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The 2000 User's Guide to Chesapeake Bay Program Biological and Living Resources Monitoring Data

Chesapeake Bay Program
January 2000

Chesapeake Bay Program

The Chesapeake Bay Program is a unique regional partnership leading and directing the restoration of the Chesapeake Bay since 1983. The Chesapeake Bay Program partners include the states of Maryland, Pennsylvania and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the U.S. Environmental Protection Agency (EPA), which represents the federal government; and participating citizen advisory groups.

In the 1987 Chesapeake Bay Agreement, Chesapeake Bay Program partners set a goal to reduce the nutrients nitrogen and phosphorus entering the Bay by 40 percent by the year 2000. In the 1992 Amendment to the Chesapeake Bay Agreement, partners agreed to maintain the 40 percent goal beyond the year 2000 and to attack nutrients at their source--upstream in the tributaries. The Chesapeake Executive Council, made up of the governors of Maryland, Pennsylvania and Virginia; the mayor of Washington, D.C.; the EPA administrator; and the chair of the Chesapeake Bay Commission, guided the restoration effort in 1993 with five directives addressing key areas of the restoration, including the tributaries, toxics, underwater bay grasses, fish passages and agricultural nonpoint source pollution. In 1994 partners outlined initiatives for habitat restoration of aquatic, riparian and upland environments; nutrient reduction in the Bay's tributaries; and toxics reductions, with an emphasis on pollution prevention.

The 1995 Local Government Partnership Initiative engages the watershed's 1,650 local governments in the Bay restoration effort. The Chesapeake Executive Council followed this in 1996 by adopting the Local Government Participation Action Plan and the Priorities for Action for Land, Growth and Stewardship in the Chesapeake Bay Region, which address land use management, growth and development, stream corridor protection and infrastructure improvements. A 1996 riparian forest buffers initiative furthers the Bay Program's commitment to improving water quality and enhancing habitat with the goal of increasing riparian buffers on 2,010 miles of stream and shoreline in the watershed by the year 2010.

Since its inception, the Chesapeake Bay Programs highest priority has been the restoration of the Bays living resources its finfish, shellfish, bay grasses, and other aquatic life and wildlife. Improvements include fisheries and habitat restoration, recovery of bay grasses, nutrient reductions and significant advances in estuarine science.

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January 2000

Prepared for

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by

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This document is available online at http://www.chesapeakebay.net

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SUMMARY

This document describes how to access biological monitoring data from the Chesapeake Bay Program's Chesapeake Information Management System (CIMS). It provides information on:

- Currently available Chesapeake Bay Program (CBP) biological and living resources monitoring and geographic information system (GIS) databases;
- Procedures for obtaining biological and living resources monitoring data online from the CBP-CIMS Internet web page, online from CIMS partner web pages, or directly from the biological monitoring data manager and/or living resources GIS specialists;
- CIMS standards for publishing data to the public, including field names, attributes, and CIMS data dictionary tables;
- Guidance for organizations submitting Biological and Living Resource data directly to the CBPO data center;
- Guidance for data usage and calculation of benthic ecosystem indicator metrics.

Phytoplankton, Zooplankton and Benthos

All Chesapeake Bay Program phytoplankton, zooplankton (including microzooplankton, mesozooplankton and gelatinous zooplankton) and benthos monitoring data and data documentation for Maryland and Virginia from 1984 to 1998 can be obtained directly from the World Wide Web home page (http://www.chesapeakebay.net or https://archive.chesapeakebay.net/pub/) or from the Biological Monitoring Data Manager. All data are published in standardized formats and are compatible with the CBP water quality and other databases. They are available as a) comma or pipe delimited ASCII flat files, b) as Microsoft Access databases, and c) conversion scripts to create SAS data sets from flat files.

Submerged Aquatic Vegetation (SAV)

Data and documentation for the annual Chesapeake Bay Submerged Aquatic Vegetation Aerial Survey are generated and managed by the Virginia Institute of Marine Sciences (VIMS). Data is maintained as GIS data layers. Survey data layers and related reports are available from the VIMS Internet home page (http://www.vims.edu/bio/sav/index.html). Pointers on the CBP-CIMS home page direct users to the VIMS SAV home page for data. These data are also accessible through an Internet based mapping tool, "Bay Atlas" on the CBP-CIMS home page.

Finfish and Blue Crabs

Survey data and summary statistics for the Virginia Seine, Trawl and Push Nets surveys are presently available through the VIMS Fisheries Internet Home page (http://www.fisheries.vims.edu). Links on the CBP-CIMS home page direct users to the VIMS Fisheries home page for these data.

The Biological Monitoring Data Manager is currently working with the Fisheries Division of the Maryland Department of Natural Resources (MDDNR) to establish distributed databases and make available the Maryland juvenile seine surveys, summer trawl and Baywide winter dredge surveys through the CIMS network.

Geographic Information System Resources

The Chesapeake Bay Program Data Center has made available many of its GIS data layers. The available data layers cover a wide range of topic areas including habitats, fish passage, Bay bathymetry and political boundaries. Data are available on-line as GIS data layers or via the Internet mapping tool Bay Atlas on the CBP-CIMS home page (http://www.chesapeakebay.net).

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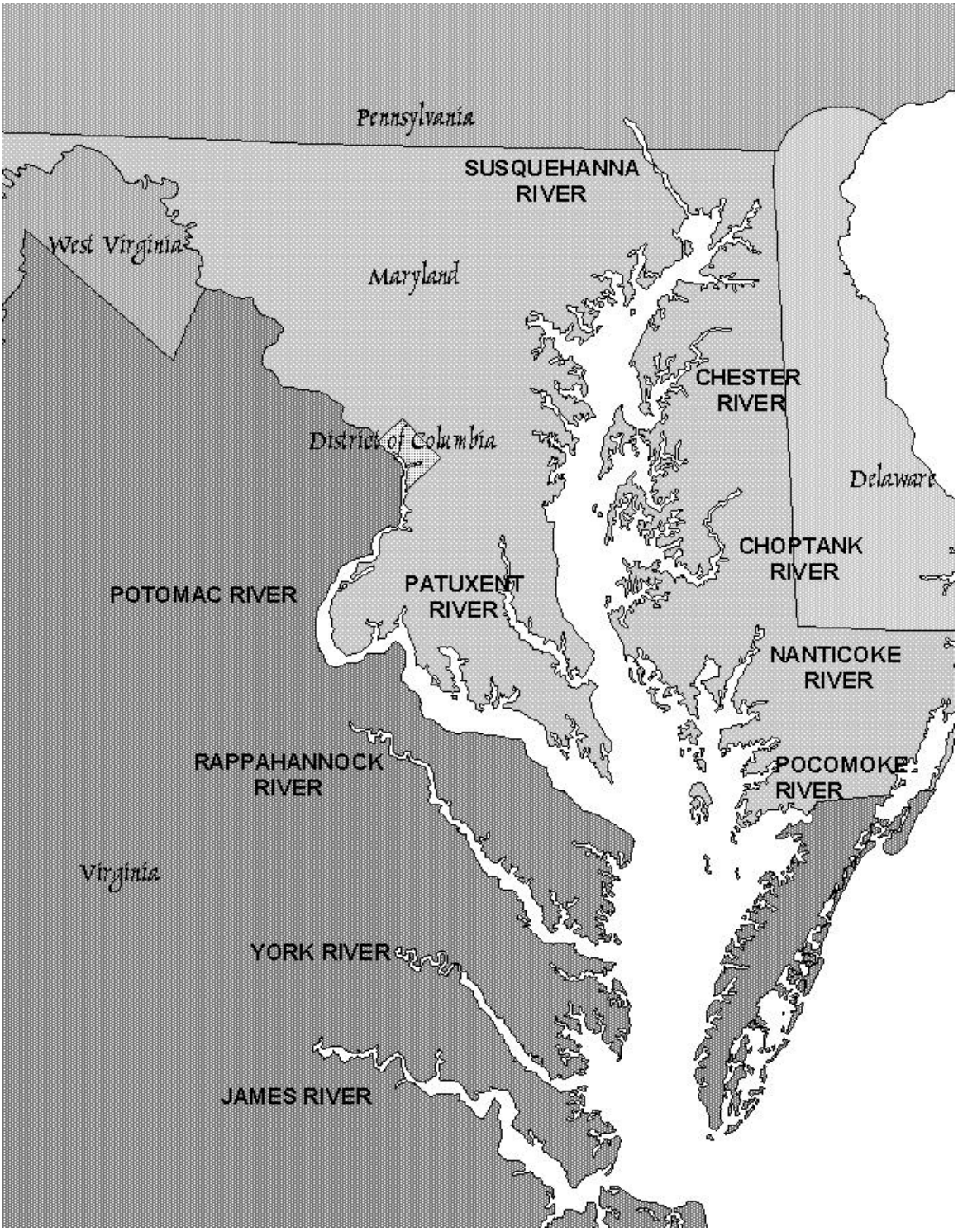

THE 2000 USER'S GUIDE TO CHESAPEAKE BAY PROGRAM BIOLOGICAL AND LIVING RESOURCES MONITORING DATA

INTRODUCTION{tc "INTRODUCTI O N"}

The *2000 User's Guide* is intended to help data users to access and use biological and living resources monitoring data collected in the Chesapeake Bay and its tidal tributaries. This guide describes many of the biological and living resources databases currently available through the Chesapeake Information Management System in standardized structures and formats (CIMS databases). It describes where the data and data products reside and how to obtain them. For the first time, this guide also includes guidance for calculating standard ecosystem indicators and summary statistics derived from the monitoring data.

Chesapeake Information Management System

In 1996 the Chesapeake Executive Council adopted the *Strategy for Increasing Basin-wide Public Access to Chesapeake Bay Information*. This strategy calls for partners in the Chesapeake Bay Program to develop the Chesapeake Information Management System (CIMS). CIMS will electronically link a variety of information about the Bay and rivers and make this information available electronically through the Internet to anyone, from students, to scientists to citizens. The information targeted for distribution through CIMS includes technical and public information, educational material, environmental indicators, policy documents and scientific data. (See Figure 1.)

As a result of the CIMS initiative the various federal, state, academic and non-governmental organizations are working to establish a system of distributed databases. In the ideal system, a CIMS database would be created, managed, reside with, and be made directly available from the data originator's institution on an Internet server. All the data would eventually be retrievable from a single web site. This system has several advantages over a single data repository. Primarily, the people with the most expertise and knowledge about the data–the data originators–will manage the data. Additional advantages include reduced costs due to elimination of intermediate data handling at a central repository, and decreased the time between collection and release of the data.

Chesapeake Bay Program Data Center

The EPA CBP presently maintains a Data Center at its main office in Annapolis, Maryland. The Data Center provides data management, GIS and technical support to program participants to accomplish the goals agreed on by the Chesapeake Executive Council. The Data Center manages computer hardware and software, provides user support and training for these computer resources, acquires and stores data sets and provides analytical support for CBP activities. The CBP Data Center is intended to be one of many geographically distributed data centers in the Chesapeake Bay Watershed as the CIMS network evolves. Recipients of Data Center services are the CBP subcommittees, CBP resource managers and the watershed's scientific community and stakeholders.

The primary information and data analysis system for the Annapolis Data Center are a network of web, database and GIS servers, running on the Microsoft NT platform. Other high-level computing needs are met with a variety of UNIX workstations. Routine staff computing

needs are met with the multiple-networked IBM compatible workstations. The DEC Alpha 3800 Computer (CHESIE), which was the heart of the CBPO information processing system for many years, was retired in September of 1999.

The Information Pyramid {tc "Types of Data" \l 2}

During the development of the current CBP data management philosophy, it was recognized that information used by the Bay Program is not exclusively monitoring data. Five basic kinds of information were identified as being collected, used or generated by the CBP participants. These types of data were identified and described in detail in the 1996 Chesapeake Bay Program document *Chesapeake Bay Program Information Management Requirements and Recommendations* (EPA Contract Number 01-08833-07-3872-005). The data types can be described as follows:

- Technical Data – Field sampling and laboratory results
  - Raw Data – Original field sampling and laboratory results
  - Primary Data – Information submitted and exchanged as is by data providers
  - Chesapeake Bay Program Data – Information reviewed (e.g. QA/QC) and processed according to CBP standards and specifications
- Maps and Analyzed Data – Summary results from data analysis including ecosystem indicators, graphics and maps.
- Status and Trends – Highly summarized data designed to tell a story about the health of the Bay.
- Publication – Technical reports, technical publications and summary reports based on analyzed data.
- General Information – News accounts, press releases, fact sheets and information summaries based on results from data analysis.

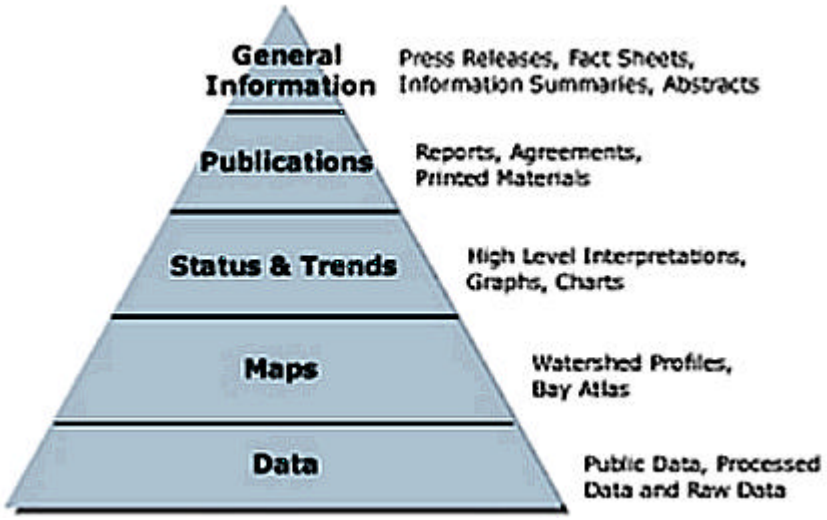

Figure 1. The Chesapeake Information Management System (CIMS) Data Information Pyramid

The Living Resources Biological Monitoring Data Management Program

The Biological Monitoring Data Management Program (BMDMP) has traditionally focused on the lower levels of the information pyramid, the Technical Data and the Analyzed Data. Data at these levels consists of:

- Raw data: Typically the original field and laboratory results of monitoring programs. Data are collected and managed offsite by the data originators and not available from the CBP data center.

- Primary data: Delivered to the CBP Data Center by the data originators. Many data sets are currently available from the Data Center "as is" with their existing documentation. A long-term goal of the CBP Data Center is to work with the data originators to produce primary data sets that meet or come close to CIMS standards and specifications, and to de-emphasize use of primary data in favor of "CIMS data."

- CBP Data: CBP monitoring databases or CIMS compliant databases which are available through the CIMS partners. All CIMS-compliant databases follow common data dictionaries and data reporting standards. Biological and living resources point data become CIMS data after they are placed in uniform, relational databases. Prior to loading data into the databases, data are rigorously checked for duplicate fields, outliers, erroneous data and other errors, and problems in the data are resolved with the data providers. Biological and living resources point data in CIMS database structures are currently stored in relational databases and as comma or pipe delimited, ASCII flat files on CBP Data Center Servers and the CBP-CIMS Internet home page.

- Ecosystem Indicator data: Databases of technical indicators derived from monitoring data are now becoming available. The information is calculated from water quality, biological and living resources CBP databases using accepted algorithms and/or GIS methods. These forms of the data are expected to be most useful to CBP participants and resource managers.

The BMDMP has had a major influence on the establishment of CIMS and continues to be a major contributor to the CIMS effort. The BMDMP has helped establish CIMS standards for data dictionaries, data documentation and uniform relational database designs. This document is part of the CIMS data management guidance. The BMDMP has helped to improve the ability of data generators to produce quality data and establish a number of data generators as distributed CIMS data sites. In the future the BMDMP will be placing an increased emphasis on development of more data analysis tools, creating indicators and document level information.

MONITORING DATA CURRENTLY AVAILABLE THROUGH CIMS

Chesapeake Bay Program and Historical Monitoring Point Data

These data are collected as part of the CBP monitoring program are described briefly below. Point data are data collected at a single point that can be referred to by a single latitude and longitude. All of the 1984-present phytoplankton, zooplankton and benthos monitoring data for the Maryland and Virginia CBP monitoring programs are currently available from the CBP-CIMS Internet home page. Plankton and benthos data are submitted by generators in standardized table structure suitable for loading into the relational databases. The Biological Monitoring Data Manager rigorously QA/QC's the data, loads them into the CIMS relational database structure, and updates the data documentation provided. The data are published through an on-line searchable database or as comma or pipe delimited, ASCII flat files in single calendar year file. Scripts to convert ASCII files into SAS files, data in alternate formats and/or data on media (disk, tape or CD) are by request.

All CBP funded plankton monitoring data (phytoplankton, zooplankton and fluorescence) are routinely updated in six-month increments. Data collected between January and June of the current calendar year are added to the databases in December of the same year. Data collected between July and December are added to the database by May of the following year. CBP benthic monitoring data are updated annually. The previous year's data are available by July of the following year. Selected historical data sets are also being included in the online databases. Historic data are being provided to the CBP Data Center on an ongoing basis; please contact the Biological Data Manager (See Appendix D) for details and data set availability. The URL of the CBP-CIMS world wide web pages is at http://www.chesapeakebay.net/. FTP data access is also available at https://archive.chesapeakebay.net./Pub/. File structures (i.e. field names, definitions and attributes) for the currently available data on the FTP Site provided in Appendix A. Field names and attributes for data from the on-line databases are provided in Appendix B. A complete list of CIMS-compliant field names for biological and living resources data sets, and their definitions and units, are also provided in Appendix B. An explanation of field values and definitions of the parameter codes used in the CIMS databases are contained in Appendix C. A list of CBPO Data Center contacts are provided in Appendix D. A complete list of general CIMS data reporting standards and living resource specific data reporting formats for CBP monitoring data submitters are included in Appendix E.

Phytoplankton

Maryland Phytoplankton Taxonomic Survey. Data have been collected at fixed sampling stations in the upper Chesapeake Bay, tidal tributaries in Maryland and the Potomac River since July of 1984. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. The surveys examine phytoplankton community species composition and abundance. Data were collected by staff from the Academy of Natural Sciences Benedict Estuarine Research Center (ANSBERC) for the Maryland Department of the Environment (MDE)/Maryland Department of Natural Resources (MDDNR).

Virginia Phytoplankton Taxonomic Survey. Data were collected at fixed sampling stations in the Lower Chesapeake Bay mainstem since January 1985, in Virginia tidal tributaries since July 1986 and in the Elizabeth River since January 1989. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. The surveys examine phytoplankton community species composition and abundance. The Virginia survey also includes conversion factors for biomass estimation. Data were collected by staff from Old Dominion University (ODU) for the Virginia Department of Environmental Quality (VADEQ).

Picoplankton

Virginia Picoplankton Abundance Survey. Data were collected at fixed sampling stations in the Lower Chesapeake Bay mainstem, Virginia tidal tributaries and the Elizabeth River since January 1989. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. The surveys provide epifluorescence counts of picoplankton abundance. Data were collected by staff from ODU for VADEQ.

Primary Productivity

Maryland Carbon-14 Primary Production Survey. Data have been collected at fixed sampling stations in the upper Chesapeake Bay, tidal tributaries in Maryland and the Potomac River since July 1984. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. The surveys consisted of precision measurements of photosynthetic (primary) production. Data were collected by staff from ANSBERC for MDE/MDDNR.

Virginia Carbon-14 Primary Production Survey. Data were collected at fixed sampling stations in the Chesapeake Bay mainstem since January 1989, in Virginia tidal tributaries since July 1996 and in the Elizabeth River since January 1989. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. The surveys consist of precision measurements of photosynthetic (primary) production. Data prior to 1995 lacks concurrent measurement of chlorophyll a for determination of assimilation ratio (production efficiency). Data were collected by staff from ODU for VADEQ.

Fluorescence

Maryland Vertical Fluorescence Survey. Surface-to-bottom *in situ* fluorescence measurements have been made at fixed sampling stations in the upper Chesapeake Bay, tidal tributaries in Maryland and in the Potomac River since July 1984. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. Survey results consist of *in situ* chlorophyll estimates. Data were collected by staff of ANSBERC for MDE/MDDNR.

Virginia Vertical Fluorescence Survey. Surface-to-bottom *in situ* fluorescence measurements were conducted at fixed sampling stations in the lower Chesapeake Bay since 1992. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. Survey results consist of *in situ* chlorophyll estimates. Data for the mid-section of the bay prior to January 1995 were collected by the Virginia Institute of Marine Sciences(VIMS). Fluorescence surveys for the southern mainstem performed by ODU from 1992-1995. After January 1996, ODU performed all Virginia fluorescence surveys. All surveys were collected on behalf of VADEQ.

Maryland Horizontal Fluorescence Survey. *In situ* fluorescence measurements were taken along surface transects between monitoring stations in the upper Chesapeake Bay and tidal tributaries in Maryland since 1984. A special summertime (April-September) Potomac River Survey was added in addition to the routine Potomac monitoring in 1990. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. Survey results consist of *in situ* chlorophyll estimates. Data were collected by staff from ANSBERC for MDE/MDDNR.

Virginia Horizontal Fluorescence Survey. *In situ* fluorescence measurements were taken along surface transects between monitoring stations in the lower Chesapeake Bay since 1991. Sampling was coordinated with the CBP water quality monitoring survey. The data (through the

last six calendar months) are available on the CBP-CIMS home page and FTP site. Survey results consist of *in situ* chlorophyll estimates. Data for mid-section of the bay prior to January 1995 were collected by the VIMS. Fluorescence surveys for the southern mainstem performed by ODU from 1991- 1995. After January 1996, ODU performed all Virginia fluorescence surveys. All surveys were collected on behalf of VADEQ.

Microzooplankton

Maryland Microzooplankton Taxonomic Survey. Data have been collected at fixed sampling stations in the upper Chesapeake Bay, tidal tributaries in Maryland and in the Potomac River since July 1984. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. Survey data consist of measurements of microzooplankton between 202 and 44 micron in size enumerated for species composition and abundance. Data were collected by staff of ANSBERC for MDE/MDDNR.

Virginia Microzooplankton Taxonomic Survey. Data were collected at fixed sampling stations in the lower Chesapeake Bay and the Virginia tidal tributaries, including the Elizabeth River since July 1993. Sampling was coordinated with the CBP water quality survey. All microzooplankton less than 202 microns in size whole water samples were collected and enumerated to major taxonomic group. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. Survey data consist of measurements of species composition and abundance Data were collected by the staff from ODU for VADEQ.

Mesozooplankton and Gelatinous Zooplankton

Maryland Zooplankton Taxonomic Survey. Data have been collected at fixed sampling stations in the upper Chesapeake Bay, tributaries in Maryland and in the Potomac River since July 1984. Sampling was coordinated with the CBP water quality survey. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. Measurements made as part of this survey include identifications of mesozooplankton species (>202 microns) to the lowest practical taxonomic level, measurements of mesozooplankton biomass, and measurements of gelatinous zooplankton biovolumes. Data were collected by staff from Versar Incorporated, for MDE/MDDNR.

Virginia Zooplankton Taxonomic Survey. Data were collected at fixed sampling stations in the lower mainstem since July 1985, at tributary stations since July 1986 and in the Elizabeth River since January 1989. Sampling was coordinated with the CBP water quality survey. Measurements made as part of this survey include taxonomic identifications of mesozooplankton species (>202 microns) to the lowest practical taxonomic level. Biomass determinations were performed sporadically from 1985-1997 and discontinued in 1998. Biomass data for Virginia are available by request from the Living Resources Data manager. Measurements of gelatinous zooplankton counts and biovolumes began in 1996. The data (through the last six calendar months) are available on the CBP-CIMS home page and FTP site. Data were collected by staff from ODU for VADEQ.

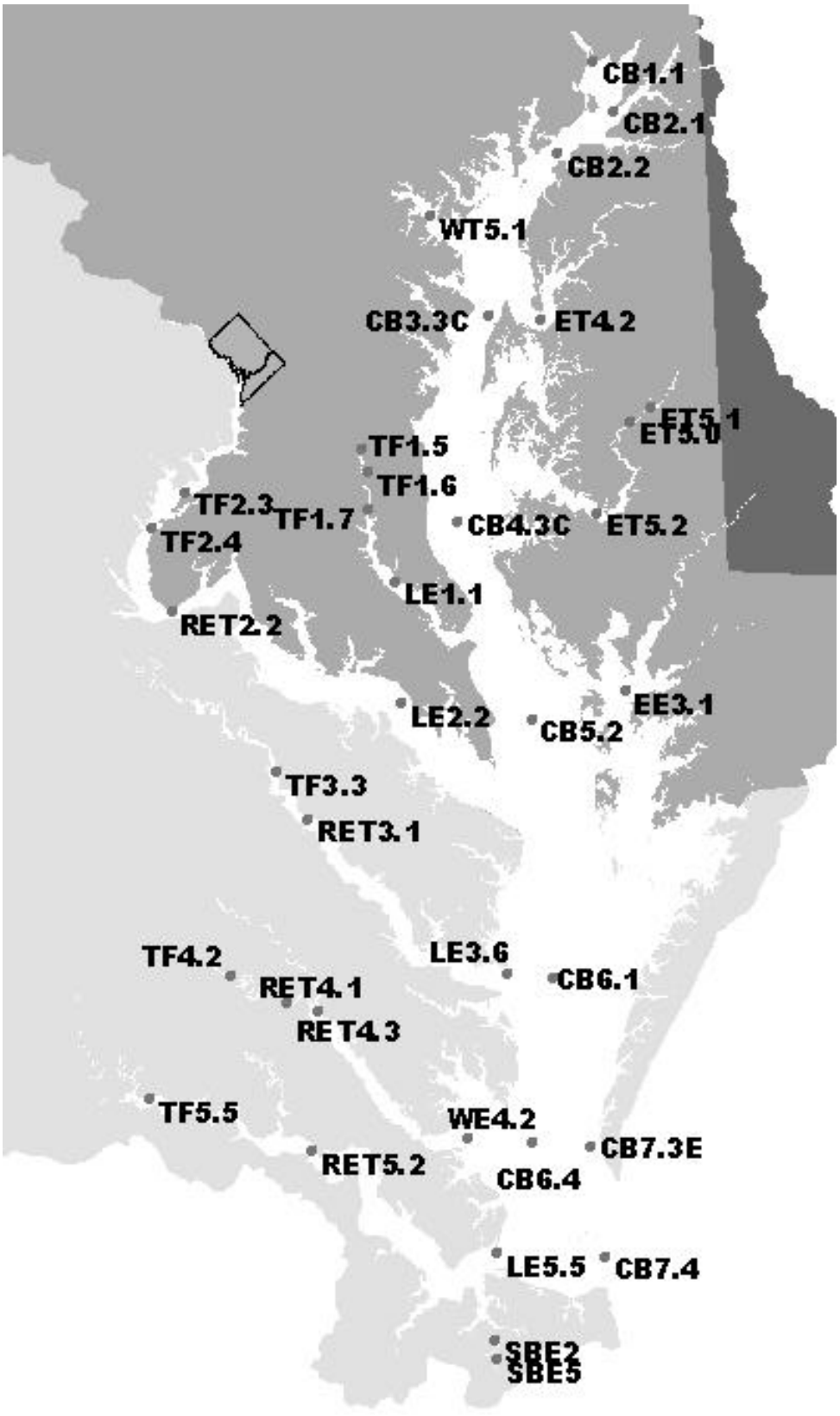

Figure 2. A Map of Chesapeake Bay Program Plankton Monitoring Stations

Benthos

Maryland Benthic Count, Biomass, and Sediment and Bottom Water Analyses Survey. Data have been collected at fixed and random sampling stations in the upper Chesapeake Bay, tributaries in Maryland and in the Potomac River since July 1984. Sampling was not coordinated with the CBP water quality survey. The data (through the last calendar year) are available on the CBP-CIMS home page and FTP site. The data include detailed taxonomic identifications and counts of species, determination of sample biomass, sediment analysis and hydrographic profiles. The protocol for selection of sampling stations, collection gear and methods of biomass analysis has changed over the history of the monitoring program. Please see the Data Documentation for details. Data were collected by staff from Versar Incorporated, for MDE/MDDNR.

Virginia Benthic Count, Biomass, and Sediment and Bottom Water Analyses Survey. Data were collected at fixed sampling stations in the lower Chesapeake Bay and its Virginia tributaries since July 1985 and in the Elizabeth River monitoring data since January 1989. Prior to 1996, sampling was done quarterly and separately from the regular CBP water quality surveys. Locations of the sampling stations deviate slightly from those in the CBP water quality and plankton monitoring program. In 1996 sampling at existing stations was cut back to twice a year, and a random site sampling component was added. Please see the Data Documentation for details. The files include taxonomic identifications and counts of species, biomass determinations, sediment analysis and hydrographic profiles. The data through the last calendar year are available on the CBP-CIMS home page and FTP site. Data were collected by staff from ODU for VADEQ.

Virginia Benthic Sediment Profile Images (SPI) and Image Analysis Surveys. Data were collected concurrently with the traditional benthic monitoring sample collection at all fixed and random sampling stations in the lower Chesapeake Bay and its Virginia tributaries since 1996. Sampling is done twice annually and separately from the regular CBP water quality surveys. Locations of the sampling stations deviate slightly from those in the CBP water quality and plankton monitoring program. Please see the Data Documentation for details. The data files include image analysis of the vertical sediment profiles. The actual images are also available by request. Summary analysis of SPI images (through the last calendar year) are available on the CBP-CIMS home page and FTP site. Data was collected by staff of VIMS for VADEQ.

Other Point Data

Benthos

Historic Benthic Count, Sediment and Bottom Water Analyses Studies. Data were collected at fixed sampling stations in the Chesapeake Bay and some of its tributaries prior to 1984. These data sets complement and enhance the ongoing CBP benthic monitoring programs, which began in 1984. In all cases, the authors retained the raw data from these studies. Dr. Robert Diaz, VIMS, reformatted the following data sets to the CIMS database structure:

STUDY SITE	DATE	REFERENCE
Piney Point, Potomac River	1975	Virnstein & Boesch, 1975
Possum Point, Potomac River	1977-1978	Ecological Analysts, 1979
Tangier Island, Chesapeake Bay	1975	Orth & Boesch, 1975
Amoco Refinery, Lower York River	1977	Hinde, 1981
Thimble Shoals, Chesapeake Bay	1981	Hobbs et al., 1985
Warwick River, James River	1975-1976	Diaz & Boesch, 1976
Hampton Roads to Richmond, James River	1981	Schaffner et al., 1987

Table 1. Summary of Historic Virginia Benthic Studies.

The studies were combined into single files for taxon counts, sediment water analysis and bottom water analysis and event information. These related data sets are available on the CBP-CIMS home page and FTP site.

Marine Mammal and Sea Turtle Standings

Maryland Department of Natural Resources/National Oceanographic & Atmospheric Administration Marine Mammal and Sea Turtle Stranding Data. The MDDNR's Cooperative Oxford Laboratory responds to all reported Strandings of marine mammals and sea turtles in the state of Maryland. Most of these Strandings occur in the Atlantic Ocean, but a few do occur in the Chesapeake Bay. The available stranding data have been reported to the CBP Data Center, computerized and are available by request from the Biological Monitoring Data Manager.

Geographical Information System (GIS) Data

Several types of detailed biological, living resource and habitat coverages are available by contacting the Living Resources GIS Specialists(Appendix D). Geographic data are now available as a variety of products and formats.

