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ANNUAL PRIMARY PRODUCTION IN LAKES OF THE EXPERIMENTAL LAKES AREA,  
NORTHWESTERN ONTARIO; 1976-1980 RESULTS

by

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## ABSTRACT

Fee, E.J., D. Hayward, and J.A. Shearer. 1982. Annual primary production in lakes of the Experimental Lakes Area, northwestern Ontario; 1976-1980 results. Can. Data Rep. Fish. Aquat. Sci. 327: iv + 33 p.

Detailed summaries of annual primary production rates for lakes in the Experimental Lakes Area are given. Daily integral surface irradiances for the period 1973-1980 are also summarized. Details of methodology are discussed.

Key words: primary production; photosynthesis; phytoplankton; experimental data; incubation; computer models; surface irradiance.

## RESUME

Fee, E.J., D. Hayward, and J.A. Shearer. 1982. Annual primary production in lakes of the Experimental Lakes Area, northwestern Ontario; 1976-1980 results. Can. Data Rep. Fish. Aquat. Sci. 327: iv + 33 p.

On donne ici des résumés détaillés des taux de production primaire annuels pour les lacs de la Région des Lacs Expérimentaux, ainsi que du flux énergétique par unité de surface pour la période 1973-1980. On y discute quelques points des méthodes employées.

Mots-clés: production primaire; photosynthèse; phytoplancton; résultats expérimentaux; incubation; modèles pour ordinateur; flux énergétique par unité de surface.

## INTRODUCTION

In situ phytoplankton primary production has been estimated with an incubator technique in lakes of the Experimental Lakes Area of NW Ontario since 1973. Fee (1980) summarized annual production figures for the years 1973-1976. This report presents a detailed tabulation of results for the period 1976-1980. It also gives graphical summaries of surface light data and annual productions for the entire period 1973-1980.

## METHODS

Laboratory and numerical methods were essentially unchanged during the period 1973-1978. In 1979 there were several changes in laboratory methods (detailed below) that made it difficult to directly compare results from 1979-1980 with previous years. Accordingly, all data from 1976-1978 have been corrected to make them consistent with the later years. Further, changes in the numerical model were made in 1979 as a consequence of a whole-lake  $^{14}\text{C}$  experiment (Bower 1981). All results presented in this report were made with the modified model. The difference between the 1976 rates given in Fee (1980) and those presented here were between 5 to 13% depending on the units chosen; these empirical correction factors were used to back correct the rates given in Fee (1980) to obtain comparable results for the period 1973-1980.

In situ primary production was simulated numerically from direct measurements of (1) production as a function of irradiance (measured in an incubator), (2) transparency of the lake, and (3) changes of surface irradiance over time. The computer program that synthesizes these data was presented by Fee (1977). Annual summaries of the first two data sets along with detailed descriptions of field and laboratory methods were published (DeClercq et al. 1977; DeClercq and Shearer 1978, 1979, 1980; DeBruyn and Shearer 1981; Shearer and DeClercq 1977, 1978, 1979, 1980; Shearer and DeBruyn 1981). Surface light data for the period 1973-1980 are summarized in Fig. 1.

Two important sources of error were corrected in 1979 (DeClercq and Shearer 1980). Prior to this time we had measured the  $^{14}\text{C}$  added to the experimental bottles by taking 10  $\mu\text{L}$  aliquots of the concentrated stock solution and injecting it into 0.5 mL of an organic base (NCS) to which a dioxane-based fluor was added. We now take 2.5 mL from an experimental bottle after injection and mixing of the stock solution and count it in PCS fluor. The new method gives activities which average 4% higher than the old. A more important systematic error was discovered as a consequence of changing to a new liquid scintillation spectrometer. The efficiency of counting  $^{14}\text{C}$  with the old machine was calculated from an external standard quench curve based on counts of a commercially prepared set of internal standards quenched with carbon tetrachloride. The new machine uses a different method ("H number") based on the Compton scattering of a set of water-quenched PCS internal

standards prepared in our laboratory. On identical samples the quench corrected counts were 17% higher with the new machine than with the old machine. We subsequently found that the stated activity of the commercially prepared internal standards was incorrect. Additional errors resulted from the presence of different quenching agents in the  $^{14}\text{C}$  standard, the quenched standards and the samples. The two errors work in opposite directions, so all previously reported primary production estimates for the period prior to 1979 are 13% lower than they would have been with the current setup. All production rates from 1973-1978 have been corrected by this amount to make the rates from all years comparable.

A systematic error in the measurement of light in the incubator was also discovered in 1979. Prior to this time, a cosine-corrected flat plate collector had been used. In 1979, we obtained a spherical collector which gave readings averaging 84, 66, 61 and 60% higher than those given by the flat plate collector at the four incubator light levels (high to low, respectively). The reported incubator irradiances from 1976 through 1978 were increased by these factors to make all results comparable.

Several changes were made in the numerical model used in previous years to simulate in situ production. These changes were made as a result of a whole lake  $^{14}\text{C}$  experiment (Bower 1981). The full data and a detailed interpretation are given there. Since this work may be difficult to obtain, the major findings will be summarized here.

1. The surface inhibition of photosynthesis by high irradiances was removed from the model. Dropping this factor caused only a 4 to 6% increase of integral production on sunny days and no difference on cloudy days. We concluded that the exaggerated surface inhibition commonly seen in in situ bottles is an artifact. In the open waters cells circulate over the mixed zone and are only briefly exposed to very high irradiances whereas in bottles held at fixed depths the algae are damaged by continual exposure to high irradiances and cannot resume photosynthesis later in the day when light at these depths is optimal for photosynthesis.
2. The diurnal variation of the photosynthesis vs light curves reported by Fee (1975) was deleted from the model. Removal of this factor resulted in a 6 to 14% increase of production and made results more consistent with the whole lake  $^{14}\text{C}$  rates. Moreover, Fee (1980) had previously concluded that the pattern of diurnal variation in ELA lakes was not predictable and thus the use of this factor was arbitrary.
3. The light quality correction reported by Fee (1978) was removed from the model. It is now clear that the need for this correction results from a systematic error in the measurement of irradiances in the incubator (reported above).

The numerical model, therefore, incorporates the following assumptions:

1. The photosynthesis vs light curve is invariant over the day and our measurements of it are not affected either by the sampling method or by the time lag involved in transporting the samples to the laboratory.
2. There is no inhibition of photosynthesis in natural lakes by high irradiances.
3. The differences in the quality of light between the incubator and in situ conditions are not important.
4. The optical properties of the lakes do not vary over the day.

#### DATA PRESENTATION

Tables 1-3 contain the production rates for ELA lakes for the period 1976-1980. In Table 1 the rates are expressed as the mass of carbon fixed in the lakes (metric tonnes per year). Table 2 gives annual production per square meter of surface area and per cubic meter of the epilimnion and euphotic zone, respectively. Table 3 gives these same figures divided by the total number of days for which calculations were made. In all three tables, results are given for both actual and simulated cloudless weather, and the results are both corrected and uncorrected for morphometry (Fee 1980). Table 1 also contains the surface area of the lakes, the volume of the euphotic zone, the time period for which calculations were made and the depth of the euphotic zone. In mathematical terms (symbols explained below), Table 1 contains the sum over the ice-free season of the following integrals:

$$Ao \int_0^{Zeu} P(z) dz$$

$$Ao \int_0^{Zepi} P(z) dz$$

$$\int_0^{Zeu} P(z) A(z) dz$$

$$\int_0^{Zepi} P(z) A(z) dz$$

Table 2 contains the sum over the ice-free season of the following integrals:

$$\int_0^{Zeu} P(z) dz / Zeu \quad (\text{Euphotic zone, uncorrected, } m^{-3})$$

$$\int_0^{Zeu} P(z) A(z) dz / Veu \quad (\text{Euphotic zone, corrected, } m^{-3})$$

$$\int_0^{Zepi} P(z) A(z) dz / Vepi \quad (\text{Epilimnion, corrected, } m^{-3})$$

$$\int_0^{Zeu} P(z) dz \quad (\text{Euphotic zone, uncorrected, } m^{-2})$$

$$\int_0^{Zepi} P(z) dz \quad (\text{Epilimnion, uncorrected, } m^{-2})$$

$$\int_0^{Zeu} P(z) A(z) dz / Ao \quad (\text{Euphotic zone, corrected, } m^{-2})$$

$$\int_0^{Zepi} P(z) A(z) dz / Ao \quad (\text{Epilimnion, corrected, } m^{-2})$$

Table 3 has the same values as Table 2 but divided by the number of days during the ice-free season.

Symbols:  $Ao$  = surface area  
 $P(z)$  = daily primary production as a function of depth  
 $Zeu$  = the depth of the euphotic zone  
 $Zepi$  = the depth of the epilimnion  
 $A(z)$  = area as a function of depth  
 $Ve$  = volume of the euphotic zone  
 $Vepi$  = volume of the epilimnion

Figures 2-4 summarize the primary production rates for lakes for which more than one year of data are available. The units are given on the figures.

#### ACKNOWLEDGMENTS

Doug DeClercq and Ed DeBruyn did the laboratory work and these data are the basis for the results presented here.

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Figure 1. Solar irradiance data for the Experimental Lakes Area  
for the period 1973-1980.

