based on NH_4 concentrations, the plume appears to have been confined within the nearfield area and below the pycnocline in October in contrast with August when it extended to the south and later in the year when the nearfield was well mixed and it reached the surface.

Nearfield. The nearfield surveys are conducted more frequently and provide a higher resolution of the temporal variation in nutrient concentrations over the semi-annual period. In previous sections, the transition from summer to winter physical and nutrient characteristics has been discussed. For most of the nearfield, summer conditions of depleted nutrient concentrations in the surface waters existed until late October (WN01F) and did not return to nutrient replete winter conditions until late December (WN01H). The progression from summer to winter conditions is illustrated in the series of nearfield transect plots for NO_3 presented in Figures 4-30 and 4-31. In August (WF01B), NO_3 concentrations were depleted (<1 μM) in the surface layer (0-10 m) increasing gradually with depth across the nearfield transect, but only reaching concentrations >3 μM below 25 m at the stations further offshore (Figure 4-30). By mid September (WN01C), NO_3 levels were still depleted in the upper 5 m of surface waters along the transect, but concentrations had increased substantially below that depth. Although the physical oceanographic data suggest that stratification was weakening, there was no obvious indication of upwelling in the temperature and salinity data. It is unclear if the increase in nutrients was only due to increased mixing or if an upwelling event in early September may have been missed in the physical data, but captured in remnants of an elevated nutrient signature. A gradient in NO_3 concentrations was still associated with the pycnocline at 20 m. By early October (WN01D), biological utilization had reduced nutrient concentrations in the surface waters and NO_3 concentrations were <1 μM in the upper 15 m across the transect except for station N10 (1-3 μM) and there was a strong gradient in concentration associated with the pycnocline at 20 m. Temperature data had indicated that water column mixing had led to cooler surface and warmer bottom waters from mid September to early October, thus suggesting continued input of nutrients into the surface waters. A coincident increase in production (see Figure 5-2) over this time period, however, led to a decrease in nutrient concentrations.

By mid October (WF01E), NO_3 concentrations had once again increased to 1-5 μM throughout most of the surface layer (upper 20 m) and to >5 μM at depths below the weakening pycnocline (Figure 4-31). This was coincident with a decrease in production from the early October peak. Similar NO_3 concentrations were observed in late October. In early December (WN01G), NO_3 concentrations were relatively low (1-3 μM) in the upper 20 m at the inshore and offshore stations along the nearfield transect and there was still a gradient in nutrient concentrations associated with the weak pycnocline at the offshore stations. The availability of nutrients and the continued mild weather (relatively warm temperatures, few storm events, and as a result incomplete mixing) was coincident with the peak productivity at both stations N04 and N18 for this time period (see Section 5.1) and the highest chlorophyll concentrations of the fall/winter bloom. By late December, the water column was well mixed and nutrient concentrations had returned to typical winter levels over the entire nearfield transect.

An examination of the nutrient-nutrient plots showed that surface waters were generally depleted in DIN relative to PO_4 and SiO_4 in the nearfield during this semi-annual period (Appendix D).

4.2.2 Chlorophyll A

Chlorophyll concentrations (based on *in situ* fluorescence measurements) were relatively low for most of this time period, but reached unexpectedly high levels during the late fall/winter bloom in early December. Fall 2001 was a departure from the trend during the two previous years. During September and October of 1999 and 2000, substantial and prolonged fall blooms were observed, but in 2001 there was a minor fall bloom in September and with a more substantial bloom observed in late October and early December. The peak nearfield survey mean chlorophyll concentration was observed in early December, which is later in the season than usual and is the highest December mean observed since baseline monitoring began in 1992. Even with elevated chlorophyll concentrations in late October to December the fall nearfield mean areal chlorophyll value was about half (85 mg m^{-2}) that of the fall threshold value (161 mg m^{-2}), which continued the trend of relatively low chlorophyll concentrations that had been noted for the first half of 2001 (Libby *et al*., 2002).

4.2.2.1 Horizontal Distribution

In July, nearfield surface chlorophyll concentrations were low and only reached concentrations of >1 μgL^{-1} at the inshore stations. At mid-depth, concentrations were higher but variable across the nearfield with no clear trends (0.6 to 8.1 μgL^{-1}). Surface and mid-depth chlorophyll concentrations were both low in early August with surface concentrations of 1 μgL^{-1} only measured at stations N10 and N11 and concentrations at the mid-depth 'chlorophyll max' ranging from a low of 0.6 μgL^{-1} at N05 to a high of 2.7 μgL^{-1} at station N10. By the late August nearfield/farfield combined survey, elevated surface chlorophyll concentrations 2-5 μgL^{-1} were observed in Boston Harbor and the coastal and nearfield waters of western Massachusetts Bay (Figure 4-32a). The distribution was most closely tied to the distribution of DIN (specifically NH4; see Figure 4-20). The highest surface chlorophyll concentration was recorded at station N10 (5 $\mu g\ L^{-1}$). Surface chlorophyll concentrations were <1 μgL^{-1} in the eastern nearfield and at boundary and Cape Cod Bay stations. Higher chlorophyll concentrations were observed at mid-depth with levels of 4-8 μgL^{-1} measured in an area extending from the near harbor coastal and inshore nearfield stations to the south along the coast (Figure 4-32b). The high chlorophyll concentrations observed in both surface and mid-depth harbor and coastal waters were concomitant with high abundances of centric diatoms – *Leptocylindrus danicus*, *Skeletonema costatum*, and *Dactyliosolen fragilissimus* (see Figure 5-19). Phytoplankton abundances at other stations were comparable, but the assemblage was primarily comprised of microflagellates rather than centric diatoms.

There appeared to be little change from late August to mid September in nearfield surface and mid-depth chlorophyll concentrations, but SeaWiFS satellite imagery suggests that there was a relatively large increase (to 5-10 μgL^{-1}) in surface chlorophyll in early September (Figure 4-33). Although the sampling program did not capture this increase, the satellite images provided an indication of the short-term phytoplankton dynamics that occurred in early September of 2001. By mid September, surface water chlorophyll concentrations in the nearfield ranged from undetectable at station N15 to 2.5-3 μgL^{-1} at stations N09 and N10. The trend of decreasing surface chlorophyll concentrations from southwest to northeast in the nearfield during WN01C were corroborated by similar trends in the concurrent SeaWiFS image that showed low concentrations in the northeastern portion of the nearfield (and Massachusetts Bay) and an increase in concentrations reaching 5-10 μgL^{-1} to the south and inshore of the nearfield area (see Appendix I).

By the October combined nearfield/farfield survey (WF01E), high surface chlorophyll concentrations were observed at the coastal and southern Massachusetts Bay waters (Figure 4-34). SeaWiFS images indicated that chlorophyll concentrations had remained high (5-10 μgL^{-1}) in the coastal waters since the mid September survey (Appendix I). The October surface chlorophyll concentrations ranged from 0.9 μgL^{-1} at station F29 to 10.5 μgL^{-1} at station F18. The data were variable in northwestern Massachusetts Bay with the highest surface value measured at station F18 off of Nahant and chlorophyll concentrations of <2 $\mu\ L^{-1}$ in the northern nearfield, which is 5 km to the south. This sharp gradient of decreasing chlorophyll may have been an artifact of the sampling schedule. The nearfield stations were visited on October 20th and station F18 on October 25th. Except for the elevated chlorophyll concentration at station F18, there was an increase in surface water chlorophyll concentrations from the northern nearfield across the nearfield and into southern Massachusetts Bay. Surface water chlorophyll concentrations of 4-7 μgL^{-1} were measured along the southern edge of the nearfield, the Cohasset transect, and down to the stations along the Marshfield transect. Chlorophyll concentrations were relatively low (<2 μgL^{-1}) at most of the boundary and Cape Cod Bay stations. The chlorophyll maximum at most stations was in the upper water column and sampled at the mid-surface depth (Figure 4-34b). The pattern in chlorophyll concentrations at this depth was similar to that observed for the surface, although values were generally 1-2 μgL^{-1} higher. The elevated surface and chlorophyll maximum concentrations were concomitant with higher nutrient concentrations in the upper water column in western Massachusetts Bay (see Figure 4-21).

Surface chlorophyll concentrations increased in the nearfield from October to early December. Surface concentrations ranged from a low of 3.5 μgL^{-1} at station N21 to 8.2 μgL^{-1} at station N16 and values were >6 μgL^{-1} throughout the southeastern nearfield. These high chlorophyll concentrations in early December were coincident with an increase in diatoms (see Figures 5-17 and 5-18). SeaWiFS also measured elevated chlorophyll concentrations throughout the bays and the western Gulf of Maine in early December (Figure 4-35). Although no surveys were conducted in November, the limited number of SeaWiFS images available for that month suggest that elevated chlorophyll concentrations were present in the bays from late October to early December (see Appendix I). This late fall/early winter bloom achieved chlorophyll concentrations and production rates that are unprecedented in comparison to baseline values for December. By late December, surface chlorophyll concentrations had declined across the nearfield to values ranging from 0.5 μgL^{-1} at station N17 to 2.7 μgL^{-1} at station N01. The SeaWiFS image for this survey (December 19th) was inferior, but the image for December 30th shows low surface chlorophyll concentrations throughout Massachusetts Bay (see Appendix I).

4.2.2.2 Vertical Distribution

Farfield. Chlorophyll concentrations over the water column were examined along the three east/west farfield transects (Figure 1-3) to compare the vertical distribution of chlorophyll across the region. In August, the typical summer distribution of chlorophyll concentrations was observed along each of the transects with elevated concentrations in the surface waters at the inshore stations and near the pycnocline (15-20 m) further offshore. Overall the concentrations were relatively low with values reaching 3-6 $\mu g\ L^{-1}$ at the near surface and near pycnocline chlorophyll maxima as shown for the Boston-Nearfield transect (Figure 4-36a). A subsurface layer of high chlorophyll concentrations was measured along the Nearfield-Marshfield transect with the highest values measured at station F10 (Figure 4-36b). The chlorophyll patterns illustrated along these two transects appear to be related to those shown in Figure 4-27 for NH_4 concentrations. The availability of NH_4, which is preferentially taken up by phytoplankton over NO_3, may have contributed to the elevated chlorophyll concentrations along the Nearfield-Marshfield transect. The physical and biological dynamics associated with the distribution of nutrients and chlorophyll are complex and it may not be possible to clearly distinguish between the influence of background nutrients and effluent NH_4. This will be examined in more detail in the 2001 annual water column report.

By October (WF01E), chlorophyll concentrations along each of transects were slightly higher than those measured in August and high concentrations were measured over a relatively thick layer extending from the surface to the pycnocline at 15-20 m (Figure 4-37). Along the Boston-Nearfield transect, chlorophyll concentrations were 3-5 $\mu g\ L^{-1}$ in the surface and near surface chlorophyll maximum except at harbor station F23. Higher concentrations were observed in the surface and subsurface maximum (>5 $\mu g\ L^{-1}$) along the two transects to the south. The higher concentration at station F06 along the Marshfield transect was coincident with the highest phytoplankton abundance for the October survey. The increase in chlorophyll concentrations along these transects may have been related to the increase in nutrient availability in October compared to August.

Nearfield. Trends in the nearfield chlorophyll concentrations are summarized in Figure 4-38. This figure presents the average of the surface, mid-depth, and bottom values for each nearfield survey.

Note that when a subsurface chlorophyll maximum was present, the mid-depth sample represents the water quality characteristics associated with the feature. The nearfield mean for the mid-depth chlorophyll concentrations was higher than the surface and bottom mean values for all but one of the surveys during this time period. In July and August, surface and bottom water nearfield chlorophyll concentrations were consistently low (≤1 μgL^{-1}; Figure 4-38). At mid-depth, the survey mean chlorophyll concentration decreased from 5 μgL^{-1} in early July to almost 1 μgL^{-1} in early August and then returned to 4 μgL^{-1} by the late August survey. These relatively high chlorophyll concentrations (4 μgL^{-1}) continued to be observed in the nearfield at mid-depth from late August to early October and after a decline in concentrations in mid-October mean concentrations increased to 5 and 7 μgL^{-1} during the late October and early December surveys, respectively. There was a steady increase in surface chlorophyll concentrations from 1 μgL^{-1} in late August to a maximum of >5 μgL^{-1} in early December. The elevated chlorophyll concentrations in October and December were coincident with peaks in primary production.

The vertical distribution of chlorophyll during the late fall bloom was examined in more detail along a transect extending diagonally through the nearfield from the southwest to the northeast corner (see Figure 1-3). The southwest corner, station N10, often exhibits an inshore or harbor chlorophyll signal while an offshore chlorophyll signal is more often observed at the northeast corner, station N04. In September, chlorophyll concentrations were low (<1 μgL^{-1}) in the surface waters and reached a maximum in a narrow subsurface layer at all but harbor-influenced station N10 (3-5 μgL^{-1}; Figure 4-39). By early October, the range in chlorophyll concentrations had increased only slightly, but elevated concentrations were measured over a thick layer from 5-25 m. A similar pattern was observed during both subsequent surveys in October (Figures 4-39 and 4-40). During the October surveys, elevated chlorophyll concentrations were generally measured over the entire upper 15-20 m of the water column at the inshore stations N10 and N19, while low surface and subsurface chlorophyll maximum concentrations were observed further from shore. This pattern of a surface chlorophyll maximum inshore and a separate subsurface chlorophyll maximum further offshore has been noted during previous fall blooms. By early December, chlorophyll concentrations had increased to 4-12 μgL^{-1} in the upper 25-30 m over nearly the entire transect (Figure 4-40). The high chlorophyll concentrations were coincident with the peak production rates for this July to December period and with high abundances of diatoms. By late December, chlorophyll concentrations along the nearfield transect had returned to more typical winter levels.

The progression of chlorophyll concentrations in the nearfield during the fall of 2001 can be more clearly seen through a series of contour plots of fluorescence over time at stations N10, N18, and N07 (Figure 4-41). These stations are representative of inshore (N10), center (N18), and offshore (N07) nearfield stations. The late fall/early winter bloom clearly stands out in the chlorophyll concentration contours at each of these stations. At station N10, chlorophyll concentrations in the upper 10-15 m ranged were generally 2-5 μgL^{-1} from July to late October. At stations N07 and N18, a subsurface chlorophyll maximum of 2-5 μgL^{-1} was measured in July and then again in September and October, but not during the August surveys. Chlorophyll concentrations peaked in early December at each of these stations and extended over the entire water column (30 m) at station N10 and N18 and to a depth of 25 m at station N07. These contours suggest that there was a prolonged bloom from October to December, and ancillary data (SeaWiFS imagery) imply that this was the case. Mooring data for chlorophyll fluorescence are currently available through October 23rd, but the full 2001 dataset will be available for inclusion in the annual report and will provide additional insight into the duration and magnitude of the atypical late fall/early winter bloom of 2001.

4.2.3 Dissolved Oxygen

Spatial and temporal trends in the concentration of dissolved oxygen (DO) were evaluated for the entire region (Section 4.2.3.1) and for the nearfield area (Section 4.2.3.2). Due to the importance of identifying low DO conditions, bottom water DO minima were examined for the water sampling events. The minimum bottom water DO concentration was 7.0 mgL^{-1} in the nearfield at station N13 during in late October (WN01F) and stations N01 and N16 in early December (WN01G). Regionally, a DO concentration minimum of 7.2 mgL^{-1} was observed at coastal station F14 in October. Not surprisingly, the lowest %saturation value for the year in the nearfield (73%) was measured at stations N13 (WN01F) and N16 (WN01G). The lowest farfield %saturation value was 75% measured at station F16 in October.

The 2001 nearfield survey mean bottom water DO minimum of 7.4 mgL^{-1} was measured during the mid and late October surveys. The survey mean bottom water DO %saturation minimum (77%) occurred during the mid October survey and only slightly higher at 78% in late October. These values were comparable to the survey mean bottom water minima for Stellwagen Basin stations – 7.8 mgL^{-1} and 79%. Although all of these survey mean minimum values were relatively high, the DO %saturation values were below the caution threshold (80%) for both the nearfield and Stellwagen Basin, but well above the background values calculated based on the baseline data (64.3% and 66.3%, respectively).

The bottom water DO survey minimum values were relatively high and comparable to those measured in the fall of 2000. It might be expected that 2001 DO values would be high given the relatively low chlorophyll concentrations measured in 2001 and presumed low level of organic loading to the bottom waters and benthos. The fact that similar DO minima were observed in two very different ‘biological’ years – major spring and fall blooms in 2000 and minor blooms in 2001 – suggests that either loading plays a relatively minor role in controlling bottom water DO or that the presumption that high chlorophyll concentrations are indicative of high loading is incorrect. An examination of the connection between physical oceanographic conditions and DO concentrations suggests that it is the former (Geyer *et al*., 2002).

4.2.3.1 Regional Trends of Dissolved Oxygen

Temporal trends in bottom water DO concentrations were limited for the farfield as stations were only sampled twice during this period and due to technical problems the *in situ* sensor data from WF01B (and WN01A) were marked suspect. DO concentrations from Winkler analyses (bottle data) are presented for WF01B. Survey mean DO concentrations reached minimum values in October for each of the farfield areas – 7.5-7.6 mgL^{-1} in the coastal and offshore areas and 7.9-8.1 mgL^{-1} in Boston Harbor, boundary, and Cape Cod Bay waters. A comparison of bottom water bottle data showed a 1 mgL^{-1} decrease in DO concentrations from August to October in each of the areas. The mean DO %saturation at these areas also reached a minimum in October and ranged from a low of 79% for the offshore area to a high of 90% in Boston Harbor and Cape Cod Bay. Overall, as in the nearfield, bottom water DO concentrations and %saturation were relatively high in the farfield areas.

In August (WF01B), bottom water DO concentrations were high throughout the bays ranging from a minimum of 8.6 mg L^{-1} at station F26 of off Cape Ann to a maximum of 9.8 mg L^{-1} at station N07 in the nearfield (Figure 4-42). By October (WF01E), bottom water DO concentrations had decreased by 0.5-2 mg L^{-1} across the bays (Figure 4-43). The lowest DO concentration was measured at coastal station F24 (7.4 mg L^{-1}) and the highest at station F29 off of Provincetown (8.6 mg L^{-1}). In addition to the low DO concentration at station F24, bottom water concentrations in the nearfield and much of the eastern half of Massachusetts Bay were approximately 7.5 m mg L^{-1}. A more detailed picture of the DO distribution in bottom waters is presented in Figure 4-44 that shows the DO concentrations measured *in situ*. These data indicate that DO concentrations of 7.2 to 7.5 mg L^{-1} were observed in the coastal and nearfield waters and concentrations increased both offshore and to the south. Bottom water temperatures were warmer at these shallower inshore stations and chlorophyll concentrations were consistently elevated compared to further offshore.

4.2.3.2 Nearfield Trends of Dissolved Oxygen

Dissolved oxygen concentrations and percent saturation values for both the surface and bottom waters at the nearfield stations were averaged and plotted for each of the nearfield surveys (Figure 4-45). The gradient in mean DO concentration between the surface and bottom waters ranged from 0.2 to 2.2 mgL^{-1} over this time period. During the summer, lower production rates and higher respiration rates (see Section 5.2) led to decreases in mean DO concentrations from July to mid September of 1 mgL^{-1} in the surface waters and almost 2 mgL^{-1} for the bottom waters. Mean DO concentrations remained steady from September to early October as both production and respiration rates increased over this time period. The nearfield bottom water survey mean DO concentration minimum (7.4 mgL^{-1}) was observed during the second and third surveys in October, which were conducted 9 days apart (October 20th and 29th). The relatively mild fall and early winter that led to weak mixing and a late fall bloom also contributed to an extended period of relatively low DO. The mean bottom water DO concentration increased slightly from late October (7.4 mgL^{-1}) to early December (7.7 mgL^{-1}). By late December, the water column had finally become well mixed across the entire nearfield and mean surface and bottom water DO concentrations were 9.5 mgL^{-1}.

DO %saturation followed a trend similar to that of DO concentration (Figure 4-45b). The differences are due to the dependent relationship between temperature and DO %saturation, the large gradient in temperature between surface and bottom waters in the summer, and the eventual decrease of the temperature gradient in the fall as the surface waters cool and bottom waters warm. From early July to early December, there was a 20-30% difference in %saturation between surface and bottom waters. The surface waters were above 100% saturation for the entire July to December period, while bottom waters were under saturated for all but the late December surveys. From mid September to early December, survey mean bottom water DO %saturation was about 80% and reached a minimum of 77% in mid October. The duration of these conditions was due to the weak mixing that occurred in fall 2001.

4.3 Contingency Plan Thresholds

September 6, 2000 marked the end of the baseline period, completing the data set for MWRA to calculate the threshold values used to compare monitoring results to baseline conditions. Those parameters include background levels for water quality parameters chlorophyll and dissolved oxygen. Annual and seasonal chlorophyll areal concentration thresholds have been developed for the nearfield area and bottom water dissolved oxygen concentration and percent saturation minima thresholds have been designated for the nearfield and Stellwagen Basin (Table 4-1). There were no threshold exceedances for water quality parameters in 2001.

For the second half of 2001, the summer and fall 2001 seasonal nearfield areal means were low 45 and 85 mg m^{-2} respectively, which is almost half the caution threshold value. These low seasonal values in combination with the low winter/spring 2001 mean resulted in an annual areal chlorophyll mean of 67 mg m^{-2} well below the caution threshold of 107 mg m^{-2} (Table 4-1). The dissolved oxygen concentration survey mean minimum for the fall of 2001 was well above the threshold standard for both the nearfield and Stellwagen Basin. The percent saturation values were slightly below the caution threshold of 80% in each area, but the survey mean minima that were measured were well above the background value and thus no threshold exceedance.

Table 4-1. Contingency plan threshold values for water quality parameters.

Parameter	Time Period	Caution Level	Warning Level	Background	2001
Bottom Water DO concentration	Survey Mean in June-October	< 6.5 mg/l (unless background lower)	< 6.0 mg/l (unless background lower)	Nearfield - 5.75 mg/l Stellwagen - 6.2 mg/l	7.4 mg/L 7.8 mg/L
Bottom Water DO %saturation	Survey Mean in June-October	< 80% (unless background lower)	< 75% (unless background lower)	Nearfield - 64.3% Stellwagen - 66.3%	77% 79%
Chlorophyll	Annual	107 mg/m^2	143 mg/m^2	--	67 mg/m^2
	Winter/spring	182 mg/m^2	--	--	69 mg/m^2
	Summer	80 mg/m^2	--	--	45 mg/m^2
	Autumn	161 mg/m^2	--	--	85 mg/m^2

4.4 Summary of Water Column Results

Summary of Water Column Results

- Regionally, seasonal stratification had deteriorated at the inshore stations and began to weaken at the offshore stations by the October survey (WF01E).
- In the nearfield, stratification had weakened by early October (WN01D), but a weak density gradient existed through to early December (WN01G). Well-mixed winter conditions were not achieved until late December (WN01H).
- The mild fall weather likely led to the weak mixing conditions and the extended duration of weakly stratified conditions.
- Nutrient concentrations followed typical trends during the 2001 July to December. Depleted concentrations in the surface waters during summer stratified conditions, increasing concentrations with the breakdown of stratification and increase in mixing, punctuated with decreases due to biological utilization during the fall bloom, and finally return to typical winter levels.
- NH_4 concentrations continue to be a good tracer, albeit not a conservative tracer, of the effluent plume both within and extending from the nearfield. In August, a layer of lower salinity and higher NH_4 concentrations (plume signature) extended from the nearfield into southern Massachusetts Bay.
- Chlorophyll concentrations were relatively low for most of this time period, but reached unexpectedly high levels during the late fall/winter bloom in early December.
- Fall 2001 was a departure from 1999 and 2000 when large and prolonged fall blooms were observed. In 2001 there was a minor fall bloom in September and then a more substantial bloom from October to early December.
- The highest nearfield survey mean chlorophyll concentration was observed in early December, which is later in the season than usual and was the highest December mean observed since baseline monitoring began in 1992.
- The summer, fall, and annual mean areal chlorophyll threshold values were well below the cautions levels – by about 50%.

- Mean nearfield bottom water DO concentrations in 2001 were relatively high and well above the caution thresholds.
- DO percent saturation values in October fell just below the caution threshold (<80%) in both the nearfield and Stellwagen Basin (77% and 79%, respectively). The DO percent saturations in both of these areas were well above baseline background levels (64.3% and 66.3%, respectively).

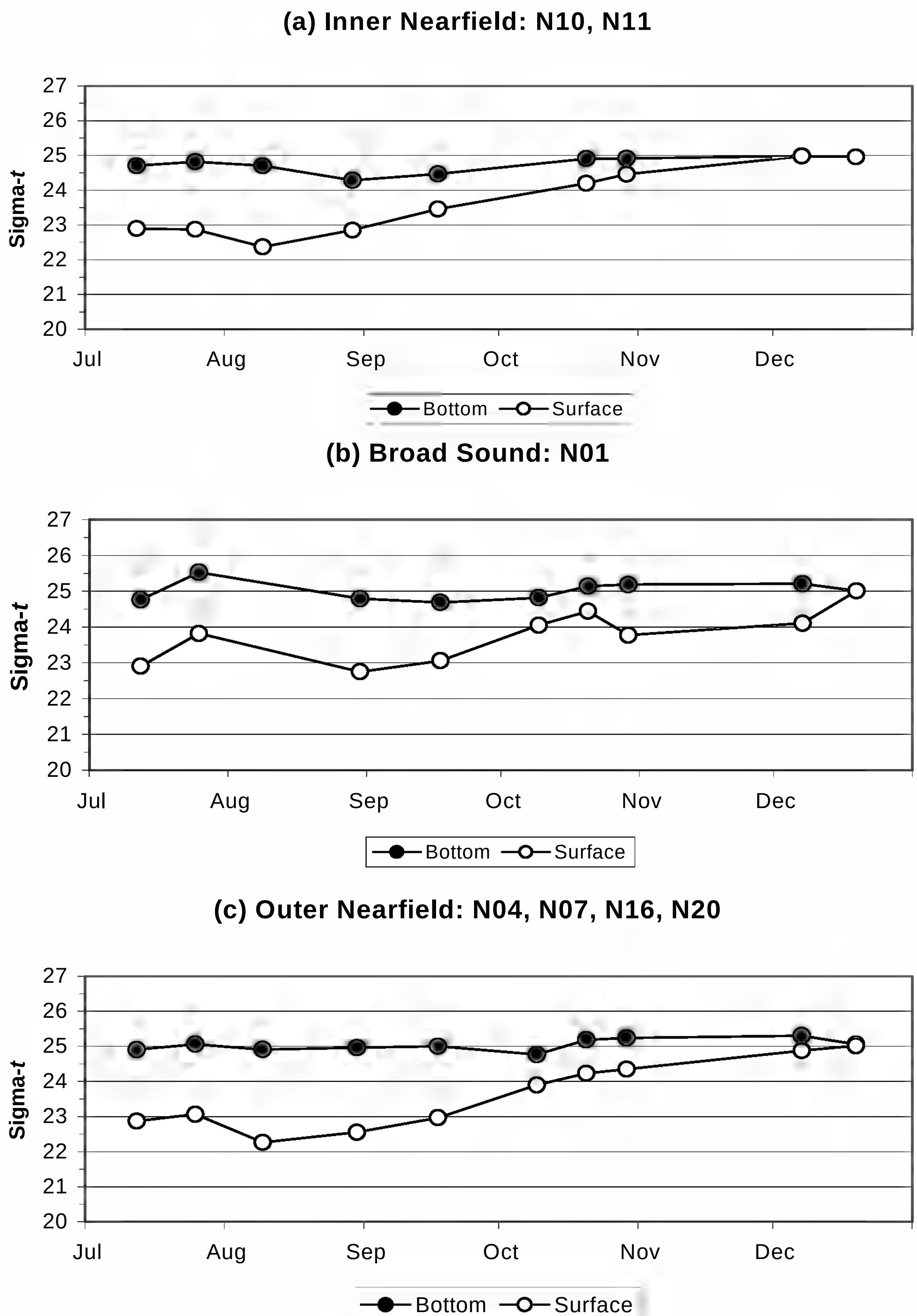


Figure 4-1. Time-Series of Average Surface and Bottom Water Density (σ_T) in the Nearfield

Note: No data are available for survey WN01A (station N01) and WN01D (stations N10 and N11)

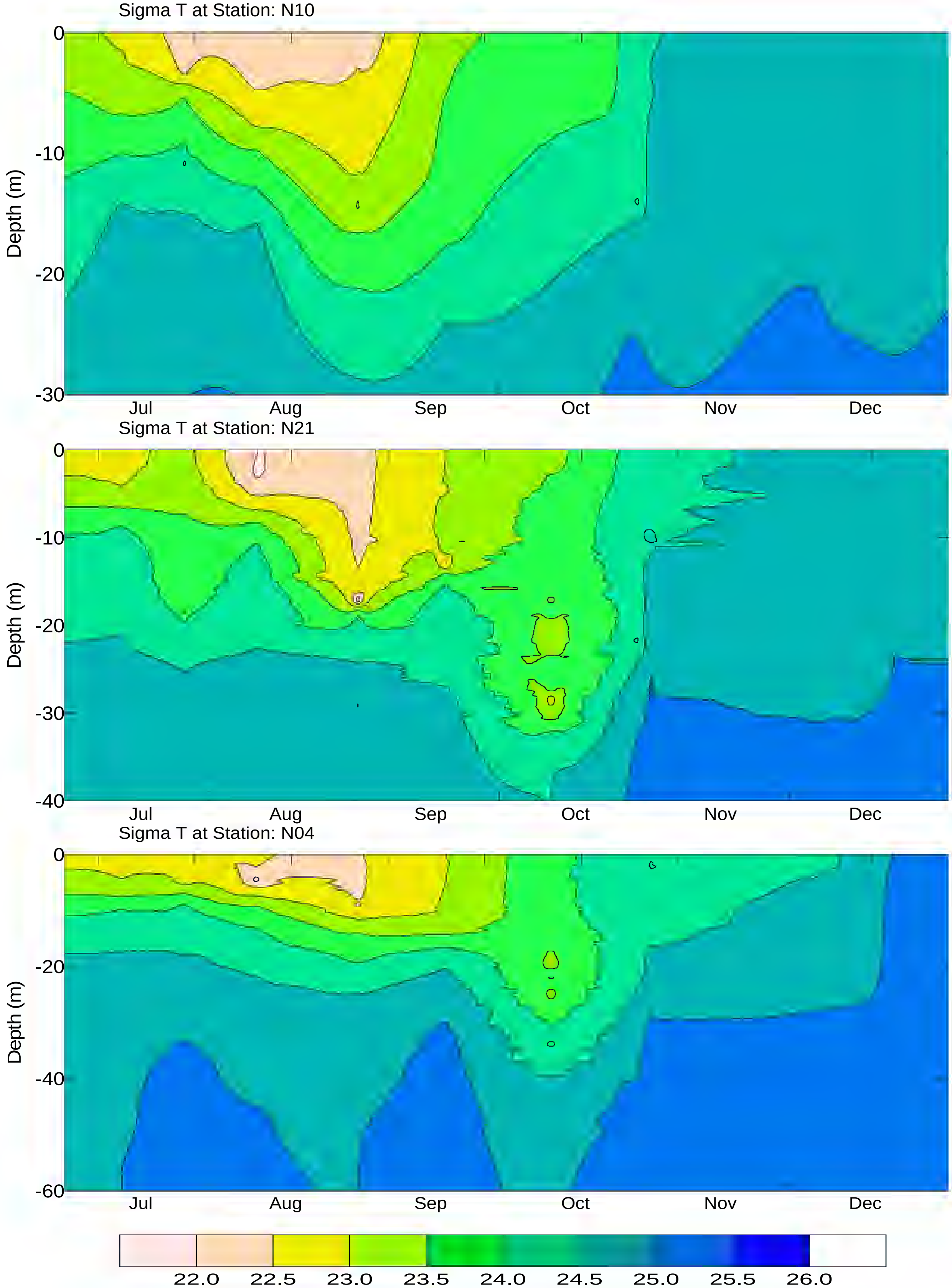


Figure 4-2. Sigma-*t* Depth vs. Time Contour Profiles for Stations N10, N21, and N04

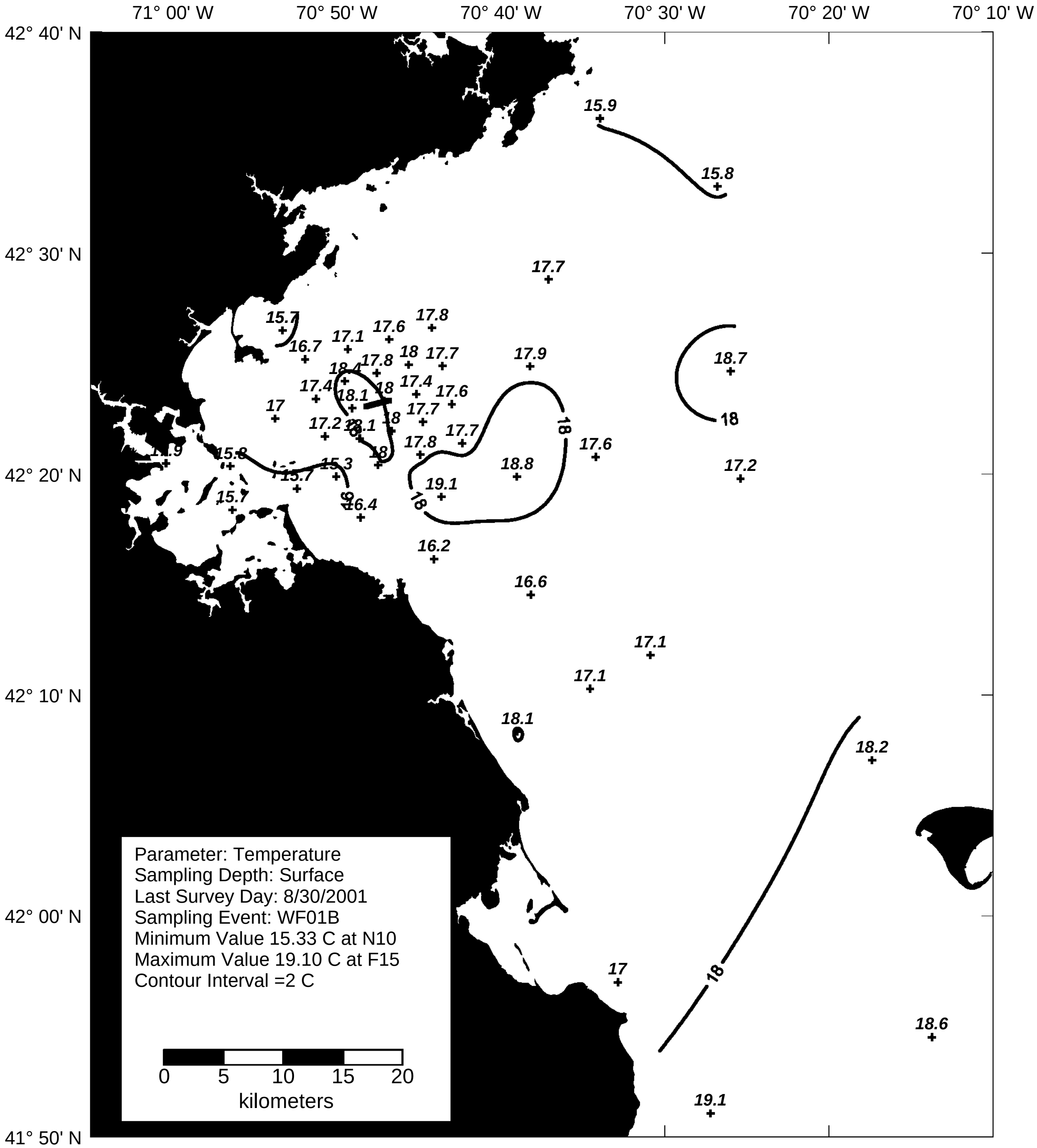


Figure 4-3. Temperature Surface Contour Plot for Farfield Survey WF01B (Aug 01)

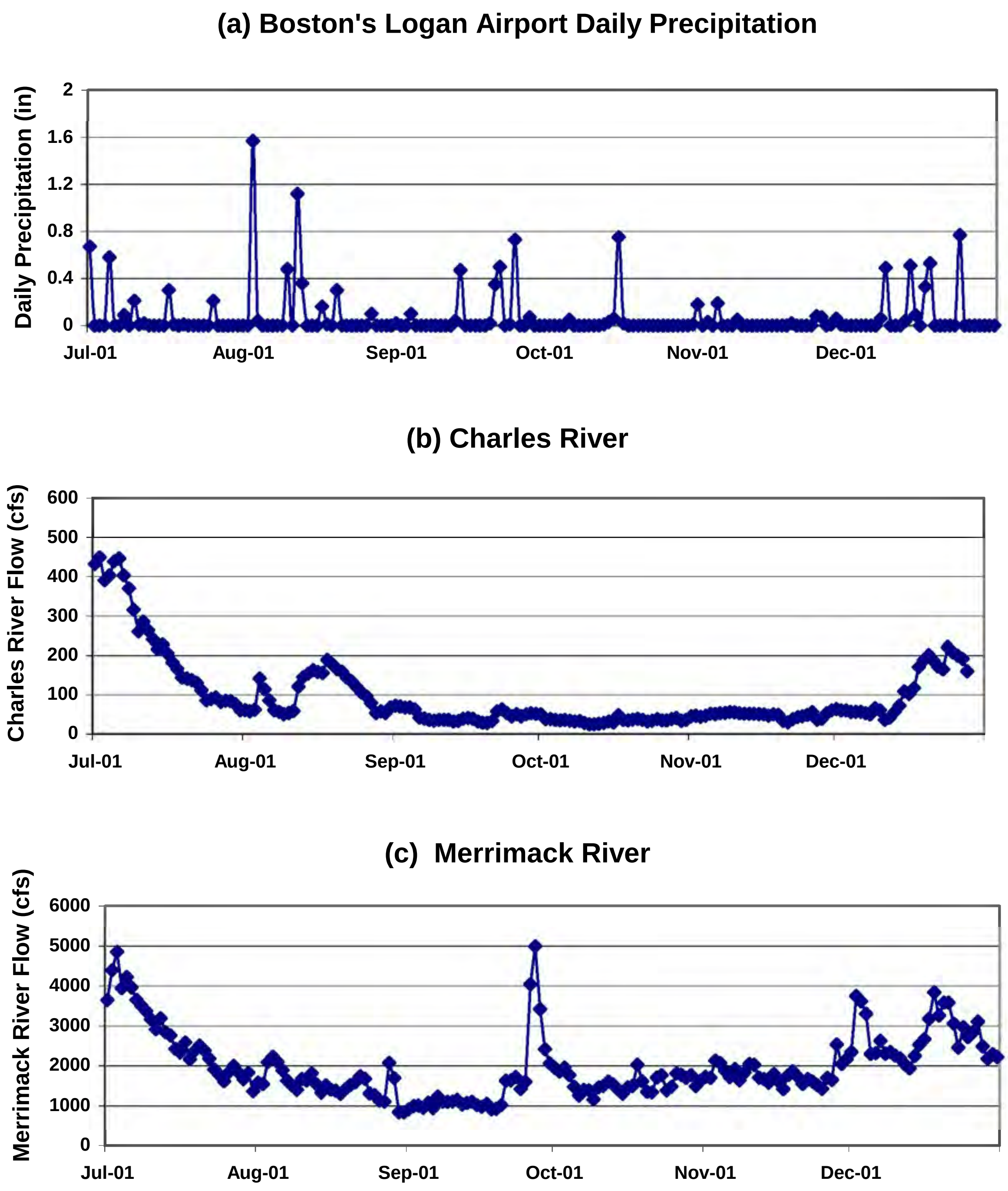


Figure 4-4. Precipitation at Logan Airport and River Discharges for the Charles and Merrimack Rivers

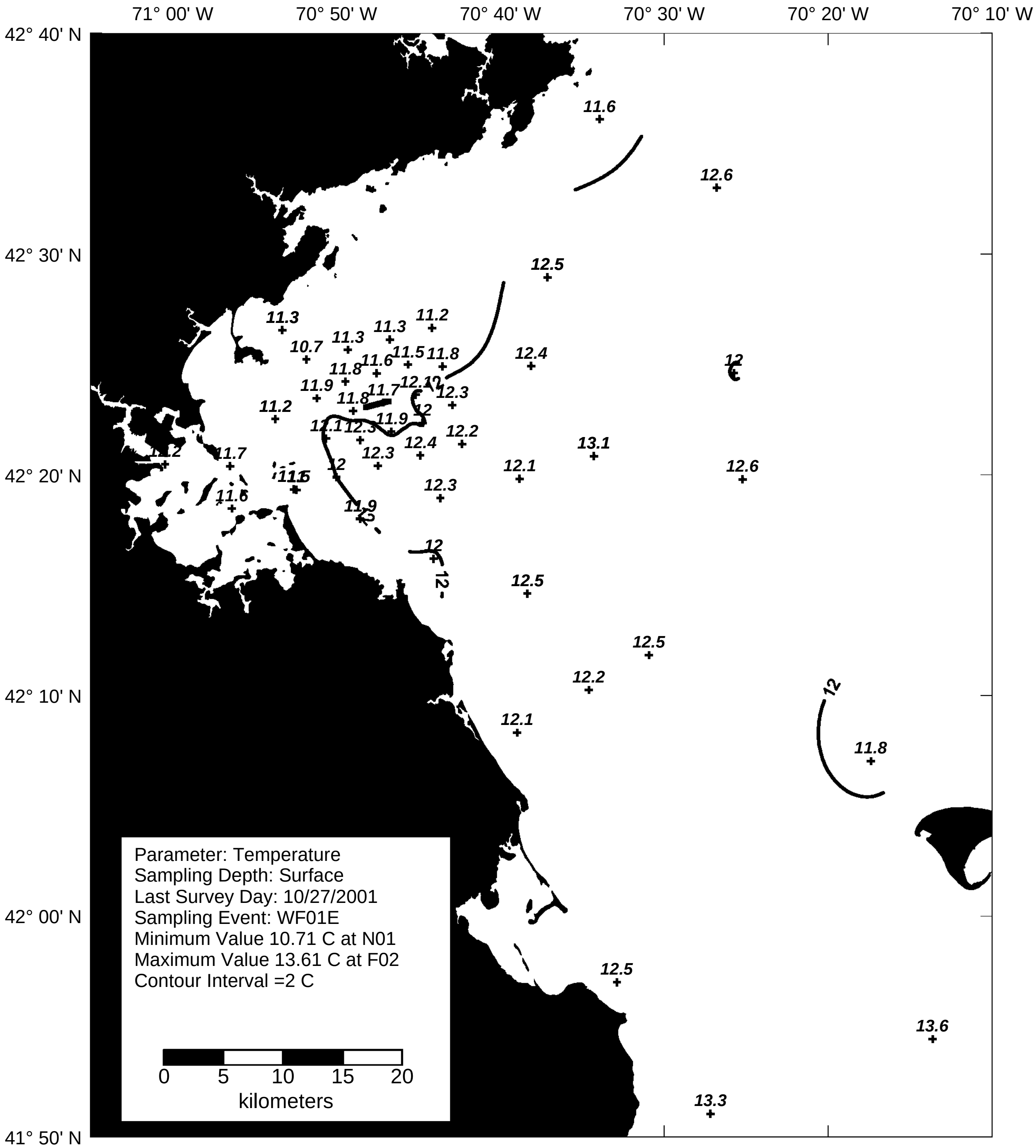


Figure 4-5. Temperature Surface Contour Plot for Farfield Survey WF01E (Oct 01)

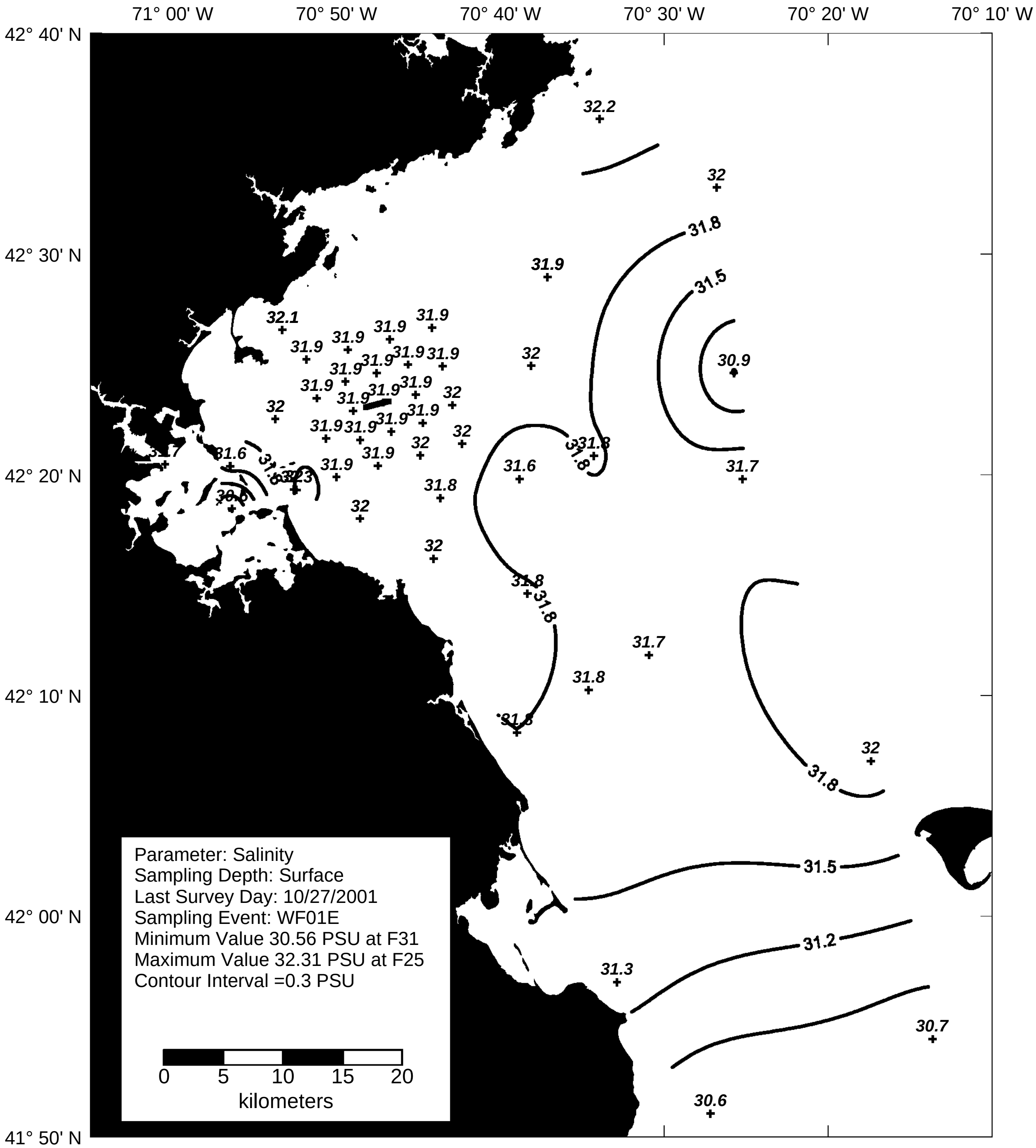


Figure 4-6. Salinity Surface Contour Plot for Farfield Survey WF01E (Oct 01)

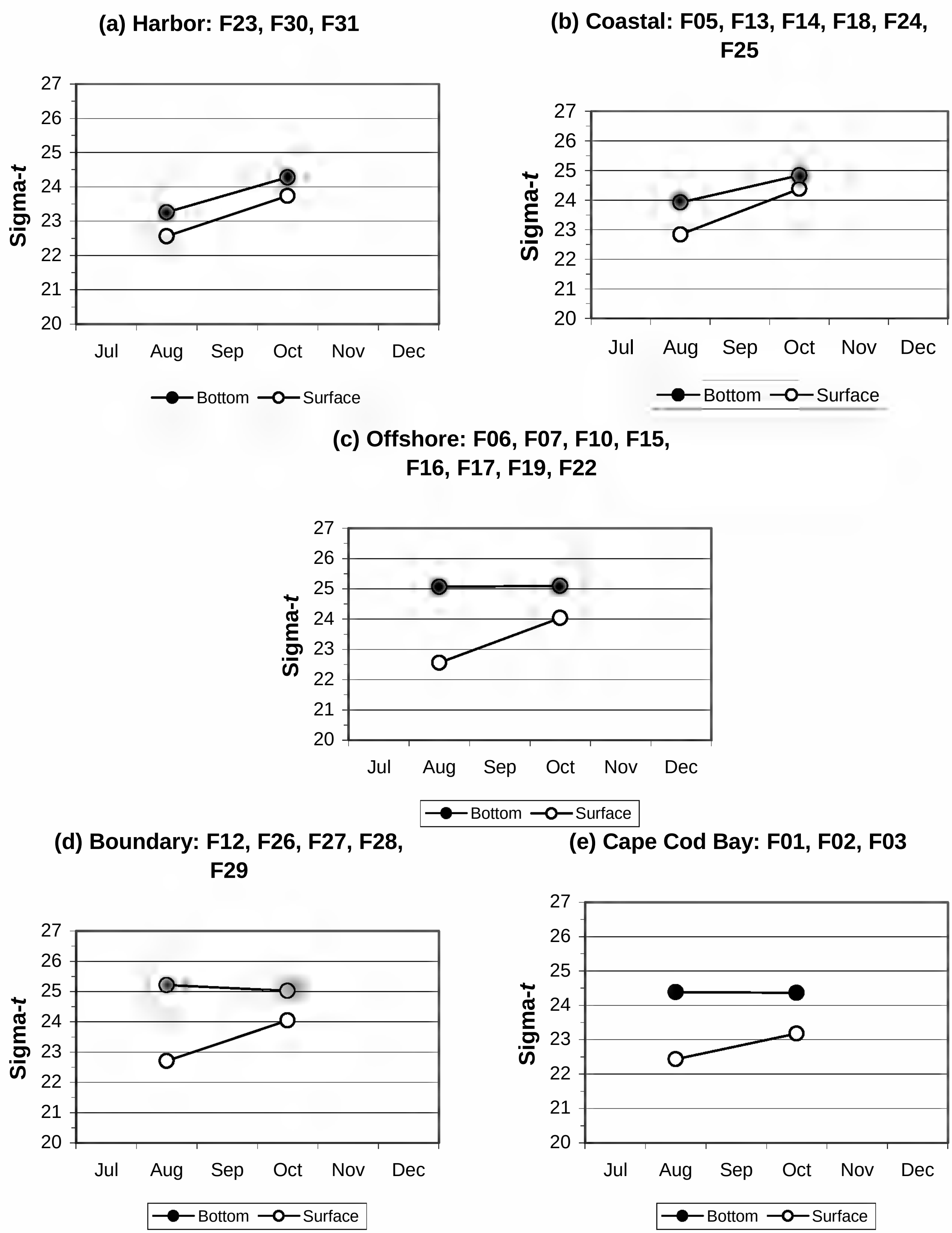


Figure 4-7. Time-Series of Average Surface and Bottom Water Density (σ_T) in the Farfield

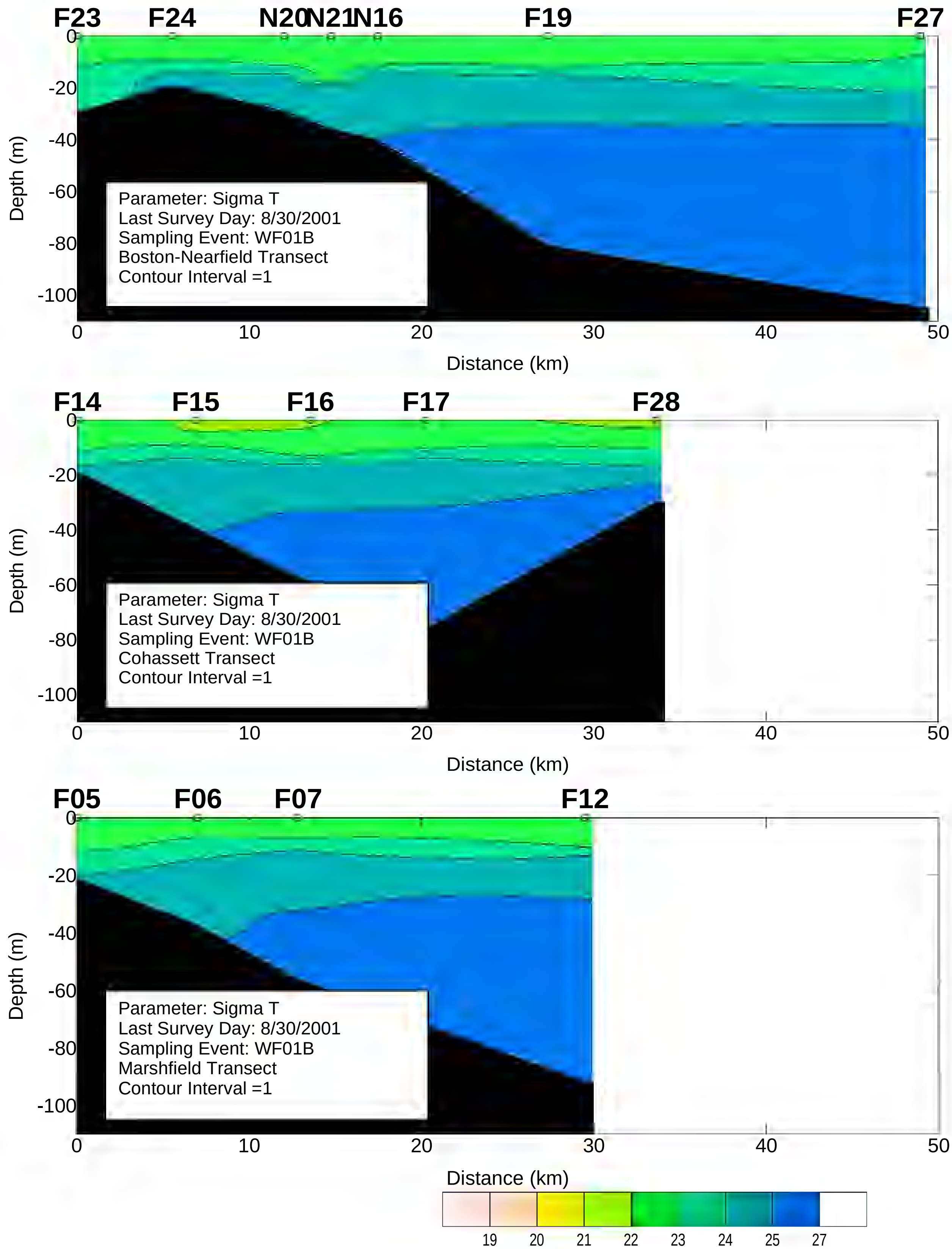


Figure 4-8. Sigma-*t* Vertical Transects for Farfield Survey WF01B (Aug 01)

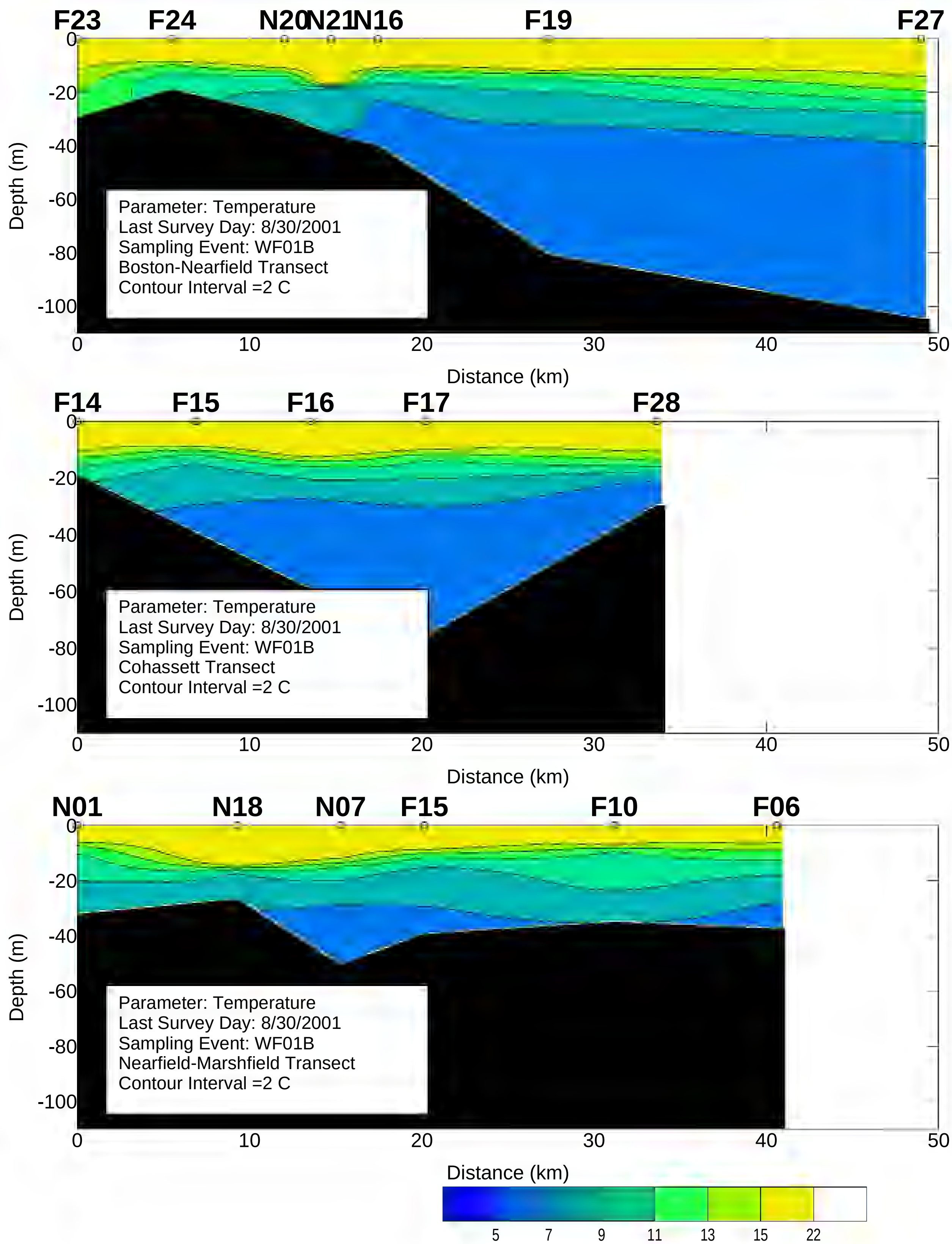


Figure 4-9. Temperature Vertical Transect for Farfield Survey WF01B (Aug 01)

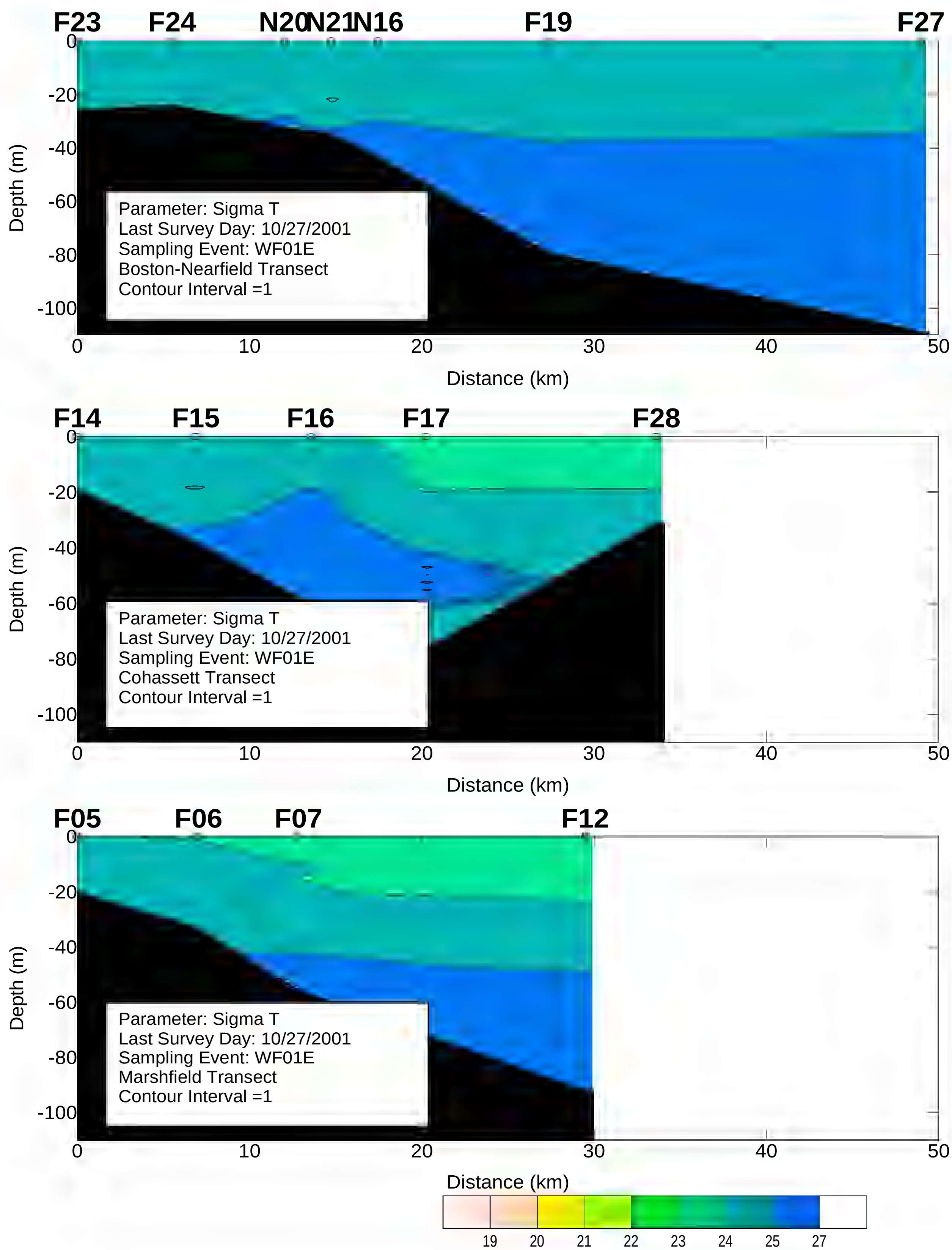
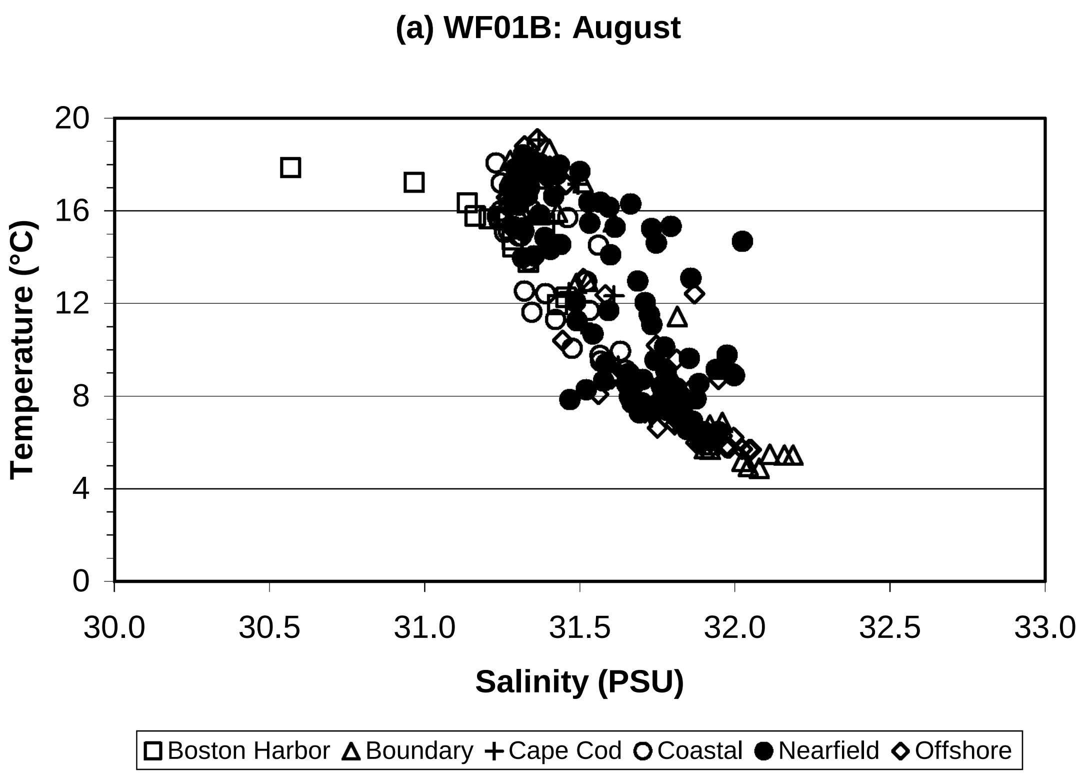


Figure 4-10. Sigma-*t* Vertical Transect for Farfield Survey WF01E (Oct 01)



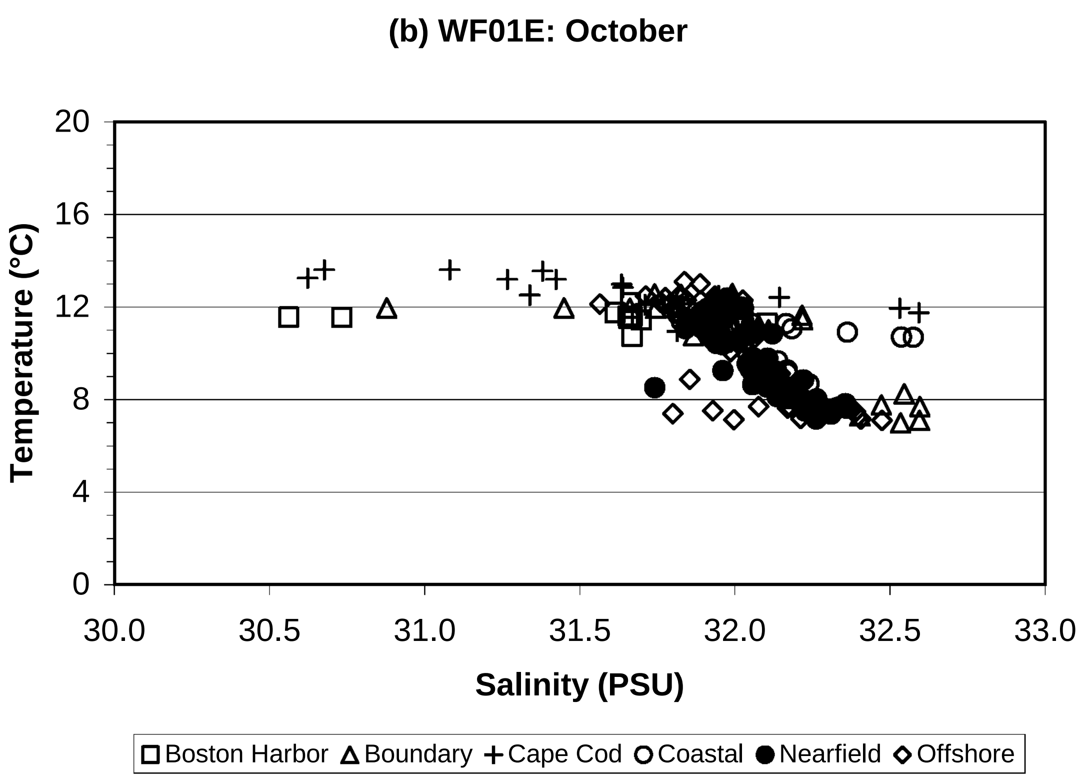


Figure 4-11. Temperature/Salinity Distribution for All Depths during (a) August and (b) October

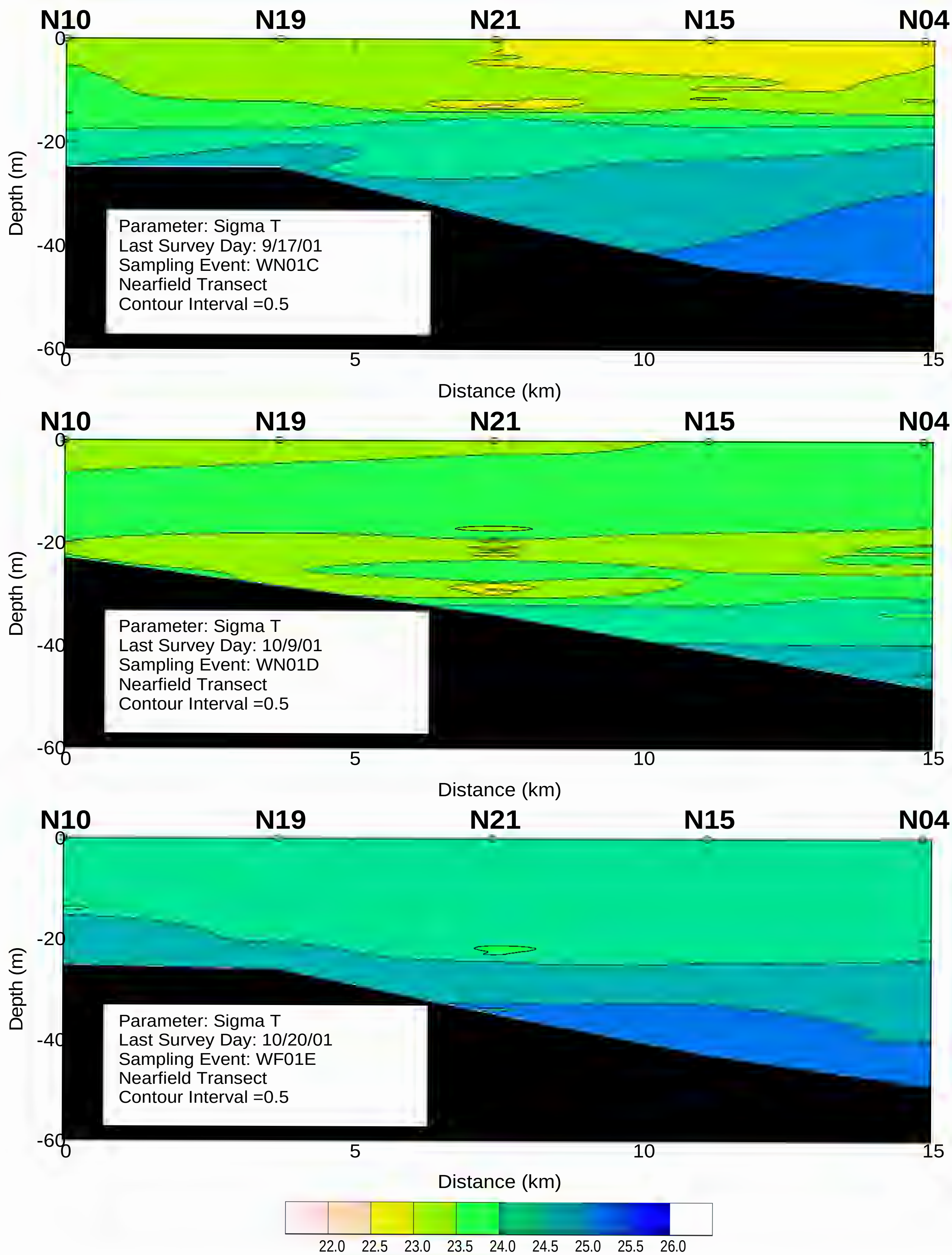


Figure 4-12. Sigma-*t* Vertical Nearfield Transect for Surveys WN01C, WN01D, and WF01E

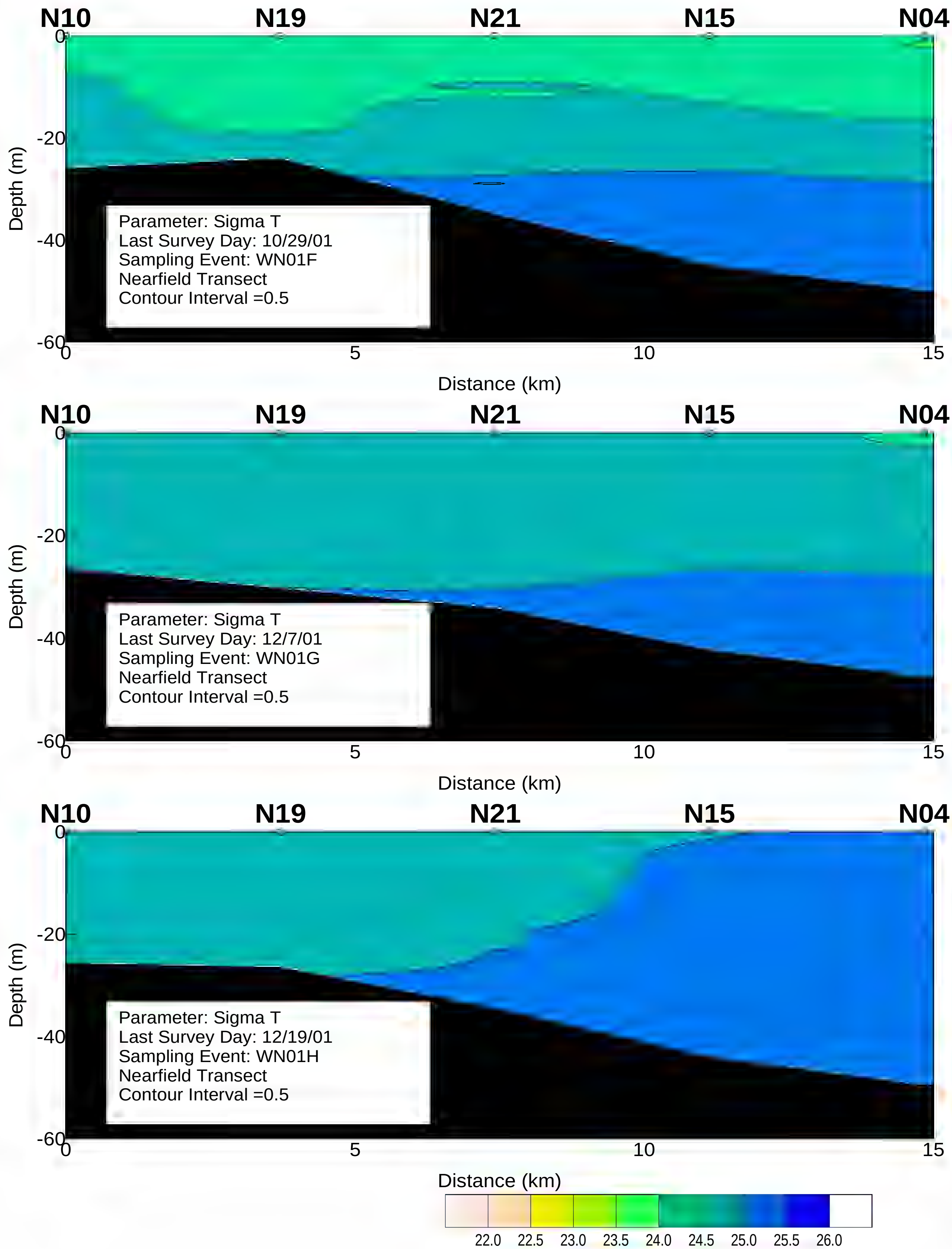


Figure 4-13. Sigma-*t* Vertical Nearfield Transect for Surveys WN01F, WN01G, and WN01H

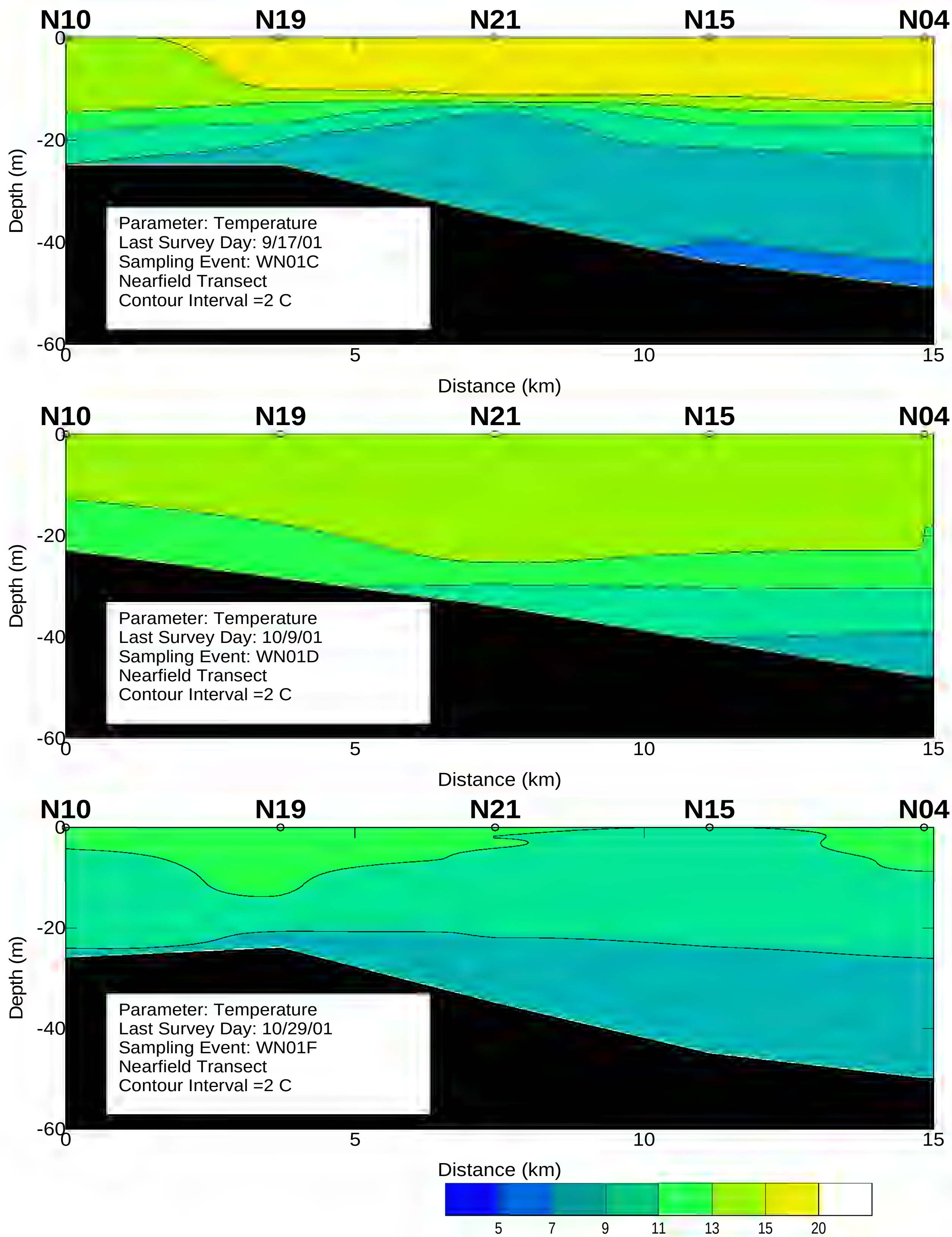


Figure 4-14. Temperature Vertical Nearfield Transect for Surveys WN01C, WN01D, and WN01F

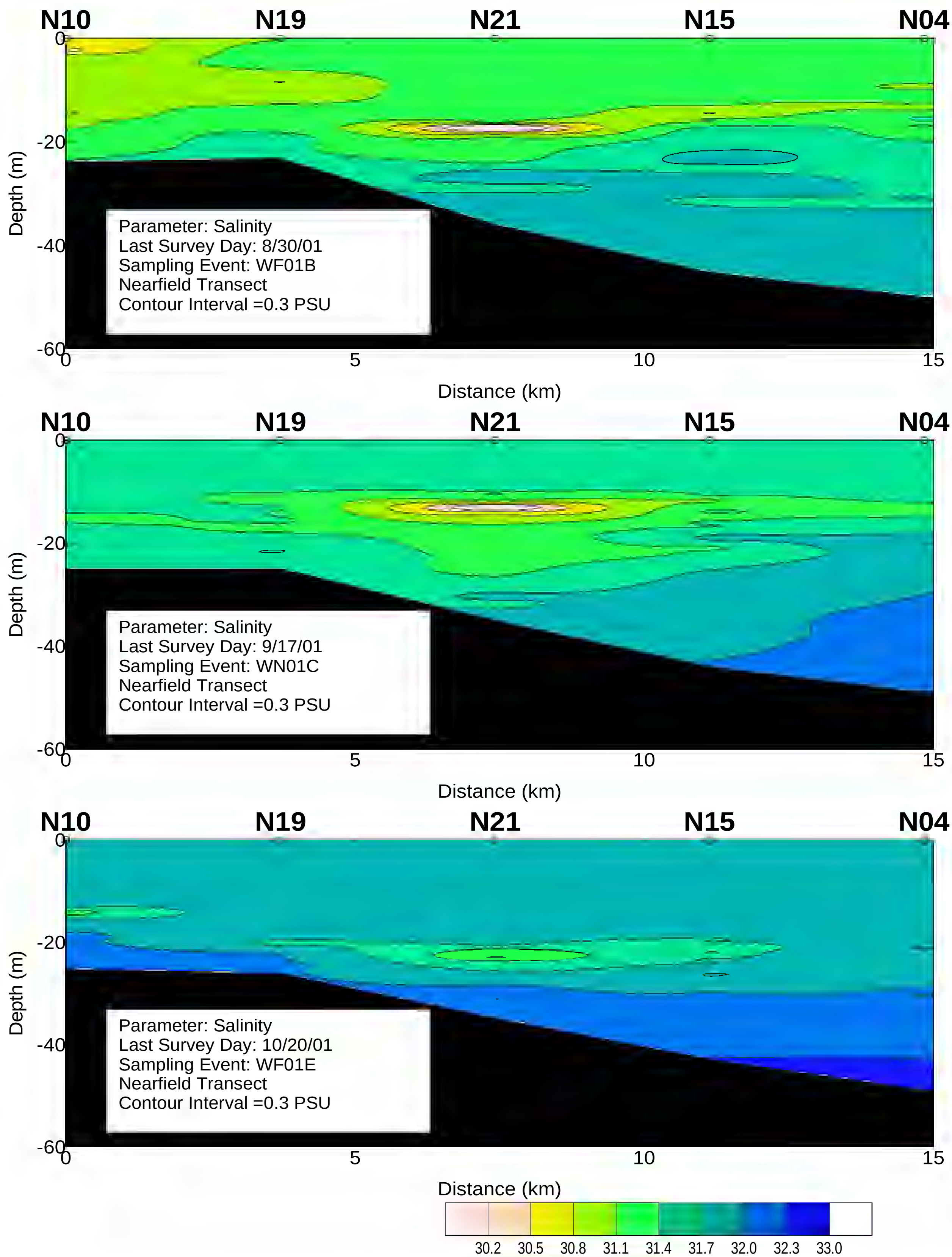


Figure 4-15. Salinity Vertical Nearfield Transect for Surveys WF01B, WN01C, and WF01E

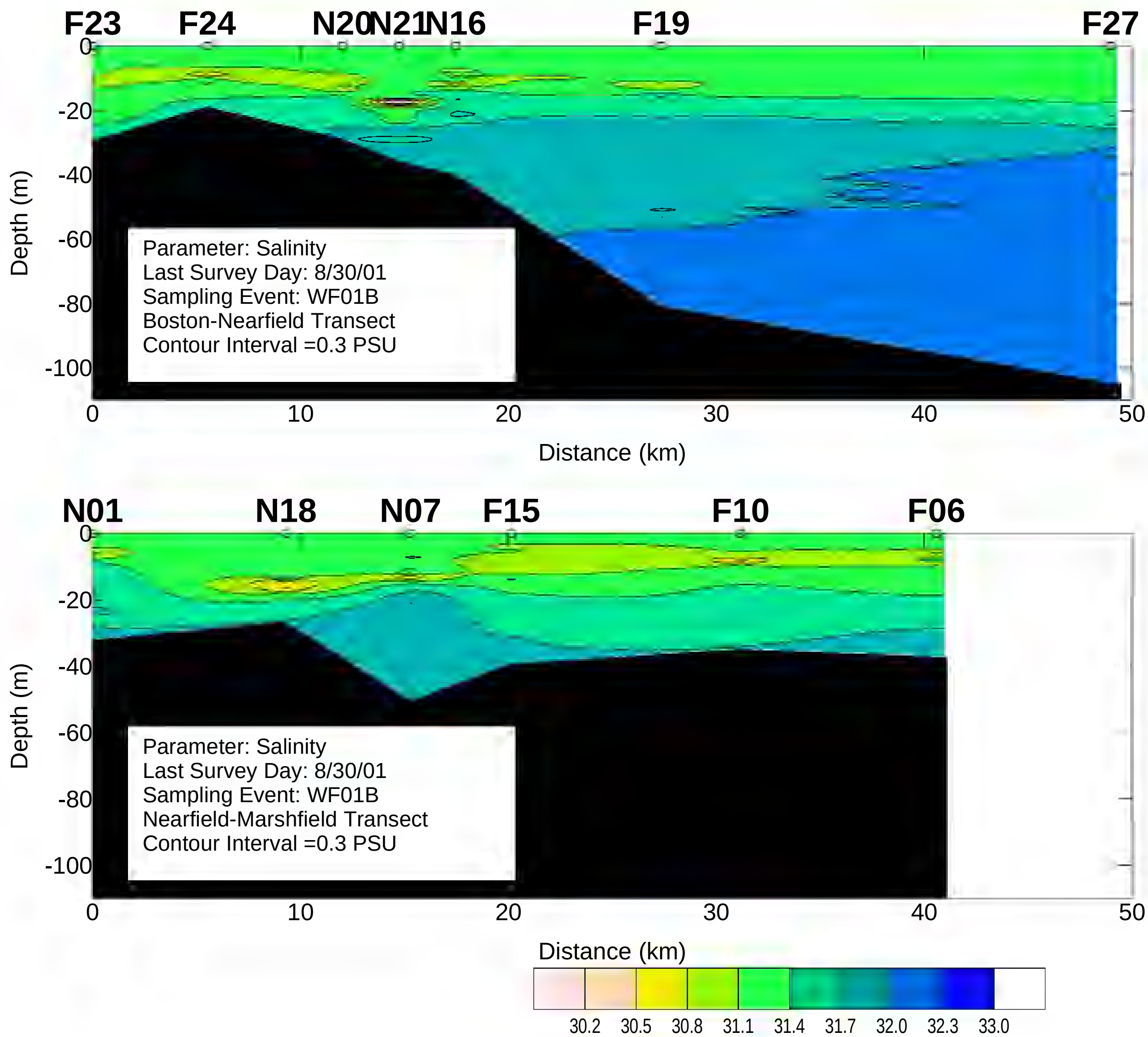


Figure 4-16. Salinity Vertical (a) Boston-Nearfield and (b) Nearfield-Marshfield Transects for Survey WF01B

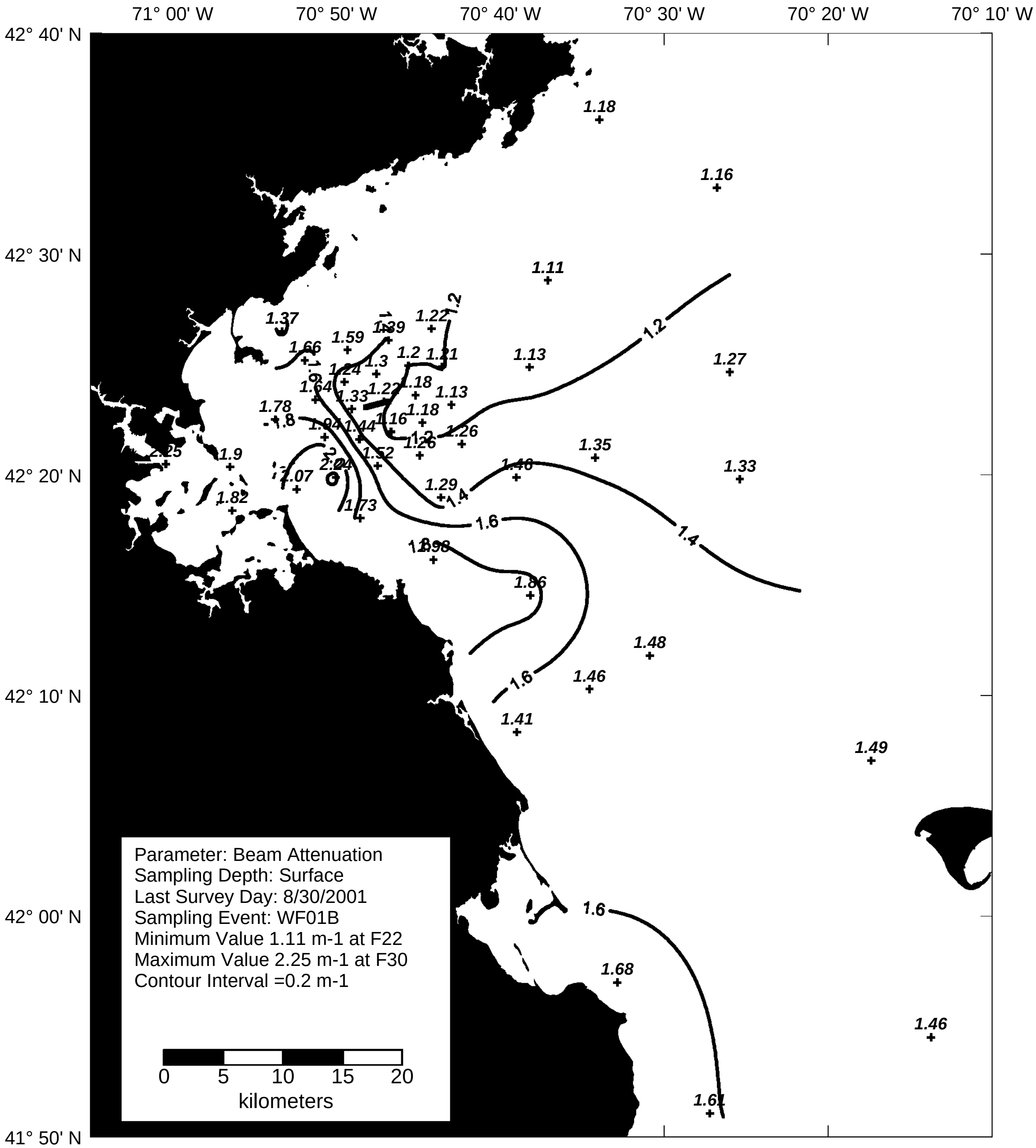


Figure 4-17. Beam Attenuation Surface Contour Plot for Farfield Survey WF01B (Aug 01)

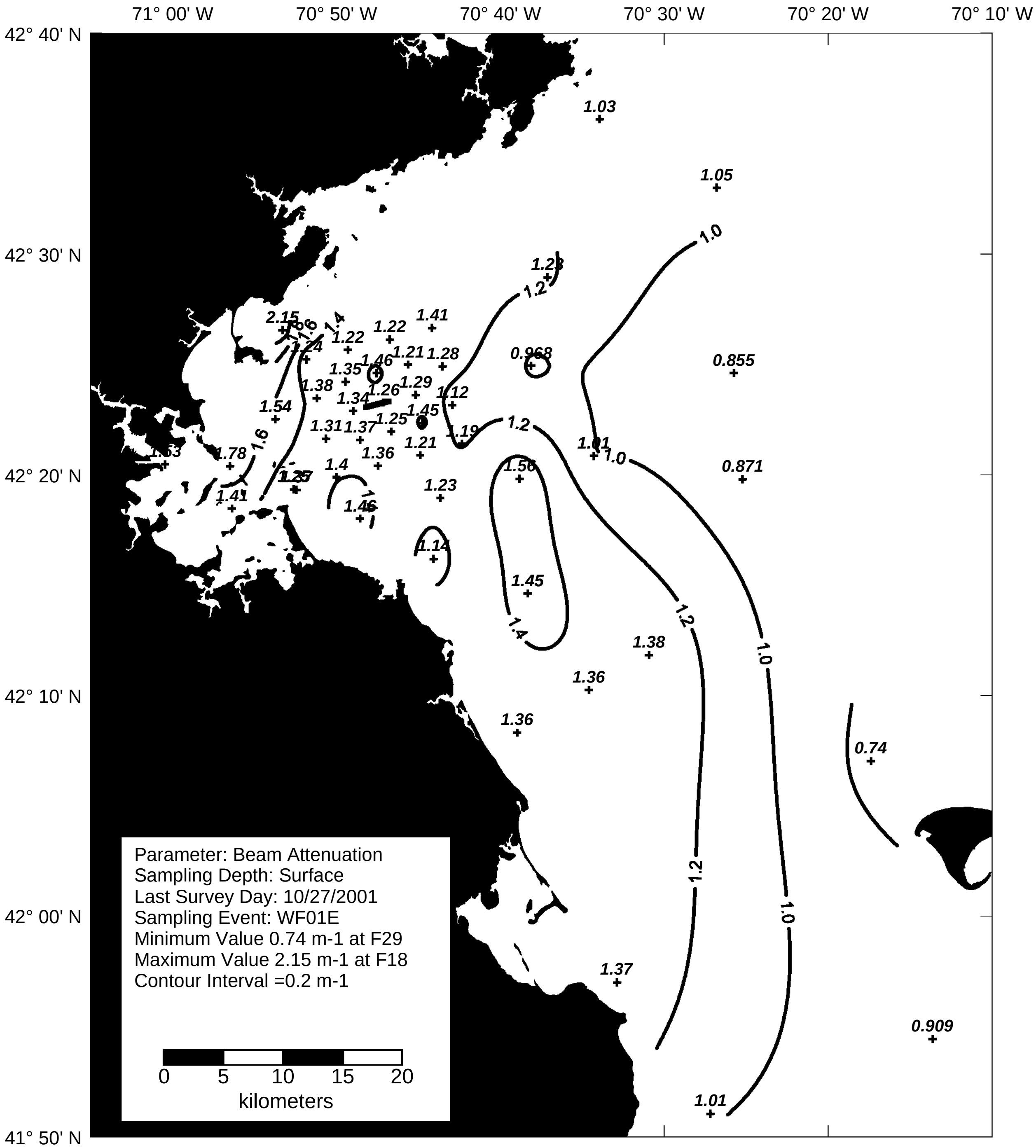


Figure 4-18. Beam Attenuation Surface Contour Plot for Farfield Survey WF01E (Oct 01)

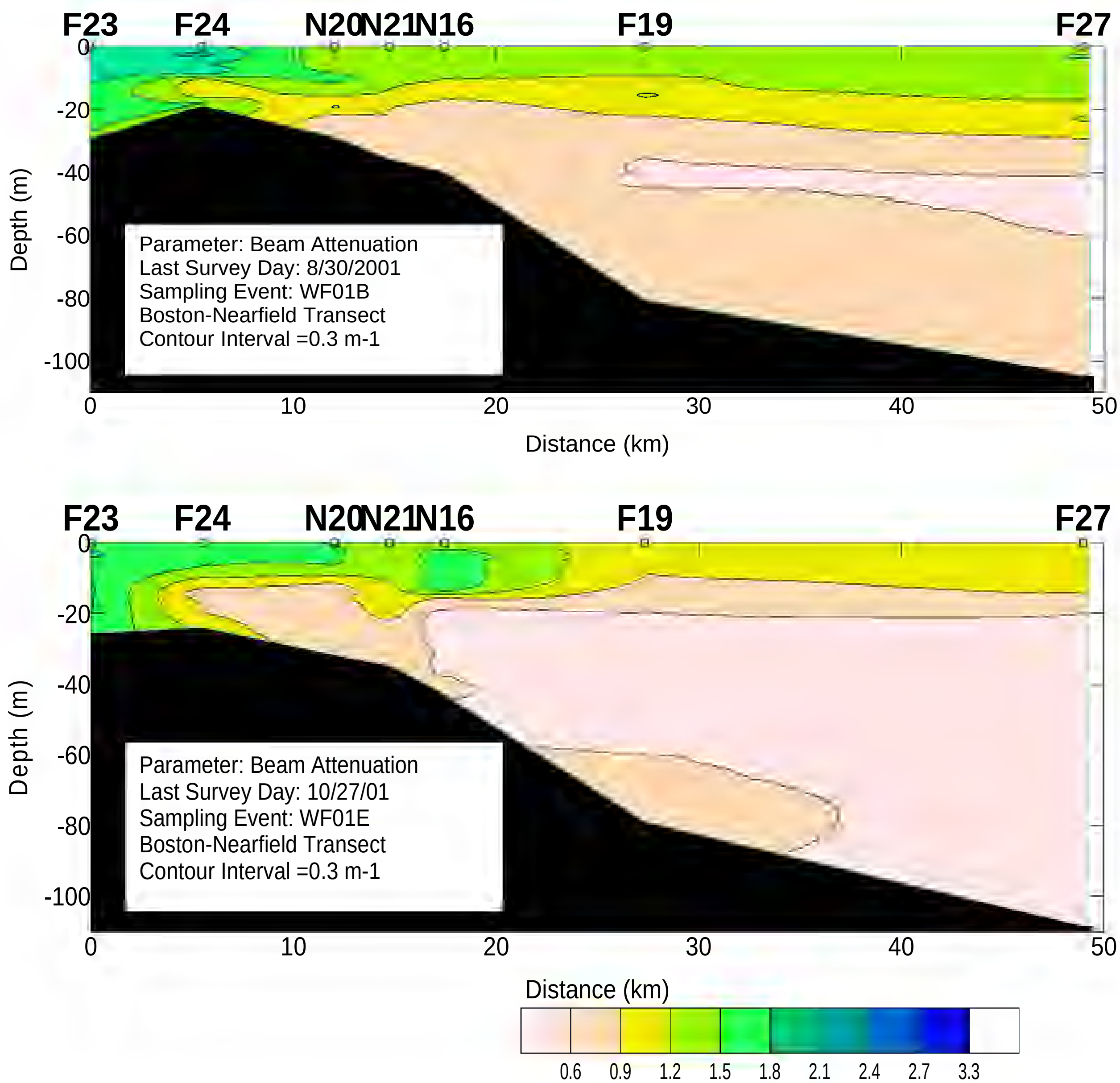


Figure 4-19. Beam Attenuation Boston-Nearfield Transects for Farfield Surveys WF01B (Aug 01) and WF01E (Oct 01)

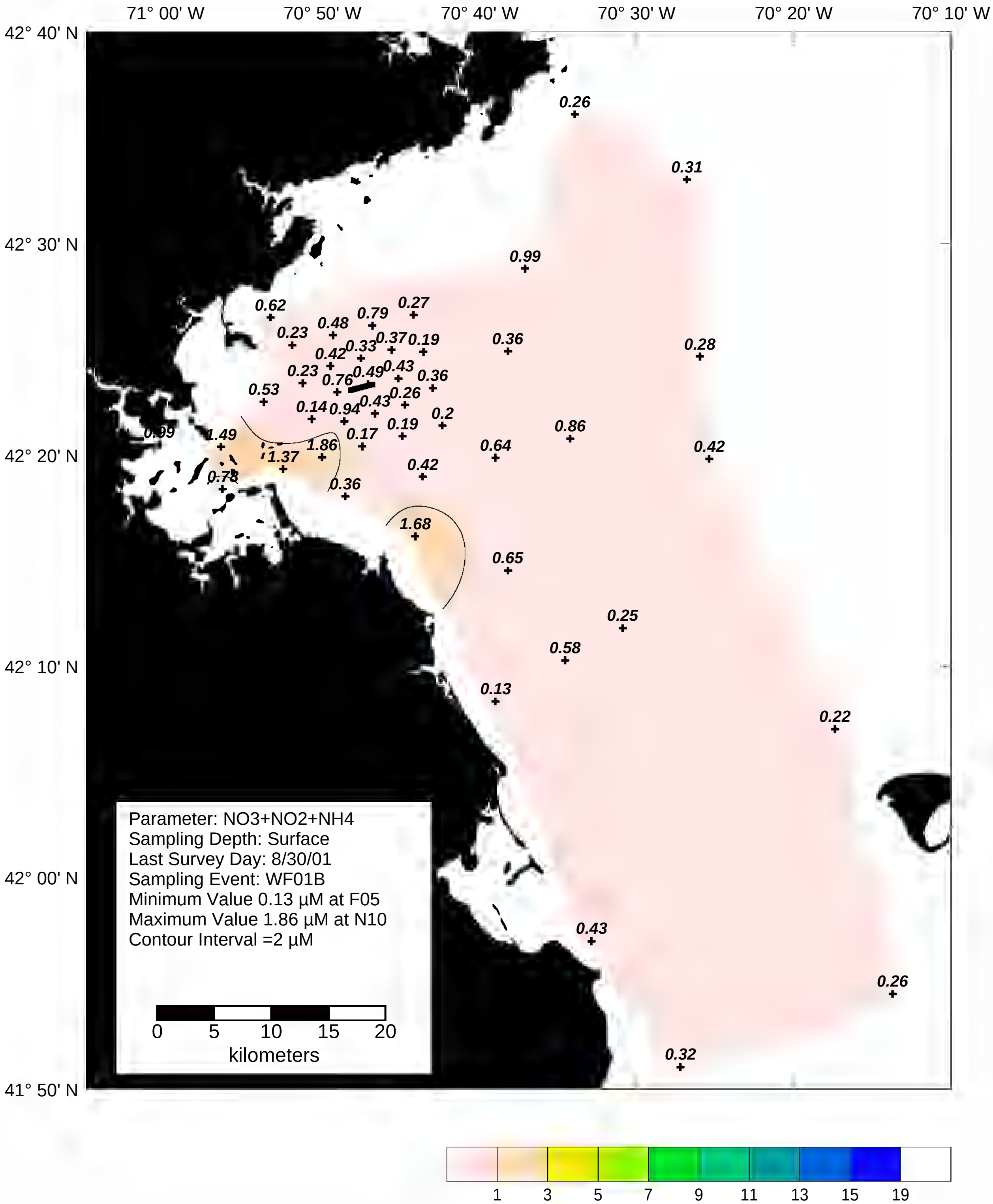


Figure 4-20. DIN Surface Contour Plot for Farfield Survey WF01B (Aug 01)

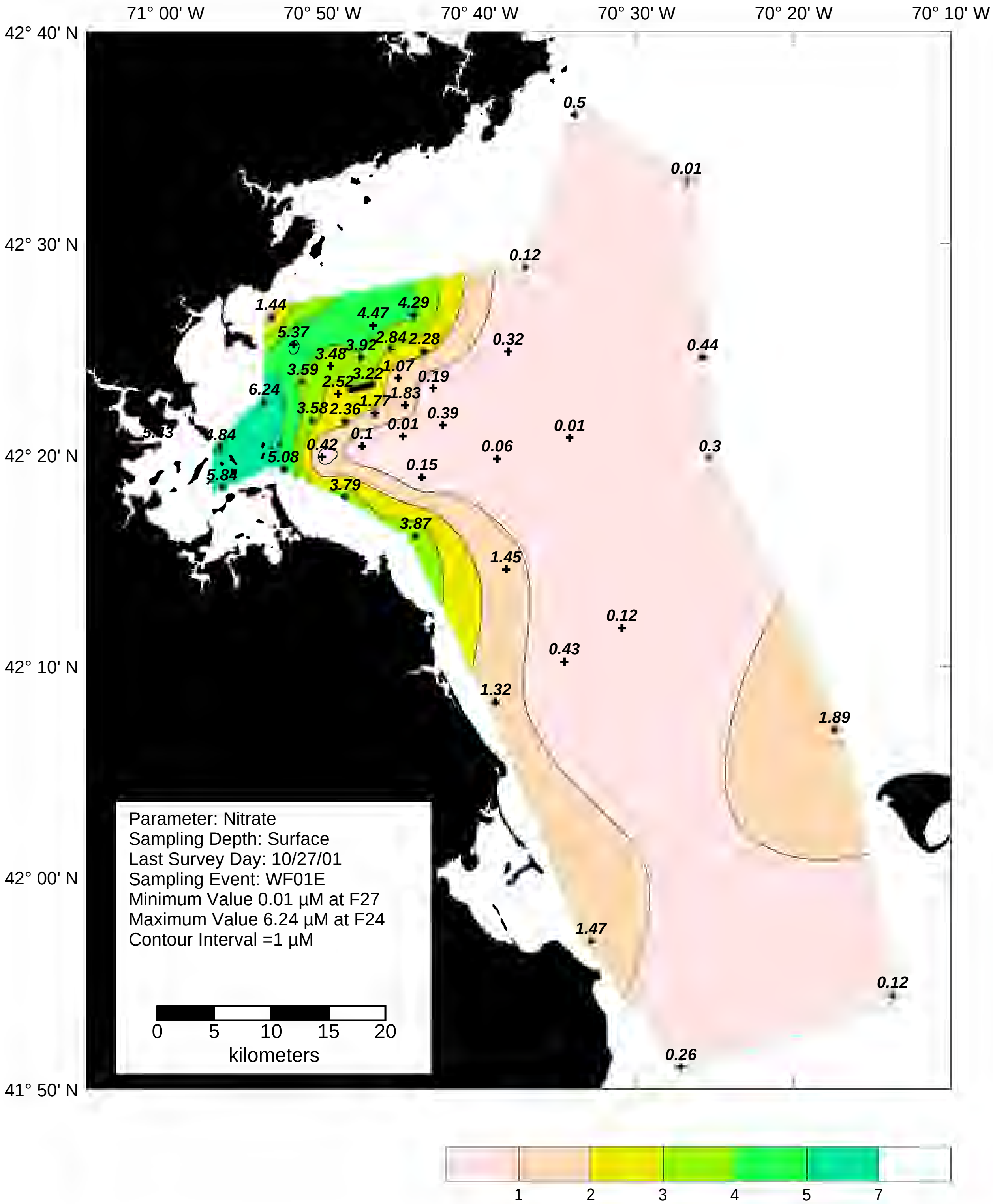


Figure 4-21. Nitrate Surface Contour Plot for Farfield Survey WF01E (Oct 01)

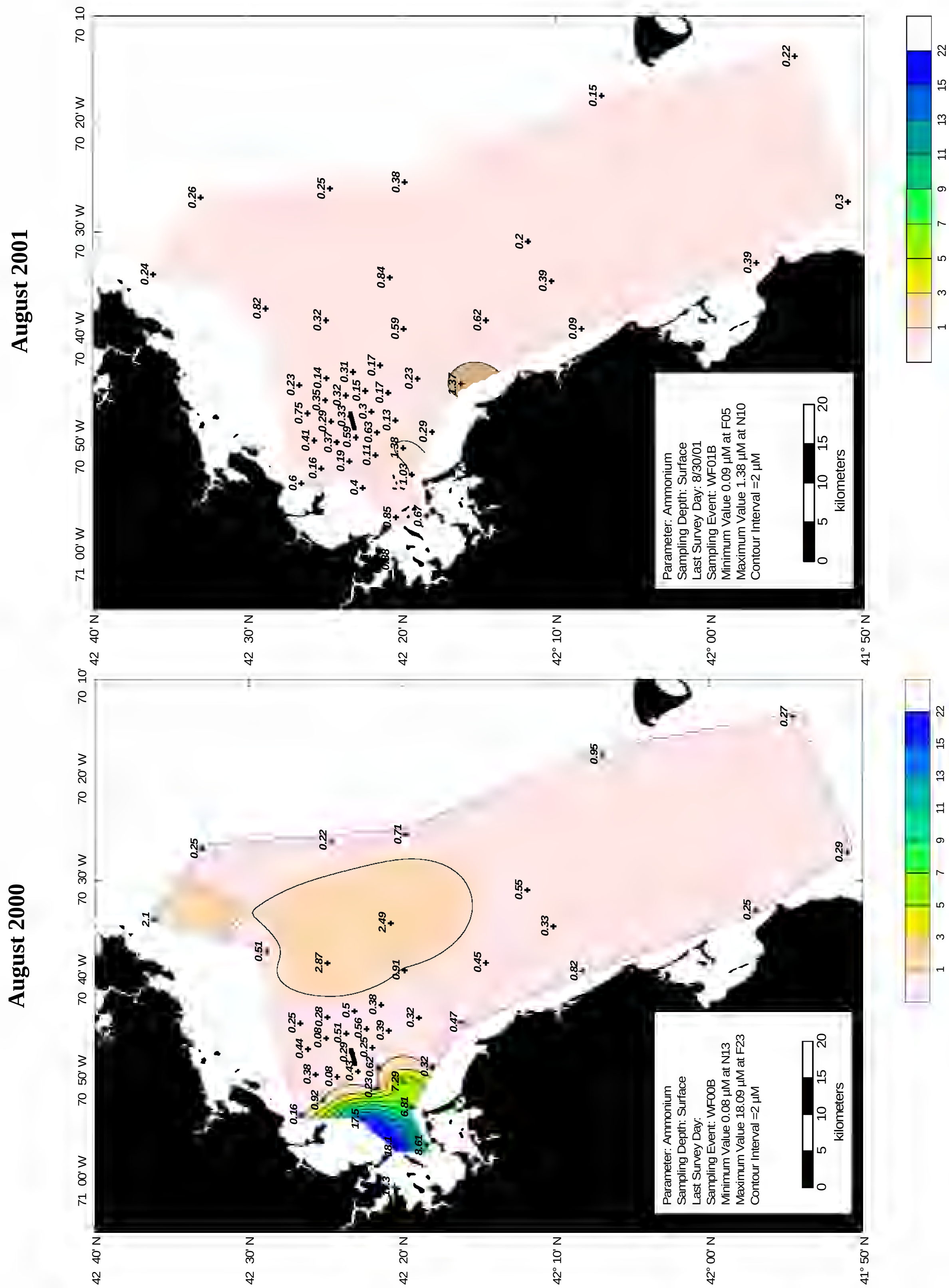


Figure 4-22. Ammonium Surface Contour Plot for Farfield Surveys WF00B (Aug 00) and WF01B (Aug 01)

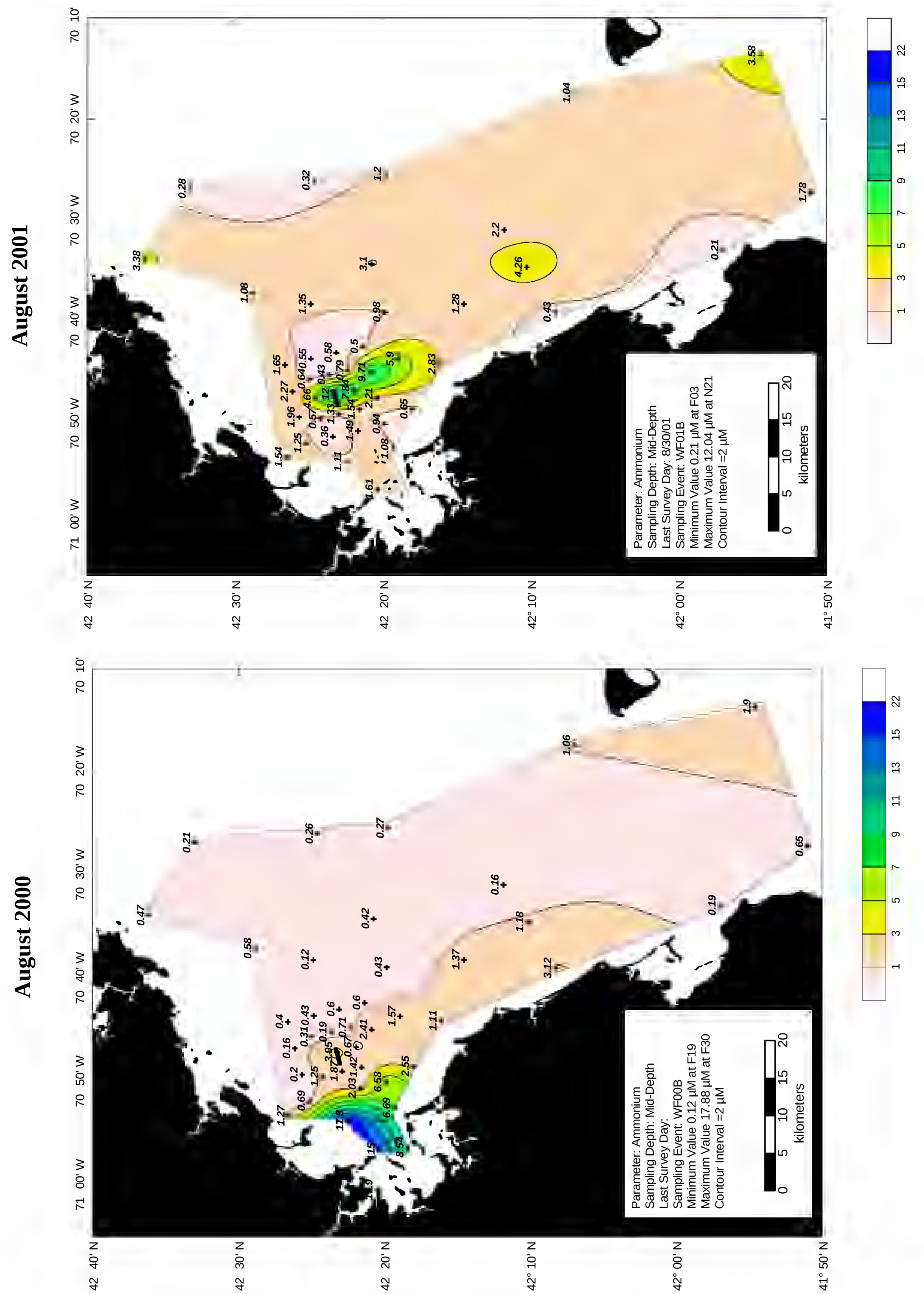


Figure 4-23. Ammonium Mid-Depth Contour Plot for Farfield Surveys WF00B (Aug 00) and WF01B(Aug 01)

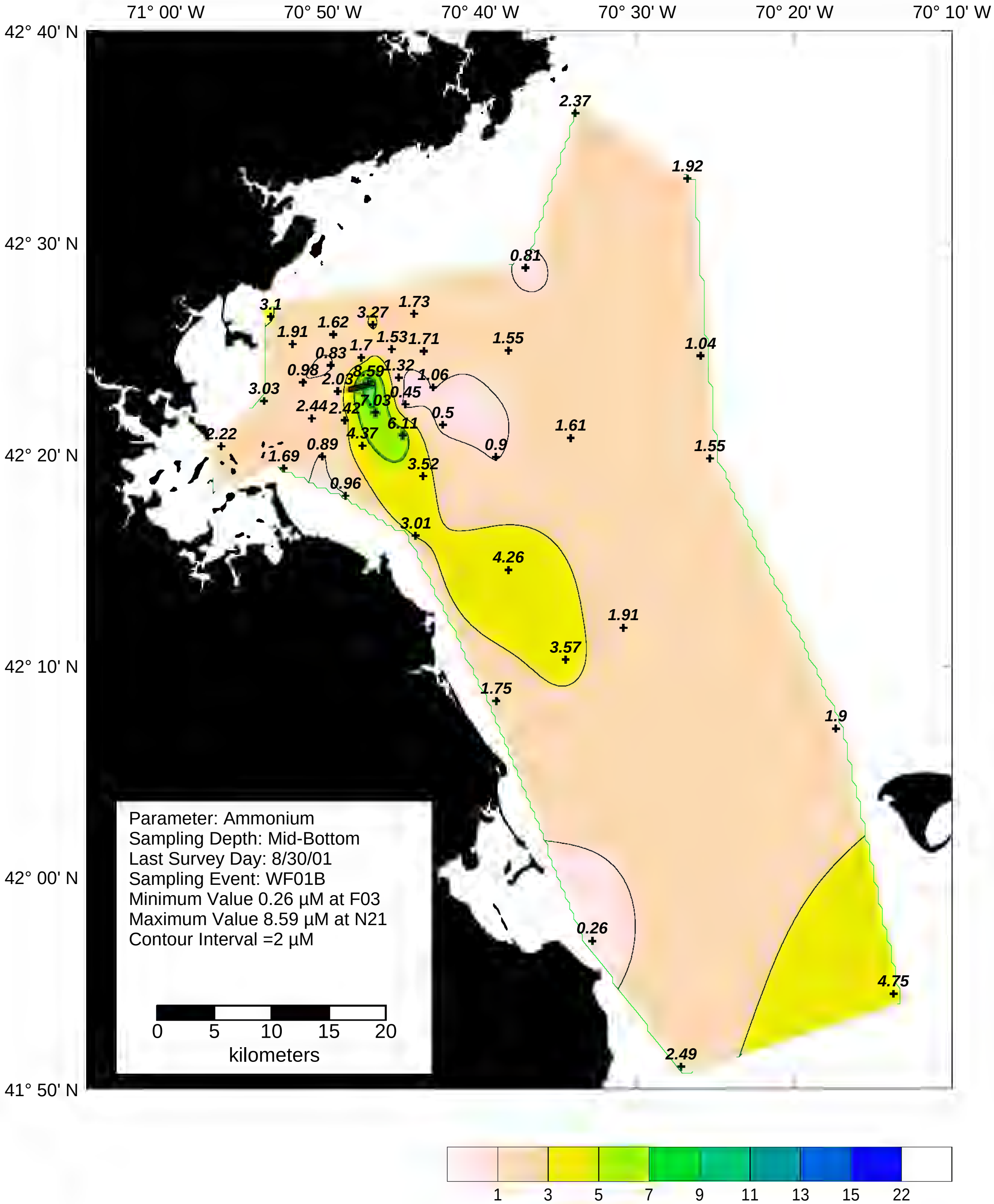


Figure 4-24. Ammonium Mid-Bottom Contour Plots for Farfield Survey WF01B (Aug 01)

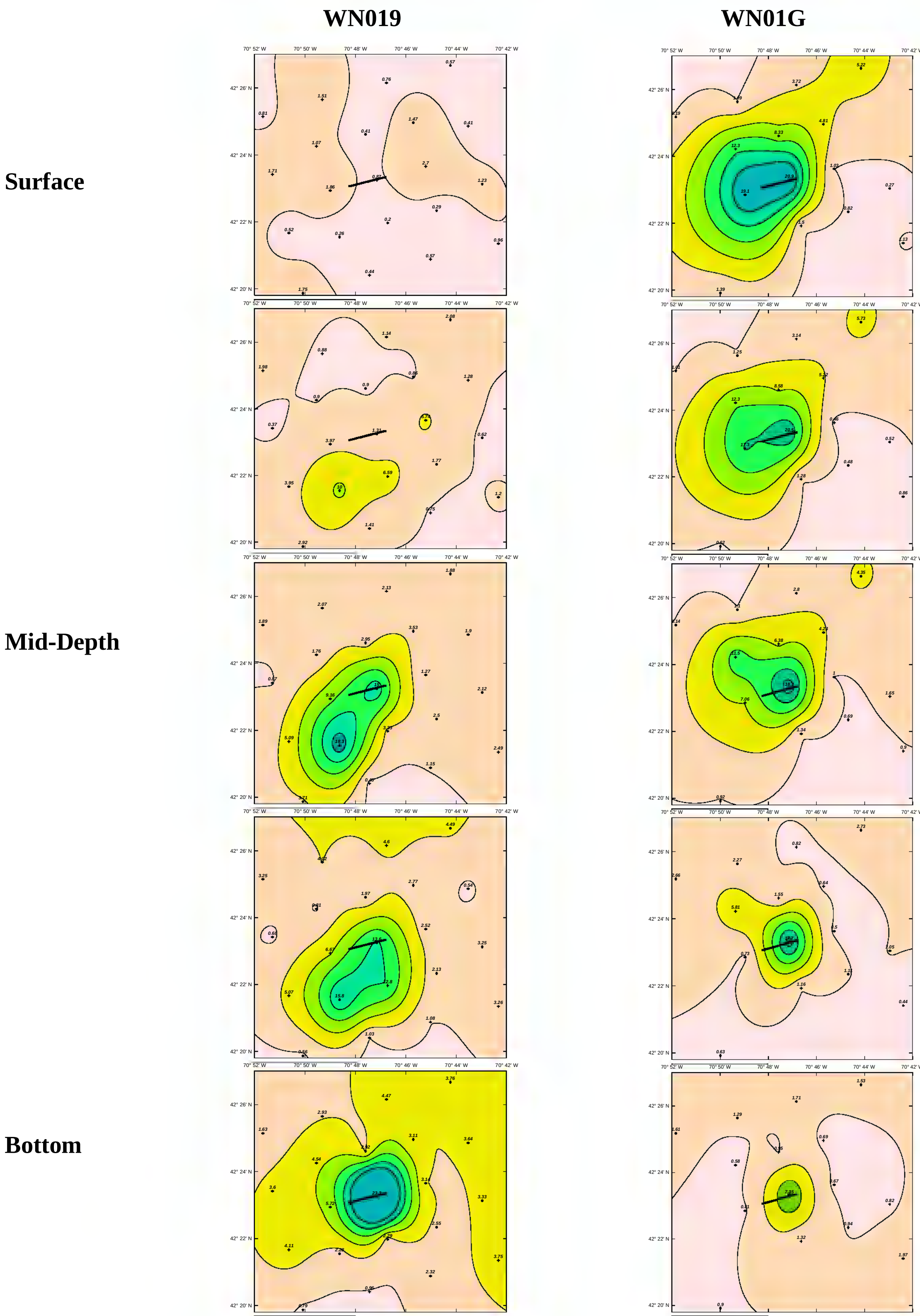


Figure 4-25. Ammonium Contour Plots at All Depths for Nearfield Surveys WN019 (Jul 01) and WN01G (Dec 01)

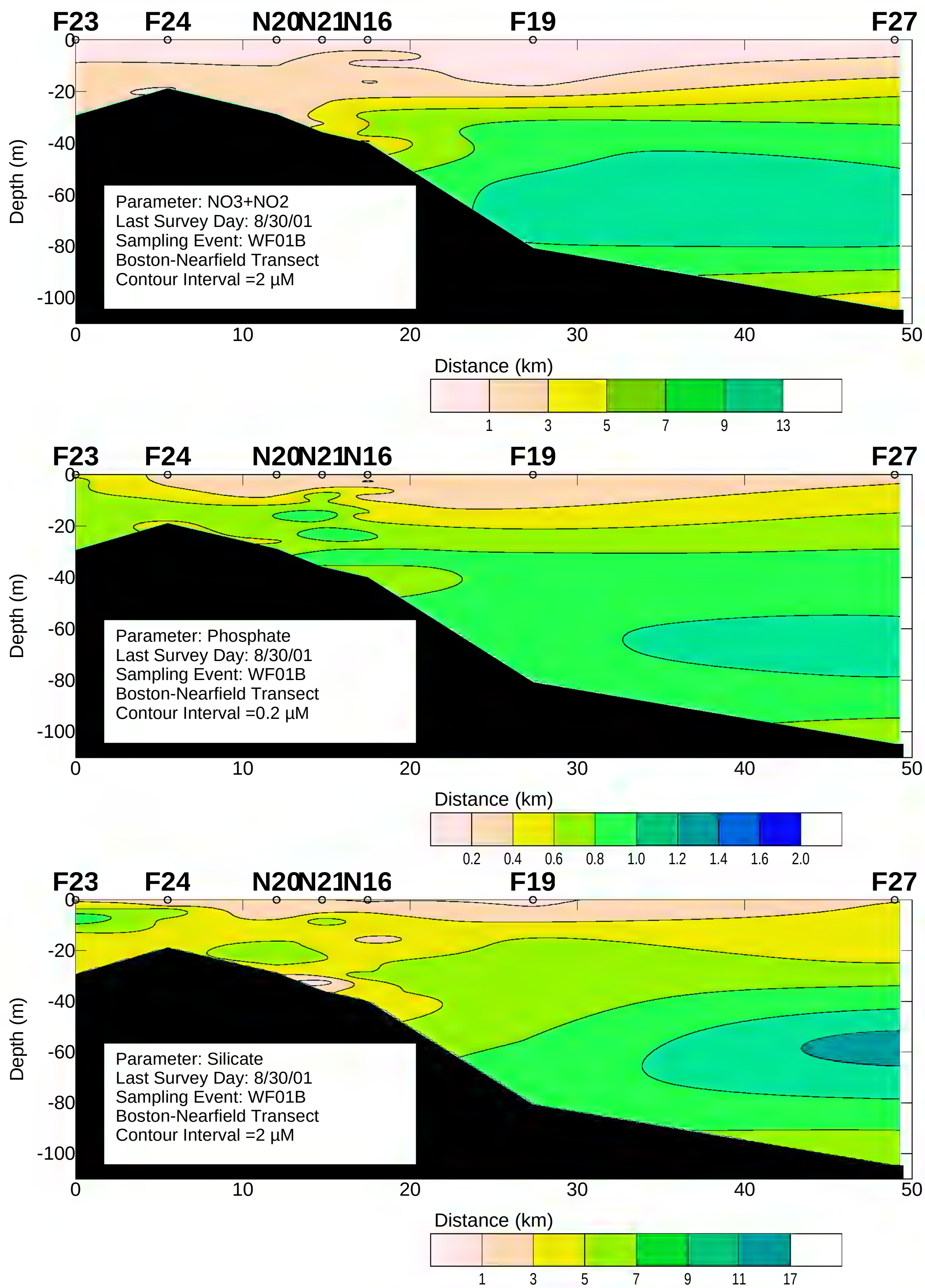


Figure 4-26. Nitrate, Phosphate, and Silicate Vertical Boston-Nearfield Transect Plots for Farfield Survey WF01B (Aug 01)

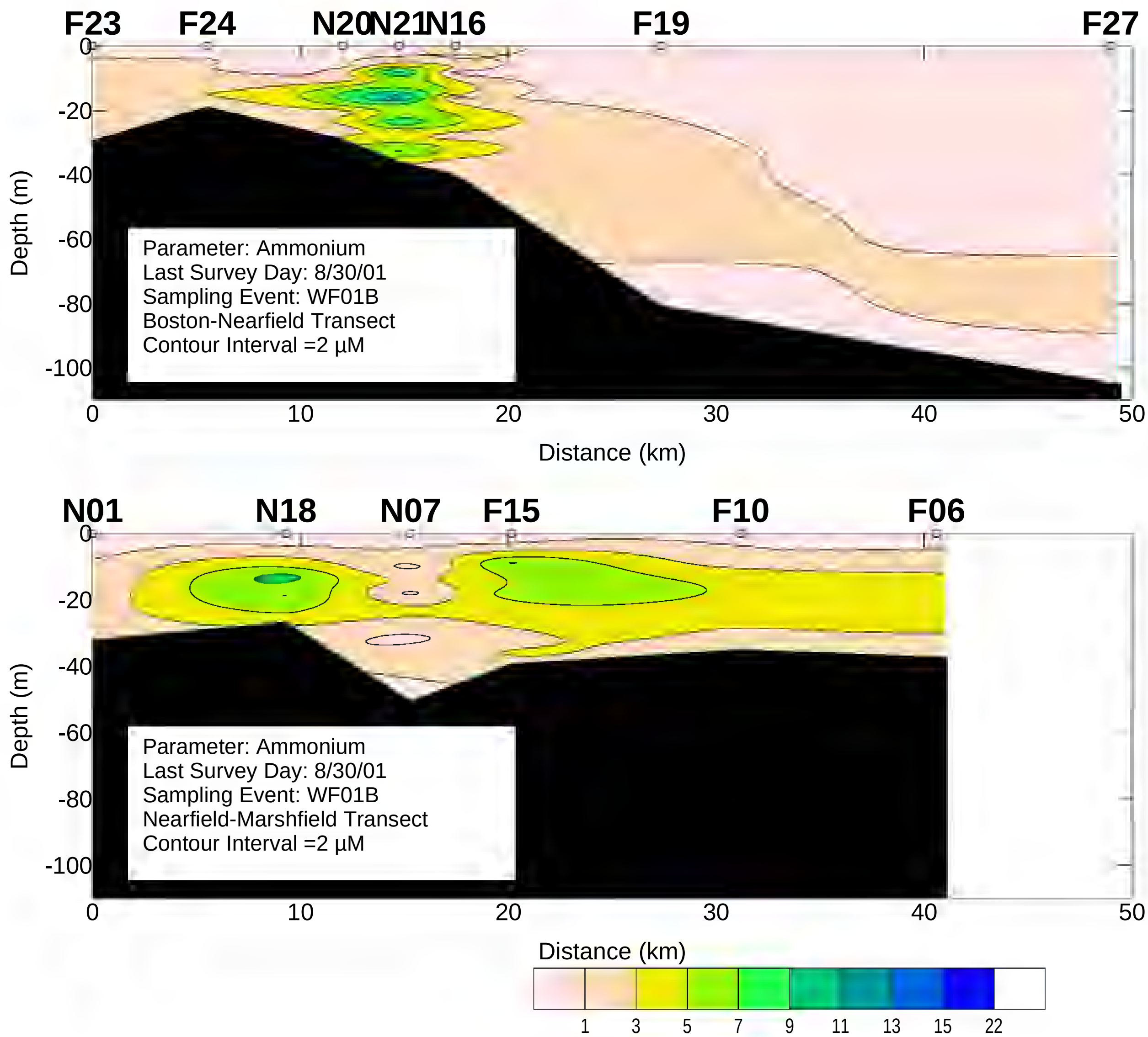


Figure 4-27. Ammonium Vertical Boston-Nearfield and Nearfield-Marshfield Transect Plots for Farfield Survey WF01B (Aug 01)

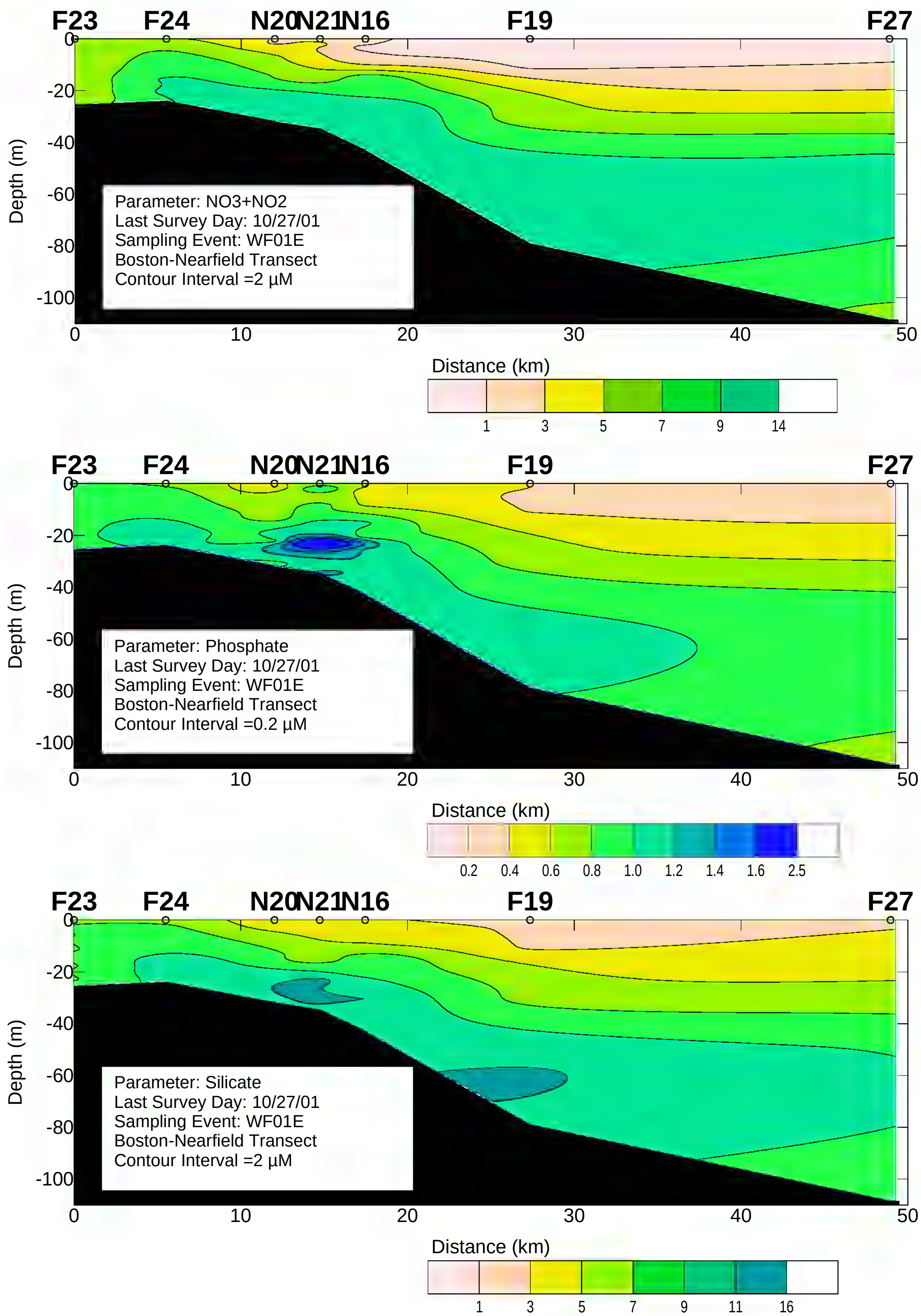


Figure 4-28. Nitrate, Phosphate, and Silicate Vertical Boston-Nearfield Transect Plots for Farfield Survey WF01E (Oct 01)

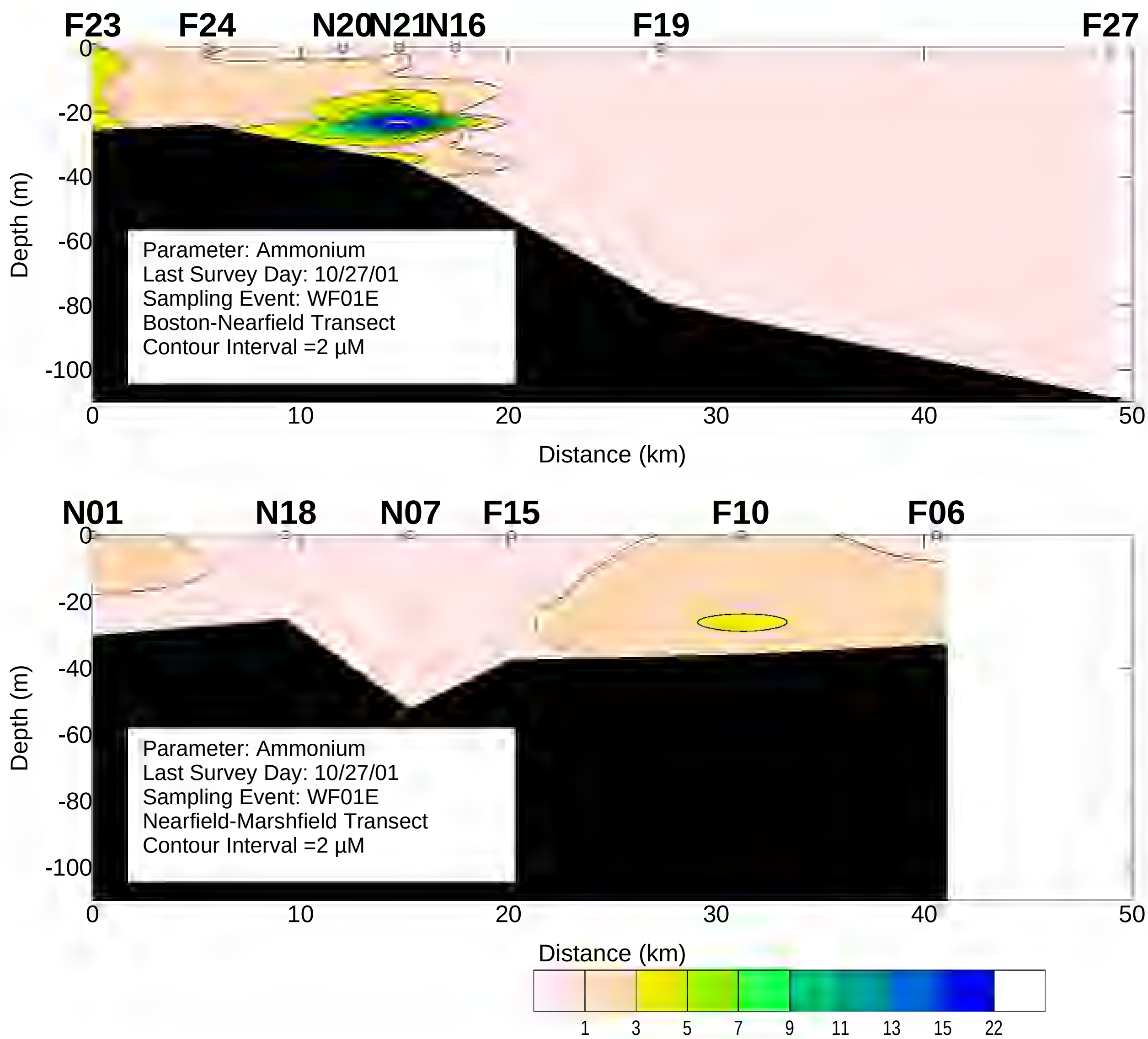


Figure 4-29. Ammonium Vertical Boston-Nearfield and Nearfield-Marshfield Transect Plots for Farfield Survey WF01E (Oct 01)

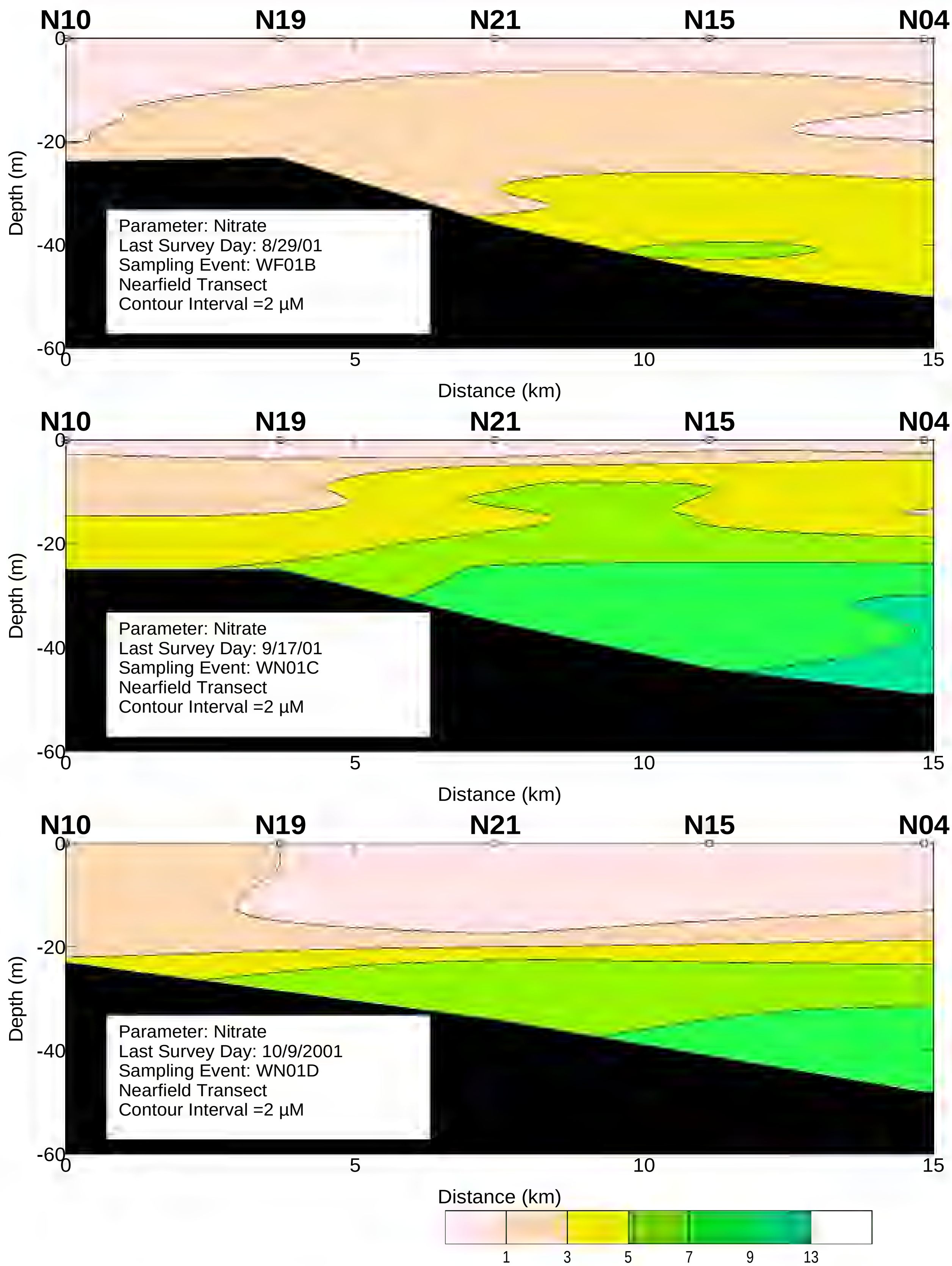


Figure 4-30. Nitrate Vertical Nearfield Transects for Surveys WF01B, WN01C, and WN01D

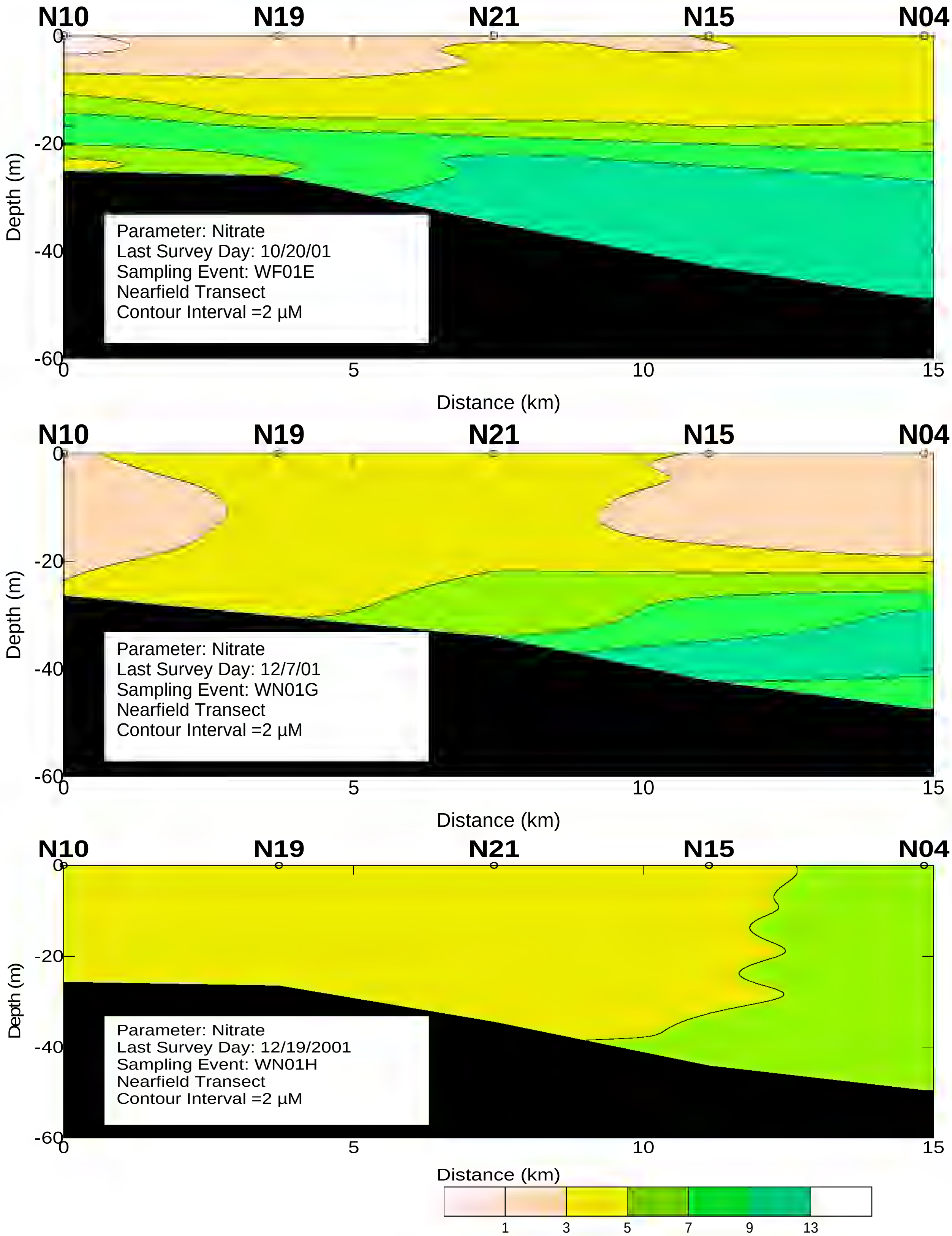


Figure 4-31. Nitrate Vertical Nearfield Transects for Surveys WF01E, WN01G, and WN01H

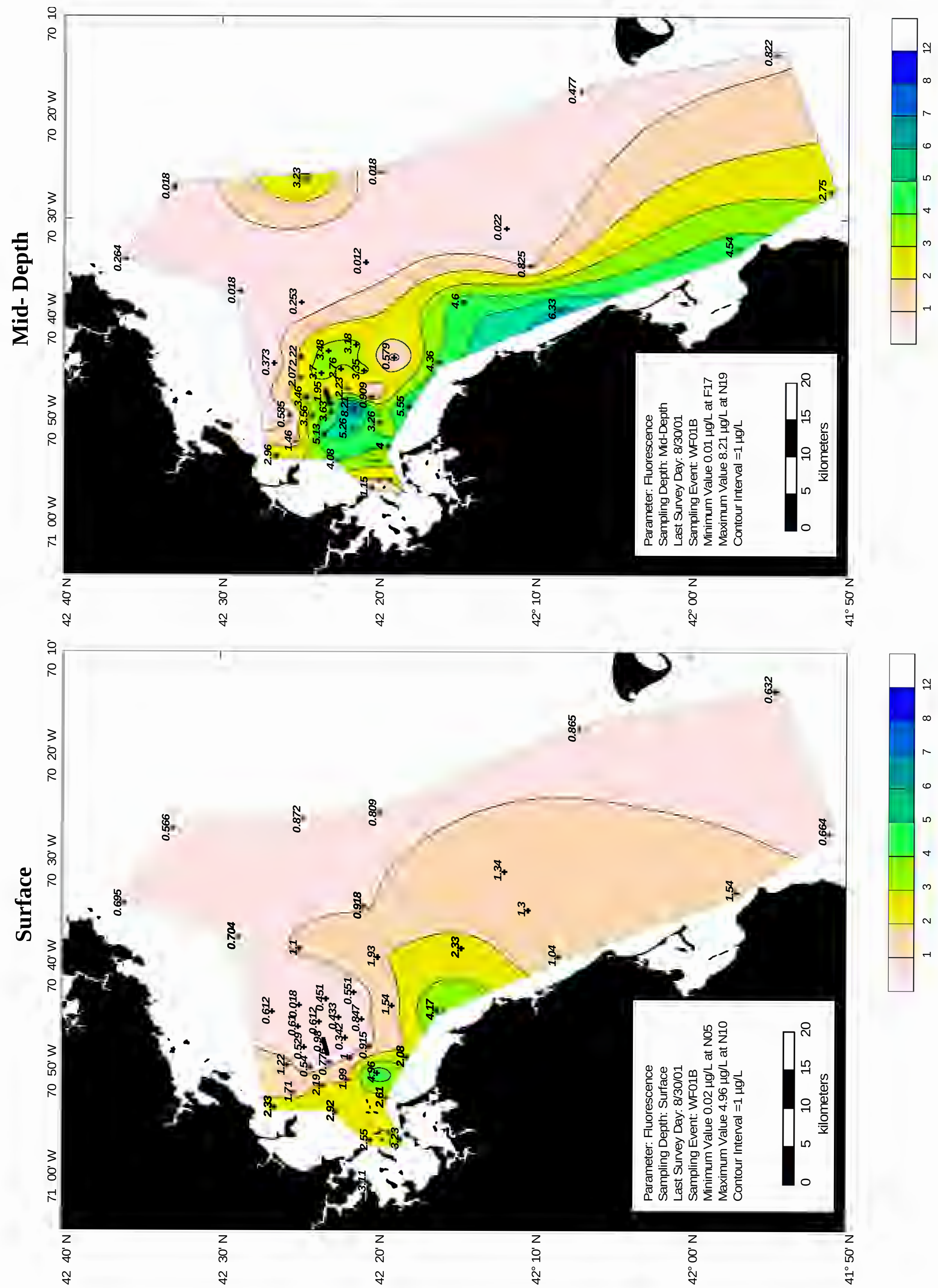


Figure 4-32. Fluorescence Surface and Mid-Depth Contour Plots for Farfield Survey WF01B (Aug 01)

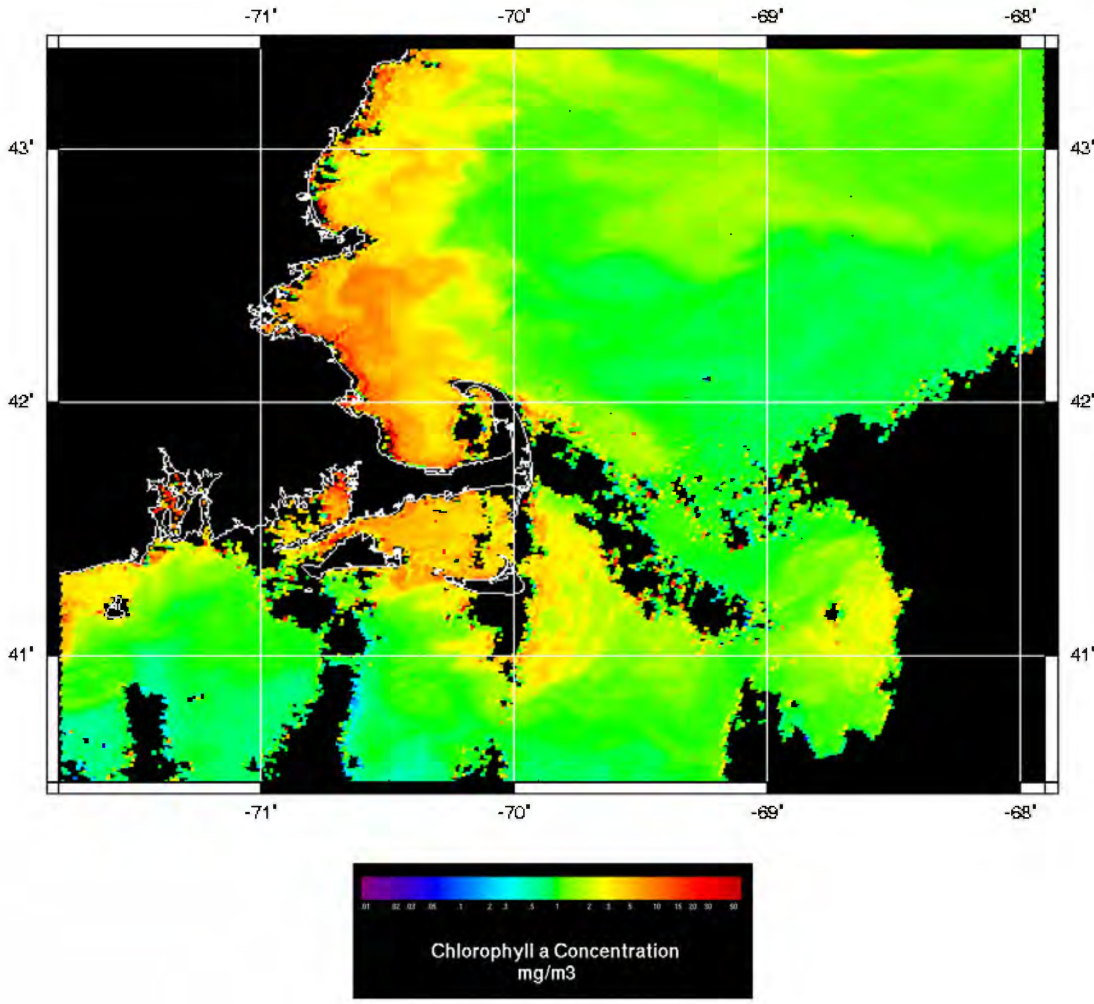
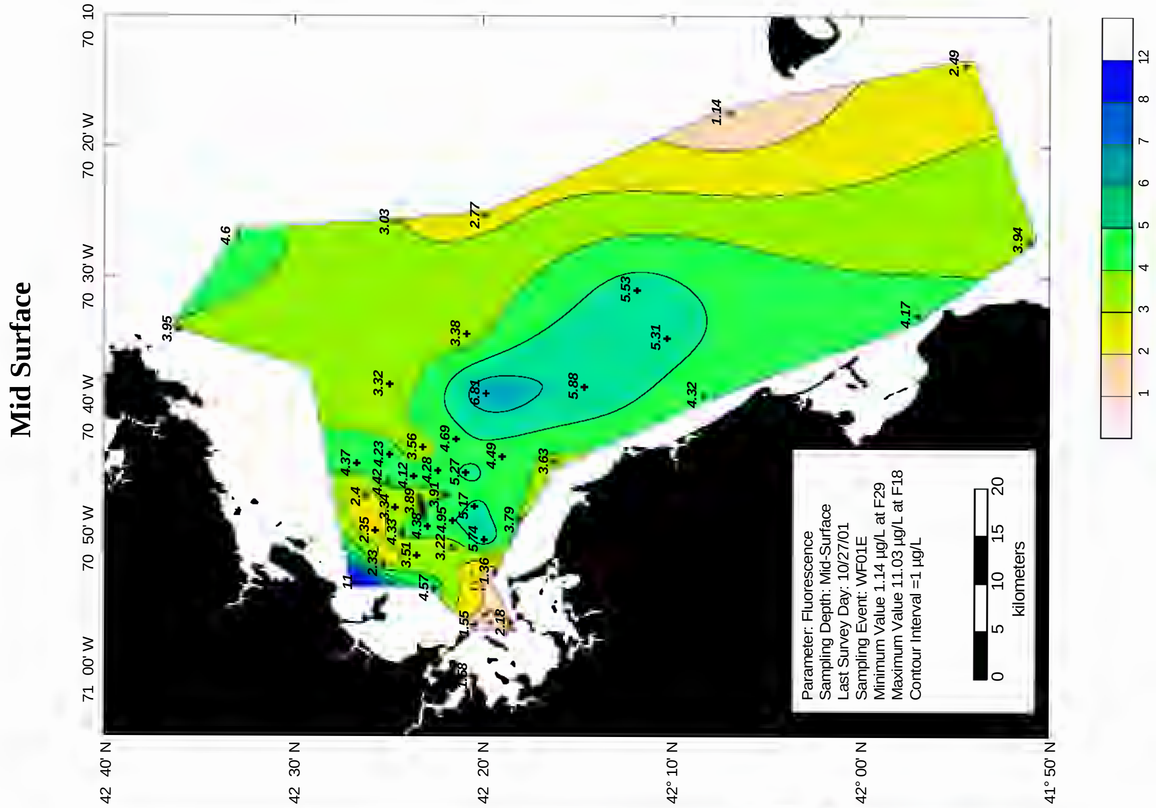


Figure 4-33. SeaWiFS Chlorophyll Image for September 5, 2001



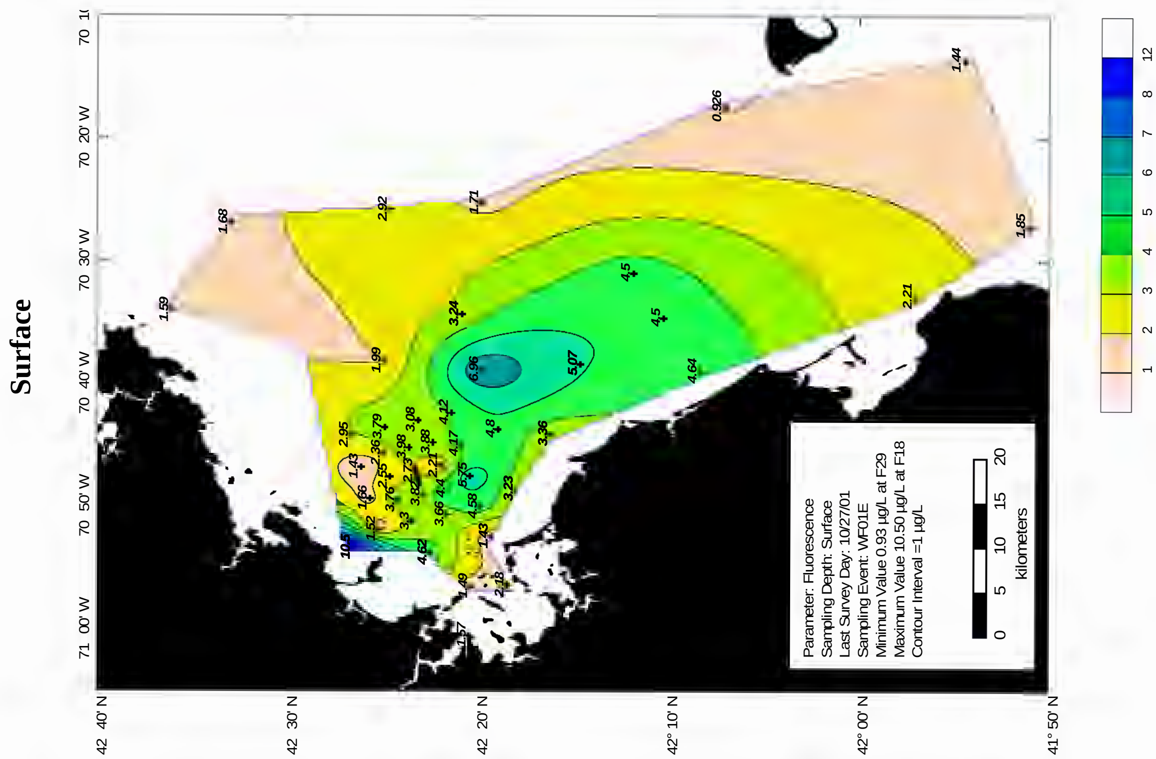


Figure 4-34. Fluorescence Surface and Mid-Surface Contour Plots for Farfield Survey WF01E (Oct 01)

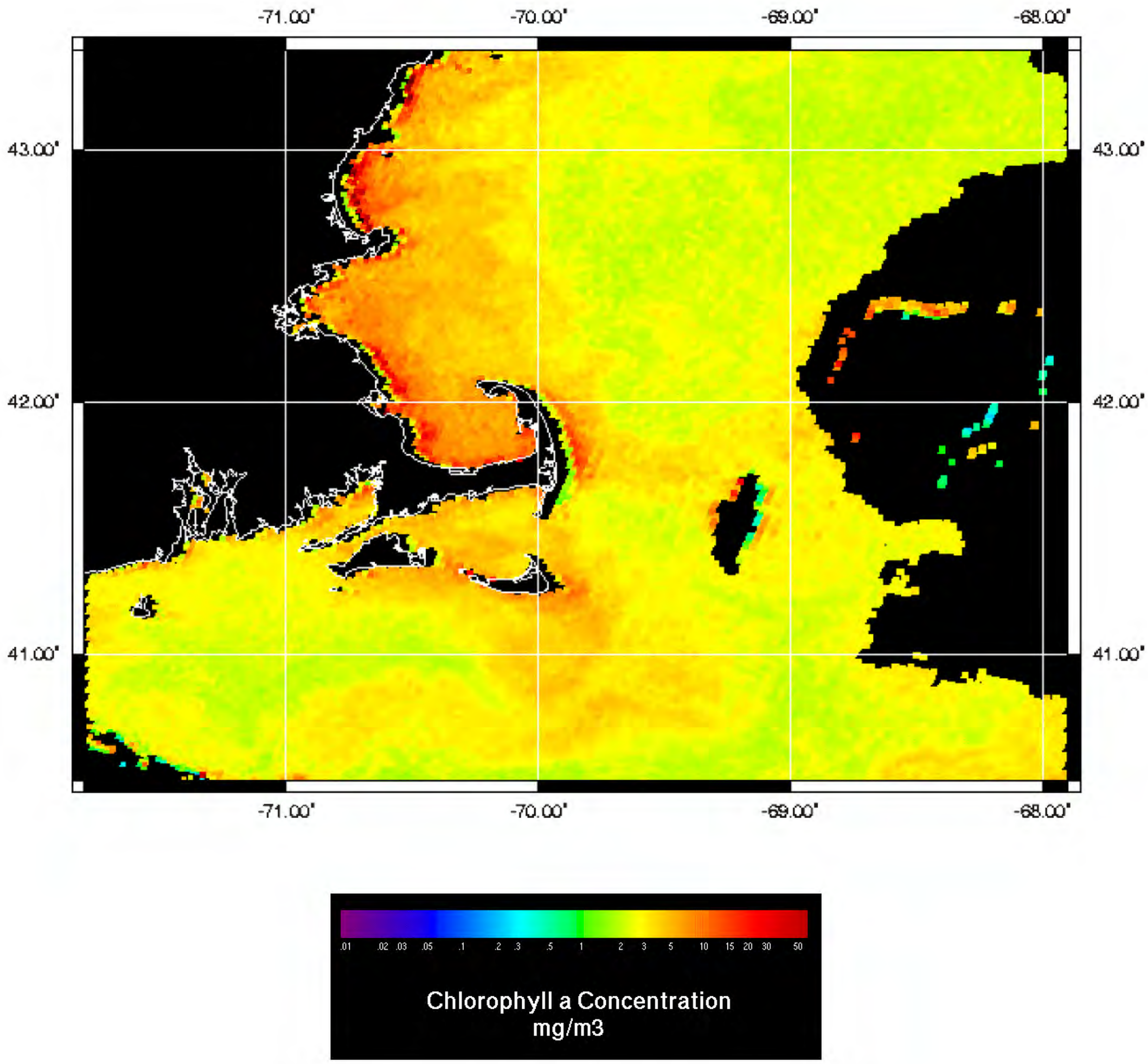


Figure 4-35. SeaWiFS Chlorophyll Image for December 5, 2001

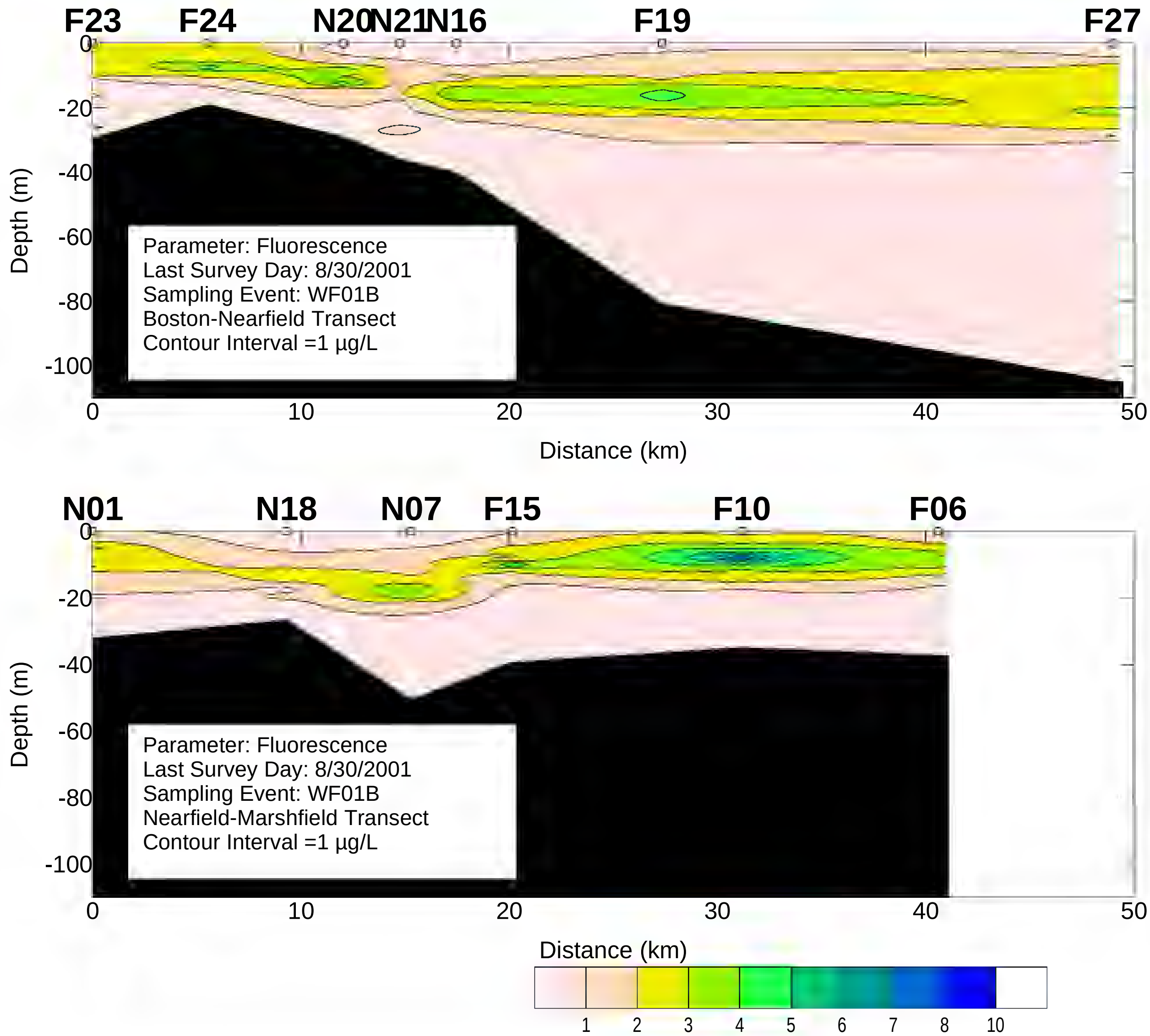


Figure 4-36. Fluorescence Vertical Boston-Nearfield and Nearfield-Marshfield Transect Plots for Farfield Survey WF01B (Aug 01)

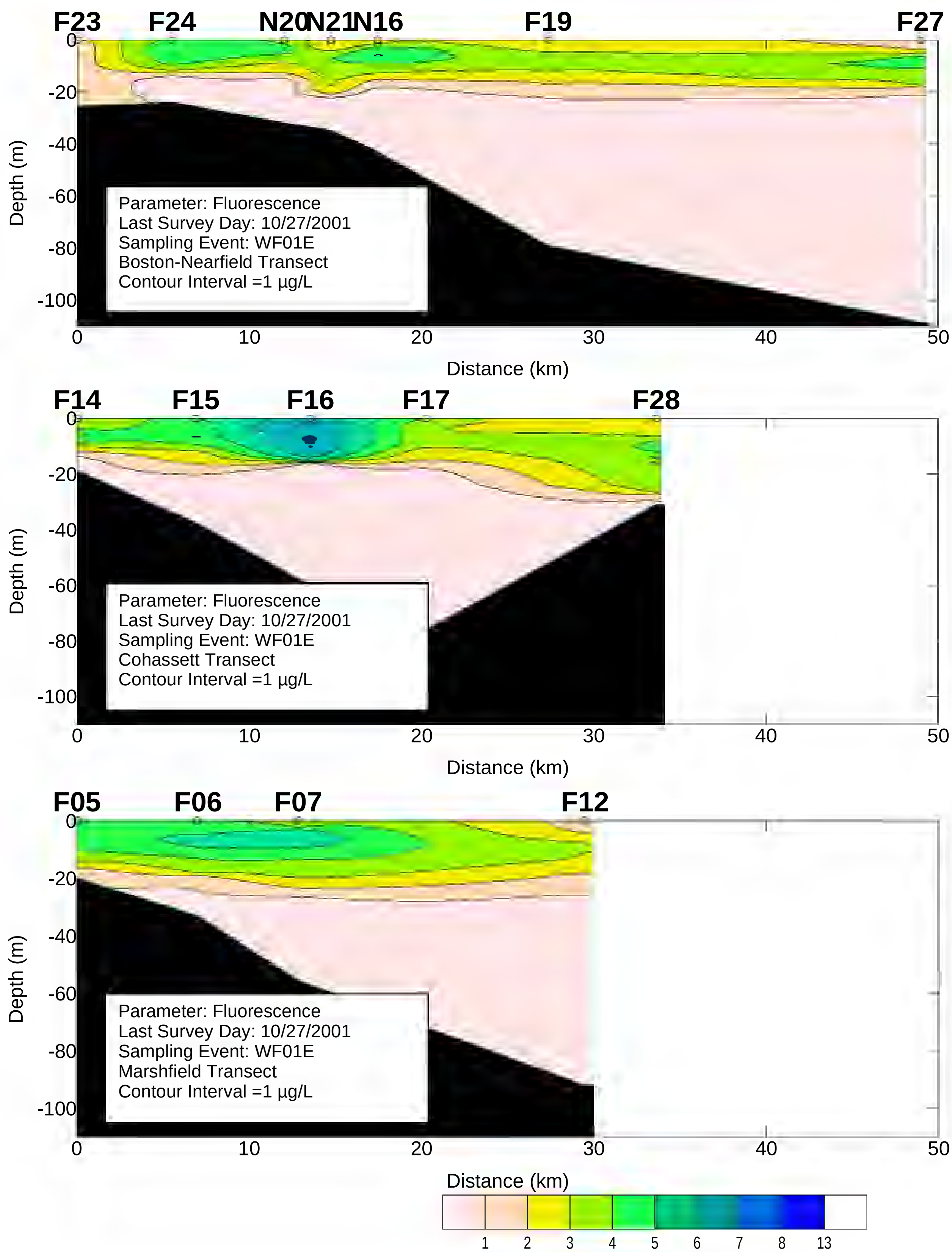


Figure 4-37. Fluorescence Vertical Transect Plots for Farfield Survey WF01E (Oct 01)

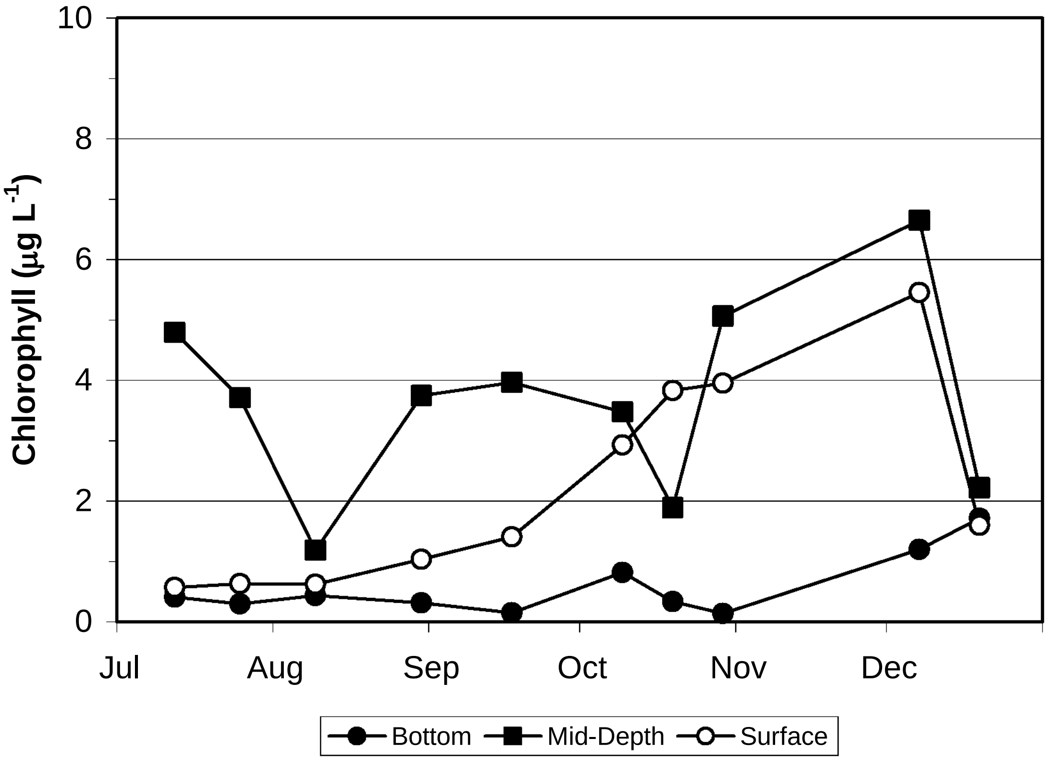


Figure 4-38. Time Series of Average Fluorescence in the Nearfield – Surface, Mid-Depth, and Bottom Depth

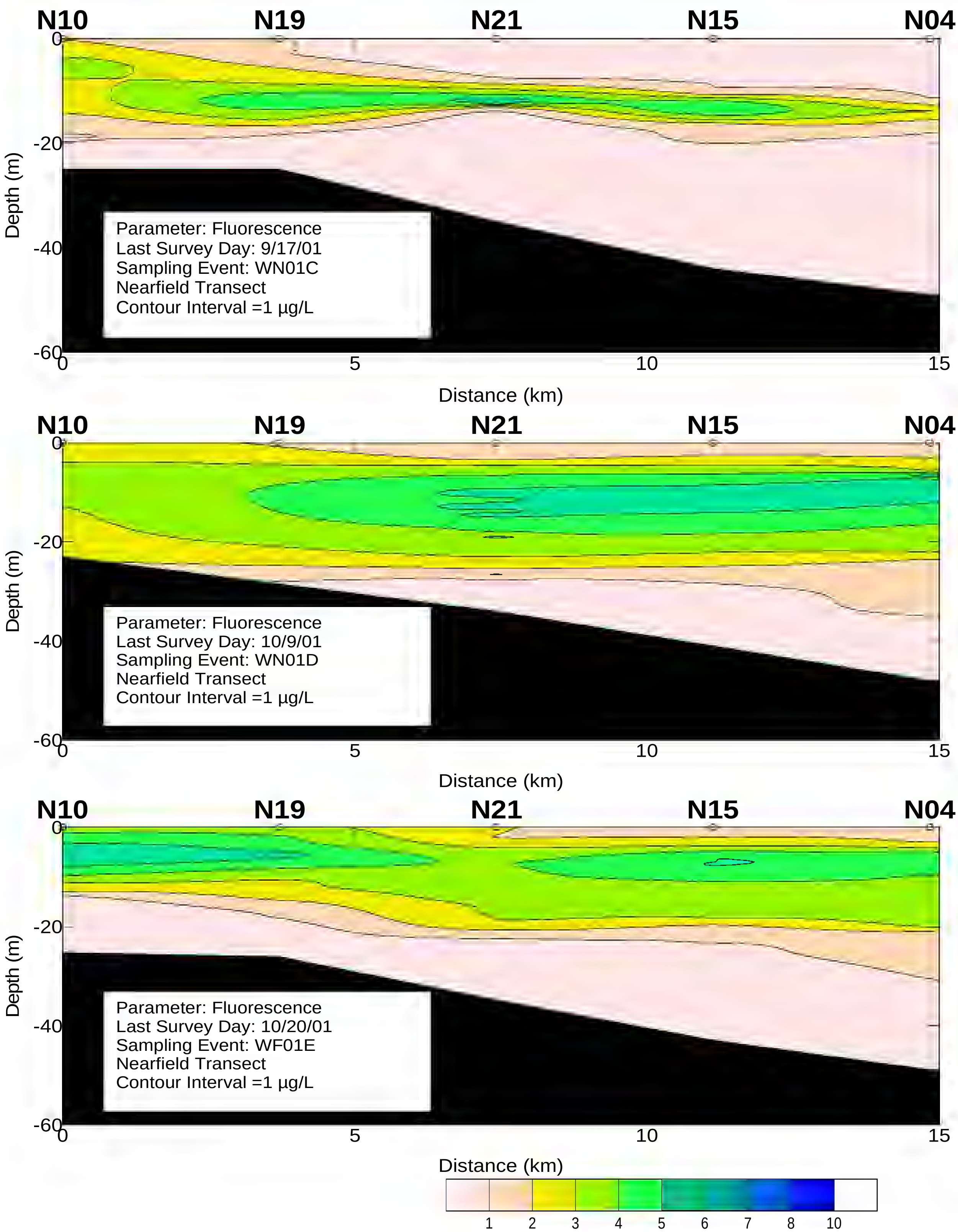


Figure 4-39. Fluorescence Vertical Nearfield Transect Plots for Surveys (a) WN01C, (b) WN01D, and (c) WF01E

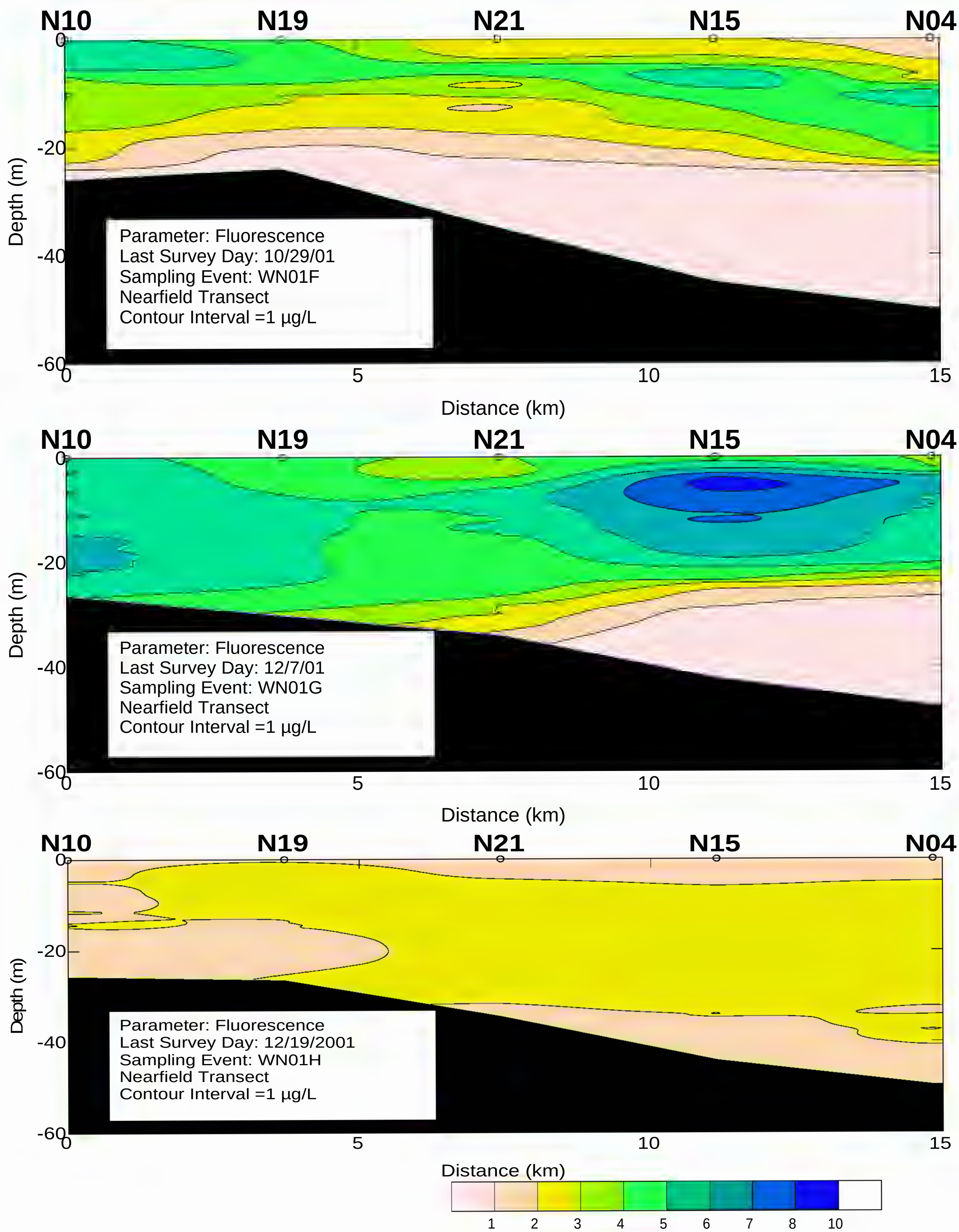


Figure 4-40. Fluorescence Vertical Nearfield Transect Plots for Surveys (a) WN01F, (b) WN01G, and (c) WN01H

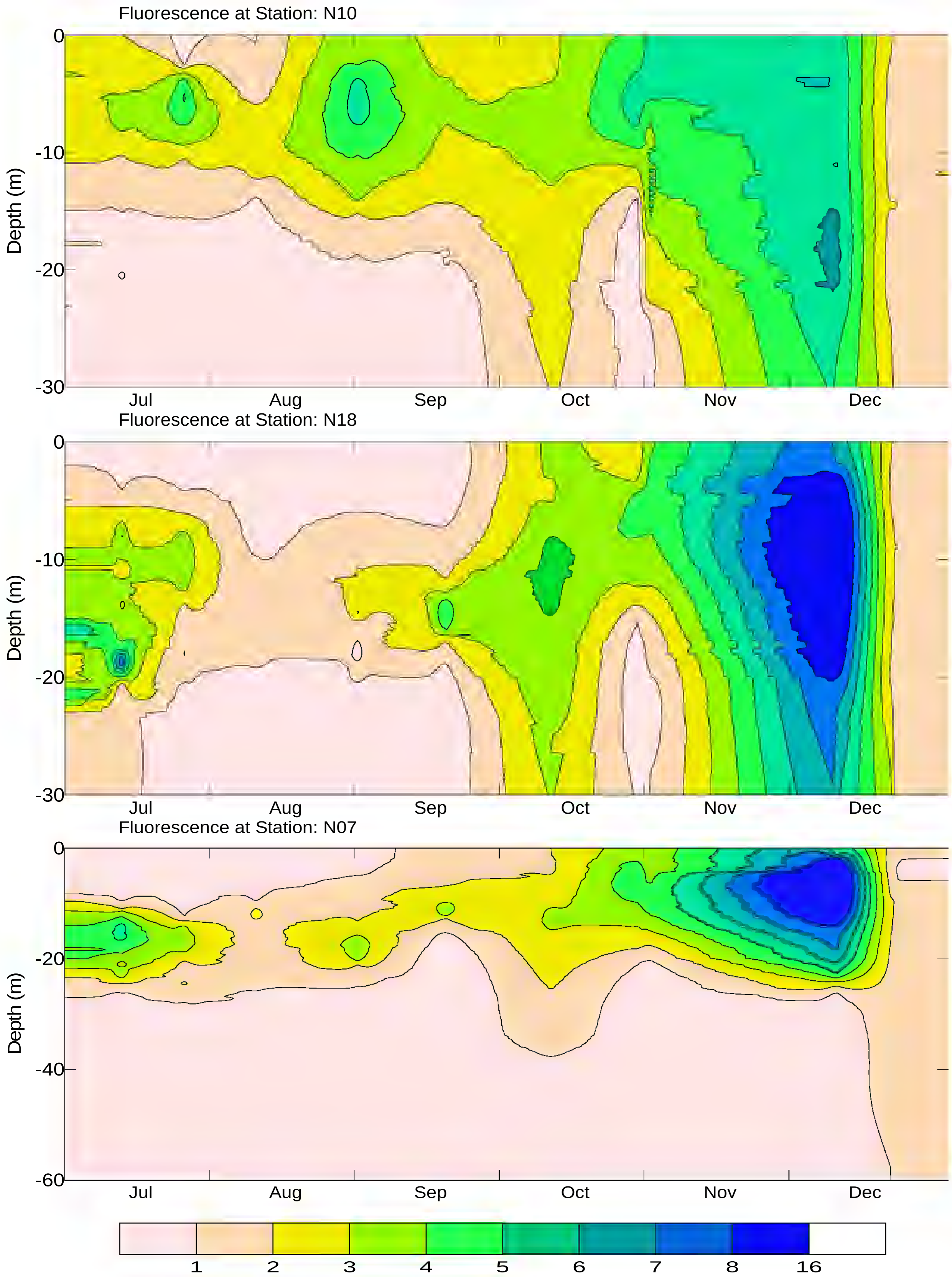


Figure 4-41. Fluorescence Depth vs. Time Contour Plots for Stations N10, N18, and N07

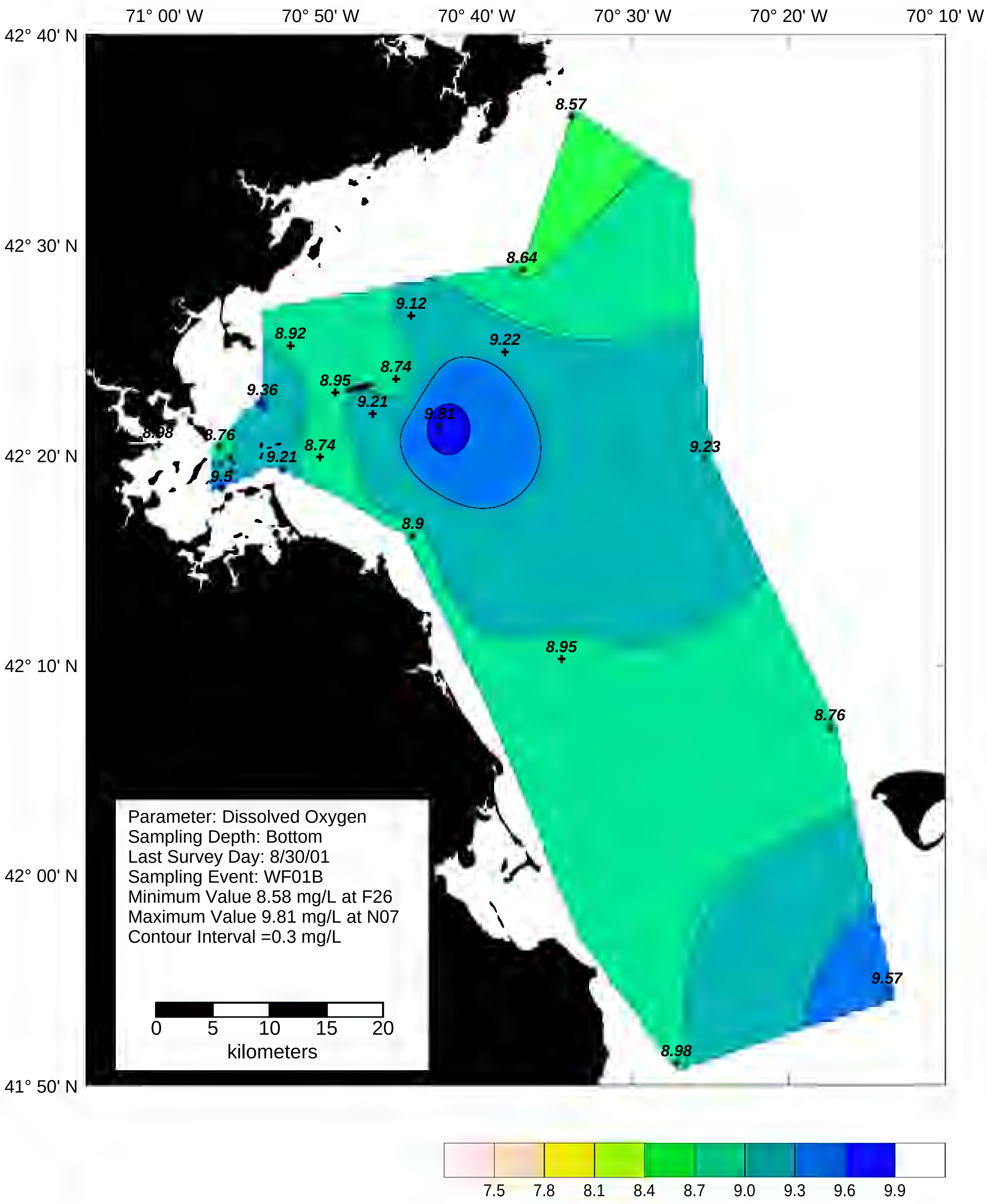


Figure 4-42. Dissolved Oxygen Bottom Contour (Bottle Data) in the Farfield Survey WF01B (Aug 01)

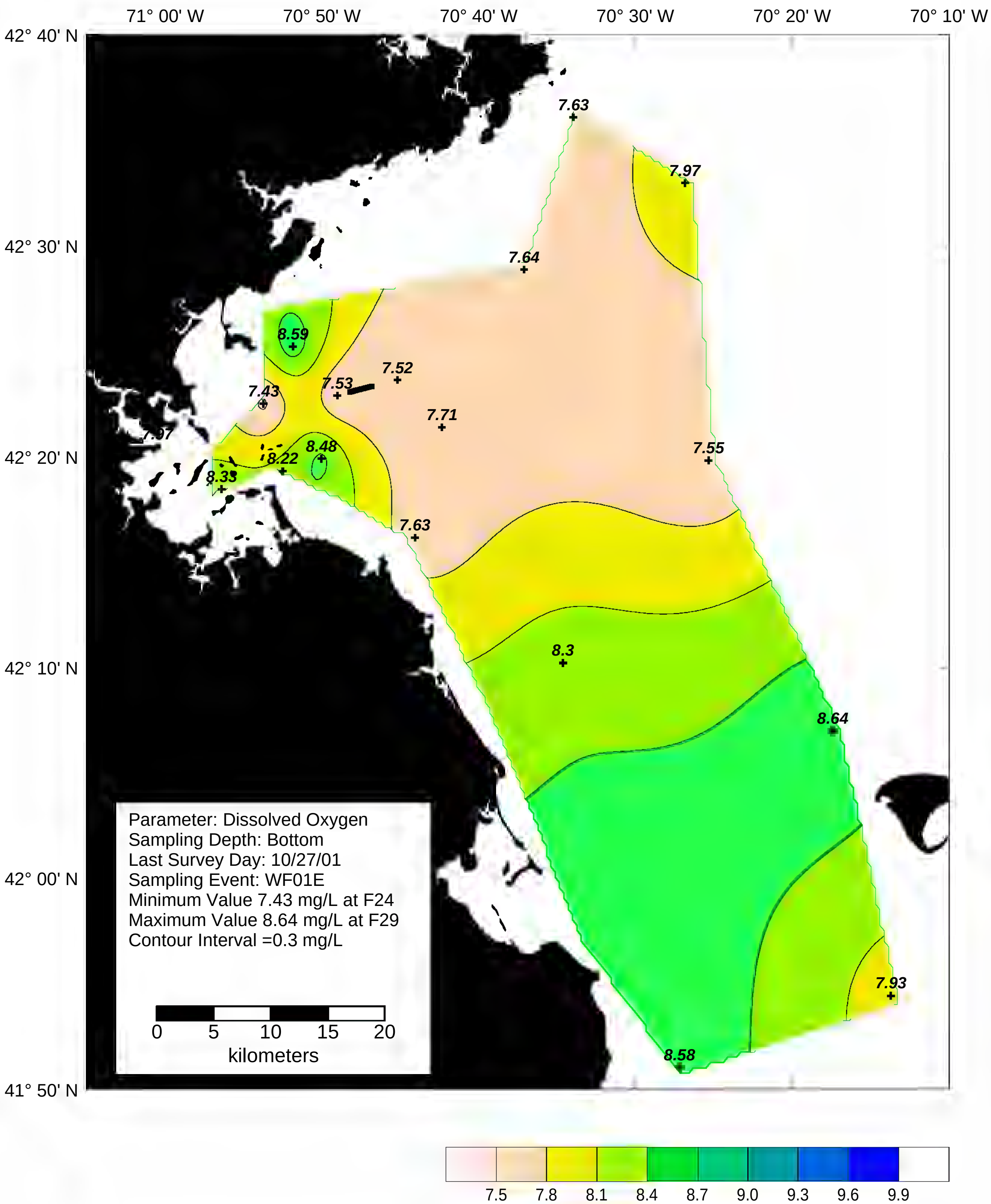


Figure 4-43. Dissolved Oxygen Bottom Contour (Bottle Data) in the Farfield Survey WF01E (Oct 01)

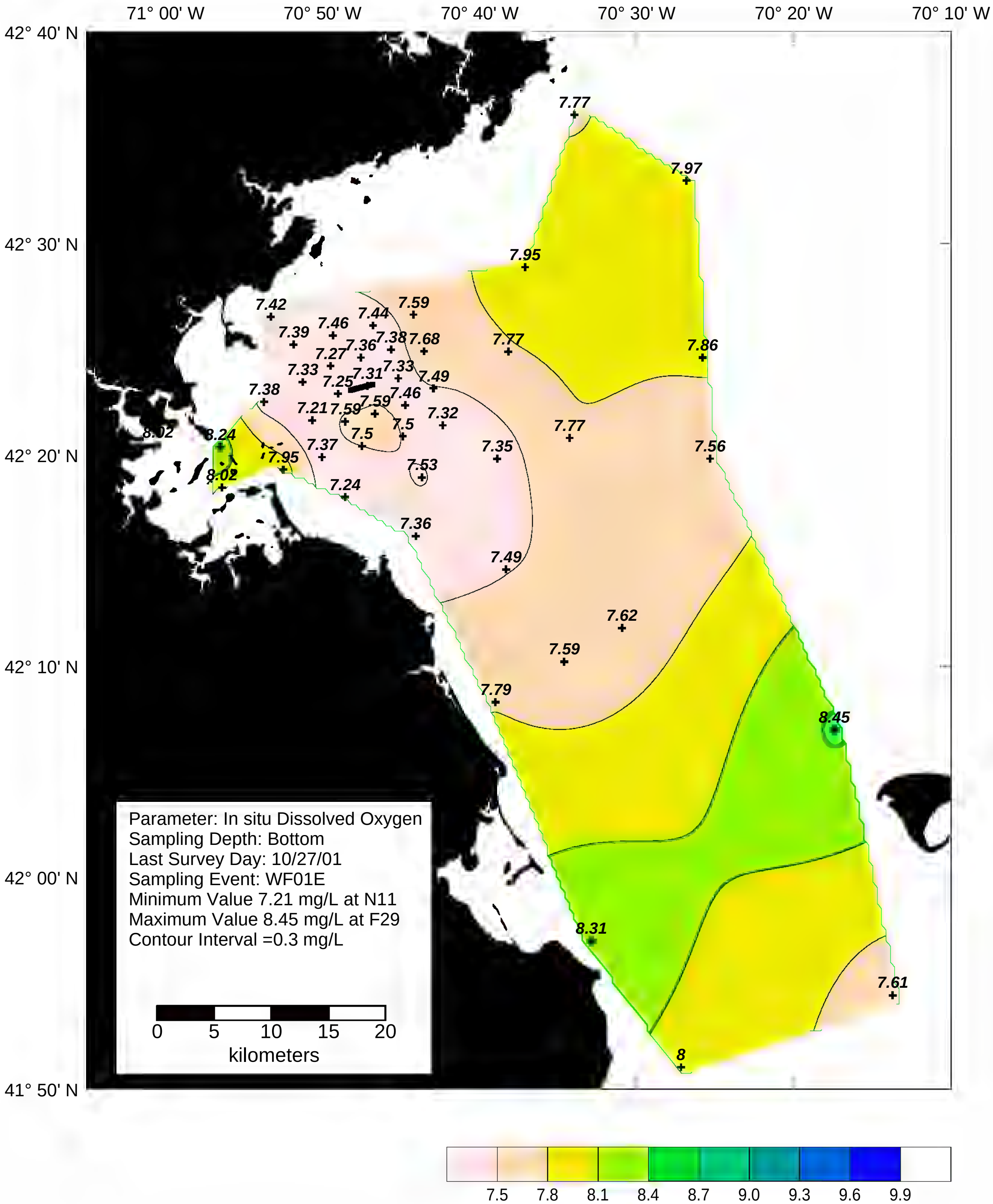


Figure 4-44. Dissolved Oxygen Bottom Contour (In situ Data) in the Farfield Survey WF01E (Oct 01)

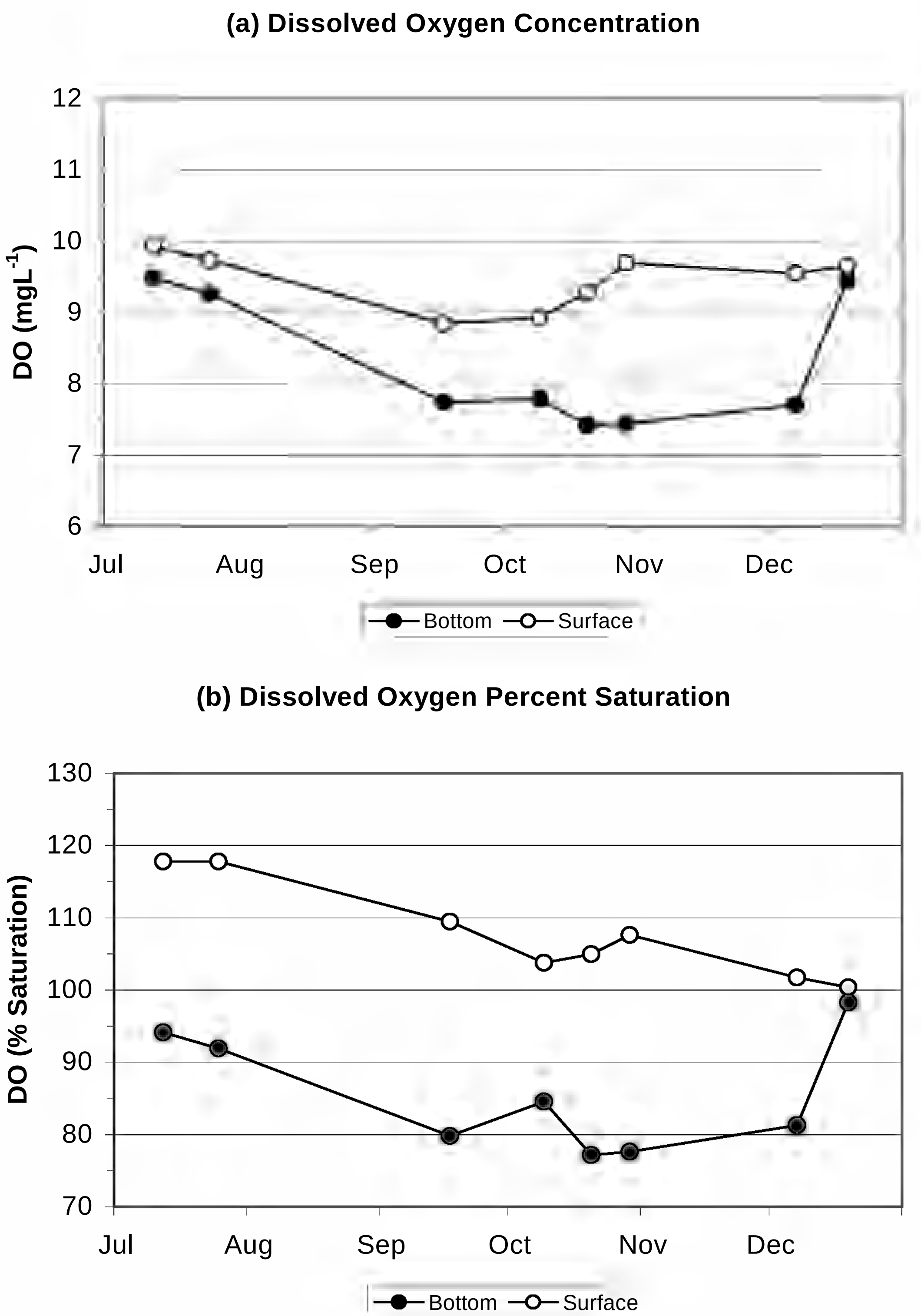


Figure 4-45. Time Series of Average Surface and Bottom (a) DO Concentration and (b) Percentage Saturation in the Nearfield

Note: All *in situ* DO data were suspect for both August surveys (WN01A and WF01B)

5.0 PRODUCTIVITY, RESPIRATION, AND PLANKTON RESULTS

5.1 Productivity

Production measurements were taken at two nearfield stations (N04 and N18) and one farfield station (F23) near the entrance of Boston Harbor. All three stations were sampled on August 29 (WF01B) and October 20 (WF01E). Stations N04 and N18 were also sampled on July 12 (WN018), July 25 (WN019), August 9 (WN01A), September 17 (WN01C), October 9 (WN01D), October 29 (WN01F), December 7 (WN01G), and December 19 (WN01H). Samples were collected at five depths throughout the euphotic zone. Production was determined by measuring ^{14}C at varying light intensities as summarized below and in Appendix A.

In addition to samples collected from the water column, productivity calculations also utilized light attenuation data from a CTD-mounted 4π sensor, and incident light time-series data from a 2π irradiance sensor located on Deer Island, MA. After collection, productivity samples were returned to the Marine Ecosystems Research Laboratory (MERL) in Rhode Island and incubated in temperature controlled incubators. The resulting photosynthesis versus light intensity (P-I) curves (Figure 5-1 and comprehensively in Appendix E) were used, in combination with light attenuation and incident light information, to determine hourly production at 15-min intervals throughout the day for each sampling depth.

For this semi-annual report, areal production (mg C m^{-2} d^{-1}) and depth-averaged chlorophyll-specific production (mg C mg Chl^{-1} d^{-1}) are presented (Figures 5-2 and 5-3). Areal productions are determined by integrating measured productivity over the depth interval. Chlorophyll-specific productivity for each depth was determined by normalizing productivity by measured chlorophyll *a*. Productivity, chlorophyll-specific productivity and chlorophyll *a* for each depth are also presented as contour plots (Figures 5-4 to 5-9).

5.1.1 Areal Production

Areal production at the nearfield stations (N04 and N18) displayed a similar pattern throughout the semi-annual sampling period (Figure 5-2). Areal production at the two sites was > 890 mg C m^{-2} d^{-1} during the initial survey in July. Production at station N18 was somewhat higher at this time (~1400 mg C m^{-2} d^{-1}) compared with station N04 (~ 900 mg C m^{-2} d^{-1}). Values at both stations decreased by late July to 667 mg C m^{-2} d^{-1} at N18 and 312 mg C m^{-2} d^{-1} at N04. By early August, productivity increased somewhat to about 740 mg C m^{-2} d^{-1} at both stations. At station N04 productivity declined slightly from late August through mid September. During the same period, station N18 was characterized by a minor productivity peak in late August (~1500 mg C m^{-2} d^{-1}) followed by a slight decline (~1000 mg C m^{-2} d^{-1}) in mid September. Following this decline, production increased at both stations to a major productivity peak (~ 2700 mg C m^{-2} d^{-1}) in early October. Productivity declined somewhat during the following 2 sampling events in October reaching lower levels at N18 than N04. The maximum annual productivity for each station was observed during early December (WN01G) with peak values >3250 mg C m^{-2} d^{-1} at both stations. Productivity at station N18 (and N16) is generally greater than that observed at station N04. However, during this semi-annual reporting period productivity at station N18 was consistently higher than N04 from July through September. From October through December productivity was higher at station N04. The 2001 fall peaks in productivity observed at both stations during October and December were markedly similar. Productivity at station F23, at the outer edge of Boston Harbor, was greater than the nearfield sites in late August and lower in October. In 1995 and 1996 the highest areal productivity values were recorded at station F23. Beginning in 1997, the highest areal productivity measurements over the annual cycle were recorded in the nearfield region rather than Boston Harbor.

At both stations the timing and the magnitude of the early and late fall blooms in production were similar. Productivity has typically been greater at station N18 during the initial fall bloom and greater at station N04 during the second bloom. The peak productivity at station N04 during this semi-annual period occurred December 7 with a production of 3264 mg C m^{-2} d^{-1}. Station N18 reached its maximum value (3250 C m^{-2} d^{-1}) on the same date. Both stations were also characterized by elevated production (2670 - 2714 mg C m^{-2} d^{-1}) on October 9. Production minima for this reporting period were observed at station N04 (312 mg C m^{-2} d^{-1}) on July 25 and station N18 (667 C m^{-2} d^{-1}) on December 19, the final survey of the year.

At the Boston Harbor productivity/respiration station (F23), areal production (1999 mg C m^{-2} d^{-1}) during the August survey was the highest productivity observed at the three monitoring stations for that sampling event. Areal production at station F23 decreased to 703 mg C m^{-2} d^{-1} by October 20 and was lower than the measured production at the nearfield stations. The production data at station F23 are in agreement with the chlorophyll data. During WF01B, chlorophyll values were high and productivity was high. Lower chlorophyll values during WF01E were associated with decreased productivity levels.

Areal production in 2001 followed patterns typically observed in prior years. Distinct fall phytoplankton blooms were observed as increases in production at both nearfield stations during the sampling period (Figure 5-2). In general, nearfield stations are characterized by the occurrence of a fall bloom. The fall blooms observed at nearfield stations in 1995-2000 generally reached values of 1600 to 4900 mg C m^{-2} d^{-1}, with blooms typically lasting 3-4 weeks. The bloom in 2001 reached peak values of >3250 mg C m^{-2} d^{-1} at both stations and occurred from October 20 through December 7. The secondary peak in fall productivity occurred later than usual. The patterns observed at the nearfield sites were generally consistent with those observed during prior years although the timing of events varied. The late fall increase in productivity at station N04 relative to N18 has not been observed in prior years. The delay in peak productivity and the increase in station N04 production relative to station N18 will be discussed in more detail in the 2001 annual report.

Station N18 is the productivity station closest to the outfall and any effects from sewage-derived nutrients would be detected here first. Areal productivity at station N18 did not increased in 2001 either relative to prior years or compared with station N04 during the current year.

5.1.2 Chlorophyll-Specific Production

Depth-averaged chlorophyll-specific production displayed a similar pattern but different magnitudes at both nearfield sites (N04 and N18) during the initial three surveys (WN018 – WN01A) for the current semi-annual reporting cycle (Figure 5-3). At station N04, depth-averaged chlorophyll-specific production rates were relatively constant from mid-July through December and consistently lower than values at station N18. At station N18, depth-averaged chlorophyll-specific production increased from late-July to a seasonal maximum in late summer, and then decreased to relatively stable values throughout the fall period (21.7 – 23.8 mg C mg Chl a^{-1} d^{-1}). Seasonal maxima were reached during September (WN01C) at station N18 with a recorded value of 58.4 mg C mg Chl a^{-1} d^{-1} and during August (WN01A) at station N04 with a peak of 17.2 mg C mg Chl a^{-1} d^{-1}. The seasonal minima (5.2 mg C mg Chl a^{-1} d^{-1} at station N04 and 18.4 mg C mg Chl a^{-1} d^{-1} at station N18) were reached during the late July survey (WN019). Chlorophyll-specific rates in the harbor were closer to the values reported for station N04 than station N18 during the sample period (Figure 5-3).

The distribution of depth-averaged chlorophyll-specific production indicates that the efficiency of production was high relative to the amount of biomass present at station N18 on August 29 and September 17. At both stations N04 and N18 the peak chlorophyll-specific production occurred during the summer rather than during the late-fall phytoplankton bloom. The previously observed fall production peaks appeared to be an effect of high biomass levels rather than actual increases in specific production rates. Variation in chlorophyll-specific production is an approximate measure for the efficiency of production and frequently reflects nutrient conditions at the sampling sites. The consistently higher depth-averaged chlorophyll-specific production at N18 most likely reflects the greater availability of nutrients at this station during this sampling period. The late summer peak in chlorophyll-specific productivity at station N18 may reflect an increase in nutrients related to destratification of the water column or may be related to species composition. The efficiency of productivity at station N04 was relatively constant throughout this semi-annual reporting period.

5.1.3 Production at Specified Depths

The spatial and temporal distribution of production, chlorophyll and chlorophyll-specific production on a volumetric basis were summarized by showing contoured values over the sampling period (Figures 5-4 to 5-9). Chlorophyll-specific productions (daily production normalized to chlorophyll concentration at each depth) were calculated to compare production with chlorophyll concentrations. Chlorophyll-specific production can be used as an indicator of the optimal conditions necessary for photosynthesis.

The volumetric data reveal that the fall peaks in areal productivity (October 9 and December 7) reported during WN01D and WN01G at station N04 were concentrated in the upper 10 m of the water column (Figure 5-4). Areal productivity at station N18 reached bloom values (>100 mg C m^{-3} d^{-1}) on the same dates with high values observed from the surface to the bottom sample on October 9, at depths down to 20 m (Figure 5-5). At station N18, the annual productivity peak occurred on December 7 (WN01G) and was distributed throughout the upper 15 m of the water column with values from the surface to mid-bottom depth samples ranging from ~120 - 220 mg C m^{-3} d^{-1} (Figure 5-5). At the two-nearfield stations, productions were elevated from late summer through the fall bloom peak period. For station N04, the highest production value observed (~220 mg C m^{-3} d^{-1}) occurred at the surface (1.43 m) on October 20. For station N18, the highest production value observed (~220 mg C m^{-3} d^{-1}) occurred on December 7 and was recorded at the mid-surface depth (5.2 m). Peak production values tended to be correlated with the occurrence of the highest chlorophyll *a* measurements (Figures 5-6 and 5-7).

High productivity (>100 mg C m^{-3} d^{-1}) at station N18 commonly occurred at depths >15 m throughout the late summer-fall period, with values greater than 60 mg C m^{-3} d^{-1} occurring to depths of 20 m. At station N18 both the mean and maximum productivity at the bottom depths were greater than prior years. A similar increase in bottom productivity was not noted at station N04. At station N04 productivity greater than 100 mg C m^{-3} d^{-1} was generally confined to the upper 10 m of the water column. The productivity pattern at specified depths observed in 2001 was similar to that observed in prior years for station N04. At station N04 productivity >10 mg m^{-3} d^{-1} was rarely observed at depths >20 m. At station N18 productivity as high as 133 mg C m^{-3} d^{-1} was recorded from depths of 20 m with values > 60 mg C m^{-3} d^{-1} frequently observed here. Productivity in the harbor was largely restricted to the upper 10 m of the water column. The relatively high bottom water productivity that was measured at station N18 will be examined in more detail in the 2001 annual report.

Chlorophyll-specific production (mg C mg Chl^{-1} d^{-1}) exhibited a much more uniform behavior (Figures 5-8 and 5-9) compared to depth-specific daily productivity, particularly at station N04. Elevated chlorophyll-specific production was primarily concentrated in the upper portions of the water column throughout the sampling period at N04. At station N18, elevated chlorophyll-specific production was generally confined to the summer and early-fall periods and extended from the surface to the mid-depths. Peak chlorophyll-specific productions occurred during the September surveys (WN01C) at station N18 and during late October (WF01E) at station N04. In general, the efficiency of photosynthesis decreased both with depth (station N04 and N18) and as the season progressed (station N18). Chlorophyll-specific production did not increase at either station in late fall indicating that the December production peak primarily reflects higher phytoplankton biomass (measured as total chlorophyll *a*) at this time.

5.2 Respiration

Respiration measurements were made at the same nearfield (N04 and N18) and farfield (F23) stations as productivity and at an additional station in Stellwagen Basin (F19). All four stations were sampled during each of the combined farfield/nearfield surveys and stations N04 and N18 were also sampled during the eight nearfield surveys. Respiration samples were collected from three depths (surface, mid-depth, and bottom) and were incubated in the dark at *in situ* temperatures for 8±1 days.

Both respiration (in units of $\mu MO_2 hr^{-1}$) and carbon-specific respiration ($\mu MO_2 \mu MC^{-1} hr^{-1}$) waters are presented in the following sections. Carbon-specific respiration was calculated by normalizing respiration rates to the coincident particulate organic carbon (POC) concentrations. Carbon-specific respiration rates provide a relative indication of the biological availability (labile) of the particulate organic material for microbial degradation.

5.2.1 Water Column Respiration

Due to the timing of the surveys, the farfield stations were only sampled twice (WF01B and WF01E). Evaluation of the temporal trends is therefore focused on the nearfield area where data are available over the entire July to December time period.

Nearfield respiration rates reached a maximum for this time period during the early July survey with rates of >0.2 $\mu MO_2 hr^{-1}$ in the surface waters at both stations N04 and N18 (Figure 5-10). Lower rates were observed in the mid-depth waters 0.11-0.13 $\mu MO_2 hr^{-1}$. Respiration rates were low (<0.05 $\mu MO_2 hr^{-1}$) in the bottom waters at station N04 in July and early August. Bottom water rates at station N18 decreased from 0.1 $\mu MO_2 hr^{-1}$ in early July to 0.05 $\mu MO_2 hr^{-1}$ in August. This decrease was coincident with decreasing rates in both surface and mid-depth waters at both stations. By mid-August (WF01B), respiration rates had increased to 0.1 – 0.15 $\mu MO_2 hr^{-1}$ over the entire water column at both nearfield stations. Rates were somewhat higher at Boston Harbor station F23 ranging from 0.13 – 0.16 $\mu MO_2 hr^{-1}$, but the highest respiration rates for the time period were observed at Stellwagen Basin station F19 (Figure 5-11). The maximum rate of 0.25 $\mu MO_2 hr^{-1}$ was measured in station F19 mid-depth waters and elevated respiration (0.17 $\mu MO_2 hr^{-1}$) was also observed for the surface water.

Respiration rates at station N18 increased slightly from August thru early October. At station N04 there was a small decrease in rates in September (WN01C) with a subsequent increase in surface and bottom water rates in early October. Relatively low respiration rates (≤0.1$\mu MO_2 hr^{-1}$) were observed across the nearfield in mid October (WF01E). Similarly low rates were observed at station F19 and in the mid-depth and bottom waters at station F23. Surface water respiration reached a survey maximum of 0.18 $\mu MO_2 hr^{-1}$ at Boston Harbor station F23. Nearfield respiration rates for surface and mid-depth waters increased to 0.15 $\mu MO_2 hr^{-1}$ by late October coincident with increasing production associated with the late fall bloom. Rates remained elevated and increased in bottom waters at station N18 in early December with the continuation of the late fall/early winter bloom. Rates were lower (<0.1 $\mu MO_2 hr^{-1}$) at station N04 in early December and were low at both stations by the late December survey. The magnitude and trends in the respiration rate data for the nearfield stations were similar to previous years for this time period.

The rate of respiration is dependent upon a number of factors including the effect of temperature on metabolic processes and the availability of organic carbon. During the second half of 2001, these parameters were not as closely correlated as might be expected (Figure 5-12). Although the data in these plots are from all 4 stations, there was no substantial improvement in the relationships at the individual stations. The relationship between respiration and temperature is often represented by an exponential fit, but in this case the data were best fit by the linear regression presented (R^2=0.26 vs. 0.24; Figure 5-12a). Although the R2 is relatively low, the relationship between respiration and temperature is significant ($P<0.01$). This is not the case for respiration and particulate organic carbon (POC; P=0.08; Figure 5-12b) and the relationship between respiration and dissolved organic carbon (DOC) was even worse (data not shown, $P>0.3$). The lack of a relationship between respiration and organic carbon concentrations may have more to do with the make-up (recalcitrant vs. labile) of the organic carbon. This influence of organic carbon composition is discussed further in the next section. A more detailed review of factors affecting respiration rates will be conducted in the 2001 annual water column report.

5.2.2 Carbon-Specific Respiration

Normalizing respiration by carbon attempts to account for the effect variations in the size of the POC pool have on respiration. Differences in carbon-specific respiration result from variations in the quality of the available particulate organic material or from environmental conditions such as temperature. Particulate organic material that is more easily degraded (more labile) will result in higher carbon-specific respiration. In general, newly produced organic material is the most labile. Water temperature is the main physical characteristic that controls the rate of microbial oxidation of organic material – the lower the temperature the lower the rate of oxidation. When stratified conditions exist, the productive, warmer surface and/or mid-depth waters usually exhibit higher carbon-specific respiration rates and bottom waters have lower carbon-specific respiration rates due to both lower water temperature and lower substrate quality due to the degradation of particulate organic material during sinking.

POC concentrations were high in the mid-depth water at station N18 in early July (62 μM) coincident with elevated chlorophyll concentrations (see Figure 4-38). Lower values were measured for station N18 surface and bottom waters and no data were available for station N04 during this survey (Figure 5-13). By late July, POC concentrations had decreased at station N18 to 23 – 27 μM and were <23 μM at station N04. POC concentrations remained relatively low at all 4 respiration stations from August through October (Figures 5-13 and 5-14). There was a large decrease in POC concentration in the mid-depth and bottom waters at station N18 from early to mid October, which was coincident with a decrease in respiration. From mid-October to early December there was a large increase in POC concentrations at the nearfield stations that resulted from the late fall/early winter bloom. In early December, POC concentrations at station N18 ranged from 55 – 60 over the entire water column and reached a maximum for this time period of 88μM for the mid-depth at station N04. Surface water POC concentration was also high (44 μM) at station N04. These high POC concentrations were coincident with the productivity and chlorophyll maxima observed at both stations during this survey. By late December, POC concentrations had decreased to ~20 μM across the nearfield.

Carbon-specific respiration rates reached a maximum in the nearfield at station N04 in late August with a rate of 0.018 $\mu MO_2 \mu MC^{-1} hr^{-1}$ in the bottom water (Figure 5-15). The bottom water rate was also high at station N04 in mid October (0.011 $\mu MO_2 \mu MC^{-1} hr^{-1}$). Otherwise carbon-specific respiration rates were generally low ($\leq$0.005 $\mu MO_2 \mu MC^{-1} hr^{-1}$) and relatively constant over the entire July to December time period. At station F23, carbon-specific respiration rates remained relatively low throughout this time period with a decrease in mid-depth and bottom waters and an increase in surface water from August to October (Figure 5-16). At the Stellwagen Basin station F19, carbon-specific respiration rates were high in the mid-depth and bottom waters in August (0.014 and 0.011 $\mu MO_2 \mu MC^{-1} hr^{-1}$, respectively) and decreased by October over the entire water column.

