APPENDIX A

Productivity Methods

Methods

Production Analyses by ^{14}C - Field Procedures.

From each of the 5 productivity depths at each productivity station, samples were obtained by filtration through 300 mm Nitex screen (to remove zooplankton) from the Niskin bottles into opaque 1 gal polyethylene bottles. Under subdued green light, sub-samples were transferred by siphon into individual 75 ml acid cleaned polycarbonate bottles. Each bottle was flushed with approximately 250 ml of sample. A total of 16 bottles (14 light bottles, 2 dark bottles) were filled for each depth and incubated in a light and temperature controlled incubator. Light bottles from each depth are incubated at 14 light intensities (250 W tungsten-halogen lamps attenuated with Rosco neutral density filters) and all bottles incubated within 2° C of the *in situ* temperature at each depth for 4-6 hr (actual time was recorded). Single bottles of sample collected from each depth was assayed for background (time-zero) activity.

The 75 ml samples were incubated with 5-10 μCi ^{14}C-bicarbonate (higher activity during winter and spring season) and biological activity terminated by filtration of the entire contents of the bottles through 2.5 cm diameter Whatman GF/F glass fiber filters and immediate contact of the filters with 0.2 ml of a 20% aqueous solution of acetic acid contained in pre-prepared 20 ml glass scintillation vials (vials immediately recapped). For specific activity determination 0.1 ml aliquots of sample were placed in pre-prepared 20 ml scintillation vials containing 0.2 ml of benzethonium hydroxide (approximately 1.0 M solution in methanol; Sigma Chemical Company) to covalently sequester the ^{14}C inorganic carbon (vials immediately recapped). Specific activity was determined from the measured activity and measurements of DIC.

Samples for DIC analysis were collected from the Niskin bottles into 300 ml BOD bottles, following collection procedures used for oxygen analyses. Within 6 hr. of BOD sample collection, duplicate 10 ml samples were injected into 20 ml crimp-sealed serum bottles containing 0.5 ml of a 2N aqueous solution of sulfuric acid for subsequent I.R. analysis (Beckman IR-315 infrared analyzer) of the gaseous phase (5 - 150 ml samples) at the W.H.O.I. laboratory.

During summer months 1995 some of the ^{14}C incubations (W9508-W9513) were incubated on shore in the MWRA laboratory at Deer Island. Samples were collected in opaque bottles and maintained at *in situ* temperature until transport to the lab. The ^{14}C incubations were begun approximately 2 - 3 hr from sample collection and should compare favorably with samples that are incubated aboard the ship.

Production Analyses by ^{14}C - Laboratory Procedures.

Sample processing. Upon arrival to the W.H.O.I. laboratory scintillation cocktail (10 ml Scintiverse II) were added to the scintillation vials containing the specific activity samples and analyzed using a Packard Tricarb 4000 liquid scintillation counter which possesses automated routines for quench correction. Vials containing acidified filters were opened and placed in a

ventilator in the hood for overnight to allow the filters to dry and excess ^{14}C carbon dioxide dissipate. The vials containing the filters were analyzed by scintillation spectroscopy as described above.

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

$$P(i) = \frac{1.05(DPM(i)-DPM(blk))}{V_s A_{sp} T}$$

$$P(d) = \frac{1.05(DPM(d)-DPM(blk))}{V_s A_{sp} T}$$

$$A_{sp} = \frac{DPM(sa)-DPM(back)}{V_{sa} DIC}$$

where:

P(i) = primary production rate at light intensity i, ($\mu gC\ l^{-1}h^{-1}$ or $mgC\ m^{-3}h^{-1}$)
P(d) = dark production, ($\mu gC\ l^{-1}h^{-1}$ or $mgC\ m^{-3}h^{-1}$)
A_{sp} = specific activity (DPM/μgC)
DPM(i) = dpm in sample incubated at light intensity i
DPM(blk) = dpm in zero time blank (sample filtered immediately after addition of tracer)
DPM(d) = dpm in dark incubated sample
DPM(back) = background dpm in vial containing only scintillation cocktail
V_s = volume of incubated sample (l)
T = incubation time (h)
V_{sa} = volume counted of specific activity sample (ml)
DIC = concentration of dissolved inorganic carbon (μg/ml)

P-I curves. For each of the 5 depths for each photosynthesis station a P-I curve was obtained from the data P(I) = P(i)-P(d) vs. the irradiance (I, $\mu E\ m^{-2}s^{-1}$) that the incubating sample is exposed. The P-I curves were fit via one of two possible models, depending upon whether or not significant photoinhibition occurs. In cases where photoinhibition is evident the model of Platt et al. (1980) was fit (SAAM II, 1994) to obtain the theoretical maximum production, and terms for light-dependent rise in production and degree of photoinhibition:

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

$$P\max" = P_{sb}"[a"/(a"+\beta")][\beta"/(a"+\beta")]^{\beta"/}$$ (Lohrenz et al., 1994)

where:

P(I) = primary production at irradiance I, corrected for dark fixation (P(i)-P(d))
P_{sb}"= theoretical maximum production without photoinhibition
a = α"I/Psb", and α"is the initial slope the light-dependent rise in production

b = β"I/Psb", and β"is a term relaying the degree of photoinhibition
P_{max}"= light saturated maximum production

If it is not possible to converge upon a solution the model of Webb et al. (1974) was similarly fit to obtain the maximum production and the term for light-dependent rise in production:

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

where:

P(I) = primary production at irradiance I corrected for dark fixation (P(i)-P(d))
P_{max}"= light saturated maximum production
a' = α"I/Pmax", and α"is the initial slope the light-dependent rise in production

Nearly all P-I curves obtained did not show evidence of photoinhibition and were fit according to the Webb model.

Light vs. depth profiles. To obtain a numerical representation of the light field throughout the water column bin averaged CTD light profiles (0.5 m intervals) was fit (SAAM II, 1994) to an empirical sum of exponentials equation of the form:

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

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 ($I_0 = A_1+A_2$)
a_1, a_2 = coefficients relating to the extinction coefficient ($k = a_1+a_2$)

The expanded equation was used as pigment absorption and other factors usually resulted in significant deviation from the idealized standard irradiance vs. depth equation. The best fit profiles were used to compute percent light attenuation for each of the sampling depths.

Daily incident light field. During normal CTD hydrocasts the incident light field was routinely measured via a deck light sensor at high temporal resolution. The average incident light intensity was determined for each of the CTD casts to provide, over the course of the photoperiod (12 hr period centered upon solar noon), a reasonably well resolved irradiance time series consisting of 12-17 data points. A 48 point time series (every 15 min.) of incident was obtained from these data by linear interpolation.

Calculation of daily primary production. Given the best fit parameters (Pmax", α", β") of the P-I curves obtained for each of the 5 sampling depths, percent *in situ* light attenuation at each depth determined from the sum of exponential fits of the *in situ* light field, and the photoperiod incident light (I_0) time series it was possible to compute daily volumetric production for each depth. To do this at a given depth, hourly production was 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 computed from the percent attenuation and incident irradiance. Daily production ($\mu gC\ l^{-1}d^{-1}$) was obtained by integration of the determined activity throughout the 12 hr 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 for 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.

Calculation of daily areal production. Areal production ($mgC\ m^{-2}d^{-1}$) was obtained by trapezoidal integration of daily volumetric production vs. depth from the sea surface down to the 0.5% light level. The P-I factors from the uppermost sampling depth (approximately 1.2 - 2.7 m, depending upon weather state) were used to compute the contribution of the portion of the water column between the sea surface interface and uppermost sampling depth to areal production (rather than to assume that the activity in the uppermost sample is representative of that section of the water column, which is not always the case).

Calculation of chlorophyll-specific parameters. Chlorophyll-specific measures of the various parameters were determined by dividing by the appropriate chlorophyll term obtained from independent measurements:

$$\alpha = \frac{\alpha''}{[chla]}$$

$$P\max = \frac{P\max''}{[chla]}$$

where:

α = chlorophyll-a-specific initial slope of light-dependent production $[(gC(gchla)^{-1}h^{-1}(\mu Em^{-2}s^{-1})^{-1}]$

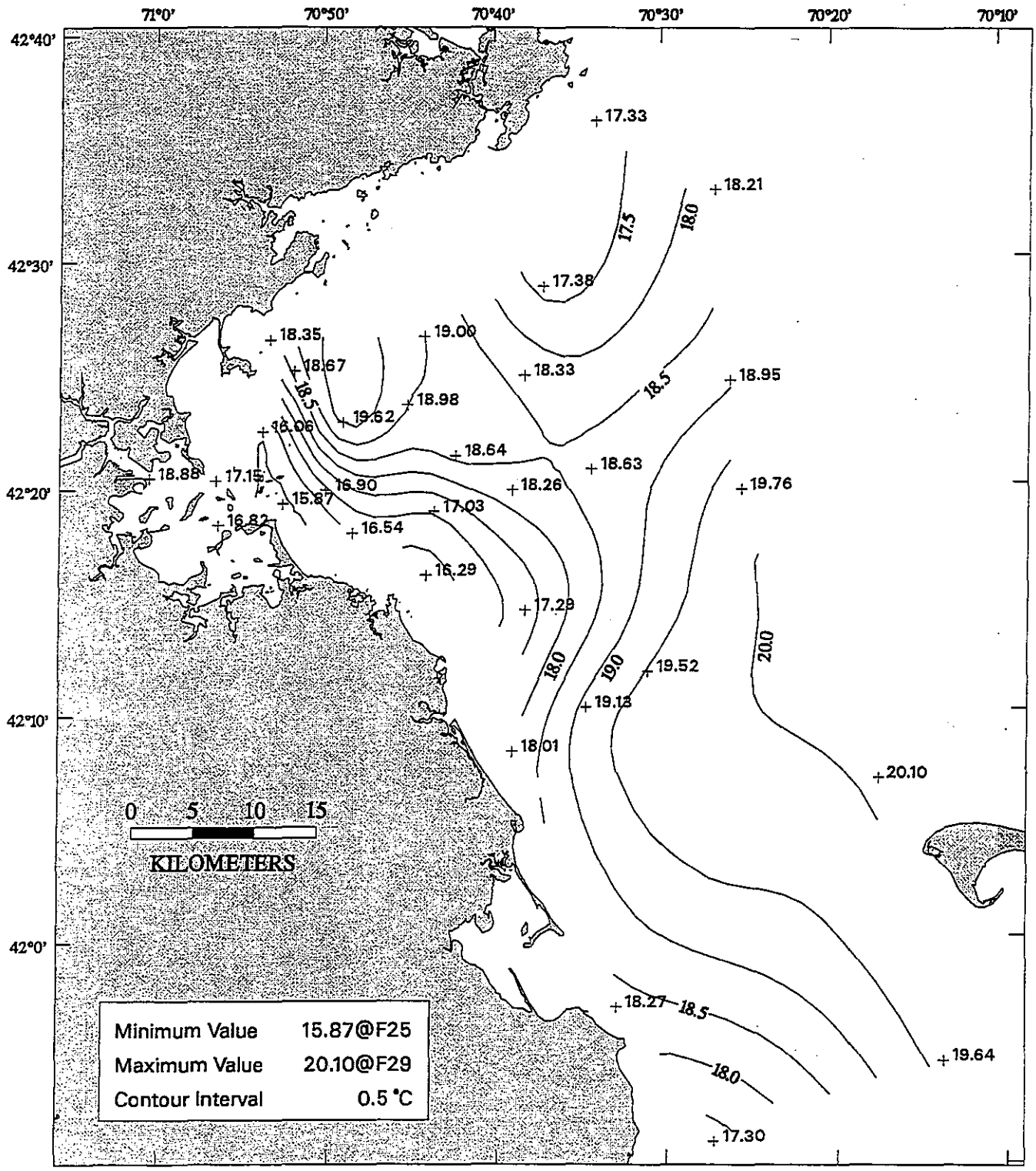
Pmax = light saturated chlorophyll-specific production $[gC(gchla)^{-1}h^{-1}]$

APPENDIX B
Surface Contour Plots - Farfield Surveys

All contour plots were created using data from the surface bottle sample (A). Each plot is labelled on the bottom right with the survey number ("9601"), and parameter as listed below. The minimum and maximum value, and the station where the value was measured, is provided for each plot, as well as the contour interval and parameter units.

Appendix B: Table of Contents

*$NO_3 + NO_2 + NH_4$



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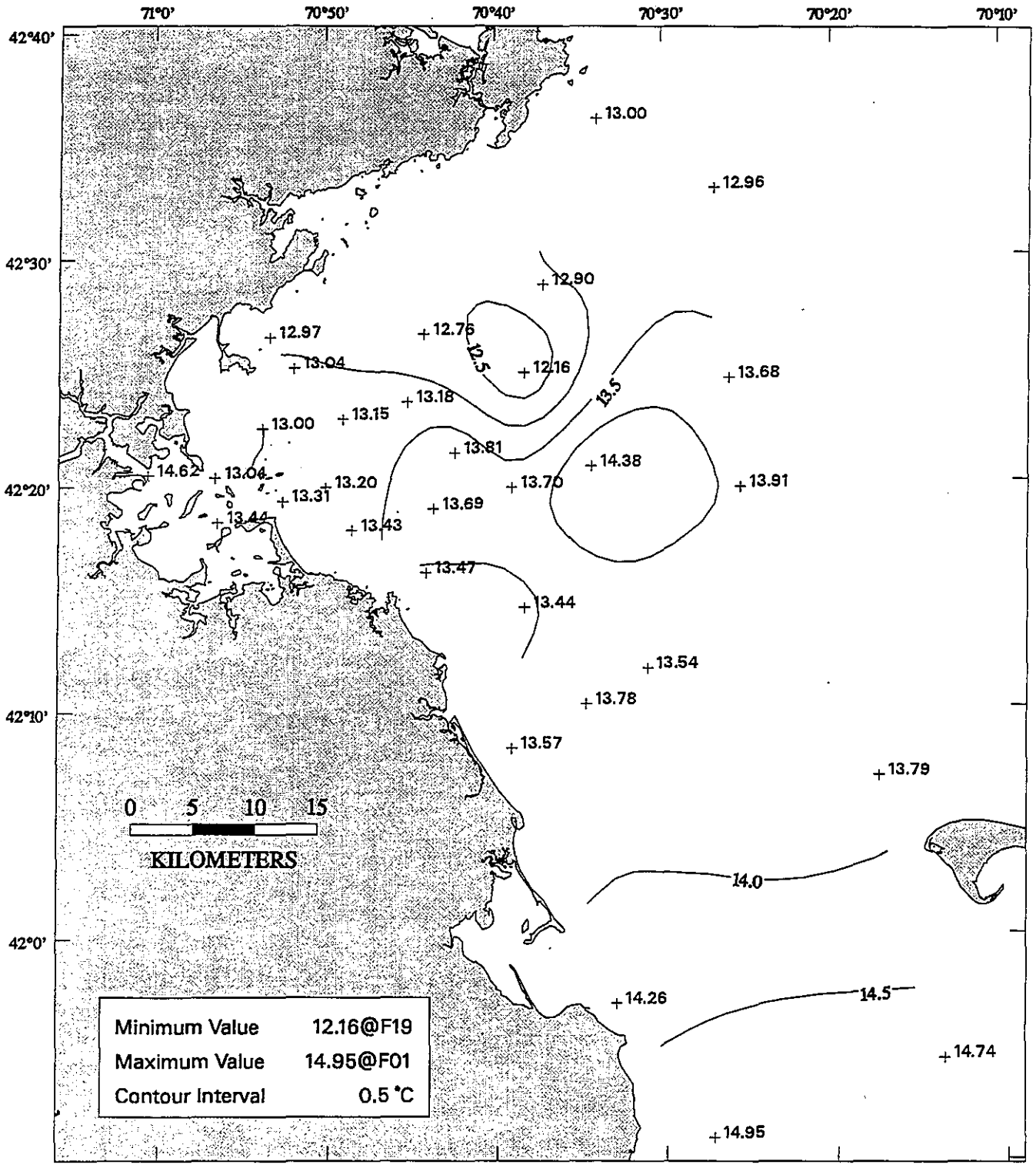

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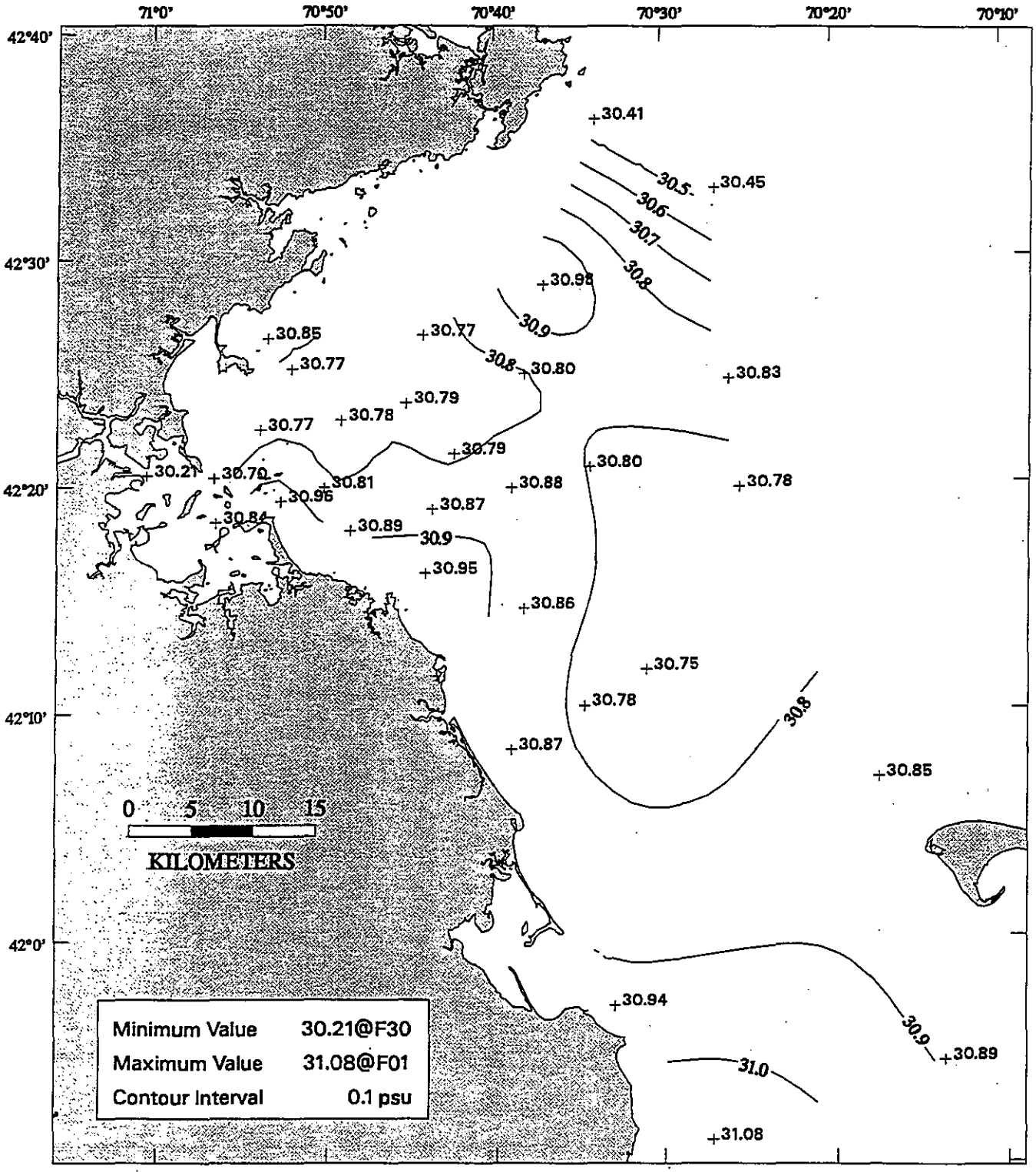

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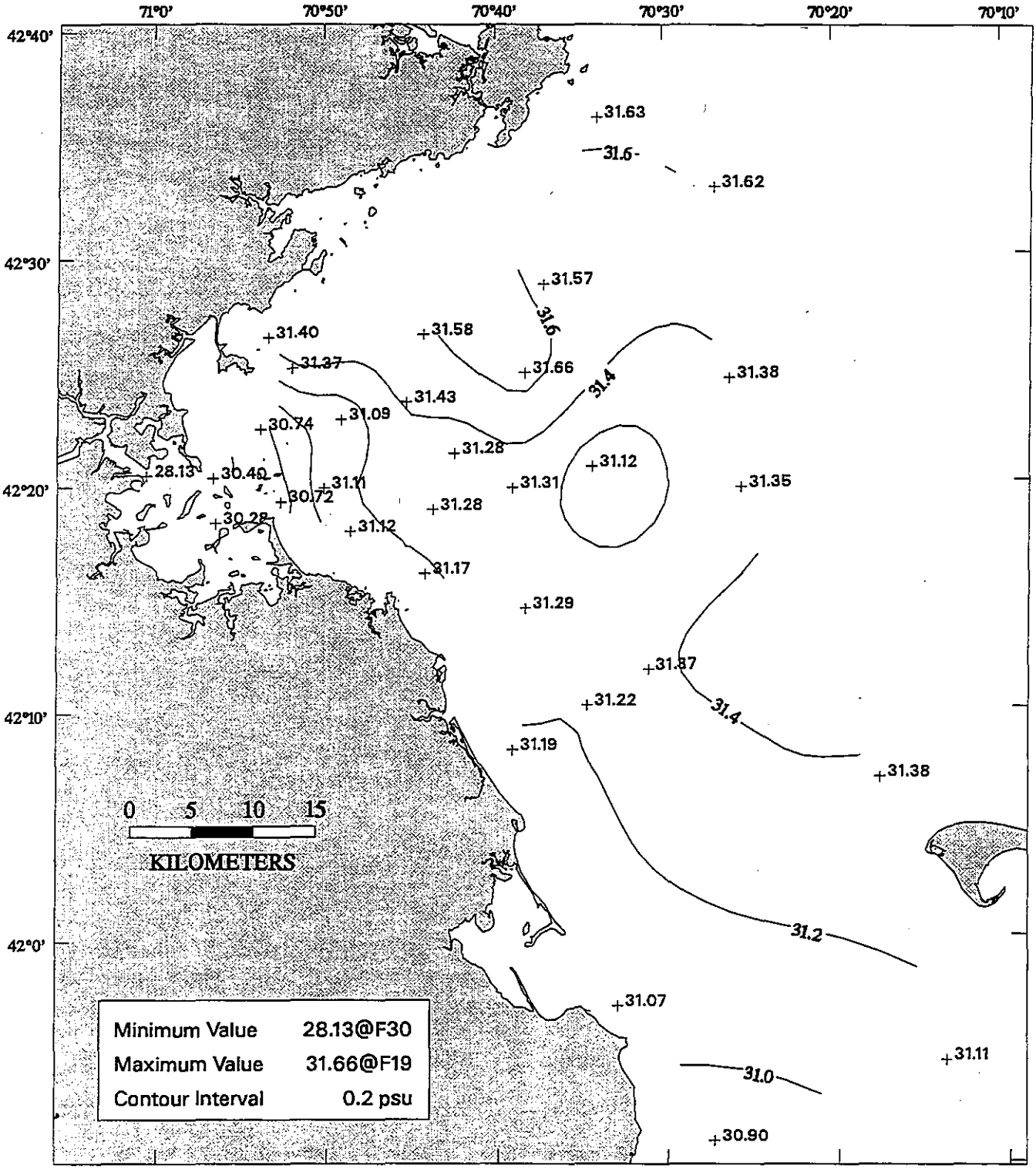

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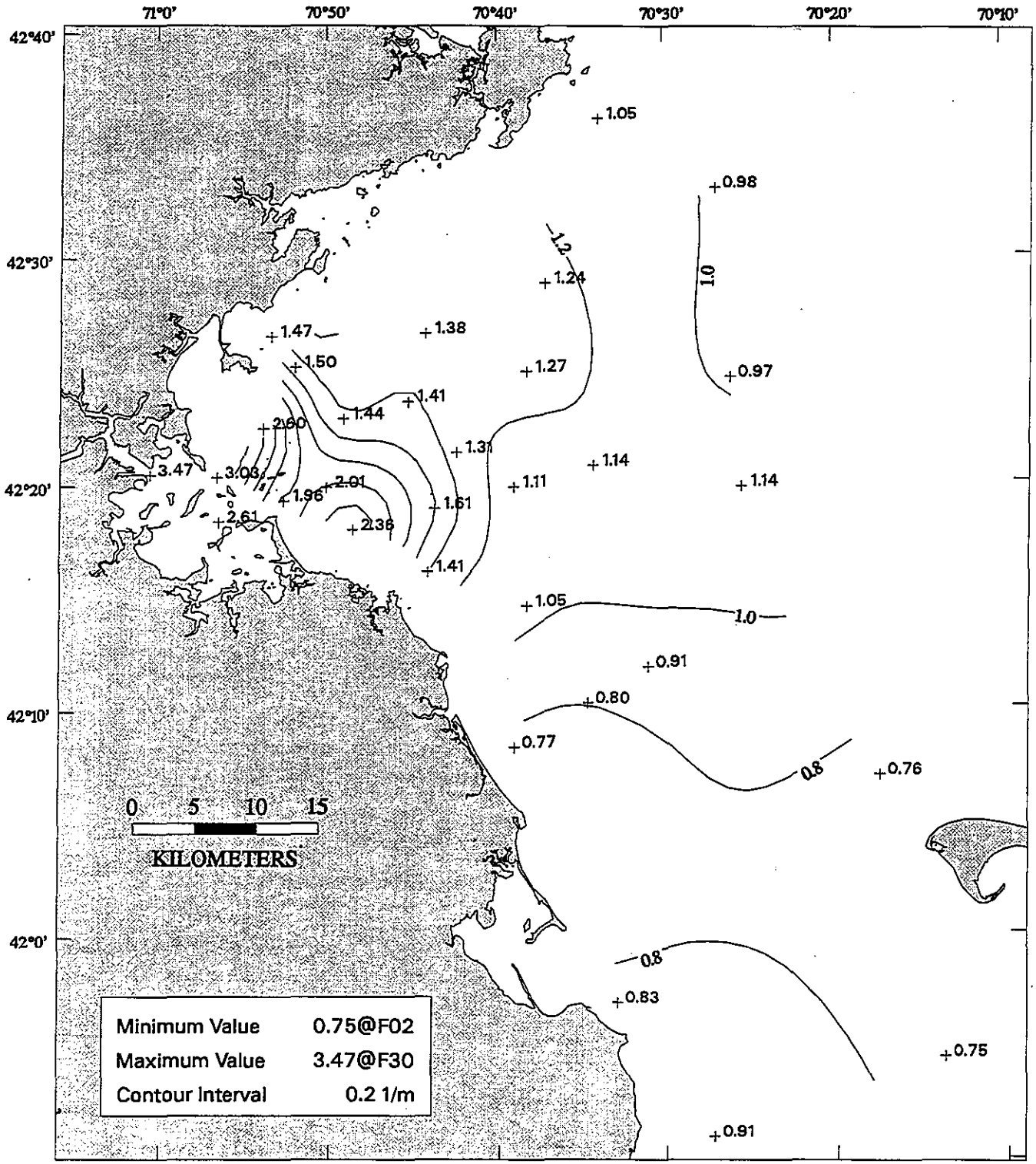

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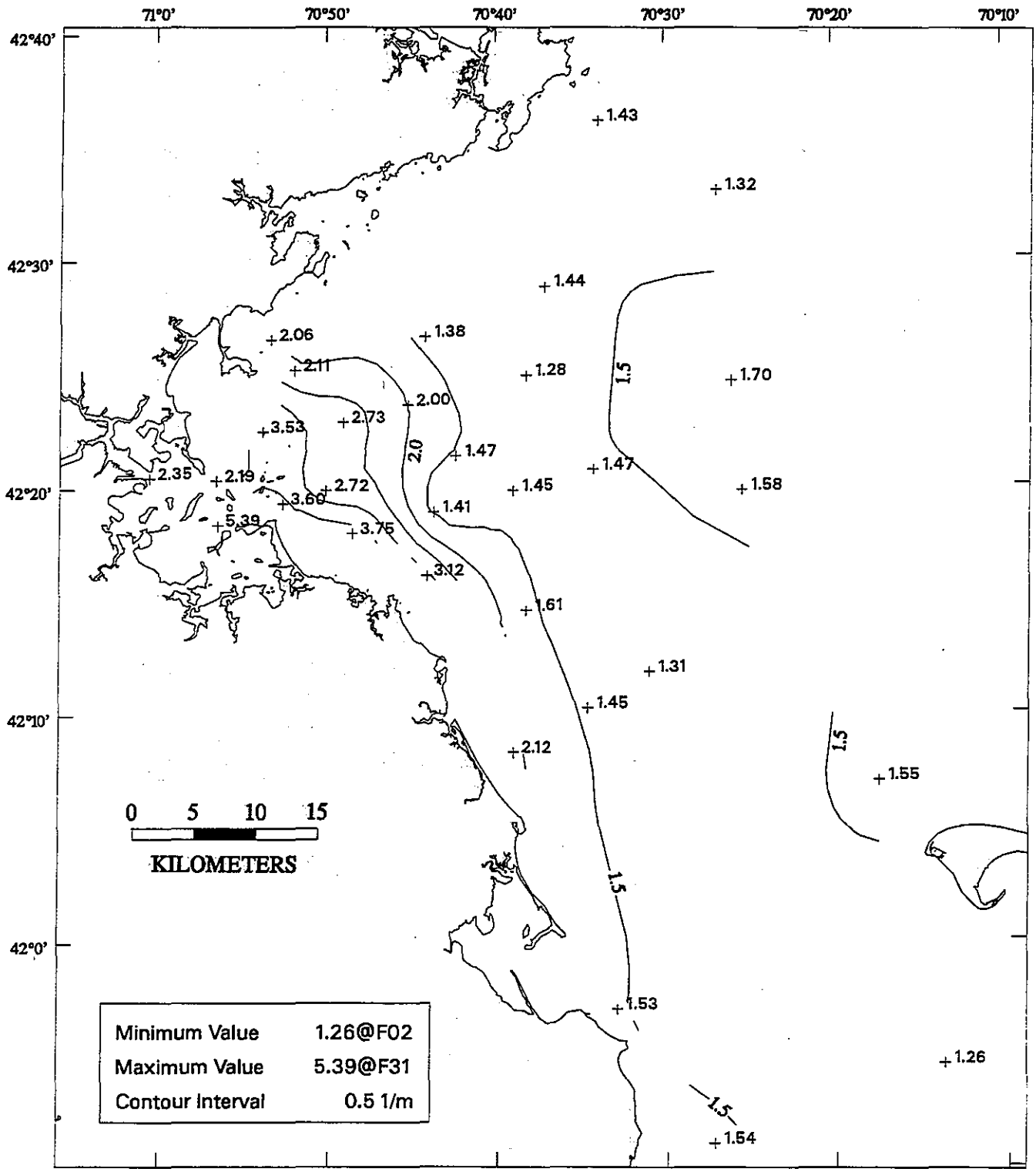

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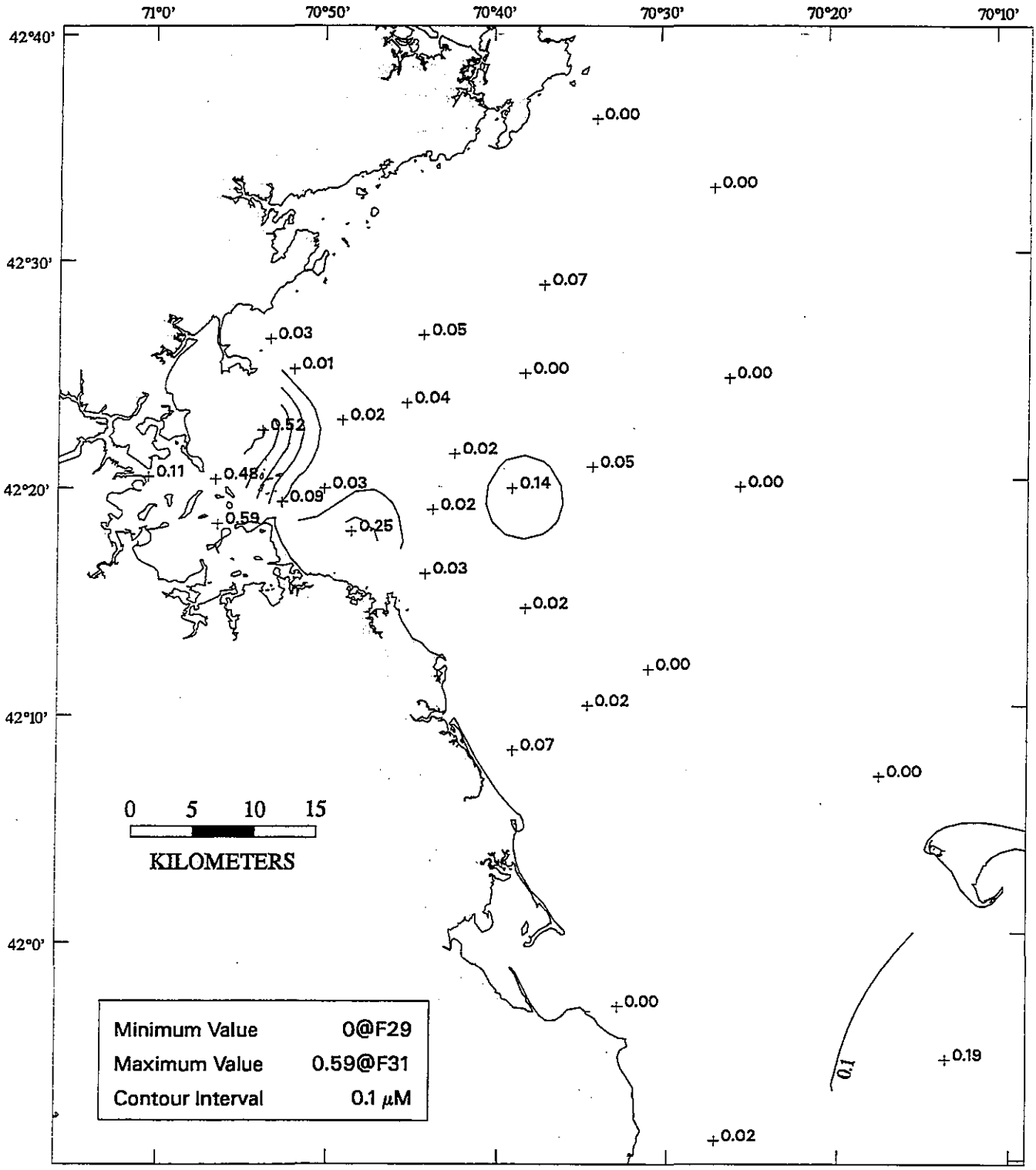

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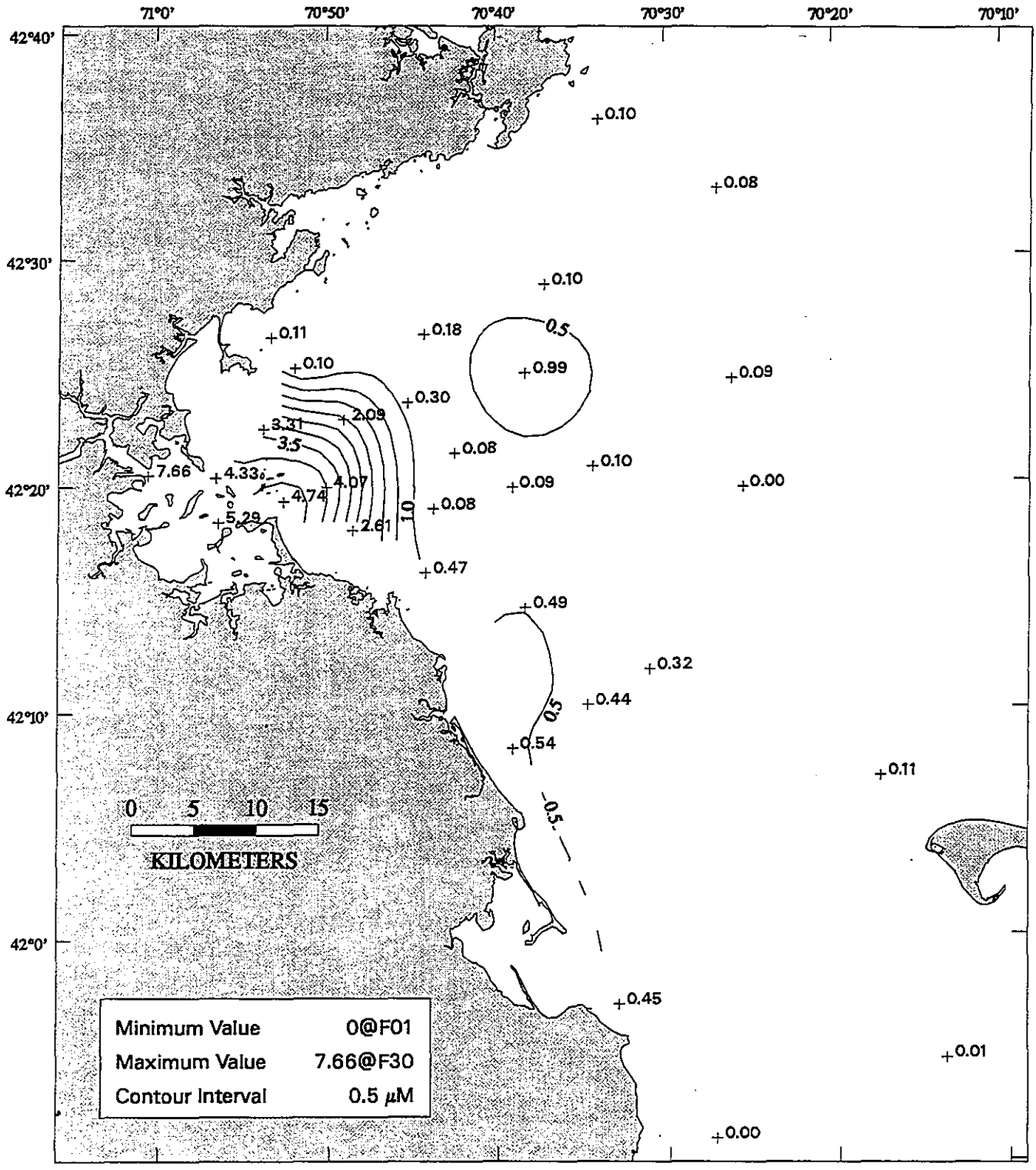

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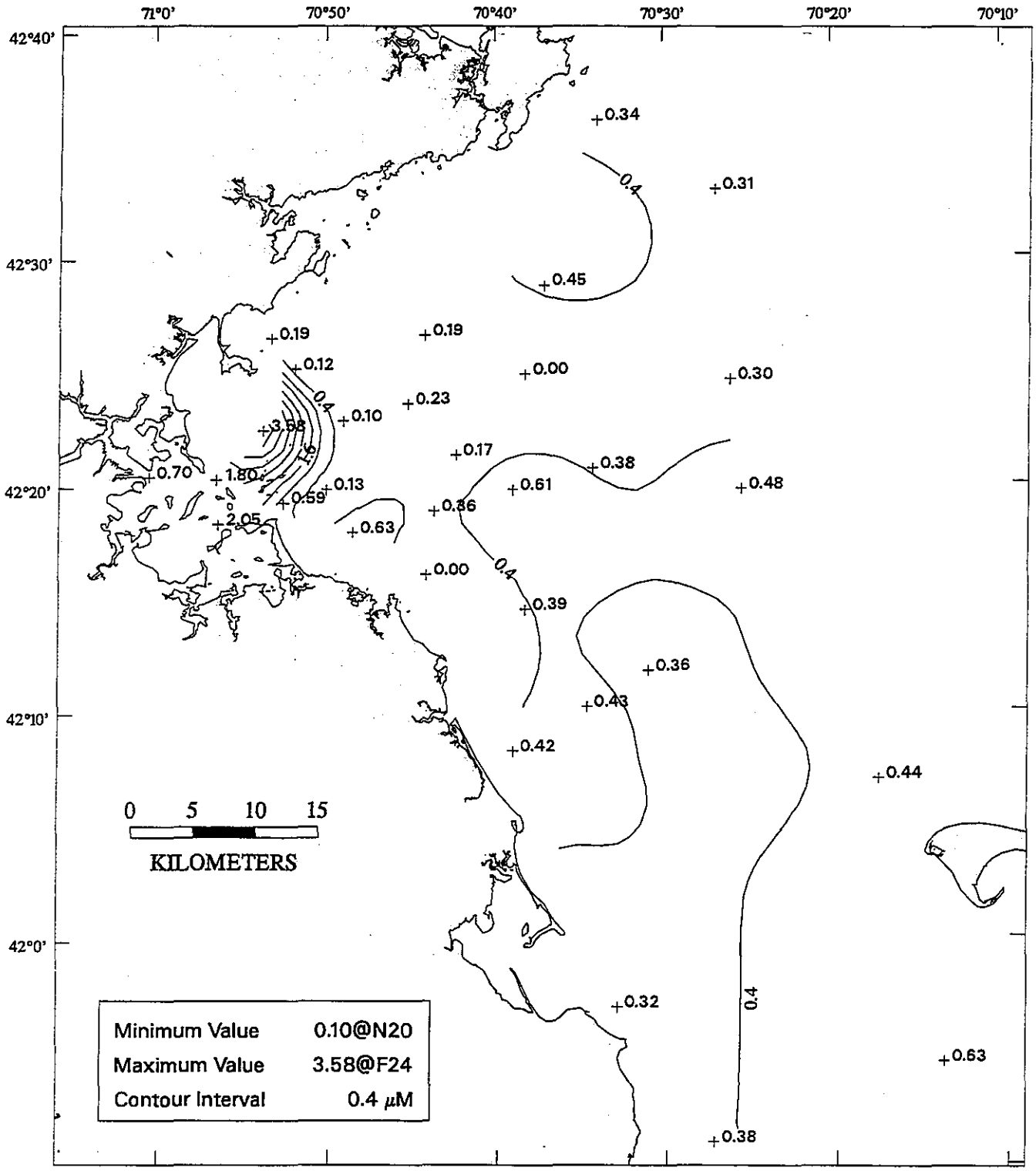

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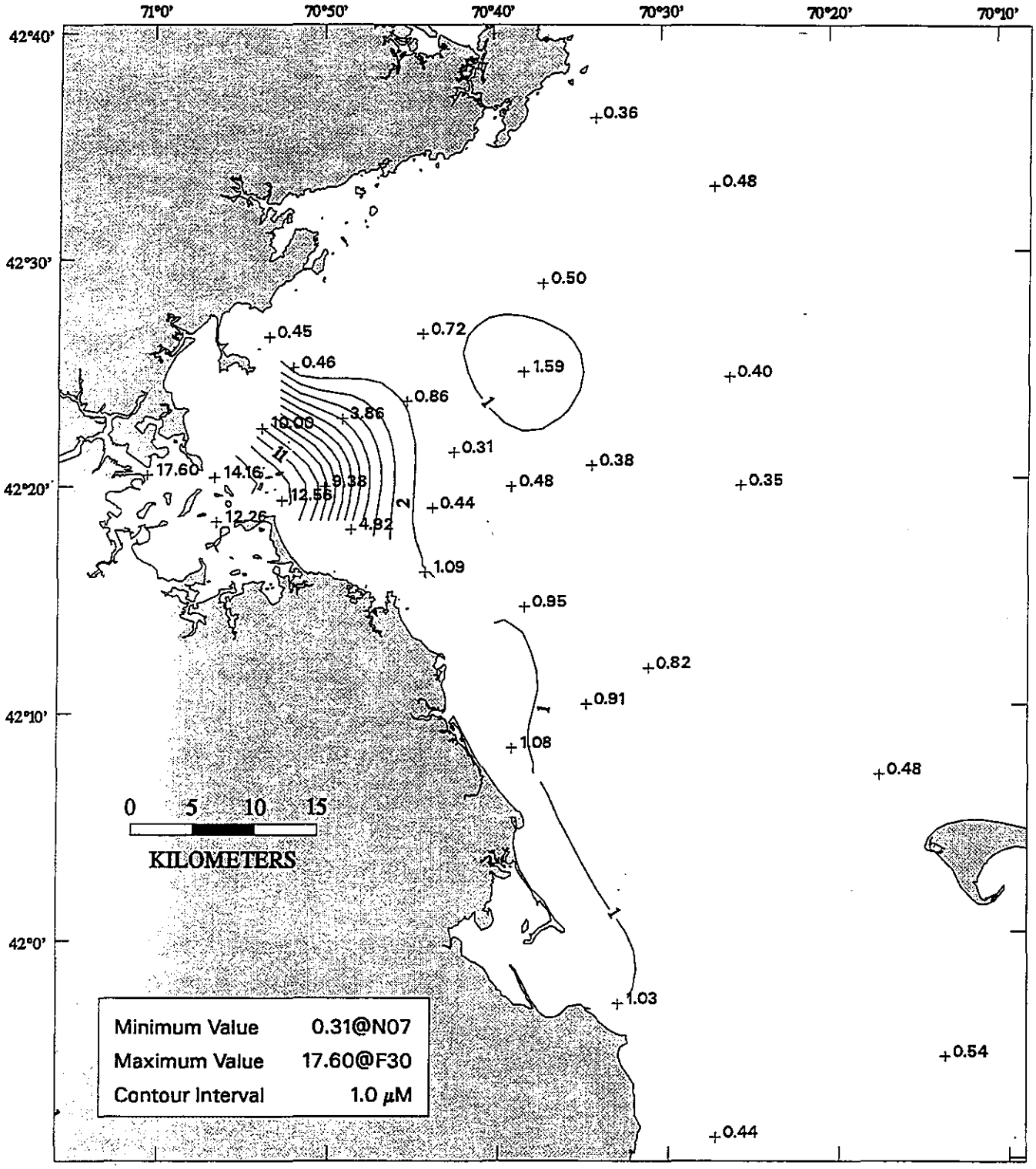

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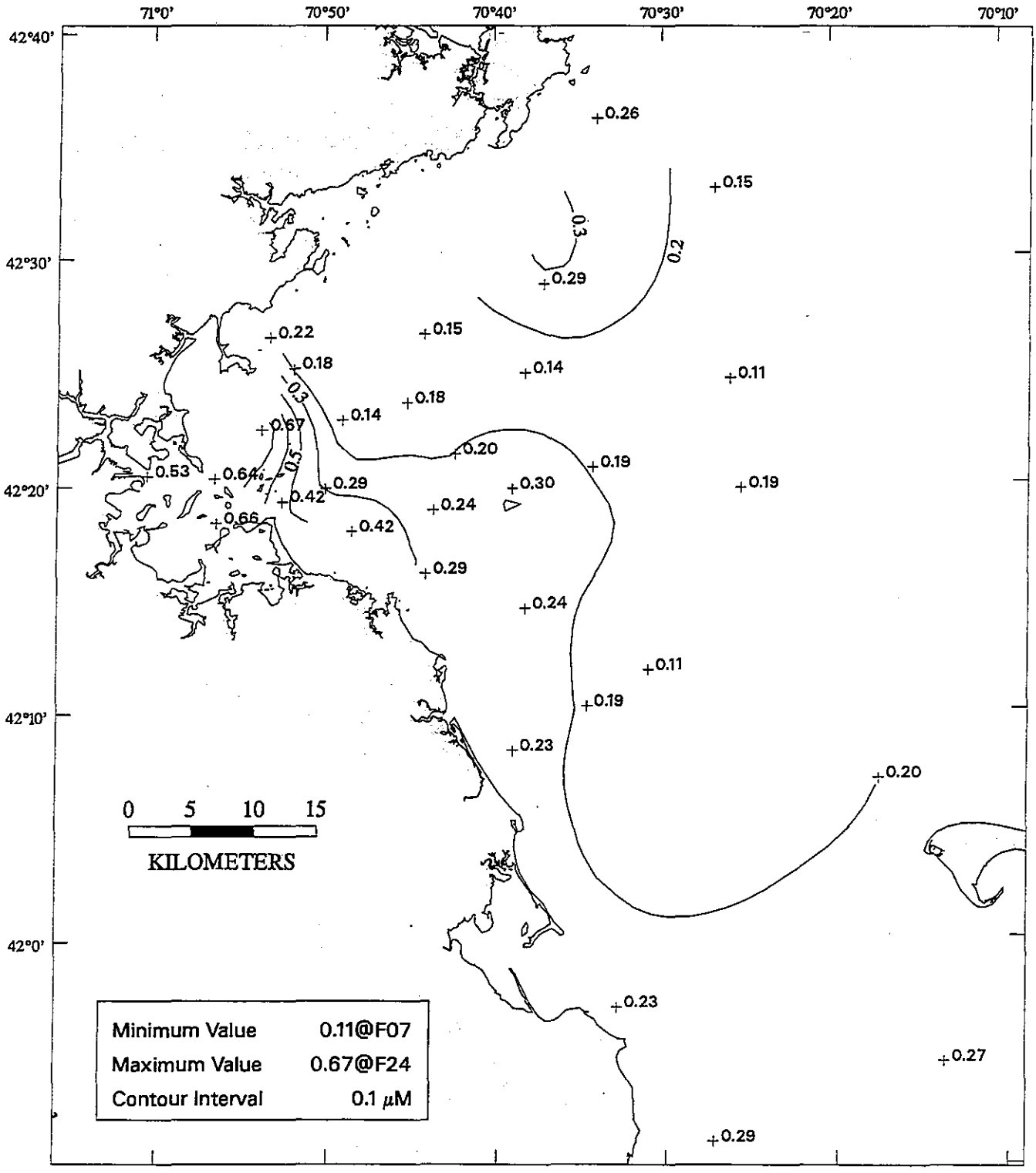

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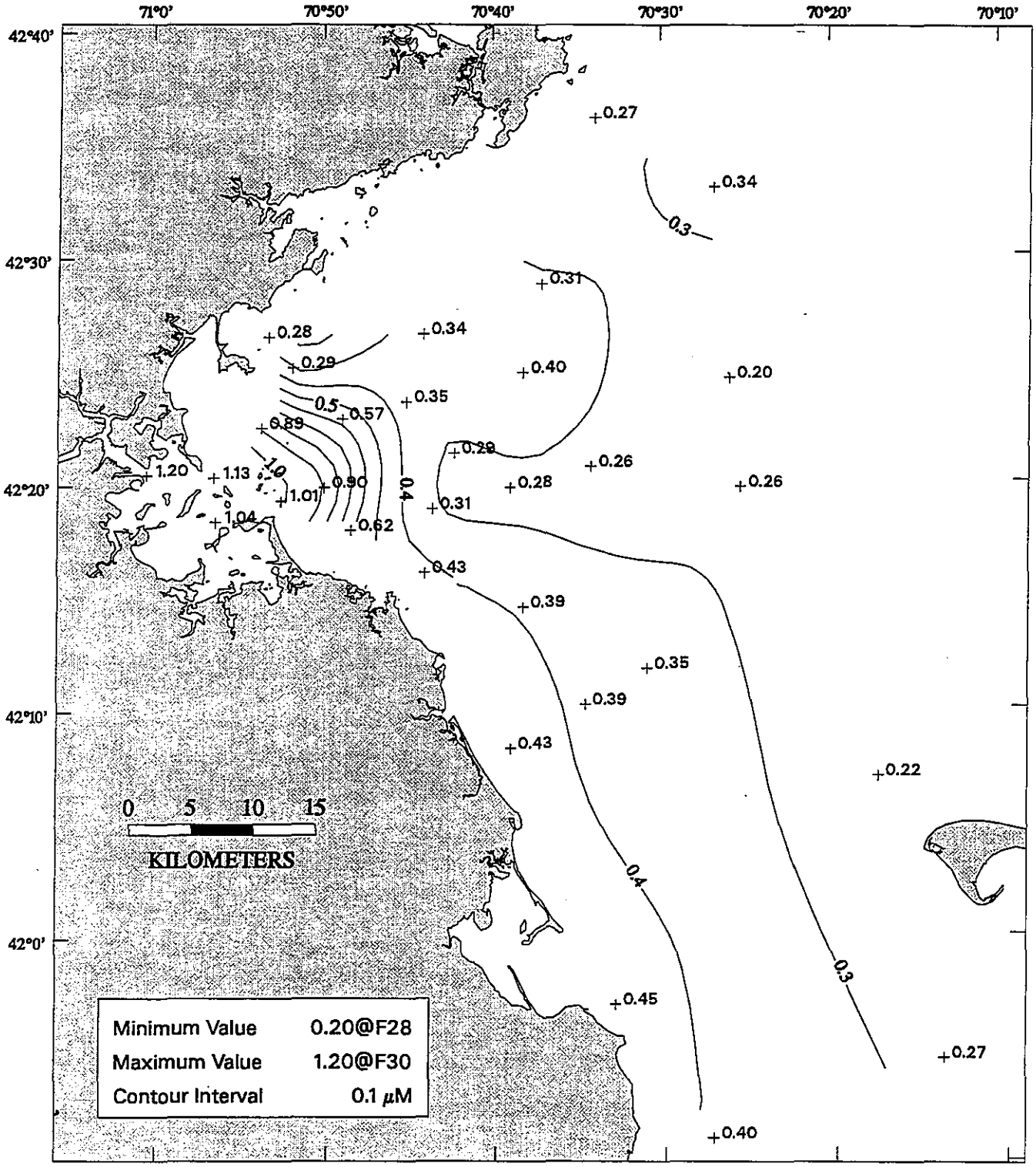

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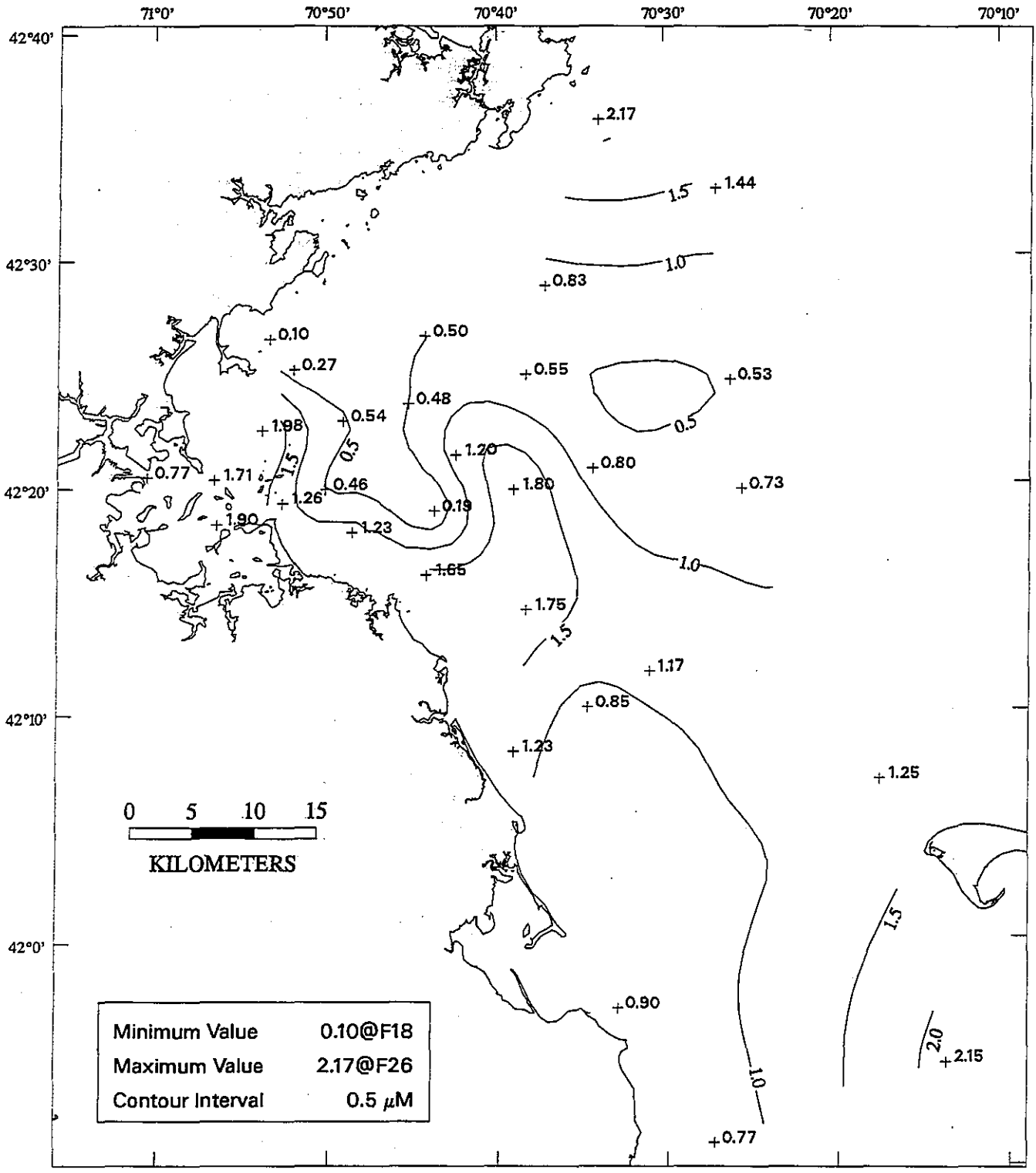

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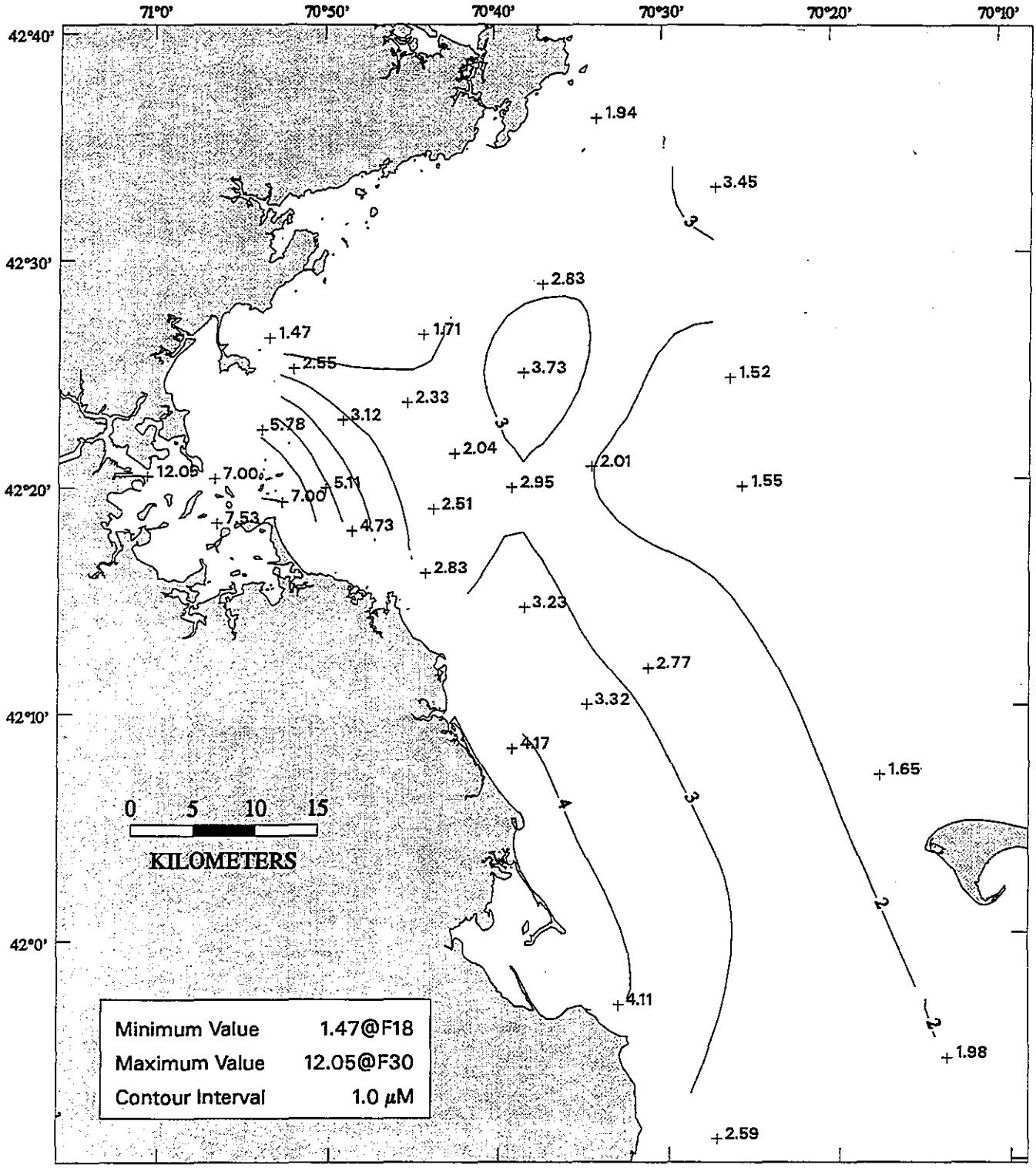

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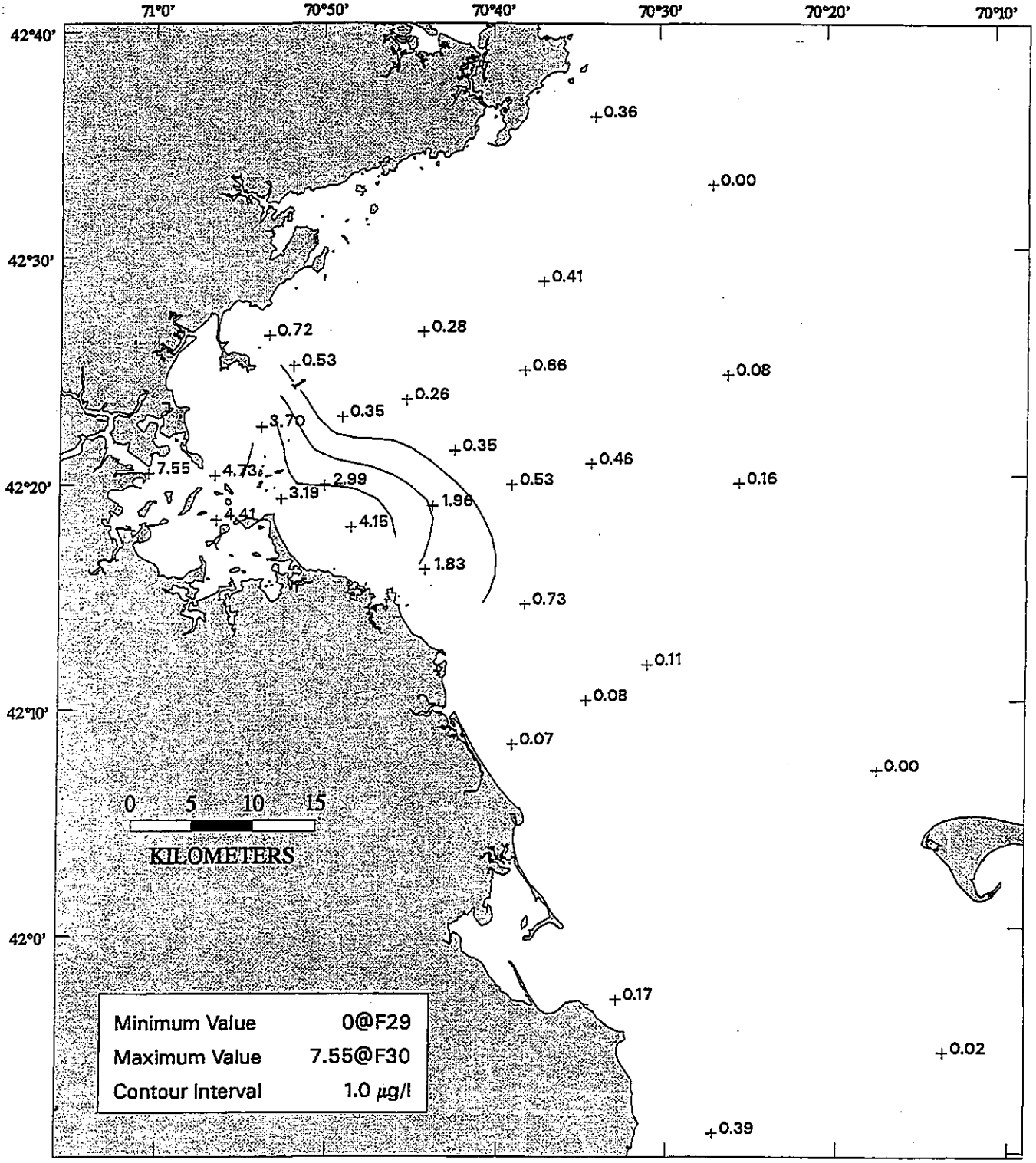

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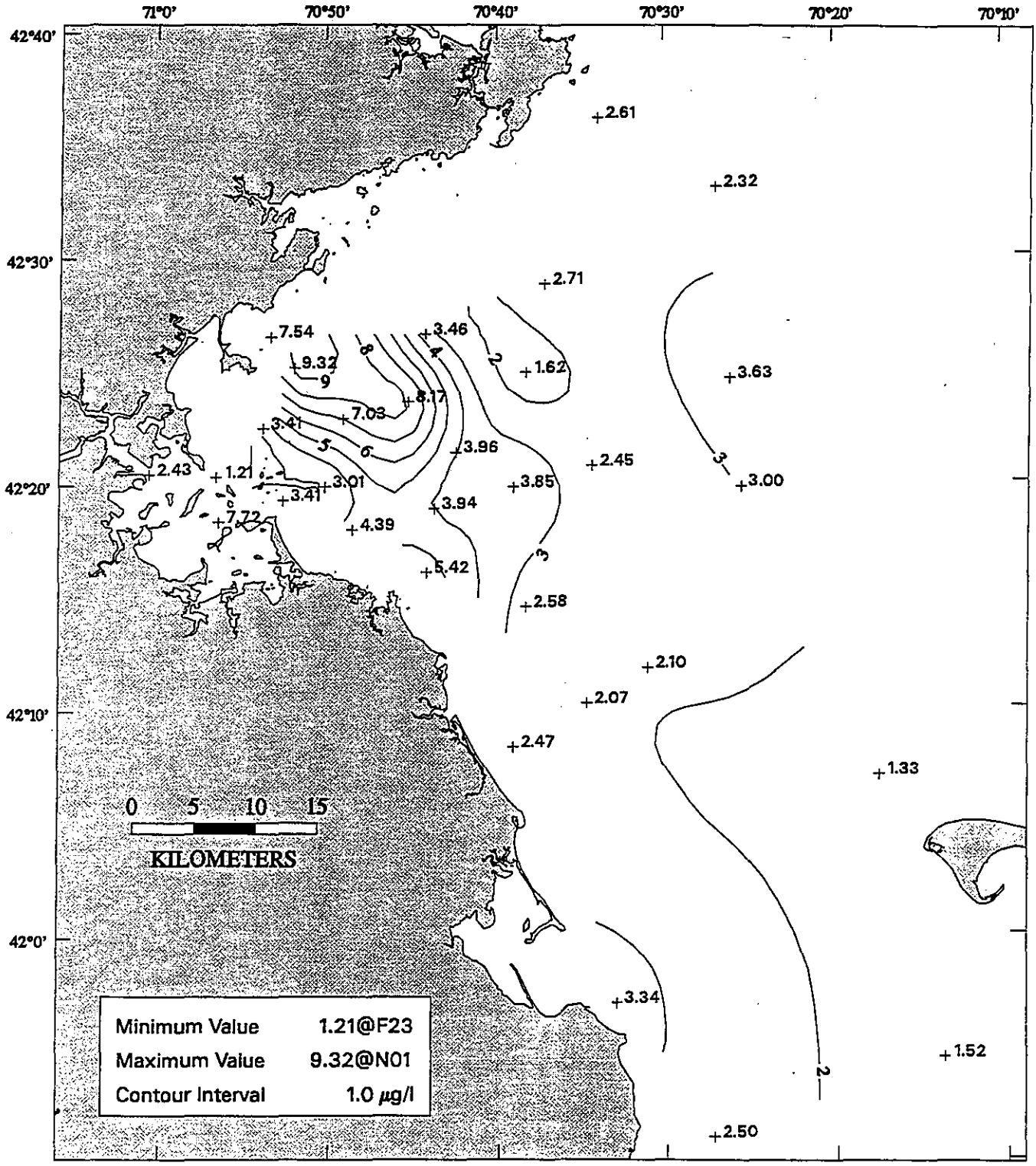

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APPENDIX C

Transect Plots

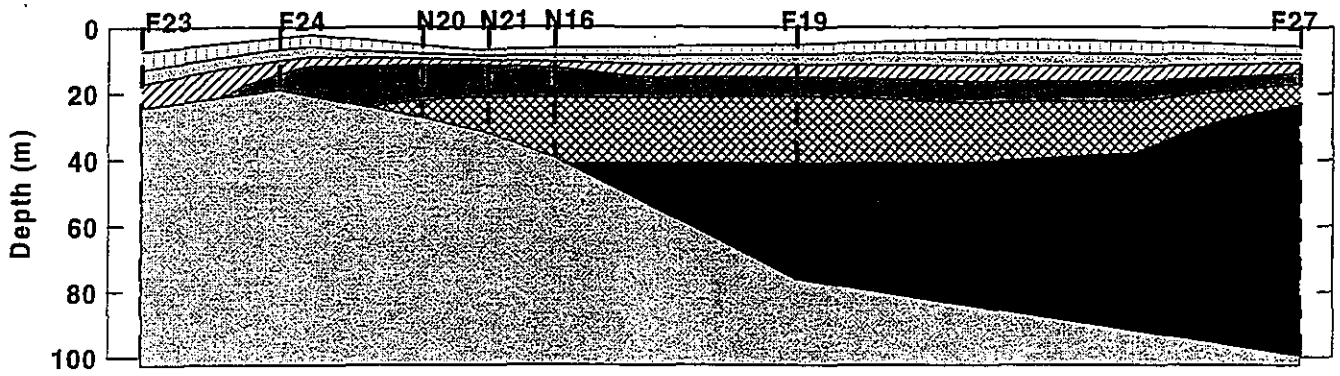
Data were contoured relative to water depth and distance between stations as shown on the transects (Figure 1-3, text). Relative distances between stations and water depth at each station is shown on the transect. Water depth is labelled with negative values in meters, with zero depth at the sea surface, and shaded. Three 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. Contour units are as noted on the table below. Each plot is labelled on the bottom right with the parameter as listed below, and the survey number ("9601").

Appendix C: Table of Contents

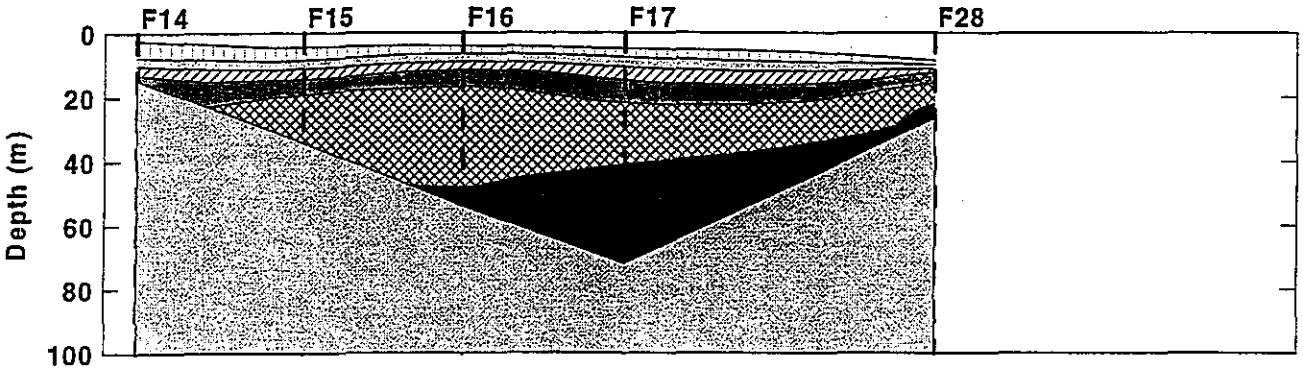
Parameter Name	Units
Sigma-T (σ_t)	n/a
Temperature	°C
Salinity	PSU
Beam Attenuation	/m
Nitrate + Nitrite	µM
Phosphate (PO_4)	µM
Silicate (SiO_4)	µM
Ammonium (NH_4)	µM
Fluorescence (clophylla)	µg/L
Dissolved Oxygen	mg/L

*$NO_3 + NO_2 + NH_4$

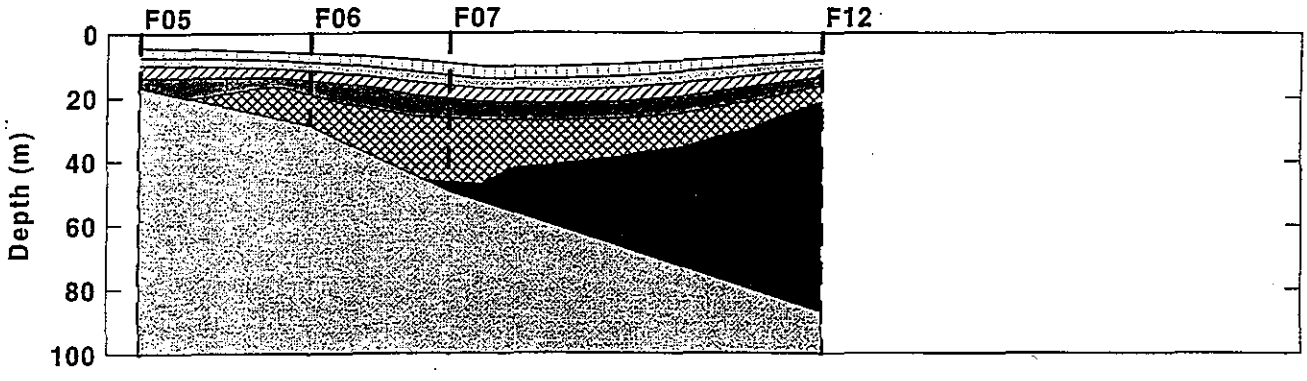
Boston-Nearfield Transect

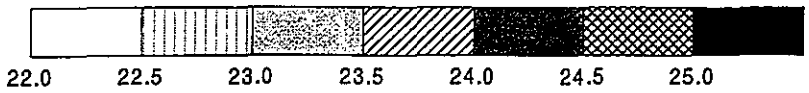


Cohassett Transect



Marshfield Transect





Parameter: Sigma-T
Survey: 9611

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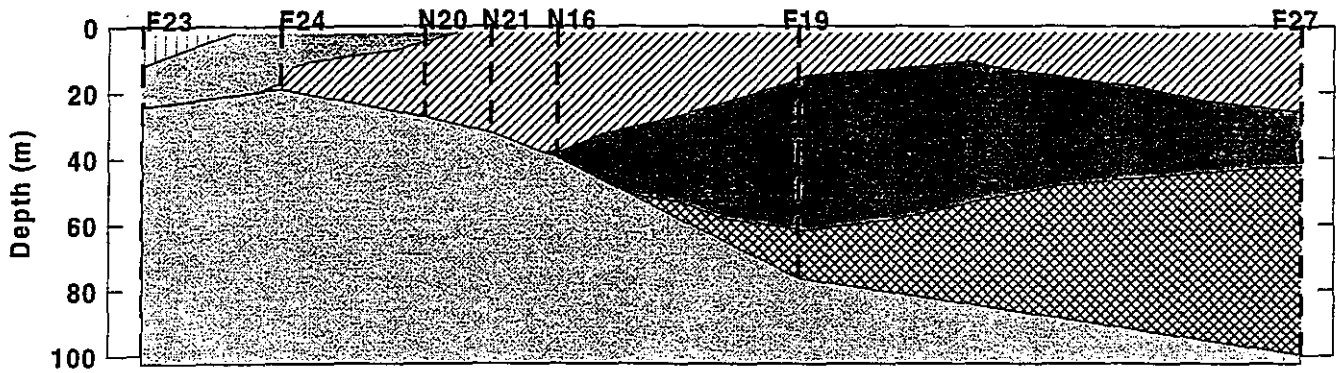

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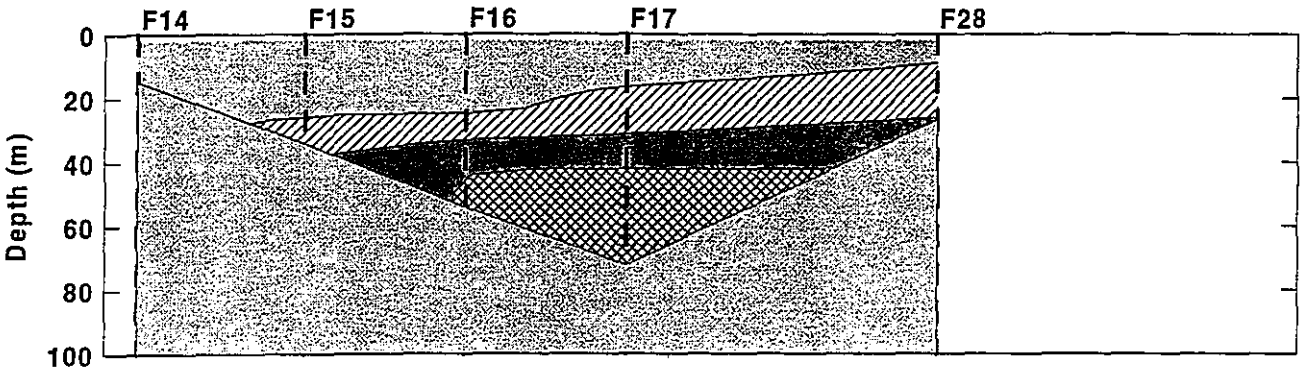

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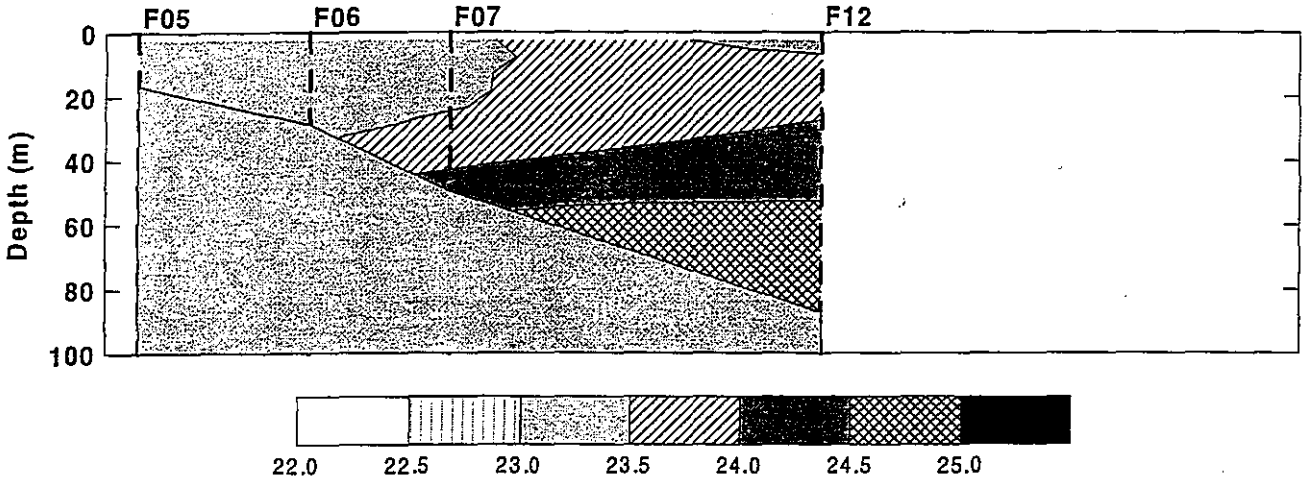

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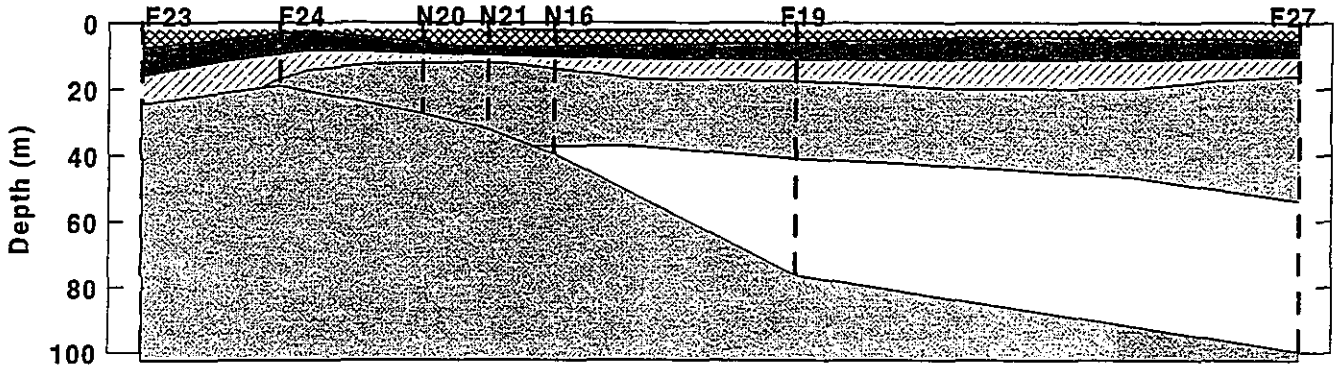

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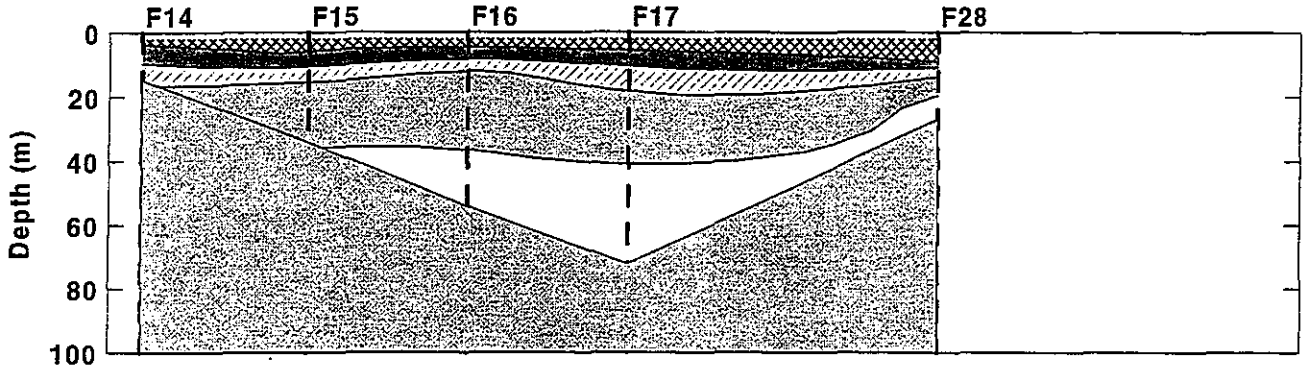

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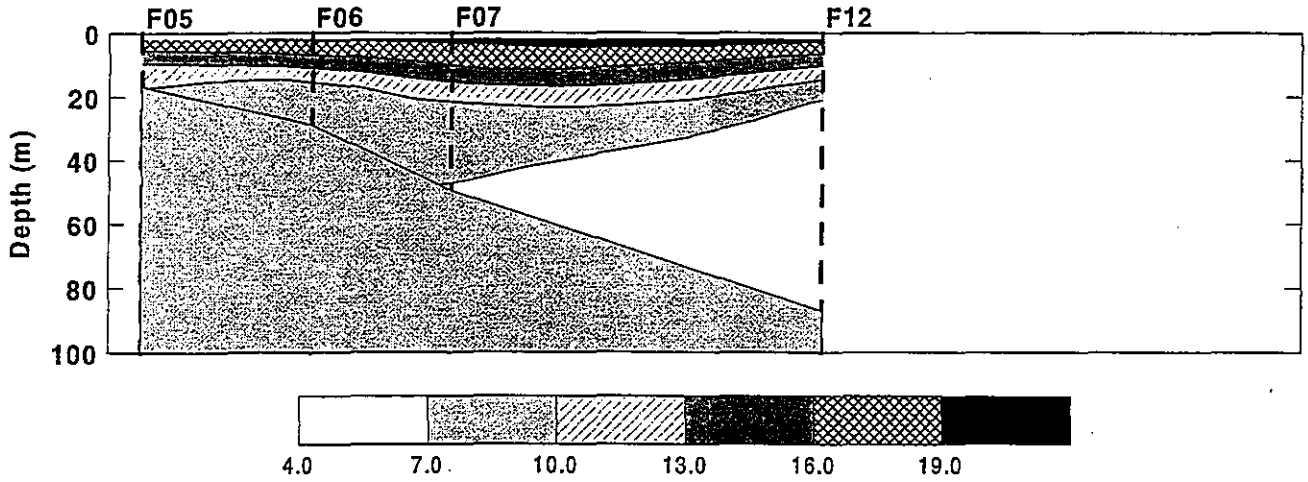

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Survey: 9611

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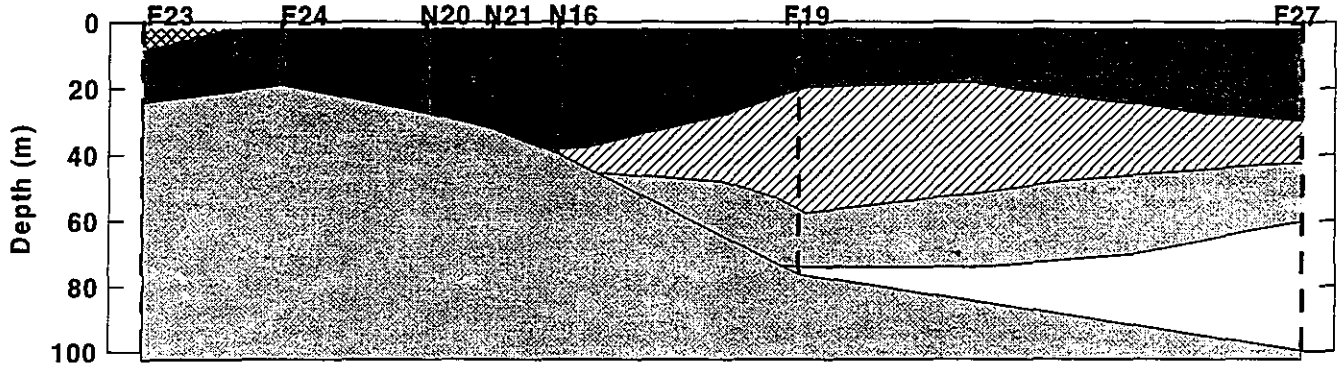

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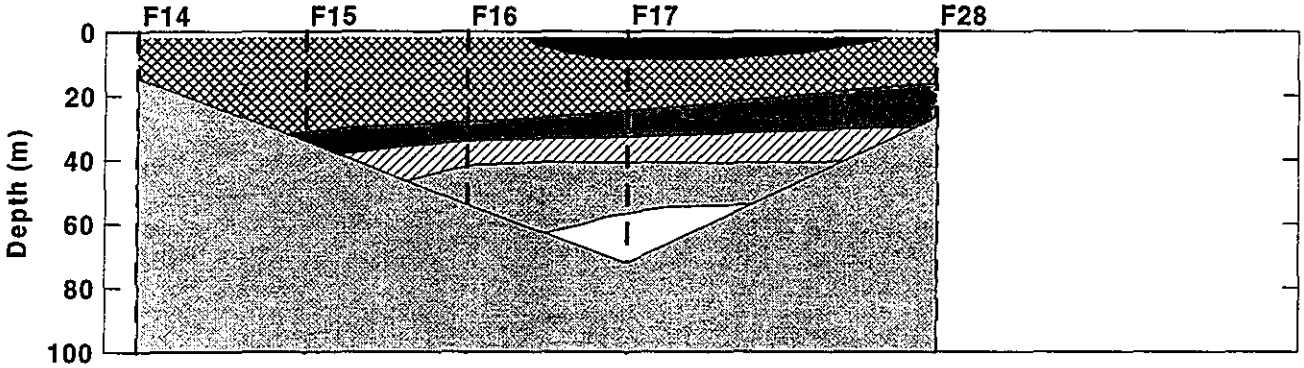

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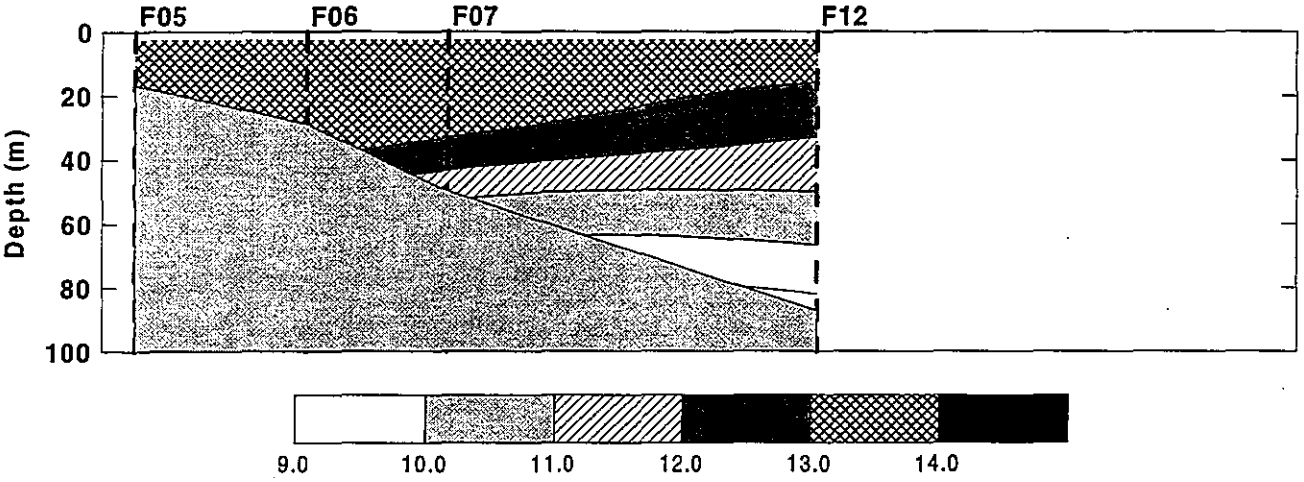

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Survey: 9614

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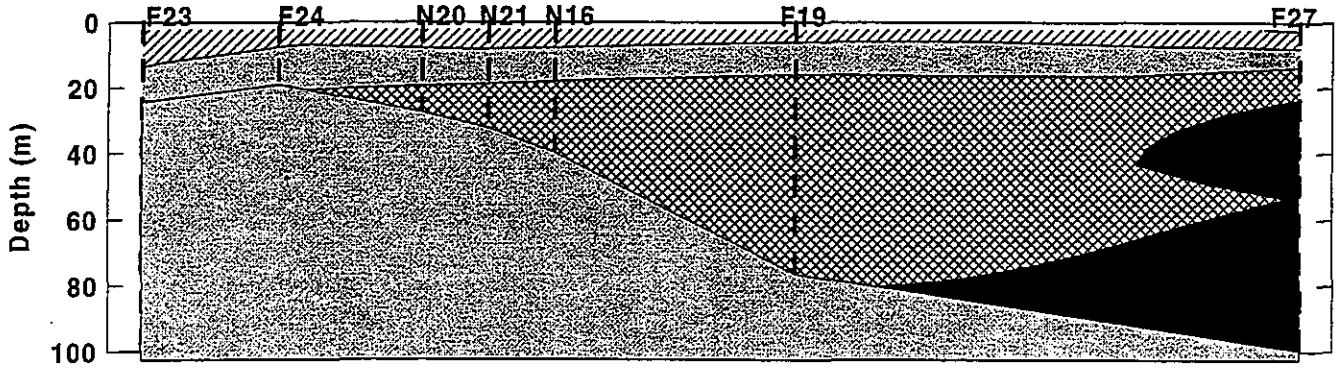

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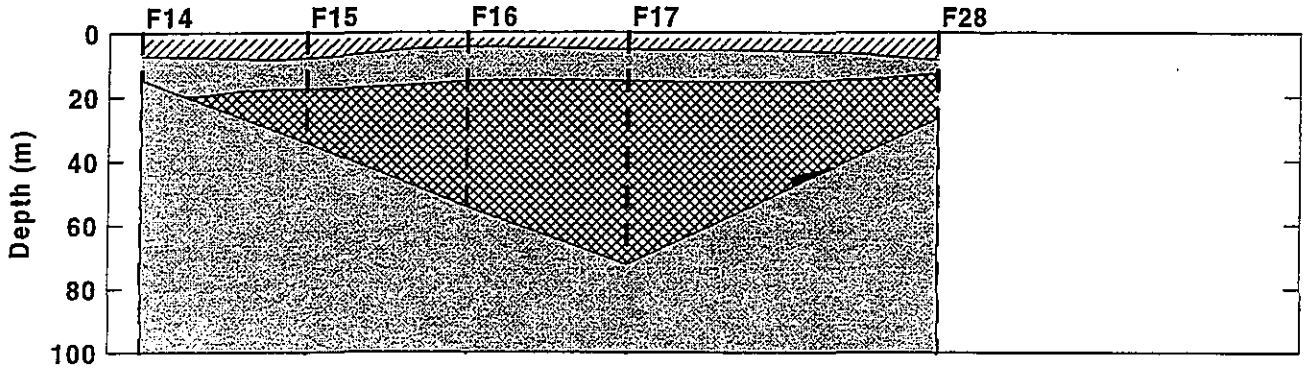

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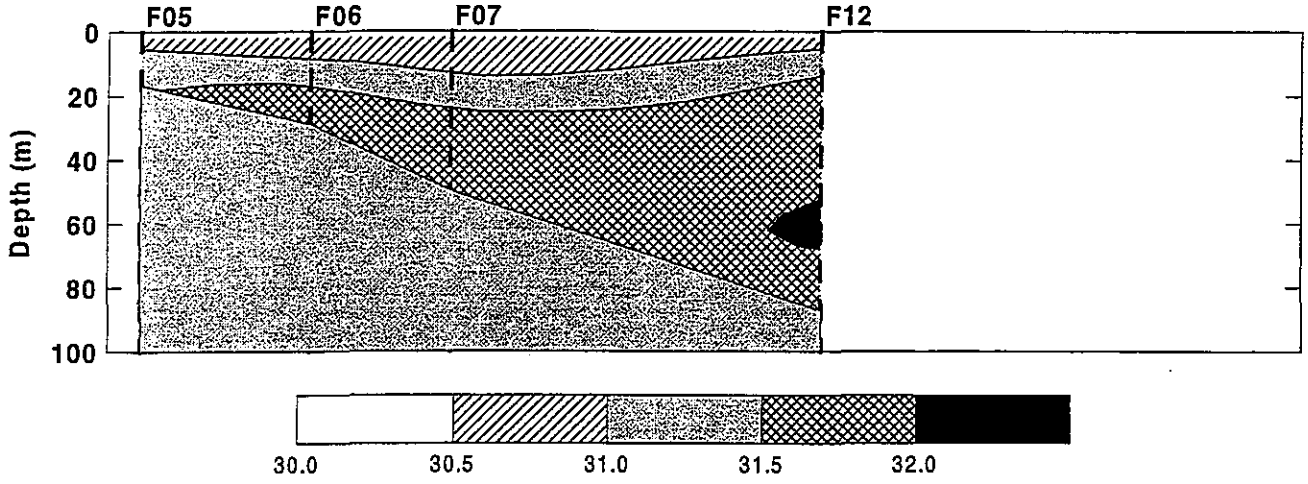
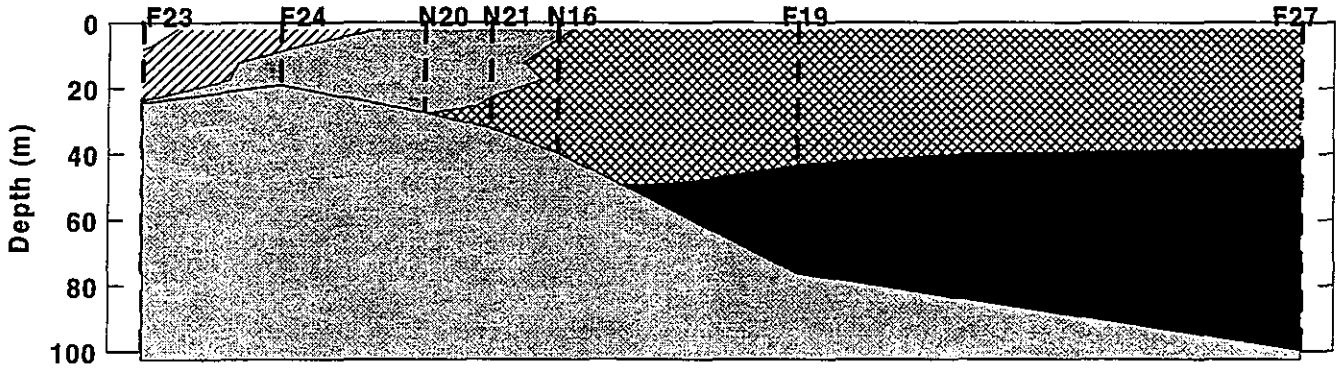


Parameter: Salin
Survey: 96

Boston-Nearfield Transect



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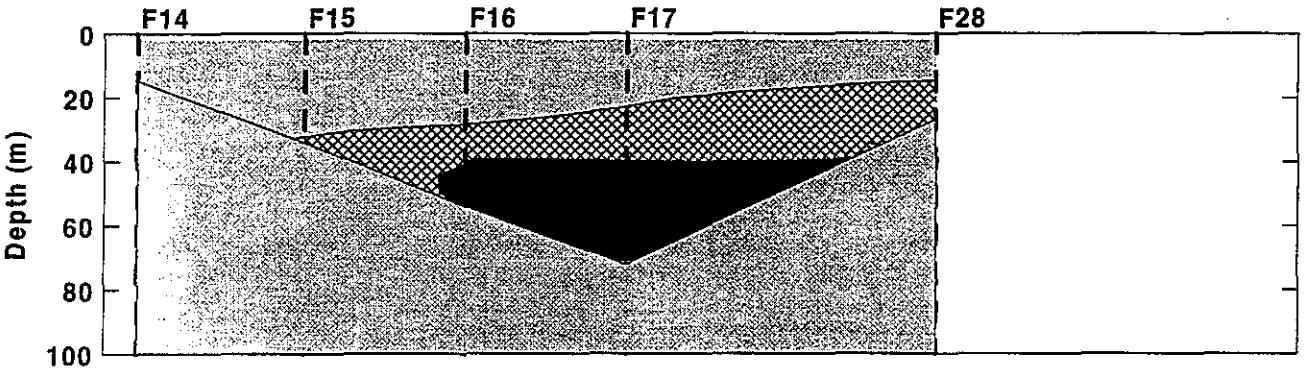

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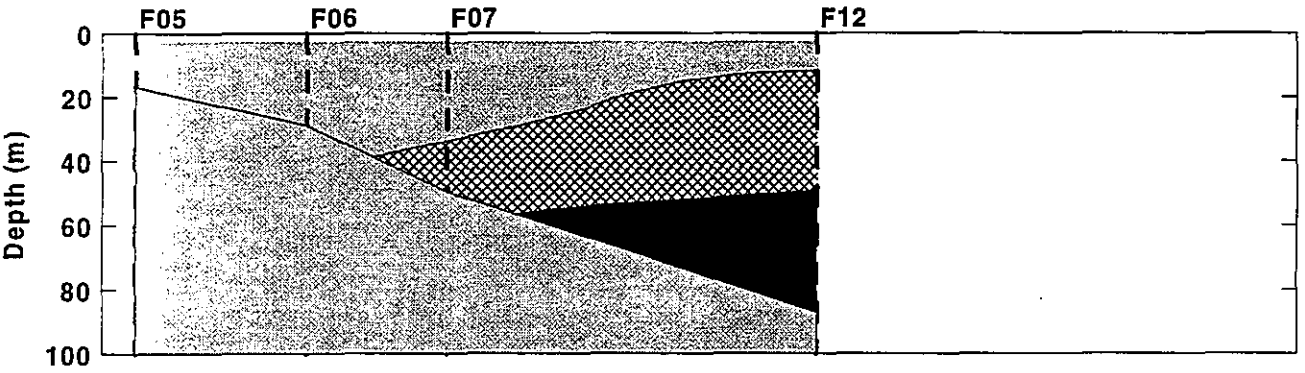

