

Calculations for estimating primary productivity

Gross photosynthesis (oxygen produced by photosynthesis) (mgO_2/l) = mean of light A & B - mean of dark A & B

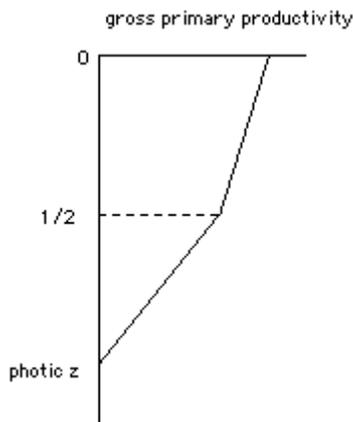
(Note: Respiration and net photosynthesis can be calculated each separately if desired by considering initial D.O. in bottles. For calculating gross photosynthesis, initial D.O. does not need to be considered because it subtracts out when calculating Gross PS from Net PS and respiration)

Gross Primary Productivity at each depth ($\text{mgC}/\text{m}^3/\text{h}$) = (Gross photosynthesis * 1000 * 0.375/1.25) / time of incubation

where:

- 1.25 is the photosynthetic quotient to adjust for conversion of sugar to other organic forms
- .375 is the ratio of moles of carbon to moles of oxygen in the reaction for photosynthesis (12/32)

Primary Productivity over depth interval ($\text{mgC}/\text{m}^2/\text{h}$) = depth interval * (GP at top of interval + GP at bottom of interval) / 2



(Assume GP at bottom of deepest interval is zero)

Primary Productivity throughout water column ($\text{mgC}/\text{m}^2/\text{h}$) = sum of photosynthesis over intervals

Primary Productivity expressed by volume ($\text{mgC}/\text{m}^3/\text{h}$) = Primary Productivity throughout water column / photic depth

Calculations to determine chlorophyll concentration

$$[\text{Chl } a] = (26.73 * ((\text{abs}_{665}\text{before} - \text{abs}_{750}\text{before}) - (\text{abs}_{665}\text{after} - \text{abs}_{750}\text{after})) * \text{ml of extract}) / (\text{liters filter} * \text{path length})$$

Calculations to determine zooplankton densities for each taxa

$$\text{Density of zooplankton (individuals/m}^3\text{)} = \frac{(\text{total individuals per subsample} * \text{sample volume} / \text{total subsample volume})}{\text{volume of water sampled}}$$

volume of water sampled

where:

$$\text{Volume of water sampled} = \text{depth of tow} * (\text{radius of net})^2 * 3.1415$$

$$\text{diameter of net} = 0.3048\text{m}$$