PRIMARY PRODUCTIVITY BY PHYTOPLANKTON IN THE TIDAL, FRESH POTOMAC RIVER, MARYLAND, MAY 1980 TO AUGUST 1981

By Ronald R. H. Cohen and Sheryl O. Pollock

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Errata: Primary Productivity by Phytoplankton in the tidal fresh Potomac River, Maryland, May 1980 to August 1981. R.R.H. Cohen and S.O. Pollock

Page 18, Table 2 - the units for p_{max} should be changed from

mg O_2 L^{-1} D-1, to O_2 L^{-1} H^{-1} per mg Chlorophyll-a

Page 26, Table 7 - fourth line of legend, "Hallowing is Hollowing Point" should read "Hal is Hallowing Point"

CONTENTS

ILLUSTRATIONS

TABLES

FACTORS FOR CONVERTING INTERNATIONAL SYSTEM OF UNITS (SI) TO INCH-POUND UNITS

Multiply SI unit	By	To obtain inch-pound unit
meter (m)	3.281	foot
kilometer (km)	0.6214	mile
kilometer (km)	0.5400	nautical mile
gram (g)	0.0022	pound
cubic meter per second ($m^3 S^{-1}$)	35.31	cubic foot per second

Concentration Conversions

Constituent	From	To	Divide by
Nitrate	micromoles per liter	milligrams per liter (N)	0.0140
Ammonia	micromoles per liter	milligrams per liter (N)	0.0140
Phosphate	micromoles per liter	milligrams per liter (N)	0.0310

PRIMARY PRODUCTIVITY BY PHYTOPLANKTON IN THE TIDAL, FRESH POTOMAC RIVER, MARYLAND, MAY 1980 TO AUGUST 1981

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ABSTRACT

Primary productivity, the assimilation of carbon and evolution of oxygen by phytoplankton, was measured on samples collected from the tidal Potomac River, Maryland. The studies were performed monthly from May 1980 through September 1981. Additional studies were done once a week in August 1980, twice a week from August 4 through 8, 1980, and twice in September 1980. Depth-integrated samples were collected at five stations and incubated in boxes that were exposed to natural sunlight. The boxes were covered with neutral density filters transmitting 100-, 65-, 32-, 16- and 6-percent surface light. River water was pumped continuously over the samples. The extinction of light in the water column was measured when samples were collected.

Methods for routine productivity analysis were evaluated. No difference was found between productivity (1) determined <u>in-situ</u> and in the boxes; (2) measured in 300-milliliter and 1-liter B.O.D. <u>bottles</u>; (3) measured in point samples and depth integrated samples; and (4) calculated from short term (4 hours) and long term (10-24 hours) incubations. Productivity in samples that were rotated among different light intensities every 15 minutes (simulating mixing) was higher than those in bottles that remained stationary. Respiration was significantly less in samples pumped through a hose from those collected using a depth-integrating sampler.

Depth-integrated primary productivity was determined from the productivity data using an equation modified from one reported in the literature. Depth-integrated gross primary productivity was highest in August 1980 and 1981 and lowest in January 1980.

INTRODUCTION

The tidal Potomac River and Estuary, Md. extends 187 kilometers from above Washington, D.C. at Chain Bridge to the Chesapeake Bay (fig. 1). The tidal, fresh-water reach, approximately 62 km long, has a volume of 3.4 x 10^8 m^3 and receives drainage from the non-tidal Potomac River and metropolitan Washington, D.C. It has an average flow of 310 m^3 sec^{-1} and receives approximately 1.4 x 10^6 m^3 per day of treated waste water from municipal treatment facilities. During the summer, a zone of high phytoplankton concentration extends from river kilometer 180 at Memorial Bridge to kilometer 126 at Quantico, Va., the approximate, late-summer location of the brackish-fresh-water interface (fig. 2).

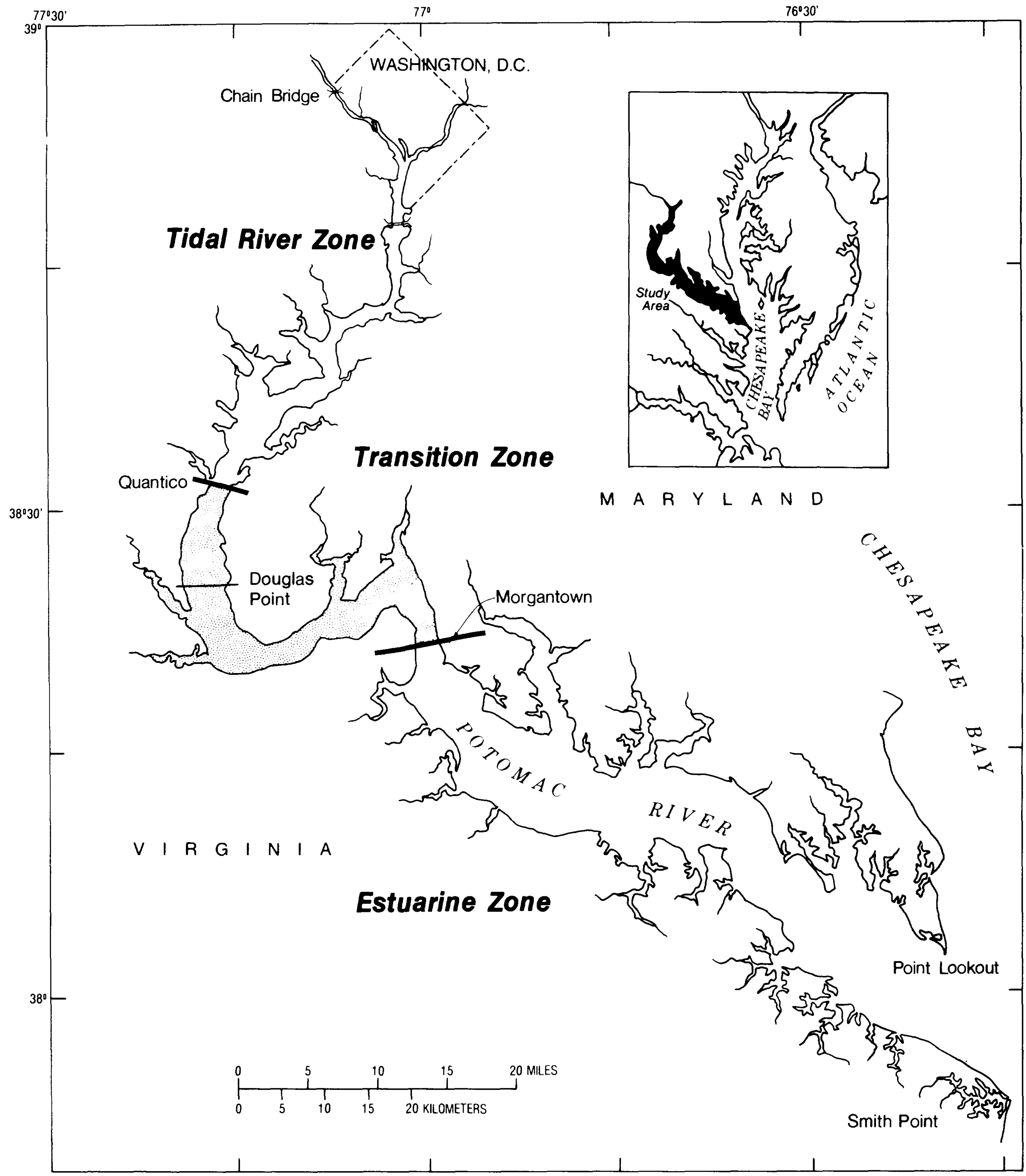

Figure 1.--Tidal Potomac River and Estuary. Shaded area is the transition zone between fresh, tidal river and brackish estuary. Thick lines delineate approximate boundaries of zones.

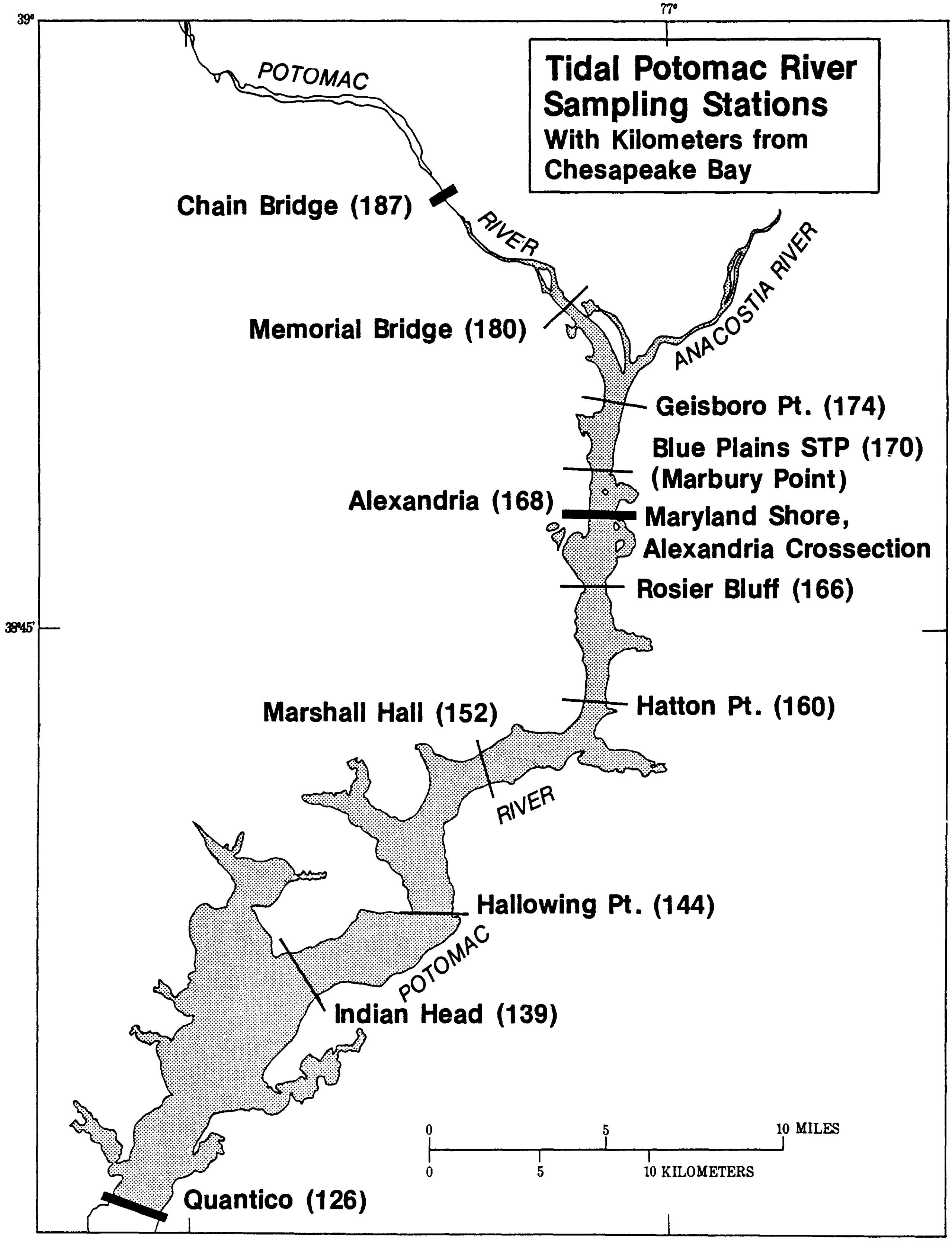

Figure 2.--The fresh, tidal Potomac River. Thick lines identify sites of cross sections that were sampled frequently as part of the Potomac River transport study. The thin lines identify sites of cross sections that were sampled in less detail or in special studies.

Phytoplankton produce organic compounds from inorganic nutrients using light as an energy source. The organic material formed by the phytoplankton is called "primary production" and primary production per unit time per volume of water (or under a unit surface area), is called "primary productivity". The process by which phytoplankton synthesize organic material, photosynthesis, consumes inorganic carbon and releases oxygen. Thus, a measurement of the rate of increase of oxygen in solution due to the phytoplankton is a direct measurement of primary productivity.

Primary productivity measurements can yield valuable information about aquatic ecosystems. The ratio of the moles of carbon dioxide taken up to the moles of oxygen evolved by phytoplankton (the phytosynthetic quotient) is approximately 1.0 (Parsons and others, 1977). Therefore, primary productivity measurements are estimates of the increase of the carbon biomass of phytoplankton--an indication of the rate of growth. The effects of light, temperature, nutrients, and toxins on phytoplankton growth can be determined from primary productivity measurements. The information can be used to estimate the contribution of phytoplankton to the diel dissolved oxygen regimes of aquatic systems.

Sampling stations for productivity analysis or productivity experiments are listed below (with the depth used to calculate depth-integrated productivity) and shown in figure 2. (Potomac River at Douglas Point is shown in fig. 1.) River distances are measured from the center of a line drawn between Smith Point and Point Lookout at the mouth of the Potomac River.

Station number	Station name	River Distance from Chesapeake Bay, in kilometers	Depth, in meters
01652590	Potomac River at Alexandria, Va. (in the channel near the Virginia shoreline)	168	2.2
384736077013300	Potomac River across from Alexandria, Va., near Maryland shoreline	168	2.8
384318077020300	Potomac River at Hatton Point, Md.	160	3.9
384136077054600	Potomac River at Marshall Hall (Mt. Vernon), Va.	152	3.7
383818077072800	Potomac River at Hallowing Point, Va.	144	5.6

Station number	Station name	River Distance from Chesapeake Bay, in kilometers	Depth, in meters
01658710	Potomac River at Quantico, Va.	126	5.8
382640077159900	Potomac River at Douglas Point, Md.	117	3.8

Purpose and Scope

The purpose of this study was to determine primary productivity and respiration of the fresh, tidal Potomac River. The data will be used by the authors and other researchers involved in modelling chemical and biological properties to calculate phytoplankton growth rates. Methods are documented in detail so that the report could serve as a reference.

The report covers the period from May 1980 through August 1981. Five stations were selected for study that are representative of biologically important reaches of the fresh, tidal Potomac River.

Acknowledgements

Joan Woodward performed the chlorophyll a analyses from May 1980 through April 1981. Sheryl O. Pollock performed chlorophyll a analyses from May through September 1981.

METHODS

Measurement of primary productivity poses many problems in methodology (Berman and Eppley, 1974). Some of the difficulties include:

1) Large surface area to volume ratio in bottles offers colonization substrate for bacteria. The bacteria increase respiration rates and remove nutrients from the water.

2) Sedimentation during incubation increases self-shading by phytoplankton.

3) Incubation at fixed depths or light intensities induces inhibition of productivity at high light levels in phytoplankton that are adapted to mixing (Marra, 1978).

4) Pump sampling of phytoplankton may result in cell damage and aberrations in productivity capacity.

5) All difficulties increase with the length of the incubation.

Therefore, several alternative procedures for measuring primary productivity were considered and tested. We examined the differences due to methods of sample collection and the volume, length of time and technique of incubation. The methods chosen for primary productivity measurements were selected on the basis of precision, accuracy, and available resources such as research ships and personnel.

We used a light- and dark-bottle oxygen method for determining phytoplankton productivity similar to that described by Greeson and others (1977). Depth-integrated samples were collected with an open, weighted, 4-liter, polyethylene bottle fitted with a vent tube. The bottle was filled as it was lowered and raised in the water column at a uniform rate. Samples were composited until a 20-liter, polyethylene carboy was filled. At the Quantico station, two verticals were depth integrated and composited. The samples were collected during the evening (between 1700 and 2100 hours) and incubated overnight and throughout the next day, for a total of 24 hours. The first two productivity determinations (May 1980) were performed from dawn to dusk. Dawn to dusk, 4-hour and 2-hour, mid-day productivity incubations have been recommended (Vollenweider, 1965). However, nutrients for nutrient limitation bioassays must be added during the evening to demonstrate any significant stimulation during the next day (Stross, 1980).

In August and September 1980, samples were often supersaturated with oxygen at the time of collection. The 20-liter carboy was shaken until oxygen decreased to saturation concentration. To delay oxygen supersaturation in August and September 1981, oxygen was purged from the carboy by bubbling nitrogen gas through perforated, polyethylene tubes until dissolved oxygen levels were 4-5 mg L^{-1}. In spite of these precautions, oxygen degassing occurred in bottles exposed to full sunlight by 1300 to 1400 hours on some clear days in August and September. As soon as small bubbles were observed in several bottles, dissolved oxygen was measured in all the bottles for that station.

Samples from Alexandria stations were placed in incubation bottles and were incubating typically within 30-45 minutes of sampling. Samples from stations more distant from the incubation site required delays of 1-2 hours. Clear and opaque, black, 300-mL B.O.D. bottles were filled by siphon from the 20-liter bottles. Additional nutrients for bioassays were added to nine bottles. One milliliter of 18.7 millimole ammonium chloride was added to three bottles and 1 milliliter of 4.12 millimole sodium nitrate was added to another three to yield minimum concentrations of 0.02 and 0.01 millimole NH_4 as ammonia, and NO_3 as nitrate, respectively. One milliliter of 0.74 millimole potassium phosphate was added to three bottles such that the concentration of phosphate attained a minimum of 0.002 millimole as PO_4. Prior to incubation, dissolved oxygen was measured in all the bottles with an Orbisphere[1/] polarographic oxygen probe; the B.O.D. bottles were then sealed.

The bottles were placed in 92-cm wide by 122-cm long by 15-cm-high wooden boxes that were placed on a dock (fig. 3). The boxes were filled to overflowing with river water by submersible pumps capable of 0.003 m^3/s. Thus, the bottles were maintained at _in situ_ river temperatures. The boxes

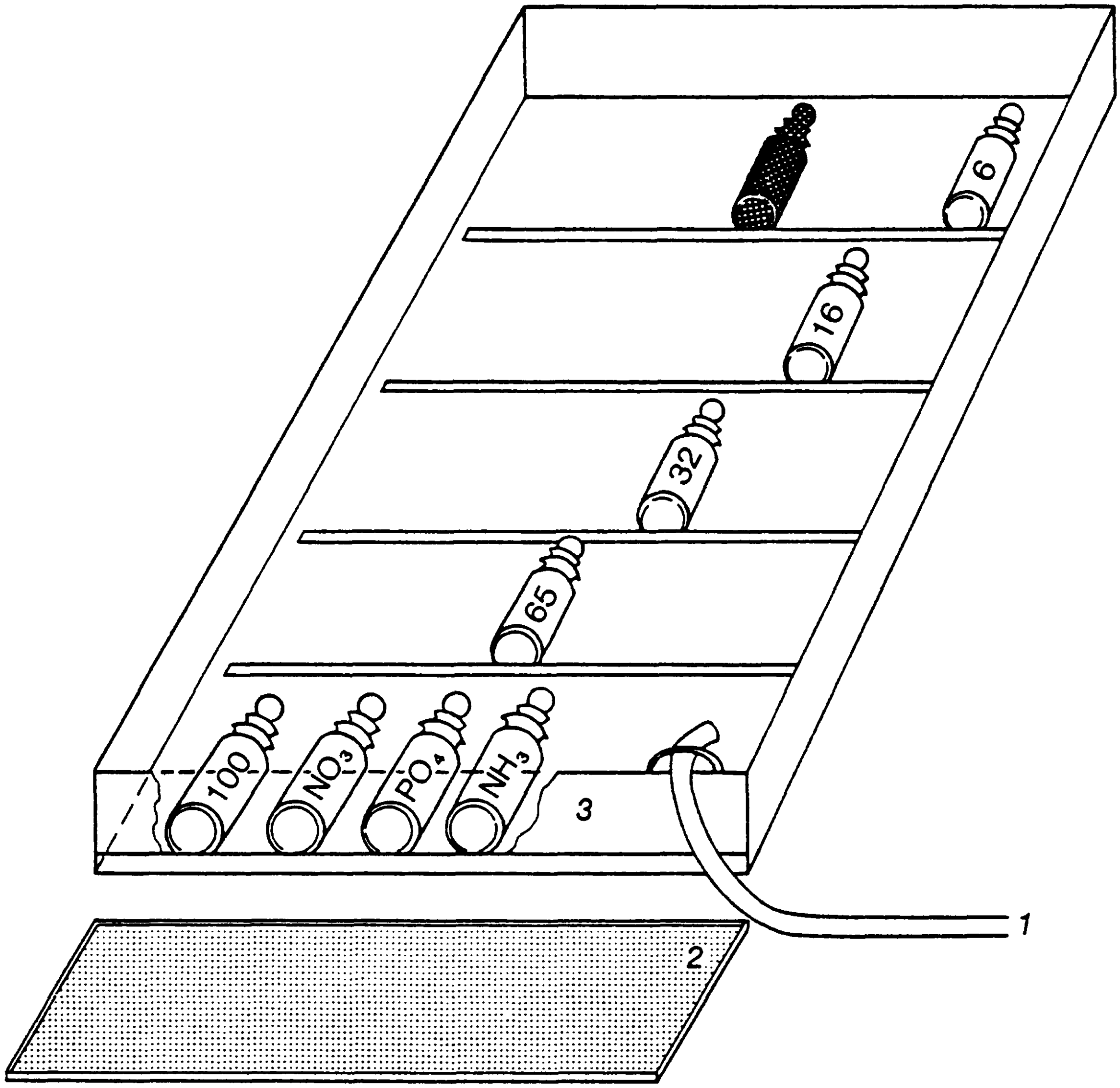

Figure 3.--Diagram of dock-side incubator used for productivity incubations: 1 is a hose from which river water flows into the incubation box; 2 is a nylon-mesh screen; 3 is the incubation box; 100, 65, 32, 16, 6 are the percentages of surface light intensity as regulated by the number of screens; NO_3, PO_4, NH_3 are nitrate-, phosphate- and ammonia-enriched samples incubated under 100 percent light. The dark bottle is incubated under 6 percent light.

were divided into five sections by 2-cm-high partitions. One section was exposed to full, surface sunlight. The other sections were covered by 1, 2, 3, or 5 layers of nylon screen transmitting 65-, 32-, 16-, and 6-percent surface light, respectively.

