# PHYTOPLANKTON CHLOROPHYLL AND PRIMARY

# Productivity FOR THE MAFLA SURVEY

1975 - 1976

Florida State University, Department of Oceanography

Principal Investigator:
Richard L. Iverson

# PHYTOPLANKTON CHLOROPHYLL AND PRIMARY PRODUCTIVITY FOR THE MAFLA SURVEY 1975 - 1976

Richard L. Iverson

Department of Oceanography
Florida State University
Tallahassee, Florida

## INTRODUCTION

The phytoplankton ecology of the northeastern Gulf of Mexico is not well known. Phytoplankton species composition has been reported for various areas of the northeastern Gulf of Mexico (reviewed by Steidinger, 1973). Very little data is available concerning phytoplankton primary productivity and chlorophyll distribution in the open northeastern Gulf of Mexico which is considered highly oligotrophic based on a few productivity estimates (El Sayd, et al., 1972).

Phytoplankton species composition and chlorophyll data were collected during the first MAFLA survey (1974 - 1975). During the 1975 - 1976 MAFLA survey, chlorophyll and primary productivity data were collected and combined with estimates of photosynthetically active radiation to yield assimilation rates. It was postulated that since assimilation rates are normalized to phytoplankton biomass (estimated by chlorophyll) and to available light, assimilation rate values would provide a better reference data set for use in evaluating effects of hydrocarbon extraction operations than would raw productivity estimates.

## METHODS

Water samples were collected with PVC Niskin bottles from surface and from near-bottom or from the depth at which light energy was one percent of the surface value. Three 2-liter subsamples were filtered through Whatman GF/A glass fiber filters after which several ml of a saturated solution of $MgCO_3$ were

D

passed through each filter. Filters were frozen and returned to shore where they were processed using methods giben in Strickland and Parsons (1972).

For primary productivity estimates, three subsamples of about 200 ml were drawn into glass bottles after which each bottle was inoculated with 10 uCi of C-14 as $NaHCO_3$. Bottles were placed in a deck-board incubator constructed of plexiglass covered with blue plastic. Blue filters have been shown to result in higher carbon fixation than has the use of neutral density filters. Temperature was regulated in the deck incubator by pumping seawater from the ship sea chest through the incubator. Solar radiation was measured continuously during incubation of the productivity samples using a Lambda quanta sensor. After a 3-hour incubation period, samples were fixed with mercuric chloride then filtered through Whatman GF/C glass fiber scintillation pads. The pads were frozen and transported to shore where carbon-14 activity was measured with a liquid scintillation spectrometer using Aquasol as the scintillation cocktail. Stable carbon content of seawater samples was estimated with the titration alkalinity method given in Strickland and Parsons (1972). Assimilation ratios were calculated by dividing hourly productivity estimates by chlorophyll *a* values obtained from the same water samples from which water for productivity estimates was obtained. These values were then divided by quanta flux for the exposure period.

## RESULTS AND DISCUSSION

Data obtained during the 1975 - 1976 MAFLA survey are contained in Appendix 1.

The average and range of seasonal chlorophyll a values for each MAFLA transect are presented in Table 1 and 2. Figures 1 a,b,c and 2 a,b,c illustrate spatial chlorophyll a distribution pattern. in surface and bottom. water, respectively.

With the exception of transect 4, surface chlorophyll a values ranged between 0.1 and 0.5 $mg/m^3$ throughout the MAFLA region during the summer sampling period. Surface chlorophyll a values were greater in transects 3 and 4 than in transects 1 and 2 (Fig. 1a). Bottom chlorophyll a values were, in general, greater than surface values (Fig. 2b). There appeared to be an offshore decrease in chlorophyll a in transects 2, 3, and 4. The range of chlorophyll a values was greater in bottom than in surface water.

Chlorophyll a values were, in general, higher in the fall than in the summer in transects 1 and 2 and lower in transects 3 and 4 for both surface and bottom samples (Fig. lb, 2b). Transects 1 and 2 were sampled after hurricane Eloise had passed through the study aread and the increased chlorophyll a may have been caused by advection of relatively nutrient-rich water into the study area or by nutrient input accompanying sediment resuspension. Fall surface offshore chlorophyll a values were among the lowest observed during the MAFLA survey.

With the exception of transect 4, winter chlorophyll a values generally ranged between 0.1 and 0.5 $mg/m^3$ in both surface and

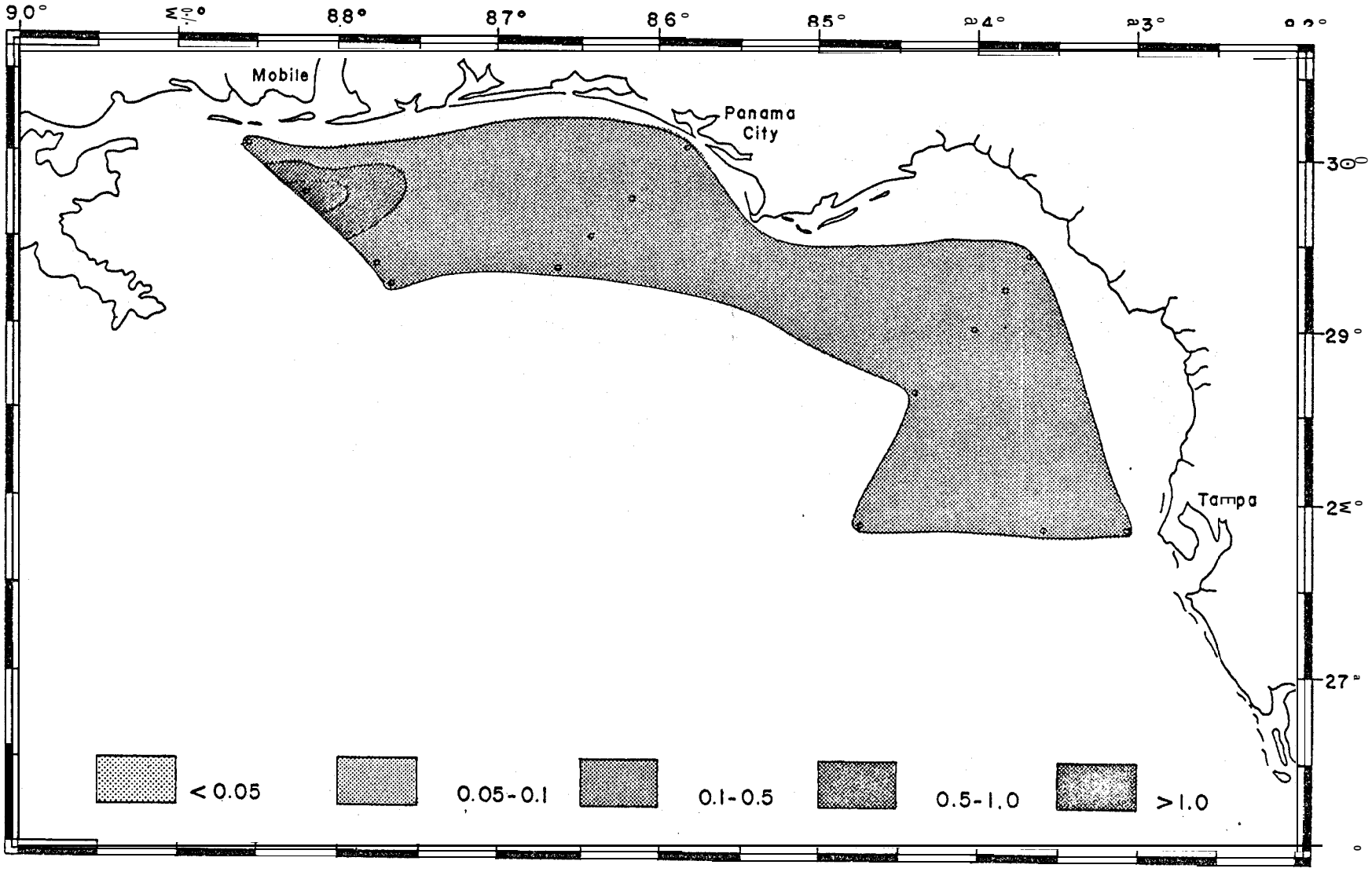



Figure 1a. The horizontal distribution of the surface chlorophyll a (mg/m³), June-July, 1975.

