

Methodology Applied in the Calculation of Chesapeake Bay Program Phytoplankton Composite Metrics and Index of Biotic Integrity (PIBI)



Chesapeake Bay Program

1 March 2008

Prepared for:
United States Environmental Protection Agency
Chesapeake Bay Program
410 Severn Avenue
Annapolis, Maryland 21403

Prepared By:



Interstate Commission on the Potomac River Basin
51 Monroe Street, PE 8
Rockville, Maryland 20850

Introduction

Teams of Bay Program scientists and natural resource managers have worked to develop indicators of Chesapeake Bay ecosystem health. These indicators are calculated using monitoring data and provide an indication of how well the various biological communities are functioning. The technical indicators are being used to interpret and communicate monitoring results in the annual Bay Health and Restoration Report. Scientists and managers have found that these summaries provide quantitative information on food chain responses to toxic load reductions in the Chesapeake Bay. Indicators have also been a critical piece of the ongoing efforts to develop biocriteria and restoration targets for state waters (USEPA Chesapeake Bay Program. 2003, Gibson et al 2000). There are number of technical indicators for various trophic groups currently under development or peer review.

Phytoplankton (free-floating, microscopic algae) are supported by nutrients and light in the water and form the base of the estuarine food web. Planktonic organisms have long been used to assess pelagic environmental conditions (Stevenson & Pan, 1999). The state of Maryland and the Commonwealth of Virginia in cooperation with the US EPA Chesapeake Bay Program has monitored phytoplankton in Chesapeake Bay and its tidal tributaries as part of bay-wide water quality monitoring program since 1985. Through these coordinated programs plankton species abundance and composition are assessed to give comprehensive spatial and temporal information about plankton community conditions in the bay (Marshall et.al. 2006). Recently, additional emphasis has been placed on bloom and toxin producing species. This long term monitoring record has allowed for the assessment of trends in population development and changes in long term environmental relationships. Further information about the plankton monitoring programs can be found in the World Wide Web at <http://www.chesapeakebay.net/data/index.htm>.

Plankton indicators have frequently been used in composite indexes of ecosystem health (Jordan & Vaas, 2000; Bianchi et al., 2003). Metrics calculated from the long term monitoring data were recently used to characterize "reference communities," or populations of phytoplankton living in least-degraded water quality conditions (Alden etal 1997, Buchanan et. al 2005). Once established, these reference communities were used to create a Phytoplankton Index of Biotic Integrity (PIBI), or quantitative scale for assessing phytoplankton community status relative to water quality. The Chesapeake Bay Phytoplankton Index of biotic integrity was released in 2006 (Lacouture et al. 2006) was meant to be a tool for assessing the condition of the phytoplankton community in the bay.

The Phytoplankton Composite Metrics and P-IBI

As part of the development of Chesapeake Bay Phytoplankton reference communities (Buchanan et al 2005) and a Phytoplankton Index of Biotic Integrity (PIBI) (Lacouture et al 2006) a series of summary phytoplankton parameters were calculated for all monitoring events. While the majority of these calculated values are not scored metrics in the PIBI, many users of monitoring data have found summary data to be more useful than “raw” taxa counts. Therefore the complete suite of these composite metrics is being made available as the Phytoplankton Indicator dataset as well as the scored PIBI metric data set. All values in this data set are layer-averaged values. See appendix A for details. The current list of available summary phytoplankton based parameters in the indicator dataset is as follows:

CHLOROPHYTE ABUNDANCE	MICROCYSTIS AERUGINOSA ABUNDANCE
CHLOROPHYTE BIOMASS	MICROCYSTIS AERUGINOSA BIOMASS
CHRYSOPHYTE ABUNDANCE	PICOPLANKTON ABUNDANCE
CHRYSOPHYTE BIOMASS	PICOPLANKTON BIOMASS
COCHLODINIUM HETEROLOBATUM ABUNDANCE	PRASINOPHYTE ABUNDANCE
COCHLODINIUM HETEROLOBATUM BIOMASS	PRASINOPHYTE BIOMASS
CRYPTOPHYTE ABUNDANCE	PROROCENTRUM MINIMUM ABUNDANCE
CRYPTOPHYTE BIOMASS	PROROCENTRUM MINIMUM BIOMASS
CYANOPHYTE ABUNDANCE	TOTAL PHYTOPLANKTON ABUNDANCE
CYANOPHYTE BIOMASS	TOT_PHYTOPLANKTON BIOMASS
DIATOM ABUNDANCE	BIOMASS TO CHLOPHYLL RATIO
DIATOM BIOMASS	AVERAGE CELL SIZE
DINOFLLAGGELATE ABUNDANCE	PERCENT CRYPTOPHYTE BIOMASS
DINOFLLAGGELATE BIOMASS	PERCENT CYANOPHYTE BIOMASS
EUGLENOPHYTE ABUNDANCE	PERCENT DIATOM BIOMASS
EUGLENOPHYTE BIOMASS	PERCENT DINOFLLAGGELATE BIOMASS
HAPTOPHYTE ABUNDANCE	
HAPTOPHYTE BIOMASS	

There are also a number of relevant water quality parameters which have been extracted from the Chesapeake Bay Program Water Quality Database. These parameters then had average layer values computed and were merged into the composite metric data set. These parameters include:

SALINITY	DISSOLVED OXYGEN
SURFACE CHLOROPHYLL	DISSOLVED ORGANIC CARBON
INORGANIC PHOSPHATE	PARTICULATE CARBON
CHLOROPHYLL a	PHAEOPHYTEN
SECCII DEPTH	TOTAL ORGANIC CARBON
DISOLVED INORGANIC NITROGEN	WATER TEMPERATURE
TOTAL SUSPENDED SOLIDS	

Determination of Phytoplankton Summary Parameters

Generally speaking the Chesapeake Bay phytoplankton monitoring data in mainstem and tidal tributaries of Maryland and Virginia collected prior to 2005 is not entirely comparable. While each lab used an Utermohl counting methodology, differences in the microscopic enumeration procedures produced data with significant method biases. In the Maryland the 1984-2004 counting procedure consisted of a two step procedure (USEPA Chesapeake Bay Program, 2006A). The primary counting magnification was 600X and 20 random fields were counted with a 200 cells count minimum. A secondary scan of 20 random fields to find the rarer, larger forms of the counting chamber was performed at 312X. In Virginia prior to 2005 a three step counting procedure was used (USEPA Chesapeake Bay Program, 2006B). The primary counting magnification was at 312X and 10 random fields were counted with a 200 cell minimum. A secondary count of 10 random fields at 500X was performed to enumerate small cells not discernable at the 315x counted at 500X. In the final step, the entire counting chamber was scanned at 125X for previously unrecorded larger species in the chamber. The end product of these counts at different magnifications was that Maryland produced higher counts of smaller cells (<5 microns) while species diversity was higher in Virginia data. Based on this information and the results of the split sample

comparisons, prior to 2005 Maryland and Virginia abundance data should be analyzed separately for baywide status and trends.

A uniform three magnification counting technique was adopted by both states in 2005. In this protocol all species are counted at only one magnification. At *high magnification (600X or 500X)* 20 random fields are counted. *Only cells* ≥ 3 and ≤ 10 microns in diameter are counted and no colonies, trichomes or filaments counted at this magnification. At mid-magnification (*300X OR 312X*) 10 random fields with a 200 cell minimum are counted. At this level only cells between 5 microns and 60 microns are enumerated. Counts here do include all colonies, trichomes & filaments. At low magnification (*125X*) the entire chamber scanned for unrecorded larger species. Rare species are defined as having 1 cell in less than 10 grids. Larger species are defined at those >60 microns in diameter. The counts produced under the uniform protocol will have the better estimates of species diversity of the old Virginia method and the more accurate assessment of smaller cells (<5 microns) from the old Maryland protocol along with baywide consistency.

In recent years, there has been an increased recognition of the value of phytoplankton biovolume /cell size estimates and conversion to carbon content based on biovolume. Both phytoplankton biovolume distributions and carbon estimates are providing increased insight into the health of estuarine systems. In the Chesapeake Bay, there are a number of laboratories in the region in addition to those who participate in the CBP monitoring program, which routinely enumerate phytoplankton. All of these Individual laboratories have been compiling cell dimensions for the Bay's phytoplankton taxa from taxonomic keys and actual microscope cell measurements for many years. In 2007, there was a coordinated effort between labs to compile a unified comprehensive master list of dimensions, biovolumes and carbon factors. This was a massive effort since approximately 1400 unique phytoplankton taxa identified in Chesapeake Bay program monitoring data record (Johnson, 2008 personal comm.).

It has become common practice to estimate cell biovolumes through the application of geometric shapes and there are numerous literature sources recommending geometric shape assignment (Kovala and Larrance, 1966; Edler 1979; Hillebrand et al., 1999, Sun and Liu 2003, Olenina et al., 2006; Vadrucci et al., 2007). In the unified Chesapeake Bay biovolume\ carbon list geometric shape were assigned as recommended in Hillebrand et al (1999) with noted exceptions. Within the biovolume literature, there are two schools of thought about the assignment of geometric forms for the calculation of biovolume. Some have recommended the use of complex geometric forms to approximate the actual configuration of plankton cells for the calculation of biovolume (Kovala and Larrance, 1966; Hillebrand et al., 1999; Sun and Liu, 2003). However, complex geometric shapes such as the cymbelloid, gomphonemoid proposed by (Hillebrand et al., 1999) or composites of multiple shapes (example-elliptical prism plus four cones) as suggested in (Sun and Liu, 2003) require detail measurement of complex angles and projection from the cell body that are difficult to make. Other sources advocate the use of simpler geometric forms contending less bias (Edler 1979; Vadrucci 2007) although simpler shapes tends to over estimated biovolume. The detailed measurement required for the use of complex shapes is not part of the existing data set; therefore, we opted to use the simplest geometric shape possible. It was community consensus that even a slight overestimation of biovolume was acceptable because taxa cell sizes vary greatly in estuarine systems due to environmental conditions (XXXXX). Cell dimensions derived from actual microscope cell measurements selected over dimensions derived from taxonomic keys. Currently, dimensions for 986 taxa found in the current monitoring data have been compiled. These are denoted by the following method codes noting the source of dimensions (JJ_2008, MSU_2007, MSU_2006, MSU_FEB_08, MSU_APR_01, MSU_SEP_01, ODU_2008, ODU_2006, SELLNER_2008, SERC_2007, SERC_FEB_08) (Table B1). Currently there are 21 shapes employed in the standardized Chesapeake Bay List (Table B2). There are four notable simplifications to shape codes over Hillebrand et al., 1999 recommended the shape. All taxa in the genera of Amphora, Auricula, Cymbella, Encyonema, Hemidiscus, and Rhopalodia, where the recommended geometric shape is cymbelloid were simplified to ellipsoids. Shapes for the taxa of the genera Actinastrum and Ankistrodesmus were simplified to prolated sphere from cylinder+ 2 cones. Species in the genera of Chataeteroceros were estimated as cylinder, the recommended shape is elliptical prism but dimensions were unavailable to use the correct shape. Taxa in the genus Chattonella were estimated using a shape of a cone plus half sphere.

The conversion of biovolume to carbon was based on protocol and equation from Smayda, (1978). For all phytoplankton other than diatoms, the following equation was used to convert biovolume to a carbon estimate

$$\log_{10} C = (0.866 * \log_{10} (TV)) - 0.46$$

Where:

TV = Total Cell Biovolume in Cubic Microns

C = Cell Carbon Value in picogram per Cell

For all diatoms, cell plasma volume was corrected for the presences of the cell vacuole, and then a conversion to carbon was made (Smayda, 1978; Sicko-Goad et al., 1977). The cell cytoplasmic layer was calculated as the ratio of total cell surface area to area to total cell volume.

Ratio of Total Cell Area to Total Cell Volume	Cytoplasmic Layer Thickness
X < 0.35	2 μ m
0.35 <= X > 0.50	1.5 μ m
0.50 - 0.89	1 μ m
> 0.90	PV= Total Volume

Cell plasma volume was then calculated using an equation from Smayda (1978).

$$Plasma\ Volume = (SA)(CL) + (0.1 * TV)$$

Where:

SA = Cell Surface Area in Square Microns

TV = Total Cell Biovolume in Cubic Microns

CL = Cytoplasmic Layer Thickness in Microns

Then the following equations were applied to convert plasma volume to estimate cell carbon:

Equation to calculate phytoplankton carbon for diatoms where the ratio of cell surface area to cell volume is < 0.9

$$\log_{10} C = 0.892 * \log_{10} (PV) - 0.61$$

Equation to calculate phytoplankton carbon for diatoms where the ratio of cell surface area to cell volume is > 0.9

$$\log_{10} C = 0.758 * \log_{10} (TV) - 0.422$$

Where:

PV = Total Cell Plasma in Cubic Microns

TV = Total Cell Biovolume in Cubic Microns

C = Cell Carbon Value in picograms per Cell

The current unified list has 405 taxa had carbon values calculated, but not the dimensions used to make carbon estimate were not provided by the data generating lab. For 71 of these taxa; biovolumes and surface areas were derived by computing a mean of all carbon value for all the taxa in the genus, family or group. These taxa have an assigned the method designations of FAMILY_AVE, GENUS_AVE, or GROUP_AVE. For the remaining 332 taxa, a biovolume was back calculated using the appropriate equations from Smayda (1978). In all cases where diatom biovolumes were back calculated, the plasma volume was assumed to equal to Total Cell volume. (Method codes: CBP_EST_T1 and CBP_EST_TB)

There was a subset of the remaining 332 taxa where it was possible to derive an estimate of cell dimensions. Any cell where the assigned shape was sphere or a cube requires only one dimension to calculate a biovolume. There were 96 taxa where both biovolume and dimensions were back calculated (method code: CBP_EST_TB). Resulting dimensions were spot checked against available taxonomic resources to assess whether derived values were realistic values. There were an additional 352 Taxa where carbon values were provided but the taxa is not currently found in the Chesapeake Bay Program monitoring data (method CBP_EST_T2). These data had their average biovolume calculated as described.

The biomass estimation method is described extensive detail in Lacouture et al (in prep.) with current conversion factors in Appendix C. Surprisingly the 1984-2004 data showed few significant differences between the Maryland and Virginia count-based biomass estimates. Despite the known count differences and biomass data can be combined for baywide status and trend and IBI development work across the entire data record.

All of the phytoplankton metrics are simple upper or lower water column averages of total or specific groups or taxa. The technique, which is used to generate the biomass and abundance values for the Chesapeake Bay Program Phytoplankton data, is a simple mathematical process summarized as follows:

1. All desired phytoplankton data is pulled from database.
2. There are a number of taxa which appear in the data but are not truly part of the nano-micro phytoplankton size fractions (2 - 200 μm) and are thus removed from the data set. These taxa are as follows:
 - All Unidentified Blue Green Single Sphere
 - Enteromorpha Intestinalis
 - All Unidentified Green Cells (All Size Classes)
 - Hydrodictyon Sp.
 - Lemma Minor
 - All Unidentified Microphytoflagellates (All Size Classes)
3. The derived phytoplankton biomass conversion factors are applied. The data matched to conversion factor based on data source and in-house species code. Conversion factor was then multiplied by abundance for taxa to derive a taxon biomass.
4. Total abundance and total biomass are estimated by summing data on a per sample basis with a sample defined as a station, date, layer combination. For events where replicate samples were taken, replicates were averaged. Abundance values are reported as cell per liter all biomass is reported as micrograms carbon per liter.
5. Total Abundance and Biomass of major groups (phylum) and specific harmful algal taxa (*Microcystis Aeruginosa*, *Cochlodinium Heterolobatum* *Prorocentrum Minimum*) are also calculated on a per sample basis for each group. Again a sample was defined as a station, date, layer, sample number combination. Phytoplankton species phylum assignments are based on ITIS, NOAA NODC or other reputable taxonomic reference. See appendix X for complete details.
6. Finally various biomasses to abundance ratios are calculated.
 - Average Cell Size- Total Biomass / Total Abundance
 - Percent Cryptophyte Biomass= Cryptophyte Biomass/Total Biomass
 - Percent Cyanophyte Biomass= Cyanophyte Biomass/Total Biomass
 - Percent Diatom Biomass= Diatom Biomass/Total Biomass
 - Percent Dinoflagellate Biomass= Dinoflagellate Biomass/Total Biomass
7. Picoplankton Total biomass and abundance were calculated in an identical manner.
8. It was some stations required water layer reassignment. Due to changes in the Maryland monitoring program only whole water column samples were collected at the following stations after June of 1989: CB1.1, CB2.2, ET5.1, RET2.2, TF1.5, and TF 1.7. Maryland DNR felt that this change was justifiable because the stations are frequently well mixed and not significantly

stratified. WC reassigned AP for metric purposes. These stations are usually in the Tidal Fresh and Oligohaline salinity regimes.

Determination of Water Quality Summary Parameters

In the development of the PIBI and the phytoplankton reference communities a number of parameters from the Chesapeake Bay Water Quality Monitoring Program are used. These parameters included chlorophyll, salinity, dissolved inorganic nitrogen (DIN), Orthophosphate (PO₄), secchi depth, and dissolved organic carbon (DOC), phaeophytin, total suspended solids (TSS), total organic carbon (TOC) and water temperature. DIN is the sum of nitrate, nitrite and ammonia measurements. Orthophosphate (PO₄) is measured directly. For our analysis only the data for samples filtered through a glass fiber filter were used. Secchi depth is used to quantify available light because it has the longest period of record in both Maryland and Virginia (measurements of light attenuation, or K_d, were begun in the mid-1990s in Virginia). Chlorophyll and pheophytin are measured values. Secchi depth is always identified as a surface (S) value in the water quality database, and productivity is always identified as either above-pycnocline (AP) or water column (WC). The DIN, PO₄, chlorophyll and pheophytin data are apportioned to S, AP, below-pycnocline (BP) and bottom (B) layers in the database. If S and AP data were available, then the mean of the S and AP values was used as the upper layer, or AP, value. Similarly, if BP and B data were available, the mean of BP and B values was used as the lower layer, or BP, value. If AP and BP data were not collected at a station-date, indicating no pycnocline was present, then all available data was included in a water column (WC) mean. Conversely, if AP and BP data were collected even though no pycnocline was present, then AP and BP means were calculated and the layers retained as such. Salinity data are available in one-meter increments and assigned a layer code. A Salinity zone was assigned to each datum according to the layer's mean salinity using a standard Venice System: tidal fresh (F) (0.0 - 0.5 ppt), oligohaline (O) (>0.5 - 5.0 ppt), mesohaline (M) (>5.0 - 18.0 ppt), and polyhaline (P) (>18.0 ppt). A season was assigned by sampling month as follows: spring (March, April, May), summer (July, August, September), autumn (October, November), and winter (December, January, February). June was not assigned to any season because this month is a "transition" period between spring and summer phytoplankton patterns, and it usually exhibits much variability.

Handling of below detection limit (BDL) Water Quality data.

In the Chesapeake Bay Program water quality database, values below an analytical instrument's detection limit are not reported. Instead, the values are flagged as "bdl" and the parameter measurement takes the value of the detection limit. The detection limits have changed over the history of monitoring program as method sensitivity has improved. Therefore to following adjustment were made to the nutrient parameter to insure a uniform detection limit is reported though out the data set.

Ortho-Phosphate: If the measurement was bdl but above the cutoff level for its respective salinity zone, the value of the measurement was set to the cutoff level. That is, for tidal fresh, oligohaline, and polyhaline salinities, the value was set to 0.003-mg liter⁻¹, and for mesohaline the value was set to 0.002-mg liter⁻¹.

Dissolved Inorganic Nitrogen: DIN is obtained from the sum of NO₃, and NH₄. If DIN was greater than 0.03-mg liter⁻¹ and both of the constituents were bdl, then the value for DIN was set to 0.03-mg liter⁻¹. If only one of the constituents was bdl, and the non-bdl constituent was greater than or equal to 0.03, the value was not changed. If the non-bdl constituent was less than 0.03, then the value of DIN was set to 0.03-mg liter⁻¹.