GIS Data/Metadata

Some CBP living resources-related GIS data, with accompanying metadata, are available for downloading at http://www.chesapeakebay.net/. These data include:

- Streams (1:100K scale)
- Watersheds HUCS-8 (sub-basins)
- Watersheds HUCS-11 (small watersheds)
- Bathymetry (1-meter contour lines)
- Benthic Index of Biotic Integrity
- Habitat Restoration Sites
- Chesapeake Bay Program 1997 Study Segments
- Submerged Aquatic Vegetation (SAV) (linked to VIMS)

Other living resources-related GIS data are held by the Chesapeake Bay Program but not presently available through its web site due to, among other reasons, lack of metadata, ongoing data compilation, ongoing data revisions and pending journal publication. Many of these data are available by request from the living resources GIS staff. The following is a list of these data sets.

Oysters

- Virginia's Public (Baylor) and Privately Leased Oyster Grounds
- Maryland's Surveyed Oyster Grounds (Yates survey plus more recent data)
- Designated Sanctuary Areas

Fish and Fish Passage

- Historic (1970s and later) Maryland Survey Data for Spawning Shad, Herring, and Perch
- Virginia Fish Blockages
- New York Dams within the Chesapeake Bay Watershed
- EPA RF3 (1:100K Scale) Stream Data
- Low Resolution Stream Data
- Habitat and Terrestrial Species
- Pennsylvania Stream Habitat Survey Data for Selected Streams in the Lower Susquehanna Watershed
- Breeding Bird Atlas Data for Neotropical Migrant Land Birds in the Chesapeake Bay Watershed

Bay Atlas

Bay Atlas (formerly Chart the Bay) is an interactive mapping component of the CBP's CIMS web site. It uses Environmental Systems Research Institute, Inc.'s Map Objects software to allow on-line users to create customized maps and download data. Bay Atlas offers raw, interpreted and summarized data and includes available metadata. Raw data represent the actual occurrence of something, e.g., a line representing a mapped stream or a point representing a known fish passage. Interpreted data are raw data that have been manipulated to represent something else, e.g., monitoring station water quality data that have been interpolated and averaged over three years to give a picture of conditions throughout the Bay. Summarized data are those that have been aggregated to represent a value for a larger spatial area. The current version of Bay Atlas includes the following living resources-related data.

Raw Data

- Streams (1:100K scale)
- Water Bodies (1:100K scale)
- 8-Digit HUCs (sub-basins)
- Habitat Restoration Sites
- Reef Restoration Sites
- Fish Passages and Blockages
- SAV Beds 1985-1997
- SAV Change 1985-1997

Interpreted Data:

- SAV Tier Goals (I, II and III)
- Benthic Index of Biotic Integrity – Random and Fixed Sampling Sites
- Number of Chesapeake Bay Program Target Species (Aquatic) by Season (Spring or Summer)
- Interpolated Water Quality Data – Dissolved Oxygen and Total Suspended Solids
- Land Cover by Small Watershed
    - Percent Land Usage by categories (Agriculture, Forest and Developed)
    - Percent Impervious Surface
    - Percent Riparian Forest Buffer
    - Percent Forest Edge
    - Largest Patch Index
- Historic Oyster Beds
- Leased Oyster Grounds in Virginia
- Oyster Reef Restoration
- Summer Bottom Fish Habitats
- Spring Water-Column Fish Habitats
- Juvenile Weakfish/Post-Larval Blue Crab Potential Habitats
- Spring Upper Water Column Dissolved Oxygen
- Spring Lower Water Column Dissolved Oxygen
- Spring Deep Water Column Dissolved Oxygen
- Summer Upper Water Column Dissolved Oxygen
- Summer Lower Water Column Dissolved Oxygen
- Summer Deep Water Column Dissolved Oxygen
- SAV Light Attenuation at 1 Meter
- SAV Light Attenuation at 2 Meters

Bay Atlas can be accessed through the CBP web site at http://www.chesapeakebay.net.

Living Resources and Biological Monitoring Databases Accessible through CIMS

The CBP partners are working together as part of the CIMS initiative to develop a system of distributed databases to better utilize the rapid expansion of the Internet and the advancement of data management practices. In the envisioned distributed database system, data will be collected, managed and maintained by the data originator. Several distributed databases and information resources currently exist for Chesapeake Bay data. The following sites represent data publication provided via the data originator's Internet server.

Chesapeake Bay Submerged Aquatic Vegetation Aerial Surveys

The Chesapeake Bay SAV data were compiled by the VIMS from 1:24,000 scale aerial photography. Years for which data exist are 1971; 1974; 1978; 1979 (Maryland only); 1980 and 1981 (Virginia only); 1984 through 1987; and 1989 through 1998. SAV data for 1999 will soon be available. Also available from VIMS is the Tier I data layer, which is a compilation of the historical SAV data listed above from 1971 through 1990. The SAV data files are in Arc/Info (ESRI, Redlands, CA) export format. Data files are served as both PKZIP compressed files for use on IBM-compatible personal computers and tar.Z compressed files for use on UNIX platforms. Each file contains both the .e00 Arc/Info export file and also a .txt metadata file. The Internet address for the VIMS SAV home page is:

http://www.vims.edu/bio/sav/index.html

Chesapeake Bay Chlorophyll Remote Sensing Project

The objective of the remote sensing program is to improve the monitoring of phytoplankton response to nutrient reductions in the Bay. The distribution of phytoplankton in estuaries and coastal waters is characterized by high spatial and temporal variability. Thus it is difficult to quantify phytoplankton in these regions using measurements from ships alone. Therefore, the National Oceanographic and Atmospheric Administration (NOAA) started a remote sensing program in 1989 with the goal of determining concentrations of chlorophyll using measurements of ocean color from aircraft. These data have been enumerated using the Ocean Data Acquisition System (ODAS), a relatively simple ocean color instrument that was developed in the mid-1980s by NASA's Goddard Space Flight Center. Since 1997 the remote sensing SEAWIFS aircraft simulator (SASII) instrument has been implemented for improved measurements. The Internet address for the ODAS home page is:

http://noaa.chesapeakebay.net/odas_sas.html

Virginia Fishery Independent Seine and Trawl Surveys

VIMS has conducted annual trawl and seine surveys since 1955. The primary objective of the survey is to monitor trends in the abundance of juveniles in about 20 recreationally, commercially and ecologically important finfish and invertebrates. Since 1955, the trawl survey has sampled waters from the mouth of the Chesapeake Bay north to the freshwater interfaces of the James, York, and Rappahannock rivers. Samples from about 60 stations are collected every month. At each station, a 30-foot-wide shrimp trawl is towed for five minutes.

A seine survey for juvenile striped bass was initiated in 1967, but was briefly suspended between 1973 and 1980, due to lack of funding. An indexes of abundance has been calculated every year since 1980 and this is the second longest continuous striped bass index in the U.S. The Internet address for the Virginia Institute of Marine Sciences Fisheries Home page is:

http://www.fisheries.vims.edu/

NOAA Chesapeake Bay Program Fisheries Data

The NOAA-National Marine Fisheries Division maintains a division office in Annapolis to better serve the Chesapeake Bay Region. As part of their services to the Bay Region the office maintains a web site providing a variety of Chesapeake Bay specific summaries of Recreational and Commercial fishery trends, stock assessment information as well as long term database of commercial and recreational fisheries landings for the Bay. The Internet address for the NOAA Chesapeake Bay Program Fisheries Statistics Page is:

http://noaa.chesapeakebay.net/fisheries.htm

National Marine Fisheries Statistics & Economics Division Data

The Statistics & Economics Division of National Marine Fisheries Service (NMFS) maintains a home page which provides a wide range of fisheries-related data collected by NMFS for the entire country. Through these on-line databases, information on commercial fisheries landings, fisheries trade information, recreational fisheries landing, fishery market news and other fisheries economic information pertaining to the Chesapeake Bay and the rest of the United States, is available. The Internet address for the NMFS Statistics and Economics Division home page is:

http://www.st.nmfs.gov/

Environmental Monitoring and Assessment Program (EMAP) Data

The EPA's Environmental Monitoring and Assessment Program (EMAP) is a research program dedicated to developing the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of ecological conditions and forecasts of the future risks to the sustainability of our natural resources. EMAP's research supports the National Environmental Monitoring Initiative of the Committee on Environment and Natural Resources (CENR). The EMAP program provides both point data sets and GIS databases for its study areas. EMAP data for the Chesapeake Bay Region (the Virginian Province) and the rest of North America are available at:

http://www.epa.gov/emap/

Multi-Resolution Land Characteristics (MRLC) Land Cover

The EPA publishes Multi-Resolution Land Characteristics (MRLC) land cover data. MRLC data were derived from the classification of Landsat Thematic Mapper satellite imagery acquired between 1991 and 1993. The data are in grid cell format with a resolution of 30 meters. The MRLC data are separated into 15 classes: water, low-intensity developed, high-intensity residential, high-intensity commercial/industrial, hay/pasture, row crops, other grass, evergreen forest, mixed forest, deciduous forest, woody wetland, emergent herbaceous wetland, and three classes of bare. A land cover map of the Chesapeake Bay watershed based on the MRLC data is available at http://www.chesapeakebay.net. Metadata can be viewed at the MRLC web site. The MRLC home page is:

http://www.epa.gov/mrlc/

NASA LANDSAT Imagery

The missions of the LANDSAT series are part of NASA's Earth Science Enterprise (ESE), which is being built to continue the flow of global change information to users worldwide. Scientists use LANDSAT satellites to gather remotely sensed images of the land surface and surrounding coastal regions for global change research, regional environmental change studies and other civil and commercial purposes. LANDSAT 7, the current mission, will provide repetitive, synoptic coverage of continental surfaces; spectral bands in the visible, near-infrared, short-wave and thermal infrared regions of the electromagnetic spectrum; spatial resolution of 30 meters (98-feet); and absolute radiometric calibration. No other current or planned remote sensing system matches this combination of capabilities. The data from LANDSAT 7 is being distributed under a cooperative arrangement with the US Geological Survey and can be obtained at:

http://landsat7.usgs.gov/

National Wetlands Inventory Data

National Wetlands Inventory (NWI) data are published by the U.S. Fish and Wildlife Service. Each data layer comprises the Arial equivalent of one 7.5' quad (1:24,000 scale) map. The wetlands are classified according to the Cowardin, et al. (1979) wetland classification scheme. The wetlands are delineated from photo interpretation of aerial photography, mapped on stable-base copies of 7.5' quad sheet overlays and either manually digitized or scanned. The dates of photography used are highly variable and range from the early 1970s through the early 1990s. Of the 1,336 7.5' quads that are wholly or partially contained within the Chesapeake Bay watershed, 1,211 are available, 33 are in the process of being completed and 92 are expected to be completed by 2001. NWI data can be downloaded in ARC Export or DLG formats via anonymous FTP. The data are organized by USGS 250K map names, so it is advisable to have a USGS index book for the state in which desired quads are located in order to find which 250K directory to access. Metadata are available at the NWI web site. The NWI home page is:

http://www.nwi.fws.gov.

Chesapeake Bay Land Margin Ecosystem Research-Trophic Interaction in Estuary Systems

The Chesapeake Bay Land Margin Ecosystem Research (LMER) project investigates mechanisms affecting secondary production of estuarine ecosystems. There are three major elements in the Trophic Interactions in Estuary Systems (TIES) project: (1) a field program; (2) a modeling and analysis component; and (3) a comparative studies program. Some of the data from the field program are now available on-line. Data available as part of the field program include: physical oceanographic parameters, aerial remote sensing , zooplankton and fish abundance measurements, sediment measurements, stable isotope analysis, zooplankton and fish production/predation/feeding and production and respiration measurements. TIES data can be found at:

http://www.chesapeake.org/ties/

United States Geologic Survey Chesapeake Bay Region Data

The mission of the USGS is to provide geologic, topographic, hydrologic, biological and other natural sciences information that contributes to the wise management of the nation's natural and biological resources and promotes the health, safety, and well-being of the people. The site provides quick links to Bay-related information from USGS on earth and biological sciences, including data, publications, and interpretive studies. Subject areas include stream flow, water quality, ground water, wetlands, sediment, geology, mapping and spatial data, biology and ecology. Links are provided to individual USGS programs and projects working on issues relevant to Chesapeake Bay, including units of the USGS Ecosystem Program. The web site is located at:

http://mapping.usgs.gov/mac/chesbay/index.html

The CBP Data Center is interested in listing and describing Chesapeake Bay living resources and biological monitoring data sets that are available on the Internet. If you know of such data sets, please contact the Biological Monitoring Data Manager at the CBP Data Center (see "CBP Data Center Contacts").

OBTAINING MONITORING DATA

Information Access through the Chesapeake Bay Program-Chesapeake Information Management System Home page

A major component of the development of the CIMS network has been to establish user interfaces for information retrieval. The primary user interface is the data users world wide web browser. Users can search and download databases, summary statistics and indicators, data documentation, key data management documents and data inventories from several servers via the CBP-CIMS home page. Using the CBP-CIMS web site, biological monitoring data can be obtained geographically, chronologically and programmatically. Customized data sets are generated when a data user submits search criteria (time, geographic location, data type, etc.) to a monitoring database. Once search results are returned to the user, they can be saved as a delimited ASCII flat file. Frequently requested data sets also have been provided on an FTP site. In the future, routine monitoring data will be accessible through the GIS based Bay Atlas web application. This interface enhancement will allow for geographic and graphical analysis of data on line. Other CBP databases and data management "tools" (e.g. QA/QC programs, documentation, and conversion tables and algorithms to calculate indicators) are being added to the home page server in installments.

CBP-CIMS FTP Access (Point Data Only)

Data users needing complete copies of the living resource point databases and data documentation files may directly access ASCII flat file versions of these data through anonymous FTP. The flat files contain the same data available from the searchable databases however, data is also provided in preselected subsets for immediate download. The subdirectories in ftp.chesapeakebay.net contain the CBP plankton and benthos monitoring data are shown in Figure 3.

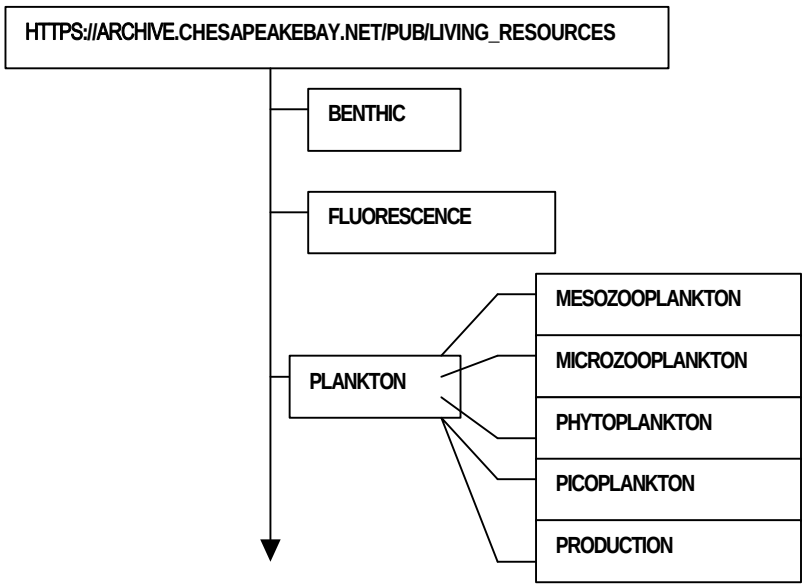

Figure 3. Diagram of present directory structure on ftp.chesapeakebay.net for point data.

Other types of point data will be placed in additional, appropriately named subdirectories of the ftp site when they become available to the Data Center.

Typical File Transfer Protocol (FTP)

1) Login to your local machine with INTERNET access as usual.

2) Type **ftp**

3) Type **open ftp.chesapeakebay.net**.

4) Login by identifying yourself as follows:
username: **anonymous**
password: ***your email address***

5) After the initial login you will be in a master data directory. You will need to change directories to get to the Living Resources file area. Type **cd /pub/living_resources/.**

6) You will enter the living resources public access directory as described above. Enter the directory containing the desired datasets by typing **cd /*** . (For *, insert data type of interest. For example, type the command **cd /benthic** for Maryland benthic data.)

7) You are now ready to transfer data. (The default data transfer mode is ASCII.) To transfer the complete data set and documentation **type mget <filename.txt>**. You will be prompted if you wish to transfer the first file. **Type a** (for all) when prompted and all files in the current directory will be transferred to your local machine.

8) Type **bye** or **quit** to end your FTP session.

Note: Your local FTP protocol will vary with your available FTP clients software. Please consult your local computer support staff for further assistance

A standard protocol for naming the living resources data sets on the FTP site has been established. Files downloaded from the searchable databases are named by the data user and are not subject to the standard naming convention. The naming protocol is as follows:

Table 2. Naming Protocol for CBP biological database or documentation files :

SSDDTTYY.ASC
HIDDTTYY.ASC
SSDDDOC.ASC

SS = State Providing Data
HI = Historic Dataset
DD = Data Type
TT = Data File Type
YY = Collection Year of Data in File
DOC = Data Documentation Text

State Provider Abbreviations
VA = Virginia
MD = Maryland
PA = Pennsylvania
DC = District of Columbia

Data Type Abbreviations
PH = Phytoplankton
PP = Picoplankton
MZ = Mesozooplankton
MI = Microzooplankton
PD = Primary Production
FL = Fluorescence
BE = Benthic

Data File Type Abbreviations
DOC = Data Dictionary
TX = Taxonomic
EV = Sampling Event
BM = Biomass
BV = Biovolume
FL = Fluorescence
SD = Sediment data
CF = Carbon 14 Fixation Rates
KY = Taxon Key
VF = Vertical Fluorescence
HF = Horizontal Fluorescence
PF = Potomac Fluorescence
WQ = Water Quality
EB = Biota Sampling Event

CBP-CIMS World Wide Web Access (Point Data Only)

All living resources point data sets and data documentation files are also web accessible through searchable online databases. The Bay Program has developed user-friendly graphical web interfaces for its relational databases of monitoring data to allow data users self serve data retrieval. A data users will go to a web page, select or input basic data search criteria (data type, time range, geographic area of interest, etc) and then submit data search criteria to the database. In turn the database will execute a search and return all the monitoring data which fits the search parameters. Data can then be saved to the users local PC as a pipe delimited ASCII file.

Typical World Wide Web Data Retrieval from www.chesapeakebay.net

1) Login to your local machine with Internet access as usual.

2) Open your world wide web browser.

3) Type in the URL **www.chesapeakebay.net**.

4) Select the **Datahub** button from the front of the CBP home page or click on the **Data** tab on any underlying page on the site.

5) A window with a pull down box will appear. Select from any of the Living Resources CBP-CIMS data bases (**Plankton, Benthos, Fluorescence**) in the pull down list. There are also links for Non-Living Resources CBP databases (i.e. water quality, modeling , point source) in the pull

down list. Links to CIMS partner databases appear below the pull down list. Selecting any of these links will take you to their data interfaces.

6) Once a CBP living resources database has been selected, in the next window which will open in your browser and you will be prompted to select the type of data you wish to retrieve from the living resources database of choice.

PLANKTON	BENTHOS	FLUORESCENCE
STATION INFORMATION	SAMPLING EVENT	HORIZONTAL FLUORESCENCE
SAMPLING EVENT	BIOLOGICAL EVENT	VERTICAL FLUORESCENCE
PHYTOPLANKTON	SEDIMENT	
MESOZOOPLANKTON	BIOMASS	
MICROZOOPLANKTON	TAXONOMIC	
PICOPLANKTON	WATER QUALITY	
JELLYFISH	BENTHIC INDEX OF BIOTIC INTEGRITY METRICS	
PRIMARY PRODUCTION	SEDIMENT PROFILE IMAGE-EVENT INFORMATION	
	SEDIMENT PROFILE IMAGE SUMMARY DATA	

TABLE 3. Summary Of Data Type Selections By Database

7) Once a data type has been selected, you will be asked to select how you wish to search data geographically. You may choose to select data by USGS Hydrologic Unit Code (HUC), Federal Information Processing Code (FIPS), CBP monitoring segment, CBP monitoring station or water body. A user will also be asked to type in the time frame of interest for data retrieval. The temporal extent of available data will be displayed in a table under the date input boxes. Click the **Continue** button at the bottom of the page once all selection criteria have been input.

8) In the next window, select the geographic regions or stations of interest from the pull-down list. The contents of the pull-down list have been based on the type of geographic search selected in the previous window. Click the **Continue** button at the bottom of the page once all selection criteria have been input.

9) Next, a user identification will appear. If this is the first time you have downloaded data from the CBP web site since October 1, 1999 please click the **Create User Profile** button and follow the directions that follow. Otherwise, enter your email address and click the **Continue** button.

10) Finally, your data search will be executed, and you will be prompted to save any data that has been retrieved to your local PC. Data will be formatted as a **Pipe Delimited ASCII file**, with a header line. See Appendices B and C for details on data attributes and acceptable field values.

Creating a Data User Profile

1) Start by clicking the **Create User Profile** button.
2) A form will appear. Fill in your name, email address, zip code and pick the user type and data usage which best describes you.
3) Click the **Submit** button and return to Step 9 of the on-line data retrieval process.

Data on Media

Individuals without Internet access, users wishing to obtain SAS conversion scripts or wishing complete databases in Microsoft Access format can request data directly from the Biological Monitoring Data Manager. Data can be sent on floppy disk or CD-ROM depending on the size of the data set requested. Requests for living resources GIS coverages or other GIS products should be sent to a Living Resources Geographic Information Specialist. All requests must be made in writing or by email. A data request form and the address and phone numbers for Data Center contacts are provided in Appendix D.

DISCLAIMER NOTICE: The CBP home page and all data documentation clearly request that data users acknowledge the original monitoring programs as the data originators in publications they reference or use the databases. Although these data have been processed successfully on a computer system at the Chesapeake Bay Program, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly recommended that careful attention be paid to the contents of the data documentation file associated with these data. The Chesapeake Bay Program shall not be held liable for improper or incorrect use of the data described and/or contained herein.

USING MONITORING DATA

Data availability and demand for data access have grown at exponential rates due to the extensive development of the Internet. The combination of increased data access and new mechanisms to store and distribute data have radically changed data management. Providing adequate guidance to data users on correctly handling the databases and interpreting the data is a challenge. Unsatisfactory results may be due to the use of data that are unsuitable for the analysis, incorrect manipulation of data sets or incorrect interpretation of the information in a database.

Please read the data documentation files. Before you use data, become aware of the original objective(s) and sampling design of a study or monitoring program as well as the database structure. The data documentation files explain the details of sample collection and processing and the structure of the data files for each study. All of the data documentation sets have been written with the end data user in mind. They assume that a user has no previous knowledge of the data collection program. The biological data sets described in this document are typically either from large-scale monitoring programs or intensive, targeted studies. The Chesapeake Bay monitoring programs and other long-term efforts are intended to detect changes and/or trends in the status of living resources on a large scale. They were designed to be used in a wide variety of analyses. These monitoring programs do not have a spatial or temporal scale fine enough to answer many site or time-specific questions. However, they are useful in answering complex, Baywide questions. Another portion of the data sets, predominantly the historic data sets, are targeted studies. These studies were originally designed to answer specific scientific or resource management questions on a fine scale. Therefore, sampling design, analytical protocol or site selection criteria may preclude or obscure elements of the data set critical for your analytical questions.

This section provides guidance on how to merge related files from the CBP-CIMS interface and subsequently work with monitoring data. The Chesapeake Bay Program relational database structures and formats have been discussed in other sections of this document. Actual field names and attributes appear in Appendix A and on-line in the individual data set documentation files. A list of possible CBP field names for biological and living resources data, and their definitions and units, are provided in Appendix B. Appendix C contains definitions of parameter and look-up codes used in the databases.

In the development of Baywide zooplankton and phytoplankton indicators, it became necessary to understand the degree of comparability inherent in the data collected and analyzed by different laboratories. Until that time, a program of regular quality assurance /quality control and split-sample comparisons were not part of either the phytoplankton or zooplankton long-term monitoring programs. In 1998 a split-sampling project compared results of the Maryland and Virginia mesozooplankton, microzooplankton and phytoplankton long-term monitoring programs. The various methodologies used for plankton enumeration had some biases that have serious implications in Bay analysis and are important for data users to be aware of.

CBP Phytoplankton and Picoplankton Monitoring Data

The Virginia and Maryland files may be combined with no special preparation. The taxon and event files can be merged by linking on the following fields:

SOURCE
SAMPLING_DATE
STATION
LAYER

The following is a list of known sampling biases and common user errors for these data.

1) The Virginia sample enumeration technique includes a special effort to identify smaller, rare species below 8 microns in size. Please account for these extra species when combining Maryland and Virginia data. A list of the rare species is provided in the on-line data set documentation.

2) The species *Merismopedia* and *Agmenellum* have been determined to be synonymous. The currently accepted literature name for this species is *Merismopedia.* As of January 1999 all programs will switch to the accepted species name. The Maryland monitoring program has previously used the *Agmenullum* name.

3) The Virginia plankton program has a picoplankton enumeration component. The Maryland monitoring program currently lacks this element. Therefore Maryland has counted organisms as either micro flagellates or unidentified blue-green spheres that Virginia omits because they are accounted for in the picoplankton analysis.

   a) Maryland counts all visible small green flagellated cells as microflagellates. Virginia includes these organisms as phytoplankton only if they appear to be autotrophic.

   b) Maryland counts all small non-flagellated blue-green spheres as unidentified *Microcycstis* species. Virginia omits these organisms from their phytoplankton counts.

4) The Maryland program counts individual cells when blue-green trichomes are observed. The Virginia program counts only whole trichomes. After January 1999 the Virginia program adapted the Maryland protocol.

5) Composite samples: It should be noted that the CBP sampling protocol utilizes composite samples. There are no samples for individual depths.

6) NODC Codes and TSNs: All species were assigned National Oceanographic Data Center, Version 8 (NODC) species codes and permanent Integrated Taxonomic Information System (ITIS) Taxon Serial Numbers (TSN) where available. The NODC taxonomic code is a hierarchical system of numerical codes used to represent the scientific names of organisms. The code links the Linnaean system of biological nomenclature to a numerical schema that facilitates modern methods of computerized data storage and retrieval. Additionally, each recognized species is given a unique ITIS permanent TSN. The TSN value does not change regardless of changes in taxonomic classification over time. NODC codes are not currently being updated.

7) Virginia picoplankton counts: Picoplankton counts are available for Virginia waters only. The data files are structured the same as for phytoplankton data. The count data are provided in the taxon file and are identified taxonomically as Autotrophic Picoplankton.

8) Maryland SAMPLE_ NUMBER: Note that the Maryland SAMPLE_NUMBERs are sample identifiers; they **are not synonymous with a replicate number.** Please perform a count of SAMPLE_NUMBER by STATION, SAMPLE_DATE, LAYER and SOURCE to determine the number of replicate samples taken at a station.

CBP Primary Production Monitoring Data

The Virginia and Maryland files may be combined with no special preparation. The production and event files can be merged by linking on the following fields:

SOURCE
SAMPLING_DATE
STATION
LAYER

Known sampling biases and common user errors for these data.

1) The primary production data has not been subject to a split-sample evaluation program at this time. There are no documented sampling biases.

2) The Maryland production data were resubmitted in 1995 due to errors in the calculation of some primary production values. Do not use data with an R_DATE prior to May 31, 1995.

3) It should be noted that the CBP sampling protocol uses composite samples. There are no samples for individual depths.

4) Maryland SAMPLE_ NUMBER: Note that the Maryland SAMPLE_NUMBERs are sample identifiers; they **are not synonymous with a replicate number.** Please perform a count of SAMPLE_NUMBER by STATION, SAMPLE_DATE, LAYER and SOURCE to determine the number of replicate samples taken at a station.

CBP Fluorescence Monitoring Data

The horizontal and vertical files may be used with no special preparation

The following is a list of known sampling biases and common user errors for these data.

1) The Maryland horizontal fluorescence data between 1984 and 1998 (excluding the special Potomac survey) and all Virginia horizontal fluorescence collected by Old Dominion University between 1991 and 1997 had station latitudes and longitudes estimated through an interpolation process. The latitudes and longitudes are at best approximations of actual positions in the field. Please see FORMULAS, CALCULATIONS AND CONVERSIONS in the Data Documentation for detailed explanation of how the positions were estimated. This method of locating position does not meet EPA sampling position policy since sampling locations were not measured with a Global Positioning System (GPS). Inaccuracies in the estimated station locations may be problematic in mapping or ground truthing applications.

2) Locations for the horizontal Potomac fluorescence, horizontal fluorescence collected by the Virginia Institute of Marine Sciences, and the Maryland and Virginia Vertical Fluorescence surveys were determined with Loran-C and should be less problematic.

3) The Maryland Fluorescence data were resubmitted due to errors in the calculation of fluorescence values. Do not use data with an R_DATE prior to May 31, 1995.

CBP Microzooplankton and Mesozooplankton Monitoring Data

The Virginia and Maryland files may be combined with no special preparation. The taxon and event files can be merged by linking on the following fields:

SOURCE
SAMPLING_DATE
STATION
LAYER

Linking the following fields can merge mesozooplankton biomass, biovolume and event files:

SOURCE
SAMPLING_DATE
STATION
LAYER

Please read the data documentation file before attempting to merge the Maryland and Virginia microzooplankton data. The taxonomic identification levels in the Virginia microzooplankton data are not as detailed as those in the Maryland data. You may want to make the taxonomic identification levels comparable by removing species identifications in specific cases and summing counts for genus, family or order levels. Linking the following fields can merge the taxon and event files for microzooplankton:

SOURCE
SAMPLING_DATE
STATION
LAYER

The microzooplankton and mesozooplankton taxon files can be merged if the following sample volume correction is made to the mesozooplankton:

1) The mesozooplankton taxon counts and total counts must be converted to liters before the sets can be merged. Mesozooplankton counts are reported in organisms per cubic meters. Microzooplankton counts are reported in organisms per liter. The conversion is:

   DEN_M3 / 1000 = DEN_L

The following is a list of known sampling biases and common user errors for the microzooplankton data.

1) Virginia has used the classical definition of microzooplankton as being zooplankton 20-200 um in size. Maryland considers barnacle nauplii, polychaete larvae and cladocerans to be mesozooplankton and does not count any organisms from these groups. These organisms are enumerated in the Maryland mesozooplankton program. Maryland also counts the non-loricate cilliates and tintinnids that are less than 20 um in size. The Virginia size cutoffs for tintinnids and non-loricate ciliates are based on widths while Maryland's size categories are based on length. After January 1999 Virginia adopted the Maryland method of enumerating all ciliates and does not drop any cilliates from counts that are less than 20 m in width. The Virginia group of oligotrichs was renamed non-loricate cilliates. The following table lists the differences between Maryland and Virginia in defining various taxonomic groups of microzooplankton:

GROUP	VIRGINIA	MARYLAND
Copepod nauplii	All, length <200 um	All
Rotifers	All, length <200 um	All
Sarcodinids	All	All
Tintinnids	All >20 um in width, length doesn't matter	All in mesohaline All > 44 um in other salinities
Non-loric ciliates	All > 20 um in width, less than 200 m in length	All in mesohaline All > 44 um in other salinities
Barnacle nauplii	All < 200 um in length	None
Polychaete larvae	All < 200 um in length	None
Pelecypod larvae	All < 200 um in length (In other category)	All
Gastropod larvae	All < 200 um in length (In other category)	All
Cladocerans	All < 200 um in length	None

Table 4. Comparison of Microzooplankton size classes

2) Not paying attention to the life stage column is another common error. These data sets will have multiple records for the same species that differ by the life stage. An empty life stage column means the taxon counted were adult organisms.

3) NODC Codes and TSNs: All species were assigned National Oceanographic Data Center, Version 8 (NODC) species codes and permanent Integrated Taxonomic Information System (ITIS) Taxon Serial Numbers (TSN) where available. The NODC taxonomic code is a hierarchical system of numerical codes used to represent the scientific names of organisms. The code links the Linnaean system of biological nomenclature to a numerical schema that facilitates modern methods of computerized data storage and retrieval. Additionally, each recognized species is given a unique ITIS permanent TSN. The TSN value does not change regardless of changes in taxonomic classification over time. NODC codes are not currently being updated.