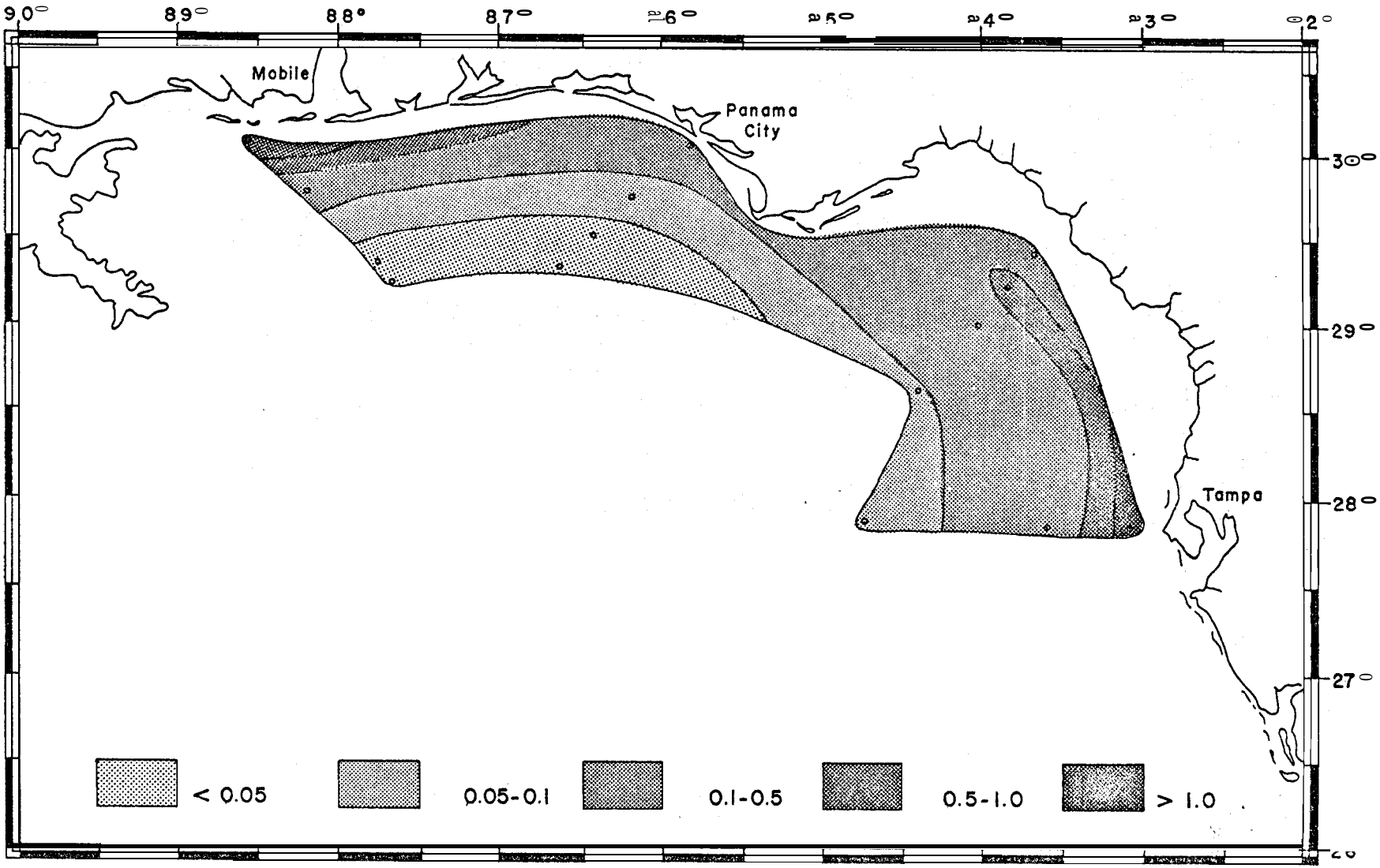



Figure 1b. The horizontal distribution of the surface chlorophyll a (mg/m$^3$), September-October, 1975.

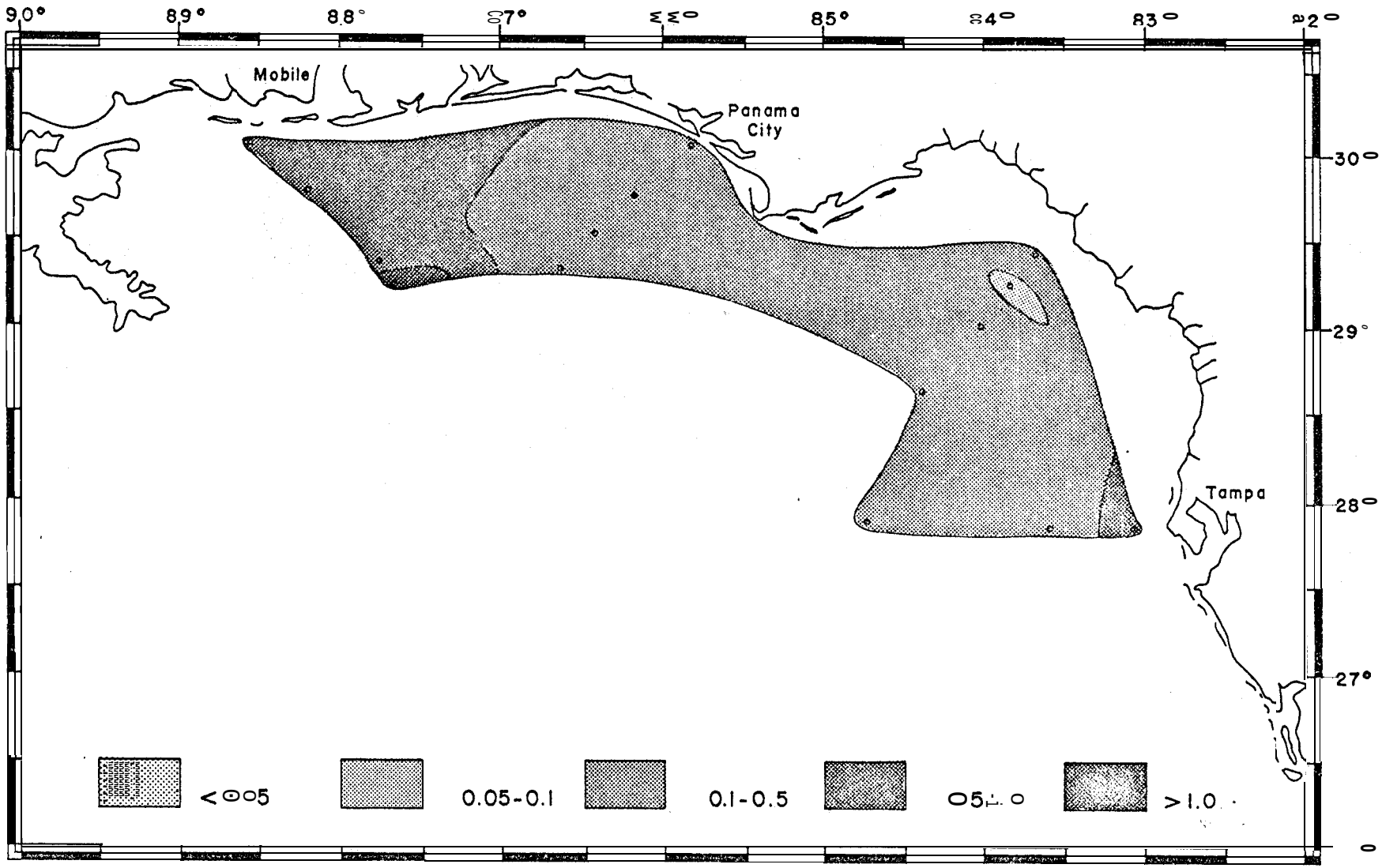
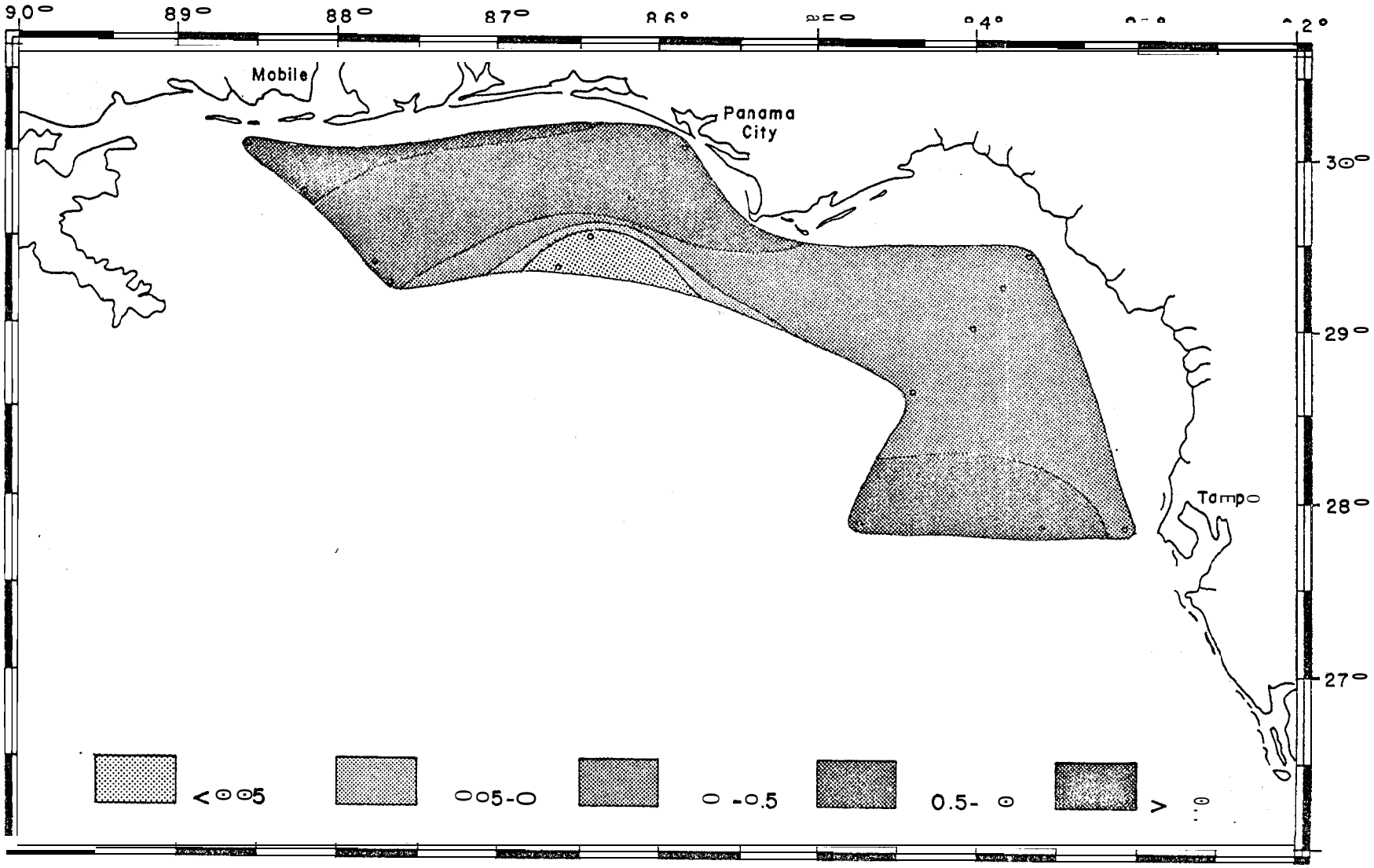



Figure 1c. The horizontal distribution of the surface chlorophyl a mg/m³), January-February, 1976.




F gure 2a. The horizontal distribution of the bot om ch rophyl l a mg/m³), June-July, 1975.