Protocol for the Assignment of Phytoplankton Habitat Quality Classifications

Classification of water quality conditions or definitions for healthy versus unhealthy environmental conditions for plankton (i.e., promoting "desirable" vs. "undesirable" plankton) based on the phytoplankton

reference communities for Chesapeake Bay are also assigned in the data set. Each major phytoplankton water quality parameter, (DIN, PO₄, and secchi) was ranking of Better, Best, Poor or Worst based on water quality classification thresholds described in phytoplankton reference communities (Buchanan et al 2005). The current cutoffs used to differentiate water quality conditions in the four salinity zones are given in Table 1 for spring and Table 2 for summer. Finally the nutrient and light rankings are combined in to an overall phytoplankton habitat class (WQ_CATEGORY). For detail discussion of the derivation of water quality classification thresholds and overall water quality category assignments see Buchanan et al (2005),

Table 1. Spring (March - May) criteria for Worst, Poor, Better, and Best water quality categories.

Season	Parameter	Salzone	Worst	Poor	Better	Best
Spring	Secchi	TF	<0.7	=<0.9	>0.9	>1.1
Spring	Secchi	OH	<0.5	=<0.7	>0.7	>1.1
Spring	Secchi	MH	<1.35	=<1.8	>1.8	>2.25
Spring	Secchi	PH	<1.6	=<2.15	>2.15	>2.55
Spring	DIN	TF	>.585	>0.070	=<0.070	<0.030
Spring	DIN	OH	>.885	>0.070	=<0.070	<0.030
Spring	DIN	MH	>.265	>0.070	=<0.070	<0.030
Spring	DIN	PH	>.063	>0.070	=<0.070	<0.030
Spring	PO ₄	TF	>0.020	>0.003	=<0.003	=<0.003
Spring	PO ₄	OH	>0.010	>0.003	=<0.003	=<0.003
Spring	PO ₄	MH	>0.003	>0.002	=<0.002	=<0.002
Spring	PO ₄	PH	>0.005	>0.003	=<0.003	=<0.003

Table 2. Summer (July - September) criteria for Worst, Poor, Better, and Best water quality categories.

Season	Parameter	Salzone	Worst	Poor	Better	Best
Summer	Secchi	TF	<0.6	=<0.8	>0.8	>1.0
Summer	Secchi	OH	<0.55	=<0.6	>0.6	>0.7
Summer	Secchi	MH	<1.2	=<1.45	>1.45	>1.7
Summer	Secchi	PH	<1.55	=<1.85	>1.85	>2.35
Summer	DIN	TF	>.390	>0.070	=<0.070	<0.030
Summer	DIN	OH	>.090	>0.070	=<0.070	<0.030
Summer	DIN	MH	>.074	>0.070	=<0.070	<0.030
Summer	DIN	PH	>.070	>0.070	=<0.070	<0.030
Summer	PO ₄	TF	>0.025	>0.003	=<0.003	=<0.003
Summer	PO ₄	OH	>0.010	>0.003	=<0.003	=<0.003
Summer	PO ₄	MH	>0.008	>0.002	=<0.002	=<0.002
Summer	PO ₄	PH	>0.010	>0.003	=<0.003	=<0.003

Merging water quality and phytoplankton monitoring data.

The calculated data for phytoplankton biomasses and abundances are then merged with the water quality data. Phytoplankton and water quality data are usually collected simultaneously in the Chesapeake Bay Monitoring Program, however logistical issues sometimes require samples to be collected one or more days apart. In order utilize some of the mismatched data, the phytoplankton date was allowed to match up with a water quality date if the two events were within plus or minus three days of each other. This involved roughly 16% of the merge data records as of the end of calendar 2002. In some tidal fresh and oligohaline areas, WC layer phytoplankton samples could not be matched with equivalent water quality data because only AP and BP layer water quality samples were collected. It was felt that the WC phytoplankton samples should be matched with the AP water quality data for the best comparisons. So, AP or WC plankton samples were always matched with AP water quality data, and BP plankton samples were always matched with BP water quality data. In the case of secchi depth, which is always associated with the S (surface) layer in the water quality database, secchi was merged with the phytoplankton data on just the station and date fields. A complete list of field names and reporting units can be found in Appendix A.

The Phytoplankton Index of Biotic Integrity (PIBI)

The Chesapeake Bay P-IBI is calculated by scoring each of several attributes of phytoplankton community structure and function (abundance, biomass, present/absence of HAB's etc.) according to thresholds established from reference data distributions. The scores (on a 1 to 5 scale) are then averaged across attributes to calculate an index value. Samples with index values of 3.0 or more are considered to have good phytoplankton condition indicative of good habitat quality. The current Phytoplankton IBI's are salinity dependant, spring and summer indices based on above pycnocline samples. Currently twelve metrics are used to calculate the PIBI:

- Phytoplankton Total Biomass to Chlorophyll Ratio
- Surface Chlorophyll
- Percent Cryptophyte Biomass
- Cyanophyte Biomass
- Diatom Biomass
- Dino flagellate Biomass
- Dissolved Organic Carbon
- Microcystis Aeruginosa Abundance
- Pheophyten
- Picoplankton Abundance
- Prorocentrum Minimum Abundance
- Total Phytoplankton Biomass

A detailed discussion of the derivation of scoring thresholds can be found in Lacouture et al 2006. Table 3 and Table 4 show the current metrics and thresholds used to score each metric in the Chesapeake Bay PIBI by salinity regime and season. Once scored metric scores are averaged for a sampling event to obtain an overall PIBI score for each sampling event.

SCORING CRITERIA			
	5	3	1
SPRING FRESH			
BIOMASS_CHL_RATIO	>41.72	39.28>= and =41.72	<39.28
CHLA_SURF	>4.37 and <13.98	>=3.42 and <=4.37 or >=13.98and<=14.45	<3.42 or >14.45
CYANO_BIOMASS	NULL	NULL	>23.02
DOC	<2.19	>=2.19 and <=2.4	>2.4
PHEO	<1.55	>=1.55 and <=2.5	>2.5
TOT_BIOMASS	>172.99 and <583.9	>=583.9 and =828.5	<=172.99 or >828.5
SPRING OLIGOHALINE			
BIOMASS_CHL_RATIO	>21.245 AND <48.601	<=21.245 AND >=18.817	<18.817 OR >=48.601
CHLA_SURF	>7.74 AND <20.93	>=20.93 AND <=33.64 OR >=6.77 AND <=7.74	<6.77 OR >33.64
DOC	<2.69	>=2.69 AND <=3.27	>3.27
PHEO	<2.23	>=2.23 AND <=2.68	>2.68
TOT_BIOMASS	>133.67 AND <426.31	>=131.37 AND <=133.67 OR >=426.31 AND <=685.81	<131.37 OR >685.81
SPRING MESOHALINE			
BIOMASS_CHL_RATIO	>69.52	<=69.52 AND >=45.04	<45.04
CHLA_SURF	>2.9 AND <6.2	>=2.6 AND <=2.9 OR >=6.2 AND <=8.0	<2.6 OR >8.0
DIATOM_BIOMASS	>275.4 AND <2513	>=149 AND <=275.4	<149 OR >=2513
DINO_BIOMASS	>28.3 AND <156.9	>=156.9 AND <=268.2	<=28.3 OR >268.2
DOC	<2.84	>=2.84 AND <=3.17	>3.71
PHEO	<1.0	>=1.0 AND <=1.03	>1.03
PROROCENTRUM_MIN_ABUND	NULL	NULL	>1477600
TOT_BIOMASS	>342.2 AND <1149.7	>=305.1 AND <=342.2 OR >=1149.7 AND <=1512.1	<305.1 OR >1512.1
SPRING POLYHALINE			
BIOMASS_CHL_RATIO	>107.5	>=71 AND <=107.5	<71
CHLA_SURF	<2.8	>=2.8 AND <=4	>4
CRYPTO_BIO_PCT	<4.93	>=4.93 AND <=7.06	>7.06
DOC	<2.5	>=2.5 AND <=2.61	>2.61
PHEO	<0.55	>=0.55 AND <=0.9	>0.9
PROROCENTRUM_MIN_ABUND	<672	>=672 AND <=7488	>7488
TOT_BIOMASS	NULL	NULL	>1061.7

SCORING CRITERIA			
	5	3	1
SUMMER FRESH			
CHLA_SURF	>5.4 AND <12.0	>=12.0 AND <=12.3 OR <=5.4	>12.3
CYANO_BIOMASS	<38.87	>=38.37 AND <=67.4	>67.4
DIATOM_BIOMASS	<122.1	>=122.1 AND <=192.6	>192.6
DOC	<2.67	>=2.67 AND <=3.18	>3.18
MICROCYSTIS_AER_ABUND	NULL	NULL	>262507
PHEO	<2.4	>=2.4 AND <=4.3	>4.3
TOT_BIOMASS	>231.3 AND <555.7	<=231.3	>=555.7
SUMMER OLIGOHALINE			
CHLA_SURF	>4.2 AND <9.47	<=4.2	>=9.47
CYANO_BIOMASS	>1.79 AND <26.55	<=1.79	>=26.55
DIATOM_BIOMASS	>44.14 AND <126.59	<=44.14	>=126.59
DOC	<3.15	>=3.15 AND <=4	>4.0
PHEO	<1.58	>=1.58 AND <=2.81	>2.81
SUMMER MESOHALINE			
BIOMASS_CHL_RATIO	>36.91	>= 32.16 AND <=36.91	<32.16
CHLA_SURF	>2.6 AND <7.84	>=7.84 AND <= 9.74 OR <=2.6	>9.74
DINO_BIOMASS	>55.98 AND <200.92	<=55.98	>=200.92
DOC	<2.99	>=2.99 AND <=3.35	>3.35
PHEO	<1.23	>=1.23 AND <=1.6	>1.6
PICO_ABUND	>598,720,000	>=352,000,000 and <=598,720,000	<352,000,000
TOT_BIOMASS	>116.3 AND <331.2	>=70.8 AND <=116.3	>=331.2 OR <70.8
SUMMER POLYHALINE			
BIOMASS_CHL_RATIO	>74.5	<=74.5 AND >=37.67	<37.67
CHLA_SURF	<4.52	>=4.52 AND <=5.33	>5.33
CRYPTO_BIO_PCT	<3.9	>=3.9 AND <=6.5	>6.5
DIATOM_BIOMASS	> 181.45 AND <799.17	>137.44 AND <=181.45	>=799.17 OR <137.44
DINO_BIOMASS	>49.46 AND <554.45	>=33.8 AND <=49.46	>=554.45 OR <33.8
DOC	<2.59	>=2.59 AND <=2.8	>2.8
PHEO	<0.93	>=0.93 AND <=1.5	>1.5
PICO_ABUND	>269,500,000	>= 208,583,000 AND <=269,500,000	<208,583,000
TOT_BIOMASS	>206.5 AND <718.7	>= 180.8 AND <=206.5 OR >=718.7 AND <=757.3	>757.3 OR <180.8

REFERENCES

- Alden, R., H. Marshall, and K. Sellner. 1997. Phytoplankton indicators within the Chesapeake Bay Monitoring Program. Old Dominion University Research Foundation, AMRL Tech. Rpt. 3051. Norfolk, Va., 112 pp.
- Bianchi, F., Acri, F., Bernardi, A., Beron, A., Boldrin, A., Camatti, E., Cassin, D., & Comaschi, A. (2003). Can Phytoplankton communities be considered as bio-indicators of Water Quality in the Lagoon of Venice? *Marine Pollution Bulletin*, 46, 964-971.
- Buchanan, C., R.V. Lacouture, H.G. Marshall, M. Olson, J. Johnson. 2005. Phytoplankton reference communities for Chesapeake Bay and its tidal tributaries. *Estuaries* 28(1): 138-159.
- Edler, L. (Ed.), 1979. Recommendations on the methods for marine biological studies in the Baltic Seas. Phytoplankton and Chlorophyll. The Baltic Marine Biologists Publication no. 5
- Gibson, G. R., M. L. Bowman, J. Gerritsen, and B. D. Snyder. 2000. Estuarine and coastal marine waters: Bioassessment and biocriteria technical guidance. EPA 822-B-00-024. U.S. Environmental Protection Agency, Office of Water, Washington, DC. Available on-line at [http://www.epa.gov/ost/biocriteria/States/estuaries/Estuaries final.pdf](http://www.epa.gov/ost/biocriteria/States/estuaries/Estuaries%20final.pdf).
- Jordan, S. J. & Vass, P. A. (2000). An Index of Ecosystem Integrity for Northern Chesapeake Bay. *Environmental Science & Policy*, 3, S59-S88.
- Lacouture, R. V., J. M. Johnson, C. Buchanan, and H. G. Marshall (2006) Phytoplankton Index of Biotic Integrity for Chesapeake Bay and its Tidal Tributaries *Estuaries*, Vol. 29, No.4, pgs. 598-616.
- Lacouture, R. V., J. M. Johnson, C. Buchanan, and H. G. Marshall. (In prep.) The procedure for estimating carbon content of phytoplankton and its application to phytoplankton taxonomic data in Chesapeake Bay Estuary.
- Hillebrand, H., C-D. Durselen, D. Kikrschtel, U. Pollinger, and T. Zohary. 1999. Biovolume calculation for pelagic and benthic microalgae. *J. Phycol.* 35:403-424.
- Kovala, P. E. & Larrance, J. P. 1966. Computation of phytoplankton cell numbers, cell volume, cell surface area and plasma volume per litre, from microscopic counts. Special report, vol. 38, University of Washington, Seattle, pp. 1-91.
- Marshall H. G., R.V. Lacouture, R. V., C. Buchanan, and J. M. Johnson. (2006) Phytoplankton assemblages associated with water quality and salinity regions in Chesapeake Bay, USA. *Estuarine, Coastal, and Shelf Science*, 69:10-18.
- Mullin, M.M., P.R. Sloan, and R.W. Eppley. 1966. Relationship between carbon content, cell volume, and area in phytoplankton. *Limnol. Oceanogr.* 11: 307-311.
- Olenina, I., Hajdu, S., Edler, L., Andersson, A., Wasmund, N., Busch, S., Göbel, J., Gromisz, S., Huseby, S., Huttunen, M., Jaanus, A., Kokkonen, P., Ledaine, I. and Niemkiewicz, E. (2006) Biovolumes and size-classes of phytoplankton in the Baltic Sea. *HELCOM Balt. Sea Environ. Proc.* No. 106, 144pp.
- Sicko-Goad, L., E.F. Stoermer, and B.G. Ladewski (1977) A Morphometric Method for Correcting Phytoplankton Cell Volume Estimates. *Protoplasma* 93:147-163

Smayda, T.J. 1965. A quantitative analysis of the phytoplankton of the Gulf of Panama, II. On the relationship between C¹⁴ assimilation and the diatom standing crop. *Bull. Inter-am. Trop. Tuna Comm.* 9: 465-531.

Smayda, T.J. 1978. What to count? p 165-166. In A. Sournia (ed) *Phytoplankton Manual*. UNESCO. Paris. 337 pp.

Strathmann, R.R. 1967. Estimating the organic carbon content of phytoplankton from cell volume or plasma volume. *Limnol. Oceanogr.* 12: 411-418.

Stevenson, R. J., & Pan, Y. (1999). Assessing environmental conditions in rivers and streams with diatoms. In E. F. Stoermer, & J. P. Smol, (Eds.), *The Diatoms: Applications for the Environmental and Earth Sciences*. (pp. 11-40). New York: Cambridge University Press.

Sun and Liu J (2003) Geometric model for calculating cell biovolume and surface area for plankton. *Journal of Plankton Research* 25:1331-1346

USEPA Chesapeake Bay Program. 2003. Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll *a* for the Chesapeake Bay and Its Tidal Tributaries. U. S. Environmental Protection Agency. EPA 903-R-03-002. Available on-line at <http://www.epa.gov/region03/chesapeake/baycriteria.htm>.

USEPA Chesapeake Bay Program (2006A, June 11). Maryland Chesapeake Bay Program Phytoplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/phyto/mdphdoc.pdf

USEPA Chesapeake Bay Program (2006B, June 11). Virginia Chesapeake Bay Program Phytoplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/phyto/vaphdoc.pdf

Vadrucci M.R., Cabrini M., Basset A.(2007) Biovolume determination of phytoplankton guilds in transitional water ecosystems of Mediterranean Ecoregion. *Transit. Waters Bull.* 2(2007), 83-102

Appendix A- Description of Metrics and Reporting Units for Composite Phytoplankton Parameters.

Table A1- Field names, Definitions and Reporting units for Composite Phytoplankton Metrics

FIELD NAME	DEFINITION AND UNITS
WATER_BODY	CBP STREAM DESIGNATION
STATION	CBP SAMPLING STATION
SAMPLE_DATE	PHYTOPLANKTON SAMPLING DATE
UP_DATE	UPPER END OF 3 DAY DATA MATCHING WINDOW
DN_DATE	LOWER END OF 3 DAY DATA MATCHING WINDOW
WQ_DATE	WATER QUALITY SAMPLING DATE
Season	CBP SEASON DESIGNATION
WORK_LAYER	SAMPLE LAYER-ALL DATA AP (ABOVE PYCNOCLINE)
WORK_SALZONE	CBP ABOVE PYCNOCLINE SALINITY ZONE DESIGNATION
CHL_SURF	SURFACE CHLOROPHYLL A (0.5 M)
CHLORO_ABUND	TOTAL CHLOROPHYTE ABUNDANCE IN NUMBER/LITER
CHLORO_BIOMASS	TOTAL CHLOROPHYTE BIOMASS IN UG CARBON/LITER
CHRYSO_ABUND	TOTAL CHRYSOPHYTE ABUNDANCE IN NUMBER/LITER
CHRYSO_BIOMASS	TOTAL CHRYSOPHYTE BIOMASS IN UG CARBON/LITER
COCHLODINIUM_HET_ABUND	TOTAL COCHLODINIUM ABUNDANCE IN NUMBER/LITER
COCHLODINIUM_HET_BIOMASS	TOTAL COCHLODINIUM BIOMASS IN UG CARBON/LITER
CRYPTO_ABUND	TOTAL CRYPTOPHYTE ABUNDANCE IN NUMBER/LITER
CRYPTO_BIOMASS	TOTAL CRYPTOPHYTE BIOMASS IN UG CARBON/LITER
CYANO_ABUND	TOTAL CYANOPHYTE ABUNDANCE IN NUMBER/LITER
CYANO_BIOMASS	TOTAL CYANOPHYTE BIOMASS IN UG CARBON/LITER
DIATOM_ABUND	TOTAL DIATOM ABUNDANCE IN NUMBER/LITER
DIATOM_BIOMASS	TOTAL DIATOM BIOMASS IN UG CARBON/LITER
DINO_ABUND	TOTAL DINOFLAGGELATE ABUNDANCE IN NUMBER/LITER
DINO_BIOMASS	TOTAL DINOFLAGGELATE BIOMASS IN UG CARBON/LITER
EUGLENO_ABUND	TOTAL EUGLENOPHYTE ABUNDANCE IN NUMBER/LITER
EUGLENO_BIOMASS	TOTAL EUGLENOPHYTE BIOMASS IN UG CARBON/LITER
HAPTO_ABUND	TOTAL HAPTOPHYTE ABUNDANCE IN NUMBER/LITER
HAPTO_BIOMASS	TOTAL HAPTOPHYTE BIOMASS IN UG CARBON/LITER
MICROCYSTIS_AER_ABUND	TOTAL MICROCYSTIS ABUNDANCE IN NUMBER/LITER
MICROCYSTIS_AER_BIOMASS	TOTAL MICROCYSTIS BIOMASS IN UG CARBON/LITER
PICO_ABUND	TOTAL PICOPLANKTON ABUNDANCE IN NUMBER/LITER
PICO_BIOMASS	TOTAL PICOPLANKTON BIOMASS IN UG CARBON/LITER
PRASINO_ABUND	TOTAL PRASINOPHYTE ABUNDANCE IN NUMBER/LITER
PRASINO_BIOMASS	TOTAL PRASINOPHYTE BIOMASS IN UG CARBON/LITER
PROROCENTRUM_MIN_ABUND	PROROCENTRUM_MINIMUM ABUNDANCE IN NUMBER/LITER
PROROCENTRUM_MIN_BIOMASS	PROROCENTRUM_MINIMUM BIOMASS IN UG CARBON/LITER
TOT_ABUND	TOTAL PHYTOPLANKTON ABUNDANCE IN NUMBER/LITER
TOT_BIOMASS	TOTAL PHYTOPLANKTON BIOMASS IN UG CARBON/LITER
SALINITY	AVE AP SALINITY IN PSU
PO4	AVE AP PO4 CONC IN MG/L
DIN	AVE AP DISSOLVED ORGANIC N (NO2+NO3+NH4) IN MG/L
Secchi	SECCHI DEPTH IN METERS
CHLA	AVE AP CHLA IN UG/L
DO	AVE AP DISSOLVED OXYGEN IN PPM
DOC	AVE AP DISSOLVED ORGANIC CARBON CONC IN MG/L
PC	AVE AP PARTICULATE CARBON CONC IN MG/L
PHEO	AVE AP PO4 CONC IN MG/L
TSS	AVE AP TOTAL SUSPENDED SOLIDS

FIELD NAME	DEFINITION AND UNITS
WTEMP	AVE AP WATER TEMP CELSIUS
TOC	AVE AP TOTAL ORGANIC CARBON CONC IN MG/L
BIOMASS_CHL_RATIO	TOTAL PHYTOPLANKTON BIOMASS TO AP CHL RATIO
CELL_SIZE	AVERAGE CELL SIZE PG/CELL
CRYPTO_BIO_PCT	PERCENT CRYPTOPHYTE BIOMASS
CYANO_BIO_PCT	PERCENT CYANOPHYTE BIOMASS
DIATOM_BIO_PCT	PERCENT DIATOM BIOMASS
DINO_BIO_PCT	PERCENT DINOFLAGGELATE BIOMASS
WQ_CATEGORY	FISHER WATER QUALITY CATEGORY SEE BUCHANAN ETAL 2005
R_DATE	DATE PHYTO DATA WAS CALCULATE

Note for additional information about codes and sampling stations please see

Johnson, J.M and Buchanan C., (2000) The 2000 Users Guide to Chesapeake Bay Program Biological and Living Resources Data. US EPA Chesapeake Bay Program at ftp://ftp.chesapeakebay.net/Pub/Living_Resources/guide2000.pdf

Appendix B- Equations and Method Codes for Estimating Phytoplankton Biovolumes and Surface areas.