4) Maryland Microzooplankton SAMPLE_ NUMBER: Note that the Maryland microzooplankton SAMPLE_NUMBERs are sample identifiers; they **are not synonymous with a replicate number.** Please perform a count of SAMPLE_NUMBER by STATION, SAMPLE_DATE, LAYER and SOURCE to determine the number of replicate samples taken at a station.

5) CBP monitoring program components collect composite samples. There are no samples for individual depths.

The following is a list of known sampling biases and common user errors for the mesozooplankton data.

1) Not paying attention to the life stage column is a common error. These data sets will have multiple records for the same species that differ only by the life stage. An empty life stage column means the taxon counted were adult organisms.

2) NODC Codes and TSNs: All species were assigned National Oceanographic Data Center, Version 8 (NODC) species codes and permanent Integrated Taxonomic Information System (ITIS) Taxon Serial Numbers (TSN) where available. The NODC taxonomic code is a hierarchical system of numerical codes used to represent the scientific names of organisms. The code links the Linnaean system of biological nomenclature to a numerical schema that facilitates modern methods of computerized data storage and retrieval. Additionally, each recognized species is given a unique ITIS permanent TSN.

The TSN value does not change regardless of changes in taxonomic classification over time. NODC codes are not currently being updated.

3) CBP monitoring program components collect composite samples. There are no samples for individual depths.

4) Prior of 1999 the Coefficient of Variance Separation method (Alden, etal 1982) used by ODU to sieve mesozooplankton before counting them consistently lost small individuals (e.g. *Bosmina*) and narrow individuals (e.g. *Acartia* copepodites) through the 202 um mesh sieve. Therefore, Virginia counts prior to 1999 underestimate the actual abundances of many taxa. In 1999 a 64 um sieve was added to capture the smaller/narrower taxa. Split sampling efforts to confirm the comparability of the Maryland and Virginia mesozooplankton counts are nearly complete. Please contact the living resources data manager for details of the split sampling comparisons and final report. The final report will include correction factors for the pre-1999 Virginia data counts of common species. These correction factors must be applied before any Baywide analysis is attempted.

5) Between 1989 and 1998, Versar Incorporated ceased macrozooplankton (amphipods, shrimp, etc.). Also in 1998, In addition, all samples, after the standard hierarchical counting technique, were filtered through an 850 micrometer sieve. Mesozooplankton that were retained in the 850 micrometer sieve that were not previously identified in the subsamples and/or macrozooplankton were counted and identified.

6) The 1998-1999 split sampling results showed some differences in taxonomic identifications between Maryland and Virginia. These differences will be more thoroughly described in the final report. Please contact the living resources data manager for details of the split sampling comparisons and final report.

Known sampling biases and common user errors in using the mesozooplankton and microzooplankton data in combination include:

1) Copepod nauplii were counted in both the mesozooplankton and microzooplankton samples and are included in both data sets. The smaller mesh size (<44u) of the net used to collect microzooplankton samples in Maryland and the whole water sample collection method in Virginia are more efficient in retaining the smallest copepod nauplii. Therefore, the microzooplankton estimates of copepod nauplii density are considered by the principal investigators to be more accurate. Remove the copepod nauplii in the mesozooplankton files prior to merging the micro- and mesozooplankton files.

2) Barnacle nauplii were reported in the Virginia mesozooplankton data from January 1985 through December 1992. After January 1993 barnacle nauplii were reported only in the microzooplankton data.

CBP Benthos Monitoring Data

These data sets require merging to be fully functional. The Virginia and Maryland CBP monitoring programs and the historic files may be combined with no special preparation. There are two types of sampling event files presented with the benthic monitoring data– the event and biota event files. The event data files contain records for all sampling events, which have occurred as part of the benthic monitoring program. This includes all instances where water quality, sediment or biota data were collected. The biota event files contain only event records for sampling events where biota samples were analyzed for content. Note: Not all-sampling events had biota data collected or have had the biota

samples analyzed for content. Linking the following fields can merge all benthic taxon, biomass, sediment, water quality, biota event and Event files:

SOURCE
SAMPLING_DATE
STATION
SAMPLE_NUMBER (for taxon and biomass files)

Protocols in the Maryland CBP benthos monitoring program diverge significantly from those in the Virginia CBP benthos monitoring programs and the historic data sets. The Maryland benthic monitoring program has changed its criteria for selecting sampling locations several times in the course of the program, going from fixed sites, to randomly stratified sites, to a mixture of the two. As of January 1996 Virginia also has added a random site selection component to their monitoring program. It is critical to read the data documentation file before attempting to use either the Maryland or Virginia benthic monitoring data. Below is a brief outline of the differences between the Maryland and Virginia CBP programs.

Maryland CBP Benthic Monitoring Program

1) Multiple sampling schemes: fixed stations, sites randomly selected for identified strata and combination random strata and fixed site sampling. Sampling sites are not associated with any standard CBP monitoring stations. Analysts must use a geographic mechanism to relate stations (e.g., CBP Chesapeake Bay segmentation scheme, centroids). A unique station naming convention was developed to account for the various site selection processes.

2) Multiple sampling gears. Sampling gear artifacts vary in data.

3) Changing sampling frequencies. Sampling frequency varies from 7 to 10 times annually, and occurs in the spring, summer and fall.

4) Major change in biomass methodology in 1989. (See data documentation.)

5) Chemical analyses performed on sediment samples varied by date.

6) Surface to bottom water column hydro casts were made at each site.

7) Maryland SAMPLE_ NUMBER: Note that the Maryland SAMPLE_NUMBERs are sample identifiers; they **are not synonymous with a replicate number.** Please perform a count of SAMPLE_NUMBER by STATION, SAMPLE_DATE, LAYER and SOURCE to determine the number of replicate samples taken at a station.

Virginia CBP Benthic Monitoring Program

1) A fixed site sampling scheme was used from 1985-1995. Most of the fixed stations corresponded with regular CBP monitoring stations. The data, therefore, has direct locational linkages to plankton, zooplankton and water quality data sets. In 1996 a random strata component was added to the fixed site sampling. These sampling sites are not associated with any standard CBP monitoring stations. Analysts must use a geographic mechanism to relate stations (e.g., CBP Chesapeake Bay segmentation scheme, centroids). A unique station naming convention was developed to account for the various site selection processes.

2) One sampling gear used from 1985-1995. Multiple gears were employed after 1995.

3) Sampling was performed quarterly from 1985-1995. After 1995 to present , sampling is conducted twice a year.

4) Water quality data for bottom of water column only.

5) In 1996 a Sediment Profile Camera Imaging Program was added. Image summary data is available on-line, actual imagery is available by request from the living resources data manager.

Historic Benthic Data Sets

Most of the historic benthic data sets were "targeted studies". This means they were concentrated around areas of resource management interest such as power plants and industrial sites. Some of the studies were meant as baselines to examine the environmental effect of the operation of these facilities before and after they went operational. Other studies were begun after a power plant or industrial sites was operational and were designed to determine how much damage had been done to an area. These studies frequently did not measure all the parameters found in current monitoring data sets and do not include biomass determinations.

The following is a list of known sampling biases and common user errors for this data.

1) Using either the Maryland or Virginia CBP monitoring data without understanding the use of both fixed, randomized and hybrid site sampling protocol, adapted in various stages of the program.

2) NODC Codes and TSNs: All species were assigned National Oceanographic Data Center, Version 8 (NODC) species codes and permanent Integrated Taxonomic Information System (ITIS) Taxon Serial Numbers (TSN) where available. The NODC taxonomic code is a hierarchical system of numerical codes used to represent the scientific names of organisms. The code links the Linnaean system of biological nomenclature to a numerical schema that facilitates modern methods of computerized data storage and retrieval. Additionally, each recognized species is given a unique ITIS permanent TSN. The TSN value does not change regardless of changes in taxonomic classification over time. NODC codes are not currently being updated.

3) In the CBP monitoring data, benthic biomass values are determined on a per taxon basis. See documentation for Maryland methodology changes.

Remember: Please Read the Data Documentation Files!

ECOSYSTEM INDICATORS

Teams of Bay Program scientists and natural resource managers have worked to develop indicators of Chesapeake Bay ecosystem health. These indicators are calculated using monitoring data and provide an indication of how well the various biological communities are functioning. The technical indicators will be used primarily to interpret and communicate monitoring results. Scientists and managers will find these summaries useful for a quick overview of Chesapeake Bay monitoring data. The indicators are expected to provide quantitative information on food chain responses to toxic load reductions in the Chesapeake Bay. Indicators are also potentially useful in ongoing efforts to develop biocriteria and restoration targets for state waters. There are number of technical indicators for various trophic groups currently under development or peer review.

The Benthic Index of Biotic Integrity (BIBI)

The Chesapeake Bay Benthic Index of Biotic Integrity (BIBI) initially released in 1997 (Weisberg et al. 1997) was meant to be a tool for assessing benthic living resource conditions. Since its introduction, the index has been used in a variety of restoration and habitat targeting efforts (Dalal et al. 1999). The BIBI makes a good integrator of long-term environmental conditions because benthic organisms have limited mobility and their responses to stress are well documented. The current indices are both habitat and seasonally dependent. Therefore, data must be selected for time of the year and preclassified for habitat conditions.

A series of summary statistics or metrics are first calculated for all sites. The current summary statistics are as follows:

Shannon-Weiner Species Diversity Index
Total Species Abundance
Total Species Biomass
Percent Abundance of Pollution-Indicative Species
Percent Abundance of Pollution-Sensitive Species
Percent Biomass of Pollution-Indicative Species
Percent Biomass of Pollution-Sensitive Species
Percent Abundance of Carnivores and Omnivores
Percent Abundance of Deep Deposit Feeders

(Note that not all metrics are valid for use in all habitat regimes.) Depending on salinity and bottom type regime, the selected summary statistics are scored on a ranking of 1, 3 or 5. Pristine sites receive a 5, slightly degraded sites are ranked a 3, while severely degraded sites receive a score of 1. Lastly, the summary statistics are combined into a single RGI value for the benthic community at each site by averaging the scored index metrics.

Data Preparation:

Generally speaking for the Chesapeake Bay, benthic monitoring data in mainstem and tidal tributaries of Maryland and Virginia are comparable. While there have been major differences in sampling site selection over the course of the program, there have not been major differences in how samples have been collected or analyzed. Therefore, the data can be combined for Baywide status and trend work with few caveats.

Seasonal selection:

The current BIBI and RGI are summertime indices. For purposes of calculating the B-IBI, summer is defined as July 15 - September 30. Therefore, part of the first step in all data selection procedures is to select data for sampling events occurring during the summer period.

Determine Habitat Areas:

Benthic communities differ significantly according to habitat. Therefore, indices and goals were designed to be calculated by habitat area. The major factors affecting the compositions of benthic communities in the Chesapeake Bay are salinity and sediment composition. For these indices the classic Venice System is slightly modified for salinity classification. Sediments are classified by the silt-sand content. Sediments having less than 40 percent silt-clay content are defined as sand. Sediments with greater than a 40 percent silt-clay content are considered mud habitats.

Bottom Type Classification**:**

Habitat is determined by a long-term average of the data collected concurrently with the biological sample.

Step 1) Data are extracted from the SEDIMENT_TABLE for the parameter SILT_CLAY content.

Step 2) For each station an arithmetic mean SILT_CLAY content value is determined.

Step 3) All stations are classified for sediment content based on the resulting average SILT_CLAY values. All sites with an average SILT_CLAY value of less than 41 percent are classified as a sand (S) habitat. All other sites are classified as mud (M) habitats.

Silt-Clay Content (%)	Habitat Classification
0-40 % Silt-Clay	Sand
>40 % Silt-Clay	Mud

Table 5. Sediment Classification System

Salinity Type Classification:

In the calculation module of the CBP benthic database, habitat is classified by a long-term average of all available salinity data collected concurrently with the biological sample.

Step 1) Data are extracted from the WATER_QUALITY_TABLE for the parameter SALINITY where SAMPLE_DEPTH is equivalent to station TOTAL_DEPTH.

Step 2) For each Station a arithmetic mean SALINITY content value is determined.

Step 3) All stations have their average AVERAGE_SALINITY values classified based on the ranges.

Salinity (in ppt)	Habitat Classification
0.0-0.5	Fresh Water (F)
0.5-5.0	Oligohaline (O)
5.0-12.0	Low Mesohaline (LM)
12.0-18.0	High Mesohaline (HM)
> 18.0	Polyhaline (P)

Table 6. Salinity Regimes-Modified Venice System

Combining the Habitat Type Classification:

In the next stage of the CBP benthic database, bottom habitat is grouped into seven major habitat classifications based on the combination of salinity and sediment classes. The currently used bottom habitat classes are as follows:

*Tidal Fresh Sand and Mud	*Oligohaline Sand and Mud
Low Mesohaline Sand and Mud	
High Mesohaline Sand	High Mesohaline Mud
Polyhaline Sand	Polyhaline Mud

Table 7. Benthic Index of Biotic Integrity Habitat Classifications

NOTE: The current BIBI and RGI technique were found to be most accurate in high salinity areas and decreasing in value as salinity decreases. It is not recommended to calculate these indices for oligohaline and tidal fresh water areas even though the published protocol does provide metrics and scoring criteria for these regions.

Taxon equilibration:

These indices are based on observations about fauna that indicate current benthic conditions. All data sets must be standardized by applying uniform taxonomic identifications to the data. Eliminate taxa not sampled quantitatively or taxa groups not truly indicative of benthic conditions. Such groups include algae, vertebrates (fish larvae), pelagic invertebrates and epifauna. See Table 8 for the list of currently omitted Epifaunal species (For More Details See- Chesapeake Bay Benthic Community Restoration Goals, 1994- Appendix B). Also eliminate any fragments or juvenile organisms from the counts.

Summary Statistics:

Calculate Total Species Abundance:

The metric of total species abundance is calculated by a computing a simple arithmetic mean of the total normalized species abundance.

Step 1) Calculate the number of organisms present in each sample normalizing the number or organisms to number of organisms per meter squared of surface area.

Step 2) Sum the corrected total abundance of all organisms by STATION and SAMPLE_DATE.

Step 3) Divide the grand sum of species abundance by the total count of SAMPLE_NUMBER (or number of replicate samples taken per station on a given date.

Table 8. Current List of Chesapeake Bay Benthic Species Not Meeting B-IBI Macrofaunal Criteria

Aegathoa Medialis
Alboglossiphonia Heteroclita
Alona Affinis
Alpheus Heterochaelis
Amnicola Limosa
Ampithoe Valida
Ampithoidae
Amygdalum Papyrium
Anachis
Anachis Avara
Anachis Lafresnayi
Anachis Obesa
Anemone
Anomia Simplex
Anthozoa
Argulus
Balanus
Balanus Amphitrite Niveus
Balanus Improvisus
Balcis Interme0dia
Batea Catharinensis
Batracobdella
Batracobdella Phalera
Boonea Bisuturalis
Boonea Impressa
Brachyura
Branchiostoma Virginiae
Callinectes Sapidus
Caprella Equilibra
Caprella Penantis
Caprellidae
Caridea
Cassidinidea Ovalis
Cephalocarida
Cerapus Tubularis
Chrysaora
Cnemidocarpa Mollis
Cordylophora Lacustris
Corophium
Corophium Acherusicum
Corophium Acutum
Corophium Insidiosum
Corophium Lacustre
Corophium Simile
Corophium Tuberculatum
Corophium Volutator
Crangon Septemspinosa
Crangonidae
Crassostrea Virginica
Cratena Pilata
Crepidula Fornicata
Crepidula Plana
Cylichnella Bidentata
Cymadusa Compta
Cymothoidae
Decapoda
Diadumene Leucolena
Doridella Obscura
Dugesia Tigrina
Echinoidea
Edotea Triloba
Elasmopus Laevis
Epitonium
Epitonium Multistriatum
Epitonium Rupicola
Erichsonella
Erichsonella Attenuata
Erichsonella Filiformis
Ericthonius Brasiliensis
Euplana Gracilis
Eupleura Caudata
Eurypanopeus Depressus
Gastropoda
Geukensia Demissa
Glossiphoniidae
Green Cells (Unknown)
Harmothoe
Harmothoe Extenuata
Helobdella
Helobdella Fusca
Helobdella Stagnalis
Helobdella Triserialis
Heteromysis Formosa
Hexapanopeus Angustifrons
Hirudinea
Hydra
Hydracarina
Hydrobiidae
Hydroides Dianthus
Hydroides Protulicola
Ilyanassa Obsoleta
Ischadium Recurvum
Lepidonotus Sublevis
Lepidonotus Variabilis
Libinia Dubia
Libinia Emarginata
Limulus Polyphemus
Lolliguncula Brevis
Majidae
Melita
Melita Nitida
Microprotopus Raneyi
Molgula Lutulenta
Molgula Manhattensis
Mollusca
Mysella
Mysella Planulata
Mysidacea
Mysidae
Mysidopsis
Mysidopsis Almyra
Mysidopsis Bigelowi
Mytilidae (Mollusca)
Mytilopsis
Mytilopsis Leucophaeata
Mytilus Edulis
Naididae
Nais Pseudobtusa
Nassarius
Nassarius Trivittatus
Nassarius Vibex
Neomysis Americana
Neopanope Sayi
Nudibranchia
Odostomia
Odostomia Bisuturalis
Odostomia Engonia
Odostomia Impressa
Oecetis
Oecetis Inconspicua
Pagurus
Pagurus Longicarpus
Palaemonetes
Palaemonetes Pugio
Panopeus Herbstii
Paracaprella Tenuis
Paracereis Caudata
Parametopella Cypris
Parapleustes Estuarius
Parathemisto Compressa
Photis
Photis Pollex
Physella
Piscicola
Piscicolidae
Planariidae
Pleustidae
Pleusymtes
Pleusymtes Glaber
Polychaeta
Polydora Websteri
Protodrilus
Pycnogonida
Pyramidellidae
Rhabdocoela
Rhithropanopeus Harrisii
Sabellaria Vulgaris
Sarsiella
Scyphozoa
Serpulidae
Skeneopsis Planorbis
Stenothoe
Stenothoe Minuta
Stylochus Ellipticus
Syllides Convoluta
Syllides Fulva
Syllides Japonica
Syllides Papillosa
Syllides Verrilli
Teleostei
Trematoda
Turbellaria
Turbonilla
Turbonilla Interrupta
Urosalpinx Cinerea
Vitrinellidae
Xanthidae

Calculate Total Biomass:

The Total Species Biomass metric is calculated by computing a simple arithmetic mean of the total normalized species biomass. Biomass must be reported as ash-free dry weigh per taxa to compute this metric.

Step 1) Calculate the biomass of organisms present in each sample normalizing the ash-free dry weight of each taxa (in grams) to biomass in grams per meter squared of surface area.

Step 2) Sum the corrected total abundance of all organisms by STATION and SAMPLE_DATE.

Step 3) Divide the grand sum of species biomass by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given date.

Calculate Percent Abundance of Pollution Indicative Taxa:

The Percent Abundance of Pollution Indicative Taxa metric is computed by the sum of total abundance, sum of total abundance of pollution indicative taxa and determining a simple percentage.

Step 1) Calculate the number of organisms present in each sample normalizing the number or organisms to number of organisms per meter squared of surface area.

Step 2) Sum the corrected total abundance of all organisms by STATION, SAMPLE_DATE, and SAMPLE_NUMBER (replicate number if applicable).

Step 3) Sum the corrected total abundance of Pollution Indicative organisms by STATION, SAMPLE_DATE and SAMPLE_NUMBER. The current list of pollution indicative species is provided in Table 9.

Step 4) Divide the sum of pollution indicative taxa abundance by the sum of total species abundance by STATION, SAMPLE_DATE and SAMPLE_NUMBER to determine the percent PI abundance by replicate.

Step 5) Sum all of the percentages by STATION and SAMPLE_DATE.

Step 6) Divide the grand sum of species abundance percentages by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given SAMPLE_DATE, multiply by 100 to get a final percentage.

Asabellides Oculata	*Aulodrilus Limnobius*	*Aulodrilus Paucichaeta*
Aulodrilus Pigueti	*Aulodrilus Pluriseta*	*Bothrioneurum Vejdovskyanum*
Capitella Spp.	*Chironomus Spp.*	*Cladotanytarsus Spp.*
Coelotanypus Spp.	*Glyptotendipes Spp.*	*Haber Cf. Speciosus*
Hypereteone Heteropoda	*Isochaetides Curvosetosus*	*Isochaetides Frevi*
Leitoscoloplos Fragilis	*Limnodrilus Hoffmeisteri*	*Mulinia Lateralis*
Nucula Proxima	*Paraprionospio Pinnata*	*Polypedilum Tripodurn*
Potamothrix Vejdovskyi	*Procladius Sublettei*	*Quistadrilus Multisetosus*
Streblospio Benedicti	*Tanypus Spp.*	*Tubificid Immature Without Capilliform Chaetae*

Table 9: Currently defined pollution indicative taxa in Chesapeake Bay.

Calculate Percent Biomass of Pollution Indicative Taxa:

Calculate the percentage of total species biomass composed of pollution indicative taxa.
The Percent Abundance of Pollution Indicative Taxa metric is computed by summing total biomass, summing total biomass of pollution indicative taxa and then determining a simple percentage.

Step 1) Calculate the number of organisms present in each sample normalizing the biomass in ash-free dry weight in grams to grams biomass per meter squared of surface area.

Step 2) Sum the corrected total biomass of all organisms by STATION, SAMPLE_DATE, and SAMPLE_NUMBER (replicate number if applicable).

Step 3) Sum the corrected total biomass of pollution indicative organisms by STATION, SAMPLE_DATE and SAMPLE_NUMBER. The current list of pollution indicative species is given in Table 9.

Step 4) Divide the sum of pollution indicative taxa biomass by the sum of total species biomass by STATION, SAMPLE_DATE and SAMPLE_NUMBER to determine the percent pollution indicative species biomass by replicate.

Step 5) Sum all of the percentages by STATION and SAMPLE_DATE.

Step 6) Divide the grand sum of biomass percentages by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given SAMPLE_DATE multiply by 100 to get a final percentage.

Calculate Abundance of Pollution Sensitive Taxa:

The Percent Abundance of Pollution Sensitive Taxa metric is computed by summing total abundance, summing total abundance of pollution sensitive taxa and determining a simple percentage.

Step 1) Calculate the number of organisms present in each sample normalizing the number or organisms to number of organisms per meter squared of surface area.

Step 2) Sum the corrected total abundance of all organisms by STATION, SAMPLE_DATE, and SAMPLE_NUMBER (replicate number if applicable).

Step 3) Sum the corrected total abundance of pollution sensitive organisms by STATION, SAMPLE_DATE and SAMPLE_NUMBER. The current list of pollution sensitive species is provided in Table 10.

Step 4) Divide the sum of pollution sensitive taxa abundance by the sum of total species abundance by STATION, SAMPLE_DATE and SAMPLE_NUMBER to determine the percent PI abundance by replicate.

Step 5) Sum all of the percentages by STATION and SAMPLE_DATE.

Step 6) Divide the grand sum of species abundance percentages by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given SAMPLE_DATE), and multiply by 100 to get a final percentage.

Alpheus Heterochaelis	*Anadara Ovalis*	*Anadara Transversa*
Asychis Elongata	*Bhawania Heteroseta*	*Biffarius Biformis*
Callianassa Setimanus	*Ceriantheopsis Americana*	*Chaetopterus Variopedatus*
Clymenella Torquata	*Cyathura Polita*	*Cyrtopleura Costata*
Diopatra Cuprea	*Dosinia Discus*	*Ensis Directus*
Glycera Americana	*Glycinde Solitaria*	*Listriella Clymenellae*
Loimia Medusa	*Macoma Baltica*	*Macroclymene Zonalis*
Marenzelleria Viridis	*Mediomastus Ambiseta*	*Mercenaria Mercenaria*
Microphiopholis Atra	*Mya Arenaria*	*Nephtys Picta*
Rangia Cuneata	*Spiochaetopterus Costarum*	*Spiophanes Bombyx*
Spisula Solidissima	*Squilla Empusa*	*Tagelus Divisus*
Tagelus Plebeius	*Tellina Agilis*	

Table 10: Currently defined pollution sensitive taxa in Chesapeake Bay

Calculate Biomass of Pollution Sensitive Taxa:
The Percent Abundance of Pollution Sensitive Taxa metric is computed by summing total biomass, summing total biomass of pollution sensitive taxa and determining a simple percentage.

Step 1) Calculate the number of organisms present in each sample normalizing the biomass in ash-free dry weight in grams to grams biomass per meter squared of surface area.

Step 2) Sum the corrected total biomass of all organisms by STATION, SAMPLE_DATE, and SAMPLE_NUMBER (replicate number if applicable).

Step 3) Sum the corrected total biomass of pollution sensitive organisms by STATION, SAMPLE_DATE and SAMPLE_NUMBER. The current list of pollution sensitive species is given in Table 10.

Step 4) Divide the sum of pollution sensitive taxa biomass by the sum of total species biomass by STATION, SAMPLE_DATE and SAMPLE_NUMBER to determine the percent pollution indicative species biomass by replicate.

Step 5) Sum all of the percentages by STATION and SAMPLE_DATE.

Step 6) Divide the grand sum of biomass percentages by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given SAMPLE_DATE), and multiply by 100 to get a final percentage.

Calculate the Shannon-Wiener Index:

The Shannon-Wiener Index of Species Diversity is calculated for each site.

$$H' = -\sum_{i=1}^{S} P_i LOGP_i$$

Where
H' is the index value
S is the number of species observed in a sample
Pi is the proportion of the total number of individuals consisting of the i th species
LOG used for index development was log base 2

Equation 1: The equation for the Shannon Wiener Index

Step 1) Calculate the number of organisms present in each sample, normalizing the number or organisms to number of organisms per meter squared of surface area.

Step 2) Sum the corrected total abundance of all organisms by STATION, SAMPLE_DATE, and SAMPLE_NUMBER (replicate number if applicable). Count the number of individual taxa observed in each sample.

Step 3) Calculate the ratio of each individual taxa divided by the total abundance for each sample. The take the log base 2 of each ratio.

Step 4) Sum the log of the ratios by STATION, SAMPLE_DATE and SAMPLE_NUMBER. Next multiply the sums by -1.

Step 5) Sum all of the ratios by STATION and SAMPLE_DATE.

Step 6) Divide the grand sum of ratios by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given SAMPLE_DATE).

Percent Abundance of Carnivores and Omnivores:

The Percent Abundance of Carnivores and Omnivores metric is computed by summing total taxa abundance, summing total abundance of carnivorous and omnivorous feeding taxa and then determining a simple percentage.

Step 1) Calculate the number of organisms present in each sample normalizing the number or organisms to number of organisms per meter squared of surface area.

Step 2) Sum the corrected total abundance of all organisms by STATION, SAMPLE_DATE, and SAMPLE_NUMBER (replicate number if applicable).

Step 3) Sum the corrected total abundance of carnivores and omnivores by STATION, SAMPLE_DATE and SAMPLE_NUMBER. The current list of assigned feeding guilds is given in Table 15.

Step 4) Divide the sum of carnivore and omnivore taxa abundance by the sum of total species abundance by STATION, SAMPLE_DATE and SAMPLE_NUMBER to determine the percent PI abundance by replicate.

Step 5) Sum all of the percentages by STATION and SAMPLE_DATE.

Step 6) Divide the grand sum of carnivore and omnivore abundance percentages by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given SAMPLE_DATE), and multiply by 100 to get a final percentage.

Percent Abundance of Deep Deposit Feeders:

The Percent Abundance of Deep Deposit Feeders is computed by summing total abundance and total abundance of deep deposit feeding taxa and determines a simple percentage.

Step 1) Calculate the number of organisms present in each sample normalizing the number or organisms to number of organisms per meter squared of surface area.

Step 2) Sum the corrected total abundance of all organisms by STATION, SAMPLE_DATE, and SAMPLE_NUMBER (replicate number if applicable).

Step 3) Sum the corrected total abundance of deep deposit feeders by STATION, SAMPLE_DATE and SAMPLE_NUMBER. The current list of assigned feeding guilds is given in Table 15.

Step 4) Divide the Deep Deposit Feeding taxa abundance by the sum of Total species abundance by STATION, SAMPLE_DATE and SAMPLE_NUMBER to determine the percent PI abundance by replicate.

Step 5) Sum all of the percentages by STATION and SAMPLE_DATE.

Step 6) Divide the grand sum of deep deposit feeders abundance percentages by the total count of SAMPLE_NUMBER (or number of replicate samples taken per STATION on a given SAMPLE_DATE), and multiply by 100 to get a final percentage.

Scoring the Results:

Scoring the summary statistics to calculate BIBI values can be done in one of two ways: 1) by comparing sites of unknown quality to reference sites or benchmarks or 2) comparing scoring sites based on established benchmarks for an estuarine system. Benchmarks or " Restoration Goals " for the Chesapeake Bay were initially established in 1997 by the site comparison procedure. Monitoring data are now measured against these goals to determine progress.

Scoring by Reference Sites:

Reference sites are the unimpacted or least-impacted sites within a habitat type. They are used as a basis for comparison. In the establishment of the current index, reference sites were site that showed no chemical contaminant impact or significant low oxygen events. (For more details see- *Chesapeake Bay Benthic Community Restoration Goals*, 1994 and Weisberg et al. 1997)

A value of 5 is assigned to a site whose conditions approximate reference sites, a score of 3 is given to sites that slightly deviate from reference conditions. A value of 1 is assigned for sites deviating greatly from the reference site conditions. The values for each of the above metrics are then compared to the values for the reference site by habitat area with the Kolmogorov-Smirnov test. Threshold values were established as the 5th and 50th median percentile value for the Shannon-Weiner species diversity index, abundance of pollution indicative taxa and abundance of pollution sensitive taxa. Total abundance and biomass respond biomodally and are scored on the bimodal scale. Values of 95 percent were scored as 1, greater than 5 but less than 95 percent were scored as 3 and values greater than 25 but less than 75 percent were scored as 5.

B- IBI Score	Single Modal Percentile	Bimodal Percentile
1	X<5	X<5 or <95
3	5>X<50	5>X<25 or 75>X<95
5	X>50	25>X<75

Table 11. Benthic Index of Biotic Integrity Scoring Percentiles

Not all summary statistics are valid for use in all habitat areas see Table 13 for complete listing of appropriate metric usage.

Scoring by Reference Benchmarks:

Scoring metrics with respect to established benchmarks (Weisberg et al. 1997) is the protocol used in the BIBI values in the CBP-CIMS benthic database. The metrics are currently scored based on appropriate usage in habitat areas (Table 13) and value ranges (Table 14).

Calculating the Benthic Restoration Goal:

To determine if a site's benthic community meets the benthic restoration goal, each metric is first compared to established benchmarks (Table 12) and scored. The mean value of the scored metrics is then calculated. If the mean value is equal to or greater than 3, the site meets the restoration goal. An overall score or BRGI values can then calculated by deriving a mean value for the individual BIBI values available. All sites with BRGI values of 3 or greater are considered to have met minimum restoration goal. Values of less than 3 are further broken down into categories of marginally degraded and severely degraded (Table 14).