Given the high chlorophyll concentrations and production rates at stations N04 and N18 and the increase in POC concentrations by early December that resulted, it might have been expected that carbon-specific respiration would increase with the increased availability of newly produced, labile organic carbon. The sharp decrease in temperatures, however, resulted in lower respiration rates offsetting whatever the impact may have been due to the availability of more labile organic carbon in December. It has been suggested that dissolved organic carbon may provide additional insight into trends in respiration, but as noted in the previous section, there was no significant relationship between DOC and respiration during July – December 2001. The calculation of carbon-specific respiration rates based on DOC and also TOC (total organic carbon) provided no additional insight into the trends in respiration for this time period. The importance of DOC as a pool of available organic carbon will be included in the more detailed analysis of respiration for the 2001 annual report.

5.3 Plankton Results

Plankton samples were collected on each of the ten surveys conducted from July to December 2001. Phytoplankton and zooplankton samples were collected at two stations (N04 and N18) during each nearfield survey and at 13 farfield plus the two nearfield stations (total = 15) during the farfield surveys. Phytoplankton samples included both whole-water and 20 µm-mesh screened samples, from the surface and mid-depth. The mid-depth sample corresponds to the subsurface chlorophyll maximum if one is present. Zooplankton samples were collected by vertical/oblique tows with 102 µm-mesh nets. Methods of sample collection and analyses are detailed in Albro *et al*. (2002).

In this section, the seasonal trends in plankton abundance and regional characteristics of the plankton assemblages are evaluated. Total abundance and relative abundance of major taxonomic group are presented for each phytoplankton and zooplankton community. Tables in the appendices provide data on cell densities and relative abundance for all dominant plankton species (>5% abundance): Appendix F – whole water phytoplankton, Appendix G – 20-µm screened phytoplankton, and Appendix H – zooplankton.

5.3.1 Phytoplankton

5.3.1.1 Seasonal Trends in Total Phytoplankton Abundance

Total phytoplankton abundance in nearfield whole water samples (surface and mid-depth) varied from 0.99 – 4.49 x 10^6 cells L^{-1} in July, 0.60-2.60 x 10^6 cells L^{-1} in August, and declined to 0.78-1.67 x 10^6 cells L^{-1} in mid September (Table 5-1). There were only two samples during the four July - September surveys with an abundance > 3.0 x 10^6 cells L^{-1} (N18, surface and mid depth WN019) and they were primarily composed of microflagellates (Figures 5-17a and 5-18a). Phytoplankton abundance increased slightly by October (1.01 – 3.26 x 10^6 cells L^{-1}), and microflagellates remained the dominant component through late October (Figures 5-17 and 5-18). Phytoplankton abundance declined to lower levels (0.49-2.09 x 10^6 cells L^{-1}) in December. The decrease in phytoplankton abundance from fall to early winter is typical for this time of year, but in comparison to most years the late fall and early winter abundance levels were relatively high. Levels of > 10^6 cells L^{-1} at station N04 (mostly centric diatoms) during WF01E, WN01F, and WN01G (Figs. 5-16c and 5-17c), and at station N18 during WN01G (Figs. 5-16a and 5-17a) were coincident with not only high chlorophyll concentrations (see Section 4.2.2) but also with the peak primary production (> 3,500 mg C m^{-3} d^{-1}), for this semiannual period (see Section 5.1.1).

Total phytoplankton abundance in farfield whole water samples (Table 5-1) was similar for August (0.67 – 3.84 x 10^6 cells L^{-1}) and October (0.81 – 2.62 x 10^6 cells L^{-1}). As in the nearfield, total abundance generally declined from August to October (Figures 5-19 and 5-20).

Total abundance of dinoflagellates and silicoflagellates in 20 μm-mesh-screened water samples were considerably lower than those recorded for total phytoplankton in whole-water samples, due to the screening technique which selects for larger, albeit rarer cells. Screened phytoplankton abundance fluctuated widely (385 – 15,314 cells L^{-1}) from July through December (Table 5-2).

Table 5-1. Nearfield and Farfield Averages and Ranges of Abundance (10^6 Cells L^{-1}) of Whole-Water Phytoplankton

Survey	Dates (2001)	Nearfield Mean	Nearfield Range	Farfield Mean	Farfield Range
WN018	7/12	1.64	0.99-2.22	--	--
WN019	7/25	3.29	1.73-4.49	--	--
WN01A	8/09	1.65	0.80-2.18	--	--
WF01B	8/27-8/30	1.62	0.60-2.60	2.11	0.67-3.84
WN01C	9/17	1.29	0.78-1.67	--	--
WN01D	10/09	1.84	1.01-2.42	--	--
WF01E	10/19-22, 25,26	1.82	1.20-2.24	1.50	0.81-2.61
WN01F	10/29	2.44	1.35-3.26	--	--
WN01G	12/07	1.67	1.23-2.09	--	--
WN01H	12/19	0.66	0.49-0.78	--	--

Table 5-2. Nearfield and Farfield Average and Ranges of Abundance (Cells L^{-1}) for >20 μM-Screened Dinoflagellates

Survey	Dates (2001)	Nearfield Mean	Nearfield Range	Farfield Mean	Farfield Range
WN018	7/12	7294	2063-15314	--	--
WN019	7/25	1310	649-1843	--	--
WN01A	8/09	999	455-1482	--	--
WF01B	8/27-8/30	632	385-858	689	58-4128
WN01C	9/17	593	260-1155	--	--
WN01D	10/09	1977	1350-2525	--	--
WF01E	10/19-22, 25,26	1309	680-2000	774	70-2793
WN01F	10/29	1475	783-2025	--	--
WN01G	12/07	2623	1400-4030	--	--
WN01H	12/19	2896	1840-3955	--	--

5.3.1.2 Nearfield Phytoplankton Community Structure

Whole-Water Phytoplankton – In early July (WN018), nearfield whole-water phytoplankton assemblages from both depths (Figures 5-17 and 5-18) were dominated by unidentified microflagellates (> 50% of total abundance). Cryptomonads, chain-forming centric diatoms (*Dactyliosolen fragilissimus, Guinardia delicatula, Leptocylindrus minimus*), the pennate diatom

Cylindrotheca closterium, and a dinoflagellate of the genus *Gymnodinium* were subdominants (5-16% of total abundance). By mid July (WN019), the dominance of microflagellates (> 50-76% of total abundance) continued, with subdominant contributions (5-10%) from cryptomonads and *Gymnodinium* sp. However, at the sub-surface chlorophyll maximum depth, these were joined by the pennate diatoms *Cylindrotheca closterium* and *Pseudo-nitzschia pseudodelicatissima* (this species has been systematically listed in the bi-monthly reports in combination with *P. delicatissima*, which is another species); the latter at an abundance of 0.278 x 10^6 cells L^{-1}, comprising 16.1% to total cells.

In August (WN01A and WN01B) the dominance of <10 µm microflagellates (68-86% of total cells) continued in the nearfield, but there were subdominant contributions (5-10%) from cryptomonads, the diatoms *Leptocylindrus danicus* and *Dactyliosolen fragilissimus*, and *Gymnodinium* sp. In mid-September (WN01C), microflagellates continued to comprise 53-60% of total cells, with cryptomonads, *Leptocylindrus danicus*, small centric diatoms <10 µm in longest dimension and Gymnodinium sp. comprising 5.2-11.3% of total abundance. By early October (WN01D), microflagellates continued to dominate abundance (62-64%), with contributions of cryptomonads, *Dactyliosolen fragilissimus*, small centric diatoms <10 µm in longest dimension and *Gymnodinium* spp. comprising 5-17% of total abundance.

During early October (WF01E), microflagellates had declined to 17-73% of total cells, with greater proportions of cryptomonads (up to 17% of total abundance), small centric diatoms < 10 µm in diameter, *Gymnodinium* sp., and the chain-forming diatoms *Leptocylindrus danicus* (up to 24%) and *Leptocylindrus minimus* (up to 36%). The dominance by microflagellates (58-69%), with additional contributions from cryptomonads (10-15%), *Leptocylindrus danicus* (5-13%) and small centric diatoms (5-8%) and *Gymnodinium* sp. (up to 7%) continued during late October (WN01F). By early December (WN01G) microflagellate dominance had declined (20-47% of total cells), with a mixture of subdominants such as cryptomonads (5-6%), small centric diatoms <10 µm in longest dimension (up to 8%), a small species of the diatom genus *Thalassiosira* with cells 10-20 µm in longest dimension (7%), and other diatoms such as *Guinardia delicatula* (up to 5%), *Leptocylindrus danicus* (5-20%), *Skeletonema costatum* (5-17%), *Thalassiosira nordenskioldii* (6.9-7.6%). The high chlorophyll levels recorded for late November to early December by SeaWiFS (Appendix I) was coincident with the increased abundance of these large chain-forming diatoms (Figures 5-17 and 5-18) and elevated production rates (see Section 5.1.1). By late December (WN01H) dominance by microflagellates (48-57%), was shared with cryptomonads (up to 12%), *Dactyliosolen fragilissimus* (8-19%), *Leptocylindrus danicus* (8-11%), and small centric diatoms <10 µm in longest dimension (6%).

Screened Phytoplankton – The dinoflagellates *Ceratium tripos*, *Ceratium fusus*, *Ceratium longipes* and other members of this genus were the overwhelming dominants in nearfield screened phytoplankton samples from July and early August (WN018, WN019, and WN01A). In late August (WF01B), additional contributions came from other dinoflagellates such as *Dinophysis norvegica* and, at the chlorophyll-maximum depth at Station N16, an unidentified athecate dinoflagellate that comprised 30.5% of total abundance. Dominance by the *Ceratium* trio continued in September (WN01C) and early October (WN01D), with additional contributions from dinoflagellates such as *Prorocentrum micans*, *P. minimum*, *Protoperidinium bipes*, *Scrippsiella trochoidea*, unidentified athecate and thecate dinoflagellates, and the silicoflagellate *Dictyocha fibula*. By late October (WF01E) there was a shift to lesser dominance by *Ceratium fusus* (6-22%) and *C. tripos* (up to 17%), with greater contributions by the dinoflagellates *Prorocentrum micans* (up to 20%), *Gymnodinium* sp. (27% at the chlorophyll maximum depth at Station N04), unidentified thecate and athecate dinoflagellates, and the silicoflagellate *Dictyocha fibula* (14-76%). *Ceratium fusus* (7-23%) and *C. tripos* (9-23%) continued to proportionally decline relative to *P. micans* (up to 61%) and *D. fibula* (up to 56%) near the end of October (WN01F). From early December (WN01G), varying proportions of

C. fusus (up to 58%), *C. lineatum* (up to 5%), *P. micans* (up to 61%) and *D. fibula* (up to 36%) gave way by mid-December (WN01H), to declining proportions of *C. fusus* (6-14%), *C. lineatum* (7-13%), and *C. tripos* (up to 7%) compared to greatly increased proportions (64-75%) of *P. micans*.

5.3.1.3 Farfield Phytoplankton Assemblages

Whole-Water Phytoplankton - During WF01B in August, most farfield station assemblages were dominated at both depths by unidentified microflagellates, with lesser contributions by cryptomonads and centric diatoms (Figure 5-19). However, relative proportions of these taxa varied with location. At stations in Boston Harbor (F23, F30, F31), microflagellates only comprised approximately 36-48% of total cells, and cryptomonads comprised only 9-20%. Combinations of small centric diatoms <10µm in size (5-8%), and other centrics such as *Dactyliosolen fragilissimus* (up to 12-13%), *Leptocylindrus danicus* (up to 8-19%), and *Skeletonema costatum* (up to 29% at station F30) shared dominance with the microflagellates and cryptomonads (Figs. 5-16a, b). Similarly, at coastal stations (F13, F24, F25), microflagellates (40-75%), cryptomonads (10-16%), small centrics (up to 6-9%), *Dactyliosolen fragilissimus* (up to 12%), and Leptocylindrus *danicus* (5-25%) shared dominance. Patterns were different for offshore (F06, F22), boundary (F26, F27), and Cape Cod (F01, F02) stations. There, microflagellates were dominant comprising 72-84%, 67-77%, and 66-76%, respectively, and cryptomonads comprised 7-13%, 10-14%, and 8-12%, respectively, at offshore, boundary and Cape Cod stations (Figs. 5-19a, b).

During WF01E in October, most farfield stations were dominated by unidentified microflagellates and cryptomonads <10 µm in size, with small centric diatoms <10µm in size present in subdominant abundance (Figure 5-20a, b). However, as in August, there were regional differences in the relative proportions of these taxa. At stations in Boston Harbor (F23, F30, F31), microflagellates only comprised approximately 46-57% of total cells, and cryptomonads comprised only 10-19%. Combinations of small centric diatoms <10µm in size (up to 5-8%), and other centrics such as *Leptocylindrus danicus* (5-16%), *L. minimus* and *Skeletonema costatum* (each up to 6%) shared dominance. Similarly, at coastal stations (F13, F24, F25), microflagellates (35-61%), cryptomonads (up to 13%), small centrics (up to 10%), and Leptocylindrus *danicus* (5-35%), and *L. minimus* (up to 8%) shared dominance. Patterns were different for offshore (F06, F22), boundary (F26, F27), and Cape Cod (F01, F02) stations. There, microflagellates were dominant comprising approximately 60-68%, 58-72%, and 63-75%, respectively, and cryptomonads comprised 5-13%, 10-13%, and 8-14%, respectively, at offshore, boundary and Cape Cod stations (Figs. 5-20a, b). Contributions of diatoms such as *Dactyliosolen fragilissimus, Leptocylindrus danicus, L. minimus, Guinardia delicatula,* small centrics <10µm in size, and dinoflagellates of the genus *Gymnodinium* never exceeded 10%.

Screened Phytoplankton – During late August (WF01B), 20-µm screened phytoplankton samples from the farfield were similar to nearfield assemblages, dominated by the dinoflagellates *Ceratium. fusus* (up to 52%), *C. longipes* (up to 80%), *C. tripos* (up to 100%) and other members of the genus *Ceratium* (up to 11%), with lesser contributions at various stations by the dinoflagellate *Prorocentrum micans* (up to 48% in Boston Harbor, < 6% elsewhere), *P. minimum* (up to 8% in Boston Harbor), *Scrippsiella trochoidea* (< 16%), *Gymnodinium* sp. (< 10%), and various other identified thecate (up to 25%) and athecate (up to 32%) dinoflagellates.

During late October (WF01E), 20-µm screened phytoplankton samples from the farfield were similar to nearfield assemblages, dominated by the dinoflagellates *Ceratium fusus* (up to 22%), *C. longipes* (up to 12%), *C. tripos* (up to 26%) and other members of the genus *Ceratium* (up to 11%), with lesser contributions at various stations by the dinoflagellate *Prorocentrum micans* (up to 60% in Boston Harbor, < 52% elsewhere), *P. minimum* (up to 8% in Boston Harbor), *Scrippsiella trochoidea* (< 16%), *Gymnodinium* sp. (< 10%), and various other identified thecate (up to 40%) and athecate (up to 19%) dinoflagellates. The silicoflagellates *Dictyocha fibula* and *Distephanus speculum* also comprised up to 76% and up to 9%, respectively, of total abundance at various stations, particularly outside Boston Harbor. Within the harbor, abundances of these silicoflagellates were < 11% of total cells.

5.3.1.4 Nuisance Algae

There were no confirmed blooms of harmful or nuisance phytoplankton species in Massachusetts and Cape Cod Bays during July – December 2001. Some species that have caused harmful blooms in different seasons in previous years, such as *Phaeocystis pouchetii* (early spring), were unrecorded during this period. *Alexandrium* spp. were recorded only twice in screened water samples, both in July: at station N04 at the chlorophyll maximum depth during survey WN018 there were 2.6 cells l^{-1}, and at station N18 at the chlorophyll maximum depth during survey WN019, there were 2.5 cells l^{-1}. These values were well below the threshold limit for Alexandrium, which is 100 cells l^{-1} for any single nearfield sample (Table 5-3). Other non-toxic species whose blooms have caused anoxic events elsewhere, such as *Ceratium tripos* were routinely present, but not at abundances approaching those previously associated with anoxia.

Potentially toxic species of the diatom genus *Pseudo-nitzschia* were present at many stations from July through December, but usually in extremely low abundances. *Pseudo-nitzschia pseudodelicatissima* was present in all 6 whole-water phytoplankton samples from the July-August surveys WN018, WN019, and WN01A. At the chlorophyll maximum depth at station N04 during survey WN019, there were 278 x 10^3 cells l^{-1} of *P. pseudodelicatissima*. Otherwise, values for this species during these surveys was ≤ 71.5 x 10^3 cells l^{-1}. During survey WF01B in late August, *P. pseudodelicatissima* was recorded for 27 of 30 samples, at a range of 0.2-14.8 x 10^3 cells l^{-1}. *Pseudo-nitzschia pseudodelicatissima* was present in all but 6 of 48 samples from the September-December surveys WN01C, WN01D, WF01E, WN01F, WN01G, and WN01H, at abundance levels of 0.5-23.9 x 10^3 cells l^{-1}. *Pseudo-nitzschia pseudodelicatissima* has been associated with domoic acid toxicity in the sea (Hasle and Syvertsen, 1997). It is unclear whether abundances of *P. pseudodelicatissima* within the threshold levels should cause alarm, when these thresholds were originally established for what is identified with light microscopy as *Pseudo-nitzschia "pungens*." This designation can include both non-toxic *P. pungens* as well as the identical-appearing (at least with light microscopy) domoic-acid-producing species *P. multiseries*. Resolving the species identifications of these two species requires scanning electron microscopy. MWRA and HOM3 scientists are currently reviewing the inclusion of additional Pseudo-nitzschia species in the MWRA threshold calculation.

Nominal *Pseudo-nitzschia pungens* were recorded throughout the July-December period. There were two July-August records for *P. pungens*: an abundance of 1.4 x 10^3 cells l^{-1}at the chlorophyll maximum depth at station N04 during WN019, and 1.1 x 10^3 cells l^{-1}at the surface at station N16 during WF01B. However, during the September-December surveys, *P. pungens* was recorded for all but 9 of 48 samples, at abundance levels of 0.4-35.9 x 10^3 cells l^{-1}. The maximum value of 35.9 x 10^3 cells l^{-1} was the only record that exceeded the nearfield autumn threshold for *P. pungens* of 24.6 x 10^3 cells l^{-1}. However, the autumn 2001 nearfield mean for *P. pungens* was 5.9 x 10^3 cells l^{-1}, which is the value that is compared against the threshold (Table 5-3).

Table 5-3. Contingency plan nearfield threshold values for Nuisance Algae

Location	Parameter	Time Period	Caution Level	Value Observed (2001)
Nearfield	*Phaeocystis pouchetii*	Summer Mean	334 cells l^{-1}	none
		Autumn Mean	2,370 cells l^{-1}	none
Nearfield	*Pseudo-nitzchia pungens*	Summer Mean	38,000 cells l^{-1}	1,400 cells l^{-1}
		Autumn Mean	24,600 cells l^{-1}	5,900 cells l^{-1}
Nearfield	*Alexandrium tamarense*	Any nearfield screened sample	100 cells l^{-1}	2.6 cells l^{-1}

5.3.2 Zooplankton

5.3.2.1 Seasonal Trends in Total Zooplankton Abundance

Total zooplankton abundance at nearfield stations was at normal seasonal high levels in July (15.3-45.4 x 10^3 animals m^{-3}). This increased to even higher levels in early August (47.3-50.5 x 10^3 animals m^{-3}), with annual maximum levels (40.6-104.2 x 10^3 animals m^{-3}) in late August (Table 5-4). This pattern of annual zooplankton maximum abundance in August is typical. Zooplankton abundance decreased in early September to maximum levels less than half of the August maxima, and remained low (< 43.1 x 10^3 animals m^{-3}) through December (Figure 5-21).

Zooplankton abundance in Boston Harbor reached unprecedented low levels during October 2000 due to decimation of zooplankton populations by ctenophore predation. This did not occur in fall of 2001. Disintegrated tissue of the ctenophore *Mnemiopsis leidyi* was absent from samples collected during this period.

Table 5-4. Nearfield and Farfield Average and Ranges of Abundance (10^3 Animals m^{-3}) for Zooplankton

Survey	Dates (2001)	Nearfield Mean	Nearfield Range	Farfield Mean	Farfield Range
WN018	7/12	24.7	19.7-29.6	--	--
WN019	7/25	30.3	15.3-45.4	--	--
WN01A	8/09	48.9	47.3-50.5	--	--
WF01B	8/27-8/30	63.1	40.6-104.2	56.9	23.9-79.4
WN01C	9/17	34.0	31.2-36.8	--	--
WN01D	10/09	16.2	14.7-17.7	--	--
WF01E	10/19-22, 25,26	26.3	20.1-33.1	31.4	9.1-76.7
WN01F	10/29	28.8	22.9-34.7	--	--
WN01G	12/07	33.3	23.5-43.1	--	--
WN01H	12/19	23.2	15.8-30.5	--	--

5.3.2.2 Nearfield Zooplankton Community Structure

In July (WN018 and WN019) nearfield zooplankton assemblages were dominated by copepod nauplii, *Oithona similis* copepodites and females, with subdominant contributions by copepodites of the genera *Pseudocalanus*, *Temora*, and *Centropages* (Figure 5-21). In August (WN01A and WF01B), the nearfield zooplankton assemblages continued to be dominated by copepod nauplii, and females and copepodites of *Oithona similis* with lesser contributions by copepodites of *Pseudocalanus* sp. The extremely high abundance (104,236 animals m^{-3}) at station N04 during survey WF01B was not due to a spike in the abundance of any particular taxon. Rather, it was simply due to higher overall zooplankton abundance at this station. Comparisons of percentages of total abundance for dominant taxa at the three nearfield stations during this survey revealed that each had approximately the same relative abundances; copepod nauplii were 20-26%, *Oithona similis* copepodites were 44-47%, *O. similis* females were 8-13%, and *Pseudocalanus* copepodites were 5-8% of total abundance, respectively, at the nearfield stations. Also, at 4 other stations in various regions of the farfield (F01, F06, F26, and F31), total zooplankton abundances were between 70-80 x 10^3 animals m^{-3}, approaching that at station N04 (Figure 5-22a). In September (WN01C) and October (WN01D, WF01E, and WN01F), dominance of copepod nauplii, and females and copepodites of *Oithona similis* continued, with lesser contributions from *Centropages* copepodites and in late October, bivalve veligers. In December (WN01G and WN01H), the dominance of copepod nauplii and *Oithona similis* was shared to a lesser extent by copepodites of the genus *Pseudocalanus*.

5.3.2.3 Farfield Zooplankton Assemblages

At farfield stations during survey WF01B in late August, copepod nauplii were dominants (16-37%), with subdominant contributions at various stations outside Boston Harbor by females (5-11%) and copepodites (33-52%) *Oithona similis*, and other species recorded for the nearfield (Figure 5-22). Adults and copepodites of *Acartia* spp. comprised up to 27% of the assemblage in Boston Harbor, and *Centropages hamatus* copepodites and adults comprised 20% of the assemblage at station F23 in Boston Harbor. During WF01E in late October, copepod nauplii were dominant everywhere (10-57%), and outside the harbor *Oithona similis* copepodites (11-37%) and females (up to 8%), Pseudocalanus copepodites (up to 14%) and bivalve veligers (up to 29%) were abundant at most farfield stations. *Acartia* spp. adults and copepodites were again abundant in Boston Harbor (up to 19%).

In summary, zooplankton assemblages during the second half of 2001 were comprised of taxa recorded for this time of year in previous baseline monitoring years.

5.4 Summary of Water Column Biological Results

- Areal production at the nearfield stations (N04 and N18) displayed a similar pattern throughout the semi-annual sampling period. Productivity at N18 tended to be somewhat higher than N04 during July through mid-September; productivity at N04 tended to be somewhat higher than N18 from October through December. The elevated productivity at N04 versus N18 is a change from previous years.
- The maximum annual productivity for each station was observed in early December with peak values >3250 mg C m^{-2} d^{-1} at both stations and was correlated with the occurrence of the highest chlorophyll *a* measurements. This was relatively late for the peak production to be observed in the nearfield in comparison to previous years.
- At station N04, chlorophyll-specific areal production rates were relatively constant from mid-July through December and consistently lower than values at station N18.
- At station N18 both the mean and maximum productivity at the bottom depths were greater than prior years. A similar increase in bottom productivity was not noted at station N04
- Nearfield respiration rates reached a maximum for this time period during the early July survey with rates reaching 0.22 μMO_2hr^{-1} in the surface waters at station N18. Farfield respiration rates reached a maximum of 0.25 μMO_2hr^{-1} at mid-depth at station F19. Rates were relatively low for the remainder of the period.
- There was no coincident increase in respiration rates in the nearfield associated with the elevated chlorophyll concentrations and high production rates observed at these stations during the late fall/early winter bloom. This was likely due to the lower water temperatures.
- POC concentration at mid-depth was high at station N18 (62 µM) in early July. Maximum POC concentrations were reached in early December – 88 µM at mid-depth at station N04 and 55-60 µM over the entire water column and station N18. The increase in POC concentrations was coincident with the increase in productivity and chlorophyll concentrations during the early December survey.
- Carbon-specific respiration rates reached a maximum in late August in the nearfield at station N04 with a rate of 0.018 $\mu MO_2\mu MC^{-1}hr^{-1}$ in the bottom water and in the farfield at the Stellwagen Basin station F19 in the mid-depth water (0.014 $\mu MO_2\mu MC^{-1}hr^{-1}$).
- Total phytoplankton abundances in the whole water samples were maximal in late July, decreasing somewhat through August- October, and declined to lower levels in December.
- The whole water phytoplankton assemblage was dominated by unidentified microflagellates, with cryptomonads and the chain-forming centric diatoms *Leptocylindrus danicus*, *Dactyliosolen fragilissimus*, *Guinardia delicatula*, and other diatoms and dinoflagellates as subdominants.
- The >20-µm screened dinoflagellate assemblage was dominated from July through October by *Ceratium tripos, C. longipes* and *C. fusus* as in previous years, with a transition to dominance by *Prorocentrum micans* in December.
- There were no confirmed blooms of harmful or nuisance phytoplankton species in Massachusetts and Cape Cod Bays during July – December 2001, although the potentially-toxic diatom *Pseudo-nitzschia pseudodelicatissima* was present and frequently abundant throughout much of the area

from July through December. This species is not currently included in the calculation of the *Pseudo-nitzschia "pungens"* threshold.

- Zooplankton abundance increased through July to annual maximum levels in late August, progressively declining through September and October, into December.
- Zooplankton abundance was, as usual, dominated by copepod nauplii and adults and copepodites of the small copepods *Oithona similis*, and copepodites of *Pseudocalanus* and *Centropages* sp., with lesser contributions, at some stations, by meroplankters such as bivalve veligers and, in Boston Harbor, *Acartia* spp. copepodites and adults.

WN018 **Station N18**

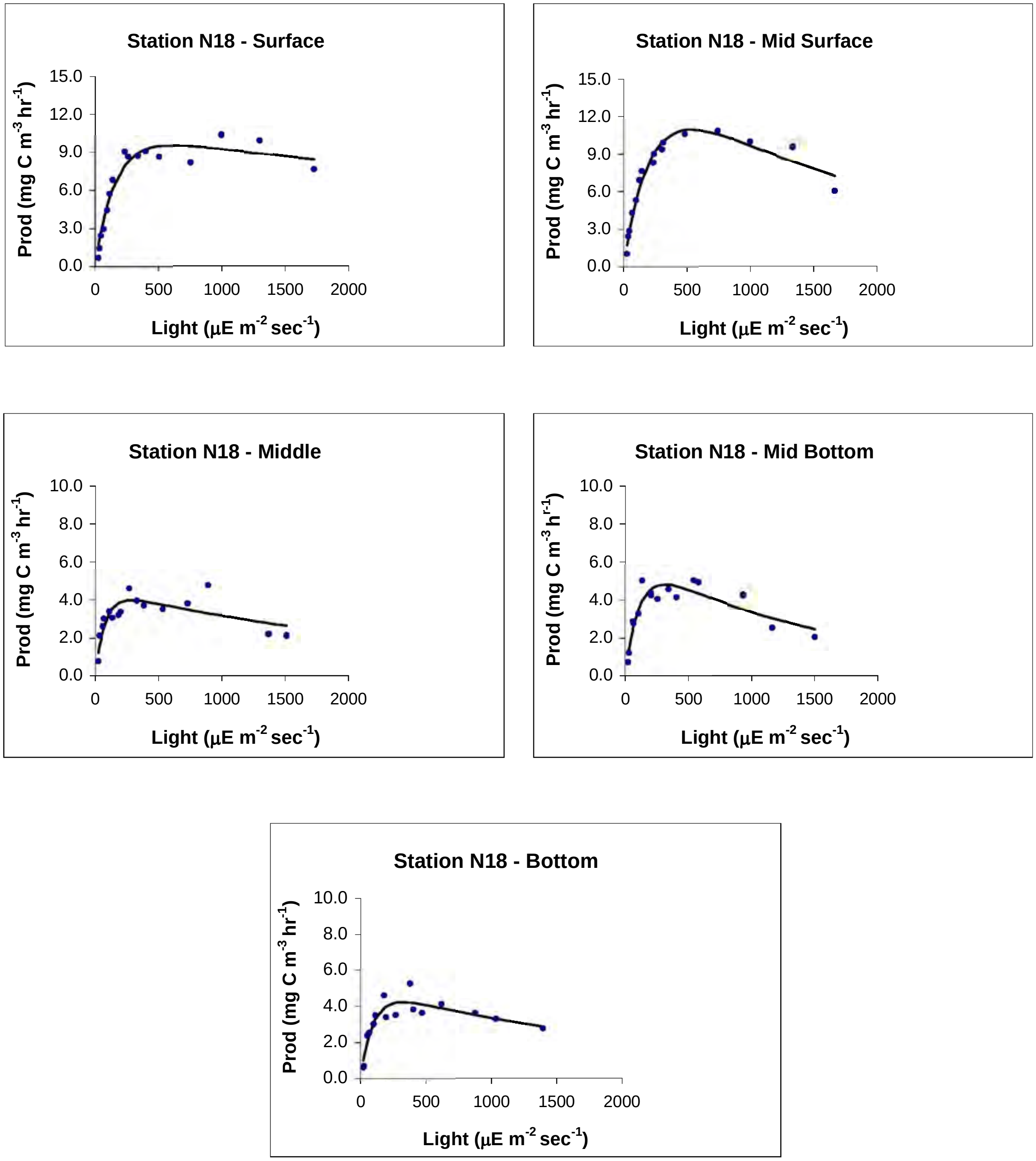


Figure 5-1. An example photosynthesis-irradiance curve from station N18 collected in July 2001

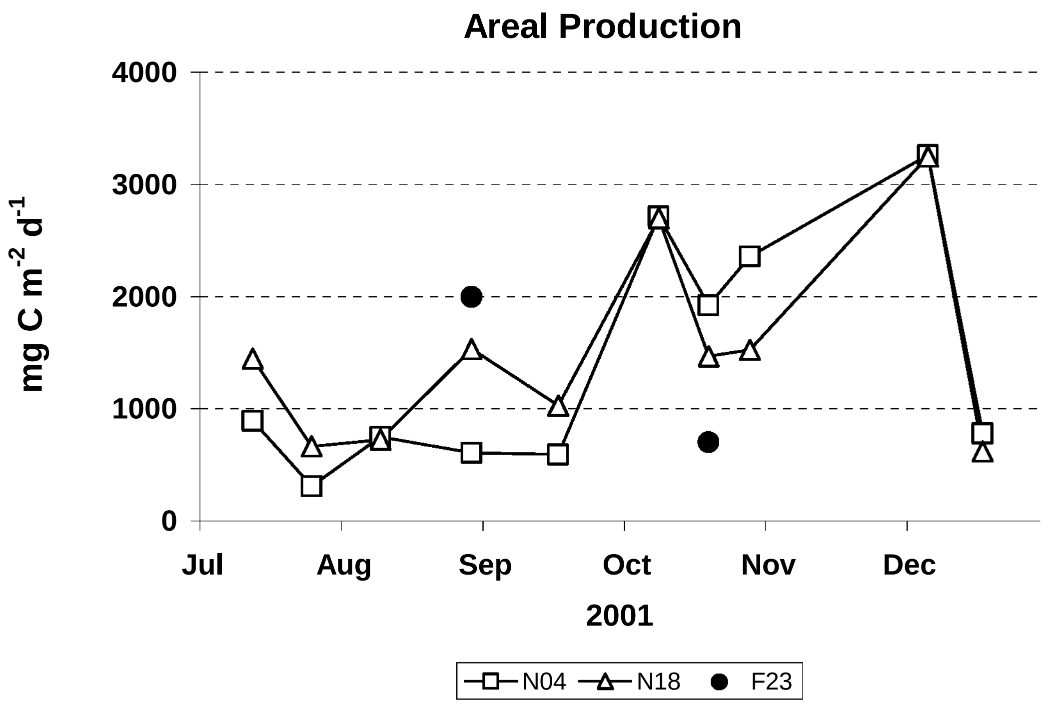


Figure 5-2. Time-series of areal production (mg C m^{-2} d^{-1}) for stations N04, N18 and F23

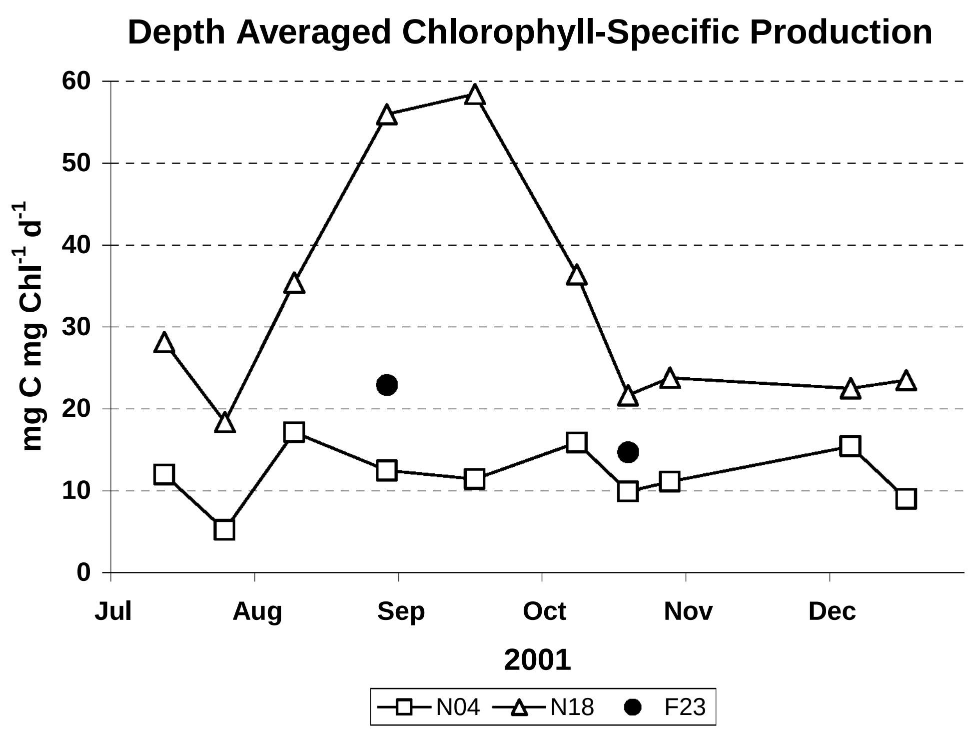


Figure 5-3. Time-series of depth-averaged chlorophyll-specific production (mg C mg Chl^{-1} d^{-1}) for stations N04, N18 and F23

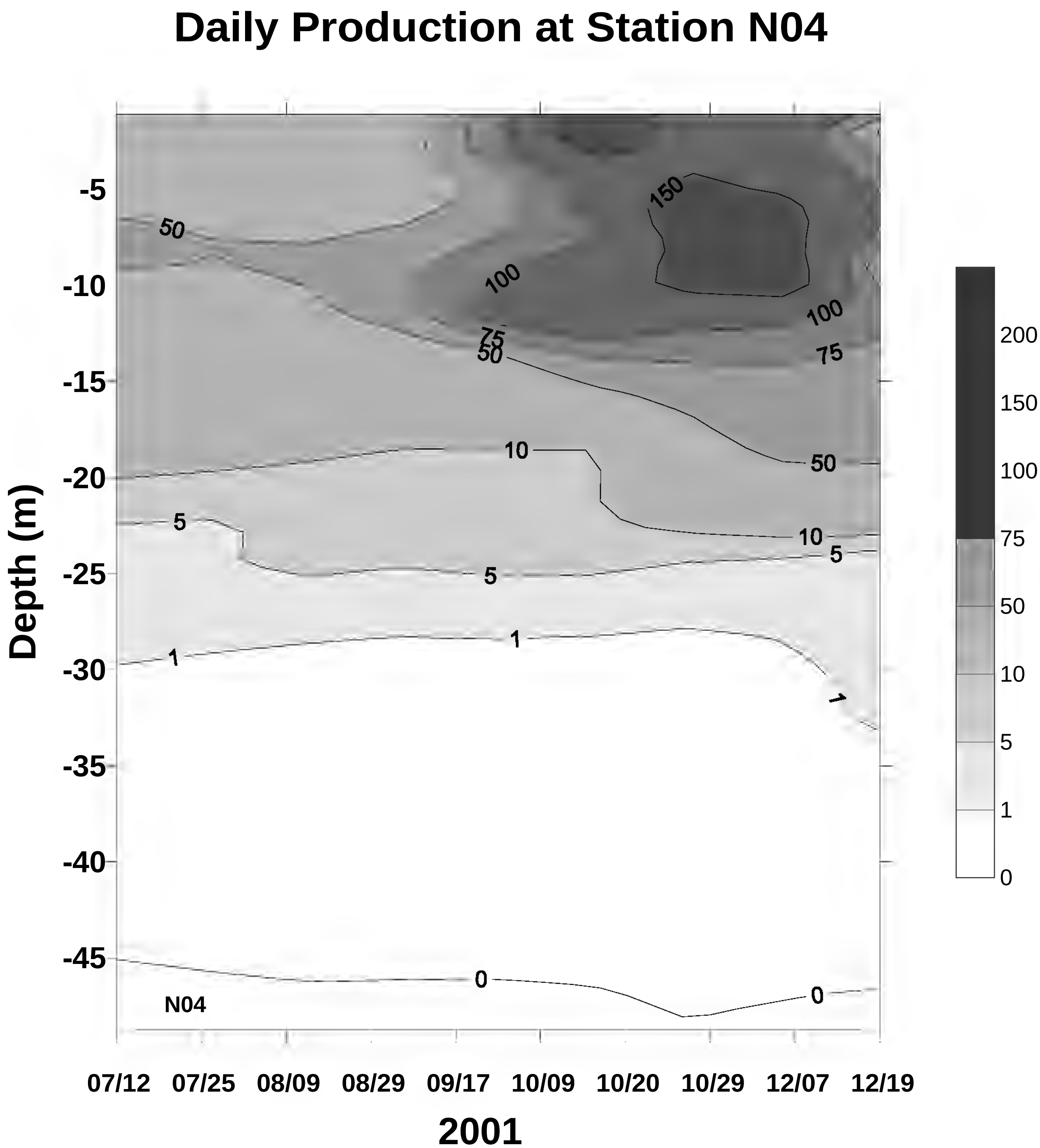


Figure 5-4. Time series of contoured daily production (mgCm^{-3}d^{-1}) over depth at station N04

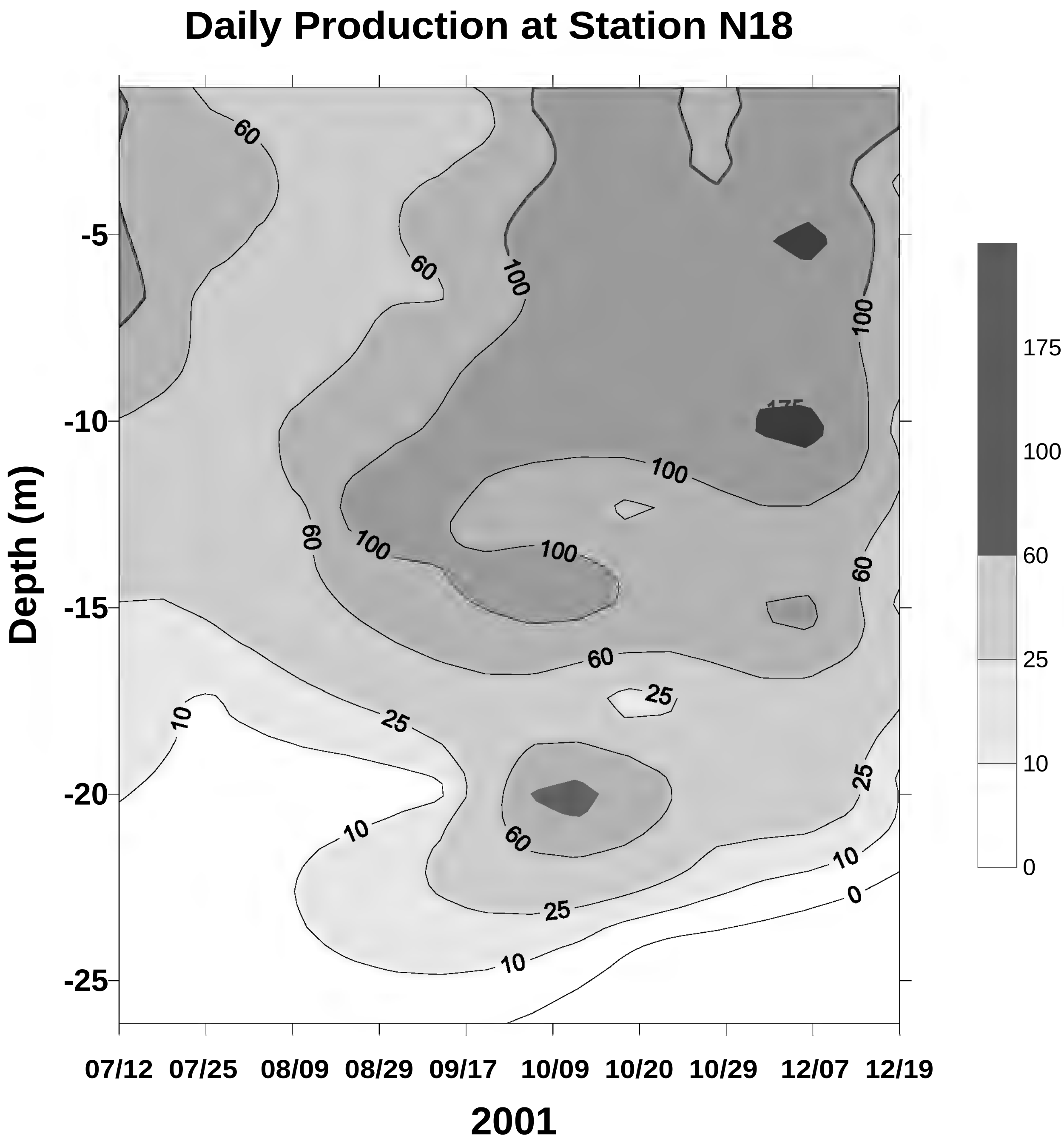


Figure 5-5. Time series of contoured daily production ($mgCm^{-3}d^{-1}$) over depth at station N18

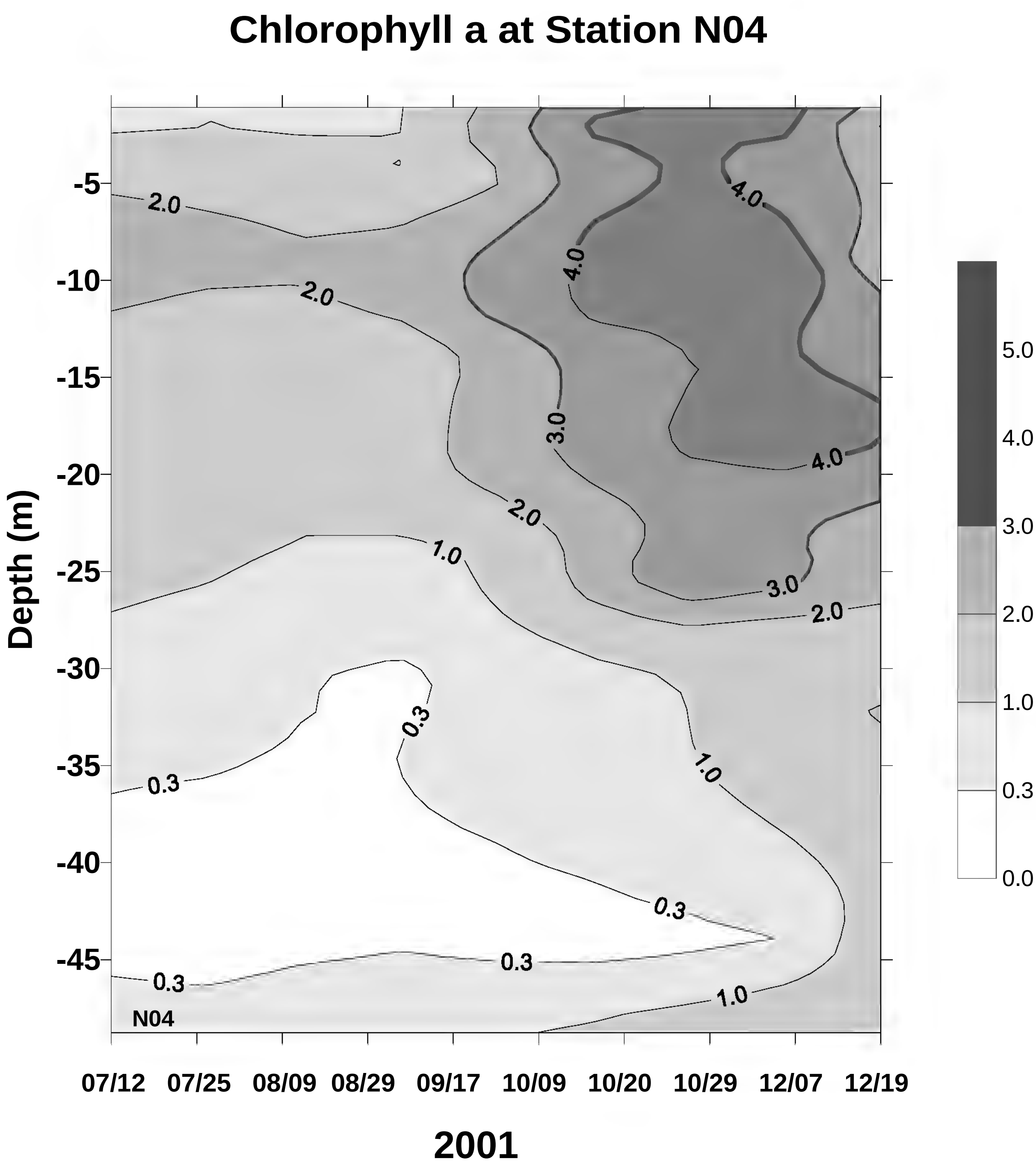


Figure 5-6. Time series of contoured chlorophyll concentration (μg L^{-1}) over depth at station N04

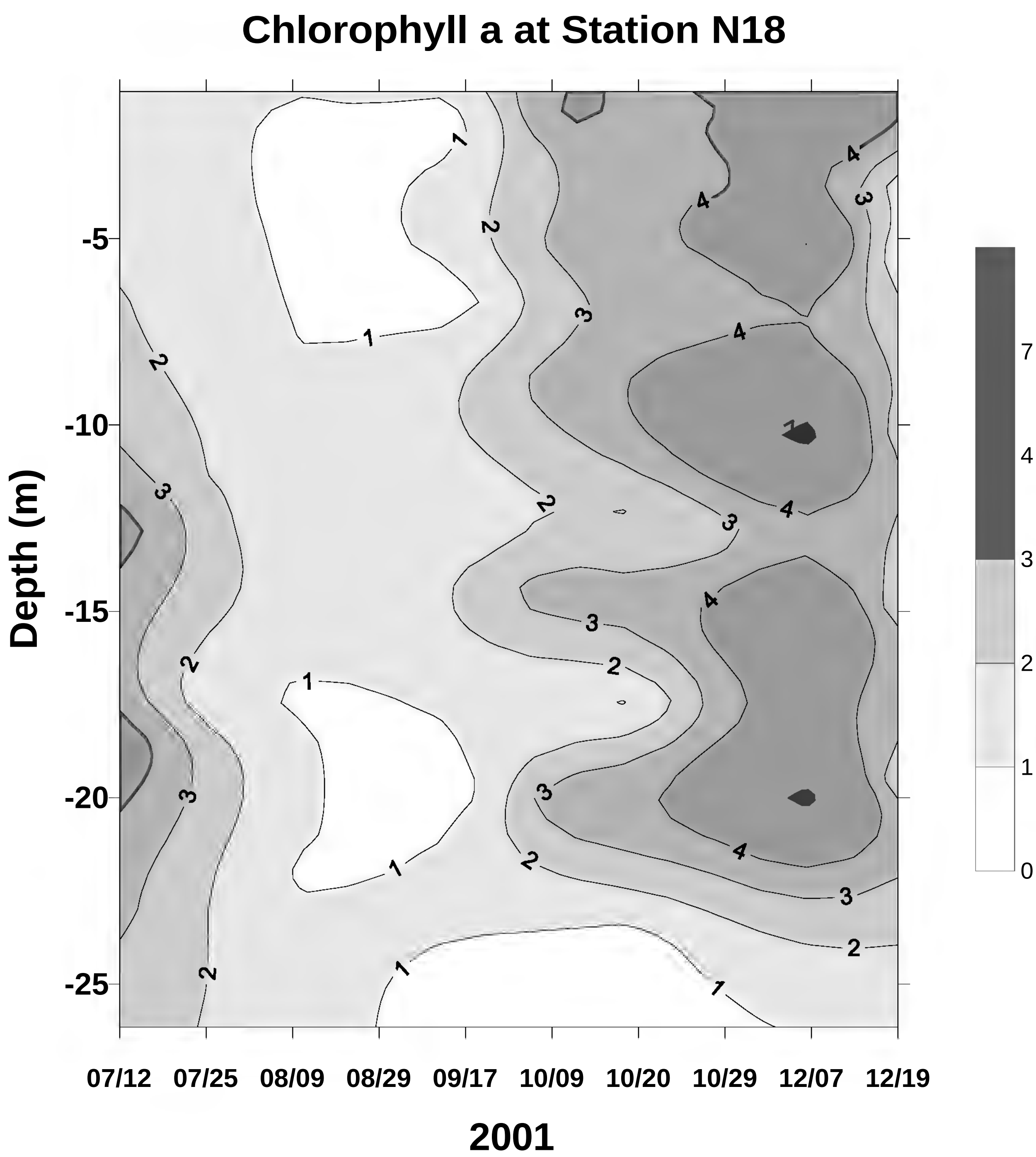


Figure 5-7. Time series of contoured chlorophyll concentration (μg L^{-1}) over depth at station N18

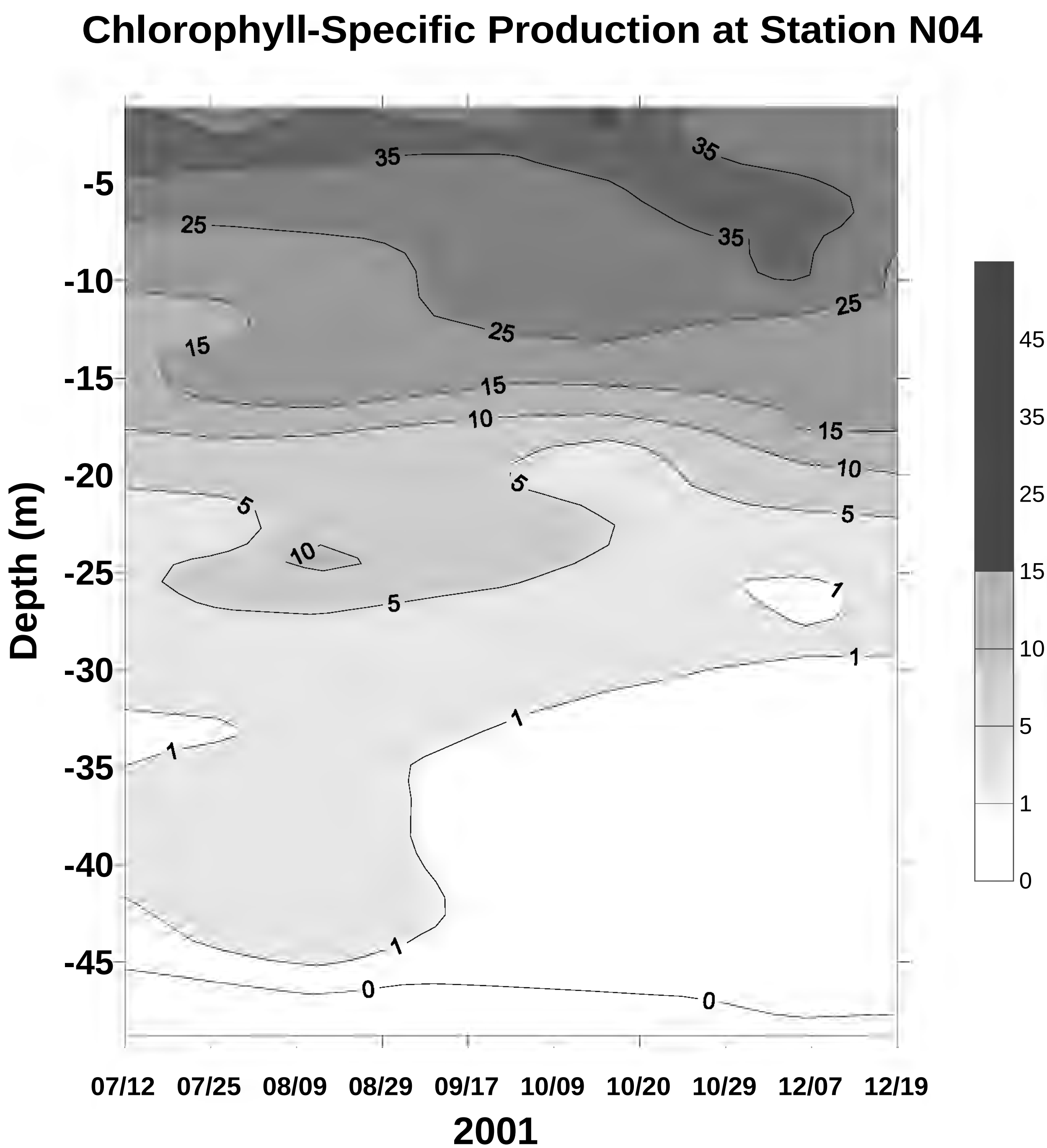


Figure 5-8. Time series of contoured chlorophyll-specific production (mg Cmg $Chl^{-1}d^{-1}$) over depth at station N04

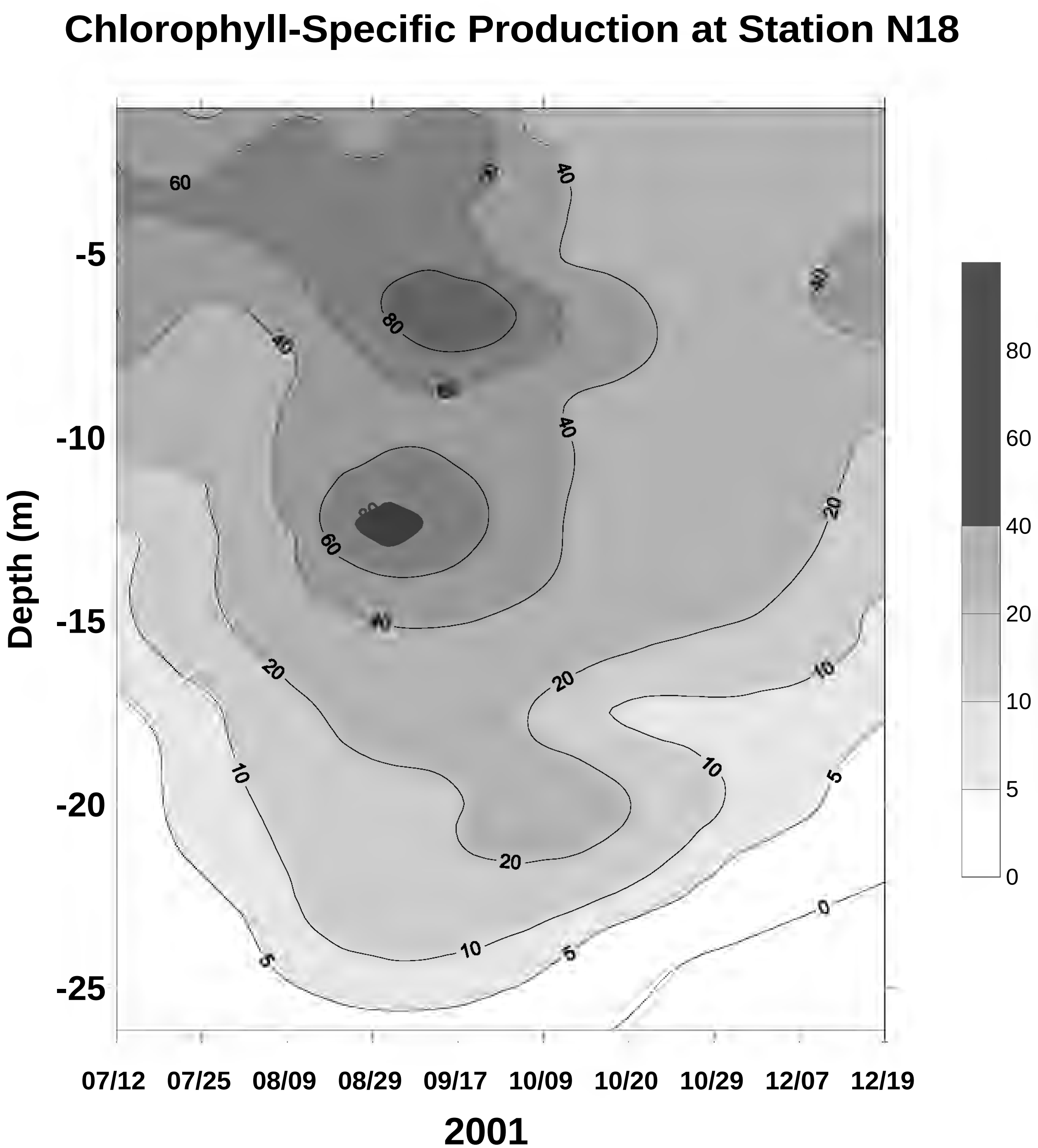
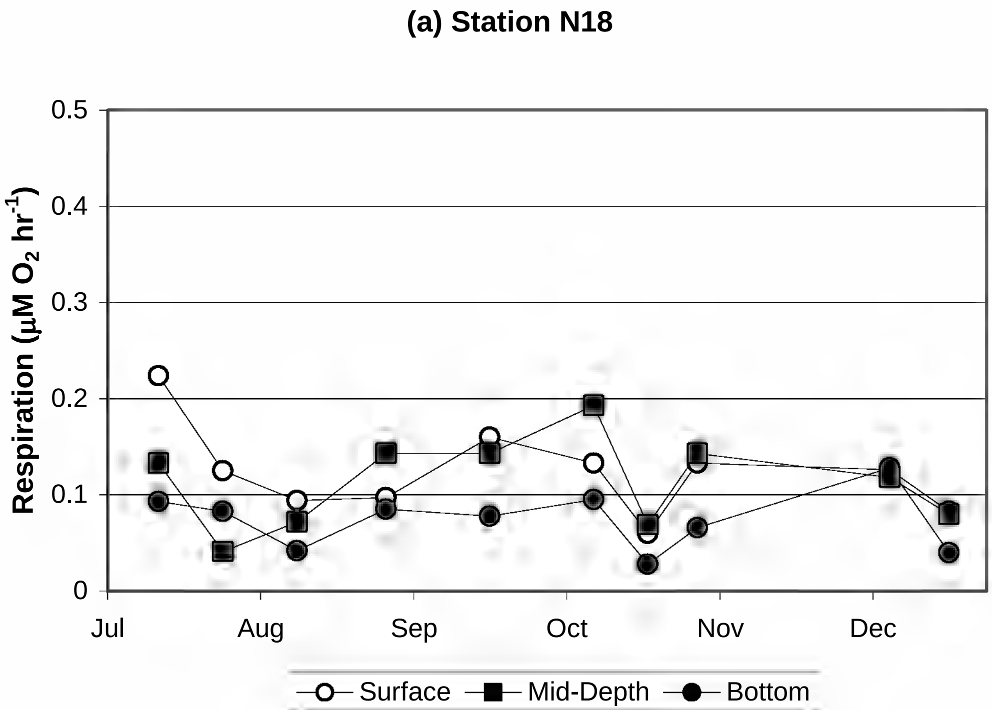


Figure 5-9. Time series of contoured chlorophyll-specific production (mg Cmg $Chl^{-1}d^{-1}$) over depth at station N18



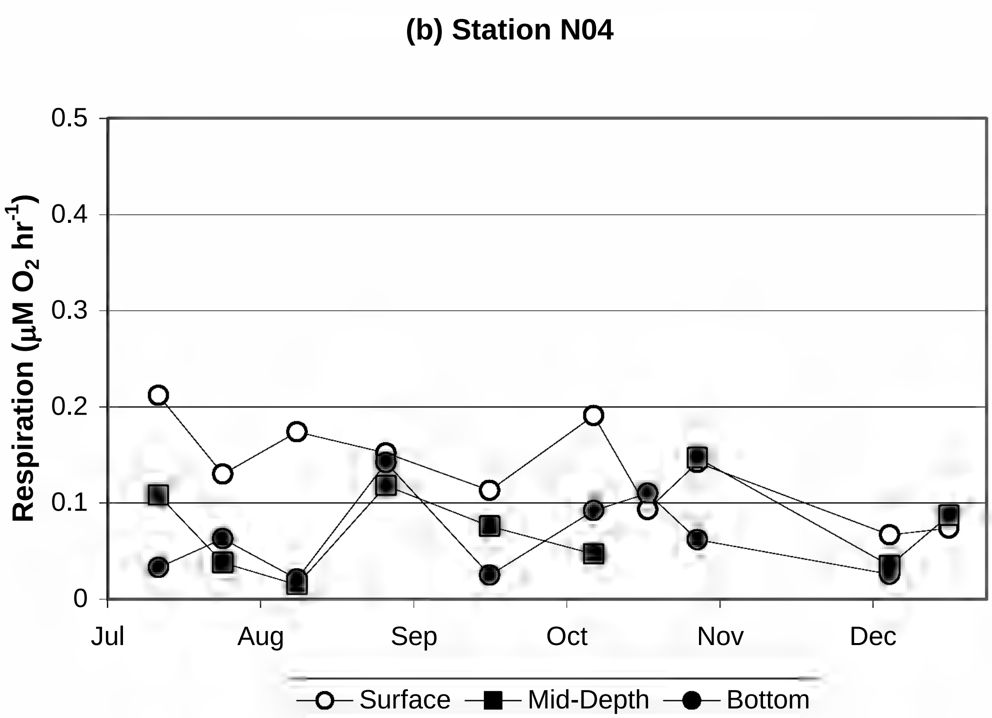
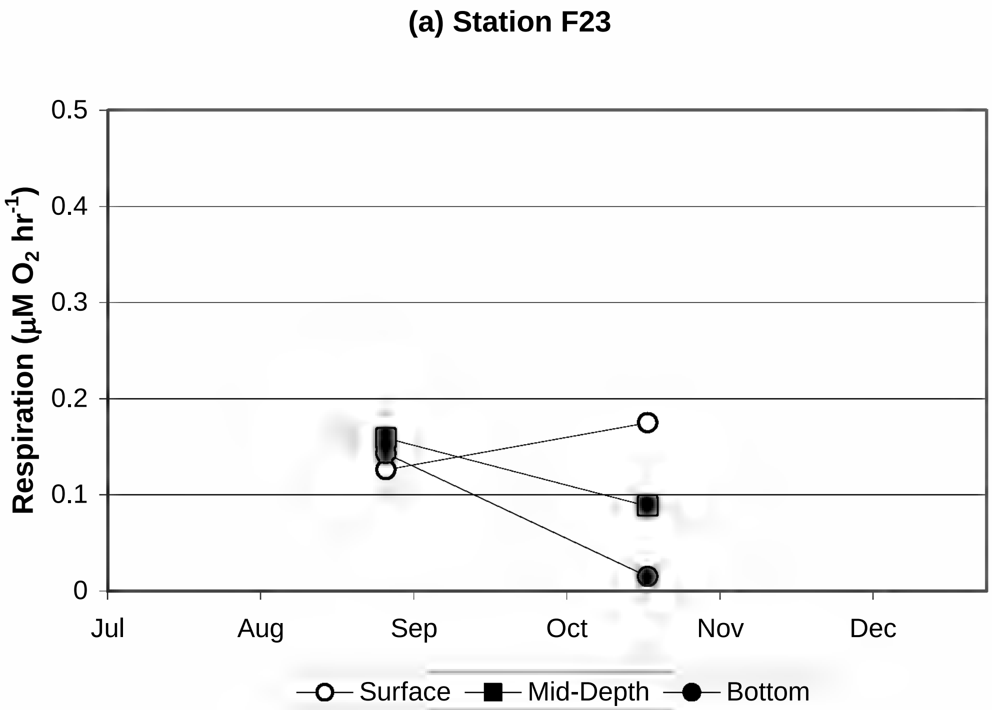


Figure 5-10. Time series plots of respiration (μMO_2hr^{-1}) at stations N18 and N04



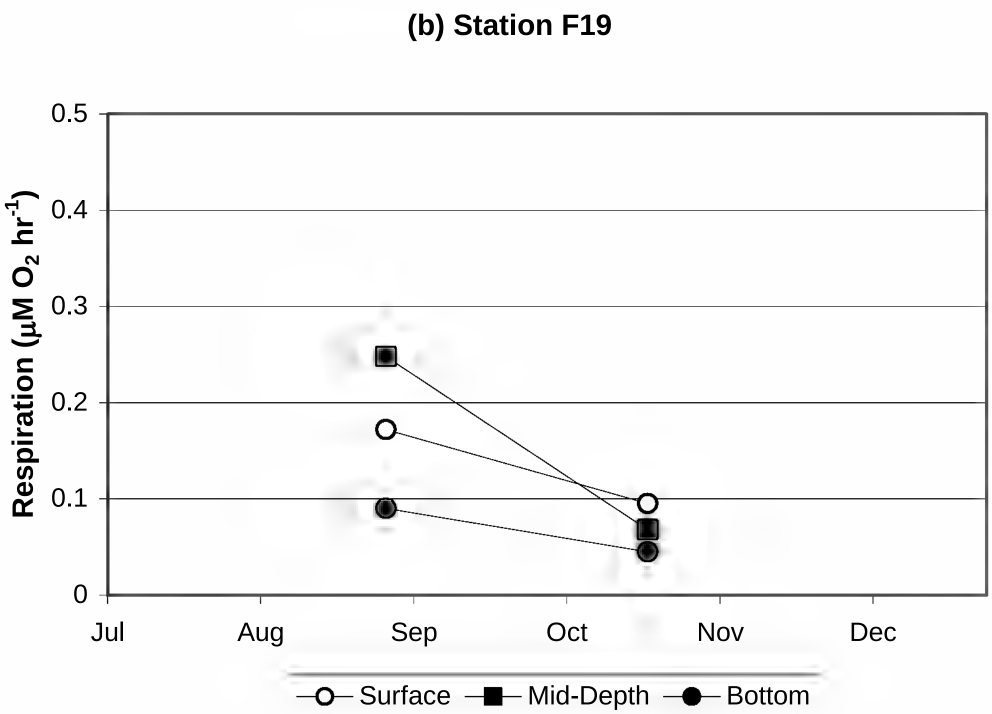
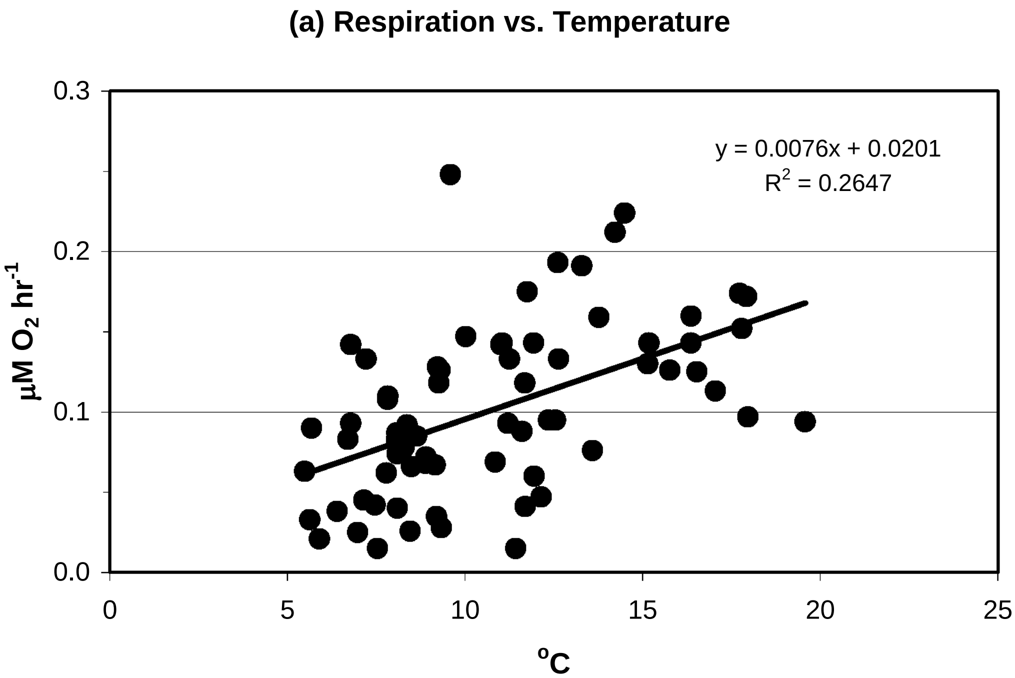


Figure 5-11. Time series plots of respiration (µMO$_2$hr^{-1}) at stations F23 and F19



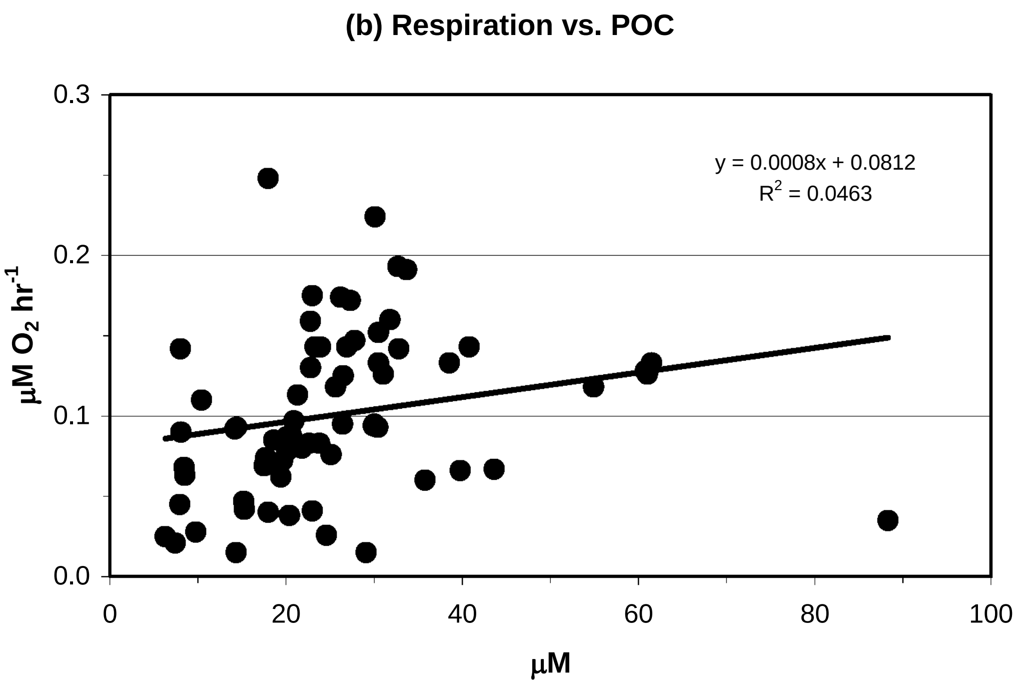
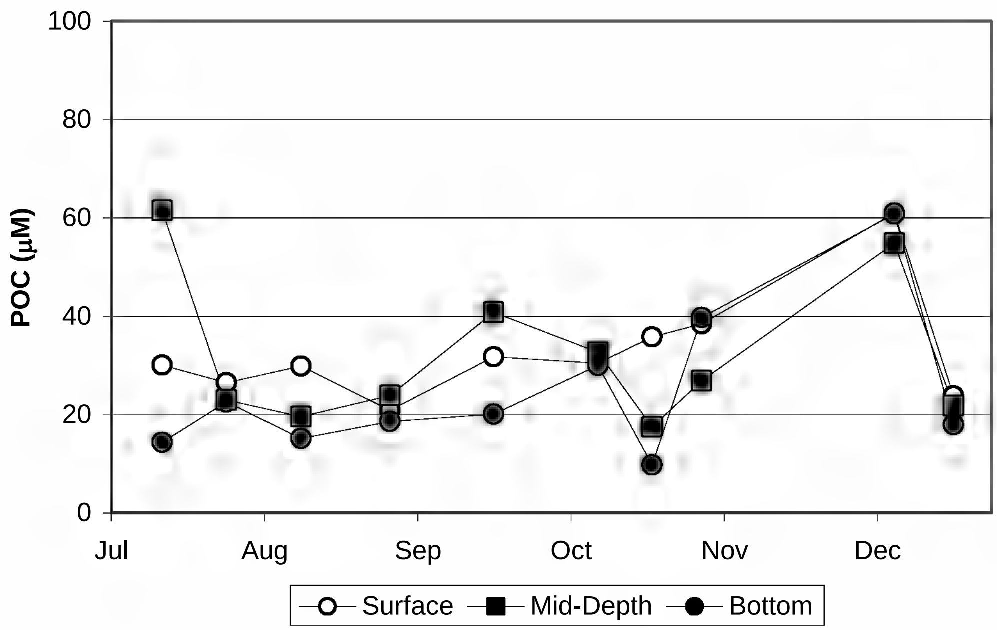


Figure 5-12. Comparison of respiration rate versus a) temperature and b) POC concentration for data collected at stations N04, N18, F19 and F23 in July – December 2001.

(a) Station N18



(b) Station N04

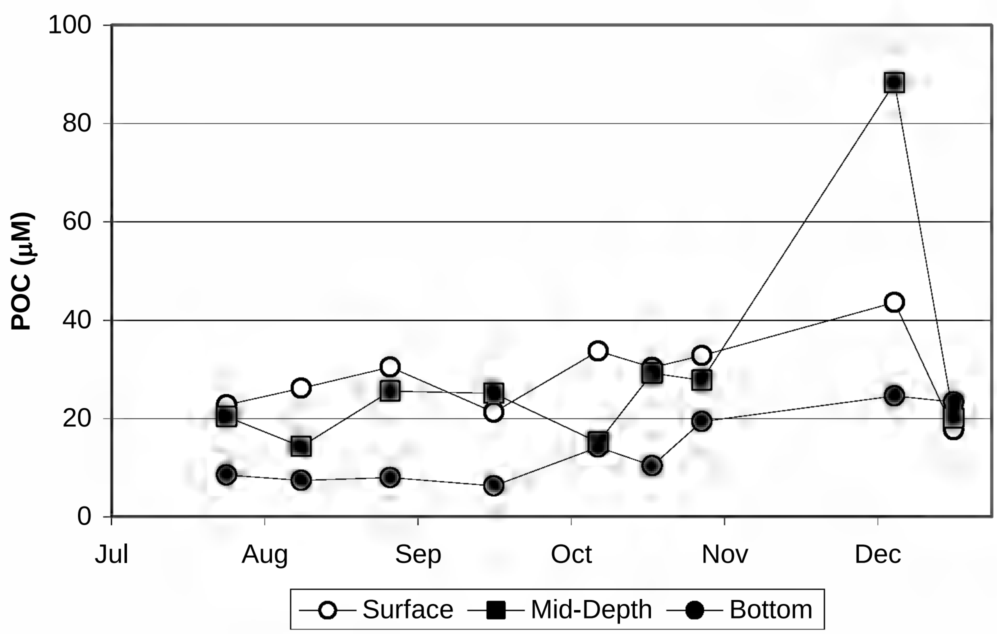
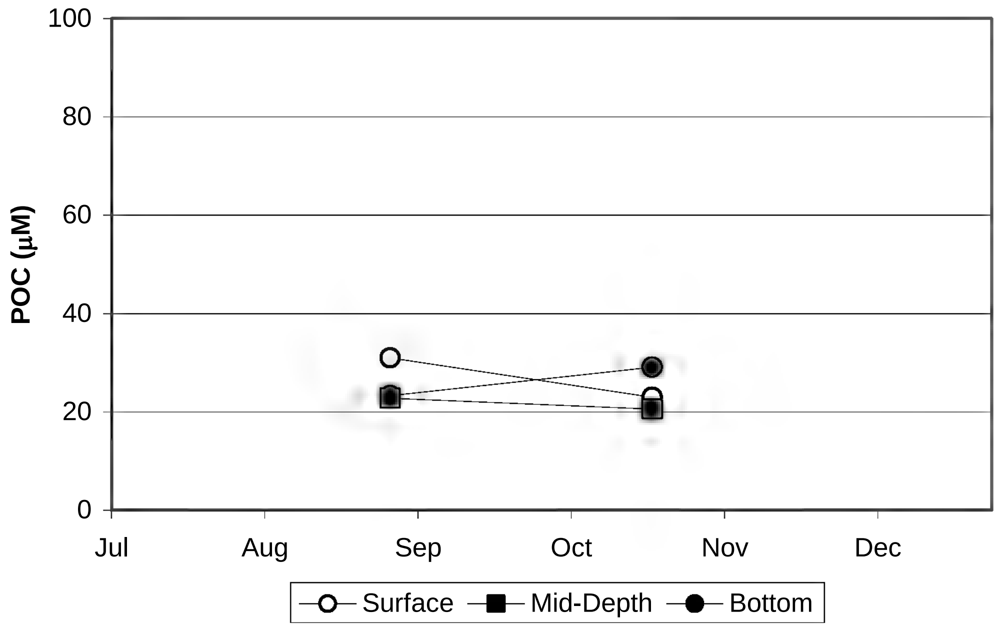


Figure 5-13. Time series plots of POC (µMC) at stations N18 and N04

(a) Station F23



(b) Station F19

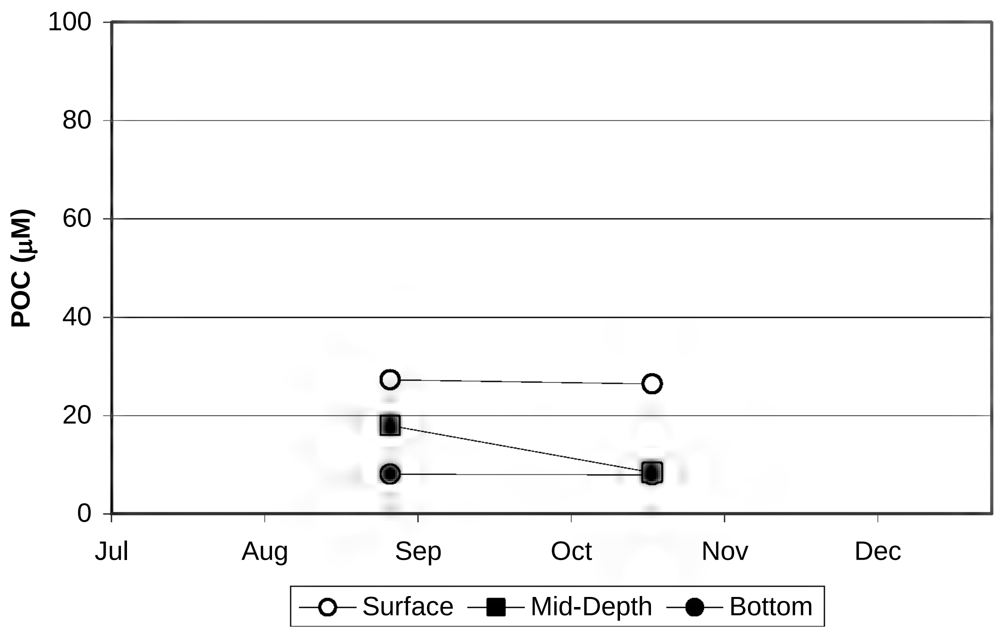


Figure 5-14. Time series plots of POC (μMC) at stations F23 and F19

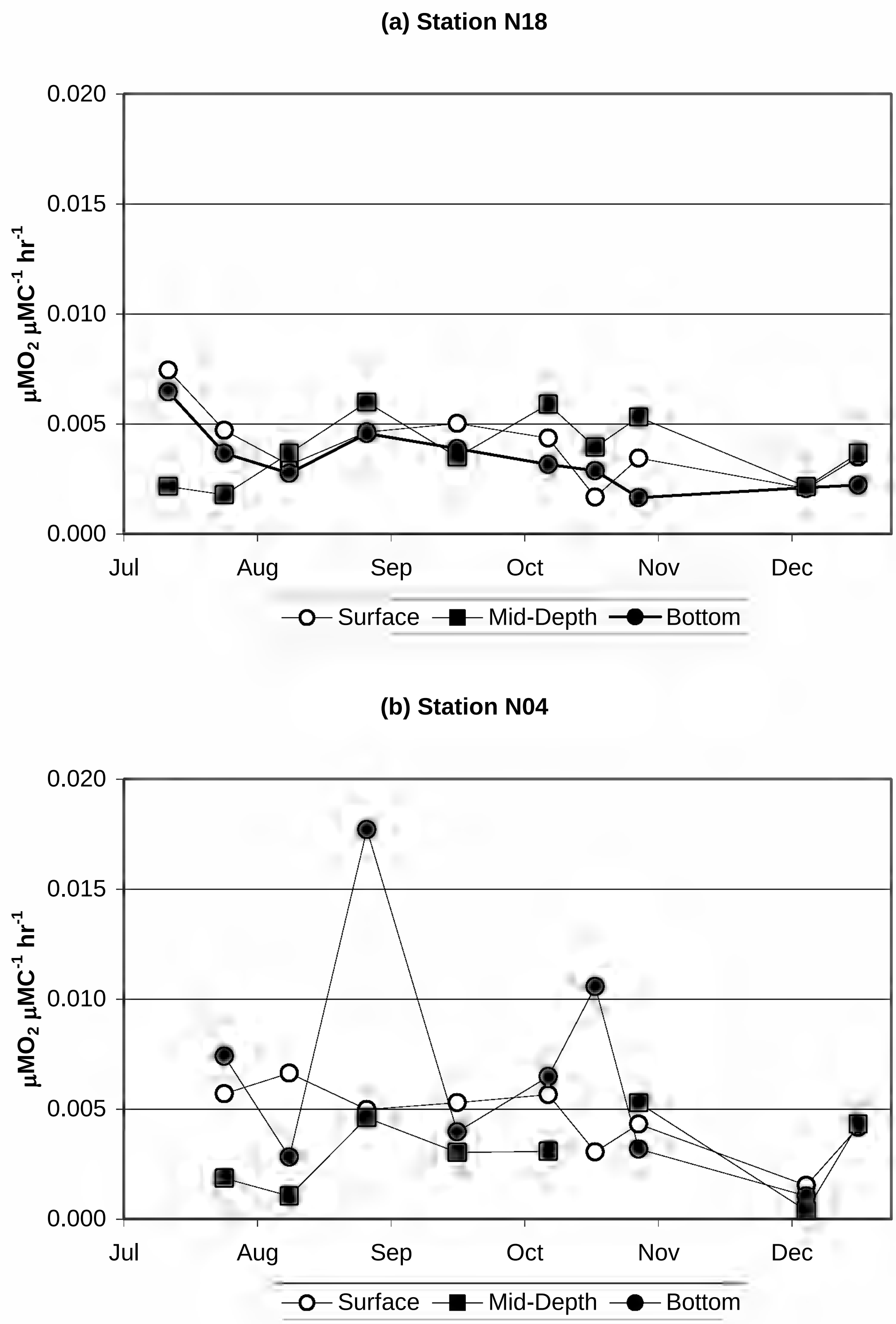
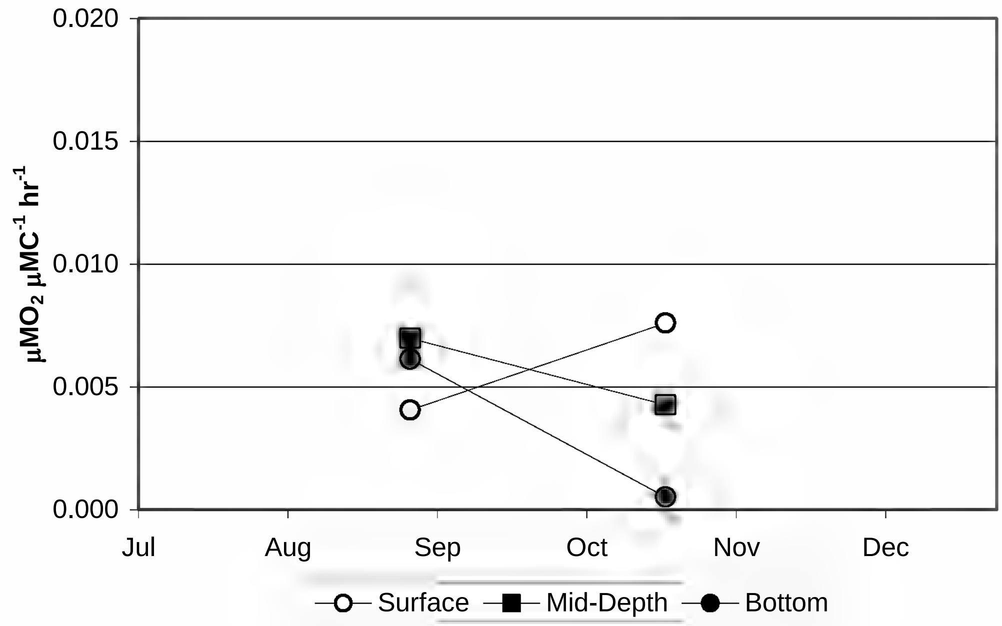


Figure 5-15. Time Series plots of carbon-specific respiration ($\mu MO_2 \mu MC^{-1} hr^{-1}$) at stations N18 and N04

(a) Station F23



(b) Station F19

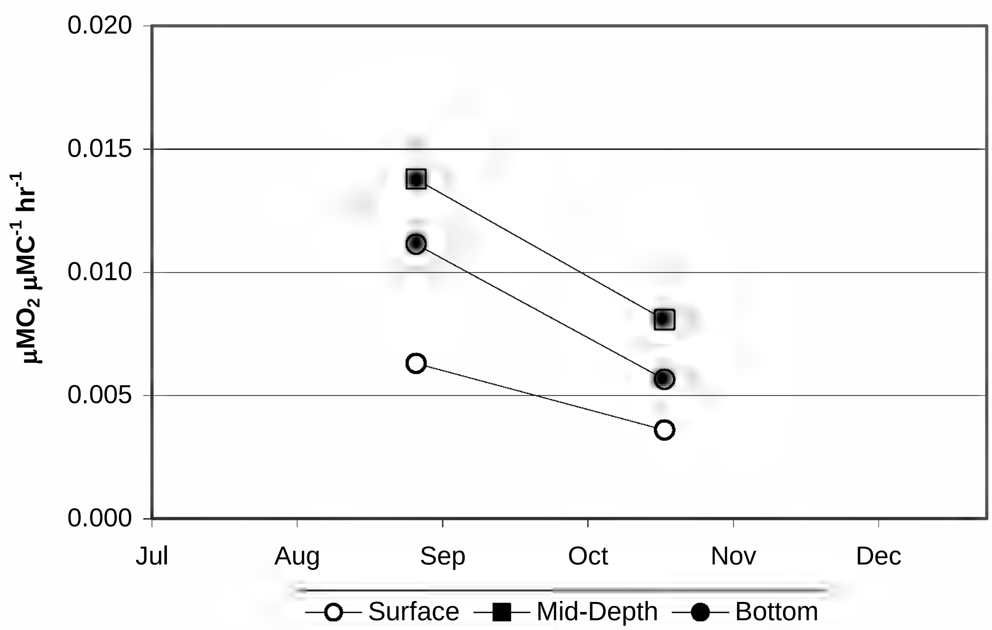


Figure 5-16. Time Series plots of carbon-specific respiration ($\mu MO_2 \mu MC^{-1} hr^{-1}$) at stations F23 and F19

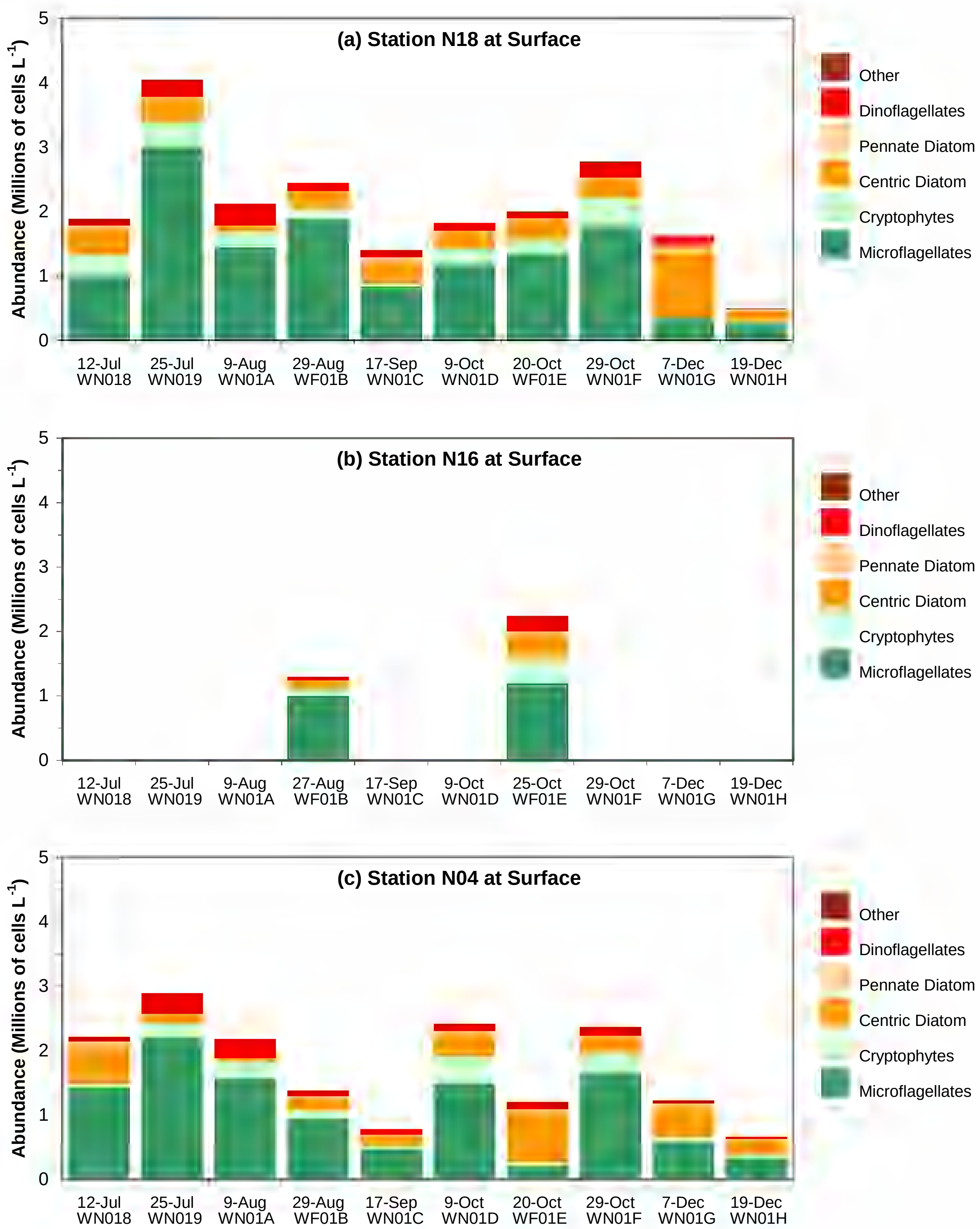


Figure 5-17. Phytoplankton abundance by major taxonomic group, nearfield surface samples

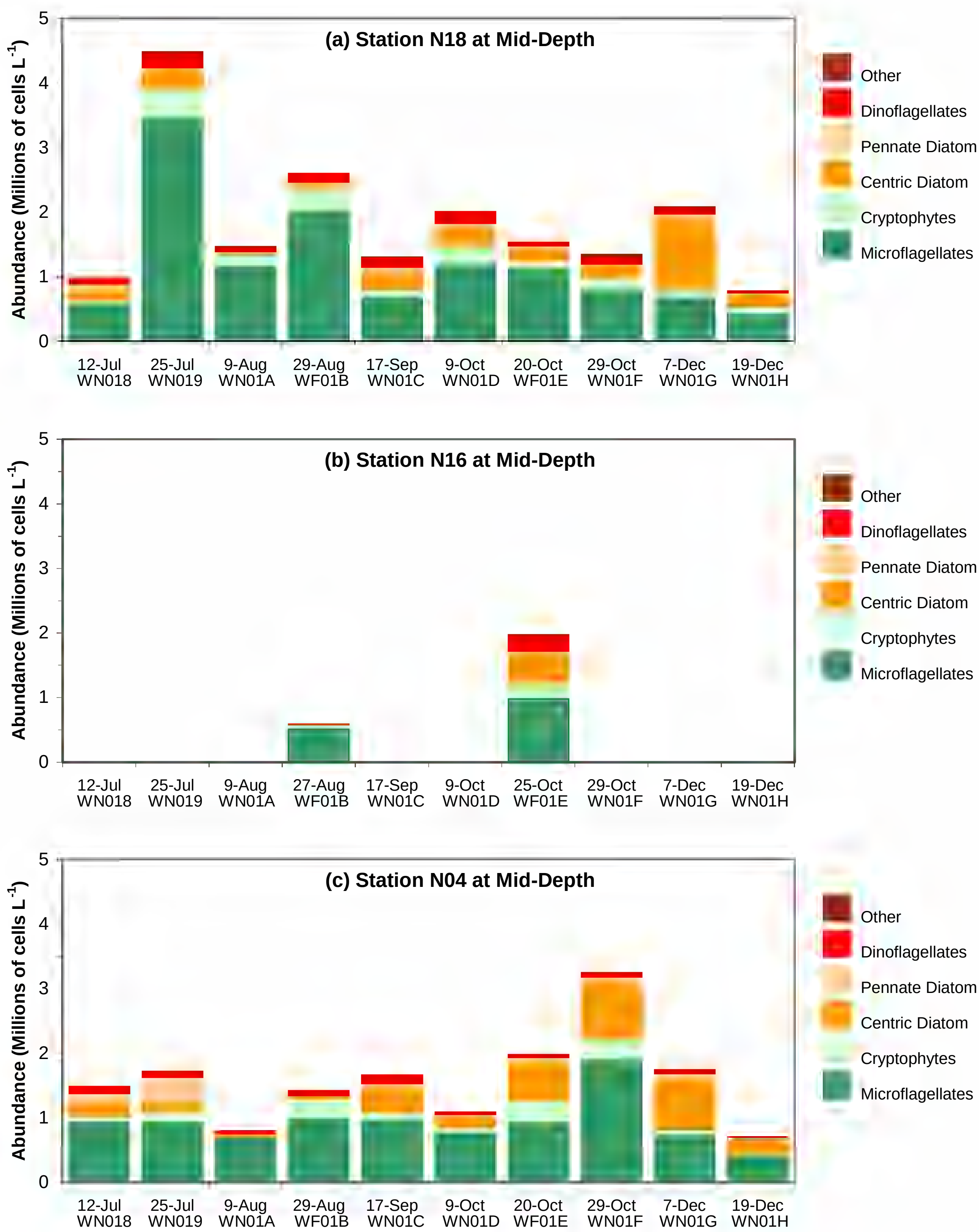


Figure 5-18. Phytoplankton abundance by major taxonomic group, nearfield mid-depth samples

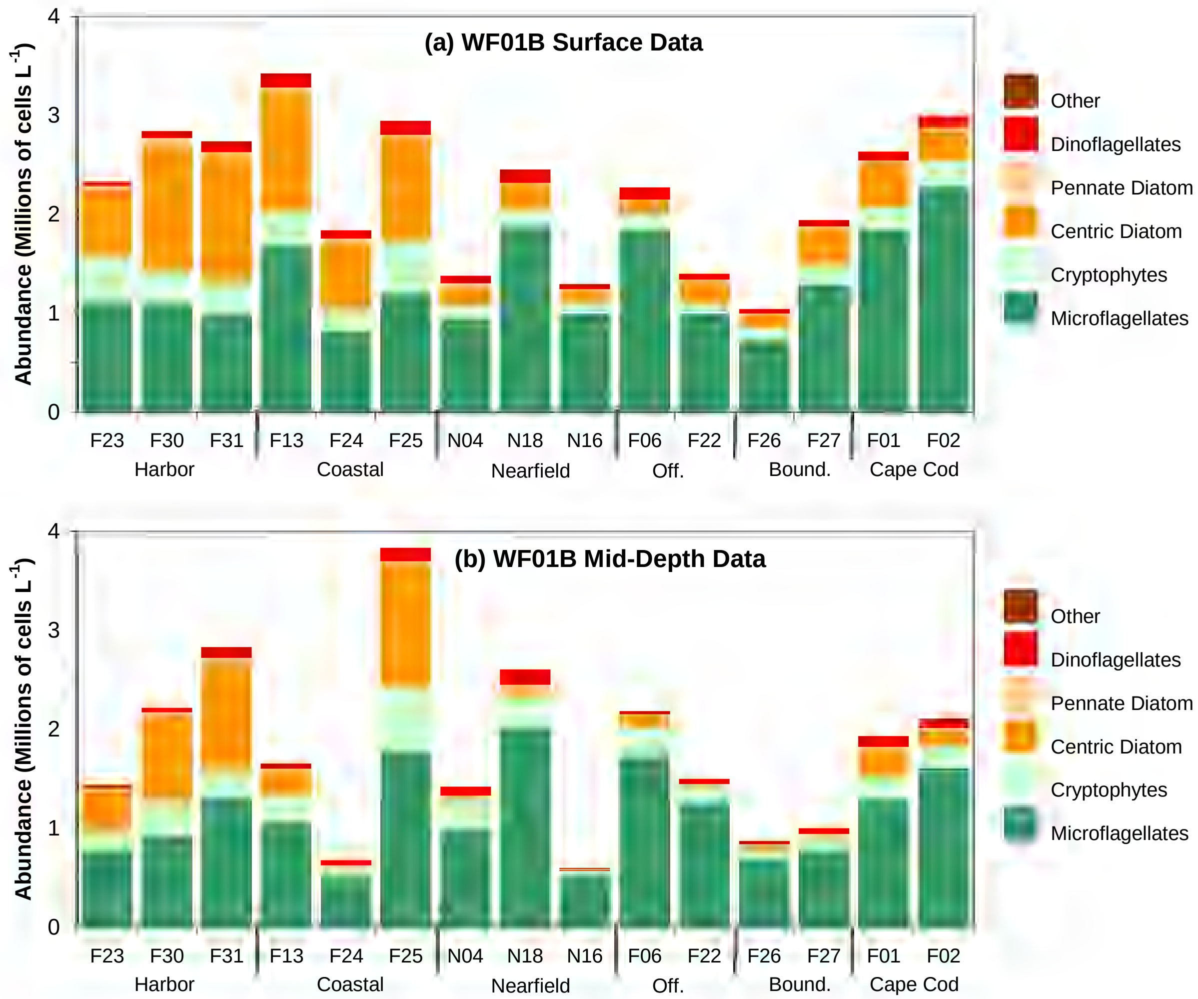


Figure 5-19. Phytoplankton abundance by major taxonomic group, WF01B farfield survey (August 27 – 30)

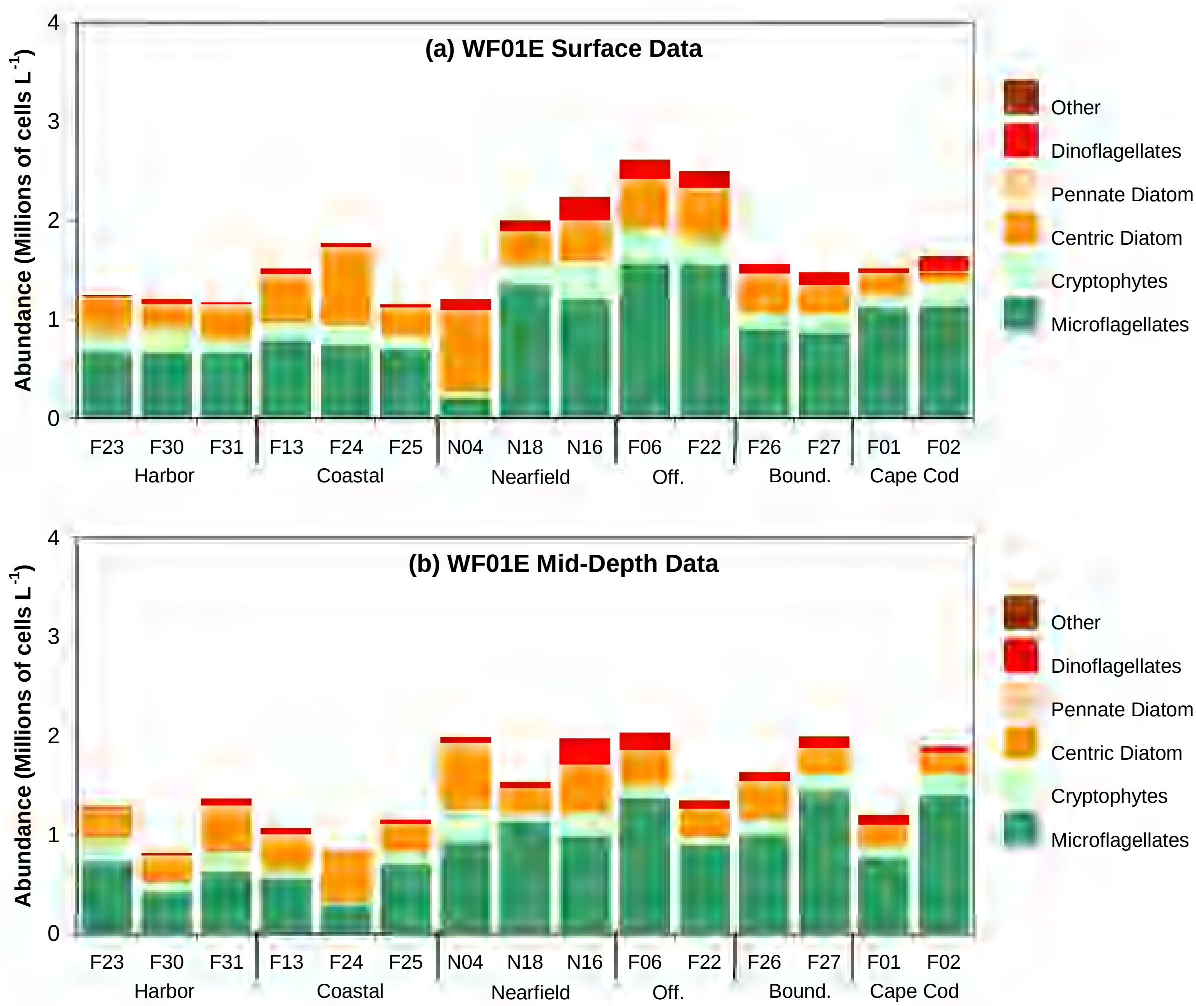


Figure 5-20. Phytoplankton abundance by major taxonomic group, WF01E farfield survey (October 19 – 26)

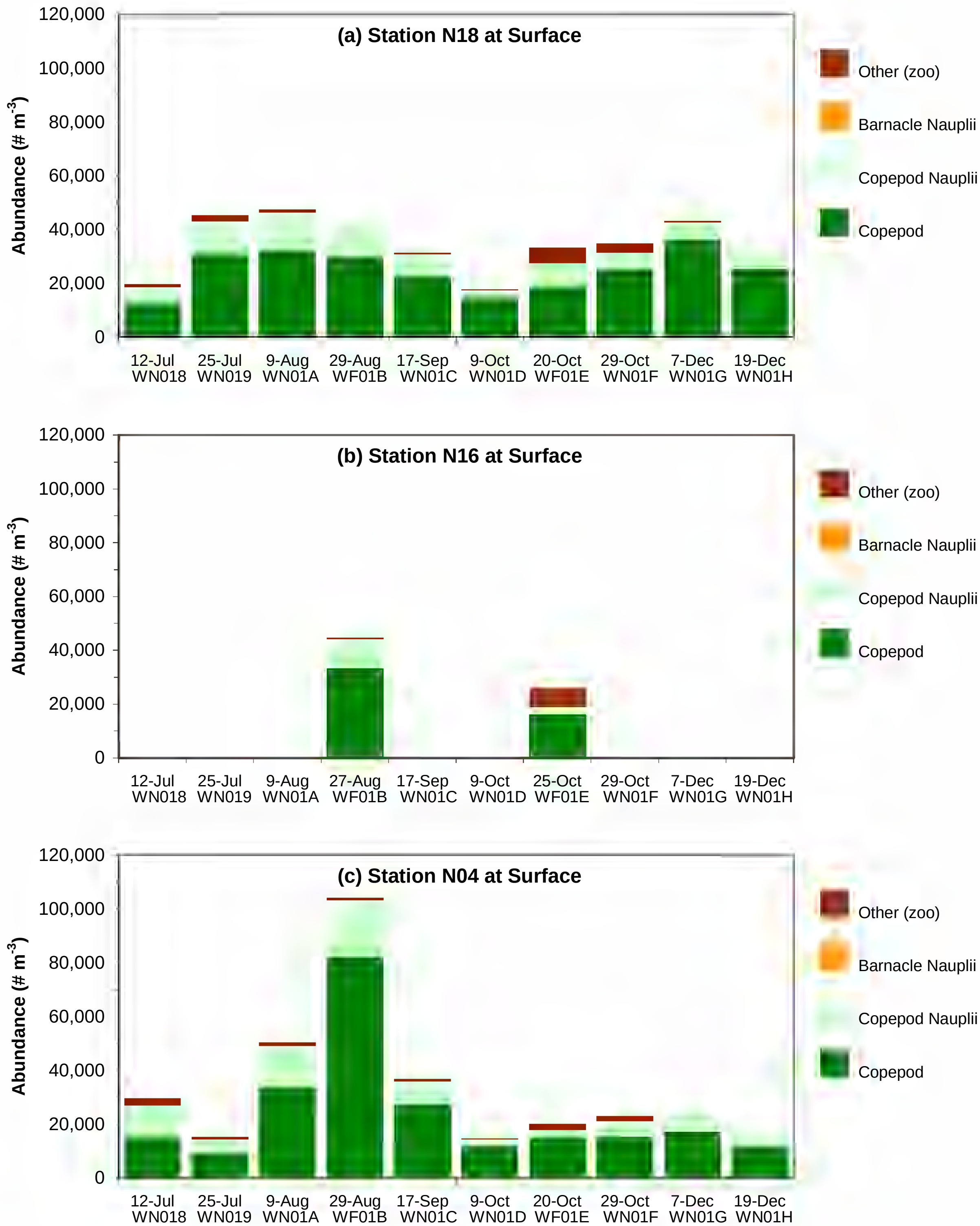


Figure 5-21. Zooplankton Abundance by Major Taxonomic Group, Nearfield Samples

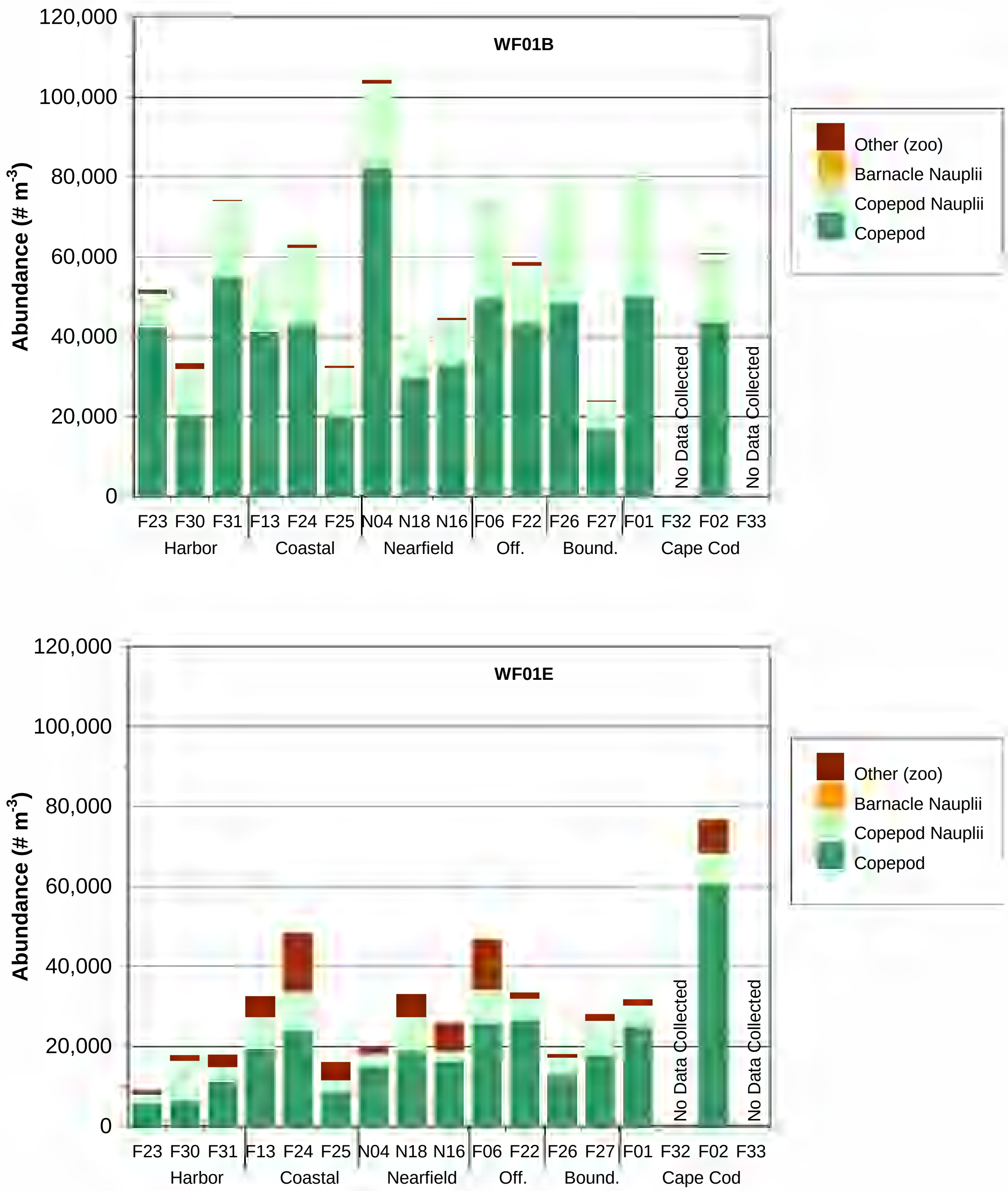


Figure 5-22. Zooplankton abundance by major taxonomic group (a) WF01B farfield survey (August 27 – 30) and (b) WF01E farfield survey (October 19 – 26)

6.0 SUMMARY OF MAJOR WATER COLUMN EVENTS

The primary physical characteristic of this period was the delay in the overturn of the water column and the return to winter conditions. Regionally, seasonal stratification had deteriorated at the coastal and Boston Harbor stations and had begun to weaken at the offshore stations by the October survey (WF01E). In the nearfield, mooring data indicated that there was a strong mixing event in late September. By early October, however, both the mooring and nearfield monitoring data indicated that although stratification had weakened since the September survey, the water column at all but the most inshore nearfield stations was stratified. A weak density gradient continued to be observed from late October to early December. The water column finally returned to well-mixed winter conditions over the entire nearfield in late December (WN01H). Mild meteorological conditions (infrequent storms, warm dry fall, weak and variable winds) contributed to the lingering stratification into early December. In turn, the weak stratification from October to December allowed for both a steady influx of nutrients to the surface waters and the development of a prolonged late fall/early winter bloom.

The general trend in nutrient concentrations during the 2001 July to December period was similar to previous baseline monitoring years. Nutrients were depleted in the surface waters during the summer due to biological utilization and increased in concentration with weakening stratification and increased mixing. The extended period of weak stratification from October to December still provided a source of nutrients to the surface waters due to weak mixing, supporting the late fall/early winter phytoplankton bloom. The combination of limited mixing and the late fall/early winter bloom kept surface water nutrient concentrations low until the water column became well mixed in late December.

The transfer of MWRA effluent from the harbor to the bay outfall on September 6, 2000 moved the anthropogenic nutrient signal from the harbor offshore to the center of the nearfield. Although it is not a conservative tracer due to biological utilization, NH_4 has been shown to be a clear indicator of the effluent plume in the nearfield now that the outfall is online. In August 2001, salinity and NH_4 data suggest that the plume was advected from the nearfield to the south. A comparison of contour plots of NH_4 and chlorophyll concentrations along the Nearfield-Marshfield transect suggest that the elevated NH_4 concentrations in the plume and preferential uptake of NH_4 by phytoplankton may have contributed to localized increases in chlorophyll concentrations. An attempt will be made to more quantitatively evaluate this linkage via a simple box model for the 2001 annual water column report.

Chlorophyll concentrations were relatively low during the second half of 2001, but reached unusually high levels during the late fall/winter bloom in early December. The timing and magnitude of the fall 2001 bloom was a departure from the two previous years. During September and October of 1999 and 2000, substantial and prolonged fall blooms were observed. In 2001 there was a minor fall bloom in September and then a more prolonged and substantial bloom was observed in late October and early December. The peak nearfield survey mean chlorophyll concentration was observed in early December and was coincident with high POC concentrations and peak areal production rates of >3250 mg C m^{-2} d^{-1}. This was relatively late for the peak production rates and chlorophyll concentrations to be observed. These were the highest December values observed since baseline monitoring began in 1992. However, areal production was higher at station N04 in comparison to station N18 from early October to early December, which is a deviation from the spatial trend in production observed during previous years. At station N18, the mean and maximum productivity at the bottom depths was greater than prior years, although a similar increase in bottom productivity was not noted at station N04.

There was relatively good agreement between the chlorophyll data from the monitoring program and SeaWiFS imagery for the fall of 2001. The SeaWiFS data provided information on a relatively short-term chlorophyll event in early September that was not captured directly by the monitoring program. The imagery also provided confirmation that the elevated chlorophyll concentrations observed in both October and December had continued during the intervening period. These images along with the USGS mooring data provide a valuable source of information between surveys.

Total phytoplankton abundances in the whole water samples were highest in late July, decreasing somewhat through August and October, and declining to lower levels in December. The decrease in phytoplankton abundance from fall to early winter is typical for this time of year. However, in comparison to previous years, the late fall and early winter abundance levels were relatively high. Levels of $>10^6$ cells L^{-1} in the nearfield (mostly centric diatoms) from October to early December were coincident with high chlorophyll concentrations and primary production rates. The high chlorophyll levels recorded for late November to early December by SeaWiFS was coincident with the increased abundance of these large chain-forming diatoms and elevated production rates. There were no confirmed blooms of harmful or nuisance phytoplankton species in Massachusetts and Cape Cod Bays during this time period.

Zooplankton abundance reached annual maximum levels in late August and progressively declined through September and October into December. Zooplankton abundance was, as usual, dominated by copepod nauplii and adults and copepodites of the small copepods *Oithona similis*, and copepodites of *Pseudocalanus* and *Centropages* sp., with lesser contributions, at some stations, by meroplankters such as bivalve veligers and, in Boston Harbor, *Acartia* spp. copepodites and adults. Zooplankton abundance in Boston Harbor reached unprecedented low levels during October 2000 likely due to decimation of zooplankton populations by ctenophore (*Mnemiopsis leidyi*) predation. This did not occur in fall of 2001.

The bottom water DO survey minimum values were relatively high and comparable to those measured in the fall of 2000. It might be expected that 2001 DO values would be high given the relatively low chlorophyll concentrations measured in 2001 and presumed low level of organic loading to the bottom waters and benthos. The fact that similar DO minima were observed in two very different 'biological' years – major spring and fall blooms in 2000 and minor blooms in 2001 – suggests that either loading plays a relatively minor role in controlling bottom water DO or that the presumption that high chlorophyll concentrations are indicative of high loading is incorrect. An examination of the connection between physical oceanographic conditions and DO concentrations suggests that it is the former (Geyer *et al*., 2002). It should be noted, however, that even though 2001 DO minimum concentrations were relatively high, bottom water DO concentrations did not increase to typical winter values until late December because of persistent stratified conditions.

September 6, 2000 marked the end of the baseline period, completing the data set for MWRA to calculate the threshold values used to compare monitoring results to baseline conditions. The water quality parameters included as thresholds are annual and seasonal chlorophyll levels in the nearfield, dissolved oxygen concentrations and percent saturation in bottom waters of the nearfield and Stellwagen Basin, and nuisance algae (*Alexandrium*, *Phaeocystis*, and *Pseudo-nitzschia*). Even with elevated chlorophyll concentrations from late October to early December the fall nearfield mean areal chlorophyll value was about half (85 mg m^{-2}) that of the fall threshold value (161 mg m^{-2}). This continued the trend of relatively low chlorophyll concentrations that had been noted for the first half of 2001. The low concentrations from February to December resulted in summer and annual mean areal chlorophyll values (45 and 67 mg m^{-2}) that were also well below threshold levels (80 and 107 mg m^{-2}). The DO concentration survey mean minimum for the fall of 2001 was well above the threshold standard for both the nearfield and Stellwagen Basin. The percent saturation values were slightly below the caution threshold of 80% in each area, but were well above the background values and there were no DO concentration or percent saturation threshold exceedances in the fall of 2001.

There were no confirmed blooms of harmful or nuisance phytoplankton in Massachusetts and Cape Cod Bays for July – December 2001. *Phaeocystis pouchetii*, which often blooms during the spring and was observed in April 2001, was not recorded during this period. *Alexandrium* spp. were only observed in July at an abundance of 2.6 cells L^{-1} well below the threshold abundance of 100 cells L^{-1}. There were no incidences of shellfish toxicity associated with *Alexandrium tamarense* in Massachusetts and Cape Cod Bays in 2001. The *Pseudo-nitzschia "pungens"* threshold designation can include both non-toxic *P. pungens* as well as the identical-appearing (at least with light microscopy) domoic-acid-producing species *P. multiseries* and since resolving the species identifications of these two species requires scanning electron microscopy all *P. pungens* and *Pseudo-nitzschia* unidentified beyond species were included in the threshold. This grouping of *Pseudo-nitzschia* was observed during many of the surveys from July to December 2001, but at low abundances well below threshold values. The potentially toxic diatom *Pseudo-nitzschia pseudodelicatissima*, however, was present and frequently abundant throughout much of the area over this time period. This species is not currently included in the calculation of the *Pseudo-nitzschia "pungens"* threshold and it is unclear whether abundances of *P. pseudodelicatissima* above the current threshold levels should cause alarm. MWRA and HOM3 scientists are currently reviewing the inclusion of *Pseudo-nitzschia pseudodelicatissima* and additional *Pseudo-nitzschia* species in the MWRA threshold calculation.

A number of topics were called out in this report that will be discussed in greater detail in the 2001 annual water column report including the following:

- Examine physical oceanographic conditions in the summer and fall of 2001 including upwelling/downwelling favorable conditions, the apparent late September mixing event, and the impact of low riverine flows and precipitation during the drought in fall 2001.
- Explore the use of NH_4 concentration and flow data for the MWRA effluent discharge in concert with Massachusetts Bay to estimate dilution rates and more quantitatively evaluate this linkage between elevated NH_4 concentrations in the plume and higher chlorophyll concentrations via a simple box model.
- Obtain and evaluate chlorophyll data from the USGS mooring for October – December 2001 to provide additional insight into the duration and magnitude of the atypical late fall/early winter bloom of 2001.
- Evaluate the atypical patterns that were observed in productivity including – the delay in peak productivity until early December, the increase in station N04 production relative to station N18, and the relatively high bottom water productivity that was measured at station N18 – none of which had been observed during previous years.

7.0 REFERENCES

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APPENDIX A

Productivity Methods

METHODS

URI conducted a study of the reliability of using reduced sample volumes to measure primary productivity using ^{14}C. The study found that analyses using 5-mL samples could produce results that were comparable to analyses using larger sample volumes. A summary of the study is in Appendix E of the Combined work/quality assurance plan for baseline water quality monitoring: 1998-2000 (Albro *et. al.*, 2002).

URI also measured the effects of sample holding time and increased incubation time on measurements of primary productivity using the photosynthetrons at URI. The results, summarized below, show that sample analysis must begin within 6 h of sample collection and incubation between 0.5 h and 2 h produce comparable results.

Incubation Time	
Time (h)	Productivity (g/C/m²/h)
0.5	0.195
1	0.207
1.5	0.182
2	0.212

Holding Time	
Time (h)	Productivity (g/C/m²/h)
0	0.207
4	0.182
6	0.210
8	0.177

Based on the results of these tests the following method has been used to collect and analyze water samples for productivity.

Primary Analysis by ^{14}C – Field Procedures

From each of 5 depths at each productivity station, samples are obtained by filtration through 300-μm-mesh screen (to remove large zooplankton) from the Rosette sampling bottle into opaque 1-L polyethylene bottles. The bottles are rinsed twice prior to filling. The samples are then placed in a cooler and transferred to the URI laboratory within 5 hours of water sampling. Productivity samples are taken from the same bottles and depths as the other analyses.

Primary Analysis by ^{14}C – Laboratory Procedures

Under subdued green light, each depth is processed separately starting with the surface water sample. Each sample is mixed thoroughly and then poured into a repipette set to deliver 5 mL. The repipette is rinsed twice with sample prior to use. The delivery tip of the repipette is flushed three times and 5 mL of sample will be pipetted into 20 mL borosilicate vials. A total of 16 bottles (14-16 light bottles, 2 dark bottles) are filled for each depth. These vials are incubated in a light and temperature controlled incubator. Light bottles from each depth are incubated at 14 to 16 light intensities (250 w Tungsten-halogen lamps attenuated with neutral density filters, range 0 to 2000 μE m^{-2} s^{-1}) and all bottles are incubated within 2°C of the *in situ* temperature.

The 5 mL samples are incubated with 100 μL of 10 μCi/mL (1 μCi for 5 mL sample) Carbon-14 (^{14}C) stock solution. All vials are then placed in the incubator for two hours. Time and temperature are recorded at the start and end of the incubation period. The light intensity within the incubator is measured before and after the incubation period. Temperature is constantly monitored throughout the incubation period and the location of each vial in the incubator is recorded. Upon removal from the incubator, 100 μL of 0.05N HCl, is added to each vial. Vials will remain loosely capped while shaken overnight. The following morning 15 mL Ecolume is added to each vial, which is again loosely capped and shaken overnight. Two days following the cruise, vials are tightly capped and placed on the Beckman LS 3801 to be counted.

Calculation of Primary Production. Volume-specific primary production is calculated using equations similar to that of Strickland and Parsons (1972) as follows:

$$P(i) = \frac{1.05(DPM\,(i))DIC}{A_{sp}T}$$

$$P(d) = \frac{1.05(DPM\,(d))DIC}{A_{sp}T}$$

$$A_{sp} = DMP(sa) - DPM\,(back)$$

where:

$P(i)$ = primary production rate at light intensity i (μgC $L^{-1}h^{-1}$ or mgC $m^{-3}h^{-1}$)
$P(d)$ = dark production, (μgC $L^{-1}h^{-1}$ or mgC $m^{-3}h^{-1}$)
$DPM\,(i)$ = dpm in sample incubated at light intensity i
$DPM\,(d)$ = dpm in dark incubated sample
$DPM\,(back)$ = background dpm in vial containing only scintillation cocktail
$DPM\,(sa)$ = specific activity added to incubation samples (DPM)
T = incubation time (h)
DIC = concentration of dissolved inorganic carbon (μg/mL)

Table A-1 shows the frequency that primary productivity measurements and calculations are performed per vial, depth, station, and survey.

Table A-1. Measurement frequency for variables involved in calculation of primary production.

Measurement/ Calculation	Vial	Depth	Station	Survey
DPM(i)	✔			
P(i)	✔			
DIC		✔		
P(d)		✔		
DPM(d)		✔		
Asp			✔	
T			✔	
DPM(sa)			✔	
DPM(back)				✔

P–I curves. For each of the 5 depths for each photosynthesis station a P–I curve is obtained from the data P(I) = P(i)-P(d) vs. the irradiance (I, μE $m^{-2}s^{-1}$) to which the incubating sample is exposed. The P-I curves are fit via one of two possible models, depending upon whether or not significant photo-inhibition occurs. In cases where photoinhibition is evident the model of Platt *et al.* (1980) is fit (SAS 1985) to obtain the theoretical maximum production, and terms for light-dependent rise in production and degree of photoinhibition:

$$P(I) = P_{sb}(1 - e^{-a})e^{-b}$$

where:

$P(I)$ = primary production at irradiance I, corrected for dark fixation (P(i)-P(d))

P_{sb} = theoretical maximum production without photoinhibition

$a = {}^{\alpha I}/_{P_{sb}}$ and α is the initial slope, the light-dependent rise in production

$b = {}^{\beta I}/_{P_{sb}}$ and β is a term relaying the degree of photoinhibition

If ß is not significantly different from zero, an alternative model of Webb *et al.* (1974) is similarly fit to obtain the maximum production and the term for light-dependent rise in production:

$$P(I) = P_{\max}(1 - e^{-a'})$$

where:

$P(I)$ = primary production at irradiance I corrected for dark fixation (P(i)-P(d))

$P_{\max}$ = light saturated maximum production

$a' = {}^{\alpha I}/_{P_{\max}}$ and α is the initial slope the light-dependent rise in production

P_{max} and P_{sb} are not equivalent but they are mathematically related using the equation:

$$P_{max} = P_{sb}\,[\alpha/(\alpha+\beta)][\beta/(\alpha+\beta)]^{\beta/\alpha}$$

Light vs. Depth Profiles. To obtain a numerical representation of the light field throughout the water column averaged CTD light profiles (0.5 m intervals) are fit (SAS 1985) to an empirical sum of exponentials equation of the form:

$$I_Z = A_1 e^{-a_1 Z} + A_2 e^{-a_2 Z} + \ldots.$$

which is an expansion of the standard irradiance vs. depth equation:

$$I_Z = I_0 e^{-kZ}$$

where:

I_Z = light irradiance at depth Z

I_0 = incident irradiance ($Z = 0$)

k = extinction coefficient

A_1, A_2 . . . = factors relating to incident irradiance ($I_0 = A_1 + A_2 + \ldots$)

a_1, a_2 . . . = coefficients relating to the extinction coefficient ($k = a_1 + a_2 + \ldots$)

The expanded equation is used in most instances as spectral shifts, pigment layering and other factors result in deviation from the idealized standard irradiance vs. depth equation. The simplest form of the expanded equation is implemented to adequately model the light field, which in the large majority of cases is the sum of two exponentials.

Daily Incident Light Field. During normal CTD hydrocasts the incident light field is routinely measured via a deck light sensor at high temporal resolution. The average incident light intensity is determined for each of the CTD casts to provide, over the course of the photoperiod (12-hr period centered upon solar noon), a well resolved irradiance time series consisting of 12-17 data points. A 48-point time series (every 15 min) of incident is obtained from these data by linear interpolation. A similar time series of light data is collected at Deer Island, and is used as the photoperiod incident light (I_o) time series described below. The Deer Island data are collected using a 4 π sensor and the light intensity measured in the incubator is collected with a cosine sensor. The cosine values are converted to 4 π readings using an empirically determined equation:

$$4\pi = 17.58 + 1.0529\,(\cos) - 0.00008\,(\cos)^2$$

with both 4 π and cosine light intensity in units of $\mu E\ m^{-2}\ sec^{-1}$. The r^2 for the empirical equation is 0.99. The light data are converted prior to fitting the P-I curves.

Calculation of Daily Primary Production. Given the best fit parameters (P_{sb} or P_{max}, α, β) of the P-I curves obtained for each of the five sampling depths, the in situ light intensity (*i.e.*, I_z) at each depth determined from the sum of exponential fits on the in situ light field, and the photoperiod incident light (I_0) time series, it is possible to compute daily volumetric production for each depth. To do this at a given depth, hourly production is determined for the in situ light intensity computed for each 15 min interval of the photoperiod, using the appropriate P-I parameters and in situ irradiance. Daily production ($\mu g\ C\ L^{-1}\ d^{-1}$) is obtained by integration of the determined activity throughout the 12-hour photoperiod. An advantage of this approach is that seasonal changes in photoperiod length are automatically incorporated into the integral computation. For example, during winter months computed early morning and late afternoon production contributes minimally to whole day production, whereas during summer months the relative contribution during these hours is more significant. The investigator does not have to decide which factor to employ when converting hourly production to daily production. The primary assumption of the approach is that the P-I relationship obtained at the time of sample procurement (towards the middle of the photoperiod) is representative of the majority of production occurring during the photoperiod, which should be the case.

Calculation of Daily Areal Production. Areal production ($mg\ C\ m^{-2}\ d^{-1}$) is obtained by trapezoidal integration of daily volumetric production vs. depth down to the 1% light level.

Calculation of Chlorophyll-Specific Parameters. Chlorophyll-specific measures of the various parameters (including the P-I parameters) is determined by dividing by the appropriate chlorophyll term obtained from independent measurements.

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APPENDIX B

Surface Contour Plots – Farfield Surveys

Surface Contour Plots – Farfield Surveys

All contour plots were created using data from the surface bottle sample (A). Each plot is labeled with the survey number (WF01B and WF01E), and parameter. The minimum and maximum value, and the station where the value was measured are provided for each plot, as well as the contour interval and parameter units.

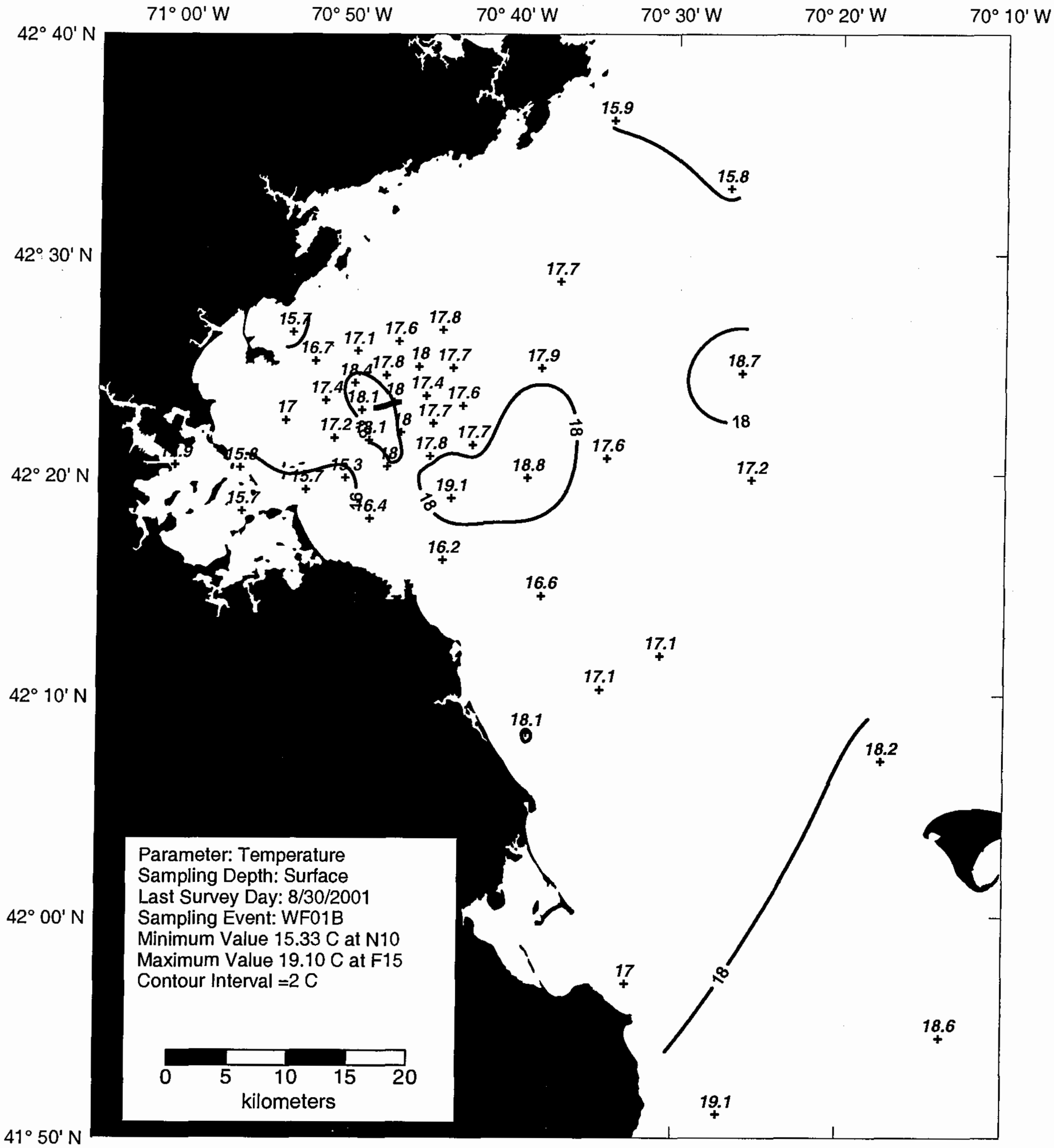


Figure B-1. Temperature Surface Contour Plot for Farfield Survey WF01B (Aug 01)

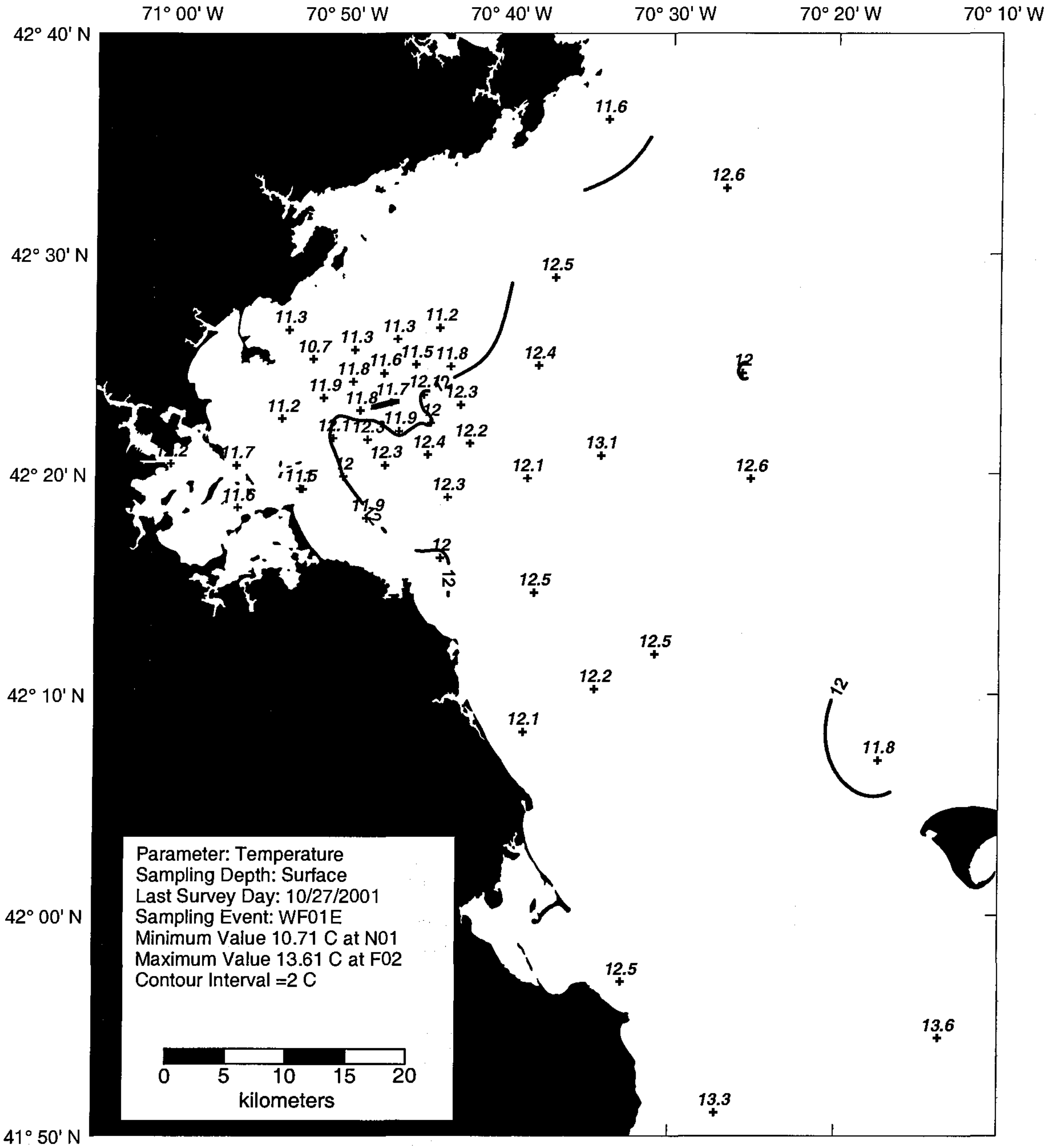


Figure B-2. Temperature Surface Contour Plot for Farfield Survey WF01E (Oct 01)

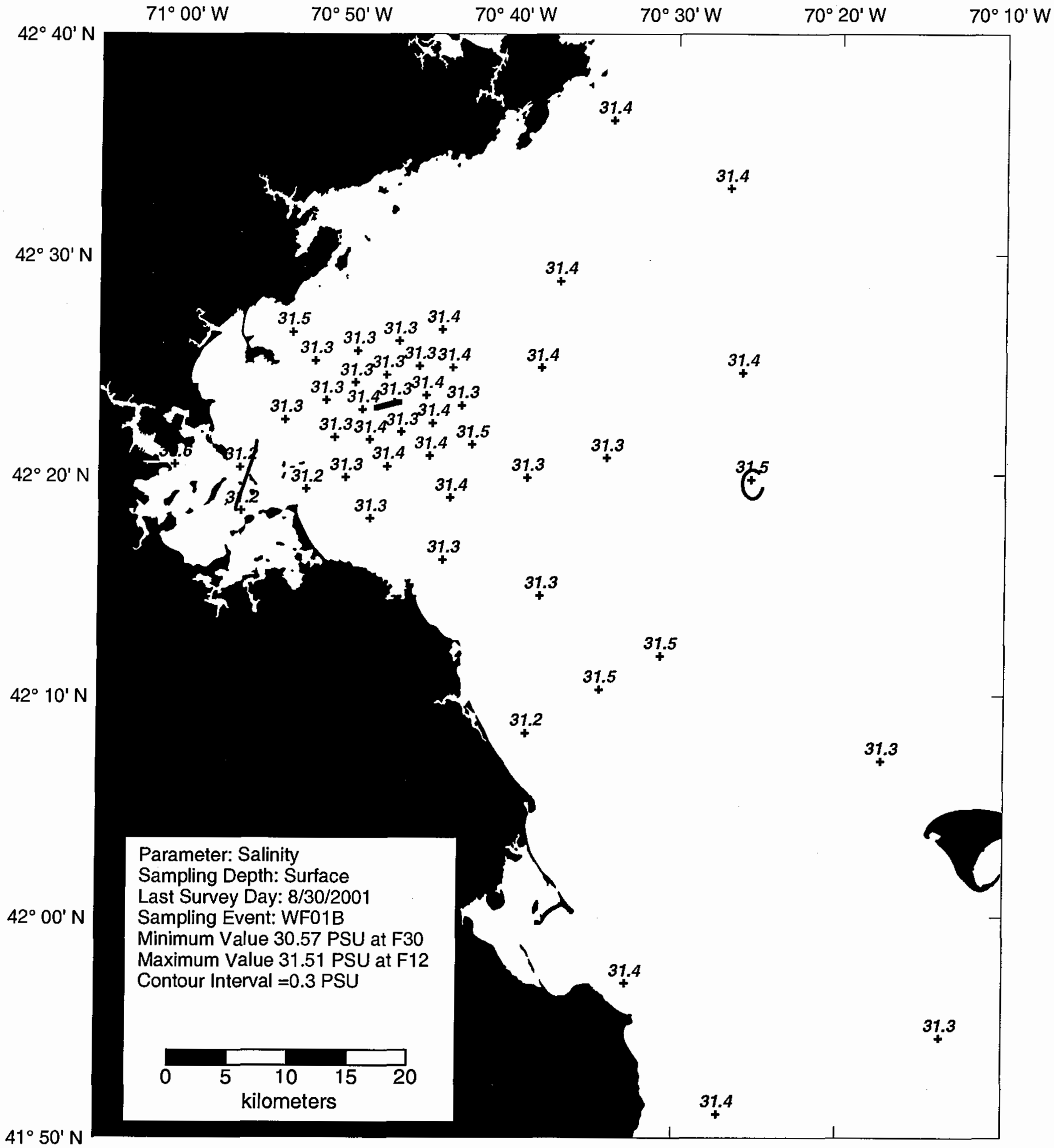


Figure B-3. Salinity Surface Contour Plot for Farfield Survey WF01B (Aug 01)

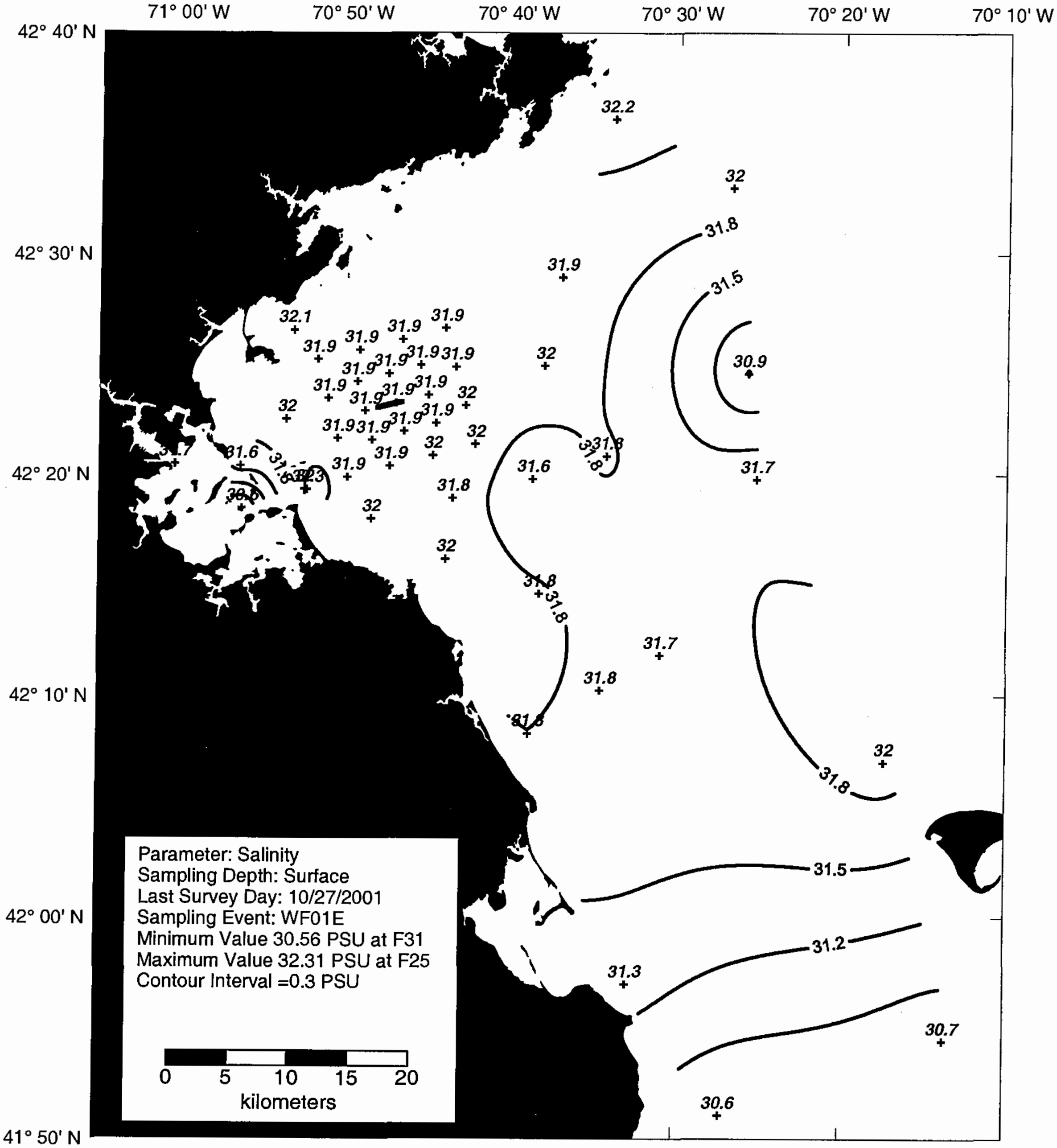


Figure B-4. Salinity Surface Contour Plot for Farfield Survey WF01E (Oct 01)

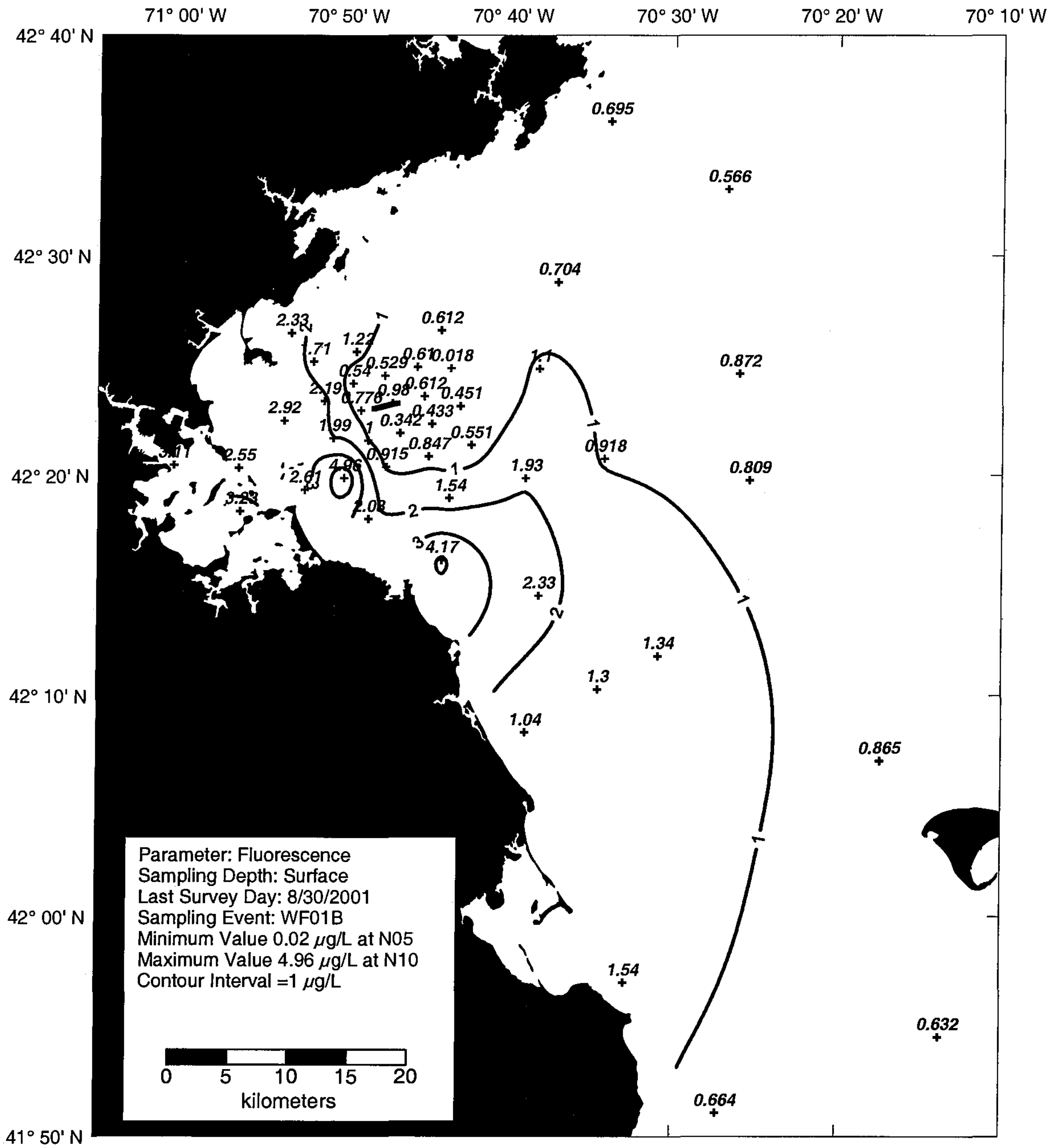


Figure B-5. Fluorescence Surface Contour Plot for Farfield Survey WF01B (Aug 01)

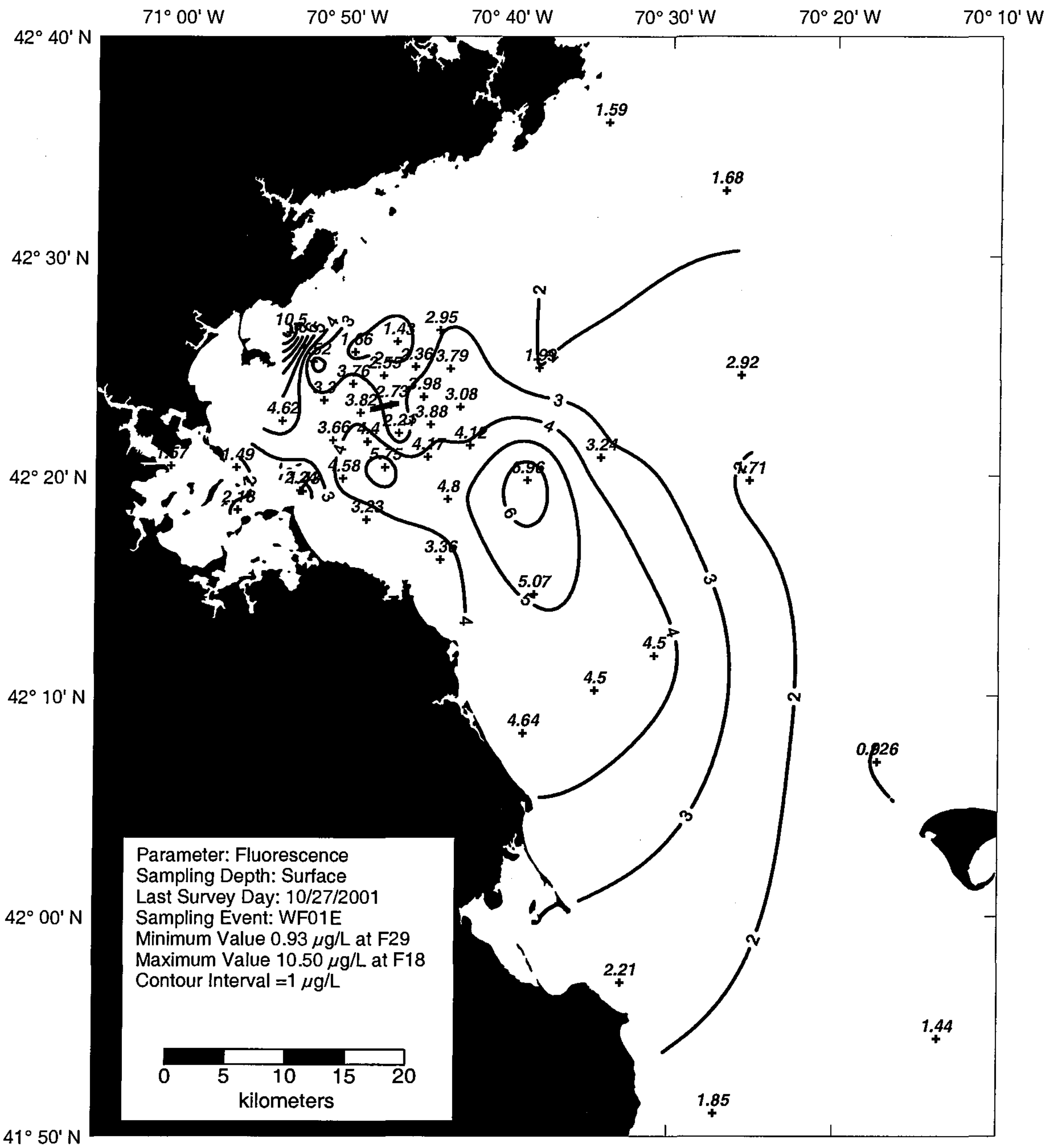


Figure B-6. Fluorescence Surface Contour Plot for Farfield Survey WF01E (Oct 01)

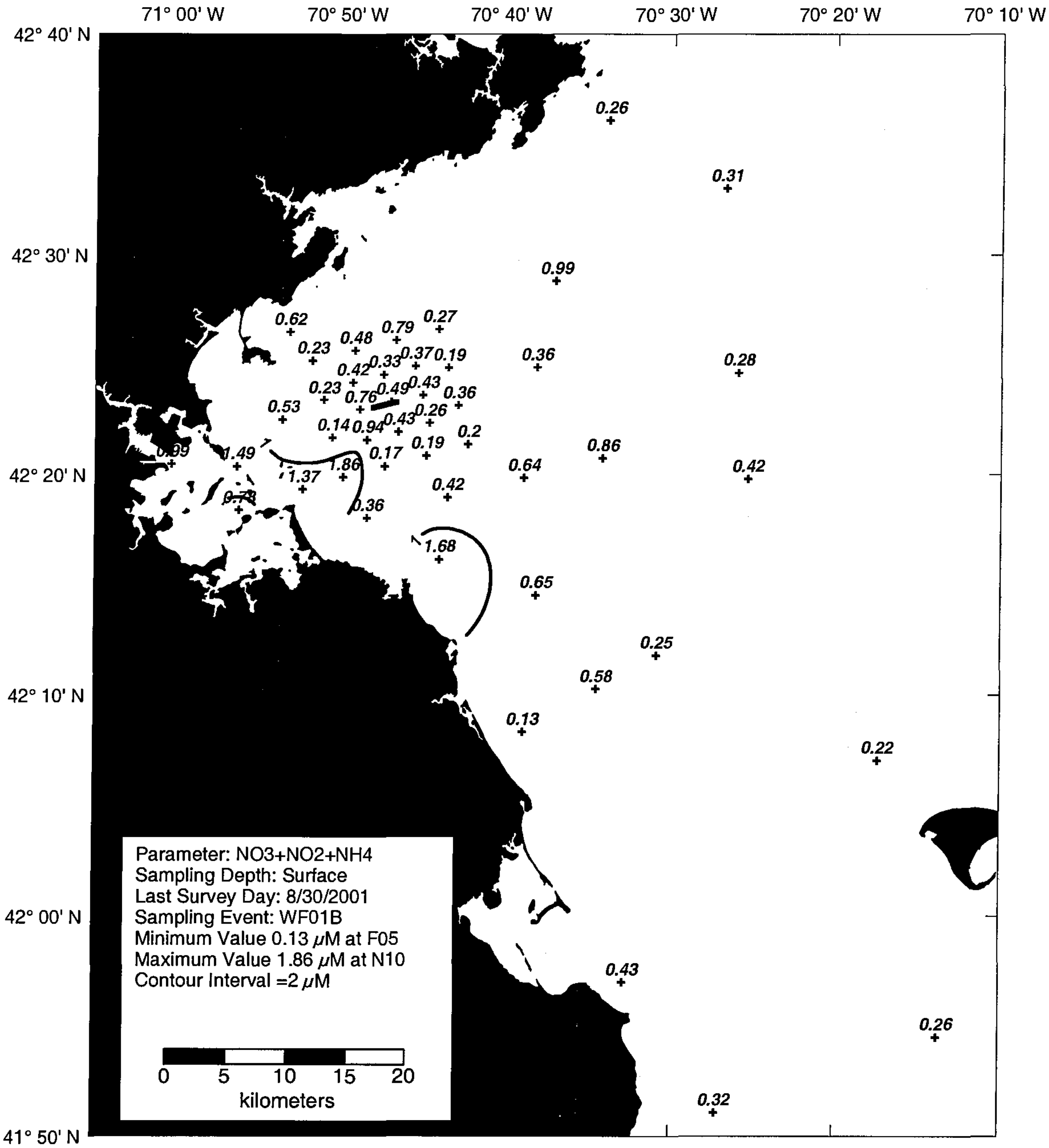


Figure B-7. DIN Surface Contour Plot for Farfield Survey WF01B (Aug 01)

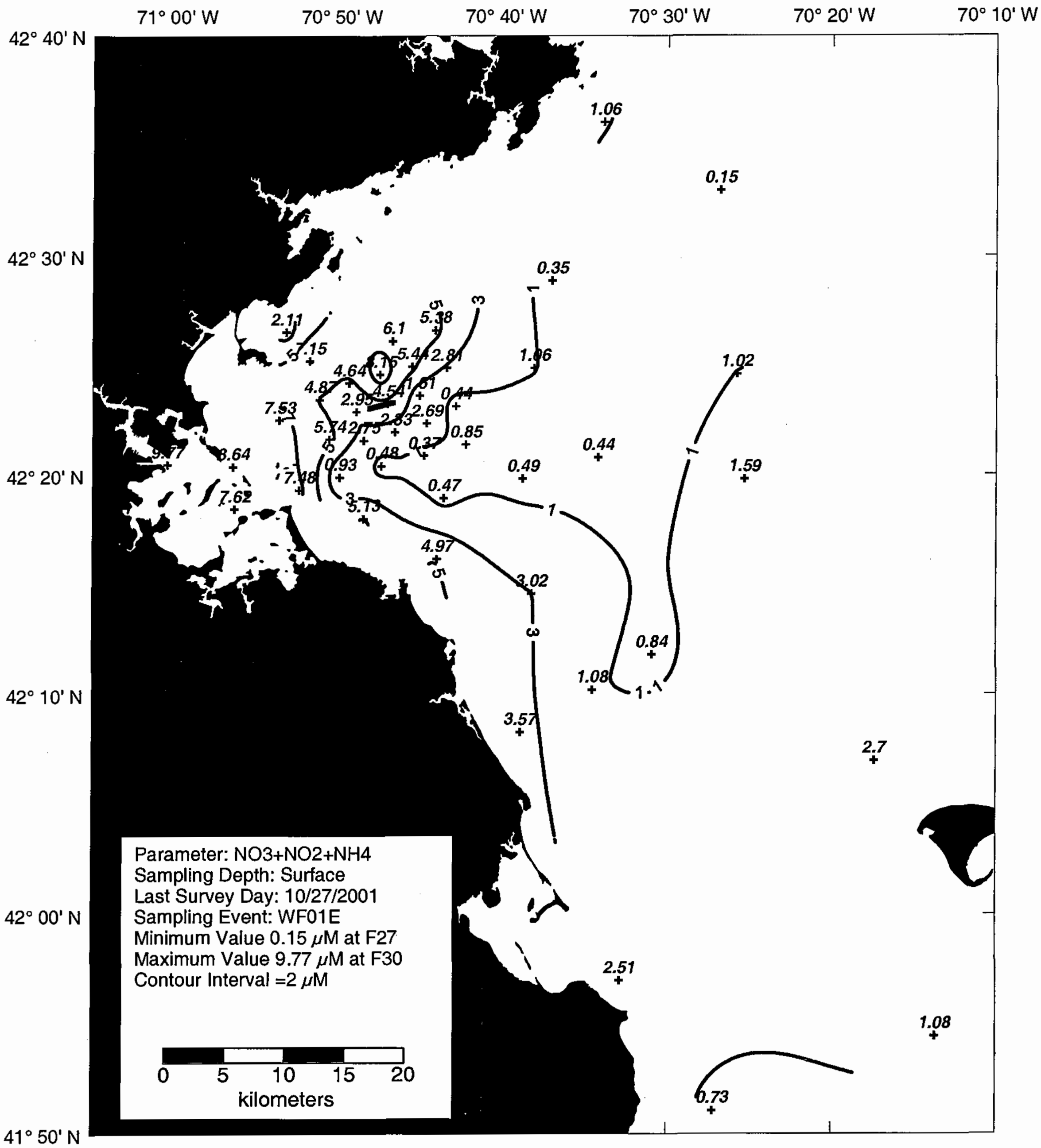


Figure B-8. DIN Surface Contour Plot for Farfield Survey WF01E (Oct 01)

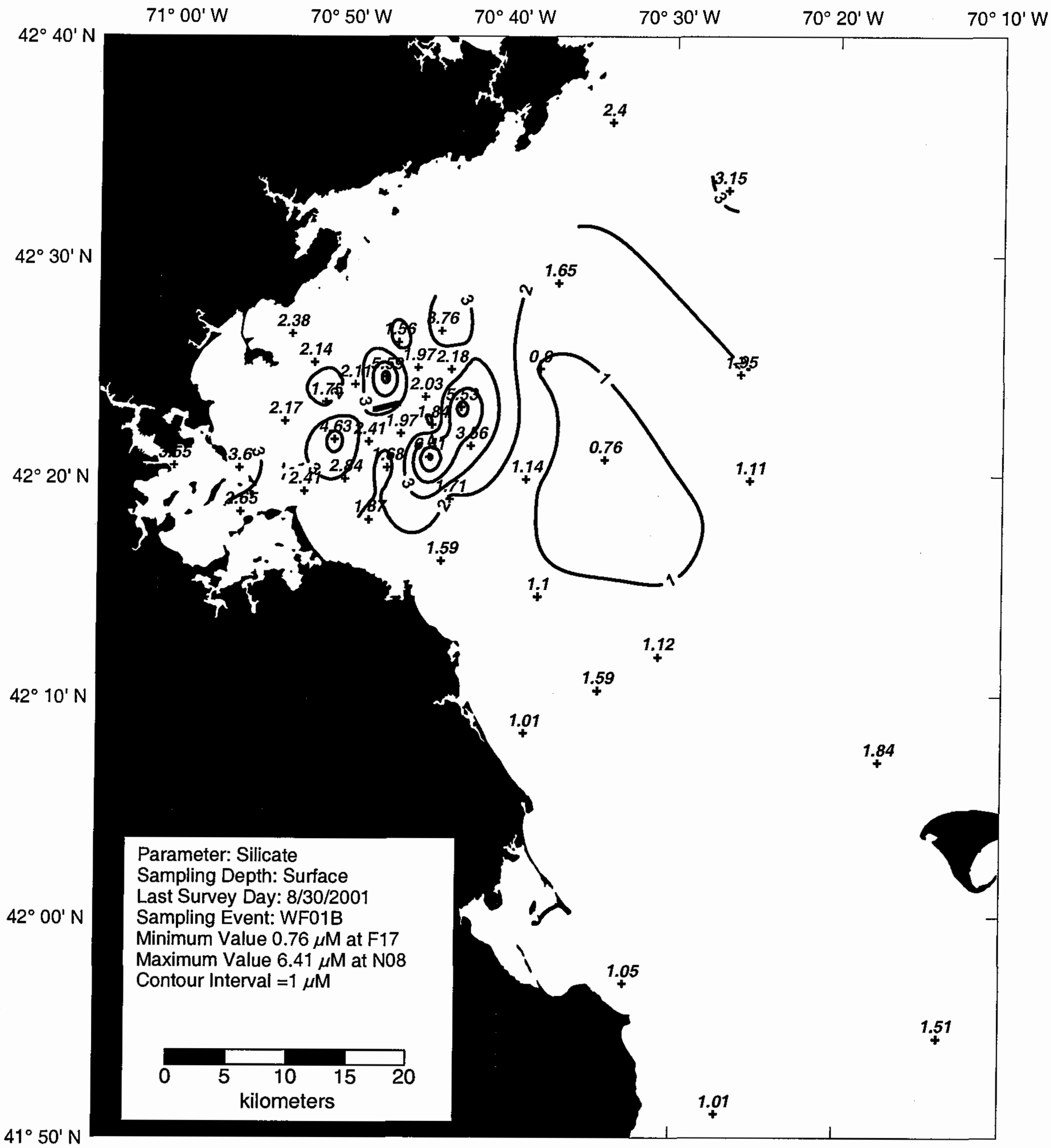


Figure B-9. Silicate Surface Contour Plot for Farfield Survey WF01B (Aug 01)

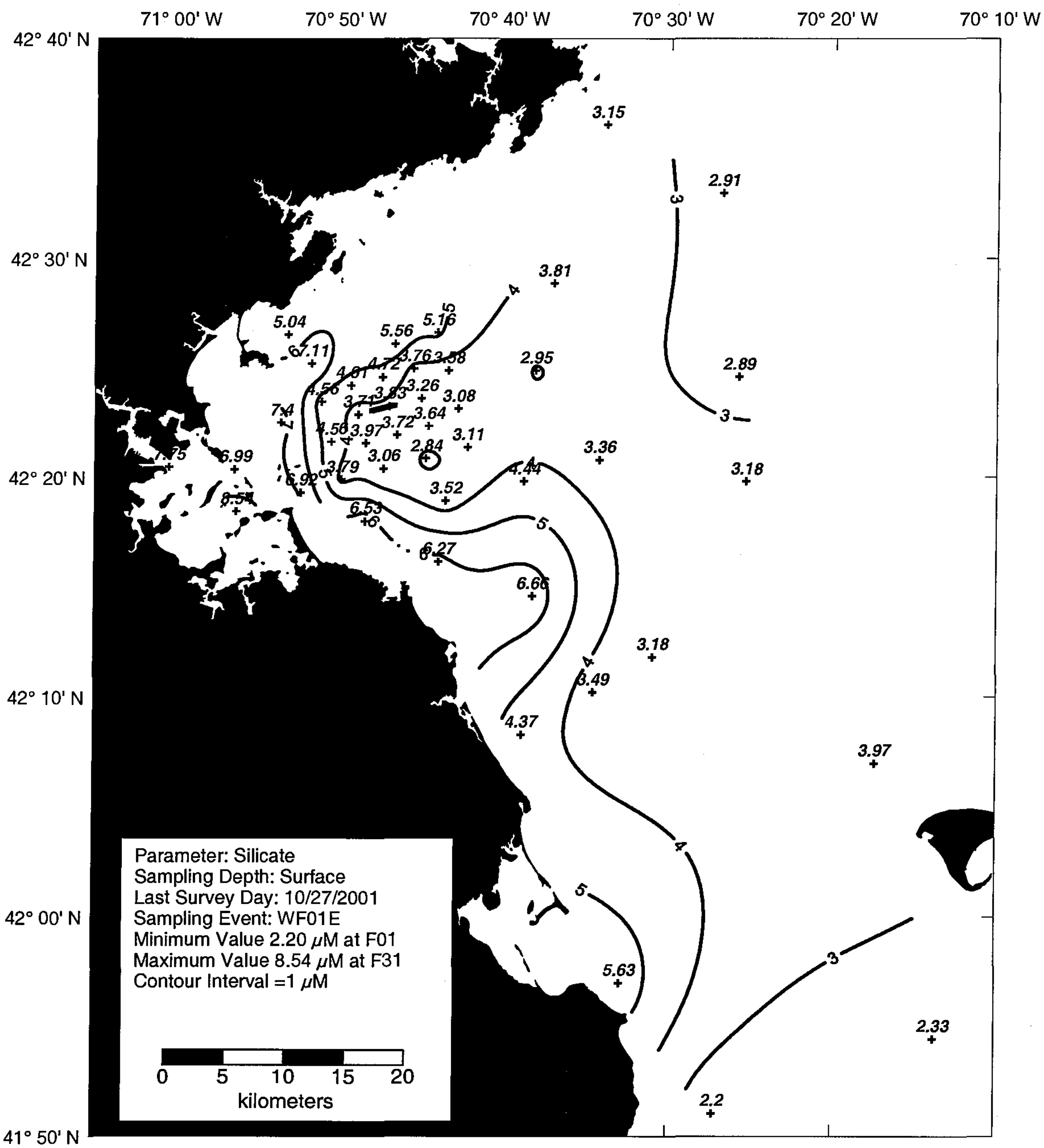


Figure B-10. Silicate Surface Contour Plot for Farfield Survey WF01E (Oct 01)

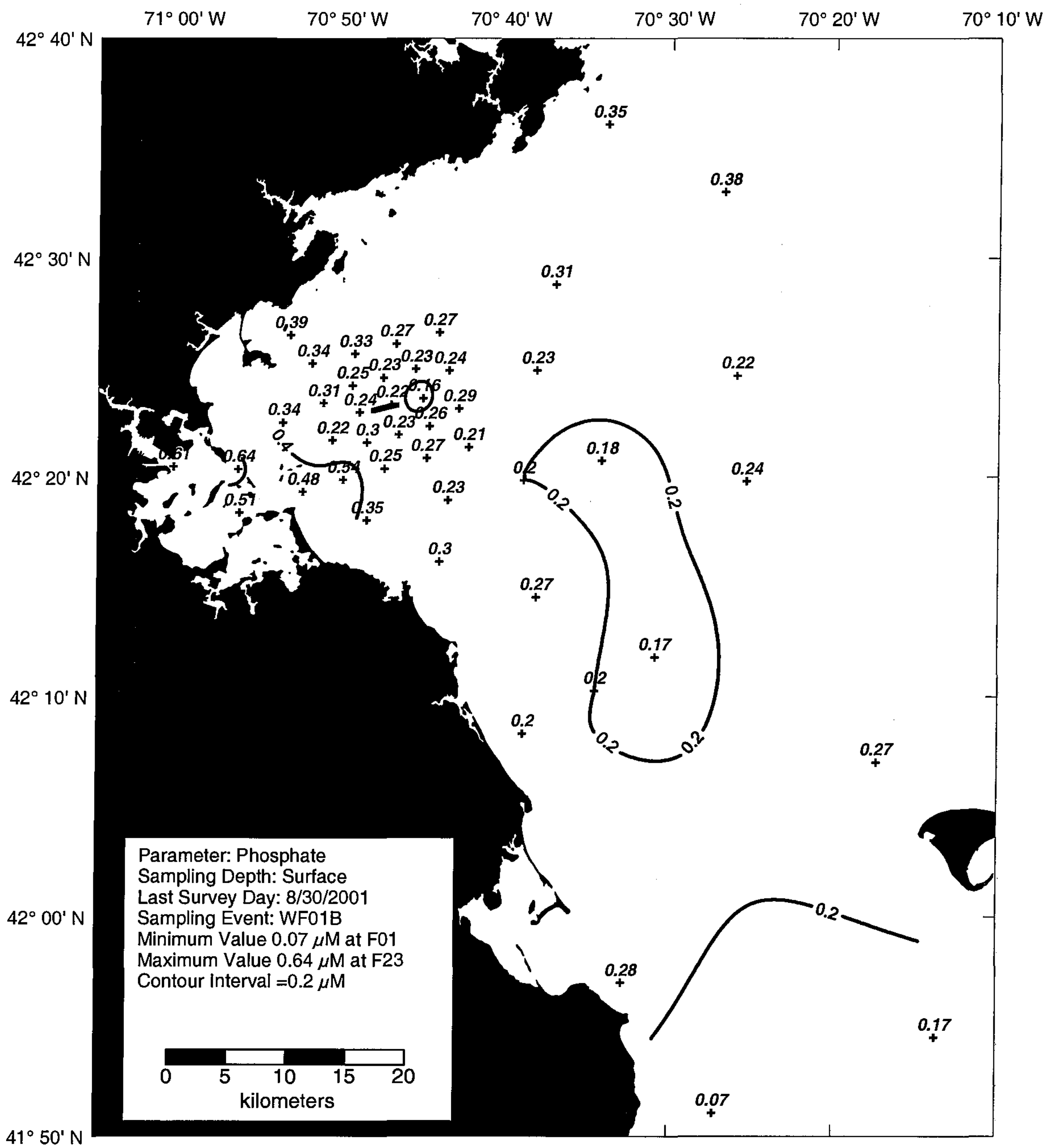


Figure B-11. Phosphate Surface Contour Plot for Farfield Survey WF01B (Aug 01)

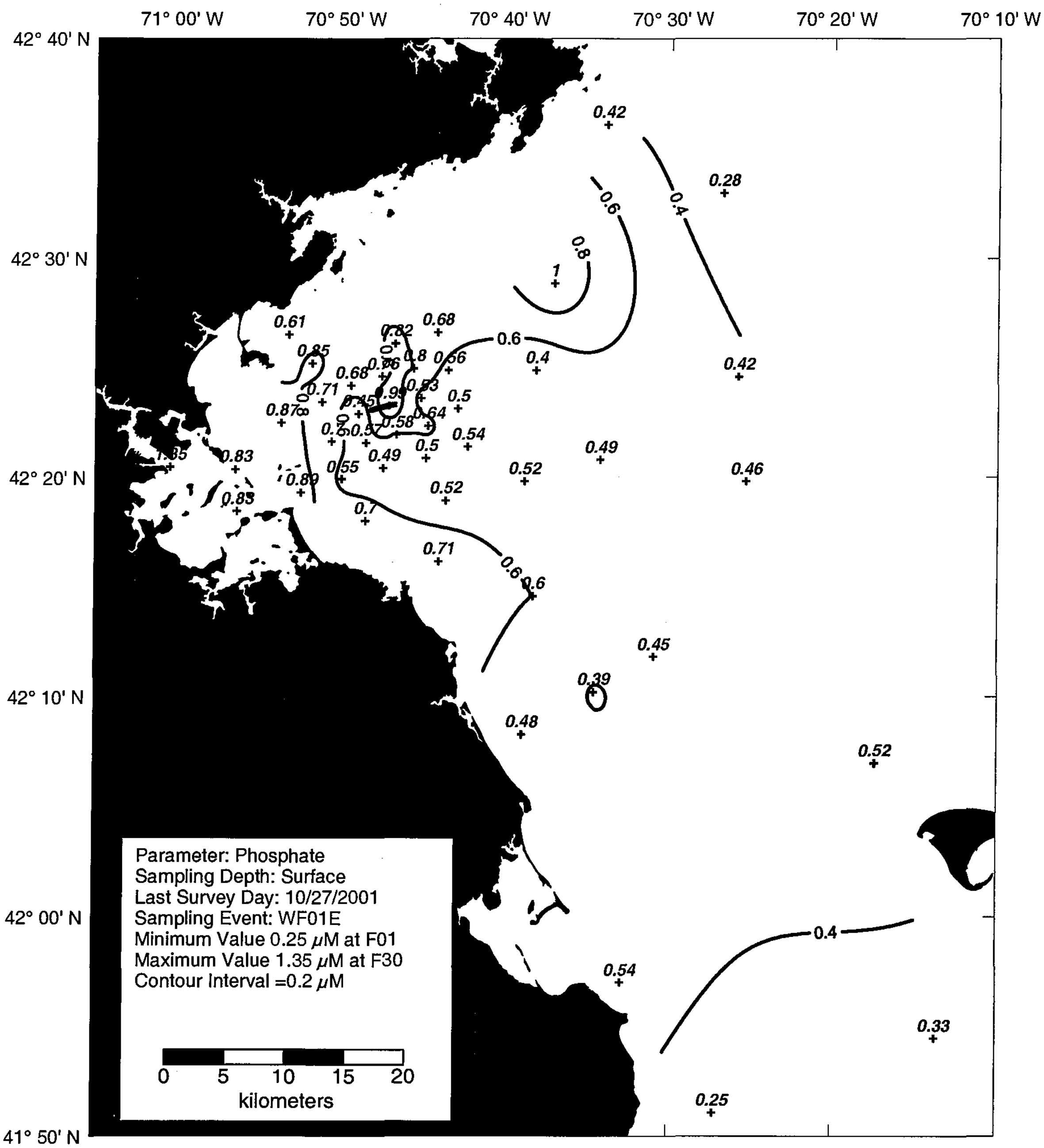


Figure B-12. Phosphate Surface Contour Plot for Farfield Survey WF01E (Oct 01)

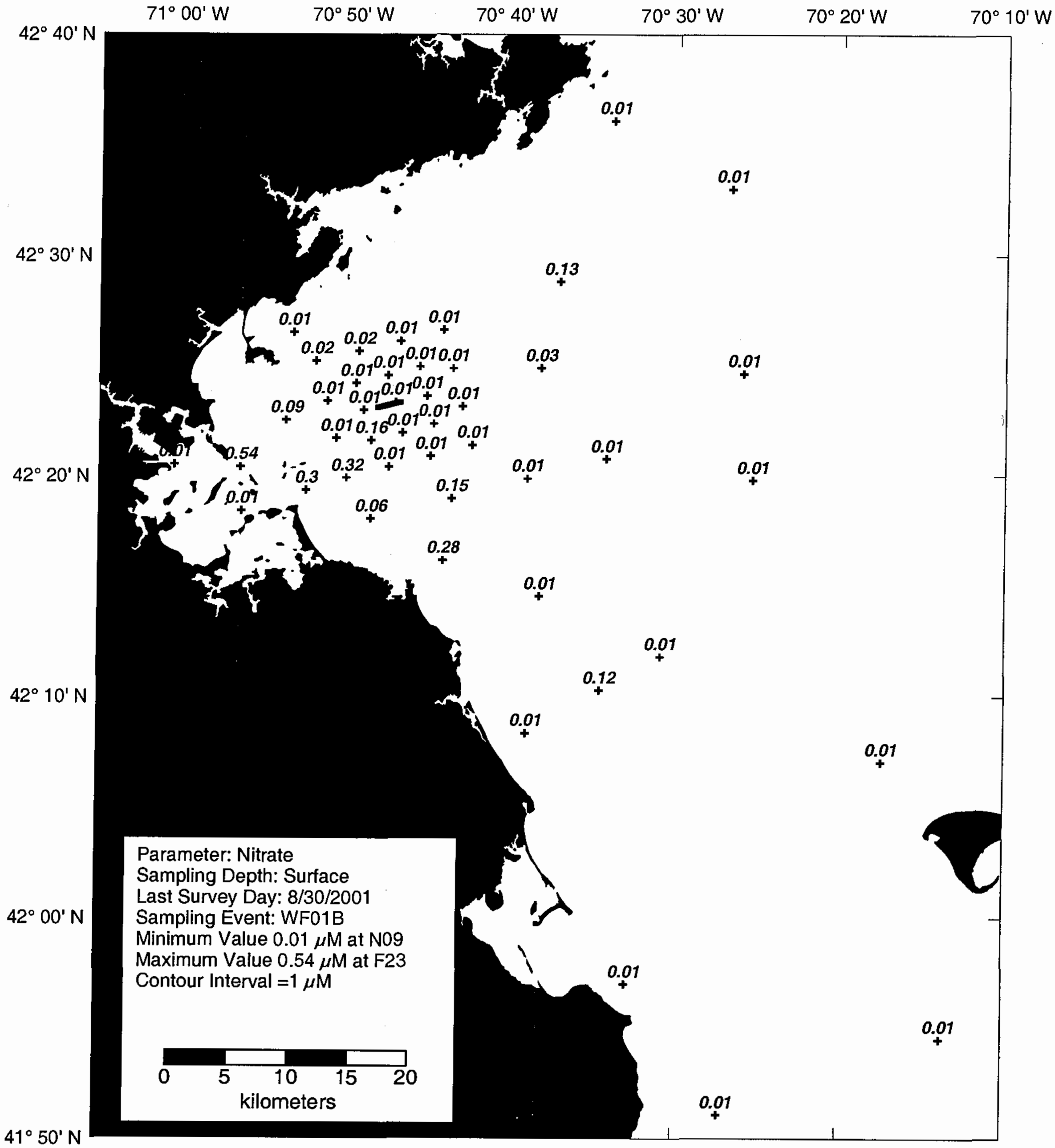


Figure B-13. Nitrate Surface Contour Plot for Farfield Survey WF01B (Aug 01)

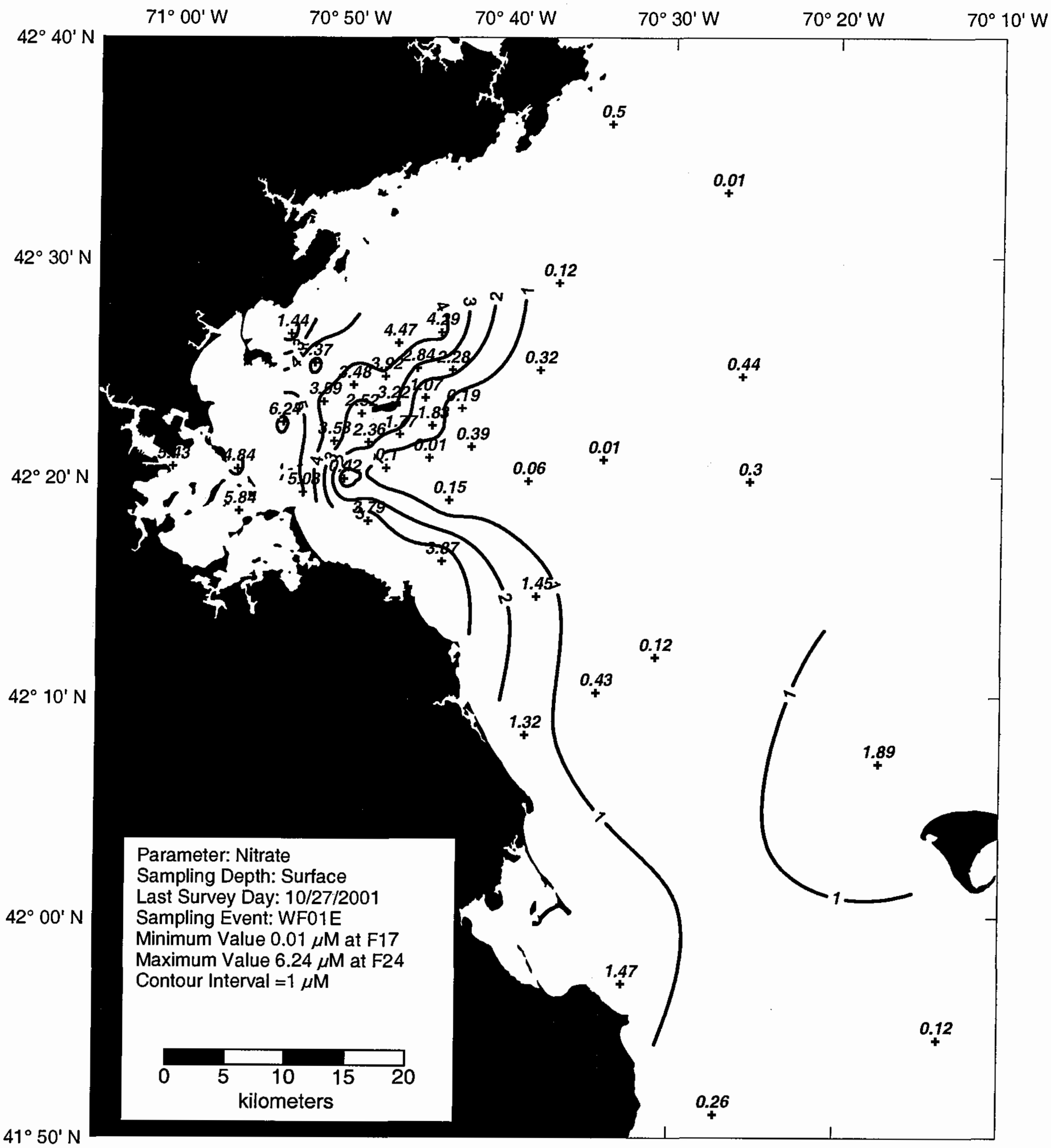


Figure B-14. Nitrate Surface Contour Plot for Farfield Survey WF01E (Oct 01)

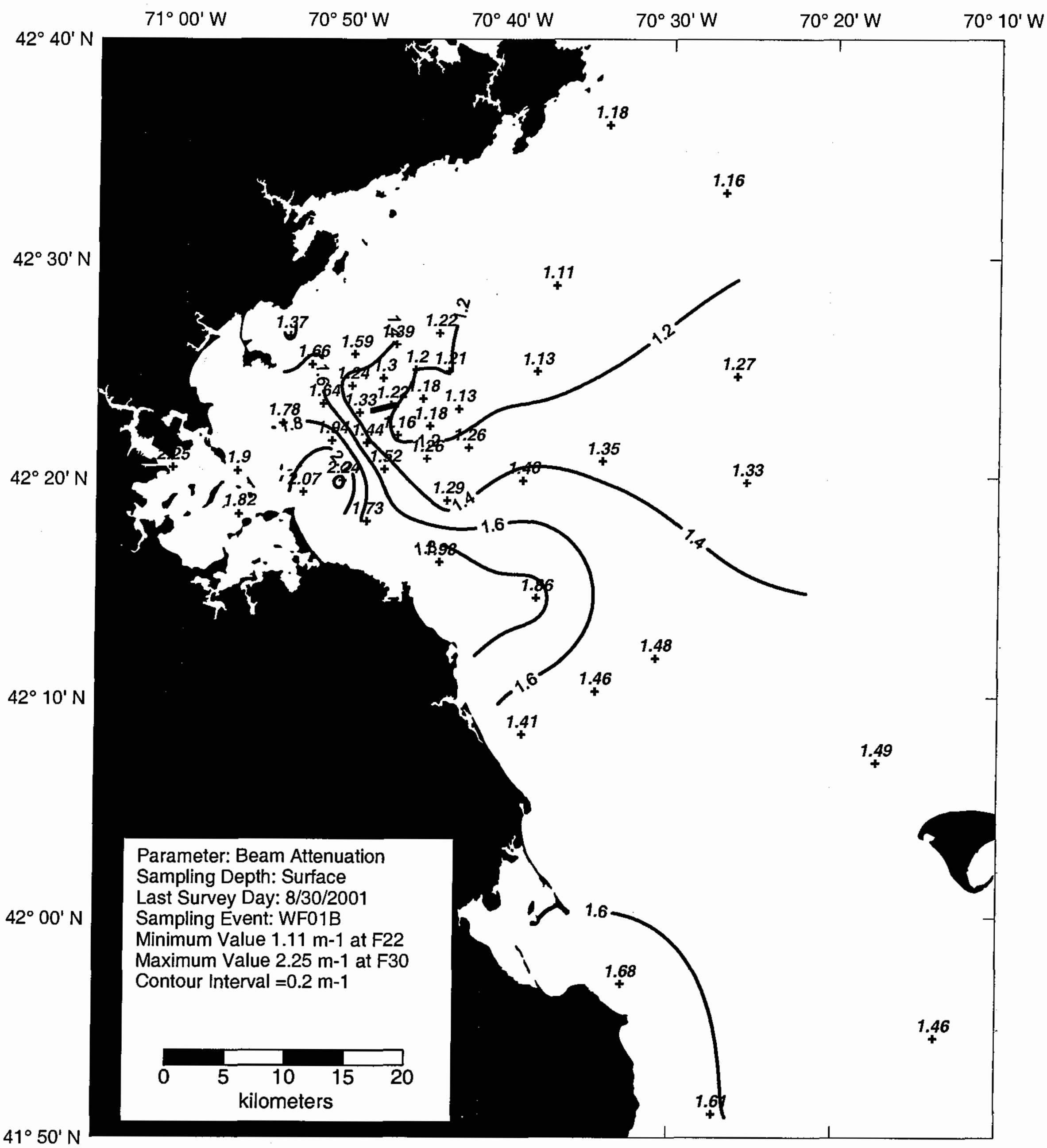


Figure B-15. Beam Attenuation Surface Contour Plot for Farfield Survey WF01B (Aug 01)

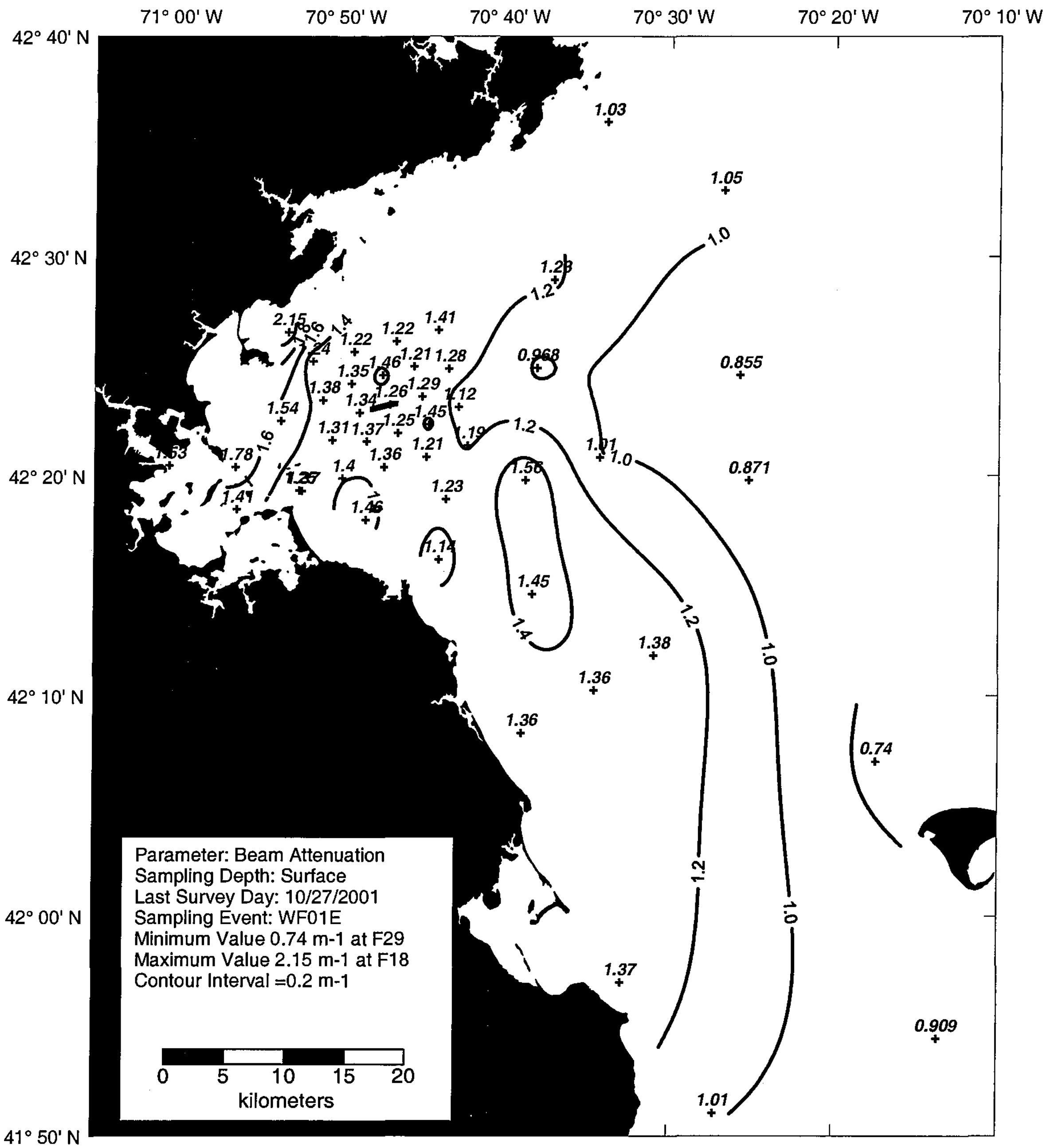


Figure B-16. Beam Attenuation Surface Contour Plot for Farfield Survey WF01E (Oct 01)

APPENDIX C

Transect Plots

Transect Plots – Farfield Surveys

Data were contoured relative to water depth and distance between stations as shown on the transects (Figure 1-3). Distances between stations and water depth at each station is shown on the transect. Water depth is labeled with negative values in meters, with zero depth at the sea surface. The depth to the seabed is shown by the solid shading at the bottom of each plot. Three West-East transects (Boston-Nearfield, Cohasset, and Marshfield) are provided on each plot, as well as shaded contour levels on the scale bar at the bottom of the plot. Additionally, 2 transects which run North-South through Massachusetts Bay have been included for the *in situ* parameters reported in this Appendix. Contour units are as noted on the plot. Each plot is labeled on the bottom left with the parameter, survey number, and last day of the survey date. The data used for the contours were based on high-resolution *in situ* hydrographic casts and individual data points as noted below.