1976



POSSIBLE (CLOUDLESS) TOTAL 15 9264 EINSTEINS/SQ.M  
ACTUAL (MEASURED) TOTAL 15 6232 EINSTEINS/SQ.M

POSSIBLE (CLOUDLESS) TOTAL 15 9702 EINSTEINS/SQ.M  
ACTUAL (MEASURED) TOTAL 15 6849 EINSTEINS/SQ.M

15 30 45 60 75  
EINSTEINS/SQ.M DRY

5

1974



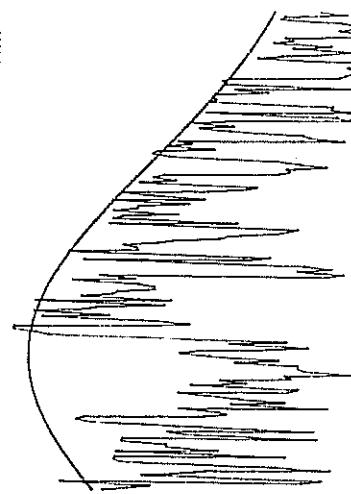
15 30 45 60 75  
EINSTEINS/SQ.M DRY

POSSIBLE (CLOUDLESS) TOTAL 15 9264 EINSTEINS/SQ.M  
ACTUAL (MEASURED) TOTAL 15 6232 EINSTEINS/SQ.M

POSSIBLE (CLOUDLESS) TOTAL 15 9702 EINSTEINS/SQ.M  
ACTUAL (MEASURED) TOTAL 15 6849 EINSTEINS/SQ.M

15 30 45 60 75  
EINSTEINS/SQ.M DRY

1973



15 30 45 60 75  
EINSTEINS/SQ.M DRY

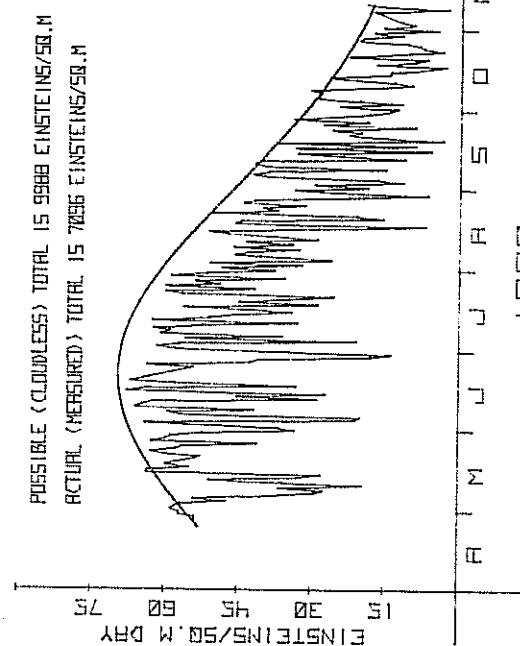
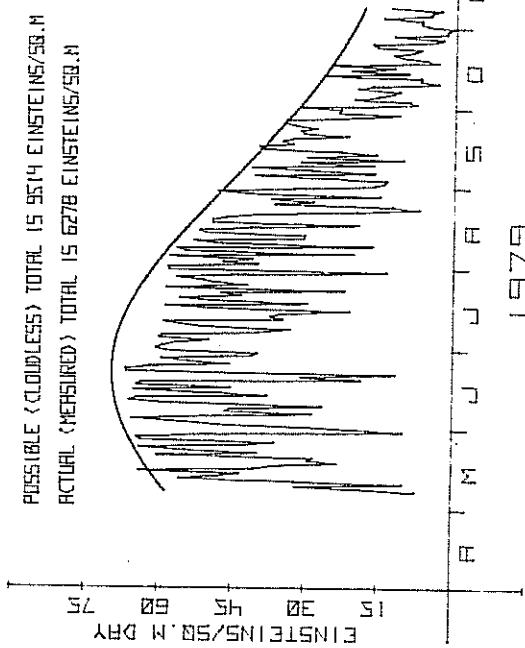
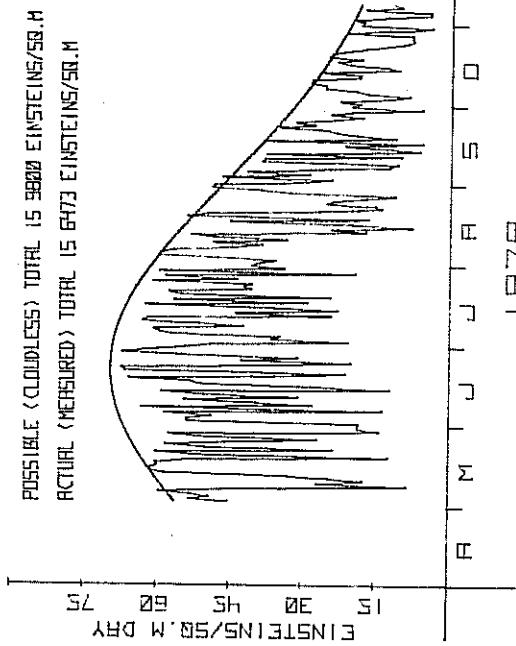
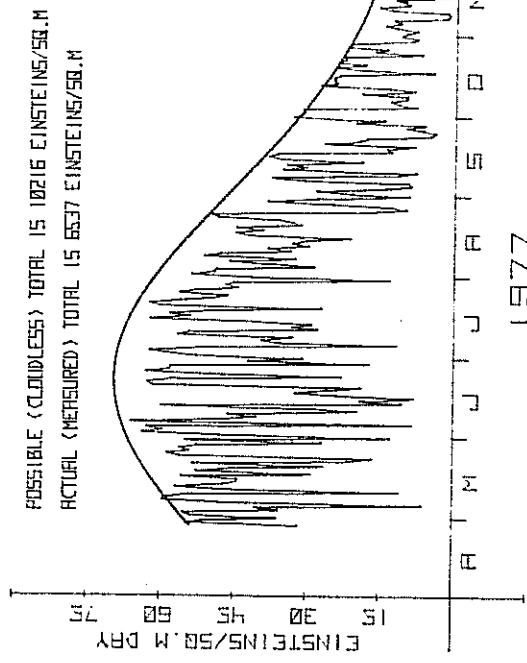
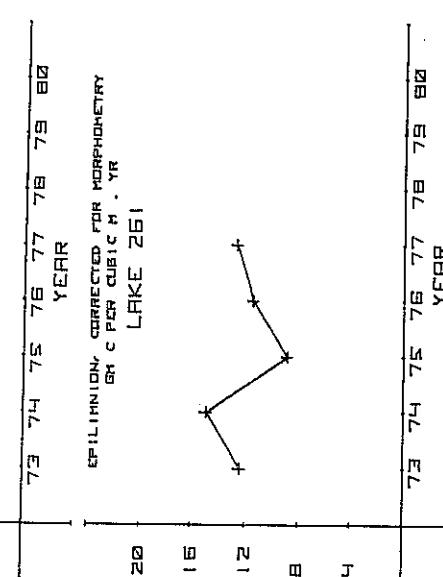
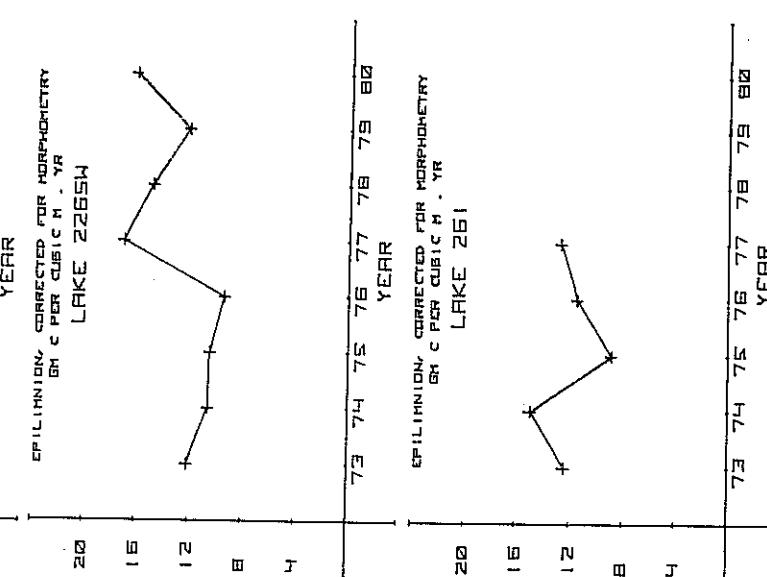
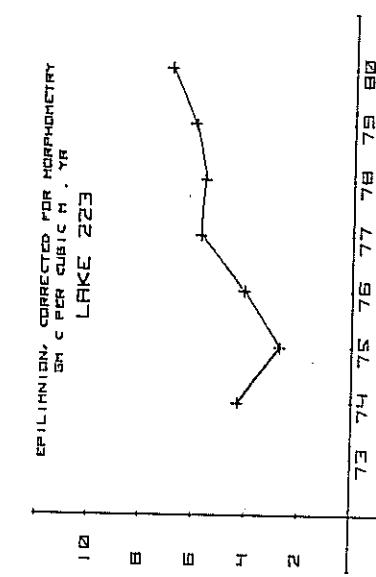
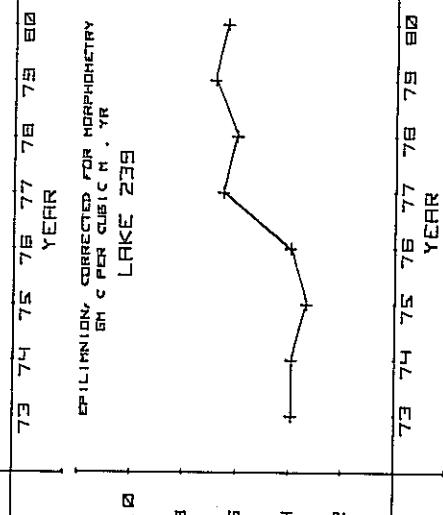
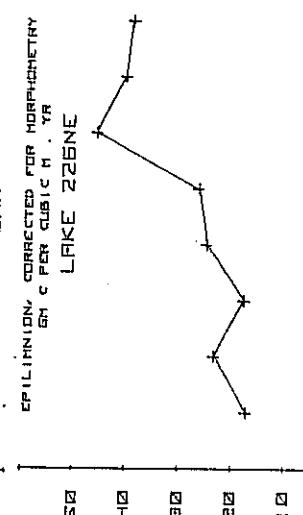
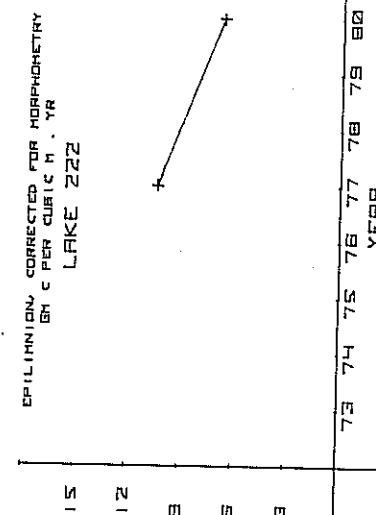
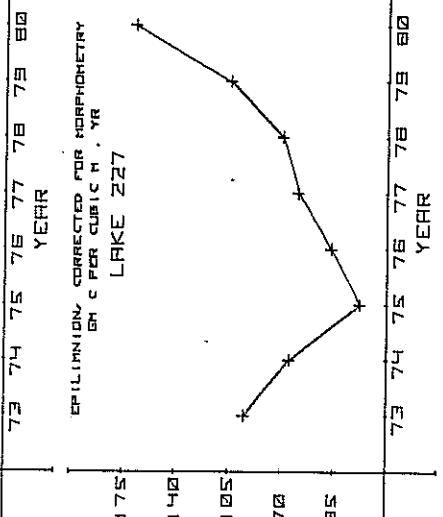
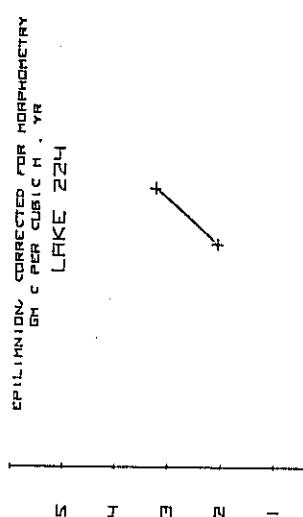
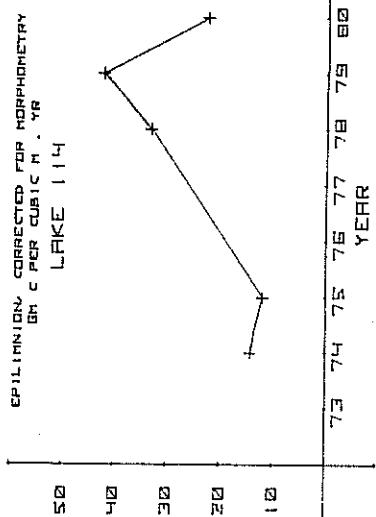


Figure 2. Production per cubic meter of epilimnion, corrected for morphometry, for ELA lakes for the period 1973-1980.