Table B1. Geometric Equations for the Estimation of Cell Volumes and Surface Areas. Note D= cell diameter, H= Height or longest dimension, W= width or second longest dimension and DE= Depth or third longest dimension.

CODE	SHAPE	VOLUME	SURFACE AREA
1	SPHERE	$\frac{\pi}{6} * D^3$	$\pi * D^2$
2	CYLINDAR	$\frac{\pi}{4} * D^2 * H$	$\pi * D * \left(\frac{D}{2} + H \right)$
3	ELLIPSEOID	$\frac{\pi}{6} * D * H * W$	$\frac{\pi}{4} * (D+W) * \left[\left(\frac{D+W}{2} \right) + \frac{2H^2}{\sqrt{4 * H^2 - (D+W)^2}} \text{SIN}^{-1} \frac{\sqrt{4H^2 - (D+W)^2}}{2D} \right]$
4	CONE	$\frac{\pi}{12} * D^2 * H$	$\frac{\pi}{2} * D * \left(\frac{D}{2} + \sqrt{\left(H^2 \right) + \left(\frac{D}{2} \right)^2} \right)$
5	TRAPEZOIDAL PRISM	$\frac{1}{2} * H * DE * (W + W2)$	SHAPE NOT IN CURRENT USE
6	CUBE	W^3	$6 * W^2$
7	RETANGULAR BOX	$H * W * DE$	$(2 * H * W) + (2 * W * DE) + (2 * H * DE)$
8	TRUNCATED CONE	$\frac{\pi}{12} * H * (D^2 + (D * D2) + D2^2)$	$\frac{\pi}{4} * (D2^2 + D^2 + 2h(D2 + D))$

CODE	SHAPE	VOLUME	SURFACE AREA
9	TRIANGULAR PRISM	$\frac{1}{2} * H * W * D$	$(W * DE) + (3 * H * W)$
10	ELLIPTICAL PRISM	$\frac{\pi}{4} * H * W * DE$	$\frac{\pi}{2} (H * W + (H + W) * DE)$
11	CONE+HALF SPHERE	$\frac{\pi}{12} * D^2 * (H + D)$	$\frac{1}{2} * \pi * D * (L + D)$
12	NOT ASSIGNED		
13	NOT ASSIGNED		
14	DUMBELL	$2 * \left(\frac{\pi}{6} * D^3 \right)$	$2 * \pi * D^2$
15	PRISM ON PARALLELOGRAM	$\frac{\pi}{2} * H * W * DE$	$W * H + \left(\frac{\sqrt{H^2 + W^2}}{4} \right) * DE$
16	PYRAMID	$\frac{1}{3} H * W * DE$	SHAPE NOT IN CURRENT USE
17	CYLINDER+ 2 HALF SPHERES	$\pi * D^2 * \left(\frac{H}{4} + \frac{D}{6} \right)$	$\pi * D * (D + H)$

CODE	SHAPE	VOLUME	SURFACE AREA
18	PROLATE SPHERE	$\frac{\pi}{6} * D^2 * H$	$\frac{\pi * D}{2} * \left(D + \frac{H^2}{\sqrt{H^2 - D^2}} * \text{SIN}^{-1} \left(\frac{\sqrt{H^2 - D^2}}{H} \right) \right)$
19	2 CONES	$\frac{\pi}{12} * D^2 * H$	$\pi * D * \sqrt{H^2 + \left(\frac{D}{2} \right)^2}$
20	HALF SPHERE	$\frac{\pi}{12} * D^3$	$\frac{3\pi}{4} * D^2$
21	CYLINDER + CONE	$\left(\frac{\pi}{4} * D^2 * H \right) + \left(\frac{\pi}{12} * D^2 * H^2 \right)$	$\left(\pi * \left(\frac{D}{2} \right)^2 \right) + \left(2 * \pi * \frac{D}{2} * H \right) + \left(\pi * \frac{D}{2} * \left(H^2 + \left(\frac{D}{2} \right)^2 \right) \right)$
22	CYMBELLOID	USE ELLIPESOID EQUATIONS	USE ELLIPESOID EQUATIONS
23	2 ELLIPSEOID	$\frac{\pi}{6} * D * H * W * 2$	$\frac{\pi}{4} * (D+W) * \left[\left(\frac{D+W}{2} \right) + \frac{2H^2}{\sqrt{4 * H^2 - (D+W)^2}} \text{SIN}^{-1} \frac{\sqrt{4H^2 - (D+W)^2}}{2D} \right] * 2$
24	SICKLE SHAPED PRISM	$\frac{\pi}{4} * H * DE * W$	$\frac{\pi}{4} * (H * W + DE * W + H * DE) + H * DE$

TABLE B2 Method codes for determination of biovolume and carbon conversion factors.

Estimate_Method	Description
AVE_GEN_DIM	Dimensions provided were calculated as average for all taxa in genus-2008
BALTIC_LIST	Dimensions provided Checklist of Baltic Sea Phytoplankton Species
CBP_EST_2008_T1	Taxa in current CBP Monitoring data, ODU provided carbon value w/out dimensions, biovolume back calculated
CBP_EST_2008_T2	Taxa not found in current CBP Monitoring data, ODU provided carbon value w/out dimensions, biovolume back calculated
CBP_EST_2008_T3	Taxa not in current data, ODU did not provide a carbon value
CBP_EST_2008_TB	Taxa which ODU provided carbon value w/out dimensions, biovolume and however shapes were either sphere or square and dimensions were back calculated from carbon value.
FAMILY_AVE	Biovolume and surface area were calculated as average for all taxa in family-2008
GENUS_AVE	Biovolume and surface area were calculated as average for all taxa in Genus-2008
GROUP_AVE	Biovolume and surface area were calculated as average for all taxa in Group-2008
JJ_2008	Dimensions provided by Jackie Johnson from taxon keys-2008
MSU_2007	Dimensions provided by Richard Lacouture from taxon keys & lab measurements -2007
MSU_2006	Dimensions provided by Richard Lacouture from taxon keys & lab measurements -2006
MSU_FEB_08	Dimensions provided by Richard Lacouture from taxon keys & lab measurements -2008
MSU_APR_01	Dimensions provided by Richard Lacouture from taxon keys & lab measurements-April 2001
MSU_SEP_01	Dimensions provided by Richard Lacouture from taxon keys lab & measurements -Sept 2001
ODU_2008	Dimensions provided by Todd Egerton-ODU 2008
ODU_2006	Dimensions provided by Todd Egerton-ODU 2006
SELLNER_2008	Dimensions provided by Kevin Sellner from taxon keys Feb 2008
SERC_2007	Dimensions provided by Sharyn Hedrick from taxon keys & lab measurements- Fall 2007
SERC_FEB_08	Dimensions provided by Sharyn Hedrick from taxon keys Feb 2008

**Appendix C-Current Biovolume and Carbon Conversion Factors for Chesapeake Bay
Phytoplankton Taxa**

Table C1- Currently Found Phytoplankton taxa in Chesapeake Bay and their biovolumes and carbon conversion factors. All biovolumes are in picograms per cell, all biovolumes are in cubic microns.

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
ACANTHOICA		0002187	43.94	268.07
ACANTHOICA ACANTHIFERA		0002188	52.5	329.23
ACANTHOICA ACANTHOS		BAY0001	59.67	381.68
ACANTHOICA ACULEATA		0002189	52.5	329.23
ACANTHOICA QUATTROSPINA		0002190	63.8	412.33
ACANTHOSPHAERA ZACHARIASI		0006330	126	904.78
ACHNANTHES		0003429	91.66	1397.48
ACHNANTHES CLEVEI		0003437	85	1265.13
ACHNANTHES DELICATULA		0003471	78.01	226.19
ACHNANTHES FIMBRIATA		0003572	241.14	5006.91
ACHNANTHES LEMMERMANNI		0003511	41.67	98.17
ACHNANTHES LONGIPES		0003435	153.99	2770.88
ACHNANTHES SUBSALOIDES		0003470	37.63	86.39
ACHNANTHES TAENIATA		0003436	73.9	196.35
ACTINASTRUM		0006098	29.25	167.55
ACTINASTRUM HANTZSCHII		0006099	31.16	180.25
ACTINASTRUM HANTZSCHII ELONGATUM		0006101	76.55	508.9
ACTINASTRUM HANTZSCHII FLUVIATILE		0006100	42.76	259.77
ACTINOCYCLUS NORMANNI NORMANNI		0002663	1048.16	34790.68
ACTINOPTYCHUS		0002618	1661.77	63900.26
ACTINOPTYCHUS SENARIUS		0002620	685.17	19855.65
ACTINOPTYCHUS SPLENDENS		0002621	3320.75	159278.75
ACTINOPTYCHUS VULGARIS		0202432	484.4	12566.37
AGMENELLUM		0000605	6.02	27
AGMENELLUM QUADRUPPLICATUM		0000606	14.04	71.82
AGMENELLUM THERMALE		0000607	54.4	343
ALEXANDRIUM MONILATUM		0573526	1578.02	16755.16
AMPHIDINIOPSIS KOFOIDII		0183936	760.32	7210.52
AMPHIDINIUM		0009997	315.24	2608.82
AMPHIDINIUM ACUTISSIMUM		0010008	143	1047.2
AMPHIDINIUM ACUTUM		0010009	249.31	1989.68
AMPHIDINIUM BIPES		0202442	796	7602.65
AMPHIDINIUM CARTERI		0009998	162.27	1211.8
AMPHIDINIUM CRASSUM		0010017	281.07	2285.12
AMPHIDINIUM EXTENSUM		0573326	72.86	480.66
AMPHIDINIUM GLAUCUM		0010010	311.4	2572.16
AMPHIDINIUM GLOBOSUM		0010011	99.77	691.02
AMPHIDINIUM KLEBSII		0010016	162.27	1211.8
AMPHIDINIUM LACUSTRE		0010012	244.99	1949.88
AMPHIDINIUM LANCEOLATUM		0010013	127.5	917.24
AMPHIDINIUM LATUM		0610145	209	1623.05
AMPHIDINIUM LONGUM		0010007	341.71	2863.43
AMPHIDINIUM OPERCULATUM		0010001	733	6912.13
AMPHIDINIUM OVOIDEUM		0202443	340.43	2851
AMPHIDINIUM SCHROEDERI		0010014	244.99	1949.88
AMPHIDINIUM SPHENOIDES		0010006	531.74	4771.29

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
AMPHIDINIUM STEINI		0010015	362.25	3063.05
AMPHIDINIUM TATRAE		BAY0009	111.47	785.4
AMPHIDINIUM TURBO		0573509	480.18	4241.15
AMPHIDINIUM WISLOUCHII		0183896	733	6912.13
AMPHIDOMA		0010357	1057	10548.27
AMPHIDOMA ACUMINATA		BAY0011	307.3	2533.1
AMPHIPRORA		0004674	561.43	15267.63
AMPHIPRORA ALATA		0004680	941.98	30218.19
AMPHIPRORA CHOLNOKYI		BAY0012	227.09	824.98
AMPHIPRORA COSTATA		0004695	399.9	9758.47
AMPHIPRORA GIGANTEA SULCATA		0004678	789.3	23930.26
AMPHIPRORA ORNATA		0004683	488.98	12723.45
AMPHIPRORA PALUDOSA		0004685	617.32	17303.89
AMPHISOLENIA		0009923	5489.36	70685.83
AMPHISOLENIA BIDENTATA		0009926	17407	267970.93
AMPHISOLENIA GLOBIFERA		0009924	666.6	6194.3
AMPHORA		0004705	177.86	3351.03
AMPHORA ACUTA		BAY0013	1984.1	80737.62
AMPHORA ARENARIA		0004744	6333	373288.13
AMPHORA BINODIS		BAY0014	393.1	9540.16
AMPHORA COFFAEIFORMIS		0004713	272.39	5880
AMPHORA COSTATA		0004731	429.45	10720.68
AMPHORA CRASSA		0004745	3200.6	151720.43
AMPHORA CUNEATA		0004732	748	22292.31
AMPHORA EGREGIA INTERRUPTA		BAY0015	5346.2	298533.91
AMPHORA EXIGUA		0004746	269.7	5803.57
AMPHORA GIGANTEA		BAY0016	7229.6	444537.09
AMPHORA GREVILLEANA CONTRACTA		BAY0017	7853.4	495823.16
AMPHORA LAEVIS		0004733	1441.9	52989.38
AMPHORA MARINA		BAY0018	808.5	24701.18
AMPHORA OBTUSA		0004718	52665	6104487.28
AMPHORA OSTREARIA		0004720	275.6	5971.64
AMPHORA OVALIS		0004721	625.12	17592.92
AMPHORA PERAGALLI		BAY0019	1080.7	36222.45
AMPHORA PROTEOIDES		0004737	1032	34084.66
AMPHORA PROTEUS		0004728	147.51	2617.99
AMPHORA ROBUSTA		0004729	1111.82	37604.86
AMPHORA SPECTABILIS		0202439	63.42	180.91
AMPHORA SZABOI		BAY0021	230.3	4712.06
AMPHORA TERRORIS		BAY0022	153.8	2766.27
AMPHORA TURGIDA		0004785	93.24	339.29
ANABAENA		0001100	3.44	14.14
ANABAENA	SPECIES 1	0001100	3.44	14.14
ANABAENA	SPECIES 2	0001100	3.44	14.14
ANABAENA AEQUALIS		0001129	43.57	265.46
ANABAENA AFFINIS		0001107	16.6	87.11
ANABAENA AUGSTUMALIS MARCHICA		0001132	35.04	206.41
ANABAENA CIRCINALIS		0001104	78.46	523.6
ANABAENA CONFERVOIDES		0001134	3.44	14.15

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
ANABAENA LIMNETICA		0001141	155.12	1150.32
ANABAENA SPIROIDES		0001119	37.16	220.89
ANABAENA SPIROIDES CRASSA		0001121	94.68	650.48
ANABAENA WISCONSINENSE		0001143	3.44	14.14
ANABAENOPSIS		0001182	3.1	12.57
ANACYSTIS		0000609	12.96	65.45
ANACYSTIS CYANEA		0000610	7.26	33.51
ANACYSTIS DIMIDIATA		0000611	53.31	335.1
ANACYSTIS MARINA		0000612	1.33	4.71
ANACYSTIS MONTANA		0000613	2.14	8.18
ANACYSTIS THERMALIS		0000616	7.26	33.51
ANKISTRODESMUS		0005877	86.72	587.75
ANKISTRODESMUS BRAUNII		0005887	212.45	1654.05
ANKISTRODESMUS CONVOLUTUS		0005886	42.16	255.55
ANKISTRODESMUS FALCATUS		0005878	12.15	60.74
ANKISTRODESMUS FALCATUS ACICULARIS		0005880	58.71	374.63
ANKISTRODESMUS FALCATUS MIRABILIS		0005882	74.2	490.87
ANKISTRODESMUS FALCATUS TUMIDUS		0005884	87.49	593.76
ANKISTRODESMUS SPIRALIS		0005889	26.2	147.55
ANOPOSOLENIA BRASILIENSIS		BAY0024	31.1	179.85
ANTHOSPHAERA		0002191	30.6	176.52
ANTHOSPHAERA QUADRICORNU		0002192	42.1	255.15
ANTHOSPHAERA ROBUSTA		0002193	100.5	696.86
APEDINELLA RADIANS		0001791	29.57	169.65
APHANIZOMENON		0001191	16.91	89.01
APHANIZOMENON	SPECIES 1	0001191	33.56	196.35
APHANIZOMENON	SPECIES 2	0001191	7.6	35.34
APHANIZOMENON FLOSAQUAE		0001192	7.6	35.34
APHANIZOMENON ISSATSCHENKOI		BAY0390	5.18	22.7
APHANOCAPSA		0000625	2.37	9.2
APHANOCAPSA DELICATISSIMA		0000634	0.06	0.13
APHANOCAPSA ELACHISTA		0000627	2.37	9.2
APHANOCAPSA GREVILLEI		0000635	10.44	50.99
APHANOCAPSA PULCHRA		0000630	6.8	31.08
APHANOTHECE		0000636	11.78	58.64
APHANOTHECE GELATINOSA		0000647	8.2	38.58
ARTHRODESMUS		0008276	581.73	5292.96
ARTHRODESMUS INCUS EXTENSUS		BAY0345	77.1	513.13
ARTHRODESMUS OCTOCORNIS		0008278	1377	14315.71
ARTHRODESMUS VALIDUS INCRASSATUS		0008288	1163.949	11790.09
ASTERIONELLA		0003116	117.8	457.78
ASTERIONELLA FORMOSA		0003120	68.6	124.56
ASTERIONELLA GLACIALIS		0003118	65.05	212.06
ASTERIONELLA GRACILLIMA		0003125	102.73	303.95
ASTERIONELLA NOTATA		0003127	356.5	8386.13
ASTERIONELLOPSIS KARIANA		0615891	97.3	1512

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
ASTEROCOCCUS LIMNETICUS		0009179	645.09	5964.12
ASTEROLAMPRA MARYLANDICA		0002642	240.89	5000
ASTEROMPHALUS		0002633	444.46	11217.84
ASTEROMPHALUS FLABELLATUS		0002636	2707.9	121693.48
ASTEROMPHALUS HEPTACTIS		0002634	926.9	29581.46
ASTEROMPHALUS ROPERIANUS		0573616	444.8	11229.21
ATTHEYA DECORA		BAY0028	599.57	16650.44
AULACODISCUS		0002626	3185.2	150758.09
AULACOSEIRA		0002290	54.05	696.23
AULACOSEIRA DISTANS		0591208	26.96	278.05
AULACOSEIRA GRANULATA		0591207	39.44	459.46
AULACOSEIRA GRANULATA CURVATA		BAY0299	57.3	751.96
AULACOSEIRA GRANULATA ANGUSTISSIMA		0591623	62.61	213.63
AULACOSEIRA GRANULATA SPIRALIS		0591691	263.52	5628.67
AULACOSEIRA HERZOGII		BAY0033	35.7	402.81
AULACOSEIRA ISLANDICA		0591482	156.78	2837.25
AULACOSEIRA ITALICA		0591483	167.69	3100.46
AULISCUS CAELATUS		0002672	1018.8	33510.68
AULISCUS SCULPTUS		0002675	141.72	2483.26
AURICULA INSECTA		0004703	244.6	5101.83
AZPEITIA TABULARIS		0610121	1200.9	41629.77
BACILLARIA PAXILLIFER		0005301	128.65	2185.76
BACILLARIOPHYCEAE		0002287	100.15	1570.8
BACTERIASTRUM		0002862	280.33	6107.26
BACTERIASTRUM COMOSUM		0002863	578	15864.72
BACTERIASTRUM DELICATULUM		0002864	345.37	8042.48
BACTERIASTRUM ELONGATUM		0002865	448.39	11349
BACTERIASTRUM FURCATUM		0573687	691.71	20106.19
BACTERIASTRUM HYALINUM		0002866	378.62	9079.2
BACTERIASTRUM HYALINUM PRINCEPS		0002868	386	9313.49
BELLEROCHEA HOROLOGICALIS		0002727	2854.7	130471.34
BELLEROCHEA MALLEUS		0002726	2484	108597.55
BERKELEYA RUTILANS		BAY0404	47	578.98
BIDDULPHIA		0002678	19338.52	1627946.78
BIDDULPHIA AURITA OBTUSA		0002682	2435.89	105831.62
BIDDULPHIA BIDDULPHIANA		0002706	4125.27	212057.5
BIDDULPHIA LONGICRURIS		0002686	3132.41	147470.29
BIDDULPHIA PULCHELLA		0002690	4125.27	212057.5
BIDDULPHIA REGIA		0002696	16547.37	1325359.4
BIDDULPHIA RETICULATA		BAY0040	3523.9	172257.79
BIDDULPHIA RHOMBUS		0002691	9243.39	614745.87
BIDDULPHIA SINENSIS		0002698	78817.11	10390817.69
BIDDULPHIA TRIDENS		0002702	19274.9	1620884.82
BIDDULPHIA TURGIDA		0002697	560.51	15234.39
BLEAKELEYA NOTATA		BAY0348	146	2582.71
BLUE GREEN SPHERE	SPHERE	BAY0042	3.44	14.14
BLUE GREEN SPHERE	SPHERES	BAY0042	3.44	14.14
BLUE GREEN SPHERE	TRICHOME B	BAY0042	7.6	35.34

