
MARYLAND CHESAPEAKE BAY PROGRAM BENTHIC MONITORING SURVEY DATA DICTIONARY

Maryland Chesapeake Bay Water Quality Monitoring Program: Benthic Component

- Taxonomic Data Dictionary
- Biomass Data Dictionary
- Sediment Data Dictionary
- Water Quality Data Dictionary
- Event and Biota Event Data Dictionary
- Benthic Index of Biotic Integrity Data Dictionary

NOTE THIS DICTIONARY WAS REVISED ON 21 JUNE 2012 AND SUPERSEDES ALL OTHER CBP DICTIONARIES FOR THE MARYLAND BENTHIC MONITORING DATA

The state of Maryland, in cooperation with the US EPA Chesapeake Bay Program, has monitored benthic species abundance and biomass in the Maryland Chesapeake Bay mainstem and tributaries since July 1984. This monitoring effort began as an extension of the ongoing Power Plant monitoring studies in the state. The current program is designed to give comprehensive spatial and temporal information on benthic conditions in the bay. The sampling parameters include water quality measurements, benthic fauna composition and abundance, benthic fauna biomass determination, and sediment analysis. Sample collection is performed twice a year, independently from the Maryland Plankton and water quality monitoring programs.

NAMES AND DESCRIPTIONS OF ASSOCIATED DATA DICTIONARY FILE
2012 User's Guide to Chesapeake Bay Program Biological Data

#PROJECT TITLE:

Maryland Chesapeake Bay Water Quality Monitoring Program: Benthic Organism Component

CURRENT PRINCIPAL INVESTIGATORS:

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>DATA COORDINATOR: J. Dew, Versar, Inc.

#CURRENT FUNDING AGENCIES:

Maryland Department of Natural Resources as match grant to U.S. Environmental Protection Agency Chesapeake Bay Program

#PROJECT COST

\$202,522 (for fiscal year July 1, 2011-June 30, 2012)

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#LOCATION OF STUDY

Chesapeake Bay and tidal tributaries in Maryland

#DATE INTERVALS

01/01/84-12/31/2011

#ABSTRACT

The purpose of this study is to detect, monitor and assess long term responses of benthic communities to changes in water quality resulting from Bay-wide cleanup efforts, and to assess the long and short term responses of the benthos to power plant operations.

STATION NAMES AND DESCRIPTIONS

Please be aware that the sampling design of this survey has changed several times to accommodate changes in the State of Maryland's objectives for this program. In the current sampling program, two types of sites are sampled: (1) fixed sites to identify temporal trends and (2) spatially random sites are sampled to assess bay-wide benthic status. Although, the site selection criteria for random site stations has changed, the actual methods of sample collection and analysis has not changed significantly. Currently three benthic organism samples are collected at fixed sites with gear used since 1984, while a single sample is collected at each randomly selected site with a Young Grab. Please read the station names and descriptions section carefully before trying to use this data.

* The fixed site element of the program has consisted of as many as 70 fixed sites. A fixed sampling site is defined by geography (within a 1 km radius from a fixed location) and by specific habitat (depth and substrate) criteria. Samples were collected haphazardly within the 1 KM radius of a fixed location. -July 1984- June 1988. Samples were collected from seventy fixed sites, on eight to ten occasions annually. Numbers ranging from 001 to 080 identifies the fixed stations. During each sampling event three samples were taken at each site, with varying types of gear.
-July 1989-June 1994. Fixed site sampling continued at 27 sites located within the small strata random sampling areas. Each area was visited on four to six sampling cruises annually and single benthic samples were collected from the fixed sites in each small area.
-July 1994-Present. Samples were collected from 27 fixed sites. Twenty-three of these fixed sites have been sampled from beginning of program in 1984; they were among the 70 original fixed sites sampled from 1984-1989. Two of the other four were additional sites were added in 1989 and the last two were added in 1995. Three samples are collected at each site during a sampling trip.

* The Spatially Random Site or Probability-based sampling was intended to estimate the area of the Bay's Mainstem and Potomac River that met the Chesapeake Bay Program Community Restoration Goals. This sampling program had two phases the Small Area/Strata sampling phase and the Large Area/Strata sampling phase.

-July 1984-June 1988. No random sampling was conducted.

-July 1989-June 1994. A small area random strata sampling element was added around 27 existing fixed site. Additionally four new strata were added in regions where sampling was previously absent, but were targeted for resource management activity. Samples were collected at random from approximately 25 kilometer squared area surrounding fixed sites to assess the representativeness of the fixed locations. Stratum boundaries were determined by environmental factors, which impact benthic community compositions in the bay including salinity, sediment type, and bottom depth. Each area was visited on four to six sampling cruises annually and single benthic samples were collected from the fixed and three random sites in each small area.

-July 1994-June 1995. The habitat strata were redefined in 1994 using EMAP criteria to "piggy-back" on EMAP sampling results. Three sampling strata were defined, the mainstem (including Tangier and Pocomoke Sounds, the Potomac River and remaining tributaries). Twenty-seven samples were allocated to the Mainstem, twenty-eight to the Potomac River and eleven to the other tributaries in Maryland.

-July 1995-Present. The habitat strata were redefined again in 1995 to better suit state of Maryland information needs. Six strata were defined, the Potomac River, the Patuxnet River, the upper Maryland Bay (all Chesapeake Bay Mainstem above/north the Bay Bridge), the Lower Maryland Bay (all Chesapeake Bay Mainstem below/South of the Bay Bridge), the Eastern Tributaries (all tributaries to Chesapeake Bay on the Eastern shore), and the Western Tributaries (all tributaries to Chesapeake Bay on the Western shore, excluding the Potomac and Patuxnet Rivers). Twenty-five samples were allotted to each stratum. Regions on the Maryland Main stem deeper than 12 meters are excluded from sampling because the area has been consistently found to be azoic.

>Stations, which were randomly selected from each stratum as follows:

- Random stations were selected by overlay grids on navigational charts.
- Each stratum was mapped and numbers assigned to all grid locations falling within the stratum.
- Sampling locations were chosen for each stratum at random by a computer generated random number. If a selected grid could not be sampled, another grid was randomly selected until the number of samples per stratum desired was reached. In 1995, selection of a random point started being done within a Geographic Information System.

*EPA-National Coast Assessment sampling was conducted during the 2005-2006 time frames. Sampling for this program used randomly selected Chesapeake Bay Program monitoring sites

STATION NAMES AND POSITIONS

The variable SITETYPE in the EVENT FILE indicates whether a sampling site is a fixed, random or special study site. Fixed sampling site stations will not necessarily have identical latitudes and longitudes.

>Fixed Station Naming. All stations designated with the SITETYPE code of F (Fixed Sampling Site).

-From July 1984- June 1989 and July 1995-Present. All Fixed station names are designated in the form XXX, where XXX is a constant station number.

-From July 1989-June 1995, fixed stations names are designated in the form AAA-SSSS, where AAA refers to a small Strata area designation and SSSS refers to a site number. The fixed site sampling station within a stratum was designated with the site number of four.

>Small Strata Random Station Naming. All stations designated with the SITETYPE CODE of R (Random Small Strata Site). - From July 1989- June 1995. All random stations names are designated in the form AAA-SSSS, where AAA refers to a small Strata area designation and SSSS refers to a site number.

>Large Area Random Station Naming. All stations designated with the SITETYPE code of R (Random Large Strata Site).

> From 1995- Present. All random stations names are designated in the form SSSSS, where SSSSS refers to a random site number.

> Station Relocation-Fixed Station 022 was moved during the 2010 due to construction on the old site.

>Fixed Site Positions. Sampling station list for Surveys done from July 1984 through present. Station Number, Location, Longitude, (decimal degrees), Latitude (decimal degrees), Total_Depth (average station depth is given in meters), FIPS, Chesapeake Bay Program Monitoring Segment and USGS Hydrologic Unit Code. Positions in data sets are NAD83 Coordinates.

STATION	DESCRIPTION	LONGITUDE	LATITUDE	TOTAL_DEPTH	FIPS	CBP_SEGMENT	HUC
001	Rocky Point	-76.41657	38.41982	3	24009	CB4MH	02060001
002	Rocky Point	-76.40827	38.42372	7	24009	CB4MH	02060001
003	Rocky Point	-76.39157	38.42792	14	24009	CB4MH	02060001
004	Taylor's Island	-76.35997	38.43792	28	24019	CB4MH	02060001
005	Taylor's Island	-76.32777	38.44762	3	24019	CB4MH	02060001
006	Calvert Cliffs	-76.44297	38.44232	3	24009	CB4MH	02060001
007	Calvert Cliffs	-76.43887	38.44202	6	24009	CB4MH	02060001
008	Calvert Cliffs	-76.42527	38.45292	12	24009	CB4MH	02060001
009	Flag Pond	-76.44827	38.45592	3	24009	CB4MH	02060001
010	Flag Pond	-76.44747	38.45592	7	24009	CB4MH	02060001
011	Flag Pond	-76.43327	38.46292	12	24009	CB4MH	02060001
012	Scientists Cliffs	-76.50297	38.50872	2	24009	CB4MH	02060001
013	Scientists Cliffs	-76.51298	38.50822	6	24009	CB4MH	02060004
014	Scientists Cliffs	-76.45357	38.51372	12	24009	CB4MH	02060001
015	Holland Point	-76.51358	38.71512	2	24003	CB4MH	02060001
016	Holland Point	-76.45108	38.73092	13	24041	CB4MH	02060001
017	Holland Point	-76.43467	38.72842	25	24041	CB4MH	02060001
018	Tilghman	-76.36357	38.72872	3	24041	CB4MH	02060001
019	Curtis Point	-76.48528	38.85652	3	24003	CB4MH	02060001
020	Curtis Point	-76.43578	38.85732	10	24003	CB4MH	02060001
021	Bloody Point	-76.40188	38.85822	27	24035	CB4MH	02060001
OLD-022	Fort McHenry	-76.58749	39.25481	4	24510	PATMH	02060003
NEW-022	Fort McHenry	-76.59512	39.258082	4	24510	PATMH	02060003
024	Eastern Neck	-76.35528	39.12201	6	24003	CB3MH	02060001
025	Eastern Neck	-76.25498	39.07511	7	24029	CB3MH	02060002
026	Pooles Island	-76.28998	39.27151	4	24025	CB2OH	02060001
027	Grove Point	-76.06077	39.40651	6	24015	CB2OH	02060001
028	Turkey Point	-76.03357	39.45761	4	24015	CB1TF	02060001
029	Ford Landing	-75.94437	39.47952	6	24015	ELKOH	02060002
036	Rosier Bluff	-77.0375	38.76981	3	24033	POTTF	02070010
038	Sandy Point	-77.2933	38.48542	6	24017	POTOH	02070011
039	Maryland Point	-77.2228	38.36573	2	24017	POTOH	02070011
040	Maryland Point	-77.2305	38.35733	8	24017	POTOH	02070011
043	Popes Creek	-76.9891	38.38403	2	24017	POTMH	02070011
044	Popes Creek	-76.9958	38.38573	14	24017	POTMH	02070011
045	Aqualand	-76.9861	38.36953	2	24017	POTMH	02070011
046	Aqualand	-76.9933	38.36873	14	24017	POTMH	02070011
047	Route 301 Bridge	-76.9844	38.36433	3	24017	POTMH	02070011
048	Route 301 Bridge	-76.9897	38.36233	19	24017	POTMH	02070011
049	Picowaxen Creek	-76.94249	38.32703	2	24017	POTMH	02070011