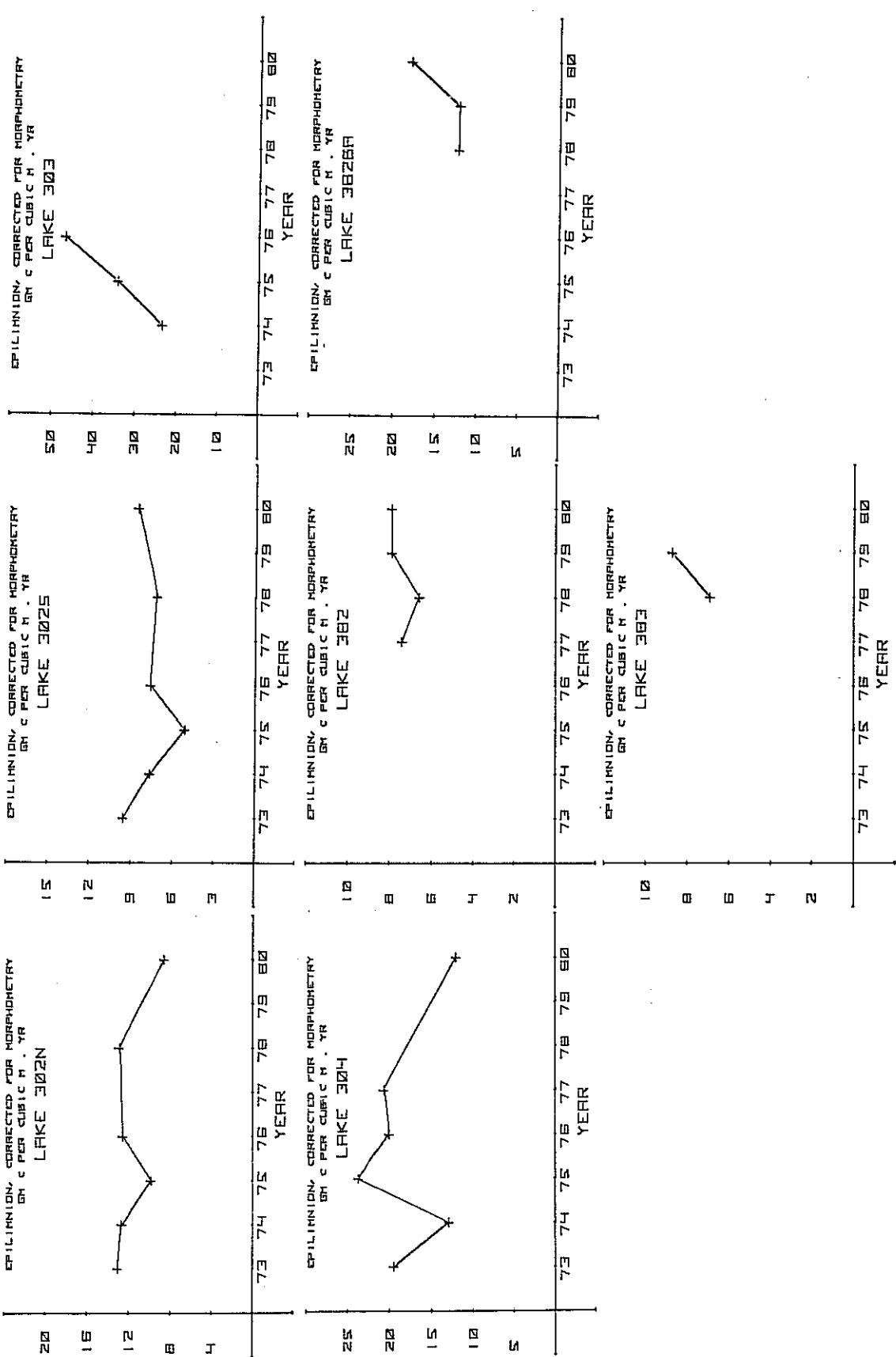
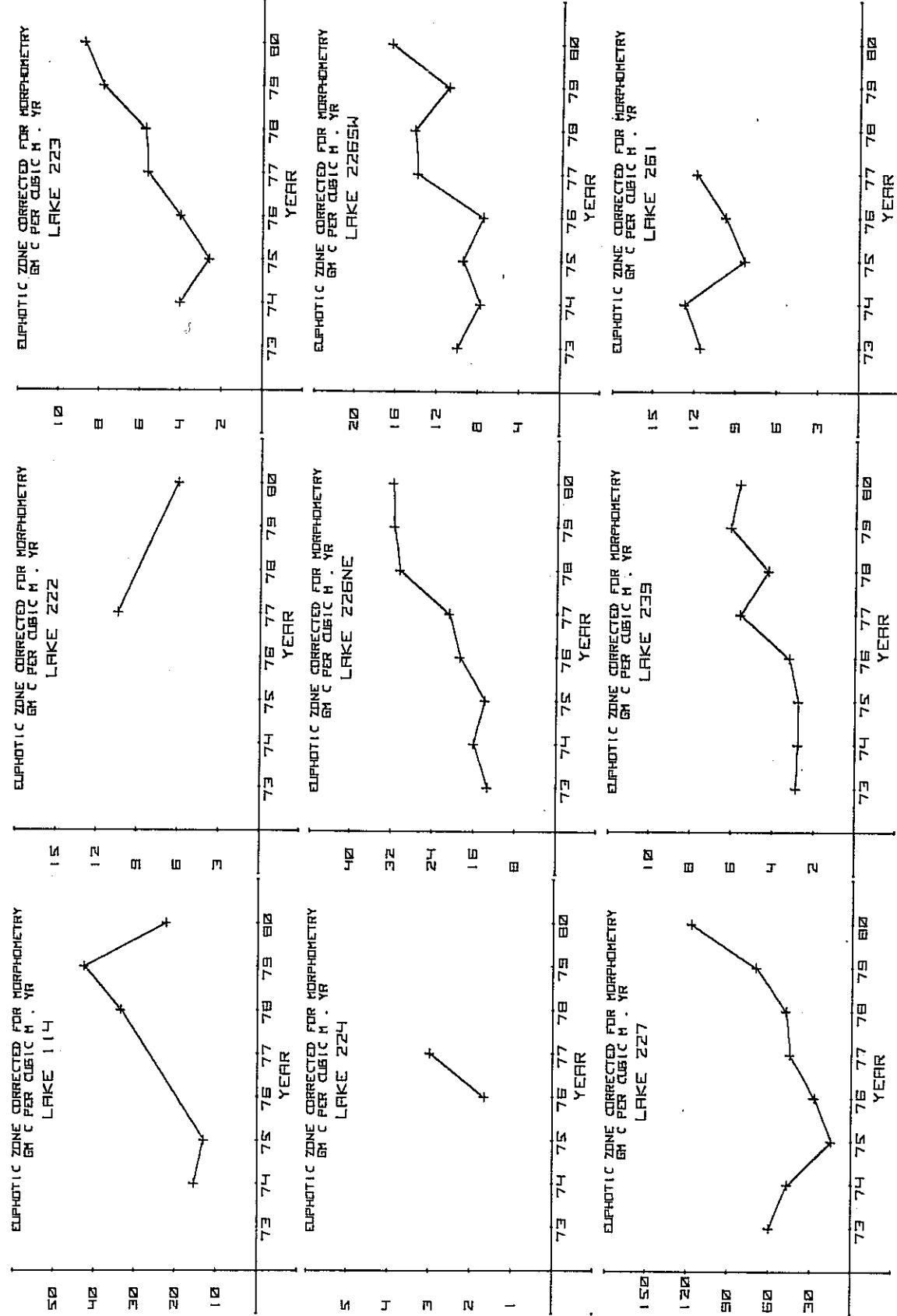


Figure 3. Production per cubic meter of the euphotic zone, corrected for morphometry, for the period 1973-1980.