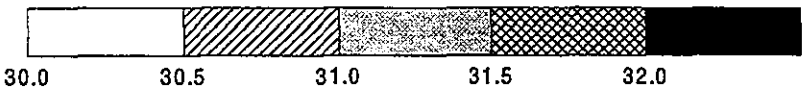

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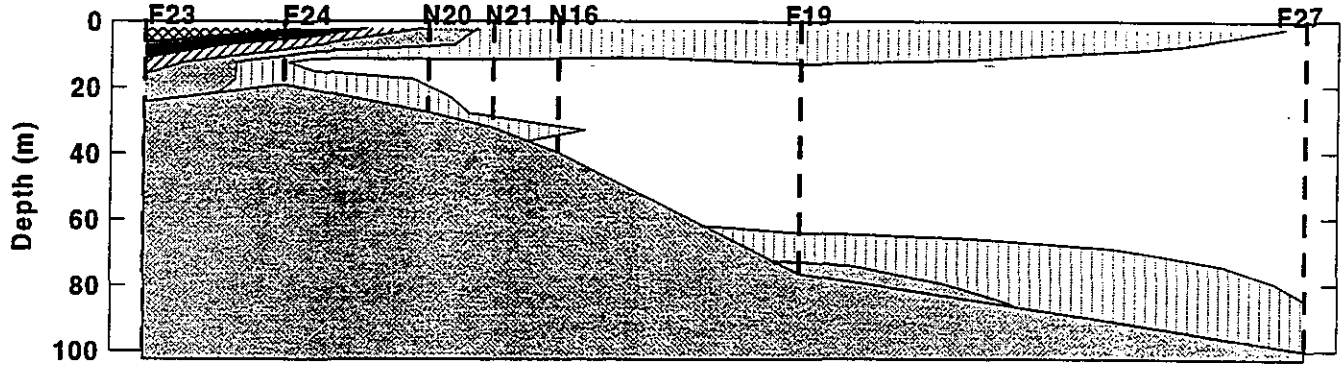
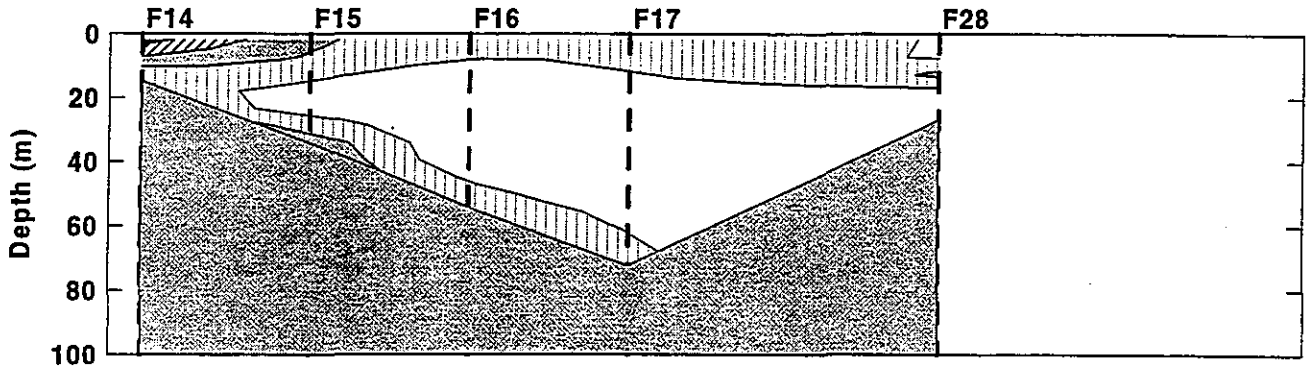
Survey: 9614

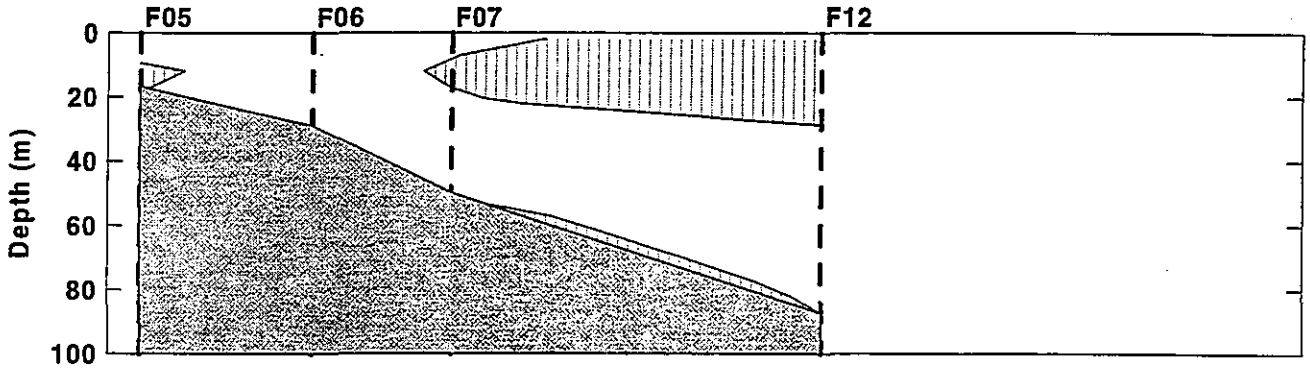
Boston-Nearfield Transect

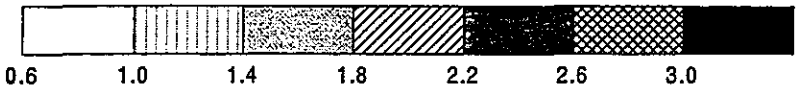


Cohassett Transect



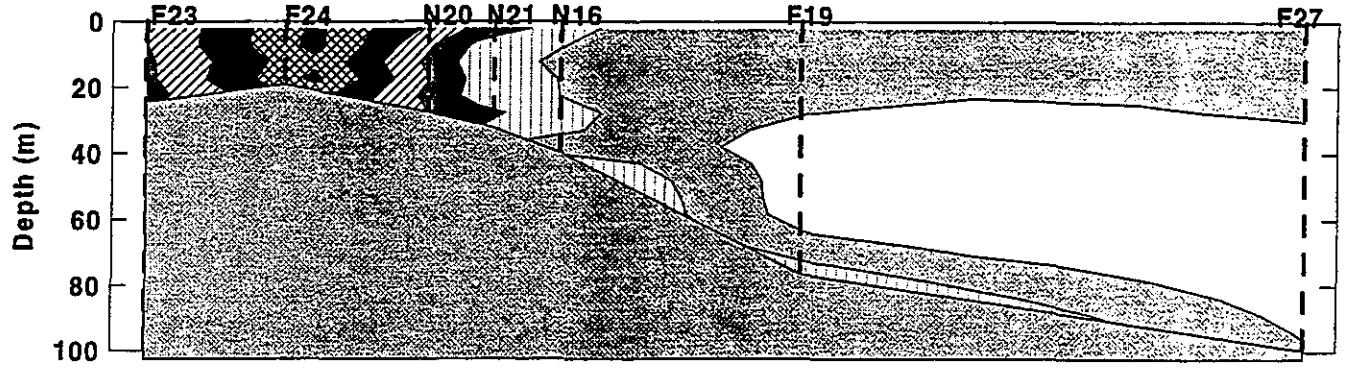
Marshfield Transect



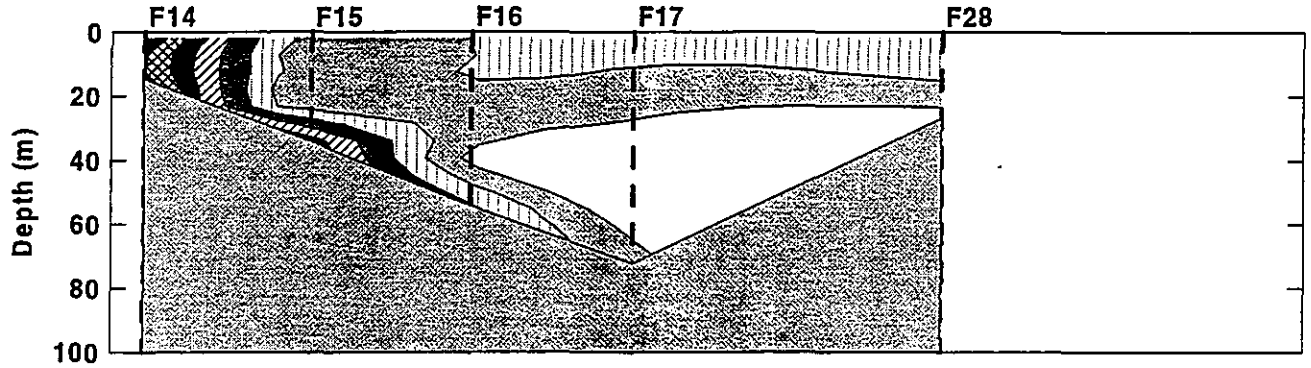


Parameter: Beam Attenuation
Survey: 9611

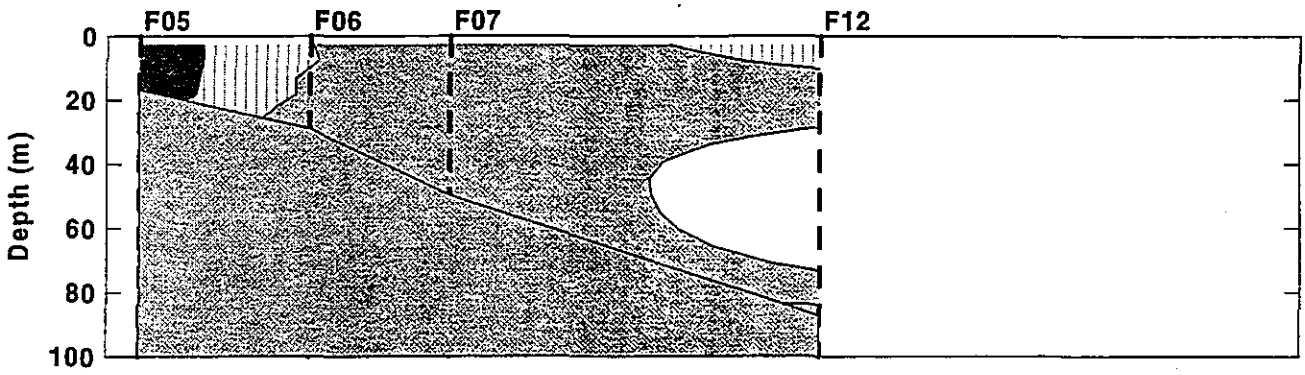
Boston-Nearfield Transect



Cohassett Transect

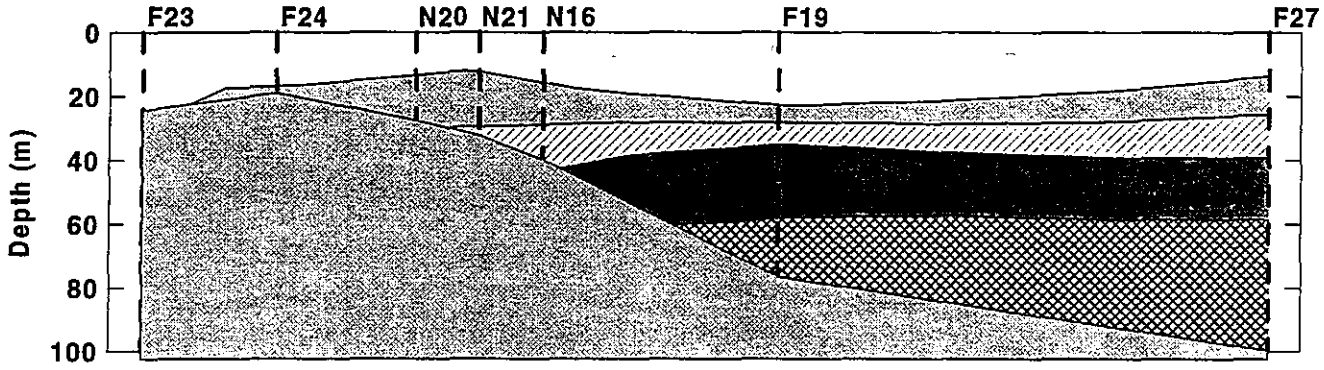


Marshfield Transect



Parameter: Beam Attenuation
Survey: 9614

Boston-Nearfield Transect



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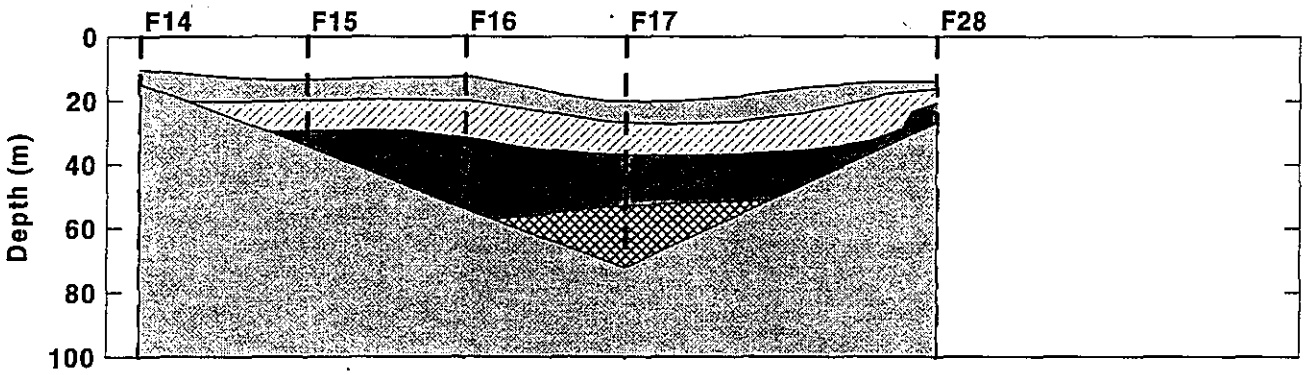
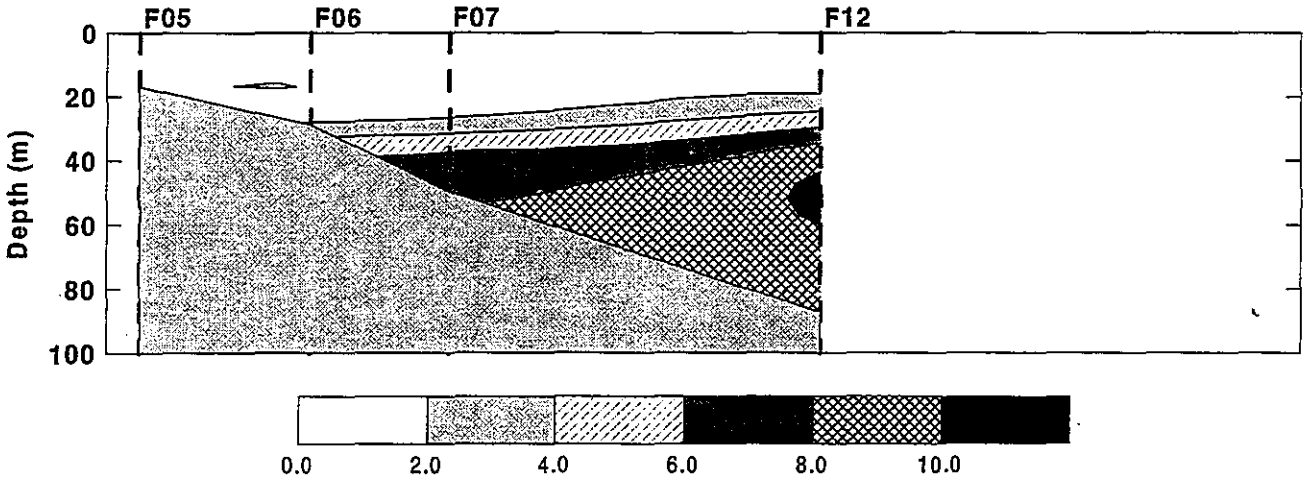
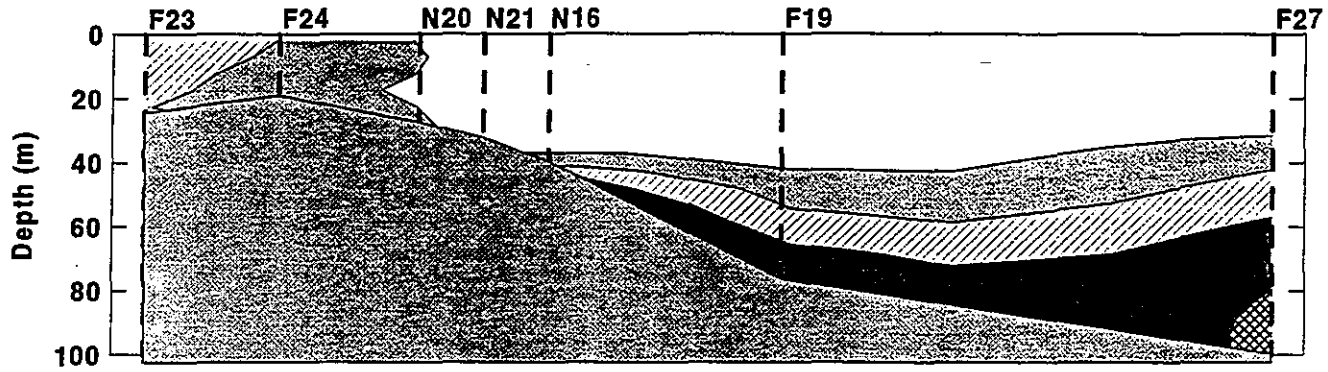


Marshfield Transect

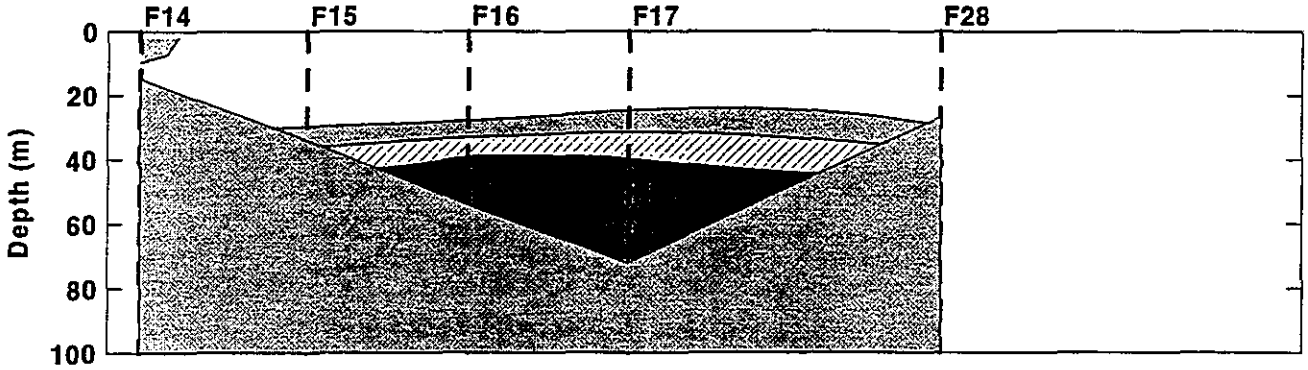


Parameter: Nitrite+Nitrate
Survey: 9611

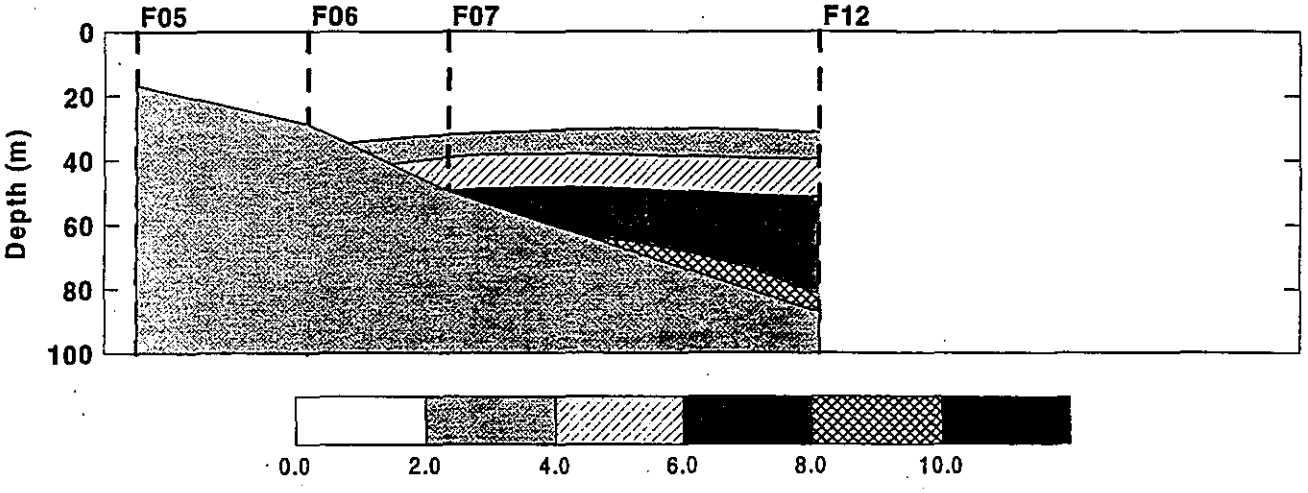
Boston-Nearfield Transect



Cohassett Transect

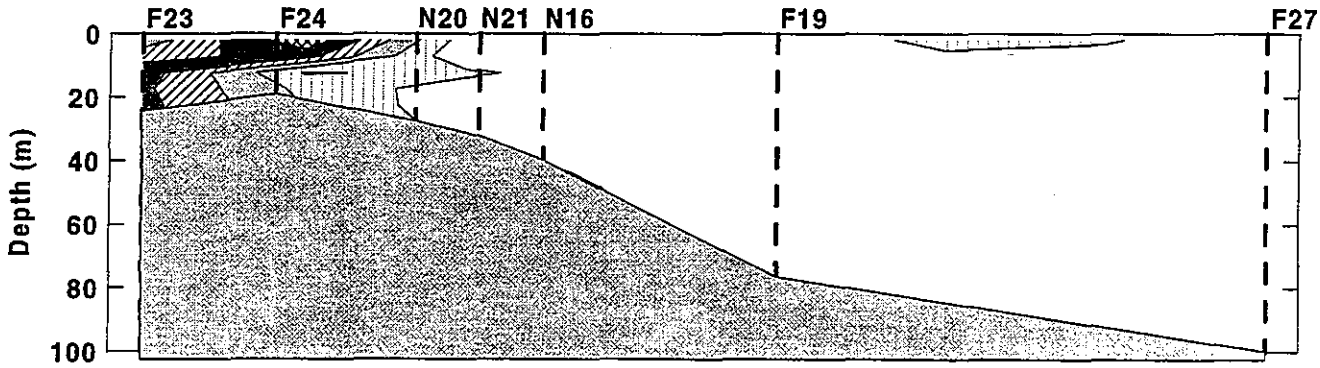


Marshfield Transect



Parameter: Nitrite+Nitrate
Survey: 9614

Boston-Nearfield Transect



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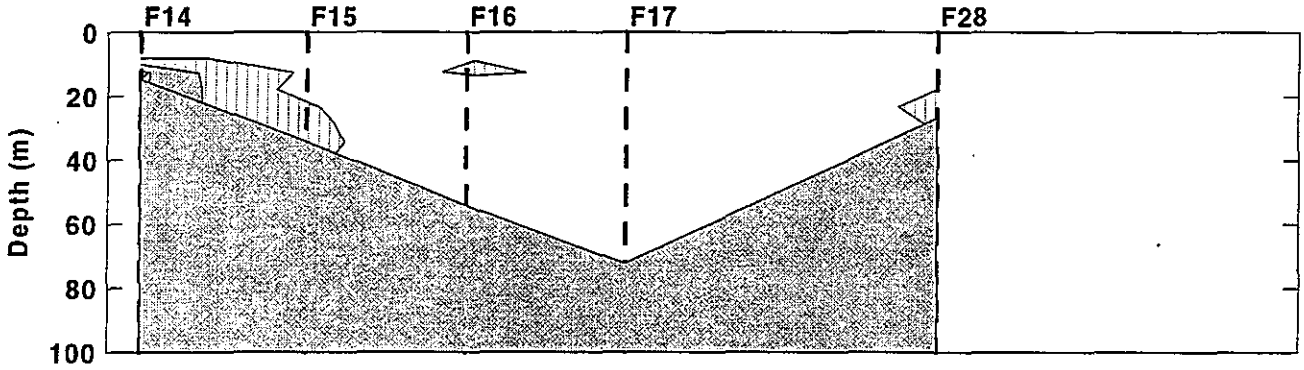
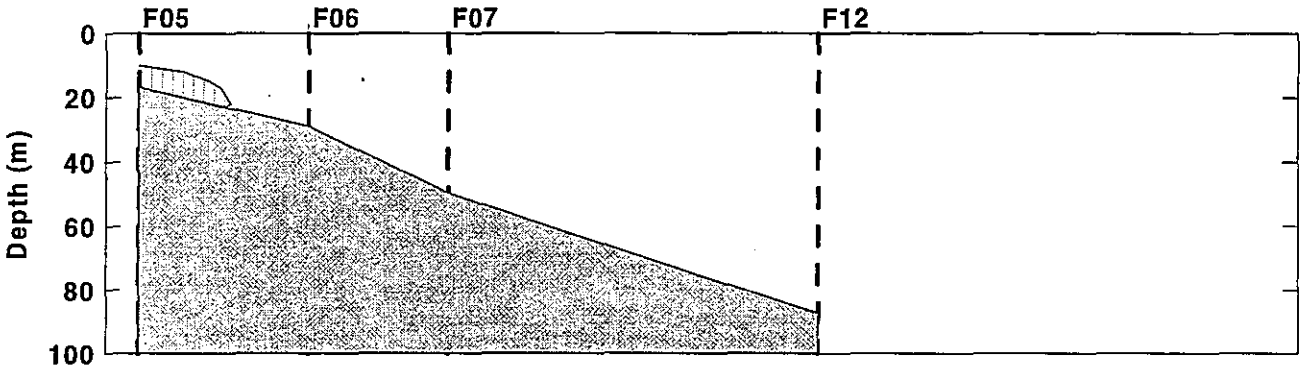
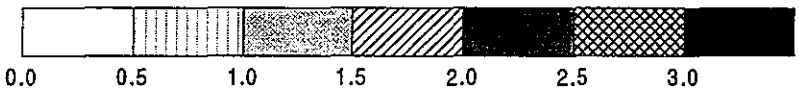


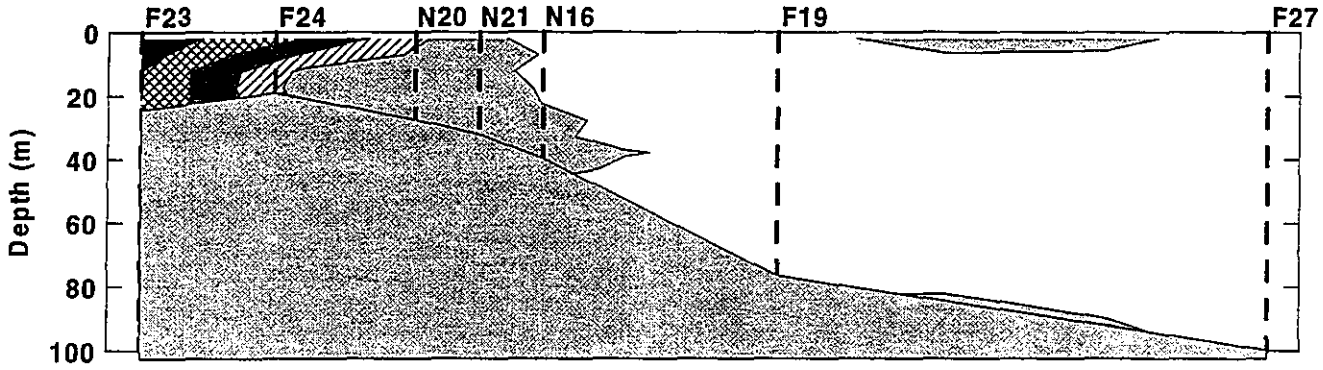
Marshfield Transect



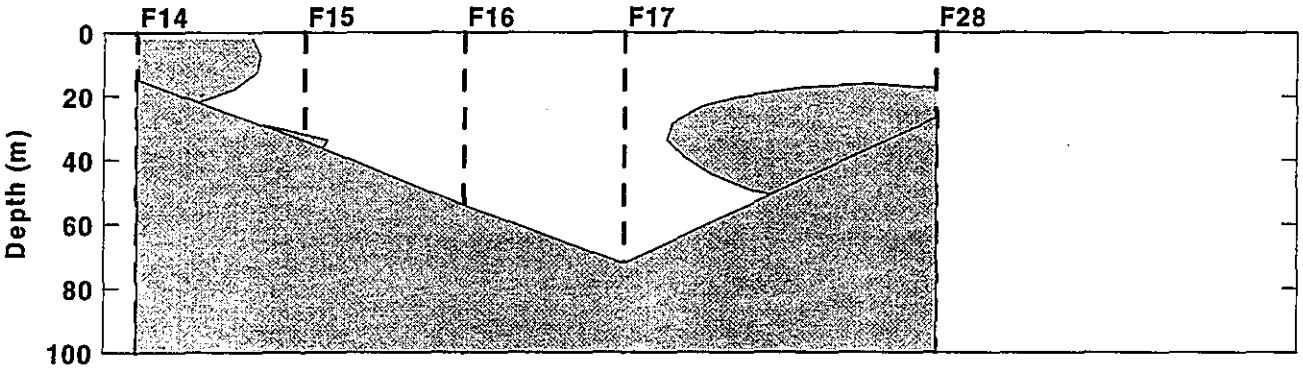


Parameter: Ammonium
Survey: 9611

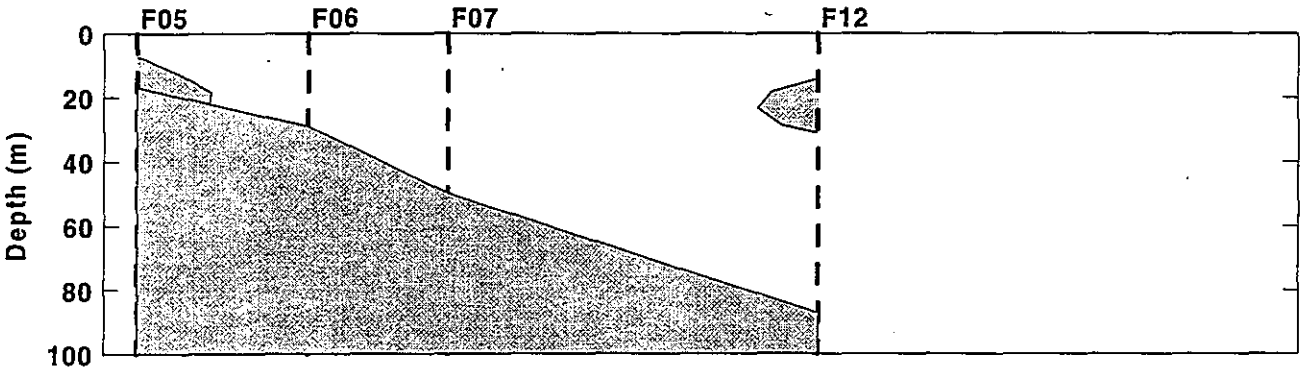
Boston-Nearfield Transect

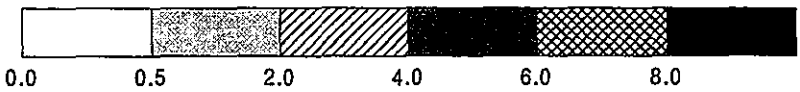


Cohassett Transect



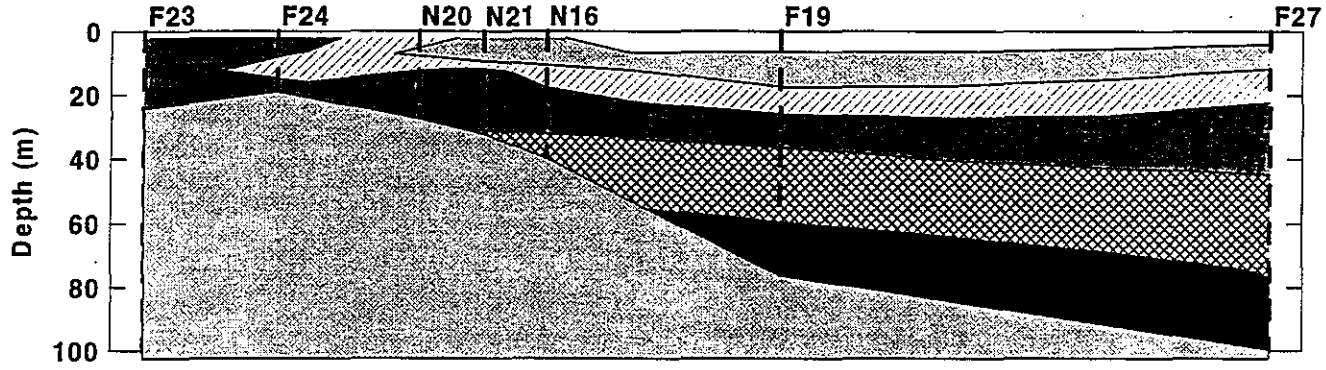
Marshfield Transect



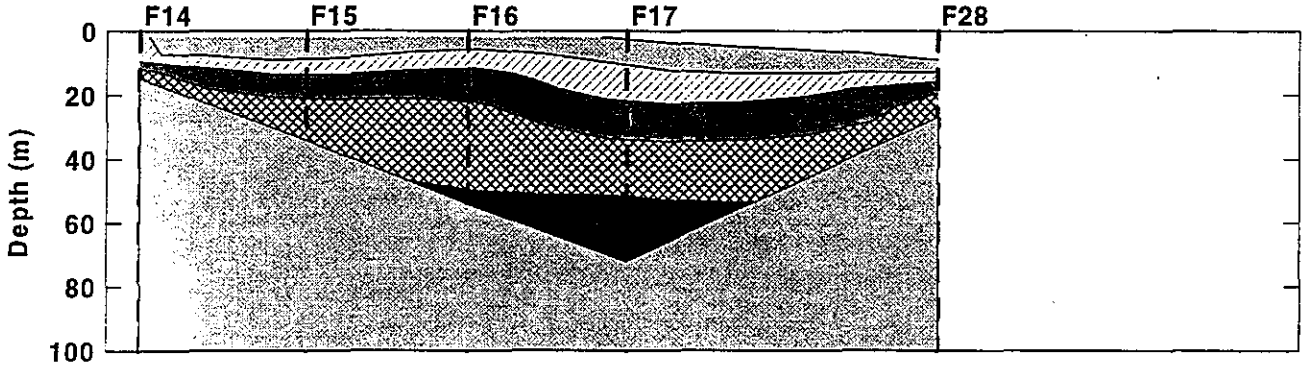


Parameter: Ammonium
Survey: 9614

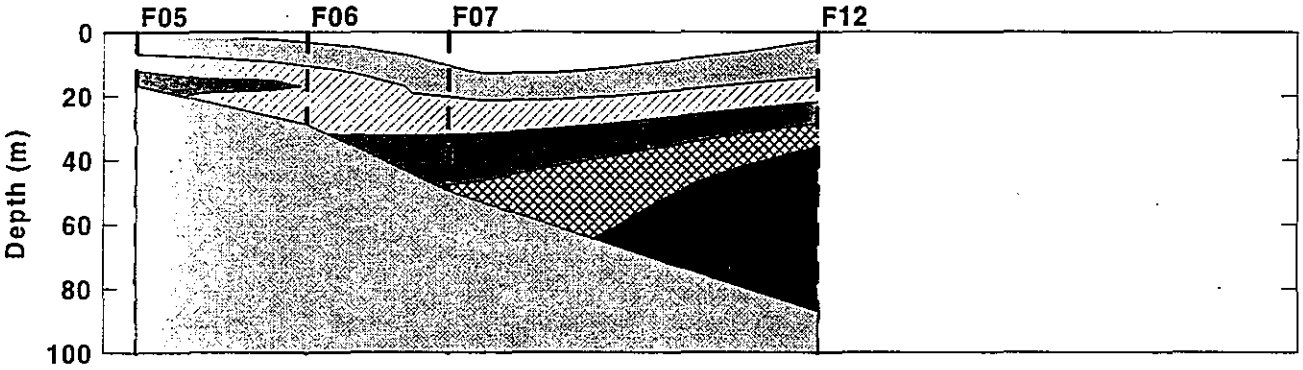
Boston-Nearfield Transect

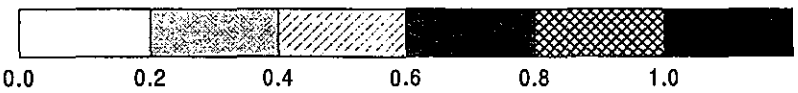


Cohassett Transect



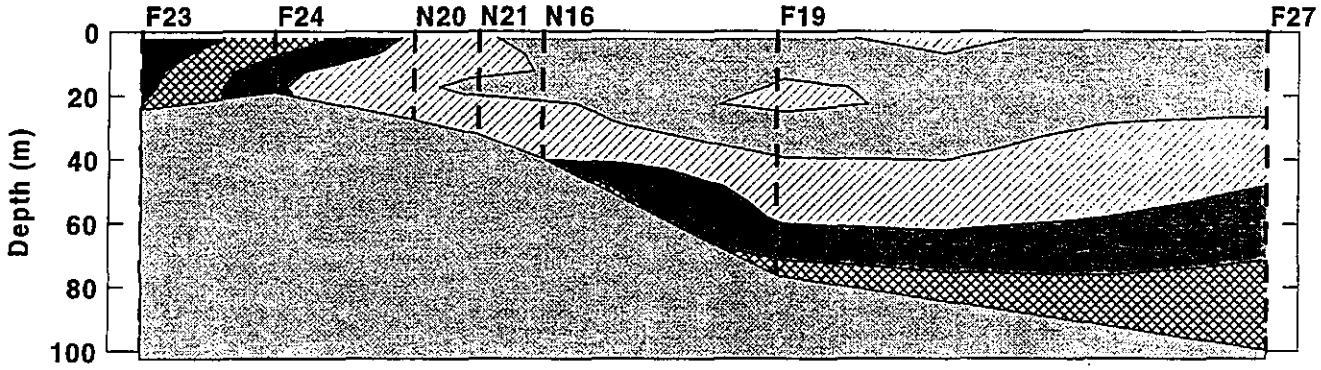
Marshfield Transect



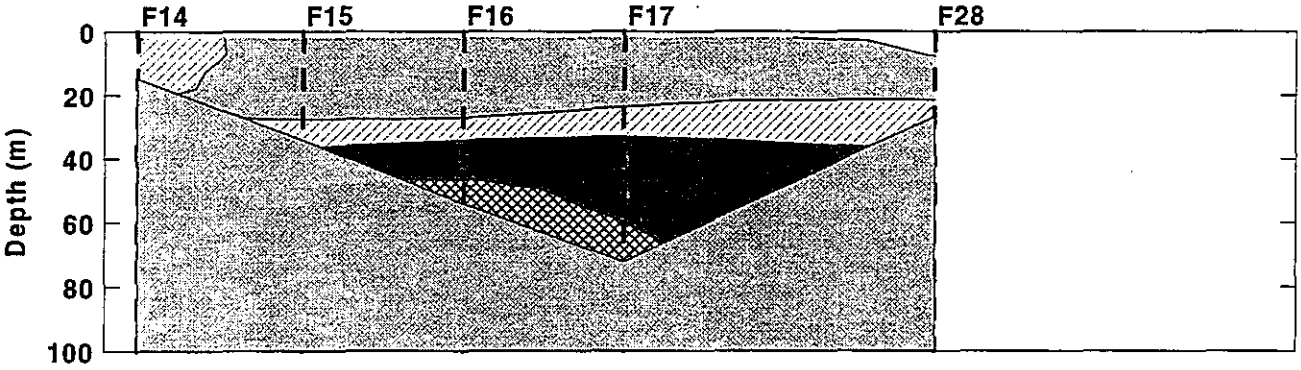


Parameter: Phosphate
Survey: 9611

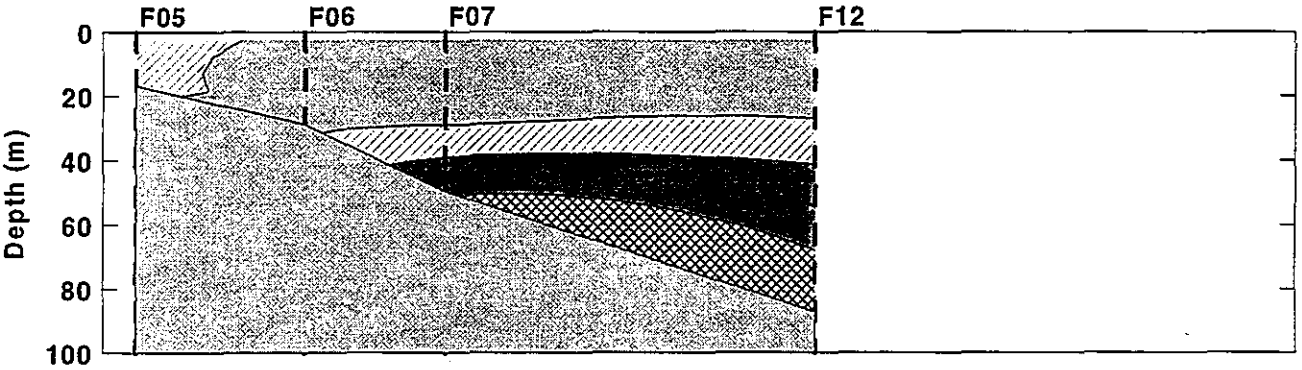
Boston-Nearfield Transect

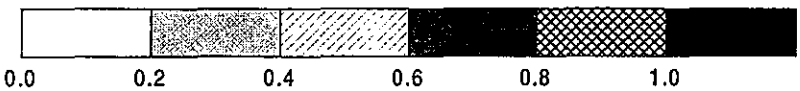


Cohassett Transect



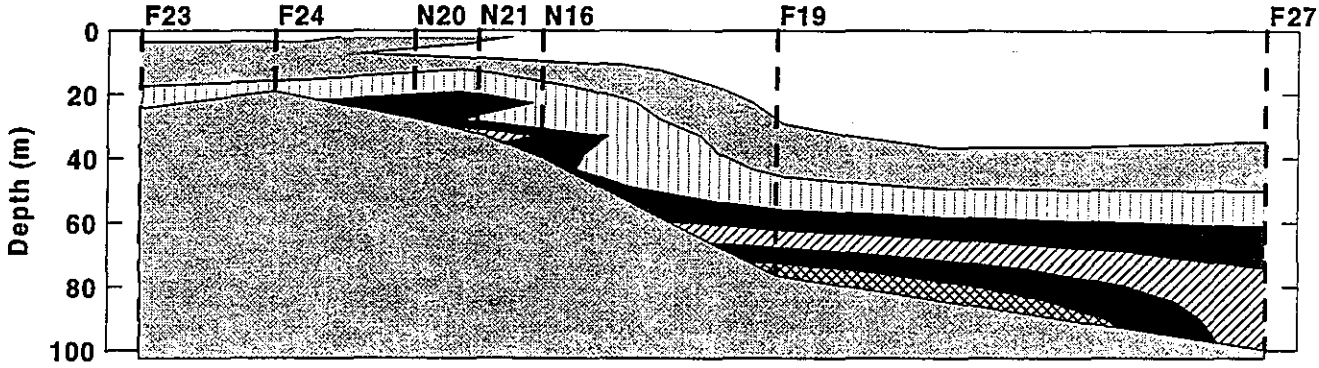
Marshfield Transect





Parameter: Phosphate
Survey: 9614

Boston-Nearfield Transect



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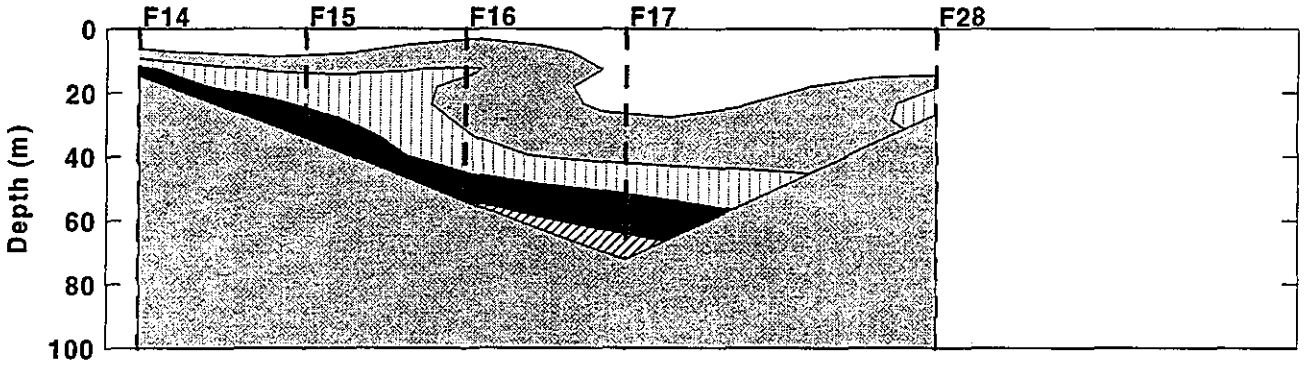
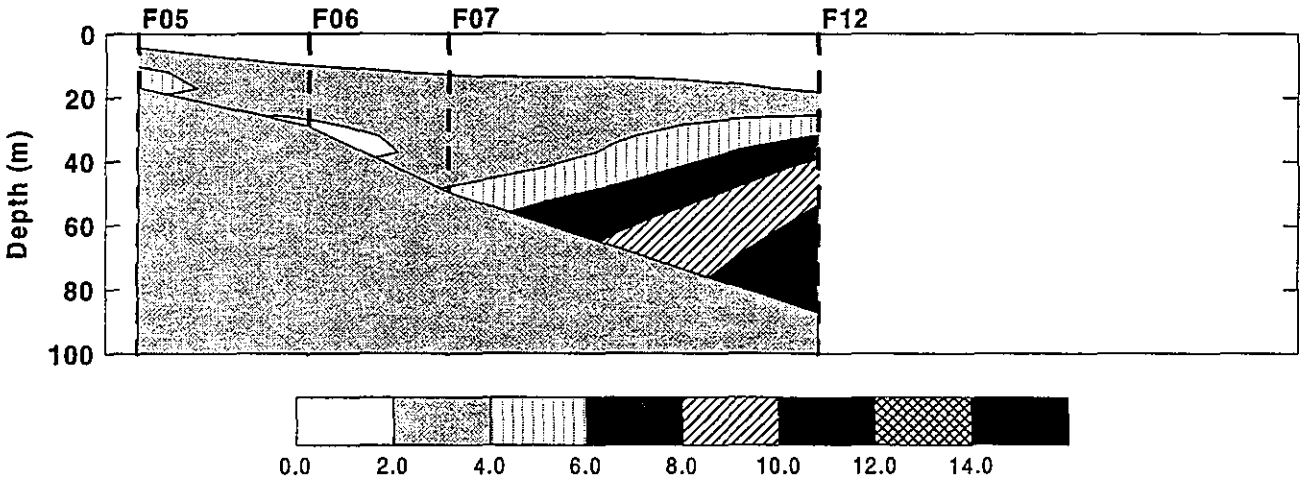
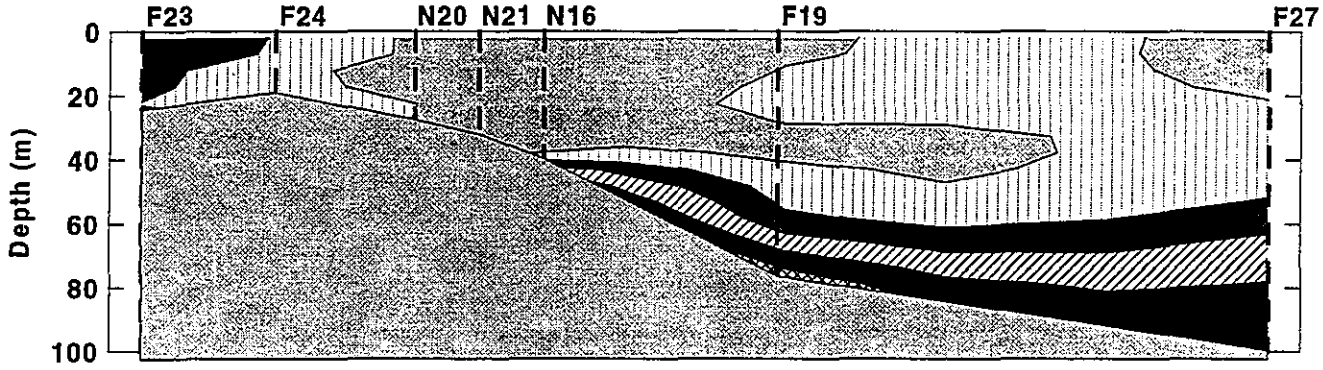


Marshfield Transect

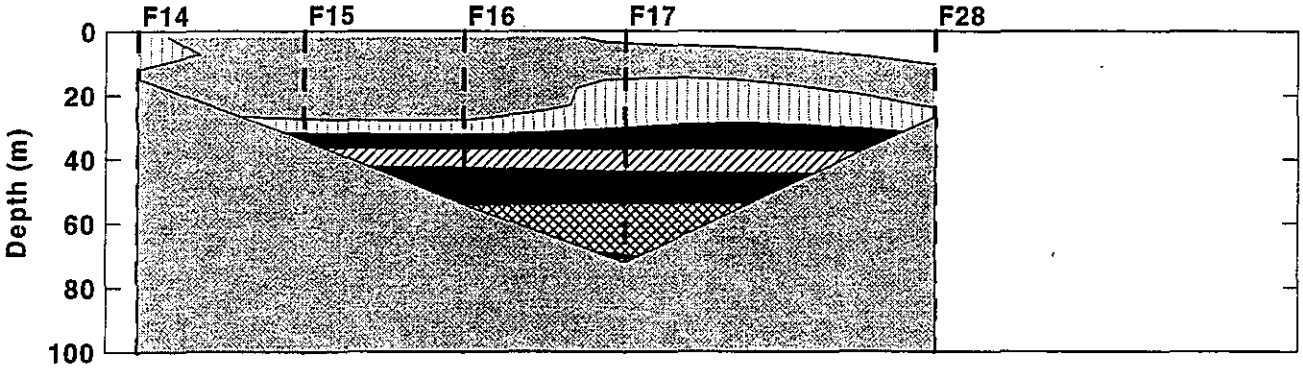


Parameter: Silicate
Survey: 9611

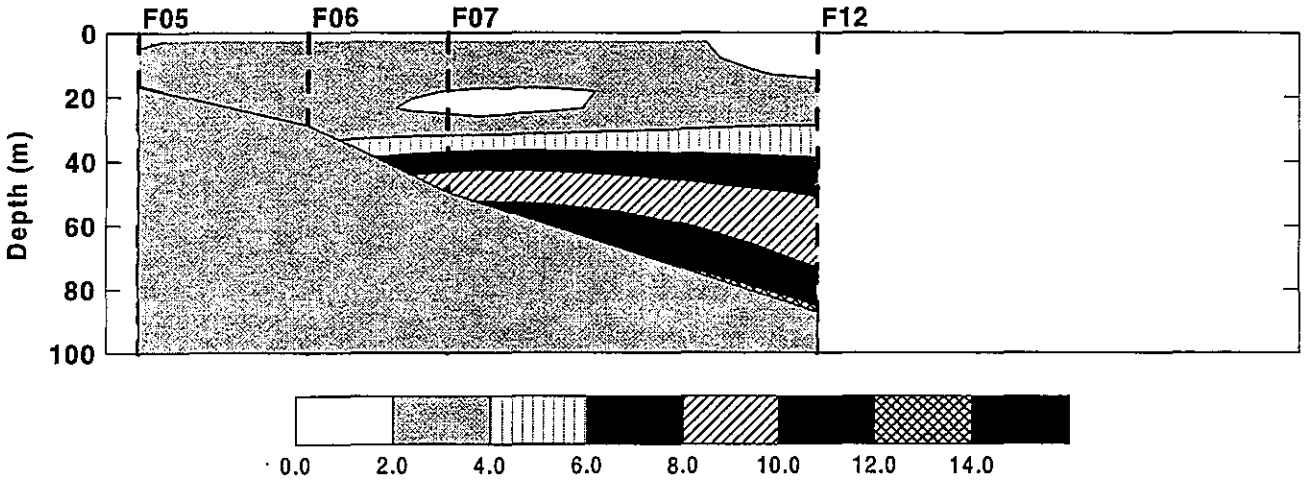
Boston-Nearfield Transect



Cohassett Transect

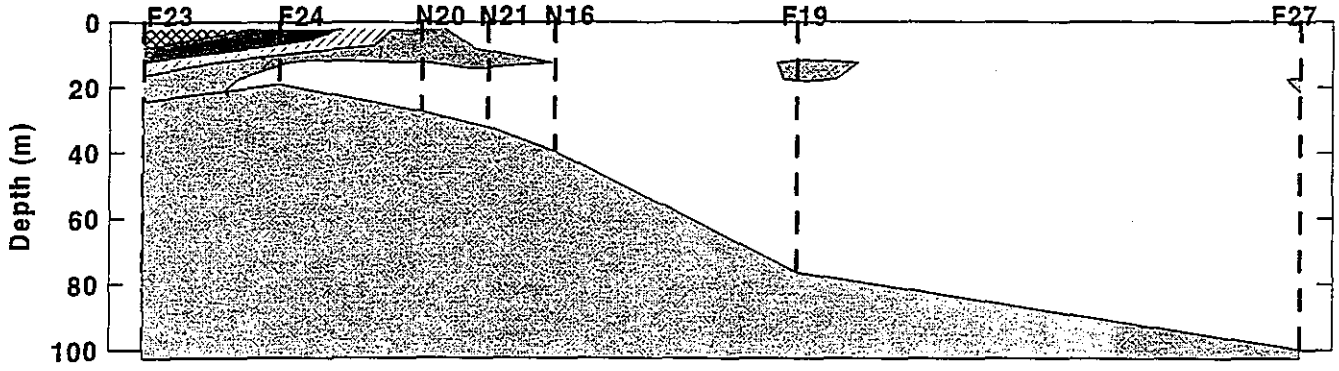


Marshfield Transect

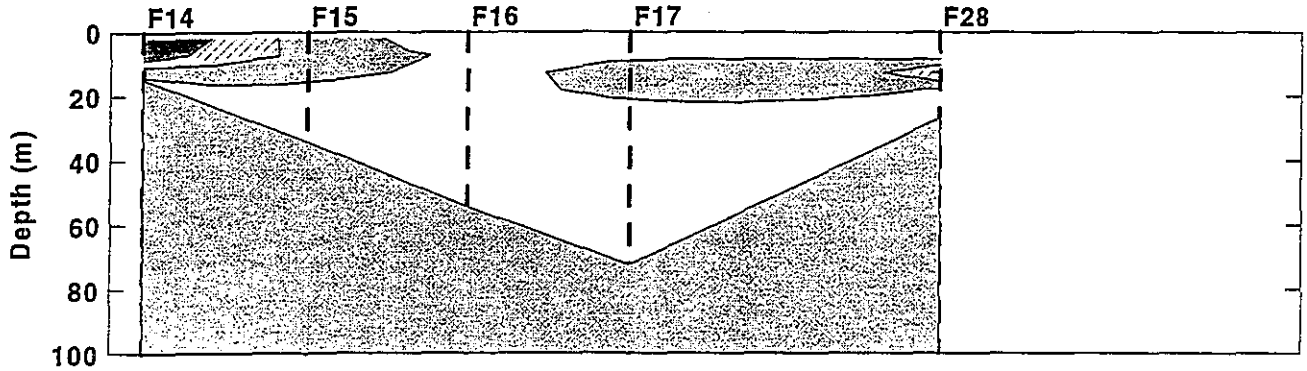


Parameter: Silicate
Survey: 9614

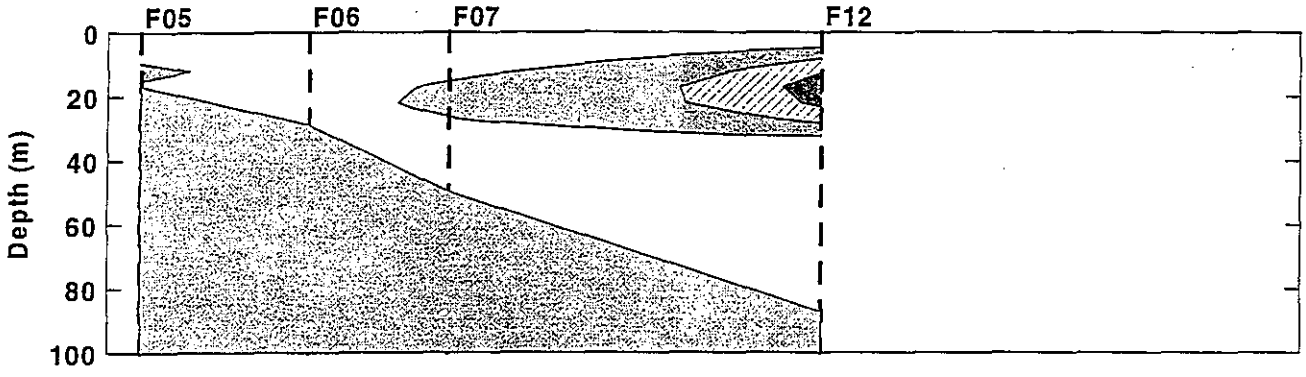
Boston-Nearfield Transect

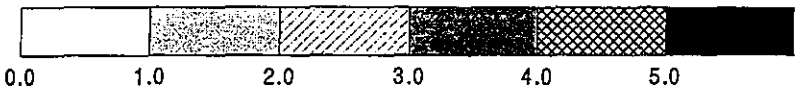


Cohassett Transect



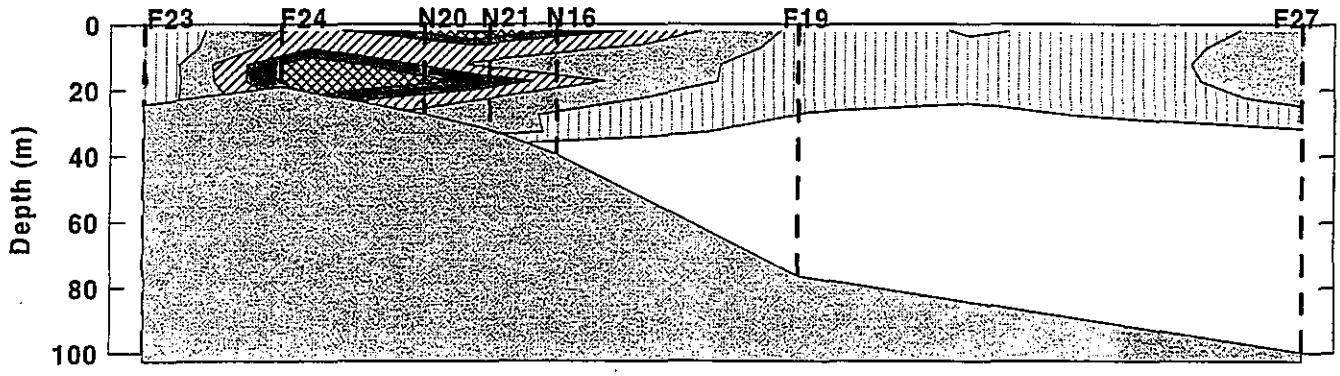
Marshfield Transect



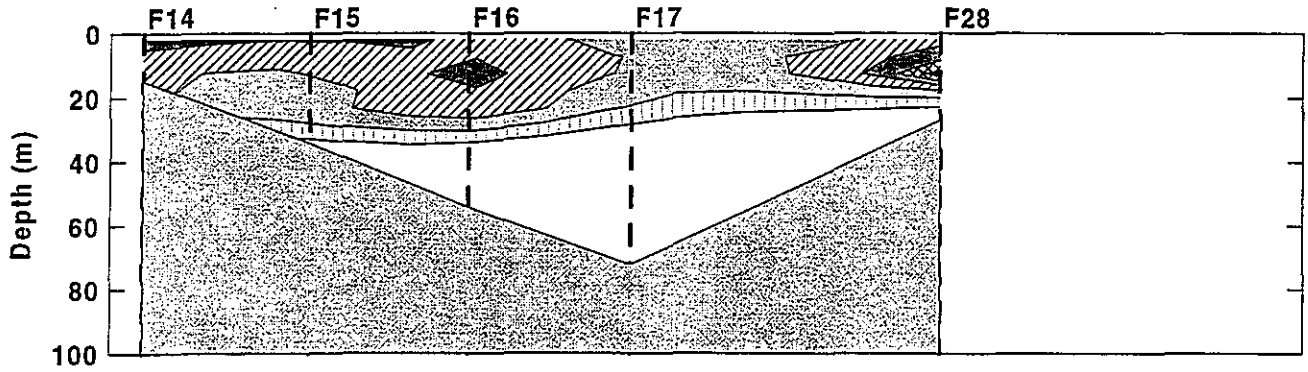


Parameter: Fluorescence
Survey: 9611

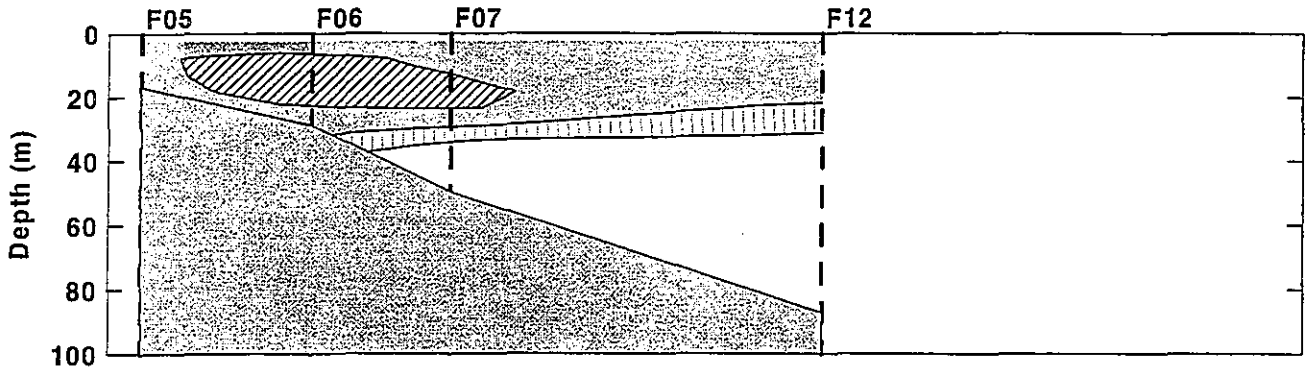
Boston-Nearfield Transect

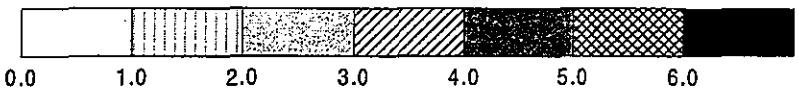


Cohassett Transect



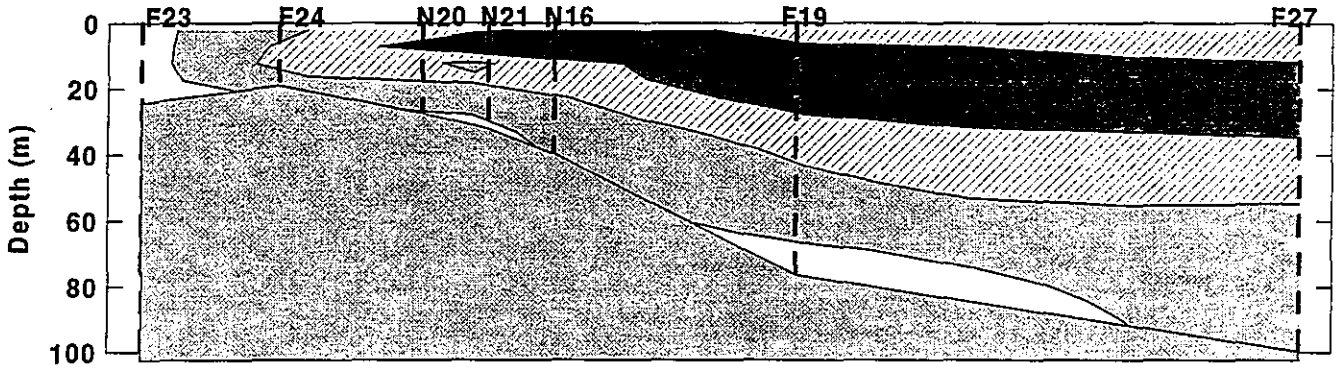
Marshfield Transect



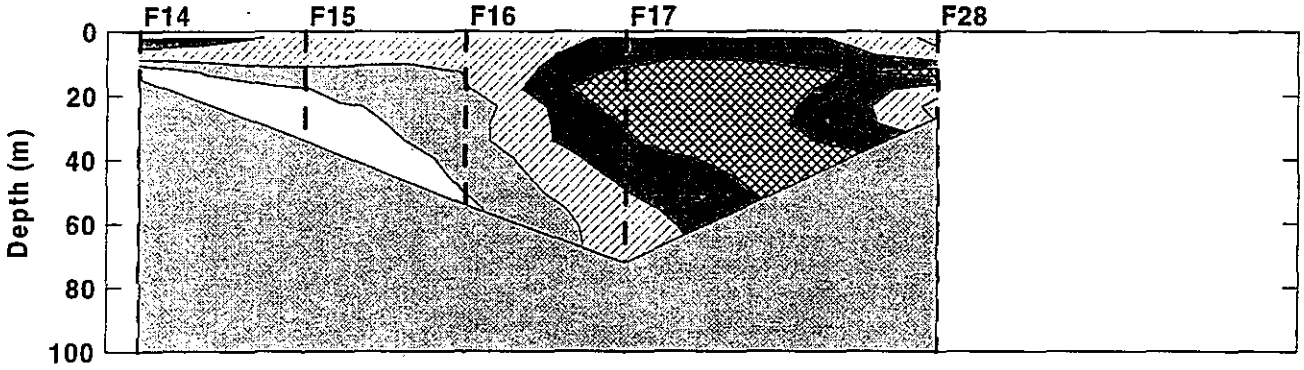


Parameter: Fluorescence
Survey: 9614

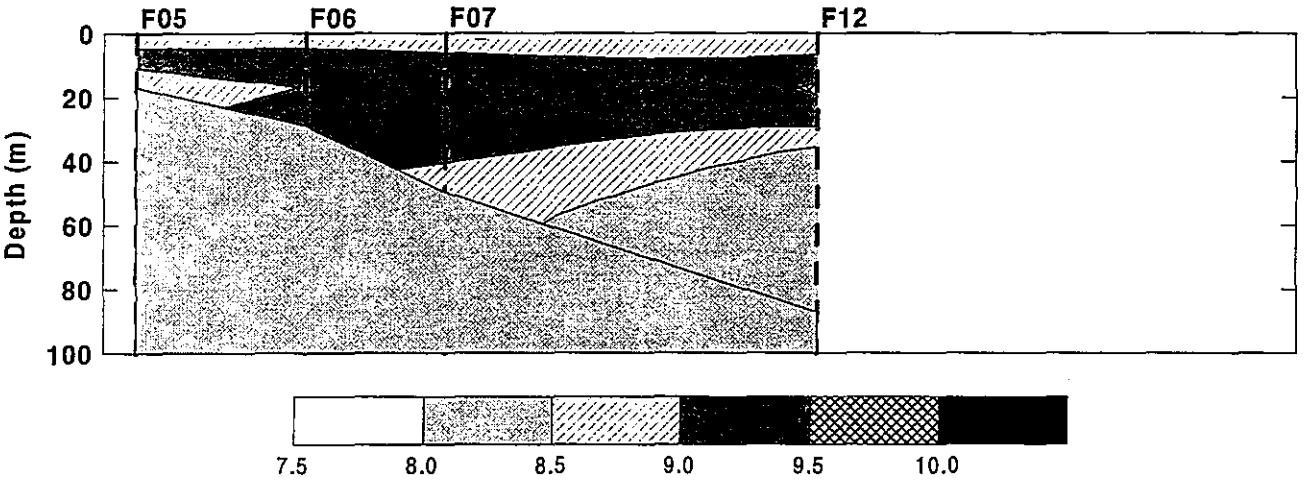
Boston-Nearfield Transect



Cohassett Transect

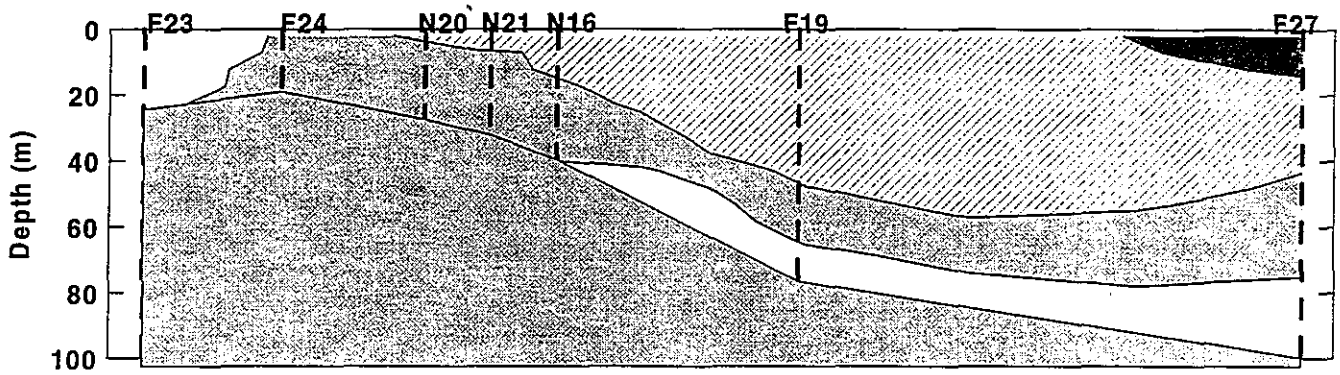


Marshfield Transect

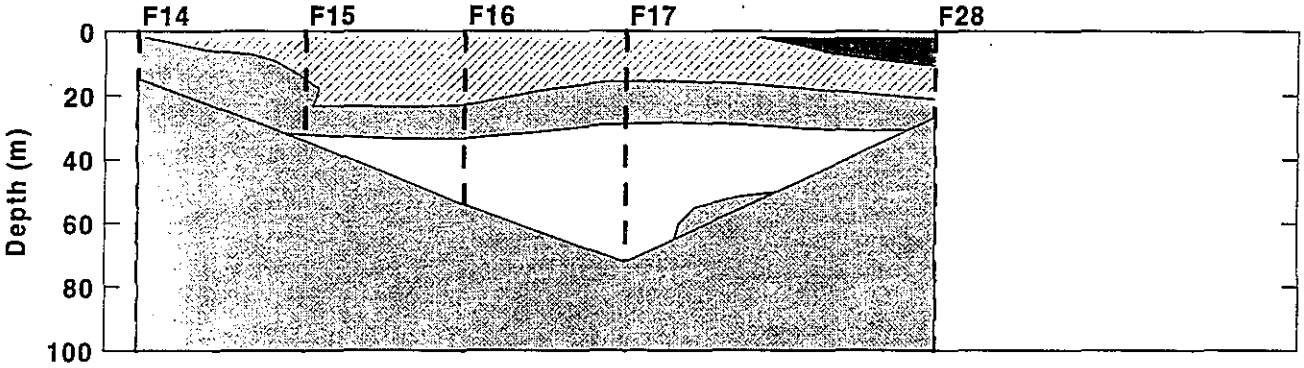


Parameter: Dissolved Oxygen (mg/L)
Survey: 9611

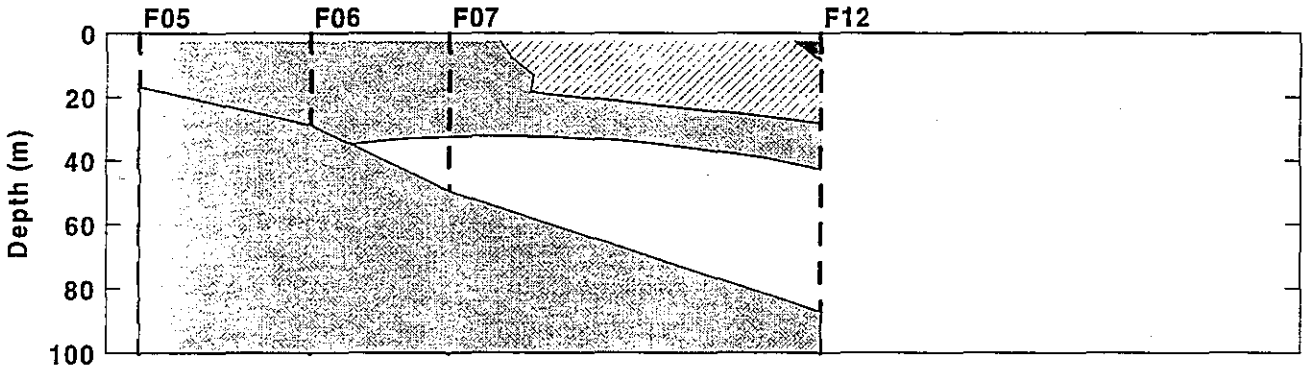
Boston-Nearfield Transect

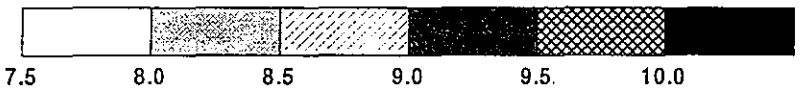


Cohassett Transect



Marshfield Transect





Parameter: Dissolved Oxygen (mg/L)
Survey: 9614

APPENDIX D

Nutrient Scatter Plots

Scatter plots are included for every survey conducted during the semi-annual period. Each plot includes all stations and all depths. The plots are organized by type of plot, and then by survey. Combined nearfield/farfield surveys show the regions with different symbols, including Boundary, Cape Cod Bay, Coastal, Boston Harbor, Nearfield, and Offshore. Available plots are summarized in the text.

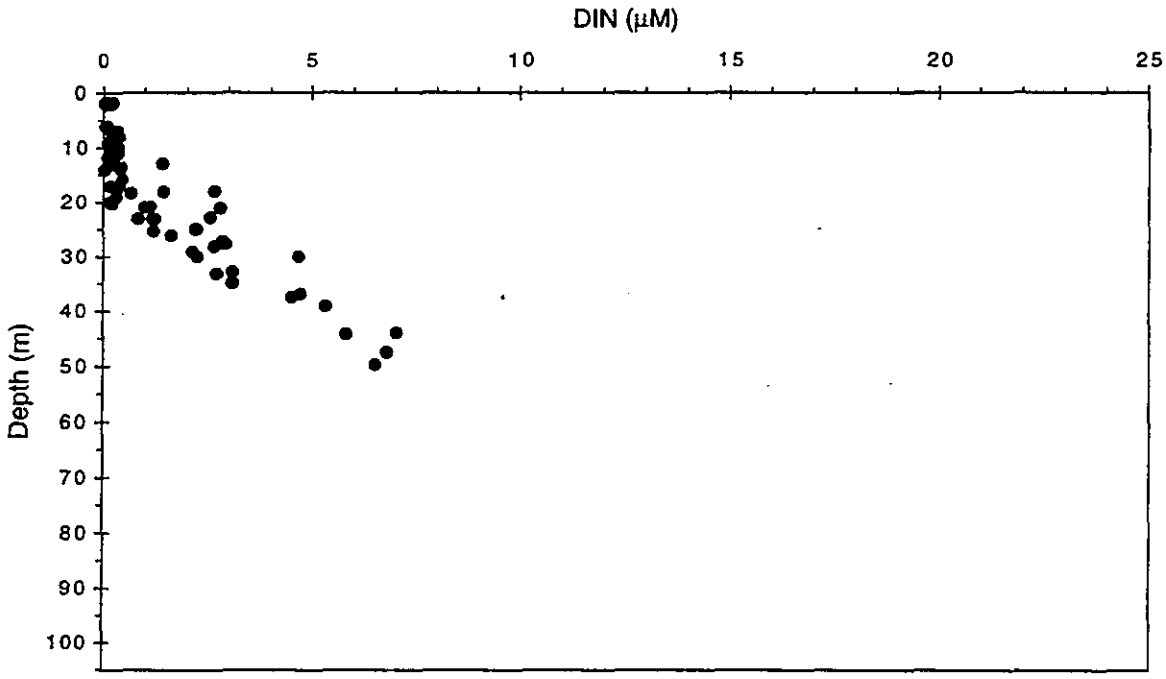


FIGURE 4-136
Depth vs. nutrient plots for nearfield survey W9610, (Aug 96).

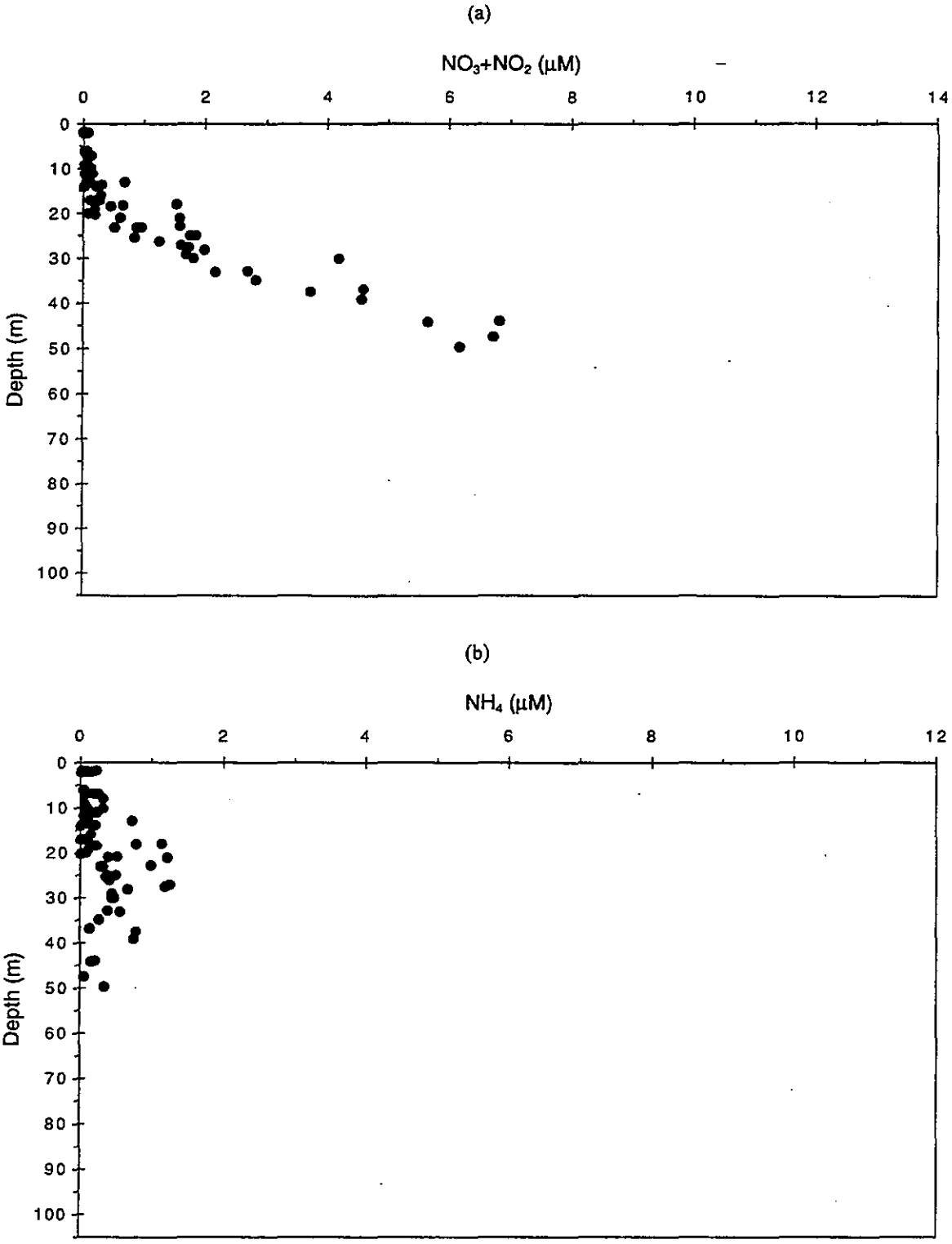


FIGURE 4-137
Depth vs. nutrient plots for nearfield survey W9610, (Aug 96).

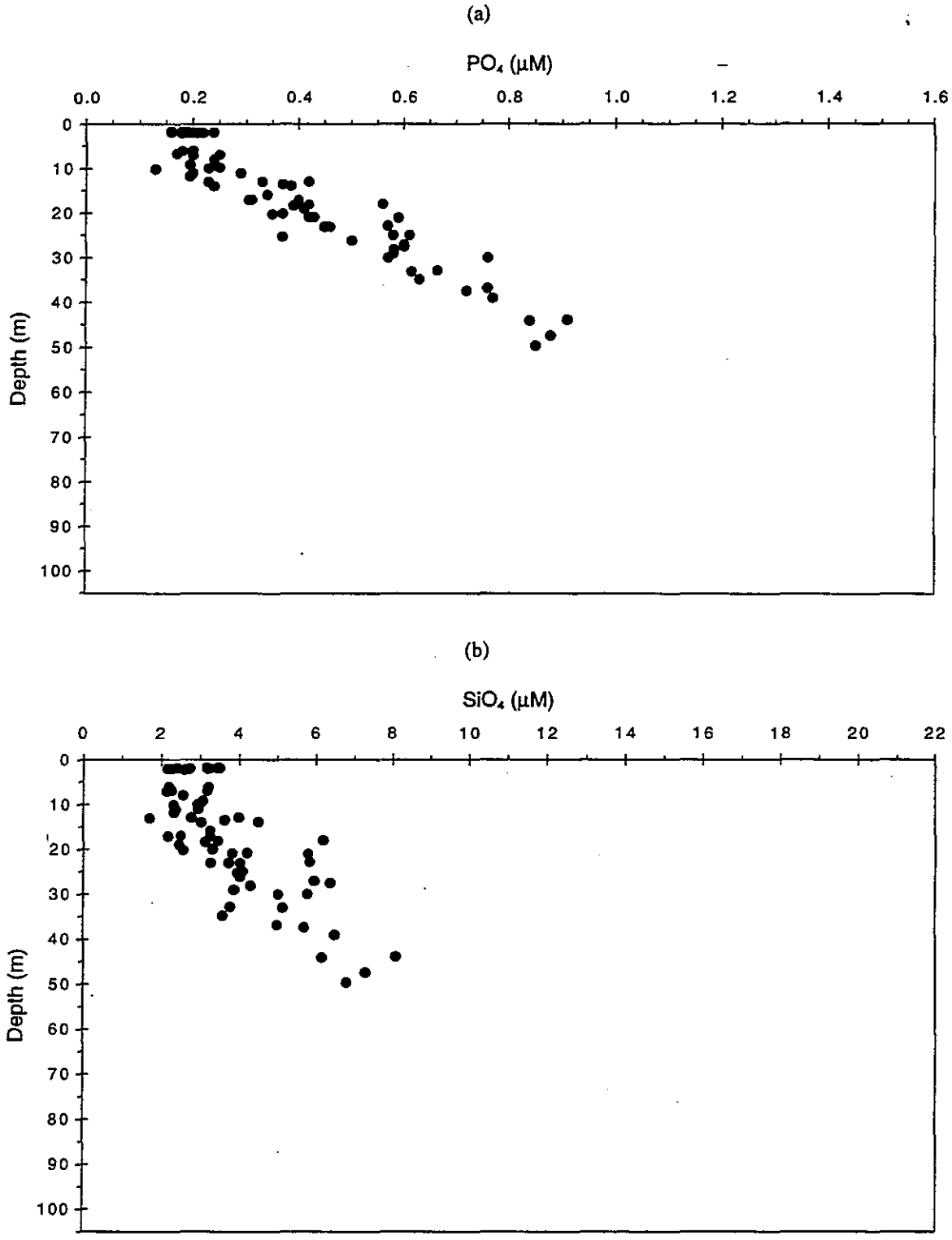


FIGURE 4-138
Depth vs. nutrient plots for nearfield survey W9610, (Aug 96).

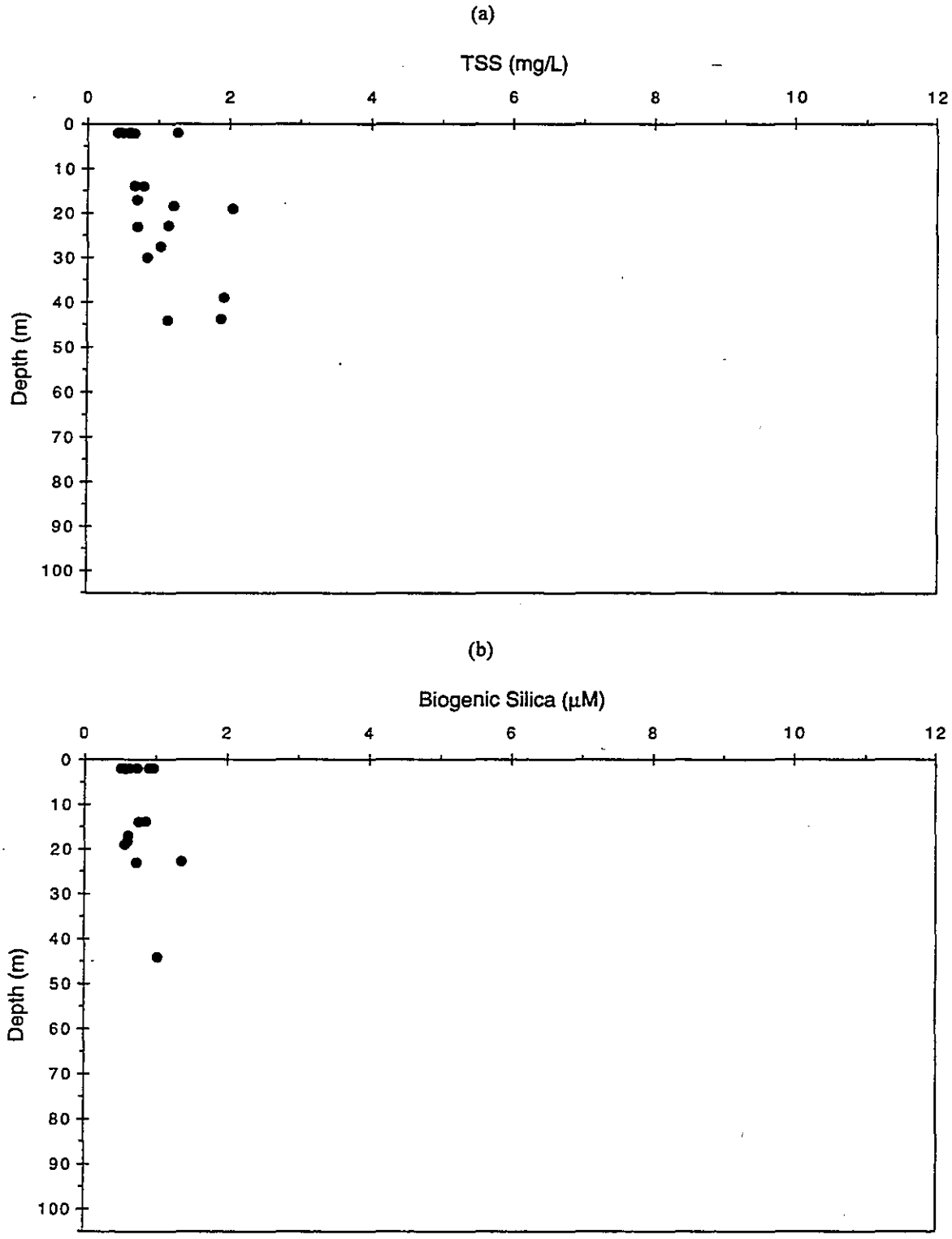
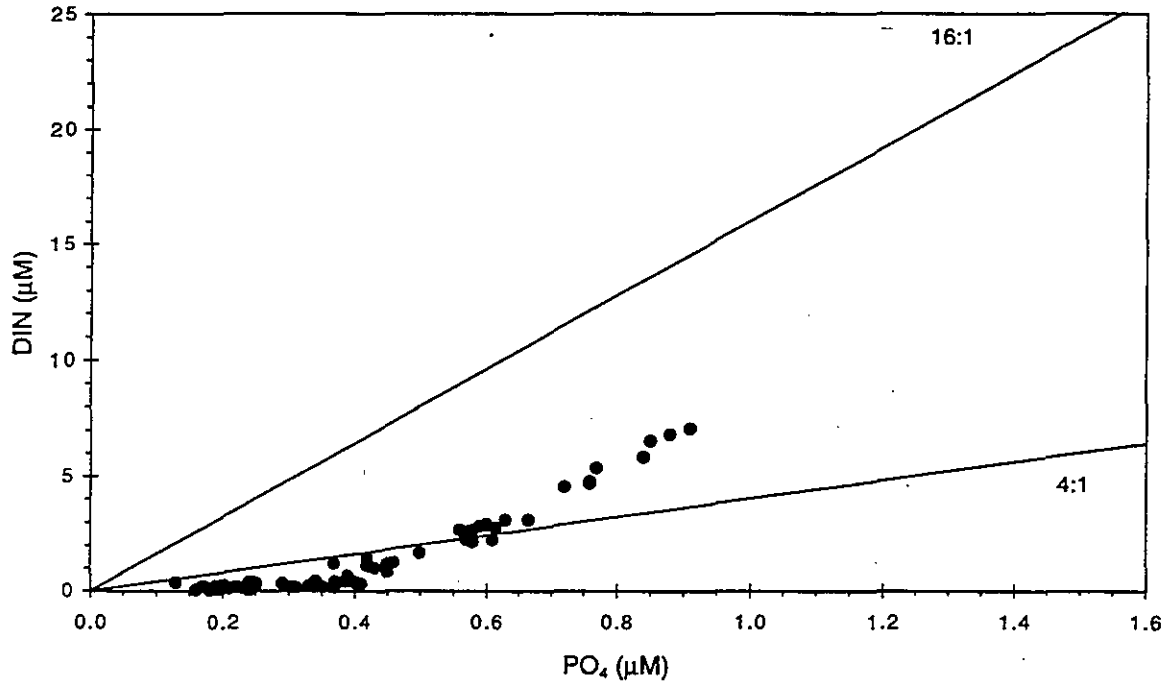


FIGURE 4-139
Depth vs. nutrient plots for nearfield survey W9610, (Aug 96).