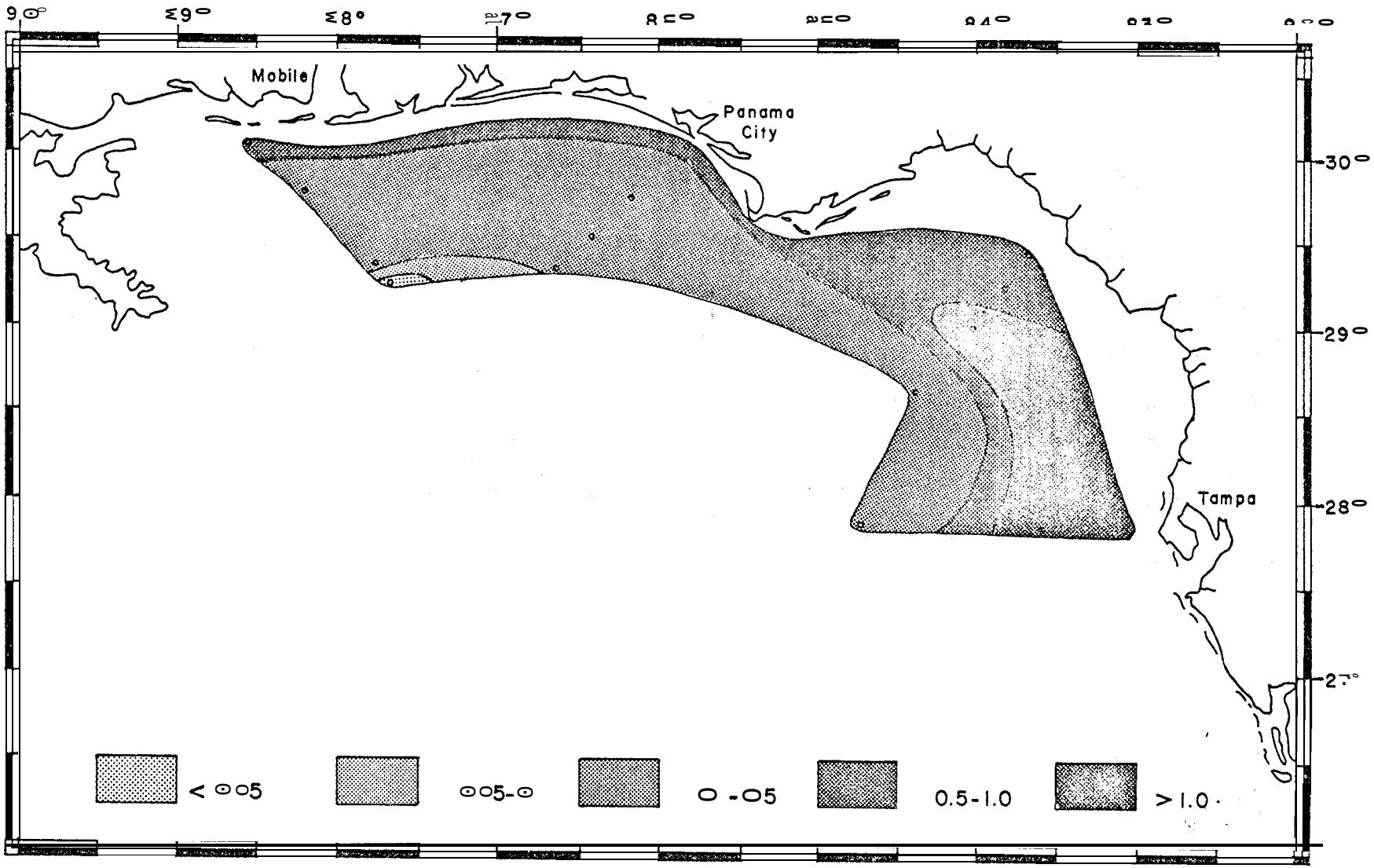



Figure 2 b. The horizontal distribution of the bottom chlorophyll a (mg/m³) September-October, 1975.

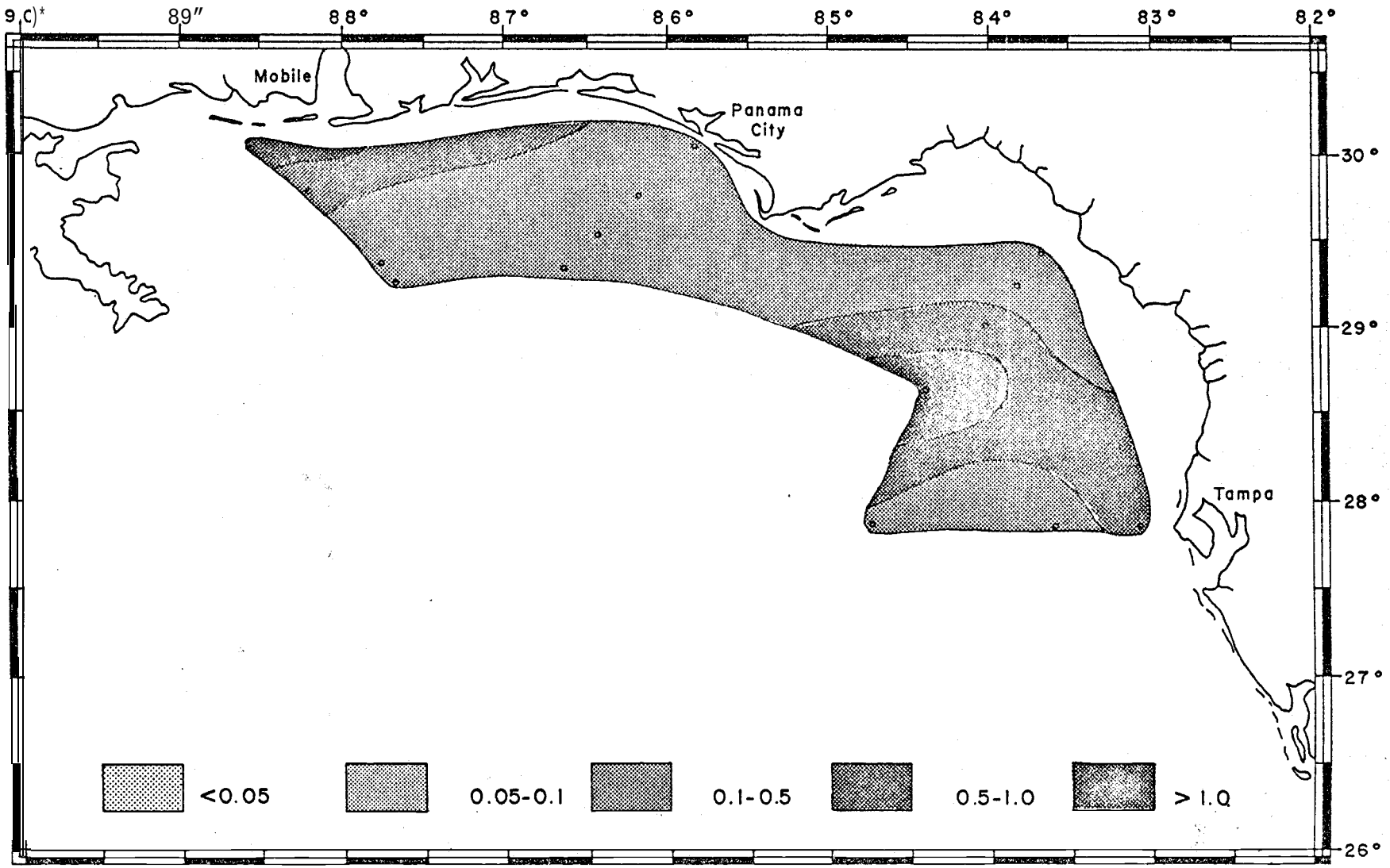



Figure 2c. The horizontal distribution of the bottom chlorophyll a (mg/m³) January-February, 1976.

bottom water samples (Fig. 1c,2c). Higher chlorophyll a values which were evident along transect 4 may be the result of effects of nutrients discharged from the Mississippi River of from Mobile Bay.

The average and range of surface primary productivity values are presented in Table 3 while the spatial distribution of surface primary productivity is presented in Figures 3 a,b,c. Mean productivity walues were of similar magnitude for summer and fall along each transect except for transect 1 where fall values were highter. Winter productivity values were significantly lower than summer and fall vales along transects 1,2, and 3. Bottom productivity balues for summer and fall were incorrectly obtained due to placement of productivity bottles in the wrong deck incubator box. Attempts to correct the values based on ratios of productivity for the correct deck box were not successful due to nolinearities in the data. Bottom productivity values for the winter sampling period varied from 30 percent to less than 1 percent of surface productivity values (appendix I).

There was no apparent correlation between either chlorophyll a values or primary productivity values and temperature or salinity.

Average surface assimilation rates together with ranges of values are presented in table 4. Differences between largest and smallest mean values are reduced by about a factor of 4 for transect 1, 2, and 3 assimilation rates compared to productivity values. Average assimilation rates for transect 4 show more