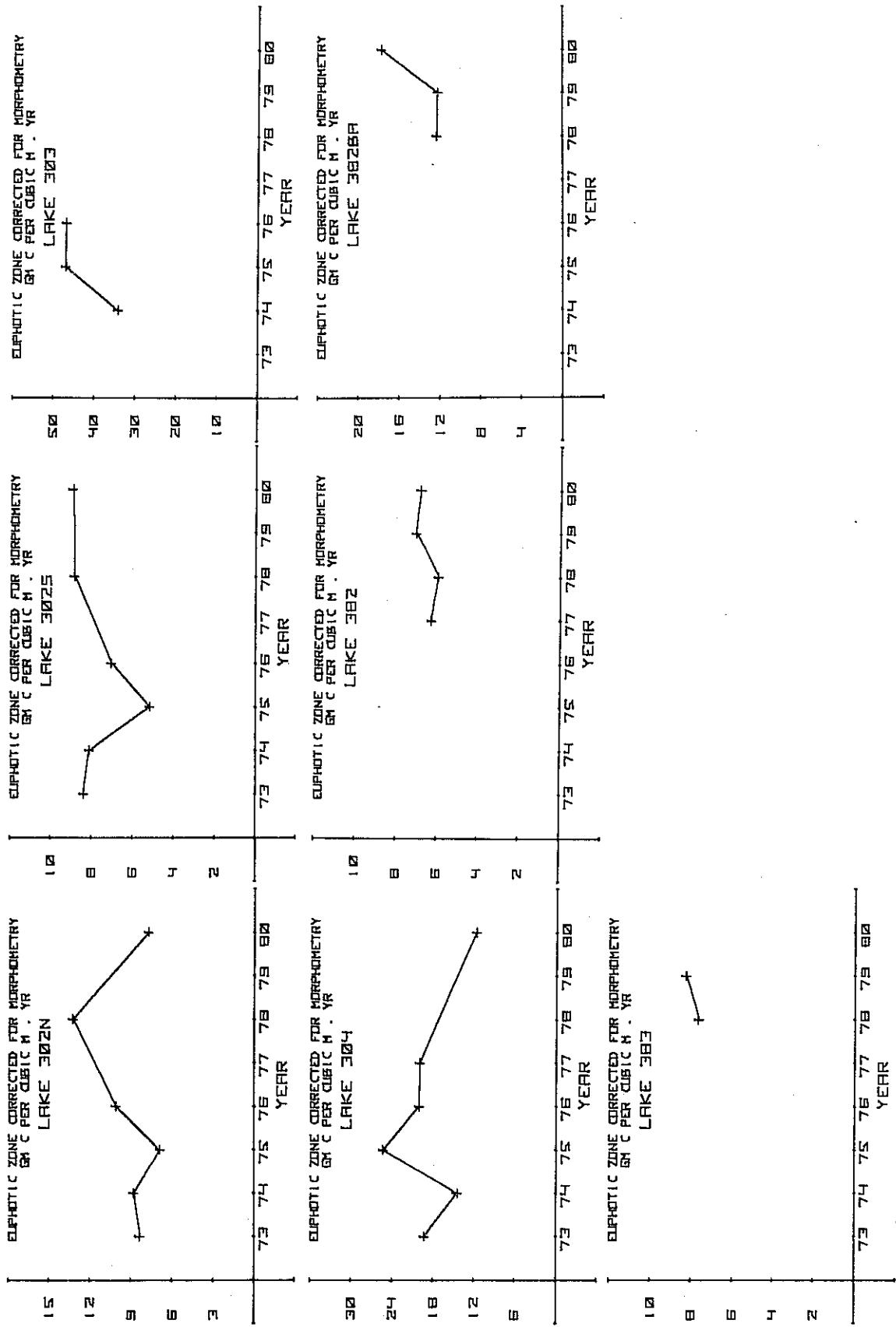
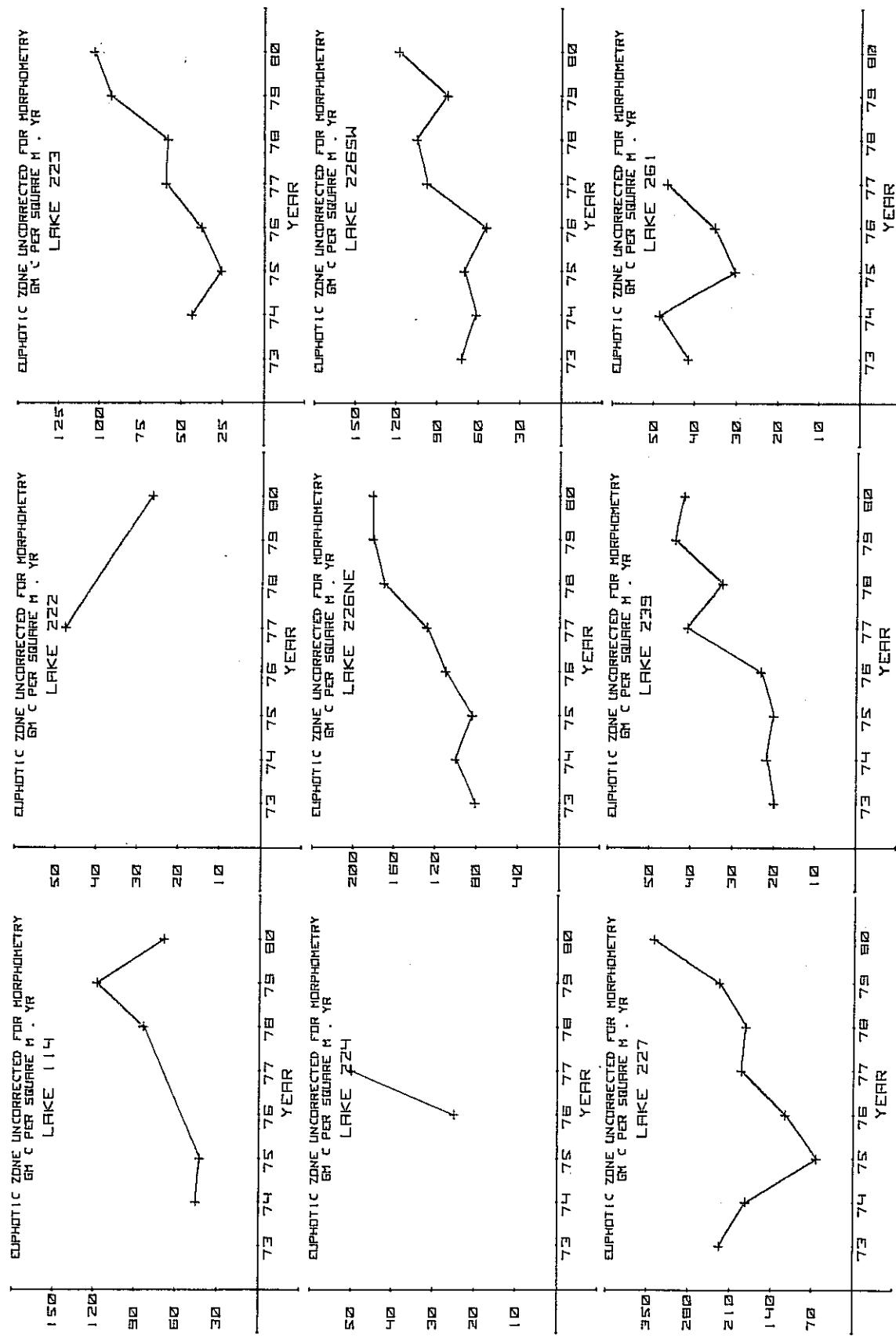


Figure 4. Euphotic zone production per square meter of surface area, uncorrected for morphometry, for ELA lakes during the period 1973-1980.



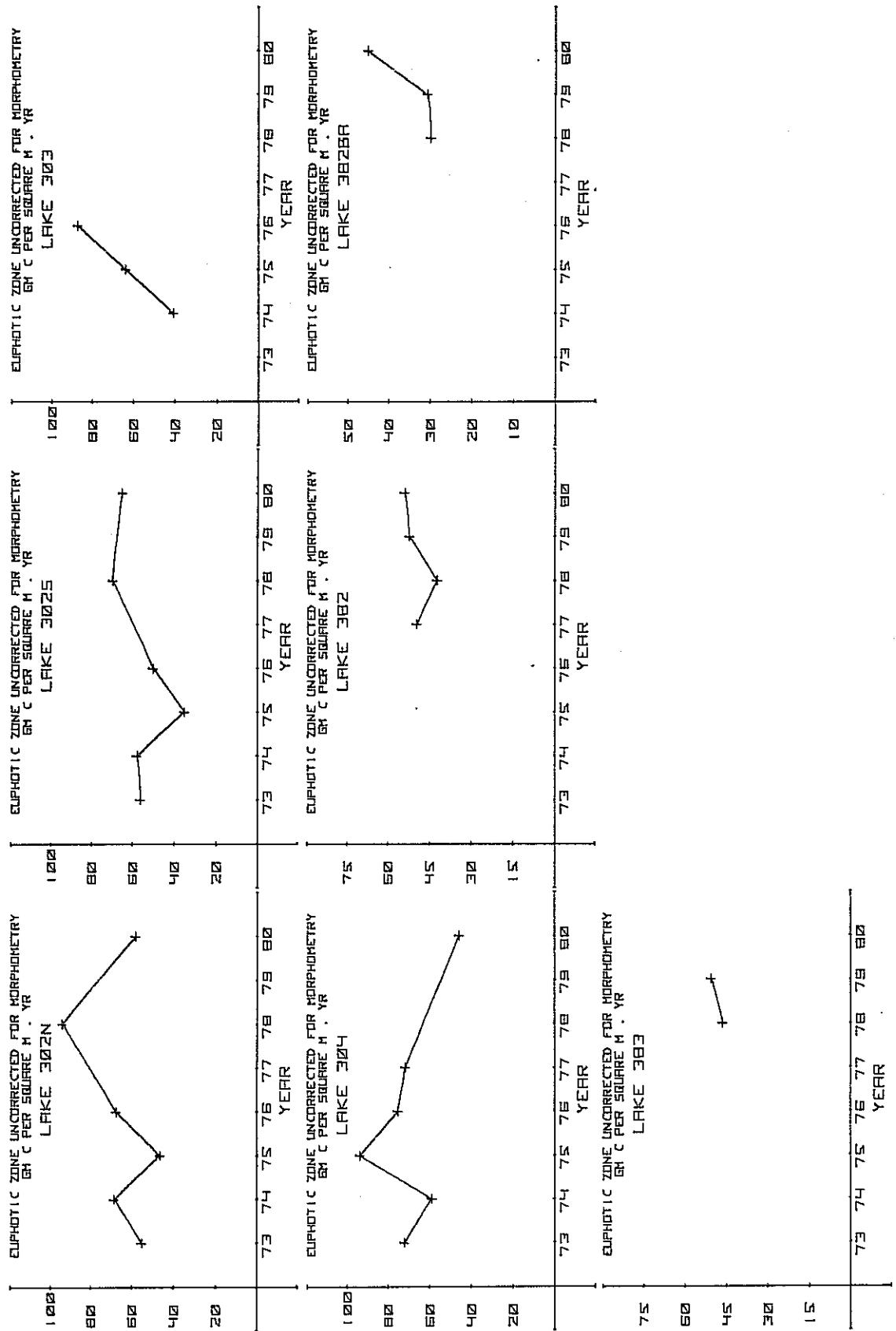


Table 1. Annual primary production in ELA lakes expressed in units of metric tonnes of carbon. A separate table is given for each year. "Area" is the surface area in square meters, "Vol" is the volume of the euphotic zone in cubic meters, "Day per" gives the first and last days for which calculations were made, and "Depth eup" is the depth of the euphotic zone in meters. "Uncorrected" and "corrected" refer to the morphometry correction of Fee (1980). The top figure for any pair is the production calculated with actual weather, the bottom is calculated with simulated cloudless weather (see Fee 1980).