(a)



(b)

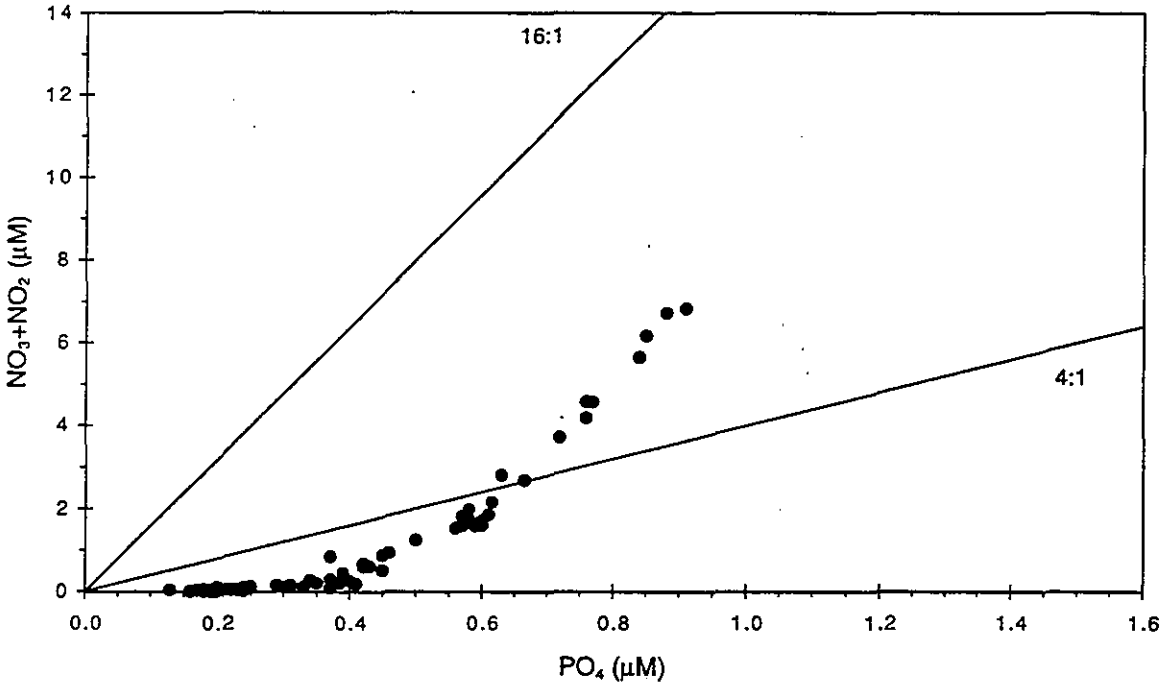
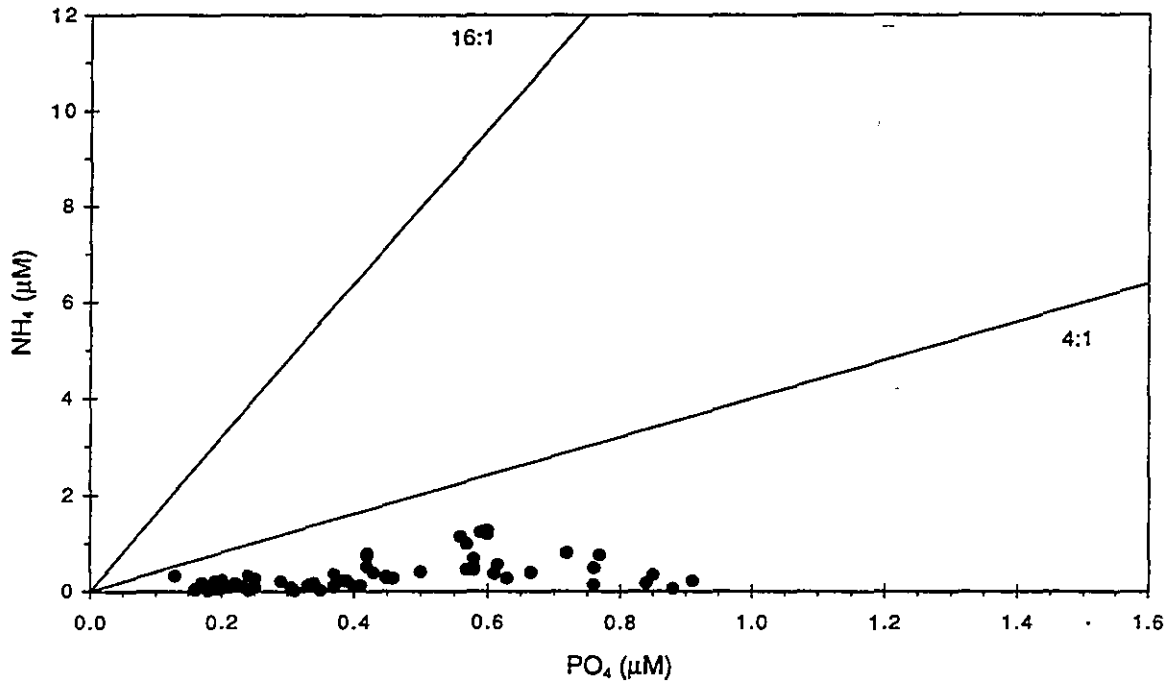


FIGURE 4-140
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

(a)



(b)

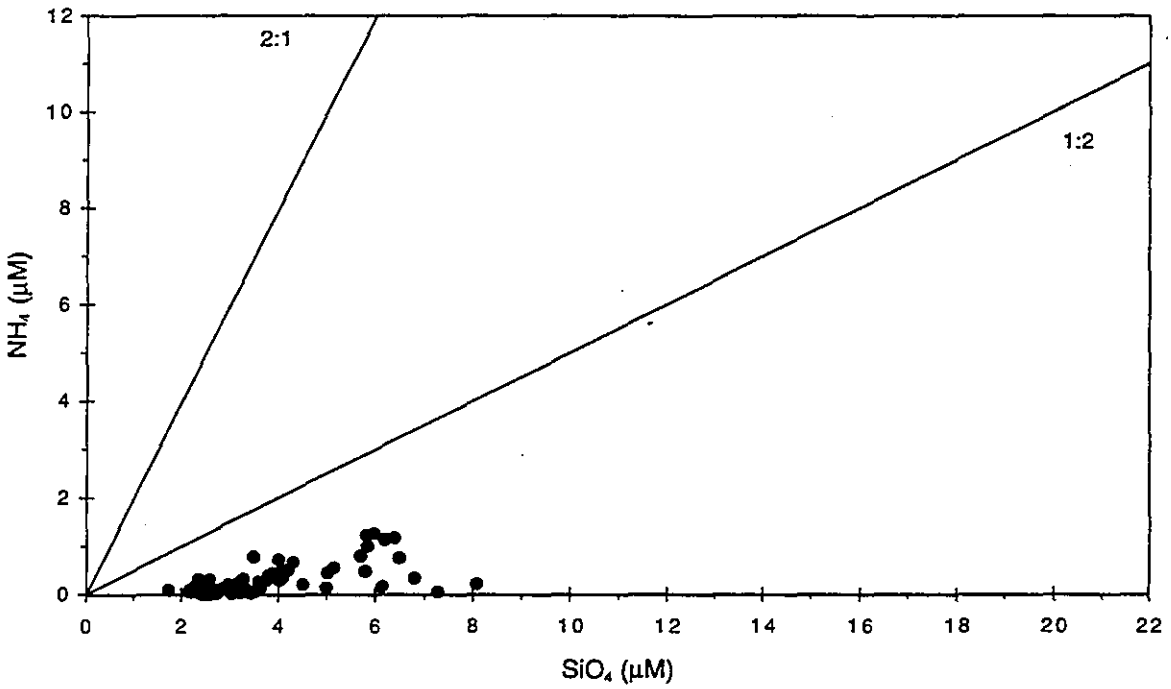


FIGURE 4-141
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

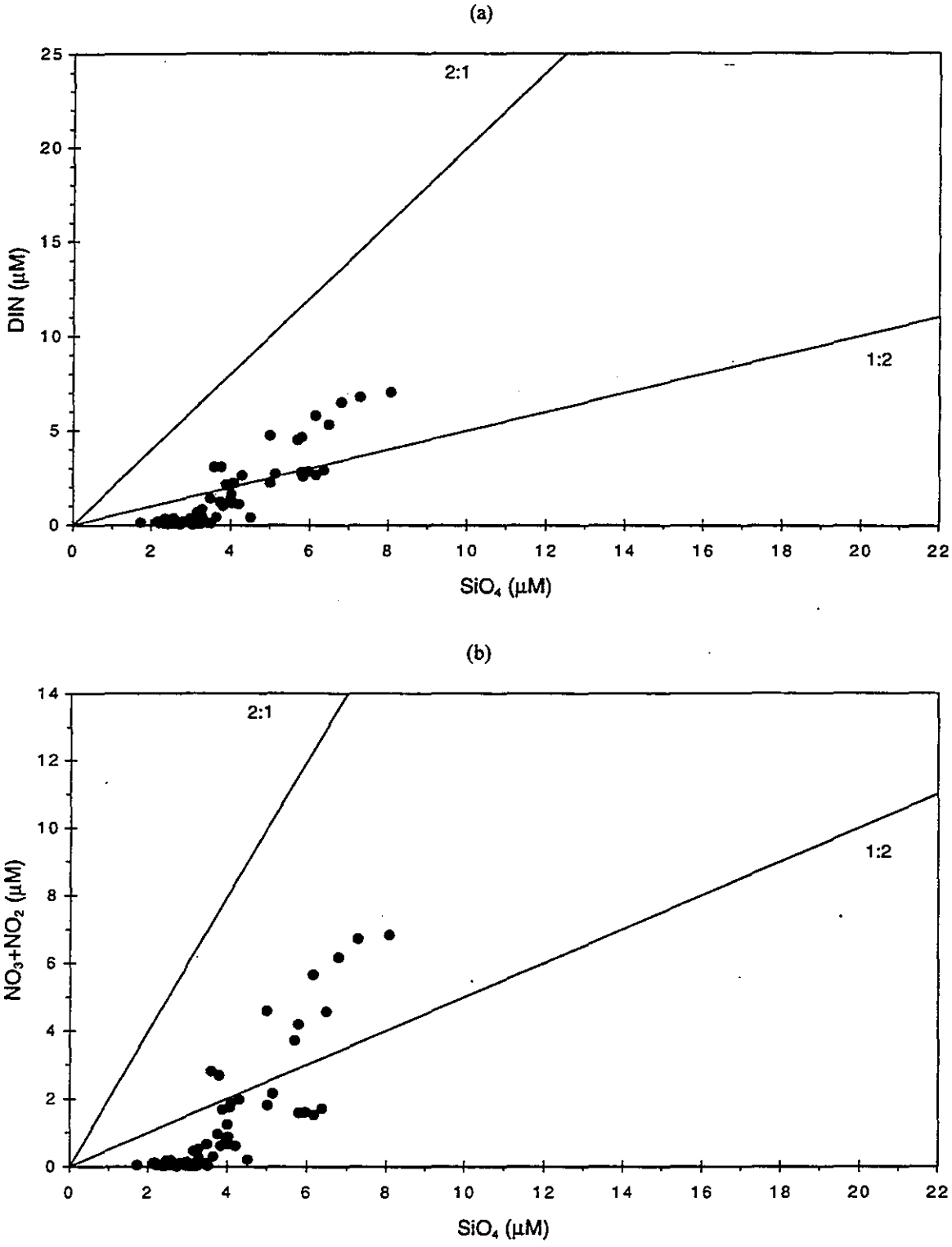


FIGURE 4-142
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

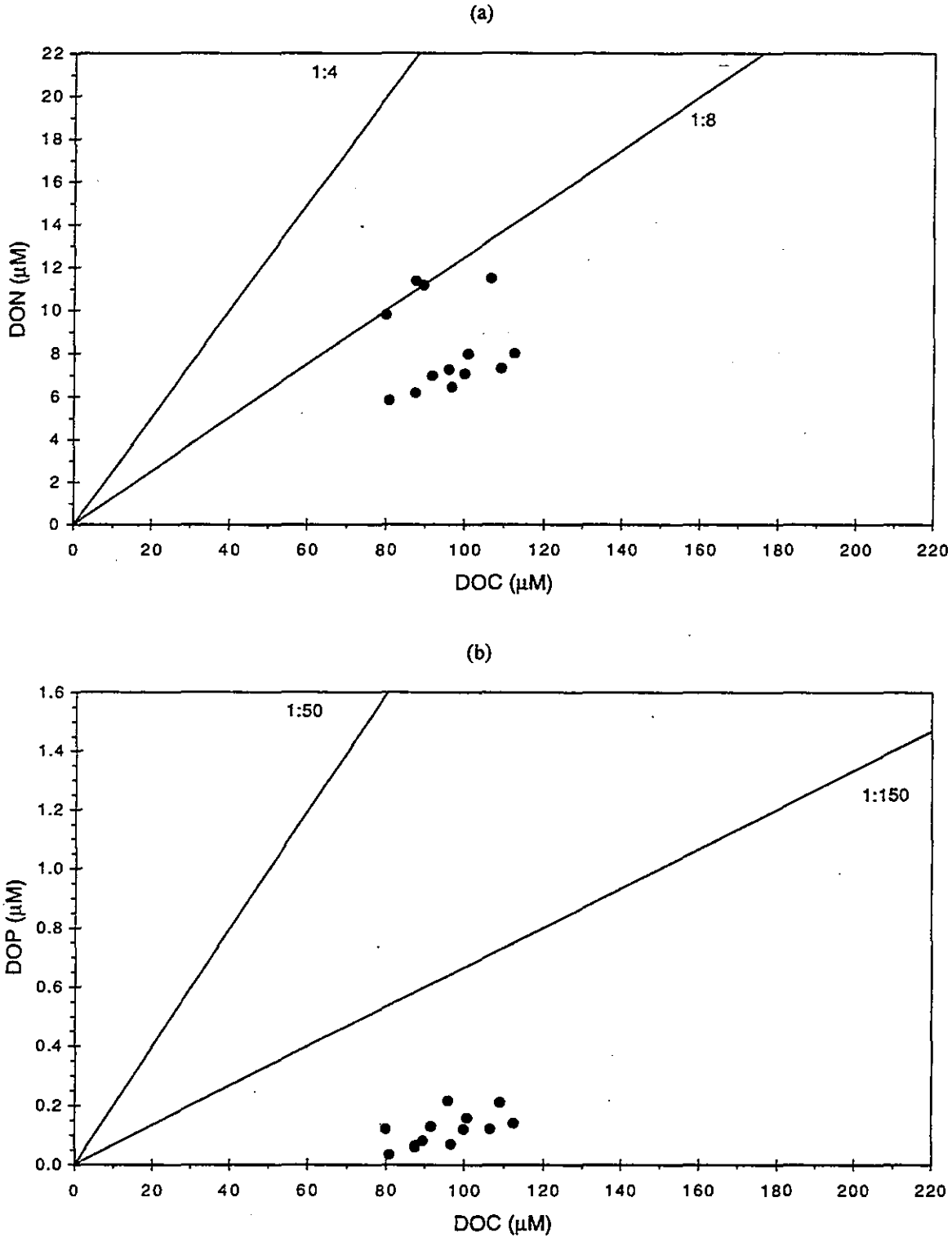
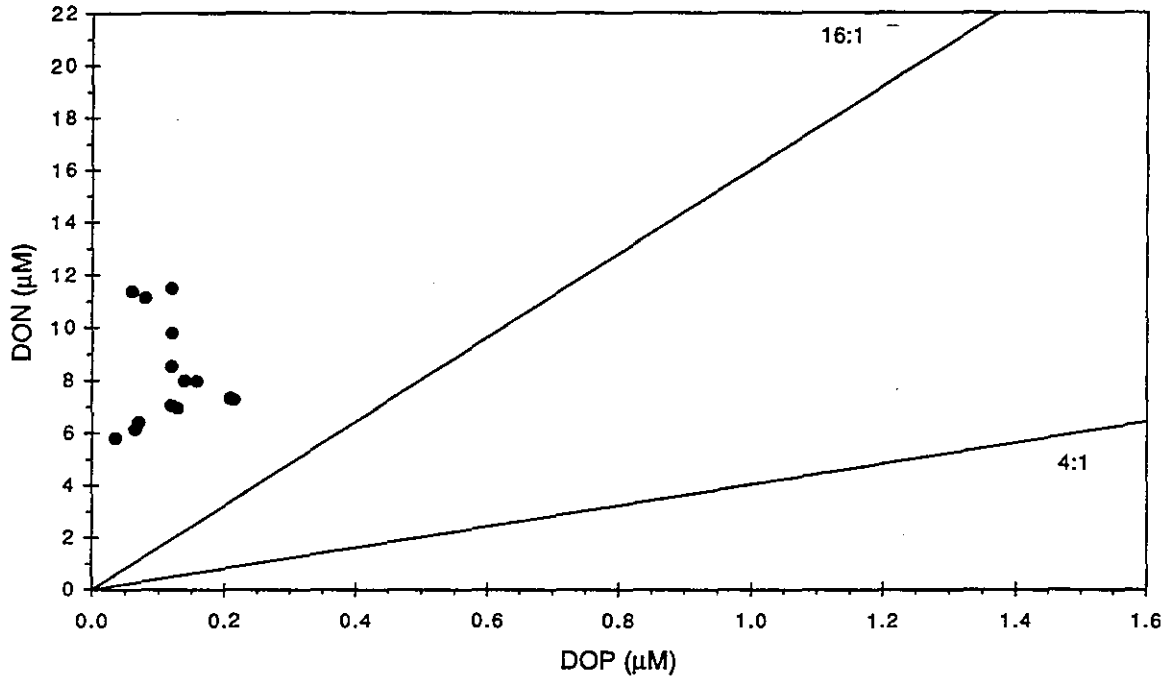


FIGURE 4-143
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

(a)



(b)

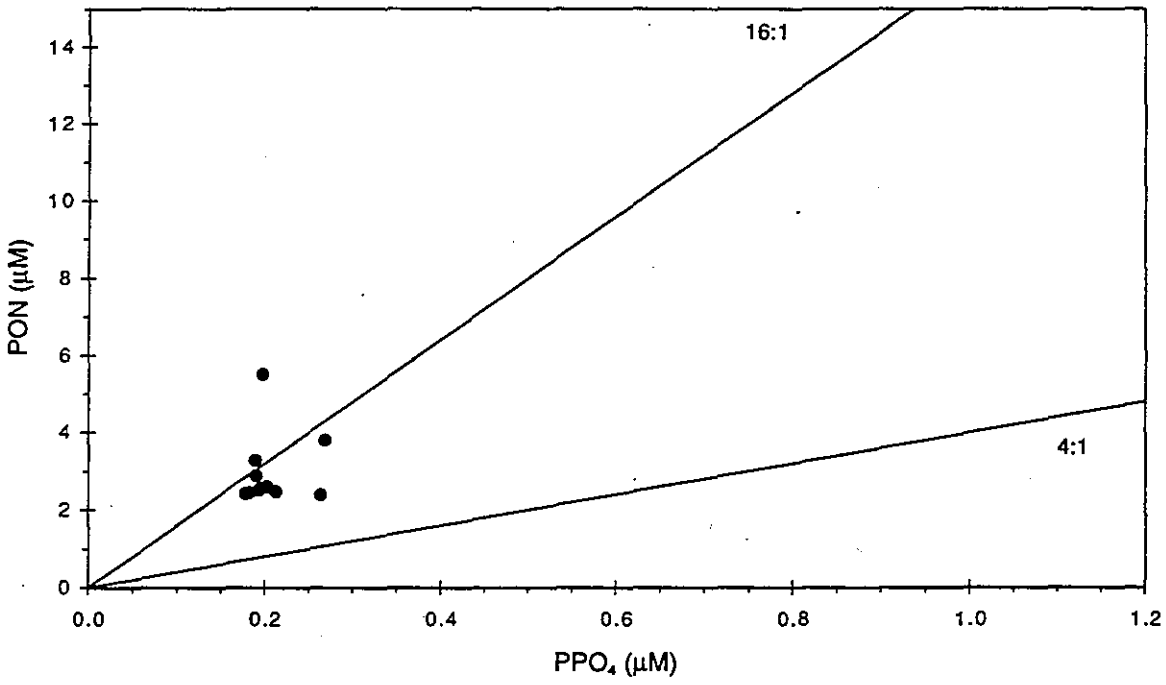


FIGURE 4-144
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

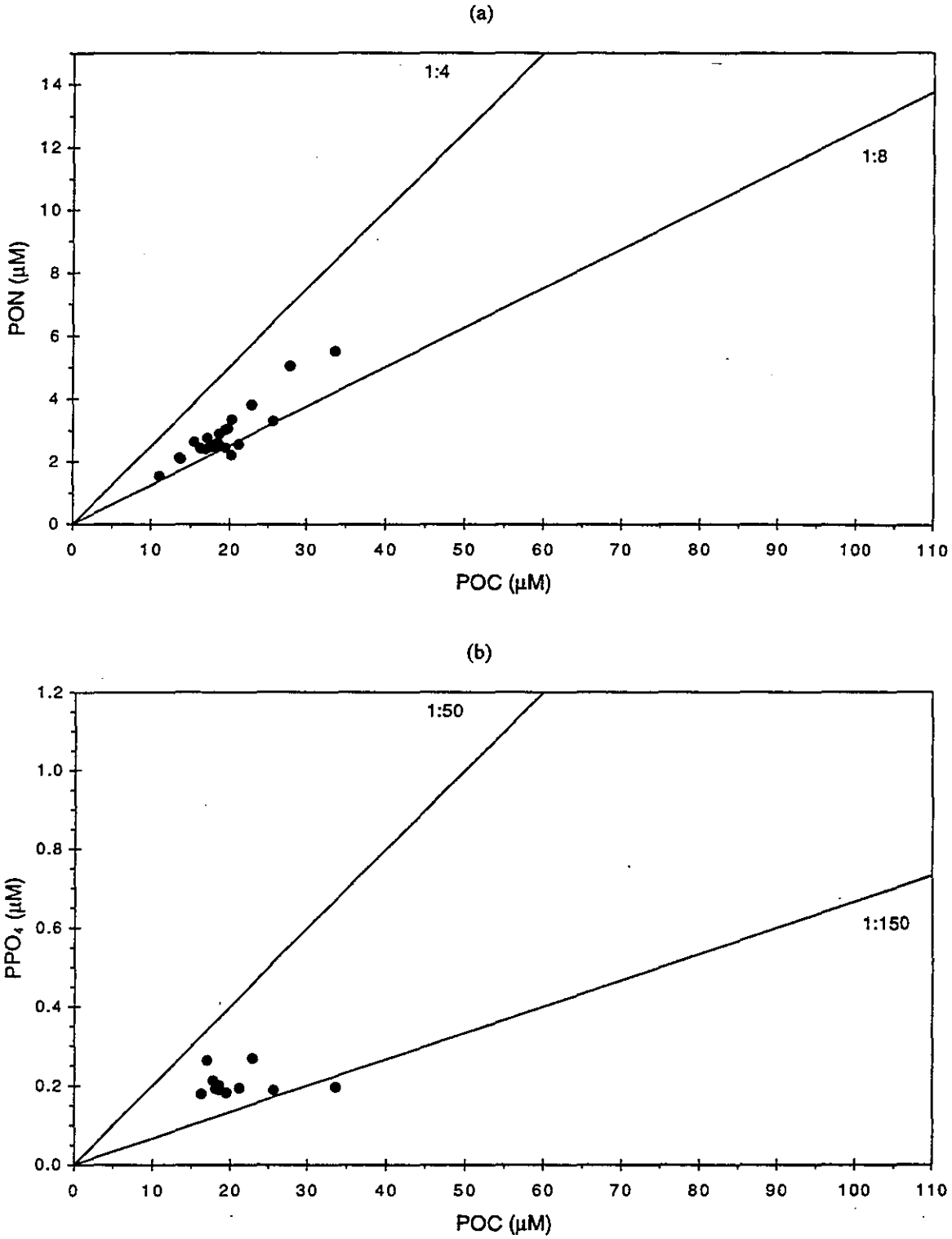
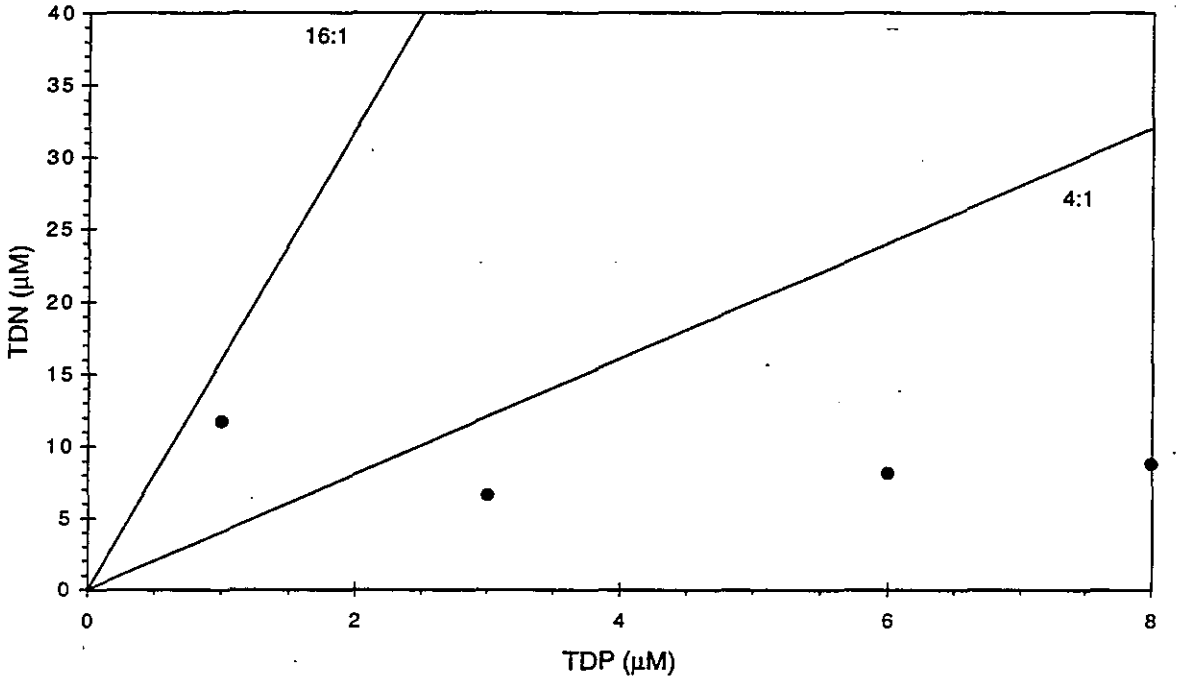


FIGURE 4-145
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

(a)



(b)

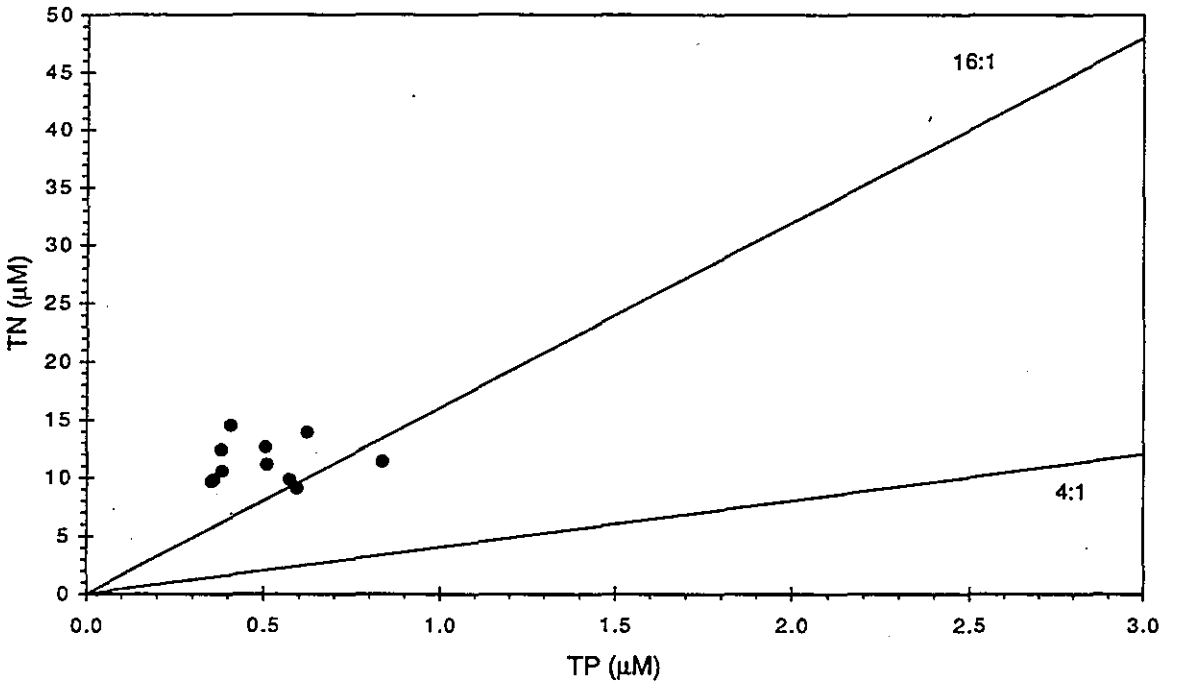
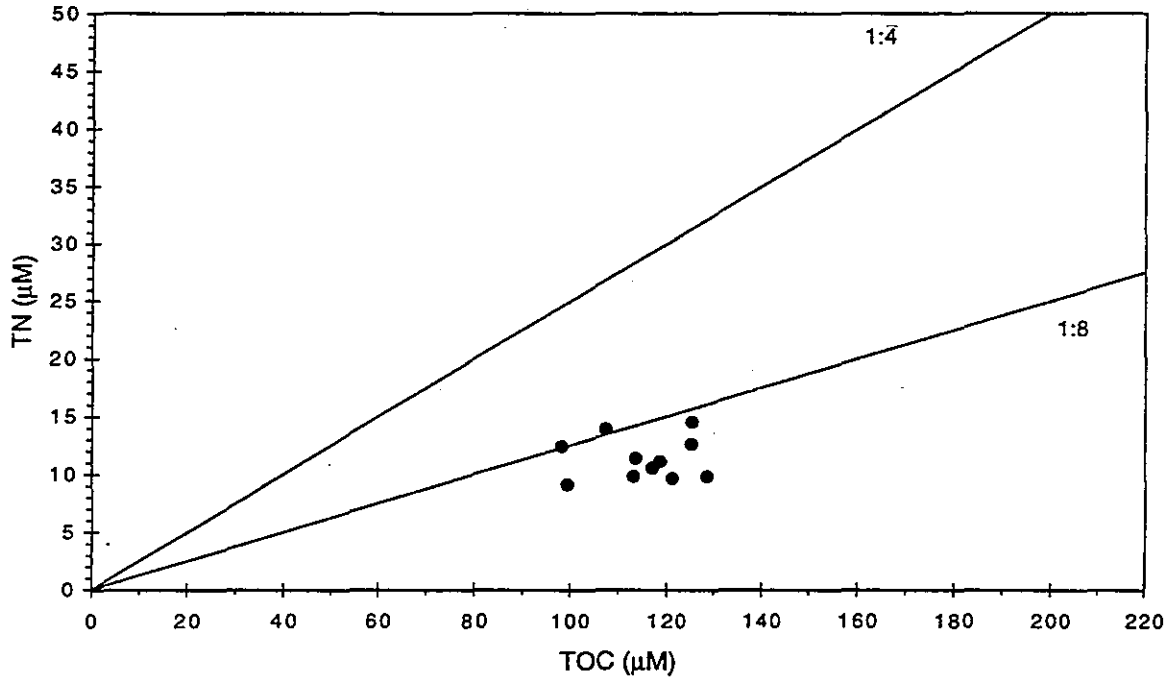


FIGURE 4-146
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

(a)



(b)

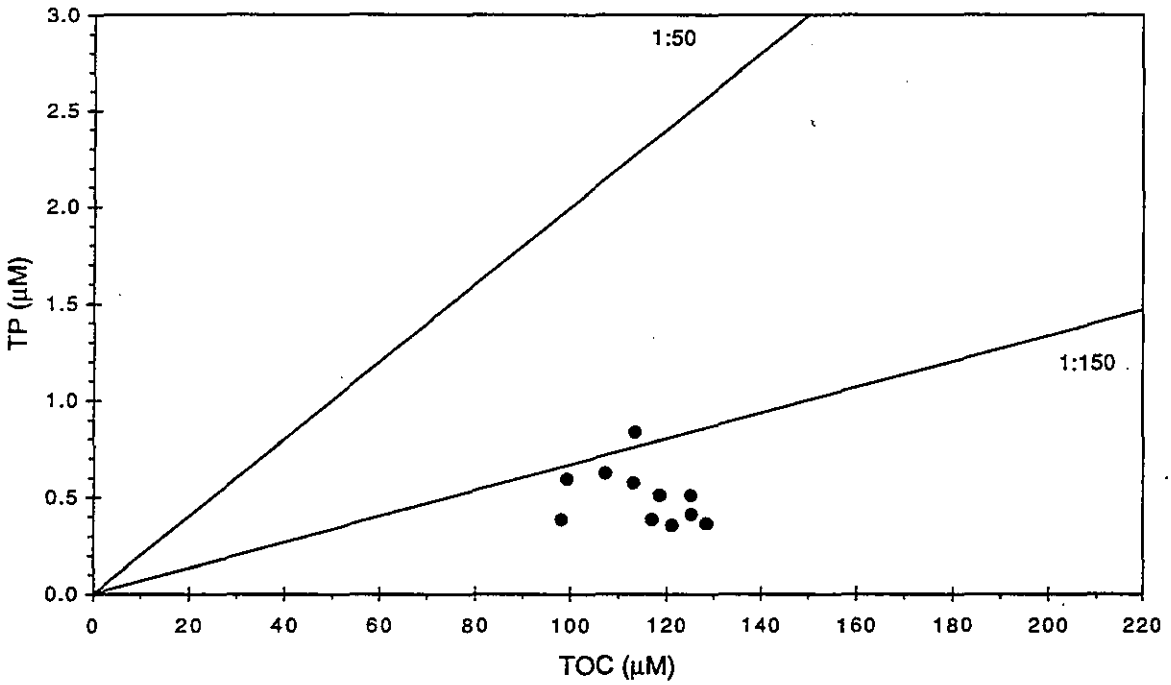


FIGURE 4-147
Nutrient vs. nutrient plots for nearfield survey W9610, (Aug 96).

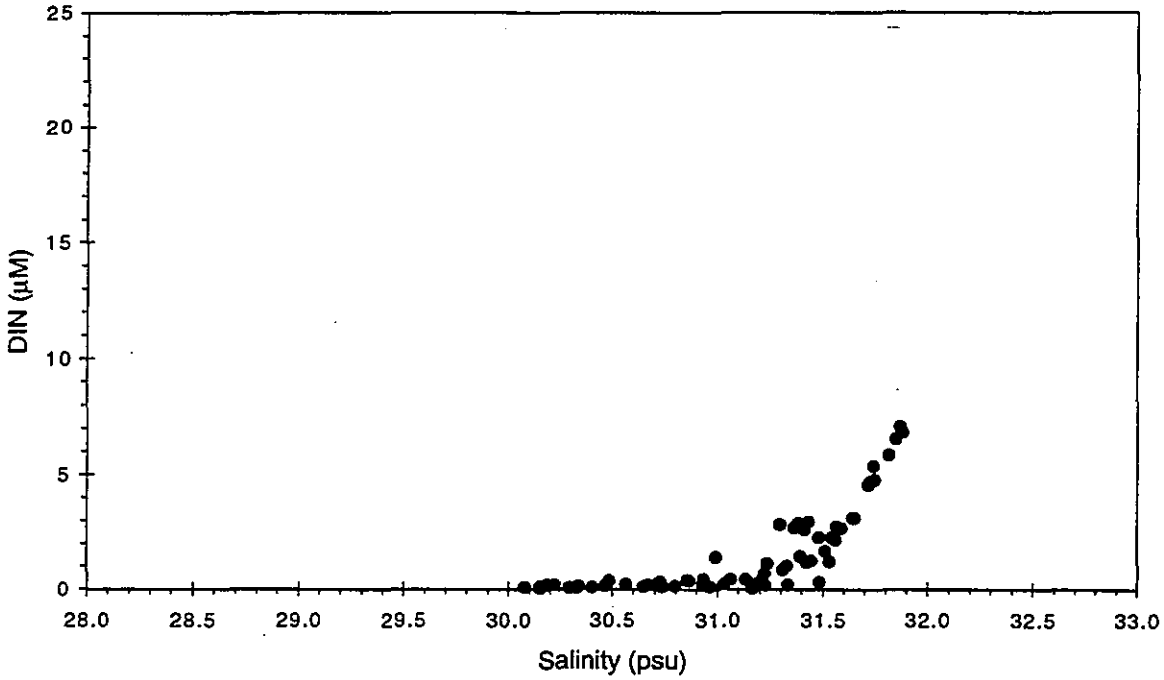
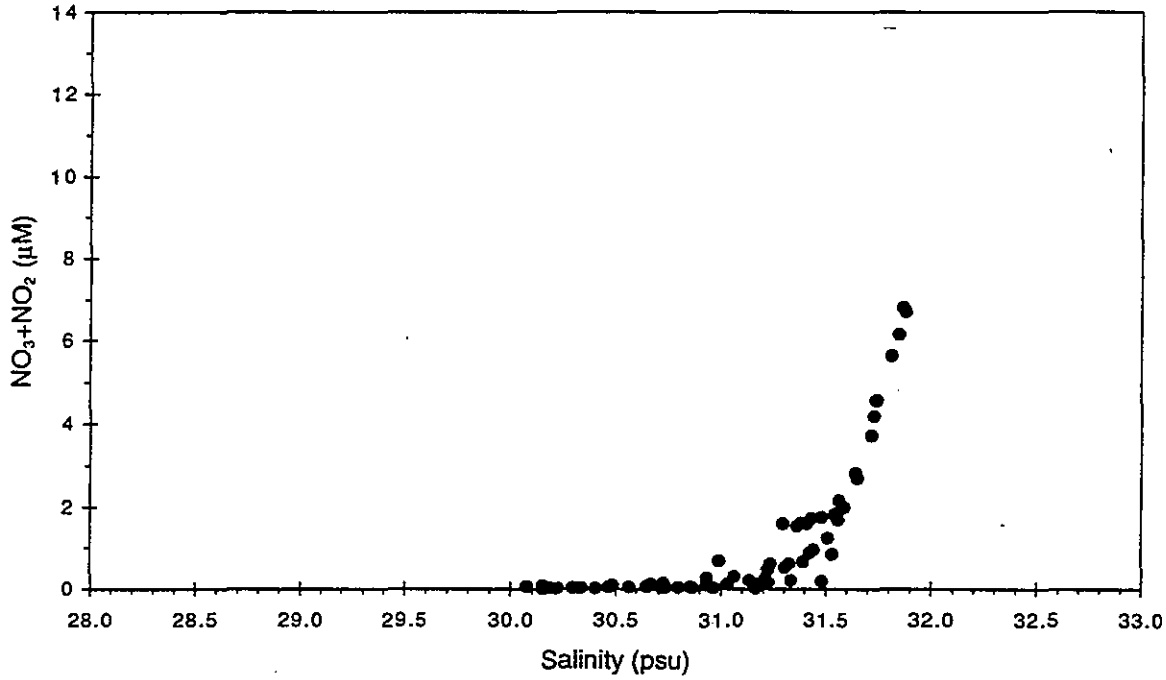


FIGURE 4-148
Nutrient vs. salinity plots for nearfield survey W9610, (Aug 96).

(a)



(b)

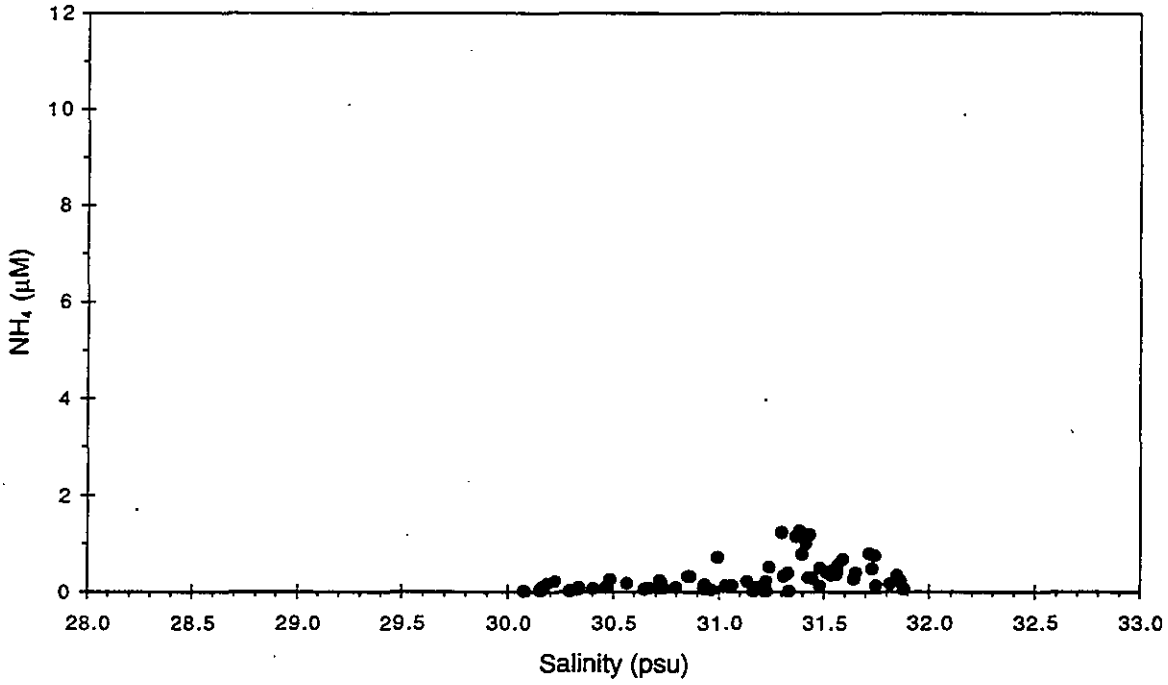
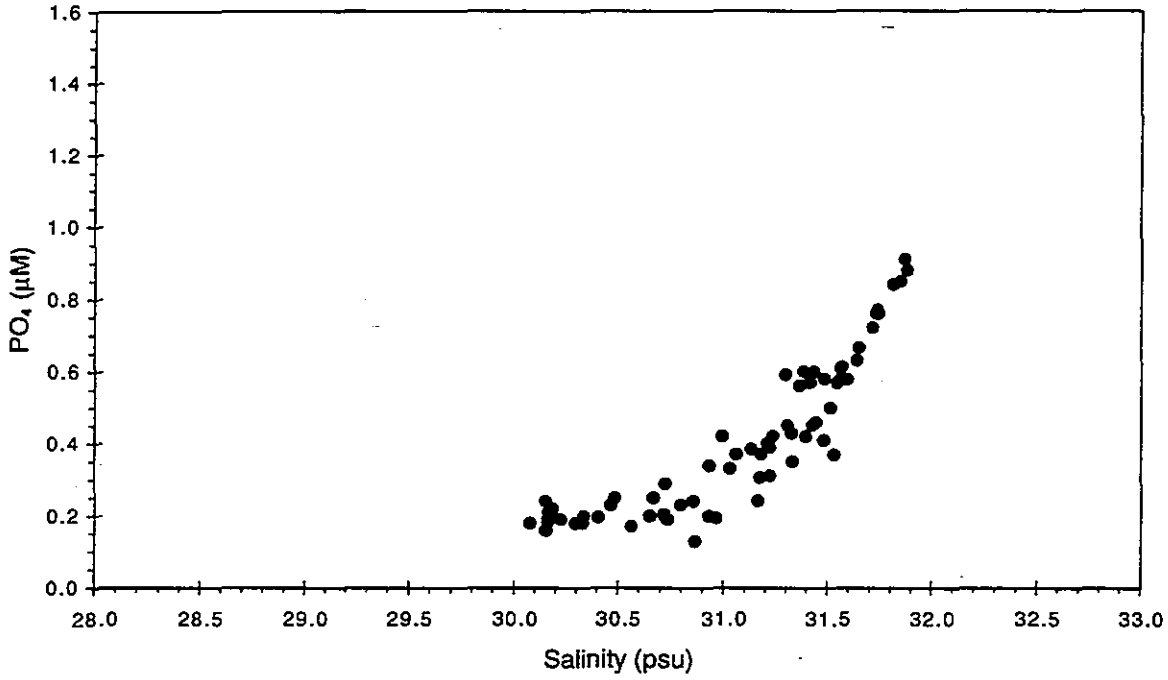


FIGURE 4-149
Nutrient vs. salinity plots for nearfield survey W9610, (Aug 96).

(a)



(b)

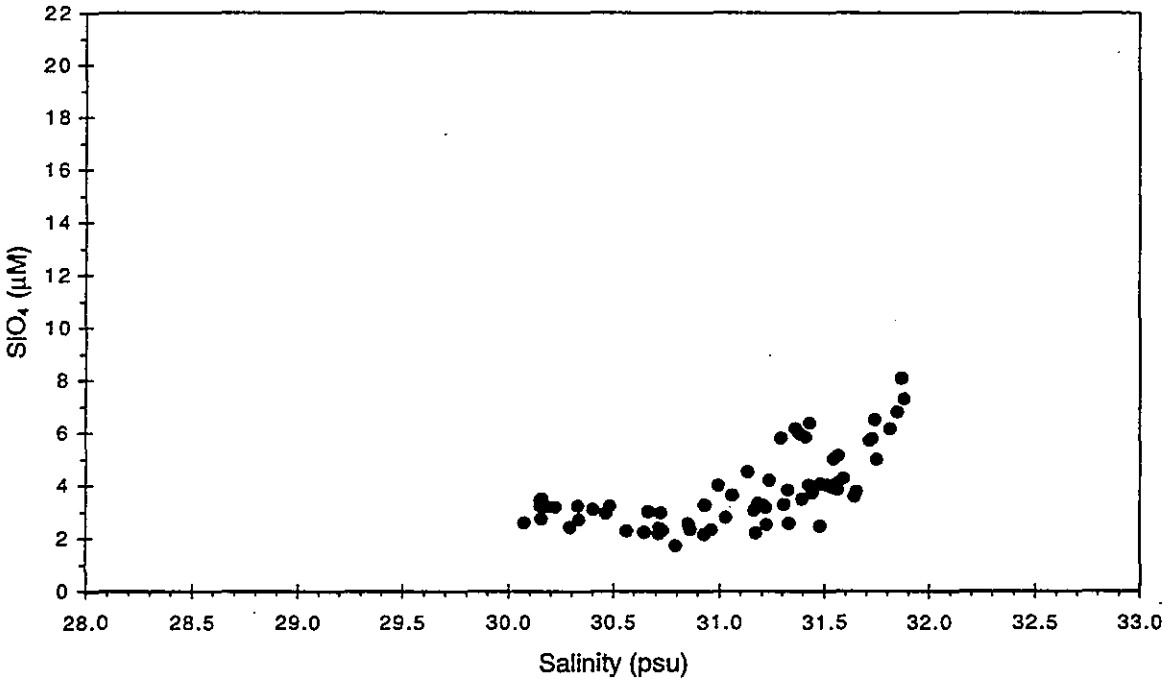


FIGURE 4-150
Nutrient vs. salinity plots for nearfield survey W9610, (Aug 96).

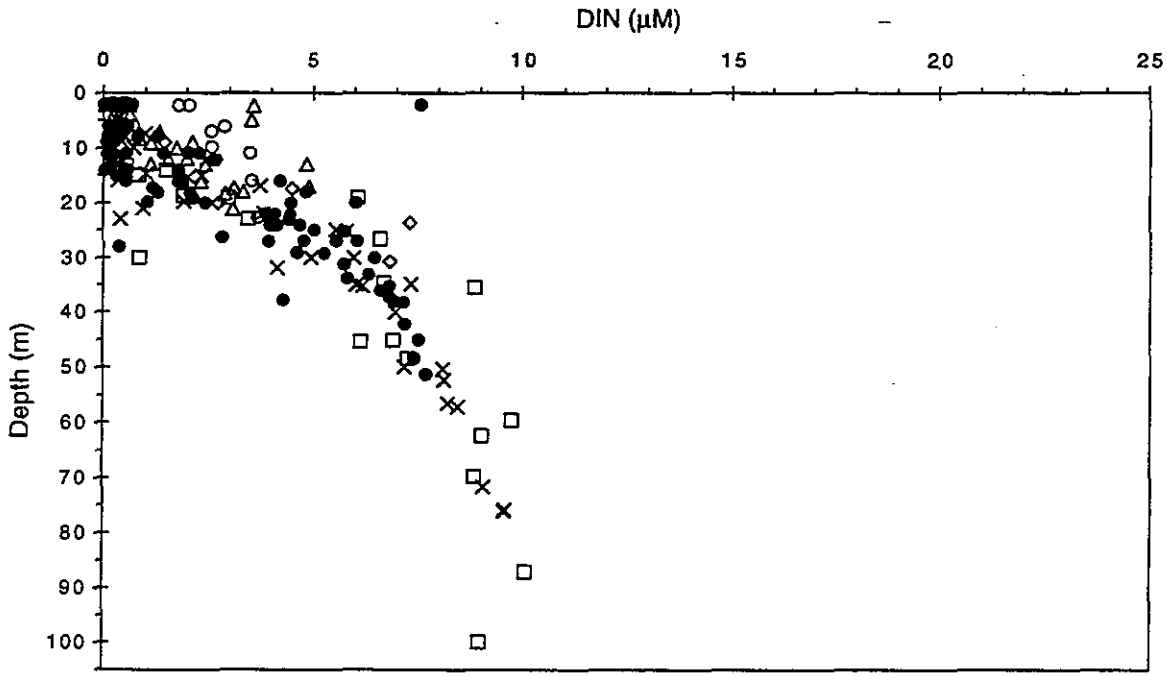


FIGURE 4-151
Depth vs. nutrient plots for farfield survey W9611, (Aug 96).

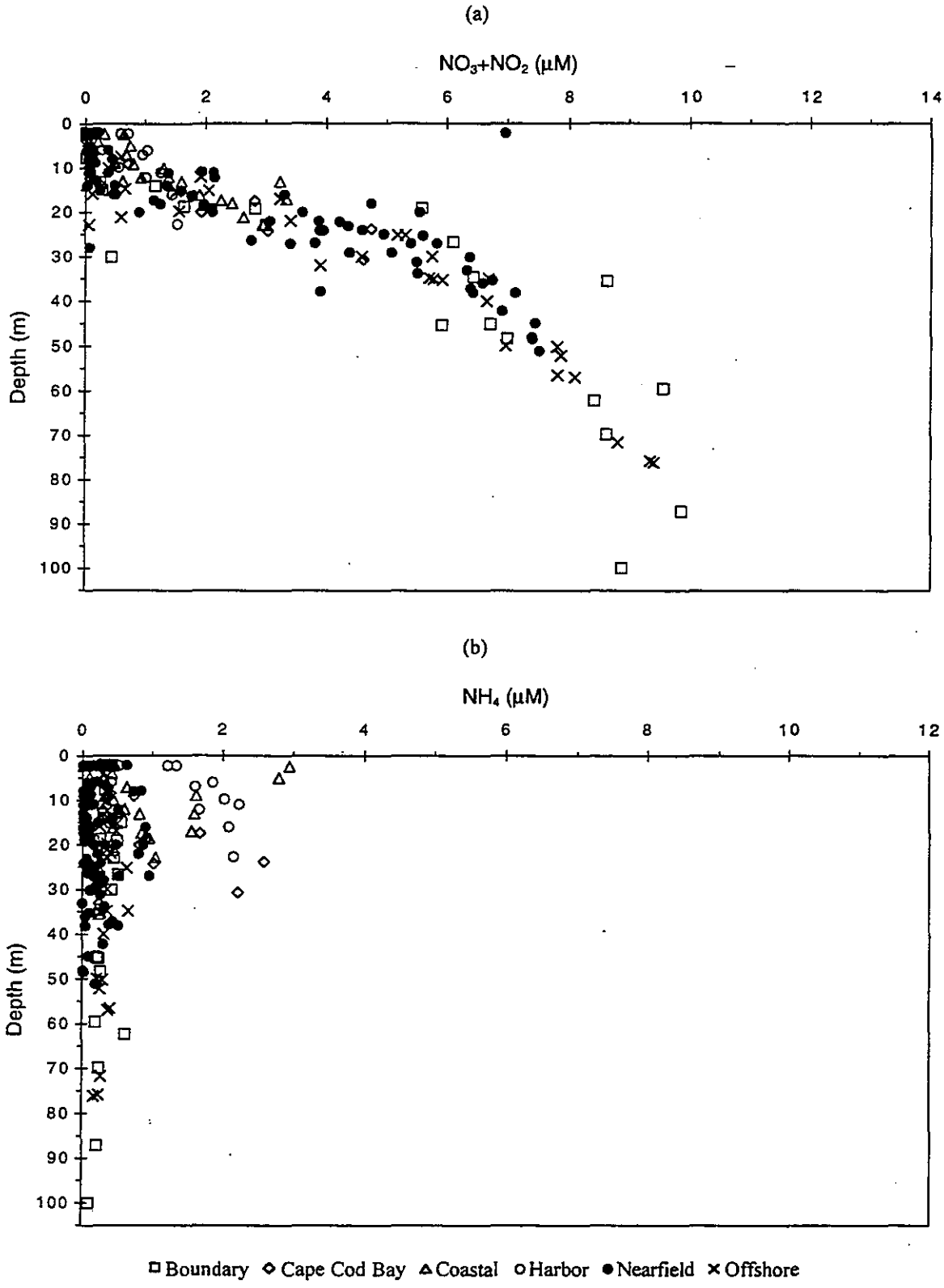


FIGURE 4-152
Depth vs. nutrient plots for farfield survey W9611, (Aug 96).

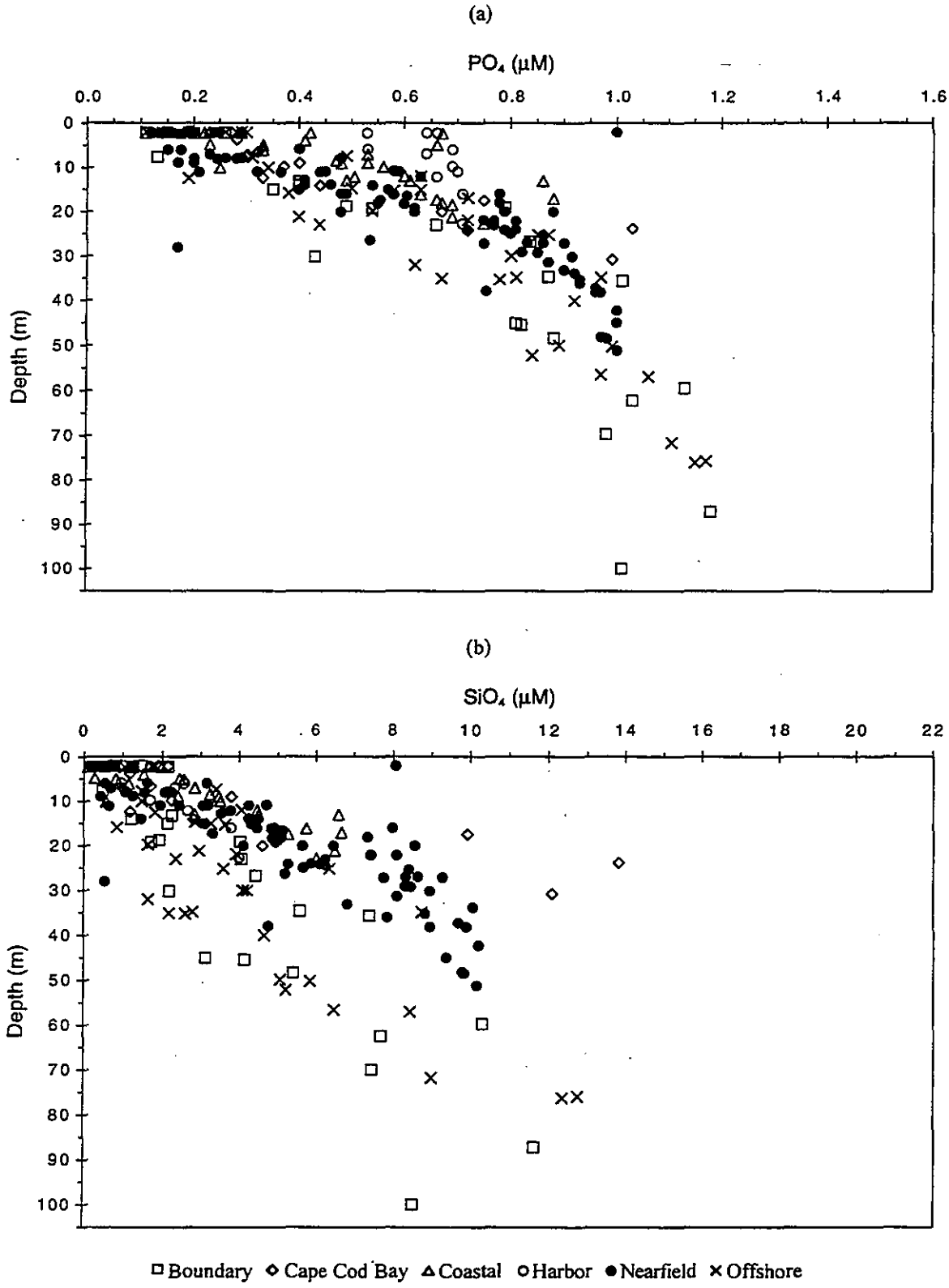


FIGURE 4-153
Depth vs. nutrient plots for farfield survey W9611, (Aug 96).

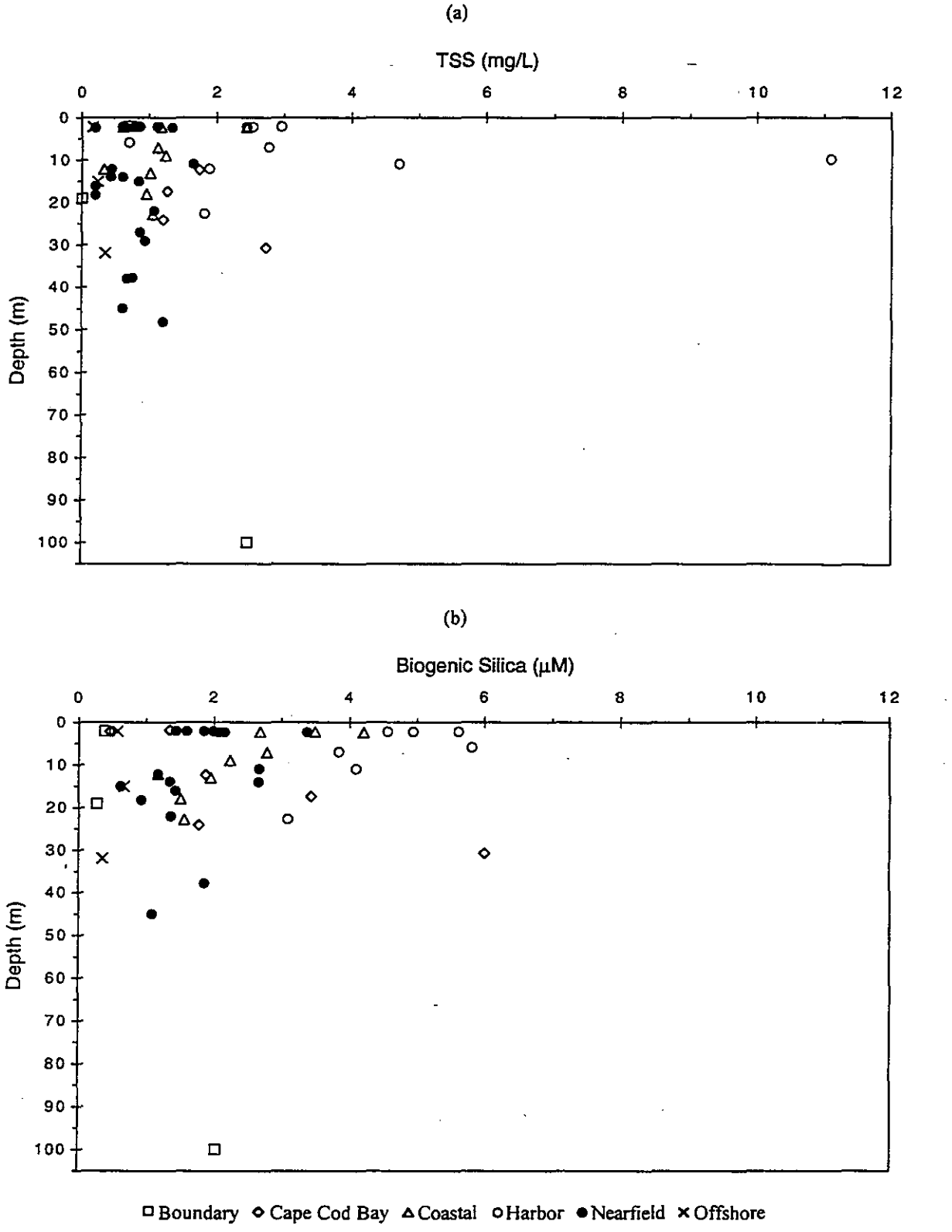


FIGURE 4-154
Depth vs. nutrient plots for farfield survey W9611, (Aug 96).

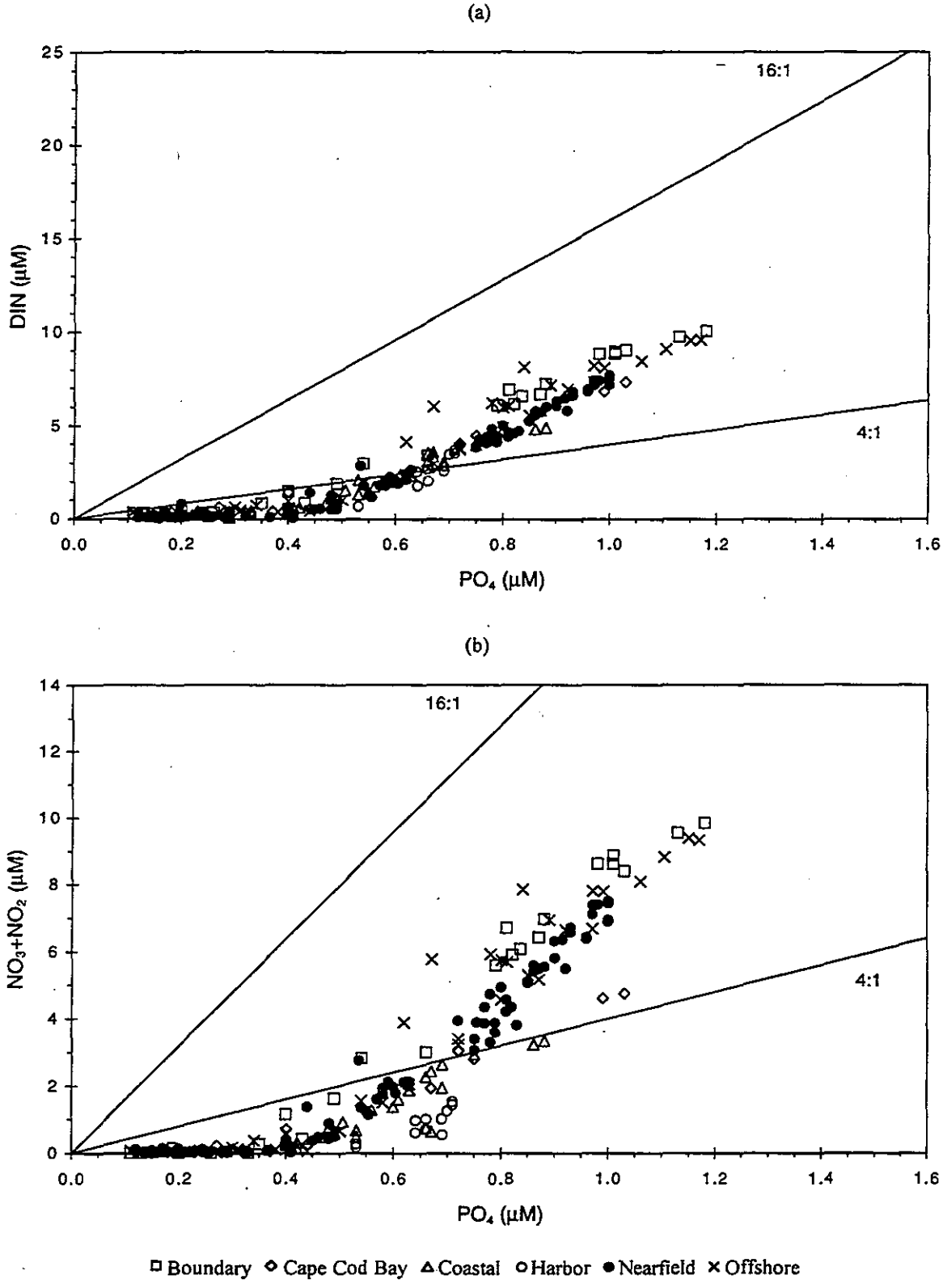


FIGURE 4-155
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).

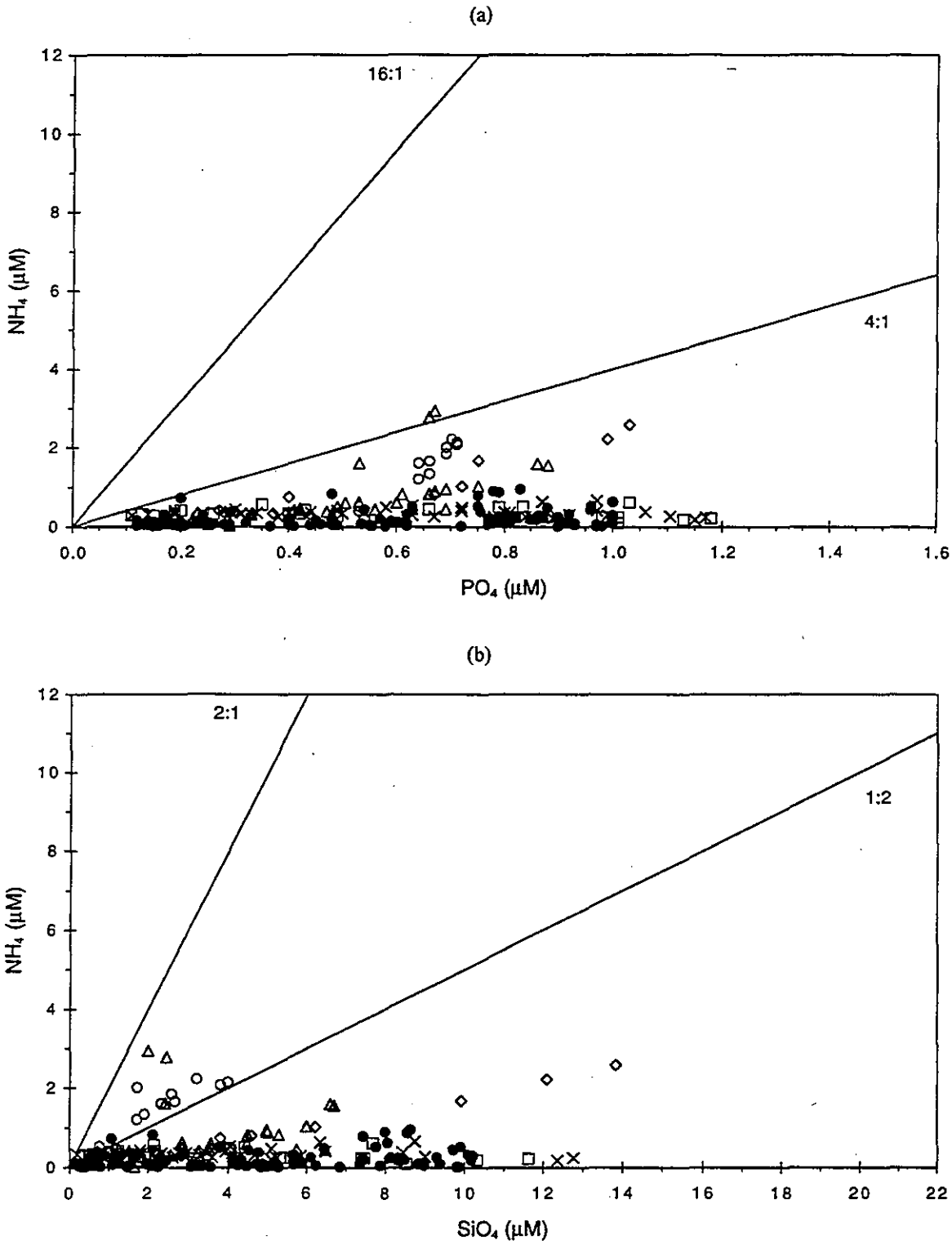


FIGURE 4-156
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).

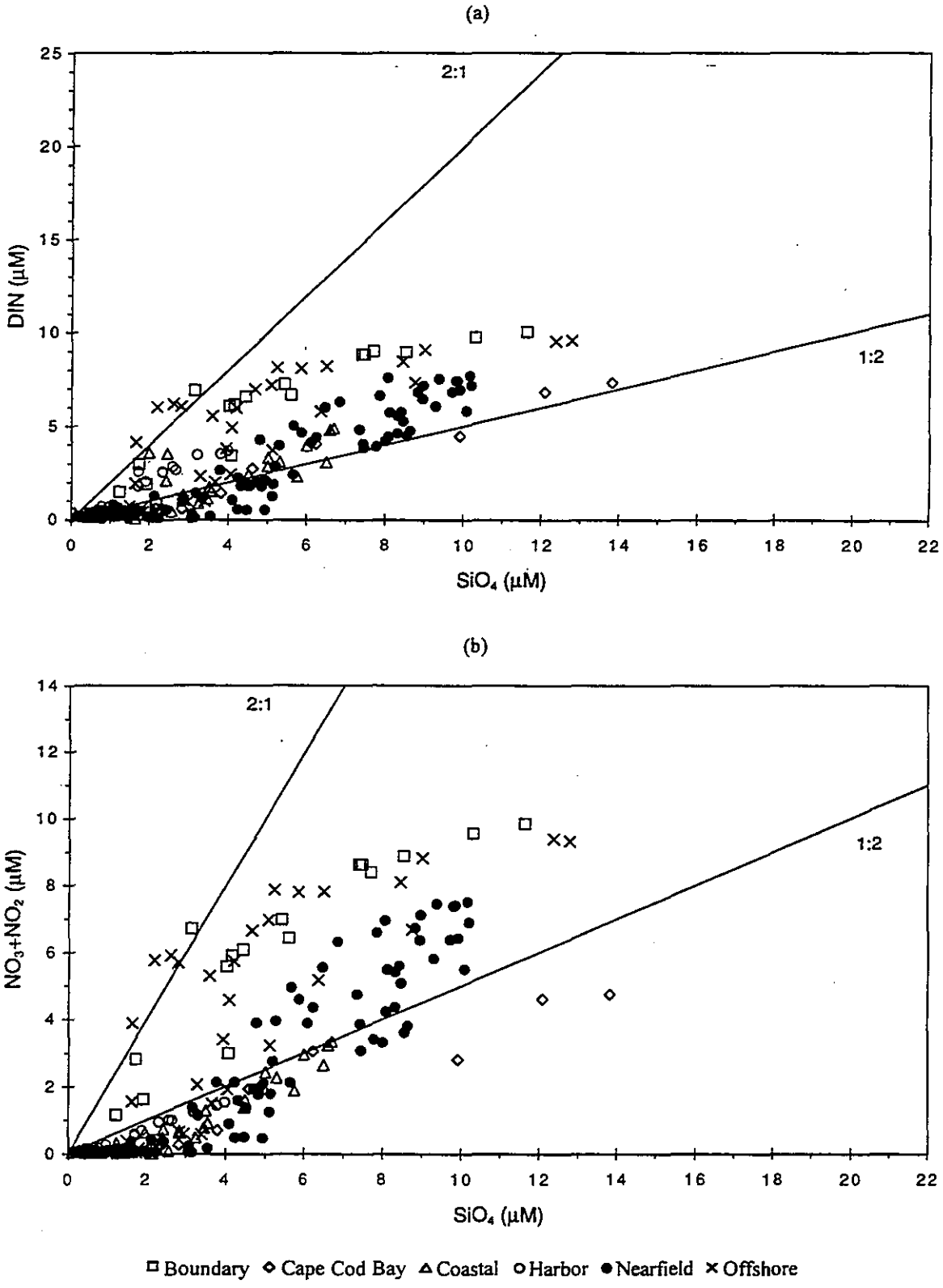


FIGURE 4-157
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).

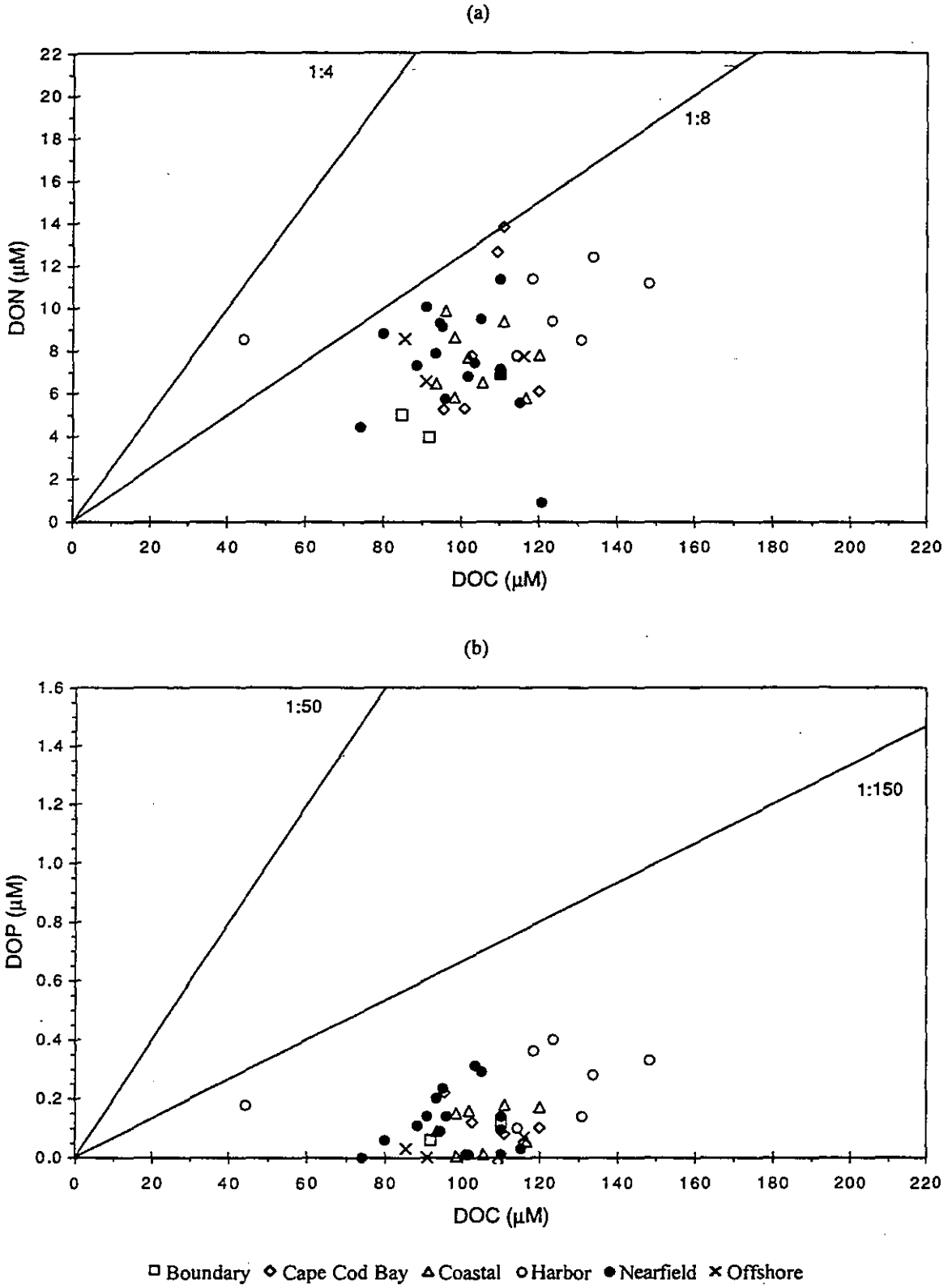


FIGURE 4-158
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).

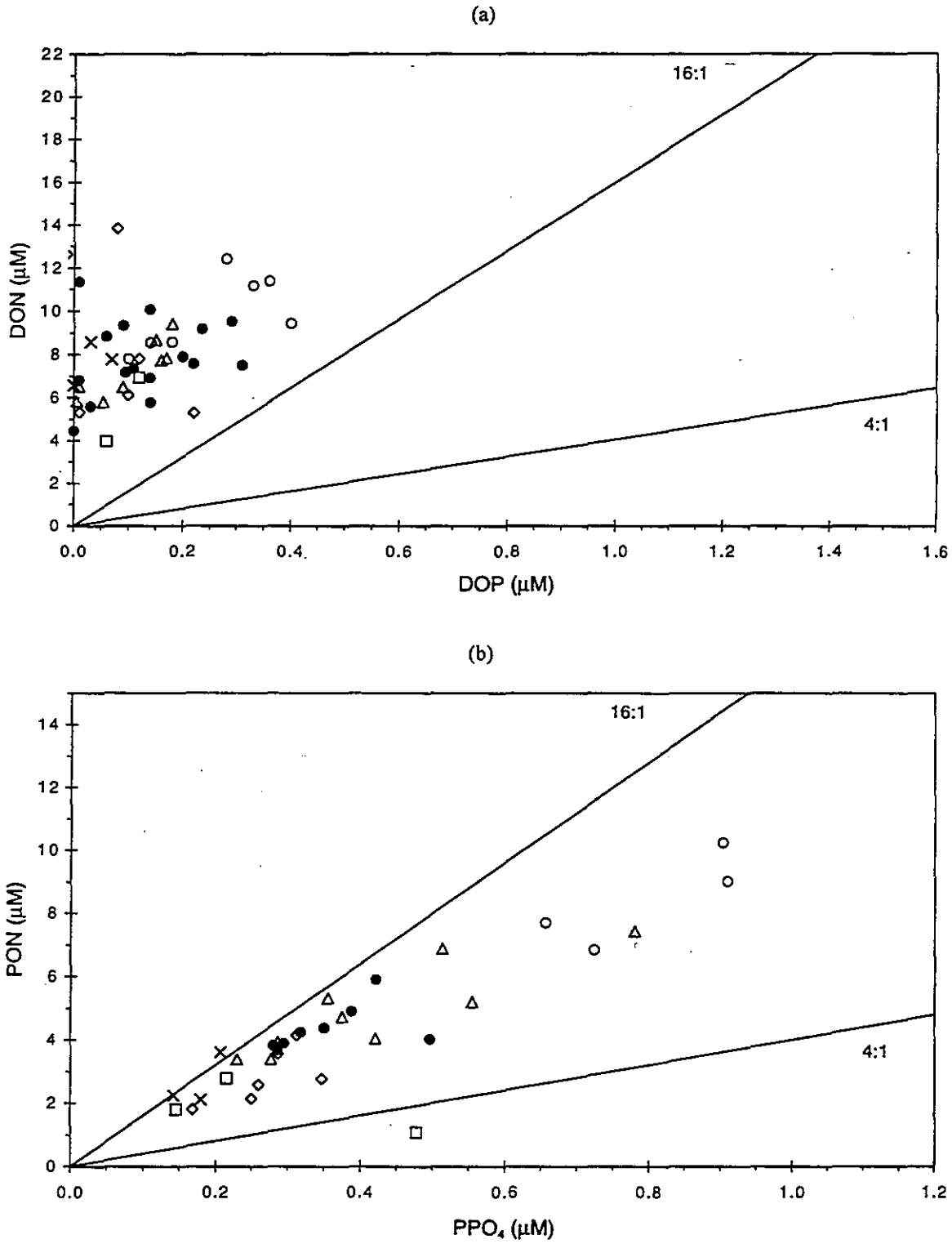


FIGURE 4-159
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).

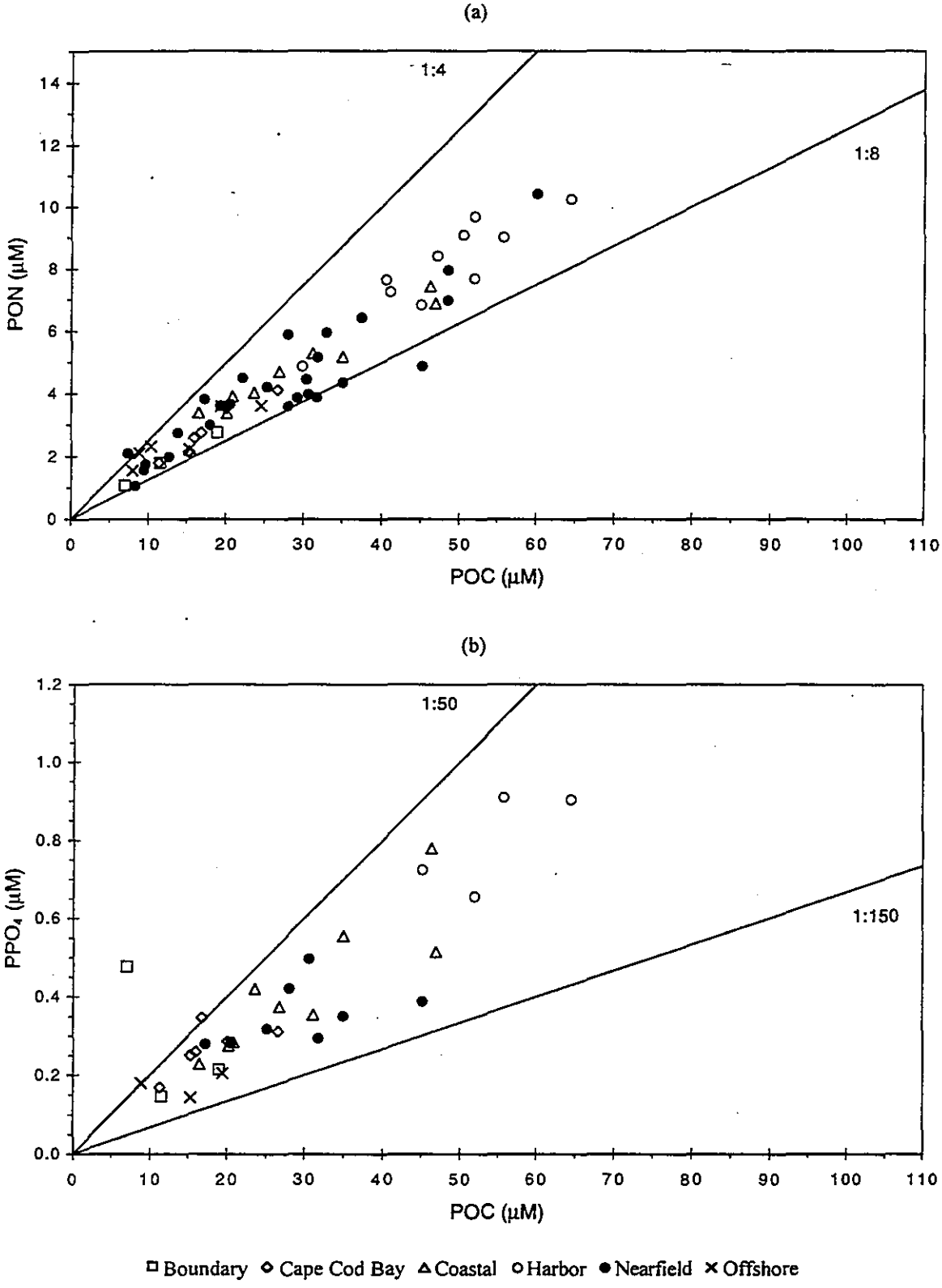


FIGURE 4-160
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).

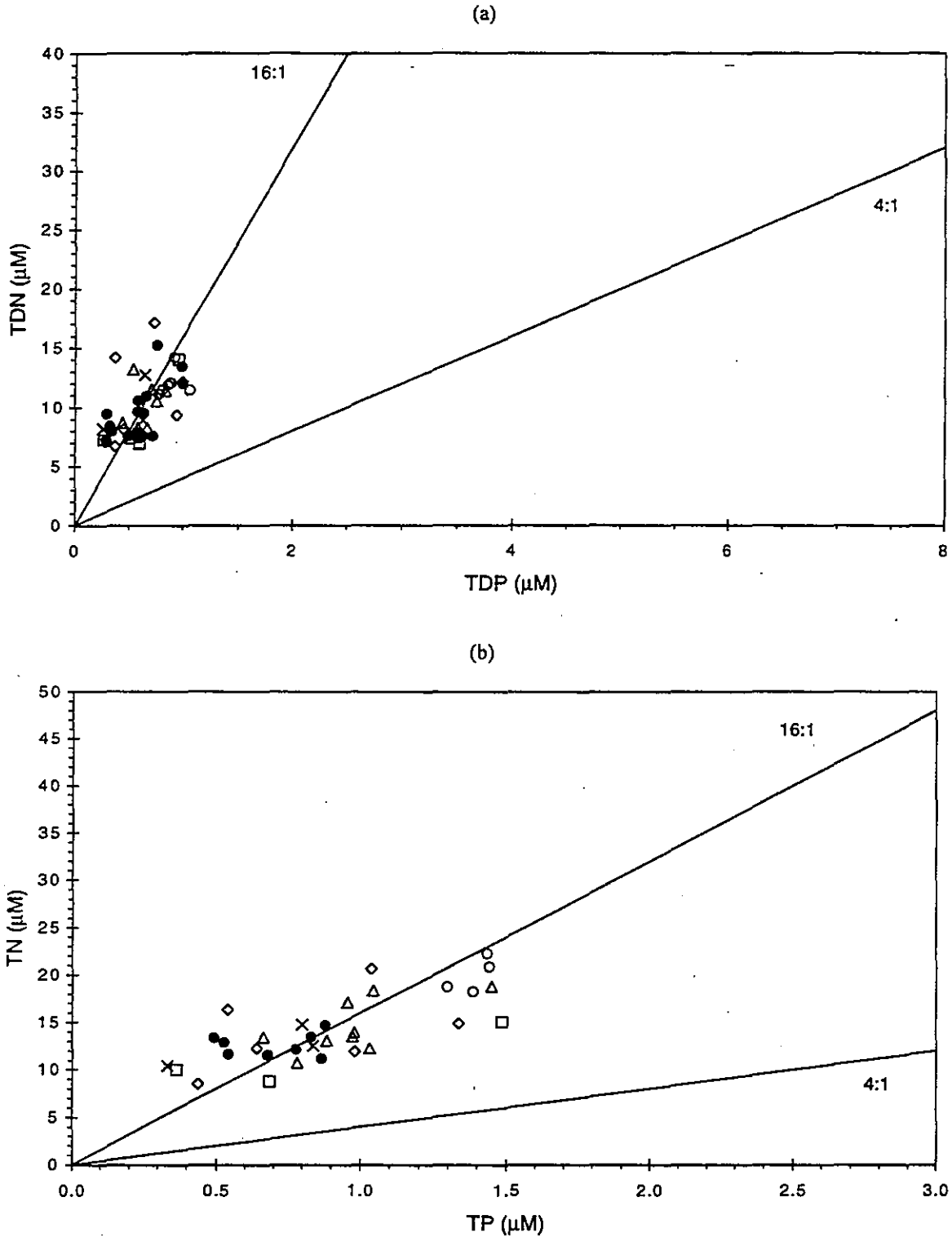


FIGURE 4-161
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).

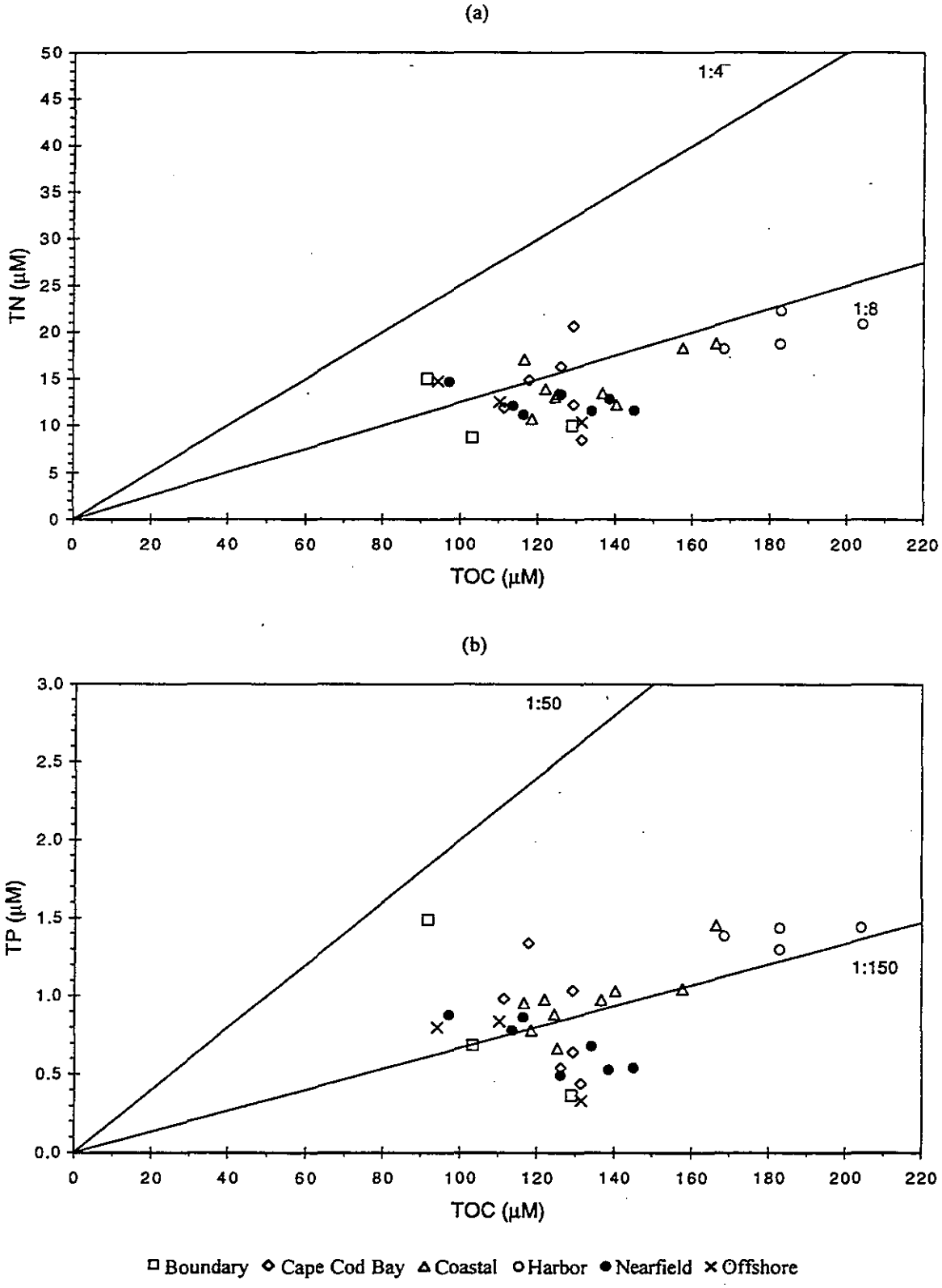
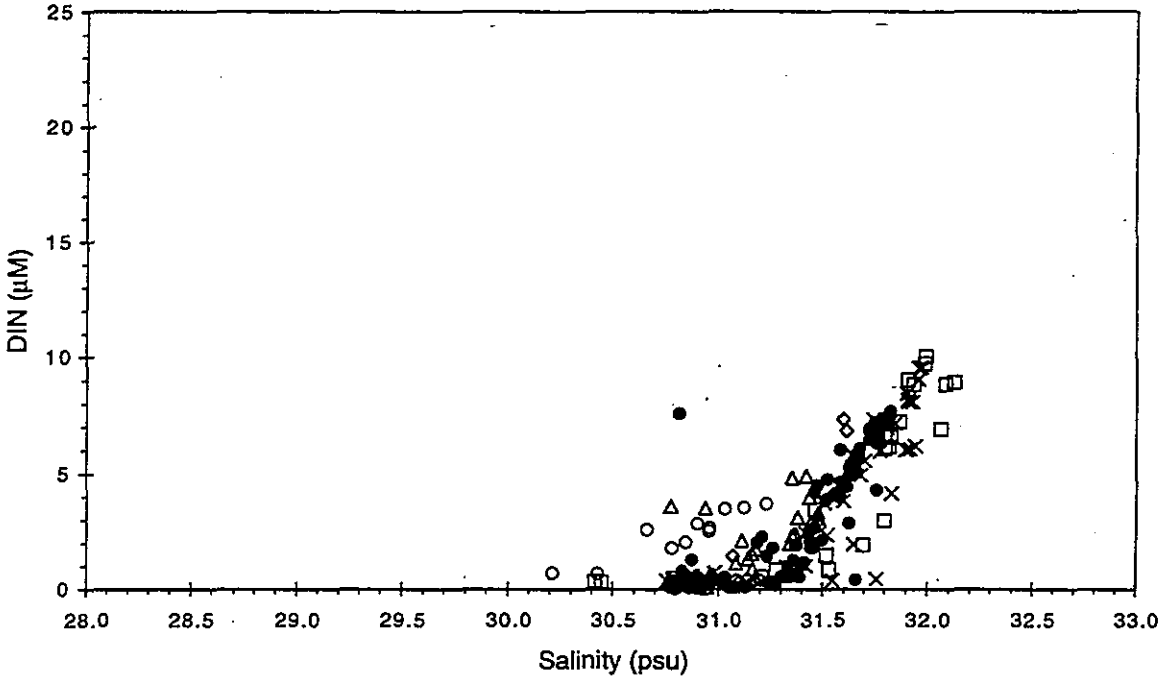


FIGURE 4-162
Nutrient vs. nutrient plots for farfield survey W9611, (Aug 96).



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-163
Nutrient vs. salinity plots for farfield survey W9611, (Aug 96).

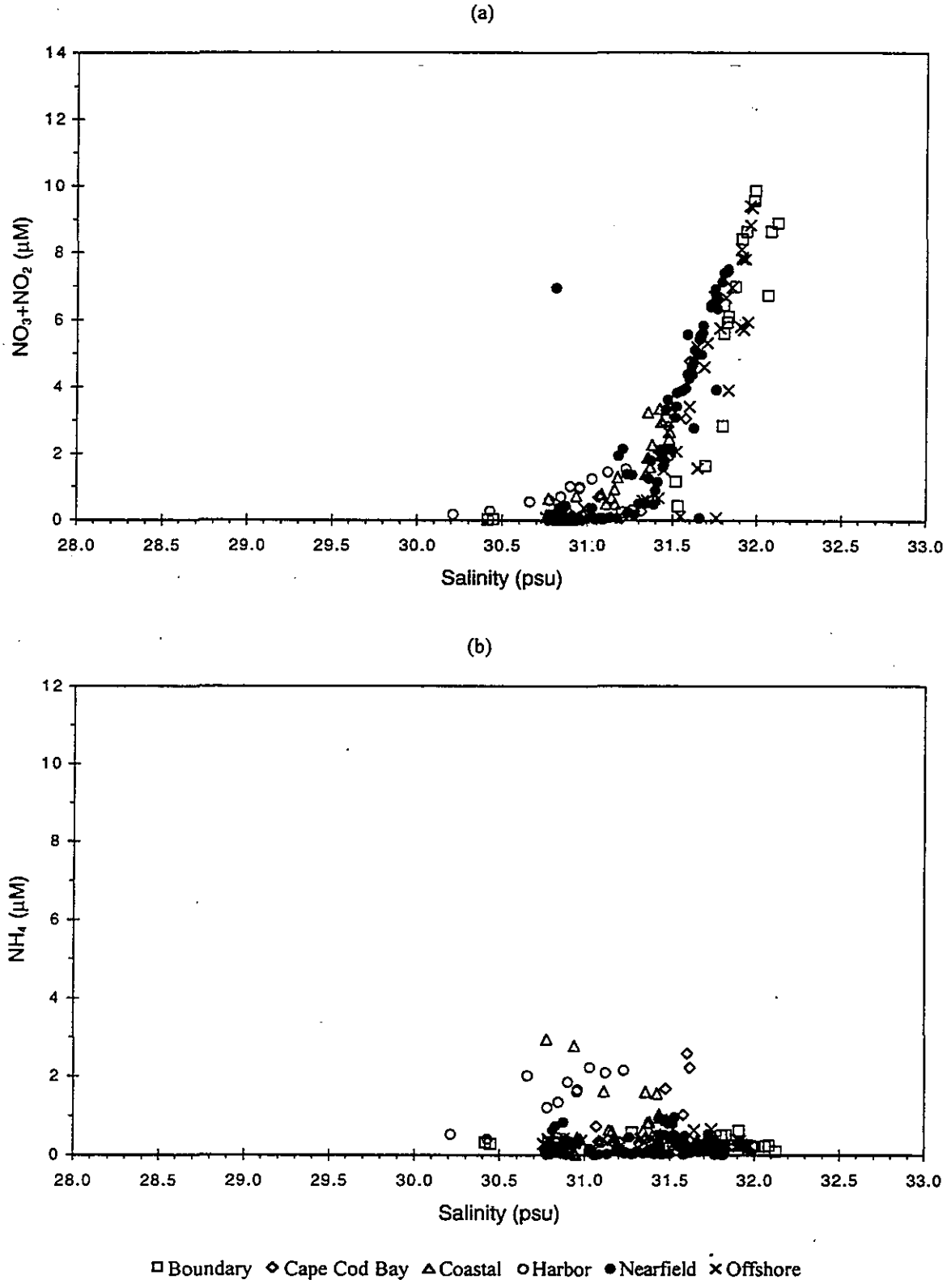
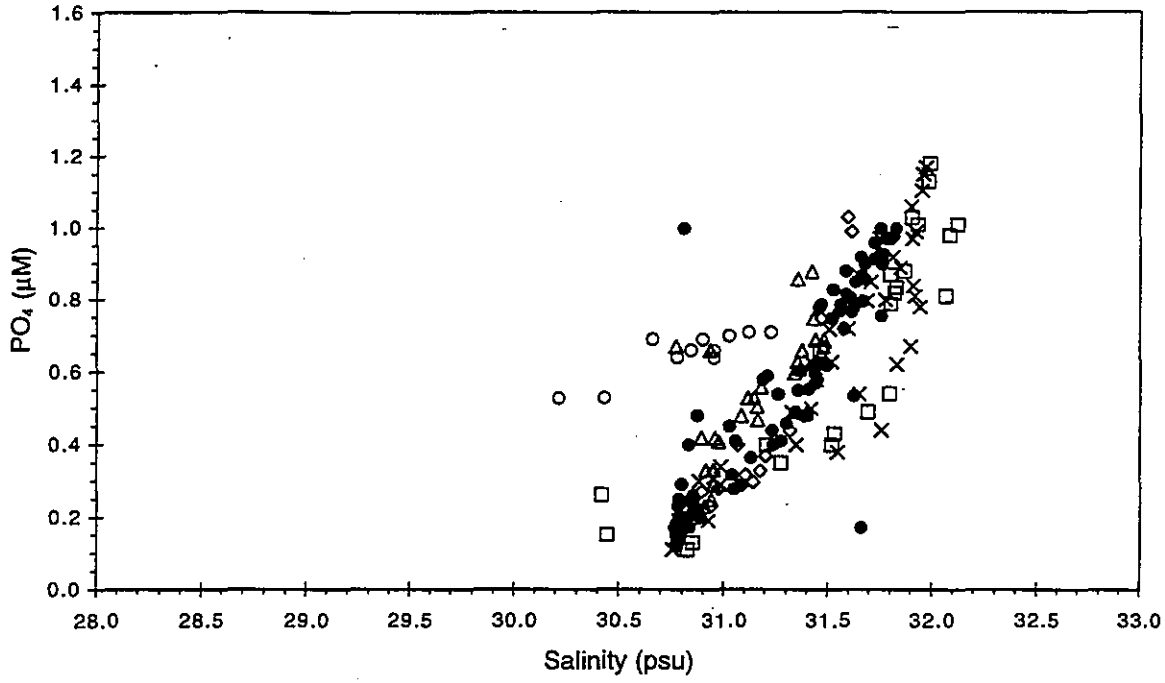
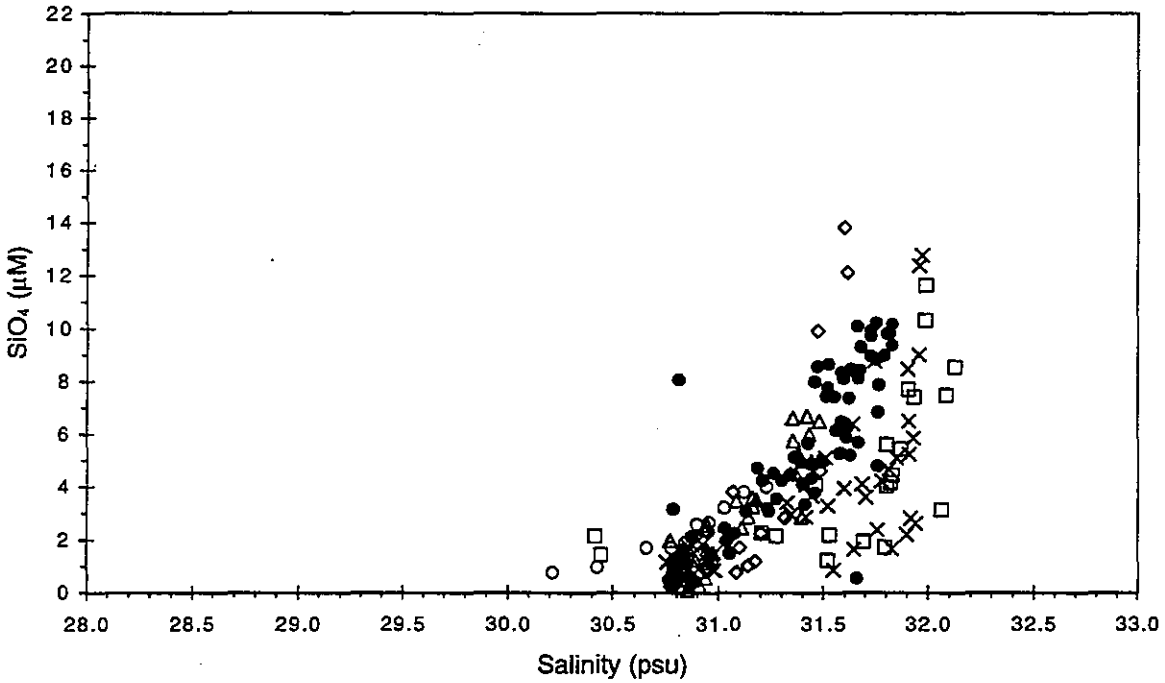


FIGURE 4-164
Nutrient vs. salinity plots for farfield survey W9611, (Aug 96).

(a)



(b)



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-165
Nutrient vs. salinity plots for farfield survey W9611, (Aug 96).

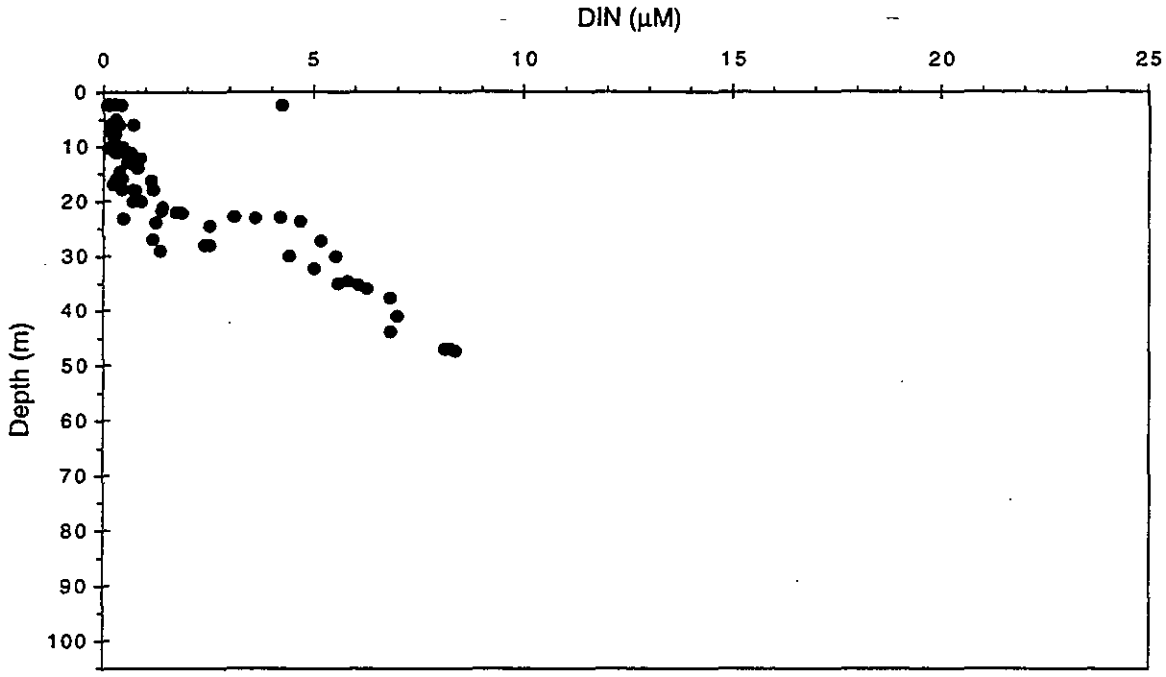


FIGURE 4-166
Depth vs. nutrient plots for nearfield survey W9612, (Sep 96).

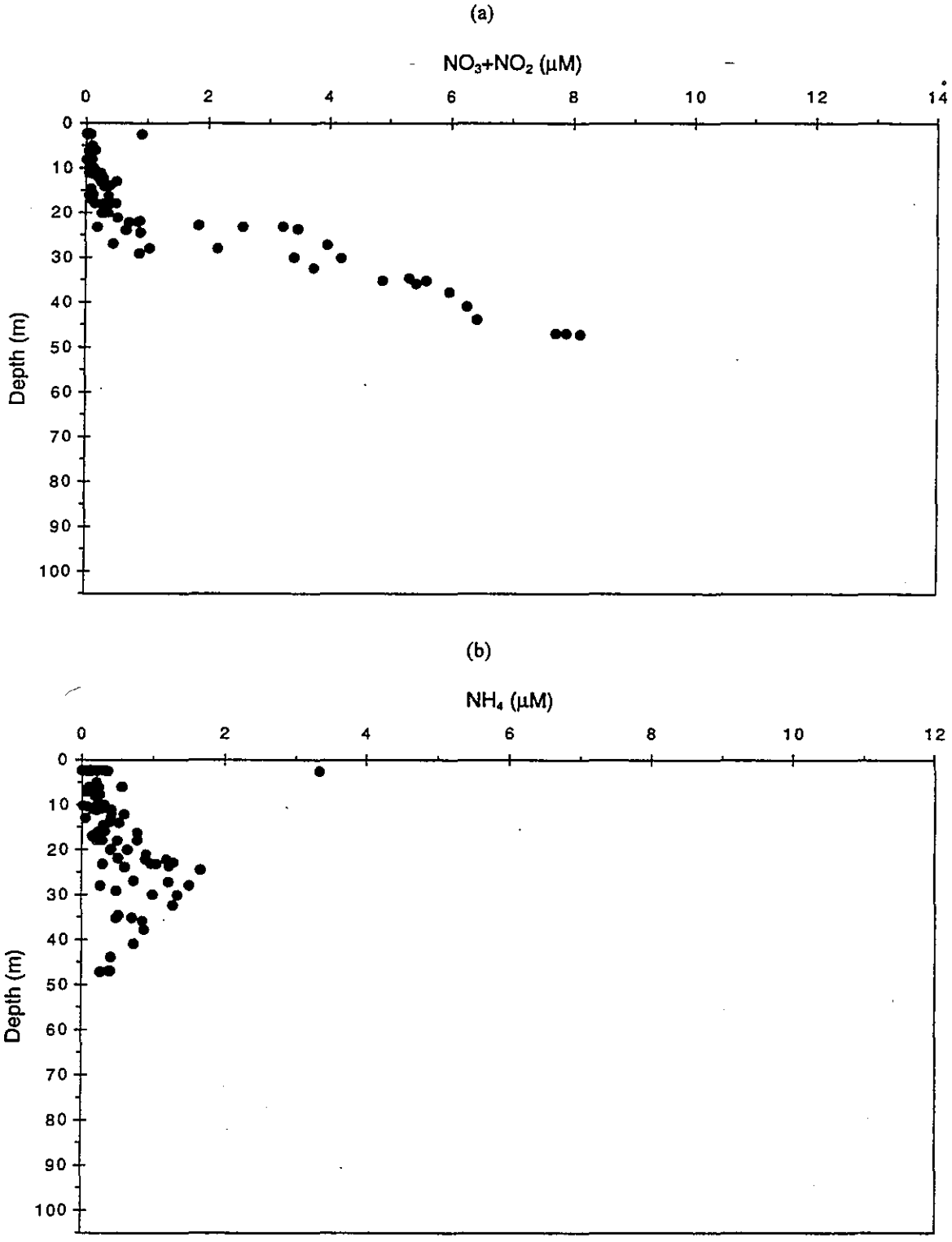


FIGURE 4-167
Depth vs. nutrient plots for nearfield survey W9612, (Sep 96).