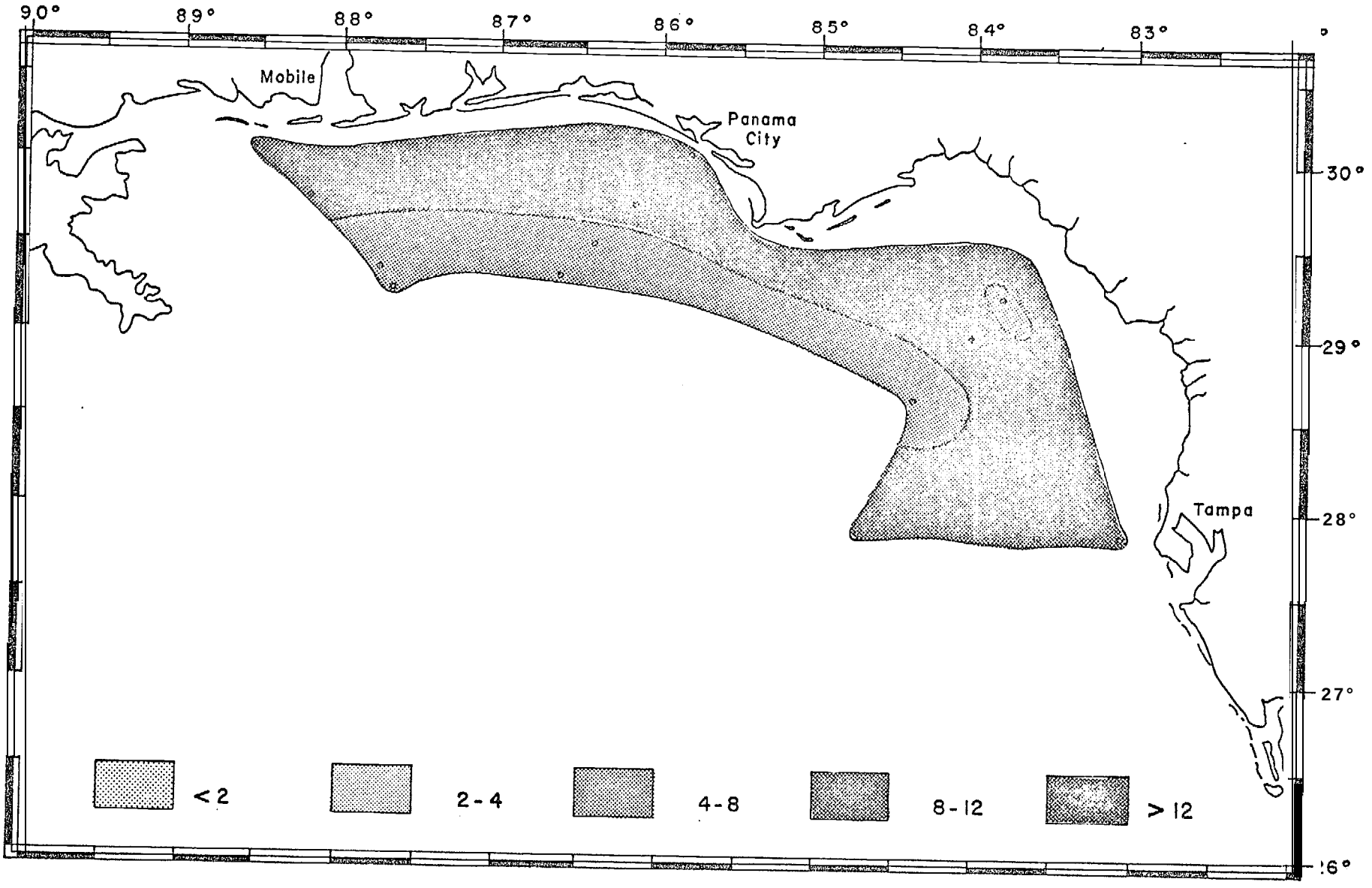



Figure 3a. The horizontal distribution of surface primary productivity ( g C/m /hr) June- July, 1975.

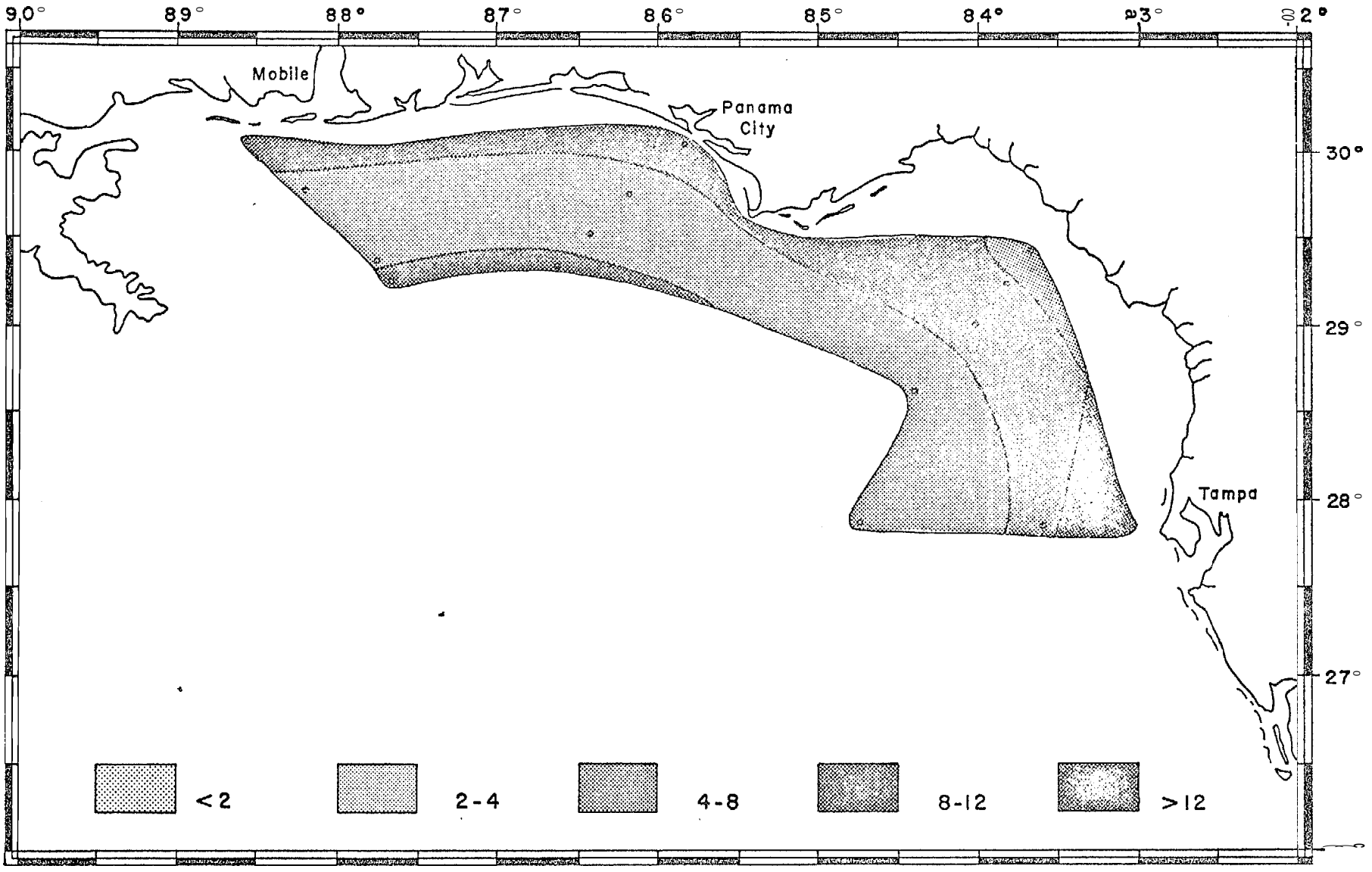



Figure 3b. The horizonta distribution of surface primary productivi y gC/m /hr) September-October, 975.

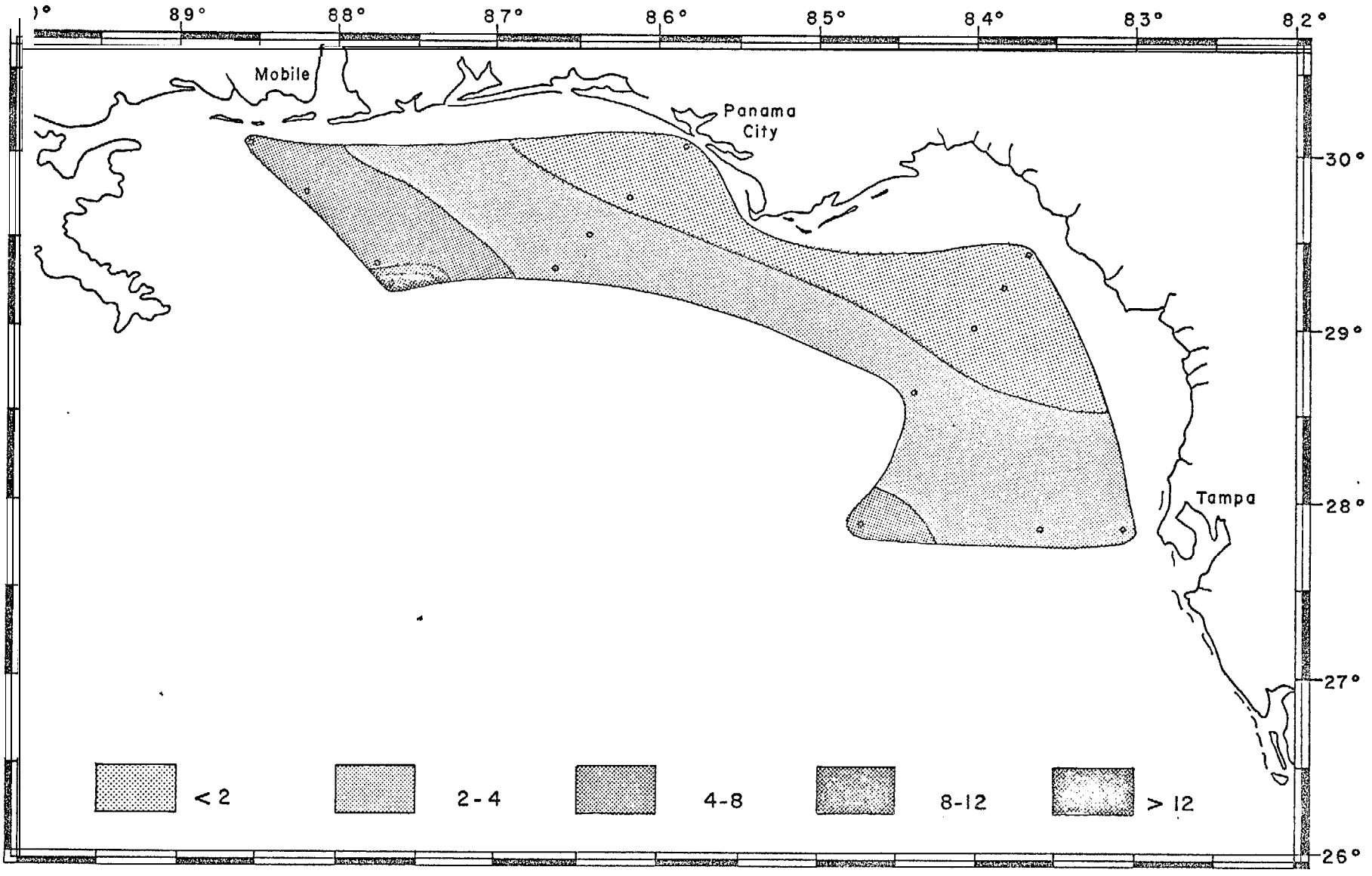



Figure 3c. The horizontal distribution of surface primary product vity ( gC/m /hr) January-February, 1976.

variance than do productivity values. Apparently the use of assimilation rates reduces variability caused by differences in chlorophyll a concentration and light, both of which influence primary productivity values.

## REFERENCES

El Sayed, S.Z., W.M. Sackett, L.M Jeffrey, A.D. Fredericks, R.P Sauders, P.S. Conger, G.A. Fryxell, K.A. Steidinger, and S.A. Earle. 1972. Chemistry, Primary Productivity, and Benthic Algae of the Gulf of Mexico. Searial Atlas of the Marine Environment. Folio 22. American Geographical Society.

Steidinger, K.A. 1973. Phytoplankton. In. A Summary of Knowledge of the Eastern Gulf of Mexico. J. 1. Jones, ed. State University System Institute of Oceanography. pp. III E-1 to III E-17.