**1976 FLA ANNUAL PRIMARY PRODUCTION IN TONNES  
ACTUAL/CLOUDLESS WEATHER**

LAKE	UNCORRECTED			CORRECTED			AREA M2	DAY PER	DEPTH EUP M
	EUP	EPI	%	EUP	EPI	%			
223	10.30 13.67	5.95 7.61	57.8 55.7	7.30 9.52	5.05 6.40	69.2 67.2	272700 1827550	122 294	10.00
224	6.41 8.48	3.74 4.77	58.3 56.3	4.58 5.95	3.12 3.94	68.1 66.2	259000 2769449	122 294	18.00
226NE	9.10 11.83	7.57 9.62	83.1 81.3	7.55 9.70	6.68 8.44	88.4 86.9	83250 403887	122 294	8.00
226SW	4.19 5.54	2.92 3.71	69.6 67.0	3.32 4.32	2.53 3.19	76.2 73.8	77740 439435	122 294	8.00
227	5.77 7.54	4.65 6.01	80.7 79.7	4.51 5.82	3.87 4.95	85.8 85.0	50000 165750	122 294	5.00
230	0.77 1.00	0.43 0.54	56.6 53.9	0.63 0.81	0.40 0.49	63.2 60.7	16700 64435	122 232	5.00
239	12.97 17.16	10.57 13.57	81.5 79.1	11.09 14.51	9.39 11.96	84.7 82.4	561000 3459573	122 294	8.00
261	1.97 2.62	1.68 2.21	85.5 84.5	1.40 1.81	1.31 1.68	93.1 92.6	55700 143435	122 294	5.00
302N	8.63 11.20	6.35 8.06	73.5 71.9	6.53 8.34	5.27 6.52	80.7 79.3	128000 646744	122 294	8.00
302S	5.44 6.99	3.41 4.28	62.7 61.2	3.83 4.82	2.87 3.56	74.9 73.9	109000 544816	122 294	8.00
303	8.64 10.92	8.64 10.92	100.0 100.0	6.85 8.55	6.85 8.55	100.0 100.0	99300 146650	122 294	2.00
304	2.71 3.51	2.20 2.76	81.1 78.8	2.18 2.77	1.92 2.40	88.1 86.7	36200 109025	122 294	5.00

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 $\% = 100 * \text{EPILIMNION PRODN} / \text{EUPHOTIC ZONE PRODN}$   
 PRODUCTION FOR THE ICE FREE SEASON IN TONNES OF CARBON

1977 ELA ANNUAL PRIMARY PRODUCTION IN TONNES  
ACTUAL/CLCUDLESS WEATHER

LAKE	UNCORRECTED			CORRECTED			AREA M <sup>2</sup>	DAY VOL M <sup>3</sup>	DEPTH PER	EUP M
	EUP	EPI	%	EUP	EPI	%				
221	4.55 6.44	3.86 5.35	84.8 83.1	2.98 4.01	2.82 3.78	94.8 94.1	90300 187200	117 320	5.00	
222	7.82 10.81	4.83 6.55	61.7 60.6	6.05 8.26	4.19 5.63	69.2 68.2	164000 582850	117 320	5.00	
223	16.14 23.45	9.85 13.54	61.0 57.8	10.89 15.17	7.91 10.61	72.6 69.9	272700 1938271	117 320	12.00	
224	12.90 18.26	4.56 8.74	50.8 47.9	8.53 11.66	5.46 7.14	64.1 61.3	259000 2873920	117 320	20.00	
226NE	10.64 15.00	7.91 10.78	74.3 71.8	8.44 11.58	6.96 9.34	82.4 80.6	83250 403887	117 320	8.00	
226SW	7.55 10.69	5.34 7.26	70.8 68.0	6.15 8.51	4.68 6.27	76.1 73.6	77740 439435	117 320	8.00	
227	9.53 13.53	7.41 10.27	77.8 75.9	7.48 10.38	6.19 8.42	82.8 81.1	50000 165750	117 320	5.00	
239	22.91 32.00	18.11 24.35	79.0 76.1	19.34 26.64	15.92 21.21	82.3 79.6	561000 3459573	117 320	8.00	
240	15.55 21.73	12.58 16.98	80.9 78.2	12.08 16.42	10.47 13.88	86.7 84.5	441000 2490659	117 320	9.00	
261	2.61 3.70	1.88 2.58	72.0 69.6	1.70 2.31	1.41 1.87	82.7 80.7	55700 143435	117 320	5.00	
304	2.58 3.80	1.87 2.66	72.2 69.9	2.05 2.96	1.61 2.26	78.5 76.4	36200 102854	117 320	4.30	
382	16.78 23.53	12.36 16.79	73.6 71.4	12.47 17.03	9.99 13.31	80.1 78.2	338000 1984500	117 320	10.00	

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 % = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
 PRODUCTION FOR THE ICE FREE SEASON IN TONNES OF CARBON

**1978 ELA ANNUAL PRIMARY PRODUCTION IN TONNES  
ACTUAL/CLCUDLESS WEATHER**

LAKE	UNCORRECTED			CORRECTED			AREA VOL M3	M2	DAY PER	DEPTH EUP M
	EUP	EPI	%	EUP	EPI	%				
114	10.11	10.11	100.0	7.07	7.07	100.0	121000	122	4.00	
	14.17	14.17	100.0	9.47	9.47	100.0	212256	312		
127	1.70	1.70	100.0	1.18	1.18	100.0	49000	122	2.50	
	2.21	2.21	100.0	1.50	1.50	100.0	80300	312		
129	1.50	1.50	100.0	1.34	1.34	100.0	48400	122	2.00	
	2.07	2.07	100.0	1.81	1.81	100.0	80900	312		
130	1.99	1.99	100.0	1.81	1.81	100.0	74500	122	2.50	
	2.58	2.58	100.0	2.34	2.34	100.0	167675	312		
132	2.81	2.81	100.0	2.28	2.28	100.0	71700	122	3.00	
	3.69	3.69	100.0	2.98	2.98	100.0	170150	312		
223	15.75	8.38	53.2	11.05	7.06	63.9	272700	122	11.50	
	21.90	11.01	50.1	14.97	9.17	61.2	1922959	312		
226NE	14.12	11.78	83.4	12.33	10.91	88.5	83250	122	8.00	
	19.71	16.02	81.3	16.95	14.75	87.0	403887	312		
226SW	8.13	4.86	59.7	6.28	4.28	68.1	77740	122	8.00	
	11.45	6.42	56.1	8.65	5.60	64.8	439435	312		
227	9.14	6.96	76.2	7.42	6.09	82.1	50000	122	4.50	
	12.77	9.44	73.9	10.20	8.17	80.1	153814	312		
239	18.23	15.35	84.2	15.93	13.81	86.7	561000	122	9.00	
	25.27	20.62	81.6	21.77	18.37	84.4	3761423	312		
302N	12.03	6.29	52.3	8.56	5.22	61.0	128000	122	8.00	
	16.93	8.38	49.5	11.76	6.86	58.3	646744	312		
302S	7.57	3.34	44.1	4.88	2.76	56.6	109000	122	9.00	
	10.61	4.46	42.1	6.62	3.63	54.8	552910	312		
382	14.28	10.73	75.1	11.01	8.87	80.6	338000	122	8.50	
	20.03	14.47	72.2	15.12	11.81	78.1	1853056	312		
382RA	0.98	0.98	100.0	0.61	0.61	100.0	32800	122	3.00	
	1.33	1.33	100.0	0.79	0.79	100.0	49775	312		
383	2.57	1.13	44.2	1.81	0.93	51.4	55500	122	7.00	
	3.64	1.51	41.4	2.52	1.22	48.5	237986	312		
384	2.22	2.02	90.8	1.89	1.76	93.3	69000	122	3.00	
	3.01	2.70	89.6	2.52	2.33	92.5	164425	312		

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
% = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
PRODUCTION FOR THE ICE FREE SEASON IN TONNES OF CARBON

1979 FLA ANNUAL PRIMARY PRODUCTION IN TONNES  
ACTUAL/CLOUDLESS WEATHER

LAKE	UNCORRECTED			CORRECTED			AREA M <sup>2</sup>	DAY	DEPTH
	EUP	EPI	%	EUP	EPI	%			
114	14.26	14.26	100.0	9.00	9.00	100.0	121000	127	4.00
	19.33	19.33	100.0	11.59	11.59	100.0	212256	305	
223	25.33	11.07	43.7	15.26	8.79	57.6	272700	127	13.00
	35.46	15.27	43.1	20.82	11.86	57.0	1951603	312	
226NE	15.03	12.32	82.0	12.43	10.95	88.1	83250	127	7.50
	20.61	16.56	80.4	16.75	14.54	86.8	391697	312	
226SW	6.39	4.07	63.7	4.95	3.53	71.4	77740	127	8.30
	8.88	5.59	63.0	6.77	4.78	70.6	448965	312	
227	11.41	9.24	81.0	9.89	8.33	84.3	50000	127	4.00
	15.38	12.14	78.9	13.17	10.85	82.4	141189	312	
239	24.63	18.07	73.4	21.03	16.19	77.0	561000	127	8.00
	33.94	24.30	71.6	28.64	21.56	75.3	3459573	312	
382	17.68	13.81	78.1	13.42	11.23	83.7	338000	127	9.00
	24.23	18.49	76.3	17.98	14.77	82.1	1903619	312	
382BA	1.00	1.00	100.0	0.60	0.60	100.0	32800	127	3.00
	1.36	1.36	100.0	0.78	0.78	100.0	49775	312	
383	2.80	1.78	63.4	2.02	1.42	70.3	55500	127	7.50
	3.88	2.42	62.4	2.75	1.90	69.3	244863	312	