Parameter	Data Used
Density (Sigma-T)	High-resolution *in situ* data
Temperature	High-resolution *in situ* data
Salinity	High-resolution *in situ* data
Beam Attenuation	High-resolution *in situ* data
Nitrate plus Nitrite	Individual data points based on discrete water column
Phosphate	Individual data points based on discrete water column
Silicate	Individual data points based on discrete water column
Ammonium	Individual data points based on discrete water column
Fluorescence	High-resolution *in situ* data
Dissolved Oxygen	High-resolution *in situ* data

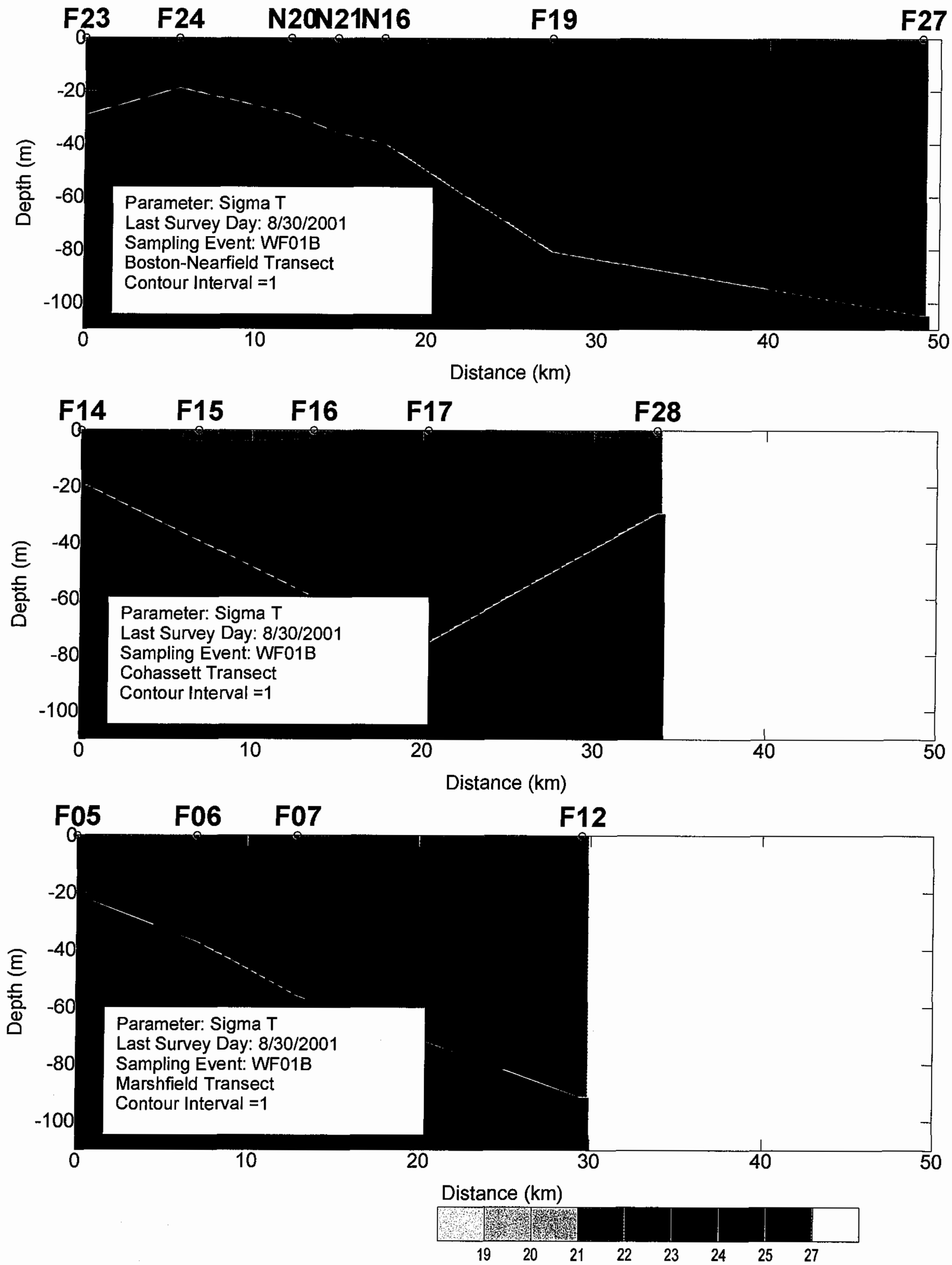


Figure C-1. Density Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

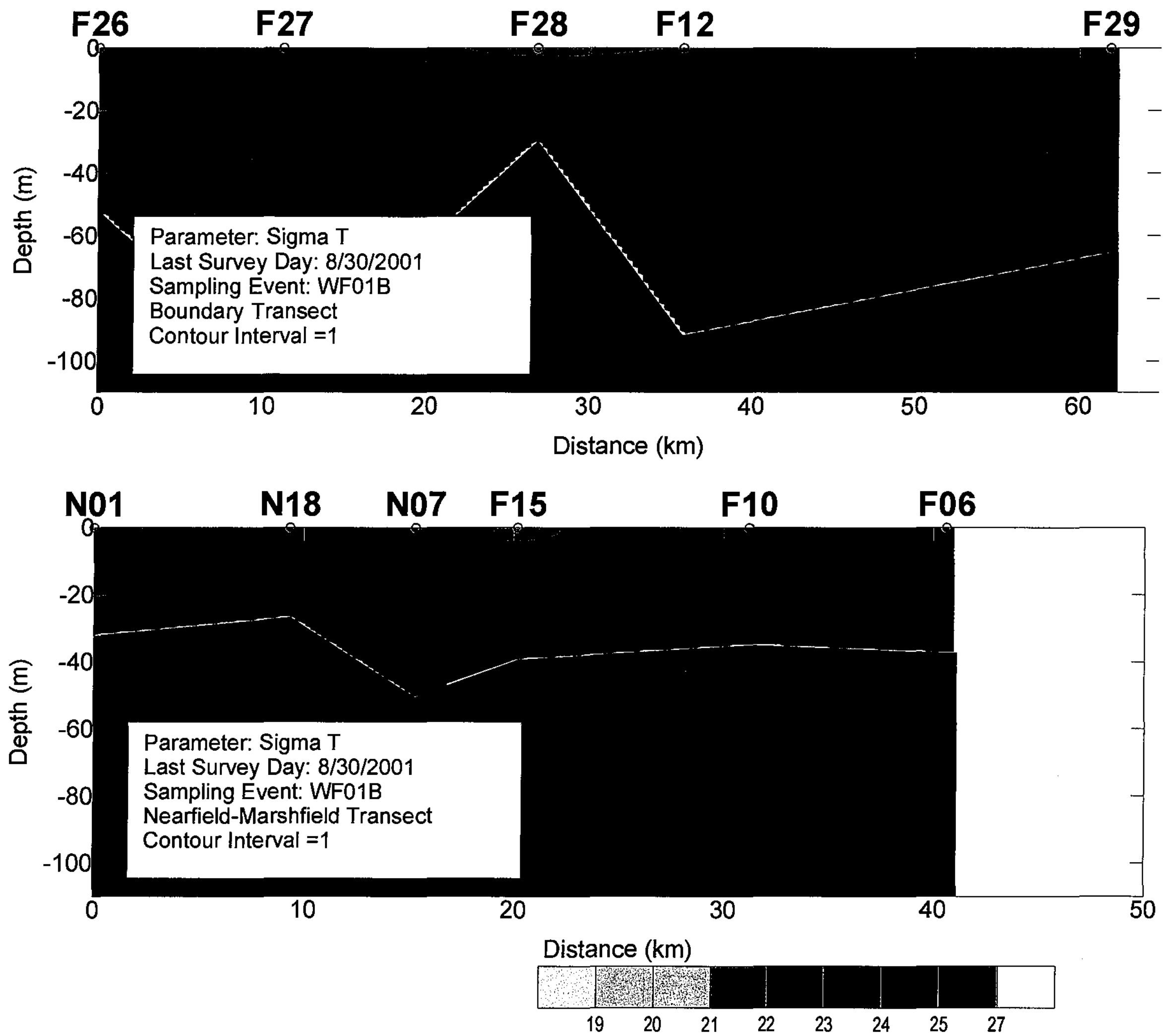


Figure C-2. Density Transect Plots (North - South) for Farfield Survey WF01B (Aug 01)

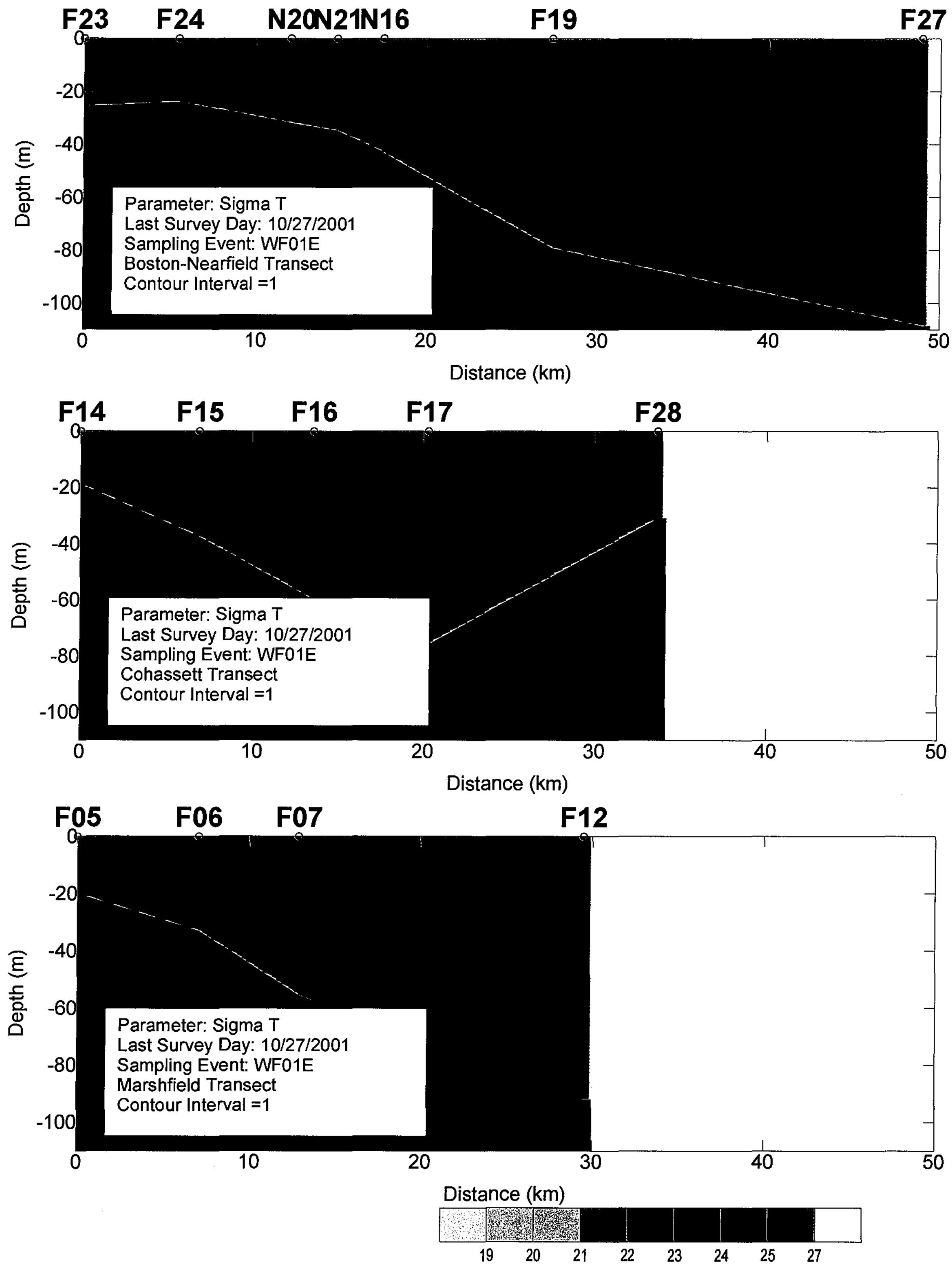


Figure C-3. Density Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

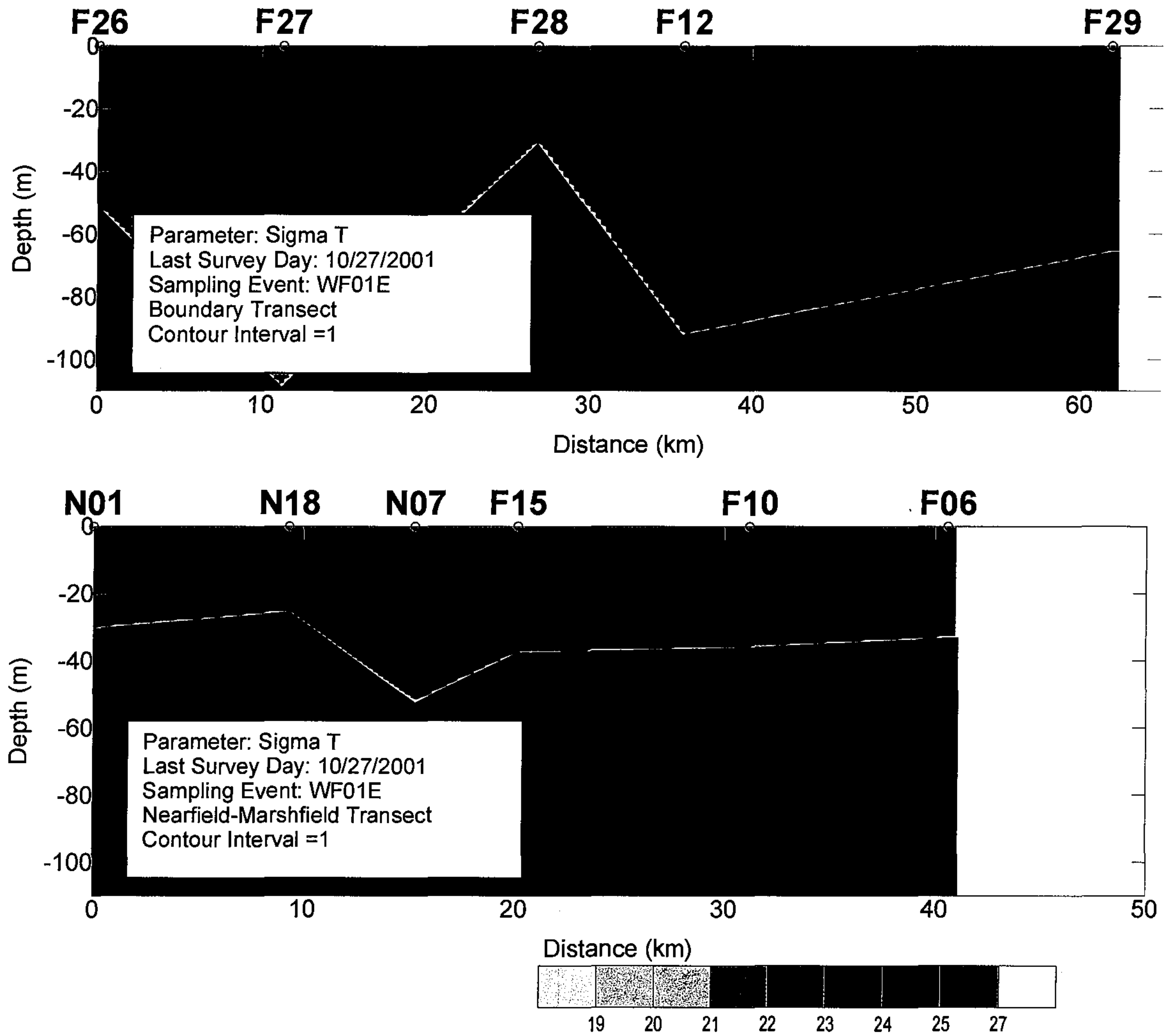


Figure C-4. Density Transect Plots (North - South) for Farfield Survey WF01E (Oct 01)

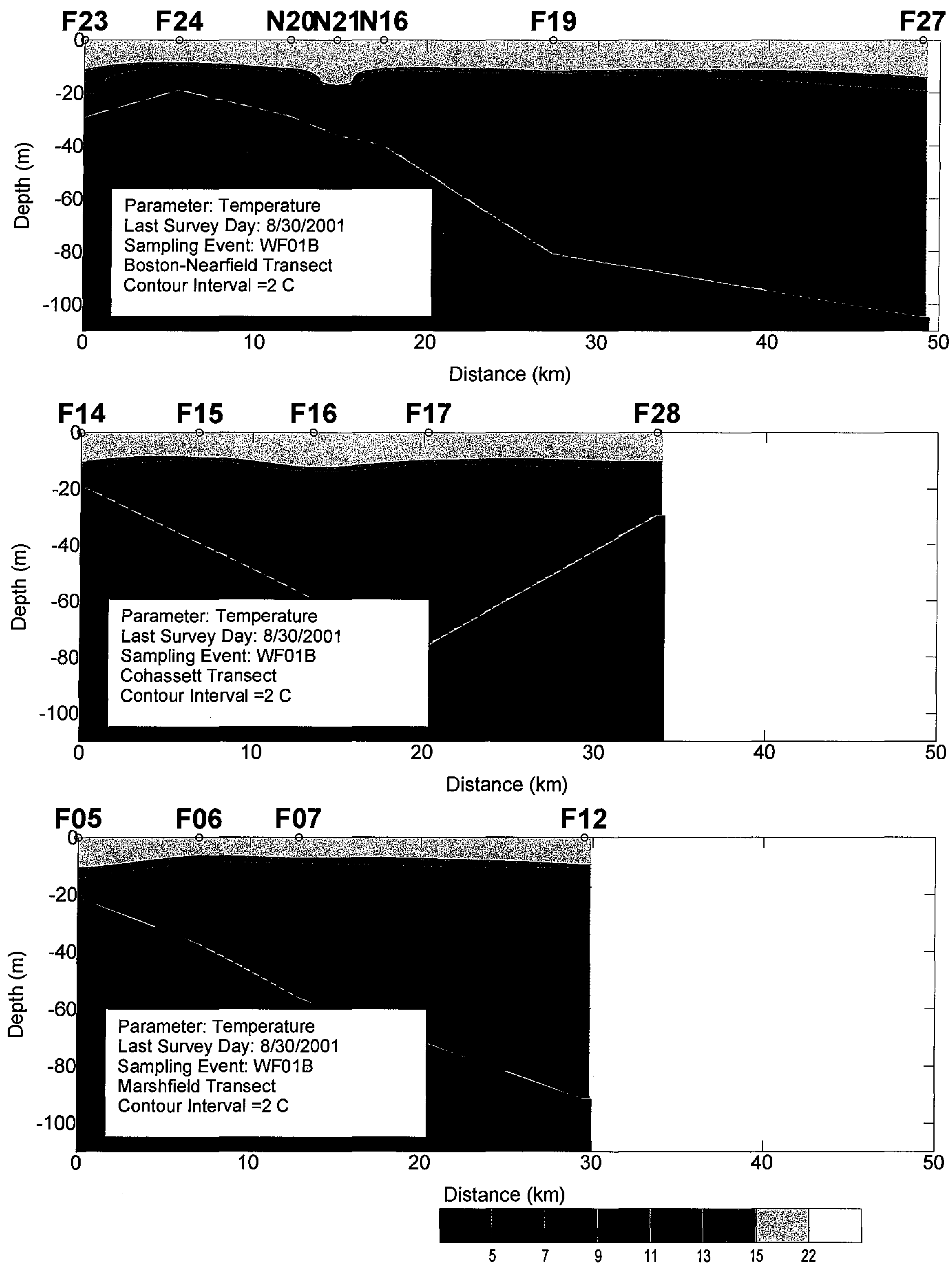


Figure C-5. Temperature Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

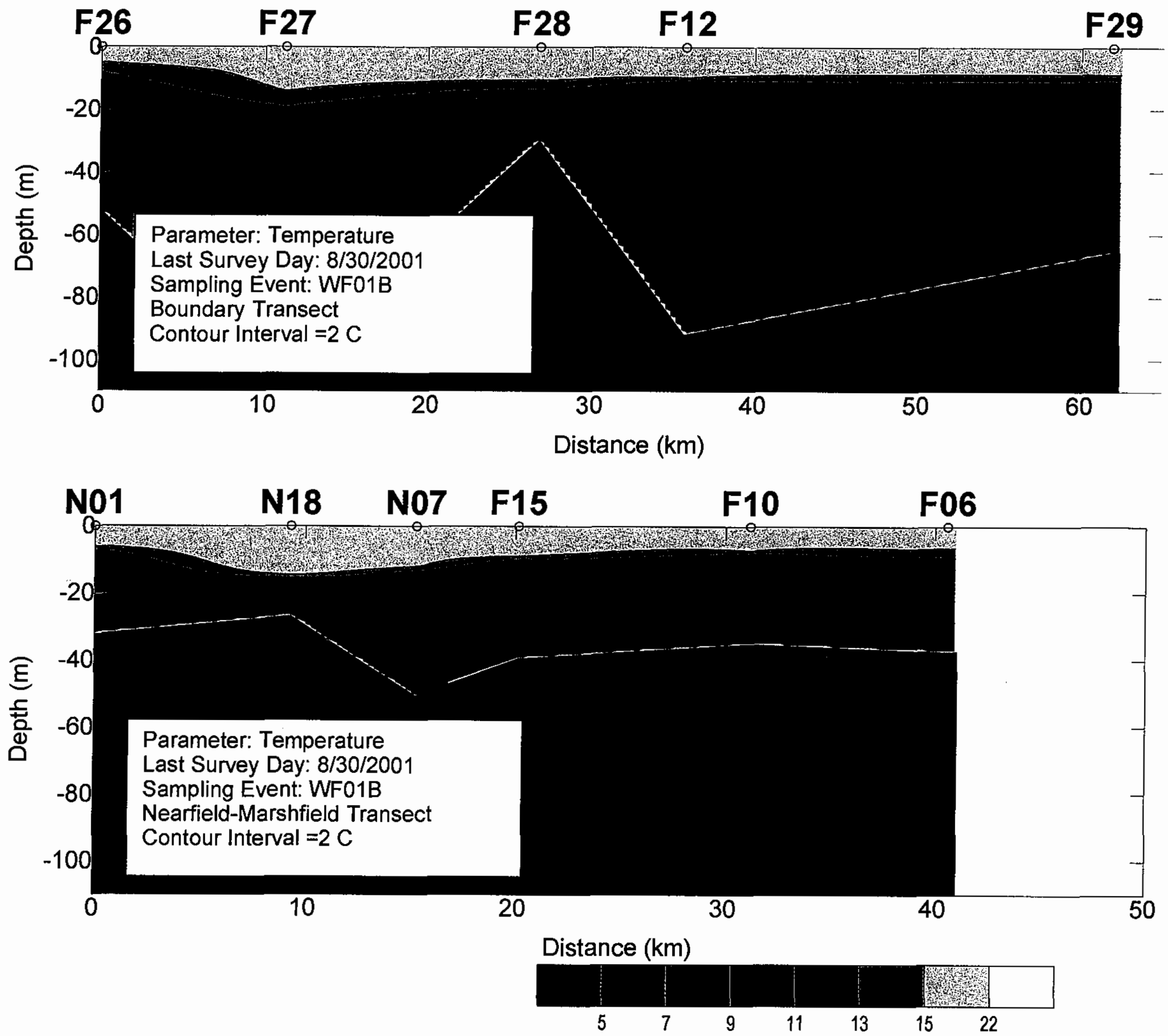


Figure C-6. Temperature Transect Plots (North - South) for Farfield Survey WF01B (Aug 01)

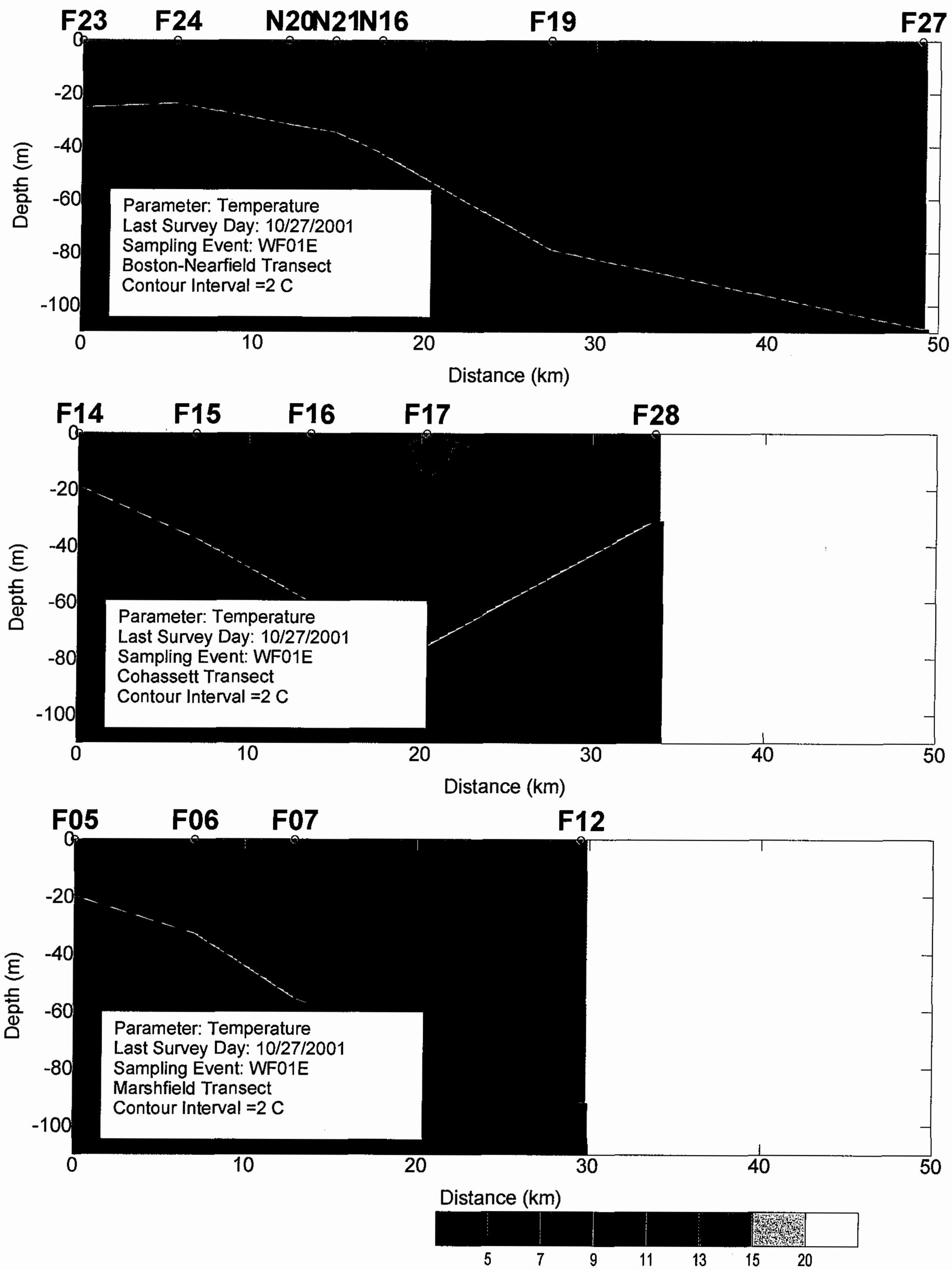


Figure C-7. Temperature Transect Plots (West – East) for Farfield Survey WF01E (Oct 01)

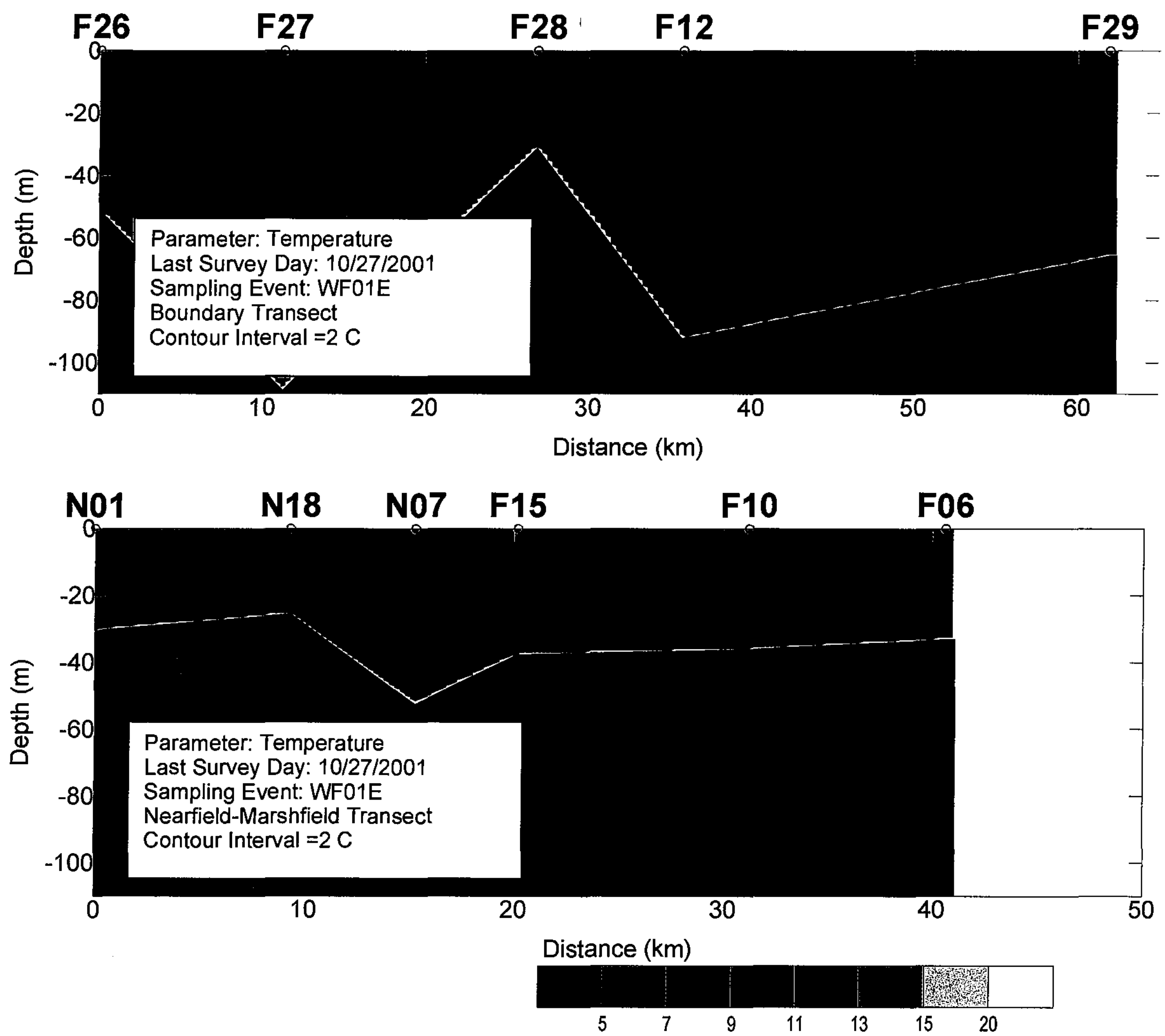


Figure C-8. Temperature Transect Plots (North - South) for Farfield Survey WF01E (Oct 01)

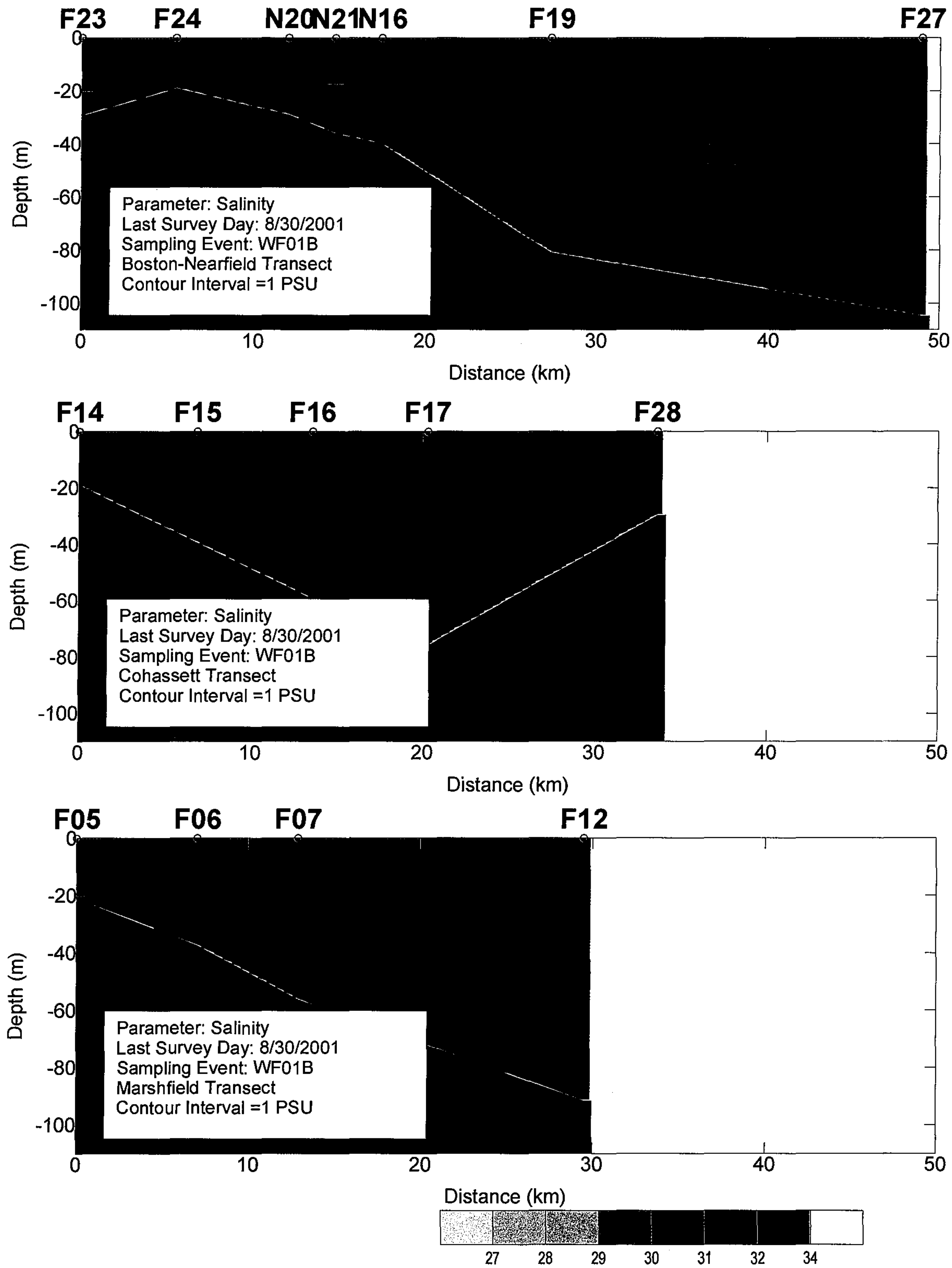


Figure C-9. Salinity Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

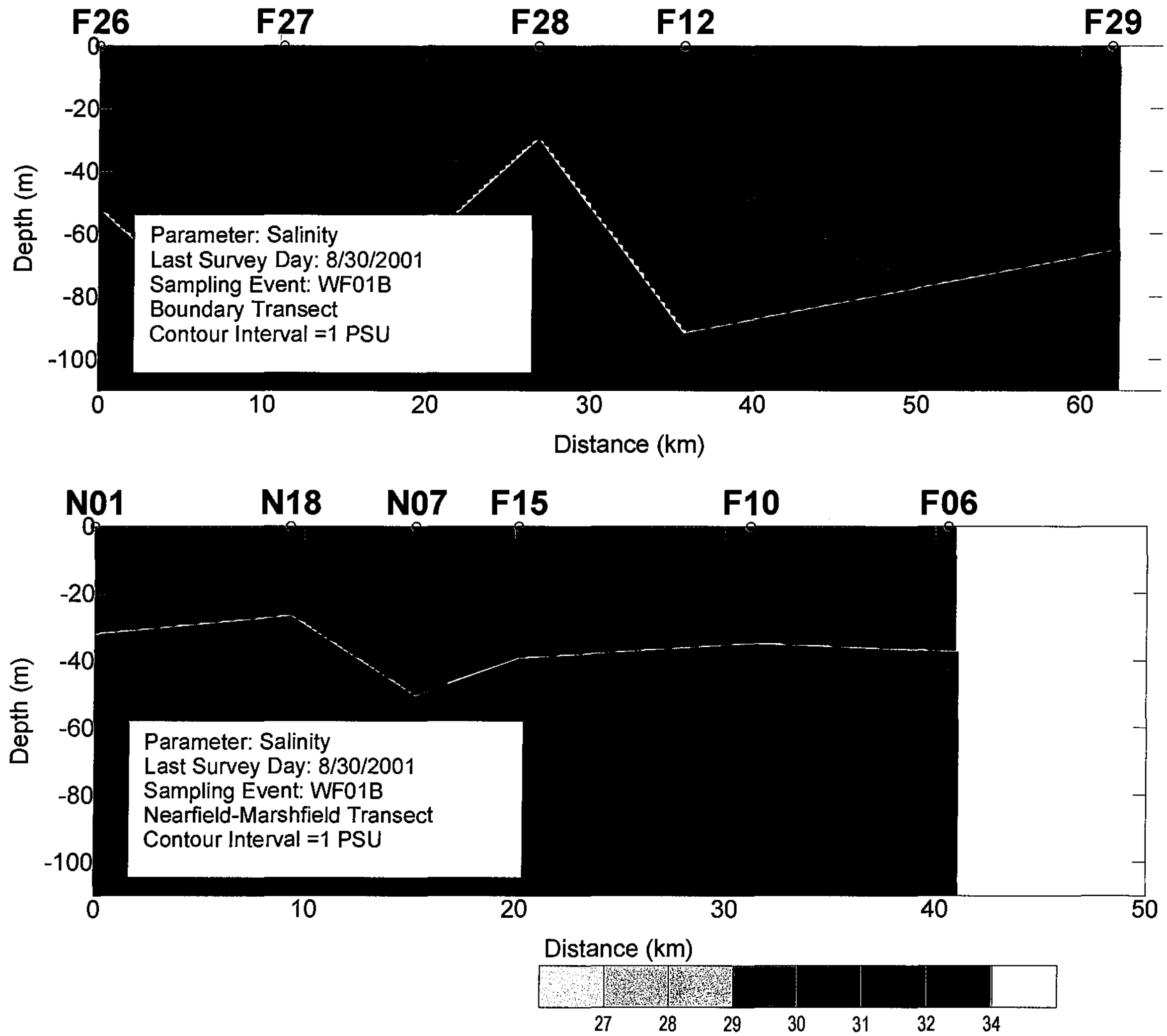


Figure C-10. Salinity Transect Plots (North - South) for Farfield Survey WF01B (Aug 01)

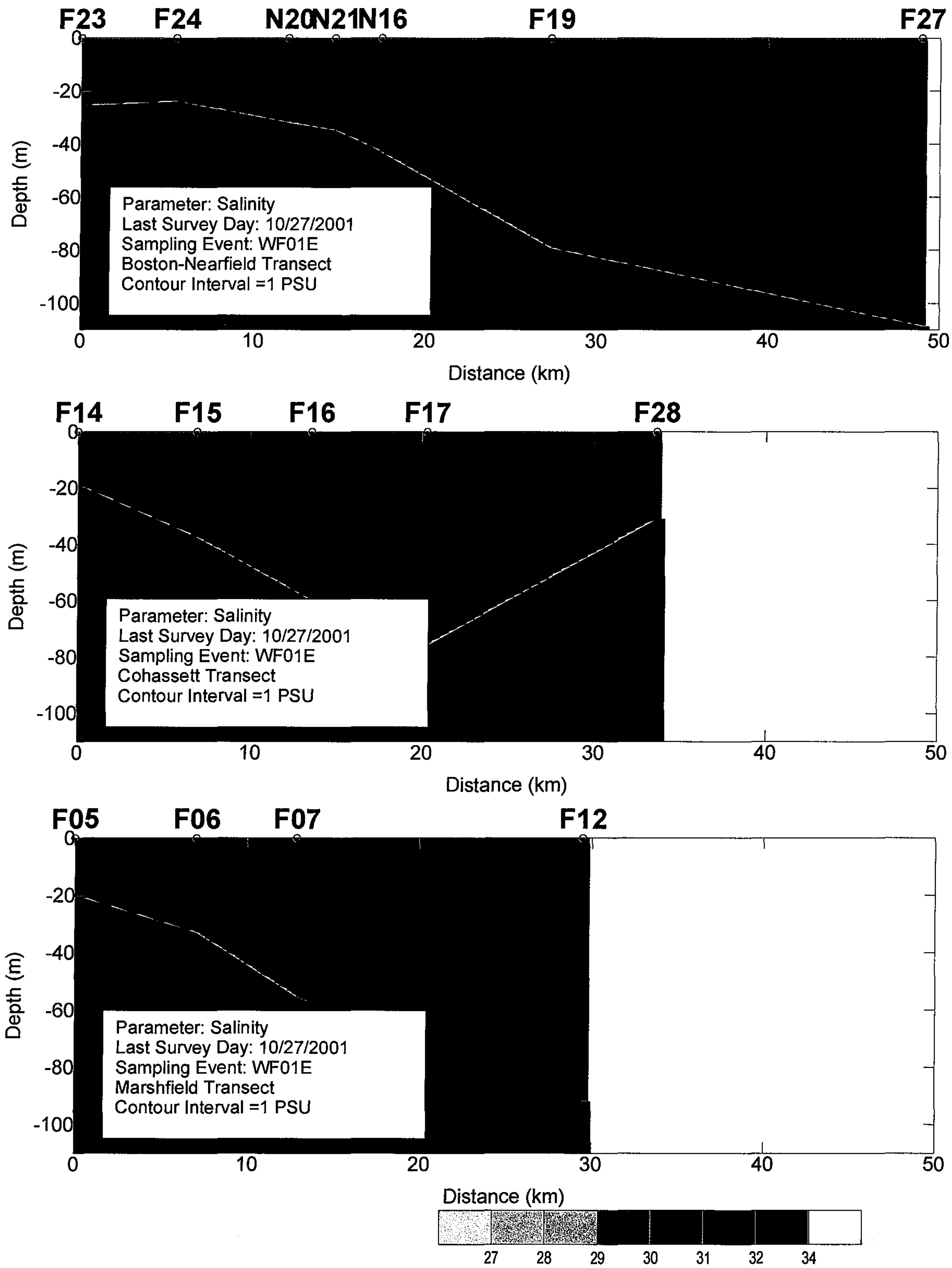


Figure C-11. Salinity Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

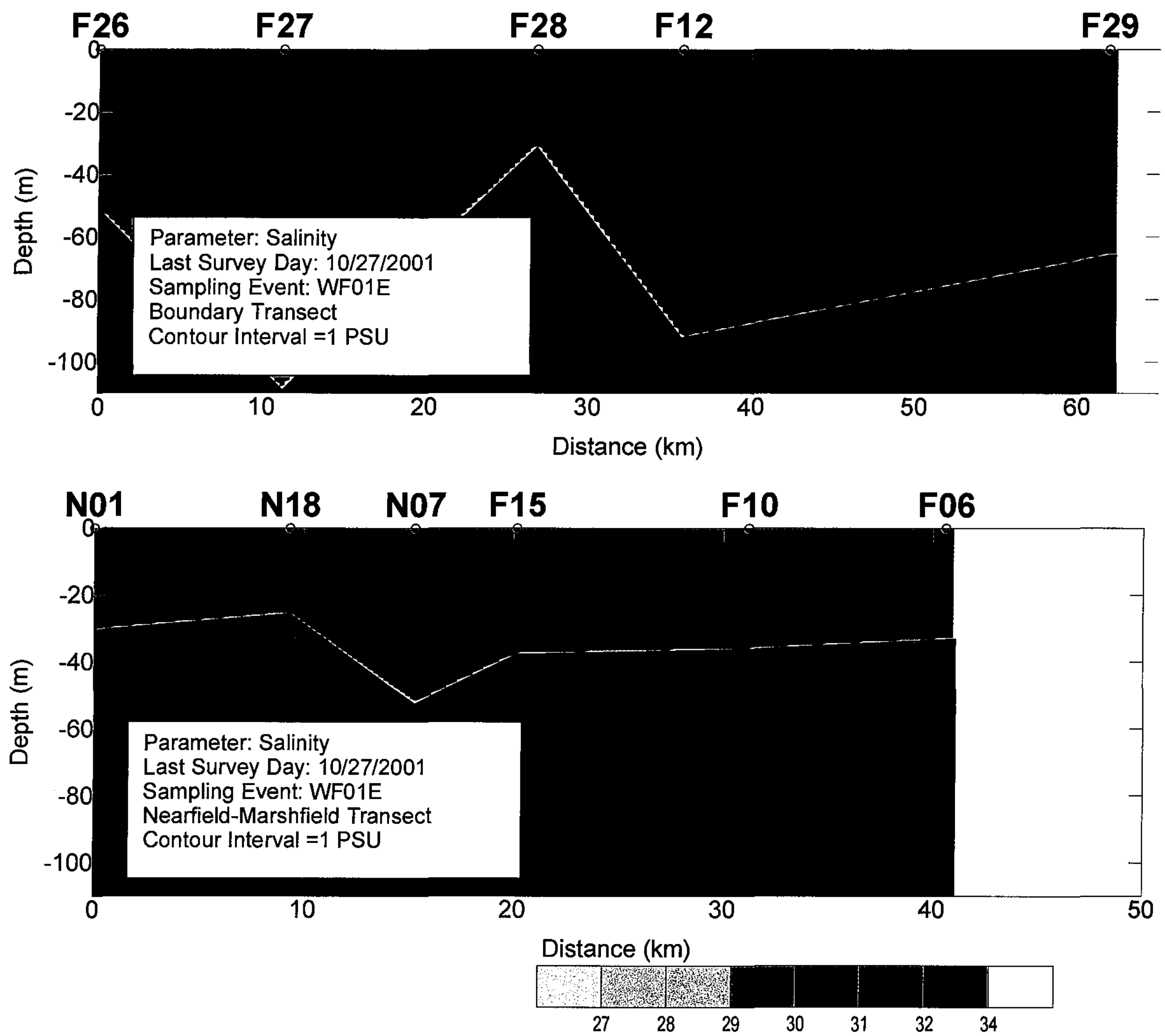


Figure C-12. Salinity Transect Plots (North - South) for Farfield Survey WF01E (Oct 01)

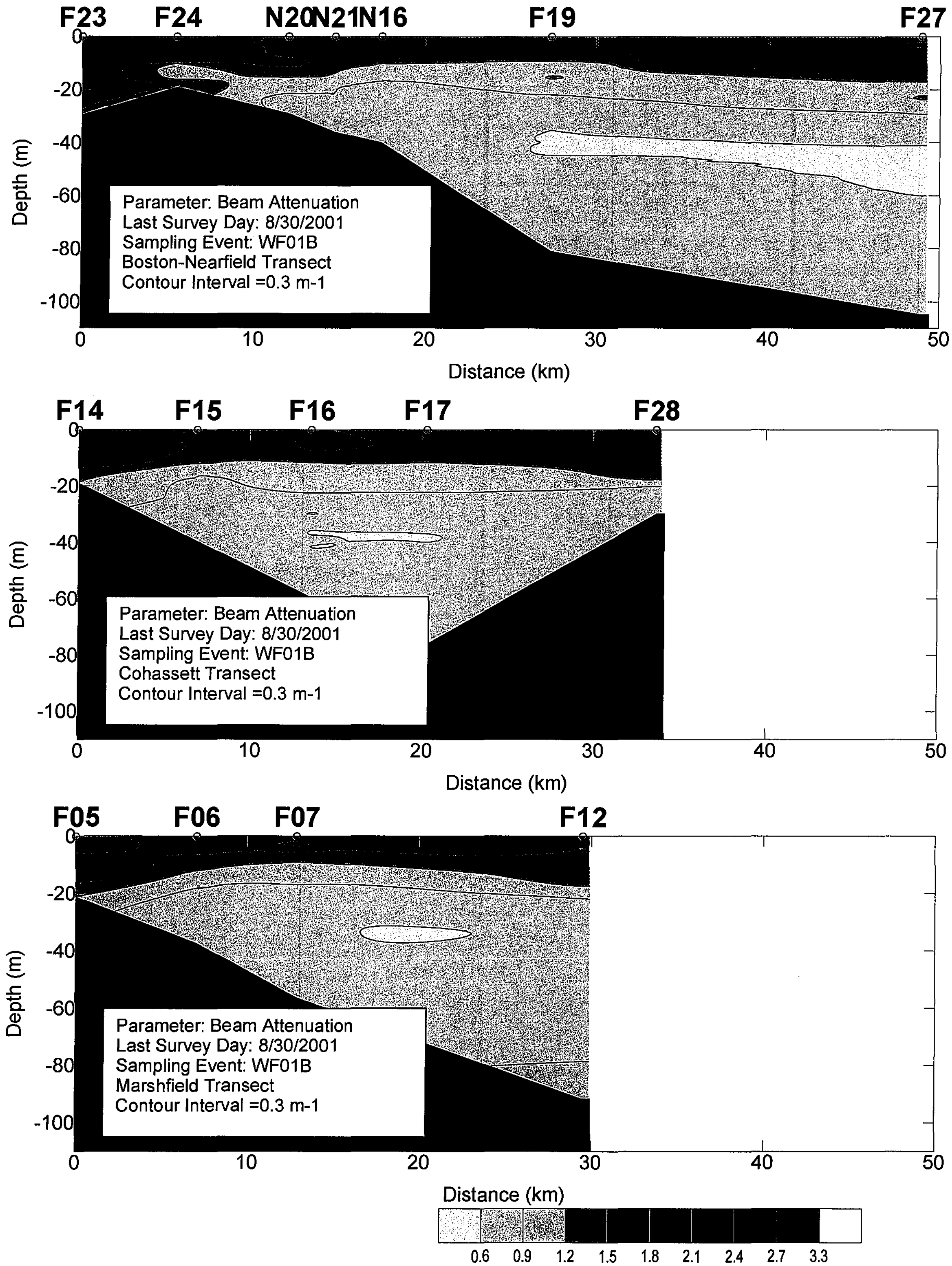


Figure C-13. Beam Attenuation Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

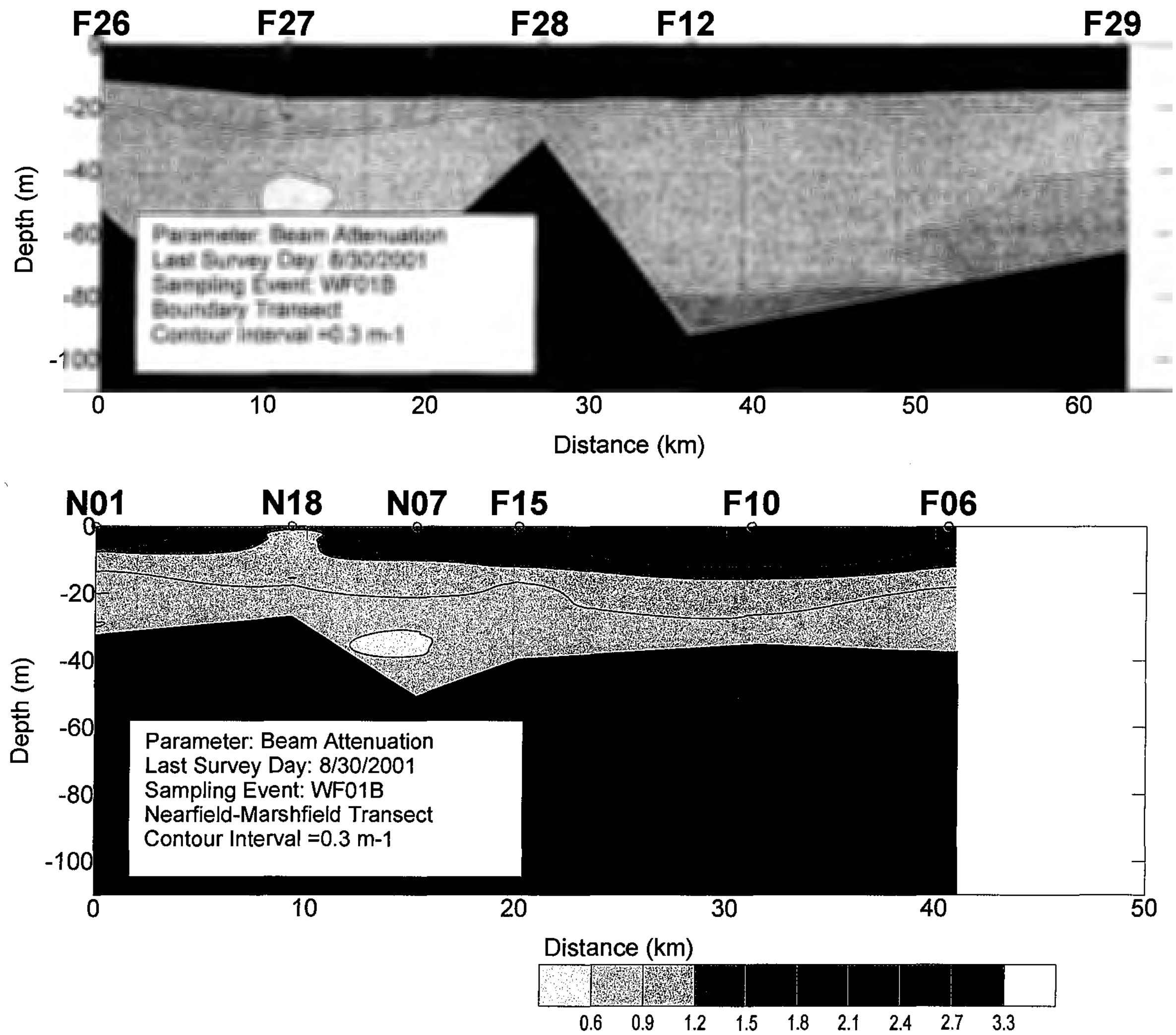


Figure C-14. Beam Attenuation Transect Plots (North - South) for Farfield Survey WF01B (Aug 01)

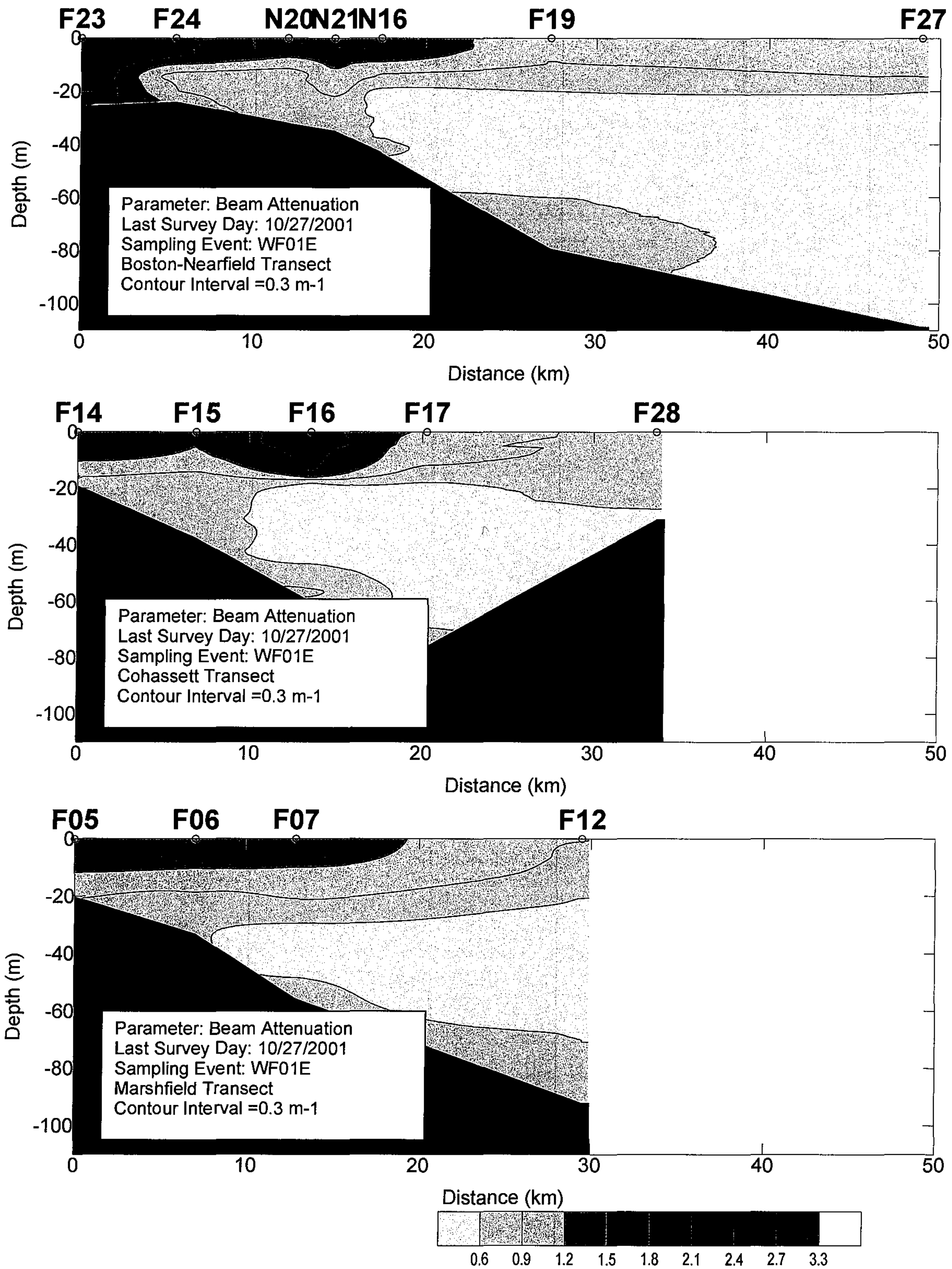


Figure C-15. Beam Attenuation Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

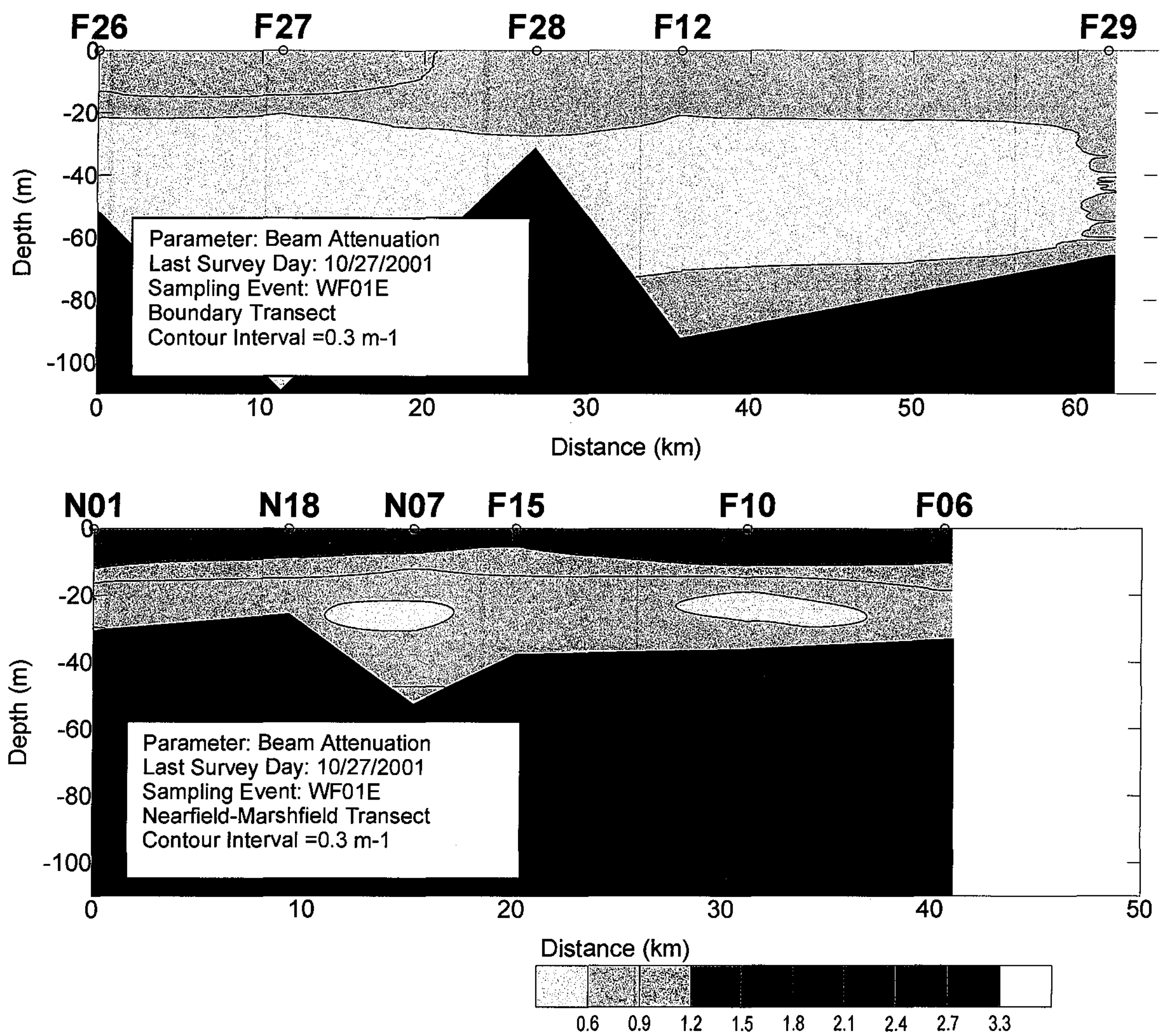


Figure C-16. Beam Attenuation Transect Plots (North - South) for Farfield Survey WF01E (Oct 01)

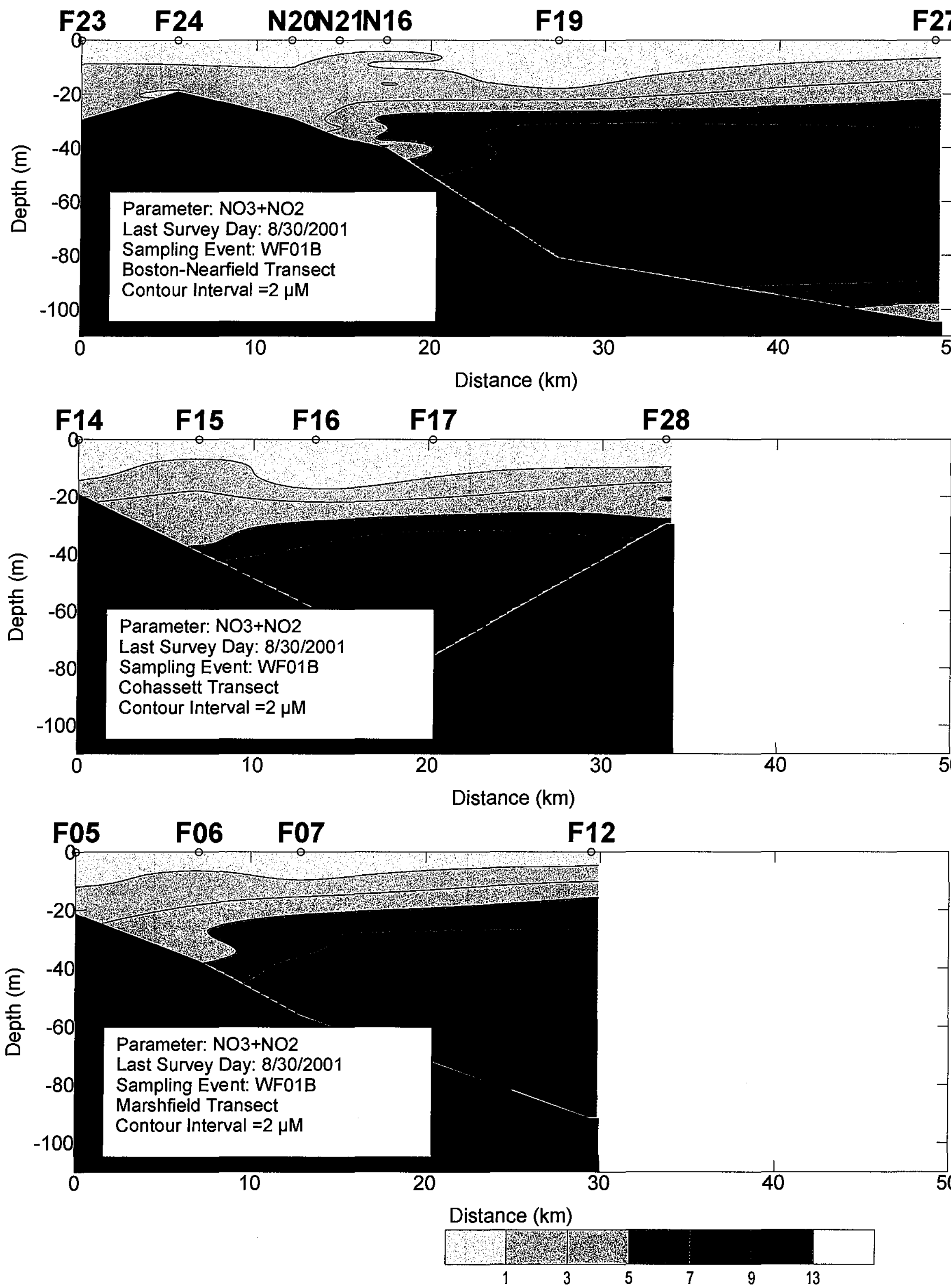


Figure C-17. Nitrate Plus Nitrite Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

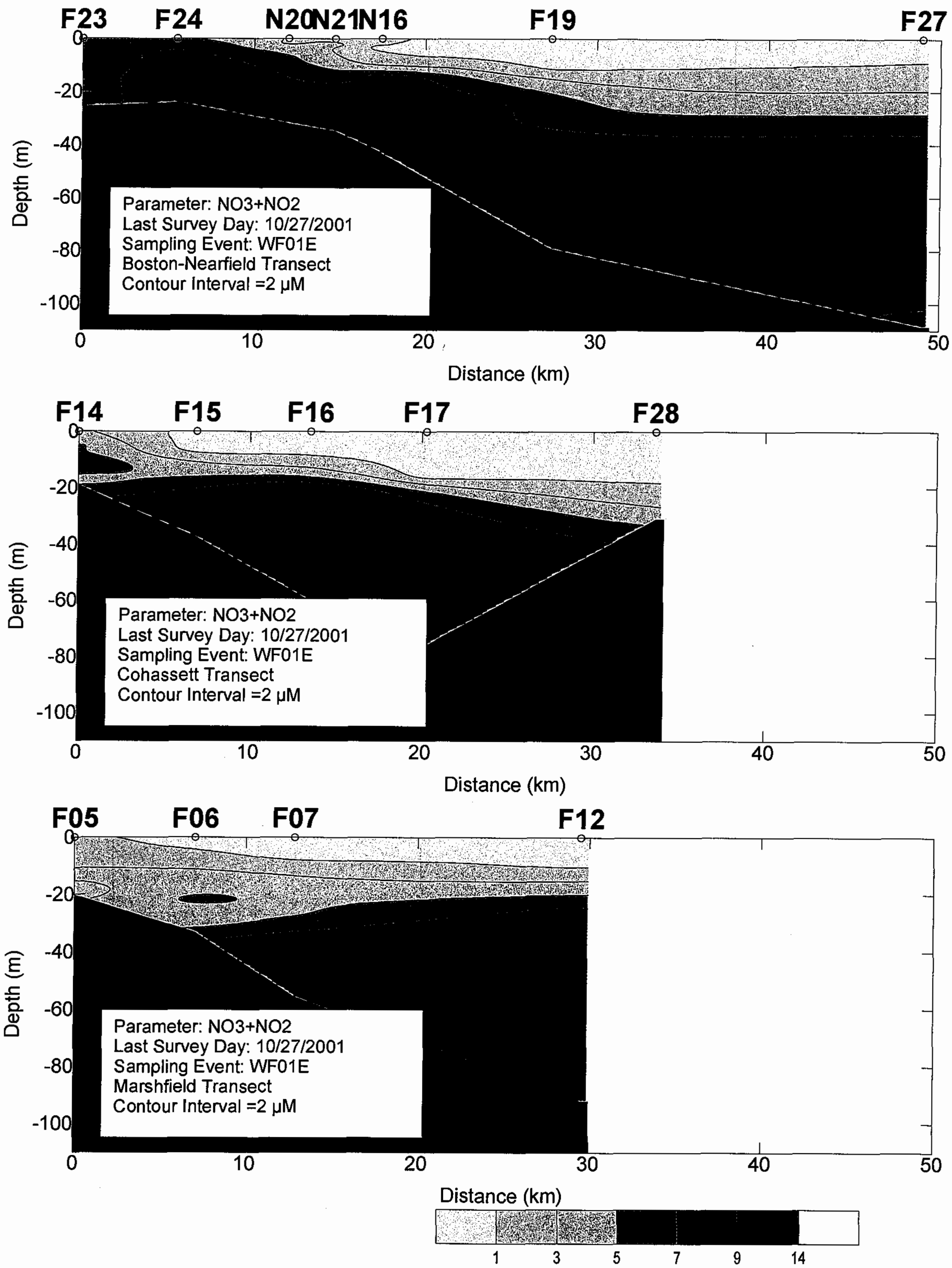


Figure C-18. Nitrate Plus Nitrite Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

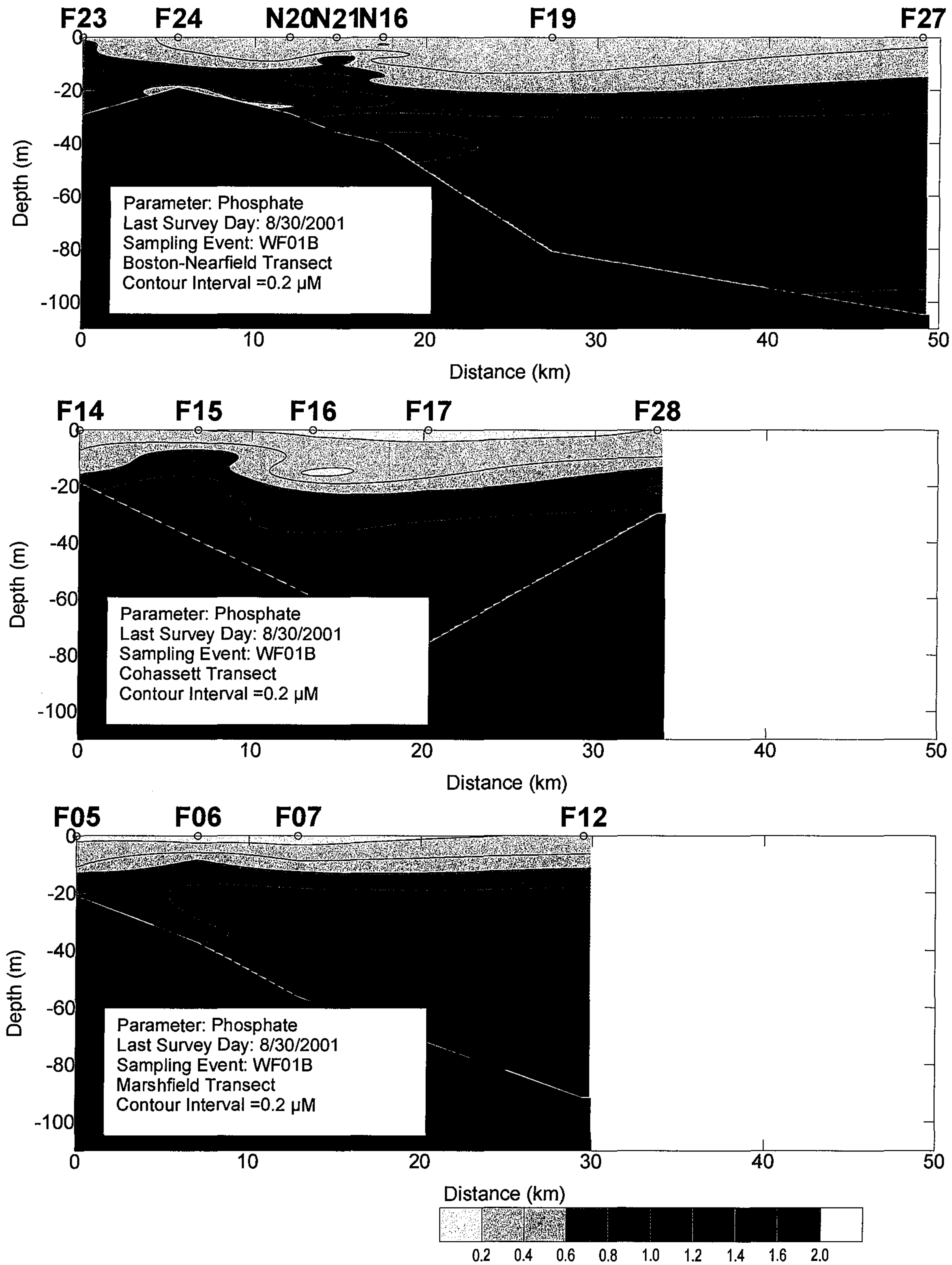


Figure C-19. Phosphate Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

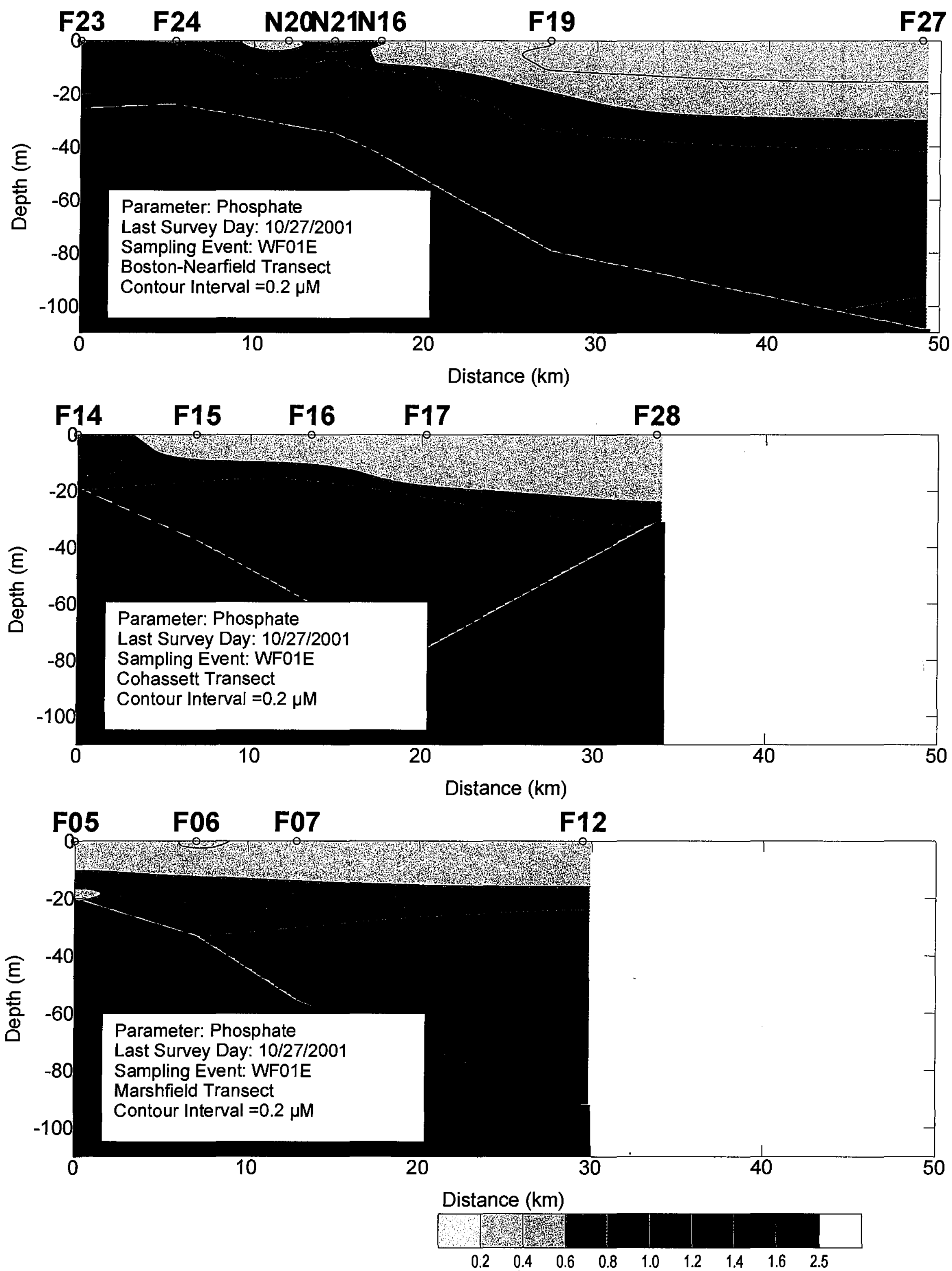


Figure C-20. Phosphate Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

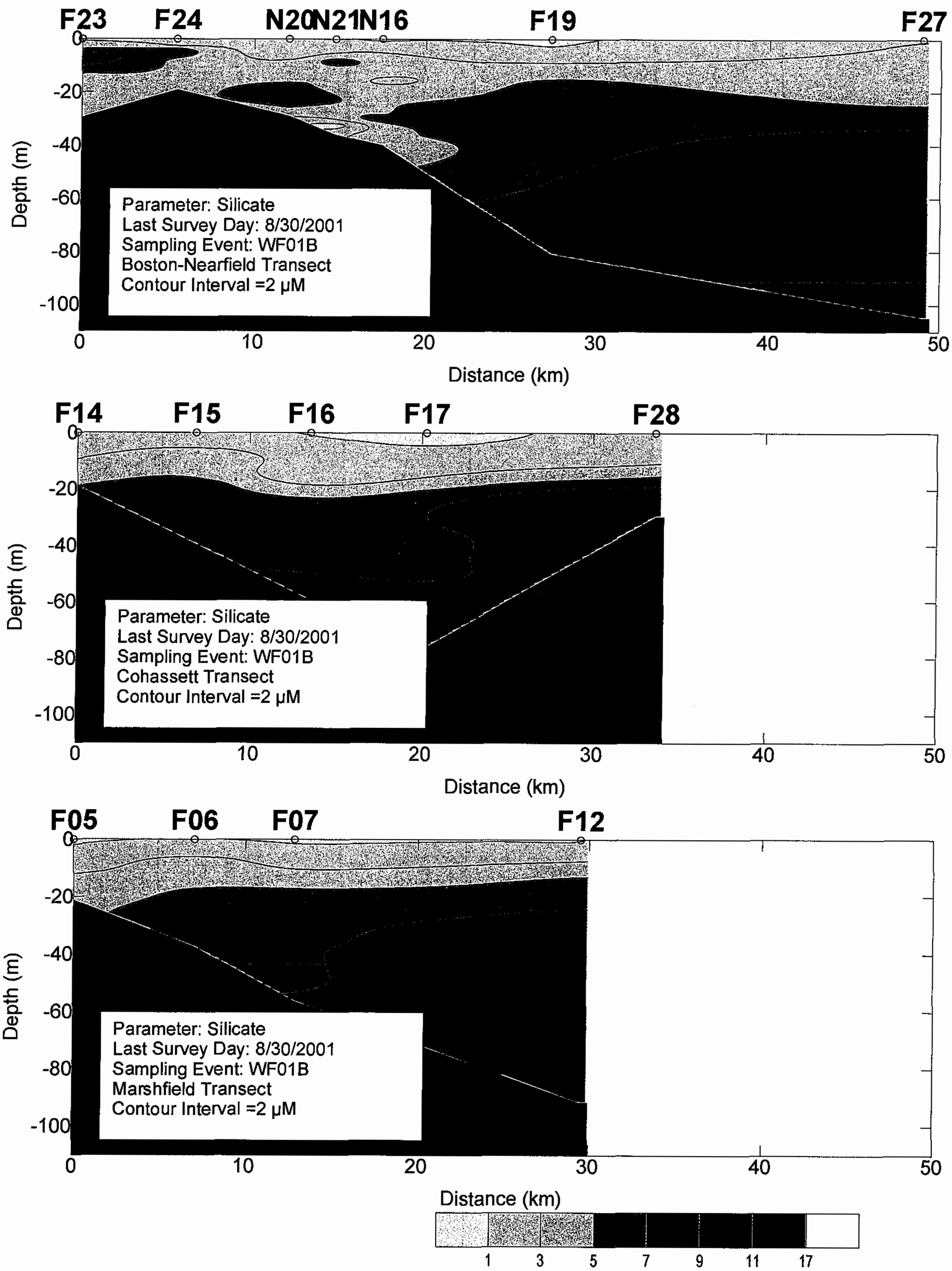


Figure C-21. Silicate Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

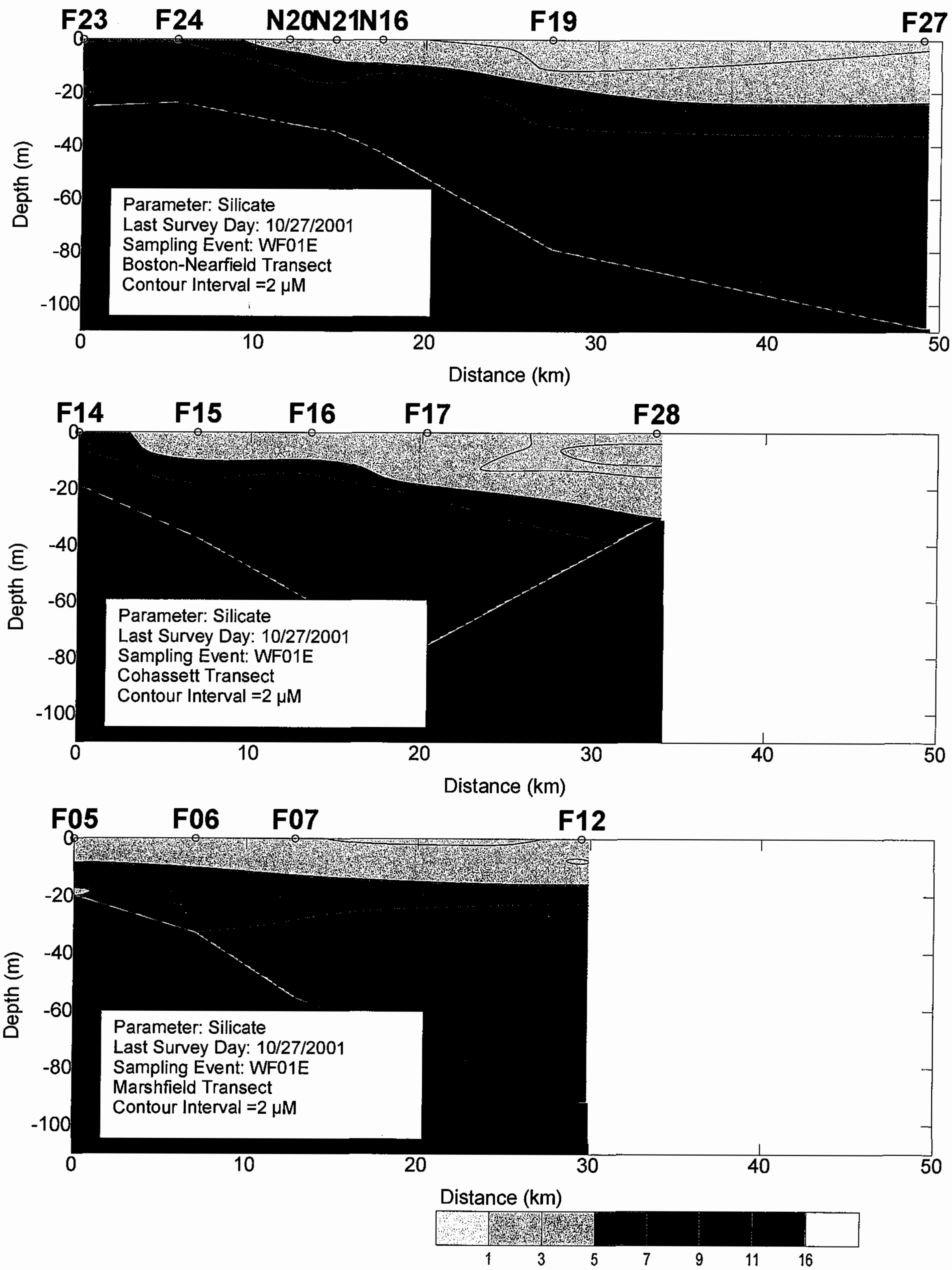


Figure C-22. Silicate Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

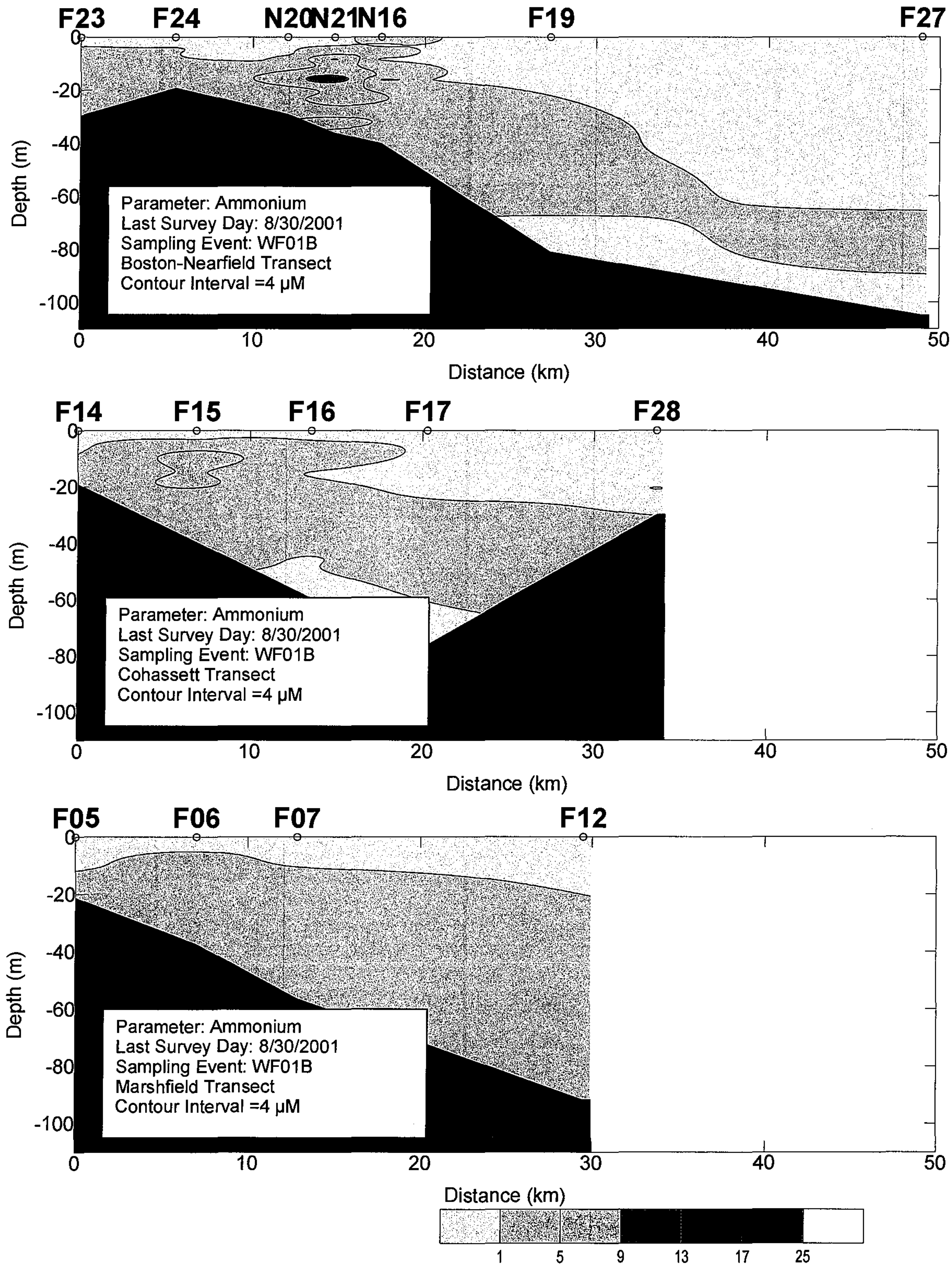


Figure C-23. Ammonium Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

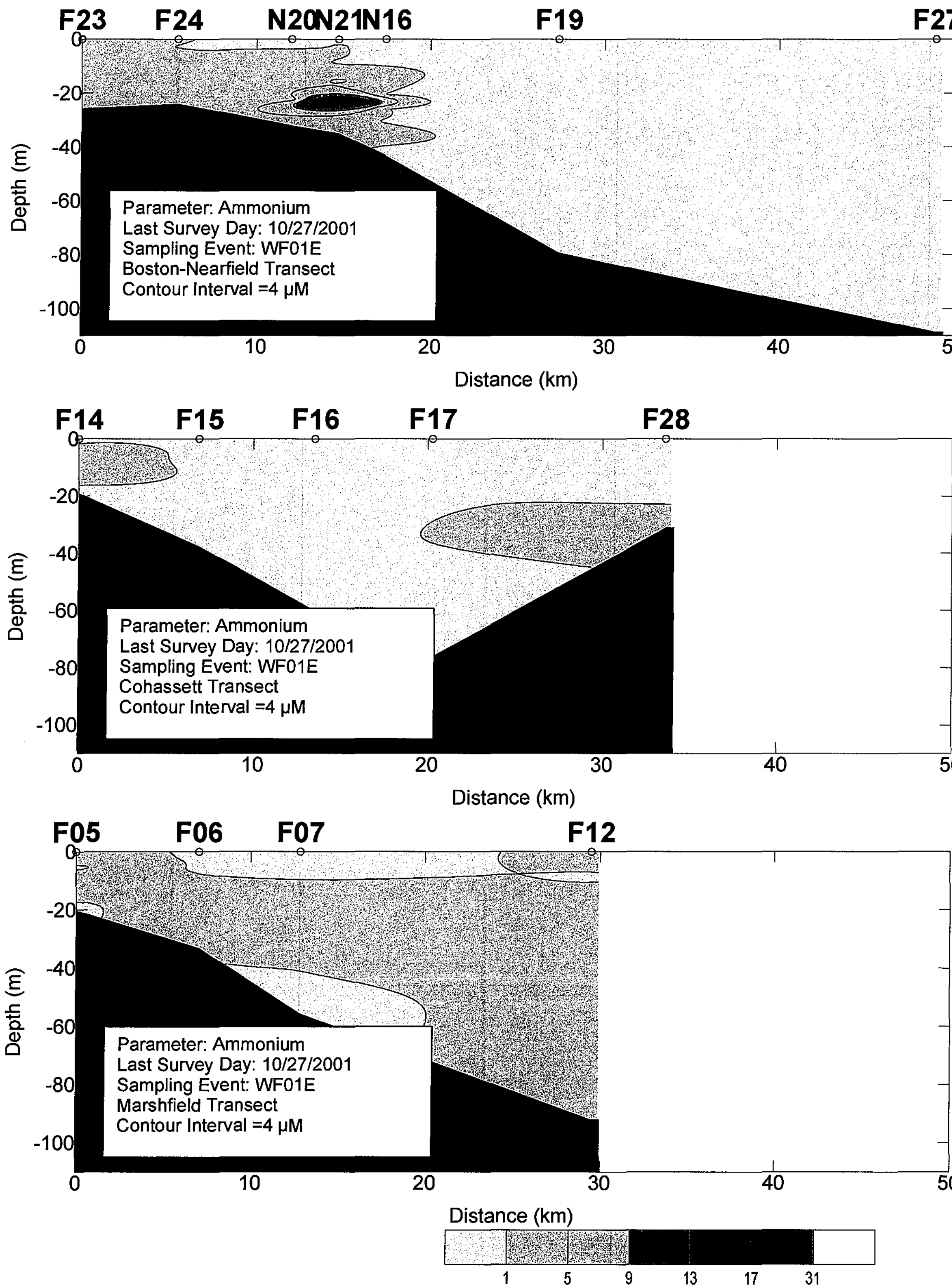


Figure C-24. Ammonium Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

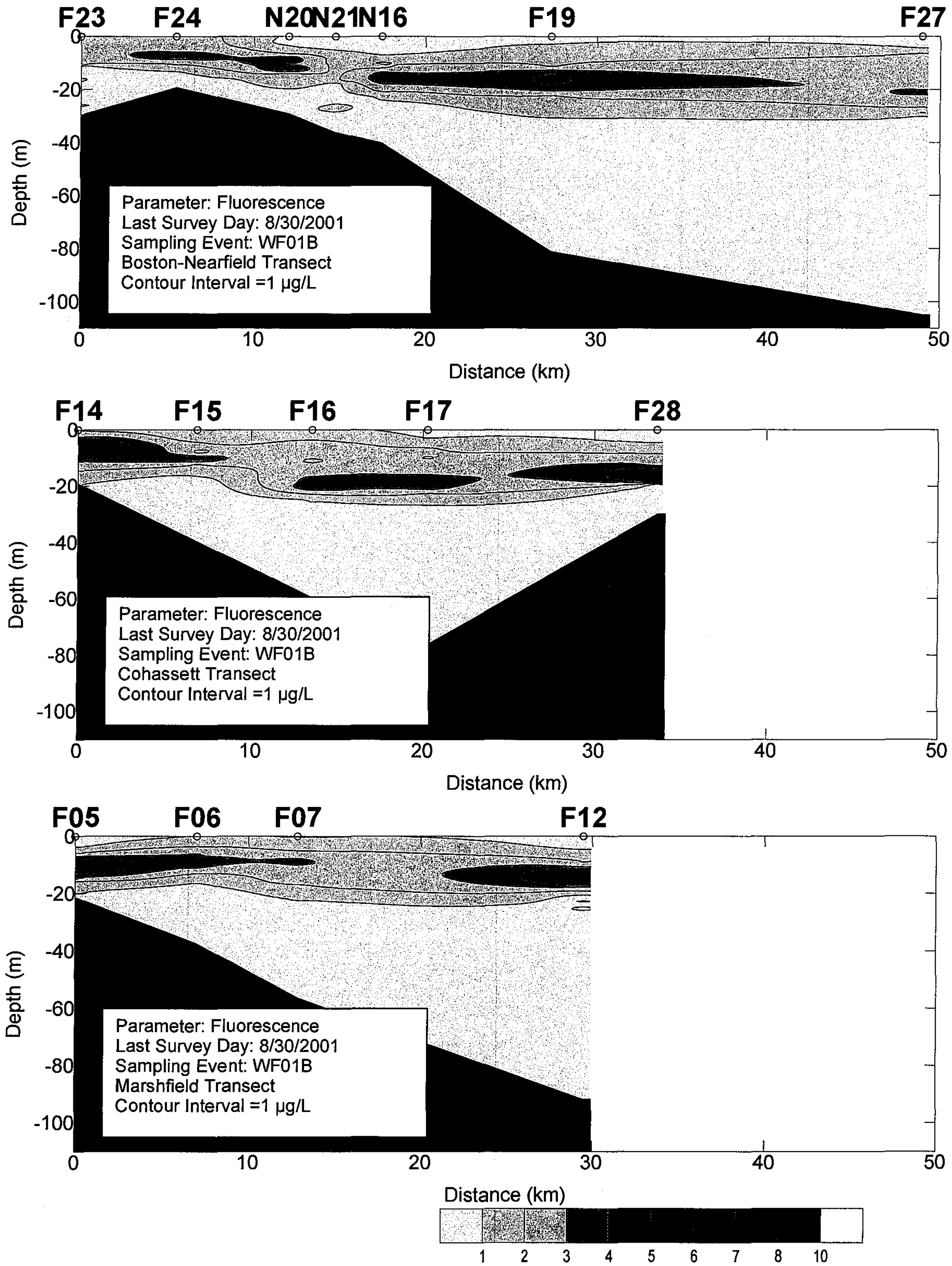


Figure C-25. Fluorescence Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

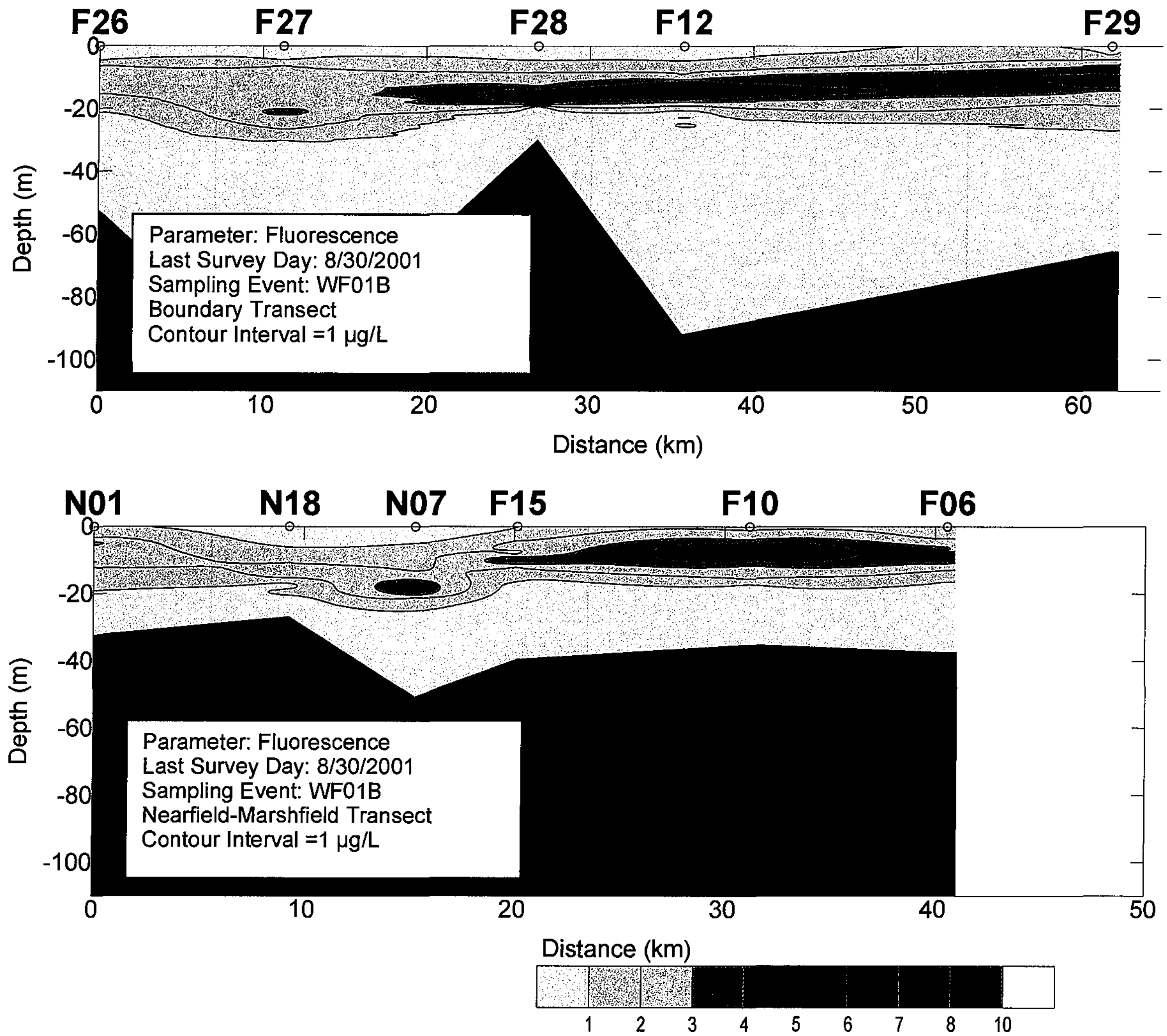


Figure C-26. Fluorescence Transect Plots (North - South) for Farfield Survey WF01B (Aug 01)

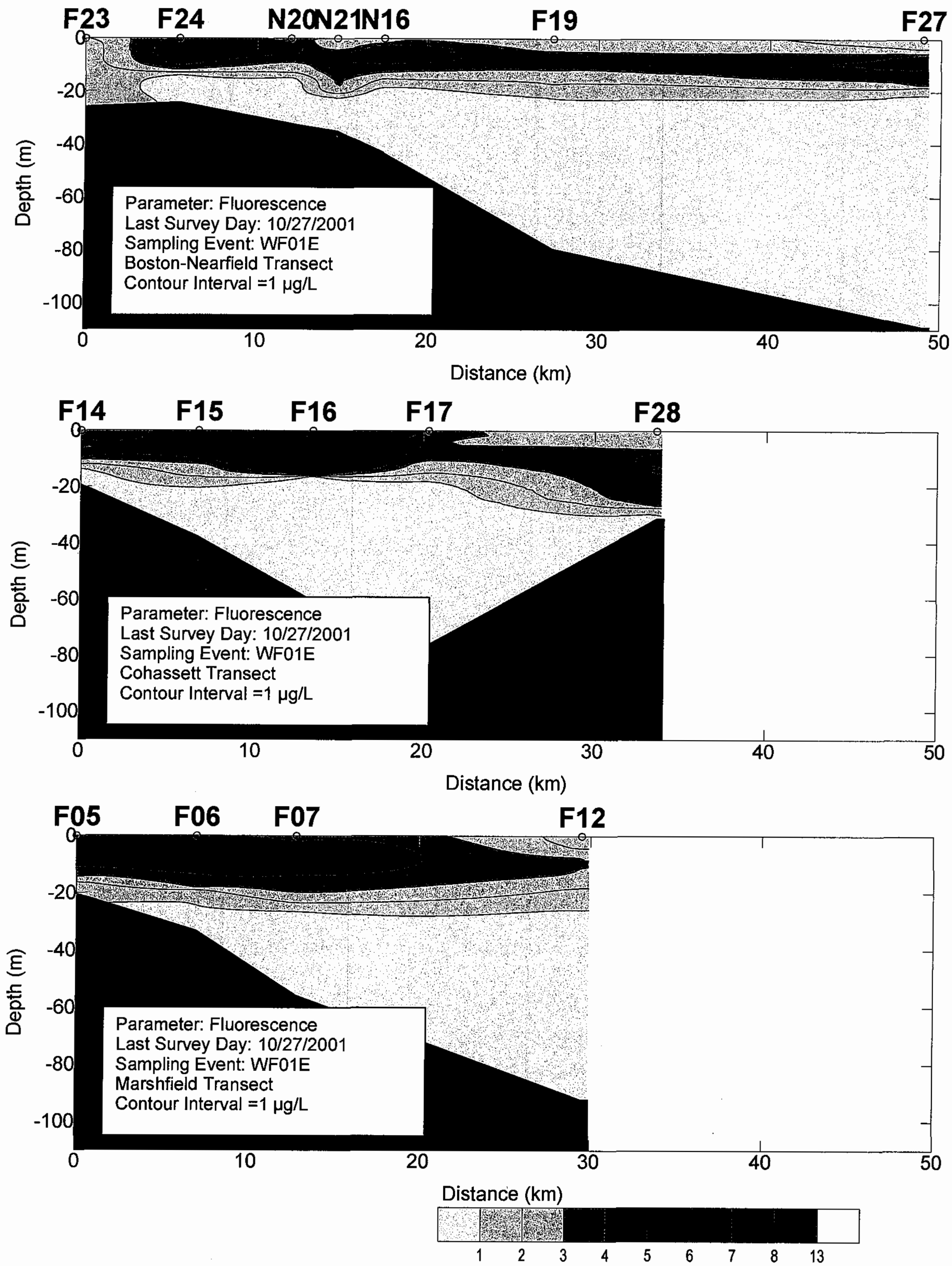


Figure C-27. Fluorescence Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

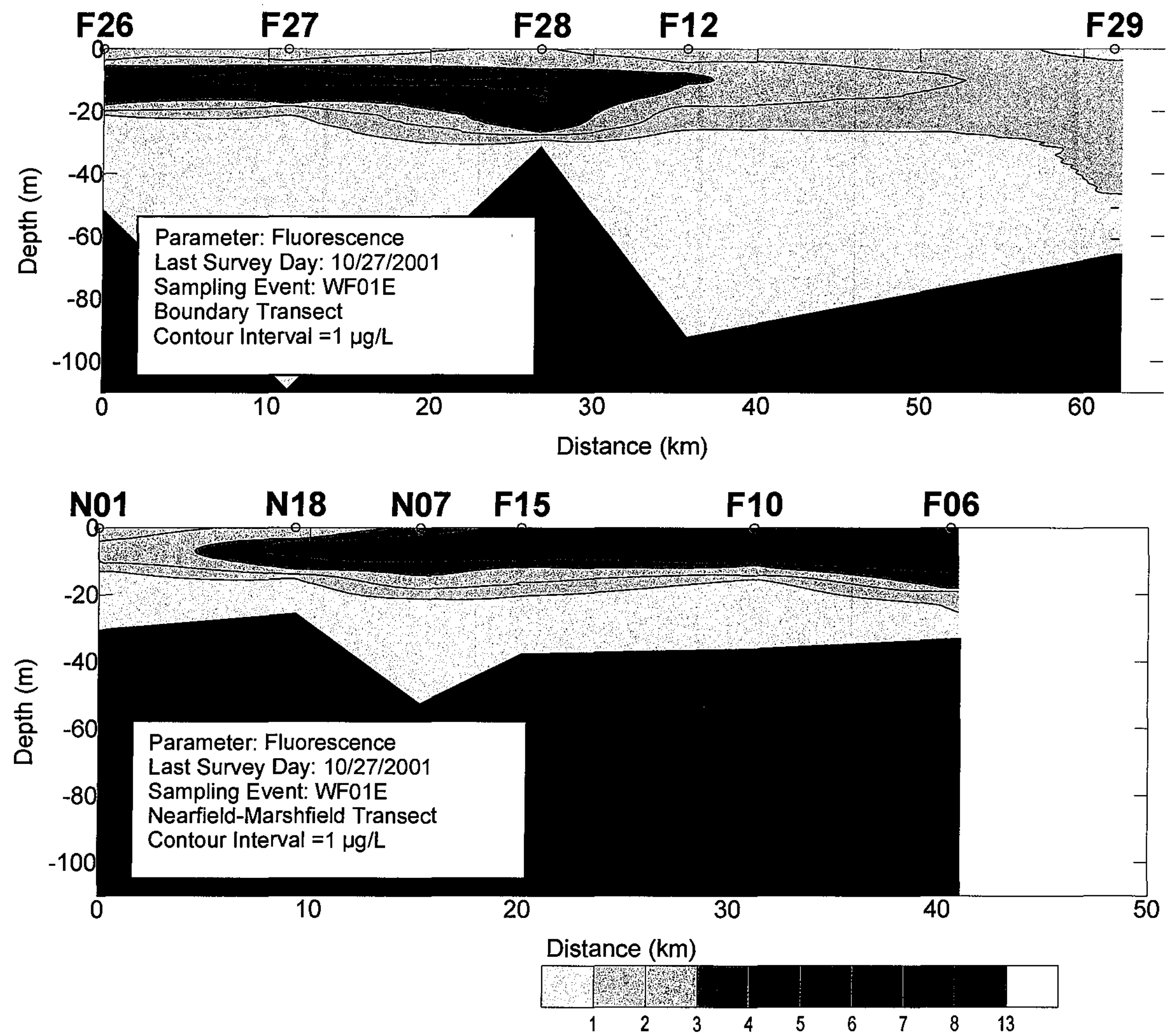


Figure C-28. Fluorescence Transect Plots (North - South) for Farfield Survey WF01E (Oct 01)

Figure C-29. Dissolved Oxygen Transect Plots (West - East) for Farfield Survey WF01B (Aug 01)

Figure C-30. Dissolved Oxygen Transect Plots (North - South) for Farfield Survey WF01B (Aug 01)

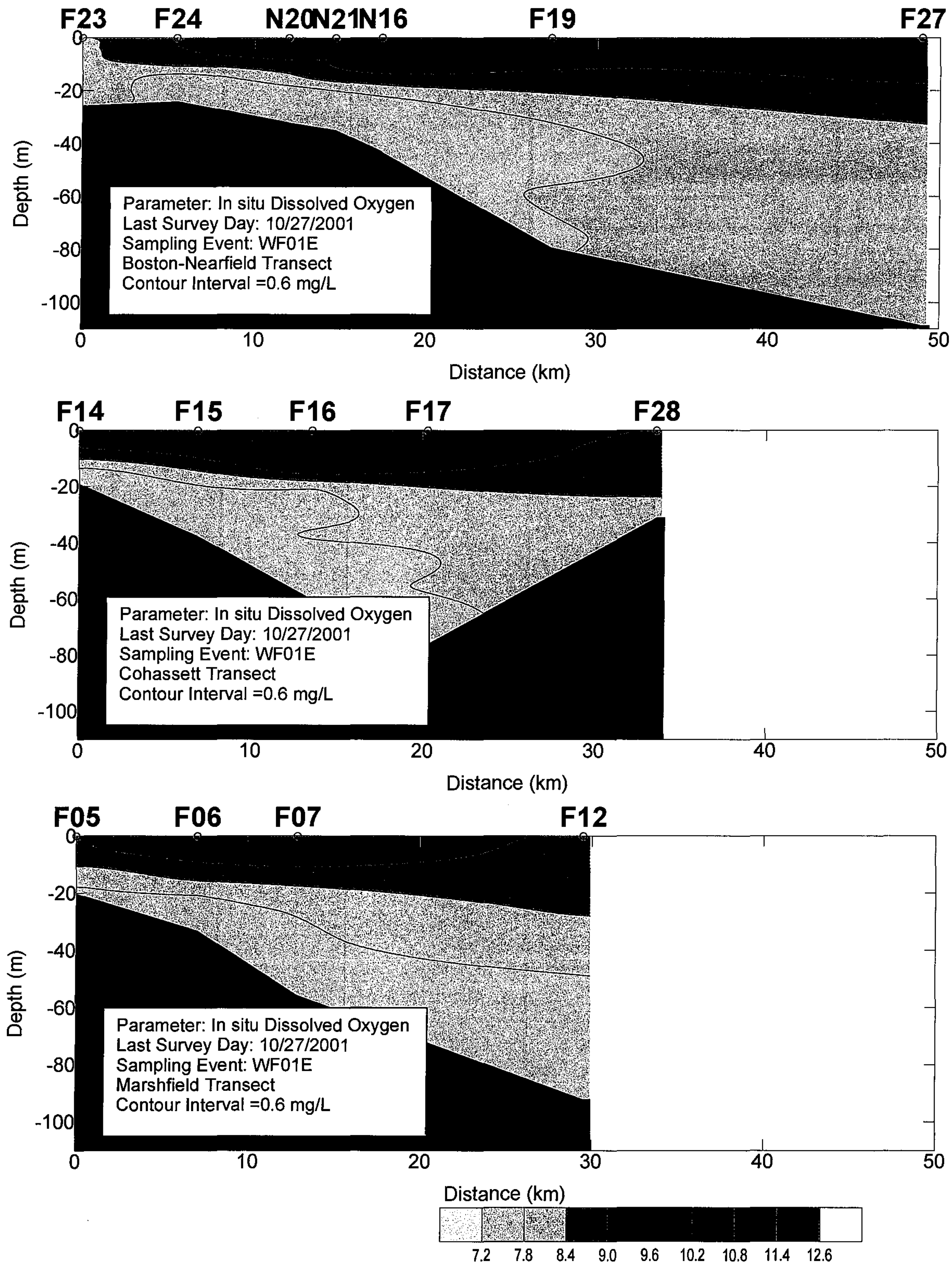


Figure C-31. Dissolved Oxygen Transect Plots (West - East) for Farfield Survey WF01E (Oct 01)

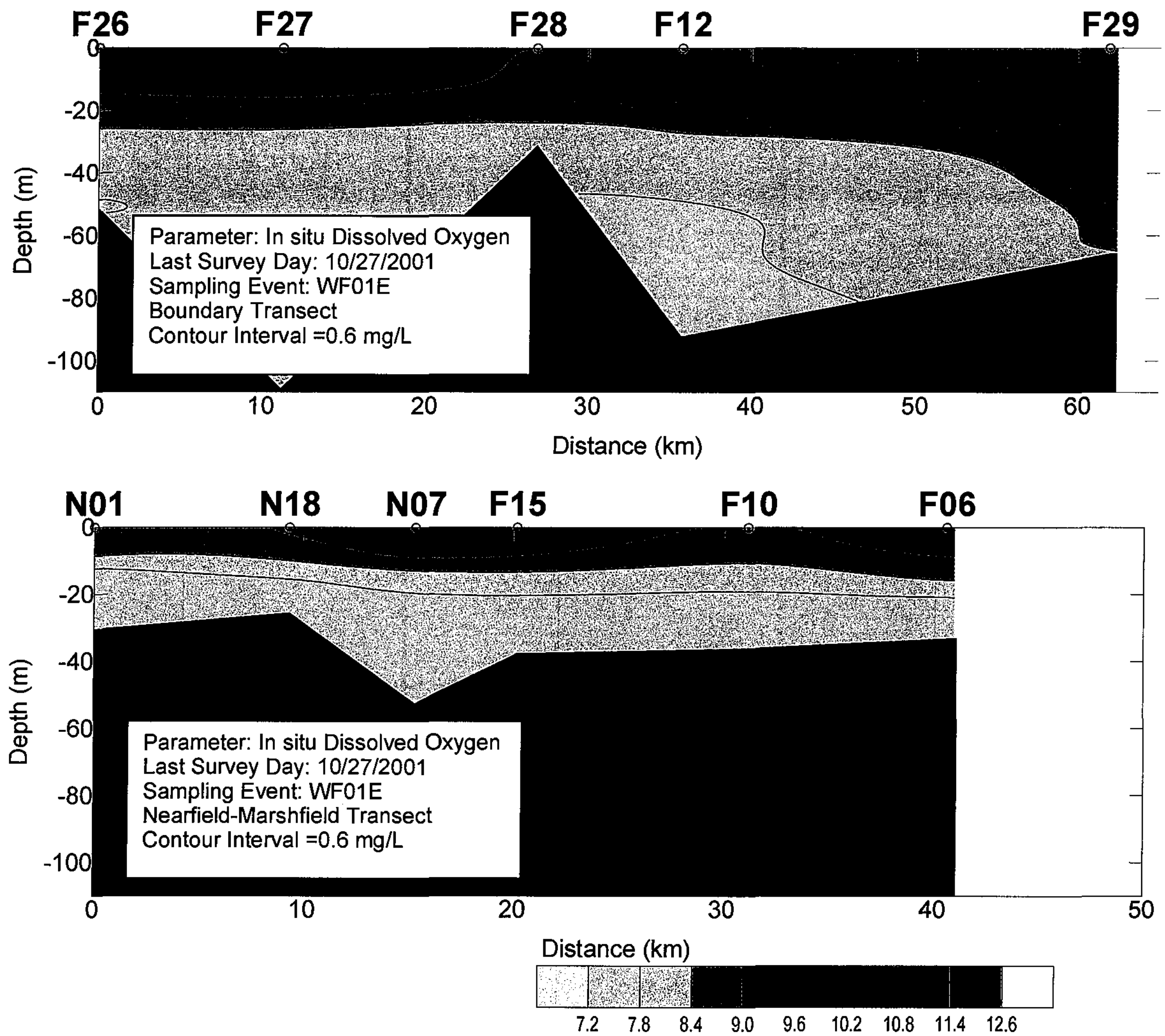


Figure C-32. Dissolved Oxygen Transect Plots (North - South) for Farfield Survey WF01E (Oct 01)

APPENDIX D

Nutrient Scatter Plots for each Survey

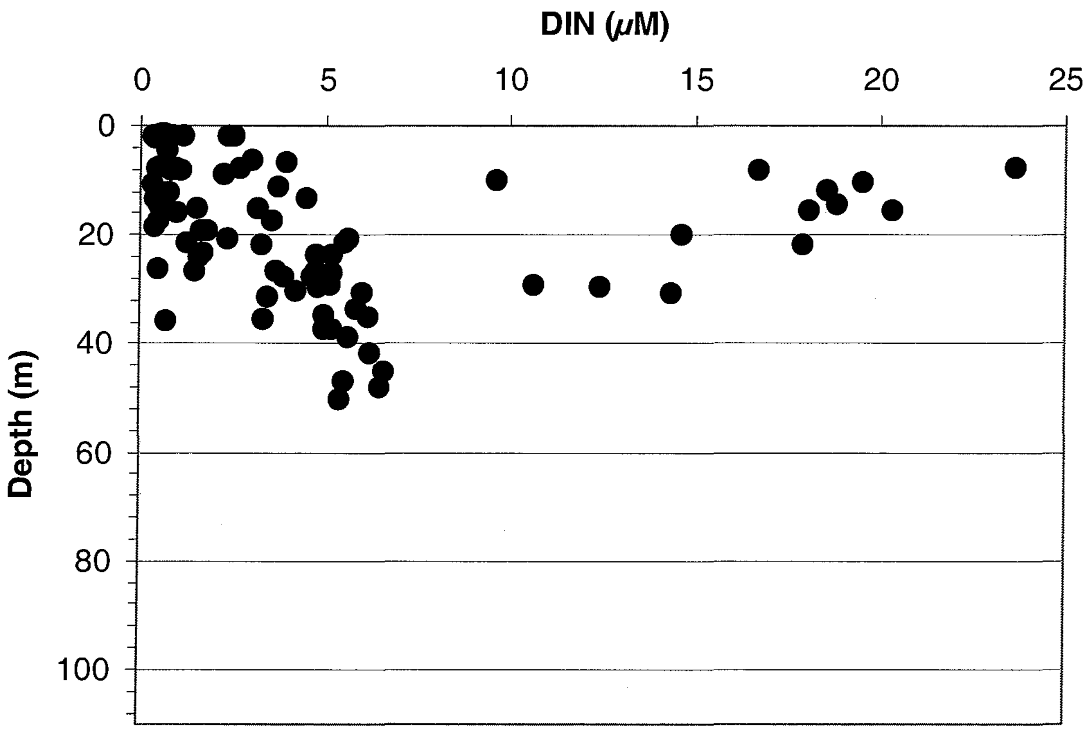
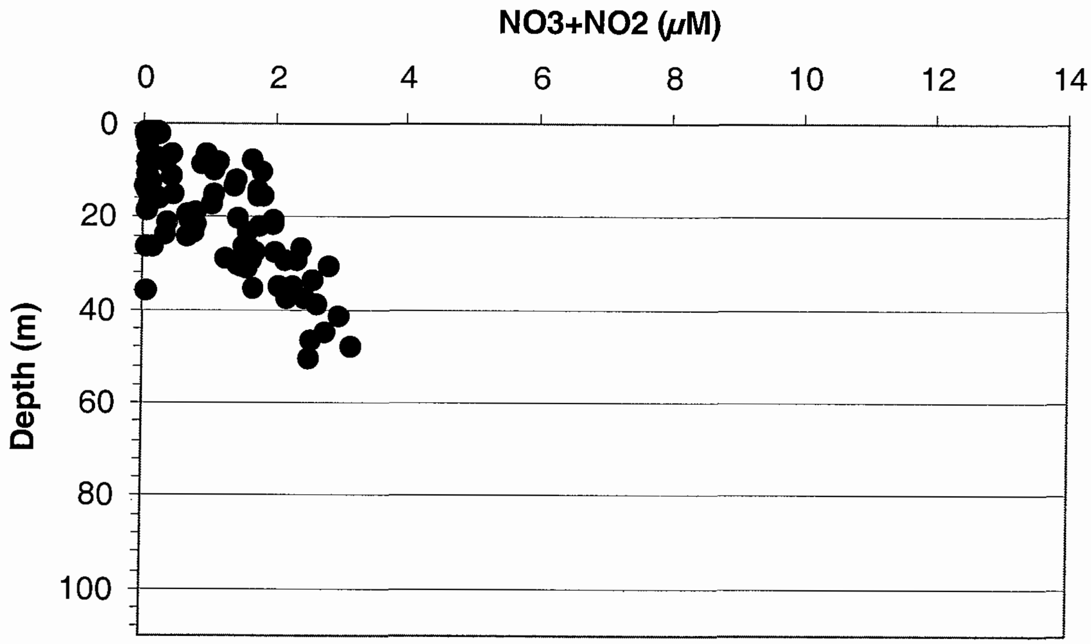


Figure D-1. Depth vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

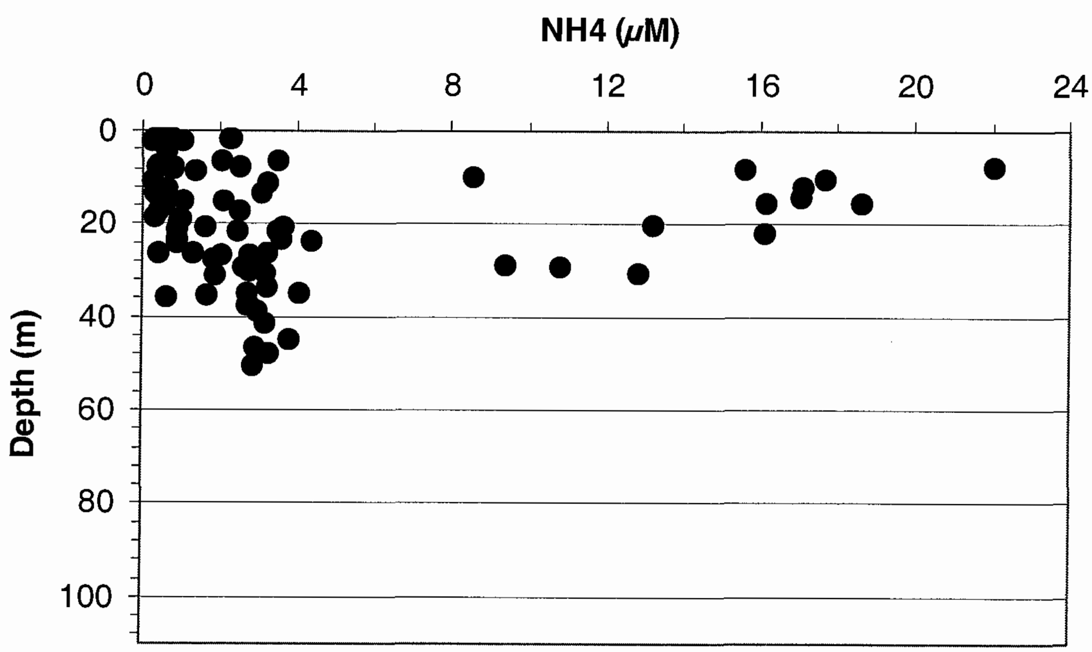


Figure D-2. Depth vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

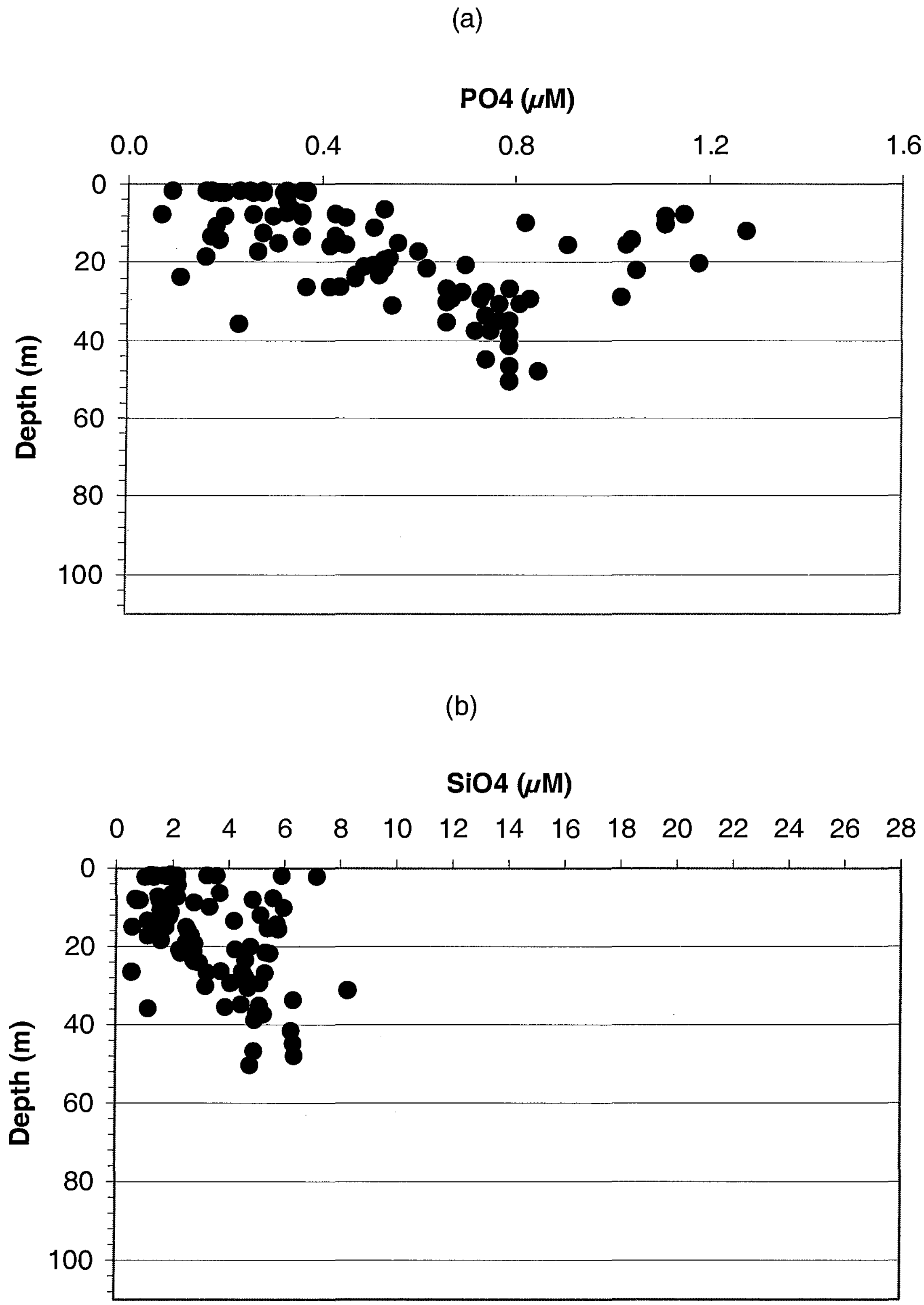
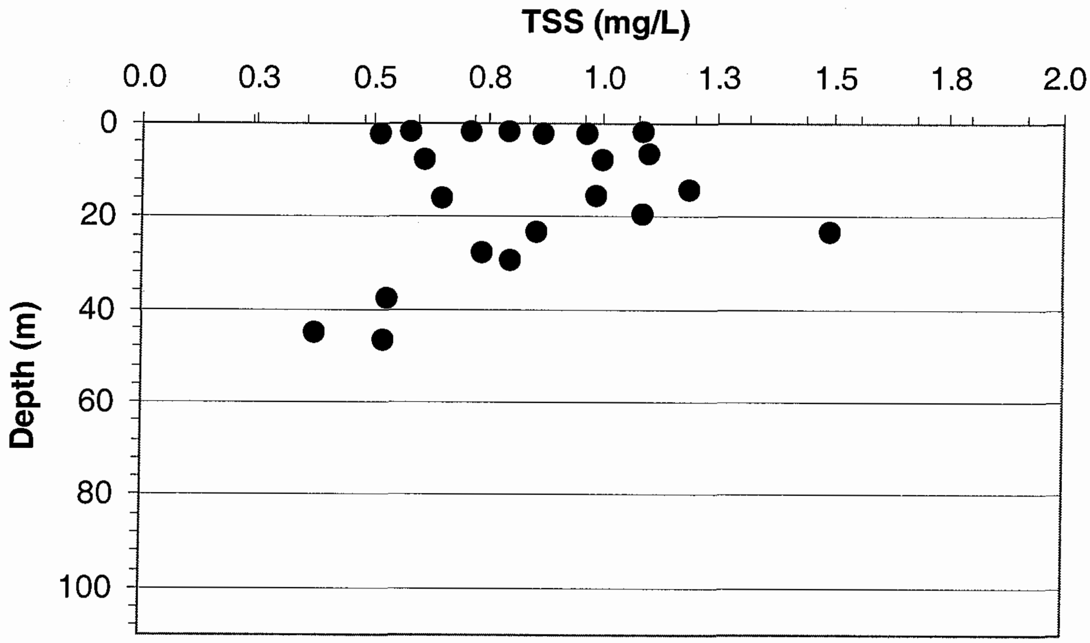


Figure D-3. Depth vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

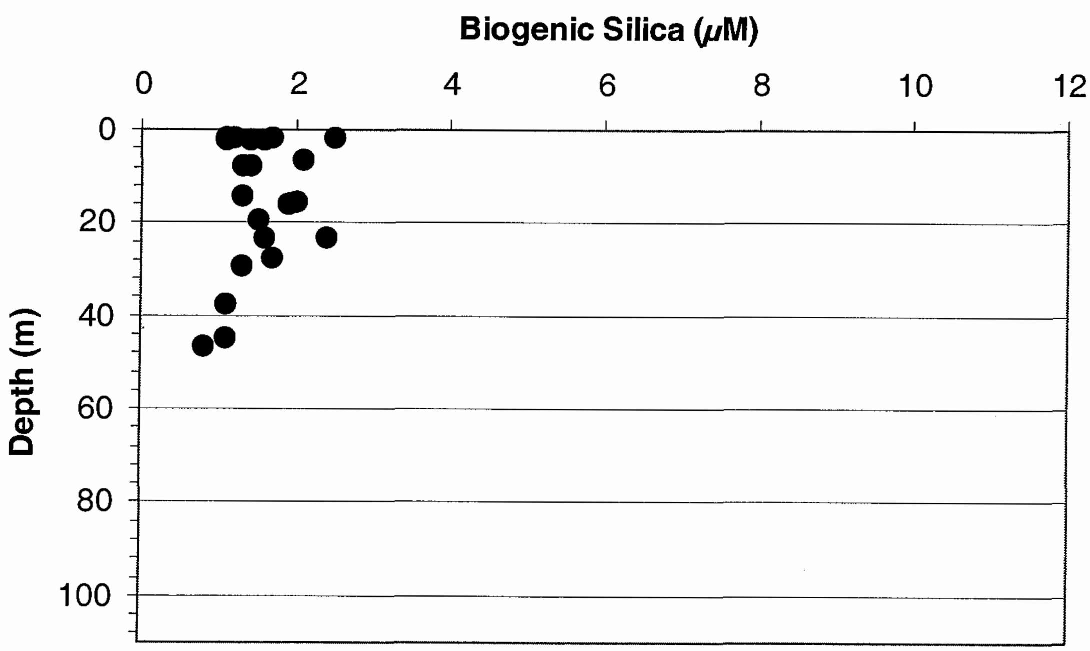
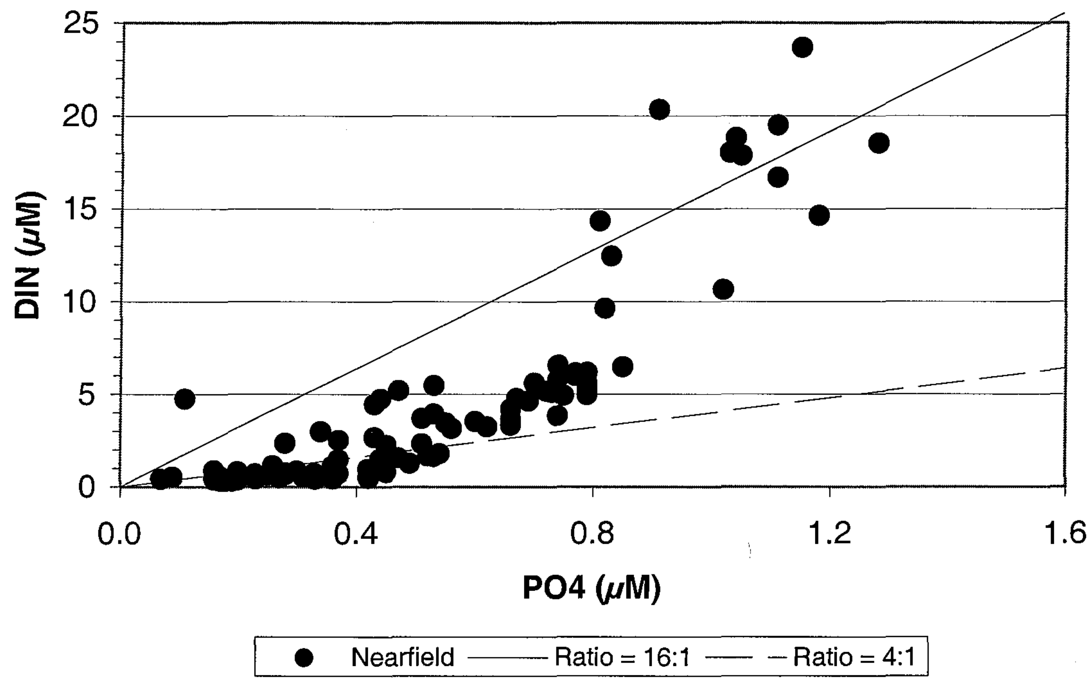


Figure D-4. Depth vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

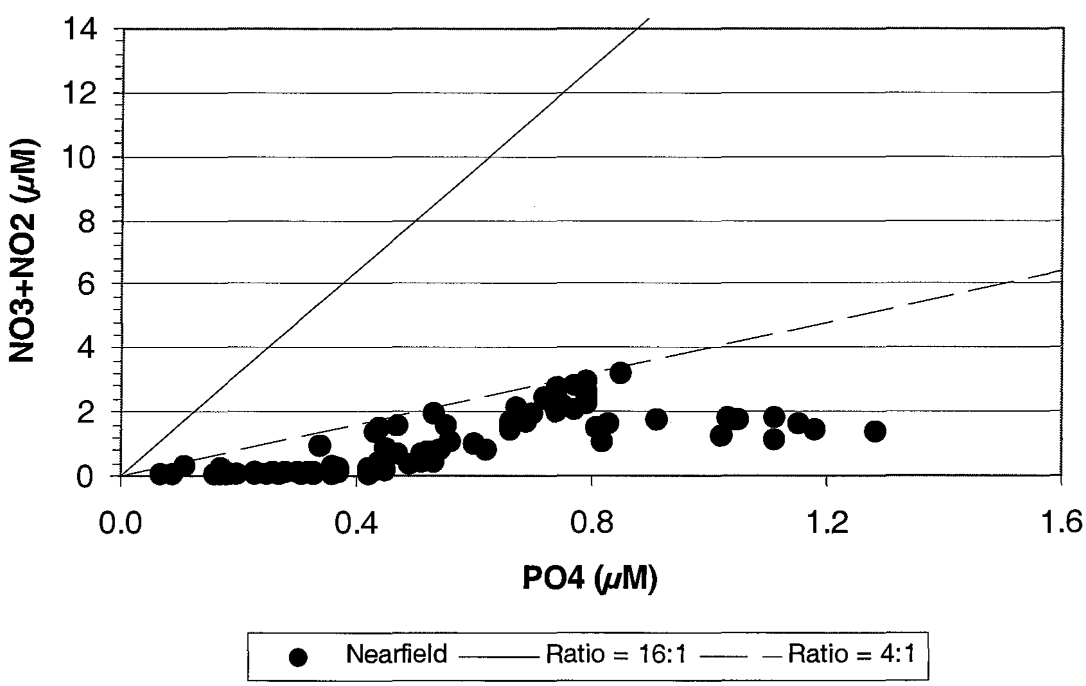
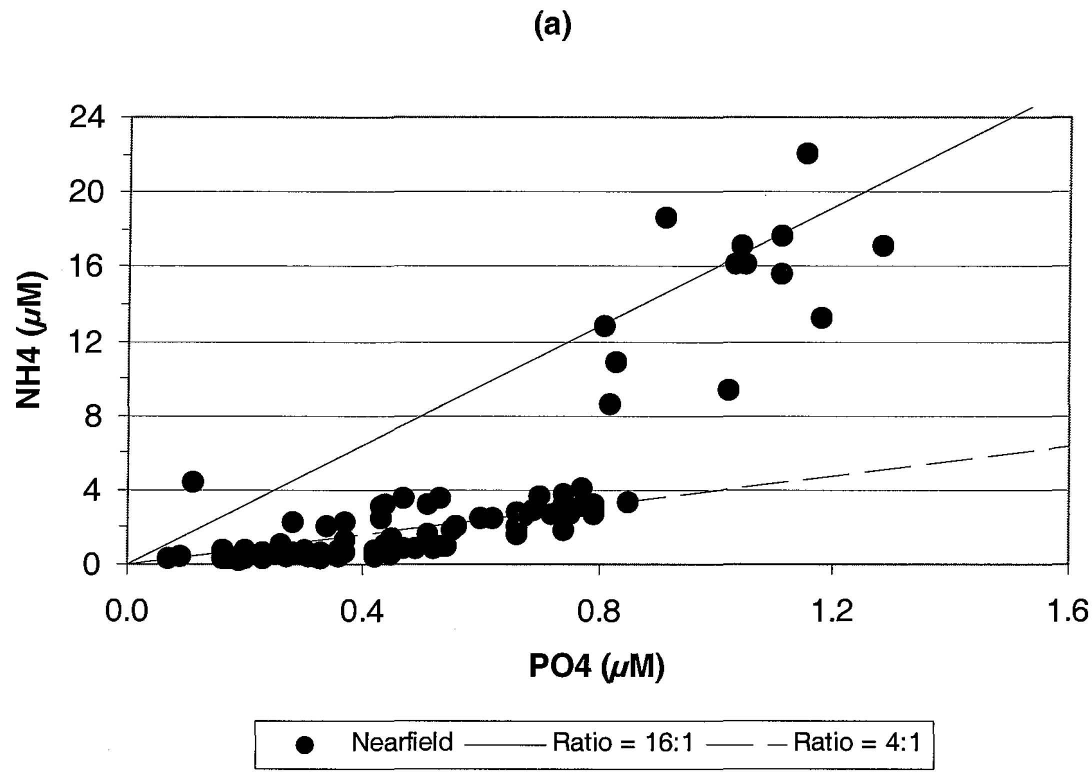


Figure D-5. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)



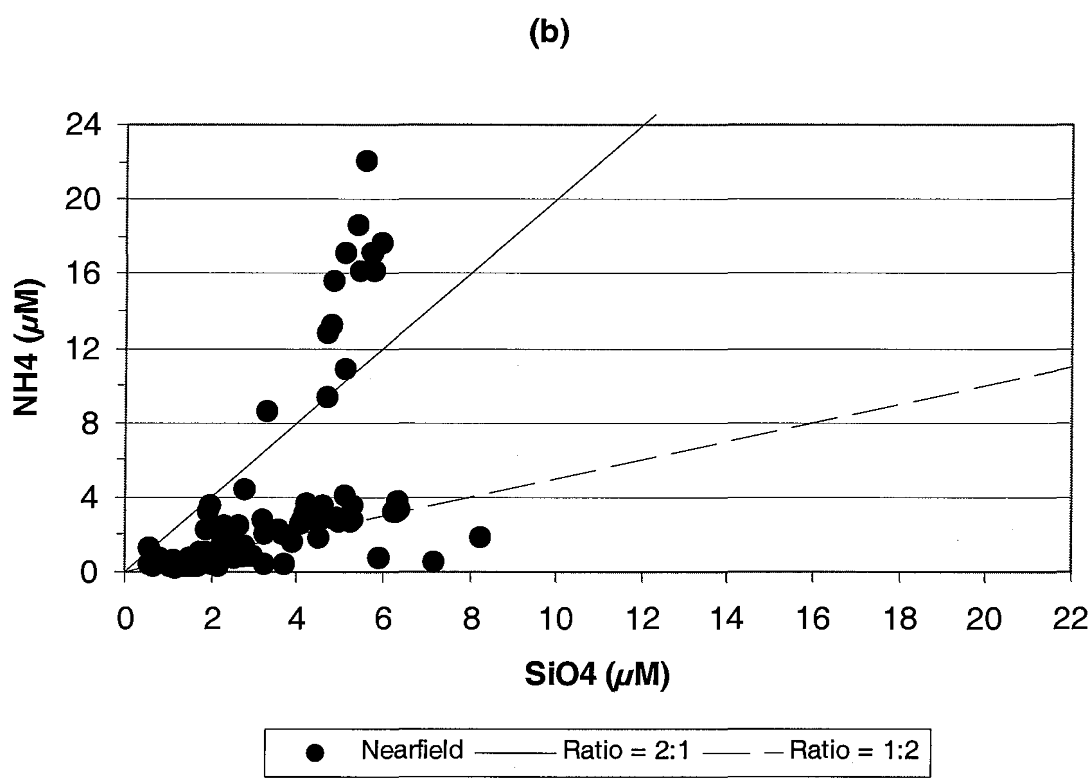


Figure D-6. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

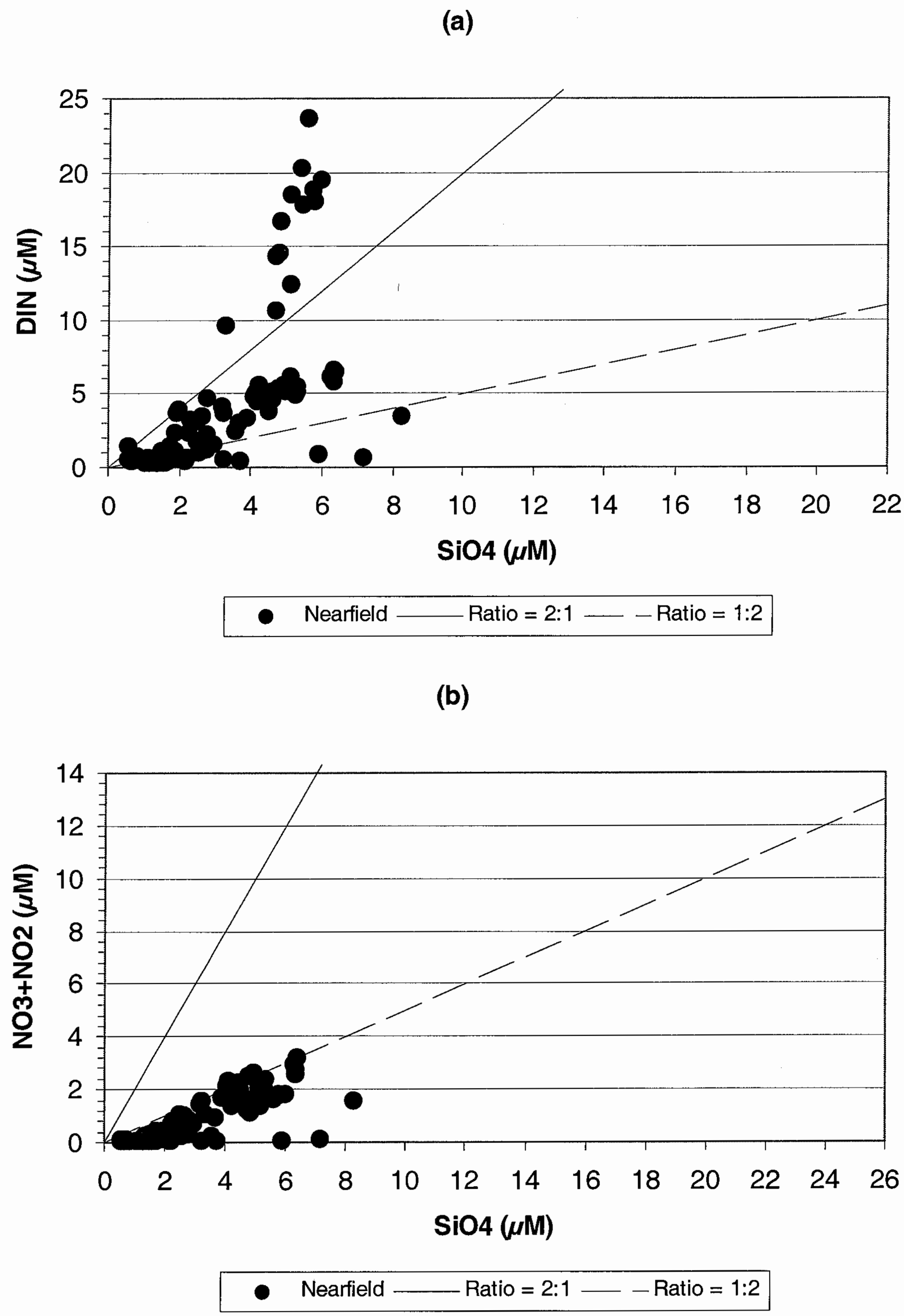
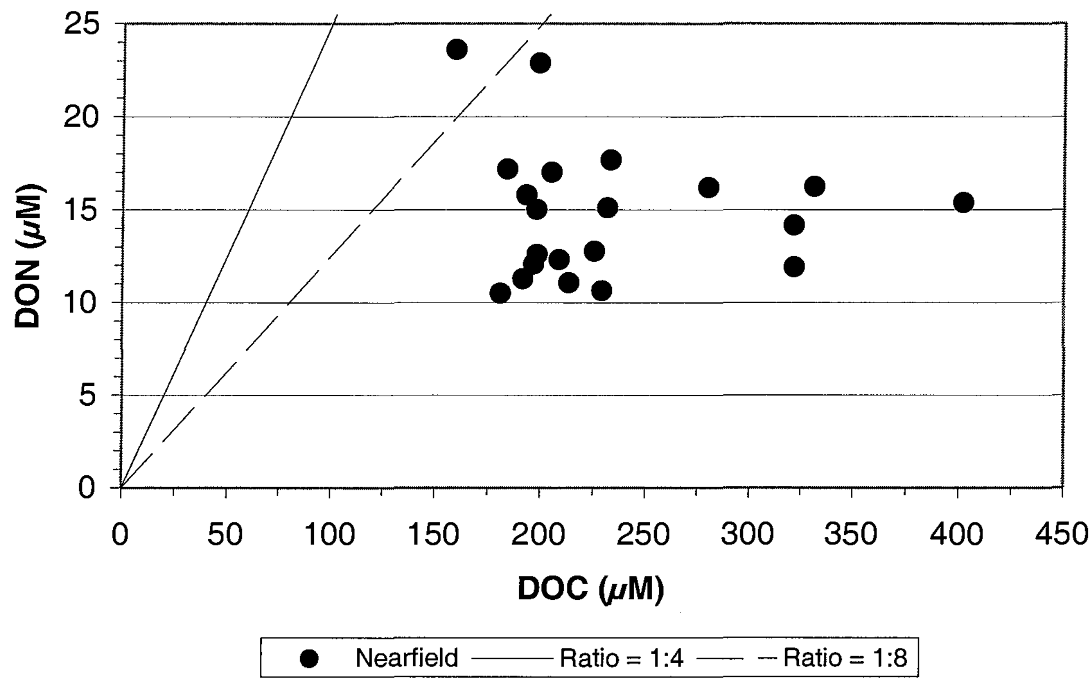


Figure D-7. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

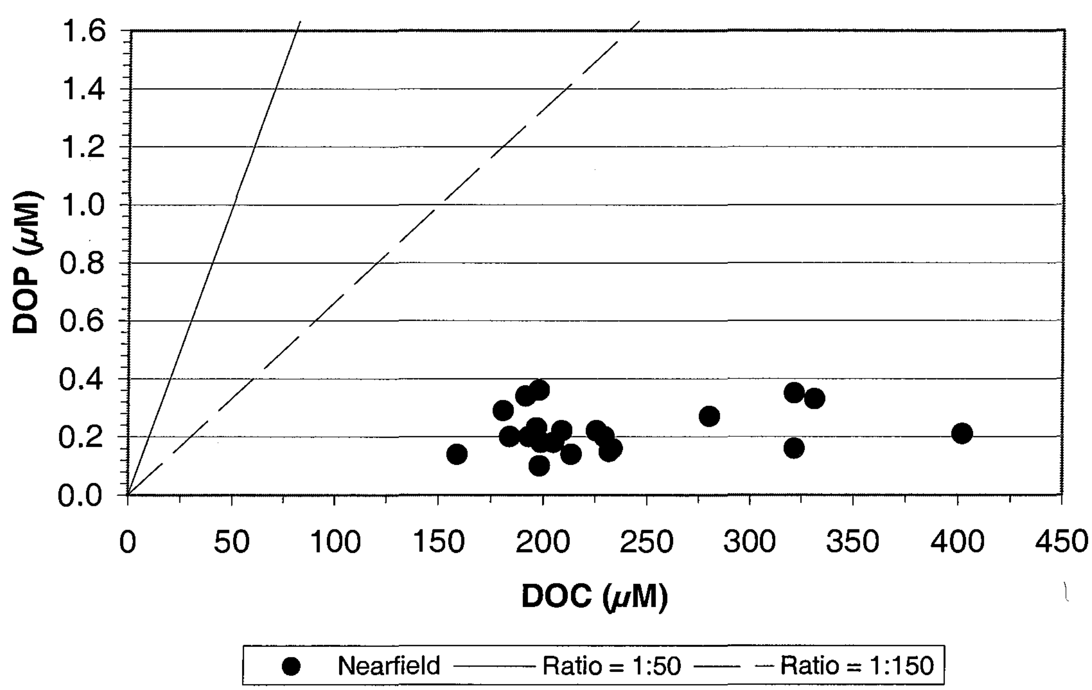
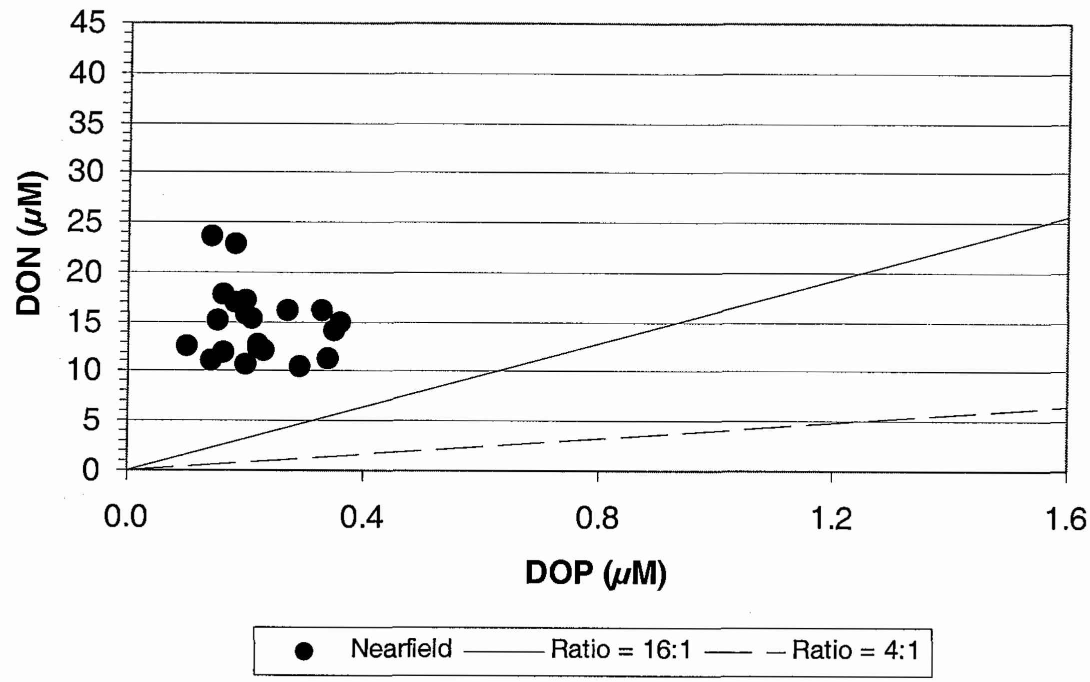


Figure D-8. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

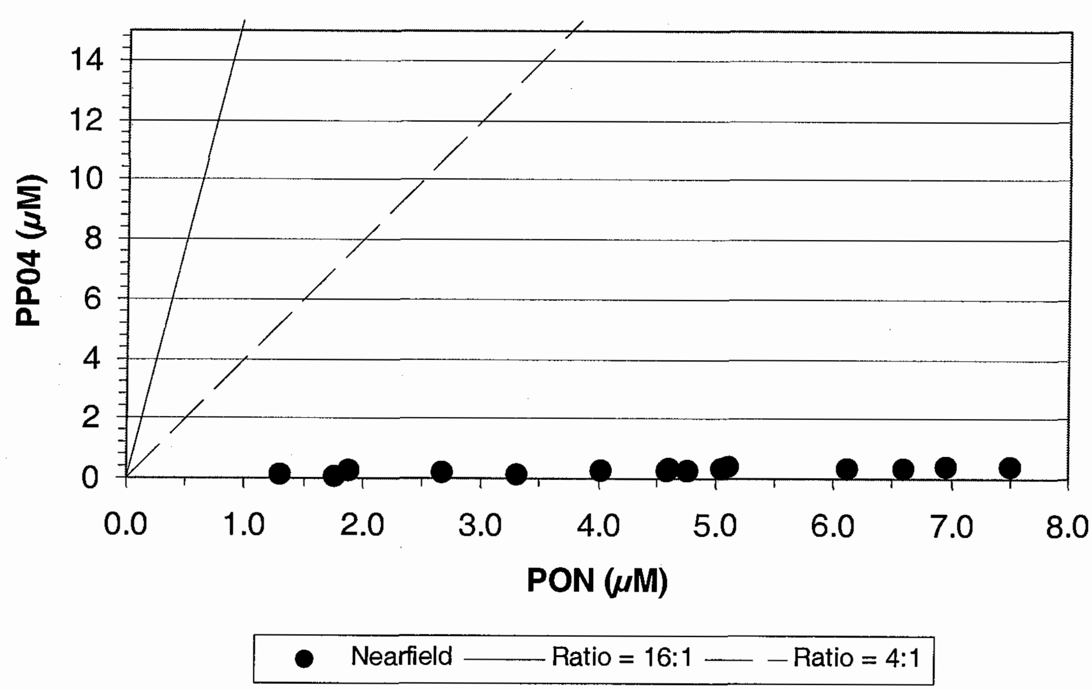
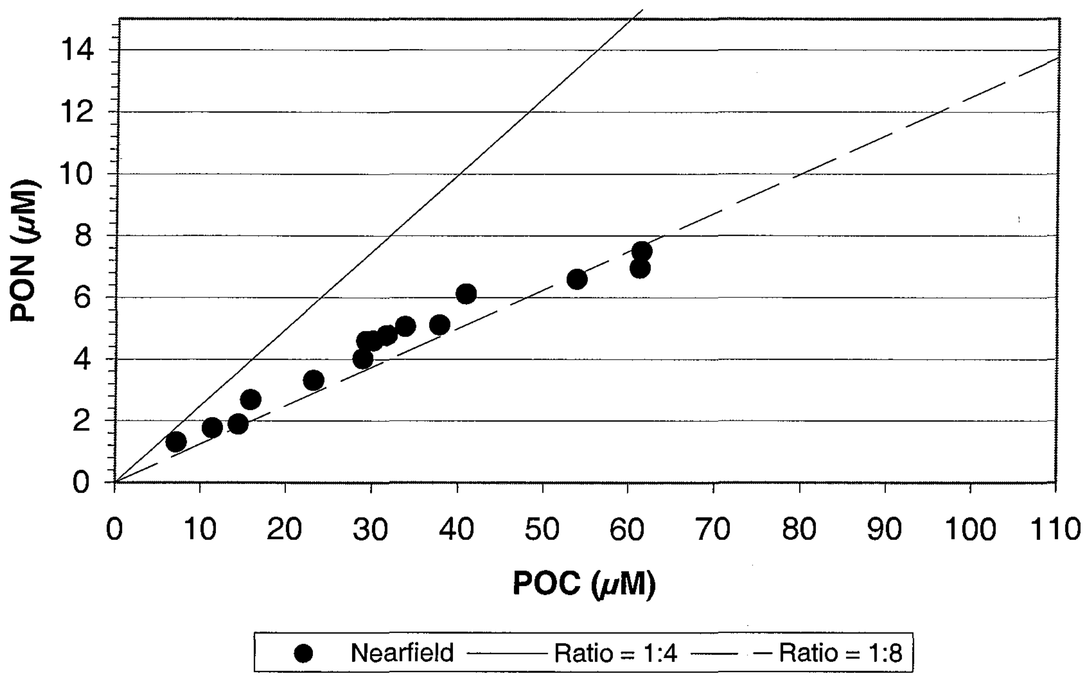


Figure D-9. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

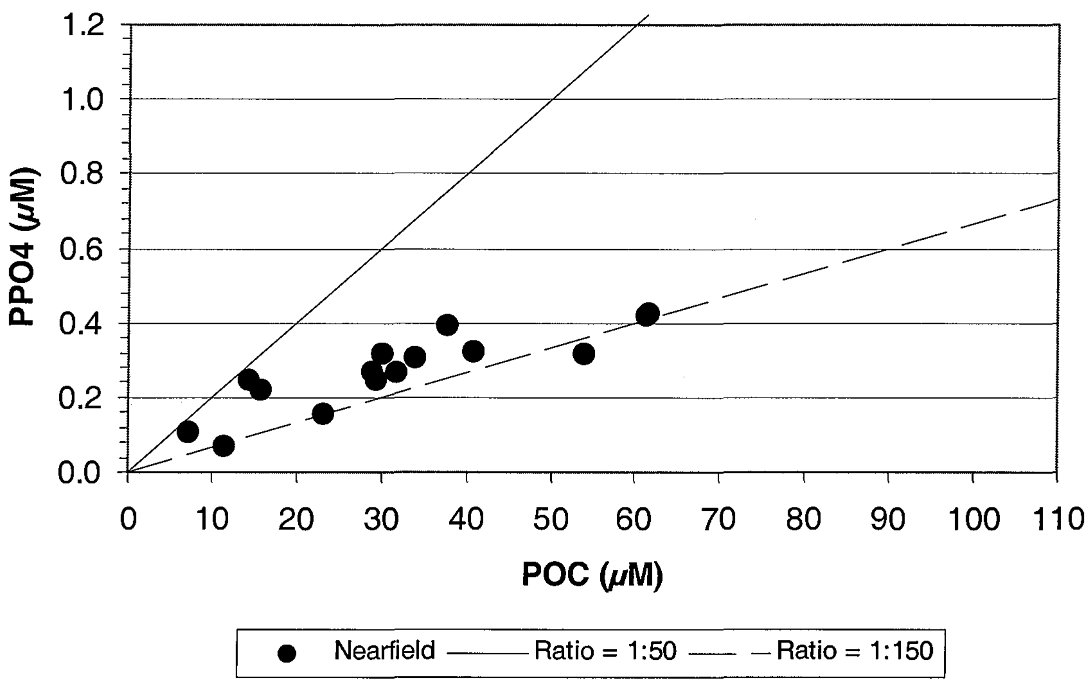
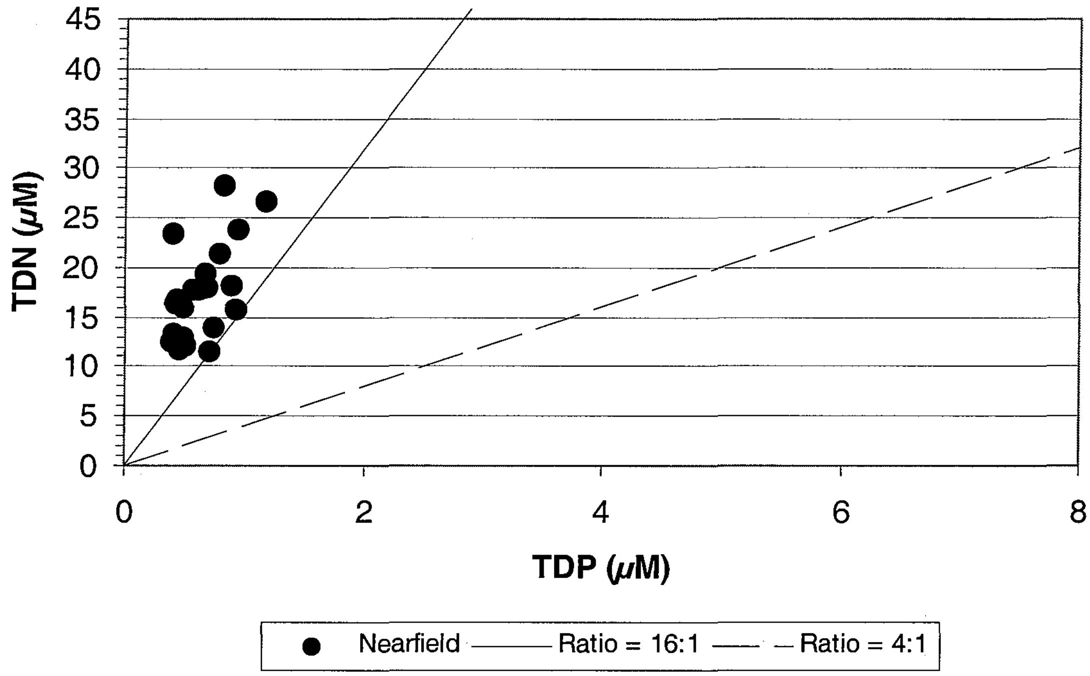


Figure D-10. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

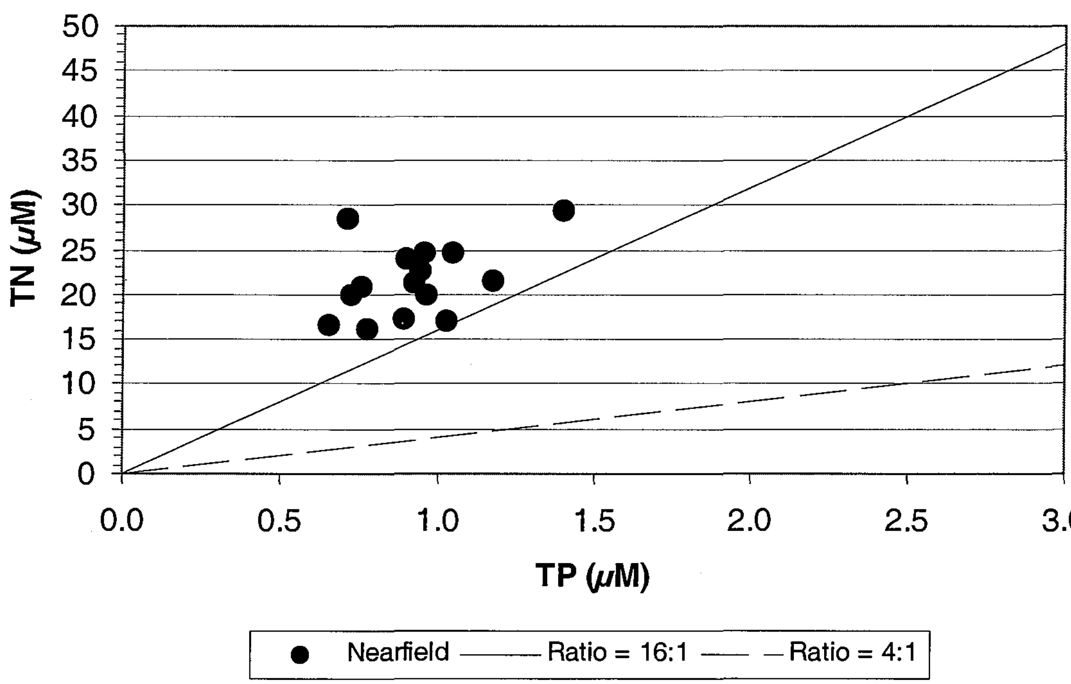
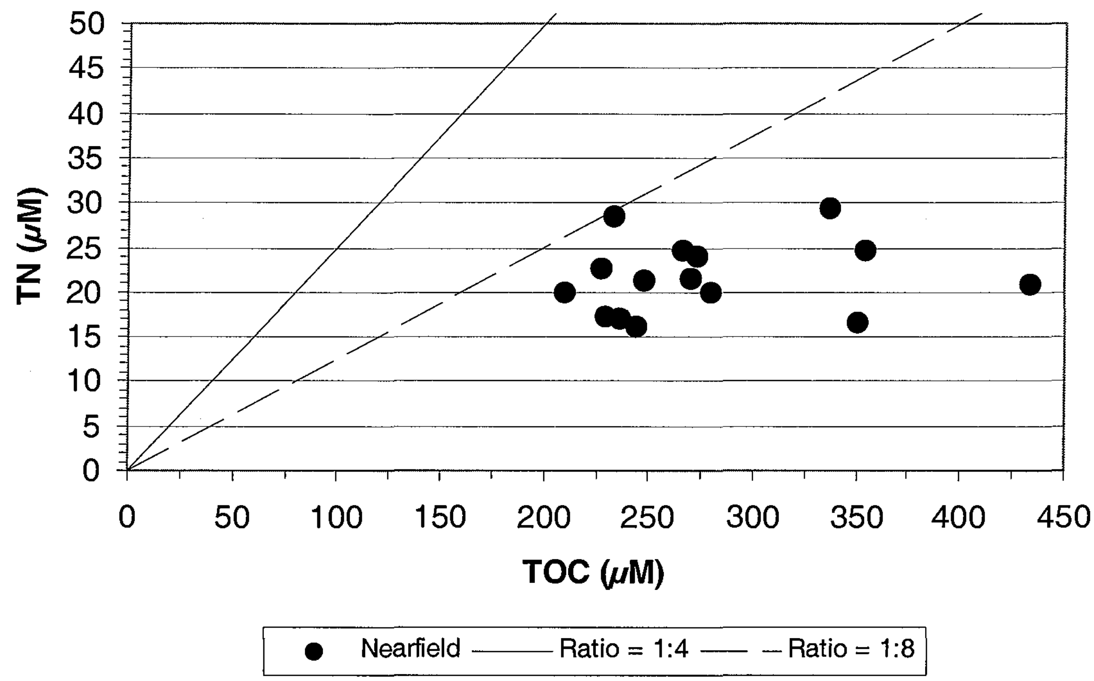


Figure D-11. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

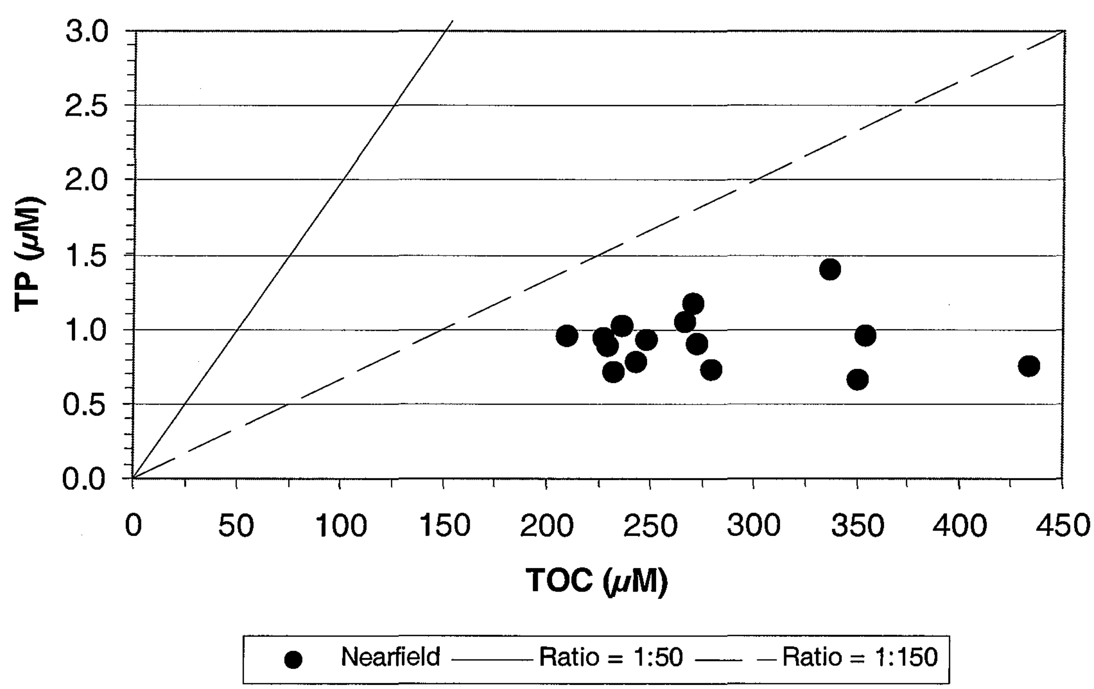


Figure D-12. Nutrient vs. Nutrient Plots for Nearfield Survey WN018, (Dec 01)

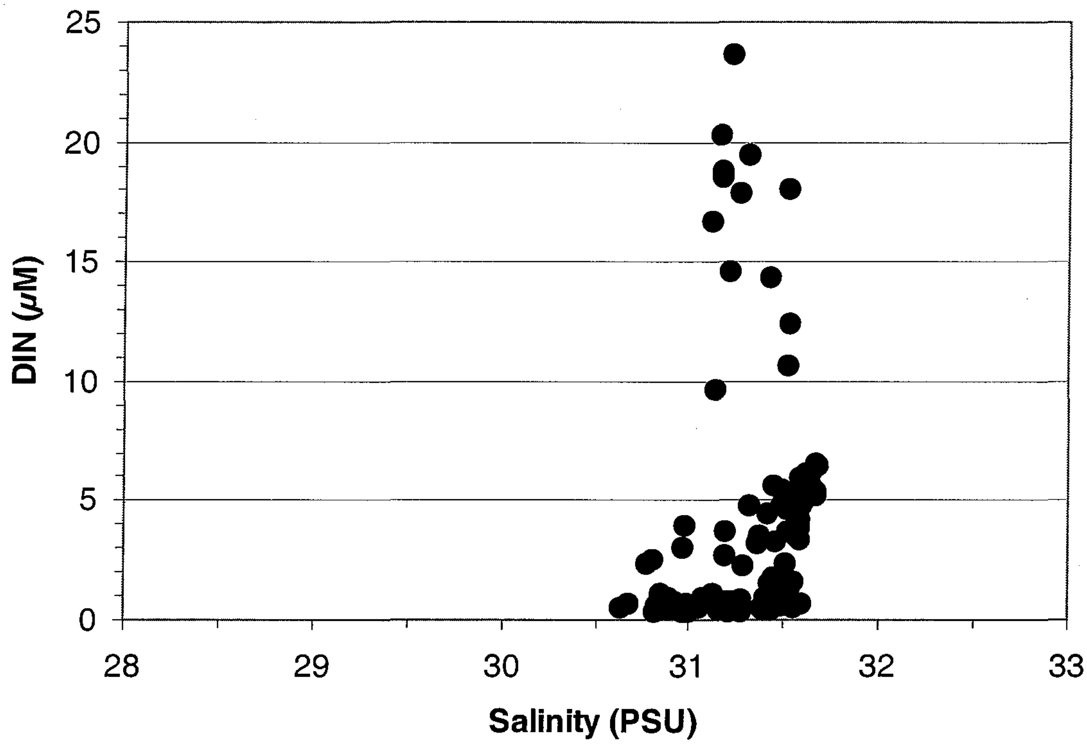
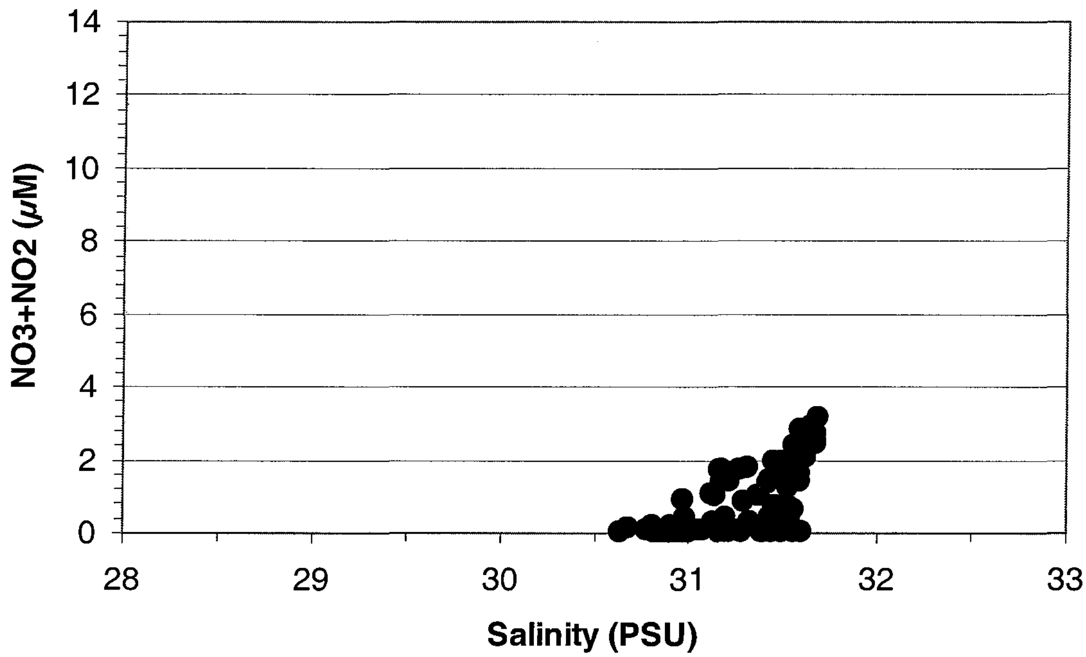


Figure D-13. Nutrient vs. Salinity Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

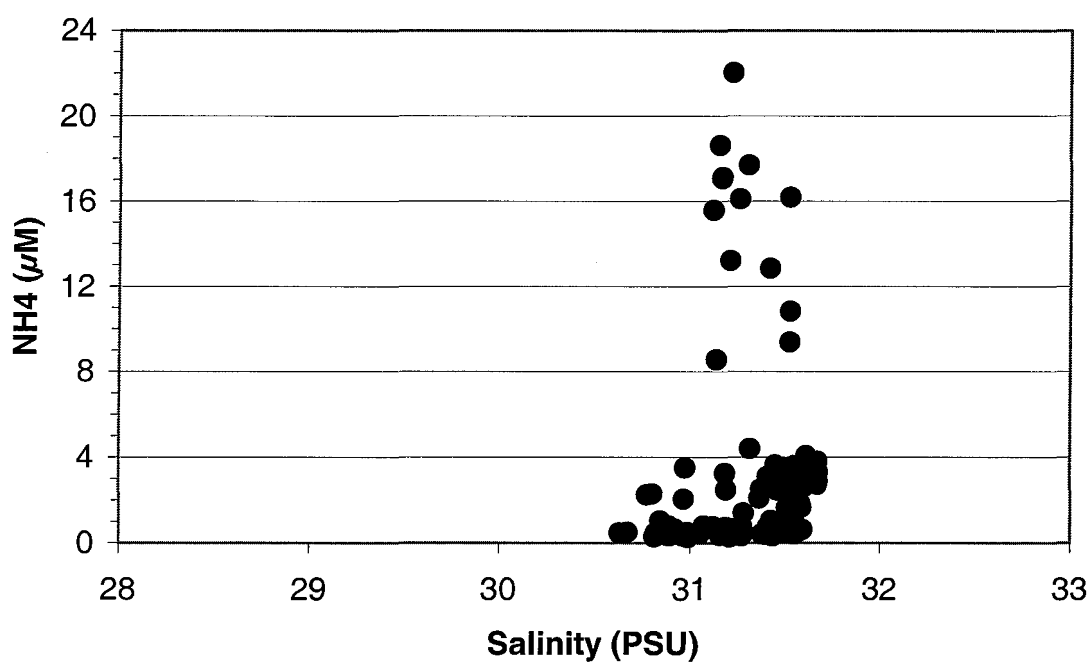
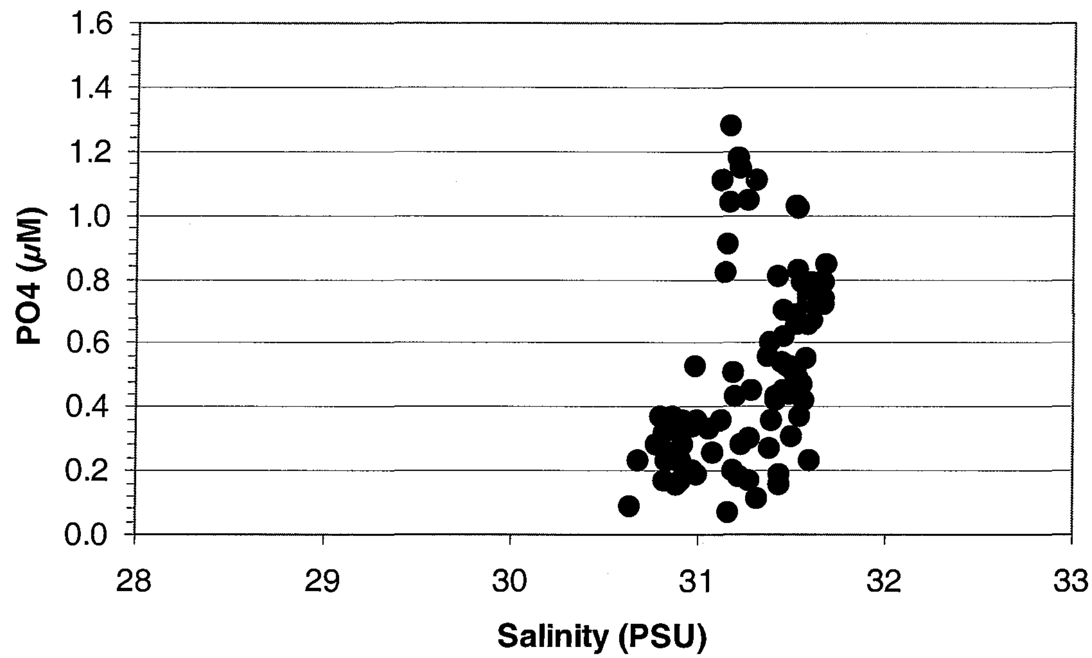


Figure D-14. Nutrient vs. Salinity Plots for Nearfield Survey WN018, (Dec 01)

(a)



(b)

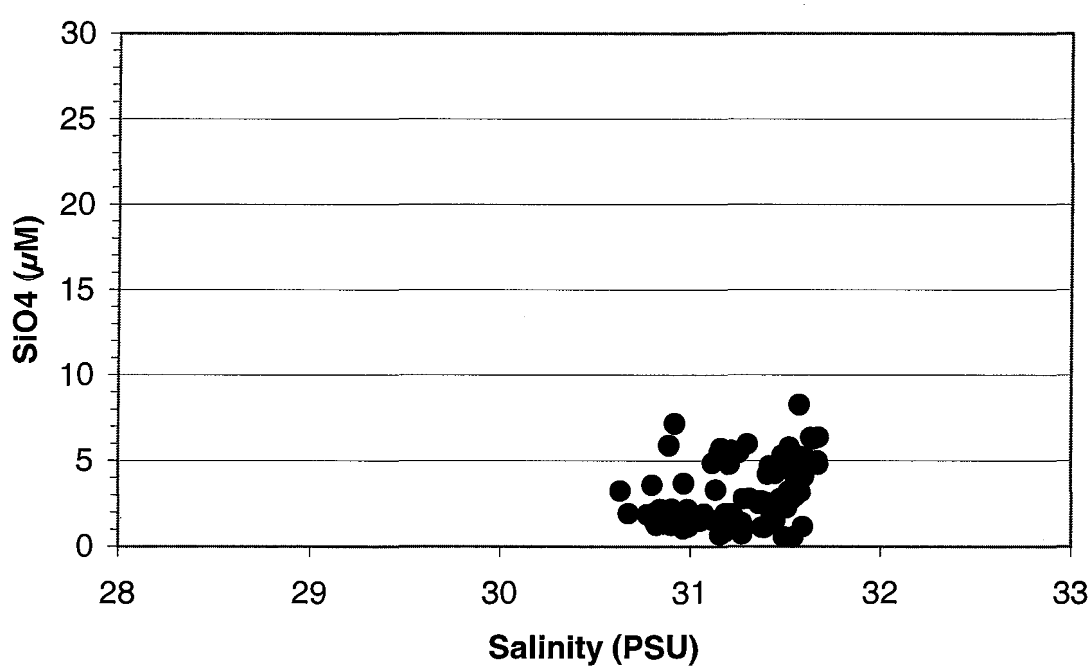


Figure D-15. Nutrient vs. Salinity Plots for Nearfield Survey WN018, (Dec 01)

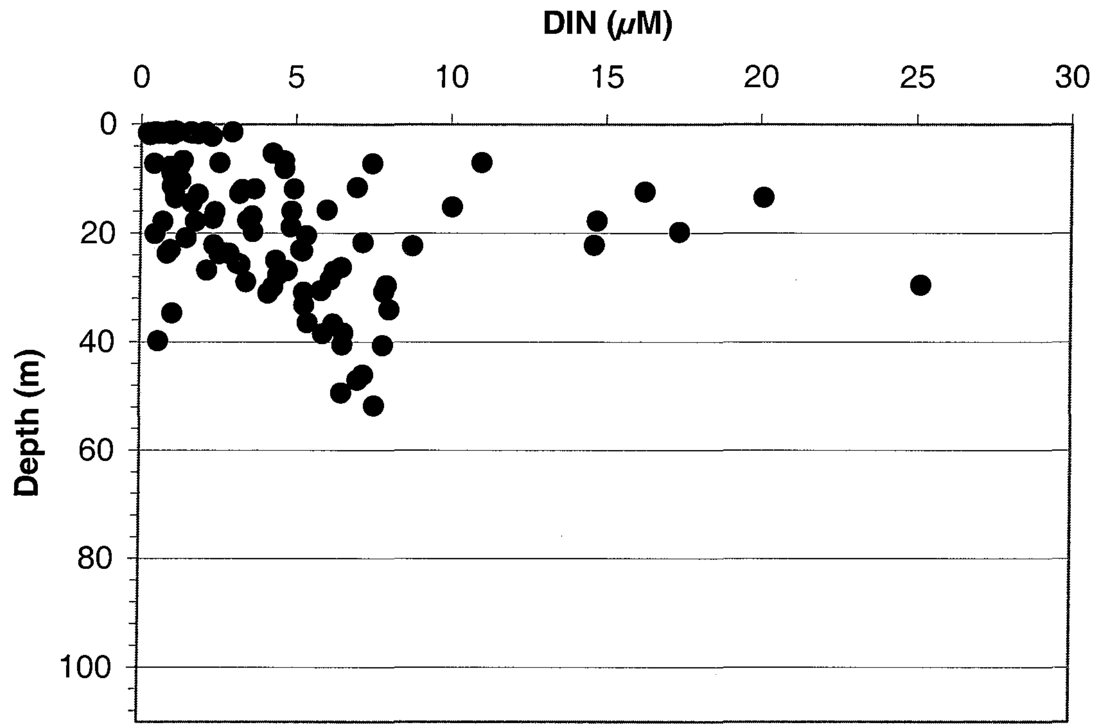


Figure D-16. Depth vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

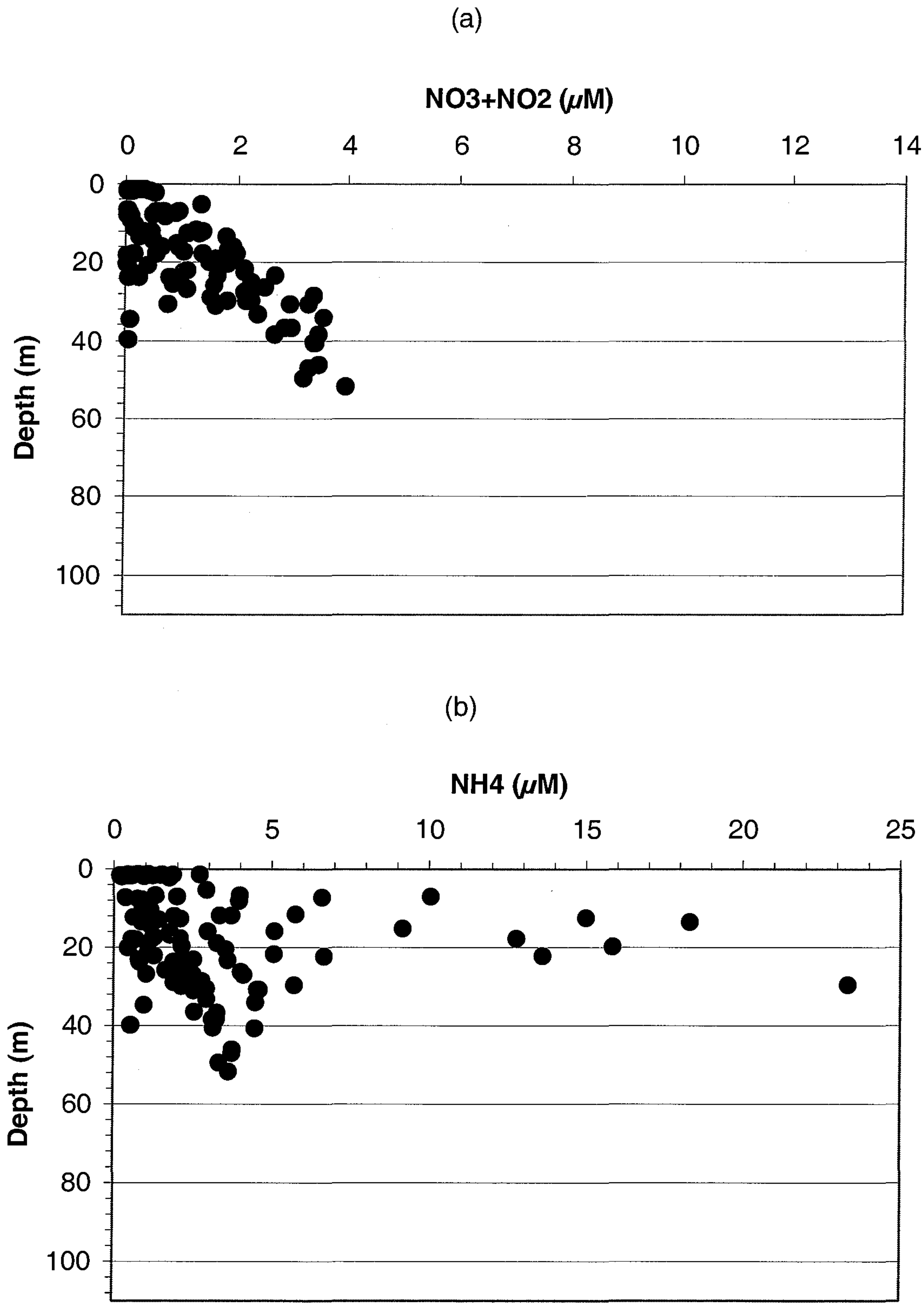
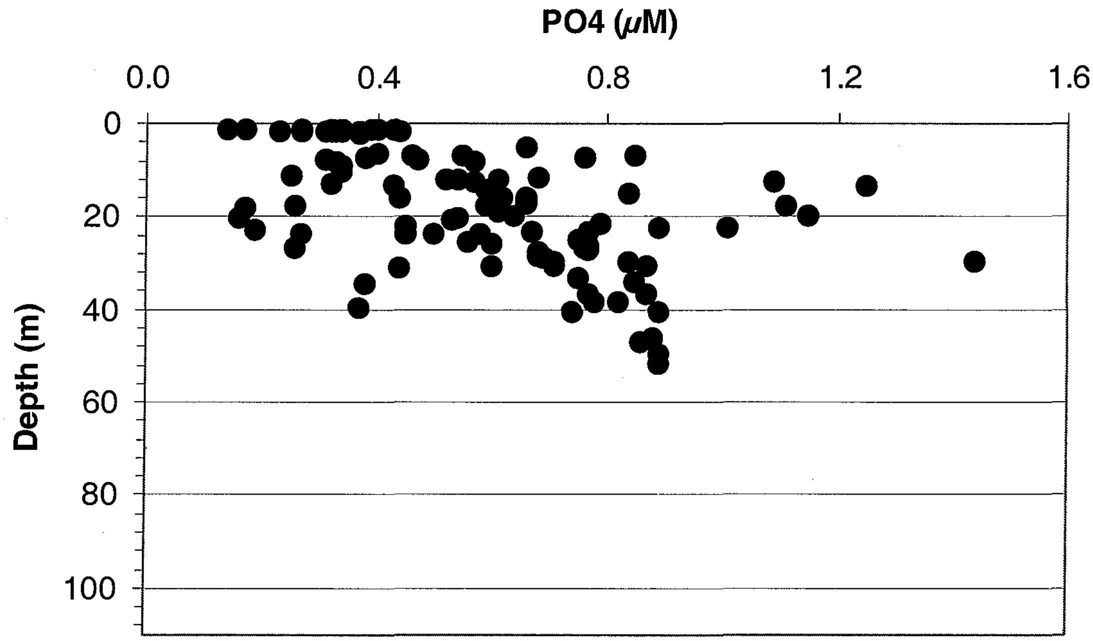


Figure D-17. Depth vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

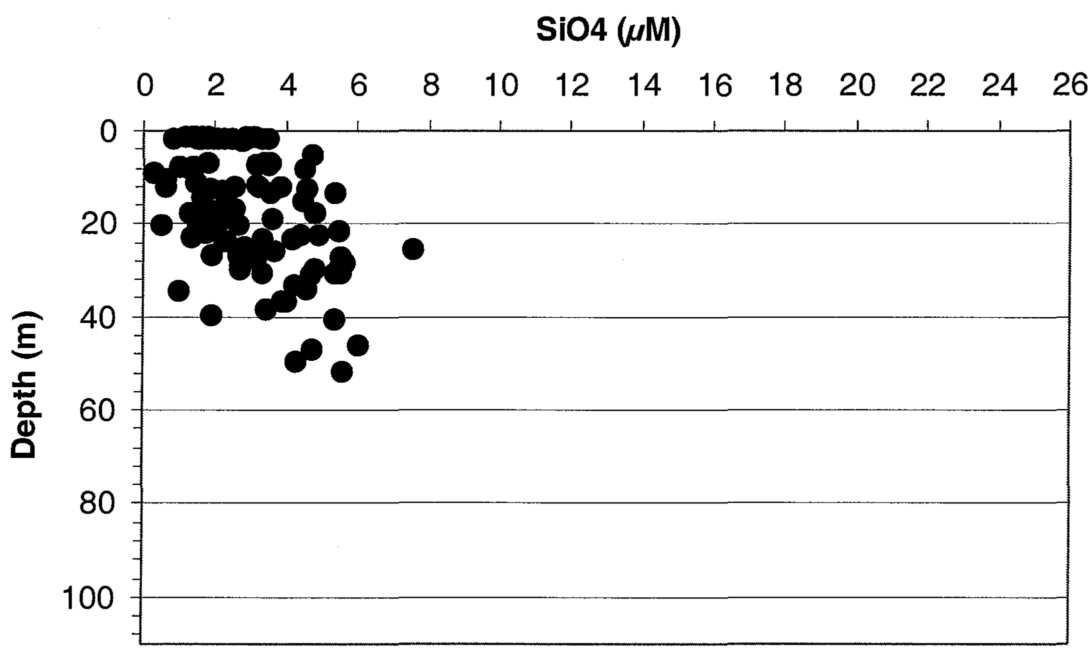
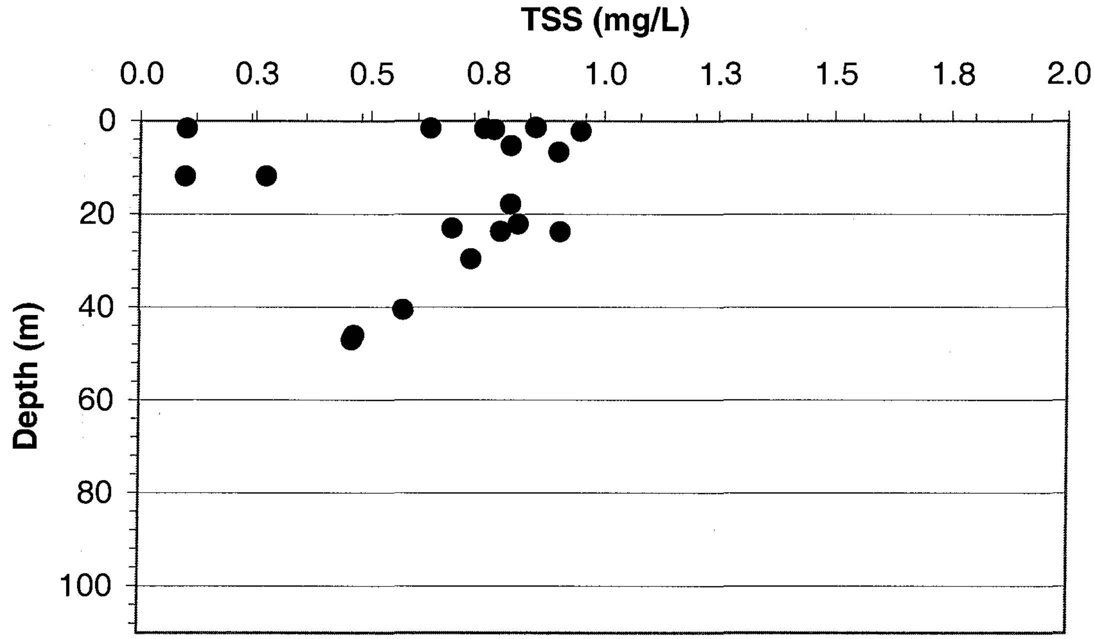


Figure D-18. Depth vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

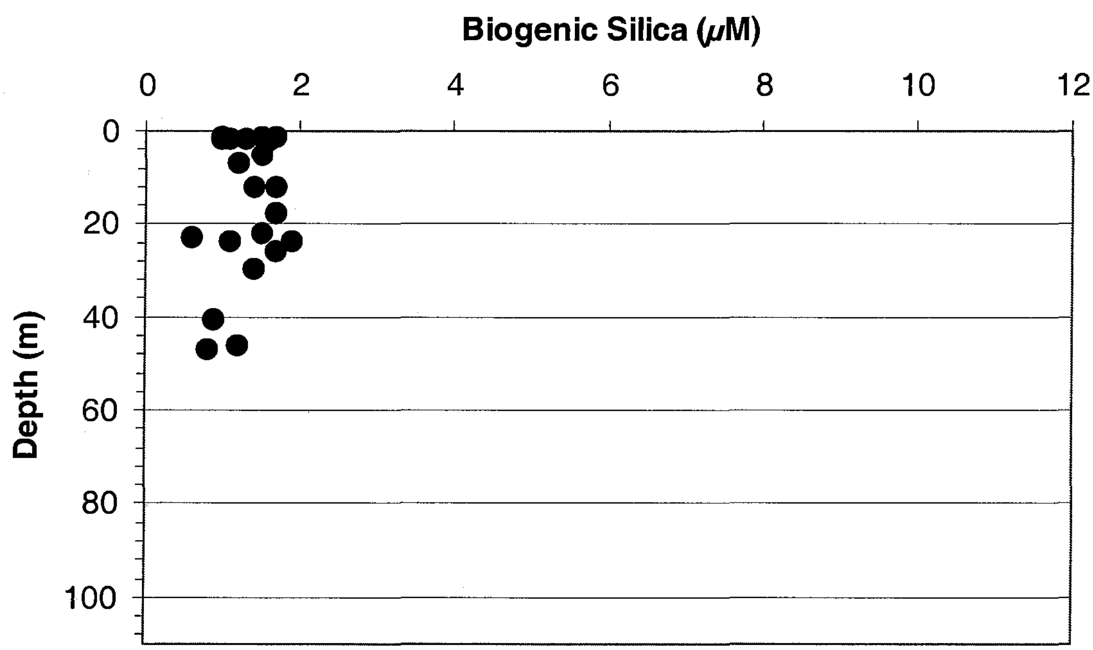
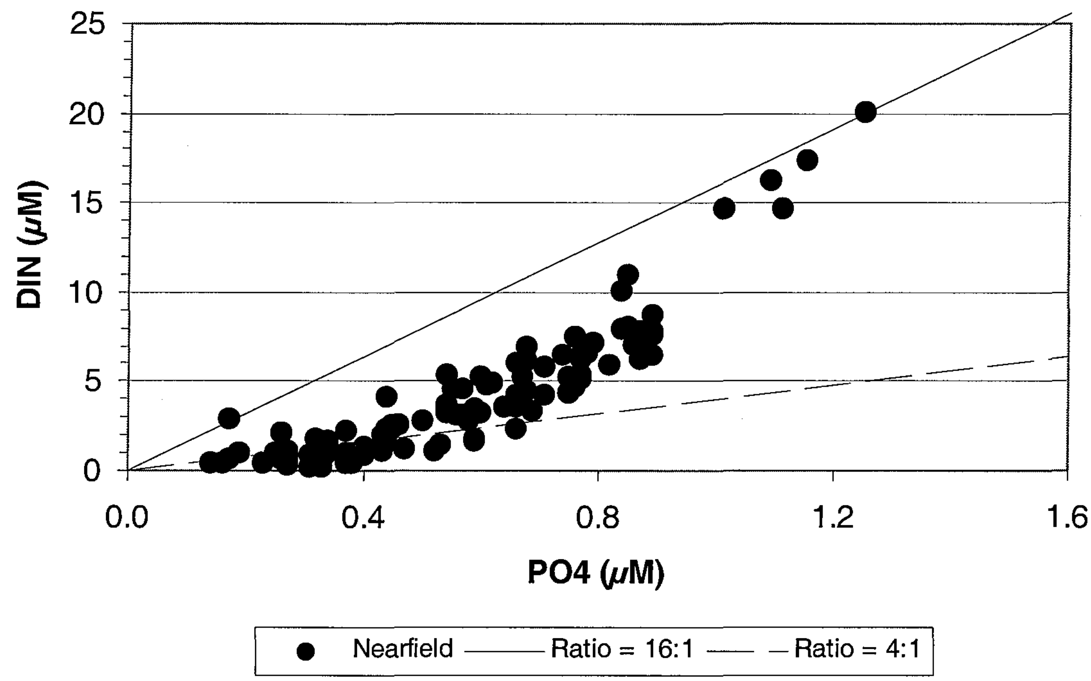


Figure D-19. Depth vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

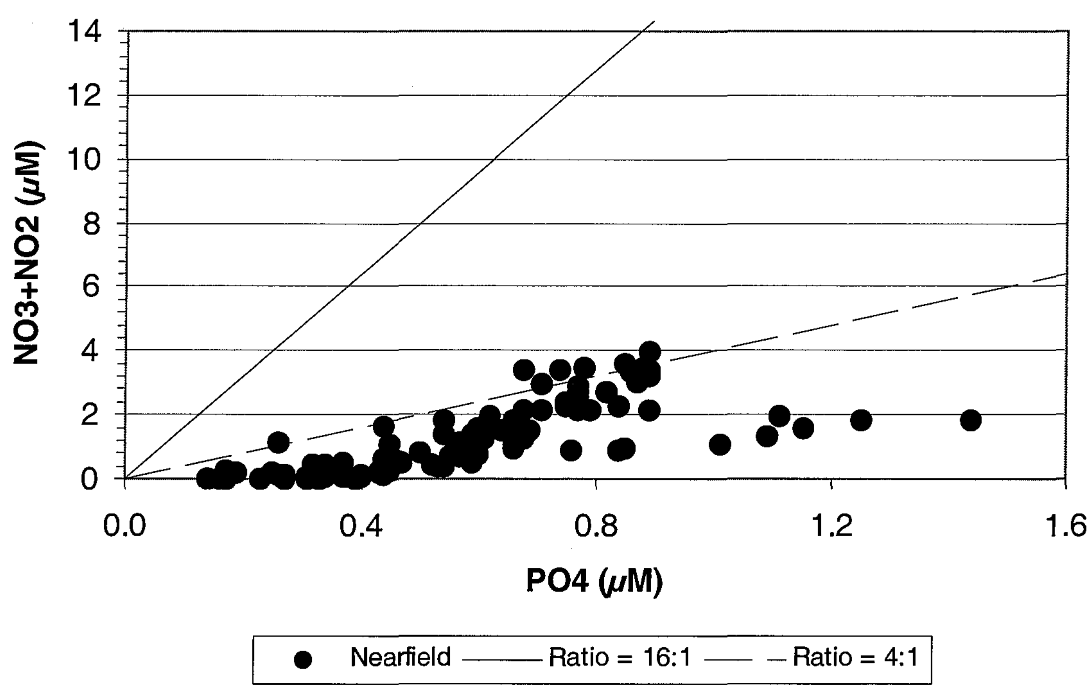
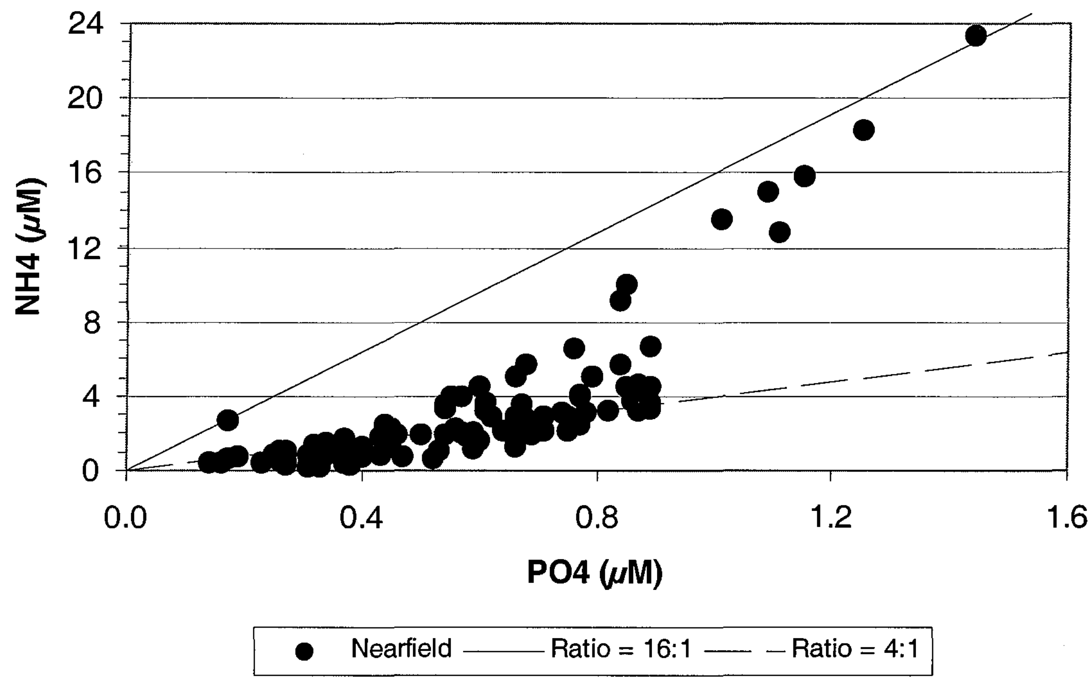


Figure D-20. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

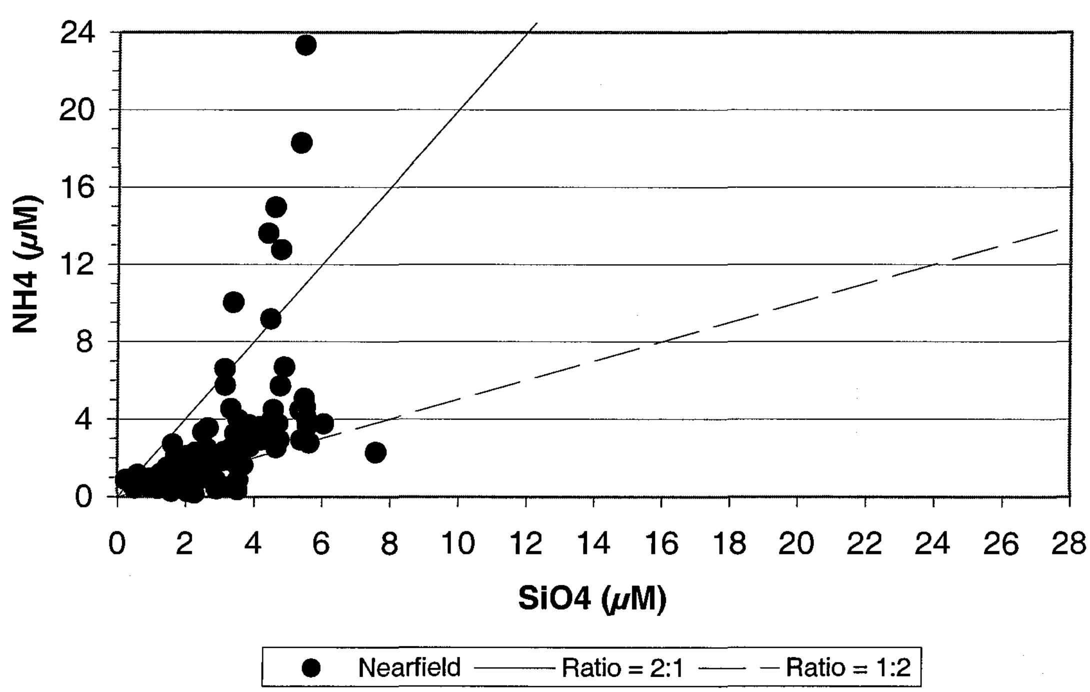
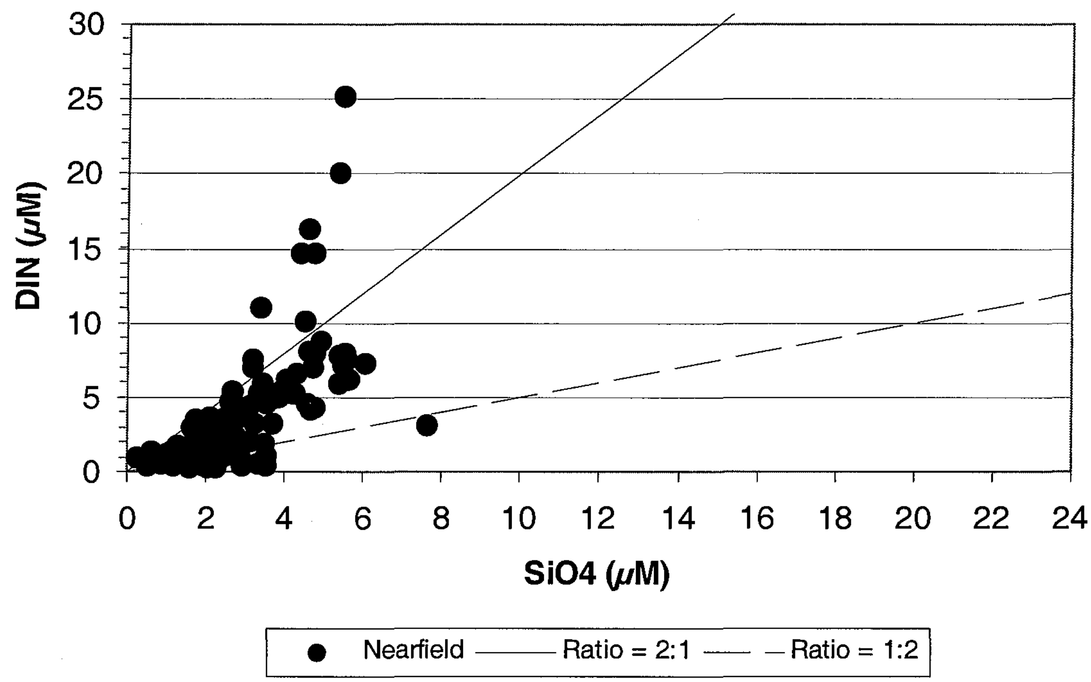


Figure D-21. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

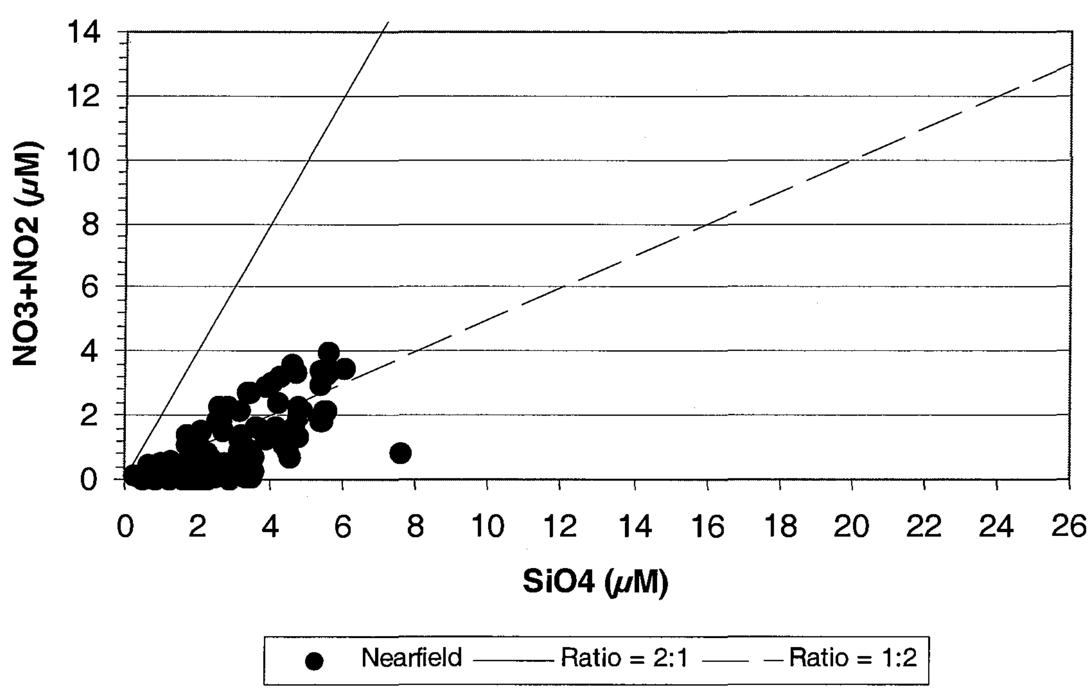
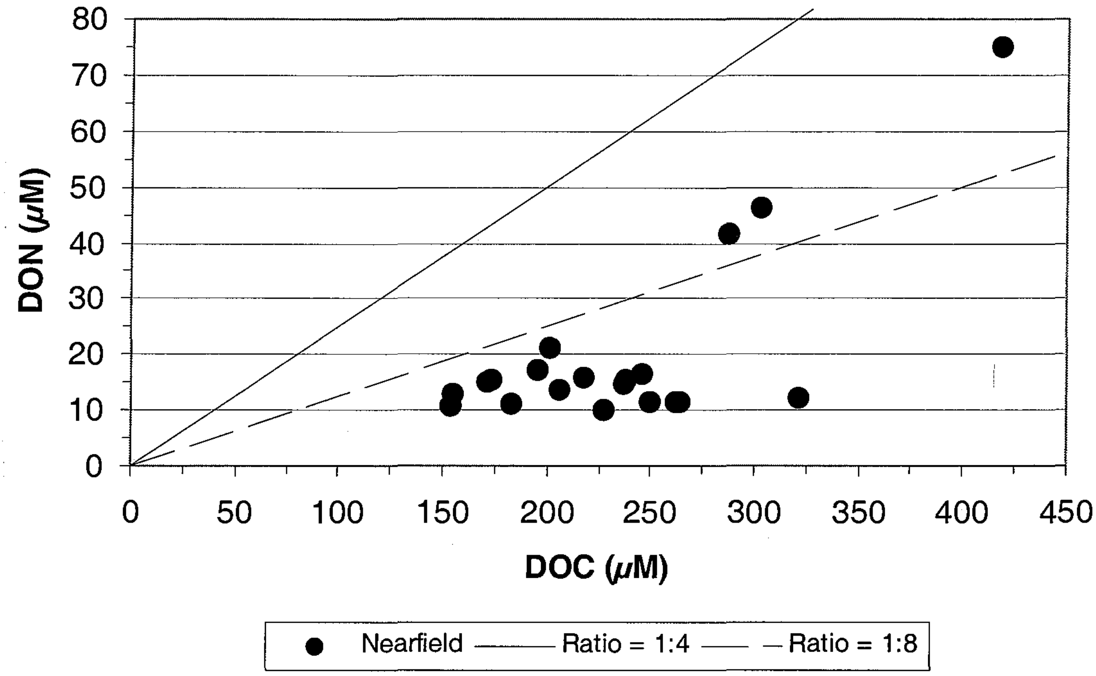


Figure D-22. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

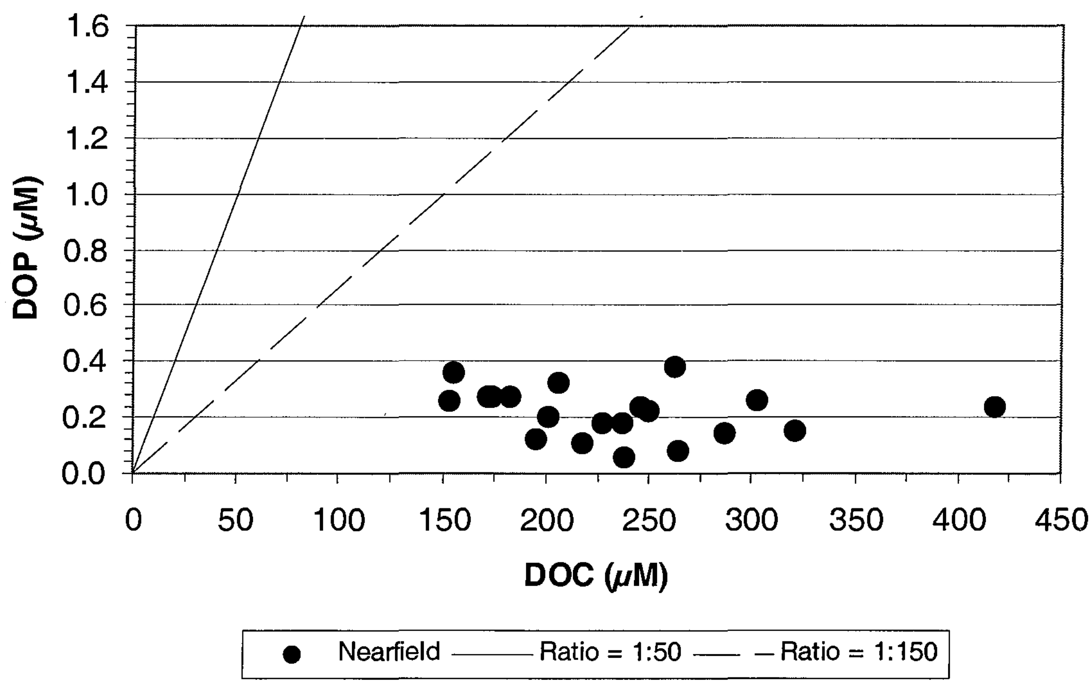
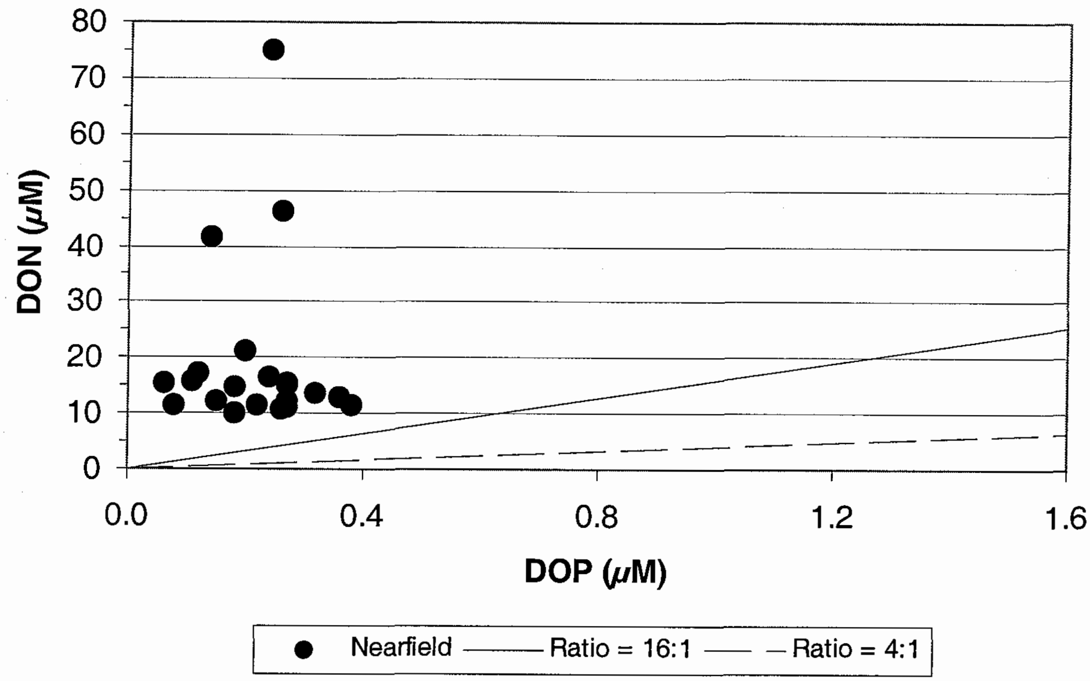


Figure D-23. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

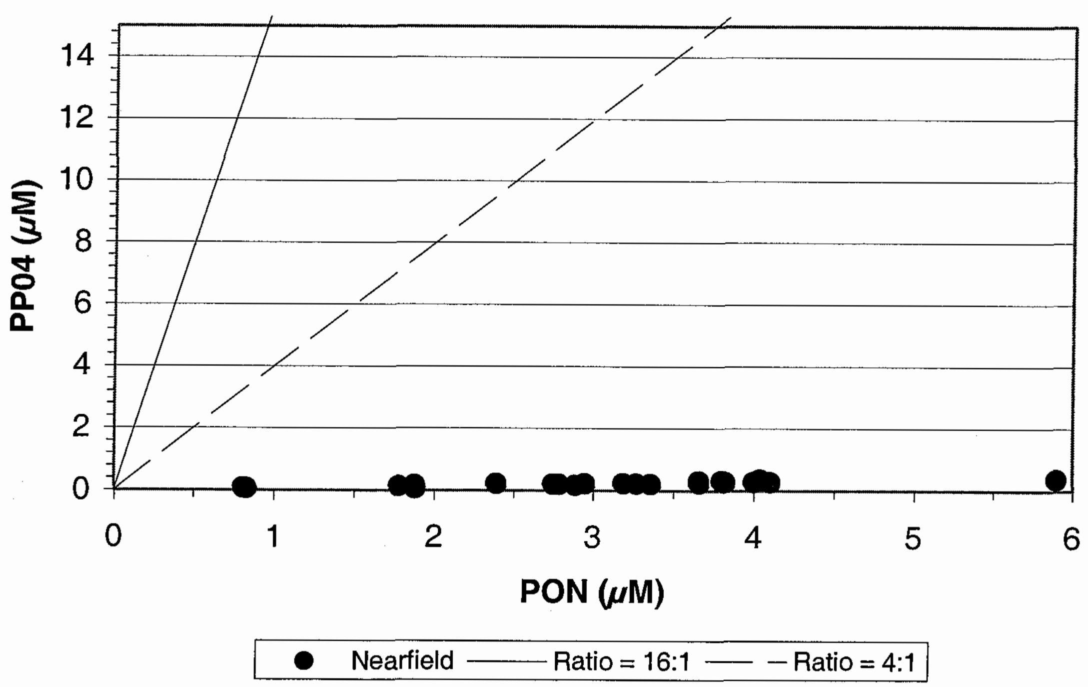
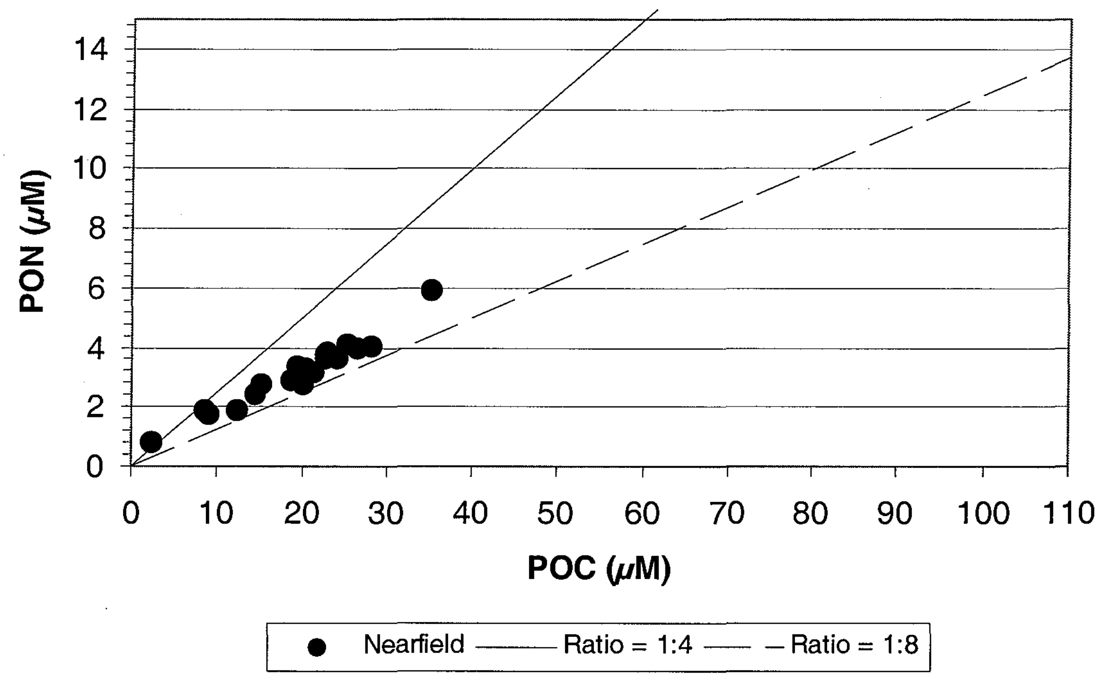


Figure D-24. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

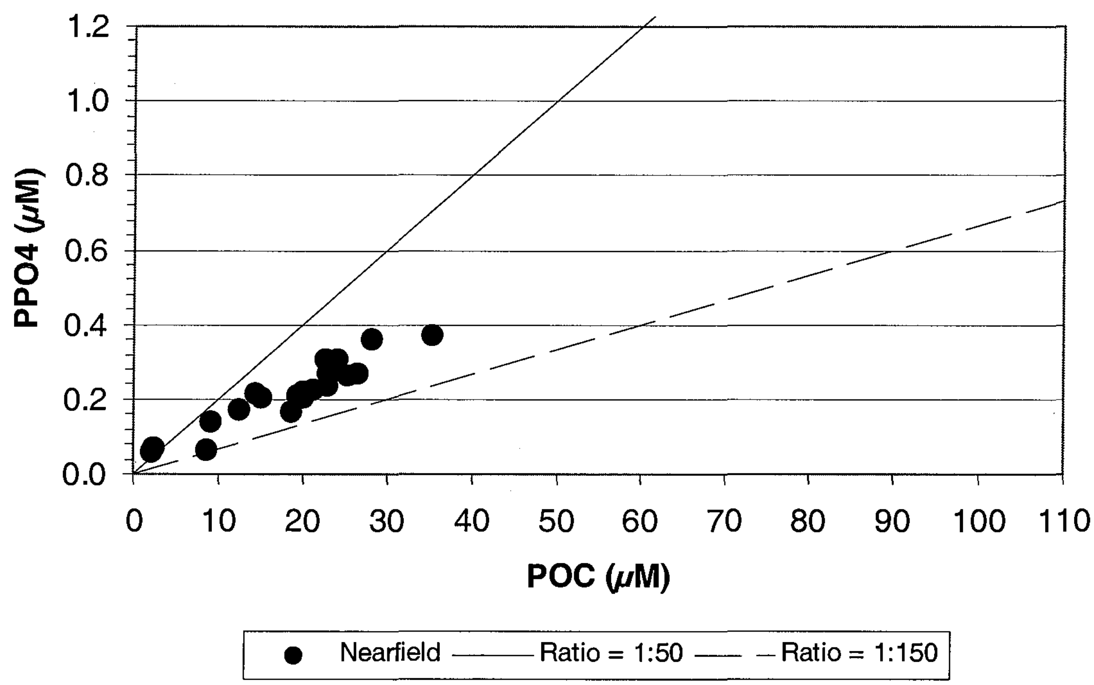
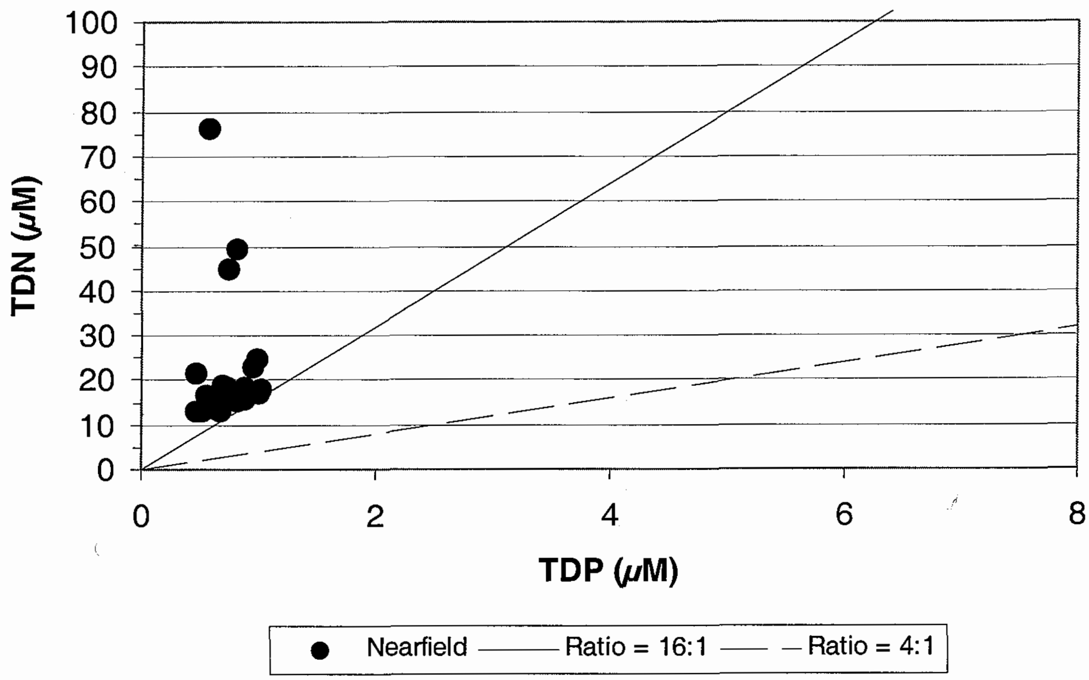


Figure D-25. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

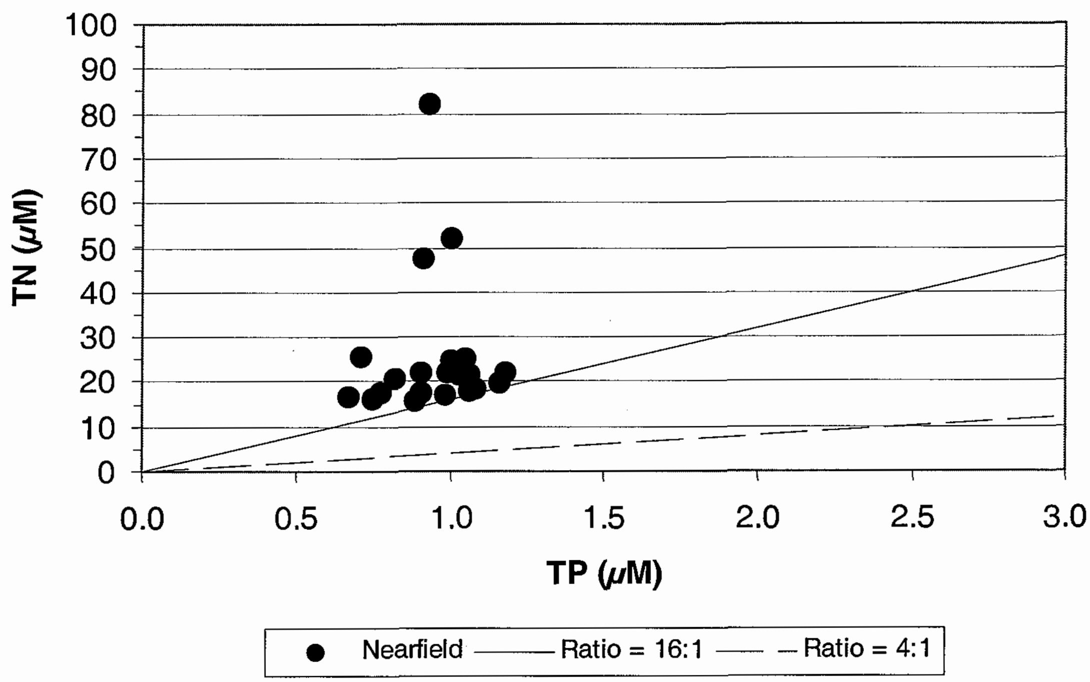
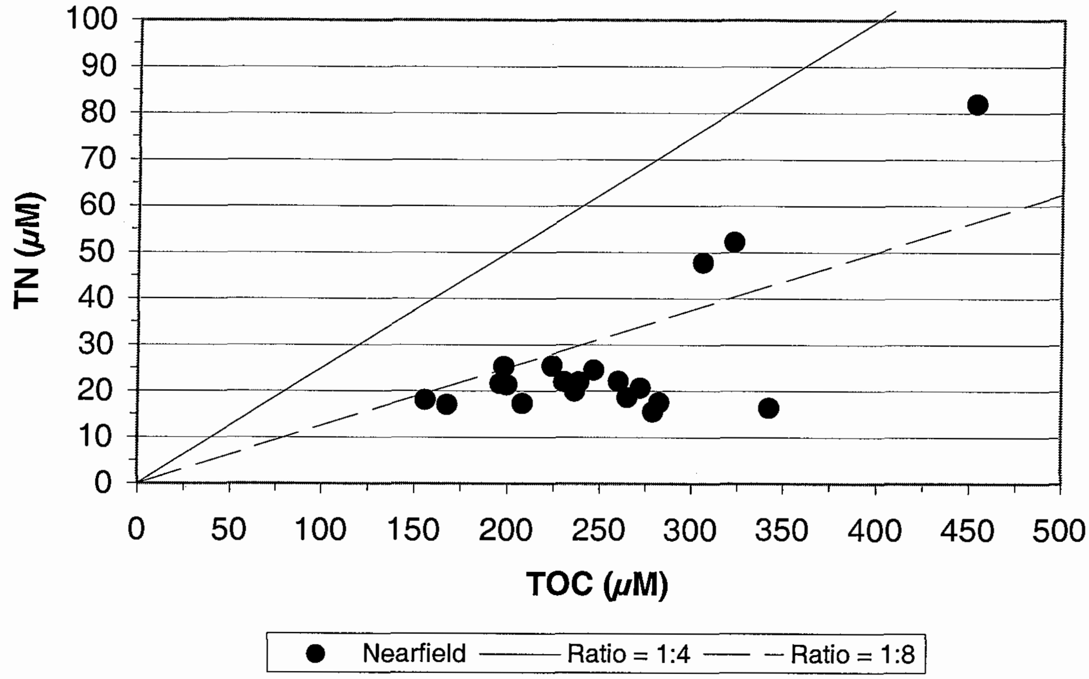


Figure D-26. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

(a)



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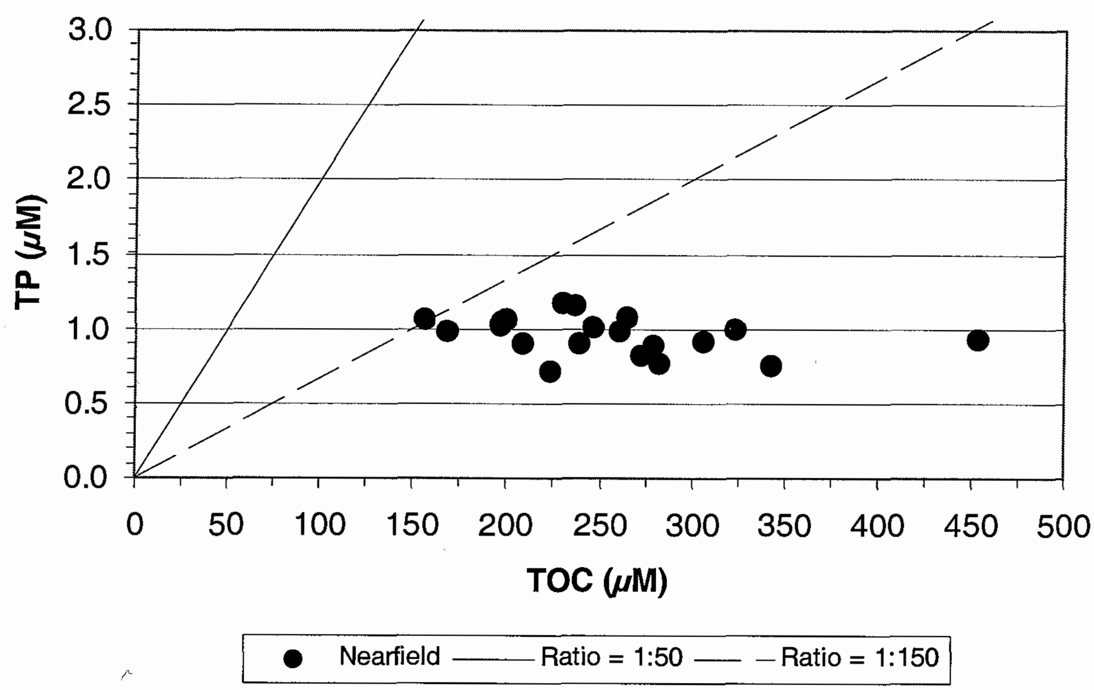


Figure D-27. Nutrient vs. Nutrient Plots for Nearfield Survey WN019, (Dec 01)

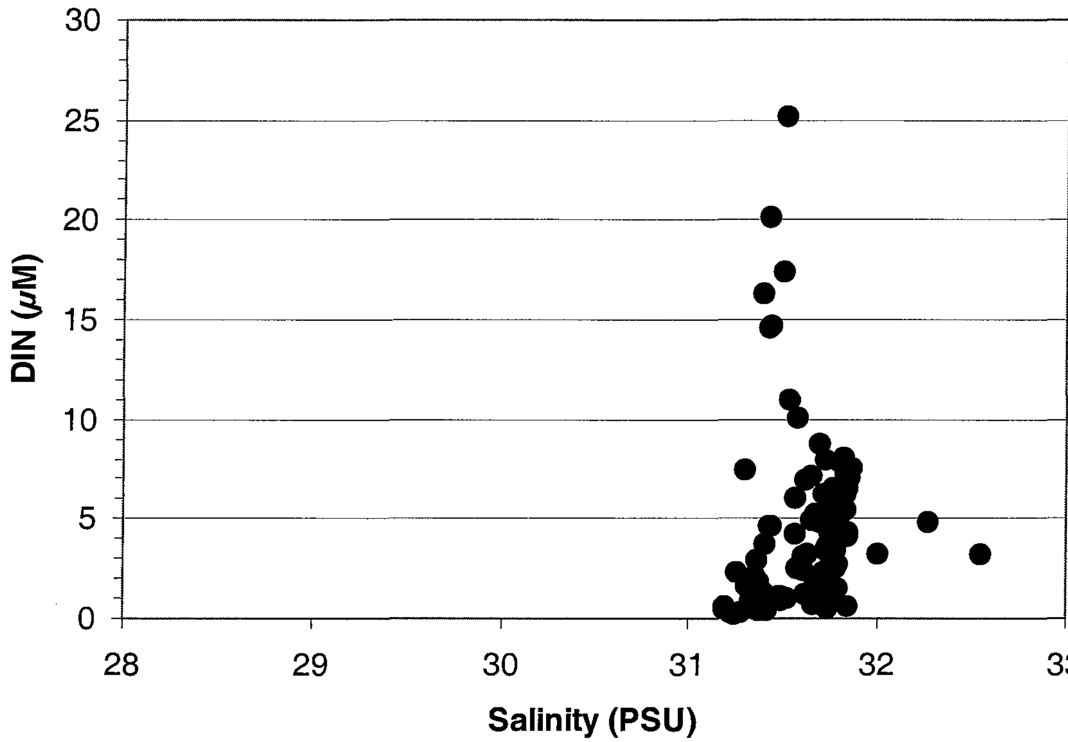
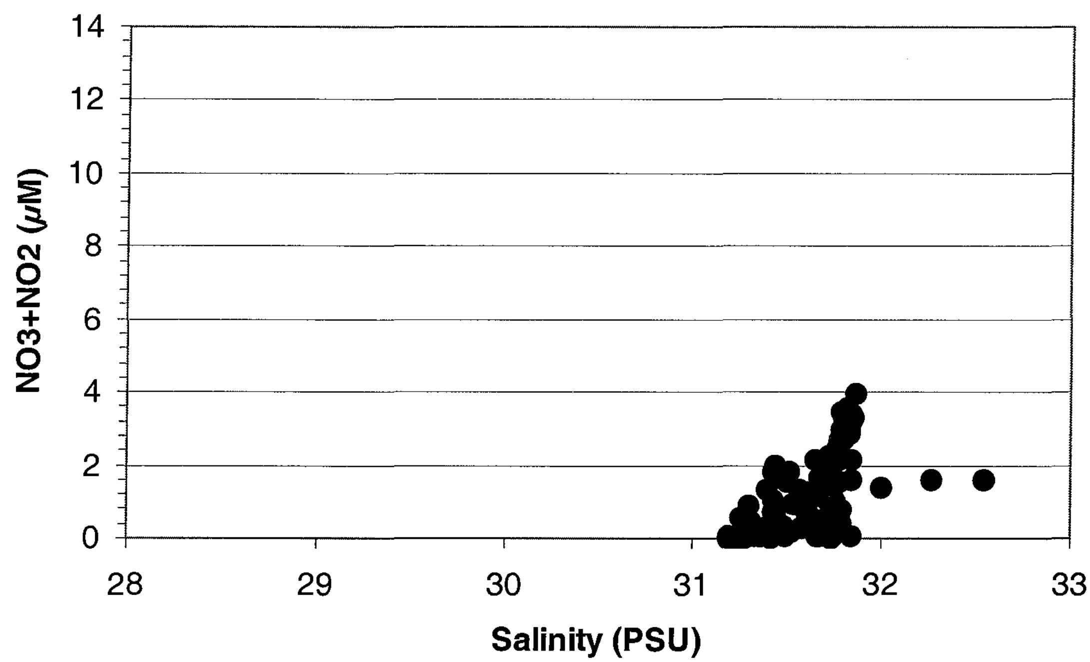


Figure D-28. Nutrient vs. Salinity Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

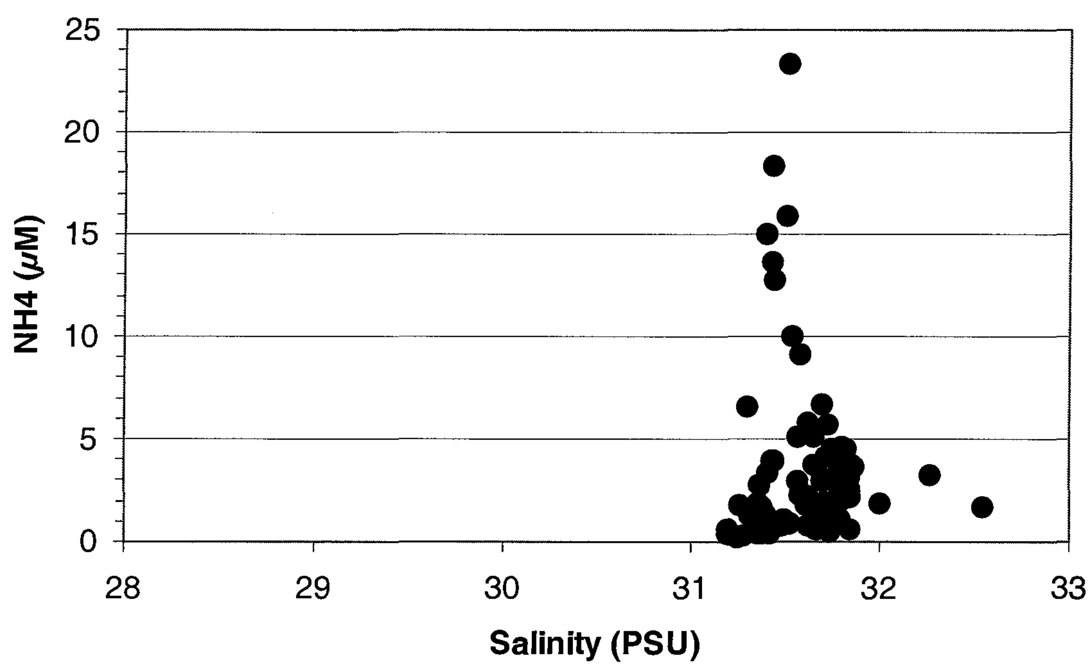
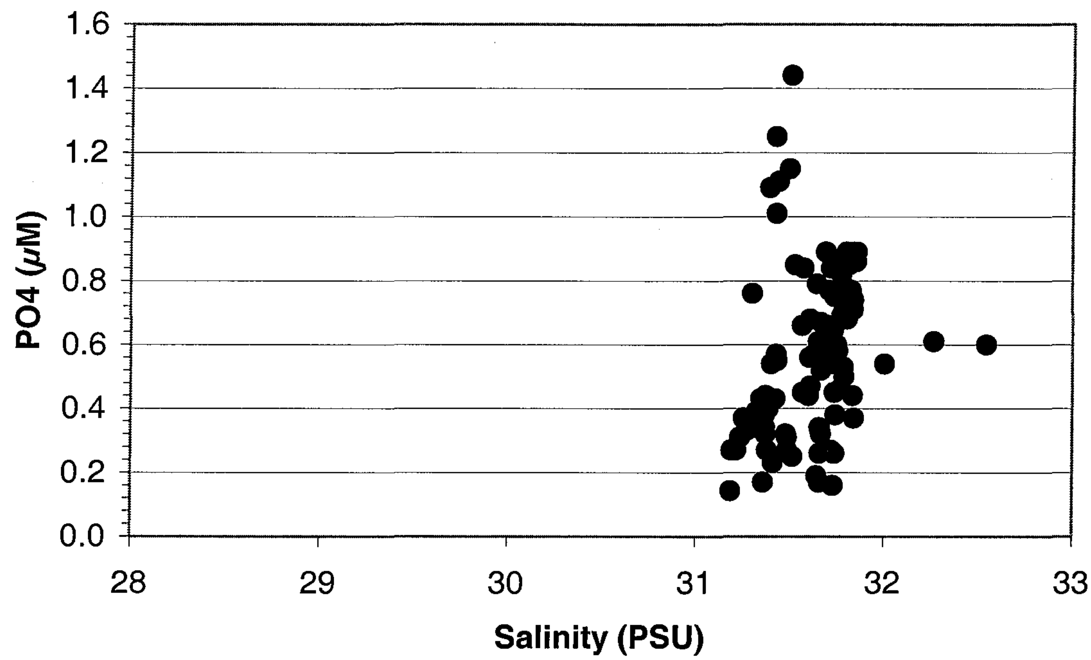