STATION	DESCRIPTION	LONGITUDE	LATITUDE	TOTAL_DEPTH	FIPS	CBP_SEGMENT	HUC
050	Picowaxen Creek	-76.9853	38.31873	14	24017	POTMH	02070011
051	St. Clements Island	-76.73799	38.20543	2	24037	POTMH	02070011
052	St. Clements Island	-76.74779	38.19233	11	24037	POTMH	02070011
053	Cornfield Point	-76.35937	38.05573	3	24037	POTMH	02070011
054	Cornfield Point	-76.36247	38.04843	13	24037	POTMH	02070011
055	Point No Point	-76.31247	38.13343	3	24037	CB5MH	02060001
056	Point No Point	-76.29547	38.13183	8	24037	CB5MH	02060001
057	Point No Point	-76.28247	38.13042	14	24037	CB5MH	02060001
058	Point No Point/Hollands Point	-76.22636	38.12372	30	24037	CB5MH	02060001
059	Holland Island	-76.11186	38.11822	4	24019	TANMH	02060001
060	Terrapin Sand Point	-75.95606	37.99482	3	24039	TANMH	02060001
061	Clay Island	-75.93826	38.22202	6	24019	TANMH	02060007
062	Penknife Point	-75.84996	38.38402	6	24045	NANMH	02060008
063	Benoni Point	-76.22527	38.66092	8	24041	CHOMH1	02060005
064	Cambridge	-76.06936	38.59042	9	24019	CHOMH2	02060005
065	Jamaica Point	-75.97886	38.62322	3	24019	CHOMH2	02060005
066	Tuckahoe Creek	-75.92186	38.80151	3	24011	CHOOH	02060005
067	Corsica Neck	-76.17937	39.07571	7	24029	CHSMH	02060002
068	Bookers Wharf	-76.07857	39.13291	6	24029	CHSMH	02060002
070	Drum Point	-76.42077	38.31512	16	24009	CB5MH	02060006
071	Broomes Island	-76.54888	38.39512	15	24037	PAXMH	02060006
072	Trent Hall	-76.65968	38.47342	3	24037	PAXMH	02060006
073	Route 231 Bridge	-76.66938	38.51872	3	24017	PAXMH	02060006
074	Chalk Point	-76.67608	38.54902	3	24033	PAXOH	02060006
075	Potts Point	-76.67578	38.56542	3	24009	PAXOH	02060006
076	Cedarhaven	-76.68109	38.58232	3	24033	PAXOH	02060006
077	Holland Cliff	-76.67498	38.60452	3	24033	PAXOH	02060006
078	Lower Marlborough	-76.68829	38.66572	3	24009	PAXOH	02060006
079	Lyons Creek	-76.68909	38.75042	3	24003	PAXTF	02060006
080	Western Branch	-76.71359	38.78401	3	24033	PAXTF	02060006

* Small Area/Strata Random Site Positions. A Strata list for randomly selected stations for Benthic Surveys done from 1989 through 1994. Given are the Strata Number, Location, western and eastern Longitude, and northern and southern Latitude Stratum limits in Decimal degrees. Since the strata were additionally defined by bathymetric contour, the stratum depth limits (in feet) are also listed. Positions in data sets are NAD83 Coordinates.

STRATA	DESCRIPTION	LATITUDE NORTH	LONGITUDE EAST	LATITUDE SOUTH	LONGITUDE WEST	TOTAL_DEPTH
101	Calvert Cliffs	38.50012	-76.40407	38.41682	-76.49967	6-12
102	Calvert Cliffs	38.50012	-76.37827	38.41682	-76.46277	36-50
103	Calvert Cliffs	38.50012	-76.33297	38.41682	-76.42137	50-50
104	Holland Point	38.73072	-76.49968	38.58342	-76.53188	6-12
105	Holland Point	38.73072	-76.38717	38.58342	-76.48158	36-36
106	Bloody Point	38.99731	-76.35028	38.84182	-76.45028	36-36
107	Bodkin Point	39.16621	-76.23748	39.03981	-76.43358	12-12
108	Poole's Island	39.30011	-76.18297	39.21591	-76.39278	12-12
109	Turkey Point	39.50011	-75.92356	39.37181	-76.14077	6- 6
110	Point Lookout	38.16683	-76.30717	38.03263	-76.36497	6-12

STRATA	DESCRIPTION	LATITUDE NORTH	LONGITUDE EAST	LATITUDE SOUTH	LONGITUDE WEST	TOTAL DEPTH
111	Point Lookout	38.16683	-76.18656	38.00013	-76.40527	30-30
112	St Clements Island	38.24543	-76.68498	38.20403	-76.81639	6-12
113	St Clements Island	38.23903	-76.68498	38.16323	-76.85389	24-24
114	Morgantown	38.39622	-76.92469	38.28953	-76.9941	6-12
115	Morgantown	38.39452	-76.92469	38.27433	-77.0136	12-12
116	Maryland Point	38.53432	-77.1241	38.33733	-77.3214	6- 6
117	Rosier Bluff	38.79371	-77.0228	38.63452	-77.1441	12-12
118	Todd's Point	38.64122	-76.14636	38.61182	-76.29797	6-12
119	Todd's Point	38.68342	-76.15297	38.61682	-76.32467	12-12
120	Jamaica Point	38.68452	-75.94746	38.56122	-76.08106	6- 6
121	King's Creek	38.81451	-75.89776	38.75681	-75.99776	6- 6
122	Piney Point	39.10931	-76.11357	38.97541	-76.22938	6- 6
123	Frying Pan Point	39.20841	-76.03637	39.12931	-76.08937	6- 6
124	Sparrows Point	39.21681	-76.46388	39.16681	-76.53529	6- 6
125	Bear Creek	39.24821	-76.48778	39.20431	-76.51999	6- 6
126	Curtis Bay	39.22731	-76.55139	39.20071	-76.58389	6- 6
127	Middle Branch	39.26571	-76.58329	39.23341	-76.63049	6- 6
128	Broomes Island	38.43372	-76.50298	38.38592	-76.61858	6-12
129	Broomes Island	38.43372	-76.50298	38.37322	-76.61858	12-12
130	Chalk Point	38.61762	-76.65468	38.51202	-76.68389	6- 6
131	Jug Bay	38.78152	-76.69549	38.75012	-76.71499	6- 6
132	Rosier Bluff	38.79371	-77.0228	38.63452	-77.1269	6-12
133	Poole's Island A	39.26401	-76.26908	39.25841	-76.27748	12-12
134	Poole's Island B	39.28761	-76.25658	39.27791	-76.26358	12-12
135	Poole's Island C	39.32731	-76.23578	39.30011	-76.24968	12-12
136	Poole's Island D	39.30011	-76.18297	39.22651	-76.39908	12-12

* Large Area/Strata Random Site Positions. A Strata list for randomly selected stations for Benthic Surveys done from 1994 through Present. Given are the Strata Number, Location, western and eastern Longitude, and northern and southern Latitude Stratum limits in Decimal degrees. Since the strata were additionally defined by bathymetric contour, the stratum depth limits (in feet) are also listed.

-1994 Large Strata Areas

LAR Large Estuary (Chesapeake Bay Mainstem)
 POT Tidal River (Potomac River)
 SML Small Estuary (All other Tributaries)

-1995 to Present Large Strata Areas

MTW Maryland Western Tributaries
 MET Maryland Eastern Tributaries
 UPB Maryland Mainstem, Upper Bay
 MMS Maryland Mainstem, Lower Bay
 PMR Potomac River
 PXR Patuxnet River

>EPA-National Coast Assessment Samples (NCA). The following is a complete list of the samples considered to be part of this sampling effort. Please note that these stations have both CBP and NCA names. Co-listed stations, random CBP sites also collected as part of the NCA, were selected using standard CBP protocol for random site selection. Non-Colisted sites were selected using NCA's protocol described above. All sites where data was collected as part of NCA have additional water quality (Nutrients, chlorophyll) and toxicity data collected synchronously. These data sets will have data for stations by the NCA names. This ancillary data can be obtained by contacting

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EPA/NCA Name	CBP Name	CBP Large Area strata	Sample Date
MD05-0025	12109	PMR	8/29/2005
MD05-0003	12118	PMR	9/30/2005
MD05-0011	12119	PMR	9/29/2005
MD05-0008	12305	MWT	9/8/2005
MD05-0018	12317	MWT	8/31/2005
MD05-0019	12401	MET	9/28/2005
MD05-0009	12404	MET	9/20/2005
MD05-0013	12505	MMS	8/30/2005
MD05-0021	12512	MMS	8/29/2005
MD05-0023	12518	MMS	9/13/2005
MD05-0002	12520	MMS	9/21/2005
MD05-0020	12523	MMS	9/13/2005
MD05-0016	12524	MMS	9/21/2005
MD05-0014	12525	MMS	9/28/2005
MD05-0015	12624	UPB	9/1/2005
MD06-0034	13103	PMR	9/21/2006
MD06-0030	13107	PMR	9/21/2006
MD06-0026	13119	PMR	9/26/2006
MD06-0044	13120	PMR	9/21/2006
MD06-0038	13124	PMR	9/11/2006
MD06-0047	13306	MWT	9/6/2006
MD06-0037	13413	MET	9/12/2006
MD06-0048	13423	MET	9/7/2006
MD06-0028	13502	MMS	9/22/2006
MD06-0050	13508	MMS	9/22/2006
MD06-0043	13515	MMS	9/22/2006
MD06-0029	13518	MMS	9/22/2006
MD06-0049	13524	MMS	9/28/2006
MD06-0027	13606	UPB	9/8/2006

METHODOLOGY DESCRIBING CHAIN OF CUSTODY FOR LAB SAMPLES

Upon completion of field sampling, samples were inspected for proper labeling and logged into a master control notebook. Three replicate were designated for processing and one was archived. Samples were stored on shelves in the laboratory by sample date until they were processed. Alternatively, samples were transferred to the Cove Corporation for processing. Each sample was tracked on an archive log sheet maintained in the project files.

BIOLOGICAL ENUMERATION TECHNIQUES

In the lab all samples were sieved through either a 0.5 mm screen using an elutriative process. Organisms were sorted from detritus under a dissecting microscope and identified to the lowest practical taxonomic level and counted. Oligochaetes and chironomids were mounted on slides and examined under a compound microscope for genus and species identification. Any taxa requiring slide mounting for identification are excluded from biomass measurements. Approximately 10 % of samples are reprocessed as a QA/QC check. Species identifications are verified by comparison to voucher specimens

#FORMULAS AND CALCULATIONS

>Taxonomic Abundance Data

Multiplication of organism count per size class by gear conversion factor will give concentration of organisms per area value.

>Biomass Data

-Multiplication of organism count per size class by gear conversion factor will give concentration of organisms per area value.

-For samples where biomass was estimated the following regression formulas to morphometric measurements of organisms was used to estimate biomass.

Results of nonlinear regression analysis between ash-free dry weight and morphogenetic measurements ($W=aL^{**b}$), in all cases Prob.> F= 0.0001.

TAXON	L_VARIABLE	R**2	A_PARAMETER	B_PARAMETER
Eteone heteropoda	dorso-ventral	0.56	2.6335	2.8841
	or lateral width at fifth setiger	0.57	0.9855	2.2699
Glycinde solitaria	dorso-ventral	0.72	4.7133	2.4613
	or lateral width at fith setiger	0.68	4.4969	2.4707
Heteromastus filiformis	dorso-ventral width at eighth setiger	0.93	11.4691	3.7932
Marenzelleria viridis	dorso-ventral	0.77	4.8080	3.2172
	or lateral width at tenth setiger	0.90	0.8028	2.5909
Nereis succinea	dorso-ventral	0.94	2.5911	2.8553
	or lateral width at first setiger	0.92	1.8557	2.4253
Paraprionospio pinnata	dorso-ventral	0.95	8.6232	3.8036
	or lateral width at tenth setiger	0.91	3.8087	3.3139
Streblospio	total lenght,	0.93	0.0012	2.0133

benedicti	length through fifth	0.80	0.4450	2.5394
	setiger or fifth setiger width	0.84	1.3871	2.4282
Cyathura polita	length	0.92	0.0015	2.7873
Gammarus sp.	length	0.96	0.0004	3.7070
Leptocheirus plumulosus	length	0.82	0.0189	1.9816
Acteocina canaliculata	shell length	0.98	0.0071	3.3524
Corbicula sp	shell length	0.99	0.0029	3.4920
Gemma gemma	shell length	0.99	0.0129	3.4834
Haminole solitaria	shell length	0.98	0.0032	3.8843
Malcoma balthica	shell length	0.96	0.0073	3.0583
Malcoma mitchelli	shell length	0.96	0.0094	2.8021
Mulina lateralis	shell length	0.94	0.0012	3.8217
Mya arenaria	shell length	0.99	0.0118	2.8427
Rangia cuneata	shell length	0.86	0.1131	2.2981
Tagelus plebeius	shell length	0.96	0.0206	2.5630
Carinoma tremaphoros	dorso-ventral	0.87	3.4238	1.5451
	or lateral width just past head	0.91	3.1511	2.3960
Micrura leidyi	dorso-ventral	0.87	6.7288	2.3937
	or lateral width Just past head	0.94	2.7685	4.0281

Where:

TAXON= Organism

L_VARIABLE= Independent Variable

R**2 = R Squared Value of Regression

A_PARAMETER= Multiplicative Parameter

B_PARAMETER= Exponential Parameter

#INDEX OF BIOTIC INTEGRITY CALCULATIONS

All Chesapeake Bay Index of Biotic Integrity Data has been calculated using the protocol described in

Alden, R. W., III, D. M. Dauer, J. A. Ranasinghe, L. C. Scott, and R. J. Llansó. 2002. Statistical verification of the Chesapeake Bay Benthic Index of Biotic Integrity. *Environmetrics*, 13:473-498.

