VIRGINIA CHESAPEAKE BAY PROGRAM PHYTOPLANKTON AND PICOPLANKTON MONITORING SURVEYDATA DICTIONARY

Virginia Chesapeake Bay Water Quality Monitoring Program: Phytoplankton and Picoplankton Components
- Taxonomic Data Dictionary
- Event Data Dictionary

NOTES:
1) THIS DICTIONARY WAS REVISED ON 3 January 2011 AND SUPERSEDES ALL OTHER DICTIONARIES FOR THE VIRGINIA PHYTOPLANKTON DATA

The Commonwealth of Virginia, in cooperation with the US EPA Chesapeake Bay Program, has monitored plankton species abundance and composition in the Virginia Chesapeake Bay mainstem and tributaries since 1985. The current program is designed to give comprehensive spatial and temporal information on phytoplankton. Sampling is performed in conjunction with the water quality monitoring programs.

NAMES AND DESCRIPTIONS OF ASSOCIATED DATA DICTIONARY FILE
2000 User's Guide to Chesapeake Bay Program Biological and Living Resources Monitoring Data

PROJECT TITLE:
Virginia Chesapeake Bay Monitoring Program: Lower Chesapeake Bay Phytoplankton and Picoplankton Studies

CURRENT PRINCIPAL INVESTIGATORS:

>Program Manager: Frederick Hoffman, Virginia Department of Environmental Quality
>Principal Investigator: Harold Marshall, Old Dominion University
>Statistician: Michael Lane, Old Dominion University
>Data Coordinator: TBD, Old Dominion University, Applied Marine Research Laboratory

CURRENT FUNDING AGENCIES:
Not Applicable

PROJECT COST
Not Applicable

QA/QC OFFICER: Not Applicable

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LOCATION OF STUDY
Chesapeake Bay and its Tidal Tributaries in the Commonwealth of Virginia

DATE INTERVALS
08/01/1985- 09/30/2010

ABSTRACT
The phytoplankton monitoring program was established to determine the composition, distribution, biomass, and abundance of these plankton constituents in the Chesapeake Bay and Virginia tributaries, in relation to water quality conditions and algal productivity in these waters. Additional emphasis has been placed on bloom and toxin producing species and long term trends in population development and environmental relationships. Composite plankton collections, above and below the pycnocline, began at 7 Bay stations in July 1985. River station collections in the James, York, Rappahannock, and Pamunkey Rivers began in March 1986. Twice monthly collections were taken March through October, and once monthly November through February at all stations. Two stations were added in the Elizabeth River in February 1989, with station SBE2 discontinued in January 1998. Autotrophic picoplankton collections were added at all stations in January 1989, with plankton productivity (C-14) determinations for all stations added in July 1989. Beginning in October 1990 monthly collections were taken at all stations and this pattern continues for the Bay stations, however in 2002 collections in the tributaries for November through February were discontinued, with monthly collections taken only from March through October for the tributaries. Other modifications include discontinuing and replacing in March 1986 station RET4.1 with station TF4.2 in the Pamunkey River, and a station designation and site change in August 2005 for LE5.5 to LE5.5-W. Sampling was reduced in frequcy in 2010 due to budget constraints. All below pycnocline sampleing in the tributary stations was dropped in 2010.

STATION NAMES AND DESCRIPTIONS

CB6.1	Main Channel, Mid-Bay
CB6.4	Main Channel, Mid-Bay
CB7.3E	Eastern Shore Channel, Southern End
CB7.4	Baltimore Channel, Bay Mouth
LE3.6	Off Mouth of Rappahannock River
LE5.5	Off Mouth of James River
LE5.5-W	Off Mouth of James River
RET3.1	Rappahannock River, N Buoy R10
RET4.1	York River,
RET4.3	York River, Buoy C57
RET5.2	James River, Off Swann's Point
SBE2	South Branch Elizabeth River
SBE5	South Branch Elizabeth River, Off VEPCO
TF3.3	Rappahannock River, Buoy N40
TF4.2	Pamunkey River, Off White House
TF5.5	James River, Red Buoy 107
WE4.2	Off Mouth of York River

STATION NAMES, LATITUDES (decimal degrees), LONGITUDES (decimal degrees), TOTAL DEPTH (meters), LATITUDES (degrees, minutes and decimal seconds), and LONGITUDES (degrees, minutes and decimal seconds). These station postions represent target values and are not actual values. They are the values used by the Chesapeake Bay Prorgram as a whole to coordinate data for the stations. Station positions are provided as NAD83 coodinates.

STATION	LATITUDE	LONGITUDE	TOTAL_DEPTH	LATITUDE (DMS)	LONGITUDE (DMS)
CB6.1	37.58833	-76.1625	13.1	37 35' 18"	-77 50' 15"
CB6.4	37.23639	-76.2083	10.5	37 14' 11"	-77 47' 30"
CB7.3E	37.22861	-76.0542	17.8	37 13' 43"	-77 56' 45"

CB7.4	36.99556	-76.0208	13.8	36 59' 44"	-77 58' 45"
LE3.6	37.59667	-76.285	9.8	37 35' 48"	-77 42' 54"
LE5.5	36.99889	-76.3136	21.4	36 59' 48"	-76 18' 12"
LE5.5-W	36.99903	-76.31328	6.0	36 59' 56"	-76 18' 49"
RET3.1	37.92014	-76.8214	5.8	37 55' 12.488"	-77 10' 43.138"
RET4.1	37.52514	-76.8697		37 31' 30.522"	-77 7' 49.131"
RET4.3	37.50681	-76.788	5.2	37 30' 24.522"	-77 12' 43.14"
RET5.2	37.21015	-76.793	8.3	37 12' 36.533"	-77 12' 25.145"
SBE2	36.81265	-76.3058	13.0	36 48' 45.533"	-77 41' 39.212"
SBE5	36.76987	-76.2961	10.0	36 46' 11.534"	-77 42' 14.215"
TF3.3	38.01874	-76.908	6.6	38 1' 7.481"	-77 5' 31.122"
TF4.2	37.57987	-77.0216	6.4	37 34' 47.52"	-78 58' 42.113"
TF5.5	37.31293	-77.2328	9.0	37 18' 46.534"	-78 46' 2.087"
WE4.2	37.24167	-76.3867	14.1	37 14' 30"	-77 36' 48"

Station depths are based on a nine year (1985-1994) averages of Virginia Department of Environmental Quality, water quality hydrographic data collected concurrently with the plankton samples.

METHODOLOGY DESCRIBING CHAIN OF CUSTODY FOR LAB SAMPLES

The phytoplankton field chief is the custodian for all samples collected, and verifies proper labeling of bottles, complete field data entries, the collection of the samples, preservative used and transport to the laboratory. He also supervises the calibration and availability of field equipment. Samples are turned over to the laboratory chief who oversees the sample processing, analysis and recording of the raw data. The principal investigator and laboratory chief for quality assurance routinely check taxon identifications, raw data sheets and other stages of the collection and analysis procedures.

BIOLOGICAL ENUMERATION TECHNIQUES

-Chesapeake Bay Program Sample Analysis Method PH102

Upon return to the laboratory, each 500 ml water sample (fixed with Lugol's solution on station) are preserved with 5 ml of buffered formaldehyde. The 500 ml replicate sample sets are mixed (1000 ml), then 500 ml are withdrawn and allowed to settle undisturbed for 72 hours, the original 500 ml is reduced by careful siphoning to approximately 200-250 ml. The samples are allowed to stand undisturbed for an additional 48 hours and are again siphoned to 20-40 ml concentrates. The final 20-40 ml concentrate is transferred to a previously labeled storage vial, where the label information from the collection bottle has been transferred and verified by the laboratory supervisor. A known volume of the entire concentrate will be placed in an Utermöhl settling chamber for examination with an inverted plankton microscope. If the phytoplankton, and/or silt, density is too great in the final concentrate for clear examination, a known volume of the concentrate is drawn off to provide a sub-sample suitable for analysis. Prior to counting, a work sheet is prepared, where information from the sample vial label is transferred to the raw data sheet and verified. The microscopic examination will be done at 3 magnifications (Marshall and Alden, 1990). At 300X magnification, a combined random field (10) and minimum cell count (200) procedure will be followed where all taxa are counted to the lowest taxonomic category possible. This examination is repeated at 500x magnification for 10 randomly selected fields. Cells not clearly discernable at the 300x magnification are examined at 600X for identification. All species will be counted at only one of these magnifications. In addition, the entire chamber will be scanned at 125X for recording previously unrecorded larger species in the chamber. All phytoplankton categories will be included in this analysis, including colonies and algal filaments at 300x. Calculations will be made from these data at the different magnifications to determine cell concentrations per unit volume (e.g. cells/l). Identification will be based on internationally accepted identification keys, and checked against voucher specimens (e.g. Chesapeake Bay) that are maintained in the ODU phytoplankton analysis laboratory. Samples are archived for a period of one year. Raw data sheets are kept on file.

-Chesapeake Bay Program Analytical Method Code PH102M

Counting Method 102 was slightly modified in January 2005 for better agreement with the new counting methodology adopted in the Maryland Phytoplankton program. Beginning in 2005, at 600X all cells were indentified using the following categories:
CENTRIC DIATOMS < 10UM
CRYPTOMONAS <10UM
PENNATE DIATOMS< 10UM
UNIDENTIFIED GREEN CELLS 3-5UM
UNIDENTIFIED MICROPHYTOFLAGELLATES <10UM
All other protocol for sample enumeration remained the same.

-Chesapeake Bay Program analytical Method Code PH103
Beginning in October 2005 the counting enumeration method was slightly modified again to be in agreement with the official Chesapeake Bay program technique for phytoplankton enumeration. The final enumeration protocol for the Virginia program is as follows:

(1) At 300X magnification, a minimum of twenty random fields and 200 cells of taxa > 5 microns in largest dimension will be counted. If 200 cells are not tallied in 10 fields, cells in additional fields will be enumerated until 200 cells have been enumerated. All colonies, trichomes, & filaments are counted at this magnification. Very large (>60 Microns) or rare species (less than 1 cell in less than 10 Grids) not counted in this scan.