EUP = EUPHOTIC ZONE, EPI = EPILIMNION

% = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
PRODUCTION FOR THE ICE FREE SEASON IN TONNES OF CARBON

**1980 FLA ANNUAL PRIMARY PRODUCTION IN TONNES  
ACTUAL/CLCUPLESS WEATHER**

LAKE	UNCORRECTED			CORRECTED			AREA VOL M3	M2 PER	DAY EUP M	DEPTH
	EUP	EPI	%	FUP	EPI	%				
114	8.31	8.02	96.5	4.72	4.71	99.8	121000	122	4.00	
	11.01	10.66	96.8	6.02	5.98	99.4	212256	306		
222	4.34	3.14	72.2	3.50	2.73	78.0	164000	122	5.00	
	5.92	4.18	70.6	4.71	3.60	76.5	582850	306		
223	28.18	12.08	42.9	17.00	9.71	57.1	272700	122	12.00	
	37.88	15.97	42.2	22.24	12.62	56.7	1938271	306		
226NE	15.07	12.01	79.7	12.10	10.70	88.4	83250	122	7.00	
	20.15	15.83	78.5	16.28	13.94	85.6	378326	306		
226SW	9.17	6.35	69.2	7.29	5.53	75.9	77740	122	8.00	
	12.37	8.33	67.4	9.67	7.18	74.2	439435	306		
227	16.95	15.22	89.8	13.36	13.60	101.8	50000	122	3.00	
	22.60	20.28	89.7	19.57	17.99	91.9	113950	306		
239	23.40	16.83	71.9	19.50	14.87	76.3	561000	122	8.00	
	31.77	22.30	70.2	26.19	19.53	74.6	3459573	306		
302N	7.45	5.18	69.5	5.30	4.15	78.3	128000	153	9.00	
	10.36	7.04	68.0	7.20	5.54	76.9	682608	306		
302S	7.06	4.67	66.2	4.95	3.83	77.4	109000	153	9.00	
	9.72	6.34	65.3	6.66	5.11	76.8	552910	306		
304	1.65	1.25	75.7	1.23	1.03	83.9	36200	183	4.50	
	2.33	1.73	74.2	1.69	1.40	82.9	104872	306		
382	18.27	12.71	69.5	13.30	10.28	77.3	338000	122	9.50	
	24.83	16.81	67.7	17.70	13.40	75.7	1946914	306		
3A2BA	1.48	1.48	100.0	0.88	0.68	100.0	32800	122	3.00	
	1.95	1.95	100.0	1.12	1.12	100.0	49775	306		

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 % = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
 PRODUCTION FOR THE ICE FREE SEASON IN TONNES OF CARBON

Table 2. ELA primary production expressed in units of  $\text{gm}/\text{m}^2$  and  $\text{gm}/\text{m}^3$ . A separate table is given for each year.

ELA PRIMARY PRODUCTION TOTALS FOR 1976  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN G/M3.YR						PRODN G/M2.YR													
	UNCORRECTED		CORRECTED		UNCORRECTED		CORRECTED		UNCORRECTED		CORRECTED									
	EUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%							
223	3.78	4.00	4.10	102.5	37.75	21.83	57.6	26.78	16.52	69.2	5.01	5.21	5.19	99.6	50.12	27.91	55.7	34.93	23.47	67.2
224	1.38	1.65	2.09	126.0	24.75	14.44	58.3	17.69	12.05	68.1	1.82	2.15	2.63	122.5	32.74	18.43	56.3	22.98	15.20	66.2
226NE	13.67	18.70	24.77	132.5	109.33	90.88	83.1	90.73	80.24	88.4	17.77	24.03	31.28	130.2	142.13	115.60	81.3	116.58	101.33	86.9
226SW	6.74	7.57	9.33	123.3	53.95	37.55	69.6	42.77	32.58	76.2	8.90	9.84	11.75	119.4	71.21	47.68	67.0	55.60	41.01	73.8
227	23.07	27.22	36.73	135.0	115.35	93.07	80.7	90.22	77.44	85.8	30.16	35.14	46.95	133.6	150.82	120.20	79.7	116.48	99.00	85.0
230	9.20	9.84	13.82	140.4	45.98	26.00	56.6	37.96	23.98	63.2	11.93	12.63	17.06	135.0	59.67	32.17	53.9	48.74	29.60	60.7
239	2.89	3.21	3.96	123.5	23.12	18.85	81.5	19.77	16.73	84.7	3.82	4.19	5.05	120.3	30.58	24.19	79.1	25.86	21.32	82.4
261	7.07	9.78	11.45	117.1	35.37	30.24	85.5	25.19	23.45	93.1	9.39	12.65	14.72	116.4	46.97	39.68	84.5	32.57	30.14	92.6
302N	8.43	10.09	12.55	124.4	67.43	49.59	73.5	51.00	41.15	80.7	10.94	12.90	15.78	122.3	87.51	62.94	71.9	65.20	51.73	79.3
302S	6.24	7.03	7.61	108.2	49.89	31.30	62.7	35.16	26.32	74.9	8.02	8.85	9.45	106.8	64.13	39.27	61.2	44.24	32.69	73.9
303	43.52	46.74	46.74	100.0	87.05	87.05	100.0	69.03	69.03	100.0	55.00	58.32	58.31	100.0	110.00	110.00	100.0	86.12	86.12	100.0
304	14.99	19.99	19.99	100.0	74.97	60.77	81.1	60.19	53.04	88.1	19.39	25.38	31.36	123.6	96.97	76.38	78.8	76.44	66.24	86.7

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 % = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
 CORRECTED AND UNCORRECTED REFER TO MORPHOMETRY.  
 PRODUCTION IN GRAMS OF CARBON.

ELA PRIMARY PRODUCTION TOTALS FOR 1977  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN G/M3.YR						PRODN G/M2.YR					
	UNCORRECTED			CORRECTED			UNCORRECTED			CORRECTED		
	EUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%	EUP	%
221	10.08 14.26	15.91 21.44	17.46 23.35	109.7 108.9	50.39 71.32	42.75 59.27	84.8 83.1	32.99 44.45	31.28 41.84	94.8 94.1		
222	9.53 13.19	10.38 14.18	10.35 14.18	99.7 100.0	47.65 65.93	29.42 39.97	61.7 60.6	36.90 50.38	25.54 34.35	69.2 68.2		
223	4.93 7.17	5.62 7.83	5.77 7.75	102.7 99.0	59.20 85.98	36.14 49.66	61.0 57.8	39.93 55.63	28.99 38.91	72.6 69.9		
224	2.49 3.52	2.97 4.06	3.27 4.27	110.2 105.4	49.81 70.50	25.32 33.73	50.8 47.9	32.92 45.02	21.10 27.59	64.1 61.3		
226NE	15.98 22.53	20.91 28.67	26.46 35.51	126.6 123.9	127.81 180.22	94.99 129.46	74.3 71.8	101.43 139.10	83.58 112.17	82.4 80.6		
226SW	12.14 17.18	13.99 19.36	17.02 22.78	121.6 117.6	97.14 137.45	68.75 93.43	70.8 68.0	79.10 109.44	60.23 80.60	76.1 73.6		
227	38.13 54.13	45.13 67.62	58.97 80.19	130.7 128.1	190.63 270.64	148.28 205.49	77.8 75.9	149.60 207.60	123.86 168.44	82.8 81.1		
239	5.11 7.13	5.59 7.70	6.52 8.69	116.7 112.9	40.84 57.04	32.27 43.40	79.0 76.1	34.47 47.49	28.38 37.81	82.3 79.6		
240	3.92 5.47	4.85 6.59	5.87 7.78	121.0 117.9	35.27 49.26	28.53 38.51	80.9 78.2	27.39 37.23	23.74 31.47	86.7 84.5		
261	9.36 13.29	11.87 16.13	12.71 16.85	107.1 104.5	46.80 66.43	33.71 46.26	72.0 69.6	30.57 41.54	25.30 33.54	82.7 80.7		
304	16.59 24.44	19.95 28.76	20.65 28.98	103.5 100.8	71.34 105.10	51.54 73.50	72.2 69.9	56.69 81.71	44.50 62.46	78.5 76.4		
382	4.96 6.96	6.28 8.58	7.39 9.84	117.5 114.7	49.65 69.62	36.55 49.67	73.6 71.4	36.89 50.38	29.56 39.38	80.1 78.2		

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 $\chi = 100 * \text{EPILIMNION PRODN} / \text{EUPHOTIC ZONE PRODN}$   
 CORRECTED AND UNCORRECTED REFER TO MORPHOMETRY.  
 PRODUCTION IN GRAMS OF CARBON.

ELA PRIMARY PRODUCTION TOTALS FOR 1978  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN G/M3.YR						PRODN G/M2.YR					
	UNCORRECTED			CORRECTED			UNCORRECTED			CORRECTED		
	EUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%	EUP	%
114	20.88	33.30	33.30	100.0	83.54	83.54	100.0	58.41	58.41	100.0		
	29.27	44.61	44.61	100.0	117.07	117.07	100.0	78.26	78.26	100.0		
127	13.91	14.74	14.75	100.0	34.76	34.76	100.0	24.16	24.16	100.0		
	18.01	18.74	18.74	100.0	45.03	45.03	100.0	30.71	30.71	100.0		
129	15.54	16.54	16.54	100.0	31.08	31.08	100.0	27.64	27.64	100.0		
	21.34	22.40	22.40	100.0	42.68	42.68	100.0	37.44	37.44	100.0		
130	10.66	10.80	10.80	100.0	26.65	26.65	100.0	24.31	24.31	100.0		
	13.87	13.99	13.98	100.0	34.66	34.66	100.0	31.48	31.48	100.0		
132	13.04	13.42	13.42	100.0	39.12	39.12	100.0	31.85	31.85	100.0		
	17.17	17.49	17.49	100.0	51.50	51.50	100.0	41.51	41.51	100.0		
223	5.02	5.75	5.62	97.7	57.77	30.71	53.2	40.52	25.90	63.9		
	7.01	7.78	7.29	93.6	80.64	40.36	50.1	54.90	33.62	61.2		
226NE	21.21	30.53	45.69	149.7	169.67	141.51	83.4	148.11	131.05	88.5		
	29.59	41.97	61.74	147.1	236.74	192.44	81.3	203.60	177.18	87.0		
226SW	13.08	14.30	14.82	103.5	104.64	62.51	59.7	80.82	55.06	68.1		
	18.41	19.69	19.41	98.6	147.26	82.64	56.1	111.29	72.10	64.8		
227	40.60	48.25	69.85	144.8	182.70	139.24	76.2	148.44	121.80	82.1		
	56.77	66.31	93.68	141.3	255.46	188.87	73.9	204.00	163.36	80.1		
239	3.61	4.24	6.00	141.6	32.50	27.36	84.2	28.40	24.62	86.7		
	5.00	5.79	7.98	137.9	45.04	36.76	81.6	38.81	32.75	84.4		
302N	11.75	13.24	12.91	97.5	94.00	49.13	52.3	66.91	40.79	61.0		
	16.53	18.18	16.97	93.3	132.26	65.50	49.5	91.87	53.59	58.3		
302S	7.72	8.84	7.16	81.1	69.46	30.61	44.1	44.82	25.35	56.6		
	10.81	11.97	9.40	78.6	97.32	40.96	42.1	60.71	33.28	54.8		
382	4.97	5.94	6.58	110.7	42.26	31.74	75.1	32.57	26.26	80.6		
	6.97	8.16	8.75	107.2	59.26	42.81	72.2	44.73	34.94	78.1		
382BA	9.94	12.25	12.25	100.0	29.81	29.81	100.0	18.58	18.58	100.0		
	13.49	15.91	15.91	100.0	40.48	40.48	100.0	24.14	24.14	100.0		
383	6.61	7.62	6.93	91.0	46.25	20.45	44.2	32.68	16.79	51.4		
	9.37	10.57	9.08	85.9	65.57	27.17	41.4	45.33	21.98	48.5		
384	10.74	11.48	12.00	104.5	32.22	29.24	90.8	27.36	25.54	93.3		
	14.56	15.33	15.87	103.5	43.68	39.15	89.6	36.54	33.78	92.5		