Further details can be found at <http://www.esm.versar.com/Vcb/Benthos/docs/ChesBayBIBI.PDF>

BIOLOGICAL VARIABLES QA/QC PLAN FOR PROJECT

All sorting and identifying operations were conducted, QA/QC checked in accordance with the Versar ESM Operations Benthic Laboratory Operations Manual. All variables were checked for accuracy and admissibility by computer program.

#VARIABLE NAMES, MEASUREMENT UNITS AND DESCRIPTIONS

>PARAMETER: AFDW (taxon ash free dry weight in grams)

-COLLECTION METHODS: Hydraulic Grab, Ponar Grab or Post Hole Digger, [starting in 1989 a WildCo Box Corer was also used for sampling] followed by field sieving through a 0.5 mm sieve. Organisms and detritus retained in sieve were transferred into labeled jars and preserved in 10% buffered formalin with rose Bengal. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either a Ponar grab or a WildCo box corer.

-SAMPLE PRESERVATIVES: 10% buffered formalin with rose bengal transferred to 70% propanol

-SAMPLE STORAGE ENVIRONMENT: Plastic bottles

-TIME IN STORAGE: Until commencement of processing

-LABORATORY TECHNIQUES WITH REFERENCES: For data collected in 1984, actual biomass determinations were made by the groupings of mollusks, crustacean, worm and miscellaneous. Actual determination of ash free dry weight by group was done by drying samples at 60 degree. C to a constant weight, ashing in a muffle furnace, and weighed.

For 1985-1994 samples, organisms were grouped into major taxonomic categories. Species specific biomass was determine for 22 selected species. The 22 selected species have traditionally made up 90 % of all benthic biomass. All specimens were photographed and morphometric measurements of a species were made on photographic negative with a digital planimeter. The species specific morphometric measurements were subsequently entered into a nonlinear regression to obtain estimated values of ash free dry weight for each species.

The non-linear regression relationships for each of the 22 target species were developed from the 1985-1986 data field data. All specimens were photographed and morphometric measurements of a species were made on the photographic negative with a digital planimeter. Next, samples of individual species were dried at 60 degree C to a constant weight, ashed in a muffle furnace, and weighed. Nonlinear regressions between the body measurements and actual ash free dry weight were established.

For the years 1985-1994 the species selected for biomass estimation were:

ACTEOCINA CANALICULATA
 CARINOMA TREMAPHOROS
 CORBICULA FLUMINEA
 CYATHURA POLITA
 GAMMARUS SP.
 GEMMA GEMMA
 GLYCIDINDE SOLITARIA
 HAMINOEA SOLITARIA
 HETEROMASTUS FILIFORMIS
 HYPERETEONE HETEROPODA
 LEPTOCHEIRUS PLUMULOSUS

MACOMA BALTICA
 MACOMA MITCHELLI
 MARENZELLERIA VIRIDIS
 MICRURA LEIDYI
 MULINIA LATERALIS
 MYA ARENARIA
 NEANTHES SUCCINEA
 PARAPRIONOSPIO PINNATA
 RANGIA CUNEATA
 STREBLOSPIO BENEDICTI
 TAGELUS PLEBEIUS

Since 1994 to present, ash-free dry weight biomass is measured directly for each species (with the exceptions listed below) by drying the organisms to a constant weight at 60 C and ashing in a muffle furnace at 500 C for four hours and re-weighing (ash weight). The difference between dry weight and ash weight is the ash free weight. Because oligochaetes and chironomids require slide mounting for identification, species-specific biomass for Oligochaeta and Chironomidae is not provided except for Tubificoides spp., Branchiura sowerbyi, and Coelotanypus spp., which do not require slide mounting for identification. Bivalves are crushed to open the shells and expose the animal to drying and ashing (shells included).

For data from 1984 and after 1994

>DATA ENTRY METHOD: Double key punch to disk

>DATA VERIFICATION: Visually verified twice and then checked by computer programs

For data from 1985 to 1994

>DATA ENTRY METHOD: Direct planimeter to computer link

>DATA VERIFICATION: Checked by computer programs

>PARAMETER: TIC (Total Inorganic Carbon Content: CHN Analyzer, %)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES: Ashing in a muffle furnace at a low temperature of 500oC results in the removal of organic carbon. The inorganic carbon remaining in the ash is then injected in a carbon analyzer (Exeter Analytical, Inc., CE-440 Elemental Analyzer) and combusted at high temperature (975o C). The carbon dioxide produced during combustion is measured by thermal conductivity detection. Prior to ashing, each sample is homogenized and oven-dried. No acid applied.

Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experimental Station, Vicksburg. Mississippi. Technical Report EPA/CE-81-1

Buchanan, J.B. (1984) Sediment analysis . In: Method for study of Marine Benthos. IBP Handbook NO 16, 2nd Edition., 41-65. N.A. Holme and A.D. McIntyre, eds. Oxford, England: Blackwell Scientific Publications.

>PARAMETER: TC (Carbon Content: Ignition, %)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES:

Combustion at high temperature (975o C) in a carbon analyzer (Exeter Analytical, Inc., CE-440 Elemental Analyzer) and subsequent measurement of the carbon dioxide produced by thermal conductivity detection. Prior to combustion, each sample is homogenized and oven-dried. No acid applied.

Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experimental Station, Vicksburg. Mississippi. Technical Report EPA/CE-81-1

Buchanan, J.B. (1984) Sediment analysis . In: Method for study of Marine Benthos. IBP Handbook NO 16, 2nd Edition., 41-65. N.A. Holme and A.D. McIntyre, eds. Oxford, England: Blackwell Scientific Publications.

>PARAMETER: TOC (Total organic carbon content in percent)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

- SAMPLE PRESERVATIVES: None
- SAMPLE STORAGE: Frozen until processing
- LABORATORY TECHNIQUE: TOC is determined by performing separate TC and TIC analyses and subtracting the results

>PARAMETER: COUNT (# of a benthic taxon per sample)

-COLLECTION METHODS: Hydraulic Grab, Ponar Grab or Post Hole Digger [starting in 1989 a WildCo Box Corer was also used for sampling] followed by field sieving through a 0.5mm sieve and preserved in the field. Organisms and detritus retained in sieve were transferred into labeled jars and preserved in 10% buffered formalin with rose bengal. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: 10% buffered formalin with Rose Bengal transferred to 70% ethanol after sorting.

-SAMPLE STORAGE ENVIRONMENT: Plastic (Nalgene) Bottles

-TIME IN STORAGE: Until commencement of processing

-LAB TECHNIQUES WITH REFERENCES: Laboratory Technique: Most organisms are separated from the detritus in gridded Petri dishes and sorted into major taxa using binocular dissecting microscopes. After sorting, the organisms are stored in 70% ethanol and subsequently identified to the lowest possible taxonomic level (usually species) and counted. Fragments without heads are eliminated from the counts but included in biomass determinations. Oligochaetes and chironomids are mounted on microscope slides, examined under a compound microscope, and identified to genus and species following procedures based upon currently accepted practices in benthic ecology. If the number of oligochaetes or chironomids in a sample is between 20 and 300 individuals, the sample is split and approximately 50% of the specimens are mounted. The remaining portion is saved and used in biomass determinations. Evenly spreading the specimens in a gridded tray and selecting half of the total number of grids at random split the sample. If the number of individuals is greater than 300, grids are selected randomly until 150 specimens are mounted. Total taxonomic counts for each oligochaete and chironomid species are adjusted by the proportion of the total number of specimens mounted in the sample.

>PARAMETER: SPCONDUCT (Conductivity,umHo/cm)

-COLLECTION METHODS:

July to November 1984: Beckman Model RS5-3 Salinometer with a toroidal conductivity cell with thermistor compensation. December 1984 to December 1995: Hydrolab Surveyor II nickle six-pin electrode in combination with a salt water cell block and temperature compensation. January 1996 to Present: Hydrolab Datasonde III or Hydrolab H2O nickle six-pin electrode in combination with a salt water cell block and temperature compensation.

-SAMPLE PRESERVATIVES: N/A

-SAMPLE STORAGE ENVIRONMENT: N/A

-TIME IN STORAGE: N/A

-LAB TECHNIQUES WITH REFERENCES: N/A

>PARAMETER: DO (Dissolved Oxygen, ppm), DO_PSAT (Percent Saturation)

-COLLECTION METHODS: July to November 1984: YSI Model 57 or 58 Oxygen meter with automatic temperature and manual salinity correction corroborated by Winkler tirations. December 1984 to December 1995: Hydrolab Surveyor II membrane DO probe with automatic temperature and salinity compensation corroborated by Winkler tirations. January 1996 to Present: Hydrolab Datasonde III or Hydrolab H2O nickle membrane DO probe with automatic temperature and salinity compensation corroborated by Winkler tirations.

-SAMPLE PRESERVATIVES: N/A

-SAMPLE STORAGE ENVIRONMENT: N/A

-TIME IN STORAGE: N/A

-LAB TECHNIQUES WITH REFERENCES: Winkler Titration

Carpenter, J.H. (1965) Limnology and Oceanography 10:135-140

Carritt, D.E. and J.H. Carpenter (1966) NASCO Report. Journal of Marine Research 24:286-318

>PARAMETER: Latitude and Longitude (Degrees, decimal minutes and seconds)

-COLLECTION METHODS: Loran-C, Global Positioning System (GPS)

-SAMPLE PRESERVATIVES: None

-SAMPLE STORAGE ENVIRONMENT: None

-TIME IN STORAGE: None

-LAB TECHNIQUES WITH REFERENCES:

From 1984-1996: Station latitudes and longitudes were determined by Loran-C. Loran-C is accurate to +/- 1500 ft. From 1996 to present: Station latitudes and longitudes are determined by differential GPS using NAD 83 coordinates. All positions in the datasets have been converted to NAD83 coordinates.

PARAMETER: MEDDIAM (Folk Median Diameter)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES: Dry Sieve Series and Pipette Analysis;

Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experimental Station, Vicksburg, Mississippi. Technical Report EPA/CE-81-1

>PARAMETER: MOIST (Sediment Moisture Content, %)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES: Weight loss on drying for at least 24 hours at 60 degrees centigrade.

Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experimental Station, Vicksburg, Mississippi. Technical Report EPA/CE-81-1

>PARAMETER: TN (Nitrogen Content: CHN Analyzer, %)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES: Combustion at high temperature in a Exeter Analytical, Inc., CE-440 Elemental Analyzer. The nitrogen concentration is measured by thermal conductivity against a reference cell after all the carbon and hydrogen in the combustion chamber is removed.

Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples.

Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experimental Station, Vicksburg, Mississippi. Technical Report EPA/CE-81-1

Buchanan, J.B. (1984) Sediment analysis . In: Method for study of Marine Benthos. IBP Handbook NO 16, 2nd Edition., 41-65. N.A. Holme and A.D. McIntyre, eds. Oxford, England: Blackwell Scientific Publications.

>PARAMETER: ORP (Oxidation-Reduction Potential)

-COLLECTION METHODS: December 1984 to December 1995: Hydrolab Surveyor II, platinum band glass ORP electrode.

-SAMPLE PRESERVATIVES: N/A

-SAMPLE STORAGE ENVIRONMENT: N/A

-TIME IN STORAGE: N/A

-LAB TECHNIQUES WITH REFERENCES: N/A

>PARAMETER: PH (pH)

-COLLECTION METHODS:

July 1984 to November 1984: Orion Analog PH meter.

December 1984 to December 1995: Hydrolab Surveyor II glass pH electrode with Lazaran reference electrode. January 1996 to Present: Hydrolab Datasonde III or Hydrolab H2O glass pH electrode with standard reference electrode.

-SAMPLE PRESERVATIVES: N/A

-SAMPLE STORAGE ENVIRONMENT: N/A

-TIME IN STORAGE: N/A

-LAB TECHNIQUES WITH REFERENCES: N/A

>PARAMETER: SALINITY (Salinity, psu)

-COLLECTION METHODS

July to November 1984: Beckman Model RS5-3 Salinometer with a toroidal conductivity cell with thermistor compensation. December 1984 to December 1995: Hydrolab Surveyor II nickle six-pin electrode in combination with a salt water cell block and temperature compensation. January 1996 to Present: Hydrolab Datasonde III or Hydrolab H2O nickle six-pin electrode in combination with a salt water cell block and temperature compensation.