Figure D-29. Nutrient vs. Salinity Plots for Nearfield Survey WN019, (Dec 01)

(a)



(b)

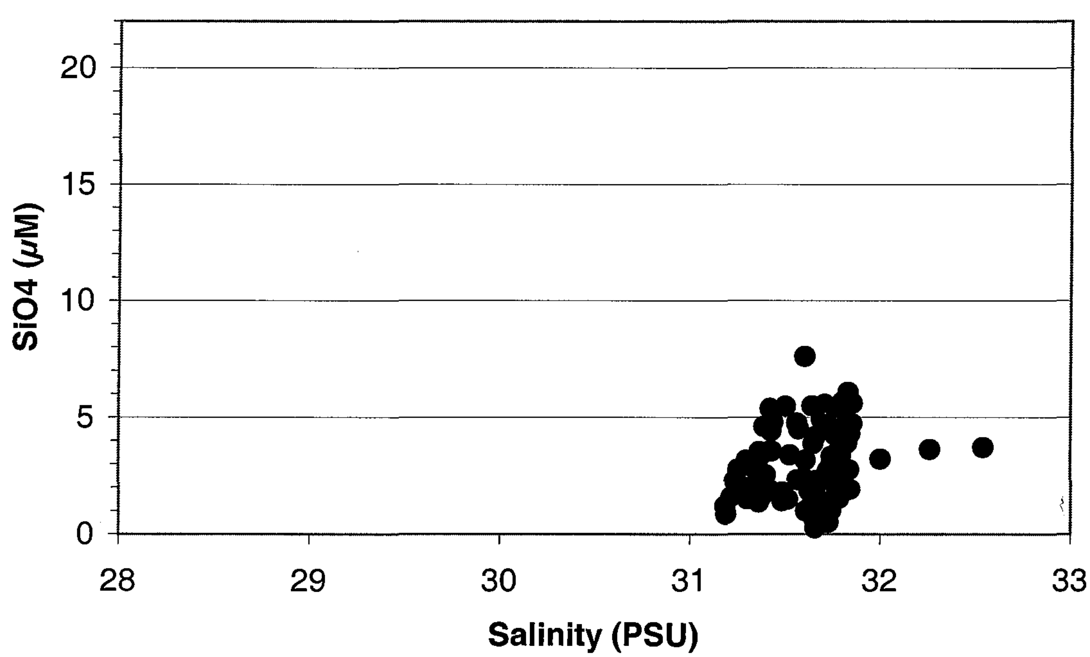


Figure D-30. Nutrient vs. Salinity Plots for Nearfield Survey WN019, (Dec 01)

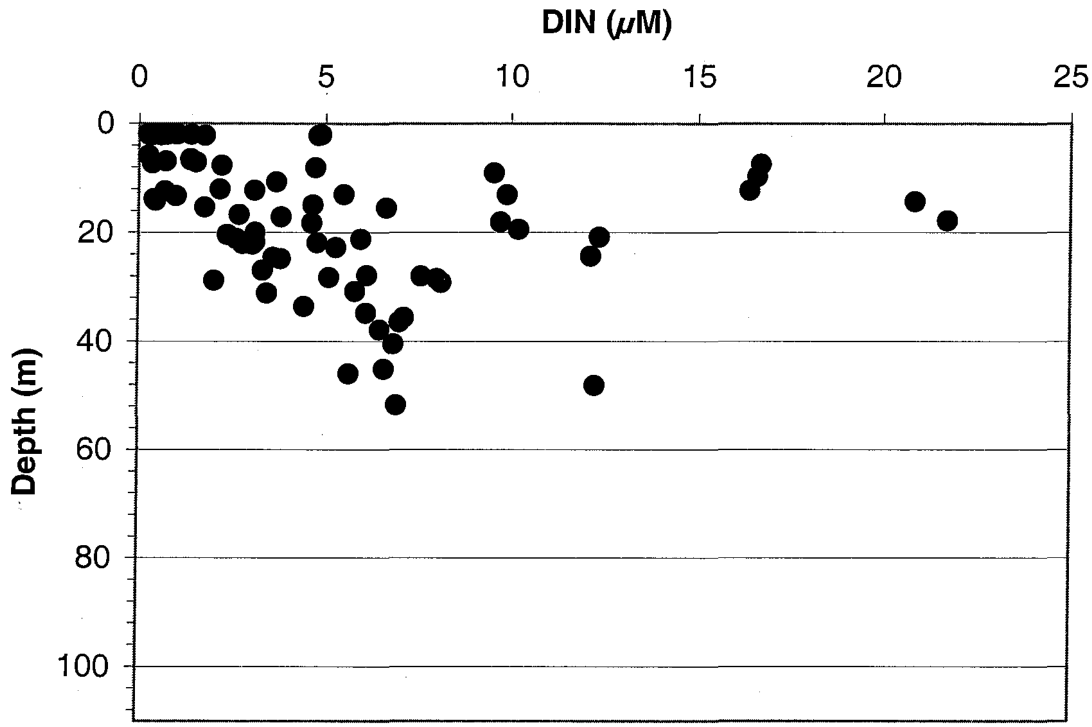
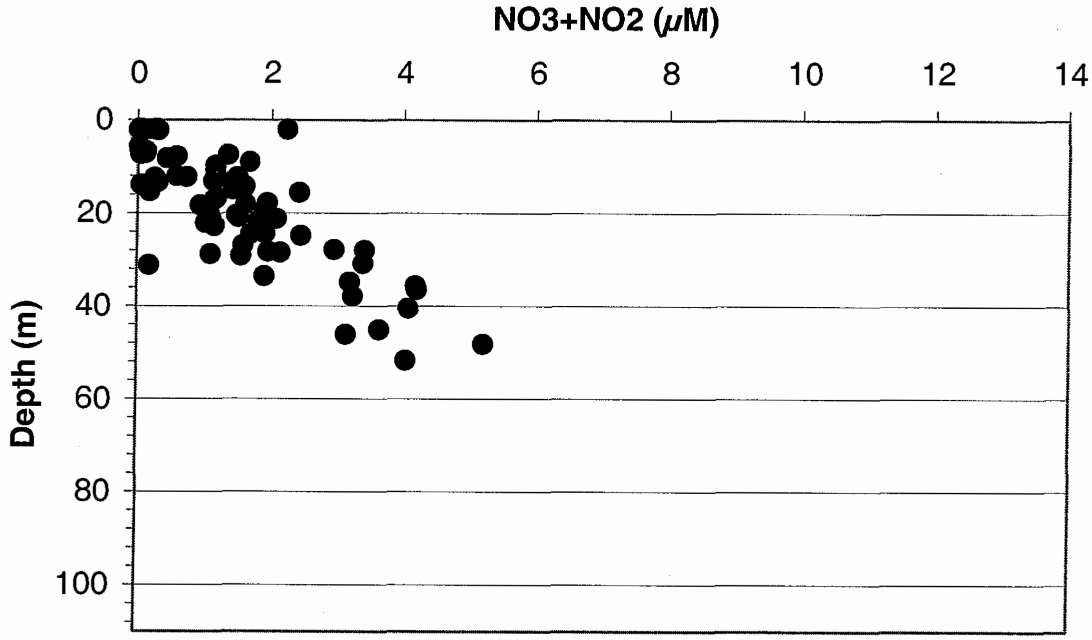


Figure D-31. Depth vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

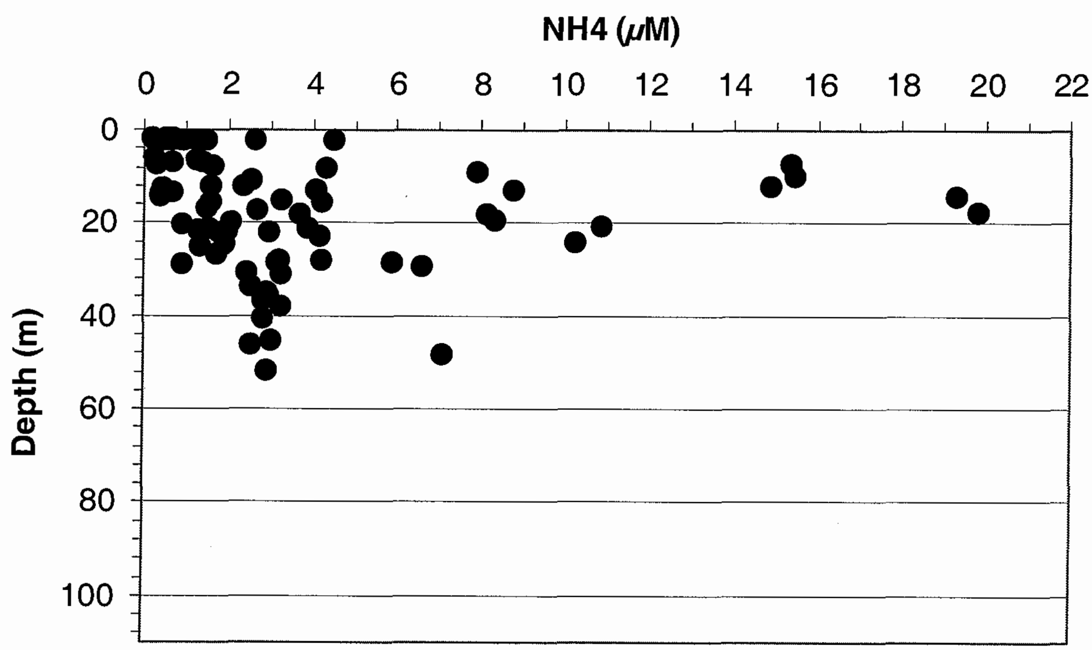
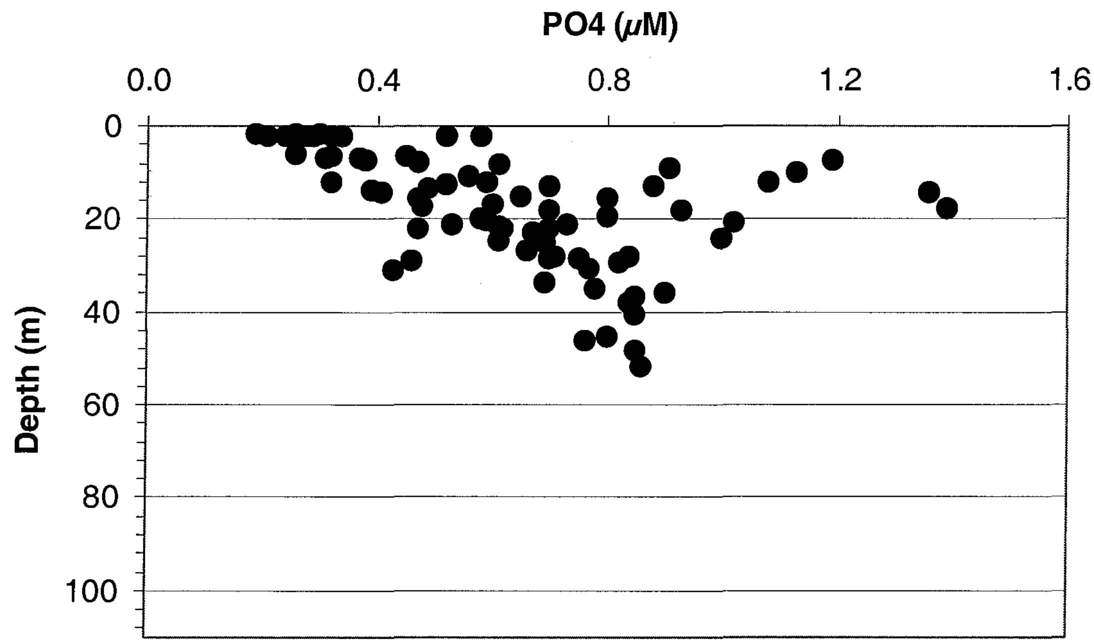


Figure D-32. Depth vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

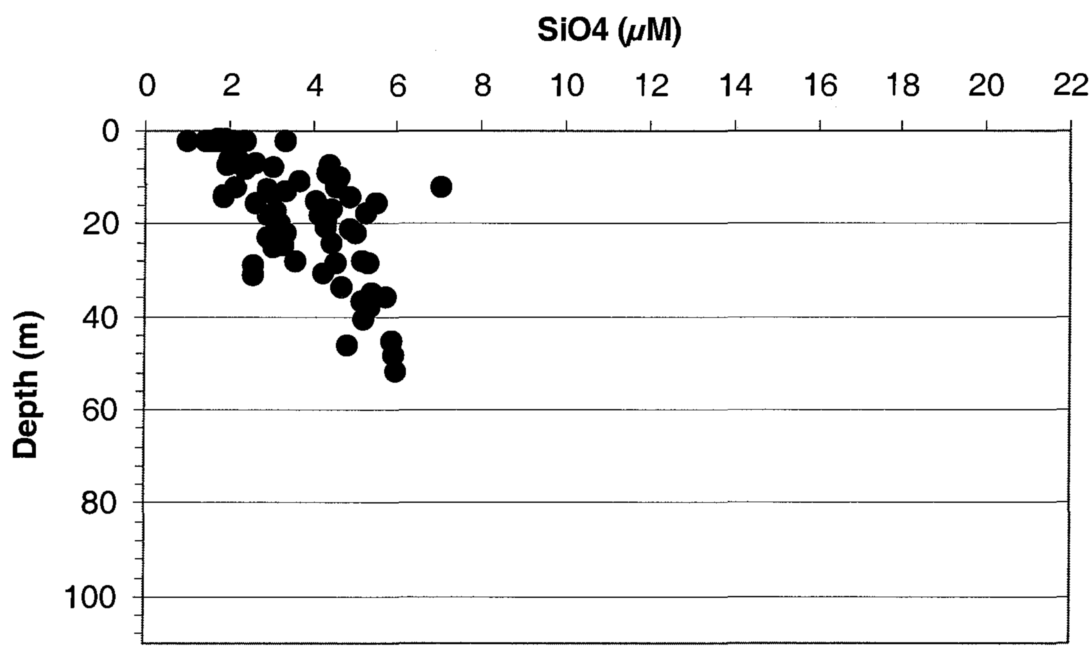
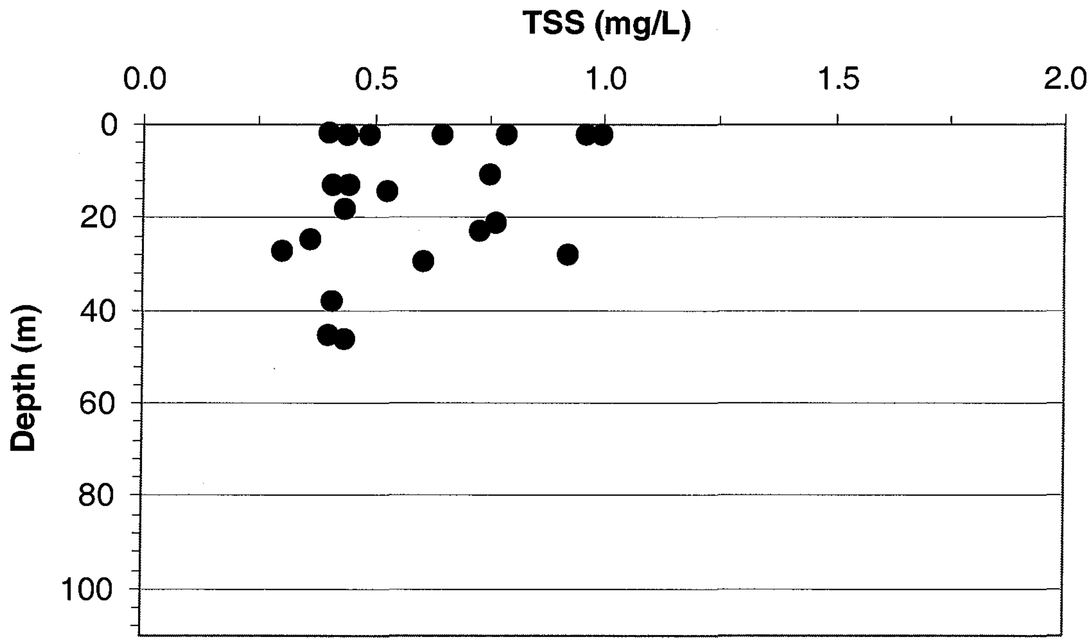


Figure D-33. Depth vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

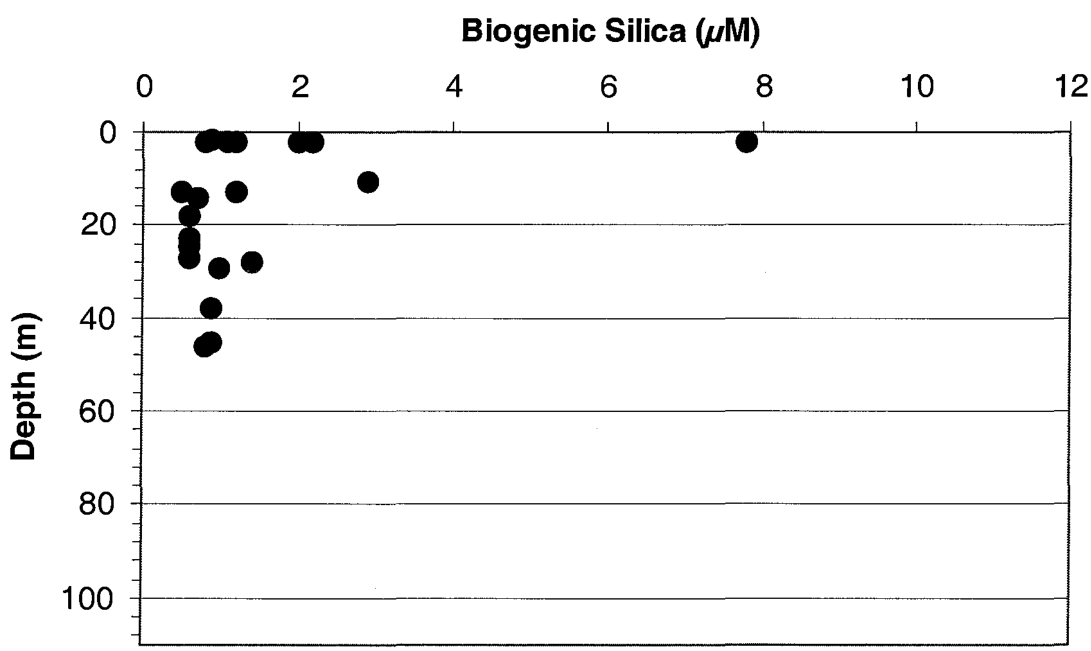
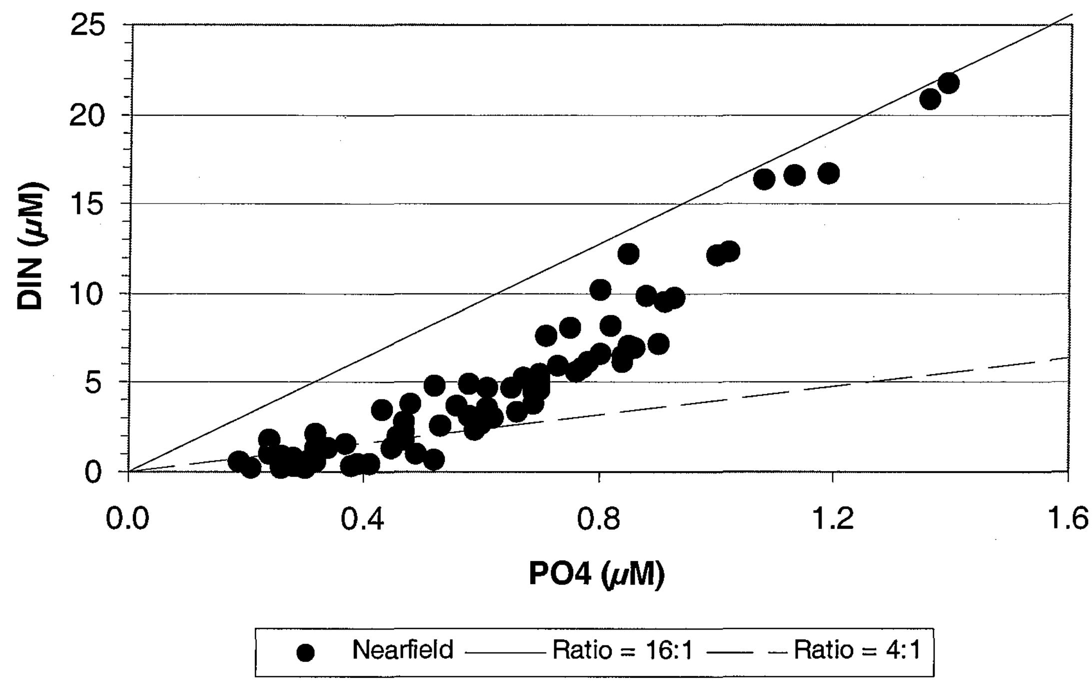


Figure D-34. Depth vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

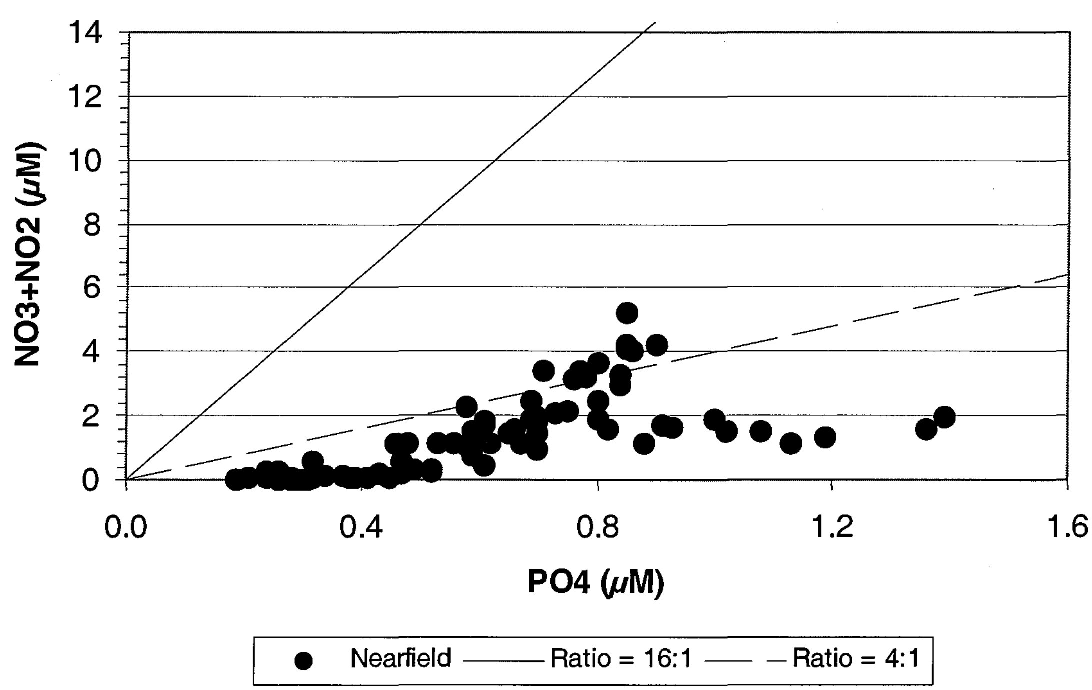
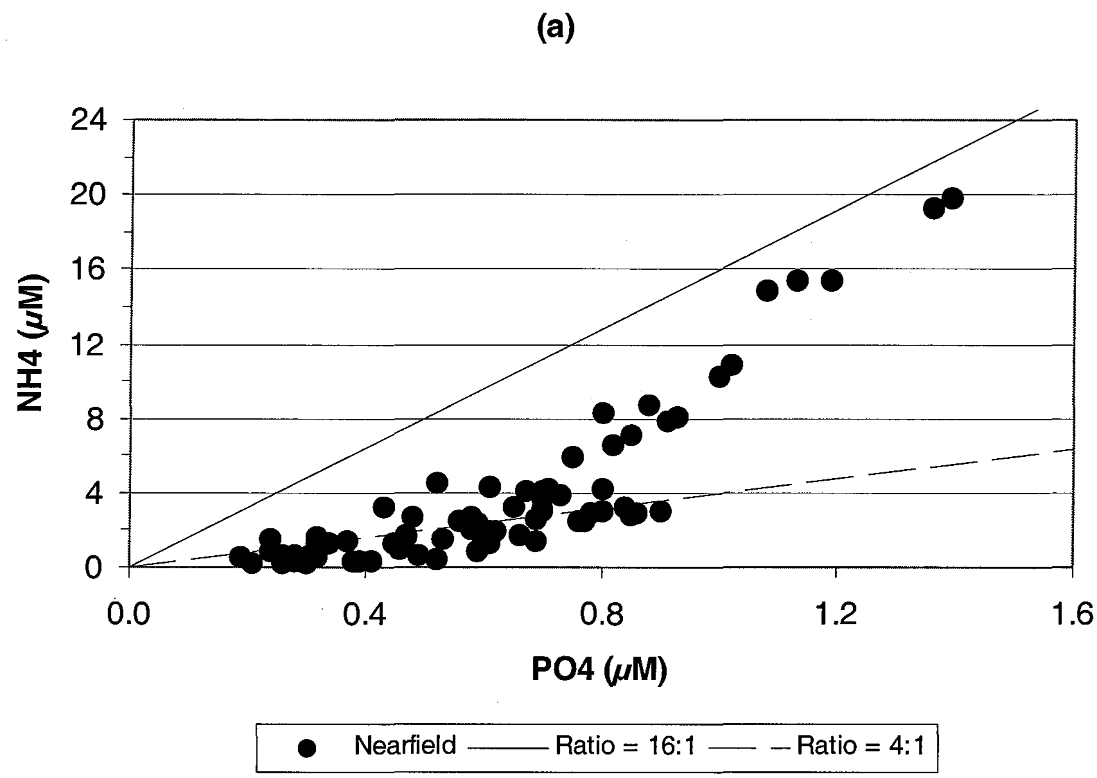


Figure D-35. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)



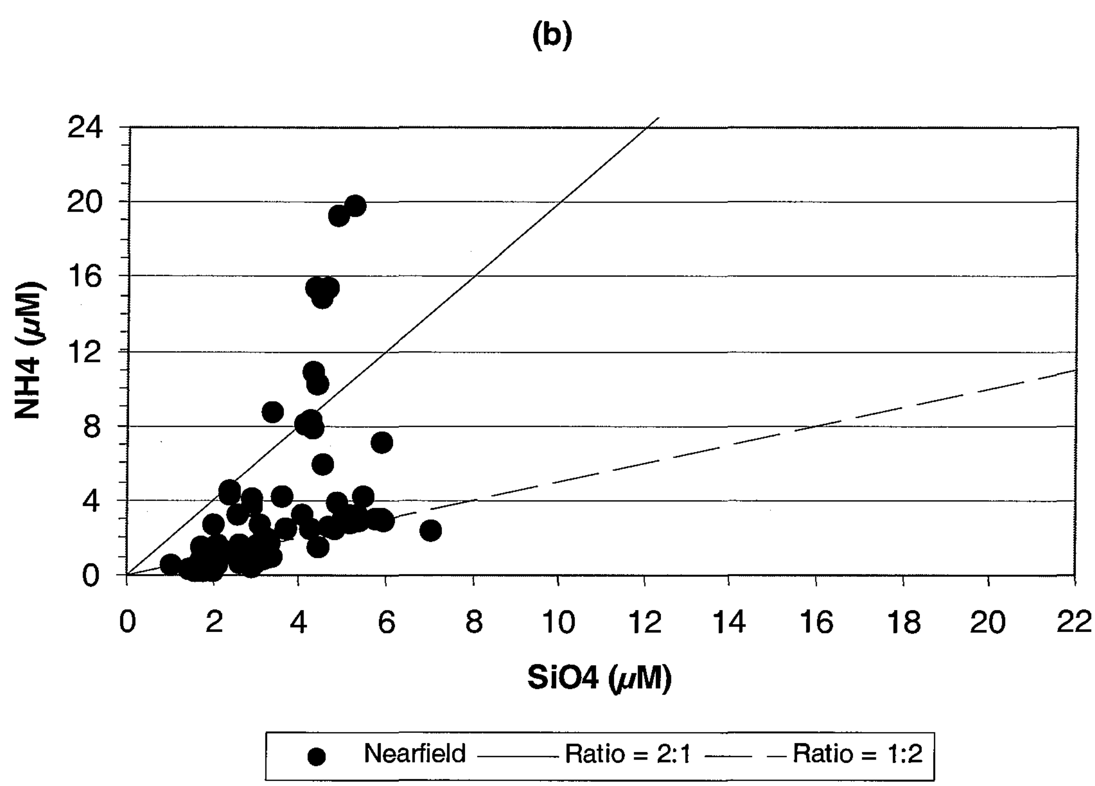
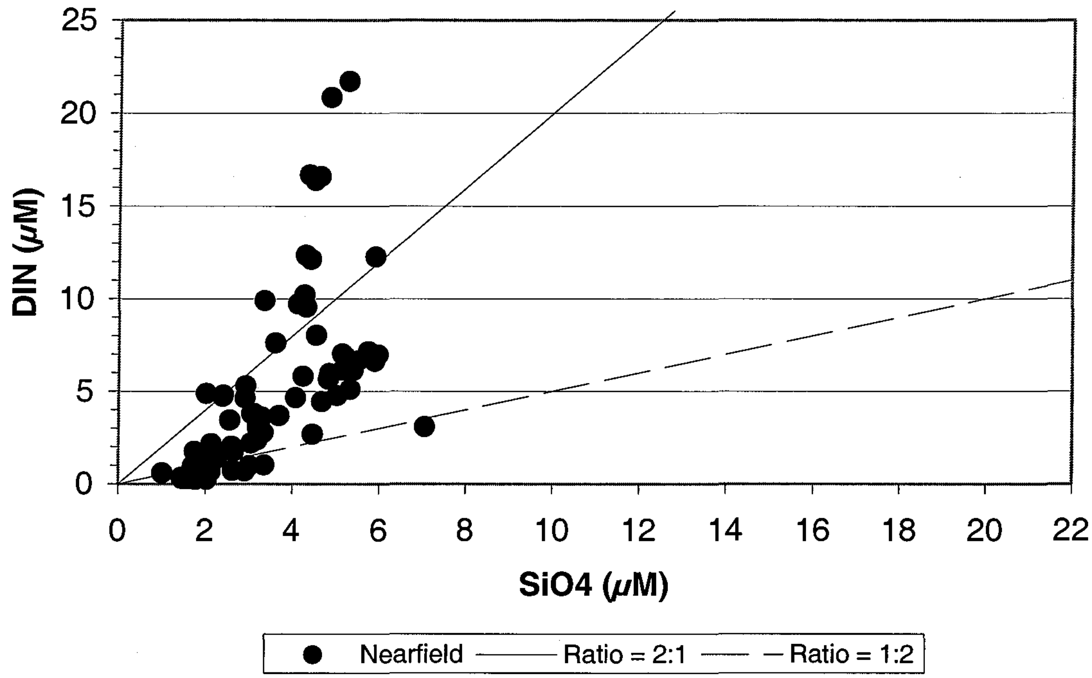


Figure D-36. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

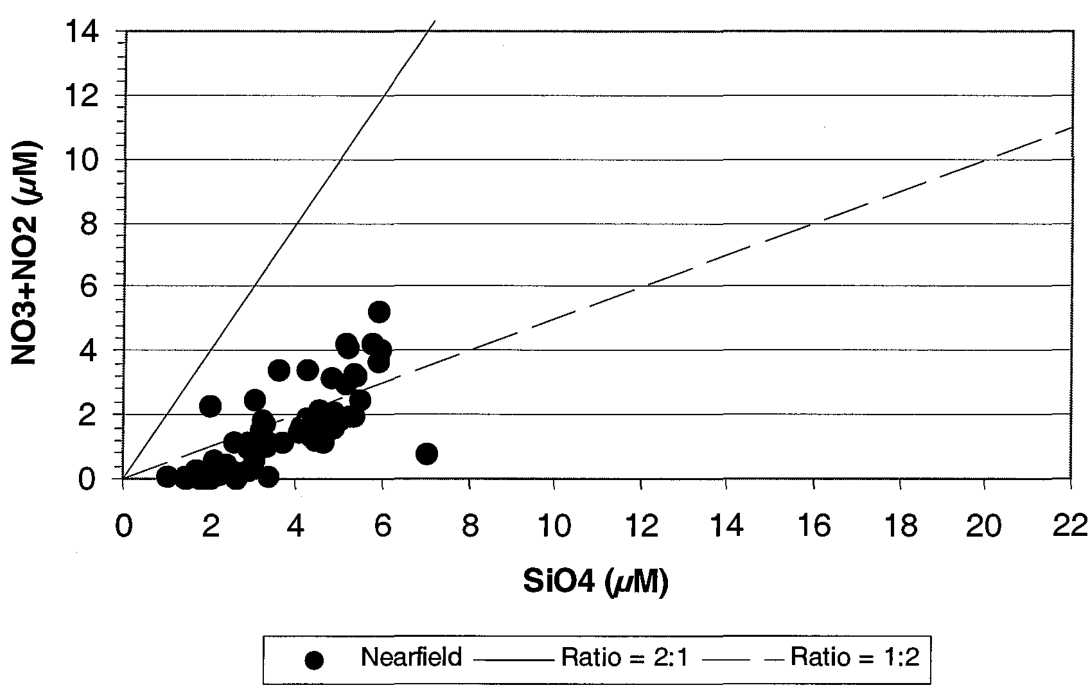
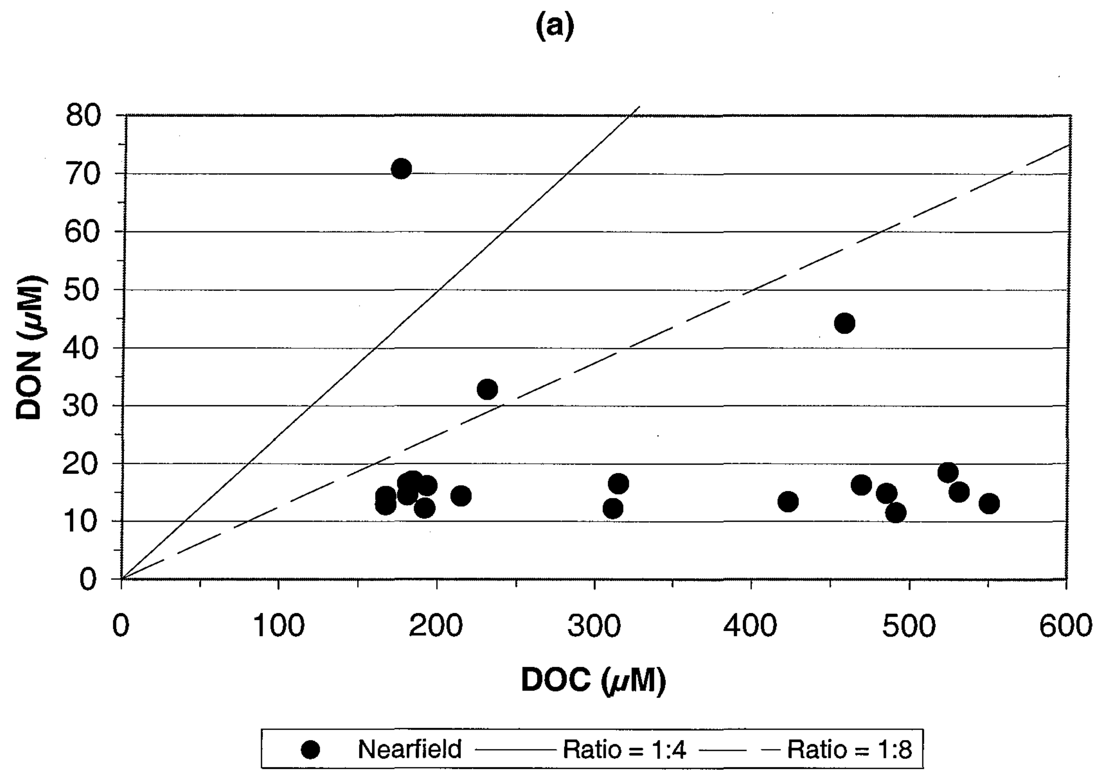


Figure D-37. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)



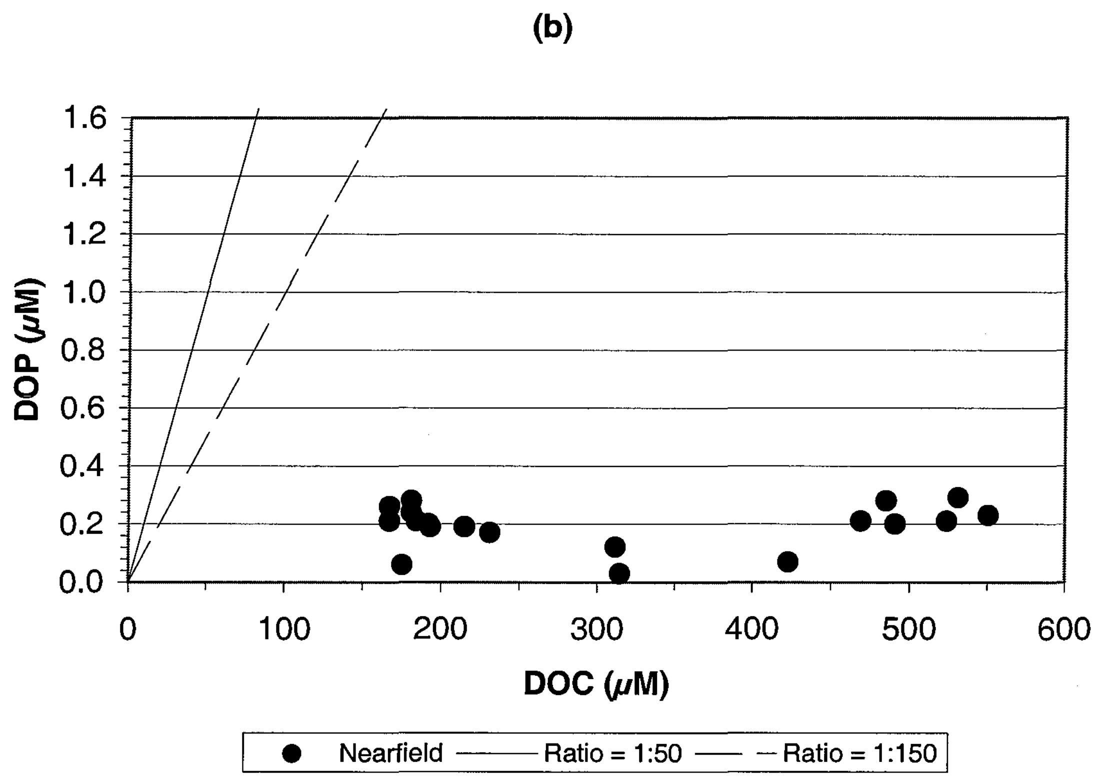
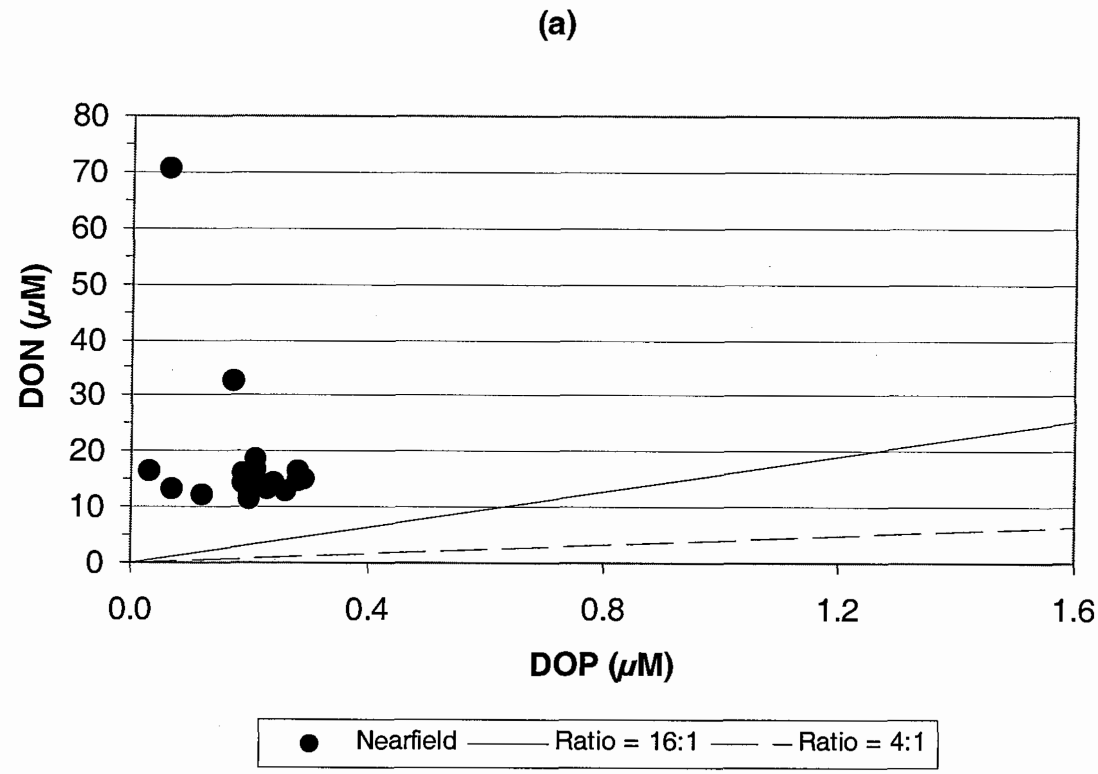


Figure D-38. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)



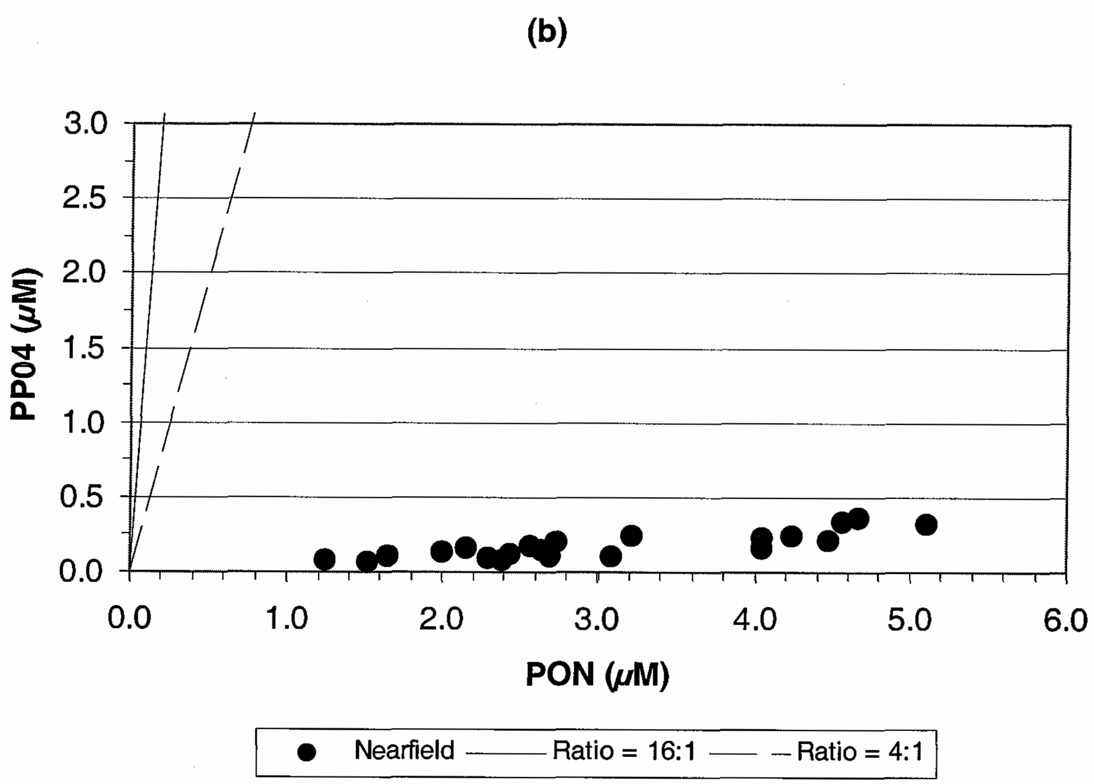
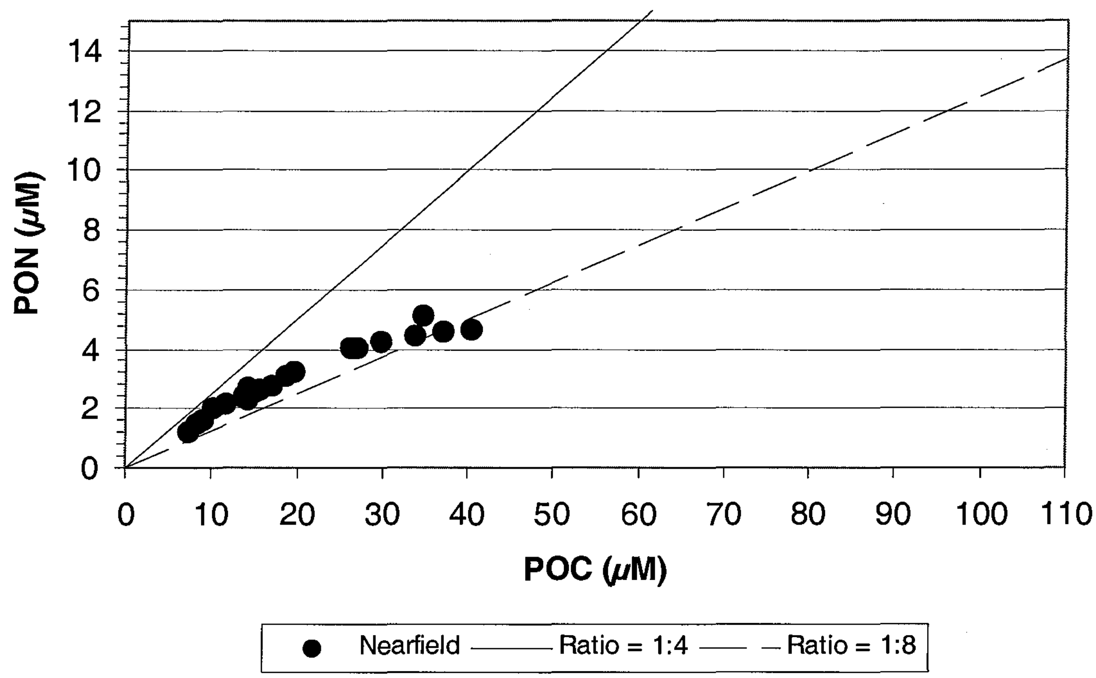


Figure D-39. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

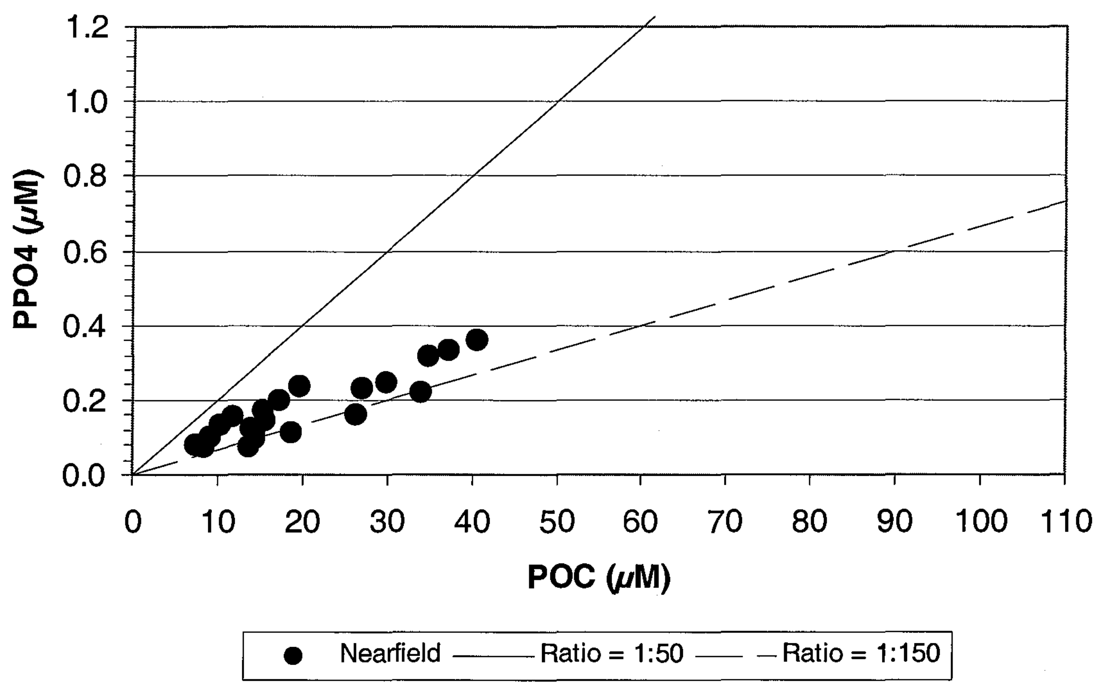
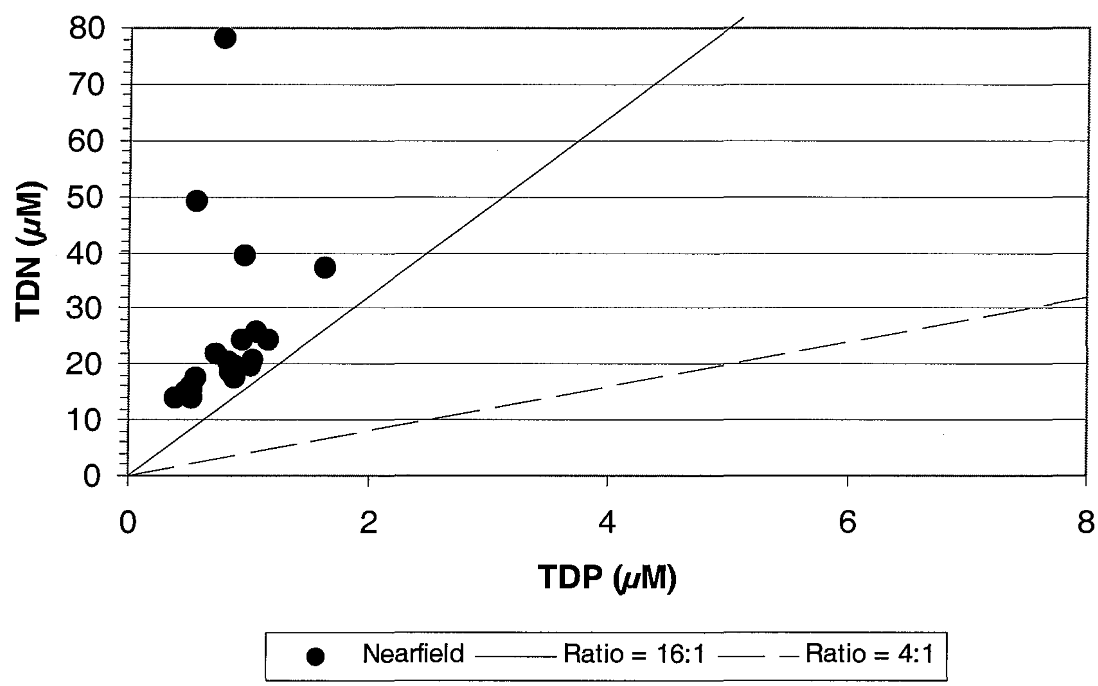


Figure D-40. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

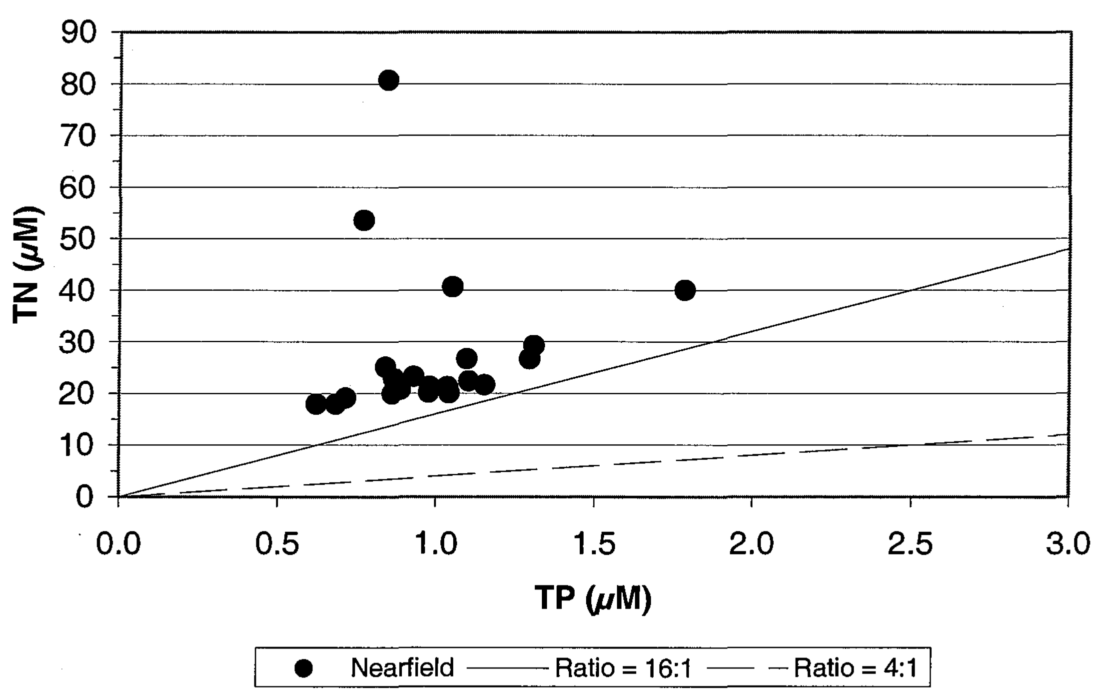
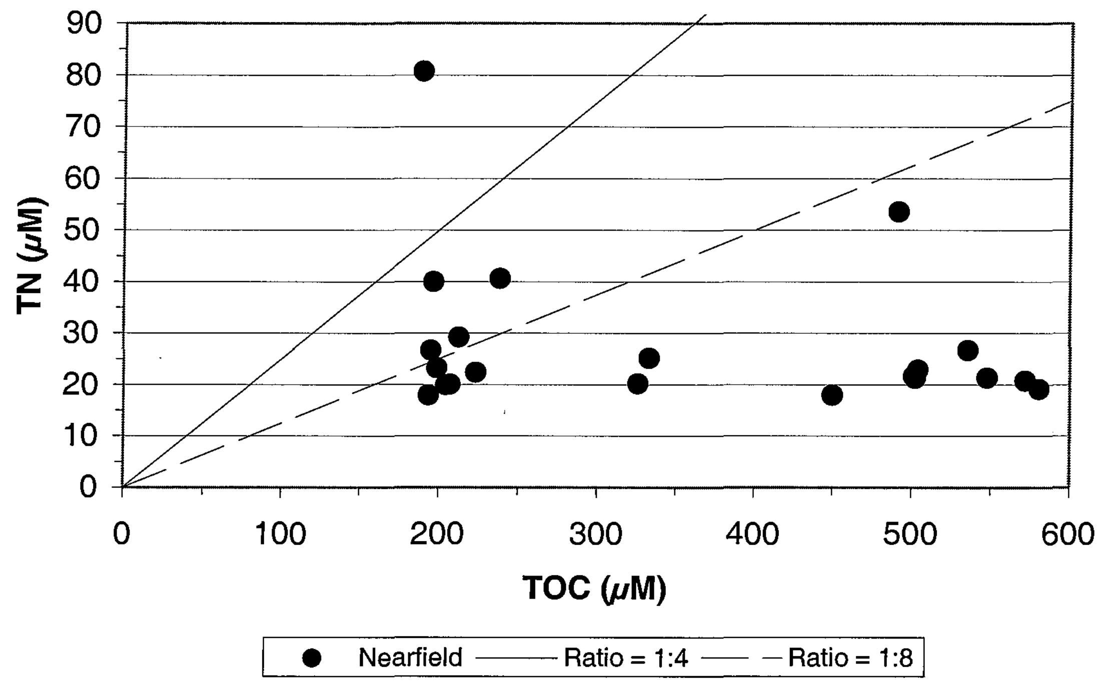


Figure D-41. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

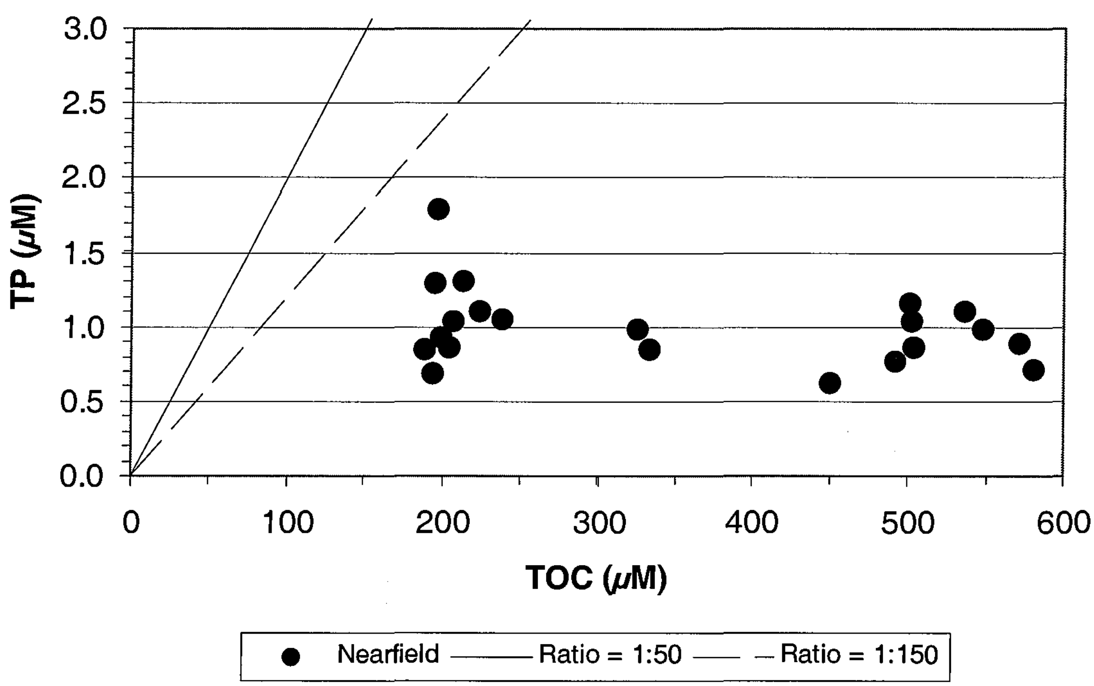


Figure D-42. Nutrient vs. Nutrient Plots for Nearfield Survey WN01A, (Aug 01)

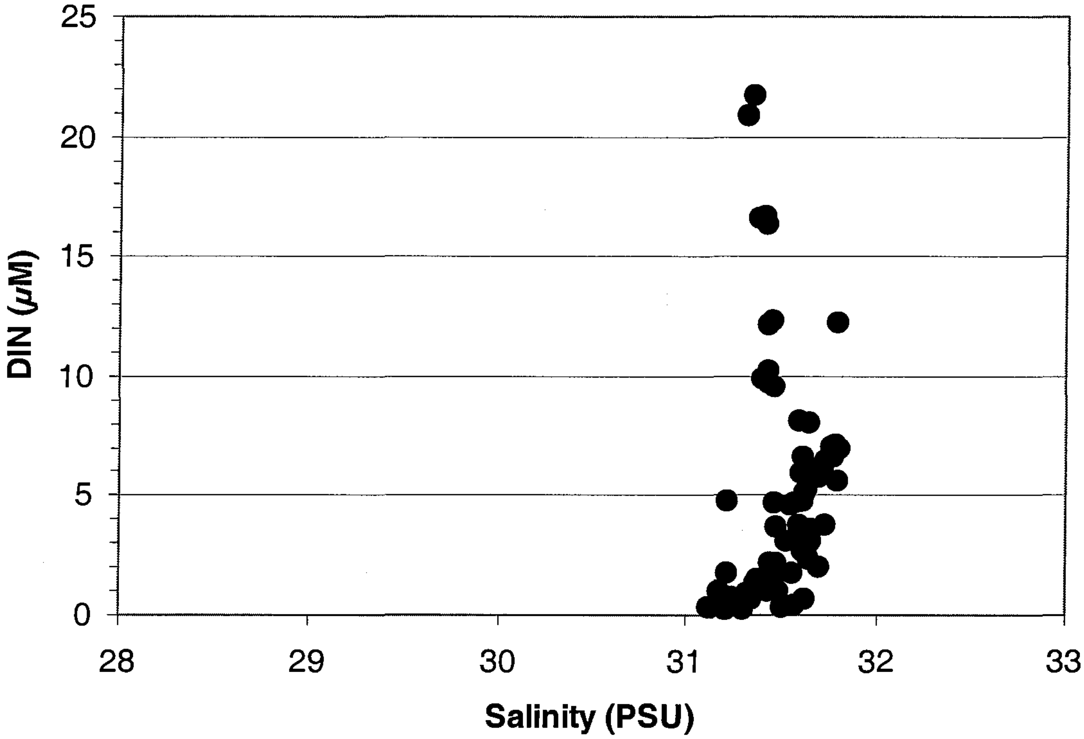
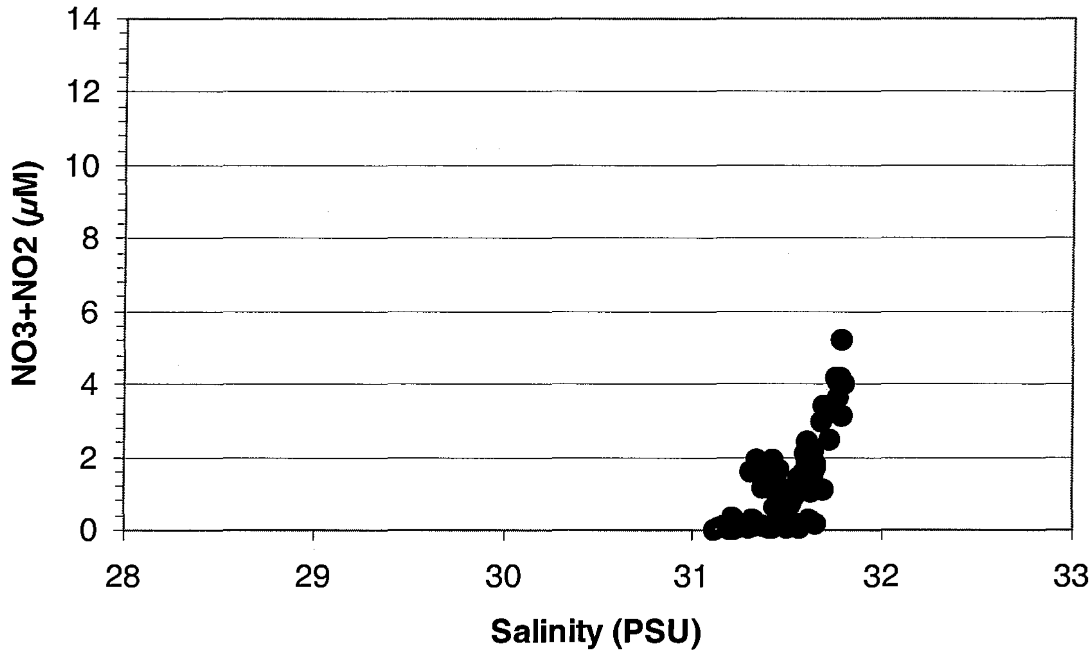


Figure D-43. Nutrient vs. Salinity Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

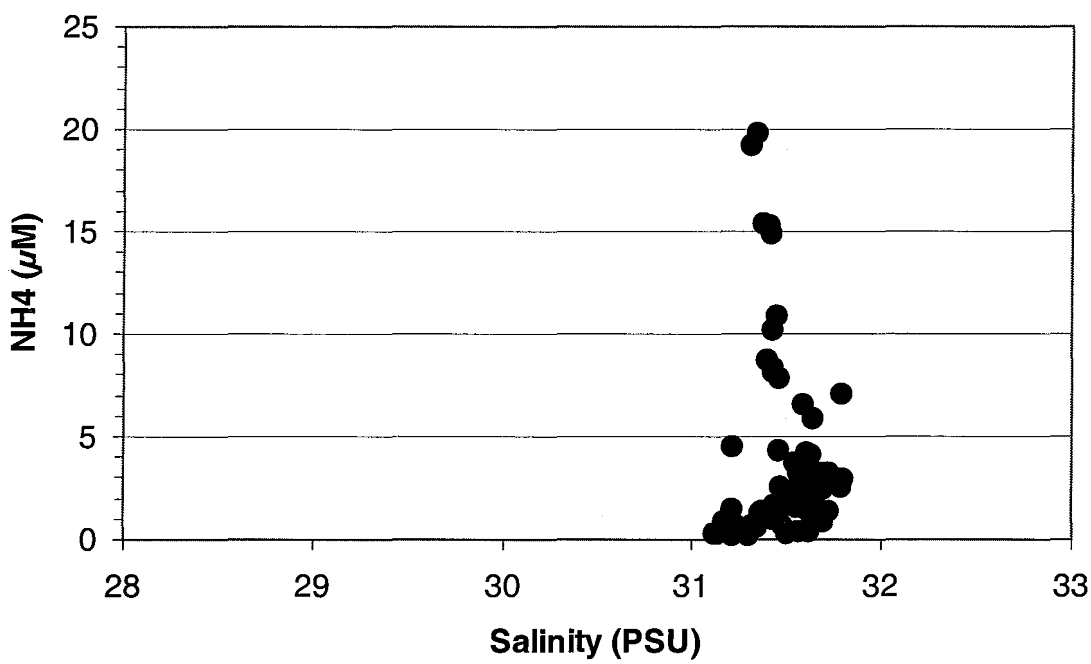
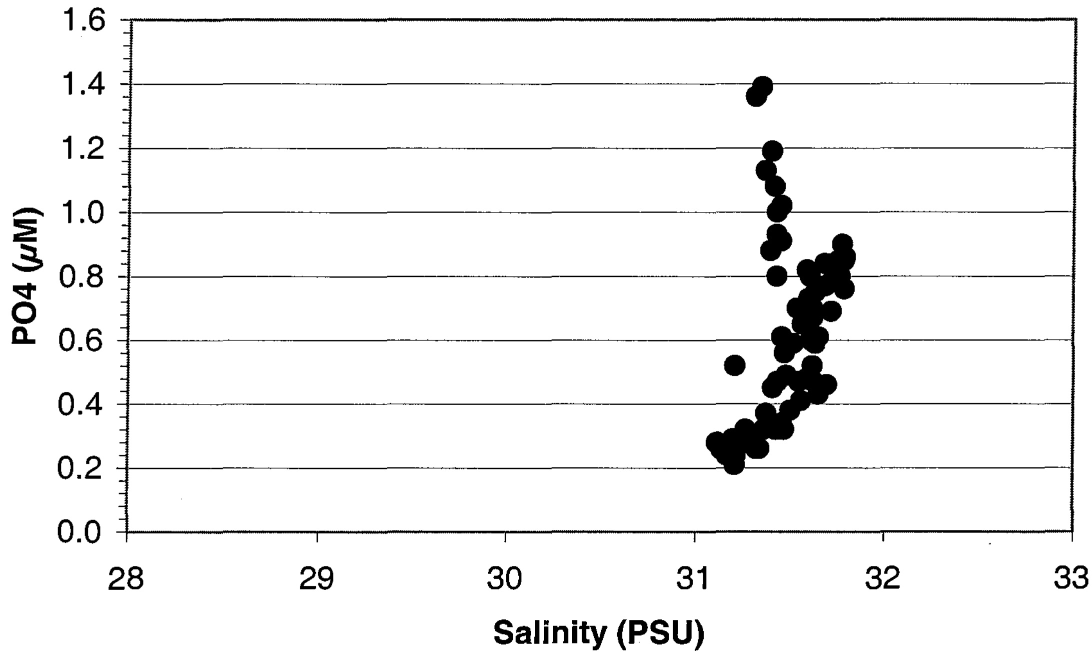


Figure D-44. Nutrient vs. Salinity Plots for Nearfield Survey WN01A, (Aug 01)

(a)



(b)

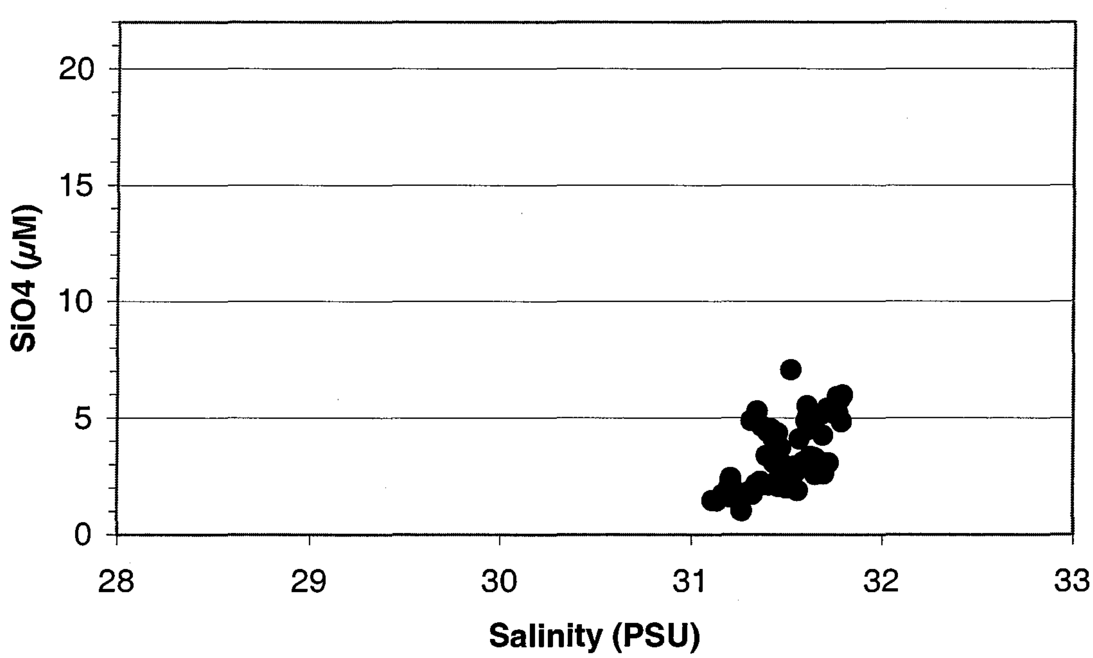


Figure D-45. Nutrient vs. Salinity Plots for Nearfield Survey WN01A, (Aug 01)

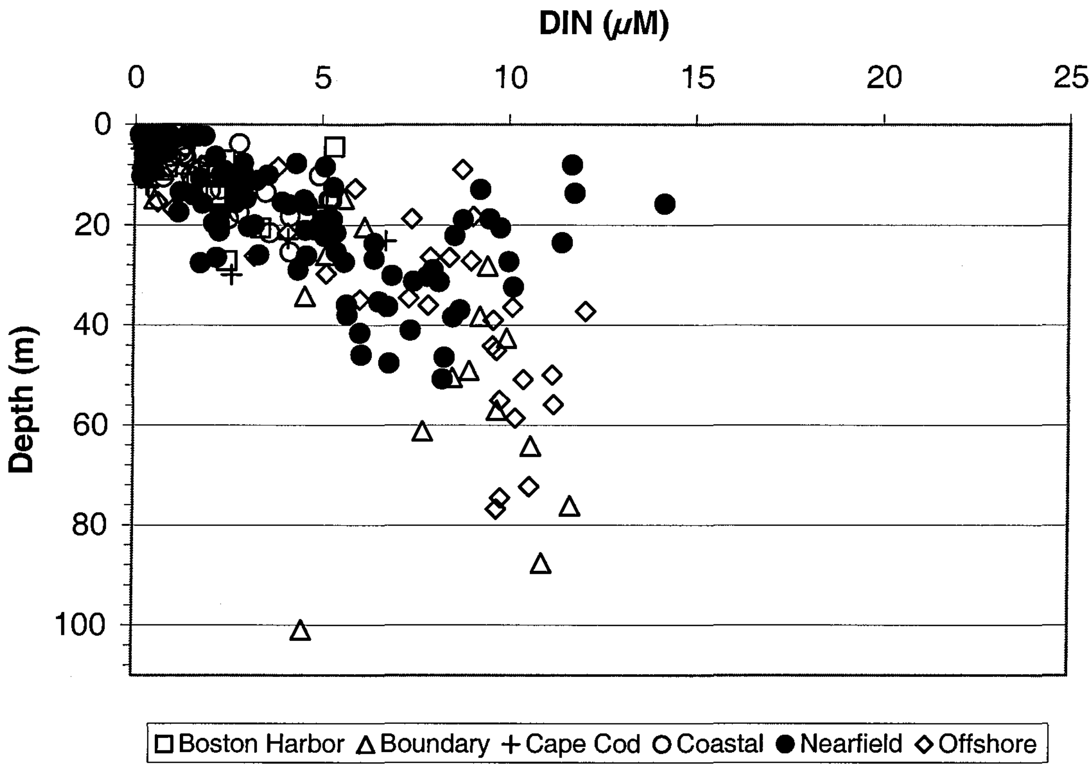
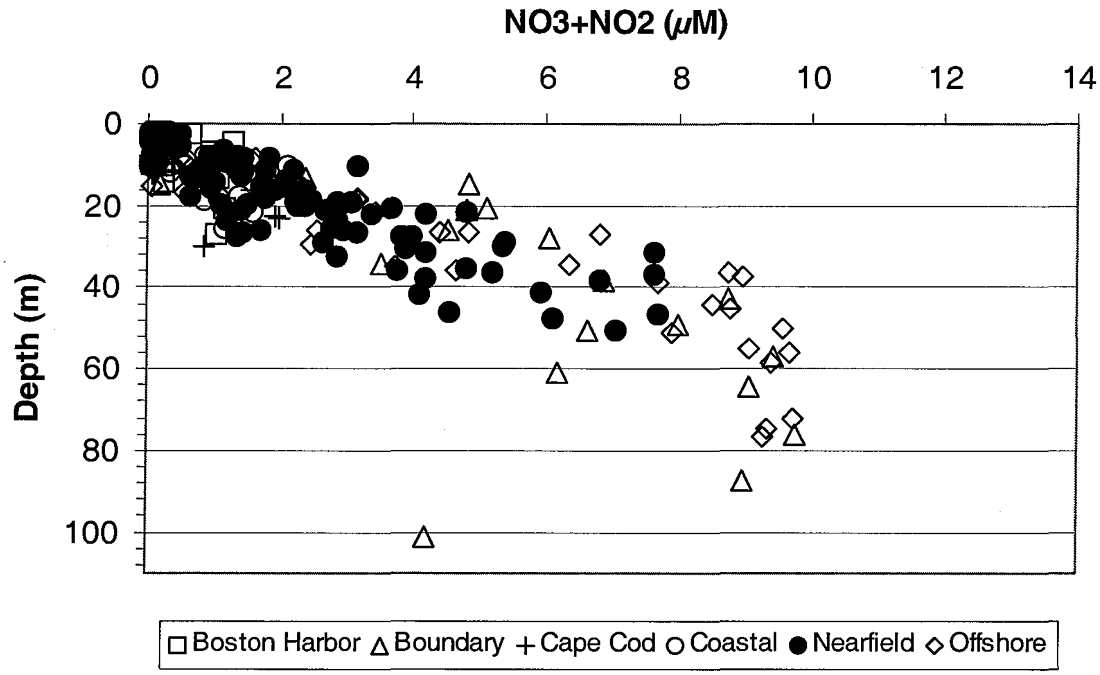


Figure D-46. Depth vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

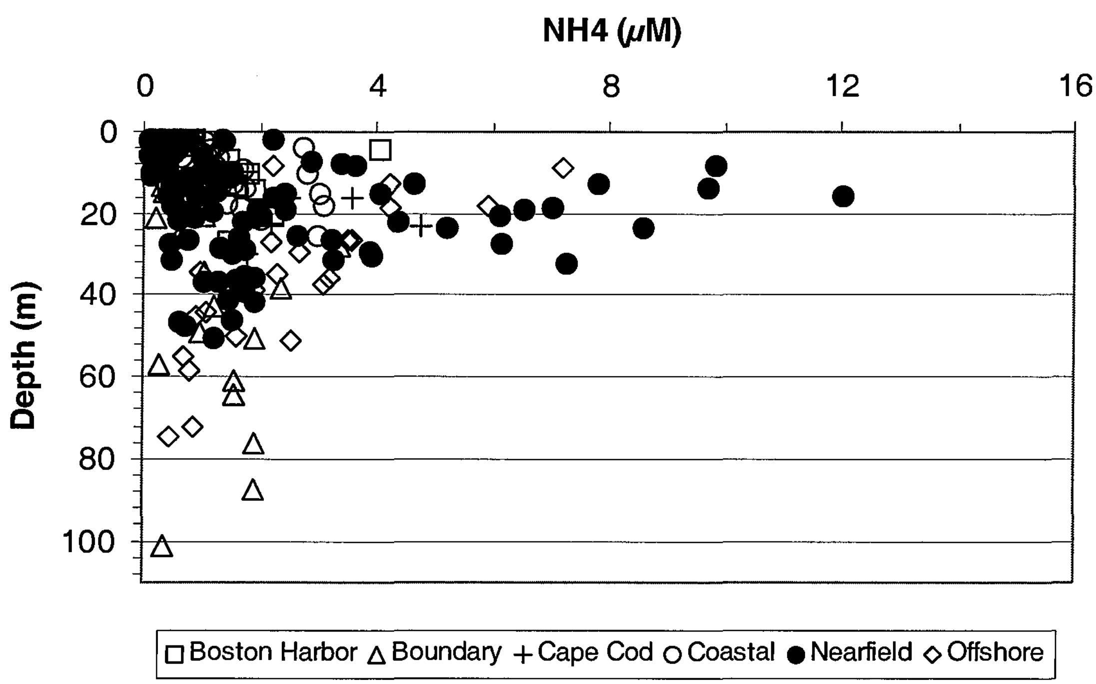
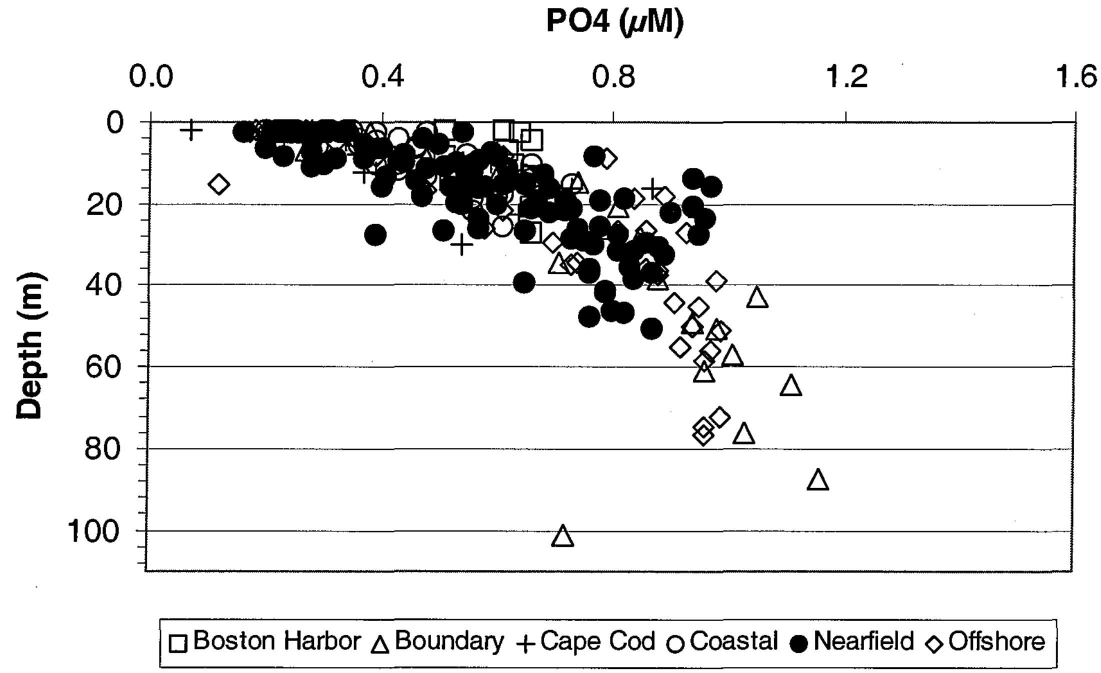


Figure D-47. Depth vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

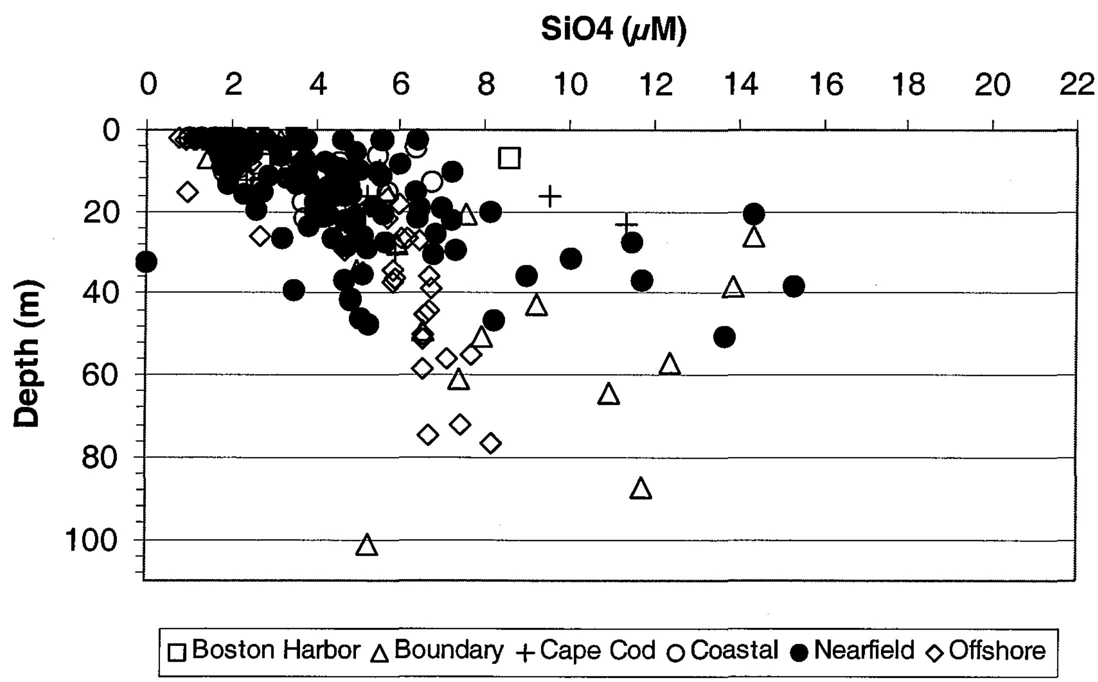
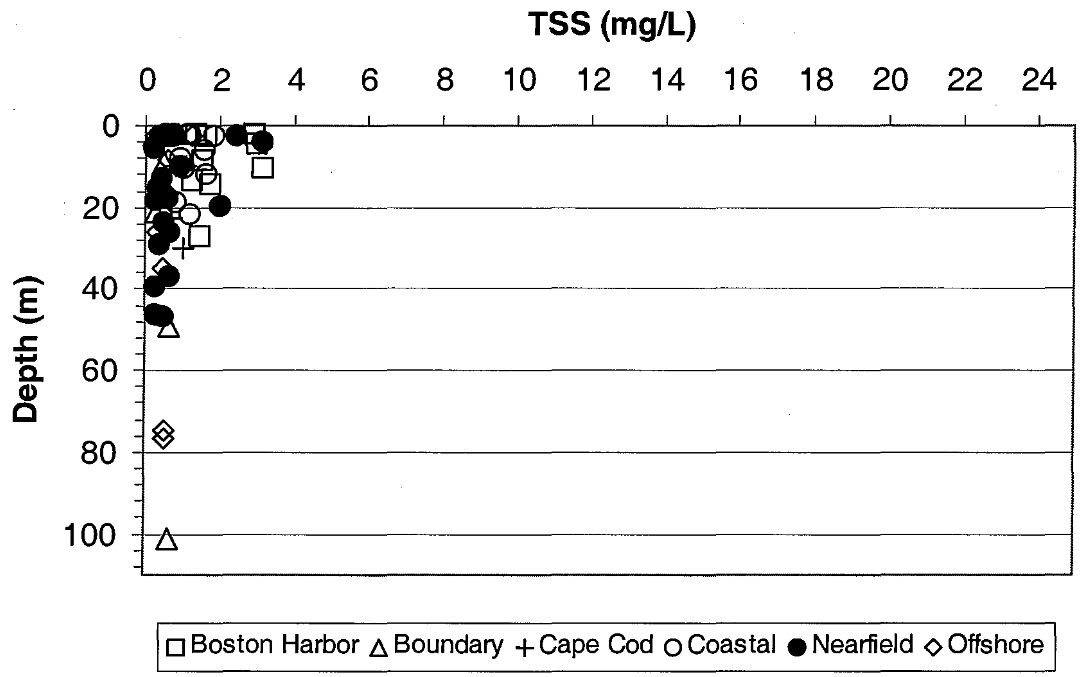


Figure D-48. Depth vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

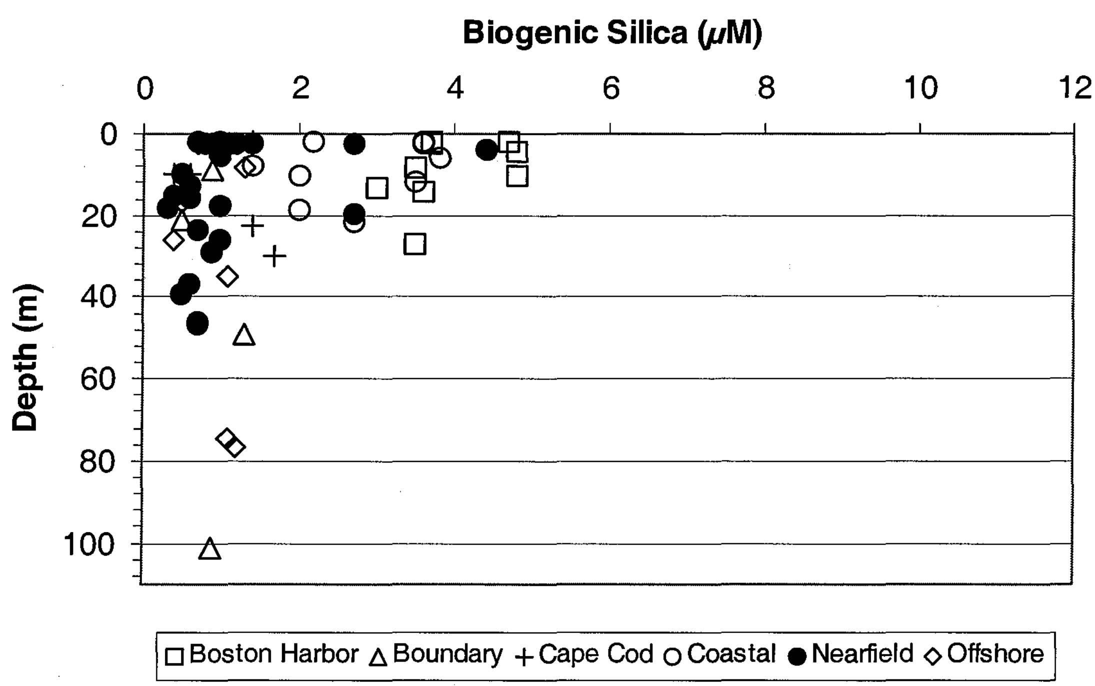
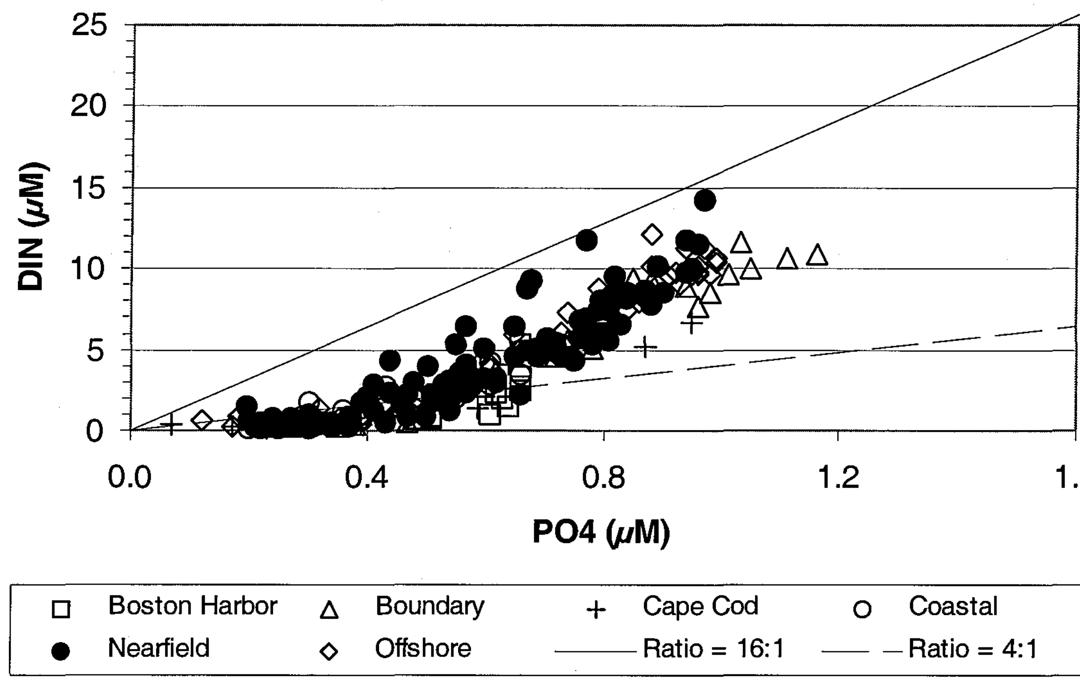


Figure D-49. Depth vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

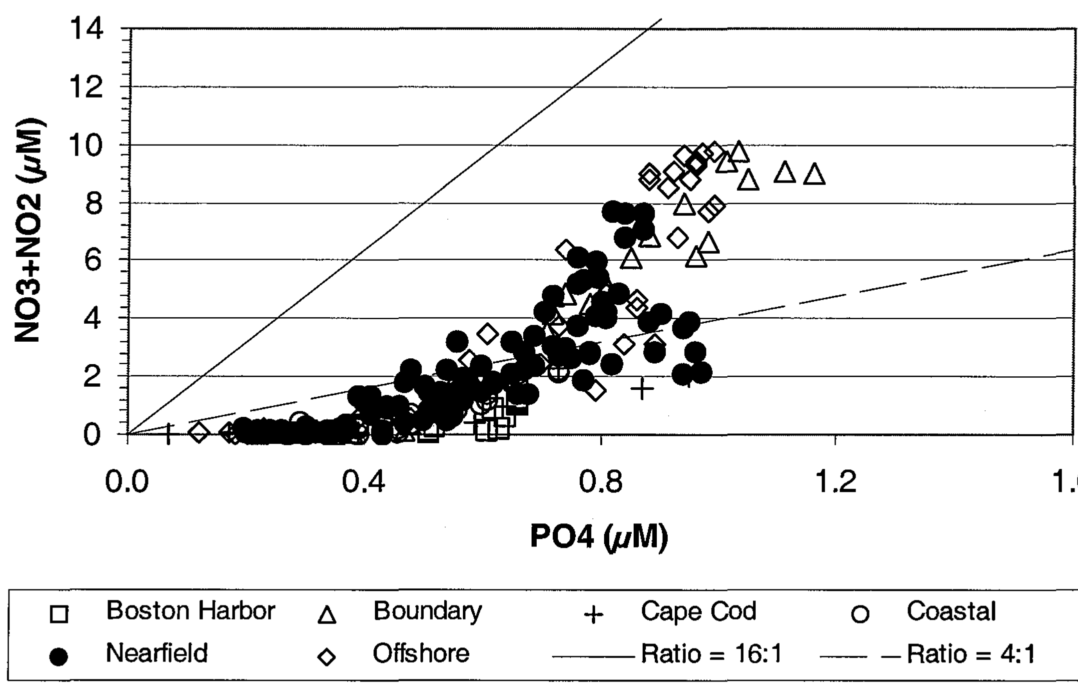


Figure D-50. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

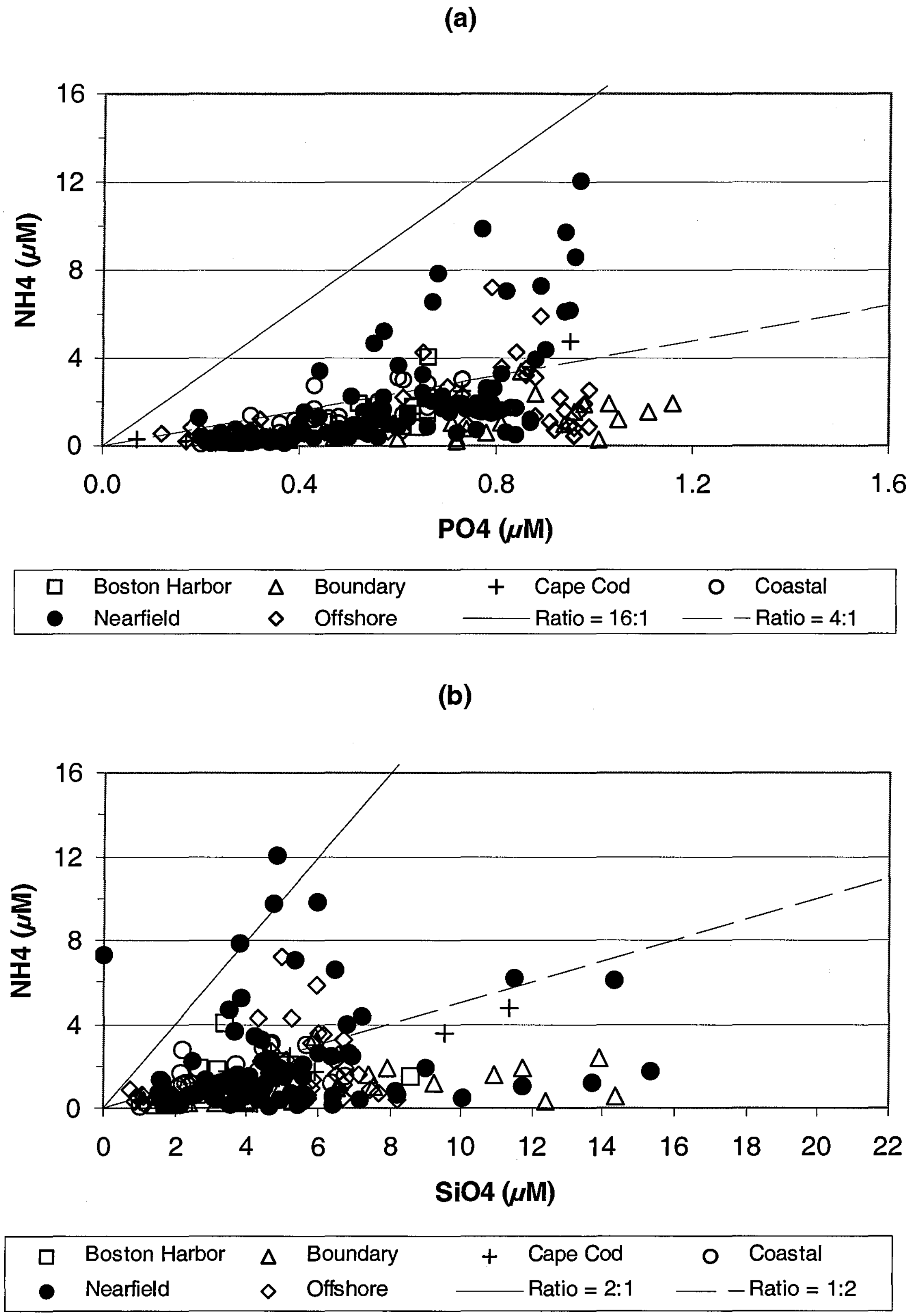
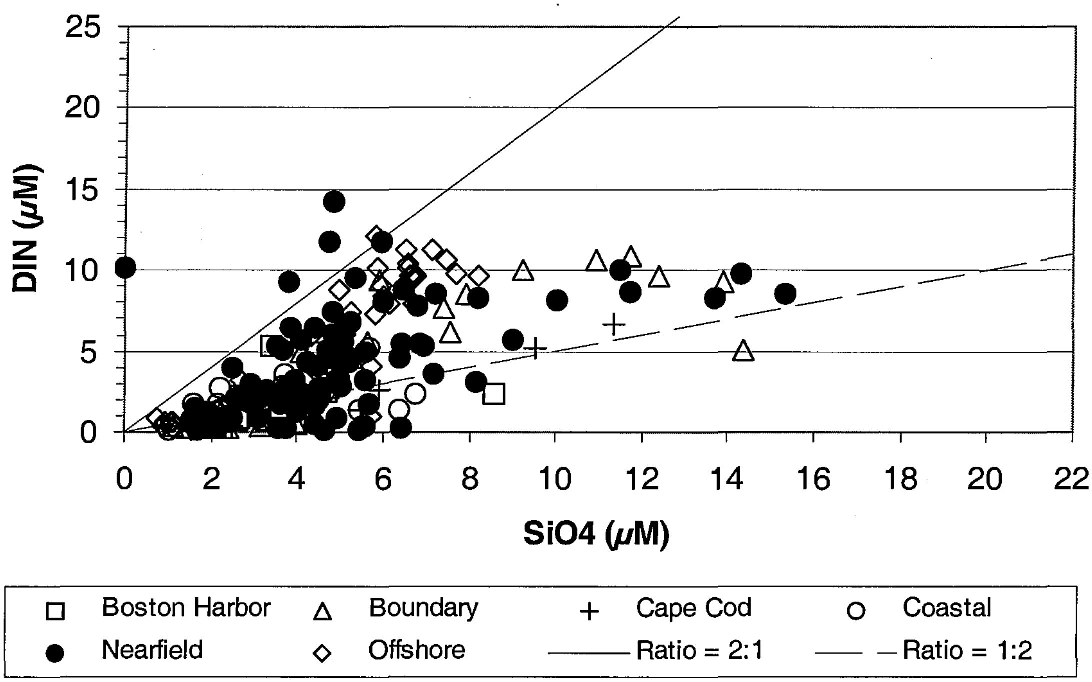


Figure D-51. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

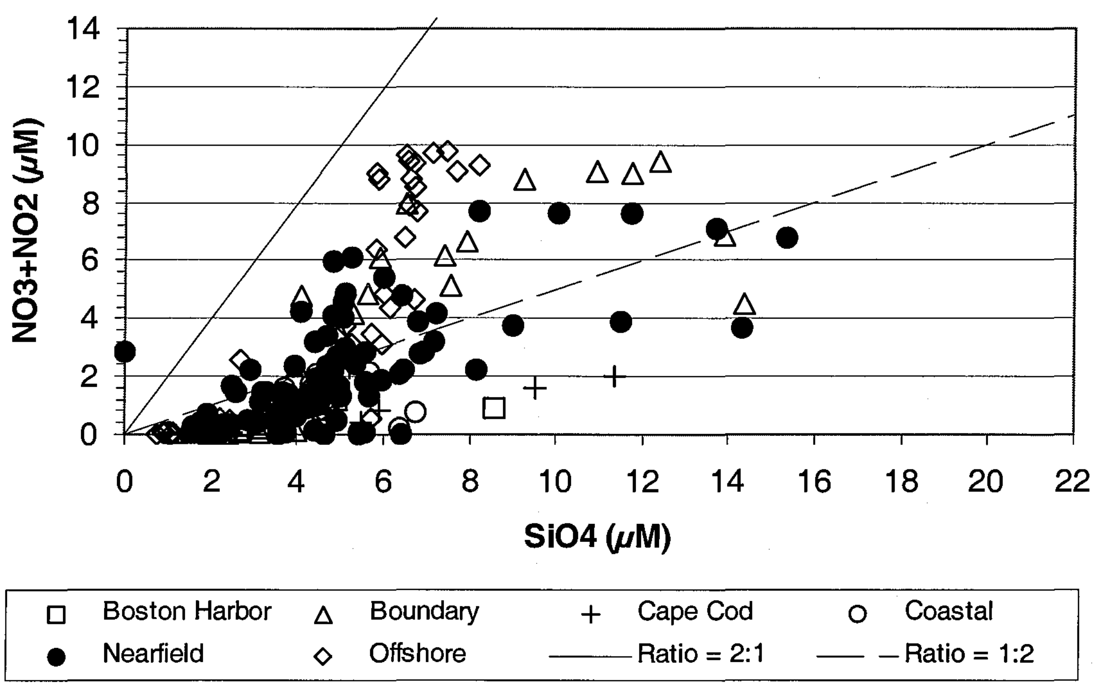
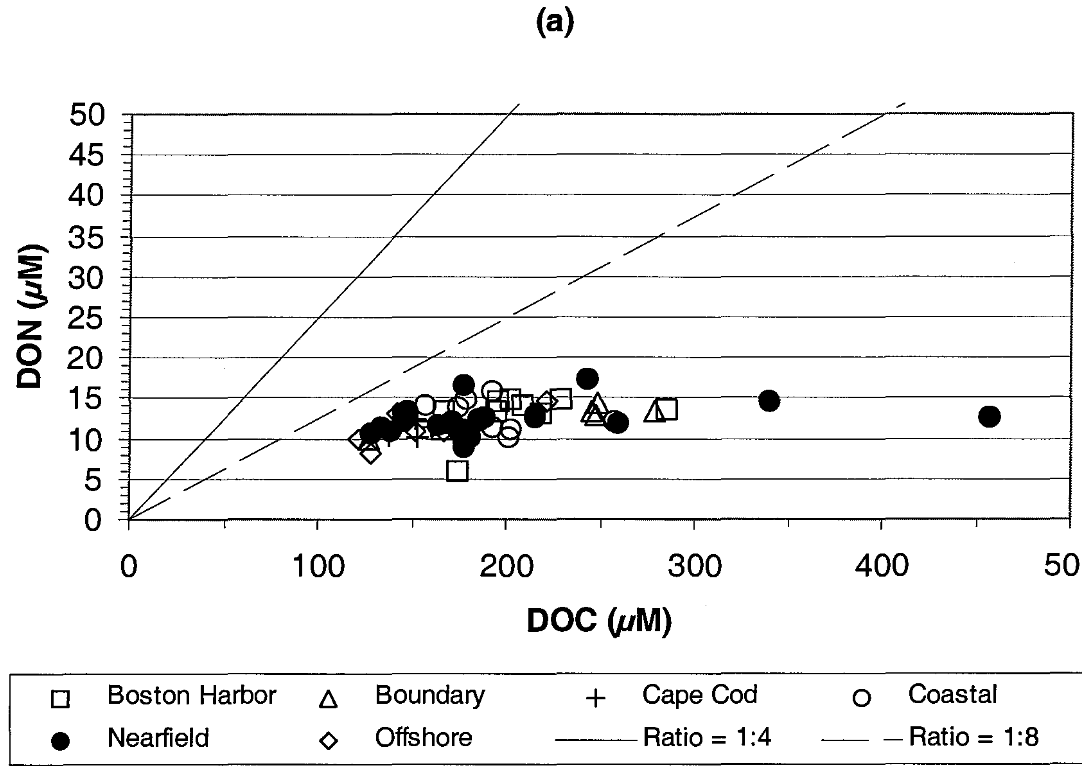


Figure D-52. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)



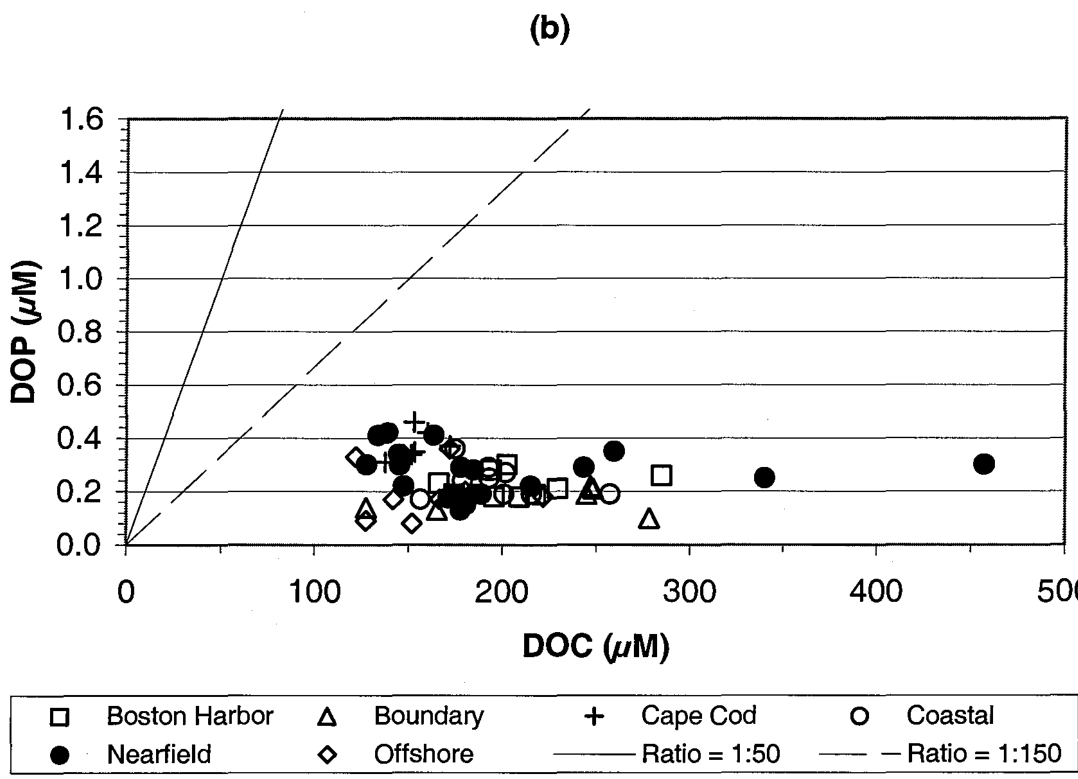
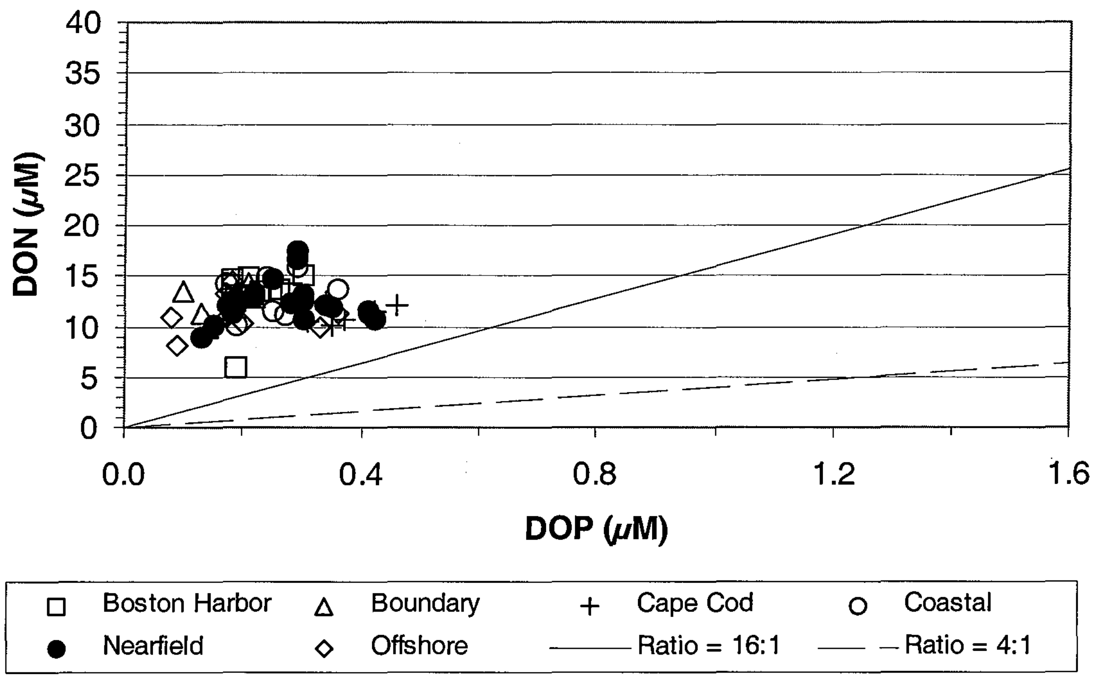


Figure D-53. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

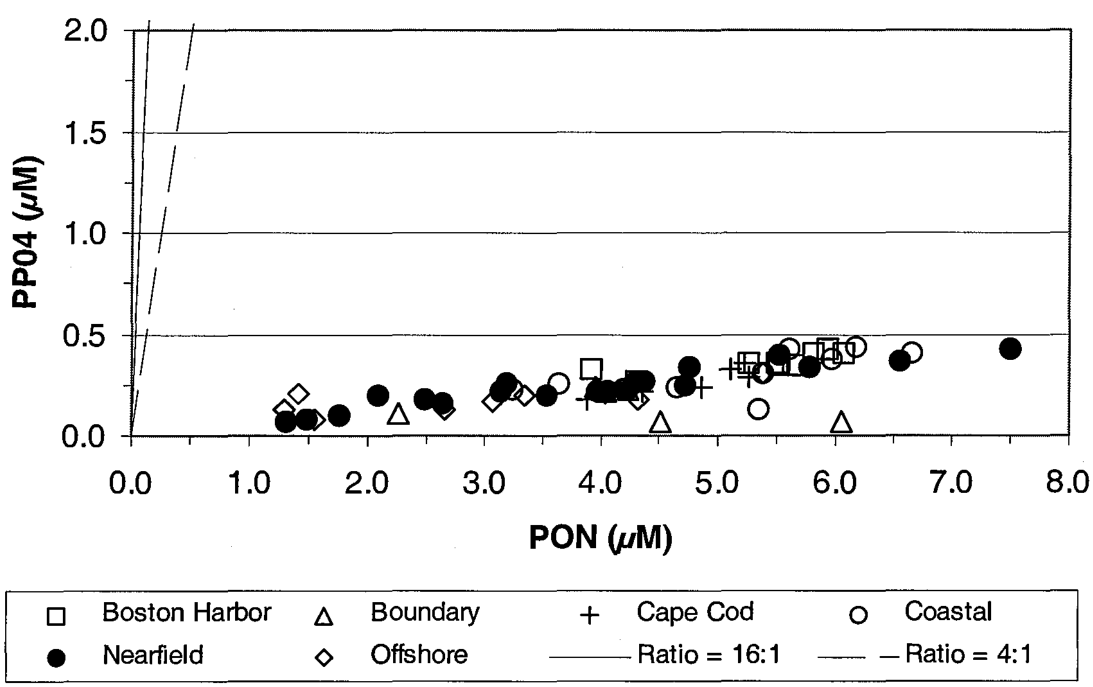
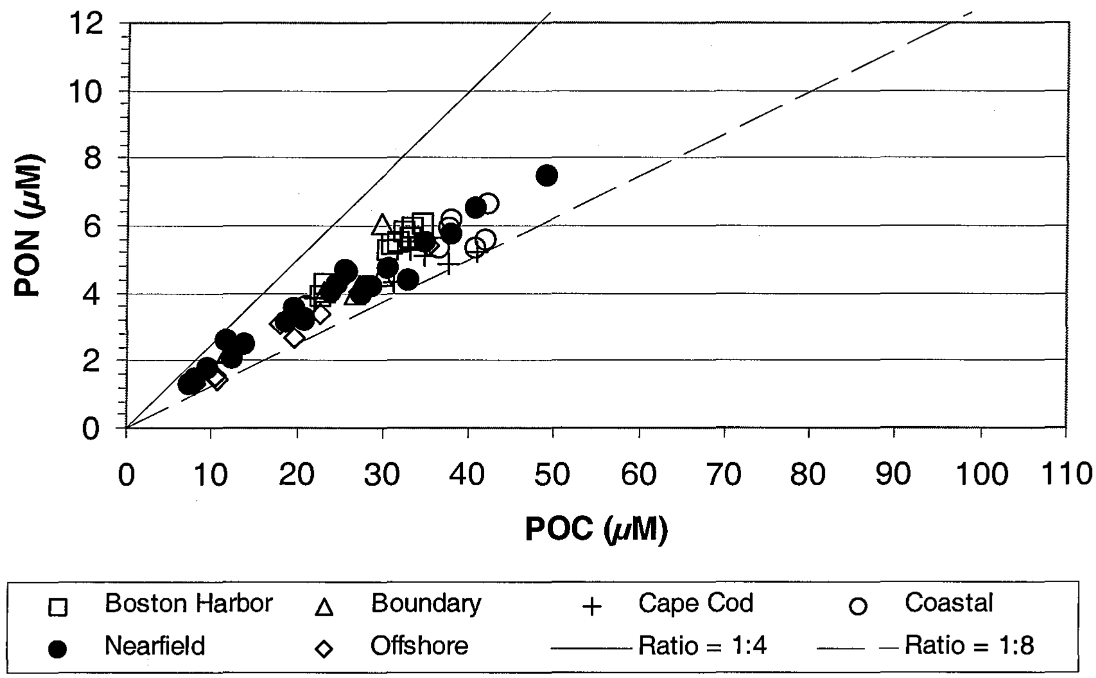


Figure D-54. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

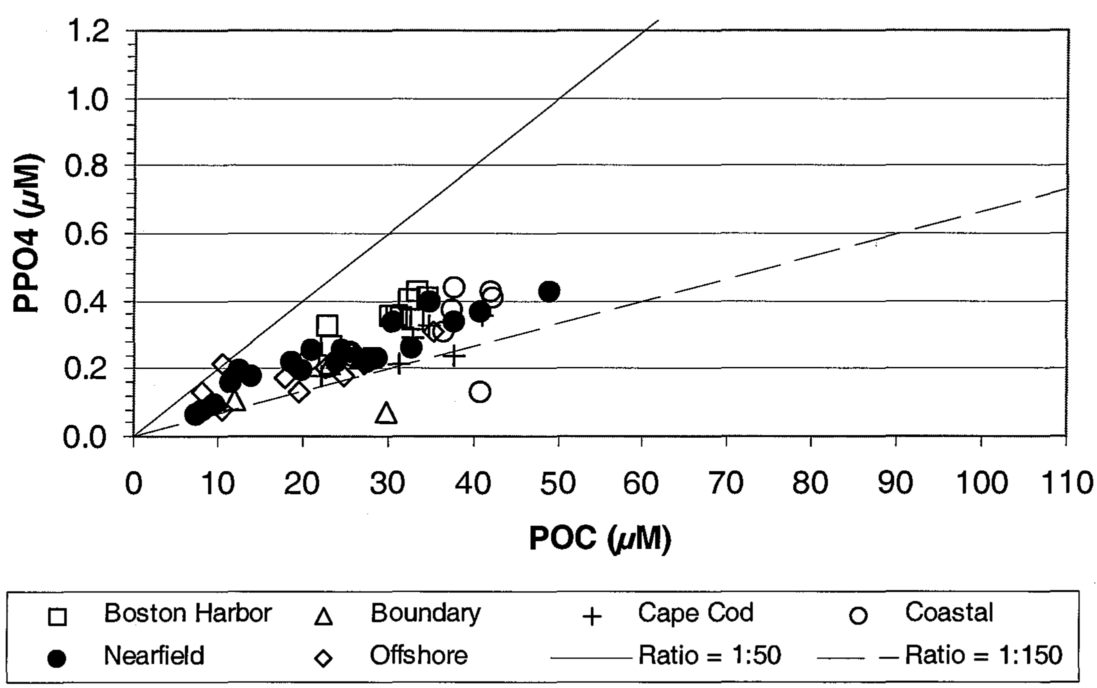
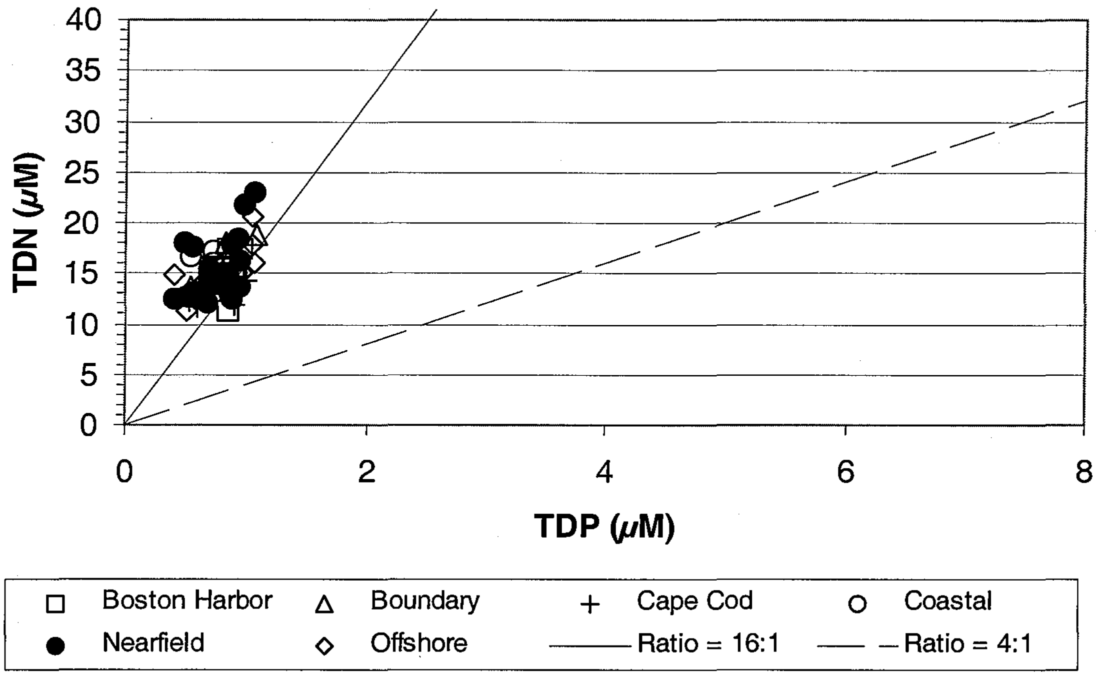


Figure D-55. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

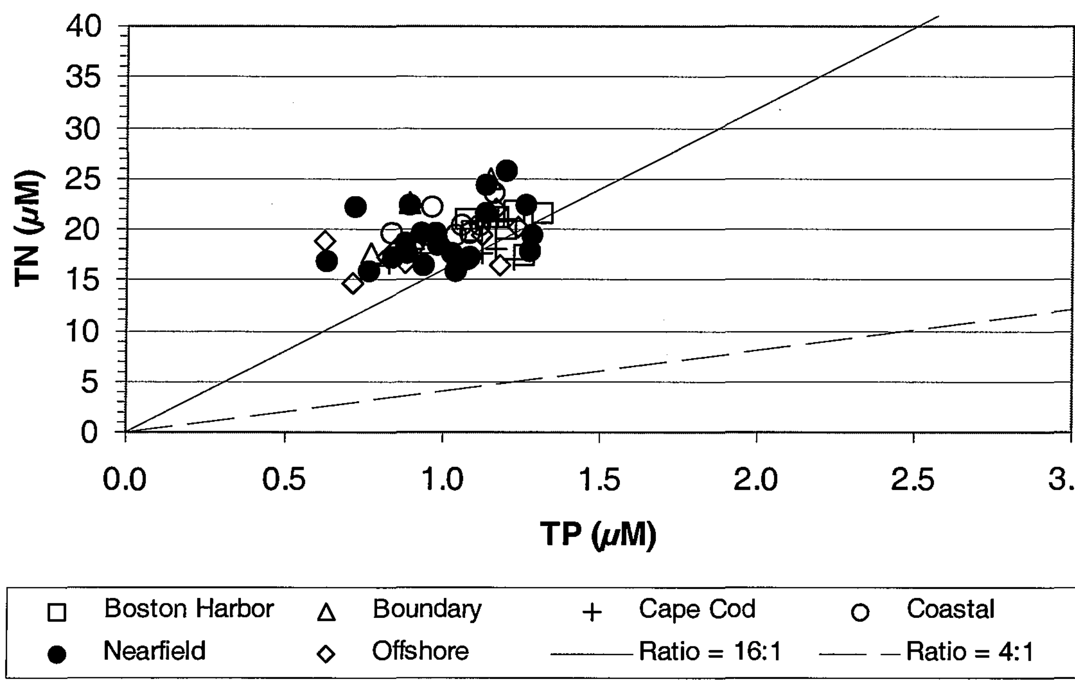
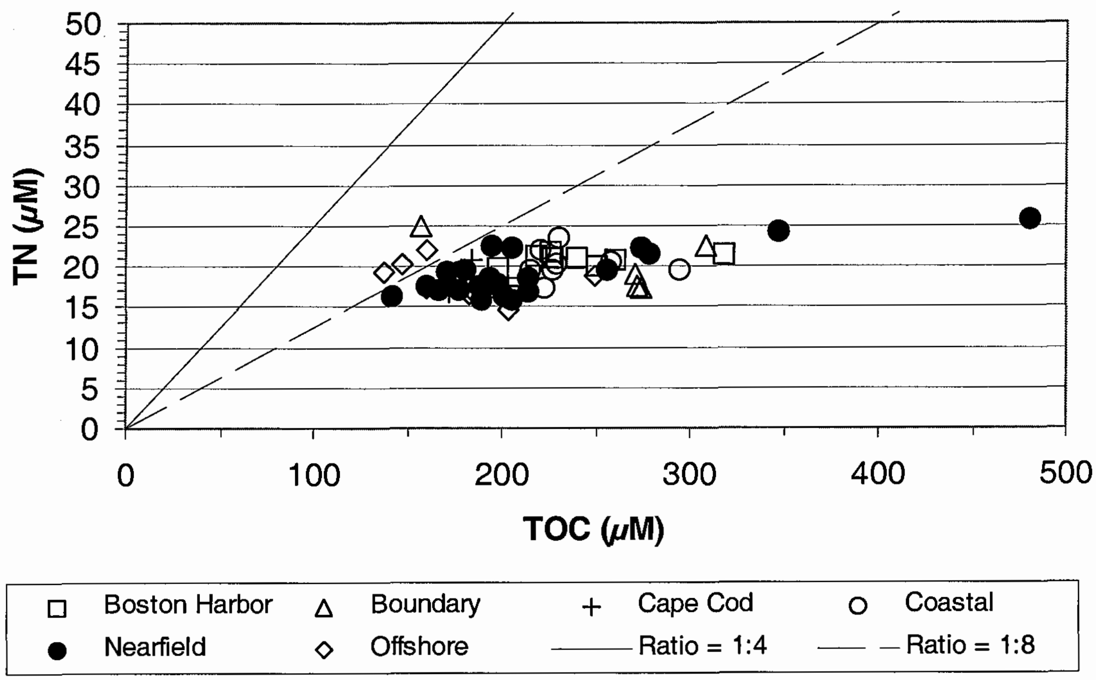


Figure D-56. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

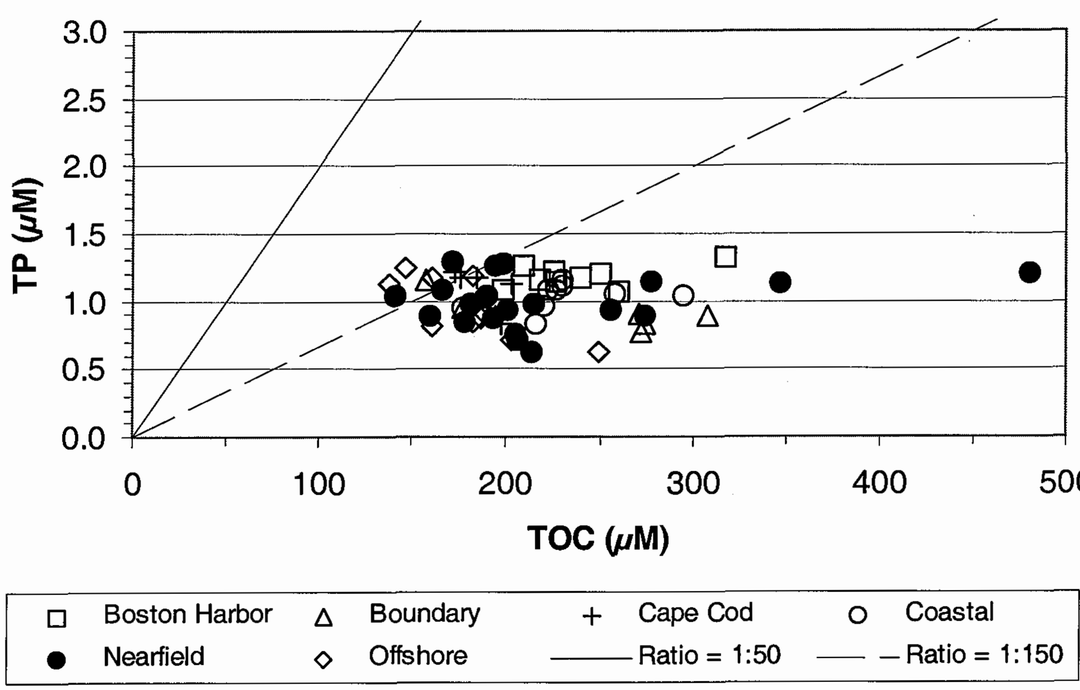


Figure D-57. Nutrient vs. Nutrient Plots for Farfield Survey WF01B, (Aug 01)

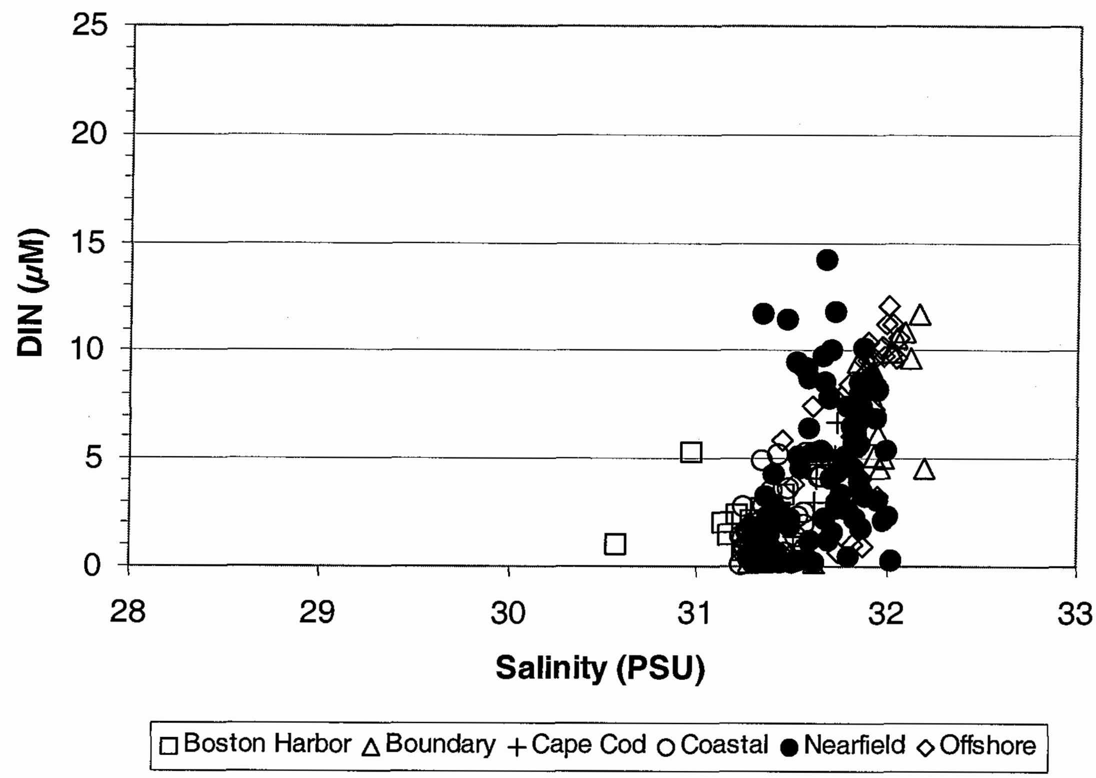
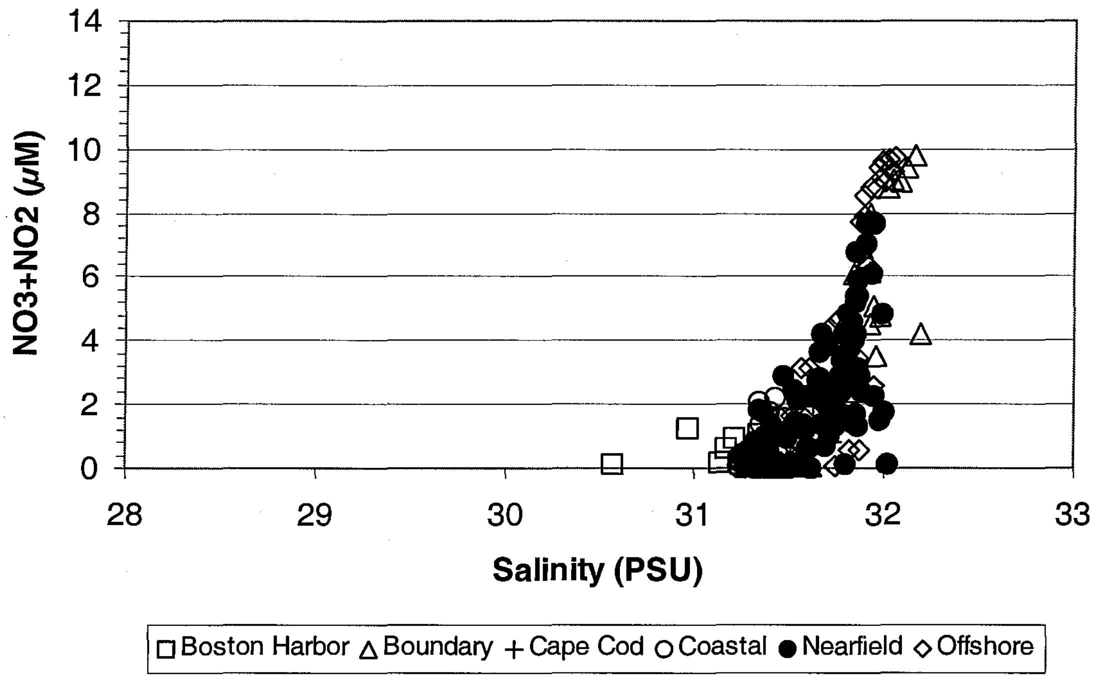


Figure D-58. Nutrient vs. Salinity Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

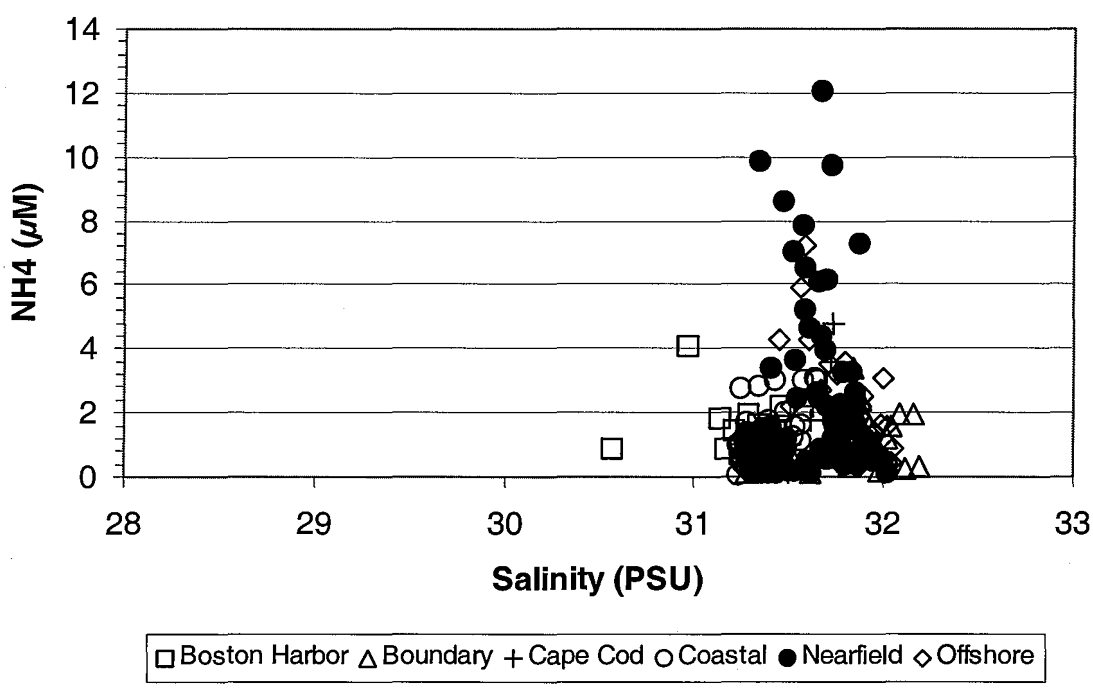
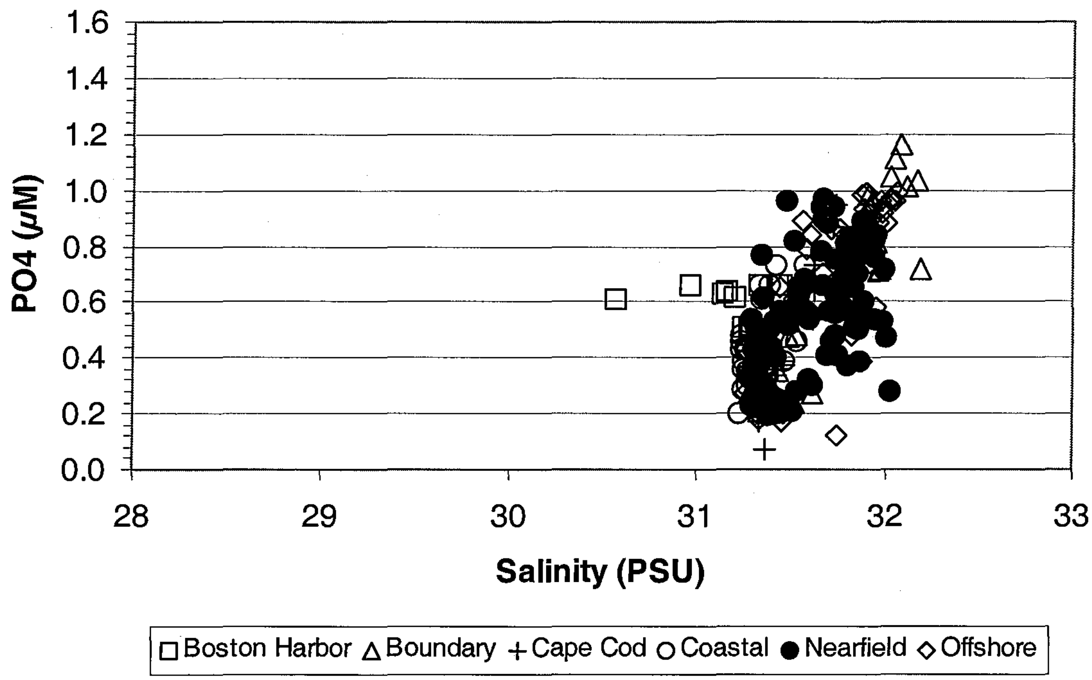


Figure D-59. Nutrient vs. Salinity Plots for Farfield Survey WF01B, (Aug 01)

(a)



(b)

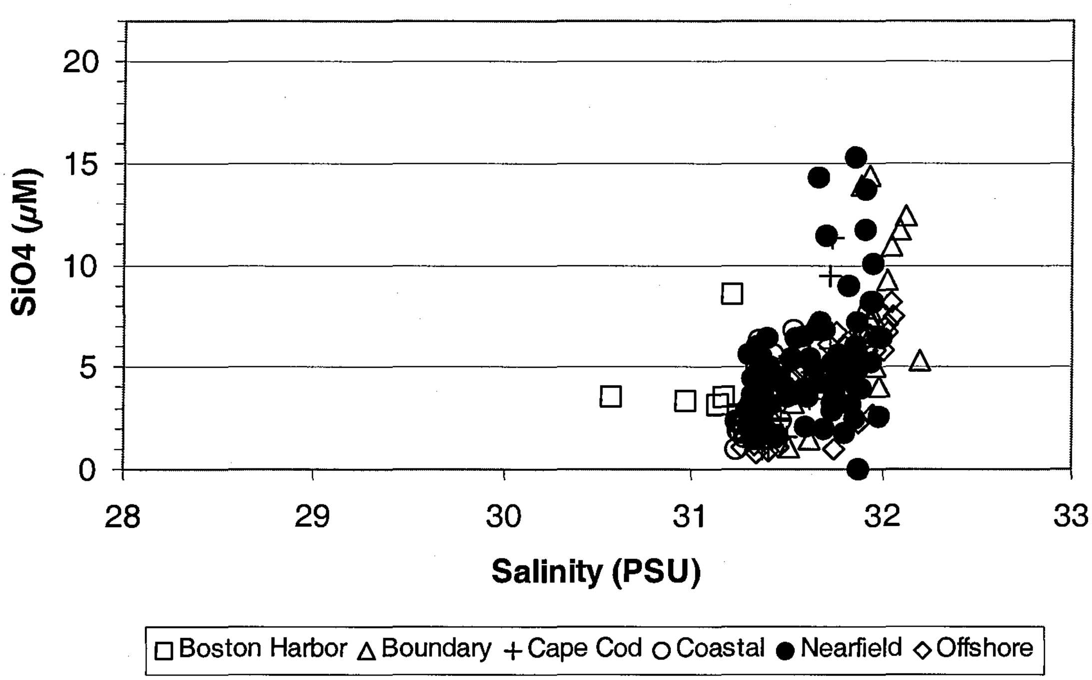


Figure D-60. Nutrient vs. Salinity Plots for Farfield Survey WF01B, (Aug 01)

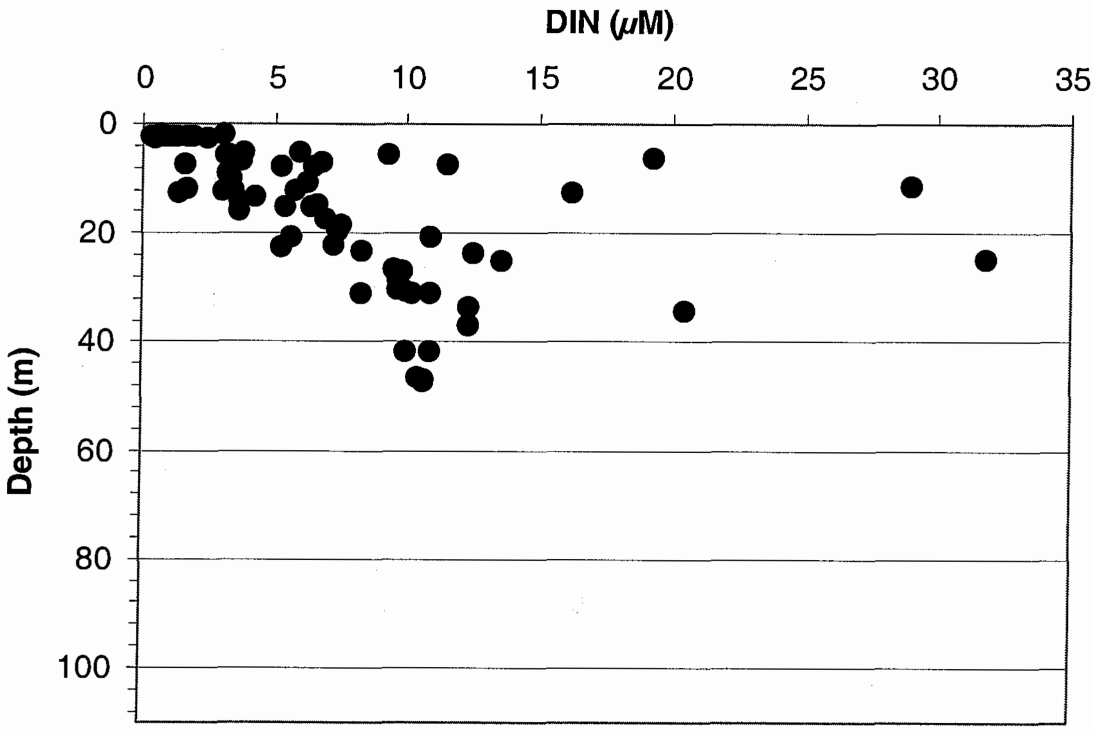
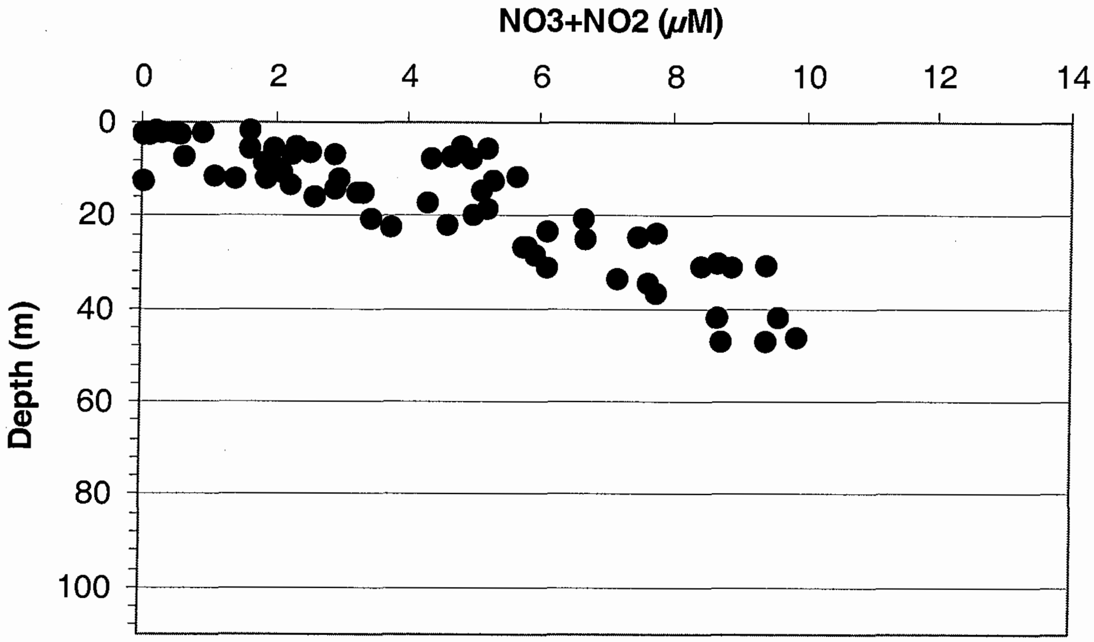


Figure D-61. Depth vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

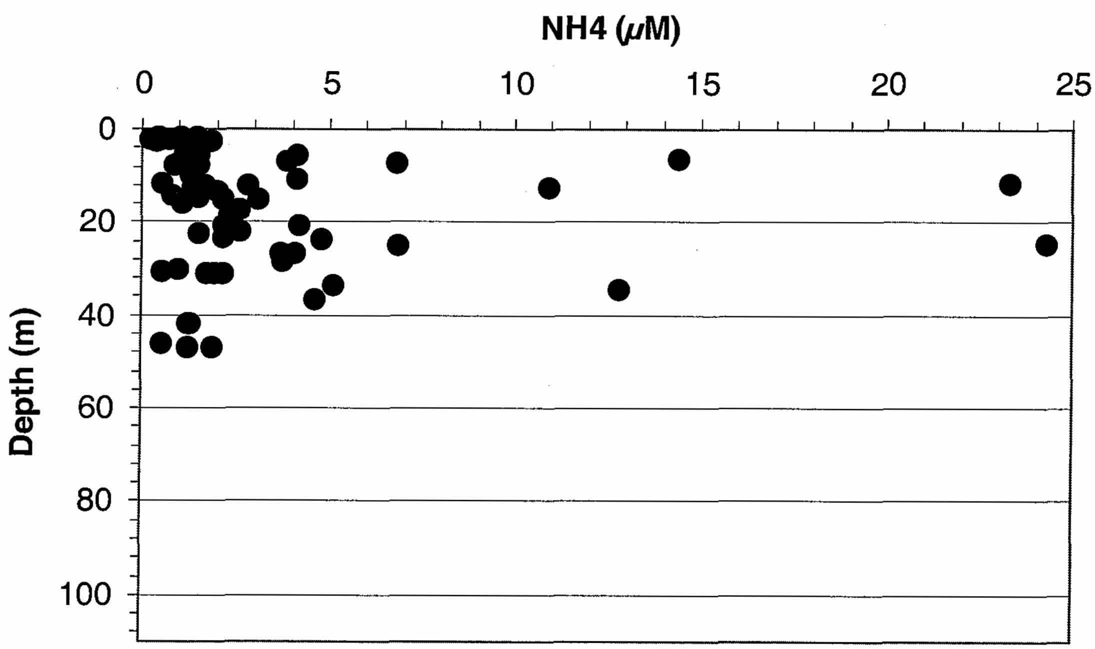
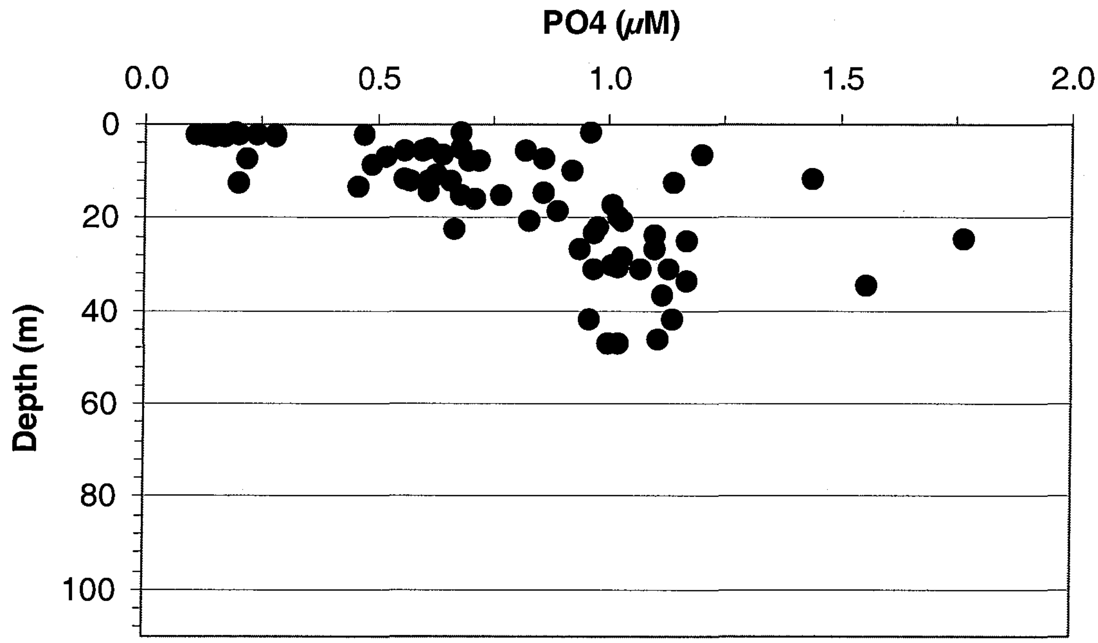


Figure D-62. Depth vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

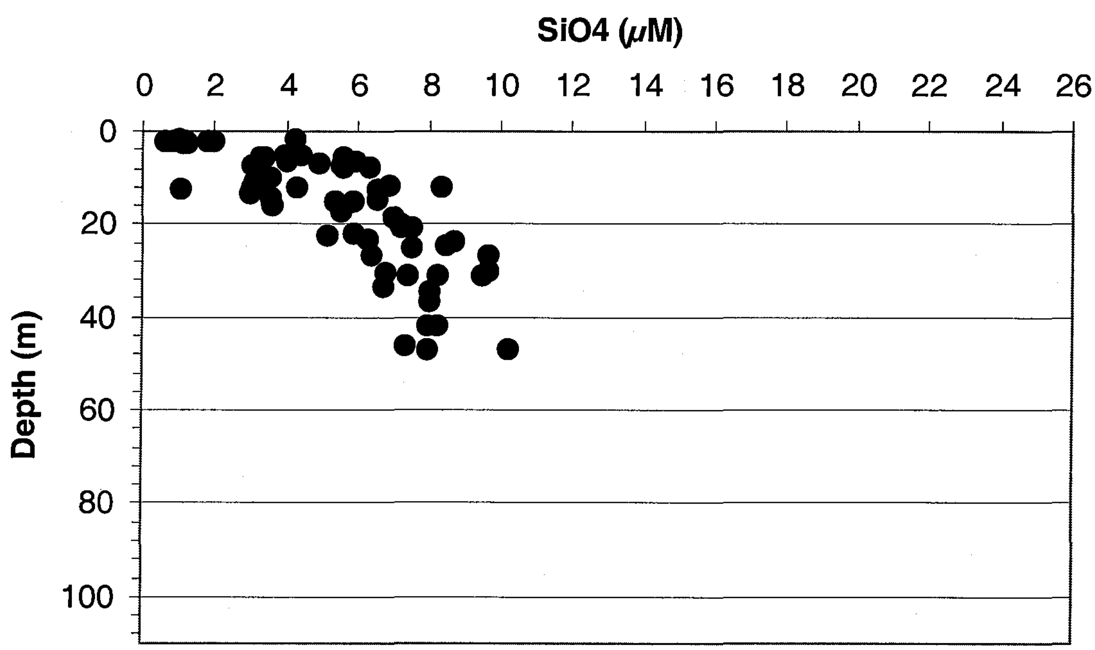
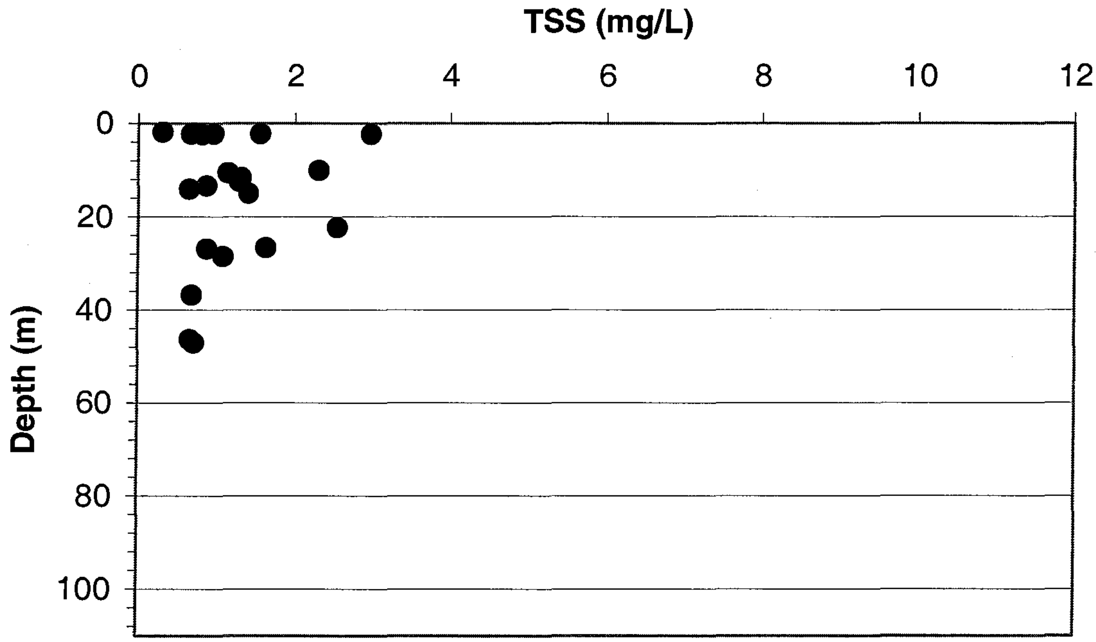


Figure D-63. Depth vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

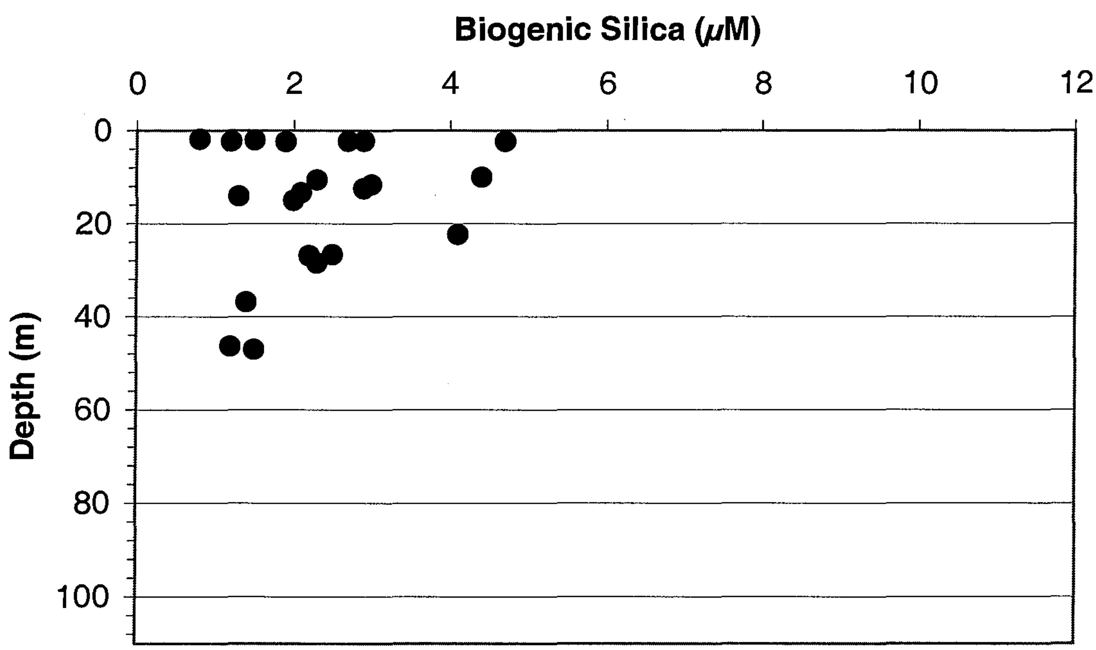
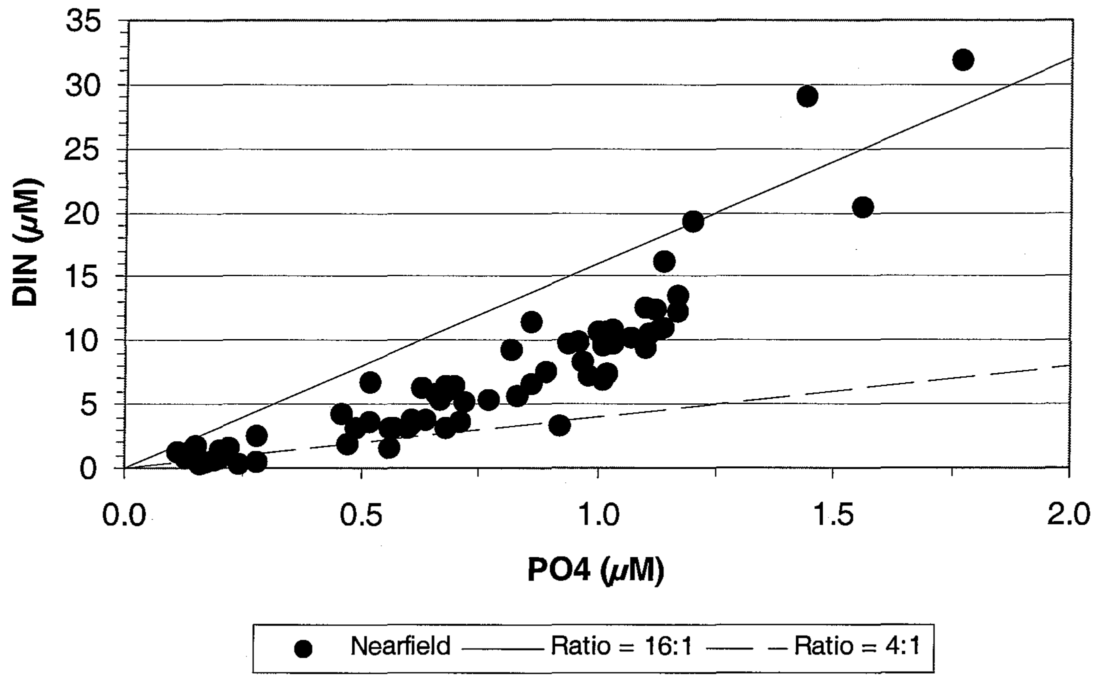


Figure D-64. Depth vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

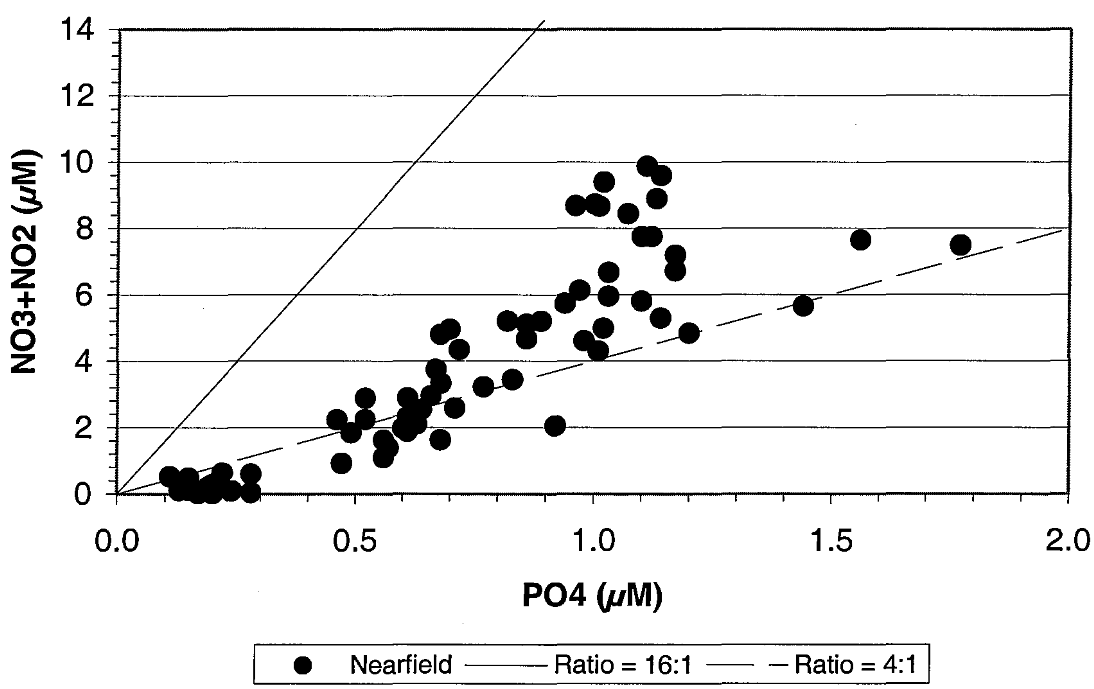
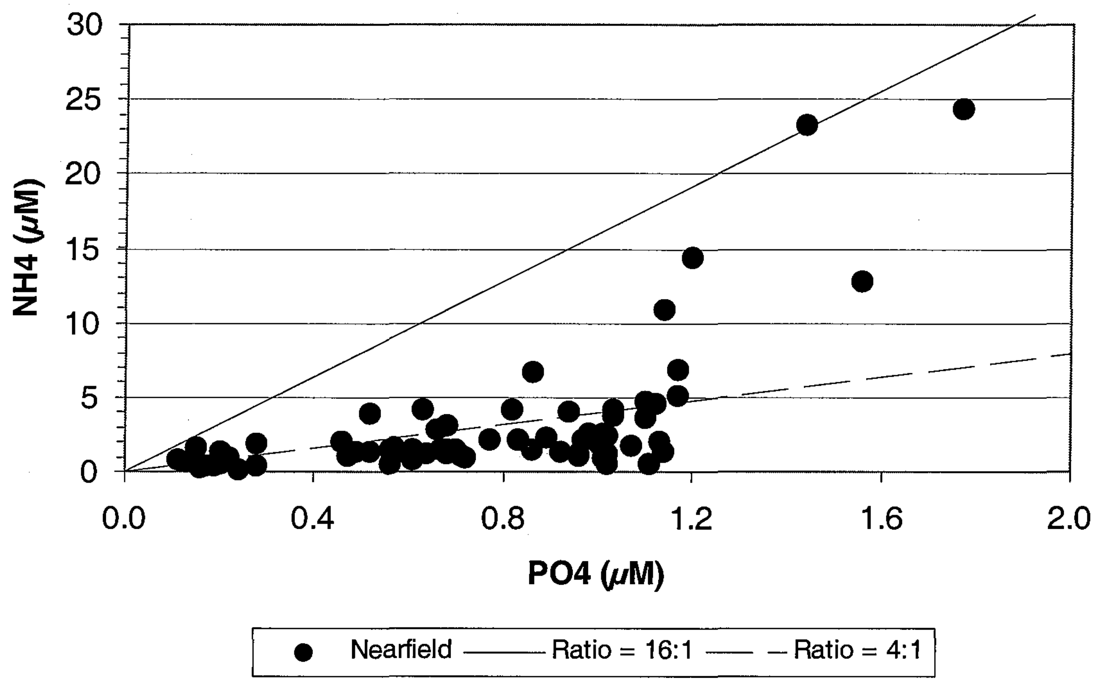


Figure D-65. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

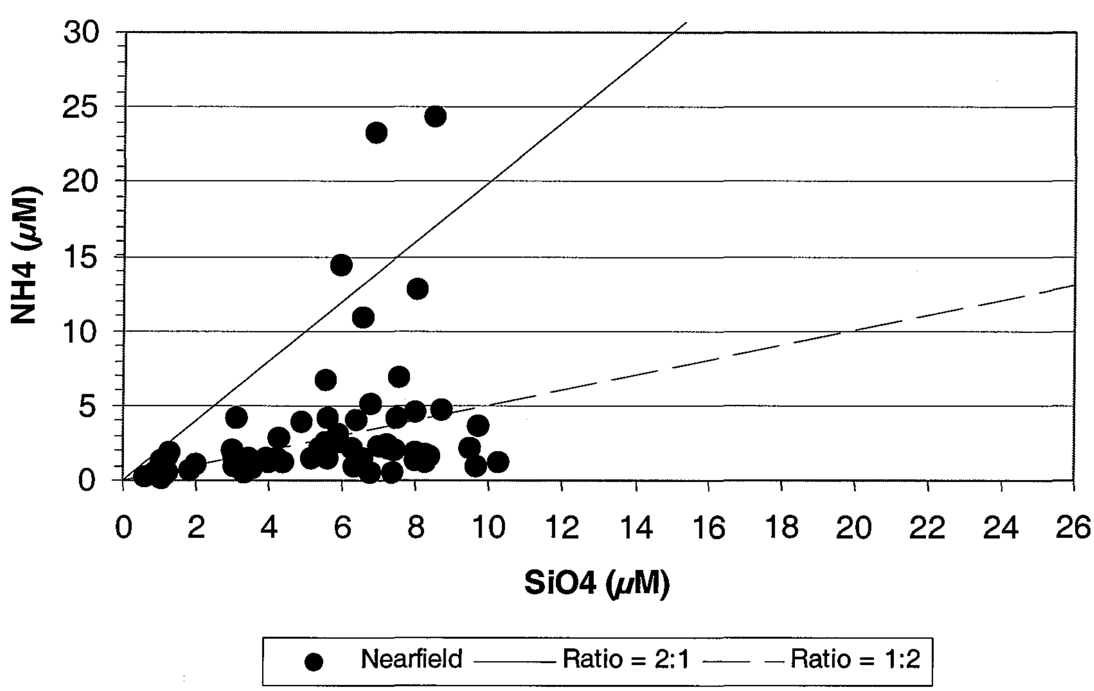
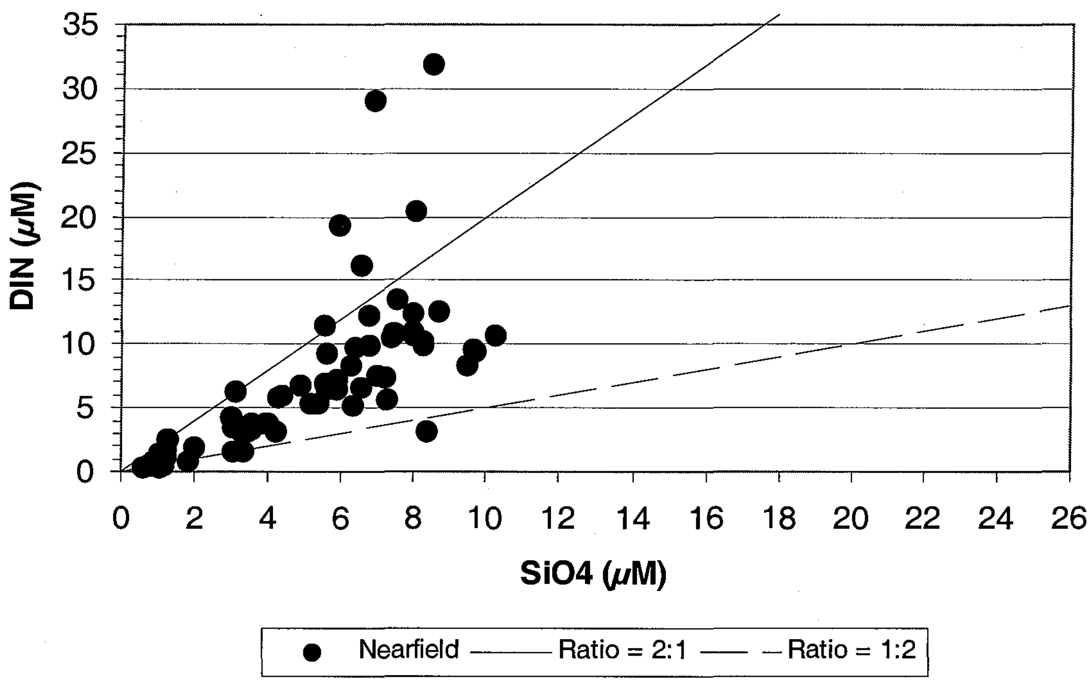


Figure D-66. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

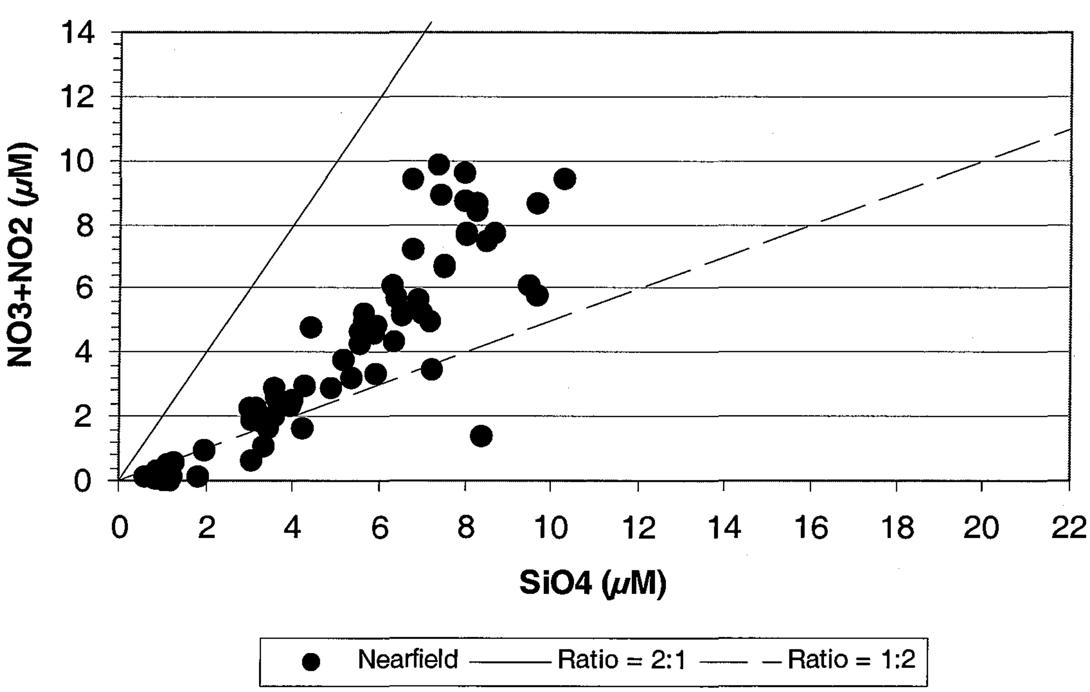
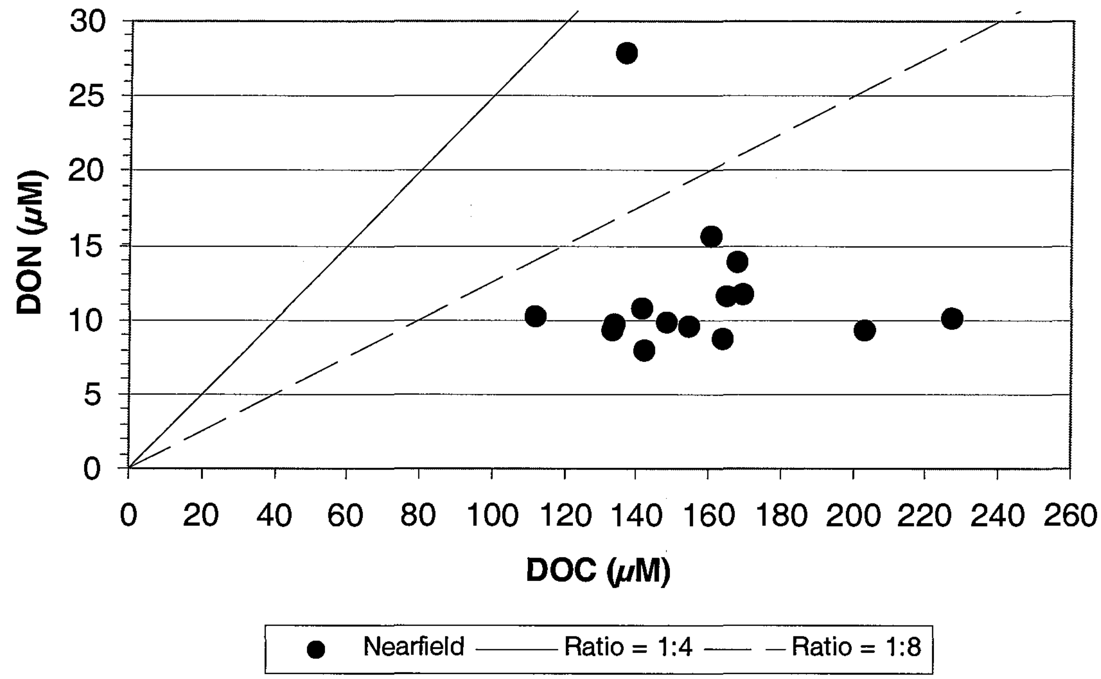


Figure D-67. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

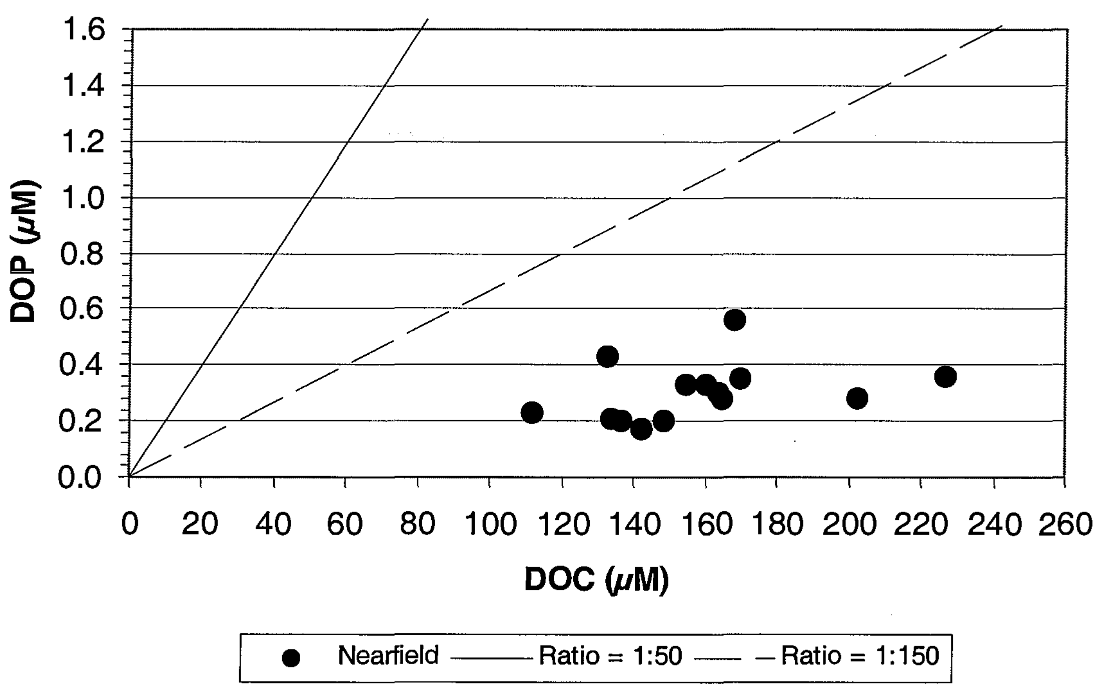
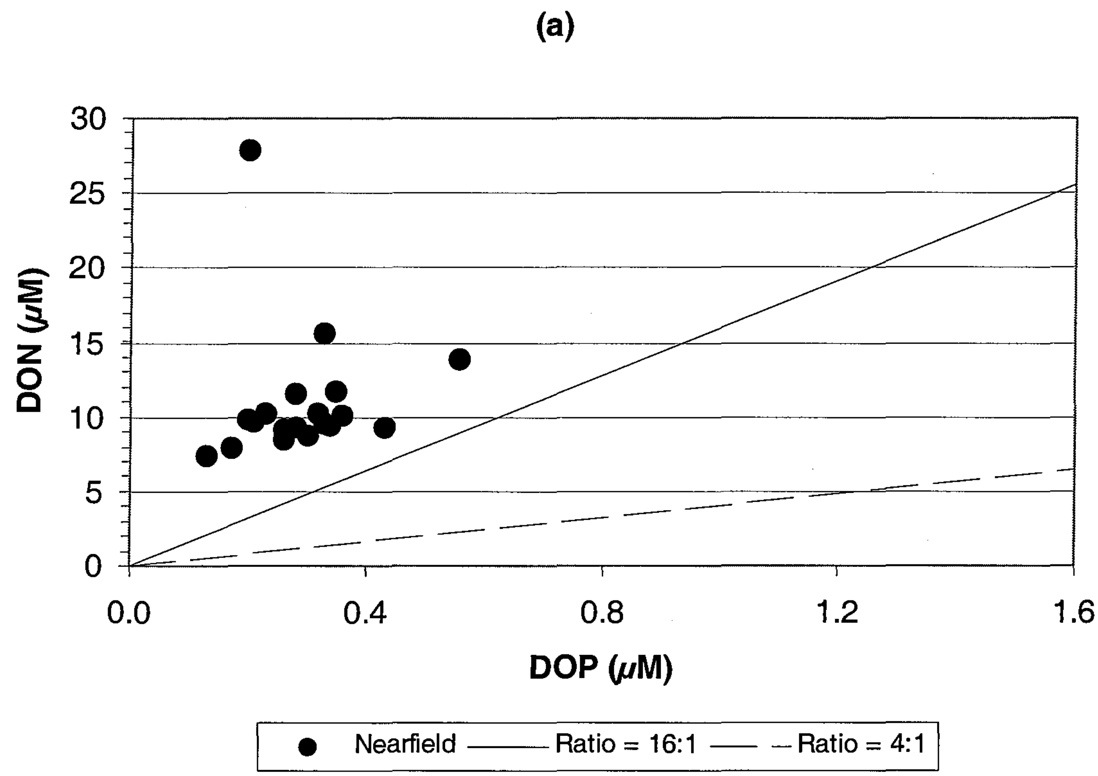


Figure D-68. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)



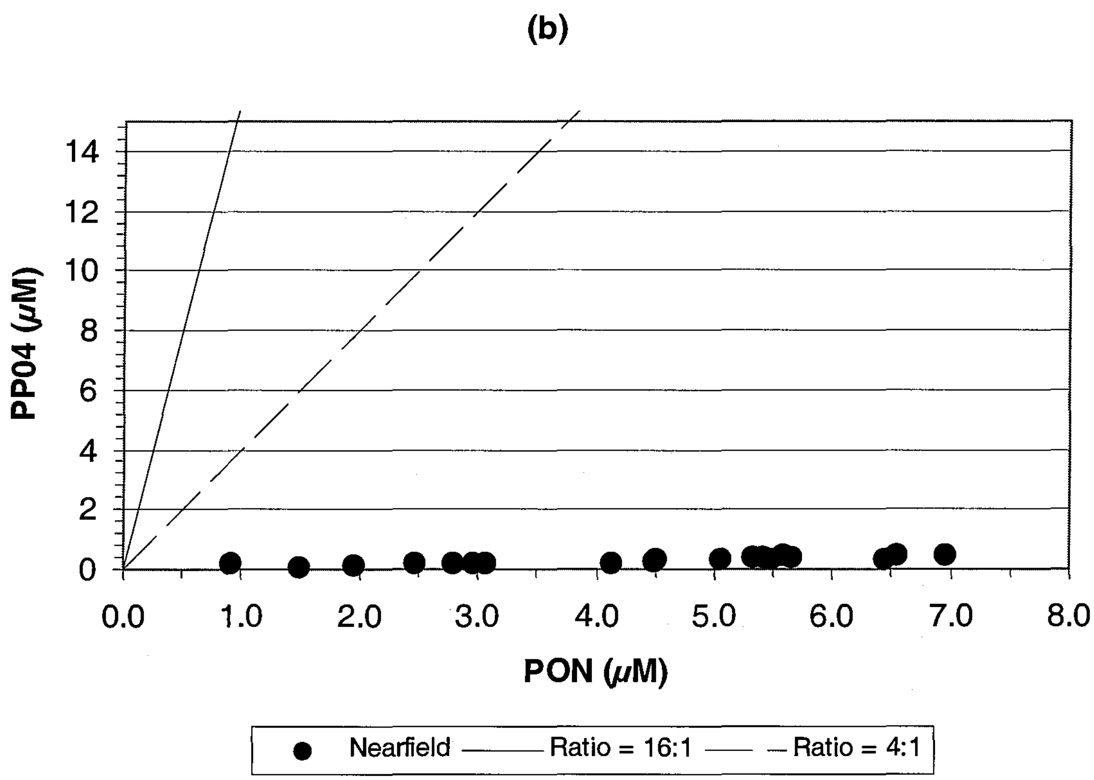
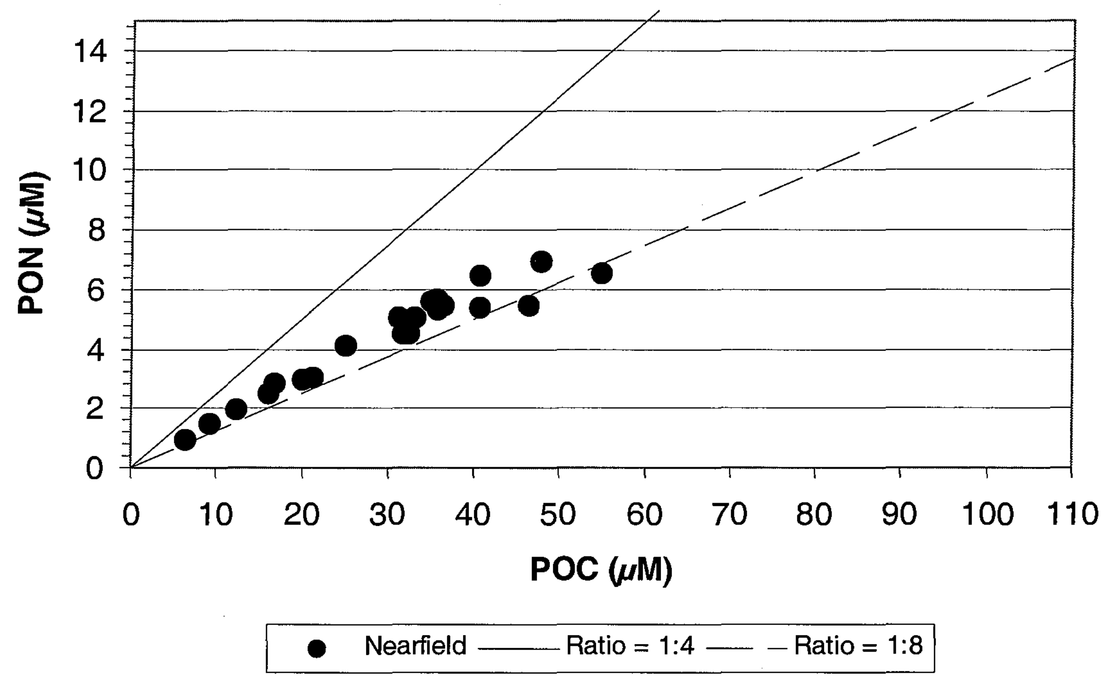


Figure D-69. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

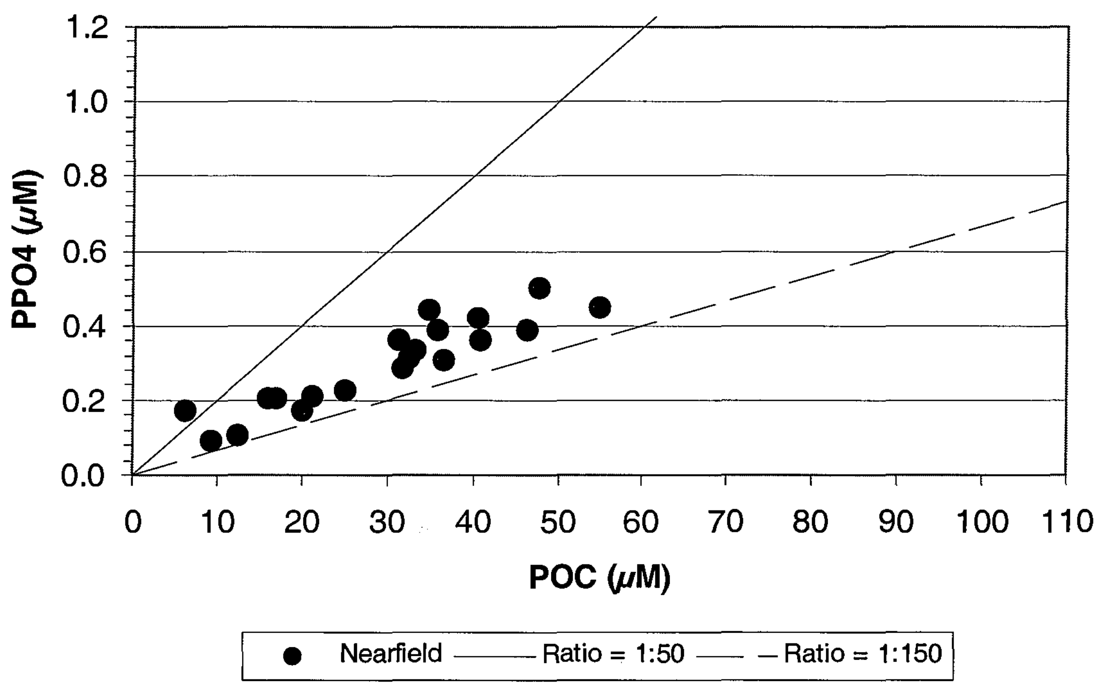


Figure D-70. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

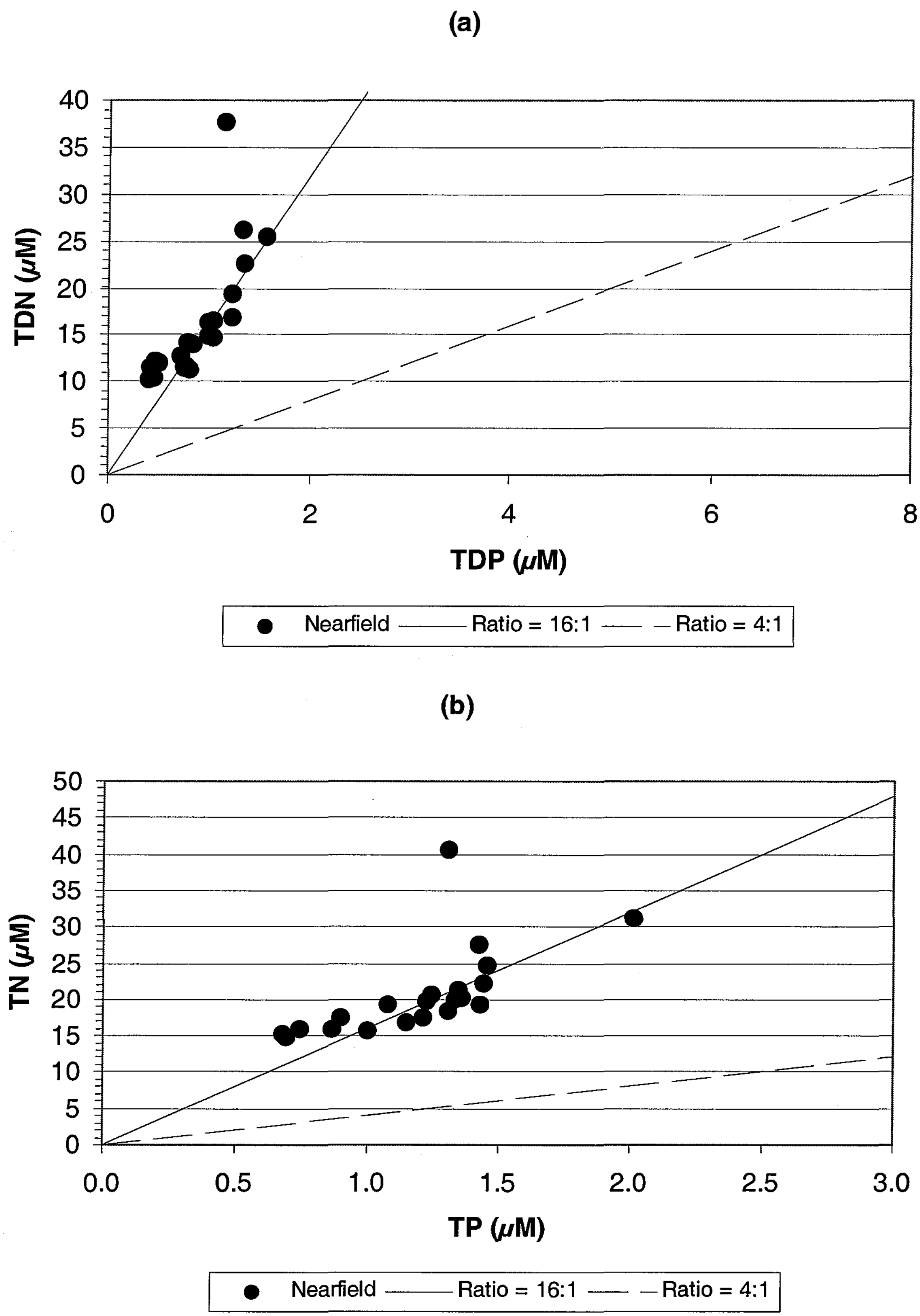
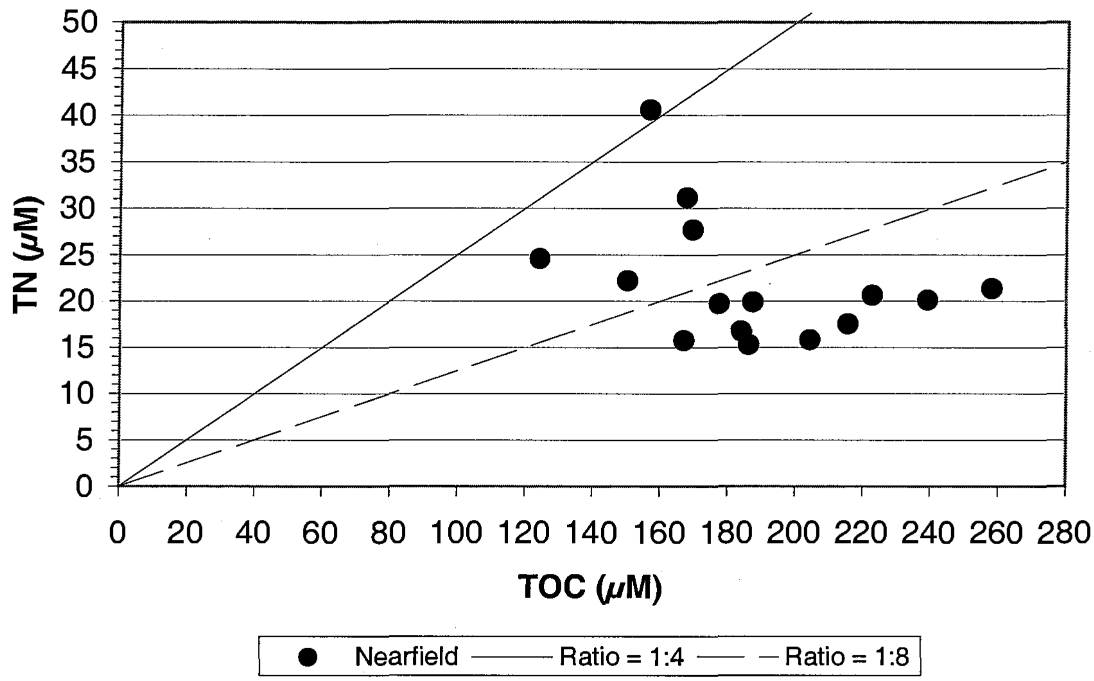


Figure D-71. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

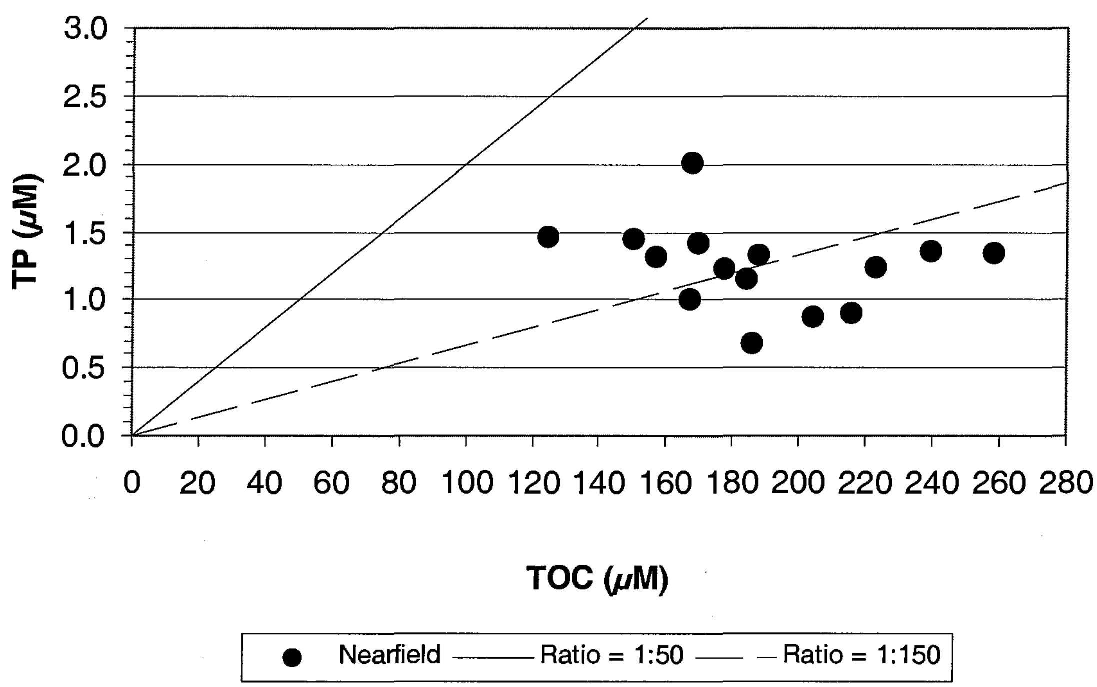


Figure D-72. Nutrient vs. Nutrient Plots for Nearfield Survey WN01C, (Sep 01)

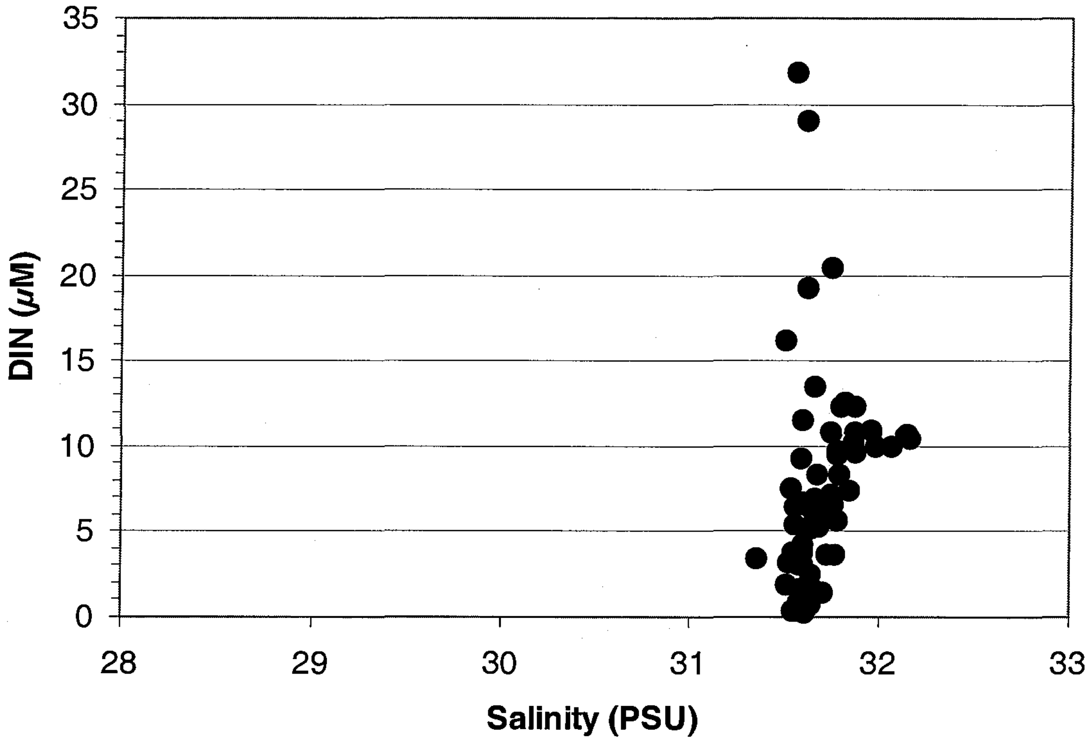
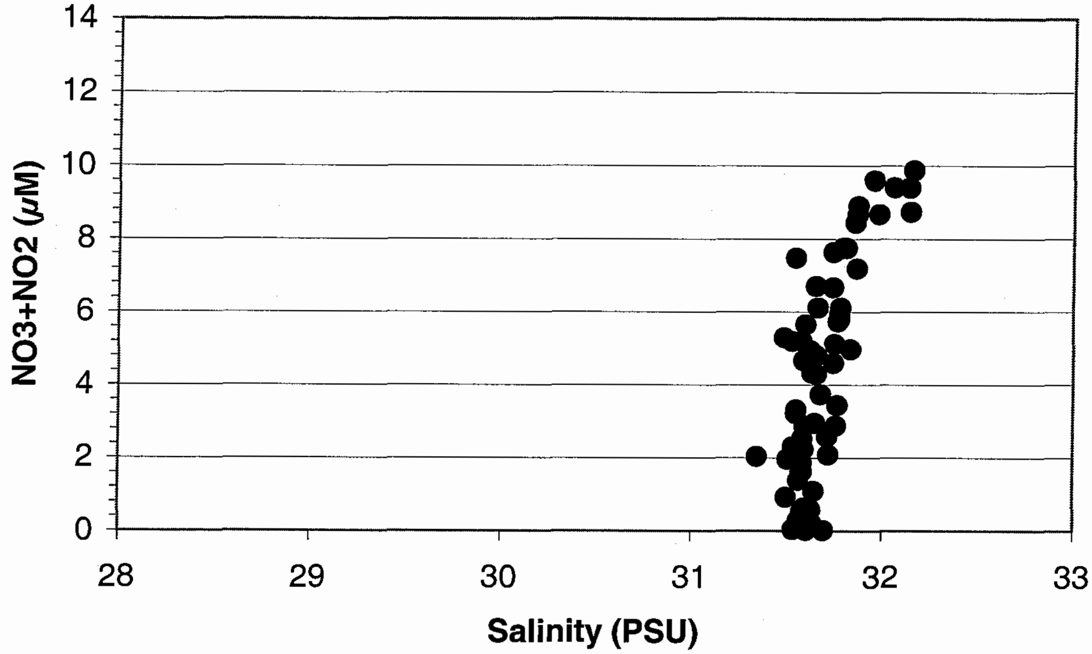


Figure D-73. Nutrient vs. Salinity Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

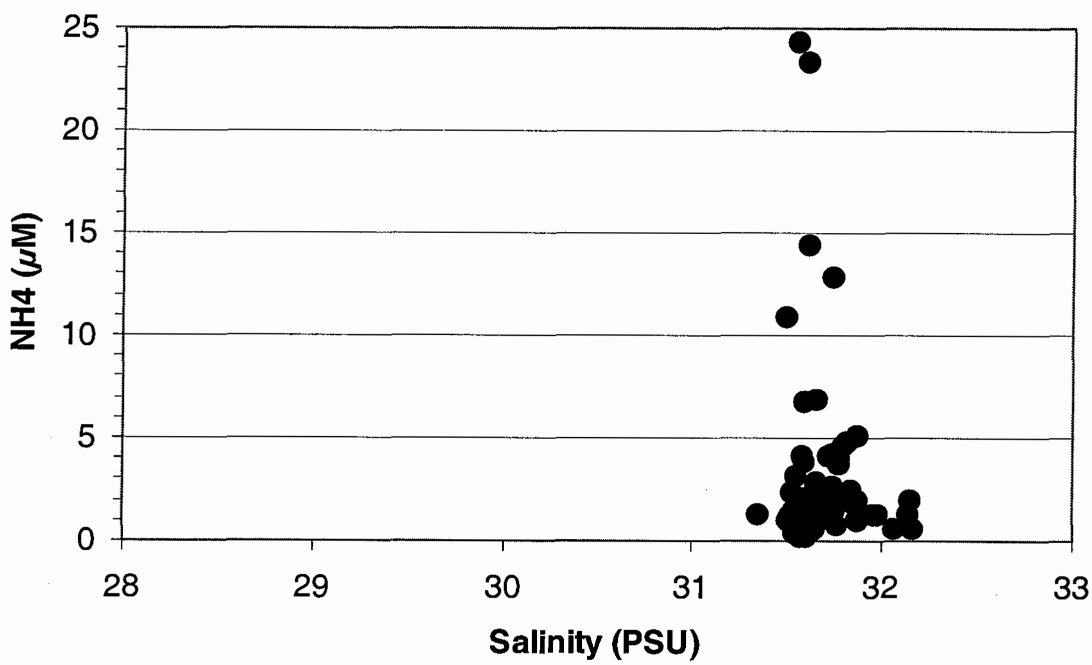
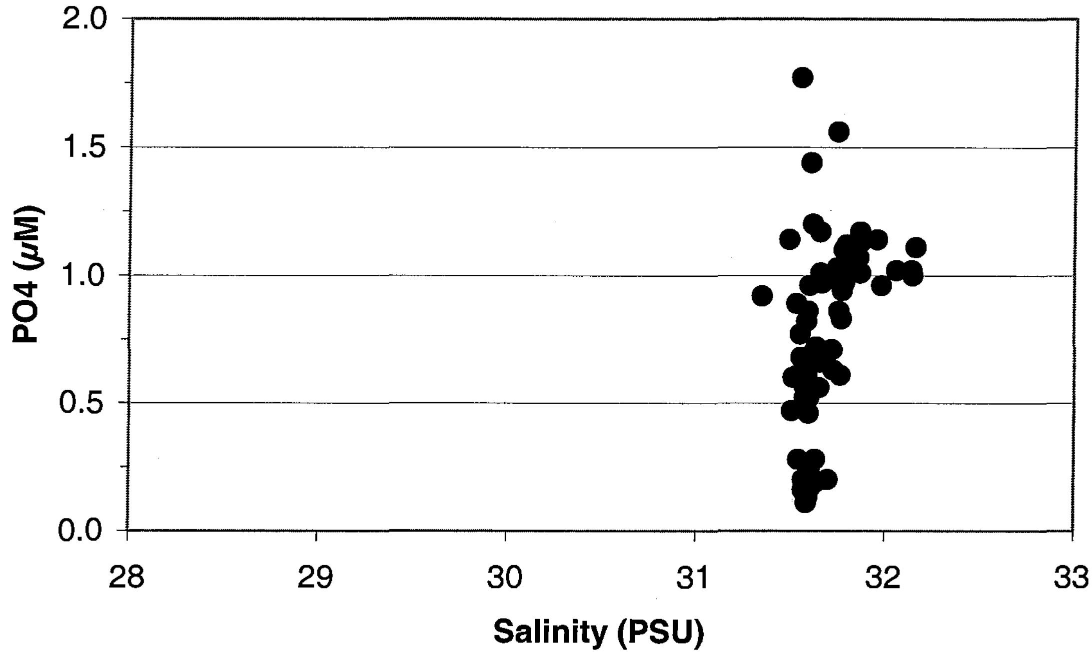


Figure D-74. Nutrient vs. Salinity Plots for Nearfield Survey WN01C, (Sep 01)

(a)



(b)

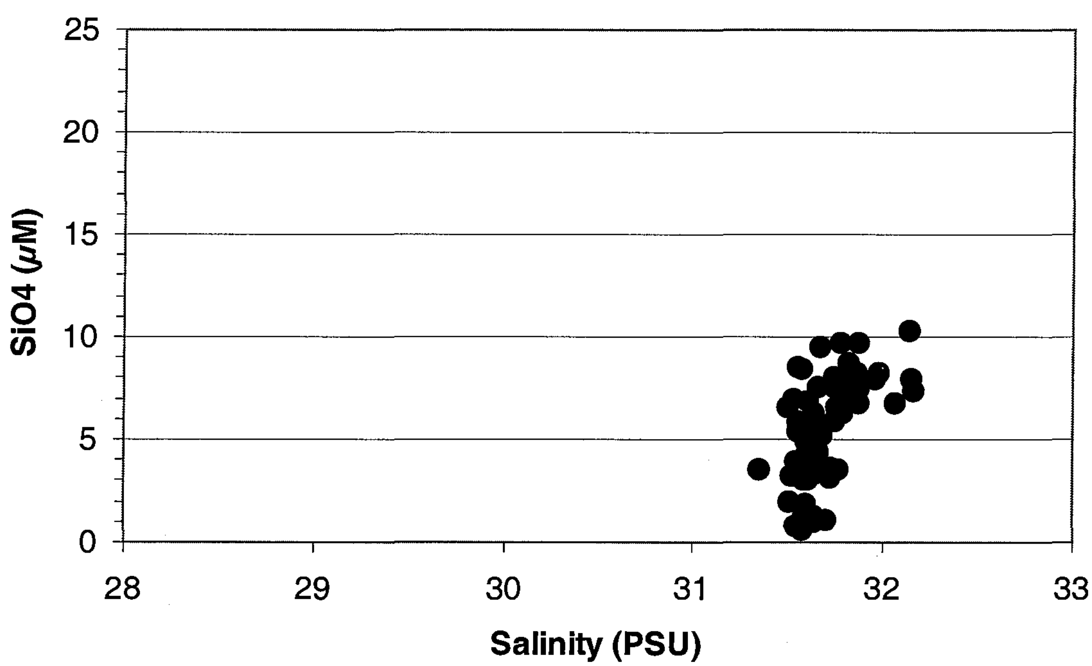


Figure D-75. Nutrient vs. Salinity Plots for Nearfield Survey WN01C, (Sep 01)

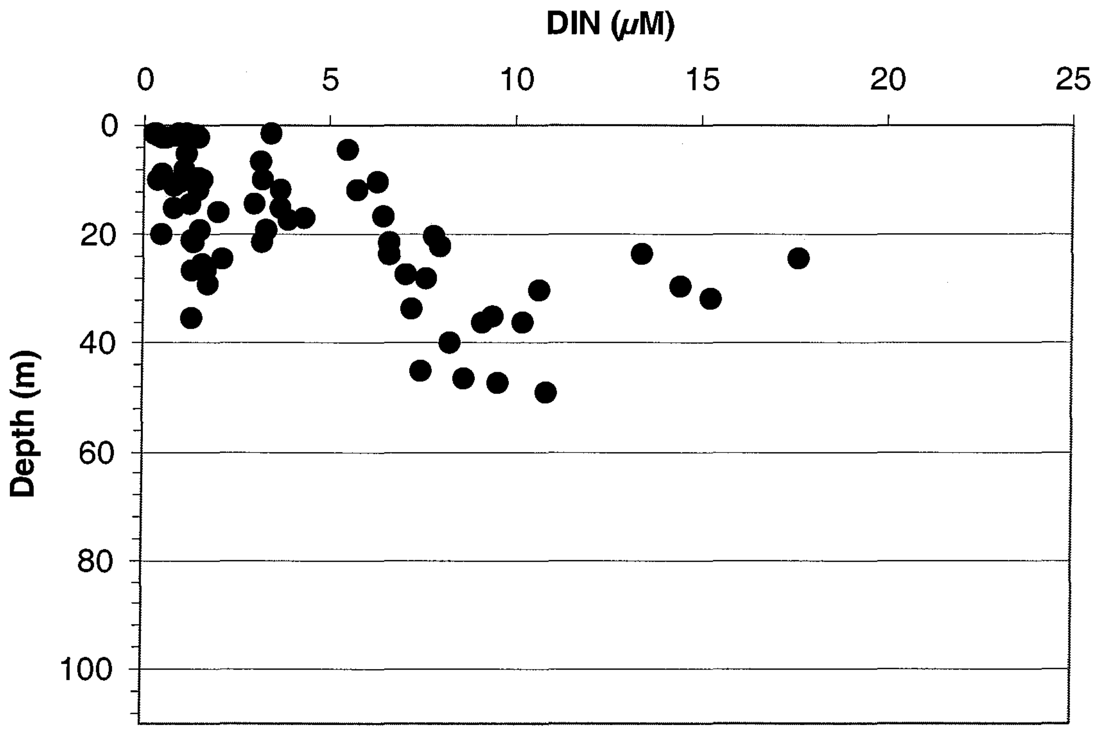
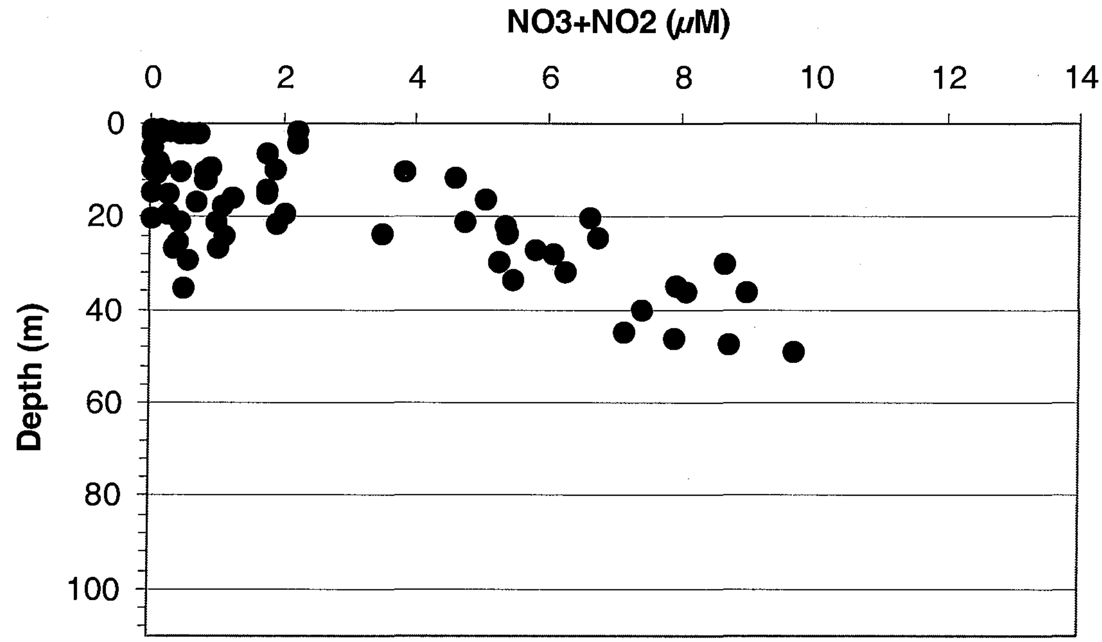


Figure D-76. Depth vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

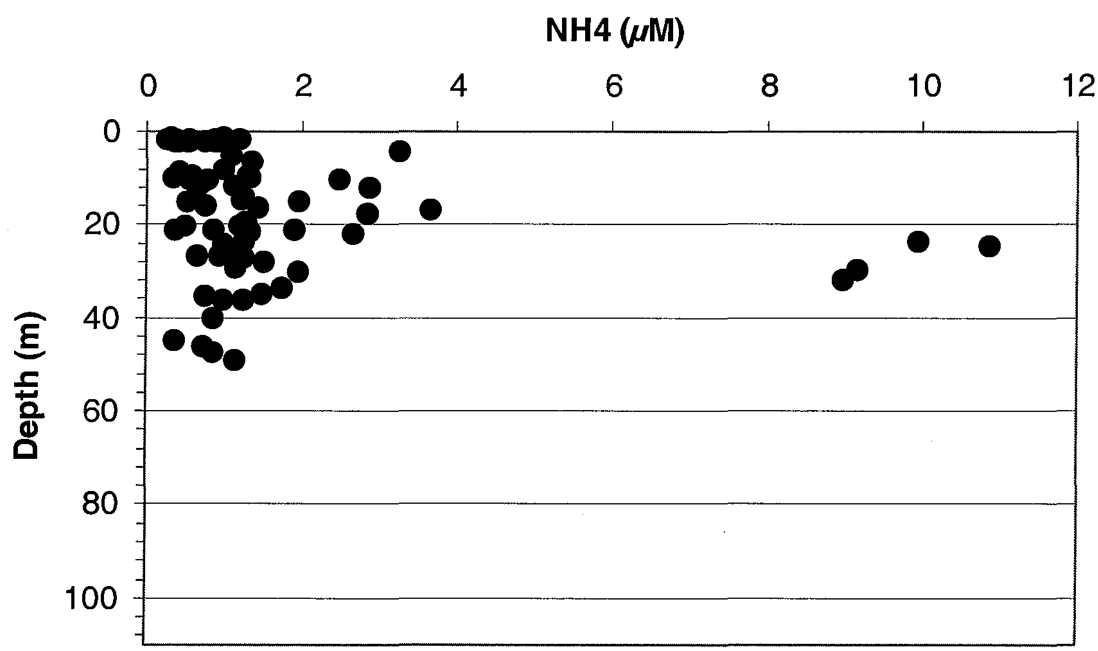
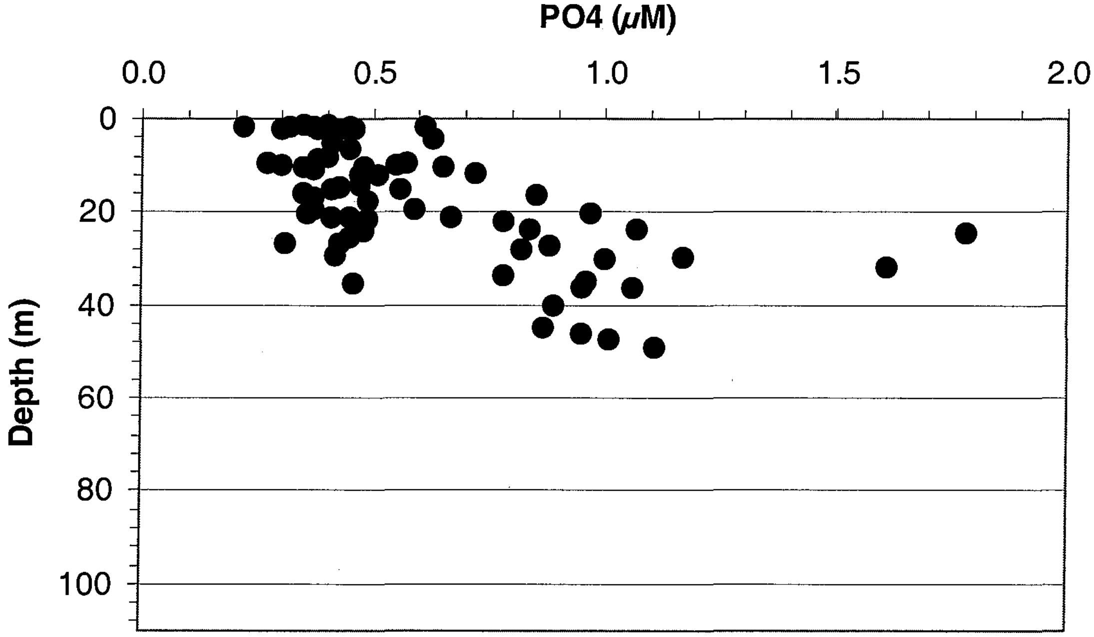


Figure D-77. Depth vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

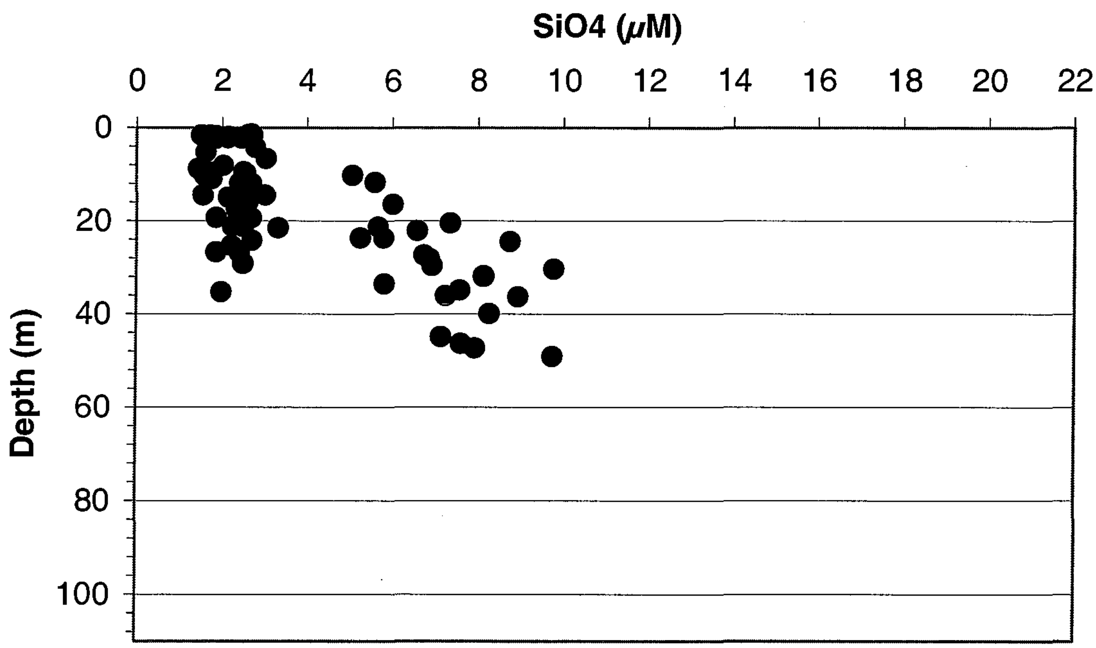
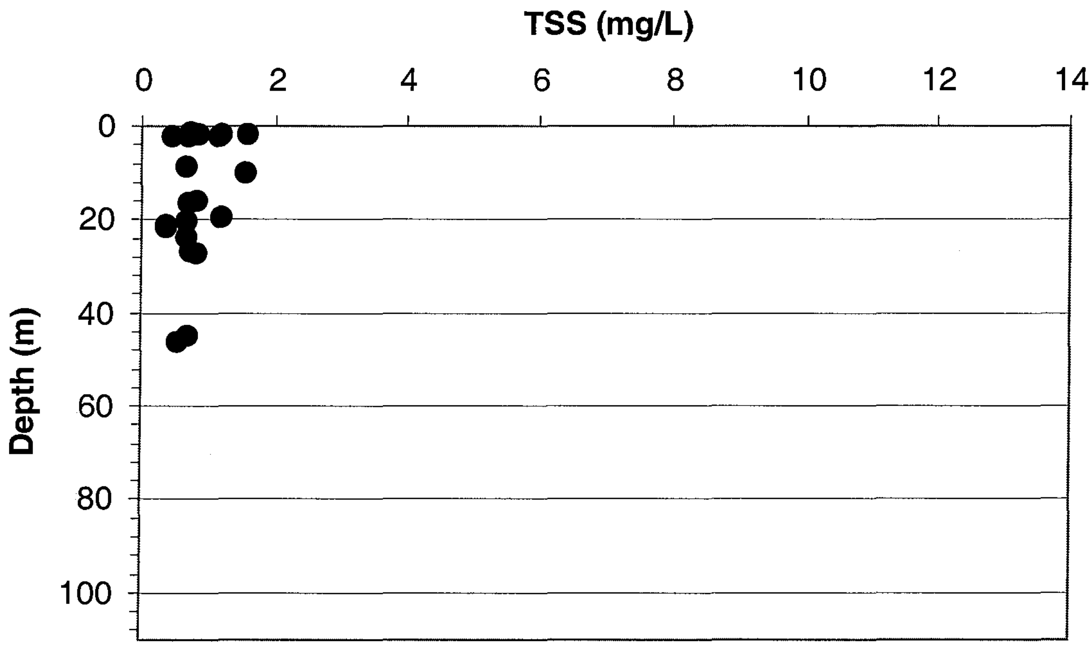