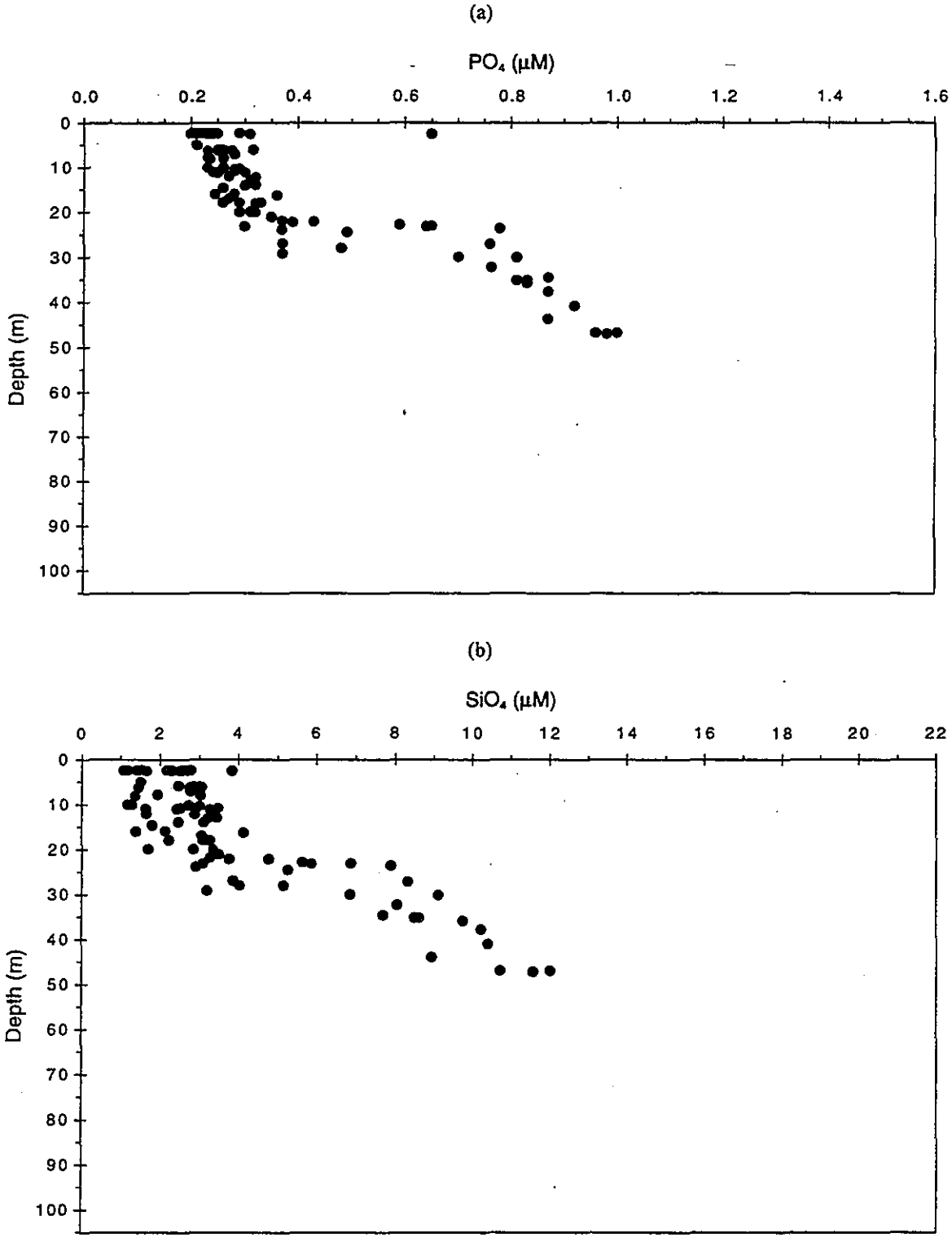
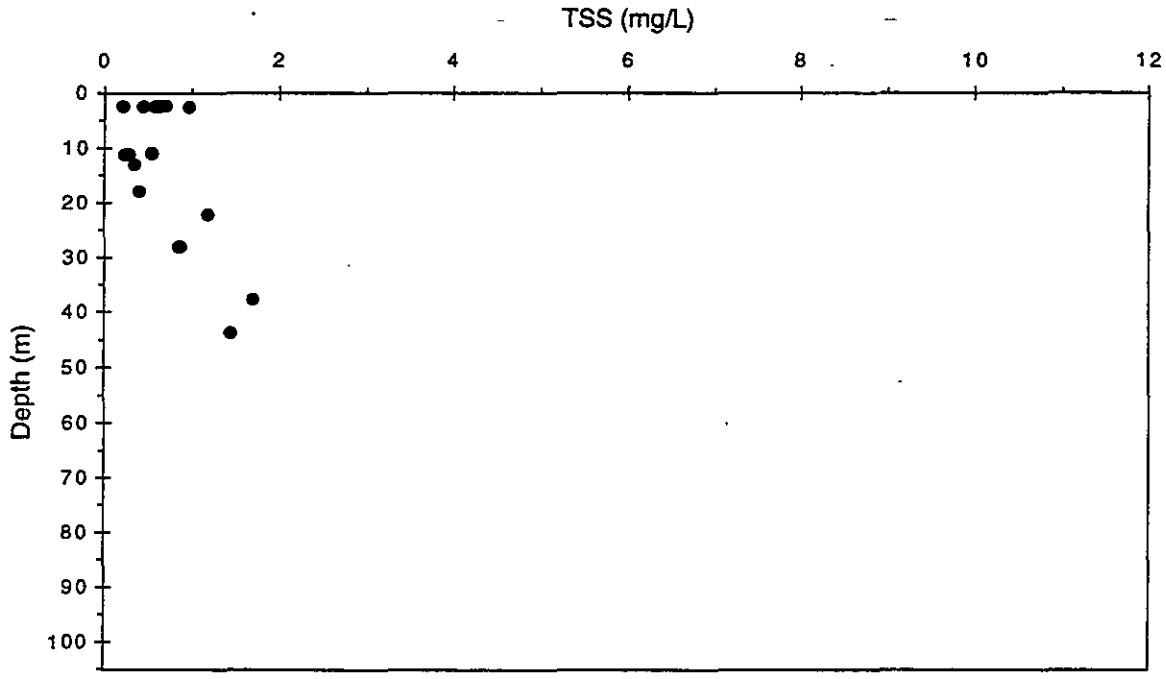


FIGURE 4-168
Depth vs. nutrient plots for nearfield survey W9612, (Sep 96).

(a)



(b)

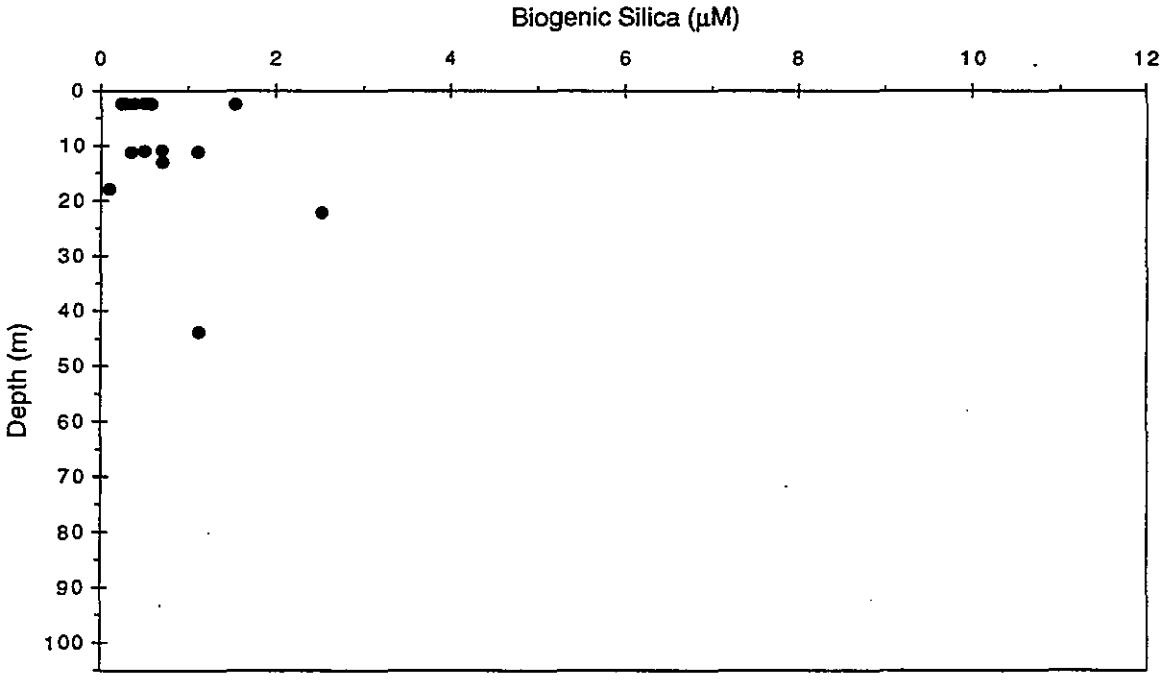
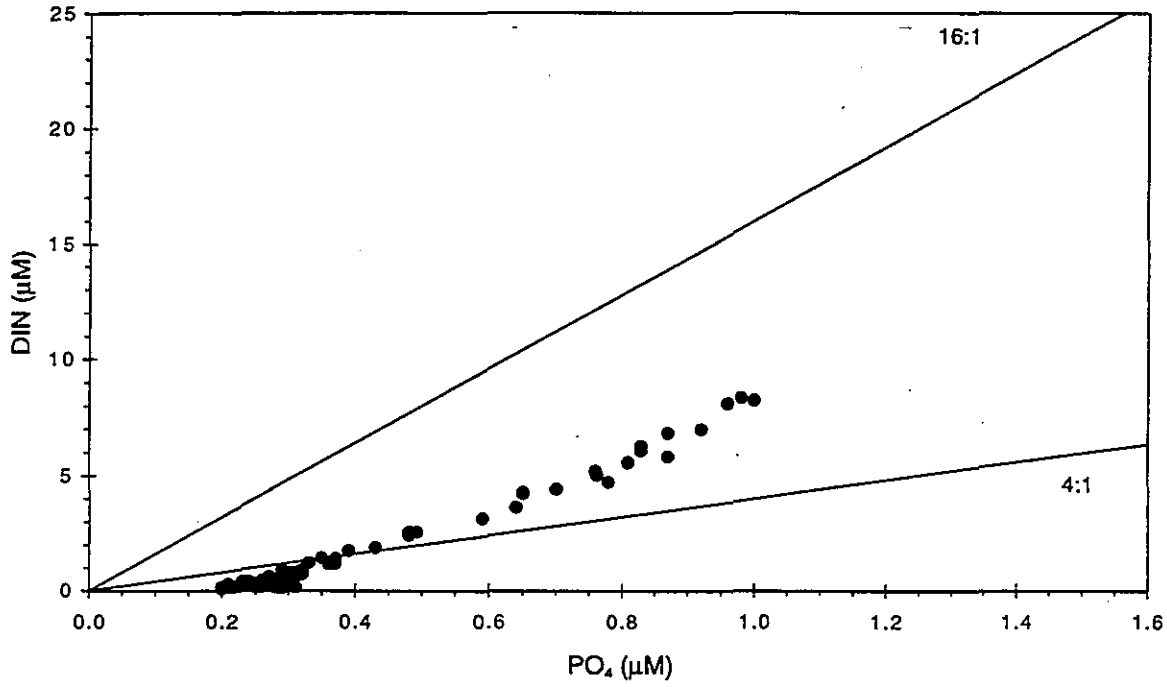


FIGURE 4-169
Depth vs. nutrient plots for nearfield survey W9612, (Sep 96).

(a)



(b)

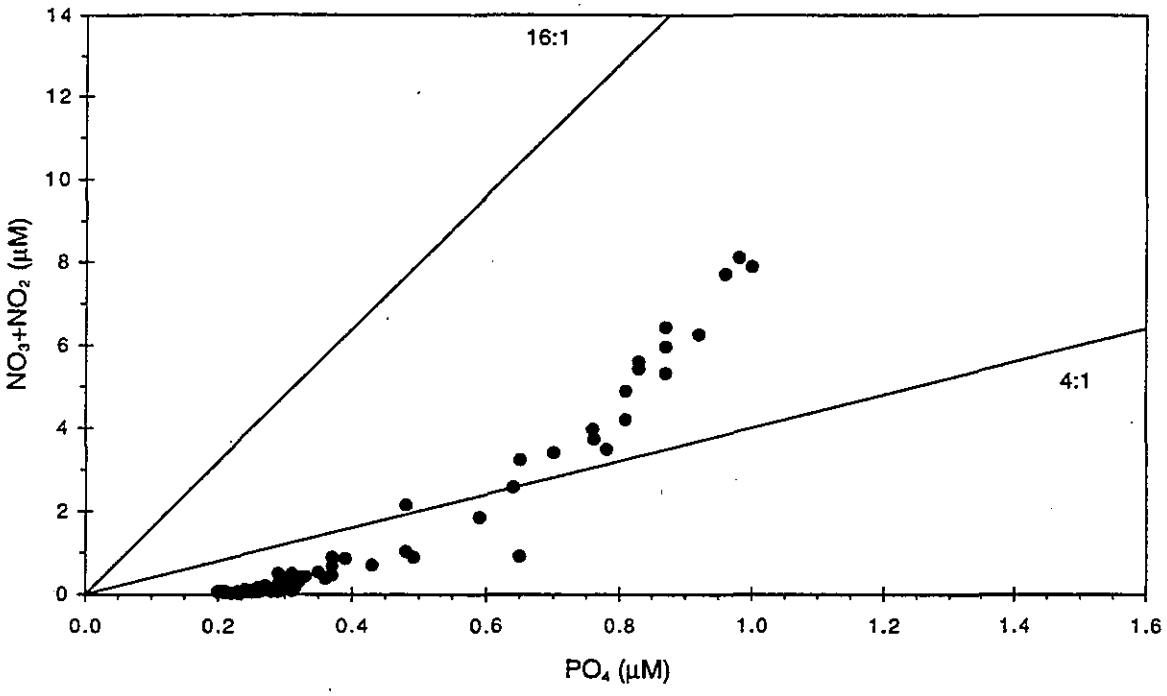


FIGURE 4-170
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

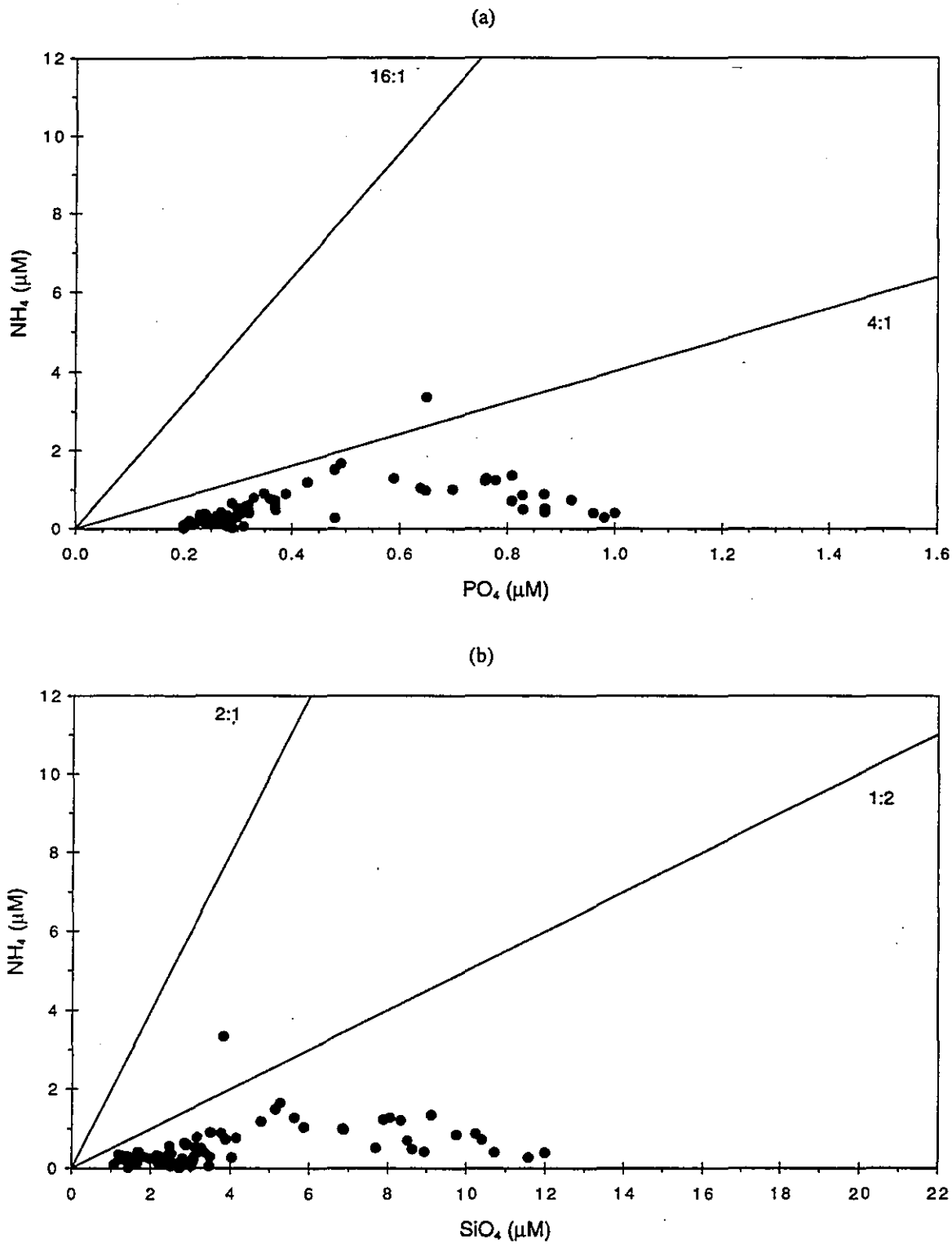


FIGURE 4-171
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

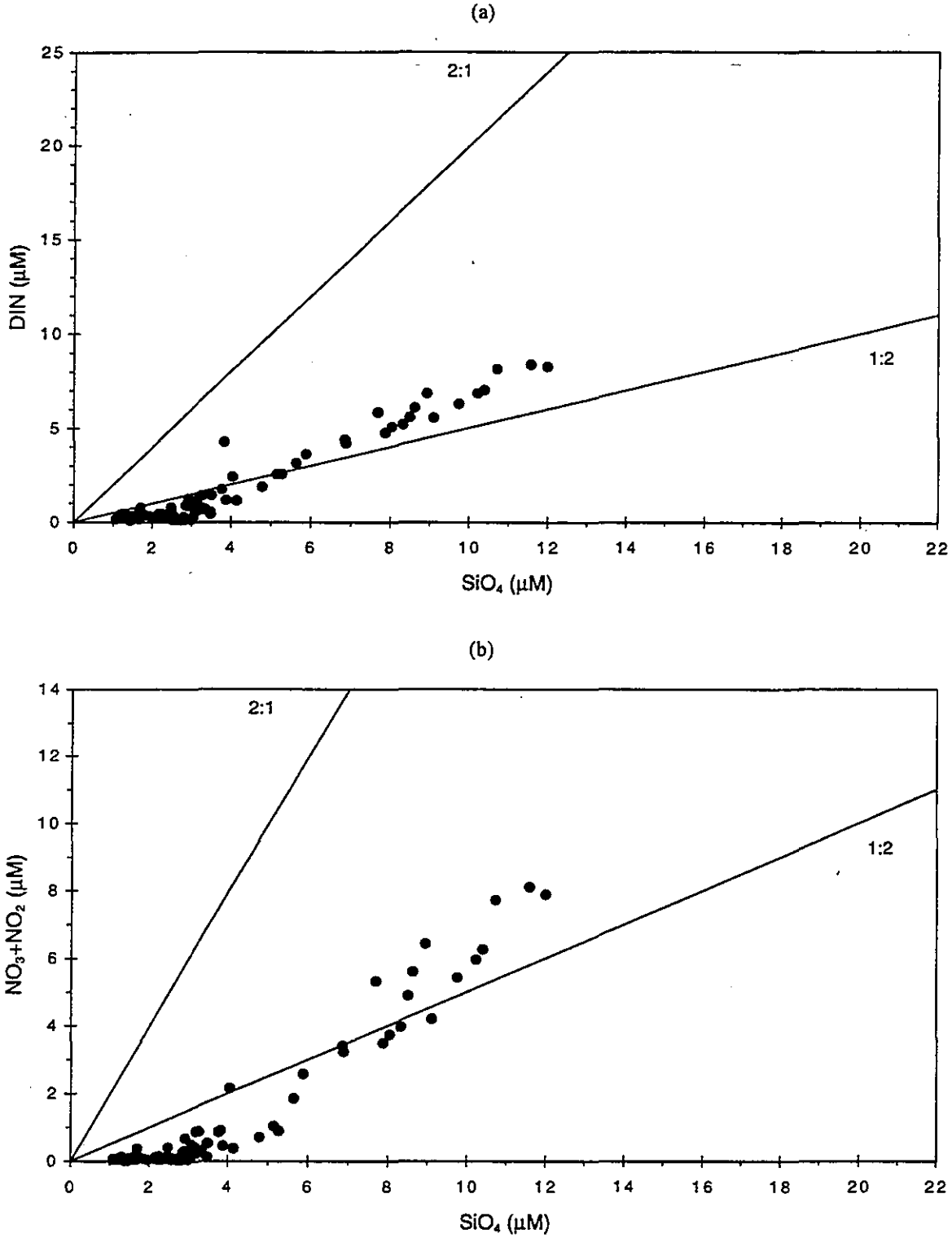
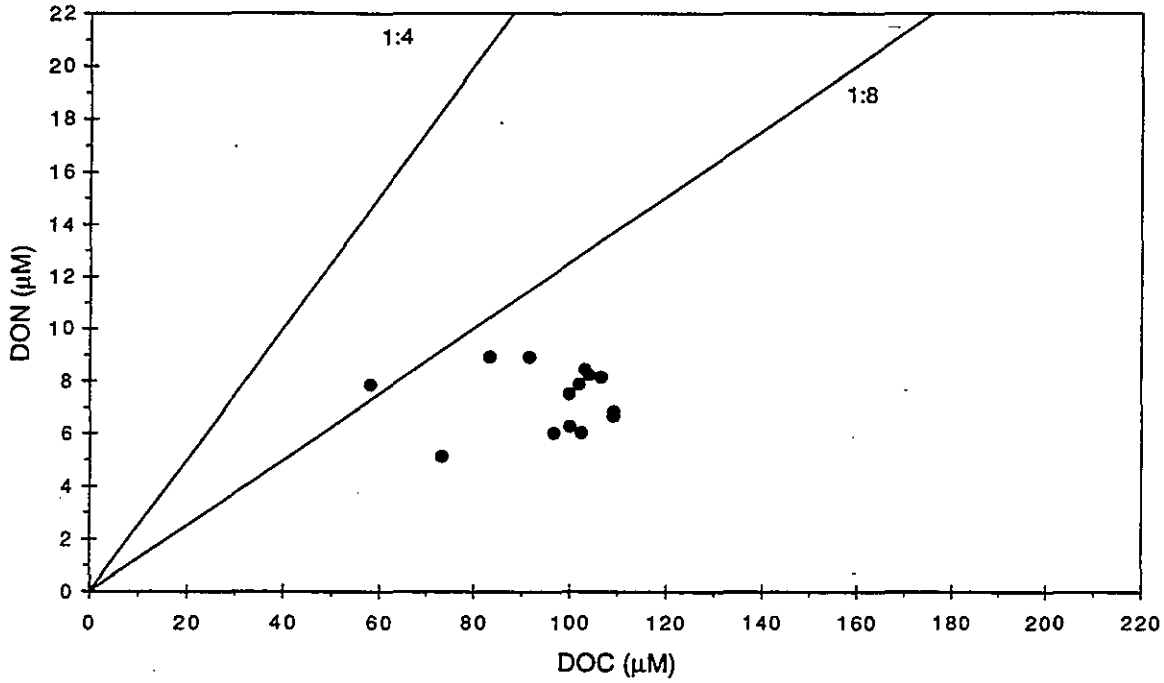


FIGURE 4-172
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

(a)



(b)

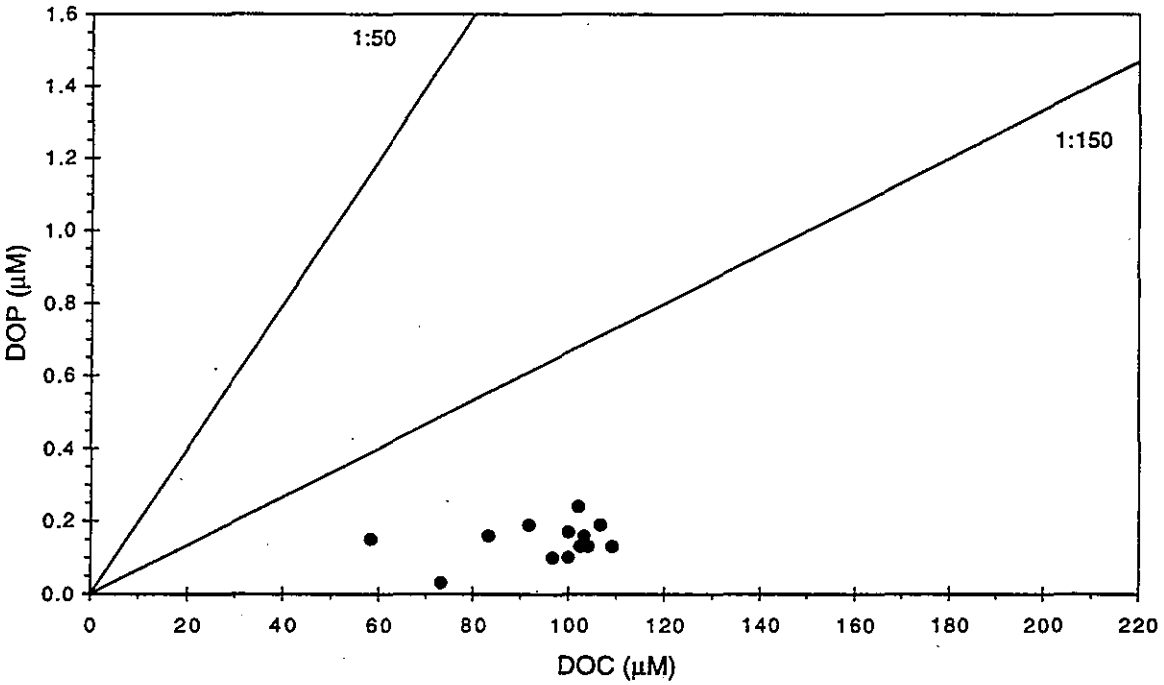
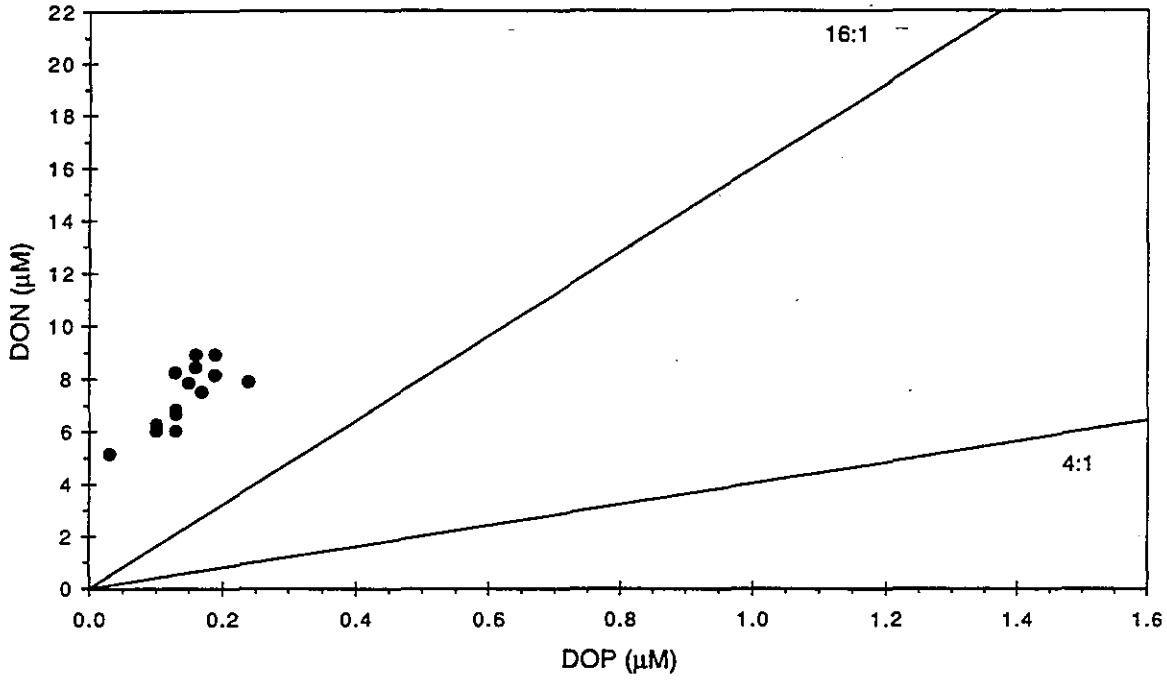


FIGURE 4-173
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

(a)



(b)

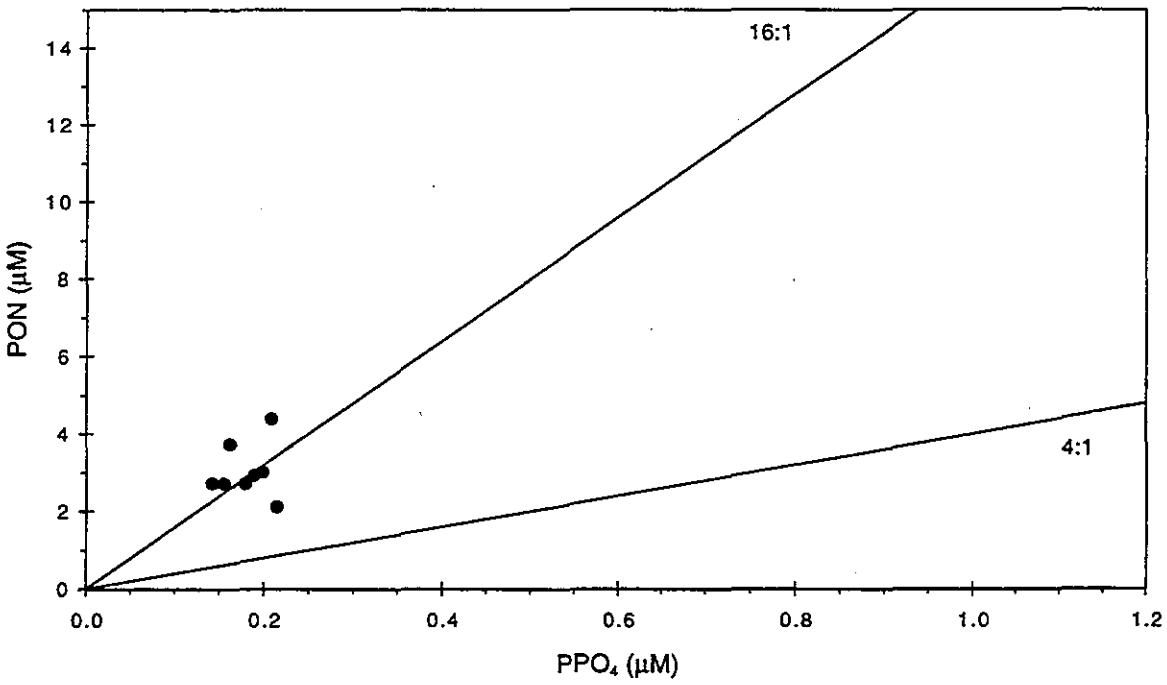


FIGURE 4-174
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

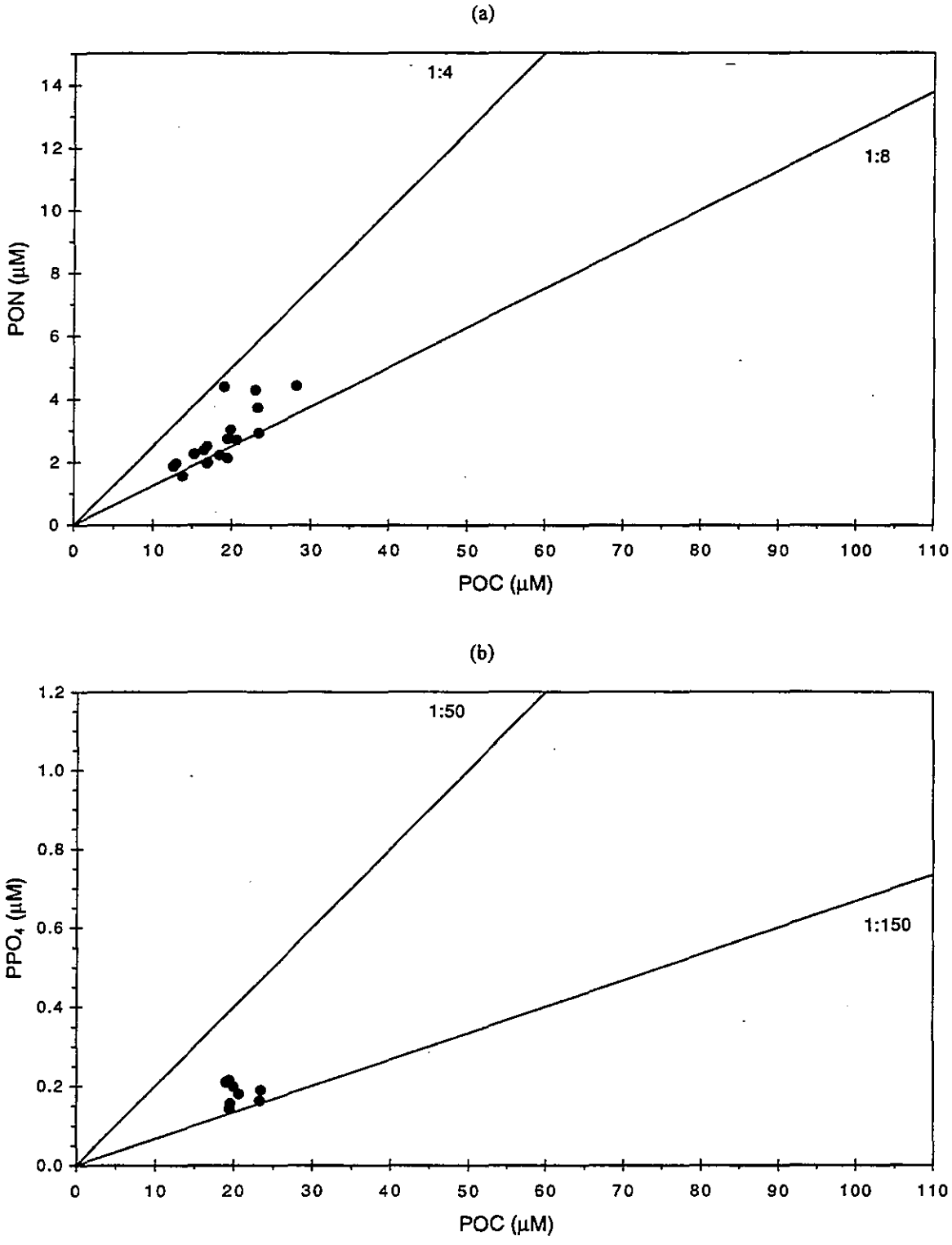
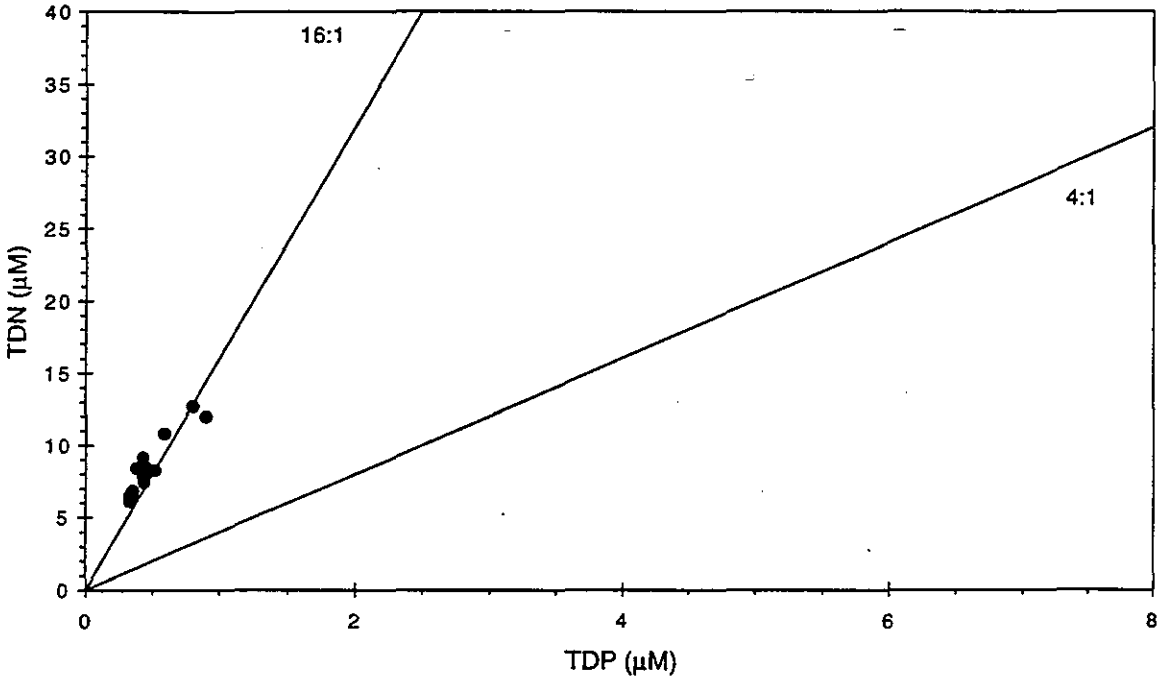


FIGURE 4-175
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

(a)



(b)

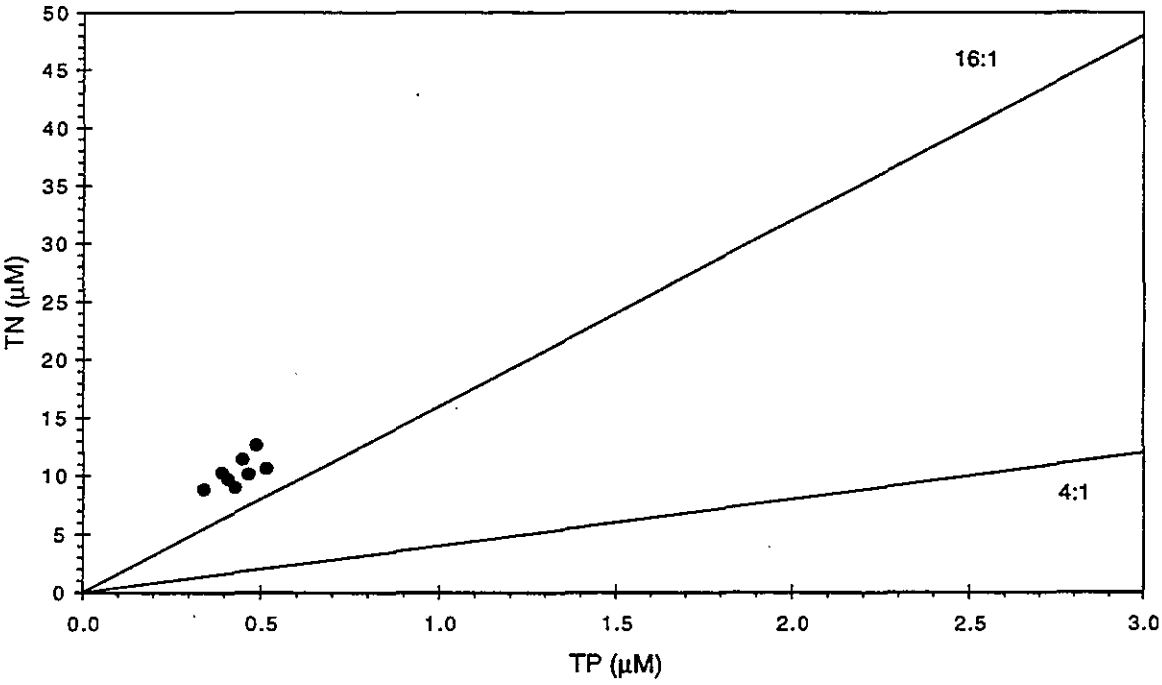
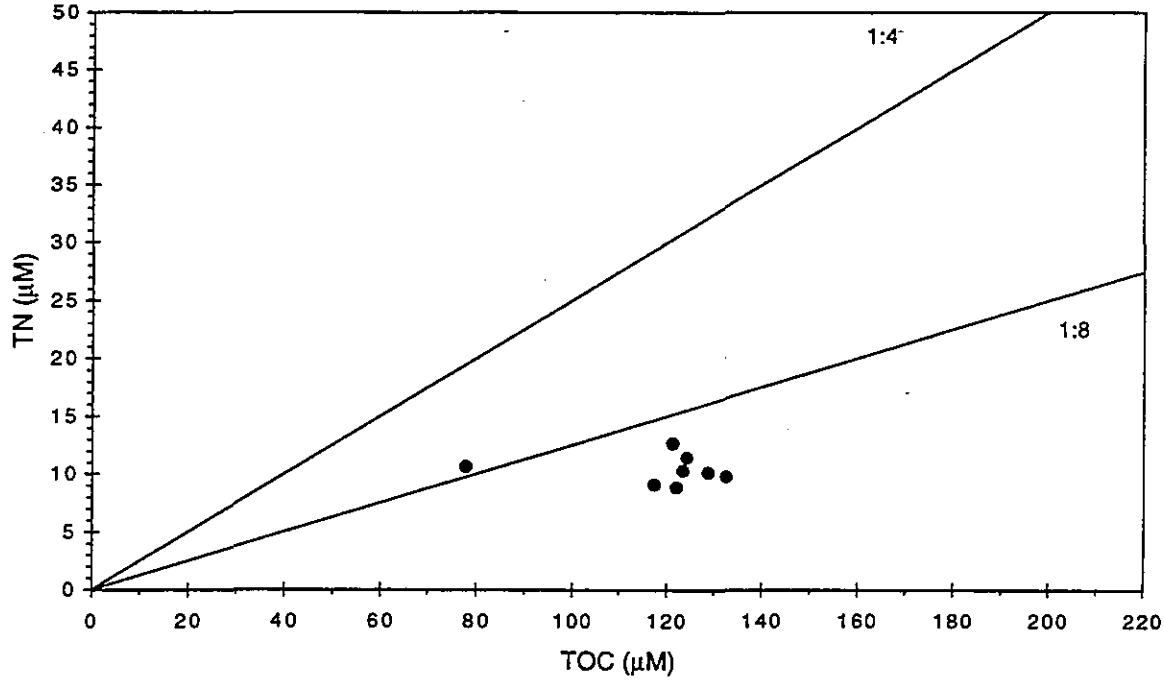


FIGURE 4-176
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

(a)



(b)

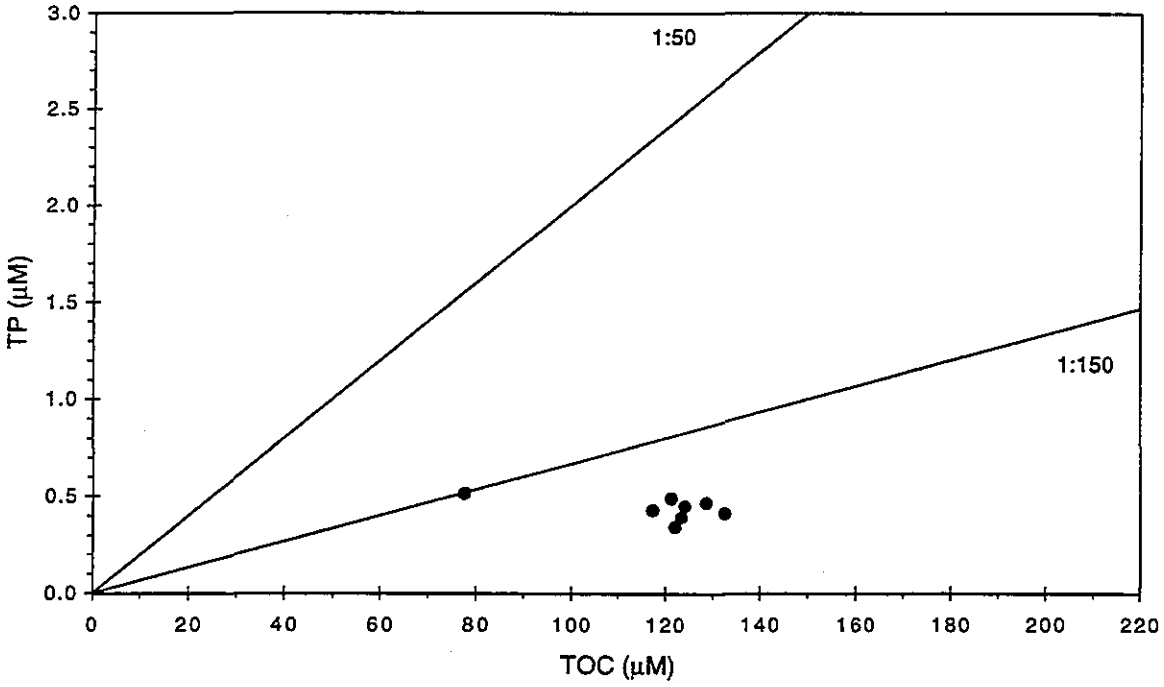


FIGURE 4-177
Nutrient vs. nutrient plots for nearfield survey W9612, (Sep 96).

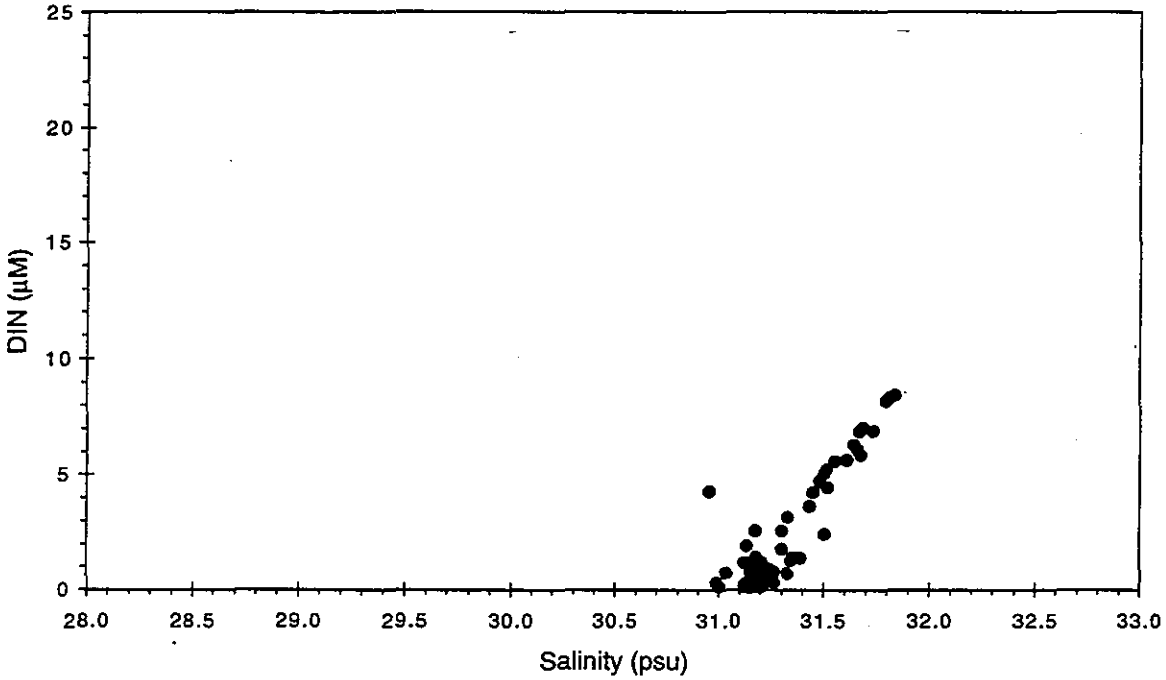
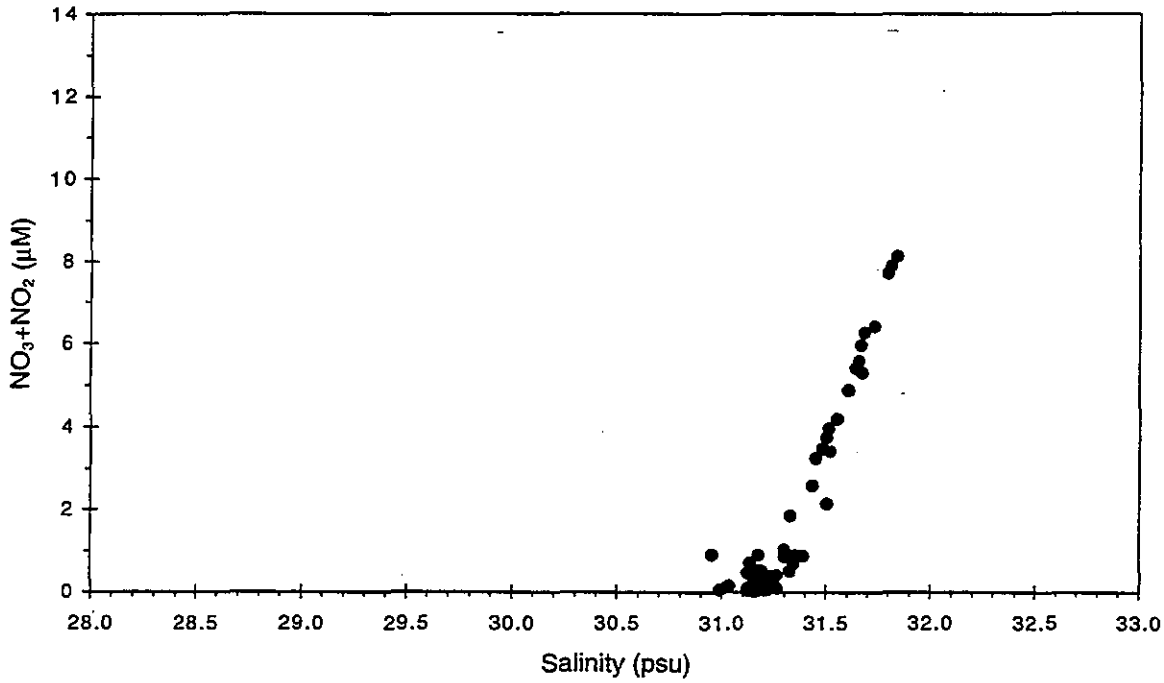


FIGURE 4-178
Nutrient vs. salinity plots for nearfield survey W9612, (Sep 96).

(a)



(b)

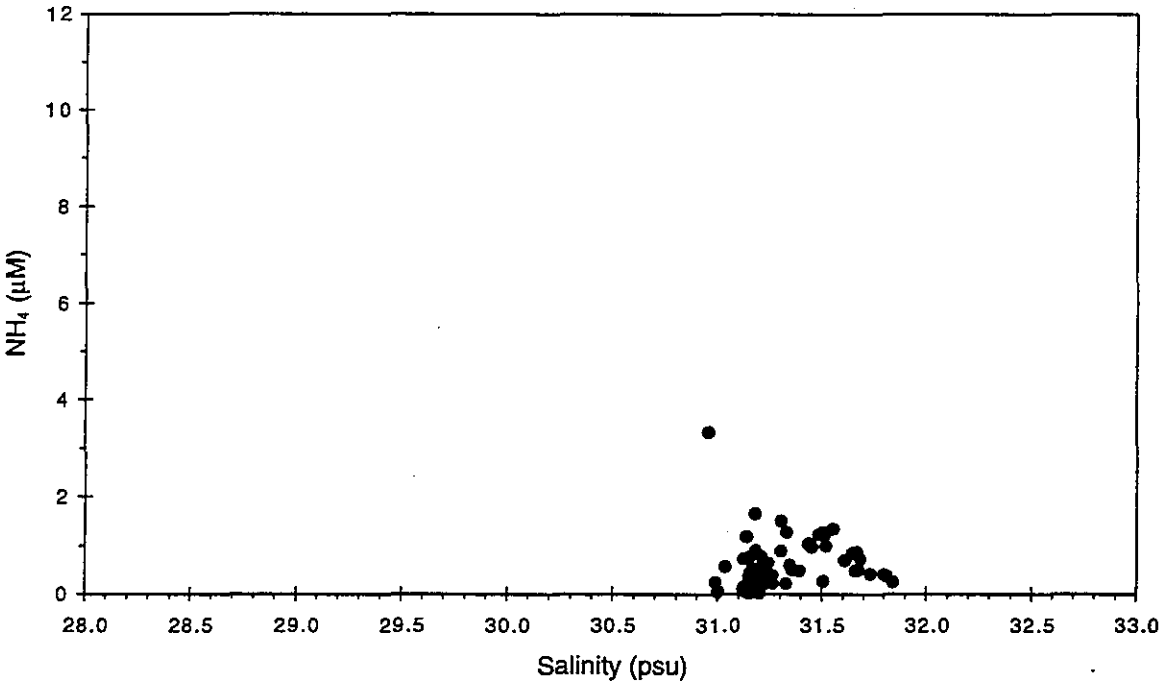
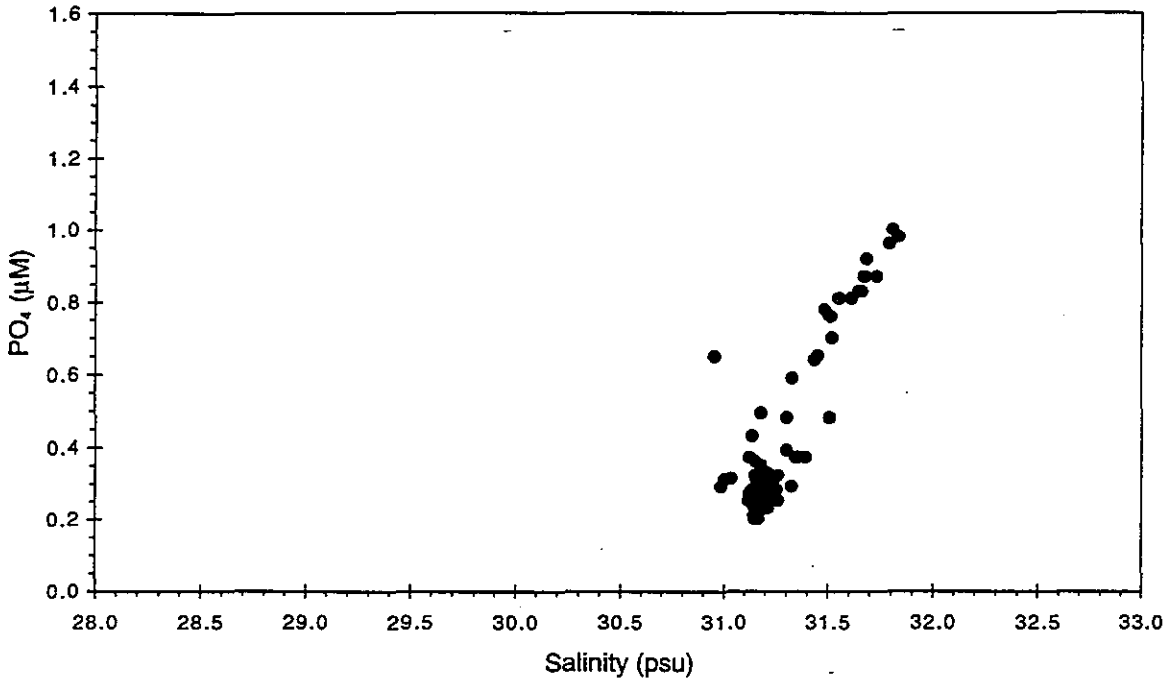


FIGURE 4-179
Nutrient vs. salinity plots for nearfield survey W9612, (Sep 96).

(a)



(b)

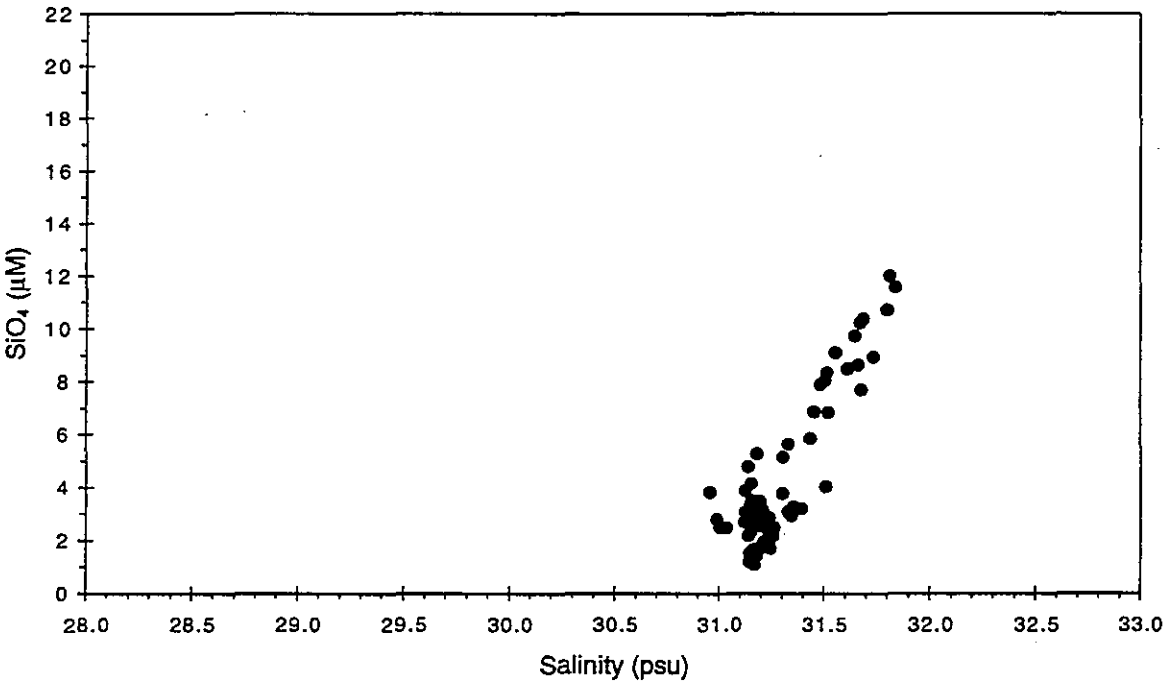


FIGURE 4-180
Nutrient vs. salinity plots for nearfield survey W9612, (Sep 96).

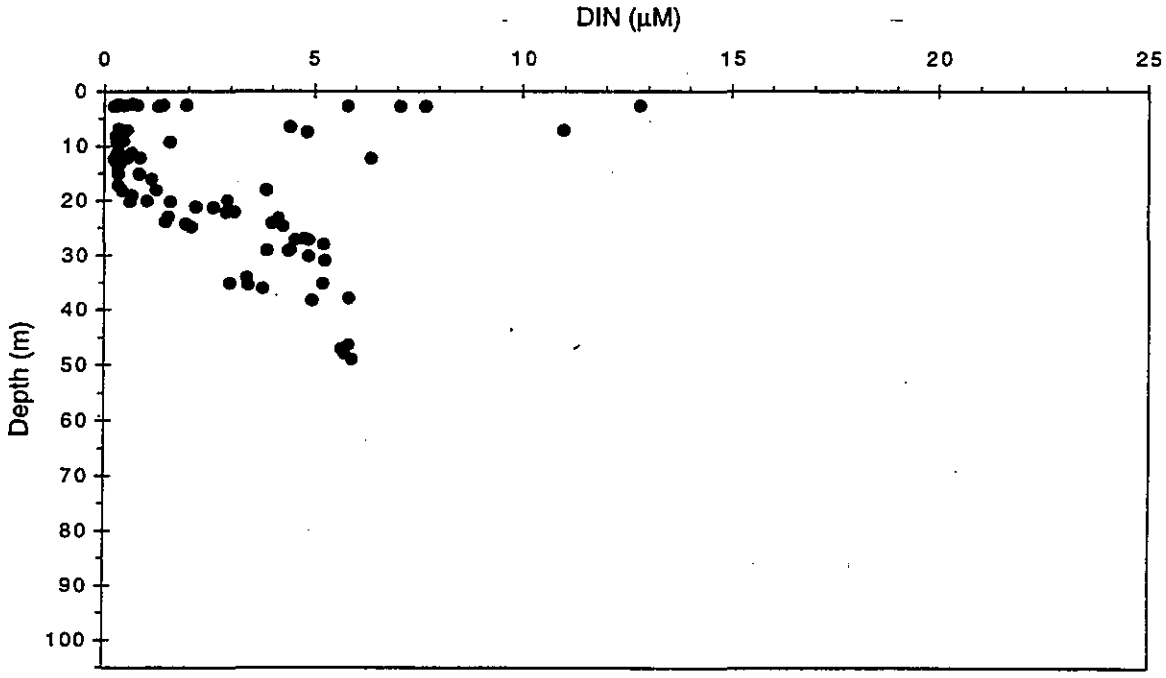


FIGURE 4-181
Depth vs. nutrient plots for nearfield survey W9613, (Sep 96).

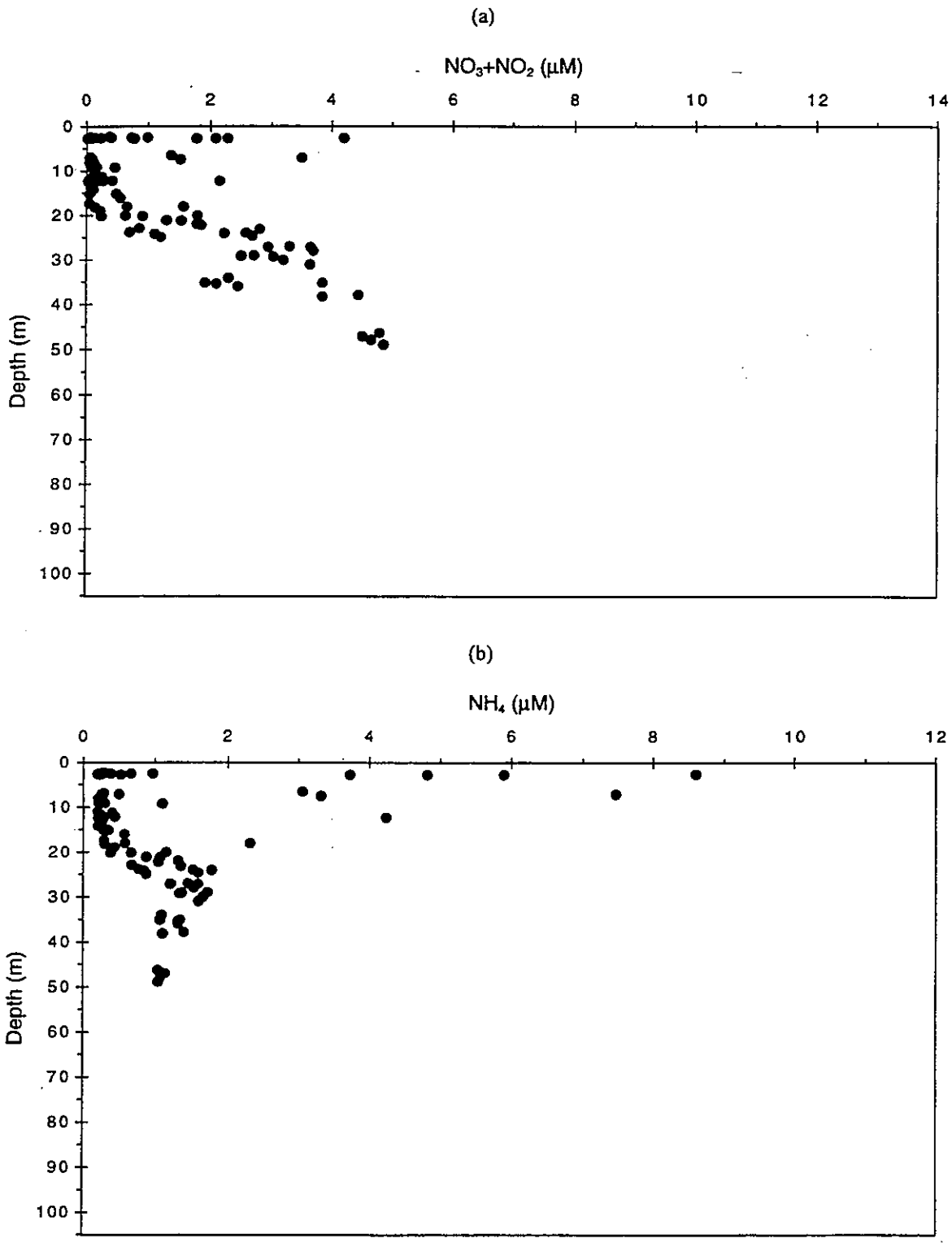


FIGURE 4-182
Depth vs. nutrient plots for nearfield survey W9613, (Sep 96).

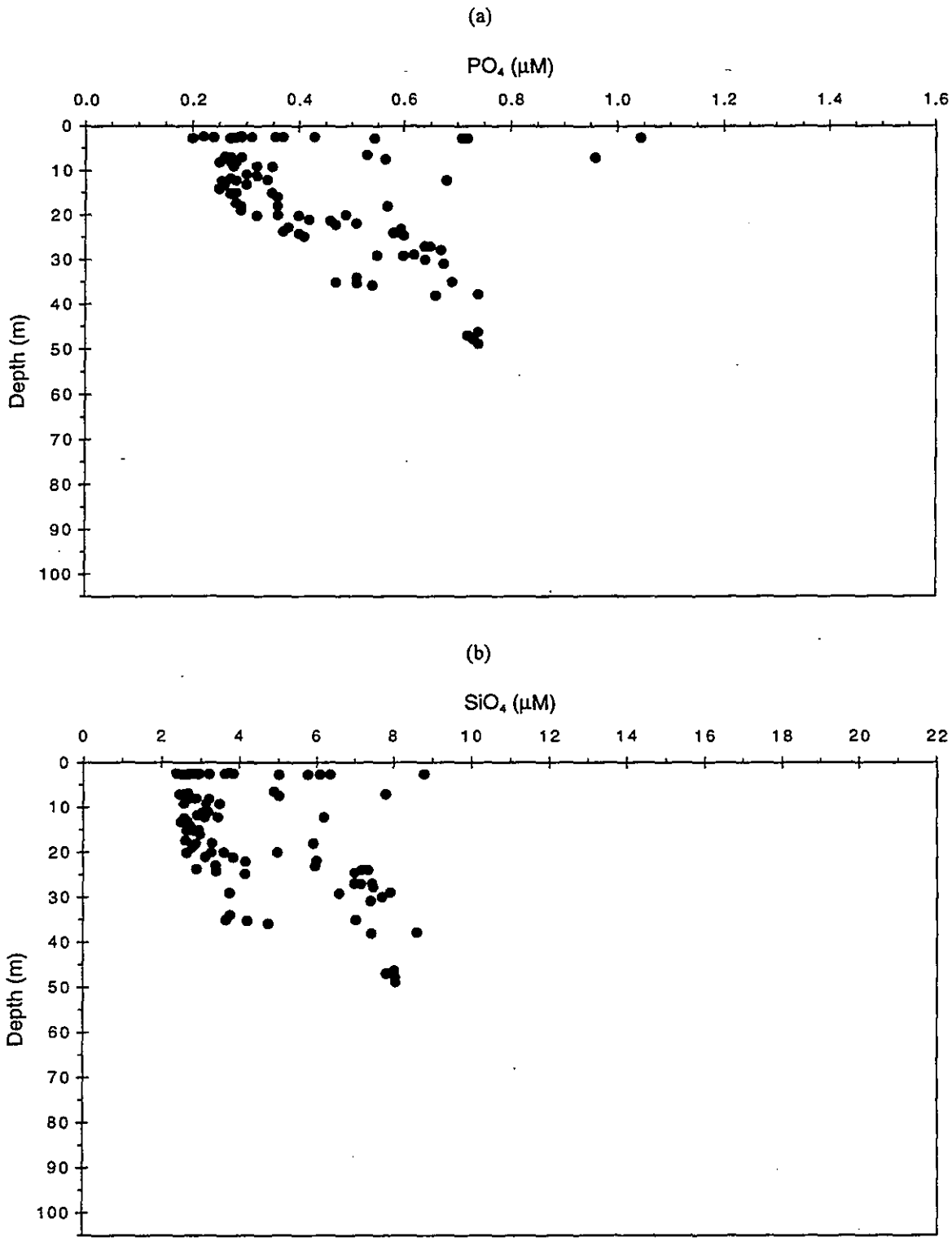


FIGURE 4-183
Depth vs. nutrient plots for nearfield survey W9613, (Sep 96).

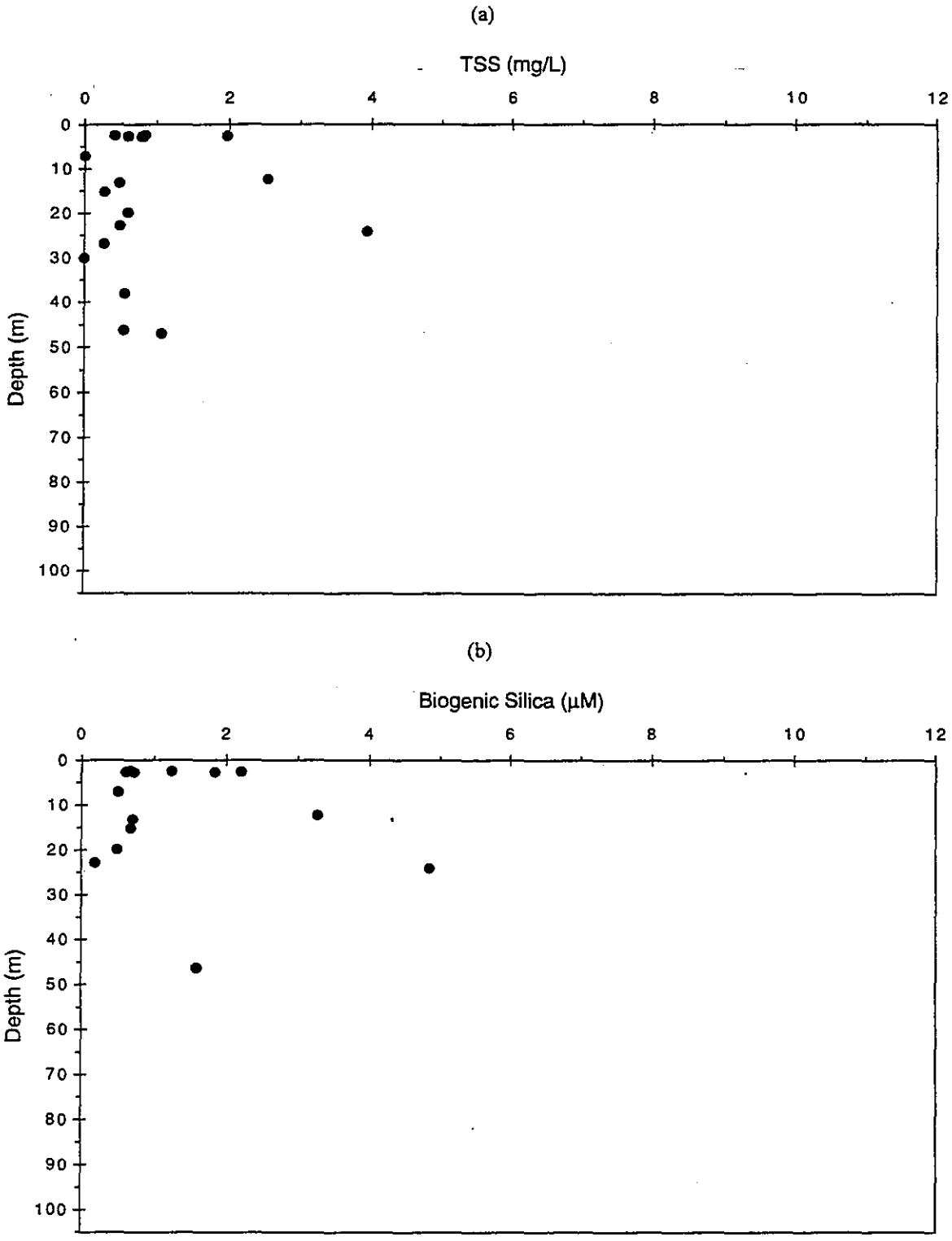
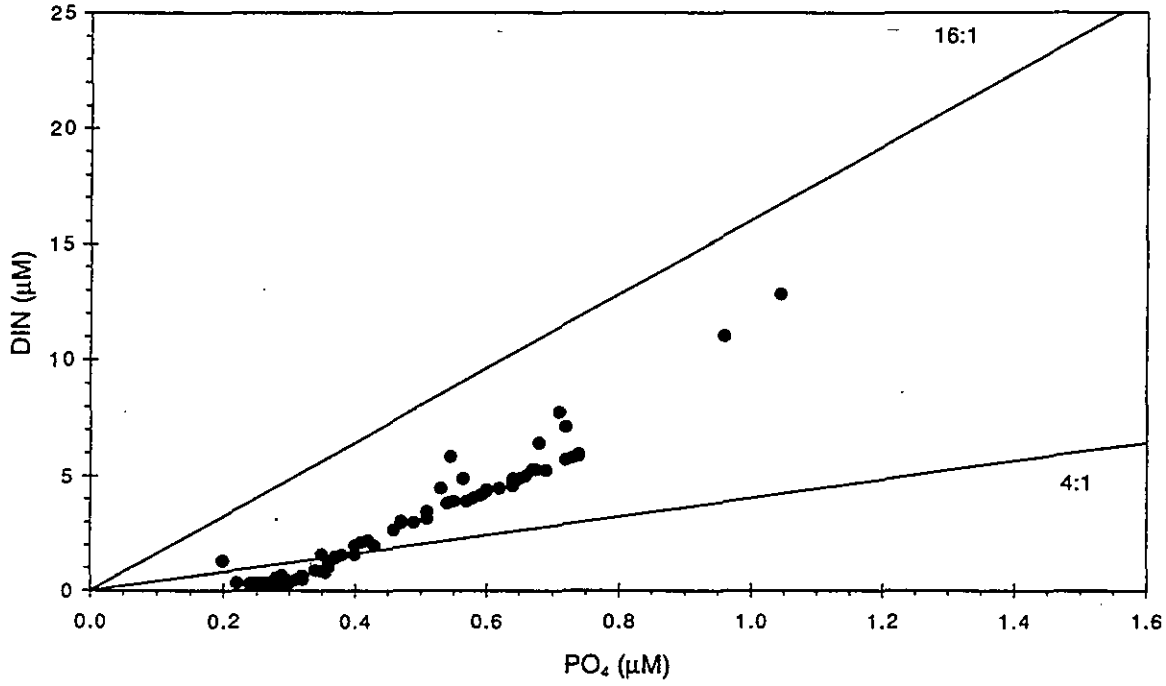


FIGURE 4-184
Depth vs. nutrient plots for nearfield survey W9613, (Sep 96).

(a)



(b)

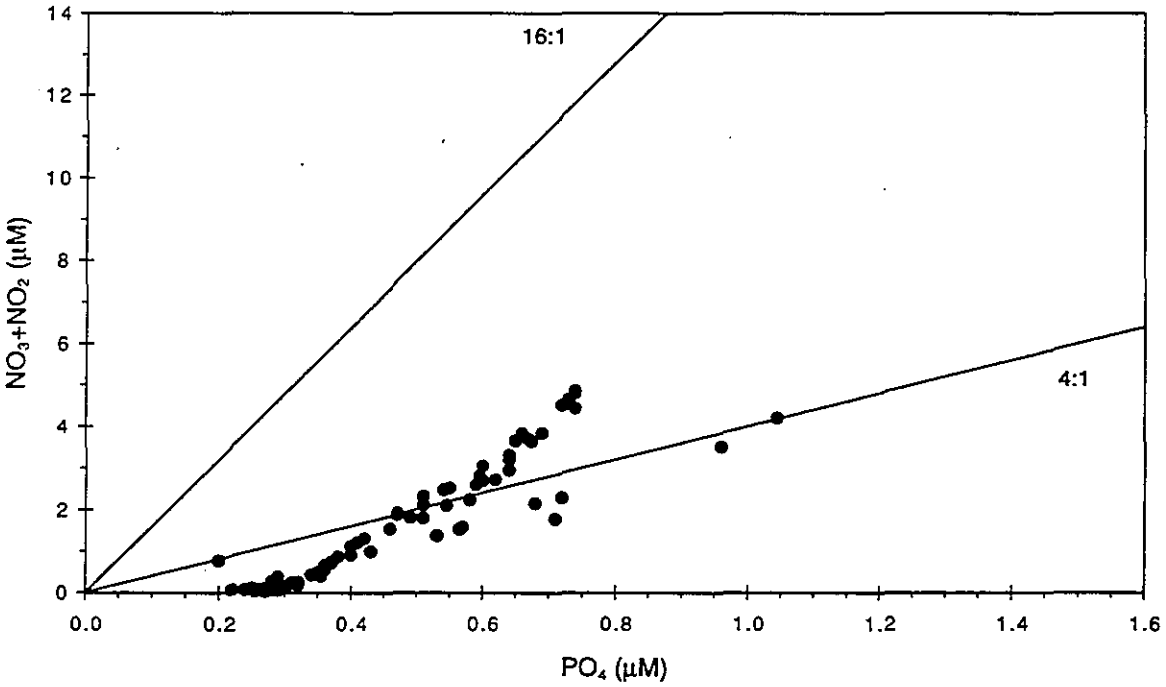


FIGURE 4-185
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

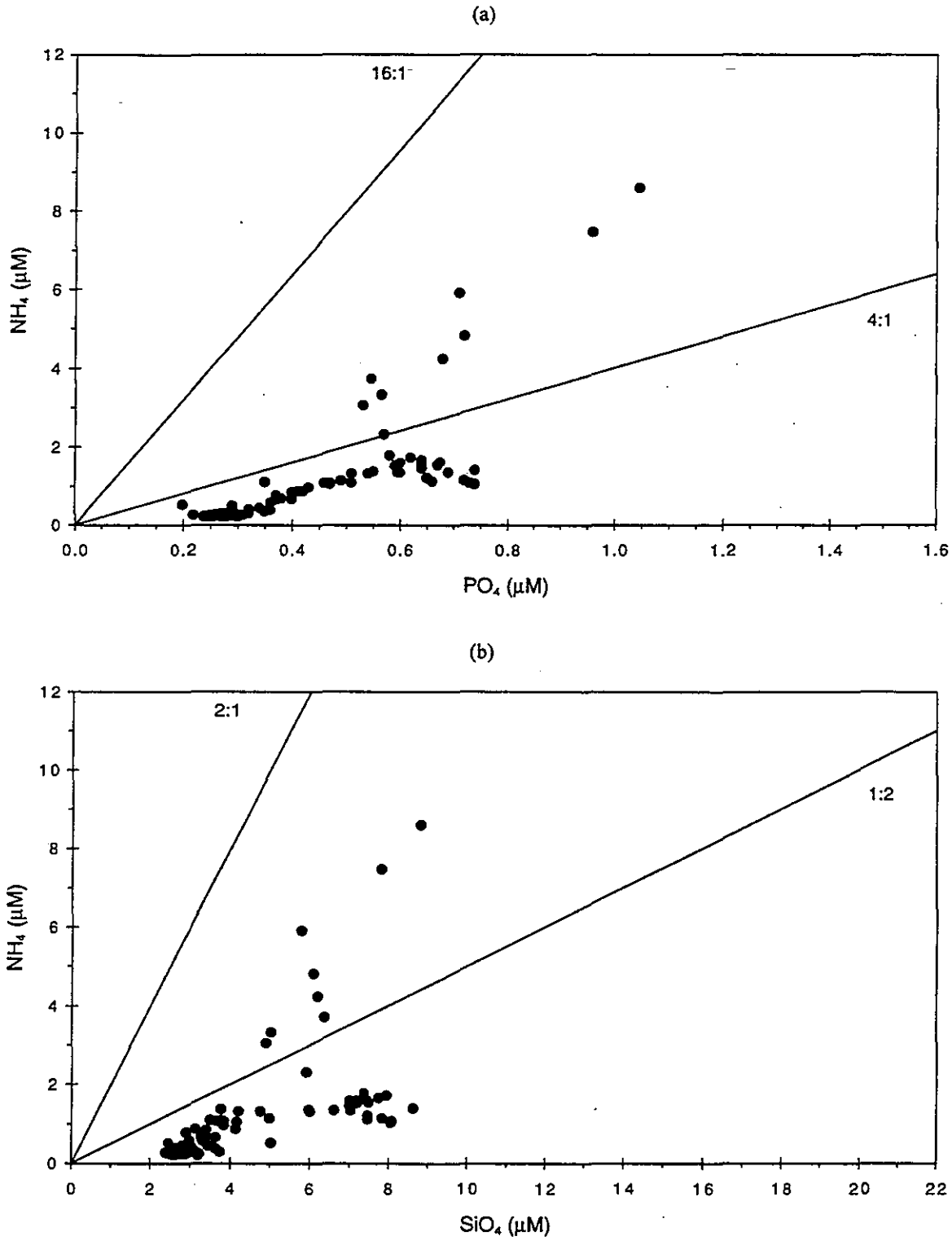


FIGURE 4-186
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

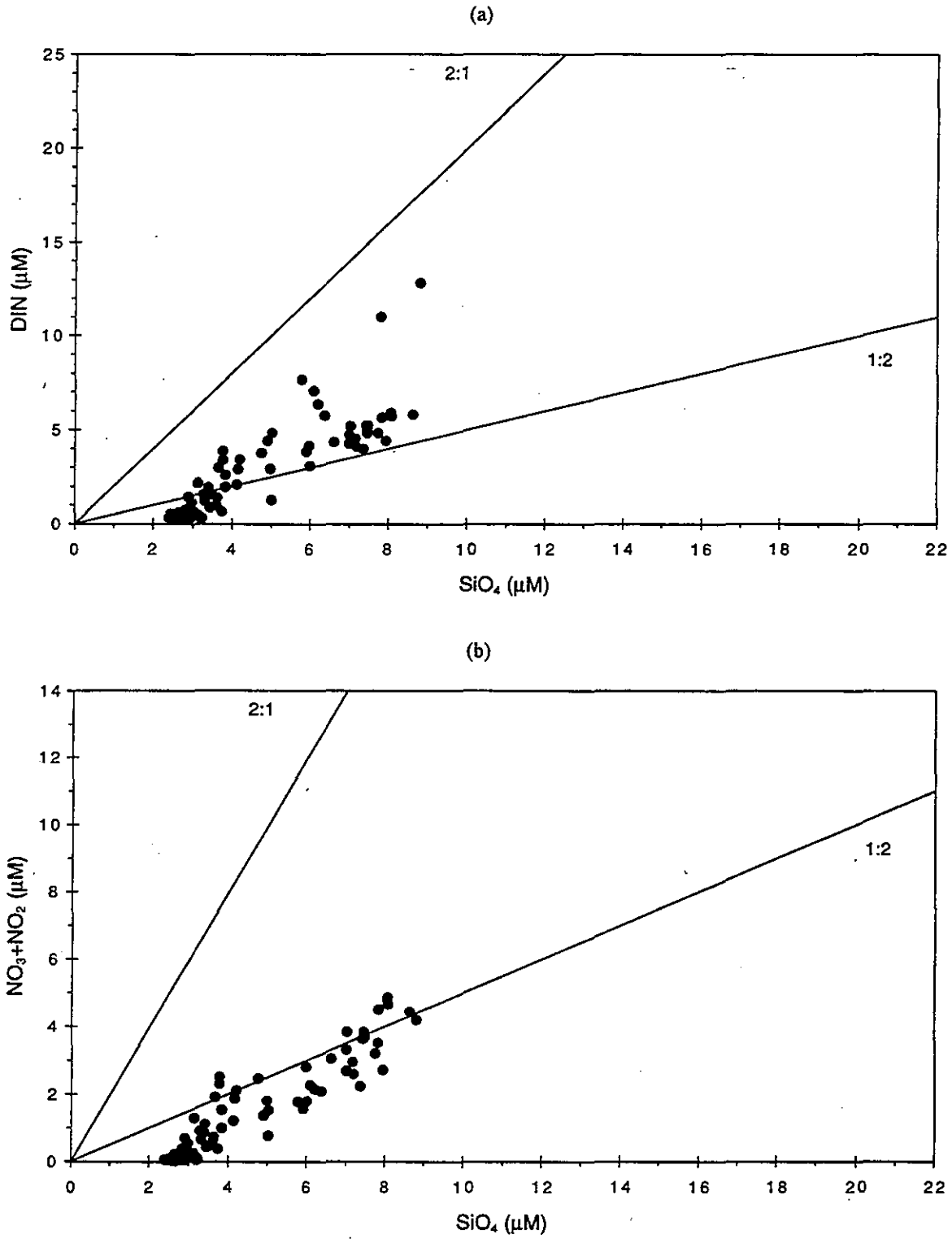


FIGURE 4-187
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

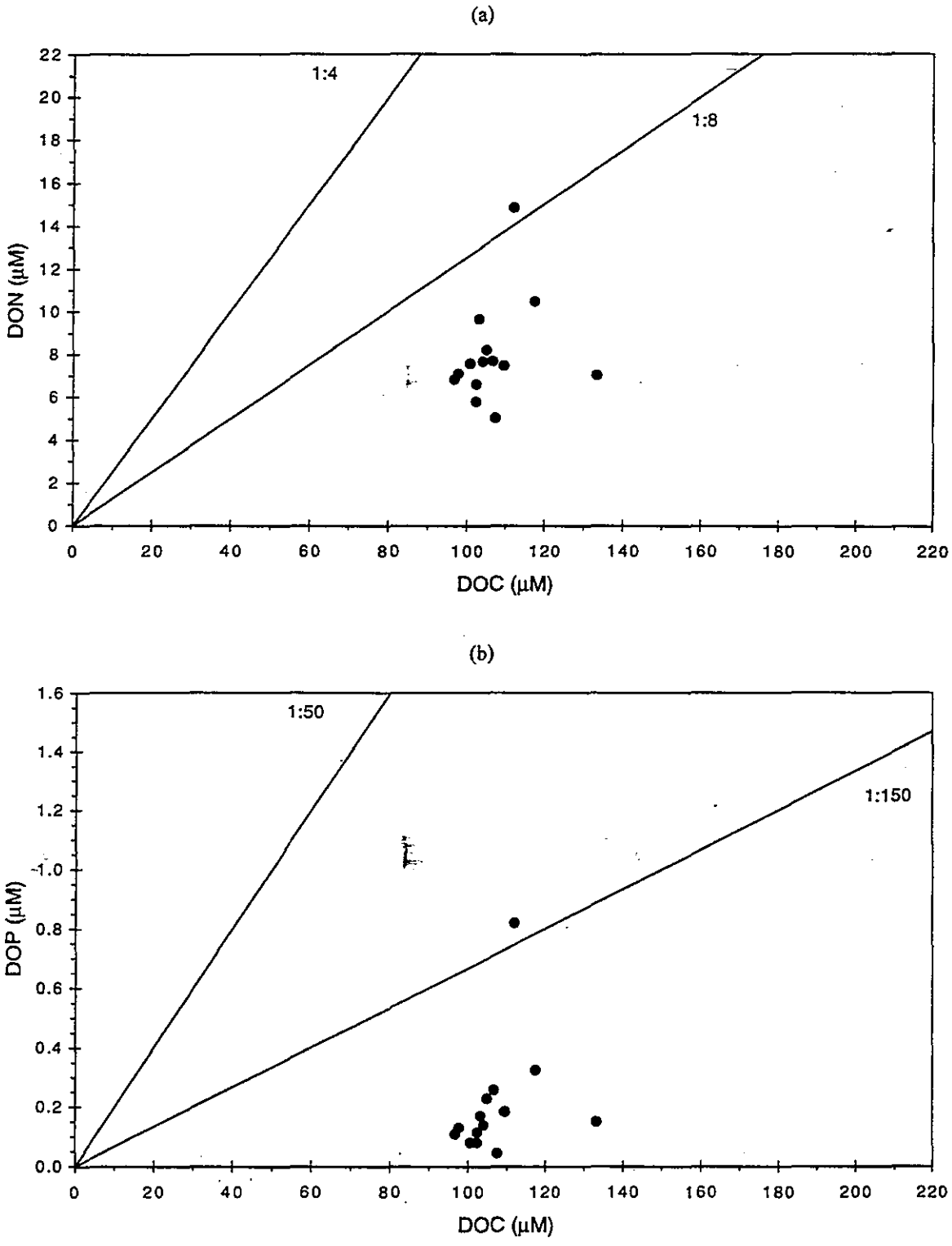


FIGURE 4-188
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

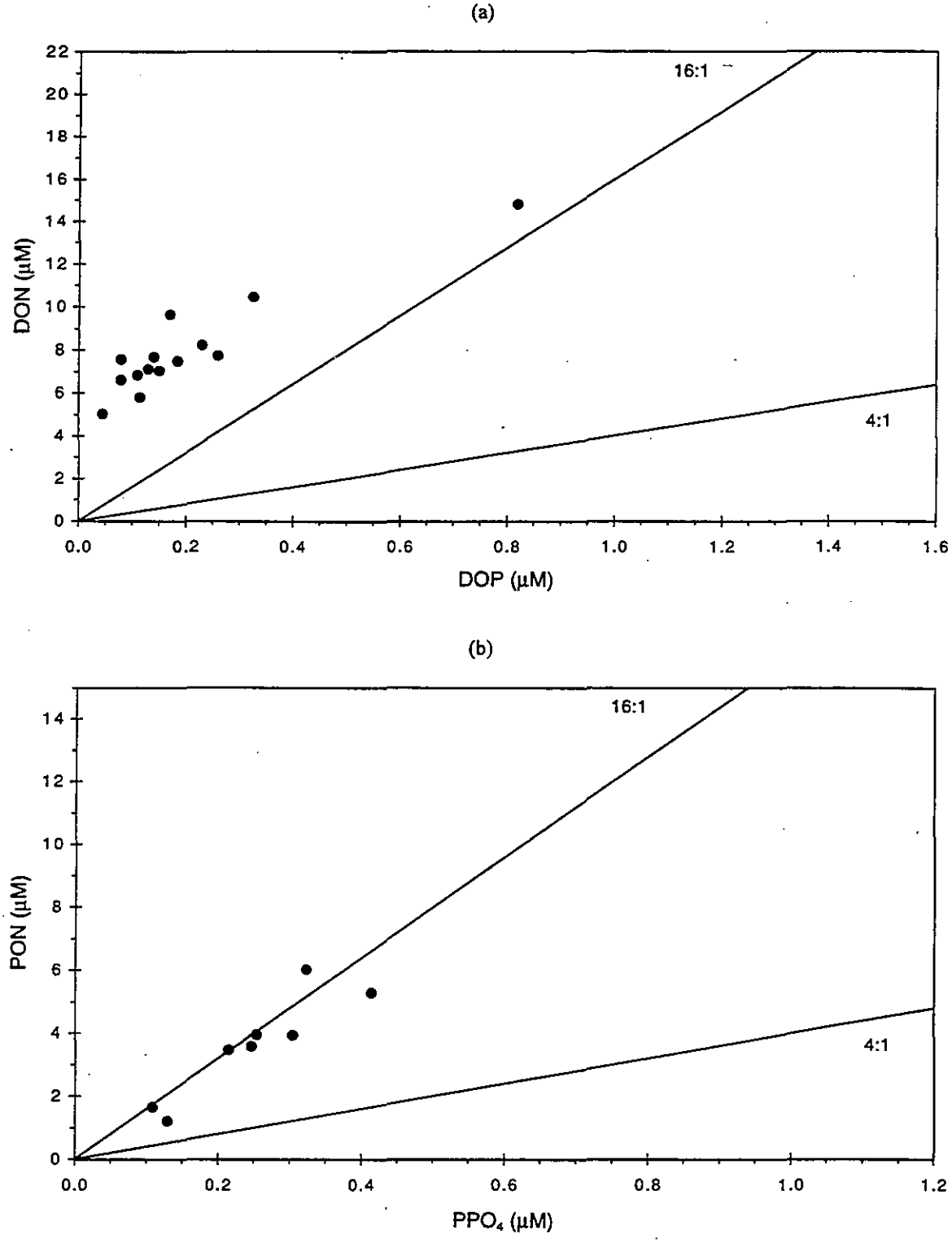


FIGURE 4-189
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

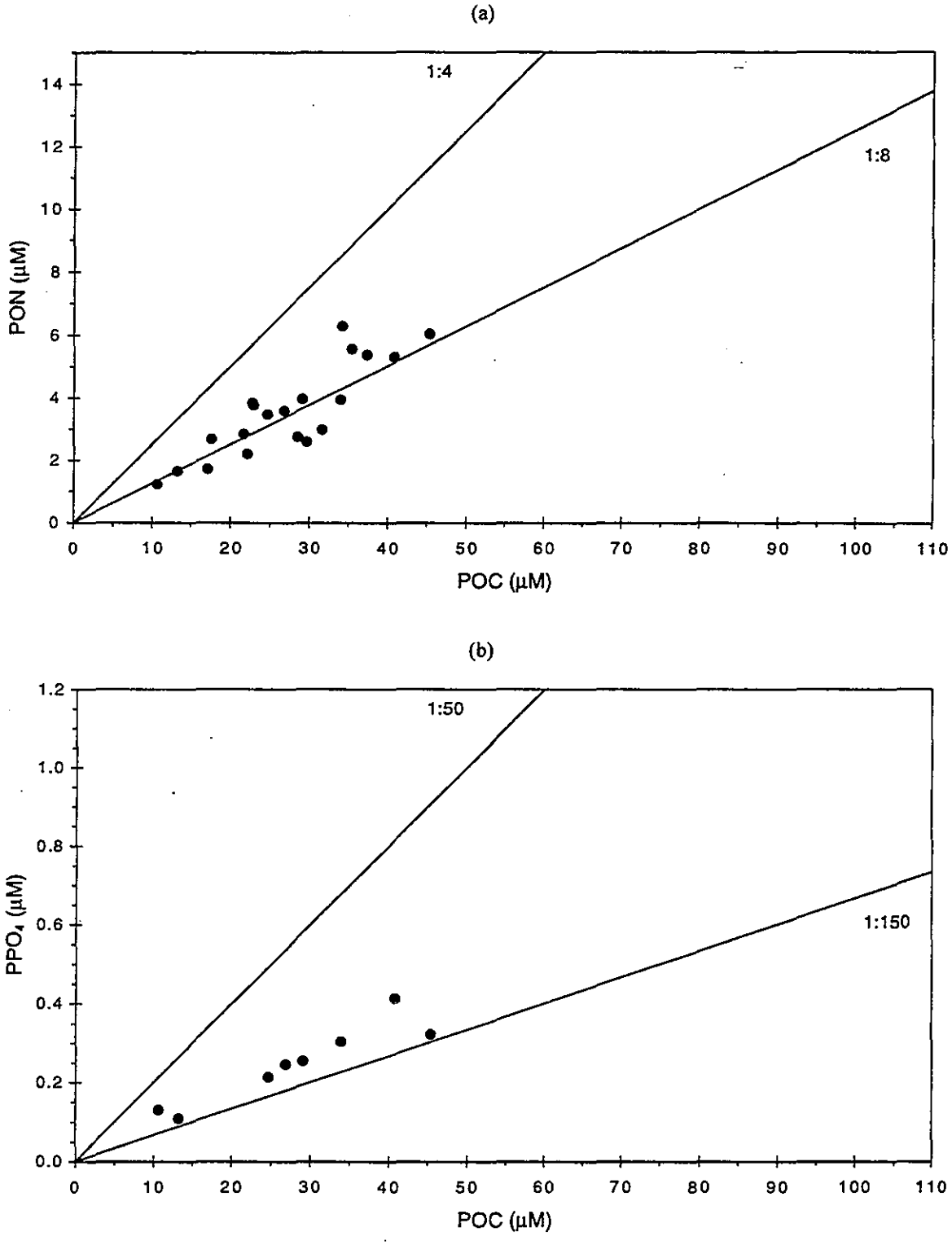
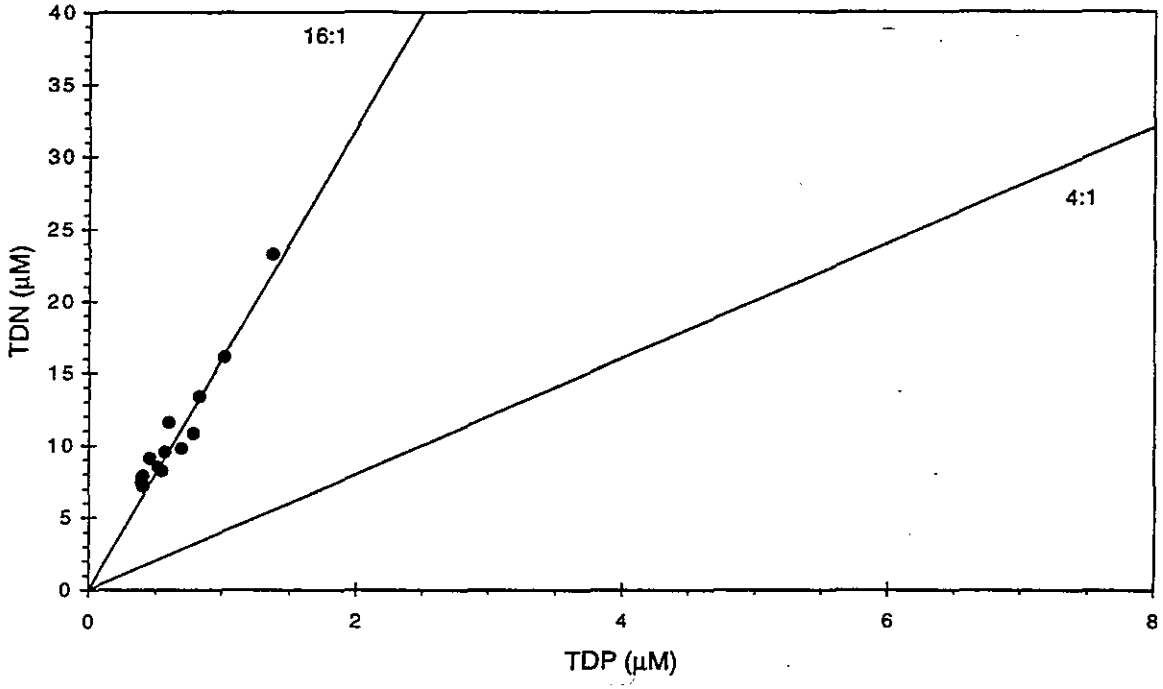


FIGURE 4-190
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

(a)



(b)

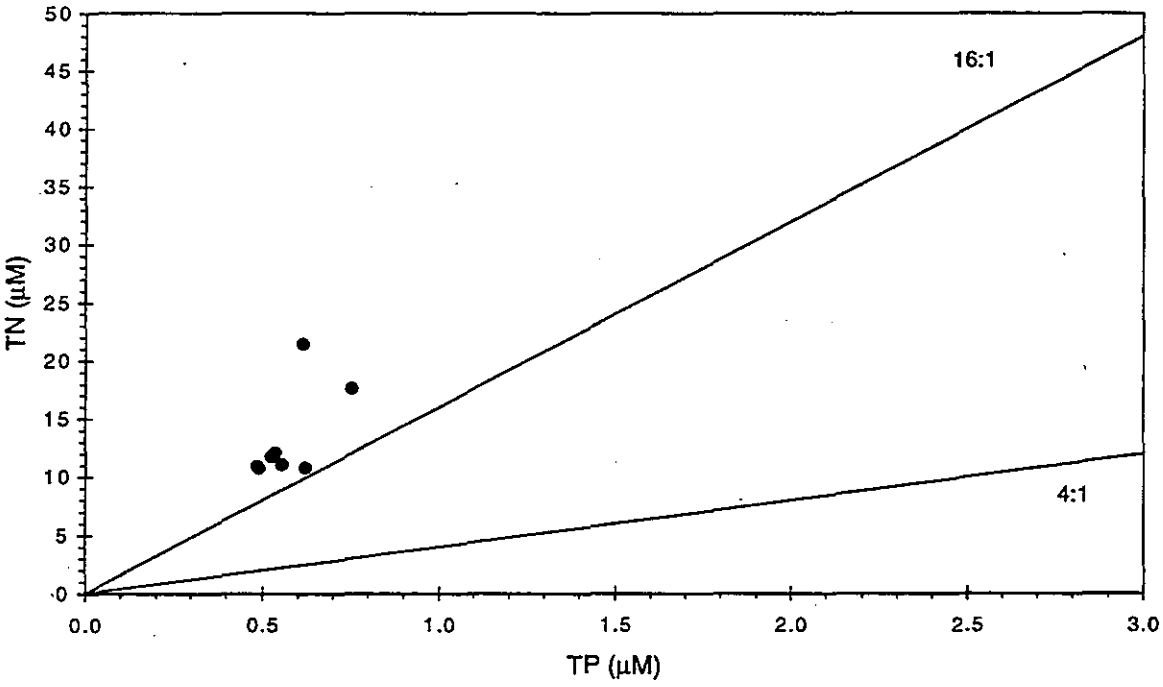
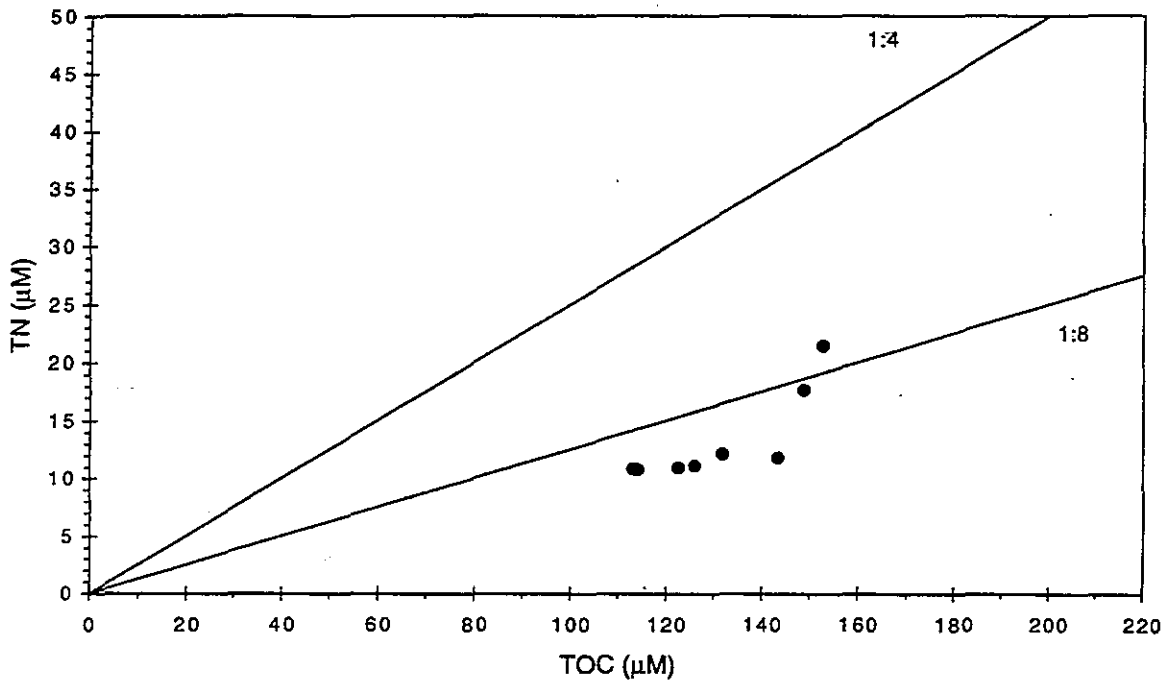


FIGURE 4-191
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

(a)



(b)

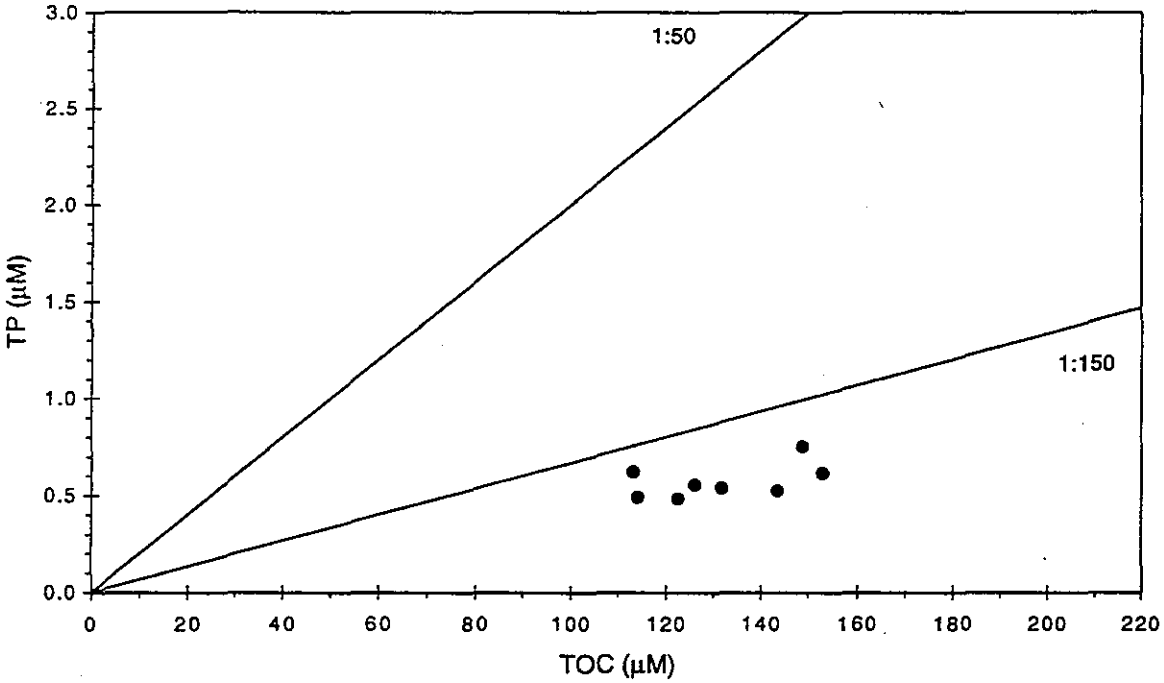


FIGURE 4-192
Nutrient vs. nutrient plots for nearfield survey W9613, (Sep 96).