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
% = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN

ELA PRIMARY PRODUCTION TOTALS FOR 1979  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN G/M3.YR						PRODN G/M2.YR						
	UNCORRECTED		CORRECTED		UNCORRECTED		CORRECTED		UNCORRECTED		CORRECTED		
	EUP	EPI	EUP	EPI	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%
114	29.46	42.38	42.39	100.0	117.84	117.84	100.0	74.35	74.35	100.0			
	39.93	54.60	54.58	100.0	159.72	159.72	100.0	95.79	95.79	100.0			
223	7.14	7.82	6.05	77.4	92.88	40.60	43.7	55.96	32.24	57.6			
	10.00	10.67	8.16	76.5	130.02	56.00	43.1	76.35	43.49	57.0			
226NE	24.07	31.73	40.20	126.7	180.51	147.97	82.0	149.31	131.53	88.1			
	33.01	42.76	53.40	124.9	247.58	198.95	80.4	201.20	174.65	86.8			
226SW	9.90	11.02	12.18	110.5	82.17	52.31	63.7	63.62	45.39	71.4			
	13.76	15.09	16.51	109.4	114.17	71.90	63.0	87.14	61.54	70.6			
227	57.06	70.03	104.33	149.0	228.26	184.81	81.0	197.74	166.70	84.3			
	76.90	93.28	135.79	145.6	307.60	242.75	78.9	263.40	217.00	82.4			
239	5.49	6.08	6.87	113.1	43.90	32.22	73.4	37.49	28.86	77.0			
	7.56	8.28	9.15	110.6	60.51	43.32	71.6	51.05	38.43	75.3			
382	5.81	7.05	7.88	111.8	52.32	40.87	78.1	39.70	33.22	83.7			
	7.97	9.45	10.37	109.7	71.69	54.70	76.3	53.20	43.70	82.1			
382BA	10.21	12.14	12.14	100.0	30.63	30.63	100.0	18.42	18.42	100.0			
	13.80	15.74	15.74	100.0	41.41	41.41	100.0	23.88	23.88	100.0			
383	6.74	8.25	8.75	106.0	50.54	32.06	63.4	36.41	25.60	70.3			
	9.32	11.21	11.72	104.5	69.91	43.61	62.4	49.48	34.29	69.3			

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 $\% = 100 * \text{EPILIMNION PRODN} / \text{EUPHOTIC ZONE PRODN}$   
 CORRECTED AND UNCORRECTED REFER TO MORPHOMETRY.  
 PRODUCTION IN GRAMS OF CARBON.

ELA PRIMARY PRODUCTION TOTALS FOR 1980  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN G/M3.YR						PRODN G/M2.YR					
	UNCORRECTED		CORRECTED				UNCORRECTED		CORRECTED			
	EUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%	EUP	%
114	17.18	22.24	22.77	102.4	68.72	66.32	96.5	39.01	38.93	99.8		
	22.74	28.34	28.45	100.4	90.96	88.08	96.8	49.72	49.41	99.4		
222	5.30	6.00	6.72	111.8	26.48	19.13	72.2	21.34	16.65	78.0		
	7.22	8.08	8.72	108.0	36.11	25.51	70.6	28.70	21.97	76.5		
223	8.61	8.77	6.98	79.5	103.34	44.29	42.9	62.34	35.61	57.1		
	11.58	11.47	8.92	77.7	138.92	58.57	42.2	81.55	46.28	56.7		
226NE	25.86	31.98	38.87	121.5	181.02	144.29	79.7	145.35	128.53	88.4		
	34.58	43.03	49.67	115.4	242.06	190.09	78.5	195.56	167.45	85.6		
226SW	14.74	16.59	16.26	98.0	117.91	81.64	69.2	93.77	71.13	75.9		
	19.88	22.02	24.49	111.2	159.07	107.20	67.4	124.45	92.32	74.2		
227	112.99	117.24	167.41	142.8	338.96	304.35	89.8	267.20	272.00	101.8		
	150.64	171.74	223.95	130.4	451.92	405.57	89.7	391.40	359.80	91.9		
239	5.21	5.64	6.40	113.5	41.72	29.99	71.9	34.76	26.51	76.3		
	7.08	7.57	8.27	109.3	56.64	39.74	70.2	46.68	34.81	74.6		
302N	6.47	7.76	8.58	110.5	58.22	40.46	69.5	41.41	32.42	78.3		
	8.99	10.56	11.21	106.2	80.95	55.01	68.0	56.29	43.27	76.9		
302S	7.19	8.95	8.56	95.6	64.75	42.84	66.2	45.41	35.14	77.4		
	9.90	12.04	11.19	92.9	89.13	58.18	65.3	61.08	46.93	76.8		
304	10.13	11.69	11.96	102.3	45.61	34.51	75.7	33.87	28.43	83.9		
	14.27	16.10	16.09	100.0	64.24	47.67	74.2	46.63	38.65	82.9		
382	5.69	6.83	7.90	115.6	54.06	37.60	69.5	39.35	30.41	77.3		
	7.73	9.09	10.12	111.3	73.46	49.72	67.7	52.37	39.64	75.7		
382BA	15.02	17.66	17.95	101.6	45.07	45.07	100.0	26.80	26.80	100.0		
	19.80	22.52	22.52	100.0	59.41	59.41	100.0	34.18	34.18	100.0		

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
% = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
CORRECTED AND UNCORRECTED REFER TO MORPHOMETRY.  
PRODUCTION IN GRAMS OF CARBON.

Table 3. Daily average production for the ice-free season for ELA lakes expressed in units of  $\text{mg}/\text{m}^3$  and  $\text{mg}/\text{m}^2$ . Separate tables are given for each year.

DAILY AVERAGE PRODUCTION FOR 1976  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN MG/M3.DAY						PRODN MG/M2.DAY					
	UNCORRECTED		CORRECTED				UNCORRECTED		CORRECTED			
	EUP	EUP	EPI	%			EUP	EPI	%	EUP	EPI	%
223	21.8	23.1	23.7	102.5	218.2	126.2	57.8	154.8	107.1	69.2		
	29.0	30.1	30.0	99.6	289.7	161.3	55.7	201.9	135.7	67.2		
224	7.9	9.6	12.1	126.0	143.1	83.5	58.3	102.3	69.6	68.1		
	10.5	12.4	15.2	122.5	189.3	106.5	56.3	132.8	87.9	66.2		
226NE	79.0	108.1	143.2	132.5	632.0	525.3	83.1	524.4	463.8	88.4		
	102.7	138.9	180.8	130.2	821.5	668.2	81.3	673.9	585.7	86.9		
226SW	39.0	43.7	53.9	123.3	311.8	217.1	69.6	247.2	188.3	76.2		
	51.5	56.9	67.9	119.4	411.6	275.6	67.0	321.4	237.0	73.8		
227	133.4	157.3	212.3	135.0	666.8	538.0	80.7	521.5	447.6	85.8		
	174.4	203.1	271.4	133.6	871.8	694.8	79.7	673.3	572.3	85.0		
230	82.9	88.6	124.5	140.4	414.3	234.3	56.6	342.0	216.0	63.2		
	107.5	113.8	153.7	135.0	537.5	289.8	53.9	439.1	266.7	60.7		
239	16.7	18.5	22.9	123.5	133.6	108.9	81.5	114.3	96.7	84.7		
	22.1	24.2	29.2	120.3	176.8	139.8	79.1	149.5	123.2	82.4		
261	40.9	56.5	66.2	117.1	204.4	174.8	85.5	145.6	135.5	93.1		
	54.3	73.1	85.1	116.4	271.5	229.4	84.5	188.3	174.2	92.6		
302N	48.7	58.3	72.6	124.4	389.7	286.7	73.5	294.8	237.9	80.7		
	63.2	74.6	91.2	122.3	505.9	363.8	71.9	376.9	299.0	79.3		
302S	36.0	40.7	44.0	108.2	288.4	180.9	62.7	203.2	152.1	74.9		
	46.3	51.2	54.6	106.8	370.7	227.0	61.2	255.7	188.9	73.9		
303	251.6	270.2	270.2	100.0	503.2	503.2	100.0	399.0	399.0	100.0		
	317.9	337.1	337.1	100.0	635.8	635.8	100.0	497.8	497.8	100.0		
304	86.7	115.5	115.5	100.0	433.4	351.2	81.1	347.9	306.6	88.1		
	112.1	146.7	181.3	123.6	560.5	441.5	78.8	441.8	382.9	86.7		

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
% = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
UNCORRECTED AND CORRECTED REFER TO MORPHOMETRY.  
PRODUCTION IN MILLIGRAMS OF CARBON.

DAILY AVERAGE PRODUCTION FOR 1977  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN MG/M3.DAY					PRODN MG/M2.DAY				
	UNCORRECTED		CORRECTED			UNCORRECTED		CORRECTED		
	EUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%
221	49.4	78.0	85.6	109.7	247.0	209.5	84.8	161.7	153.4	94.8
	69.9	105.1	114.5	108.9	349.6	290.5	83.1	217.9	205.1	94.1
222	46.7	50.9	50.7	99.7	233.6	144.2	61.7	180.9	125.2	69.2
	64.6	69.5	69.5	100.0	323.2	195.9	60.6	247.0	168.4	68.2
223	24.2	27.5	28.3	102.7	290.2	177.1	61.0	195.8	142.1	72.6
	35.1	38.4	38.0	99.0	421.5	243.4	57.8	272.7	190.7	69.9
224	12.2	14.5	16.0	110.2	244.2	124.1	50.8	161.4	103.4	64.1
	17.3	19.9	21.0	105.4	345.6	165.4	47.9	220.7	135.2	61.3
226NE	78.3	102.5	129.7	126.6	626.5	465.6	74.3	497.2	409.7	82.4
	110.4	140.5	174.1	123.9	883.4	634.6	71.8	681.9	549.8	80.6
226SW	59.5	68.6	83.4	121.6	476.2	337.0	70.8	387.7	295.2	76.1
	84.2	94.9	111.7	117.6	673.8	458.0	68.0	536.5	395.1	73.6
227	186.9	221.2	289.1	130.7	934.5	726.9	77.8	733.3	607.2	82.8
	265.3	307.0	393.1	128.1	1326.7	1007.3	75.9	1017.6	825.7	81.1
239	25.0	27.4	32.0	116.7	200.2	158.2	79.0	169.0	139.1	82.3
	34.9	37.7	42.6	112.9	279.6	212.7	76.1	232.8	185.3	79.6
240	19.2	23.8	28.8	121.0	172.9	139.8	80.9	134.3	116.4	86.7
	26.8	32.3	38.1	117.9	241.5	188.8	78.2	182.5	154.3	84.5
261	45.9	58.2	62.3	107.1	229.4	165.2	72.0	149.9	124.0	82.7
	65.1	79.1	82.6	104.5	325.6	226.8	69.6	203.6	164.4	80.7
304	81.3	97.8	101.2	103.5	349.7	252.6	72.2	277.9	218.2	78.5
	119.8	141.0	142.1	100.8	515.2	360.3	69.9	400.6	306.2	76.4
382	24.3	30.8	36.2	117.5	243.4	179.2	73.6	180.9	144.9	80.1
	34.1	42.1	48.2	114.7	341.3	243.5	71.4	247.0	193.0	78.2

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 X = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
 UNCORRECTED AND CORRECTED REFER TO MORPHOMETRY.  
 PRODUCTION IN MILLIGRAMS OF CARBON.