Figure D-78. Depth vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

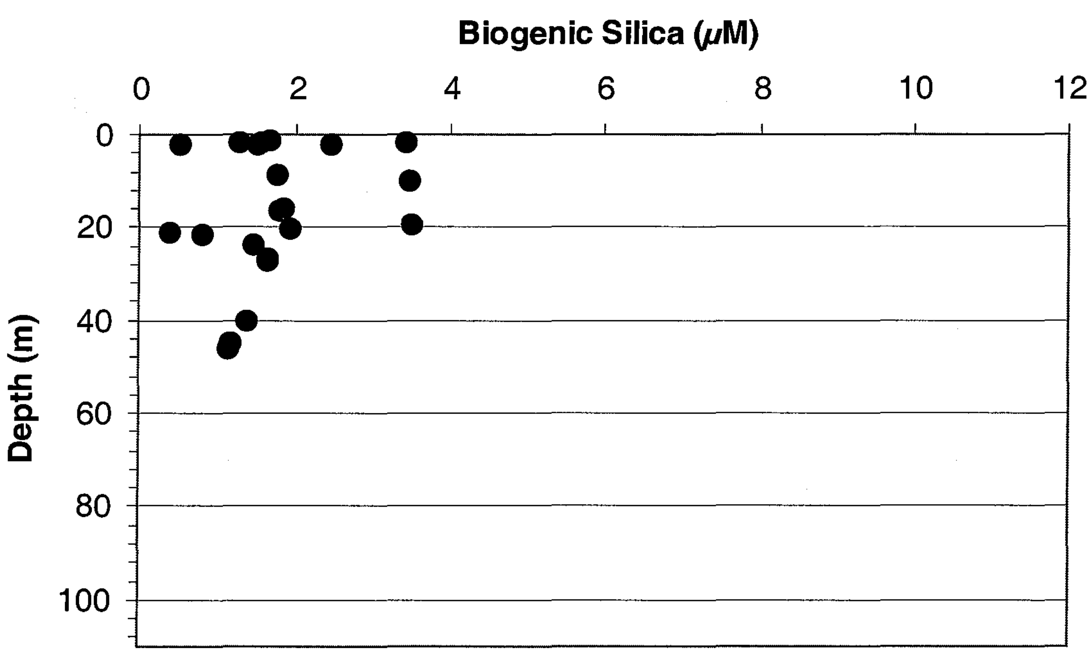
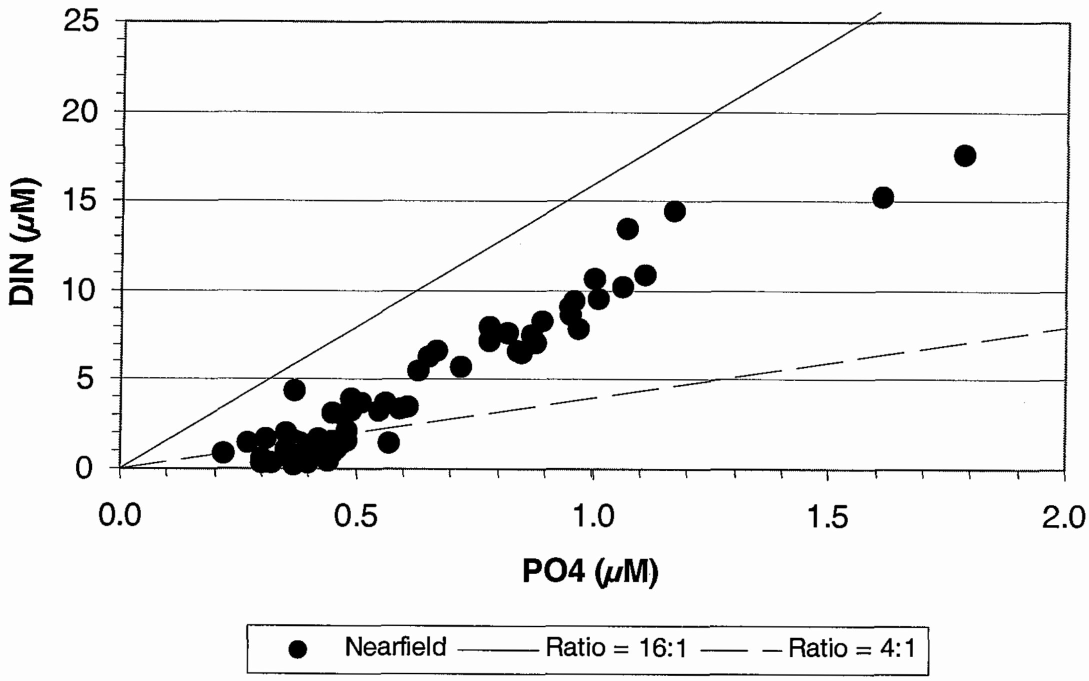


Figure D-79. Depth vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

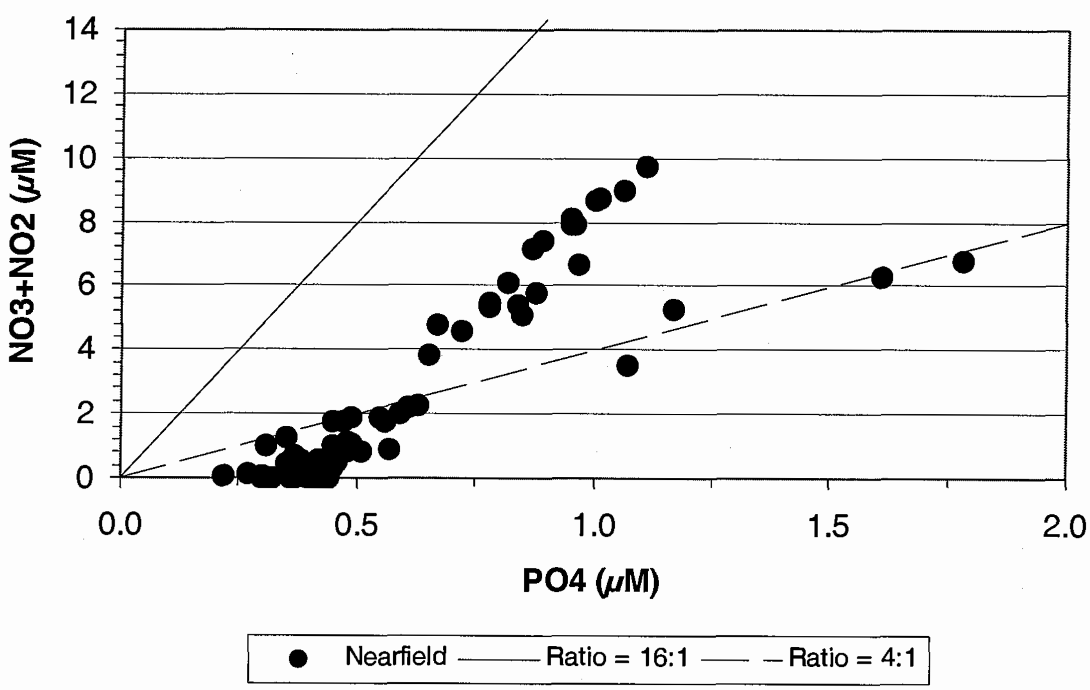
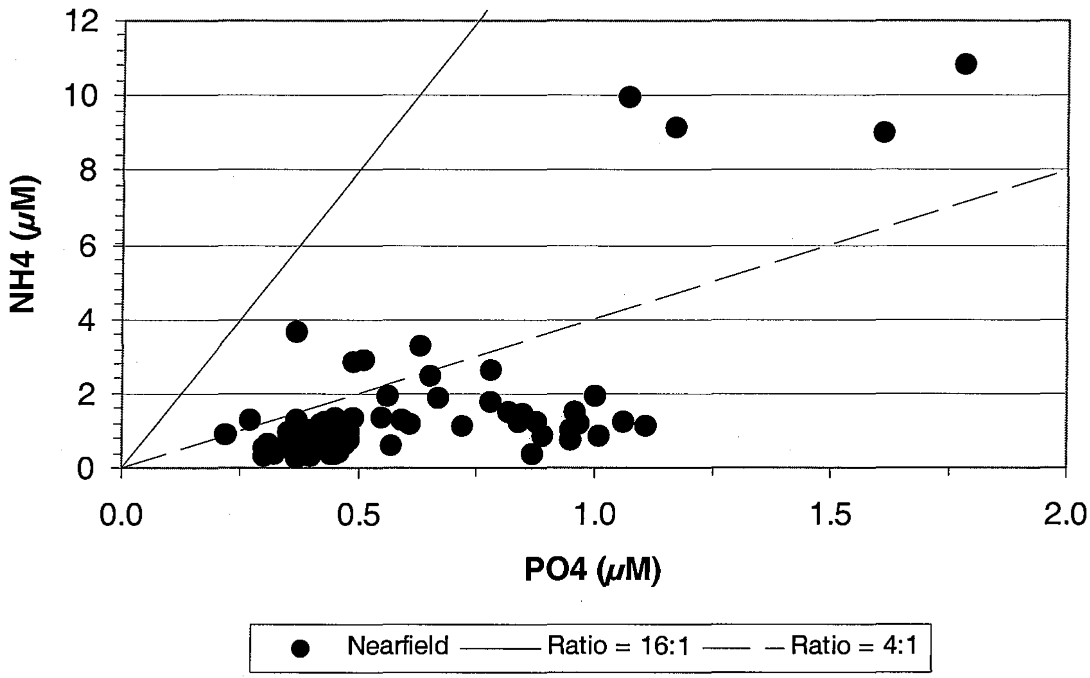


Figure D-80. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

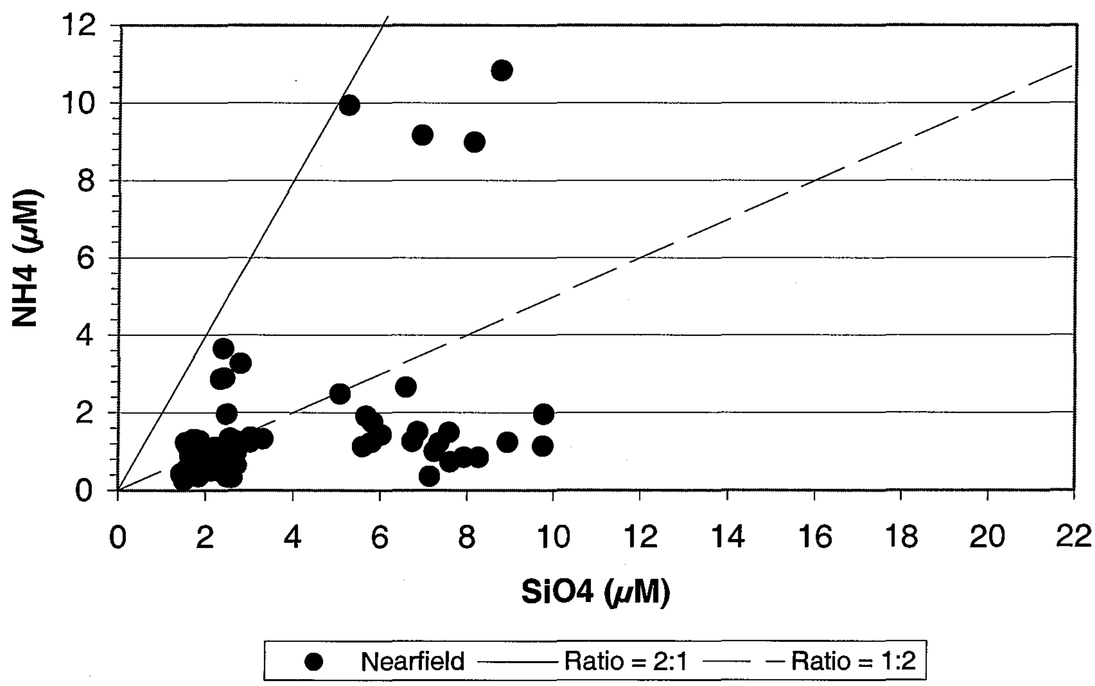
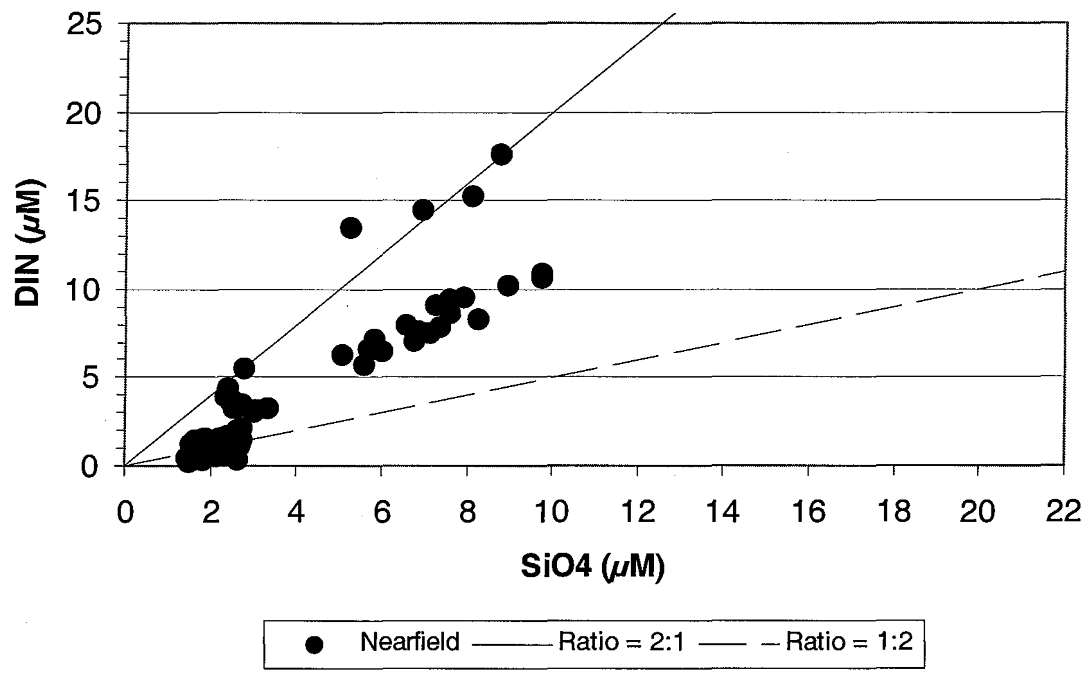


Figure D-81. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

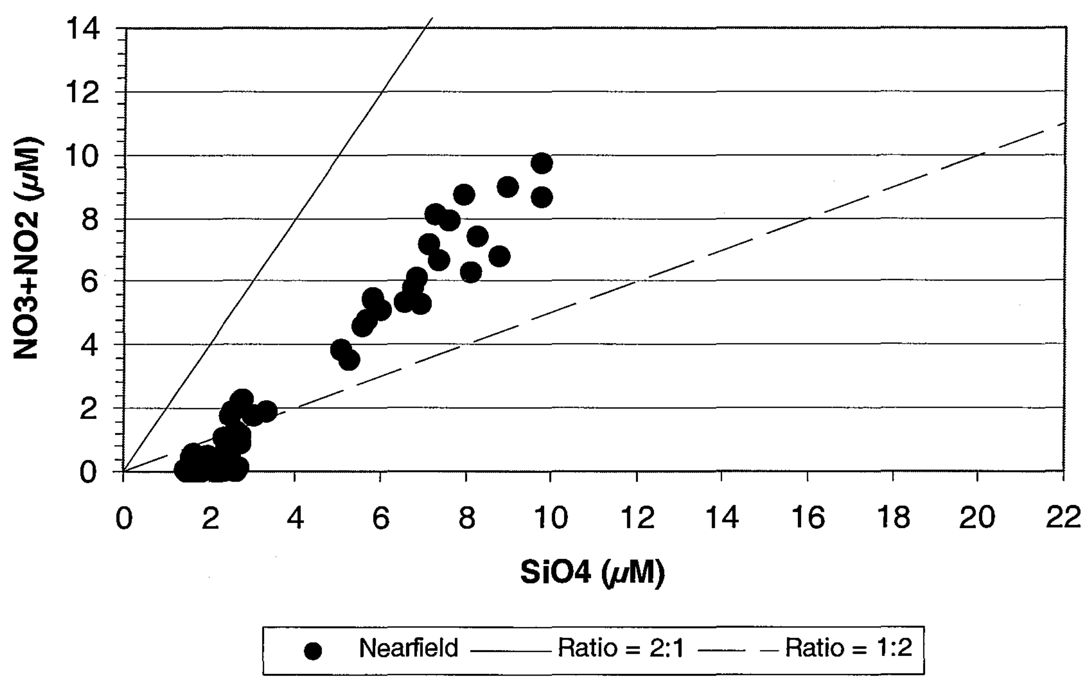
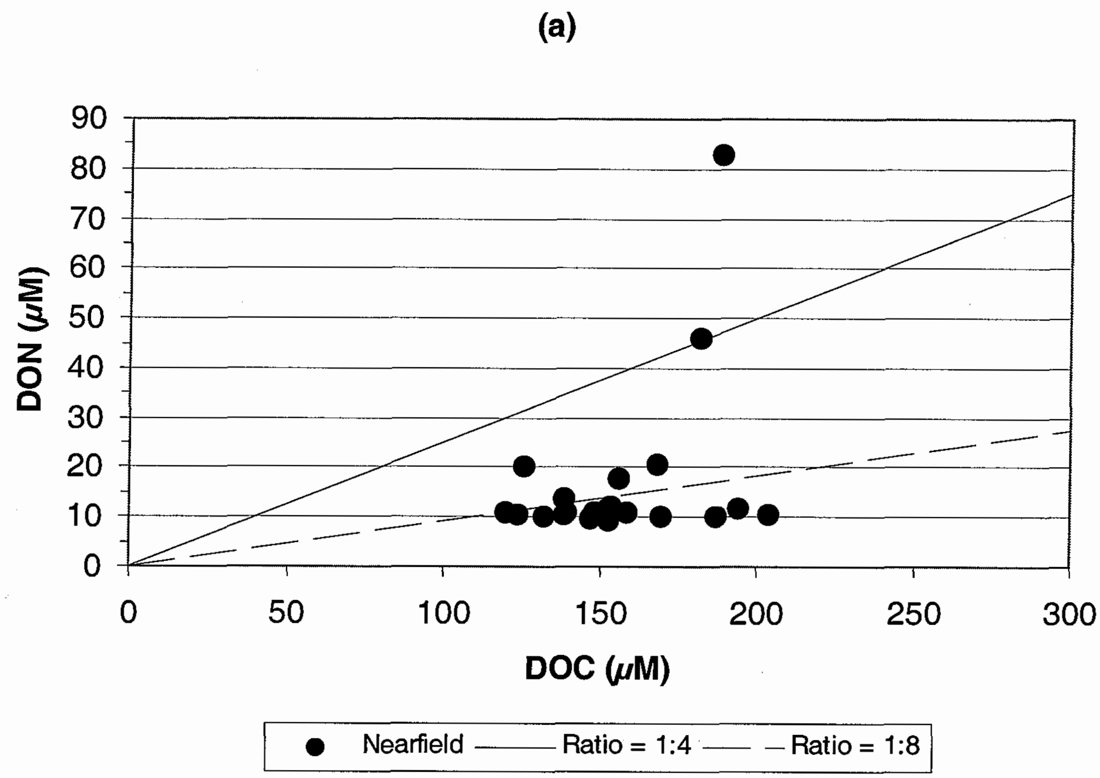


Figure D-82. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)



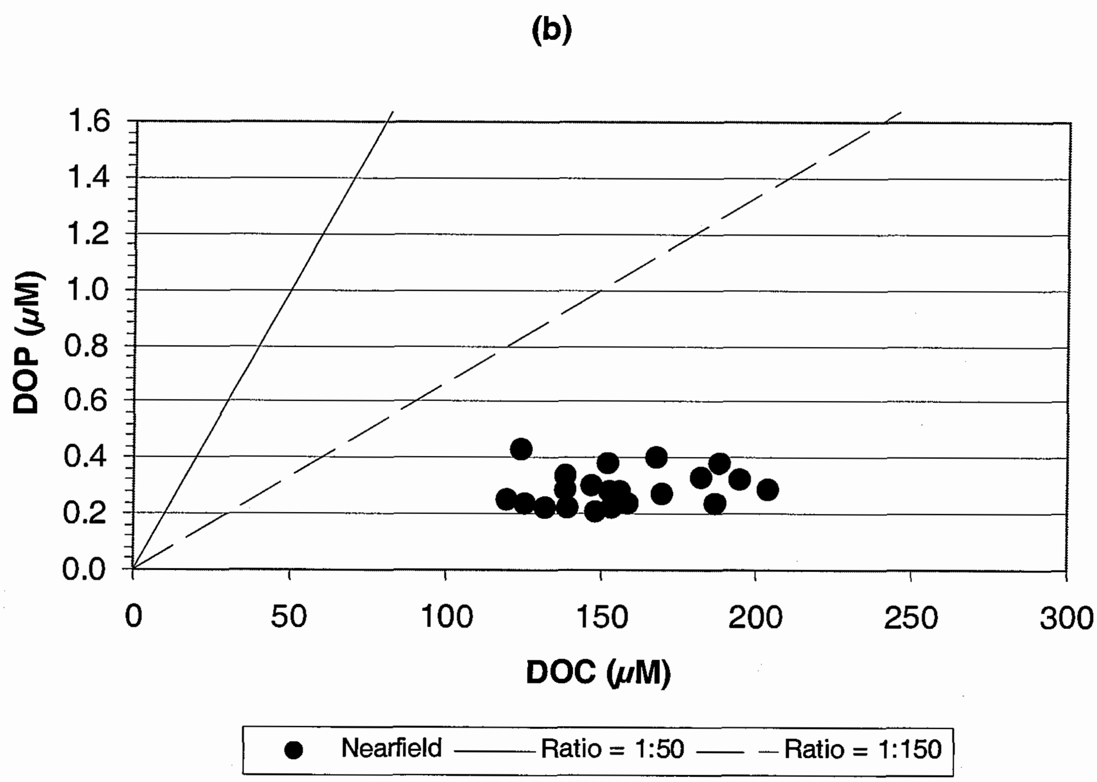
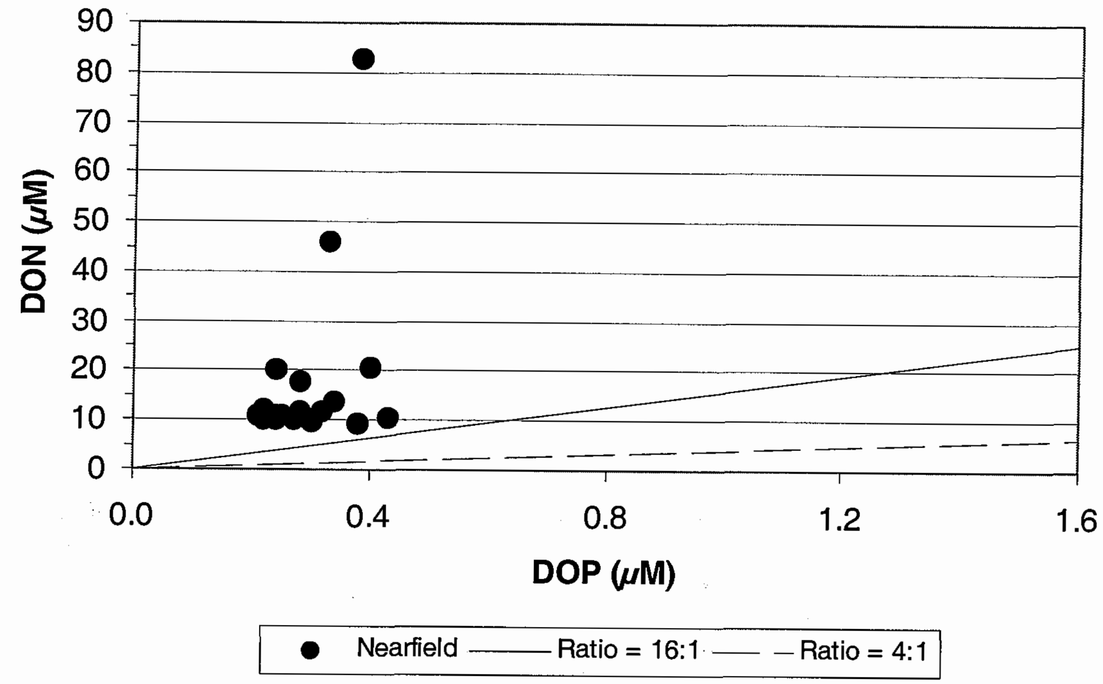


Figure D-83. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

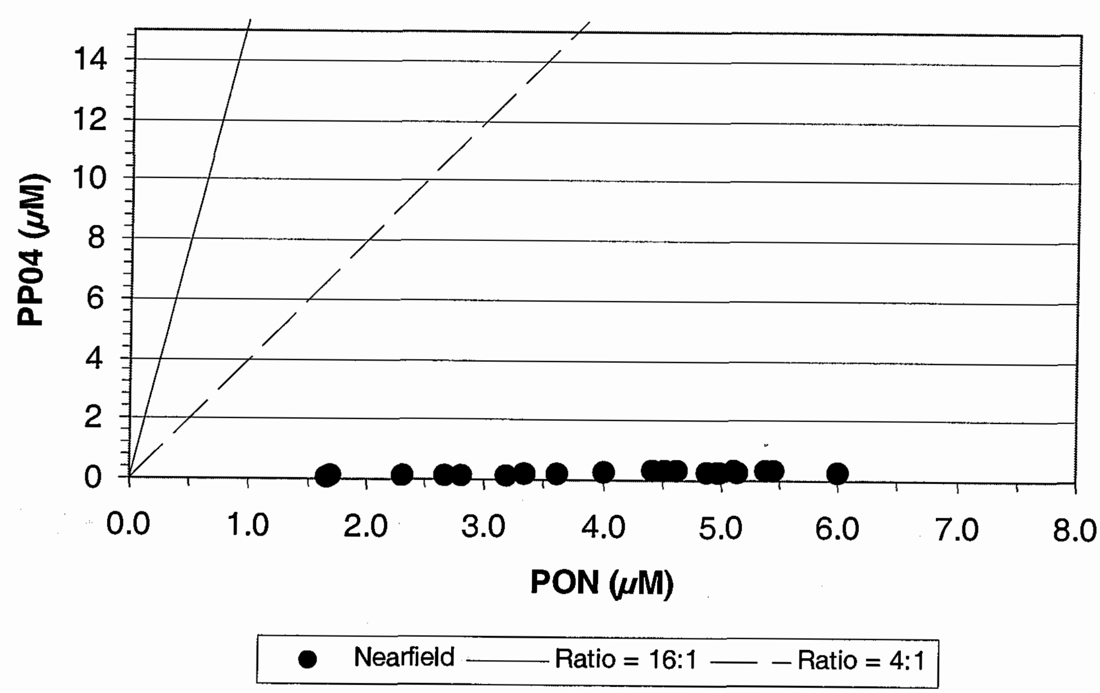
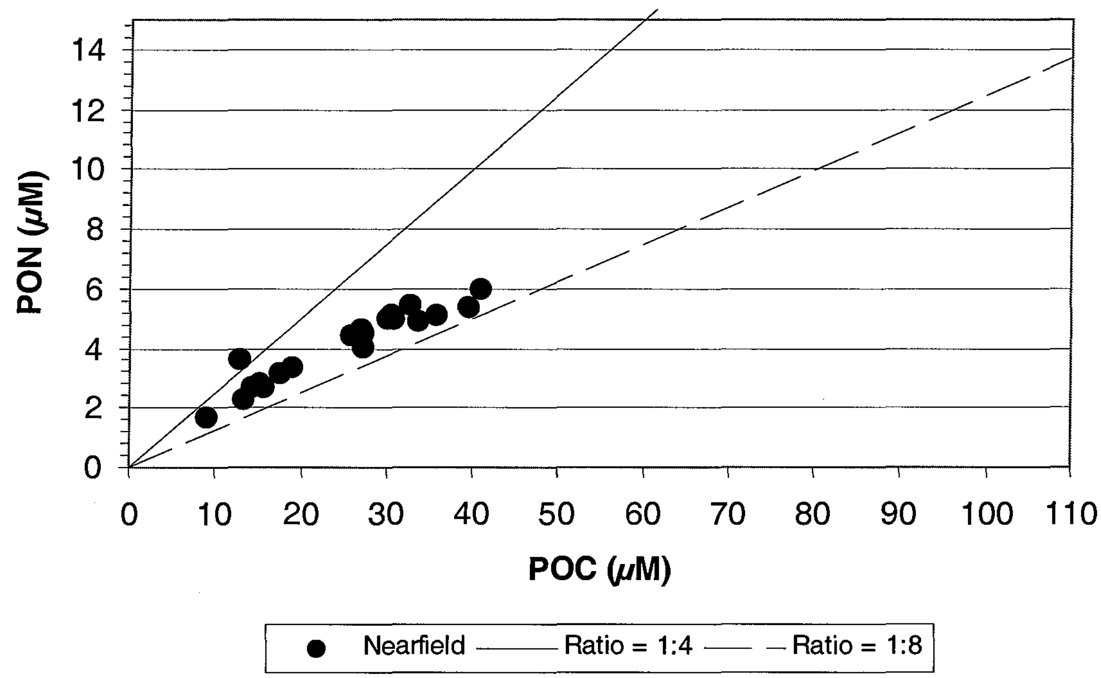


Figure D-84. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

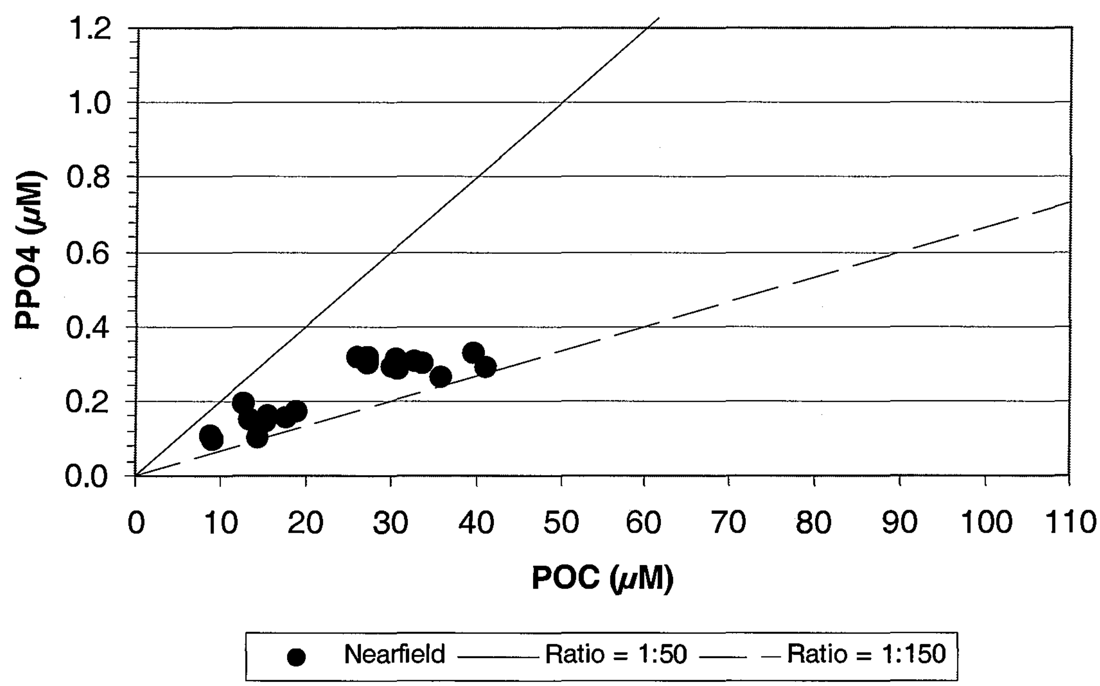
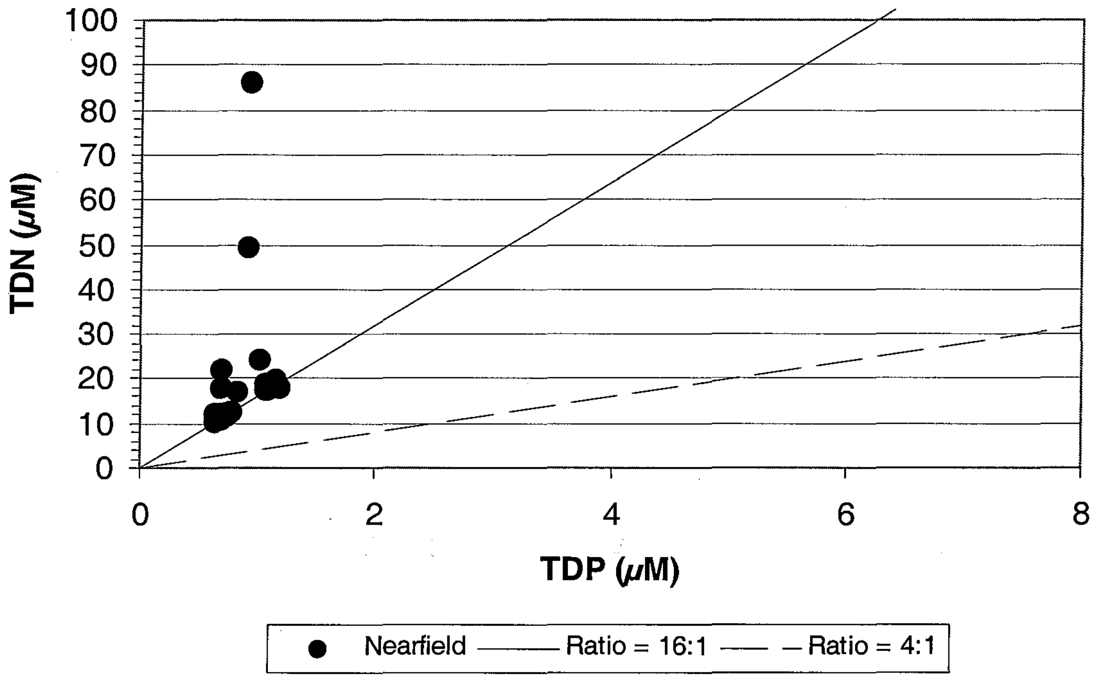


Figure D-85. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

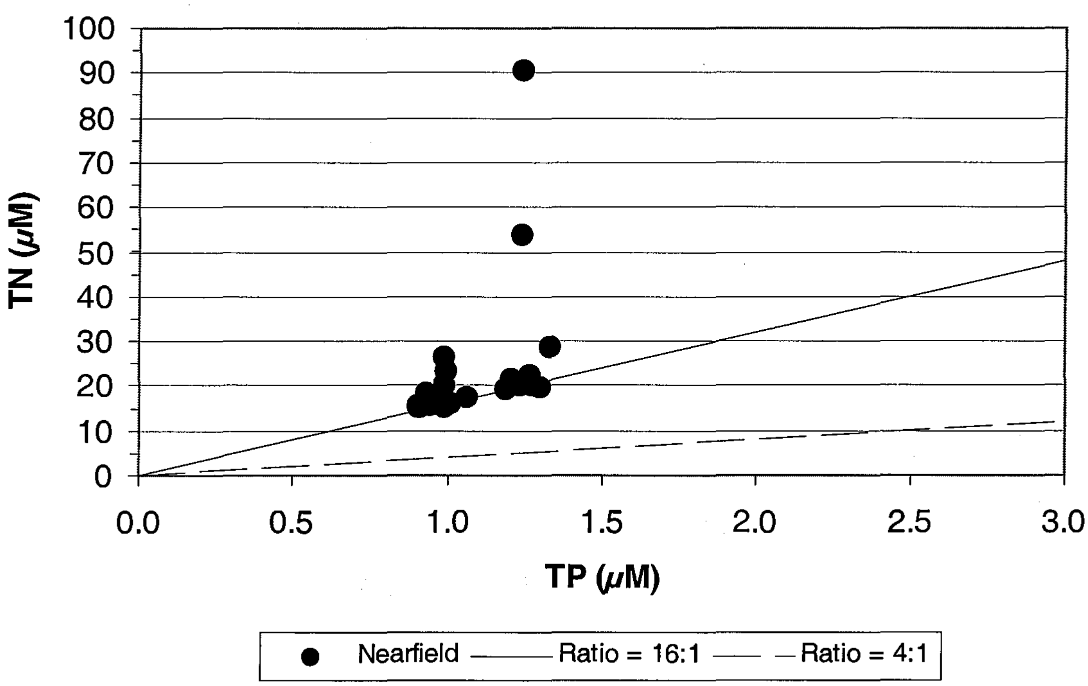
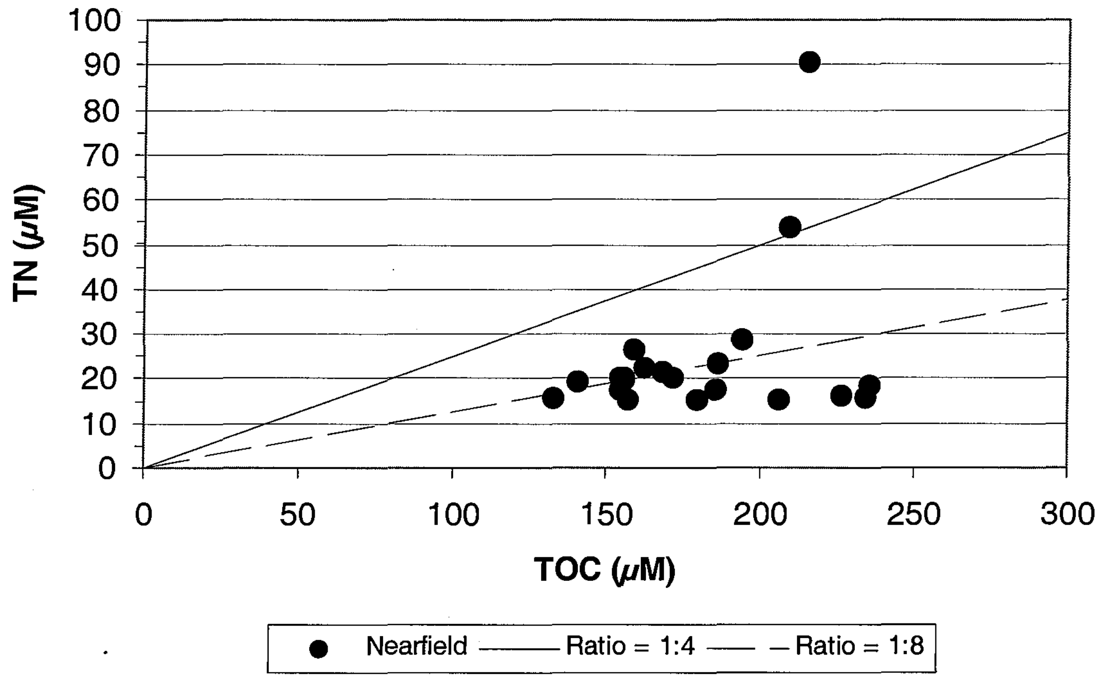


Figure D-86. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

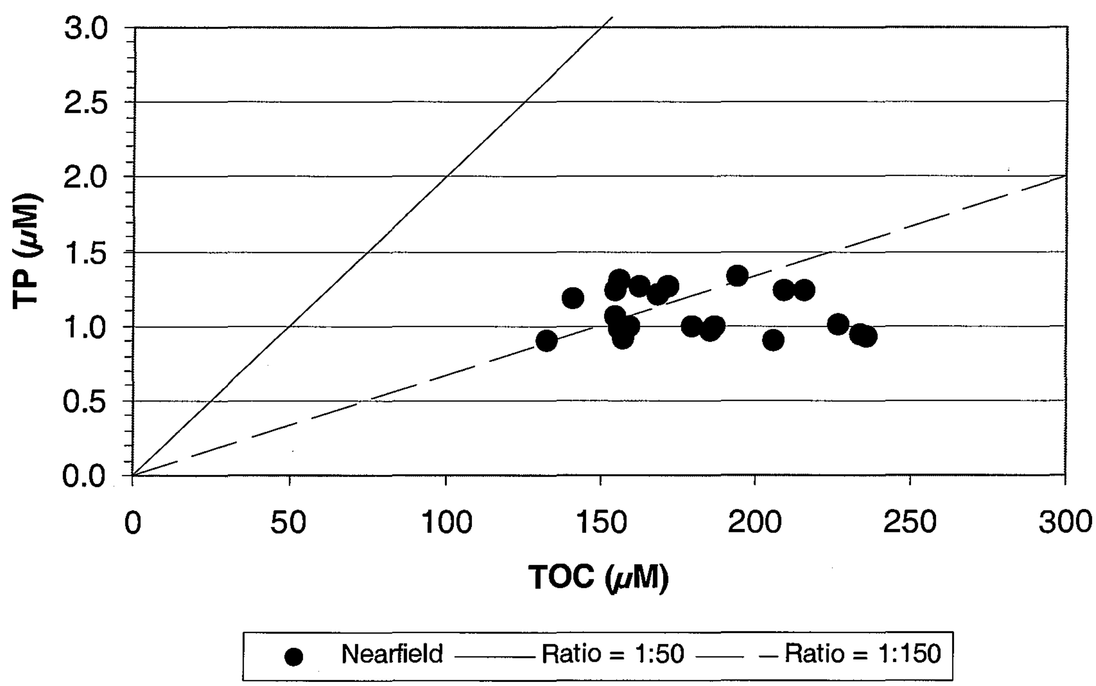


Figure D-87. Nutrient vs. Nutrient Plots for Nearfield Survey WN01D, (Sep 01)

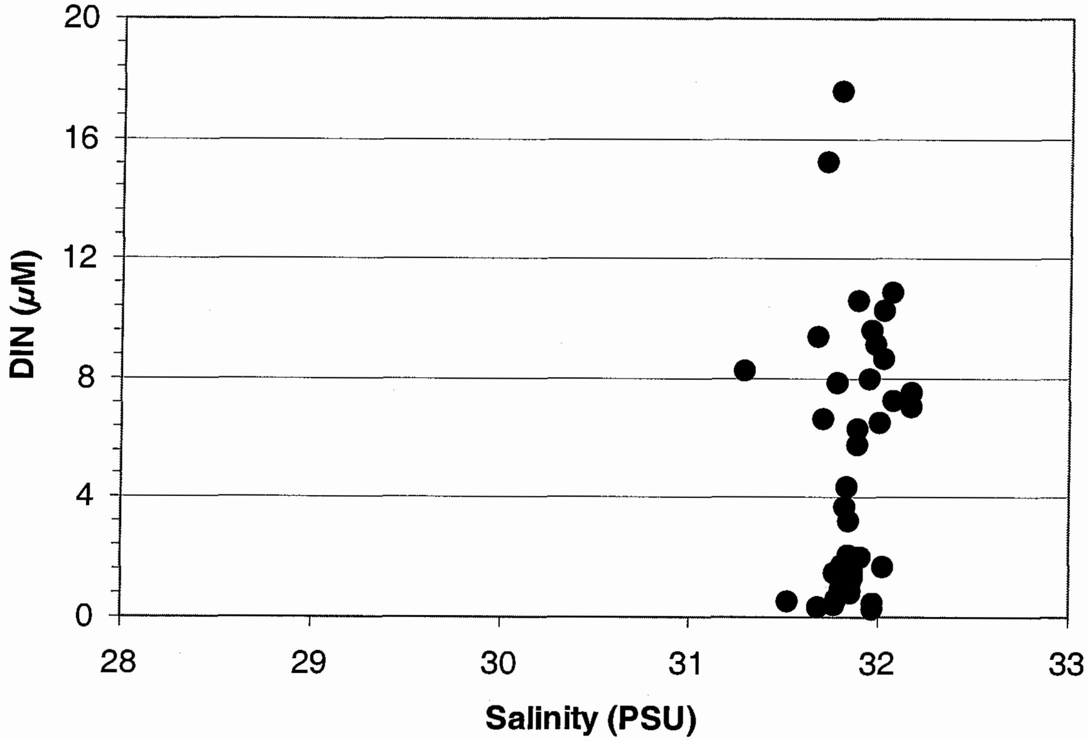
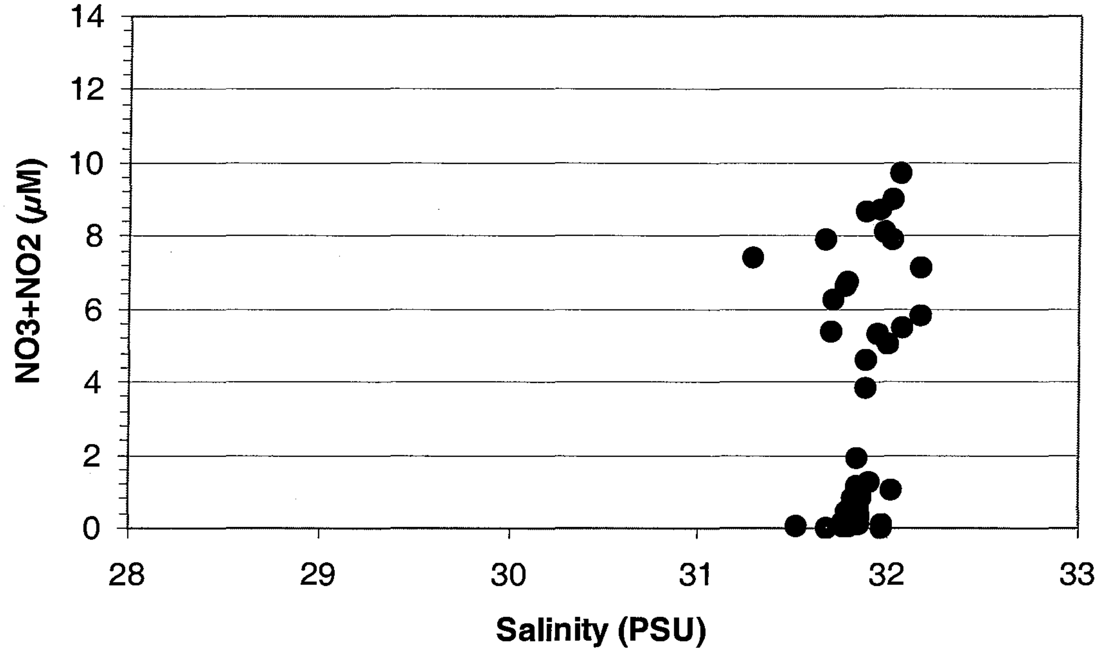


Figure D-88. Nutrient vs. Salinity Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

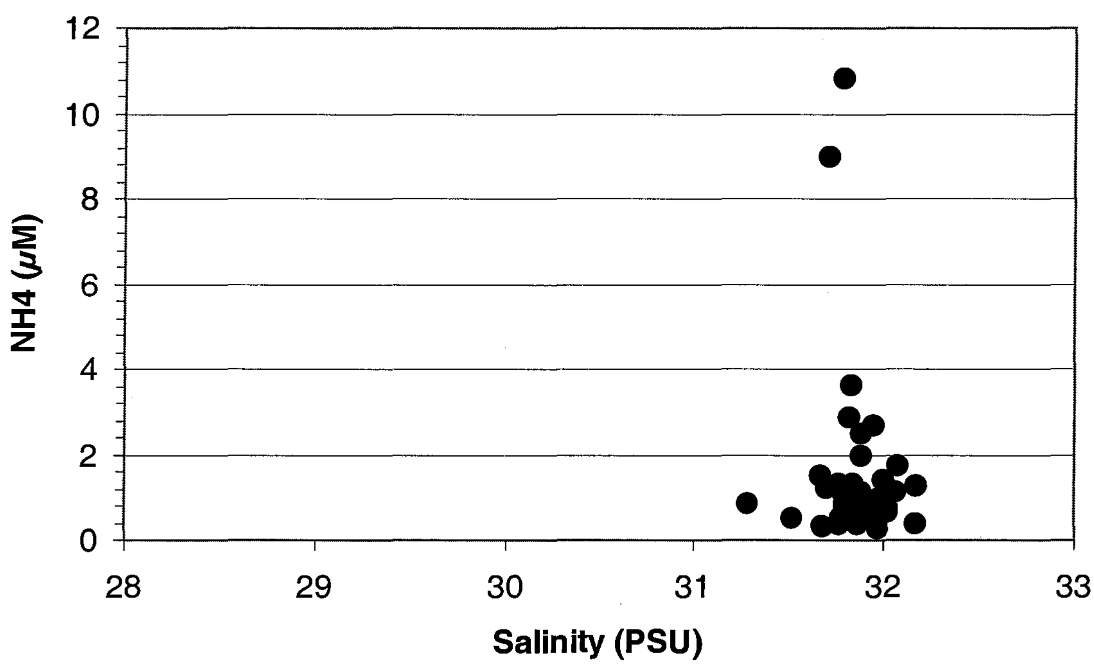
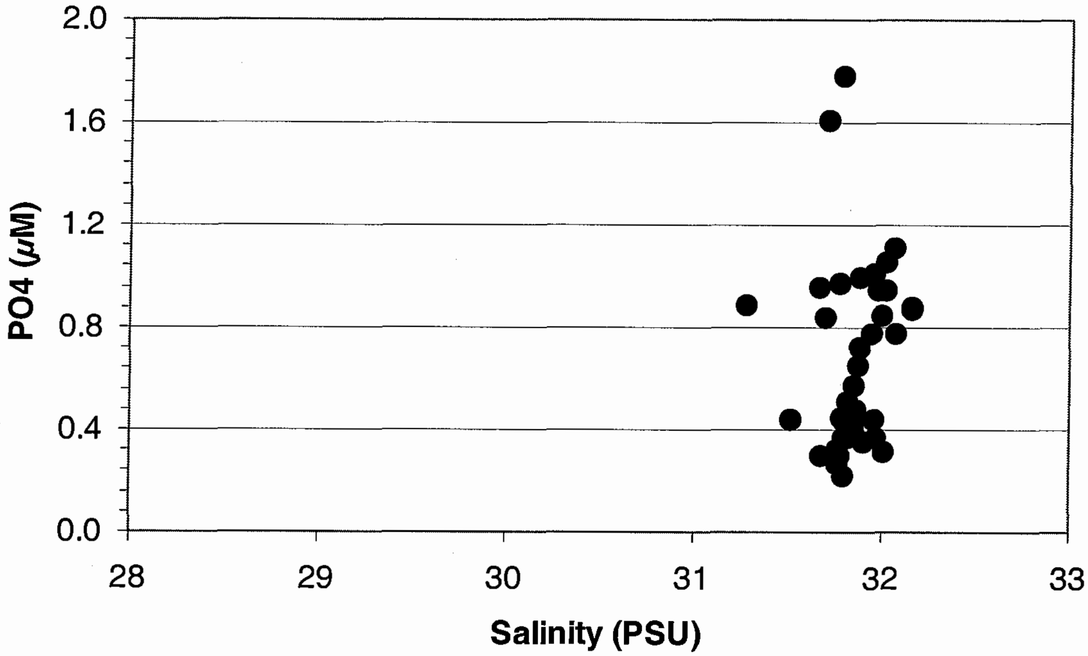


Figure D-89. Nutrient vs. Salinity Plots for Nearfield Survey WN01D, (Sep 01)

(a)



(b)

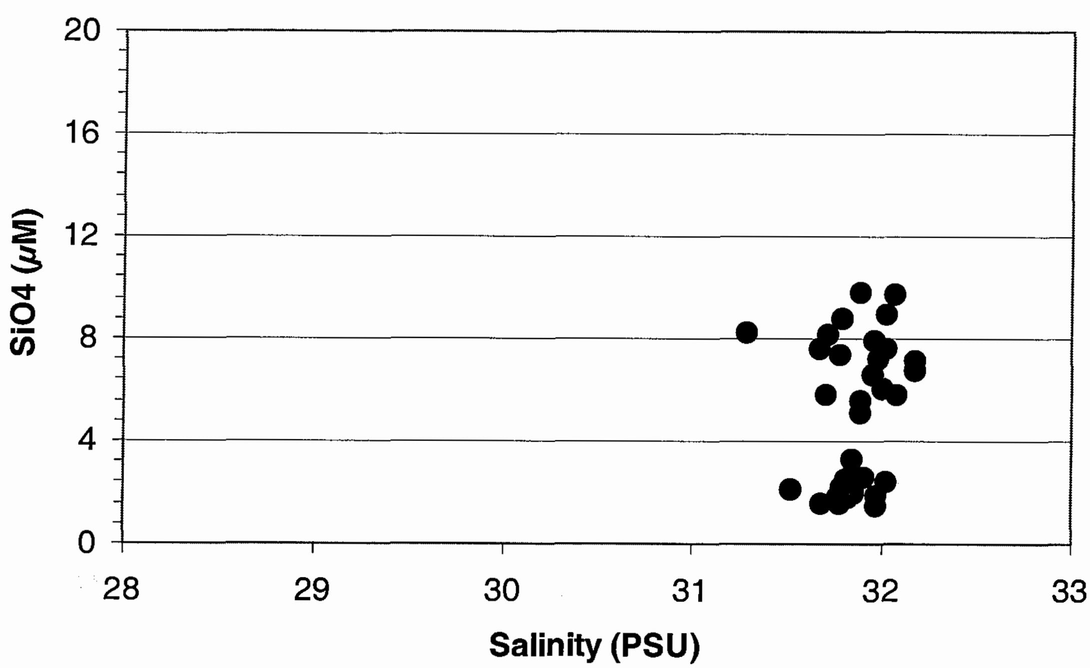


Figure D-90. Nutrient vs. Salinity Plots for Nearfield Survey WN01D, (Sep 01)

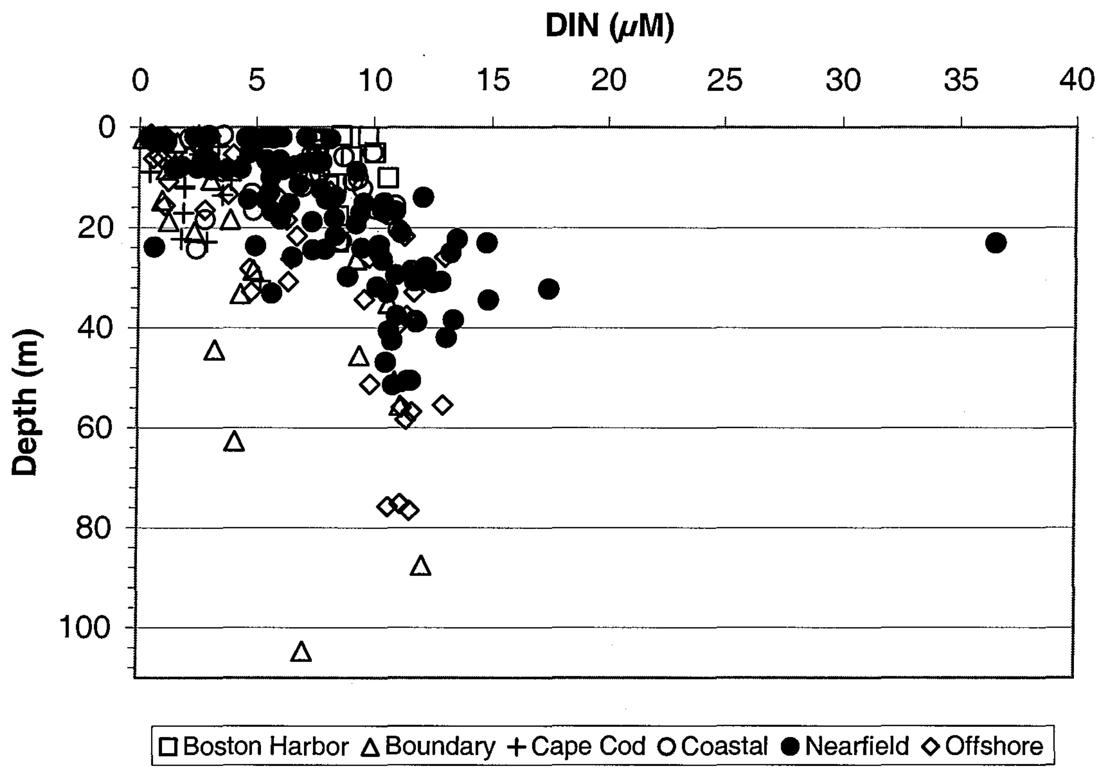
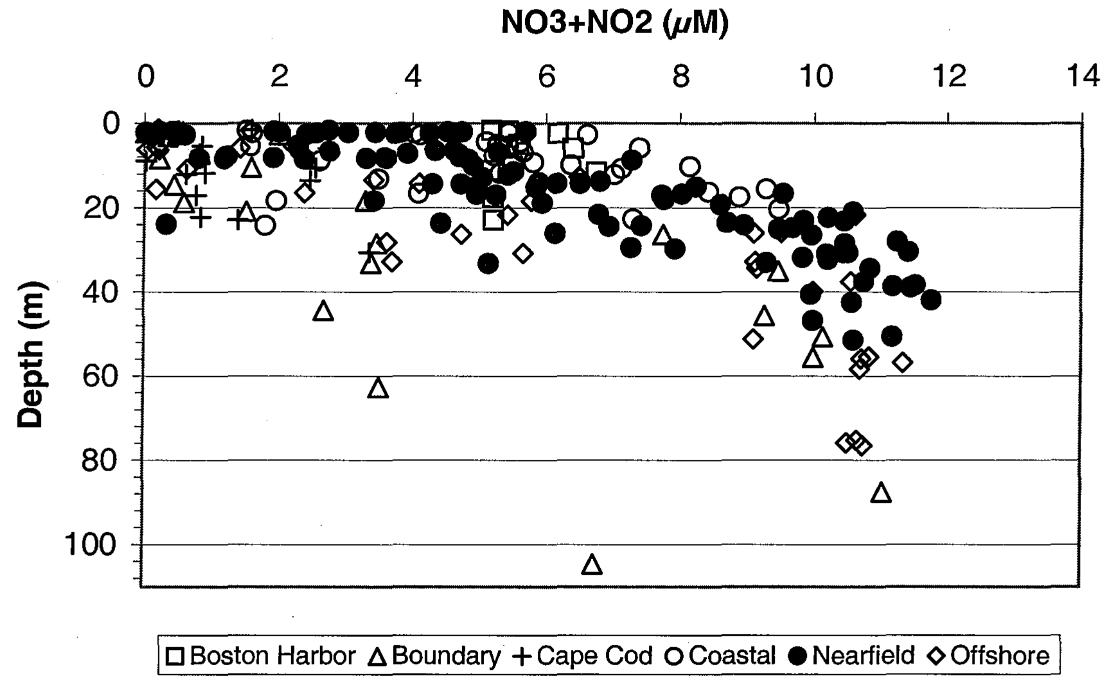


Figure D-91. Depth vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

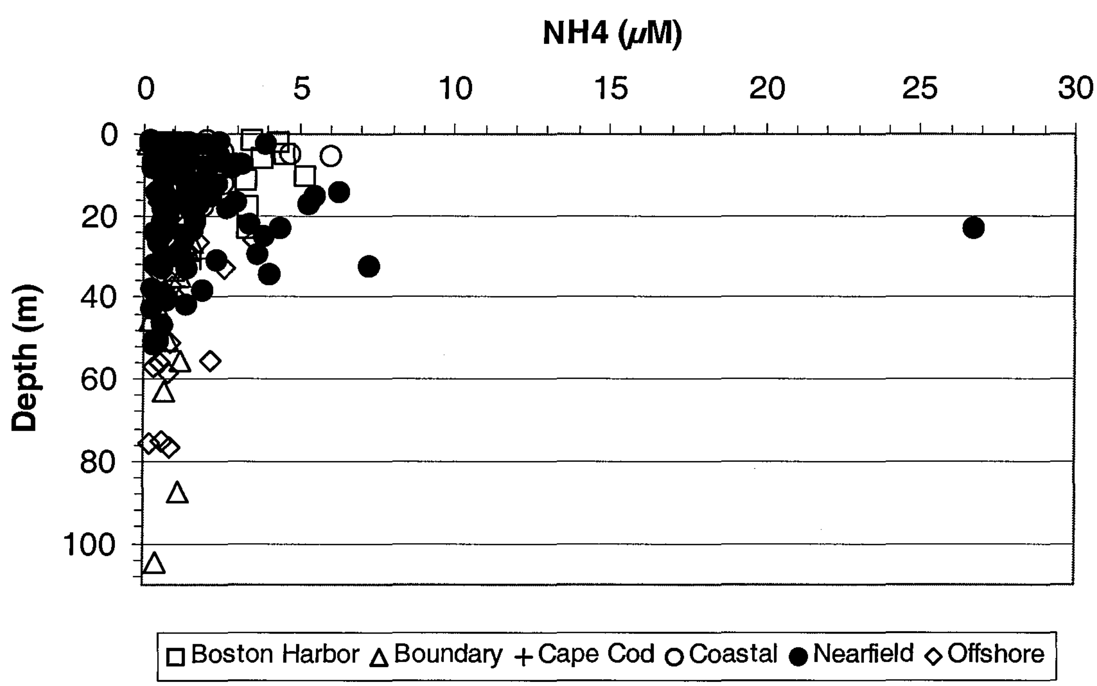
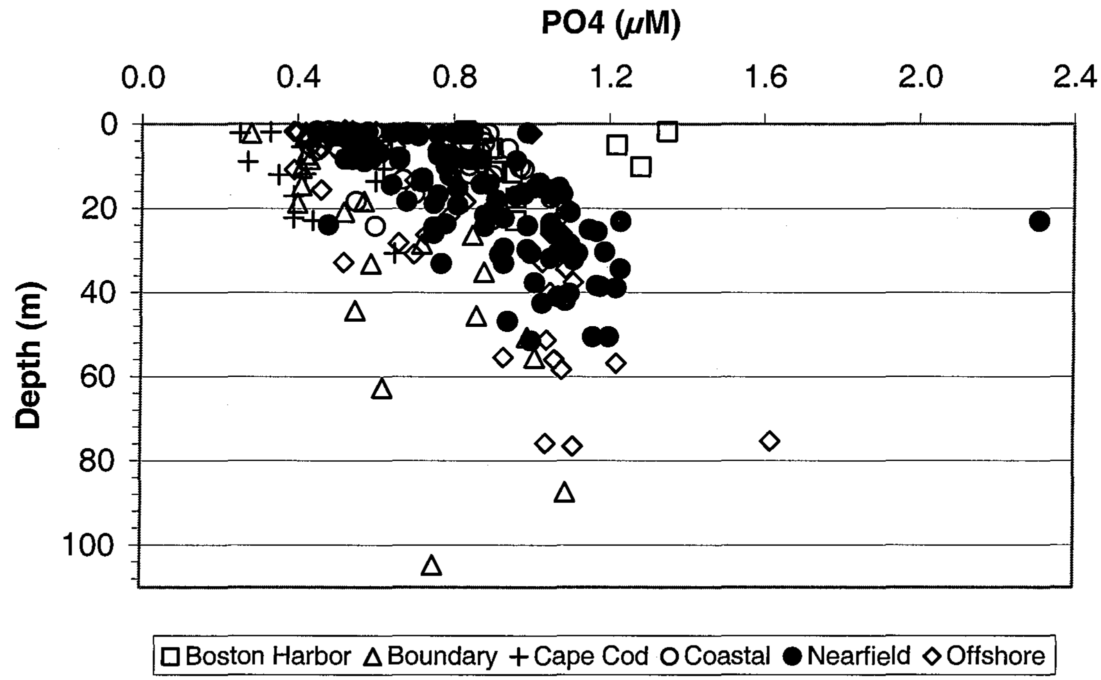


Figure D-92. Depth vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

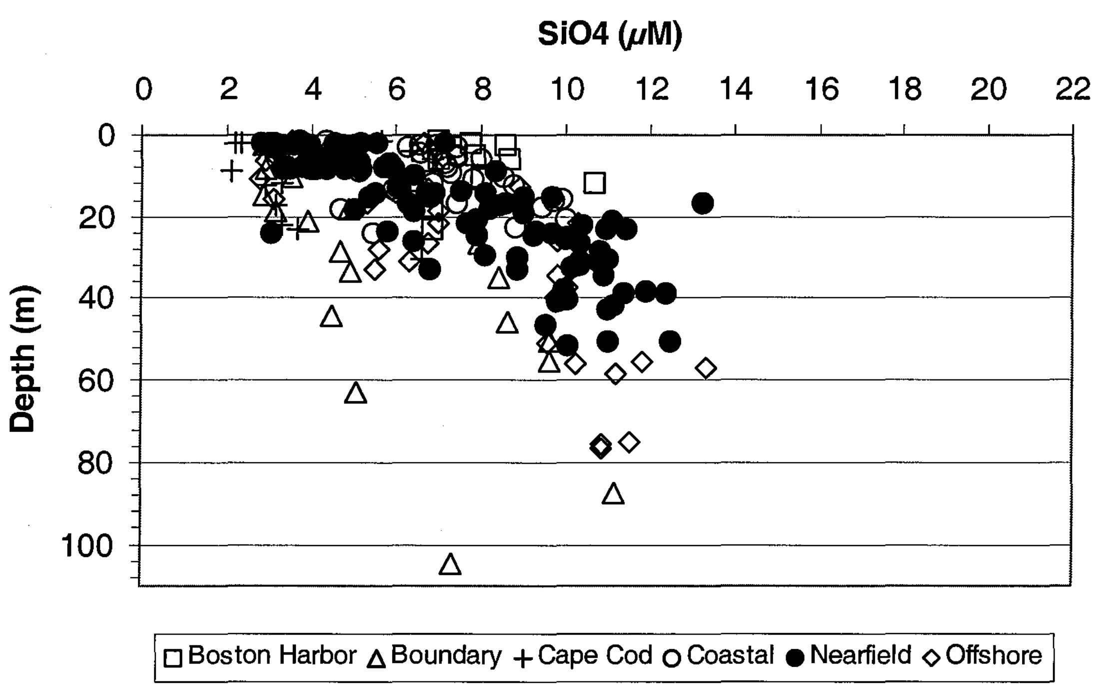
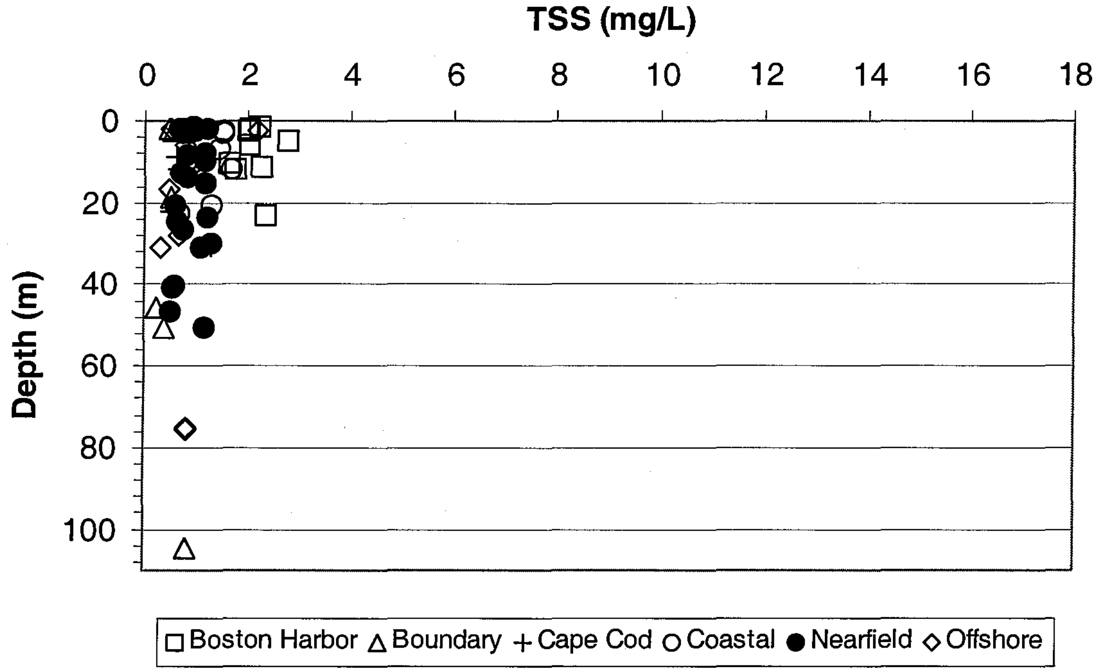


Figure D-93. Depth vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

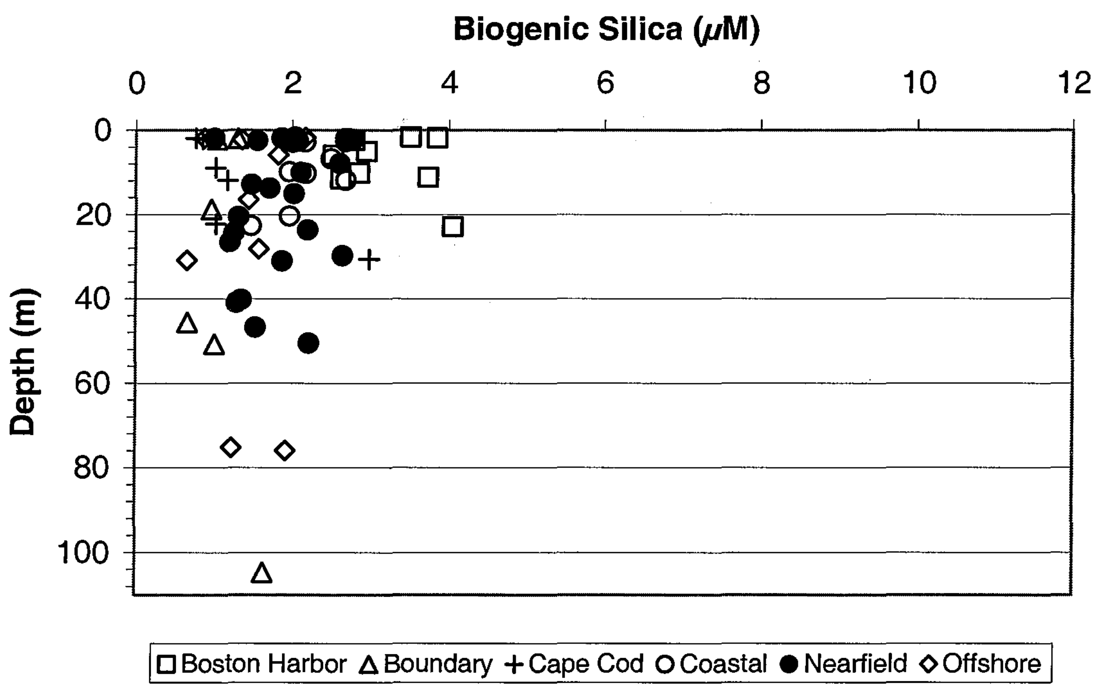
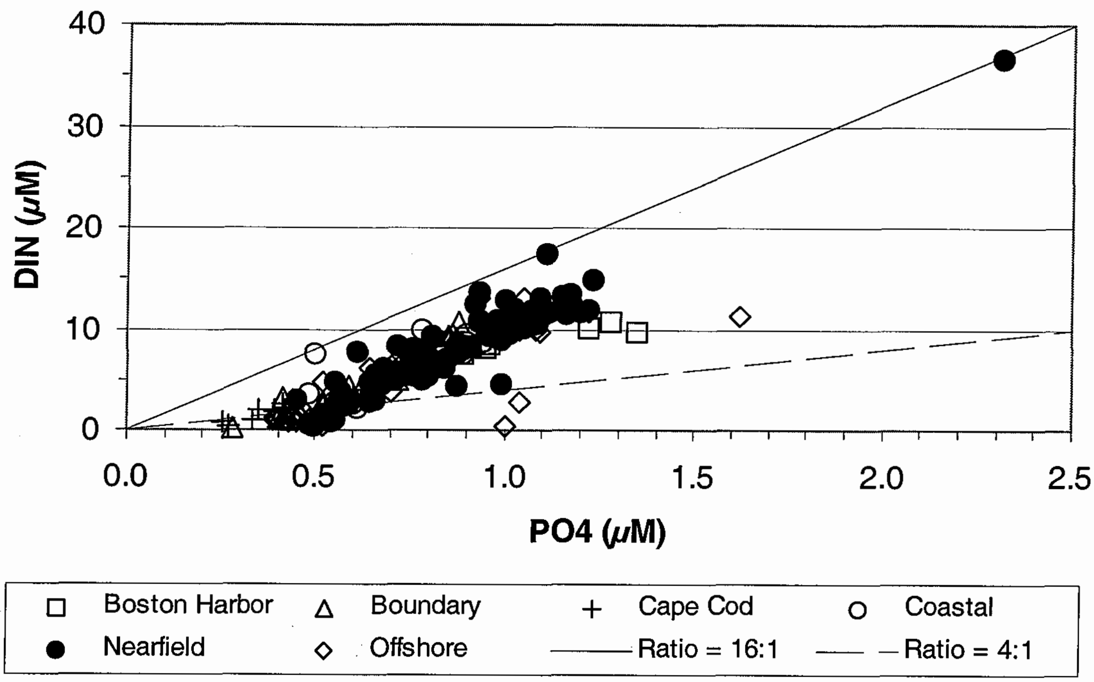


Figure D-94. Depth vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

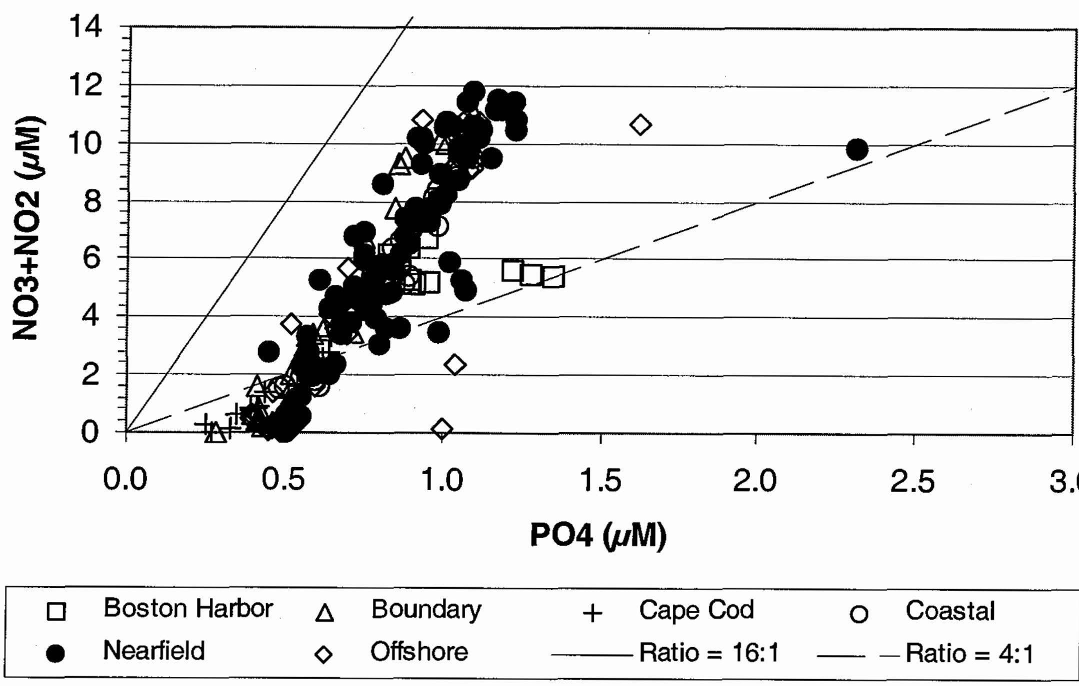
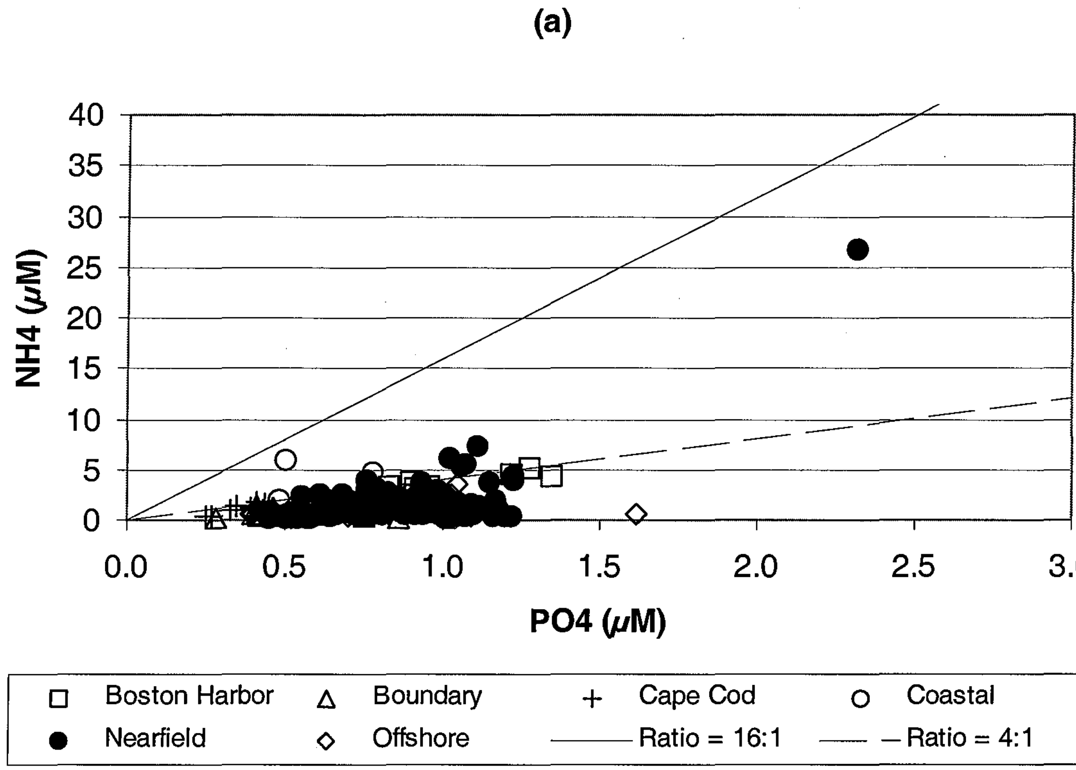


Figure D-95. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)



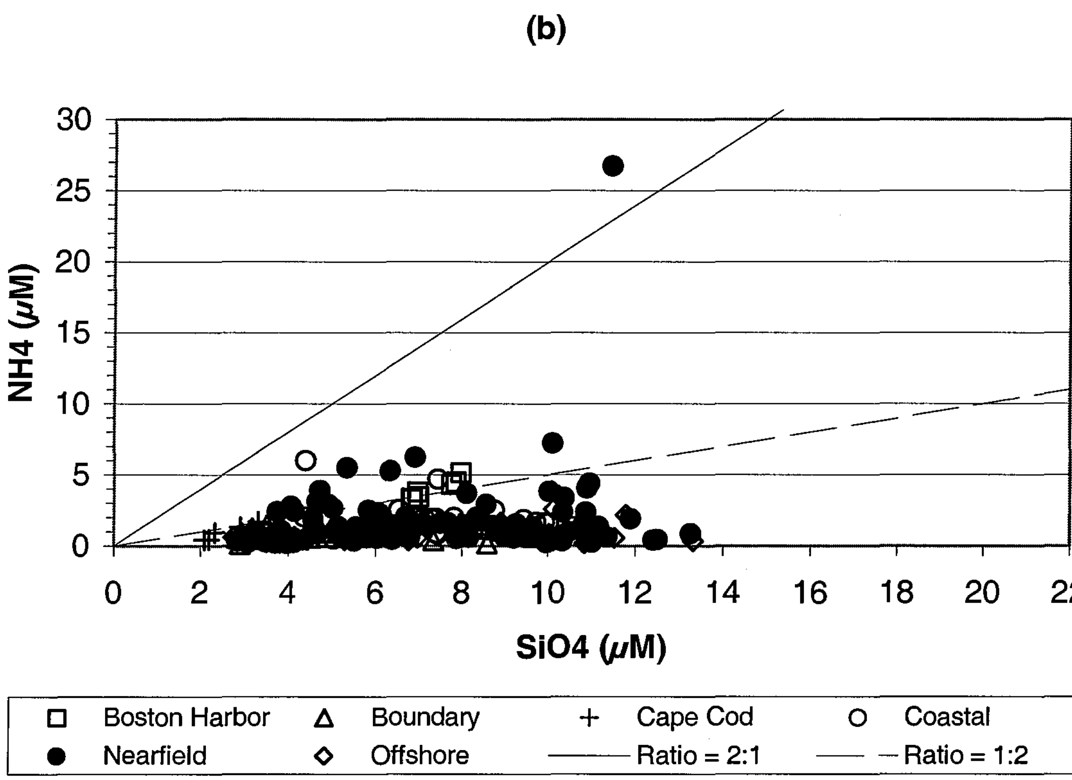
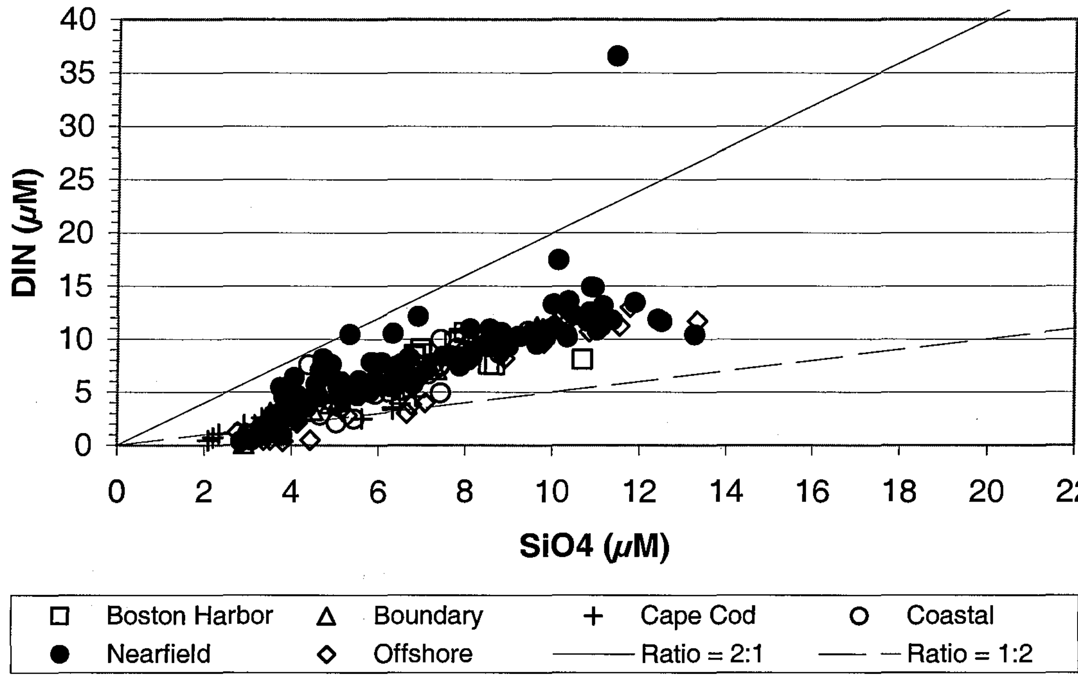


Figure D-96. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

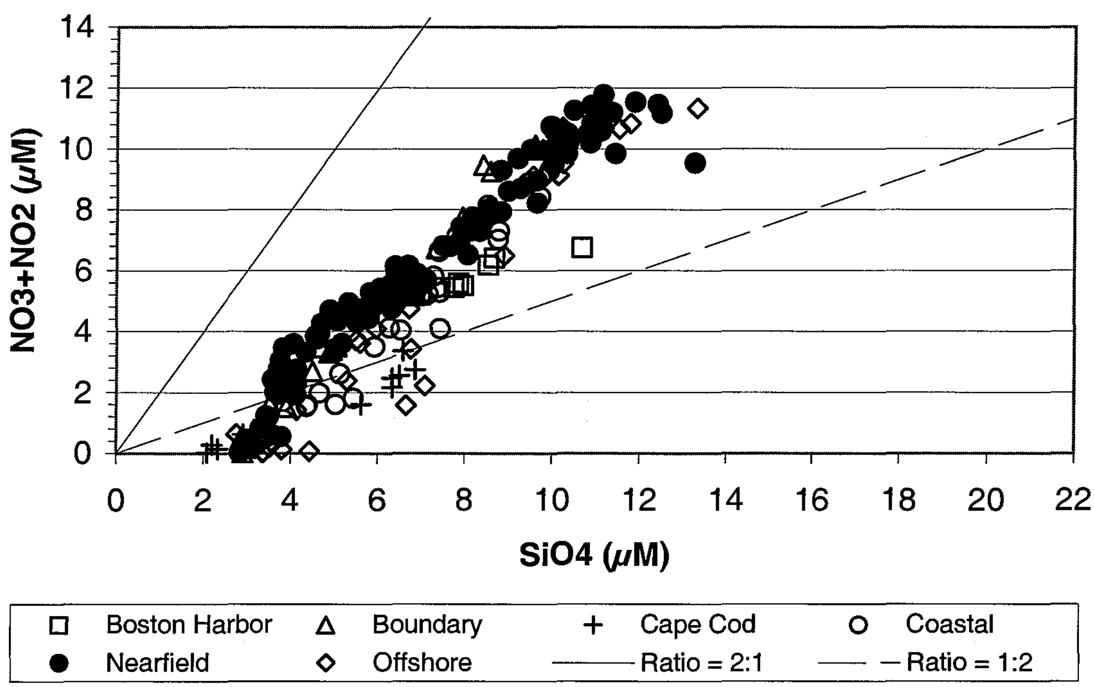
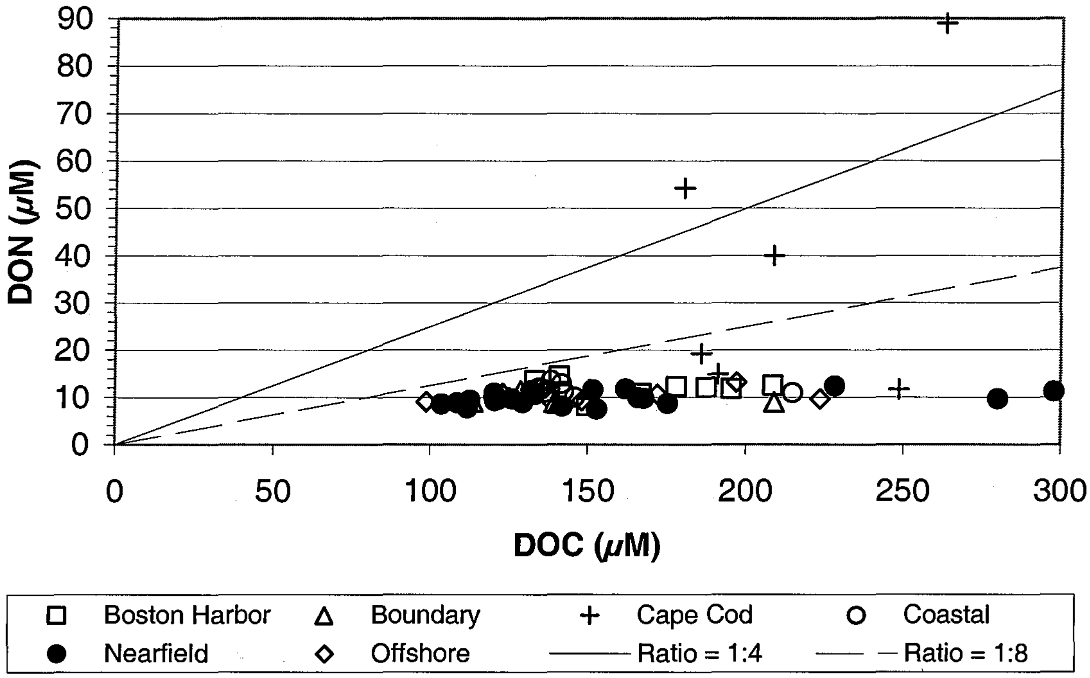


Figure D-97. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

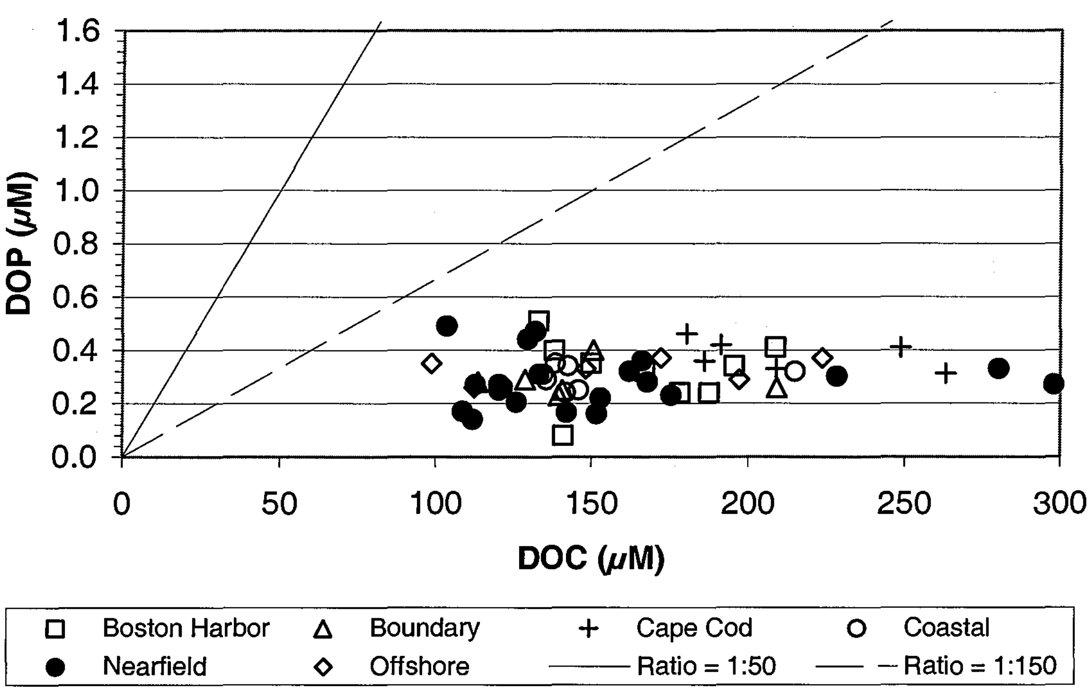
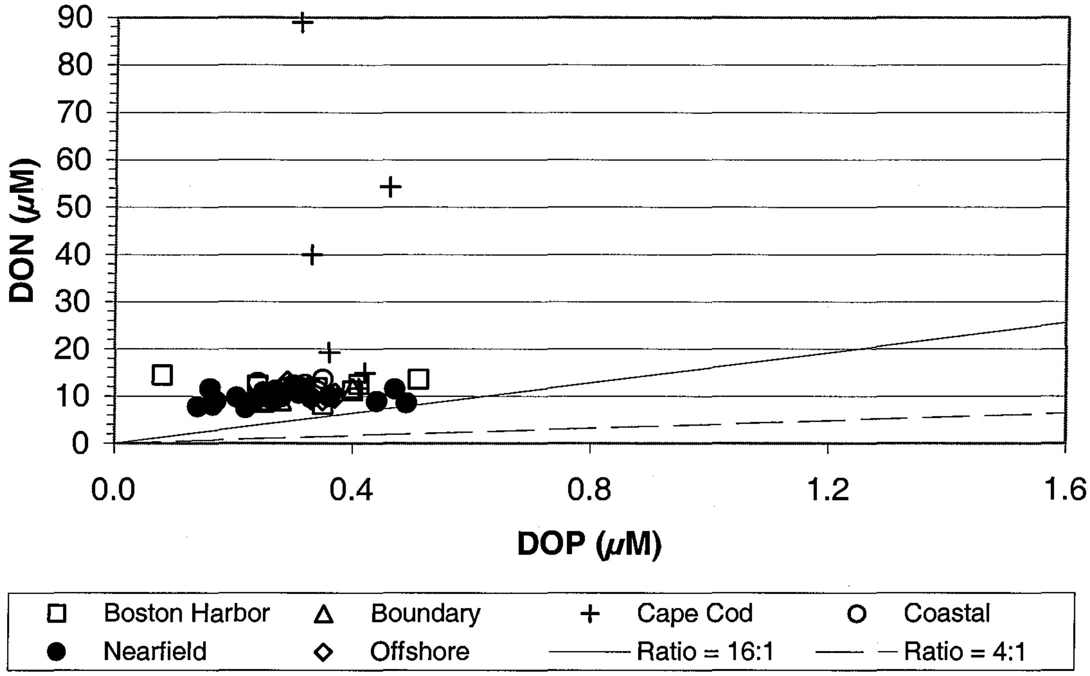


Figure D-98. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

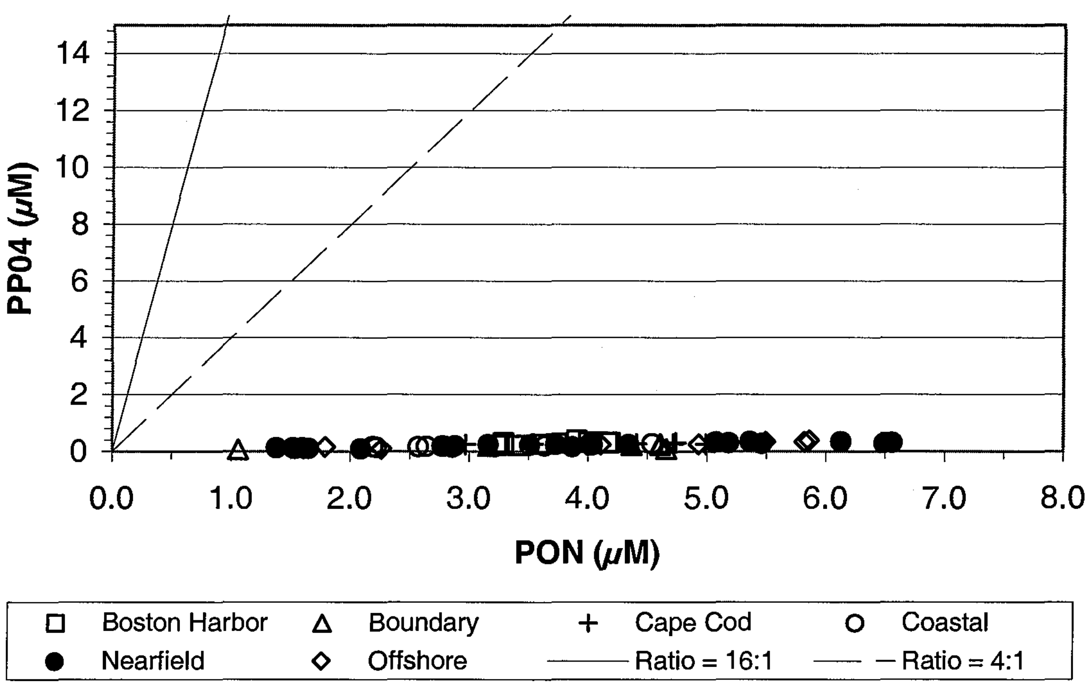
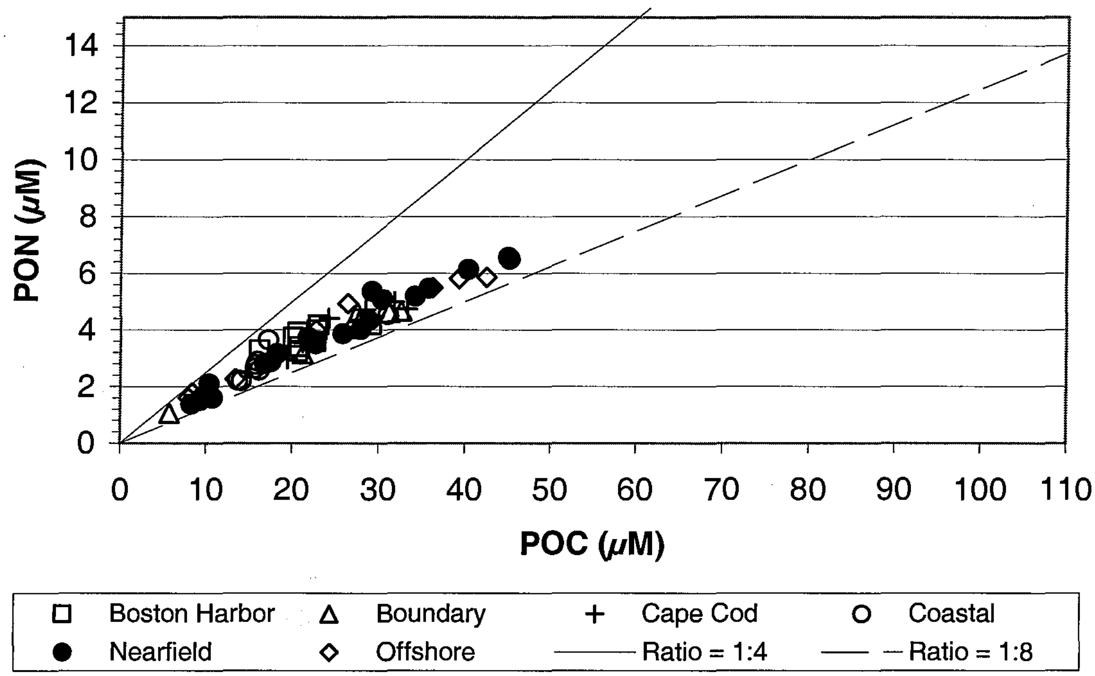


Figure D-99. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

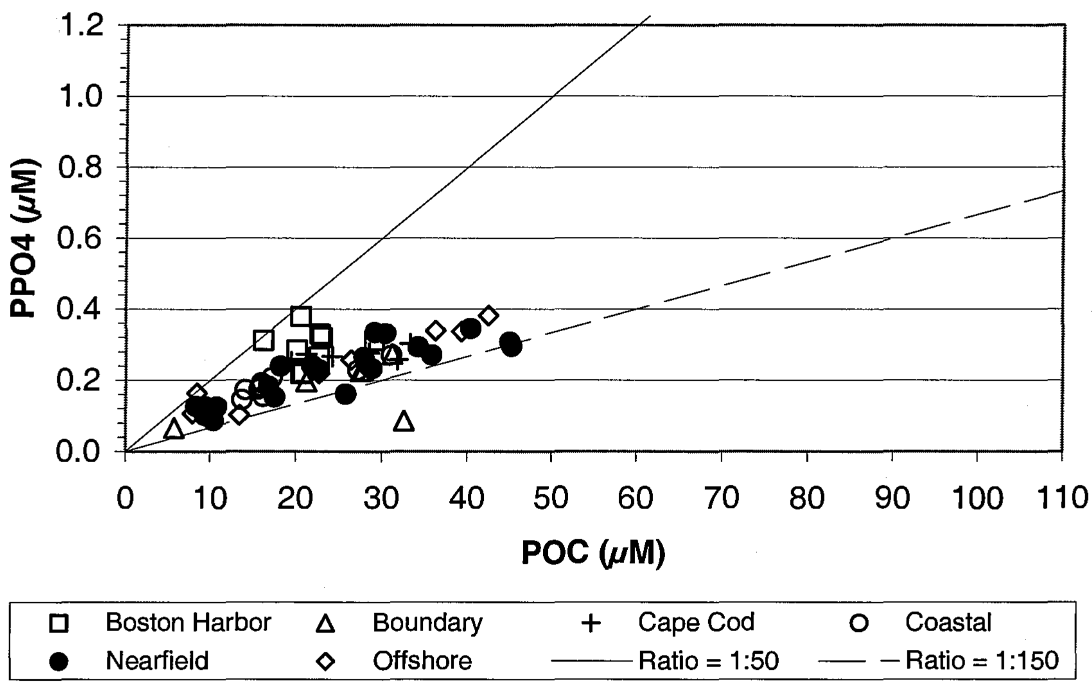


Figure D-100. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

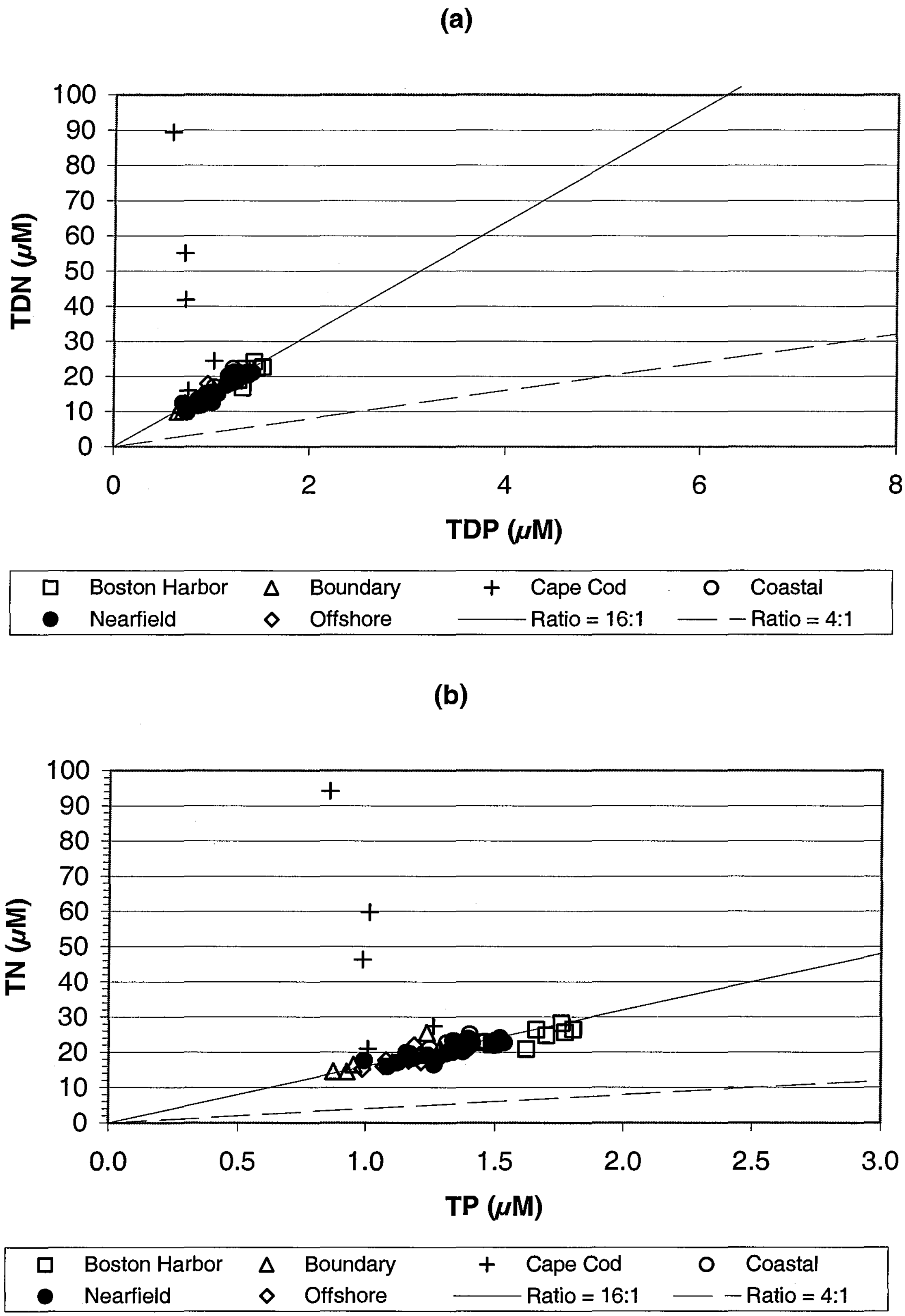
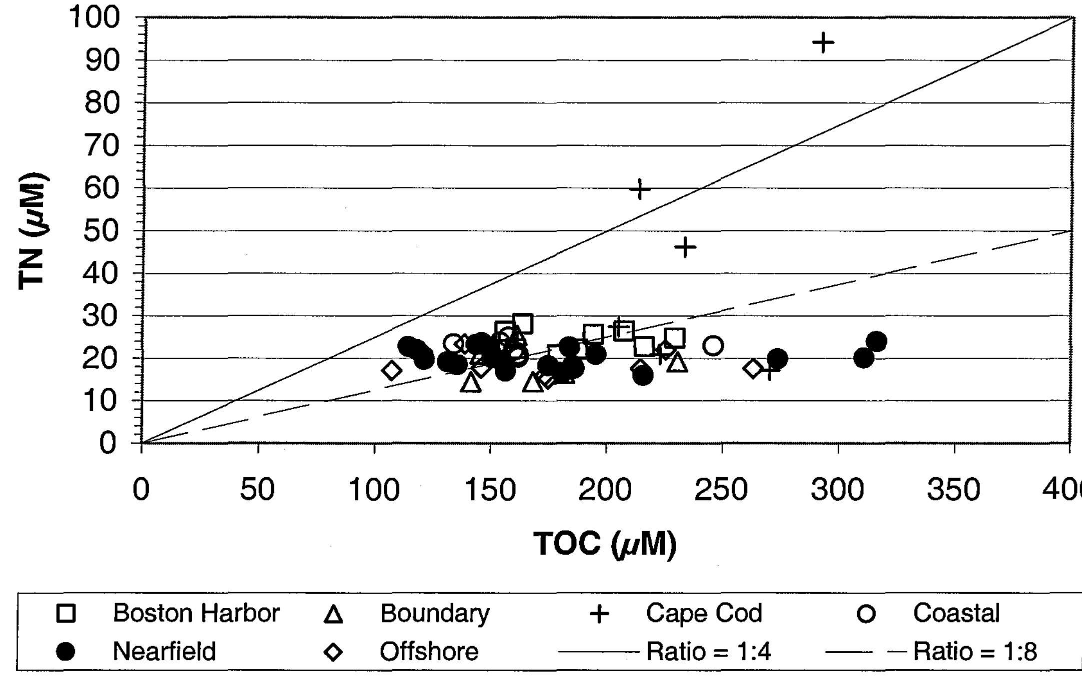


Figure D-101. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

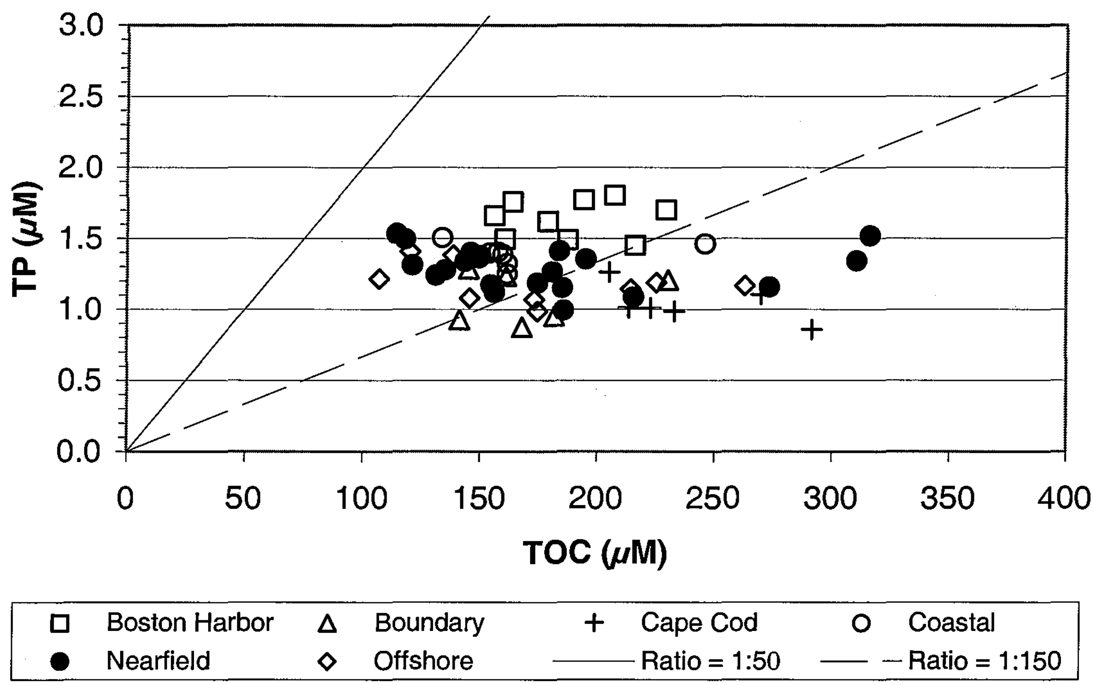


Figure D-102. Nutrient vs. Nutrient Plots for Farfield Survey WF01E, (Oct 01)

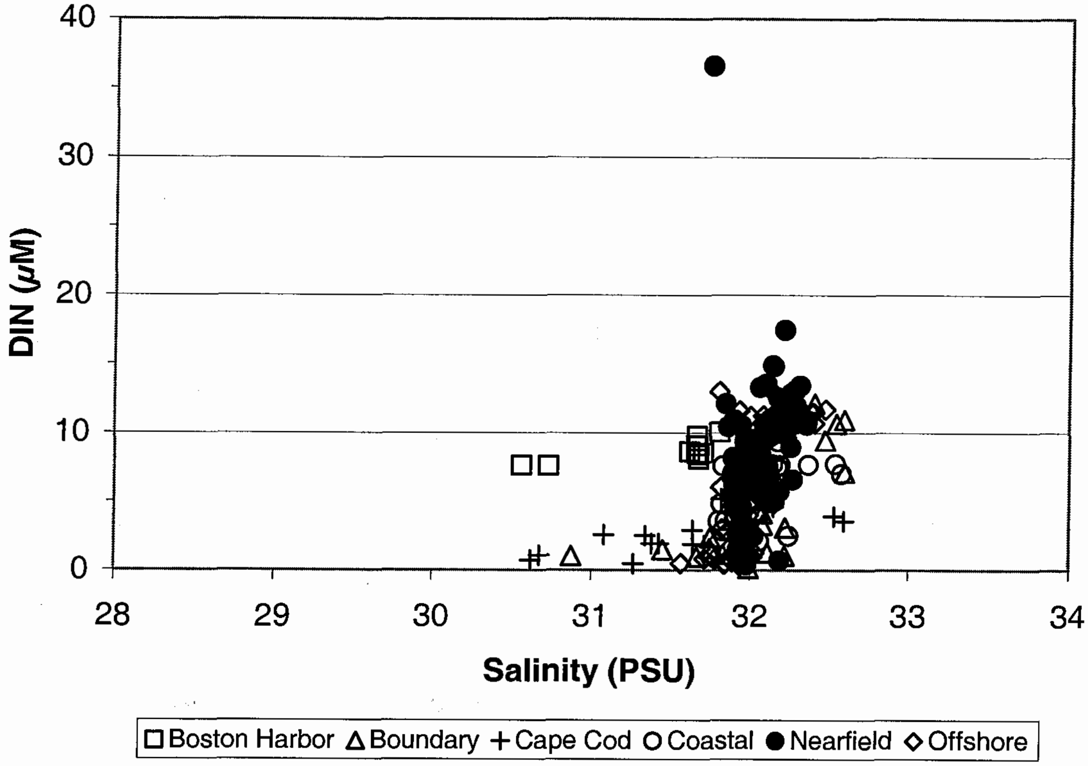
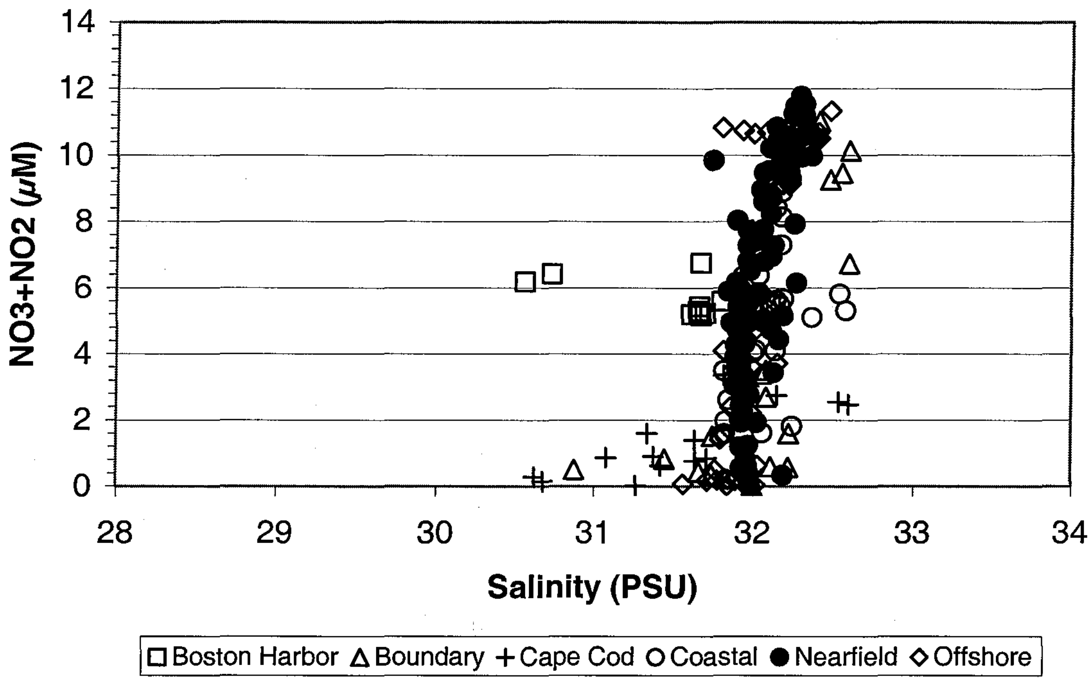


Figure D-103. Nutrient vs. Salinity Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

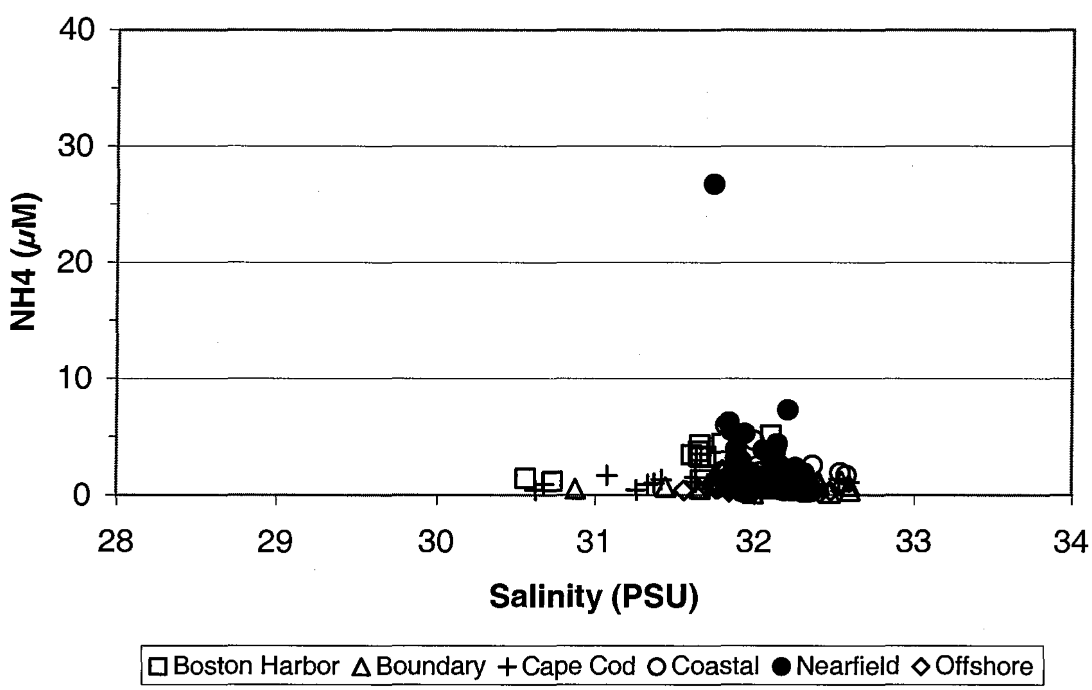
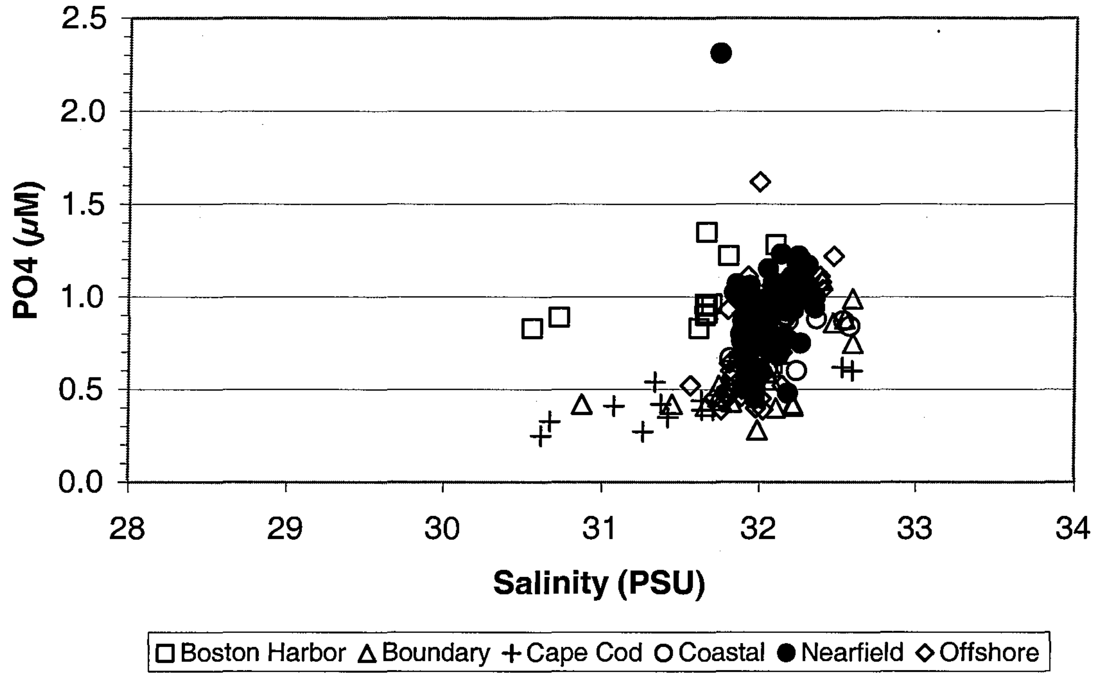


Figure D-104. Nutrient vs. Salinity Plots for Farfield Survey WF01E, (Oct 01)

(a)



(b)

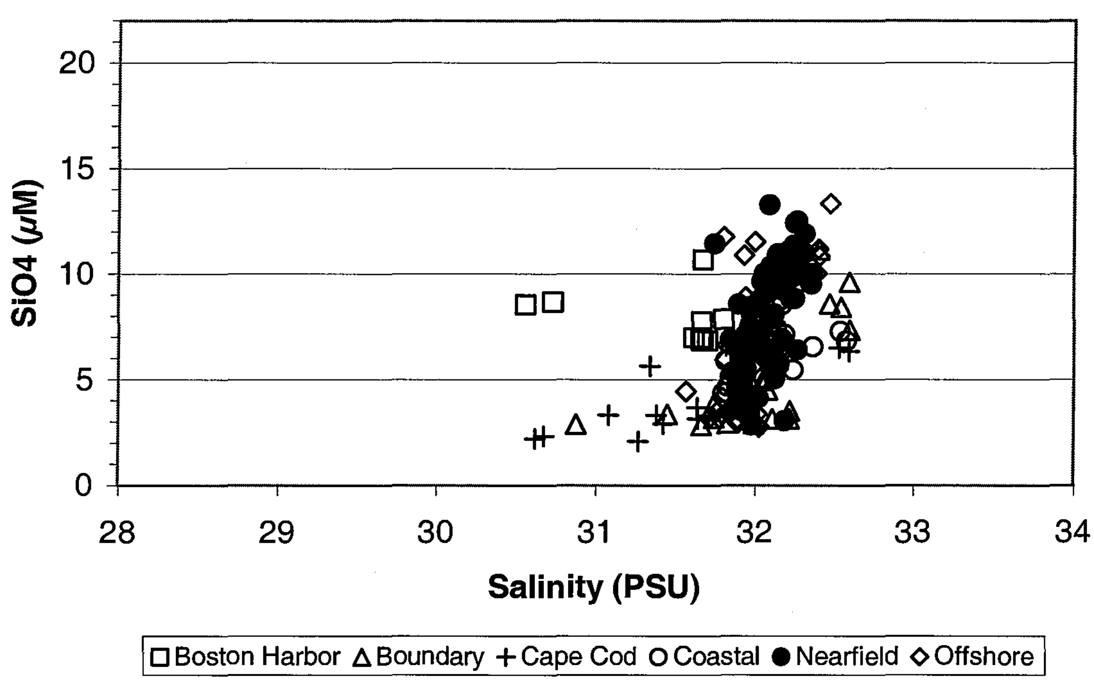


Figure D-105. Nutrient vs. Salinity Plots for Farfield Survey WF01E, (Oct 01)

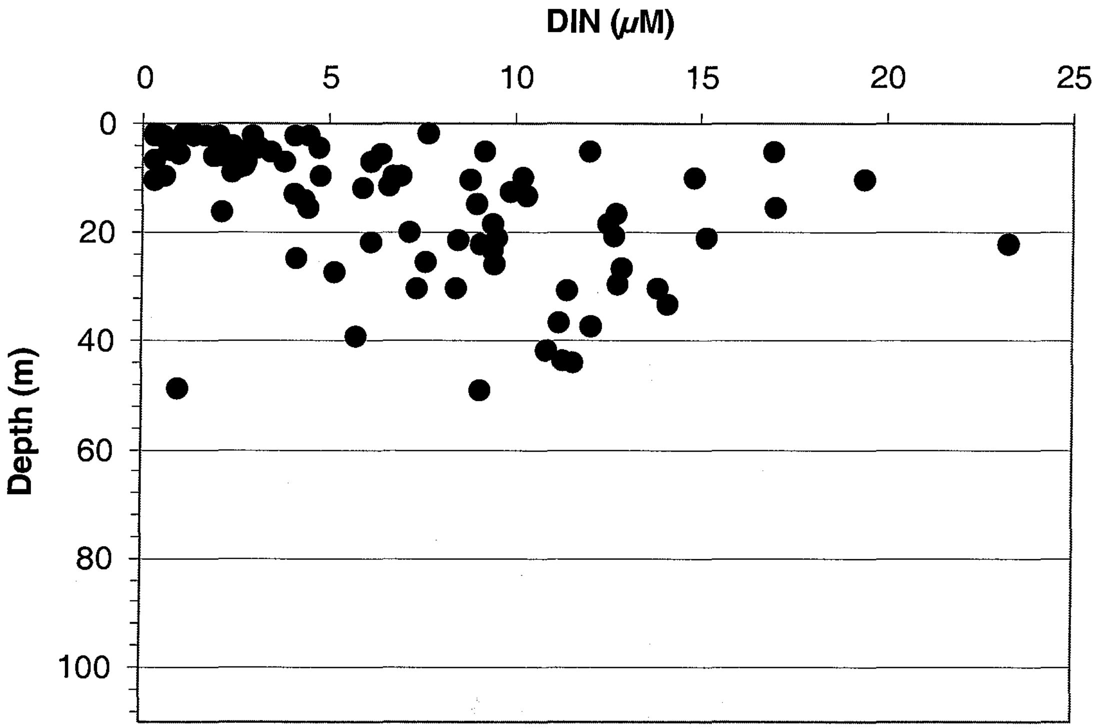
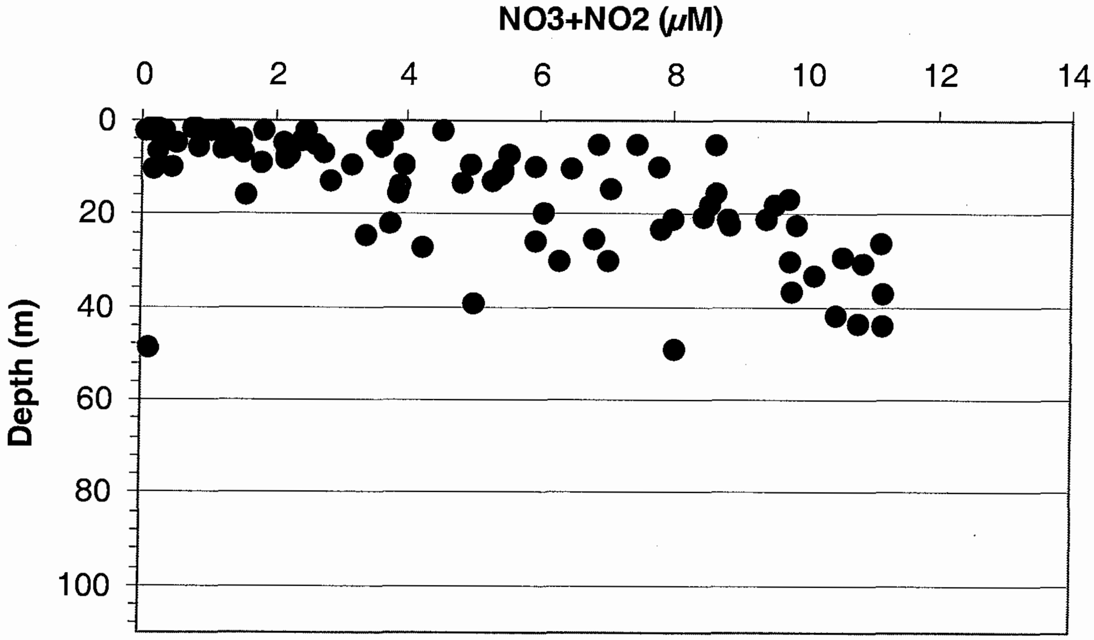


Figure D-106. Depth vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

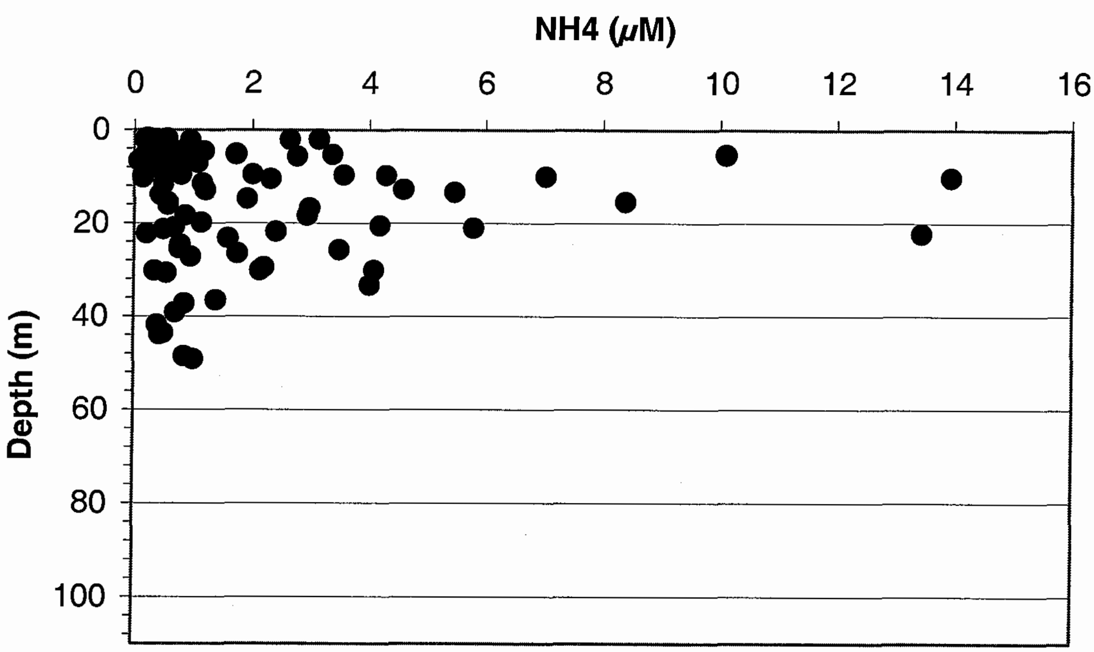
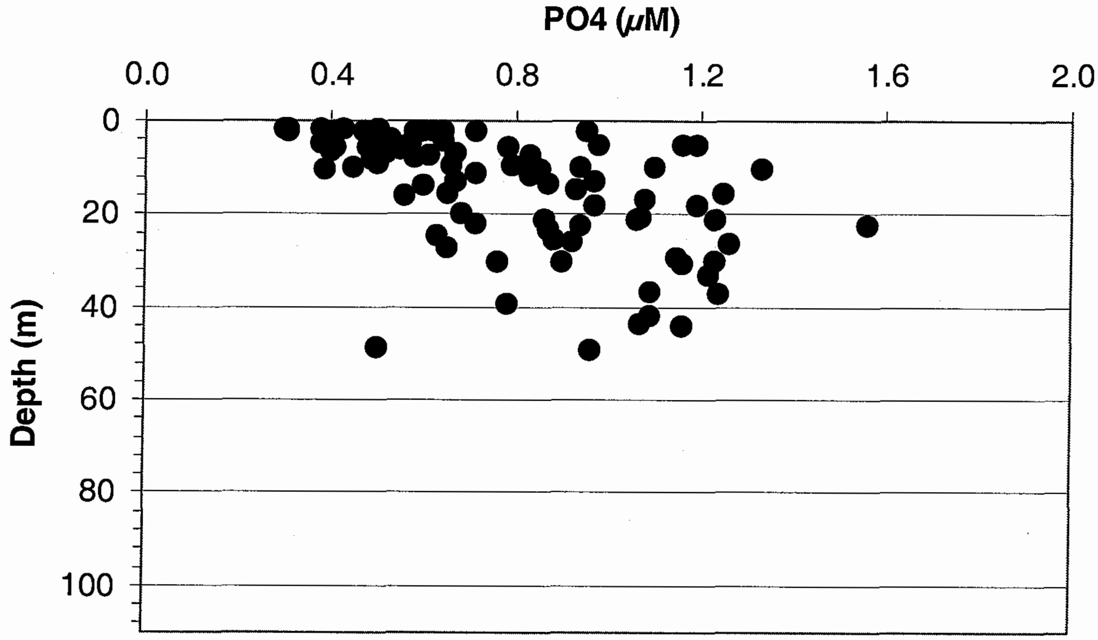


Figure D-107. Depth vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

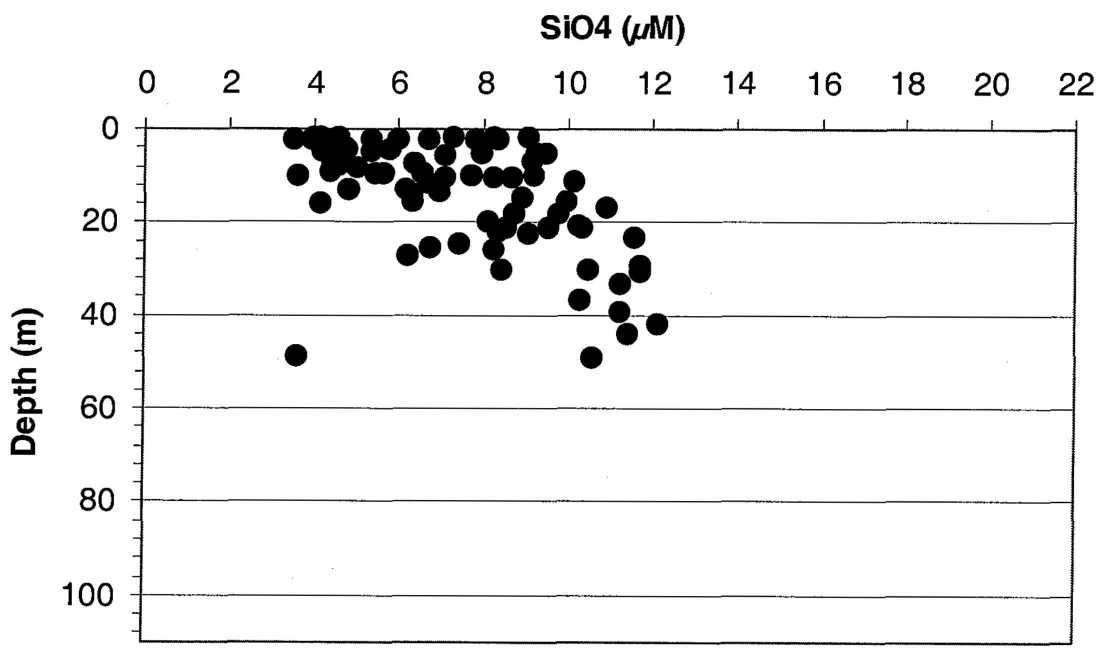
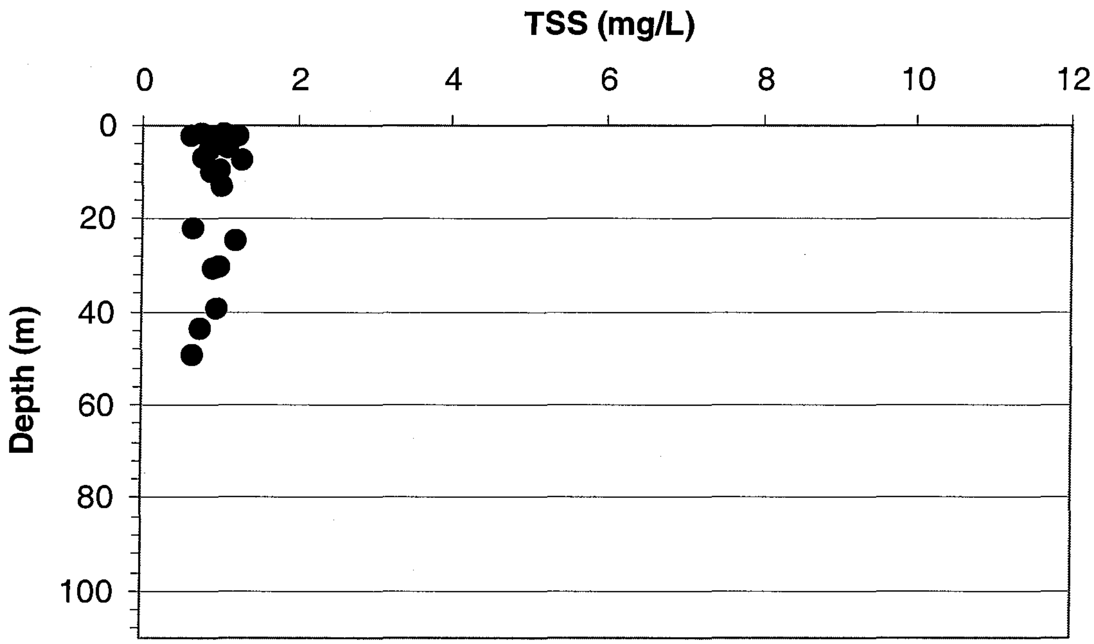


Figure D-108. Depth vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

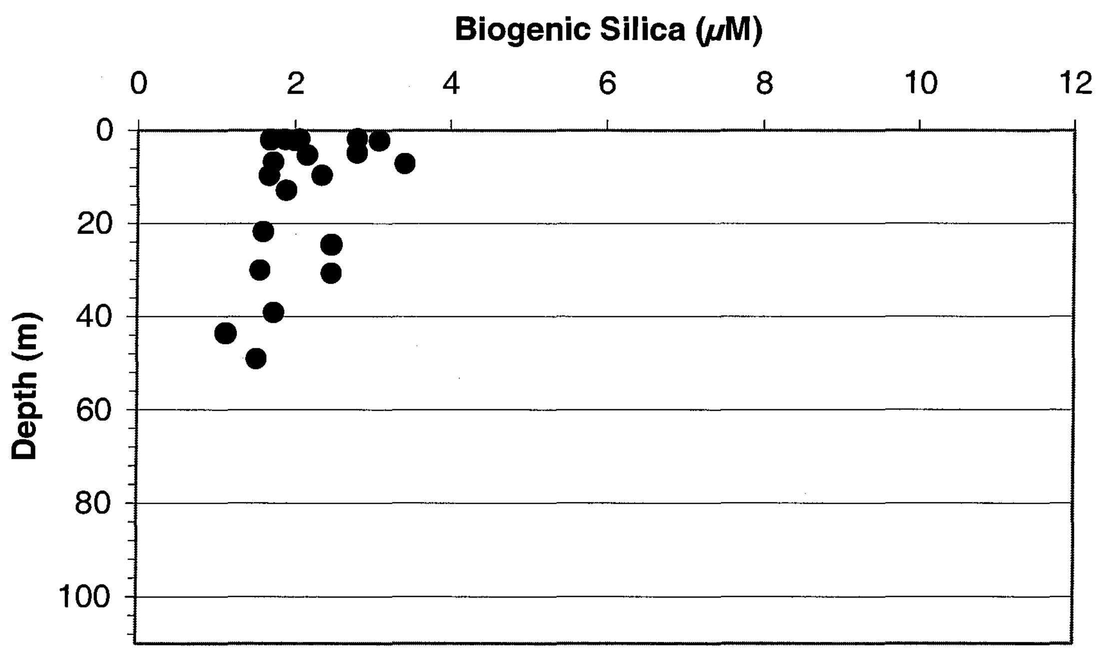
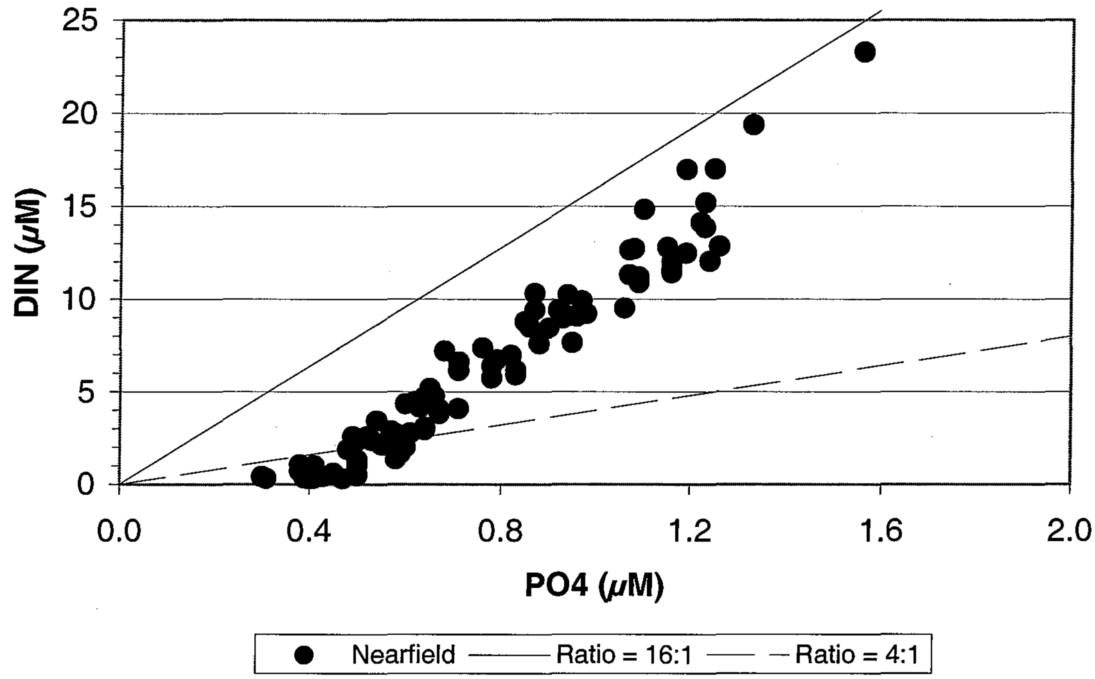


Figure D-109. Depth vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

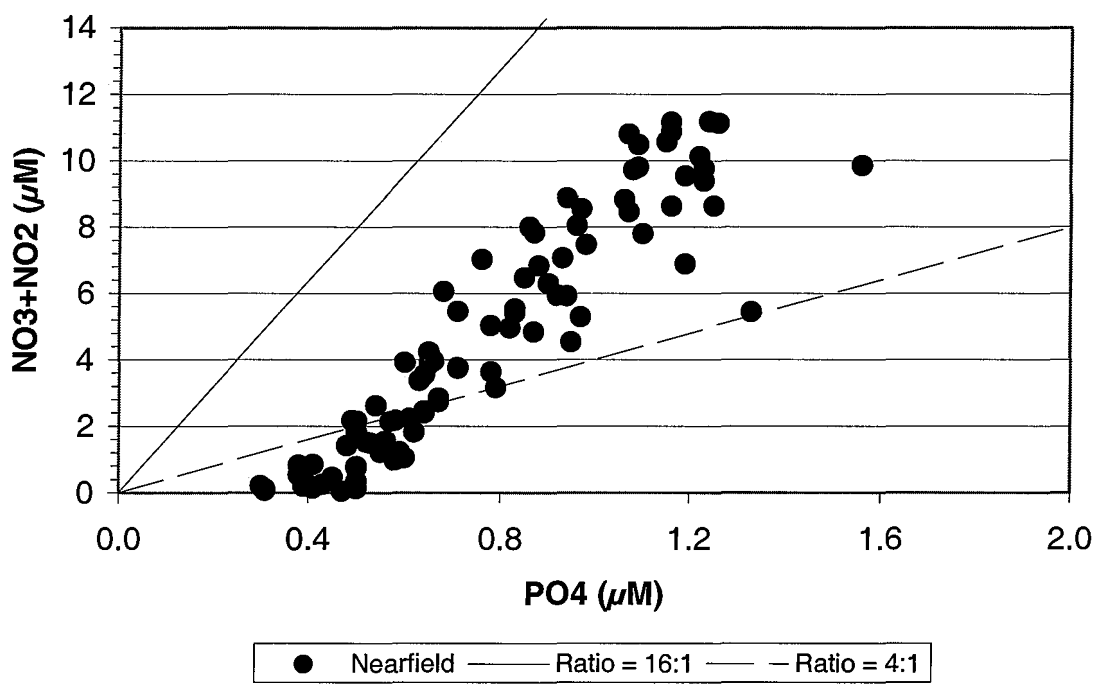
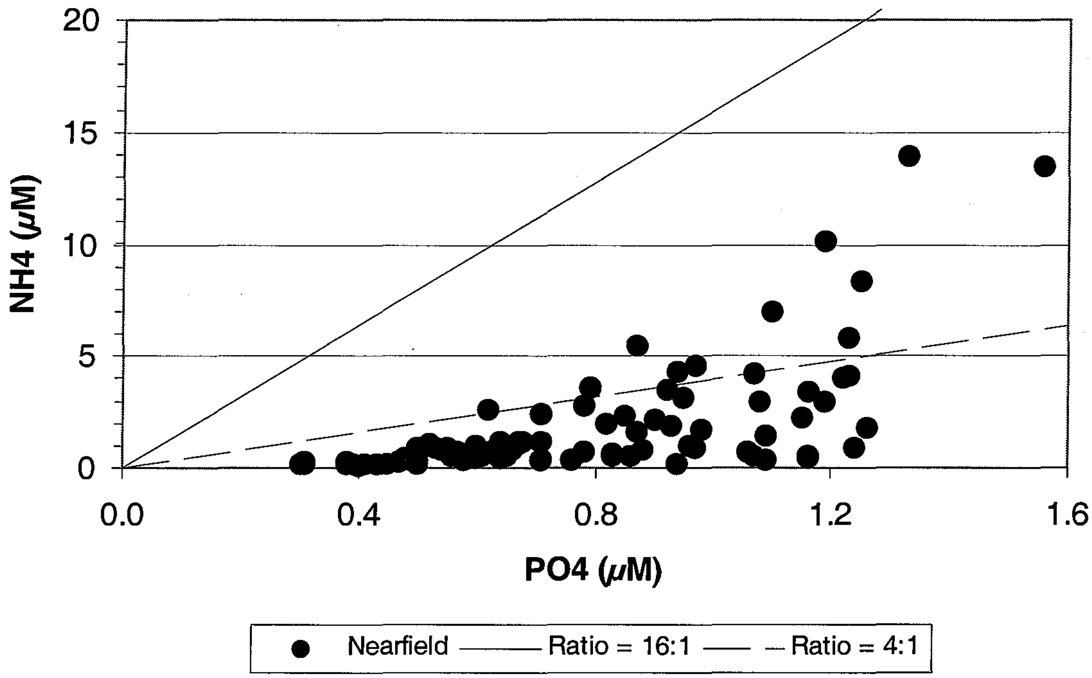


Figure D-110. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

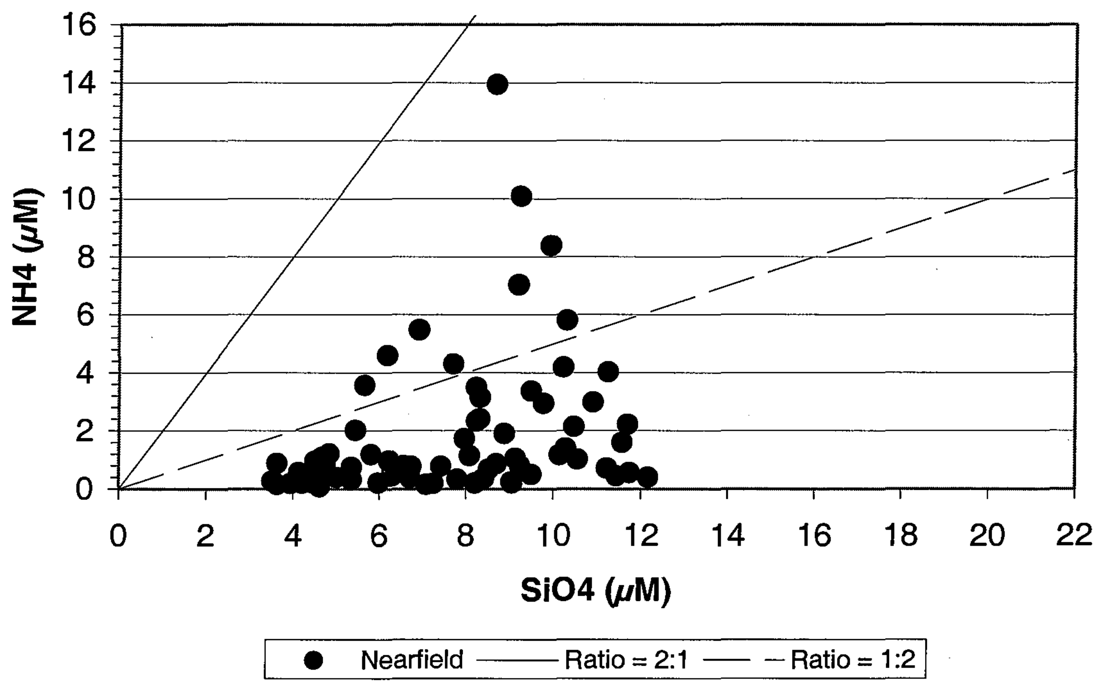
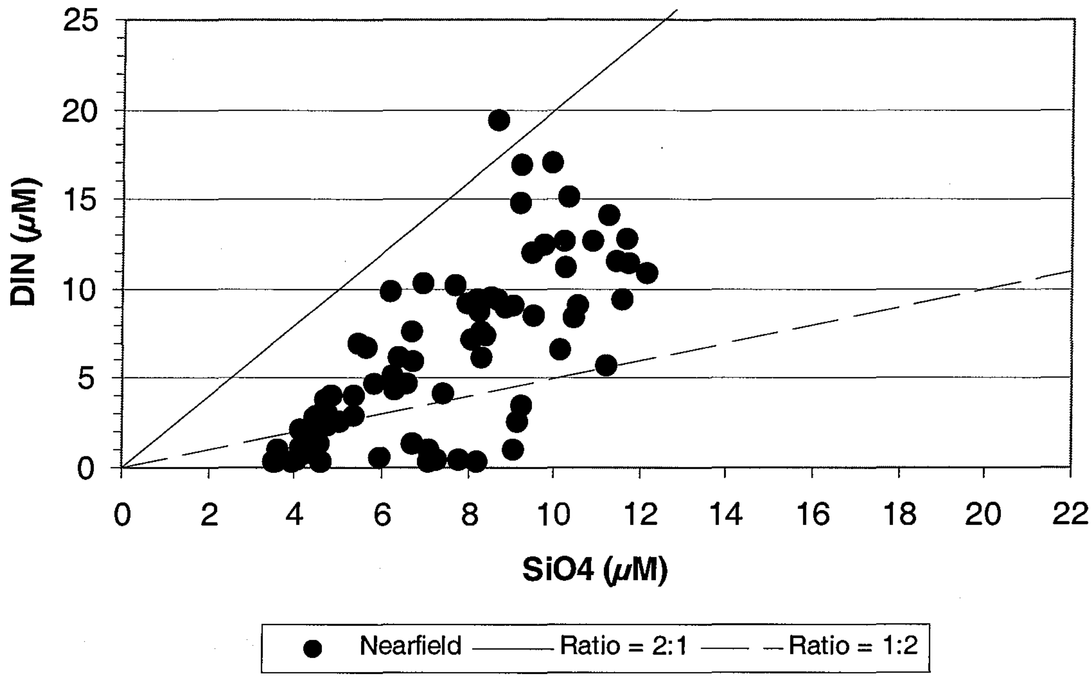


Figure D-111. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

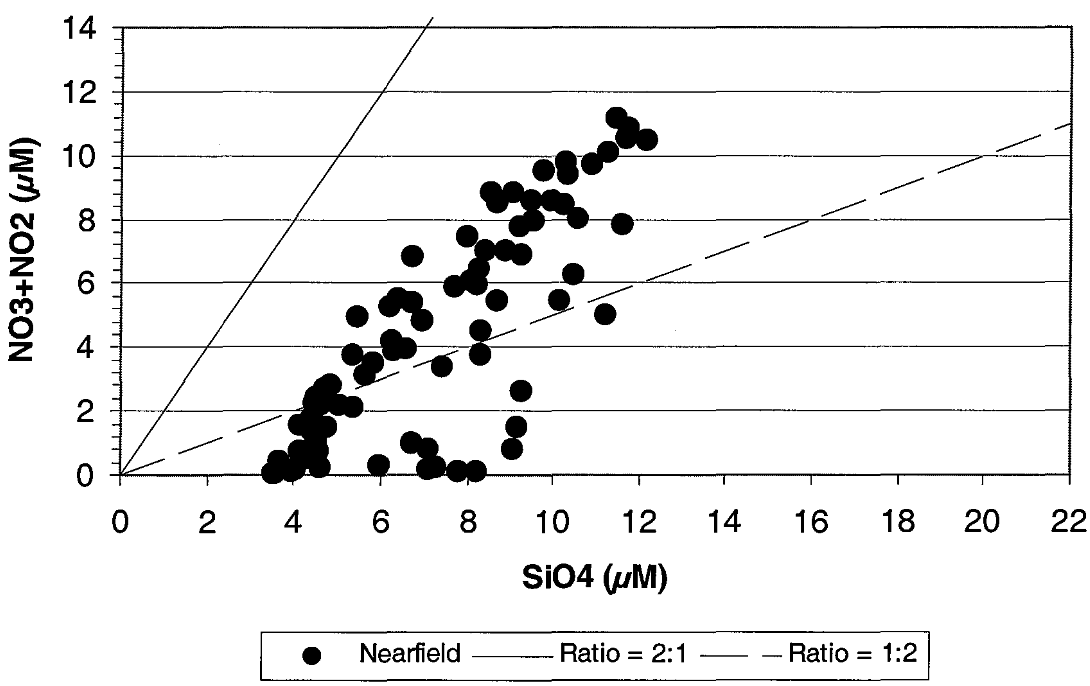
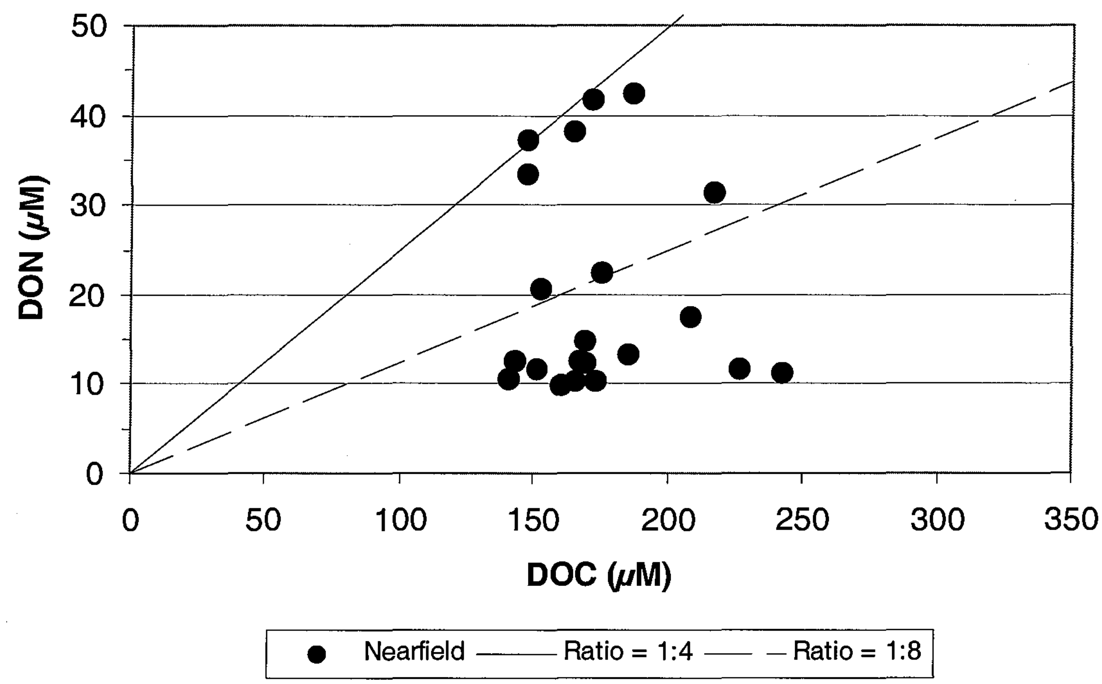


Figure D-112. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

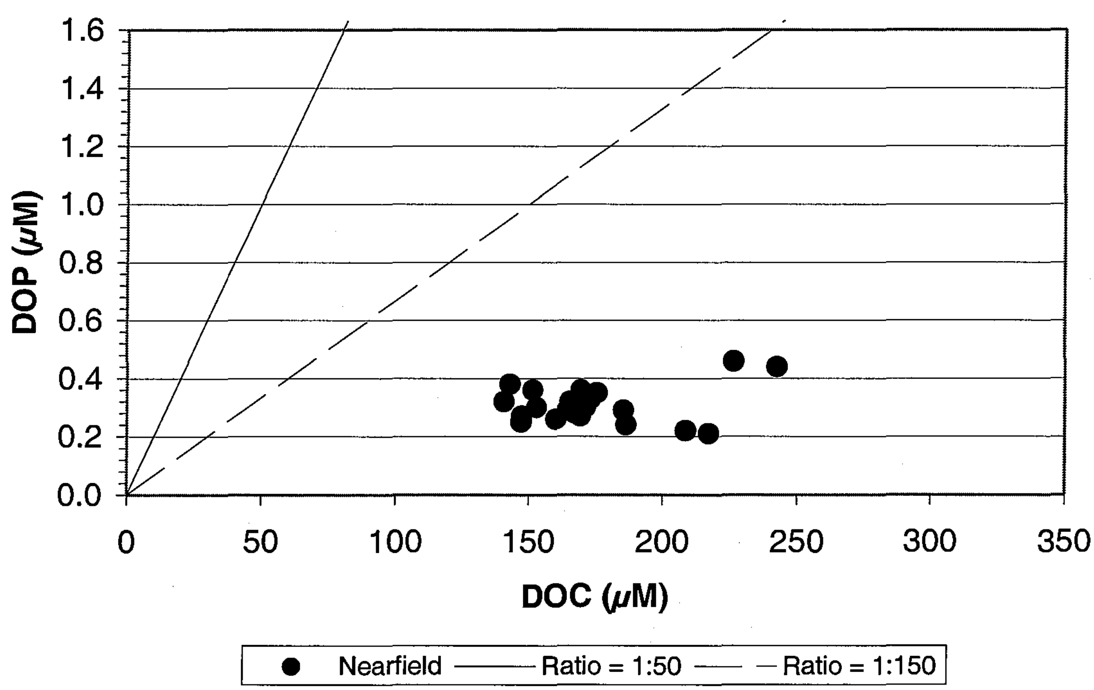
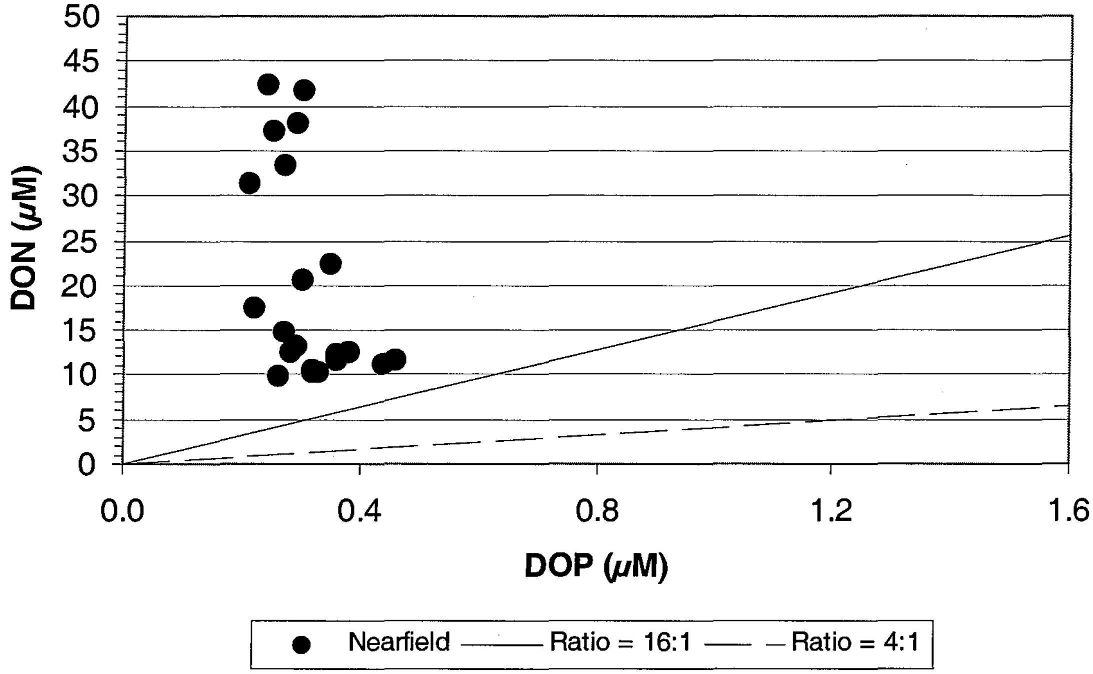


Figure D-113. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

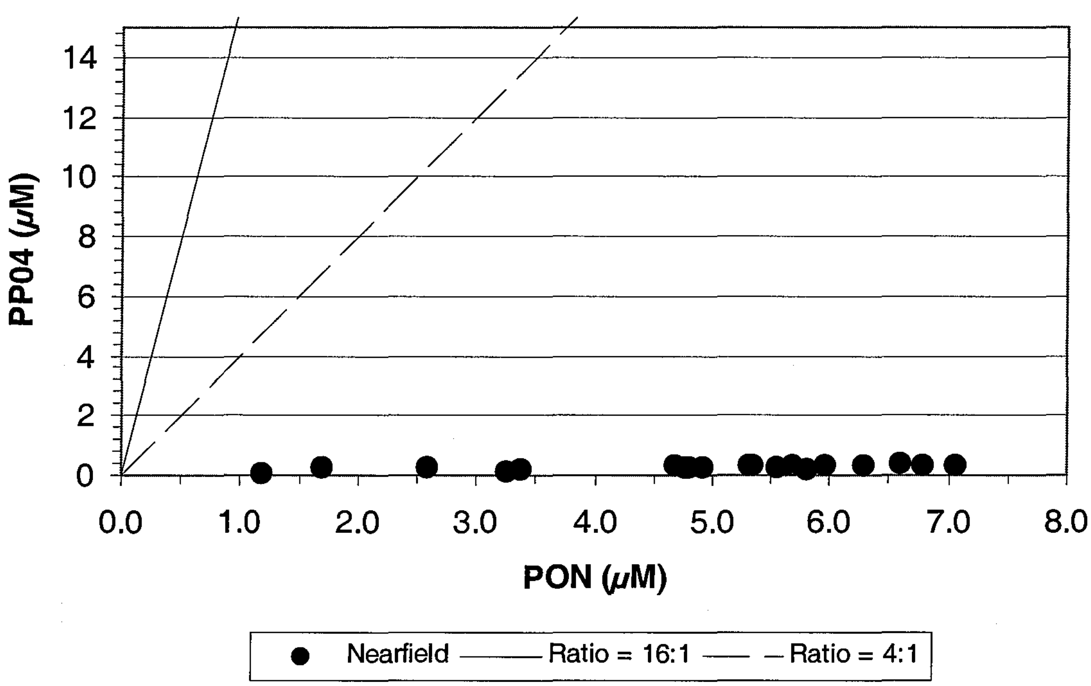
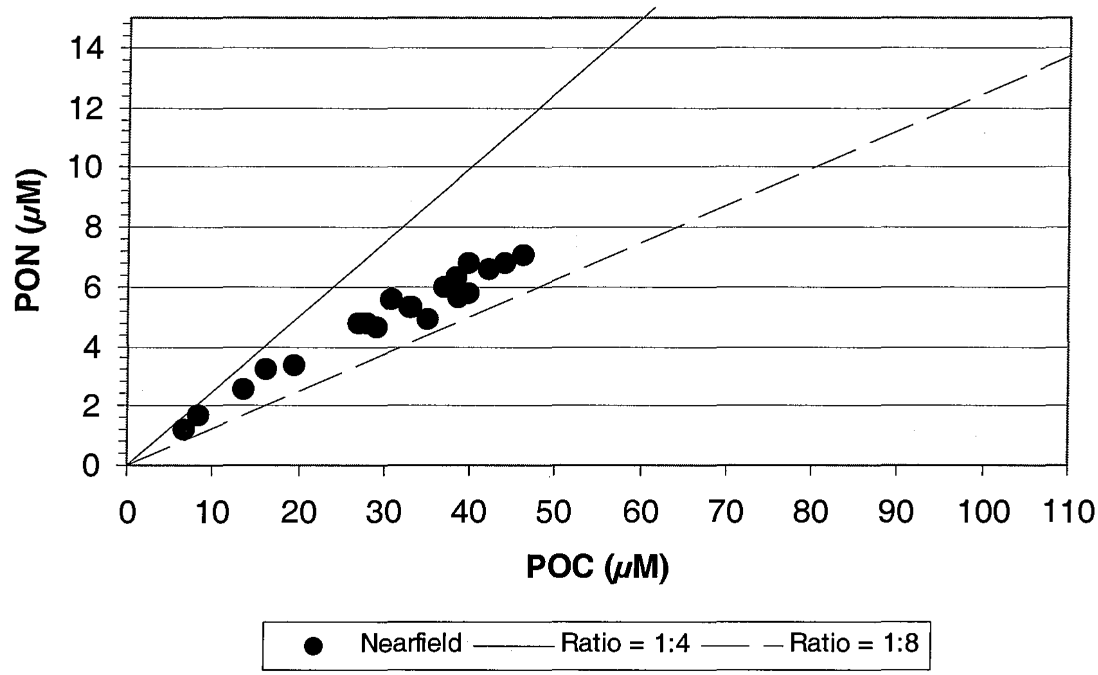


Figure D-114. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

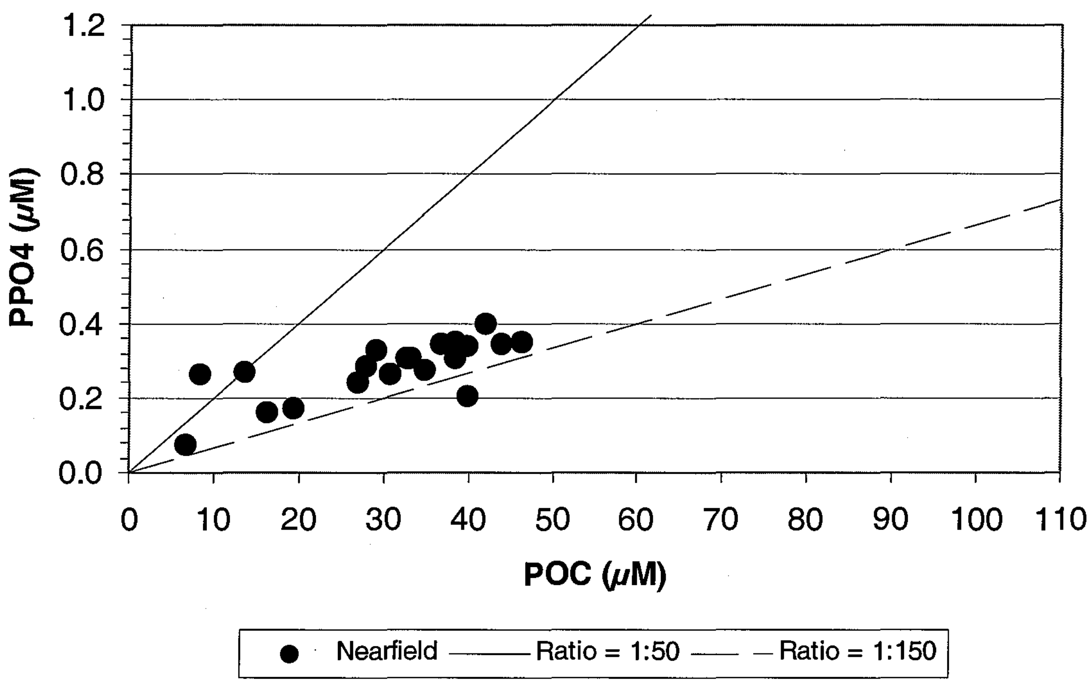
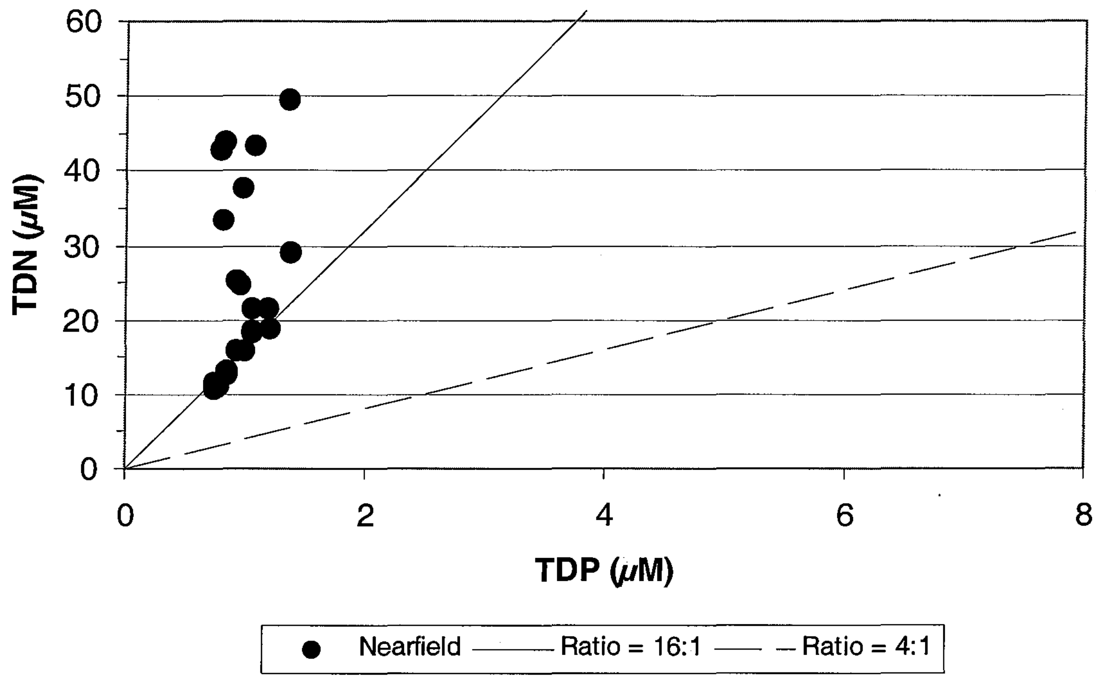


Figure D-115. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

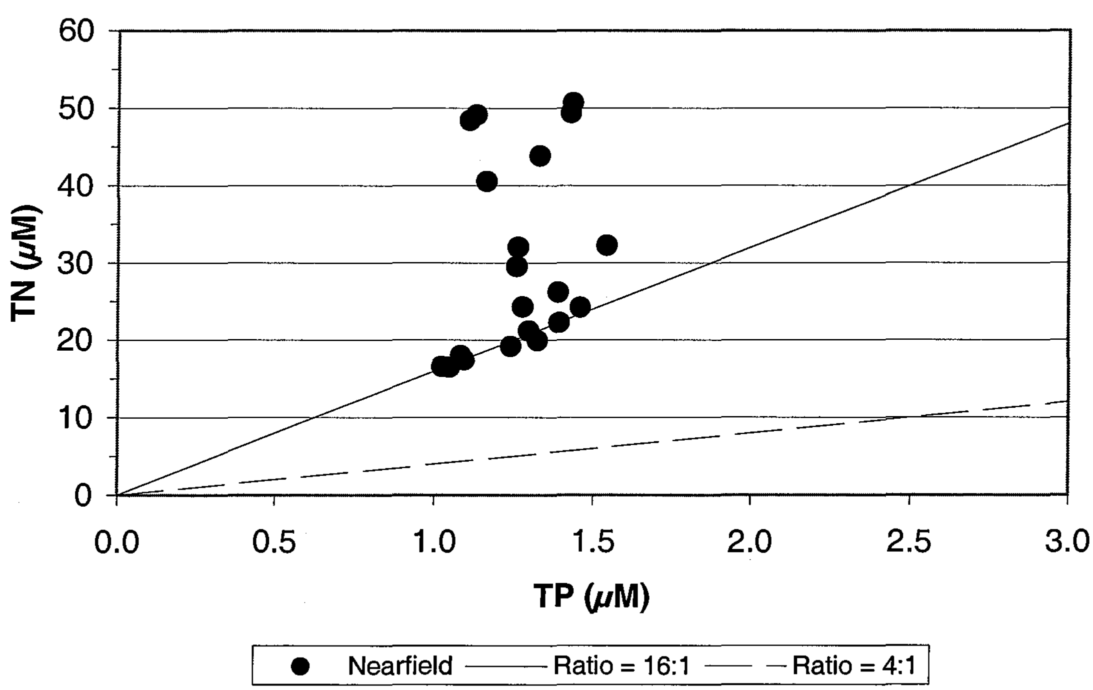
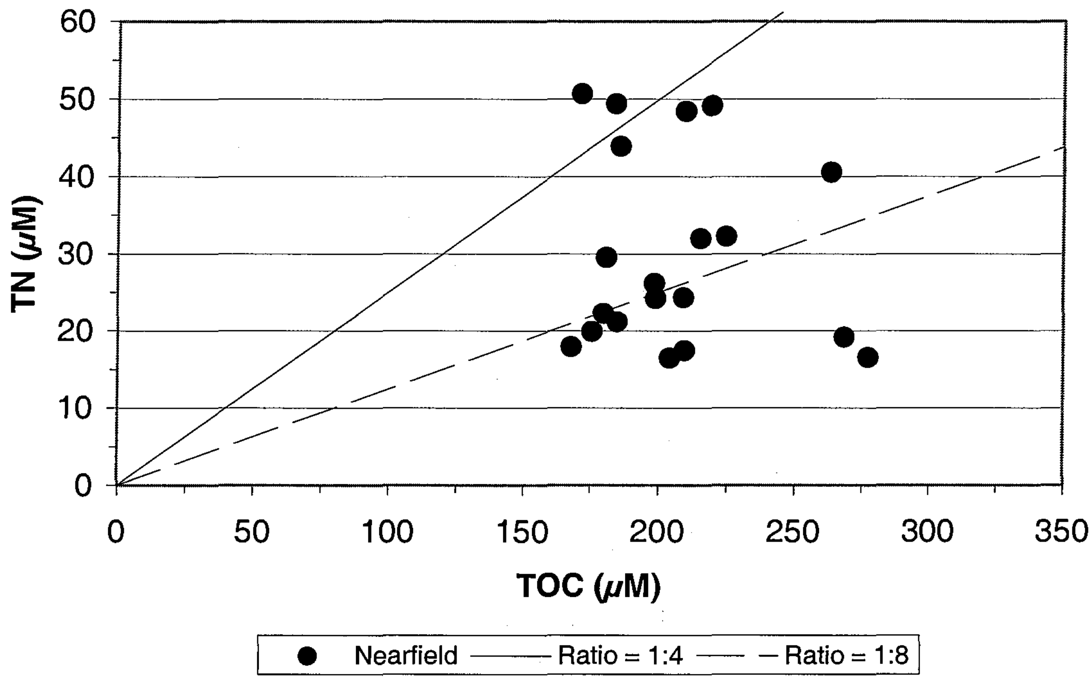


Figure D-116. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

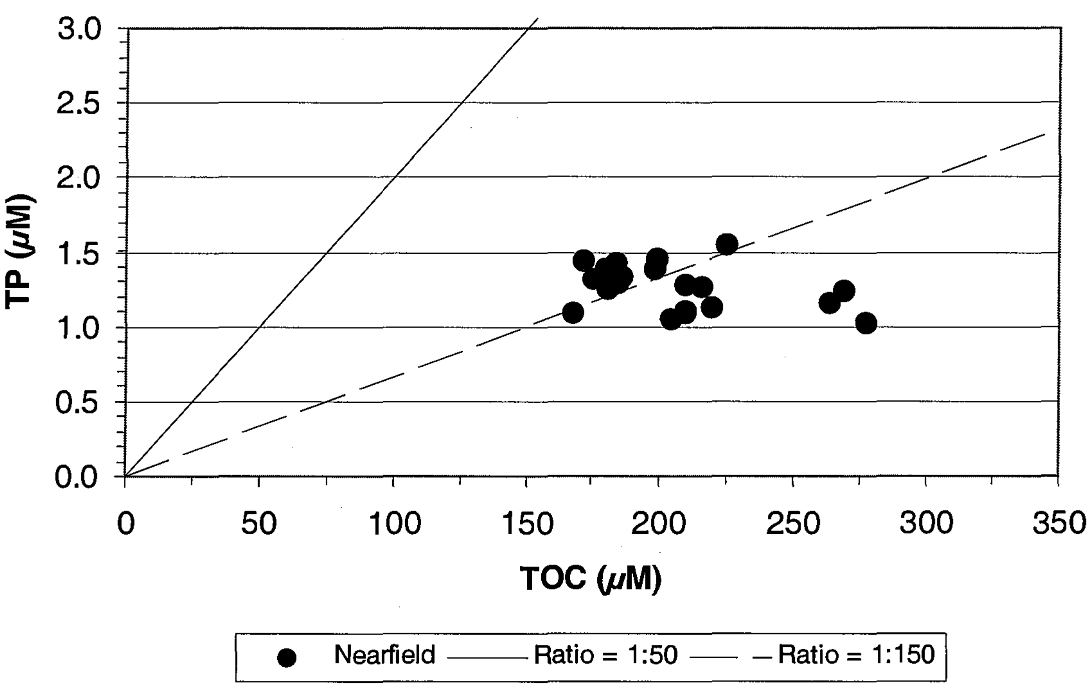


Figure D-117. Nutrient vs. Nutrient Plots for Nearfield Survey WN01F, (Oct 01)

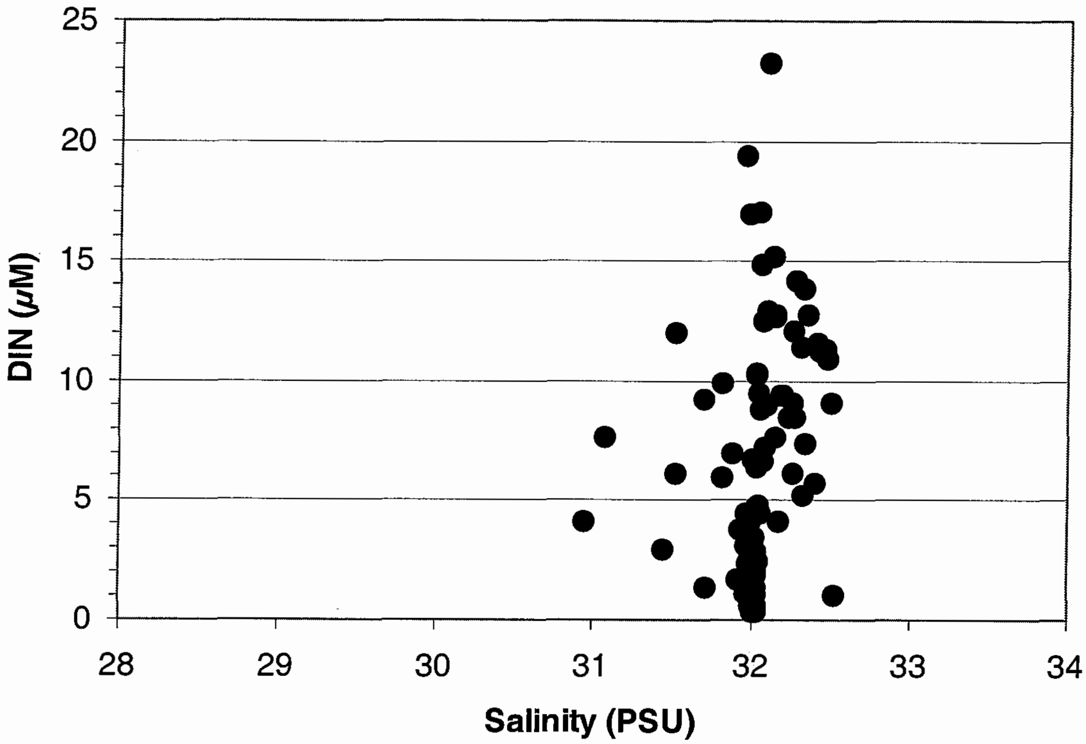


Figure D-118. Nutrient vs. Salinity Plots for Nearfield Survey WN01F, (Oct 01)

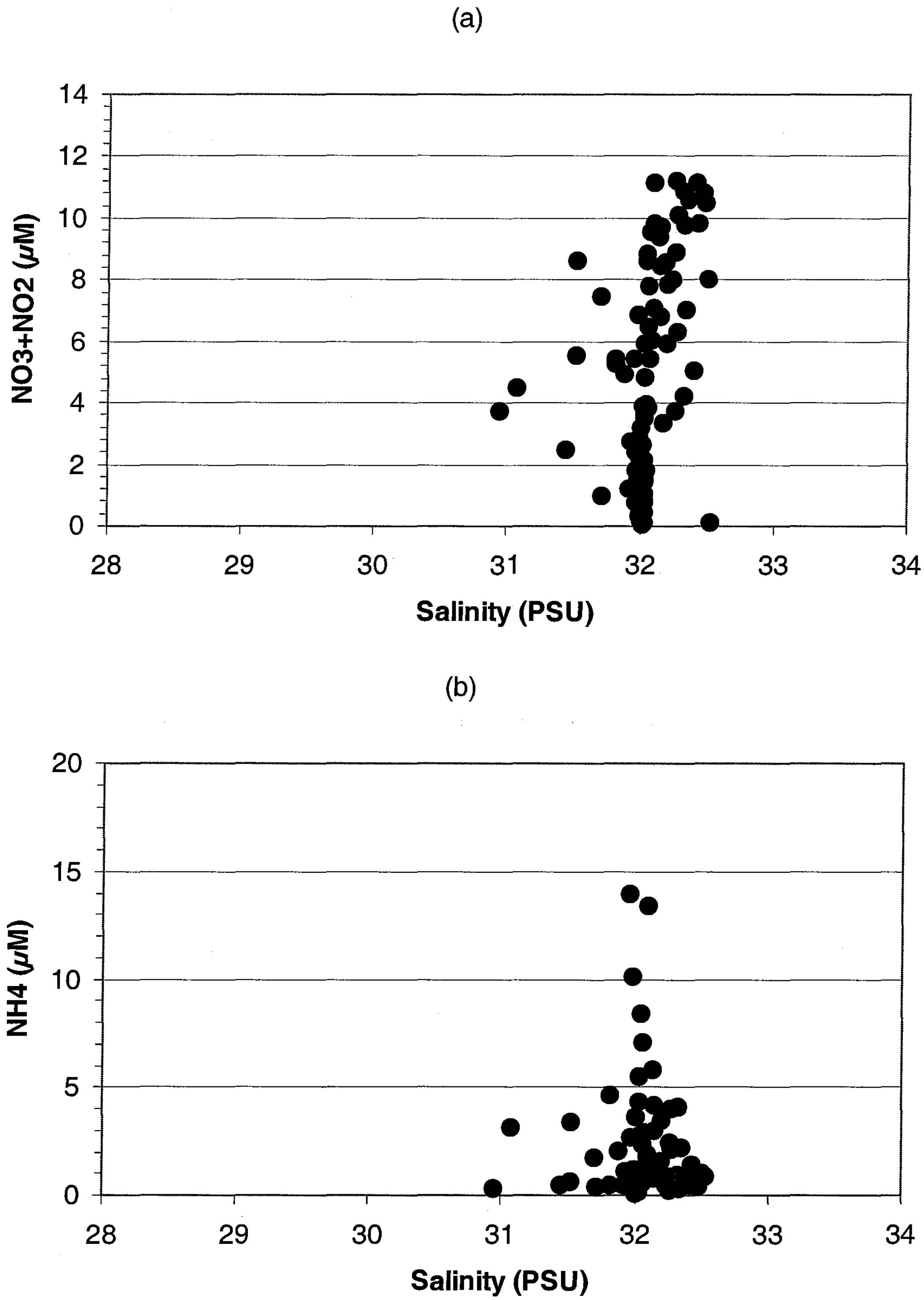
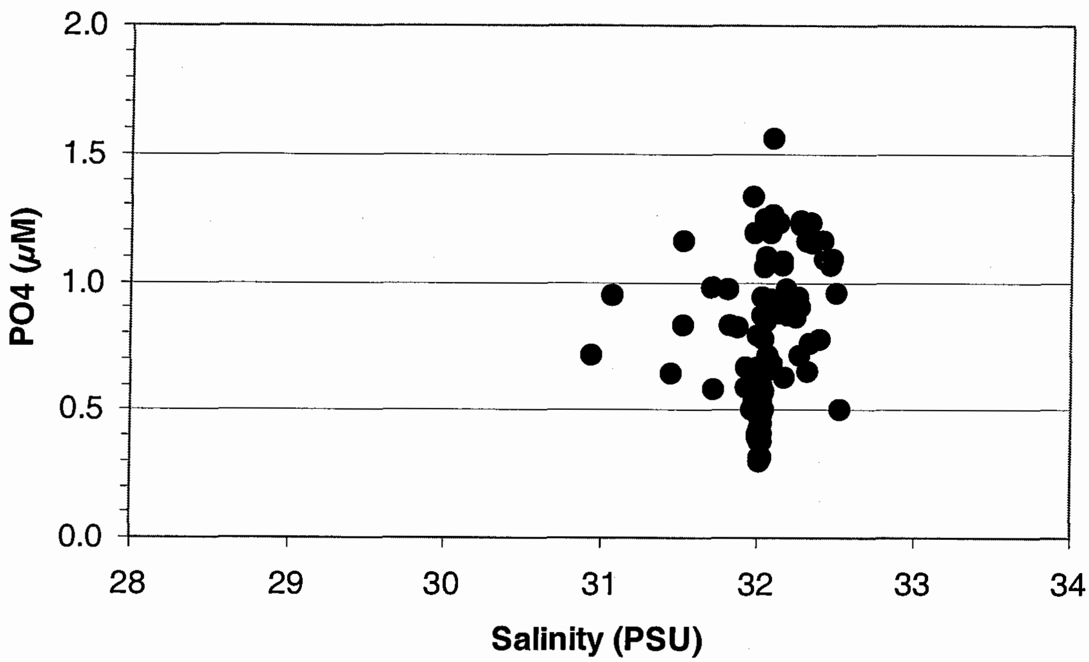


Figure D-119. Nutrient vs. Salinity Plots for Nearfield Survey WN01F, (Oct 01)

(a)



(b)

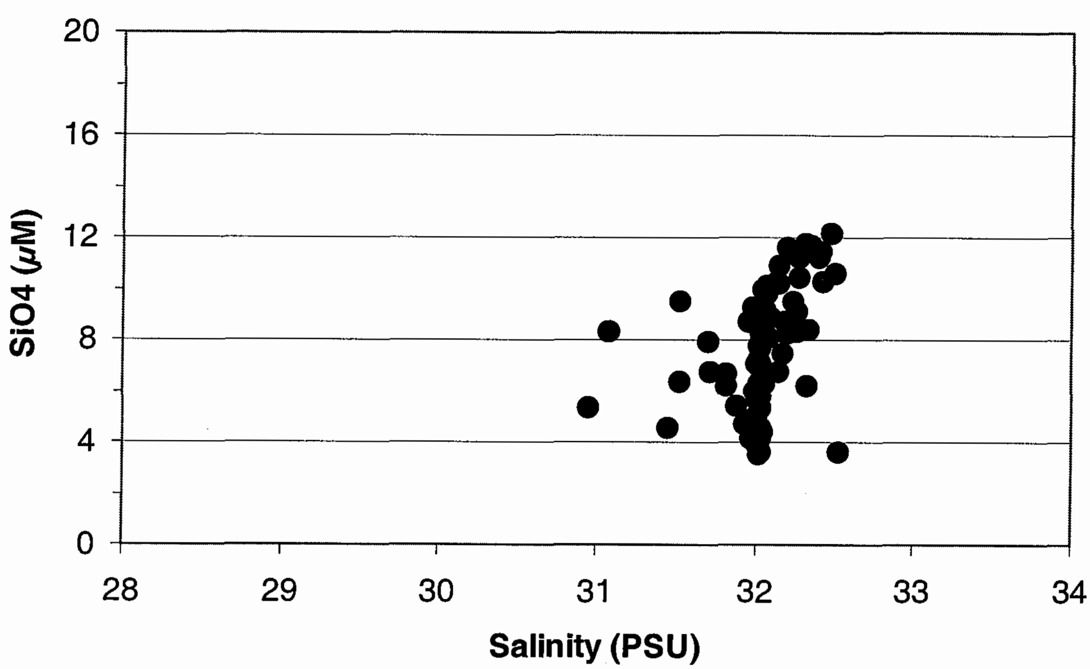


Figure D-120. Nutrient vs. Salinity Plots for Nearfield Survey WN01F, (Oct 01)

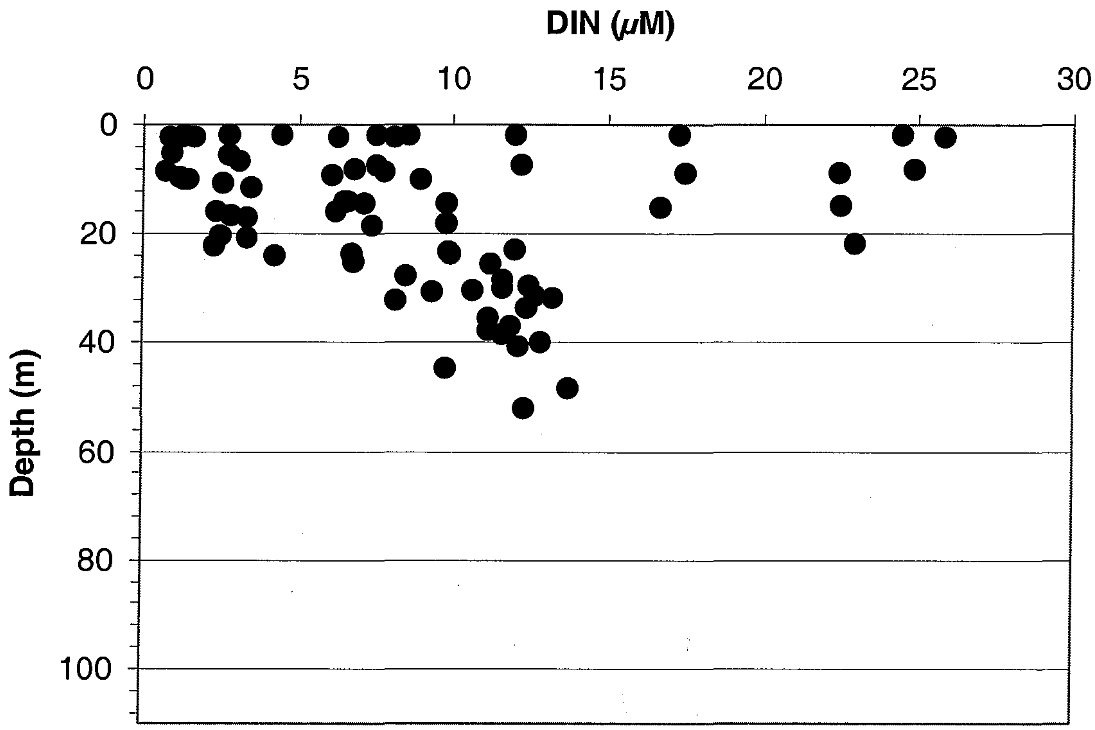
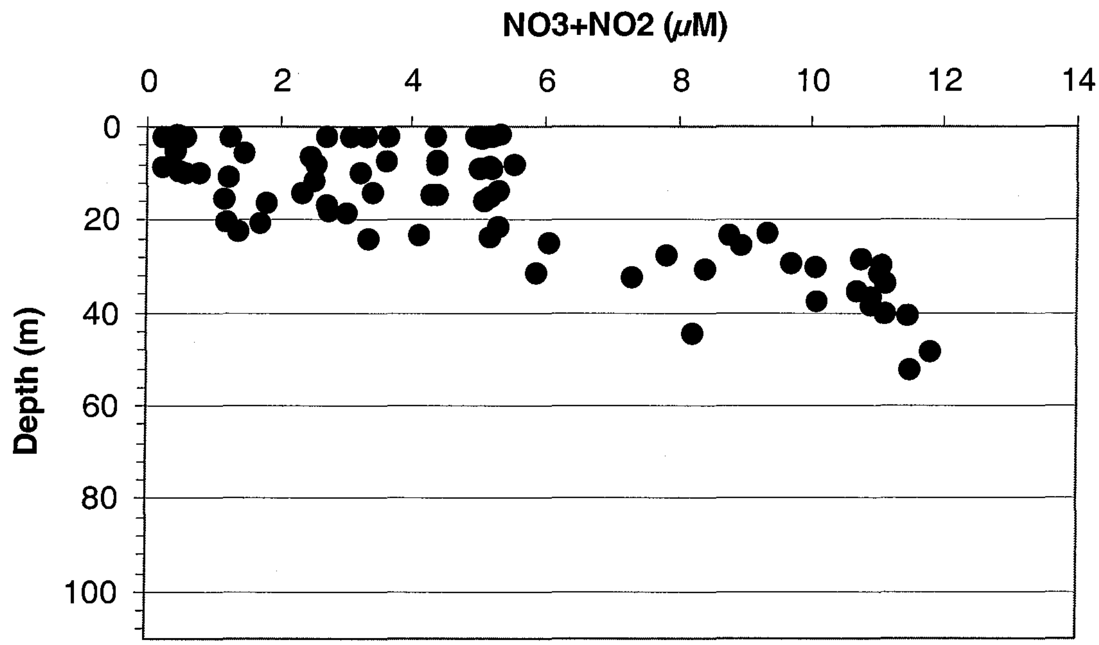


Figure D-121. Depth vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

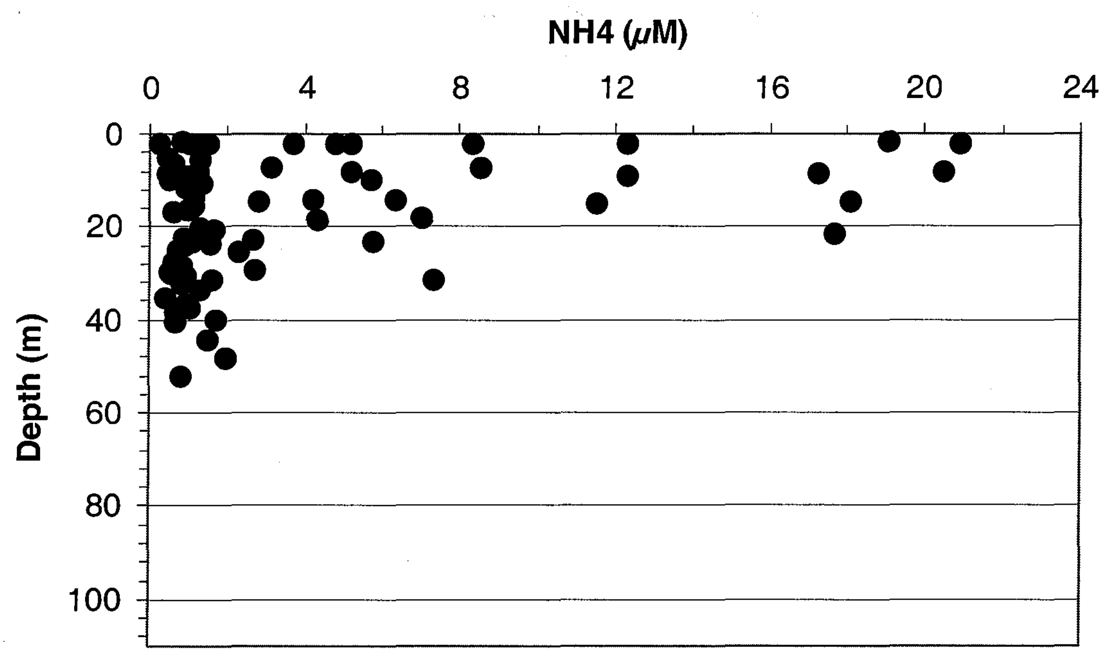
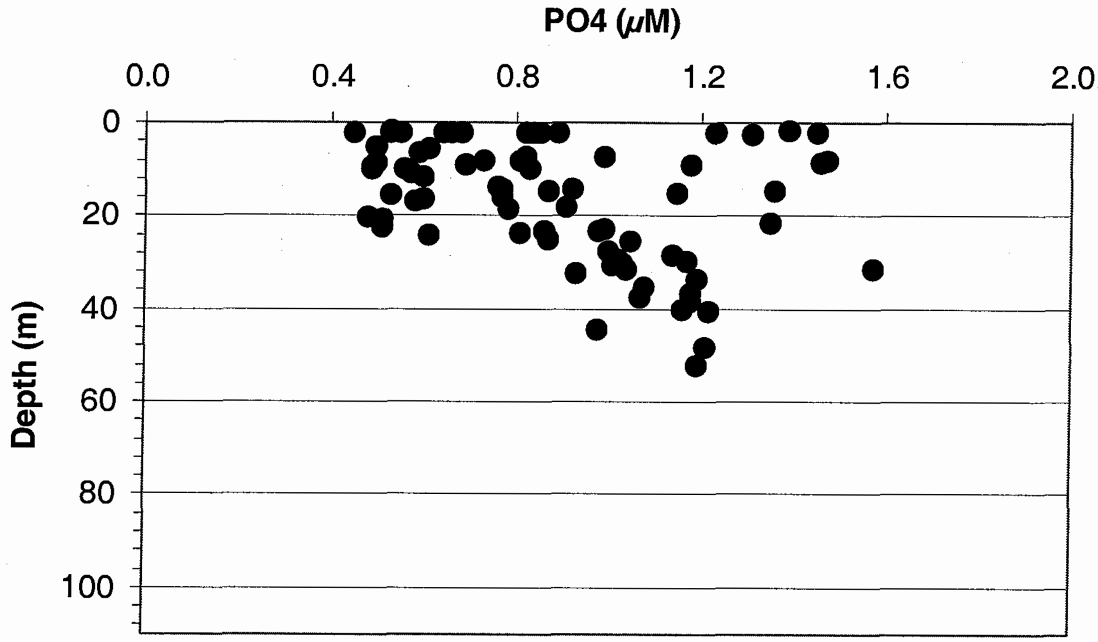


Figure D-122. Depth vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

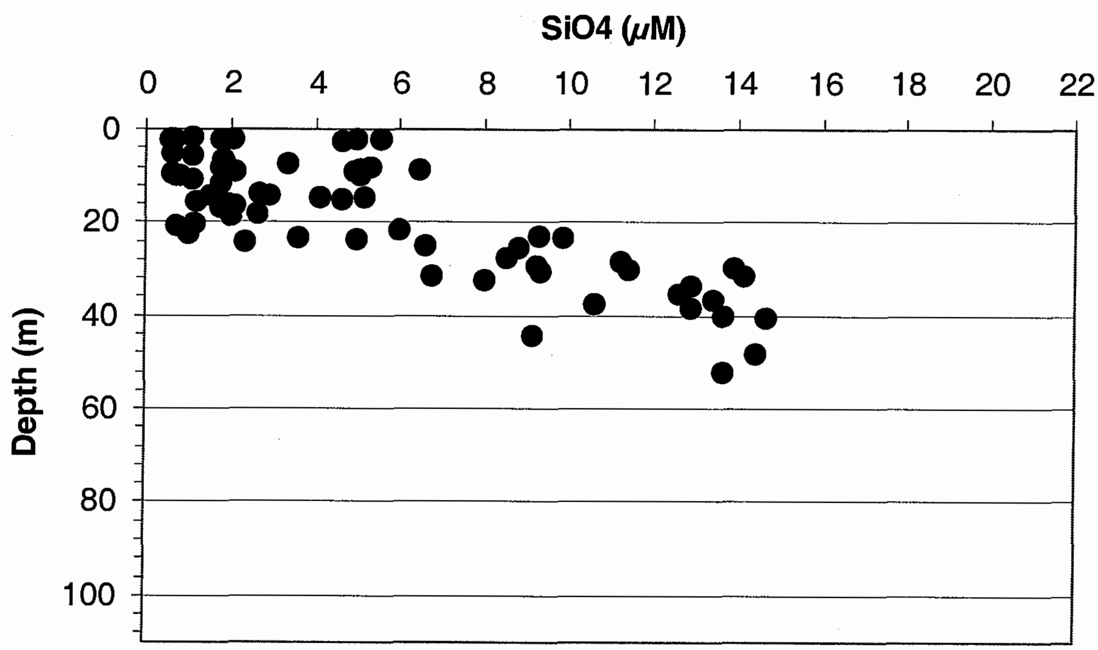
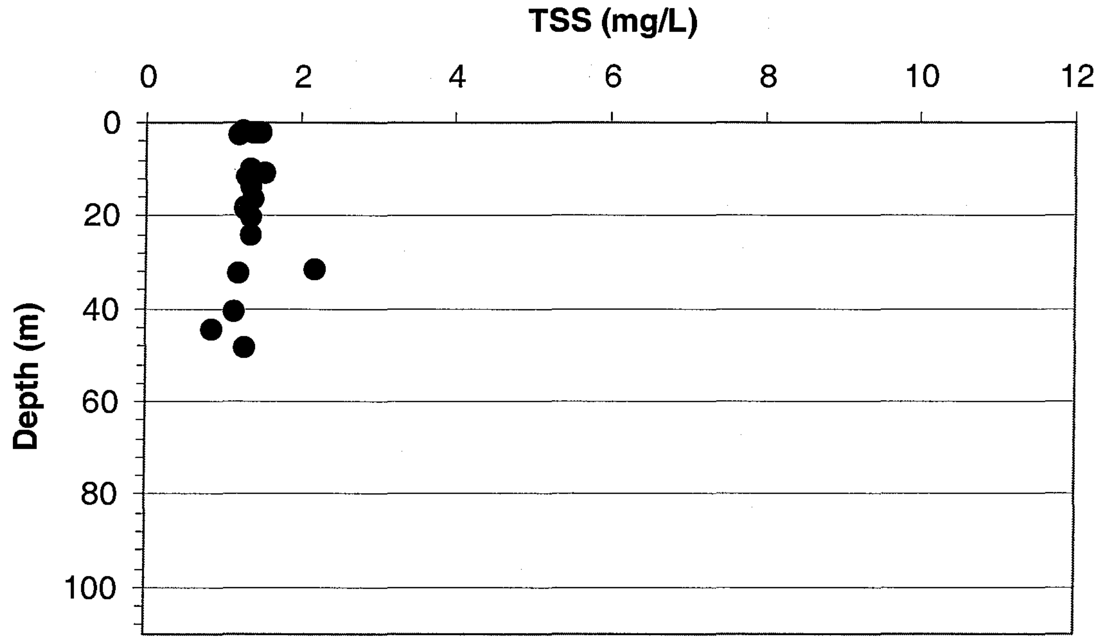


Figure D-123. Depth vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

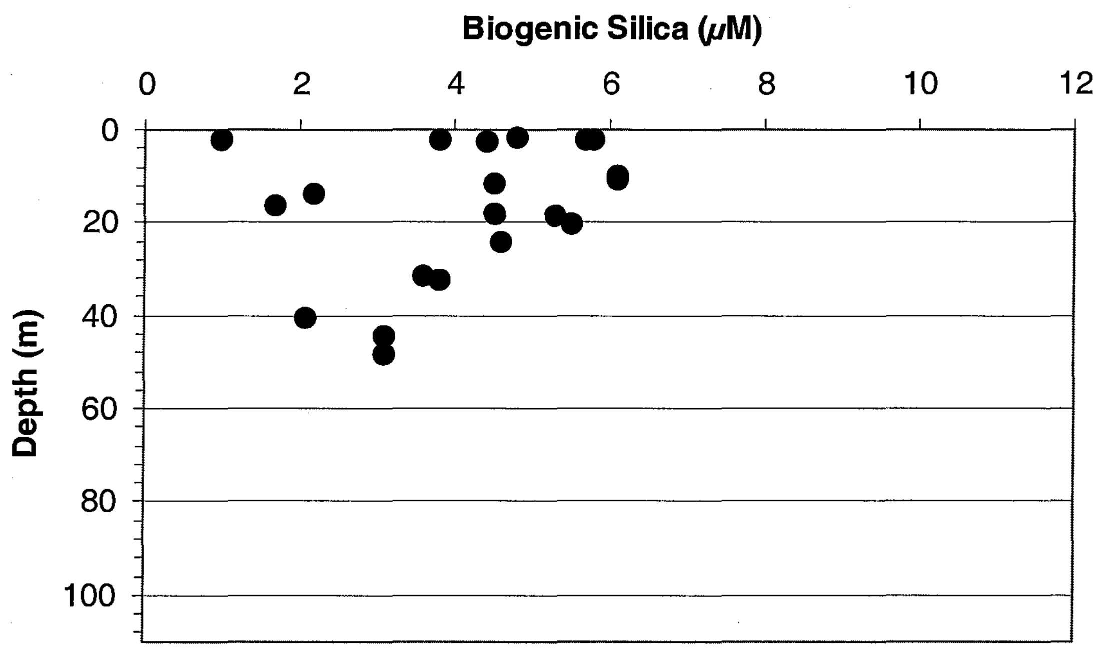


Figure D-124. Depth vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

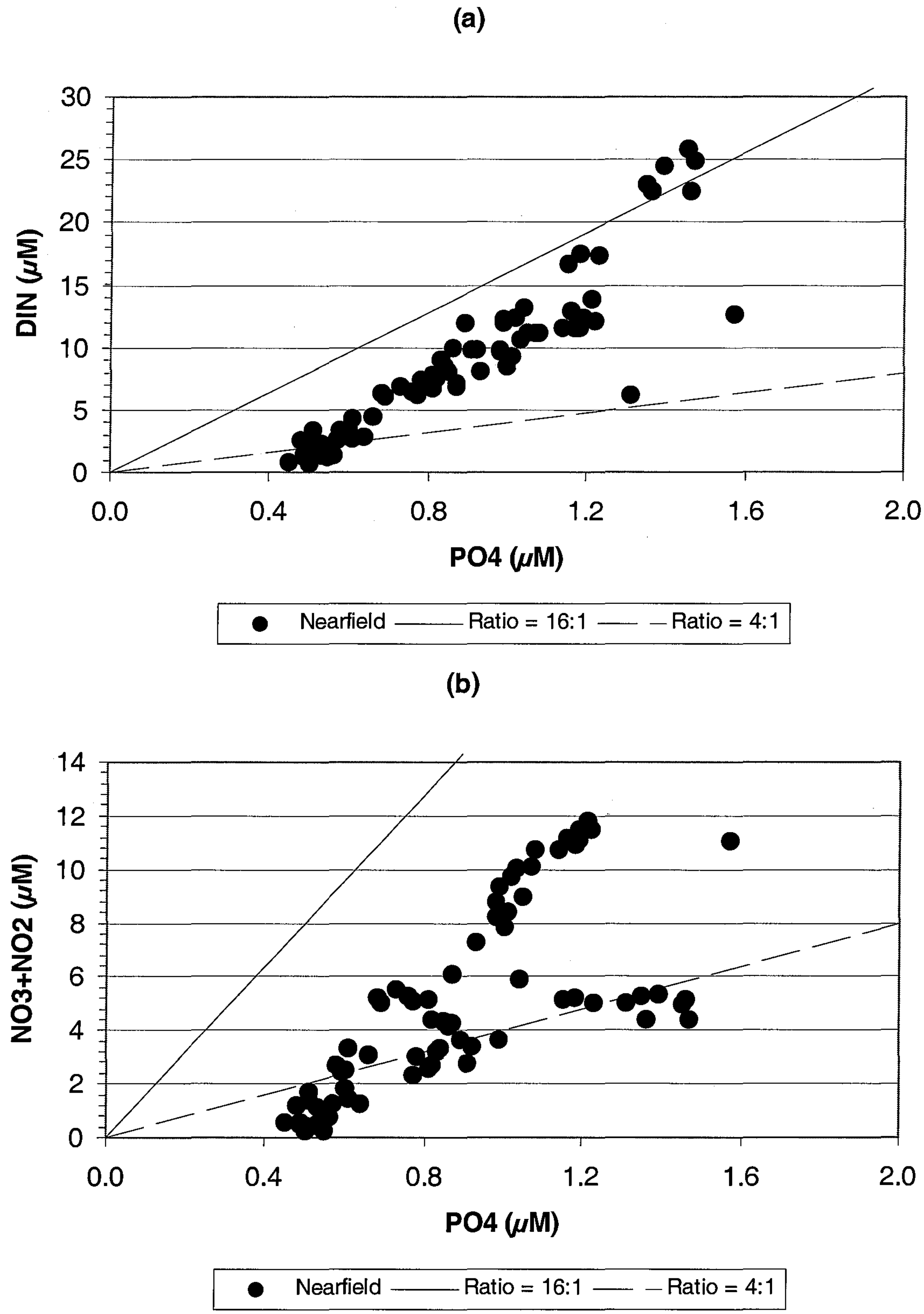


Figure D-125. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

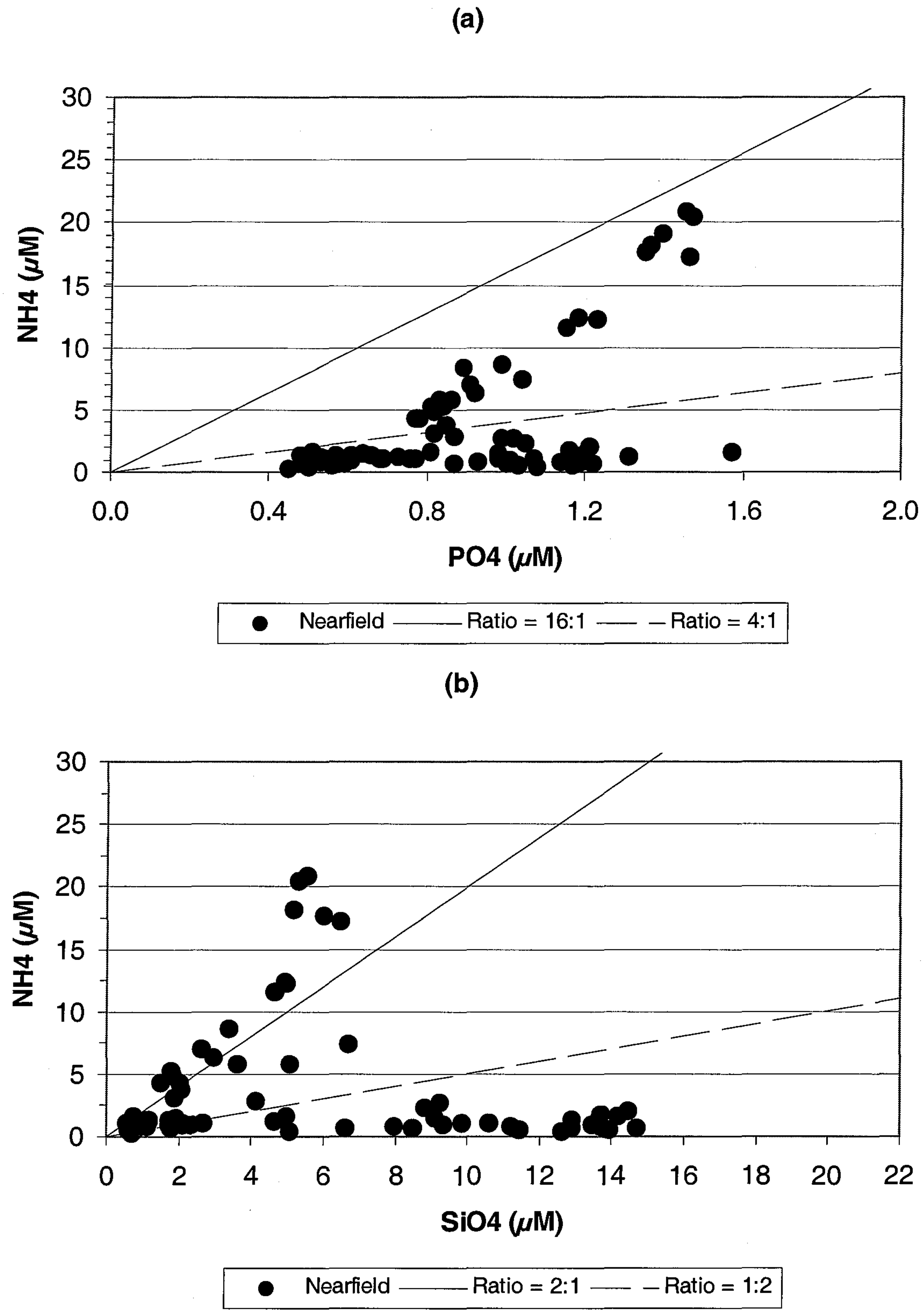
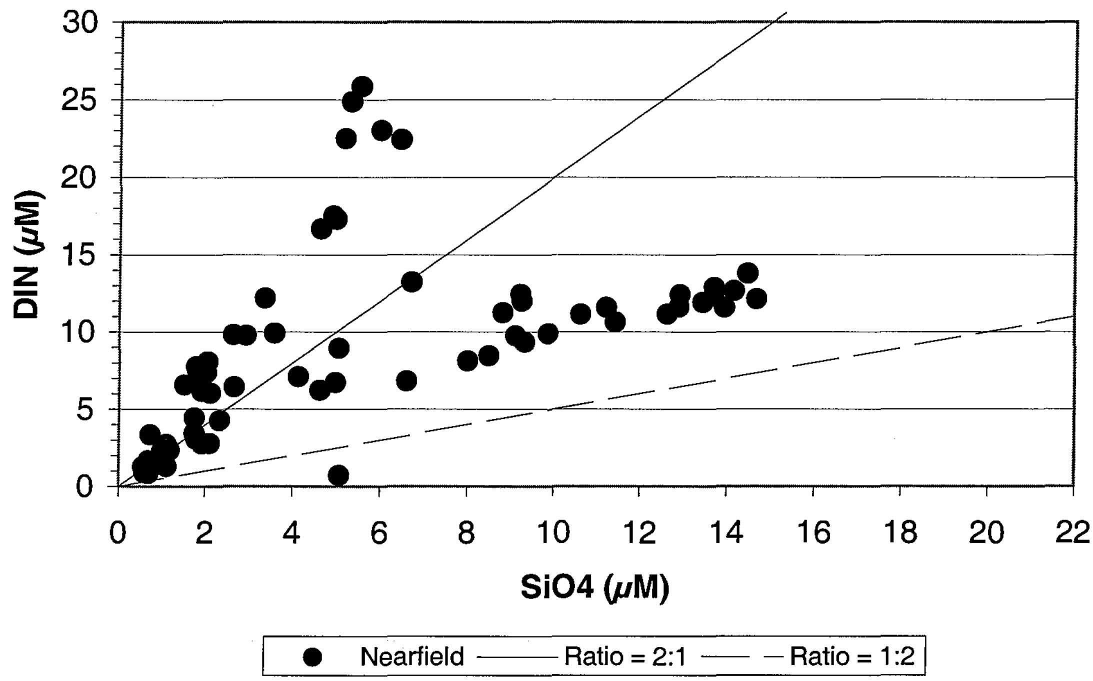


Figure D-126. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

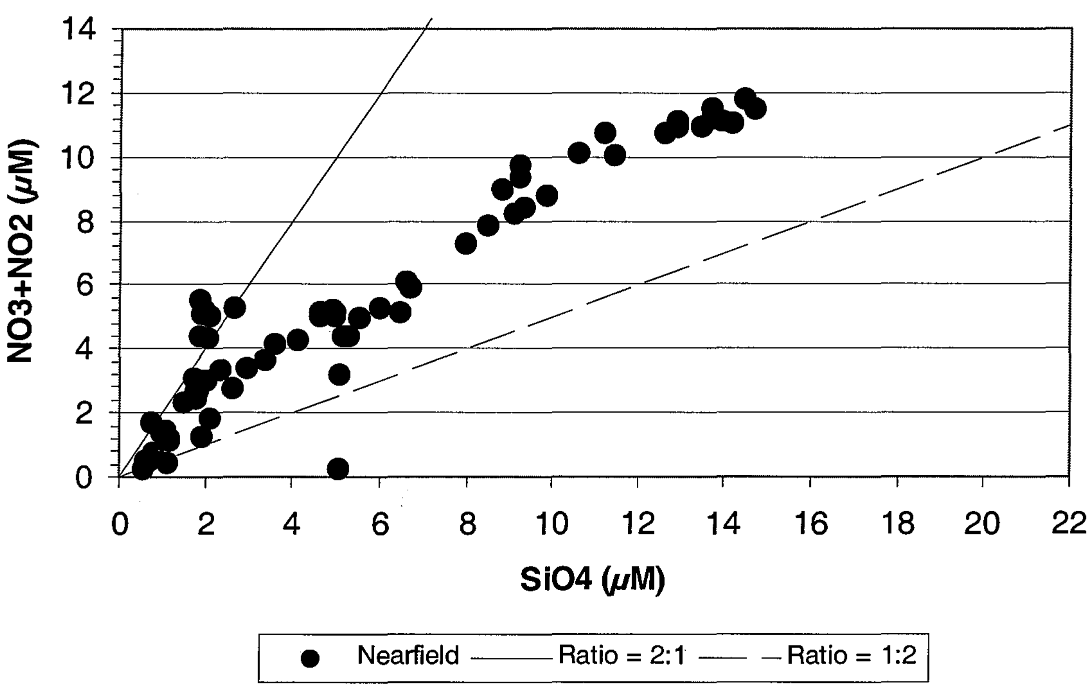
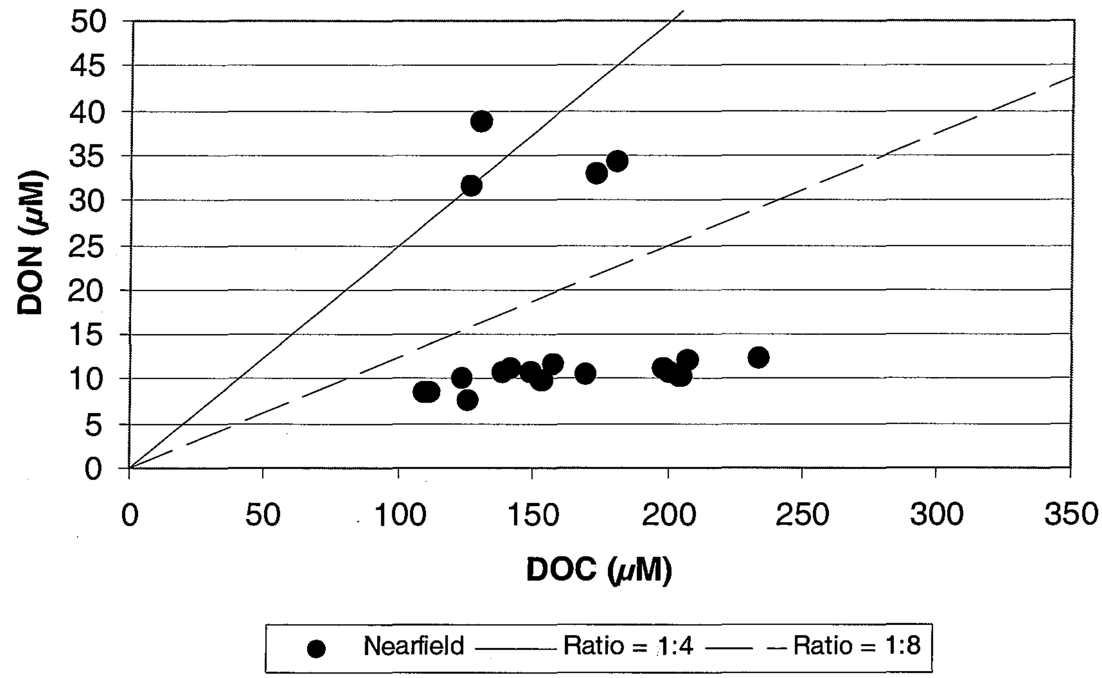