(2) At 600X magnification, twenty random fields will be counted for taxa >=3 and <=5 microns in diameter. No colonies, trichomes or filaments counted. Again all cells were indentified using the following categories: CENTRIC DIATOM < 10UM, CRYPTOMONAS <10UM, PENNATE DIATOM < 10UM, UNIDENTIFIED GREEN CELLS 3-5UM UNIDENTIFIED MICROPHYTOFLAGELLATES <10UM

(3) At 125X magnification, the entire chamber will be scanned for taxa which were not enumerated at the other two magnifications.

> Chesapeake Bay Program Sample Analysis Method PP101

Using a Millipore apparatus, a backing 0.45 um nuclepore filter was wetted with distilled water, was placed on the Millipore stem. Then a 0.20 um nuclepore filer, previously stained in an irgalan black solution was placed over the other filter. Two milliliters of the shaken water sample was added to the filter apparatus. Using a pump, and a maximum vacuum of ten centimeter for mercury, the sample was filtered until the meniscus disappears from the top of the filter. The 0.2 um nucleopore filter was removed and placed immediately on a glass slide previously moistened by breath. A drop of immersion oil was placed at the center of the filter, then covered with a cover slip. The slide is examined immediately with a Zeiss Axioskop epifluorescenct microscope equipped with a 100 watt mercury lamp and a 100X oil immersion objective. The autotrophic picoplankton were counted using a "green" filter set (g546. FT580, LP590). Count are made on replicate samples and averaged. A minimum of 200 cells and a minimum coverage of 20 field is counted on each slide.

FORMULAS, CALCULATIONS, AND CONVERSIONS
The following equation was used to convert raw counts to density for each taxon identified for both phytoplankton and picoplankton:

(# cells/#fields counted)*constant*(1/concentration*volume)

MONITORING QA/QC PLAN FOR PROJECT

The principal investigator and laboratory chief for quality assurance routinely check taxon identifications, raw data sheets and other stages of the collection and analysis procedures.

VARIABLE NAMES, MEASUREMENT UNITS AND DESCRIPTIONS

>PARAMETER: COUNT (# of a Phytoplankton Taxon per liter),

-COLLECTION METHODS: At each station, composite phytoplankton samples are taken from above and below the pycnocline. After the pycnocline has been determined at each station, two vertical series of five samples equidistance apart depths ate taken between the pycnocline and bottom. Water in each carboy is mixed, then a 500 milliliter sample is taken from each carboy, and is preserved with five milliliters of Lugol's solution. The pre-labeled sample bottles are transported back to the laboratory for analysis.
-SAMPLE PRESERVATION: Lugol's solution
-SAMPLE STORAGE ENVIRONMENT: Room temperature
-TIME IN STORAGE: 1 months
-LABORATORY TECHNIQUE WITH REFERENCES

Marshall, H.G. and R.W. Alden. (1990) A comparison of phytoplankton assemblages and environmental relationships in three estuarine rivers of the lower Chesapeake Bay. Estuaries, 13:287-300.

Marshall, H.G. (1994) Chesapeake Bay Phytoplankton: I. Composition. Proceedings of the Biological Society of Washington. 107:573-585.

>PARAMETER:COUNT (# Autotrophic Picoplankton per liter)
-COLLECTION METHODS: At each station, composite phytoplankton samples are taken from above and below the pycnocline. After the pycnocline has been determined at each station, two vertical series of five samples equidistance apart depths ate taken between the pycnocline and bottom. Water in each carboy is mixed, then a 125 milliliter sample is taken from each carboy, and is preserved with two milliliters of Glutaraldehyde solution. The pre-labeled sample bottles are transported back to the laboratory and placed in a refrigerator for analysis.
-SAMPLE PRESERVATION: Glutaraldehyde solution
-SAMPLE STORAGE ENVIRONMENT: Refrigerator
-TIME IN STORAGE: one week
-LABORATORY TECHNIQUE WITH REFERENCES

Davis, P.G. and J.McN. Sieburth (1982) Differentiation of phototrophic and heterotrophic nanoplankton populations in marine waters by epifluorescence microscopy. Ann. Inst. Oceanography. 58:249-260.

Marshall, H.G. (1995) Autotrophic picoplankton distribution and abundance in the Chesapeake Bay, USA Marine Nature 4:33-42.

>PARAMETER: LATITUDE and LONGITUDE (in decimal degrees)
COLLECTION METHODS: LORAN-C, NAD27 before July 1995; GPS, NAD83 After July 1995. All postions converted to NAD83 coordiantes in 2000.
-SAMPLE PRESERVATIVES: None
-SAMPLE STORAGE ENVIRONMENT: None
-TIME IN STORAGE: None
-LAB TECHNIQUES WITH REFERENCES: Station positions in data set are approximations of actual positions in the field. Station latitudes and longitudes are input into a Loran-C or GPS receiver and sampling begins when boat reaches preprogrammed coordinates. Loran-C is accurate to +/- 1500 ft. The actual Loran or GPS coordinates for each sampling event are not currently recorded in data set.

>PARAMETER: P_DEPTH
COLLECTION METHODS: Hydrolab CTD
-SAMPLE PRESERVATIVES: None
-SAMPLE STORAGE ENVIRONMENT: None
-TIME IN STORAGE: None
-LAB TECHNIQUES WITH REFERENCES: Water column conductivity is recorded immediately before plankton sampling. P_DEPTH is set at 0.5 meters above the Pycnocline and is used at the cutoff depth between upper and lower water column composite samples. If a station has no pycnocline the water column is divided in to thirds by total depth and the top third of the water column is treated as the upper water column. The pycnocline is determined as follows:
((Bottom Conductivity-Surface Conductivity)/ Bottom Depth)*2= Threshold

if Threshold is less than 500, then the station has no pycnocline, else if Threshold is greater than 500, then the pycnocline depth is determined to be the first depth at which the conductivity change is greater than the threshold value.
Units of measurement: Conductivity- uhhos/cm and Depth- meters

>PARAMETER: SALZONE (Salinity zone)
-COLLECTION METHODS: Hydrolab CTD
-SAMPLE PRESERVATIVES: None
-SAMPLE STORAGE ENVIRONMENT: None
-TIME IN STORAGE: None
-LAB TECHNIQUES WITH REFERENCES: Water column salinity, temperature and depth is recorded prior to zooplankton tows. Salinity values are averaged over the layer of the water column and a zone is determined. Salinity Ranges are as follows: Fresh 0-0.5 ppt (F), Oligohaline >0.5-5.0 ppt (O), Mesohaline >5.0-18 ppt (M), and Polyhaline >18-32 ppt (P).

>PARAMETER: TOTAL_DEPTH
-COLLECTION METHODS: Hydrolab CTD
-SAMPLE PRESERVATIVES: None
-SAMPLE STORAGE ENVIRONMENT: None
-TIME IN STORAGE: None
-LAB TECHNIQUES WITH REFERENCES: Water column salinity, temperature and depth is recorded prior to water collection.

>DATA ENTRY METHOD: Phytoplankton and picoplankton counts are entered using a program written in BASIC. ASCII format files are then converted into SAS datasets and used for statistical analyses . ASCII format data sets for submittal are exported from the SAS datasets.

>DATA VERIFICATION: Double-entry with comparison of two files in SAS. Re-entry until both copies match exactly.

SPECIES INHOUSE CODES AND SCIENTIFIC NAME
The in-house codes used by Old Dominion University are numeric.
>INHOUSE SPECIES LIST: Old Dominion University in-house phytoplankton species codes and Latin Names are as follows:

SPEC_CODE	SOURCE_LBL
2	Amphiprora sp.
3	Amphora sp.
4	Amphora proteoides
5	Asterionellopsis glacialis
6	Asterolampra marylandica
7	Asteromphalus sp.
8	Asteromphalus heptactis
9	Bacteriastrum comosum
10	Bacteriastrum delicatulum
11	Bacteriastrum elongatum
12	Bacteriastrum hyalinum
13	Odontella sp.
14	Odontella alternans
15	Odontella aurita
16	Odontella longicruris
17	Odontella sinensis
18	Cerataulina pelagica
19	Nitzschia angularis var. affinis
20	Chaetoceros sp.
21	Chaetoceros affinis
22	Chaetoceros affinis var. willei
23	Chaetoceros atlanticus
24	Chaetoceros borealis
25	Chaetoceros brevis
26	Chaetoceros coarctatus
27	Chaetoceros compressus
28	Chaetoceros concavicornis
29	Trachelomonas intermedia
30	Chaetoceros constrictus
31	Chaetoceros convolutus
32	Chaetoceros costatus
33	Chaetoceros curvisetus
34	Chaetoceros danicus
35	Chaetoceros debilis
36	Chaetoceros decipiens
37	Chaetoceros densus
38	Chaetoceros didymus
39	Chaetoceros didymus var. protuberans
40	Chaetoceros difficilis
41	Chaetoceros gracilis
42	Chaetoceros laciniosus
43	Chaetoceros pelagicus
44	Chaetoceros pendulus
45	Chaetoceros peruvianus
46	Chaetoceros pseudocurvisetus
47	Chaetoceros radians
48	Chaetoceros socialis
49	Chlorella marina
50	Chaetoceros tetrastichon
51	Chaetoceros tortissimus
52	Climacodium sp.