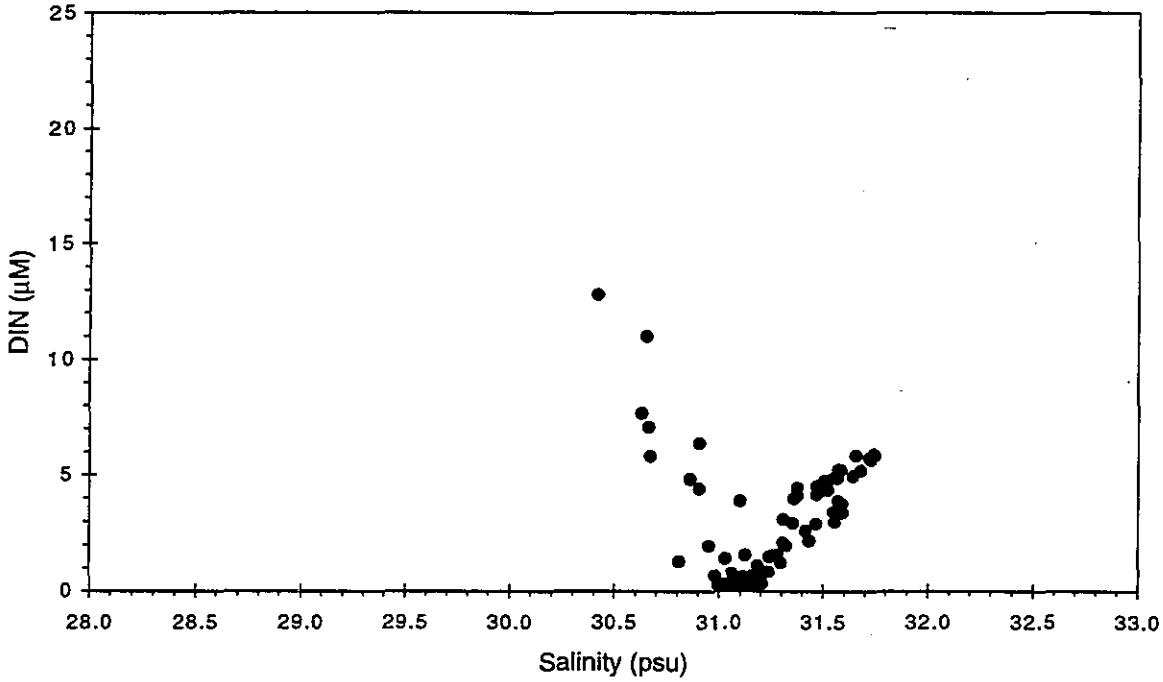
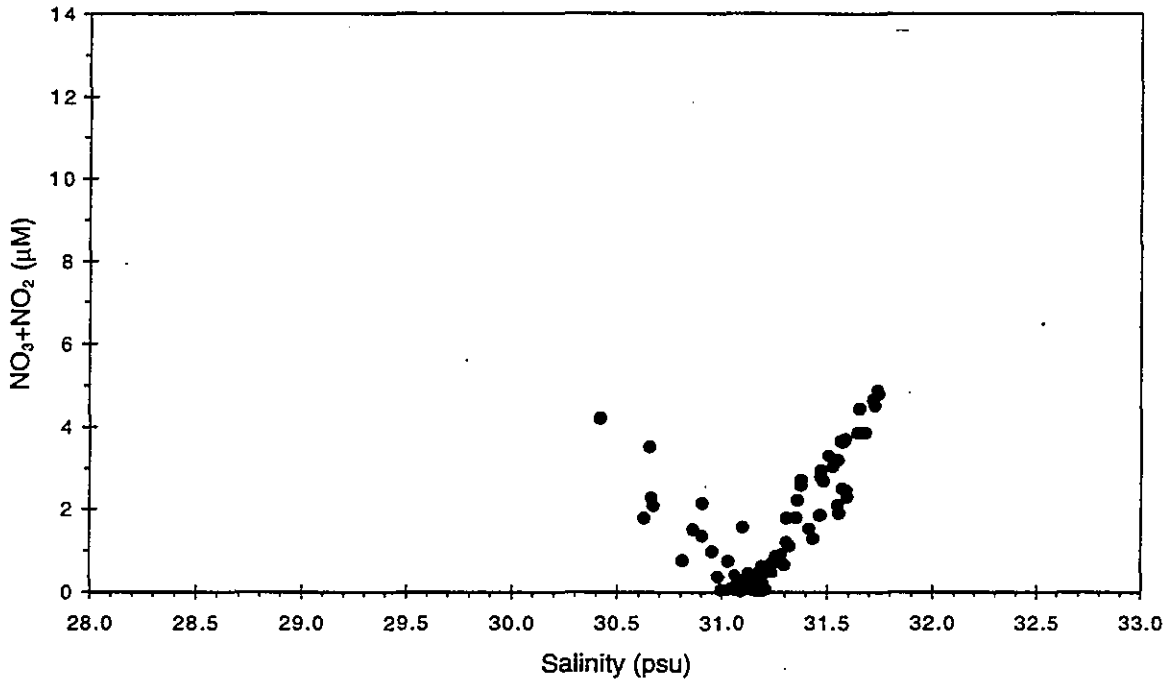


FIGURE 4-193
Nutrient vs. salinity plots for nearfield survey W9613, (Sep 96).

(a)



(b)

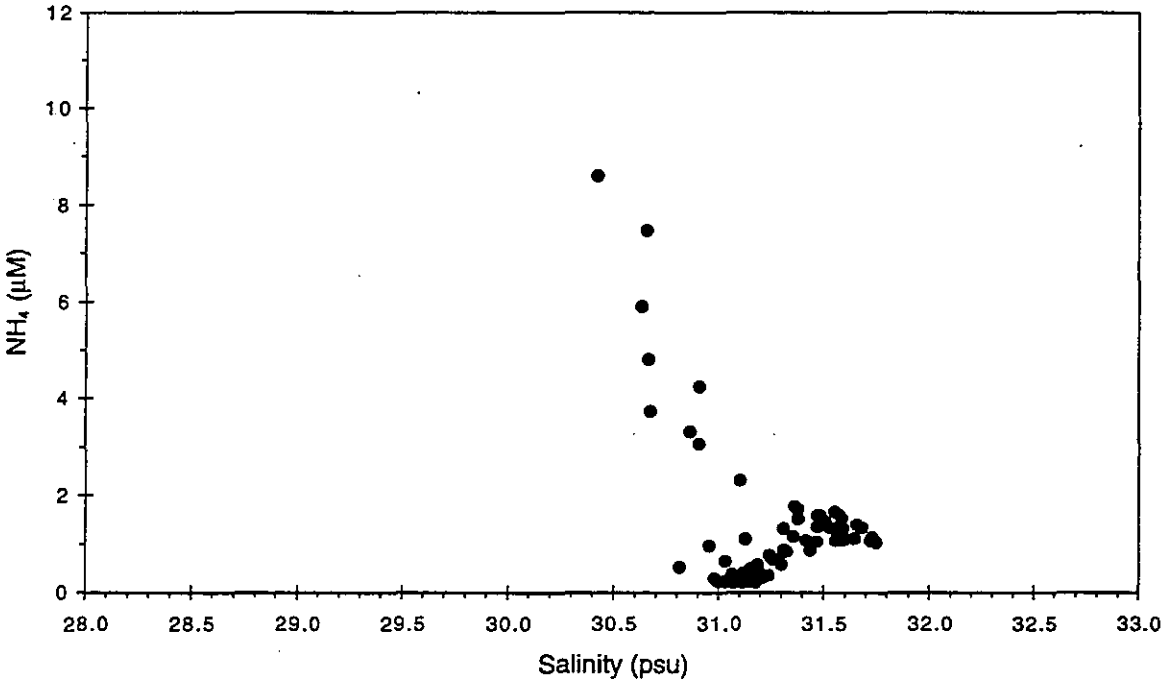
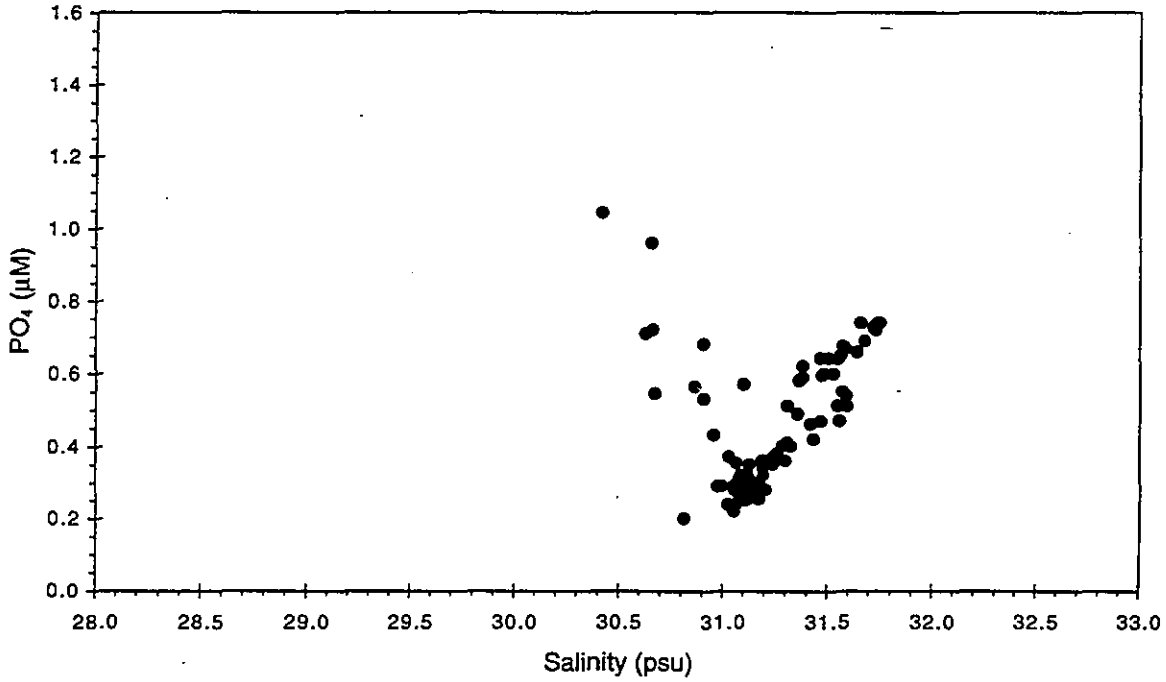


FIGURE 4-194
Nutrient vs. salinity plots for nearfield survey W9613, (Sep 96).

(a)



(b)

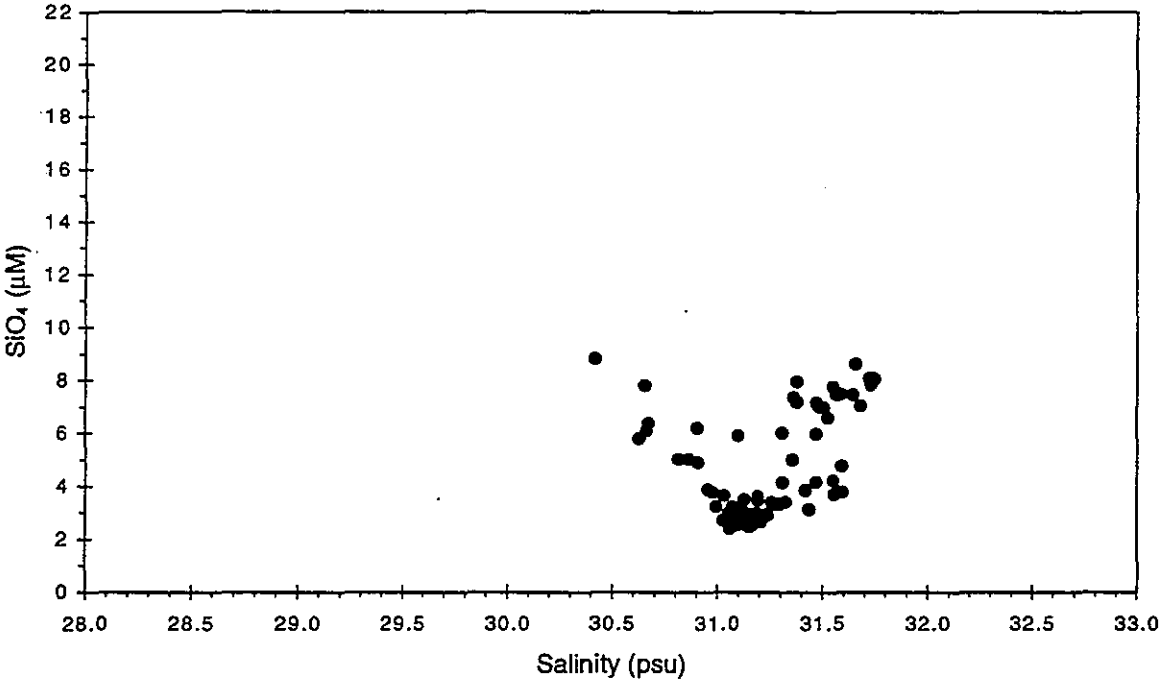
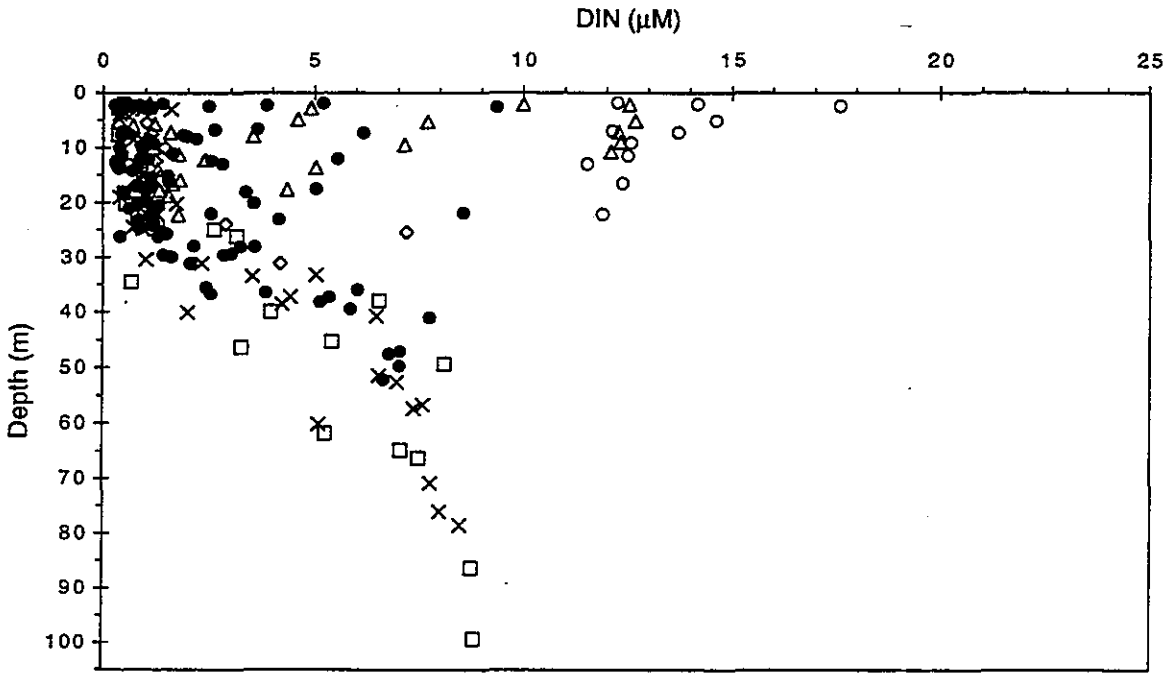


FIGURE 4-195
Nutrient vs. salinity plots for nearfield survey W9613, (Sep 96).



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-196
Depth vs. nutrient plots for farfield survey W9614, (Oct 96).

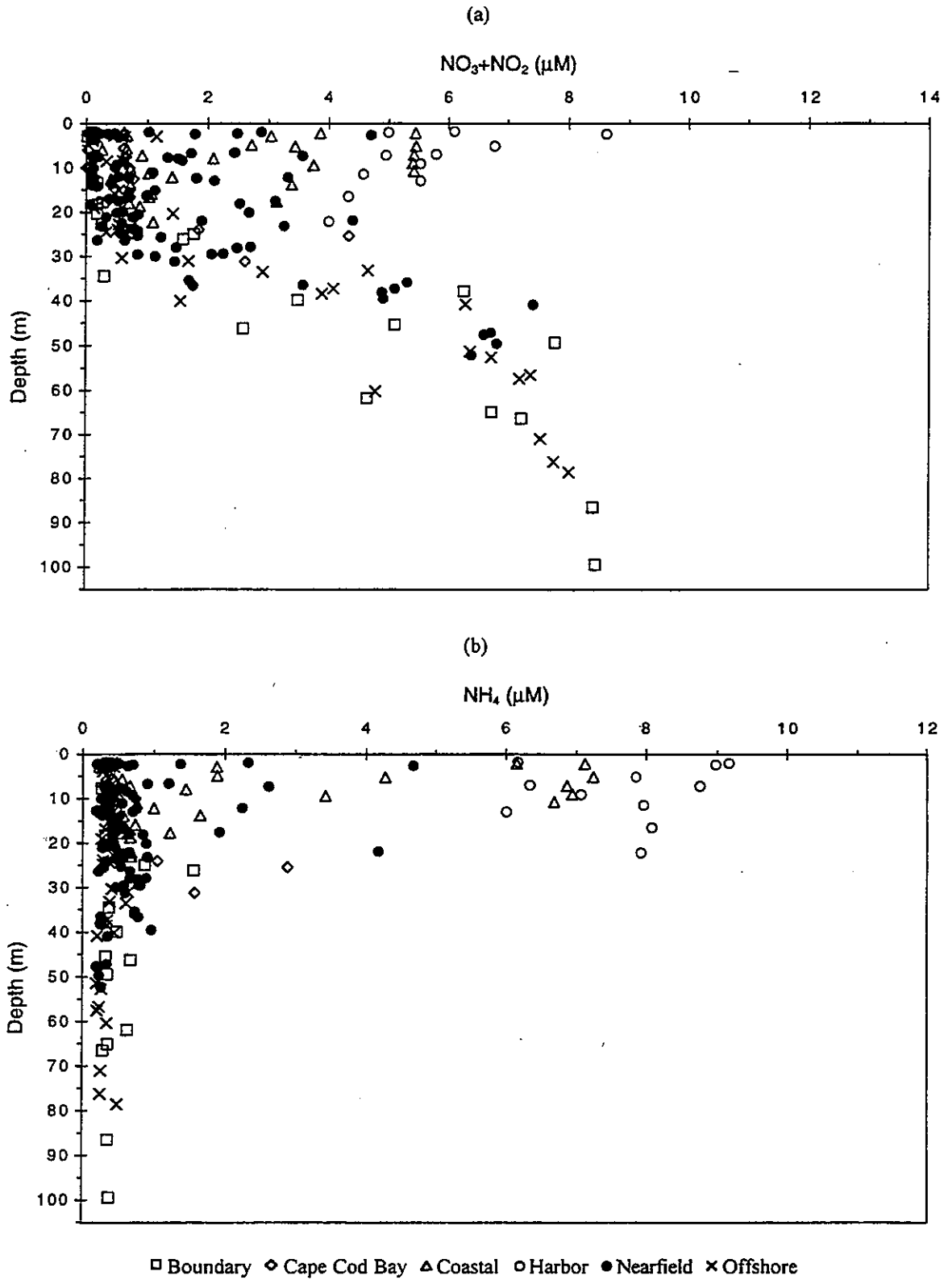


FIGURE 4-197
Depth vs. nutrient plots for farfield survey W9614, (Oct 96).

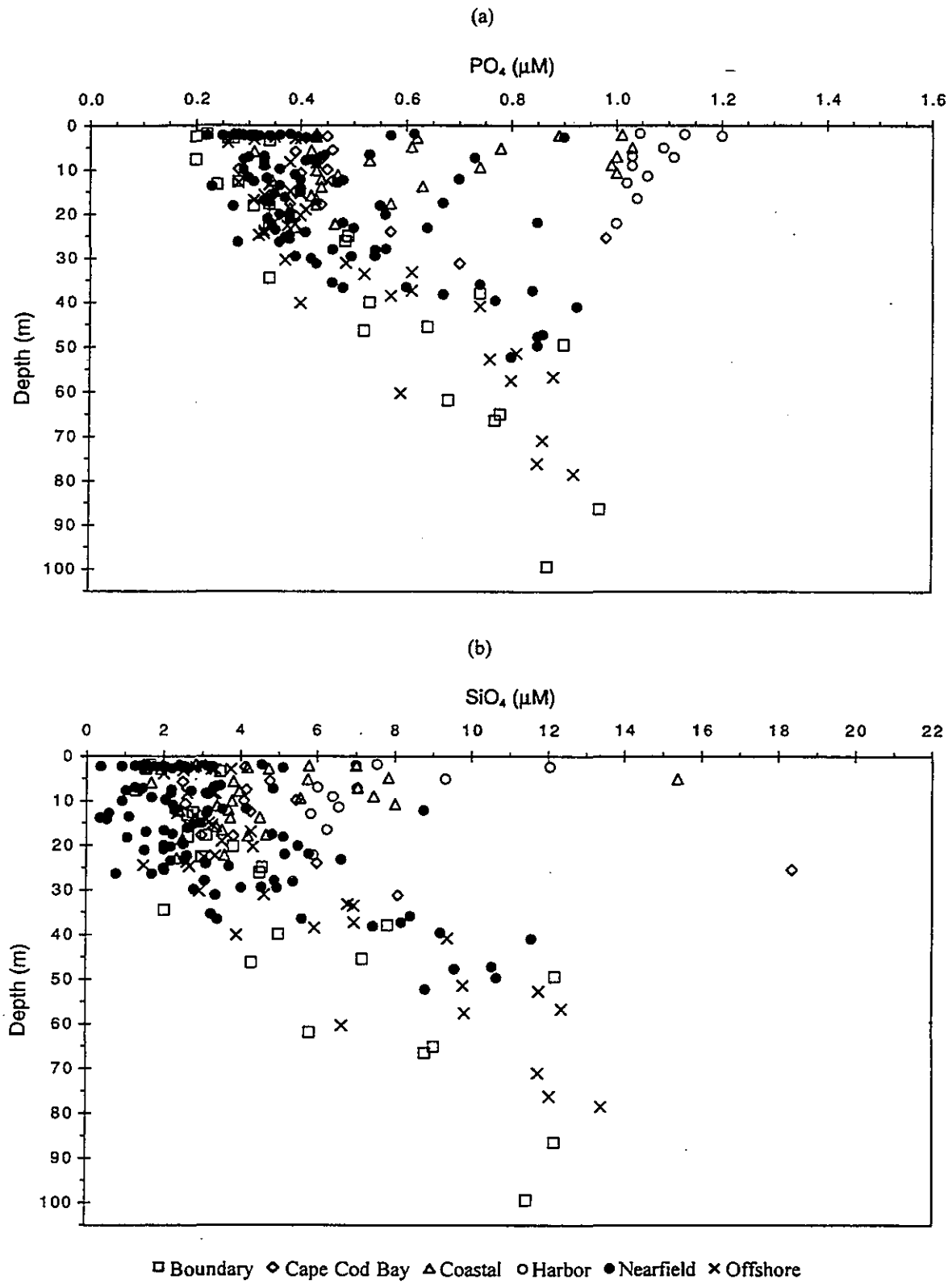


FIGURE 4-198
Depth vs. nutrient plots for farfield survey W9614, (Oct 96).

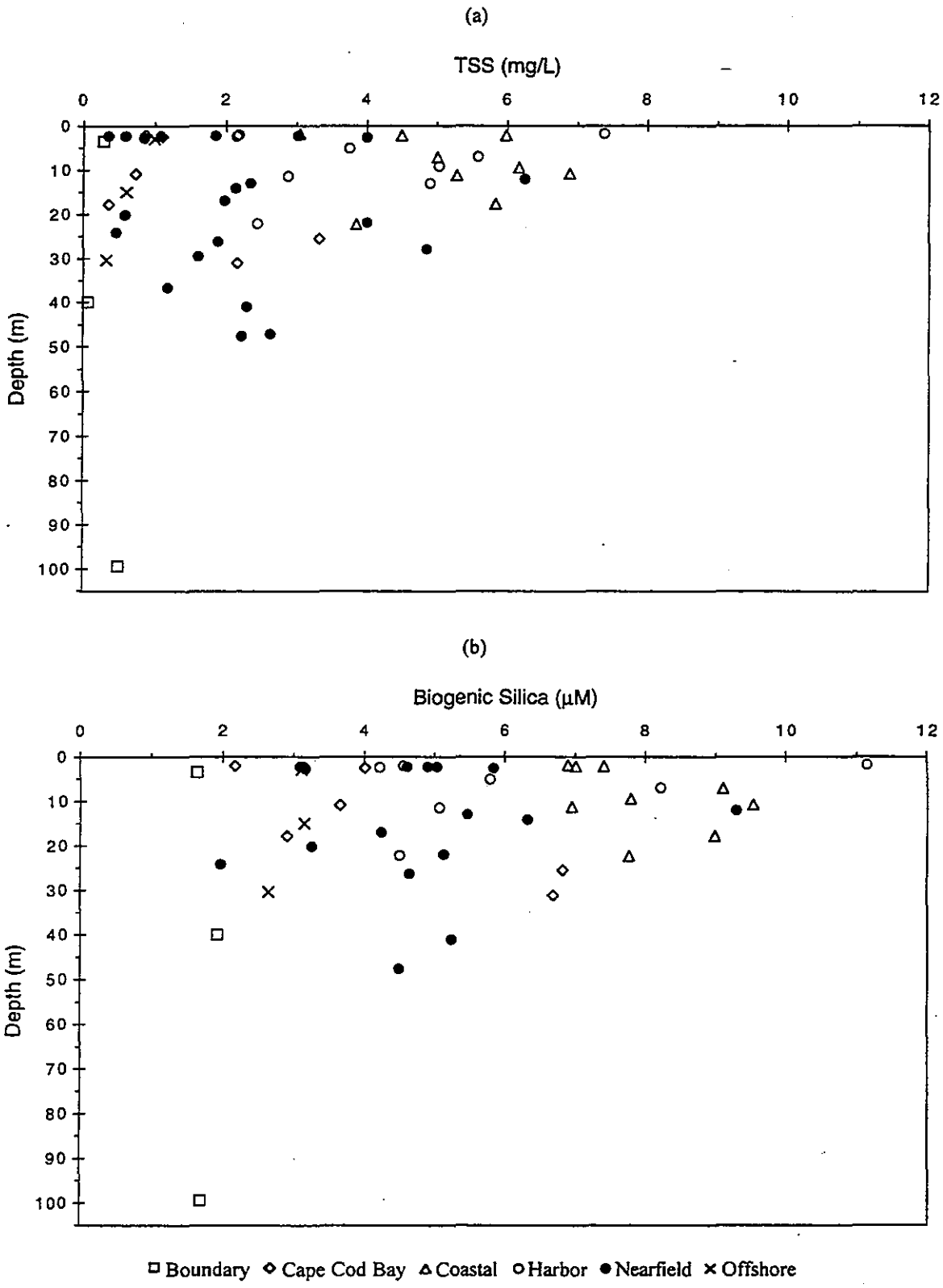


FIGURE 4-199
Depth vs. nutrient plots for farfield survey W9614, (Oct 96).

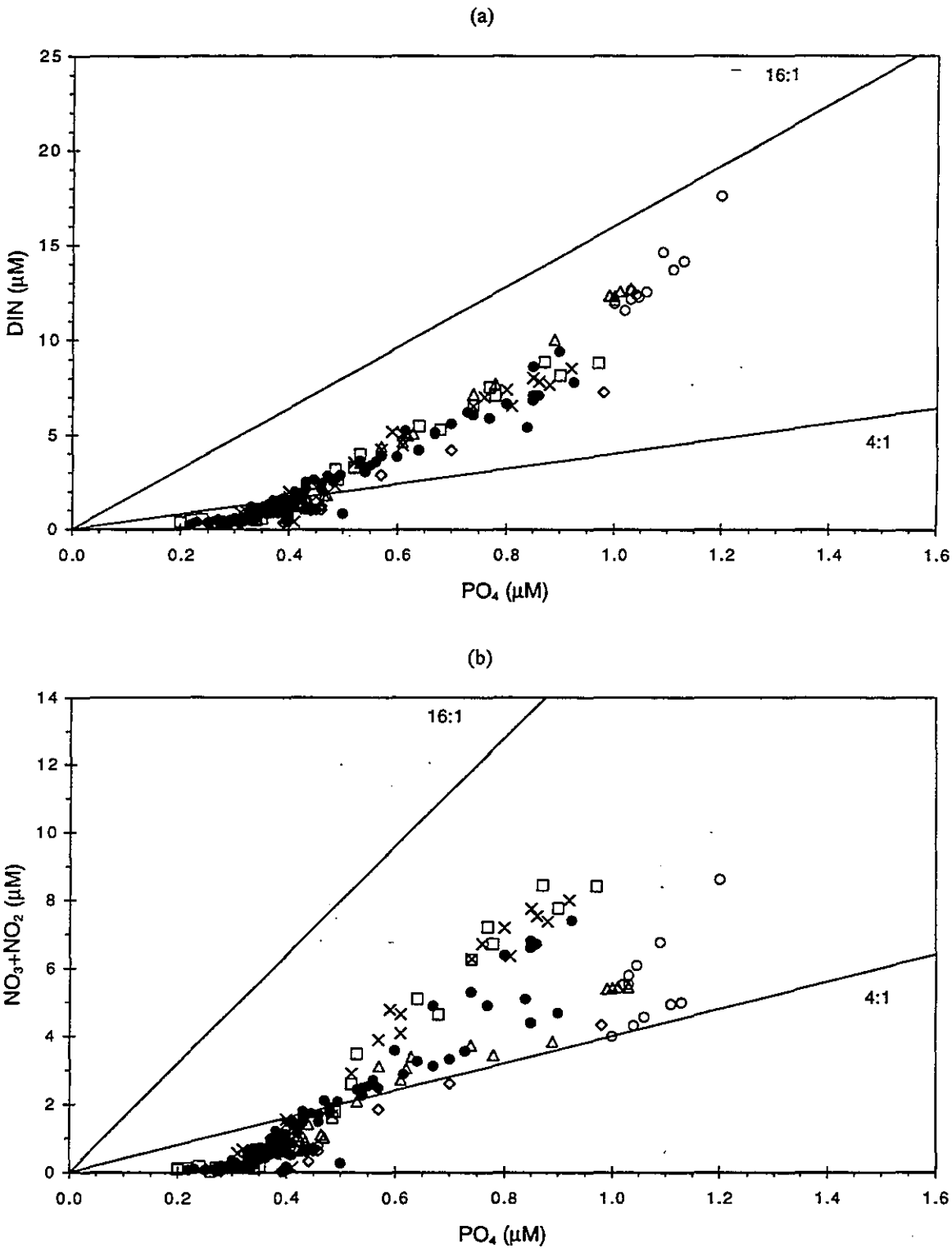


FIGURE 4-200
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).

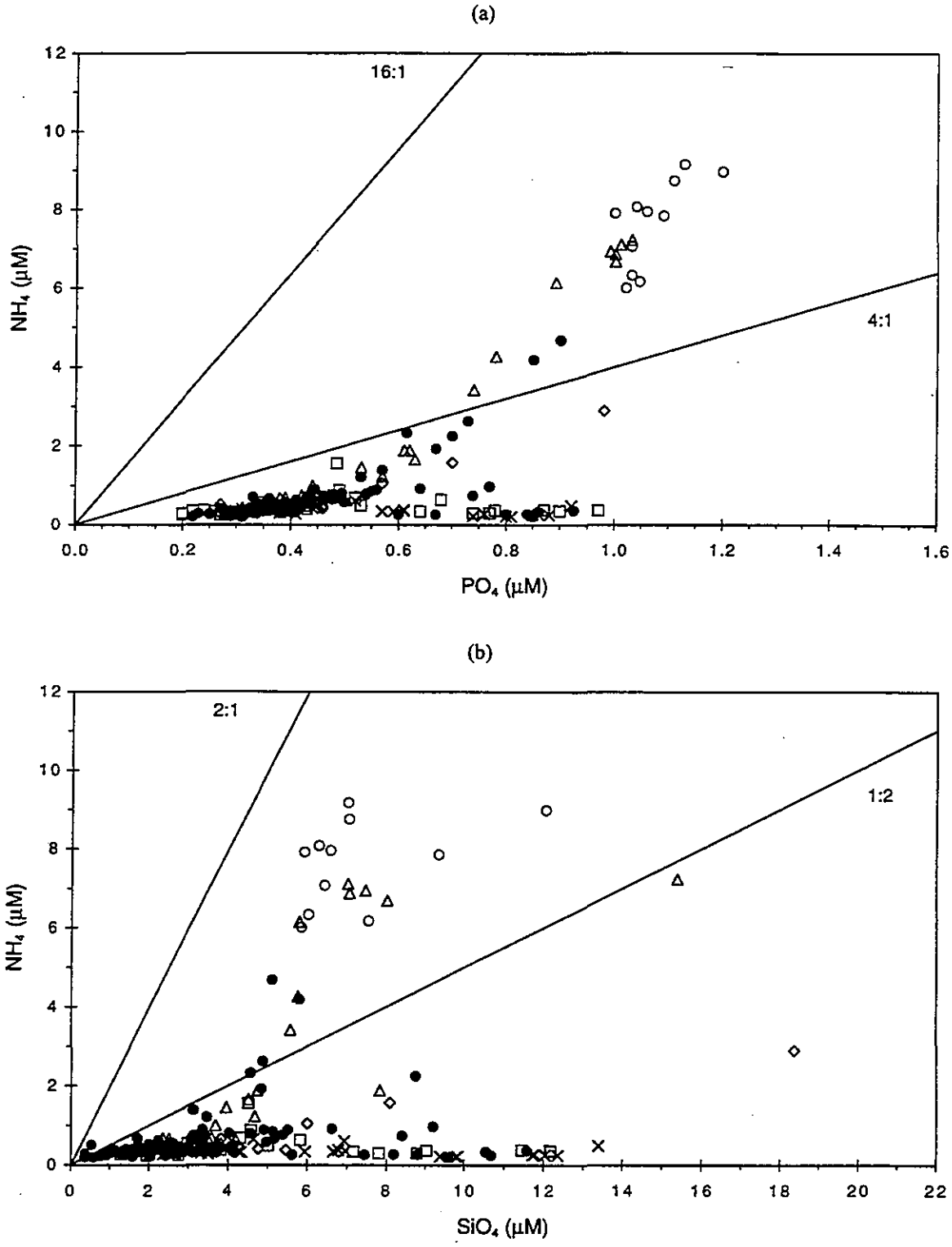


FIGURE 4-201
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).

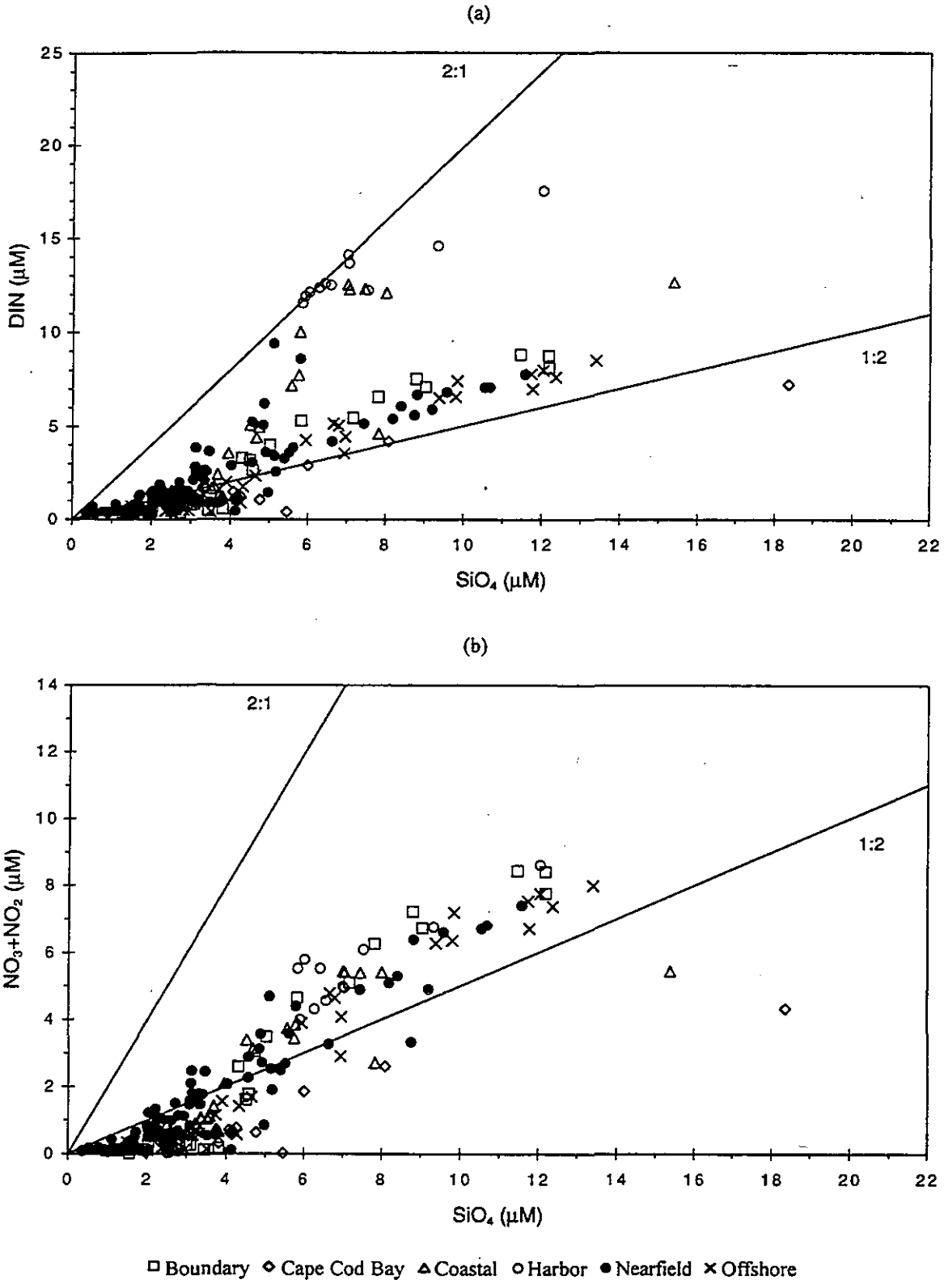


FIGURE 4-202
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).

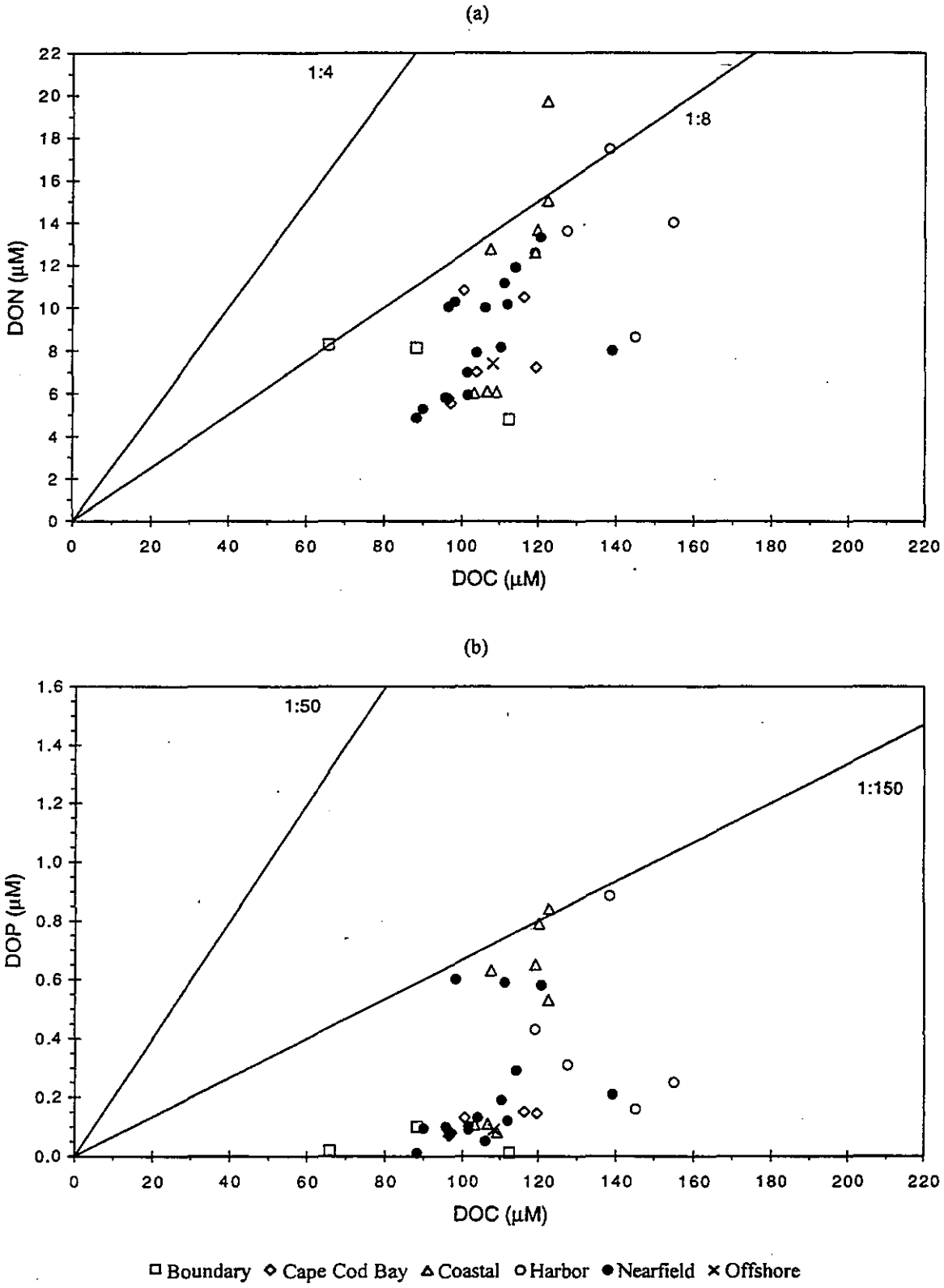


FIGURE 4-203
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).

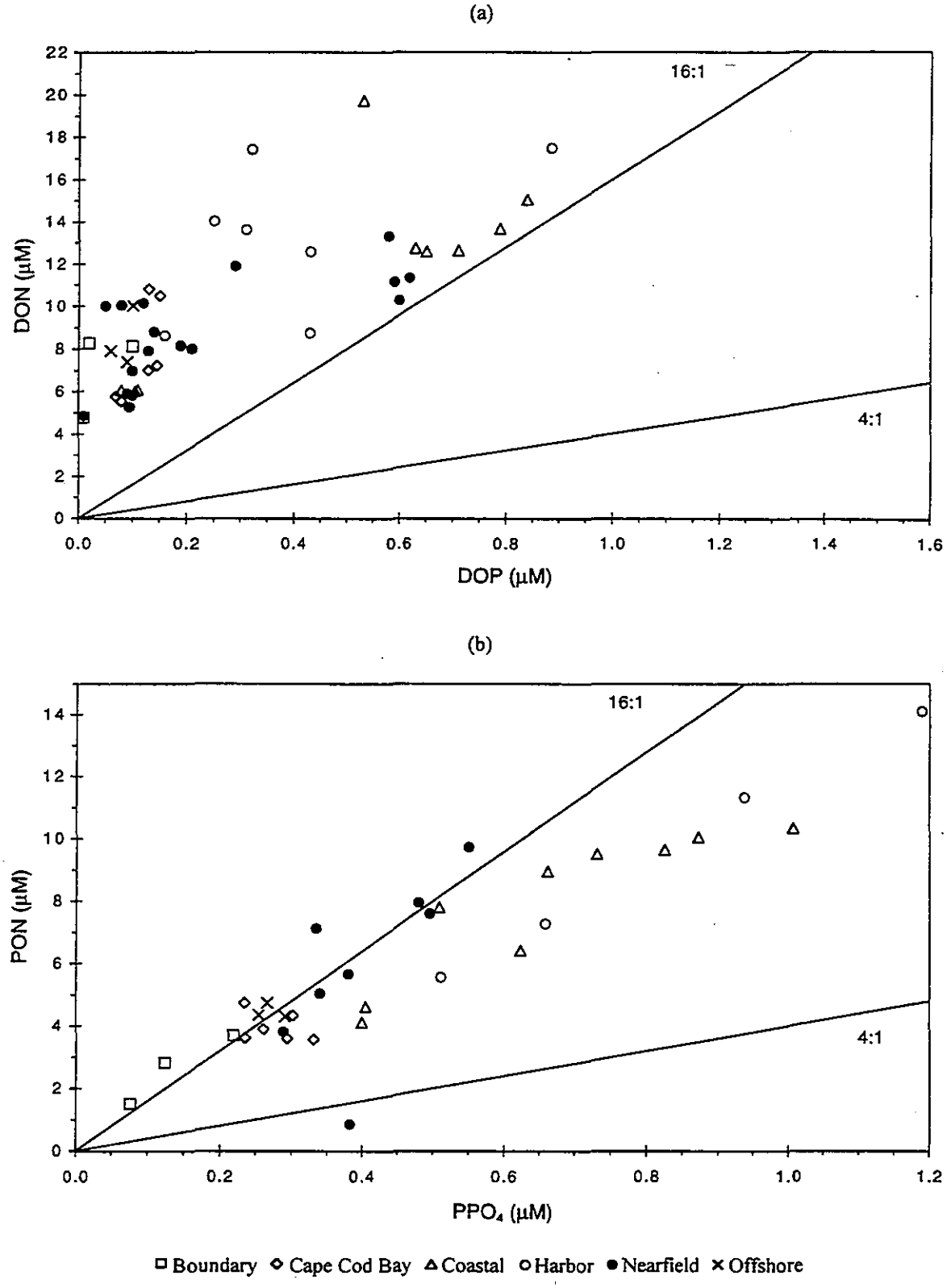


FIGURE 4-204
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).

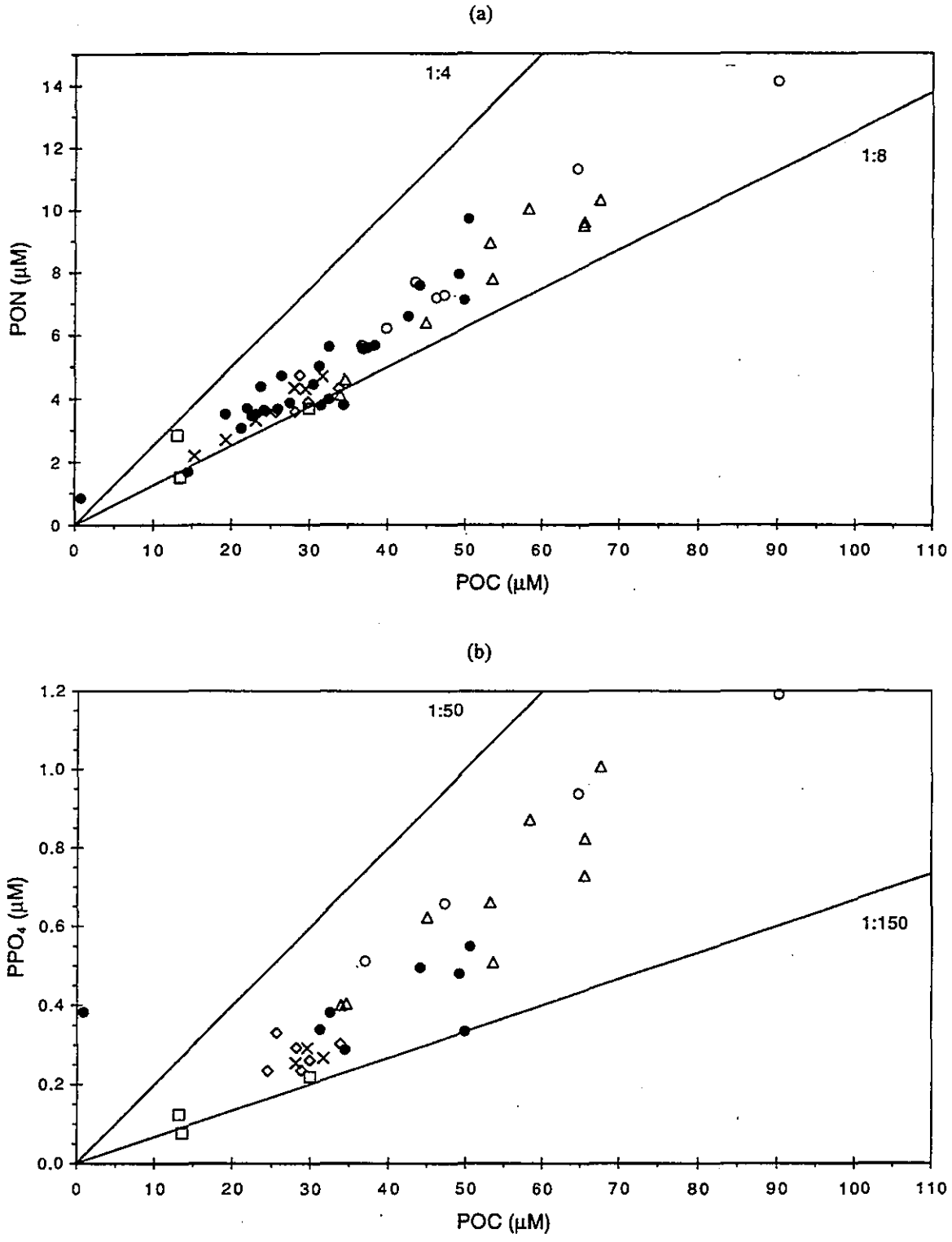


FIGURE 4-205
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).

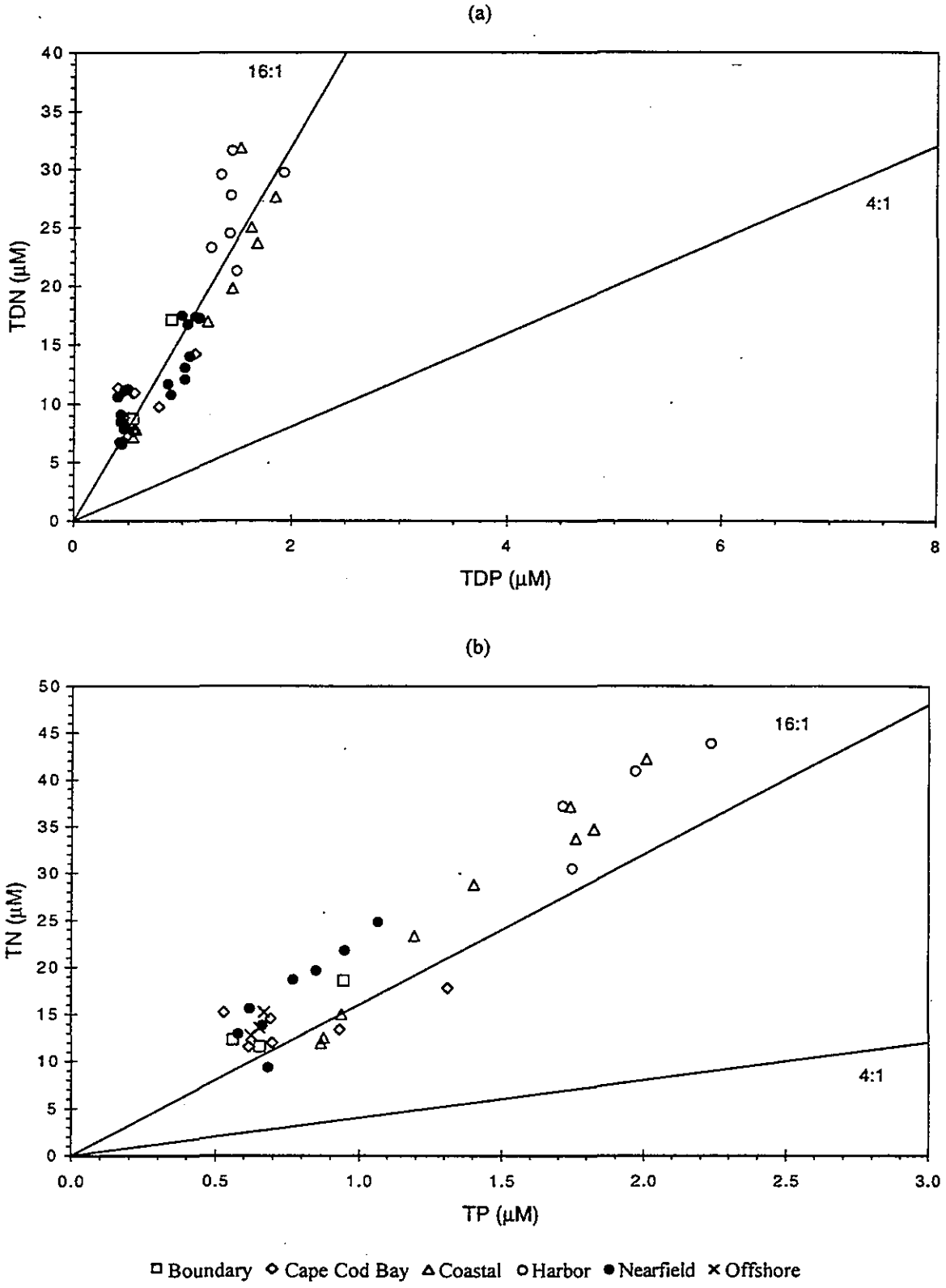


FIGURE 4-206
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).

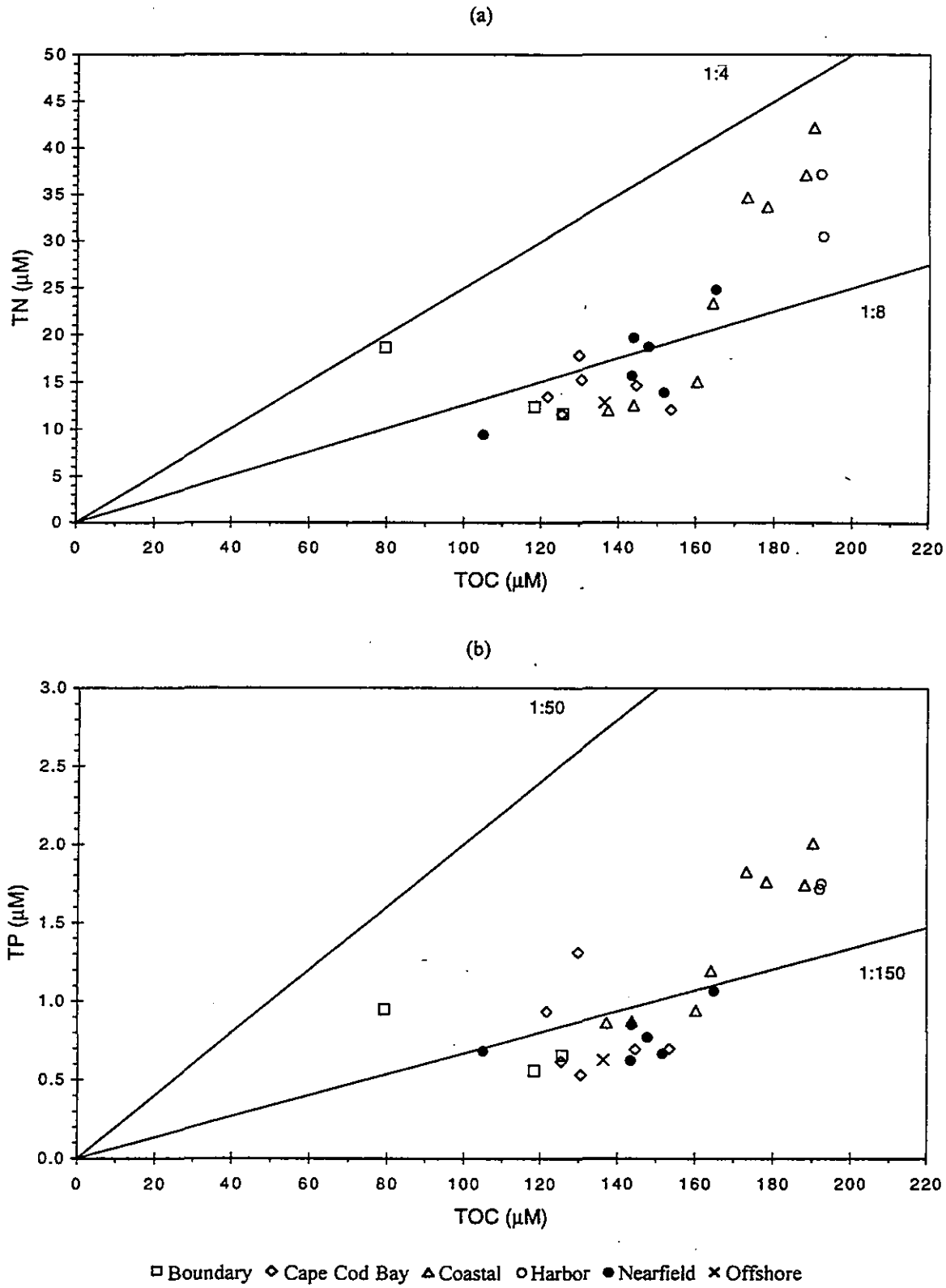
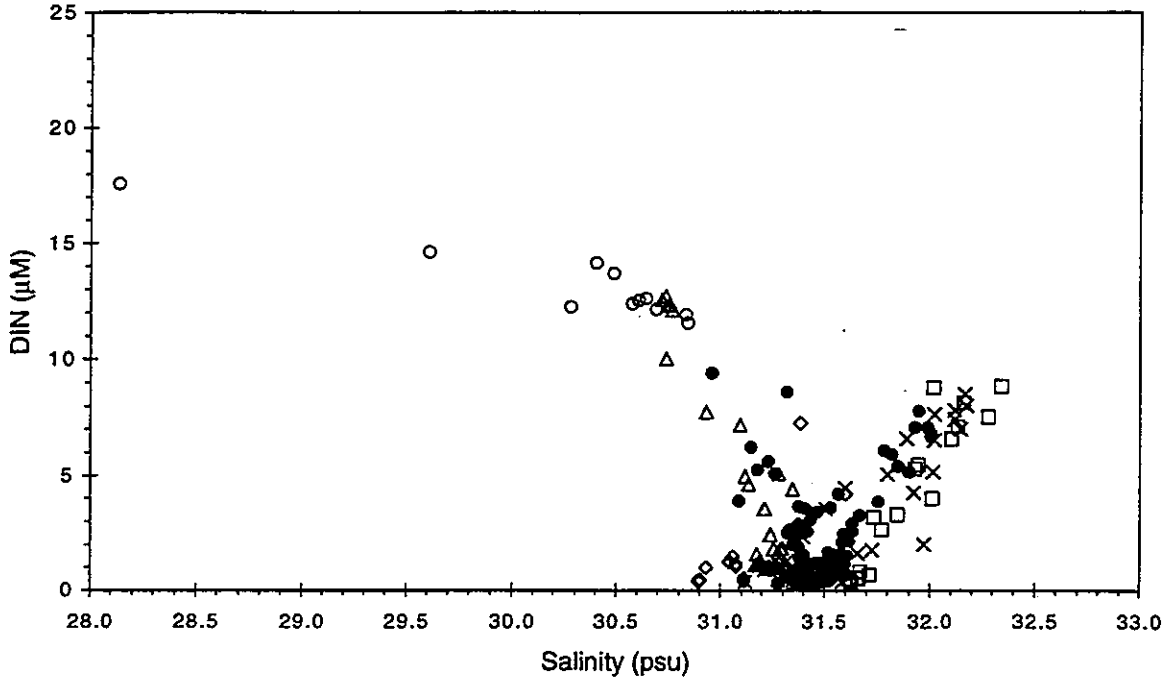


FIGURE 4-207
Nutrient vs. nutrient plots for farfield survey W9614, (Oct 96).



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-208
Nutrient vs. salinity plots for farfield survey W9614, (Oct 96).

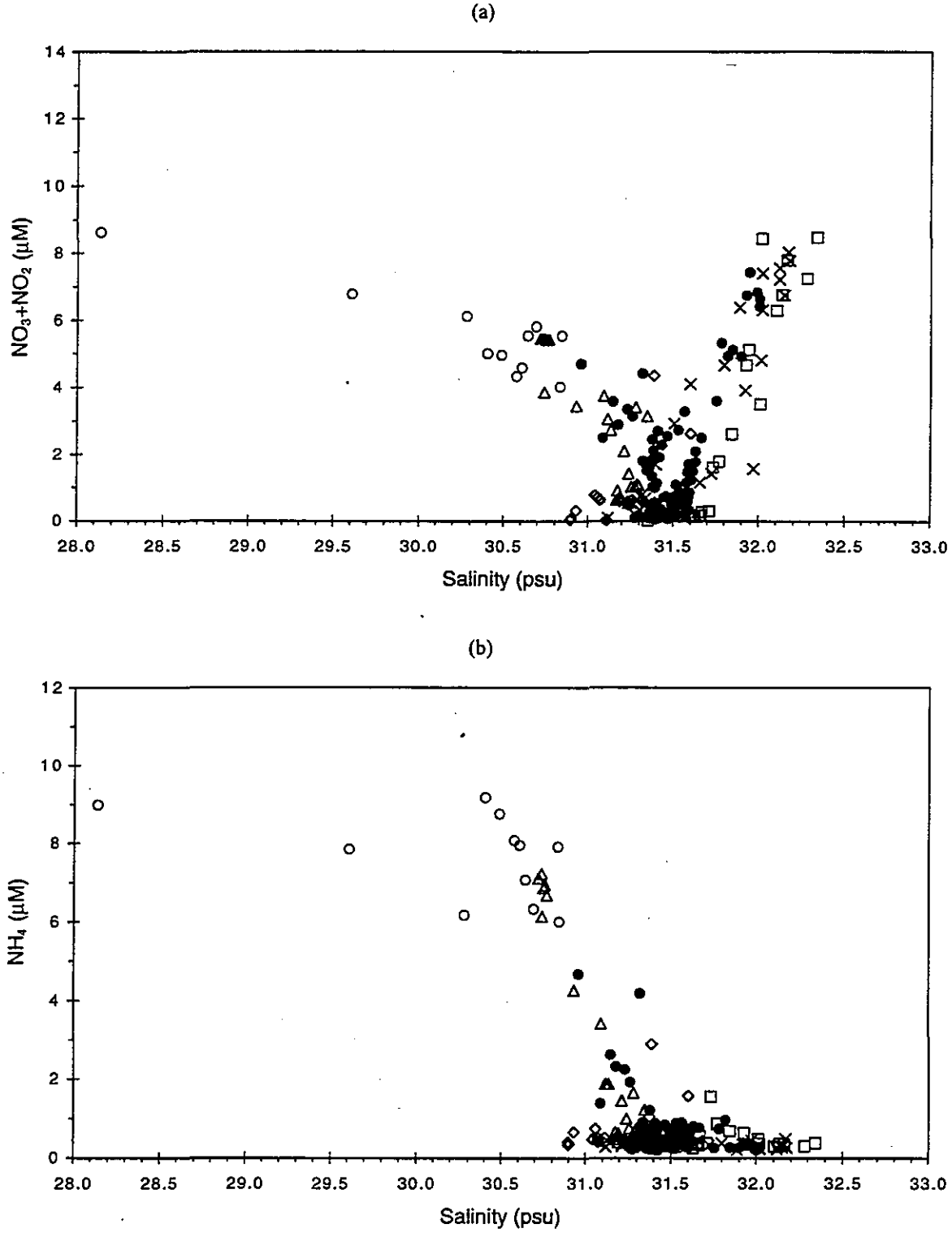
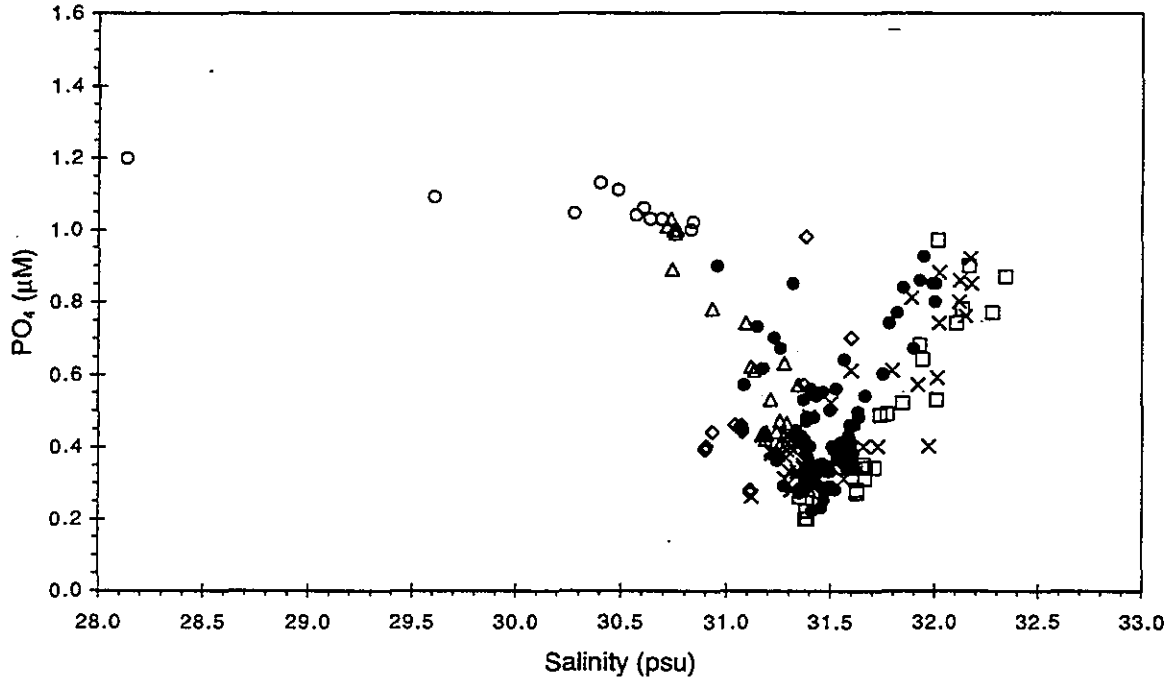
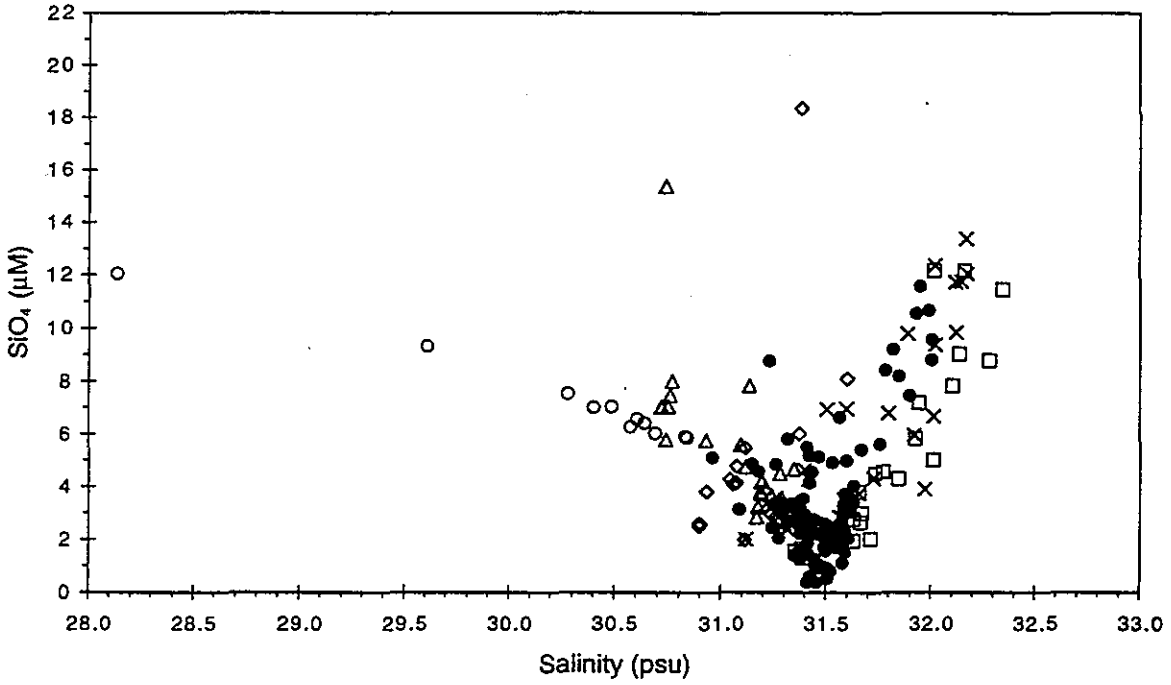


FIGURE 4-209
Nutrient vs. salinity plots for farfield survey W9614, (Oct 96).

(a)



(b)



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-210
Nutrient vs. salinity plots for farfield survey W9614, (Oct 96).

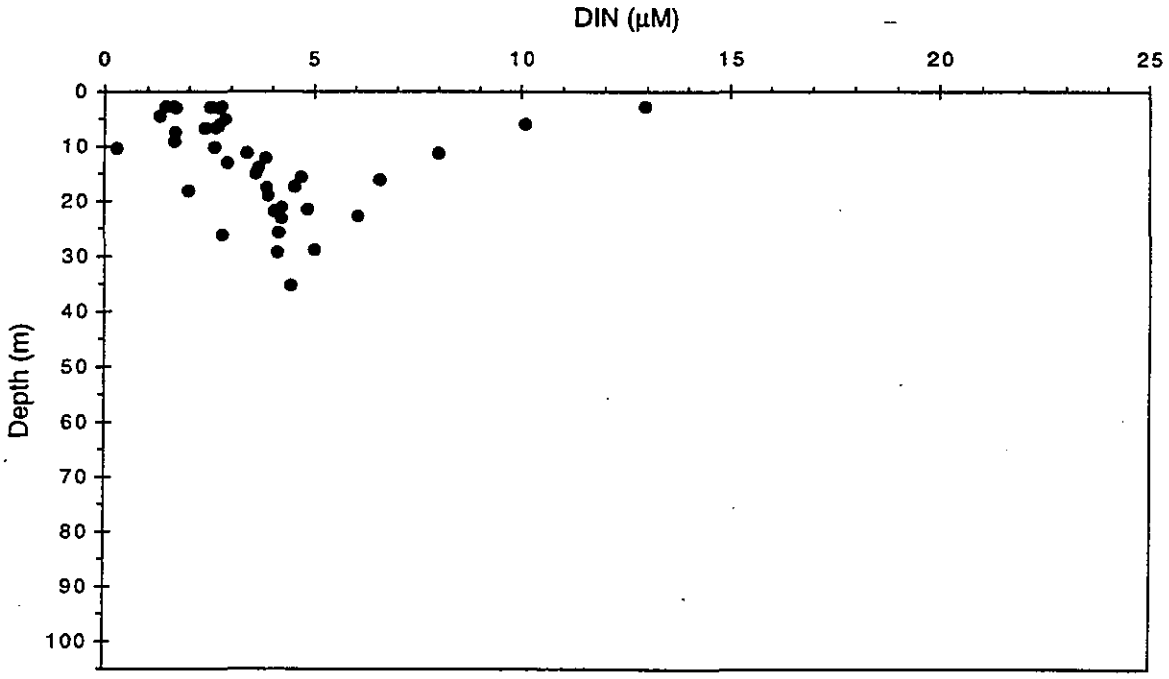


FIGURE 4-211
Depth vs. nutrient plots for nearfield survey W9615, (Oct 96).

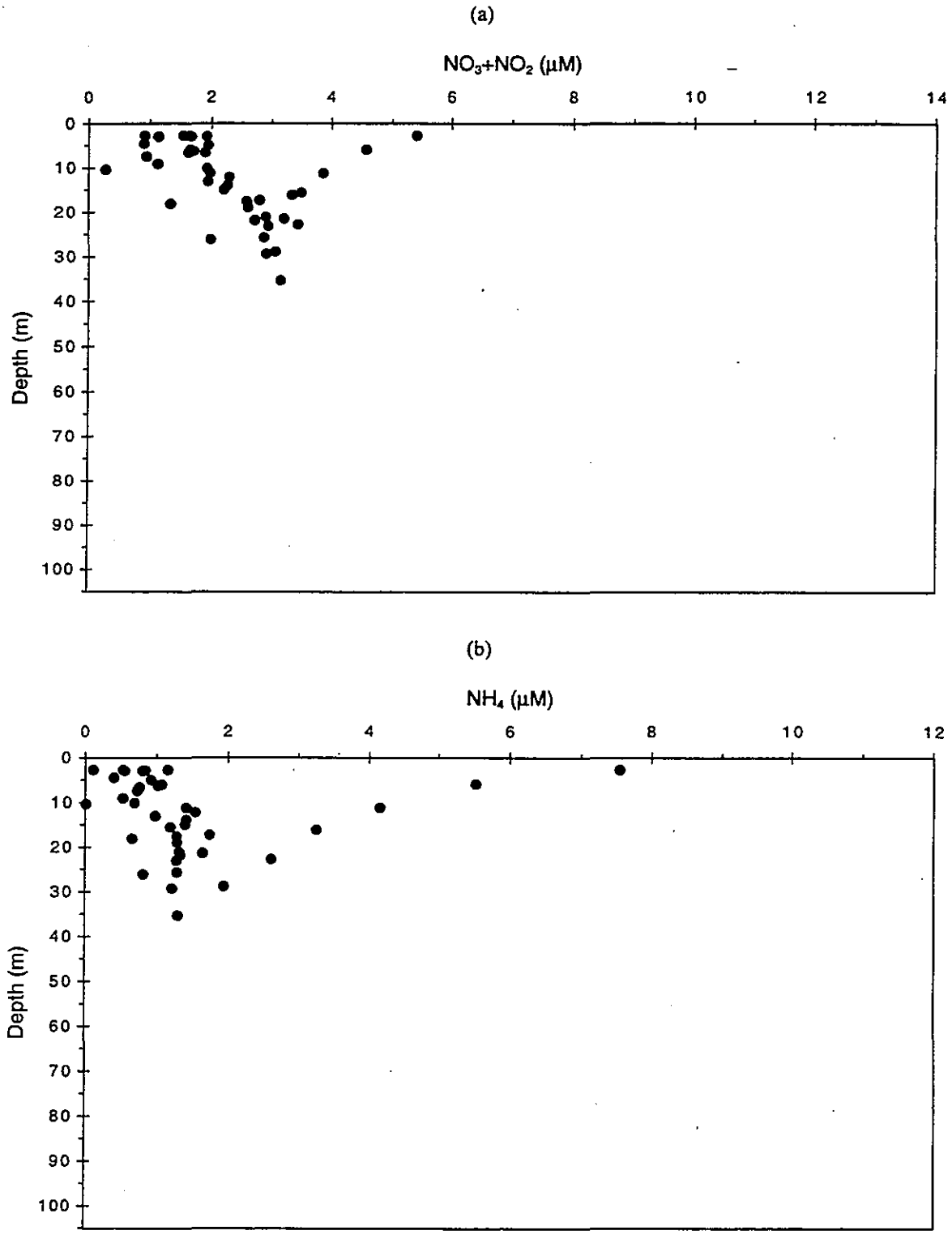


FIGURE 4-212
Depth vs. nutrient plots for nearfield survey W9615, (Oct 96).

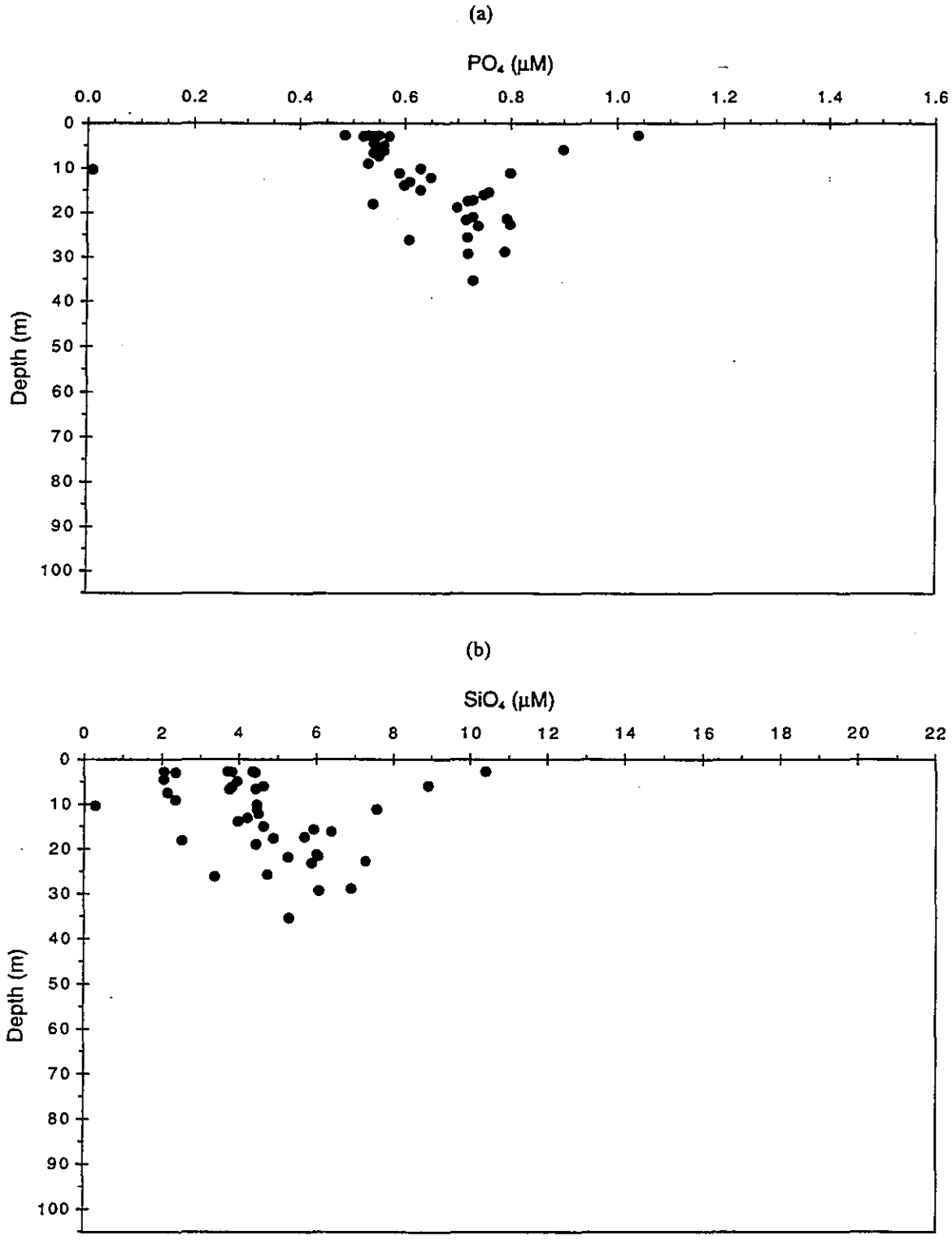


FIGURE 4-213
Depth vs. nutrient plots for nearfield survey W9615, (Oct 96).

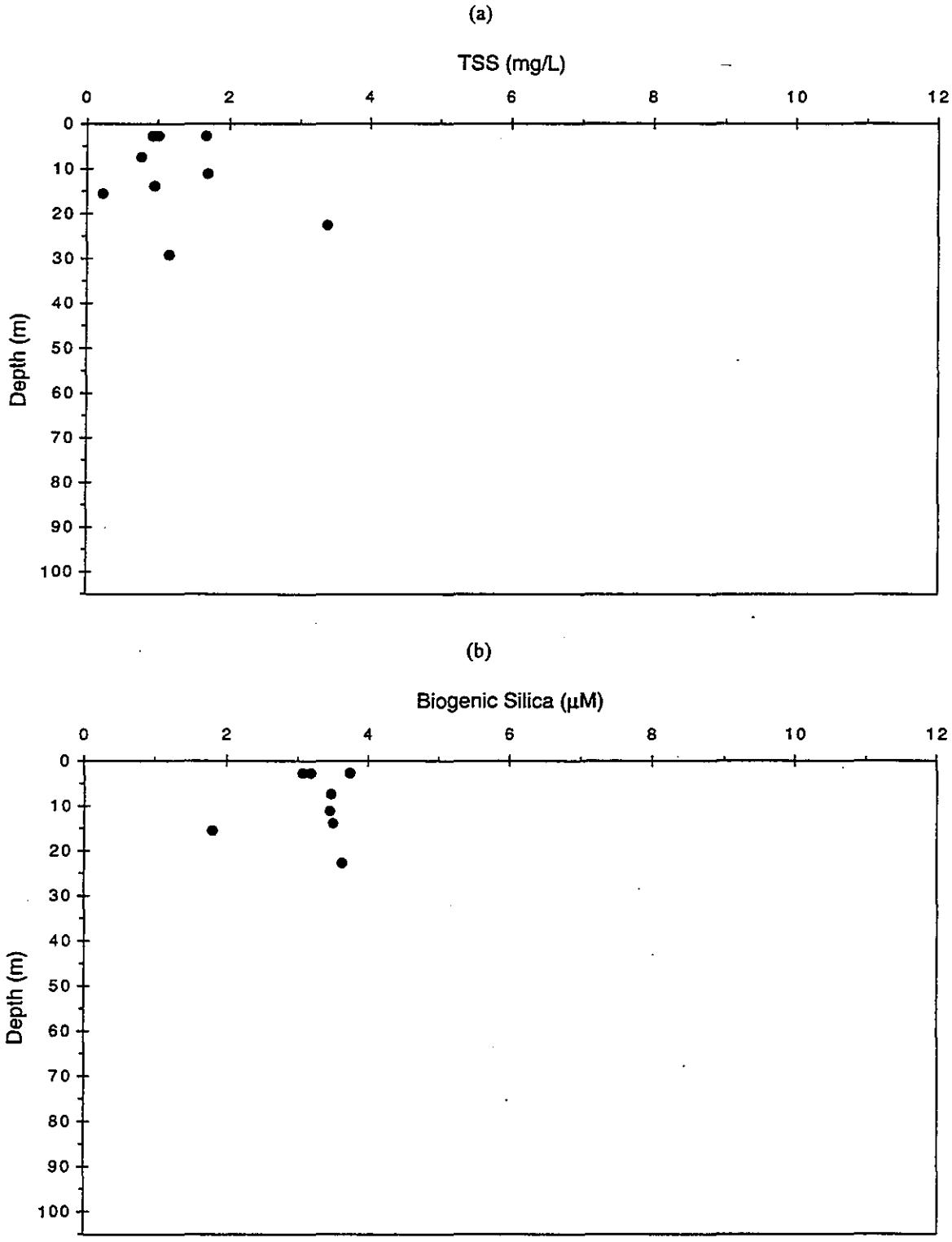


FIGURE 4-214
Depth vs. nutrient plots for nearfield survey W9615, (Oct 96).