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
BLUE GREEN SPHERE	TRICHOMES	BAY0042	7.6	35.34
BLUE GREEN TRICHOME	CELL	BAY0042	2.42	9.43
BLUE GREEN TRICHOME	CELL B	BAY0042	2.42	9.43
BLUE GREEN TRICHOME	CELL- SMALL	BAY0042	0.57	1.77
BLUE GREEN TRICHOME	CELL-SMALL TAPER	BAY0042	0.57	1.77
BLUE GREEN TRICHOME	TRICHOME (CELL) LARGE	BAY0042	20.81	113.1
BOTRYOCOCCUS		0006306	26.7	150.8
BOTRYOCOCCUS BRAUNII		0006308	84.8	572.75
BOTRYOCOCCUS PROTUBERANS		0006310	38	226.68
BOTRYOCOCCUS SUDETICUS		0006309	6.9	31.61
CALCISOLENIA		0002196	136.1	989.05
CALCISOLENIA GRANII		0002198	152.3	1126.2
CALCISOLENIA MURRAYI		0002197	119.9	854.4
CALONEIS		0004369	202.25	3970.19
CALONEIS FUSIOIDES		0202438	934.9	29918.75
CALONEIS LEPIDULA		BAY0346	349.4	8166.49
CALONEIS LEWISII		0004408	349.4	8166.49
CALONEIS STAUROPHORA		BAY0047	2242.6	94895.4
CALONEIS SUBSALINA		0004376	212.63	4241.15
CALONEIS TRINODIS		BAY0304	399.9	9758.47
CALONEIS WARDII		0004425	133.6	2297.29
CALONEIS WESTI		0004377	254.36	5372.12
CALOTHRIX		0001243	11.4	56.44
CALOTHRIX PARIETINA		0001251	10.8	53.03
CALYCOMONAS		0001747	4.64	20.01
CALYCOMONAS GRACILIS		0001748	10.7	52.46
CALYCOMONAS OVALIS		0001750	5.13	22.45
CALYCOMONAS WULFFII		0001749	5.07	22.15
CALYPTROSPHAERA		0002199	376.9	3206.53
CALYPTROSPHAERA OBLONGA		0002200	605.9	5547.69
CAMPSOPOGAN COERULUS		BAY0048	0	0
CAMPYLODISCUS		0005401	1023.01	33693.58
CAMPYLODISCUS LIMBATUS		0005411	3674.1	182009.32
CAMPYLODISCUS RUTILIS		BAY0049	1023.01	33693.49
CAMPYLOSIRA		0003190	81.22	207.35
CAMPYLOSIRA CYMBELLIFORMIS		0003191	81.22	207.35
CARTERIA		0005429	366.52	3104.81
CARTERIA CORDIFORMIS		0005442	158.1987	1176.72
CENTRALES	< 10 MICRONS	0002288	25.05	58.9
CENTRALES		0002288	33.75	76.97
CENTRALES		0002288	33.75	76.97
CENTRALES	>100 MICRON DIAMETER	0002288	4332.09	226194.67
CENTRALES	>100 MICRONS	0002288	4332.09	226194.67
CENTRALES	>60 MICRONS	0002288	2342.84	100530.96
CENTRALES	>60 MICRONS DIAMETER	0002288	2342.84	100530.96
CENTRALES	10-20 MICRONS	0002288	74.35	1060.29
CENTRALES	10-30 MICRONS DIAMETER	0002288	143.01	2513.27
CENTRALES	20-100 MICRONS	0002288	895.69	28274.33
CENTRALES	20-100 MICRONS DIAMETER	0002288	895.69	28274.33

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
CENTRALES	31-60 MICRONS DIAMETER	0002288	664.92	19085.18
CENTRALES	DIAM	0002288	25.05	58.9
CENTRALES	DIAM 10-30 MICRONS	0002288	143.01	2513.27
CENTRALES	DIAM 31-60 MICRONS	0002288	664.92	19085.18
CENTRATRACTUS BELONOPHORUS		0002013	130.53	942.46
CENTRONELLA		BAY0052	49.07	89.54
CERATAULINA PELAGICA		0002755	248.7	5214.95
CERATAULUS RADIATUS		BAY0053	3637.09	179594.38
CERATIUM		0010397	5060.16	64343.42
CERATIUM ARCTICUM		0010398	497.5	4418.32
CERATIUM ARIETINUM		0550467	11789	170864.72
CERATIUM AZORICUM		0550468	4768	60072.99
CERATIUM BELONE		0010424	4415.7	54977.41
CERATIUM BREVE		0550540	18891	294521.2
CERATIUM BUCEROS		0010432	3905.7	47712.93
CERATIUM BUCEROS TENUE		0010434	2196.3	24543.93
CERATIUM CANDELABRUM		0010418	7422	100138.61
CERATIUM CAROLINIANUM		0180929	30702.8	516032.03
CERATIUM CARRIENSE		0010444	10077	142548.35
CERATIUM CONTORTUM		0010425	1677462.45	52359877.5
CERATIUM CONTORTUM KARSTENI		0010426	13985.5	208130.09
CERATIUM CONTRARIUM		0010415	3526.9	42410.63
CERATIUM DECLINATUM		0550469	5979.6	78024.52
CERATIUM DIGITATUM		BAY0058	12137.7	176713.88
CERATIUM EXTENSUM		0010427	178015	3926998.52
CERATIUM FURCA		0010399	5822.35	75660.02
CERATIUM FUSUS		0010400	2958.62	34622.97
CERATIUM GALLICUM		0010405	203.2	1571.15
CERATIUM GENICULATUM		0010441	11061.5	158748.28
CERATIUM HIRUNDINELLA		0010411	2737.01	31646.05
CERATIUM HIRUNDINELLA BRACHYCERAS		BAY0059	17795.5	274888.94
CERATIUM HORRIDUM		0010428	3905.7	47712.93
CERATIUM INFLATUM		0550471	36804	636171.09
CERATIUM KOFOIDII		0010429	3043.3	35769.75
CERATIUM LIMULUS		0573344	9337.7	130542.07
CERATIUM LINEATUM		0010401	850.79	8210.03
CERATIUM LONGINUM		0010447	31092.3	523598.83
CERATIUM LONGIPES		0010402	9834.22	138590.05
CERATIUM LONGIROSTRUM		0573345	7375	99406.72
CERATIUM MACROCEROS		0010403	2939.24	34361.17
CERATIUM MASSILIENSE		0010412	3887.13	47451.14
CERATIUM MINUTUM		0010417	1823.41	19798.58
CERATIUM PAVILLARDII		0010442	22122.3	353429.55
CERATIUM PENTAGONUM		0010406	3033.5	35636.77
CERATIUM PULCHELLUM SEMIPULCHELLUM		BAY0063	4372.6	54358.23
CERATIUM RANIPES		0010430	11415.9	164635.86
CERATIUM SCHROETERI		0573355	19977	314158
CERATIUM SETACEUM		0010420	3466.8	41577.22

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
CERATIUM TERES		0010431	4309.7	53456.3
CERATIUM TRICHOCEROS		0010413	7791.93	105924.03
CERATIUM TRIPOS		0010408	7581.35	102625.36
CERATIUM TRIPOS ATLANTICUM		0010409	3011.8	35342.57
CERATOCORYS HORRIDA		0183914	4957.1	62832.51
CERATONEIS		0003321	81.66	1199.96
CHAETOCEROS		0002758	176.62	3320.12
CHAETOCEROS	SP#1 DIAM	0002758	52.82	196.35
CHAETOCEROS	SP#2 DIAM 10-30 MICRONS	0002758	230.31	4712.39
CHAETOCEROS AFFINIS		0002759	106.84	1710.6
CHAETOCEROS AFFINIS WILLEI		0002761	71.41	1005.31
CHAETOCEROS ATLANTICUM		0002769	1469	54307.18
CHAETOCEROS ATLANTICUM NEAPOLITANA		0002771	30.2	323.03
CHAETOCEROS BOREALIS		0002774	470.01	12076.28
CHAETOCEROS BREVIS		0002776	146.79	2601.24
CHAETOCEROS COARCTATUS		0002779	1867	74511.29
CHAETOCEROS COMPRESSUS		0002780	151.61	2714.34
CHAETOCEROS CONCAVICORNIS		0002781	471.37	12122.62
CHAETOCEROS CONSTRICTUS		0002783	756.31	22619.47
CHAETOCEROS CONVOLUTUS		0002784	338.9	7844.29
CHAETOCEROS COSTATUS		0002785	240.37	4985.71
CHAETOCEROS CRINITUS		0002838	194.47	3769.91
CHAETOCEROS CURVIVSETUS		0002787	71.41	1005.31
CHAETOCEROS DANICUS		0002789	106.84	1710.6
CHAETOCEROS DEBILIS		0002790	209.4	4156.33
CHAETOCEROS DECIPIENS		0002791	358.38	8444.6
CHAETOCEROS DENSUM		0002794	89.75	1359.26
CHAETOCEROS DIADEMA		0002795	181	3429.23
CHAETOCEROS DIDYMUS		0002797	51.51	653.45
CHAETOCEROS DIDYMUS PROTUBERANS		0002799	44.51	538.78
CHAETOCEROS DIFFICILIS		0002801	49.2	615
CHAETOCEROS DIVERSUS		0002803	65.2	891.65
CHAETOCEROS FRAGILIS		0002841	52.82	196.35
CHAETOCEROS GRACILIS		0002806	73.22	1039.08
CHAETOCEROS LACINIOSUS		0002809	383.92	9247.28
CHAETOCEROS LORENZIANUS		0002811	979.2	31803.06
CHAETOCEROS MESSANENSIS		0002812	132	2261.1
CHAETOCEROS MUELLERI		0002849	292	6444.84
CHAETOCEROS NEOGRACILIS		BAY0066	60.21	251.33
CHAETOCEROS PELAGICUS		0002814	20.6	195.01
CHAETOCEROS PENDULUS		0002819	53.01	678.58
CHAETOCEROS PERUVIANUS		0002816	209.4	4156.33
CHAETOCEROS PSEUDOCURVIVSETUS		0002821	412.89	10178.76
CHAETOCEROS RADICANS		0002822	155.18	2799.16
CHAETOCEROS ROSTRATUS		0550512	572	15647.82
CHAETOCEROS SIMILIS		0002826	106	1692.92
CHAETOCEROS SIMPLEX		0002844	270.4	5823.45
CHAETOCEROS SIMPLEX CALCITRANS		0002845	270	5812.09

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
CHAETOCEROS SOCIALIS LAUDER		0002827	63.66	863.94
CHAETOCEROS SUBTILIS		0002829	60.21	251.33
CHAETOCEROS TERES		0002830	1728	67281.26
CHAETOCEROS TETRASTICHON		0002831	65.2	891.65
CHAETOCEROS TORTISSIMUS		0002832	145.8	2578.04
CHAETOCEROS WIGHAMI		0002835	109.5	1767.15
CHAETOSPHAERIDIUM GLOBOSUM		0009370	266	2144.23
CHARACIUM LIMNETICUM		0005760	12.34	61.83
CHATTONELLA		BAY0343	480.18	4241.15
CHATTONELLA SUBSALSA		BAY0344	480.18	4241.15
CHILOMONAS		0010610	75.17	498.34
CHILOMONAS MARINA		0010612	19.99	107.99
CHLAMYDOMONAS		0005448	7.26	33.51
CHLORELLA		0005811	22.37	122.96
CHLORELLA ELLIPSOIDEA		0005820	25.02	139.9
CHLORELLA MARINA		0005812	11.26	55.63
CHLORELLA SACCHAROPHILA ELLIPSOIDEA		0005819	63.3	408.62
CHLORELLA SALINA		0005814	16.6	87.11
CHLORELLA VULGARIS		0005815	37.16	220.89
CHLOROGONIUM		0005539	6.1	27.43
CHLOROPHYCEAE	FILAMENT (CELL)	0005415	20.81	113.1
CHLOROPHYCEAE	FILAMENTS	0005415	27.3	154.73
CHLOROPHYCEAE	MICROPHYTOFLAGGELATES	0005415	101.75	706.88
CHLOROPHYCEAE	SPHERE	0005415	7.26	33.51
CHLOROPHYCEAE	UNIDENTIFIED	0005415	22.5	123.76
CHLOROPHYTA		0005414	22.5	123.76
CHOANOFLLAGELLIDA		0043811	11.18	55.19
CHODATELLA		0005866	22.17	121.67
CHODATELLA LONGISETA		0005870	22.17	121.67
CHROMULINA PARVULA		0001721	3.4	13.96
CHROOCOCCUS		0000654	20.81	113.1
CHROOCOCCUS DISPERSUS		0000665	3.44	14.14
CHROOCOCCUS DISPERSUS MINOR		0000667	1.2	4.19
CHROOCOCCUS LIMNETICUS		0000656	20.81	113.1
CHROOCOCCUS LIMNETICUS ELEGANS		0000660	361.29	3053.63
CHROOCOCCUS PRESCOTTII		0000674	24.9	139.13
CHROOCOCCUS TURGIDUS		0000655	475	4188.4
CHROOMONAS		0010613	15.89	82.82
CHROOMONAS AMPHIOXEIA		0010620	60.16	385.3
CHROOMONAS SALINA		0010614	36.71	217.82
CHROOMONAS VECTENSIS		0010615	7.93	37.11
CHRYSAMOEBA RADIANS		0001827	23.91	132.73
CHRYSOCAPSA		0001860	51.44	321.56
CHRYSOCHROMULINA		0002160	100.51	696.91
CHRYSOCHROMULINA MINOR		0002161	11.34	56.12
CHRYSOCOCCUS MINUTUS		0001762	37.2	221.18
CHRYSOCOCCUS RUFESCENS		0001753	20.81	113.09
CHRYSOCOCCUS TESSELATUS		BAY0071	188.1	1437.12

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
CHRYSOPHYCEAE		0001448	78.46	523.6
CHRYSOPHYCEAE	MICROPHYTOFLAGELLATES	0001448	78.46	523.6
CHRYSOPHYCEAE	UNIDENTIFIED	0001448	78.46	523.6
CLADOPHORA		0006763	38015.9	660421.7
CLADOPYXIS		0010482	126	904.78
CLADOPYXIS BRACHIOLATA		0183951	3470.6	41629.85
CLADOPYXIS CARYOPHYLLUM		0010483	6078.8	79521.12
CLADOPYXIS CLAYTONII		0183952	266	2144.23
CLADOPYXIS SETIFERA		0010487	335.79	2806.16
CLIMACODIUM		0002734	2301.1	98174.77
CLIMACODIUM BICONCAVUM		0002736	214.6	4292.96
CLIMACODIUM FRAUENFELDIANUM		0002735	643.7	18285.86
CLOSTERIOPSIS		0005926	329.85	2748.89
CLOSTERIOPSIS LONGISSIMA		0005927	706.72	6626.8
CLOSTERIUM		0007257	2359.82	26665.92
CLOSTERIUM ARCHERIANUM		0007294	5573.8	71942.87
CLOSTERIUM DIANAE		0007318	4957.1	62832.51
CLOSTERIUM LINEATUM		0007352	5502.35	70879
CLOSTERIUM PARVULUM		0007365	3158.951	37343.96
CLOSTERIUM PRONUM		0007378	647.39	5988.64
CLOSTERIUM SETACEUM		0007266	22.18	121.71
COCCOCHLORIS		0000678	1.2	4.19
COCCOLITHOPHORIDA		0043790	127.88	920.39
COCCOLITHOPHORIDA	UNIDENTIFIED	0043790	127.88	920.39
COCCOLITHUS PELAGICUS		0002249	126	904.79
COCCONEIS		0003577	85.85	1281.77
COCCONEIS CLANDESTINA		BAY0073	761	22804.85
COCCONEIS COSTATA		0003578	169	3132.51
COCCONEIS DISTANS		0003592	742	22056.71
COCCONEIS FLUVIATILIS		0003611	0	0
COCCONEIS MOLESTA CRUCIFERA		BAY0074	345.5	8046.45
COCCONEIS PEDICULUS		0003617	654.6	18695.46
COCCONEIS PINNATA		0003593	630	17774.18
COCCONEIS SCUTELLUM		0003584	124.66	2096.82
COCCONEIS SCUTELLUM ORNATA		0003585	960.5	31004.26
COCHLODINIUM		0010021	154.7	1146.73
COCHLODINIUM BRANDTII		0573358	3184.95	37699.11
COCHLODINIUM CONSTRICTUM		BAY0076	7118.54	95425.88
COCHLODINIUM HETEROLOBATUM		0010023	2163.99	24127.43
COELASTRUM		0006273	37.16	220.89
COELASTRUM CAMBRICUM		0006275	31.06	179.59
COELASTRUM MICROPORUM		0006279	3.44	14.14
COELASTRUM RETICULATUM		0006281	84.72	572.15
COELASTRUM SPHAERICUM		0006282	14.35	73.62
COELOSPHAERIUM		0000791	3.44	14.14
CORETHRON		0002386	2167.52	90726.68
CORETHRON CRIOPHILUM		0002387	540.52	14521.69
CORETHRON VALDIVAE		BAY0078	1175.7	40481.01
COSCINODISCUS		0002546	4205.86	217540.03

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
COSCINODISCUS	SP#1 DIAM	0002546	230.31	4712.39
COSCINODISCUS	SP#2 DIAM 40-100 MICRONS	0002546	1913.5	76969.02
COSCINODISCUS	SP#3 DIAM >100 MICRONS	0002546	8262.1	530143.76
COSCINODISCUS APICULIFERUS		0002590	3567.16	175053.03
COSCINODISCUS ARGUS		0002599	266.7	5718.55
COSCINODISCUS ASTEROMPHALUS		0002551	3174	150059.13
COSCINODISCUS CENTRALIS		0002552	8975.67	591365.55
COSCINODISCUS CINCTUS		0002589	30635.54	2986975.24
COSCINODISCUS CONCINNUS		0002555	30635.54	2986975.24
COSCINODISCUS GIGAS		0002584	41.1	485.07
COSCINODISCUS GIGAS PRAETEXTA		0002585	41.1	485.07
COSCINODISCUS GRANII		0002557	3505.31	171059.72
COSCINODISCUS GRANULOSUS		0002586	17.9	162.02
COSCINODISCUS LINEATUS		0002559	1438.2	52810.17
COSCINODISCUS MARGINATUS		0002560	1787.84	70371.68
COSCINODISCUS NITIDUS		0002561	869.08	27171.63
COSCINODISCUS NOBILIS		0002576	4557.1	241821.07
COSCINODISCUS OBSCURUS		0002587	328.4	7525.26
COSCINODISCUS OCULUS-IRIDIS		0002562	4742.54	254886.84
COSCINODISCUS PERFORATUS		0002563	1402.15	51070.52
COSCINODISCUS RADIATUS		0002567	2402.26	103908.18
COSCINODISCUS ROTULA		BAY0079	3567.16	175053.03
COSCINODISCUS STELLARIS		0002568	2402.26	103908.18
COSCINODISCUS SUB-BULLIENS		0002592	1435	52655.11
COSCINODISCUS SUBLINEATUS		BAY0080	213	4250.78
COSCINODISCUS WAILESII		0002571	12596.17	924727.8
COSCINOSIRA		0002540	185.19	3534.29
COSCINOSIRA POLYCHORDA		0002541	552.76	14957.12
COSMARIUM		0007848	22.26	122.25
COSMARIUM ALPESTRE		0007858	4989.9	63312.83
COSMARIUM CONTRACTUM		0007897	1694.72	18193.99
COSMARIUM COSTATUM		0007902	2347.6	26506.57
COSMARIUM CYNTHIA		BAY0349	2380.98	26942.25
COSMARIUM ORNATUM		0008012	2746.8	31776.77
COSMARIUM SUBRENIFORME		0008125	3101.5	36560.82
COSMARIUM TENUE		0008137	148.2646	1091.82
COSMARIUM TURPINII		0008148	13389	197913.73
COSMOCLADIUM		0007164	143	1047.2
CRUCIGENIA		0006225	7.72	36
CRUCIGENIA APICULATA		0006230	12.02	60
CRUCIGENIA CRUCIFERA		0006227	7.72	36
CRUCIGENIA FENESTRATA		0006228	10.97	54
CRUCIGENIA IRREGULARIS		0006239	21.19	115.5
CRUCIGENIA LAUTERBORNII		0006234	63.7	411.6
CRUCIGENIA QUADRATA		0006235	6.59	30
CRUCIGENIA RETANGULARIS		0006236	2.52	9.88
CRUCIGENIA TETRAPEDIA		0006226	8.55	40.5
CRYPTOMONAS		0010635	120.75	861.36
CRYPTOMONAS		0010635	11.78	58.64