-SAMPLE PRESERVATIVES: N/A

-SAMPLE STORAGE ENVIRONMENT: N/A

-TIME IN STORAGE: N/A

-LAB TECHNIQUES WITH REFERENCES: N/A

>PARAMETER:SAND (Sand Content, %)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydrolic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES: Wet sieving through 63um mesh;

Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory,

U.S. Army Waterways Experimental Station, Vicksburg. Mississippi.
Technical Report EPA/CE-81-1

>PARAMETER: SAMPLE_DEPTH (Sampling Depth, Meters)

-COLLECTION METHODS: Hydrolab Surveyor II-

SAMPLE PRESERVATIVES: N/A

-SAMPLE STORAGE ENVIRONMENT: N/A

-TIME IN STORAGE: N/A

-LAB TECHNIQUES WITH REFERENCES: N/A

>PARAMETER: WTEMP (Water Temperature, Centigrade)

-COLLECTION METHODS: Thermistor attached to Hydrolab Surveyor II

-SAMPLE PRESERVATIVES: N/A

-SAMPLE STORAGE ENVIRONMENT: N/A

-TIME IN STORAGE: N/A

-LAB TECHNIQUES WITH REFERENCES: N/A

>PARAMETER: SILTCLAY (Silt-Clay Content,%), SILT_G (Silt content in grams)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES: Wet sieving through 63um mesh
Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experimental Station, Vicksburg. Mississippi. Technical Report EPA/CE-81-1

>PARAMETER: SITETYPE (Sampling Site Type)

-COLLECTION METHODS: Pre-Determined by Investigator

-SAMPLE PRESERVATIVES: None

-SAMPLE STORAGE ENVIRONMENT: None

-TIME IN STORAGE: None

-LAB TECHNIQUES WITH REFERENCES: See Station Listing Above for sampling Site criteria

>PARAMETER: SKEWNESS (Folk Skewness), SORTING (Folk Sort), QUARTDEV(Quartile Deviation)

-COLLECTION METHODS: 20ml and 100ml sample were taken from a bottom grab and frozen. The bottom depth at each stratum determined the type of gear used to collect benthos. A hand operated box core was used on all strata with a total depth less than three meters. At Station depths between 3 and 9 meters a hydraulic grab was used. Sampling of deeper habitats was performed with either the Ponar grab or WildCo box corer.

-SAMPLE PRESERVATIVES: Frozen

-SAMPLE STORAGE ENVIRONMENT: Frozen

-TIME IN STORAGE: Until thawed for analysis

-LAB TECHNIQUES WITH REFERENCES: Dry Sieve Series and Pipette Analysis;
Plumb, R.H. (1981), Procedures for handling and chemical analysis of sediment and water samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee of Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experimental Station, Vicksburg. Mississippi. Technical Report EPA/CE-81-1

>PARAMETER: TOTAL_DEPTH(Total Station Depth, Meters)
 -COLLECTION METHODS: YSI CTD, Ships fathometer
 -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 benthic sampling.

>DATA ENTRY METHOD: Double key punch to disk. Data is then entered to SAS data sets for management and storage.

>DATA VERIFICATION: Visually verified twice and then checked by computer programs.

SPECIES INHOUSE CODES AND SCIENTIFIC NAMES

Versar employed Maryland Power Plant species codes for taxonomic identification.

> IN HOUSE SPECIES LIST

The in-house species codes and Latin Names are as follows:

SPEC_CODE	SOURCE_LBL	TSN
T1415	ABLABESMYIA MALLOCHI	0128097
T3418	ABLABESMYIA MONILIS	0128107
T296	ABLABESMYIA SP.	0128079
T1413	ABLABESMYIA AURIENSIS	0128104
T603	ACANTHOHAUSTORIUS MILLSI	0093982
T536	ACTEOCINA CANALICULATA	0076117
T964	ACTEOCINA SP.	0076107
T1518	ACTINIARIA	0052485
T1793	AESHNA SP.	0101603
T2533	ALBOGLOSSIPHONIA HETEROCLITA	0069389
T2969	ALIGENA ELEVATA	0080685
T1776	ALLOCAPNIA	0102644
T2098	ALMYRACUMA PROXIMOCULI	0090979
T2368	ALONA AFFINIS	0083979
T2209	AMASTIGOS CAPERATUS	BAY0003
T2616	AMERICAMYSIS ALMYRA	0090591
T1300	AMERICAMYSIS BIGELOWI	0682618
T468	AMEROCULODES SPECIES COMPLEX	0656551
T1052	AMNICOLA LIMOSA	0070748
T1749	AMPELISCA	0093321
T1286	AMPELISCA ABDITA	0093329
T461	AMPELISCA VADORUM	0093330
T2937	AMPELISCA VERRILLI	0093331
T1602	AMPHARETIDAE	0067718
T101	AMPHIPODA	0093294
T2986	AMPHIPORUS BIOCULATUS	0057533
T1260	AMPITHOE VALIDA	0093424
T332	AMYGDALUM PAPYRIA	0079529
T2967	ANACHIS LAFRESNAYI	0073631
T1228	ANADARA OVALIS	0079342
T2856	ANADARA SP.	0079337
T2861	ANADARA TRANSVERSA	0079340
T2873	ANCISTROSYLLIS HARTMANAE	0065543
T2874	ANCISTROSYLLIS JONESI	0065544

SPEC_CODE	SOURCE_LBL	TSN
T3411	ANCISTROSYLLIS SPP.	0065541
T975	ANCYLIDAE	0076568
T3206	ANEMONE SP. A	0018425
T2215	ANISOPTERA	0101594
T1948	ANODONTA	0079930
T1239	ANTHOZOA	0051938
T635	APOCOROPHIUM LACUSTRE	0656749
T1248	ARABELLIDAE	0066422
T580	ARACHNIDA	0082708
T2113	ARCTEONAIIS LOMONDI	0068976
T2463	ASABELLIDES OCULATA	0067786
T191	ASELLIDAE	0092657
T226	ASELLUS SP.	0092658
T2128	AULODRILUS LIMNOBIUS	0068682
T2713	AULODRILUS PAUCICHAETA	0068686
T2015	AULODRILUS PIGUETI	0068680
T2129	AULODRILUS PLURISETA	0068684
T1718	AULODRILUS SPP.	0068679
T3324	AXARUS	0129236
T3079	AXARUS FESTIVUS	0129239
T982	BAETIDAE	0100755
T1769	BALANUS	0089600
T1076	BALANUS AMPHITRITE NIVEUS	0089617
T1030	BALANUS IMPROVISUS	0089622
T2216	BATRACOBDELLA PHALERA	0069374
T2002	BATRACOBDELLA SP.	0069358
T616	BEZZIA SP.	0127778
T3025	BEZZIA SPP.	0127778
T236	BIVALVIA	0079118
T2204	BOCCARDIELLA LIGERICA	0067012
T3170	BOCCARDIELLA LIGERICA	0067012
T3160	BOCCARDIELLA LIGERICA	0067012
T2924	BOONEA BISUTURALIS	0075987
T2201	BOONEA IMPRESSA	0075989

SPEC_CODE	SOURCE_LBL	TSN
T1997	BOTHRIONEURUM VEJDOVSKYANUM	0068779
T2022	BRACHYURAN MEGALOPA	0098276
T2023	BRACHYURAN ZOEA	0098276
T1226	BRANCHIOSTOMA CARIBAEUM	0159682
T315	BRANCHIURA SOWERBYI	0068621
T2720	BRANIA CLAVATA	0065761
T2033	BRATISLAVIA BILONGATA	0069022
T2143	BRATISLAVIA UNIDENTADA	0069023
T2839	CAECIDOTEA	0092686
T1279	CAECIDOTEA COMMUNIS	0568819
T273	CAENIS SP.	0101478
T102	CALLINECTES SAPIDUS	0098696
T2224	CAMPELOMA DECISUM	0070312
T1244	CAPITELLA CAPITATA	0067415
T1243	CAPITELLIDAE	0067413
T3068	CAPITELLIDES JONESI	0067450
T2862	CAPRELLA PENANTIS	0095419
T2177	CAPRELLIDAE	0095375
T1240	CARINOMA TREMAPHORUS	0057429
T1232	CASSIDINIDEA OVALIS	0092348
T2225	CERACLEA SP.	0116684
T2866	CERAPUS TUBULARIS	0093587
T621	CERATOPOGONIDAE	0127076
T2976	CEREBRATULUS LACTEUS	0057455
T2714	CEREBRATULUS SP.	0057446
T2870	CERIANTHEOPIS AMERICANUS	0051991
T972	CHAETOGASTER SP.	0068934
T2882	CHAETOPTERUS VARIOPEATUS	0067097
T1141	CHAOBORIDAE	0125886
T2955	CHAOBORUS ALBATUS	0125905
T2186	CHAOBORUS PUNCTIPENNIS	0125923
T2185	CHAOBORUS PUPAE	0125904
T292	CHAOBORUS SP.	0125904
T282	CHEUMATOPSYCHE SP.	0115408
T625	CHIRIDOTEA ALMYRA	0092638
T496	CHIRIDOTEA CAECA	0092641
T787	CHIRONOMID LARVAE	0127917
T3553	CHIRONOMIDAE	0127917
T1113	CHIRONOMIDAE PUPAE	0127917
T2017	CHIRONOMINI	0129229
T1040	CHIRONOMUS SP.	0129254
T325	CHRYSAORA POLYPS	0051640
T1684	CHRYSOMELIDAE	0114509
T1594	CIRRATULIDAE	0067116
T2884	CIRRIFORMIA GRANDIS	0067122
T2136	CLADOPELMA SPP.	0129350
T2733	CLADOTANYTARSUS MANCUS GROUP	0129881
T2173	CLADOTANYTARSUS SP.	0129873
T3028	CLADOTANYTARSUS SPP. A EPLER	0129873
T3498	CLADOTANYTARSUS SPP. B EPLER	0129873
T3507	CLADOTANYTARSUS SPP. F ELPLER	0129873
T1870	CLINOTANYPUS	0127996

SPEC_CODE	SOURCE_LBL	TSN
T2956	CLINOTANYPUS PINGUIS	0127998
T1216	CLYMENELLA TORQUATA	0067528
T2049	CLYMENELLA ZONALIS	0067531
T301	COELOTANYPUS SP.	0128010
T632	COENAGRIONIDAE	0102077
T489	COLLEMBOLA	0099237
T1932	CORBICULA FLUMINEA	0081387
T1036	CORDYLOPHORA LACUSTRIS	0048894
T1609	COROPHIIDAE	0093584
T2864	COROPHIUM ACHERUSICUM	0093590
T634	COROPHIUM SP.	0093589
T2140	COROPHIUM TUBERCULATUM	0093596
T107	CRANGON SEPTESPINOSA	0097110
T1747	CRANGONYX SPP.	0095081
T517	CRASSOSTREA VIRGINICA	0079872
T538	CRATENA PILATA	0078713
T2918	CREPIDULA FORNICATA	0072623
T1419	CRICOTOPUS BICINCTUS	0128583
T637	CRICOTOPUS SP.	0128575
T1480	CRICOTOPUS SYLVESTRIS	0128645
T2170	CRICOTOPUS/ISOCLADIUS GRP.	0568515
T2607	CRICOTOPUS/ORTHOCLADIUS SPP.	0128575
T638	CRYPTOCHIRONOMUS SP.	0129368
T1151	CRYPTOTENDIPES SP.	0129394
T1676	CURCULIONIDAE	0114666
T497	CYATHURA POLITA	0092149
T2178	CYCLASPIS VARIANS	0091033
T2865	CYMADUSA COMPTA	0093430
T1223	CYMOTHODAE (IMMATURE)	0092437
T289	CYRNELLUS SP.	0117091
T492	DECAPODA	0095599
T3570	DEMICRYPTOCHIRONOMUS SPP.	0129421
T3457	DEMONAX MICROPHthalmus	0068222
T2030	DERO DIGITATA	0068904
T2858	DERO FLABELLIGER	0068902
T1266	DERO NIVEA	0068900
T2777	DERO OBTUSA	0068907
T973	DERO SP.	0068898
T456	DIADUMENE LEUCOLENA	0052749
T1089	DIAMESINAE	0128341
T1421	DICROTENDIPES NEOMODESTUS	0129450
T294	DICROTENDIPES SP.	0129428
T2814	DIOPATRA CUPREA	0066180
T169	DIPTERA	0118831
T782	DIPTERAN LARVAE	0118831
T1673	DOLICHOPODIDAE	0136824
T539	DORIDELLA OBSCURA	0078439
T2052	DRILONEREIS LONGA	0066426
T989	DROMOGOMPHUS SP.	0101730
T1682	DRYOPIIDAE	0113999
T277	DUBIRAPHIA SP.	0114126
T1714	DUGESIA SPP.	0054503