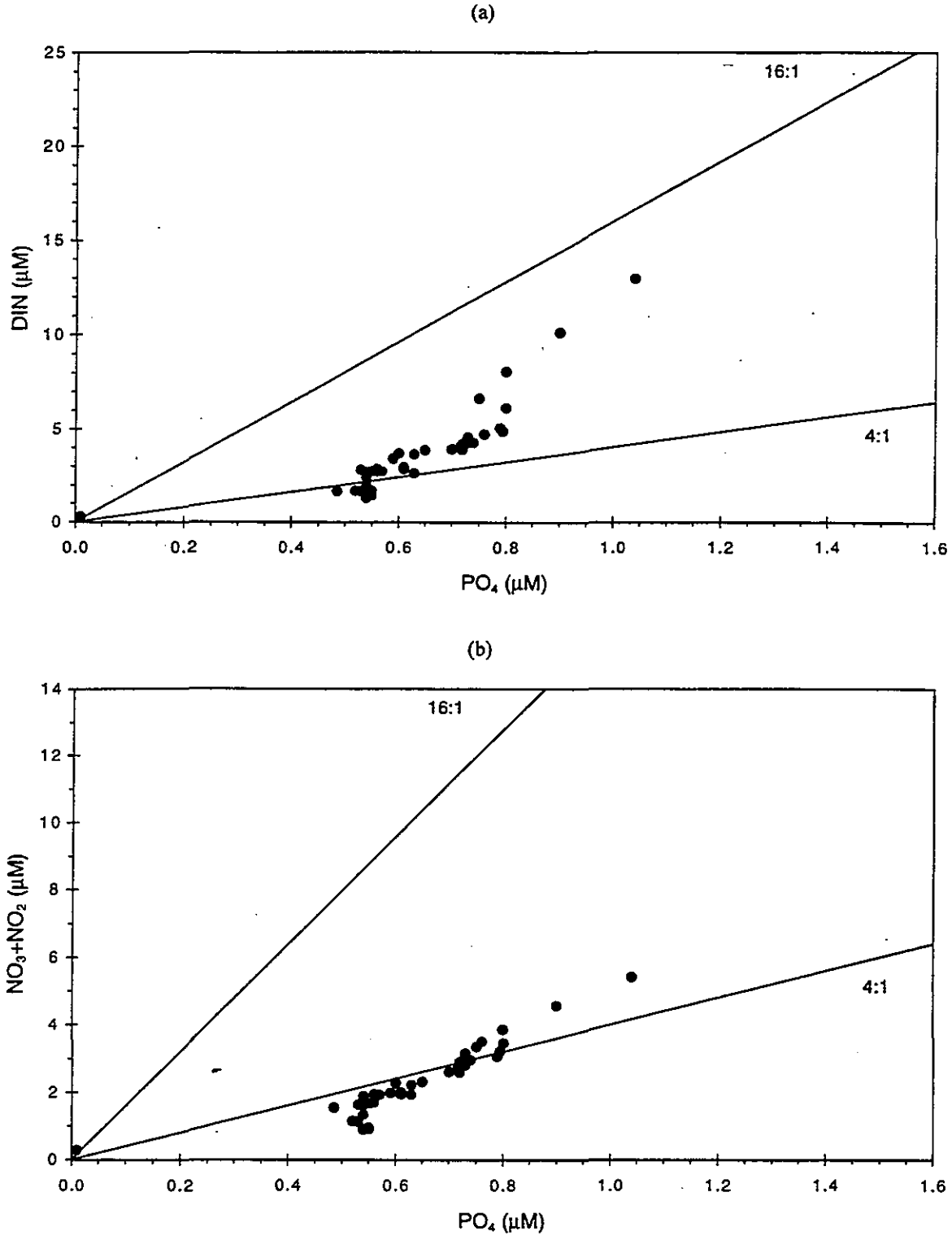


FIGURE 4-215
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

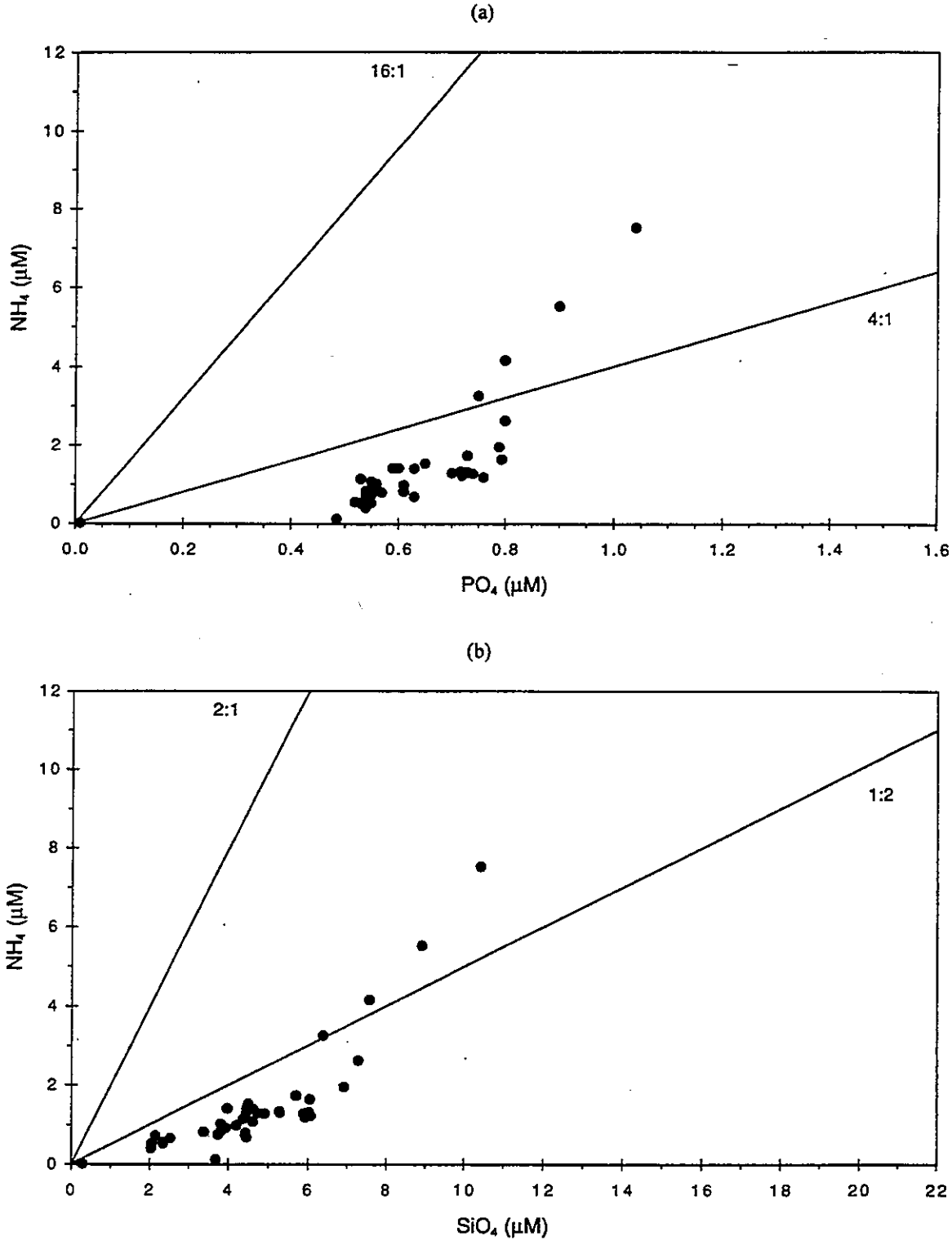


FIGURE 4-216
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

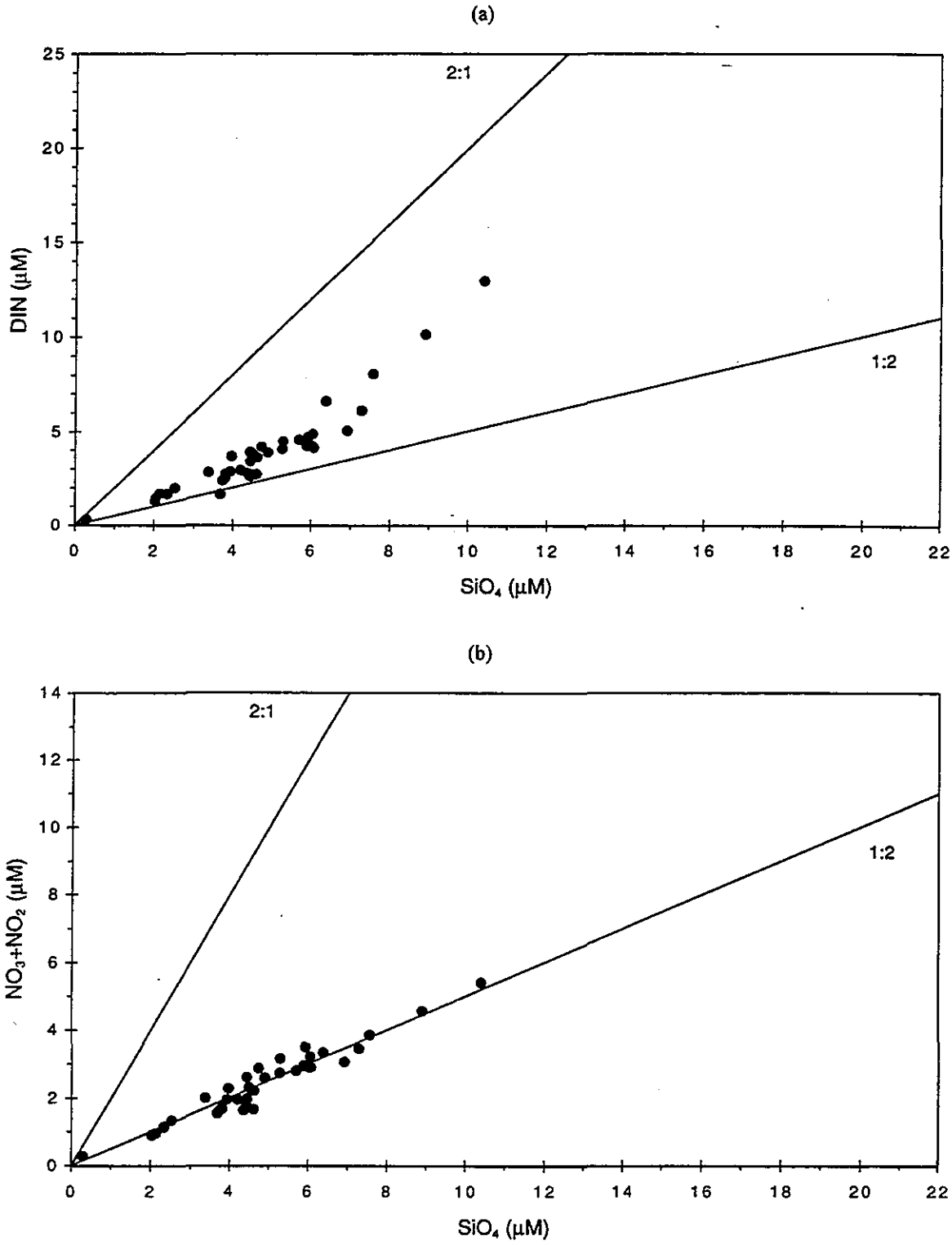
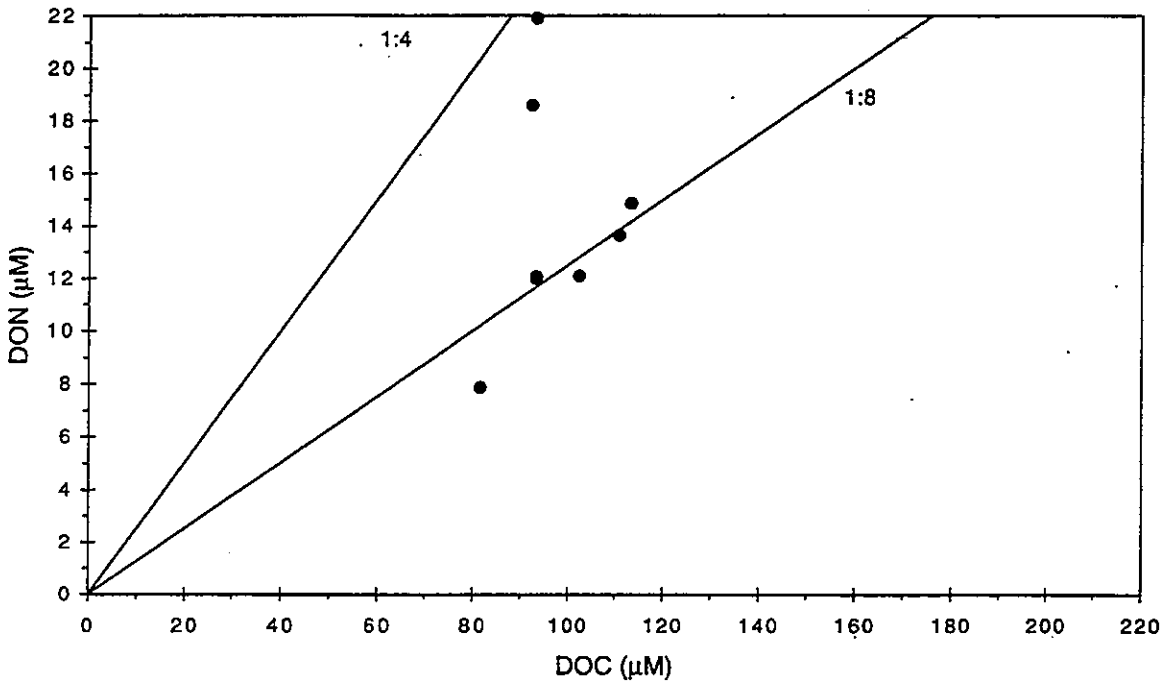


FIGURE 4-217
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

(a)



(b)

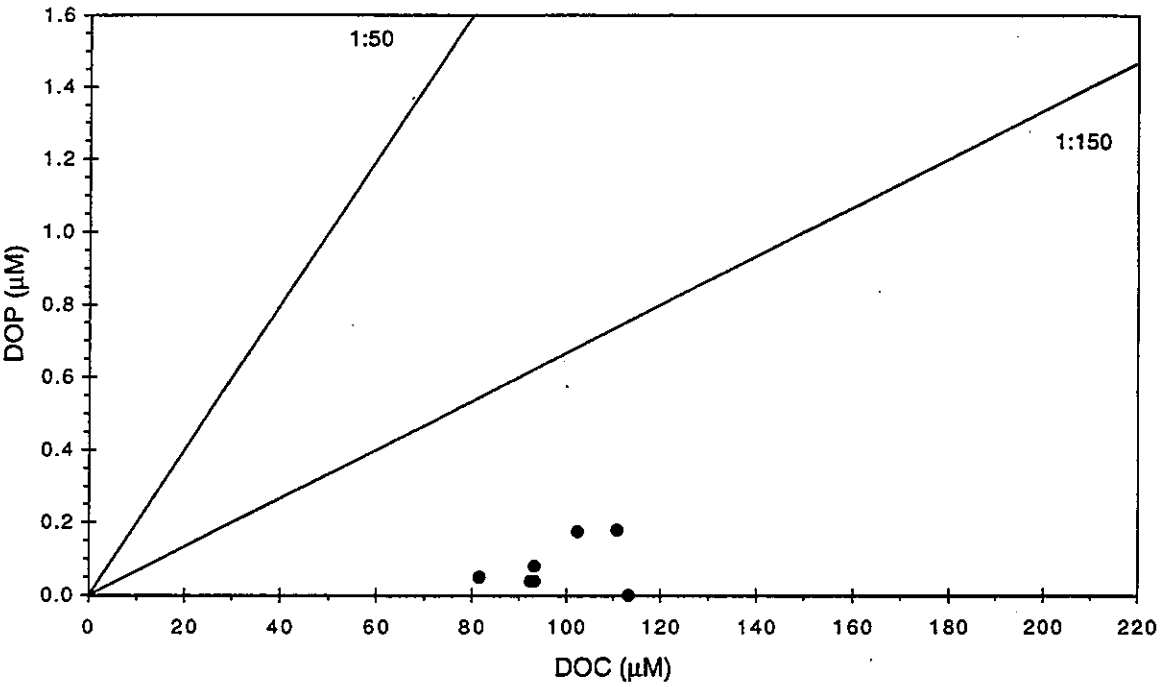
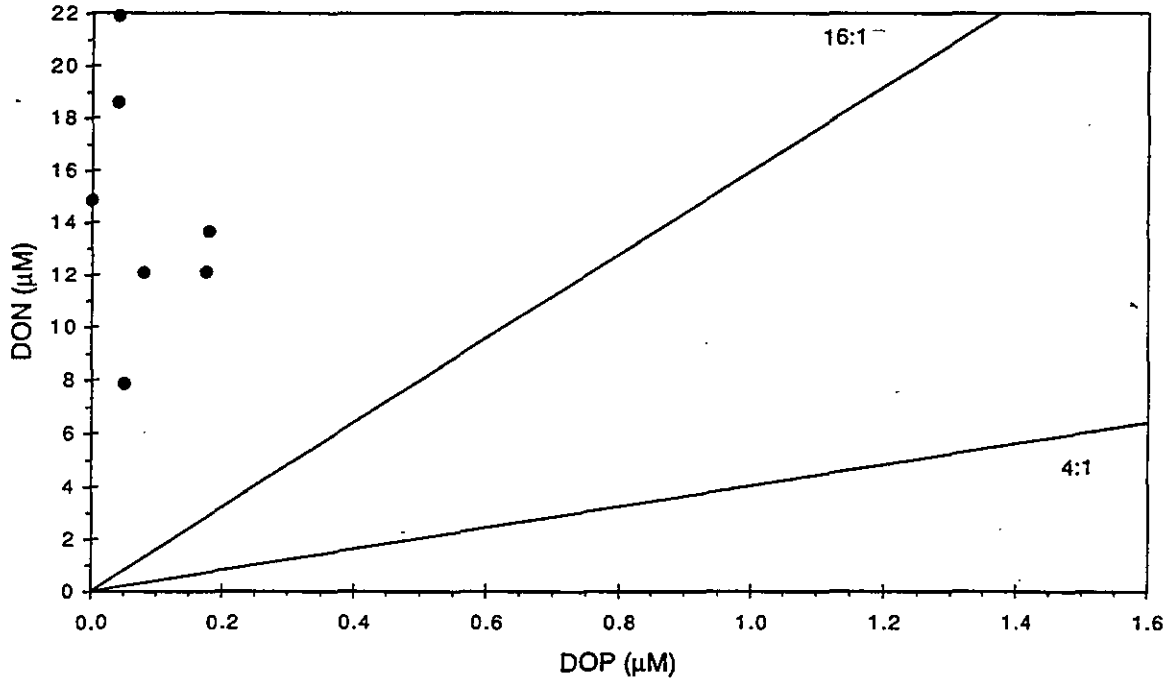


FIGURE 4-218
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

(a)



(b)

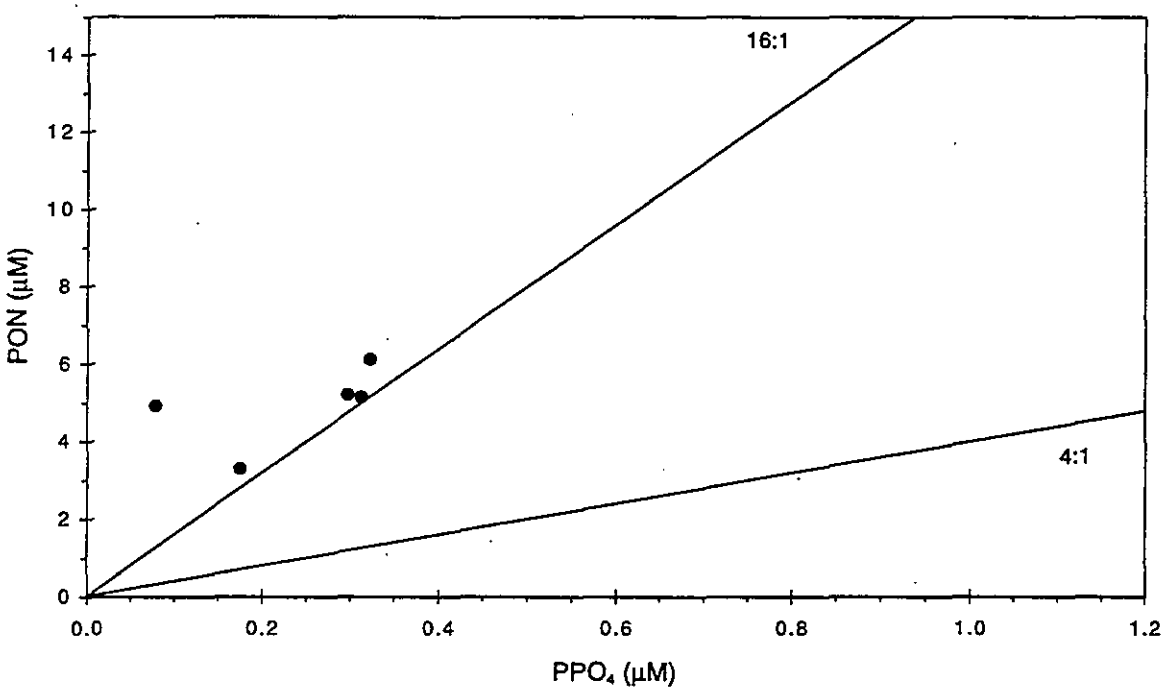
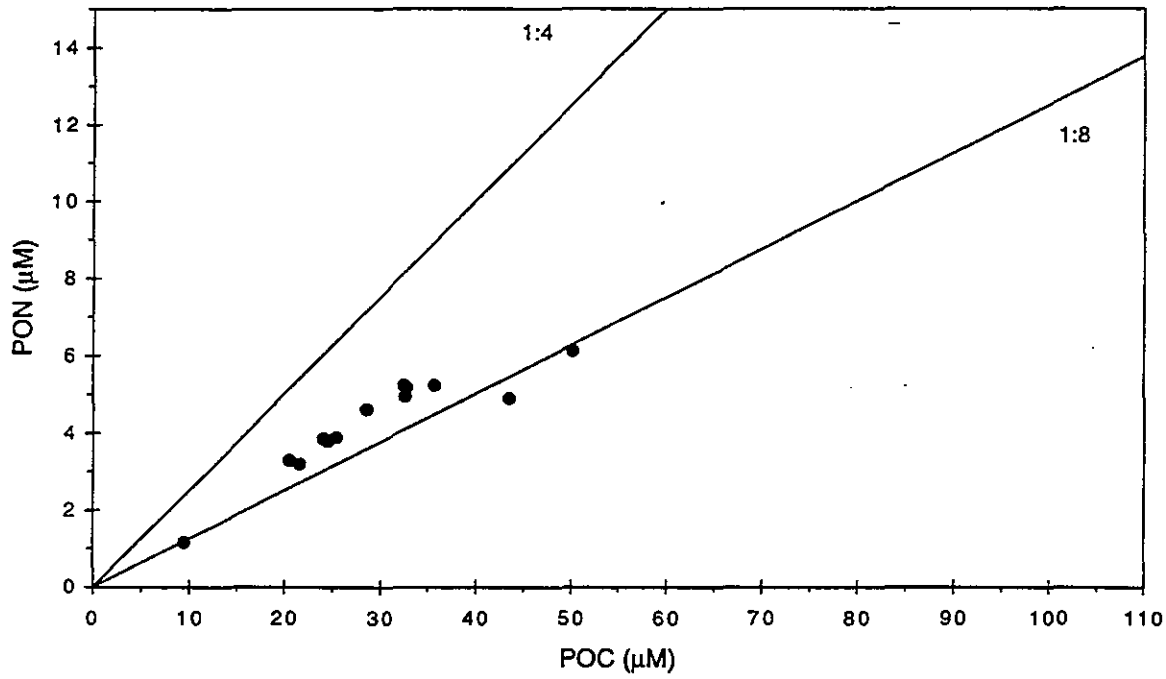


FIGURE 4-219
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

(a)



(b)

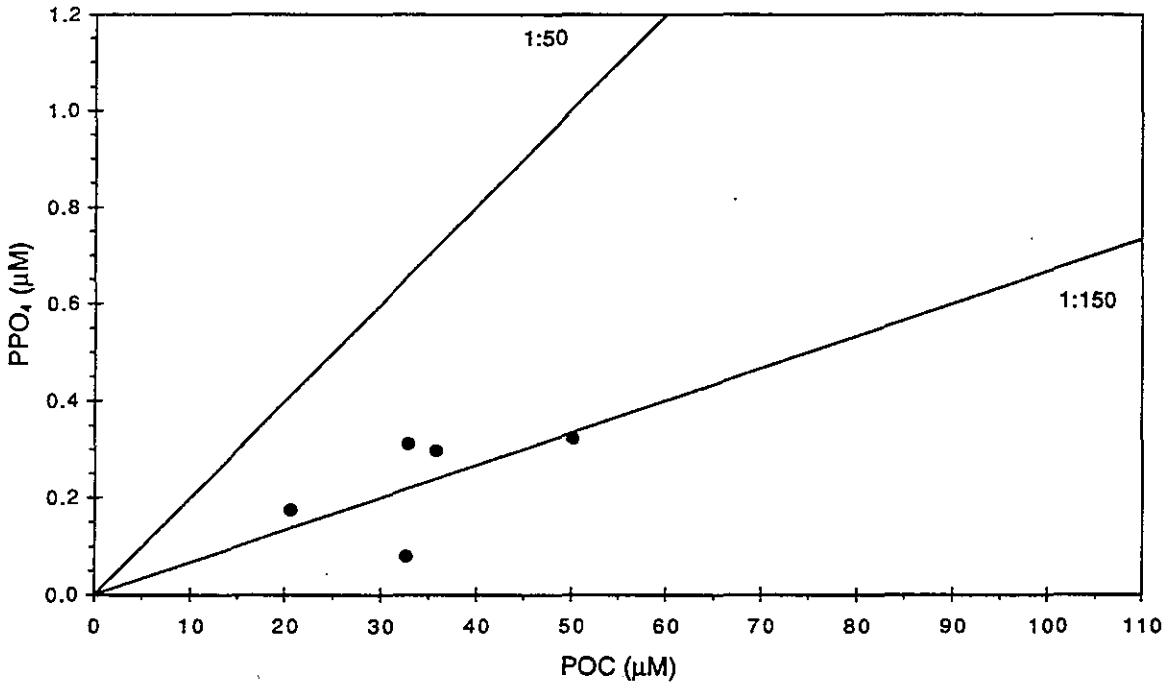
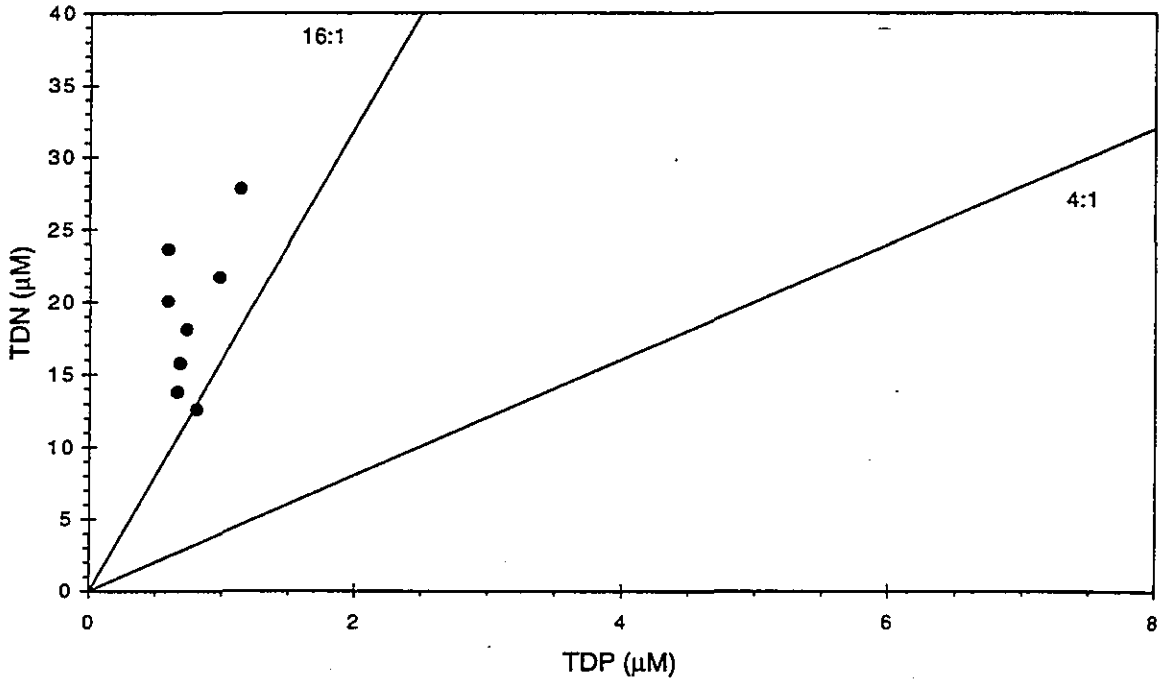


FIGURE 4-220
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

(a)



(b)

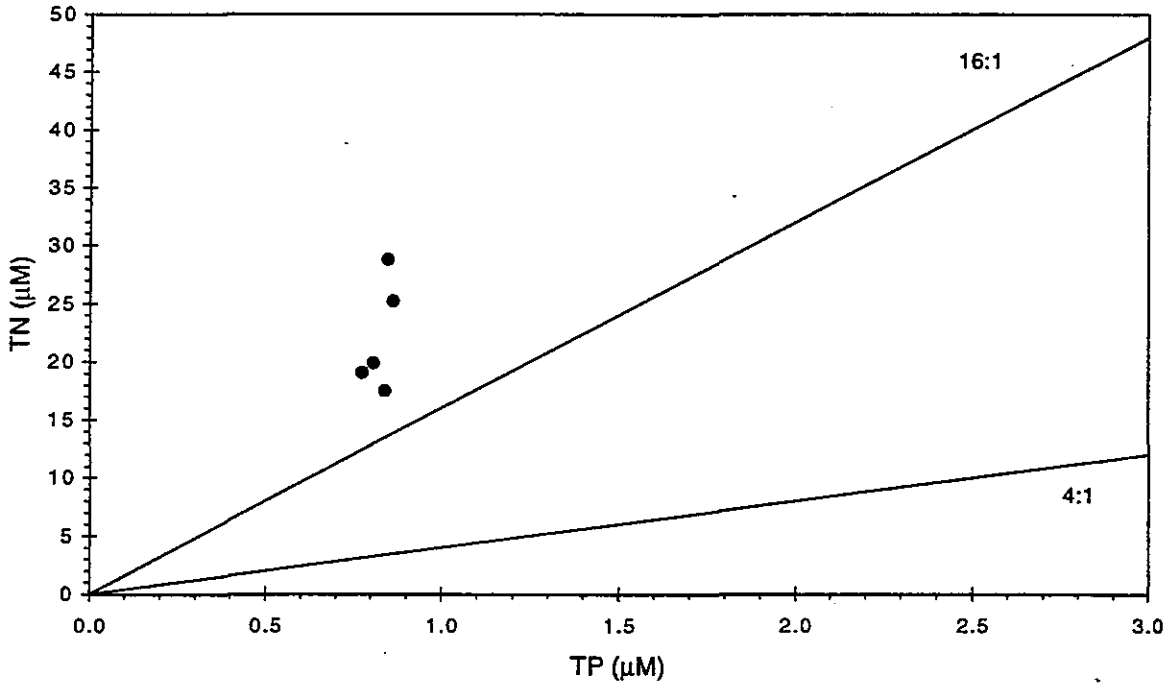
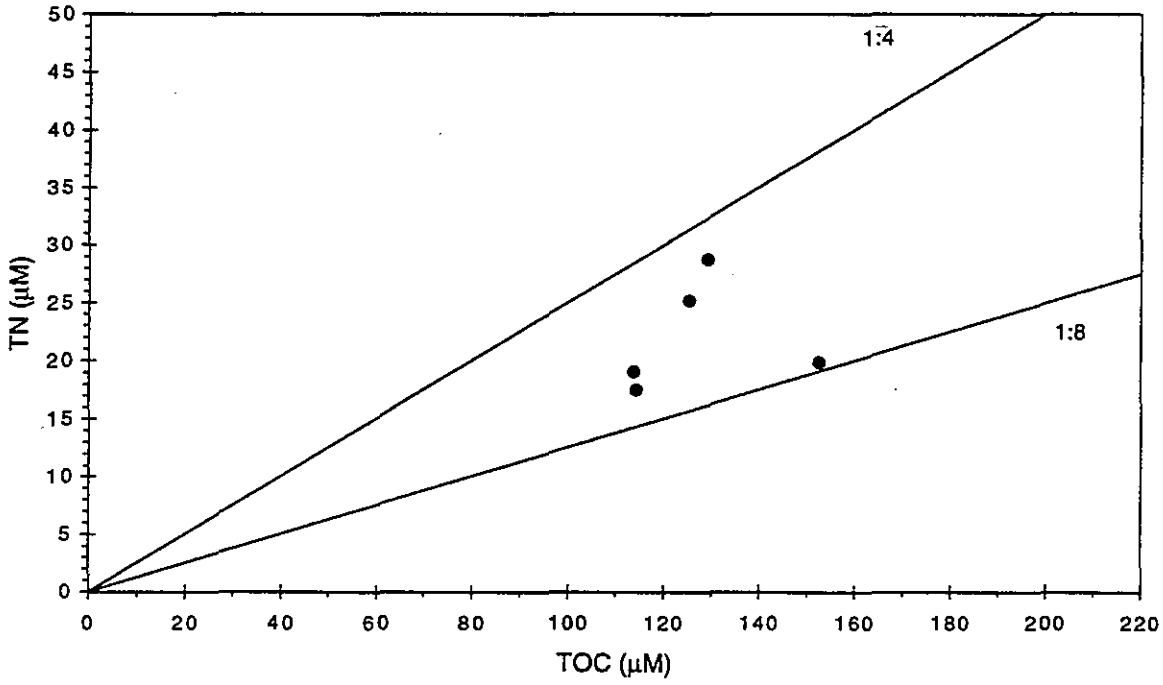


FIGURE 4-221
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

(a)



(b)

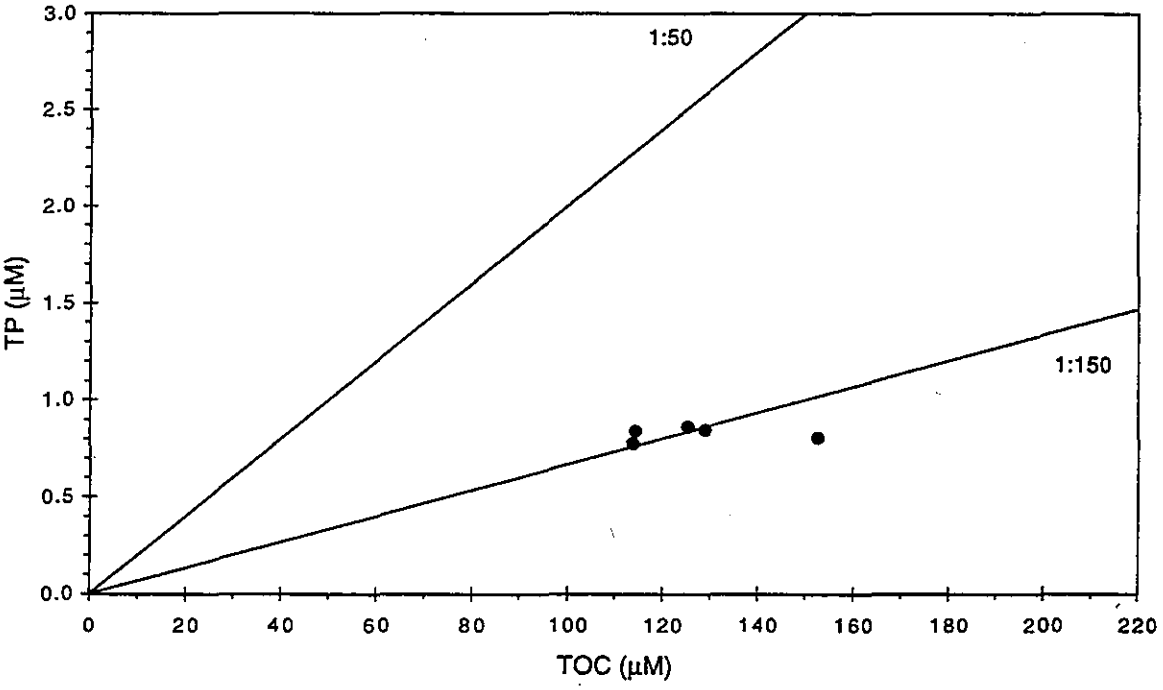


FIGURE 4-222
Nutrient vs. nutrient plots for nearfield survey W9615, (Oct 96).

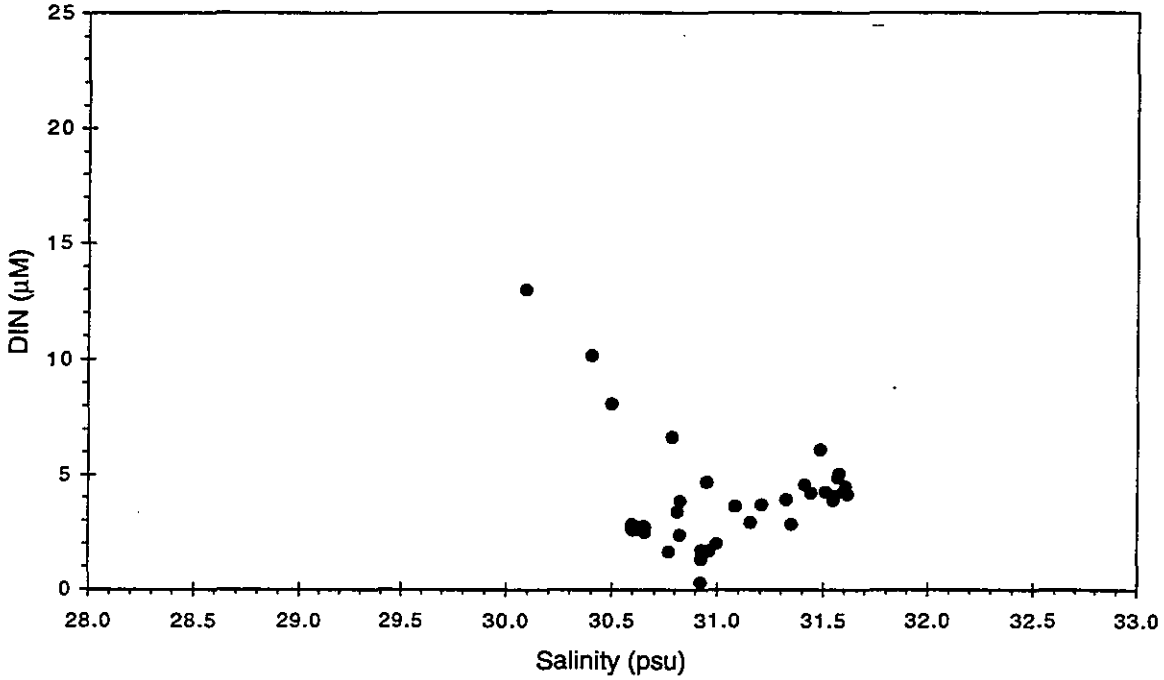


FIGURE 4-223
Nutrient vs. salinity plots for nearfield survey W9615, (Oct 96).

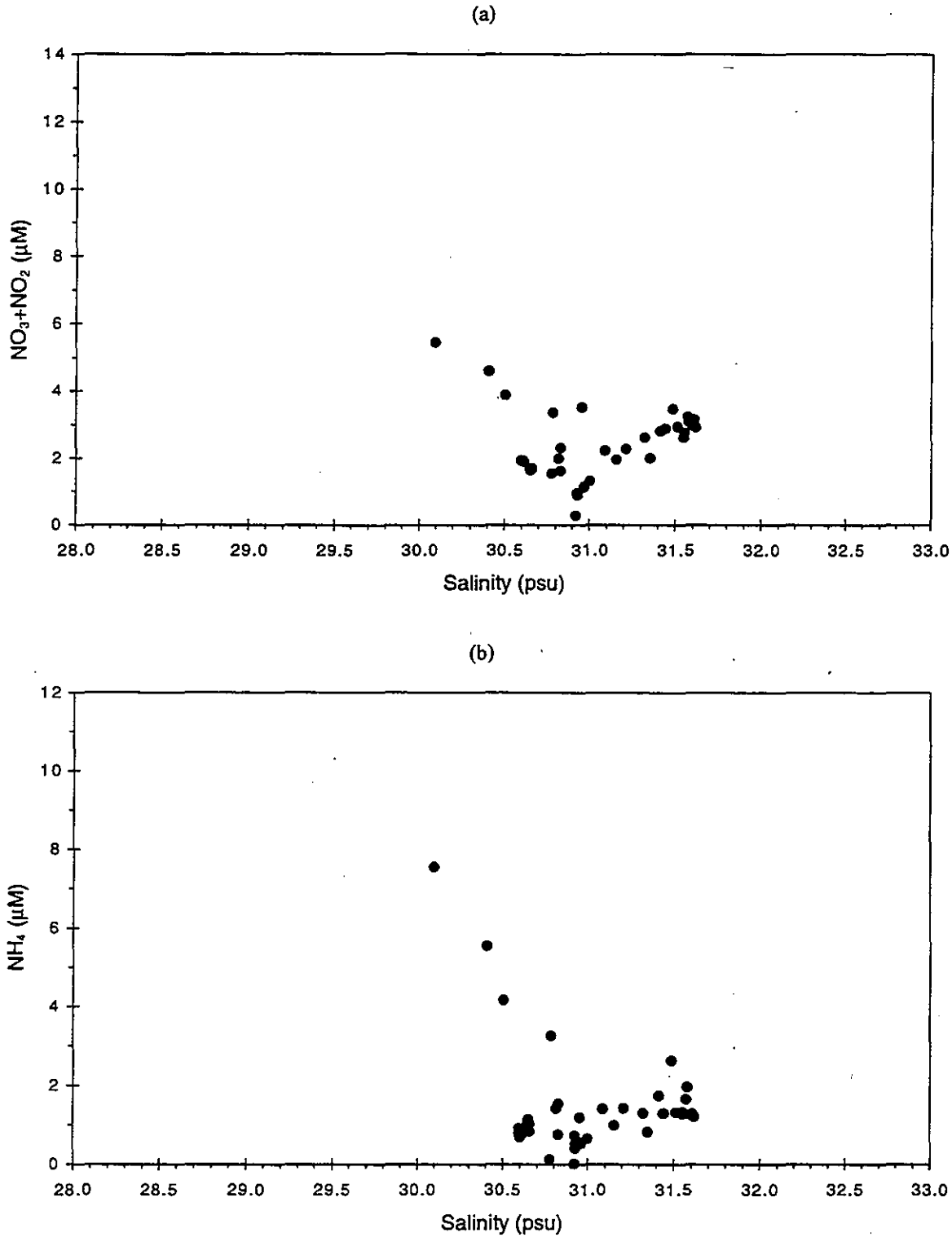
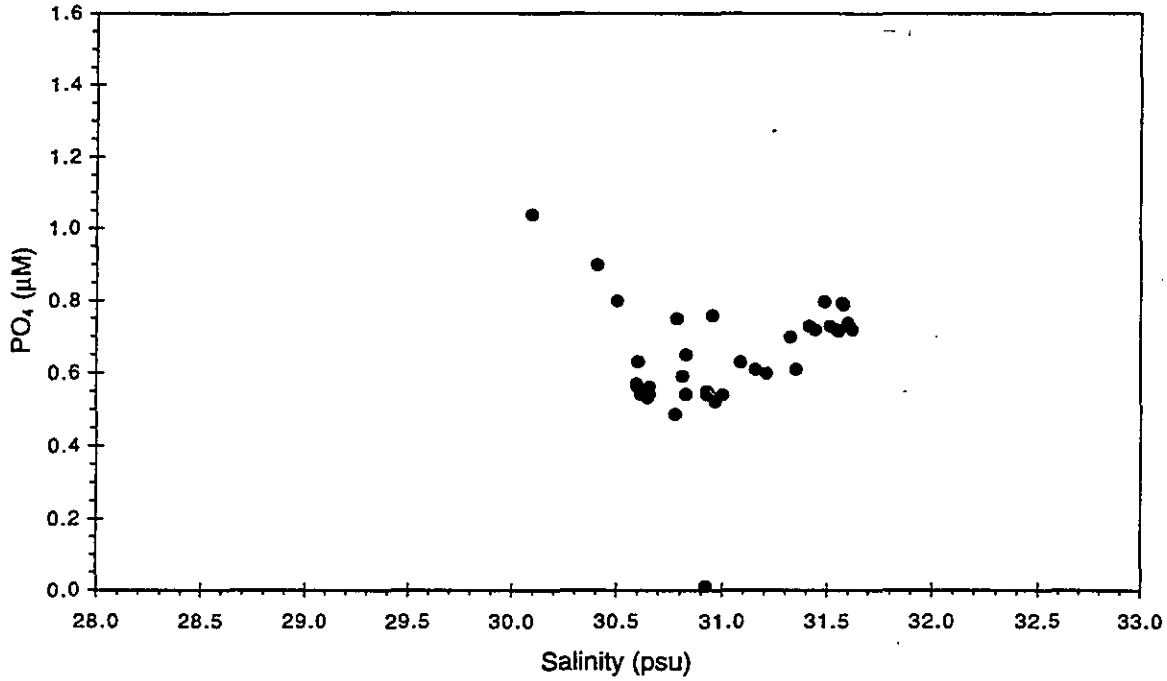


FIGURE 4-224
Nutrient vs. salinity plots for nearfield survey W9615, (Oct 96).

(a)



(b)

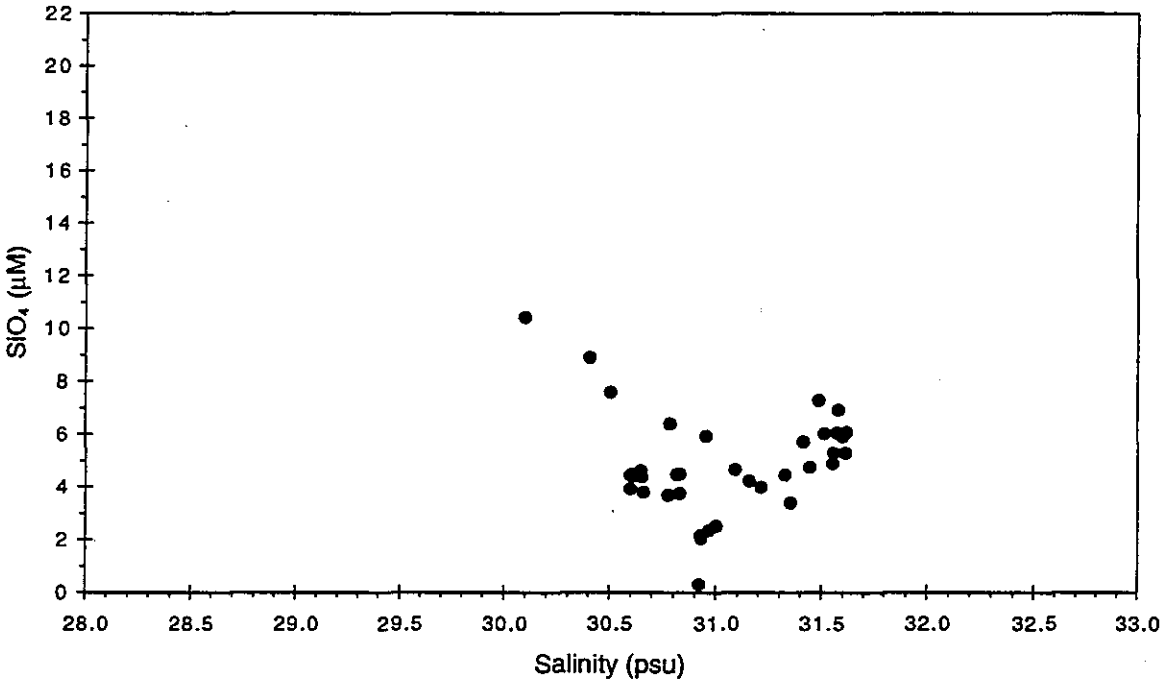
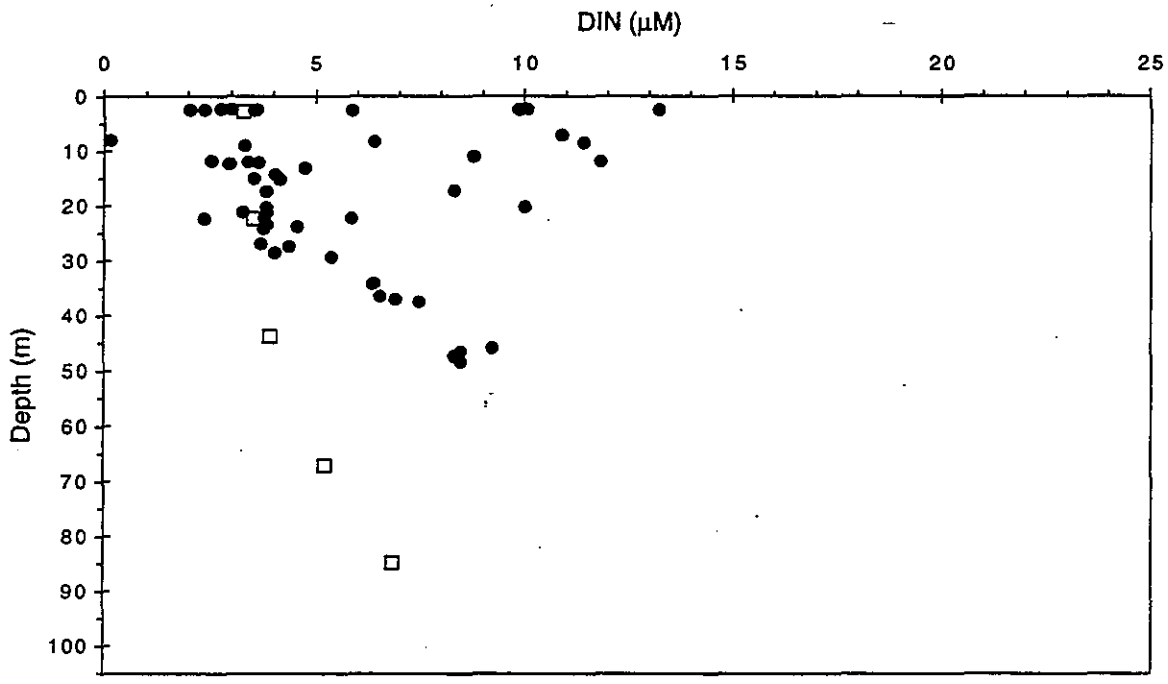


FIGURE 4-225
Nutrient vs. salinity plots for nearfield survey W9615, (Oct 96).



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-226
Depth vs. nutrient plots for winter nutrients survey W9616, (Nov 96).

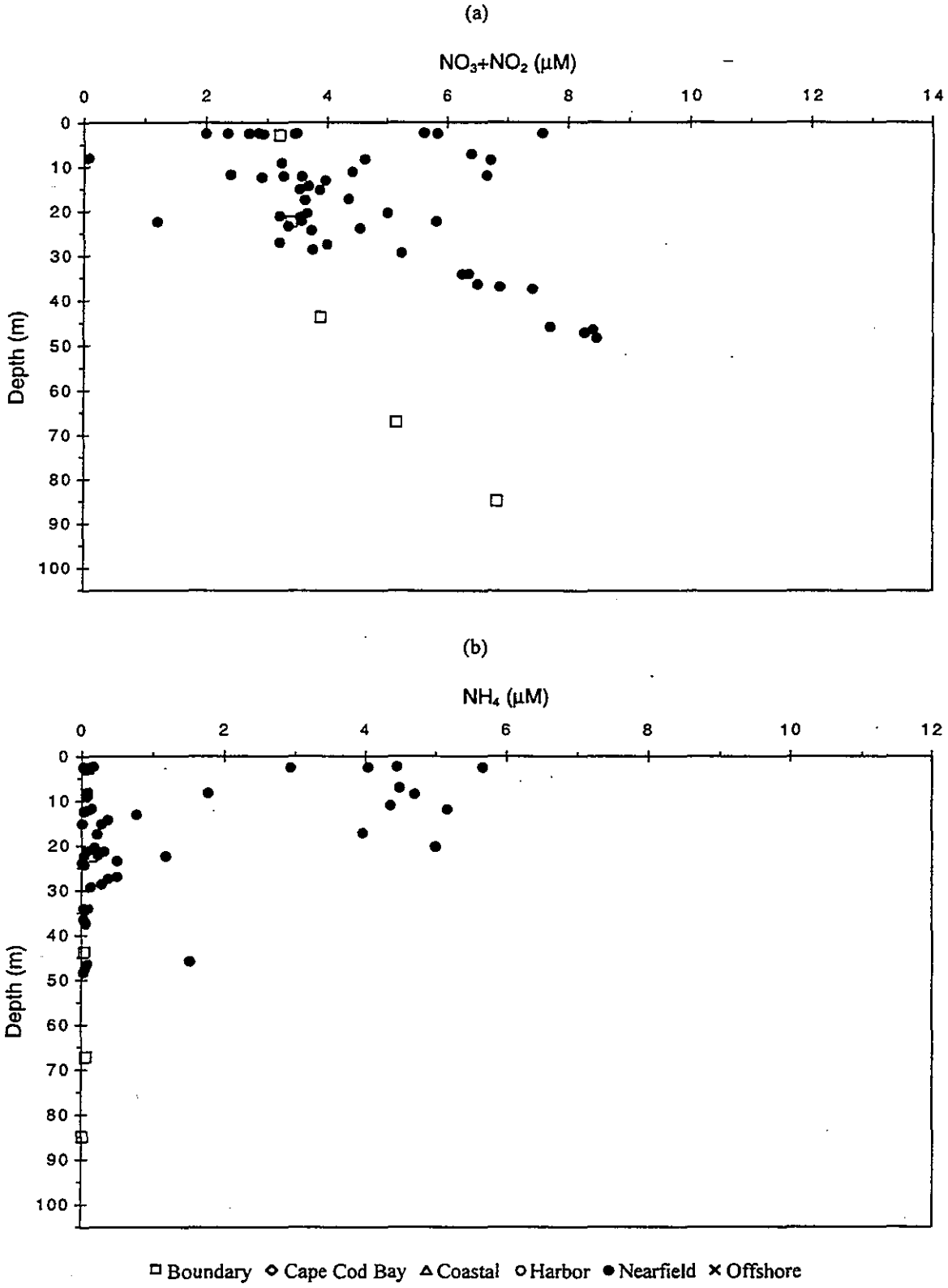


FIGURE 4-227
Depth vs. nutrient plots for winter nutrients survey W9616, (Nov 96).

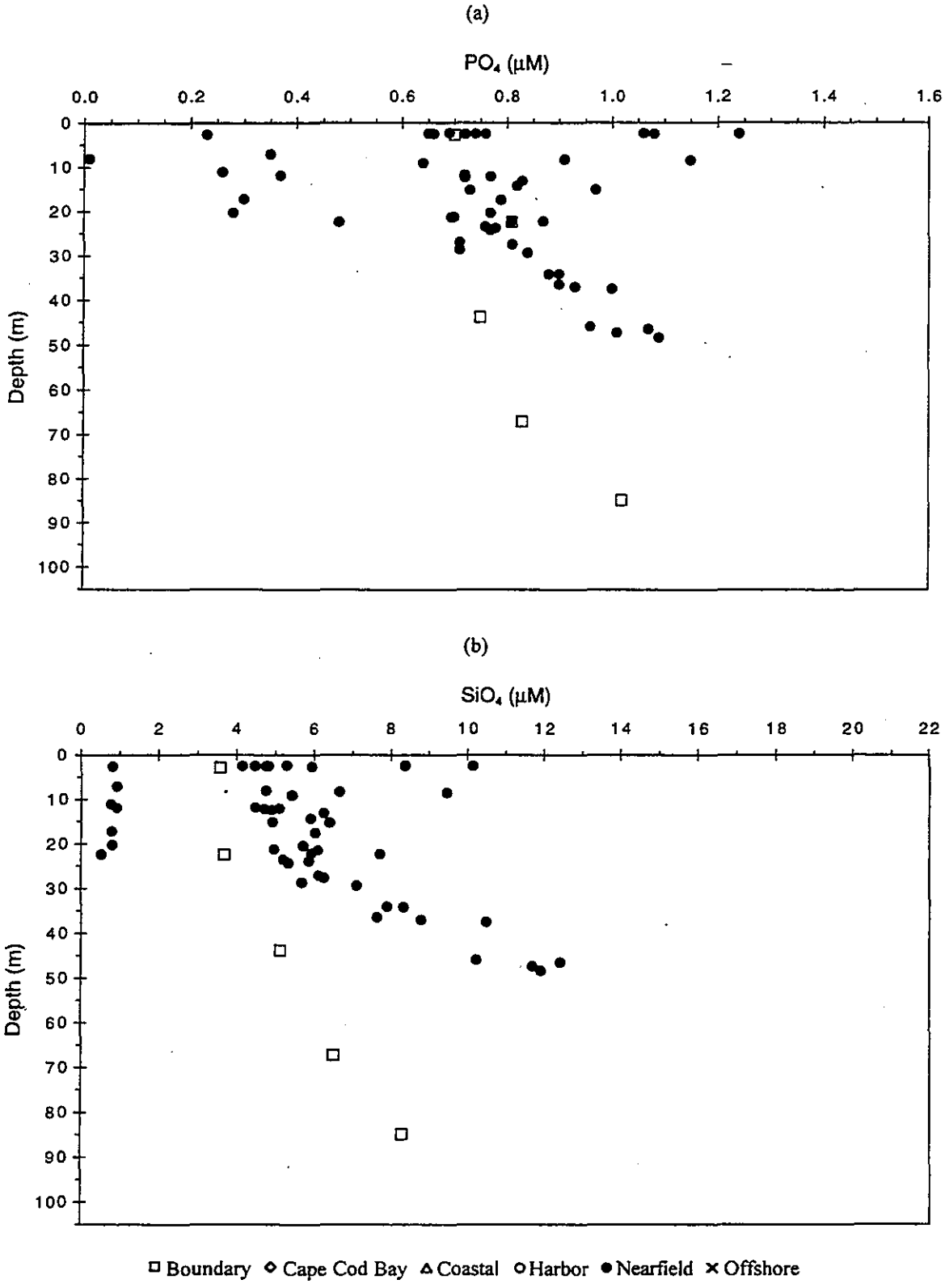


FIGURE 4-228
Depth vs. nutrient plots for winter nutrients survey W9616, (Nov 96).

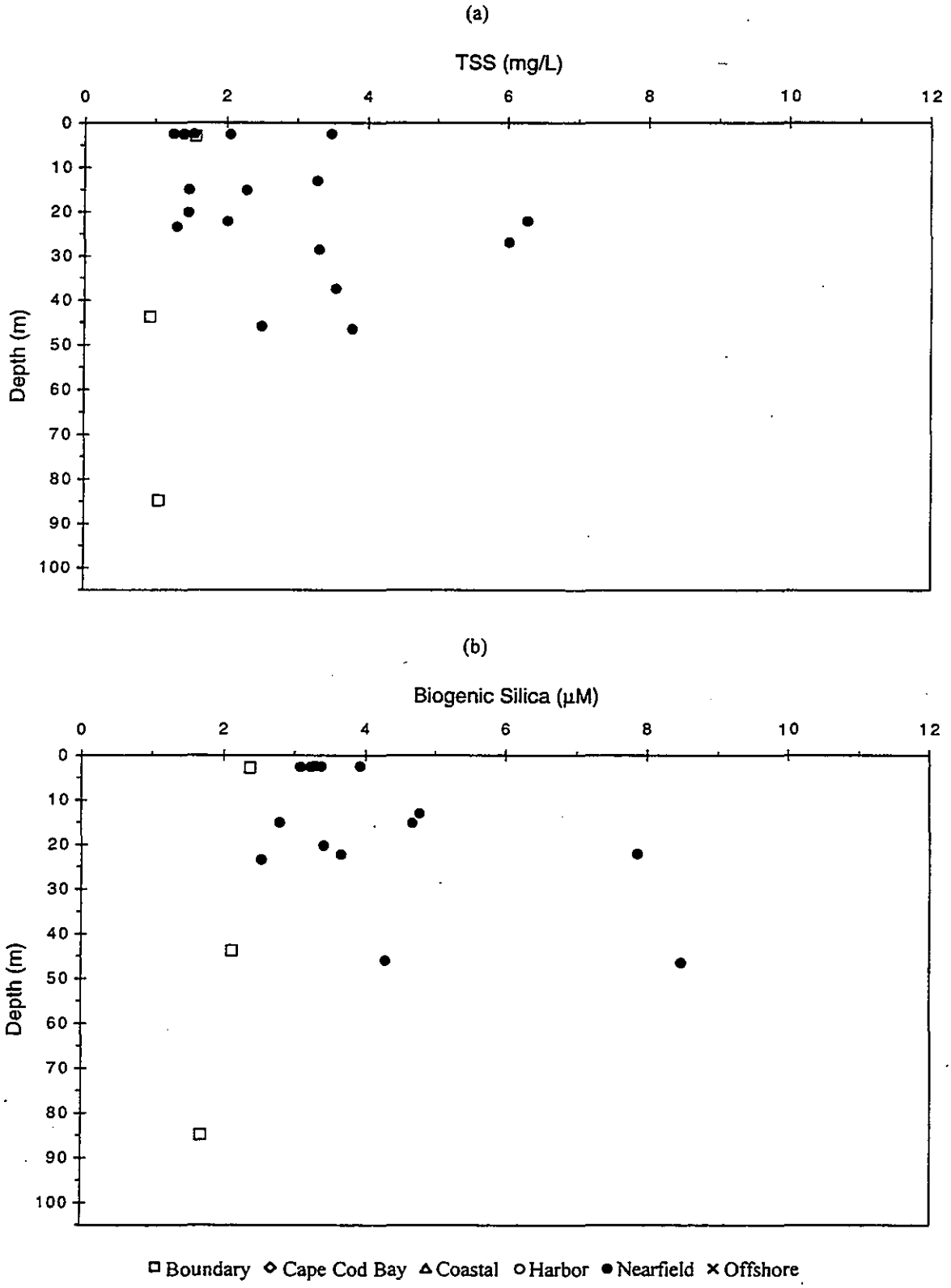
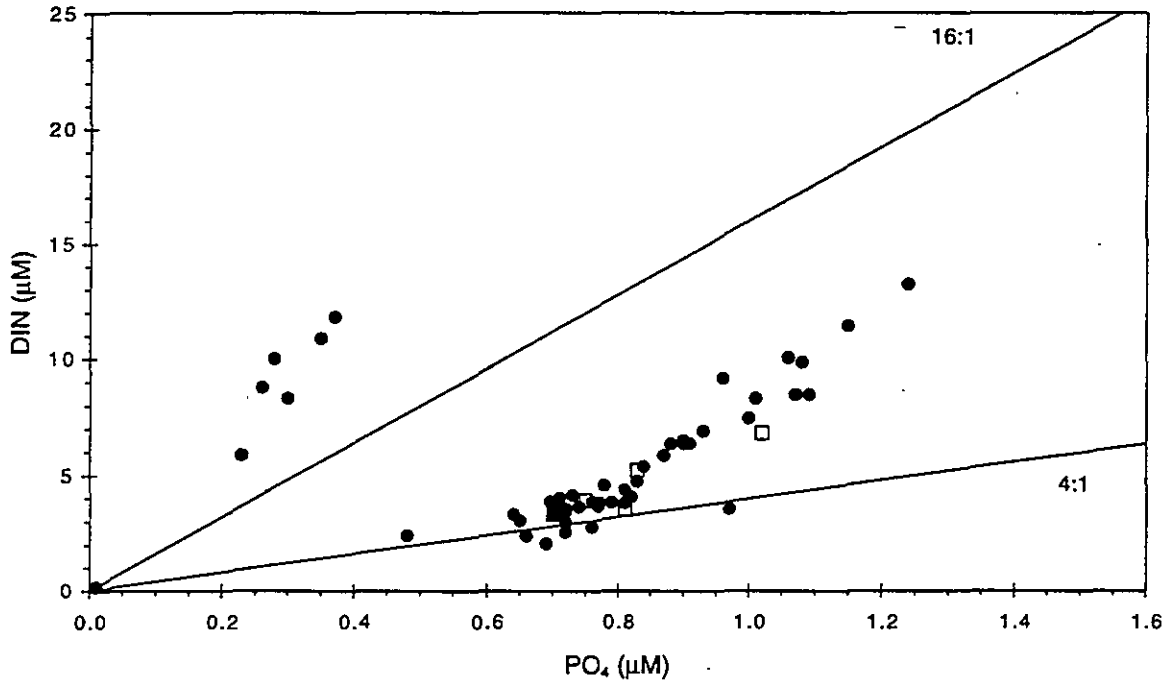
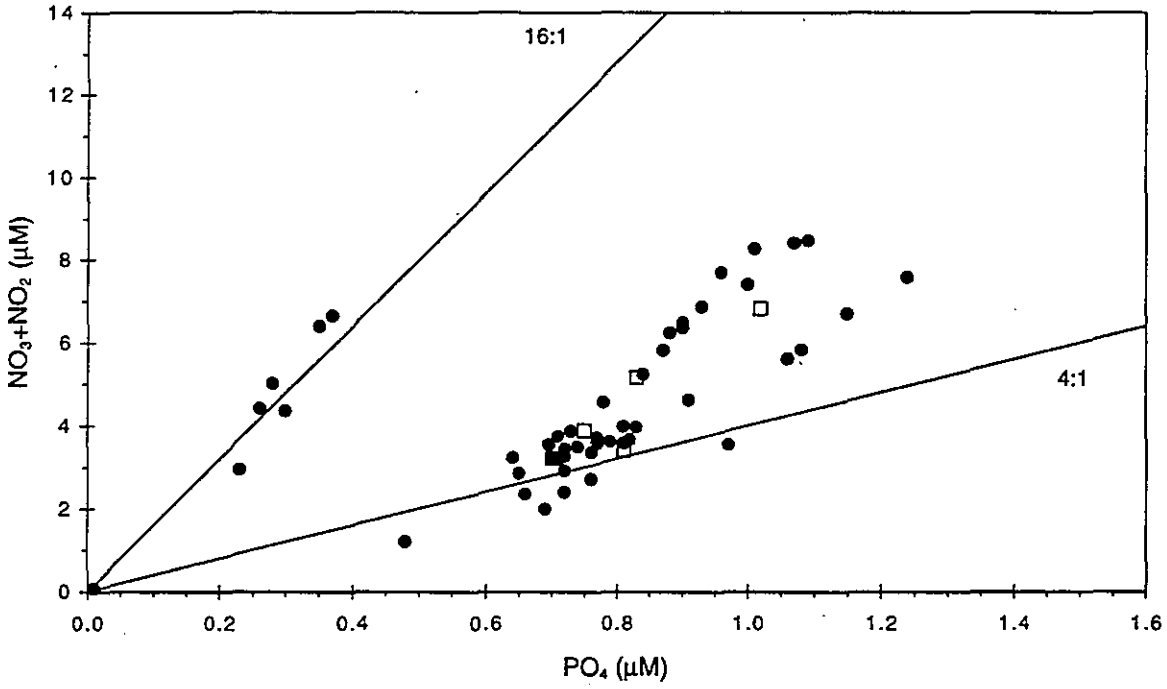


FIGURE 4-229
Depth vs. nutrient plots for winter nutrients survey W9616, (Nov 96).

(a)



(b)



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-230
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

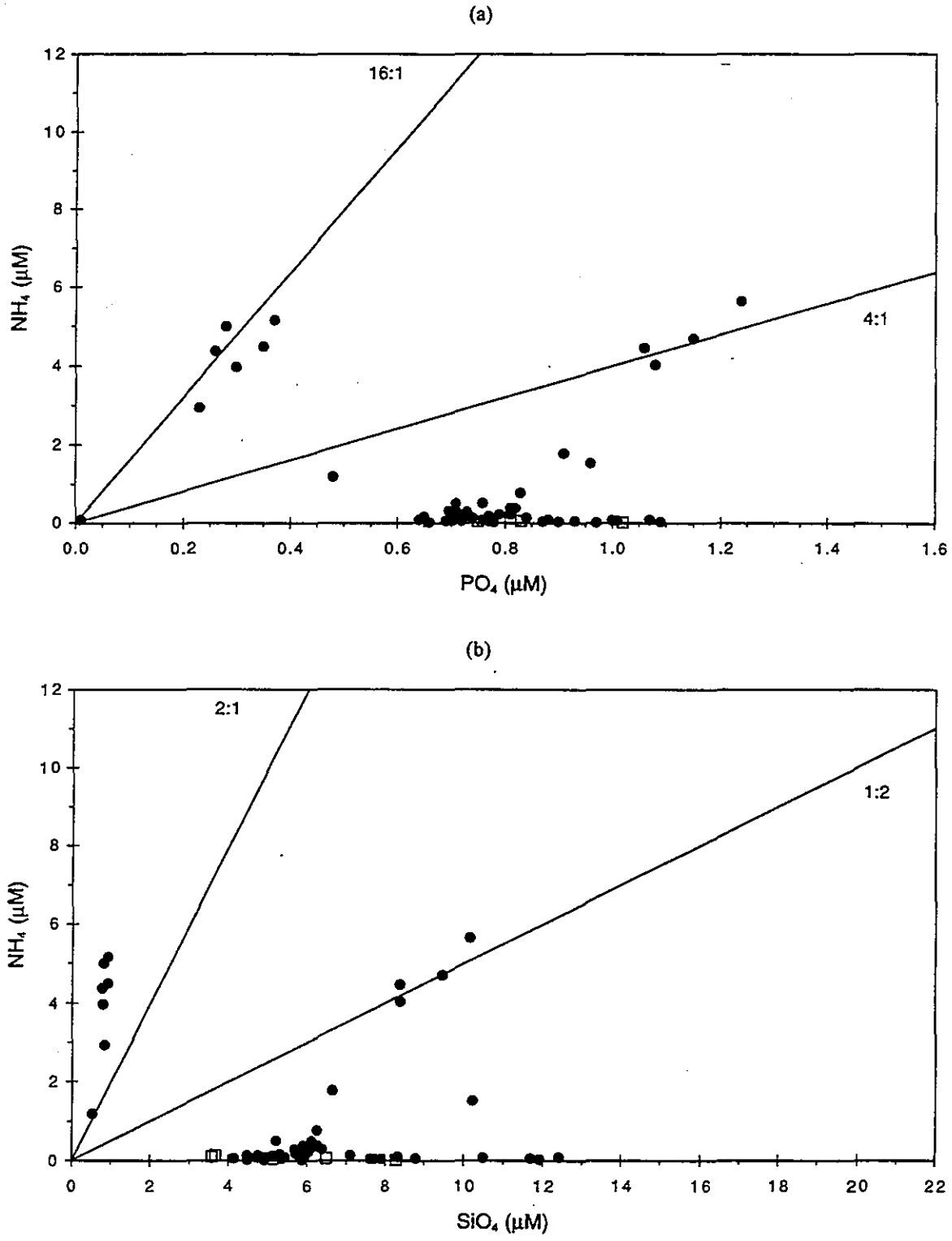


FIGURE 4-231
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

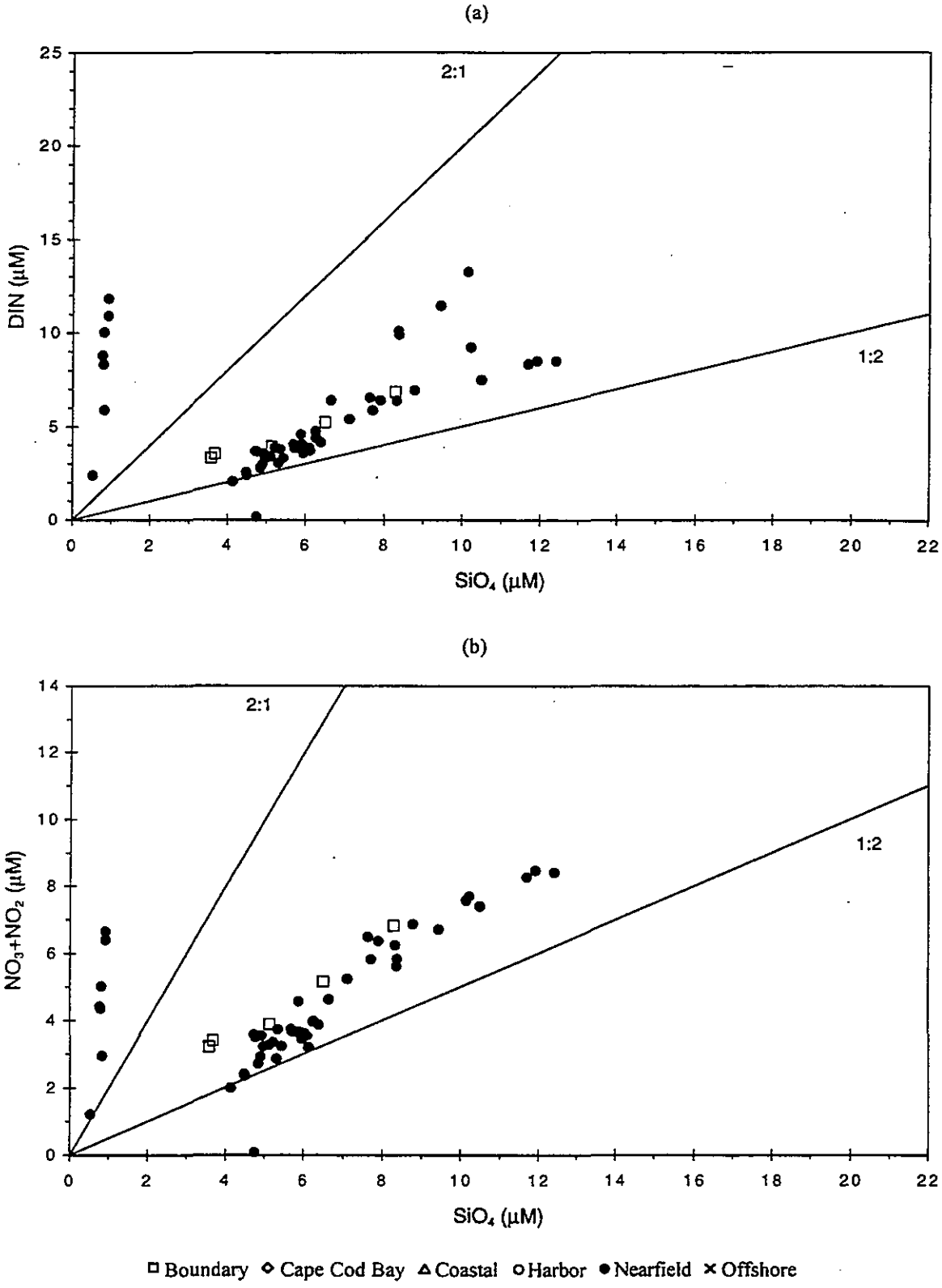


FIGURE 4-232
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

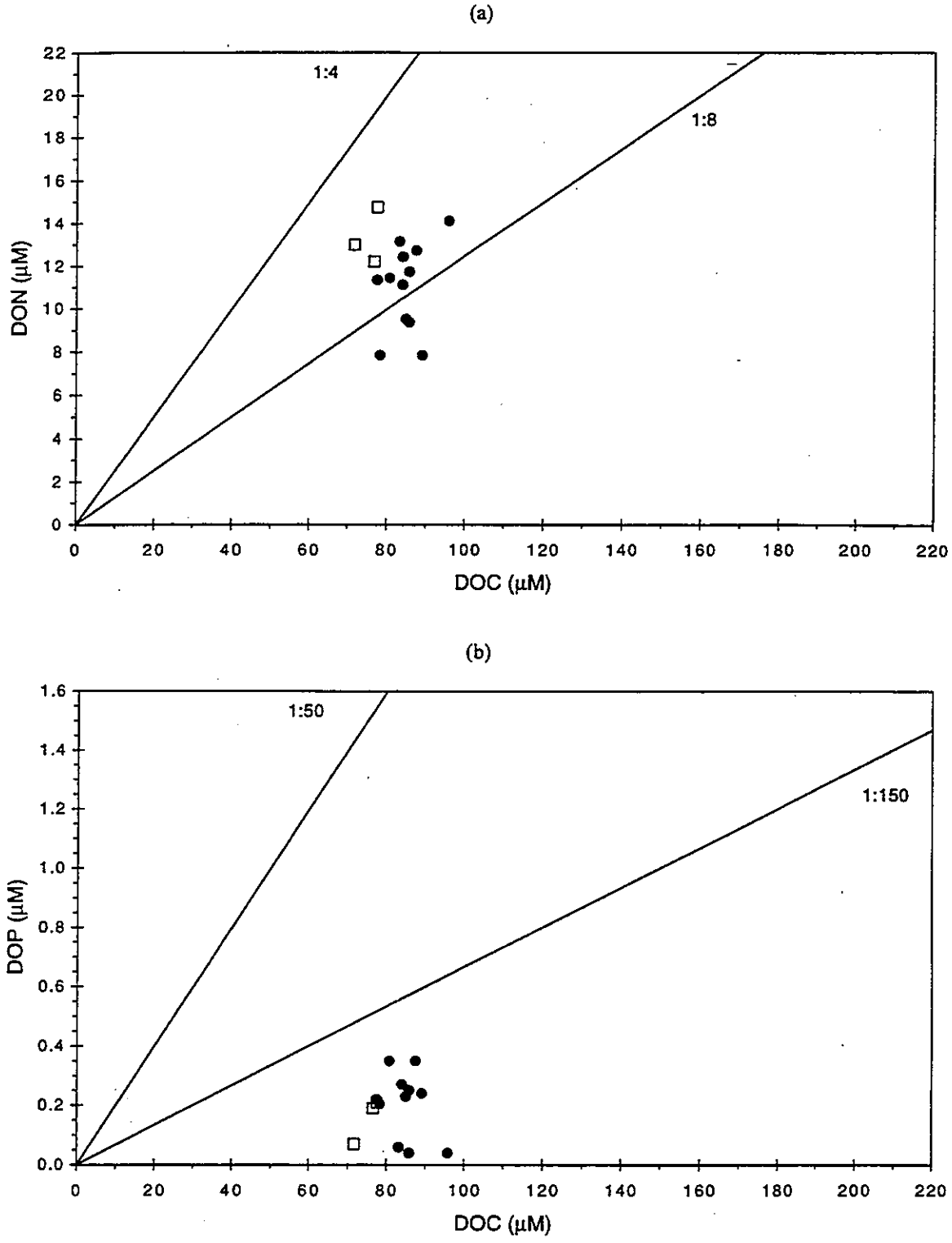


FIGURE 4-233
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

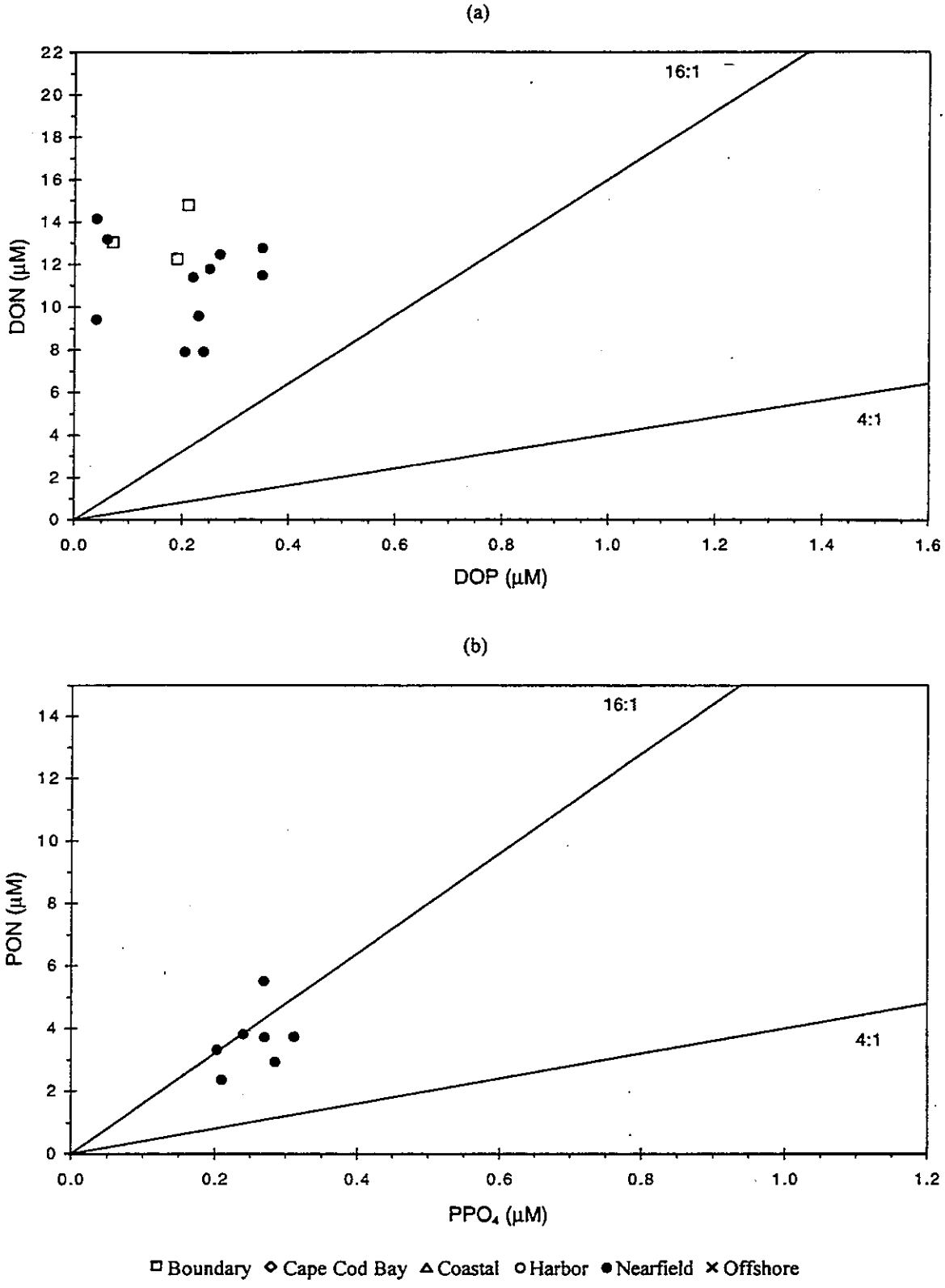


FIGURE 4-234
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

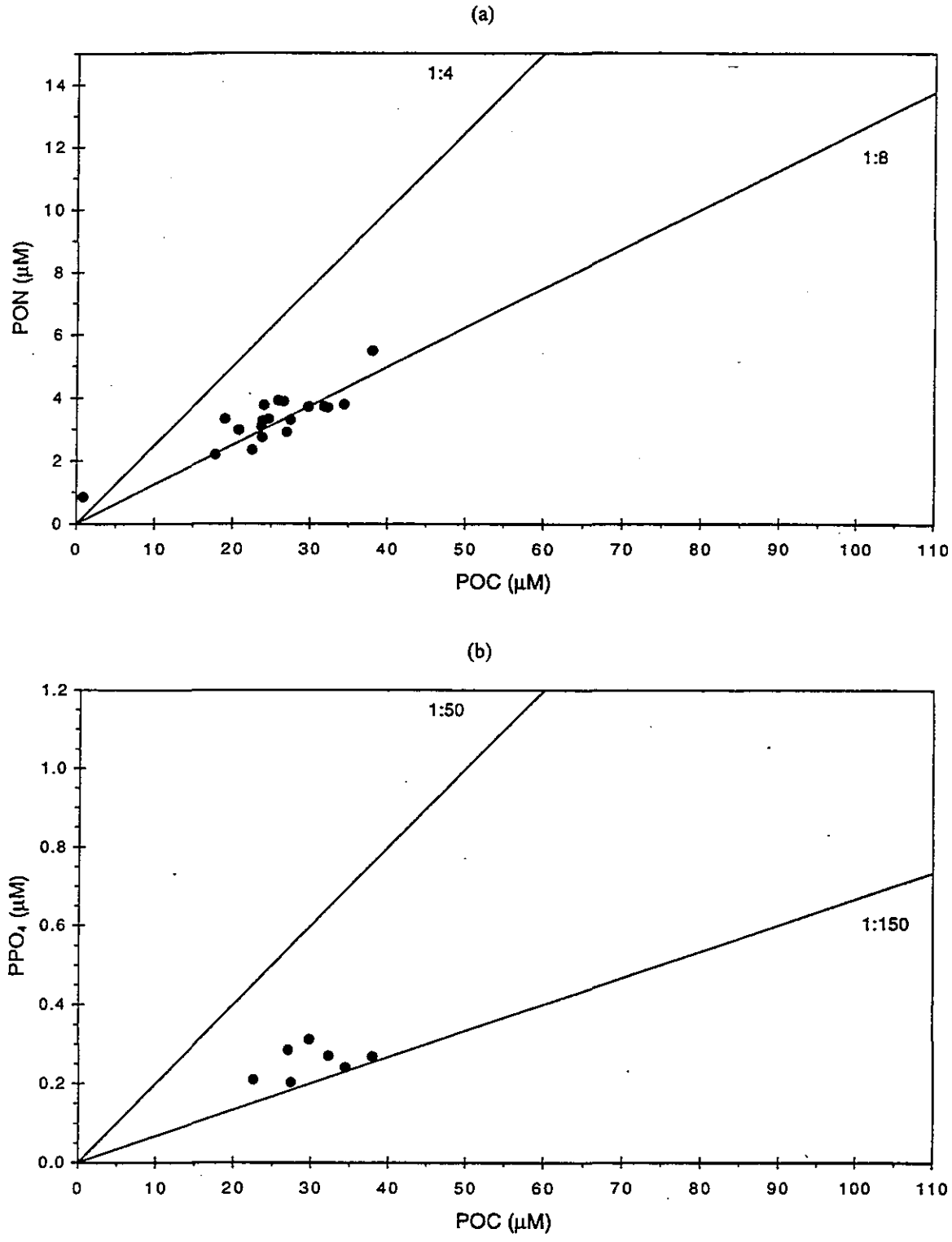


FIGURE 4-235
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

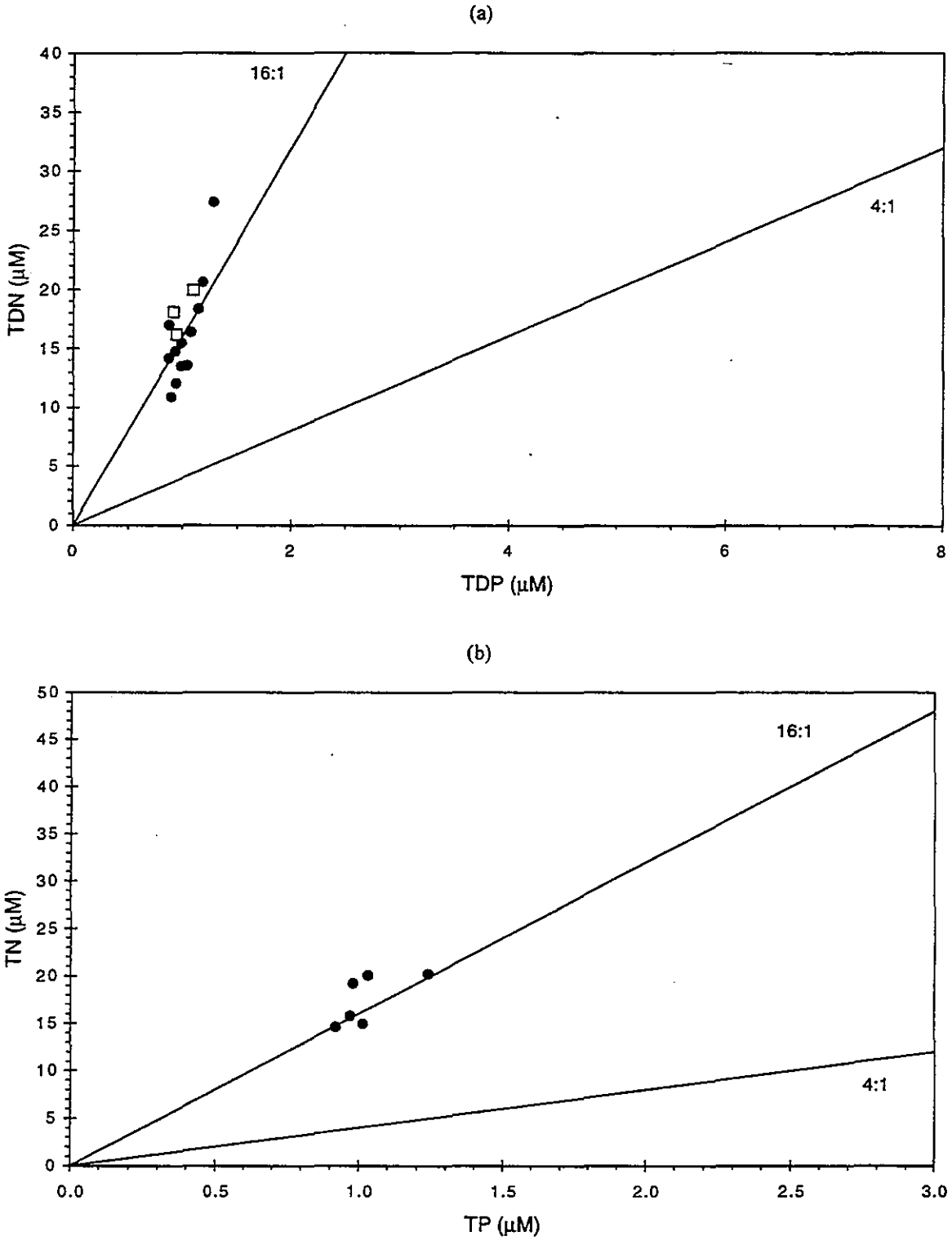


FIGURE 4-236
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

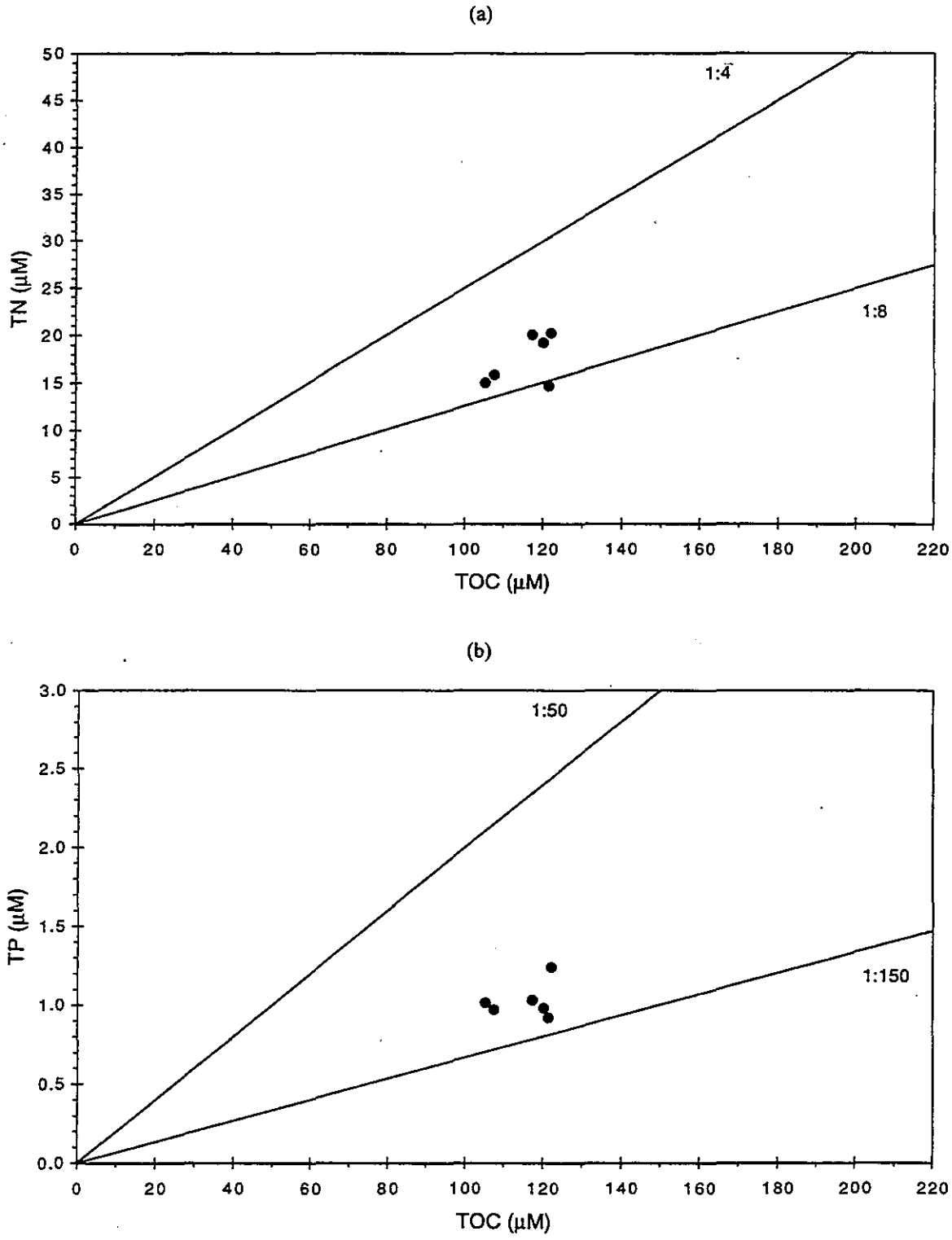
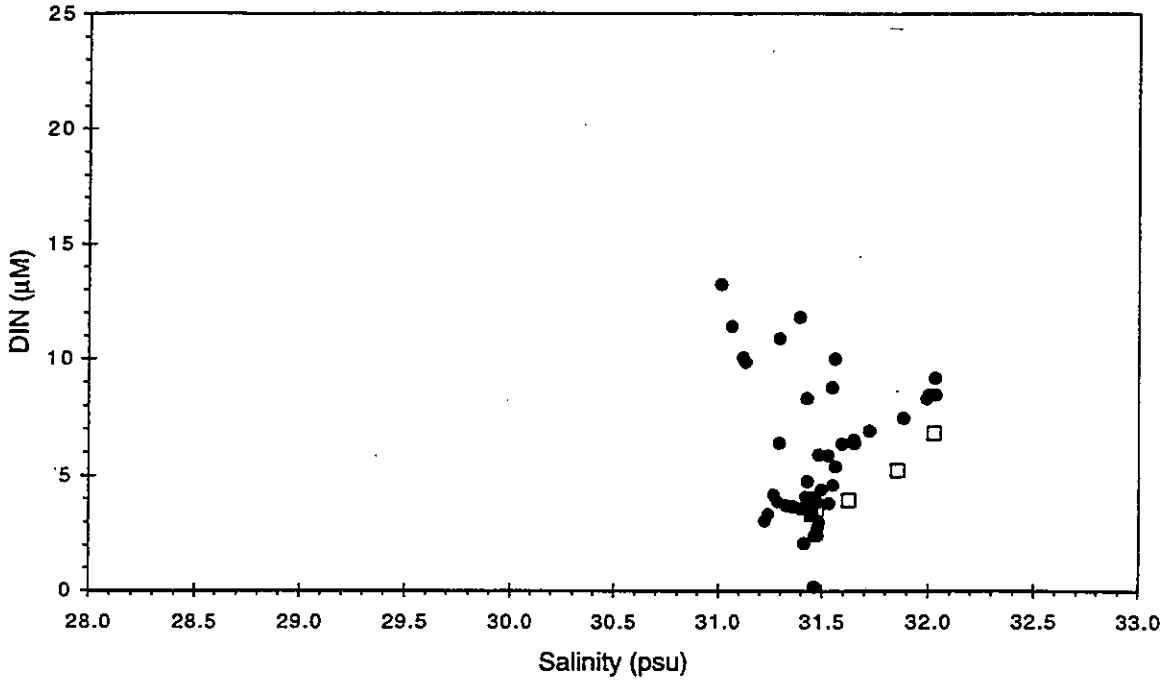


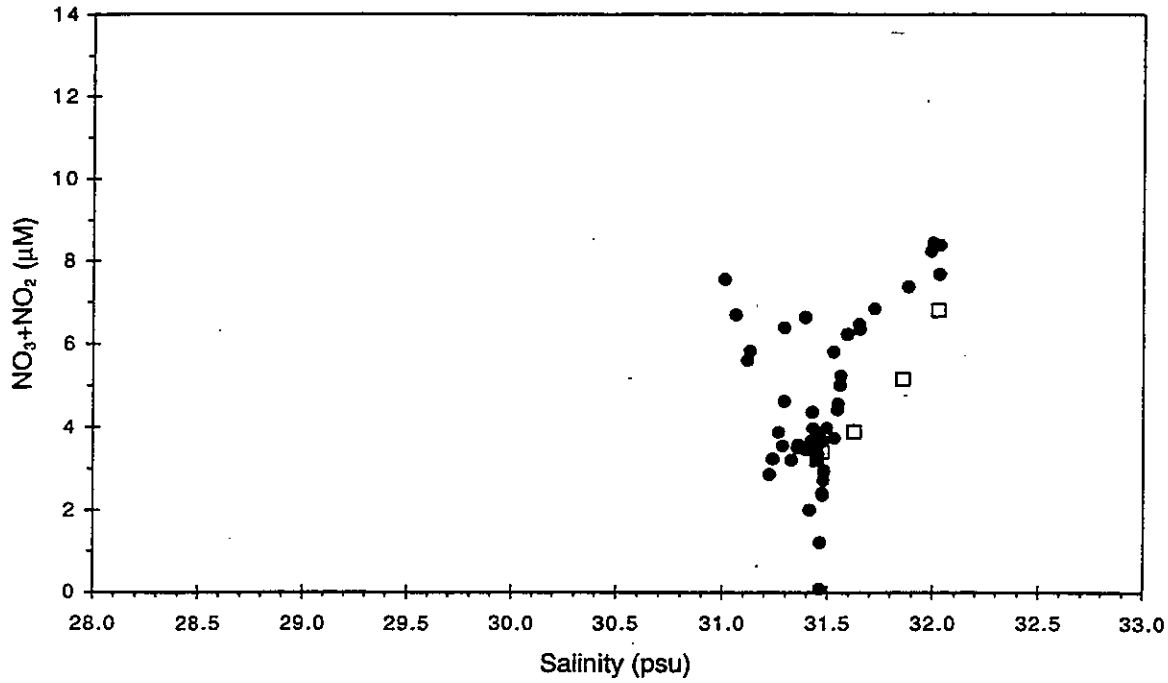
FIGURE 4-237
Nutrient vs. nutrient plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).



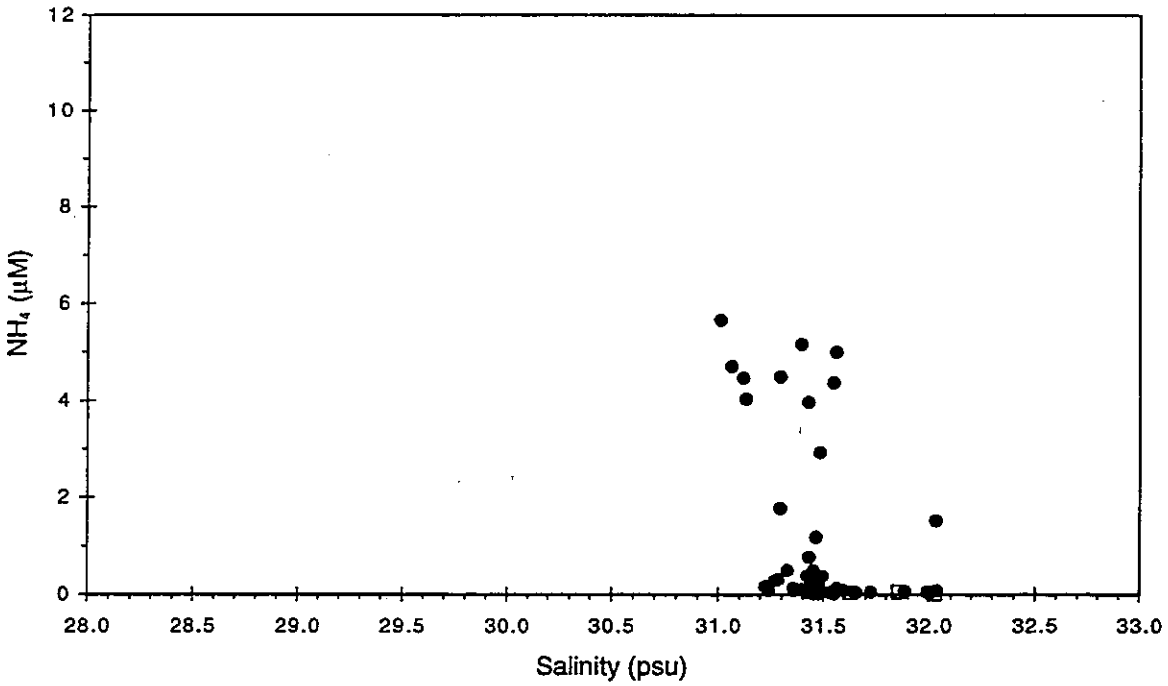
□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-238
Nutrient vs. salinity plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

(a)



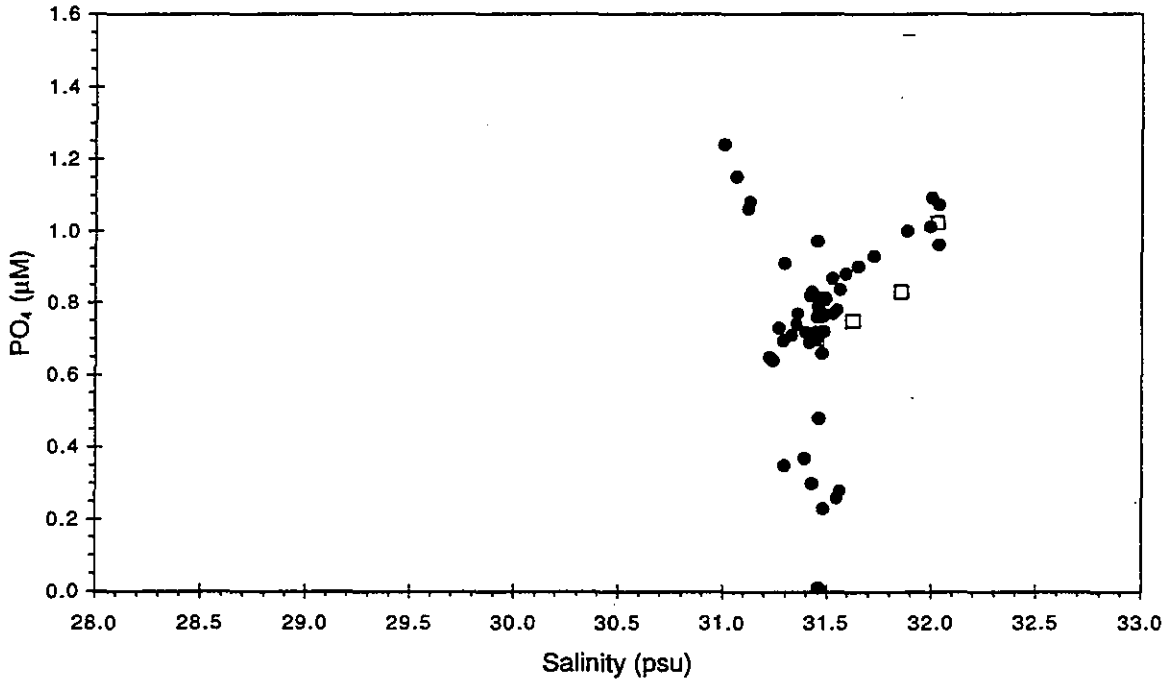
(b)



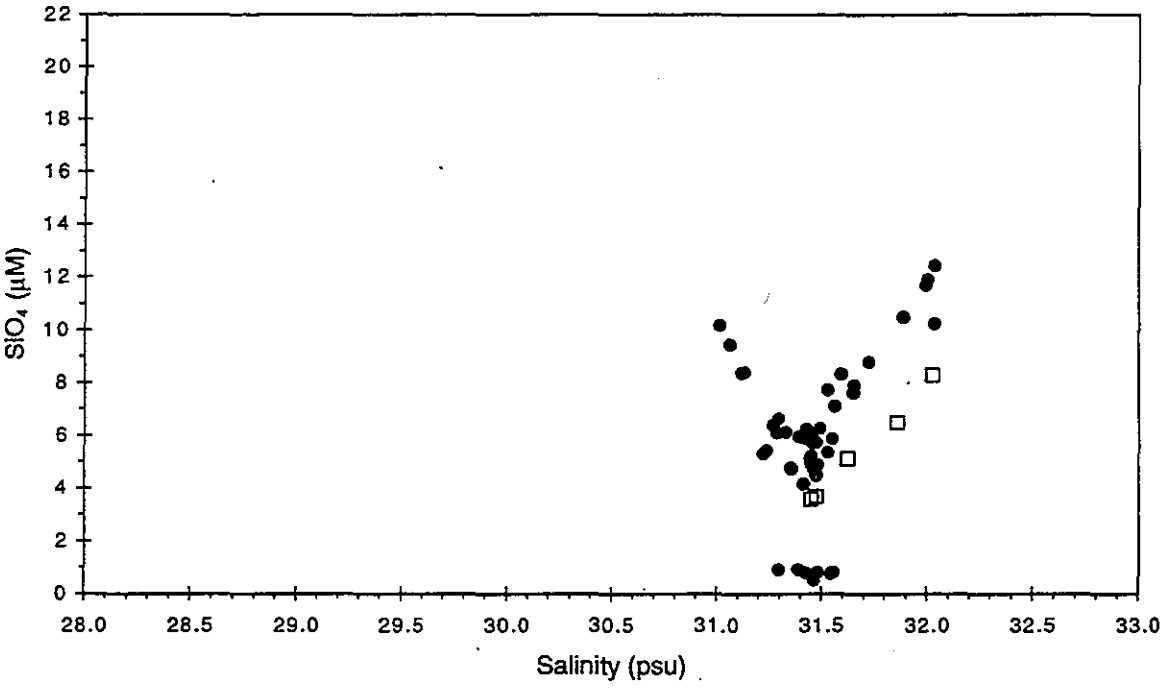
□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-239
Nutrient vs. salinity plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).