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
CRYPTOMONAS	SP#1 LENGTH	0010635	11.78	58.64
CRYPTOMONAS	SP#2 LENGTH >10 MICRONS	0010635	75.73	502.65
CRYPTOMONAS	SPECIES #1	0010635	120.75	861.36
CRYPTOMONAS	SPECIES #2	0010635	120.75	861.36
CRYPTOMONAS EROSA		0010641	318.39	2638.94
CRYPTOMONAS EROSA REFLEXA		0010643	374.2238	3180.25
CRYPTOMONAS MARSSONII		0010648	414.9176	3582.85
CRYPTOMONAS OVALIS		BAY0084	158.36	1178.1
CRYPTOMONAS OVATA		0010646	418.91	3622.65
CRYPTOMONAS PHASEOLUS		0010656	392	3355.32
CRYPTOMONAS PSEUDOBALTICA		0010637	75.53	501.1
CRYPTOMONAS ROSTRATA		BAY0350	5300	67877.73
CRYPTOMONAS ROSTRELLA		0010650	98.51	680.94
CRYPTOMONAS STIGMATICA		0010636	71.34	469.14
CYCLOCOCOLITHUS FRAGILIS		0002254	361.3	3053.77
CYCLOCOCOLITHUS LEPTOPORUS		0002253	302.6	2488.41
CYCLOSTEPHANOS DUBIUS		0591126	34.4	383.57
CYCLOTELLA		0002439	324.11	7395.74
CYCLOTELLA		0002439	33.25	98.17
CYCLOTELLA	>30 microns	0002439	537.98	14431.69
CYCLOTELLA	10-30 microns	0002439	169.37	3141.59
CYCLOTELLA	SP#1 DIAM	0002439	33.25	98.17
CYCLOTELLA	SP#2 DIAM 10-30 MICRONS	0002439	169.37	3141.59
CYCLOTELLA	SP#3 DIAM >30 MICRONS	0002439	537.98	14431.69
CYCLOTELLA ATOMUS		0002457	54.49	703.72
CYCLOTELLA BODANICA		0002460	679.39	19634.95
CYCLOTELLA CASPIA		0002440	61.81	830.95
CYCLOTELLA GLOMERATA		0002470	28.11	72.21
CYCLOTELLA MENEGHINIANA		0002445	115	1884.96
CYCLOTELLA STRIATA		0002453	348.64	8143.01
CYCLOTELLA STYLORUM		0002456	985.51	32073.7
CYLINDROSPERMUM DORYPHORUM		BAY0351	13.75221	70.1
CYLINDROTHECA CLOSTERIUM		0005318	105.02	347.84
CYMATOPLEURA		0003256	1116.19	37800
CYMATOSIRA BELGICA		0003193	60.98	170.87
CYMATOSIRA LORENZIANA		0202435	136.19	2356.19
CYMBELLA		0004795	76.43	1099.56
CYMBELLA AFFINIS		0004803	104.14	1653.92
CYMBELLA TUMIDA		0004871	880.3	27635.37
CYMBELLA TURGIDULA		0004872	88.1	1326.35
CYSTODINIUM		0010567	2902.5	33865.7
DACTYLIOSOLEN ANTARCTICUS		0002398	1018.8	33510.68
DACTYLIOSOLEN FRAGILISSIMUS		0615882	124.53	2093.91
DACTYLIOSOLEN MEDITERRANEUS		0002399	484.4	12566.37
DACTYLOCOCCOPSIS		0006446	30.63	176.71
DACTYLOCOCCOPSIS FASCICULARIS		0005890	3.7	15.39
DACTYLOCOCCOPSIS RHAPHIDIOIDES		0006451	30.63	176.71
DELPHINEIS SURIRELLA		BAY0087	115	1884.96
DENTICULA		0005319	155.55	2807.8

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
DESMIDIACEAE	UNIDENTIFIED	0007256	8099.75	110770.56
DESMIDIUM		0008844	497.5	4418.32
DESMIDIUM BAILEYI		0008849	392.2	3357.3
DESMIDIUM GREVILLII		0008863	682.2	6361.99
DETONULA CONFERVACEA		0002535	127.49	2159.84
DETONULA PUMILA		0573633	905.12	28667.82
DIATOMA		0003214	190.11	3658.82
DIATOMA ANCEPS		0003226	94.79	1460.84
DIATOMA ELONGATUM		0003229	230.62	942.48
DIATOMA HIEMALE		0003215	413.85	10210.18
DIATOMA VULGARE		0003219	121.27	2021.76
DICTYOCHA FIBULA		0001805	749.08	7087.5
DICTYOCHA SIDEREA		BAY0317	329.8	2748.45
DICTYOSPHAERIUM		0006297	12.96	65.45
DICTYOSPHAERIUM PLANCTONICUM		0006300	46	282.63
DICTYOSPHAERIUM PULCHELLUM		0006298	25.62	143.79
DIDYMOCYSTIS		0055858	5.54	24.54
DIMEROGRAMMA		0003182	68.71	212.06
DIMEROGRAMMA MINOR		0003187	133.78	565.49
DIMORPHOCOCCUS		0006303	14.35	73.62
DINOBYRON		0001515	109.53	769.69
DINOBYRON BAVARICUM		0001522	280.53	2280.03
DINOBYRON CALCIFORMIS		0001529	16.6	87.11
DINOBYRON CYLINDRICUM		0001530	518.32	4632.57
DINOBYRON DIVERGENS		0001534	37.1	220.49
DINOBYRON SERTULARIA		0001517	318.39	2638.94
DINOBYRON SOCIALE		0001525	37.1	220.49
DINOPHYSIS		0009928	3274.97	38932.19
DINOPHYSIS ACUMINATA		0009938	688.88	6433.98
DINOPHYSIS ACUTA		0009930	7718.36	104770.02
DINOPHYSIS ARCTICA		0009931	377.96	3216.94
DINOPHYSIS BALTICA		BAY0088	377.96	3216.94
DINOPHYSIS CAUDATA		0009939	5120.45	65229.41
DINOPHYSIS DENTATA		BAY0089	761.7	7225.58
DINOPHYSIS DIEGENSIS		0009971	5489.4	70686.4
DINOPHYSIS DORYPHORUM		0009970	3526.9	42410.63
DINOPHYSIS EXIGUA		0009946	4180.5	51610.08
DINOPHYSIS FORTII		0009947	2496.14	28452.52
DINOPHYSIS HASTATA		0009948	4466.67	55710.91
DINOPHYSIS LACHMANNII		0009953	377.96	3216.94
DINOPHYSIS MICROPTERYGIA		0009949	5135.4	65449.39
DINOPHYSIS MINUTA		0009977	617.9	5674.75
DINOPHYSIS MONACANTHA		0573374	9763.8	137444.71
DINOPHYSIS NORVEGICA		0009932	11234.03	161610.86
DINOPHYSIS OVUM		0009936	4646.98	58315.81
DINOPHYSIS PARVULA		0009950	4957.1	62832.51
DINOPHYSIS PULCHELLA		0009979	625.89	5759.59
DINOPHYSIS PUNCTATA		0009951	424.21	3675.66
DINOPHYSIS ROTUNDATA		0009933	1531	16179.99

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
DINOPHYSIS SACCOLUS		0573380	3407.5	40757.08
DINOPHYSIS SCHROEDERI		0009954	11927.2	173179.75
DINOPHYSIS SCHUETTII		0009952	3590.5	43294.98
DINOPHYSIS SPHAERICA		0009935	2027.89	22383.85
DINOPHYSIS TRIPOS		0009941	9034.7	125663.04
DIPLONEIS		0004325	192.56	3721.18
DIPLONEIS BOMBUS (Navicula bombus)		0004333	99.97	1567.05
DIPLONEIS CONSTRICTA		0004345	497	12999.5
DIPLONEIS CRABRO		0004334	2597.8	115208.49
DIPLONEIS CRABRO PANDURA		BAY0092	1348.2	48494.41
DIPLONEIS ELLIPTICA		0004350	1767.1	69296.91
DIPLONEIS GRUENDLERI		BAY0093	408.1	10023.31
DIPLONEIS LITTORALIS		0004341	575	15756.18
DIPLONEIS OBLIQUA		BAY0094	7059.7	430806.9
DIPLONEIS SMITHI		0004328	10620.7	738373.18
DIPLONEIS SUBCINCTA		0004332	1279	45237.86
DIPLONEIS SUBORBICULARIS		0004337	1039.6	34416.2
DIPLOPELTOPSIS MINOR		0010198	3264.8	38792.6
DIPLOPSALIS		0010169	364.45	3084.51
DIPLOPSALIS LENTICULA		0010171	2802.01	32515.48
DISCOSPHAERA		0002255	106.5	745.12
DISCOSPHAERA TUBIFER		0002256	106.5	745.12
DISPORA CRUCIGENIOIDES		0006381	4.83	20.94
DISSODIUM ASYMMETRICUM		0010339	5406.55	69455.9
DISTEPHANUS SPECULUM		0001810	111.47	785.4
DITYLUM BRIGHTWELLII		0002928	1633.26	62458.01
EBRIA TRIPARTITA		0001814	487.48	4315.72
ECHINOSPHAERELLA		0006336	89.06	606.13
ELAKATOTHRIX		0009412	634.65	5852.79
ELAKATOTHRIX GELATINOSA		0009413	50.96	318.09
EMILIANA HUXLEYI		0002251	31.06	179.59
ENCYONEMA		0590838	174.35	3263.93
ENCYONEMA SILESIAECUM		0591272	88.1	1326.35
ENTEROMORPHA INTESTINALIS		0006535	127000000000	22548729649937.2
ENTOPHYSALIS DEUSTA		0000829	1.2	4.19
EPIPHYTIC FLAGELLATES		BAY0303	3.4	13.96
EPITHEMIA		0005005	210.14	4175.77
EPITHEMIA ARGUS		0005006	182.06	3455.75
EPITHEMIA TURGIDA		0005020	237.07	4895.78
ERRERELLA		0006331	3.44	14.14
ERRERELLA BORNHEMIENSIS		0006332	12.9	65.1
EUASTRUM		0008525	70.72	464.4
EUASTRUM ABRUPTUM		0008527	70.72	464.4
EUCAMPIA CORNUTA		0002731	608.13	16964.6
EUCAMPIA ZODIACUS		0002733	441.91	11133.02
EUDORINA		0005597	152.04	1124
EUDORINA ELEGANS		0005598	225	1767.36
EUGLENA		0009620	1017.01	10088.84
EUGLENA ACUS		0009622	651.43	6031.86

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
EUGLENA AGILIS		0550494	59.03	376.99
EUGLENA CONVOLUTA		0009653	2016.478	22238.51
EUGLENA DESES		0009626	1458.42	15297.59
EUGLENA EHRENBERGI		0009631	969.01	9540.95
EUGLENA ELASTICA		0009646	765	7261.74
EUGLENA FUSCA		0009673	1013.89	10053.1
EUGLENA MUTABILIS		0009632	263.46	2120.61
EUGLENA MUTABILIS MAINXI		0009634	1158.69	11728.61
EUGLENA POLYMORPHA		0009664	3009.8	35315.47
EUGLENA PROXIMA		0009627	928	9076.26
EUGLENA PUMILA		0009628	12	59.91
EUGLENA SPIROGYRA		0009630	2632	30248.21
EUGLENA VIRIDIS		0009636	914.89	8928.37
EUNOTIA		0003337	164.68	3027.19
EUNOTIA BIDENTULA		0193766	104.86	1668.97
EUNOTIA MAJOR		0003403	248.42	5207.19
EUNOTIA PECTINALIS		0003357	84.51	1255.52
EUNOTIA PRAERUPTA		0003365	129.53	2205.4
EUNOTIA SERRA DIADEMA		0003374	257.1	5448.57
EUTREPTIA		0009605	656.77	6088.93
EUTREPTIA LANOWII		0009607	119.91	854.51
EUTREPTIA MARINA		0009606	1508.38	15904.31
EUTREPTIA VIRIDIS		0009608	196.1	1507.96
FLORISPHAERA PROFUNDA		BAY0107	22.6	124.4
FRAGILARIA		0002932	153.6	595.43
FRAGILARIA	SP#1 LENGTH	0002932	42.32	106.03
FRAGILARIA	SP#2 LENGTH 30-60 MICRONS	0002932	140.13	530.14
FRAGILARIA	SP#3 LENGTH >60 MICRONS	0002932	283.39	1319.47
FRAGILARIA ARCUS		0003325	206.13	942.48
FRAGILARIA CAPUCINA		0002953	213	4250.78
FRAGILARIA CONSTRUENS		0002957	37.63	86.39
FRAGILARIA CROTONENSIS		0002933	214.48	706.86
FRAGILARIA HYALINA		0202433	179.58	706.86
FRAGILARIA INTERMEDIA		0002987	202.6	3979.13
FRAGILARIA PINNATA		0002937	32.4	354.43
FRAGILARIA STRIATULA		0002941	102.05	365.21
FRAGILARIOPSIS CYLINDRUS		0005076	24.8	249.1
FRAGILARIOPSIS OCEANICA		0005140	66.1	907.92
FRANCEIA		0005958	51.44	321.56
FRANCEIA OVALIS		0005960	119.51	851.19
FRUSTULIA		0004564	533.7	14280.57
FRUSTULIA RHOMBOIDES		0004565	1600	60785.42
GEMINELLA		0006463	4.32	18.41
GEPHYROCAPSA CARIBBEANICA		0002259	78.5	523.9
GEPHYROCAPSA ERICSONII		BAY0109	3.43	14.1
GEPHYROCAPSA OCEANICA		0002258	78.5	523.9
GLENODINIUM		0010174	580.53	5280.32
GLENODINIUM ARMATUM		0010183	977.4	9636.45
GLENODINIUM DANICUM		0010176	324.94	2701.77

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
GLENODINIUM GYMNODINIUM		0010178	771.26	7330.38
GLENODINIUM QUADRIDENS		0010185	1495.3	15745.12
GLOEOCAPSA		0000682	3.44	14.14
GLOEOCAPSA AERUGINOSA		0000689	3.44	14.15
GLOEOCAPSA PUNCTATA		0000700	0.965525	3.26
GLOEOCYSTIS		0006355	78.46	523.6
GLOEOCYSTIS VESICULOSA		0006360	7.26	33.51
GLOEOTHECE		0000703	5.35	23.56
GLOEOTHECE LINEARIS COMPOSITA		0000708	10.2	49.64
GLYPHODESMIS DISTANS		0003189	709.98	20809.91
GOLENKINIA RADIATA		0006315	100.51	696.91
GOMPHONEMA		0004911	325.08	7425
GOMPHONEMA ACUMINATUM		0004919	357.72	8424
GOMPHONEMA GEMINATUM		0004940	403.35	9869.76
GOMPHONEMA SPHAEROPHORUM		0004982	383.86	9245.5
GOMPHOSPHAERIA		0000714	7.26	33.51
GOMPHOSPHAERIA APONINA		0000715	12.96	65.45
GONATOZYGON BREBISSEONII		0008923	554.03	5002.99
GONIUM		0005573	126	904.78
GONIUM PECTORALE		0005574	29.2	167.23
GONIUM SOCIALE		0005575	173.49	1309
GONYAULAX		0010359	1914.72	20947.78
GONYAULAX APICULATA		0010378	3526.9	42410.63
GONYAULAX BIROSTRIS		0010376	11339.4	163362.55
GONYAULAX CONJUNCTA		BAY0110	818.7	7853.5
GONYAULAX DIACANTHA		0010364	650.06	6017.2
GONYAULAX DIEGENSIS		0010379	3689.8	44680.52
GONYAULAX DIGITALIS		0010366	2579.66	29554.7
GONYAULAX EXCAVATA		0010381	1913.8	20936.14
GONYAULAX FRAGILIS		0615888	23483	378649.5
GONYAULAX LONGISPINA		0010375	2422.8	27489.43
GONYAULAX MINIMA		0010382	683.8	6379.23
GONYAULAX MINUTA		0010377	454	3975.32
GONYAULAX MONILATA		0010367	1676.9	17973.27
GONYAULAX MONOCANTHA		0010368	1453.13	15233.45
GONYAULAX POLYEDRA		0010370	2825.23	32826.8
GONYAULAX POLYGRAMMA		0010371	2163.99	24127.43
GONYAULAX SPINIFERA		0010361	1228.14	12544.12
GONYAULAX TRIACANTHA		0010373	1544.31	16342.56
GONYAULAX UNICORNIS		0010374	624.4	5743.74
GONYAULAX VERIOR		0550478	820.07	7868.64
GRAMMATOPHORA		0003197	141.05	2467.72
GRAMMATOPHORA ANGULOSA		0003198	117.53	337.72
GRAMMATOPHORA MARINA		0003199	306.82	1174.96
GRAMMATOPHORA SERPENTINA		0003203	272.76	5890.49
GREEN CELLS		BAY0286	0.57	1.77
GREEN CELLS	3-5 MICRONS	BAY0286	7.26	33.51
GREEN CELLS	5-10 MICRONS	BAY0286	37.16	220.89
GUINARDIA CYLINDRUS		BAY0352	3544	173555.19