Benthic RGI Value	Score
X <= 2	Severely Degraded
2 < X>2.6	Degraded
2.6<X>3	Marginal
X= 3.0	Meets Goal

Table 12. Benthic Restoration Score Ranges

	Tidal Fresh Sand and Mud	Oligohaline Sand and Mud	Low Mesohaline Sand and Mud	High Mesohaline Sand	High Mesohaline Mud	Polyhaline Sand	Polyhaline Mud
Shannon-Weiner Species Diversity Index	X	X	X	X	X	X	X
Total Species Abundance	X	X	X	X	X	X	X
Total Species Biomass	X	X	X	X	X	X	X
Percent Abundance of Pollution-Indicative Species	X	X	X	X			
Percent Abundance of Pollution-Sensitive Species		X		X		X	
Percent Biomass of Pollution-Indicative Species					X	X	X
Percent Biomass of Pollution-Sensitive Species			X		X		X
Percent Abundance of Carnivores and Omnivores				X	X		X
Percent Abundance of Deep Deposit Feeders						X	

Table 13. Metric Usage by Habitat Classification. An X denotes that a metric is appropriate for usage in BIBI calculations for a given habitat. (From Weisberg et al. 1997)

Table 14. Benthic Index of Biotic Integrity Metric Benchmarks for the Chesapeake Bay. (From Weisberg et al. 1997)

SCORE	5	3	1
Tidal Fresh Sand and Mud			
Shannon-Weiner	≥1.8	1.0-1.8	<1.0
Abundance (#/M2)	≥1000-4000	500-1000 or ≥4000-10000	<500 or ≥10000
Biomass (g/M2)	≥0.5-3.0	0.25-0.5 or ≥3.0-50	<0.25 or ≥50.0
Abundance Pollution Indicative Taxa (%)	≤25	25-75	>75
Oligohaline Sand and Mud			
Shannon-Weiner	≥2.5	1.9-2.5	<1.9
Abundance (#/M2)	≥1500-3000	500-1500 or ≥3000-8000	<500 or >8,000
Biomass (g/M2)	≥3.0-25.0	0.5-3.0 or ≥ 25.0-60.0	<0.5 or ≥60.0
Abundance Pollution Indicative Taxa (%)	≤25	25-75	>75
Abundance Pollution Sensitive Taxa (%)	≥40	10-40	>75
Low Mesohaline Sand and Mud			
Shannon-Weiner	≥2.5	1.7-2.5	<1.7
Abundance (#/M2)	≥1500-2500	500-1500 or ≥2500-6000	<500 or >6000
Biomass (g/M2)	≥0.5-10.0	1.0-5.0 or ≥10.0-30.0	<1.0 or ≥30.0
Abundance of Pollution Indicative Taxa (%)	≤10	10.0-20.0	>20
Biomass of Pollution Sensitive Taxa (%)	≥80	40.0-80.0	<40
High Mesohaline Sand			
Shannon-Weiner	≥3.2	2.5-3.2	<2.5
Abundance (#/M2)	≥1500-3000	1000-1500 or ≥3000-5000	<1000 or ≥5000
Biomass (g/M2)	≥3.0-15.0	1.0-3.0 or 15.0-50.0	<1.0 or ≥50.0
Abundance of Pollution Indicative Taxa (%)	≤10	10-25	>25
Abundance of Pollution Sensitive Taxa (%)	≥40	10-40	<10
Abundance of Carnivores and Omnivores (%)	≥35	20-30	<20
High Mesohaline Mud			
Shannon-Weiner	≥3.0	2.0-3.0	<2.0
Abundance (#/M2)	≥1500-2500	1000-1500 or ≥2500-5000	<1000 or ≥5000
Biomass (g/M2)	≥2.0-10.0	0.5-2.0 or ≥10.0-50.0	<0.5 or ≥50.0
Biomass of Pollution Indicative Taxa (%)	≤ 5	5.0-30.0	>30
Biomass of Pollution Sensitive Taxa (%)	≥60	30-60	<30
Abundance of Carnivores and Omnivores (%)	≤25	10-25	<10
Polyhaline Sand			
Shannon-Weiner	≥3-5	2.7-3.5	<2.7
Abundance (#/M2)	≥3000-5000	1500-3000 or ≥5000-8000	<1500 or ≥8000
Biomass (g/M2)	≥5.0-20.0	1.0-5.0 or ≥20.0-50.0	<1.0 or ≥50.0
Biomass of Pollution Indicative Taxa (%)	≤ 5	5-15	>15
Abundance of Pollution Sensitive Taxa (%)	≥50	25-50	<25
Abundance of Deep-Deposit Feeders (%)	≥25	10-25	<10

SCORE	5	3	1
Polyhaline Mud			
Shannon-Weiner	≥3.3	2.4-3.3	<2.4
Abundance (#/M2)	1500-2500	1000-1500 or ≥3000-8000	<1000 or ≥8000
Biomass (g/M2)	3.0-10.0	0.5-3 or ≥10-30	<0.5 or ≥30.0
Biomass of Pollution Indicative Taxa (%)	≥3-10	5-20	>20
Biomass of Pollution Sensitive Taxa (%)	≥40	30-60	<30
Abundance of Carnivores and Omnivores (%)	≥40	25-40	<25

Table 15. Feeding Guild Assignments for Species Found in Current Monitoring Data.

LATIN NAME	FEEDING GUILD
Ablabesmyia	Carnivore/Omnivore
Ablabesmyia Auriensis	Carnivore/Omnivore
Ablabesmyia Parajanta	Carnivore/Omnivore
Acanthohaustorius Millsi	Interface
Acteocina	Carnivore/Omnivore
Acteocina Canaliculata	Carnivore/Omnivore
Acteon Punctostriatus	Carnivore/Omnivore
Actiniaria	Carnivore/Omnivore
Aedicira Albatrossae	Deep Deposit
Aegathoa Medialis	Carnivore/Omnivore
Aeshna	Carnivore/Omnivore
Aglaophamus Verrilli	Carnivore/Omnivore
Alboglossiphonia Heteroclita	Not Assigned
Aligena Elevata	Suspension
Allocapnia	Not Assigned
Almyracuma Proximoculi	Interface
Alona Affinis	Not Assigned
Alpheus Heterochaelis	Carnivore/Omnivore
Amastigos Caperatus	Deep Deposit
Amnicola Limosa	Not Assigned
Ampelisca	Suspension
Ampelisca Abdita	Suspension
Ampelisca Vadorum	Suspension
Ampelisca Verrilli	Suspension
Ampharete Acutifrons	Interface
Ampharete Americana	Interface
Ampharete Arctica	Interface
Ampharetidae	Interface
Amphiodia Atra	Not Assigned
Amphipoda	Interface
Amphiporus Bioculatus	Not Assigned
Amphitrite Ornata	Interface
Ampithoe Valida	Not Assigned
Ampithoidae	Interface
Amygdalum Papyrium	Not Assigned
Anachis Avara	Carnivore/Omnivore
Anachis Lafresnayi	Carnivore/Omnivore
Anachis Obesa	Carnivore/Omnivore
Anachis Translirata	Carnivore/Omnivore
Anadara	Suspension
Anadara Ovalis	Suspension
Anadara Transversa	Suspension
Ancistrosyllis	Carnivore/Omnivore
Ancistrosyllis Commensalis	Carnivore/Omnivore
Ancistrosyllis Hartmanae	Carnivore/Omnivore
Ancistrosyllis Jonesi	Carnivore/Omnivore
Ancylidae	Carnivore/Omnivore
Anemone	Not Assigned
Anisoptera	Carnivore/Omnivore
Anodonta	Suspension

LATIN NAME	FEEDING GUILD
Anthozoa	Not Assigned
Antinoella Sarsi	Deep Deposit
Aoridae	Interface
Apoprionospio Pygmaea	Interface
Arabella Iricolor	Carnivore/Omnivore
Arabellidae	Carnivore/Omnivore
Arachnida	Not Assigned
Arcteonais Lomondi	Deep Deposit
Aricidea	Deep Deposit
Aricidea Catherinae	Interface
Aricidea Cerruti	Interface
Aricidea Fragilis	Interface
Aricidea Wassi	Interface
Asabellides Oculata	Interface
Asellidae	Carnivore/Omnivore
Asellus	Carnivore/Omnivore
Asychis Elongata	Deep Deposit
Aulodrilus Limnobius	Deep Deposit
Aulodrilus Paucichaeta	Deep Deposit
Aulodrilus Pigueti	Deep Deposit
Aulodrilus Pluriseta	Deep Deposit
Autolytus	Carnivore/Omnivore
Axarus Festivus	Not Assigned
Balanoglossus Aurantiacus	Deep Deposit
Balanus	Not Assigned
Balanus Amphitrite Niveus	Not Assigned
Balanus Improvisus	Not Assigned
Balcis Intermedia	Carnivore/Omnivore
Barnea Truncata	Suspension
Batea Catharinensis	Interface
Batracobdella	Not Assigned
Batracobdella Phalera	Not Assigned
Bezzia	Carnivore/Omnivore
Bivalvia	Deep Deposit
Boccardia Hamata	Interface
Boccardiella Ligerica	Interface
Boonea Bisuturalis	Carnivore/Omnivore
Boonea Impressa	Carnivore/Omnivore
Bothrioneurum Vejdovskyanum	Deep Deposit
Brachyura	Not Assigned
Branchiostoma Virginiae	Not Assigned
Branchiura Sowerbyi	Deep Deposit
Brania Clavata	Carnivore/Omnivore
Brania Pusilla	Carnivore/Omnivore
Brania Wellfleetensis	Carnivore/Omnivore
Bratislavia Bilongata	Deep Deposit
Bratislavia Unidentata	Deep Deposit
Busycon	Carnivore/Omnivore
Busycon Canaliculatum	Carnivore/Omnivore
Busycon Carica	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Cabira Incerta	Carnivore/Omnivore
Caecidotea	Carnivore/Omnivore
Caecidotea Communis	Carnivore/Omnivore
Caenis	Carnivore/Omnivore
Callianassa Atlantica	Carnivore/Omnivore
Callianassa Biformis	Carnivore/Omnivore
Callinectes Sapidus	Carnivore/Omnivore
Capitella	Deep Deposit
Capitella Capitata	Deep Deposit
Capitellidae	Deep Deposit
Capitellides Jonesi	Deep Deposit
Caprella Penantis	Not Assigned
Caprellidae	Not Assigned
Carazziella Hobsonae	Interface
Caridea	Not Assigned
Carinoma Tremaphoros	Carnivore/Omnivore
Cassidinidea Lunifrons	Carnivore/Omnivore
Cassidinidea Ovalis	Carnivore/Omnivore
Caulleriella	Interface
Caulleriella Killariensis	Interface
Cephalocarida	Not Assigned
Ceraclea	Carnivore/Omnivore
Cerapus Tubularis	Not Assigned
Ceratonereis Irritabilis	Carnivore/Omnivore
Ceratopogonidae	Carnivore/Omnivore
Cerebratulus	Not Assigned
Cerebratulus Lacteus	Not Assigned
Ceriantheopsis Americana	Carnivore/Omnivore
Cerianthus Americanus	Carnivore/Omnivore
Cerithiopsis Greeni	Carnivore/Omnivore
Chaetogaster	Deep Deposit
Chaetopterus Variopedatus	Suspension
Chaetozone Setosa	Interface
Chaoboridae	Carnivore/Omnivore
Chaoborus	Carnivore/Omnivore
Chaoborus Albatus	Carnivore/Omnivore
Chaoborus Punctipennis	Carnivore/Omnivore
Cheumatopsyche	Carnivore/Omnivore
Chiridotea	Carnivore/Omnivore
Chiridotea Almyra	Carnivore/Omnivore
Chiridotea Arenicola	Carnivore/Omnivore
Chiridotea Caeca	Carnivore/Omnivore
Chiridotea Coeca	Carnivore/Omnivore
Chiridotea Nigrescens	Carnivore/Omnivore
Chironomidae	Carnivore/Omnivore
Chironomini	Carnivore/Omnivore
Chironomus	Carnivore/Omnivore
Chironomus Attenuatus	Carnivore/Omnivore
Chironomus Decorus	Carnivore/Omnivore
Chrysaora	Not Assigned
Chrysomelidae	Not Assigned
Cirratulidae	Interface

LATIN NAME	FEEDING GUILD
Cirriformia Grandis	Interface
Cirrophorus	Interface
Cirrophorus Lyriformis	Interface
Cladopelma	Not Assigned
Cladotanytarsus	Carnivore/Omnivore
Cladotanytarsus Mancus	Carnivore/Omnivore
Clinotanypus	Carnivore/Omnivore
Clinotanypus Pinguis	Carnivore/Omnivore
Clymenella Torquata	Deep Deposit
Clymenella Zonalis	Deep Deposit
Cnemidocarpa Mollis	Not Assigned
Coelotanypus	Carnivore/Omnivore
Coenagrionidae	Not Assigned
Collembola	Carnivore/Omnivore
Corbicula Fluminea	Suspension
Corbicula Manilensis	Suspension
Cordylophora Lacustris	Not Assigned
Corophiidae	Interface
Corophium	Interface
Corophium Acherusicum	Interface
Corophium Acutum	Interface
Corophium Insidiosum	Interface
Corophium Lacustre	Interface
Corophium Simile	Interface
Corophium Tuberculatum	Interface
Corophium Volutator	Interface
Crangon Septemspinosa	Not Assigned
Crassispira Ostrearum	Carnivore/Omnivore
Crassostrea Virginica	Not Assigned
Cratena Pilata	Not Assigned
Crepidula Fornicata	Carnivore/Omnivore
Crepidula Plana	Carnivore/Omnivore
Cricotopus	Carnivore/Omnivore
Cricotopus Bicinctus	Carnivore/Omnivore
Cryptochironomus	Carnivore/Omnivore
Cryptochironomus Fulvus	Carnivore/Omnivore
Cryptochironomus Parafulvus	Carnivore/Omnivore
Cryptotendipes	Not Assigned
Curculionidae	Not Assigned
Cyathura	Carnivore/Omnivore
Cyathura Burbancki	Carnivore/Omnivore
Cyathura Polita	Carnivore/Omnivore
Cyclaspis Varians	Interface
Cylichnella Bidentata	Carnivore/Omnivore
Cymadusa Compta	Not Assigned
Cymothoidae	Not Assigned
Cyrnellus	Not Assigned
Cyrtopleura Costata	Suspension
Decapoda	Carnivore/Omnivore
Dero	Deep Deposit
Dero Digitata	Deep Deposit
Dero Flabelliger	Deep Deposit

LATIN NAME	FEEDING GUILD
Diadumene Leucolena	Not Assigned
Diamesinae	Not Assigned
Diastylis Polita	Not Assigned
Dicrotendipes	Carnivore/Omnivore
Dicrotendipes Neomodestus	Carnivore/Omnivore
Dicrotendipes Nervosus	Carnivore/Omnivore
Diopatra Cuprea	Carnivore/Omnivore
Diptera	Carnivore/Omnivore
Djalmabatista Pulcher	Carnivore/Omnivore
Dolichopodidae	Not Assigned
Doridella Obscura	Carnivore/Omnivore
Dosinia Discus	Suspension
Drilonereis	Carnivore/Omnivore
Drilonereis Longa	Carnivore/Omnivore
Drilonereis Magna	Carnivore/Omnivore
Dromogomphus	Carnivore/Omnivore
Dromogomphus Armatus	Carnivore/Omnivore
Dryopidae	Not Assigned
Dubiraphia	Not Assigned
Dugesia Tigrina	Not Assigned
Echinoidea	Not Assigned
Echiura	Deep Deposit
Edotea Triloba	Carnivore/Omnivore
Edwardsia Elegans	Carnivore/Omnivore
Einfeldia	Carnivore/Omnivore
Elasmopus Laevis	Interface
Elliptio Complanata	Suspension
Elmidae	Not Assigned
Enchytraeidae	Deep Deposit
Endochironomus	Carnivore/Omnivore
Endochironomus Subtendens	Carnivore/Omnivore
Ensis Directus	Suspension
Ephemeridae	Carnivore/Omnivore
Ephemeroptera	Carnivore/Omnivore
Ephoron	Carnivore/Omnivore
Epitonium	Carnivore/Omnivore
Epitonium Humphreysii	Carnivore/Omnivore
Epitonium Multistriatum	Carnivore/Omnivore
Epitonium Rupicola	Carnivore/Omnivore
Epoicocladius	Not Assigned
Erichsonella	Carnivore/Omnivore
Erichsonella Attenuata	Carnivore/Omnivore
Erichsonella Filiformis	Carnivore/Omnivore
Ericthonius Brasiliensis	Not Assigned
Erioptera	Carnivore/Omnivore
Eteone	Carnivore/Omnivore
Eteone Foliosa	Carnivore/Omnivore
Eteone Heteropoda	Carnivore/Omnivore
Eteone Lactea	Carnivore/Omnivore
Euceramus Praelongus	Carnivore/Omnivore
Euchone	Suspension
Eukiefferiella	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Eukiefferiella Devonica	Carnivore/Omnivore
Eumida Sanguinea	Carnivore/Omnivore
Eunicea	Carnivore/Omnivore
Euplana Gracilis	Not Assigned
Eupleura Caudata	Carnivore/Omnivore
Eupolymnia	Interface
Eurylophella	Not Assigned
Eurypanopeus Depressus	Carnivore/Omnivore
Exogone	Carnivore/Omnivore
Exogone Dispar	Carnivore/Omnivore
Exogone Verugera	Carnivore/Omnivore
Ferrissia	Carnivore/Omnivore
Ferrissia Rivularis	Carnivore/Omnivore
Gammarus	Interface
Gammarus Daiberi	Interface
Gammarus Fasciatus	Interface
Gammarus Mucronatus	Interface
Gammarus Palustris	Interface
Gammarus Tigrinus	Interface
Gastropoda	Carnivore/Omnivore
Gemma Gemma	Suspension
Genetyllis Castanea	Carnivore/Omnivore
Geukensia Demissa	Not Assigned
Glossiphoniidae	Not Assigned
Glycera	Carnivore/Omnivore
Glycera Americana	Carnivore/Omnivore
Glycera Capitata	Carnivore/Omnivore
Glycera Dibranchiata	Carnivore/Omnivore
Glycinde Solitaria	Carnivore/Omnivore
Glyptotendipes	Carnivore/Omnivore
Gomphidae	Carnivore/Omnivore
Gomphus	Carnivore/Omnivore
Goniobasis Virginica	Not Assigned
Gyptis	Carnivore/Omnivore
Gyptis Brevipalpa	Carnivore/Omnivore
Gyptis Vittata	Carnivore/Omnivore
Gyraulus	Carnivore/Omnivore
Haber Cf. Speciosus	Deep Deposit
Haloclava Producta	Carnivore/Omnivore
Haminoea Solitaria	Carnivore/Omnivore
Hargeria Rapax	Interface
Harmothoe	Carnivore/Omnivore
Harmothoe Extenuata	Carnivore/Omnivore
Harnischia	Carnivore/Omnivore
Helisoma	Carnivore/Omnivore
Helobdella	Not Assigned
Helobdella Fusca	Not Assigned
Helobdella Stagnalis	Not Assigned
Helobdella Triserialis	Not Assigned
Hemerodromia	Not Assigned
Hemichordata	Deep Deposit
Hesionidae	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Heteromastus Filiformis	Deep Deposit
Heteromysis Formosa	Not Assigned
Hexagenia	Carnivore/Omnivore
Hexapanopeus Angustifrons	Carnivore/Omnivore
Hirudinea	Carnivore/Omnivore
Hobsonia Florida	Interface
Holothuroidea	Deep Deposit
Hydra	Not Assigned
Hydracarina	Not Assigned
Hydrobaenus	Carnivore/Omnivore
Hydrobia	Carnivore/Omnivore
Hydrobia Truncata	Carnivore/Omnivore
Hydrobiidae	Carnivore/Omnivore
Hydropsyche	Carnivore/Omnivore
Hydropsychidae	Carnivore/Omnivore
Hydroptila	Carnivore/Omnivore
Hydroptilidae	Carnivore/Omnivore
Idoteidae	Not Assigned
Idunella	Not Assigned
Idunella Barnardi	Not Assigned
Idunella Bowenae	Not Assigned
Idunella Smithii	Not Assigned
Ilyodrilus	Deep Deposit
Ilyodrilus Templetoni	Deep Deposit
Insecta	Carnivore/Omnivore
Ischadium Recurvum	Not Assigned
Ischnura	Not Assigned
Isochaetides Curvisetosus	Deep Deposit
Isochaetides Freyi	Deep Deposit
Isopoda	Carnivore/Omnivore
Jassa Falcata	Not Assigned
Kiefferulus	Not Assigned
Kurtziella Atrostyla	Carnivore/Omnivore
Laeonereis Culveri	Carnivore/Omnivore
Lampsilis	Suspension
Lauterborniella	Carnivore/Omnivore
Leitoscoloplos	Deep Deposit
Leitoscoloplos Fragilis	Deep Deposit
Leitoscoloplos Robustus	Deep Deposit
Lepidactylus Dytiscus	Interface
Lepidametria Commensalis	Carnivore/Omnivore
Lepidonotus Sublevis	Carnivore/Omnivore
Lepidonotus Variabilis	Carnivore/Omnivore
Leptalpheus Forceps	Carnivore/Omnivore
Leptoceridae	Carnivore/Omnivore
Leptocheirus Plumulosus	Interface
Leptosynapta Tenuis	Deep Deposit
Leucon Americanus	Interface
Levinsenia Gracilis	Interface
Libinia Dubia	Carnivore/Omnivore
Limnodrilus	Deep Deposit
Limnodrilus Cervix	Deep Deposit

LATIN NAME	FEEDING GUILD
Limnodrilus Claparedianus	Deep Deposit
Limnodrilus Hoffmeisteri	Deep Deposit
Limnodrilus Profundicola	Deep Deposit
Limnodrilus Udekemianus	Deep Deposit
Limnophyes	Carnivore/Omnivore
Limulus Polyphemus	Not Assigned
Lipinella	Not Assigned
Lironeca Ovalis	Not Assigned
Listriella Barnardi	Interface
Listriella Clymenellae	Interface
Littoridinops	Carnivore/Omnivore
Littoridinops Tenuipes	Carnivore/Omnivore
Littorina	Carnivore/Omnivore
Loimia Medusa	Interface
Lolliguncula Brevis	Not Assigned
Lumbriculidae	Deep Deposit
Lumbrineridae	Carnivore/Omnivore
Lumbrineris Fragilis	Carnivore/Omnivore
Lumbrineris Tenuis	Carnivore/Omnivore
Lyonsia Hyalina	Interface
Lysidice Ninetta	Carnivore/Omnivore
Macoma	Interface
Macoma Baltica	Interface
Macoma Mitchelli	Interface
Macoma Tenta	Interface
Macroclymene Zonalis	Deep Deposit
Magelona	Suspension
Maldanidae	Deep Deposit
Maldanopsis	Not Assigned
Malmgrenia Lunulata	Carnivore/Omnivore
Manayunkia Speciosa	Suspension
Mancocuma Stellifera	Not Assigned
Mangelia Plicosa	Not Assigned
Marenzelleria Viridis	Interface
Mediomastus Ambiseta	Deep Deposit
Melinna	Interface
Melinna Maculata	Interface
Melita	Interface
Melita Appendiculata	Interface
Melita Nitida	Interface
Menetus	Not Assigned
Mercenaria Mercenaria	Suspension
Microchironomus	Not Assigned
Microcylloepus	Not Assigned
Microphthalmus	Carnivore/Omnivore
Microphthalmus Aberrans	Carnivore/Omnivore
Microphthalmus Sczelkowii	Carnivore/Omnivore
Microprotopus Raneyi	Interface
Micropsectra	Not Assigned
Microspio Pigmentata	Not Assigned
Microtendipes	Carnivore/Omnivore
Micrura Leidyi	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Minuspio Cirrifera	Not Assigned
Minuspio Cirrobranchiata	Not Assigned
Mitrella Lunata	Not Assigned
Molgula Lutulenta	Not Assigned
Molgula Manhattensis	Not Assigned
Mollusca	Not Assigned
Monoculodes	Interface
Monoculodes Edwardsi	Interface
Monoculodes Intermedius	Interface
Mulinia Lateralis	Suspension
Musculium	Suspension
Musculium Transversum	Suspension
Mya Arenaria	Suspension
Mysella	Suspension
Mysella Planulata	Suspension
Mysidacea	Not Assigned
Mysidae	Not Assigned
Mysidopsis	Not Assigned
Mysidopsis Almyra	Not Assigned
Mysidopsis Bigelowi	Not Assigned
Mystides Borealis	Carnivore/Omnivore
Mytilidae (Mollusca)	Not Assigned
Mytilopsis Leucophaeata	Not Assigned
Mytilus Edulis	Not Assigned
Naididae	Deep Deposit
Nais	Deep Deposit
Nais Bretscheri	Deep Deposit
Nais Communis	Deep Deposit
Nais Pardalis	Deep Deposit
Nais Pseudobtusa	Deep Deposit
Nais Simplex	Deep Deposit
Nais Variabilis	Deep Deposit
Nanocladius	Carnivore/Omnivore
Nanocladius Balticus	Carnivore/Omnivore
Nanocladius Bicolor	Carnivore/Omnivore
Nassarius Trivittatus	Carnivore/Omnivore
Nassarius Vibex	Carnivore/Omnivore
Natarsia	Not Assigned
Natica Pusilla	Carnivore/Omnivore
Naticidae	Carnivore/Omnivore
Neanthes Succinea	Carnivore/Omnivore
Nemertea	Carnivore/Omnivore
Neomysis Americana	Not Assigned
Neopanope Sayi	Carnivore/Omnivore
Nephtyidae	Carnivore/Omnivore
Nephtys	Carnivore/Omnivore
Nephtys Bucera	Carnivore/Omnivore
Nephtys Incisa	Carnivore/Omnivore
Nephtys Picta	Carnivore/Omnivore
Nereidae	Carnivore/Omnivore
Nereiphylla Fragilis	Carnivore/Omnivore
Nereis	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Nereis Acuminata	Carnivore/Omnivore
Nereis Succinea	Carnivore/Omnivore
Notomastus	Deep Deposit
Notomastus Latericeus	Deep Deposit
Notomastus Lobatus	Deep Deposit
Nucula Proxima	Deep Deposit
Nuculana	Deep Deposit
Nuculana Messanensis	Deep Deposit
Nudibranchia	Not Assigned
Odonata	Carnivore/Omnivore
Odostomia	Carnivore/Omnivore
Odostomia Bisuturalis	Carnivore/Omnivore
Odostomia Engonia	Carnivore/Omnivore
Oecetis	Carnivore/Omnivore
Oecetis Inconspicua	Carnivore/Omnivore
Ogyrides Alphaerostris	Carnivore/Omnivore
Oligochaeta	Deep Deposit
Onchidoris Aspersa	Not Assigned
Opheliidae	Deep Deposit
Ophidonais Serpentina	Deep Deposit
Ophiuroidea	Deep Deposit
Optioservus	Not Assigned
Orbinia Ornata	Deep Deposit
Orbiniidae	Deep Deposit
Orthocladiinae	Carnivore/Omnivore
Owenia Fusiformis	Suspension
Oxyurostylis Smithi	Interface
Pagurus	Carnivore/Omnivore
Pagurus Longicarpus	Carnivore/Omnivore
Pagurus Pubescens	Carnivore/Omnivore
Palaemonetes	Not Assigned
Palaemonetes Pugio	Not Assigned
Paleanotus Heteroseta	Not Assigned
Palpomyia	Carnivore/Omnivore
Pandora Gouldiana	Suspension
Pandora Trilineata	Suspension
Panopeus Herbstii	Carnivore/Omnivore
Paracaprella Tenuis	Not Assigned
Paracereis Caudata	Not Assigned
Parachironomus	Carnivore/Omnivore
Paracladopelma	Not Assigned
Paradoneis Lyra	Interface
Parahaustorius Longimerus	Not Assigned
Parahesione Luteola	Carnivore/Omnivore
Paralauterborniella	Carnivore/Omnivore
Paraleptophlebia	Carnivore/Omnivore
Parametopella Cypris	Interface
Parametriocnemus	Carnivore/Omnivore
Paranais	Deep Deposit
Paranais Frici	Deep Deposit
Paranais Litoralis	Deep Deposit
Paranaitis Polynoides	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Paranaitis Speciosa	Carnivore/Omnivore
Paraonis Fulgens	Interface
Parapionosyllis Longicirrata	Carnivore/Omnivore
Parapleustes Estuarius	Interface
Paraprionospio Pinnata	Interface
Paratendipes	Carnivore/Omnivore
Parathemisto Compressa	Not Assigned
Parvilucina Multilineata	Suspension
Pectinaria Gouldi	Deep Deposit
Peltodytes	Not Assigned
Pentamera Pulcherrima	Deep Deposit
Petricola Pholadiformis	Suspension
Phaenopsectra	Not Assigned
Phascolion Strombi	Deep Deposit
Phoronis Architecta	Suspension
Phoronis Psammophila	Suspension
Photis	Interface
Photis Macrocoxa	Interface
Photis Pollex	Interface
Photis Reinhardi	Interface
Phyllodoce	Carnivore/Omnivore
Phyllodoce Arenae	Carnivore/Omnivore
Phyllodoce Castanea	Carnivore/Omnivore
Phyllodoce Fragilis	Carnivore/Omnivore
Phyllodoce Mucosa	Carnivore/Omnivore
Phyllodocidae	Carnivore/Omnivore
Physa	Carnivore/Omnivore
Physella	Carnivore/Omnivore
Physidae	Carnivore/Omnivore
Piguetiella Michiganensis	Deep Deposit
Pilargidae	Carnivore/Omnivore
Pinnixa	Carnivore/Omnivore
Pinnixa Chaetopterana	Carnivore/Omnivore
Pinnixa Cristata	Carnivore/Omnivore
Pinnixa Retinens	Carnivore/Omnivore
Pinnixa Sayana	Carnivore/Omnivore
Pinnotheres Ostreum	Carnivore/Omnivore
Piscicola	Not Assigned
Piscicolidae	Not Assigned
Pisidiidae	Suspension
Pisidium	Suspension
Pista Cristata	Interface
Pista Palmata	Interface
Pista Quadrilobata	Interface
Planariidae	Not Assigned
Planorbidae	Carnivore/Omnivore
Platyhelminthes	Not Assigned
Pleurocera	Carnivore/Omnivore
Pleuroceridae	Carnivore/Omnivore
Pleustidae	Interface
Pleusymtes	Interface
Pleusymtes Glaber	Interface

LATIN NAME	FEEDING GUILD
Podarke Obscura	Carnivore/Omnivore
Podarkeopsis Levifuscina	Carnivore/Omnivore
Polinices Duplicatus	Carnivore/Omnivore
Polycentropus	Carnivore/Omnivore
Polychaeta	Not Assigned
Polycirrus Eximius	Interface
Polydora	Interface
Polydora Caulleryi	Interface
Polydora Cornuta	Interface
Polydora Ligni	Interface
Polydora Socialis	Interface
Polydora Websteri	Interface
Polygordius	Deep Deposit
Polynoidae	Carnivore/Omnivore
Polyonyx Gibbesi	Carnivore/Omnivore
Polypedilum	Carnivore/Omnivore
Polypedilum Convictum	Carnivore/Omnivore
Polypedilum Fallax	Carnivore/Omnivore
Polypedilum Tripodura	Carnivore/Omnivore
Potamanthus	Carnivore/Omnivore
Potamilla Reniformis	Not Assigned
Potamothrix	Deep Deposit
Potamothrix Vejdovskyi	Deep Deposit
Prionospio	Interface
Prionospio Perkinsi	Interface
Prionospio Steenstrupi	Interface
Pristina	Deep Deposit
Pristina Longiseta Longiseta	Deep Deposit
Pristina Osborni	Deep Deposit
Pristinella	Deep Deposit
Pristinella Jenkinae	Deep Deposit
Pristinella Osborni	Deep Deposit
Pristinella Sima	Deep Deposit
Proceraea	Carnivore/Omnivore
Proceraea Cornuta	Carnivore/Omnivore
Procladius	Carnivore/Omnivore
Procladius Sublettei	Carnivore/Omnivore
Protodrilus	Not Assigned
Pseudeurythoe Ambigua	Carnivore/Omnivore
Pseudeurythoe Paucibranchiata	Carnivore/Omnivore
Pseudochironomus Fulviventris	Carnivore/Omnivore
Pseudoleptocuma Minor	Not Assigned
Ptilanthura Tenuis	Carnivore/Omnivore
Ptilanthura Tricarina	Carnivore/Omnivore
Pycnogonida	Not Assigned
Pyramidella	Not Assigned
Pyramidellidae	Not Assigned
Quistradrilus Multisetosus	Deep Deposit
Rangia Cuneata	Suspension
Rhabdocoela	Not Assigned
Rheotanytarsus	Carnivore/Omnivore
Rhepoxynius Epistomus	Interface