Strickland, J.D.H. and T.R. Parsons. 1973. A Practical Handbook of Seawater Analysis. Bulletin 167. Fisheries Research Board of Canada.

Table 1 Average surface concentrations of chlorophyll a ($mg/m^3$) and the observed range of concentrations along each transect

| Season | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Summer | 0.21 | 0.13 | 0.36 | 0.80 |
| range | 0.13-0.31 | 0.10-0.17 | 0.26-0.49 | 0.39-1.48 |
| Fall | 0.47 | 0.31 | 0.12 | 0.33 |
| range | 0.09-1.18 | 0.10-0.57 | 0.03-0.35 | 0.04-1.09 |
| Winter | 0.37 | 0.27 | 0.34 | 0.94 |
| range | 0.22-0.57 | 0.09-0.50 | 0.27-0.36 | 0.54-1.73 |

Table 2 Average bottom concentrations of chlorophyll a ($mg/m^3$) and the observed range of concentrations along each transect

| Season | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Summer | 0.57 | 0.28 | 0.49 | 1.70 |
| range | 0.11-0.86 | 0.26-0.29 | 0.01-0.97 | 0.51-4.37 |
| Fall | 1.90 | 0.63 | 0.22 | 0.27 |
| range | 0.21-4.85 | 0.34-0.95 | 0.11-0.51 | 0.05-0.54 |
| Winter | 0.45 | 1.12 | 0.36 | 0.55 |
| range | 0.21-0.73 | 0.10-3.38 | 0.24-0.45 | 0.28-1.04 |

Table 3 Average seasonal surface primary productivity ($mg\ C\ m^{-3}\ hr^{-1}$) and the observed ranges along each transect

| Season | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Summer | 9.4 | 7.9 | 8.8 | 7.6 |
| range | 8.1 - 11.8 | 4.3 - 10.9 | 7.7 - 9.3 | 6.3 - 9.1 |
| Fall | 12.0 | 7.3 | 8.3 | 8.7 |
| range | 6.9 - 18.8 | 6.0 - 8.8 | 4.2 - 10.9 | 7.6 - 10.4 |
| Winter | 3.4 | 1.5 | 2.0 | 8.0 |
| range | 2.1 - 4.5 | 1.1 - 2.4 | 1.8 - 2.1 | 6.7 - 13.6 |

Table 4 Average surface assimilation rate values and observed ranges along each transect. mg C/(mg chl)/E $m^{-2}$/hr

| Season | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Summer | 2.8 | 2.1 | 2.1 | 1.1 |
| range | 0.1 - 8.2 | 0.4 - 3.6 | 0.7 - 3.9 | 0.3 - 1.4 |
| Fall | 2.0 | 4.4 | 2.8 | 2.5 |
| range | 1.2 - 2.9 | 1.3 - 18.3 | 0.9 - 4.6 | 1.8 - 3.3 |
| Winter | 2.6 | 0.9 | 1.9 | 1.4 |
| range | 0.6 - 4.6 | 0.5 - 1.6 | 0.2 - 7.9 | 0.6 - 2.1 |

# APPENDIX I

June - July 1975

| Station | Time (EDT) | Depth (m) | Chlorophyll a ($mg\ m^{-3}$) 1 | 2 | 3 | mean | Primary Productivity ($mg\ C\ m^{-3}\ hr^{-1}$) 1 | 2 | 3 | mean | Solar Radiation $E\ m^{-2}$ | Assimilation Rate $\frac{mg\ C(mg\ chl\ a)^{-1}}{E\ m^{-2})(hr)}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 | 0745-1055 | sfc | 0.248 | 0.145 | 0.171 | 0.188 | 5,639 | 10.065 | 7.413 | 7.706 | S.0I- | S.18 |
| 1101 | 0740-10s0 | 15 | 0.099 | 0.088 | 0.113 | 0.100 | 0,759 | 0.684 | 0.629 | 0.691 | .003 | 2303.3 |
| 1101 | 1235-1535 | sfc | 0.102 | 0.231 | 0.188 | 0.174 | 10,S02 | 1S.927 | 7.334 | 11.2S4 | 11.88 | 5.44 |
| 1101 | 1230-1530 | 15 | 0.125 | 0.11S | 0.118 | 0.119 | 0.974 | 0.867 | 0.943 | 0.928 | .0078 | 999.78 |
| 1102 | 0805-1105 | sfc | 0.117 | 0.125 | 0,173 | 0.138 | 1.021 | 1.045 | 1.669 | 1.245 | 4.75 | 1.90 |
| 1102 | 0800-1100 | 30 | 0.850 | 0.766 | 0.933 | 0.850 | 1.031 | 0.640 | 0.644 | 0.772 | .003 | 302.7S |
| 1102 | 1300-1605 | Sfc | 0.107 | 0.142 | 0.13s | 0.128 | 1.160 | 1.360 | 3..398 | 1.306 | 11..34 | 0.899 |
| 1102 | 1255-1600 | 30 | 0.832 | 0.840 | 0.922 | 0.86s | 1.109 | 0.496 | 0.781 | 0.79s | .007 | 131.29 |
| 1103 | 0840-1140 | sfc | 0.405 | 0.435 | 0.330 | 0.390 | 0.663 | "0.489 | 0.48S | 0.546 | 10.40 | 0.14 |
| 1103 | 0845-1145 | 102 | 0.73s | 0.7S8 | 0.743 | 0.745 | 0.606 | 0.569 | 1.673 | 0.949 | .0068 | 187.33 |
| 1103 | 1300-1600 | sfc | 0.230 | 0.225 | 0.230 | 0.228 | 0.39s | 0.280 | 0.S06 | 0.394 | 13.26 | 0.13 |
| 1103 | 1255-155s | 102 | 0.690 | 0.710 | 0.740 | 0.713 | 0.445 | 0.541 | 0.631 | 0,s39 | .0087 '.' . | 86.89 |

| Station | Time (EDT) | Depth (m) | Chlorophyll a 1 | 2 | 3 | mean | Primary Productivity mg C $m^{-2}$ $hr^{-1}$ 1 | 2 | 3 | mean | Solar Radiation E $m^{-2}$ | Assimilation Rate mg C(mg chl a)$^{-1}$ (E $m^{-2}$)(hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1204 | 08~0-1115 | Sfc | 0.180 | 0.163 | 0.232 | 0.192 | 5.090 | 4.265 | 4,318 | 4.558 | 8.16 | 2.91 |
| 1204 | 0805-1110 | 12 | 0.238 | 0,250 | 0.182 | 0.223 | 0,883 | 0.460 | 0.508 | 0.617 | .0054 | 512.37 |
| 1204 | 1240-1545 | Sfc | 0.108 | 0.139 | 0.190 | 0.142 | 0.619 | 1.088 | | 0.854 | 13.63 | 0.44 |
| 1204 | 1235-1540 | 12 | 0.361 | 0.356 | 0.364 | 0.360 | 1,243 | 0.683 | 0.538 | 0.821 | .0089 | 256.24 |
| 1205 | 0755-1055 | Sfc | 0.186 | 0.117 | 0.130 | 0.144 | 2.510 | 1.360 | 3.744 | 2.538 | 4.98 | 3.54 |
| 1205 | 0750-1050 | 16 | 0.225 | 0.204 | 0.251 | 0.227 | 0.451 | 0.721 | 0.597 | 0.590 | .0032 | 812.22 |
| 1205 | ~3~0-1610 | Sfc | 0.121 | 0.159 | 0.092 | 0,124 | 0.791 | 1.095 | 0.887 | 0.924 | 3.57 | 2.09 |
| 1205 | 1305-1605 | 16 | 0.161 | 0.158 | 0.177 | 0.165 | 0.343 | 0.297 | 0.167 | 0.269 | .0023 | 708.83 |
| 1206 | CEIO-1110 | sfc | 0.122 | 0.106 | 0.182 | 0.137 | 1.890 | 2.362 | 0,919 | 1.857 | 7.67 | 1.77 |
| 1206 | 0805-1105 | 24 | 0.258 | 0.233 | 0.268 | 0.253 | 0.875 | 0.500 | 0.616 | 0.664 | 0.005 | 524.90 |
| 1206 | 1300-1615 | sfc | 0.124 | 0.121 | 0.076 | 0.107 | 1.793 | 0.947 | 0.795 | 1.178 | 10.47 | 1.05 |
| 1206 | 1300-1615 | 24 | 0.285 | 0.297 | 0.314 | 0.299 | 0.192 | 0.302 | 0.145 | 0.213 | .0069 | 103.24 |

| Station | Tine (EDT) | Depth (m) | Chlorophyll a 1 | 2 | 3 | mean | Primary Productivity mg C $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | me an | Solar Radiation E $m^{-2}$ | Assimilation Rate mg C(mg chl a)$^{-1}$ (E $m^{-2}$)(hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1207 | 0825-1135 | Sfc | 0.013 | 0.093 | | 0.053 | 1.81.8 | 1.629 | 0.891 | 1.446 | 7.51 | 3.63 |
| 1207 | 0820-1130 | 32 | 0.228 | 0.119 | 0.227 | 0.191 | 0.145 | 0.117 | 0.126 | 0.129 | .005 | 135.0s |
| 1207 | 1250-1555 | sfc | 0.160 | 0.179 | 0.122 | 0.154 | 1.478 | 1.319 | 0.959 | 1.252 | 6.72 | 1.21 |
| 1207 | 12b5-1550 | 32 | 0.388 | 0.324 | 0.242 | 0.318 | 0.218 | 0.241 | 0.111 | 0.190 | .0044 | 135.79 |
| 130a | 0800-1100 | Sfc | 0.366 | 0.308 | 0.331 | 0.335 | 6.914 | 9.987 | 7.569 | 8.157 | 6.65 | 3.66 |
| 130a | 0755-1055 | 15 | 0.539 | 0.779 | 0.743 | 0.707 | 0.325 | 0.212 | 0.371 | 0.303 | .0044 | 97.40 |
| 1308 | 1255-1555 | sfc | 0.364 | 0.472 | 0.379 | 0.405 | 11.100 | 11.292 | 5.525 | 9.306 | 11.92 | 1.93 |
| 1308 | 1250-1550 | 15 | 0.749 | 1.389 | 1.534 | 1.224 | 0.321″ | 0.303 | 0.445 | 0.356 | .0079 | 36.82 |
| 1309 | 0810-1110 | Sfc | 0.438 | 0.618 | 0.519 | 0.525 | 3.730 | 2.717 | 3.131 | 3.193 | 7.10 | 0.86 |
| 1209 | 0810-1110 | 48 | 0.548 | 0.56S | 0.477 | 0,531 | 0.205 | 0.121 | 0.291 | 0.206 | ,0047 | 82.54 |
| 1309 | 1250-1550 | Sfc | 0.501 | 0.414 | 0.472 | 0.462 | 0.934 | 0.707 | 1.634 | 1.092 | 11.88 | 0.20 |
| 1309 | 12~5-1545 | 48 | 0.389 | 0.458 | 0.440 | 0.429 | 0.142 | 0.184 | 0.299 | 0.208 | ,0081 | 59.86 |