(a)

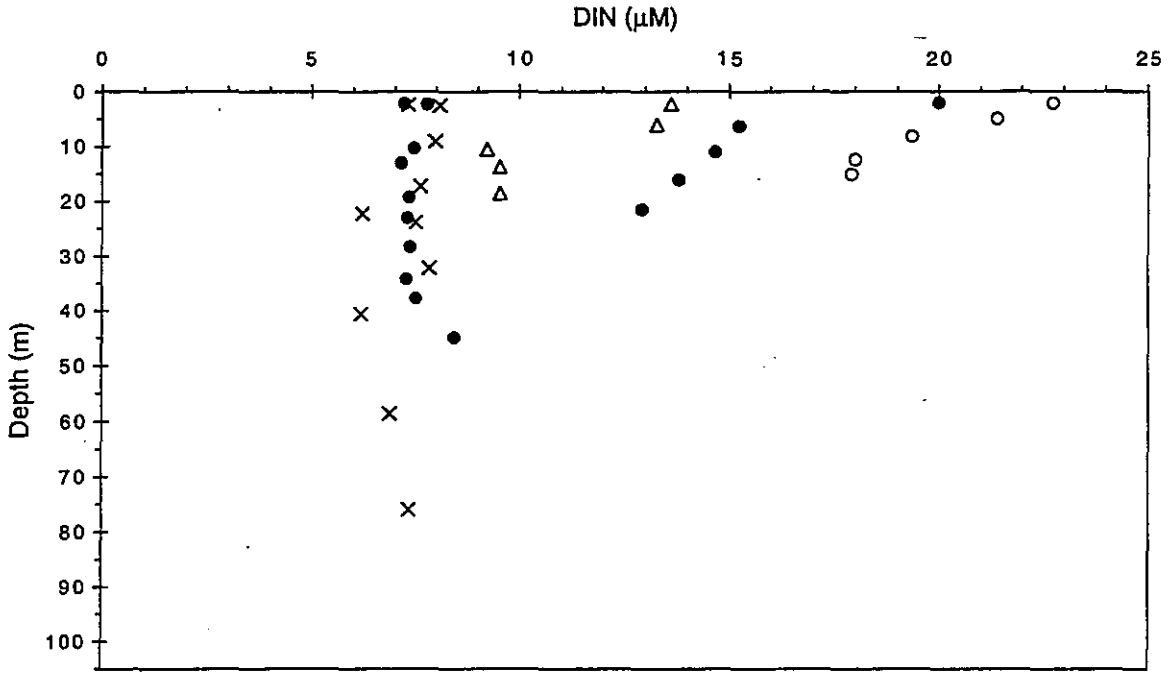


(b)



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-240
Nutrient vs. salinity plots for nearfield/Stellwagen Basin survey W9616, (Nov 96).



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-241
Depth vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

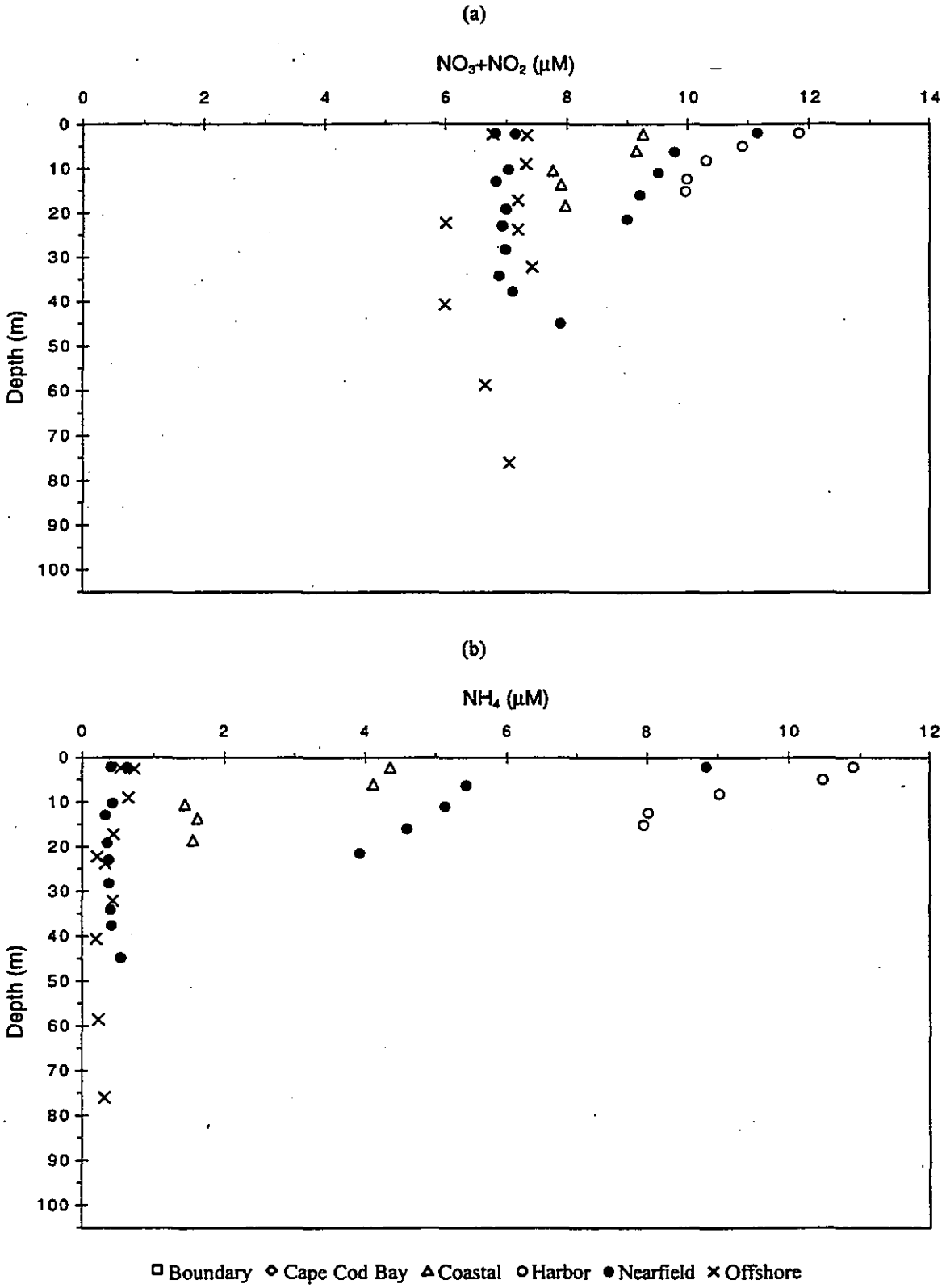


FIGURE 4-242
Depth vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

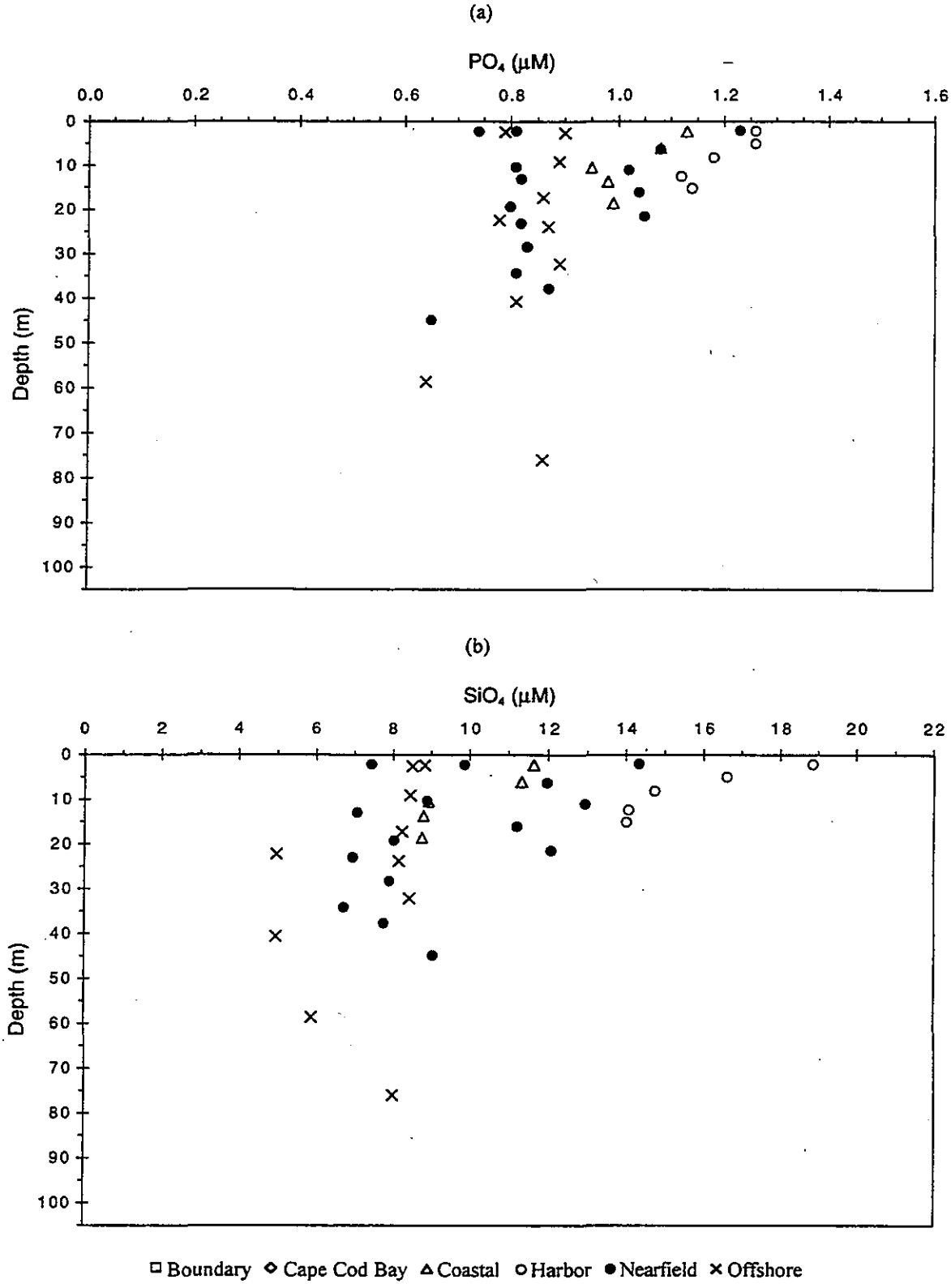


FIGURE 4-243
Depth vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

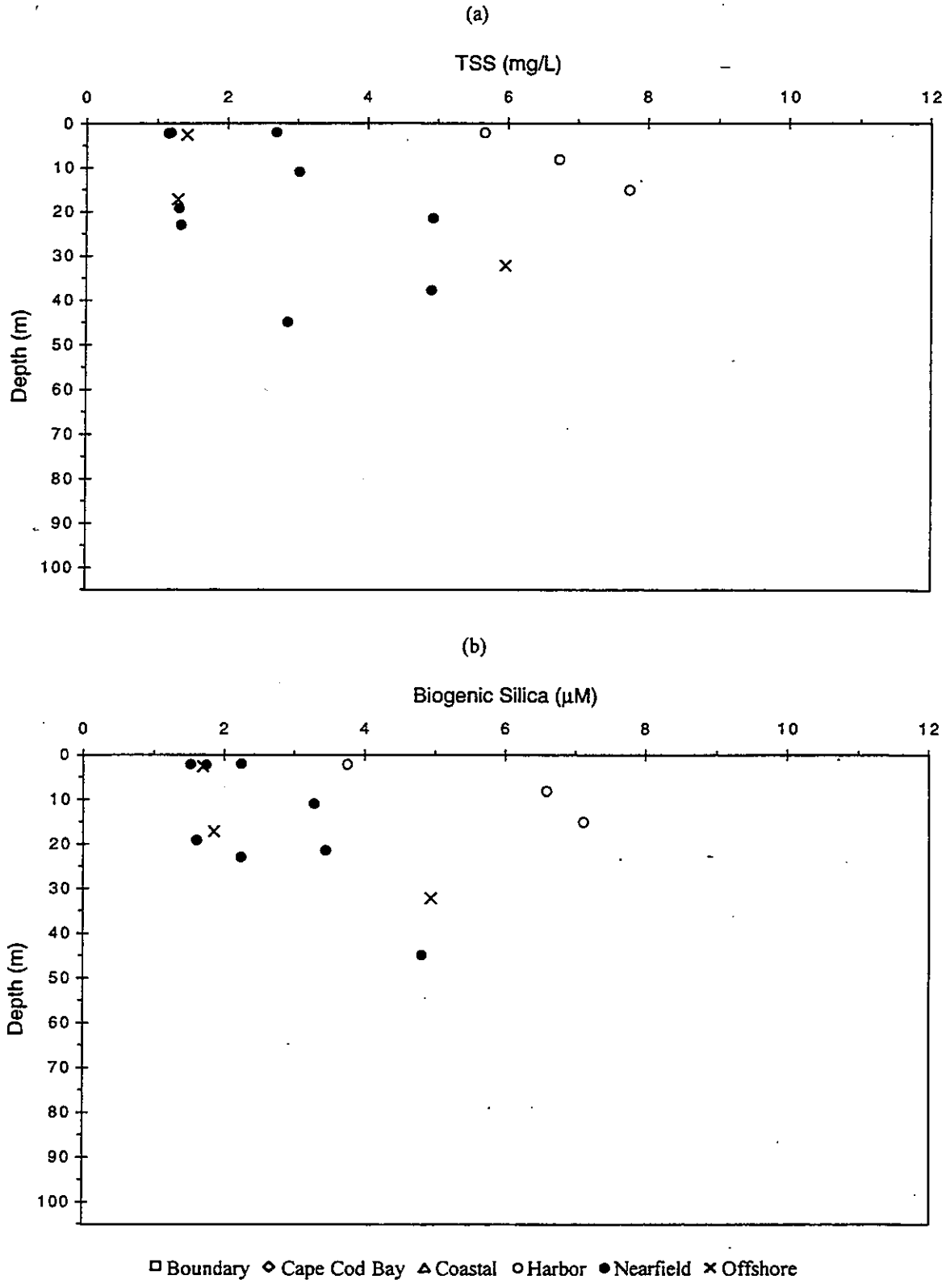
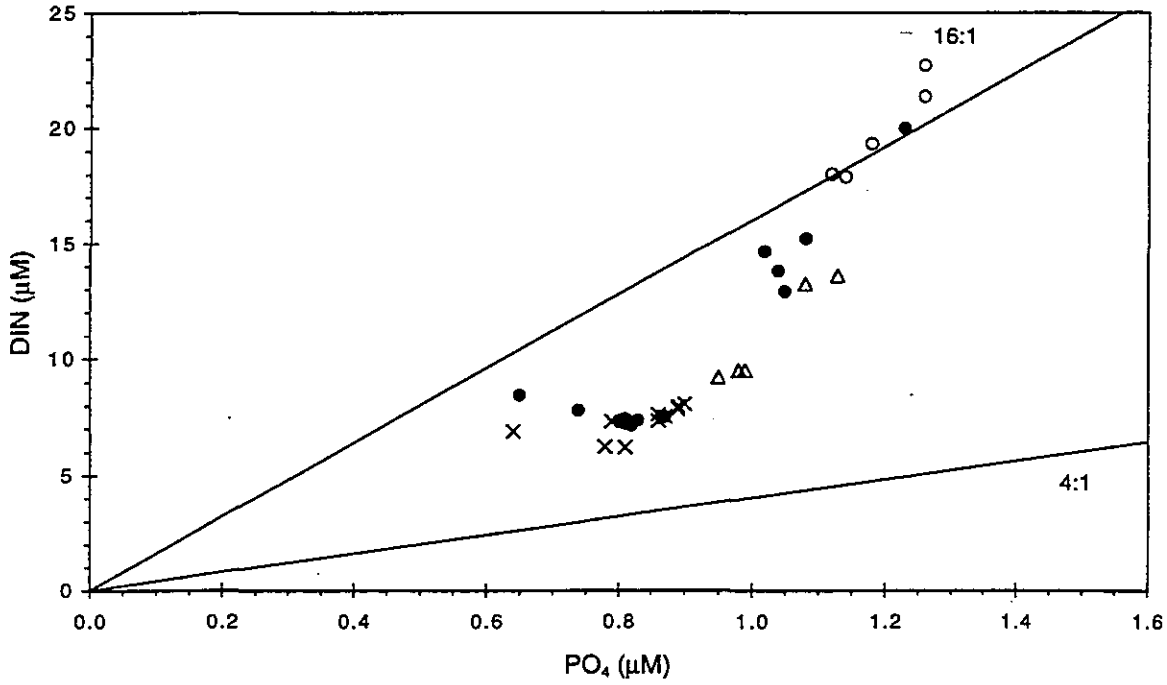
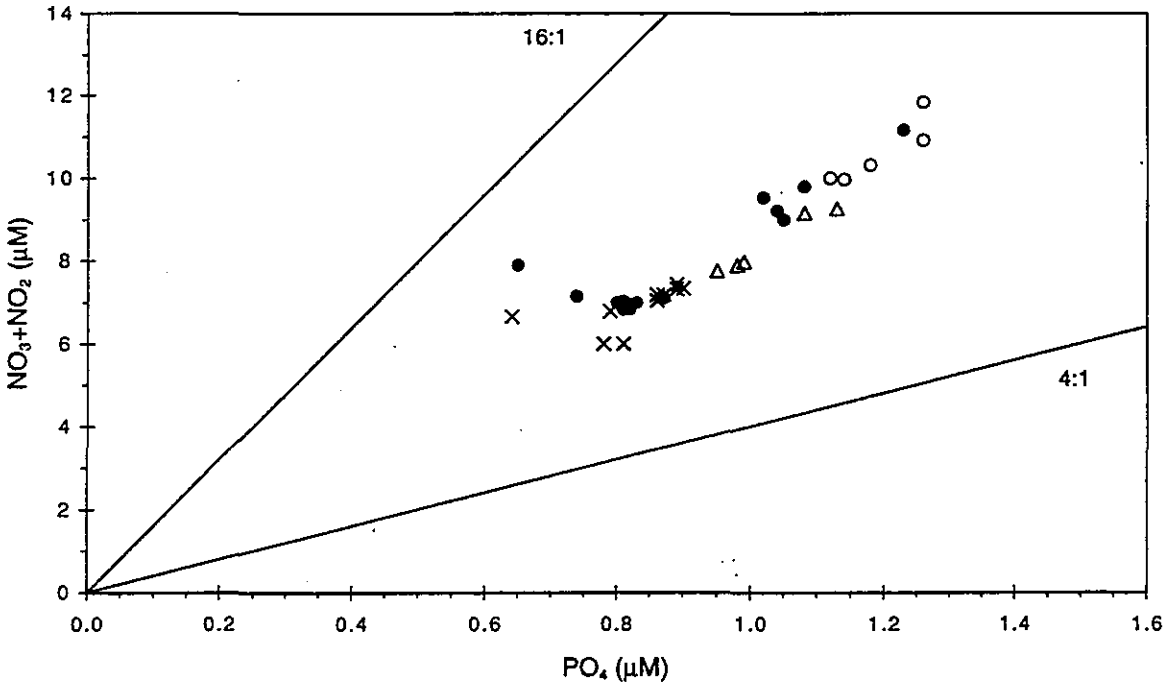


FIGURE 4-244
Depth vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

(a)



(b)



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-245
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

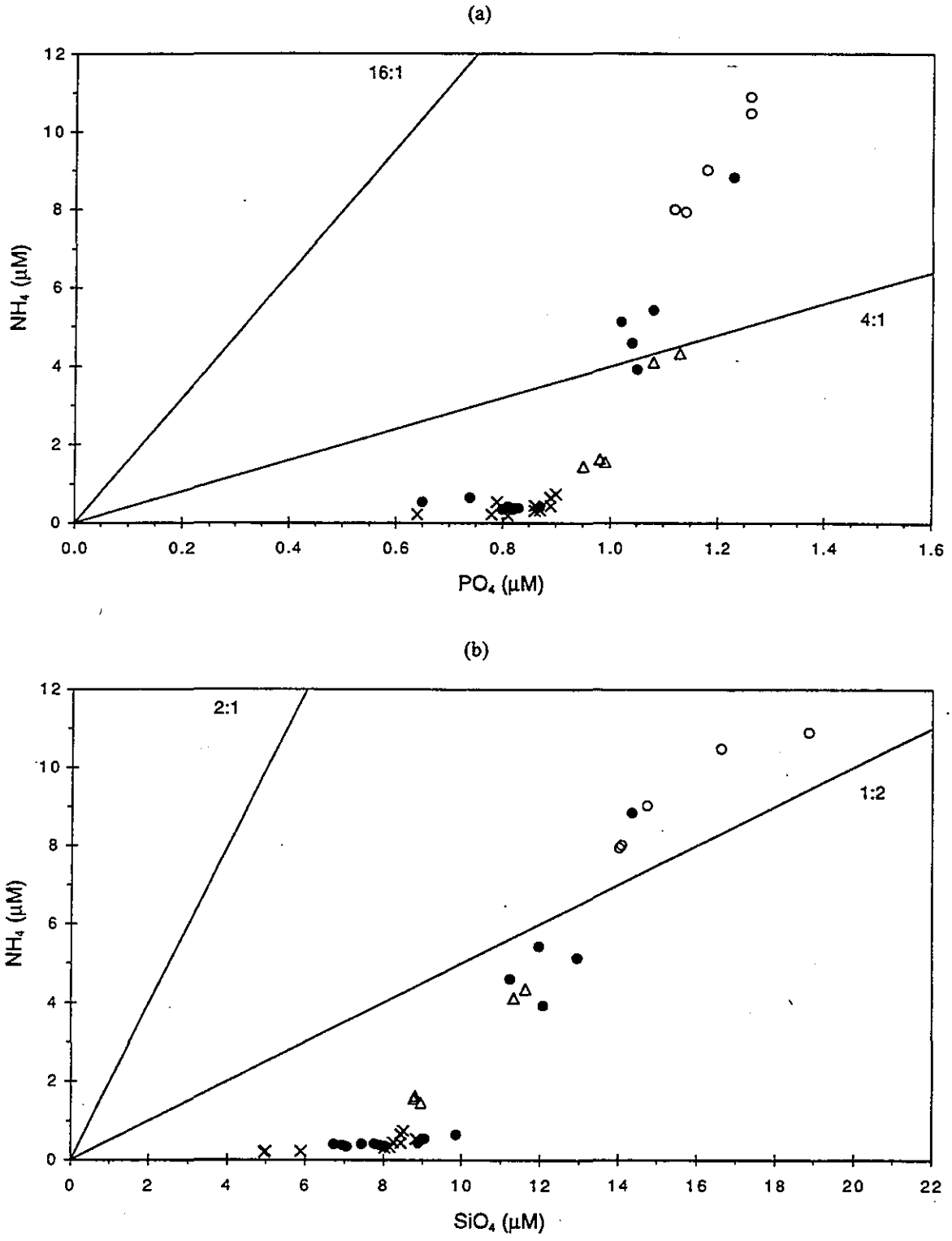


FIGURE 4-246
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617; (Dec 96).

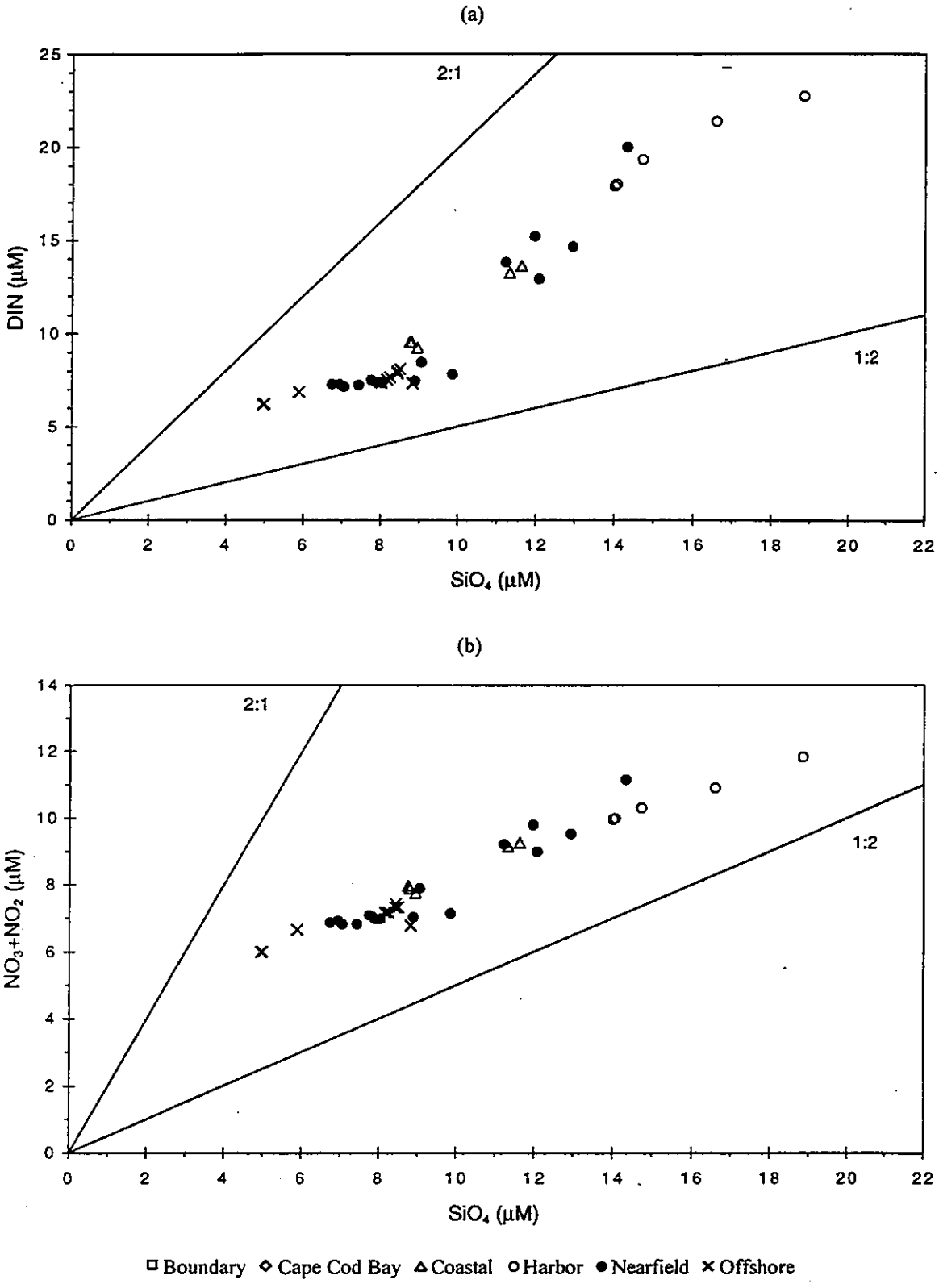


FIGURE 4-247
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

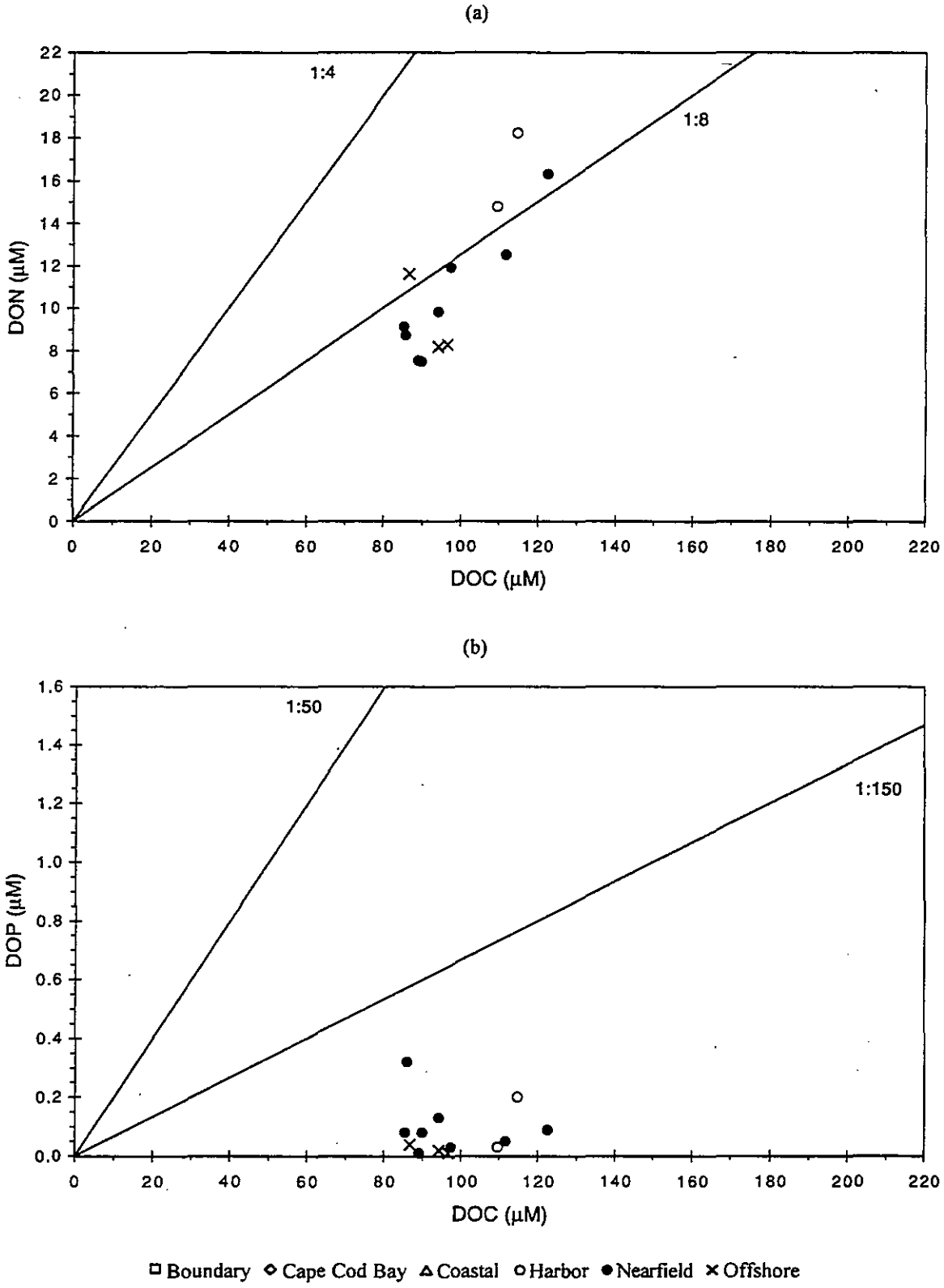
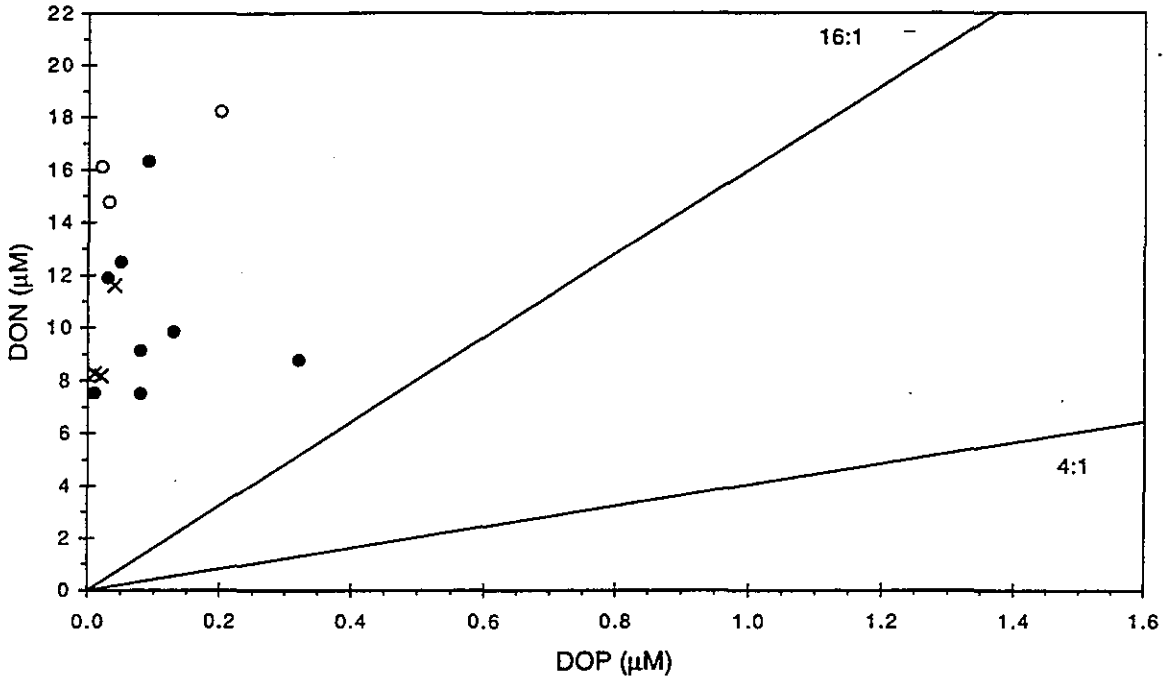
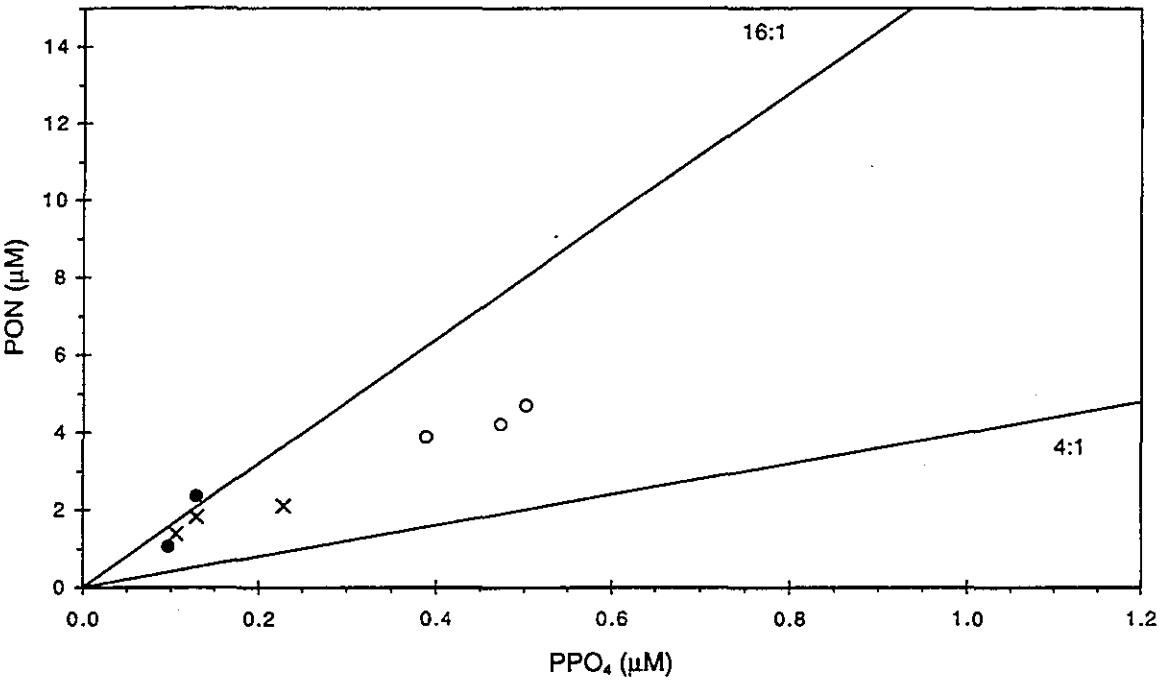


FIGURE 4-248
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

(a)



(b)



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-249
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

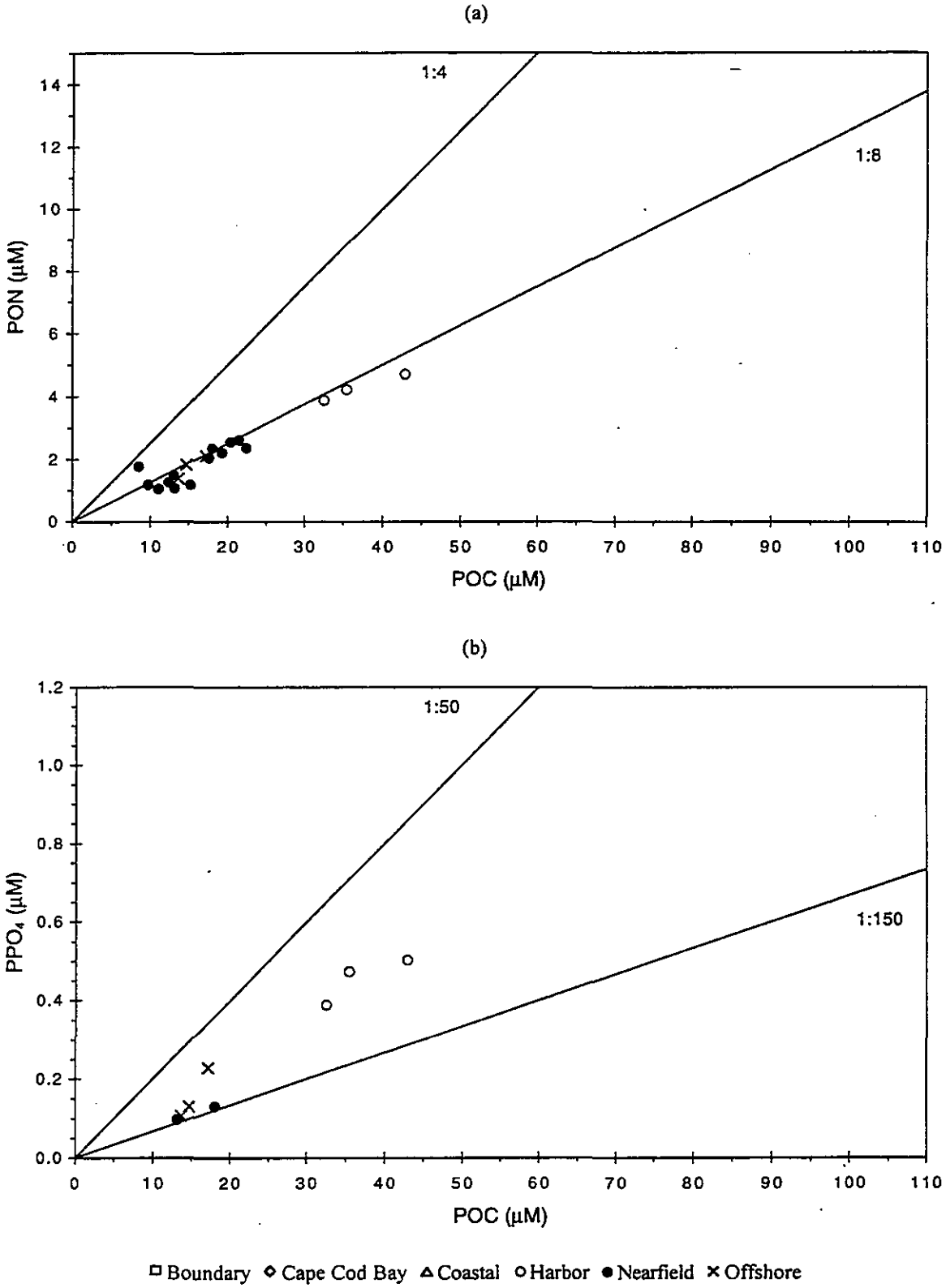


FIGURE 4-250
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

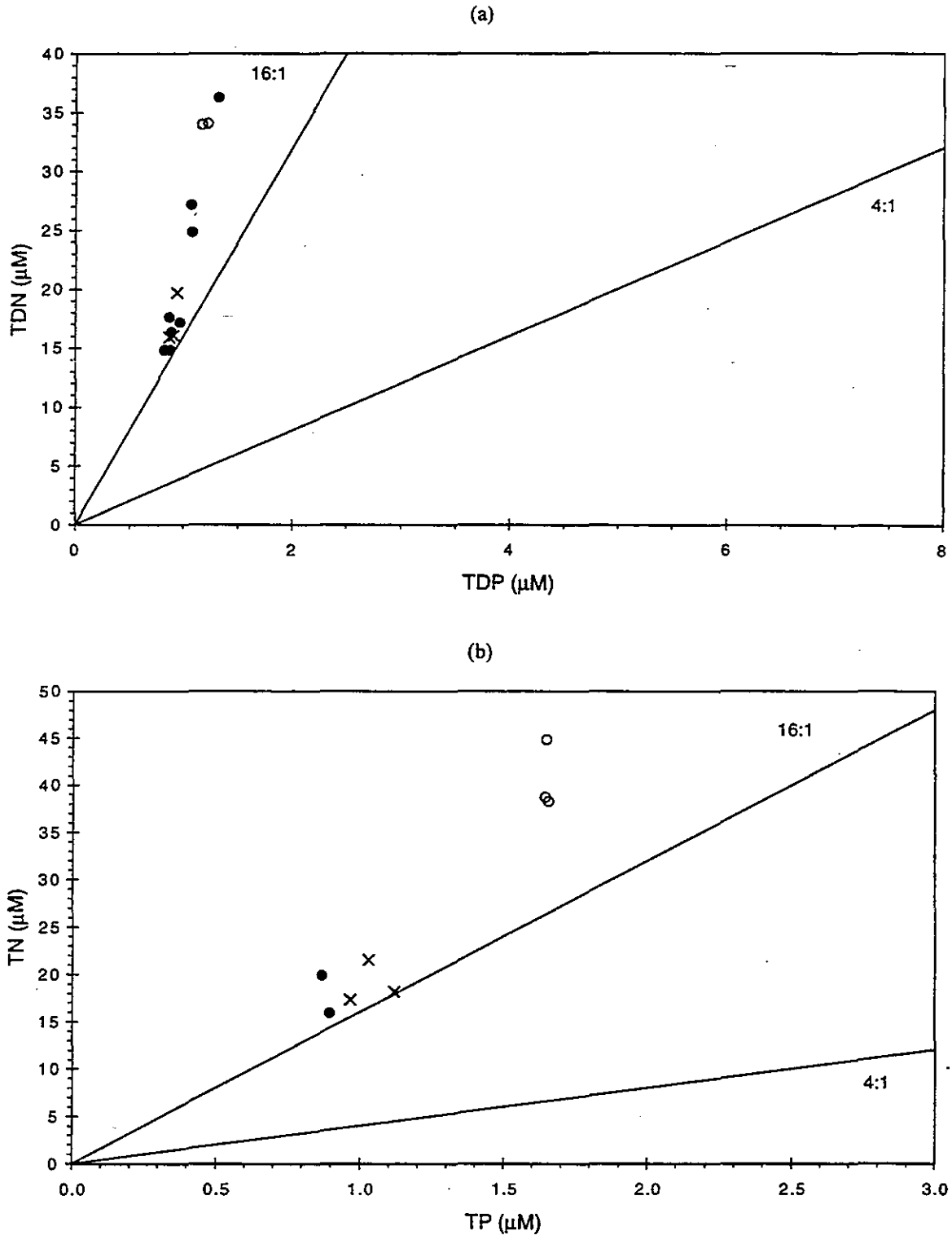


FIGURE 4-251
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).

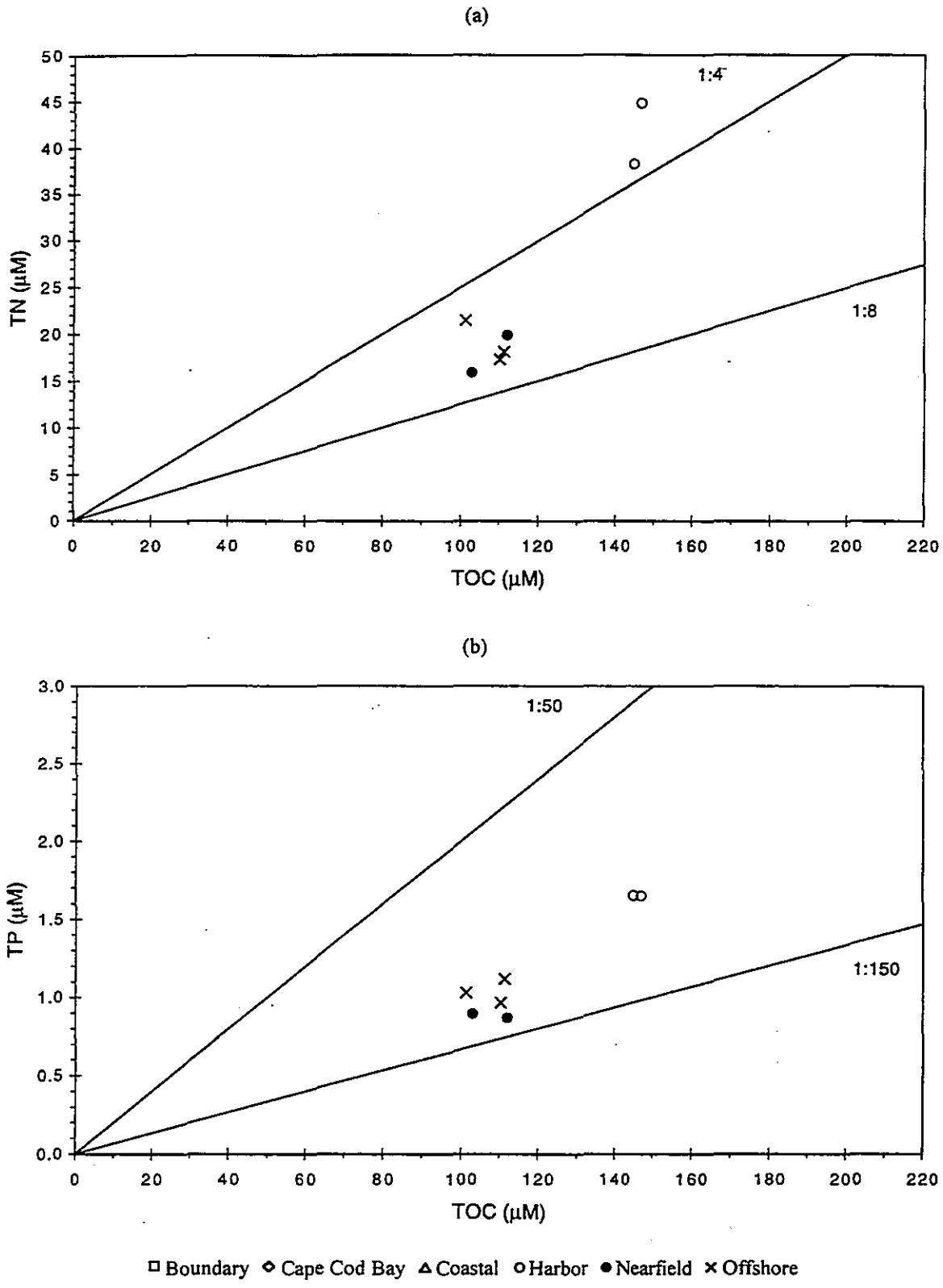
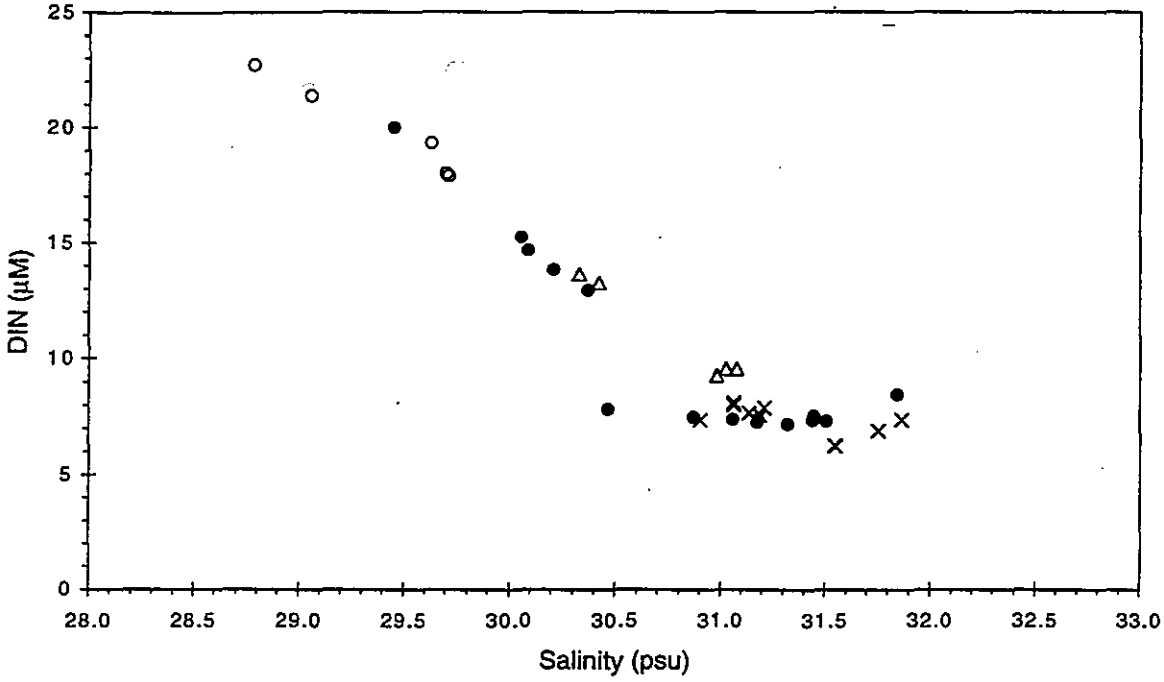


FIGURE 4-252
Nutrient vs. nutrient plots for nearfield/winter nutrients survey W9617, (Dec 96).



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-253
Nutrient vs. salinity plots for nearfield/winter nutrients survey W9617, (Dec 96).

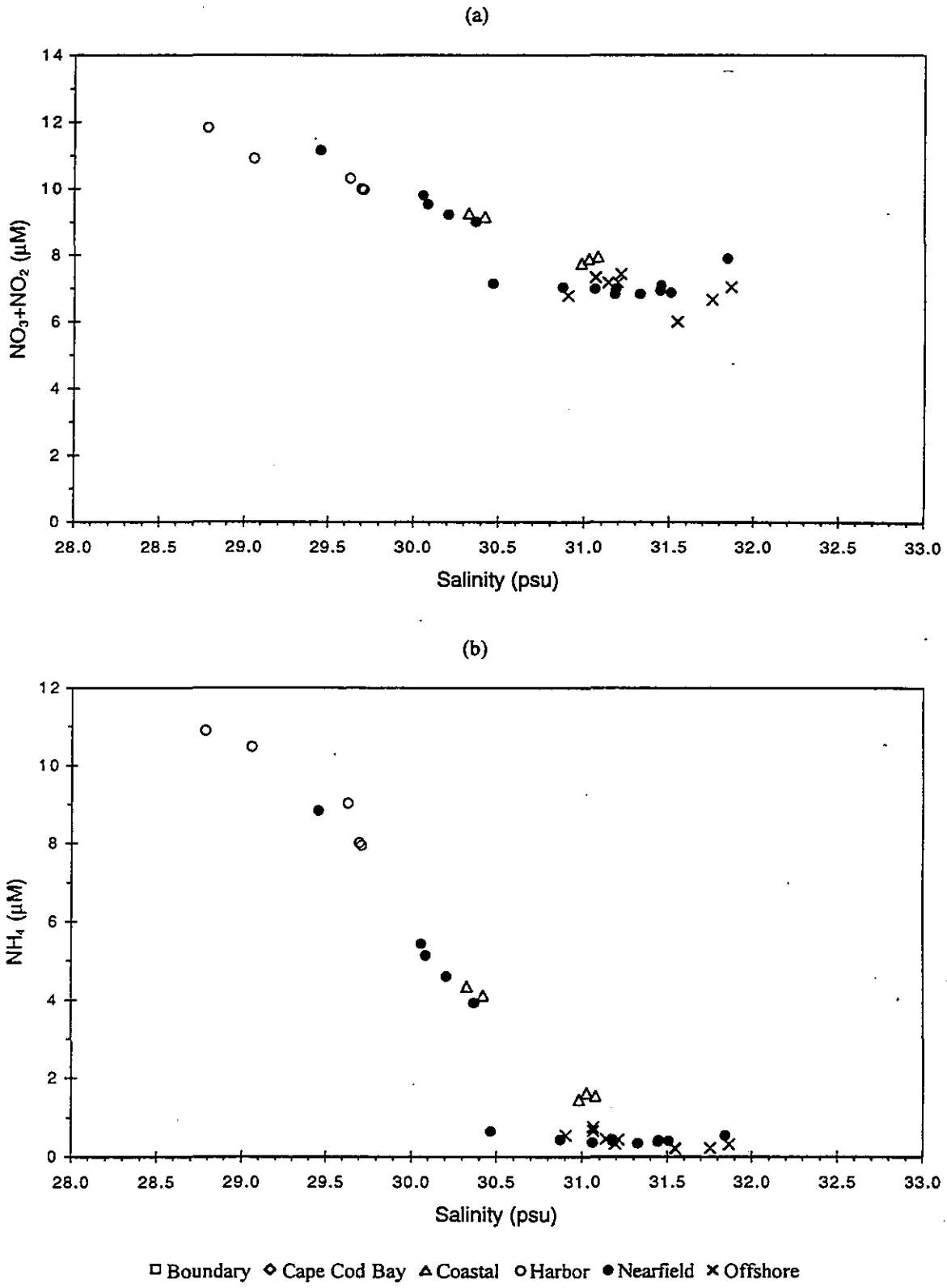
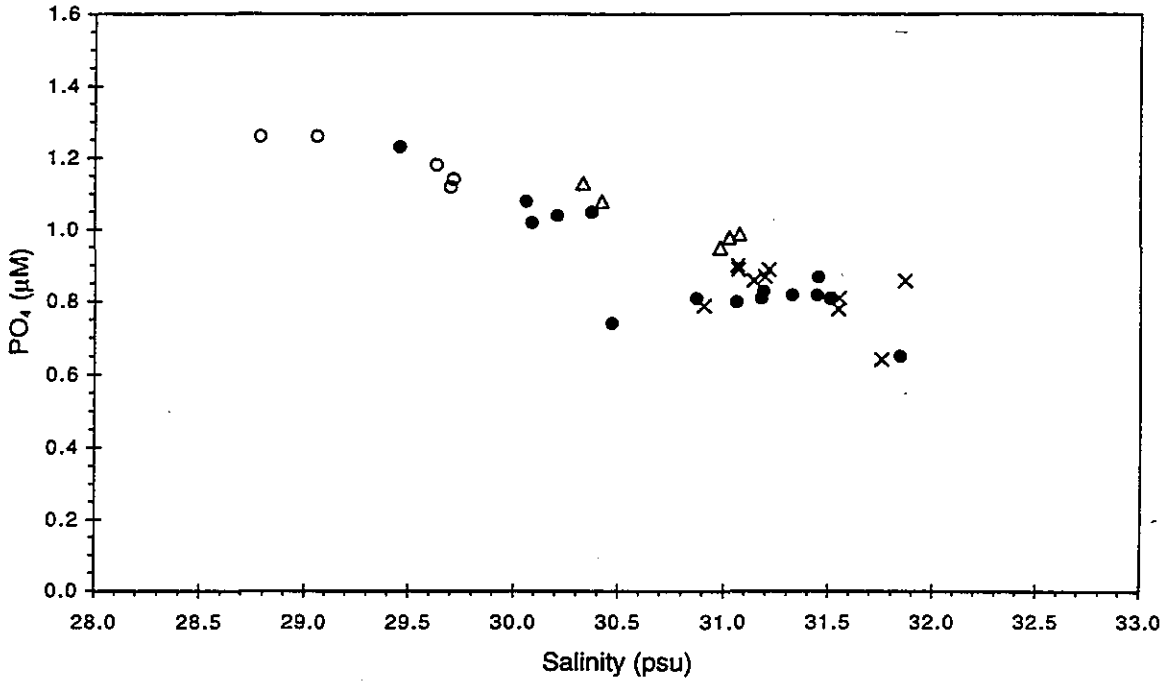
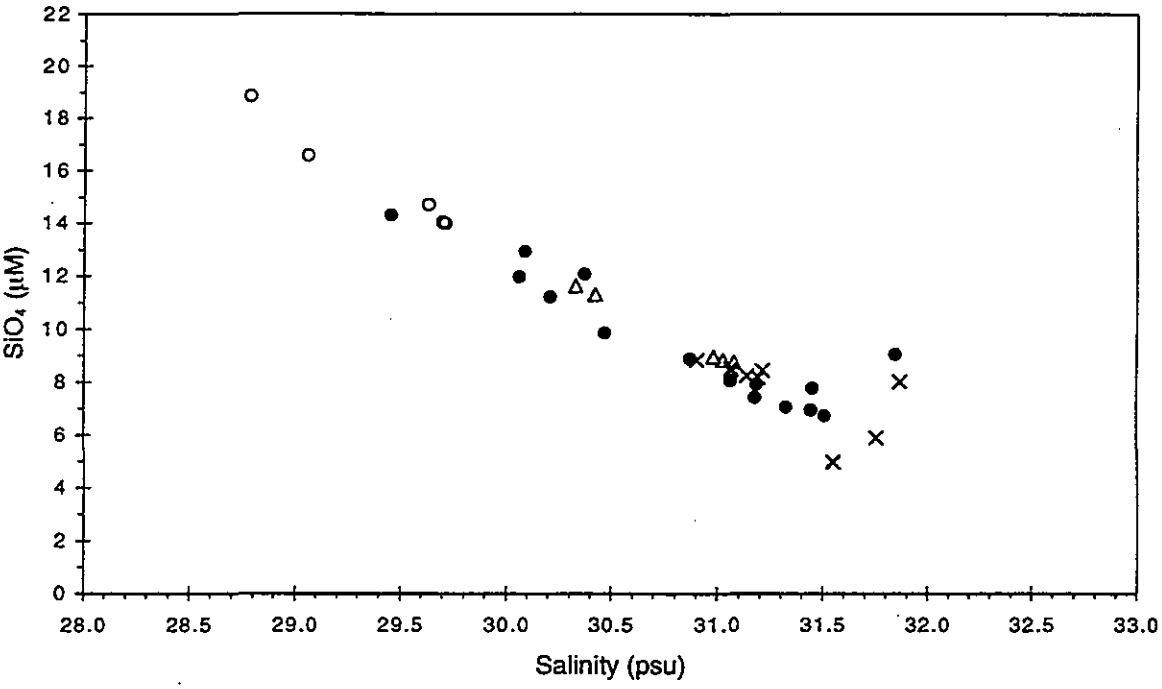


FIGURE 4-254
Nutrient vs. salinity plots for nearfield/winter nutrients survey W9617, (Dec 96).

(a)



(b)



□ Boundary ◇ Cape Cod Bay △ Coastal ○ Harbor ● Nearfield × Offshore

FIGURE 4-255
Nutrient vs. salinity plots for nearfield/winter nutrients survey W9617, (Dec 96).

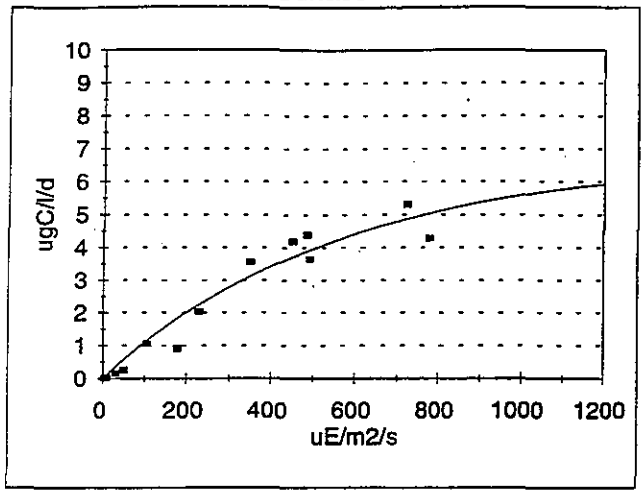
APPENDIX E

Photosynthesis-Irradiance (P-I) Curves

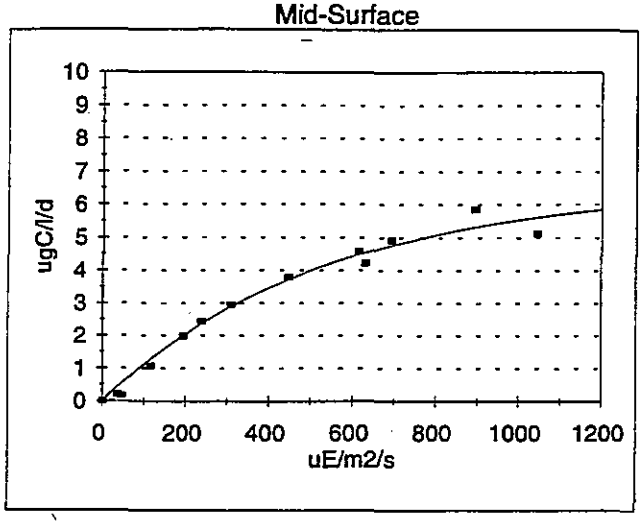
Productivity calculations (Appendix A) utilized light attenuation data from a CTD-mounted 4π sensor and incident light time-series data from an on-deck 2π irradiance sensor. After collection of the productivity samples, they were incubated in a temperature-controlled incubator. The resulting photosynthesis ($mgC/m^3/h$) versus light irradiance ($\mu E/m^2/s$, P-I) curves are comprehensively presented in this appendix. These data were used to determine hourly production at intervals throughout the day for each sampling depth.

W9610 Station N10

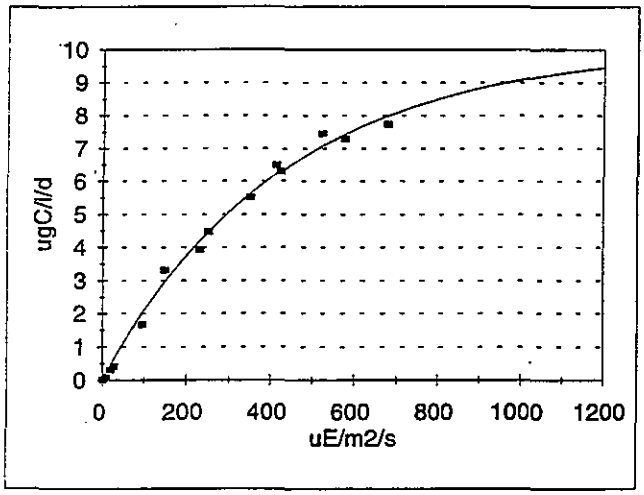
Surface



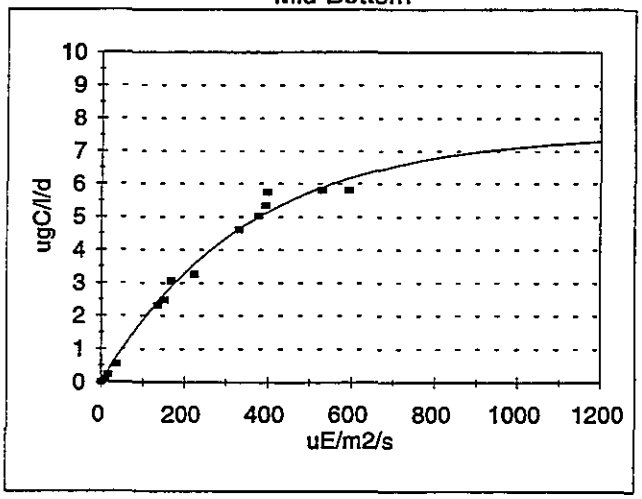
Mid-Surface



Middle



Mid-Bottom



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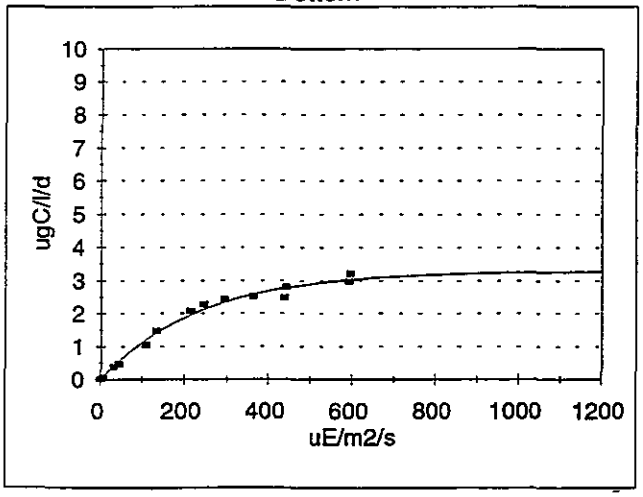
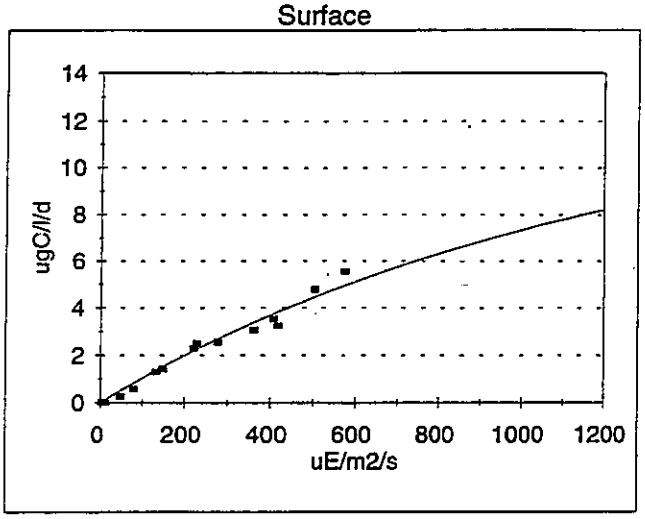


W9610 Station N04

Surface



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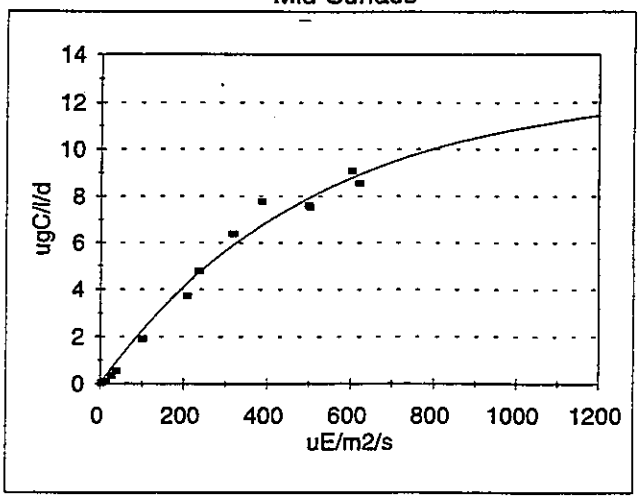

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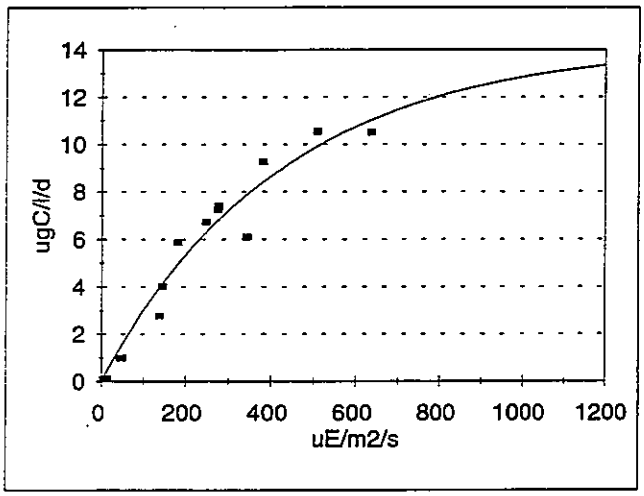

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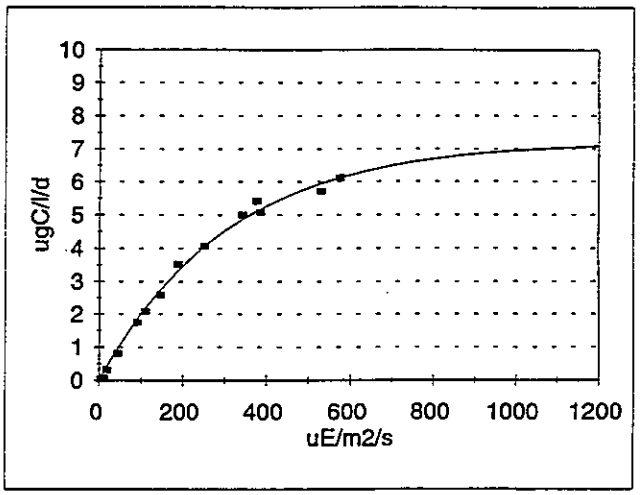

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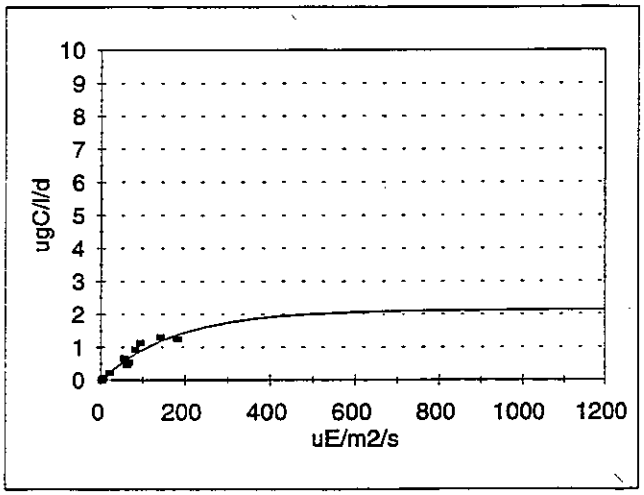
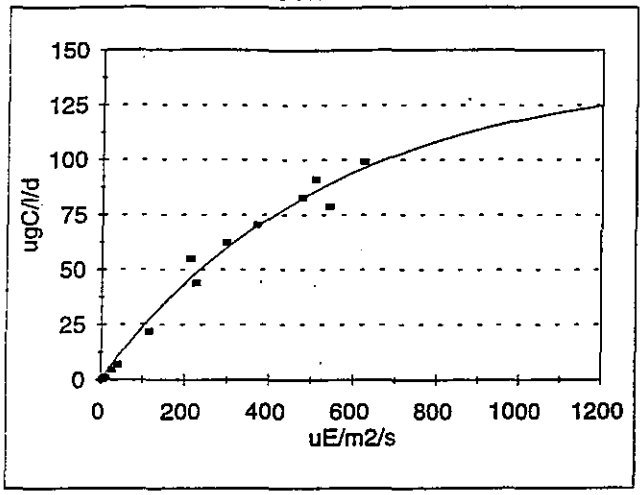


W9611 Station F23

Surface



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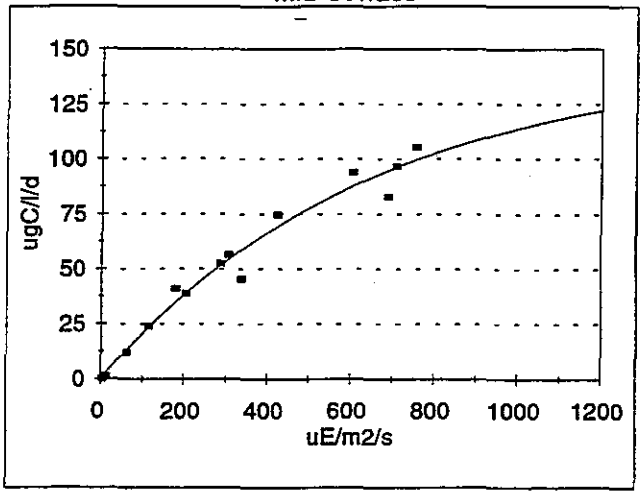

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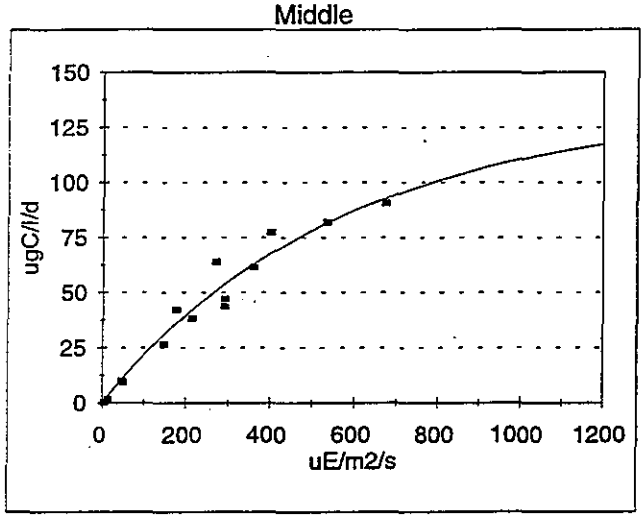

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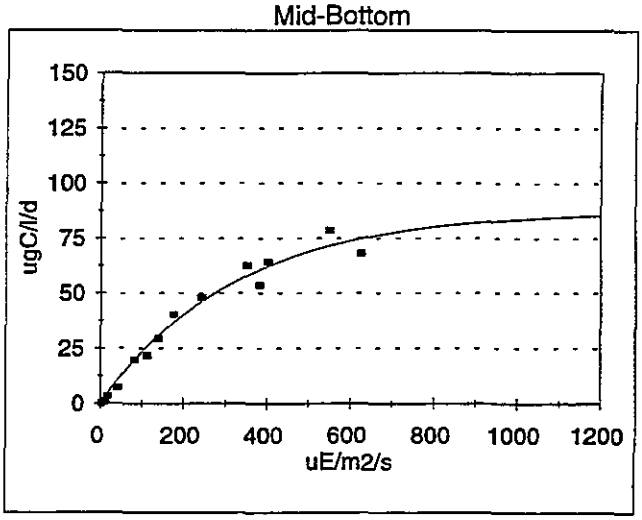

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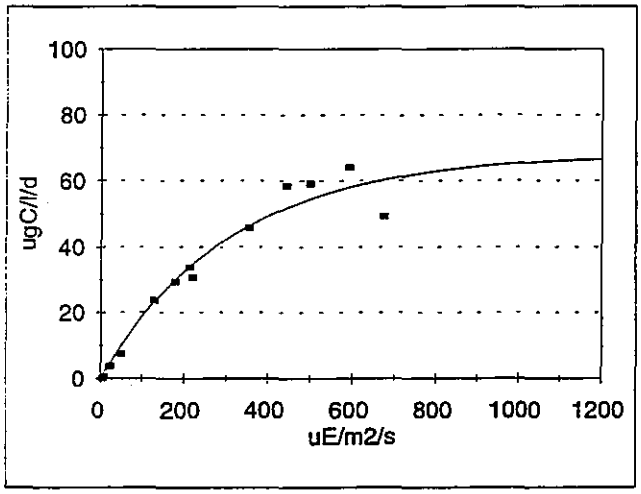
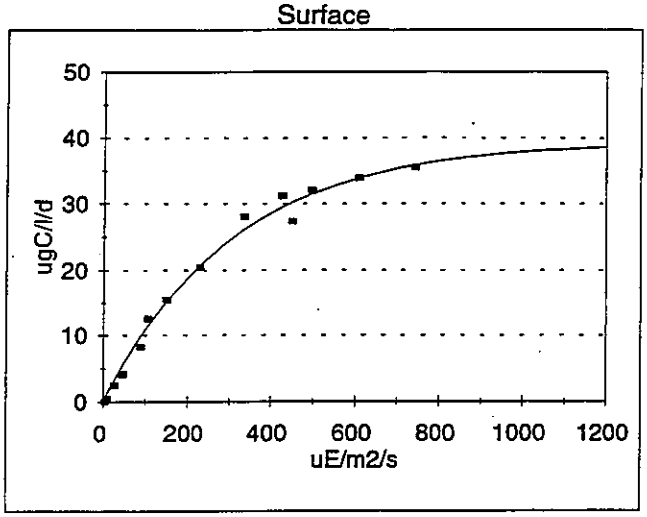


W9611 Station N10

Surface



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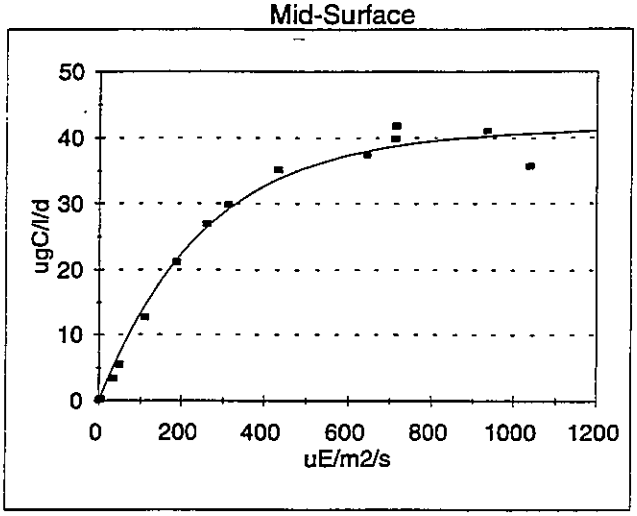

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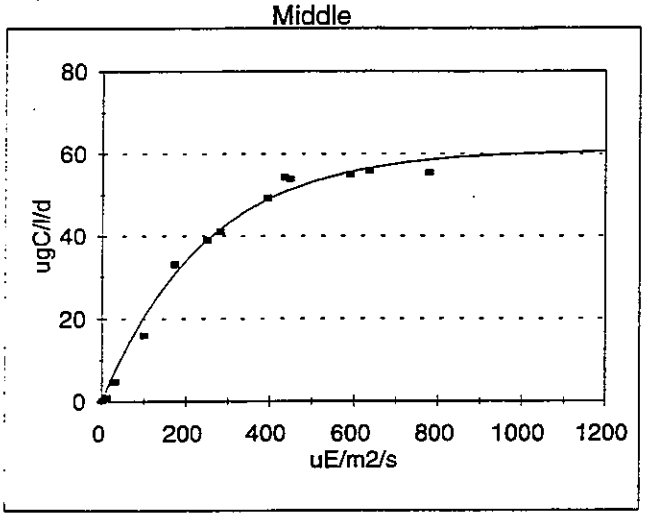

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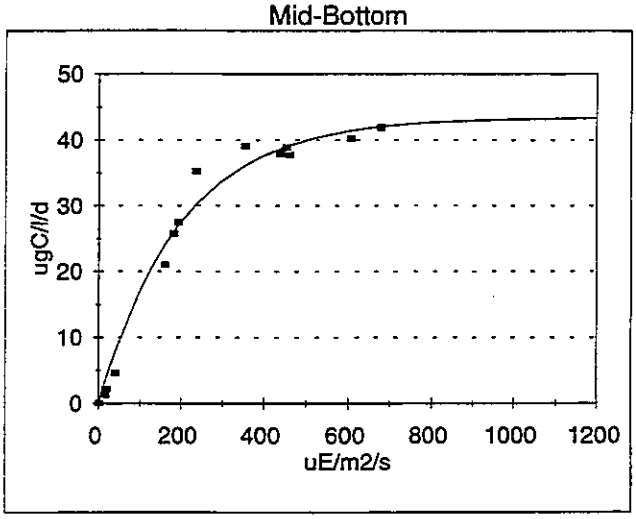

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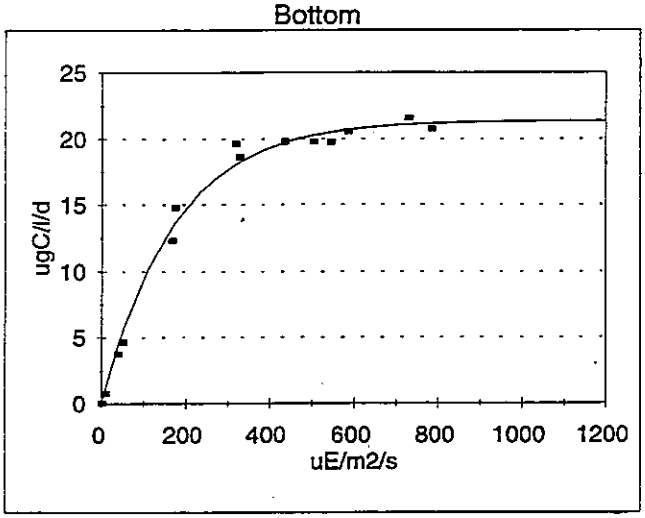
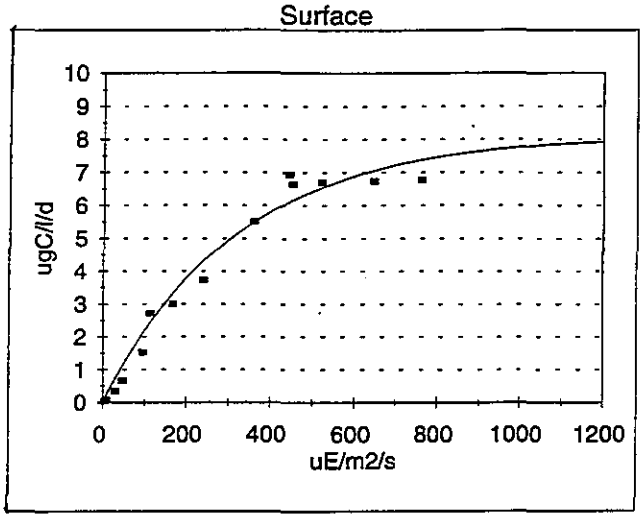


W9611 Station N16

Surface



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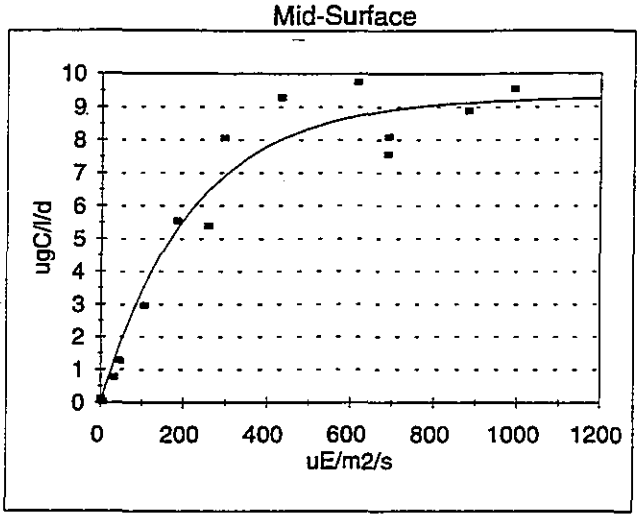

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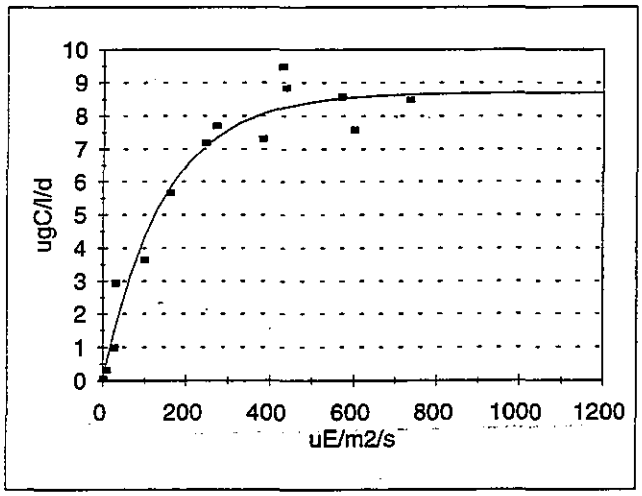

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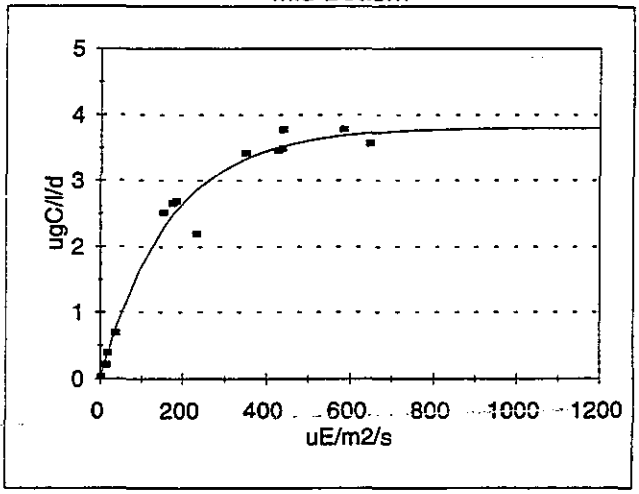

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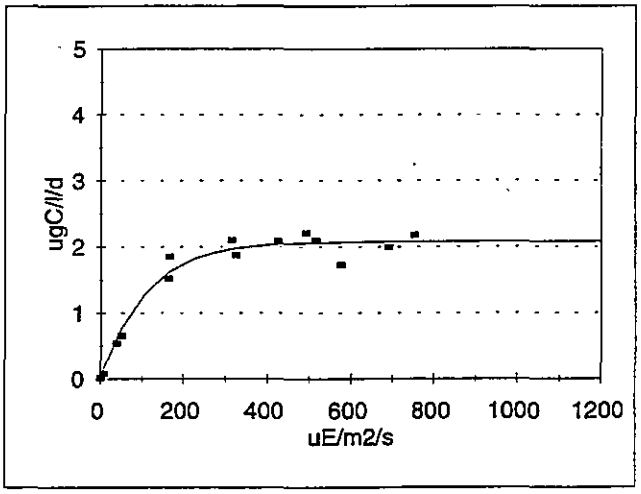
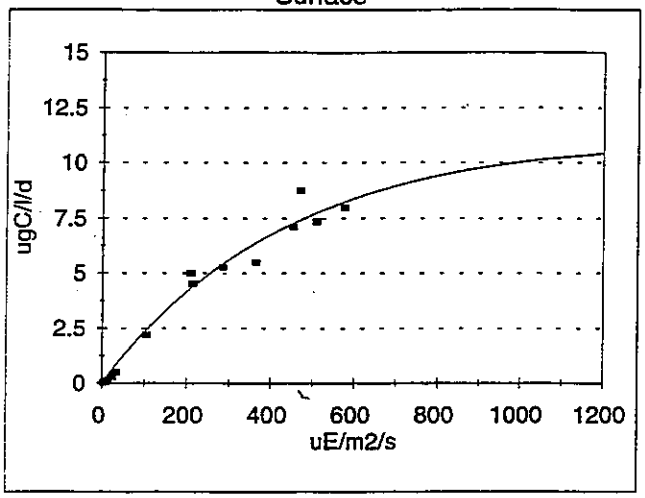
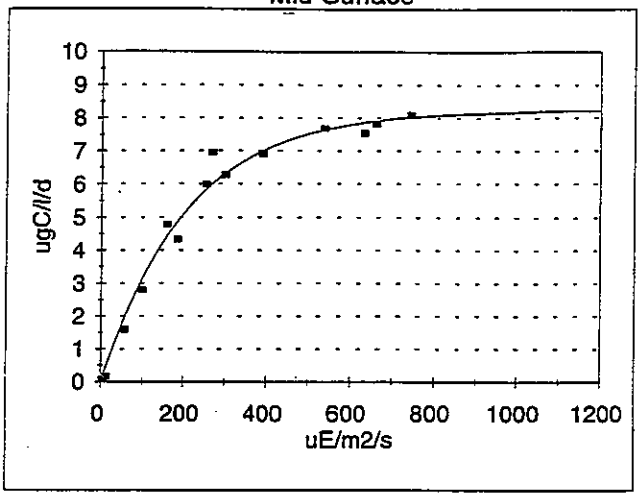


W9611 Station N04

Surface



Mid-Surface



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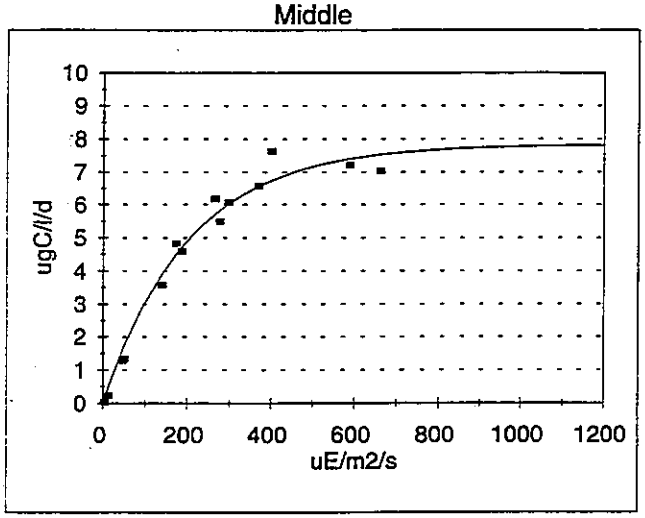

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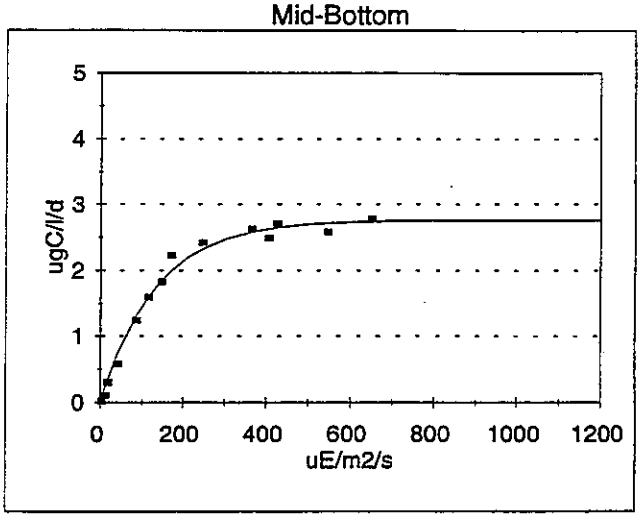

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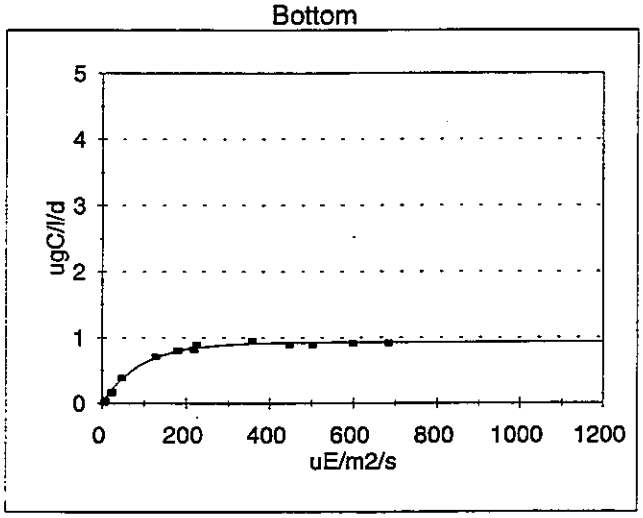
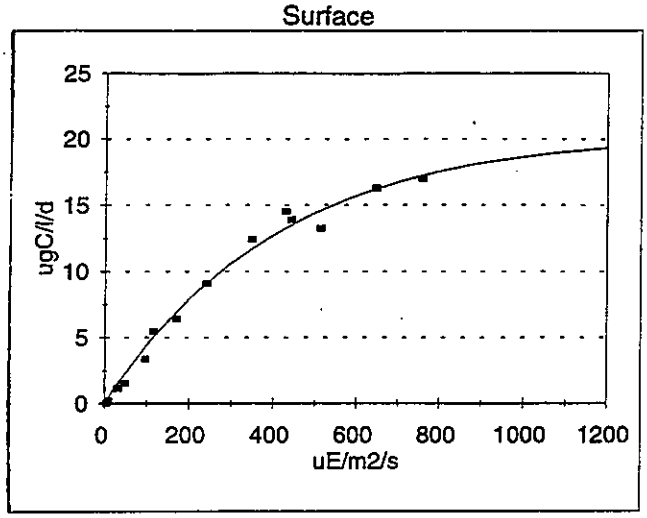
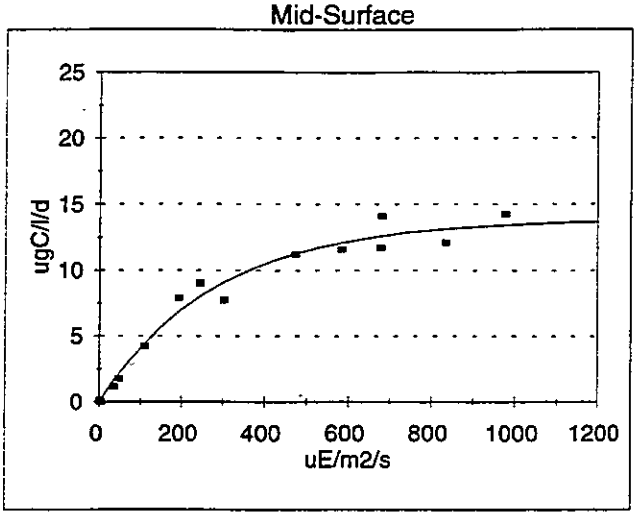


W9612 Station N10

Surface



Mid-Surface



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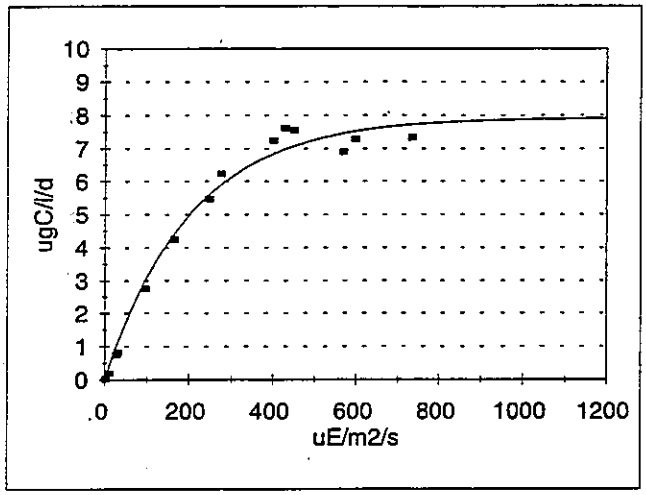

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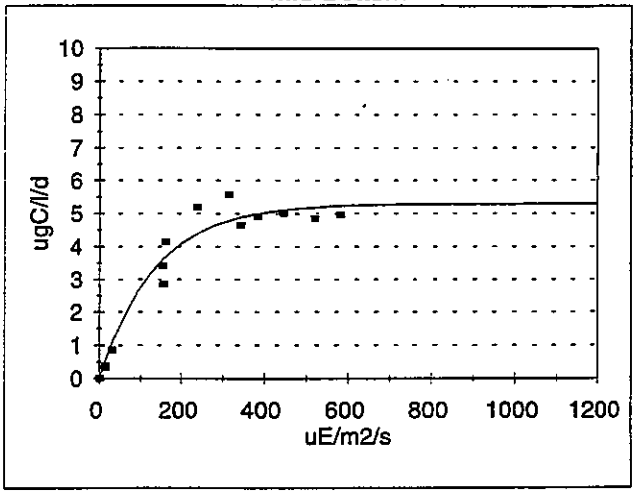

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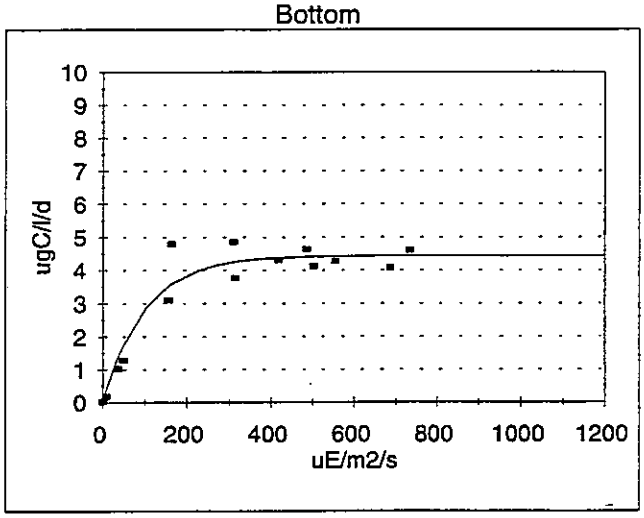
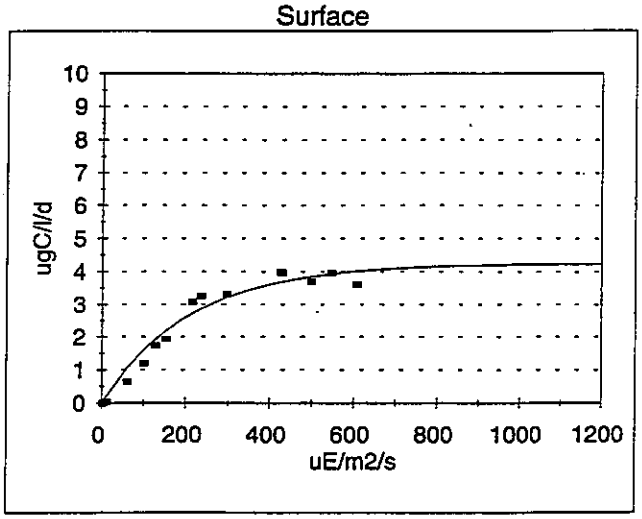
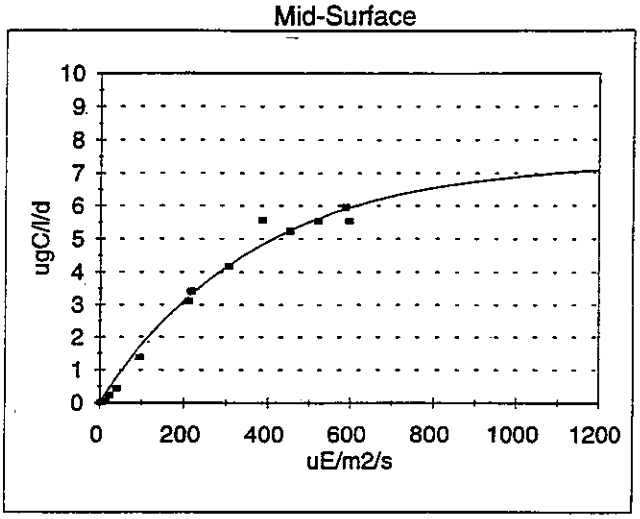


W9612 Station N04

Surface



Mid-Surface



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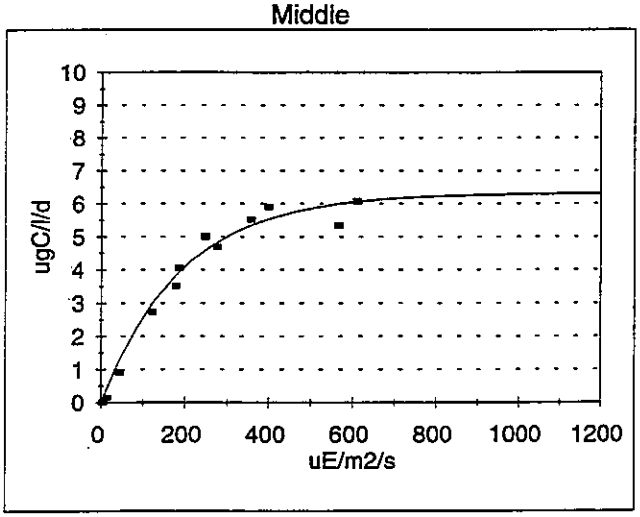

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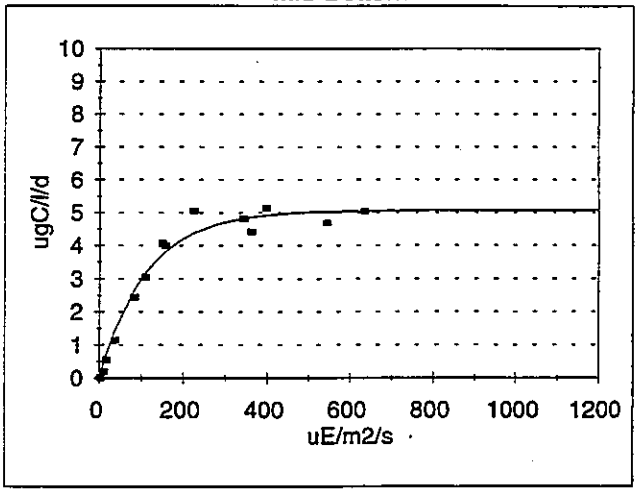