53	Climacodium biconcavum
54	Climacodium frauenfeldianum
55	Cocconeis sp.
56	Corethron sp.
57	Corethron criophilum
58	Coscinodiscus sp.
59	Coscinodiscus centralis
60	Thalassiosira eccentrica
61	Coscinodiscus granii
62	Thalassiorsira leptopus
63	Coscinodiscus marginatus
64	Coscinodiscus nitidus
65	Coscinodiscus perforatus
66	Coscinodiscus radiatus
68	Chlorella salina
69	Detonula confervacea
70	Diatoma elongatum
71	Diatoma hyemale
72	Diploneis sp.
73	Diploneis bombus
74	Ditylum brightwellii
75	Eucampia cornuta
76	Eucampia zodiacus
77	Fragilaria sp.
78	Fragilaria crotonensis
79	Gomphonema sp.
80	Grammatophora marina
81	Guinardia flaccida
82	Gyrosigma sp.
83	Hemiaulus hauckii
84	Hemiaulus membranaceus
85	Hemiaulus sinensis
86	Pyramimonas amylifer
87	Lauderia annulata
88	Leptocylindrus danicus
89	Leptocylindrus minimus
90	Licmophora abbreviata
91	Licmophora paradoxa
92	Mastogloia sp.
93	Melosira sp.
94	Aulacoseira granulata
95	Melosira hummii
96	Paralia sulcata
97	Navicula sp.
98	Navicula membranacea
99	Nitzschia sp.
100	Cylindrotheca closterium
101	Pseudo-nitzschia delicatissima
102	Nitzschia longissima
103	Pyramimonas grossii
104	Pseudo-nitzschia pungens
105	Pseudo-nitzschia seriata
106	Plagiogrammopsis vanheurckii
107	Planktoniella sol
108	Pleurosigma sp.
109	Pleurosigma angulatum
110	Pleurosigma elongatum
111	Pleurosigma formosum
112	Rhizosolenia acuminata
113	Proboscla alata
114	Proboscla alata f. curvirostris
115	Proboscla alata f. gracillima
116	Proboscla alata f. indica
117	Rhizosolenia bergonii
118	Psuedosoleia calcar-avis
119	Rhizosolenia castracanei
120	Guinardia cylindrus
121	Guinardia delicatula
122	Pyramimonas plurioculata
123	Dactyliosolen fragilissimus
124	Chroomonas salina
125	Cryptomonas pseudobaltica
126	Merismopedia elegans
127	Rhizosolenia hebetata
128	Rhizosolenia hebetata f. semispina
129	Rhizosolenia imbricata
130	Rhizosolenia rhombus
131	Rhizosolenia robusta
132	Rhizosolenia setigera
134	Rhizosolenia styliformis
135	Detonula pumila
136	Skeletonema costatum
137	Stephanopyxis sp.
138	Stephanopyxis palmeriana
139	Striatella unipunctata
140	Surirella sp.
141	Synedra ulna
142	Thalassionema sp.
143	Thalassionema nitzschioides
144	Thalassiosira decipiens
145	Thalassiosira delicatula
146	Pennate Diatoms (Unid.) < 20u apical axis
147	Thalassiosira gravida
148	Pennate Diatoms (Unid.) > 20u apical axis
149	Thalassiosira nordenskioeldii
150	Thalassiosira rotula
151	Lioloma delicatulum
152	Thalassiothrix frauenfeldii
153	Thalassiothrix mediterranea
154	Tropidoneis sp.
155	Centric Diatoms (Unid.)
156	Thalassiosira sp.
157	Centric Diatoms (Unid.) 20u-100u diameter
158	Centric Diatoms (Unid.) > 100u diameter
159	Dinoflagellates (Unid.)
160	Navicula distans
161	Coscinodiscus rotula
163	Lauderia sp.
164	Asterionella formosa
165	Plagiogramma sp.
166	Aulacoseira distans
167	Melosira arenaria
168	Thalassiosira aestivalis
169	Dinophysis micropterygia
170	Ankistrodesmus convolutus
171	Chaetoceros lorenzianus
172	Dinoflagellate cysts (Unid.)
173	Phalacroma sp.
174	Tetracyclus sp.
175	Stephanopyxis turris
176	Actinoptychus senarius
177	Coscinodiscus oculus iridis
178	Cocconeis clandestina
179	Rhizosolenia sp.
180	Biddulphia biduplphiana
181	Grammatophora sp.
182	Aulacoseira granulata var. angustissima
183	Oscillatoria sp.
184	Nitzschia frustulum
185	Odontella rhombus f. trigona
186	Diploneis litoralis
188	Achnanthes subsalsoides
189	Glenodinium sp.
190	Grammatophora angulosa
191	Coscinodiscus obscurus
192	Tabellaria sp.
193	Achnanthes sp.
194	Odontella aurita var. obtusa
195	Melosira nummuloides
196	Nitzschia angularis

197 Thalassiosira hyalina
198 Achnanthes taeniata
199 Bacteriastrum sp.
200 Protoperidinium hirobis
201 Gymnodinium dissimile
202 Gyrodinium fusiforme
203 Prorocentrum obtusum
204 Licmophora sp.
205 Amphidinium lacustre
206 Melosira moniliformis
207 Licmophora gracilis
208 Diploneis subcincta
209 Chaetoceros teres
210 Nitzschia vitrea
211 Aulacoseira islandica
212 Dinophysis hastata
213 Pleurosigma naviculaceum
214 Achnanthes delicatula
215 Prorocentrum triestinum
216 Anthosphaera robusta
217 Synedra sp.
218 Cocconeis costata
219 Cocconeis distans
220 Gephyrocapsa caribbeanica
221 Chaetoceros messanensis
222 Gephyrocapsa ericsonii
223 Diatoma sp.
224 Toxarium undulatum
225 Ophiaster hydroideus
226 Melosira islandica f. curvata
228 Acantheoca aculeata
229 Odontella mobiliensis
230 Achnanthes lemmermannii
231 Florisphaera profunda
232 Fragilariopsis oceanica
233 Chaetoceros tenuissimus
234 Thalassiosira baltica
235 Thalassiosira bioculata
236 Syracosphaera corolla
237 Syracosphaera histrica
238 Odontella granulata
239 Protoperidinium sub-curvipes
240 Stephanopyxis nipponica
241 Protoperidinium mite
242 Grammatophora serpentina
243 Prorocentrum rotundatum
244 Prorocentrum ovum
245 Azpeitia tabularis
247 Fragilaria construens
248 Chaetoceros subtilis
249 Achnanthes longipes
250 Prorocentrum cordatum
251 Chaetoceros wighamii
252 Thalassiothrix longissima
253 Rhaphoneis sp.
254 Amphidinium operculatum
255 Leptocylindrus mediterraneus
256 Fragilaria pinnata
257 Chaetoceros similis
258 Bleakeleya notata
259 Thalassiosira antarctica
260 Membraneis challengeri
261 Cyclotella striata
262 Aulacoseira italica
263 Coscinosira polychorda
264 Melosira jurgensii
265 Caloneis fusioides
266 Asteromphalus roperianus
267 Prorocentrum nanum
268 Licmophora flabellata
269 Coscinodiscus gigas var. praetexta
270 Mastogloia rostrata
271 Pleurosigma directum
272 Amphiprora alata
273 Hemidiscus cuneiformis
274 Tropidoneis lepidoptera
275 Biddulphia tridentata
276 Triceratium reticulum
277 Campylodiscus limbatus
278 Cyclotella meneghiniana
279 Thalassiosira pseudonana
280 Coscinodiscus gigas
281 Coscinodiscus asteromphalus
283 Chaetoceros simplex
284 Chaetoceros diadema
285 Cymatosira belgica
286 Dactyliosolen antarcticus
287 Diploneis crabro
288 Diploneis crabro var. pandura
289 Eunotia sp.
290 Eunotia bidentula
291 Rhabdosphaera hispida
292 Podosira stelligera
293 Rhizosolenia temperei
294 Striatella interrupta
295 Synedra gaillonii
296 Synedra fulgens
297 Crucigenia tetrapedia
298 Synedra toxoneides
299 Synedra crystallina
300 Amphidinium sp.
301 Ceratium sp.
302 Ceratium arcticum
303 Ceratium azoricum
304 Ceratium candelabrum
305 Ceratium extensum
306 Ceratium furca
307 Ceratium fusus
308 Ceratium lineatum
309 Ceratium longipes
310 Ceratium macroceros
311 Ceratium massiliense
312 Ceratium minutum
313 Ceratium pentagonum
314 Pediastrum duplex var. reticulatum
315 Ceratium tripos
316 Ornithocercus sp.
317 Nostoc sp.
318 Chaetoceros neapolitanus
319 Skeletonema potamos
320 Dinophysis sp.
321 Dinophysis acuminata
322 Dinophysis acuta
323 Dinophysis arctica
324 Dinophysis caudata
325 Dinophysis norvegica
326 Dinophysis ovum
327 Dinophysis punctata
328 Dinophysis schuettii
329 Agmenellum thermale
330 Prorocentrum compressum
331 Eutreptia sp.
332 Gonyaulax digitale
333 Gonyaulax polygramma
334 Gonyaulax spinifera
335 Gonyaulax triacantha
336 Gonyaulax sp.
337 Gymnodinium sp.
338 Gymnodinium costatum
339 Gymnodinium rhomboides