SPEC_CODE	SOURCE_LBL	TSN
T648	DUGESIA TIGRINA	0054504
T498	EDOTEA TRILOBA	0092627
T1125	EDWARDSIA ELEGANS	0052489
T1875	EINFELDIA	0129459
T2867	ELASMOPUS LAEVIS	0093761
T1458	ELLIPTIO COMPLANATA	0079952
T244	ELMIDAE	0114093
T260	EMPIDIDAE	0135830
T650	ENALLAGAMA SPP.	0102102
T238	ENCHYTRAEIDAE	0068510
T1012	ENDOCHIRONOMUS SP.	0129470
T3298	ENDOCHIRONOMUS SUBTENDENS	0129474
T518	ENSIS DIRECTUS	0081022
T1093	EPHEMERIDAE	0101525
T237	EPHEMEROPTERA	0100502
T215	EPHORON SP.	0101570
T540	EPITONIUM RUPICOLA	0072249
T2082	ERICHSONELLA ATTENUATA	0092618
T2936	ERICHSONELLA FILIFORMIS	0092619
T2863	ERICHSONELLA SP. A	0092617
T2718	ERICHTHONIUS BRASILIENSIS	0093613
T1857	ERIOPTERA SP.	0120503
T1725	ETEONE	0065258
T412	ETEONE FOLIOSA	0065270
T411	ETEONE HETEROPODA	0065266
T2266	EUCERAMUS PRAELONGUS	0098081
T971	EUCHONE SP.	0068091
T2611	EUKIEFFERIELLA DEVONICA GROUP	0128695
T300	EUKIEFFERIELLA SP.	0128689
T413	EUMIDA SANGUINEA	0065343
T1236	EUPLANA GRACILIS	0054139
T2276	EURYLOPHELLA SP.	0101324
T2970	EXOgone SP.	0065721
T265	FERRISSIA RIVULARIS	0076572
T1454	FERRISSIA RIVULARIS	0076572
T658	GAMMARUS DAIBERI	0093779
T1037	GAMMARUS FASCIATUS	0093780
T967	GAMMARUS JUVENILES	0093773
T2179	GAMMARUS PALUSTRIS	0093782
T464	GAMMARUS SP.	0093773
T659	GAMMARUS TIGRINUS	0093781
T171	GASTROPODA	0069459
T519	GEMMA GEMMA	0081511
T2900	GENETYLIS CASTENEA	0065318
T2633	GEUKENSIA DEMISSA	0079555
T1055	GLOSSIPHONIIDAE	0069357
T1060	GLOSSIPHONIIDAE SP6.	0069357
T1276	GLYCERA AMERICANA	0066106
T316	GLYCERA DIBRANCHIATA	0066107
T414	GLYCERA DIBRANCHIATA	0066107
T1729	GLYCERA SPP.	0066102
T415	GLYCINDE SOLITARIA	0066132

SPEC_CODE	SOURCE_LBL	TSN
T1011	GLYPTOTENDIPES SP.	0129483
T182	GOMPHIDAE	0101664
T222	GOMPHUS SP.	0101665
T3267	GONIOBASIS SP.	0071542
T1452	GONIOBASIS VIRGINICA	0071852
T1051	GYRAULUS SP.	0076592
T2110	HABER CF. SPECIOSUS	0068746
T2982	HAEMONAIS WALDVOGELI	0069004
T541	HAMINOEA SOLITARIA	0076258
T968	HARGERIA RAPAX	0092068
T2889	HARMOTHOE EXTENUATA	0064509
T1144	HARNISCHIA SP.	0129516
T976	HELISOMA SP.	0076599
T2003	HELOBDELLA	0069396
T2211	HELOBDELLA FUSCA	0069401
T2415	HELOBDELLA STAGNALIS	0069398
T2212	HELOBDELLA TRISERIALIS	0069399
T2806	HEMERODROMIA SP.	0136327
T1973	HESIONIDAE	0065467
T416	HETEROMASTUS FILIFORMIS	0067420
T2596	HETEROMYSIS FORMOSA	0089977
T1325	HEXAGENIA LIMBATA	0101552
T275	HEXAGENIA SP.	0101537
T662	HIRUDINEA	0069290
T3208	HIRUDINEA SP. B	0069290
T669	HOBSONIA FLORIDA	0067755
T1283	HYALELLA AZTECA	0094026
T664	HYDRA SP.	0050845
T267	HYDRACARINA	0050848
T2182	HYDROBAENUS	0128750
T668	HYDROBIA SP. 2	0070494
T666	HYDROBIA SP. 3	0070494
T3081	HYDROBIA TRUNCATA	0070495
T1688	HYDROBIIDAE	0070493
T3018	HYDROBIIDAE SP. A	0070493
T3019	HYDROBIIDAE SP. B	0070493
T245	HYDROPSYCHIDAE	0115398
T284	HYDROPTILA SP. A	0115641
T3352	HYDROPTILA SPP.	0115641
T246	HYDROPTILIDAE	0115629
T2941	IDUNELLA SP.	0094206
T3280	ILYANASSA OBSOLETA	0074169
T1717	ILYODRILUS	0068660
T2121	ILYODRILUS TEMPLETONI	0068662
T2105	IMM. TUBIFICID W/ CAP. CHAETE	0068585
T2104	IMM. TUBIFICID W/O CAP. CHAETE	0068585
T1262	INSECTA	0099208
T516	ISCHADIUM RECURVUM	0079561
T672	ISCHNURA SP.	0102078
T2130	ISOCHAETIDES CURVOSOTOSUS	0068809
T2131	ISOCHAETIDES FREYI	0068810
T500	ISOPODA	0092120

SPEC_CODE	SOURCE_LBL	TSN
T417	LAONEREIS CULVERI	0065965
T2239	LAEVAPEX FUSCUS	0076577
T1949	LAMPISILIS	0079986
T1888	LAUTERBORNIELLA	0129525
T317	LEITOSCOLOPLOS FRAGILIS	0066656
T432	LEITOSCOLOPLOS ROBUSTUS	0182728
T2965	LEITOSCOLOPLOS SP.	0066653
T465	LEPIDACTYLUS DYTISCUS	0093998
T1231	LEPIDAMETRIA COMMENSALIS	0064703
T1210	LEPIDONOTUS SUBLEVIS	0064610
T247	LEPTOCERIDAE	0116547
T466	LEPTOCHEIRUS PLUMULOSUS	0093486
T677	LEPTOCHEIRUS PLUMULOSUS	0093486
T1299	LEPTOCHELIA DUBIA	0092029
T1224	LEPTOSYNAPTA TENUIS	0158432
T481	LEUCON AMERICANUS	0090790
T2107	LIMNODRILUS CERVIX (TYP)	0068652
T2108	LIMNODRILUS CERVIX (VAR)	0068652
T2428	LIMNODRILUS CLAPAREDIANUS	0068654
T1263	LIMNODRILUS HOFFMEISTERI	0068639
T1038	LIMNODRILUS SP.	0068638
T2109	LIMNODRILUS UDEKEMIANUS	0068644
T3013	LIMNOPHYES SP.	0128776
T142	LIMULUS POLYPHEMUS	0082703
T3355	LIPINIELLA	0129531
T1178	LIRONECA OVALIS	0092444
T2602	LISTRIELLA BARNARDI	0094213
T2942	LISTRIELLA CLYMENELLAE	0094214
T3082	LITTORIDININAE SP. A	0070527
T1251	LITTORIDINOPS TENUIPES	0070528
T2102	LITTORINA SP.	0070395
T418	LOIMIA MEDUSA	0068015
T2597	LOLLIGUNCULA BREVIS	0082379
T239	LUMBRICULIDAE	0068440
T1596	LUMBRINEREIDAE	0066335
T1692	LYMNAEIDAE	0076483
T1029	LYONSIA HYALINA	0081926
T520	MACOMA BALTHICA	0081052
T521	MACOMA MITCHELLI	0081054
T1214	MACOMA TENTA	0081055
T1591	MALDANIDAE	0067515
T2050	MALDANOPSIS	BAY0145
T3423	MANAYUNKIA AESTUARINA	0068171
T312	MANAYUNKIA AESTUARINA	0068171
T430	MARENZELLERIA VIRIDIS	0573739
T2208	MEDIOMASTUS AMBISETA	0067439
T2553	MELINNA MACULATA	0067766
T2857	MELINNA SP.	0067762
T467	MELITA NITIDA	0093812
T682	MELITA SP.	0093806
T2830	MENETUS SP.	0076626
T1219	MERCENARIA MERCENARIA	0081496

SPEC_CODE	SOURCE_LBL	TSN
T3506	MESOSMITTIA SPP.	0128818
T2351	MICROCHIRONOMUS	0129532
T994	MICROCYLLOEPUS SP.	0114146
T326	MICROPHTHALMUS ABERRANS	0065478
T3284	MICROPHTHALMUS SCZELKOWII	0065477
T2534	MICROPROTOPUS RANEYI	0094122
T305	MICROPSECTRA SPP.	0129890
T2988	MICROPHTHALMUS SP.	0065476
T2352	MICROSPECTRA	0129890
T297	MICROTENDIPES SP.	0129535
T551	MICRURA LEIDYI	0057477
T210	MISCELLANEA	BAY0286
T451	MOLGULA MANHATTENSIS	0159557
T978	MOLLUSCA	0069458
T463	MUCROGAMMARUS MUCRONATUS	0093783
T522	MULINIA LATERALIS	0080959
T1951	MUSCULIUM SP.	0081427
T1996	MUSCULIUM TRANSVERSUM	0081428
T523	MYA ARENARIA	0081692
T2202	MYSELLA SP.	0080651
T820	MYSID	0089856
T685	MYSIDACEA	0089807
T1257	MYSIDAE	0089856
T1768	MYSIDOPSIS	0090138
T1694	MYTILIDAE	0079451
T329	MYTILOPSIS LEUCOPHAETA	0081335
T687	MYTILUS EDULIS	0079454
T688	NAIDIDAE	0068854
T1267	NAIS BRETSCHERI	0068961
T2004	NAIS COMMUNIS	0068950
T1998	NAIS PARDALIS	0068954
T1152	NAIS PSEUDOBTUSA	0068956
T1268	NAIS SIMPLEX	0068957
T262	NAIS SP.	0068946
T1999	NAIS VARIABILIS	0068959
T2745	NANOCLADIUS BALTICUS	0128866
T2746	NANOCLADIUS BICOLOR GRP.	0128846
T1513	NANOCLADIUS CRASSICORNUS	0128852
T1512	NANOCLADIUS DISTINCTUS	0128853
T1961	NANOCLADIUS SPP.	0128844
T1928	NASSARIUS SPP.	0074103
T1229	NASSARIUS TRIVITTATUS	0074109
T542	NASSARIUS VIBEX	0074107
T2989	NATICIDAE	0072878
T420	NEANTHES SUCCINEA	0065918
T233	NEMERTEA	0057411
T2987	NEMERTEA SP. C	0057411
T3000	NEMERTEA SP. D	0057411
T108	NEOMYSIS AMERICANA	0090062
T1588	NEPHTYIDAE	0066010
T1116	NEPHTYS BUCERA	0066027
T1972	NEPHTYS PICTA	0066030