| Station | Time (EDT) | Depth (m) | Chlorophyll a 1 | 2 | 3 | mean | Primary Productivity mg C $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | mean | Solar Radiation E $m^{-2}$ | Assimilation Rate $\frac{mg\ C(mg\ chl\ a)^{-1}}{(E\ m^{-2})(hr)}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1310 | 0825-1125 | sfc | 0.067 | 0.077 | 0.125 | 0.090 | 1.573 | 1.914 | 2.161 | 1.883 | 6.72 | 3.11 |
| 1310 | 0820-1120 | 59 | 0.051 | 0,075 | - | 0.063 | 0.131 | 0.070 | 0.083 | 0.095 | .0044 | 342.71 |
| 1310 | 1225-1525 | Sfc | 0,057 | 0.054 | - | 0.056 | 1.499 | 2.646 | 1.434 | 1.860 | 8.62 | 3.85 |
| 1310 | 1220-1520 | 59 | 0.102 | 0.093 | - | 0.098 | 0.132 | 0.077 | 0.047 | 0.085 | .0052 | 156.80 |
| 1311 | 0820-1130 | sfc | 0.077 | 0.435 | - | 0.256 | 1.379 | 0.902 | 1.391 | 1.224 | 6.47 | 0.74 |
| 1311 | 0815-1125 | 86 | 0.365 | 0.253 | - | 0.309 | 0.548 | 0,503 | 0.631 | 0.561 | .004 | 453.88 |
| 1311 | 1300-1600 | Sfc | | | | | 0.513 | 1.149 | 0.372 | 0.678 | 10.88 | |
| 1311 | 1300-1600 | 86 | 0.146 | 0.203 | - | 0.175 | 0.125 | 0.083 | 0.045 | 0.084 | .007 | 68.57 |
| 1412 | 0755-1055 | Sfc | 0.369 | 0.302 | 0.398 | 0.356 | 3.213 | 7.084 | 4.332 | 4.876 | 4.08 | 3.36 |
| 1412 | 0750-1050 | 12 | 3.268 | 3.568 | 3.611 | 3.482 | 0.441 | 0.355 | 0.203 | 0.333 | .0026 | 36.78 |
| 1412 | 1300-1605 | sfc | 0.377 | 0.301 | 0.934 | 0.537 | 7.960 | 5.188 | 4,552 | 5.900 | 12.27 | 0.30 |
| 1412 | 1255-1600 | 12 | 5.633 | 4.805 | 5.329 | 5.256 | 0.294 | 0.550 | 0.333 | 0.392 | .008 | 9.32 |

| Station | Time (EDT) | Depth (m) | Chlorophyll a 1 | 2 | 3 | mean | Primary productivity mg C $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | mean | Solar Radiation E $m^{-2}$ | Assimilation Rate $\frac{mg\,C(mg\ chl\ a)^{-1}}{(E\ m^{-2})(hr)}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1413 | 0830-1130 | sfc | 1.690 | 1.829 | 1.722 | 1.747 | 11.742 | 11.595 | 10.343 | 11.227 | 7.15 | 0.90 |
| 1413 | 0830-1130 | 31 | 1.118 | 1,264 | 0.963 | 1.115 | 0.106 | 0.110 | 0.122 | 0.113 | .0047 | 21.56 |
| 1413 | l?30-1630 | sfc | 0.885 | 0.921 | 0.908 | 0,905 | 18.369 | 17.936 | 18.924 | 18.416 | 11.02 | 1.38 |
| 1413 | 1330-1630 | 31 | 1.240 | 1.187 | 1.214 | 1.214 | 0.317 | 0.315 | 0.385 | 0.339 | .0072 | 52.03 |
| 1414 | 0840-1140 | Sfc | 1.139 | 0.904 | 0.992 | 1.012 | 2.029 | 3.120 | 1.757 | 2.302 | 5,09 | 0.45 |
| 1414 | 0835-1135 | 61 | 0.649 | 0.727 | 0.849 | 0.757 | 0.560 | 0.657 | 0.542 | 0.586 | .0033 | 234.58 |
| 1414 | 1300-1630 | Sfc | 0.804 | 0.697 | 0.747 | 0.749 | 3.742 | 4.361 | 0.520 | 2.874 | 8.07 | 0.33 |
| 1414 | 1300-1630 | 61 | 0.728 | 0.981 | 1.150 | 1.073 | 0,362 | 0.189 | 0.202 | 0,251 | .0053 | 63.23 |
| 1415 | 0845-1150 | Sfc | 0.244 | 0.351 | 0.387 | 0.327 | 1.695 | 1.059 | 1.086 | 1.280 | 8.74 | 0.45 |
| 1415 | 0840-1145 | 71 | 0.425 | 0.449 | 0.482 | 0.452 | 0.324 | 0,300 | 0.472 | 0.365 | .0057 | 141.67 |
| 1415 | 1410-1710 | Sfc | 0.455 | 0.456 | 0.420 | 0.444 | 0.381 | 1.709 | 0.342 | 0.811 | 3.81 | 0.4s |
| 1415 | 1405-1705 | 71 | 0.521 | 0.562 | 0.596 | 0.560 | 0.211 | 0.320 | 0.393 | 0.308 | .0025 | 220.0 |

September - October 1975

| Station | Time (GMT) | Depth (m) | Chlorophyll a mg chl a $m^{-3}$ 1 | 2 | 3 | mean | Primary Productivity mg C $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | mean | Solar Radiation E $m^{-2}$ | Assimilation Rate mg C(mg chl a)$^{-1}$ (E $m^{-2}$) (hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 | 1245-1547 | Sf c | 0.488 | 0.420 | 0.498 | 0.469 | 8.885 | 7.623 | 6.458 | 7.655 | 9.09 | 1.796 |
| | | 12m | 4.389 | 4.304 | 4.247 | 4.313 | 1.188 | 1.742 | 3.405 | 2.112 | .0059 | 83.0 |
| 1101 | 1652-1952 | Sf c | 2.195 | 1.739 | 1.853 | 1.929 | 30.234 | 29.463 | 29.996 | 29.898 | 10.27 | 1.509 |
| | | 12m | 5.187 | 5.615 | 5,444 | 5,415 | 20.643 | 10.755 | 2.917 | 11.438 | .0068 | 310.6 |
| 1102 | 1332-1632 | sfc | 0.124 | 0.228 | 0.156 | 0.169 | 1.865 | 2.115 | 2.488 | 2.156 | 10.43 | 1.223 |
| | | 30m | 0.748 | 0.754 | 0.782 | 0.763. | 0.422 | 0.657 | 0.880 | 0.653 | .0069 | 124. 4 |
| 1102 | 1744-2045 | " Sfc | 0.108 | 0.078 | 0.100 | 0.095 | 2.277 | 1.814 | 2.504 | 2.198 | 10.19 | 2.271 |
| | | 30m | 0.956 | 1.112 | 1.034 | 1.034 | 0.522 | 0.480 | 2.078 | 1.027 | .0067 | 148.2 |
| 32.03 | 1313-1614 | Sfc | 0.182 | 0.086 | 0,062 | 0.110 | 2.075 | 1,083 | 2.579 | 1.912 | 4.63 | 2.34 |
| | | 50m | 0.208 | 0.182 | 0.180 | 0.190 | 0.S73 | 0,354 | 0.213 | 0.3'30 | .0031 | 645.2 |
| 1103 | 1740-2055 | Sfc | 0.074 | 0.054 | 0.066 | 0.065 | 2.005 | 0.808 | 2.467 | 1.760 | 9.13 | 2.967 |
| | | 50m | 0.218 | 0.214 | 0.230 | 0.221 | 0.985 | 0.894 | 0.406 | 0.762 | .0060 | 574.7 |
| 1204 | 1215-1516 | sfc | 0.294 | 0.242 | 0.276 | 0.271 | 2.003 | 2.444 | 2.012 | 2.153 | 6.05 | 1.313 |
| | | 10m | 0.369 | 0.387 | 0.417 | 0.391 | 0.493 | 0.447 | 0.609 | 0.516 | .0040 | 329.9 |
| 1204 | 1732-2032 | Sfc | 0.584 | 0.606 | 0.561 | 0.584 | 7.251 | 8.420 | 9.057 | 8.243 | 6.09 | 2.315 |
| | | 10m | 0.589 | 0.669 | 0.635 | 0.631 | 2.199 | 1,401 | 1.267 | 1.622 | . 0040. | 642.6 |