340 Gymnodinium simplex
341 Gyrodinium sp.
342 Gyrodinium lacryma
343 Noctiluca scintillans
344 Fragilaria striatula
345 Pediastrum biradiatum
346 Oxytoxum gladiolus
347 Oxytoxum milneri
348 Oxytoxum reticulatum
349 Oxytoxum scolopax
350 Oxytoxum sphaeroideum
351 Oxytoxum variabile
352 Dissodium asymmetricum
353 Pyrophacus sp.
354 Oblea rotunda
355 Protoperidinium sp.
356 Protoperidinium breve
357 Protoperidinium cerasus
358 Protoperidinium conicoides
359 Protoperidinium depressum
360 Protoperidinium leonis
361 Protoperidinium oceanicum
362 Protoperidinium ovatum
363 Protoperidinium pallidum
364 Protoperidinium pellucidum
365 Protoperidinium pentagonum
366 Protoperidinium punctulatum
367 Thalassiosira subtilis
368 Crucigenia irregularis
369 Podolampas bipes
370 Podolampas elegans
371 Podolampas palmipes
372 Prorocentrum sp.
373 Prorocentrum dentatum
374 Prorocentrum micans
375 Prorocentrum minimum
376 Prorocentrum rostratum
377 Prorocentrum scutellum
378 Nitzschia gracillima
379 Coscinodiscus sublineatus
380 Anacystis sp.
381 Gymnodinium arcticum
382 Ceratium tripos var. atlanticum
383 Dinophysis rotundata
384 Dinophysis fortii
385 Oxytoxum sceptrum
386 Cladopyxis brachiolata
387 Prorocentrum vaginulum
388 Gonyaulax polyedra
389 Ceratium arietinum
390 Amphidinium schroederi
391 Amphidinium bipes
393 Protoperidinium conicum
394 Triceratium acutum
395 Podolampas sp.
396 Amphidinium globosum
397 Gonyaulax minima
398 Oxytoxum mitra
399 Oxytoxum diploconus
400 Ceratium longirostrum
401 Gonyaulax birostris
402 Monodus sp.
403 Oxytoxum constrictum
404 Dinophysis minuta
405 Protoperidinium brevipes
406 Prorocentrum balticum
407 Amphidinium latum
408 Bellerochea horologicalis
409 Gonyaulax minuta
410 Heteraulacus polyedricus
411 Gymnodinium splendens
412 Katodinium rotundatum
413 Pavillardinium spinosa
414 Oxytoxum obliquum
415 Ceratium setaceum
416 Ceratium teres
417 Protoperidinium fimbriatum
418 Amphidinium turbo
419 Ceratium belone
420 Diploneis smithii
421 Oxytoxum longiceps
422 Amphidinium steinii
423 Prorocentrum aporum
424 Gymnodinium marinum
425 Pavillardinium sp.
426 Calciosolenia granii
427 Pyrocystis fusiformis
428 Green cells (
429 Green cells (3-5 microns)
430 Green cells (5-10 microns)
431 Chlorella sp.
432 Oxytoxum belgicae
433 Amphidinium sphenoides
434 Mallomonas sp.
435 Calycomonas gracilis
436 Oxytoxum crassum
437 Protoperidinium claudicans
438 Dinophysis parvula
439 Coscinodiscus nobilis
440 Amphidoma acuminata
441 Coscinodiscus subbulliens
442 Prorocentrum lima
443 Ceratium horridum
444 Glenodinium gymnodinium
445 Oxytoxum laticeps
446 Actinoptychus splendens
447 Heterocapsa triquetra
448 Ceratium longinum
449 Ceratium trichoceros
450 Odontella regia
451 Gonyaulax conjuncta
452 Glenodinium danicum
453 Gonyaulax longispina
454 Rhabdosphaera longistylis
455 Navicula paleralis
456 Protoperidinium bipes
457 Amphora crassa
458 Cochlodinium sp.
459 Oxytoxum gracile
460 Heteromastix pyriformis
461 Protoperidinium pyriforme
462 Scrippsiella trochoidea
463 Dinophysis lachmannii
464 Cystodinium sp.
465 Pyramimonas obovata
466 Gymnodinium conicum
467 Amphidinium ovoideum
468 Gymnodinium punctatum
469 Amphidoma sp.
470 Oxytoxum globosum
471 Ceratocorys horrida
472 Podolampas spinifera
473 Prorocentrum gracile
474 Protoperidinium globulum
475 Amphidinium acutum
476 Gonyaulax diacantha
477 Pyrocystis lunula
478 Protoperidinium granii
479 Amphidinium glaucum
480 Amphidinium wislouchi

481 Protoperidinium diabolum
482 Gonyaulax unicornis
483 Cochlodinium constrictum
484 Diplopsalis lenticula
485 Gyrodinium spirale
486 Protoperidinium nudum
487 Gyrodinium undulans
488 Amphidinium crassum
489 Protoperidinium orbiculare
490 Protoperidinium steinii
491 Protoperidinium subinerme
492 Dinophysis sphaerica
493 Protoperidinium excentricum
494 Cladopyxis setifera
495 Dinophysis exigua
496 Protoperidinium minutum
497 Protoperidinium oblongum
498 Ceratium breve
499 Protoperidinium abei
500 Acanthoica sp.
501 Acanthoica acanthifera
502 Acanthoica acanthos
503 Gonyaulax excavata
504 Acanthoica quattrospina
505 Anoplosolenia brasiliensis
506 Chilomonas marina
507 Anthosphaera sp.
508 Anthosphaera quadriconu
509 Chroomonas vectensis
510 Cryptomonas stigmatica
511 Calciosolenia murrayi
512 Calyptrosphaera sp.
513 Prorocentrum cassubicum
514 Calyptrosphaera oblonga
515 Emiliania huxleyi
516 Coccolithus pelagicus
517 Hymenomonas carterae
518 Cyclococcolithus fragilis
519 Cyclococcolithus leptoporus
520 Discosphaera tubifer
521 Gephyrocapsa oceanica
522 Halopappus adriaticus
523 Pseudo-nitzschia subpacifica
524 Calciosolenia sp.
525 Pyramimonas sp.
526 Spirulina sp.
527 Michaelsarsia elegans
528 Desmidium sp.
529 Dinophysis monacantha
530 Pontosphaera syracusana
531 Rhabdosphaera clavigera
532 Chaetoceros rostratus
533 Rhabdosphaera stylifer
534 Crucigenia sp.
535 Scyphosphaera apsteinii
536 Umbellosphaera tenuis
537 Staurastrum quadricuspidatum
538 Pyramimonas torta
539 Triceratium formosum pentagonal
540 Syracosphaera mediterranea
541 Syracosphaera molischii
542 Syracosphaera pirus
543 Syracosphaera pulchra
544 Schizothrix tenerrima
545 Navicula directa
546 Umbellosphaera irregularis
547 Umbilicosphaera hulburtiana
548 Coccolithophores (Unid.)
549 Katodinium sp.
550 Thalassiosira nana
551 Syracosphaera sp.
552 Rhabdosphaera sp.
553 Cyclotella atomus
554 Amphora egregia var. interrupta
555 Pontosphaera sp.
556 Discosphaera sp.
557 Ceratium hirundinella
558 Surirella cruciata
559 Hantzschia marina
560 Calycomonas wulffii
561 Chrysococcus minutus
562 Tribonema affine
563 Tribonema monochloron
564 Heteromastix rotunda
565 Pavlova salina
566 Tetraselmis maculata
567 Pyramimonas micron
568 Phacus curvicauda
569 Phacus sp.
570 Phacus longicauda
571 Phacus lemmermanni
572 Euglena proxima
573 Euglena mutabilis var. mainxi
574 Euglena pumila
575 Ceratium declinatum
576 Protoperidinium crassipes
577 Auliscus caelatus
578 Ochromonas caroliniana
579 Gyrodinium dominans
580 Tetraselmis gracilis
581 Histoneis variabilis
582 Ornithocercus quadratus
583 Ornithocercus steinii
584 Ornithocercus thumii
585 Oxytoxum coronatum
586 Oxytoxum curvatum
587 Auliscus sculptus
588 Ceratium ranipes
589 Protoperidinium nipponicum
590 Protoperidinium achromaticum
591 Dinophysis tripos
592 Polykrikos kofoidii
593 Prorocentrum maximum
594 Podolampas curvatus
595 Pyrocystis fusiformis f. biconica
596 Pyrocystis robusta
597 Pyrocystis pseudonoctiluca
598 Katodinium asymmetricum
599 Bacteriastrum hyalinum var. princeps
600 Tetraselmis sp.
601 Triceratium favus
602 Tropidoneis seriata
603 Chrysochromulina sp.
604 Actinoptychus vulgaris
605 Amphora acuta
606 Amphora binodis
607 Amphora grevilleana var. contracta
608 Amphora coffeaeformis
609 Amphora cuneata
610 Amphora terroris
611 Amphora obtusa
612 Amphora ostrearia
613 Amphora ovalis
614 Amphora peragalli
615 Amphora proteus
616 Amphora robusta
617 Gyrosigma wansbeckii
618 Asterionellopsis kariana
619 Asteromphalus flabellatus
620 Bacillaria paxillifer