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
GUINARDIA DELICATULA		0615883	226.21	4601.94
GUINARDIA FLACCIDA		0002922	879.34	27595.75
GUINARDIA STRIATA		BAY0389	1113.93	37699.11
GYMNODINIUM		0010031	1725.77	18579.44
GYMNODINIUM	SP.#1 5-20UM W 10-20UM L	0010031	74.2	490.87
GYMNODINIUM	SP.#2 21-40UM W 21-50UM L	0010031	601.18	5497.79
GYMNODINIUM	SP.#3 41-70UM W 51-70UM L	0010031	2302.4	25918.14
GYMNODINIUM	SP.#4 71-100UM W 71-120UM L	0010031	7777.76	105701.5
GYMNODINIUM	SPECIES 2	0010031	1725.77	18579.44
GYMNODINIUM ARCTICUM		0010043	622.7	5725.69
GYMNODINIUM BOGUENSIS		0010059	734.38	6927.21
GYMNODINIUM BREVE		0010157	237.91	1884.96
GYMNODINIUM CNECOIDES		BAY0353	0	0
GYMNODINIUM COERULEUM		0331281	21353.9	339292.41
GYMNODINIUM CONICUM		0573402	1349.3	13983.69
GYMNODINIUM COSTATUM		0573403	3673.32	44450.26
GYMNODINIUM DANICANS		0010048	183.88	1399.97
GYMNODINIUM DISSIMILE		0010044	4784.9	60318.93
GYMNODINIUM FLAVUM		0010050	576.31	5235.99
GYMNODINIUM FUSCUM		0010040	15229.9	229658.25
GYMNODINIUM GRACILENTUM		0010052	59.67	381.7
GYMNODINIUM GRAMMATICUM		0010045	1061	10594.38
GYMNODINIUM IMPATIENS		BAY0354	0	0
GYMNODINIUM MARINUM		0010053	704	6597.34
GYMNODINIUM MITRATUM		0180905	3091.225	36420.99
GYMNODINIUM NEGLECTUM		0180906	1929.7	21137.13
GYMNODINIUM NELSONII		0010034	3382.26	40408.74
GYMNODINIUM PUNCTATUM		0010033	35.48	209.44
GYMNODINIUM PYGMAEUM		0010035	94	645.08
GYMNODINIUM RHOMBOIDES		0010070	2464.3	28033.87
GYMNODINIUM SIMPLEX		0010036	99.07	685.39
GYMNODINIUM SITULA		BAY0119	3526.9	42410.63
GYMNODINIUM SPLENDENS		0010037	489.4	4335.4
GYMNODINIUM STELLATUM		0010055	548.75	4948.01
GYMNODINIUM UBERRIMUM		0180910	1731.7	18653.21
GYMNODINIUM VARIABILE		0010039	271.89	2199.11
GYMNODINIUM VERRUCULOSUM		0010058	71.62	471.24
GYRODINIUM		0010077	2374.98	26863.86
GYRODINIUM	SP#1 5-20UM W 10-20UM L	0010077	90.01	613.59
GYRODINIUM	SP#2 21-40UM W 21-50UM L	0010077	601.18	5497.79
GYRODINIUM	SP#3 41-70UM W 51-70UM L	0010077	2302.4	25918.14
GYRODINIUM	SP#4 71-100UM W 71-120UM L	0010077	6411.07	84561.2
GYRODINIUM AUREOLUM		0010078	608	5569.9
GYRODINIUM DOMINANS		0010082	330.66	2756.75
GYRODINIUM ESTUARIALE		0010089	77.78	518.36
GYRODINIUM FUSIFORME		0010088	8014.93	109432.14
GYRODINIUM LACRYMA		0202444	2170.9	24216.44
GYRODINIUM SPIRALE		0010086	4784.59	60314.39
GYRODINIUM UNCATENUM		0010095	2067.74	22892.65

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
GYRODINIUM UNDULANS		0010096	1597.1	16989.31
GYROSIGMA		0004622	111.23	1804
GYROSIGMA BALTICUM		0004623	2966.43	137250
GYROSIGMA BALTICUM SILIMIS		BAY0122	5552	313787.16
GYROSIGMA FASCIOLA		0004624	111.23	1804
GYROSIGMA HIPPOCAMPUS		0004637	1297.01	46080
GYROSIGMA MACRUM		0004650	1285.6	45546.08
GYROSIGMA SPENCERI		0004625	1535.2	57558.85
GYROSIGMA SPENCERI NODIFERUM		0591548	1129	38373.28
GYROSIGMA WANSBECKII		0004631	1202.4	41698.21
HALOPAPPUS ADRIATICUS		BAY0125	169.3	1272.58
HANTZSCHIA		0005303	286.87	1364.22
HANTZSCHIA MARINA		0005309	209.96	4170.93
HELICOTHECA TAMESIS		BAY0316	2357.17	101342.54
HEMIAULUS		0002748	734.94	21780.08
HEMIAULUS HAUCKII		0002749	327.91	7510.37
HEMIAULUS INDICUS		0002752	185.3	3537.11
HEMIAULUS MEMBRANACEUS		0002750	775.95	23397.8
HEMIAULUS SINENSIS		0002751	1076.79	36049.78
HEMIDISCUS CUNEIFORMIS		0002668	2082.35	86053.46
HEMISELMIS		0010604	7.6	35.34
HETRAULACUS POLYEDRICUS		0010459	4524.8	56548.91
HETEROCAPSA TRIQUETRA		0010207	294.61	2412.74
HETEROMASTIX PYRIFORMIS		0009517	4.4	18.8
HETEROMASTIX ROTUNDA		0009528	20.81	113.1
HETEROSIGMA AKASHIWO		BAY0342	196.69	1513.2
HISTIONEIS LONGICOLLIS		0573432	4030.7	49480.57
HISTIONEIS VARIABILIS		0573438	2302.4	25918.14
HORMIDIUM KLEBSII		BAY0355	162.8368	1216.65
HYALOTHECA		0008750	610.69	5598.32
HYALOTHECA DISSILIENS TATRICA		0008755	488.48	4325.97
HYDRODICTYON		0006079	1244497	37091719.57
HYDRODICTYON RETICULATUM		0006080	324450	7853980.41
HYMENOMONAS		0002209	224.98	1767.15
HYMENOMONAS CARTERAE		0002210	224.98	1767.15
ISOCHRYSIS GALBANA		0002143	4.1	17.33
JOHANNESBAPTISTIA PELLUCIDA		0000725	67.73	441.79
KARLODINIUM MICRUM		BAY0326	116.15	823.62
KATODINIUM		0010104	21.12	115.03
KATODINIUM ASYMMETRICUM		0010108	211.11	1642.01
KATODINIUM ROTUNDATUM		0010106	21.12	115.03
KEPHYRION		0001764	37.16	220.89
KEPHYRION OVALE		BAY0134	37.16	220.89
KERATOCOCCUS		0202441	8.04	37.7
KIRCHNERIELLA		0005895	10.5	51.31
KIRCHNERIELLA CONTORTA		0005905	4.2	17.82
KIRCHNERIELLA ELONGATA		0005906	18.4	98.11
KIRCHNERIELLA LUNARIS		0005896	25.65	143.99
KIRCHNERIELLA OBESA MAJOR		0005904	38	226.68

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KIRCHNERIELLA SUBSOLITARIA		0005907	13.23	67.02
LAGERHEIMIA		BAY0135	22.17	121.67
LAGERHEIMIA CILIATA		0005872	223.4	1752.85
LAGERHEIMIA CITRIFORMIS		BAY0136	98.5	680.87
LAGERHEIMIA LONGISETA		0006022	22.17	121.67
LAUDERIA		0002530	1385.36	50265.48
LAUDERIA BOREALIS		0002531	1385.36	50265.48
LAUTERBORNIELLA ELEGANTISSIMA		BAY0137	7.72	36
LEPOCINCLIS		0009758	413.88	3572.46
LEPTOCINCLIS OVUM GRACILICAUDA		BAY0375	1231.05	12578.4
LEPTOCINCLIS SPHAGNOPHILA		0009765	168.7459	1267.77
LEPTOCYLINDRUS DANICUS		0002395	97.1	1507.96
LEPTOCYLINDRUS MEDITERRANEUS		0573630	484.4	12566.49
LEPTOCYLINDRUS MINIMUS		0002396	64.64	156.09
LICMOPHORA		0003155	91.54	1395
LICMOPHORA ABBREVIATA		0003168	36.92	120
LICMOPHORA FLABELLATA		0003161	320.59	7290
LICMOPHORA GRACILIS		0003162	908.6	28813.41
LICMOPHORA INFLATA		BAY0140	26.14	267.03
LICMOPHORA PARADOXA		0003163	4448	234212.75
LICMOPHORA PARADOXA TINCTA		0003164	2314	98901.37
LICMOPHORA TINCTA		0003166	346.5	8077.19
LINGULODINIUM POLYEDRA		0573538	2825.23	32826.8
LITHODESMIUM		0002924	1640.67	62831.85
LITHODESMIUM UNDULATUM		0002925	1640.67	62831.85
LYNGBYA		0000870	6.03	27.07
LYNGBYA CONTORTA		0000882	2.73	10.84
LYNGBYA HIERONYMUSII		0000890	0.77	2.51
LYNGBYA LIMNETICA		0000894	6.3	28.46
MALLOMONAS		0001598	278.6	2261.95
MALLOMONAS CAUDATA		0001604	1969.99	21647.55
MALLOMONAS PRODUCTA		0001609	575.43	5226.8
MALLOMONAS TONSURATA		0001612	297.59	2440.9
MARSSONIELLA ELEGANS		0046208	2.32	9
MASTIGOCOLEUS TESTARUM		0001378	33.56	196.35
MASTOGLOIA		0004549	111.71	1814.27
MASTOGLOIA APICULATA		BAY0147	885	27830.19
MASTOGLOIA BRAUNI		0004550	885	27830.19
MASTOGLOIA COCCONEIFORMIS		BAY0148	1800	71004.03
MASTOGLOIA GIBBOSA		BAY0149	102.6	1621.65
MASTOGLOIA PUMILA		0004562	75.2	1076.34
MASTOGLOIA ROSTRATA		0004552	482	12484.41
MASTOGLOIA SMITHII		0004553	268	5755.36
MELOSIRA		0590863	54.05	696.23
MELOSIRA	SP#1 DIAM	0002290	45.19	549.78
MELOSIRA	SP#2 DIAM >20 MICRONS	0002290	488.98	12723.45
MELOSIRA ARENARIA		0002327	1148.94	39269.91
MELOSIRA DUBIA		0002326	58.77	777.54
MELOSIRA HUMMI		0002319	45.3	551.51

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MELOSIRA ISLANDICA CURVATA		BAY0150	74	1053.74
MELOSIRA ISLANDICA HELVETICA		0002307	292	6444.84
MELOSIRA JURGENSII		0002292	188.69	3622.65
MELOSIRA LINEATA		0002309	188.69	3622.65
MELOSIRA MONILIFORMIS		0002293	1052.7	34989.49
MELOSIRA NUMMULOIDES		0002294	312.1	7036.38
MELOSIRA VARIANS		0002339	919.48	29269.53
MEMBRANEIS CHALLENGERI		BAY0376	894.7	28233.31
MERIDION		0003237	149.62	2667.5
MERIDION CIRCULARE		0003238	23.19	228
MERISMOPEDIA		0000727	6.02	27
MERISMOPEDIA CONVOLUTA		0000729	9.9	47.96
MERISMOPEDIA ELEGANS		0000732	54.4	343
MERISMOPEDIA ELEGANS MAJOR		0000743	162.3	1212.02
MERISMOPEDIA GLAUCA		0000728	17.26	91.13
MERISMOPEDIA PUNCTATA		0000738	6.02	27
MERISMOPEDIA TENUISSIMA		0000739	0.99	3.36
MESOCENA POLYMORPHA		0001817	7.26	33.52
MICHAELSARSIA ELEGANS		0002221	42	254.45
MICRACTINIUM		0006321	12.96	65.45
MICRACTINIUM PUSILLUM		0006322	12.96	65.45
MICRACTINIUM PUSILLUM ELEGANS		0006324	12.96	65.45
MICRANTHODINIUM		0010485	50.41	314.16
MICRASTERIAS		0008358	77847.12	1510998.2
MICRASTERIAS JOHNSONII		0008444	6013.8	78540.06
MICRASTERIAS PINNATIFIDA		0008422	571.3	5183.51
MICRASTERIAS RADIATA		0008371	1263.2	12958.49
MICRASTERIAS TRUNCATA		0008425	889.2	8639.51
MICROCOLEUS		0000906	254.31	2035.83
MICROCOLEUS LYNGBYACEUS		0000908	254.31	2035.83
MICROCYSTIS		0000747	1.2	4.19
MICROCYSTIS AERUGINOSA		0000750	7.26	33.51
MICROCYSTIS INCERTA		0000771	0.35	1.02
MICROFLAGELLATES	SPECIES #2	BAY0153	76.55	508.9
MICRO-PHYTOFLAG	LENGTH	BAY0152	20.81	113.1
MICRO-PHYTOFLAG	LENGTH >10 MICRONS	BAY0152	126	904.78
MICRO-PHYTOFLAGELLATES		BAY0152	20.81	113.1
MICRO-PHYTOFLAGELLATES	>10 MICRONS	BAY0152	126	904.78
MICROSPORA		0009295	3294.56	39201.19
MICROSPORA QUADRATA		0009304	39.29945	235.65
MINUSCULA BIPES		0010209	286.12	2332.63
MONODUS		0001941	4.41	18.85
MONODUS GUTTULA		BAY0156	5.54	24.53
MONORAPHIDIUM		0005990	23.78	131.95
MOUGEOTIA		0007055	246.47	1963.5
MURRAYELLA		0016153	3084	36322.71
NANNOCHLORIS		0005825	2.14	8.18
NANNOCHLORIS ATOMUS		0005826	3.4	13.96
NAVICULA		0003649	192	3706.73

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NAVICULA	SP#1 LENGTH	0003649	48.31	117.81
NAVICULA	SP#2 LENGTH 20-60 MICRONS	0003649	247.07	942.48
NAVICULA	SP#3 LENGTH >60 MICRONS	0003649	567.55	2513.27
NAVICULA ABRUPTA		0003747	4768	256693.32
NAVICULA AMPHIPLEUROIDES		0004083	1555.9	58584.92
NAVICULA ANNULATA		BAY0162	936.95	30005.33
NAVICULA ARENARIA		0003656	269.5	5797.89
NAVICULA ARVENSIS		0003737	13.13	107.65
NAVICULA ATOMUS		0003804	15.06	129
NAVICULA BEYRICHIANA		BAY0163	170.21	3162.13
NAVICULA BOMBUS		0003697	122.61	2051.26
NAVICULA CANCELLATA		0003699	288.73	6349.94
NAVICULA CINCTA		0003741	58.65	775.42
NAVICULA CLAVATA		0003781	2391	103265.97
NAVICULA CUSPIDATA AMBIGUA		0003734	573.67	15707.96
NAVICULA DIRECTA		0003669	444.8	11229.21
NAVICULA DISTANS		0003670	1414.9	51684.28
NAVICULA EIDRIGEANA		BAY0377	1451.4	53450.45
NAVICULA ELEGANS		0003806	1451.4	53450.45
NAVICULA FORCIPATA		0003728	654.5	18691.69
NAVICULA GRANULATA		0003786	279.68	6088.41
NAVICULA HENNEDYI		0003730	1933.4	78027.02
NAVICULA HUMEROSA		0003704	1710.7	66394.04
NAVICULA INSERATA		0591330	936.95	30005.33
NAVICULA INTERRUPTA		BAY0164	138.59	2411.24
NAVICULA IRRORATA		0003706	34.4	383.57
NAVICULA LAEVISSIMA		0004063	196.1	3811.58
NAVICULA LATA		BAY0166	162.58	2976.44
NAVICULA LYRA		0003707	349.19	8160
NAVICULA MACULATA		0003710	3086	144594.89
NAVICULA MEMBRANACEA		0003677	1268.91	44767.7
NAVICULA NORTHUMBRICA		0202437	86.57	1296
NAVICULA NOTABLIS		0591003	218.64	4400
NAVICULA OPIMA		BAY0168	27.24	281.93
NAVICULA PALPEBRALIS		0003729	717.8	21112.65
NAVICULA PEREGRINA		0003752	1155.9	39584.04
NAVICULA PHYLLEPTA		0003744	196.1	3811.58
NAVICULA PLACENTA		0003925	413	10182.39
NAVICULA PRAETEXTA		0003803	7250.8	446257.63
NAVICULA PUSILLA		0004102	480.6	12436.6
NAVICULA RETUSA CANCELLATA		BAY0169	288.73	6349.94
NAVICULA RHOMBICA		0591353	846.7	26252.36
NAVICULA SALINARUM		0003712	175.96	622.04
NAVICULA SEPTENTRIONALIS		0003684	143.4772	2523.99
NAVICULA SPECTABILIS		0003801	357	8401.65
NAVICULA SPICULA		0003716	0	0
NAVICULA TRANSITANS ASYMMETRICA		0003687	513.4	13568.37
NEIDIUM AFFINE		0003270	209.1	746.13

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NEPHROCHLORIS		0001901	10.2	49.64
NEPHROCHLORIS SALINA		0001477	11.4	56.44
NEPHROCYTIUM AGARDHIANUM		0005965	7.87	36.82
NEPHROCYTIUM LIMNETICUM		0005968	107.4	752.4
NITZSCHIA		0005070	95.77	1480.79
NITZSCHIA	SP#1 LENGTH	0005070	32.03	100
NITZSCHIA	SP#2 LENGTH 30-70 MICRONS	0005070	104.99	400
NITZSCHIA	SP#3 LENGTH >70 MICRONS	0005070	153.17	600
NITZSCHIA ACICULARIS		0005099	32.79	360
NITZSCHIA AMPHIBIA		0005160	64.43	877.78
NITZSCHIA ANGULARIS		0005163	810	24761.66
NITZSCHIA ANGULARIS AFFINIS		0005164	6.9	46.07
NITZSCHIA BILOBATA		0005073	764.9	22959.16
NITZSCHIA BILOBATA MINOR		0005074	4.4	25.45
NITZSCHIA CLAUSII		0005165	45	546.7
NITZSCHIA CONSTRICTA		0005103	115.8	1902.39
NITZSCHIA DELICATISSIMA		0005077	43.71	72.5
NITZSCHIA DISTANS		0005178	1404	51159.65
NITZSCHIA FRUSTULUM		0005150	70	979.25
NITZSCHIA FRUSTULUM PERPUSILLA		0005152	22.87277	223.88
NITZSCHIA GRACILLIMA		0005167	54	695.36
NITZSCHIA INCURVA LORENZIANA		BAY0174	168.47	680
NITZSCHIA INSIGNIS		0005168	1508	56217.28
NITZSCHIA LINEARIS		0005104	159.77	620
NITZSCHIA LONGISSIMA		0005080	47.37	585
NITZSCHIA LORENZIANA DENSISTRATA		0005174	292.4	6456.49
NITZSCHIA LORENZIANA INCERTA		0005170	27.2	281.38
NITZSCHIA OBTUSA		0005085	185.34	3538.08
NITZSCHIA OBTUSA SCALPELLIFORMIS		0005087	362.7	8579.07
NITZSCHIA PACIFICA		0005088	137.7	2390.79
NITZSCHIA PALEACEA		0005250	29.84	83.6
NITZSCHIA PANDURIFORMIS		0005110	1279	45237.86
NITZSCHIA PARADOXA		0005089	44.27	535
NITZSCHIA PLANA		0005114	599.01	2925
NITZSCHIA PROXIMA		0005179	129.18	2197.59
NITZSCHIA SIGMA		0005118	188.98	3630
NITZSCHIA SIGMA INTERCEDENS		BAY0176	41280.9	4426974.98
NITZSCHIA SIGMA RIGIDA		0005120	352.5	8262.21
NITZSCHIA SOCIALIS		0005177	243.1	5060.6
NITZSCHIA SPATHULATA		0005175	95.73	1480
NITZSCHIA TRIBIONELLA		0005130	337.86	7812.5
NITZSCHIA VERMICULARIS		0005135	301.53	6723.77
NITZSCHIA VITREA		0005204	40.75	479.7
NITZSCHIA VITREA RECTA		BAY0178	63.38	858.96
NITZSCHIA VITREA SALINARUM		BAY0179	169.23	1272
NOCTILUCA MILIARIS		0010149	6900500.52	268082572.8
NOCTILUCA SCINTILLANS		0010150	6900514.5	268083200.13