SPEC_CODE	SOURCE_LBL	TSN
T328	NEPHTYS SP.	0066011
T1585	NEREIDAE	0065870
T424	NEREIPHYLLA FRAGILIS	0065336
T3100	NO ORGANISMS FOUND	BAY0291
T2897	NOTOMASTUS SPP.	0067423
T2932	NUCULA PROXIMA	0079132
T2974	ODOSTOMIA ENGONIA	0075504
T2925	ODOSTOMIA SP.	0075447
T287	OECETIS SP.	0116607
T2210	OGYRIDES ALPHAEROSTRIS	0096737
T3552	OLIGOCHAETA	0068422
T974	OLIGOCHAETA	0068422
T1598	OPHELIIDAE	0067342
T2574	OPHIDONAIS SERPENTINA	0068996
T2595	OPHIUROIDEA	0157325
T278	OPTIOSERVUS SP.	0114177
T2093	ORBINIA ORNATA	0066621
T1599	ORBINIIDAE	0066570
T1088	ORTHOCLADIINAE	0128457
T229	ORTHOCLADIUS	0128874
T482	OXYUROSTYLIS SMITHI	0090923
T694	PALAEMONETES PUGIO	0096390
T106	PALAEMONETES SP.	0096383
T2037	PALAEMONETES SP. ZOEAE	0096383
T1619	PALAEMONIDAE	0096213
T2808	PARACAPRELLA TENUIS	0095434
T3278	PARACEREIS CAUDATA	0092290
T3071	PARACHIRONOMUS FREQUENS GRP.	0129579
T3424	PARACHIRONOMUS MONOCHROMUS/TENUICADATUS GRP.	0129581
T696	PARACHIRONOMUS SP.	0129564
T306	PARACLADOPELMA SP.	0129597
T1118	PARAHESIONE LUTEOLA	0065493
T1880	PARALAUTERBORNIELLA SP.	0129616
T1808	PARALEPTOPHLEBIA	0101187
T2205	PARAMETOPELLA CYPRIS	0094927
T1881	PARAMETRIOCNEMUS SP.	0128978
T2546	PARANAIS FRICI	0068865
T2083	PARANAIS LITORALIS	0068863
T1153	PARANAIS SP.	0068862
T421	PARANAITIS SPECIOSA	0065321
T1211	PARAONIS FULGENS	0066697
T3297	PARAPIONOSYLLIS LONGICIRRATA	0065824
T966	PARAPLEUSTES AESTUARIUS	BAY0199
T427	PARAPRIONOSPIO PINNATA	0066937
T1086	PARATENDIPES SP.	0129623
T2617	PARATHEMISTO COMPRESSA	0095158
T1217	PARVILUCINA MULTILINEATA	0080388
T423	PECTINARIA GOULDII	0067709
T3223	PELTODYTES SP. LARVA	0111923
T524	PETRICOLA PHOLADIFORMIS	0081627
T299	PHAENOPSECTRA SP.	0129637

SPEC_CODE	SOURCE_LBL	TSN
T3322	PHORIDAE	0138921
T963	PHORONIS SPP.	0155462
T2868	PHOTIS POLLEX	0094078
T1117	PHYLLODOCE ARENAE	0065366
T1582	PHYLLODOCIDAE	0065228
T1543	PHYLLODOCIDAE	0065228
T225	PHYSA SP.	0076677
T2009	PHYSELLA SP.	0076698
T190	PHYSIDAE	0076676
T3354	PIGUETIELLA MICHIGANENSIS	0068994
T2594	PINNIXA CHAETOPTERANA	0098998
T2809	PINNIXA SP.	0098993
T1174	PISCICOLA	0069304
T1579	PISCICOLIDAE	0069296
T2101	PISIDIDAE	0081388
T266	PISIDIUM SP.	0081400
T1575	PLANARIIDAE	0054502
T1693	PLANORBIDAE	0076591
T970	PLATYHELMINTHES	0053963
T1072	PLEUROCERA SP.	0071549
T1690	PLEUROCERIDAE	0071541
T2203	PLEUSYMTES SP.	0094794
T2410	PODARKE OBSCURA	0065517
T1119	PODARKEOPSIS LEVIFUSCINA	0555698
T3569	POLINICES SPP.	0072911
T1007	POLYCENTROPUS SP.	0117044
T235	POLYCHAETA	0064358
T1732	POLYDORA	0066789
T426	POLYDORA CORNUTA	0204501
T2409	POLYDORA WEBSTERI	0066802
T1584	POLYNOIDAE	0064397
T2122	POLYPEDILUM (TRIPODURA)	0129657
T1483	POLYPEDILUM CONVICTUM	0129671
T3070	POLYPEDILUM FALLAX	0129676
T3462	POLYPEDILUM FLAVUM	BAY0421
T3032	POLYPEDILUM HALTERALE	0129684
T1484	POLYPEDILUM ILLINOENSE GROUP	0129688
T2453	POLYPEDILUM SCALAENUM GROUP	0129708
T3412	POLYPEDILUM SIMULANS/DIGITIFER	BAY0322
T295	POLYPEDILUM SP.	0129657
T2253	POTOMANTHUS	0101510
T2014	POTOMOTHRIX	0068786
T2994	PRIONOSPIO SP.	0066838
T2008	PRISTINA LONGISETA LONGISETA	0068884
T2016	PRISTINA OSBORNI	0068887
T263	PRISTINA SP.	0068876
T3505	PRISTINELLA JENKINAE	0069030
T2070	PRISTINELLA SIMA	0069028
T3188	PRISTINELLA SP.	0069024
T563	PROBEZZIA	0127729
T564	PROCLADIUS SP.	0128277
T2006	PROSTOMA RUBRUM	0193496

SPEC_CODE	SOURCE_LBL	TSN
T3096	PROTODRILUS SP.	0068401
T3500	PSECTROTANYPUS DYARI	0128056
T428	PSEUDEURYTHOE PAUCIBRANCHIATA	0065176
T298	PSEUDOCHIRONOMUS SPP.	0129851
T1221	PSEUDOLEPTOCUMA MINOR	0091040
T2855	PTILANTHURA TENUIS	0092155
T2618	PTILANTHURA TRICARINA	0092156
T568	PYRAMIDELLA SP.	0075947
T3207	PYRAMIDELLIDAE	0075446
T2133	QUISTADRILUS MULTISETOSUS	0068794
T526	RANGIA CUNEATA	0080962
T2124	RHABDOCOELA SP.	BAY0237
T1886	RHEOTANYTARSUS SP.	0129952
T103	RHITHROPANOPEUS HARRISII	0098790
T1073	RHITHROPANOPEUS HARRISII ZOEAE	0098790
T537	RICTAXIS PUNCTOSTRIATUS	0076083
T429	SABELLARIA VULGARIS	0067671
T2036	SACCOGLOSSUS KOWALEVSKII	0158626
T2598	SARSIELLA SP.	0084274
T667	SAYELLA CHESAPEAKEA	0070946
T3571	SCOLELEPIS SPP.	0066942
T1212	SCOLELEPIS TEXANA	0066949
T2599	SCOLOPLOS RUBRA	0066603
T1120	SIGAMBRA TENTACULATA	0065552
T3101	SILIOQUA COSTATA	0081012
T314	SLAVINA APPENDICULATA	0068856
T1150	SMITTIA SP.	0129110
T2134	SPECARIA JOSINAE	0068985
T1121	SPHAEROMA QUADRIDENTATUM	0092339
T573	SPIO FILICORNIS	0066865
T2910	SPIO SETOSA	0066868
T2860	SPIO SP.	0066864
T2911	SPIOCHAETOPTERUS COSTARUM	0067107
T1222	SPIOCHAETOPTERUS COSTARUM	0067107
T1170	SPIONIDAE	0066781
T1215	SPIOPHANES BOMBYX	0066897
T3177	SPIROSPERMA FEROX	0068610
T2571	SQUILLA EMPUSA	0099143
T2623	STEMPELLINA	0129962
T271	STENACRON SP.	0100713
T276	STENELMIS SP.	0114095
T1220	STENOTHOE MINUTA	0094936
T2112	STEPHENSONIANA TRIVANDRANA	0069018
T3414	STICTOCHIRONOMUS CAFFARIUS	BAY0323
T1085	STICTOCHIRONOMUS SP.	0129785
T433	STREBLOSPIO BENEDICTI	0066939
T1270	STYLARIA LACUSTRIS	0068872
T1722	STYLARIA SP.	0068871
T556	STYLOCHUS ELLIPTICUS	0054089
T1586	SYLLIDAE	0065587
T3455	SYNIDOTEA LATICAUDA	0092581
T525	TAGELUS PLEBEIUS	0081272

SPEC_CODE	SOURCE_LBL	TSN
T2019	TANYPODINAE	0127994
T3334	TANYPUS NEOPUNCTIPENNIS	0128329
T1145	TANYPUS SP.	0128324
T3287	TANYPUS STELLATUS	0128336
T2018	TANYTARSINI	0129872
T293	TANYTARSUS SP.	0129978
T3493	TANYTARSUS SPP. G EPLER	0129978
T2805	TELEOSTEI	0161105
T1255	TELLINA AGILIS	0081088
T1699	TELLINIDAE	0081032
T2000	TELMATODRILUS VEJDOVSKYI	0068760
T1603	TEREBELLIDAE	0067899
T1227	THARYX SP.	0067141
T302	THIENEMANNIELLA	0129182
T3508	THIENEMANNIELLA LABAPODEMA	BAY0405
T1958	THIENEMANNIMYIA SP.	0128236
T248	TIPULIDAE	0118840
T2785	TREMATODA	0054556
T230	TRIBELOS SP.	0129820
T576	TRICHOPTERA	0115095
T272	TRICORYTHODES SP.	0101405
T1716	TUBIFEX TUBIFEX	0068623
T2126	TUBIFICOIDES BROWNAE	0068688
T2106	TUBIFICOIDES HETEROCHAETUS	0068595
T2120	TUBIFICOIDES HETEROCHAETUS (IMM)	0068595
T2127	TUBIFICOIDES MAURERI	0068695
T1039	TUBIFICOIDES SP.	0068687
T2427	TUBIFICOIDES WASELLI	0068692
T578	TURBELLARIA	0053964
T330	TURBELLARIA (ACOELA) SP. A	0053964
T3097	TURBELLARIA SP. C	0053964
T3184	TURBELLARIA SP. D	0053964
T3185	TURBELLARIA SP. F	0053964
T3092	TURBELLARIA SP. E	0053964
T1234	TURBONILLA INTERRUPTA	0075687
T2927	TURBONILLA SPP.	0075676
T2964	UNCIOLA SERRATA	0093633
T2948	UNCIOLA SP.	0093629
T2214	UNID. CRAB MEGALOPS	0098276
T765	UNID. CRAB ZOEAE	0098276
T1123	UNID. SCYPHOZOAN POLYPS	0051483
T768	UNID. SHRIMP ZOEAE	0096106
T1233	UNID. SIPUNCULIDA	0181215
T1034	UNID. TUBULANIDAE	0057415
T1705	UNIONIDAE	0079913
T2953	UPOGEBIA AFFINIS	0098209
T3422	VALVATA SINCERA	0070349
T2057	VALVATA SPP.	0070346
T2977	VITRINELLIDAE	0071064
T1625	XANTHIDAE	0098748
T2767	ZAVRELIELLA	0130040

VARIABLES NAMES AND DESCRIPTIONS FOR DATA FILES

Structures for data files on <http://www.chesapeakebay.net>

> BENTHIC SURVEY EVENT DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Text	8	Sampling Date (MM/DD/YYYY)
LATITUDE	Number	8.5	Latitude (Decimal Degrees- NAD83)
LONGITUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
R_DATE	Text	8	Data Version Date (MM/DD/YYYY)
SITETYPE	Text	4	Sampling Site Type
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_TIME	Text	5	Sample Collection Time (HHMM)

> BENTHIC WATER QUALITY SURVEYS

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	2	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Text	8	Sampling Date (MM/DD/YYYY)
SAMPLE_DEPTH	Number	8.1	Sampling Depth
SAMPLE_NUMBER	Number	8.0	Sample Number
REPORTED_PARAMETER	Text	15	Sampling Parameter
REPORTED_VALUE	Number	8.4	Sampling Parameter Value
REPORTED_UNITS	Text	15	Reporting Units of Value
WQ_METHOD	Text	8	Chesapeake Bay Program Parameter Analysis Code
R_DATE	Text	8	Data Version Date (MM/DD/YYYY)

>BENTHIC SEDIMENT SURVEY DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	2	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Text	8	Sampling Date (MM/DD/YYYY)
TOTAL_DEPTH	Number	8.1	Total Station Depth
SAMPLE_NUMBER	Number	8.0	Sample Number
REPORTED_PARAMETER	Text	15	Sampling Parameter
REPORTED_VALUE	Number	8.4	Sampling Parameter Value
REPORTED_UNITS	Text	15	Reporting Units of Value
R_DATE	Text	8	Data Version Date (MM/DD/YYYY)

> BENTHIC SURVEY BIOTA EVENT DATA

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
LATITUDE	Number	8.5	Latitude (Decimal Degrees-NAD83)
LONGITUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
PENETR	Number	8.4	Sampling Gear Penetration Depth (cm)
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)
SAMPLE_NUMBER	Number	8.0	Sample Number
SITE_TYPE	Text	10	Sampling Site Type
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)

