# Equations for Microplankton Analysis

## Preservative factor

(sample water, ml – preservative added, ml)/ sample water ml

## Volume of organism, by shape, in µm3 per cell

### diameter = sa; height = la, width = wi

cone1 = (pi/12) \* diameter2 \* height

cones2 = 2 \* pi/12) \* diameter2 \* height

sphere = (pi/6) \* diameter3

prolate spheroid = (pi/6) \* diameter2 \* height

cylinder = (pi/4) \* diameter2 \* height

ellipsoid = (pi/6) \* diameter \* height \* width

rectangular box = diameter \* height \* width

prism on elliptic base = (pi/4) \* diameter \* height \* width

prism on parallelogram = 0.5 \* diameter \* height \* width

## Equivalent Spherical Diameter of organism

esd = 2\*(0.75/pi\*vol\_per\_cell\_um3)1/3

6/17/23, Alternatively, below:

Volume of a sphere:

V=

d = 2r; r = d/2

V=

d3 = V\*6/

d = 3

## Biomass, by taxonomic group, in pgC cell-1

### volume= volume per cell

ciliate = 0.216 \* volume0.939

tintinnid = 0.216 \* volume0.939

chlorophyte = 0.216 \* volume0.939

dinoflagellate = 0.216 \* volume0.939

ochrophyte = 0.216 \* volume0.939

unidentified = 0.216 \* volume0.939

cyanobacteria = 0.216 \* volume0.939

cyanobacteria = 0.216 \* volume0.939

diatom, V > 3,000 µm3 = 0.117 \* volume0.881

diatom V ≤ 3,000 µm3 = 0.287 \* volume0.811

## Clearance Rate, ml copepod-1 day-1

(ml of water with that organism in it; i.e., concentration of that organism)

V /T \* ( lnC -lnE)/n

V= volume of experimental container, 595 ml

T= time of experiment, 1 day

C = means of control samples, counts ml-1

E = experimental samples, counts ml-1

ln = natural log, or loge, or log base e

## Ingestion Rate (aka feeding rate or consumption rate), quantity (biomass pgC or µgC, or cell counts) copepod-1 day-1

CR x mean I

CR = Clearance rate, ml copepod-1 day-1

I = initial samples, counts ml-1 or biomass, µgC L-1

## Counts (cells) per milliliter

counts/(propCntd\*pres\_fact\*vol\_set\_ml)

propCntd = proportion of the slide area that was counted

pres\_fact = preservative factor, see above

vol\_set\_ml = volume of sample settled in the conical tube, in milliliters

## Biomass per milliliter, in pg Carbon

bio\_pgC\_ml = tot\_biomass\_pgC/(propCntd\*pres\_fact\*vol\_set\_ml)

tot\_biomass\_pgC = counts \* biomass\_cell\_pgC

See above for divisor details

## Biomass per liter, in µg Carbon

bio\_pgC\_ml\*0.001

1pg = 0.000001 µg

1ml = 0.001 L

1pg ml-1 = 0.001 µg L-1

1 pg mL-1 \* \* = 0.001 µg L-1

1 pg / ml \* 0.000001 µg / 1 pg \* 1 ml / 0.001 L = 0.001 µg/L