A black tarpaulin covered the boxes from the beginning of the incubation (in the evening) until just before dawn. Three clear bottles were placed in full sunlight and two were placed in box sections exposed to 65-, 32-, 16-, and 6-percent of full sunlight. Bottles spiked with nutrients were placed in full sunlight. Five black bottles were placed under the five layers of screen. Bottles were shaken and rotated every hour to eliminate artifacts due to settling phytoplankton and sediment. Dissolved oxygen was measured at the end of the incubation. Samples for chlorophyll-a analysis and cell enumeration and indentification were taken at the beginning and end of the incubations. The chlorophyll-a concentrations were reported as averages of those measured at the beginning and end of the incubation.

Assumptions

Oxygen-based primary productivity was calculated from the light- and dark-bottle data. The calculations are based on the following assumptions:

1) Phytoplankton were the only source of oxygen in the sealed light-bottles.

2) Community respiration (bacteria, phytoplankton, and zooplankton) was the only oxygen sink.

3) Phytoplankton respiration was the same in the light and dark bottles. Although studies have suggested that light reduces phytoplankton respiration and increases other forms of phytoplankton oxygen consumption (Harris and Piccinin, 1977), evidence concerning the effect of light on respiration is contradictory.

4) Phytoplankton respiration is constant with depth.

5) Phytoplankton productivity per unit of light in the afternoon is the same as in the morning. Lehman and others (1975) reported that productivity per unit of light in the afternoon is lower than that in the morning. Greeson and others (1977) recommend the use of Vollenweider's method (Vollenweider, 1965) when incubations do not last for the entire dawn to dusk period. The method is based on a plot of "percent cumulative productivity versus time", with sunrise to midday accounting for 56 percent of the daily productivity and midday to sunset representing the other 44 percent for a cloudless day. Cohen and others

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[1]/The mention of brand names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

(1982), Schindler and Fee (1973) and Harris and Lott (1973) have suggested that the depression of productivity in the afternoon relative to the morning is an artifact of the productivity method and is associated with inorganic carbon depletion in bottles sealed from the atmosphere. Therefore, when incubations were terminated approximately at midday due to oxygen supersaturation, primary productivity per day was calculated by assuming that productivity in the afternoon was the same as in the morning. Vollenweider (1965) suggests that reasonable day rate estimates are obtained by assuming a symmetrical daily curve of instantaneous productivity rate. Therefore, partial day incubations were expanded to day rate integrals by assuming that instantaneous productivity followed the positive portion of a sine wave.

Calculations

Primary productivity and related parameters were calculated as follows:

1) $R/HR = R_T / N$

2) $R_D = R/HR \cdot D_H$

3) $GPP/D = (O_A - O_B) + R_T$, if incubation lasted from dawn to dusk.

4) $GPP/H = (GPP/D) / D_H$

5) When incubations were terminated at mid-day, GPP/H was calculated by determining GPP for the half day incubation and dividing by the length of the daylight portion of the incubation:

5a) $GPP/H = ((O_A - O_B) + R_T) / 0.5\ D_H$

5b) $GPP/D = GPP/H \cdot D_H$

6) $NPP/D = GPP/D - R_D$

7) $DBAL = GPP/D - (R/HR \cdot 24)$

where

R/HR = dark bottle respiration, mg O_2 $L^{-1}h^{-1}$;

R_T = total respiration for the entire incubation period, in mg O_2 L^{-1};

N = duration of incubation, in hours;

D_H = hours of day light, in hours;

R_D = respiration during daylight hours, in mg O_2 L^{-1};

GPP/D = gross productivity per day, mg O_2 L^{-1},

O_A = concentration of oxygen at the end of the incubation, in mg O_2 L^{-1};

O_B = concentration of oxygen at the beginning of the incubation, in O_2 mg L^{-1};

GPP/H = gross productivity, in mg O_2 $L^{-1}h^{-1}$;

NPP/D = net primary productivity, in mg O_2 L^{-1} per day;

DBAL = net daily dissolved oxygen balance for a 24-hour period, in mg O_2 L^{-1}.

Alternative Techniques for the Measurement of Primary Productivity

Experiments were performed to select the procedure to measure primary productivity that would minimize artifacts due to collection and incubation techniques. The alternative techniques that were tested are listed below.

1. One-liter B.O.D. bottles were filled with samples and compared with 300 mL bottles to evaluate the effects of volume on primary production. Samples were collected in the Alexandria, Va., channel.

2. Depth-integrated samples were obtained in Alexandria, Va., channel by lowering an opaque rubber hose through the water column while pumping with a plastic-impeller, centrifugal pump. Sample collection through a hose is faster than with a depth-integrating bottle, but organisms may be damaged by the pump or chemicals in the hose material.

3. Dark bottles with water from the Alexandria, Va., channel were incubated in the 100-percent sunlight section of the incubation boxes and in the 6-percent sunlight section and compared. Light may leak into sealed dark bottles through pinhole flaws in the plastic coatings.

4. Point samples were collected at Marbury Point with a horizontal Niskin bottle; the samples were then placed in the incubation boxes at a light intensity equivalent to that at the depth from which the sample was removed. The results were compared to those obtained from depth-integrated samples from the same station.

5. Samples taken from Alexandria were placed in 300-mL B.O.D. bottles and were suspended in the water column at depths equivalent to the following light intensities: approximately 100-percent surface light (immersed just below the water surface); 65; 30; 16; and 6-percent light intensity, and were compared to similar samples in the incubation boxes.

6. Samples from Alexandria were incubated from 1100 to 1500 hours; daily productivity then was calculated by the method of Vollenweider (1965). The results were compared to those from all-day (10-hour) incubations.

7. Dye-tracer studies suggest that the fresh, tidal Potomac River, from Alexandria to Hallowing Point, mixes top to bottom in one hour or less (W. E. Webb, U.S. Geol. Survey, personal commun.). To duplicate this mixing pattern, samples from Marshall Hall were moved from one light intensity in the incubation boxes to the next, consecutive intensity such that they were mixed from 100-percent to 6-percent light in one hour and back to 100-percent in the next hour. The pattern was repeated dawn to dusk.

Measurement of Downwelling Irradiation

The extinction of light in the water column was determined by measuring sunlight on the surface with the air-calibrated setting of a quantum sensor and then measuring the depth of 1-percent light with a water calibrated setting. The depth of 1-percent light is considered the limit of the photic zone, the zone at which productivity exceeds respiration (Parsons and others, 1977).

The extinction coefficient, k, was determined from the Beer-Lambert-Bouger law:

$$I = I_0 e^{-k_I z} \qquad (8)$$

where
z = depth, in meters
I = light at depth z, in μeinsteins $m^{-2}sec^{-1}$
I_0 = surface light, in μeinsteins $m^{-2}sec^{-1}$
k_I = extinction coefficient, m^{-1}

A Secchi depth was determined in conjunction with every extinction coefficient measurement. Secchi depth is the depth at which brightness due to scattering of light is the same as the brightness of light reflected from a Secchi disc.

Secchi depth does not yield an accurate extinction coefficient because scattering of light is related in a complex, non-linear manner to the number and size of suspended particles and to the depth at which light penetrates through the water column. The Secchi depth, however, can be a valuable source of information concerning turbidity and can be calibrated against measurements taken with a light meter. When light measurements were not available, the extinction coefficients were calculated as follows:

$$k_I = \frac{1.7}{D_s} \qquad (9)$$

where D_s = Secchi depth in meters (Idso and Gilbert, 1974). The extinction coefficient calculated using the Secchi depth tended to be 0.6 m^{-1} higher than that determined using the quantum light sensor (fig. 4). The coefficients determined from Secchi depth are marked with an asterisk in table 1. When more than one depth of 1-percent light or secchi depth was deter-

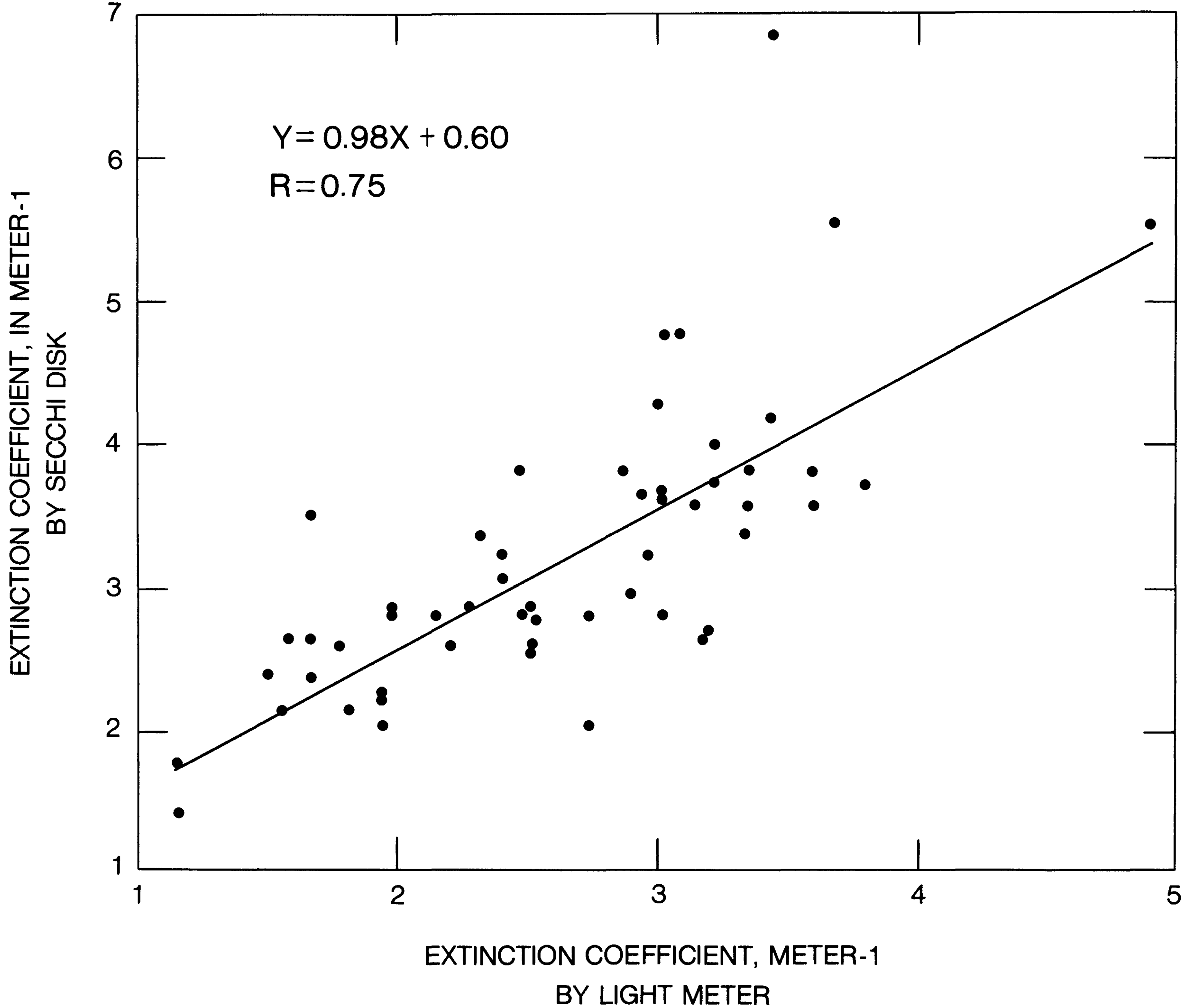

Figure 4. Graph showing the relationship of extinction coefficients calculated from Secchi depth, y, to those determined using a light meter that measures light in radiation band that is useful for photosynthesis, x. Units are in inverse meters. The regression equation of best fit is $y = 0.98x + 0.60$, $r = 0.75$.

Table 1.--Solar radiation extinction coefficients, (k), in the water column.

At Alexandria, Virginia (Al VA); Alexandria, Maryland channel (Al MD); Hatton Point (Hatton); Hallowing Point (Hal); Mount Vernon (MtV); Quantico (Q); and Douglas Point (Dg) stations.

Extinction coefficients were determined using quantum sensor measurements of the depth of 1 percent light except where marked: * = k determined by secchi disc; t = k determined by quantum sensor measurements of depth of 50 percent light.

	Extinction Coefficients at, k, Stations						
Productivity Dates	Al VA	Al MD	Hatton	Hal	MtV	Dg	Q
1980							
05/22	-2.52	-2.33*	----	----	-3.70*	----	----
05/29	----	----	----	----	----	-2.30*	-3.70*
06/23-06/24	-2.52	-3.04*	----	----	-2.66*	----	----
06/25-06/26	----	----	----	----	----	-2.65*	-2.79*
07/23-07/24	-2.74	-3.21*	-2.02*	-3.66*	----	----	----
07/29-07/30	-2.53	-2.53	-2.83*	-5.31*	----	----	----
08/04-08/05	-2.33	-3.15	-2.21	-3.36	----	----	----
08/07-08/08	-1.99	-2.48	-1.95	-3.03	----	----	----
08/13-08/14	-3.34	-2.41	-2.41	-3.61	----	----	----
08/20-08/21	-3.20	-3.36	-1.59	-3.01	----	----	----
08/25-08/26	-3.22	-1.68	-1.68	-3.52*	----	----	----
09/03-09/04	-2.43*	-2.35*	-1.68	-3.02	----	----	----
09/15-09/16	-2.94*	-1.99	-2.52	-3.36	----	----	----
11/18-11/19	-2.58*	----	-1.57	-2.36*	----	----	-1.38
12/16-12/17	-1.82	-1.51	-2.28	-2.95	----	----	-2.30*
1981							
02/04-02/05	-1.16	-1.16	-1.18*	-2.54*	----	----	-1.16
04/01-04/02	-2.58*	-3.04*	-4.72*	-6.78*	----	----	-3.54*
04/15-04/16	-3.68	-3.44*	-3.09	-3.44	----	----	----
05/19-05/20	-2.52	-2.52	-2.48	-3.60	----	----	-4.90
06/30-07/01	-3.03	-2.74	-2.88	-3.22	----	----	-3.81
07/08-07/09	-2.43*	-2.16	-1.78	-2.97	----	----	-4.15*
07/20-07/21	-1.33t	-3.03	-1.95	-3.62*	----	----	-3.21*
08/03-08/04	-3.52	----	----	----	----	----	----
08/19-08/20	-2.79*	-2.78*	-1.95	-2.98*	----	----	----
08/25-08/26	-2.90	----	----	----	----	----	----

mined during a single day, those determined closest to the time of sample collection were averaged. All Secchi depths used were reported in Blanchard and others (1982).

The extinction coefficients permit the calculation of a depth in the water column equivalent to a percentage of surface light. The depth of 60 percent of surface light is 0.17 meter if $k_I = 3.0$. Thus, the percentage of surface light in the productivity boxes can be converted to an equivalent depth.

Calculation of Depth-integrated Productivity

Gross productivity under a unit surface area of a water body can be calculated by integrating productivity from the surface to the bottom of the water column

$$\int_0^z P dz \qquad (10)$$

where

z = depth, in meters
P = gross primary productivity, in units of oxygen evolved or carbon produced per unit volume per unit time.

The data required for the calculation are the gross productivities at several depths and the depth of the representative water column. The depths used were 2.2, 2.8, 3.9, and 5.6 meters at the Alexandria, Va., Maryland Channel, Hatton Point, and Hallowing Point Stations, respectively.

The percentage of surface light in the productivity boxes was converted to an equivalent depth with the extinction coefficient. The depth of one percent light is considered the compensation depth, the depth at which gross productivity equals respiration (Parsons and others, 1977). Respiration is assumed to be constant with depth. A graph of productivity and respiration with depth is shown in figure 5. In figure 5, GPP is the area under the gross productivity curve, R is the area under respiration curve, and GPP minus R is net productivity per square meter.

There are several ways to calculate the area under the gross productivity curve. The curve can be integrated numerically, measured on graph paper or approximated by empirical equations that are reported in the literature (Talling, 1957).

The same three data sets were analyzed by the three different techniques. First, a function that describes the productivity-depth relationship was obtained using a third degree polynomial. The areas were calculated by integrating the polynomial by Gaussian quadrature.