>BENTHIC TAXONOMIC SURVEY DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	7	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_NUMBER	Number	8.0	Sample Number
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
CONVFACT	Number	8.2	Conversion Factor (# Individual/Sample to # Individuals/Meter Squared)
NET_MESH	Number	8.2	Screen Mesh Width (Millimeters)
TSN	Text	7	ITIS Taxon Serial Number
LIFE_STAGE	Text	45	Species Life Stage
LATIN_NAME	Text	45	Species Latin Name
REPORTING_VALUE			
	Number	12	Total Count of Given Taxa in Sample
REPORTING_UNITS	Text	15	Reporting Units of Value
NODCCODE	Text	12	National Oceanographic Data Center Species Code
SPEC_CODE	Text	14	Agency Species Code
SER_NUM	Text	12	Sample Serial Number
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)

>BENTHIC BIOMASS SURVEY DATA

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	7	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_NUMBER	Number	8.0	Sample Number
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
CONVFACT	Number	8.2	Conversion Factor (# Individual/Sample to # Individuals/Meter Squared)
NET_MESH	Number	8.2	Screen Mesh Width (Millimeter)
TSN	Text	7	ITIS Taxon Serial Number
LIFESTAGE	Text	45	Organisms Life Stage
LATIN_NAME	Text	45	Species Latin Name
VALUE_TYPE	Text	10	Actual or Estimated Parameter Value
REPORTING_VALUE	Number	8.4	Taxon Biomass
REPORTING_UNITS	Text	15	Sampling Parameter Reporting Units
NODCCODE	Text	12	National Oceanographic Data Center Species Code
SPEC_CODE	Text	14	Agency Species Code
SER_NUM	Text	12	Agency Sample Serial Number
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)

>BENTHIC INDEX OF BIOTIC INTEGRITY DATA

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
LATITUDE	Number	8.5	Latitude (Decimal Degrees-NAD83)
LONGITUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)
SITE_TYPE	Text	10	Sampling Site Type
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)
IBI_PARAMETER	Text	15	IBI Parameter
IBI_VALUE	Number	8.4	Parameter Value
IBI_SCORE	Number	8.0	Value Reporting Units

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

Name	Type	Width	Description
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/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

#VARIABLE NAMES AND DESCRIPTIONS FOR SPECIES KEY

These tables cross references Versar species codes and spellings with current Integrated Taxonomic Information System (ITIS) and National Oceanographic Data Center taxonomic codes and spellings. Web address: <http://www.chesapeakebay.net/>

Name	Type	Width	Description
SPECCODE	Text	14	Data provider Species Code
SOURCE_LBL	Text	45	Source Species Latin Name
LBL	Text	45	ITIS Latin Name
NODC_LBL	Text	45	National Oceanographic Data Center Latin Name
NODCCODE	Text	12	National Oceanographic Data Center Species Code
TSN	Text	7	ITIS Taxon Serial Number
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)

REFERENCE CODES IN DATA FILES AND TAXONOMIC KEY

See The 2000 Guide to Biological and Living Resources Data for full listing.

> DATA_TYPE: Data Type

BE	Benthic
FL	Fluorescence
MI	Microzooplankton
MZ	Mesozooplankton
PD	Primary Production
PH	Phytoplankton
PP	Picoplankton

>A/EAFDW: Actual or Estimated Ash Free Dry Weight

A or ACTUAL - Actual Determination of Ash Free Dry Weight
E or ESTIMATE - Estimated Ash Free Dry Weight

>SOURCE : Data Collection Agency
VERSAR- Versar Incorporated

>COLTYPE: Collection Type
D or DISCRETE - Discrete Sample
C or COMPOSITE- Composite Sample

>BASIN - Sampling Station Tributary or Mainstem Designation

TRIB_COD	BASIN
BAY	CHESAPEAKE BAY
CHS	CHESTER RIVER
CHP	CHOPTANK RIVER
ELZ	ELIZABETH RIVER
JAM	JAMES RIVER
PAT	PATAPSCO RIVER
PAX	PATUXNET RIVER
POT	POTOMAC RIVER
RAP	RAPPAHANOCK RIVER
YRK	YORK RIVER

>CRUISE: Chesapeake Bay Program Cruise Number

The numbers may be merged onto this data set but the data is not Collected in conjunction with the regular Chesapeake Bay Monitoring Water Quality And Plankton cruises See 2012 User's Guide for complete listing of CBP Cruise numbers.

>GMETHOD- Sampling Gear Codes

- 16-Post-Hole Digger (250 square centimeters)
- 20-Wildco Box Core Grab(220 square centimeters)
- 96-Hydrolic Van Veen Grab(1000 square centimeters)
- 97-Young Modified Van Veen Grab (440 square centimeters)
- 98-Petite Ponar Grab (250 square centimeters)

>INS_CODE- Sampling Instrument Codes

HLSII- Hydrolab Surveyor CTD, Model

>TSN: Interagency Taxonomic Identification System, Taxon Serial Numbers Note for current listing of Chesapeake Bay Program Species and their codes . Organisms without current serial numbers have ALL been assigned TSN of BAYXXXX.

>LIFE STAGE

Life stages are any additional descriptors of a species in addition to The scientific name see IN HOUSE SPECIES LIST for details

>LATIN_NAME

See for IN HOUSE SPECIES LIST for details

>NODCCODE: National Oceanographic Data Center Species Code

NOTE: For current listing of Chesapeake Bay species and their codes, see 1998 Chesapeake Bay Basin Species List.

>STATION- Station Names-Please See Station Names and

Positions for details on name designation.

>SKIP- THE SKIP VARIABLE OF THE BENTHIC TAXONOMIC AND ABUNDANCE

DATA RECORD: In counting the number of taxa present in a sample, general taxonomic designations at the generic, familial, and higher taxonomic levels are dropped if there is one valid lower level designation for that group. For example, if both *Leitoscoloplos* sp. And *Leitoscoloplos fragilis* have been identified in one sample, *Leitoscoloplos* sp. is skipped when counting the number of taxa. Skip codes are used to track these general taxonomic designations.

>SITETYPE- Sampling Station Site Type

- F or FIXED - Fixed Sampling Site
- R or RANDOM- Randomly Selected Site within a habitat area

>TSN: Interagency Taxonomic Identification System taxon serial numbers

NOTE: For current listing of Chesapeake Bay species and their codes, see the 2007 Bay Basin Species List for details.

>PARAMETERS-

PARAMETER	DESCRIPTION
CLAY	CLAY CONTENT,PERCENT
DO	DISSOLVED OXYGEN
DO_PSAT	DISSOLVED OXYGEN PERCENT SATURATION
INTSAL	INTERSTITIAL SALINITY
KURTOSIS	KURTOSIS
MEANDIAM	MEAN SEDIMENT DIAMETER
MEDDIAM	MEDIAN SEDIMENT DIAMETER
MOIST	MOISTURE CONTENT
ORP	OXIDATION REDUCTION POTENTIAL
PENETR	GEAR PENETRATION DEPTH
PH	PH
QUARTDEV	QUARTILE DEVIATION
SALINITY	SALINITY
SAND	SAND CONTENT, PERCENT
SILT	SILT CONTENT, PERCENT
SILTCLAY	SILT CLAY CONTENT, PERCENT
SKEWNESS	SKEWNESS
SORTING	SORTING
SPCOND	SPECIFIC CONDUCTIVITY
TC	CARBON CONENT-CHN ANALYZER
TIC	CARBONATE CONTENT
TN	NITROGEN CONTENT-CHN ANALYZER
TOC	TOTAL ORGAINIC CARBON
VOLORG	VOLATILE ORGANIC, PERCENT
WTEMP	WATER TEMPERATURE, CENTEGRAGE

> HUC8: USGS Hydrologic Unit Codes

HUC8	CATALOGING_UNIT_DESCRIPTION
02050306	LOWER SUSQUEHANNA
02060001	UPPER CHESAPEAKE BAY
02060002	CHESTER-SASSAFRAS
02060003	GUNPOWDER-PATAPSCO
02060004	SEVERN
02060005	CHOPTANK
02060006	PATUXENT
02060007	BLACKWATER-WICOMICO
02060008	NANTICOKE
02060009	POCOMOKE
02070010	MIDDLE POTOMAC-ANACOSTIA-OCOCOQUAN
02070011	LOWER POTOMAC

>FIPS: Federal Information Processing Codes

FIPS	NAME
24003	ANNE ARUNDEL
24005	BALTIMORE
24009	CALVERT
24011	CAROLINE
24015	CECIL
24017	CHARLES
24019	DORCHESTER
24025	HARFORD
24029	KENT
24033	PRINCE GEORGES
24035	QUEEN ANNES

FIPS	NAME
24037	SAINT MARYS
24039	SOMERSET
24041	TALBOT
24045	WICOMICO
24510	BALTIMORE CITY
51001	ACCOMACK
51059	FAIRFAX
51099	KING GEORGE
51153	PRINCE WILLIAM
51179	STAFFORD
51193	WESTMORELAND

> CBSEG_2003: Chesapeake Bay Program Monitoring Segment

CBSEG_2003	DESCRIPTION
BACOH	BACK RIVER-OLIGOHALINE REGION
BIGMH	BIG ANNEMESSEX RIVER-MESOHALINE REGION
BOHOH	BOHEMIA RIVER-OLIGOHALINE REGION
BSHOH	BUSH RIVER-OLIGOHALINE REGION
CB1TF	CHESAPEAKE BAY-TIDAL FRESH REGION
CB2OH	CHESAPEAKE BAY-OLIGOHALINE REGION
CB3MH	CHESAPEAKE BAY-MESOHALINE REGION
CB4MH	CHESAPEAKE BAY-MESOHALINE REGION
CB5MH	CHESAPEAKE BAY-MESOHALINE REGION
CHOMH1	CHOPTANK RIVER-MESOHALINE REGION 1
CHOMH2	CHOPTANK RIVER-MESOHALINE REGION 2
CHOOH	CHOPTANK RIVER-OLIGOHALINE REGION
CHOTF	CHOPTANK RIVER-TIDAL FRESH REGION
CHSMH	CHESTER RIVER-MESOHALINE REGION
CHSOH	CHESTER RIVER-OLIGOHALINE REGION
CHSTF	CHESTER RIVER-TIDAL FRESH REGION
EASMH	EASTERN BAY-MESOHALINE REGION
ELKOH	ELK RIVER-OLIGOHALINE REGION
FSBMH	FISHING BAY-MESOHALINE REGION
GUNOH	GUNPOWDER RIVER-OLIGOHALINE REGION
HNGMH	HONGA RIVER-MESOHALINE REGION
LCHMH	LITTLE CHOPTANK RIVER-MESOHALINE REGION
MAGMH	MAGOTHY RIVER-MESOHALINE REGION
MANMH	MANOKIN RIVER-MESOHALINE REGION
MATTF	MATTAWOMAN CREEK-TIDAL FRESH REGION
MIDOH	MIDDLE RIVER-OLIGOHALINE REGION
NANMH	NANTICOKE RIVER-MESOHALINE REGION
NANOH	NANTICOKE RIVER-OLIGOHALINE REGION
NORTF	NORTHEAST RIVER-TIDAL FRESH REGION
PATMH	PATAPSCO RIVER-MESOHALINE REGION
PAXMH	PATUXENT RIVER-MESOHALINE REGION
PAXOH	PATUXENT RIVER-OLIGOHALINE REGION
PAXTF	PATUXENT RIVER-TIDAL FRESH REGION
POCMH	POCOMOKE RIVER-MESOHALINE REGION
POCOH	POCOMOKE RIVER-OLIGOHALINE REGION

CBSEG_2003	DESCRIPTION
POTMH	POTOMAC RIVER-MESOHALINE REGION
POTOH	POTOMAC RIVER-OLIGOHALINE REGION
POTTF	POTOMAC RIVER-TIDAL FRESH REGION
RHDMH	RHODE RIVER-MESOHALINE REGION
SASOH	SASSAFRAS RIVER-OLIGOHALINE REGION
SEVMH	SEVERN RIVER-MESOHALINE REGION
SOUHM	SOUTH RIVER-MESOHALINE REGION
TANMH	TANGIER SOUND-MESOHALINE REGION
WICMH	WICOMICO RIVER-MESOHALINE REGION
WSTMH	WEST RIVER-MESOHALINE REGION

>PROGRAM- Chesapeake Bay Program Monitoring Program Designation

PROGRAM	DESCRIPTION
EPA\NCAS	EPA EMAP NATIONAL COASTAL ASSESSMENT PROGRAM
HISTORIC	PRE-CHESAPEAKE BAY MONITORING PROGRAM
WQMP	CHESAPEAKE BAY MAINSTEM AND TIDAL TRIBUTARY WATER QUALITY MONITORING PROGRAM

> PROJECT - Chesapeake Bay Program Monitoring Project Designation

PROJECT	DESCRIPTION
MAIN/TRIB	LONG-TERM BENTHIC MONITORING PROGRAM
VA/CBAY	VIRGINIA COASTAL BAY MONITORING
VA/HIST	VIRGINIA HISTORIC DATA RECOVERY

>PARAMETER and UNIT: Measured Parameter and reporting units.