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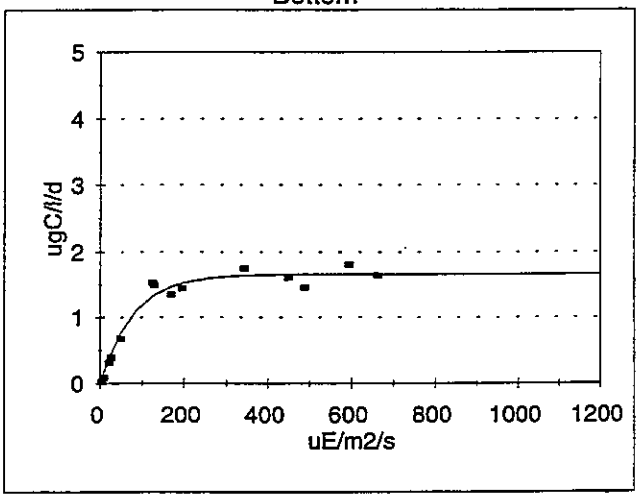
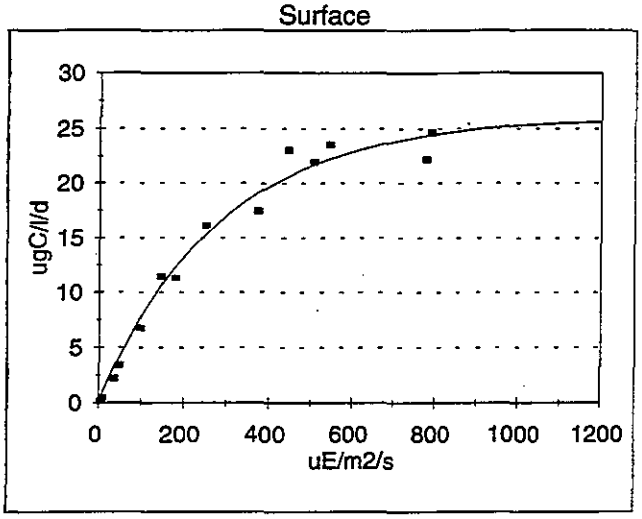


W9613 Station N10

Surface



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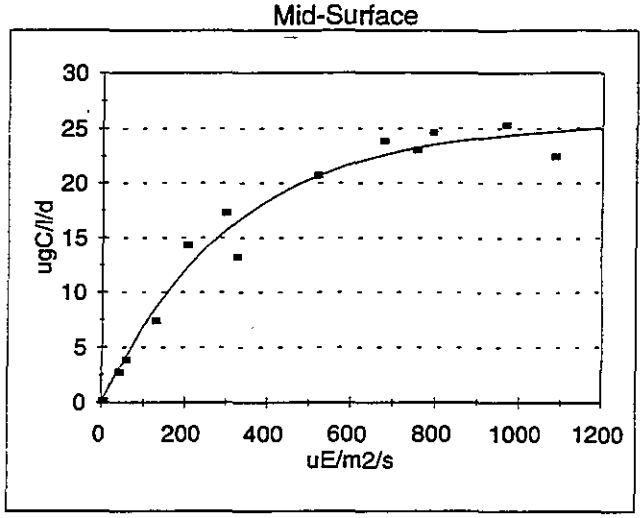

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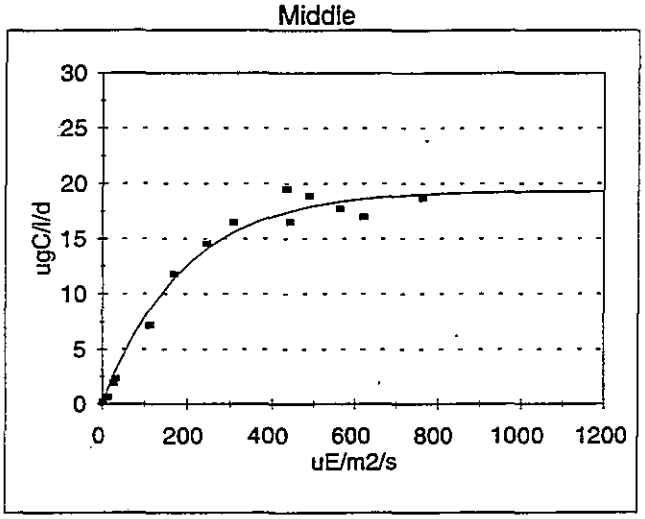

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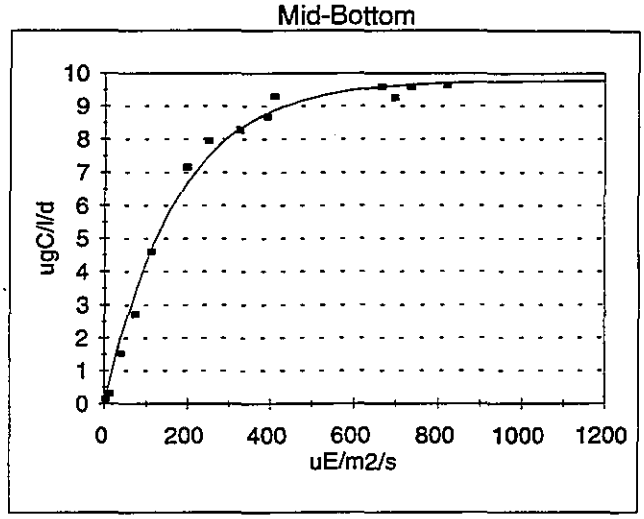

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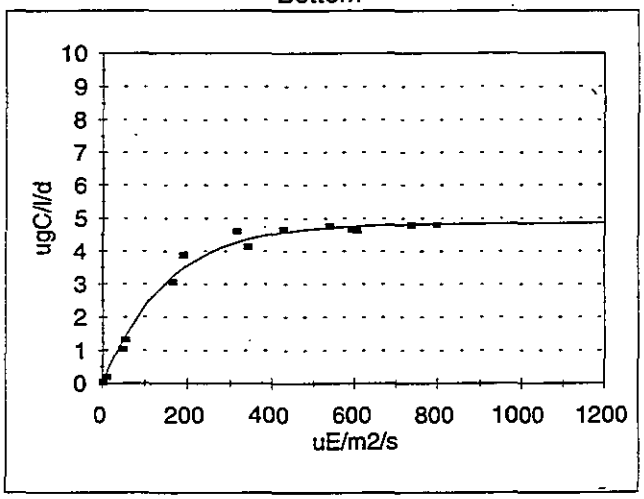
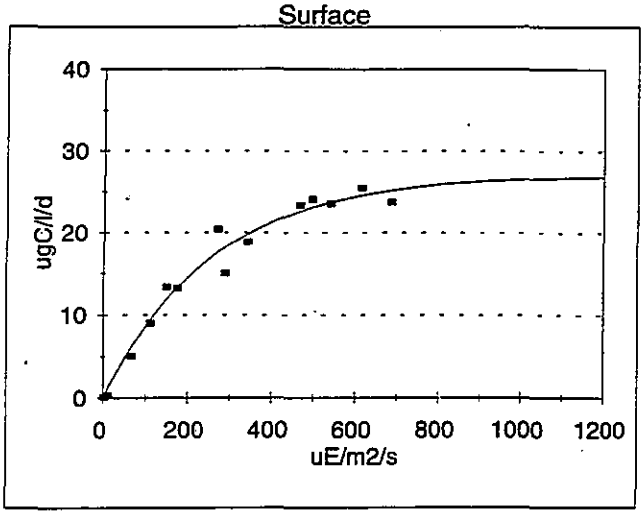
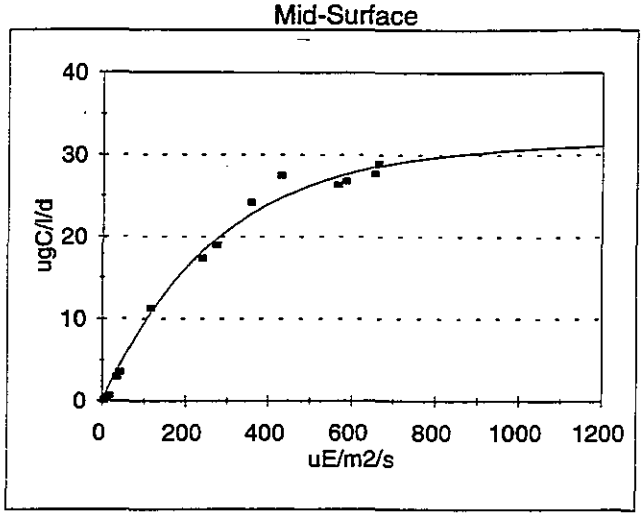


W9613 Station N04

Surface



Mid-Surface



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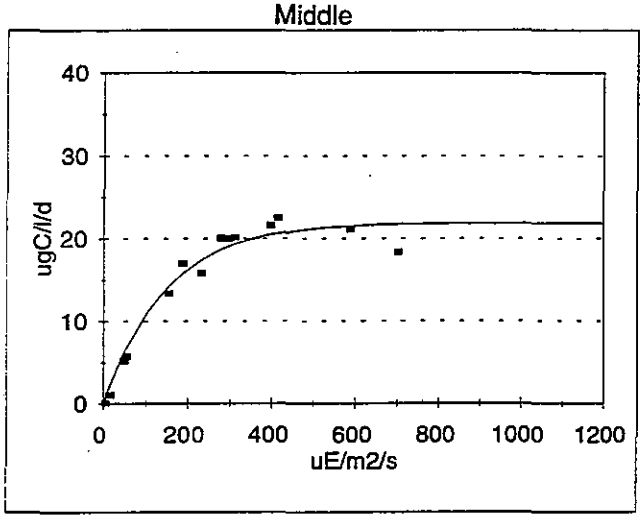

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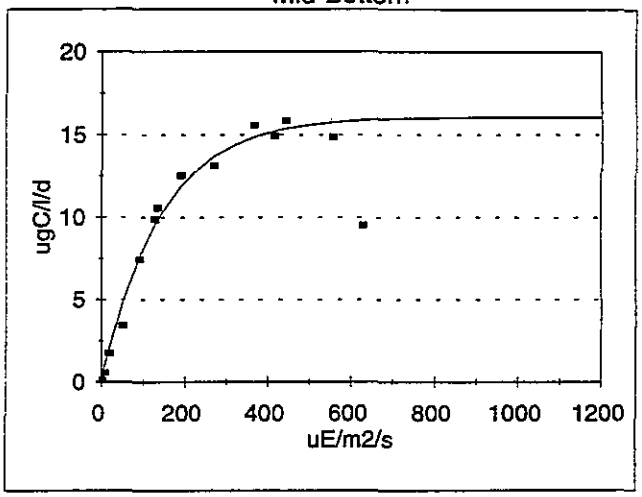

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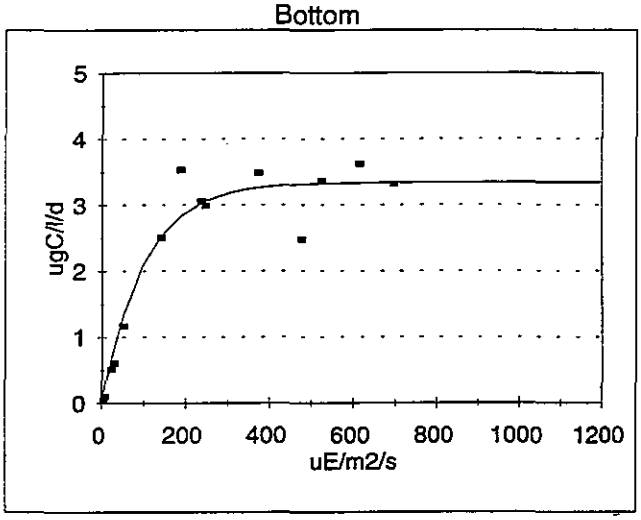
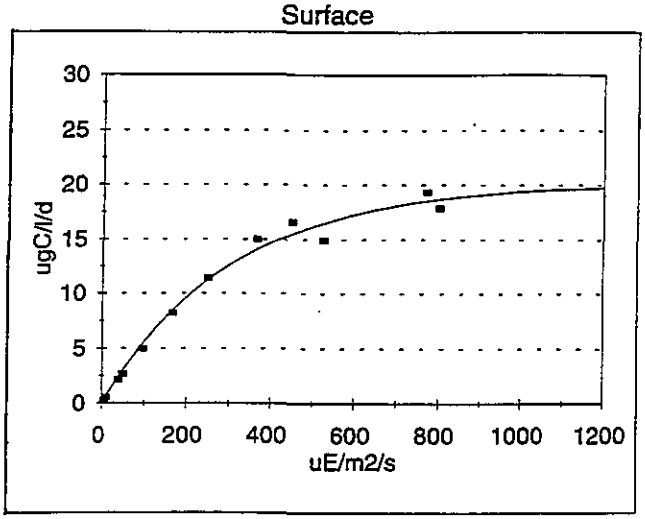
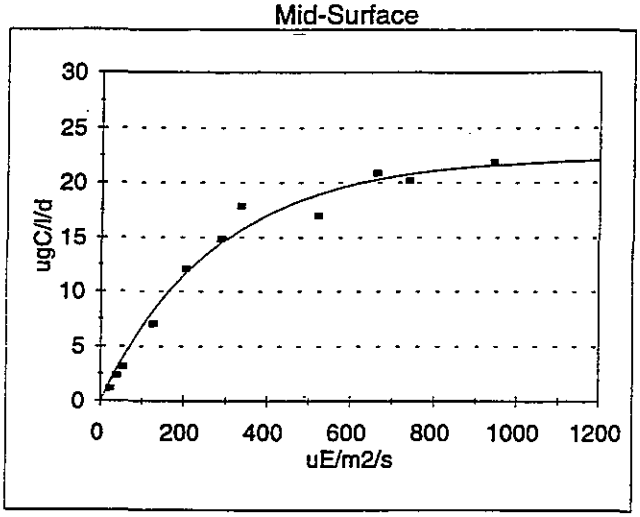


W9614 Station F23

Surface



Mid-Surface



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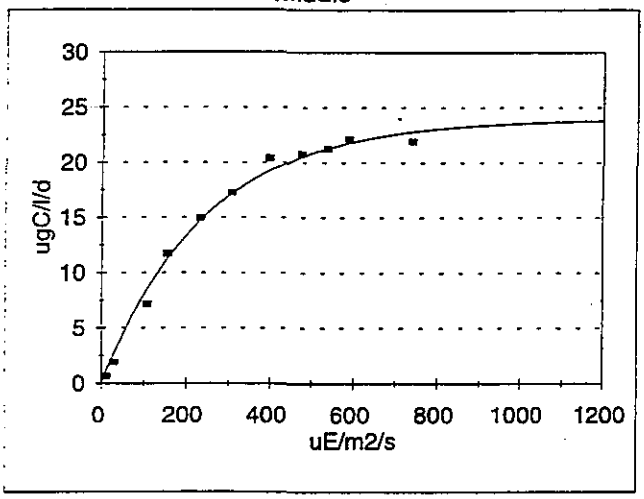
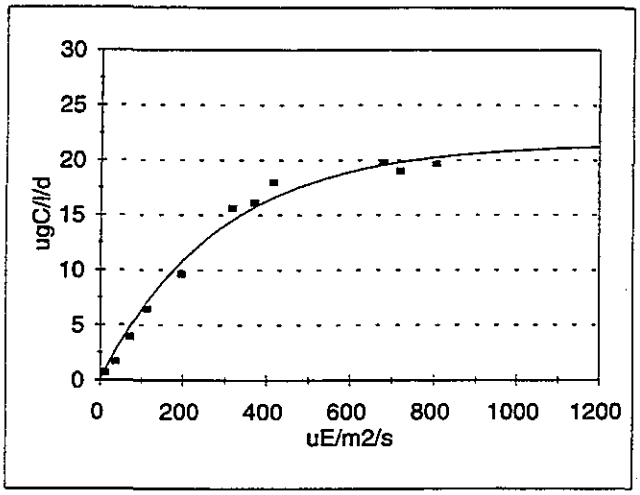


Mid-Bottom



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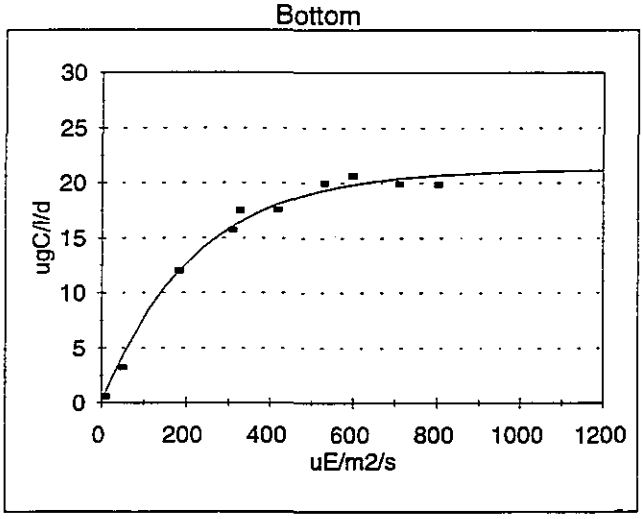
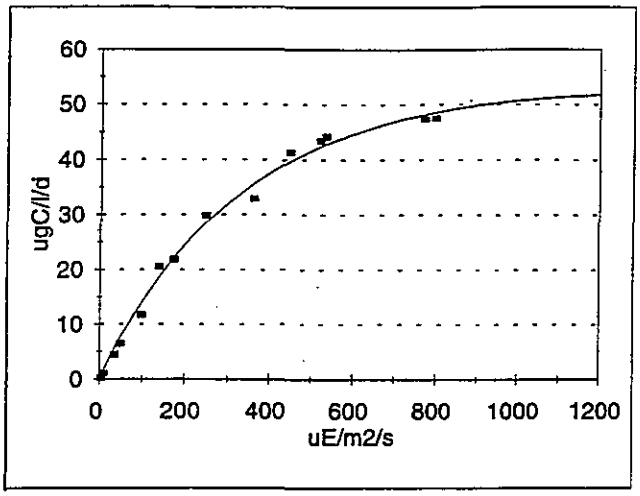
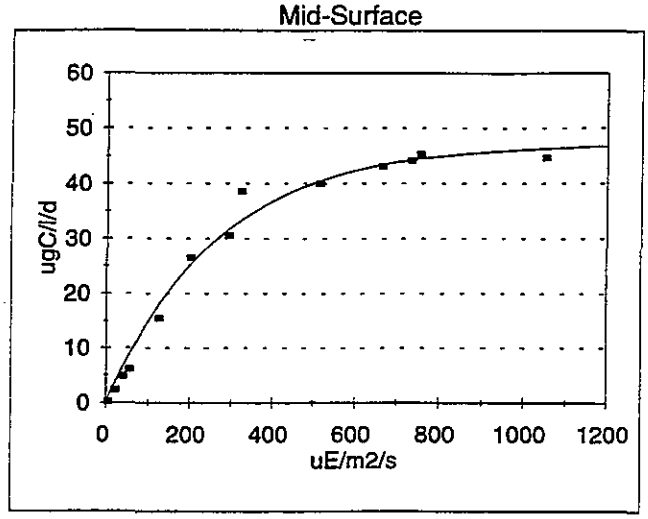


W9614 Station N10

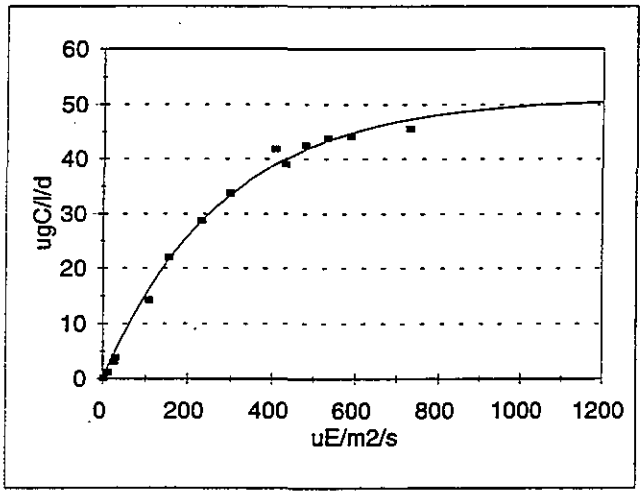
Surface



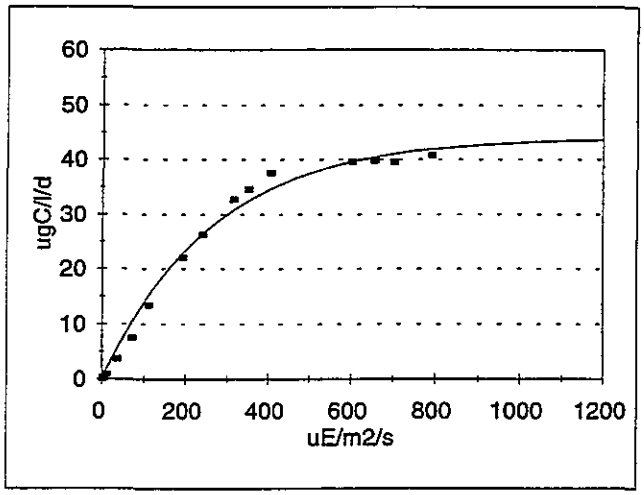
Mid-Surface



Middle



Mid-Bottom



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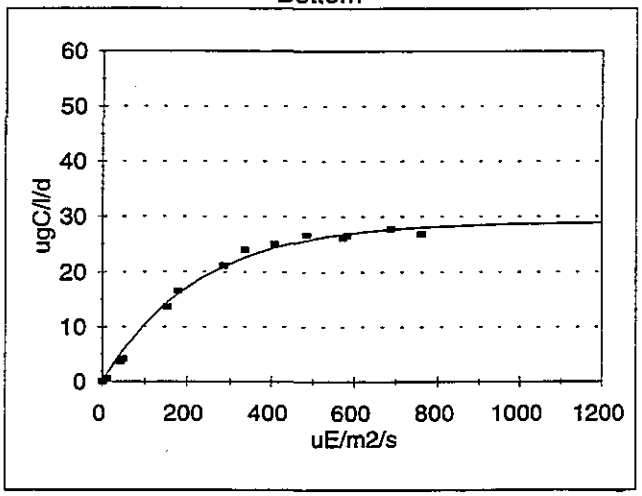
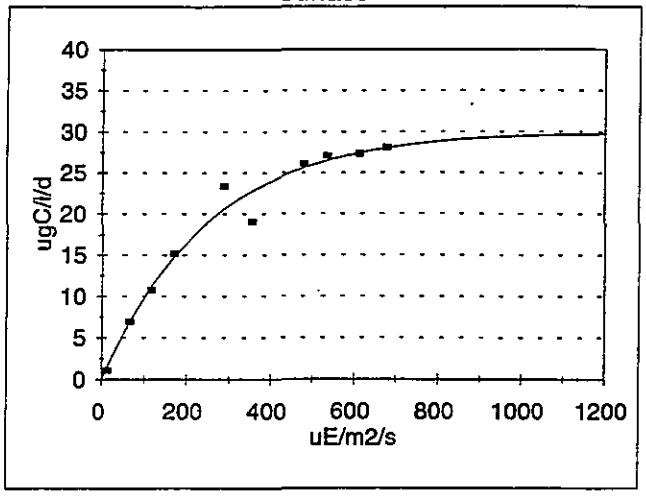
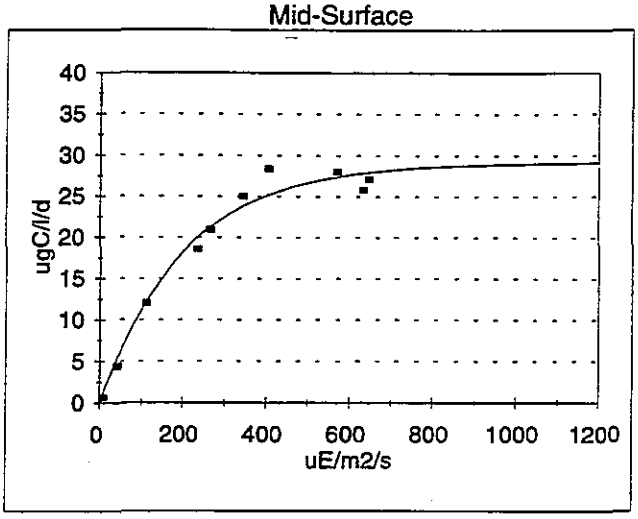


W9614 Station N16

Surface



Mid-Surface



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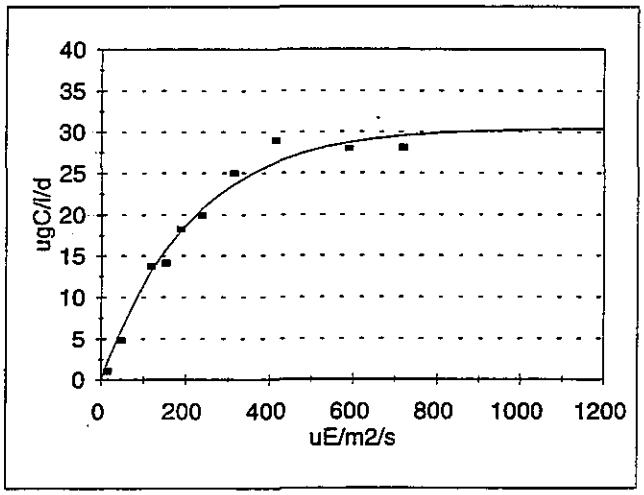

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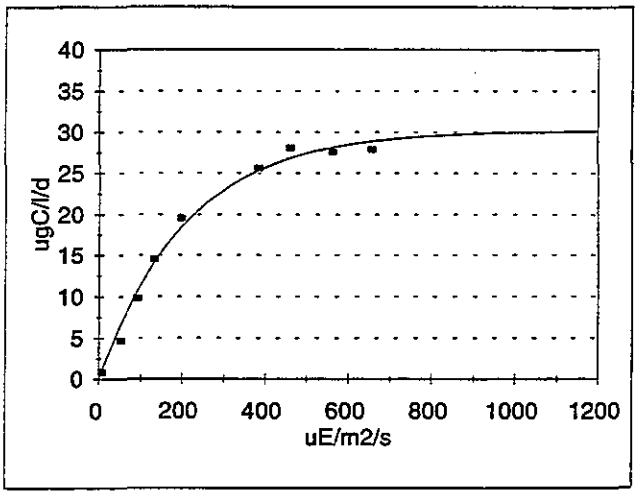

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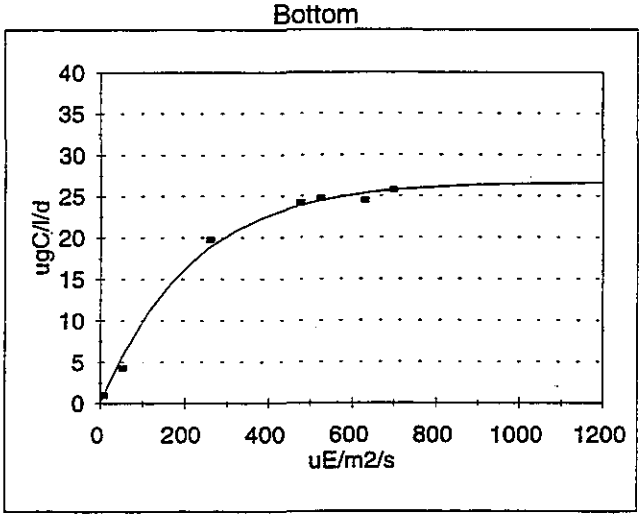
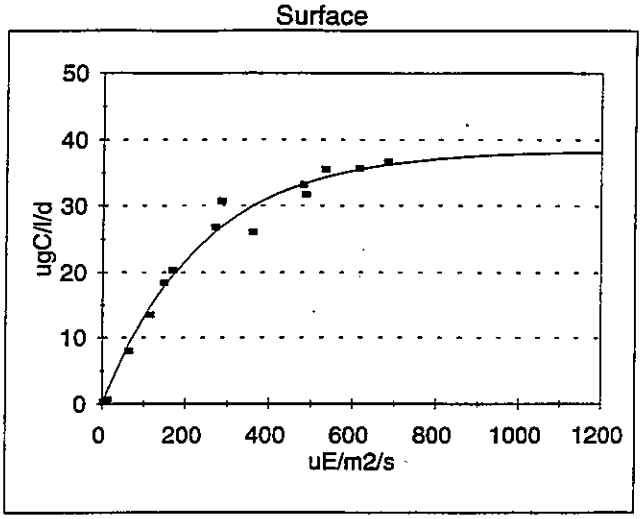


W9614 Station N04

Surface



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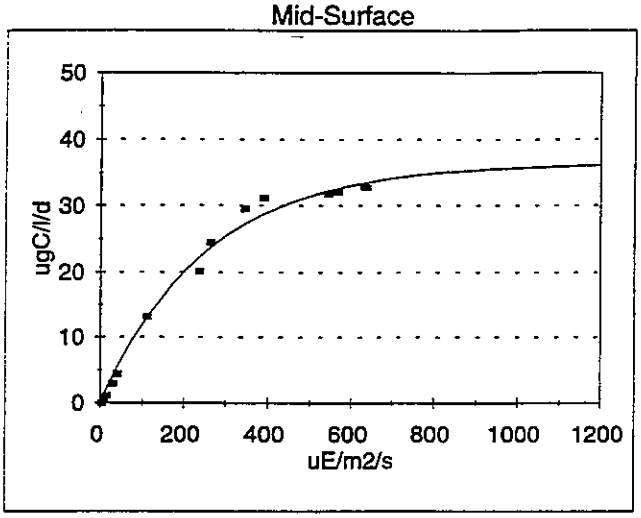

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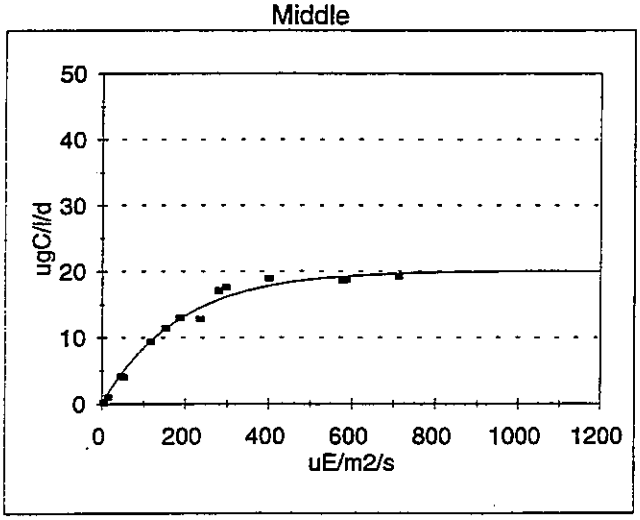

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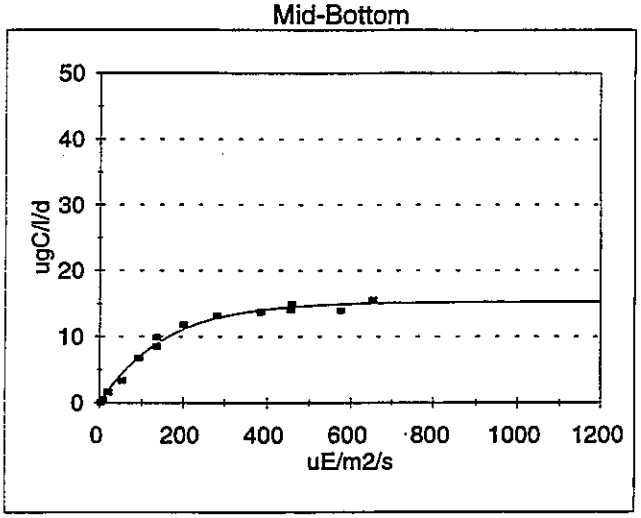

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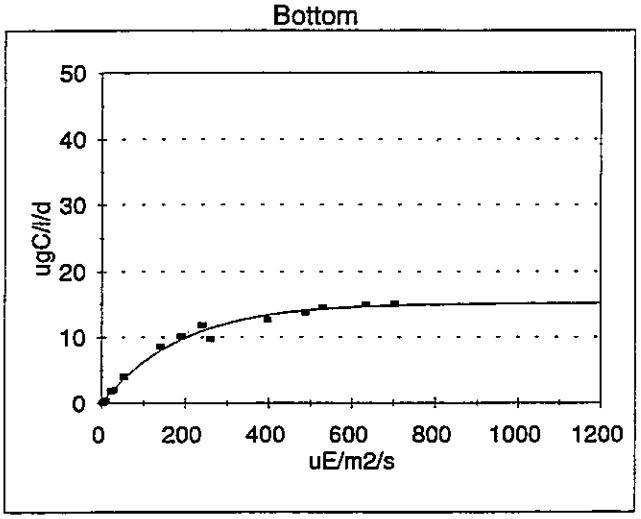
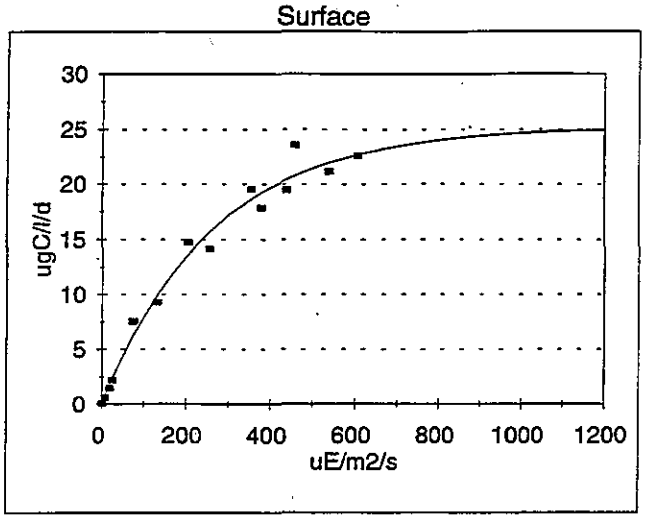


W9615 Station N10

Surface



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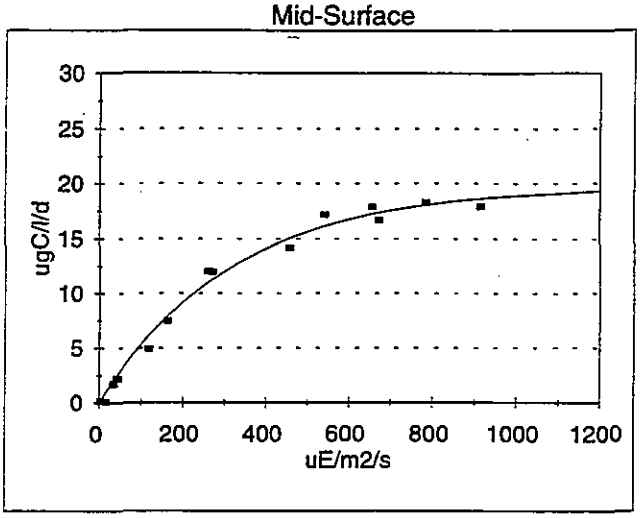

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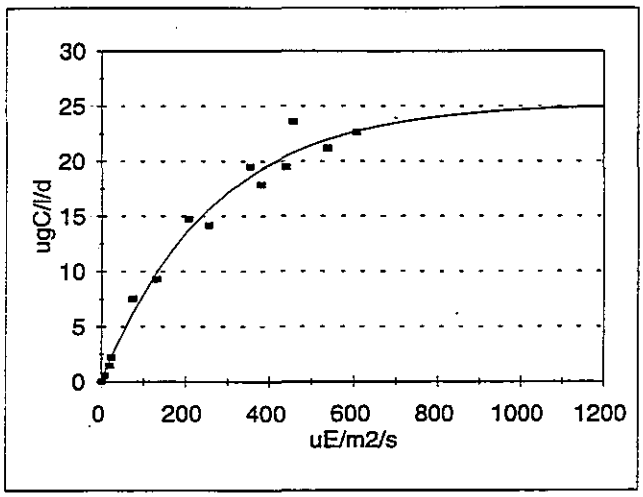

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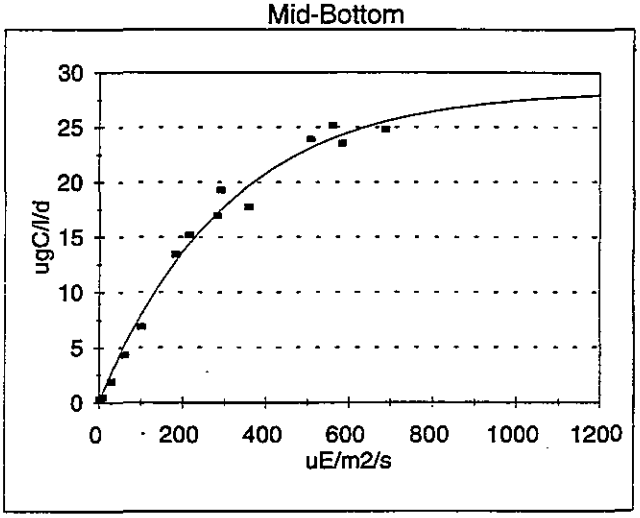

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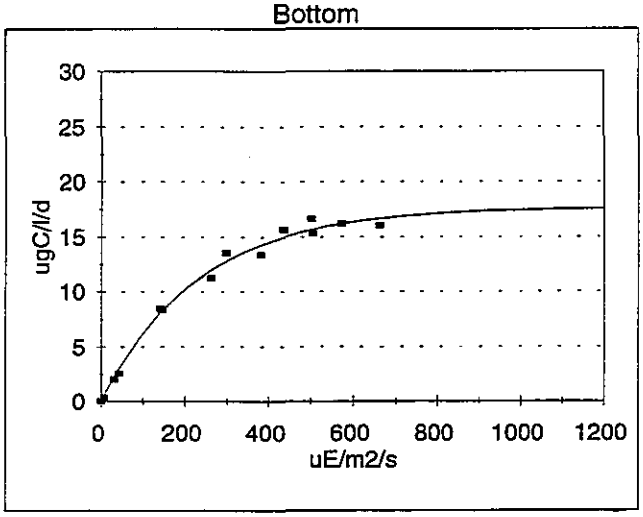
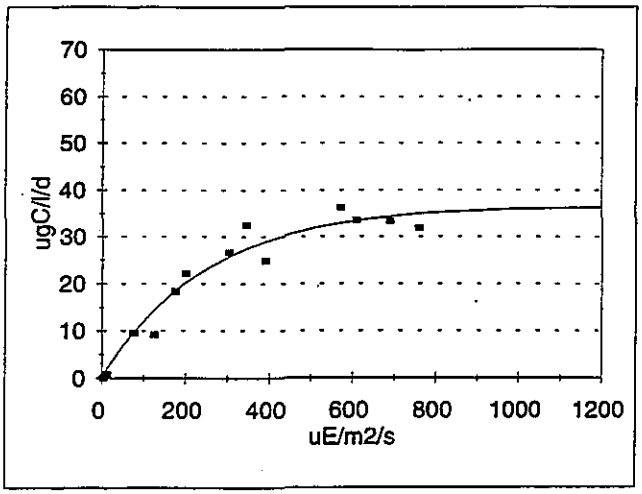


W9615 Station N04

Surface



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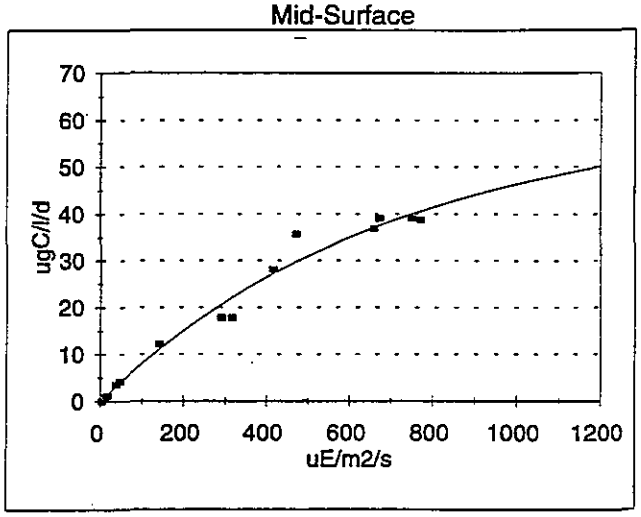

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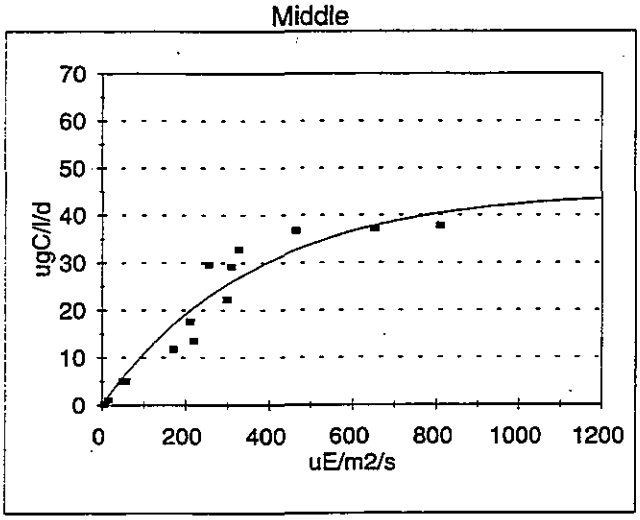

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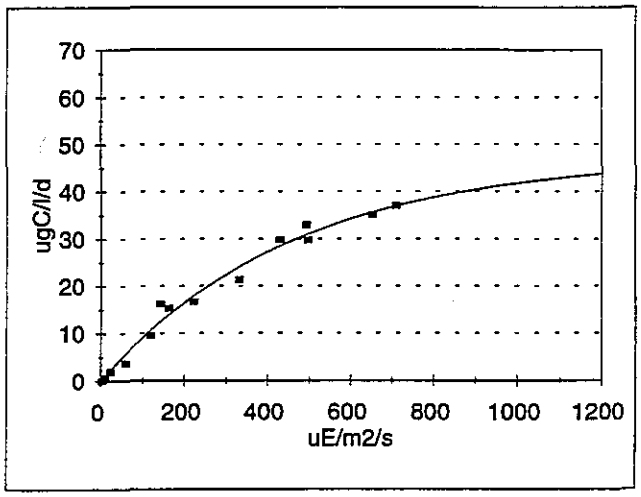

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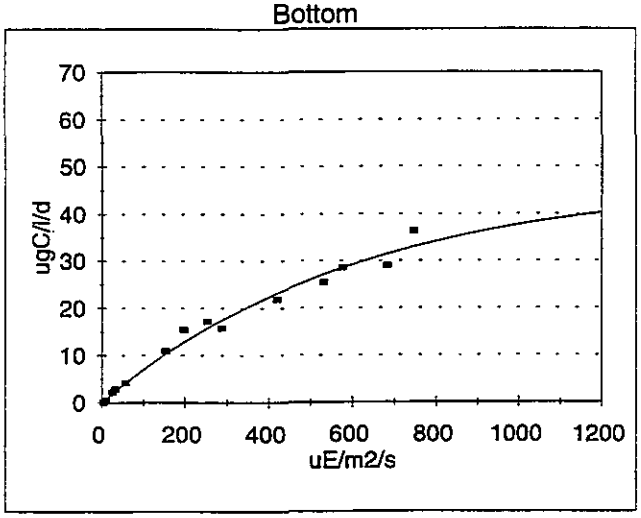
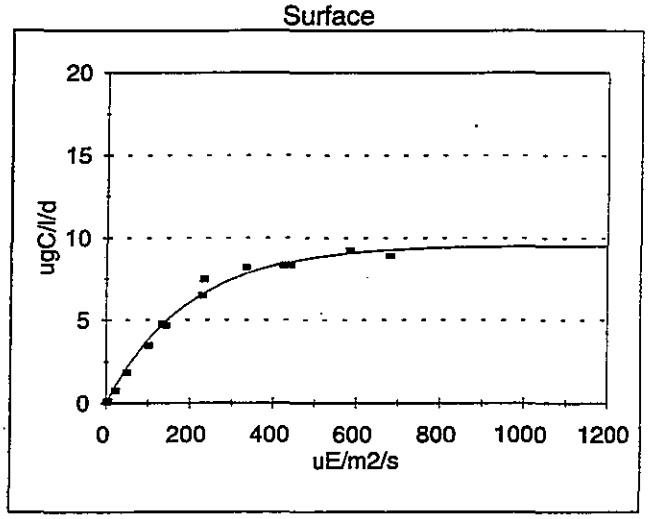


W9616 Station N10

Surface



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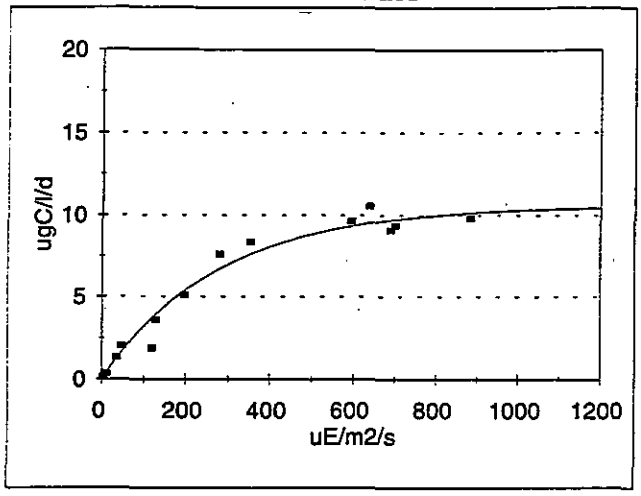

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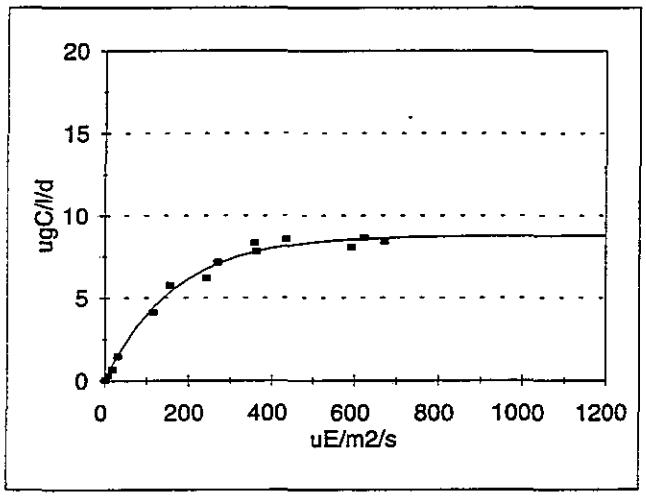

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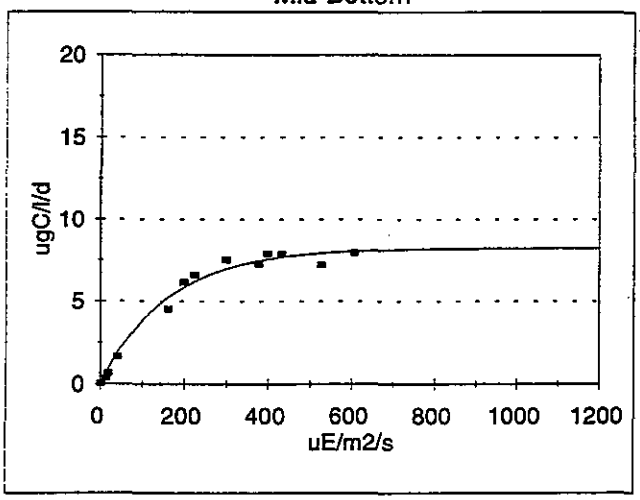

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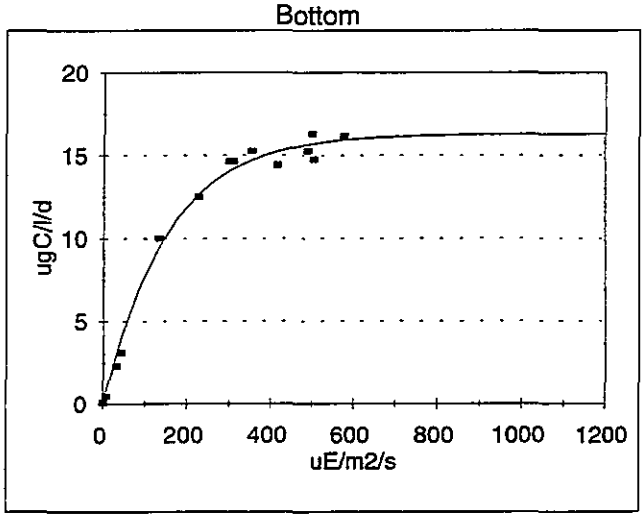
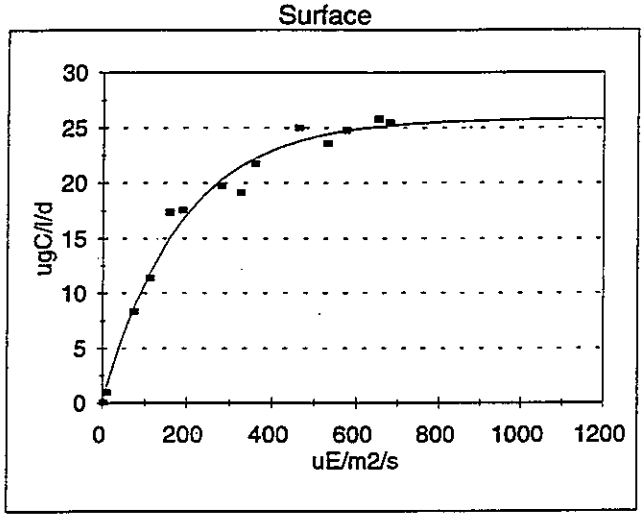


W9616 Station N04

Surface



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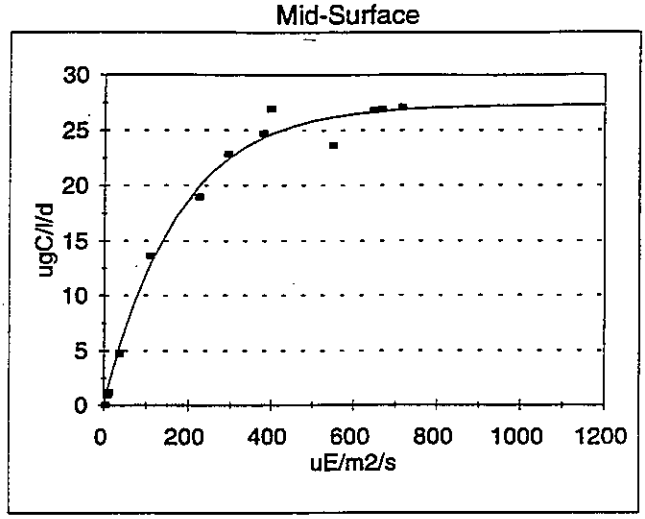

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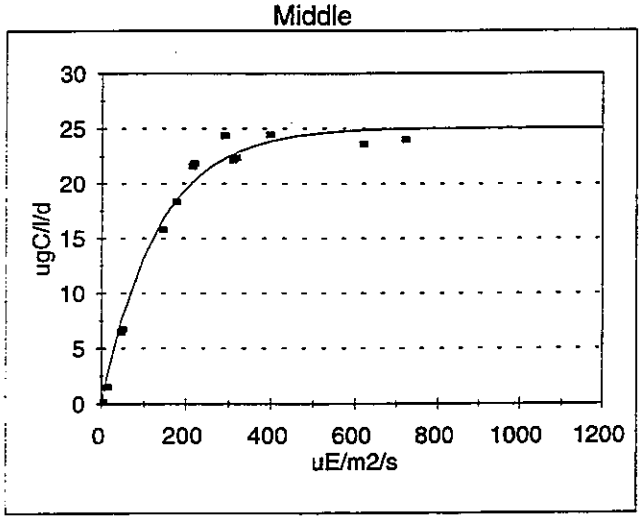

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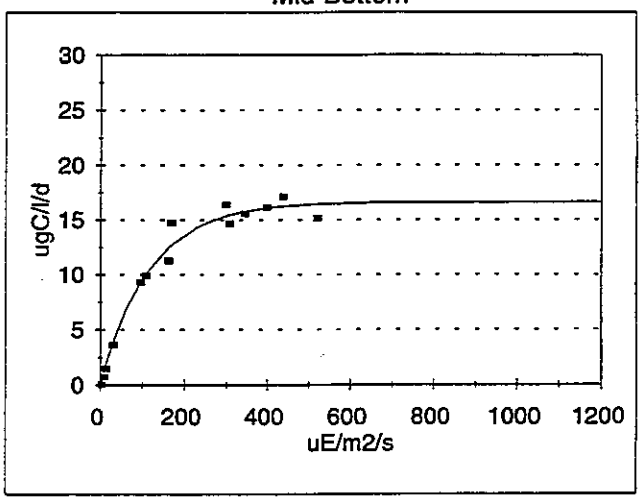

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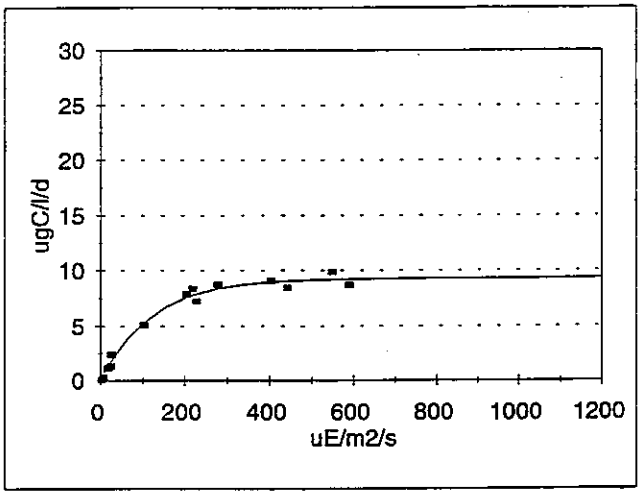
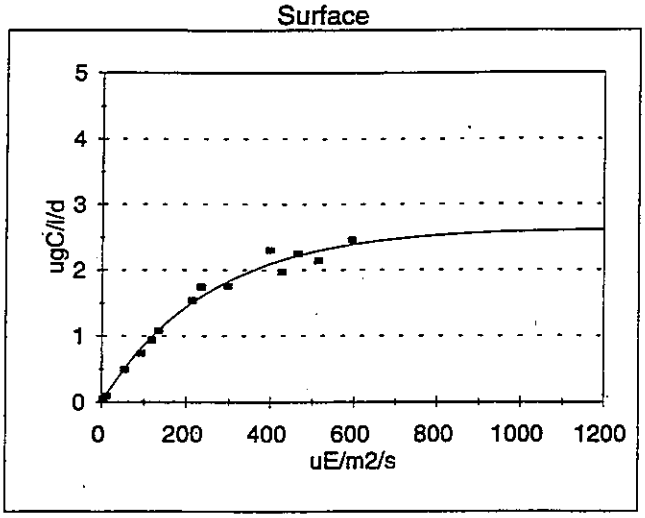
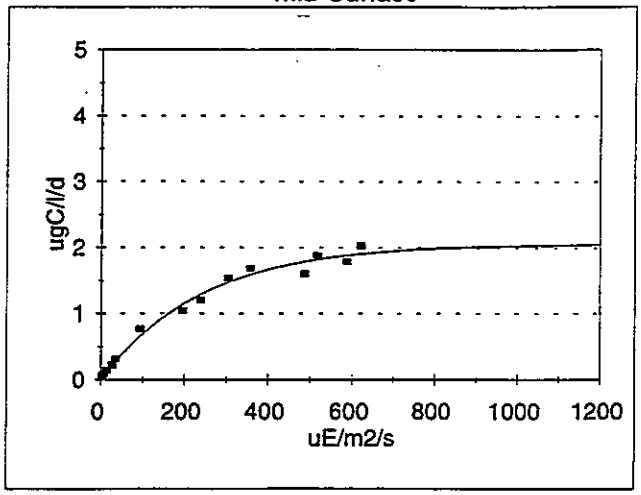


W9617 Station N10

Surface



Mid-Surface



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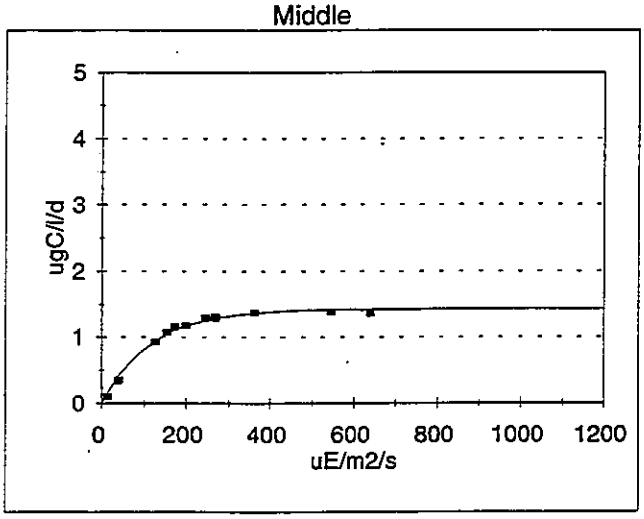

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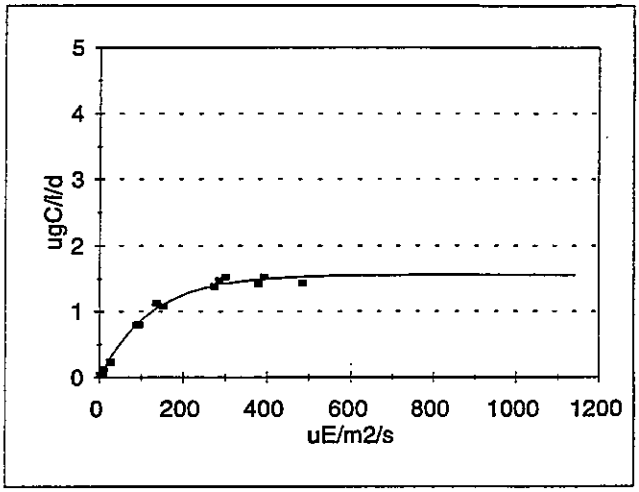

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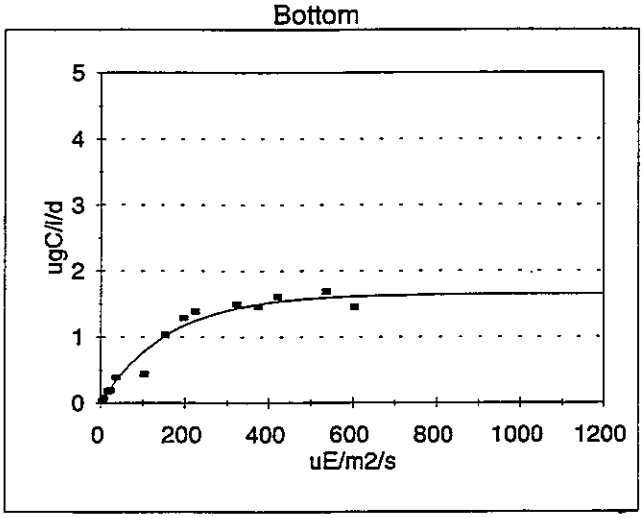
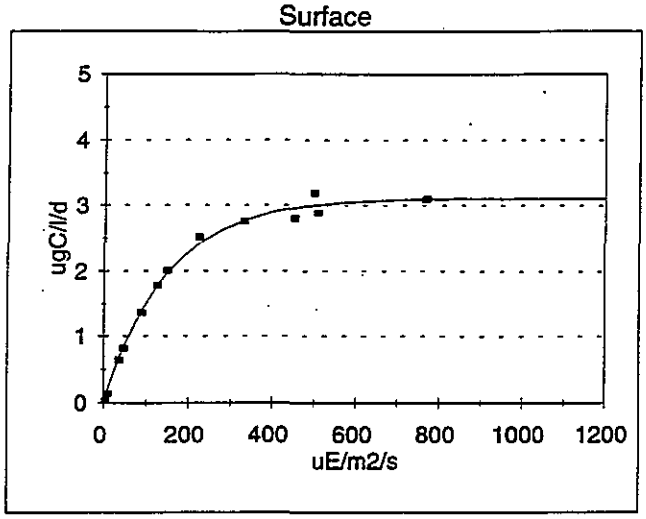
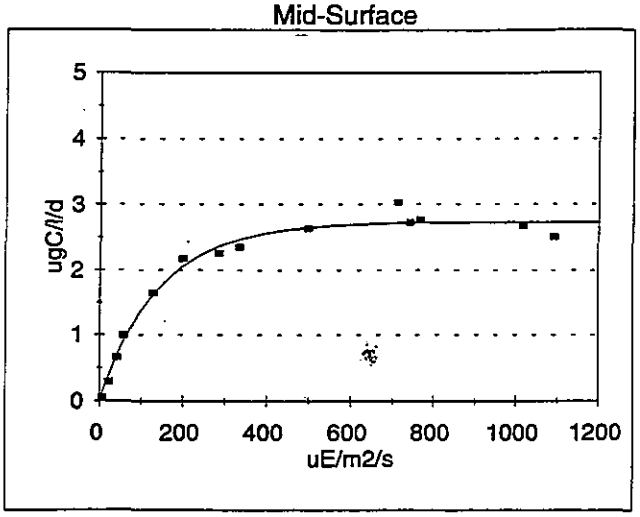


W9617 Station N04

Surface



Mid-Surface



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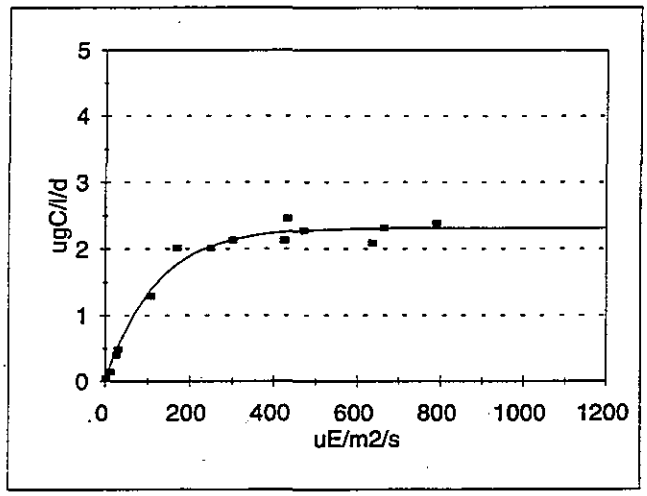
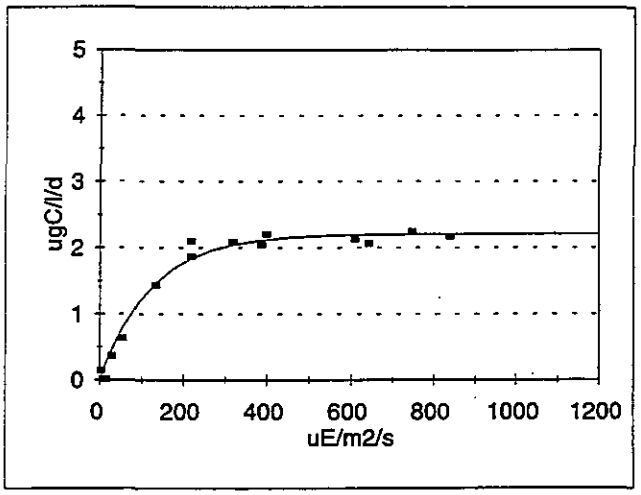


Mid-Bottom



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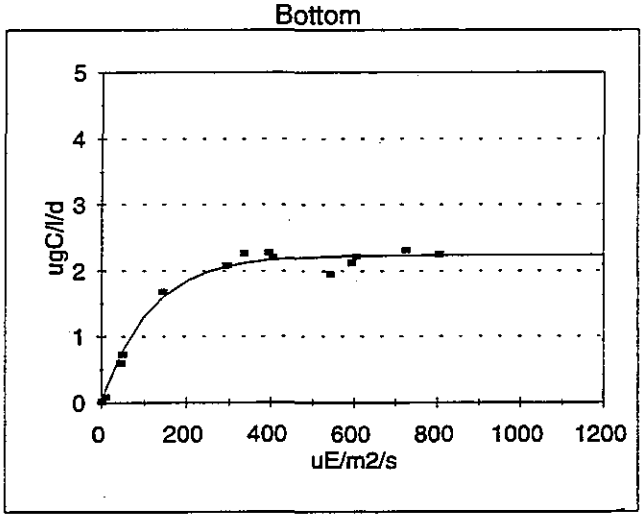

APPENDIX F-1

Abundance of Prevalent Whole-Water Phytoplankton Species in Surface Sample

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9610
August 5-6, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L							0.15	0.10					
		%							17	6					
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L							0.05						
		%							5						
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6Cells/L							0.10	0.20					
		%							12	12					
PYRAMIMONAS SPP.	PR	10^6Cells/L							0.06						
		%							7						
RHIZOSOLENIA FRAGILISSIMA	CD	10^6Cells/L							0.06						
		%							7						
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L							0.36	1.23					
		%							41	71					

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9611
August 18-23, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CHAETOCEROS SP#1 DIAM <10 MICRONS	CD	10^6Cells/L		0.28											
		%		5											
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L	0.29	0.48	0.34										
		%	10	9	7										
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L	0.27	0.54	0.60	0.19		0.20						0.07	
		%	9	10	13	7		6						6	
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6Cells/L				0.27			0.15	0.33	0.19	0.13	0.31	0.13	0.16
		%				10			8	8	15	13	36	11	18
LEPTOCYLINDRUS MINIMUS	CD	10^6Cells/L	0.20		0.34	0.21	0.38			0.34				0.13	
		%	7		7	8	10			8				12	
PYRAMIMONAS SPP.	PR	10^6Cells/L		0.28											
		%		5											
RHIZOSOLENIA FRAGILISSIMA	CD	10^6Cells/L	0.31	0.75	0.31	0.50	0.37	1.03	0.25	0.87	0.15			0.23	
		%	10	14	7	18	9	29	14	21	12			20	
SKELETONEMA COSTATUM GREV+CLEVE	CD	10^6Cells/L		0.47											
		%		9											
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6Cells/L	0.22				0.27	0.39		0.37					
		%	7				7	11		9					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L	1.18	1.42	2.27	0.93	2.16	1.05	1.02	1.34	0.68	0.68	0.46	0.44	0.56
		%	39	26	49	34	55	30	58	33	52	69	53	39	63

Group Definitions:	
CD	Centric Diatom
DF	Dinoflagellate
MF	Microflagellate
O	Other
PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9612
September 3-4, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L							0.04	0.29					
		%							7	24					
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L								0.25					
		%								21					
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6Cells/L							0.07	0.13					
		%							11	11					
LEPTOCYLINDRUS MINIMUS	CD	10^6Cells/L								0.07					
		%								5					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L							0.43	0.31					
		%							64	25					

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9613
September 23-24, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L							0.47	0.52					
		%							17	43					
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L							0.53	0.10					
		%							19	8					
CYCLOTELLA SP#1 DIAM <10 MICRONS	CD	10^6Cells/L								0.08					
		%								7					
PYRAMIMONAS SPP.	PR	10^6Cells/L							0.36						
		%							13						
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6Cells/L								0.06					
		%								5					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L							1.04	0.26					
		%							37	21					

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9614
October 6-11, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6 Cells/L			0.45								0.16		
		%			5								8		
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6 Cells/L	0.36	0.53	2.38	0.18		0.38	0.25	0.28	0.15		0.37		0.16
		%	12	17	27	7		14	8	10	6		17		8
CYCLOTELLA SP#1 DIAM <10 MICRONS	CD	10^6 Cells/L				0.15						0.13		0.13	0.13
		%				6						5		5	6
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L				0.29			0.41	0.15	0.17	0.33	0.17	0.30	0.39
		%				11			12	5	7	13	8	12	19
PYRAMIMONAS SPP.	PR	10^6 Cells/L			0.61										
		%			6.97										
SKELETONEMA COSTATUM GREV+CLEVE	CD	10^6 Cells/L	0.87	0.83	0.90		2.00	0.47		0.60	0.19				
		%	30	27	10.24		50	17		21	8				
THALASSIONEMA NITZSCHIOIDES	PD	10^6 Cells/L	0.160			0.27	0.41			0.21	0.17	0.13			
		%	5			10	10			8	7	5			
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L	0.17			0.40	0.20	0.28	0.52	0.27	0.46	0.51		0.34	0.28
		%	6			15	5	10	15	10	19	20		13	14
UNID. CENTRIC DIATOM DIAM 10-30 MICRONS	CD	10^6 Cells/L				0.15			0.188	0.151					
		%				6			6	5					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.84	0.79	2.84	0.88	0.79	0.89	1.24	0.79	0.85	1.10	1.13	1.21	0.81
		%	29	25	32	33	20	33	37	28	35	44	54	47	40

Group Definitions:

CD	Centric Diatom
DF	Dinoflagellate
MF	Microflagellate
O	Other
PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9615
October 29-30, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L	0.18	
		%	16	
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L	0.09	
		%	7	
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L	0.12	
		%	10.37	
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.49	
		%	42	
CERATIUM LONGIPES	DF	10^6 Cells/L		
		%		
CERATIUM TRIPOS	DF	10^6 Cells/L		
		%		

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9616
November 17-19, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L		0.16
		%		7
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L	0.21	0.51
		%	21	21
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L		
		%		
RHIZOSOLENIA FRAGILISSIMA	CD	10^6 Cells/L		0.22
		%		9
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L	0.14	0.26
		%	13	11
UNID. CENTRIC DIATOM DIAM 10-30 MICRONS	CD	10^6 Cells/L		
		%		
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.46	0.80
		%	45	33
CERATIUM FUSUS	DF	10^6 Cells/L		
		%		
CERATIUM LONGIPES	DF	10^6 Cells/L		
		%		
CERATIUM TRIPOS	DF	10^6 Cells/L		
		%		
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L		
		%		
NITZSCHIA PUNGENS	PD	10^6 Cells/L		
		%		

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Whole Water Phytoplankton, Survey W9617
December 16-17, 1996

Species	Group	Parameter	Station Cast			
			F06	F23	N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L	0.02			
		%	6			
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L	0.04	0.04	0.02	0.02
		%	11	6	7	7
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L			0.02	0.02
		%			7	7
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.23	0.43	0.24	0.22
		%	59	75	69	69
UNID. MICRO-PHYTOFLAG LENGTH >10 MICRONS	MF	10^6 Cells/L			0.02	
		%			5	
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L				
		%				
CERATIUM FUSUS	DF	10^6 Cells/L				
		%				
CERATIUM LONGIPES	DF	10^6 Cells/L				
		%				
CERATIUM TRIPOS	DF	10^6 Cells/L				
		%				
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L				
		%				

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

APPENDIX F-2

Abundance of Prevalent Whole-Water Phytoplankton Species in Chlorophyll *a* Maximum Sample

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9610
August 5-6, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L							0.33	0.08					
		%							21	9					
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L							0.26	0.05					
		%							17	5					
KATODINIUM ROTUNDATUM	DF	10^6Cells/L							0.08						
		%							5						
PYRAMIMONAS SPP.	PR	10^6Cells/L								0.06					
		%								6					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L							0.76	0.55					
		%							48	65					
Group Definitions:	CD	Centric Diatom													
	DF	Dinoflagellate													
	MF	Microflagellate													
	O	Other													
	PD	Pennate Diatom													

Abundance of Prevalent Species (> 5% Total Count) In Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9611
August 18-23, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CHAETOCEROS SP#1 DIAM <10 MICRONS	CD	10^6Cells/L									0.06				
		%									7				
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L	0.14	0.63	0.26										
		%	5	11	7										
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L	0.21	0.64	0.28	0.08	0.07	0.16	0.05		0.05	0.05	0.04		0.04
		%	8	11	8	7	6	5	6		5	6	6		5
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6Cells/L				0.15			0.13	0.19	0.14	0.08	0.12	0.13	0.04
		%				14			17	6	16	10	19	10	6
KATODINIUM ROTUNDATUM	DF	10^6Cells/L							0.08		0.08	0.05			
		%							11		10	7			
LEPTOCYLINDRUS MINIMUS	CD	10^6Cells/L	0.34		0.25		0.10	0.29						0.12	
		%	13		7		9	9						10	
RHIZOSOLENIA DELICATULA	CD	10^6Cells/L				0.07									
		%				6									
RHIZOSOLENIA FRAGILISSIMA	CD	10^6Cells/L	0.30	0.50	0.53	0.12	0.16	0.58		0.99				0.26	
		%	11	8	15	11	14	18		30				20	
SKELETONEMA COSTATUM GREV+CLEVE	CD	10^6Cells/L		0.37											
		%		6											
THALASSIONEMA NITZSCHIOIDES	PD	10^6Cells/L													0.19
		%													27
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6Cells/L	0		0.23			0.28		0.37					
		%	7		6			9		11					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L	1.07	2.32	1.61	0.49	0.53	1.18	0.44	1.10	0.33	0.52	0.39	0.55	0
		%	41	39	44	45	47	37	56	33	38	65	61	42	49

Group Definitions:	
CD	Centric Diatom
DF	Dinoflagellate
MF	Microflagellate
O	Other
PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9612
September 3-4, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L							0.10	0.24					
		%							10	25					
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L							0.05	0.08					
		%							5	8					
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6Cells/L							0.07	0.06					
		%							7	7					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L							0.69	0.50					
		%							71	51					
Group Definitions:	CD	Centric Diatom													
	DF	Dinoflagellate													
	MF	Microflagellate													
	O	Other													
	PD	Pennate Diatom													

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9613
September 23-24, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6Cells/L							0.45	0.23					
		%							18	34					
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6Cells/L							0.29						
		%							12						
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6Cells/L							0.13						
		%							5						
PYRAMIMONAS SPP.	PR	10^6Cells/L							0.64						
		%							26						
THALASSIONEMA NITZSCHIOIDES	PD	10^6Cells/L								0.05					
		%								7					
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6Cells/L								0.11					
		%								16					
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6Cells/L							0.67	0.12					
		%							27	17					

Group Definitions:	
CD	Centric Diatom
DF	Dinoflagellate
MF	Microflagellate
O	Other
PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9614
October 6-11, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	CR	10^6 Cells/L			0.32										
		%			9										
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	CR	10^6 Cells/L	0.27	0.56	0.79			0.40	0.19				0.04	0.13	
		%	12	14	21			14	15				5	7	
CYCLOTELLA SP#1 DIAM <10 MICRONS	CD	10^6 Cells/L				0.20		0.21		0.14	0.16				
		%				7		7		6	6				
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L							0.16		0.27	0.37	0.13	0.23	0.13
		%							13		10	13	18	12	9
RHIZOSOLENIA DELICATULA	CD	10^6 Cells/L											0.06		
		%											8		
SKELETONEMA COSTATUM GREV+CLEVE	CD	10^6 Cells/L	0.490	1.880	0.79	0.15	2.18	0.81		0.41	0.22		0.05		
		%	23	45	21	6	52	28		18	8		7		
THALASSIONEMA NITZSCHIOIDES	PD	10^6 Cells/L	0.113			0.28	0.25			0.13	0.15	0.20			0.14
		%	5			10	6			6	5	7			10
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L	0.21		0.28	0.80	0.21	0.19	0.07	0.40	0.45	0.67		0.30	0.18
		%	10		7	30	5	6	5	17	16	24		15	13
UNID. CENTRIC DIATOM DIAM 10-30 MICRONS	CD	10^6 Cells/L				0.32		0.16							0.08
		%				11.82		5.36							5.44
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.69	0.86	0.85	0.68	1.00	0.71	0.59	0.79	1.27	1.12	0.34	0.95	0.55
		%	32	21	23	25	24	25	45	34	45	39	44	48	39

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9615
October 29-30, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L	0.30	
		%	16	
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L	0.18	
		%	9	
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L	0.20	
		%	10.36	
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.84	
		%	44	
CERATIUM LONGIPES	DF	10^6 Cells/L		
		%		
CERATIUM TRIPOS	DF	10^6 Cells/L		
		%		

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

ndance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9616
November 17-19, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L		
		%		
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L	0.07	0.07
		%	8	9
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L		0.04
		%		5.5656
RHIZOSOLENIA FRAGILISSIMA	CD	10^6 Cells/L	0.1948	0.05
		%	20	6
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L	0.16	0.16
		%	16	23
UNID. CENTRIC DIATOM DIAM 10-30 MICRONS	CD	10^6 Cells/L		0
		%		6
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.34	0.23
		%	36	32
CERATIUM FUSUS	DF	10^6 Cells/L		
		%		
CERATIUM LONGIPES	DF	10^6 Cells/L		
		%		
CERATIUM TRIPOS	DF	10^6 Cells/L		
		%		
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L		
		%		
NITZSCHIA PUNGENS	PD	10^6 Cells/L		
		%		

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Whole Water Phytoplankton, Survey W9617
December 16-17, 1996

Species	Group	Parameter	Station Cast			
			F06	F23	N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L				
		%				
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L	0.03	0.02		0.02
		%	8	5		6
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L	0.03			0.03
		%	7.36			9
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L	0.25	0.32	0.23	0.24
		%	61	76	72	65
UNID. MICRO-PHYTOFLAG LENGTH >10 MICRONS	MF	10^6 Cells/L				
		%				
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L			0.02	0.02
		%			5	5
CERATIUM FUSUS	DF	10^6 Cells/L				
		%				
CERATIUM LONGIPES	DF	10^6 Cells/L				
		%				
CERATIUM TRIPOS	DF	10^6 Cells/L				
		%				
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L				
		%				

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

APPENDIX G-1

Abundance of all Identified Taxa in Screened Samples Near the Surface

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9610
August 5-6, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6Cells/L							0.00005	0.00023					
		%							17	62					
CERATIUM LONGIPES	DF	10^6Cells/L							0.00018	0.00009					
		%							60	25					
CERATIUM TRIPOS	DF	10^6Cells/L							0.00002	0.00002					
		%							6	6					
DINOPHYSIS NORVEGICA	DF	10^6Cells/L							0.00005						
		%							16						

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9611
August 18-23, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6Cells/L						0.00003	0.00005			0.00005	0.00015	0.00006	0.00013
		%						9	11			22	46	36	60
CERATIUM LONGIPES	DF	10^6Cells/L	0.00003	0.00001	0.00001		0.00009	0.00011	0.00006				0.00004	0.00005	0.00003
		%	19	11	31		15	36	14				12	32	15
CERATIUM TRIPOS	DF	10^6Cells/L	0.00001		0.000004			0.00005	0.00012			0.00014	0.00012	0.00004	0.00003
		%	5		10			17	29			64	38	25	14
DINOPHYSIS NORVEGICA	DF	10^6Cells/L			0.00001			0.00002							
		%			16			7							
GONYAULAX SPP.	DF	10^6Cells/L		0.00001											
		%		6											
NITZSCHIA PUNGENS	PD	10^6Cells/L	0.00010	0.00007		0.00600	0.00043		0.00018	0.00500	0.00300				
		%	59	56		98	74		43	78	89				
NITZSCHIA SERIATA	PD	10^6Cells/L								0.00100					
		%								16					
PROTOPERIDINIUM SP.#1 10-30W 10-40L	DF	10^6Cells/L		0.00001	0.00001										
		%		7	16										
PROTOPERIDINIUM SP.#2 31-75W 41-80L	DF	10^6Cells/L			0.000004			0.00004							
		%			10			14							
SCRIPPSIELLA TROCHOIDEA	DF	10^6Cells/L						0.00002							
		%						7							

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9612
September 3-4, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6Cells/L							0.00008	0.00015					
		%							36	19					
CERATIUM LONGIPES	DF	10^6Cells/L							0.00003	0.00013					
		%							12	16					
CERATIUM TRIPOS	DF	10^6Cells/L							0.00011	0.00049					
		%							48	61					
Group Definitions:	CD	Centric Diatom													
	DF	Dinoflagellate													
	MF	Microflagellate													
	O	Other													
	PD	Pennate Diatom													

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9613
September 23-24, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6Cells/L							0.00003	0.00001					
		%							12	7					
CERATIUM LONGIPES	DF	10^6Cells/L							0.00004	0.00002					
		%							14	9					
CERATIUM TRIPOS	DF	10^6Cells/L							0.00019	0.00014					
		%							68	75					
DINOPHYSIS NORVEGICA	DF	10^6Cells/L								0.00001					
		%								7					
Group Definitions:	CD	Centric Diatom													
	DF	Dinoflagellate													
	MF	Microflagellate													
	O	Other													
	PD	Pennate Diatom													

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9614
October 6-11, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6 Cells/L				0.00005		0.000002	0.0001	0.00002	0.00004		0.00008	0.00004	0.00004
		%				8		6	7	8	9		8	6	8
CERATIUM LINEATUM	DF	10^6 Cells/L							0.0002				0.0001		
		%							11				13		
CERATIUM LONGIPES	DF	10^6 Cells/L	0.00003	0.00003	0.00001	0.00005	0.00002		0.0002	0.00002	0.00005	0.00023	0.00008		0.00004
		%	18	10	13	8	12		14	7	11	10	8		8
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0001	0.0002	0.00004	0.001	0.0001	0.00002	0.0008	0.0002	0.0003	0.00201	0.001	0.0006	0.0004
		%	56	76	70	81	84	87	60	83	69	86	58	87	81
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L							0.0001		0.00003		0.0001		
		%							5		6		7		
NITZSCHIA PUNGENS	PD	10^6 Cells/L	0.00002	0.00002											
		%	15	9											
UNID. DINOFLAGELLATE	DF	10^6 Cells/L			0.00001										
		%			12										

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9615
October 29-30, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L		
		%		
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L		
		%		
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L		
		%		
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L		
		%		
CERATIUM LONGIPES	DF	10^6 Cells/L	0.00003	
		%	6	
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0004	
		%	83	

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9616
November 17-19, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L		
		%		
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L		
		%		
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L		
		%		
RHIZOSOLENIA FRAGILISSIMA	CD	10^6 Cells/L		
		%		
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L		
		%		
UNID. CENTRIC DIATOM DIAM 10-30 MICRONS	CD	10^6 Cells/L		
		%		
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L		
		%		
CERATIUM FUSUS	DF	10^6 Cells/L		0.00003
		%		6
CERATIUM LONGIPES	DF	10^6 Cells/L	0.0001	0.00004
		%	14	7
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0003	0.0004
		%	79	83
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L	0.00002	
		%	5	
NITZSCHIA PUNGENS	PD	10^6 Cells/L		
		%		

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Surface Sample
Screened Phytoplankton, Survey W9617
December 16-17, 1996

Species	Group	Parameter	Station Cast			
			F06	F23	N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L				
		%				
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L				
		%				
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L				
		%				
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L				
		%				
UNID. MICRO-PHYTOFLAG LENGTH >10 MICRONS	MF	10^6 Cells/L				
		%				
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L				
		%				
CERATIUM FUSUS	DF	10^6 Cells/L	0.0001	0.00002	0.00003	0.00006
		%	8	8	14	12
CERATIUM LONGIPES	DF	10^6 Cells/L	0.0001	0.00003	0.00002	0.00004
		%	11	13	8	7
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0005	0.0001	0.0001	0.0004
		%	75	73	66	71
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L			0.00001	
		%			5	

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

APPENDIX G-2

Abundance of all Identified Taxa in Screened Samples Near the Chlorophyll Maximum

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Screened Phytoplankton, Survey W9610
August 5-6, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6Cells/L								0.00004					
		%								7					
CERATIUM LONGIPES	DF	10^6Cells/L							0.00100	0.00047					
		%							79	85					
DINOPHYSIS NORVEGICA	DF	10^6Cells/L							0.00019						
		%							15						
Group Definitions:	CD	Centric Diatom													
	DF	Dinoflagellate													
	MF	Microflagellate													
	O	Other													
	PD	Pennate Diatom													

Abundance of Prevalent Species (> 5% Total Count) In Chlorophyll a Maximum Sample
Screened Phytoplankton, Survey W9611
August 18-23, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
AMYLAX TRIACANTHA	DF	10^6Cells/L													0.00006
		%													19
CERATIUM FUSUS	DF	10^6Cells/L		0.00001		0.00004		0.00003	0.00002			0.00008		0.00012	
		%		5		24		11	6			12		32	
CERATIUM LONGIPES	DF	10^6Cells/L	0.00007		0.00002	0.00004	0.00030	0.00010	0.00031	0.00028	0.00047	0.00041	0.00022	0.00012	0.00017
		%	18		13	24	71	33	69	52	77	63	86	32	57
CERATIUM TRIPOS	DF	10^6Cells/L			0.00001	0.00004		0.00003	0.00004		0.00003	0.00012	0.00002	0.00006	
		%			7	27		11	9		5	18	9	17	
DINOPHYSIS NORVEGICA	DF	10^6Cells/L		0.00003	0.00001		0.00002	0.00003		0.00014					
		%		20	5		6	9		27					
DIPLOPSALIS SPP.	DF	10^6Cells/L		0.00002											
		%		16											
GONYAULAX SPINIFERA	DF	10^6Cells/L			0.00001										
		%			9										
GONYAULAX SPP.	DF	10^6Cells/L		0.00001	0.00002			0.00002							
		%		5	14			7							
NITZSCHIA PUNGENS	PD	10^6Cells/L	0.00028			0.00003									
		%	75			19									
PROTOPERIDINIUM SP.#2 31-75W 41-80L	DF	10^6Cells/L		0.00005	0.00003			0.00003							
		%		34	21			9							
SCRIPPSIELLA TROCHOIDEA	DF	10^6Cells/L			0.00001										
		%			5										

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Screened Phytoplankton, Survey W9612
September 3-4, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F08	F27	F01	F02
CERATIUM FUSUS	DF	10^6Cells/L							0.00007	0.00006					
		%							20	12					
CERATIUM LONGIPES	DF	10^6Cells/L							0.00009	0.00015					
		%							25	30					
CERATIUM TRIPOS	DF	10^6Cells/L							0.00015	0.00019					
		%							44	39					
DINOPHYSIS NORVEGICA	DF	10^6Cells/L								0.00008					
		%								17					

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) In Chlorophyll *a* Maximum Sample
Screened Phytoplankton, Survey W9613
September 23-24, 1996

Species	Group	Parameter	Station Cast											
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6Cells/L							0.00013	0.00002					
		%							8	15					
CERATIUM LONGIPES	DF	10^6Cells/L							0.00031	0.00002					
		%							21	13					
CERATIUM TRIPOS	DF	10^6Cells/L							0.00100	0.00009					
		%							67	60					
DINOPHYSIS NORVEGICA	DF	10^6Cells/L								0.00002					
		%								10					
Group Definitions:	CD	Centric Diatom													
	DF	Dinoflagellate													
	MF	Microflagellate													
	O	Other													
	PD	Pennate Diatom													

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Screened Phytoplankton, Survey W9614
October 6-11, 1996

Species	Group	Parameter	Station Cast												
			F23	F30	F31	F13	F24	F25	N04	N10	N16	F06	F27	F01	F02
CERATIUM FUSUS	DF	10^6 Cells/L		0.00001		0.00004	0.000012		0.000053	0.000016	0.00007	0.000121		0.00015	0.00008
		%		5		10	8		6	7	10	6		8	7
CERATIUM LONGIPES	DF	10^6 Cells/L	0.00002	0.00001	0.000006		0.00002	0.00001	0.00013	0.00002	0.00016			0.00013	0.0002
		%	14	10	15		13	18	14	9	24			7	16
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0001	0.0001	0.00003	0.0003	0.0001	0.00005	0.00064	0.0002	0.0004	0.00177	0.0001	0.0016	0.0009
		%	68	73	60	81	62	78	73	83	60	91	13	85	76
NITZSCHIA PUNGENS	PD	10^6 Cells/L		0.00001			0.00001						0.001		
		%		10			6						78		
UNID. DINOFLAGELLATE	DF	10^6 Cells/L	0.00002		0.00001										
		%	14		23										

Group Definitions:

CD	Centric Diatom
DF	Dinoflagellate
MF	Microflagellate
O	Other
PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Screened Phytoplankton, Survey W9615
October 29-30, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L		
		%		
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L		
		%		
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L		
		%		
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L		
		%		
CERATIUM LONGIPES	DF	10^6 Cells/L	0.00260	
		%	10	
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0214	
		%	82	

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Screened Phytoplankton, Survey W9616
November 17-19, 1996

Species	Group	Parameter	Station Cast	
			N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L		
		%		
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L		
		%		
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L		
		%		
RHIZOSOLENIA FRAGILISSIMA	CD	10^6 Cells/L		
		%		
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L		
		%		
UNID. CENTRIC DIATOM DIAM 10-30 MICRONS	CD	10^6 Cells/L		
		%		
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L		
		%		
CERATIUM FUSUS	DF	10^6 Cells/L		
		%		
CERATIUM LONGIPES	DF	10^6 Cells/L	0.0000	0.00003
		%	7	9
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0002	0.0002
		%	83	79
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L		
		%		
NITZSCHIA PUNGENS	PD	10^6 Cells/L		0.0000
		%		5

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

Abundance of Prevalent Species (> 5% Total Count) in Chlorophyll *a* Maximum Sample
Screened Phytoplankton, Survey W9617
December 16-17, 1996

Species	Group	Parameter	Station Cast			
			F06	F23	N10	N04
CRYPTOMONAS SP#1 LENGTH <10 MICRONS	O	10^6 Cells/L				
		%				
CRYPTOMONAS SP#2 LENGTH >10 MICRONS	O	10^6 Cells/L				
		%				
GYMNODINIUM SP.#1 5-20UM W 10-20UM L	DF	10^6 Cells/L				
		%				
UNID. MICRO-PHYTOFLAG LENGTH <10 MICRONS	MF	10^6 Cells/L				
		%				
UNID. MICRO-PHYTOFLAG LENGTH >10 MICRONS	MF	10^6 Cells/L				
		%				
UNID. CENTRIC DIATOM DIAM <10 MICRONS	CD	10^6 Cells/L				
		%				
CERATIUM FUSUS	DF	10^6 Cells/L	0.00004		0.00002	0.00004
		%	7		8	7
CERATIUM LONGIPES	DF	10^6 Cells/L	0.00005	0.00001	0.00003	0.0001
		%	8	6	12	15
CERATIUM TRIPOS	DF	10^6 Cells/L	0.0005	0.0001	0.0002	0.0004
		%	79	85	68	70
DINOPHYSIS NORVEGICA	DF	10^6 Cells/L				
		%				

Group Definitions:		
	CD	Centric Diatom
	DF	Dinoflagellate
	MF	Microflagellate
	O	Other
	PD	Pennate Diatom

APPENDIX H

Zooplankton Species Data

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9610
August 5-6, 1996

Species	Life Stage	Group	Parameter	Station Cast													
				F23	F30	F31	F13	F24	F25	N04	N10	N16	N18	F27	F06	F01	F02
BIVALVIA SPP.	L	OZ	ind/m^3							5543							
			%							8							
COPEPOD SPP.	N	C	ind/m^3							9317	26900						
			%							14	18						
OITHONA SIMILIS CLAUS	C	C	ind/m^3							9435	21930						
			%							14	15						

Life Stage Definitions:		Group Definitions:	
C	Copepodite stages I-V	B	Barnacle
F	Copepoda adult female	C	Copepod
L	Larva	OZ	Other Zooplankton
M	Copepoda adult male		
N	Nauplii		
T	Trochophore (larval stage of polychaete)		
Y	Cypris Larva of Barnacle		

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9611
August 18-23, 1996

Species	Life Stage	Group	Parameter	Station Cast													
				F23	F30	F31	F13	F24	F25	N04	N10	N16	N18	F27	F06	F01	F02
ACARTIA HUDSONICA	C	C	ind/m^3	8202	20704												
			%	9	15												
ACARTIA HUDSONICA	M	C	ind/m^3	5601	7628												
			%	6	5												
ACARTIA TONSA	C	C	ind/m^3	11403	25063												
			%	12	18												
ACARTIA TONSA	F	C	ind/m^3			4217											
			%			5											
ACARTIA TONSA	M	C	ind/m^3	6401	8717	4439											
			%	7	6	5											
BIVALVIA SPP.	L	OZ	ind/m^3					6694	3206	6238	5242	5386				7503	9583
			%					9	7	14	15	10				7	18
COPEPOD SPP.	N	C	ind/m^3	16404	44677	24415	23442	31685	16029	18245	10342	22762		12405	14163	25237	14792
			%	18	32	30	35	42	35	42	29	42		40	29	24	28
MICROSETELLA NORVEGICA		C	ind/m^3														3750
			%														7
OITHONA SIMILIS CLAUS	C	C	ind/m^3			11320	15118	14950	7577	8421	4250	11120		11491	13464	24214	6667
			%			14	23	20	17	19	12	21		37	28	23	13
OITHONA SIMILIS CLAUS	F	C	ind/m^3	5201		8212	7304	5802	2914	2963	3967	2954		2677	3847	7503	2917
			%	6		10	11	8	6	7	11	6		9	8	7	6
POLYCHAETE SPP.	T	OZ	ind/m^3														2708
			%														5
PSEUDOCALANUS NEWMANI	C	C	ind/m^3			4439			2332	2495		3475			3497		3750
			%			5			5	6		6			7		7
TEMORA LONGICORNIS	C	C	ind/m^3													5798	
			%													5	

Life Stage Definitions:

- C Copepodite stages I-V
- F Copepoda adult female
- L Larva
- M Copepoda adult male
- N Nauplii
- T Trochophore (larval stage of polychaete)
- Y Cypris Larva of Barnacle

Group Definitions:

- B Barnacle
- C Copepod
- OZ Other Zooplankton

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9612
September 3-4, 1996

Species	Life Stage	Group	Parameter	Station Cast F23	F30	F31	F13	F24	F25	N04	N10	N16	N18	F27	F06	F01	F02
BIVALVIA SPP.	L	OZ	ind/m^3							6805	18586						
			%							12	29						
COPEPOD SPP.	N	C	ind/m^3							8361	15770						
			%							15	24						
OIKOPLEURA DIOICA		OZ	ind/m^3							3889							
			%							7							
OITHONA SIMILIS CLAUS	C	C	ind/m^3							16527	8730						
			%							29	13						
OITHONA SIMILIS CLAUS	F	C	ind/m^3								3661						
			%								6						
PSEUDOCALANUS NEWMANI	C	C	ind/m^3							3694	3520						
			%							7	5						
TEMORA LONGICORNIS	C	C	ind/m^3							5444							
			%							10							

Life Stage Definitions:		Group Definitions:	
C	Copepodite stages I-V	B	Barnacle
F	Copepoda adult female	C	Copepod
L	Larva	OZ	Other Zooplankton
M	Copepoda adult male		
N	Nauplii		
T	Trochophore (larval stage of polychaete)		
Y	Cypris Larva of Barnacle		

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9613
September 23-24, 1996

Species	Life Stage	Group	Parameter	Station Cast F23	F30	F31	F13	F24	F25	N04	N10	N16	N18	F27	F06	F01	F02
BIVALVIA SPP.	L	OZ	ind/m^3							5108	2584						
			%							9	12						
CENTROPAGES TYPICUS		C	ind/m^3							3746							
			%							6							
COPEPOD SPP.	N	C	ind/m^3							22815	6251						
			%							39	30						
OITHONA SIMILIS CLAUS	C	C	ind/m^3							17367	3417						
			%							30	16						
OITHONA SIMILIS CLAUS	F	C	ind/m^3							4767	1083						
			%							8	5						

Life Stage Definitions:

- C Copepodite stages I-V
- F Copepoda adult female
- L Larva
- M Copepoda adult male
- N Nauplii
- T Trochophore (larval stage of polychaete)
- Y Cypris Larva of Barnacle

Group Definitions:

- B Barnacle
- C Copepod
- OZ Other Zooplankton

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9614
October 6-11, 1996

Species	Life Stage	Group	Parameter	Station Cast													
				F23	F30	F31	F13	F24	F25	N04	N10	N16	N18	F27	F06	F01	F02
ACARTIA TONSA	C	C	ind/m^3		2022	4613											
			%		7	11											
ACARTIA TONSA	F	C	ind/m^3			2661											
			%			6											
ACARTIA TONSA	M	C	ind/m^3		1596	3371											
			%		6	8											
BIVALVIA SPP.	L	OZ	ind/m^3	8201	3830		24593	3692	879	4430	1927	16765		8676	9628	12536	4747
			%	14	13		40	11	6	8	7	23		13	16	14	8
CENTROPAGES SPP.		C	ind/m^3							3138		4432		4522			
			%							6		6		7			
CENTROPAGES TYPICUS		C	ind/m^3							6645		7130		7199			
			%							12		10		11			
COPEPOD SPP.	N	C	ind/m^3	13222	11278	9581	13147	11538	4467	20397	7172	24473		28058	20896	36215	29335
			%	23	40	23	21	35	32	36	25	34		42	35	41	46
GASTROPODA;MOLLUSCA		OZ	ind/m^3						1098								
			%						8								
OITHONA SIMILIS CLAUS	C	C	ind/m^3	12385		5234	11137	6692	1831	16428	8136	14645		12644	15160	16715	15580
			%	21		13	18	20	13	29	28	20		19	26	19	25
OITHONA SIMILIS CLAUS	F	C	ind/m^3		1915			2308							4302	8357	7060
			%		7			7							7	9	11
POLYCHAETE SPP.	L	OZ	ind/m^3	4017													
			%	7													
Pseudodiaptomus coronatus	C	C	ind/m^3		1809												
			%		6												

Life Stage Definitions:			Group Definitions:	
	C	Copepodite stages I-V	B	Barnacle
	F	Copepoda adult female	C	Copepod
	L	Larva	OZ	Other Zooplankton
	M	Copepoda adult male		
	N	Nauplii		
	T	Trochophore (larval stage of polychaete)		
	Y	Cypris Larva of Barnacle		

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9615
October 29-30, 1996

Species	Life Stage	Group	Parameter	Station Cast	
				N04	N10
BIVALVIA SPP.	L	OZ	ind/m^3	8760	7075
			%	9	14
CENTROPAGES SPP.		C	ind/m^3	7398	
			%	8	
CENTROPAGES TYPICUS		C	ind/m^3	7203	11290
			%	8	23
COPEPOD SPP.	N	C	ind/m^3	27060	7828
			%	29	16
OITHONA SIMILIS CLAUS	C	C	ind/m^3	32122	12194
			%	35	25

Life Stage Definitions:

- C Copepodite stages I-V
- F Copepoda adult female
- L Larva
- M Copepoda adult male
- N Nauplii
- T Trochophore (larval stage of polychaete)
- Y Cypris Larva of Barnacle

Group Definitions:

- B Barnacle
- C Copepod
- OZ Other Zooplankton

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9616
November 17-19, 1996

Species	Life Stage	Group	Parameter	Station Cast	
				N04	N10
BIVALVIA SPP.	L	OZ	ind/m^3	2091	836
			%	9	6
CENTROPAGES TYPICUS		C	ind/m^3	1206	
			%	5	
COPEPOD SPP.	N	C	ind/m^3	6755	6029
			%	31	40
MICROSETELLA NORVEGICA		C	ind/m^3		1313
			%		9
OITHONA SIMILIS CLAUS	C	C	ind/m^3	6755	2865
			%	31	19

Life Stage Definitions:

- C Copepodite stages I-V
- F Copepoda adult female
- L Larva
- M Copepoda adult male
- N Nauplii
- T Trochophore (larval stage of polychaete)
- Y Cypris Larva of Barnacle

Group Definitions:

- B Barnacle
- C Copepod
- OZ Other Zooplankton

Abundance of Prevalent Species (> 5% Total Count)
Zooplankton, Survey W9617
December 16-17, 1997

Species	Life Stage	Group	Parameter	Station Cast			
				F23	N04	N10	F06
ACARTIA HUDSONICA	C	C	ind/m^3	713			
			%	11			
ACARTIA HUDSONICA	F	C	ind/m^3	757			
			%	11			
COPEPOD SPP.	C	C	ind/m^3	445			
			%	7			
COPEPOD SPP.	N	C	ind/m^3	1915	15495	8938	18040
			%	29	55	47	46
OITHONA SIMILIS CLAUS	C	C	ind/m^3	891	6280	4390	12810
			%	14	22	23	33
OITHONA SIMILIS CLAUS	F	C	ind/m^3			1164	
			%			6	
PSEUDOCALANUS NEWMANI	C	C	ind/m^3		1702	1164	2274
			%		6	6	6

Life Stage Definitions:

- C Copepodite stages I-V
- F Copepoda adult female
- L Larva
- M Copepoda adult male
- N Nauplii
- T Trochophore (larval stage of polychaete)
- Y Cypris Larva of Barnacle

Group Definitions:

- B Barnacle
- C Copepod
- OZ Other Zooplankton