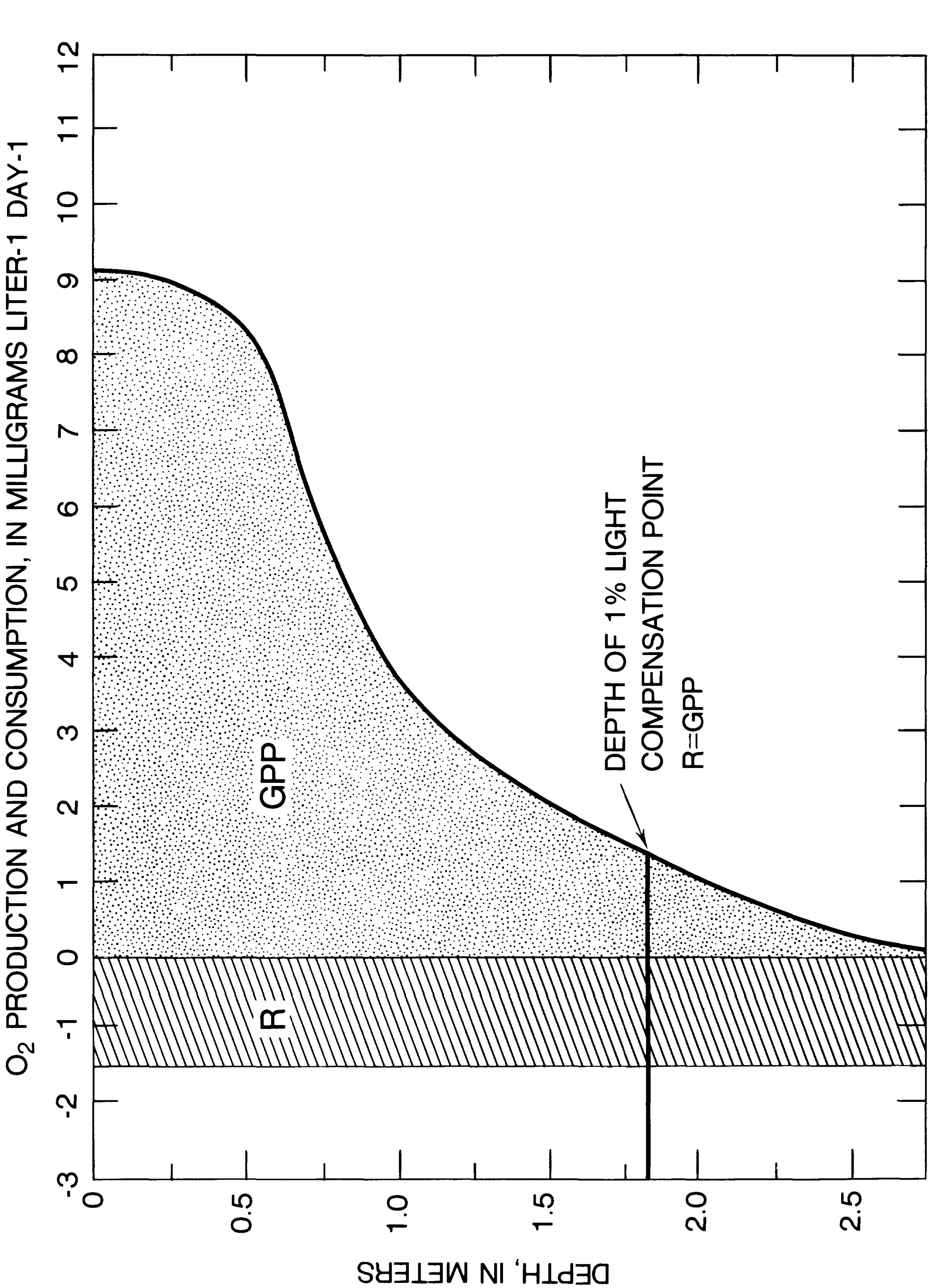

Figure 5.--Examples of gross primary productivity, GPP, and respiration, R, as a function of depth.

Second, two equations were tested. One equation was derived by Talling (1957). The other was Talling's equation modified by the authors of this paper. Talling's method uses the equation

$$\int_0^H P dz = \frac{P_{max}}{1.33\ k_I} \left(\ln \frac{I_o}{0.5\ I_k}\right) \qquad (11)$$

where

P = productivity, g O_2 m^{-3} day^{-1}
z = depth, m
P_{max} = maximum rate of photosynthesis in the water column g O_2 m^{-3} day^{-1}
k_I = water column extinction coefficient, m^{-1}
I_o = surface light intensity, μ einsteins $m^{-2}sec^{-1}$
I_k = value of light intensity at which the tangent to the linear part of P versus I curve reaches a line drawn at P_{max} (Figure 6).
H = the limit of integration

The parameter P_{max} for equation (11) must be determined using the equation that describes the relationship of productivity to light intensity

$$P = P_{max} \frac{I}{I + K_m} \qquad (12)$$

where

I = light intensity, μeinsteins m^{-2} per day
K_m = light intensity at which $P = 0.5\ P_{max}$.

A nonlinear least-squares parameter-estimation technique (Bard, 1974) was used to fit the productivity-light equation to each productivity experiiment and to estimate P_{max}. In addition to P_{max}, the half-saturation constant, K_m, is also obtained. Figure 6 shows the typical relationship of P to I. Table 2 lists values of P_{max} and K_m determined for each station and date on which a productivity measurement was made. Talling's parameter, I_k, is determined by drawing a line tangent to the initial, linear part of the P versus I curve and observing where the line intercepts P_{max} (fig. 6). We calculated depth-integrated primary productivity using Talling's equation.

Talling's parameter, I_k, is difficult to determine accurately because the slope of the initial part of the P versus I graph is determined by visual inspection (Talling, 1957). The slope, however, can be calculated as the ratio of P_{max} to K_m in which case $I_k = K_m$. The parameters K_m and P_{max} can be determined from equation (12). The values of I_k obtained by graphical solution were compared K_m calculated by equation (12) for ten sets of data which yield a value of $K_m/I_k = 0.59$ (Standard Deviation = 0.12).

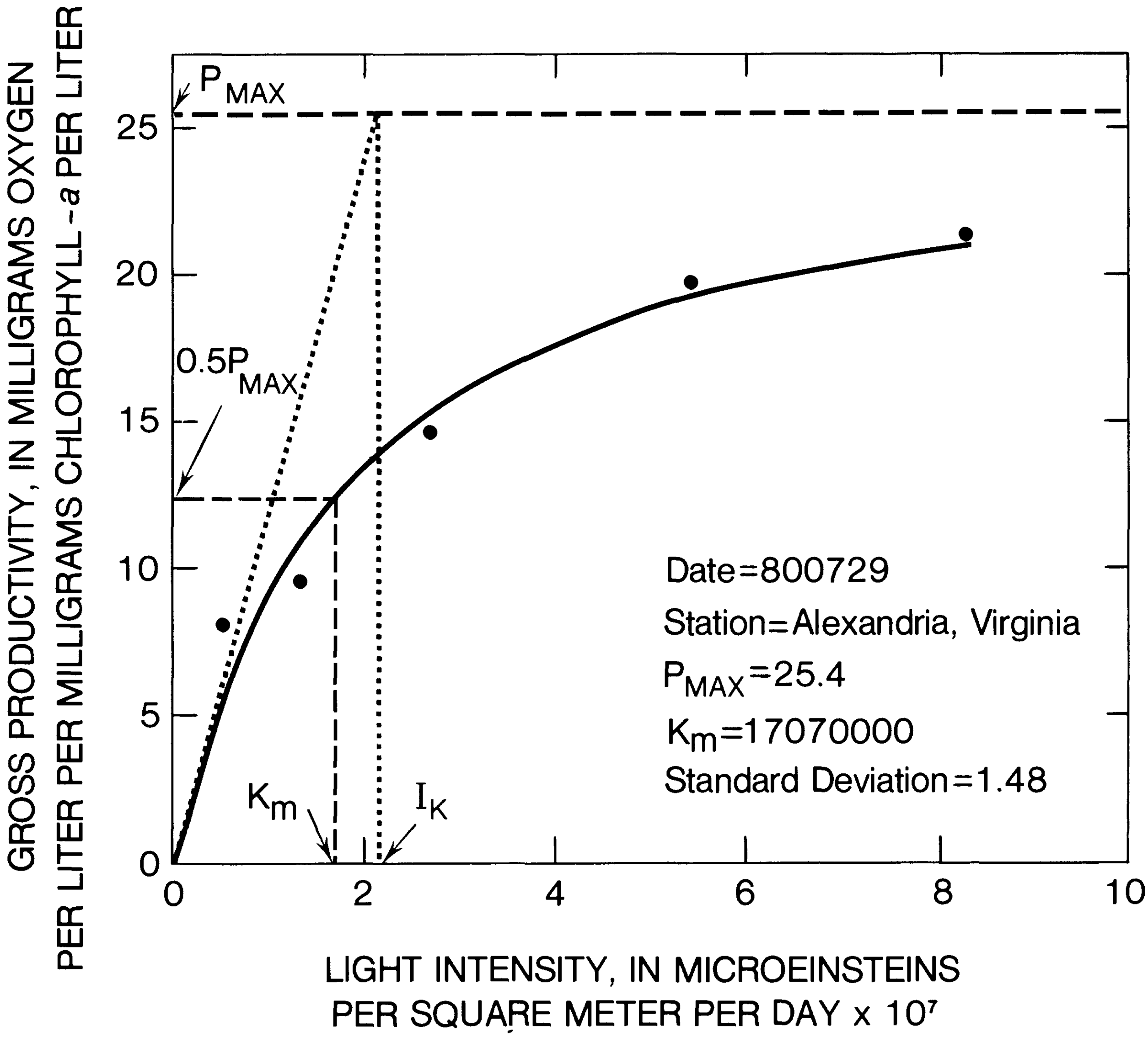

Figure 6.--Graph of gross primary productivity, in milligrams of oxygen per liter per day, as a function of light intensity, in microeinsteins per square meter per second. [P_{max} = maximum productivity, K_m = half-saturation constant, I_k = Talling's parameter. Solid circles are measured data; solid line is the best non-linear, least-squares fit to the data. Horizontal, dashed line is level of P_{max}.----. represents line used to determine Talling's I_k.]

Table 2.--The maximum rate of primary productivity, P_{max} in mg O_2 L^{-1} D^{-1}, and the half-saturation constant, K_m in μeinstein's m^{-2} s^{-1}, in the fresh, tidal Potomac River, Md. One einstein = 6.02 x 10^{23} quanta of photons ≈ 52 x 10^3 gram calorie.

The stations are Al VA, Alexandria, VA. Al MD, Alexandria, Va. near the Maryland shore. Hatton, Hatton Point, Md. Hal, Hallowing Point, Va; and Quantico, Quantico, Va. An einstein, as used in this table, is equal to 6.02 x 10^{23} quanta or approximately 2.2 x 10^5 joules.

	Productivity									
Date of incubation	Al VA		Al MD		Hatton		Hal		Quantico	
	P_{max}	K_m	P_{max}	K_m	P_{max}	K_m	P_{max}	K_m		
1980										
5/22	11.50	0.76	6.40	0.28	----	----	----	----	----	----
5/29	----	----	----	----	----	----	----	----	21.66	2.39
6/23-6/24	13.37	5.34	10.03	1.61	----	----	----	----	----	----
6/25-6/26	----	----	----	----	----	----	----	----	9.61	0.29
7/23-7/24	11.31	.90	13.88	4.18	11.21	3.16	12.83	2.25	----	----
7/29-7/30	25.40	1.71	19.91	.65	22.47	1.17	13.42	0.54	----	----
8/4-8/5	29.31	1.60	21.18	.95	26.36	1.03	16.69	.77	----	----
8/7-8/8	27.99	1.84	23.29	2.03	25.56	1.51	11.48	1.26	----	----
8/13-8/14	24.63	2.43	24.11	1.75	22.43	1.17	12.91	.73	----	----
8/20-8/21	43.77	6.52	16.43	1.62	15.14	0.87	14.20	1.35	----	----
8/25-8/26	22.57	1.44	26.57	1.46	26.50	.87	18.24	.85	----	----
9/3-9/4	33.10	3.13	22.79	1.89	36.96	3.21	15.81	.98	----	----
9/15-9/16	39.70	4.05	28.50	3.87	22.72	2.12	14.86	1.67	----	----
11/18-11/19	1.88	.06	----	----	8.23	.58	5.58	.24	3.81	.24
12/16-12/17	9.97	.16	5.11	.18	8.24	.13	17.54	5.56	3.29	.16
1981										
2/4-2/5	9.79	2.02	7.64	.48	3.61	.18	4.59	.61	12.34	.13
4/1-4/2	10.52	.55	10.88	.31	10.20	.24	14.13	.42	12.64	.10
4/15-4/16	10.30	5.45	11.69	.54	12.03	5.82	10.88	4.69	----	----
5/19-5/20	10.56	.97	12.40	.84	12.40	2.90	7.09	.93	4.81	.69
6/30-7/1	14.66	3.59	17.59	5.20	12.95	7.33	9.84	7.90	8.11	.69
7/8-7/9	21.84	2.17	14.21	1.66	19.22	5.64	10.55	.81	15.15	3.13
7/20-7/21	6.79	1.39	7.87	1.47	8.97	1.77	13.76	3.38	18.28	2.99
8/3-8/4	17.36	3.84	----	----	----	----	----	----	----	----
8/19-8/20	7.68	2.38	13.0	3.25	8.72	1.61	10.62	1.88	----	----

Talling used the coefficient 1.33 in equation (11) to approximate phytosynthetically active radiation (PAR) from measurements made with a thermopile (Talling, 1957). We measured PAR and did not need the coefficient 1.33. Therefore, the equation for depth-integrated primary productivity becomes

$$\int_{0}^{H} Pdz = \frac{P_{max}}{k_I} \left(\ln \frac{I_o}{0.85\ K_m} \right) \qquad (13)$$

The results obtained from equation 13 were compared to those calculated from Talling's equation.

Gross productivity data also were plotted as a function of depth on linear axes. A curve was drawn through the data points so that the area under the curve could be measured. Area was estimated by counting grid blocks. The results of the graphical determinations were used as a standard to judge the Talling and modified Talling integration methods.

RESULTS AND DISCUSSION

Experimental design

The hypothesis that "gross primary productivity and respiration determined using 300-mL B.O.D. bottles was the same as those in 1-liter bottles" was accepted at the 5-percent significance level (table 4). Primary productivity in depth-integrated samples pumped through a hose was the same as productivity in samples collected with a polyethelene bottle (5-percent significance) (table 3). Respiration in samples taken by pump and hose, however, was significantly lower than that in samples collected with the depth-integrating bottle (5-percent significance) (table 3). The reduction in respiration due to pumping has been observed in B.O.D. experiments (W. E. Webb, personal commun., 1981). Respiration measured in dark bottles that were exposed to full sunlight was less than respiration in bottles shielded from full sunlight (5-percent significance) (table 3). The results suggest that black plastic coatings and black paint may pass light through small holes or flaws in the coatings.

Productivities determined from depth-integrated samples that were incubated at 16-percent and 6-percent light were the same as productivities in point samples collected at 1.5 meter (16-percent light) and 2.1 meter (6-percent light) and incubated in 16- and 6-percent light (5-percent significance) (table 4). Depth-integrated samples yielded higher productivity measurements than those in point samples taken from and incubated at light intensities equivalent to the surface and at 0.6 meter and 0.9 meter. Bottles incubated in the water column were not significantly different from those in the incubation boxes at the 100-, 65-, and 16-percent light intensities, but were significantly different at 32-percent light (5-percent significance level) (table 3).

Table 3.--Productivity measurements of samples collected through a hose and on pump, and by samples incubated in place compared to samples collected with a depth-integrating bottle and incubated in an incubation box.

[Respiration in dark (plastic-coated) bottles exposed to full surface sunlight is compared to respiration in dark bottles exposed to 6 percent light. Mean productivity of samples mixed through five light intensities is compared to mean productivity of samples remaining under each of five light intensities for the whole incubation. DI = depth integrated, standard deviation and number of tests are in parentheses. Measurements are in milligram O_2 $Liter^{-1}$ Day^{-1}]

Light Intensity, percent of surface	Productivity: 300-milliliter, 10-hour DI-protected dark bottles	Pump-hose samples	Unprotected dark bottles	Incubation in place	Depth integrated, stationary bottles	Mixed bottles
Surface	3.91 (0.62,3)	3.48 (0.58,3)		4.02 (0.14,3)		
65%	3.11 (1.17,2)			2.74 (0.11,3)		
32%	2.64 (0.14,2)			1.65 (0.04,2)		
16%	1.9 (0.14,2)			1.19 (0.06,2)		
6%	0.76 (0.04,2)					
0	-0.24 (0.02,3)	-0.18 (0.03,3)	- 0.07 (0.03,5)	-0.21 (0.03,2)	4.12	6.21

Table 4.--Productivity of samples incubated in 300-milliliter bottles compared to 1-liter bottles, point samples compared to depth-integrated samples, and samples incubated for 10-hours compared to 4-hours (and converted to dawn to dusk values by Vollenweider's method).

DI = depth-integrated. Standard deviation and number of tests are in parenthesis. Measurements are in milligram O_2 $Liter^{-1}$ Day^{-1}

	Productivity					
Light Intensity, percent of surface	300-milliliter DI	vs 1-liter DI	Point Samples	DI Samples	4-hour incubation	10-hour incubation
Surface	7.11 (0.39,4)	7.22 (0.58,9)	8.33 (0.29,3)	10.22 (0.06,3)	5.7 (0.14,3)	5.29 (0.62,3)
65%			7.14 (0.49,3)	8.95 (0.43,3)		
32%			5.88 (0.23,3)	7.40 (0.29,3)	5.4 (0.21,2)	4.67 (0.14,2)
16%	2.00 (0.38,2)	1.90 (0.14,2)	4.37 (1.28,3)	4.67 (0.22,3)	4.95(,1)	3.85 (0.14,2)
6%			0.77 (0.26,3)	0.98 (0.17,3)		

The 4 hour incubation, 1100 to 1500 hours, yielded estimates of productivity calculated by the method of Vollenweider (1965) equal to the estimates from 10-hour incubation (5-percent significance level) (table 4).

Productivity bottles that were moved from 100-percent to 6-percent light and back to 100-percent light in two hours, had depth-integrated water column productivities that were higher than those found with stationary bottles (table 3).

We chose to incubate depth-integrated samples for primary productivity determinations in 300-mL B.O.D. bottles that were placed in incubation boxes and were kept at ambient temperatures. Although nylon-mesh neutral-density screens do not change the spectral distribution of light as does the extinction of light in a water column, most incubation-box determinations of productivity were not significantly different than those done in the water column. Because one liter bottles offered no advantages for productivity measurements, required greater sample volumes, and were inconveniently large, they were not used. Samples collected through an opaque hose suppressed respiration. Therefore, all samples were collected with a depth-integrating bottle. The data suggest that there may have been photosynthesis in dark bottles exposed to bright sunlight. For additional accuracy of respiration measurements, dark B.O.D. bottles were shielded from bright sunlight. The fresh, tidal Potomac River from Alexandria to Hallowing Point can be considered well mixed. Thus, point samples offered no advantage over depth-integrated samples and were more time consuming to collect. Moreover, depth-integrated samples are considered to be more representative of a well mixed system.

The procedure that was selected to measure primary productivity is shown in the flow-chart in figure 7. Samples were collected in the evening and returned to a dockside laboratory at Alexandria, Va. for processing. Light extinction was measured at each station at the time of sample collection. Dockside incubation did not require boat time necessary for water column incubations. Chlorophyll-a samples were taken from the well-mixed 20-liter sample bottles. Samples were placed in 300-mL bottles, nutrients were added to test for nutrient limitation, dissolved oxygen was measured and the bottles were sealed and placed in the incubation boxes. The phytoplankton and suspended sediment were dispersed by rotating the bottles every hour during incubation. The incubations were terminated at dusk or at midday if degassing was obvious. Dissolved oxygen was measured in, and a chlorophyll sample was taken from each bottle. Gross and net primary productivity and respiration were calculated. The productivity-light relationship (equation (12)) was used to estimate P_{max} and K_m. Depth-integrated productivity was calculated with the modified Talling equation (13).

Productivity studies were performed monthly, from May 1980 to September 1981, several times in August, twice in September 1980, and twice during the week of August 4, 1980. The results of these efforts are presented in table 6 (in the back of the report).

The standard error of the mean for the method used for routine productivity measurements was 0.22 mg O_2 L^{-1} day^{-1} for a 24 hour experiment (n=8).