DAILY AVERAGE PRODUCTION FOR 1978  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN MG/M3.DAY				PRODN MG/M2.DAY					
	UNCORRECTED		CORRECTED		UNCORRECTED		CORRECTED			
	FUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%
114	109.3	174.3	174.3	100.0	437.4	437.4	100.0	305.8	305.8	100.0
	153.2	233.6	233.6	100.0	612.9	612.9	100.0	409.7	409.7	100.0
127	72.8	77.2	77.2	100.0	182.0	182.0	100.0	126.5	126.5	100.0
	94.3	98.1	98.1	100.0	235.7	235.7	100.0	160.8	160.8	100.0
129	81.4	86.6	86.6	100.0	162.7	162.7	100.0	144.7	144.7	100.0
	111.7	117.3	117.3	100.0	223.4	223.4	100.0	196.0	196.0	100.0
130	55.8	56.5	56.6	100.0	139.6	139.6	100.0	127.3	127.3	100.0
	72.6	73.2	73.2	100.0	181.5	181.5	100.0	164.8	164.8	100.0
132	68.3	70.3	70.3	100.0	204.8	204.8	100.0	166.8	166.8	100.0
	89.9	91.6	91.6	100.0	269.6	269.6	100.0	217.3	217.3	100.0
223	26.3	30.1	29.4	97.7	302.5	160.8	53.2	212.2	135.6	63.9
	36.7	40.8	38.2	93.6	422.2	211.3	50.1	287.4	176.0	61.2
226NE	111.0	159.8	239.2	149.7	888.3	740.9	83.4	775.4	686.1	88.5
	154.9	219.7	323.3	147.1	1239.5	1007.5	81.3	1066.0	927.6	87.0
226SW	68.5	70.9	77.6	103.6	547.9	327.3	59.7	423.1	288.2	68.1
	96.4	103.1	101.6	96.6	771.0	432.6	56.1	582.7	377.5	64.8
227	212.6	252.6	365.7	144.8	956.6	729.0	76.2	777.2	637.7	82.1
	297.2	347.2	490.5	141.3	1337.5	988.8	73.9	1068.1	855.3	80.1
239	18.9	22.2	31.4	141.6	170.2	143.3	84.2	148.7	128.9	86.7
	26.2	30.3	41.8	137.9	235.8	192.5	81.6	203.2	171.4	84.4
302N	61.5	69.3	67.6	97.5	492.1	257.2	52.3	350.3	213.6	61.0
	86.6	95.2	88.8	93.3	692.5	343.0	49.5	481.0	280.6	58.3
302S	40.4	46.3	37.5	81.1	363.7	160.2	44.1	234.6	132.7	56.6
	56.6	62.7	49.2	78.6	509.5	214.4	42.1	317.8	174.2	54.8
382	26.0	31.1	34.4	110.7	221.2	166.2	75.1	170.5	137.5	80.6
	36.5	42.7	45.8	107.2	310.3	224.2	72.2	234.2	182.9	78.1
382RA	52.0	64.1	64.1	100.0	156.1	156.1	100.0	97.3	97.3	100.0
	70.7	83.3	83.3	100.0	212.0	212.0	100.0	126.4	126.4	100.0
383	34.6	39.9	36.3	91.0	242.2	107.1	44.2	171.1	87.9	51.4
	49.0	55.4	47.5	85.9	343.3	142.3	41.4	237.3	115.1	48.5
384	56.2	60.1	62.8	104.5	168.7	153.1	90.8	143.3	133.7	93.3
	76.2	80.3	83.1	103.5	228.7	204.9	89.6	191.3	176.9	92.5

EUF = EUPHOTIC ZONE, EPI = EPILIMNION

% = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN

DAILY AVERAGE PRODUCTION FOR 1979  
ACTUAL/CLOUDLESS WEATHER

LAKE	PRODN MG/M3.DAY					PRODN MG/M2.DAY				
	UNCORRECTED		CORRECTED			UNCORRECTED		CORRECTED		
	EUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%
114	164.6	236.8	236.8	100.0	658.3	658.3	100.0	415.3	415.3	100.0
	223.1	305.0	304.9	100.0	892.3	892.3	100.0	535.1	535.1	100.0
223	38.4	42.0	32.5	77.4	499.3	218.3	43.7	300.9	173.4	57.6
	53.8	57.4	43.8	76.5	699.0	301.1	43.1	410.5	233.8	57.0
226NE	129.4	170.6	216.1	126.7	970.5	795.5	82.0	802.7	707.2	88.1
	177.5	229.9	287.1	124.9	1331.1	1069.6	80.4	1081.7	939.0	86.8
226SW	53.2	59.2	65.5	110.5	441.8	281.2	63.7	342.1	244.1	71.4
	74.0	81.1	88.7	109.4	613.8	386.6	63.0	468.5	330.9	70.6
227	306.8	376.5	560.9	149.0	1227.2	993.6	81.0	1063.1	896.2	84.3
	413.4	501.5	730.0	145.6	1653.8	1305.1	78.9	1416.1	1166.7	82.4
239	29.5	32.7	36.9	113.1	236.0	173.2	73.4	203.5	155.2	77.0
	40.7	44.5	49.2	110.6	325.3	232.9	71.6	274.5	206.6	75.3
382	31.3	37.9	42.4	111.8	281.3	219.7	78.1	213.5	178.6	83.7
	42.8	50.8	55.7	109.7	385.4	294.1	76.3	286.0	234.9	82.1
382RA	54.9	65.3	65.2	100.0	164.7	164.7	100.0	99.0	99.0	100.0
	74.2	84.6	84.6	100.0	222.6	222.6	100.0	128.4	128.4	100.0
383	36.2	48.4	47.1	106.0	271.7	172.4	63.4	195.8	137.7	70.3
	50.1	60.3	63.0	104.5	375.8	234.5	62.4	266.0	184.3	69.3

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
% = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
UNCORRECTED AND CORRECTED REFER TO MORPHOMETRY.  
PRODUCTION IN MILLIGRAMS OF CARBON.

DAILY AVERAGE PRODUCTION FOR 1980  
ACTUAL/CLCUDLESS WEATHER

LAKE	PRODN MG/M3.DAY				PRODN MG/M2.DAY					
	UNCOPRECTED	CORRECTED	UNCOPRECTED	CORRECTED	UNCOPRECTED	CORRECTED	UNCOPRECTED	CORRECTED		
	FUP	EUP	EPI	%	EUP	EPI	%	EUP	EPI	%
114	92.9	120.2	123.1	102.4	371.5	358.5	96.5	210.9	210.4	99.8
	122.9	153.2	153.8	100.4	491.7	476.1	96.8	268.8	267.1	99.4
222	28.6	32.5	36.3	111.8	143.2	103.4	72.2	115.4	90.0	78.0
	39.0	43.7	47.1	108.0	195.2	137.9	70.6	155.1	118.8	76.5
223	46.5	47.4	37.7	79.5	558.6	239.4	42.9	337.0	192.5	57.1
	62.6	62.0	48.2	77.7	750.9	316.6	42.2	440.8	250.2	56.7
226ME	139.8	172.9	210.1	121.5	978.5	780.0	79.7	785.7	694.7	88.4
	186.9	232.6	268.5	115.4	1308.4	1027.5	78.5	1057.1	905.1	85.6
226SW	79.7	89.7	87.9	98.0	637.3	441.3	69.2	506.9	384.5	75.9
	107.5	119.0	132.4	111.2	859.8	579.5	67.4	672.7	499.0	74.2
227	610.7	633.8	904.9	142.8	1832.2	1645.2	89.8	1444.3	1470.3	101.8
	814.3	928.3	1210.5	130.4	2442.8	2192.3	89.7	2115.7	1944.9	91.9
239	28.2	30.5	34.6	113.5	225.5	162.1	71.9	187.9	143.3	76.3
	38.3	40.9	44.7	109.3	306.1	214.8	70.2	252.3	188.2	74.6
302N	42.0	50.4	55.7	110.5	378.0	262.7	69.5	268.9	210.5	78.3
	58.4	68.5	72.8	106.2	525.6	357.2	68.0	365.5	280.9	76.9
302S	46.7	58.1	55.6	95.6	420.4	278.2	66.2	294.9	228.2	77.4
	64.3	78.2	72.7	92.9	578.8	377.8	65.3	396.6	304.7	76.8
304	81.7	94.3	96.5	102.3	367.8	278.3	75.7	273.1	229.2	83.9
	115.1	129.8	129.8	100.0	518.0	384.4	74.2	376.0	311.7	82.9
382	30.8	36.9	42.7	115.6	292.2	203.2	69.5	212.7	164.4	77.3
	41.8	49.1	54.7	111.3	397.1	268.8	67.7	283.1	214.3	75.7
382RA	81.2	95.5	97.0	101.6	243.6	243.6	100.0	144.9	144.9	100.0
	107.0	121.7	121.7	100.0	321.1	321.1	100.0	184.7	184.7	100.0

EUP = EUPHOTIC ZONE, EPI = EPILIMNION  
 % = 100 \* EPILIMNION PRODN / EUPHOTIC ZONE PRODN  
 UNCORRECTED AND CORRECTED REFER TO MORPHOMETRY.  
 PRODUCTION IN MILLIGRAMS OF CARBON.