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NODULARIA		0001225	161.6	1205.98
NODULARIA HARVEYANA		0001226	12.85	64.8
NOSTOC		0001146	18.59	99.25
NOSTOC COMMUNE		0001147	18.63	99.54
NOSTOCALES	TRICHOME	0000861	7.6	35.34
OBLEA ROTUNDA		0010194	475.04	4188.79
OCHROMONAS		0001455	54.5	343.77
OCHROMONAS CAROLINA		0001456	83.11	559.6
OCHROMONAS MINUSCULA		0202431	59.7	381.91
OCHROMONAS VARIABILIS		0001457	21.48	117.29
ODONTELLA ALTERNANS		BAY0314	2163.01	90477.87
ODONTELLA AURITA		0610098	1486.34	55154.59
ODONTELLA GRANULATA		0610124	3795.13	189960.33
ODONTELLA LONGICRURIS		0573696	2837.75	129450.12
ODONTELLA MOBILIENSIS		0610125	7157.64	438708.69
ODONTELLA RHOMBUS		0610128	11889.62	856918.48
ODONTELLA RHOMBUS TRIGONA		0610144	601.97	16738.41
ODONTELLA SINENSIS		0610127	48878.01	5532148.31
OEDOGONIUM		0008959	6069.99	79388.05
OLISTHODISCUS		0001903	54.03	340.34
OLISTHODISCUS LUTEUS		0001905	42	254.47
OOCYSTIS		0005827	31.06	179.59
OOCYSTIS BORGEI		0005833	189.5554	1449.97
OOCYSTIS ELLIPTICA		0005834	339.3	2840.08
OOCYSTIS PARVA		0005838	44.6	272.72
OPHIASTER HYDROIDEUS		0002223	5.13	22.45
OPHIOCYTIUM		0002016	13.82	70.52
OPHIOCYTIUM CAPITATUM LONGISPINUM		0002019	102.68	714.35
ORNITHOCERCUS		0009985	6569.7	86981.93
ORNITHOCERCUS MAGNIFICUS		0009988	7447.2	100531.32
ORNITHOCERCUS QUADRATUS		0009986	9940.1	140314.48
ORNITHOCERCUS STEINI		0009989	5135.4	65449.39
ORNITHOCERCUS THURNII		0009987	3470.6	41629.85
OSCILLATORIA		0000917	14.65	75.4
OSCILLATORIA	CELLS #1 DIAM <5UM	0000917	8.04	37.7
OSCILLATORIA	CELLS #2 DIAM >5UM	0000917	41.55	251.33
OSCILLATORIA	TRICHOME	0000917	139.93	1021.26
OSCILLATORIA	TRICHOMES	0000917	139.93	1021.26
OSCILLATORIA ERYTHRAEA		0000934	366.08	3100.46
OSCILLATORIA LACUSTRIS		0000940	25.25	141.39
OSCILLATORIA LIMNETICA		0000975	3.1	12.55
OSCILLATORIA LIMOSA		0000976	2.81	11.2
OSCILLATORIA LUTEA		0000925	22.34	122.72
OSCILLATORIA SUBBREVIS		0000987	2.5	9.79
OSCILLATORIA SUBMEMBRANACEAE		0000932	31.39	181.77
OSCILLATORIA TENUIS		0000954	11.4	56.44
OXYRRHIS MARINA		0010146	186.63	1424.19
OXYTOXUM		0010463	2303.41	25931.23
OXYTOXUM BELGICAE		0573451	3526.9	42410.63

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
OXYTOXUM CONSTRICTUM		0010475	7042.4	94248.25
OXYTOXUM CORONATUM		0010477	354.2	2984.58
OXYTOXUM CRASSUM		0573456	288.63	2356.19
OXYTOXUM CURVATUM		0550532	2209.1	24709.18
OXYTOXUM DIPLOCONUS		0573458	685.7	6399.7
OXYTOXUM ELEGANS		0573459	2471.2	28124.53
OXYTOXUM GLADIOLUS		0010466	1061.7	10602.45
OXYTOXUM GLOBOSUM		BAY0192	1288.1	13253.9
OXYTOXUM GRACILE		0573461	128.3	923.89
OXYTOXUM LATICEPS		0550489	225	1767.36
OXYTOXUM LONGICEPS		0010467	1897.8	20734.16
OXYTOXUM MEDITERRANEUM		0573464	790.3	7539.77
OXYTOXUM MILNERI		0010468	2196.28	24543.69
OXYTOXUM MITRA		0573465	3705.39	44898.59
OXYTOXUM OBLIQUUM		0573466	2646	30434.07
OXYTOXUM PARVUM		0010469	912.48	8901.18
OXYTOXUM RETICULATUM		0010470	15290	230705.07
OXYTOXUM SCEPTRUM		0010471	5489.3	70684.92
OXYTOXUM SCOLOPAX		0010472	9099.91	126710.9
OXYTOXUM SPHAEROIDEUM		0010476	921.18	8999.35
OXYTOXUM TESSELATUM		0010473	2302.4	25918.14
OXYTOXUM TURBO		0010474	1766.38	19085.18
OXYTOXUM VARIABILE		0010465	27.66	157.08
PALMODICTYON		0009175	3.44	14.14
PALMODICTYON VARIUM		0009176	136	988.21
PANDORINA		0005578	66.56	433.04
PANDORINA MORUM		0005580	226.3	1779.15
PARALIA SULCATA		0002346	132.87	2280.8
PAVILLARDINIUM		0010478	3084	36322.71
PAVILLARDINIUM BICONICA		BAY0200	132.87	2280.78
PAVILLARDINIUM SPINOSA		0610152	3084	36322.71
PAVLOVA HOMMERSANDII		0001478	26.1	146.9
PAVLOVA SALINA		0001476	11.4	56.44
PEDIASTRUM		0006031	103.61	721.79
PEDIASTRUM BIRADIATUM		0006050	55.34	349.89
PEDIASTRUM BORYANUM		0006032	155.61	1154.54
PEDIASTRUM BORYANUM LONGICORNE		0006033	468.6	4123.34
PEDIASTRUM DUPLEX		0006036	20.81	113.1
PEDIASTRUM DUPLEX CLATHRATUM		0006037	55.11	348.17
PEDIASTRUM DUPLEX GRACILLIMUM		0006041	4.63	19.96
PEDIASTRUM DUPLEX RETICULATUM		0006038	4.81	20.83
PEDIASTRUM DUPLEX ROTUNDATUM		0006043	53	332.86
PEDIASTRUM GLANDULIFERUM		0006064	46.02	282.74
PEDIASTRUM MUTICUM		0006070	97.62	673.87
PEDIASTRUM OBTUSUM		0006065	130.53	942.48
PEDIASTRUM SIMPLEX		0006045	67.04	436.65
PEDIASTRUM SIMPLEX DUODENARIUM		0006046	421.66	3650.14
PEDIASTRUM TETRAS		0006053	3.91	16.42
PEDIASTRUM TETRAS TETRAODON		0006055	125.57	901.24

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
PENIUM		0008499	526.05	4712.39
PENNALES		0002930	23.74	42
PENNALES		0002930	23.74	42
PENNALES		0002930	51.7	125
PENNALES		0002930	51.7	125
PENNALES		0002930	51.7	125
PENNALES	>100 MICRONS LENGTH	0002930	409.85	10080
PENNALES	>20 MICRONS	0002930	68.95	960
PENNALES	>20 UM LENGTH	0002930	68.95	960
PENNALES	>60 MICRONS DIAMETER	0002930	233.55	4800
PENNALES	10-30 MICRONS DIAMETER	0002930	98.37	360
PENNALES	10-30UM LENGTH	0002930	98.37	360
PENNALES	31-60 MICRONS DIAMETER	0002930	93.76	1440
PENNALES	31-60UM LENGTH	0002930	93.76	1440
PENNALES	61-100UM LENGTH	0002930	233.55	4800
PERIDINIUM		0010212	6578.32	87113.75
PERIDINIUM ACICULIFERUM		0010302	2001.431	22047
PERIDINIUM CINCTUM		0010329	13846	205734.7
PERIDINIUM GATUNENSE		0010330	0	0
PERIDINIUM INCONSPICUUM		0010331	1196.877	12176.08
PERIDINIUM LOMNICKII SPLENDIDA		BAY0359	3346.816	39920.09
PERIDINIUM PSEUDOLAEVE		BAY0360	8451.896	116350.14
PHACUS		0009766	5684.69	73598.23
PHACUS		0009766	224.98	1767.15
PHACUS	>50UM L	0009766	3639.81	43982.3
PHACUS CURVICAUDA		0009797	1308.71	13499.03
PHACUS LATUS		BAY0361	3230	38315.52
PHACUS LEMMERMANNII		0009789	896.51	8721.55
PHACUS LONGICAUDA		0009771	11470.24	165541.07
PHACUS MONILATUS		0180823	2428.8	27568.06
PHACUS ORBICULARIS		0009793	7218.9	96981.1
PHACUS PERKINENSIS		BAY0362	3230	38315.52
PHACUS SUECICUS		0009780	1002.6	9923.92
PHACUS TRIQUETER		0009776	4624.11	57984.51
PHALACROMA		0009929	1492.2	15707.43
PHORMIDIUM		0000992	0.97	3.29
PINNULARIA		0004428	233.26	4792.2
PINNULARIA GIBBA		0004449	425.4	10587.63
PINNULARIA LEGUMEN		0004494	1104.8	37291.88
PINNULARIA MAJOR		0004498	3346.1	160885.06
PINNULARIA NOBILIS		0004439	1745.3	68171.4
PINNULARIA RETANGULATA		0004527	213.58	4266
PINNULARIA TREVELYANA		0004446	521.74	13860
PLAGIOGRAMMA		0003194	55.15	135.25
PLAGIOGRAMMA INTERRUPTUM		0202436	123.62	424.12
PLAGIOGRAMMA STAUROPHORUM		0003196	164.99	725.75
PLAGIOGRAMMA VANHEURCKI		0003195	86.79	291.58
PLANKTONIELLA SOL		0002483	819.18	25132.74
PLATYDORINA		0005592	19.06	102.16

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
PLEODORINA		0005594	475	4188.4
PLEUROCAPSA MINOR		BAY0363	20.81	113.09
PLEUROSIGMA		0004592	682.39	19749.39
PLEUROSIGMA ACUTUM		0004620	2779.5	125956.3
PLEUROSIGMA AESTUARII		0004605	619.92	17400
PLEUROSIGMA ANGULATUM		0004593	1379.39	49980
PLEUROSIGMA ANGULATUM STRIGOSA		BAY0209	4462.7	235234.44
PLEUROSIGMA DELICATULUM		0004612	1732.7	67522.79
PLEUROSIGMA DIRECTUM		0004611	6509.9	387105.12
PLEUROSIGMA ELONGATUM		0004594	1239.15	43387.5
PLEUROSIGMA FASCIOLA		0004598	93.92	1443.2
PLEUROSIGMA FORMOSUM		0004599	9550.5	641833.39
PLEUROSIGMA HAMULIFERUM		0004600	134.16	2310
PLEUROSIGMA MACRUM		BAY0210	494.84	12925
PLEUROSIGMA NAVICULACEUM		0004613	431.85	10800
PLEUROSIGMA NICOBARICUM		0004602	12.9	105.17
PLEUROSIGMA NORMANI		0004603	3625.7	178852.85
PLEUROSIGMA OBSCURUM		0591037	105	1671.88
PLEUROSIGMA RIGIDUM		0004614	7020.3	427637.8
PLEUROSIGMA SALINARUM		0555629	937.9	30045.47
PLEUROSIGMA STRIGOSUM		0004618	4643.7	247901.92
PLEUROTAENIUM		0008712	5569.9	71884.74
PLEUROTAENIUM NODOLOSUM		0008749	10004.9	141371.27
PLEUROTAENIUM SUBCORONULATUM DENTUM		0008738	0	0
PLEUROTAENIUM TRABECULA		0008713	26217.95	430017.21
PLEUROTAENIUM TRIDENTULUM		0008739	1134.9	11450.98
PODOLAMPAS		0010498	1745.04	18819.22
PODOLAMPAS BIPES		0010499	1712.71	18417.19
PODOLAMPAS CURVATUS		0573497	1230	12566.02
PODOLAMPAS ELEGANS		0010500	26.7	150.81
PODOLAMPAS PALMIPES		0010501	3653.9	44178.97
PODOLAMPAS SPINIFER		0010502	2719.8	31416.36
PODOSIRA		0002384	1445.45	53161.34
PODOSIRA STELLIGER		0002382	598.6	16614.87
POLYEDRIOPSIS		0005931	185.4	1413.33
POLYEDRIOPSIS SPINULOSA		0005932	185.4	1413.33
POLYKRIKOS		0010138	3324.5	39612.92
POLYKRIKOS HARTMANNII		0331299	4538.39	56745.02
POLYKRIKOS KOFOIDI		0010140	2035.49	22480.82
PONTOSPHAERA		0002226	43.9	267.79
PONTOSPHAERA SYRACUSANA		0002228	939.2	9202.88
POROSIRA GLACIALIS		0002537	1943.02	78539.82
PROBOSCIA ALATA		0610099	1385.36	50265.48
PROBOSCIA ALATA GRACILLIMA		BAY0309	1015.97	5378.41
PROBOSCIA INERMIS		0610100	1577.5	59660.27
PROBOSCLA ALATA CURVIROSTRIS		BAY0378	1889.5	75698.21
PRONOCTILUCA		0010143	306.1	2521.68
PROROCENTRUM		0009877	364.46	3084.67

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
PROROCENTRUM APORUM		0009886	884.47	8586.5
PROROCENTRUM BALTICUM		0009888	24.15	134.3
PROROCENTRUM CASSUBICUM		0009914	891	8659.71
PROROCENTRUM COMPRESSUM		0009890	350.15	2945.24
PROROCENTRUM CORDATUM		0009902	300	2463.74
PROROCENTRUM DENTATUM		0009904	858.3	8293.8
PROROCENTRUM GRACILE		0009901	329.25	2743.13
PROROCENTRUM LIMA		0009893	1202	12236.28
PROROCENTRUM MAXIMUM		0009898	725.72	6832.96
PROROCENTRUM MICANS		0009879	618.22	5678.17
PROROCENTRUM MINIMUM		0009880	35.18	207.35
PROROCENTRUM NANUM		0009905	62.53	402.91
PROROCENTRUM OBTUSUM		0009899	2696.2	31101.79
PROROCENTRUM OVUM		0009908	5.5	24.33
PROROCENTRUM ROSTRATUM		0009910	295.28	2419.03
PROROCENTRUM ROTUNDATUM		0009912	425.45	3688.1
PROROCENTRUM SCUTELLUM		0009884	3606	43510.88
PROROCENTRUM TRIESTINUM		0009881	117.87	837.76
PROROCENTRUM VAGINULUM		0009896	264	2125.63
PROTOPERIDINIUM		0010340	7122.1	95481.07
PROTOPERIDINIUM	SP.#1 10-30W 10-40L	0010340	467.7	4114.17
PROTOPERIDINIUM	SP.#2 31-75W 41-80L	0010340	3087.35	36368.22
PROTOPERIDINIUM	SP.#3 76-150W 81-150L	0010340	15169.93	228614.36
PROTOPERIDINIUM ABEI		0573548	18684.2	290801.36
PROTOPERIDINIUM ACHROMATICUM		0010242	1621.8	17293.07
PROTOPERIDINIUM ACICULIFERUM		BAY0220	3587.9	43258.78
PROTOPERIDINIUM AVELLANA		0010304	4714.8	59299.67
PROTOPERIDINIUM BICONICUM		BAY0221	10113.1	143138.2
PROTOPERIDINIUM BREVE		0010255	1753.42	18923.65
PROTOPERIDINIUM BREVIPES		0010215	745.14	7044.5
PROTOPERIDINIUM BROCHII		0010344	22165.2	354221.1
PROTOPERIDINIUM CERASUS		0010218	2575.9	29504.95
PROTOPERIDINIUM CINCTUM		BAY0222	4130.2	50893.7
PROTOPERIDINIUM CLAUDICANS		0010246	10715	153020.1
PROTOPERIDINIUM CONICOIDES		0010248	2182.51	24366.13
PROTOPERIDINIUM CONICUM		0010220	11880.42	172395.68
PROTOPERIDINIUM CRASSIPES		0010306	19364.69	303065.52
PROTOPERIDINIUM DECIPIENS		0010291	14624.87	219155.77
PROTOPERIDINIUM DEPRESSUM		0010224	29720.22	497009.77
PROTOPERIDINIUM DIABOLUM		0010308	3537.57	42558.76
PROTOPERIDINIUM DIVERGENS		0550482	5262.42	67322.24
PROTOPERIDINIUM EXCENTRICUM		0010226	4574	57259.53
PROTOPERIDINIUM FIMBRIATUM		BAY0224	1362.1	14136.99
PROTOPERIDINIUM GLOBULUM		0010293	9951.5	140500.32
PROTOPERIDINIUM GLOBULUM OVATUM		BAY0225	13085.6	192744.11
PROTOPERIDINIUM GRANDE		0550484	36203.2	624194.32
PROTOPERIDINIUM GRANII		0010228	3911.92	47800.64
PROTOPERIDINIUM HIROBIS		0010295	906.66	8835.73
PROTOPERIDINIUM LEONIS		0010282	9034.74	125663.71

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
PROTOPERIDINIUM MINUTUM		0010310	2783.63	32269.33
PROTOPERIDINIUM MITE		0010312	3432.4	41101.19
PROTOPERIDINIUM NIPPONICUM		0010314	3230.9	38327.85
PROTOPERIDINIUM NUDUM		BAY0228	848.2	8181.17
PROTOPERIDINIUM OBLONGUM		0010277	2817.64	32724.92
PROTOPERIDINIUM OCEANICUM		0010273	78762.2	1531526.42
PROTOPERIDINIUM ORBICULARE		BAY0229	3470.6	41629.85
PROTOPERIDINIUM OVATUM		0010237	1338.56	13855.25
PROTOPERIDINIUM PALLIDUM		0010233	9213.12	128533.03
PROTOPERIDINIUM PAULSENI		BAY0230	4196.36	51836.28
PROTOPERIDINIUM PELLUCIDUM		0010235	3331.65	39711.3
PROTOPERIDINIUM PENDUNCULATUM		0010299	2876.1	33510.26
PROTOPERIDINIUM PENTAGONUM		0010270	16810.07	257388.07
PROTOPERIDINIUM PUNCTULATUM		0010267	6918	92328.44
PROTOPERIDINIUM PYRIFORME		0010265	3540.7	42602.35
PROTOPERIDINIUM QUARNERENSE		0010341	2482.6	28274.41
PROTOPERIDINIUM ROSEUM		0010316	3172	37522.15
PROTOPERIDINIUM SOLIDICORNE		BAY0231	21340.5	339046.56
PROTOPERIDINIUM SPHAERICUM		0010318	8234.5	112901.28
PROTOPERIDINIUM STEINI		0010261	1685.14	18075.31
PROTOPERIDINIUM SUBCURVIPES		0010320	3524.9	42382.86
PROTOPERIDINIUM SUBINERME		0010259	7348.4	98992.82
PROTOPERIDINIUM THORIANUM		0010239	12538.6	183470.83
PROTOPERIDINIUM WISCONSISENSE		BAY0232	3814.6	46430.17
PSAMMODISCUS NITIDUS		BAY0233	869.08	27171.63
PSEUDO-NITZSCHIA PUNGENS		0584566	204.38	541.92
PSEUDO-NITZSCHIA SERIATA		0615879	223.67	737.96
PSEUDO-NITZSCHIA SUBPACIFICA		BAY0380	102.9	1627.91
PSEUDOPEDINELLA PYRIFORMIS		0001789	18.79	100.53
PSEUDOTETRAEDRON NEGLECTUM		0002009	53.69	337.84
PSUEDOSOLENIA CALCAR-AVIS		BAY0310	2774.6	125663.71
PYRAMIMONAS		0009535	69.26	453.4
PYRAMIMONAS AMYLIFERA		0009536	70.38	461.81
PYRAMIMONAS GROSSII		0009538	13.85	70.69
PYRAMIMONAS MICRON		0009539	11.42	56.55
PYRAMIMONAS OBOVATA		0009540	27.66	157.08
PYRAMIMONAS PLURIOCULATA		0009541	18.79	100.53
PYRAMIMONAS TETRAHYNCHUS		0009543	278.6	2261.95
PYRAMIMONAS TORTA		0009542	37.28	221.74
PYROCYSTIS		0010551	51724.55	942422.55
PYROCYSTIS FUSIFORMIS		0010553	77356.18	1500000
PYROCYSTIS FUSIFORMIS BICONICA		0573560	24235.7	392698.78
PYROCYSTIS HAMULUS		0010554	6633.9	87964.19
PYROCYSTIS LUNULA		0010552	23815.39	384845.1
PYROCYSTIS PSEUDONOCILUCA		0010557	4023478.8	143793317.52
PYROCYSTIS ROBUSTA		0010558	870338	24543691.94
PYRODINIUM BAHAMENSE		0010387	1411.1	14725.86
PYROPHACUS		0010161	67804.72	1288249.34
PYROPHACUS HOROLOGICUM		0010162	1091.79	10950.2