| Station | Time (GMT) | Depth (m) | Chlorophyll a mg chl a $m^{-3}$ 1 | 2 | 3 | mean | Primary Productivity mg C $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | mean | Solar Radiation E $m^{-2}$ | Assimilation Rate mg C(mg chl a)$^{-1}$ (E $m^{-2}$) (hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1205 | 1230-1530 | Sfc | 0.283 | 0.266 | 0.261 | 0.270 | 1.506 | 2.948 | 2.370 | 2.275 | 7.04 | 1.197 |
| | | 15m | 0.397 | 0.385 | 0.436 | 0.406 | 0.309 | 0.394 | 0.207 | 0.303 | .0046 | 162.2 |
| 1205-A | 1225-1535 | Sf c | 0,476 | 0.470 | 0.476 | 0.474 | 4.698 | 4.814 | 4,272 | 4.595 | 6.37 | 1.522 |
| | | 15m | 0,550 | 0.618 | 0.601 | 0.590 | 0.287 | 0.440 | 0.219 | 0.315 | .0042 | 127.1 |
| 1205-A | 1702-2004 | Sf c | 0.691 | 0.669 | 0.652 | 0.671 | 17.202 | 18.195 | 18.059 | 17.819 | 11.16 | 2.380 |
| | | 15m | 0.810 | 0.883 | 0.810 | .818 | 2.008 | 1.077 | 3.968 | 2.351 | .0074 | 388.4 |
| 1205 | | | NO SAMPLES COLLECTED HURRICANE ELOISE | | | | | | | | | |
| 1206 | 1255-1600 | sfc | 0.122 | 0.114 | 0.136 | 0.124 | 0.887 | 1.880 | 2.514 | 1.763 | 7.09 | 2.005 |
| | | 23m | 0.606 | 0.697 | 0.771 | 0.691 | 1.515 | 0.217 | 0.234 | 0.655 | .0047 | 201.7 |
| 1206 | 1722-2022 | Sf c | 0.116 | 0.108 | 0.120 | 0.115 | 4.313 | 3.1'62 | 3.598 | 3.691 | 9.58 | 3.350 |
| | | 23m | 1.397 | 1.97 | 1.97 | 1.264 | 0.585 | "0.823 | 1.013 | 0.807 | .0063 | 2.01.3 |
| 1207 | ~250-15s0 | sfc | 0.116 | 0.104 | 0.100 | 0.107 | 7.704 | 2.851 | 3.396 | 4.650 | 2.37 | 18.34 |
| | | 2 5m | 0.425 | 0.385 | 0.527 | 0.446 | 2.568 | 0.715 | 2.307 | 1.863 | . 00i6 | 2610.7 |
| 1207 | 173.6-2016 | Sf c | 0.080 | 0.084 | 0,082 | 0.082 | 2.501 | 2.765 | 2.387 | 2.884 | 8.93 | 3.94 |
| | | 25rn | 0.238 | 0.272 | 0.244 | 0.251 | 0.920 | 0.630 | 1.650 | 1.067 | .0059 | 720.5 |
| 1308 | 1245-1620 | sfc | 0.329 | 0.312 | 0.340 | 0.327 | 5,156 | 3.909 | 4,197 | 4.421 | 9.29 | 1.455 |
| | | 14m | 0.6'23 | 0,640 | 0.657 | 0.640 | 0.322 | 0.474 | 0.665 | 0.487 | . 0061 | 124.7 |
| 1308 | 17~4-"2015 | sfc | 0.419 | 0.351 | 0.334 | 0.368 | 2.872 | 6.088 | 4.514 | 4.491 | 12.40 | 0.984 |
| | | 14m | 0,408 | 0.397 | 0.403 | 0 .404 | 0.873 | 0.478 | 0.570 | 1.140 | .0082 | 344.1 |

| Station | Time (GMT) | Depth (m) | Chlorophyll·a mg chl a $m^{-3}$ 1 | 2 | 3 | mean | Primary Productivity mg C $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | mean | Solar Radiation E $m^{-2}$ | Assimilation Rate mg C(mg chl a)$^{-1}$ / (E $m^{-2}$) (hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1309 | 1315-1620 | sf c | 0.052 | 0.071 | 0.069 | 0.064 | 0.559 | 0.715 | 0.418 | 0.564 | 3.75 | 2,350 |
| | | 4 5m | 0.402 | 0.374 | 0.419 | 0.398 | 0.135 | 0.118 | 0.188 | 0.147 | .0025 | 147.7 |
| 1309 | le20-2121 | Sf c | 0.086 | 0.080 | 0.068 | 0.078 | 1.563 | 1.661 | 1.614 | 1.613 | 4.50 | 4.595 |
| | | 45m | 0.158 | 0.160 | 0.146 | 0.155 | 0.605 | 0.137 | 0.394 | 0.379 | .0030 | 815.0 |
| 1310 | 1207-1550 | sf c | 0.037 | 0.039 | 0.042 | 0.039 | 0.280 | 0.953 | 0.519 | 0.584 | 6.25 | 2.396 |
| | | 90m | 0.164 | 0.148 | 0.170 | 0.161 | 0.280 | 0.438 | 0.256 | 0.325 | .0041 | 492.3 |
| 1310 | 1815-2115 | Sf c | 0.034 | 0.036 | 0.030 | 0.033 | 1.719 | 1.147 | 0.935 | 1.267 | 8.85 | 4.338 |
| | | 90m | 0.125 | 0.120 | 0.126 | 0.124 | 0.439 | 0.362 | 0.244 | 0.348 | .0058 | 483.9 |
| 1311 | 1252-1553 | sfc | 0.034 | 0.035 | 0.035 | 0.035 | 0.502 | 0.962 | 1.574 | 1.013 | 7.89 | 3.668 |
| | | 9 0m | 0.096 | 0.083 | 0.081 | 0.087 | 0.515 | 0.954 | "0.790 | 0.753 | .0052 | 1664.5 |
| 1311 | 1832-2133 | sf c | 0.024 | 0.032 | 0.028 | 0.028 | 1.619 | 0.864 | 0.463 | 0.982 | 12.68 | 2.766 |
| | | 90m | 0.056 | 0.060 | 0.071 | 0.062 | 0.650 | 0.538 | 0.492 | 0.560 | .0084 | 1075.3 |
| 1412 | i220-1520 | s fc | 1.063 | 0.961 | 0.893 | 0.972 | 14.061 | 15.934 | 14.343 | 14.779 | 6.01 | 2.530 |
| | | 14m | 0.570 | 0.604 | 0.527 | 0.567 | 0.175 | 0.124 | 0.126 | 0.142 | .0040 | 62.61 |
| 1412 | 172.5-2025 | sf c | 1.190 | 1.156 | 1.241 | 1.196 | 30.898 | 29.552 | 17.065 | 25.838 | 12.34 | 1.751 |
| | | 14m | 0.502 | 0.502 | 0.510 | 0.505 | 0.684 | 0.615 | 0.627 | 0.642 | .0081 | 156.9 |
| 1413 | 1240-1540 | sfc | 0.165 | 0.144 | 0.180 | 0.163 | 2.761 | 2.487 | 1.541 | 2.263 | 5.48 | 2.533 |
| | | 28m | 0.255 | 0.216 | 0.246 | 0.239 | 0.072 | 0.158 | 0.100 | 0.110 | .0036 | 127.8 |

| Station | Time (GMT) | Depth (m) | Chlorophyll a mg chl a $m^{-3}$ 1 | 2 | -3 | mean | Primary Productivity mg C $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | mean | Solar Radiation E $m^{-2}$ | Assimilation Rate $\frac{mg\ C(mg\ chl\ a)^{-1}}{(E\ m^{-2})\ (hr)}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1413 | 1826-2126 | s fc | 0.084 | 0.080 | 0.108 | 0.091 | 2.131 | 2.822 | 2.421 | 2.458 | 9.74 | 2.770 |
| | | 29m | 0.357 | 0.323 | 0.317 | 0.332 | 0.824 | 0.564 | 0.362 | 0.583 | .0064 | 274.4 |
| 1414 | 1253-1553 | sfc | 0.041 | 0.038 | 0.043 | 0.041 | 0.986 | 0.779 | 0.555 | 0.773 | 7.69 | 2.452 |
| | | 65m | 0.156 | 0.160 | 0.170 | 0.162 | 0.581 | 0.646 | 0.715 | 0.647 | .0051 | 783.1 |
| 1414 | 1843-2144 | Sf c | 0.039 | 0.036 | 0.037 | 0.037 | 0.385 | 1.836 | 0.648 | 0.956 | 7.91 | 3.266 |
| | | 65m | 0.225 | 0.230 | 0.251 | 0.235 | 0.401 | 0.400 | 0.323 | 0.375 | .0052 | 306.9 |
| 1415 | 1303-1605 | Sf c | 0.040 | 0,044 | 0.056 | 0.047 | 1.650 | 0.476 | 0.588 | 0.905 | 9.54 | 2.018 |
| | | 9om | 0.054 | 0.058 | 0.059 | 0.057 | 000S8 | 0.089 | 0.066 | 0.071 | .0063 | 197.7 |
| 1415 | 1840-2145 | Sfc | 0.031 | 0.031 | 0.029 | 0.030 | 1,416 | 0.782 | 0.687 | 0.962 | 11.32 | 2.833 |
| | | 90m | 0.049 | 0.056 | 0.047 | 0* 051 | 0.824 | 0.881 | 0.447 | 0.717 | .0075 | 1874.5 |

BLM PHYTOPLANKTON, WINTER (JAN-FEB) 1976 T-7601 or BLM #28

| Station | Incubation Times (GMT) | Depth (m) | Chlorophyll-A mg chl-a $m^{-3}$ 1 | 2 | 3 | CHL-A Mean | Primary Productivity mgC $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | Mean | Solar Radiation Σ $m^{-2}$ | Assimilation Rate mgC(mg chl-a)$^{-1}$ (Σ$m^{-2}$)(hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 | 140%-1706 | Sf c | 0.655 | 0.646 | 0.731 | 0.677 | 3.175 | 2.712 | 3.190 | 3.026 | 7.93 | 0.564 |
| | | 15 | 0.689 | 0.672 | 0.655 | 0.672 | 2.049 | 1.292 | 1.748 | 1.696 | 0.10 | 25.23 |
| 1101 | l-7ii7-2100 | sf c | 0.485 | 0.427 | 0.479 | 0.464 | 3.773 | 4.960 | 3.205 | 3.979 | 9.76 | 0.879 |
| | | 15 | 0.822 | 0.836 | 0.724 | 0.794 | 0.623 | 1.206 | 0.663 | 0.831 | 0.12 | 8.722 |
| 1.3.02 | 14C15-1705 | Sf c | 0.237 | 0.246 | 0.213 | 0.232 | 1.661 | 2.188 | -- | 1.925 | 1.80 | 4.610 |
| | | 26 | 0.228 | 0,210 | 0.222 | 0.220 | 0.717 | 0.485 | 0.404 | 0.535 | 0.027 | 90.07 |
| 3.3.02 | 1815-2115 | sfc | 0.210 | 0.204 | 0.216 | 0.210 | 2.529 | 2.208 | 2.100 | 2.279 | 2.41 | 4,503 |
| | | 26 | 0.204 | 0.219 | 0.195 | 0.206 | 0.452 | 0.763 | 1.056 | 0.757 | 0.036. | 102.1 |
| 1103 | 1432-1732 | sfc | 0.459 | 0.425 | 0.391 | 0.42S | 5.721 | 6.220 | 6.136 | 6.026 | 8.79 | 1.613 |
| | | 54 | 0.s95 | 0.816 | 0.672 | 0.694 | 0.930 | 1.046 | 1.733 | 1.236 | 0.134 | 13.29 |
| 1103 | 1855-2155 | sfc | 0.218 | 0.258 | 0.224 | "0.233 | 2.516" | 2.956 | 3.591 | 3.021 | 3.71 | 3.495 |
| | | 54 | 0.158 | 0.137 | 0.146 | 0.147 | 0.268 | 0.366 | 0.462 | 0.365 | 0.056 | 44.34 |
| 1204 | 1405-1708 | sfc | 0.306 | 0.315 | 0.354 | 0.325 | 1.428 | 1.501 | 1.502 | 1.477 | 8.32 | 0.546 |
| | | 8 | 0.360 | 0.363 | 0,348 | 0.357 | 1.190 | 1.435 | 1.263 | 1.296 | 1.59 | 2.283 |
| 12 04 | 1828-2130 | sfc | 0.300 | 0.270 | 0.243 | 0.271 | 1.200 | 1.140 | 1.027 | 1.122 | 8.48 | 0.488 |
| | | 8 | 0.339 | 0.294 | 0.312 | 0.315 | 1.259 | 1,053 | 1.135 | 1.149 | 1.62 | 2,252 |
| 1205 | 1415-1715 | sfc | 0.095 | 0.100 | 0.086 | 0.096 | 1.169 | 1,383 | 1.052 | 1.201 | 8.01 | 1.562 |
| | | 14 | 0.114 | 0.114 | 0.102 | 0.107 | 1.061 | 1.046 | 1.002 | 1.036 | 1.53 | 6.328 |