621 Bacteriastrum furcatum Shadbolt
622 Caloneis staurophora
623 Caloneis wardii
624 Mastogloia braunii
625 Ochromonas sp.
626 Chaetoceros diversus
627 Cocconeis molesta var. crucifera
628 Cocconeis pinnata
629 Coscinodiscus apiculiferus
630 Coscinodiscus argus
631 Coscinodiscus granulosus
632 Stellarima microtrias
633 Fragilariopsis cylindrus
634 Cymatosira lorenziana
635 Glyphodesmis distans
636 Gyrosigma hippocampus
637 Mastogloia smithii
638 Melosira dubia
639 Navicula abrupta
640 Navicula annulata
641 Navicula cancellata
642 Navicula clavata
643 Navicula forcipata
644 Navicula inserata
645 Navicula lundstroemii
646 Navicula opima
647 Navicula palpebralis
648 Navicula praetexta
649 Navicula pusilla
650 Navicula transitans var. asymmetrica
651 Nitzschia constricta
652 Nitzschia distans
653 Nitzschia lorenziana var. densistriata
654 Nitzschia insignis
655 Nitzschia lorenziana var. incerta
657 Nitzschia panduriformis
658 Nitzschia sigma
659 Nitzschia sigma var. intercedens
660 Nitzschia sigma var. rigida
661 Nitzschia socialis
662 Meridion circulare
663 Pinnularia trevelyana
664 Pinnularia rectangulata
665 Plagiogramma staurophorum
666 Pleurosigma aestuarii
667 Pleurosigma hamuliferum
668 Pleurosigma nicobaricum
669 Pleurosigma normanii
670 Pleurosigma obscurum
671 Pleurosigma angulatum var. strigosa
672 Hemiaulus indicus
673 Rhaphoneis amphiceros
674 Delphineis surirella
675 Rhizosolenia formosa
676 Amphora marina
677 Nitzschia clausii
678 Scoliotropis latestriata
679 Stauroneis amphioxys
680 Stenopterobia anceps
681 Surirella pandura contracta
682 Closterium sp.
683 Synedra robusta
684 Amphora costata
686 Trinacria regina
687 Diploneis constricta
688 Mastogloia cocconeiformis
689 Crucigenia apiculata
690 Coscinodiscus wailesii
691 Achnanthes fimbriata
692 Dimerogramma sp.
693 Amphiprora gigantea var. sulcata
694 Licmophora paradoxa var. tincta
695 Navicula cuspidata var. ambigua
696 Synedra superba
698 Amphora laevis
699 Cocconeis scutellum
700 Scenedesmus armatus
701 Dictyocha fibula
702 Scenedesmus dimorphus
703 Scenedesmus abundans
704 Dactylococcopsis raphidioides
705 Dinophysis diegensis
706 Distephanus speculum
707 Asterionella sp.
708 Mesocena polymorpha
709 Silicoflagellates (Unid.)
710 Chlorophyceans (Unid.)
711 Crucigenia quadrata
712 Ceratium limulus
713 Skeletonema sp.
714 Helicotheca tamesis
715 Gomphosphaeria sp.
716 Melosira islandica var. helvetica
717 Podosira sp.
718 Ebria tripartita
719 Stauroneis salina
720 Synura sp.
721 Cerataulus radiatus
722 Asterionella notata
723 Stauroneis sp.
724 Syracosphaera prolongata
725 Trachelomonas acanthostoma
726 Trachelomonas charkowiensis
727 Trachelomonas hispida
728 Trachelomonas volvocina var. punctata
729 Trachelomonas sp.
730 Protoperidinium avellana
731 Protoperidinium quarnerense
732 Protoperidinium roseum
733 Dinophysis schroderi
734 Dinophysis sacculus
735 Cladopyxis sp.
736 Protoperidinium thorianum
737 Gymnodinium variabile
738 Thalassiothrix sp.
739 Gonyaulax fragilis
740 Actinastrum sp.
741 Oxytoxum mediterraneum
742 Amphidinium carterae
743 Ceratium buceros var. tenue
744 Oxytoxum parvum
745 Dinophysis dentata
746 Ceratium contortum karstenii
747 Dinophysis pulchella
748 Hemiaulus sp.
749 Protoperidinium divergens
750 Amphisolenia sp.
751 Ankistrodesmus sp.
752 Pyrophacus horologium
753 Ceratium gallicum
754 Oxytoxum turbo
755 Amphisolenia bidentata
756 Pavillardinium biconica
757 Cladopyxis caryophyllum
758 Dinophysis baltica
759 Gonyaulax monocantha
760 Triceratium sp.
761 Oxytoxum elegans
762 Ceratium schroeteri
763 Chroococcus limneticus

764 Amphidinium acutissimum
765 Gymnodinium pygmaeum
766 Nitzschia spathulata
767 Striatella sp.
768 Gymnodinium grammaticum
769 Ceratium buceros
770 Gymnodinium flavum
771 Ceratium pulchellum f. semipulchellum
772 Amphisolenia globifera
773 Actinastrum hantzschii
774 Gymnodinium coeruleum
775 Gymnodinium danicans
776 Gyrodinium estuariale
777 Oxytoxum sp.
778 Protoperidinium biconicum
779 Protoperidinium brochii
780 Protoperidinium grande
781 Gymnodinium nelsonii
782 Protoperidinium pendunculatum
783 Protoperidinium solidicorne
784 Protoperidinium sphaericum
785 Amphidinium klebsii
786 Amphidinium lanceolatum
787 Ceratium carriense
788 Ceratium contortum
789 Ceratium contrarium
790 Ceratium digitatum
791 Ceratium geniculatum
792 Ceratium kofoidii
793 Ceratium pavillardii
794 Gonyaulax apiculata
795 Gonyaulax diegensis
796 Gonyaulax monilata
797 Gymnodinium breve
798 Protoperidinium globulus var. ovatum
799 Gymnodinium situla
800 Oscillatoria erythraea
801 Lithodesmium sp.
802 Histoneis longicollis
803 Choanoflagellates (Unid.)
804 Micro-phytoflagellates (Unid.) < 10 u
805 Micro-phytoflagellates (Unid.) > 10 u
806 Richelia intracellularis
807 Coscinodiscus concinnus
808 Amphidinium longum
809 Anabaena sp.
810 Spirulina subsala
811 Pyrocystis sp.
812 Entophysalis deusta
813 Anacystis cyanea
814 Chroococcus turgidus
815 Blue Green Single Spheres (Unid.)
816 Blue Green Trichomes (Unid.)
817 Agmenellum quadruplicatum
818 Gomphosphaeria aponina
819 Johannesbaptistia pellucida
820 Nostoc commune
821 Microcystis aeruginosa
822 Synechococcus sp.
823 Oscillatoria submembranacea
824 Schizothrix calcicola
825 Nodularia harveyana
826 Oscillatoria lutea
827 Calothrix parietina
828 Microcystis sp.
829 Microcoleus lyngbyaceus
830 Schizothrix arenaria
831 Chroococcus sp.
833 Biddulphia reticulata
834 Epiphytic diatoms
835 Diplopeltopsis minor
836 Thalassiosira oestrupii var. venrickae
837 Cyclotella glomerata
838 Calycomonas sp.
839 Chrysophyceans (Unid.)
840 Cyclotella caspia
841 Oscillatoria trichomes
842 Amphidinium extensum
843 Tribonema sp.
844 Chaetoceros neogracilis
845 Rhopalodia gibberula
846 Cryptomonas sp. 2
847 Rhopalodia sp.
848 Gymnodinium sp. b
849 Gyrosigma spenceri
850 Euglena sp.
851 Eutreptia marina
852 Eutreptia viridis
853 Calothrix sp.
854 Eutreptia lanowii
855 Euglena acus
856 Euglena agilis
857 Euglena ehrenbergii
858 Euglena deses
859 Euglena fusca
860 Chilomonas sp.
861 Chroomonas sp.
862 Cryptomonas sp.
863 Olisthodiscus luteus
864 Synedra acus
865 Chroomonas amphioxeia
866 Cryptomonas rostrella
867 Cladopyxis claytonii
868 Oocystis sp.
869 Asterionella gracillima
870 Oscillatoria limnetica
871 Pediastrum sp.
872 Scenedesmus sp.
873 Scenedesmus quadricauda
874 Staurastrum manfeldtii var. flumenense
875 Staurastrum leptocladum var. insigne
876 Scenedesmus acuminatus
877 Staurastrum sp.
878 Crucigenia fenestrata
879 Kirchneriella sp.
880 Tetraedron minimum
881 Crucigenia crucifera
882 Pediastrum duplex
883 Tetraedron trigonum var. gracile
884 Kirchneriella lunaris
885 Tetrastrum staurogeniaeforme
886 Arthrodesmus sp.
887 Chlorella vulgaris
888 Chlorella saccharophilia var. ellipsoidea
889 Nannochloris atomus
890 Enteromorpha intestinalis
891 Monodus guttula
892 Oedogonium sp.
893 Tetraedron sp.
894 Tetraedron muticum
895 Chrysochromulina minor
896 Ochromonas variabilis
897 Ochromonas minuscula
898 Chromulina parvula
899 Calycomonas ovalis
900 Pediastrum simplex
901 Cyclotella stylorum
902 Diploneis obliqua
903 Diploneis suborbicularis
904 Gyrosigma balticum silimis