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
PYRROPHYCOPHYTA		0009873	519.45	4644.19
PYRROPHYCOPHYTA	CYST	0009873	1086.52	10889.22
PYRROPHYCOPHYTA	CYST	0009873	475.04	4188.79
PYRROPHYCOPHYTA	CYSTS	0009873	1086.52	10889.22
PYRROPHYCOPHYTA	UNIDENTIFIED	0009873	519.45	4644.19
QUADRICOCCLUS EURYHALINICUS		BAY0403	29	165.92
QUADRIGULA		0005938	86.89	589.05
QUADRIGULA CHODATI		0005943	146.86	1079.88
QUADRIGULA CLOSTEROIDES		0005939	84.37	569.39
QUADRIGULA LACUSTRIS		0005941	32.39	188.5
RAPHIDIOPSIS		0001290	70.07	459.46
RAPHIDIOPSIS CUVATA		0001291	70.07	459.46
RHABDODERMA		0000805	5.2	22.8
RHABDODERMA LINEARE		0000806	5.7	25.35
RHABDODERMA SIGMOIDEA MINOR		0000809	6.45	29.24
RHABDOMONAS SPIRALIS		0009808	49	304.02
RHABDONEMA		0003208	859.8	26789.52
RHABDONEMA ARCUATUM		0003209	1250	43889.59
RHABDONEMA MINUTUM		0003211	125.35	2112
RHABDOSPHAERA		0002262	224.98	1767.15
RHABDOSPHAERA CLAVIGER		0002264	78.46	523.6
RHABDOSPHAERA HISPIDA		0002265	100.51	696.91
RHABDOSPHAERA LONGISTYLIS		0002266	9.9	47.96
RHABDOSPHAERA STYLIFERA		0002263	78.46	523.6
RHAPHONEIS		0003145	224.27	4550
RHAPHONEIS AMPHICEROS		0003147	86.77	1300
RHAPHONEIS GEMMIFERA		BAY0238	337.45	7800
RHIZOCHRYSIS LIMNETICA		0001822	2876.1	33510.26
RHIZOLENIA		0002879	6115.86	356495.81
RHIZOLENIA ACUMINATA		0002880	37117.8	3847696.67
RHIZOLENIA ALATA INDICA		0002884	12127.89	879645.94
RHIZOLENIA BERGONII		0002887	3075.4	143940.01
RHIZOLENIA CASTRACANEI		0002889	98296	13905516.7
RHIZOLENIA ERIENSIS		0002915	326.28	7461.28
RHIZOLENIA FORMOSA		BAY0364	45867.3	5087080.03
RHIZOLENIA HEBETATA		0002893	13021	966092.96
RHIZOLENIA HEBETATA SEMISPINA		0002895	556.19	15079.64
RHIZOLENIA IMBRICATA		0002897	4125.27	212057.5
RHIZOLENIA IMBRICATA SHRUBSOLEI		0002898	617.71	17318.03
RHIZOLENIA MINIMA		0002918	42.7	95.57
RHIZOLENIA RHOMBUS		BAY0241	28114	2666977.27
RHIZOLENIA ROBUSTA		0002901	19618.87	1659153.62
RHIZOLENIA SETIGERA		0002902	1398.47	50893.8
RHIZOLENIA SHRUBSOLEII		0002910	2361.9	101610.89
RHIZOLENIA STOLTERFOTHII		0002903	1205.84	41855.54
RHIZOLENIA STYLIFORMIS		0002904	16421.79	1312105.81
RHIZOLENIA STYLIFORMIS LONGISPINA		0002905	4663.33	249285.38
RHIZOLENIA TEMPEREI		BAY0242	2242.8	94906.56

Taxa Name	Size Category	ITIS TSN	Carbon Conversion	Biovolume
RHODOMONAS MINUTA		0010665	84.46396	570.13
RHOICOSPHENIA ABBREVIATA		BAY0243	77.65	1122.9
RHOPALODIA		0005024	2130.9	88709.96
RHOPALODIA GIBBA		0005041	1469.33	54323.37
RHOPALODIA GIBBERULA		0005025	129.6	2207.02
RHOPALODIA OPERCULATA		BAY0244	50.01	628.32
RICHELIA INTRACELLULARIS		0001249	33.92	198.8
SCENEDESMUS		0006104	41.29	249.49
SCENEDESMUS ABUNDANS		0006133	9.82	47.5
SCENEDESMUS ACUMINATUS		0006105	17.34	91.63
SCENEDESMUS ANOMALUS		0006203	11.42	56.55
SCENEDESMUS ARCUATUS		0006139	19.47	104.72
SCENEDESMUS ARCUATUS PLATYDISCA		0006141	3.37	13.8
SCENEDESMUS ARMATUS		0006120	49.54	307.88
SCENEDESMUS BERNARDII		0006161	23.88	132.54
SCENEDESMUS BIJUGA		0006127	23.88	132.54
SCENEDESMUS BIJUGA ALTERNANS		0006128	37.93	226.19
SCENEDESMUS BRASILIENSIS		0006165	27.89	158.59
SCENEDESMUS DENTICULATUS		0006145	45.94	282.22
SCENEDESMUS DENTICULATUS RECURVATUS		0006148	58.45	372.71
SCENEDESMUS DIMORPHUS		0006143	29.25	167.55
SCENEDESMUS ECORNIS		0006174	2.65	10.47
SCENEDESMUS HYSTRIX		0006180	7.16	32.99
SCENEDESMUS INCRASSATULUS		0006181	69.28	453.5
SCENEDESMUS IRREGULARIS		BAY0246	26.88	152
SCENEDESMUS OBLIQUUS		0006160	35.57	210
SCENEDESMUS OPOLIENSIS		0006194	52.51	329.31
SCENEDESMUS PARISIENSIS		0006207	45.94	282.22
SCENEDESMUS PERFORATUS		0006198	20.4	110.52
SCENEDESMUS QUADRICAUDA		0006110	11.78	58.64
SCENEDESMUS QUADRICAUDA MAXIMUS		0006115	230.62	1818.39
SCHIZOCHLAMYS COMPACTA		0009200	43.94	268.08
SCHIZOTHRIX		0001032	9.56	46.07
SCHIZOTHRIX ARENARIA		0001033	11.62	57.73
SCHIZOTHRIX CALCICOLA		0001034	2.17	8.33
SCHIZOTHRIX TENERRIMA		0001035	14.1	72.16
SCHROEDERELLA DELICATULA		0002392	1899.14	76208.17
SCHROEDERIA		0005656	867.59	8397.48
SCHROEDERIA SETIGERA		0005657	62.36	401.63
SCOLIOTROPIS LATESTRIATA		0004545	2670.1	119457.41
SCRIPPSIELLA FAVIONESE	CYST	BAY0248	958.13	9417.45
SCRIPPSIELLA PRECARIA		BAY0402	314.93	2605.86
SCRIPPSIELLA TROCHOIDEA		0010537	355.27	2994.98
SCYPHOSPHAERA APSTEINII		BAY0249	335.8	2806.27
SELENASTRUM		0006249	44.68	273.32
SELENASTRUM GRACILE		0006255	45	275.55
SELENASTRUM MINUTUM		0006256	54.21	341.65

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SELENASTRUM WESTII		0006258	10.6	51.9
SILICOFLAGELLIDA		0043789	78.46	523.6
SKELETONEMA		0002401	38.3	119.3
SKELETONEMA COSTATUM		0002402	48.99	176.71
SKELETONEMA POTAMOS		0002414	27.22	61.89
SORASTRUM		0006088	75.91	504
SPHAEROCYSTIS		0009169	78.46	523.6
SPIROGYRA		0006996	31280.5	527260.26
SPIROGYRA CRASSA		0007010	230847.36	5301437.71
SPIROGYRA TENUISSIMA		0007023	1043.32	10390.79
SPIRULINA		0001053	5.16	22.62
SPIRULINA LAXA		0001063	4.62	19.89
SPIRULINA MAJOR		0001054	1.3	4.6
SPIRULINA SUBSALSA		0001055	5.16	22.62
SPONDYLIOSIUM PLANUM		0008472	169.1	1270.84
SPONDYLIOSIUM PYGMAEUM		0008474	18.7	99.96
STAUSTRUM		0007440	521.79	4668.35
STAUSTRUM AMERICANUM		0007597	155.85	1156.59
STAUSTRUM CHAETOCEROS		0007442	42.14	255.44
STAUSTRUM CINGULUM FLORIDENSE		BAY0365	4728.59	59499.99
STAUSTRUM CURVATUM		0007769	190.46	1458
STAUSTRUM GRANDE		0007796	358.2	3023.53
STAUSTRUM LEPTOCLADUM		0007507	16751.6	256354.52
STAUSTRUM LEPTOCLADUM CORNUTUM		0007510	922.04	9009
STAUSTRUM LEPTOCLADUM INSIGNE		0007509	897.79	8736
STAUSTRUM MANFELDTII FLUMINENSE		0007522	228.79	1801.8
STAUSTRUM PARADOXUM		0007549	345.75	2902.5
STAUSTRUM PARADOXUM CINGULUM		BAY0254	372.4	3162.36
STAUSTRUM PENTACERUM		0007557	1640.01	17517.5
STAUSTRUM QUADRICUSPINATUM		0007568	223.43	1753.13
STAUSTRUM		0004127	154.8	2790.13
STAUSTRUM AMPHIOXYS		0004136	171.93	3204.42
STAUSTRUM ANCEPS HYALINA		0004149	326	7452.79
STAUSTRUM OBLIQUE		BAY0255	185.53	3542.9
STAUSTRUM SALINA		0004272	137.05	2375.83
STELLARIMA MICROTRIAS		0610108	352	8246.68
STENOPTEROBIA ANCEPS		0001088	5.16	22.6
STEPHANODISCUS		0002415	404.17	9896.02
STEPHANODISCUS HANTZSCHII		0002426	51.22	648.52
STEPHANODISCUS SUBSALSUS		0002436	27.22	61.89
STEPHANOPYXIS		0002371	1113.93	37699.11
STEPHANOPYXIS NIPPONICA		0002372	594.4	16461.25
STEPHANOPYXIS PALMERIANA		0002373	1943.02	78539.82
STEPHANOPYXIS TURRIS		0002374	1331.7	47712.94
STIGEOCLONIUM GLOMERATA		0006671	165.9587	1243.62
STRIATELLA		0003178	527.85	14074.34

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STRIATELLA INTERRUPTA		0003181	88.6	1336.29
STRIATELLA UNIPUNCTATA		0003180	970.15	31415.93
STROMBOMONAS AUSTRALICA		BAY0366	183.3	1394.86
SURIRELLA		0005331	387.58	9363.66
SURIRELLA ANCEPS		0005339	432.97	10836.8
SURIRELLA CRUCIATA		BAY0381	580	15937.18
SURIRELLA CRUMERA		BAY0258	532.37	14233.64
SURIRELLA FASTUOSA		0005332	803.32	24492.64
SURIRELLA GEMMA		0005342	2184	91637.81
SURIRELLA OVALIS		0005348	472.18	12150.11
SURIRELLA OVATA CRUMERA		0202440	532.37	14233.64
SURIRELLA PANDURA CONTRACTA		BAY0259	160	2914.33
SURIRELLA PATELLA		0005374	2106	87344.98
SURIRELLA PATELLA NEUPAUERI		0005376	80.53	1178.1
SURIRELLA RECEDENS		0005334	532.37	14233.64
SURIRELLA ROBUSTA		0005357	247.63	947.11
SURIRELLA SPENDIDA		0005338	1195.927	41402.32
SURIRELLA SPIRALIS		0005398	159.3	2897.52
SURIRELLA STRIATULA		0005364	19576	1654372.06
SYNECHOCOCCUS		0000773	0.57	1.77
SYNEDRA		0003013	501.58	13157.78
SYNEDRA ACUS		0003056	409.72	1417.5
SYNEDRA CLOSTERIOIDES		BAY0265	238.18	722.5
SYNEDRA CRYSTALLINA		0003022	965.09	31200
SYNEDRA FASCICULATA		0003018	193.69	3750
SYNEDRA FULGENS		0003015	361.67	8547
SYNEDRA GAILLONII		0003110	333.8	7689
SYNEDRA LONGISSIMA		0590930	351.79	8240.4
SYNEDRA PROVINCIALIS		0003044	344.93	1575
SYNEDRA ROBUSTA		0202434	1321.89	47250
SYNEDRA SUPERBA		0573678	168	3108.08
SYNEDRA TOXONEIDES		0003108	158.5	2878.34
SYNEDRA ULNA		0003023	513.67	2356.9
SYNEDRA ULNA LONGISSIMA		0003036	564.67	2969.46
SYNEDRA UNDULATA		0003021	636.06	18000
SYNEDROSPHENIA GOMPHONEMA		BAY0267	1470.39	54375
SYNURA		0001655	4.3	18.33
SYNURA ADAMSII		0001657	325.1	2703.28
SYNURA UVELLA		0001656	4.3	18.33
SYRACOSPHAERA		0002234	126	904.78
SYRACOSPHAERA CORALLA		0002244	112.8	796.25
SYRACOSPHAERA HISTRICA		BAY0268	192	1471.58
SYRACOSPHAERA MEDITERRANEA		0002238	206	1596.17
SYRACOSPHAERA MOLISCHII		0002239	20.8	113.03
SYRACOSPHAERA PIRUS		BAY0269	315.2	2608.44
SYRACOSPHAERA PROLONGATA		BAY0270	164	1226.69
SYRACOSPHAERA PULCHRA		0002235	892.99	8681.99
TABELLARIA		0003241	60.12	801.11
TABELLARIA FENESTRATA		0003242	212.87	948.37

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TABELLARIA FENESTRATA ASTERIONELLOIDES		0003244	102.9	1627.91
TABELLARIA FLOCCULOSA		0003247	174.2	3260.29
TABULARIA FASCICULATE		0590882	168	3108.08
TERPSINOE		0002737	901.34	28509.95
TETRACYCLUS		0003328	255.35	5399.61
TETRADESMUS		0006244	921.18	8999.35
TETRADESMUS SMITHII		0006245	50.9	317.68
TETRAEDRON		0005661	541.7	4874.64
TETRAEDRON ARTHRODESMIFORME		0005684	2820.85	32768
TETRAEDRON CAUDATUM		0005691	21.91	120
TETRAEDRON CRUCIATUM		0005710	1744.83	18816.62
TETRAEDRON GRACILE		0005717	1129.72	11390.63
TETRAEDRON HASTATUM		0005695	201.8	1558.65
TETRAEDRON LIMNETICUM		0005667	3366.7	40194.09
TETRAEDRON LOBULATUM		0005674	237.1	1877.56
TETRAEDRON MINIMUM		0005670	33.36	195
TETRAEDRON MUTICUM		0005700	126	904.79
TETRAEDRON PENTAEDRICUM		0005701	444.8	3882.44
TETRAEDRON REGULARE		0005678	52.99	332.82
TETRAEDRON REGULARE INCUS		0005682	335.8	2806.27
TETRAEDRON REGULARE TORSUM		0005683	1247.28	12770.09
TETRAEDRON TRIGONUM		0005662	40.19	241.8
TETRAEDRON TRIGONUM GRACILE		0005664	18.85	100.86
TETRAEDRON TRIGONUM SETIGERUM		0005665	57.27	364
TETRASELMIS		0009560	153.96	1140.4
TETRASELMIS GRACILIS		0009561	47.67	294.52
TETRASELMIS MACULATA		0009562	37.76	225
TETRASTRUM		0006260	15.99	83.43
TETRASTRUM CAUDATUM		BAY0273	31.06	179.59
TETRASTRUM GLABRUM		0006264	22.69	125
TETRASTRUM HETERACANTHUM		0006261	3.74	15.6
TETRASTRUM STAUROGENIAEFORME		0006263	3.31	13.52
THALASSIONEMA		0003138	163.85	630
THALASSIONEMA NITZSCHIOIDES		0003139	163.85	630
THALASSIOPHYSA HYALINA		BAY0274	41.72	494.75
THALASSIOSIRA		0002484	225.81	4591.2
THALASSIOSIRA	SP#1 DIAM	0002484	53.01	678.58
THALASSIOSIRA	SP#2 DIAM >20 MICRONS	0002484	264.45	5654.87
THALASSIOSIRA AESTIVALIS		0002485	480.81	12443.65
THALASSIOSIRA ANGUSTE-LINEATA		0550490	552.76	14957.2
THALASSIOSIRA ANTARCTICA		0002504	35.6	401.32
THALASSIOSIRA BALTICA		0002486	1018.4	33493.33
THALASSIOSIRA BIOCULATA		0002487	2238.3	94655.42
THALASSIOSIRA DECIPIENS		0002489	171.17	3185.57
THALASSIOSIRA DELICATULA		0002520	251.82	5301.44
THALASSIOSIRA ECCENTRICA		0002503	328.88	7539.82
THALASSIOSIRA GRAVIDA		0002490	316.5	7167.54
THALASSIOSIRA HYALINA		0002496	159.3	2897.52
THALASSIOSIRA LEPTOPUS		0002524	1438.2	52810.17

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THALASSIOSIRA NANA		0002502	21.49	35.64
THALASSIOSIRA NORDENSKIOELDII		0002492	185.19	3534.29
THALASSIOSIRA OESTRUPHII VENRICKAE		0002507	328.88	7539.82
THALASSIOSIRA PSEUDONANA		0002509	16.86	31.06
THALASSIOSIRA ROTULA		0002494	204.22	4021.24
THALASSIOSIRA SUBTILIS		0002495	140.47	2454.37
THALASSIOTHRIX		0003131	1964.88	8350
THALASSIOTHRIX DELICATULA		0003132	3412.05	15200
THALASSIOTHRIX FRAUENFELDI		0003133	347.71	1500
THALASSIOTHRIX LONGISSIMA		0003134	2298.6	98033.95
THALASSIOTHRIX MEDITERRANEA		0003135	1866.79	74500
TRACHELOMONAS		0009690	270.25	2183.82
TRACHELOMONAS ACANTHOSTOMA		0009718	445.01	3884.55
TRACHELOMONAS ARMATA LONGA		BAY0368	4735.919	59606.5
TRACHELOMONAS BULLA		0009734	1591	16914.4
TRACHELOMONAS CHARKOWENSIS		0009731	396.86	3403.39
TRACHELOMONAS GLOBULARIS BOYERI		BAY0369	637.9158	5887.55
TRACHELOMONAS HISPIDA		0009692	271.35	2194.14
TRACHELOMONAS HISPIDA CORONATA		0009695	1740.815	18766.63
TRACHELOMONAS INTERMEDIA		0009700	217.82	1702.39
TRACHELOMONAS PLANCTONICA OBLONGA		BAY0370	569.2752	5162.3
TRACHELOMONAS RACIBORSKII		BAY0371	2468.517	28089.28
TRACHELOMONAS REGULOSA		BAY0372	0	0
TRACHELOMONAS SCABRA LONGICOLLIS		BAY0373	845.68	8153.11
TRACHELOMONAS SIMILIS		0180813	1143.409	11550.17
TRACHELOMONAS SUPERBA		0009721	1986.377	21855.62
TRACHELOMONAS SUPERBA DUPLEX		BAY0374	2518.743	28750.27
TRACHELOMONAS VARIANS		0009724	1119.128	11267.41
TRACHELOMONAS VERRUCOSA		0180815	189.3124	1447.82
TRACHELOMONAS VOLVOCINA		0009697	473.9442	4177.65
TRACHELOMONAS VOLVOCINA PUNCTATA		0009699	78.46	523.59
TREUBARIA SETIGERUM		0005921	43.9	267.79
TRIBONEMA		0002053	79.38	530.69
TRIBONEMA AFFINE		0002060	116.6	827.31
TRIBONEMA MINUS		0002059	71.11	467.41
TRIBONEMA MONOCHLORUM		0002062	87.51	593.96
TRICERATIUM		0002739	356.47	8385.12
TRICERATIUM ACUTUM		0002742	1901.8	76348.98
TRICERATIUM FAVUS		0002740	421.58	10462.5
TRICERATIUM FORMOSUM PENTAGONAL		BAY0276	15716.8	1238307.96
TRICERATIUM RETICULUM		0002743	5829	334603.45
TRINACRIA REGINA		BAY0279	85344	1680246.4
TROPIDONEIS		0004657	642.39	18236.95
TROPIDONEIS LEPIDOPTERA		0004658	690.75	20069.28

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TROPIDONEIS SERIATA		BAY0283	3659	181023.12
ULOTHRIX		0006417	327.67	2728.01
ULOTHRIX SUBTILISSIMA		0006429	37.17	220.95
UMBELLOSPHAERA HULBURTIANA		0002270	435	3783.83
UMBELLOSPHAERA IRREGULARIS		0002269	224.9	1766.45
UMBELLOSPHAERA TENUIS		0002268	155.1	1150.15
UROGLENA		0001483	62.43	402.12
VOLVOX AUREUS		0005585	25.3	141.71
VOLVOX TERTIUS		0005584	25.3	141.71
WESTELLA		0005969	3.15	12.77
XANTHIDIUM		0008313	5242	67020.64
XANTHIDIUM SUBHASTIFERUM TOWERII		0008342	1466.8	15399.1
ZYGABIKODINIUM LENTICULATUM		0180935	3684.2	44602.28
ZYGNEMA		0007100	7149.6	95906.84

Note: All carbon conversion factor are given as picograms per cell. All biovolumes are in cubic microns.