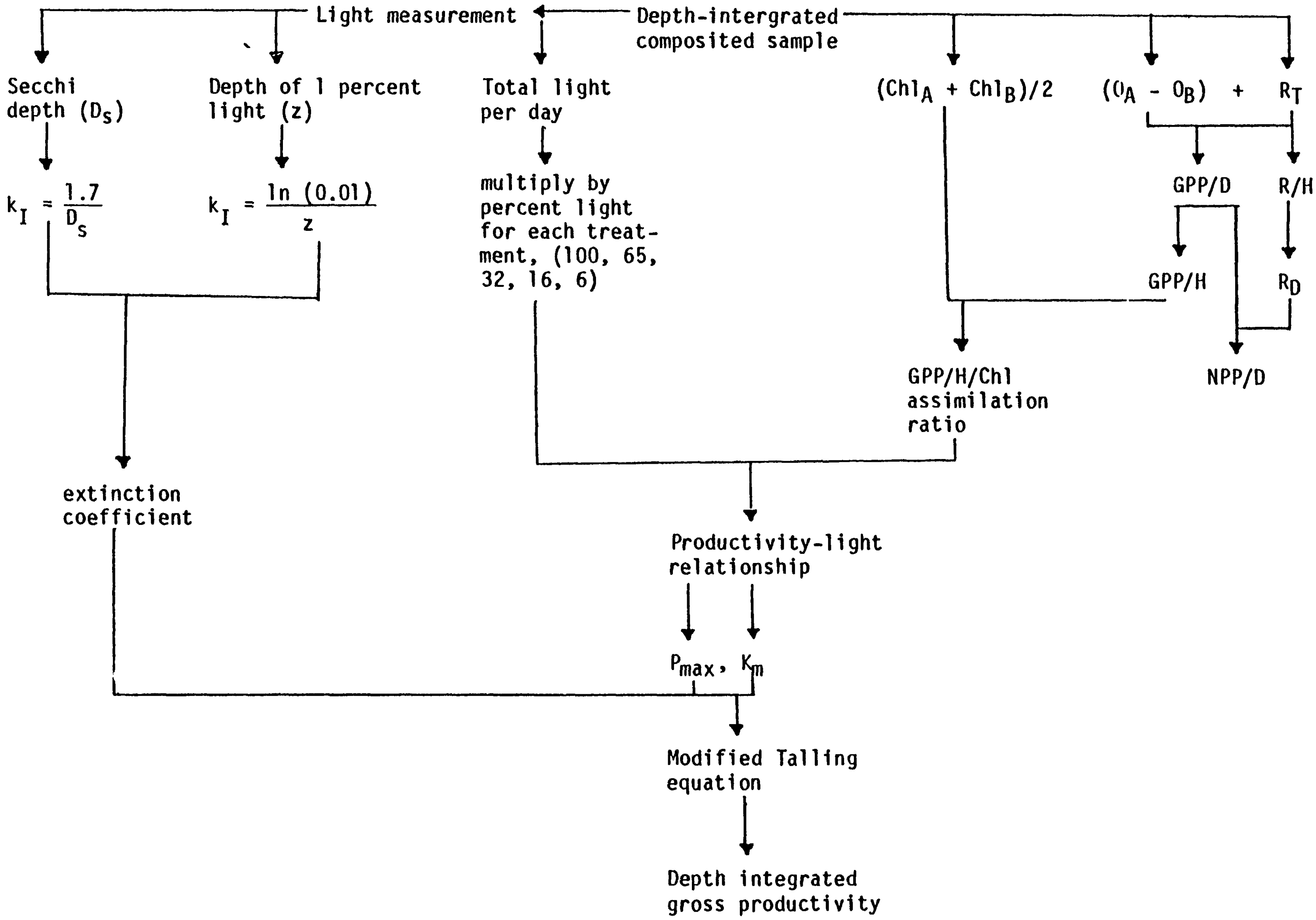

Figure 7. Flow-chart for the measurement and calculation of primary productivity. [Chl_A, Chl_B = chlorophyll after and before incubation; D_s is Secchi depth; k_I is extinction coefficient of light; z is depth, P_{max} is the maximum rate of productivity; K_m is the half-saturation constant for light; GPP is gross primary productivity; H is hours; O_A is oxygen measured after incubation; O_B is oxygen before incubation; R_T is total respiration for the incubation period; R is respiration; R_D is respiration for a 24-hour period; NPP is net primary productivity.]

Table 5.--Depth-integrated gross primary productivity, determined by the graphical method (1), numeric integration (2), Talling's method (3) and the modified Talling method (4).

[Measurements in milligrams O_2 per square meter per day]

		Gross Productivity			
Date	Station	1	2	3	4
7/29/80	Alexandria, Va.	9.7	10.77	7.02	9.41
8/7/80	Alexandria, Va.	18.02	19.11	14.8	16.84
8/13/80	Hatton Point	23.62		12.6	18.78
5/19/81	Hallowing Point	1.66		1.23	1.73
7/8/81	Alexandria, Va.	8.82	10.94	6.57	8.92

With a mean gross productivity of 6.90 mg O_2 L^{-1} per day, there is a 95 percent probability that the population mean lies between 7.32 and 6.48 mg O_2 L^{-1} per day. The standard error of the mean for the oxygen probe used for all but one of the experiments was 0.022 mg O_2 L^{-1} at a mean dissolved oxygen level of 9.93 mg O_2 L^{-1} (n = 39). The standard error of the mean for chlorophyll-a measurements was 0.15 µg L^{-1} when the mean concentration was 62.9 µg L^{-1} (n=5).

Depth-Integrated Productivity

The use of the modified "Talling" equation (Talling, 1957) yielded depth-integrated productivities that were within 7 percent of the results obtained graphically for four out of five cases and was within 20 percent in one case (table 5). Talling's unmodified equation (Talling, 1957) yielded results that differed as much as 32 percent from graphically determined values.

The "modified Talling" method was used to calculate depth-integrated gross primary productivity for each station and date. The method gives results very close to those determined graphically and utilizes parameters, P_{max} and K_m, that are biologically meaningful. Thus, the equation can be used for predictive purposes by using experimentally determined or literature parameters. The depth-integrated productivities for each station and date are reported in table 7.

Table 7.--Depth-integrated primary productivity in the tidal, fresh Potomac River, Md.

Stations are Al VA is Alexandria, VA; Al MD is Alexandria, VA next to the Maryland shore; Hatton is Hatton Point, MD; Hallowing is Hallowing Point, VA; Quantico is Quantico, VA.. GPP = gross primary productivity, RESP = respiration, both in O_2 g m^{-2}

Productivity Dates	Al VA		Al MD		Hatton		Hal		Quantico	
1980	GPP	RESP	GPP	RESP	GPP	RESP	GPP	RESP	GPP	RESP
05/22	9.48	7.68	7.80	2.86	----	----	----	----	----	----
05/29	----	----	----	----	----	----	----	----	6.81	3.43
06/23-06/24	1.87	1.43	4.15	5.71	----	----	----	----	----	----
06/25-06/26	----	----	----	----	----	----	----	----	7.32	5.71
07/23-07/24	7.34	9.99	2.68	4.00	4.04	14.28	3.44	9.04	----	----
07/29-07/30	11.91	8.57	15.09	6.28	11.47	11.42	5.18	9.04	----	----
08/04-08/05	15.16	12.85	10.76	9.14	18.34	11.42	8.75	12.57	----	----
08/06-08/07	18.67	12.85	11.77	7.43	19.34	11.42	6.11	5.71	----	----
08/13-08/14	7.85	7.14	13.12	7.43	15.06	11.42	7.04	6.85	----	----
08/20-08/21	6.45	5.71	2.81	3.43	9.96	8.57	3.36	5.71	----	----
08/25-08/26	9.07	4.28	20.31	2.29	26.36	8.57	8.15	9.04	----	----
09/03-09/04	5.38	5.71	7.03	5.71	12.81	0	7.72	6.85	----	----
09/15-09/16	5.53	5.71	6.56	4.52	8.21	14.28	4.82	10.28	----	----
11/18-11/19	2.60	1.14	----	----	9.69	0	5.92	0	6.96	1.14
12/16-12/17	15.45	2.85	9.35	1.14	10.75	2.85	0.97	2.29	4.08	1.14
1981										
02/04-02/05	8.45	1.43	13.70	0.57	8.69	2.86	3.43	1.14	32.39	3.43
04/01-04/02	6.57	2.86	7.29	1.71	4.82	8.57	3.78	3.43	10.40	2.29
04/15-04/16	1.14	4.28	7.31	2.29	1.40	8.57	1.65	4.57	----	----
05/19-05/20	6.66	2.86	8.37	1.71	3.83	5.71	3.19	3.43	1.83	3.43
06/30-07/01	3.00	2.86	2.19	2.29	0.38	5.71	0.08	4.57	3.98	11.42
07/08-07/09	10.81	7.14	9.24	5.14	5.24	8.57	6.90	2.29	3.39	4.57
07/20-07/21	6.99	12.85	3.45	8.00	5.47	17.14	2.67	5.71	4.61	5.71
08/03-08/04	3.18	12.85	----	----	----	----	----	----	----	----
08/19-08/20	2.07	11.31	2.42	5.71	4.67	25.70	3.31	8.00	----	----
08/25-08/26	3.03	11.31	----	----	----	----	----	----	----	----

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Table 6.--A list of the productivity and chlorophyll-a data from May 1980 to September 1981. The terms are defined in the text. Data for 100 percent light and nutrient addition experiments are an average of three tests. All other productivities are an average of two tests. NO represents the nitrate, NH the ammonia and PO the phosphate additions. Time is based on a 24 hour clock.

ALEX MD
BEGINNING DATE 800723 YEAR MONTH DAY
SUNRISE 550 SUNSET 2022 IN MILITARY HOURS
TIMEIN 1900 800723 TIMEOUT 2000 800724 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.5E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	15.18	0.07	126.5	1.19	17.25	16.30	15.68	8.86	9.38
65	13.21	0.07	126.5	1.05	15.22	14.28	13.66	7.77	8.28
32	11.00	0.07	126.5	0.89	12.96	12.01	11.39	6.53	7.05
16	2.94	0.07	126.5	0.32	4.69	3.74	3.12	2.03	2.55
6	1.20	0.07	126.5	0.20	2.90	1.96	1.34	1.06	1.58
NO 100	9.89	0.08	126.5	0.84	12.26	11.06	10.28	6.02	6.67
NH 100	14.57	0.08	126.5	1.17	17.05	15.86	15.08	8.63	9.27
PO 100	15.79	0.08	126.5	1.26	18.33	17.12	16.34	9.31	9.97

ALEX MD
BEGINNING DATE 800729 YEAR MONTH DAY
SUNRISE 555 SUNSET 2017 IN MILITARY HOURS
TIMEIN 1830 800729 TIMEOUT 1545 800730 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.3E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	11.33	0.11	69.8	1.39	19.90	18.35	17.31	18.31	19.86
65	10.41	0.11	73.0	1.29	18.55	17.01	15.97	16.22	17.69
32	10.61	0.11	83.8	1.31	18.85	17.30	16.26	14.38	15.66
16	6.01	0.11	83.3	0.84	12.13	10.58	9.54	8.84	10.14
6	6.66	0.11	80.0	0.91	13.08	11.53	10.49	10.03	11.38
NO 100	11.31	0.14	68.3	1.46	20.91	18.88	17.52	19.25	21.32
NH 100	10.83	0.14	64.3	1.41	20.21	18.18	16.82	19.69	21.89
PO 100	11.60	0.14	75.3	1.48	21.30	19.29	17.94	17.84	19.70

ALEX MD
BEGINNING DATE 800804 YEAR MONTH DAY
SUNRISE 559 SUNSET 2012 IN MILITARY HOURS
TIMEIN 1715 800804 TIMEOUT 1230 800805 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	9.18	0.16	95.3	1.87	26.56	24.35	22.83	17.98	19.61
65	8.55	0.16	103.8	1.77	25.17	22.96	21.44	15.57	17.07
32	7.56	0.16	102.3	1.62	23.01	20.80	19.28	14.31	15.83
16	5.17	0.16	109.3	1.25	17.80	15.59	14.07	10.04	11.46
6	1.44	0.16	88.3	0.68	9.66	7.45	5.93	5.94	7.70
NO 100	9.96	0.15	101.3	1.99	28.23	26.03	24.52	18.08	19.61
NH 100	10.02	0.15	100.3	1.99	28.28	26.11	24.61	18.32	19.84
PO 100	11.93	0.18	108.3	2.37	33.66	31.08	29.30	20.19	21.87

ALEX MD
BEGINNING DATE 800807 YEAR MONTH DAY
SUNRISE 604 SUNSET 2007 IN MILITARY HOURS
TIMEIN 1845 800807 TIMEOUT 1245 800808 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	9.29	0.13	91.2	1.74	24.49	22.65	21.34	17.68	19.11
65	8.90	0.13	91.7	1.68	23.67	21.83	20.52	16.94	18.37
32	7.94	0.13	99.0	1.54	21.65	19.81	18.51	14.24	15.57
16	4.08	0.13	101.8	0.96	13.54	11.70	10.39	8.18	9.47
6	0.88	0.13	79.5	0.48	6.81	4.97	3.66	4.45	6.10
NO 100	9.89	0.17	78.5	1.94	27.20	24.82	23.14	22.51	24.66
NH 100	8.52	0.16	88.2	1.71	24.03	21.76	20.15	17.56	19.39
PO 100	11.52	0.16	84.8	2.17	30.42	28.12	26.49	23.60	25.53

ALEX MD
BEGINNING DATE 800813 YEAR MONTH DAY
SUNRISE 609 SUNSET 2000 IN MILITARY HOURS
TIMEIN 1815 800813 TIMEOUT 1245 800814 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.0E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	7.01	0.13	65.5	1.42	19.64	17.88	16.59	19.71	21.65
65	7.38	0.13	79.5	1.47	20.42	18.66	17.37	16.95	18.54
32	4.78	0.13	76.0	1.08	14.96	13.20	11.91	12.54	14.21
16	4.32	0.13	89.5	1.01	14.00	12.24	10.95	9.87	11.29
6	1.46	0.13	74.0	0.58	8.00	6.24	4.95	6.08	7.80
NO 100	8.57	0.12	75.5	1.64	22.68	21.01	19.78	20.09	21.69
NH 100	9.45	0.12	73.5	1.77	24.53	22.85	21.63	22.45	24.10
PO 100	10.28	0.11	82.5	1.87	25.83	24.31	23.20	21.28	22.61

ALEX MD
BEGINNING DATE 800820 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 1915 800820 TIMEOUT 1315 800821 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 3.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	3.59	0.06	60.0	0.67	9.17	8.32	7.68	10.15	11.19
65	2.93	0.06	60.3	0.58	7.89	7.04	6.40	8.55	9.58
32	1.60	0.06	57.3	0.39	5.30	4.45	3.80	5.68	6.77
16	0.52	0.06	54.3	0.23	3.19	2.34	1.70	3.16	4.31
6	-0.56	0.06	49.8	0.08	1.09	0.24	-0.40	0.35	1.60
NO 100	4.36	0.08	58.8	0.82	11.22	10.16	9.35	12.65	13.97
NH 100	4.09	0.08	58.8	0.79	10.79	9.69	8.86	12.07	13.44
PO 100	4.49	0.08	58.8	0.85	11.57	10.47	9.64	13.04	14.41

ALEX MD
BEGINNING DATE 800825 YEAR MONTH DAY
SUNRISE 620 SUNSET 1942 IN MILITARY HOURS
TIMEIN 2115 800825 TIMEOUT 1300 800826 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.85	0.04	18.4	0.38	5.09	4.51	4.04	18.38	20.76
65	2.46	0.04	20.3	0.47	6.32	5.73	5.26	21.17	23.33
32	2.04	0.04	25.0	0.41	5.47	4.89	4.42	14.63	16.38
16	1.16	0.04	22.8	0.28	3.71	3.12	2.66	10.27	12.20
6	0.15	0.04	19.0	0.13	1.68	1.10	0.63	4.33	6.63
NO 100	2.48	0.03	18.3	0.45	5.97	5.55	5.21	22.75	24.49
NH 100	2.54	0.05	20.0	0.50	6.72	6.03	5.48	22.55	25.12
PO 100	2.45	0.03	19.3	0.45	5.97	5.53	5.17	21.47	23.22

ALEX MD
BEGINNING DATE 800903 YEAR MONTH DAY
SUNRISE 628 SUNSET 1931 IN MILITARY HOURS
TIMEIN 2100 800903 TIMEOUT 1245 800904 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	5.08	0.10	58.5	1.06	13.89	12.56	11.44	16.45	18.20
65	4.38	0.10	62.3	0.95	12.44	11.11	9.99	13.67	15.31
32	3.54	0.10	64.0	0.82	10.70	9.36	8.24	11.21	12.81
16	2.21	0.10	65.3	0.61	7.93	6.60	5.48	7.75	9.32
6	-0.71	0.10	52.5	0.14	1.87	0.54	-0.58	0.78	2.73

ALEX MD
BEGINNING DATE 800915 YEAR MONTH DAY
SUNRISE 640 SUNSET 1910 IN MILITARY HOURS
TIMEIN 1830 800915 TIMEOUT 1230 800916 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.56	0.08	28.8	0.52	6.54	5.50	4.55	15.31	18.19
65	1.03	0.08	28.0	0.43	5.40	4.37	3.41	12.47	15.43
32	0.65	0.08	31.3	0.37	4.59	3.55	2.60	9.09	11.74
16	-0.33	0.08	30.8	0.20	2.49	1.45	0.50	3.77	6.47
6	-1.37	0.08	28.8	0.02	0.26	-0.78	-1.73	-2.16	0.72

ALEX MD
BEGINNING DATE 801216 YEAR MONTH DAY
SUNRISE 715 SUNSET 1636 IN MILITARY HOURS
TIMEIN 1850 801216 TIMEOUT 1815 801217 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.9E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	-0.30	0.02	3.1	0.01	0.13	-0.05	-0.33	-1.79	4.36
65	-0.25	0.02	3.5	0.02	0.17	-0.01	-0.29	-0.29	5.16
32	-0.25	0.02	3.3	0.02	0.17	-0.01	-0.29	-0.32	5.55
16	-0.30	0.02	3.4	0.01	0.13	-0.05	-0.33	-1.63	3.98
6	-0.30	0.02	3.8	0.01	0.13	-0.05	-0.33	-1.48	3.61
NO 100	-0.20	0.02	3.2	0.02	0.21	0.03	-0.25	1.11	7.22
NH 100	-0.30	0.02	3.2	0.01	0.13	-0.05	-0.33	-1.76	4.29
PO 100	-0.30	0.02	3.1	0.01	0.13	-0.05	-0.33	-1.81	4.43

ALEX MD
BEGINNING DATE 810204 YEAR MONTH DAY
SUNRISE 706 SUNSET 1722 IN MILITARY HOURS
TIMEIN 1545 810204 TIMEOUT 1715 810205 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.03	0.01	4.0	0.03	0.34	0.22	0.05	5.34	8.37
65	-0.10	0.01	4.2	0.02	0.21	0.09	-0.08	2.03	4.93
32	0.00	0.01	4.3	0.03	0.31	0.19	0.02	4.28	7.10
16	-0.05	0.01	4.3	0.03	0.26	0.14	-0.03	3.13	5.96
6	-0.15	0.01	4.7	0.02	0.16	0.04	-0.13	0.77	3.35
NO 100	-0.23	0.01	4.3	0.01	0.08	-0.04	-0.21	-0.99	1.83
NH 100	-0.20	0.01	4.2	0.01	0.11	-0.01	-0.18	-0.31	2.53
PO 100	-0.10	0.01	4.1	0.02	0.21	0.09	-0.08	2.06	5.05

ALEX MD
BEGINNING DATE 810401 YEAR MONTH DAY
SUNRISE 539 SUNSET 1828 IN MILITARY HOURS
TIMEIN 1945 810401 TIMEOUT 1600 810402 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 4.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.92	0.03	16.0	0.16	1.99	1.56	1.18	7.59	9.72
65	1.21	0.03	18.0	0.18	2.35	1.92	1.54	8.31	10.20
32	0.93	0.03	18.0	0.16	2.01	1.57	1.19	6.80	8.70
16	0.93	0.03	18.0	0.16	2.01	1.57	1.19	6.80	8.70
6	0.20	0.03	19.2	0.09	1.10	0.67	0.28	2.70	4.48
NO 100	0.96	0.03	16.2	0.16	2.04	1.61	1.23	7.74	9.84
NH 100	1.15	0.03	14.6	0.18	2.28	1.84	1.46	9.84	12.18
PO 100	0.95	0.03	15.5	0.16	2.03	1.59	1.21	8.02	10.22

ALEX MD
BEGINNING DATE 810415 YEAR MONTH DAY
SUNRISE 523 SUNSET 1838 IN MILITARY HOURS
TIMEIN 2000 810415 TIMEOUT 1930 810416 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.4E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.94	0.04	27.5	0.20	2.66	2.15	1.75	5.91	7.29
65	1.87	0.04	29.7	0.20	2.59	2.09	1.68	5.31	6.58
32	0.85	0.04	30.8	0.12	1.63	1.13	0.72	2.78	4.01
16	0.14	0.04	32.0	0.07	0.97	0.46	0.06	1.10	2.28
6	-0.31	0.04	25.3	0.04	0.54	0.04	-0.36	0.13	1.62
NO 100	2.31	0.04	26.7	0.23	3.00	2.50	2.09	7.07	8.49
NH 100	2.35	0.04	27.5	0.23	3.04	2.54	2.13	6.97	8.35
PO 100	2.43	0.04	28.5	0.24	3.12	2.61	2.21	6.92	8.25