LATIN NAME	FEEDING GUILD
Rhithropanopeus Harrisii	Carnivore/Omnivore
Rictaxis Punctostriatus	Carnivore/Omnivore
Sabellaria Vulgaris	Suspension
Sabellides Octocirrata	Interface
Saccoglossus Kowalevskii	Deep Deposit
Samythella Elongata	Interface
Sarsiella	Not Assigned
Sayella Chesapeakea	Carnivore/Omnivore
Schistomeringos Caeca	Not Assigned
Schistomeringos Rudolphi	Not Assigned
Scolecolepides Viridis	Not Assigned
Scolelepis	Interface
Scolelepis Bousfieldi	Interface
Scolelepis Squamata	Interface
Scolelepis Texana	Interface
Scoloplos Rubra	Deep Deposit
Scyphozoa	Not Assigned
Semele Purpurascens	Suspension
Sigambra	Carnivore/Omnivore
Sigambra Bassi	Carnivore/Omnivore
Sigambra Tentaculata	Carnivore/Omnivore
Siliqua Costata	Suspension
Sipuncula	Deep Deposit
Sipunculoidea	Deep Deposit
Skeneopsis Planorbis	Carnivore/Omnivore
Slavina Appendiculata	Deep Deposit
Specaria Josinae	Deep Deposit
Sphaeriidae	Not Assigned
Sphaerium	Suspension
Sphaeroma Quadridentatum	Not Assigned
Spio	Interface
Spio Filicornis	Interface
Spio Pettiboneae	Interface
Spio Setosa	Interface
Spiochaetopterus Costarum	Interface
Spiochaetopterus Oculatus	Interface
Spionidae	Interface
Spiophanes Bombyx	Interface
Spisula Solidissima	Suspension
Squilla Empusa	Carnivore/Omnivore
Stempellina	Not Assigned
Stenacron	Not Assigned
Stenelmis	Not Assigned
Stenothoe	Interface
Stenothoe Minuta	Interface
Stephensoniana Trivandrana	Deep Deposit
Sthenelais	Carnivore/Omnivore
Sthenelais Boa	Carnivore/Omnivore
Stictochironomus	Carnivore/Omnivore
Streblospio Benedicti	Interface
Streptosyllis Arenae	Not Assigned
Stylaria	Deep Deposit
Stylaria Lacustris	Deep Deposit
Stylochus Ellipticus	Not Assigned
Syllidae	Carnivore/Omnivore
Syllides Verrilli	Carnivore/Omnivore
Synchelidium Americanum	Interface
Tagelus Divisus	Suspension
Tagelus Plebeius	Suspension
Tanaidacea	Suspension
Tanypodinae	Not Assigned
Tanypus	Carnivore/Omnivore
Tanystylum Orbiculare	Not Assigned
Tanytarsini	Carnivore/Omnivore
Tanytarsus	Carnivore/Omnivore
Teleostei	Not Assigned
Tellina Agilis	Interface
Tellinidae	Interface
Terebellidae	Interface
Thalassema	Deep Deposit
Thalassinidae	Carnivore/Omnivore
Tharyx	Interface
Tharyx Annulosus	Interface
Tharyx Setigera	Interface
Thienemannimyia	Carnivore/Omnivore
Thyonella Pervicax	Deep Deposit
Tipulidae	Carnivore/Omnivore
Trematoda	Not Assigned
Tribelos	Not Assigned
Trichoptera	Carnivore/Omnivore
Tricorythodes	Carnivore/Omnivore
Tubifex	Deep Deposit
Tubificidae	Deep Deposit
Tubificoides	Deep Deposit
Tubificoides Benedeni	Deep Deposit
Tubificoides Brownae	Deep Deposit
Tubificoides Diazi	Deep Deposit
Tubificoides Gabriellae	Deep Deposit
Tubificoides Heterochaetus	Deep Deposit
Tubificoides Maureri	Deep Deposit
Tubificoides Wasselli	Deep Deposit
Tubulanidae	Carnivore/Omnivore
Turbellaria	Not Assigned
Turbonilla	Carnivore/Omnivore
Turbonilla Interrupta	Carnivore/Omnivore
Turridae	Carnivore/Omnivore
Uncinais Uncinata	Deep Deposit
Unciola	Interface
Unciola Dissimilis	Interface
Unciola Irrorata	Interface
Unciola Serrata	Interface
Unionidae	Suspension
Upogebia Affinis	Carnivore/Omnivore
Urosalpinx Cinerea	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Vitrinellidae	Not Assigned
Wapsa Mobilis	Deep Deposit
Websterinereis Tridentata	Carnivore/Omnivore
Xanthidae	Carnivore/Omnivore
Xenochironomus	Carnivore/Omnivore

LATIN NAME	FEEDING GUILD
Xenochironomus Festivus	Carnivore/Omnivore
Yoldia	Deep Deposit
Yoldia Limatula	Deep Deposit
Zavreliella	Carnivore/Omnivore

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APPENDIX A – DATA SET STRUC TURES FOR AVAILABLE CIMS DATA

December 1999

This appendix lists the field names, attributes and descriptions for the phytoplankton, zooplankton and benthos data available through ftp.chesapeakebay.net\pub\living_resources. Note that these data structures represent query output and not represent the underlying structures of the relational databases from which the data is being served. If you are interested in more details about the actual relational databases please contact the Living Resources data manager or see the TOOLS section of cims.chesapeakebay.net. For complete data documentation, please see the data documentation files that accompany the data sets.

Table A-1. Phytoplankton and Picoplankton Count Data File Format
On ftp.chesapeakebay.net\pub\living_resources.

Field_Name	Type	Width	Descriptions
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 Sample Was Taken
SAMPLE_NUMBER	Number	8	Sample 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	12.4	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)
BASIN	Text	30	Chesapeake Bay Program Basin Designation
HUC8	Text	8	USGS Eight-Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-2. Phytoplankton and Picoplankton Event Data File Format
On ftp.chesapeakebay.net\pub\living_resources.

Field_Name	Type	Width	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)
LAT_27	Number	8.5	Latitude In Decimal Degrees (NAD27)
LONG_27	Number	8.5	Longitude In Decimal Degrees (NAD27)
P_DEPTH	Number	8.1	Composite Sample Cut-Off Depth
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
SALZONE	Text	2	Salinity Zone
SAMPLE_VOLUME	Number	8.3	Total Volume of Sample
UNITS	Text	15	Reporting Units of Sample Volume
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (meters)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)
BASIN	Text	30	Chesapeake Bay Program Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-3. Primary Production Data File Format
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Description
SOURCE	Text	10	Data Collection Agency
SAMPLE_TYPE	Text	2	Collection Type
CRUISE	Text	6	Chesapeake Bay Program Cruise Number
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sample Date (YYYYMMDD)
LAYER	Text	3	Layer In Water Column from Which Sample Was Taken
SAMPLE_NUMBER	Number	8	Sample Number
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
CARBFIX	Number	8.2	Carbon Fixation Value
UNITS	Text	15	Carbon Fixation Reporting Units
QUALIFIER	Text	7	Detection Limit Qualifiers
METHOD	Text	8	Chesapeake Bay Program Analytical Method Code
CHLA	Number	8.2	Chlorophyll A (Ug/L)
ASMRATIO	Number	8.2	Production Efficiency (Ug-C/Ug-Chl)
SER_NUM	Text	12	Sample Serial Number
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
BASIN	Text	30	Chesapeake Bay Program Basin Designation
HUC8	Text	8	USGS Eight-Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-4. Primary Production Event Data File Format.
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	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	Sample Date (YYYYMMDD)
LAT_27	Number	8.5	Latitude In Decimal Degrees (NAD27)
LONG_27	Number	8.5	Longitude In Decimal Degrees (NAD27)
P_DEPTH	Number	8.1	Composite Sample Cut-Off Depth (Meters)
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
SALZONE	Text	2	Salinity Zone
SAMPLE_VOLUME	Number	8.3	Total Volume Of Sample
UNITS	Text	15	Units For Sample Volume
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_TIME	Date/Time	8	Sampling Time (HHMM)
BASIN	Text	30	Chesapeake Bay Program Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-5. In Situ Fluorescence Data File Format
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Description
SOURCE	Text	10	Data Collection Agency
CRUISE	Text	6	Chesapeake Bay Program Cruise Number
SAMPLE_DATE	Date/Time	8	Sampling Date (YYYYMMDD)
SAMPLE_TIME	Date/Time	8	Sample Collection Time(HH:MM:SS)
LATITUDE	Number	8.5	Latitude In Decimal Degrees
LONGITUDE	Number	8.5	Longitude In Decimal Degrees
STATION	Text	15	Sampling Station
SAMPLE_TYPE	Text	7	Sample Type
SAMPLE_DEPTH	Number	8.1	Sample Collection Depth (Meters)
PARAMETER	Text	10	Parameter
VALUE	Number	8.2	Parameter Value
UNITS	Text	10	Parameter Reporting Units
QUALIFIER	Text	10	Chlorophyll A Detection Limit
METHOD	Text	5	Chlorophyll A Method Code
SALZONE	Text	2	Salinity Zone
R_DATE	Date/Time	8	Version Date Of Data(YYYYMMDD)
BASIN	Text	20	Chesapeake Bay Basin Designation
PROJECT	Text	10	Chesapeake Bay Program Project Identifier
SER_NUM	Text	12	Sample Serial Number
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code
LL_DATUM	Text	5	Latitude And Longitude Geographic Datum

Table A-6. Microzooplankton, Mesozooplankton and Count Data File Format On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Description
SOURCE	Text	10	Data Collection Agency
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 in Water Column From Which Sample was taken
SAMPLE_NUMBER	Number	8	Sample Number
GMETHOD	Text	3	Chesapeake Bay Program Sampling Gear Code
TSN	Text	7	ITIS Taxon Serial Number
LATIN_NAME	Text	45	Species Latin Name
DESCRIPTION	Text	50	Life Stage of Individual
METHOD	Text	8	Parameter Method Analysis Code
PARAMETER	Text	10	Parameter Name
VALUE	Number	12.3	Parameter Value
UNITS	Text	15	Parameter Reporting Units.
NODCCODE	Text	12	NODC Species Code
SPEC_CODE	Text	14	Source Species Taxon Code
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)
BASIN	Text	30	Chesapeake Bay Tributary Basin
HUC8	Text	8	USGS Eight-Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-7. Microzooplankton, Mesozooplankton and Gelatinous Zooplankton Event Data File Format
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	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)
LAT_27	Number	8.5	Latitude in Decimal Degrees (NAD27)
LONG_27	Number	8.5	Longitude in Decimal Degrees (NAD27)
P_DEPTH	Number	8.1	Composite Sample Cut Off Depth
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
SALZONE	Text	2	Salinity Zone
SAMPLE_VOLUME	Number	8.3	Total Volume of Sample
UNITS	Text	15	Reporting Units of Sample Volume
STATION	Text	15	Sampling Station
TOTAL_DEPTH	Number	8.1	Total Station Depth (meters)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)
BASIN	Text	30	Chesapeake Bay Tributary Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-8. Gelatinous Zooplankton Count and Biovolume Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Descriptions
SOURCE	Text	10	Data Collection Agency
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 in Water Column from Which Sample was Taken
SAMPLE_NUMBER	Number	8.0	Sample Number
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
TSN	Text	7	Taxon Serial Number
LATIN_NAME	Text	45	Species Latin Name
DESCRIPTION	Text	50	Chesapeake Bay Program Life Stage Description
METHOD	Text	8	Chesapeake Bay Program Analysis Method Code
PARAMETER	Text	10	Reporting Parameter
VALUE	Number	12.3	Parameter Value
UNITS	Text	15	Parameter Reporting Units
NODCCODE	Text	12	National Oceanographic Data Center Species Code
SPEC_CODE	Text	14	Agency Species Code
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)
BASIN	Text	30	Tributary Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-9. Mesozooplankton Biomass Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Definitions
SOURCE	Text	10	Data Collection Agency
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 in Water Column from Which Sample Was Taken
GMETHOD	Text	3	Chesapeake Bay Program Gear Method Code
SAMPLE_NUMBER	Number	8.0	Sample Number
METHOD	Text	8	Chesapeake Bay Program Analysis Method Code
VALUE_TYPE	Text	10	Value Type Description
PARAMETER	Text	10	Reporting Parameter
VALUE	Number	8.4	Parameter Value
UNITS	Text	15	Parameter Reporting Units
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)
BASIN	Text	30	Tributary Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
FIPS	Text	5	Federal Information Processing Code

Table A-10. Benthic Count Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Descriptions
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 (YYYYMMDD)
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
VALUE	Number	12	Total Count of Given Taxa in Sample
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 (YYYYMMDD)
BASIN	Text	20	Tributary Designation

Table A-11. Benthic Biomass Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Descriptions
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 (YYYYMMDD)
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
VALUE	Number	8.4	Taxon Biomass
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 (YYYYMMDD)
BASIN	Text	20	Tributary Designation

Table A-12. Benthic Water Quality Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Descriptions
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	2	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Text	8	Sampling Date (YYYYMMDD)
SAMPLE_DEPTH	Number	8.1	Sampling Depth
SAMPLE_NUMBER	Number	8.0	Sample Number
PARAMETER	Text	15	Sampling Parameter
VALUE	Number	8.4	Sampling Parameter Value
UNITS	Text	15	Reporting Units of Value
METHOD	Text	8	Chesapeake Bay Program Parameter Analysis Code
R_DATE	Text	8	Data Version Date (YYYYMMDD)
BASIN	Text	20	Tributary Designation

Table A-13. Benthic Sediment Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Descriptions
SOURCE	Text	6	Data Collection Agency
SAMPLE_TYPE	Text	2	Sample Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Text	8	Sampling Date (YYYYMMDD)
TOTAL_DEPTH	Number	8.1	Total Station Depth
SAMPLE_NUMBER	Number	8.0	Sample Number
PARAMETER	Text	15	Sampling Parameter
VALUE	Number	8.4	Sampling Parameter Value
UNITS	Text	15	Reporting Units of Value
R_DATE	Text	8	Data Version Date (YYYYMMDD)
BASIN	Text	20	Tributary Designation

Table A-14. Benthic Event Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Descriptions
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Text	8	Sampling Date (YYYYMMDD)
LAT_27	Number	8.5	Latitude (Decimal Degrees- NAD27)
LONG_27	Number	8.5	Longitude (Decimal Degrees-NAD27)
R_DATE	Text	8	Data Version Date (YYYYMMDD)
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)
BASIN	Text	20	Tributary Designation

Table A-15. Benthic Biota Event Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Description
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (YYYYMMDD)
LAT_27	Number	8.5	Latitude (Decimal Degrees-NAD27)
LONG_27	Number	8.5	Longitude (Decimal Degrees-NAD27)
PENETR	Number	8.4	Sampling Gear Penetration Depth (cm)
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
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)
BASIN	Text	20	Tributary Designation

Table A-16. Benthic Index of Biotic Integrity Data Files
On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Description
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (YYYYMMDD)
LAT_27	Number	8.5	Latitude (Decimal Degrees-NAD27)
LONG_27	Number	8.5	Longitude (Decimal Degrees-NAD27)
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
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
VALUE	Number	8.4	Parameter Value
SCORE	Number	8.0	Value Reporting Units
BASIN	Text	20	Tributary Designation

Table A-17. Benthic Sediment Image Profile Camera Image Analysis Data Files On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Description
SOURCE	Text	6	Data Collection Agency
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (YYYYMMDD)
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SAMPLE_NUMBER	Number	8.0	Sample Number
PARAMETER	Text	15	Image Analysis Parameter
VALUE	Number	8.4	Parameter Value
UNITS	Text	15	Value Reporting Units
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
BASIN	Text	20	Tributary Designation

Table A-18. Benthic Sediment Image Profile Camera Imaging Event Data Files On ftp.chesapeakebay.net\pub\living_resources.

Field Name	Type	Width	Description
SOURCE	Text	6	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (YYYYMMDD)
STATION	Text	15	Sampling Station
SITE_TYPE	Text	10	Sampling Site Type
LAT_27	Number	8.5	Latitude (Decimal Degrees- NAD27)
LONG_27	Number	8.5	Longitude (Decimal Degrees- NAD27)
R_DATE	Date/Time	8	Data Version Date (YYYYMMDD)
SAMPLE_NUMBER	Number	8.0	Sample Number
TOTAL_DEPTH	Number	8.1	Total Station Depth (Meters)
SEDIMENT_TYPE	Text	10	Sediment Type Characterization
SURFACE_FAUNA	Text	50	Surface Fauna Characterization
TUBE_ABUNDANCE	Text	50	Tube Abundance Characterization
PELLET_ABUNDANCE	Text	50	Fecal Pellet Abundance Characterization
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)
BASIN	Text	20	Tributary Designation
COMMENTS	Memo	N/A	Investigator Comments

Table A-19. Taxonomic Key Format for all Biological Groups On ftp.chesapeakebay.net\pub\living_resources.

Name	Type	Width	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	ITIS Species Latin Name
TSN	Text	7	ITIS Taxon Serial Number
R_DATE	Date/Time	8	Version Date of Data (YYYYMMDD)
VOLUME	Number	8.4	Cell Biomass Estimator
SIZE	Text	30	Taxa Size-Fraction Identifier
LIFE_STG	Text	3	Chesapeake Bay Program Life Stage Code

APPENDIX B – BIOLOGICAL AND LIVING RESOURCES DATA DICTIONARY

December 1999

This data dictionary is the source of terms used in defining data in the CIMS living resources and biological databases. Its purpose is to provide consistency within the CIMS databases by making data submittal and retrieval compatible among institutions that participate in the program. This dictionary will be expanded as new parameter and field names are required. Institutions submitting data to the CBP monitoring database should use these variable names whenever possible so that names and units of measure are consistent within the CBP monitoring database. Some of the terms in this dictionary will be subject to change as the Chesapeake Bay Information Management System implements data dictionary consolidation among monitoring programs.

Each entry in this appendix lists the dictionary term name, a brief term description, and whether a term is an attribute or value in as attribute field, a data type and field length.

VARIABLE	DESCRIPTION	ATTRIBUTE	FIELD	FIELD
ABOVEMLW	Meters Above Mean Low Water	Field	Numeric	8.1
ACCOUNTING_UNIT	USGS Six-Digit Hydrologic Units Code	Field	Text	6
ACCOUNTING_UNIT_DESCRIPTION	USGS Six-Digit Hydrologic Unit Code Description	Field	Text	40
ADDRESS	Physical Mailing Address of Contact	Field	Text	50
AEPENETR	Actual or Estimated Gear Penetration Depth Indicator	Field	Text	2
AFDW	Ash-Free Dry Weight for a Sample	Value	Numeric	
AFDW_TAX	Ash-Free Dry Weight for a Taxon	Value	Numeric	
AGENCY	State or Federal Agency Responsible for a Monitoring Program	Field	Text	25
ANSCODE	Academy Of Natural Science Species Code	Value	Text	
ASH_FRWT	Ash-Free Dry Weight for a Taxon	Value	Numeric	
ASH_WT	Sample Total Sample Ash-Free Dry Weight (Normalized)	Value	Numeric	
ASHWT	Sample Total Sample Ash-Free Dry Weight	Value	Numeric	
ASMRATIO	Production Efficiency Ratio (ug-C/ug-chl A)	Field	Numeric	8.2
ATEMP	Air Temperature	Value	Numeric	
BASIN	CBP Tributary or River Basin Designation	Field	Text	30
BEROE	Number of Beroe	Value	Numeric	
BEROEVOL	Volume of Beroe	Value	Numeric	
BOTTYPE1	Primary Bottom Sediment Characterization	Field	Text	25
CARBCHN	Carbon Content (Chn Analyzer)	Value	Numeric	
CARBFIX	Carbon Fixation Rate (Percent)	Field	Numeric	8.2
CARBIGN	Carbon Content (Ignition)	Value	Numeric	
CARBNATE	Carbonate Content	Field	Numeric	8.2
CARBWET	Carbon Content (Wet Oxidation)	Value	Numeric	
CATALOGING_UNIT	USGS Eight-Digit Hydrologic Units Code	Field	Text	8
CATALOGING_UNIT_DESCRIPTION	USGS Eight-Digit Hydrologic Units Code Descriptor	Field	Text	40
CB_SEG85	CBP Segment Designation (1985 Scheme)	Field	Text	8
CB_SEG97	CBP Segment Designation (1997 Scheme)	Field	Text	8
CB_SEG98	CBP segment designation (1998 Scheme)	Field	Text	8
CBP_BASIN	CBP Monitoring Basin Designation	Field	Text	30
CHLA	Chlorophyll A Estimate (Mg Chl A/Liter)	Field	Text	8.2
CITY	City Location	Field	Text	50
CLAY	Clay Content	Value	Numeric	
CLOUD	Cloud Cover	Value	Text	
CNIDA	Number of Cnidarians	Value	Numeric	
CNIDAVOL	Volume of Cnidarians	Value	Numeric	

CNTPROSP	# Species in a Profile Sample	Value	Numeric	
COMMENT	Comment Field	Field	Memo	-
COMMON_NAME	Species Common Name	Field	Text	45
CONDUCT	Specific Conductivity	Value	Numeric	
CONTACT	Monitoring Program Contact	Field	Text	25
CONVFACT	Converts Number Per Sample To Normalized Count	Field	Numeric	8.2
COUNT	Number Per Sample	Value	Numeric	
COUNTY	County	Field	Text	50
CRAB_NUM	Crab or Fish Identification Number	Field	Text	12
CRUISE	Chesapeake Bay Program Cruise Identifier	Field	Text	6
CS_DEPTH	Depth of Core Slice	Field	Numeric	8.2
CTENO	Number of Ctenophores	Value	Numeric	
CTENOVOL	Volume of Ctenophores	Value	Numeric	
DATA_TYPE	Date Type Code	Field	Text	2
DATE	Date of Sample Collection (YYYYMMDD)	Field	Date/Time	8
DESCRIPTIONS	Description of Look Up Code Field	Field	Text	50
DISOFFS	Distance Offshore	Field	Numeric	8.2
DISTANCE	Distance of Trawl Or Dredge	Field	Numeric	8.2
DO	Dissolved Oxygen	Value	Numeric	
DO_DK	Dark Bottle Dissolved Oxygen	Value	Numeric	
DO_GROPR	Gross Productivity	Value	Numeric	
DO_LI	Light Bottle Dissolved Oxygen	Value	Numeric	
DO_NETPR	Light\Dark Bottle Net Productivity	Value	Numeric	
DO_PRO_D	02 Rate of Change/Day - Production	Value	Numeric	
DO_PRO_H	02 Rate of Change/Hour - Production	Value	Numeric	
DO_PSAT	Dissolved Oxygen Percent Saturation	Value	Numeric	
DO_RES_D	02 Rate of Change/Day - Respiration	Value	Numeric	
DO_RES_H	02 Rate of Change/Hour - Respiration	Value	Numeric	
DOC_ID	Documentation Identification	Value	Text	
DODEL_DK	Final DO - Init DO (Dark)	Value	Numeric	
DODEL_LT	Final DO - Init DO (Light)	Value	Numeric	
DRY_WT	Sample Dry Weight (Normalized)	Value	Numeric	
DRYWT	Sample Dry Weight	Value	Numeric	
DURATION	Duration of Sampling Effort (MM:SS -24 Hour Time)	Field	Date/Time	8
END_DATE	End Date of Sampling Effort Or Cruise (YYYYMMDD)	Field	Date/Time	8
END_DEPTH	Bottom Depth at End of Sampling Effort	Field	Numeric	8.1

VARIABLE	DESCRIPTION	ATTRIBUTE	FIELD	FIELD
END_LAT	Latitude at End of Sampling Effort	Field	Numeric	8.5
END_LONG	Longitude at End of Sampling Effort	Field	Numeric	9.5
EPAR_S	Light Irradiance in Air	Field	Numeric	8.3
EPARD_ Z	Light Irradiance from Down Facing Probe dt Depth	Field	Numeric	8.3
EPARU_Z	Light Irradiance from Up Facing Probe dt Depth	Field	Numeric	8.3
EUDEPTH	Euphotic Zone (Depth Of 1% Light)	Value	Numeric	
FALL_LINE	Above/Below Fall Line Indicator	Field	Text	1
FIPS	Federal Information Processing Codes (ZIP CODES)	Field	Text	5
FOLKISTD	Inclusive Graphic Standard Deviation (Folk Method)	Value	Numeric	
FOLKMEAN	Mean Diameter (Folk Method)	Value	Numeric	
FORK_LENGTH	Length of Individual	Value	Numeric	
FVOL_M3	Filtered Volume	Field	Numeric	8.2
GENDER	Sex of Individuals	Field	Text	2
GMETHOD	Sampling Gear	Field	Text	3
HUC_8	USGS 8-Digit Hydrologic Unit Code	Field	Text	8
HYDRA	Number of Hydra Medusae	Value	Numeric	
HYDRAVOL	Volume of Hydra Medusae	Value	Numeric	
IBI_BOTTOM_TYPE	Index of Biotic Integrity Bottom Type	Field	Text	2
IBI_PARAMETER	Index of Biotic Integrity Parameter	Field	Text	15
IBI_SALZONE	Index of Biotic Integrity Salinity Zone	Field	Text	2
INS_CODE	Instrument Code	Field	Text	10
JELLY	Number of Jellyfish	Value	Numeric	
JELLYVOL	Volume of Jellyfish	Value	Numeric	
KURT	Kurtosis (Folk Method)	Value	Numeric	
LAT_XX	Latitude Expressed in a Specific Geographic Datum	Field	Numeric	8.5
LATIN_NAME	Species Latin Name	Field	Text	45
LATITUDE	Latitude	Field	Numeric	8.5
LAYER	Water Column Description	Field	Text	3
LENGTH	Length of Individual	Value	Numeric	
LIFE_STAGE	Life Stages of Individual	Field	Text	45
LL_DATUM	Geographic Datum Desigation	Field	Text	8
LONG_XX	Longitude Expressed in a Specific Geographic Datum	Field	Numeric	8.5
LONGITUDE	Longitude	Field	Numeric	8.5
MAT	Organism Maturity Descriptor	Field	Text	1
MAXDEPTH	Maximum Sample Depth	Field	Numeric	8.1
MEDDIAM	Median Diameter	Value	Numeric	
MINDEPTH	Minimum Sample Depth (In Meters)	Field	Numeric	8.1

MISS	Indicator of Missing Appendages In Blue Crab Surveys	Field	Numeric	8.0
MNEMIOP	Number of Mnemiopsis	Value	Numeric	
MNEMVOL	Volume of Mnemiopsis	Value	Numeric	
MOIST	Moisture of Sediment	Value	Numeric	
MOMCKURT	Kurtosis (Method of Moments - Mcbride In Carver 71)	Value	Numeric	
MOMCSKEW	Skewness (Method of Moments - Mcbride In Carver 71)	Value	Numeric	
MOMEAN_1	Mean Diameter (Method of Moments)	Value	Numeric	
MOMTKURT	Kurtosis (Method of Moments - Math Tables Handbook)	Value	Numeric	
MOMTSKEW	Skewness (Method of Moments - Math Tables Handbook)	Value	Numeric	
MOSTD_2	Standard Deviation (Method of Moments)	Value	Numeric	
NETMESH	Screen Mesh Width (Millimeters)	Field	Numeric	8.4
NITCHN	Nitrogen-CHN Analyzer	Field	Numeric	8.4
NOAA_SEGMENT	NOAA River Segment Designation	Field	Text	7
NODCCODE	NOAA-NODC Species Code	Field	Text	12
ODUCODE	Old Dominion University Species Code	Value	Text	
ORP	Redox Potential	Value	Numeric	
P_DEPTH	Composite Sample Cut-Off Depth (Meters)	Field	Numeric	8.1
PARAMETER	Parameter Measured	Field	Text	20
PELLETS	Fecal Pellet Abundance Descriptor	Field	Text	10
PENETR	Gear Penetration Depth (Centimeters)	Field	Numeric	8.1
PH	Sample pH	Value	Numeric	
PHONE	Contact Phone Number	Field	Text	12
PRECIP	Precipitation Code	Value	Text	
PROGRAM	Monitoring Program Designation	Field	Text	20
PROJECT	Monitoring Program-Project Designation	Field	Text	10
QUALIFIER	Analytical Detection Limit Qualifier	Field	Text	8
QUARTDEV	Quartile Deviation	Value	Numeric	
R_DATE	Version Date of Data (YYYYMMDD)	Field	Date/Time	8
REGION_UNIT	USGS Two-Digit Hydrologic Units Code	Field	Text	2
REGION_UNIT_DESCRIPTION	USGS Two-Digit Hydrologic Units Code Description	Field	Text	40
RIVER_MILE	CBP River Mile Designation	Field	Numeric	8.1
SALINITY	Salinity	Value	Numeric	
SALZONE	Salinity Zone	Field	Text	2
SAMPLE_DATE	Date of Sample Collection (YYYYMMDD)	Field	Date/Time	8
SAMPLE_DEPTH	Sample Depth-Distance from Water Surface (Meters)	Field	Numeric	8.1

VARIABLE	DESCRIPTION	ATTRIBUTE	FIELD	FIELD
SAMPLE_NUMBER	Sample Number	Field	Numeric	8.0
SAMPLE_TIME	Sample Collection Time (HH:MM:SS-24 Hour Time)	Field	Date/Time	8
SAMPLE_TYPE	Sample Collection Type	Field	Text	4
SAMVOL_L	Sample Volume	Field	Numeric	8.2
SAND	Sand Content	Value	Numeric	
SCORE	Index of Biotic Integrity Metric Score	Field	Numeric	8.0
SECCHI	Secchi Depth	Value	Numeric	
SEDIMENT_TYPE	Benthic Sediment Profile Image Analysis Sediment Characterization Type	Field	Text	2
SER_NUM	Data Collection Agency Sample Serial Number	Field	Text	12
SET_VOL	Sample Settled Volume (Normalized)	Value	Numeric	
SET_VOLZ	Sample Settled Volume of Zooplankton (Normalized)	Value	Numeric	
SETVOL	Sample Settled Volume	Value	Numeric	
SETVOLZ	Sample Settled Volume of Zooplankton	Value	Numeric	
SIGMA_T	Specific Gravity of Water (Corrected to Sigma Units)	Value	Numeric	
SILT	Silt Content	Value	Numeric	
SILTCLAY	Percent Silt to Clay Ratio	Value	Numeric	
SITE_TYPE	Site Type	Field	Text	2
SITENO	Collecting Agency Site Number	Field	Text	8
SIZE	Organism Size Fraction Designation or Descriptor	Field	Text	45
SKEW	Skewness (Folk Method)	Value	Numeric	
SORT	Sorting (Folk Method)	Value	Numeric	
SOURCE	Data Collection Agency	Field	Text	8
SPECCODE	Agency Species Code	Field	Text	12
START_DATE	Start Date Of Sampling Effort or Cruise (YYYYMMDD)	Field	Date/Time	8
START_DEPTH	Starting Bottom Depth of Sampling Effort (Meters)	Field	Numeric	8.1
START_LAT	Latitude at Start of Sampling Effort	Field	Numeric	8.5
START_LONG	Longitude at Start of Sampling Effort	Field	Numeric	8.5
STATION	Sampling Station Identifier	Field	Text	15
STEMP	Sediment Temperature	Value	Numeric	
STRATUM	Sampling Stratum	Field	Text	6
SUBBASIN	CBP Tributary Sub-Basin Designation	Field	Text	30
SUBREGION_UNIT	USGS Four-Digit Hydrologic Unit Code	Field	Text	4
SUBREGION_UNIT _DESCRIPTION	USGS Four-Digit Hydrologic Unit Code Description	Field	Text	40
SURVEY_ID	Database Auto-Indexing Field	Field	Numeric	-
TIDE	Tidal Stage Code	Value	Text	
TIMDUR_H	Duration of Incubation Period (HH:MM:SS 24 Hour Time)	Field	Date/Time	8

TIME_BEG	Beginning Time (HH:MM:SS 24 Hour Time)	Field	Date/Time	8
TIME_END	Ending Time(HH:MM:SS- 24 Hour Time)	Field	Date/Time	8
TOTAL_DEPTH	Total Water Depth at Station In Meters (Bottom Depth)	Field	Numeric	8.1
TOW_DIR_CURRENT	Tow Direction Relative to Current	Field	Text	15
TOW_DIR_STREAM	Tow Direction Relative to Stream Flow	Field	Text	15
TOW_SPD	Speed of Tow	Field	Numeric	8.2
TRIB_COD	Tributary or Mainstem Code	Field	Text	3
TRIP	Agency/Source Sampling Trip Number	Field	Text	8
TSN	National Oceanographic Data Center Taxon Serial Number	Field	Text	7
TVS_P	Total Volatile Solids (W/W)	Value	Numeric	
UNITS	Reported Units	Field	Text	15
VALUE	Parameter Value	Field	Numeric	Variable
VALUE_TYPE	Actual or Estimated Parameter Code	Field	Text	2
VERCODE	Maryland Power Plant Study (Versar) Species Codes	Field	Text	14
VOLORG	Volatile Organic	Value	Numeric	
WAVHGT	Wave Height Code	Value	Text	
WINDIR	Wind Direction Code	Value	Text	
WINDSPD	Wind Speed	Value	Text	
WTEMP	Water Temperature	Value	Numeric	

To implement CIMS it will be necessary to modify the existing Living Resources Data Dictionary. Changes are being implemented as the new relational databases come on-line. As of December 1, 1997, the following Living Resources Data Dictionary terms have been renamed for CIMS compliance.