Figure D-127. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

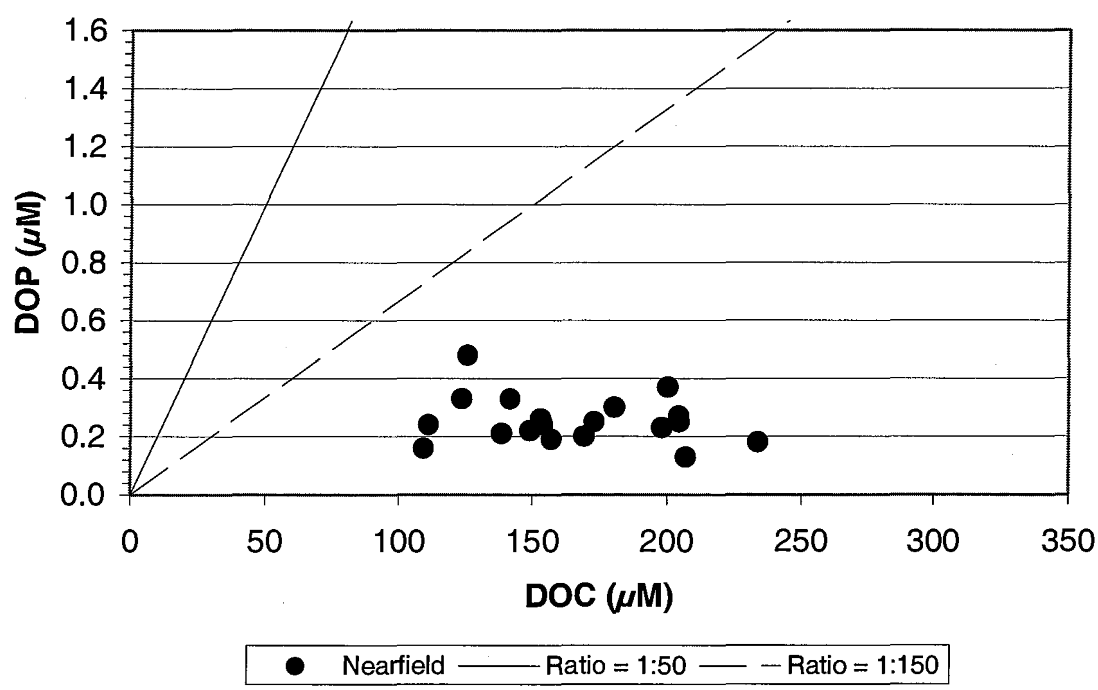
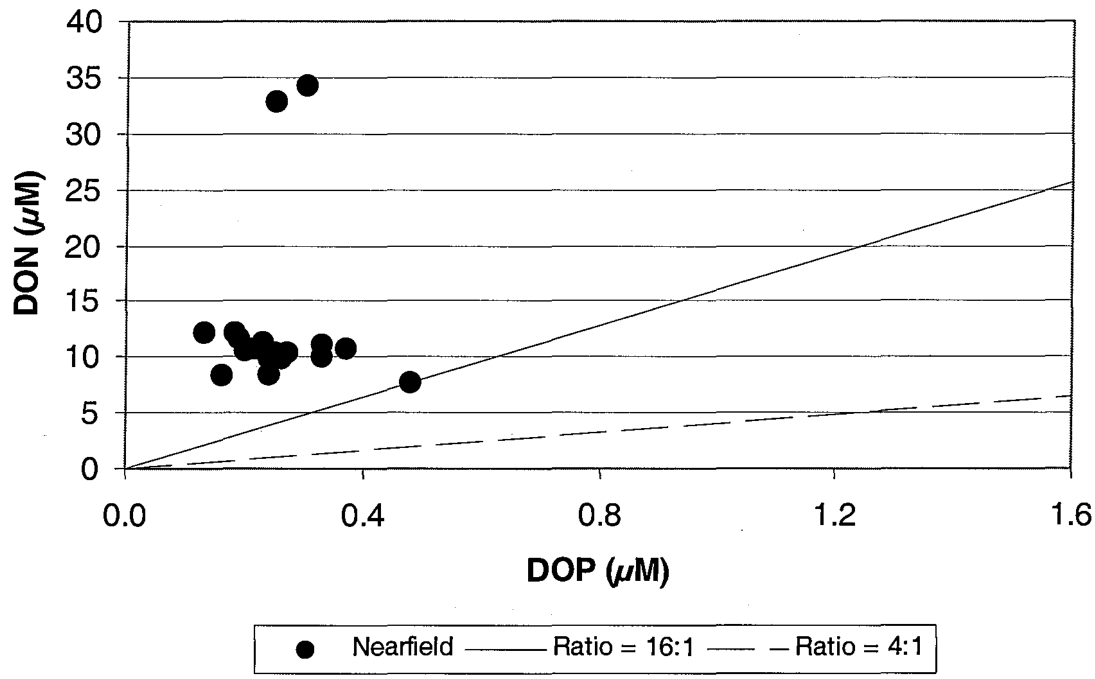


Figure D-128. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

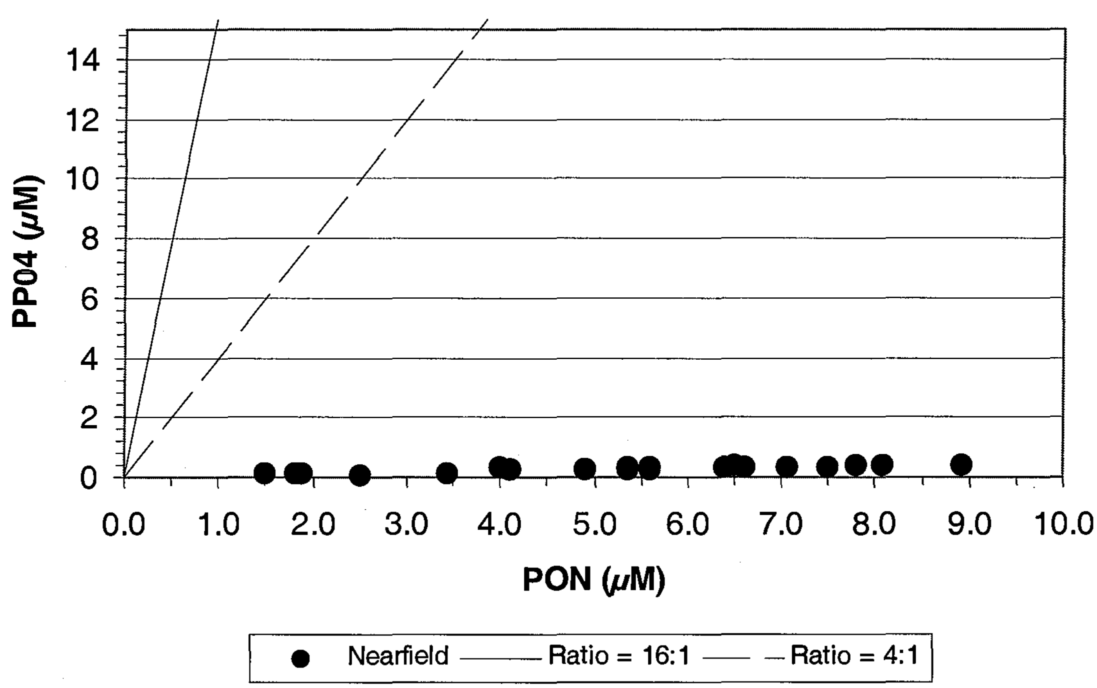
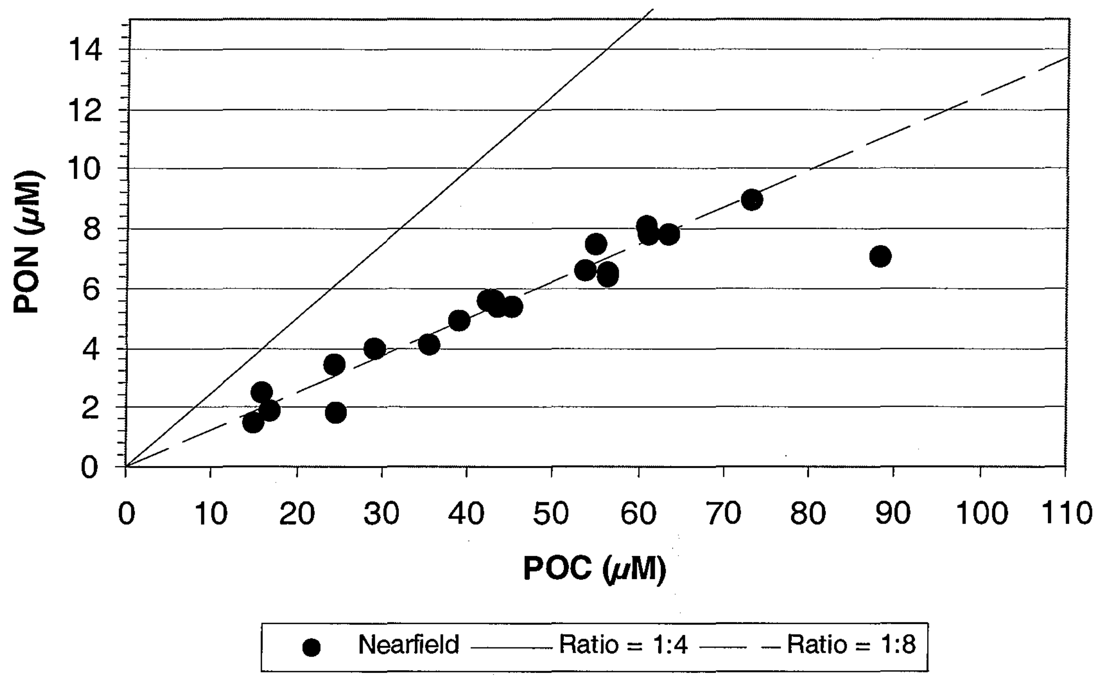


Figure D-129. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

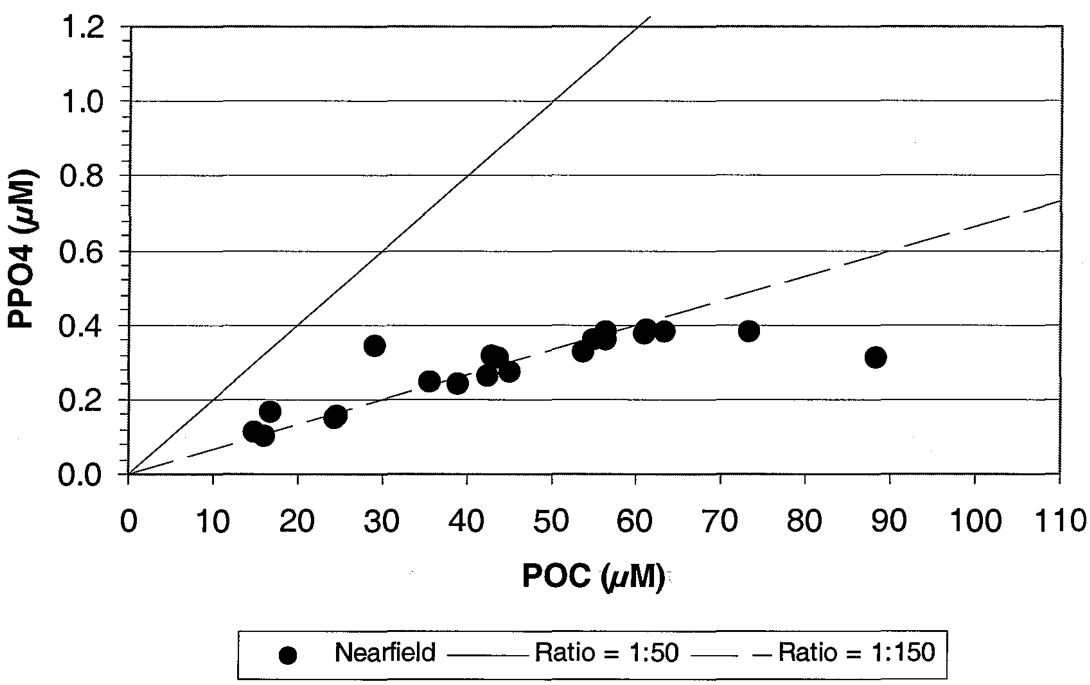
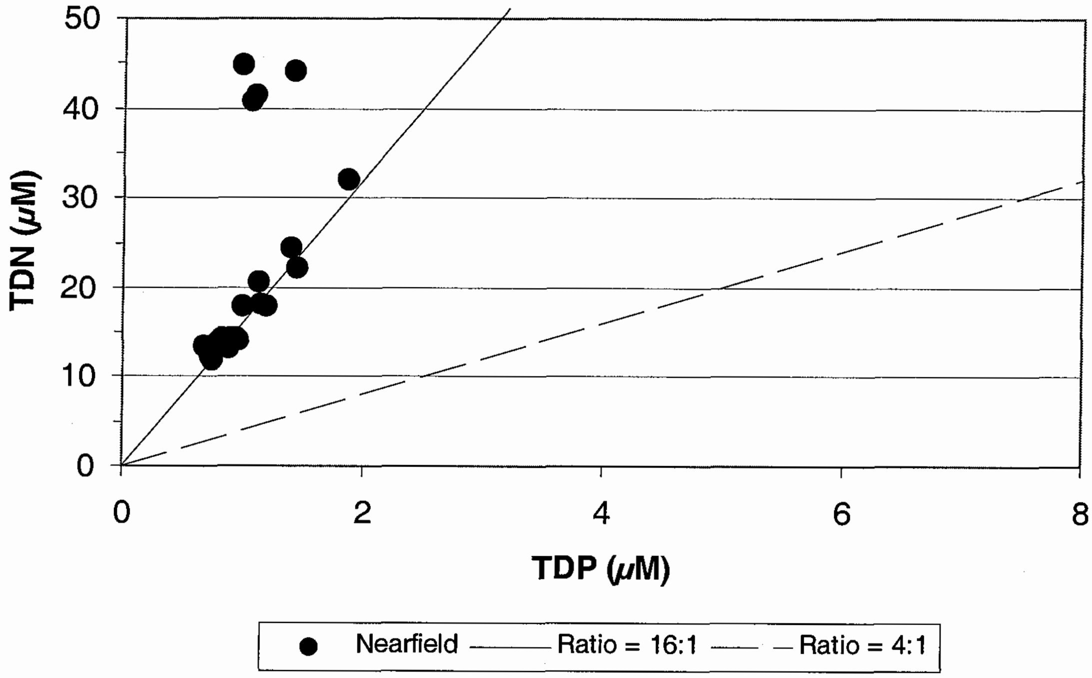


Figure D-130. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

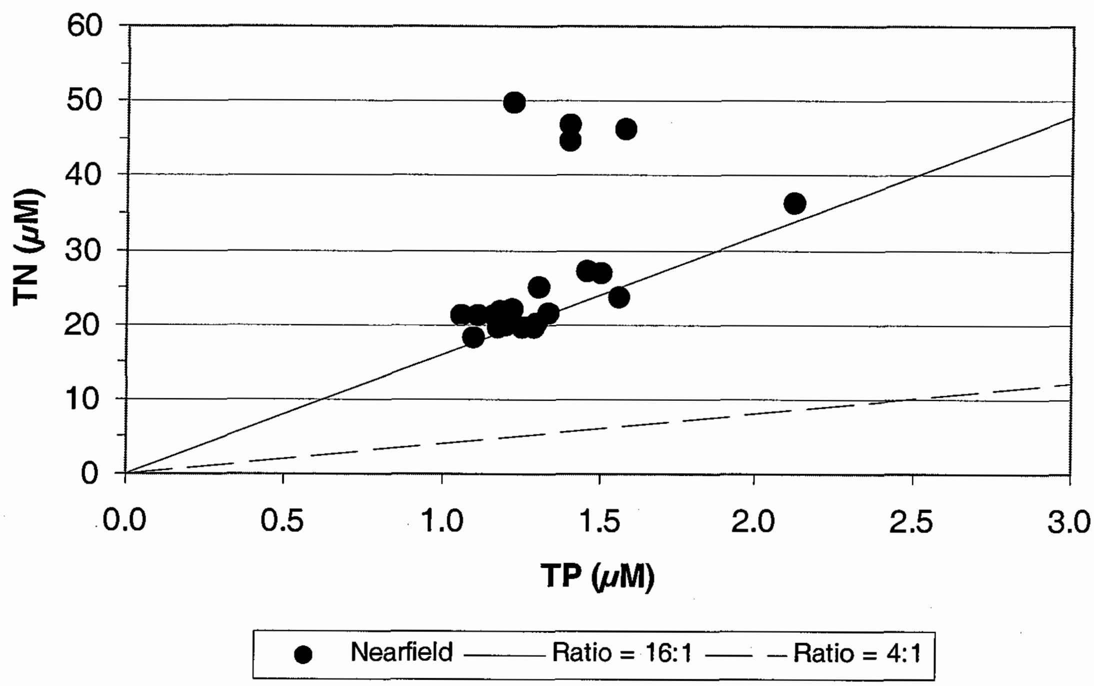
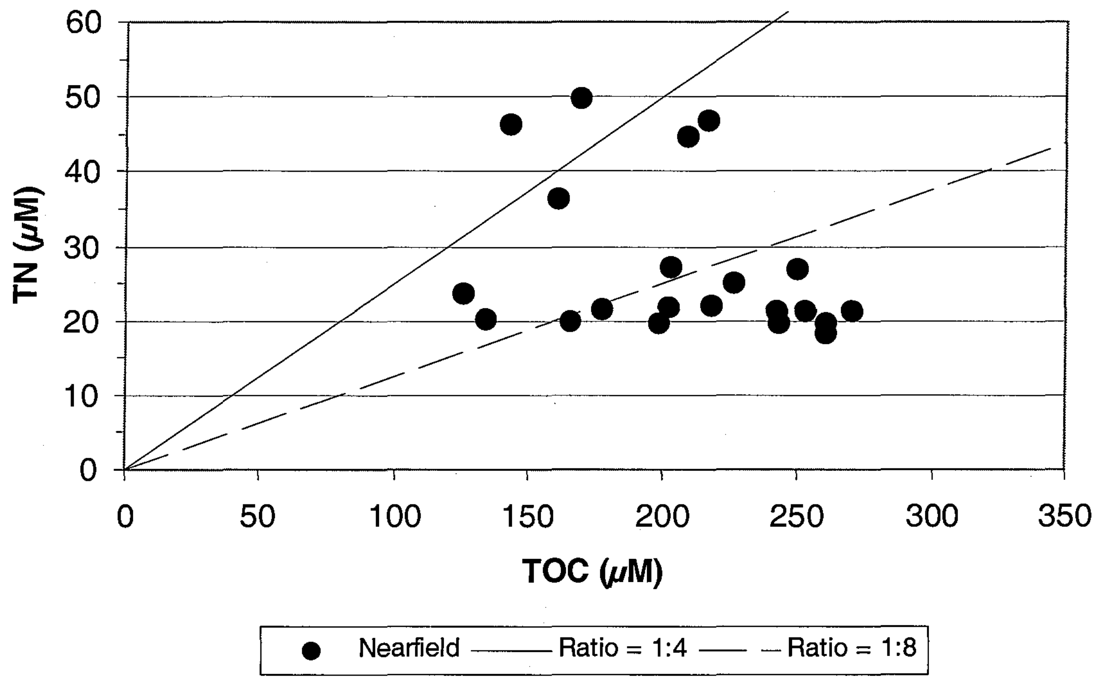


Figure D-131. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

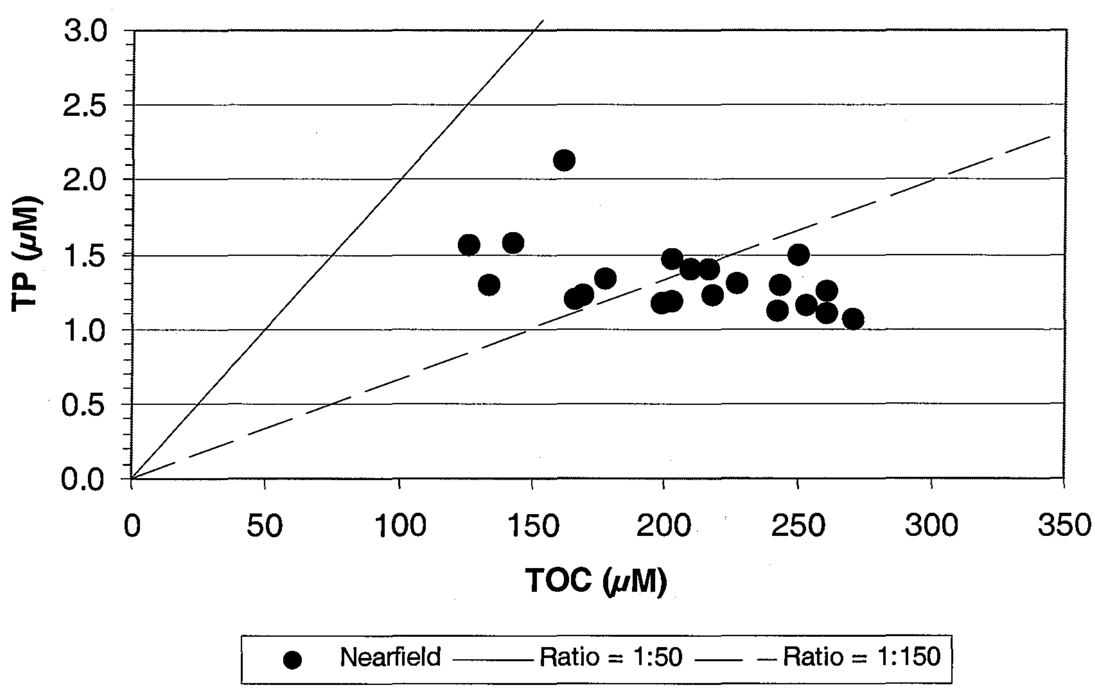


Figure D-132. Nutrient vs. Nutrient Plots for Nearfield Survey WN01G, (Nov 01)

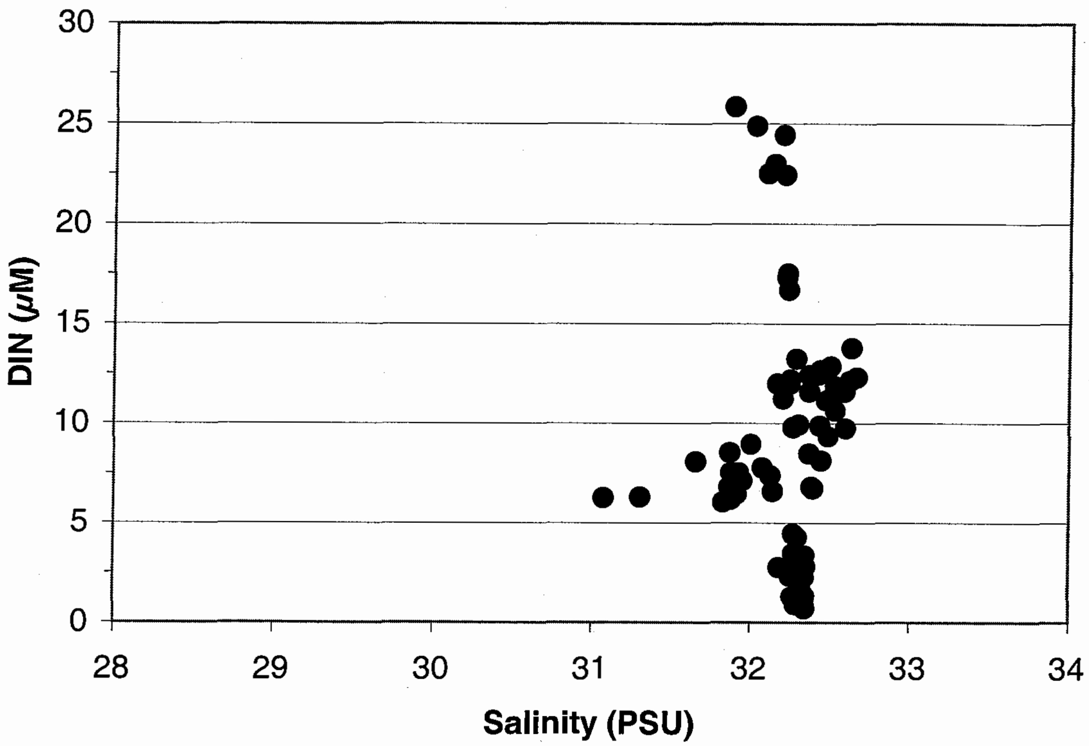
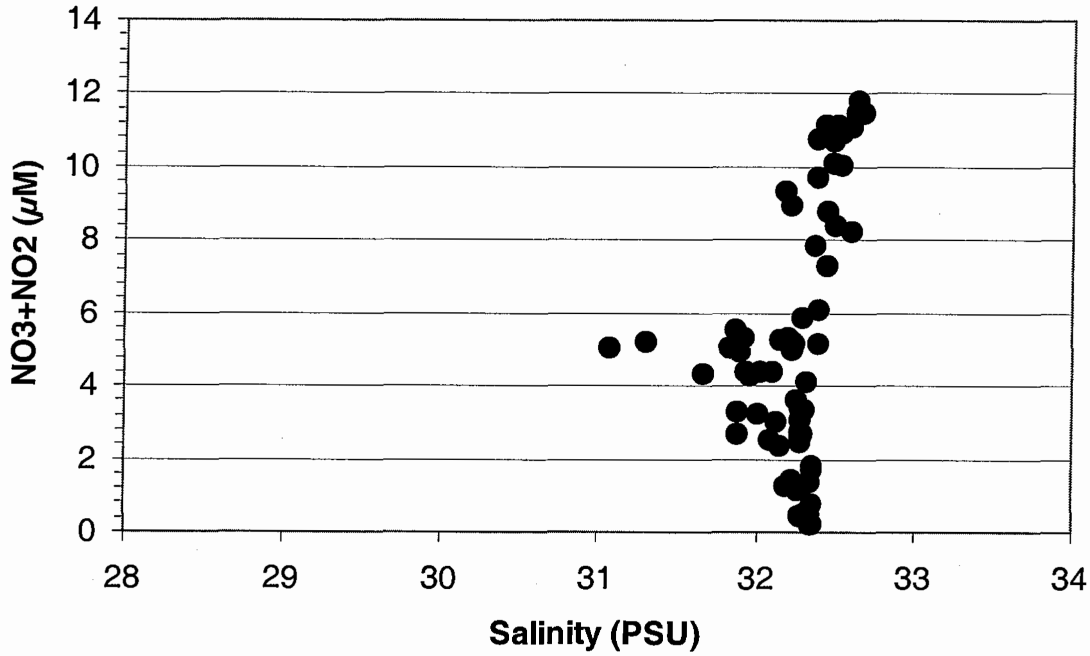


Figure D-133. Nutrient vs. Salinity Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

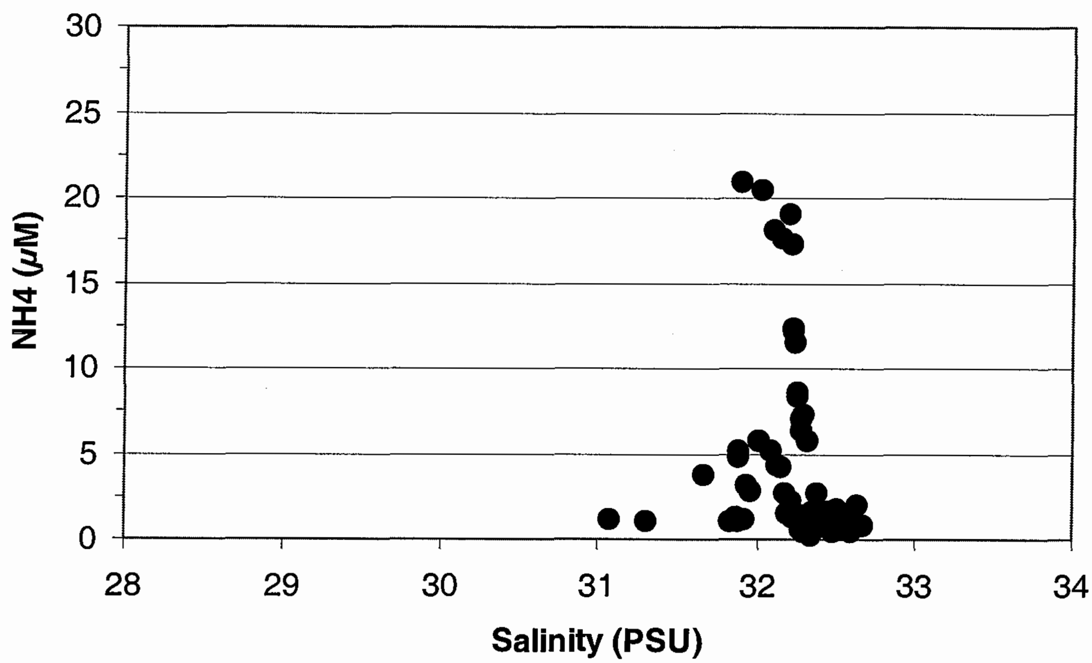
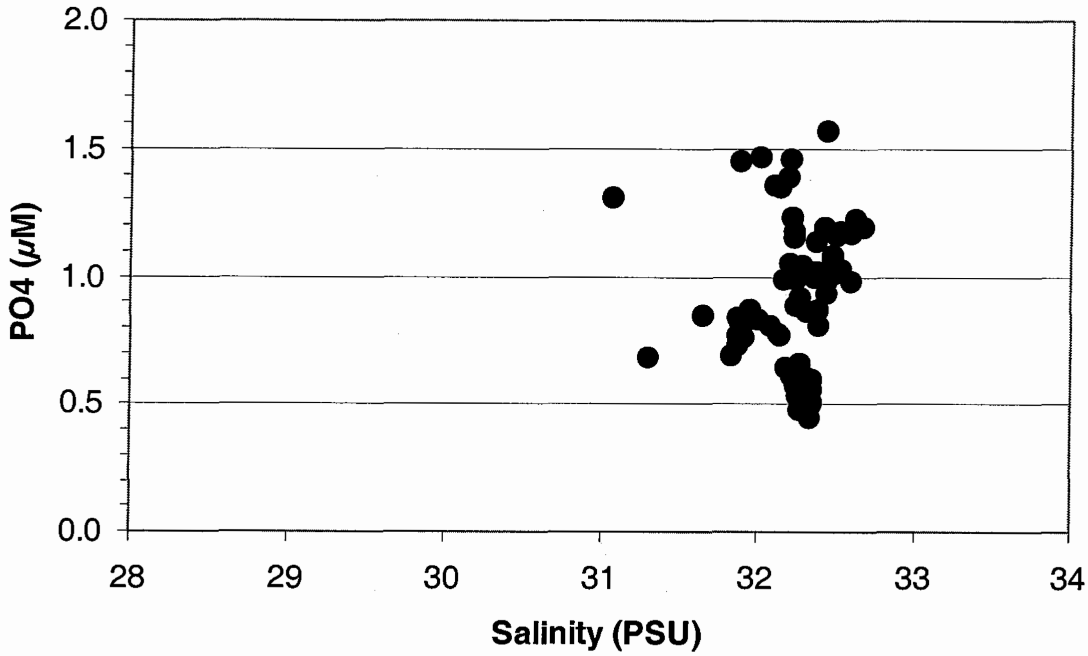


Figure D-134. Nutrient vs. Salinity Plots for Nearfield Survey WN01G, (Nov 01)

(a)



(b)

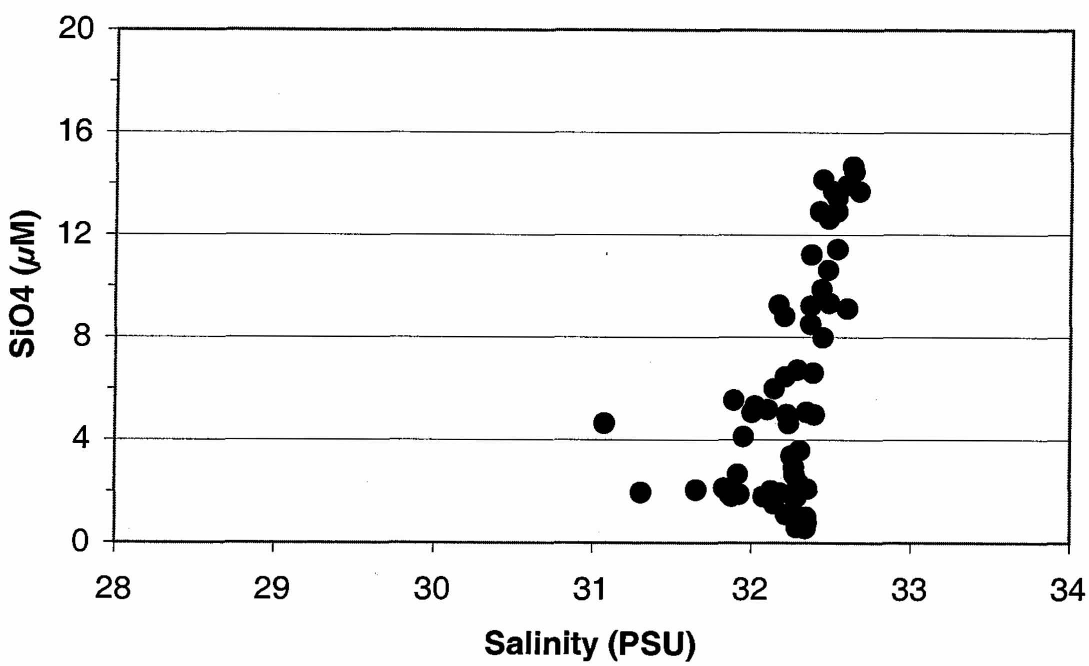


Figure D-135. Nutrient vs. Salinity Plots for Nearfield Survey WN01G, (Nov 01)

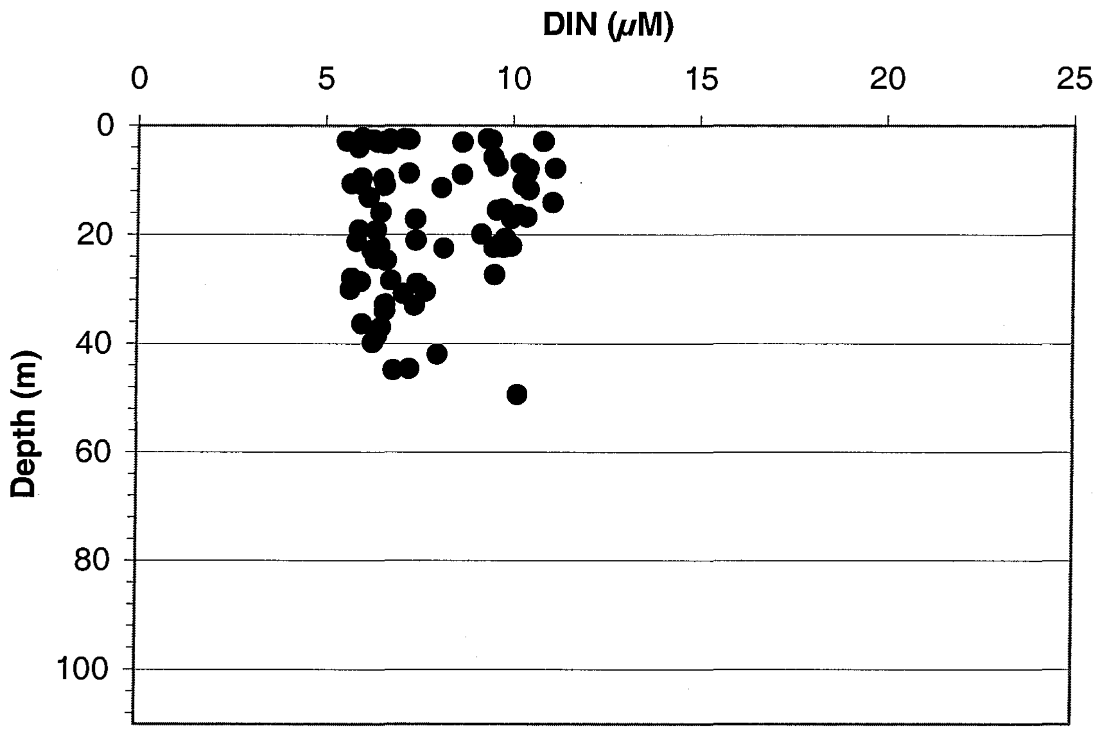
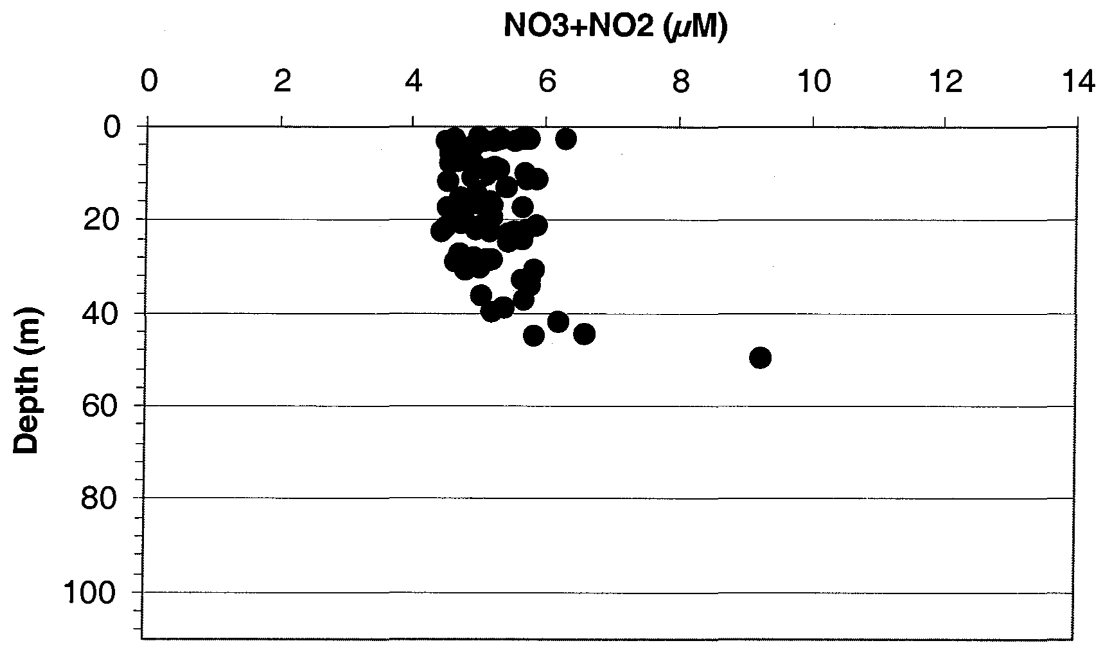


Figure D-136. Depth vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

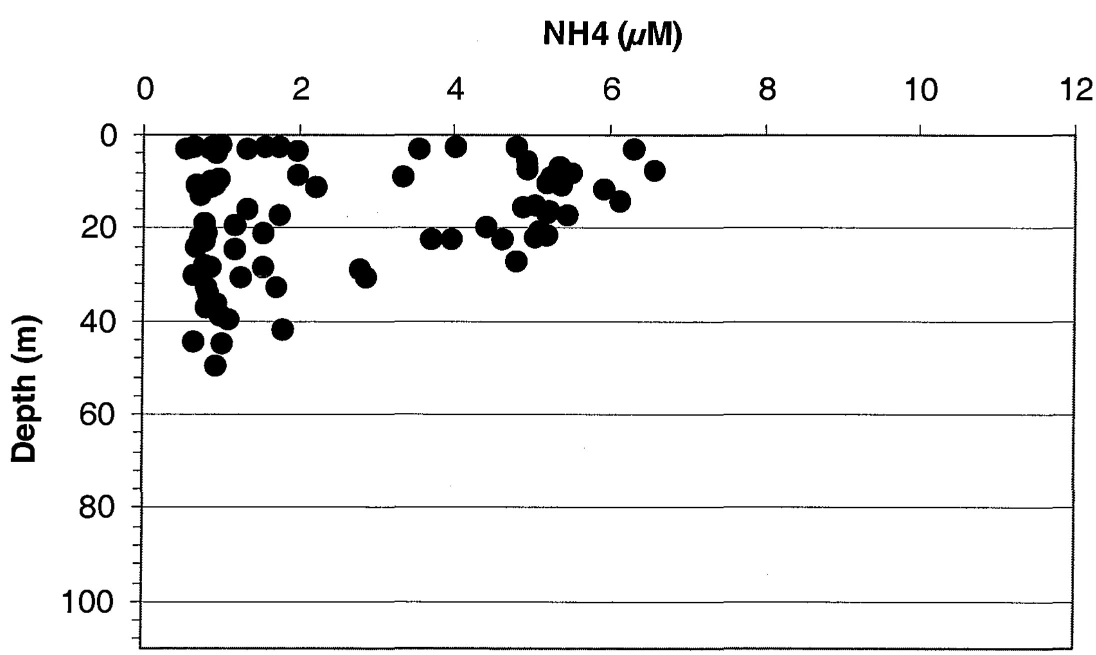
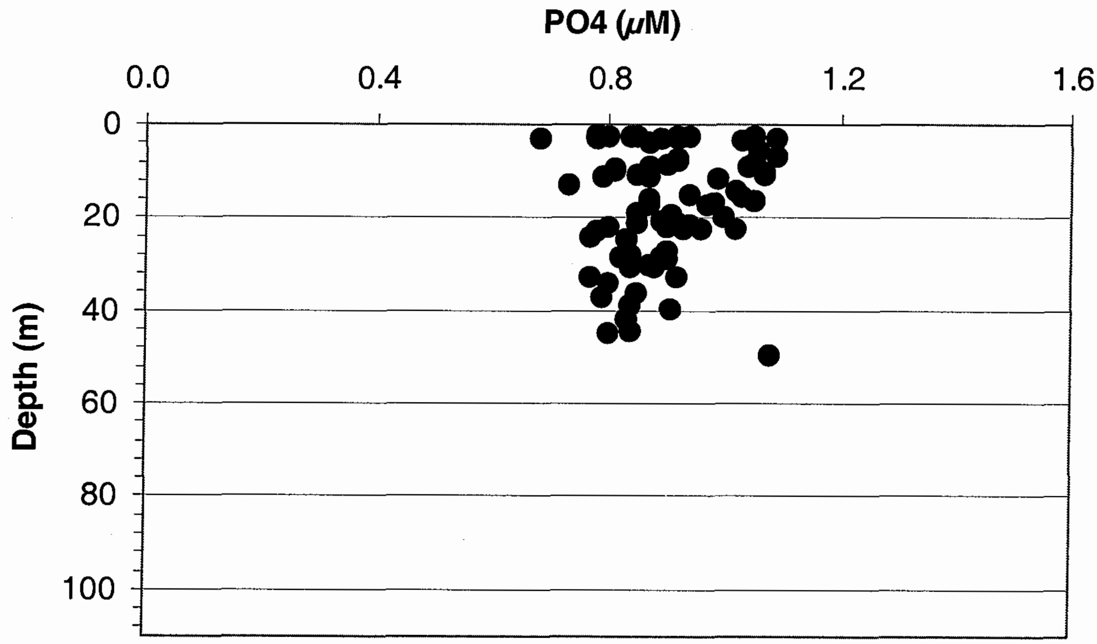


Figure D-137. Depth vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

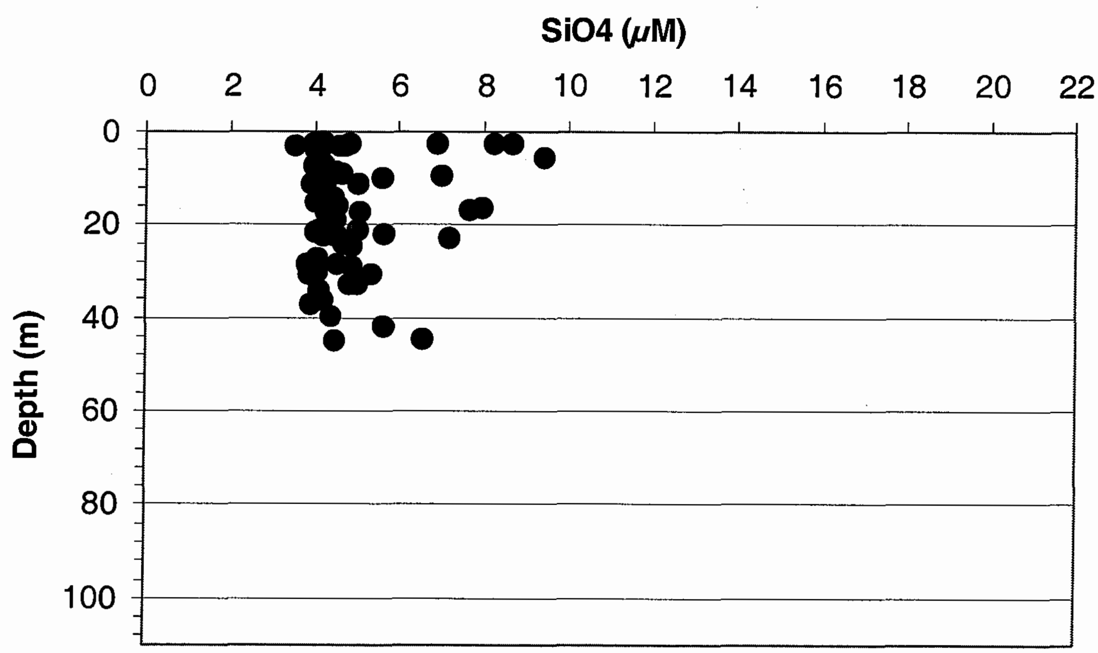
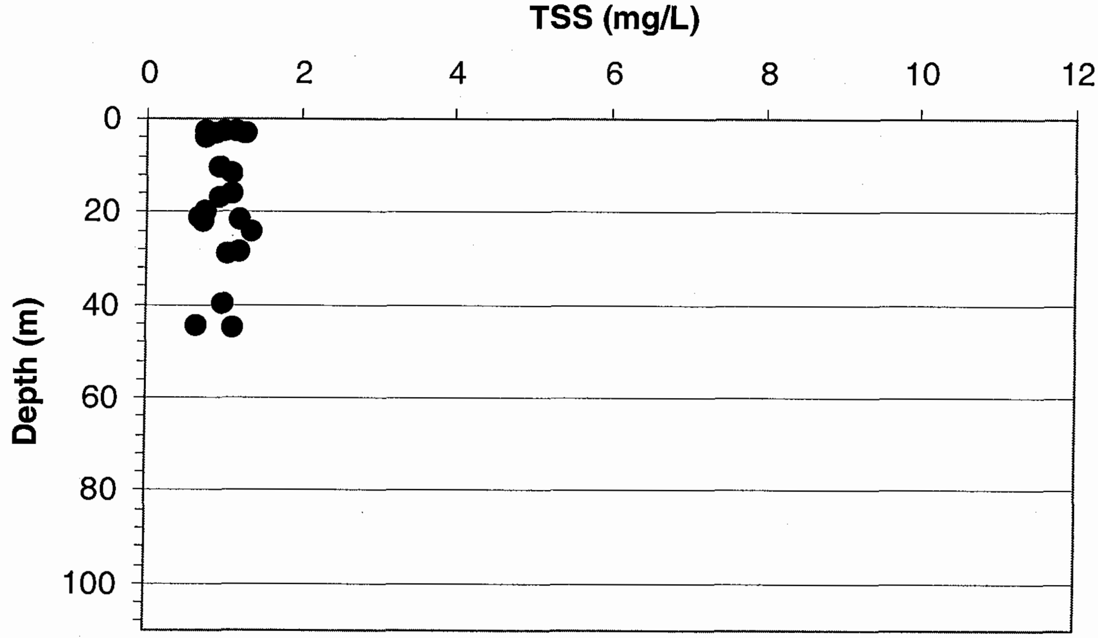


Figure D-138. Depth vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

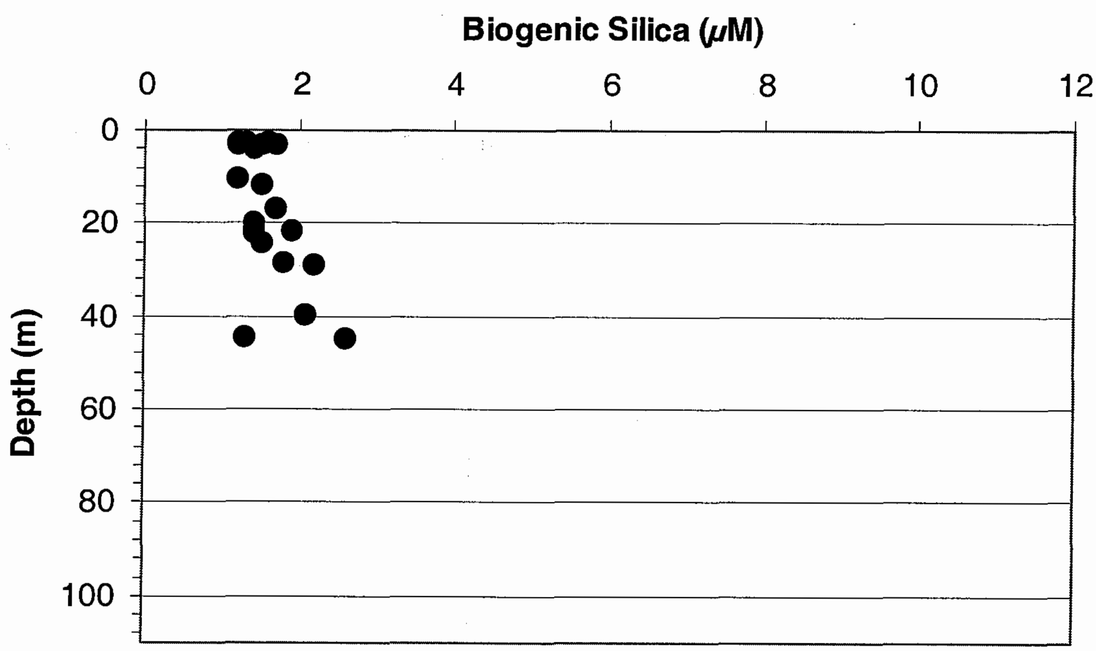
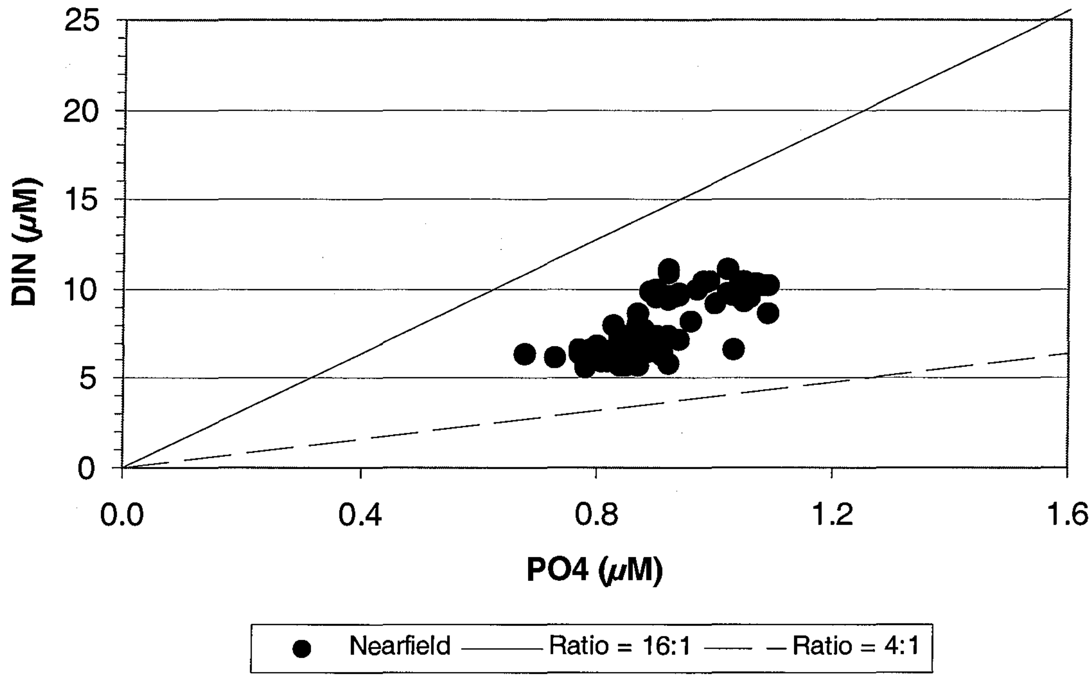


Figure D-139. Depth vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

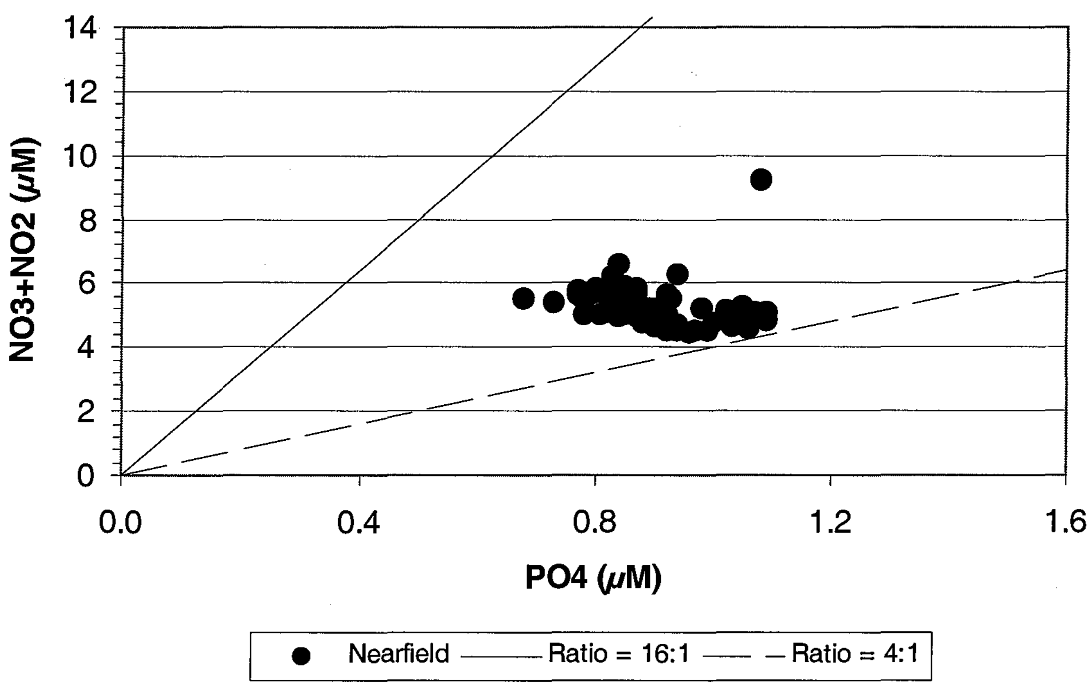
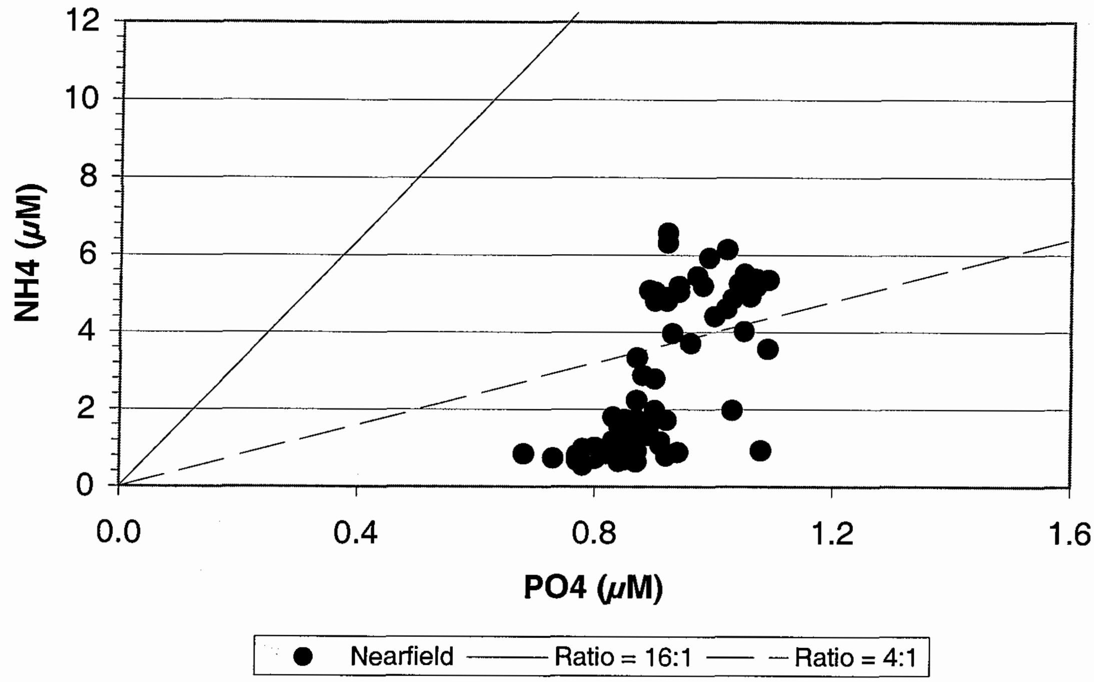


Figure D-140. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

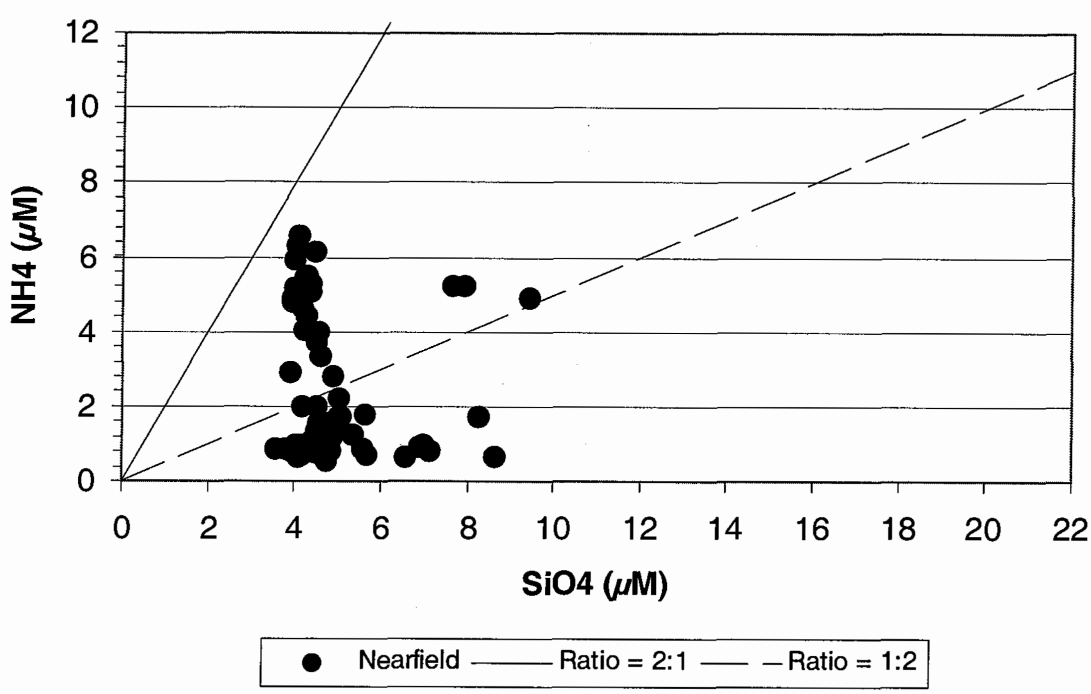
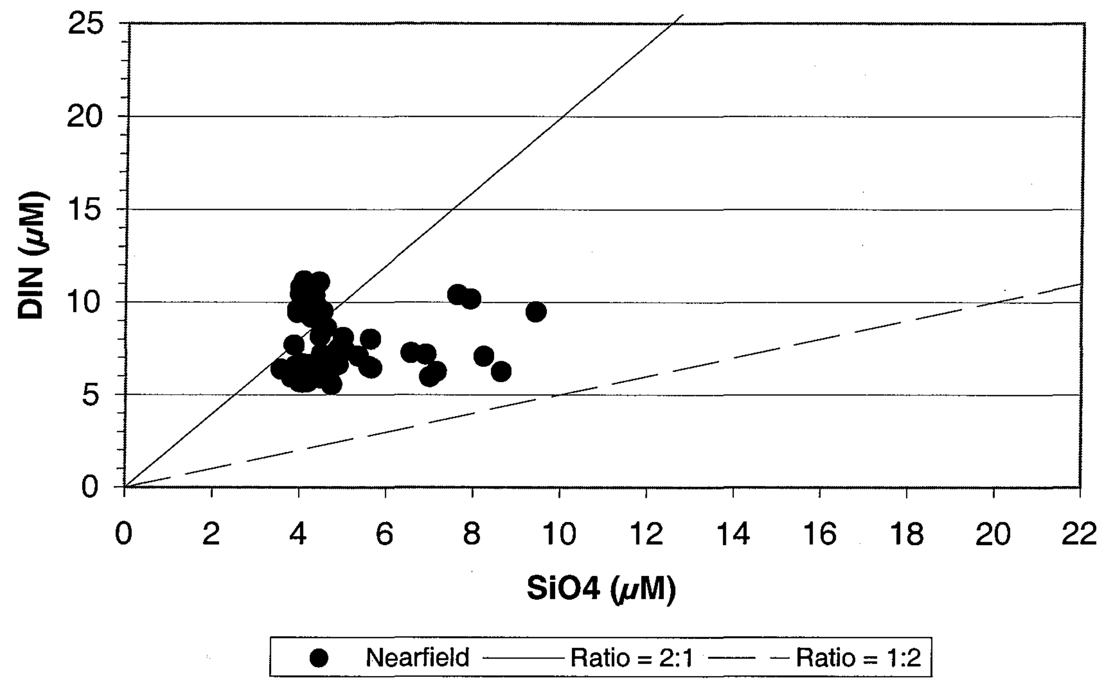


Figure D-141. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

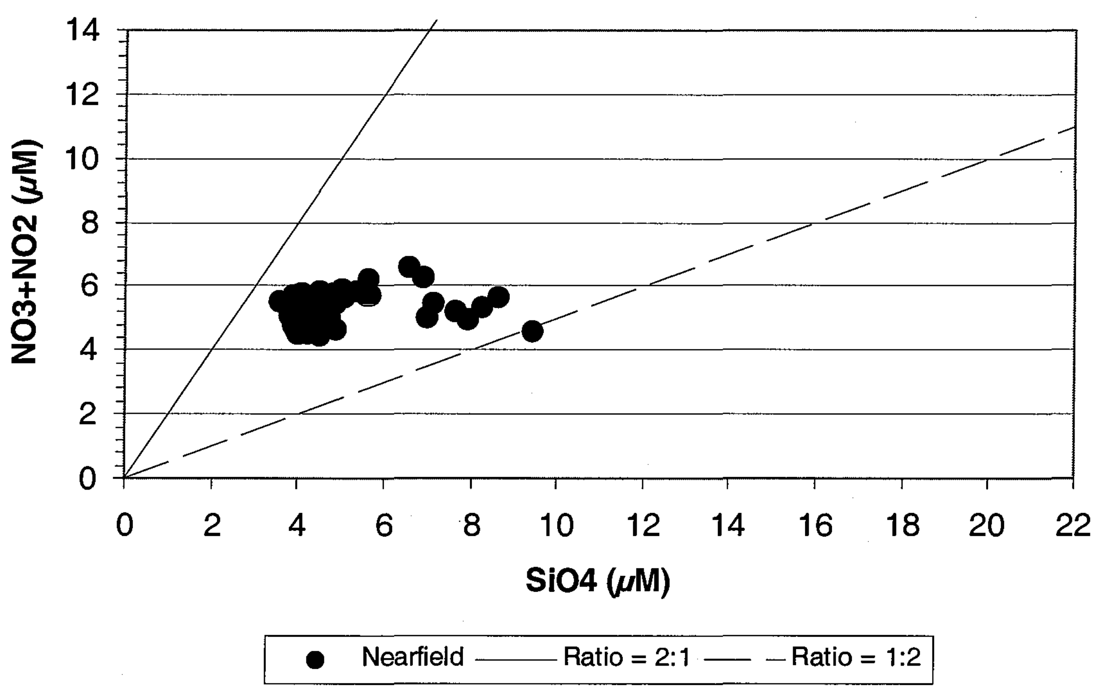
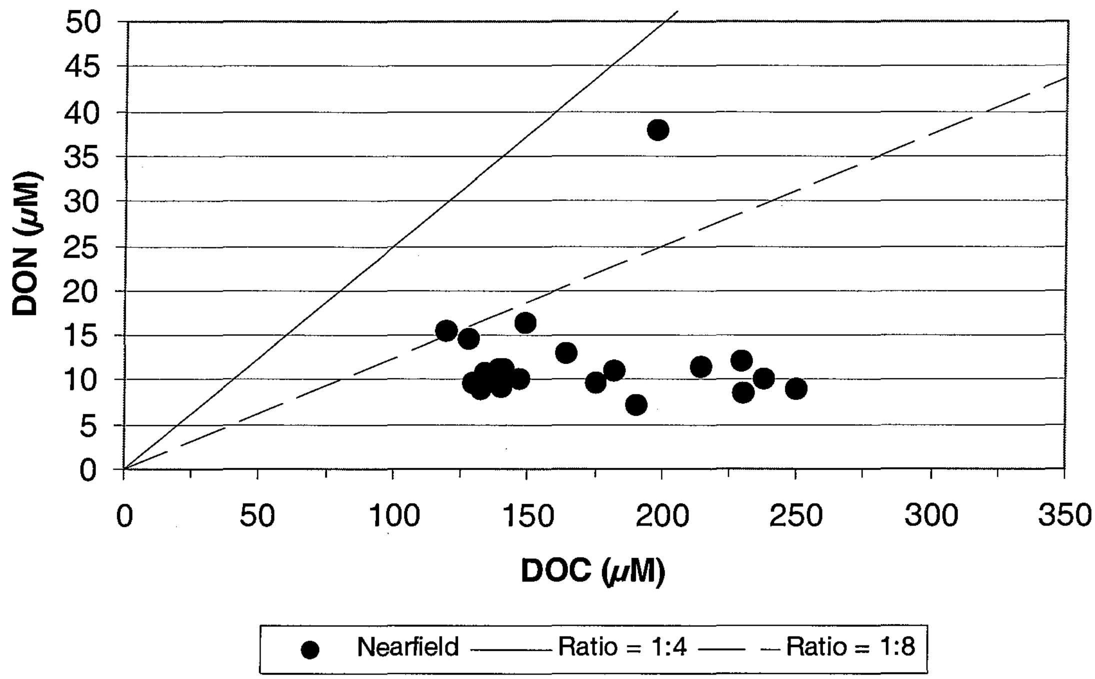


Figure D-142. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

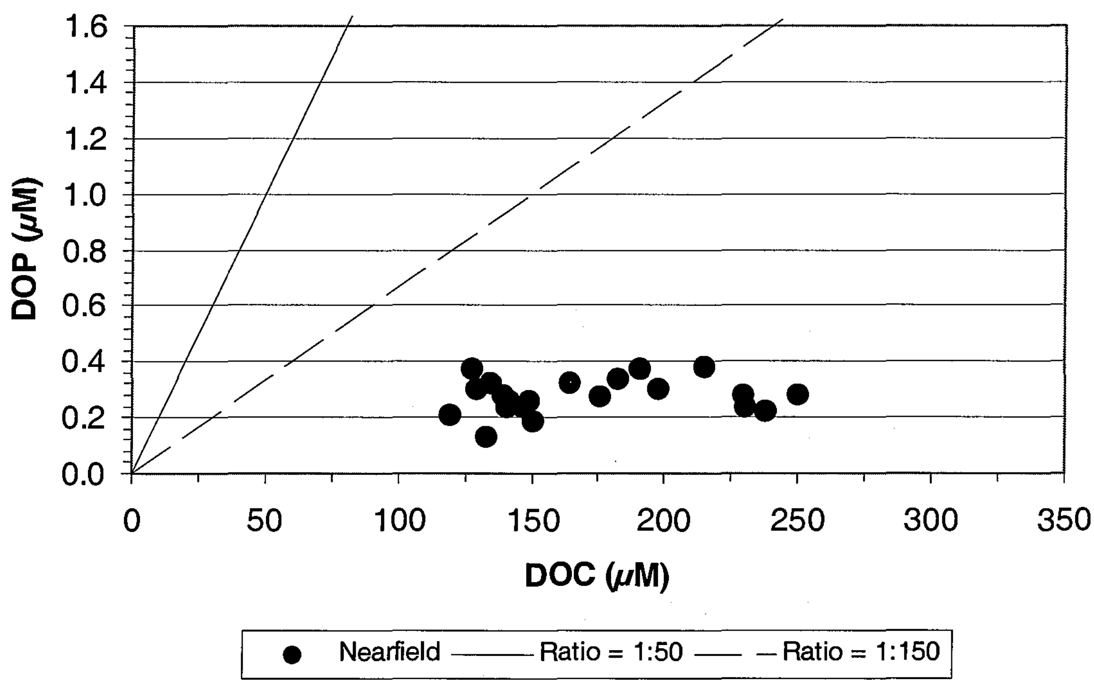
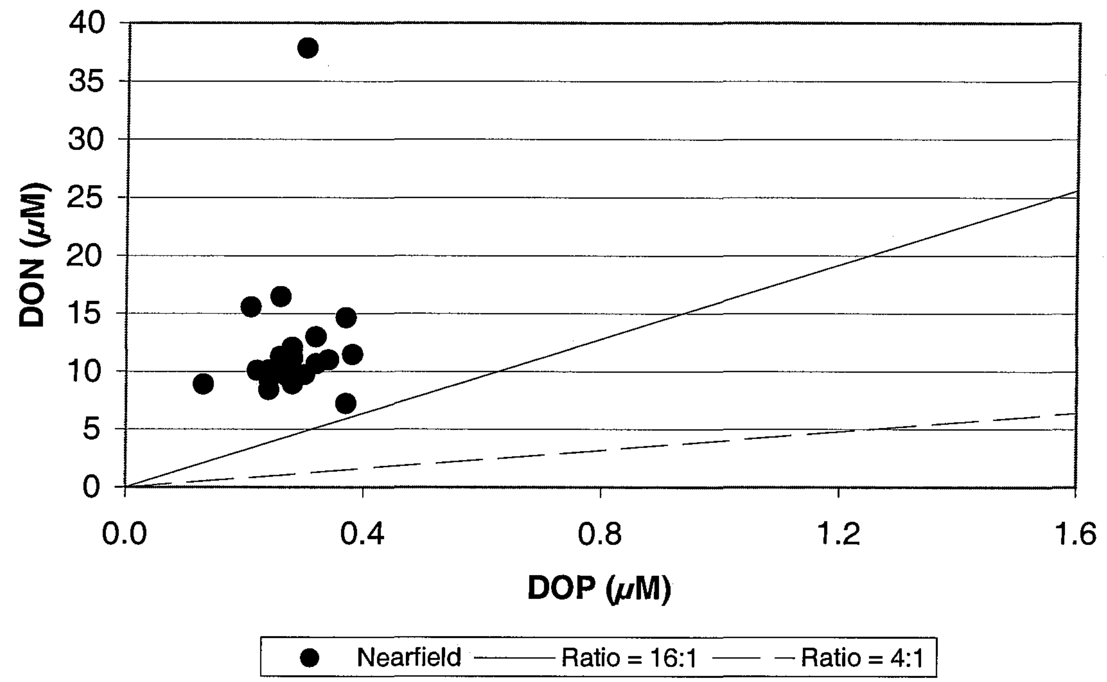


Figure D-143. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

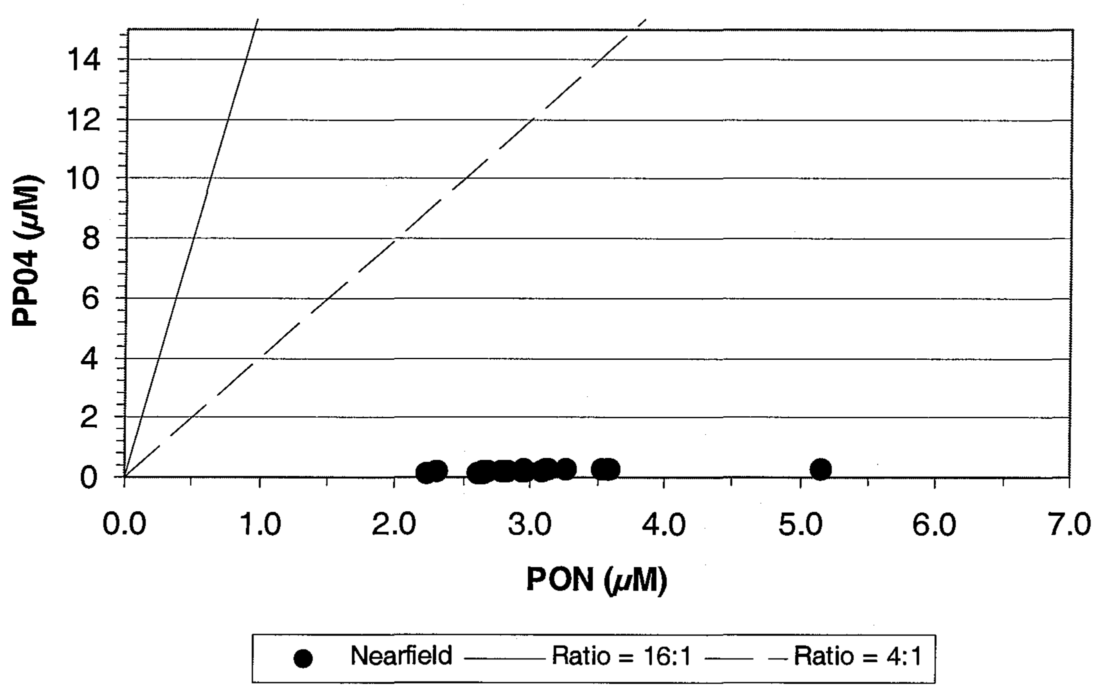
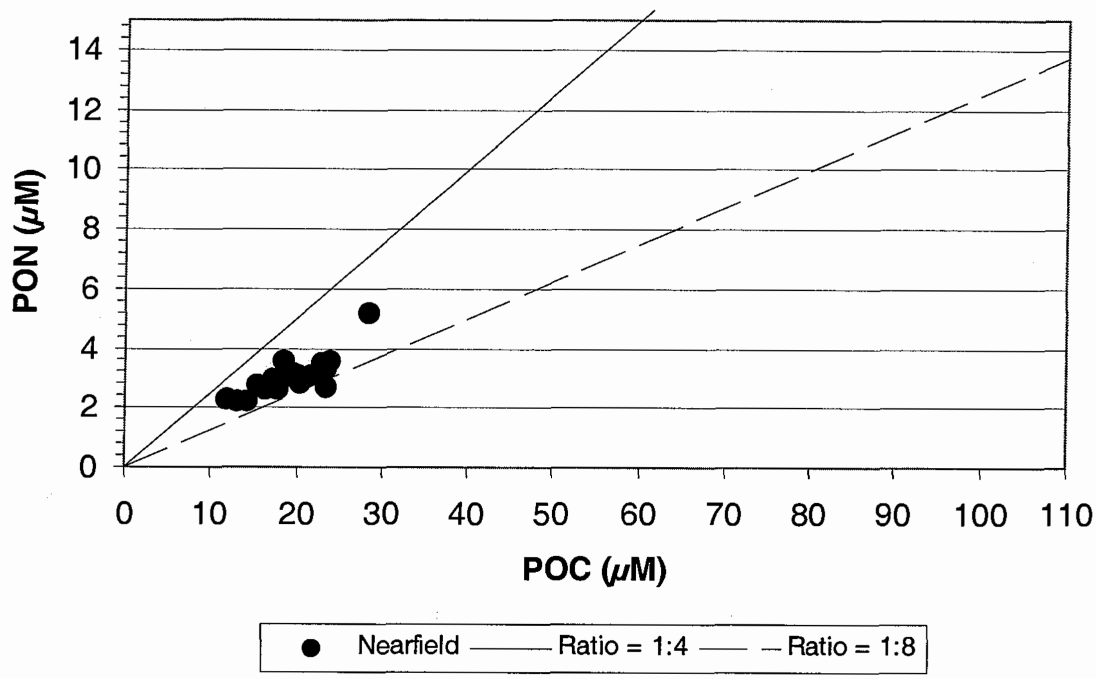


Figure D-144. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

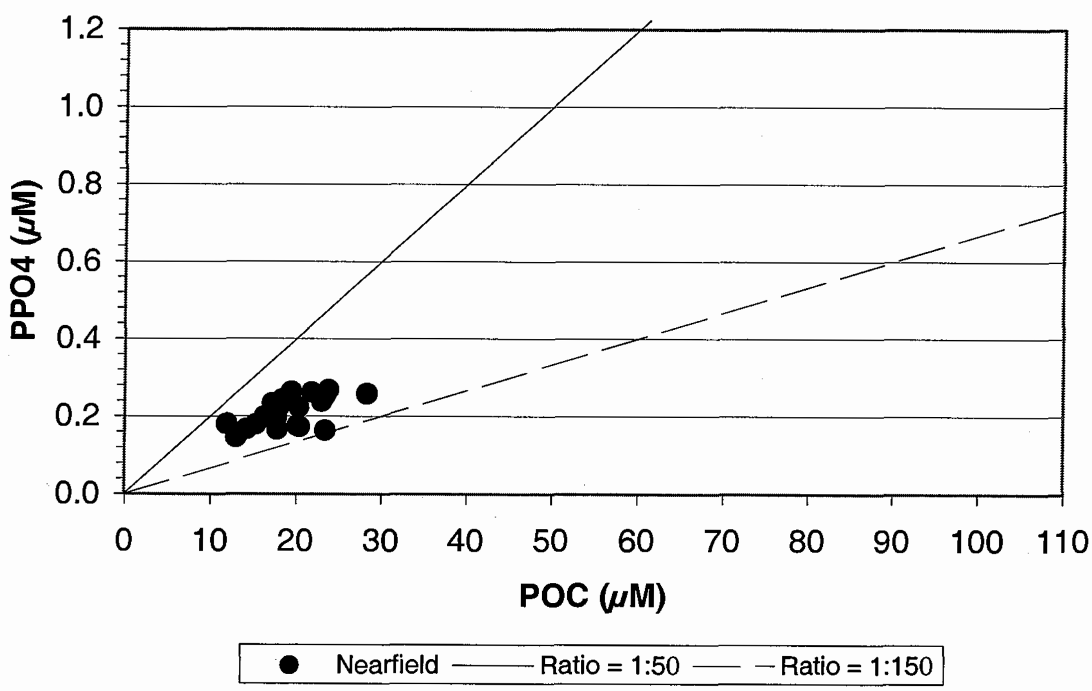
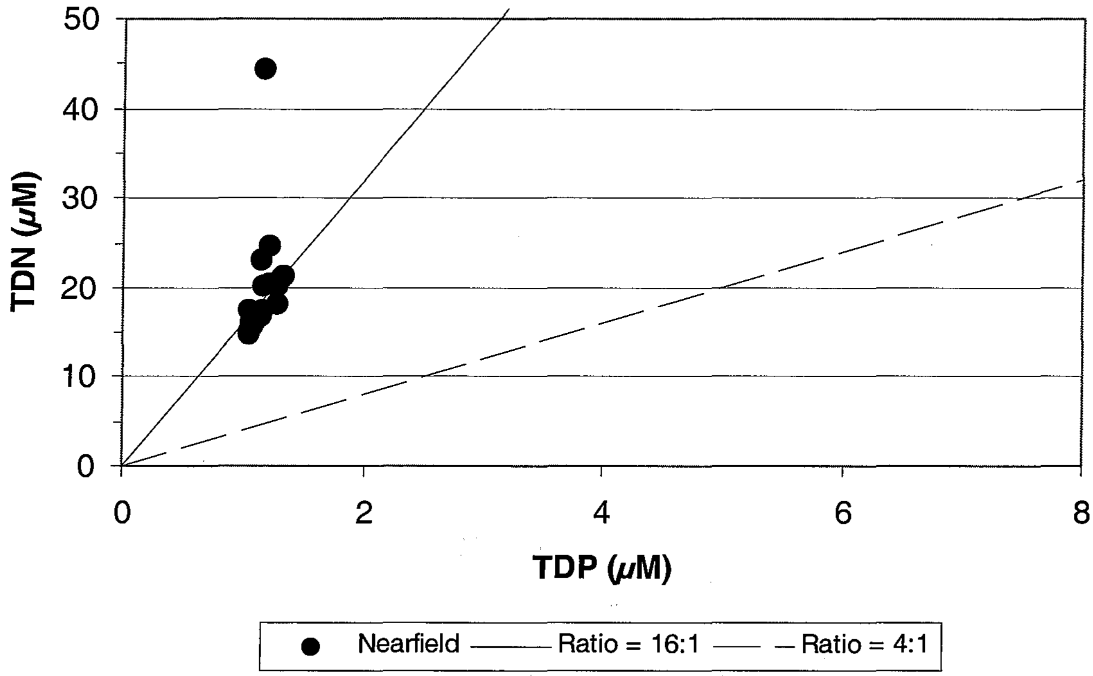


Figure D-145. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

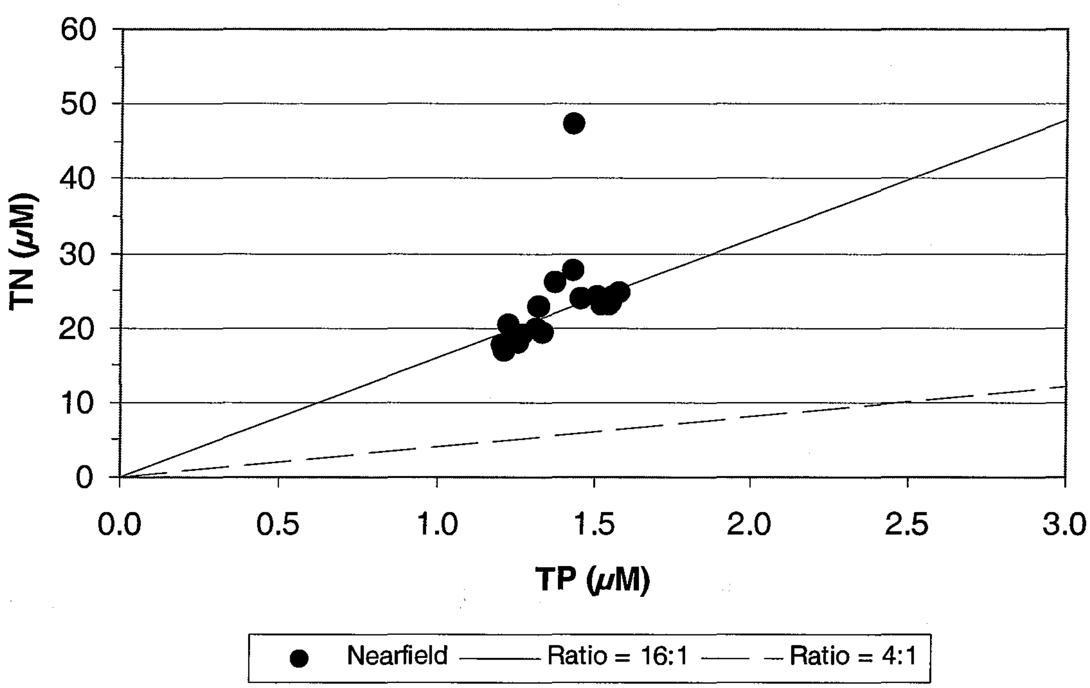
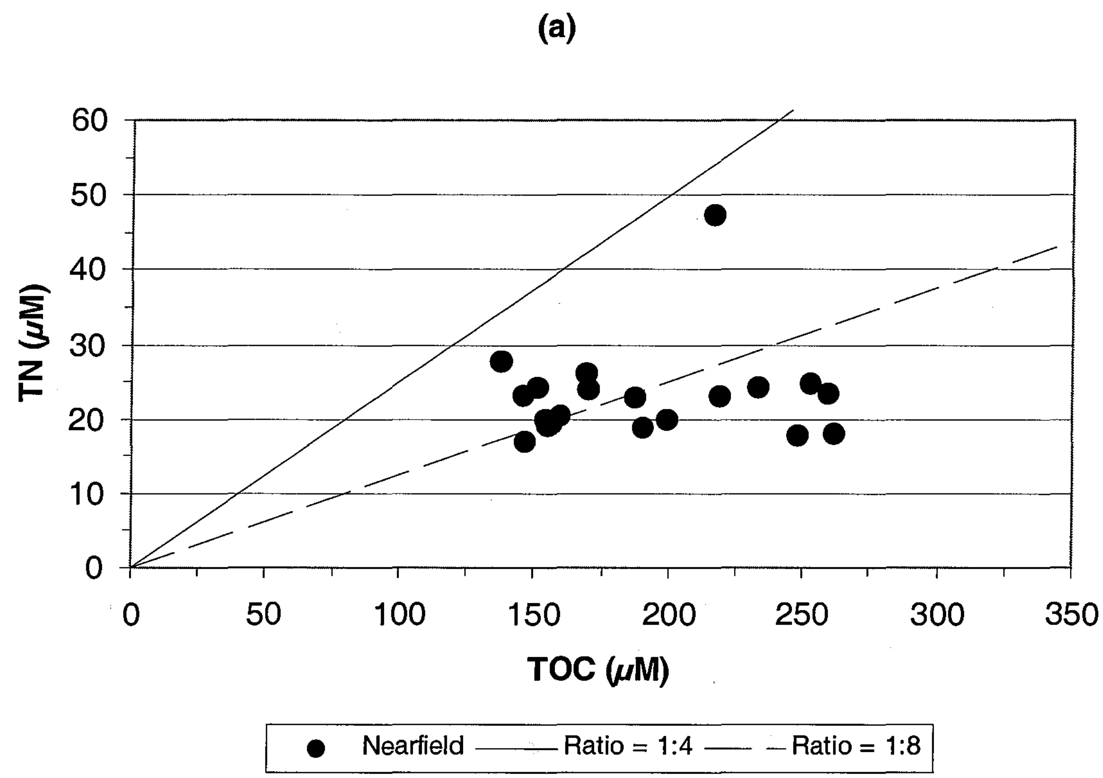


Figure D-146. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)



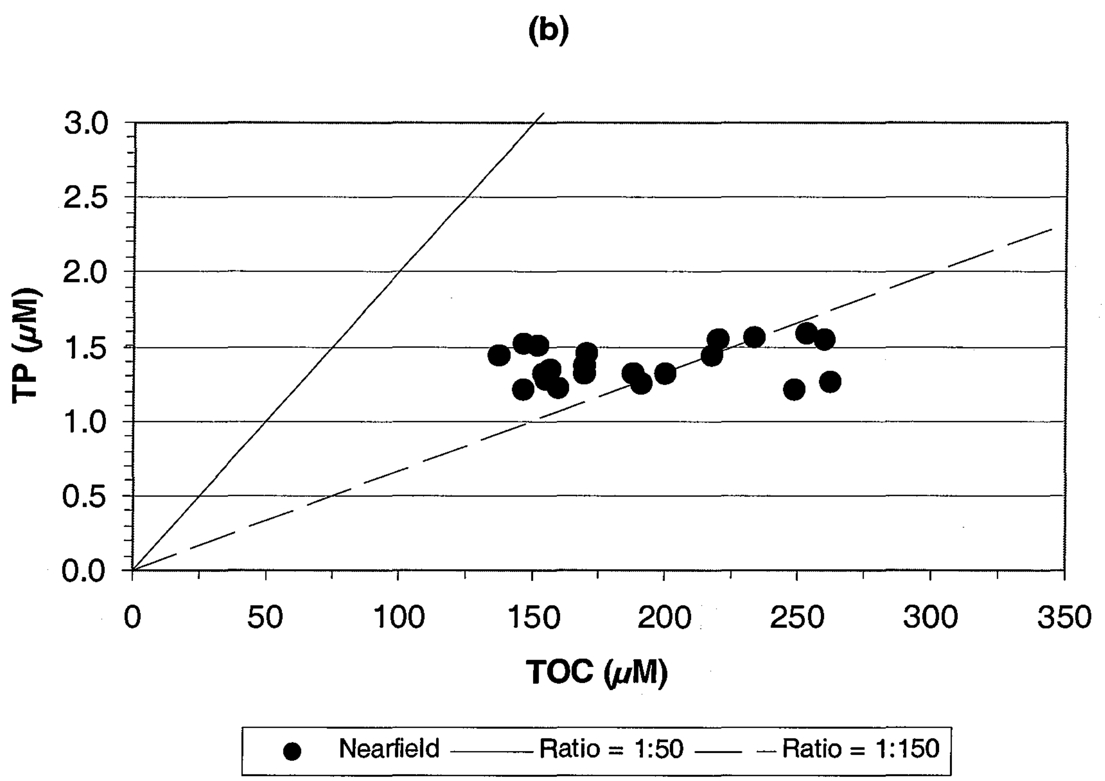


Figure D-147. Nutrient vs. Nutrient Plots for Nearfield Survey WN01H, (Dec 01)

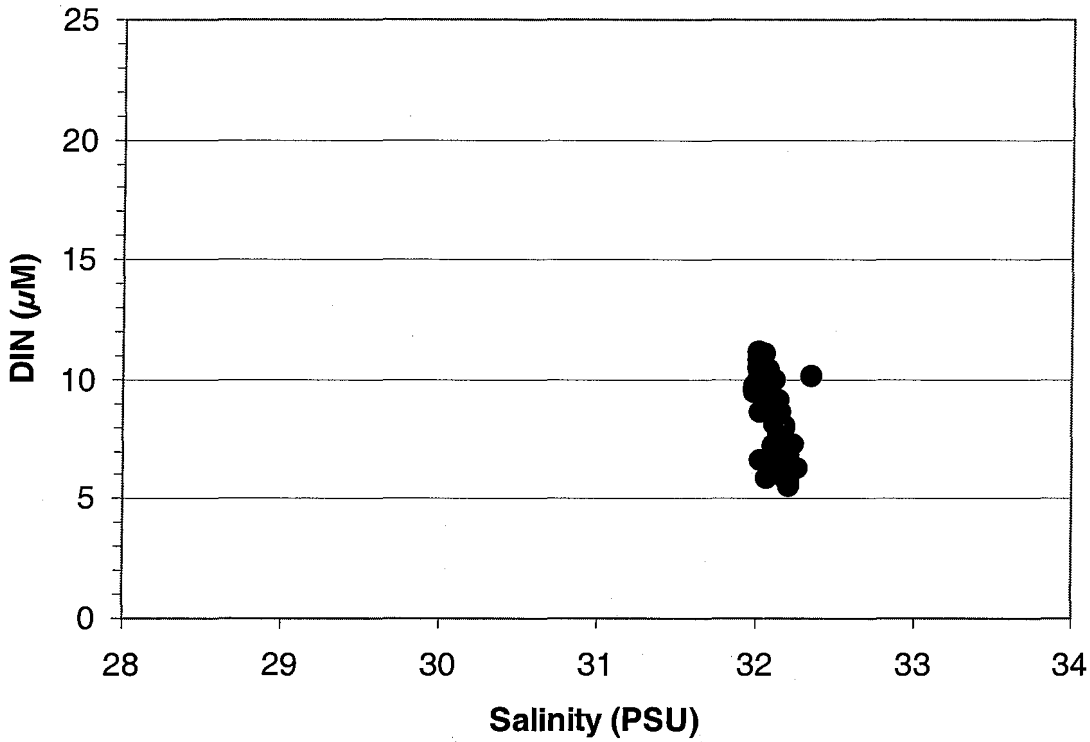
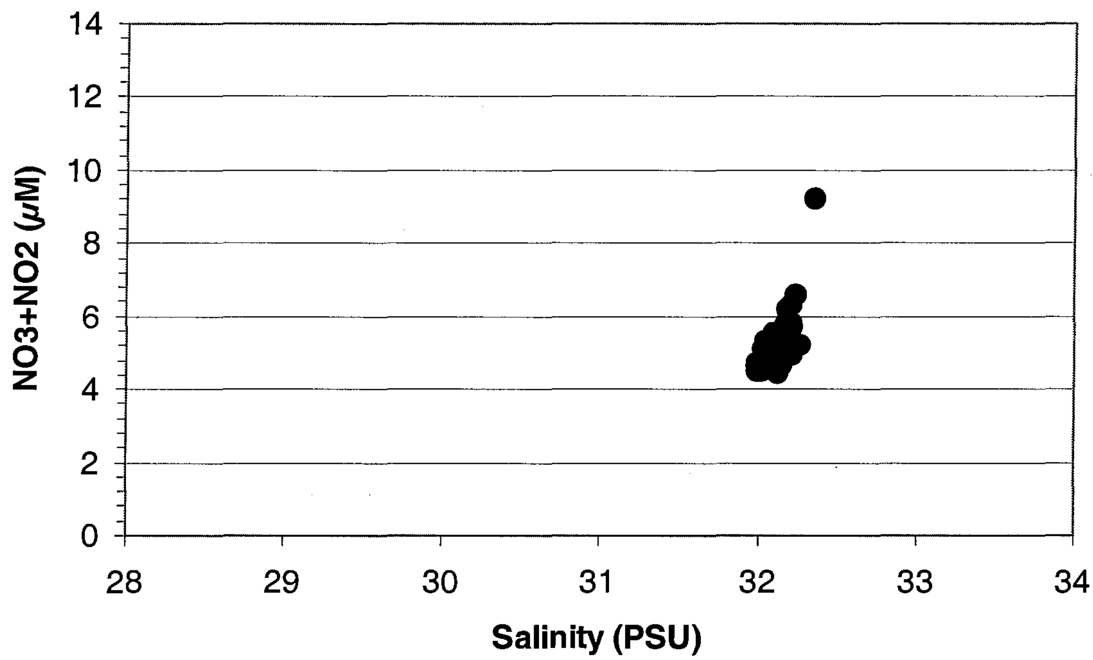


Figure D-148. Nutrient vs. Salinity Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

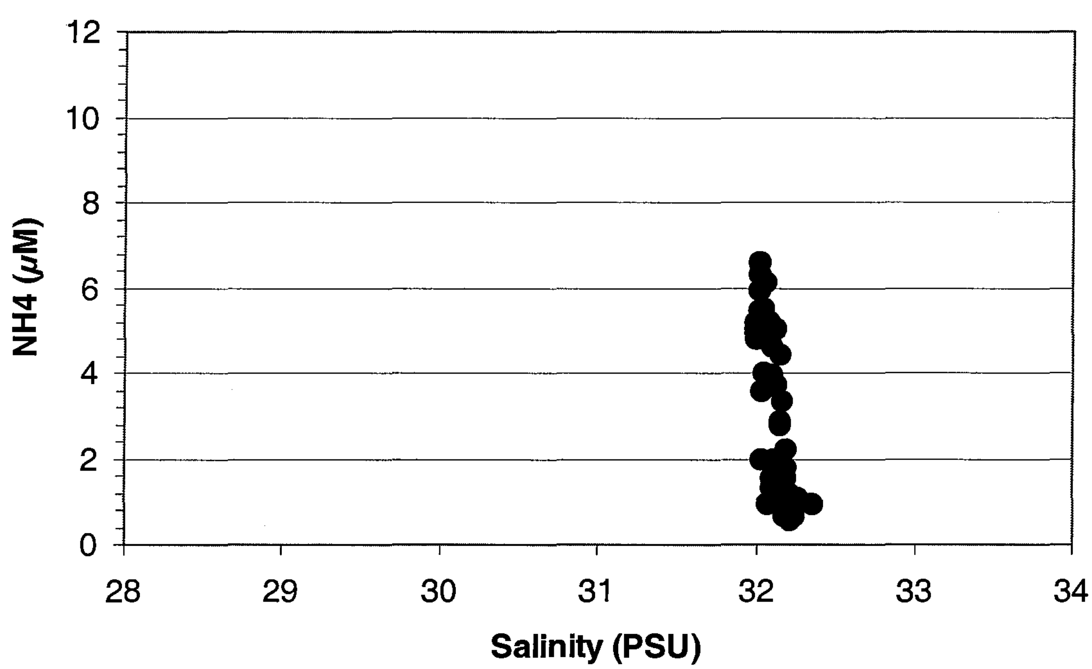
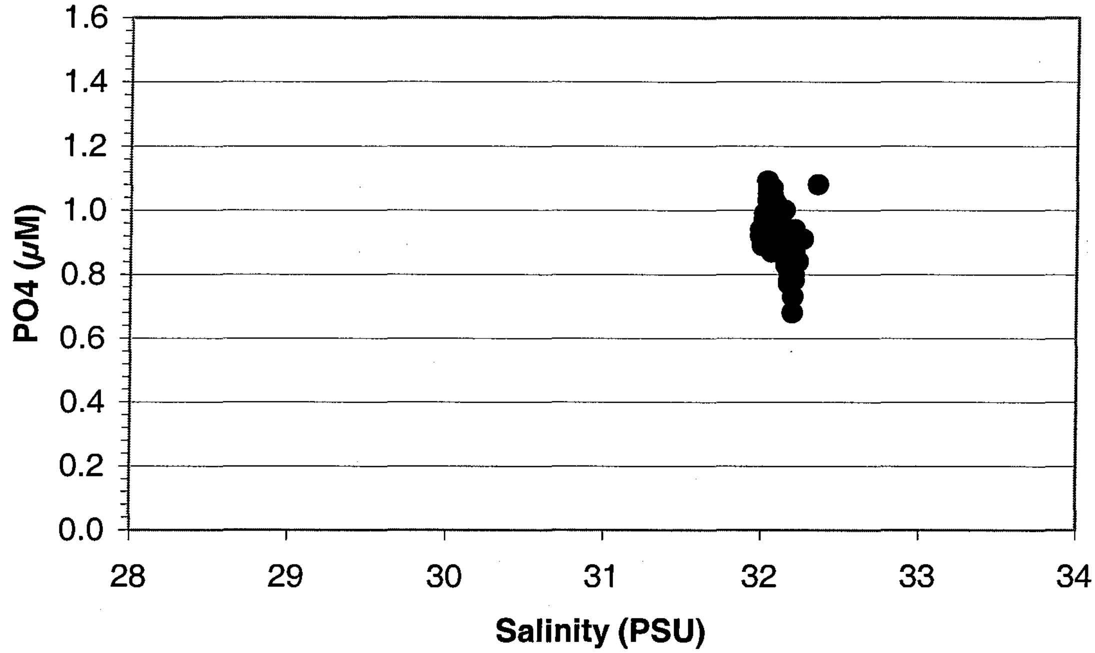


Figure D-149. Nutrient vs. Salinity Plots for Nearfield Survey WN01H, (Dec 01)

(a)



(b)

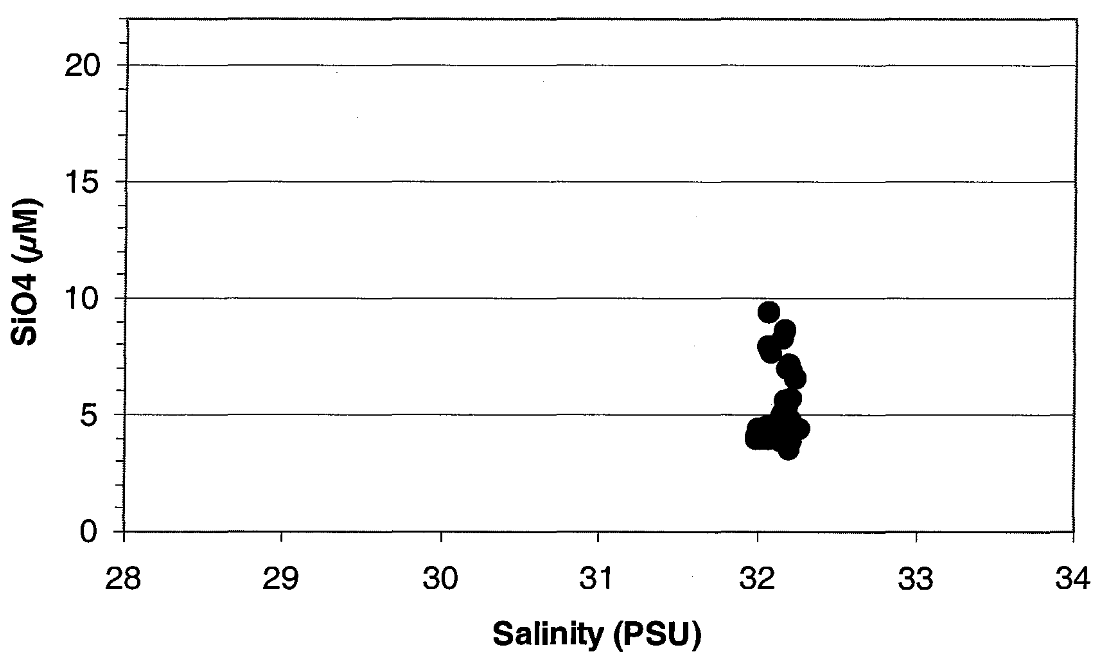


Figure D-150. Nutrient vs. Salinity Plots for Nearfield Survey WN01H, (Dec 01)

APPENDIX E

Photosynthesis-Irradiance (P-I) Curves

Photosynthesis-Irradiance (P-I) Curves

Productivity (Prod, mg C m^{-3} hr^{-1}) versus irradiance (Light, μE m^{-2} sec^{-1}) curves for the period August 2 to December 21, 2001. Comprehensive data are presented for each cruise by station (N04, N18, and F23) and by depth (surface, mid-surface, middle, mid-bottom and bottom). Productivity calculations (Appendix A) utilized light attenuation data from a CTD-mounted 4-π sensor and incident light time-series data from a 2-π irradiance sensor located on Deer Island, MA. After collection of the productivity samples, they were transported to the Marine Ecosystems Research Laboratory (MERL) where they were incubated in temperature controlled incubators. Hourly productivity measurements were converted to daily values by fitting the measured hourly rates and light data to one of two P-I models (with or without photoinhibition). Using the fitted parameters, the measured incident light, and the light attenuation data, production rates were calculated for each 15-minute interval over the daylight period (centered from 6 AM to 6 PM), summed for each sampling depth, then integrated over depth to give areal production for each station.

WN018 **Station NO4**

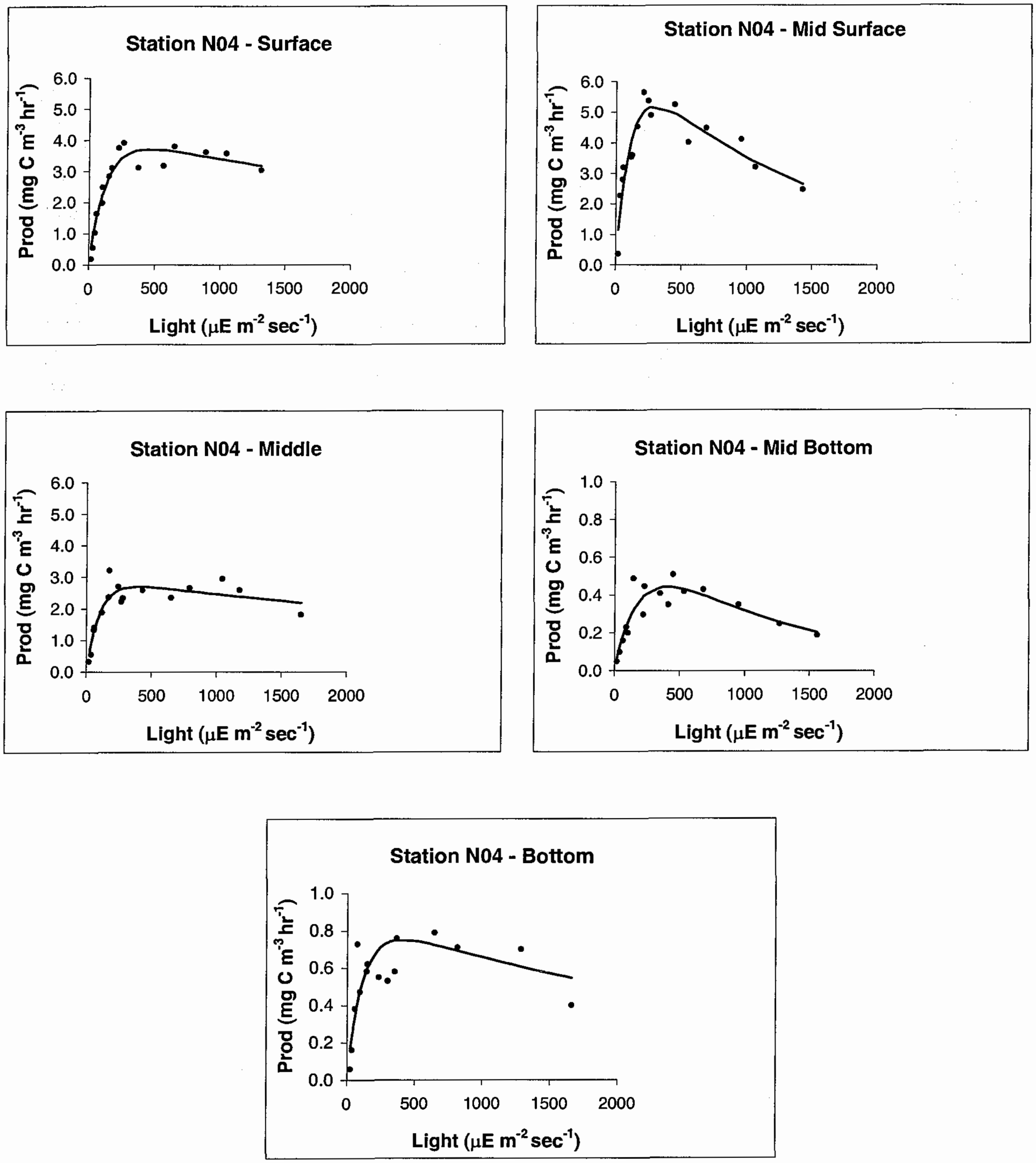


Figure E-1. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN018 (Jul 01)

WN018 **Station N18**

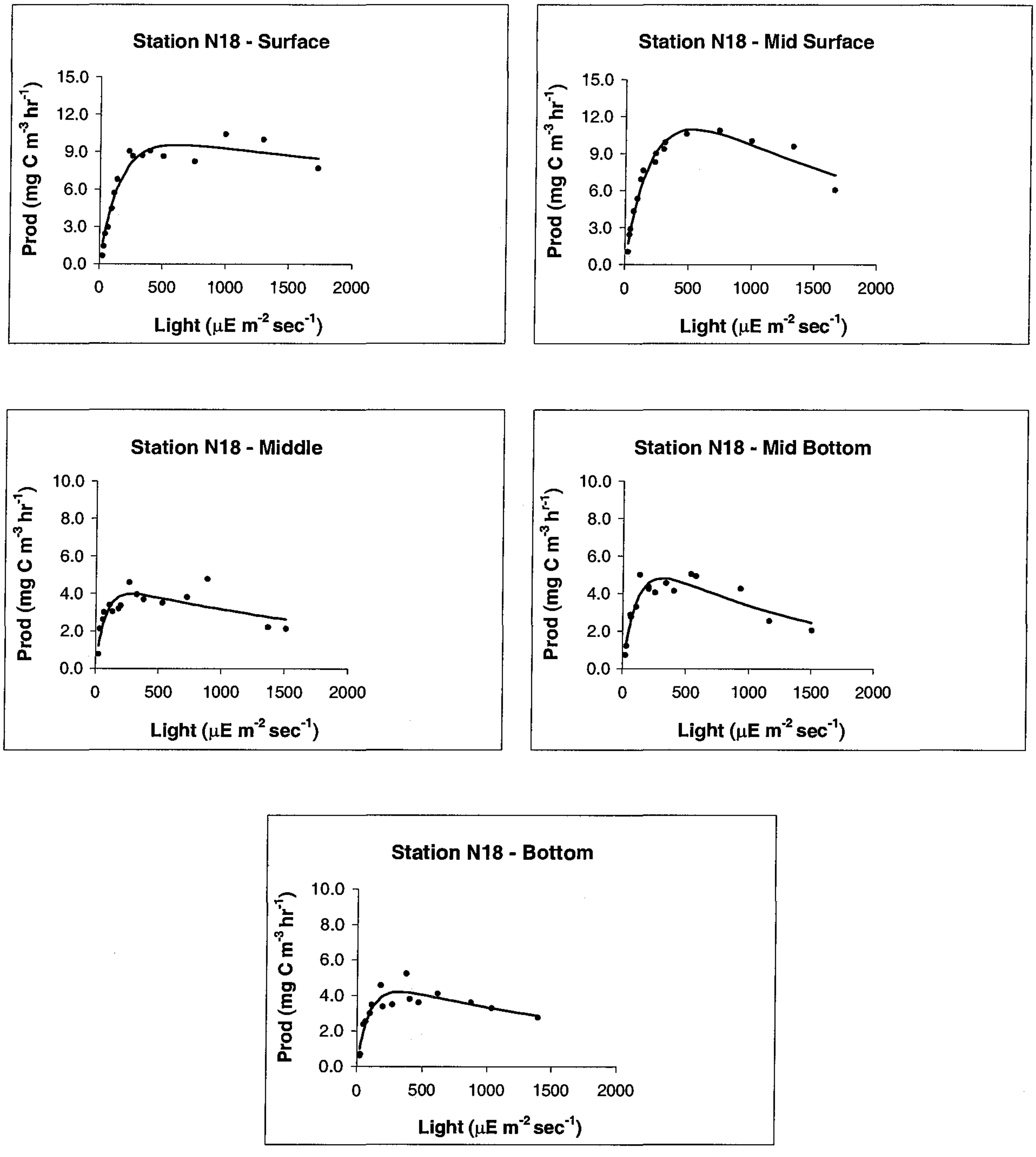


Figure E-2. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN018 (Jul 01)

WN019 | **Station NO4**

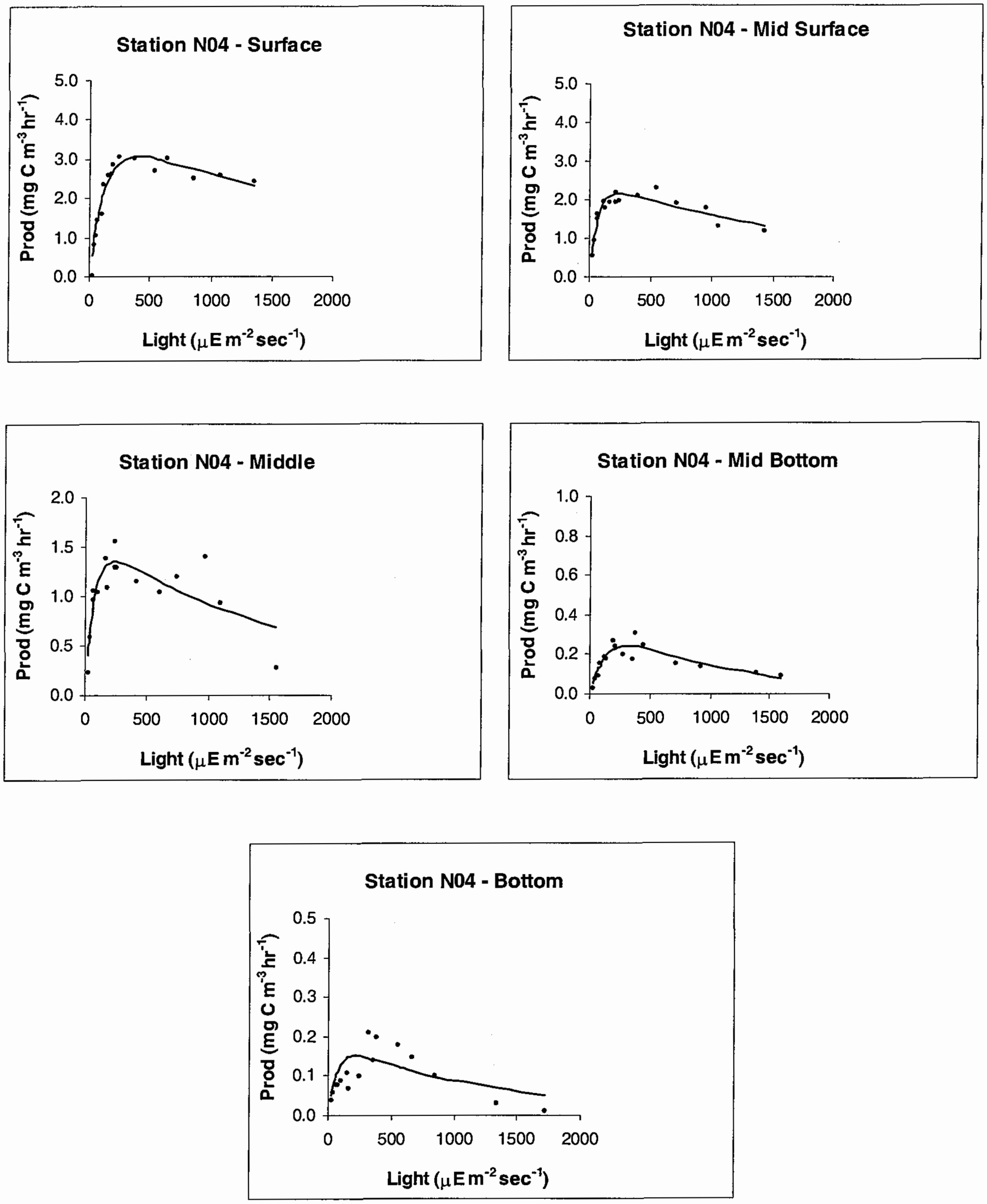


Figure E-3. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN019 (Jul 01)

WN019 **Station N18**

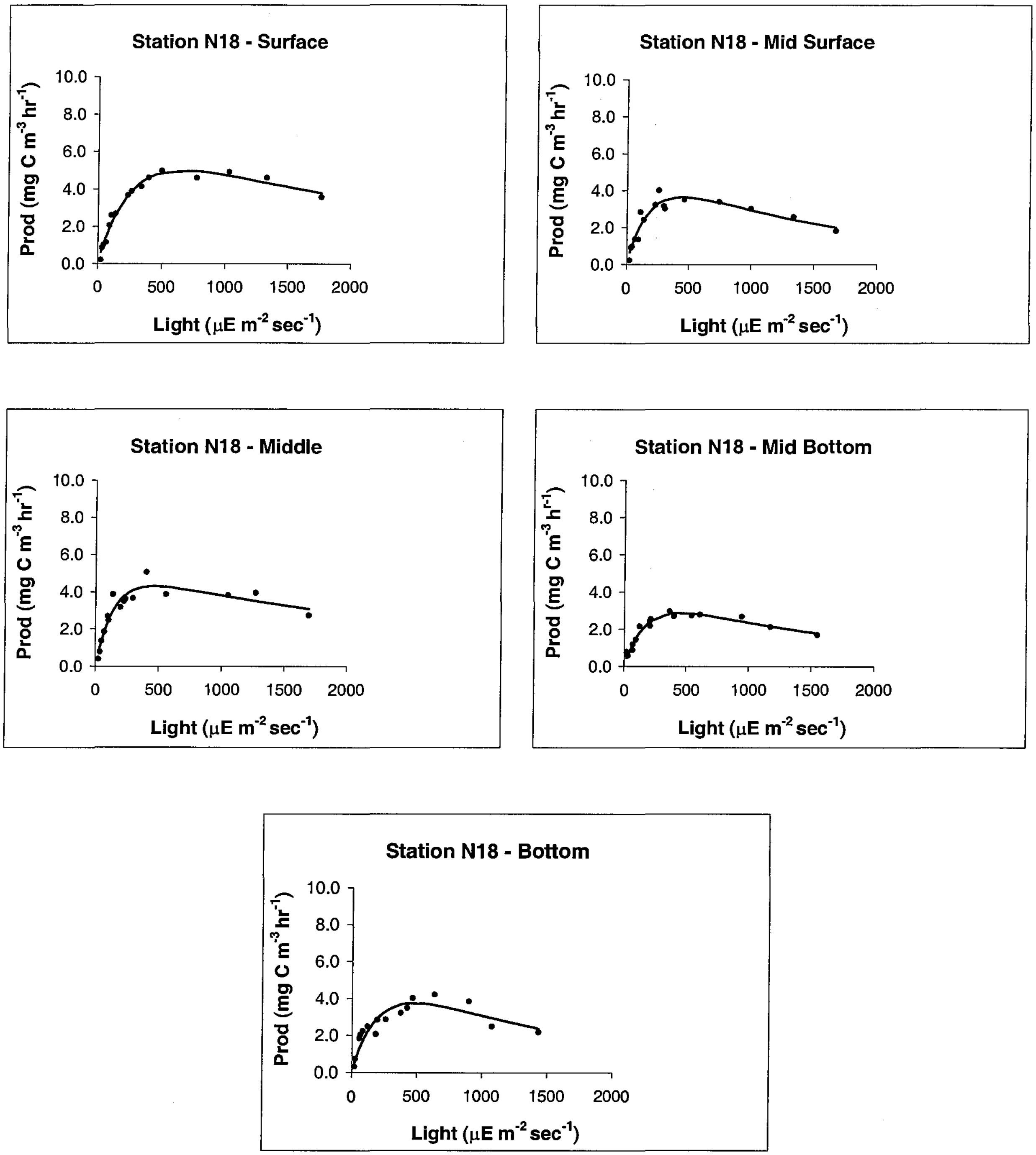


Figure E-4. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN019 (Jul 01)

WN01A **Station NO4**

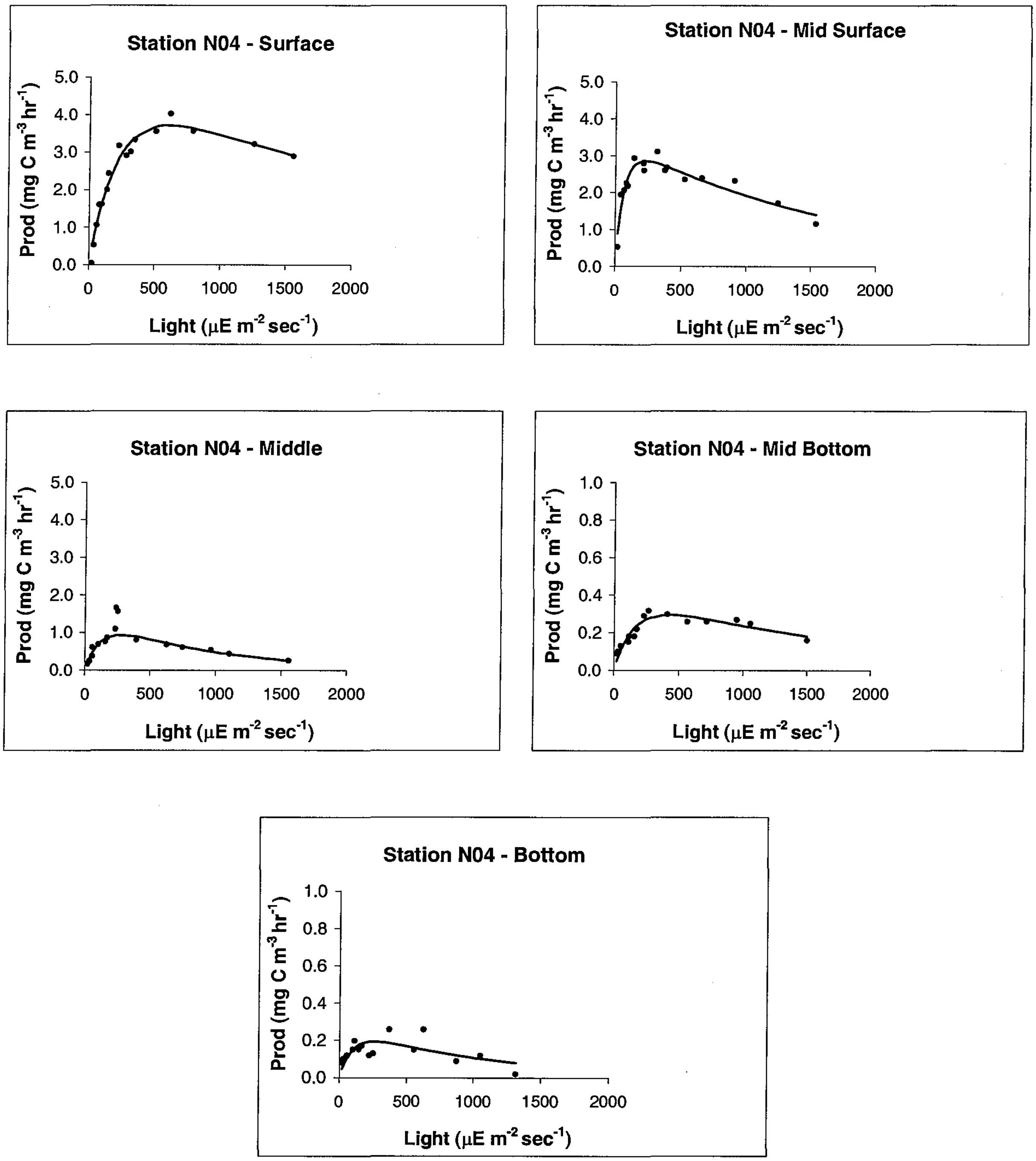
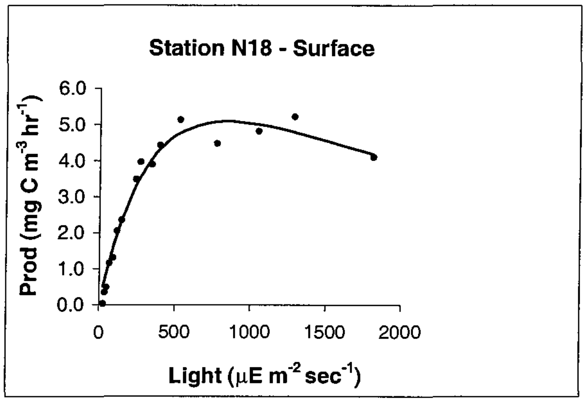
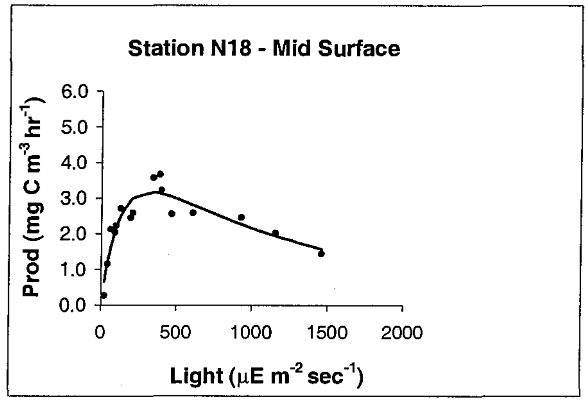
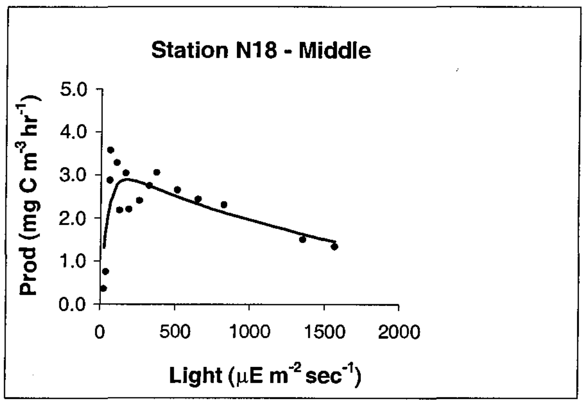


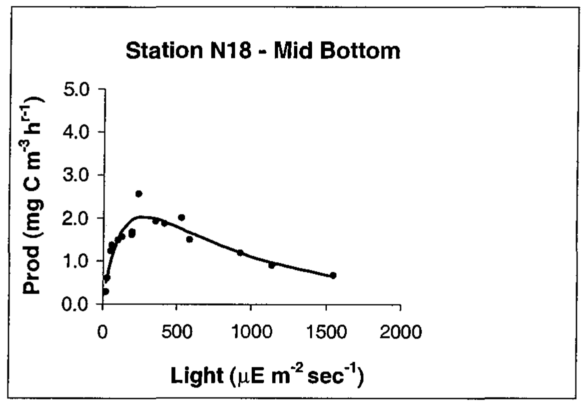
Figure E-5. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN01A (Aug 01)

WN01A **Station N18**









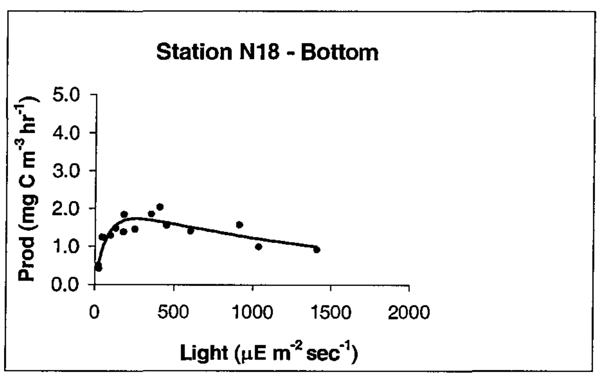


Figure E-6. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN01A (Aug 01)

WF01B **Station NO4**

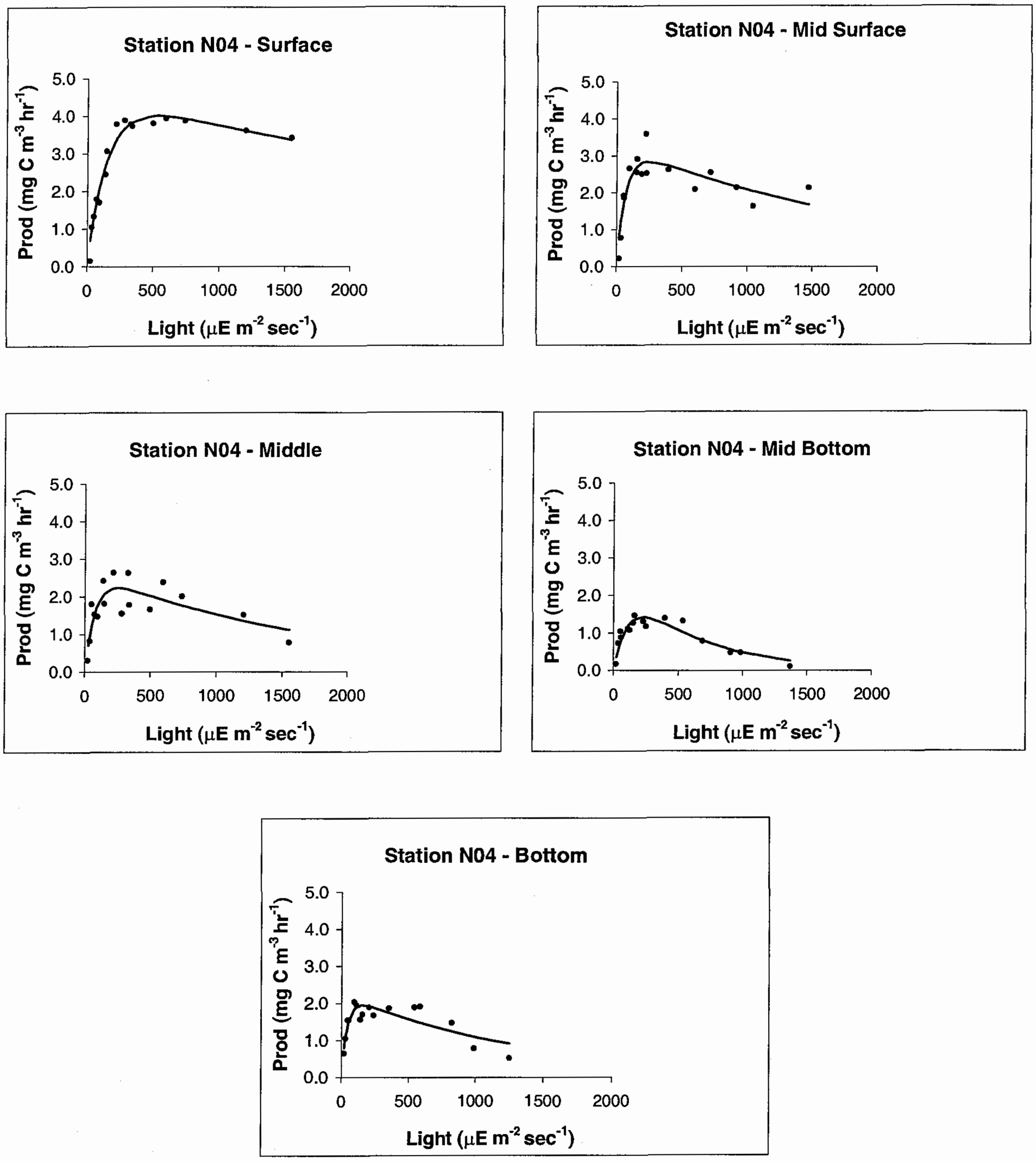


Figure E-7. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Farfield Survey WF01B (Aug 01)

WF01B **Station N18**

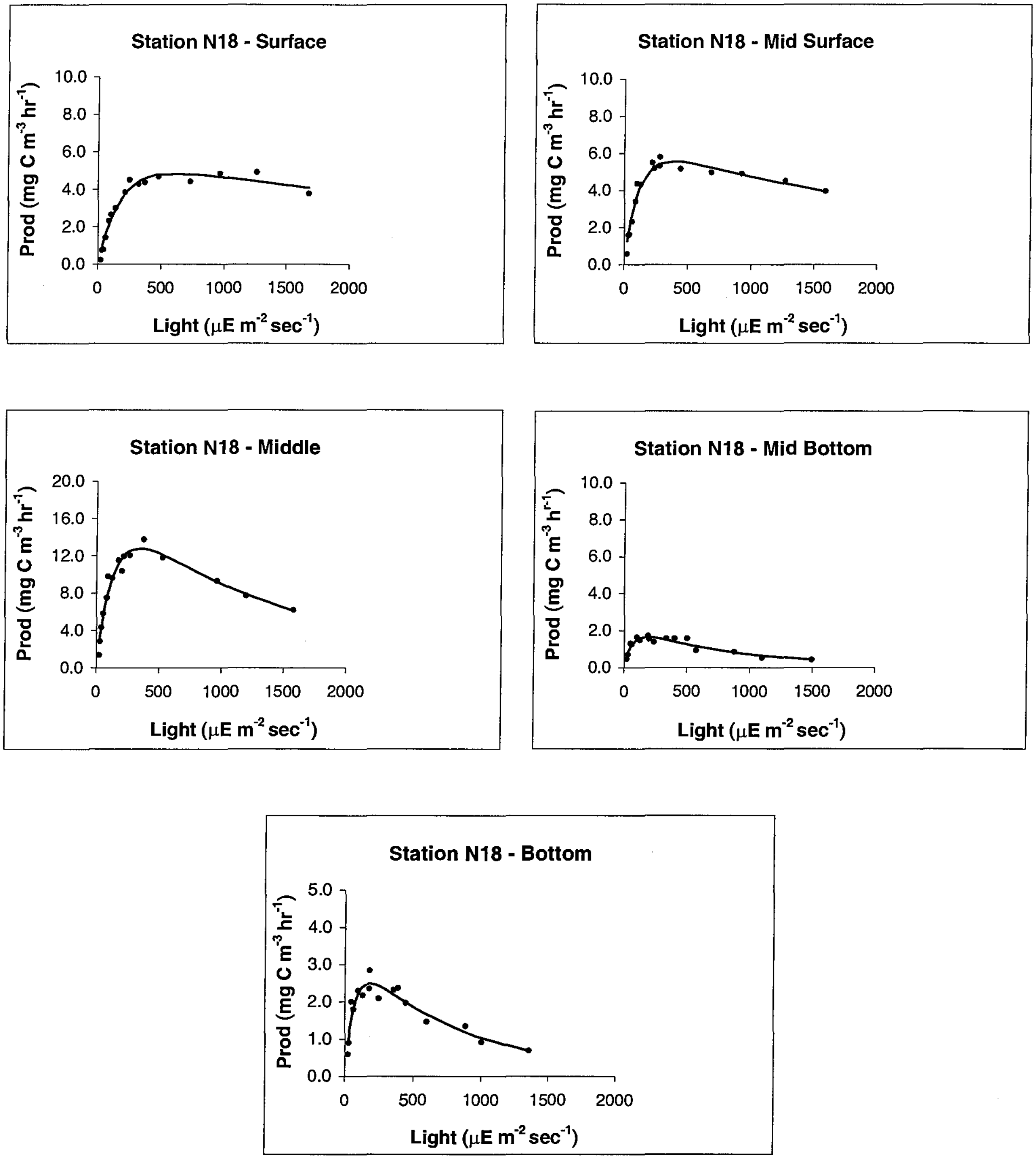


Figure E-8. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Farfield Survey WF01B (Aug 01)

WF01B **Station F23**

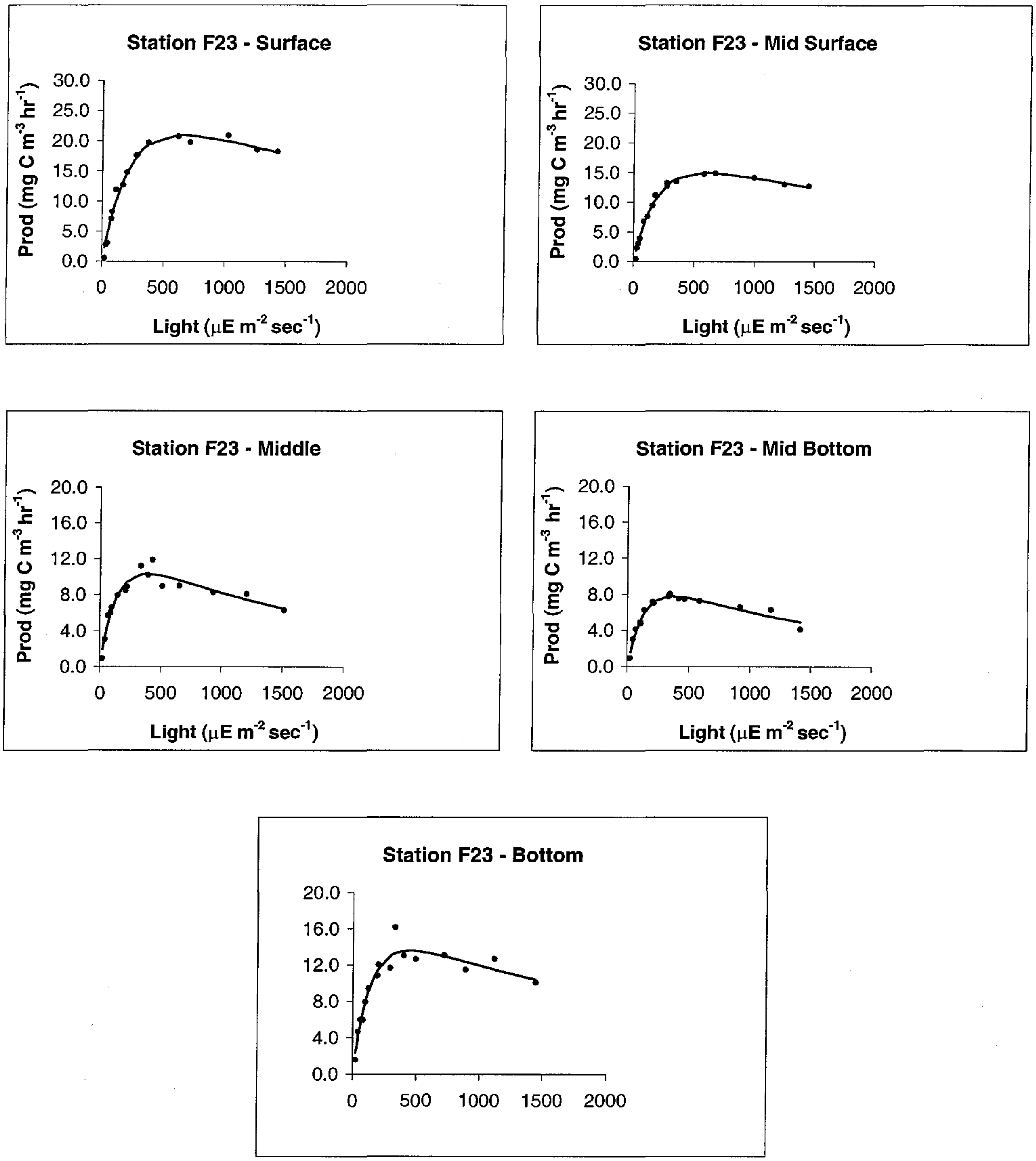


Figure E-9. Photosynthesis-Irradiance (P-I) Curves for Station F23 from Farfield Survey WF01B (Aug 01)

WN01C **Station NO4**

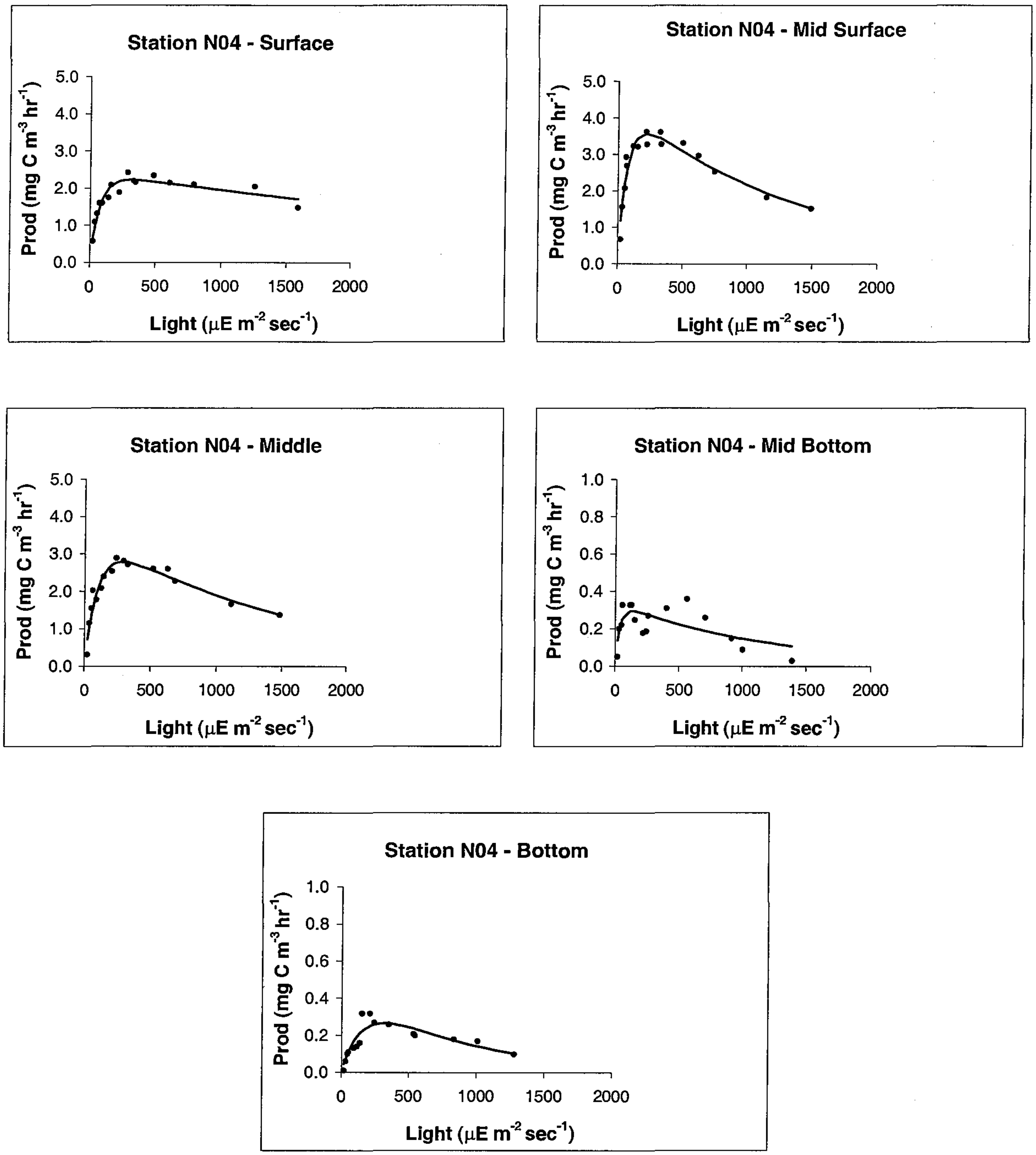


Figure E-10. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN01C (Sept 01)

WN01C **Station N18**

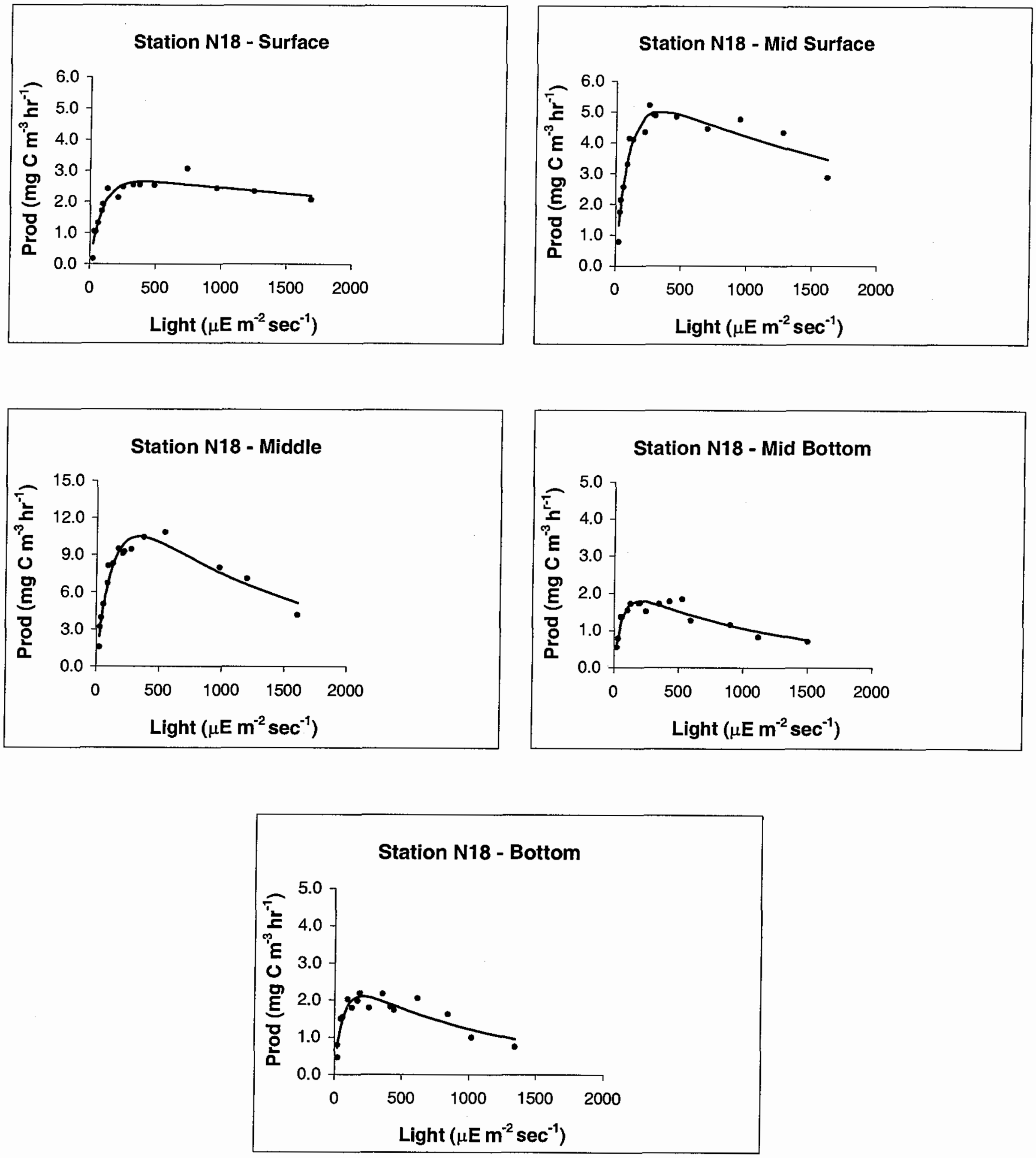


Figure E-11. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN01C (Sept 01)

WN01D **Station NO4**

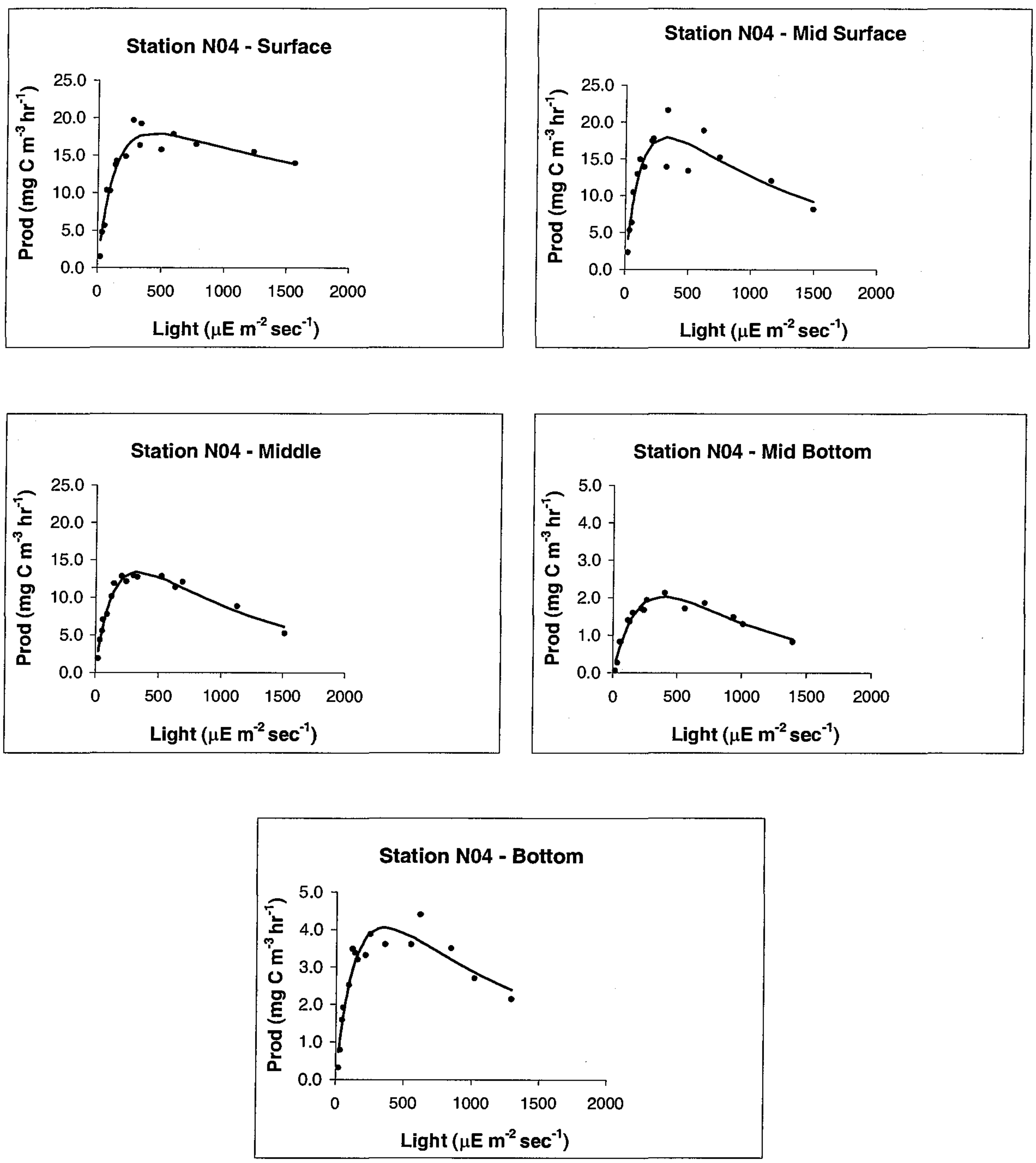


Figure E-12. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN01D (Oct 01)

WN01D **Station N18**

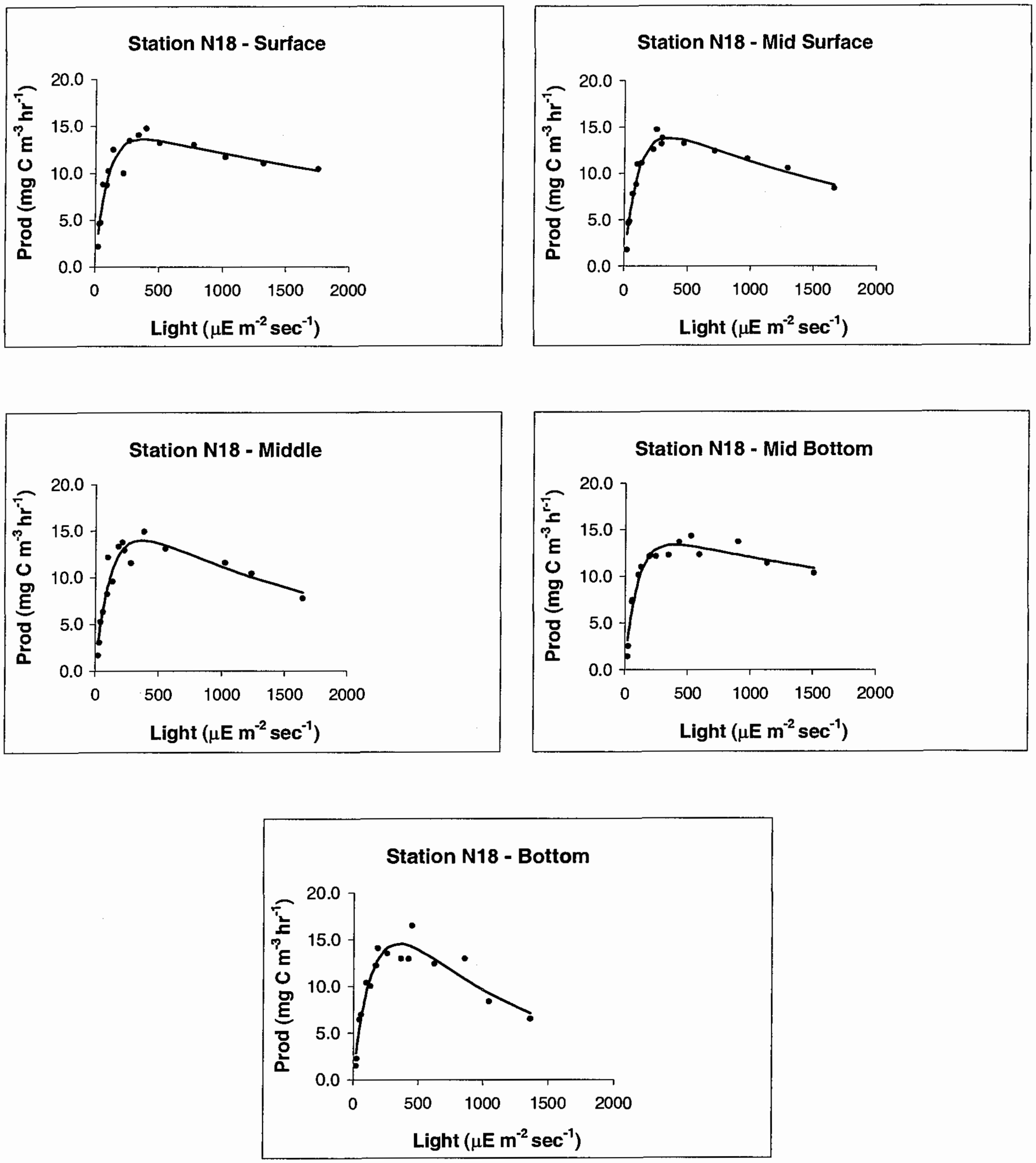
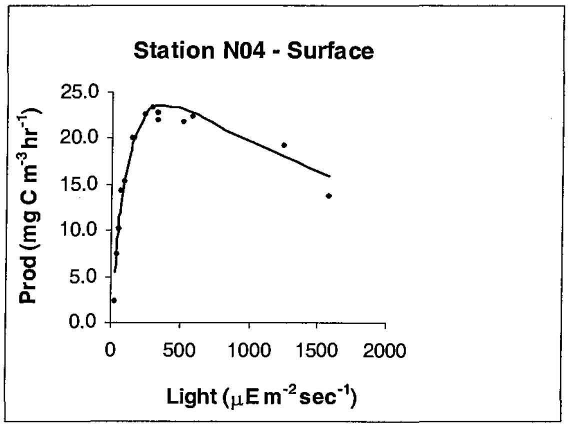
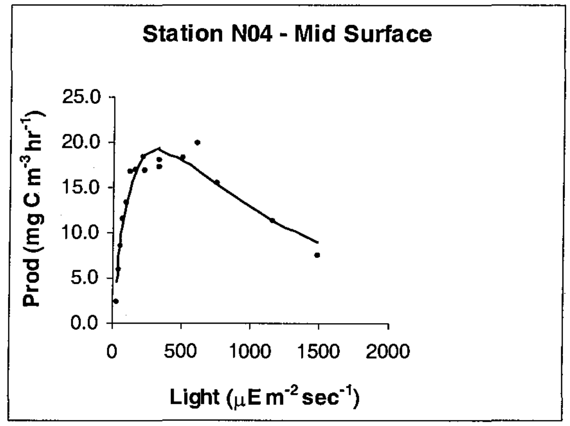
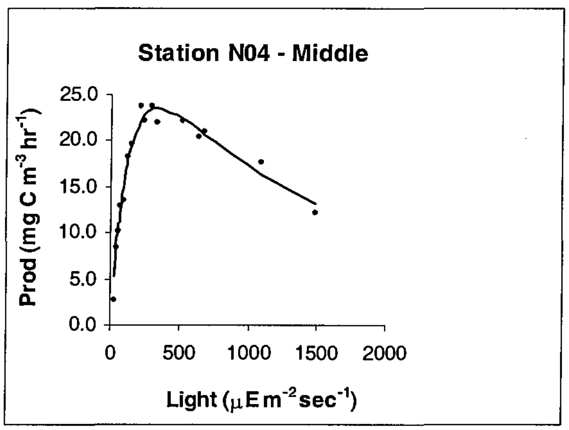


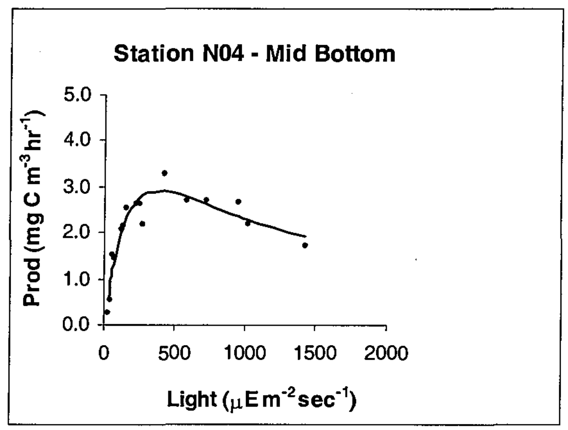
Figure E-13. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN01D (Oct 01)

WF01E **Station NO4**









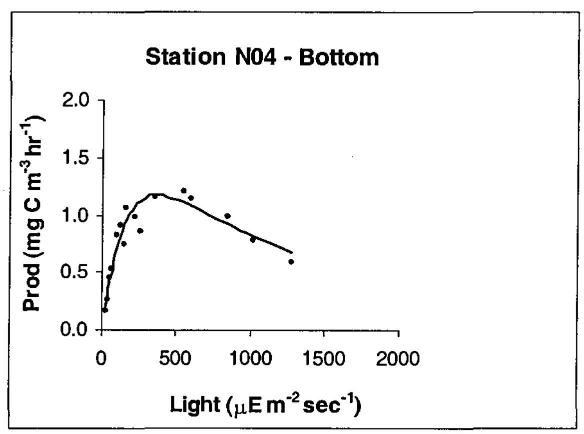


Figure E-14. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Farfield Survey WF01E (Oct 01)

WF01E **Station N18**

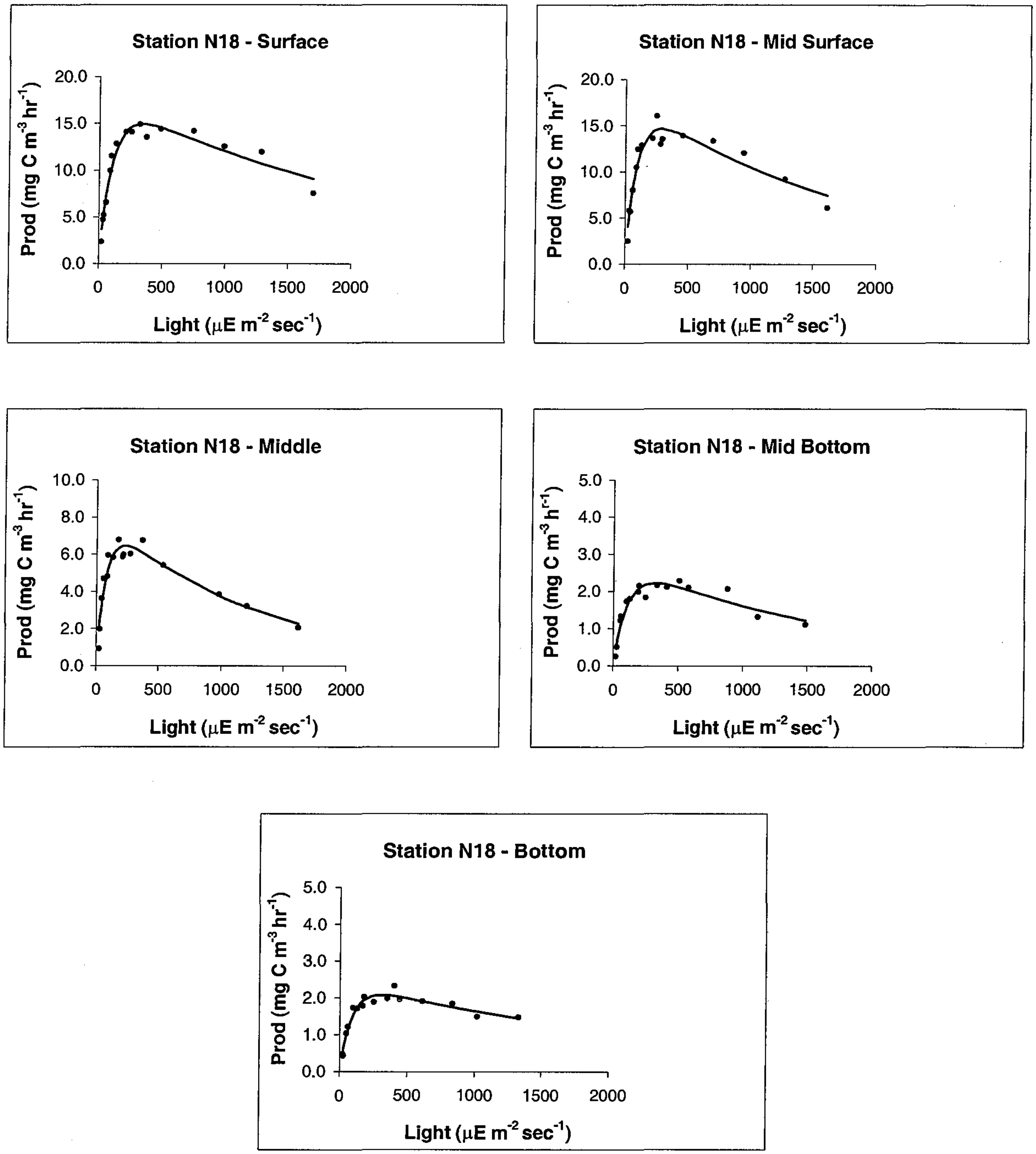


Figure E-15. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Farfield Survey WF01E (Oct 01)

WF01E **Station F23**

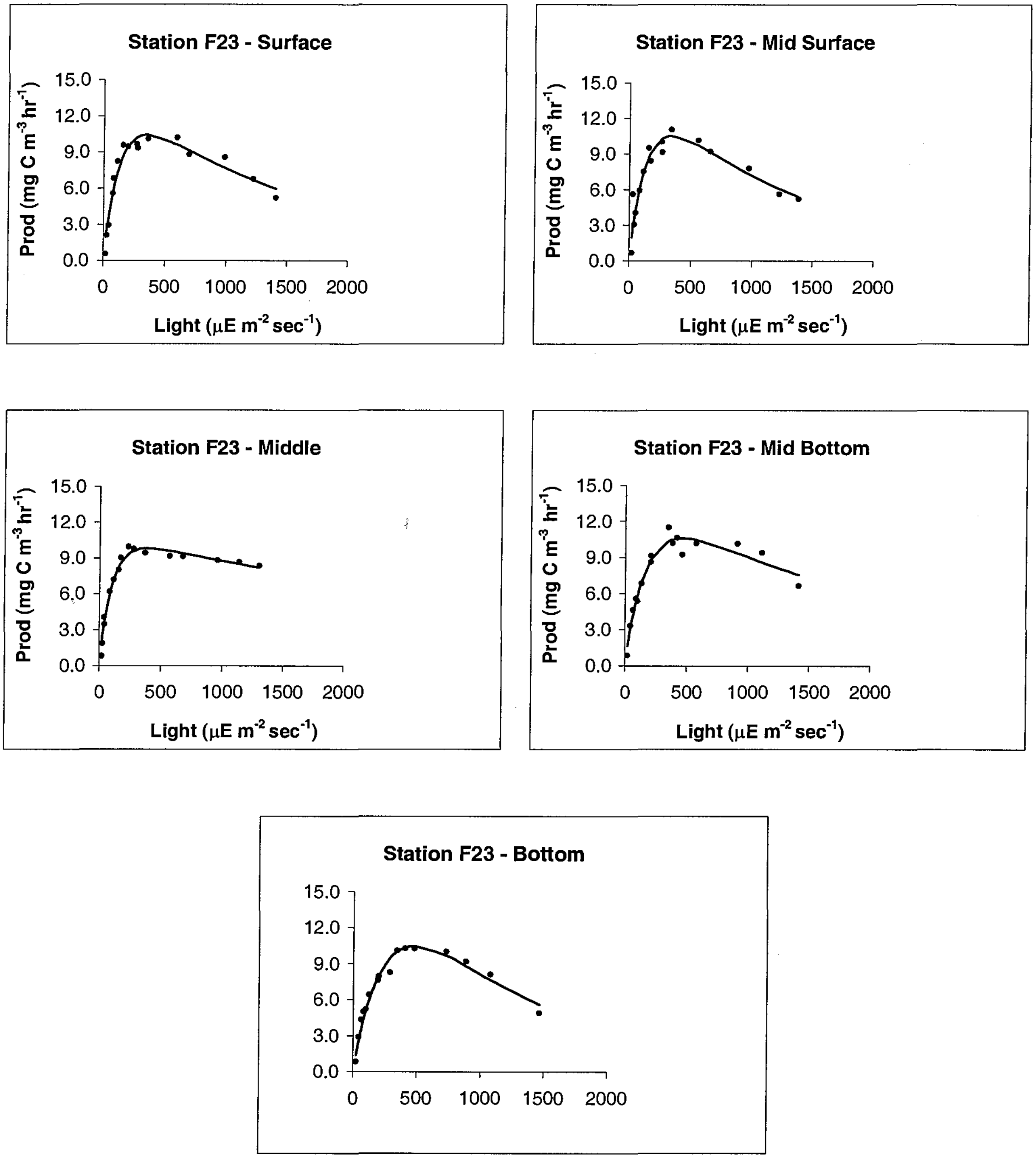
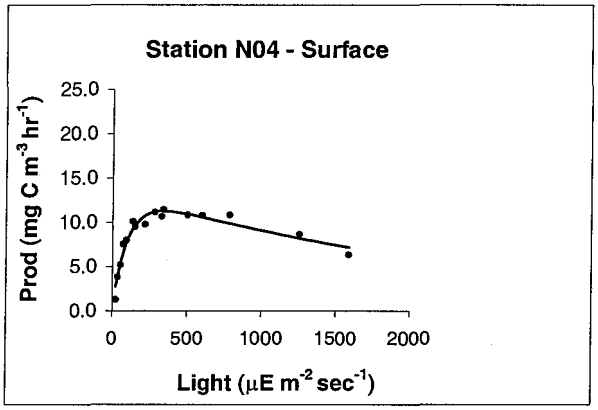
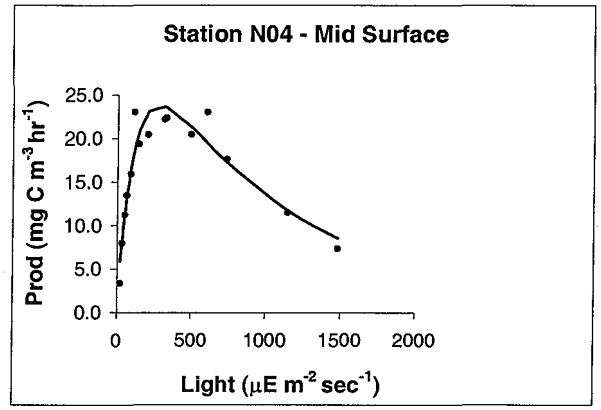
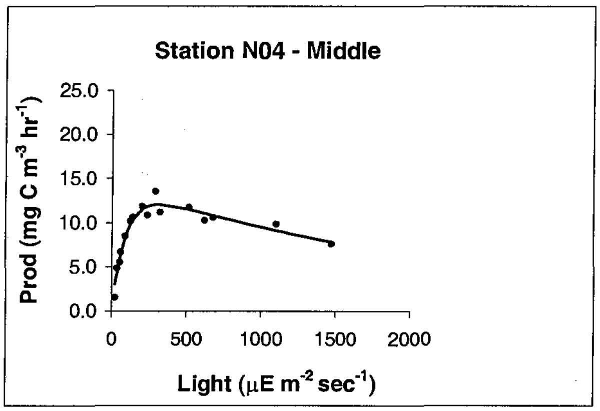


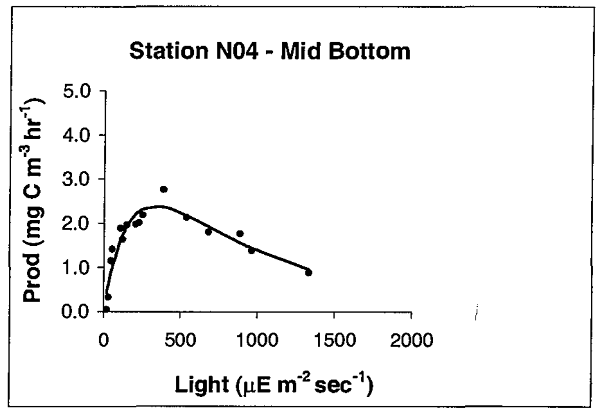
Figure E-16. Photosynthesis-Irradiance (P-I) Curves for Station F23 from Farfield Survey WF01E (Oct 01)

WN01F **Station NO4**









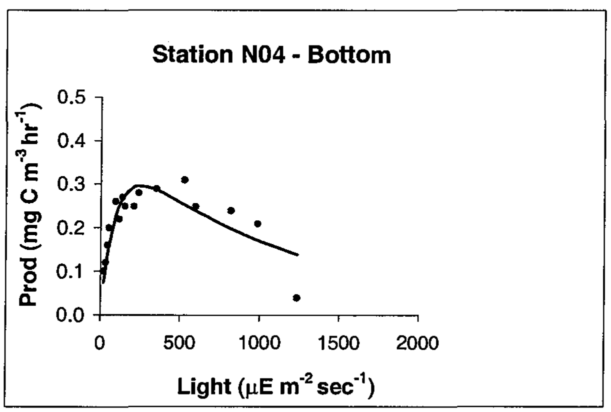


Figure E-17. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN01F (Oct 01)

WN01F **Station N18**

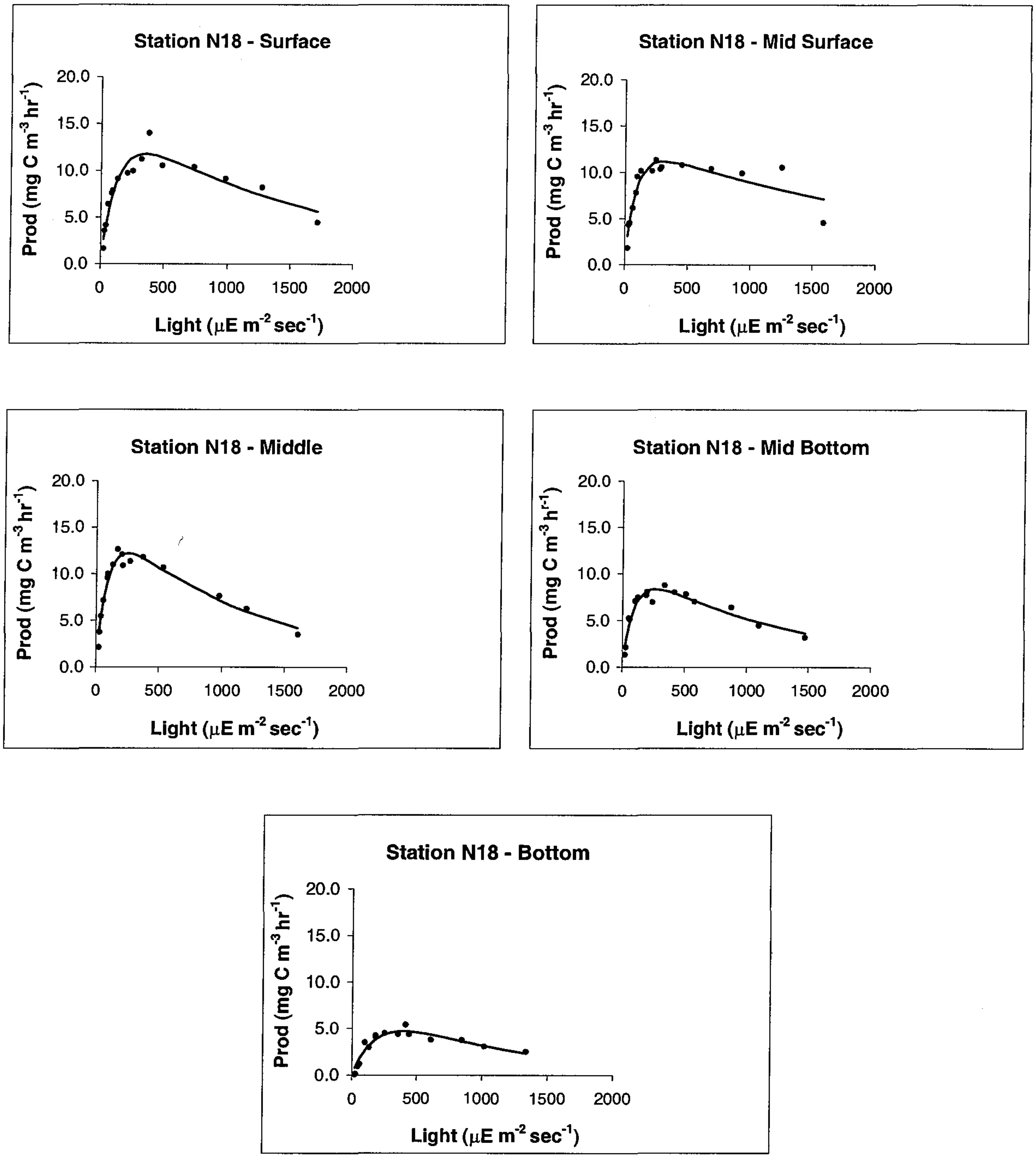


Figure E-18. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN01F (Oct 01)

WN01G **Station NO4**

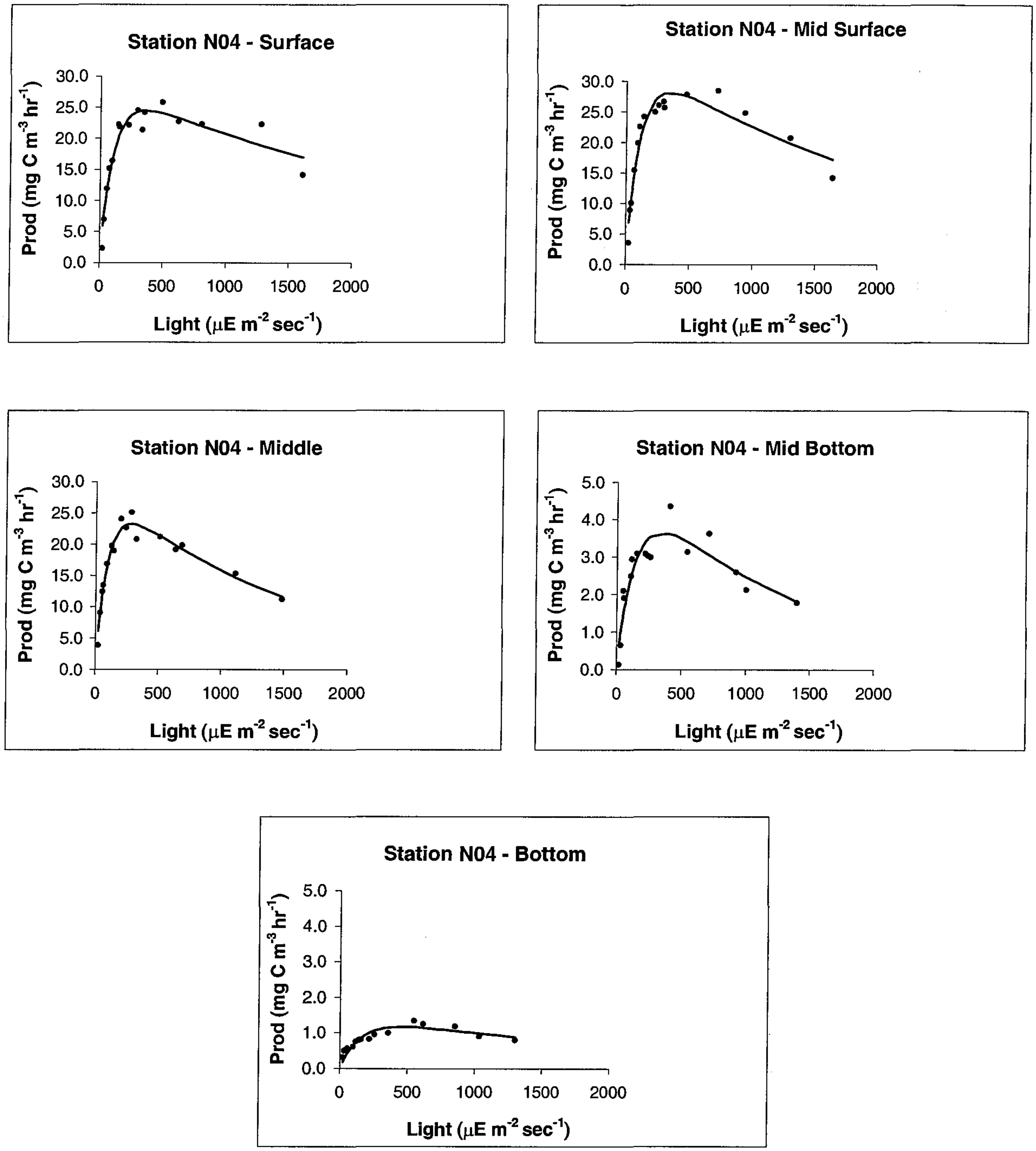


Figure E-19. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN01G (Dec 01)

WN01G **Station N18**

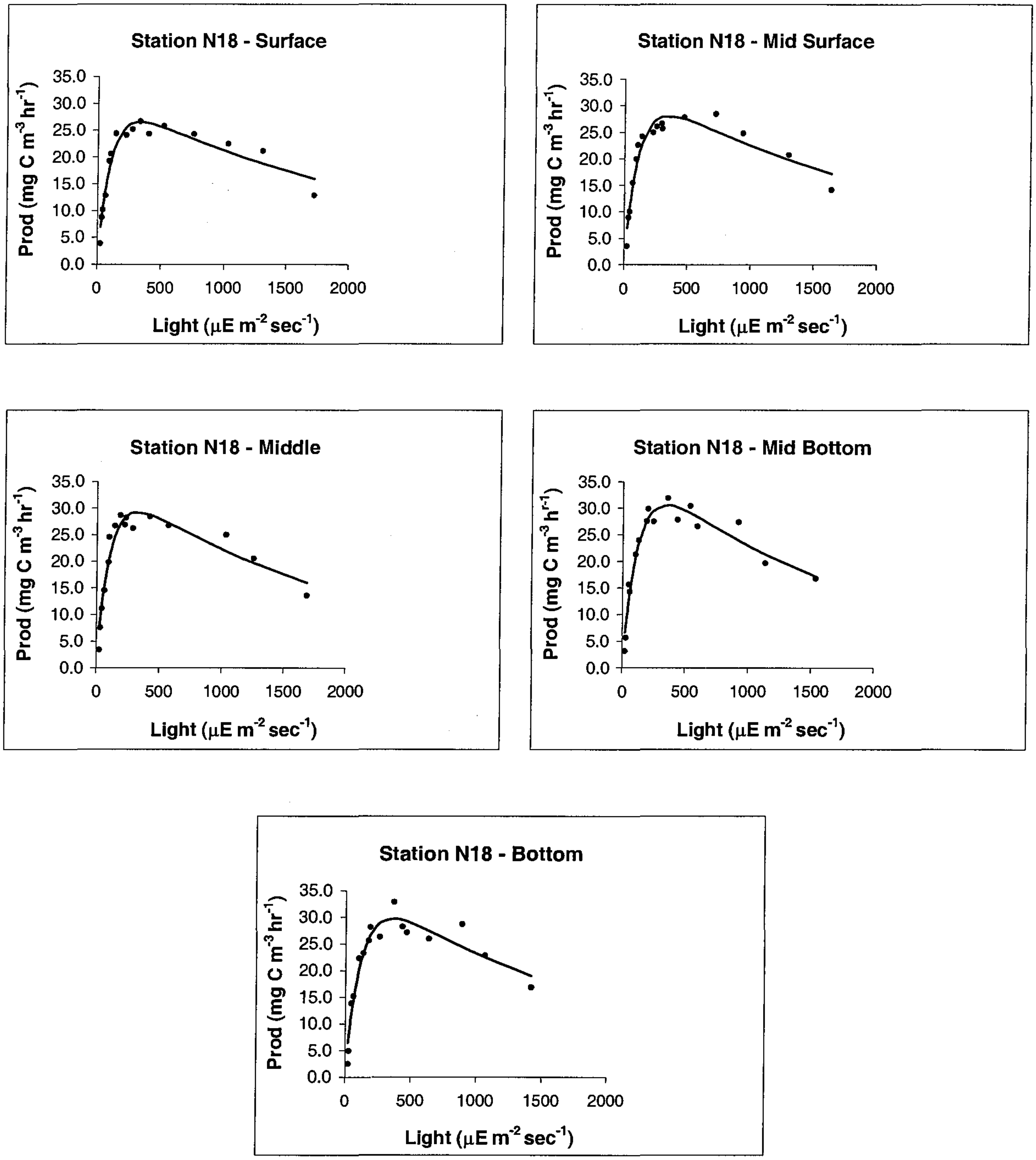


Figure E-20. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN01G (Dec 01)

WN01H **Station NO4**

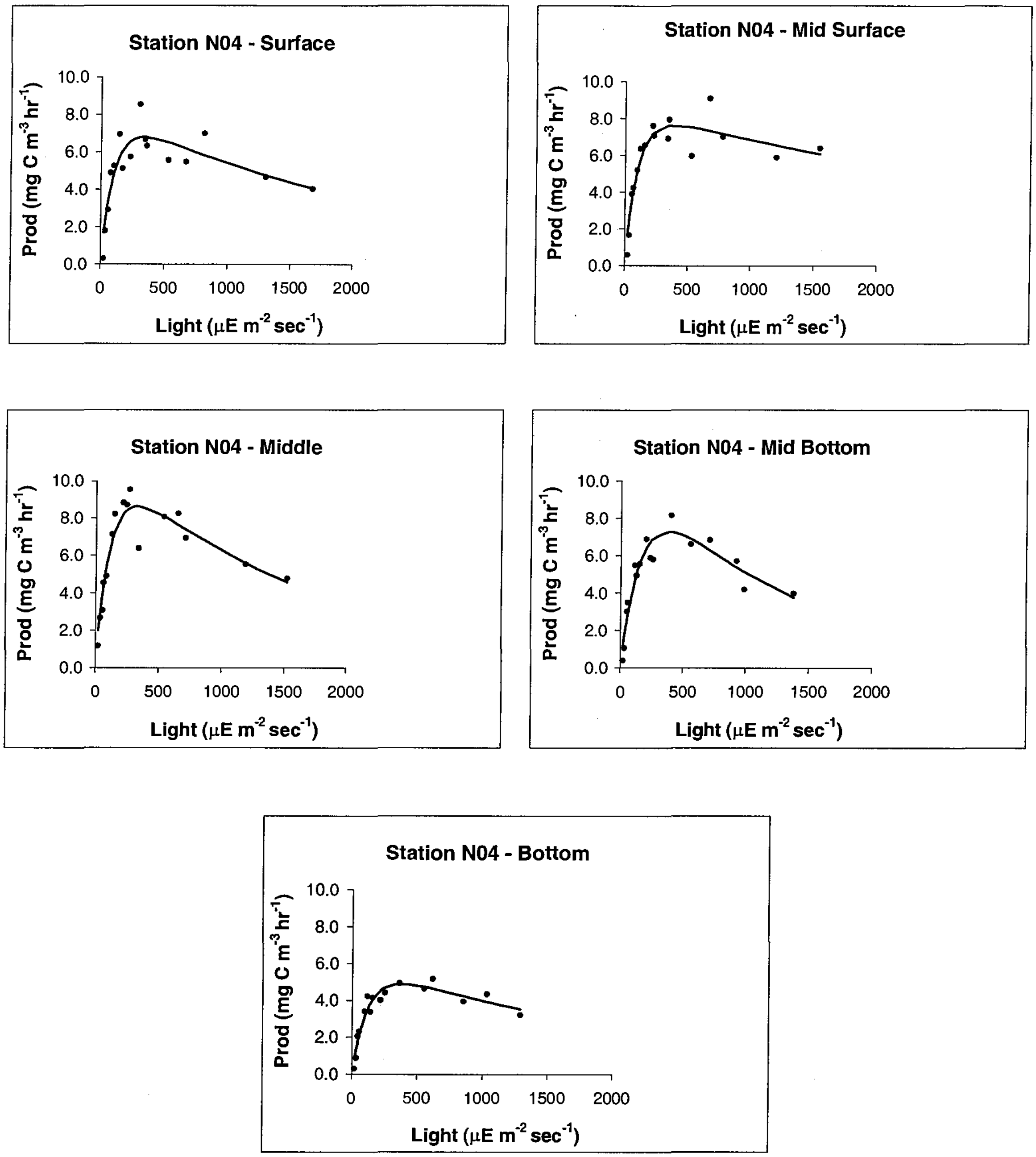


Figure E-21. Photosynthesis-Irradiance (P-I) Curves for Station N04 from Nearfield Survey WN01H (Dec 01)

WN01H **Station N18**

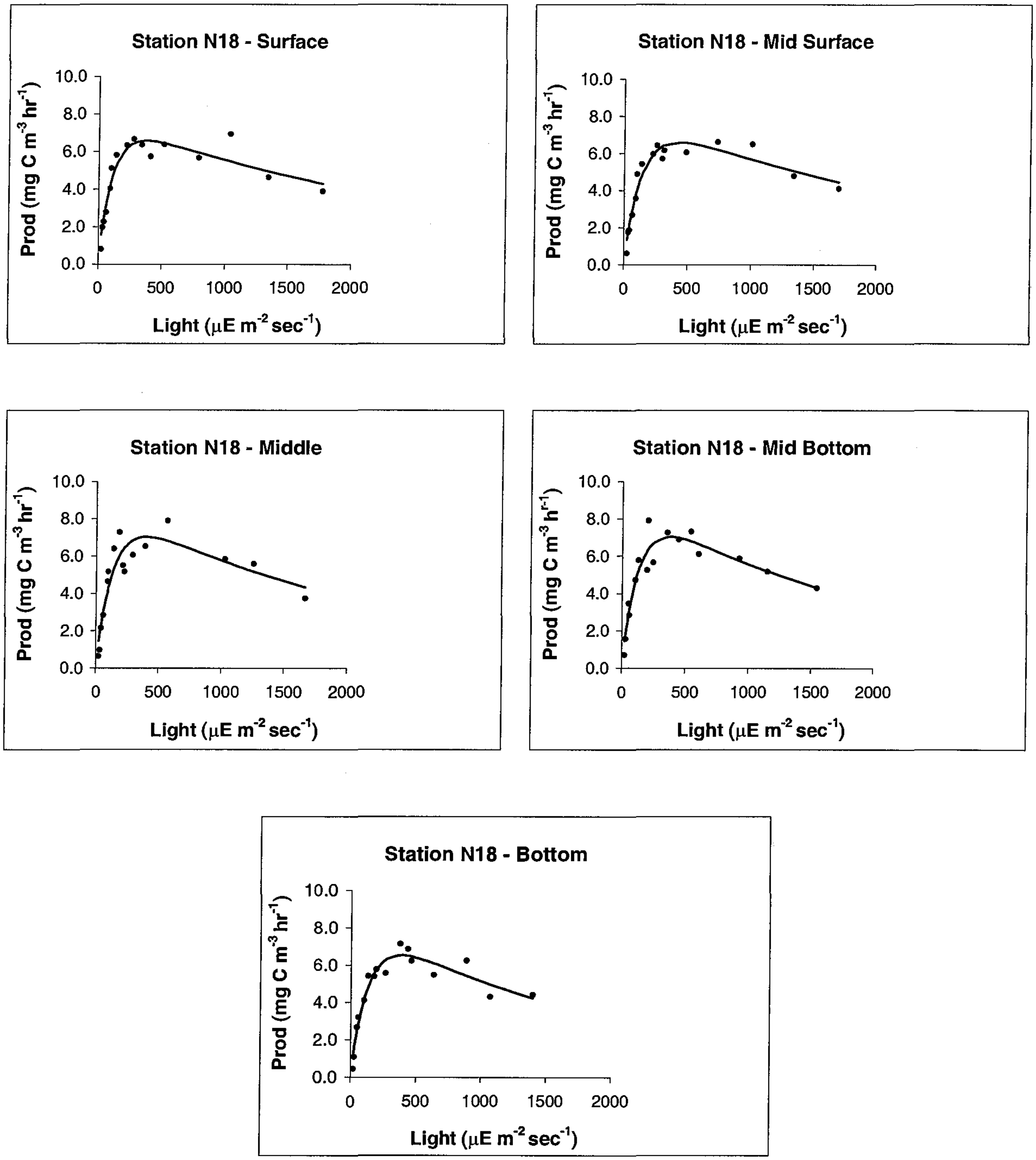


Figure E-22. Photosynthesis-Irradiance (P-I) Curves for Station N18 from Nearfield Survey WN01H (Dec 01)

APPENDIX F

ABUNDANCE OF PREVALENT PHYTOPLANKTON SPECIES IN WHOLE WATER SURFACE AND CHLOROPHYLL-A MAXIMUM SAMPLES

Life Stage and Group Definitions

Life Stage Definitions:

A = ADULT (not sexed)
B = CYST
C = COPEPODITES
F = FEMALE
G = FRAGMENT
J = Juvenile (unspecified stage)
K = Colonial species, not counted individually
L = LARVAE
M = MALE
N = NAUPLII
O = OVA
P = POST LARVAE
R = REGENERATING
S = SPORES
T = TROCHOPHORE
U = UNIDENTIFIED (lumped) not able to identify to stage or gender
V = VELIGER
X = Complex
Y = CYPRIDS
Z = ZOEA
null = no value, used as a place holder for a key field

Group Definitions:

B = BARNACLE
CD = CENTRIC DIATOM
CH = CHLOROPHYTES
CR = CHRYSOPHYTES
C = COPEPOD
CY = CRYTPOPHYTES
CN = CYANOPHYTES
DF = DINOFLAGELLATES
EU = EUGLENOPHYTES
H = HAPTOPHYTES
MF = MICROFLAGELLATES
OZ = OTHER (ZOO)
PD = PENNATE DIATOM
PR = PRASINOPHYTES

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN018

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%		16.201
		E6CELLS/L		0.305
DACTYLIOSOLEN FRAGILISSIMUS	CD	%		9.422
		E6CELLS/L		0.177
GUINARDIA DELICATULA	CD	%		9.814
		E6CELLS/L		0.185
LEPTOCYLINDRUS MINIMUS	CD	%	16.132	
		E6CELLS/L	0.358	
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	64.783	53.166
		E6CELLS/L	1.436	1.002

**Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN019**

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	6.259	8.574
		E6CELLS/L	0.181	0.347
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%	10.157	5.585
		E6CELLS/L	0.294	0.226
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	76.334	74.489
		E6CELLS/L	2.209	3.016

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN01A

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	10.948	10.975
		E6CELLS/L	0.239	0.233
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%	12.569	13.683
		E6CELLS/L	0.274	0.290
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	71.767	68.274
		E6CELLS/L	1.567	1.448

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WF01B

			F01	F02	F06	F13	F22	F23	F24	F25
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	6.631	5.235		7.027		6.033		9.706
		E6CELLS/L	0.175	0.156		0.240		0.141		0.286
CERATAULINA PELAGICA	CD	%				10.505				5.731
		E6CELLS/L				0.359				0.169
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	8.569	9.207	7.761	10.070	7.116	19.717	11.860	16.361
		E6CELLS/L	0.226	0.275	0.176	0.344	0.099	0.461	0.218	0.482
DACTYLIOSOLEN FRAGILISSIMUS	CD	%	5.652				7.754	12.801		11.832
		E6CELLS/L	0.149				0.108	0.299		0.348
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%								
		E6CELLS/L								
LEPTOCYLINDRUS DANICUS	CD	%				10.505			24.892	5.122
		E6CELLS/L				0.359			0.457	0.151
SKELETONEMA COSTATUM	CD	%								
		E6CELLS/L								
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	70.284	76.090	81.017	49.047	71.683	48.114	44.367	40.302
		E6CELLS/L	1.852	2.272	1.836	1.677	0.999	1.124	0.814	1.187

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WF01B

			F26	F27	F30	F31	N04	N16	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%			5.772	7.534			
		E6CELLS/L			0.164	0.206			
CERATAULINA PELAGICA	CD	%							
		E6CELLS/L							
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	13.622	9.982	11.965	11.708	9.745	8.061	7.058
		E6CELLS/L	0.142	0.194	0.339	0.320	0.134	0.104	0.173
DACTYLIOSOLEN FRAGILISSIMUS	CD	%		7.099		12.116			7.361
		E6CELLS/L		0.138		0.331			0.180
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%					5.057		
		E6CELLS/L					0.070		
LEPTOCYLINDRUS DANICUS	CD	%		7.918	8.151	18.530	9.745		
		E6CELLS/L		0.154	0.231	0.506	0.134		
SKELETONEMA COSTATUM	CD	%			28.576				
		E6CELLS/L			0.810				
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	68.842	66.594	38.571	36.245	68.460	77.702	76.761
		E6CELLS/L	0.718	1.293	1.094	0.990	0.945	1.001	1.878

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN01C

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	7.108	
		E6CELLS/L	0.055	
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%	8.589	5.954
		E6CELLS/L	0.067	0.083
LEPTOCYLINDRUS DANICUS	CD	%	7.761	11.090
		E6CELLS/L	0.060	0.155
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	60.712	60.116
		E6CELLS/L	0.472	0.838

**Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN01D**

			N04	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	5.607	
		E6CELLS/L	0.135	
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	17.133	14.393
		E6CELLS/L	0.414	0.261
DACTYLIOSOLEN FRAGILISSIMUS	CD	%		5.312
		E6CELLS/L		0.097
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%		5.053
		E6CELLS/L		0.092
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	61.678	64.157
		E6CELLS/L	1.490	1.166

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WF01E

Species	Group	Unit	F01	F02	F06	F13	F22	F23	F24	F25
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%				9.609		6.778		7.797
		E6CELLS/L				0.146		0.085		0.090
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	8.095	14.136	12.809	11.496	9.716	15.426	10.351	12.843
		E6CELLS/L	0.123	0.232	0.335	0.174	0.243	0.193	0.184	0.147
DACTYLIOSOLEN FRAGILISSIMUS	CD	%	8.561		6.917					
		E6CELLS/L	0.130		0.181					
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%		8.156						
		E6CELLS/L		0.134						
LEPTOCYLINDRUS DANICUS	CD	%				8.736	7.881	11.959	20.796	5.838
		E6CELLS/L				0.132	0.197	0.150	0.369	0.067
LEPTOCYLINDRUS MINIMUS	CD	%							7.910	
		E6CELLS/L							0.140	
SKELETONEMA COSTATUM	CD	%								
		E6CELLS/L								
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	73.757	69.413	59.971	51.991	62.601	54.225	41.406	60.315
		E6CELLS/L	1.119	1.137	1.566	0.788	1.563	0.679	0.735	0.693

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WF01E

			F26	F27	F30	F31	N04	N16	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	5.982	6.276		5.634			5.659
		E6CELLS/L	0.094	0.093		0.066			0.113
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	10.192	12.912	18.736	11.080		17.401	9.733
		E6CELLS/L	0.159	0.191	0.225	0.130		0.389	0.195
DACTYLIOSOLEN FRAGILISSIMUS	CD	%							
		E6CELLS/L							
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%		5.738			6.072	7.544	
		E6CELLS/L		0.085			0.073	0.169	
LEPTOCYLINDRUS DANICUS	CD	%			5.641	10.562	24.247	8.868	
		E6CELLS/L			0.068	0.124	0.291	0.198	
LEPTOCYLINDRUS MINIMUS	CD	%	10.230	6.624		5.812	36.211		
		E6CELLS/L	0.160	0.098		0.068	0.434		
SKELETONEMA COSTATUM	CD	%			6.334				
		E6CELLS/L			0.076				
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	57.937	58.999	55.317	56.529	17.140	53.419	66.207
		E6CELLS/L	0.906	0.872	0.664	0.664	0.206	1.195	1.324

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN01F

			N04	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%		5.121
		E6CELLS/L		0.142
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	13.020	14.904
		E6CELLS/L	0.309	0.413
LEPTOCYLINDRUS DANICUS	CD	%	5.478	
		E6CELLS/L	0.130	
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	69.295	63.458
		E6CELLS/L	1.644	1.760

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN01G

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	6.088	
		E6CELLS/L	0.075	
GUINARDIA DELICATULA	CD	%		5.428
		E6CELLS/L		0.088
LEPTOCYLINDRUS DANICUS	CD	%	5.090	19.957
		E6CELLS/L	0.062	0.324
SKELETONEMA COSTATUM	CD	%	5.166	17.403
		E6CELLS/L	0.063	0.282
THALASSIOSIRA NORDENSKIOLDII	CD	%	6.989	7.105
		E6CELLS/L	0.086	0.115
THALASSIOSIRA SP. GROUP 3 10-20 MICRONS LENGTH	CD	%	7.369	
		E6CELLS/L	0.090	
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	47.027	20.470
		E6CELLS/L	0.576	0.332

**Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey WN01H**

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	9.582	6.161
		E6CELLS/L	0.063	0.030
DACTYLIOSOLEN FRAGILISSIMUS	CD	%	19.039	10.991
		E6CELLS/L	0.126	0.054
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	48.277	55.103
		E6CELLS/L	0.319	0.270

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample Whole Water Phytoplankton, Survey WN018

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	5.364	
		E6CELLS/L	0.080	
CYLINDROTHECA CLOSTERIUM	PD	%		7.353
		E6CELLS/L		0.072
DACTYLIOSOLEN FRAGILISSIMUS	CD			5.897
				0.058
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF			5.831
				0.057
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF		61.599	59.227
			0.918	0.584

**Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WN019**

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	9.419	9.666
		E6CELLS/L	0.163	0.434
CYLINDROTHECA CLOSTERIUM	PD	%	6.375	
		E6CELLS/L	0.110	
GYMNODINIUM SP. GROUP I 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%		5.113
		E6CELLS/L		0.230
PSEUDONITZSCHIA DELICATISSIMA	PD	%	16.125	
		E6CELLS/L	0.278	
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	53.962	76.389
		E6CELLS/L	0.932	3.432

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample Whole Water Phytoplankton, Survey WN01A

			N04	N18
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%		10.490
		E6CELLS/L		0.155
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%	7.618	5.423
		E6CELLS/L	0.061	0.080
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF		86.029	79.386
			0.689	1.171

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WF01B

			F01	F02	F06	F13	F22	F23	F24	F25
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	7.343			6.388		6.943		6.430
		E6CELLS/L	0.142			0.106		0.100		0.247
CERATAULINA PELAGICA	CD	%								
		E6CELLS/L								
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	12.374	10.715	13.358	16.130	11.074	12.106	12.239	15.583
		E6CELLS/L	0.239	0.226	0.292	0.267	0.166	0.174	0.082	0.598
DACTYLIOSOLEN FRAGILISSIMUS	CD	%	6.313					13.174		9.304
		E6CELLS/L	0.122					0.190		0.357
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%								
		E6CELLS/L								
LEPTOCYLINDRUS DANICUS	CD	%								6.505
		E6CELLS/L								0.250
SKELETONEMA COSTATUM	CD	%								
		E6CELLS/L								
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	66.359	76.156	79.251	64.043	83.802	54.300	74.619	45.613
		E6CELLS/L	1.282	1.604	1.730	1.060	1.257	0.782	0.503	1.750

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WF01B

			F26	F27	F30	F31	N04	N16	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%			8.177	7.695			
		E6CELLS/L			0.181	0.218			
CERATAULINA PELAGICA	CD	%				13.433			
		E6CELLS/L				0.380			
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	12.684	13.684	14.992	9.390	20.457	8.762	12.282
		E6CELLS/L	0.111	0.137	0.332	0.266	0.291	0.053	0.320
DACTYLIOSOLEN FRAGILISSIMUS	CD	%			8.549				
		E6CELLS/L			0.190				
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%							5.400
		E6CELLS/L							0.141
LEPTOCYLINDRUS DANICUS	CD	%			12.638	13.150			
		E6CELLS/L			0.280	0.372			
SKELETONEMA COSTATUM	CD	%			7.854				
		E6CELLS/L			0.174				
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	76.541	76.238	41.754	46.298	69.452	86.819	77.607
		E6CELLS/L	0.669	0.762	0.926	1.311	0.989	0.521	2.020

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample Whole Water Phytoplankton, Survey WN01C

			N04	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	5.299	
		E6CELLS/L	0.089	
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	6.462	7.181
		E6CELLS/L	0.108	0.094
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%	8.143	11.319
		E6CELLS/L	0.136	0.148
LEPTOCYLINDRUS DANICUS	CD	%	11.097	11.360
		E6CELLS/L	0.186	0.149
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	57.645	52.577
		E6CELLS/L	0.964	0.688

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WN01D

			N04	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	8.262	
		E6CELLS/L	0.091	
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	7.761	13.846
		E6CELLS/L	0.085	0.279
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%		6.725
		E6CELLS/L		0.136
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	69.474	59.076
		E6CELLS/L	0.762	1.192

**Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WF01E**

			F01	F02	F06	F13	F22	F23	F24	F25
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%				11.015			5.760	5.829
		E6CELLS/L				0.117			0.048	0.067
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	8.881	11.313	5.311	8.197	5.752	18.700		11.033
		E6CELLS/L	0.106	0.214	0.108	0.087	0.077	0.241		0.127
DACTYLIOSOLEN FRAGILISSIMUS	CD	%	5.075		7.315					
		E6CELLS/L	0.061		0.149					
GUINARDIA DELICATULA	CD	%	6.766				5.111			
		E6CELLS/L	0.081				0.069			
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%	5.375		6.491					
		E6CELLS/L	0.064		0.132					
LEPTOCYLINDRUS DANICUS	CD	%				7.544	7.982	10.165	34.984	6.339
		E6CELLS/L				0.080	0.107	0.131	0.291	0.073
LEPTOCYLINDRUS MINIMUS	CD	%							5.990	6.962
		E6CELLS/L							0.050	0.080
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	63.802	74.697	67.667	52.002	66.955	56.612	35.763	60.787
		E6CELLS/L	0.762	1.410	1.375	0.554	0.900	0.731	0.297	0.698

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WF01E

			F26	F27	F30	F31	N04	N16	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%			7.840	5.541		5.328	
		E6CELLS/L			0.064	0.076		0.105	
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	10.213	10.072	10.454	14.160	16.851	11.172	6.240
		E6CELLS/L	0.167	0.201	0.085	0.194	0.335	0.221	0.096
DACTYLIOSOLEN FRAGILISSIMUS	CD	%							
		E6CELLS/L							
GUINARDIA DELICATULA	CD	%							
		E6CELLS/L							
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%						9.110	
		E6CELLS/L						0.180	
LEPTOCYLINDRUS DANICUS	CD	%	7.479		9.349	15.570	16.147	13.041	5.139
		E6CELLS/L	0.122		0.076	0.213	0.321	0.257	0.079
LEPTOCYLINDRUS MINIMUS	CD	%	7.062			5.224	8.787		
		E6CELLS/L	0.115			0.071	0.175		
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	61.276	71.650	53.140	45.557	46.490	50.188	72.879
		E6CELLS/L	0.999	1.428	0.431	0.623	0.925	0.991	1.119

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample Whole Water Phytoplankton, Survey WN01F

			N04	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	7.760	
		E6CELLS/L	0.253	
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%	10.037	11.677
		E6CELLS/L	0.327	0.158
GYMNODINIUM SP. GROUP 1 5-20 MICRONS WIDTH, 10-20 MICRONS LENGTH	DF	%		6.600
		E6CELLS/L		0.089
LEPTOCYLINDRUS DANICUS	CD	%	13.094	5.512
		E6CELLS/L	0.426	0.074
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	58.114	59.275
		E6CELLS/L	1.893	0.801

**Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WN01G**

			N04	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	8.159	
		E6CELLS/L	0.143	
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%		5.533
		E6CELLS/L		0.115
LEPTOCYLINDRUS DANICUS	CD	%	7.307	16.319
		E6CELLS/L	0.128	0.340
SKELETONEMA COSTATUM	CD	%	10.022	15.942
		E6CELLS/L	0.175	0.332
THALASSIOSIRA NORDENSKIOLDII	CD	%	7.586	
		E6CELLS/L	0.133	
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	41.754	32.567
		E6CELLS/L	0.730	0.679

**Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Whole Water Phytoplankton, Survey WN01H**

			N04	N18
CENTRIC DIATOM SP. GROUP 1 DIAM <10 MICRONS	CD	%	6.049	
		E6CELLS/L	0.043	
CRYPTOMONAS SP. GROUP 1 LENGTH <10 MICRONS	CY	%		11.795
		E6CELLS/L		0.093
DACTYLIOSOLEN FRAGILISSIMUS	CD	%	8.348	
		E6CELLS/L	0.060	
LEPTOCYLINDRUS DANICUS	CD	%	10.716	8.403
		E6CELLS/L	0.076	0.066
UNID. MICRO-PHYTOFLAG SP. GROUP 1 LENGTH <10 MICRONS	MF	%	56.933	53.993
		E6CELLS/L	0.406	0.424

APPENDIX G

ABUNDANCE OF PREVALENT PHYTOPLANKTON SPECIES IN SCREENED WATER SURFACE AND CHLOROPHYLL-A MAXIMUM SAMPLES

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WN018

			N04	N18
CERATIUM FUSUS	DF	%		7.5
		CELLS/L		155.0
CERATIUM LONGIPES	DF	%	45.3	37.3
		CELLS/L	3601.5	770.0
CERATIUM SPP.	DF	%	11.3	
		CELLS/L	897.8	
CERATIUM TRIPOS	DF	%	37.2	39.8
		CELLS/L	2961.0	820.0

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WN019

			N04	N18
CERATIUM FUSUS	DF	%	21.9	35.7
		CELLS/L	234.5	231.5
CERATIUM LONGIPES	DF	%	24.4	15.3
		CELLS/L	261.5	99.2
CERATIUM TRIPOS	DF	%	48.9	37.5
		CELLS/L	525.0	243.8

**Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WN01A**

			N04	N18
CERATIUM FUSUS	DF	%	43.0	30.8
		CELLS/L	637.6	140.0
CERATIUM LONGIPES	DF	%	9.8	10.4
		CELLS/L	145.6	47.5
CERATIUM TRIPOS	DF	%	39.4	48.4
		CELLS/L	584.3	220.0

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WF01B

			F01	F02	F06	F13	F22	F23	F24	F25
ATHECATE DINOFLAGELLATE	DF	%	5.7				11.4	6.6		31.7
		CELLS/L	32.5				54.1	15.0		82.5
CERATIUM FUSUS	DF	%	33.2	27.1	33.0	27.6	16.8	35.2	41.9	24.0
		CELLS/L	190.0	340.0	292.5	145.0	79.8	80.0	282.5	62.5
CERATIUM LONGIPES	DF	%		11.4	23.4	7.6		7.7		
		CELLS/L		142.5	207.5	40.0		17.5		
CERATIUM SPP.	DF	%						5.5		9.6
		CELLS/L						12.5		25.0
CERATIUM TRIPOS	DF	%	44.1	53.1	36.1	47.1	51.9	28.6	32.2	14.4
		CELLS/L	252.5	665.0	320.0	247.5	247.2	65.0	217.5	37.5
DINOPHYSIS NORVEGICA	DF	%								
		CELLS/L								
GONYAULAX SPP.	DF	%								
		CELLS/L								
GYMNODINIUM SP. GROUP 2 21-40 MICRONS WIDTH, 21-50 MICRONS LENGTH	DF	%	7.4							
		CELLS/L	42.5							
PROROCENTRUM MICANS	DF	%						11.0		
		CELLS/L						25.0		
PROROCENTRUM MINIMUM	DF	%								5.8
		CELLS/L								15.0
SCRIPPSIELLA TROCHOIDEA	DF	%					9.2			
		CELLS/L					43.8			
THECATE DINOFLAGELLATE SPP.	DF	%					5.4		6.3	11.5
		CELLS/L					25.8		42.5	30.0

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WF01B

			F26	F27	F30	F31	N04	N16	N18
ATHECATE DINOFLAGELLATE	DF	%			12.5	14.0		5.1	
		CELLS/L			15.0	20.0		40.0	
CERATIUM FUSUS	DF	%	49.2	51.5		7.0	25.7	35.0	
		CELLS/L	540.0	492.9		10.0	220.0	272.5	
CERATIUM LONGIPES	DF	%				5.3	17.5		36.4
		CELLS/L				7.5	150.0		140.0
CERATIUM SPP.	DF	%						6.8	
		CELLS/L						52.5	
CERATIUM TRIPOS	DF	%	37.8	36.3		43.9	43.1	43.7	63.6
		CELLS/L	415.0	347.2		62.5	370.0	340.0	245.0
DINOPHYSIS NORVEGICA	DF	%					9.6		
		CELLS/L					82.5		
GONYAULAX SPP.	DF	%			6.3				
		CELLS/L			7.5				
GYMNODINIUM SP. GROUP 2 21-40 MICRONS WIDTH, 21-50 MICRONS LENGTH	DF	CELLS/L							
PROROCENTRUM MICANS	DF	%							
		CELLS/L		5.5	47.9				
PROROCENTRUM MINIMUM	DF	%		53.0	57.5				
		CELLS/L			8.3				
SCRIPPSIELLA TROCHOIDEA	DF	%			10.0				
		CELLS/L							
THECATE DINOFLAGELLATE SPP.	DF	%			25.0	24.6			
		CELLS/L			30.0	35.0			

Abundance of Prevalent Species (>5% Total Count) in Surface Sample Screened Phytoplankton, Survey WN01C

			N04	N18
ATHECATE DINOFLAGELLATE	DF	%	16.1	13.5
		CELLS/L	91.8	52.5
CERATIUM FUSUS	DF	%	17.0	25.0
		CELLS/L	96.9	97.5
CERATIUM LONGIPES	DF	%	12.1	10.9
		CELLS/L	68.9	42.5
CERATIUM TRIPOS	DF	%	29.6	29.5
		CELLS/L	168.3	115.0
PROROCENTRUM MICANS	DF	%	7.6	6.4
		CELLS/L	43.4	25.0
PROROCENTRUM MINIMUM	DF	%	6.3	
		CELLS/L	35.7	
THECATE DINOFLAGELLATE SPP.	DF	%	5.4	5.8
.		CELLS/L	30.6	22.5

**Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WN01D**

			N04	N18
CERATIUM FUSUS	DF	%	18.1	16.6
		CELLS/L	427.2	420.0
CERATIUM TRIPOS	DF	%	15.9	17.5
		CELLS/L	373.8	442.5
DICTYOCHA FIBULA	CR	%	36.3	31.9
		CELLS/L	854.4	805.0
PROROCENTRUM MICANS	DF	%	14.1	14.9
		CELLS/L	331.5	375.0
THECATE DINOFLAGELLATE SPP.	DF	%		5.5
		CELLS/L		140.0

**Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WF01E**

			F01	F02	F06	F13	F22	F23	F24	F25
ATHECATE DINOFLAGELLATE	DF	%		5.9				7.2		13.4
		CELLS/L		100.0				40.0		40.0
CERATIUM FUSUS	DF	%		20.4	13.7	8.0	7.2		15.2	7.6
		CELLS/L		345.0	220.0	162.5	200.0		40.0	22.5
CERATIUM LINEATUM	DF	%							5.7	
		CELLS/L							15.0	
CERATIUM LONGIPES	DF	%								
		CELLS/L								
CERATIUM SPP.	DF	%								
		CELLS/L								
CERATIUM TRIPOS	DF	%		8.4	21.2	25.5	11.8	6.3	13.3	7.6
		CELLS/L		142.5	340.0	515.0	330.0	35.0	35.0	22.5
DICTYOCHA FIBULA	CR	%	70.4	28.6	54.7	51.7	68.8	6.7	27.6	30.3
		CELLS/L	690.0	482.5	877.5	1045.0	1922.5	37.5	72.5	90.0
DISTEPHANUS SPECULUM	CR	%								9.2
		CELLS/L								27.5
GONYAULAX SPP.	DF	%								
		CELLS/L								
GYRODINIUM SP. GROUP 2 21-40 MICRONS WIDTH, 21-50 MICRONS LENGTH	DF	%							8.6	5.9
		CELLS/L							22.5	17.5
PROROCENTRUM MICANS	DF	%		23.5		6.2	7.8	59.6	14.3	18.5
		CELLS/L		397.5		125.0	217.5	332.5	37.5	55.0
PROTOPERIDINIUM SP. GROUP 2 31-75 MICRONS WIDTH, 41-80 MICRONS LENGTH	DF	%								
		CELLS/L								
THECATE DINOFLAGELLATE SPP.	DF	%	7.4	6.2					6.7	
		CELLS/L	72.5	105.0					17.5	

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WF01E

			F26	F27	F30	F31	N04	N16	N18
ATHECATE DINOFLAGELLATE	DF	%	18.8	6.5	13.4	15.2			
		CELLS/L	30.0	17.5	37.5	17.5			
CERATIUM FUSUS	DF	%		11.1	14.3		16.5	9.0	6.0
		CELLS/L		30.0	40.0		157.5	140.0	120.0
CERATIUM LINEATUM	DF	%							
		CELLS/L							
CERATIUM LONGIPES	DF	%		10.2					
		CELLS/L		27.5					
CERATIUM SPP.	DF	%	10.9		8.9				
		CELLS/L	17.5		25.0				
CERATIUM TRIPOS	DF	%		8.3	9.8	19.6		8.2	8.6
		CELLS/L		22.5	27.5	22.5		127.5	172.5
DICTYOCHA FIBULA	CR	%		33.3	10.7		48.6	76.0	72.9
		CELLS/L		90.0	30.0		462.5	1182.5	1457.5
DISTEPHANUS SPECULUM	CR	%			5.4				
		CELLS/L			15.0				
GONYAULAX SPP.	DF	%	9.4						
		CELLS/L	15.0						
GYRODINIUM SP. GROUP 2 21-40 MICRONS WIDTH, 21-50 MICRONS LENGTH	DF	%			7.1				
		CELLS/L			20.0				
PROROCENTRUM MICANS	DF	%	20.3	17.6	7.1	30.4	20.2		10.3
		CELLS/L	32.5	47.5	20.0	35.0	192.5		205.0
PROTOPERIDINIUM SP. GROUP 2 31-75 MICRONS WIDTH, 41-80 MICRONS LENGTH	DF	%	7.8		9.8				
		CELLS/L	12.5		27.5				
THECATE DINOFLAGELLATE SPP.	DF	%	18.8	11.1	10.7	23.9			
		CELLS/L	30.0	30.0	30.0	27.5			

Abundance of Prevalent Species (>5% Total Count) in Surface Sample Screened Phytoplankton, Survey WN01F

			N04	N18
CERATIUM FUSUS	DF	%	22.7	16.3
		CELLS/L	460.0	270.4
CERATIUM TRIPOS	DF	%	19.3	8.9
		CELLS/L	390.0	147.0
DICTYOCHA FIBULA	CR	%	46.7	41.3
		CELLS/L	945.0	682.5
PROROCENTRUM MICANS	DF	%	9.3	27.0
		CELLS/L	187.5	446.3

Abundance of Prevalent Species (>5% Total Count) in Surface Sample
Screened Phytoplankton, Survey WN01G

			N04	N18
CERATIUM FUSUS	DF	%	57.5	5.5
		CELLS/L	805.0	220.0
CERATIUM LINEATUM	DF	%		5.2
		CELLS/L		210.0
DICTYOCHA FIBULA	CR	%	36.3	30.1
		CELLS/L	507.5	1215.0
PROROCENTRUM MICANS	DF	%		56.6
		CELLS/L		2280.0

Abundance of Prevalent Species (>5% Total Count) in Surface Sample Screened Phytoplankton, Survey WN01H

			N04	N18
CERATIUM FUSUS	DF	%	11.2	7.2
		CELLS/L	290.0	230.0
CERATIUM LINEATUM	DF	%	10.9	11.0
		CELLS/L	282.5	352.5
CERATIUM TRIPOS	DF	%	6.2	
		CELLS/L	160.0	
PROROCENTRUM MICANS	DF	%	70.1	74.9
		CELLS/L	1820.0	2390.0

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample Screened Phytoplankton, Survey WN018

			N04	N18
CERATIUM FUSUS	DF	%	19.6	
		CELLS/L	756.0	
CERATIUM LONGIPES	DF	%	69.6	30.4
		CELLS/L	2680.1	4648.8
CERATIUM SPP.	DF	%		12.2
		CELLS/L		1872.0
CERATIUM TRIPOS	DF	%		51.7
		CELLS/L		7914.4

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WN019

			N04	N18
CERATIUM FUSUS	DF	%		20.6
		CELLS/L		380.0
CERATIUM LONGIPES	DF	%	46.6	31.3
		CELLS/L	780.9	577.5
CERATIUM SPP.	DF	%	15.2	
		CELLS/L	254.2	
CERATIUM TRIPOS	DF	%	27.3	42.1
		CELLS/L	457.7	775.0

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WN01A

			N04	N18
CERATIUM FUSUS	DF	%		10.0
		CELLS/L		114.8
CERATIUM LONGIPES	DF	%	44.0	31.2
		CELLS/L	401.6	357.8
CERATIUM SPP.	DF	%		7.1
		CELLS/L		81.0
CERATIUM TRIPOS	DF	%	48.3	48.7
		CELLS/L	441.0	558.0

**Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WF01B**

			F01	F02	F06	F13	F22	F23	F24	F25
ATHECATE DINOFLAGELLATE	DF	%			7.1				12.1	51.1
		CELLS/L			40.0				27.5	297.5
CERATIUM FUSUS	DF	%		18.0	50.0		13.0	51.8	17.6	
		CELLS/L		742.5	280.0		42.5	72.5	40.0	
CERATIUM LONGIPES	DF	%	32.7	9.9	7.1	21.7	16.8		18.7	6.9
		CELLS/L	160.0	407.5	40.0	12.5	55.0		42.5	40.0
CERATIUM SPP.	DF	%					7.6	10.7		
		CELLS/L					25.0	15.0		
CERATIUM TRIPOS	DF	%	36.2	69.8	34.8	69.6	54.2	37.5	34.1	23.6
		CELLS/L	177.5	2880.0	195.0	40.0	177.5	52.5	77.5	137.5
DINOPHYSIS NORVEGICA	DF	%					8.4			
		CELLS/L					27.5			
DISTEPHANUS SPECULUM	CR	%								
		CELLS/L								
PROROCENTRUM MICANS	DF	%				8.7				12.0
		CELLS/L				5.0				70.0
PROTOPERIDINIUM SP. GROUP 1 10-30 MICRONS WIDTH, 10-40 MICRONS LENGTH	DF	%							8.8	
		CELLS/L							20.0	
SCRIPPSIELLA TROCHOIDEA	DF	%	15.8							
		CELLS/L	77.5							
THECATE DINOFLAGELLATE SPP.	DF	%								
		CELLS/L								

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WF01B

			F26	F27	F30	F31	N04	N16	N18
ATHECATE DINOFLAGELLATE	DF	%						30.5	
		CELLS/L						152.5	
CERATIUM FUSUS	DF	%	41.7	25.6		54.5	60.2	8.0	14.7
		CELLS/L	572.5	260.0		210.0	355.0	40.0	100.0
CERATIUM LONGIPES	DF	%	14.9	11.8				6.5	29.3
		CELLS/L	205.0	120.0				32.5	200.0
CERATIUM SPP.	DF	%		5.4					
		CELLS/L		55.0					
CERATIUM TRIPOS	DF	%	32.6	38.3	100.0	26.6	36.4	29.0	39.9
		CELLS/L	447.5	390.0	60.0	102.5	215.0	145.0	272.5
DINOPHYSIS NORVEGICA	DF	%		5.4				8.0	
		CELLS/L		55.0				40.0	
DISTEPHANUS SPECULUM	CR	%		8.8					
		CELLS/L		90.0					
PROROCENTRUM MICANS	DF	%				5.2			
		CELLS/L				20.0			
PROTOPERIDINIUM SP. GROUP 1 10-30 MICRONS WIDTH, 10-40 MICRONS LENGTH	DF	%							
		CELLS/L							
SCRIPPSIELLA TROCHOIDEA	DF	%							
		CELLS/L							
THECATE DINOFLAGELLATE SPP.	DF	%				7.8		14.0	
		CELLS/L				30.0		70.0	

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WN01C

			N04	N18
ATHECATE DINOFLAGELLATE	DF	%	13.5	6.1
		CELLS/L	35.0	70.0
CERATIUM FUSUS	DF	%	16.3	21.4
		CELLS/L	42.5	247.5
CERATIUM TRIPOS	DF	%	35.6	32.9
		CELLS/L	92.5	380.0
DICTYOCHA FIBULA	CR	%	10.6	
		CELLS/L	27.5	
PROTOPERIDINIUM BIPES	DF	%	5.8	
		CELLS/L	15.0	
SCRIPPSIELLA TROCHOIDEA	DF	%		25.5
		CELLS/L		295.0
THECATE DINOFLAGELLATE SPP.	DF	%	10.6	
		CELLS/L	27.5	

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample Screened Phytoplankton, Survey WN01D

			N04	N18
CERATIUM FUSUS	DF	%	25.2	20.2
		CELLS/L	340.6	338.2
CERATIUM TRIPOS	DF	%	26.5	30.0
		CELLS/L	357.7	502.9
DICTYOCHA FIBULA	CR	%	23.4	25.5
		CELLS/L	316.1	427.2
PROROCENTRUM MICANS	DF	%	14.3	7.4
		CELLS/L	193.6	124.6

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WF01E

			F01	F02	F06	F13	F22	F23	F24	F25
ATHECATE DINOFLAGELLATE	DF	%		7.7				6.0	6.5	16.8
		CELLS/L		32.5				15.0	20.0	42.5
CERATIUM FUSUS	DF	%		7.1	10.2	10.3		12.0	19.4	13.9
		CELLS/L		30.0	177.5	140.0		30.0	60.0	35.0
CERATIUM LONGIPES	DF	%								
		CELLS/L								
CERATIUM SPP.	DF	%								5.9
		CELLS/L								15.0
CERATIUM TRIPOS	DF	%	12.4	5.3	15.7	17.5	13.8	7.0	16.1	13.9
		CELLS/L	182.5	22.5	272.5	237.5	127.5	17.5	50.0	35.0
DICTYOCHA FIBULA	CR	%	76.2	7.1	62.1	63.7	77.8	7.0	29.0	19.8
		CELLS/L	1120.0	30.0	1080.0	865.0	720.0	17.5	90.0	50.0
GONYAULAX SPP.	DF	%								
		CELLS/L								
GYMNODINIUM SP. GROUP 2 21-40 MICRONS WIDTH, 21-50 MICRONS LENGTH	DF	%								
		CELLS/L								
PROROCENTRUM MICANS	DF	%	7.0	52.1				48.0		13.9
		CELLS/L	102.5	220.0				120.0		35.0
PROTOPERIDINIUM SP. GROUP 2 31-75 MICRONS WIDTH, 41-80 MICRONS LENGTH	DF	%							6.5	
		CELLS/L							20.0	
THECATE DINOFLAGELLATE SPP.	DF	%						9.0	16.1	10.9
		CELLS/L						22.5	50.0	27.5

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WF01E

			F26	F27	F30	F31	N04	N16	N18
ATHECATE DINOFLAGELLATE	DF	%	5.5		7.1	19.0	5.3		
		CELLS/L	7.7		5.0	27.5	37.5		
CERATIUM FUSUS	DF	%	18.2	22.4		6.9	8.5	11.0	22.4
		CELLS/L	25.5	102.5		10.0	60.0	215.0	152.5
CERATIUM LONGIPES	DF	%				12.1			
		CELLS/L				17.5			
CERATIUM SPP.	DF	%			10.7	5.2			
		CELLS/L			7.5	7.5			
CERATIUM TRIPOS	DF	%	20.0	8.7	21.4	22.4	17.4	11.6	
		CELLS/L	28.1	40.0	15.0	32.5	122.5	227.5	
DICTYOCHA FIBULA	CR	%	14.5	40.4	35.7	13.8	14.2	61.6	51.8
		CELLS/L	20.4	185.0	25.0	20.0	100.0	1207.5	352.5
GONYAULAX SPP.	DF	%				8.6			
		CELLS/L				12.5			
GYMNODINIUM SP. GROUP 2 21-40 MICRONS WIDTH, 21-50 MICRONS LENGTH	DF	%					27.0		
		CELLS/L					190.0		
PROROCENTRUM MICANS	DF	%	20.0	16.9			10.6	9.4	14.0
		CELLS/L	28.1	77.5			75.0	185.0	95.0
PROTOPERIDINIUM SP. GROUP 2 31-75 MICRONS WIDTH, 41-80 MICRONS LENGTH	DF	%							
		CELLS/L							
THECATE DINOFLAGELLATE SPP.	DF	%	14.5	8.7	25.0		9.6		
		CELLS/L	20.4	40.0	17.5		67.5		

**Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WN01F**

			N04	N18
CERATIUM FUSUS	DF	%	7.7	15.0
		CELLS/L	60.0	215.0
CERATIUM TRIPOS	DF	%	17.9	23.3
		CELLS/L	140.0	335.0
DICTYOCHA FIBULA	CR	%		55.8
		CELLS/L		802.5
PROROCENTRUM MICANS	DF	%	61.0	
		CELLS/L	477.5	
THECATE DINOFLAGELLATE SPP.	DF	%	6.7	
		CELLS/L	52.5	

**Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WN01G**

			N04	N18
CERATIUM FUSUS	DF	%	44.9	
		CELLS/L	745.0	
CERATIUM LINEATUM	DF	%		5.2
		CELLS/L		177.5
DICTYOCHA FIBULA	CR	%		23.6
		CELLS/L		805.0
PROROCENTRUM MICANS	DF	%	42.4	61.4
		CELLS/L	702.5	2090.0

Abundance of Prevalent Species (>5% Total Count) in Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey WN01H

			N04	N18
CERATIUM FUSUS	DF	%	14.1	6.1
		CELLS/L	260.0	242.5
CERATIUM LINEATUM	DF	%	7.6	12.9
		CELLS/L	140.0	510.0
CERATIUM TRIPOS	DF	%	6.9	5.4
		CELLS/L	127.5	212.5
PROROCENTRUM MICANS	DF	%	64.1	70.3
		CELLS/L	1180.0	2780.0

APPENDIX H

ABUNDANCE OF PREVALENT SPECIES IN ZOOPLANKTON TOW SAMPLES

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WN018

				N04	N18
CENTROPAGES SPP.	C	C	%		9
			ind/m3		1838
COPEPOD SPP.	N	C	%	41	32
			ind/m3	12141	6236
OIKOPLEURA DIOICA	null	OZ	%	5	
			ind/m3	1526	
OITHONA SIMILIS	C	C	%	16	19
			ind/m3	4856	3807
OITHONA SIMILIS	F	C	%	7	
			ind/m3	1943	
PSEUDOCALANUS NEWMANI	C	C	%		8
			ind/m3		1641
TEMORA LONGICORNIS	C	C	%	13	
			ind/m3	3816	

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WN019

				N04	N18
COPEPOD SPP.	N	C	%	35	27
			ind/m3	5305	12197
OITHONA SIMILIS	C	C	%	33	32
			ind/m3	5109	14356
OITHONA SIMILIS	F	C	%		7
			ind/m3		3049
PSEUDOCALANUS NEWMANI	C	C	%	10	7
			ind/m3	1544	3049
TEMORA LONGICORNIS	C	C	%		7
			ind/m3		3049

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WN01A

				N04	N18
COPEPOD SPP.	N	C	%	31	30
			ind/m3	15525	14277
MICROSETELLA NORVEGICA	null	C	%	5	
			ind/m3	2666	
OITHONA SIMILIS	C	C	%	27	35
			ind/m3	13486	16641
OITHONA SIMILIS	F	C	%	8	12
			ind/m3	4234	5673
PSEUDOCALANUS NEWMANI	C	C	%	7	5
			ind/m3	3607	2458
PSEUDOCALANUS NEWMANI	F	C	%	5	
			ind/m3	2666	

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WF01B

				F01	F02	F06	F13	F22	F23	F24	F25
ACARTIA HUDSONICA	M	C	%								
			ind/m3								
ACARTIA SPP.	C	C	%						9		
			ind/m3						4876		
CENTROPAGES HAMATUS	M	C	%						6		
			ind/m3						3080		
CENTROPAGES SPP.	C	C	%						14		
			ind/m3						7443		
COPEPOD SPP.	N	C	%	37	28	33	24	25	16	31	37
			ind/m3	29339	17192	24407	12660	14592	8341	19338	11994
OITHONA SIMILIS	C	C	%	36	35	33	45	46	16	38	45
			ind/m3	28764	21082	24611	24038	27154	8341	23758	14806
OITHONA SIMILIS	F	C	%	7	11	10	10	8		5	5
			ind/m3	5753	6776	7295	5609	4695		3315	1654
PSEUDOCALANUS NEWMANI	C	C	%	7	11	11	6	8		9	
			ind/m3	5609	6525	7977	3045	4441		5525	
TEMORA LONGICORNIS	M	C	%							6	
			ind/m3							3683	

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WF01B

				F26	F27	F30	F31	N04	N16	N18
ACARTIA HUDSONICA	M	C	%			7				
			ind/m3			2170				
ACARTIA SPP.	C	C	%			27				
			ind/m3			9127				
CENTROPAGES HAMATUS	M	C	%							
			ind/m3							
CENTROPAGES SPP.	C	C	%							
			ind/m3							
COPEPOD SPP.	N	C	%	37	29	35	26	20	25	26
			ind/m3	28785	6976	11687	19075	21190	11024	10702
OITHONA SIMILIS	C	C	%	33	52	7	38	44	44	47
			ind/m3	25797	12563	2449	28110	45688	19607	19264
OITHONA SIMILIS	F	C	%	6	7		10	13	10	8
			ind/m3	4404	1625		7404	13474	4513	3254
PSEUDOCALANUS NEWMANI	C	C	%	6				7	8	5
			ind/m3	4247				7472	3625	2055
TEMORA LONGICORNIS	M	C	%							
			ind/m3							

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WN01C

				N04	N18
COPEPOD SPP.	N	C	%	23	27
			ind/m3	8588	8383
OITHONA SIMILIS	C	C	%	40	43
			ind/m3	14865	13560
OITHONA SIMILIS	F	C	%	21	16
			ind/m3	7818	5013

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WN01D

				N04	N18
CENTROPAGES SPP.	C	C	%	6	9
			ind/m3	923	1516
COPEPOD SPP.	N	C	%	17	17
			ind/m3	2575	2947
OITHONA SIMILIS	C	C	%	55	58
			ind/m3	8112	10232
OITHONA SIMILIS	F	C	%	6	6
			ind/m3	923	1011

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WF01E

				F01	F02	F06	F13	F22	F23	F24	F25
ACARTIA SPP.	C	C	%						18		
			ind/m3						1678		
BIVALVIA SPP.	V	OZ	%			25	16			29	25
			ind/m3			11629	5071			14274	4013
CENTROPAGES SPP.	C	C	%	24	19	8	12	29	20	5	13
			ind/m3	7684	14841	3625	4019	9853	1867	2482	2133
COPEPOD SPP.	N	C	%	17	10	18	25	17	25	21	17
			ind/m3	5451	7632	8458	8039	5542	2246	10033	2794
OIKOPLEURA DIOICA	null	OZ	%		11						
			ind/m3		8480						
OITHONA SIMILIS	C	C	%	32	37	27	13	24	7	18	11
			ind/m3	10186	28197	12687	4329	7918	595	8792	1727
OITHONA SIMILIS	F	C	%					6		5	
			ind/m3					1847		2482	
POLYCHAETE SPP.	L	OZ	%						9		
			ind/m3						866		
PSEUDOCALANUS NEWMANI	C	C	%	7	9		14	5		6	
			ind/m3	2323	7208		4452	1759		3103	

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WF01E

				F26	F27	F30	F31	N04	N16	N18
ACARTIA SPP.	C	C	%			19				
			ind/m3			3331				
BIVALVIA SPP.	V	OZ	%				13	8	27	15
			ind/m3				2360	1639	6852	4978
CENTROPAGES SPP.	C	C	%	14			11	21	8	16
			ind/m3	2505			2043	4225	2033	5215
COPEPOD SPP.	N	C	%	26	31	57	21	15	10	26
			ind/m3	4643	8673	10177	3813	2964	2560	8612
OIKOPLEURA DIOICA	null	OZ	%							
			ind/m3							
OITHONA SIMILIS	C	C	%	34	35		12	24	24	18
			ind/m3	6171	9829		2224	4918	6174	5926
OITHONA SIMILIS	F	C	%	7	8		6	8	7	
			ind/m3	1222	2248		1044	1513	1807	
POLYCHAETE SPP.	L	OZ	%			7				
			ind/m3			1259				
PSEUDOCALANUS NEWMANI	C	C	%				11			
			ind/m3				1997			

Abundance of Prevalent Species, (>5% Total Count)
Zooplankton, Survey WN01F

				N04	N18
BIVALVIA SPP.	V	OZ	%	7	9
			ind/m3	1611	3103
CENTROPAGES SPP.	C	C	%	18	28
			ind/m3	4111	9752
COPEPOD SPP.	N	C	%	25	18
			ind/m3	5679	6206
OITHONA SIMILIS	C	C	%	23	20
			ind/m3	5171	7019
OITHONA SIMILIS	F	C	%	9	6
			ind/m3	2077	2216
PSEUDOCALANUS NEWMANI	C	C	%	6	6
			ind/m3	1399	1921

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WN01G

				N04	N18
COPEPOD SPP.	N	C	%	26	15
			ind/m3	6171	6497
OITHONA SIMILIS	C	C	%	42	48
			ind/m3	9965	20655
OITHONA SIMILIS	F	C	%	14	21
			ind/m3	3252	9212
PSEUDOCALANUS NEWMANI	C	C	%	6	7
			ind/m3	1501	3200

Abundance of Prevalent Species (>5% Total Count)
Zooplankton, Survey WN01H

				N04	N18
CENTROPAGES SPP.	C	C	%	6	7
			ind/m3	980	2117
COPEPOD SPP.	N	C	%	26	17
			ind/m3	4124	5140
OITHONA SIMILIS	C	C	%	39	44
			ind/m3	6084	13304
OITHONA SIMILIS	F	C	%	7	9
			ind/m3	1062	2822
PSEUDOCALANUS NEWMANI	C	C	%	13	13
			ind/m3	2001	4031

APPENDIX I

Satellite Images of Chlorophyll a Concentrations and Temperature

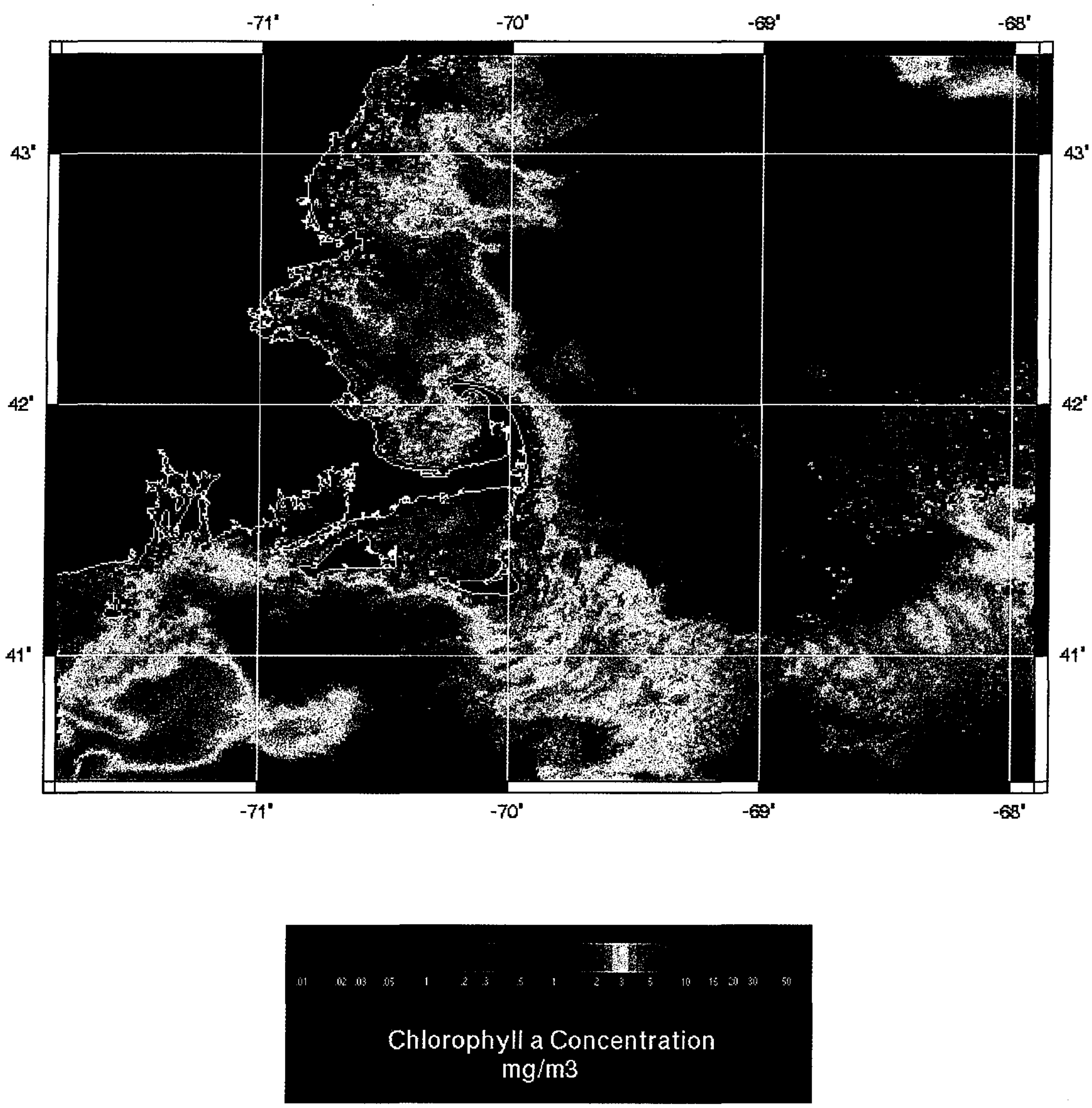


Figure I-1. Chlorophyll a Concentrations from July 2, 2001.