ALEX MD
BEGINNING DATE 810519 YEAR MONTH DAY
SUNRISE 441 SUNSET 1912 IN MILITARY HOURS
TIMEIN 2045 810519 TIMEOUT 2130 810520 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.16	0.03	8.8	0.12	1.70	1.23	0.92	9.58	13.29
65	1.01	0.03	11.5	0.11	1.57	1.10	0.79	6.58	9.44
32	0.75	0.03	10.7	0.09	1.35	0.87	0.56	5.60	8.65
16	0.29	0.03	11.5	0.07	0.95	0.47	0.16	2.85	5.70
6	0.37	0.03	10.2	0.07	1.01	0.54	0.23	3.64	6.85
NO 100	1.16	0.03	9.5	0.12	1.70	1.23	0.92	8.93	12.40
NH 100	1.32	0.03	12.0	0.13	1.84	1.36	1.05	7.83	10.56
PO 100	1.18	0.03	9.7	0.12	1.72	1.24	0.93	8.86	12.24

ALEX MD
BEGINNING DATE 810630 YEAR MONTH DAY
SUNRISE 534 SUNSET 2033 IN MILITARY HOURS
TIMEIN 2000 810630 TIMEOUT 2115 810701 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.2E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	4.75	0.04	33.9	0.37	5.51	4.91	4.54	9.68	10.87
65	3.45	0.04	31.2	0.29	4.27	3.67	3.30	7.85	9.14
32	2.76	0.04	52.4	0.24	3.61	3.01	2.64	3.83	4.60
16	1.18	0.04	31.0	0.14	2.10	1.50	1.13	3.23	4.53
6	-0.20	0.04	25.0	0.05	0.78	0.18	-0.19	0.48	2.09
NO 100	4.59	0.04	56.2	0.36	5.36	4.75	4.39	5.64	6.36
NH 100	5.76	0.04	44.5	0.43	6.48	5.87	5.51	8.80	9.71
PO 100	4.81	0.04	45.6	0.37	5.57	4.96	4.60	7.26	8.15

ALEX MD
BEGINNING DATE 810708 YEAR MONTH DAY
SUNRISE 539 SUNSET 2031 IN MILITARY HOURS
TIMEIN 2400 810708 TIMEOUT 1540 810709 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	8.36	0.09	75.0	0.98	14.60	13.20	12.34	11.84	13.10
65	9.02	0.09	103.7	1.05	15.58	14.18	13.32	9.20	10.11
32	8.03	0.09	98.6	0.95	14.11	12.71	11.85	8.67	9.63
16	6.25	0.09	87.9	0.77	11.47	10.07	9:21	7.70	8.78
6	0.61	0.09	79.5	0.21	3.10	1.70	0.83	1.44	2.63
NO 100	9.03	0.09	67.3	1.05	15.60	14.19	13.33	14.18	15.58
NH 100	9.06	0.09	82.6	1.05	15.64	14.24	13.38	11.59	12.73
PO 100	9.21	0.09	99.9	1.07	15.87	14.46	13.60	9.74	10.68

ALEX MD
BEGINNING DATE 810720 YEAR MONTH DAY
SUNRISE 546 SUNSET 2026 IN MILITARY HOURS
TIMEIN 2145 810720 TIMEOUT 1445 810721 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.6E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.27	0.14	141.5	0.96	14.01	12.02	10.75	5.79	6.75
65	4.95	0.14	132.8	0.81	11.85	9.86	8.59	5.06	6.09
32	3.66	0.14	123.2	0.66	9.75	7.75	6.49	4.29	5.39
16	2.30	0.14	143.4	0.51	7.53	5.53	4.27	2.63	3.58
6	0.25	0.14	134.5	0.28	4.18	2.19	0.92	1.11	2.12
NO 100	6.71	0.14	112.4	1.00	14.73	12.73	11.47	7.73	8.94
NH 100	6.12	0.14	105.6	0.94	13.76	11.77	10.50	7.60	8.89
PO 100	6.85	0.14	110.7	1.02	14.96	12.96	11.69	7.99	9.21

ALEX MD
BEGINNING DATE 810818 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 2015 810818 TIMEOUT 1430 810819 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	8.93	0.10	145.5	1.29	17.67	16.35	15.36	8.22	8.89
65	6.19	0.10	138.1	0.96	13.14	11.83	10.83	6.26	6.96
32	4.65	0.10	153.2	0.78	10.60	9.28	8.29	4.43	5.06
16	3.17	0.10	177.0	0.60	8.15	6.83	5.84	2.83	3.37
6	-0.23	0.10	138.2	0.19	2.53	1.21	0.21	0.64	1.34
NO 100	6.32	0.10	133.1	0.98	13.36	12.04	11.04	6.62	7.35
NH 100	6.96	0.10	120.0	1.05	14.42	13.10	12.10	7.98	8.79
PO 100	6.37	0.10	115.8	0.98	13.44	12.12	11.13	7.66	8.49

ALEX VA
BEGINNING DATE 800522 YEAR MONTH DAY
SUNRISE 540 SUNSET 2012 IN MILITARY HOURS
TIMEIN 740 800522 TIMEOUT 1920 800522 IN MILITARY HOURS

DAY INCUBATION ONLY
TOTAL LIGHT SUNRISE TO SUNSET 1.2E+08 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	5.22	0.05	44.5	0.42	6.13	5.45	5.01	8.43	9.47
65	5.99	0.05	44.5	0.48	6.94	6.27	5.83	9.70	10.74
32	5.97	0.05	44.5	0.48	6.92	6.25	5.81	9.66	10.70
16	5.04	0.05	44.5	0.41	5.93	5.26	4.82	8.13	9.18
6	2.17	0.05	44.5	0.20	2.88	2.21	1.77	3.42	4.46
NO 100	5.39	0.05	44.5	0.43	6.31	5.63	5.20	8.71	9.75
NH 100	5.53	0.05	44.5	0.44	6.45	5.78	5.34	8.94	9.98
PO 100	5.82	0.05	44.5	0.47	6.76	6.09	5.65	9.42	10.46

ALEX VA
BEGINNING DATE 800623 YEAR MONTH DAY
SUNRISE 532 SUNSET 2033 IN MILITARY HOURS
TIMEIN 2115 800623 TIMEOUT 2100 800624 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.5E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.35	0.01	52.5	0.43	6.42	6.25	6.15	7.93	8.14
65	5.33	0.01	52.5	0.36	5.43	5.26	5.16	6.68	6.88
32	3.67	0.01	52.5	0.25	3.82	3.65	3.55	4.63	4.84
16	1.47	0.01	52.5	0.11	1.68	1.52	1.42	1.92	2.13
6	0.98	0.01	52.5	0.08	1.20	1.04	0.94	1.32	1.53
NO 100	5.58	0.02	52.5	0.39	5.92	5.59	5.40	7.10	7.51
NH 100	4.04	0.02	52.5	0.29	4.35	4.07	3.91	5.16	5.52
PO 100	5.50	0.05	52.5	0.44	6.55	5.76	5.29	7.31	8.31

ALEX VA
BEGINNING DATE 800723 YEAR MONTH DAY
SUNRISE 550 SUNSET 2022 IN MILITARY HOURS
TIMEIN 1930 800723 TIMEOUT 2100 800724 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.5E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	6.28	0.07	48.0	0.54	7.78	6.73	6.05	9.65	11.15
65	4.42	0.07	48.0	0.41	6.00	4.95	4.27	7.10	8.60
32	4.44	0.07	48.0	0.41	6.02	4.97	4.29	7.12	8.63
16	4.21	0.07	48.0	0.40	5.80	4.75	4.07	6.81	8.31
6	0.81	0.07	48.0	0.17	2.54	1.49	0.81	2.14	3.64
NO 100	6.67	0.07	48.0	0.56	8.18	7.12	6.42	10.20	11.73
NH 100	5.63	0.07	48.0	0.49	7.12	6.09	5.43	8.74	10.21
PO 100	6.52	0.07	48.0	0.55	7.96	6.94	6.28	9.95	11.41

ALEX VA
BEGINNING DATE 800729 YEAR MONTH DAY
SUNRISE 555 SUNSET 2017 IN MILITARY HOURS
TIMEIN 1930 800729 TIMEOUT 1500 800730 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.3E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	4.55	0.06	30.1	0.64	9.24	8.36	7.77	19.32	21.34
65	4.55	0.06	32.6	0.64	9.23	8.35	7.76	17.82	19.69
32	4.03	0.06	39.1	0.57	8.25	7.37	6.78	13.11	14.67
16	2.46	0.06	41.6	0.40	5.77	4.89	4.30	8.17	9.64
6	0.82	0.06	27.1	0.22	3.17	2.29	1.71	5.89	8.14
NO 100	5.99	0.07	36.2	0.71	10.15	9.17	8.52	17.64	19.52
NH 100	5.20	0.06	64.3	0.71	10.19	9.28	8.66	10.05	11.04
PO 100	5.18	0.07	75.3	0.71	10.25	9.29	8.65	8.59	9.48

ALEX VA
BEGINNING DATE 800804 YEAR MONTH DAY
SUNRISE 559 SUNSET 2012 IN MILITARY HOURS
TIMEIN 1745 800804 TIMEOUT 1300 800805 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	7.51	0.09	54.4	1.32	18.70	17.42	16.55	22.54	24.18
65	6.42	0.09	54.9	1.16	16.49	15.22	14.35	19.51	21.14
32	6.06	0.09	54.4	1.11	15.76	14.49	13.62	18.75	20.39
16	2.94	0.09	53.4	0.66	9.44	8.17	7.30	10.77	12.44
6	-0.20	0.09	41.9	0.22	3.08	1.81	0.94	3.04	5.17
NO 100	7.96	0.10	50.4	1.41	19.99	18.58	17.61	25.95	27.92
NH 100	7.66	0.10	53.4	1.36	19.33	17.94	16.99	23.64	25.47
PO 100	7.74	0.10	50.4	1.37	19.42	18.06	17.12	25.21	27.12

ALEX VA
BEGINNING DATE 800807 YEAR MONTH DAY
SUNRISE 604 SUNSET 2007 IN MILITARY HOURS
TIMEIN 1915 800807 TIMEOUT 1330 800808 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.85	0.09	49.6	1.14	16.05	14.78	13.89	21.20	23.02
65	6.06	0.09	44.1	1.04	14.55	13.29	12.40	21.44	23.48
32	4.97	0.09	48.6	0.89	12.49	11.23	10.34	16.44	18.29
16	2.43	0.09	44.1	0.55	7.69	6.43	5.54	10.37	12.41
6	0.77	0.09	40.0	0.32	4.56	3.29	2.40	5.86	8.11
NO 100	6.48	0.03	44.1	0.95	13.29	12.86	12.56	20.75	21.43
NH 100	6.91	0.15	43.4	1.29	18.13	16.06	14.60	26.36	29.74
PO 100	7.91	0.11	45.1	1.33	18.62	17.12	16.07	27.01	29.37

ALEX VA
BEGINNING DATE 800813 YEAR MONTH DAY
SUNRISE 609 SUNSET 2000 IN MILITARY HOURS
TIMEIN 1915 800813 TIMEOUT 1330 800814 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.0E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.86	0.05	51.5	1.06	14.74	14.01	13.47	19.64	20.66
65	6.30	0.05	57.5	0.99	13.68	12.95	12.42	16.26	17.18
32	4.75	0.05	60.0	0.78	10.76	10.03	9.50	12.07	12.95
16	3.78	0.05	58.5	0.64	8.93	8.20	7.67	10.12	11.02
6	0.78	0.05	50.0	0.24	3.28	2.55	2.02	3.68	4.73
NO 100	6.67	0.09	50.5	1.14	15.73	14.46	13.53	20.67	22.50
NH 100	6.94	0.08	50.5	1.16	16.00	14.82	13.96	21.19	22.87
PO 100	6.40	0.09	50.5	1.10	15.23	13.95	13.02	19.95	21.77

ALEX VA
BEGINNING DATE 800820 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 1820 800820 TIMEOUT 1245 800821 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 3.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.85	0.04	15.5	0.25	3.36	2.80	2.38	13.21	15.84
65	0.40	0.04	17.0	0.18	2.41	1.86	1.43	7.99	10.38
32	-0.18	0.04	17.3	0.09	1.20	0.64	0.22	2.71	5.07
16	-0.18	0.04	15.8	0.09	1.20	0.64	0.22	2.97	5.55
6	-0.49	0.04	13.8	0.04	0.55	-0.01	-0.43	-0.06	2.90
NO 100	0.98	0.04	16.4	0.27	3.63	3.07	2.65	13.70	16.19
NH 100	0.92	0.04	17.5	0.26	3.50	2.95	2.52	12.32	14.64
PO 100	0.85	0.04	16.8	0.25	3.36	2.80	2.38	12.23	14.66

ALEX VA
BEGINNING DATE 800825 YEAR MONTH DAY
SUNRISE 620 SUNSET 1942 IN MILITARY HOURS
TIMEIN 2145 800825 TIMEOUT 1315 800826 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.82	0.03	17.8	0.32	4.29	3.95	3.67	16.63	18.08
65	2.08	0.03	19.3	0.36	4.79	4.45	4.17	17.29	18.63
32	1.74	0.03	20.5	0.31	4.14	3.79	3.52	13.83	15.09
16	1.14	0.03	21.0	0.22	2.98	2.63	2.36	9.37	10.60
6	0.13	0.03	15.8	0.08	1.02	0.68	0.40	3.23	4.87
NO 100	2.02	0.03	16.0	0.36	4.81	4.41	4.08	20.60	22.50
NH 100	2.05	0.03	17.5	0.37	5.01	4.54	4.17	19.46	21.46
PO 100	2.17	0.03	17.5	0.39	5.22	4.76	4.40	20.35	22.31

ALEX VA
BEGINNING DATE 800903 YEAR MONTH DAY
SUNRISE 628 SUNSET 1931 IN MILITARY HOURS
TIMEIN 2030 800903 TIMEOUT 1235 800904 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.0E7MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	2.72	0.04	23.8	0.55	7.19	6.66	6.22	21.50	23.20
65	2.11	0.04	24.5	0.45	5.89	5.36	4.92	16.77	18.42
32	1.55	0.04	24.3	0.36	4.69	4.17	3.72	13.17	14.83
16	0.78	0.04	23.8	0.23	3.05	2.52	2.08	8.14	9.84
6	-0.50	0.04	21.0	0.02	0.32	-0.21	-0.65	-0.75	1.17

ALEX VA
BEGINNING DATE 800915 YEAR MONTH DAY
SUNRISE 640 SUNSET 1910 IN MILITARY HOURS
TIMEIN 1815 800915 TIMEOUT 1230 800916 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.93	0.04	11.5	0.30	3.71	3.16	2.66	21.98	25.79
65	0.85	0.04	14.3	0.28	3.54	2.99	2.48	16.77	19.85
32	0.57	0.04	15.3	0.23	2.94	2.39	1.88	12.53	15.40
16	0.02	0.04	14.5	0.14	1.76	1.21	0.71	6.67	9.69
6	-0.71	0.04	12.0	0.02	0.19	-0.36	-0.86	-2.37	1.29

ALEX VA
BEGINNING DATE 801118 YEAR MONTH DAY
SUNRISE 648 SUNSET 1642 IN MILITARY HOURS
TIMEIN 2000 801118 TIMEOUT 1630 801119 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.6E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.00	0.00	11.6	0.01	0.07	0.04	-0.01	0.33	0.62
65	0.40	0.00	11.6	0.05	0.48	0.45	0.40	3.88	4.18
32	0.25	0.00	12.1	0.03	0.33	0.29	0.24	2.44	2.73
16	-0.10	0.00	12.1	-0.00	-0.03	-0.06	-0.11	-0.54	-0.25
6	0.25	0.00	12.3	0.03	0.33	0.29	0.24	2.40	2.68
NO 100	0.25	0.00	11.0	0.03	0.33	0.29	0.24	2.69	3.00
NH 100	0.45	0.00	11.0	0.05	0.53	0.50	0.45	4.56	4.87
PO 100	0.20	0.00	11.0	0.03	0.28	0.24	0.19	2.22	2.53

ALEX VA
BEGINNING DATE 801216 YEAR MONTH DAY
SUNRISE 715 SUNSET 1636 IN MILITARY HOURS
TIMEIN 1905 801216 TIMEOUT 1745 801217 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.9E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	-0.25	0.02	2.1	0.01	0.13	-0.03	-0.29	-1.58	6.72
65	-0.15	0.02	2.5	0.02	0.22	0.06	-0.20	2.49	9.62
32	-0.10	0.02	2.4	0.03	0.27	0.10	-0.16	4.50	11.78
16	0.00	0.02	2.5	0.04	0.36	0.19	-0.07	8.26	15.39
6	-0.05	0.02	2.1	0.03	0.31	0.15	-0.11	7.38	15.69
NO 100	-0.25	0.02	2.0	0.01	0.13	-0.03	-0.29	-1.66	7.05
NH 100	-0.15	0.02	2.2	0.02	0.22	0.06	-0.20	2.77	10.70
PO 100	-0.10	0.02	2.2	0.03	0.27	0.10	-0.16	5.02	13.14

ALEX VA
BEGINNING DATE 810204 YEAR MONTH DAY
SUNRISE 706 SUNSET 1722 IN MILITARY HOURS
TIMEIN 1630 810204 TIMEOUT 1750 810205 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	-0.33	0.01	3.9	-0.00	-0.03	-0.15	-0.31	-3.80	-0.73
65	0.00	0.01	3.9	0.03	0.29	0.17	0.00	4.19	7.26
32	-0.10	0.01	3.9	0.02	0.19	0.07	-0.09	1.76	4.34
16	-0.15	0.01	3.9	0.01	0.14	0.02	-0.14	0.55	3.63
6	-0.20	0.01	3.9	0.01	0.10	-0.03	-0.19	-0.55	2.39
NO 100	-0.20	0.01	3.7	0.01	0.10	-0.03	-0.19	-0.68	2.52
NH 100	-0.20	0.01	3.7	0.01	0.10	-0.03	-0.19	-0.68	2.52
PO 100	-0.20	0.01	3.7	0.01	0.10	-0.03	-0.19	-0.68	2.52

ALEX VA
BEGINNING DATE 810401 YEAR MONTH DAY
SUNRISE 539 SUNSET 1828 IN MILITARY HOURS
TIMEIN 2045 810401 TIMEOUT 1630 810402 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 4.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.05	0.02	13.2	0.13	1.69	1.44	1.23	8.53	9.98
65	0.99	0.02	14.8	0.13	1.62	1.37	1.16	7.23	8.53
32	0.74	0.02	14.2	0.10	1.32	1.08	0.86	5.91	7.27
16	0.61	0.02	15.0	0.09	1.17	0.92	0.71	4.80	6.08
6	0.19	0.02	13.5	0.05	0.67	0.43	0.21	2.47	3.89
NO 100	0.86	0.02	12.7	0.11	1.46	1.22	1.00	7.48	9.00
NH 100	0.88	0.02	12.8	0.12	1.49	1.24	1.03	7.57	9.07
PO 100	0.85	0.02	12.7	0.11	1.45	1.21	0.99	7.41	8.93