905	Mastogloia gibbosa
906	Mastogloia pumila
907	Tabellaria fenestrata
908	Navicula arenaria
909	Rhabdonema arcuatum
910	Gyrosigma spenceri var. nodiferum
911	Gyrosigma macrum
912	Dimerogramma minor
914	Pronoctiluca sp.
915	Gyrosigma fasciola
916	Pinnularia sp.
917	Surirella ovalis
918	Amphora arenaria
919	Kirchneriella contorta
920	Cocconeis scutellum var. ornata
921	Merismopedia punctata
922	Navicula maculata
923	Nitzschia bilobata
924	Nitzschia obtusa var. scalpelliformis
925	Pleurosigma strigosum
926	Staurastrum paradoxum
927	Amphora gigantea
928	Amphora szaboi
929	Caloneis subsalina
930	Campylosira cymbelliformis
931	Fragilaria capucina
932	Fragilaria hyalina
933	Navicula humerosa
934	Merismopedia tenuissima
935	Anabaena spiroides
936	Nitzschia bilobata var. minor
937	Nitzschia pacifica
938	Plagiogramma interruptum
939	Pleurosigma acutum
940	Pleurosigma delicatulum
941	Pleurosigma rigidum
942	Synedra provincialis
943	Euastrum sp.
944	Navicula salinarum
945	Lithodesmium undulatum
946	Synedrosphenia gomphonema
947	Navicula rhombica
948	Navicula laevissima
949	Navicula hennedyii
950	Lyngbya contorta
951	Navicula atomus
952	Navicula arvensis
953	Navicula irrorata
954	Navicula amphipleuroides
955	Cyclotella spp. > 30 um
956	Cyclotella caspia
957	Epithemia argus
958	Eunotia praerupta
959	Auricula insecta
960	Surirella striatula
961	Surirella fastuosa
962	Rhabdonema minutum
963	Pinnularia major
964	Stauroneis anceps var. hyalina
965	Nitzschia amphibia
967	Nitzschia proxima
968	Nitzschia vermicularis
969	Caloneis westii
970	Cymbella turgidula
971	Gyrosigma balticum
972	Proboscia inermis
973	Phormidium sp.
974	Neidium affine
975	Cymbella sp.
976	Mastogloia apiculata
977	Chaetoceros muelleri
978	Dinophysis doryphorum
979	Oxytoxum tesselatum
980	Tribonema minus
981	Lemma minor
982	Campsopogan coerulus
983	Merismopedia sp.
984	Pyrocystis hamulus
985	Ornithocercus magnificus
986	Arthrodesmus sublatus
987	Scenedesmus bijuga
988	Ankistrodesmus falcatus
989	Ankistrodesmus falcatus var. acicularis
990	Tetraedron trigonum var. setigerum
991	Chlamydomonas sp.
992	Coscinodiscus cinctus
993	Aulacodiscus sp.
994	Pseudotetraedron neglectum
995	Porosira gracialis
996	Tetraedron trigonium
997	Schroederia setigera
998	Scenedesmus bijuga var. alternans
999	Staurastrum americanum
1000	Staurastrum leptocladum
1001	Micractinium sp.
1002	Synedra closterioides
1003	Cymbella tumida
1004	Dinobryon sp.
1005	Gomphonema sphaerophorum
1006	Nitzschia sp. I
1007	Berkeleya rutilans
1008	Surirella gemma
1009	Hantzchia sp.
1010	Aphanocapsa sp.
1011	Coelosphaerium sp.
1012	Dactylococcopsis sp.
1013	Eudorina sp.
1014	Pandorina sp.
1015	Coelastrum reticulatum
1016	Coelastrum sp.
1017	Micractinium pusillum
1018	Melosira varians
1019	Diploneis elliptica
1020	Achnanthes clevei
1021	Diploneis gruendleri
1022	Frustulia sp.
1023	Rhabdonema sp.
1024	Botryoccus protuberans
1025	Cosmarium costatum
1026	Cosmarium sp.
1027	Dictyosphaerium planctonicum
1028	Dictyosphaerium pulchellum
1029	Kirchneriella obesa major
1030	Micrasterias sp.
1031	Pediastrum boryanum
1032	Pediastrum duplex var. rotundatum
1033	Scenedesmus bernardii
1034	Scenedesmus hystrix
1035	Tetraedron lobulatum
1036	Anabaena confervoides
1037	Chroococcus dispersus
1038	Lyngbya limnetica
1039	Merismopedia glauca
1040	Microcystis incerta
1041	Oscillatoria tenuis
1042	Hemiselmis sp.
1043	Nephrochloris salina
1044	Olisthodiscus sp.
1045	Frustulia rhomboides
1046	Merismopedia elegans v. major

1047 Lyngbya sp.
1048 Nephrochloris sp.
1049 Schizothrix sp.
1050 Rhabdoderma sp.
1051 Cyclotella spp.
1052 Cyclotella spp. 10 - 30 um
1053 Rhabdoderma lineare
1054 Dactylococcopsis fascicularis
1055 Raphidiopsis curvata
1056 Rhabdoderma sigmoidea f. minor
1057 Amphiprora costata
1058 Staurastrum grande
1059 Nodularia sp.
1060 Tetraedron regulare
1061 Gyrodinium aureolum
1062 Gonium sp.
1063 Campylosira sp.
1064 Tetraedron gracile
1065 Scenedesmus arcuatus
1066 Mougeotia sp.
1067 Tetraedron pentaedricum
1068 Lagerheimia citriformis
1069 Lagerheimia sp.
1070 Chroococcus limneticus var elegans
1071 Quadrigula lacustris
1072 Chroococcus prescottii
1073 Desmids (Unid.)
1074 Pleodorina sp.
1075 Spirogyra sp.
1076 Chlorophycean filaments
1077 Dinobryon cylindricum
1078 Rhizosolenia eriensis
1080 Glenodinium armatum
1081 Xanthidinium subhastiferum v. towerii
1082 Pleurotaenium tridentulum
1083 Micrasterias johnsonii
1084 Lagerheima longiseta
1085 Oxyrrhis marina
1086 Pleurotaenium sp.
1087 Quadrigula sp.
1088 Aphanothece sp.
1089 Cryptomonad #1
1090 Micrasterias radiata
1091 Hyalotheca sp.
1092 Chrysophycean microphytoflagellates (unid)
1093 Kephyrion ovale
1094 Arthrodesmus octocornis
1095 Desmidium grevellii
1096 Elakatothrix gelatinosa
1098 Protoperidinium wisconsisense
1099 Gomphonema acuminatum
1100 Tetrastrum sp.
1101 Selenastrum sp.
1102 Scenedesmus denticulatus
1103 Dictyosphaerium sp.
1104 Euglenoid (Unid.)
1105 Ceratium hirundinella form brachyceras
1106 Gonatozygon brebissonii
1107 Franceia sp.
1108 Spondylosium planum
1109 Actinastrum hantzschii var. fluviatile
1110 Desmidium baileyi
1111 Cosmarium alpestre
1112 Chaetosphaeridium globosum
1113 Pleurotaenium nodulosum
1114 Volvox tertius
1115 Protoperidinium cinctum
1116 Glenodinium quadridens
1117 Xanthidinium sp.
1118 Micrasterias pinnatifida
1119 Tetraedron regulare var. incus
1120 Marssoniella elegans
1121 Crucigenia lauterbornii
1122 Errerella bornhemiensis
1123 Chrysococcus tesselatus
1124 Botryoccus sp.
1125 Polydrieopsis spinulosa
1126 Ankistrodesmus spiralis
1127 Pediastrum tetras
1128 Panadorina morum
1129 Microspora sp
1130 Microphytoflagellate sp #2 (unid)
1131 Aulacoseira herzogii
1132 Ceratium carolinianum
1133 Ceratium inflatum
1134 Merismopedia convoluta
1135 Chlorophycean microphytoflagellates (unid.)
1136 Euglena elastica
1137 Lagerheimia ciliata
1138 Kephyrion sp.
1139 Caloneis lepidula
1140 Apedinella radians
1141 Closteriopsis longissima
1142 Pyrodinium bahamense
1143 Coelastrum cambricum
1144 Euglena spirogyra
1145 Pediastrum simplex var duodenarium
1146 Scenedesmus perforatus
1147 Phacus suecicus
1149 Trachelomonas bulla
1150 Tetradesmus smithii
1151 Spondylosium pygmaeum
1152 Nephrocytium agardhianum
1153 Tetraedron limneticum
1154 Eunotia serra var. diadema
1155 Synura uvella
1156 Micrasterias truncata
1157 Dinobryon calciformis
1158 Dinobryon bavaricum
1159 Rhabdomonas spiralis
1160 Staurastrum paradoxum var. cingulum
1161 Licmophora tincta
1162 Zygnema sp.
1163 Rhoicosphenia abbreviata
1164 Lyngbya hieronymusii
1165 Caloneis sp
1166 Euastrum abruptum
1167 Navicula peregrina
1168 Navicula cincta
1169 Navicula placenta
1170 Navicula eidrigeana
1171 Navicula spectabilis
1172 Pinnularia legumen
1173 Pinnularia gibba
1174 Amphora exigua
1175 Cocconeis pediculus
1176 Suriella spiralis
1177 Tabellaria flocculosa
1178 Bellerochea malleus
1179 Oocystis parva
1180 Oocystis elliptica
1181 Botryococcus sudeticus
1182 Pediastrum duplex gracilimum
1183 Closterium archerianum
1184 Chroococcus dispersus minor
1185 Aphanothece gelatinosa
1186 Gloeothece linearis composita
1187 Phacus orbicularis
1188 Actinocyclus normanii f. normanii
1189 Stephanodiscus hantzschii