| Station | Incubation Times (GMT) | Depth (m) | Chlorophyll-A mg chl-a $m^{-3}$ 1 | 2 | 3 | CHL-A Mean | Primary Productivity mgC $m^{-3}$ $hr^{-1}$ 1 | 2 | 3 | Mean | Solar Radiation Σ $m^{-2}$ | Assimilation Rate mgC(mg chl-a)$^{-1}$ / (Σm $^{-2}$) (hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1205 | 1840-2140 | Sf c | 0.087 | 0.084 | 0.082 | 0.084 | 1.095 | 0.679 | 1.009 | 0.928 | 6.74 | 1.639 |
| | | 14 | 0.087 | 0.102 | 0.088 | 0.092 | 0,790 | 1.008 | 0.660 | 0.819 | 1.29 | 6.901 |
| 1206 | 1420-1720 | Sf c | 0.198 | 0.213 | 0.213 | 0.208 | 1.209 | 1.220 | 1.371 | 1.267 | 8.54 | 0.713 |
| | | 23 | 0.604 | 0.587 | 0.493 | 0.561 | 2.029 | 2.250 | 2.798 | 2.359 | 1.63 | 2.5S0 |
| 1206 | 1830-2131 | Sf c | 0.171 | 0.169 | 0.168 | 0.169 | 1.347 | 1.304 | 1.472 | 1.374 | 8.77 | 0,927 |
| | | 23 | 0.761 | 0.672 | 0.741 | 0.725 | 3.042 | 3.011 | 3.595 | 3.216 | 1.68 | 2.640 |
| 1207 | 1422-1725 | sfc | 0.714 | 0.757 | 0.825 | 0.765 | 3.508 | 3,753 | 4.060 | 3.774 | 8.03 | 0.614 |
| | | 29 | 2.480 | 2.309 | 2.522 | 2.437 | 7.958 | 8.175 | 8.847 | 8.327 | 1.54 | 2.219 |
| 1207 | 1840-2142 | Sf c | 0.228 | 0.198 | 0.249 | 0.225 | 1.992 | 2.035 | 1.927 | 1.985 | 8.64 | 1.021 |
| | | 29 | 4.190 | 4.318 | 4.489 | 4.332 | 17.321 | 20.341 | 16.333 | 17.998 | 1.65 | 2.518 |
| 1308 | 1425-1725 | Sf c | 0.417 | 0.378 | 0.366 | 0.387 | 0.984 | 0,538 | 0.916 | 0.813 | 8.48 | 0.248 |
| | | 14 | 0.544 | 0.510 | 0.442 | 0.499 | 2.333 | 2.319 | ,2,031 | 2.228 | 1.62 | 2.756 |
| 1308 | lE25-2125 | Sf c | 0.318 | 0.357 | 0.321 | 0.332 | 2.141 | 1.930 | 1.674 | 1.915 | 7.79 | 0.740 |
| | | 14 | 0.396 | 0.354 | 0.369 | 0.373 | 2.277 | 2.667 | 2.359 | 2.434 | 1.49 | 4.380 |
| 1309 | 1515-1815 | sfc | 0.351 | 0.321 | 0.327 | 0.333 | 1.576 | 2.147 | 1.507 | 1.743 | 7.00 | 0.748 |
| | | 43 | 0.249 | 0.351 | 0.285 | 0.295 | 0.301 | 0.28S | 0.295 | 0.291 | 0.106 | 9.306 |
| 1309 | 19C0-2200 | sfc | 0.312 | 0.324 | 0.300 | 0.312 | 2.177 | 2.403 | 2.049 | 2.210 | 0.890 | 7.959 |
| | | 43 | 0.276 | 0.294 | 0.297 | 0.289 | 0.388 | 0.139 | 0.257 | 0.261 | 0.010 | 90.31 |

| Station | Incubation Times (GMT) | Depth (m) | Chlorophyll-A mg chl-a $m^{-3}$ 1 | 2 | 3 | CHL-A Mean | Primary Productivity mg cm-3 $hr^{-1}$ 1 | 2 | 3 | Mean | solar Radiation $\Sigma\ m^{-2}$ | Assimilation Rate $\frac{mgC(mg\ chl\text{-}a)^{-1}}{\Sigma m^{-2}\ hr}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1310 | 1455-1755 | sf c | 0.570 | 0.621 | 0,587 | 0.593 | 2.276 | 2.437 | 2.977 | 2.S63 | 7,24 | 0,s97 |
| | | 67 | 0.629 | 0.663 | 0.655 | 0.649 | 1.182 | 0.680 | 0.869 | 0.910 | 0.11 | 12.7S |
| 1310 | 1900-2200 | sfc | 0.216 | 0.229 | 0.219 | 0.238 | 1.629 | 1.630 | 1.6S3 | 1.637 | 5.68 | 1.211 |
| | | 67 | 0.255 | 0,252 | 0.2S5 | 0.254 | 0.694 | 0.581 | 0.896 | 0.724 | 0.086 | 33.14 |
| 1311 | 1430-1730 | Sf c | 0.333 | 0.270 | 0.276 | 0.293 | 1.426 | 2.462 | 1.970 | 1.953 | 3.59 | 1.857 |
| | | 53 | 0.234 | 0.213 | 0.237 | 0.228 | 0.3S2 | 0.920 | 0.323 | 0.S32 | 0.0s | 46.67 |
| 1311 | 1855-2155 | Sf c | 0.228 | 0.237 | 0.243 | 0,236 | 1.896 | 3.36S | 1.478 | 2.246 | 5.54 | 1.718 |
| | | 53 | 0.261 | 0.228 | 0.252 | 0.247 | 0.462 | 0.903 | 0.993 | 0.786 | 0.09 | 39.78 |
| 1412 | 1429-1730 | Sfc | 0.731 | 0.765 | 0.765 | 0.7s4 | 3.290 | 3.254 | 3.188 | 3.244 | 6.96 | 0.618 |
| | | 12 | 0.935 | 0.986 | 0.998 | 0.966 | 1.793 | 1.562 | 1.354 | 1.570 | 0.106 | 15.33 |
| 1412 | 1825-2125 | s f c | 0.782 | 0.842 | 0.833 | 0.819 | S.765 | 5.261 | 5.147 | 5.391 | 6.33 | 1.045 |
| | | 12 | 1.224 | 0.995 | 1.139 | 1.119 | 6,227 | 1.798 | 1.235 | 3.087 | 0.096 | 28.74 |
| 1413 | 1435-1735 | sfc | 0.690 | 0.706 | 0.757 | 0.714 | S.560 | 3.900 | 8.838 | 6.099 | 5.50 | 1.5s3 |
| | | 26 | 0.536 | 0.510 | 0.544 | 0.530 | 0.925 | 1.080 | 4.744 | 2.160 | 0.084 | 48.52 |
| 1413 | 1832-2132 | sfc | 0.731 | 0.697 | 0.714 | 0.714 | 7.S72 | 7.747 | 6.357 | 7.225 | 5.96 | " 1.698 |
| | | 26 | 0.536 | 0.544 | 0.ss3 | 0,544 | 6.499 | 2.305 | 1.767 | 3.S24 | 0.09 | 71.98 |

| Station | Incubation Times (GMT) | Depth (m) | Chlorophyll-A mg chl-a $m^{-3}$ 1 | 2 | 3 | CHL-A Mean | Primary Productive.ty Mg $Cm^{-3}$ $hr^{-1}$ 1 | 2 | 3 | Mean | solar Radiation $\Sigma$ $m^{-2}$ | Assimilation Rate mgC(mg chl-a)$^{-1}$ ($\Sigma$ $m^{-2}$ $hr^{-1}$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1414 | 1425-1725 | Sf c | 0.544 | 0.536 | 0.638 | 0.573 | 5.140 | 7.208 | 7.906 | 6.751 | 7.04 | 1.674 |
| | | 41 | 0.318 | 0.345 | 0.312 | 0.325 | 0.742 | 0.562 | 1.022 | 0.775 | 0.11 | 21.68 |
| 1414 | 1825-2125 | sfc | 0.527 | 0.502 | 0.502 | 0.510 | 6.795 | 8.477 | 8.390 | 7,887 | 7.16 | 2.160 |
| | | 41 | 0.324 | 0.303 | 0.318 | 0.315 | 0.422 | 0.505 | 0.549 | 0.492 | 0.11 | 14.20 |
| 1415 | 1430-1735 | Sf c | 1.625 | 1.710 | 1.796 | 1.710 | 16.566 | 10.226 | 16.686 | 14.493 | 7.51 | 1.129 |
| | | 34 | 0.323 | 0.332 | 0.332 | 0.329 | 0,.542 | 1.005 | 0.700 | 0.749 | 0.11 | 20.70 |
| 1415 | 1905-2205 | s fc | 1.796 | 1.710 | 1.753 | 1.753 | 12.171 | 17.179 | 8.482 | 12,611 | 5.58 | 1.289 |
| | | 34 | 0.198 | 0.243 | 0.228 | 0.223 | 0.726 | 1.273 | 0.567 | 0.855 | 0.085 | 45.11 |