ALEX VA
BEGINNING DATE 810415 YEAR MONTH DAY
SUNRISE 523 SUNSET 1838 IN MILITARY HOURS
TIMEIN 1930 810415 TIMEOUT 1930 810416 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.4E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.14	0.03	19.3	0.13	1.68	1.32	1.03	5.17	6.57
65	0.00	0.00	21.0	0.00	0.00	0.00	0.00	0.00	0.00
32	0.44	0.03	21.8	0.08	1.02	0.66	0.37	2.30	3.54
16	0.02	0.03	22.5	0.05	0.63	0.27	-0.02	0.91	2.11
6	-0.25	0.03	20.0	0.03	0.38	0.02	-0.27	0.06	1.42
NO 100	1.27	0.03	19.5	0.13	1.76	1.42	1.16	5.51	6.79
NH 100	1.14	0.03	19.3	0.13	1.68	1.32	1.03	5.17	6.57
PO 100	1.26	0.03	18.1	0.14	1.79	1.43	1.14	5.98	7.48

ALEX VA
BEGINNING DATE 810519 YEAR MONTH DAY
SUNRISE 441 SUNSET 1912 IN MILITARY HOURS
TIMEIN 2000 810519 TIMEOUT 2045 810520 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.58	0.02	7.3	0.07	1.02	0.70	0.49	6.57	9.60
65	0.56	0.02	8.0	0.07	1.00	0.68	0.47	5.88	8.67
32	0.32	0.02	7.1	0.05	0.79	0.46	0.25	4.49	7.61
16	0.13	0.02	6.8	0.04	0.61	0.29	0.08	2.96	6.23
6	-0.21	0.02	6.3	0.02	0.31	-0.02	-0.23	-0.17	3.38
NO 100	0.63	0.02	6.7	0.07	1.07	0.74	0.53	7.66	10.98
NH 100	0.61	0.02	5.6	0.07	1.05	0.73	0.51	8.88	12.84
PO 100	0.61	0.02	5.3	0.07	1.05	0.73	0.51	9.41	13.60

ALEX VA
BEGINNING DATE 810630 YEAR MONTH DAY
SUNRISE 534 SUNSET 2033 IN MILITARY HOURS
TIMEIN 1930 810630 TIMEOUT 2150 810701 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.2E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.41	0.02	11.8	0.13	1.89	1.52	1.30	8.66	10.73
65	0.79	0.02	10.7	0.09	1.32	0.95	0.73	5.95	8.22
32	0.40	0.02	11.4	0.06	0.96	0.59	0.37	3.47	5.60
16	0.06	0.02	10.5	0.04	0.64	0.28	0.06	1.79	4.11
6	-0.22	0.02	9.0	0.03	0.39	0.02	-0.20	0.17	2.86
NO 100	1.58	0.02	9.8	0.14	2.04	1.68	1.46	11.40	13.87
NH 100	1.16	0.02	9.3	0.11	1.66	1.29	1.07	9.26	11.86
PO 100	1.38	0.02	9.6	0.12	1.86	1.50	1.28	10.37	12.90

ALEX VA
BEGINNING DATE 810708 YEAR MONTH DAY
SUNRISE 539 SUNSET 2031 IN MILITARY HOURS
TIMEIN 2400 810708 TIMEOUT 1415 810709 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	4.52	0.05	35.3	0.61	9.06	8.31	7.85	15.84	17.28
65	4.43	0.05	34.8	0.60	8.90	8.15	7.69	15.74	17.19
32	3.42	0.05	34.0	0.48	7.16	6.41	5.94	12.68	14.16
16	2.71	0.05	39.3	0.40	5.93	5.18	4.72	8.86	10.15
6	0.68	0.05	47.6	0.16	2.42	1.67	1.21	2.36	3.42
NO 100	5.09	0.05	30.2	0.68	10.04	9.29	8.83	20.70	22.38
NH 100	4.80	0.05	36.1	0.64	9.54	8.79	8.33	16.37	17.77
PO 100	4.76	0.05	38.7	0.64	9.47	8.72	8.26	15.18	16.48

ALEX VA
BEGINNING DATE 810720 YEAR MONTH DAY
SUNRISE 546 SUNSET 2026 IN MILITARY HOURS
TIMEIN 2230 810720 TIMEOUT 1515 810721 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.6E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.62	0.09	152.1	0.86	12.65	11.28	10.42	5.06	5.67
65	5.61	0.09	133.6	0.76	11.09	9.72	8.85	4.96	5.66
32	3.79	0.09	130.0	0.56	8.27	6.91	6.04	3.62	4.34
16	2.92	0.09	127.9	0.47	6.93	5.56	4.69	2.97	3.69
6	0.41	0.09	134.3	0.21	3.05	1.68	0.81	0.85	1.55
NO 100	6.74	0.09	119.8	0.88	12.84	11.47	10.60	6.53	7.31
NH 100	7.42	0.09	119.6	0.95	13.89	12.52	11.65	7.14	7.92
PO 100	6.56	0.09	126.6	0.86	12.56	11.19	10.32	6.03	6.76

ALEX VA
BEGINNING DATE 810818 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 2045 810818 TIMEOUT 1500 810819 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	5.62	0.08	132.2	0.80	10.90	9.87	9.10	5.46	6.03
65	4.62	0.08	158.8	0.68	9.34	8.31	7.54	3.83	4.30
32	3.40	0.08	154.7	0.54	7.44	6.41	5.63	3.03	3.52
16	2.47	0.08	160.7	0.44	5.99	4.96	4.18	2.26	2.73
6	-0.27	0.08	132.6	0.13	1.71	0.69	-0.09	0.38	0.95
NO 100	6.19	0.08	151.3	0.86	11.79	10.76	9.98	5.20	5.70
NH 100	6.38	0.08	113.9	0.88	12.08	11.06	10.28	7.10	7.76
PO 100	6.77	0.08	137.7	0.93	12.69	11.66	10.89	6.20	6.74

ALEX VA
BEGINNING DATE 810825 YEAR MONTH DAY
SUNRISE 620 SUNSET 1943 IN MILITARY HOURS
TIMEIN 1800 810825 TIMEOUT 1315 810826 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	5.44	0.08	95.2	1.00	13.37	12.35	11.54	9.69	10.49
65	5.50	0.08	103.8	1.01	13.49	12.46	11.65	8.97	9.70
32	3.27	0.08	112.3	0.69	9.17	8.15	7.34	5.42	6.10
16	2.79	0.08	147.2	0.62	8.24	7.22	6.41	3.67	4.18
6	-0.04	0.08	101.8	0.21	2.77	1.74	0.93	1.28	2.03
NO 100	5.31	0.08	102.1	0.98	13.12	12.10	11.29	8.85	9.60
NH 100	5.22	0.08	91.9	0.97	12.94	11.92	11.11	9.69	10.52
PO 100	5.12	0.08	110.6	0.95	12.75	11.73	10.92	7.92	8.61

MT VERNON
BEGINNING DATE 800522 YEAR MONTH DAY
SUNRISE 540 SUNSET 2012 IN MILITARY HOURS
TIMEIN 730 800522 TIMEOUT 1900 800522 IN MILITARY HOURS

DAY INCUBATION ONLY
TOTAL LIGHT SUNRISE TO SUNSET 1.2E+08 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	2.56	0.05	18.8	0.24	3.47	2.68	2.17	9.82	12.69
65	2.04	0.05	18.8	0.20	2.90	2.12	1.61	7.74	10.61
32	1.85	0.05	18.8	0.19	2.69	1.91	1.40	6.99	9.85
16	1.67	0.05	18.8	0.17	2.50	1.71	1.20	6.27	9.14
6	0.36	0.05	18.8	0.07	1.07	0.28	-0.23	1.04	3.91
NO 100	2.23	0.05	18.8	0.21	3.11	2.32	1.81	8.50	11.37
NH 100	1.91	0.05	18.8	0.19	2.76	1.97	1.46	7.23	10.09
PO 100	2.32	0.05	18.8	0.22	3.20	2.42	1.91	8.86	11.73

MOUNT VERNON
BEGINNING DATE 800623 YEAR MONTH DAY
SUNRISE 532 SUNSET 2033 IN MILITARY HOURS
TIMEIN 2040 800623 TIMEOUT 1915 800624 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.5E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	3.74	0.08	69.0	0.40	6.08	4.87	4.15	4.70	5.86
65	4.10	0.08	69.0	0.43	6.47	5.27	4.55	5.08	6.24
32	3.41	0.08	69.0	0.38	5.71	4.51	3.79	4.35	5.52
16	2.61	0.08	69.0	0.32	4.84	3.64	2.92	3.51	4.67
6	-1.08	0.08	69.0	0.05	0.80	-0.40	-1.12	-0.39	0.77
NO 100	2.98	0.06	69.0	0.32	4.81	3.87	3.31	3.73	4.64
NH 100	2.85	0.10	69.0	0.37	5.58	4.09	3.19	3.94	5.39
PO 100	5.82	0.12	69.0	0.62	9.37	7.55	6.46	7.29	9.04

HATTON POINT
BEGINNING DATE 800723 YEAR MONTH DAY
SUNRISE 550 SUNSET 2022 IN MILITARY HOURS
TIMEIN 2200 800723 TIMEOUT 2300 800724 IN MILITARY [illegible]URS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.5E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	11.31	0.05	91.0	0.73	10.63	9.91	9.43	7.49	8.04
65	10.74	0.05	91.0	0.70	10.15	9.42	8.95	7.12	7.67
32	7.66	0.05	91.0	0.52	7.54	6.82	6.34	5.15	5.70
16	4.25	0.05	91.0	0.32	4.65	3.93	3.46	2.97	3.52
6	0.80	0.05	91.0	0.12	1.73	1.01	0.54	0.76	1.31
NO 100	11.25	0.05	91.0	0.72	10.48	9.82	9.40	7.43	7.92
NH 100	11.58	0.05	91.0	0.74	10.78	10.11	9.67	7.64	8.15
PO 100	13.77	0.04	91.0	0.86	12.53	11.93	11.54	9.02	9.47

HATTON POINT
BEGINNING DATE 800729 YEAR MONTH DAY
SUNRISE 555 SUNSET 2017 IN MILITARY HOURS
TIMEIN 2030 800729 TIMEOUT 1415 800730 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.3E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	7.72	0.04	51.0	1.01	14.53	13.95	13.57	19.04	19.83
65	7.16	0.04	53.5	0.94	13.56	12.98	12.60	16.89	17.64
32	6.24	0.04	54.0	0.83	11.98	11.41	11.02	14.70	15.44
16	6.55	0.04	60.0	0.87	12.51	11.93	11.55	13.84	14.51
6	0.63	0.04	37.5	0.16	2.30	1.73	1.34	3.21	4.27
NO 100	7.69	0.05	45.0	1.02	14.64	13.99	13.56	21.65	22.65
NH 100	8.10	0.05	48.0	1.08	15.52	14.79	14.30	21.44	22.50
PO 100	8.53	0.05	47.5	1.14	16.36	15.58	15.06	22.84	23.97

HATTON POINT
BEGINNING DATE 800804 YEAR MONTH DAY
SUNRISE 559 SUNSET 2012 IN MILITARY HOURS
TIMEIN 2115 800804 TIMEOUT 1345 800805 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.07	0.04	38.8	0.86	12.25	11.71	11.34	21.26	22.23
65	6.36	0.04	38.8	0.90	12.78	12.24	11.87	22.22	23.19
32	5.42	0.04	43.8	0.78	11.06	10.52	10.15	16.92	17.78
16	4.69	0.04	40.0	0.68	9.72	9.19	8.82	16.15	17.09
6	1.20	0.04	37.8	0.23	3.33	2.80	2.43	5.21	6.21
NO 100	6.06	0.05	43.3	0.88	12.58	11.88	11.40	19.32	20.45
NH 100	6.90	0.05	36.3	1.00	14.26	13.49	12.96	26.18	27.67
PO 100	9.12	0.05	51.3	1.28	18.23	17.51	17.01	24.03	25.02

HATTON POINT
BEGINNING DATE 800807 YEAR MONTH DAY
SUNRISE 604 SUNSET 2007 IN MILITARY HOURS
TIMEIN 2000 800807 TIMEOUT 1345 800808 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.52	0.04	46.4	0.94	13.18	12.64	12.25	19.40	20.23
65	7.61	0.04	44.9	1.08	15.18	14.63	14.24	23.21	24.07
32	6.15	0.04	51.4	0.89	12.51	11.96	11.57	16.57	17.33
16	4.44	0.04	51.9	0.67	9.38	8.83	8.45	12.12	12.87
6	1.84	0.04	41.4	0.33	4.63	4.08	3.69	7.02	7.96
NO 100	6.35	0.05	38.1	0.94	13.26	12.55	12.04	23.42	24.75
NH 100	6.90	0.06	38.9	1.03	14.48	13.68	13.10	25.04	26.52
PO 100	9.63	0.11	47.4	1.50	21.07	19.57	18.51	29.40	31.65

HATTON POINT
BEGINNING DATE 800813 YEAR MONTH DAY
SUNRISE 609 SUNSET 2000 IN MILITARY HOURS
TIMEIN 1945 800813 TIMEOUT 1445 800814 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.0E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	7.65	0.04	48.5	0.97	13.42	12.92	12.56	19.23	19.97
65	8.47	0.04	55.0	1.06	14.74	14.24	13.88	18.69	19.34
32	7.68	0.04	60.0	0.97	13.46	12.97	12.60	15.61	16.20
16	6.96	0.04	68.5	0.89	12.30	11.81	11.45	12.45	12.97
6	3.28	0.04	59.5	0.46	6.38	5.88	5.52	7.14	7.74
NO 100	7.60	0.05	45.0	1.00	13.83	13.11	12.58	21.04	22.20
NH 100	7.97	0.05	46.0	1.04	14.46	13.73	13.19	21.54	22.70
PO 100	9.59	0.06	55.5	1.24	17.15	16.38	15.81	21.31	22.31

HATTON POINT
BEGINNING DATE 800820 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 2215 800820 TIMEOUT 1400 800821 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 3.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.60	0.03	12.4	0.15	1.99	1.53	1.18	9.06	11.78
65	0.49	0.03	11.4	0.13	1.79	1.33	0.99	8.61	11.57
32	0.20	0.03	11.4	0.09	1.28	0.82	0.48	5.32	8.28
16	-0.09	0.03	10.1	0.06	0.77	0.31	-0.03	2.28	5.61
6	-0.32	0.03	8.1	0.03	0.37	-0.09	-0.44	-0.82	3.34
NO 100	0.84	0.03	10.9	0.18	2.41	1.95	1.60	13.16	16.26
NH 100	0.89	0.02	10.6	0.15	2.09	1.83	1.64	12.66	14.45
PO 100	0.66	0.03	10.6	0.15	2.09	1.63	1.29	11.28	14.45

HATTON POINT
BEGINNING DATE 800825 YEAR MONTH DAY
SUNRISE 620 SUNSET 1942 IN MILITARY HOURS
TIMEIN 2345 800825 TIMEOUT 1315 800826 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	1.41	0.03	12.0	0.27	3.58	3.14	2.79	19.57	22.29
65	1.60	0.03	12.5	0.29	3.94	3.51	3.16	20.99	23.60
32	1.52	0.03	13.3	0.28	3.79	3.35	3.01	18.93	21.39
16	1.06	0.03	13.5	0.22	2.90	2.46	2.12	13.70	16.12
6	0.18	0.03	11.0	0.09	1.20	0.76	0.42	5.19	8.15
NO 100	1.83	0.03	10.5	0.32	4.25	3.89	3.59	27.68	30.29
NH 100	1.80	0.03	10.8	0.32	4.29	3.87	3.54	26.84	29.72
PO 100	1.45	0.03	10.3	0.27	3.63	3.21	2.87	23.41	26.52

HATTON POINT
BEGINNING DATE 800903 YEAR MONTH DAY
SUNRISE 628 SUNSET 1931 IN MILITARY HOURS
TIMEIN 100 800903 TIMEOUT 1230 800903 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	2.69	0.00	17.5	0.45	5.90	5.86	5.82	25.66	25.86
65	2.35	0.00	19.5	0.40	5.17	5.12	5.09	20.14	20.31
32	1.87	0.00	20.0	0.32	4.13	4.09	4.05	15.65	15.83
16	1.15	0.00	18.3	0.20	2.57	2.53	2.49	10.62	10.81
6	0.14	0.00	14.8	0.03	0.39	0.34	0.31	1.79	2.02

HATTON POINT
BEGINNING DATE 800915 YEAR MONTH DAY
SUNRISE 640 SUNSET 1910 IN MILITARY HOURS
TIMEIN 2230 800915 TIMEOUT 1250 800916 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.49	0.05	20.5	0.35	4.40	3.81	3.26	14.85	17.17
65	1.33	0.05	20.5	0.33	4.07	3.48	2.94	13.59	15.90
32	0.95	0.05	22.0	0.26	3.30	2.71	2.17	9.86	12.01
16	0.38	0.05	21.8	0.17	2.15	1.56	1.01	5.72	7.90
6	-0.28	0.05	19.3	0.06	0.81	0.22	-0.33	0.91	3.37

HATTON POINT
BEGINNING DATE 801118 YEAR MONTH DAY
SUNRISE 648 SUNSET 1642 IN MILITARY HOURS
TIMEIN 2040 801118 TIMEOUT 1700 801119 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.6E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.90	0.00	9.6	0.09	0.87	0.87	0.87	9.19	9.19
65	0.45	0.00	9.6	0.04	0.44	0.44	0.44	4.60	4.60
32	0.60	0.00	9.6	0.06	0.58	0.58	0.58	6.13	6.13
16	0.80	0.00	9.6	0.08	0.78	0.78	0.78	8.17	8.17
6	0.15	0.00	9.6	0.01	0.15	0.15	0.15	1.53	1.53
NO 100	0.63	0.00	9.6	0.06	0.61	0.61	0.61	6.43	6.43
NH 100	0.53	0.00	9.6	0.05	0.51	0.51	0.51	5.41	5.41
PO 100	0.60	0.00	9.6	0.06	0.58	0.58	0.58	6.13	6.13

HATTON POINT
BEGINNING DATE 801216 YEAR MONTH DAY
SUNRISE 715 SUNSET 1636 IN MILITARY HOURS
TIMEIN 1825 801216 TIMEOUT 1730 801217 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.9E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	-0.15	0.01	2.0	0.01	0.14	0.02	-0.18	0.81	7.23
65	-0.10	0.01	2.2	0.02	0.18	0.06	-0.13	2.93	8.77
32	-0.15	0.01	2.1	0.01	0.14	0.02	-0.18	0.77	6.89
16	-0.05	0.01	2.8	0.02	0.23	0.11	-0.08	4.14	8.87
6	-0.15	0.01	2.6	0.01	0.14	0.02	-0.18	0.64	5.68
NO 100	0.00	0.01	2.1	0.03	0.27	0.15	-0.04	7.84	14.11
NH 100	-0.05	0.01	2.1	0.02	0.23	0.11	-0.08	5.36	11.48
PO 100	-0.10	0.01	2.2	0.02	0.18	0.06	-0.13	3.00	8.97

HATTON POINT
BEGINNING DATE 810204 YEAR MONTH DAY
SUNRISE 706 SUNSET 1722 IN MILITARY HOURS
TIMEIN 1710 810204 TIMEOUT 1805 810205 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	-0.10	0.01	7.5	0.02	0.24	0.09	-0.10	1.23	3.16
65	-0.10	0.01	7.8	0.02	0.24	0.09	-0.10	1.18	3.03
32	0.00	0.01	7.9	0.03	0.34	0.19	-0.01	2.32	4.15
16	-0.05	0.01	8.1	0.03	0.29	0.14	-0.06	1.70	3.48
6	-0.15	0.01	8.3	0.02	0.20	0.05	-0.15	0.56	2.30
NO 100	-0.20	0.01	7.3	0.01	0.15	0.00	-0.20	0.02	2.00
NH 100	-0.10	0.01	7.6	0.02	0.24	0.09	-0.10	1.21	3.11
PO 100	-0.05	0.01	7.5	0.03	0.29	0.14	-0.06	1.84	3.76