PARAMETER	UNITS
AFDW_TAX	GRAMS/SAMPLE
CLAY	PERCENT
COUNT	NUMBER/SAMPLE
DO	MG/L
KURTOSIS	FOLK METHOD
MEANDIAM	PHI
MEDDIAM	PHI
SALINITY	PPT
SAND	PERCENT
SILT	PERCENT
SILTCLAY	PERCENT
SKEWNESS	FOLK METHOD
SORT	FOLK METHOD
VOLORG	PERCENT
WTEMP	DEG C

>IBI_PARAMETER	DESCRIPTION
GRAND_SCORE	FIXED STATION REPLICATE AVERAGED TOTAL IBI SCORE
PCT_BIO_DP05	PERCENT TOTAL BIOMASS FOUND GREATER THAN 5 CM BELOW SEDIMENT WATER INTERFACE
PCT_CARN_OMN	PERCENT CARNIVORES AND OMNIVORES
PCT_DEPO	PERCENT DEEP DEPOSIT FEEDERS
PCT_PI_ABUND	PERCENT POLLUTION INDICATIVE SPECIES ABUNDANCE
PCT_PI_BIO	PERCENT POLLUTION INDICATIVE SPECIES BIOMASS
PCT_PI_F_ABUND	PERCENT POLLUTION INDICATIVE SPECIES ABUNDANCE-FRESH WATER
PCT_PI_F_BIO	PERCENT POLLUTION INDICATIVE SPECIES BIOMASS-FRESH WATER
PCT_PI_O_ABUND	PERCENT POLLUTION INDICATIVE SPECIES ABUNDANCE-OLIGOHALINE WATER
PCT_PI_O_BIO	PERCENT POLLUTION INDICATIVE SPECIES BIOMASS- OLIGOHALINE WATER

PCT_PS_ABUND	PERCENT POLLUTION SENSITIVE SPECIES ABUNDANCE
PCT_PS_BIO	PERCENT POLLUTION SENSITIVE SPECIES BIOMASS
PCT_PS_O_ABUND	PERCENT POLLUTION SENSITIVE SPECIES ABUNDANCE- OLIGOHALINE WATER
PCT_PS_O_BIO	PERCENT POLLUTION SENSITIVE SPECIES BIOMASS- OLIGOHALINE WATER
PCT_TANYPODINI	PERCENT TANYPODINAE TO CHIRONOMIDAE
SW	SHANNON-WEINER SPECIES DIVERSITY INDEX
TOLARANCE	POLLUTION TOLARANCE INDEX
TOT_ABUND	TOTAL SPECIES ABUNDANCE (NUMBER PER METER SQUARED)
TOT_BIOMASS	TOTAL SPECIES BIOMASS IN (GRAMS PER METER SQUARED)
TOT_TXA_DP05	SPECIES ABUNDANCE FOUND GREATER THAN 5 CM BELOW SEDIMENT WATER INTERFACE
TOTAL_SCORE	TOTAL BENTHIC IBI SCORE FOR SINGLE SAMPLE

NUMERIC WARNING AND ERROR BOUNDS

Variable	Valid Ranges
AFDW	0- 999.9999
TIC	0 - 100 PERCENT
TC	0- 100 PERCENT
TOC	0 - 100 PERCENT
COUNT	0-99999999
SP_CONDUCT	0 - 50000 uVHOS
DO	0- 15.0 PPT
DO_PSAT	0- 200 PERCENT
KURT	0-5 FOLK UNITS
MEDDIAM	0-99999999 FOLK UNITS
MOIST	0-100 PERCENT
TN	0-100, PERCENT
ORP	0- 999.99 MILLIVOLT
PENETR	0-30.0
PH	0- 14
SALINITY	0 - 32.0 PPT
SAMPLE_DEPTH	1-100 METERS
SAMPLE_NUMBER	1-25
SAMPLE_TIME	0000-2400 missing time denoted as 00:00
SAND	0-100 PERCENT
SILT_G	0-1000 GRAMS
SILTCLAY	0-100 PERCENT
SKEW	-1.0 - 1.0 FOLK UNITS
SORT	0- 8 FOLK UNITS
TOTAL_DEPTH	0.1-100 METERS
WTEMP	0- 35 DEGREES CELSIUS

#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.

10/31/95- Please be aware that Versar has changed there sampling protocol several times over the course of this program. Please read the methods section carefully to note the changes in station locations. Note the multiple sampling gear type used in field over time.

10/31/96- BIOMASS DATA-Biomass determination was done by actual ash free dry weigh determination from July 1984-June 1985 and July 1993-present, length regression estimation from July1985-June 1991, with brief periods where both methods were used in 1990 and 1991

10/31/95- CRUISE NUMBERS - BAY004-BAY211 were supplied by the Chesapeake Bay Program office. See the Guide to Living Resources Data Sets for complete listing of Cruise periods.

10/31/95- LBL all Latin Names and spelling for names have been corrected to the National Oceanographic Data Center accepted spelling.

10/31/95- INS_CODE For an extensive list of Chesapeake Bay Program assigned codes please see The Guide to Using Living Resources Data Sets.

10/31/95- SEDIMENT SURVEYS- The following parameters are available for all cruises: MOIST,SAND, SILTCLAY. Only from July 1984-June 1989 the following additional parameters were collected:CARBNATE,CARCHN,INTSAL,MEDDIAM,QUARTDEV,SKEW. From July 1995 to present the following additional parameters were collected: CARCHN,NITCHN. The parameter INTSAL was collected from July 1984-June 1995.

10/31/95- NODCCODES all Species have been given their assigned National Oceanographic Data Center Version 8.0 Species Codes where possible. This Hierarchy Code provides taxonomic information about a given species. If A code number is not available, a partial code based on available taxonomic Information ending with alphabetic characters has been provided.

10/31/95- TSN all Species have been given their assigned Interagency Taxonomic Identification System taxon serial number. The taxon serial number is a permanent number assigned to a species and does not change with changes in taxonomic classification. Species without assigned coded have been assigned temporary BAYXXXX serial numbers. Permanent ITIS serial numbers have been applied for.

10/31/95- WATER QUALITY - The following parameters are available for all cruises: CONDUCT, DISOXY, PH, SALINITY, WTEMP. The parameter ORP was added in July 1989 and DO_SAT was added in July 1995.

Calendar Year 1995- Only Summer samples were collected. No data were collected for Spring of 1995.

01/03/96- No TIC analysis was conducted in 1996 and previous years. For these years only TN and TC data are available.

08/05/97- Some Dissolved Oxygen Values were found to be suspect in data from July 1984-Dec 1996 submitted in June 1997- therefore all of the currently available water quality data is provisional until QA/QC issues are addressed.

01/31/98- Note that the Maryland benthic data is known to contains several potential problems which must be addressed before analysis. These problems include:

1) Fixed sampling stations do not always have the same name though out the entire data set. During the time period from 1 July 1990 to 31 August 1994 long term fixed stations were given alternate station names based on their sampling strata. Stations were named as follows:

ALTERNATE STATION NAME	FIXED STATION NAME
101-0004	001
102-0004	003

103-0004	004
104-0004	015
105-0004	017
106-0004	021
107-0004	024
108-0004	026
109-0004	029
110-0004	053
111-0004	054
112-0004	051
113-0004	052
114-0004	043
115-0004	044
116-0004	040
117-0004	036
119-0004	063
120-0004	064
121-0004	066
122-0004	067
123-0004	068
124-0004	023
127-0004	022
129-0004	071
130-0004	074
131-0004	079

2) Samples were taken at many sites. For every site at which samples were collected water quality and sediment analysis data is available. However not all samples collected were analyzed for biologic content. There for please note the difference in the number of records between the general event records and the biological event records.

3) Samples analyzed for biological content and found to contain no organisms are recorded in the data base with an empty count record and a TSN of BAY0229.

4) The benthic biomass data has some additional caveats. A) Due to shortages in project funding not all samples collected and analyzed for taxonomic content had biomass determination performed. These samples will appear as missing samples. B) Note that during the period in which the length-biomass determination method was used there will be samples in which biomass is reported as an empty sample But will have taxonomic content. This is due to biomass only being estimated using the 10 most abundant species in the bay. C) The biomass data collected from January 1984- July 1985 is known to have replicate number discrepancies with the taxonomic data.

Calendar Year 1998- The following following stations taxonomic and biomass data are missing:

Sample replicate number 1 for station 023, sample replicate number 1 for station 068 and sample replicate numbers 2 and 3 for station 079. Samples are missing due to lose in the lab.

Calendar Year 1999- The following stations have missing taxonomic and biomass data:

Sample replicate Number 3 for Station 026 and Sample replicate Number 01 for Station 001

Calendar Year 1999- Sediment nitrogen and carbon data for station 026 is missing.

Calendar Year 1999- Sand, siltclay, and moisture data are for station 6617 is missing.

SUMMER 2000- All Latitude and Longitude positions converted to NAD83 coordinates.

Calendar Year 2000- Water quality data for station 068 is missing due to Hydrolab failure in the field.

06/01/2001- 4 new taxa added.

Calendar Year 2001-Sample replicate number 3 for station 079 is missing due to contamination in the lab.

06/01/2002- 11 new taxa added.

06/01/2003- 6 new taxa added.

Calendar Year 2004- Water quality data for station UPB-11628 is missing due to Hydrolab failure in the field.

06/01/2004- 4 new taxa added.

06/01/2005- 2 new taxa added.

06/01/2006- 2 new taxa added. EPA National Coastal Assessment Monitoring begins in conjunction with on going monitoring program. This includes sampling sites in the Virginia coastal bay. See station information for details.

Calendar Year 2007- Moisture missing for some stations. Percent DO is missing for some stations due to Hydrolab failure in the field.

06/01/2007- 2 new taxa added. EPA National Coastal Assessment Monitoring continues. See station information for details.

05/22/2008- 3 new taxa added.

Calendar Year 2008- The following stations have missing taxonomic and biomass data: sample replicate number 3 for station 079.

Calendar Year 2009- Only Summer samples were collected. No data were collected for Spring of 2009.

Calendar Year 2010- Fixed Station 022 was moved during the 2010 due to construction on the old site.

OLD-022	Fort McHenry	-76.58749	39.25481	4	24510	PATMH	02060003
NEW-022	Fort McHenry	-76.59512	39.258082	4	24510	PATMH	02060003

Calendar Year 2010- Only Summer samples were collected. No data were collected for Spring of 2010. Conductivity and Percent Dissolved Oxygen is missing in stations: MET-17422, MMS-17505, MMS-17506, MMS-17510, and MMS-17514 due to Hydrolab failure in the field.

Calendar Year 2011- In 2011, salinities were very low after Hurricane Irene (27 August 2011) and Tropical Storm Lee (7 September 2011). Because of very low salinities at some sampling sites but similar species composition at these sites relative to previous years, a salinity class correction was necessary for making the BIBI more comparable to previous years. Box plots of bottom salinity for all THE RANDOM sites, 1995-2010, were constructed. Five years for which the salinity was clearly too high or too low (1995, 1996, 1999, 2002, and 2004) were removed. Using GIS, the bottom salinity values of the remaining years were mapped and the 2011 sites were superimposed on the map. The salinity class of the 2011 sites was then re-assigned to reflect the predominant salinity class of the average year. Some of the 2011 sites did not need re-assignment because their salinity, although low (e.g., 6) was still within the salinity class of the average year (e.g., 5-12). Affected sites included many of the sites in the Upper Bay and Upper Maryland Western Tributaries strata; some of the sites in the Maryland Eastern Tributaries stratum and the Maryland Main Stem; and some of the sites in the Patuxent River. Sites sampled prior to the storms were not evaluated nor were their salinity class re-assigned.

#KEY WORDS (EXCLUDING VARIABLE NAMES)

Benthic Taxon Counts
Benthic Organism densities
Benthic Biomass
Benthic Organism Biomass
Benthic sediments
Sediment characterization
Water Quality Measurement
Hydrographic Profiles
Benthic Sampling Event
Benthic Monitoring Surveys

**THIS IS THE END OF THE MARYLAND CHESAPEAKE BAY PROGRAM
BENTHIC DATA DICTIONARY**