1190 Cyclostephanos dubius
1191 Ulothrix sp.
1192 Protoperidinium aciculiferum
1193 Gloecapsa sp.
1194 Tetraedron hastatum
1195 Epithemia sp.
1196 Nephrocytium limneticum
1197 Odontella rhombus
1198 Rhopalodia gibba
1200 Closterium dianae
1201 Cosmarium turpinii
1202 Cochlodinium heterolobatum
1203 Cochlodinium brandtii
1204 Botryococcus braunii
1205 Gymnodinium neglectum
1206 Palmodictyon varium
1207 Gymnodinium boguensis
1208 Pleurosigma salinarum
1209 Gymnodinium verruculosum
1210 Selenastrum minutum
1211 Gymnodinium gracilentum
1212 Pavlova homersandii
1213 Oscillatoria subbrevis
1214 Isochrysis galbana
1215 Aphanizomenon sp
1216 Acanthosphaera zachariasi
1217 Actinastrum hantzschii var. elongatum
1219 Ankistrodesmus falcatus var. mirabilis
1220 Asterococcus limneticus
1221 Coelastrum microporum
1222 Eudorina elegans
1223 Franceia ovalis
1224 Gonium pectorale
1225 Kirchneriella elongata
1226 Kirchneriella subsolitaria
1227 Micractinium pusillum var. elegans
1228 Pleurocapsa minor
1229 Quadrigula chodatii
1230 Rhizochrysis limnetica
1231 Scenedesmus incrassatulus
1232 Selenastrum gracile
1233 Selenastrum westii
1234 Spirogyra crassa
1235 Quadrigula closterioides
1236 Scenedesmus obliquus
1237 Spirogyra tenuissima
1238 Tetraedron arthrodesmiforme
1239 Tetraedron cruciatum
1240 Tetraedron regulare var. torsum
1241 Volvox aureus
1242 Arthrodesmus incus var. extensus
1243 Closterium limeatum
1244 Closterium pronum
1245 Closterium setaecum
1246 Cosmarium cynthia
1247 Penium sp.
1248 Pleurotaenium trabecula
1249 Staurastrum cingulum var. floridense
1250 Staurastrum leptocladum var. cornumtum
1251 Staurastrum pentacerum
1252 Anabaena affinis
1253 Anabaena aequalis
1254 Anabaena augstumalis var. marchica
1255 Anabaena limnetica
1256 Anabaena circinalis
1257 Anabaena spiroides var. crassa
1258 Anabaena wisconsinense
1259 Aphanocapsa delicatssima
1260 Aphanocapsa grevillei
1261 Aphanocapsa pulchra
1262 Gloeocapsa aeruginosa
1263 Gloeothece sp.
1264 Oscillatoria lacustris
1265 Oscillatoria limosa
1267 Eunotia pectinalis
1268 Nitzschia acicularis
1269 Surirella patella
1270 Centritractus belanophorus
1271 Chrysococcus rufescens
1272 Dinobryon divergens
1273 Dinobryon sertularia
1274 Mallomonas caudata
1275 Mallomonas producta
1276 Mallomonas tonsurata
1277 Trachelomonas scabra var. longicollis
1278 Ophiocytium capitatum var. longispinum
1279 Synura adamsii
1280 Euglena mutabilis
1281 Euglena virdis
1282 Leptocinclis ovum var. gracilicauda
1283 Phacus latus
1284 Phacus monilatus
1285 Phacus perkinensis
1286 Phacus triqueter
1287 Strombomonas australica
1288 Trachelomonas acanthophora
1289 Trachelomonas armata var. longa
1290 Trachelomonas globularis var. boyeri
1291 Trachelomonas hispida var. coronata
1292 Trachelomonas planctonica var. oblonga
1293 Trachelomonas raciborskii
1294 Trachelomonas regulosa
1295 Trachelomonas similis
1296 Trachelomonas superba
1297 Trachelomonas superba var. duplex
1298 Trachelomonas varians
1299 Trachelomonas verrucosa
1300 Trachelomonas volvocina
1301 Gymnodinium fusum
1302 Peridinium aciculiferum
1303 Peridinium cinctum
1304 Peridinium sp.
1305 Cryptomonas erosa
1306 Cryptomonas erosa var. reflexa
1307 Cryptomonas massonii
1308 Cryptomonas ovata
1309 Cryptomonas phaseolus
1310 Cryptomonas rostrata
1311 Rhodomonas minuta
1312 Dinobryon sociale
1313 Gleocapsa punctata
1314 Pediastrum tetras var. tetraodon
1315 Cladophora sp
1316 Pediastrum obtusum
1317 Euglena polymorpha
1318 Euglena convoluta
1319 Cosmarium contractum
1320 Zygabikodinium lenticulatum
1321 Peridinium pseudolaeve
1322 Gymnodinium cnecoides
1323 Protoperidiunium decipiens
1324 Peridinium lomnickii var. splendida
1325 Aulacoseira sp
1326 Aulacoseira granulata var. curvata
1327 Cymbella affinis
1328 Caloneis trinodis
1329 Cosmarium subreniforme
1330 Cosmarium tenue
1331 Closterium parvulum
1332 Arthrodesmus validus var. incrassatus

1333	Gymnodinium uberrimum
1334	Gymnodinium mitratum
1335	Peridinium inconspicuum
1336	Cocconeis flumiatilis
1337	Gymnodinium impatiens
1338	Cosmarium ornatum
1339	Cylindrosperum doryphorum
1340	Hyalotheca dissiliens var. tatrica
1341	Spirulina laxa
1342	Spirulina major
1343	Hydrodictyon reticulatum
1344	Treubaria setigerum
1345	epiphytic flagellates (unid)
1346	Microcoleus sp.
1347	Stigeoclonium glomeratum
1349	Blue Green Trichome B (unid)
1350	Lepocinclis sphagnophila
1351	Carteria cordiformis
1352	Microspora quadrata
1353	Hormidium Klebsii
1354	Oocystis Borgei
1355	Pleurotaenium subcoronulatum var. detum
1356	Peridinium gatunense
1357	Dictyocha Siderea
1358	Navicula septentrionalis
1359	Characium limneticum
1360	Centric diatom < 10um
1361	Centric diatom 10-20um
1362	Pennate diatoms < 10um
1363	Pennate diatoms < 10-20um
1364	Cryptomonas sp. < 10um
1365	Aphanizomenon flos-aqua
1366	Thalassiosira anguste-lineata
1367	Unid. Centric Diatom Diam 10-30 um
1368	Unid. Centric Diatom Diam 31-60 um
1369	Unid. Centric Diatom Diam >60 um
1370	Unid. Pennate Diatom Length 10-30 um
1371	Unid. Pennate Diatom Length 31-60 um
1372	Unid. Pennate Diatom Length >60 um
1373	Caloneis lewisii
1374	Encyonema silesiacum
1375	Navicula elegans
1376	Navicula phyllepta
1377	Navicula lyra
1378	Navicula spicula
1379	Suriella Splendida
1380	Surirella Crumena
1381	Tabularia fasciculate
1382	Hydrodictyon
1383	Nitzschia frustulum perpulsilla
1384	Scenedesmus opoliensis
1385	Scenedesmus brasiliensis
1386	Guinardia striata
1387	Aphanizomenon issatschenkoi
1388	Blue Green Trichome cell
1389	Blue Green Trichome B cell
1390	Alexandrium monilatum

#VARIABLE NAMES AND DESCRIPTIONS FOR DATA FILES
Structure for data files on: http://www.chesapeakebay.net/

>PHYTOPLANKTON OR PICOPLANKTON TAXONOMIC ABUNDANCE AND COMPOSITON FILES

Name	Type	Width	Variable Description
SOURCE	Text	10	Data Collection Agency
SAMPLE_TYPE	Text	2	Sample Collection Type
CRUISE	Text	6	Chesapeake Bay Program Cruise Number
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (YYYYMMDD)
LAYER	Text	3	Layer of Water Column in Which SampleWas Taken
SAMPLE_NUMBER	Number	4	Sample Replicate Number
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
TSN	Text	7	ITIS Taxon Serial Number
LATIN_NAME	Text	45	Species Latin Name
SIZE	Text	30	Cell Size Groupings when taken
METHOD	Text	8	Chesapeake Bay Program Sample Analysis Code
PARAMETER	Text	15	Sampling Parameter Name
VALUE	Number	8	Sampling Parameter Value
UNITS	Text	15	Sampling Parameter Reporting Units
NODCCODE	Text	12	National Oceanographic Data Center Species Code
SPEC_CODE	Text	14	In House Species Code
SER_NUM	Text	12	Sample Serial Number
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)

> PHYTOPLANKTON AND PICOPLANKTON SAMPLING EVENT FILES

Name	Type	Width	Variable Description
SOURCE	Text	10	Data Collection Agency
SAMPLE_TYPE	Text	2	Collection Type
CRUISE	Text	6	Chesapeake Bay Program cruise number
SAMPLE_DATE	Date/Time	8	Sampling date (YYYYMMDD)
LATITUDE	Number	8	Latitude in decimal degrees

LONGITUDE	Number	8	Longitude in decimal degrees
P_DEPTH	Number	4	Composite Sample Cut Off Depth
R_DATE	Date/Time	8	Data version date (YYYYMMDD)
SALZONE	Text	2	Salinty zone
SAMPLE_VOLUME	Number	8	Total Volume of Sample
UNITS	Text	15	Reporting Units of Sample Volume
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	4	Total Station Depth (meters)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)

>The following field may also appear in a downloaded data set:

Name	Type	Width	Variable Definitions
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City or County Designation
LL_DATUM	Text	5	Latitude and Longitude Geographic Datum
CBSEG_1998	Text	6	1998 Chesapeake Bay Segment Designation
CBSEG_1998_DESCRIPTION	Text	50	1998 Chesapeake Bay Segment Designation Description

VARIABLES NAMES AND DESCRIPTIONS FOR SPECIES KEY

> PHYTOPLANKTON AND PICOPLANKTON SPECIES KEY
File of name format: VAPHKYyy.TXT

Name	Type	Width	Variable Descriptions
SPEC_CODE	Text	14	Source In-House Species Codes
SOURCE	Text	6	Data Source Identifier
DATA_TYPE	Text	2	Data Type Identifier Code
SOURCE_LBL	Text	45	Source Species Latin Name
LBL	Text	45	National Oceanographic Data Center Species Latin Name
TSN	Text	7	ITIS Taxon Serial Number
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)
VOLUME	Number	8	Cell Biomass Estimator
SIZE	Text	30	Taxa Size-Fraction Identifier
LIFE_STG	Text	3	Chesapeake Bay Program Life Stage Code

REFERENCE CODES IN DATA FILES AND TAXONOMIC KEY
See 2000 Users Guide to Chesapeake Bay Program Biological and Living Resources Monitoring Data for full listing.

>MISSING VALUES: Missing Sampling Times have been replaced with 00:00.

> DATA_TYPE: Data Type
BE Benthic
FL Fluorescence
MI Microzooplankton
MZ Mesozooplankton
PD Primary Production
PH Phytoplankton
PP Picoplankton

>SOURCE: Data Collection Agency
ODU - Old Dominion University

>SAMPLE_TYPE: Collection Type
C - Field Composite Sample, sample composed of subsamples from multiple depths

>CRUISE: Chesapeake Bay Program Cruise Number
See 2000 USERS GUIDE for complete listing of CBP cruise numbers

>GMETHOD: Sampling Gear Code
07 - unspecified plankton pump

>LAYER: Layer of Water Column in which Sample was Taken
AP- Above Pycnocline
BP- Below Pycnocline
WC- Whole Water Column

>NODCCODE: National Oceanographic Data Center Species Code, Version 8.
NOTE: For current listing of Chesapeake Bay species and their codes, see The 1997 Chesapeake Bay Basin Species list. Organisms with out current NODC Codes have been assigned partial NODC codes containing alphabetic where no code has been assigned.