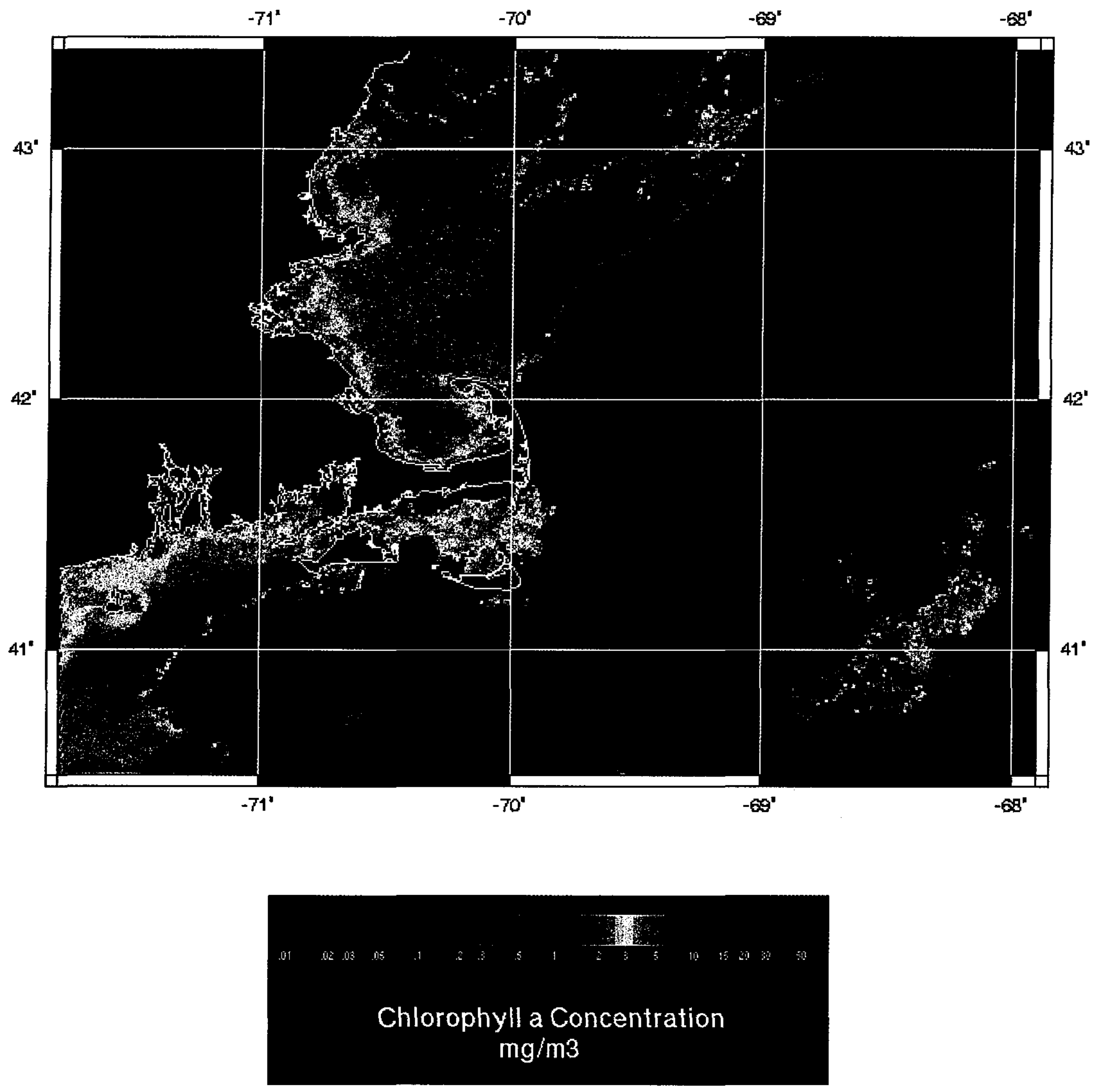


Figure I-2. Chlorophyll a Concentrations from July 9, 2001.

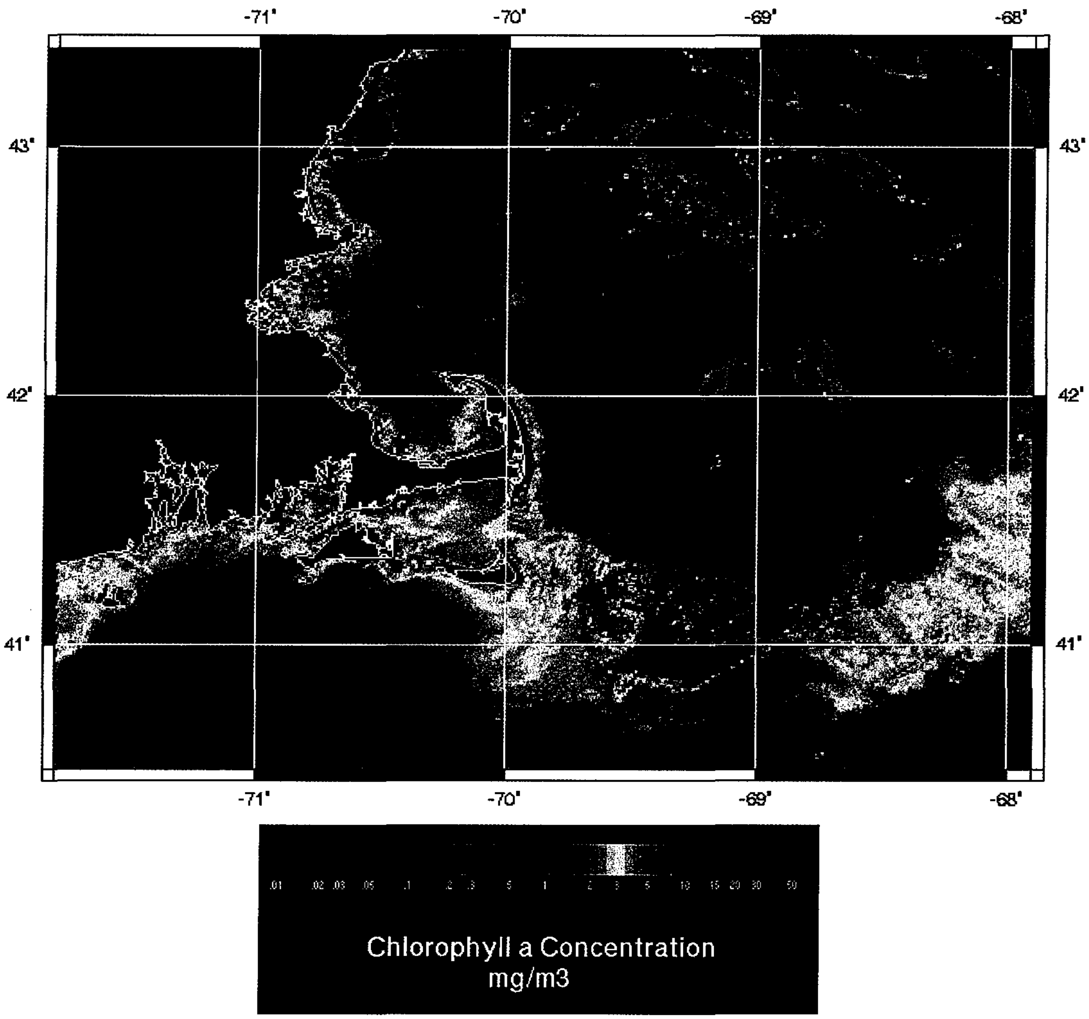


Figure I-3. Chlorophyll a Concentrations from July 16, 2001.

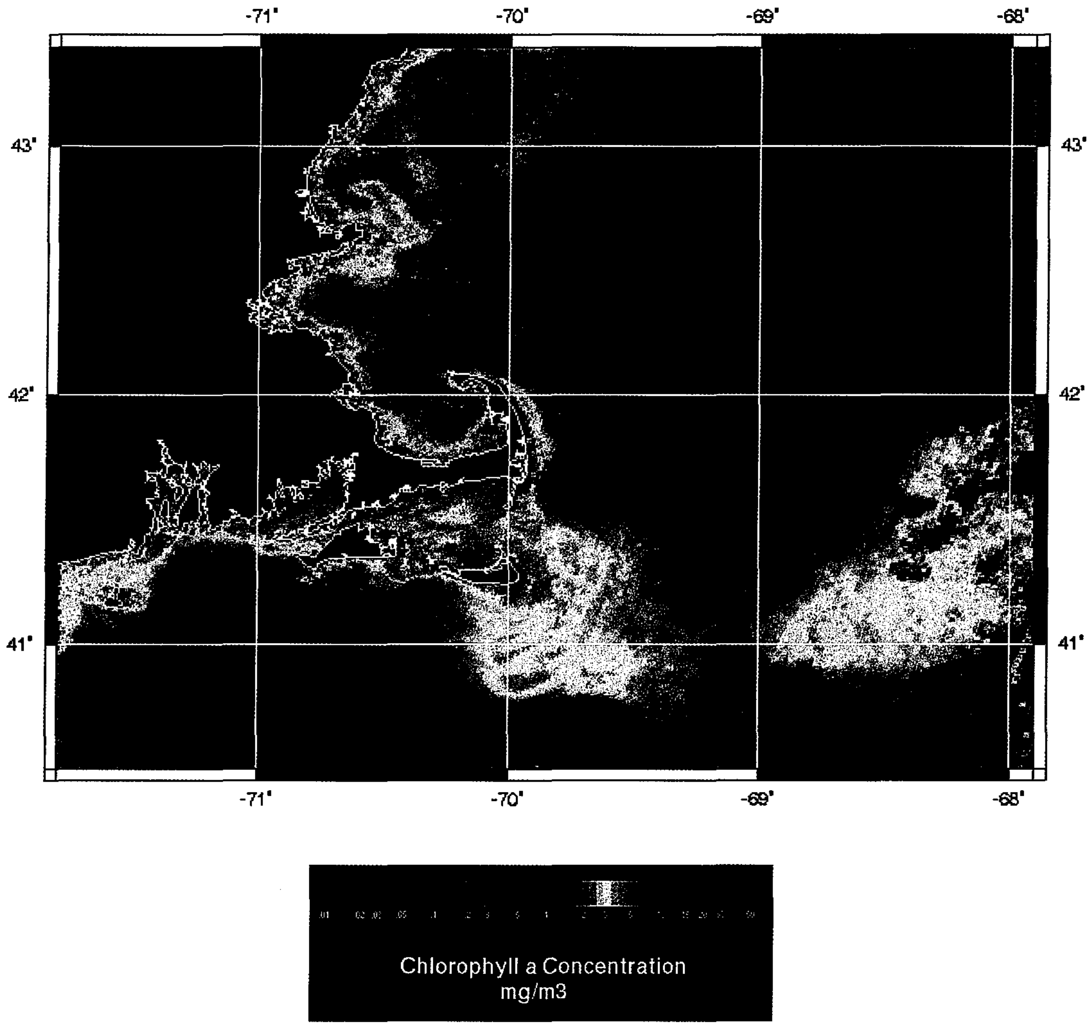


Figure I-4. Chlorophyll a Concentrations from July 21, 2001.

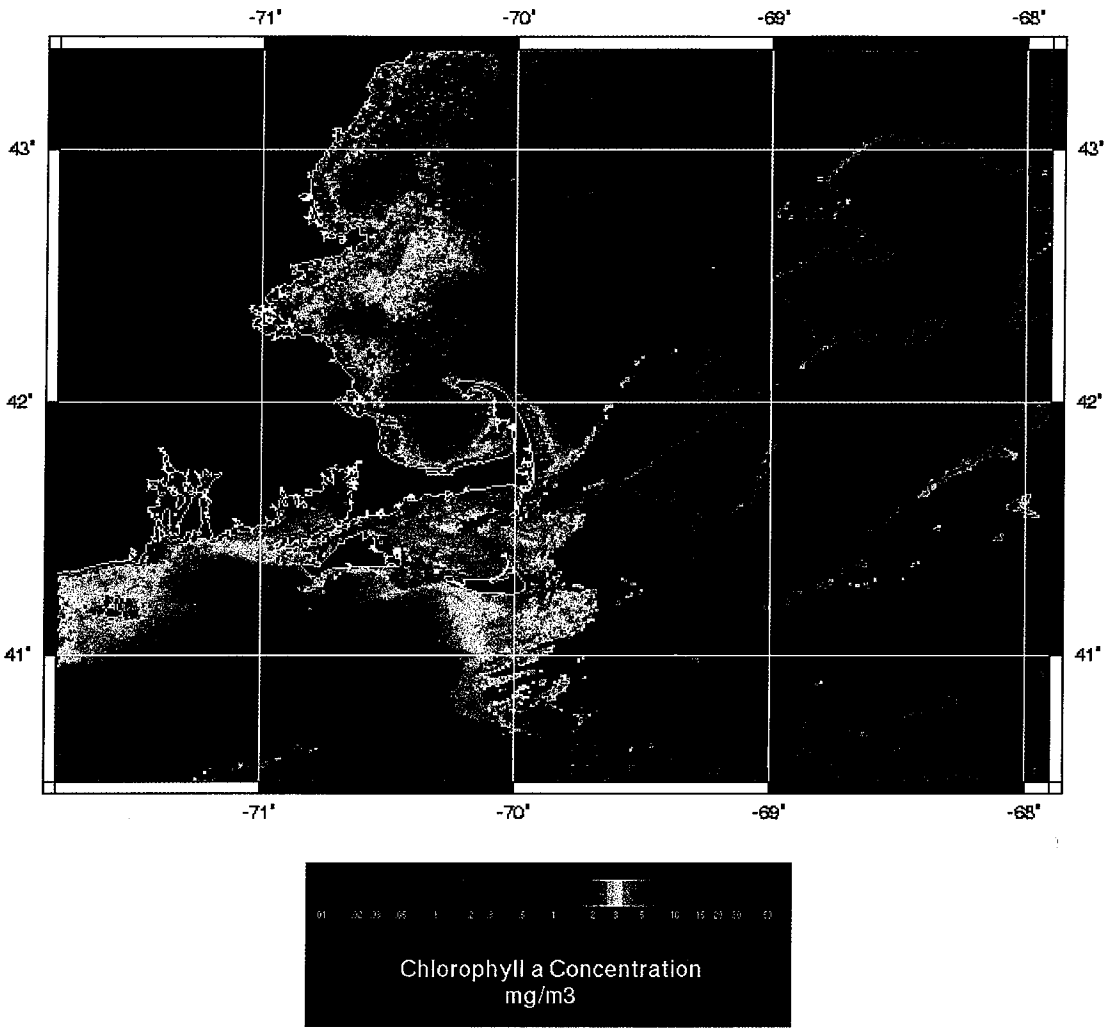


Figure I-5. Chlorophyll a Concentrations from July 23, 2001.

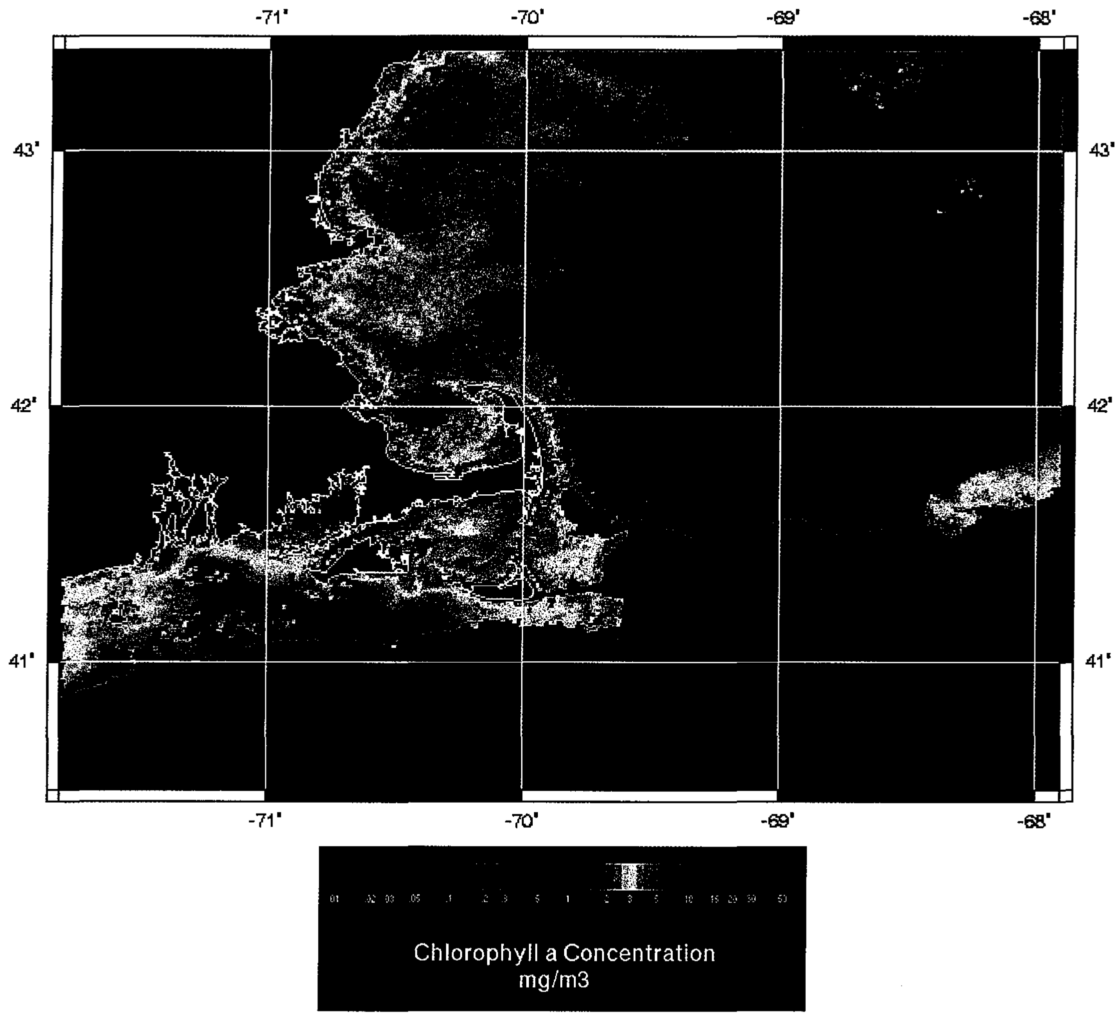


Figure I-6. Chlorophyll a Concentrations from July 25, 2001.

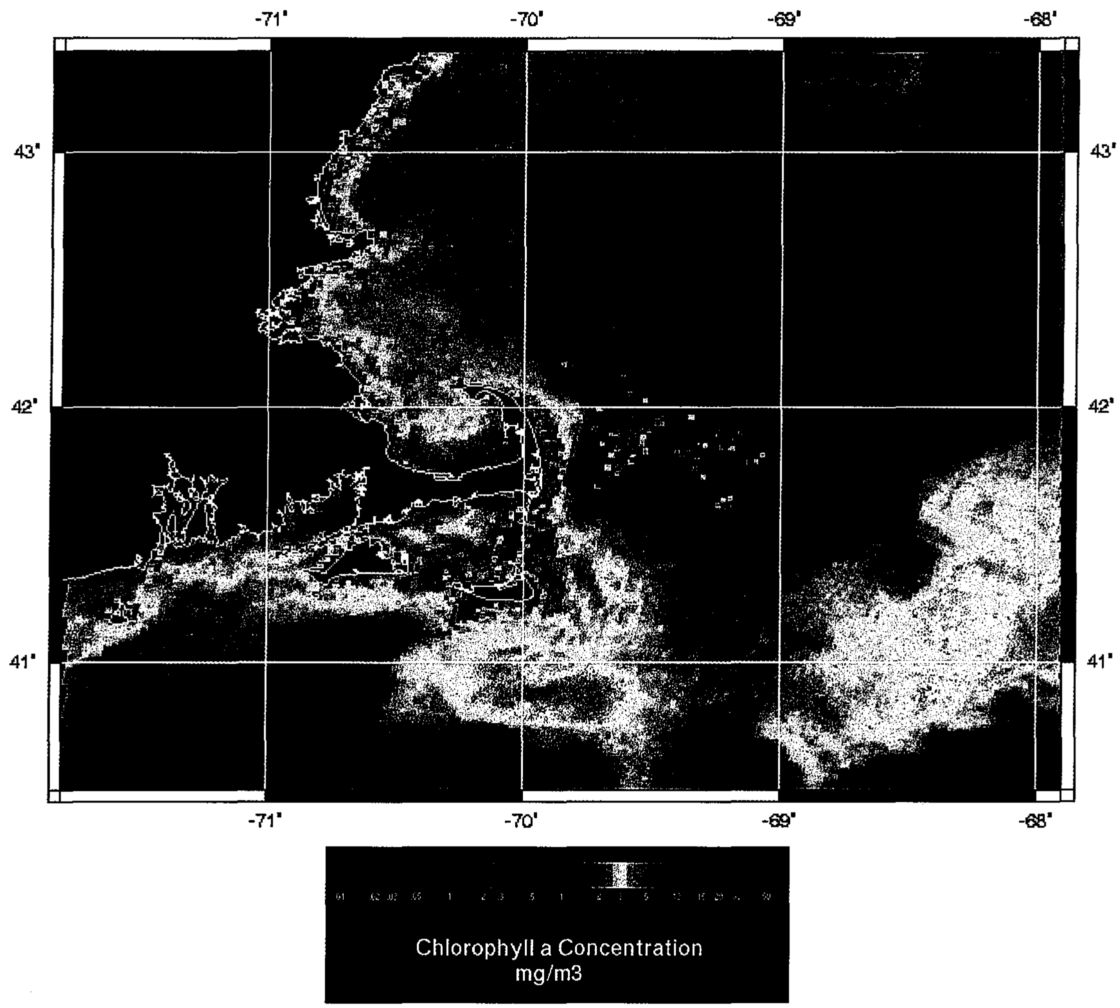


Figure I-7. Chlorophyll a Concentrations from July 27, 2001.

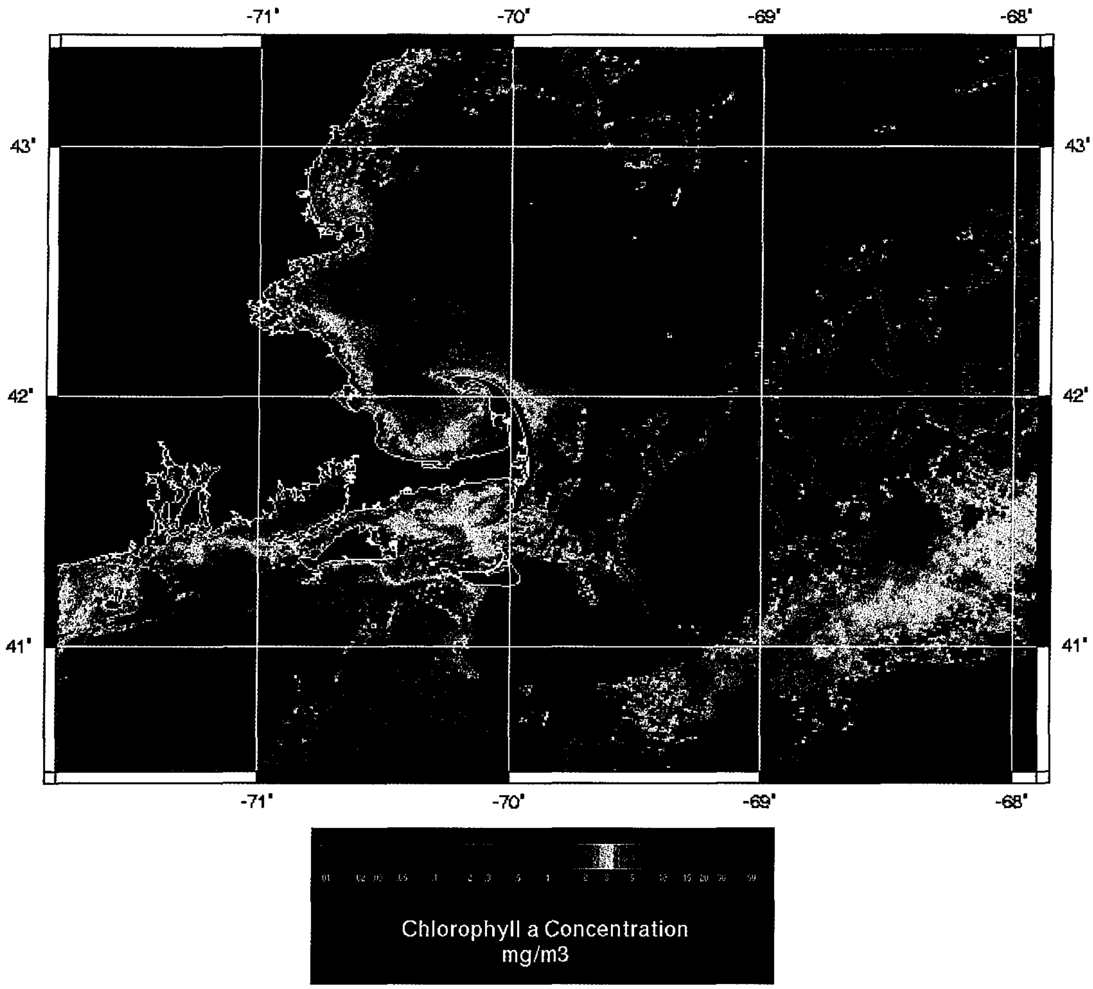


Figure I-8. Chlorophyll a Concentrations from July 30, 2001.

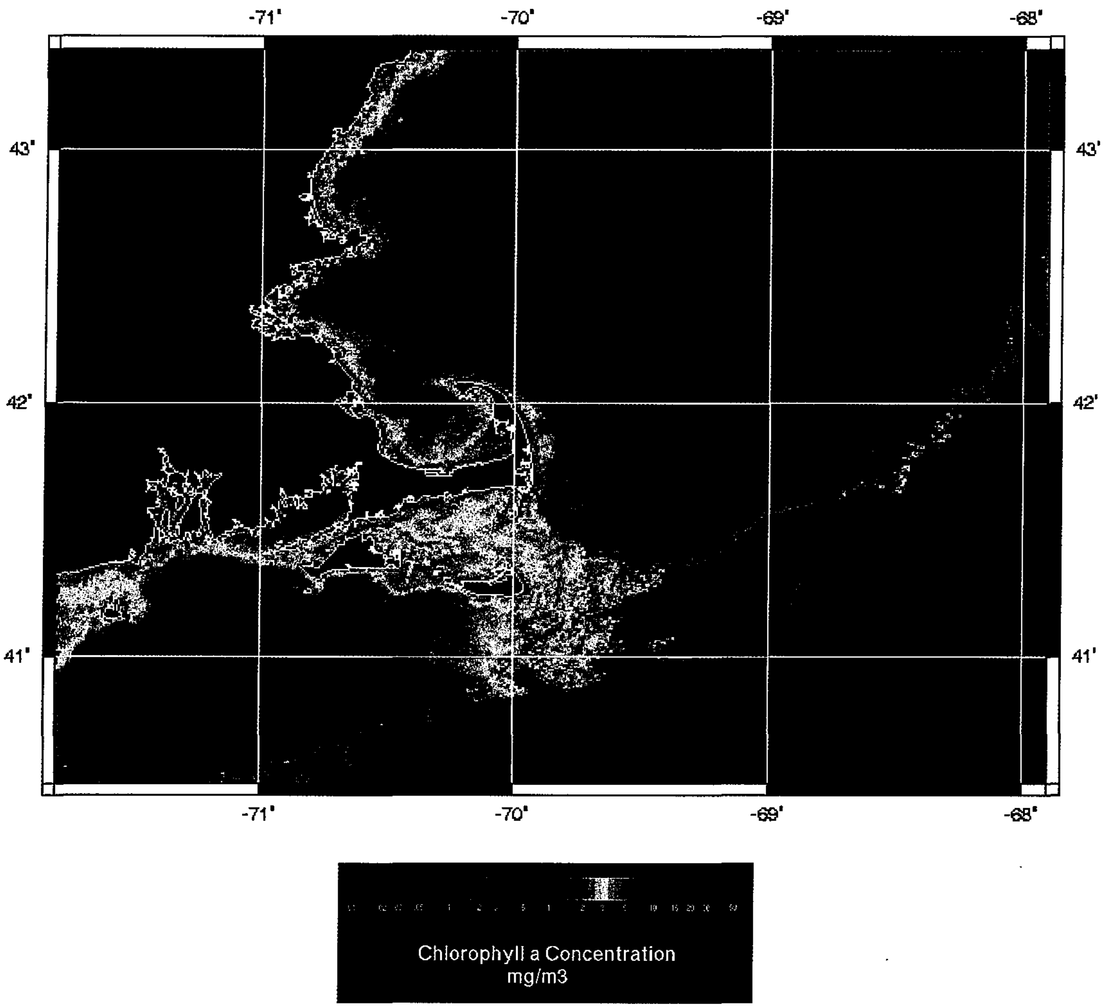


Figure I-9. Chlorophyll a Concentrations from August 1, 2001.

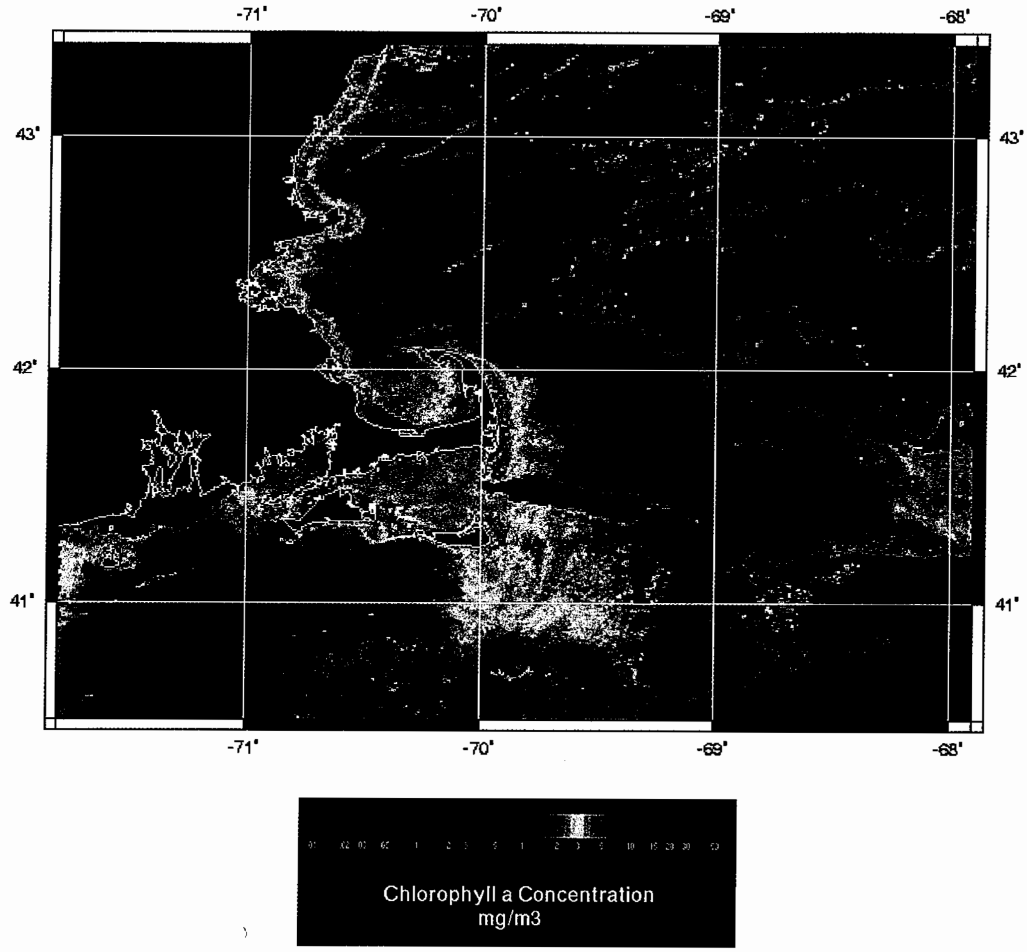


Figure I-10. Chlorophyll a Concentrations from August 8, 2001.

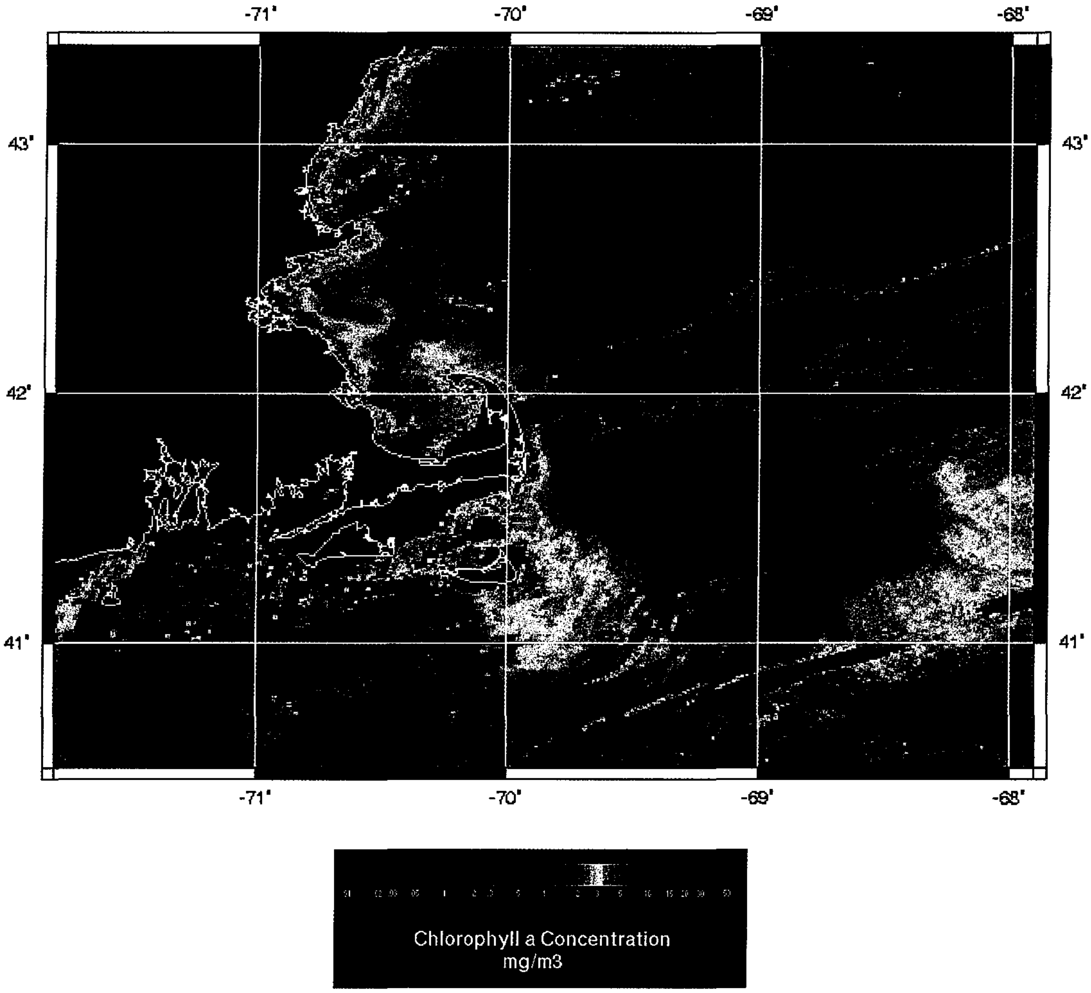


Figure I-11. Chlorophyll a Concentrations from August 24, 2001.

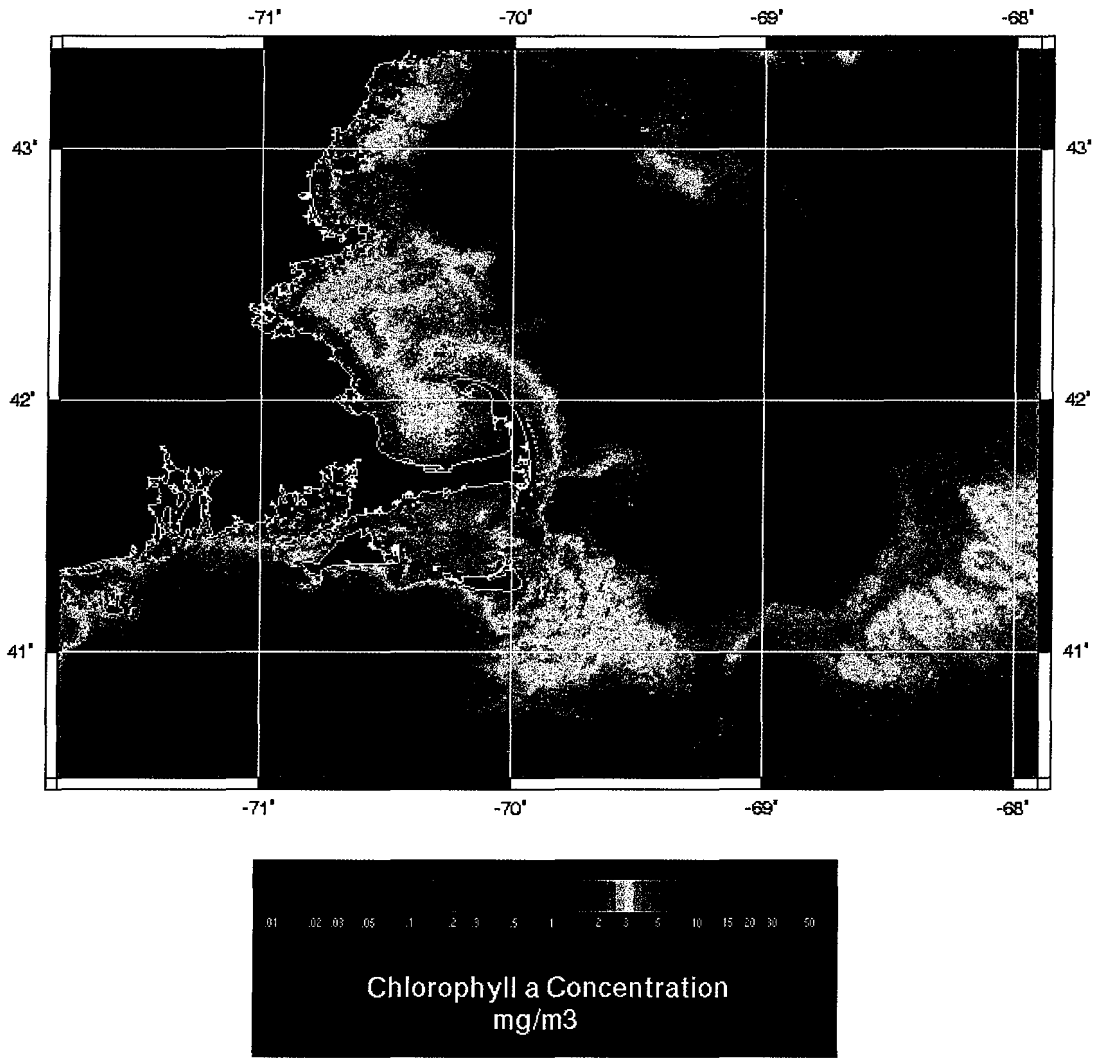


Figure I-12. Chlorophyll a Concentrations from August 29, 2001.

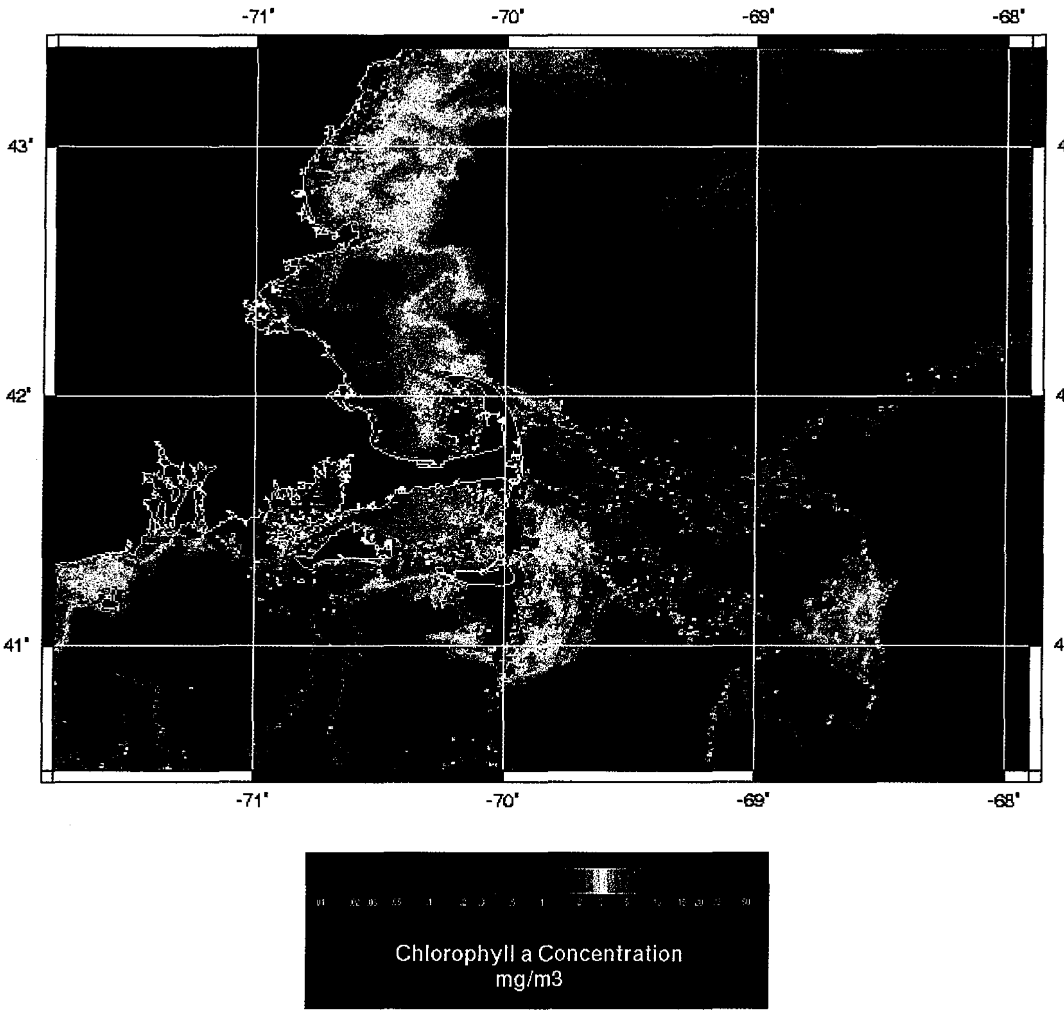


Figure I-13. Chlorophyll a Concentrations from September 5, 2001.

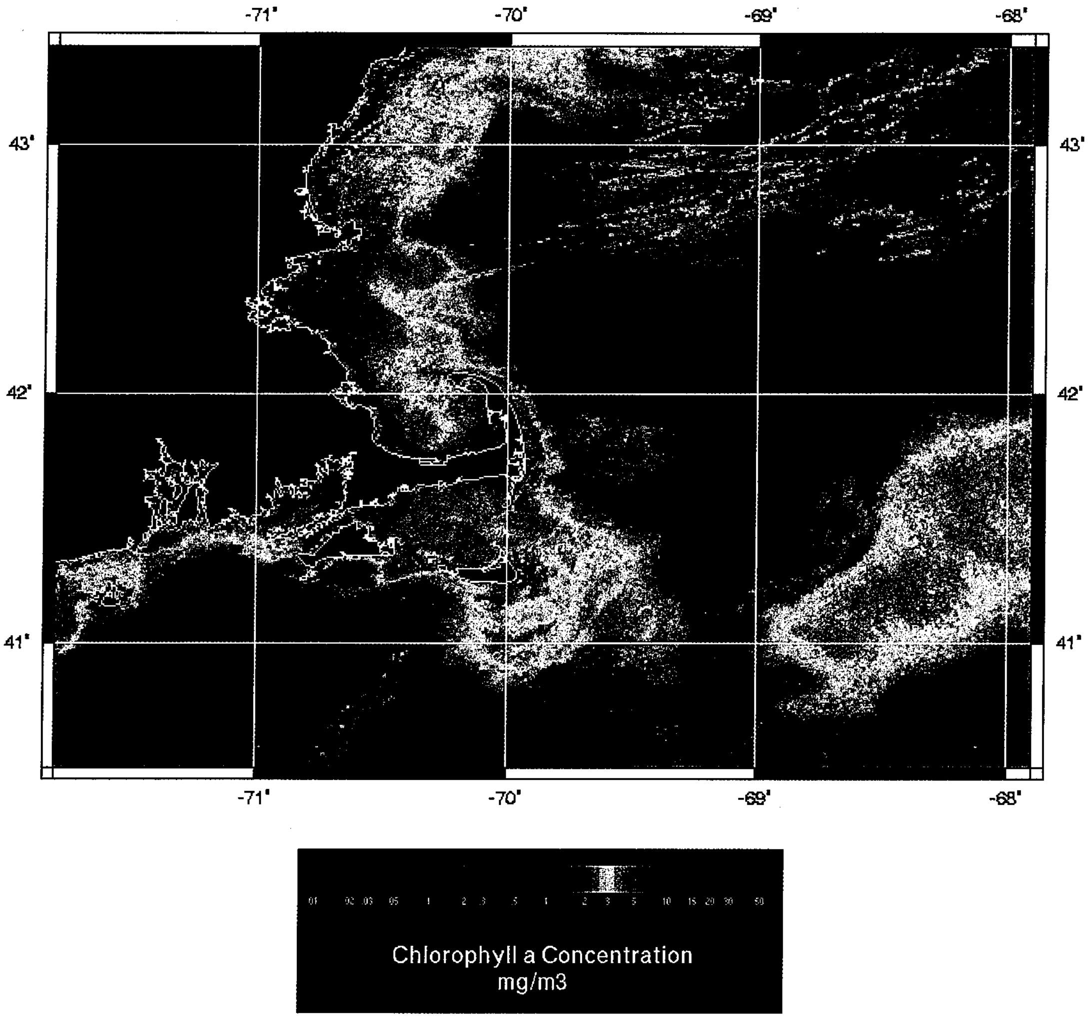


Figure I-14: Chlorophyll a Concentrations from September 7, 2001.

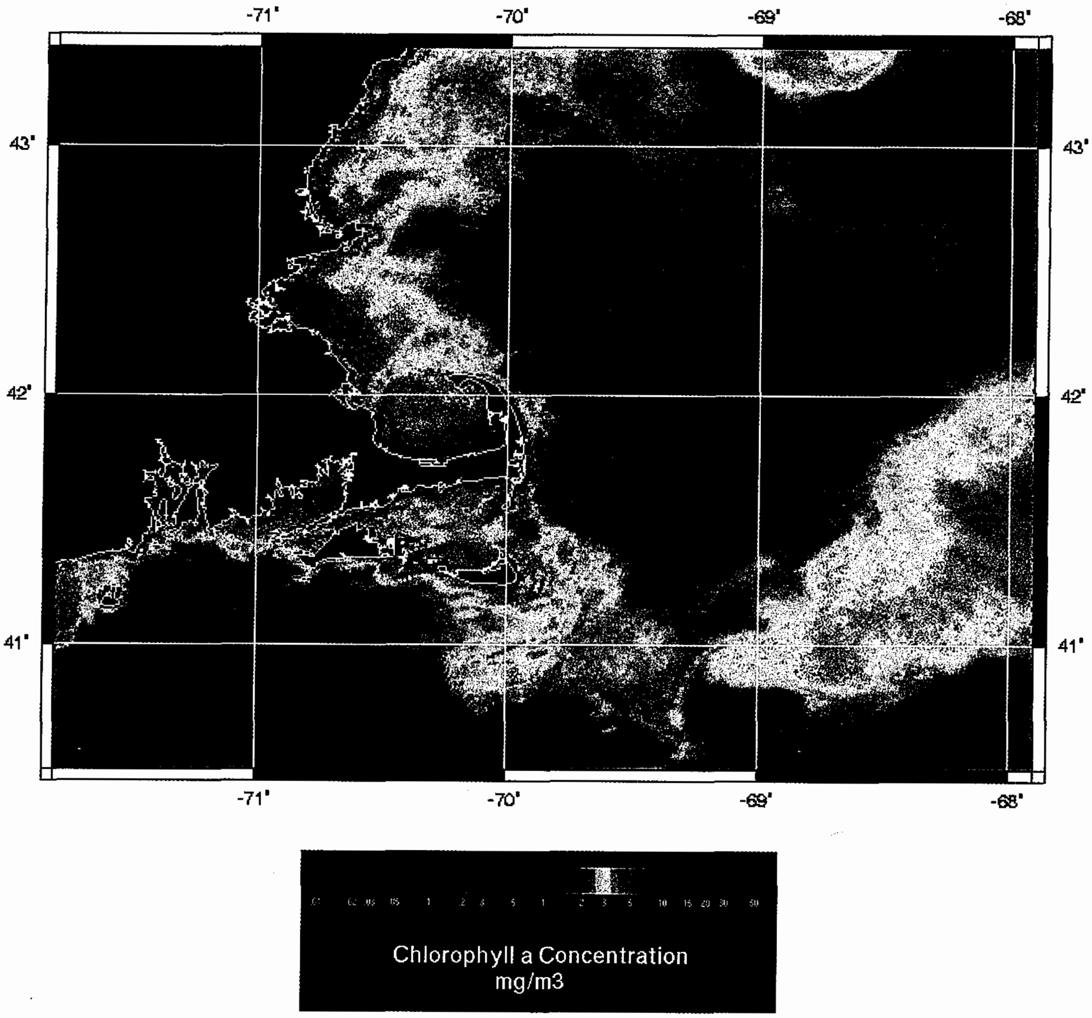


Figure I-15. Chlorophyll a Concentrations from September 12, 2001.

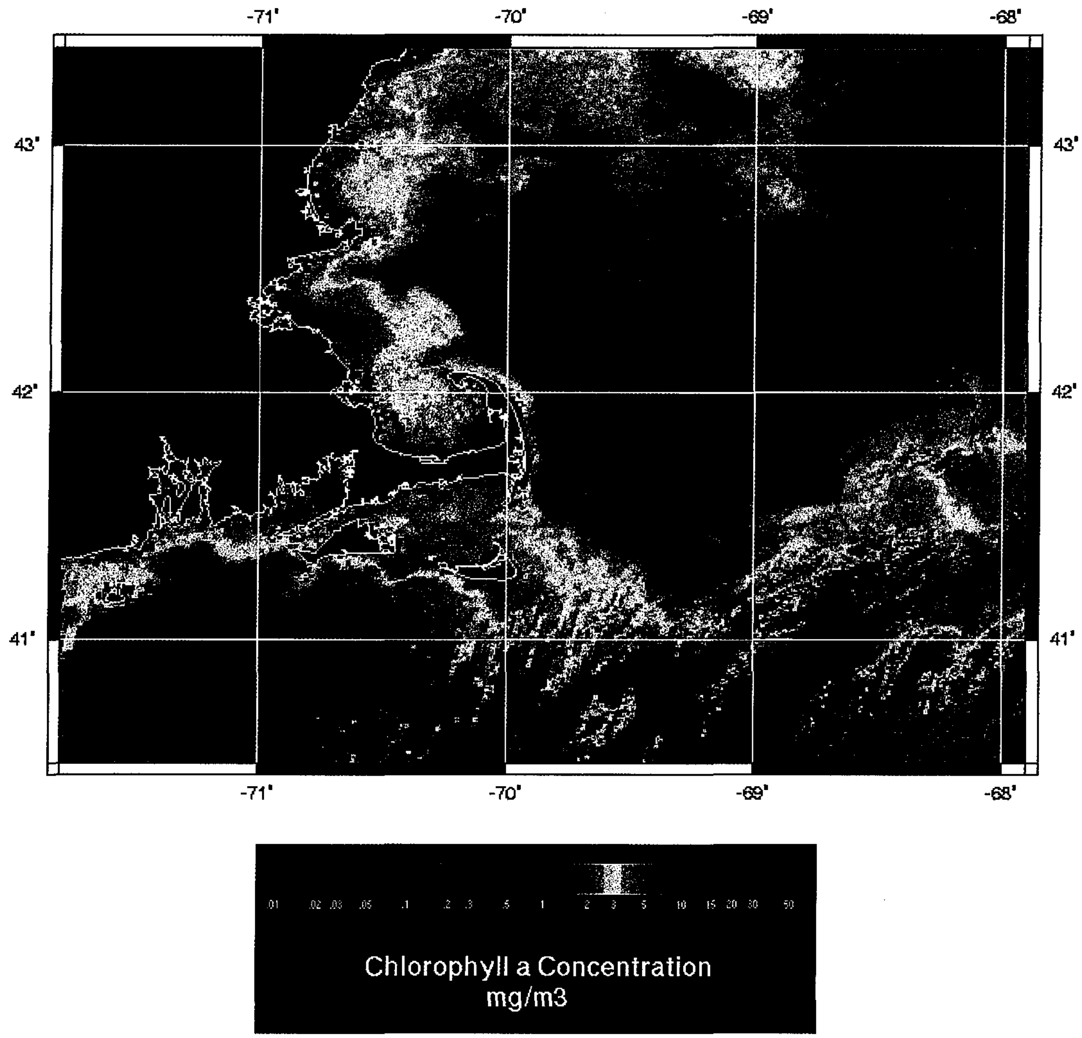


Figure I-16. Chlorophyll a Concentrations from September 16, 2001.

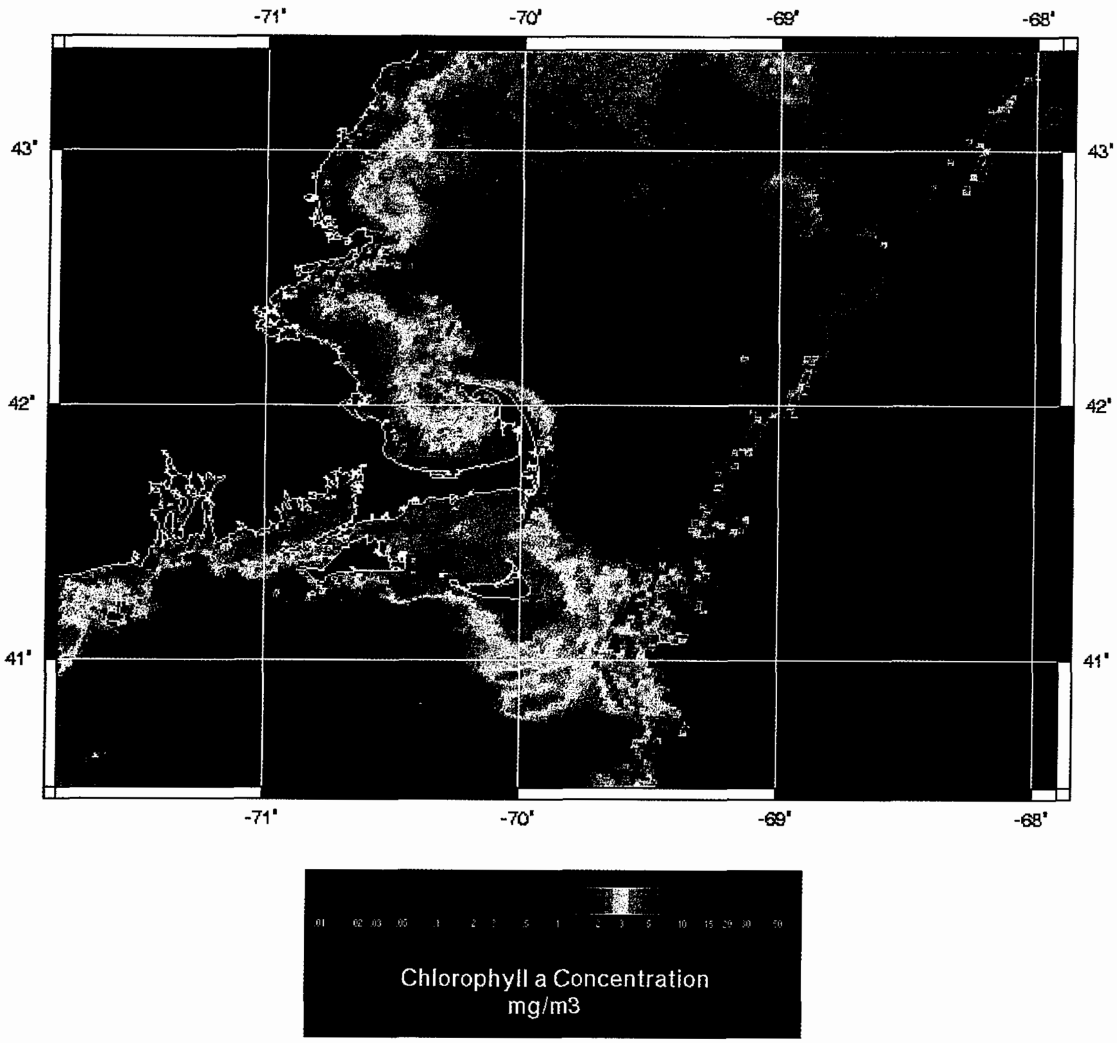


Figure I-17. Chlorophyll a Concentrations from September 17, 2001.

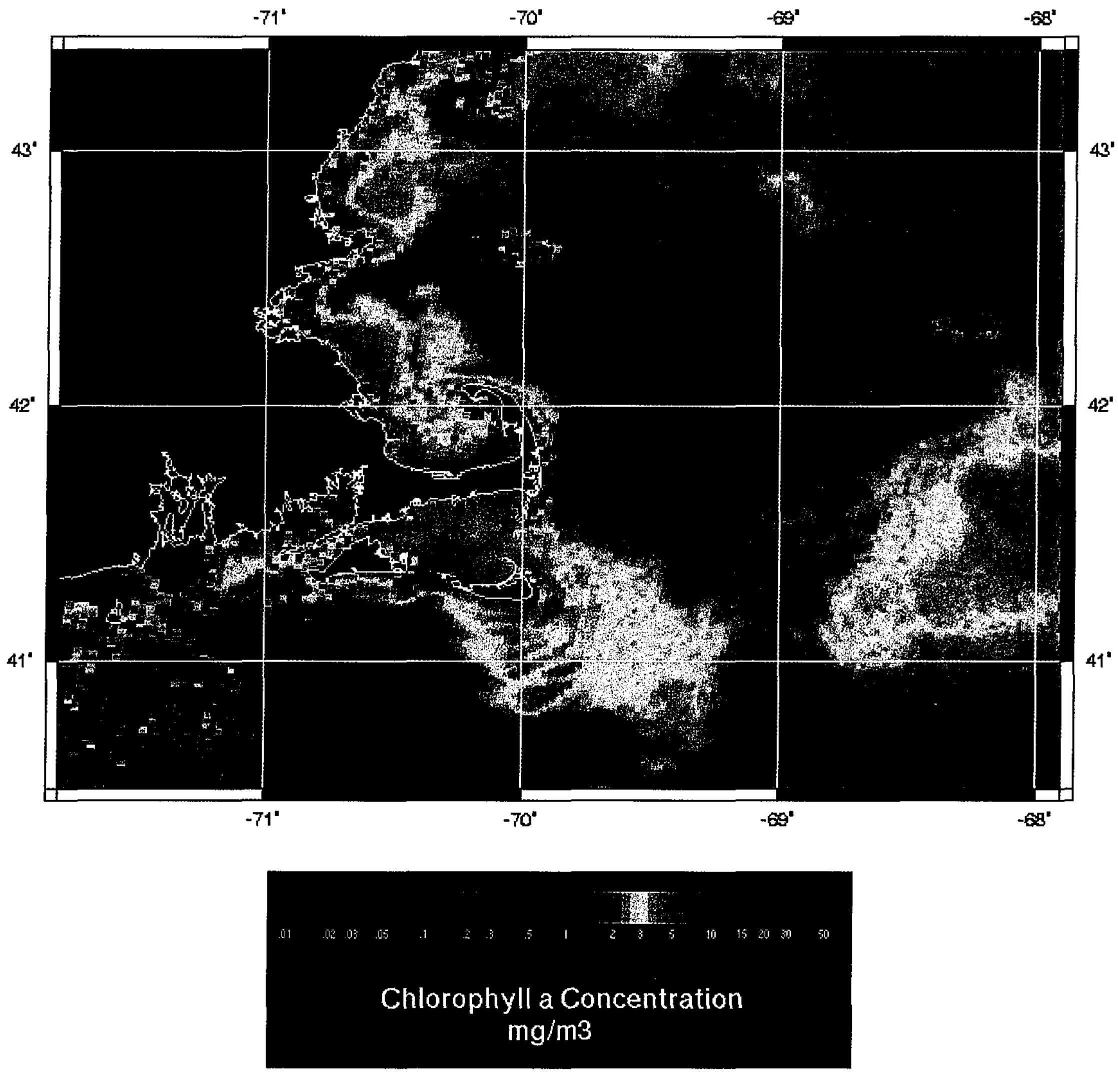


Figure I-18. Chlorophyll a Concentrations from September 18, 2001.

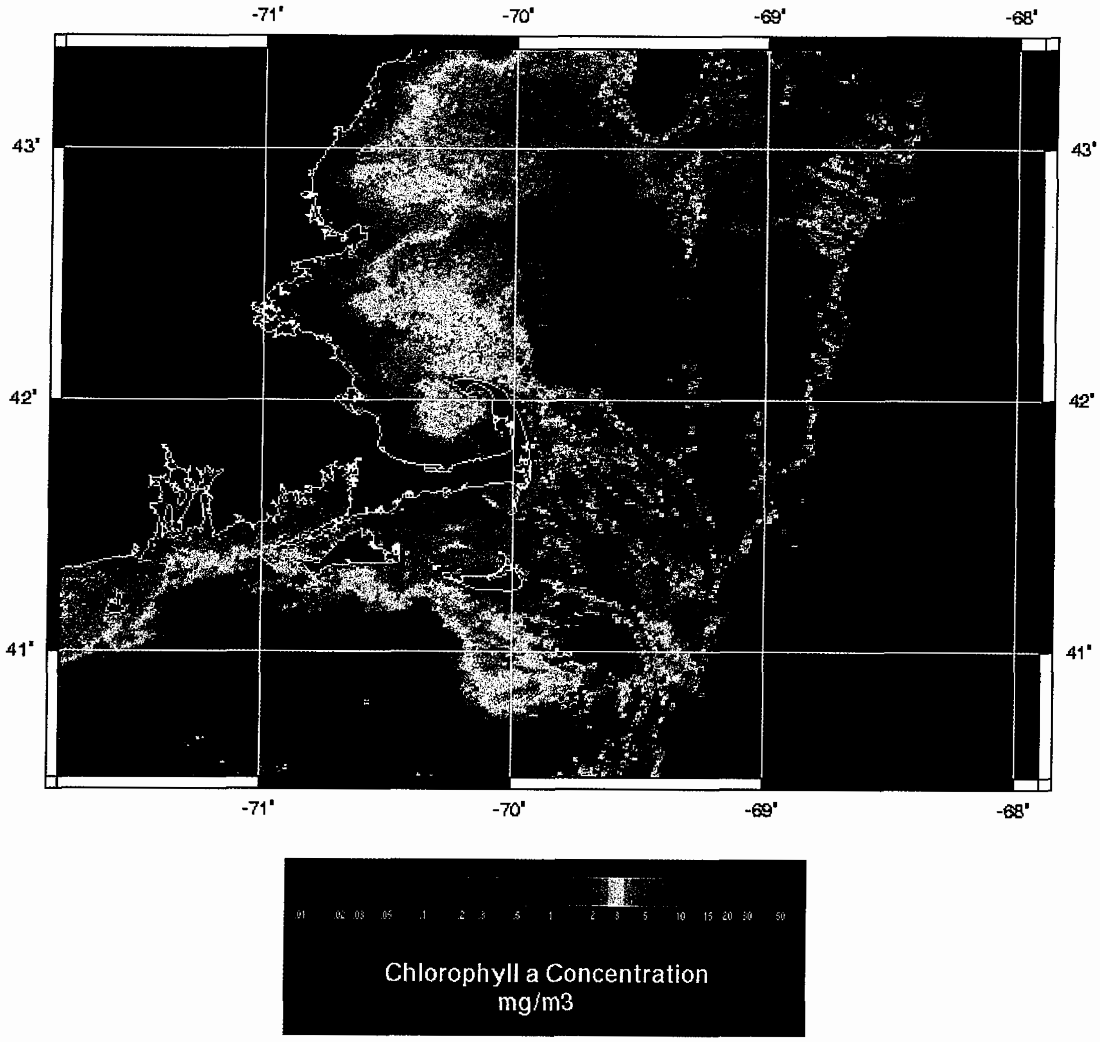


Figure I-19. Chlorophyll a Concentrations from September 26, 2001.

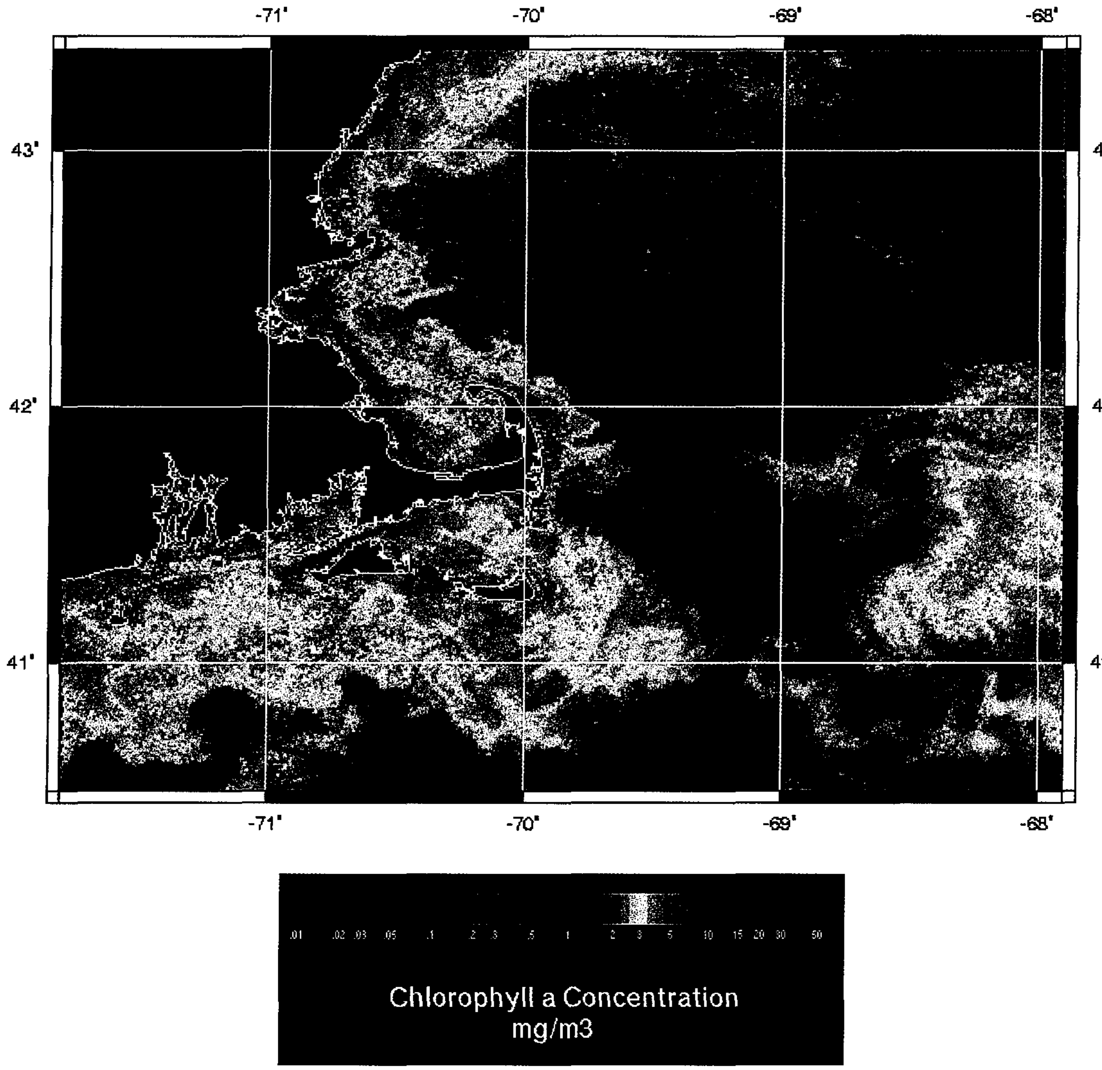


Figure I-20. Chlorophyll a Concentrations from October 5, 2001.

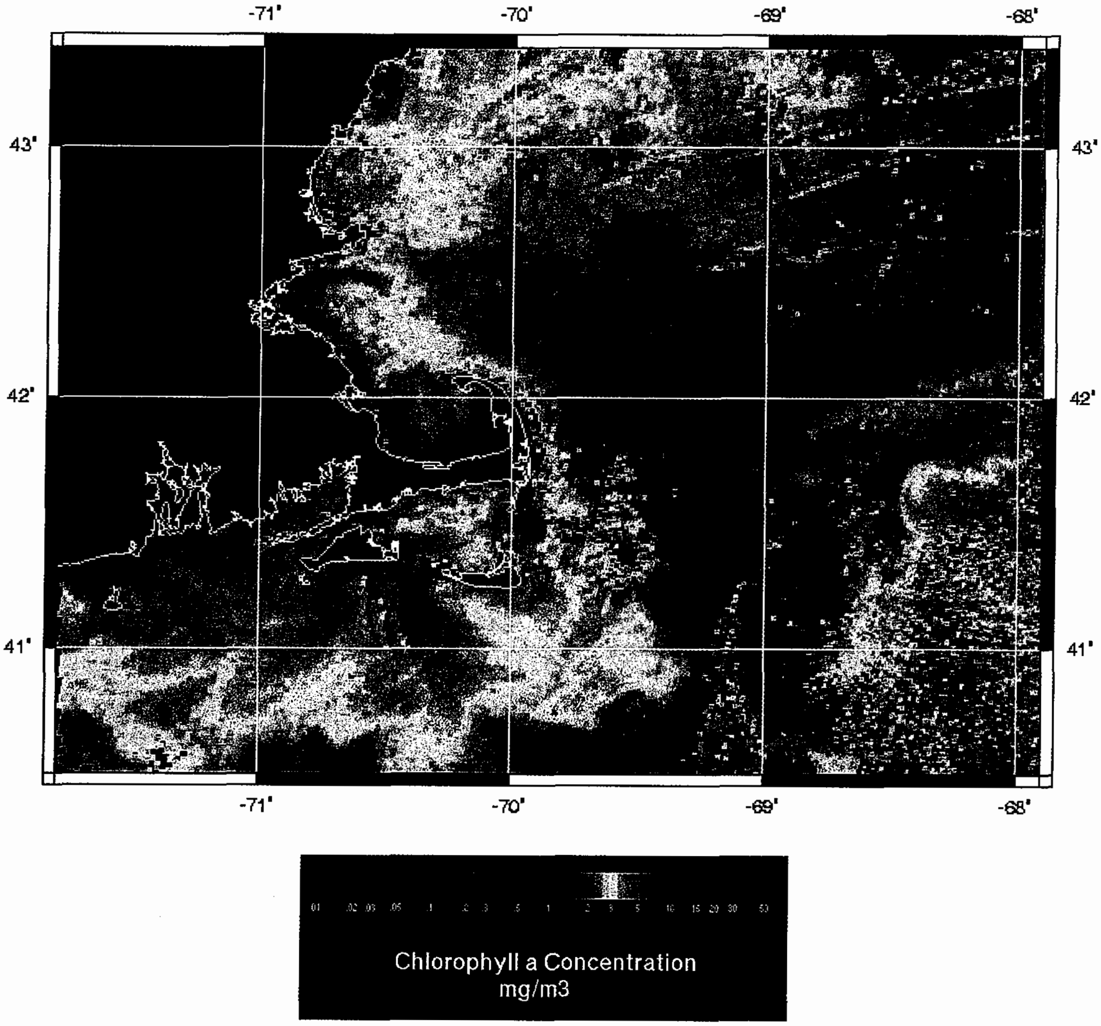


Figure I-21. Chlorophyll a Concentrations from October 9, 2001.

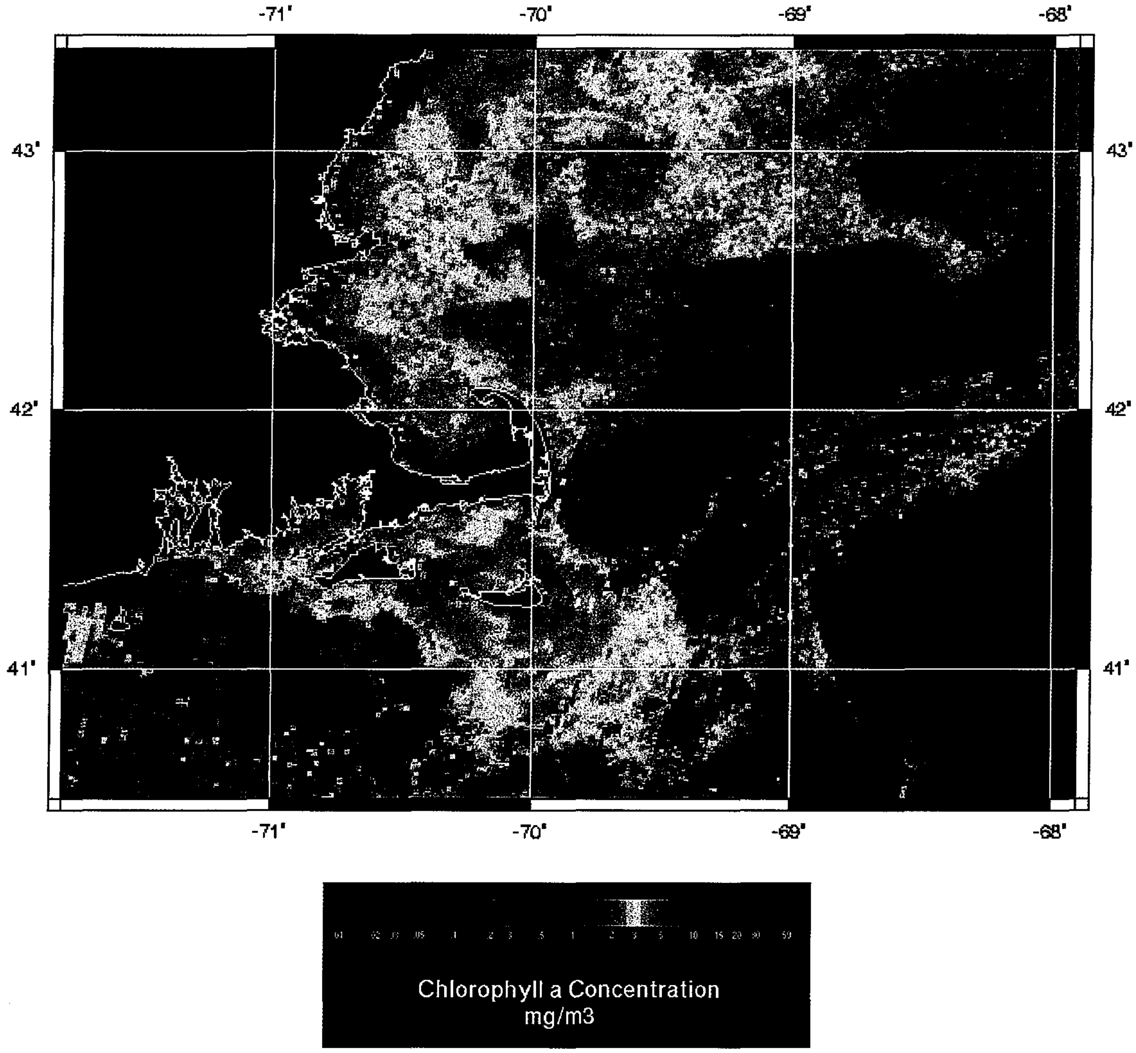


Figure I-22. Chlorophyll a Concentrations from October 16, 2001.

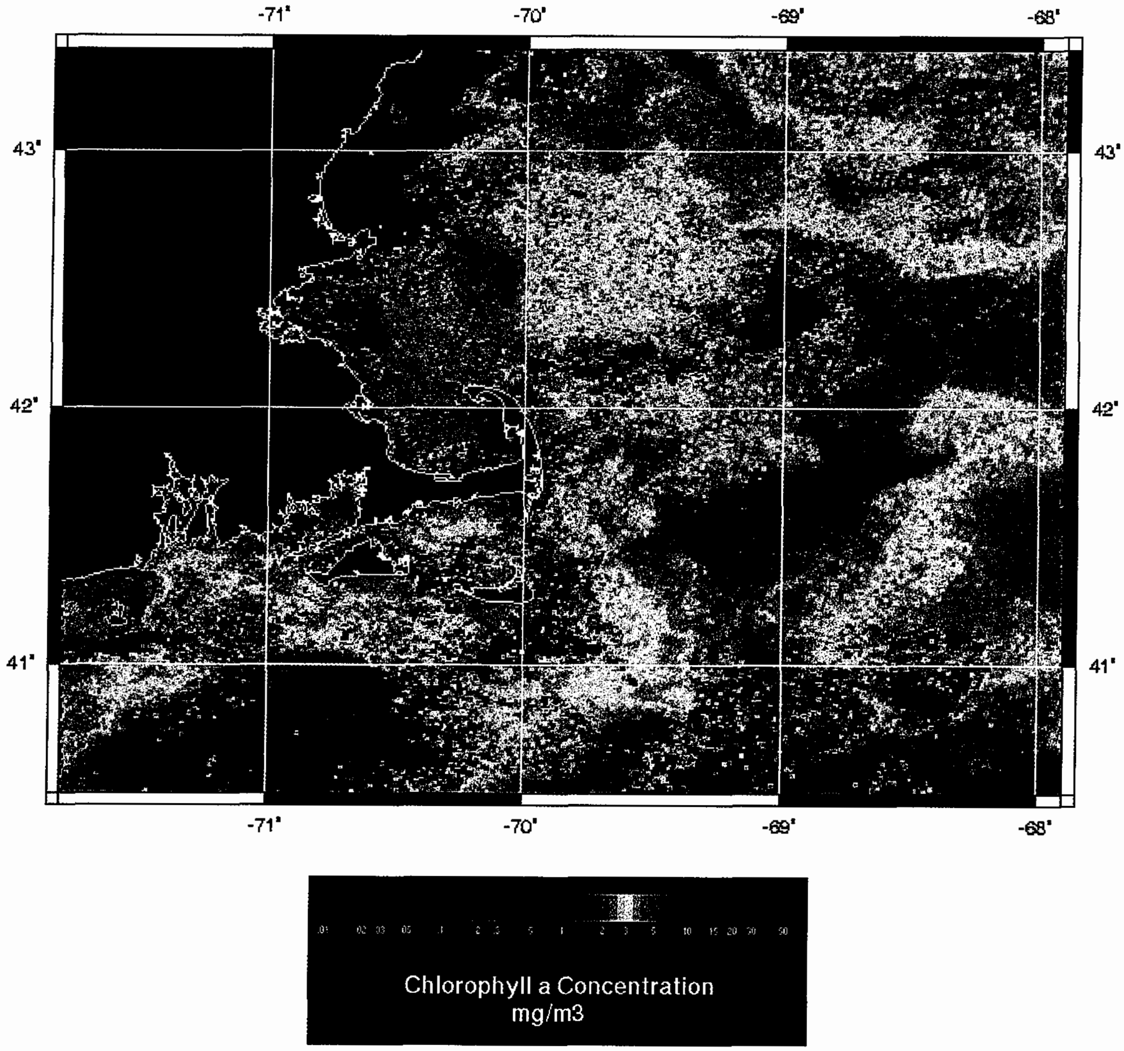


Figure I-23. Chlorophyll a Concentrations from October 26, 2001.

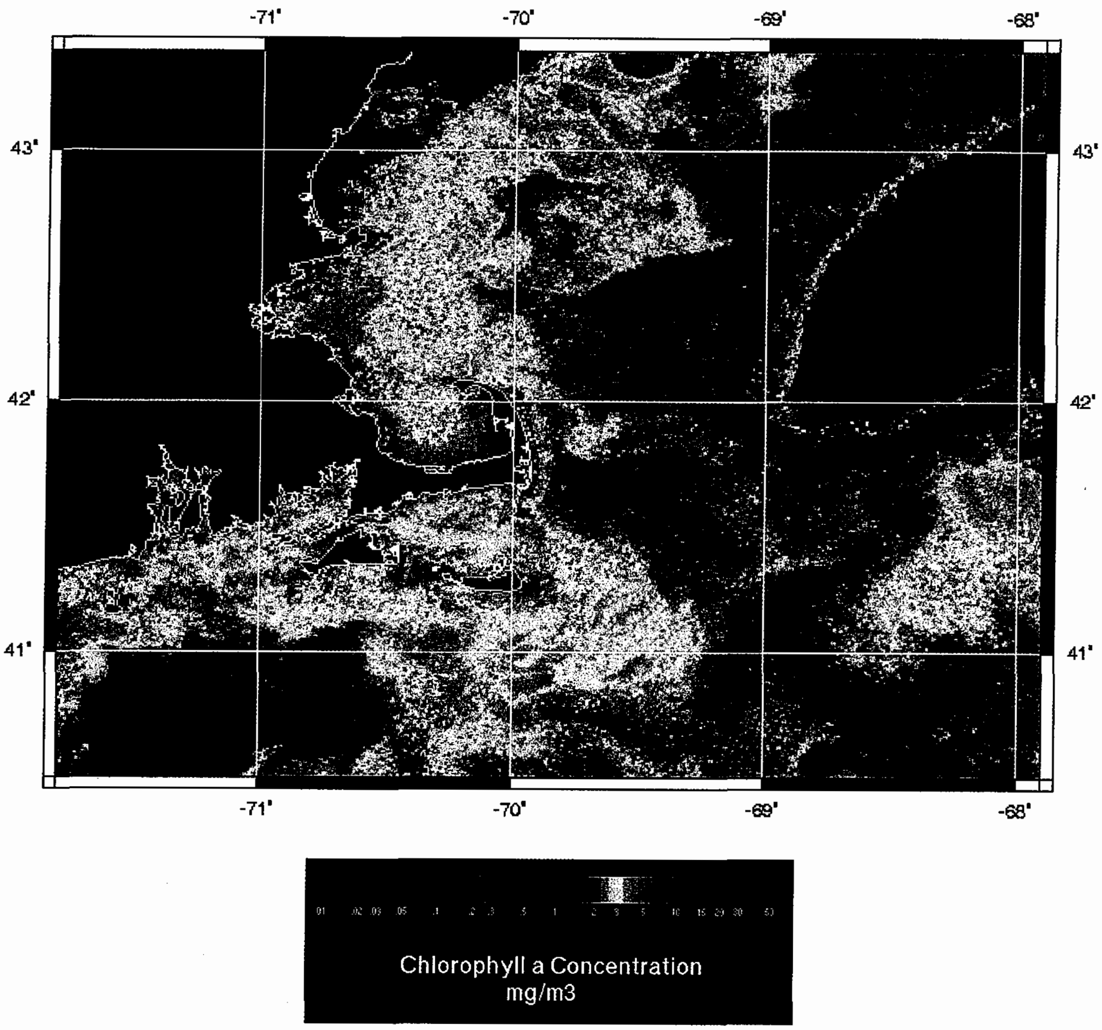


Figure I-24. Chlorophyll a Concentrations from November 4, 2001.

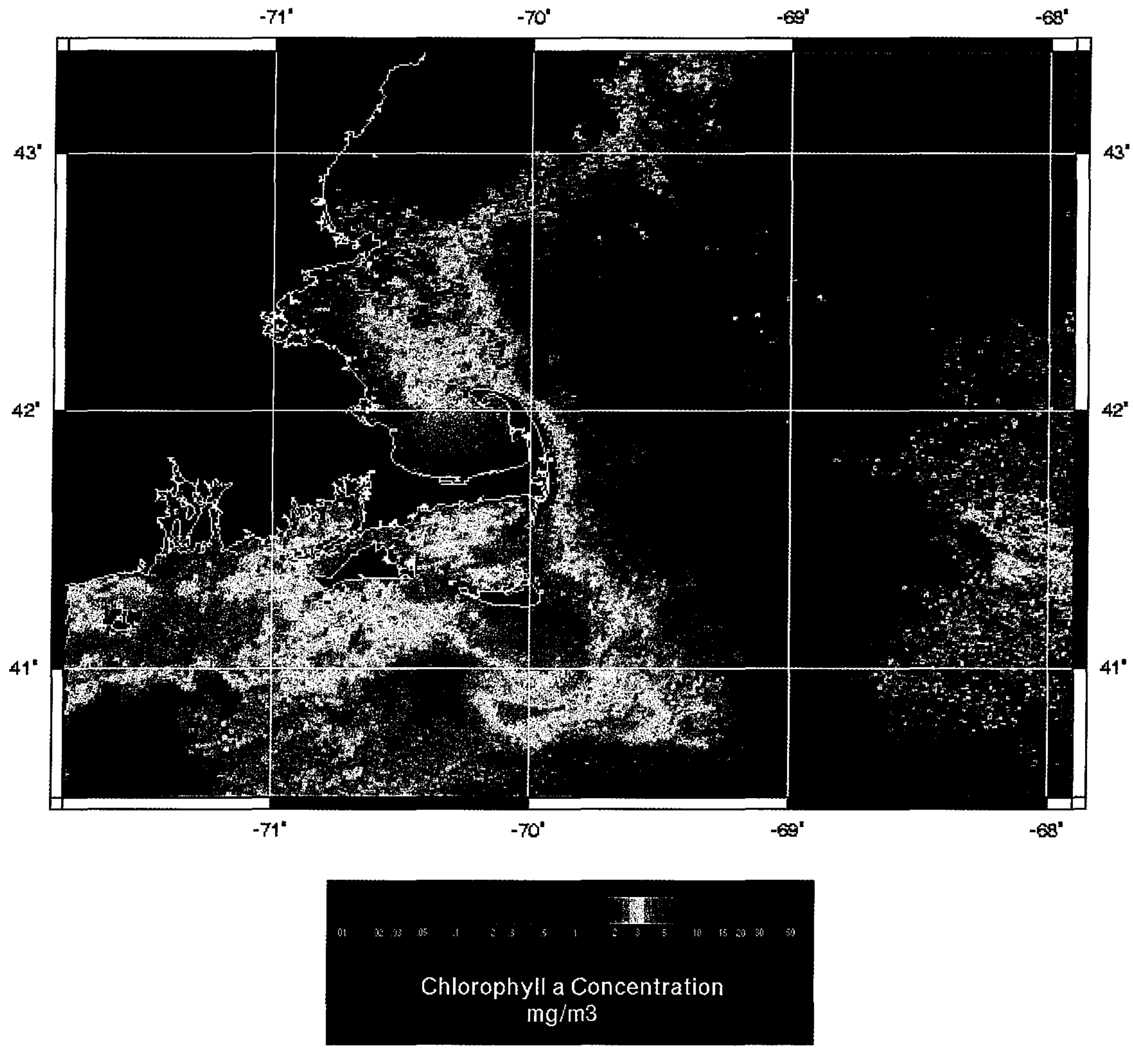


Figure I-25. Chlorophyll a Concentrations from November 13, 2001.

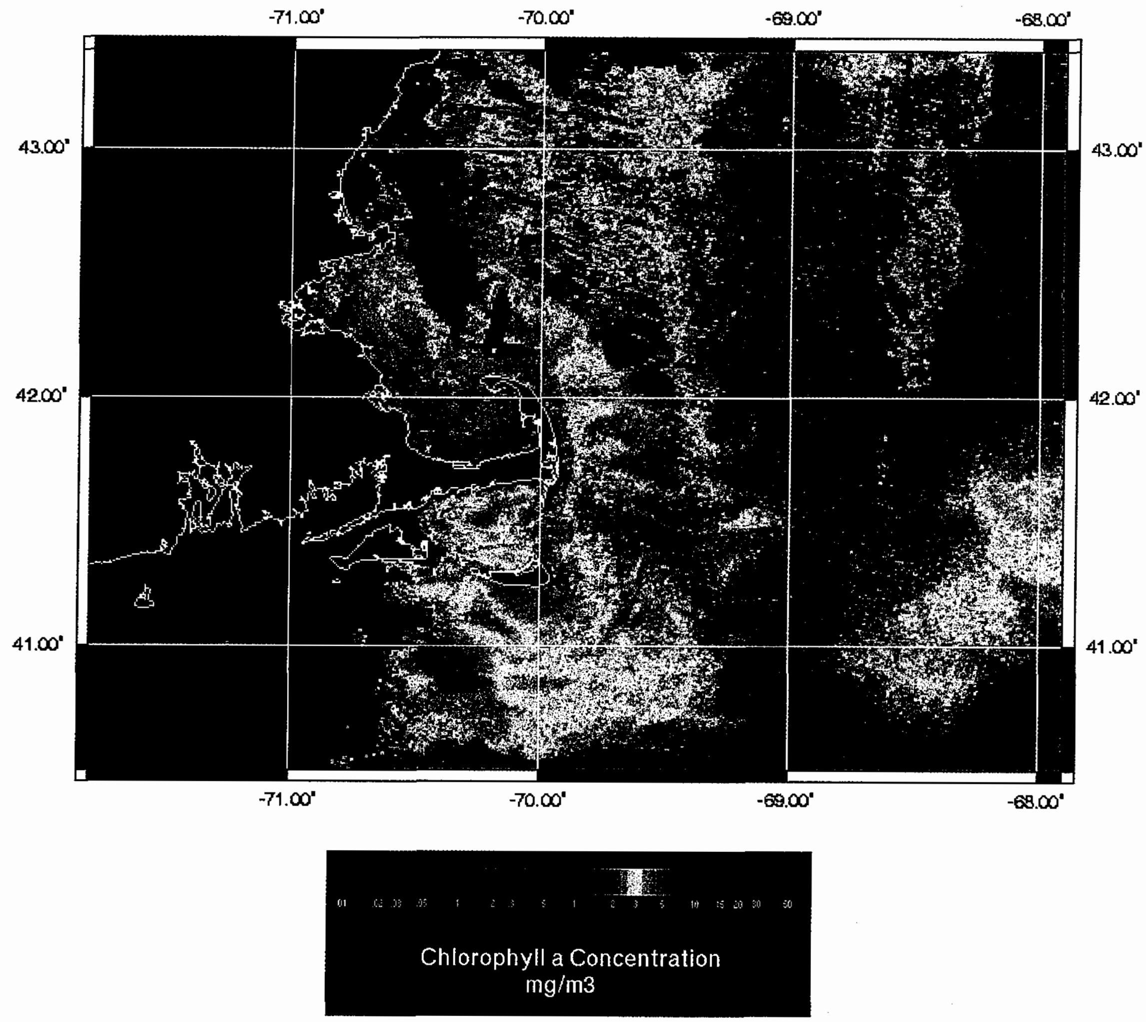


Figure I-26. Chlorophyll a Concentrations from November 25, 2001.

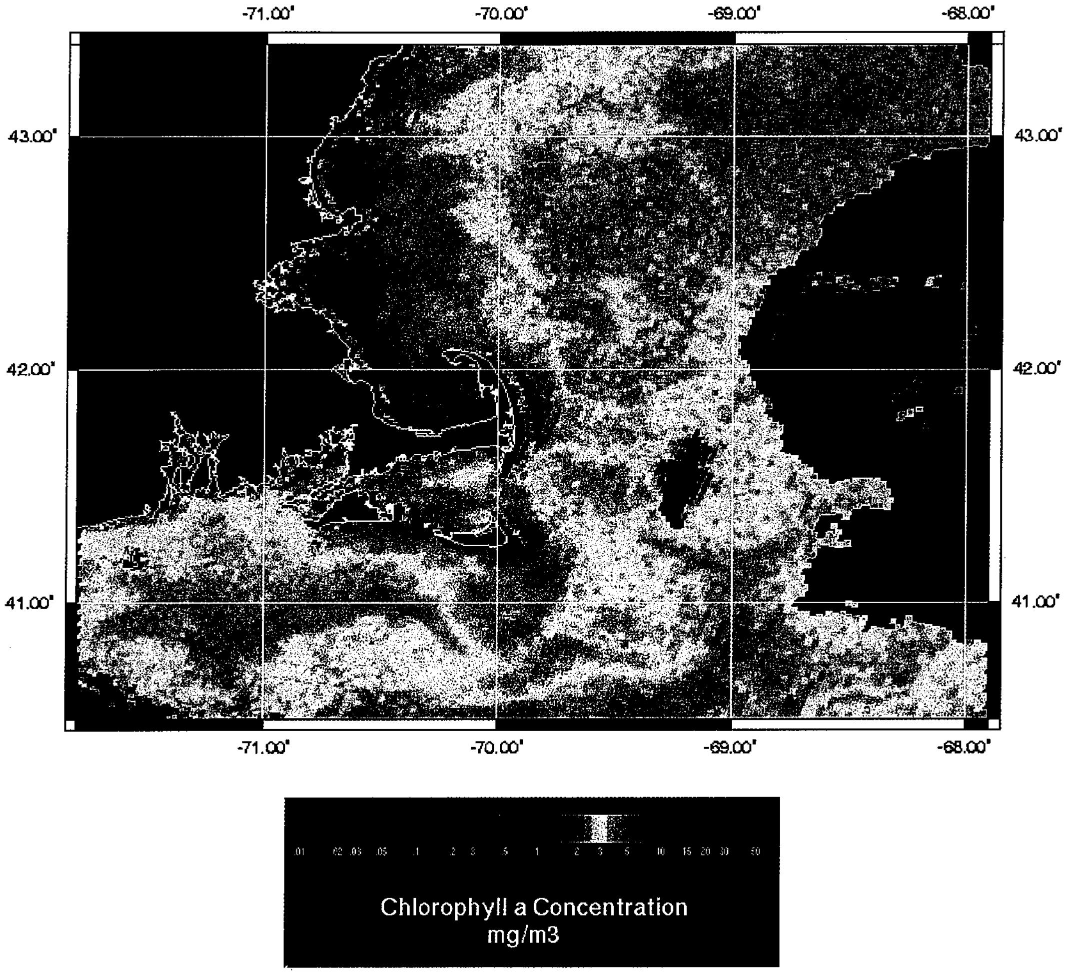


Figure I-27. Chlorophyll a Concentrations from December 5, 2001.

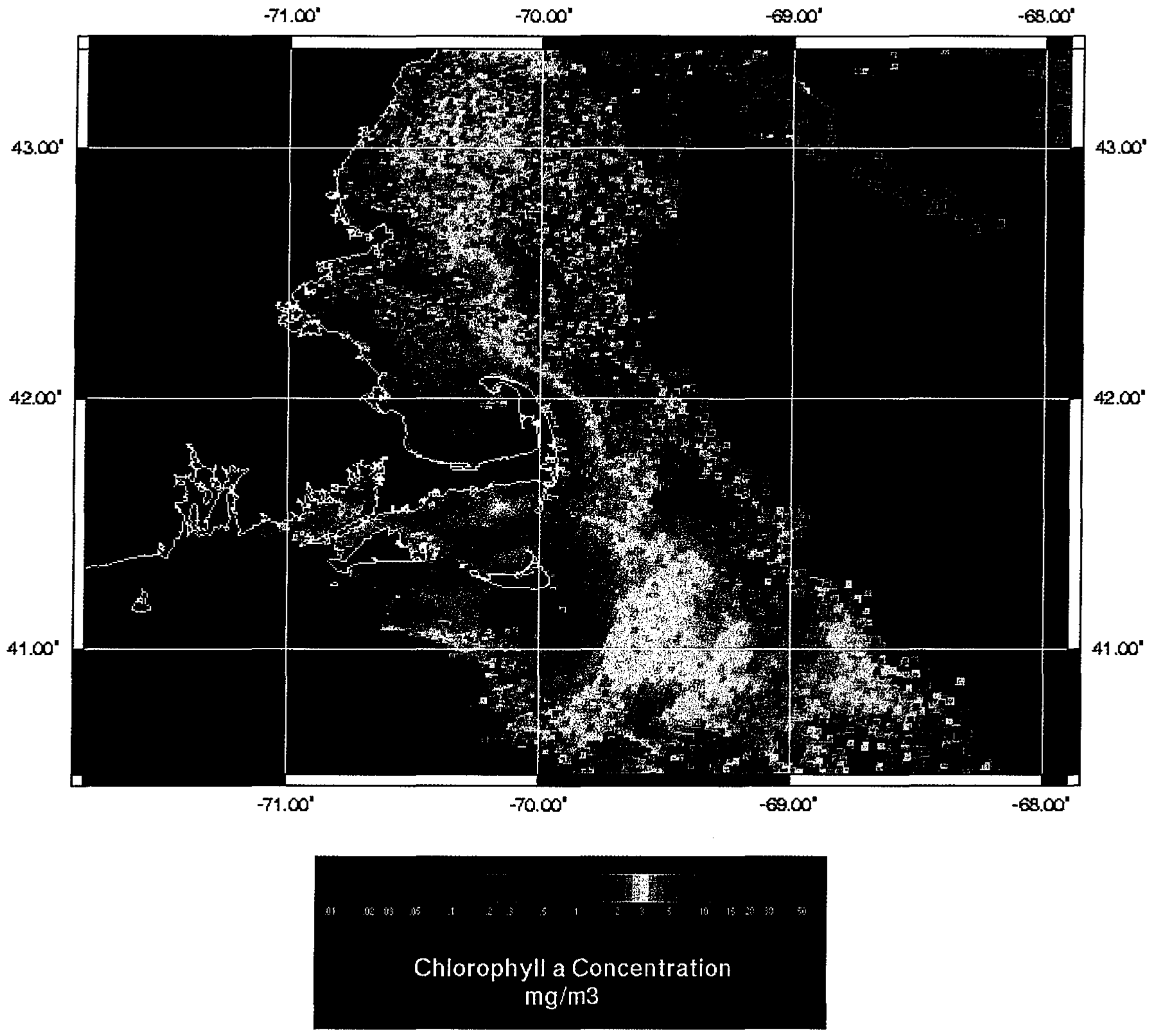


Figure I-28. Chlorophyll a Concentrations from December 19, 2001.

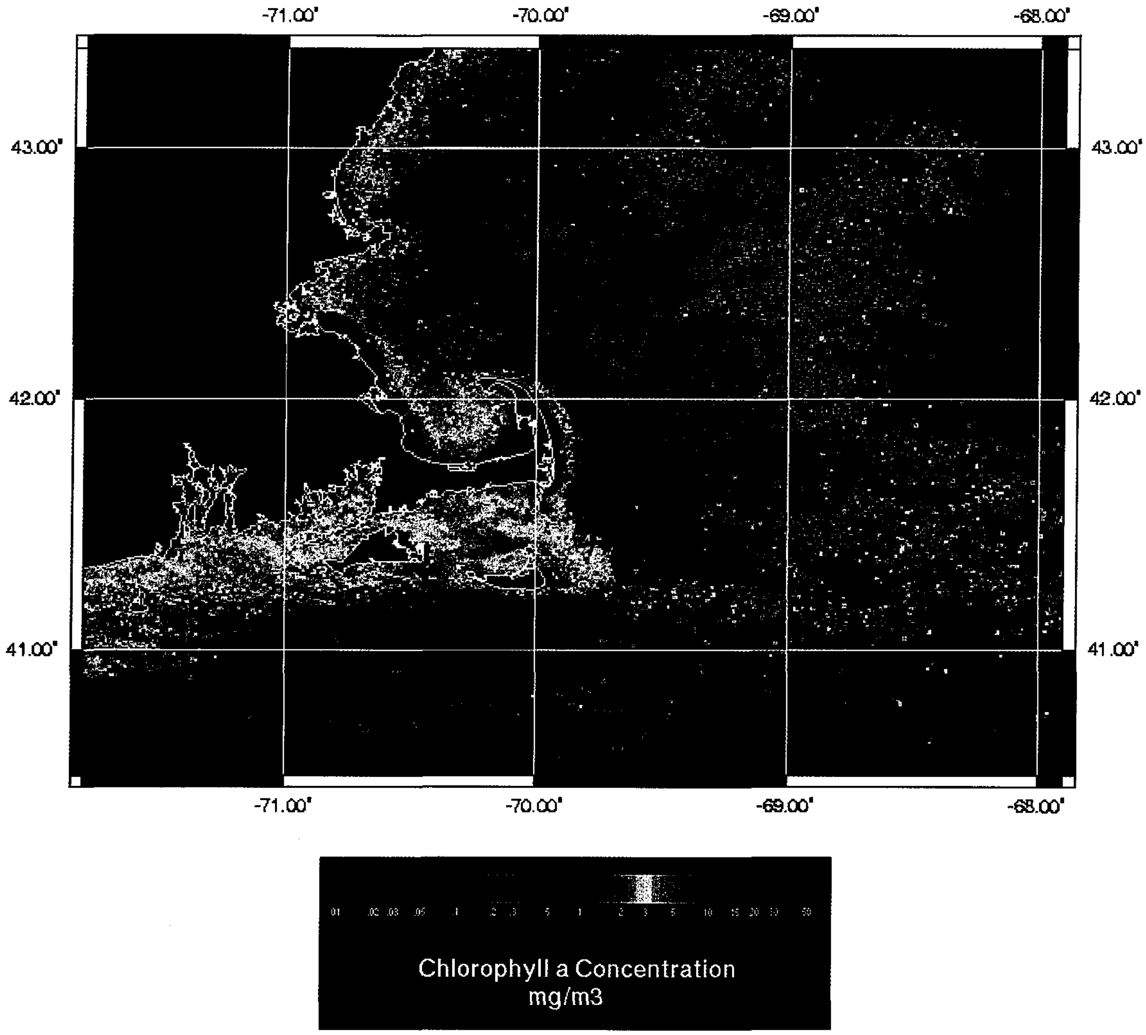


Figure I-29. Chlorophyll a Concentrations from December 30, 2001.

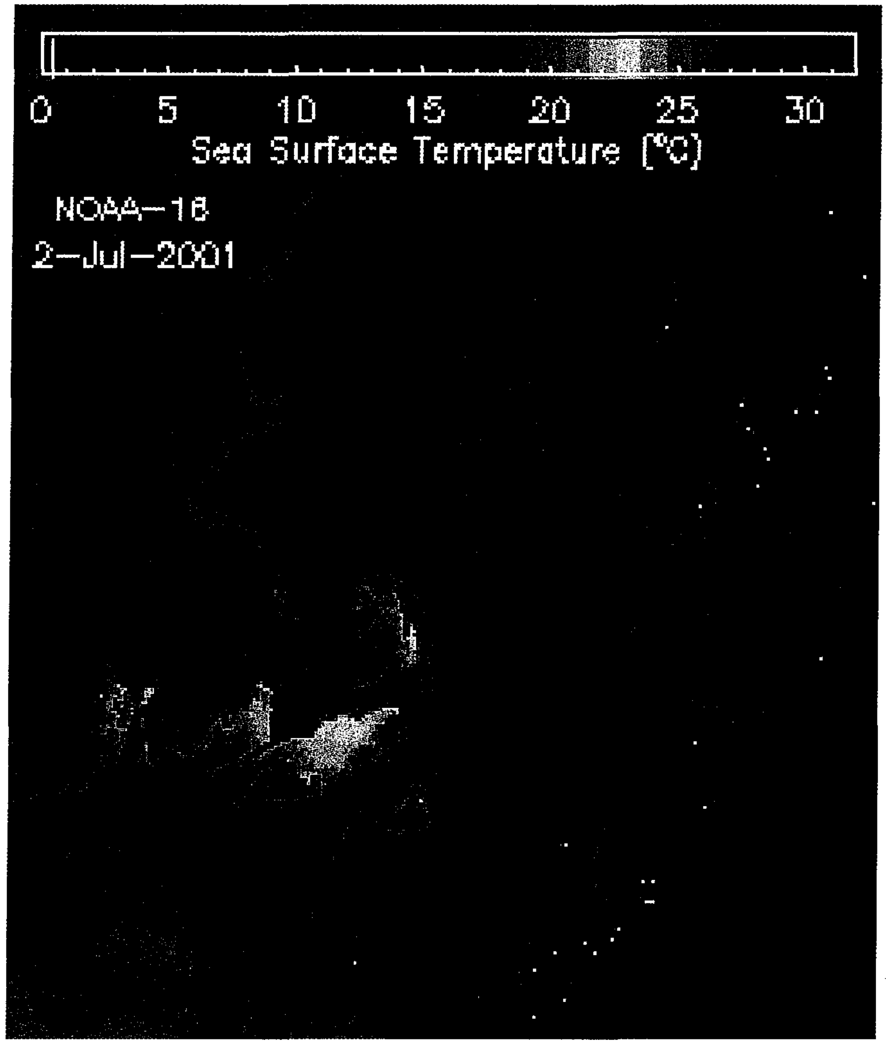


Figure I-30. Sea Surface Temperature from July 2, 2001 .

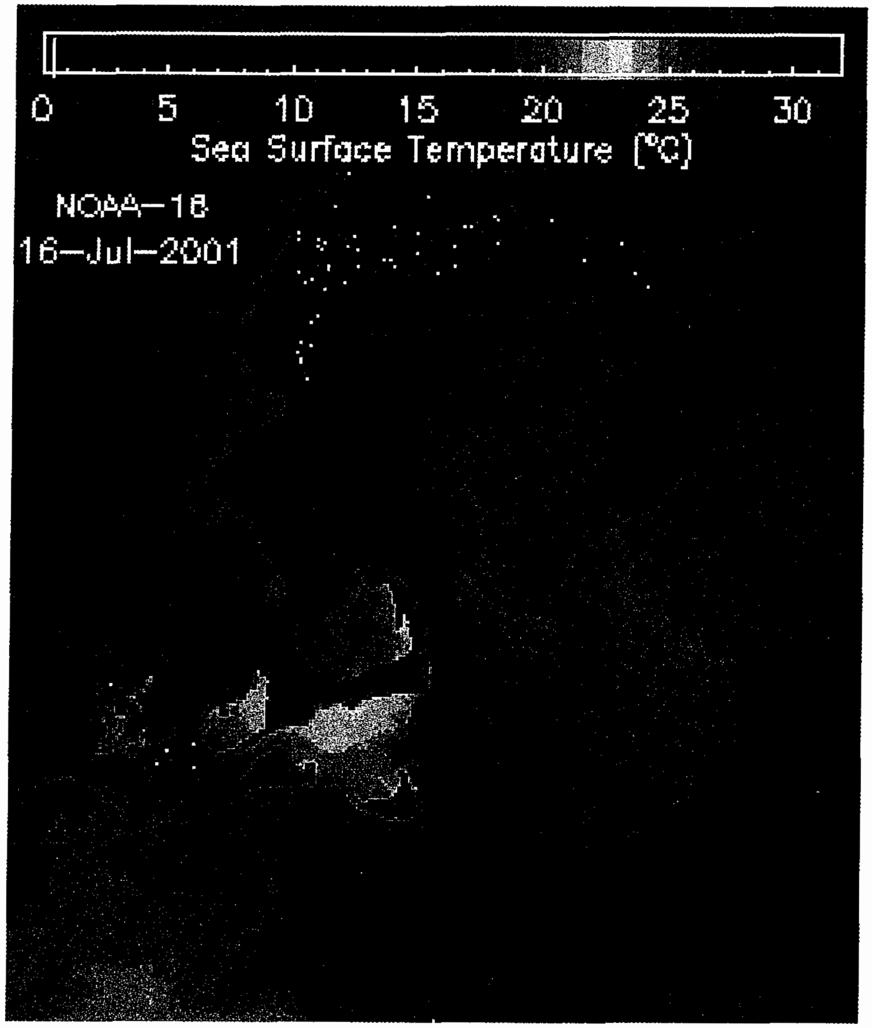


Figure I-31. Sea Surface Temperature from July 16, 2001.

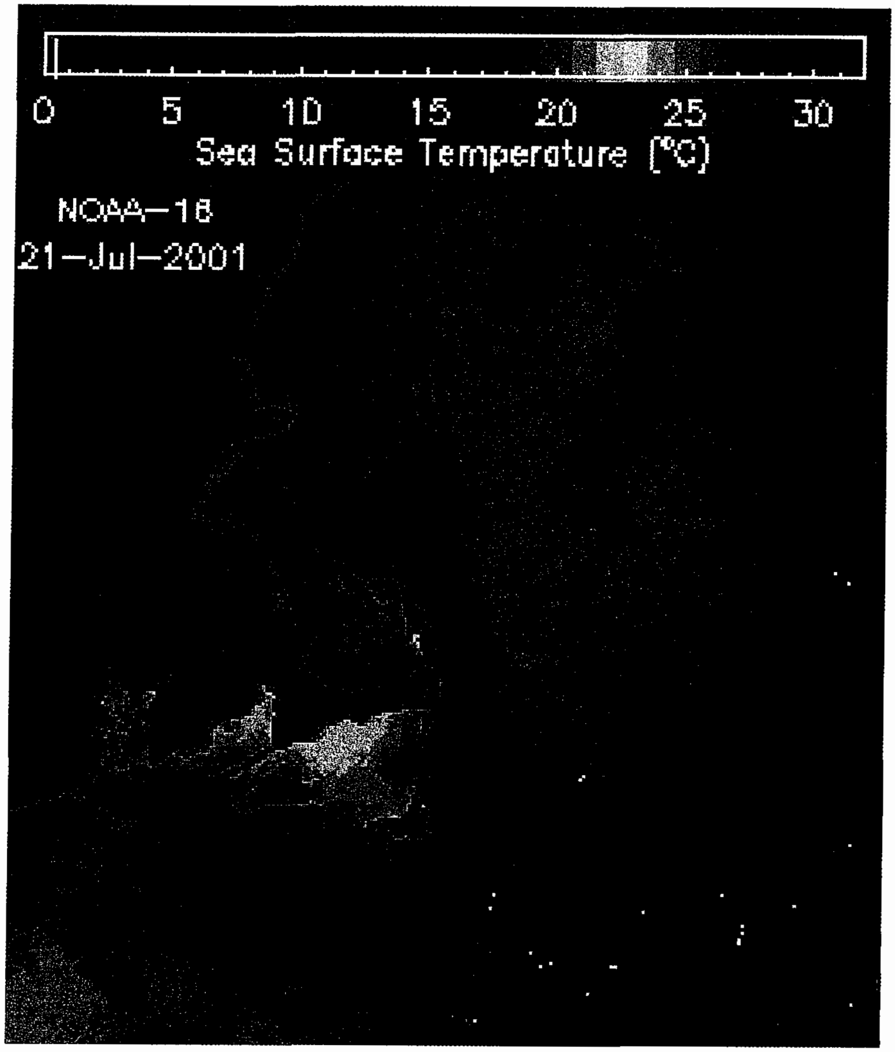


Figure I-32. Sea Surface Temperature from July 21, 2001.

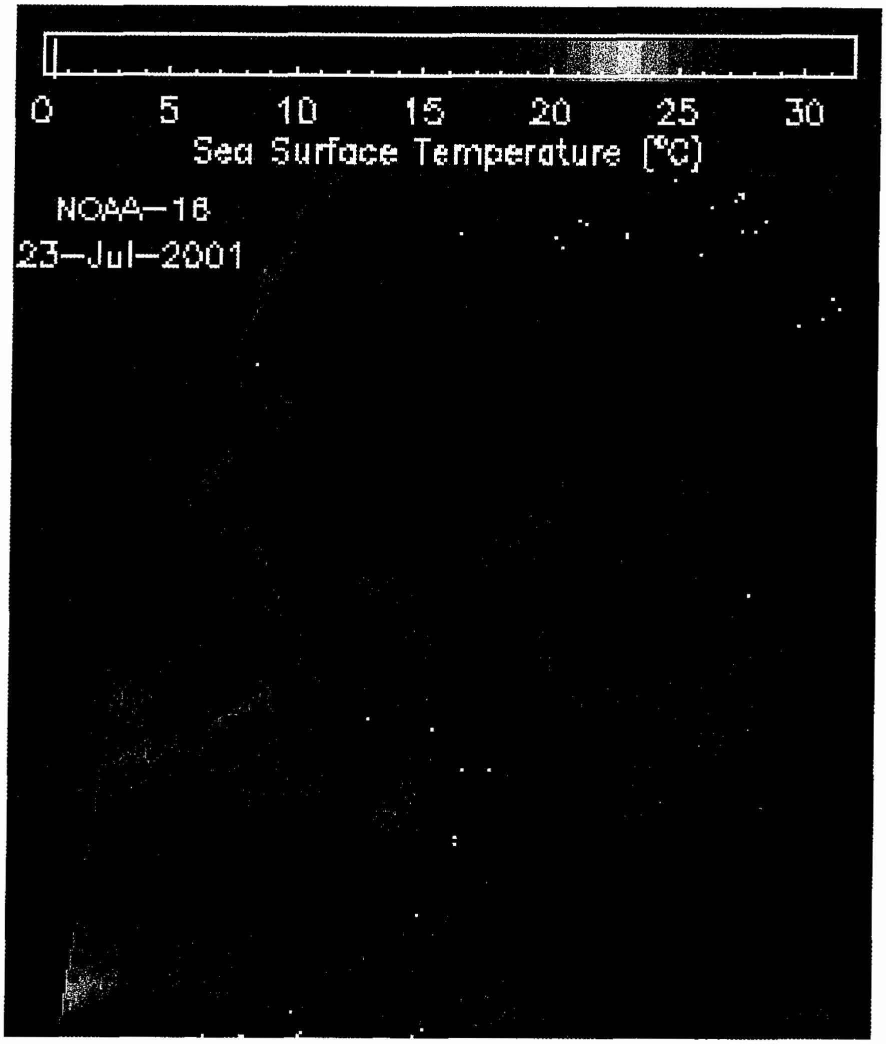


Figure I-33. Sea Surface Temperature from July 23, 2001.

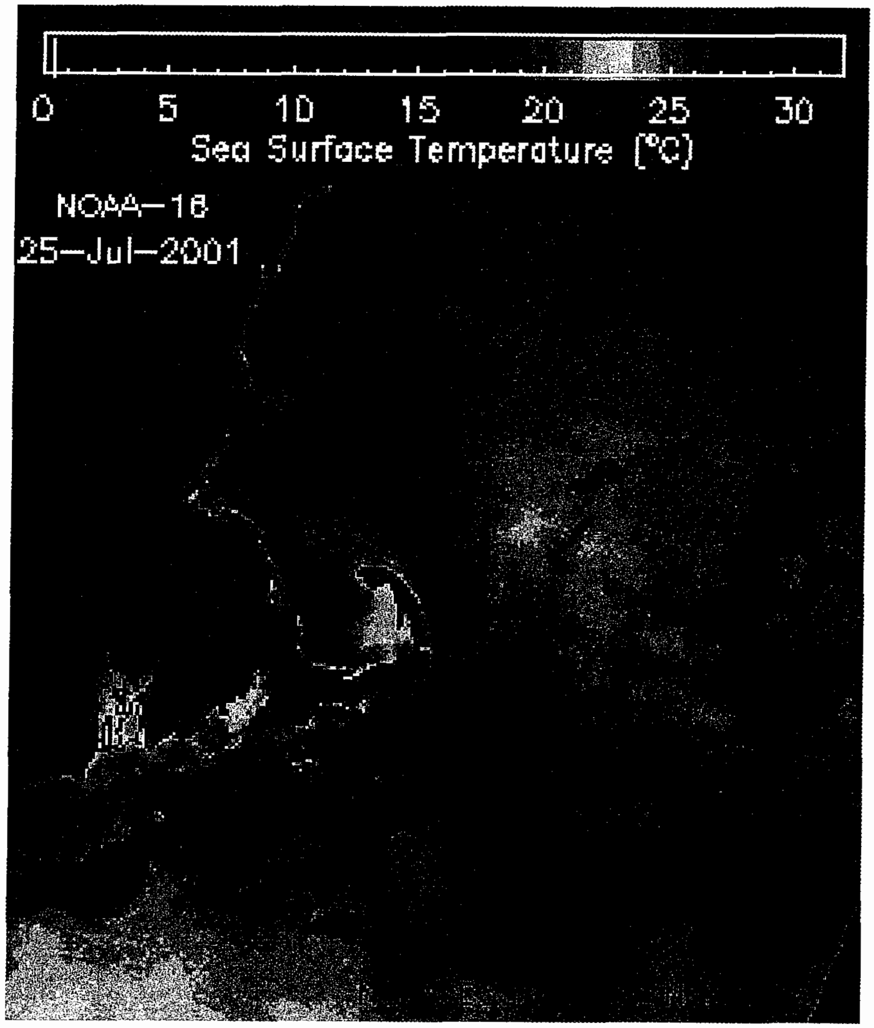


Figure I-34. Sea Surface Temperature from July 25, 2001.

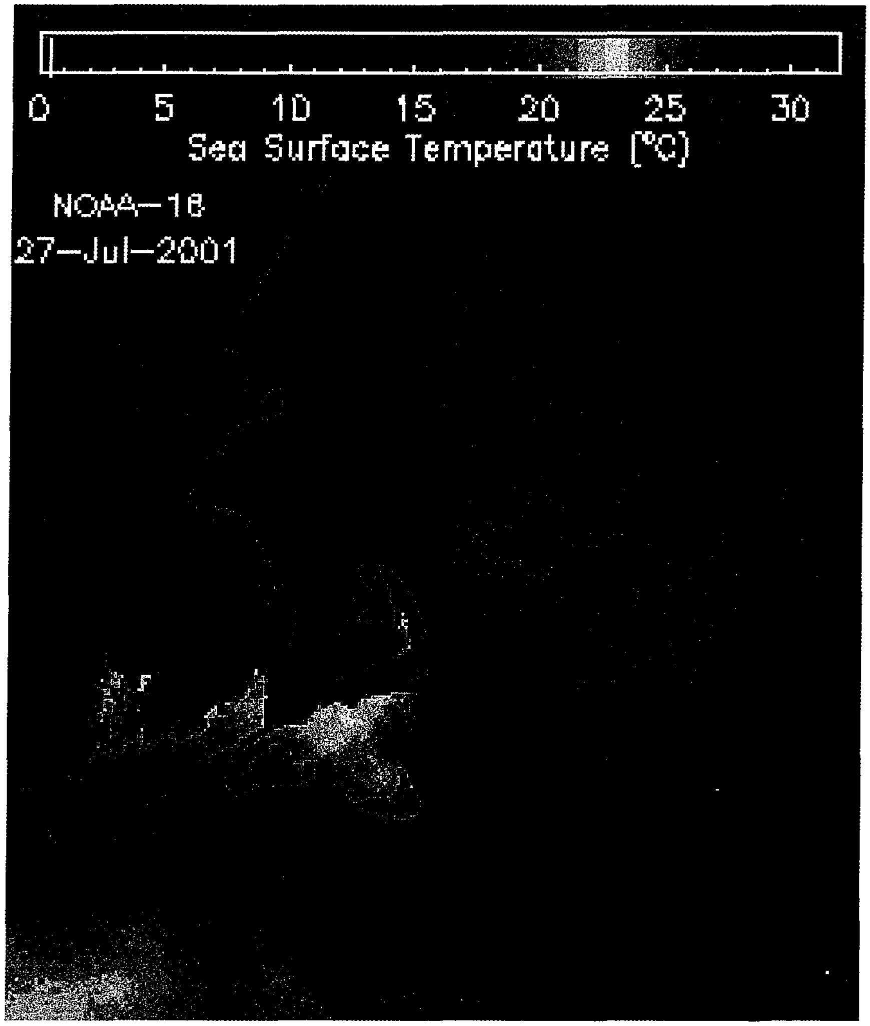


Figure I-35. Sea Surface Temperature from July 27, 2001.

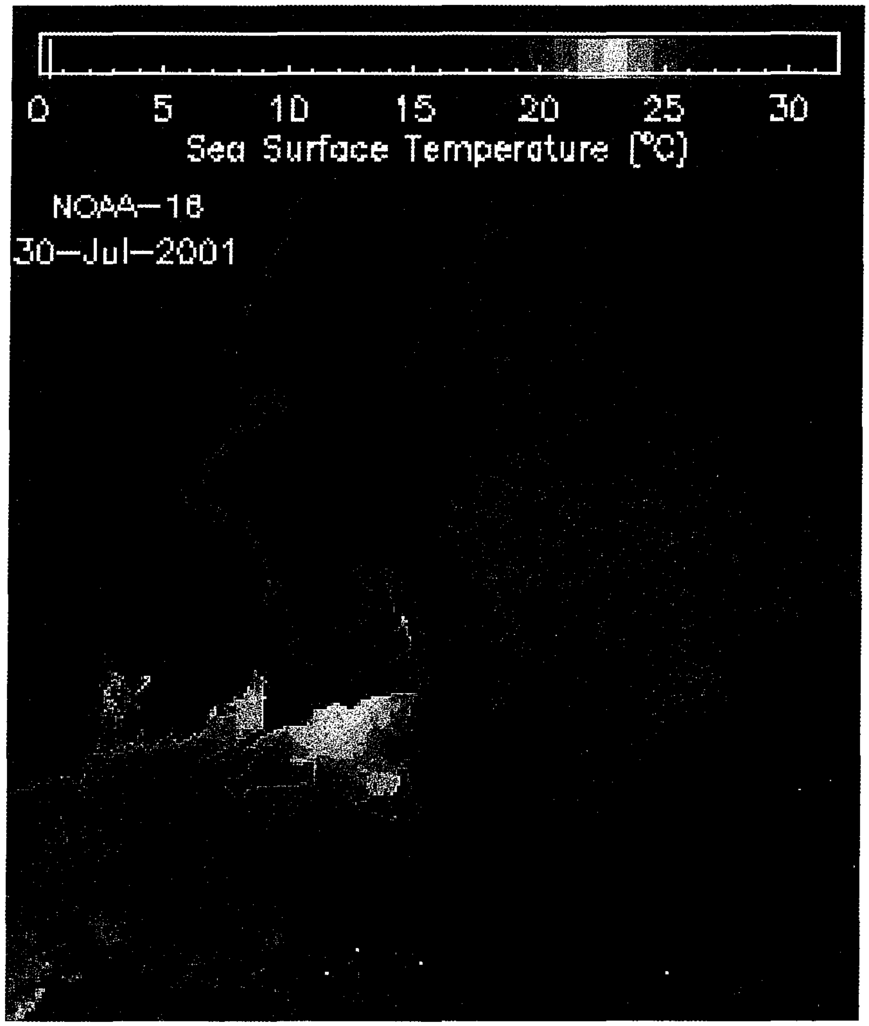


Figure I-36. Sea Surface Temperature from July 30, 2001.

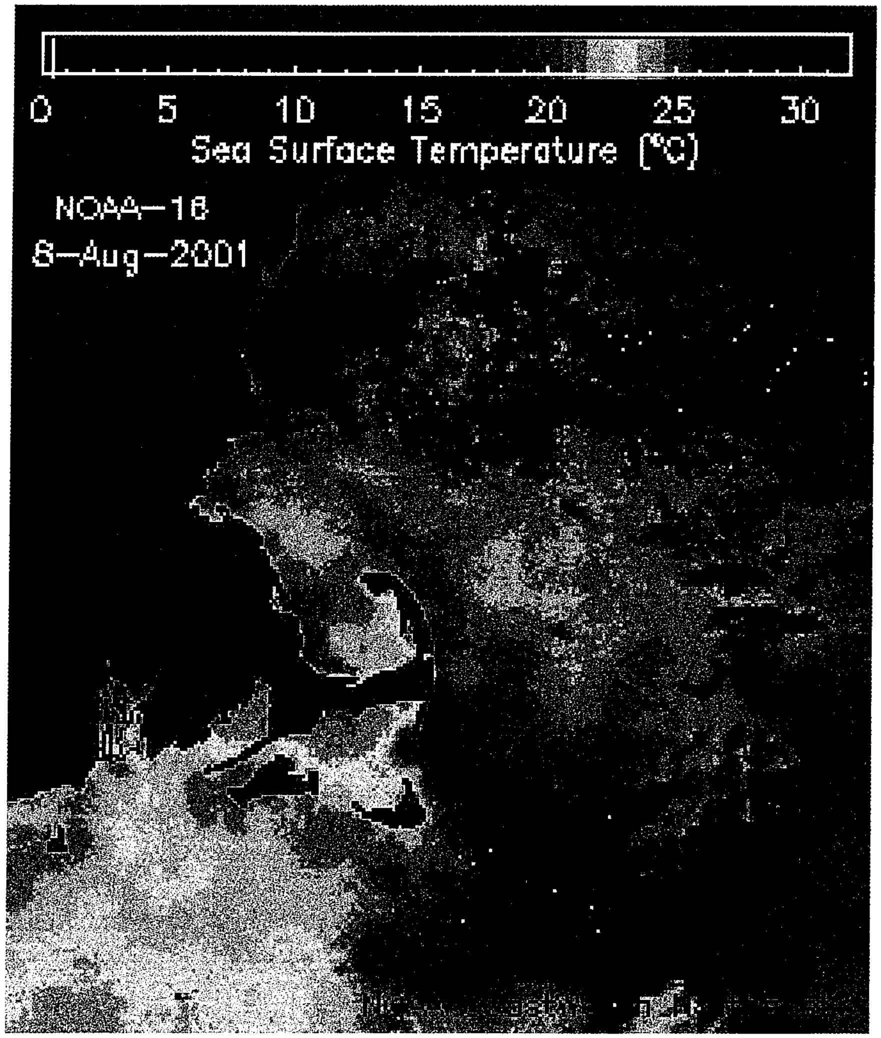


Figure I-37. Sea Surface Temperature from August 8, 2001.

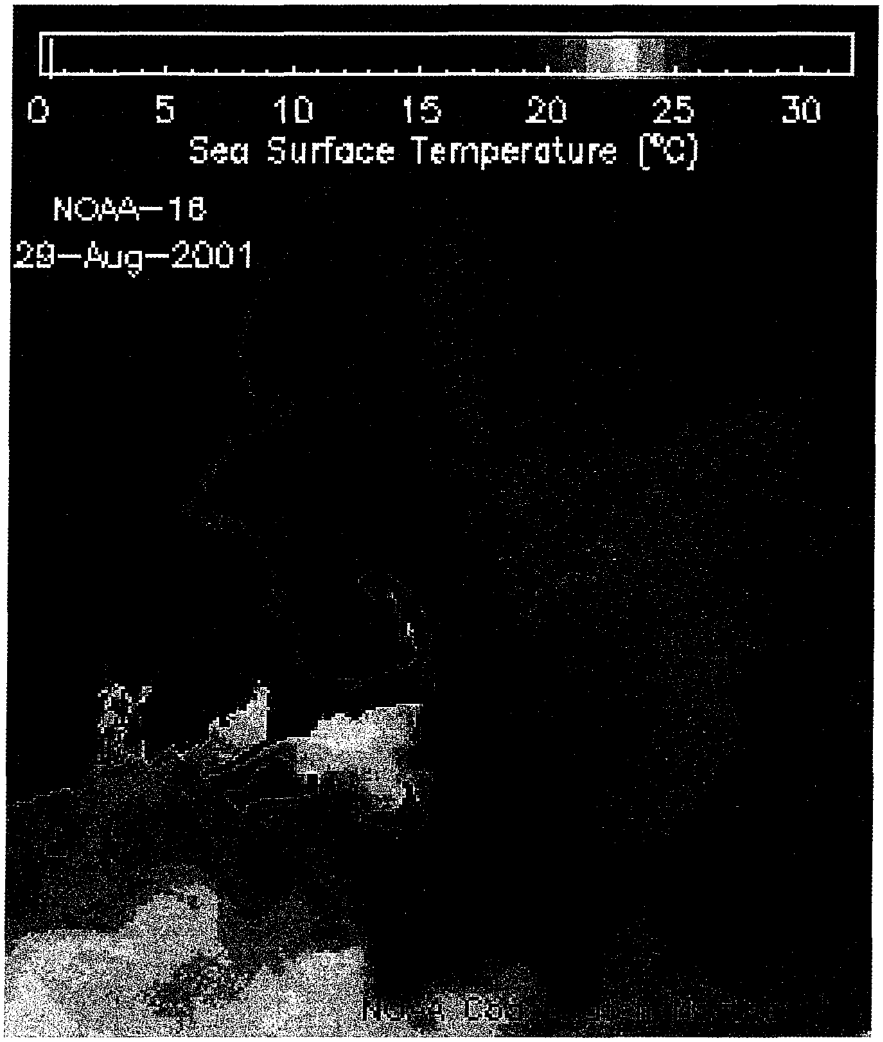


Figure I-38. Sea Surface Temperature from August 29, 2001.

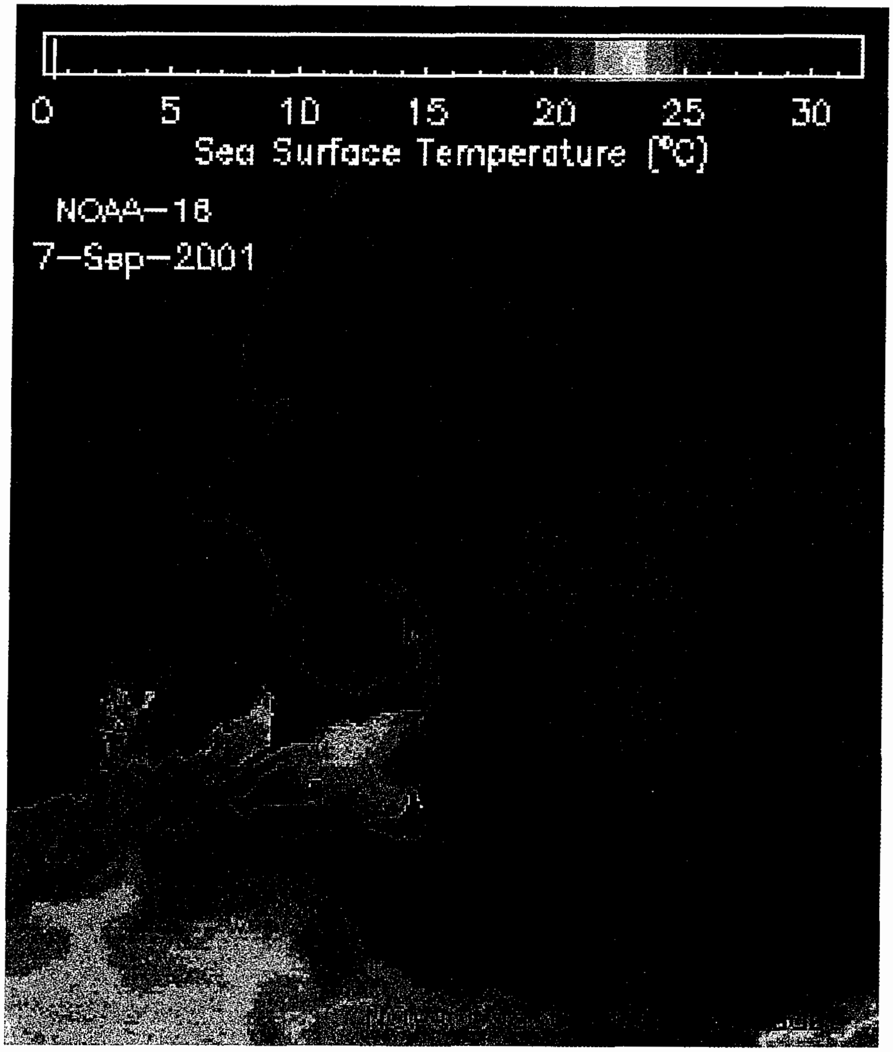


Figure I-39. Sea Surface Temperature from September 7, 2001.

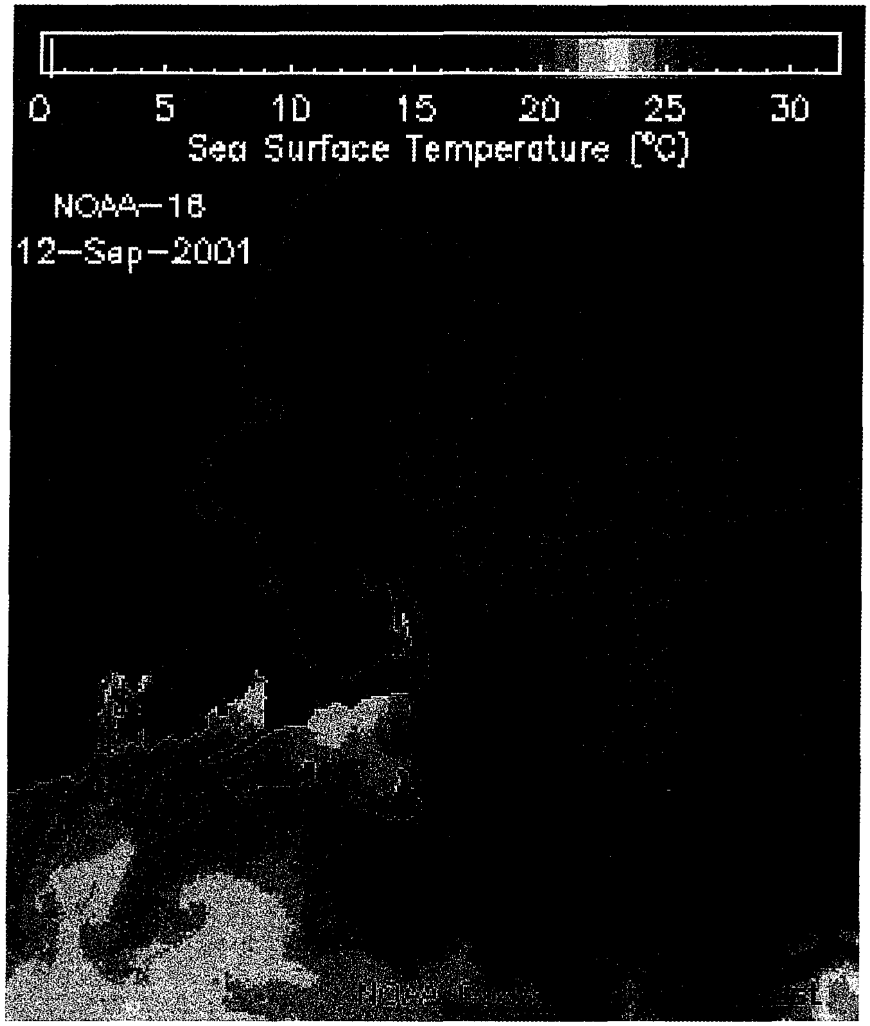


Figure I-40. Sea Surface Temperature from September 12, 2001.

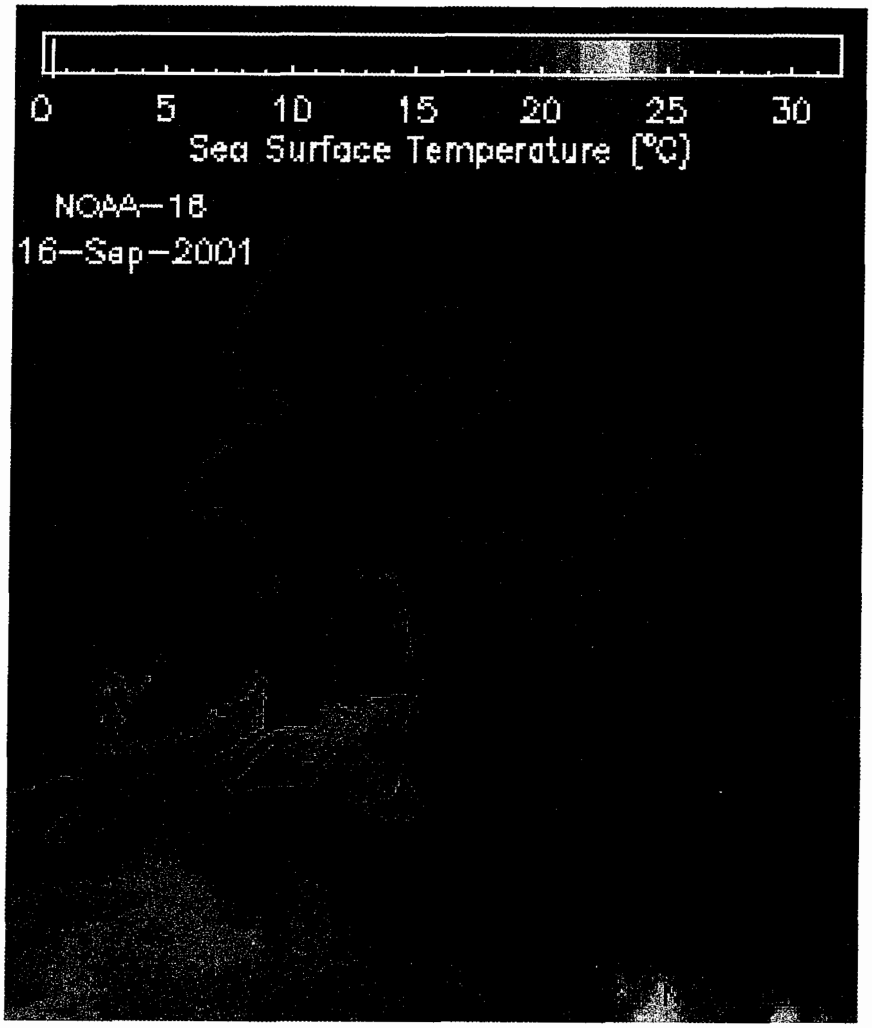


Figure I-41. Sea Surface Temperature from September 16, 2001.

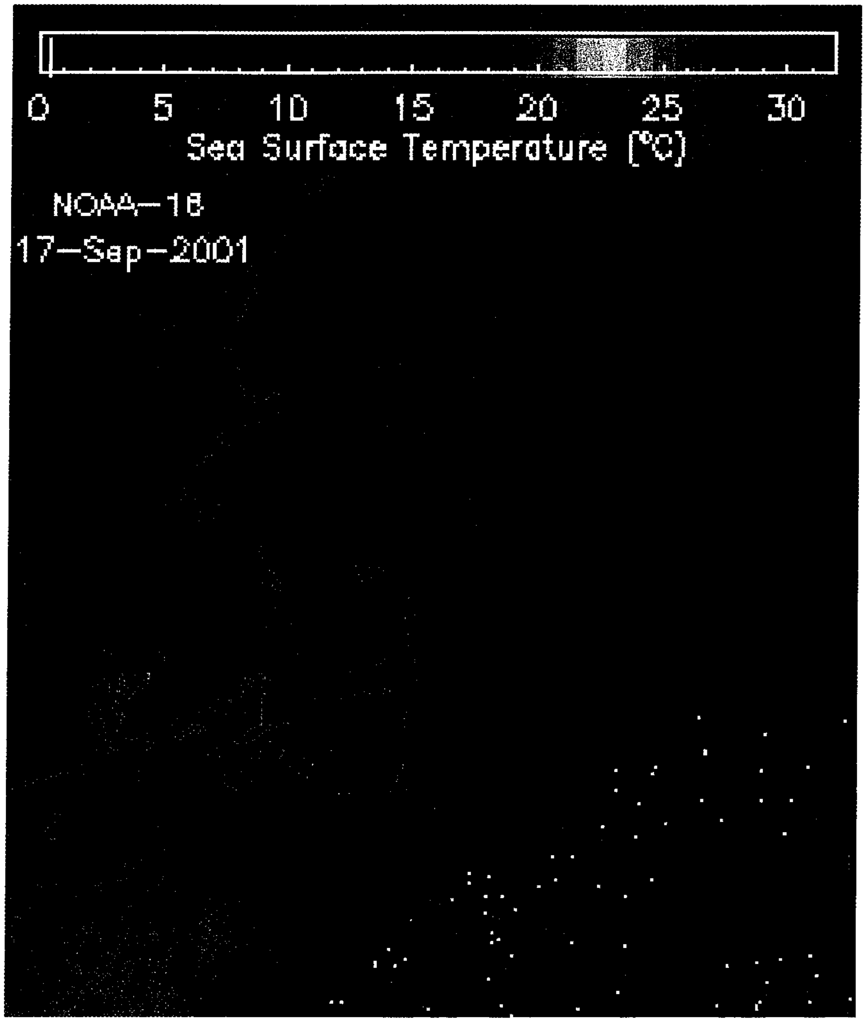


Figure I-42. Sea Surface Temperature from September 17, 2001.

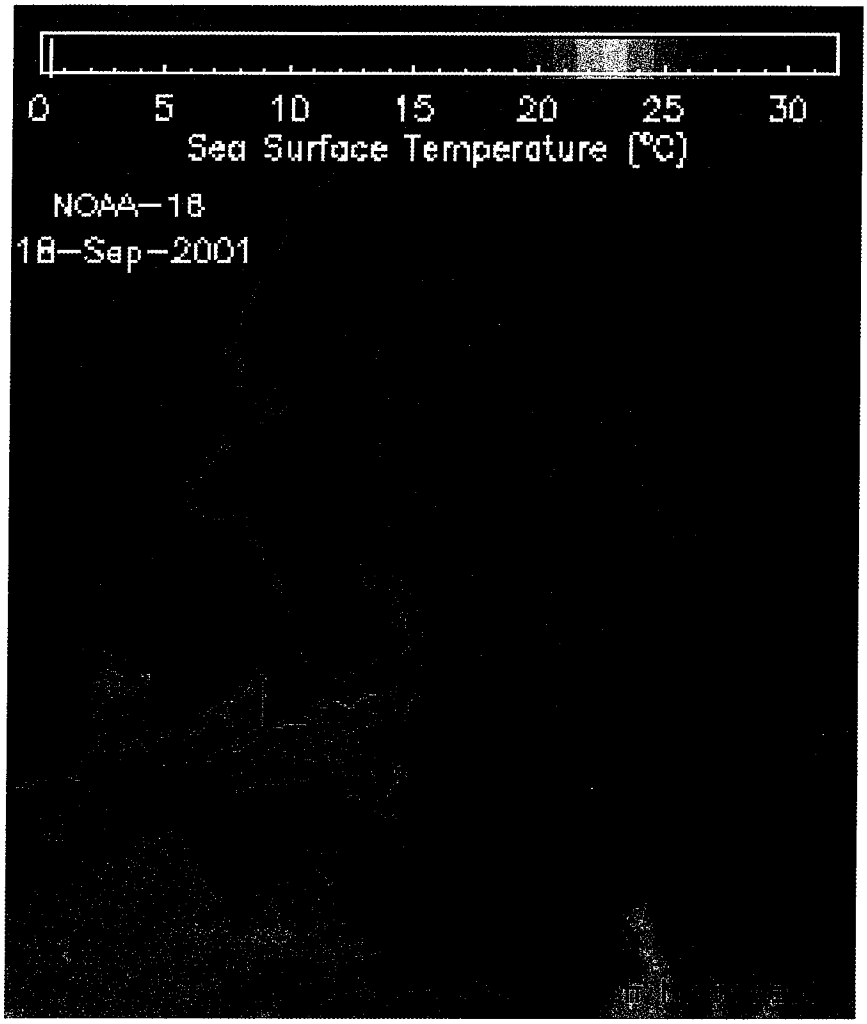


Figure I-43. Sea Surface Temperature from September 18, 2001.

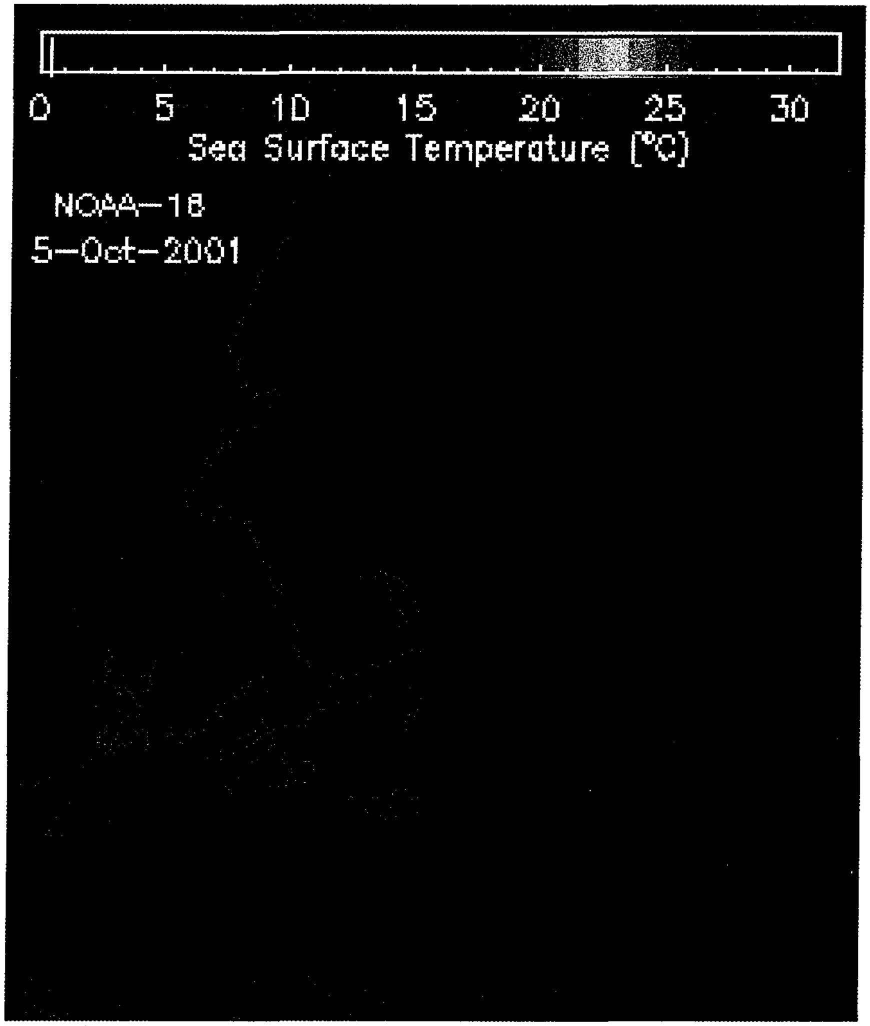


Figure I-44. Sea Surface Temperature from October 5, 2001.

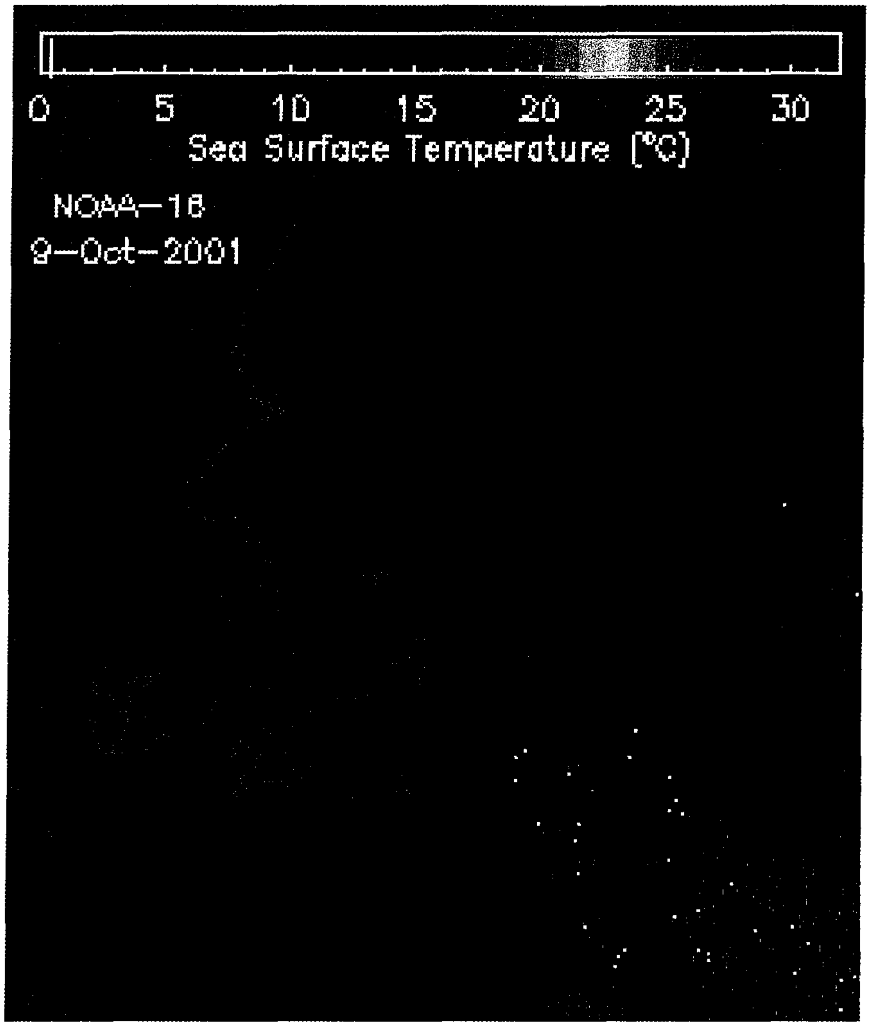


Figure I-45. Sea Surface Temperature from October 9, 2001.

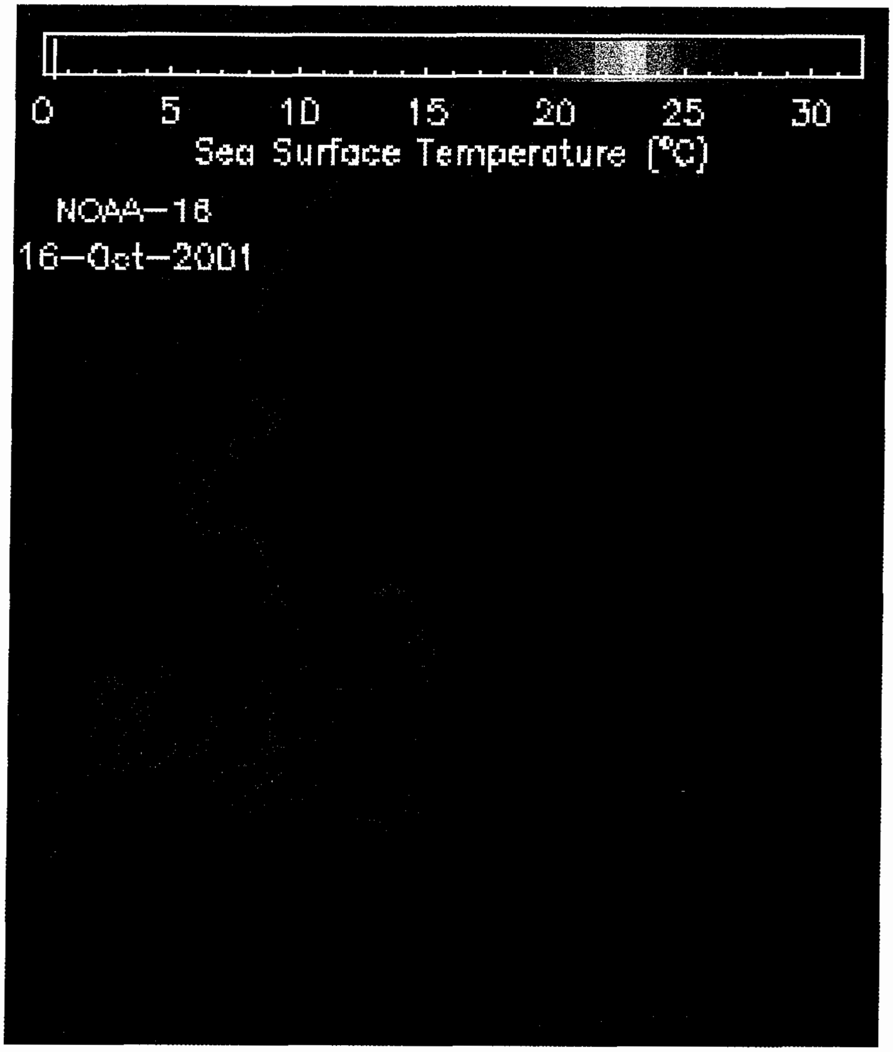


Figure I-46. Sea Surface Temperature from October 16, 2001.

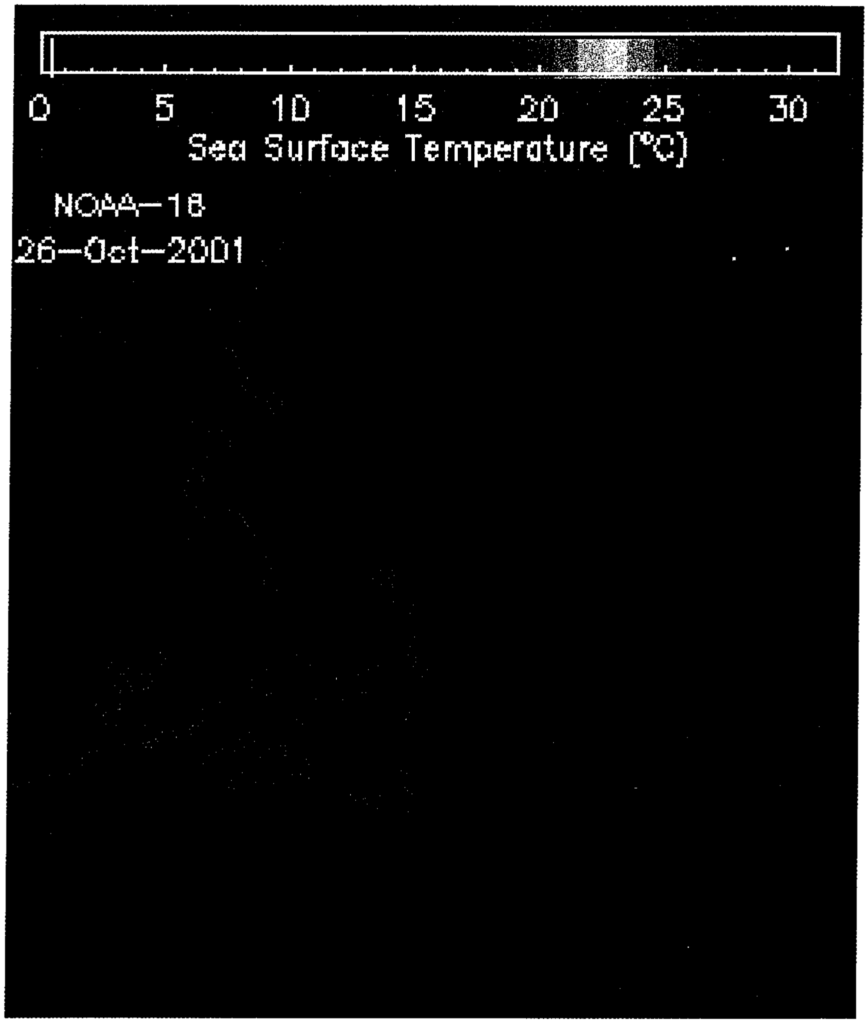


Figure I-47. Sea Surface Temperature from October 26, 2001.

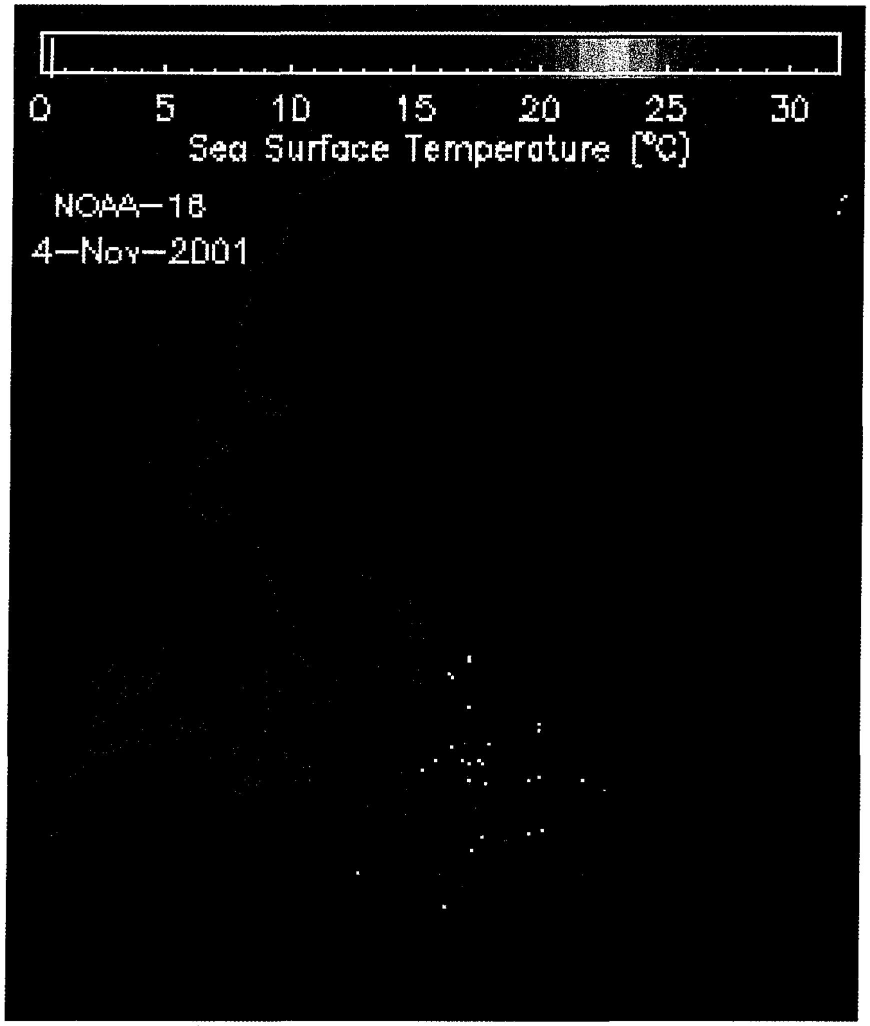


Figure I-48. Sea Surface Temperature from November 4, 2001.

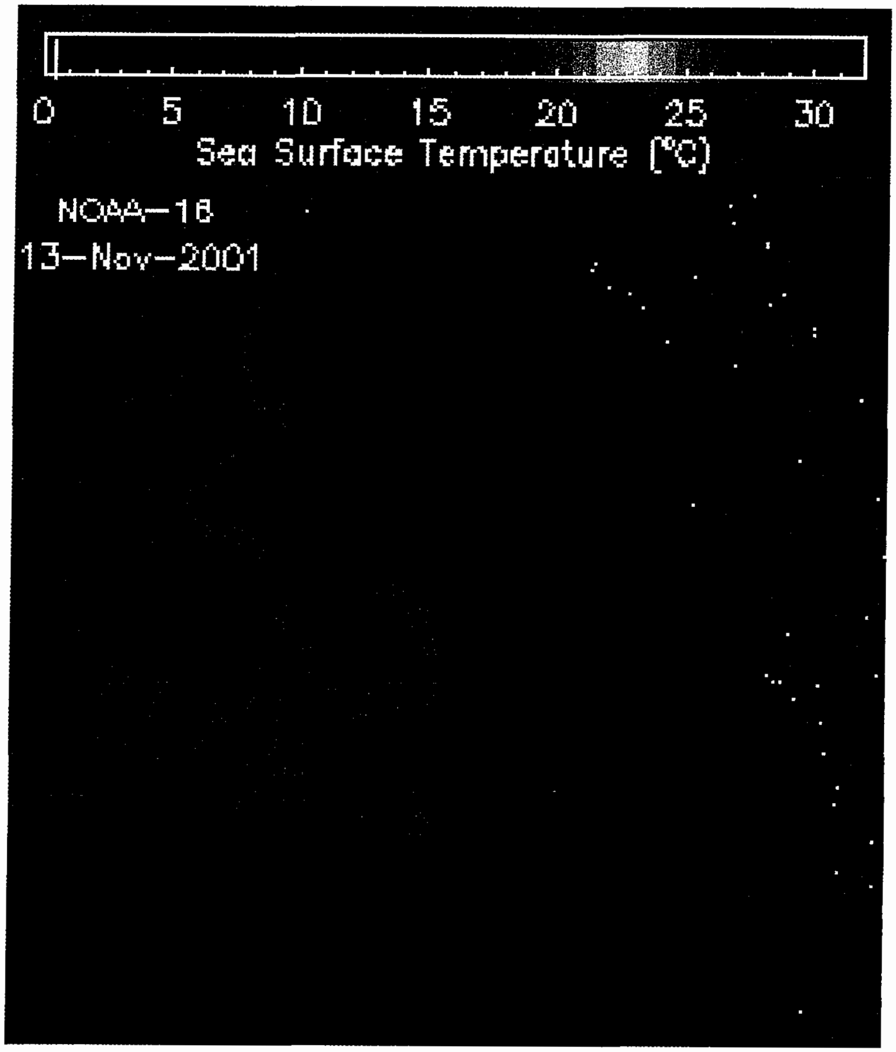


Figure I-49. Sea Surface Temperature from November 13, 2001.

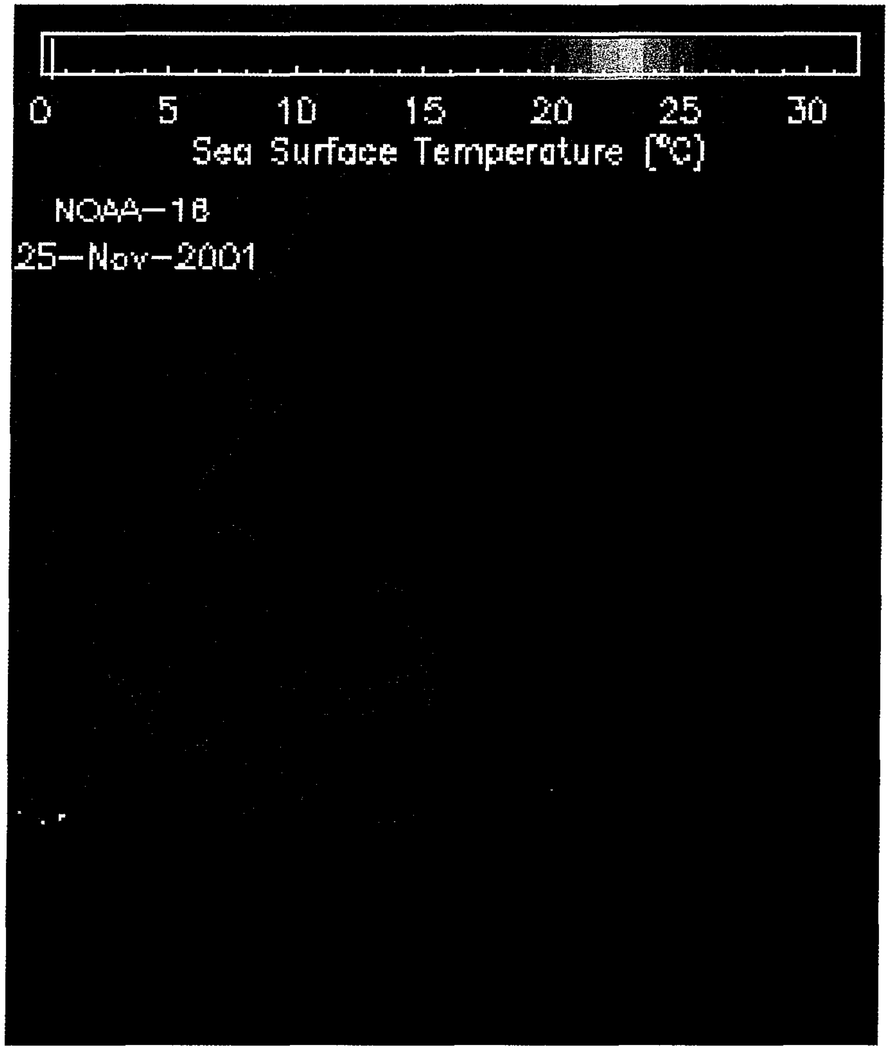


Figure I-50. Sea Surface Temperature from November 25, 2001.

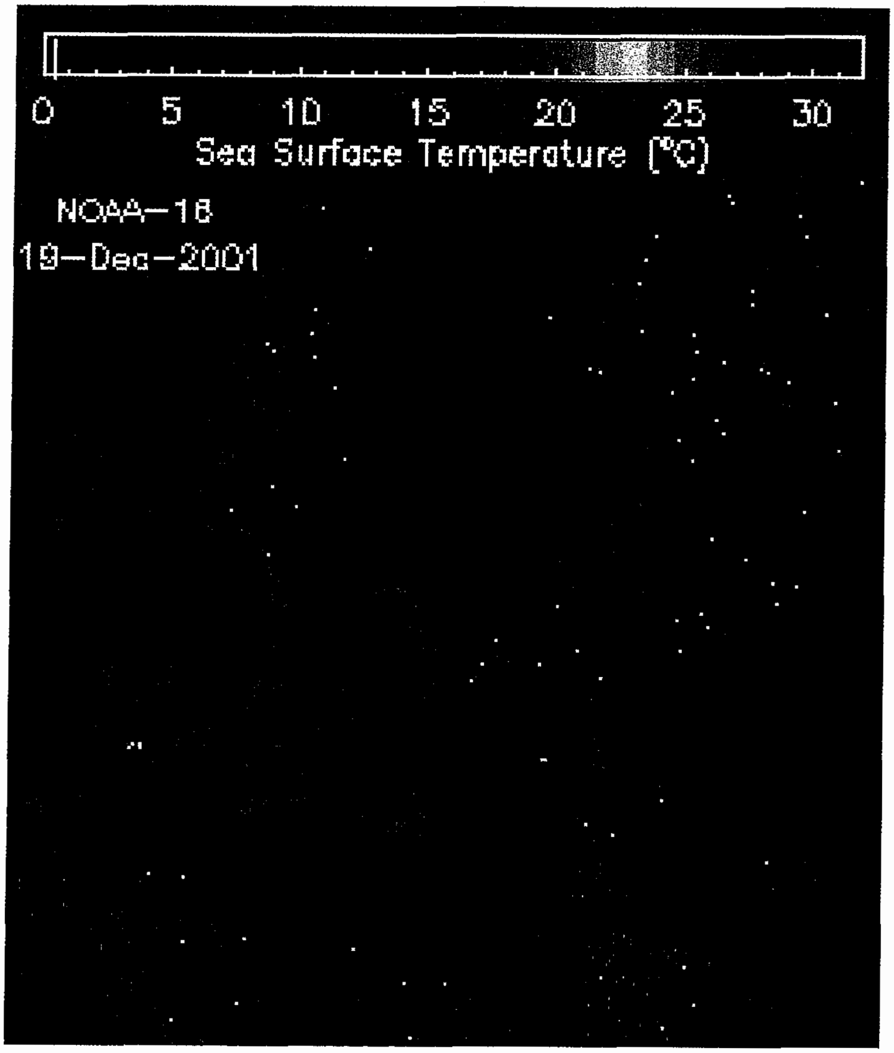


Figure I-51. Sea Surface Temperature from December 19, 2001.

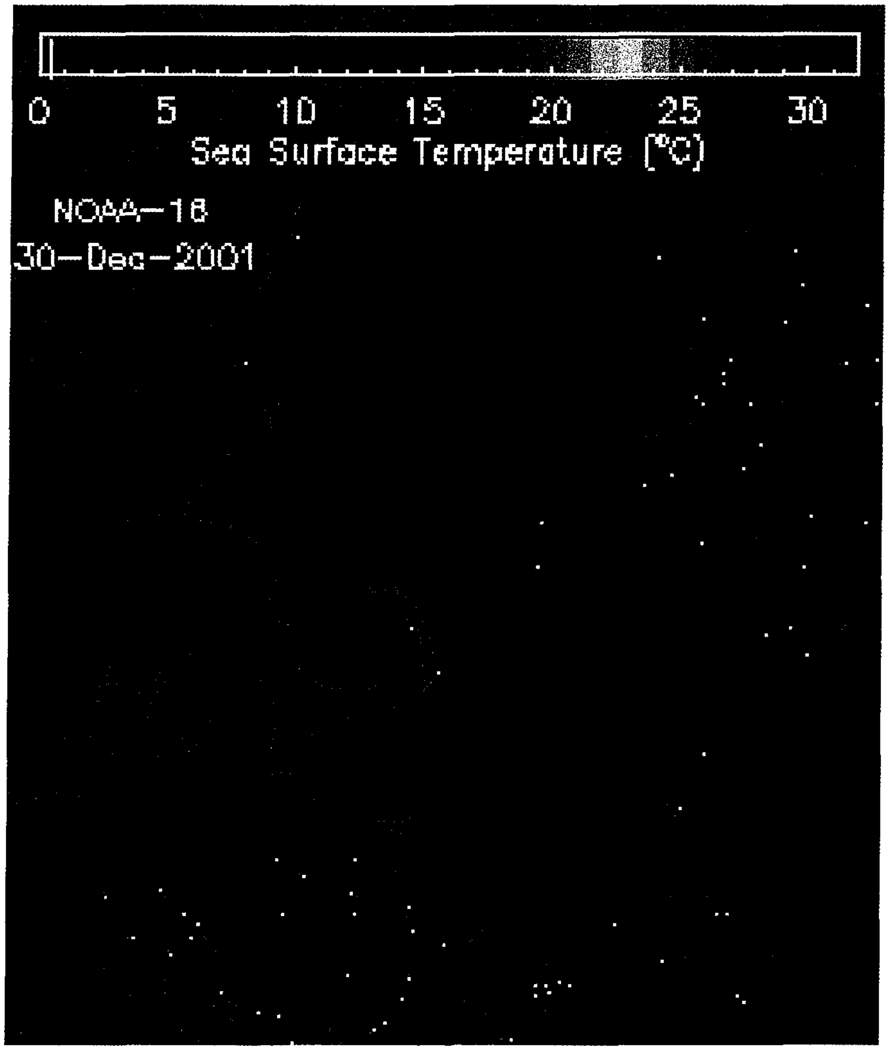


Figure I-52. Sea Surface Temperature from December 30, 2001.