OLD NAME	NEW CIMS NAME
AGENCY	SOURCE
COLTYPE	SAMPLE_TYPE
DATE	SAMPLE_DATE
TIME	SAMPLE_TIME
LAT	LATITUDE
LONG	LONGITUDE
REP_NUM	SAMPLE_NUMBER
REP_TYPE	SAMPLE_TYPE
LBL	LATIN_NAME Plus LIFE_STAGE or SIZE
TRIB_COD	BASIN
AEAFDW	VALUE_TYPE
SDEPTH	SAMPLE_DEPTH
TDEPTH	TOTAL_DEPTH
AEAFDW	VALUE_TYPE
AEDRY	VALUE_TYPE
LEN_CM	LENGTH OR FORK_LENGTH
LEN_MM	LENGTH OR FORK_LENGTH
DISOXY	DO

The following analytical method fields have been replaced by the generic METHOD field:

ATEMP_M	Air Temperature measurement method code
WTEMP_M	Water temperature measurement method code
CHL_F_M	Fluorescence Chlorophyll a measurement method code
C14_M	Carbon-14 analytical methods
COND_M	Specific conductivity method code
SALIN_M	Salinity method code
DISOXY_M	Dissolved oxygen method code

The following method detection limit fields have been replaced by the generic QUALIFIER field:

ATEMP_D	Air temperature method detection limit code
WTEMP_D	Water temperature method detection limit code
CHL_F_D	Fluorescence Chlorophyll a method detection limit code
C14_D	Carbon-14 method detection limit methods
COND_D	Specific conductivity method detection limit code
SALIN_D	Salinity method detection limit code
DISOXY_D	Dissolved oxygen method detection limit code

APPENDIX C – EXPLANATION OF LOOK-UP TABLE VALUES AND PARAMETER CODES

December 1999

A variety of numeric and alphanumeric codes are used in the CIMS databases and data sets to identify specific sampling gears, analytical methods, collecting agencies, segments, cruise numbers, etc. These codes are documented in this appendix.

Table C-1. Chesapeake Bay Program Basin Designation (CBP_BASIN).

As part of geographic referencing of sampling sites for cross-program data analysis, stations have been assigned CBP basin designations. Designations are as follows:

CBP_BASIN	DESCRIPTION
CHESAPEAKE BAY	CHESAPEAKE BAY
JAMES RIVER	JAMES RIVER WATERSHED
MD EASTERN SHORE	MARYLAND EAST OF CHESAPEAKE BAY
MD WESTERN SHORE	MARYLAND WEST OF CHAESAPEAKE BAY, EXCLUDING THE POTOMAC AND PATUXENT WATERSHEDS
PATUXENT RIVER	PATUXENT RIVER WATERSHED
POTOMAC RIVER	POTOMAC RIVER WATERSHED
RAPPAHANNOCK RIVER	RAPPAHANNOCK RIVER WATERSHED
SUSQUEHANNA RIVER	SUSQUEHANNA RIVER WATERSHED
VA EASTERN SHORE	VIRGINIA EAST OF CHESAPEAKE BAY
VA WESTERN SHORE	VIRGINIA WEST OF CHESAPEAKE BAY, EXCLUDING THE POTOMAC, JAMES, RAPPAHANNOCK AND YORK WATERSHEDS
YORK RIVER	YORK RIVER WATERSHED

Table C-2 . Sediment bottom codes (BOTTYPE).

These codes are used to report sediment bottom types in several of the Chesapeake Bay fish seine and SAV monitoring programs. The valid entries for this field are as follows:

BOTTYPE	DESCRIPTION
CL	Clay
GR	Gravel
MD	Mud
RK	Rocks
SN	Sand
SH	Shell
SL	Silt
RB	Rubble
UN	Unknown

Table C-3. Original Chesapeake Bay Program Segment Designation (CB_SEG85).

As part of the geographic referencing of stations, each station is described with a CBP segment code describing in which segment a station is located. It is based upon the original 1985 segmentation scheme. Due to controversy about the segmentation systems, these codes were modified for the 1997 CBP nutrient reevaluation (CB_SEG87) and again for better representation of living resources in 1998 (CB_SEG98). The currently accepted CB_SEG85 values and descriptions are as follows:

CBSEG85	DESCRIPTION
AFL	NON-TIDAL AREAS OF THE CHESAPEAKE BAY WATERSHED
CB1	SUSQUEHANNA FLATS
CB2	UPPER PORTION OF THE CHESAPEAKE BAY MAINSTEM
CB3	UPPER-MOST ESTUARINE ZONE IN THE CHESAPEAKE BAY MAINSTEM
CB4	UPPER PORTION OF THE CENTRAL CHESAPEAKE BAY MAINSTEM
CB5	CENTRAL PORTION OF THE CHESAPEAKE BAY MAINSTEM
CB6	LOWER WEST-CENTRAL PORTION OF THE CHESAPEAKE BAY MAINSTEM
CB7	LOWER EAST-CENTRAL PORTION OF THE CHESAPEAKE BAY MAINSTEM
CB8	SOUTHERN-MOST PORTION OF THE CHESAPEAKE BAY MAINSTEM
EE1	EASTERN BAY, MILES RIVER, AND WYE RIVER
EE2	CHOPTANK RIVER WEST OF CASTLE HAVEN, INCLUDING THE TRED AVON RIVER, BROAD CREEK, HARRIS CREEK, AND THE LITTLE CHOPTANK RIVER
EE3	TANGIER AND POCOMOKE SOUNDS
ET1	NORTHEAST RIVER
ET2	ELK AND BOHEMIA RIVERS
ET3	SASSAFRAS RIVER
ET4	CHESTER RIVER
ET5	CHOPTANK RIVER, EXCLUDING EE2
ET6	NANTICOKE RIVER
ET7	WICOMICO RIVER
ET8	MANOKIN RIVER
ET9	BIG ANNEMESSEX RIVER
ET10	POCOMOKE RIVER
LE1	PATUXENT RIVER, LOWER ESTUARINE SEGMENT
LE2	POTOMAC RIVER, LOWER ESTUARINE SEGMENT
LE3	RAPPAHANNOCK RIVER, LOWER ESTUARINE SEGMENT
LE4	YORK RIVER, LOWER ESTUARINE SEGMENT
LE5	JAMES RIVER, LOWER ESTUARINE SEGMENT
RET1	PATUXENT RIVER, RIVERINE-ESTUARINE TRANSITION ZONE
RET2	POTOMAC RIVER, RIVERINE-ESTUARINE TRANSITION ZONE
RET3	RAPPAHANNOCK RIVER, RIVERINE-ESTUARINE TRANSITION ZONE
RET4	YORK RIVER, RIVERINE-ESTUARINE TRANSITION ZONE
RET5	JAMES RIVER, RIVERINE-ESTUARINE TRANSITION ZONE
TF1	PATUXENT RIVER, TIDAL FRESHWATER SEGMENT
TF2	POTOMAC RIVER, TIDAL FRESHWATER SEGMENT
TF3	RAPPAHANNOCK RIVER, TIDAL FRESHWATER SEGMENT
TF4	YORK RIVER, TIDAL FRESHWATER SEGMENT
TF5	JAMES RIVER, TIDAL FRESHWATER SEGMENT
WE4	MOBJACK BAY
WT1	BUSH RIVER
WT2	GUNPOWDER RIVER
WT3	MIDDLE RIVER AND SENECA CREEK
WT4	BACK RIVER
WT5	PATAPSCO RIVER
WT6	MAGOTHY RIVER
WT7	SEVERN RIVER
WT8	SOUTH, RHODE AND WEST RIVERS

Table C-4. The 1998 Chesapeake Bay Program Segment Designation (CB_SEG98).

As part of the geographic referencing of stations, each station is described with a CBP segment code describing in which segment a station is located. Due to controversy about the original (CB_SEG85) and 97 Nutrient Reevaluation (CB_SEG97) segmentation systems, these codes were modified for better representation of Living Resources in late 1998 (CB_SEG98). Segment names did not differ from CB_SEG97 however boundaries were modified. Contact a Living Resources GIS Specialist for details.

CBSEG_98	DESCRIPTION
ANATF	Anacostia River-Tidal Fresh Region
APPTF	Appomattox River-Tidal Fresh Region
BACOH	Back River-Oligohaline Region
BIGMH	Big Annemessex River-Mesohaline Region
BOHOH	Bohemia River-Oligohaline Region
BSHOH	Bush River-Oligohaline Region
C&DOH	C&D Canal-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
CB6PH	Chesapeake Bay-Polyhaline Region
CB7PH	Chesapeake Bay-Polyhaline Region
CB8PH	Chesapeake Bay-Polyhaline Region
CHKOH	Chickahominy River-Oligohaline 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
CRRMH	Corrotoman River-Mesohaline Region
EASMH	Eastern Bay-Mesohaline Region
EBEMH	East Branch Elizabeth River-Mesohaline Region
ELIMH	Elizabeth River-Mesohaline Region
ELIPH	Elizabeth River-Polyhaline Region
ELKOH	Elk River-Oligohaline Region
FSBMH	Fishing Bay-Mesohaline Region
GUNOH	Gunpowder River-Oligohaline Region
GUNTF	Gunpowder River-Tidal Fresh Region
HNGMH	Honga River-Mesohaline Region
JMSMH	James River-Mesohaline Region
JMSOH	James River-Oligohaline Region
JMSPH	James River-Polyhaline Region
JMSTF	James River-Tidal Fresh Region
LAFMH	Lafayette River-Mesohaline Region
LCHMH	Little Choptank River-Mesohaline Region
LYNPH	Lynnhaven River-Polyhaline Region
MAGMH	Magothy River-Mesohaline Region
MANMH	Manokin River-Mesohaline Region
MATTF	Mattawoman Creek-Tidal Fresh Region
MIDOH	Middle River-Oligohaline Region
MOBPH	Mobjack Bay-Polyhaline Region
MPNOH	Mattaponi River-Oligohaline Region
MPNTF	Mattaponi River-Tidal Fresh Region
NANMH	Nanticoke River-Mesohaline Region
NANOH	Nanticoke River-Oligohaline Region
NANTF	Nanticoke River-Tidal Fresh Region
NORTF	Northeast River-Tidal Fresh Region
PATMH	Patapsco River-Mesohaline Region
PATTF	Patapsco River-Tidal Fresh Region
PAXMH	Patuxent River-Mesohaline Region
PAXOH	Patuxent River-Oligohaline Region
PAXTF	Patuxent River-Tidal Fresh Region
PIAMH	Piankatank River-Mesohaline Region
PISTF	Piscataway Creek-Tidal Fresh Region
PMKOH	Pamunkey River-Oligohaline Region
PMKTF	Pamunkey River-Tidal Fresh Region
POCMH	Pocomoke River-Mesohaline Region
POCOH	Pocomoke River-Oligohaline Region
POCTF	Pocomoke River-Tidal Fresh Region
POTMH	Potomac River-Mesohaline Region
POTOH	Potomac River-Oligohaline Region
POTTF	Potomac River-Tidal Fresh Region
RHDMH	Rhode River-Mesohaline Region
RPPMH	Rappahannock River-Mesohaline Region
RPPOH	Rappahannock River-Oligohaline Region
RPPTF	Rappahannock River-Tidal Fresh Region
SASOH	Sassafras River-Oligohaline Region
SBEMH	South Branch Elizabeth River-Mesohaline Region
SEVMH	Severn River-Mesohaline Region
SOUMH	South River-Mesohaline Region
SUSTF	Susquehanna River-Tidal Fresh Region
TANMH	Tangier Sound-Mesohaline Region
WBEMH	West Branch Elizabeth River-Mesohaline Region
WBRTF	Western Branch-Tidal Fresh Region
WICMH	Wicomico River-Mesohaline Region
WSTMH	West River-Mesohaline Region
YRKMH	York River-Mesohaline Region
YRKPH	York River-Polyhaline Region

Table C-5. Cruise Identifier (CRUISE).

This alpha-numeric code identifies the cruise to which the data observation belongs. Cruise identification is useful for grouping data that are collected over a range of sample dates, but that are considered data for a specific sampling period. The current CBP cruise numbers are as follows:

CRUISE	START_DATE	END_DATE	CRUISE	START_DATE	END_DATE
BAY001	06/15/1984	06/30/1984	BAY054	03/01/1987	03/15/1987
BAY002	07/01/1984	07/15/1984	BAY055	03/16/1987	03/31/1987
BAY003	07/16/1984	07/31/1984	BAY056	04/01/1987	04/15/1987
BAY004	08/01/1984	08/15/1984	BAY057	04/16/1987	04/30/1987
BAY005	08/16/1984	08/31/1984	BAY058	05/01/1987	05/15/1987
BAY006	09/01/1984	09/15/1984	BAY059	05/16/1987	05/31/1987
BAY007	09/16/1984	09/30/1984	BAY060	06/01/1987	06/15/1987
BAY008	10/01/1984	10/15/1984	BAY061	06/16/1987	06/30/1987
BAY009	10/16/1984	10/31/1984	BAY062	07/01/1987	07/17/1987
BAY010	11/01/1984	11/30/1984	BAY063	07/18/1987	07/31/1987
BAY011	12/01/1984	12/31/1984	BAY064	08/01/1987	08/15/1987
BAY012	01/01/1985	01/31/1985	BAY065	08/16/1987	08/31/1987
BAY013	02/01/1985	02/28/1985	BAY066	09/01/1987	09/15/1987
BAY014	03/01/1985	03/15/1985	BAY067	09/16/1987	09/30/1987
BAY015	03/16/1985	03/31/1985	BAY068	10/01/1987	10/15/1987
BAY016	04/01/1985	04/15/1985	BAY069	10/16/1987	10/31/1987
BAY017	04/16/1985	04/30/1985	BAY070	11/01/1987	11/30/1987
BAY018	05/01/1985	05/15/1985	BAY071	12/01/1987	12/31/1987
BAY019	05/16/1985	05/31/1985	BAY072	01/01/1988	01/31/1988
BAY020	06/01/1985	06/15/1985	BAY073	02/01/1988	02/28/1988
BAY021	06/16/1985	06/30/1985	BAY074	03/01/1988	03/15/1988
BAY022	07/01/1985	07/15/1985	BAY075	03/16/1988	03/31/1988
BAY023	07/16/1985	07/31/1985	BAY076	04/01/1988	04/15/1988
BAY024	08/01/1985	08/15/1985	BAY077	04/16/1988	04/30/1988
BAY025	08/16/1985	08/31/1985	BAY078	05/01/1988	05/15/1988
BAY026	09/01/1985	09/15/1985	BAY079	05/16/1988	05/31/1988
BAY027	09/16/1985	10/02/1985	BAY080	06/01/1988	06/14/1988
BAY028	10/03/1985	10/14/1985	BAY081	06/15/1988	06/30/1988
BAY029	10/15/1985	11/06/1985	BAY082	07/01/1988	07/15/1988
BAY030	11/07/1985	11/30/1985	BAY083	07/16/1988	07/31/1988
BAY031	12/01/1985	12/31/1985	BAY084	08/01/1988	08/15/1988
BAY032	01/01/1986	01/31/1986	BAY085	08/16/1988	08/31/1988
BAY033	02/01/1986	02/28/1986	BAY086	09/01/1988	09/13/1988
BAY034	03/01/1986	03/15/1986	BAY087	09/14/1988	09/30/1988
BAY035	03/16/1986	03/31/1986	BAY088	10/01/1988	10/15/1988
BAY036	04/01/1986	04/15/1986	BAY089	10/16/1988	10/31/1988
BAY037	04/16/1986	04/30/1986	BAY090	11/01/1988	11/30/1988
BAY038	05/01/1986	05/15/1986	BAY091	12/01/1988	12/31/1988
BAY039	05/16/1986	05/31/1986	BAY092	01/01/1989	01/31/1989
BAY040	06/01/1986	06/15/1986	BAY093	02/01/1989	02/28/1989
BAY041	06/16/1986	06/30/1986	BAY094	03/01/1989	03/15/1989
BAY042	07/01/1986	07/15/1986	BAY095	03/16/1989	03/31/1989
BAY043	07/16/1986	07/31/1986	BAY096	04/01/1989	04/15/1989
BAY044	08/01/1986	08/15/1986	BAY097	04/16/1989	04/30/1989
BAY045	08/16/1986	08/31/1986	BAY098	05/01/1989	05/15/1989
BAY046	09/01/1986	09/15/1986	BAY099	05/16/1989	05/31/1989
BAY047	09/16/1986	09/30/1986	BAY100	06/01/1989	06/15/1989
BAY048	10/01/1986	10/15/1986	BAY101	06/16/1989	06/30/1989
BAY049	10/16/1986	10/31/1986	BAY102	07/01/1989	07/15/1989
BAY050	11/01/1986	11/30/1986	BAY103	07/16/1989	07/31/1989
BAY051	12/01/1986	12/31/1986	BAY104	08/01/1989	08/15/1989
BAY052	01/01/1987	01/31/1987	BAY105	08/16/1989	08/31/1989
BAY053	02/01/1987	02/28/1987	BAY106	09/01/1989	09/15/1989

CRUISE	START_DATE	END_DATE	CRUISE	START_DATE	END_DATE
BAY107	09/16/1989	09/30/1989	BAY168	10/01/1992	10/15/1992
BAY108	10/01/1989	10/15/1989	BAY169	10/16/1992	10/31/1992
BAY109	10/16/1989	10/31/1989	BAY170	11/01/1992	11/30/1992
BAY110	11/01/1989	11/30/1989	BAY171	12/01/1992	12/31/1992
BAY111	12/01/1989	12/31/1989	BAY172	01/01/1993	01/31/1993
BAY112	01/01/1990	01/31/1990	BAY173	02/01/1993	02/28/1993
BAY113	02/01/1990	02/28/1990	BAY174	03/01/1993	03/15/1993
BAY114	03/01/1990	03/15/1990	BAY175	03/16/1993	03/31/1993
BAY115	03/16/1990	03/31/1990	BAY176	04/01/1993	04/15/1993
BAY116	04/01/1990	04/15/1990	BAY177	04/16/1993	04/30/1993
BAY117	04/16/1990	04/30/1990	BAY178	05/01/1993	05/15/1993
BAY118	05/01/1990	05/15/1990	BAY179	05/16/1993	05/31/1993
BAY119	05/16/1990	05/31/1990	BAY180	06/01/1993	06/15/1993
BAY120	06/01/1990	06/15/1990	BAY181	06/16/1993	06/30/1993
BAY121	06/16/1990	06/30/1990	BAY182	07/01/1993	07/15/1993
BAY122	07/01/1990	07/15/1990	BAY183	07/16/1993	07/31/1993
BAY123	07/16/1990	07/31/1990	BAY184	08/01/1993	08/15/1993
BAY124	08/01/1990	08/15/1990	BAY185	08/16/1993	08/31/1993
BAY125	08/16/1990	08/31/1990	BAY186	09/01/1993	09/15/1993
BAY126	09/01/1990	09/15/1990	BAY187	09/16/1993	09/30/1993
BAY127	09/16/1990	09/30/1990	BAY188	10/01/1993	10/15/1993
BAY128	10/01/1990	10/15/1990	BAY189	10/16/1993	10/31/1993
BAY129	10/16/1990	10/31/1990	BAY190	11/01/1993	11/30/1993
BAY130	11/01/1990	11/30/1990	BAY191	12/01/1993	12/31/1993
BAY131	12/01/1990	12/31/1990	BAY192	01/01/1994	01/31/1994
BAY132	01/01/1991	01/31/1991	BAY193	02/01/1994	02/28/1994
BAY133	02/01/1991	02/28/1991	BAY194	03/01/1994	03/15/1994
BAY134	03/01/1991	03/15/1991	BAY195	03/16/1994	03/31/1994
BAY135	03/16/1991	03/31/1991	BAY196	04/01/1994	04/15/1994
BAY136	04/01/1991	04/15/1991	BAY197	04/16/1994	04/30/1994
BAY137	04/16/1991	04/30/1991	BAY198	05/01/1994	05/15/1994
BAY138	05/01/1991	05/15/1991	BAY199	05/16/1994	05/31/1994
BAY139	05/16/1991	05/31/1991	BAY200	06/01/1994	06/15/1994
BAY140	06/01/1991	06/15/1991	BAY201	06/16/1994	06/30/1994
BAY141	06/16/1991	06/30/1991	BAY202	07/01/1994	07/15/1994
BAY142	07/01/1991	07/15/1991	BAY203	07/16/1994	07/31/1994
BAY143	07/16/1991	07/31/1991	BAY204	08/01/1994	08/15/1994
BAY144	08/01/1991	08/15/1991	BAY205	08/16/1994	08/31/1994
BAY145	08/16/1991	08/31/1991	BAY206	09/01/1994	09/15/1994
BAY146	09/01/1991	09/15/1991	BAY207	09/16/1994	09/30/1994
BAY147	09/16/1991	09/30/1991	BAY208	10/01/1994	10/15/1994
BAY148	10/01/1991	10/15/1991	BAY209	10/16/1994	10/31/1994
BAY149	10/16/1991	10/31/1991	BAY210	11/01/1994	11/30/1994
BAY150	11/01/1991	11/30/1991	BAY211	12/01/1994	12/31/1994
BAY151	12/01/1991	12/31/1991	BAY212	01/01/1995	01/31/1995
BAY152	01/01/1992	01/31/1992	BAY213	02/01/1995	02/28/1995
BAY153	02/01/1992	02/28/1992	BAY214	03/01/1995	03/15/1995
BAY154	03/01/1992	03/15/1992	BAY215	03/16/1995	03/31/1995
BAY155	03/16/1992	03/31/1992	BAY216	04/01/1995	04/15/1995
BAY156	04/01/1992	04/15/1992	BAY217	04/16/1995	04/30/1995
BAY157	04/16/1992	04/30/1992	BAY218	05/01/1995	05/15/1995
BAY158	05/01/1992	05/15/1992	BAY219	05/16/1995	05/31/1995
BAY159	05/16/1992	05/31/1992	BAY220	06/01/1995	06/15/1995
BAY160	06/01/1992	06/15/1992	BAY221	06/16/1995	06/30/1995
BAY161	06/16/1992	06/30/1992	BAY222	07/01/1995	07/15/1995
BAY162	07/01/1992	07/15/1992	BAY223	07/16/1995	07/31/1995
BAY163	07/16/1992	07/31/1992	BAY224	08/01/1995	08/15/1995
BAY164	08/01/1992	08/15/1992	BAY225	08/16/1995	08/31/1995
BAY165	08/16/1992	08/31/1992	BAY226	09/01/1995	09/15/1995
BAY166	09/01/1992	09/15/1992	BAY227	09/16/1995	09/30/1995
BAY167	09/16/1992	09/30/1992	BAY228	10/01/1995	10/15/1995

CRUISE	START_DATE	END_DATE
BAY229	10/16/1995	10/31/1995
BAY230	11/01/1995	11/30/1995
BAY231	12/01/1995	12/31/1995
BAY232	01/01/1996	01/31/1996
BAY233	02/01/1996	02/29/1996
BAY234	03/01/1996	03/15/1996
BAY235	03/16/1996	03/31/1996
BAY236	04/01/1996	04/15/1996
BAY237	04/16/1996	04/30/1996
BAY238	05/01/1996	05/15/1996
BAY239	05/16/1996	05/31/1996
BAY240	06/01/1996	06/15/1996
BAY241	06/16/1996	06/30/1996
BAY242	07/01/1996	07/15/1996
BAY243	07/16/1996	07/31/1996
BAY244	08/01/1996	08/15/1996
BAY245	08/16/1996	08/31/1996
BAY246	09/01/1996	09/15/1996
BAY247	09/16/1996	09/30/1996
BAY248	10/01/1996	10/15/1996
BAY249	10/16/1996	10/31/1996
BAY250	11/01/1996	11/30/1996
BAY251	12/01/1996	12/31/1996
BAY252	01/01/1997	01/31/1997
BAY253	02/01/1997	02/28/1997
BAY254	03/01/1997	03/15/1997
BAY255	03/16/1997	03/31/1997
BAY256	04/01/1997	04/13/1997
BAY257	04/14/1997	04/30/1997
BAY258	05/01/1997	05/15/1997
BAY259	05/16/1997	05/31/1997
BAY260	06/01/1997	06/15/1997
BAY261	06/16/1997	06/30/1997
BAY262	07/01/1997	07/17/1997
BAY263	07/18/1997	07/31/1997
BAY264	08/01/1997	08/15/1997
BAY265	08/16/1997	08/31/1997
BAY266	09/01/1997	09/15/1997
BAY267	09/16/1997	09/30/1997
BAY268	10/01/1997	10/17/1997
BAY269	10/18/1997	10/31/1997
BAY270	11/01/1997	11/30/1997
BAY271	12/01/1997	12/31/1997
BAY272	01/01/1998	01/31/1998
BAY273	02/01/1998	02/28/1998
BAY274	03/01/1998	03/15/1998
BAY275	03/16/1998	03/31/1998
BAY276	04/01/1998	04/15/1998
BAY277	04/16/1998	04/30/1998
BAY278	05/01/1998	05/15/1998
BAY279	05/16/1998	05/31/1998
BAY280	06/01/1998	06/14/1998
BAY281	06/15/1998	06/30/1998
BAY282	07/01/1998	07/15/1998
BAY283	07/16/1998	07/31/1998
BAY284	08/01/1998	08/15/1998
BAY285	08/16/1998	08/31/1998
BAY286	09/01/1998	09/13/1998
BAY287	09/14/1998	09/30/1998
BAY288	10/01/1998	10/15/1998
BAY289	10/16/1998	10/31/1998
BAY290	11/01/1998	11/30/1998
BAY291	12/01/1998	12/31/1998
BAY292	01/01/1999	01/31/1999
BAY293	02/01/1999	02/28/1999
BAY294	03/01/1999	03/14/1999
BAY295	03/15/1999	03/31/1999
BAY296	04/01/1999	04/15/1999
BAY297	04/16/1999	04/30/1999
BAY298	05/01/1999	05/15/1999
BAY299	05/16/1999	05/31/1999
BAY300	06/01/1999	06/13/1999
BAY301	06/14/1999	06/30/1999
BAY302	07/01/1999	07/16/1999
BAY303	07/17/1999	07/31/1999
BAY304	08/01/1999	08/15/1999
BAY305	08/16/1999	08/30/1999
BAY306	09/01/1999	09/15/1999
BAY307	09/16/1999	09/30/1999
BAY308	10/01/1999	10/15/1999
BAY309	10/16/1999	10/31/1999
BAY310	11/01/1999	11/30/1999
BAY311	12/01/1999	12/31/1999
BAY312	01/01/2000	01/31/2000
BAY313	02/01/2000	02/29/2000
BAY314	03/01/2000	03/15/2000
BAY315	03/16/2000	03/31/2000
BAY316	04/01/2000	04/15/2000
BAY317	04/16/2000	04/30/2000
BAY318	05/01/2000	12/15/2000
BAY319	05/16/2000	12/31/2000
BAY320	06/01/2000	12/15/2000
BAY321	06/16/2000	06/30/2000
BAY322	07/01/2000	07/15/2000
BAY323	07/16/2000	07/31/2000
BAY324	08/01/2000	08/15/2000
BAY325	08/16/2000	08/30/2000
BAY326	09/01/2000	09/15/2000
BAY327	09/16/2000	09/30/2000
BAY328	10/01/2000	10/15/2000
BAY329	10/16/2000	10/31/2000
BAY330	11/01/2000	11/30/2000
BAY331	12/01/2000	12/31/2000

Table C-6. Cloud Cover (CLOUD).

This one-digit code best describes the type of cloud coverage during a sampling period, If these data are collected. Note that in the CIMS Water Quality database Cloud Cover is a field in the event table, while in Living Resources data bases it is a parameter in a weather table. Possible values for this field are:

CLOUD	DESCRIPTION	PERCENT CLOUD COVER
0	Clear	0 to 10 %
1	Scattered to Partly	10 to 50 %
2	Partly to Broken	50 to 90 %
3	Overcast	> 90 %
4	Foggy	
5	Hazy	
6	Clouds	No % given

Table C-7 Data Type (DATA_TYPE).

This table stores information related to DATA_TYPE codes in the CIMS Plankton databases. This table contains information about the type of sample collected during an event. The following list of data types represent those that were either directly measured in the field or analyzed in the laboratory. Additional codes may be added as needed. Currently accepted DATA_TYPE and DESCRIPTION designations are as follows:

DATA_TYPE	DESCRIPTION
BE	BENTHIC
FL	FLUORESCENCE
MI	MICROZOOPLANKTON
MZ	MESOZOOPLANKTON
PD	PRIMARY PRODUCTION
PH	PHYTOPLANKTON
PP	PICOPLANKTON

Table C-8. Fall Line Designation (FALL_LINE).

Designation of sampling station position relative to fall line.

FALL_LINE	DESCRIPTION
A	Above Fall Line or Non-tidal Portion of Tributary
B	Below Fall Line or Tidal Portion of Tributary

Table C-9. FIPS Codes (FIPS).