HATTON POINT
BEGINNING DATE 810401 YEAR MONTH DAY
SUNRISE 539 SUNSET 1828 IN MILITARY HOURS
TIMEIN 1915 810401 TIMEOUT 1515 810402 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 4.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	0.08	0.03	8.0	0.07	0.92	0.53	0.19	5.17	8.98
65	0.29	0.03	8.6	0.09	1.20	0.81	0.47	7.35	10.90
32	0.12	0.03	9.0	0.08	0.97	0.58	0.24	5.06	8.45
16	0.09	0.03	10.6	0.07	0.93	0.54	0.20	4.00	6.88
6	-0.06	0.03	9.5	0.06	0.73	0.34	0.00	2.82	6.03
NO 100	-0.02	0.03	8.5	0.06	0.79	0.40	0.06	3.64	7.23
NH 100	0.23	0.03	9.0	0.09	1.12	0.73	0.39	6.33	9.72
PO 100	0.05	0.03	8.0	0.07	0.88	0.49	0.15	4.78	8.59

HATTON POINT
BEGINNING DATE 810415 YEAR MONTH DAY
SUNRISE 523 SUNSET 1838 IN MILITARY HOURS
TIMEIN 1900 810415 TIMEOUT 1930 810416 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.4E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	2.18	0.03	28.0	0.21	2.75	2.34	2.02	6.32	7.41
65	1.71	0.03	27.5	0.17	2.31	1.90	1.57	5.22	6.34
32	0.80	0.03	29.8	0.11	1.45	1.05	0.72	2.66	3.69
16	0.25	0.03	28.5	0.07	0.94	0.53	0.20	1.41	2.49
6	-0.14	0.03	26.5	0.04	0.57	0.17	-0.16	0.48	1.53
NO 100	2.16	0.03	27.0	0.21	2.73	2.33	2.00	5.50	7.63
NH 100	2.20	0.03	26.5	0.21	2.77	2.36	2.03	6.73	7.89
PO 100	2.14	0.03	26.0	0.20	2.71	2.31	1.98	6.70	7.87

HATTON POINT
BEGINNING DATE 810519 YEAR MONTH DAY
SUNRISE 441 SUNSET 1912 IN MILITARY HOURS
TIMEIN 2130 810519 TIMEOUT 2315 810520 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	-0.29	0.02	2.1	0.02	0.27	-0.09	-0.32	-2.90	8.62
65	-0.25	0.02	2.6	0.02	0.30	-0.06	-0.29	-1.57	8.03
32	-0.30	0.02	2.4	0.02	0.26	-0.10	-0.33	-2.84	7.53
16	-0.49	0.02	3.0	0.01	0.11	-0.25	-0.48	-5.69	2.53
6	-0.57	0.02	2.7	0.00	0.05	-0.31	-0.54	-7.94	1.21
NO 100	-0.27	0.02	2.2	0.02	0.28	-0.07	-0.31	-2.30	8.77
NH 100	-0.24	0.02	2.3	0.02	0.30	-0.05	-0.28	-1.48	9.00
PO 100	-0.27	0.02	2.9	0.02	0.28	-0.07	-0.31	-1.77	6.76

HATTON POINT
BEGINNING DATE 810630 YEAR MONTH DAY
SUNRISE 534 SUNSET 2033 IN MILITARY HOURS
TIMEIN 1900 810630 TIMEOUT 2045 810701 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.2E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	2.68	0.02	30.0	0.21	3.21	2.88	2.68	6.41	7.14
65	1.94	0.02	33.7	0.17	2.48	2.15	1.95	4.25	4.91
32	1.37	0.02	36.5	0.13	1.91	1.58	1.38	2.89	3.50
16	0.86	0.02	46.4	0.09	1.41	1.08	0.88	1.55	2.03
6	-0.01	0.02	28.3	0.04	0.55	0.22	0.02	0.52	1.30
NO 100	3.27	0.02	34.1	0.25	3.79	3.46	3.26	6.77	7.42
NH 100	2.59	0.02	31.7	0.21	3.12	2.79	2.59	5.86	6.56
PO 100	3.08	0.02	33.2	0.24	3.60	3.27	3.07	6.57	7.23

HATTON POINT
BEGINNING DATE 810708 YEAR MONTH DAY
SUNRISE 539 SUNSET 2031 IN MILITARY HOURS
TIMEIN 2330 810708 TIMEOUT 1730 810709 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	3.48	0.03	25.5	0.34	5.03	4.59	4.32	12.12	13.28
65	3.59	0.03	35.0	0.35	5.17	4.73	4.46	9.09	9.93
32	3.40	0.03	53.5	0.33	4.93	4.49	4.22	5.65	6.20
16	2.23	0.03	39.3	0.23	3.46	3.02	2.76	5.17	5.92
6	0.51	0.03	40.0	0.09	1.30	0.87	0.60	1.46	2.19
NO 100	5.87	0.03	44.4	0.54	8.03	7.59	7.32	11.50	12.16
NH 100	3.67	0.03	30.2	0.35	5.27	4.83	4.56	10.78	11.75
PO 100	3.69	0.03	26.3	0.36	5.29	4.86	4.59	12.40	13.52

HATTON POINT
BEGINNING DATE 810720 YEAR MONTH DAY
SUNRISE 546 SUNSET 2026 IN MILITARY HOURS
TIMEIN 2400 810720 TIMEOUT 1600 810721 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.6E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	4.71	0.06	74.9	0.55	8.04	7.22	6.69	6.56	7.32
65	6.00	0.06	95.0	0.67	9.89	9.06	8.54	6.51	7.10
32	4.17	0.06	97.1	0.50	7.27	6.44	5.92	4.52	5.10
16	3.55	0.06	103.2	0.43	6.38	5.55	5.03	3.67	4.21
6	0.86	0.06	90.5	0.17	2.52	1.70	1.17	1.28	1.90
NO 100	6.37	0.06	68.8	0.71	10.42	9.59	9.07	9.51	10.32
NH 100	5.71	0.06	75.8	0.65	9.47	8.65	8.12	7.78	8.52
PO 100	5.94	0.06	101.3	0.67	9.80	8.98	8.45	6.04	6.60

HATTON POINT
BEGINNING DATE 810818 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 1930 810818 TIMEOUT 1615 810819 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	6.68	0.09	110.6	0.85	11.56	10.38	9.49	6.86	7.64
65	4.72	0.09	120.9	0.65	8.88	7.70	6.81	4.66	5.37
32	4.85	0.09	137.8	0.66	9.06	7.88	6.99	4.18	4.81
16	3.64	0.09	128.3	0.54	7.41	6.23	5.34	3.55	4.23
6	-0.10	0.09	146.7	0.17	2.31	1.13	0.24	0.56	1.15
NO 100	6.97	0.09	116.2	0.87	11.95	10.77	9.88	6.79	7.53
NH 100	6.86	0.09	160.8	0.86	11.80	10.62	9.73	4.84	5.37
PO 100	6.32	0.09	150.5	0.81	11.07	9.89	8.99	4.81	5.38

HALLOWING POINT
BEGINNING DATE 800723 YEAR MONTH DAY
SUNRISE 550 SUNSET 2022 IN MILITARY HOURS
TIMEIN 2130 800723 TIMEOUT 2200 800724 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.5E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	12.79	0.08	90.0	0.91	13.22	12.08	11.34	9.24	10.11
65	11.45	0.08	90.0	0.83	12.01	10.88	10.14	8.32	9.18
32	10.51	0.08	90.0	0.77	11.17	10.03	9.29	7.67	8.54
16	5.18	0.08	90.0	0.44	6.38	5.24	4.50	4.01	4.87
6	0.79	0.08	90.0	0.17	2.43	1.30	0.56	0.99	1.86
NO 100	12.55	0.08	90.0	0.89	13.00	11.87	11.13	9.07	9.94
NH 100	12.32	0.08	90.0	0.88	12.86	11.68	10.92	8.93	9.83
PO 100	15.30	0.08	90.0	1.07	15.50	14.35	13.60	10.97	11.85

HALLOWING POINT
BEGINNING DATE 800729 YEAR MONTH DAY
SUNRISE 555 SUNSET 2017 IN MILITARY HOURS
TIMEIN 1730 800729 TIMEOUT 1330 800730 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.3E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	9.65	0.08	106.5	1.47	21.14	20.06	19.33	13.11	13.82
65	8.55	0.08	117.0	1.33	19.06	17.97	17.25	10.69	11.34
32	8.32	0.08	118.5	1.30	18.62	17.54	16.81	10.30	10.94
16	6.49	0.08	122.0	1.05	15.16	14.07	13.34	8.03	8.65
6	5.24	0.08	123.0	0.89	12.79	11.70	10.98	6.62	7.24
NO 100	9.36	0.08	105.5	1.45	20.85	19.67	18.88	12.98	13.76
NH 100	9.24	0.09	109.0	1.45	20.89	19.61	18.75	12.52	13.34
PO 100	9.93	0.08	107.0	1.52	21.90	20.73	19.95	13.48	14.24

HALLOWING POINT
BEGINNING DATE 800804 YEAR MONTH DAY
SUNRISE 559 SUNSET 2012 IN MILITARY HOURS
TIMEIN 2030 800804 TIMEOUT 1315 800805 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	7.43	0.11	84.8	1.27	18.06	16.53	15.48	13.71	14.98
65	8.04	0.11	94.3	1.35	19.25	17.72	16.67	13.22	14.36
32	7.49	0.11	98.8	1.28	18.18	16.65	15.60	11.85	12.94
16	6.33	0.11	97.3	1.12	15.91	14.38	13.33	10.39	11.50
6	1.56	0.11	85.0	0.46	6.57	5.05	3.99	4.18	5.44
NO 100	8.13	0.12	85.0	1.39	19.73	18.07	16.93	14.95	16.33
NH 100	7.32	0.11	86.3	1.25	17.80	16.29	15.25	13.28	14.51
PO 100	9.01	0.13	84.9	1.53	21.76	19.96	18.73	16.54	18.02

HALLOWING POINT
BEGINNING DATE 800807 YEAR MONTH DAY
SUNRISE 604 SUNSET 2007 IN MILITARY HOURS
TIMEIN 2030 800807 TIMEOUT 1415 800808 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	8.47	0.05	113.3	1.14	16.02	15.34	14.86	9.64	10.07
65	8.27	0.05	118.8	1.12	15.68	14.99	14.51	8.99	9.40
32	7.66	0.05	116.8	1.04	14.63	13.95	13.47	8.50	8.92
16	6.35	0.05	120.3	0.88	12.38	11.70	11.22	6.92	7.33
6	1.96	0.05	116.8	0.34	4.84	4.16	3.68	2.54	2.95
NO 100	9.45	0.09	109.3	1.36	19.04	17.74	16.82	11.56	12.40
NH 100	9.77	0.10	111.8	1.42	19.95	18.49	17.45	11.77	12.71
PO 100	9.87	0.10	114.3	1.42	19.93	18.56	17.58	11.56	12.42

HALLOWING POINT
BEGINNING DATE 800813 YEAR MONTH DAY
SUNRISE 609 SUNSET 2000 IN MILITARY HOURS
TIMEIN 2245 800813 TIMEOUT 1515 800814 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.0E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	10.68	0.06	110.0	1.29	17.84	16.96	16.32	11.14	11.71
65	12.63	0.06	121.5	1.50	20.81	19.93	19.29	11.84	12.36
32	9.18	0.06	124.0	1.12	15.55	14.68	14.04	8.55	9.06
16	11.99	0.06	136.0	1.43	19.83	18.96	18.32	10.06	10.53
6	5.48	0.06	141.3	0.72	9.92	9.05	8.41	4.62	5.07
NO 100	11.48	0.09	111.5	1.42	19.72	18.48	17.57	11.97	12.77
NH 100	11.27	0.11	111.5	1.43	19.83	18.35	17.27	11.89	12.84
PO 100	12.39	0.10	105.5	1.53	21.25	19.93	18.96	13.64	14.54

HALLOWING POINT
BEGINNING DATE 800820 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 2315 800820 TIMEOUT 1430 800821 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 3.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	5.23	0.05	68.9	0.73	9.95	9.24	8.71	9.82	10.57
65	4.73	0.05	80.9	0.67	9.13	8.42	7.88	7.61	8.25
32	3.85	0.05	82.4	0.56	7.67	6.96	6.43	6.18	6.81
16	2.13	0.05	81.4	0.35	4.83	4.12	3.58	3.70	4.34
6	0.12	0.05	72.4	0.11	1.50	0.80	0.26	0.80	1.52
NO 100	4.86	0.05	77.9	0.68	9.34	8.63	8.10	8.11	8.77
NH 100	5.93	0.05	77.9	0.82	11.16	10.42	9.87	9.79	10.48
PO 100	5.60	0.03	80.4	0.74	10.13	9.66	9.30	8.79	9.22

HALLOWING POINT
BEGINNING DATE 800825 YEAR MONTH DAY
SUNRISE 620 SUNSET 1942 IN MILITARY HOURS
TIMEIN 2400 800825 TIMEOUT 1315 800826 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	4.69	0.08	55.2	0.84	11.17	10.07	9.20	13.65	15.14
65	5.34	0.08	56.2	0.93	12.43	11.33	10.45	15.08	16.55
32	4.84	0.08	61.7	0.86	11.46	10.36	9.49	12.57	13.90
16	4.39	0.08	62.7	0.79	10.59	9.49	8.62	11.33	12.64
6	1.00	0.08	63.2	0.30	4.04	2.94	2.06	3.48	4.78
NO 100	4.72	0.10	54.1	0.86	11.56	10.29	9.27	14.22	15.98
NH 100	5.10	0.09	53.7	0.92	12.27	11.01	10.01	15.35	17.10
PO 100	5.35	0.10	55.2	0.96	12.87	11.55	10.50	15.65	17.44

HALLOWING POINT
BEGINNING DATE 800903 YEAR MONTH DAY
SUNRISE 628 SUNSET 1931 IN MILITARY HOURS
TIMEIN 140 800903 TIMEOUT 1230 800903 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.40	0.06	73.5	1.16	15.16	14.43	13.81	15.04	15.81
65	4.28	0.06	81.5	0.81	10.58	9.84	9.23	9.25	9.94
32	4.92	0.06	78.5	0.92	11.96	11.23	10.61	10.96	11.68
16	3.84	0.06	78.0	0.74	9.63	8.89	8.27	8.73	9.46
6	1.29	0.06	81.0	0.31	4.11	3.37	2.75	3.19	3.89

HALLOWING POINT
BEGINNING DATE 800915 YEAR MONTH DAY
SUNRISE 640 SUNSET 1910 IN MILITARY HOURS
TIMEIN 2300 800915 TIMEOUT 1300 800916 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.1E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	3.47	0.09	63.5	0.75	9.32	8.20	7.17	10.33	11.74
65	3.39	0.09	65.5	0.73	9.16	8.04	7.02	9.82	11.19
32	2.56	0.09	67.5	0.60	7.52	6.40	5.38	7.59	8.91
16	1.45	0.09	74.5	0.43	5.33	4.21	3.19	4.52	5.72
6	0.00	0.09	66.5	0.20	2.47	1.35	0.32	1.63	2.97

HALLOWING POINT
BEGINNING DATE 801118 YEAR MONTH DAY
SUNRISE 648 SUNSET 1642 IN MILITARY HOURS
TIMEIN 2100 801118 TIMEOUT 1730 801119 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.6E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	1.03	0.01	23.7	0.12	1.19	1.07	0.89	4.55	5.09
65	0.75	0.01	23.7	0.09	0.93	0.81	0.63	3.45	3.98
32	1.30	0.01	23.7	0.15	1.44	1.32	1.14	5.62	6.15
16	1.25	0.01	23.7	0.14	1.40	1.27	1.09	5.42	5.95
6	0.40	0.01	24.8	0.06	0.61	0.49	0.31	1.98	2.49
NO 100	1.20	0.01	23.7	0.14	1.35	1.23	1.05	5.22	5.76
NH 100	0.60	0.01	23.7	0.08	0.80	0.67	0.49	2.86	3.39
PO 100	1.60	0.01	23.7	0.17	1.72	1.60	1.42	6.80	7.33

HALLOWING POINT
BEGINNING DATE 801216 YEAR MONTH DAY
SUNRISE 715 SUNSET 1636 IN MILITARY HOURS
TIMEIN 1745 801216 TIMEOUT 1715 801217 IN MILITARY URS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.9E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	1.25	0.01	15.6	0.15	1.38	1.29	1.15	8.85	9.47
65	1.20	0.01	16.4	0.14	1.34	1.25	1.10	8.14	8.73
32	0.35	0.01	16.9	0.06	0.54	0.45	0.31	2.86	3.44
16	0.35	0.01	16.9	0.06	0.54	0.45	0.31	2.86	3.44
6	0.20	0.01	17.6	0.04	0.40	0.31	0.17	1.88	2.44
NO 100	0.35	0.01	15.4	0.06	0.54	0.45	0.31	3.14	3.77
NH 100	0.25	0.01	15.6	0.05	0.45	0.36	0.21	2.45	3.07
PO 100	0.35	0.01	16.1	0.06	0.54	0.45	0.31	2.99	3.60

HALLOWING POINT
BEGINNING DATE 810204 YEAR MONTH DAY
SUNRISE 706 SUNSET 1722 IN MILITARY HOURS
TIMEIN 1700 810204 TIMEOUT 1830 810205 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 7.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.00	0.01	6.8	0.03	0.27	0.15	-0.01	2.14	3.87
65	0.00	0.01	6.8	0.03	0.27	0.15	-0.01	2.14	3.87
32	0.05	0.01	7.2	0.03	0.32	0.19	0.03	2.63	4.25
16	0.00	0.01	7.2	0.03	0.27	0.15	-0.01	2.02	3.65
6	-0.20	0.01	7.0	0.01	0.09	-0.03	-0.19	-0.43	1.25
NO 100	-0.17	0.01	6.8	0.01	0.12	-0.00	-0.17	-0.05	1.68
NH 100	-0.17	0.01	6.5	0.01	0.12	-0.00	-0.17	-0.06	1.75
PO 100	-0.11	0.01	6.5	0.02	0.17	0.05	-0.11	0.75	2.56

HALLOWING POINT
BEGINNING DATE 810401 YEAR MONTH DAY
SUNRISE 539 SUNSET 1828 IN MILITARY HOURS
TIMEIN 1815 810401 TIMEOUT 1500 810402 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 4.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL.
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.43	0.03	8.7	0.10	1.32	0.99	0.70	8.87	11.80
65	0.51	0.03	8.8	0.11	1.43	1.10	0.81	9.79	12.71
32	0.47	0.03	9.0	0.11	1.37	1.04	0.76	9.05	11.88
16	0.32	0.03	8.8	0.09	1.17	0.84	0.55	7.43	10.33
6	-0.18	0.03	9.0	0.04	0.48	0.15	-0.13	1.32	4.16
NO 100	0.28	0.03	7.9	0.09	1.11	0.78	0.50	7.73	10.97
NH 100	0.17	0.03	7.6	0.07	0.96	0.63	0.35	6.49	9.85
PO 100	0.23	0.03	8.0	0.08	1.04	0.71	0.43	6.97	10.16

HALLOWING POINT
BEGINNING DATE 810415 YEAR MONTH DAY
SUNRISE 523 SUNSET 1838 IN MILITARY HOURS
TIMEIN 1800 810415 TIMEOUT 1930 810416 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.4E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	2.84	0.04	35.5	0.27	3.58	3.07	2.66	6.53	7.60
65	1.77	0.04	35.5	0.19	2.57	2.07	1.66	4.40	5.47
32	1.81	0.04	40.8	0.20	2.61	2.11	1.70	3.89	4.33
16	0.27	0.04	41.0	0.09	1.16	0.66	0.25	1.21	2.14
6	-0.28	0.04	30.0	0.05	0.65	0.14	-0.27	0.36	1.63
NO 100	2.73	0.04	33.8	0.26	3.47	2.97	2.56	6.63	7.75
NH 100	2.09	0.04	33.0	0.22	2.87	2.37	1.96	5.42	6.57
PO 100	2.28	0.04	34.0	0.23	3.05	2.55	2.14	5.65	6.77