APPENDIX J

Secchi Disk Data

Survey ID	Station ID	Station Arrival Date and Time	Secchi Disk Depth (m)	Qualifier
WF01B	F01	08/30/01 12:24 PM	5.25	v
WF01B	F02	08/30/01 11:24 AM	5.25	v
WF01B	F03	08/30/01 03:26 PM	5.	v
WF01B	F05	08/30/01 07:51 AM	6.75	v
WF01B	F06	08/30/01 08:19 AM	5.75	v
WF01B	F07	08/30/01 09:12 AM	6.25	v
WF01B	F10	08/27/01 11:45 AM	4.25	v
WF01B	F12	08/28/01 02:34 PM	6.75	v
WF01B	F13	08/27/01 11:09 AM	4.75	v
WF01B	F14	08/27/01 10:43 AM	3.75	v
WF01B	F15	08/28/01 04:38 PM	6.75	v
WF01B	F16	08/28/01 04:15 PM	6.25	v
WF01B	F17	08/27/01 12:27 PM	5.75	v
WF01B	F18	08/27/01 03:34 PM	4.75	v
WF01B	F19	08/28/01 08:49 AM	6.75	v
WF01B	F22	08/27/01 01:19 PM	6.75	v
WF01B	F23	08/29/01 06:31 AM	2.5	v
WF01B	F24	08/27/01 04:02 PM	2.75	v
WF01B	F25	08/27/01 09:13 AM	3.5	v
WF01B	F26	08/28/01 09:54 AM	5.75	v
WF01B	F27	08/28/01 11:00 AM	5.5	v
WF01B	F28	08/28/01 02:02 PM	6.75	v
WF01B	F29	08/30/01 10:13 AM	5.75	v
WF01B	F30	08/28/01 07:12 AM	2.75	v
WF01B	F31	08/28/01 06:27 AM	2.75	v
WF01B	N16	08/27/01 02:13 PM	6.5	v
WF01E	F01	10/19/01 09:41 AM	7.75	v
WF01E	F02	10/19/01 10:51 AM	7.75	v
WF01E	F03	10/19/01 09:00 AM	5.25	v
WF01E	F05	10/19/01 03:22 PM	4.75	v
WF01E	F06	10/19/01 02:35 PM	5.75	v
WF01E	F07	10/19/01 02:05 PM	5.75	v
WF01E	F10	10/25/01 06:59 AM	7.25	v
WF01E	F12	10/27/01 11:37 AM	7.75	v
WF01E	F13	10/25/01 12:11 PM	4.25	v
WF01E	F14	10/25/01 12:57 PM	4.25	v
WF01E	F15	10/19/01 04:22 PM	5.25	v
WF01E	F16	10/26/01 02:30 PM	5.75	v
WF01E	F17	10/25/01 08:00 AM	5.75	v
WF01E	F18	10/25/01 04:00 PM	5.75	v
WF01E	F19	10/21/01 08:49 AM	7.75	v
WF01E	F22	10/25/01 09:12 AM	4.75	v

Survey ID	Station ID	Station Arrival Date and Time	Secchi Disk Depth (m)	Qualifier
WF01E	F23	10/20/01 06:53 AM	3.25	v
WF01E	F24	10/25/01 04:42 PM		e
WF01E	F25	10/22/01 06:42 AM	3.75	v
WF01E	F26	10/21/01 09:58 AM	6.75	v
WF01E	F27	10/21/01 11:48 AM	6.25	v
WF01E	F28	10/27/01 10:48 AM	5.75	v
WF01E	F29	10/19/01 12:42 PM	8.75	v
WF01E	F30	10/21/01 07:13 AM	3.25	v
WF01E	F31	10/26/01 08:11 AM	4.75	v
WF01E	N16	10/25/01 10:51 AM	5.75	v

e- Results not reported, value given is null.
v- Arithmetic mean

APPENDIX J

Secchi Disk Data

Survey ID	Station ID	Station Arrival Date and Time	Secchi Disk Depth (m)	Qualifier
WF01B	F01	08/30/01 12:24 PM	5.25	v
WF01B	F02	08/30/01 11:24 AM	5.25	v
WF01B	F03	08/30/01 03:26 PM	5.	v
WF01B	F05	08/30/01 07:51 AM	6.75	v
WF01B	F06	08/30/01 08:19 AM	5.75	v
WF01B	F07	08/30/01 09:12 AM	6.25	v
WF01B	F10	08/27/01 11:45 AM	4.25	v
WF01B	F12	08/28/01 02:34 PM	6.75	v
WF01B	F13	08/27/01 11:09 AM	4.75	v
WF01B	F14	08/27/01 10:43 AM	3.75	v
WF01B	F15	08/28/01 04:38 PM	6.75	v
WF01B	F16	08/28/01 04:15 PM	6.25	v
WF01B	F17	08/27/01 12:27 PM	5.75	v
WF01B	F18	08/27/01 03:34 PM	4.75	v
WF01B	F19	08/28/01 08:49 AM	6.75	v
WF01B	F22	08/27/01 01:19 PM	6.75	v
WF01B	F23	08/29/01 06:31 AM	2.5	v
WF01B	F24	08/27/01 04:02 PM	2.75	v
WF01B	F25	08/27/01 09:13 AM	3.5	v
WF01B	F26	08/28/01 09:54 AM	5.75	v
WF01B	F27	08/28/01 11:00 AM	5.5	v
WF01B	F28	08/28/01 02:02 PM	6.75	v
WF01B	F29	08/30/01 10:13 AM	5.75	v
WF01B	F30	08/28/01 07:12 AM	2.75	v
WF01B	F31	08/28/01 06:27 AM	2.75	v
WF01B	N16	08/27/01 02:13 PM	6.5	v
WF01E	F01	10/19/01 09:41 AM	7.75	v
WF01E	F02	10/19/01 10:51 AM	7.75	v
WF01E	F03	10/19/01 09:00 AM	5.25	v
WF01E	F05	10/19/01 03:22 PM	4.75	v
WF01E	F06	10/19/01 02:35 PM	5.75	v
WF01E	F07	10/19/01 02:05 PM	5.75	v
WF01E	F10	10/25/01 06:59 AM	7.25	v
WF01E	F12	10/27/01 11:37 AM	7.75	v
WF01E	F13	10/25/01 12:11 PM	4.25	v
WF01E	F14	10/25/01 12:57 PM	4.25	v
WF01E	F15	10/19/01 04:22 PM	5.25	v
WF01E	F16	10/26/01 02:30 PM	5.75	v
WF01E	F17	10/25/01 08:00 AM	5.75	v
WF01E	F18	10/25/01 04:00 PM	5.75	v
WF01E	F19	10/21/01 08:49 AM	7.75	v
WF01E	F22	10/25/01 09:12 AM	4.75	v

Survey ID	Station ID	Station Arrival Date and Time	Secchi Disk Depth (m)	Qualifier
WF01E	F23	10/20/01 06:53 AM	3.25	v
WF01E	F24	10/25/01 04:42 PM		e
WF01E	F25	10/22/01 06:42 AM	3.75	v
WF01E	F26	10/21/01 09:58 AM	6.75	v
WF01E	F27	10/21/01 11:48 AM	6.25	v
WF01E	F28	10/27/01 10:48 AM	5.75	v
WF01E	F29	10/19/01 12:42 PM	8.75	v
WF01E	F30	10/21/01 07:13 AM	3.25	v
WF01E	F31	10/26/01 08:11 AM	4.75	v
WF01E	N16	10/25/01 10:51 AM	5.75	v

e- Results not reported, value given is null.
v- Arithmetic mean

APPENDIX K

Estimated Carbon Equivalence Data

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN018	N04	WN018048	15.94	07/12/01	Centric diatom sp. group 1 diam <10 micr	320.63
WN018	N04	WN018048	15.94	07/12/01	Ceratium longipes	399099.19
WN018	N04	WN018048	15.94	07/12/01	Ceratium tripos	5214.77
WN018	N04	WN018048	15.94	07/12/01	Chaetoceros compressus	7406.96
WN018	N04	WN018048	15.94	07/12/01	Chaetoceros sp. group 2 diam 10-30 micro	3733.28
WN018	N04	WN018048	15.94	07/12/01	Cryptomonas sp. group 1 length <10 micro	517.11
WN018	N04	WN018048	15.94	07/12/01	Cylindrotheca closterium	10730.97
WN018	N04	WN018048	15.94	07/12/01	Dictyocha speculum	165.22
WN018	N04	WN018048	15.94	07/12/01	Guinardia delicatula	5912.69
WN018	N04	WN018048	15.94	07/12/01	Gymnodinium sp. group 1 5-20 microns wid	6802.80
WN018	N04	WN018048	15.94	07/12/01	Gyrodinium sp. group 2 21-40 microns wid	4088.66
WN018	N04	WN018048	15.94	07/12/01	Gyrodinium spirale	5998.27
WN018	N04	WN018048	15.94	07/12/01	Heterocapsa rotundata	174.62
WN018	N04	WN018048	15.94	07/12/01	Leptocylindrus minimus	1007.04
WN018	N04	WN018048	15.94	07/12/01	Licmophora spp.	62.97
WN018	N04	WN018048	15.94	07/12/01	Prorocentrum minimum	317.70
WN018	N04	WN018048	15.94	07/12/01	Protoperidinium brevipes	3915.95
WN018	N04	WN018048	15.94	07/12/01	Pseudonitzschia delicatissima	1497.96
WN018	N04	WN018048	15.94	07/12/01	Skeletonema costatum	948.51
WN018	N04	WN018048	15.94	07/12/01	Unid. micro-phytoflag sp. group 1 length	19098.35
WN018	N04	WN018048	15.94	07/12/01	Unid. micro-phytoflag sp. group 2 length	2083.54
WN018	N04	WN01804A	2.21	07/12/01	Calycomonas wulffii	49.05
WN018	N04	WN01804A	2.21	07/12/01	Centric diatom sp. group 1 diam <10 micr	568.35
WN018	N04	WN01804A	2.21	07/12/01	Ceratium longipes	31974.49
WN018	N04	WN01804A	2.21	07/12/01	Ceratium tripos	24691.09
WN018	N04	WN01804A	2.21	07/12/01	Chaetoceros sp. group 2 diam 10-30 micro	6628.68
WN018	N04	WN01804A	2.21	07/12/01	Cryptomonas sp. group 1 length <10 micro	337.15
WN018	N04	WN01804A	2.21	07/12/01	Cylindrotheca closterium	3729.71
WN018	N04	WN01804A	2.21	07/12/01	Dactyliosolen fragilissimus	14576.51
WN018	N04	WN01804A	2.21	07/12/01	Ebria tripartita	792.48
WN018	N04	WN01804A	2.21	07/12/01	Guinardia delicatula	13997.80
WN018	N04	WN01804A	2.21	07/12/01	Gymnodinium sp. group 1 5-20 microns wid	4194.27
WN018	N04	WN01804A	2.21	07/12/01	Gyrodinium spirale	28400.81
WN018	N04	WN01804A	2.21	07/12/01	Heterocapsa triquetra	1228.88
WN018	N04	WN01804A	2.21	07/12/01	Leptocylindrus danicus	1185.90
WN018	N04	WN01804A	2.21	07/12/01	Leptocylindrus minimus	6223.09
WN018	N04	WN01804A	2.21	07/12/01	Protoperidinium sp. group 2 31-75 micron	18012.52
WN018	N04	WN01804A	2.21	07/12/01	Pseudonitzschia delicatissima	1123.37
WN018	N04	WN01804A	2.21	07/12/01	Skeletonema costatum	559.49
WN018	N04	WN01804A	2.21	07/12/01	Unid. micro-phytoflag sp. group 1 length	29888.56
WN018	N18	WN018075	19.31	07/12/01	Amphidinium spp.	154.64
WN018	N18	WN018075	19.31	07/12/01	Calycomonas wulffii	68.31
WN018	N18	WN018075	19.31	07/12/01	Centric diatom sp. group 1 diam <10 micr	326.65
WN018	N18	WN018075	19.31	07/12/01	Ceratium longipes	289436.61
WN018	N18	WN018075	19.31	07/12/01	Chaetoceros compressus	3676.24
WN018	N18	WN018075	19.31	07/12/01	Chaetoceros sp. group 2 diam 10-30 micro	3839.92
WN018	N18	WN018075	19.31	07/12/01	Cryptomonas sp. group 1 length <10 micro	273.89
WN018	N18	WN018075	19.31	07/12/01	Cylindrotheca closterium	11080.77
WN018	N18	WN018075	19.31	07/12/01	Dactyliosolen fragilissimus	19297.27

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN018	N18	WN018075	19.31	07/12/01	Guinardia delicatula	6145.59
WN018	N18	WN018075	19.31	07/12/01	Gymnodinium sp. group 1 5-20 microns wid	6165.58
WN018	N18	WN018075	19.31	07/12/01	Gyrodinium spirale	13161.81
WN018	N18	WN018075	19.31	07/12/01	Heterocapsa triquetra	3428.52
WN018	N18	WN018075	19.31	07/12/01	Leptocylindrus minimus	78.79
WN018	N18	WN018075	19.31	07/12/01	Pseudonitzschia delicatissima	489.88
WN018	N18	WN018075	19.31	07/12/01	Skeletonema costatum	28.86
WN018	N18	WN018075	19.31	07/12/01	Unid. micro-phytoflag sp. group 1 length	12144.20
WN018	N18	WN018078	2.03	07/12/01	Calycomonas wulffii	133.88
WN018	N18	WN018078	2.03	07/12/01	Centric diatom sp. group 1 diam <10 micr	123.12
WN018	N18	WN018078	2.03	07/12/01	Ceratium tripos	11213.76
WN018	N18	WN018078	2.03	07/12/01	Corethron criophilum	9044.05
WN018	N18	WN018078	2.03	07/12/01	Cryptomonas sp. group 1 length <10 micro	1974.73
WN018	N18	WN018078	2.03	07/12/01	Cryptomonas sp. group 2 length >10 micro	738.73
WN018	N18	WN018078	2.03	07/12/01	Cylindrotheca closterium	4977.11
WN018	N18	WN018078	2.03	07/12/01	Dactyliosolen fragilissimus	58944.39
WN018	N18	WN018078	2.03	07/12/01	Eucampia cornuta	
WN018	N18	WN018078	2.03	07/12/01	Eutreptia/eutreptiella spp.	90.26
WN018	N18	WN018078	2.03	07/12/01	Guinardia delicatula	41824.16
WN018	N18	WN018078	2.03	07/12/01	Gymnodinium sp. group 1 5-20 microns wid	6678.29
WN018	N18	WN018078	2.03	07/12/01	Gyrodinium spirale	12898.58
WN018	N18	WN018078	2.03	07/12/01	Heterocapsa triquetra	2795.25
WN018	N18	WN018078	2.03	07/12/01	Leptocylindrus minimus	308.84
WN018	N18	WN018078	2.03	07/12/01	Pleurosigma spp.	2493.50
WN018	N18	WN018078	2.03	07/12/01	Protoperidinium sp. group 2 31-75 micron	16388.75
WN018	N18	WN018078	2.03	07/12/01	Pseudonitzschia delicatissima	340.70
WN018	N18	WN018078	2.03	07/12/01	Skeletonema costatum	113.12
WN018	N18	WN018078	2.03	07/12/01	Thalassionema nitzschioides	61.71
WN018	N18	WN018078	2.03	07/12/01	Thalassiosira sp. group 3 10-20 microns	78.41
WN018	N18	WN018078	2.03	07/12/01	Unid. micro-phytoflag sp. group 1 length	20842.72
WN019	N04	WN019034	23.72	07/25/01	Calycomonas wulffii	62.26
WN019	N04	WN019034	23.72	07/25/01	Centric diatom sp. group 1 diam <10 micr	366.44
WN019	N04	WN019034	23.72	07/25/01	Ceratium fusus	4070.13
WN019	N04	WN019034	23.72	07/25/01	Ceratium longipes	135287.86
WN019	N04	WN019034	23.72	07/25/01	Ceratium tripos	10429.54
WN019	N04	WN019034	23.72	07/25/01	Chaetoceros compressus	7054.24
WN019	N04	WN019034	23.72	07/25/01	Chaetoceros septentrionalis	526.34
WN019	N04	WN019034	23.72	07/25/01	Chaetoceros sp. group 2 diam 10-30 micro	14933.13
WN019	N04	WN019034	23.72	07/25/01	Corethron criophilum	4198.72
WN019	N04	WN019034	23.72	07/25/01	Cryptomonas sp. group 1 length <10 micro	1052.05
WN019	N04	WN019034	23.72	07/25/01	Cylindrotheca closterium	16832.90
WN019	N04	WN019034	23.72	07/25/01	Dactyliosolen fragilissimus	456.85
WN019	N04	WN019034	23.72	07/25/01	Dictyocha speculum	330.44
WN019	N04	WN019034	23.72	07/25/01	Ebria tripartita	1343.50
WN019	N04	WN019034	23.72	07/25/01	Gymnodinium sp. group 1 5-20 microns wid	7394.35
WN019	N04	WN019034	23.72	07/25/01	Gyrodinium sp. group 1 5-20 microns widt	147.64
WN019	N04	WN019034	23.72	07/25/01	Gyrodinium spirale	11996.53
WN019	N04	WN019034	23.72	07/25/01	Leptocylindrus minimus	47.87
WN019	N04	WN019034	23.72	07/25/01	Protoperidinium bipes	1437.23
WN019	N04	WN019034	23.72	07/25/01	Protoperidinium sp. group 2 31-75 micron	7608.51

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN019	N04	WN019034	23.72	07/25/01	Pseudonitzschia delicatissima	5828.78
WN019	N04	WN019034	23.72	07/25/01	Pseudonitzschia pungens	69.11
WN019	N04	WN019034	23.72	07/25/01	Skeletonema costatum	105.39
WN019	N04	WN019034	23.72	07/25/01	Unid. micro-phytoflag sp. group 1 length	19385.11
WN019	N04	WN019034	23.72	07/25/01	Unid. micro-phytoflag sp. group 2 length	347.26
WN019	N04	WN019036	1.65	07/25/01	Centric diatom sp. group 1 diam <10 micr	222.01
WN019	N04	WN019036	1.65	07/25/01	Chaetoceros compressus	3039.27
WN019	N04	WN019036	1.65	07/25/01	Cryptomonas sp. group 1 length <10 micro	1171.58
WN019	N04	WN019036	1.65	07/25/01	Cryptomonas sp. group 2 length >10 micro	986.73
WN019	N04	WN019036	1.65	07/25/01	Cylindrotheca closterium	1473.13
WN019	N04	WN019036	1.65	07/25/01	Dactyliosolen fragilissimus	20667.27
WN019	N04	WN019036	1.65	07/25/01	Eutreptia/eutreptiella spp.	135.63
WN019	N04	WN019036	1.65	07/25/01	Guinardia delicatula	5363.03
WN019	N04	WN019036	1.65	07/25/01	Gymnodinium sp. group 1 5-20 microns wid	31539.45
WN019	N04	WN019036	1.65	07/25/01	Gymnodinium sp. group 2 21-40 microns wi	4403.92
WN019	N04	WN019036	1.65	07/25/01	Heterocapsa triquetra	2243.95
WN019	N04	WN019036	1.65	07/25/01	Leptocylindrus minimus	167.59
WN019	N04	WN019036	1.65	07/25/01	Pennate diatom sp. group 2 10-30 microns	24.29
WN019	N04	WN019036	1.65	07/25/01	Proboscia alata	2019.02
WN019	N04	WN019036	1.65	07/25/01	Prorocentrum micans	458.03
WN019	N04	WN019036	1.65	07/25/01	Prorocentrum minimum	114.07
WN019	N04	WN019036	1.65	07/25/01	Protoperidinium bipes	1548.05
WN019	N04	WN019036	1.65	07/25/01	Protoperidinium brevipes	1052.70
WN019	N04	WN019036	1.65	07/25/01	Pseudonitzschia delicatissima	325.79
WN019	N04	WN019036	1.65	07/25/01	Pyramimonas sp. group 1 10-20 microns le	118.03
WN019	N04	WN019036	1.65	07/25/01	Scrippsiella trochoidea	2087.54
WN019	N04	WN019036	1.65	07/25/01	Skeletonema costatum	42.50
WN019	N04	WN019036	1.65	07/25/01	Thalassiosira sp. group 3 10-20 microns	78.55
WN019	N04	WN019036	1.65	07/25/01	Unid. micro-phytoflag sp. group 1 length	45960.34
WN019	N18	WN019059	11.89	07/25/01	Calycomonas wulffii	63.29
WN019	N18	WN019059	11.89	07/25/01	Centric diatom sp. group 1 diam <10 micr	791.63
WN019	N18	WN019059	11.89	07/25/01	Ceratium fusus	2068.91
WN019	N18	WN019059	11.89	07/25/01	Ceratium longipes	13753.77
WN019	N18	WN019059	11.89	07/25/01	Ceratium tripos	15904.48
WN019	N18	WN019059	11.89	07/25/01	Chaetoceros compressus	2155.09
WN019	N18	WN019059	11.89	07/25/01	Chaetoceros sp. group 1 diam <10 microns	348.16
WN019	N18	WN019059	11.89	07/25/01	Chaetoceros sp. group 2 diam 10-30 micro	1660.47
WN019	N18	WN019059	11.89	07/25/01	Cryptomonas sp. group 1 length <10 micro	2809.82
WN019	N18	WN019059	11.89	07/25/01	Cryptomonas sp. group 2 length >10 micro	698.50
WN019	N18	WN019059	11.89	07/25/01	Cylindrotheca closterium	1818.24
WN019	N18	WN019059	11.89	07/25/01	Dactyliosolen fragilissimus	28331.39
WN019	N18	WN019059	11.89	07/25/01	Ebria tripartita	1704.43
WN019	N18	WN019059	11.89	07/25/01	Eutreptia/eutreptiella spp.	213.35
WN019	N18	WN019059	11.89	07/25/01	Guinardia delicatula	10598.36
WN019	N18	WN019059	11.89	07/25/01	Gymnodinium sp. group 1 5-20 microns wid	24656.81
WN019	N18	WN019059	11.89	07/25/01	Gyrodinium sp. group 2 21-40 microns wid	1385.55
WN019	N18	WN019059	11.89	07/25/01	Heterocapsa rotundata	118.35
WN019	N18	WN019059	11.89	07/25/01	Leptocylindrus danicus	1530.34
WN019	N18	WN019059	11.89	07/25/01	Leptocylindrus minimus	377.19
WN019	N18	WN019059	11.89	07/25/01	Prorocentrum minimum	1294.11

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN019	N18	WN019059	11.89	07/25/01	Pseudonitzschia delicatissima	234.29
WN019	N18	WN019059	11.89	07/25/01	Rhizosolenia hebetata	388.93
WN019	N18	WN019059	11.89	07/25/01	Thalassiosira sp. group 3 10-20 microns	37.07
WN019	N18	WN019059	11.89	07/25/01	Unid. micro-phytoflag sp. group 1 length	71425.05
WN019	N18	WN019059	11.89	07/25/01	Unid. micro-phytoflag sp. group 2 length	4236.37
WN019	N18	WN01905B	1.57	07/25/01	Calycomonas wulffii	71.94
WN019	N18	WN01905B	1.57	07/25/01	Centric diatom sp. group 1 diam <10 micr	476.37
WN019	N18	WN01905B	1.57	07/25/01	Ceratium tripos	72433.18
WN019	N18	WN01905B	1.57	07/25/01	Chaetoceros compressus	2445.47
WN019	N18	WN01905B	1.57	07/25/01	Cryptomonas sp. group 1 length <10 micro	2245.96
WN019	N18	WN01905B	1.57	07/25/01	Cryptomonas sp. group 2 length >10 micro	1587.90
WN019	N18	WN01905B	1.57	07/25/01	Cylindrotheca closterium	972.57
WN019	N18	WN01905B	1.57	07/25/01	Dactyliosolen fragilissimus	52791.74
WN019	N18	WN01905B	1.57	07/25/01	Eutreptia/eutreptiella spp.	97.00
WN019	N18	WN01905B	1.57	07/25/01	Guinardia delicatula	19058.90
WN019	N18	WN01905B	1.57	07/25/01	Gymnodinium sp. group 1 5-20 microns wid	24266.62
WN019	N18	WN01905B	1.57	07/25/01	Gymnodinium sp. group 2 21-40 microns wi	3149.78
WN019	N18	WN01905B	1.57	07/25/01	Gyrodinium spirale	13862.66
WN019	N18	WN01905B	1.57	07/25/01	Heterocapsa rotundata	67.26
WN019	N18	WN01905B	1.57	07/25/01	Heterocapsa triquetra	1203.69
WN019	N18	WN01905B	1.57	07/25/01	Leptocylindrus minimus	663.85
WN019	N18	WN01905B	1.57	07/25/01	Pennate diatom sp. group 2 10-30 microns	52.13
WN019	N18	WN01905B	1.57	07/25/01	Proboscia alata	4332.15
WN019	N18	WN01905B	1.57	07/25/01	Prorocentrum minimum	244.75
WN019	N18	WN01905B	1.57	07/25/01	Protoperidinium bipes	829.00
WN019	N18	WN01905B	1.57	07/25/01	Pseudonitzschia delicatissima	432.74
WN019	N18	WN01905B	1.57	07/25/01	Skeletonema costatum	121.78
WN019	N18	WN01905B	1.57	07/25/01	Unid. micro-phytoflag sp. group 1 length	62761.37
WN019	N18	WN01905B	1.57	07/25/01	Unid. micro-phytoflag sp. group 2 length	401.27
WN01A	N04	WN01A05B	24.58	08/09/01	Centric diatom sp. group 1 diam <10 micr	296.93
WN01A	N04	WN01A05B	24.58	08/09/01	Ceratium longipes	7308.45
WN01A	N04	WN01A05B	24.58	08/09/01	Chaetoceros sp. group 2 diam 10-30 micro	1515.13
WN01A	N04	WN01A05B	24.58	08/09/01	Cylindrotheca closterium	318.27
WN01A	N04	WN01A05B	24.58	08/09/01	Guinardia delicatula	100.87
WN01A	N04	WN01A05B	24.58	08/09/01	Gymnodinium sp. group 1 5-20 microns wid	6551.05
WN01A	N04	WN01A05B	24.58	08/09/01	Gymnodinium sp. group 2 21-40 microns wi	883.50
WN01A	N04	WN01A05B	24.58	08/09/01	Gyrodinium sp. group 2 21-40 microns wid	883.50
WN01A	N04	WN01A05B	24.58	08/09/01	Gyrodinium spirale	5184.57
WN01A	N04	WN01A05B	24.58	08/09/01	Heterocapsa triquetra	56.18
WN01A	N04	WN01A05B	24.58	08/09/01	Leptocylindrus minimus	5.17
WN01A	N04	WN01A05B	24.58	08/09/01	Pseudonitzschia delicatissima	21.79
WN01A	N04	WN01A05B	24.58	08/09/01	Unid. micro-phytoflag sp. group 1 length	14344.96
WN01A	N04	WN01A05B	24.58	08/09/01	Unid. micro-phytoflag sp. group 2 length	562.78
WN01A	N04	WN01A05D	1.87	08/09/01	Amphidinium crassum	22.72
WN01A	N04	WN01A05D	1.87	08/09/01	Centric diatom sp. group 1 diam <10 micr	245.27
WN01A	N04	WN01A05D	1.87	08/09/01	Ceratium fusus	871.79
WN01A	N04	WN01A05D	1.87	08/09/01	Ceratium tripos	6701.75
WN01A	N04	WN01A05D	1.87	08/09/01	Chaetoceros sp. group 2 diam 10-30 micro	5006.14
WN01A	N04	WN01A05D	1.87	08/09/01	Cryptomonas sp. group 1 length <10 micro	1546.82
WN01A	N04	WN01A05D	1.87	08/09/01	Cryptomonas sp. group 2 length >10 micro	613.19

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01A	N04	WN01A05D	1.87	08/09/01	Cylindrotheca closterium	67.60
WN01A	N04	WN01A05D	1.87	08/09/01	Eucampia cornuta	
WN01A	N04	WN01A05D	1.87	08/09/01	Guinardia delicatula	2003.02
WN01A	N04	WN01A05D	1.87	08/09/01	Gymnodinium sp. group 1 5-20 microns wid	29458.79
WN01A	N04	WN01A05D	1.87	08/09/01	Gymnodinium sp. group 2 21-40 microns wi	1167.67
WN01A	N04	WN01A05D	1.87	08/09/01	Gyrodinium spirale	1284.78
WN01A	N04	WN01A05D	1.87	08/09/01	Heterocapsa rotundata	249.35
WN01A	N04	WN01A05D	1.87	08/09/01	Leptocylindrus danicus	671.71
WN01A	N04	WN01A05D	1.87	08/09/01	Leptocylindrus minimus	28.20
WN01A	N04	WN01A05D	1.87	08/09/01	Licmophora spp.	13.49
WN01A	N04	WN01A05D	1.87	08/09/01	Proboscia alata	803.00
WN01A	N04	WN01A05D	1.87	08/09/01	Prorocentrum minimum	22.68
WN01A	N04	WN01A05D	1.87	08/09/01	Protoperidinium brevipes	4193.81
WN01A	N04	WN01A05D	1.87	08/09/01	Pseudonitzschia delicatissima	12.34
WN01A	N04	WN01A05D	1.87	08/09/01	Scrippsiella trochoidea	103.61
WN01A	N04	WN01A05D	1.87	08/09/01	Skeletonema costatum	39.44
WN01A	N04	WN01A05D	1.87	08/09/01	Unid. micro-phytoflag sp. group 1 length	32615.04
WN01A	N04	WN01A05D	1.87	08/09/01	Unid. micro-phytoflag sp. group 2 length	1115.69
WN01A	N18	WN01A072	13.1	08/09/01	Calycomonas ovalis	10.11
WN01A	N18	WN01A072	13.1	08/09/01	Centric diatom sp. group 1 diam <10 micr	250.61
WN01A	N18	WN01A072	13.1	08/09/01	Ceratium fusus	1549.12
WN01A	N18	WN01A072	13.1	08/09/01	Ceratium longipes	27032.97
WN01A	N18	WN01A072	13.1	08/09/01	Ceratium macroceros	384.74
WN01A	N18	WN01A072	13.1	08/09/01	Ceratium tripos	2977.16
WN01A	N18	WN01A072	13.1	08/09/01	Chaetoceros compressus	100.68
WN01A	N18	WN01A072	13.1	08/09/01	Corethron criophilum	399.51
WN01A	N18	WN01A072	13.1	08/09/01	Cryptomonas sp. group 1 length <10 micro	1001.04
WN01A	N18	WN01A072	13.1	08/09/01	Cryptomonas sp. group 2 length >10 micro	326.88
WN01A	N18	WN01A072	13.1	08/09/01	Cylindrotheca closterium	260.27
WN01A	N18	WN01A072	13.1	08/09/01	Dactyliosolen fragilissimus	391.23
WN01A	N18	WN01A072	13.1	08/09/01	Dictyocha speculum	314.95
WN01A	N18	WN01A072	13.1	08/09/01	Eutreptia/eutreptiella spp.	7.99
WN01A	N18	WN01A072	13.1	08/09/01	Guinardia delicatula	503.38
WN01A	N18	WN01A072	13.1	08/09/01	Gymnodinium sp. group 1 5-20 microns wid	8583.72
WN01A	N18	WN01A072	13.1	08/09/01	Gymnodinium sp. group 2 21-40 microns wi	2074.89
WN01A	N18	WN01A072	13.1	08/09/01	Gyrodinium sp. group 2 21-40 microns wid	2597.98
WN01A	N18	WN01A072	13.1	08/09/01	Leptocylindrus minimus	36.44
WN01A	N18	WN01A072	13.1	08/09/01	Proboscia alata	1070.16
WN01A	N18	WN01A072	13.1	08/09/01	Prorocentrum minimum	201.87
WN01A	N18	WN01A072	13.1	08/09/01	Pseudonitzschia delicatissima	32.89
WN01A	N18	WN01A072	13.1	08/09/01	Pyramimonas sp. group 1 10-20 microns le	156.40
WN01A	N18	WN01A072	13.1	08/09/01	Scrippsiella trochoidea	922.07
WN01A	N18	WN01A072	13.1	08/09/01	Skeletonema costatum	42.55
WN01A	N18	WN01A072	13.1	08/09/01	Unid. micro-phytoflag sp. group 1 length	24366.25
WN01A	N18	WN01A072	13.1	08/09/01	Unid. micro-phytoflag sp. group 2 length	495.63
WN01A	N18	WN01A074	2.16	08/09/01	Centric diatom sp. group 1 diam <10 micr	527.67
WN01A	N18	WN01A074	2.16	08/09/01	Ceratium fusus	2679.29
WN01A	N18	WN01A074	2.16	08/09/01	Ceratium longipes	1484.29
WN01A	N18	WN01A074	2.16	08/09/01	Ceratium tripos	6865.57
WN01A	N18	WN01A074	2.16	08/09/01	Chaetoceros sp. group 2 diam 10-30 micro	1025.70

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01A	N18	WN01A074	2.16	08/09/01	Cryptomonas sp. group 1 length <10 micro	1506.38
WN01A	N18	WN01A074	2.16	08/09/01	Cryptomonas sp. group 2 length >10 micro	125.63
WN01A	N18	WN01A074	2.16	08/09/01	Cylindrotheca closterium	138.51
WN01A	N18	WN01A074	2.16	08/09/01	Dactyliosolen fragilissimus	250.61
WN01A	N18	WN01A074	2.16	08/09/01	Ebria tripartita	1474.00
WN01A	N18	WN01A074	2.16	08/09/01	Eutreptia/eutreptiella spp.	9.21
WN01A	N18	WN01A074	2.16	08/09/01	Guinardia delicatula	2321.67
WN01A	N18	WN01A074	2.16	08/09/01	Gymnodinium sp. group 1 5-20 microns wid	31152.39
WN01A	N18	WN01A074	2.16	08/09/01	Gyrodinium sp. group 2 21-40 microns wid	299.05
WN01A	N18	WN01A074	2.16	08/09/01	Heterocapsa rotundata	447.02
WN01A	N18	WN01A074	2.16	08/09/01	Leptocylindrus danicus	440.41
WN01A	N18	WN01A074	2.16	08/09/01	Lithodesmium undulatum	247.63
WN01A	N18	WN01A074	2.16	08/09/01	Proboscia alata	5758.39
WN01A	N18	WN01A074	2.16	08/09/01	Prorocentrum minimum	1862.12
WN01A	N18	WN01A074	2.16	08/09/01	Pseudonitzschia delicatissima	443.21
WN01A	N18	WN01A074	2.16	08/09/01	Skeletonema costatum	75.03
WN01A	N18	WN01A074	2.16	08/09/01	Thalassionema nitzschioides	6.30
WN01A	N18	WN01A074	2.16	08/09/01	Unid. micro-phytoflag sp. group 1 length	30140.27
WF01B	F25	WF01B019	5.96	08/27/01	Centric diatom sp. group 1 diam <10 micr	2050.36
WF01B	F25	WF01B019	5.96	08/27/01	Cerataulina pelagica	193699.85
WF01B	F25	WF01B019	5.96	08/27/01	Chaetoceros sp. group 1 diam <10 microns	541.04
WF01B	F25	WF01B019	5.96	08/27/01	Cryptomonas sp. group 1 length <10 micro	3868.85
WF01B	F25	WF01B019	5.96	08/27/01	Cryptomonas sp. group 2 length >10 micro	2894.63
WF01B	F25	WF01B019	5.96	08/27/01	Cylindrotheca closterium	2216.15
WF01B	F25	WF01B019	5.96	08/27/01	Dactyliosolen fragilissimus	118569.14
WF01B	F25	WF01B019	5.96	08/27/01	Eucampia cornuta	
WF01B	F25	WF01B019	5.96	08/27/01	Grammatophora marina	280.17
WF01B	F25	WF01B019	5.96	08/27/01	Guinardia delicatula	7222.96
WF01B	F25	WF01B019	5.96	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	11837.91
WF01B	F25	WF01B019	5.96	08/27/01	Heterocapsa rotundata	367.84
WF01B	F25	WF01B019	5.96	08/27/01	Heterocapsa triquetra	547.64
WF01B	F25	WF01B019	5.96	08/27/01	Leptocylindrus danicus	45526.33
WF01B	F25	WF01B019	5.96	08/27/01	Leptocylindrus minimus	2575.91
WF01B	F25	WF01B019	5.96	08/27/01	Prorocentrum micans	895.76
WF01B	F25	WF01B019	5.96	08/27/01	Prorocentrum minimum	446.91
WF01B	F25	WF01B019	5.96	08/27/01	Pseudonitzschia delicatissima	182.35
WF01B	F25	WF01B019	5.96	08/27/01	Skeletonema costatum	249.33
WF01B	F25	WF01B019	5.96	08/27/01	Unid. micro-phytoflag sp. group 1 length	36425.05
WF01B	F25	WF01B019	5.96	08/27/01	Unid. micro-phytoflag sp. group 2 length	2560.23
WF01B	F25	WF01B01B	2.31	08/27/01	Centric diatom sp. group 1 diam <10 micr	2374.50
WF01B	F25	WF01B01B	2.31	08/27/01	Cerataulina pelagica	201050.07
WF01B	F25	WF01B01B	2.31	08/27/01	Chaetoceros sp. group 2 diam 10-30 micro	4615.66
WF01B	F25	WF01B01B	2.31	08/27/01	Cryptomonas sp. group 1 length <10 micro	3116.45
WF01B	F25	WF01B01B	2.31	08/27/01	Cryptomonas sp. group 2 length >10 micro	2487.57
WF01B	F25	WF01B01B	2.31	08/27/01	Cylindrotheca closterium	1869.88
WF01B	F25	WF01B01B	2.31	08/27/01	Dactyliosolen fragilissimus	115677.21
WF01B	F25	WF01B01B	2.31	08/27/01	Eutreptia/eutreptiella spp.	248.67
WF01B	F25	WF01B01B	2.31	08/27/01	Guinardia delicatula	3994.63
WF01B	F25	WF01B01B	2.31	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	11974.20
WF01B	F25	WF01B01B	2.31	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	10765.94

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F25	WF01B01B	2.31	08/27/01	Gyrodinium cf. aureolum	145.78
WF01B	F25	WF01B01B	2.31	08/27/01	Heterocapsa rotundata	229.90
WF01B	F25	WF01B01B	2.31	08/27/01	Heterocapsa triquetra	1026.83
WF01B	F25	WF01B01B	2.31	08/27/01	Leptocylindrus danicus	27497.82
WF01B	F25	WF01B01B	2.31	08/27/01	Leptocylindrus minimus	661.80
WF01B	F25	WF01B01B	2.31	08/27/01	Licmophora spp.	124.35
WF01B	F25	WF01B01B	2.31	08/27/01	Proboscia alata	7403.64
WF01B	F25	WF01B01B	2.31	08/27/01	Prorocentrum micans	839.78
WF01B	F25	WF01B01B	2.31	08/27/01	Skeletonema costatum	77.92
WF01B	F25	WF01B01B	2.31	08/27/01	Thalassionema nitzschioides	793.40
WF01B	F25	WF01B01B	2.31	08/27/01	Thalassiosira nordenskioldii	111.36
WF01B	F25	WF01B01B	2.31	08/27/01	Thalassiosira sp. group 3 10-20 microns	144.02
WF01B	F25	WF01B01B	2.31	08/27/01	Unid. micro-phytoflag sp. group 1 length	24691.11
WF01B	F25	WF01B01B	2.31	08/27/01	Unid. micro-phytoflag sp. group 2 length	1028.66
WF01B	F13	WF01B04C	10.22	08/27/01	Calycomonas ovalis	40.77
WF01B	F13	WF01B04C	10.22	08/27/01	Centric diatom sp. group 1 diam <10 micr	878.94
WF01B	F13	WF01B04C	10.22	08/27/01	Cerataulina pelagica	12582.29
WF01B	F13	WF01B04C	10.22	08/27/01	Ceratium tripos	5003.28
WF01B	F13	WF01B04C	10.22	08/27/01	Chaetoceros sp. group 2 diam 10-30 micro	2014.81
WF01B	F13	WF01B04C	10.22	08/27/01	Cryptomonas sp. group 1 length <10 micro	1727.93
WF01B	F13	WF01B04C	10.22	08/27/01	Cryptomonas sp. group 2 length >10 micro	549.34
WF01B	F13	WF01B04C	10.22	08/27/01	Cylindrotheca closterium	1110.33
WF01B	F13	WF01B04C	10.22	08/27/01	Dactyliosolen fragilissimus	9423.96
WF01B	F13	WF01B04C	10.22	08/27/01	Dictyocha speculum	158.52
WF01B	F13	WF01B04C	10.22	08/27/01	Eutreptia/eutreptiella spp.	161.35
WF01B	F13	WF01B04C	10.22	08/27/01	Guinardia delicatula	1194.29
WF01B	F13	WF01B04C	10.22	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	1986.45
WF01B	F13	WF01B04C	10.22	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	5230.45
WF01B	F13	WF01B04C	10.22	08/27/01	Heterocapsa rotundata	279.23
WF01B	F13	WF01B04C	10.22	08/27/01	Leptocylindrus danicus	11554.04
WF01B	F13	WF01B04C	10.22	08/27/01	Leptocylindrus minimus	241.14
WF01B	F13	WF01B04C	10.22	08/27/01	Licmophora spp.	181.23
WF01B	F13	WF01B04C	10.22	08/27/01	Proboscia alata	1798.47
WF01B	F13	WF01B04C	10.22	08/27/01	Prorocentrum minimum	407.11
WF01B	F13	WF01B04C	10.22	08/27/01	Pseudonitzschia delicatissima	55.28
WF01B	F13	WF01B04C	10.22	08/27/01	Skeletonema costatum	113.56
WF01B	F13	WF01B04C	10.22	08/27/01	Thalassionema nitzschioides	633.26
WF01B	F13	WF01B04C	10.22	08/27/01	Thalassiosira sp. group 3 10-20 microns	104.95
WF01B	F13	WF01B04C	10.22	08/27/01	Unid. micro-phytoflag sp. group 1 length	22065.60
WF01B	F13	WF01B04F	2.18	08/27/01	Calycomonas ovalis	57.31
WF01B	F13	WF01B04F	2.18	08/27/01	Centric diatom sp. group 1 diam <10 micr	1997.11
WF01B	F13	WF01B04F	2.18	08/27/01	Cerataulina pelagica	428081.88
WF01B	F13	WF01B04F	2.18	08/27/01	Chaetoceros sp. group 1 diam <10 microns	76.84
WF01B	F13	WF01B04F	2.18	08/27/01	Chaetoceros sp. group 2 diam 10-30 micro	840.45
WF01B	F13	WF01B04F	2.18	08/27/01	Cryptomonas sp. group 1 length <10 micro	2228.17
WF01B	F13	WF01B04F	2.18	08/27/01	Cryptomonas sp. group 2 length >10 micro	205.89
WF01B	F13	WF01B04F	2.18	08/27/01	Cylindrotheca closterium	3410.52
WF01B	F13	WF01B04F	2.18	08/27/01	Dactyliosolen fragilissimus	35730.84
WF01B	F13	WF01B04F	2.18	08/27/01	Ebria tripartita	1207.77
WF01B	F13	WF01B04F	2.18	08/27/01	Eucampia cornuta	

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F13	WF01B04F	2.18	08/27/01	Eutreptia/eutreptiella spp.	150.93
WF01B	F13	WF01B04F	2.18	08/27/01	Guinardia delicatula	3357.08
WF01B	F13	WF01B04F	2.18	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	5051.99
WF01B	F13	WF01B04F	2.18	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	31855.29
WF01B	F13	WF01B04F	2.18	08/27/01	Gyrodinium sp. group 2 21-40 microns wid	4900.81
WF01B	F13	WF01B04F	2.18	08/27/01	Gyrodinium spirale	43211.04
WF01B	F13	WF01B04F	2.18	08/27/01	Heterocapsa rotundata	784.90
WF01B	F13	WF01B04F	2.18	08/27/01	Heterocapsa triquetra	467.43
WF01B	F13	WF01B04F	2.18	08/27/01	Leptocylindrus danicus	65516.36
WF01B	F13	WF01B04F	2.18	08/27/01	Leptocylindrus minimus	1743.02
WF01B	F13	WF01B04F	2.18	08/27/01	Prorocentrum micans	764.56
WF01B	F13	WF01B04F	2.18	08/27/01	Prorocentrum minimum	1144.35
WF01B	F13	WF01B04F	2.18	08/27/01	Pseudonitzschia delicatissima	207.17
WF01B	F13	WF01B04F	2.18	08/27/01	Pyramimonas sp. group 1 10-20 microns le	98.51
WF01B	F13	WF01B04F	2.18	08/27/01	Scrippsiella trochoidea	3484.62
WF01B	F13	WF01B04F	2.18	08/27/01	Skeletonema costatum	142.11
WF01B	F13	WF01B04F	2.18	08/27/01	Thalassionema nitzschioides	619.15
WF01B	F13	WF01B04F	2.18	08/27/01	Thalassiosira sp. group 3 10-20 microns	524.46
WF01B	F13	WF01B04F	2.18	08/27/01	Unid. micro-phytoflag sp. group 1 length	34905.12
WF01B	F13	WF01B04F	2.18	08/27/01	Unid. micro-phytoflag sp. group 2 length	312.18
WF01B	F22	WF01B075	26.18	08/27/01	Centric diatom sp. group 1 diam <10 micr	144.23
WF01B	F22	WF01B075	26.18	08/27/01	Ceratium longipes	1217.12
WF01B	F22	WF01B075	26.18	08/27/01	Ceratium tripos	2814.88
WF01B	F22	WF01B075	26.18	08/27/01	Chaetoceros compressus	444.24
WF01B	F22	WF01B075	26.18	08/27/01	Corethron criophilum	377.74
WF01B	F22	WF01B075	26.18	08/27/01	Cryptomonas sp. group 1 length <10 micro	1074.81
WF01B	F22	WF01B075	26.18	08/27/01	Dictyocha speculum	29.73
WF01B	F22	WF01B075	26.18	08/27/01	Guinardia delicatula	55.99
WF01B	F22	WF01B075	26.18	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	4523.59
WF01B	F22	WF01B075	26.18	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	490.45
WF01B	F22	WF01B075	26.18	08/27/01	Heterocapsa rotundata	52.37
WF01B	F22	WF01B075	26.18	08/27/01	Pennate diatom sp. group 2 10-30 microns	28.41
WF01B	F22	WF01B075	26.18	08/27/01	Proboscia alata	674.55
WF01B	F22	WF01B075	26.18	08/27/01	Pseudonitzschia delicatissima	12.96
WF01B	F22	WF01B075	26.18	08/27/01	Thalassionema nitzschioides	10.33
WF01B	F22	WF01B075	26.18	08/27/01	Thalassiosira sp. group 3 10-20 microns	131.44
WF01B	F22	WF01B075	26.18	08/27/01	Unid. micro-phytoflag sp. group 1 length	26159.74
WF01B	F22	WF01B075	26.18	08/27/01	Unid. micro-phytoflag sp. group 2 length	937.23
WF01B	F22	WF01B077	2.6	08/27/01	Centric diatom sp. group 1 diam <10 micr	100.49
WF01B	F22	WF01B077	2.6	08/27/01	Cryptomonas sp. group 1 length <10 micro	641.58
WF01B	F22	WF01B077	2.6	08/27/01	Cryptomonas sp. group 2 length >10 micro	100.49
WF01B	F22	WF01B077	2.6	08/27/01	Dactyliosolen fragilissimus	35882.41
WF01B	F22	WF01B077	2.6	08/27/01	Dinoflagellate spp.	234.42
WF01B	F22	WF01B077	2.6	08/27/01	Guinardia delicatula	682.74
WF01B	F22	WF01B077	2.6	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	4931.71
WF01B	F22	WF01B077	2.6	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	1196.03
WF01B	F22	WF01B077	2.6	08/27/01	Gyrodinium sp. group 2 21-40 microns wid	1196.03
WF01B	F22	WF01B077	2.6	08/27/01	Heterocapsa rotundata	51.08
WF01B	F22	WF01B077	2.6	08/27/01	Leptocylindrus danicus	7057.26
WF01B	F22	WF01B077	2.6	08/27/01	Leptocylindrus minimus	199.56

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F22	WF01B077	2.6	08/27/01	Proboscia alata	16450.02
WF01B	F22	WF01B077	2.6	08/27/01	Pseudonitzschia delicatissima	214.88
WF01B	F22	WF01B077	2.6	08/27/01	Skeletonema costatum	971.11
WF01B	F22	WF01B077	2.6	08/27/01	Thalassionema nitzschioides	100.73
WF01B	F22	WF01B077	2.6	08/27/01	Unid. micro-phytoflag sp. group 1 length	20786.68
WF01B	N16	WF01B084	15.	08/27/01	Amphidinium spp.	24.43
WF01B	N16	WF01B084	15.	08/27/01	Calycomonas wulffii	17.99
WF01B	N16	WF01B084	15.	08/27/01	Centric diatom sp. group 1 diam <10 micr	99.24
WF01B	N16	WF01B084	15.	08/27/01	Centric diatom sp. group 2 diam 10-30 mi	17.05
WF01B	N16	WF01B084	15.	08/27/01	Ceratium longipes	1172.49
WF01B	N16	WF01B084	15.	08/27/01	Ceratium tripos	903.89
WF01B	N16	WF01B084	15.	08/27/01	Cryptomonas sp. group 1 length <10 micro	339.98
WF01B	N16	WF01B084	15.	08/27/01	Cylindrotheca closterium	18.24
WF01B	N16	WF01B084	15.	08/27/01	Dactyliosolen fragilissimus	118.78
WF01B	N16	WF01B084	15.	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	256.34
WF01B	N16	WF01B084	15.	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	1653.63
WF01B	N16	WF01B084	15.	08/27/01	Heterocapsa rotundata	100.89
WF01B	N16	WF01B084	15.	08/27/01	Leptocylindrus danicus	43.49
WF01B	N16	WF01B084	15.	08/27/01	Licmophora spp.	10.91
WF01B	N16	WF01B084	15.	08/27/01	Pennate diatom sp. group 2 10-30 microns	7.82
WF01B	N16	WF01B084	15.	08/27/01	Prorocentrum minimum	18.36
WF01B	N16	WF01B084	15.	08/27/01	Pseudonitzschia delicatissima	50.02
WF01B	N16	WF01B084	15.	08/27/01	Thalassionema nitzschioides	4.97
WF01B	N16	WF01B084	15.	08/27/01	Unid. micro-phytoflag sp. group 1 length	10835.78
WF01B	N16	WF01B087	2.11	08/27/01	Calycomonas ovalis	13.12
WF01B	N16	WF01B087	2.11	08/27/01	Calycomonas wulffii	12.82
WF01B	N16	WF01B087	2.11	08/27/01	Centric diatom sp. group 1 diam <10 micr	311.18
WF01B	N16	WF01B087	2.11	08/27/01	Centric diatom sp. group 2 diam 10-30 mi	40.50
WF01B	N16	WF01B087	2.11	08/27/01	Chaetoceros sp. group 2 diam 10-30 micro	577.39
WF01B	N16	WF01B087	2.11	08/27/01	Cryptomonas sp. group 1 length <10 micro	671.77
WF01B	N16	WF01B087	2.11	08/27/01	Cylindrotheca closterium	173.27
WF01B	N16	WF01B087	2.11	08/27/01	Dactyliosolen fragilissimus	10439.58
WF01B	N16	WF01B087	2.11	08/27/01	Dictyocha speculum	68.03
WF01B	N16	WF01B087	2.11	08/27/01	Guinardia delicatula	320.32
WF01B	N16	WF01B087	2.11	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	4201.40
WF01B	N16	WF01B087	2.11	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	1683.43
WF01B	N16	WF01B087	2.11	08/27/01	Leptocylindrus danicus	4338.47
WF01B	N16	WF01B087	2.11	08/27/01	Leptocylindrus minimus	290.74
WF01B	N16	WF01B087	2.11	08/27/01	Pleurosigma spp.	238.31
WF01B	N16	WF01B087	2.11	08/27/01	Proboscia alata	33186.87
WF01B	N16	WF01B087	2.11	08/27/01	Prorocentrum micans	175.08
WF01B	N16	WF01B087	2.11	08/27/01	Pseudonitzschia delicatissima	100.82
WF01B	N16	WF01B087	2.11	08/27/01	Pseudonitzschia pungens	56.91
WF01B	N16	WF01B087	2.11	08/27/01	Rhizosolenia setigera	396.06
WF01B	N16	WF01B087	2.11	08/27/01	Scrippsiella trochoidea	1196.97
WF01B	N16	WF01B087	2.11	08/27/01	Skeletonema costatum	65.09
WF01B	N16	WF01B087	2.11	08/27/01	Unid. micro-phytoflag sp. group 1 length	20827.40
WF01B	N16	WF01B087	2.11	08/27/01	Unid. micro-phytoflag sp. group 2 length	214.46
WF01B	F24	WF01B0B7	8.08	08/27/01	Amphidinium crassum	410.33
WF01B	F24	WF01B0B7	8.08	08/27/01	Centric diatom sp. group 1 diam <10 micr	154.78

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F24	WF01B0B7	8.08	08/27/01	Centric diatom sp. group 2 diam 10-30 mi	56.98
WF01B	F24	WF01B0B7	8.08	08/27/01	Ceratium longipes	1306.18
WF01B	F24	WF01B0B7	8.08	08/27/01	Ceratium tripos	1006.95
WF01B	F24	WF01B0B7	8.08	08/27/01	Cryptomonas sp. group 1 length <10 micro	533.69
WF01B	F24	WF01B0B7	8.08	08/27/01	Cylindrotheca closterium	182.83
WF01B	F24	WF01B0B7	8.08	08/27/01	Dactyliosolen fragilissimus	1058.59
WF01B	F24	WF01B0B7	8.08	08/27/01	Ebria tripartita	64.75
WF01B	F24	WF01B0B7	8.08	08/27/01	Grammatophora marina	25.64
WF01B	F24	WF01B0B7	8.08	08/27/01	Guinardia delicatula	150.23
WF01B	F24	WF01B0B7	8.08	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	1427.82
WF01B	F24	WF01B0B7	8.08	08/27/01	Gymnodinium sp. group 2 21-40 microns wi	263.17
WF01B	F24	WF01B0B7	8.08	08/27/01	Heterocapsa rotundata	505.78
WF01B	F24	WF01B0B7	8.08	08/27/01	Leptocylindrus danicus	1792.45
WF01B	F24	WF01B0B7	8.08	08/27/01	Leptocylindrus minimus	39.29
WF01B	F24	WF01B0B7	8.08	08/27/01	Licmophora spp.	24.32
WF01B	F24	WF01B0B7	8.08	08/27/01	Pennate diatom sp. group 2 10-30 microns	4.36
WF01B	F24	WF01B0B7	8.08	08/27/01	Proboscia alata	361.96
WF01B	F24	WF01B0B7	8.08	08/27/01	Prorocentrum minimum	61.35
WF01B	F24	WF01B0B7	8.08	08/27/01	Pseudonitzschia delicatissima	5.56
WF01B	F24	WF01B0B7	8.08	08/27/01	Skeletonema costatum	33.01
WF01B	F24	WF01B0B7	8.08	08/27/01	Thalassionema nitzschioides	33.25
WF01B	F24	WF01B0B7	8.08	08/27/01	Unid. micro-phytoflag sp. group 1 length	10465.41
WF01B	F24	WF01B0B7	8.08	08/27/01	Unid. micro-phytoflag sp. group 2 length	1005.81
WF01B	F24	WF01B0B9	2.	08/27/01	Amphidinium crassum	414.44
WF01B	F24	WF01B0B9	2.	08/27/01	Centric diatom sp. group 1 diam <10 micr	625.33
WF01B	F24	WF01B0B9	2.	08/27/01	Cerataulina pelagica	28773.73
WF01B	F24	WF01B0B9	2.	08/27/01	Ceratium tripos	5085.21
WF01B	F24	WF01B0B9	2.	08/27/01	Chaetoceros sp. group 2 diam 10-30 micro	910.13
WF01B	F24	WF01B0B9	2.	08/27/01	Cryptomonas sp. group 1 length <10 micro	1408.45
WF01B	F24	WF01B0B9	2.	08/27/01	Cylindrotheca closterium	1949.24
WF01B	F24	WF01B0B9	2.	08/27/01	Dactyliosolen fragilissimus	24990.05
WF01B	F24	WF01B0B9	2.	08/27/01	Gymnodinium sp. group 1 5-20 microns wid	6922.22
WF01B	F24	WF01B0B9	2.	08/27/01	Heterocapsa rotundata	170.28
WF01B	F24	WF01B0B9	2.	08/27/01	Heterocapsa triquetra	1015.78
WF01B	F24	WF01B0B9	2.	08/27/01	Leptocylindrus danicus	83321.22
WF01B	F24	WF01B0B9	2.	08/27/01	Leptocylindrus minimus	560.21
WF01B	F24	WF01B0B9	2.	08/27/01	Licmophora spp.	246.02
WF01B	F24	WF01B0B9	2.	08/27/01	Proboscia alata	5483.75
WF01B	F24	WF01B0B9	2.	08/27/01	Prorocentrum minimum	413.77
WF01B	F24	WF01B0B9	2.	08/27/01	Pseudonitzschia delicatissima	98.32
WF01B	F24	WF01B0B9	2.	08/27/01	Skeletonema costatum	269.32
WF01B	F24	WF01B0B9	2.	08/27/01	Thalassionema nitzschioides	560.62
WF01B	F24	WF01B0B9	2.	08/27/01	Thalassiosira sp. group 3 10-20 microns	35.56
WF01B	F24	WF01B0B9	2.	08/27/01	Unid. micro-phytoflag sp. group 1 length	16946.03
WF01B	F24	WF01B0B9	2.	08/27/01	Unid. micro-phytoflag sp. group 2 length	677.26
WF01B	F31	WF01B0C9	8.48	08/28/01	Calycomonas wulffii	55.63
WF01B	F31	WF01B0C9	8.48	08/28/01	Centric diatom sp. group 1 diam <10 micr	1810.99
WF01B	F31	WF01B0C9	8.48	08/28/01	Cerataulina pelagica	453347.35
WF01B	F31	WF01B0C9	8.48	08/28/01	Cryptomonas sp. group 1 length <10 micro	1720.68
WF01B	F31	WF01B0C9	8.48	08/28/01	Cryptomonas sp. group 2 length >10 micro	153.47

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F31	WF01B0C9	8.48	08/28/01	Cylindrotheca closterium	2824.77
WF01B	F31	WF01B0C9	8.48	08/28/01	Ebria tripartita	898.79
WF01B	F31	WF01B0C9	8.48	08/28/01	Eucampia cornuta	
WF01B	F31	WF01B0C9	8.48	08/28/01	Guinardia delicatula	5839.06
WF01B	F31	WF01B0C9	8.48	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	7135.37
WF01B	F31	WF01B0C9	8.48	08/28/01	Gymnodinium sp. group 2 21-40 microns wi	3653.20
WF01B	F31	WF01B0C9	8.48	08/28/01	Heterocapsa rotundata	546.08
WF01B	F31	WF01B0C9	8.48	08/28/01	Leptocylindrus danicus	67921.61
WF01B	F31	WF01B0C9	8.48	08/28/01	Leptocylindrus minimus	1122.85
WF01B	F31	WF01B0C9	8.48	08/28/01	Pseudonitzschia delicatissima	309.39
WF01B	F31	WF01B0C9	8.48	08/28/01	Skeletonema costatum	352.53
WF01B	F31	WF01B0C9	8.48	08/28/01	Thalassionema nitzschioides	1078.71
WF01B	F31	WF01B0C9	8.48	08/28/01	Thalassiosira sp. group 3 10-20 microns	293.21
WF01B	F31	WF01B0C9	8.48	08/28/01	Unid. micro-phytoflag sp. group 1 length	27287.50
WF01B	F31	WF01B0CA	1.96	08/28/01	Calycomonas ovalis	42.90
WF01B	F31	WF01B0CA	1.96	08/28/01	Calycomonas wulffii	20.95
WF01B	F31	WF01B0CA	1.96	08/28/01	Centric diatom sp. group 1 diam <10 micr	1710.65
WF01B	F31	WF01B0CA	1.96	08/28/01	Cerataulina pelagica	62981.28
WF01B	F31	WF01B0CA	1.96	08/28/01	Ceratium longipes	6827.74
WF01B	F31	WF01B0CA	1.96	08/28/01	Cryptomonas sp. group 1 length <10 micro	2069.81
WF01B	F31	WF01B0CA	1.96	08/28/01	Cryptomonas sp. group 2 length >10 micro	577.92
WF01B	F31	WF01B0CA	1.96	08/28/01	Cylindrotheca closterium	2760.96
WF01B	F31	WF01B0CA	1.96	08/28/01	Dactyliosolen fragilissimus	109933.52
WF01B	F31	WF01B0CA	1.96	08/28/01	Eucampia cornuta	
WF01B	F31	WF01B0CA	1.96	08/28/01	Eutreptia/eutreptiella spp.	42.37
WF01B	F31	WF01B0CA	1.96	08/28/01	Grammatophora marina	268.50
WF01B	F31	WF01B0CA	1.96	08/28/01	Guinardia delicatula	2198.76
WF01B	F31	WF01B0CA	1.96	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	8060.68
WF01B	F31	WF01B0CA	1.96	08/28/01	Heterocapsa rotundata	293.76
WF01B	F31	WF01B0CA	1.96	08/28/01	Leptocylindrus danicus	92331.98
WF01B	F31	WF01B0CA	1.96	08/28/01	Leptocylindrus minimus	2371.77
WF01B	F31	WF01B0CA	1.96	08/28/01	Licmophora spp.	63.55
WF01B	F31	WF01B0CA	1.96	08/28/01	Pennate diatom sp. group 2 10-30 microns	91.22
WF01B	F31	WF01B0CA	1.96	08/28/01	Proboscia alata	1892.04
WF01B	F31	WF01B0CA	1.96	08/28/01	Pseudonitzschia delicatissima	58.15
WF01B	F31	WF01B0CA	1.96	08/28/01	Skeletonema costatum	265.49
WF01B	F31	WF01B0CA	1.96	08/28/01	Thalassionema nitzschioides	724.14
WF01B	F31	WF01B0CA	1.96	08/28/01	Thalassiosira sp. group 3 10-20 microns	147.22
WF01B	F31	WF01B0CA	1.96	08/28/01	Unid. micro-phytoflag sp. group 1 length	20608.65
WF01B	F31	WF01B0CA	1.96	08/28/01	Unid. micro-phytoflag sp. group 2 length	350.51
WF01B	F30	WF01B0DB	4.46	08/28/01	Calycomonas ovalis	21.18
WF01B	F30	WF01B0DB	4.46	08/28/01	Centric diatom sp. group 1 diam <10 micr	1506.76
WF01B	F30	WF01B0DB	4.46	08/28/01	Chaetoceros compressus	351.59
WF01B	F30	WF01B0DB	4.46	08/28/01	Chaetoceros sp. group 2 diam 10-30 micro	931.92
WF01B	F30	WF01B0DB	4.46	08/28/01	Cryptomonas sp. group 1 length <10 micro	2150.74
WF01B	F30	WF01B0DB	4.46	08/28/01	Cryptomonas sp. group 2 length >10 micro	342.45
WF01B	F30	WF01B0DB	4.46	08/28/01	Cylindrotheca closterium	1680.77
WF01B	F30	WF01B0DB	4.46	08/28/01	Dactyliosolen fragilissimus	62951.13
WF01B	F30	WF01B0DB	4.46	08/28/01	Ditylum brightwellii	4752.09
WF01B	F30	WF01B0DB	4.46	08/28/01	Guinardia delicatula	775.52

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F30	WF01B0DB	4.46	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	3243.19
WF01B	F30	WF01B0DB	4.46	08/28/01	Gymnodinium sp. group 2 21-40 microns wi	1358.56
WF01B	F30	WF01B0DB	4.46	08/28/01	Heterocapsa rotundata	58.02
WF01B	F30	WF01B0DB	4.46	08/28/01	Leptocylindrus danicus	51103.68
WF01B	F30	WF01B0DB	4.46	08/28/01	Leptocylindrus minimus	811.27
WF01B	F30	WF01B0DB	4.46	08/28/01	Pennate diatom sp. group 2 10-30 microns	44.97
WF01B	F30	WF01B0DB	4.46	08/28/01	Prorocentrum micans	423.89
WF01B	F30	WF01B0DB	4.46	08/28/01	Prorocentrum minimum	422.97
WF01B	F30	WF01B0DB	4.46	08/28/01	Pseudonitzschia delicatissima	43.07
WF01B	F30	WF01B0DB	4.46	08/28/01	Skeletonema costatum	3329.89
WF01B	F30	WF01B0DB	4.46	08/28/01	Thalassionema nitzschioides	486.30
WF01B	F30	WF01B0DB	4.46	08/28/01	Thalassiosira sp. group 3 10-20 microns	72.69
WF01B	F30	WF01B0DB	4.46	08/28/01	Unid. micro-phytoflag sp. group 1 length	19266.40
WF01B	F30	WF01B0DB	4.46	08/28/01	Unid. micro-phytoflag sp. group 2 length	346.15
WF01B	F30	WF01B0DC	1.9	08/28/01	Calycomonas wulffii	30.05
WF01B	F30	WF01B0DC	1.9	08/28/01	Centric diatom sp. group 1 diam <10 micr	1359.87
WF01B	F30	WF01B0DC	1.9	08/28/01	Cerataulina pelagica	1187.01
WF01B	F30	WF01B0DC	1.9	08/28/01	Chaetoceros sp. group 2 diam 10-30 micro	1351.65
WF01B	F30	WF01B0DC	1.9	08/28/01	Cocconeis scutellum	615.58
WF01B	F30	WF01B0DC	1.9	08/28/01	Cryptomonas sp. group 1 length <10 micro	2195.01
WF01B	F30	WF01B0DC	1.9	08/28/01	Cryptomonas sp. group 2 length >10 micro	165.84
WF01B	F30	WF01B0DC	1.9	08/28/01	Cylindrotheca closterium	5494.21
WF01B	F30	WF01B0DC	1.9	08/28/01	Ebria tripartita	485.60
WF01B	F30	WF01B0DC	1.9	08/28/01	Eucampia cornuta	
WF01B	F30	WF01B0DC	1.9	08/28/01	Guinardia delicatula	1577.37
WF01B	F30	WF01B0DC	1.9	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	2998.42
WF01B	F30	WF01B0DC	1.9	08/28/01	Gymnodinium sp. group 2 21-40 microns wi	5921.27
WF01B	F30	WF01B0DC	1.9	08/28/01	Heterocapsa rotundata	505.78
WF01B	F30	WF01B0DC	1.9	08/28/01	Leptocylindrus danicus	42146.81
WF01B	F30	WF01B0DC	1.9	08/28/01	Leptocylindrus minimus	710.65
WF01B	F30	WF01B0DC	1.9	08/28/01	Pennate diatom sp. group 2 10-30 microns	32.66
WF01B	F30	WF01B0DC	1.9	08/28/01	Prorocentrum minimum	614.50
WF01B	F30	WF01B0DC	1.9	08/28/01	Skeletonema costatum	15491.64
WF01B	F30	WF01B0DC	1.9	08/28/01	Thalassionema nitzschioides	1165.62
WF01B	F30	WF01B0DC	1.9	08/28/01	Thalassiosira sp. group 3 10-20 microns	211.58
WF01B	F30	WF01B0DC	1.9	08/28/01	Unid. micro-phytoflag sp. group 1 length	22758.11
WF01B	F26	WF01B0F6	9.02	08/28/01	Amphidinium crassum	88.27
WF01B	F26	WF01B0F6	9.02	08/28/01	Calycomonas ovalis	29.47
WF01B	F26	WF01B0F6	9.02	08/28/01	Centric diatom sp. group 1 diam <10 micr	158.82
WF01B	F26	WF01B0F6	9.02	08/28/01	Ceratium fusus	564.48
WF01B	F26	WF01B0F6	9.02	08/28/01	Ceratium tripos	2892.92
WF01B	F26	WF01B0F6	9.02	08/28/01	Cryptomonas sp. group 1 length <10 micro	717.17
WF01B	F26	WF01B0F6	9.02	08/28/01	Cylindrotheca closterium	29.18
WF01B	F26	WF01B0F6	9.02	08/28/01	Ebria tripartita	93.01
WF01B	F26	WF01B0F6	9.02	08/28/01	Guinardia delicatula	864.63
WF01B	F26	WF01B0F6	9.02	08/28/01	Guinardia flaccida	2622.27
WF01B	F26	WF01B0F6	9.02	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	2461.23
WF01B	F26	WF01B0F6	9.02	08/28/01	Gymnodinium sp. group 2 21-40 microns wi	1890.17
WF01B	F26	WF01B0F6	9.02	08/28/01	Heterocapsa rotundata	12.09
WF01B	F26	WF01B0F6	9.02	08/28/01	Leptocylindrus danicus	4418.94

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F26	WF01B0F6	9.02	08/28/01	Leptocylindrus minimus	6.64
WF01B	F26	WF01B0F6	9.02	08/28/01	Licmophora spp.	69.86
WF01B	F26	WF01B0F6	9.02	08/28/01	Pennate diatom sp. group 2 10-30 microns	6.26
WF01B	F26	WF01B0F6	9.02	08/28/01	Proboscia alata	1559.82
WF01B	F26	WF01B0F6	9.02	08/28/01	Pseudonitzschia delicatissima	43.95
WF01B	F26	WF01B0F6	9.02	08/28/01	Skeletonema costatum	14.59
WF01B	F26	WF01B0F6	9.02	08/28/01	Thalassionema nitzschioides	15.92
WF01B	F26	WF01B0F6	9.02	08/28/01	Unid. micro-phytoflag sp. group 1 length	13919.73
WF01B	F26	WF01B0F6	9.02	08/28/01	Unid. micro-phytoflag sp. group 2 length	1444.82
WF01B	F26	WF01B0F7	2.05	08/28/01	Amphidinium crassum	391.17
WF01B	F26	WF01B0F7	2.05	08/28/01	Centric diatom sp. group 1 diam <10 micr	231.87
WF01B	F26	WF01B0F7	2.05	08/28/01	Cerataulina pelagica	1005.83
WF01B	F26	WF01B0F7	2.05	08/28/01	Ceratium longipes	8301.10
WF01B	F26	WF01B0F7	2.05	08/28/01	Chaetoceros sp. group 2 diam 10-30 micro	143.17
WF01B	F26	WF01B0F7	2.05	08/28/01	Cryptomonas sp. group 1 length <10 micro	919.05
WF01B	F26	WF01B0F7	2.05	08/28/01	Cylindrotheca closterium	129.11
WF01B	F26	WF01B0F7	2.05	08/28/01	Dactyliosolen fragilissimus	16538.80
WF01B	F26	WF01B0F7	2.05	08/28/01	Eutreptia/eutreptiella spp.	25.75
WF01B	F26	WF01B0F7	2.05	08/28/01	Guinardia delicatula	286.42
WF01B	F26	WF01B0F7	2.05	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	3538.93
WF01B	F26	WF01B0F7	2.05	08/28/01	Gymnodinium sp. group 2 21-40 microns wi	836.25
WF01B	F26	WF01B0F7	2.05	08/28/01	Gyrodinium spirale	3680.46
WF01B	F26	WF01B0F7	2.05	08/28/01	Heterocapsa rotundata	53.57
WF01B	F26	WF01B0F7	2.05	08/28/01	Leptocylindrus danicus	8389.69
WF01B	F26	WF01B0F7	2.05	08/28/01	Leptocylindrus minimus	154.22
WF01B	F26	WF01B0F7	2.05	08/28/01	Proboscia alata	3450.49
WF01B	F26	WF01B0F7	2.05	08/28/01	Prorocentrum minimum	64.98
WF01B	F26	WF01B0F7	2.05	08/28/01	Pseudonitzschia delicatissima	79.54
WF01B	F26	WF01B0F7	2.05	08/28/01	Thalassionema nitzschioides	17.61
WF01B	F26	WF01B0F7	2.05	08/28/01	Thalassiosira sp. group 3 10-20 microns	44.75
WF01B	F26	WF01B0F7	2.05	08/28/01	Unid. micro-phytoflag sp. group 1 length	14938.47
WF01B	F27	WF01B103	20.94	08/28/01	Amphidinium crassum	430.19
WF01B	F27	WF01B103	20.94	08/28/01	Centric diatom sp. group 1 diam <10 micr	115.91
WF01B	F27	WF01B103	20.94	08/28/01	Ceratium longipes	1369.40
WF01B	F27	WF01B103	20.94	08/28/01	Ceratium tripos	1055.69
WF01B	F27	WF01B103	20.94	08/28/01	Corethron criophilum	4674.98
WF01B	F27	WF01B103	20.94	08/28/01	Cryptomonas sp. group 1 length <10 micro	884.40
WF01B	F27	WF01B103	20.94	08/28/01	Cylindrotheca closterium	255.58
WF01B	F27	WF01B103	20.94	08/28/01	Dactyliosolen fragilissimus	832.37
WF01B	F27	WF01B103	20.94	08/28/01	Dictyocha speculum	200.68
WF01B	F27	WF01B103	20.94	08/28/01	Guinardia delicatula	94.50
WF01B	F27	WF01B103	20.94	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	4790.16
WF01B	F27	WF01B103	20.94	08/28/01	Gymnodinium sp. group 2 21-40 microns wi	2207.24
WF01B	F27	WF01B103	20.94	08/28/01	Gyrodinium sp. group 2 21-40 microns wid	275.90
WF01B	F27	WF01B103	20.94	08/28/01	Heterocapsa rotundata	58.92
WF01B	F27	WF01B103	20.94	08/28/01	Leptocylindrus danicus	1017.50
WF01B	F27	WF01B103	20.94	08/28/01	Leptocylindrus minimus	4.85
WF01B	F27	WF01B103	20.94	08/28/01	Pennate diatom sp. group 2 10-30 microns	91.47
WF01B	F27	WF01B103	20.94	08/28/01	Prorocentrum minimum	42.88
WF01B	F27	WF01B103	20.94	08/28/01	Protoperidinium sp. group 2 31-75 micron	770.14

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F27	WF01B103	20.94	08/28/01	Pseudonitzschia delicatissima	186.61
WF01B	F27	WF01B103	20.94	08/28/01	Thalassionema nitzschioides	23.24
WF01B	F27	WF01B103	20.94	08/28/01	Thalassiosira sp. group 3 10-20 microns	59.05
WF01B	F27	WF01B103	20.94	08/28/01	Unid. micro-phytoflag sp. group 1 length	15848.36
WF01B	F27	WF01B103	20.94	08/28/01	Unid. micro-phytoflag sp. group 2 length	1054.49
WF01B	F27	WF01B104	2.34	08/28/01	Amphidinium crassum	409.36
WF01B	F27	WF01B104	2.34	08/28/01	Calycomonas ovalis	40.93
WF01B	F27	WF01B104	2.34	08/28/01	Centric diatom sp. group 1 diam <10 micr	308.83
WF01B	F27	WF01B104	2.34	08/28/01	Cerataulina pelagica	12652.67
WF01B	F27	WF01B104	2.34	08/28/01	Ceratium fusus	3920.31
WF01B	F27	WF01B104	2.34	08/28/01	Cryptomonas sp. group 1 length <10 micro	1253.77
WF01B	F27	WF01B104	2.34	08/28/01	Cylindrotheca closterium	406.01
WF01B	F27	WF01B104	2.34	08/28/01	Dactyliosolen fragilissimus	45763.64
WF01B	F27	WF01B104	2.34	08/28/01	Gymnodinium sp. group 1 5-20 microns wid	4843.07
WF01B	F27	WF01B104	2.34	08/28/01	Gyrodinium spirale	23148.77
WF01B	F27	WF01B104	2.34	08/28/01	Heterocapsa rotundata	56.06
WF01B	F27	WF01B104	2.34	08/28/01	Leptocylindrus danicus	28031.27
WF01B	F27	WF01B104	2.34	08/28/01	Leptocylindrus minimus	230.56
WF01B	F27	WF01B104	2.34	08/28/01	Licmophora spp.	121.29
WF01B	F27	WF01B104	2.34	08/28/01	Proboscia alata	7221.96
WF01B	F27	WF01B104	2.34	08/28/01	Pseudonitzschia delicatissima	222.35
WF01B	F27	WF01B104	2.34	08/28/01	Skeletonema costatum	355.29
WF01B	F27	WF01B104	2.34	08/28/01	Thalassionema nitzschioides	165.84
WF01B	F27	WF01B104	2.34	08/28/01	Unid. micro-phytoflag sp. group 1 length	26902.50
WF01B	F27	WF01B104	2.34	08/28/01	Unid. micro-phytoflag sp. group 2 length	334.47
WF01B	F23	WF01B145	13.4	08/29/01	Calycomonas wulffii	38.62
WF01B	F23	WF01B145	13.4	08/29/01	Centric diatom sp. group 1 diam <10 micr	831.00
WF01B	F23	WF01B145	13.4	08/29/01	Cerataulina pelagica	12221.54
WF01B	F23	WF01B145	13.4	08/29/01	Chaetoceros compressus	2629.64
WF01B	F23	WF01B145	13.4	08/29/01	Chaetoceros didymus	47.63
WF01B	F23	WF01B145	13.4	08/29/01	Cryptomonas sp. group 1 length <10 micro	1128.10
WF01B	F23	WF01B145	13.4	08/29/01	Cryptomonas sp. group 2 length >10 micro	106.54
WF01B	F23	WF01B145	13.4	08/29/01	Cylindrotheca closterium	880.92
WF01B	F23	WF01B145	13.4	08/29/01	Dactyliosolen fragilissimus	63011.95
WF01B	F23	WF01B145	13.4	08/29/01	Dictyocha speculum	615.90
WF01B	F23	WF01B145	13.4	08/29/01	Ebria tripartita	623.92
WF01B	F23	WF01B145	13.4	08/29/01	Guinardia delicatula	1737.15
WF01B	F23	WF01B145	13.4	08/29/01	Gymnodinium sp. group 1 5-20 microns wid	1651.08
WF01B	F23	WF01B145	13.4	08/29/01	Gymnodinium sp. group 2 21-40 microns wi	2535.98
WF01B	F23	WF01B145	13.4	08/29/01	Heterocapsa rotundata	162.46
WF01B	F23	WF01B145	13.4	08/29/01	Leptocylindrus danicus	5611.38
WF01B	F23	WF01B145	13.4	08/29/01	Leptocylindrus minimus	634.70
WF01B	F23	WF01B145	13.4	08/29/01	Pennate diatom sp. group 2 10-30 microns	20.98
WF01B	F23	WF01B145	13.4	08/29/01	Pseudonitzschia delicatissima	26.80
WF01B	F23	WF01B145	13.4	08/29/01	Skeletonema costatum	599.56
WF01B	F23	WF01B145	13.4	08/29/01	Thalassionema nitzschioides	855.79
WF01B	F23	WF01B145	13.4	08/29/01	Thalassiosira sp. group 3 10-20 microns	135.69
WF01B	F23	WF01B145	13.4	08/29/01	Unid. micro-phytoflag sp. group 1 length	16274.49
WF01B	F23	WF01B147	2.31	08/29/01	Calycomonas ovalis	26.51
WF01B	F23	WF01B147	2.31	08/29/01	Calycomonas wulffii	25.89

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F23	WF01B147	2.31	08/29/01	Centric diatom sp. group 1 diam <10 micr	1171.44
WF01B	F23	WF01B147	2.31	08/29/01	Cerataulina pelagica	22495.61
WF01B	F23	WF01B147	2.31	08/29/01	Cocconeis scutellum	530.28
WF01B	F23	WF01B147	2.31	08/29/01	Cryptomonas sp. group 1 length <10 micro	2980.88
WF01B	F23	WF01B147	2.31	08/29/01	Cryptomonas sp. group 2 length >10 micro	142.86
WF01B	F23	WF01B147	2.31	08/29/01	Cylindrotheca closterium	1968.73
WF01B	F23	WF01B147	2.31	08/29/01	Dactyliosolen fragilissimus	99336.71
WF01B	F23	WF01B147	2.31	08/29/01	Eucampia cornuta	
WF01B	F23	WF01B147	2.31	08/29/01	Guinardia delicatula	2135.25
WF01B	F23	WF01B147	2.31	08/29/01	Gymnodinium sp. group 1 5-20 microns wid	1844.95
WF01B	F23	WF01B147	2.31	08/29/01	Heterocapsa rotundata	580.92
WF01B	F23	WF01B147	2.31	08/29/01	Leptocylindrus danicus	12050.05
WF01B	F23	WF01B147	2.31	08/29/01	Leptocylindrus minimus	1089.98
WF01B	F23	WF01B147	2.31	08/29/01	Proboscia alata	2338.50
WF01B	F23	WF01B147	2.31	08/29/01	Pseudonitzschia delicatissima	143.99
WF01B	F23	WF01B147	2.31	08/29/01	Skeletonema costatum	1066.46
WF01B	F23	WF01B147	2.31	08/29/01	Thalassionema nitzschioides	680.21
WF01B	F23	WF01B147	2.31	08/29/01	Unid. micro-phytoflag sp. group 1 length	23396.70
WF01B	N04	WF01B179	17.48	08/29/01	Amphidinium crassum	37.70
WF01B	N04	WF01B179	17.48	08/29/01	Centric diatom sp. group 1 diam <10 micr	284.87
WF01B	N04	WF01B179	17.48	08/29/01	Ceratium fusus	723.24
WF01B	N04	WF01B179	17.48	08/29/01	Ceratium longipes	2404.00
WF01B	N04	WF01B179	17.48	08/29/01	Ceratium tripos	1853.28
WF01B	N04	WF01B179	17.48	08/29/01	Cryptomonas sp. group 1 length <10 micro	1885.28
WF01B	N04	WF01B179	17.48	08/29/01	Cylindrotheca closterium	56.08
WF01B	N04	WF01B179	17.48	08/29/01	Dactyliosolen fragilissimus	3252.67
WF01B	N04	WF01B179	17.48	08/29/01	Guinardia delicatula	55.30
WF01B	N04	WF01B179	17.48	08/29/01	Gymnodinium sp. group 1 5-20 microns wid	1576.73
WF01B	N04	WF01B179	17.48	08/29/01	Gymnodinium sp. group 2 21-40 microns wi	726.53
WF01B	N04	WF01B179	17.48	08/29/01	Heterocapsa rotundata	1499.74
WF01B	N04	WF01B179	17.48	08/29/01	Leptocylindrus danicus	289.78
WF01B	N04	WF01B179	17.48	08/29/01	Leptocylindrus minimus	8.51
WF01B	N04	WF01B179	17.48	08/29/01	Licmophora spp.	111.89
WF01B	N04	WF01B179	17.48	08/29/01	Proboscia alata	1665.44
WF01B	N04	WF01B179	17.48	08/29/01	Pseudonitzschia delicatissima	5.12
WF01B	N04	WF01B179	17.48	08/29/01	Skeletonema costatum	93.64
WF01B	N04	WF01B179	17.48	08/29/01	Thalassionema nitzschioides	15.30
WF01B	N04	WF01B179	17.48	08/29/01	Thalassiosira sp. group 3 10-20 microns	6.48
WF01B	N04	WF01B179	17.48	08/29/01	Unid. micro-phytoflag sp. group 1 length	20586.29
WF01B	N04	WF01B179	17.48	08/29/01	Unid. micro-phytoflag sp. group 2 length	308.53
WF01B	N04	WF01B17A	2.36	08/29/01	Calycomonas wulffii	38.45
WF01B	N04	WF01B17A	2.36	08/29/01	Centric diatom sp. group 1 diam <10 micr	84.87
WF01B	N04	WF01B17A	2.36	08/29/01	Cerataulina pelagica	6084.68
WF01B	N04	WF01B17A	2.36	08/29/01	Ceratium tripos	6441.27
WF01B	N04	WF01B17A	2.36	08/29/01	Cryptomonas sp. group 1 length <10 micro	870.00
WF01B	N04	WF01B17A	2.36	08/29/01	Cylindrotheca closterium	5068.03
WF01B	N04	WF01B17A	2.36	08/29/01	Dactyliosolen fragilissimus	4937.64
WF01B	N04	WF01B17A	2.36	08/29/01	Guinardia delicatula	385.03
WF01B	N04	WF01B17A	2.36	08/29/01	Gymnodinium sp. group 1 5-20 microns wid	7489.45
WF01B	N04	WF01B17A	2.36	08/29/01	Gymnodinium sp. group 2 21-40 microns wi	1683.43

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	N04	WF01B17A	2.36	08/29/01	Gyrodinium spirale	7409.04
WF01B	N04	WF01B17A	2.36	08/29/01	Leptocylindrus danicus	24522.58
WF01B	N04	WF01B17A	2.36	08/29/01	Leptocylindrus minimus	162.62
WF01B	N04	WF01B17A	2.36	08/29/01	Licmophora spp.	116.66
WF01B	N04	WF01B17A	2.36	08/29/01	Proboscia alata	8103.77
WF01B	N04	WF01B17A	2.36	08/29/01	Pseudonitzschia delicatissima	71.28
WF01B	N04	WF01B17A	2.36	08/29/01	Thalassionema nitzschioides	284.05
WF01B	N04	WF01B17A	2.36	08/29/01	Unid. micro-phytoflag sp. group 1 length	19658.51
WF01B	N18	WF01B1A1	12.97	08/29/01	Amphidinium crassum	297.00
WF01B	N18	WF01B1A1	12.97	08/29/01	Centric diatom sp. group 1 diam <10 micr	503.85
WF01B	N18	WF01B1A1	12.97	08/29/01	Cerataulina pelagica	1366.06
WF01B	N18	WF01B1A1	12.97	08/29/01	Ceratium lineatum	1315.41
WF01B	N18	WF01B1A1	12.97	08/29/01	Ceratium tripos	5214.77
WF01B	N18	WF01B1A1	12.97	08/29/01	Cryptomonas sp. group 1 length <10 micro	2068.43
WF01B	N18	WF01B1A1	12.97	08/29/01	Cryptomonas sp. group 2 length >10 micro	343.54
WF01B	N18	WF01B1A1	12.97	08/29/01	Cylindrotheca closterium	1367.67
WF01B	N18	WF01B1A1	12.97	08/29/01	Dactyliosolen fragilissimus	2893.39
WF01B	N18	WF01B1A1	12.97	08/29/01	Guinardia delicatula	1870.31
WF01B	N18	WF01B1A1	12.97	08/29/01	Gymnodinium sp. group 1 5-20 microns wid	15084.48
WF01B	N18	WF01B1A1	12.97	08/29/01	Gymnodinium sp. group 2 21-40 microns wi	454.30
WF01B	N18	WF01B1A1	12.97	08/29/01	Heterocapsa rotundata	9.68
WF01B	N18	WF01B1A1	12.97	08/29/01	Leptocylindrus danicus	961.72
WF01B	N18	WF01B1A1	12.97	08/29/01	Leptocylindrus minimus	35.91
WF01B	N18	WF01B1A1	12.97	08/29/01	Licmophora spp.	335.81
WF01B	N18	WF01B1A1	12.97	08/29/01	Proboscia alata	6873.13
WF01B	N18	WF01B1A1	12.97	08/29/01	Pseudonitzschia delicatissima	96.02
WF01B	N18	WF01B1A1	12.97	08/29/01	Rhizosolenia hebetata	127.52
WF01B	N18	WF01B1A1	12.97	08/29/01	Thalassionema nitzschioides	66.96
WF01B	N18	WF01B1A1	12.97	08/29/01	Unid. micro-phytoflag sp. group 1 length	42039.31
WF01B	N18	WF01B1A1	12.97	08/29/01	Unid. micro-phytoflag sp. group 2 length	347.26
WF01B	N18	WF01B1A3	2.28	08/29/01	Calycomonas ovalis	23.78
WF01B	N18	WF01B1A3	2.28	08/29/01	Centric diatom sp. group 1 diam <10 micr	128.15
WF01B	N18	WF01B1A3	2.28	08/29/01	Cerataulina pelagica	7350.22
WF01B	N18	WF01B1A3	2.28	08/29/01	Chaetoceros sp. group 2 diam 10-30 micro	1044.46
WF01B	N18	WF01B1A3	2.28	08/29/01	Cryptomonas sp. group 1 length <10 micro	1117.46
WF01B	N18	WF01B1A3	2.28	08/29/01	Cylindrotheca closterium	706.40
WF01B	N18	WF01B1A3	2.28	08/29/01	Dactyliosolen fragilissimus	59816.53
WF01B	N18	WF01B1A3	2.28	08/29/01	Guinardia flaccida	28259.60
WF01B	N18	WF01B1A3	2.28	08/29/01	Gymnodinium sp. group 1 5-20 microns wid	12908.77
WF01B	N18	WF01B1A3	2.28	08/29/01	Gymnodinium sp. group 2 21-40 microns wi	3050.35
WF01B	N18	WF01B1A3	2.28	08/29/01	Leptocylindrus danicus	2807.59
WF01B	N18	WF01B1A3	2.28	08/29/01	Leptocylindrus minimus	375.02
WF01B	N18	WF01B1A3	2.28	08/29/01	Proboscia alata	16809.83
WF01B	N18	WF01B1A3	2.28	08/29/01	Pseudonitzschia delicatissima	193.42
WF01B	N18	WF01B1A3	2.28	08/29/01	Unid. micro-phytoflag sp. group 1 length	39086.71
WF01B	N18	WF01B1A3	2.28	08/29/01	Unid. micro-phytoflag sp. group 2 length	388.61
WF01B	F06	WF01B271	8.47	08/30/01	Calycomonas ovalis	18.89
WF01B	F06	WF01B271	8.47	08/30/01	Centric diatom sp. group 1 diam <10 micr	814.31
WF01B	F06	WF01B271	8.47	08/30/01	Cerataulina pelagica	832.64
WF01B	F06	WF01B271	8.47	08/30/01	Ceratium fusus	7247.97

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F06	WF01B271	8.47	08/30/01	Ceratium tripos	18572.61
WF01B	F06	WF01B271	8.47	08/30/01	Chaetoceros sp. group 2 diam 10-30 micro	237.03
WF01B	F06	WF01B271	8.47	08/30/01	Cryptomonas sp. group 1 length <10 micro	1886.16
WF01B	F06	WF01B271	8.47	08/30/01	Cylindrotheca closterium	347.35
WF01B	F06	WF01B271	8.47	08/30/01	Dactyliosolen fragilissimus	5105.14
WF01B	F06	WF01B271	8.47	08/30/01	Dinophysis norvegica	739.78
WF01B	F06	WF01B271	8.47	08/30/01	Gymnodinium sp. group 1 5-20 microns wid	1314.55
WF01B	F06	WF01B271	8.47	08/30/01	Gymnodinium sp. group 2 21-40 microns wi	1384.52
WF01B	F06	WF01B271	8.47	08/30/01	Gyrodinium spirale	1523.37
WF01B	F06	WF01B271	8.47	08/30/01	Heterocapsa rotundata	51.74
WF01B	F06	WF01B271	8.47	08/30/01	Leptocylindrus danicus	446.02
WF01B	F06	WF01B271	8.47	08/30/01	Leptocylindrus minimus	15.20
WF01B	F06	WF01B271	8.47	08/30/01	Licmophora spp.	47.97
WF01B	F06	WF01B271	8.47	08/30/01	Pennate diatom sp. group 2 10-30 microns	11.46
WF01B	F06	WF01B271	8.47	08/30/01	Proboscia alata	476.06
WF01B	F06	WF01B271	8.47	08/30/01	Prorocentrum minimum	80.69
WF01B	F06	WF01B271	8.47	08/30/01	Pseudonitzschia delicatissima	18.29
WF01B	F06	WF01B271	8.47	08/30/01	Rhizosolenia hebetata	97.16
WF01B	F06	WF01B271	8.47	08/30/01	Thalassionema nitzschioides	569.43
WF01B	F06	WF01B271	8.47	08/30/01	Thalassiosira sp. group 3 10-20 microns	83.34
WF01B	F06	WF01B271	8.47	08/30/01	Unid. micro-phytoflag sp. group 1 length	35991.82
WF01B	F06	WF01B272	2.56	08/30/01	Centric diatom sp. group 1 diam <10 micr	332.08
WF01B	F06	WF01B272	2.56	08/30/01	Cerataulina pelagica	3169.25
WF01B	F06	WF01B272	2.56	08/30/01	Cryptomonas sp. group 1 length <10 micro	1137.64
WF01B	F06	WF01B272	2.56	08/30/01	Cylindrotheca closterium	1222.44
WF01B	F06	WF01B272	2.56	08/30/01	Dactyliosolen fragilissimus	18327.36
WF01B	F06	WF01B272	2.56	08/30/01	Gymnodinium sp. group 1 5-20 microns wid	10864.77
WF01B	F06	WF01B272	2.56	08/30/01	Gyrodinium sp. group 2 21-40 microns wid	3952.37
WF01B	F06	WF01B272	2.56	08/30/01	Heterocapsa triquetra	251.31
WF01B	F06	WF01B272	2.56	08/30/01	Leptocylindrus danicus	4971.68
WF01B	F06	WF01B272	2.56	08/30/01	Leptocylindrus minimus	57.85
WF01B	F06	WF01B272	2.56	08/30/01	Proboscia alata	1812.01
WF01B	F06	WF01B272	2.56	08/30/01	Prorocentrum minimum	820.34
WF01B	F06	WF01B272	2.56	08/30/01	Pseudonitzschia delicatissima	55.69
WF01B	F06	WF01B272	2.56	08/30/01	Thalassionema nitzschioides	194.18
WF01B	F06	WF01B272	2.56	08/30/01	Thalassiosira sp. group 3 10-20 microns	35.25
WF01B	F06	WF01B272	2.56	08/30/01	Unid. micro-phytoflag sp. group 1 length	38198.61
WF01B	F02	WF01B29A	9.85	08/30/01	Amphidinium crassum	103.44
WF01B	F02	WF01B29A	9.85	08/30/01	Calycomonas ovalis	20.72
WF01B	F02	WF01B29A	9.85	08/30/01	Centric diatom sp. group 1 diam <10 micr	513.67
WF01B	F02	WF01B29A	9.85	08/30/01	Cerataulina pelagica	3996.35
WF01B	F02	WF01B29A	9.85	08/30/01	Ceratium fusus	15902.76
WF01B	F02	WF01B29A	9.85	08/30/01	Ceratium longipes	13192.67
WF01B	F02	WF01B29A	9.85	08/30/01	Ceratium tripos	25426.06
WF01B	F02	WF01B29A	9.85	08/30/01	Corethron criophilum	2047.20
WF01B	F02	WF01B29A	9.85	08/30/01	Cryptomonas sp. group 1 length <10 micro	1460.62
WF01B	F02	WF01B29A	9.85	08/30/01	Cylindrotheca closterium	205.18
WF01B	F02	WF01B29A	9.85	08/30/01	Dactyliosolen fragilissimus	25393.57
WF01B	F02	WF01B29A	9.85	08/30/01	Dictyocha speculum	161.12
WF01B	F02	WF01B29A	9.85	08/30/01	Ebria tripartita	326.98

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F02	WF01B29A	9.85	08/30/01	Eucampia cornuta	
WF01B	F02	WF01B29A	9.85	08/30/01	Guinardia delicatula	455.19
WF01B	F02	WF01B29A	9.85	08/30/01	Gymnodinium sp. group 1 5-20 microns wid	6633.79
WF01B	F02	WF01B29A	9.85	08/30/01	Heterocapsa rotundata	56.76
WF01B	F02	WF01B29A	9.85	08/30/01	Leptocylindrus minimus	46.68
WF01B	F02	WF01B29A	9.85	08/30/01	Proboscia alata	1827.92
WF01B	F02	WF01B29A	9.85	08/30/01	Prorocentrum minimum	1858.85
WF01B	F02	WF01B29A	9.85	08/30/01	Pseudonitzschia delicatissima	14.05
WF01B	F02	WF01B29A	9.85	08/30/01	Thalassionema nitzschioides	1259.27
WF01B	F02	WF01B29A	9.85	08/30/01	Thalassiosira sp. group 3 10-20 microns	106.67
WF01B	F02	WF01B29A	9.85	08/30/01	Unid. micro-phytoflag sp. group 1 length	33388.72
WF01B	F02	WF01B29A	9.85	08/30/01	Unid. micro-phytoflag sp. group 2 length	338.63
WF01B	F02	WF01B29B	2.43	08/30/01	Centric diatom sp. group 1 diam <10 micr	1298.82
WF01B	F02	WF01B29B	2.43	08/30/01	Cerataulina pelagica	11219.88
WF01B	F02	WF01B29B	2.43	08/30/01	Ceratium tripos	10197.78
WF01B	F02	WF01B29B	2.43	08/30/01	Corethron criophilum	4105.41
WF01B	F02	WF01B29B	2.43	08/30/01	Cryptomonas sp. group 1 length <10 micro	1778.38
WF01B	F02	WF01B29B	2.43	08/30/01	Cylindrotheca closterium	2472.98
WF01B	F02	WF01B29B	2.43	08/30/01	Dactyliosolen fragilissimus	40649.64
WF01B	F02	WF01B29B	2.43	08/30/01	Guinardia delicatula	304.28
WF01B	F02	WF01B29B	2.43	08/30/01	Gymnodinium sp. group 1 5-20 microns wid	8386.84
WF01B	F02	WF01B29B	2.43	08/30/01	Gyrodinium sp. group 2 21-40 microns wid	5339.37
WF01B	F02	WF01B29B	2.43	08/30/01	Heterocapsa rotundata	113.83
WF01B	F02	WF01B29B	2.43	08/30/01	Leptocylindrus danicus	2207.78
WF01B	F02	WF01B29B	2.43	08/30/01	Leptocylindrus minimus	46.81
WF01B	F02	WF01B29B	2.43	08/30/01	Prorocentrum minimum	2074.42
WF01B	F02	WF01B29B	2.43	08/30/01	Thalassionema nitzschioides	505.06
WF01B	F02	WF01B29B	2.43	08/30/01	Thalassiosira sp. group 3 10-20 microns	213.91
WF01B	F02	WF01B29B	2.43	08/30/01	Unid. micro-phytoflag sp. group 1 length	47273.67
WF01B	F01	WF01B2AA	10.03	08/30/01	Amphidinium crassum	405.23
WF01B	F01	WF01B2AA	10.03	08/30/01	Calycomonas ovalis	20.26
WF01B	F01	WF01B2AA	10.03	08/30/01	Centric diatom sp. group 1 diam <10 micr	1179.20
WF01B	F01	WF01B2AA	10.03	08/30/01	Cerataulina pelagica	4689.05
WF01B	F01	WF01B2AA	10.03	08/30/01	Cryptomonas sp. group 1 length <10 micro	1547.17
WF01B	F01	WF01B2AA	10.03	08/30/01	Cylindrotheca closterium	802.50
WF01B	F01	WF01B2AA	10.03	08/30/01	Dactyliosolen fragilissimus	40510.91
WF01B	F01	WF01B2AA	10.03	08/30/01	Eucampia cornuta	
WF01B	F01	WF01B2AA	10.03	08/30/01	Guinardia delicatula	890.16
WF01B	F01	WF01B2AA	10.03	08/30/01	Gymnodinium sp. group 1 5-20 microns wid	7332.42
WF01B	F01	WF01B2AA	10.03	08/30/01	Gymnodinium sp. group 2 21-40 microns wi	5206.71
WF01B	F01	WF01B2AA	10.03	08/30/01	Heterocapsa rotundata	499.49
WF01B	F01	WF01B2AA	10.03	08/30/01	Leptocylindrus danicus	3109.78
WF01B	F01	WF01B2AA	10.03	08/30/01	Prorocentrum minimum	404.58
WF01B	F01	WF01B2AA	10.03	08/30/01	Pseudonitzschia delicatissima	27.47
WF01B	F01	WF01B2AA	10.03	08/30/01	Thalassionema nitzschioides	492.52
WF01B	F01	WF01B2AA	10.03	08/30/01	Unid. micro-phytoflag sp. group 1 length	26686.12
WF01B	F01	WF01B2AC	1.98	08/30/01	Amphidinium crassum	414.44
WF01B	F01	WF01B2AC	1.98	08/30/01	Centric diatom sp. group 1 diam <10 micr	1451.67
WF01B	F01	WF01B2AC	1.98	08/30/01	Cerataulina pelagica	63941.62
WF01B	F01	WF01B2AC	1.98	08/30/01	Cryptomonas sp. group 1 length <10 micro	1460.62

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01B	F01	WF01B2AC	1.98	08/30/01	Cyclotella sp. group 1 diam <10 microns	164.48
WF01B	F01	WF01B2AC	1.98	08/30/01	Cylindrotheca closterium	615.55
WF01B	F01	WF01B2AC	1.98	08/30/01	Dactyliosolen fragilissimus	49450.64
WF01B	F01	WF01B2AC	1.98	08/30/01	Guinardia delicatula	2731.16
WF01B	F01	WF01B2AC	1.98	08/30/01	Guinardia flaccida	6145.96
WF01B	F01	WF01B2AC	1.98	08/30/01	Gymnodinium sp. group 1 5-20 microns wid	6056.94
WF01B	F01	WF01B2AC	1.98	08/30/01	Gymnodinium sp. group 2 21-40 microns wi	18606.35
WF01B	F01	WF01B2AC	1.98	08/30/01	Gyrodinium sp. group 2 21-40 microns wid	23922.45
WF01B	F01	WF01B2AC	1.98	08/30/01	Gyrodinium spirale	11698.48
WF01B	F01	WF01B2AC	1.98	08/30/01	Heterocapsa rotundata	56.76
WF01B	F01	WF01B2AC	1.98	08/30/01	Heterocapsa triquetra	507.04
WF01B	F01	WF01B2AC	1.98	08/30/01	Leptocylindrus danicus	5626.97
WF01B	F01	WF01B2AC	1.98	08/30/01	Leptocylindrus minimus	350.13
WF01B	F01	WF01B2AC	1.98	08/30/01	Prorocentrum minimum	413.08
WF01B	F01	WF01B2AC	1.98	08/30/01	Pseudonitzschia delicatissima	28.09
WF01B	F01	WF01B2AC	1.98	08/30/01	Thalassionema nitzschioides	335.81
WF01B	F01	WF01B2AC	1.98	08/30/01	Unid. micro-phytoflag sp. group 1 length	38534.05
WN01C	N18	WN01C04A	13.38	09/17/01	Amphidinium crassum	245.62
WN01C	N18	WN01C04A	13.38	09/17/01	Centric diatom sp. group 1 diam <10 micr	171.77
WN01C	N18	WN01C04A	13.38	09/17/01	Cerataulina pelagica	21789.18
WN01C	N18	WN01C04A	13.38	09/17/01	Ceratium fusus	4712.29
WN01C	N18	WN01C04A	13.38	09/17/01	Coccolithophorida spp.	371.22
WN01C	N18	WN01C04A	13.38	09/17/01	Cryptomonas sp. group 1 length <10 micro	607.99
WN01C	N18	WN01C04A	13.38	09/17/01	Cyclotella sp. group 1 diam <10 microns	116.97
WN01C	N18	WN01C04A	13.38	09/17/01	Cylindrotheca closterium	5715.18
WN01C	N18	WN01C04A	13.38	09/17/01	Dactyliosolen fragilissimus	16897.34
WN01C	N18	WN01C04A	13.38	09/17/01	Guinardia delicatula	359.69
WN01C	N18	WN01C04A	13.38	09/17/01	Gymnodinium sp. group 1 5-20 microns wid	15896.68
WN01C	N18	WN01C04A	13.38	09/17/01	Heterocapsa rotundata	100.92
WN01C	N18	WN01C04A	13.38	09/17/01	Leptocylindrus danicus	27113.01
WN01C	N18	WN01C04A	13.38	09/17/01	Leptocylindrus minimus	69.17
WN01C	N18	WN01C04A	13.38	09/17/01	Licmophora spp.	72.78
WN01C	N18	WN01C04A	13.38	09/17/01	Prorocentrum minimum	980.87
WN01C	N18	WN01C04A	13.38	09/17/01	Prorocentrum triestinum	122.40
WN01C	N18	WN01C04A	13.38	09/17/01	Pseudonitzschia delicatissima	432.85
WN01C	N18	WN01C04A	13.38	09/17/01	Pseudonitzschia pungens	240.06
WN01C	N18	WN01C04A	13.38	09/17/01	Pyrocystis lunula	2385.09
WN01C	N18	WN01C04A	13.38	09/17/01	Rhizosolenia setigera	3335.47
WN01C	N18	WN01C04A	13.38	09/17/01	Scrippsiella trochoidea	2236.35
WN01C	N18	WN01C04A	13.38	09/17/01	Skeletonema costatum	395.22
WN01C	N18	WN01C04A	13.38	09/17/01	Thalassionema nitzschioides	398.69
WN01C	N18	WN01C04A	13.38	09/17/01	Thalassiosira nordenskioldii	65.17
WN01C	N18	WN01C04A	13.38	09/17/01	Thalassiosira rotula	2337.99
WN01C	N18	WN01C04A	13.38	09/17/01	Unid. micro-phytoflag sp. group 1 length	14318.54
WN01C	N18	WN01C04C	2.25	09/17/01	Centric diatom sp. group 1 diam <10 micr	436.63
WN01C	N18	WN01C04C	2.25	09/17/01	Cerataulina pelagica	66222.58
WN01C	N18	WN01C04C	2.25	09/17/01	Chaetoceros didymus	150.41
WN01C	N18	WN01C04C	2.25	09/17/01	Chaetoceros sp. group 1 diam <10 microns	104.63
WN01C	N18	WN01C04C	2.25	09/17/01	Coccolithophorida spp.	1415.40
WN01C	N18	WN01C04C	2.25	09/17/01	Corethron criophilum	3083.97

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01C	N18	WN01C04C	2.25	09/17/01	Cryptomonas sp. group 1 length <10 micro	353.62
WN01C	N18	WN01C04C	2.25	09/17/01	Cyclotella sp. group 1 diam <10 microns	24.78
WN01C	N18	WN01C04C	2.25	09/17/01	Cylindrotheca closterium	5872.81
WN01C	N18	WN01C04C	2.25	09/17/01	Dactyliosolen fragilissimus	2348.91
WN01C	N18	WN01C04C	2.25	09/17/01	Dinoflagellate spp.	786.13
WN01C	N18	WN01C04C	2.25	09/17/01	Gonyaulax polygramma	6817.85
WN01C	N18	WN01C04C	2.25	09/17/01	Guinardia delicatula	685.72
WN01C	N18	WN01C04C	2.25	09/17/01	Gymnodinium sp. group 1 5-20 microns wid	8907.13
WN01C	N18	WN01C04C	2.25	09/17/01	Gyrodinium spirale	17652.63
WN01C	N18	WN01C04C	2.25	09/17/01	Leptocylindrus danicus	28194.07
WN01C	N18	WN01C04C	2.25	09/17/01	Prorocentrum minimum	311.66
WN01C	N18	WN01C04C	2.25	09/17/01	Pseudonitzschia delicatissima	550.13
WN01C	N18	WN01C04C	2.25	09/17/01	Pseudonitzschia pungens	253.82
WN01C	N18	WN01C04C	2.25	09/17/01	Rhizosolenia setigera	4239.23
WN01C	N18	WN01C04C	2.25	09/17/01	Skeletonema costatum	714.83
WN01C	N18	WN01C04C	2.25	09/17/01	Thalassionema nitzschioides	210.78
WN01C	N18	WN01C04C	2.25	09/17/01	Thalassiosira nordenskioldii	82.69
WN01C	N18	WN01C04C	2.25	09/17/01	Unid. micro-phytoflag sp. group 1 length	17439.96
WN01C	N18	WN01C04C	2.25	09/17/01	Unid. micro-phytoflag sp. group 2 length	255.06
WN01C	N04	WN01C079	14.05	09/17/01	Amphidinium spp.	221.15
WN01C	N04	WN01C079	14.05	09/17/01	Centric diatom sp. group 1 diam <10 micr	736.63
WN01C	N04	WN01C079	14.05	09/17/01	Cerataulina pelagica	82302.66
WN01C	N04	WN01C079	14.05	09/17/01	Chaetoceros sp. group 2 diam 10-30 micro	366.09
WN01C	N04	WN01C079	14.05	09/17/01	Cryptomonas sp. group 1 length <10 micro	699.42
WN01C	N04	WN01C079	14.05	09/17/01	Cylindrotheca closterium	5116.99
WN01C	N04	WN01C079	14.05	09/17/01	Dactyliosolen fragilissimus	6809.46
WN01C	N04	WN01C079	14.05	09/17/01	Guinardia delicatula	732.38
WN01C	N04	WN01C079	14.05	09/17/01	Gymnodinium sp. group 1 5-20 microns wid	14617.89
WN01C	N04	WN01C079	14.05	09/17/01	Gyrodinium spirale	9411.09
WN01C	N04	WN01C079	14.05	09/17/01	Leptocylindrus danicus	33852.07
WN01C	N04	WN01C079	14.05	09/17/01	Pennate diatom sp. group 2 10-30 microns	106.16
WN01C	N04	WN01C079	14.05	09/17/01	Pleurosigma spp.	908.13
WN01C	N04	WN01C079	14.05	09/17/01	Prorocentrum minimum	830.77
WN01C	N04	WN01C079	14.05	09/17/01	Pseudonitzschia delicatissima	316.38
WN01C	N04	WN01C079	14.05	09/17/01	Pseudonitzschia pungens	162.66
WN01C	N04	WN01C079	14.05	09/17/01	Rhizosolenia setigera	6036.94
WN01C	N04	WN01C079	14.05	09/17/01	Skeletonema costatum	309.52
WN01C	N04	WN01C079	14.05	09/17/01	Thalassionema nitzschioides	180.10
WN01C	N04	WN01C079	14.05	09/17/01	Thalassiosira sp. group 3 10-20 microns	400.46
WN01C	N04	WN01C079	14.05	09/17/01	Unid. micro-phytoflag sp. group 1 length	20066.45
WN01C	N04	WN01C07B	1.89	09/17/01	Centric diatom sp. group 1 diam <10 micr	172.25
WN01C	N04	WN01C07B	1.89	09/17/01	Cerataulina pelagica	8904.18
WN01C	N04	WN01C07B	1.89	09/17/01	Ceratium tripos	4357.79
WN01C	N04	WN01C07B	1.89	09/17/01	Chaetoceros decipiens	1284.36
WN01C	N04	WN01C07B	1.89	09/17/01	Chaetoceros sp. group 2 diam 10-30 micro	2343.76
WN01C	N04	WN01C07B	1.89	09/17/01	Cryptomonas sp. group 1 length <10 micro	357.62
WN01C	N04	WN01C07B	1.89	09/17/01	Cylindrotheca closterium	791.25
WN01C	N04	WN01C07B	1.89	09/17/01	Dactyliosolen fragilissimus	1717.98
WN01C	N04	WN01C07B	1.89	09/17/01	Guinardia delicatula	1562.94
WN01C	N04	WN01C07B	1.89	09/17/01	Gymnodinium sp. group 1 5-20 microns wid	7167.85

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01C	N04	WN01C07B	1.89	09/17/01	Gymnodinium sp. group 2 21-40 microns wi	4555.65
WN01C	N04	WN01C07B	1.89	09/17/01	Gyrodinium spirale	40167.66
WN01C	N04	WN01C07B	1.89	09/17/01	Leptocylindrus danicus	11006.84
WN01C	N04	WN01C07B	1.89	09/17/01	Pennate diatom sp. group 2 10-30 microns	226.55
WN01C	N04	WN01C07B	1.89	09/17/01	Prorocentrum micans	1423.81
WN01C	N04	WN01C07B	1.89	09/17/01	Pseudonitzschia delicatissima	180.55
WN01C	N04	WN01C07B	1.89	09/17/01	Pseudonitzschia pungens	231.41
WN01C	N04	WN01C07B	1.89	09/17/01	Pyrocystis lunula	574.80
WN01C	N04	WN01C07B	1.89	09/17/01	Rhizosolenia setigera	6441.59
WN01C	N04	WN01C07B	1.89	09/17/01	Scrippsiella trochoidea	1212.66
WN01C	N04	WN01C07B	1.89	09/17/01	Skeletonema costatum	582.48
WN01C	N04	WN01C07B	1.89	09/17/01	Thalassionema nitzschioides	71.94
WN01C	N04	WN01C07B	1.89	09/17/01	Unid. micro-phytoflag sp. group 1 length	9825.08
WN01D	N18	WN01D0C4	8.78	10/09/01	Centric diatom sp. group 1 diam <10 micr	265.34
WN01D	N18	WN01D0C4	8.78	10/09/01	Cerataulina pelagica	791.34
WN01D	N18	WN01D0C4	8.78	10/09/01	Ceratium fusus	7872.48
WN01D	N18	WN01D0C4	8.78	10/09/01	Ceratium longipes	6530.88
WN01D	N18	WN01D0C4	8.78	10/09/01	Ceratium tripos	80691.57
WN01D	N18	WN01D0C4	8.78	10/09/01	Chaetoceros debilis	1112.50
WN01D	N18	WN01D0C4	8.78	10/09/01	Chaetoceros decipiens	3963.67
WN01D	N18	WN01D0C4	8.78	10/09/01	Chaetoceros didymus	2372.58
WN01D	N18	WN01D0C4	8.78	10/09/01	Chaetoceros sp. group 2 diam 10-30 micro	8123.56
WN01D	N18	WN01D0C4	8.78	10/09/01	Corethron criophilum	4053.77
WN01D	N18	WN01D0C4	8.78	10/09/01	Cryptomonas sp. group 1 length <10 micro	1807.66
WN01D	N18	WN01D0C4	8.78	10/09/01	Cylindrotheca closterium	1625.18
WN01D	N18	WN01D0C4	8.78	10/09/01	Dactyliosolen fragilissimus	12570.79
WN01D	N18	WN01D0C4	8.78	10/09/01	Dictyocha fibula	2222.24
WN01D	N18	WN01D0C4	8.78	10/09/01	Gymnodinium sp. group 1 5-20 microns wid	14563.74
WN01D	N18	WN01D0C4	8.78	10/09/01	Gymnodinium sp. group 2 21-40 microns wi	6579.18
WN01D	N18	WN01D0C4	8.78	10/09/01	Gyrodinium sp. group 2 21-40 microns wid	5272.20
WN01D	N18	WN01D0C4	8.78	10/09/01	Gyrodinium spirale	11582.40
WN01D	N18	WN01D0C4	8.78	10/09/01	Heterocapsa rotundata	730.57
WN01D	N18	WN01D0C4	8.78	10/09/01	Leptocylindrus danicus	9325.59
WN01D	N18	WN01D0C4	8.78	10/09/01	Leptocylindrus minimus	242.66
WN01D	N18	WN01D0C4	8.78	10/09/01	Lithodesmium undulatum	5447.83
WN01D	N18	WN01D0C4	8.78	10/09/01	Pennate diatom sp. group 2 10-30 microns	21.78
WN01D	N18	WN01D0C4	8.78	10/09/01	Pleurosigma spp.	2239.06
WN01D	N18	WN01D0C4	8.78	10/09/01	Prorocentrum minimum	102.24
WN01D	N18	WN01D0C4	8.78	10/09/01	Prorocentrum triestinum	409.67
WN01D	N18	WN01D0C4	8.78	10/09/01	Pseudonitzschia delicatissima	542.34
WN01D	N18	WN01D0C4	8.78	10/09/01	Pseudonitzschia pungens	1804.70
WN01D	N18	WN01D0C4	8.78	10/09/01	Rhizosolenia setigera	1857.44
WN01D	N18	WN01D0C4	8.78	10/09/01	Rhizosolenia stolterfothii	3203.18
WN01D	N18	WN01D0C4	8.78	10/09/01	Scrippsiella trochoidea	467.01
WN01D	N18	WN01D0C4	8.78	10/09/01	Skeletonema costatum	901.53
WN01D	N18	WN01D0C4	8.78	10/09/01	Thalassionema nitzschioides	83.12
WN01D	N18	WN01D0C4	8.78	10/09/01	Thalassiosira nordenskioldii	40.76
WN01D	N18	WN01D0C4	8.78	10/09/01	Unid. micro-phytoflag sp. group 1 length	24806.89
WN01D	N18	WN01D0C4	8.78	10/09/01	Unid. micro-phytoflag sp. group 2 length	1005.81
WN01D	N18	WN01D0C6	1.5	10/09/01	Amphidinium crassum	107.07

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01D	N18	WN01D0C6	1.5	10/09/01	Amphidinium spp.	2850.24
WN01D	N18	WN01D0C6	1.5	10/09/01	Centric diatom sp. group 1 diam <10 micr	115.58
WN01D	N18	WN01D0C6	1.5	10/09/01	Centric diatom spp.	208.29
WN01D	N18	WN01D0C6	1.5	10/09/01	Ceratium fusus	2054.12
WN01D	N18	WN01D0C6	1.5	10/09/01	Chaetoceros debilis	1889.98
WN01D	N18	WN01D0C6	1.5	10/09/01	Chaetoceros didymus	1395.24
WN01D	N18	WN01D0C6	1.5	10/09/01	Chaetoceros sp. group 2 diam 10-30 micro	706.55
WN01D	N18	WN01D0C6	1.5	10/09/01	Cryptomonas sp. group 1 length <10 micro	1691.84
WN01D	N18	WN01D0C6	1.5	10/09/01	Cylindrotheca closterium	1486.67
WN01D	N18	WN01D0C6	1.5	10/09/01	Dactyliosolen fragilissimus	32048.51
WN01D	N18	WN01D0C6	1.5	10/09/01	Guinardia delicatula	9737.35
WN01D	N18	WN01D0C6	1.5	10/09/01	Gymnodinium sp. group 1 5-20 microns wid	9851.94
WN01D	N18	WN01D0C6	1.5	10/09/01	Gymnodinium sp. group 2 21-40 microns wi	2751.30
WN01D	N18	WN01D0C6	1.5	10/09/01	Gyrodinium spirale	12108.87
WN01D	N18	WN01D0C6	1.5	10/09/01	Leptocylindrus danicus	3925.11
WN01D	N18	WN01D0C6	1.5	10/09/01	Leptocylindrus minimus	169.13
WN01D	N18	WN01D0C6	1.5	10/09/01	Lithodesmium undulatum	4556.36
WN01D	N18	WN01D0C6	1.5	10/09/01	Pennate diatom sp. group 2 10-30 microns	22.77
WN01D	N18	WN01D0C6	1.5	10/09/01	Proboscia alata	1892.04
WN01D	N18	WN01D0C6	1.5	10/09/01	Protoperidinium pellucidum	4182.05
WN01D	N18	WN01D0C6	1.5	10/09/01	Pseudonitzschia pungens	139.52
WN01D	N18	WN01D0C6	1.5	10/09/01	Rhizosolenia setigera	970.94
WN01D	N18	WN01D0C6	1.5	10/09/01	Skeletonema costatum	730.11
WN01D	N18	WN01D0C6	1.5	10/09/01	Thalassionema nitzschioides	57.93
WN01D	N18	WN01D0C6	1.5	10/09/01	Thalassiosira nordenskioldii	28.41
WN01D	N18	WN01D0C6	1.5	10/09/01	Thalassiosira sp. group 3 10-20 microns	147.22
WN01D	N18	WN01D0C6	1.5	10/09/01	Unid. micro-phytoflag sp. group 1 length	24255.68
WN01D	N18	WN01D0C6	1.5	10/09/01	Unid. micro-phytoflag sp. group 2 length	350.51
WN01D	N04	WN01D131	23.68	10/09/01	Calycomonas ovalis	10.59
WN01D	N04	WN01D131	23.68	10/09/01	Centric diatom sp. group 1 diam <10 micr	753.38
WN01D	N04	WN01D131	23.68	10/09/01	Chaetoceros debilis	358.94
WN01D	N04	WN01D131	23.68	10/09/01	Chaetoceros didymus	484.82
WN01D	N04	WN01D131	23.68	10/09/01	Chaetoceros sp. group 2 diam 10-30 micro	697.77
WN01D	N04	WN01D131	23.68	10/09/01	Corethron criophilum	2092.69
WN01D	N04	WN01D131	23.68	10/09/01	Cryptomonas sp. group 1 length <10 micro	551.02
WN01D	N04	WN01D131	23.68	10/09/01	Cylindrotheca closterium	1677.95
WN01D	N04	WN01D131	23.68	10/09/01	Dactyliosolen fragilissimus	14117.44
WN01D	N04	WN01D131	23.68	10/09/01	Ebria tripartita	167.12
WN01D	N04	WN01D131	23.68	10/09/01	Guinardia delicatula	1163.27
WN01D	N04	WN01D131	23.68	10/09/01	Guinardia flaccida	3141.27
WN01D	N04	WN01D131	23.68	10/09/01	Gymnodinium sp. group 1 5-20 microns wid	4422.53
WN01D	N04	WN01D131	23.68	10/09/01	Heterocapsa rotundata	58.02
WN01D	N04	WN01D131	23.68	10/09/01	Leptocylindrus danicus	125.04
WN01D	N04	WN01D131	23.68	10/09/01	Leptocylindrus minimus	119.30
WN01D	N04	WN01D131	23.68	10/09/01	Pleurosigma spp.	288.48
WN01D	N04	WN01D131	23.68	10/09/01	Prorocentrum micans	211.94
WN01D	N04	WN01D131	23.68	10/09/01	Pseudonitzschia delicatissima	107.68
WN01D	N04	WN01D131	23.68	10/09/01	Pseudonitzschia pungens	68.90
WN01D	N04	WN01D131	23.68	10/09/01	Rhizosolenia setigera	1438.31
WN01D	N04	WN01D131	23.68	10/09/01	Skeletonema costatum	412.96

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01D	N04	WN01D131	23.68	10/09/01	Thalassionema nitzschioides	200.24
WN01D	N04	WN01D131	23.68	10/09/01	Thalassiosira sp. group 3 10-20 microns	54.52
WN01D	N04	WN01D131	23.68	10/09/01	Unid. micro-phytoflag sp. group 1 length	15864.77
WN01D	N04	WN01D133	1.97	10/09/01	Amphidinium spp.	641.44
WN01D	N04	WN01D133	1.97	10/09/01	Centric diatom sp. group 1 diam <10 micr	1125.60
WN01D	N04	WN01D133	1.97	10/09/01	Chaetoceros debilis	3277.30
WN01D	N04	WN01D133	1.97	10/09/01	Chaetoceros didymus	1537.67
WN01D	N04	WN01D133	1.97	10/09/01	Chaetoceros sp. group 2 diam 10-30 micro	3610.19
WN01D	N04	WN01D133	1.97	10/09/01	Cryptomonas sp. group 1 length <10 micro	2677.80
WN01D	N04	WN01D133	1.97	10/09/01	Cryptomonas sp. group 2 length >10 micro	208.44
WN01D	N04	WN01D133	1.97	10/09/01	Cylindrotheca closterium	2106.55
WN01D	N04	WN01D133	1.97	10/09/01	Dactyliosolen fragilissimus	22037.46
WN01D	N04	WN01D133	1.97	10/09/01	Dictyocha fibula	522.84
WN01D	N04	WN01D133	1.97	10/09/01	Eutreptia/eutreptiella spp.	153.06
WN01D	N04	WN01D133	1.97	10/09/01	Guinardia delicatula	5806.25
WN01D	N04	WN01D133	1.97	10/09/01	Gymnodinium sp. group 1 5-20 microns wid	9691.10
WN01D	N04	WN01D133	1.97	10/09/01	Gyrodinium spirale	5459.29
WN01D	N04	WN01D133	1.97	10/09/01	Heterocapsa rotundata	105.95
WN01D	N04	WN01D133	1.97	10/09/01	Leptocylindrus danicus	2055.07
WN01D	N04	WN01D133	1.97	10/09/01	Leptocylindrus minimus	283.22
WN01D	N04	WN01D133	1.97	10/09/01	Lithodesmium undulatum	3081.36
WN01D	N04	WN01D133	1.97	10/09/01	Pennate diatom sp. group 2 10-30 microns	41.06
WN01D	N04	WN01D133	1.97	10/09/01	Proboscia alata	1706.06
WN01D	N04	WN01D133	1.97	10/09/01	Pseudonitzschia delicatissima	144.20
WN01D	N04	WN01D133	1.97	10/09/01	Pseudonitzschia pungens	440.33
WN01D	N04	WN01D133	1.97	10/09/01	Rhizosolenia setigera	2626.48
WN01D	N04	WN01D133	1.97	10/09/01	Skeletonema costatum	1077.28
WN01D	N04	WN01D133	1.97	10/09/01	Thalassionema nitzschioides	313.42
WN01D	N04	WN01D133	1.97	10/09/01	Thalassiosira sp. group 3 10-20 microns	165.93
WN01D	N04	WN01D133	1.97	10/09/01	Unid. micro-phytoflag sp. group 1 length	31006.20
WF01E	F01	WF01E036	8.95	10/19/01	Amphidinium spp.	572.05
WF01E	F01	WF01E036	8.95	10/19/01	Calycomonas ovalis	21.52
WF01E	F01	WF01E036	8.95	10/19/01	Centric diatom sp. group 1 diam <10 micr	301.57
WF01E	F01	WF01E036	8.95	10/19/01	Ceratium tripos	10564.12
WF01E	F01	WF01E036	8.95	10/19/01	Cryptomonas sp. group 1 length <10 micro	686.33
WF01E	F01	WF01E036	8.95	10/19/01	Cryptomonas sp. group 2 length >10 micro	463.96
WF01E	F01	WF01E036	8.95	10/19/01	Cylindrotheca closterium	639.38
WF01E	F01	WF01E036	8.95	10/19/01	Dactyliosolen fragilissimus	20129.47
WF01E	F01	WF01E036	8.95	10/19/01	Dictyocha fibula	872.81
WF01E	F01	WF01E036	8.95	10/19/01	Dictyocha speculum	2011.60
WF01E	F01	WF01E036	8.95	10/19/01	Guinardia delicatula	18282.14
WF01E	F01	WF01E036	8.95	10/19/01	Guinardia flaccida	38367.64
WF01E	F01	WF01E036	8.95	10/19/01	Gymnodinium sp. group 1 5-20 microns wid	6890.58
WF01E	F01	WF01E036	8.95	10/19/01	Gymnodinium sp. group 2 21-40 microns wi	8282.83
WF01E	F01	WF01E036	8.95	10/19/01	Leptocylindrus danicus	254.12
WF01E	F01	WF01E036	8.95	10/19/01	Leptocylindrus minimus	339.44
WF01E	F01	WF01E036	8.95	10/19/01	Licmophora spp.	63.78
WF01E	F01	WF01E036	8.95	10/19/01	Pennate diatom sp. group 2 10-30 microns	114.23
WF01E	F01	WF01E036	8.95	10/19/01	Prorocentrum micans	430.73
WF01E	F01	WF01E036	8.95	10/19/01	Pseudonitzschia delicatissima	43.77

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F01	WF01E036	8.95	10/19/01	Pseudonitzschia pungens	105.01
WF01E	F01	WF01E036	8.95	10/19/01	Rhizosolenia setigera	7794.72
WF01E	F01	WF01E036	8.95	10/19/01	Skeletonema costatum	53.29
WF01E	F01	WF01E036	8.95	10/19/01	Thalassionema nitzschioides	29.07
WF01E	F01	WF01E036	8.95	10/19/01	Unid. micro-phytoflag sp. group 1 length	15859.23
WF01E	F01	WF01E037	2.12	10/19/01	Amphidinium spp.	559.33
WF01E	F01	WF01E037	2.12	10/19/01	Centric diatom sp. group 1 diam <10 micr	362.92
WF01E	F01	WF01E037	2.12	10/19/01	Ceratium fusus	16151.28
WF01E	F01	WF01E037	2.12	10/19/01	Ceratium tripos	3443.12
WF01E	F01	WF01E037	2.12	10/19/01	Coccolithophorida spp.	636.17
WF01E	F01	WF01E037	2.12	10/19/01	Cryptomonas sp. group 1 length <10 micro	794.70
WF01E	F01	WF01E037	2.12	10/19/01	Cryptomonas sp. group 2 length >10 micro	113.41
WF01E	F01	WF01E037	2.12	10/19/01	Cylindrotheca closterium	486.24
WF01E	F01	WF01E037	2.12	10/19/01	Dactyliosolen fragilissimus	43134.83
WF01E	F01	WF01E037	2.12	10/19/01	Dictyocha fibula	1896.47
WF01E	F01	WF01E037	2.12	10/19/01	Guinardia delicatula	10684.43
WF01E	F01	WF01E037	2.12	10/19/01	Guinardia flaccida	6242.00
WF01E	F01	WF01E037	2.12	10/19/01	Gymnodinium sp. group 1 5-20 microns wid	1757.60
WF01E	F01	WF01E037	2.12	10/19/01	Heterocapsa rotundata	115.30
WF01E	F01	WF01E037	2.12	10/19/01	Heterocapsa triquetra	343.31
WF01E	F01	WF01E037	2.12	10/19/01	Leptocylindrus minimus	15.80
WF01E	F01	WF01E037	2.12	10/19/01	Pleurosigma spp.	382.16
WF01E	F01	WF01E037	2.12	10/19/01	Prorocentrum micans	280.77
WF01E	F01	WF01E037	2.12	10/19/01	Pseudonitzschia delicatissima	9.51
WF01E	F01	WF01E037	2.12	10/19/01	Pyramimonas sp. group 1 10-20 microns le	108.53
WF01E	F01	WF01E037	2.12	10/19/01	Rhizosolenia setigera	3810.75
WF01E	F01	WF01E037	2.12	10/19/01	Thalassionema nitzschioides	18.95
WF01E	F01	WF01E037	2.12	10/19/01	Thalassiosira nordenskioldii	9.29
WF01E	F01	WF01E037	2.12	10/19/01	Unid. micro-phytoflag sp. group 1 length	23288.61
WF01E	F02	WF01E04F	11.8	10/19/01	Calycomonas ovalis	24.21
WF01E	F02	WF01E04F	11.8	10/19/01	Centric diatom sp. group 1 diam <10 micr	495.73
WF01E	F02	WF01E04F	11.8	10/19/01	Cryptomonas sp. group 1 length <10 micro	1381.35
WF01E	F02	WF01E04F	11.8	10/19/01	Cryptomonas sp. group 2 length >10 micro	130.46
WF01E	F02	WF01E04F	11.8	10/19/01	Cylindrotheca closterium	319.61
WF01E	F02	WF01E04F	11.8	10/19/01	Dactyliosolen fragilissimus	9368.25
WF01E	F02	WF01E04F	11.8	10/19/01	Guinardia delicatula	12762.76
WF01E	F02	WF01E04F	11.8	10/19/01	Gymnodinium sp. group 1 5-20 microns wid	5054.32
WF01E	F02	WF01E04F	11.8	10/19/01	Gymnodinium sp. group 2 21-40 microns wi	15526.39
WF01E	F02	WF01E04F	11.8	10/19/01	Gyrodinium spirale	27379.59
WF01E	F02	WF01E04F	11.8	10/19/01	Heterocapsa triquetra	2373.38
WF01E	F02	WF01E04F	11.8	10/19/01	Leptocylindrus danicus	1047.99
WF01E	F02	WF01E04F	11.8	10/19/01	Leptocylindrus minimus	163.62
WF01E	F02	WF01E04F	11.8	10/19/01	Pennate diatom sp. group 2 10-30 microns	205.90
WF01E	F02	WF01E04F	11.8	10/19/01	Prorocentrum micans	322.96
WF01E	F02	WF01E04F	11.8	10/19/01	Pseudonitzschia delicatissima	87.51
WF01E	F02	WF01E04F	11.8	10/19/01	Pseudonitzschia pungens	419.93
WF01E	F02	WF01E04F	11.8	10/19/01	Rhizosolenia setigera	5114.00
WF01E	F02	WF01E04F	11.8	10/19/01	Thalassionema nitzschioides	370.51
WF01E	F02	WF01E04F	11.8	10/19/01	Unid. micro-phytoflag sp. group 1 length	29336.55
WF01E	F02	WF01E051	1.91	10/19/01	Amphidinium spp.	101.21

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F02	WF01E051	1.91	10/19/01	Centric diatom sp. group 1 diam <10 micr	74.00
WF01E	F02	WF01E051	1.91	10/19/01	Ceratium fusus	7306.61
WF01E	F02	WF01E051	1.91	10/19/01	Chaetoceros sp. group 2 diam 10-30 micro	167.55
WF01E	F02	WF01E051	1.91	10/19/01	Cryptomonas sp. group 1 length <10 micro	1498.09
WF01E	F02	WF01E051	1.91	10/19/01	Cryptomonas sp. group 2 length >10 micro	123.34
WF01E	F02	WF01E051	1.91	10/19/01	Dactyliosolen fragilissimus	6068.96
WF01E	F02	WF01E051	1.91	10/19/01	Dictyocha fibula	825.00
WF01E	F02	WF01E051	1.91	10/19/01	Ebria tripartita	240.78
WF01E	F02	WF01E051	1.91	10/19/01	Guinardia delicatula	13631.02
WF01E	F02	WF01E051	1.91	10/19/01	Guinardia flaccida	2262.84
WF01E	F02	WF01E051	1.91	10/19/01	Gymnodinium sp. group 1 5-20 microns wid	14336.11
WF01E	F02	WF01E051	1.91	10/19/01	Gymnodinium sp. group 2 21-40 microns wi	4893.24
WF01E	F02	WF01E051	1.91	10/19/01	Gyrodinium spirale	4307.18
WF01E	F02	WF01E051	1.91	10/19/01	Heterocapsa rotundata	62.69
WF01E	F02	WF01E051	1.91	10/19/01	Leptocylindrus danicus	630.53
WF01E	F02	WF01E051	1.91	10/19/01	Leptocylindrus minimus	257.83
WF01E	F02	WF01E051	1.91	10/19/01	Pennate diatom sp. group 2 10-30 microns	16.20
WF01E	F02	WF01E051	1.91	10/19/01	Prorocentrum micans	610.70
WF01E	F02	WF01E051	1.91	10/19/01	Pseudonitzschia delicatissima	72.40
WF01E	F02	WF01E051	1.91	10/19/01	Pseudonitzschia pungens	148.89
WF01E	F02	WF01E051	1.91	10/19/01	Rhizosolenia setigera	3453.66
WF01E	F02	WF01E051	1.91	10/19/01	Scrippsiella trochoidea	2087.54
WF01E	F02	WF01E051	1.91	10/19/01	Thalassionema nitzschioides	61.82
WF01E	F02	WF01E051	1.91	10/19/01	Unid. micro-phytoflag sp. group 1 length	23659.69
WF01E	F06	WF01E08E	5.85	10/19/01	Calycomonas wulffii	30.09
WF01E	F06	WF01E08E	5.85	10/19/01	Centric diatom sp. group 1 diam <10 micr	597.72
WF01E	F06	WF01E08E	5.85	10/19/01	Ceratium fusus	11822.66
WF01E	F06	WF01E08E	5.85	10/19/01	Cryptomonas sp. group 1 length <10 micro	698.06
WF01E	F06	WF01E08E	5.85	10/19/01	Cryptomonas sp. group 2 length >10 micro	166.03
WF01E	F06	WF01E08E	5.85	10/19/01	Cylindrotheca closterium	610.16
WF01E	F06	WF01E08E	5.85	10/19/01	Dactyliosolen fragilissimus	49348.94
WF01E	F06	WF01E08E	5.85	10/19/01	Guinardia delicatula	6768.13
WF01E	F06	WF01E08E	5.85	10/19/01	Gymnodinium sp. group 1 5-20 microns wid	14152.09
WF01E	F06	WF01E08E	5.85	10/19/01	Gymnodinium sp. group 2 21-40 microns wi	9880.43
WF01E	F06	WF01E08E	5.85	10/19/01	Gyrodinium sp. group 2 21-40 microns wid	3952.17
WF01E	F06	WF01E08E	5.85	10/19/01	Heterocapsa rotundata	337.58
WF01E	F06	WF01E08E	5.85	10/19/01	Heterocapsa triquetra	376.95
WF01E	F06	WF01E08E	5.85	10/19/01	Leptocylindrus danicus	9094.09
WF01E	F06	WF01E08E	5.85	10/19/01	Leptocylindrus minimus	676.78
WF01E	F06	WF01E08E	5.85	10/19/01	Pennate diatom sp. group 2 10-30 microns	65.40
WF01E	F06	WF01E08E	5.85	10/19/01	Pseudonitzschia delicatissima	83.54
WF01E	F06	WF01E08E	5.85	10/19/01	Pseudonitzschia pungens	200.42
WF01E	F06	WF01E08E	5.85	10/19/01	Rhizosolenia setigera	11157.81
WF01E	F06	WF01E08E	5.85	10/19/01	Scrippsiella trochoidea	2810.11
WF01E	F06	WF01E08E	5.85	10/19/01	Thalassionema nitzschioides	500.14
WF01E	F06	WF01E08E	5.85	10/19/01	Unid. micro-phytoflag sp. group 1 length	28605.95
WF01E	F06	WF01E08E	5.85	10/19/01	Unid. micro-phytoflag sp. group 2 length	503.50
WF01E	F06	WF01E08F	1.72	10/19/01	Amphidinium spp.	1246.57
WF01E	F06	WF01E08F	1.72	10/19/01	Centric diatom sp. group 1 diam <10 micr	454.96
WF01E	F06	WF01E08F	1.72	10/19/01	Centric diatom sp. group 2 diam 10-30 mi	217.12

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F06	WF01E08F	1.72	10/19/01	Ceratium fusus	8998.94
WF01E	F06	WF01E08F	1.72	10/19/01	Ceratium tripos	23020.68
WF01E	F06	WF01E08F	1.72	10/19/01	Chaetoceros didymus	113.00
WF01E	F06	WF01E08F	1.72	10/19/01	Cryptomonas sp. group 1 length <10 micro	2164.71
WF01E	F06	WF01E08F	1.72	10/19/01	Cryptomonas sp. group 2 length >10 micro	758.27
WF01E	F06	WF01E08F	1.72	10/19/01	Cyclotella sp. group 1 diam <10 microns	223.38
WF01E	F06	WF01E08F	1.72	10/19/01	Cylindrotheca closterium	928.86
WF01E	F06	WF01E08F	1.72	10/19/01	Dactyliosolen fragilissimus	59999.12
WF01E	F06	WF01E08F	1.72	10/19/01	Dictyocha fibula	3169.95
WF01E	F06	WF01E08F	1.72	10/19/01	Guinardia delicatula	8586.06
WF01E	F06	WF01E08F	1.72	10/19/01	Guinardia flaccida	20866.98
WF01E	F06	WF01E08F	1.72	10/19/01	Gymnodinium sp. group 1 5-20 microns wid	13383.41
WF01E	F06	WF01E08F	1.72	10/19/01	Gymnodinium sp. group 2 21-40 microns wi	21057.66
WF01E	F06	WF01E08F	1.72	10/19/01	Gyrodinium sp. group 2 21-40 microns wid	6026.60
WF01E	F06	WF01E08F	1.72	10/19/01	Gyrodinium spirale	79571.94
WF01E	F06	WF01E08F	1.72	10/19/01	Heterocapsa rotundata	64.24
WF01E	F06	WF01E08F	1.72	10/19/01	Heterocapsa triquetra	1149.60
WF01E	F06	WF01E08F	1.72	10/19/01	Leptocylindrus danicus	17166.72
WF01E	F06	WF01E08F	1.72	10/19/01	Leptocylindrus minimus	1268.04
WF01E	F06	WF01E08F	1.72	10/19/01	Pennate diatom sp. group 2 10-30 microns	199.47
WF01E	F06	WF01E08F	1.72	10/19/01	Pleurosigma spp.	1277.57
WF01E	F06	WF01E08F	1.72	10/19/01	Prorocentrum micans	3760.76
WF01E	F06	WF01E08F	1.72	10/19/01	Pseudonitzschia delicatissima	254.34
WF01E	F06	WF01E08F	1.72	10/19/01	Pseudonitzschia pungens	152.81
WF01E	F06	WF01E08F	1.72	10/19/01	Pyramimonas sp. group 1 10-20 microns le	120.93
WF01E	F06	WF01E08F	1.72	10/19/01	Rhizosolenia setigera	12739.33
WF01E	F06	WF01E08F	1.72	10/19/01	Scrippsiella trochoidea	2138.95
WF01E	F06	WF01E08F	1.72	10/19/01	Thalassionema nitzschioides	126.90
WF01E	F06	WF01E08F	1.72	10/19/01	Unid. micro-phytoflag sp. group 1 length	32597.30
WF01E	F23	WF01E0CC	11.21	10/20/01	Asterionellopsis glacialis	60.33
WF01E	F23	WF01E0CC	11.21	10/20/01	Centric diatom sp. group 1 diam <10 micr	219.86
WF01E	F23	WF01E0CC	11.21	10/20/01	Chaetoceros debilis	1728.41
WF01E	F23	WF01E0CC	11.21	10/20/01	Chaetoceros didymus	184.31
WF01E	F23	WF01E0CC	11.21	10/20/01	Chaetoceros socialis	157.64
WF01E	F23	WF01E0CC	11.21	10/20/01	Chaetoceros sp. group 1 diam <10 microns	342.46
WF01E	F23	WF01E0CC	11.21	10/20/01	Chaetoceros sp. group 2 diam 10-30 micro	839.99
WF01E	F23	WF01E0CC	11.21	10/20/01	Cryptomonas sp. group 1 length <10 micro	1562.02
WF01E	F23	WF01E0CC	11.21	10/20/01	Cylindrotheca closterium	126.25
WF01E	F23	WF01E0CC	11.21	10/20/01	Dactyliosolen fragilissimus	6304.55
WF01E	F23	WF01E0CC	11.21	10/20/01	Eutreptia/eutreptiella spp.	403.61
WF01E	F23	WF01E0CC	11.21	10/20/01	Guinardia delicatula	373.43
WF01E	F23	WF01E0CC	11.21	10/20/01	Gymnodinium sp. group 1 5-20 microns wid	1064.79
WF01E	F23	WF01E0CC	11.21	10/20/01	Gymnodinium sp. group 2 21-40 microns wi	1635.46
WF01E	F23	WF01E0CC	11.21	10/20/01	Gyrodinium spirale	28840.13
WF01E	F23	WF01E0CC	11.21	10/20/01	Leptocylindrus danicus	23934.32
WF01E	F23	WF01E0CC	11.21	10/20/01	Leptocylindrus minimus	488.31
WF01E	F23	WF01E0CC	11.21	10/20/01	Lithodesmium undulatum	1354.23
WF01E	F23	WF01E0CC	11.21	10/20/01	Pennate diatom sp. group 2 10-30 microns	108.44
WF01E	F23	WF01E0CC	11.21	10/20/01	Pleurosigma spp.	694.57
WF01E	F23	WF01E0CC	11.21	10/20/01	Prorocentrum micans	2044.58

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F23	WF01E0CC	11.21	10/20/01	Pseudonitzschia delicatissima	241.98
WF01E	F23	WF01E0CC	11.21	10/20/01	Pseudonitzschia pungens	166.15
WF01E	F23	WF01E0CC	11.21	10/20/01	Rhizosolenia setigera	4625.02
WF01E	F23	WF01E0CC	11.21	10/20/01	Skeletonema costatum	457.67
WF01E	F23	WF01E0CC	11.21	10/20/01	Thalassionema nitzschioides	172.18
WF01E	F23	WF01E0CC	11.21	10/20/01	Thalassiosira sp. group 3 10-20 microns	175.02
WF01E	F23	WF01E0CC	11.21	10/20/01	Unid. micro-phytoflag sp. group 1 length	15209.86
WF01E	F23	WF01E0CE	1.71	10/20/01	Amphidinium spp.	599.96
WF01E	F23	WF01E0CE	1.71	10/20/01	Centric diatom sp. group 1 diam <10 micr	705.56
WF01E	F23	WF01E0CE	1.71	10/20/01	Chaetoceros didymus	326.32
WF01E	F23	WF01E0CE	1.71	10/20/01	Chaetoceros socialis	465.17
WF01E	F23	WF01E0CE	1.71	10/20/01	Chaetoceros sp. group 1 diam <10 microns	196.73
WF01E	F23	WF01E0CE	1.71	10/20/01	Chaetoceros sp. group 2 diam 10-30 micro	993.16
WF01E	F23	WF01E0CE	1.71	10/20/01	Corethron criophilum	2230.20
WF01E	F23	WF01E0CE	1.71	10/20/01	Cryptomonas sp. group 1 length <10 micro	1250.21
WF01E	F23	WF01E0CE	1.71	10/20/01	Cylindrotheca closterium	1117.62
WF01E	F23	WF01E0CE	1.71	10/20/01	Dactyliosolen fragilissimus	3154.60
WF01E	F23	WF01E0CE	1.71	10/20/01	Dictyocha fibula	1222.57
WF01E	F23	WF01E0CE	1.71	10/20/01	Ebria tripartita	712.41
WF01E	F23	WF01E0CE	1.71	10/20/01	Guinardia delicatula	661.18
WF01E	F23	WF01E0CE	1.71	10/20/01	Gyrodinium spirale	6372.09
WF01E	F23	WF01E0CE	1.71	10/20/01	Heterocapsa rotundata	309.17
WF01E	F23	WF01E0CE	1.71	10/20/01	Leptocylindrus danicus	27318.24
WF01E	F23	WF01E0CE	1.71	10/20/01	Leptocylindrus minimus	330.57
WF01E	F23	WF01E0CE	1.71	10/20/01	Prorocentrum micans	903.48
WF01E	F23	WF01E0CE	1.71	10/20/01	Protoperidinium sp. group 2 31-75 micron	16192.57
WF01E	F23	WF01E0CE	1.71	10/20/01	Pseudonitzschia delicatissima	229.52
WF01E	F23	WF01E0CE	1.71	10/20/01	Pseudonitzschia pungens	36.71
WF01E	F23	WF01E0CE	1.71	10/20/01	Skeletonema costatum	670.62
WF01E	F23	WF01E0CE	1.71	10/20/01	Thalassionema nitzschioides	213.40
WF01E	F23	WF01E0CE	1.71	10/20/01	Thalassiosira sp. group 3 10-20 microns	154.94
WF01E	F23	WF01E0CE	1.71	10/20/01	Unid. micro-phytoflag sp. group 1 length	14135.00
WF01E	N04	WF01E101	7.92	10/20/01	Amphidinium spp.	613.42
WF01E	N04	WF01E101	7.92	10/20/01	Centric diatom sp. group 1 diam <10 micr	323.38
WF01E	N04	WF01E101	7.92	10/20/01	Ceratium longipes	29438.40
WF01E	N04	WF01E101	7.92	10/20/01	Chaetoceros didymus	111.21
WF01E	N04	WF01E101	7.92	10/20/01	Cryptomonas sp. group 1 length <10 micro	2169.19
WF01E	N04	WF01E101	7.92	10/20/01	Cylindrotheca closterium	1142.70
WF01E	N04	WF01E101	7.92	10/20/01	Dactyliosolen fragilissimus	17367.54
WF01E	N04	WF01E101	7.92	10/20/01	Dictyocha fibula	623.96
WF01E	N04	WF01E101	7.92	10/20/01	Eutreptia/eutreptiella spp.	182.66
WF01E	N04	WF01E101	7.92	10/20/01	Guinardia delicatula	1352.03
WF01E	N04	WF01E101	7.92	10/20/01	Gymnodinium sp. group 1 5-20 microns wid	1606.30
WF01E	N04	WF01E101	7.92	10/20/01	Gyrodinium sp. group 2 21-40 microns wid	2960.63
WF01E	N04	WF01E101	7.92	10/20/01	Heterocapsa rotundata	316.11
WF01E	N04	WF01E101	7.92	10/20/01	Heterocapsa triquetra	3394.23
WF01E	N04	WF01E101	7.92	10/20/01	Leptocylindrus danicus	58587.70
WF01E	N04	WF01E101	7.92	10/20/01	Leptocylindrus minimus	3041.93
WF01E	N04	WF01E101	7.92	10/20/01	Pennate diatom sp. group 2 10-30 microns	294.47
WF01E	N04	WF01E101	7.92	10/20/01	Pleurosigma spp.	1257.36

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	N04	WF01E101	7.92	10/20/01	Prorocentrum minimum	460.87
WF01E	N04	WF01E101	7.92	10/20/01	Protoperidinium bipes	1561.06
WF01E	N04	WF01E101	7.92	10/20/01	Pseudonitzschia delicatissima	500.62
WF01E	N04	WF01E101	7.92	10/20/01	Pseudonitzschia pungens	451.18
WF01E	N04	WF01E101	7.92	10/20/01	Pyramimonas sp. group 1 10-20 microns le	59.41
WF01E	N04	WF01E101	7.92	10/20/01	Rhizosolenia setigera	4186.28
WF01E	N04	WF01E101	7.92	10/20/01	Rhizosolenia stolterfothii	5405.37
WF01E	N04	WF01E101	7.92	10/20/01	Skeletonema costatum	285.69
WF01E	N04	WF01E101	7.92	10/20/01	Thalassionema nitzschioides	124.68
WF01E	N04	WF01E101	7.92	10/20/01	Unid. micro-phytoflag sp. group 1 length	19248.87
WF01E	N04	WF01E102	2.05	10/20/01	Amphidinium spp.	1176.39
WF01E	N04	WF01E102	2.05	10/20/01	Calycomonas ovalis	18.65
WF01E	N04	WF01E102	2.05	10/20/01	Centric diatom sp. group 1 diam <10 micr	155.79
WF01E	N04	WF01E102	2.05	10/20/01	Chaetoceros didymus	569.71
WF01E	N04	WF01E102	2.05	10/20/01	Cryptomonas sp. group 1 length <10 micro	379.53
WF01E	N04	WF01E102	2.05	10/20/01	Cryptomonas sp. group 2 length >10 micro	50.25
WF01E	N04	WF01E102	2.05	10/20/01	Dactyliosolen fragilissimus	5083.83
WF01E	N04	WF01E102	2.05	10/20/01	Guinardia delicatula	6060.17
WF01E	N04	WF01E102	2.05	10/20/01	Gymnodinium sp. group 1 5-20 microns wid	7816.99
WF01E	N04	WF01E102	2.05	10/20/01	Gyrodinium sp. group 2 21-40 microns wid	7595.83
WF01E	N04	WF01E102	2.05	10/20/01	Heterocapsa rotundata	323.86
WF01E	N04	WF01E102	2.05	10/20/01	Heterocapsa triquetra	723.25
WF01E	N04	WF01E102	2.05	10/20/01	Leptocylindrus danicus	53044.69
WF01E	N04	WF01E102	2.05	10/20/01	Leptocylindrus minimus	7558.23
WF01E	N04	WF01E102	2.05	10/20/01	Pseudonitzschia delicatissima	480.84
WF01E	N04	WF01E102	2.05	10/20/01	Rhizosolenia setigera	2676.07
WF01E	N04	WF01E102	2.05	10/20/01	Thalassionema nitzschioides	399.17
WF01E	N04	WF01E102	2.05	10/20/01	Thalassiosira sp. group 3 10-20 microns	203.22
WF01E	N04	WF01E102	2.05	10/20/01	Unid. micro-phytoflag sp. group 1 length	4278.79
WF01E	N18	WF01E121	12.87	10/20/01	Amphidinium spp.	98.03
WF01E	N18	WF01E121	12.87	10/20/01	Calycomonas wulffii	28.87
WF01E	N18	WF01E121	12.87	10/20/01	Centric diatom sp. group 1 diam <10 micr	477.86
WF01E	N18	WF01E121	12.87	10/20/01	Ceratium fusus	1415.38
WF01E	N18	WF01E121	12.87	10/20/01	Chaetoceros didymus	35.61
WF01E	N18	WF01E121	12.87	10/20/01	Chaetoceros sp. group 2 diam 10-30 micro	162.28
WF01E	N18	WF01E121	12.87	10/20/01	Cryptomonas sp. group 1 length <10 micro	620.08
WF01E	N18	WF01E121	12.87	10/20/01	Cylindrotheca closterium	804.87
WF01E	N18	WF01E121	12.87	10/20/01	Dactyliosolen fragilissimus	20494.17
WF01E	N18	WF01E121	12.87	10/20/01	Dictyocha fibula	399.53
WF01E	N18	WF01E121	12.87	10/20/01	Guinardia delicatula	1731.48
WF01E	N18	WF01E121	12.87	10/20/01	Gymnodinium sp. group 1 5-20 microns wid	4525.62
WF01E	N18	WF01E121	12.87	10/20/01	Gymnodinium sp. group 2 21-40 microns wi	2843.65
WF01E	N18	WF01E121	12.87	10/20/01	Gyrodinium sp. group 2 21-40 microns wid	7595.83
WF01E	N18	WF01E121	12.87	10/20/01	Heterocapsa rotundata	80.97
WF01E	N18	WF01E121	12.87	10/20/01	Leptocylindrus danicus	14395.35
WF01E	N18	WF01E121	12.87	10/20/01	Leptocylindrus minimus	407.88
WF01E	N18	WF01E121	12.87	10/20/01	Lithodesmium undulatum	784.89
WF01E	N18	WF01E121	12.87	10/20/01	Pennate diatom sp. group 2 10-30 microns	47.06
WF01E	N18	WF01E121	12.87	10/20/01	Protoperidinium sp. group 2 31-75 micron	21202.41
WF01E	N18	WF01E121	12.87	10/20/01	Pseudonitzschia delicatissima	80.14

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	N18	WF01E121	12.87	10/20/01	Rhizosolenia setigera	4014.11
WF01E	N18	WF01E121	12.87	10/20/01	Thalassionema nitzschioides	139.71
WF01E	N18	WF01E121	12.87	10/20/01	Thalassiosira sp. group 3 10-20 microns	50.72
WF01E	N18	WF01E121	12.87	10/20/01	Unid. micro-phytoflag sp. group 1 length	23294.85
WF01E	N18	WF01E121	12.87	10/20/01	Unid. micro-phytoflag sp. group 2 length	1449.10
WF01E	N18	WF01E123	1.89	10/20/01	Amphidinium spp.	1390.86
WF01E	N18	WF01E123	1.89	10/20/01	Calycomonas ovalis	52.33
WF01E	N18	WF01E123	1.89	10/20/01	Calycomonas wulffii	51.11
WF01E	N18	WF01E123	1.89	10/20/01	Centric diatom sp. group 1 diam <10 micr	940.05
WF01E	N18	WF01E123	1.89	10/20/01	Ceratium fusus	1670.62
WF01E	N18	WF01E123	1.89	10/20/01	Chaetoceros didymus	168.11
WF01E	N18	WF01E123	1.89	10/20/01	Cryptomonas sp. group 1 length <10 micro	1258.87
WF01E	N18	WF01E123	1.89	10/20/01	Cryptomonas sp. group 2 length >10 micro	282.01
WF01E	N18	WF01E123	1.89	10/20/01	Cyclotella sp. group 1 diam <10 microns	110.77
WF01E	N18	WF01E123	1.89	10/20/01	Cylindrotheca closterium	346.04
WF01E	N18	WF01E123	1.89	10/20/01	Dactyliosolen fragilissimus	14063.86
WF01E	N18	WF01E123	1.89	10/20/01	Dictyocha fibula	471.58
WF01E	N18	WF01E123	1.89	10/20/01	Dinophysis norvegica	2391.23
WF01E	N18	WF01E123	1.89	10/20/01	Eutreptia/eutreptiella spp.	103.37
WF01E	N18	WF01E123	1.89	10/20/01	Gonyaulax spinifera	1204.56
WF01E	N18	WF01E123	1.89	10/20/01	Gyrodinium sp. group 2 21-40 microns wid	2237.63
WF01E	N18	WF01E123	1.89	10/20/01	Gyrodinium spirale	19729.41
WF01E	N18	WF01E123	1.89	10/20/01	Heterocapsa rotundata	1481.27
WF01E	N18	WF01E123	1.89	10/20/01	Heterocapsa triquetra	855.11
WF01E	N18	WF01E123	1.89	10/20/01	Leptocylindrus danicus	14519.78
WF01E	N18	WF01E123	1.89	10/20/01	Leptocylindrus minimus	1365.69
WF01E	N18	WF01E123	1.89	10/20/01	Pennate diatom sp. group 2 10-30 microns	74.19
WF01E	N18	WF01E123	1.89	10/20/01	Pseudonitzschia delicatissima	59.12
WF01E	N18	WF01E123	1.89	10/20/01	Pseudonitzschia pungens	227.33
WF01E	N18	WF01E123	1.89	10/20/01	Rhizosolenia setigera	2368.98
WF01E	N18	WF01E123	1.89	10/20/01	Thalassionema nitzschioides	94.23
WF01E	N18	WF01E123	1.89	10/20/01	Thalassiosira sp. group 3 10-20 microns	59.87
WF01E	N18	WF01E123	1.89	10/20/01	Unid. micro-phytoflag sp. group 1 length	27542.65
WF01E	N18	WF01E123	1.89	10/20/01	Unid. micro-phytoflag sp. group 2 length	3990.95
WF01E	F30	WF01E1F0	5.06	10/21/01	Calycomonas ovalis	18.18
WF01E	F30	WF01E1F0	5.06	10/21/01	Centric diatom sp. group 1 diam <10 micr	529.04
WF01E	F30	WF01E1F0	5.06	10/21/01	Chaetoceros debilis	739.38
WF01E	F30	WF01E1F0	5.06	10/21/01	Chaetoceros didymus	219.01
WF01E	F30	WF01E1F0	5.06	10/21/01	Chaetoceros socialis	374.63
WF01E	F30	WF01E1F0	5.06	10/21/01	Chaetoceros sp. group 1 diam <10 microns	36.56
WF01E	F30	WF01E1F0	5.06	10/21/01	Chaetoceros sp. group 2 diam 10-30 micro	799.85
WF01E	F30	WF01E1F0	5.06	10/21/01	Cryptomonas sp. group 1 length <10 micro	549.21
WF01E	F30	WF01E1F0	5.06	10/21/01	Cryptomonas sp. group 2 length >10 micro	391.89
WF01E	F30	WF01E1F0	5.06	10/21/01	Cyclotella sp. group 1 diam <10 microns	259.75
WF01E	F30	WF01E1F0	5.06	10/21/01	Cylindrotheca closterium	721.29
WF01E	F30	WF01E1F0	5.06	10/21/01	Dactyliosolen fragilissimus	977.15
WF01E	F30	WF01E1F0	5.06	10/21/01	Dictyocha speculum	141.35
WF01E	F30	WF01E1F0	5.06	10/21/01	Guinardia delicatula	1331.22
WF01E	F30	WF01E1F0	5.06	10/21/01	Guinardia flaccida	2696.09
WF01E	F30	WF01E1F0	5.06	10/21/01	Gymnodinium sp. group 1 5-20 microns wid	253.05

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F30	WF01E1F0	5.06	10/21/01	Gyrodinium spirale	5131.85
WF01E	F30	WF01E1F0	5.06	10/21/01	Heterocapsa rotundata	49.80
WF01E	F30	WF01E1F0	5.06	10/21/01	Heterocapsa triquetra	891.20
WF01E	F30	WF01E1F0	5.06	10/21/01	Leptocylindrus danicus	13844.61
WF01E	F30	WF01E1F0	5.06	10/21/01	Leptocylindrus minimus	399.35
WF01E	F30	WF01E1F0	5.06	10/21/01	Pennate diatom sp. group 2 10-30 microns	19.30
WF01E	F30	WF01E1F0	5.06	10/21/01	Prorocentrum triestinum	181.21
WF01E	F30	WF01E1F0	5.06	10/21/01	Pseudonitzschia delicatissima	86.26
WF01E	F30	WF01E1F0	5.06	10/21/01	Pyramimonas sp. group 1 10-20 microns le	187.50
WF01E	F30	WF01E1F0	5.06	10/21/01	Skeletonema costatum	731.37
WF01E	F30	WF01E1F0	5.06	10/21/01	Thalassionema nitzschioides	294.62
WF01E	F30	WF01E1F0	5.06	10/21/01	Thalassiosira sp. group 3 10-20 microns	280.76
WF01E	F30	WF01E1F0	5.06	10/21/01	Unid. micro-phytoflag sp. group 1 length	8979.47
WF01E	F30	WF01E1F1	1.86	10/21/01	Calycomonas wulffii	26.87
WF01E	F30	WF01E1F1	1.86	10/21/01	Centric diatom sp. group 1 diam <10 micr	415.10
WF01E	F30	WF01E1F1	1.86	10/21/01	Chaetoceros compressus	304.42
WF01E	F30	WF01E1F1	1.86	10/21/01	Chaetoceros debilis	870.19
WF01E	F30	WF01E1F1	1.86	10/21/01	Chaetoceros didymus	88.37
WF01E	F30	WF01E1F1	1.86	10/21/01	Chaetoceros socialis	793.64
WF01E	F30	WF01E1F1	1.86	10/21/01	Cryptomonas sp. group 1 length <10 micro	1454.34
WF01E	F30	WF01E1F1	1.86	10/21/01	Cryptomonas sp. group 2 length >10 micro	148.25
WF01E	F30	WF01E1F1	1.86	10/21/01	Cyclotella sp. group 1 diam <10 microns	131.02
WF01E	F30	WF01E1F1	1.86	10/21/01	Cylindrotheca closterium	272.40
WF01E	F30	WF01E1F1	1.86	10/21/01	Dactyliosolen fragilissimus	1182.90
WF01E	F30	WF01E1F1	1.86	10/21/01	Dictyocha fibula	247.90
WF01E	F30	WF01E1F1	1.86	10/21/01	Ditylum brightwellii	12364.24
WF01E	F30	WF01E1F1	1.86	10/21/01	Eutreptia/eutreptiella spp.	36.23
WF01E	F30	WF01E1F1	1.86	10/21/01	Guinardia delicatula	537.17
WF01E	F30	WF01E1F1	1.86	10/21/01	Guinardia flaccida	2719.80
WF01E	F30	WF01E1F1	1.86	10/21/01	Gymnodinium sp. group 2 21-40 microns wi	1176.28
WF01E	F30	WF01E1F1	1.86	10/21/01	Heterocapsa rotundata	452.13
WF01E	F30	WF01E1F1	1.86	10/21/01	Heterocapsa triquetra	5394.20
WF01E	F30	WF01E1F1	1.86	10/21/01	Leptocylindrus danicus	12342.36
WF01E	F30	WF01E1F1	1.86	10/21/01	Leptocylindrus minimus	92.97
WF01E	F30	WF01E1F1	1.86	10/21/01	Pleurosigma spp.	3002.38
WF01E	F30	WF01E1F1	1.86	10/21/01	Prorocentrum micans	367.01
WF01E	F30	WF01E1F1	1.86	10/21/01	Pseudonitzschia delicatissima	149.18
WF01E	F30	WF01E1F1	1.86	10/21/01	Pseudonitzschia pungens	179.25
WF01E	F30	WF01E1F1	1.86	10/21/01	Rhizosolenia setigera	830.22
WF01E	F30	WF01E1F1	1.86	10/21/01	Skeletonema costatum	1452.91
WF01E	F30	WF01E1F1	1.86	10/21/01	Thalassionema nitzschioides	148.86
WF01E	F30	WF01E1F1	1.86	10/21/01	Thalassiosira sp. group 3 10-20 microns	189.14
WF01E	F30	WF01E1F1	1.86	10/21/01	Unid. micro-phytoflag sp. group 1 length	13810.41
WF01E	F30	WF01E1F1	1.86	10/21/01	Unid. micro-phytoflag sp. group 2 length	449.56
WF01E	F26	WF01E20F	18.77	10/21/01	Amphidinium spp.	559.33
WF01E	F26	WF01E20F	18.77	10/21/01	Centric diatom sp. group 1 diam <10 micr	317.55
WF01E	F26	WF01E20F	18.77	10/21/01	Chaetoceros didymus	50.70
WF01E	F26	WF01E20F	18.77	10/21/01	Chaetoceros socialis	130.10
WF01E	F26	WF01E20F	18.77	10/21/01	Chaetoceros sp. group 1 diam <10 microns	56.53
WF01E	F26	WF01E20F	18.77	10/21/01	Chaetoceros sp. group 2 diam 10-30 micro	2541.98

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F26	WF01E20F	18.77	10/21/01	Cryptomonas sp. group 1 length <10 micro	1077.26
WF01E	F26	WF01E20F	18.77	10/21/01	Cryptomonas sp. group 2 length >10 micro	113.41
WF01E	F26	WF01E20F	18.77	10/21/01	Cyclotella sp. group 1 diam <10 microns	8.34
WF01E	F26	WF01E20F	18.77	10/21/01	Cylindrotheca closterium	729.37
WF01E	F26	WF01E20F	18.77	10/21/01	Dactyliosolen fragilissimus	5882.02
WF01E	F26	WF01E20F	18.77	10/21/01	Dictyocha speculum	163.63
WF01E	F26	WF01E20F	18.77	10/21/01	Guinardia delicatula	5855.89
WF01E	F26	WF01E20F	18.77	10/21/01	Gymnodinium sp. group 1 5-20 microns wid	7616.26
WF01E	F26	WF01E20F	18.77	10/21/01	Gymnodinium sp. group 2 21-40 microns wi	1349.79
WF01E	F26	WF01E20F	18.77	10/21/01	Heterocapsa rotundata	115.30
WF01E	F26	WF01E20F	18.77	10/21/01	Leptocylindrus danicus	22238.42
WF01E	F26	WF01E20F	18.77	10/21/01	Leptocylindrus minimus	2003.24
WF01E	F26	WF01E20F	18.77	10/21/01	Pennate diatom sp. group 2 10-30 microns	358.00
WF01E	F26	WF01E20F	18.77	10/21/01	Pleurosigma spp.	573.25
WF01E	F26	WF01E20F	18.77	10/21/01	Prorocentrum micans	2948.08
WF01E	F26	WF01E20F	18.77	10/21/01	Prorocentrum minimum	209.77
WF01E	F26	WF01E20F	18.77	10/21/01	Pseudonitzschia delicatissima	171.18
WF01E	F26	WF01E20F	18.77	10/21/01	Pseudonitzschia pungens	308.03
WF01E	F26	WF01E20F	18.77	10/21/01	Rhizosolenia setigera	3810.75
WF01E	F26	WF01E20F	18.77	10/21/01	Skeletonema costatum	104.38
WF01E	F26	WF01E20F	18.77	10/21/01	Thalassionema nitzschioides	113.68
WF01E	F26	WF01E20F	18.77	10/21/01	Thalassiosira sp. group 3 10-20 microns	72.22
WF01E	F26	WF01E20F	18.77	10/21/01	Unid. micro-phytoflag sp. group 1 length	20789.34
WF01E	F26	WF01E211	1.98	10/21/01	Calycomonas wulffii	13.04
WF01E	F26	WF01E211	1.98	10/21/01	Centric diatom sp. group 1 diam <10 micr	777.20
WF01E	F26	WF01E211	1.98	10/21/01	Ceratium fusus	5115.61
WF01E	F26	WF01E211	1.98	10/21/01	Ceratium tripos	19662.82
WF01E	F26	WF01E211	1.98	10/21/01	Chaetoceros sp. group 2 diam 10-30 micro	879.79
WF01E	F26	WF01E211	1.98	10/21/01	Cryptomonas sp. group 1 length <10 micro	1030.93
WF01E	F26	WF01E211	1.98	10/21/01	Cylindrotheca closterium	1057.84
WF01E	F26	WF01E211	1.98	10/21/01	Dactyliosolen fragilissimus	2583.91
WF01E	F26	WF01E211	1.98	10/21/01	Guinardia delicatula	5475.81
WF01E	F26	WF01E211	1.98	10/21/01	Gymnodinium sp. group 1 5-20 microns wid	7620.85
WF01E	F26	WF01E211	1.98	10/21/01	Heterocapsa rotundata	182.90
WF01E	F26	WF01E211	1.98	10/21/01	Leptocylindrus danicus	12455.44
WF01E	F26	WF01E211	1.98	10/21/01	Leptocylindrus minimus	2782.91
WF01E	F26	WF01E211	1.98	10/21/01	Pennate diatom sp. group 2 10-30 microns	454.33
WF01E	F26	WF01E211	1.98	10/21/01	Pleurosigma spp.	727.48
WF01E	F26	WF01E211	1.98	10/21/01	Prorocentrum micans	4810.21
WF01E	F26	WF01E211	1.98	10/21/01	Pseudonitzschia delicatissima	325.86
WF01E	F26	WF01E211	1.98	10/21/01	Pseudonitzschia pungens	173.74
WF01E	F26	WF01E211	1.98	10/21/01	Rhizosolenia setigera	1209.02
WF01E	F26	WF01E211	1.98	10/21/01	Skeletonema costatum	82.65
WF01E	F26	WF01E211	1.98	10/21/01	Thalassionema nitzschioides	108.20
WF01E	F26	WF01E211	1.98	10/21/01	Unid. micro-phytoflag sp. group 1 length	18850.05
WF01E	F27	WF01E224	45.53	10/21/01	Centric diatom sp. group 1 diam <10 micr	506.91
WF01E	F27	WF01E224	45.53	10/21/01	Ceratium fusus	5630.35
WF01E	F27	WF01E224	45.53	10/21/01	Chaetoceros didymus	189.17
WF01E	F27	WF01E224	45.53	10/21/01	Cryptomonas sp. group 1 length <10 micro	1299.11
WF01E	F27	WF01E224	45.53	10/21/01	Cylindrotheca closterium	679.16

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F27	WF01E224	45.53	10/21/01	Dactyliosolen fragilissimus	2527.91
WF01E	F27	WF01E224	45.53	10/21/01	Dictyocha fibula	4245.36
WF01E	F27	WF01E224	45.53	10/21/01	Dictyocha speculum	152.37
WF01E	F27	WF01E224	45.53	10/21/01	Guinardia delicatula	4161.35
WF01E	F27	WF01E224	45.53	10/21/01	Guinardia flaccida	23288.49
WF01E	F27	WF01E224	45.53	10/21/01	Gymnodinium sp. group 1 5-20 microns wid	8455.85
WF01E	F27	WF01E224	45.53	10/21/01	Gymnodinium sp. group 2 21-40 microns wi	7541.30
WF01E	F27	WF01E224	45.53	10/21/01	Gyrodinium spirale	5531.73
WF01E	F27	WF01E224	45.53	10/21/01	Heterocapsa rotundata	66.99
WF01E	F27	WF01E224	45.53	10/21/01	Heterocapsa triquetra	239.76
WF01E	F27	WF01E224	45.53	10/21/01	Leptocylindrus danicus	8907.77
WF01E	F27	WF01E224	45.53	10/21/01	Leptocylindrus minimus	1523.19
WF01E	F27	WF01E224	45.53	10/21/01	Pennate diatom sp. group 2 10-30 microns	41.60
WF01E	F27	WF01E224	45.53	10/21/01	Pleurosigma spp.	1067.58
WF01E	F27	WF01E224	45.53	10/21/01	Prorocentrum micans	784.33
WF01E	F27	WF01E224	45.53	10/21/01	Prorocentrum triestinum	97.66
WF01E	F27	WF01E224	45.53	10/21/01	Pseudonitzschia delicatissima	92.98
WF01E	F27	WF01E224	45.53	10/21/01	Pseudonitzschia pungens	318.69
WF01E	F27	WF01E224	45.53	10/21/01	Pyramimonas sp. group 1 10-20 microns le	101.06
WF01E	F27	WF01E224	45.53	10/21/01	Rhizosolenia setigera	2661.33
WF01E	F27	WF01E224	45.53	10/21/01	Scrippsiella trochoidea	3574.72
WF01E	F27	WF01E224	45.53	10/21/01	Thalassionema nitzschioides	52.93
WF01E	F27	WF01E224	45.53	10/21/01	Thalassiosira sp. group 3 10-20 microns	33.63
WF01E	F27	WF01E224	45.53	10/21/01	Unid. micro-phytoflag sp. group 1 length	29725.11
WF01E	F27	WF01E224	45.53	10/21/01	Unid. micro-phytoflag sp. group 2 length	320.25
WF01E	F27	WF01E226	2.24	10/21/01	Amphidinium spp.	135.55
WF01E	F27	WF01E226	2.24	10/21/01	Centric diatom sp. group 1 diam <10 micr	770.87
WF01E	F27	WF01E226	2.24	10/21/01	Ceratium longipes	6505.19
WF01E	F27	WF01E226	2.24	10/21/01	Cryptomonas sp. group 1 length <10 micro	1234.66
WF01E	F27	WF01E226	2.24	10/21/01	Cylindrotheca closterium	303.52
WF01E	F27	WF01E226	2.24	10/21/01	Dactyliosolen fragilissimus	3295.09
WF01E	F27	WF01E226	2.24	10/21/01	Dictyocha fibula	1106.75
WF01E	F27	WF01E226	2.24	10/21/01	Dictyocha speculum	158.89
WF01E	F27	WF01E226	2.24	10/21/01	Guinardia delicatula	5835.75
WF01E	F27	WF01E226	2.24	10/21/01	Gymnodinium sp. group 1 5-20 microns wid	9102.09
WF01E	F27	WF01E226	2.24	10/21/01	Gymnodinium sp. group 2 21-40 microns wi	3931.98
WF01E	F27	WF01E226	2.24	10/21/01	Gyrodinium spirale	23112.50
WF01E	F27	WF01E226	2.24	10/21/01	Heterocapsa rotundata	559.76
WF01E	F27	WF01E226	2.24	10/21/01	Heterocapsa triquetra	1001.74
WF01E	F27	WF01E226	2.24	10/21/01	Leptocylindrus danicus	3136.51
WF01E	F27	WF01E226	2.24	10/21/01	Leptocylindrus minimus	1703.46
WF01E	F27	WF01E226	2.24	10/21/01	Pennate diatom sp. group 2 10-30 microns	434.53
WF01E	F27	WF01E226	2.24	10/21/01	Pleurosigma spp.	1669.88
WF01E	F27	WF01E226	2.24	10/21/01	Prorocentrum micans	817.89
WF01E	F27	WF01E226	2.24	10/21/01	Pseudonitzschia delicatissima	96.96
WF01E	F27	WF01E226	2.24	10/21/01	Pseudonitzschia pungens	432.03
WF01E	F27	WF01E226	2.24	10/21/01	Rhizosolenia setigera	2775.20
WF01E	F27	WF01E226	2.24	10/21/01	Skeletonema costatum	253.38
WF01E	F27	WF01E226	2.24	10/21/01	Thalassiosira sp. group 3 10-20 microns	70.13
WF01E	F27	WF01E226	2.24	10/21/01	Unid. micro-phytoflag sp. group 1 length	18145.90

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F25	WF01E24B	6.8	10/22/01	Amphidinium spp.	122.28
WF01E	F25	WF01E24B	6.8	10/22/01	Centric diatom sp. group 1 diam <10 micr	556.30
WF01E	F25	WF01E24B	6.8	10/22/01	Chaetoceros debilis	1501.93
WF01E	F25	WF01E24B	6.8	10/22/01	Chaetoceros didymus	222.07
WF01E	F25	WF01E24B	6.8	10/22/01	Chaetoceros sp. group 1 diam <10 microns	148.54
WF01E	F25	WF01E24B	6.8	10/22/01	Chaetoceros sp. group 2 diam 10-30 micro	202.42
WF01E	F25	WF01E24B	6.8	10/22/01	Cryptomonas sp. group 1 length <10 micro	819.85
WF01E	F25	WF01E24B	6.8	10/22/01	Cryptomonas sp. group 2 length >10 micro	99.34
WF01E	F25	WF01E24B	6.8	10/22/01	Cylindrotheca closterium	731.36
WF01E	F25	WF01E24B	6.8	10/22/01	Dactyliosolen fragilissimus	3368.74
WF01E	F25	WF01E24B	6.8	10/22/01	Guinardia delicatula	1484.80
WF01E	F25	WF01E24B	6.8	10/22/01	Guinardia flaccida	43813.61
WF01E	F25	WF01E24B	6.8	10/22/01	Gymnodinium sp. group 1 5-20 microns wid	3335.62
WF01E	F25	WF01E24B	6.8	10/22/01	Heterocapsa rotundata	50.49
WF01E	F25	WF01E24B	6.8	10/22/01	Heterocapsa triquetra	451.06
WF01E	F25	WF01E24B	6.8	10/22/01	Leptocylindrus danicus	13276.26
WF01E	F25	WF01E24B	6.8	10/22/01	Leptocylindrus minimus	1391.29
WF01E	F25	WF01E24B	6.8	10/22/01	Lithodesmium undulatum	3922.60
WF01E	F25	WF01E24B	6.8	10/22/01	Pennate diatom sp. group 2 10-30 microns	19.57
WF01E	F25	WF01E24B	6.8	10/22/01	Pleurosigma spp.	1004.24
WF01E	F25	WF01E24B	6.8	10/22/01	Prorocentrum minimum	91.87
WF01E	F25	WF01E24B	6.8	10/22/01	Pseudonitzschia delicatissima	74.97
WF01E	F25	WF01E24B	6.8	10/22/01	Pseudonitzschia pungens	29.98
WF01E	F25	WF01E24B	6.8	10/22/01	Rhizosolenia setigera	2503.44
WF01E	F25	WF01E24B	6.8	10/22/01	Skeletonema costatum	91.27
WF01E	F25	WF01E24B	6.8	10/22/01	Thalassionema nitzschioides	74.68
WF01E	F25	WF01E24B	6.8	10/22/01	Unid. micro-phytoflag sp. group 1 length	14528.06
WF01E	F25	WF01E24F	2.3	10/22/01	Amphidinium spp.	89.79
WF01E	F25	WF01E24F	2.3	10/22/01	Centric diatom sp. group 1 diam <10 micr	744.07
WF01E	F25	WF01E24F	2.3	10/22/01	Ceratium fusus	1296.41
WF01E	F25	WF01E24F	2.3	10/22/01	Chaetoceros didymus	293.52
WF01E	F25	WF01E24F	2.3	10/22/01	Chaetoceros sp. group 2 diam 10-30 micro	1486.40
WF01E	F25	WF01E24F	2.3	10/22/01	Cryptomonas sp. group 1 length <10 micro	954.17
WF01E	F25	WF01E24F	2.3	10/22/01	Cryptomonas sp. group 2 length >10 micro	109.42
WF01E	F25	WF01E24F	2.3	10/22/01	Cyclotella sp. group 1 diam <10 microns	32.23
WF01E	F25	WF01E24F	2.3	10/22/01	Cylindrotheca closterium	737.22
WF01E	F25	WF01E24F	2.3	10/22/01	Dactyliosolen fragilissimus	5820.63
WF01E	F25	WF01E24F	2.3	10/22/01	Eutreptia/eutreptiella spp.	160.70
WF01E	F25	WF01E24F	2.3	10/22/01	Guinardia delicatula	1685.06
WF01E	F25	WF01E24F	2.3	10/22/01	Guinardia flaccida	12065.12
WF01E	F25	WF01E24F	2.3	10/22/01	Gymnodinium sp. group 1 5-20 microns wid	1413.14
WF01E	F25	WF01E24F	2.3	10/22/01	Gymnodinium sp. group 2 21-40 microns wi	1736.42
WF01E	F25	WF01E24F	2.3	10/22/01	Heterocapsa triquetra	995.36
WF01E	F25	WF01E24F	2.3	10/22/01	Leptocylindrus danicus	12226.41
WF01E	F25	WF01E24F	2.3	10/22/01	Leptocylindrus minimus	983.54
WF01E	F25	WF01E24F	2.3	10/22/01	Pennate diatom sp. group 2 10-30 microns	28.74
WF01E	F25	WF01E24F	2.3	10/22/01	Pseudonitzschia delicatissima	55.05
WF01E	F25	WF01E24F	2.3	10/22/01	Pseudonitzschia pungens	22.01
WF01E	F25	WF01E24F	2.3	10/22/01	Rhizosolenia setigera	612.78
WF01E	F25	WF01E24F	2.3	10/22/01	Skeletonema costatum	326.74

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F25	WF01E24F	2.3	10/22/01	Thalassionema nitzschioides	182.81
WF01E	F25	WF01E24F	2.3	10/22/01	Thalassiosira nordenskioldii	53.88
WF01E	F25	WF01E24F	2.3	10/22/01	Thalassiosira sp. group 3 10-20 microns	23.23
WF01E	F25	WF01E24F	2.3	10/22/01	Unid. micro-phytoflag sp. group 1 length	14413.30
WF01E	F22	WF01E2B1	16.47	10/25/01	Centric diatom sp. group 1 diam <10 micr	411.25
WF01E	F22	WF01E2B1	16.47	10/25/01	Ceratium tripos	5852.54
WF01E	F22	WF01E2B1	16.47	10/25/01	Cryptomonas sp. group 1 length <10 micro	500.30
WF01E	F22	WF01E2B1	16.47	10/25/01	Cylindrotheca closterium	354.22
WF01E	F22	WF01E2B1	16.47	10/25/01	Dactyliosolen fragilissimus	4614.52
WF01E	F22	WF01E2B1	16.47	10/25/01	Dictyocha fibula	322.36
WF01E	F22	WF01E2B1	16.47	10/25/01	Guinardia delicatula	15541.76
WF01E	F22	WF01E2B1	16.47	10/25/01	Guinardia flaccida	3536.67
WF01E	F22	WF01E2B1	16.47	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	6638.95
WF01E	F22	WF01E2B1	16.47	10/25/01	Heterocapsa rotundata	130.65
WF01E	F22	WF01E2B1	16.47	10/25/01	Leptocylindrus danicus	19568.90
WF01E	F22	WF01E2B1	16.47	10/25/01	Leptocylindrus minimus	228.35
WF01E	F22	WF01E2B1	16.47	10/25/01	Pennate diatom sp. group 2 10-30 microns	101.42
WF01E	F22	WF01E2B1	16.47	10/25/01	Pleurosigma spp.	1948.78
WF01E	F22	WF01E2B1	16.47	10/25/01	Prorocentrum minimum	118.85
WF01E	F22	WF01E2B1	16.47	10/25/01	Prorocentrum triestinum	476.21
WF01E	F22	WF01E2B1	16.47	10/25/01	Pseudonitzschia delicatissima	161.65
WF01E	F22	WF01E2B1	16.47	10/25/01	Pseudonitzschia pungens	620.54
WF01E	F22	WF01E2B1	16.47	10/25/01	Rhizosolenia hebetata	429.36
WF01E	F22	WF01E2B1	16.47	10/25/01	Rhizosolenia setigera	10795.72
WF01E	F22	WF01E2B1	16.47	10/25/01	Thalassionema nitzschioides	128.83
WF01E	F22	WF01E2B1	16.47	10/25/01	Thalassiosira sp. group 3 10-20 microns	40.92
WF01E	F22	WF01E2B1	16.47	10/25/01	Unid. micro-phytoflag sp. group 1 length	18730.68
WF01E	F22	WF01E2B2	2.27	10/25/01	Amphidinium spp.	1129.52
WF01E	F22	WF01E2B2	2.27	10/25/01	Calycomonas ovalis	21.25
WF01E	F22	WF01E2B2	2.27	10/25/01	Centric diatom sp. group 1 diam <10 micr	664.17
WF01E	F22	WF01E2B2	2.27	10/25/01	Ceratium fusus	4070.13
WF01E	F22	WF01E2B2	2.27	10/25/01	Chaetoceros didymus	102.39
WF01E	F22	WF01E2B2	2.27	10/25/01	Chaetoceros sp. group 1 diam <10 microns	142.45
WF01E	F22	WF01E2B2	2.27	10/25/01	Chaetoceros sp. group 2 diam 10-30 micro	466.66
WF01E	F22	WF01E2B2	2.27	10/25/01	Cryptomonas sp. group 1 length <10 micro	1569.16
WF01E	F22	WF01E2B2	2.27	10/25/01	Cryptomonas sp. group 2 length >10 micro	343.54
WF01E	F22	WF01E2B2	2.27	10/25/01	Cylindrotheca closterium	1052.06
WF01E	F22	WF01E2B2	2.27	10/25/01	Dactyliosolen fragilissimus	10964.44
WF01E	F22	WF01E2B2	2.27	10/25/01	Dictyocha fibula	1148.92
WF01E	F22	WF01E2B2	2.27	10/25/01	Guinardia delicatula	25206.71
WF01E	F22	WF01E2B2	2.27	10/25/01	Guinardia flaccida	12605.08
WF01E	F22	WF01E2B2	2.27	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	13309.84
WF01E	F22	WF01E2B2	2.27	10/25/01	Heterocapsa rotundata	174.62
WF01E	F22	WF01E2B2	2.27	10/25/01	Heterocapsa triquetra	1041.66
WF01E	F22	WF01E2B2	2.27	10/25/01	Leptocylindrus danicus	35876.39
WF01E	F22	WF01E2B2	2.27	10/25/01	Leptocylindrus minimus	263.31
WF01E	F22	WF01E2B2	2.27	10/25/01	Pennate diatom sp. group 2 10-30 microns	90.37
WF01E	F22	WF01E2B2	2.27	10/25/01	Pleurosigma spp.	6957.36
WF01E	F22	WF01E2B2	2.27	10/25/01	Proboscia alata	3748.98
WF01E	F22	WF01E2B2	2.27	10/25/01	Prorocentrum minimum	424.31

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F22	WF01E2B2	2.27	10/25/01	Prorocentrum triestinum	848.63
WF01E	F22	WF01E2B2	2.27	10/25/01	Protoperidinium sp. group 2 31-75 micron	7608.51
WF01E	F22	WF01E2B2	2.27	10/25/01	Pseudonitzschia delicatissima	201.65
WF01E	F22	WF01E2B2	2.27	10/25/01	Pseudonitzschia pungens	276.46
WF01E	F22	WF01E2B2	2.27	10/25/01	Rhizosolenia setigera	7695.42
WF01E	F22	WF01E2B2	2.27	10/25/01	Skeletonema costatum	236.73
WF01E	F22	WF01E2B2	2.27	10/25/01	Thalassionema nitzschioides	574.90
WF01E	F22	WF01E2B2	2.27	10/25/01	Thalassiosira sp. group 3 10-20 microns	583.40
WF01E	F22	WF01E2B2	2.27	10/25/01	Unid. micro-phytoflag sp. group 1 length	32518.81
WF01E	N16	WF01E2D1	8.29	10/25/01	Amphidinium spp.	695.43
WF01E	N16	WF01E2D1	8.29	10/25/01	Centric diatom sp. group 1 diam <10 micr	874.24
WF01E	N16	WF01E2D1	8.29	10/25/01	Chaetoceros sp. group 2 diam 10-30 micro	574.63
WF01E	N16	WF01E2D1	8.29	10/25/01	Cryptomonas sp. group 1 length <10 micro	1427.21
WF01E	N16	WF01E2D1	8.29	10/25/01	Cylindrotheca closterium	1295.47
WF01E	N16	WF01E2D1	8.29	10/25/01	Dactyliosolen fragilissimus	10688.54
WF01E	N16	WF01E2D1	8.29	10/25/01	Dictyocha fibula	707.37
WF01E	N16	WF01E2D1	8.29	10/25/01	Guinardia delicatula	9579.89
WF01E	N16	WF01E2D1	8.29	10/25/01	Guinardia flaccida	7760.78
WF01E	N16	WF01E2D1	8.29	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	19303.03
WF01E	N16	WF01E2D1	8.29	10/25/01	Gymnodinium sp. group 2 21-40 microns wi	6712.88
WF01E	N16	WF01E2D1	8.29	10/25/01	Heterocapsa rotundata	788.42
WF01E	N16	WF01E2D1	8.29	10/25/01	Heterocapsa triquetra	10261.36
WF01E	N16	WF01E2D1	8.29	10/25/01	Leptocylindrus danicus	46957.59
WF01E	N16	WF01E2D1	8.29	10/25/01	Leptocylindrus minimus	294.75
WF01E	N16	WF01E2D1	8.29	10/25/01	Pennate diatom sp. group 2 10-30 microns	222.56
WF01E	N16	WF01E2D1	8.29	10/25/01	Prorocentrum minimum	522.49
WF01E	N16	WF01E2D1	8.29	10/25/01	Pseudonitzschia delicatissima	70.94
WF01E	N16	WF01E2D1	8.29	10/25/01	Pyramimonas sp. group 1 10-20 microns le	269.86
WF01E	N16	WF01E2D1	8.29	10/25/01	Rhizosolenia setigera	7106.95
WF01E	N16	WF01E2D1	8.29	10/25/01	Thalassionema nitzschioides	141.58
WF01E	N16	WF01E2D1	8.29	10/25/01	Thalassiosira sp. group 3 10-20 microns	628.59
WF01E	N16	WF01E2D1	8.29	10/25/01	Unid. micro-phytoflag sp. group 1 length	20621.67
WF01E	N16	WF01E2D1	8.29	10/25/01	Unid. micro-phytoflag sp. group 2 length	427.60
WF01E	N16	WF01E2D2	2.91	10/25/01	Calycomonas ovalis	20.98
WF01E	N16	WF01E2D2	2.91	10/25/01	Centric diatom sp. group 1 diam <10 micr	904.57
WF01E	N16	WF01E2D2	2.91	10/25/01	Cryptomonas sp. group 1 length <10 micro	2517.81
WF01E	N16	WF01E2D2	2.91	10/25/01	Cryptomonas sp. group 2 length >10 micro	339.21
WF01E	N16	WF01E2D2	2.91	10/25/01	Cylindrotheca closterium	2081.14
WF01E	N16	WF01E2D2	2.91	10/25/01	Dactyliosolen fragilissimus	6315.47
WF01E	N16	WF01E2D2	2.91	10/25/01	Dictyocha fibula	567.23
WF01E	N16	WF01E2D2	2.91	10/25/01	Eutreptia/eutreptiella spp.	166.06
WF01E	N16	WF01E2D2	2.91	10/25/01	Guinardia delicatula	7067.43
WF01E	N16	WF01E2D2	2.91	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	18107.33
WF01E	N16	WF01E2D2	2.91	10/25/01	Gymnodinium sp. group 2 21-40 microns wi	29606.33
WF01E	N16	WF01E2D2	2.91	10/25/01	Heterocapsa rotundata	402.32
WF01E	N16	WF01E2D2	2.91	10/25/01	Heterocapsa triquetra	5647.55
WF01E	N16	WF01E2D2	2.91	10/25/01	Leptocylindrus danicus	36168.30
WF01E	N16	WF01E2D2	2.91	10/25/01	Leptocylindrus minimus	165.45
WF01E	N16	WF01E2D2	2.91	10/25/01	Pennate diatom sp. group 2 10-30 microns	133.62
WF01E	N16	WF01E2D2	2.91	10/25/01	Pleurosigma spp.	4579.90

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	N16	WF01E2D2	2.91	10/25/01	Prorocentrum micans	839.78
WF01E	N16	WF01E2D2	2.91	10/25/01	Protoperidinium bipes	1419.15
WF01E	N16	WF01E2D2	2.91	10/25/01	Pseudonitzschia delicatissima	85.33
WF01E	N16	WF01E2D2	2.91	10/25/01	Pseudonitzschia pungens	410.16
WF01E	N16	WF01E2D2	2.91	10/25/01	Pyramimonas sp. group 1 10-20 microns le	108.20
WF01E	N16	WF01E2D2	2.91	10/25/01	Rhizosolenia setigera	3799.31
WF01E	N16	WF01E2D2	2.91	10/25/01	Thalassionema nitzschioides	283.36
WF01E	N16	WF01E2D2	2.91	10/25/01	Thalassiosira sp. group 3 10-20 microns	72.01
WF01E	N16	WF01E2D2	2.91	10/25/01	Unid. micro-phytoflag sp. group 1 length	24861.00
WF01E	F13	WF01E2DF	9.89	10/25/01	Centric diatom sp. group 1 diam <10 micr	975.34
WF01E	F13	WF01E2DF	9.89	10/25/01	Chaetoceros didymus	101.41
WF01E	F13	WF01E2DF	9.89	10/25/01	Chaetoceros sp. group 1 diam <10 microns	84.65
WF01E	F13	WF01E2DF	9.89	10/25/01	Corethron criophilum	2079.19
WF01E	F13	WF01E2DF	9.89	10/25/01	Cryptomonas sp. group 1 length <10 micro	565.12
WF01E	F13	WF01E2DF	9.89	10/25/01	Cylindrotheca closterium	5009.78
WF01E	F13	WF01E2DF	9.89	10/25/01	Dactyliosolen fragilissimus	4524.63
WF01E	F13	WF01E2DF	9.89	10/25/01	Ebria tripartita	1330.59
WF01E	F13	WF01E2DF	9.89	10/25/01	Guinardia delicatula	5855.89
WF01E	F13	WF01E2DF	9.89	10/25/01	Guinardia flaccida	3121.00
WF01E	F13	WF01E2DF	9.89	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	4979.86
WF01E	F13	WF01E2DF	9.89	10/25/01	Heterocapsa rotundata	57.65
WF01E	F13	WF01E2DF	9.89	10/25/01	Heterocapsa triquetra	514.96
WF01E	F13	WF01E2DF	9.89	10/25/01	Leptocylindrus danicus	14659.96
WF01E	F13	WF01E2DF	9.89	10/25/01	Leptocylindrus minimus	734.92
WF01E	F13	WF01E2DF	9.89	10/25/01	Pennate diatom sp. group 2 10-30 microns	179.00
WF01E	F13	WF01E2DF	9.89	10/25/01	Pleurosigma spp.	1146.49
WF01E	F13	WF01E2DF	9.89	10/25/01	Pseudonitzschia delicatissima	42.80
WF01E	F13	WF01E2DF	9.89	10/25/01	Pseudonitzschia pungens	137.13
WF01E	F13	WF01E2DF	9.89	10/25/01	Rhizosolenia setigera	1905.38
WF01E	F13	WF01E2DF	9.89	10/25/01	Skeletonema costatum	117.23
WF01E	F13	WF01E2DF	9.89	10/25/01	Thalassionema nitzschioides	1051.58
WF01E	F13	WF01E2DF	9.89	10/25/01	Thalassiosira sp. group 3 10-20 microns	252.79
WF01E	F13	WF01E2DF	9.89	10/25/01	Unid. micro-phytoflag sp. group 1 length	11530.70
WF01E	F13	WF01E2DF	9.89	10/25/01	Unid. micro-phytoflag sp. group 2 length	343.92
WF01E	F13	WF01E2E1	2.84	10/25/01	Centric diatom sp. group 1 diam <10 micr	1210.12
WF01E	F13	WF01E2E1	2.84	10/25/01	Chaetoceros didymus	193.22
WF01E	F13	WF01E2E1	2.84	10/25/01	Chaetoceros sp. group 2 diam 10-30 micro	880.62
WF01E	F13	WF01E2E1	2.84	10/25/01	Cryptomonas sp. group 1 length <10 micro	1127.24
WF01E	F13	WF01E2E1	2.84	10/25/01	Cylindrotheca closterium	2183.84
WF01E	F13	WF01E2E1	2.84	10/25/01	Dactyliosolen fragilissimus	6034.78
WF01E	F13	WF01E2E1	2.84	10/25/01	Eutreptia/eutreptiella spp.	79.20
WF01E	F13	WF01E2E1	2.84	10/25/01	Guinardia delicatula	11157.66
WF01E	F13	WF01E2E1	2.84	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	3069.81
WF01E	F13	WF01E2E1	2.84	10/25/01	Heterocapsa rotundata	329.52
WF01E	F13	WF01E2E1	2.84	10/25/01	Heterocapsa triquetra	1471.79
WF01E	F13	WF01E2E1	2.84	10/25/01	Leptocylindrus danicus	24145.23
WF01E	F13	WF01E2E1	2.84	10/25/01	Leptocylindrus minimus	1287.37
WF01E	F13	WF01E2E1	2.84	10/25/01	Pennate diatom sp. group 2 10-30 microns	170.53
WF01E	F13	WF01E2E1	2.84	10/25/01	Pleurosigma spp.	1092.25
WF01E	F13	WF01E2E1	2.84	10/25/01	Pseudonitzschia delicatissima	54.36

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F13	WF01E2E1	2.84	10/25/01	Pseudonitzschia pungens	195.64
WF01E	F13	WF01E2E1	2.84	10/25/01	Rhizosolenia setigera	9076.14
WF01E	F13	WF01E2E1	2.84	10/25/01	Skeletonema costatum	148.91
WF01E	F13	WF01E2E1	2.84	10/25/01	Thalassionema nitzschioides	1193.37
WF01E	F13	WF01E2E1	2.84	10/25/01	Thalassiosira nordenskioldii	53.11
WF01E	F13	WF01E2E1	2.84	10/25/01	Thalassiosira sp. group 3 10-20 microns	206.42
WF01E	F13	WF01E2E1	2.84	10/25/01	Unid. micro-phytoflag sp. group 1 length	16396.56
WF01E	F13	WF01E2E1	2.84	10/25/01	Unid. micro-phytoflag sp. group 2 length	327.65
WF01E	F24	WF01E334	10.27	10/25/01	Centric diatom sp. group 1 diam <10 micr	398.01
WF01E	F24	WF01E334	10.27	10/25/01	Chaetoceros didymus	222.43
WF01E	F24	WF01E334	10.27	10/25/01	Chaetoceros sp. group 1 diam <10 microns	103.15
WF01E	F24	WF01E334	10.27	10/25/01	Cryptomonas sp. group 1 length <10 micro	193.68
WF01E	F24	WF01E334	10.27	10/25/01	Cyclotella sp. group 1 diam <10 microns	73.28
WF01E	F24	WF01E334	10.27	10/25/01	Cylindrotheca closterium	610.47
WF01E	F24	WF01E334	10.27	10/25/01	Dactyliosolen fragilissimus	4300.53
WF01E	F24	WF01E334	10.27	10/25/01	Ebria tripartita	972.84
WF01E	F24	WF01E334	10.27	10/25/01	Grammatophora marina	96.15
WF01E	F24	WF01E334	10.27	10/25/01	Guinardia delicatula	4506.77
WF01E	F24	WF01E334	10.27	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	214.17
WF01E	F24	WF01E334	10.27	10/25/01	Gymnodinium sp. group 2 21-40 microns wi	1973.76
WF01E	F24	WF01E334	10.27	10/25/01	Heterocapsa triquetra	376.50
WF01E	F24	WF01E334	10.27	10/25/01	Leptocylindrus danicus	53046.85
WF01E	F24	WF01E334	10.27	10/25/01	Leptocylindrus minimus	866.65
WF01E	F24	WF01E334	10.27	10/25/01	Pleurosigma spp.	838.24
WF01E	F24	WF01E334	10.27	10/25/01	Pseudonitzschia delicatissima	104.30
WF01E	F24	WF01E334	10.27	10/25/01	Skeletonema costatum	590.44
WF01E	F24	WF01E334	10.27	10/25/01	Thalassionema nitzschioides	623.39
WF01E	F24	WF01E334	10.27	10/25/01	Thalassiosira sp. group 3 10-20 microns	317.37
WF01E	F24	WF01E334	10.27	10/25/01	Unid. micro-phytoflag sp. group 1 length	6187.88
WF01E	F24	WF01E336	2.74	10/25/01	Amphidinium spp.	464.71
WF01E	F24	WF01E336	2.74	10/25/01	Calycomonas wulffii	34.15
WF01E	F24	WF01E336	2.74	10/25/01	Centric diatom sp. group 1 diam <10 micr	584.20
WF01E	F24	WF01E336	2.74	10/25/01	Chaetoceros debilis	1659.26
WF01E	F24	WF01E336	2.74	10/25/01	Chaetoceros didymus	84.25
WF01E	F24	WF01E336	2.74	10/25/01	Chaetoceros sp. group 2 diam 10-30 micro	3077.10
WF01E	F24	WF01E336	2.74	10/25/01	Cryptomonas sp. group 1 length <10 micro	1188.48
WF01E	F24	WF01E336	2.74	10/25/01	Cryptomonas sp. group 2 length >10 micro	1130.71
WF01E	F24	WF01E336	2.74	10/25/01	Cylindrotheca closterium	3815.43
WF01E	F24	WF01E336	2.74	10/25/01	Dactyliosolen fragilissimus	17292.36
WF01E	F24	WF01E336	2.74	10/25/01	Dictyocha fibula	946.98
WF01E	F24	WF01E336	2.74	10/25/01	Guinardia delicatula	4097.06
WF01E	F24	WF01E336	2.74	10/25/01	Gymnodinium sp. group 1 5-20 microns wid	973.51
WF01E	F24	WF01E336	2.74	10/25/01	Heterocapsa rotundata	239.48
WF01E	F24	WF01E336	2.74	10/25/01	Heterocapsa triquetra	3428.52
WF01E	F24	WF01E336	2.74	10/25/01	Leptocylindrus danicus	67299.47
WF01E	F24	WF01E336	2.74	10/25/01	Leptocylindrus minimus	2442.37
WF01E	F24	WF01E336	2.74	10/25/01	Pennate diatom sp. group 2 10-30 microns	74.36
WF01E	F24	WF01E336	2.74	10/25/01	Protoperidinium bipes	1182.62
WF01E	F24	WF01E336	2.74	10/25/01	Pseudonitzschia delicatissima	94.82
WF01E	F24	WF01E336	2.74	10/25/01	Pseudonitzschia pungens	227.87

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F24	WF01E336	2.74	10/25/01	Rhizosolenia setigera	1583.05
WF01E	F24	WF01E336	2.74	10/25/01	Skeletonema costatum	1190.40
WF01E	F24	WF01E336	2.74	10/25/01	Thalassionema nitzschioides	425.04
WF01E	F24	WF01E336	2.74	10/25/01	Thalassiosira punctigera	905.59
WF01E	F24	WF01E336	2.74	10/25/01	Thalassiosira sp. group 3 10-20 microns	360.64
WF01E	F24	WF01E336	2.74	10/25/01	Unid. micro-phytoflag sp. group 1 length	15290.37
WF01E	F24	WF01E336	2.74	10/25/01	Unid. micro-phytoflag sp. group 2 length	285.74
WF01E	F31	WF01E34D	5.94	10/26/01	Calycomonas ovalis	21.64
WF01E	F31	WF01E34D	5.94	10/26/01	Centric diatom sp. group 1 diam <10 micr	629.80
WF01E	F31	WF01E34D	5.94	10/26/01	Chaetoceros didymus	104.29
WF01E	F31	WF01E34D	5.94	10/26/01	Chaetoceros sp. group 2 diam 10-30 micro	1904.36
WF01E	F31	WF01E34D	5.94	10/26/01	Cryptomonas sp. group 1 length <10 micro	1253.12
WF01E	F31	WF01E34D	5.94	10/26/01	Cyclotella sp. group 1 diam <10 microns	68.71
WF01E	F31	WF01E34D	5.94	10/26/01	Cylindrotheca closterium	642.91
WF01E	F31	WF01E34D	5.94	10/26/01	Dactyliosolen fragilissimus	1861.21
WF01E	F31	WF01E34D	5.94	10/26/01	Ditylum brightwellii	9727.12
WF01E	F31	WF01E34D	5.94	10/26/01	Eutreptia/eutreptiella spp.	170.99
WF01E	F31	WF01E34D	5.94	10/26/01	Guinardia delicatula	2218.65
WF01E	F31	WF01E34D	5.94	10/26/01	Gymnodinium sp. group 1 5-20 microns wid	3313.69
WF01E	F31	WF01E34D	5.94	10/26/01	Heterocapsa rotundata	237.13
WF01E	F31	WF01E34D	5.94	10/26/01	Heterocapsa triquetra	3182.77
WF01E	F31	WF01E34D	5.94	10/26/01	Leptocylindrus danicus	38839.66
WF01E	F31	WF01E34D	5.94	10/26/01	Leptocylindrus minimus	1243.36
WF01E	F31	WF01E34D	5.94	10/26/01	Paralia sulcata	558.50
WF01E	F31	WF01E34D	5.94	10/26/01	Protoperidinium bipes	1463.81
WF01E	F31	WF01E34D	5.94	10/26/01	Pseudonitzschia delicatissima	205.38
WF01E	F31	WF01E34D	5.94	10/26/01	Pseudonitzschia pungens	564.09
WF01E	F31	WF01E34D	5.94	10/26/01	Pyramimonas sp. group 1 10-20 microns le	223.21
WF01E	F31	WF01E34D	5.94	10/26/01	Rhizosolenia setigera	1959.44
WF01E	F31	WF01E34D	5.94	10/26/01	Skeletonema costatum	322.02
WF01E	F31	WF01E34D	5.94	10/26/01	Thalassionema nitzschioides	1522.39
WF01E	F31	WF01E34D	5.94	10/26/01	Thalassiosira sp. group 3 10-20 microns	445.64
WF01E	F31	WF01E34D	5.94	10/26/01	Unid. micro-phytoflag sp. group 1 length	12967.72
WF01E	F31	WF01E34D	5.94	10/26/01	Unid. micro-phytoflag sp. group 2 length	353.68
WF01E	F31	WF01E34E	2.39	10/26/01	Centric diatom sp. group 1 diam <10 micr	549.66
WF01E	F31	WF01E34E	2.39	10/26/01	Chaetoceros didymus	163.83
WF01E	F31	WF01E34E	2.39	10/26/01	Chaetoceros socialis	140.12
WF01E	F31	WF01E34E	2.39	10/26/01	Chaetoceros sp. group 1 diam <10 microns	502.28
WF01E	F31	WF01E34E	2.39	10/26/01	Cryptomonas sp. group 1 length <10 micro	841.64
WF01E	F31	WF01E34E	2.39	10/26/01	Cylindrotheca closterium	1009.97
WF01E	F31	WF01E34E	2.39	10/26/01	Dactyliosolen fragilissimus	2923.85
WF01E	F31	WF01E34E	2.39	10/26/01	Eutreptia/eutreptiella spp.	44.77
WF01E	F31	WF01E34E	2.39	10/26/01	Guinardia delicatula	1327.76
WF01E	F31	WF01E34E	2.39	10/26/01	Gymnodinium sp. group 1 5-20 microns wid	709.86
WF01E	F31	WF01E34E	2.39	10/26/01	Gyrodinium spirale	6398.15
WF01E	F31	WF01E34E	2.39	10/26/01	Heterocapsa rotundata	139.70
WF01E	F31	WF01E34E	2.39	10/26/01	Heterocapsa triquetra	833.33
WF01E	F31	WF01E34E	2.39	10/26/01	Leptocylindrus danicus	22613.00
WF01E	F31	WF01E34E	2.39	10/26/01	Leptocylindrus minimus	1187.27
WF01E	F31	WF01E34E	2.39	10/26/01	Pennate diatom sp. group 2 10-30 microns	72.30

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WF01E	F31	WF01E34E	2.39	10/26/01	Pseudonitzschia delicatissima	184.36
WF01E	F31	WF01E34E	2.39	10/26/01	Rhizosolenia setigera	2052.11
WF01E	F31	WF01E34E	2.39	10/26/01	Skeletonema costatum	308.62
WF01E	F31	WF01E34E	2.39	10/26/01	Thalassionema nitzschioides	827.86
WF01E	F31	WF01E34E	2.39	10/26/01	Thalassiosira nordenskioldii	15.01
WF01E	F31	WF01E34E	2.39	10/26/01	Thalassiosira sp. group 3 10-20 microns	311.15
WF01E	F31	WF01E34E	2.39	10/26/01	Unid. micro-phytoflag sp. group 1 length	13810.46
WN01F	N04	WN01F045	12.87	10/29/01	Calycomonas wulffii	20.69
WN01F	N04	WN01F045	12.87	10/29/01	Centric diatom sp. group 1 diam <10 micr	2100.33
WN01F	N04	WN01F045	12.87	10/29/01	Chaetoceros debilis	861.46
WN01F	N04	WN01F045	12.87	10/29/01	Chaetoceros didymus	306.20
WN01F	N04	WN01F045	12.87	10/29/01	Chaetoceros sp. group 2 diam 10-30 micro	1395.54
WN01F	N04	WN01F045	12.87	10/29/01	Coccolithophorida spp.	640.30
WN01F	N04	WN01F045	12.87	10/29/01	Corethron criophilum	4185.39
WN01F	N04	WN01F045	12.87	10/29/01	Cryptomonas sp. group 1 length <10 micro	2115.19
WN01F	N04	WN01F045	12.87	10/29/01	Cryptomonas sp. group 2 length >10 micro	114.15
WN01F	N04	WN01F045	12.87	10/29/01	Cylindrotheca closterium	2307.18
WN01F	N04	WN01F045	12.87	10/29/01	Dactyliosolen fragilissimus	910.80
WN01F	N04	WN01F045	12.87	10/29/01	Dictyocha fibula	1147.20
WN01F	N04	WN01F045	12.87	10/29/01	Guinardia delicatula	4653.09
WN01F	N04	WN01F045	12.87	10/29/01	Guinardia flaccida	6282.53
WN01F	N04	WN01F045	12.87	10/29/01	Gymnodinium sp. group 1 5-20 microns wid	3832.86
WN01F	N04	WN01F045	12.87	10/29/01	Heterocapsa rotundata	812.31
WN01F	N04	WN01F045	12.87	10/29/01	Leptocylindrus danicus	77777.19
WN01F	N04	WN01F045	12.87	10/29/01	Leptocylindrus minimus	1002.16
WN01F	N04	WN01F045	12.87	10/29/01	Lithodesmium undulatum	2249.88
WN01F	N04	WN01F045	12.87	10/29/01	Pennate diatom sp. group 2 10-30 microns	720.66
WN01F	N04	WN01F045	12.87	10/29/01	Pleurosigma spp.	1153.94
WN01F	N04	WN01F045	12.87	10/29/01	Prorocentrum minimum	422.97
WN01F	N04	WN01F045	12.87	10/29/01	Pseudonitzschia delicatissima	201.01
WN01F	N04	WN01F045	12.87	10/29/01	Pseudonitzschia pungens	413.37
WN01F	N04	WN01F045	12.87	10/29/01	Rhizosolenia setigera	5753.24
WN01F	N04	WN01F045	12.87	10/29/01	Rhizosolenia stolterfothii	19876.48
WN01F	N04	WN01F045	12.87	10/29/01	Skeletonema costatum	550.61
WN01F	N04	WN01F045	12.87	10/29/01	Thalassionema nitzschioides	1258.65
WN01F	N04	WN01F045	12.87	10/29/01	Thalassiosira nordenskioldii	112.23
WN01F	N04	WN01F045	12.87	10/29/01	Thalassiosira sp. group 3 10-20 microns	1526.57
WN01F	N04	WN01F045	12.87	10/29/01	Unid. micro-phytoflag sp. group 1 length	39390.36
WN01F	N04	WN01F045	12.87	10/29/01	Unid. micro-phytoflag sp. group 2 length	346.15
WN01F	N04	WN01F047	2.14	10/29/01	Centric diatom sp. group 1 diam <10 micr	551.44
WN01F	N04	WN01F047	2.14	10/29/01	Chaetoceros didymus	94.82
WN01F	N04	WN01F047	2.14	10/29/01	Chaetoceros spp.	308.76
WN01F	N04	WN01F047	2.14	10/29/01	Cryptomonas sp. group 1 length <10 micro	1998.07
WN01F	N04	WN01F047	2.14	10/29/01	Cryptomonas sp. group 2 length >10 micro	106.05
WN01F	N04	WN01F047	2.14	10/29/01	Dictyocha fibula	3197.28
WN01F	N04	WN01F047	2.14	10/29/01	Guinardia delicatula	4610.96
WN01F	N04	WN01F047	2.14	10/29/01	Gymnodinium sp. group 1 5-20 microns wid	8217.17
WN01F	N04	WN01F047	2.14	10/29/01	Gymnodinium sp. group 2 21-40 microns wi	17669.65
WN01F	N04	WN01F047	2.14	10/29/01	Heterocapsa rotundata	646.84
WN01F	N04	WN01F047	2.14	10/29/01	Heterocapsa triquetra	1929.28

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01F	N04	WN01F047	2.14	10/29/01	Leptocylindrus danicus	23698.10
WN01F	N04	WN01F047	2.14	10/29/01	Leptocylindrus minimus	199.50
WN01F	N04	WN01F047	2.14	10/29/01	Pennate diatom sp. group 2 10-30 microns	41.77
WN01F	N04	WN01F047	2.14	10/29/01	Pleurosigma spp.	2144.04
WN01F	N04	WN01F047	2.14	10/29/01	Prorocentrum minimum	588.42
WN01F	N04	WN01F047	2.14	10/29/01	Protoperidinium bipes	664.36
WN01F	N04	WN01F047	2.14	10/29/01	Protoperidinium sp. group 1 10-30 micron	2000.52
WN01F	N04	WN01F047	2.14	10/29/01	Pseudonitzschia delicatissima	186.74
WN01F	N04	WN01F047	2.14	10/29/01	Pseudonitzschia pungens	320.02
WN01F	N04	WN01F047	2.14	10/29/01	Rhizosolenia setigera	1781.61
WN01F	N04	WN01F047	2.14	10/29/01	Thalassionema nitzschioides	212.60
WN01F	N04	WN01F047	2.14	10/29/01	Thalassiosira sp. group 3 10-20 microns	877.93
WN01F	N04	WN01F047	2.14	10/29/01	Unid. micro-phytoflag sp. group 1 length	34204.09
WN01F	N04	WN01F047	2.14	10/29/01	Unid. micro-phytoflag sp. group 2 length	964.74
WN01F	N18	WN01F075	6.8	10/29/01	Amphidinium spp.	351.41
WN01F	N18	WN01F075	6.8	10/29/01	Centric diatom sp. group 1 diam <10 micr	527.26
WN01F	N18	WN01F075	6.8	10/29/01	Ceratium fusus	2532.53
WN01F	N18	WN01F075	6.8	10/29/01	Ceratium tripos	6489.49
WN01F	N18	WN01F075	6.8	10/29/01	Coccolithophorida spp.	8393.26
WN01F	N18	WN01F075	6.8	10/29/01	Cryptomonas sp. group 1 length <10 micro	1020.74
WN01F	N18	WN01F075	6.8	10/29/01	Cryptomonas sp. group 2 length >10 micro	498.76
WN01F	N18	WN01F075	6.8	10/29/01	Cylindrotheca closterium	392.77
WN01F	N18	WN01F075	6.8	10/29/01	Dactyliosolen fragilissimus	2842.63
WN01F	N18	WN01F075	6.8	10/29/01	Dictyocha fibula	716.09
WN01F	N18	WN01F075	6.8	10/29/01	Ebria tripartita	834.55
WN01F	N18	WN01F075	6.8	10/29/01	Guinardia delicatula	3485.37
WN01F	N18	WN01F075	6.8	10/29/01	Guinardia flaccida	7843.16
WN01F	N18	WN01F075	6.8	10/29/01	Gymnodinium sp. group 1 5-20 microns wid	9569.94
WN01F	N18	WN01F075	6.8	10/29/01	Heterocapsa rotundata	615.70
WN01F	N18	WN01F075	6.8	10/29/01	Leptocylindrus danicus	13581.18
WN01F	N18	WN01F075	6.8	10/29/01	Pennate diatom sp. group 2 10-30 microns	56.23
WN01F	N18	WN01F075	6.8	10/29/01	Pleurosigma spp.	2160.88
WN01F	N18	WN01F075	6.8	10/29/01	Prorocentrum micans	1060.15
WN01F	N18	WN01F075	6.8	10/29/01	Pseudonitzschia delicatissima	35.91
WN01F	N18	WN01F075	6.8	10/29/01	Pseudonitzschia pungens	129.01
WN01F	N18	WN01F075	6.8	10/29/01	Rhizosolenia hebetata	476.09
WN01F	N18	WN01F075	6.8	10/29/01	Rhizosolenia setigera	11970.66
WN01F	N18	WN01F075	6.8	10/29/01	Rhizosolenia stolterfothii	1032.18
WN01F	N18	WN01F075	6.8	10/29/01	Thalassionema nitzschioides	392.83
WN01F	N18	WN01F075	6.8	10/29/01	Thalassiosira sp. group 3 10-20 microns	1225.14
WN01F	N18	WN01F075	6.8	10/29/01	Unid. micro-phytoflag sp. group 1 length	16665.33
WN01F	N18	WN01F077	1.92	10/29/01	Amphidinium spp.	519.79
WN01F	N18	WN01F077	1.92	10/29/01	Calycomonas ovalis	39.11
WN01F	N18	WN01F077	1.92	10/29/01	Centric diatom sp. group 1 diam <10 micr	1180.42
WN01F	N18	WN01F077	1.92	10/29/01	Ceratium fusus	1873.04
WN01F	N18	WN01F077	1.92	10/29/01	Ceratium tripos	4799.58
WN01F	N18	WN01F077	1.92	10/29/01	Chaetoceros didymus	94.24
WN01F	N18	WN01F077	1.92	10/29/01	Coccolithophorida spp.	1773.60
WN01F	N18	WN01F077	1.92	10/29/01	Corethron criophilum	3864.42
WN01F	N18	WN01F077	1.92	10/29/01	Cryptomonas sp. group 1 length <10 micro	2675.10

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01F	N18	WN01F077	1.92	10/29/01	Cryptomonas sp. group 2 length >10 micro	1370.13
WN01F	N18	WN01F077	1.92	10/29/01	Cylindrotheca closterium	969.92
WN01F	N18	WN01F077	1.92	10/29/01	Dactyliosolen fragilissimus	2102.39
WN01F	N18	WN01F077	1.92	10/29/01	Dictyocha fibula	264.36
WN01F	N18	WN01F077	1.92	10/29/01	Ebria tripartita	308.61
WN01F	N18	WN01F077	1.92	10/29/01	Eutreptia/eutreptiella spp.	154.78
WN01F	N18	WN01F077	1.92	10/29/01	Guinardia delicatula	3150.59
WN01F	N18	WN01F077	1.92	10/29/01	Guinardia flaccida	8701.12
WN01F	N18	WN01F077	1.92	10/29/01	Gymnodinium sp. group 1 5-20 microns wid	11161.23
WN01F	N18	WN01F077	1.92	10/29/01	Heterocapsa rotundata	2142.90
WN01F	N18	WN01F077	1.92	10/29/01	Heterocapsa triquetra	2876.17
WN01F	N18	WN01F077	1.92	10/29/01	Leptocylindrus danicus	11314.54
WN01F	N18	WN01F077	1.92	10/29/01	Leptocylindrus minimus	330.47
WN01F	N18	WN01F077	1.92	10/29/01	Pennate diatom sp. group 2 10-30 microns	249.52
WN01F	N18	WN01F077	1.92	10/29/01	Pleurosigma spp.	1598.17
WN01F	N18	WN01F077	1.92	10/29/01	Prorocentrum micans	782.76
WN01F	N18	WN01F077	1.92	10/29/01	Prorocentrum minimum	390.53
WN01F	N18	WN01F077	1.92	10/29/01	Pseudonitzschia delicatissima	53.03
WN01F	N18	WN01F077	1.92	10/29/01	Pseudonitzschia pungens	159.03
WN01F	N18	WN01F077	1.92	10/29/01	Rhizosolenia setigera	4426.70
WN01F	N18	WN01F077	1.92	10/29/01	Rhizosolenia stolterfothii	763.39
WN01F	N18	WN01F077	1.92	10/29/01	Thalassionema nitzschioides	501.83
WN01F	N18	WN01F077	1.92	10/29/01	Thalassiosira nordenskioldii	64.76
WN01F	N18	WN01F077	1.92	10/29/01	Thalassiosira sp. group 3 10-20 microns	1409.50
WN01F	N18	WN01F077	1.92	10/29/01	Unid. micro-phytoflag sp. group 1 length	36633.55
WN01F	N18	WN01F077	1.92	10/29/01	Unid. micro-phytoflag sp. group 2 length	1917.65
WN01G	N04	WN01G056	18.59	12/07/01	Centric diatom sp. group 1 diam <10 micr	1185.48
WN01G	N04	WN01G056	18.59	12/07/01	Chaetoceros debilis	7028.81
WN01G	N04	WN01G056	18.59	12/07/01	Chaetoceros sp. group 2 diam 10-30 micro	236.82
WN01G	N04	WN01G056	18.59	12/07/01	Corethron criophilum	12784.46
WN01G	N04	WN01G056	18.59	12/07/01	Cryptomonas sp. group 1 length <10 micro	398.15
WN01G	N04	WN01G056	18.59	12/07/01	Cryptomonas sp. group 2 length >10 micro	116.22
WN01G	N04	WN01G056	18.59	12/07/01	Cylindrotheca closterium	1815.23
WN01G	N04	WN01G056	18.59	12/07/01	Dactyliosolen fragilissimus	8809.94
WN01G	N04	WN01G056	18.59	12/07/01	Dictyocha fibula	1166.09
WN01G	N04	WN01G056	18.59	12/07/01	Guinardia delicatula	9001.62
WN01G	N04	WN01G056	18.59	12/07/01	Guinardia flaccida	15991.90
WN01G	N04	WN01G056	18.59	12/07/01	Gymnodinium sp. group 1 5-20 microns wid	6304.11
WN01G	N04	WN01G056	18.59	12/07/01	Gyrodinium spirale	24392.73
WN01G	N04	WN01G056	18.59	12/07/01	Leptocylindrus danicus	23299.05
WN01G	N04	WN01G056	18.59	12/07/01	Leptocylindrus minimus	60.74
WN01G	N04	WN01G056	18.59	12/07/01	Pennate diatom sp. group 2 10-30 microns	642.04
WN01G	N04	WN01G056	18.59	12/07/01	Pleurosigma spp.	8811.89
WN01G	N04	WN01G056	18.59	12/07/01	Prorocentrum micans	431.60
WN01G	N04	WN01G056	18.59	12/07/01	Pseudonitzschia delicatissima	58.48
WN01G	N04	WN01G056	18.59	12/07/01	Rhizosolenia setigera	17573.55
WN01G	N04	WN01G056	18.59	12/07/01	Rhizosolenia stolterfothii	35356.79
WN01G	N04	WN01G056	18.59	12/07/01	Skeletonema costatum	3350.39
WN01G	N04	WN01G056	18.59	12/07/01	Thalassionema nitzschioides	1456.29
WN01G	N04	WN01G056	18.59	12/07/01	Thalassiosira nordenskioldii	2713.89

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01G	N04	WN01G056	18.59	12/07/01	Thalassiosira rotula	6159.06
WN01G	N04	WN01G056	18.59	12/07/01	Thalassiosira sp. group 3 10-20 microns	3515.73
WN01G	N04	WN01G056	18.59	12/07/01	Unid. micro-phytoflag sp. group 1 length	15192.76
WN01G	N04	WN01G056	18.59	12/07/01	Unid. micro-phytoflag sp. group 2 length	352.45
WN01G	N04	WN01G058	2.	12/07/01	Centric diatom sp. group 1 diam <10 micr	418.41
WN01G	N04	WN01G058	2.	12/07/01	Chaetoceros sp. group 2 diam 10-30 micro	947.27
WN01G	N04	WN01G058	2.	12/07/01	Coccolithophorida spp.	433.90
WN01G	N04	WN01G058	2.	12/07/01	Corethron criophilum	17045.95
WN01G	N04	WN01G058	2.	12/07/01	Cryptomonas sp. group 1 length <10 micro	482.61
WN01G	N04	WN01G058	2.	12/07/01	Cryptomonas sp. group 2 length >10 micro	77.48
WN01G	N04	WN01G058	2.	12/07/01	Cylindrotheca closterium	1850.83
WN01G	N04	WN01G058	2.	12/07/01	Dactyliosolen fragilissimus	5564.18
WN01G	N04	WN01G058	2.	12/07/01	Dictyocha fibula	1166.09
WN01G	N04	WN01G058	2.	12/07/01	Guinardia delicatula	10528.21
WN01G	N04	WN01G058	2.	12/07/01	Guinardia flaccida	8529.01
WN01G	N04	WN01G058	2.	12/07/01	Gymnodinium sp. group 1 5-20 microns wid	3202.09
WN01G	N04	WN01G058	2.	12/07/01	Gyrodinium spirale	16261.82
WN01G	N04	WN01G058	2.	12/07/01	Heterocapsa rotundata	39.38
WN01G	N04	WN01G058	2.	12/07/01	Leptocylindrus danicus	11373.67
WN01G	N04	WN01G058	2.	12/07/01	Leptocylindrus minimus	145.77
WN01G	N04	WN01G058	2.	12/07/01	Pleurosigma spp.	3916.39
WN01G	N04	WN01G058	2.	12/07/01	Prorocentrum micans	2301.84
WN01G	N04	WN01G058	2.	12/07/01	Protoperidinium bipes	972.48
WN01G	N04	WN01G058	2.	12/07/01	Pseudonitzschia pungens	281.06
WN01G	N04	WN01G058	2.	12/07/01	Rhizosolenia setigera	3905.23
WN01G	N04	WN01G058	2.	12/07/01	Rhizosolenia stolterfothii	50509.69
WN01G	N04	WN01G058	2.	12/07/01	Skeletonema costatum	1210.23
WN01G	N04	WN01G058	2.	12/07/01	Thalassionema nitzschioides	1165.03
WN01G	N04	WN01G058	2.	12/07/01	Thalassiosira nordenskioldii	1752.13
WN01G	N04	WN01G058	2.	12/07/01	Thalassiosira sp. group 3 10-20 microns	4786.32
WN01G	N04	WN01G058	2.	12/07/01	Unid. micro-phytoflag sp. group 1 length	11991.22
WN01G	N18	WN01G087	10.71	12/07/01	Asterionellopsis glacialis	191.67
WN01G	N18	WN01G087	10.71	12/07/01	Calycomonas wulffii	19.75
WN01G	N18	WN01G087	10.71	12/07/01	Centric diatom sp. group 1 diam <10 micr	501.22
WN01G	N18	WN01G087	10.71	12/07/01	Ceratium fusus	3872.79
WN01G	N18	WN01G087	10.71	12/07/01	Ceratium tripos	19847.74
WN01G	N18	WN01G087	10.71	12/07/01	Chaetoceros compressus	2349.28
WN01G	N18	WN01G087	10.71	12/07/01	Chaetoceros decipiens	2924.84
WN01G	N18	WN01G087	10.71	12/07/01	Chaetoceros sp. group 2 diam 10-30 micro	1332.10
WN01G	N18	WN01G087	10.71	12/07/01	Coccolithophorida spp.	1222.40
WN01G	N18	WN01G087	10.71	12/07/01	Corethron criophilum	7990.29
WN01G	N18	WN01G087	10.71	12/07/01	Cryptomonas sp. group 1 length <10 micro	746.54
WN01G	N18	WN01G087	10.71	12/07/01	Cylindrotheca closterium	2602.72
WN01G	N18	WN01G087	10.71	12/07/01	Dactyliosolen fragilissimus	3477.61
WN01G	N18	WN01G087	10.71	12/07/01	Dictyocha fibula	546.61
WN01G	N18	WN01G087	10.71	12/07/01	Eutreptia/eutreptiella spp.	160.02
WN01G	N18	WN01G087	10.71	12/07/01	Guinardia delicatula	15101.39
WN01G	N18	WN01G087	10.71	12/07/01	Guinardia flaccida	17990.89
WN01G	N18	WN01G087	10.71	12/07/01	Gymnodinium sp. group 1 5-20 microns wid	7598.71
WN01G	N18	WN01G087	10.71	12/07/01	Gymnodinium sp. group 2 21-40 microns wi	5187.22

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01G	N18	WN01G087	10.71	12/07/01	Gyrodinium spirale	11414.88
WN01G	N18	WN01G087	10.71	12/07/01	Heterocapsa rotundata	110.77
WN01G	N18	WN01G087	10.71	12/07/01	Heterocapsa triquetra	991.15
WN01G	N18	WN01G087	10.71	12/07/01	Leptocylindrus danicus	62067.15
WN01G	N18	WN01G087	10.71	12/07/01	Leptocylindrus minimus	728.84
WN01G	N18	WN01G087	10.71	12/07/01	Pennate diatom sp. group 2 10-30 microns	85.99
WN01G	N18	WN01G087	10.71	12/07/01	Pleurosigma spp.	7710.40
WN01G	N18	WN01G087	10.71	12/07/01	Prorocentrum micans	4855.45
WN01G	N18	WN01G087	10.71	12/07/01	Prorocentrum minimum	1007.66
WN01G	N18	WN01G087	10.71	12/07/01	Protoperidinium bipes	1367.54
WN01G	N18	WN01G087	10.71	12/07/01	Rhizosolenia setigera	9152.89
WN01G	N18	WN01G087	10.71	12/07/01	Rhizosolenia stolterfothii	115225.24
WN01G	N18	WN01G087	10.71	12/07/01	Scrippsiella trochoidea	1844.13
WN01G	N18	WN01G087	10.71	12/07/01	Skeletonema costatum	6357.07
WN01G	N18	WN01G087	10.71	12/07/01	Thalassionema nitzschioides	1802.16
WN01G	N18	WN01G087	10.71	12/07/01	Thalassiosira nordenskioldii	1740.82
WN01G	N18	WN01G087	10.71	12/07/01	Thalassiosira sp. group 3 10-20 microns	1734.73
WN01G	N18	WN01G087	10.71	12/07/01	Unid. micro-phytoflag sp. group 1 length	14134.06
WN01G	N18	WN01G087	10.71	12/07/01	Unid. micro-phytoflag sp. group 2 length	330.42
WN01G	N18	WN01G089	2.03	12/07/01	Centric diatom sp. group 1 diam <10 micr	280.40
WN01G	N18	WN01G089	2.03	12/07/01	Chaetoceros sp. group 2 diam 10-30 micro	1760.93
WN01G	N18	WN01G089	2.03	12/07/01	Coccolithophorida spp.	2419.79
WN01G	N18	WN01G089	2.03	12/07/01	Corethron criophilum	11862.88
WN01G	N18	WN01G089	2.03	12/07/01	Cryptomonas sp. group 1 length <10 micro	117.55
WN01G	N18	WN01G089	2.03	12/07/01	Cylindrotheca closterium	1981.62
WN01G	N18	WN01G089	2.03	12/07/01	Dactyliosolen fragilissimus	1290.77
WN01G	N18	WN01G089	2.03	12/07/01	Dictyocha fibula	7586.99
WN01G	N18	WN01G089	2.03	12/07/01	Eutreptia/eutreptiella spp.	158.38
WN01G	N18	WN01G089	2.03	12/07/01	Guinardia delicatula	19929.31
WN01G	N18	WN01G089	2.03	12/07/01	Guinardia flaccida	89034.67
WN01G	N18	WN01G089	2.03	12/07/01	Gymnodinium sp. group 1 5-20 microns wid	6963.90
WN01G	N18	WN01G089	2.03	12/07/01	Heterocapsa rotundata	219.27
WN01G	N18	WN01G089	2.03	12/07/01	Heterocapsa triquetra	1958.74
WN01G	N18	WN01G089	2.03	12/07/01	Leptocylindrus danicus	59069.73
WN01G	N18	WN01G089	2.03	12/07/01	Leptocylindrus minimus	608.67
WN01G	N18	WN01G089	2.03	12/07/01	Pennate diatom sp. group 2 10-30 microns	170.22
WN01G	N18	WN01G089	2.03	12/07/01	Pleurosigma spp.	2180.45
WN01G	N18	WN01G089	2.03	12/07/01	Prorocentrum micans	5606.77
WN01G	N18	WN01G089	2.03	12/07/01	Prorocentrum minimum	2797.29
WN01G	N18	WN01G089	2.03	12/07/01	Protoperidinium bipes	1353.56
WN01G	N18	WN01G089	2.03	12/07/01	Protoperidinium sp. group 2 31-75 micron	7165.59
WN01G	N18	WN01G089	2.03	12/07/01	Pseudonitzschia delicatissima	54.26
WN01G	N18	WN01G089	2.03	12/07/01	Pseudonitzschia pungens	390.55
WN01G	N18	WN01G089	2.03	12/07/01	Rhizosolenia setigera	16306.74
WN01G	N18	WN01G089	2.03	12/07/01	Rhizosolenia stolterfothii	81239.01
WN01G	N18	WN01G089	2.03	12/07/01	Skeletonema costatum	5400.28
WN01G	N18	WN01G089	2.03	12/07/01	Thalassionema nitzschioides	2972.89
WN01G	N18	WN01G089	2.03	12/07/01	Thalassiosira nordenskioldii	2359.21
WN01G	N18	WN01G089	2.03	12/07/01	Thalassiosira rotula	2857.54
WN01G	N18	WN01G089	2.03	12/07/01	Thalassiosira sp. group 3 10-20 microns	1098.88

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01G	N18	WN01G089	2.03	12/07/01	Unid. micro-phytoflag sp. group 1 length	6913.75
WN01G	N18	WN01G089	2.03	12/07/01	Unid. micro-phytoflag sp. group 2 length	1635.21
WN01H	N04	WN01H03B	24.3	12/19/01	Centric diatom sp. group 1 diam <10 micr	358.34
WN01H	N04	WN01H03B	24.3	12/19/01	Ceratium fusus	1248.69
WN01H	N04	WN01H03B	24.3	12/19/01	Cryptomonas sp. group 1 length <10 micro	196.94
WN01H	N04	WN01H03B	24.3	12/19/01	Cylindrotheca closterium	839.19
WN01H	N04	WN01H03B	24.3	12/19/01	Dactyliosolen fragilissimus	19762.46
WN01H	N04	WN01H03B	24.3	12/19/01	Dictyocha speculum	609.29
WN01H	N04	WN01H03B	24.3	12/19/01	Guinardia delicatula	4200.79
WN01H	N04	WN01H03B	24.3	12/19/01	Guinardia flaccida	9667.91
WN01H	N04	WN01H03B	24.3	12/19/01	Gymnodinium sp. group 1 5-20 microns wid	1905.58
WN01H	N04	WN01H03B	24.3	12/19/01	Gymnodinium sp. group 2 21-40 microns wi	836.25
WN01H	N04	WN01H03B	24.3	12/19/01	Gyrodinium spirale	3680.46
WN01H	N04	WN01H03B	24.3	12/19/01	Leptocylindrus danicus	13931.51
WN01H	N04	WN01H03B	24.3	12/19/01	Leptocylindrus minimus	51.41
WN01H	N04	WN01H03B	24.3	12/19/01	Pleurosigma spp.	1065.45
WN01H	N04	WN01H03B	24.3	12/19/01	Prorocentrum micans	260.92
WN01H	N04	WN01H03B	24.3	12/19/01	Prorocentrum minimum	1171.59
WN01H	N04	WN01H03B	24.3	12/19/01	Protoperidinium depressum	40730.41
WN01H	N04	WN01H03B	24.3	12/19/01	Pseudonitzschia pungens	148.43
WN01H	N04	WN01H03B	24.3	12/19/01	Rhizosolenia hebetata	234.74
WN01H	N04	WN01H03B	24.3	12/19/01	Rhizosolenia stolterfothii	5089.27
WN01H	N04	WN01H03B	24.3	12/19/01	Skeletonema costatum	234.02
WN01H	N04	WN01H03B	24.3	12/19/01	Thalassiosira nordenskioldii	25.91
WN01H	N04	WN01H03B	24.3	12/19/01	Thalassiosira sp. group 3 10-20 microns	693.56
WN01H	N04	WN01H03B	24.3	12/19/01	Unid. micro-phytoflag sp. group 1 length	8445.78
WN01H	N04	WN01H03B	24.3	12/19/01	Unid. micro-phytoflag sp. group 2 length	319.61
WN01H	N04	WN01H03D	2.61	12/19/01	Centric diatom sp. group 1 diam <10 micr	141.44
WN01H	N04	WN01H03D	2.61	12/19/01	Cryptomonas sp. group 1 length <10 micro	409.02
WN01H	N04	WN01H03D	2.61	12/19/01	Cylindrotheca closterium	556.90
WN01H	N04	WN01H03D	2.61	12/19/01	Dactyliosolen fragilissimus	41716.33
WN01H	N04	WN01H03D	2.61	12/19/01	Dictyocha fibula	253.41
WN01H	N04	WN01H03D	2.61	12/19/01	Guinardia delicatula	3157.33
WN01H	N04	WN01H03D	2.61	12/19/01	Guinardia flaccida	16681.21
WN01H	N04	WN01H03D	2.61	12/19/01	Gymnodinium sp. group 1 5-20 microns wid	2087.57
WN01H	N04	WN01H03D	2.61	12/19/01	Heterocapsa rotundata	51.35
WN01H	N04	WN01H03D	2.61	12/19/01	Leptocylindrus danicus	4205.49
WN01H	N04	WN01H03D	2.61	12/19/01	Leptocylindrus minimus	126.71
WN01H	N04	WN01H03D	2.61	12/19/01	Pleurosigma spp.	1021.30
WN01H	N04	WN01H03D	2.61	12/19/01	Prorocentrum micans	1503.19
WN01H	N04	WN01H03D	2.61	12/19/01	Prorocentrum minimum	374.35
WN01H	N04	WN01H03D	2.61	12/19/01	Pseudonitzschia pungens	732.94
WN01H	N04	WN01H03D	2.61	12/19/01	Rhizosolenia setigera	4243.29
WN01H	N04	WN01H03D	2.61	12/19/01	Rhizosolenia stolterfothii	7317.62
WN01H	N04	WN01H03D	2.61	12/19/01	Skeletonema costatum	243.66
WN01H	N04	WN01H03D	2.61	12/19/01	Thalassionema nitzschioides	75.95
WN01H	N04	WN01H03D	2.61	12/19/01	Thalassiosira sp. group 3 10-20 microns	772.06
WN01H	N04	WN01H03D	2.61	12/19/01	Unid. micro-phytoflag sp. group 1 length	6628.47
WN01H	N04	WN01H03D	2.61	12/19/01	Unid. micro-phytoflag sp. group 2 length	306.37
WN01H	N18	WN01H067	10.4	12/19/01	Centric diatom sp. group 1 diam <10 micr	292.42

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01H	N18	WN01H067	10.4	12/19/01	Ceratium fusus	3855.94
WN01H	N18	WN01H067	10.4	12/19/01	Ceratium lineatum	1244.09
WN01H	N18	WN01H067	10.4	12/19/01	Ceratium tripos	4932.04
WN01H	N18	WN01H067	10.4	12/19/01	Cryptomonas sp. group 1 length <10 micro	598.69
WN01H	N18	WN01H067	10.4	12/19/01	Cryptomonas sp. group 2 length >10 micro	54.15
WN01H	N18	WN01H067	10.4	12/19/01	Cylindrotheca closterium	729.68
WN01H	N18	WN01H067	10.4	12/19/01	Dactyliosolen fragilissimus	12818.45
WN01H	N18	WN01H067	10.4	12/19/01	Eutreptia/eutreptiella spp.	79.53
WN01H	N18	WN01H067	10.4	12/19/01	Guinardia delicatula	2550.79
WN01H	N18	WN01H067	10.4	12/19/01	Guinardia flaccida	5960.84
WN01H	N18	WN01H067	10.4	12/19/01	Gymnodinium sp. group 1 5-20 microns wid	3496.73
WN01H	N18	WN01H067	10.4	12/19/01	Gymnodinium sp. group 2 21-40 microns wi	859.33
WN01H	N18	WN01H067	10.4	12/19/01	Heterocapsa rotundata	13.74
WN01H	N18	WN01H067	10.4	12/19/01	Leptocylindrus danicus	12022.27
WN01H	N18	WN01H067	10.4	12/19/01	Leptocylindrus minimus	188.66
WN01H	N18	WN01H067	10.4	12/19/01	Pennate diatom sp. group 2 10-30 microns	42.73
WN01H	N18	WN01H067	10.4	12/19/01	Pleurosigma spp.	729.90
WN01H	N18	WN01H067	10.4	12/19/01	Prorocentrum micans	3753.71
WN01H	N18	WN01H067	10.4	12/19/01	Prorocentrum minimum	200.65
WN01H	N18	WN01H067	10.4	12/19/01	Pseudonitzschia delicatissima	9.08
WN01H	N18	WN01H067	10.4	12/19/01	Pseudonitzschia pungens	130.95
WN01H	N18	WN01H067	10.4	12/19/01	Rhizosolenia hebetata	241.22
WN01H	N18	WN01H067	10.4	12/19/01	Rhizosolenia setigera	4245.62
WN01H	N18	WN01H067	10.4	12/19/01	Rhizosolenia stolterfothii	2614.87
WN01H	N18	WN01H067	10.4	12/19/01	Skeletonema costatum	265.36
WN01H	N18	WN01H067	10.4	12/19/01	Thalassionema nitzschioides	18.09
WN01H	N18	WN01H067	10.4	12/19/01	Thalassiosira nordenskioldii	79.86
WN01H	N18	WN01H067	10.4	12/19/01	Thalassiosira sp. group 3 10-20 microns	919.62
WN01H	N18	WN01H067	10.4	12/19/01	Unid. micro-phytoflag sp. group 1 length	8814.48
WN01H	N18	WN01H067	10.4	12/19/01	Unid. micro-phytoflag sp. group 2 length	985.29
WN01H	N18	WN01H069	4.01	12/19/01	Centric diatom sp. group 1 diam <10 micr	153.55
WN01H	N18	WN01H069	4.01	12/19/01	Cerataulina pelagica	666.09
WN01H	N18	WN01H069	4.01	12/19/01	Ceratium lineatum	534.50
WN01H	N18	WN01H069	4.01	12/19/01	Chaetoceros sp. group 2 diam 10-30 micro	569.82
WN01H	N18	WN01H069	4.01	12/19/01	Coccolithophorida spp.	390.85
WN01H	N18	WN01H069	4.01	12/19/01	Cryptomonas sp. group 1 length <10 micro	195.63
WN01H	N18	WN01H069	4.01	12/19/01	Cylindrotheca closterium	384.74
WN01H	N18	WN01H069	4.01	12/19/01	Dactyliosolen fragilissimus	17913.82
WN01H	N18	WN01H069	4.01	12/19/01	Guinardia delicatula	3034.79
WN01H	N18	WN01H069	4.01	12/19/01	Guinardia flaccida	14085.24
WN01H	N18	WN01H069	4.01	12/19/01	Gymnodinium sp. group 1 5-20 microns wid	901.38
WN01H	N18	WN01H069	4.01	12/19/01	Gymnodinium sp. group 2 21-40 microns wi	2215.16
WN01H	N18	WN01H069	4.01	12/19/01	Heterocapsa rotundata	5.90
WN01H	N18	WN01H069	4.01	12/19/01	Leptocylindrus danicus	3160.24
WN01H	N18	WN01H069	4.01	12/19/01	Leptocylindrus minimus	306.38
WN01H	N18	WN01H069	4.01	12/19/01	Pennate diatom sp. group 2 10-30 microns	27.49
WN01H	N18	WN01H069	4.01	12/19/01	Pleurosigma spp.	940.76
WN01H	N18	WN01H069	4.01	12/19/01	Prorocentrum micans	3110.22
WN01H	N18	WN01H069	4.01	12/19/01	Pseudonitzschia pungens	506.36
WN01H	N18	WN01H069	4.01	12/19/01	Rhizosolenia setigera	4690.40

Survey	Sta.	Sample Number	Depth (m)	Sampling Date	Plankton	Estimated Carbon Equivalence (ng carbon/L)
WN01H	N18	WN01H069	4.01	12/19/01	Rhizosolenia stolterfothii	1348.11
WN01H	N18	WN01H069	4.01	12/19/01	Skeletonema costatum	229.79
WN01H	N18	WN01H069	4.01	12/19/01	Thalassionema nitzschioides	139.93
WN01H	N18	WN01H069	4.01	12/19/01	Thalassiosira nordenskioldii	51.47
WN01H	N18	WN01H069	4.01	12/19/01	Thalassiosira punctigera	223.60
WN01H	N18	WN01H069	4.01	12/19/01	Thalassiosira sp. group 3 10-20 microns	533.38
WN01H	N18	WN01H069	4.01	12/19/01	Unid. micro-phytoflag sp. group 1 length	5628.01

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