>SALZONE: Salinity zone
F - Tidal fresh (0 - 0.5 ppt)
O - Oligohaline (0.5 - 5.0 ppt)
M - Mesohaline (5.0 - 18.0 ppt)
P - Polyhaline (>18.0 ppt)
*E- An F,O,M, or P followed by an E indicate an estimated salinity range based on salinity data collected within a week of the biological sampling event. Used only when no actual salinity data available.

>BASIN: Chesapeake Bay Program Basin Designations
BAY- Chesapeake Bay
ELZ- Elizabeth River
JAM- James River
YRK- York River
RAP- Rappahanock River

>TSN: IT IS Taxon Serial Numbers
Note for current listing of Chesapeake Bay Program Species and their codes; see 1998 Bay Basins Species List. Organisms without current serial numbers have ALL been assigned TSN of BAYXXXX

> CBSEG_1998: Chesapeake Bay Program Monitoring Segment

CBSEG_1998	DESCRIPTION
CB6PH	CHESAPEAKE BAY-POLYHALINE REGION
CB7PH	CHESAPEAKE BAY-POLYHALINE REGION
CB8PH	CHESAPEAKE BAY-POLYHALINE REGION
JMSOH	JAMES RIVER-OLIGOHALINE REGION
JMSPH	JAMES RIVER-POLYHALINE REGION
JMSTF	JAMES RIVER-TIDAL FRESH REGION
MOBPH	MOBJACK BAY-POLYHALINE REGION
PMKOH	PAMUNKEY RIVER-OLIGOHALINE REGION
PMKTF	PAMUNKEY RIVER-TIDAL FRESH REGION

CBSEG_1998	DESCRIPTION
RPPMH	RAPPAHANNOCK RIVER-MESOHALINE REGION
RPPOH	RAPPAHANNOCK RIVER-OLIGOHALINE REGION
SBEMH	SOUTH BRANCH ELIZABETH RIVER-MESOHALINE REGION
YRKMH	YORK RIVER-MESOHALINE REGION

>FIPS: Federal Information Processing Codes

FIPS	STATE	COUNTY
51095	VA	JAMES CITY
51097	VA	KING AND QUEEN
51103	VA	LANCASTER
51127	VA	NEW KENT
51131	VA	NORTHAMPTON
51149	VA	PRINCE GEORGE
51159	VA	RICHMOND
51199	VA	YORK
51550	VA	CHESAPEAKE CITY
51650	VA	HAMPTON
51740	VA	PORTSMOUTH
51810	VA	VIRGINIA BEACH

>HUC8: USGS Hydrologic Unit Codes

HUC8	CATALOGING_UNIT_DESCRIPTION
02050306	LOWER SUSQUEHANNA
02080101	LOWER CHESAPEAKE BAY
02080104	LOWER RAPPAHANNOCK
02080106	PAMUNKEY
02080107	YORK
02080206	LOWER JAMES
02080208	HAMPTON ROADS

>METHOD: Chesapeake Bay Program Lab Method Code Designation

PP101
PH102
PH103

>PARAMETER and UNIT: Measured Parameter and reporting units.

PARAMETER	UNITS
COUNT	NUMBER/LITER

NUMERIC VARIABLE WARNING AND ERROR BOUNDS

Variable	Valid Range
SAMPLE_DATE	19850101-20031231
COUNT	3172 - 102224636
MAXDEPTH	0.5 - 32.0
R_DATE	19950301-20041231
SAMPLE_NUMBER	1-2
LATITUDE	See Station Names, Latitudes, Longitudes and Depths.
LONGITUDE	See Station Names, Latitudes, Longitudes and Depths.
P_DEPTH	0.5-<TDEPTH Note this is a composite cut off not pycnocline depth!

R_DATE	19950301-19991230
SAMVOL_L	12-200
TOTAL_DEPTH	1.8-33
SAMPLE_TIME	0651-1935, 00:00 INDICATES MISSING TIME

IMPORTANT DATA REVISIONS

THE LIVING RESOURCES DATA MANAGER RECOMMENDS THAT ALL DATA ANALYSIS BE PERFORMED WITH THE MOST RECENT DATA SETS VERSIONS AVAILABLE. HOWEVER IF YOU HAVE BEEN WORKING WITH OLDER DATA SETS THE FOLLOWING ARE IMPORTANT CHANGES TO BE AWARE OF.

CELL BIOMASS CAN BE ESTIMATED FROM THE CELL VOLUMES PROVIDED IN THE TAXON KEY FILE. THESE MEASUREMENTS ARE THE AVERAGE CELL VOLUMES BASED ON MEASUREMENT MADE BY THE PRINCIPLE INVESTIGATORS.

6/30/1996- All plankton data was resubmitted to the Chesapeake Bay Program office due to discrepancies in sampling dates between synchronously collected samples. Sampling dates were corrected to field logs and resubmitted to the Data Center. Please do not use data with an R_DATE prior to 06/01/96.

8/31/1995- GMETHOD was changed to 7. Code 7 refers to an unspecified plankton pump. For an extensive gear code list see Table 17, PAGE F-9 APPENDIX F, of the Living Resources Data management plan, 1989. This is a change from GMETHOD code in previous versions of the data set. This does not represent a change in actual sampling gear.

8/31/1993- LBL all Latin Names and spelling for names have been corrected to the National Oceanographic Data Center accepted spelling.

8/31/1995- CRUISE NUMBERS - BAY012-BAY211 were supplied by the Chesapeake Bay Program office. See the Guide to Living Resources Data Sets for complete listing of Cruise periods.

8/31/1995- SER_NUM Old Dominion University does not use a serial number system for phytoplankton sample tracking so this variable is not available

8/31/1995- P_DEPTH >0.5-<TDEPTH Note this is a composite sample cut off depth. This depth is not the pycnocline depth!

SUMMER 1997 - The Living Resources Data manager supplied salinity zones to the plankton data based on salinity data collected by the Virginia Water Quality Monitoring Program. Values were derived from Water Quality Hydrographic data collected concurrently with the mesozooplankton. If data was not available for the of sampling but was collected within a one week window of sampling date, the water quality data was used to determine a salinity zone. However the salinity zone is marked with an E to denote being estimated.

02/01/1998- The salinity zones appearing in the 1997 data are provisional. They have not yet been checked against the water quality data for validation. The 1997 Virginia Tributary water quality data will not be delivered to the CBPO until June 1998. After delivery of the water quality data, salinity zones will be confirmed. Salinity zones will be filled in when the corresponding Water Quality monitoring data becomes available.

01/01/1999- Due to the 1998 CBP Living Resources split sampling program it was determined that the there was a nomenclature difference between laboratories in Maryland and Virginia. The species Merismopedia (VA species name) and Agmenellum (MD species name) were determined to be synonymous. After a literature review both states agreed to use the genera designation Merismopedia. Please contact the Living resources data manager for details.

01/01/2000- All Latitudes and Longitudes converted to NAD83 coordinates.

August 2002: ODU purchased new inverted plankton microscopes changing their mid- and high magnification from 315/500X to 300/600X, with magnification constants adjusted accordingly.

Winter 2002- For extensive details in regards to quality assurance issues and data comparability issues between Maryland and Virginia Programs please see the CBP Phytoplankton Split sample portion of the Chesapeake Bay Quality Assurance Program at:

http://www.chesapeakebay.net/qualityassurance.htm

08/11/2005. Note due to contract changes starting in January 1996, station LE5.5 had a coordinate change. This station move was not documented until August 2005. Due to this station relocation, all data collected at the altered location had the station name changed to LE5.5-W in August 2005.

01/01/2005- All data enumerated using new uniform bay wide counting technique. There will be a significant increase in the number of taxa identified in Maryland samples counted after 1/1/2005. Please be aware of this potential source of step trend in the data.

04/14/2006-Missing Data Report for July-Dec 2005 Data. 1) October 2005- Phytoplankton and picoplankton samples not collected at station CB6.4 due to inclement weather. 2) December 2005- Phytoplankton and picoplankton samples not collected at stations CB6.1, CB7.3e, CB7.4, LE3.6 due to boat malfunctions. 3)August 2005- Phytoplankton sample WE4.2 BP sample leaked. Autotrophic picoplankton count: 324,099,200 cells/liter. 4)October 2005- Picoplankton sample TF4.2 sample leaked.

11/04/2008- In March 2008, CB6.1, CB6.4, LE3.6, and WE4.2 were not collected due to weather. This means that the above and below phytoplankton and picoplankton samples, as well as the productivity were not collected. Also the March LE5.5W was collected on April 1, 2008, due to rescheduling from the same foul weather. During the RET5.2 collection in May, there was a problem with the sampling pump, and the BP samples could not be collected.

10/18/2010- . During the period from January–June 2010 there were no collections made in January or February due to budget/contract issues. There were also four stations that were not collected in May. TF4.2 was not collected due to boat problems, RET4.3 was not collected due to staffing/scheduling problems, and CB6.1 and LE3.6 were not collected due to foul weather.

01/03/2011- From July 2010 on wardt here will be no BP collections made in the tributary stations (RET3.1, RET4.3, RET5.2, SBE5, TF3.3, TF4.2, TF5.5). AP stations and collection protocols remain constant, as do samples collected at the BAY stations. There were also two stations that were not collected due to foul weather. RET4.3 was not collected in August, and RET5.2 was not collected in September.

KEY WORDS (EXCLUDING VARIABLE NAMES)
Phytoplankton species
Phytoplankton Counts
Phytoplankton Densities
Phytoplankton Monitoring

THIS IS THE END OF THE VIRGINIA CHESAPEAKE BAY PROGRAM PHYTOPLANKTON DATA DICTIONARY