This table contains Federal Information Processing System (FIPS) codes identifying state and county type of field samples taken at given site. This code is used in the STATIONS tables. Additional codes may be added as needed. Currently accepted FIPS CODE designations are as follows:

FIPS	STATE	NAME	FIPS	STATE	NAME
10001	DE	KENT	42013	PA	BLAIR
10003	DE	NEW CASTLE	42015	PA	BRADFORD
10005	DE	SUSSEX	42021	PA	CAMBRIA
11001	DC	DISTRICT OF COLUMBIA	42023	PA	CAMERON
24001	MD	ALLEGANY	42025	PA	CARBON
24003	MD	ANNE ARUNDEL	42027	PA	CENTRE
24005	MD	BALTIMORE	42029	PA	CHESTER
24009	MD	CALVERT	42033	PA	CLEARFIELD
24011	MD	CAROLINE	42035	PA	CLINTON
24013	MD	CARROLL	42037	PA	COLUMBIA
24015	MD	CECIL	42041	PA	CUMBERLAND
24017	MD	CHARLES	42043	PA	DAUPHIN
24019	MD	DORCHESTER	42047	PA	ELK
24021	MD	FREDERICK	42055	PA	FRANKLIN
24023	MD	GARRETT	42057	PA	FULTON
24025	MD	HARFORD	42061	PA	HUNTINGDON
24027	MD	HOWARD	42063	PA	INDIANA
24029	MD	KENT	42065	PA	JEFFERSON
24031	MD	MONTGOMERY	42067	PA	JUNIATA
24033	MD	PRINCE GEORGES	42069	PA	LACKAWANNA
24035	MD	QUEEN ANNES	42071	PA	LANCASTER
24037	MD	SAINT MARYS	42075	PA	LEBANON
24039	MD	SOMERSET	42079	PA	LUZERNE
24041	MD	TALBOT	42081	PA	LYCOMING
24043	MD	WASHINGTON	42083	PA	MCKEAN
24045	MD	WICOMICO	42087	PA	MIFFLIN
24047	MD	WORCESTER	42093	PA	MONTOUR
24510	MD	BALTIMORE CITY	42097	PA	NORTHUMBERLAND
36003	NY	ALLEGANY	42099	PA	PERRY
36007	NY	BROOME	42105	PA	POTTER
36011	NY	CAYUGA	42107	PA	SCHUYLKILL
36015	NY	CHEMUNG	42109	PA	SNYDER
36017	NY	CHENANGO	42111	PA	SOMERSET
36023	NY	CORTLAND	42113	PA	SULLIVAN
36025	NY	DELAWARE	42115	PA	SUSQUEHANNA
36043	NY	HERKIMER	42117	PA	TIOGA
36051	NY	LIVINGSTON	42119	PA	UNION
36053	NY	MADISON	42127	PA	WAYNE
36065	NY	ONEIDA	42131	PA	WYOMING
36067	NY	ONONDAGA	42133	PA	YORK
36069	NY	ONTARIO	51001	VA	ACCOMACK
36077	NY	OTSEGO	51003	VA	ALBEMARLE
36095	NY	SCHOHARIE	51005	VA	ALLEGHANY
36097	NY	SCHUYLER	51007	VA	AMELIA
36101	NY	STEUBEN	51009	VA	AMHERST
36107	NY	TIOGA	51011	VA	APPOMATTOX
36109	NY	TOMPKINS	51013	VA	ARLINGTON
36123	NY	YATES	51015	VA	AUGUSTA
42001	PA	ADAMS	51017	VA	BATH
42009	PA	BEDFORD	51019	VA	BEDFORD
42011	PA	BERKS	51023	VA	BOTETOURT

FIPS	STATE	NAME	FIPS	STATE	NAME
51029	VA	BUCKINGHAM	51163	VA	ROCKBRIDGE
51031	VA	CAMPBELL	51165	VA	ROCKINGHAM
51033	VA	CAROLINE	51171	VA	SHENANDOAH
51036	VA	CHARLES CITY	51177	VA	SPOTSYLVANIA
51037	VA	CHARLOTTE	51179	VA	STAFFORD
51041	VA	CHESTERFIELD	51181	VA	SURRY
51043	VA	CLARKE	51187	VA	WARREN
51045	VA	CRAIG	51193	VA	WESTMORELAND
51047	VA	CULPEPER	51199	VA	YORK
51049	VA	CUMBERLAND	51510	VA	ALEXANDRIA CITY
51053	VA	DINWIDDIE	51530	VA	BUENA VISTA CITY
51057	VA	ESSEX	51540	VA	CHARLOTTESVILLE CITY
51059	VA	FAIRFAX	51550	VA	CHESAPEAKE CITY
51061	VA	FAUQUIER	51560	VA	CLIFTON FORGE CITY
51065	VA	FLUVANNA	51570	VA	COLONIAL HEIGHTS CITY
51069	VA	FREDERICK	51580	VA	COVINGTON CITY
51071	VA	GILES	51600	VA	FAIRFAX CITY
51073	VA	GLOUCESTER	51610	VA	FALLS CHURCH CITY
51075	VA	GOOCHLAND	51630	VA	FREDERICKSBURG CITY
51079	VA	GREENE	51650	VA	HAMPTON CITY
51085	VA	HANOVER	51660	VA	HARRISONBURG CITY
51087	VA	HENRICO	51670	VA	HOPEWELL CITY
51091	VA	HIGHLAND	51678	VA	LEXINGTON CITY
51093	VA	ISLE OF WIGHT	51680	VA	LYNCHBURG CITY
51095	VA	JAMES CITY	51683	VA	MANASSAS CITY
51097	VA	KING AND QUEEN	51685	VA	MANASSAS PARK CITY
51099	VA	KING GEORGE	51700	VA	NEWPORT NEWS CITY
51101	VA	KING WILLIAM	51710	VA	NORFOLK CITY
51103	VA	LANCASTER	51730	VA	PETERSBURG CITY
51107	VA	LOUDOUN	51735	VA	POQOUSON CITY
51109	VA	LOUISA	51740	VA	PORTSMOUTH CITY
51111	VA	LUNENBURG	51760	VA	RICHMOND CITY
51113	VA	MADISON	51790	VA	STAUNTON CITY
51115	VA	MATHEWS	51800	VA	SUFFOLK CITY
51119	VA	MIDDLESEX	51810	VA	VIRGINIA BEACH CITY
51121	VA	MONTGOMERY	51820	VA	WAYNESBORO CITY
51125	VA	NELSON	51830	VA	WILLIAMSBURG CITY
51127	VA	NEW KENT	51840	VA	WINCHESTER CITY
51131	VA	NORTHAMPTON	54003	WV	BERKELEY
51133	VA	NORTHUMBERLAND	54023	WV	GRANT
51135	VA	NOTTOWAY	54027	WV	HAMPSHIRE
51137	VA	ORANGE	54031	WV	HARDY
51139	VA	PAGE	54037	WV	JEFFERSON
51145	VA	POWHATAN	54057	WV	MINERAL
51147	VA	PRINCE EDWARD	54063	WV	MONROE
51149	VA	PRINCE GEORGE	54065	WV	MORGAN
51153	VA	PRINCE WILLIAM	54071	WV	PENDLETON
51157	VA	RAPPAHANNOCK	54077	WV	PRESTON
51159	VA	RICHMOND	54093	WV	TUCKER
51161	VA	ROANOKE			

Table C-10. Gender (Gender).

The following-digit codes are used to identify the gender of a biological organism, if this information is collected. Currently accepted codes for this field are as follows:

GENDER	DESCRIPTION
F	Female
M	Male
I	Immature
U	Undetermined

Table C-11. Sampling Gear (GMETHOD).

The GMETHOD codes represent information relating to the type of field gear used to collect samples for all analysis. Additional codes may be added as needed. Currently accepted G_METHODS designations are as follows:

G_METHOD	DESCRIPTION	G_METHOD	DESCRIPTION
01	HAND DREDGE	44	CATFISH TRAP
02	DREDGE	45	CRAYFISH TRAP
03	ARTIFICIAL SUBSTRAIT	46	CRAB TRAP
04	DIATOMER SLIDES	47	ANIMAL TRAP
05	CLARKE-BUMPUS SAMPLER	48	HOOK AND LINE FISHING
		49	DIP NET
06	PLANKTON TRAP	50	DIVER
07	PLANKTON PUMP	51	RESERVED
08	PLANKTON NET	52	RESERVED
09	PLANKTON NET	53	RESERVED
10	PLANKTON NET	54	POUND NET
11	PLANKTON NET	55	EPIFAUNA PANELS
12	BEAM PLANKTON LINE	56	RESERVED
13	ANCHOR DREDGE	57	RESERVED
14	HYDRAULIC GRAB	58	RESERVED
15	HAND CORE	59	RESERVED
16	POST-HOLE DIGGER	60	ENDICO CURRENT METER
17	PONAR GRAB	61	BRAINCON CURRENT METER
18	PONAR GRAB		
19	PONAR GRAB	62	SEDIMENT TRAP ARRAY
20	BOX CORE GRAB	63	SEINE NET
21	VAN VEEN GRAB	64	BONGO NET
22	SHIPEK GRAB	65	PURSE SEINE
23	SEINE HAUL	66	FYKE AND HOOP NETS
24	SMITH-MACINTIRE GRAB	67	POTS
25	SEINE NET	68	BOX TRAP
26	SEINE NET	69	PUSH NET
27	SEINE NET	70	GREAT LAKE SHOAL
28	SEINE NET	71	GREAT LAKE SHOAL
29	SEINE NET	72	GREAT LAKE SHOAL
30	TRAWL	73	GREAT LAKE SHOAL
31	OTTER TRAWL	74	BEAM TRAWL
32	OTTER TRAWL	75	BONGO NET
33	TRAWL	76	BONGO NET
34	TUCKER TRAWL	77	RESERVED
35	RESERVED	78	SLAT TRAP
36	TRAWL	79	RESERVED
37	OTTER TRAWL	80	GIL NETS
38	MID-WATER TRAWL	81	USNOL SPADE CORE
39	RESERVED	82	RESERVED
40	TRAP NET	83	RESERVED
41	RESERVED	84	RESERVED
42	ECKMAN CAGE	85	MID-WATER TRAWL
43	CAGE		

Table C-12. USGS Hydrologic Unit Codes (HUC_8).

As part of the geographic referencing of stations each station has been matched with its corresponding eight-digit USGS hydrologic unit code. The list that follows contains only the HUC and the associated cataloging unit description. These tables contain specific information related to the REGION, SUBREGION, ACCOUNTING_UNIT, and CATALOGING_UNIT fields (i.e. detailed description, states covered, and area in square miles). The currently accepted 8-digit HUC and CATALOGING_UNIT_DESCRIPTIONS are as follows:

HUC_8	CATALOGING_UNIT_DESCRIPTION
02050101	UPPER SUSQUEHANNA
02050102	CHENANGO
02050103	OWEGO-WAPPASENING
02050104	TIOGA
02050105	CHEMUNG
02050106	UPPER SUSQUEHANNA-TUNKHANNOCK
02050107	UPPER SUSQUEHANNA-LACKAWANNA
02050201	UPPER WEST BRANCH SUSQUEHANNA
02050202	SINNEMAHONING
02050203	MIDDLE WEST BRANCH SUSQUEHANNA
02050204	BALD EAGLE
02050205	PINE
02050206	LOWER WEST BRANCH SUSQUEHANNA
02050301	LOWER SUSQUEHANNA-PENNS
02050302	UPPER JUNIATA
02050303	RAYSTOWN
02050304	LOWER JUNIATA
02050305	LOWER SUSQUEHANNA-SWATARA
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
02070001	SOUTH BRANCH- POTOMAC
02070002	NORTH BRANCH- POTOMAC
02070003	CACAPON-TOWN
02070004	CONOCOCHEAGUE-OPEQUON
02070005	SOUTH FORK SHENANDOAH
02070006	NORTH FORK SHENANDOAH
02070007	SHENANDOAH
02070008	MIDDLE POTOMAC-CATOCTIN
02070009	MONOCACY
02070010	MIDDLE POTOMAC-ANACOSTIA-OCCOQUAN
02070011	LOWER POTOMAC
02080101	LOWER CHESAPEAKE BAY
02080102	GREAT WICOMICO-PIANKATANK
02080103	RAPIDAN-UPPER RAPPAHANNOCK
02080104	LOWER RAPPAHANNOCK
02080105	MATTAPONI
02080106	PAMUNKEY
02080107	YORK
02080108	LYNNHAVEN-POQUOSON
02080109	WESTERN LOWER DELMARVA
02080201	UPPER JAMES
02080202	MAURY
02080203	MIDDLE JAMES-BUFFALO
02080204	RIVANNA
02080205	MIDDLE JAMES-WILLIS
02080206	LOWER JAMES
02080207	APPOMATTOX
02080208	HAMPTON ROADS
00000000	ATLANTIC OCEAN

Table C-13. B-IBI BOTTOM_TYPE Characterization (IBI_BOTTOM).

These codes store information identifying bottom type classifications used in the calculation of Benthic IBI metric values. Bottom type is based on the sand-to-clay percentages observed in the sediment analysis from each site. The IBI_BOTTOM_TYPE codes used to classify site types as follows:

IBI_BOTTOM_TYPE	DESCRIPTION	SILT-CLAY CONTENT
M	MUD	>40% SILT-CLAY
S	SAND	0-40% SILT-CLAY

Table C-14. B-IBI PARAMETER Names (IBI_PARAMETER).

These parameter names are used to identify B-IBI metric values. The current B-IBI metrics calculated are as follows:

IBI_PARAMETER	DESCRIPTION
PCT_CARN	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_PS_ABUND	PERCENT POLLUTION-SENSITIVE SPECIES ABUNDANCE
PCT_PS_BIO	PERCENT POLLUTION-SENSITIVE SPECIES BIOMASS
SW	SHANNON-WEINER SPECIES DIVERSITY INDEX
TOT_ABUND	TOTAL SPECIES ABUNDANCE (NUMBER PER METER SQUARED)
TOT_BIOMASS	TOTAL SPECIES BIOMASS IN (GRAMS PER METER SQUARED)

Table C-15. B-IBI SALZONE Designation (IBI_SALZONE).

These codes identify the various salinity classifications used in the calculation of BIBI metric values. Salinity zone is based on the observed salinity in the water quality data from each site. The IBI_SALZONE codes used to classify site types as follows:

IBI_SALZONE	DESCRIPTION	RANGE
HM	HIGH MESOHALINE	=>12 TO 18 PPT
LM	LOW MESOHALINE	=>5.0 TO 12 PPT
O	OLIGOHALINE	=>0.5 TO 5.0 PPT
P	POLYHALINE	=>18 PPT
TF	TIDAL FRESH	<0.5 PPT

Table C-16. Sample Layer (LAYER).

These codes are is used to describe the water layer or sediment being sampled.

LAYER	DESCRIPTION	LAYER	DESCRIPTION
S	Surface	AT	Above thermocline
M	Middle	BT	Below thermocline
B	Bottom	AE	Above euphotic zone
SE	Sediment	BE	Below euphotic zone
SW	Sediment/water interface (0 - 1cm)	MI	Microlayer
AP	Above pycnocline	WC	Whole water column
BP	Below pycnocline		

Table C-17. Life Stage (LIFE_STAGE).

Life stage code for biological monitoring of fish and zooplankton.

LIFESTAGE	DESCRIPTION
00	EGG
01	YOLK SAC
02	FIN FOLD
03	POST FIN FOLD
04	YEAR CLASS O
05	YEAR CLASS 1 OR OLDER
06	JUVENILES AND ADULTS
07	LARVAE, JUVENILES AND ADULTS
08	LARVAE AND JUVENILES
09	NAUPLII AND PERITRICHS
10	NAUPLII OR COPEPODITE
11	NAUPLII
12	COPEPODITE
13	ORTHONAUPLII STAGE 1-3
14	METANAUPLII STAGE 4-6
15	COPEPODITE STAGE 1-3
16	COPEPODITE STAGE 4-6
17	CYPRIS LARVAE
18	RESERVED FOR FUTURE USE
19	COPEPOD EGG
20	NYMPH
21	PUPAE
22	PHARATE
23	INSTAR
24	NAIAD
25	RESERVED FOR FUTURE USE
26	RESERVED FOR FUTURE USE
27	RESERVED FOR FUTURE USE
28	RESERVED FOR FUTURE USE
29	RESERVED FOR FUTURE USE
30	PREZOEA
31	ZOEA
32	METAZOEA
33	MEGALOPS
34	RESERVED FOR FUTURE USE
35	RESERVED FOR FUTURE USE
36	RESERVED FOR FUTURE USE
37	RESERVED FOR FUTURE USE
38	RESERVED FOR FUTURE USE
39	RESERVED FOR FUTURE USE
40	NAUPLII STAGE 1
41	NAUPLII STAGE 2
42	NAUPLII STAGE 3
43	NAUPLII STAGE 4
44	NAUPLII STAGE 5
45	NAUPLII STAGE 6
46	COPEPODITE STAGE 1
47	COPEPODITE STAGE 2
48	COPEPODITE STAGE 3
49	COPEPODITE STAGE 4
50	COPEPODITE STAGE 5
51	COPEPODITE STAGE 6
52	SPECIES A
53	SPECIES B
54	SPECIES C
55	SPECIES D
56	SPECIES E
57	SPECIES F
58	SPECIES A-FULL
59	SPECIES A-EMPTY
60	SPECIES B-FULL
61	SPECIES B-EMPTY
62	SPECIES C-FULL
63	SPECIES C-EMPTY
64	RESERVED FOR FUTURE USE
65	RESERVED FOR FUTURE USE
66	RESERVED FOR FUTURE USE
67	RESERVED FOR FUTURE USE
68	RESERVED FOR FUTURE USE
69	RESERVED FOR FUTURE USE
70	RESERVED FOR FUTURE USE
71	RESERVED FOR FUTURE USE
72	RESERVED FOR FUTURE USE
73	RESERVED FOR FUTURE USE
74	RESERVED FOR FUTURE USE
75	RESERVED FOR FUTURE USE
76	RESERVED FOR FUTURE USE
77	RESERVED FOR FUTURE USE
78	RESERVED FOR FUTURE USE
79	RESERVED FOR FUTURE USE
80	MOLTED
81	UNMOLTED
82	LARGE
83	LARGE-FULL
84	LARGE-EMPTY
85	FULL
86	EMPTY
87	MEDIUM
88	SMALL
89	RESERVED FOR FUTURE USE
90	EGG, NOT VIABLE
91	SUBADULT
92	POST LARVAL
93	JUVENILE
94	TAXON WITH COUNT STORED AS VOLUME IN MILLILITERS
95	MATURE
96	IMMATURE
97	LARVAE
98	ADULT

Table C-18. Latitude-Longitude Geographic Datum (LL_DATUM).

The LL_DATUM code contains latitude/longitude datum and descriptions. The LL_DATUM code defines the datum under which the latitude and longitude measurements for a particular station were calculated. The currently accepted LL_DATUM and DESCRIPTIONS are as follows:

LL_DATUM	DESCRIPTION
NAD27	1927 NORTH AMERICAN DATUM
NAD83	1983 NORTH AMERICAN DATUM
UNID	UNKNOWN DATUM

Table C-19. NOAA Species Code (NODCCODE) and ITIS Taxon Serial Numbers (TSN).

CIMS databases uses the Interagency Taxonomic Identification System (ITIS) Taxon Serial Numbers (TSN) for species identification within the database. For species with no TSN values, temporary Chesapeake Bay TSN is generated until a species can be submitted to ITIS for recognition. The use of the standardized TSN codes among all Bay Program databases will allows for queries by species from multiple state and national biological databases.

TSN: Each species has been given its ITIS TSN. The ITIS is a partnership of federal agencies working to improve the organization of, and access to, standardized nomenclature. As part of this system a national, easily accessible database with reliable information on species names and their hierarchical classification has been established. The database is reviewed periodically to ensure high quality with valid classifications, revisions and additions of newly described species. As part of this effort all Federal agencies have been asked to adopt the use of TSN codes which assign each recognized species a permanent number. The TSN allows a species to be tracked over time regardless of changes in name and taxonomic classification. TSN also provides a uniform key field for database development and species identification across multiple organizations. When used in conjunction with the NODC, the TSN overcomes the problem of numeric changes in the NODC code whenever species are reclassified.

Temporary codes are assigned to taxa that are recognized in the scientific literature but have not been assigned an NODC code and a TSN. The value BAYXXXX has been assigned to all taxa without TSN. A temporary NODC code is developed for each unassigned taxon based on its known taxonomy and its species name. For example, the beginning couplets of the NODC code which reflect the known phylogeny of an unassigned taxon are combined with letters from its species name to form a temporary code.

NODC_CODE: All species on the list have been assigned at least partial National Oceanographic Data Center (NODC) Taxon Codes (Version 8.0). The NODC Taxon Code is a hierarchical system of numerical codes used to represent the scientific names and phylogeny of organisms. The code links the Linnaean system of biological nomenclature to a numerical schema that facilitates modern methods of computerized data storage and retrieval. An NODC code contains a maximum of 12 digits partitioned into two-digit couplets. Each couplet represents one or more levels of the taxonomic hierarchy. For example,

Digit	Represents
1-2	Phylum
3-4	Class and/or Order
5-6	Family
7-8	Genus
9-10	Species
11-12	Subspecies

One drawback of the NODC code is that a code will changes over time to reflect current changes in taxonomic classifications. However, it provides data analysts with a very useful tool for sorting organisms into taxonomic groups.

TSN	NODCCODE	LATIN NAME	COMMON NAME
0165548	8803020101	ABLENNES HIANS	FLAT NEEDLEFISH
0168095	8835160101	ACANTHARCHUS POMOTIS	MUD SUNFISH
0028757	3258090112	ACER SACCHARINUM	SILVER MAPLE
0161069	8729010104	ACIPENSER BREVIROSTRUM	SHORTNOSE STURGEON
0179045	9158320401	AGELAIUS PHOENICEUS	RED-WINGED BLACKBIRD
0175123	9112011002	AIX GALERICULATA	MANDARIN DUCK
0175122	9112011001	AIX SPONSA	WOOD DUCK
0161703	8747010103	ALOSA MEDIOCRIS	HICKORY SHAD
0161706	8747010105	ALOSA PSEUDOHARENGUS	ALEWIFE
0161702	8747010101	ALOSA SAPIDISSIMA	AMERICAN SHAD
0096606	6179140102	ALPHEUS NORMANNI	GREEN SNAPPING SHRIMP
0171673	8845010102	AMMODYTES AMERICANUS	AMERICAN SAND LANCE
0175068	9112010903	ANAS RUBRIPES	AMERICAN BLACK DUCK
0098678	6188030107	CANCER BOREALIS	JONAH CRAB
0167687	8835020301	CENTROPRISTIS STRIATA	BLACK SEA BASS
0161724	874701020102	CLUPEA HARENGUS HARENGUS	ATLANTIC HERRING
0077939	5123030101	ELYSIA CATULUS	KITTY-CAT SEA SLUG
0085863	6118200201	EURYTEMORA AFFINIS	CALANOID COPEPOD
0021612	3305010901	HYDRILLA VERTICILLATA	HYDRILLA
0176815	9128020108	LARUS ARGENTATUS	HERRING GULL
0173839	9002040401	LEPIDOCHELYS KEMPI	KEMP'S RIDLEY TURTLE
0173780	9002030301	MALACLEMYS TERRAPIN	DIAMONDBACK TERRAPIN

Please see the current taxonomic database on www.chesapeakebay.net or the document a *Comprehensive List of Chesapeake Bay Basin Species, 1998* for a full listing.

Table C-20. Parameters (PARAMETER).

The following list of parameters represents those that are either directly measured in the field or analyzed in the laboratory as part of biological monitoring. Many of these values were previously fields in the old non-relational data sets. Additional codes may be added as needed. Currently accepted PARAMETER and DESCRIPTION designations are as follows:

PARAMETER	DESCRIPTION
ASH_FRWT	ASH-FREE DRY WEIGHT (MG/M**3)
ASH_WT	TOTAL ASH WEIGHT (MG/M**3)
ASHFREWT	ASH-FREE DRY WEIGHT (G/SAMPLE)
ASHWT	TOTAL ASH WEIGHT (G/SAMPLE)
BIOVOLUME	BIOVOLUME(ML/SAMPLE)
BURROWS	NUMBER OF BURROWS
CARBNATE	CARBONATE CONTENT
CARCHN	CARBON CONENT-CHN ANALYZER
CHL_F	CHLOROPHYLL *a* FLUORESENCE
CONDUCT	SPECIFIC CONDUCTIVITY
COUNT	NUMBER PER UNIT MEASURE
DISOXY	DISSOLVED OXYGEN
DO_PSAT	DISSOLVED OXYGEN PERCENT SATURATION
DRY_WT	TOTAL DRY WEIGHT (MG/M**3)
DRYWT	TOTAL DRY WEIGHT (G/SAMPLE)
GAS VOID DEPTH	DEPTH OF GAS VOIDS
GAS VOIDS	NUMBER OF GAS FILLED VOIDS
INFAUNA DEPTH	DEPTH OF INFAUNA OBSERVED
INFAUNA	NUMBER OF INFAUNA ORGANISMS OBSERVED
INTSAL	INTERSTITIAL SALINITY
KURT	KURTOSIS
MEANDIAM	MEAN SEDIMENT DIAMETER
MEDDIAM	MEDIAN SEDIMENT DIAMETER
MOIST	MOISTURE CONTENT
NITCHN	NITROGEN CONTENT-CHN ANALYZER
ORP	OXIDATION REDUCTION POTENTIAL
PENETR	GEAR PENETRATION DEPTH
PENETRATION	GEAR PENETRATION DEPTH
PH	PH
QUARTDEV	QUARTILE DEVIATION
RPD	REDOX POTENTIAL DISCONTINUITY LAYER DEPTH
SALINITY	SALINITY
SAND	SAND CONTENT, PERCENT
SET_VOL	SETTLED VOLUME ZOOPLANKTON AND DETRITUS (ML/M**3)
SET_VOLZ	SETTLED VOLUME OF ZOOPLANKTON (ML/M**3)
SETVOL	SETTLED VOLUME ZOOPLANKTON AND DETRITUS (ML/SAMPLE)
SETVOLZ	SETTLED VOLUME OF ZOOPLANKTON (ML/SAMPLE)
SILT	SILT CONTENT, PERCENT
SILTCLAY	SILT CLAY CONTENT, PERCENT
SKEW	SKEWNESS
SORT	SORTING
SURFACE RELIEF	SURFACE RELIEF
VOID DEPTH	DEPTH OF WATER VOIDS
VOLORG	VOLATILE ORGANIC, PERCENT
WATER VOIDS	NUMBER OF WATER FILLED VOIDS
WTEMP	WATER TEMPERATURE, CENTIGRADE

Table C-21. Sediment Profile Image Analysis Pellet and Tube Codes (PELLET and TUBES).

These codes store information identifying faunal tube, and fecal pellet abundance classifications from the SPI camera images. The current density classifications are as follows:

TUBES or PELLETS	DESCRIPTION
FEW	1 TO 6 TUBES
IND	INDETERMINATE
LAYER	PELLETS COVER SEDIMENT WATER INTERFACE
MANY	GREATER THAN 18 TUBES
NA	NO ANALYSIS
NONE	0 TUBES
SOME	7 TO 18 TUBES

Table C-22. Agency Species Codes (SPECCODE).

Many of the agencies reporting data containing species information have developed their own in-house species codes. All of these codes are found in the SPECCODE column of a given data type. Codes will vary by agency and data type. The agency code column in most cases has been given the agency name code in the data documentation. The valid alternate field names for SPECCODE are as follows:

SPECCODE	DESCRIPTION
ANSCODE	Academy of Natural Sciences, Benedict Estuarine Research Laboratory
VERCODE	Versar Incorporated–Maryland Power Plant Siting Codes
ODUCODE	Old Dominion University
VIMSCODE	Virginia Institute of Marine Sciences

Table C-23. Precipitation Identifier (PRECIP).

The precipitation code are used to describe the weather conditions encountered during a sampling event. Note that in some CIMS databases PRECIP is a field in the EVENT Table, in others it is a parameter in a weather table. The possible values for this field is as follows:

PRECIP	DESCRIPTION
10	None
11	Drizzle
12	Rain
13	Rain, heavy
14	Squally
15	Frozen Precipitation

Table C-24. Sampling Agency Codes (AGENCY).

The Agency codes were added to the database to identify the agencies that are ultimately responsible for ensuring the proper processing and storage of water quality data. In cases where a particular agency collects, processes, and stores the data, the SOURCE and AGENCY code will be identical.

AGENCY	DESCRIPTION
MDDNR	MARYLAND DEPARTMENT OF NATURAL RESOURCES
VADEQ	VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
DCDH	DISTRICT OF COLUMBIA DEPARTMENT OF HEALTH (FORMERLY DEPARTMENT OF CONSUMER AND REGULATORY AFFAIRS)
USGS	UNITED STATES GEOLOGICAL SURVEY
SRBC	SUSQUEHANNA RIVER BASIN COMMISSION
ICPRB	INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

Table C-25. Sampling Program Codes (PROGRAM).

The PROGRAM code was added to the database design because Maryland DNR has adopted a project-oriented approach to water quality data management. This approach relies the use of PROGRAM and PROJECT codes. Currently, there is only one PROGRAM code in CIMS. As other data from programs such as the fall line monitoring program, the citizens monitoring program are added to the database, new codes will be generated.

PROGRAM	DESCRIPTION
WQMP	WATER QUALITY MONITORING PROGRAM
HISTORIC	CBP HISTORIC DATA RESTORATION PROJECT

Table C-26. Sampling Project Codes (PROJECT).

The PROJECT code is used to distinguish Chesapeake Bay water quality data from tributary water quality data.

PROJECT	DESCRIPTION
MAIN	CHESAPEAKE BAY
TRIB	TRIBUTARY
VA/HIST	HISTORIC VIRGINIA DATA

Table C-27. Detection Limit Codes (QUALIFIERS).

This two-character code indicates when the value of the parameter is outside the detection limits of the method being used. The valid entries for this field are as follows:

QUALIFIER	DESCRIPTION
""	Greater than zero
#	Trace (less than an unknown detectable value)
<	Less than the detection limit of the method
J	Estimated value
NA	Not recorded/not applicable/parameter value acceptable

Table C-28. Sample Collection Type (SAMPLE_TYPE).

Sample collection method code.

SAMPLE_TYPE	DESCRIPTION
C	Composite sample (may be composed of multiple samples from a site or multiple depths)
D	Discrete sample (a grab sample or single sample from a site or depth)
ISM_H	*In Situ* measurement, collected as part of a horizontal transect
ISM_V	*In Situ* measurement, collected as part of a vertical profile

Table C-29. Benthic Image Analysis Sediment Characterization (SEDIMENT_TYPE).

Currently the Wentworth sediment classification scheme is used to characterize sediment composition in the Benthic Sediment Imaging Program. Classifications are as follows:

SEDIMENT TYPE	DESCRIPTION	SEDIMENT TYPE	DESCRIPTION
CL	CLAY	MSC	MEDIUM SAND-CLAY
CLMS	CLAY-MEDIUM SAND	MSGR	MEDIUM SAND-GRAVEL
CLSH	CLAY-SHELL	NA	NOT AVAILABLE
CLSI	CLAY-SILT	SA/SICL	SAND-SILTYCLAY
CLSI/SH	CLAY-SILT-SHELL	SACL	SANDY CLAY
CLSIFS	CLAY-SILT-FINE SAND	SASH	SAND-SHELL
FS	FINE SAND	SASI	SANDY SILT
FS/FSSI	FINE SAND-FINE SANDY SILT	SH	SHELL
FS/SI	FINE SAND- SILT	SHFS	SHELL-FINE SAND
FS/SICL	FINE SAND-SILTY CLAY	SHFSSI/CL	SHELL-FINE SAND-SILT-CLAY
FSCL	FINE SAND-CLAY	SHSA	SHELL-SAND
FSGR	FINE SAND-GRAVEL	SHSICL	SHELL-SILT-CLAY
FSMS	FINE SAND-MEDIUM SAND	SI	SILT
FSMS/SI	FINE SAND-MEDIUM SAND- SILT	SICL	SILTY CLAY
FSMSSH/SI	FINE SAND-MEDIUM SAND-SHELL- SILT	SICL/SH	SILTY CLAY-SHELL
FSSH	FINE SAND -SHELL	SICLFS	SILTY CLAY-FINE SAND
FSSICL	FINE SAND-SILT-CLAY	SIFS	SILTY FINE SAND
FSSISH	FINE SAND-SILT-SHELL	SIFSMS	SILTY FINE SAND - MEDIUM SAND
IND	INDETERMINATE	SISA	SILTY SAND
MFSCL	MEDIUM FINE SAND-CLAY	SISACL	SILTY SANDY CLAY
MS	MEDIUM SAND	SISH	SILTY SHELL

Table C-30. Site Selection Type (SITETYPE).