HALLOWING POINT
BEGINNING DATE 810519 YEAR MONTH DAY
SUNRISE 441 SUNSET 1912 IN MILITARY HOURS
TIMEIN 2230 810519 TIMEOUT 2400 810520 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	1.87	0.03	22.3	0.14	2.03	1.56	1.25	4.81	6.27
65	2.11	0.03	24.4	0.15	2.21	1.74	1.43	4.90	6.23
32	1.84	0.03	27.0	0.14	2.01	1.53	1.23	3.92	5.12
16	1.34	0.03	28.7	0.11	1.63	1.16	0.85	2.78	3.92
6	0.25	0.03	21.5	0.06	0.81	0.34	0.03	1.09	2.61
NO 100	2.15	0.03	23.2	0.15	2.24	1.77	1.46	5.26	6.66
NH 100	1.98	0.03	19.1	0.15	2.11	1.64	1.33	5.91	7.61
PO 100	2.13	0.03	18.9	0.15	2.22	1.75	1.44	6.38	8.11

HALLOWING POINT
BEGINNING DATE 810630 YEAR MONTH DAY
SUNRISE 534 SUNSET 2033 IN MILITARY HOURS
TIMEIN 1715 810630 TIMEOUT 2015 810701 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.2E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	8.49	0.04	54.8	0.65	9.77	9.17	8.81	11.16	11.89
65	3.50	0.04	82.8	0.31	4.67	4.07	3.71	3.28	3.77
32	2.45	0.04	59.1	0.24	3.60	3.00	2.64	3.39	4.07
16	1.70	0.04	90.4	0.19	2.84	2.24	1.88	1.65	2.09
6	0.13	0.04	52.7	0.08	1.23	0.64	0.27	0.80	1.56
NO 100	4.35	0.04	53.6	0.37	5.54	4.94	4.58	6.16	6.91
NH 100	4.20	0.04	53.1	0.36	5.39	4.79	4.43	6.02	6.77
PO 100	4.31	0.04	55.0	0.37	5.50	4.90	4.54	5.95	6.68

HALLOWING POINT
BEGINNING DATE 810708 YEAR MONTH DAY
SUNRISE 539 SUNSET 2031   IN MILITARY HOURS
TIMEIN 2300   810708 TIMEOUT 1700   810709 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET   1.1E8   MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	6.49	0.02	51.3	0.60	8.88	8.64	8.49	11.32	11.64
65	5.73	0.02	69.4	0.53	7.89	7.65	7.50	7.41	7.64
32	5.42	0.02	66.1	0.50	7.48	7.24	7.09	7.36	7.61
16	4.60	0.02	52.0	0.43	6.41	6.17	6.02	7.98	8.29
6	2.35	0.02	52.0	0.23	3.46	3.22	3.07	4.16	4.47
NO 100	6.33	0.02	46.0	0.58	8.67	8.43	8.28	12.33	12.68
NH 100	6.34	0.02	51.6	0.58	8.68	8.44	8.30	11.02	11.33
PO 100	6.73	0.02	57.9	0.62	9.20	8.96	8.81	10.40	10.68

HALLOWING POINT
BEGINNING DATE 810720 YEAR MONTH DAY
SUNRISE 546 SUNSET 2026   IN MILITARY HOURS
TIMEIN 2400   810720 TIMEOUT 1300   810721 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET   8.6E7   MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	4.78	0.05	71.4	0.74	10.91	10.23	9.80	9.77	10.42
65	3.94	0.05	80.3	0.63	9.21	8.53	8.10	7.24	7.82
32	3.17	0.05	88.6	0.52	7.64	6.97	6.54	5.36	5.88
16	2.31	0.05	80.9	0.40	5.90	5.22	4.79	4.40	4.97
6	0.39	0.05	107.1	0.14	2.01	1.33	0.90	0.85	1.28
NO 100	4.83	0.05	72.0	0.75	11.05	10.37	9.94	9.82	10.46
NH 100	4.70	0.05	90.0	0.73	10.75	10.07	9.64	7.63	8.14
PO 100	4.98	0.05	91.8	0.77	11.31	10.64	10.21	7.90	8.41

HALLOWING POINT
BEGINNING DATE 810818 YEAR MONTH DAY
SUNRISE 614 SUNSET 1954 IN MILITARY HOURS
TIMEIN 1845 810818 TIMEOUT 1545 810819 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 6.5E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	5.64	0.07	94.3	0.74	10.17	9.23	8.53	7.16	7.89
65	5.07	0.07	88.4	0.68	9.35	8.41	7.70	6.97	7.74
32	4.15	0.07	101.1	0.59	8.03	7.09	6.38	5.13	5.81
16	2.91	0.07	137.7	0.46	6.25	5.31	4.60	2.82	3.32
5	0.18	0.07	87.9	0.17	2.33	1.39	0.58	1.16	1.94
NO 100	5.65	0.07	81.7	0.75	10.18	9.24	8.54	8.28	9.12
NH 100	5.92	0.07	110.3	0.77	10.57	9.53	8.92	6.39	7.01
PO 100	5.15	0.07	100.3	0.69	9.46	8.53	7.82	6.22	6.91

DOUGLAS POINT
BEGINNING DATE 800529 YEAR MONTH DAY
SUNRISE 534 SUNSET 2021 IN MILITARY HOURS
TIMEIN 715 800529 TIMEOUT 1900 800529 IN MILITARY HOURS

DAY INCUBATION ONLY
TOTAL LIGHT SUNRISE TO SUNSET 1.1E+08 MICROEINSTEINS/M2/DAY

%LITE	OA-OB MG/L	R/HR MG/L/H	CHL A UG/L	GPP/H MG/L/H	GPP/D MG/L/D	NPP/D MG/L	D BAL MG/L	N/H/CHL	GPP/H/CHL MG/L/H/MG/L
100	4.92	0.05	49.5	0.41	6.03	5.33	4.89	7.28	8.24
65	5.30	0.05	49.5	0.44	6.45	5.74	5.31	7.85	8.81
32	4.26	0.05	49.5	0.36	5.30	4.60	4.16	6.29	7.25
16	3.10	0.05	49.5	0.27	4.03	3.32	2.88	4.54	5.50
6	1.26	0.05	49.5	0.14	2.00	1.30	0.86	1.77	2.74
NO 100	2.70	0.05	49.5	0.24	3.58	2.88	2.45	3.94	4.89
NH 100	3.11	0.05	49.5	0.28	4.12	3.32	2.83	4.54	5.62
PO 100	5.68	0.05	49.5	0.47	6.90	6.16	5.70	8.41	9.43

DOUGLAS POINT
BEGINNING DATE 800625 YEAR MONTH DAY
SUNRISE 532 SUNSET 2033 IN MILITARY HOURS
TIMEIN 2045 800625 TIMEOUT 1900 800626 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO_SUNSET 4.4E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB MG/L	R/HR MG/L/H	CHL A UG/L	GPP/H MG/L/H	GPP/D MG/L/D	NPP/D MG/L	D BAL MG/L	N/H/CHL	GPP/H/CHL MG/L/H/MG/L
100	2.36	0.05	31.4	0.26	3.94	3.15	2.67	6.67	8.35
65	3.14	0.05	31.4	0.32	4.81	4.02	3.54	8.52	10.19
32	1.68	0.05	31.4	0.21	3.18	2.39	1.92	5.07	6.74
16	1.28	0.05	31.4	0.18	2.73	1.94	1.47	4.12	5.79
6	-0.20	0.05	31.4	0.07	1.08	0.29	-0.18	0.62	2.29
NO 100	3.17	0.05	31.4	0.31	4.68	3.99	3.57	8.46	9.93
NH 100	3.66	0.05	31.4	0.35	5.21	4.53	4.12	9.60	11.04
PO 100	3.06	0.05	31.4	0.30	4.55	3.86	3.45	8.19	9.65

QUANTICO
BEGINGING DATE 800529 YEAR MONTH DAY
SUNRISE 534 SUNSET 2021   IN MILITARY HOURS
TIMEIN 815   800529 TIMEOUT 1930   800529 IN MILITARY HOURS

DAY INCUBATION ONLY
TOTAL LIGHT SUNRISE TO SUNSET   1.1E+08   MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	5.18	0.03	24.3	0.40	5.86	5.41	5.13	15.09	16.34
65	5.52	0.03	24.3	0.42	6.22	5.77	5.49	16.10	17.34
32	4.48	0.03	24.3	0.35	5.11	4.67	4.39	13.02	14.27
16	2.39	0.03	24.3	0.20	2.90	2.45	2.17	6.83	8.08
6	1.00	0.03	24.3	0.10	1.42	0.97	0.70	2.72	3.97
NO 100	5.97	0.03	24.3	0.45	6.69	6.25	5.97	17.43	18.68
NH 100	2.96	0.03	24.3	0.24	3.50	3.05	2.78	8.52	9.77
PO 100	1.63	0.03	24.3	0.14	2.09	1.64	1.36	4.58	5.83

QUANTICO
BEGINNING DATE 800625 YEAR MONTH DAY
SUNRISE 532 SUNSET 2033   IN MILITARY HOURS
TIMEIN 2200   800625 TIMEOUT 2000   800626 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET   4.4E+07   MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	3.86	0.05	34.0	0.35	5.23	4.43	3.94	8.67	10.25
65	2.71	0.05	34.0	0.27	4.04	3.23	2.75	6.33	7.91
32	3.29	0.05	34.0	0.31	4.64	3.83	3.35	7.51	9.09
16	1.45	0.05	34.0	0.18	2.73	1.92	1.44	3.77	5.35
6	-0.23	0.05	34.0	0.07	0.99	0.18	-0.30	0.35	1.93
NO 100	4.24	0.06	34.0	0.38	5.74	4.86	4.33	9.52	11.24
NH 100	3.70	0.05	34.0	0.34	5.06	4.26	3.78	8.34	9.90
PO 100	5.47	0.06	34.0	0.46	6.95	6.12	5.61	11.98	13.52

QUANTICO
BEGINNING DATE 800725 YEAR MONTH DAY
SUNRISE 532 SUNSET 2033 IN MILITARY HOURS
TIMEIN 2200 800725 TIMEOUT 2000 800726 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.1E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	3.86	0.05	34.0	0.35	5.23	4.43	3.94	8.67	10.25
65	2.71	0.05	34.0	0.27	4.04	3.23	2.75	6.33	7.91
32	3.29	0.05	34.0	0.31	4.64	3.83	3.35	7.51	9.09
16	1.45	0.05	34.0	0.18	2.73	1.92	1.44	3.77	5.35
6	0.23	0.05	34.0	0.10	1.46	0.66	0.18	1.29	2.87
NO 100	4.24	0.06	34.0	0.38	5.74	4.86	4.33	9.52	11.24
NH 100	3.70	0.05	34.0	0.34	5.06	4.26	3.78	8.34	9.90
PO 100	5.47	0.06	34.0	0.46	6.95	6.12	5.61	11.98	13.62

DOUGLAS POINT
BEGINNING DATE 800725 YEAR MONTH DAY
SUNRISE 532 SUNSET 2033 IN MILITARY HOURS
TIMEIN 2030 800725 TIMEOUT 1900 800726 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 9.1E+07 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	2.36	0.05	31.4	0.26	3.94	3.16	2.69	6.70	8.35
65	3.14	0.05	31.4	0.32	4.81	4.03	3.58	8.54	10.20
32	1.68	0.05	31.4	0.21	3.18	2.40	1.93	5.09	6.75
16	1.28	0.05	31.4	0.18	2.73	1.95	1.48	4.14	5.80
6	-0.20	0.05	31.4	0.07	1.08	0.30	-0.17	0.64	2.30
NO 100	3.17	0.05	31.4	0.31	4.68	4.00	3.56	8.48	9.94
NH 100	3.56	0.04	31.4	0.35	5.21	4.53	4.13	9.62	11.05
PO 100	3.06	0.05	31.4	0.30	4.55	3.87	3.46	8.21	9.66

QUANTICO
BEGINNING DATE 801118 YEAR MONTH DAY
SUNRISE 648 SUNSET 1642 IN MILITARY HOURS
TIMEIN 2120 801118 TIMEOUT 1750 801119 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	0.90	0.01	34.0	0.11	1.04	0.92	0.74	2.72	3.09
65	0.95	0.01	34.0	0.11	1.09	0.96	0.78	2.85	3.23
32	0.90	0.01	24.5	0.11	1.04	0.92	0.74	3.77	4.29
16	0.75	0.01	24.5	0.09	0.91	0.78	0.60	3.22	3.74
6	0.25	0.01	25.2	0.05	0.46	0.33	0.15	1.33	1.83
NO 100	0.93	0.01	34.0	0.11	1.07	0.94	0.76	2.80	3.17
NH 100	1.00	0.01	34.0	0.11	1.13	1.01	0.83	2.99	3.36
PO 100	0.60	0.01	34.0	0.08	0.77	0.65	0.47	1.92	2.29

QUANTICO
BEGINNING DATE 801216 YEAR MONTH DAY
SUNRISE 715 SUNSET 1636 IN MILITARY HOURS
TIMEIN 1730 801216 TIMEOUT 1630 801217 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	0.70	0.01	25.5	0.09	0.84	0.79	0.70	3.30	3.52
65	0.55	0.01	26.5	0.07	0.69	0.63	0.55	2.56	2.77
32	0.65	0.01	27.8	0.08	0.79	0.74	0.65	2.84	3.04
16	0.65	0.01	27.3	0.08	0.79	0.74	0.65	2.89	3.09
6	0.45	0.01	27.0	0.06	0.59	0.53	0.45	2.11	2.32
NO 100	0.70	0.01	25.6	0.09	0.84	0.79	0.70	3.28	3.51
NH 100	0.68	0.01	25.5	0.09	0.82	0.77	0.68	3.21	3.43
PO 100	0.65	0.01	25.4	0.08	0.79	0.74	0.65	3.10	3.33

QUANTICO
BEGINNING DATE 810204 YEAR MONTH DAY
SUNRISE 706 SUNSET 1722 IN MILITARY HOURS
TIMEIN 1945 810204 TIMEOUT 1345 810205 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	1.17	0.03	25.5	0.27	2.77	2.41	1.94	9.22	10.59
65	1.55	0.03	26.5	0.33	3.36	3.00	2.52	11.03	12.34
32	1.50	0.03	25.0	0.32	3.28	2.92	2.45	11.39	12.78
16	1.48	0.03	26.7	0.32	3.24	2.89	2.41	10.53	11.83
6	0.95	0.03	26.2	0.24	2.43	2.08	1.60	7.71	9.04
NO 100	1.25	0.03	22.9	0.28	2.89	2.54	2.06	10.80	12.31
NH 100	1.13	0.03	23.7	0.26	2.71	2.35	1.88	9.67	11.14
PO 100	1.08	0.03	23.0	0.26	2.63	2.28	1.90	9.64	11.15

QUANTICO
BEGINNING DATE 810401 YEAR MONTH DAY
SUNRISE 539 SUNSET 1823 IN MILITARY HOURS
TIMEIN 1800 810401 TIMEOUT 1430 810402 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 4.7E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	0.23	0.02	7.2	0.08	1.06	0.74	0.47	8.07	11.46
65	0.42	0.02	7.8	0.10	1.33	1.02	0.75	10.27	13.41
32	0.35	0.02	8.3	0.10	1.23	0.92	0.65	8.69	11.64
16	0.32	0.02	8.3	0.09	1.19	0.87	0.60	8.27	11.23
6	0.23	0.02	8.8	0.08	1.06	0.74	0.47	6.60	9.37
NO 100	0.36	0.02	7.2	0.10	1.25	0.93	0.66	10.11	13.50
NH 100	0.38	0.02	7.5	0.10	1.27	0.96	0.69	10.01	13.26
PO 100	0.51	0.02	7.4	0.11	1.46	1.15	0.88	12.13	15.42

QUANTICO
BEGINNING DATE 810519 YEAR MONTH DAY
SUNRISE 441 SUNSET 1912 IN MILITARY HOURS
TIMEIN 2400 810519 TIMEOUT 2400 810520 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.0E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	5.35	0.03	76.5	0.31	4.57	4.13	3.84	3.72	4.12
65	5.67	0.03	79.7	0.33	4.81	4.37	4.08	3.78	4.16
32	5.39	0.03	72.6	0.32	4.60	4.16	3.87	3.94	4.36
16	4.43	0.03	83.3	0.27	3.88	3.44	3.15	2.84	3.21
6	2.03	0.03	87.7	0.14	2.07	1.63	1.34	1.28	1.63
NO 100	5.36	0.03	73.1	0.32	4.58	4.14	3.85	3.90	4.31
NH 100	5.18	0.03	72.2	0.31	4.44	4.00	3.71	3.82	4.24
PO 100	5.42	0.03	69.7	0.32	4.62	4.18	3.89	4.13	4.57

QUANTICO
BEGINNING DATE 810630 YEAR MONTH DAY
SUNRISE 534 SUNSET 2033 IN MILITARY HOURS
TIMEIN 2010 810630 TIMEOUT 1630 810701 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.2E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L		MG/L/H/MG/L
100	7.46	0.10	135.4	0.86	12.94	11.48	10.60	5.66	6.38
65	6.25	0.10	101.5	0.75	11.28	9.82	8.94	6.46	7.42
32	5.80	0.10	94.0	0.71	10.66	9.20	8.32	6.53	7.57
16	5.05	0.10	111.3	0.64	9.63	8.18	7.30	4.88	5.75
6	1.57	0.10	136.5	0.32	4.87	3.41	2.53	1.67	2.38
NO 100	7.77	0.10	98.2	0.89	13.36	11.90	11.02	8.09	9.08
NH 100	7.23	0.10	137.5	0.84	12.62	11.16	10.28	5.42	6.13
PO 100	7.56	0.10	113.1	0.87	13.07	11.61	10.74	6.85	7.72

QUANTICO
BEGINNING DATE 810708 YEAR MONTH DAY
SUNRISE 539 SUNSET 2031 IN MILITARY HOURS
TIMEIN 2245 810708 TIMEOUT 1620 810709 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 1.1E8 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	6.60	0.04	55.7	0.69	10.23	9.59	9.20	11.58	12.35
65	5.70	0.04	58.3	0.60	8.98	8.34	7.95	9.62	10.35
32	4.64	0.04	78.0	0.50	7.50	6.87	6.48	5.92	6.47
16	4.14	0.04	80.0	0.46	6.80	6.17	5.78	5.19	5.72
6	3.00	0.04	87.5	0.35	5.22	4.58	4.19	3.52	4.01
NO 100	6.95	0.04	45.5	0.72	10.72	10.08	9.69	14.91	15.85
NH 100	6.18	0.04	57.6	0.65	9.64	9.01	8.62	10.53	11.27
PO 100	6.29	0.04	40.2	0.66	9.80	9.16	8.77	15.35	16.41

QUANTICO
BEGINNING DATE 810720 YEAR MONTH DAY
SUNRISE 546 SUNSET 2026 IN MILITARY HOURS
TIMEIN 2400 810720 TIMEOUT 1345 810721 IN MILITARY HOURS

OVERNIGHT INCUBATION
TOTAL LIGHT SUNRISE TO SUNSET 8.6E7 MICROEINSTEINS/M2/DAY

%LITE	OA-OB	R/HR	CHL A	GPP/H	GPP/D	NPP/D	D BAL	N/H/CHL	GPP/H/CHL
	MG/L	MG/L/H	UG/L	MG/L/H	MG/L/D	MG/L	MG/L	MG/L/H/MG/L	
100	7.06	0.05	66.3	0.97	14.29	13.53	13.04	13.92	14.71
65	4.50	0.05	67.0	0.65	9.59	8.82	8.33	8.98	9.76
32	4.62	0.05	68.2	0.67	9.81	9.04	8.55	9.04	9.81
16	2.93	0.05	73.3	0.46	6.71	5.94	5.45	5.52	6.24
6	0.57	0.05	86.7	0.16	2.37	1.60	1.11	1.26	1.86
NO 100	6.63	0.05	65.0	0.92	13.50	12.74	12.25	13.36	14.17
NH 100	6.62	0.05	68.2	0.92	13.48	12.72	12.23	12.72	13.48
PO 100	6.46	0.05	59.9	0.90	13.19	12.42	11.93	14.14	15.02