This code tells the user how a sampling site was selected.

SITE TYPE	DESCRIPTION
F	Fixed Location Sampling Site
R	Randomly selected site within a habitat strata

Table C-31. Data Collecting Agency (SOURCE).

An eight-character code indicating who has submitted the data. Current values for this field are as given.

SOURCE	DESCRIPTION
ANS	Benedict Estuarine Research Center, Academy of Natural Sciences
CBL	University of Maryland Chesapeake Biological Laboratory
DCDOH	District of Columbia Department of Health
DCRA	District of Columbia Department of Consumer and Regulatory Affairs
GMU	George Mason University
ICPRB	Interstate Commission on the Potomac River Basin
MDDNR	Maryland, Department of Natural Resources
MDMDE	Maryland, Maryland Department of the Environment
NRO	Virginia Department Of Environmental Quality-Northern Regional Office
ODU	Old Dominion University
PADEP	Pennsylvania Department of Environmental Protection
PRO	Virginia Department of Environmental Quality-Piedmont Regional Office
SRBC	Susquehanna River Basin Commission
TRO	Virginia Department of Environmental Quality-Tidewater Regional Office
UMCBL	University of Maryland, Chesapeake Biological Laboratory
UMHPEL	University of Maryland, Horn Point Environmental Laboratory
USNOAA	U.S. National Oceanic and Atmospheric Administration
USGS	United States Geological Survey
VAWCB	Virginia Water Control Board
VADEQ	Virginia Department Of Environmental Quality
VERSAR	Versar Incorporated
VIMS	Virginia Institute of Marine Sciences

Table C-32. Alternate Sampling Station Identifier.

The following stations had their names changed to the standard CBP station names in July 1998. Alternate names appearing in previous versions of the living resources data sets and data users guides are as follows:

STATION	CBPNAME
MEE3.1	EE3.1
MET4.2	ET4.2
MET5.1	ET5.1
MET5.2	ET5.2
MLE2.2	LE2.2
PXT0402	TF1.5
XCF8747	LE1.4
XCF9575	CB5.1W
XCG8613	CB5.1
XDA1177	RET2.2
XDE2792	LE1.2
XDE5339	LE1.1
XDE9401	RET1.1
XDF0407	LE1.3
XEA6596	TF2.3
XED4892	TF1.7
XED9490	TF1.6
MWT5.1	WT5.1
XEA1840	TF2.4
MET5.0A	ET5.0A

Table C-33. Sampling Station Identifier (STATION).

A list of the current, fixed monitoring stations for all CBP monitoring programs is given here. Note that the benthic monitoring programs in Maryland and Virginia use randomly selected sampling sites at times. These sites are given unique station identifiers in the databases and are not included in the following list.

STATION	LATITUDE	LONGITUDE	LL_DATUM	DESCRIPTION
CB1.0	39.6586	-76.1744	NAD27	SUSQUEHANNA RIVER AT CONOWINGO DAM
CB1.1	39.5447	-76.0817	NAD27	MOUTH OF SUSQUEHANNA RIVER; HEAD OF BAY; MID-CHANNEL
CB2.1	39.4400	-76.0250	NAD27	SOUTHWEST OF TURKEY POINT; UPPER LIMIT OF TRANSITION ZONE; MID-CHANNEL
CB2.2	39.3467	-76.1750	NAD27	WEST OF STILL POND NEAR BUOY R-34; MIDDLE OF TRANSITION ZONE; MID-CHANNEL
CB3.1	39.2481	-76.2381	NAD27	SOUTHEAST OF GUNPOWDER NECK BETWEEN BUOY 24A AND 24B; LOWER LIMIT OF TRANSITION ZONE; MID-CHANNEL
CB3.2	39.1631	-76.3064	NAD27	NORTHWEST OF SWAN POINT NEAR BUOY R-10; LOWER ESTUARINE REACH; MID-CHANNEL
CB3.3C	38.9958	-76.3600	NAD27	NORTH OF BAY BRIDGE; CHARACTERIZES MID-CHANNEL
CB3.3E	39.0017	-76.3464	NAD27	NORTHEAST OF BAY BRIDGE; CHARACTERIZES EASTERN SHORE
CB3.3W	39.0031	-76.3883	NAD27	NORTHWEST OF BAY BRIDGE; CHARACTERIZES WESTERN SHORE
CB4.0C	38.9269	-76.3947	NAD27	SOUTH OF BAY BRIDGE; CHARACTERIZES MID-CHANNEL
CB4.0E	38.9269	-76.3872	NAD27	SOUTHEAST OF BAY BRIDGE; CHARACTERIZES EASTERN SHORE
CB4.0W	38.9272	-76.4331	NAD27	SOUTHWEST OF BAY BRIDGE; CHARACTERIZES WESTERN SHORE
CB4.1C	38.8250	-76.4000	NAD27	SOUTHWEST OF KENT POINT; CHARACTERIZES MID-CHANNEL
CB4.1E	38.8164	-76.3714	NAD27	SOUTH OF KENT POINT; BOUNDARY BETWEEN CB4 AND EE1; RIVER CHANNEL
CB4.1W	38.8133	-76.4631	NAD27	SOUTHEAST OF HORSESHOE POINT; CHARACTERIZES WESTERN SHORE
CB4.2C	38.6447	-76.4181	NAD27	SOUTHWEST OF TILGHMAN ISLAND NEAR BUOY CR; CHARACTERIZES MID-CHANNEL
CB4.2E	38.6447	-76.4003	NAD27	SOUTHWEST OF TILGHMAN ISLAND; CHARACTERIZES EASTERN SHORE
CB4.2W	38.6433	-76.5017	NAD27	NORTHWEST OF PLUM POINT; CHARACTERIZES WESTERN SHORE
CB4.3C	38.5564	-76.4350	NAD27	EAST OF DARES BEACH NEAR BUOY R-64; CHARACTERIZES MID-CHANNEL
CB4.3E	38.5564	-76.3900	NAD27	MOUTH OF CHOPTANK RIVER; BOUNDARY BETWEEN CB4 AND EE2
CB4.3W	38.5564	-76.4933	NAD27	EAST OF DARES BEACH; CHARACTERIZES WESTERN SHORE
CB4.4	38.4131	-76.3433	NAD27	NORTHEAST OF COVE POINT; MID-CHANNEL
CB5.1	38.3183	-76.2931	NAD27	EAST OF CEDAR POINT AND PR BUOY; MID-CHANNEL
CB5.1W	38.3250	-76.3758	NAD27	MID-CHANNEL BETWEEN CEDAR POINT AND COVE POINT; CHARACTERIZES LOWER ESTUARINE

STATION	LATITUDE	LONGITUDE	LL_DATUM	DESCRIPTION
CB5.2	38.1367	-76.2283	NAD27	EAST OF POINT NO POINT; MID-CHANNEL
CB5.3	37.9117	-76.1681	NAD27	NORTHEAST OF SMITH POINT AT VIRGINIA STATE LINE; MID-CHANNEL; OVERLAP STATION WITH VIRGINIA
CB5.4	37.8000	-76.1750	UNID	CENTRAL CHESAPEAKE BAY (DEEP MAIN CHANNEL)
CB5.4W	37.8133	-76.2950	UNID	CENTRAL CHESAPEAKE BAY AT THE MOUTH OF THE GREAT WICOMICO RIVER
CB5.5	37.6917	-76.1900	UNID	CENTRAL CHESAPEAKE BAY (MAIN CHANNEL)
CB6.1	37.5883	-76.1625	UNID	LOWER WEST CENTRAL CHESAPEAKE BAY (MAIN CHANNEL OFF LOWER END OF THE RAPPAHANNOCK RIVER)
CB6.2	37.4867	-76.1567	UNID	LOWER WEST CENTRAL CHESAPEAKE BAY
CB6.3	37.4114	-76.1600	UNID	LOWER WEST CENTRAL CHESAPEAKE BAY (WOLFTRAP)
CB6.4	37.2364	-76.2083	UNID	CENTRAL CHESAPEAKE BAY OFFSHORE FROM MOUTH OF YORK RIVER
CB7.1	37.6833	-75.9900	UNID	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE CHANNEL)
CB7.1N	37.7750	-75.9750	UNID	LOWER EAST CENTRAL CHESAPEAKE BAY (TANGIER SOUND CHANNEL)
CB7.1S	37.5811	-76.0583	UNID	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE CHANNEL)
CB7.2	37.4114	-76.0800	UNID	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE CHANNEL)
CB7.2E	37.4114	-76.0250	UNID	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE, SIDE CHANNEL)
CB7.3	37.1167	-76.1256	UNID	MAINSTEM YORK SPIT CHANNEL
CB7.3E	37.2286	-76.0542	UNID	LOWER EASTERN SHORE CHANNEL AREA
CB7.4	36.9933	-76.0106	UNID	BALTIMORE CHANNEL AT THE BAY BRIDGE/TUNNEL
CB7.4N	37.0581	-75.9731	UNID	NORTH CHANNEL AT THE BAY BRIDGE/TUNNEL
CB8.1	36.9875	-76.1681	UNID	BETWEEN JAMES RIVER MOUTH AND THIMBLE SHOALS CHANNEL
CB8.1E	36.9450	-76.0250	UNID	THIMBLE SHOALS CHANNEL AT BAY BRIDGE/TUNNEL
EE1.1	38.8833	-76.2500	NAD27	EASTERN BAY BETWEEN TILGHMAN POINT AND PARSONS ISLAND, NORTH OF BUOY R-4; CHARACTERIZES EMBAYMENT
EE2.1	38.6500	-76.2750	NAD27	CHOPTANK EMBAYMENT BETWEEN TODDS POINT AND NELSON POINT; MIDWAY BETWEEN BUOY BWN63B AND R-12
EE2.2	38.5333	-76.3083	NAD27	LITTLE CHOPTANK RIVER MID-CHANNEL WEST OF RAGGED POINT, WEST OF BUOY FIG-"3"; CHARACTERIZES EMBAYMENT
EE3.0	38.2833	-76.0167	NAD27	FISHING BAY AT DAYMARK 3, WEST OF ROASTING EAR POINT; CHARACTERIZES EMBAYMENT
EE3.1	38.2000	-75.9750	NAD27	NORTH TANGIER SOUND, NORTHWEST OF HAINES POINT, 100 YARDS NORTH OF BUOY R-16; CHARACTERIZES EMBAYMENT
EE3.2	37.7925	-75.9333	NAD27	SOUTH TANGIER SOUND, MID-CHANNEL; EAST OF SMITH ISLAND, 500 YARDS NNW OF BUOY R-8; CHARACTERIZES EMBAYMENT
EE3.3	37.9417	-75.7667	NAD27	POCOMOKE SOUND, MID-CHANNEL NEAR BUOY W-"A" PLACE; STATE LINE;

STATION	LATITUDE	LONGITUDE	LL_DATUM	DESCRIPTION
				CHARACTERIZES EMBAYMENT
EE3.4	37.9083	-75.7917	UNID	TANGIER SOUND
EE3.5	37.7925	-75.8436	UNID	TANGIER SOUND
ET1.1	39.5750	-75.9583	NAD27	NORTHEAST RIVER AT BUOY F1R-12 OFF HANCE POINT; MID-CHANNEL; TIDAL FRESH WATER STATION
ET10.1	38.0833	-75.5667	NAD27	UPPER POCOMAKE RIVER NEAR ALTERNATE ROUTE 13 BRIDGE AT POCOMAKE CITY; TIDAL FRESH WATER STATION
ET2.1	39.5250	-75.8167	NAD27	BACK CREEK NEAR ROUTE 213 BRIDGE AT CHESAPEAKE BAY; TIDAL FRESH WATER STATION
ET2.2	39.4667	-75.8750	NAD27	BOHEMIA RIVER OFF OLD HACK POINT AT BUOY F1R-4; MID-CHANNEL; TIDAL FRESH WATER STATION
ET2.3	39.5083	-75.9000	NAD27	ELK RIVER, SOUTHEAST OF OLDFIELD POINT AT B-15; MID-CHANNEL; TIDAL FRESH WATER STATION
ET3.1	39.3667	-75.8833	NAD27	SASSAFRAS RIVER NEAR ROUTE 213 BRIDGE; TIDAL FRESH WATER STATION
ET4.1	39.2583	-75.9250	NAD27	CHESTER RIVER AT CRUMPTON NEAR ROUTE 290 BRIDGE; TIDAL FRESH WATER STATION
ET4.2	38.9917	-76.2167	NAD27	LOWER CHESTER RIVER, SOUTH OF EASTERN NECK ISLAND AT BUOY FIG-9; CHARACTERIZES LOWER ESTUARINE
ET5.0A	38.4651	-75.5813	NAD27	CHOPTANK RIVER, MID-CHANNEL OF MOUTH OF KINGS CREEK
ET5.1	38.8069	-75.9122	NAD27	UPPER CHOPTANK RIVER AT GANEY WHARF, DOWNSTREAM OF CONFLUENCE; TUCKAHOE CIRCLE; TIDAL FRESH WATER STATION
ET5.2	38.5800	-76.0583	NAD27	LOWER CHOPTANK RIVER NEAR ROUTE 50 BRIDGE AT CAMBRIDGE; CHARACTERIZES LOWER ESTUARINE
ET6.1	38.5333	-75.7167	NAD27	UPPER NANTICOKE RIVER NEAR ROUTE 313 BRIDGE AT SHARPTOWN; MID-CHANNEL; TIDAL FRESH WATER STATION
ET6.2	38.3333	-75.8833	NAD27	LOWER NANTICOKE RIVER; MID-CHANNEL NEAR BUOY FIG-11; CHARACTERIZES LOWER ESTUARINE
ET7.1	38.2667	-75.7917	NAD27	LOWER WICOMICO RIVER AT WHITEHEAVEN OFF OF FERRY ROAD; CHARACTERIZES LOWER ESTUARINE
ET8.1	38.1417	-75.8167	NAD27	MANOKIN RIVER AT UPPER EXTENT OF CHANNEL NEAR BUOY R-8; CHARACTERIZES LOWER ESTUARINE
ET9.1	38.0583	-75.8083	NAD27	BIG ANNEMESSEX RIVER, NORTHWEST OF LONG POINT; 250 YARDS EAST OF DAY BEACON G-5; CHARACTERIZES LOWER ESTUARINE
LE1.1	38.4250	-76.6019	NAD27	MID-CHANNEL; SSW OF JACK BAY SANDSPIT AND NORTHEAST OF SANDGATES; CHARACTERIZES LOWER ESTUARINE
LE1.2	38.3786	-76.5114	NAD27	MID-CHANNEL 1600 METERS; SOUTHWEST OF PATERSONS POINT; CHARACTERIZES LOWER ESTUARINE
LE1.3	38.3406	-76.4883	NAD27	MID-CHANNEL 1200 METERS DUE NORTH OF POINT PATIENCE; ENE OF HALF PONE POINT; CHARACTERIZES LOWER ESTUARINE

STATION	LATITUDE	LONGITUDE	LL_DATUM	DESCRIPTION
LE1.4	38.3119	-76.4217	NAD27	MID-CHANNEL BETWEEN DRUM POINT AND FISHING POINT; CHARACTERIZES LOWER ESTUARINE
LE2.2	38.1667	-76.5833	NAD27	POTOMAC RIVER OFF RAGGED POINT AT BUOY 51B; LOWER ESTUARINE ZONE
LE2.3	38.0214	-76.3481	NAD27	MOUTH OF POTOMAC RIVER; BOUNDARY BETWEEN CB5 AND LE2; RIVER CHANNEL
LE3.1	37.7606	-76.6211	UNID	VIMS SLACK WATER, BUOY #11
LE3.2	37.6703	-76.5544	UNID	LONG POINT UPSTREAM OF BUOY #R8
LE3.2N	37.6672	-76.5411	UNID	LONG POINT UPSTREAM OF BUOY #R8 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE3.2S	37.6469	-76.5703	UNID	LONG POINT UPSTREAM OF BUOY #R8 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE3.3	37.6933	-76.4733	UNID	CORROTOMAN RIVER, BUOY #R6
LE3.3A	37.6667	-76.4833	UNID	CORROTOMAN RIVER, 1984 STATION LOCATION
LE3.4	37.6333	-76.4633	UNID	ORCHARD PT, VIMS SLACK WATER
LE3.4B	37.6242	-76.4622	NAD27	
LE3.6	37.5967	-76.2850	UNID	MOUTH OF THE RAPPAHANNOCK RIVER
LE3.6N	37.6067	-76.2833	UNID	RAPPAHANNOCK RIVER NORTH SIDE
LE3.6S	37.5725	-76.2933	UNID	RAPPAHANNOCK RIVER SOUTH SIDE
LE3.7	37.5306	-76.3069	UNID	MOUTH OF THE PIANKATANK RIVER
LE4.1	37.4183	-76.6933	UNID	VIMS SLACK WATER, #N44
LE4.2	37.2917	-76.5583	UNID	VIMS SLACK WATER, #N34
LE4.2N	37.2953	-76.5589	UNID	VIMS SLACK WATER, #N34 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE4.2S	37.2750	-76.5789	UNID	VIMS SLACK WATER, #N34 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE4.3	37.2350	-76.4850	UNID	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS
LE4.3B	37.2294	-76.4728	NAD27	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS
LE4.3N	37.2533	-76.4394	UNID	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE4.3S	37.2233	-76.4328	UNID	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE5.1	37.2067	-76.6517	UNID	VIMS SLACK WATER, RED BUOY #36
LE5.2	37.0578	-76.5833	UNID	BUOY #C12-13
LE5.2N	37.0842	-76.5742	UNID	BUOY #C12-13 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE5.2S	37.0361	-76.6053	UNID	BUOY #C12-13 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE5.3	36.9900	-76.4600	UNID	NH-15 JAMES RIVER BRIDGE, VIMS
LE5.4	36.9550	-76.3917	UNID	BUOY #9, HAMPTON ROADS, VIMS

STATION	LATITUDE	LONGITUDE	LL_DATUM	DESCRIPTION
LE5.5	36.9967	-76.3033	UNID	MOUTH OF THE JAMES RIVER
LE5.5A	36.9756	-76.2878	UNID	LOWER CHESAPEAKE BAY MAINSTEM
LE5.5B	36.9717	-76.2039	UNID	LOWER CHESAPEAKE BAY MAINSTEM
LE5.6	36.9033	-76.3333	UNID	RED BUOY #18
RET1.1	38.4906	-76.6644	NAD27	MID-CHANNEL, 5000 METERS ENE OF LONG POINT; CHARACTERIZES TRANSITION ZONE
RET2.1	38.4033	-77.2694	NAD27	BUOY 27 SOUTHWEST OF SMITH POINT; CHARACTERIZES TRANSITION ZONE
RET2.2	38.3519	-77.2047	NAD27	BOUY 19 MID-CHANNEL OFF MARYLAND POINT; CHARACTERIZES TRANSITION ZONE
RET2.3	38.3881	-77.1308	NAD27	BOUY 13 OFF MONTH OF NANJEMOY CREEK; CHARACTERIZES TRANSITION ZONE
RET2.4	38.3625	-76.9908	NAD27	MID-CHANNEL AT MORGANTOWN BRIDGE (U.S. ROUTE 301); CHARACTERIZES LOWER ESTUARINE
RET3.1	37.9200	-76.8217	UNID	RAPPAHANNOCK RIVER NORTH OF BUOY R10, VIMS SLACK
RET3.1N	37.9242	-76.8131	UNID	RAPPAHANNOCK RIVER NORTH OF BUOY R10, VIMS SLACK (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET3.1S	37.9153	-76.8250	UNID	RAPPAHANNOCK RIVER NORTH OF BUOY R10, VIMS SLACK (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET3.2	37.8083	-76.7133	UNID	RAPPAHANNOCK RIVER (VIMS SLACK WATER #N16)
RET4.1	37.5250	-76.8700	UNID	PAMUNKEY RIVER AT SOUTHERN END OF LEE MARSH
RET4.2	37.5717	-76.7933	UNID	MATTAPONI RIVER AT MUDDY POINT
RET4.3	37.5067	-76.7883	UNID	YORK RIVER (VIMS SLACK WATER #C57)
RET4.3N	37.5103	-76.5589	UNID	YORK RIVER, VIMS SLACK WATER #C57 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET4.3S	37.5103	-76.8000	UNID	YORK RIVER, VIMS SLACK WATER #C57 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET5.1	37.3422	-76.8731	UNID	CHICKAHOMINY RIVER, 1984-1988 ONLY
RET5.1A	37.3119	-76.8728	UNID	CHICKAHOMINY RIVER ABOVE SHIPYARD LANDING
RET5.2	37.2100	-76.7933	UNID	SWANN'S POINT, JAMES RIVER WQMP STA#19
RET5.2A	37.2078	-76.7042	NAD27	SWANN'S POINT, JAMES RIVER WQMP STA#19- BENTHIC MONITORING STATION
RET5.2N	37.2153	-76.7792	UNID	SWANN'S POINT, JAMES RIVER WQMP STA#19 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET5.2S	37.1903	-76.7922	UNID	SWANN'S POINT, JAMES RIVER WQMP STA#19 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
SBE2	36.8125	-76.3061	UNID	SOUTHERN BRANCH OF THE ELIZABETH RIVER - ADJACENT TO ATLANTIC WOOD
SBE5	36.7697	-76.2964	UNID	SOUTHERN BRANCH OF THE ELIZABETH RIVER - ADJACENT TO VIRGINIA POWER
TF1.0	38.9558	-76.6933	NAD27	FROM UPSTREAM SIDE OF THE MD ROUTE 50 BRIDGE; USGS GAGE NO. 59440; CHARACTERIZES TIDAL FRESH ZONE

STATION	LATITUDE	LONGITUDE	LL_DATUM	DESCRIPTION
TF1.2	38.8142	-76.7511	NAD27	MIDSTREAM AT WATER STREET IN UPPER MARLBORO; CHARACTERIZES TIDAL FRESH ZONE
TF1.3	38.8103	-76.7125	NAD27	MID-CHANNEL FROM MD ROUTE 4 BRIDGE NEAR WAYSONS CORNER; CHARACTERIZES TIDAL FRESH ZONE
TF1.4	38.7728	-76.7103	NAD27	WEST SHORE FROM MAIN PIER AT JACKSON LANDING; CHARACTERIZES TIDAL FRESH ZONE
TF1.5	38.7100	-76.7017	NAD27	MID-CHANNEL AT NOTTINGHAM; CHARACTERIZES TIDAL FRESH ZONE
TF1.6	38.6578	-76.6847	NAD27	MID-CHANNEL OFF WHARF AT LOWER MARLBORO; CHARACTERIZES TRANSITION ZONE
TF1.7	38.5817	-76.6806	NAD27	MID-CHANNEL ON A TRANSSECT OF APPROXIMATE 115 DEGREE FROM JACK'S CREEK; CHARACTERIZES TRANSITION ZONE
TF2.1	38.7064	-77.0489	NAD27	AT FL BOUY 77 OFF MOUTH OF PISCATAWAY CREEK; CHARACTERIZES TIDAL FRESH ZONE
TF2.2	38.6906	-77.1114	NAD27	BOUY 67 OFF MOUTH OF PISCATAWAY CREEK; CHARACTERIZES TIDAL FRESH ZONE
TF2.3	38.6081	-77.1742	NAD27	BOUY N 54 MID-CHANNEL OFF INDIANHEAD; CHARACTERIZES TIDAL FRESH ZONE
TF2.4	38.5297	-77.2656	NAD27	BOUY 44 BETWEEN POSSUM POINT AND MOSS POINT; CHARACTERIZES TIDAL FRESH/TRANSITION ZONE
TF3.0	38.3200	-77.4717	UNID	RAPPAHANNOCK RIVER AT ROUTE 95 UPSTREAM OF FREDERICKSBURG, VA?
TF3.1A	38.2553	-77.4119	UNID	RAPPAHANNOCK RIVER BELOW MASSAPONAX STP
TF3.1B	38.2456	-77.2339	UNID	RAPPAHANNOCK RIVER DOWNSTREAM OF FREDERICKSBURG, VA AT BUOY # 89
TF3.1C	38.2828	-77.4339	UNID	RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA
TF3.1D	38.2875	-77.4489	UNID	RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA
TF3.1E	38.2450	-77.3264	UNID	RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA
TF3.2	38.1747	-77.1886	UNID	RAPPAHANNOCK RIVER JUST DOWNSTREAM OF THE PORT ROYAL BRIDGE, #N74
TF3.2A	38.1119	-77.0522	UNID	RAPPAHANNOCK RIVER ONE MILE DOWNSTREAM OF THE PORT ROYAL BRIDGE
TF3.3	38.0186	-76.9083	UNID	RAPPAHANNOCK RIVER AT JONES CREEK? (VIMS SLACK WATER #N40)
TF4.0M	37.8839	-77.1633	UNID	MATTAPONI RIVER SOUTH OF BOILER RUN (USGS GAGING STATION)?
TF4.0P	37.7678	-77.3322	UNID	PAMUNKEY RIVER NORTH OF BECHUMPS CREEK
TF4.1A	37.6672	-77.1367	UNID	PAMUNKEY RIVER AT ROUTE 360 BRIDGE
TF4.2	37.5797	-77.0219	UNID	PAMUNKEY RIVER AT WHITE HOUSE, VA
TF4.4	37.7228	-77.0239	UNID	MATTAPONI RIVER AT WALKERTON, VA
TF4.4A	37.6536	-76.8981	UNID	MATTAPONI RIVER MIDWAY BETWEEN WEST POINT, VA AND WALKERTON, VA
TF5.0A	37.2253	-77.4764	UNID	APPOMATTOX RIVER AT SR600, NEAR MATOACA, VA
TF5.0J	37.6708	-78.0861	UNID	JAMES RIVER AT CARTERSVILLE, VA (USGS GAGING STATION)
TF5.2	37.5306	-77.4339	UNID	JAMES RIVER AT MAYO'S BRIDGE (JRWQMP STATION #2)
TF5.2A	37.4497	-77.4200	UNID	JAMES RIVER AT BUOY # 166

STATION	LATITUDE	LONGITUDE	LL_DATUM	DESCRIPTION
TF5.3	37.4031	-77.3919	UNID	JAMES RIVER AT BUOY #157 (JRWQMP STATION #8)
TF5.4	37.3114	-77.2969	UNID	JAMES RIVER AT BUOY #8 (JRWQMP STATION #20A)
TF5.5	37.3128	-77.2331	UNID	JAMES RIVER AT RED BUOY #107 (JRWQMP STATION #13)
TF5.5A	37.3000	-77.1250	UNID	JAMES RIVER AT BUOY # 91
TF5.5AN	37.3089	-77.1306	UNID	JAMES RIVER AT BUOY # 91 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
TF5.5AS	37.2981	-77.1272	UNID	JAMES RIVER AT BUOY # 91 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
TF5.6	37.2747	-76.9886	UNID	JAMES RIVER NORTH OF BUOY #74, JAMES RIVER WQMP STATION #17
TF5.6A	37.2217	-76.9236	UNID	JAMES RIVER - NEW LOCATION FOR TF5.6, 1994-1995 ONLY
WE4.1	37.3117	-76.3467	UNID	CENTRAL MOBJACK BAY
WE4.2	37.2417	-76.3867	UNID	MOBJACK BAY AT THE MOUTH OF THE YORK RIVER
WE4.2N	37.2517	-76.3908	UNID	YORK RIVER NORTH SIDE
WE4.2S	37.2367	-76.3867	UNID	YORK RIVER SOUTH SIDE
WE4.3	37.1767	-76.3733	UNID	MOBJACK BAY AT THE MOUTH OF THE POQUOSON RIVER
WE4.4	37.1100	-76.2933	UNID	MOBJACK BAY AT THE MOUTH OF THE BACK RIVER
WT1.1	39.4333	-76.2417	NAD27	BUSH RIVER, EAST OF GUM POINT AT FL G LT; CHARACTERIZES SALINITY TRANSITION
WT2.1	39.3833	-76.3419	NAD27	GUNPOWDER RIVER, 200 YARDS EAST OF OLIVER POINT AT BUOY G-"15"; CHARACTERIZES SALINITY TRANSITION
WT3.1	39.3000	-76.4000	NAD27	MIDDLE RIVER, EAST OF WILSON POINT AT CHANNEL JUNCTION DAY-MARKER; CHARACTERIZES SALINITY TRANSITION
WT4.1	39.2833	-76.4500	NAD27	BACK RIVER, EAST OF STANSBURY POINT AT DAY BEACON 12; CHARACTERIZES LOWER ESTUARINE
WT5.1	39.2083	-76.5250	NAD27	PATAPSCO RIVER, EAST OF HAWKINS POINT AT BUOY 5M; CHARACTERIZES LOWER ESTUARINE
WT6.1	39.0750	-76.4750	NAD27	MAGOTHY RIVER, NORTH OF SOUTH FERRY POINT AT BUOY FL R12; CHARACTERIZES LOWER ESTUARINE
WT7.1	39.0167	-76.5083	NAD27	SEVERN RIVER, 200 YARDS UPSTREAM OF ROUTE 50-301 BRIDGE; CHARACTERIZES LOWER ESTUARINE
WT8.1	38.9333	-76.5167	NAD27	SOUTH RIVER, SOUTH OF POPLAR POINT AT DAY MARKER R-"16"; CHARACTERIZES LOWER ESTUARINE
WT8.2	38.8833	-76.5333	NAD27	RHODE RIVER BETWEEN FLAT ISLAND AND BIG ISLAND; CHARACTERIZES LOWER ESTUARINE
WT8.3	38.8500	-76.5333	NAD27	WEST RIVER JUST UPSTREAM OF DAY MARKER R-"6"; CHARACTERIZES LOWER ESTUARINE
XGG8251	38.9711	-76.2478	NAD27	KENT ISLAND NARROW AT DRAWSPAN ON ROUTE 50 BRIDGE; CHARACTERIZES FREE-FLOWING FRESHWATER
XJH6680	39.4431	-76.0328	NAD27	CHESAPEAKE BAY 2100 YARDS NORTHEAST OF SANDY POINT; MID-CHANNEL

Table C-34. Salinity Zone (SALZONE).

Salinity zone layer code. If these data are collected, they are located in the EVENT DATA FILE.

SALZONE	DESCRIPTION
F	Freshwater- less than 0.5 ppt
O	Oligohaline- 0.5 to 5.0 ppt
M	Mesohaline- 5.1 to 18.0 ppt
P	Polyhaline- greater than 18.0 ppt
N	Not Recorded
E	An E accompanying an F, O, M, or P indicates an estimated salinity zone. Salzone value based on salinity data NOT collected synchronous with biological data.

Table C-35. Tidal Stage (TIDE).

This code describes the tidal state during the sampling period. Note that in the CIMS water quality database PRECIP is a field in the Event Table, while in living resources databases it is a parameter in a weather table. The possible values for this field are given below.

TIDE	DESCRIPTION
E	Ebb tide (stage of water movement from a higher to a lower level)
F	Flood tide (stage of water movement from a lower to higher level)
L	Low tide (stage of water where the level is below mean and velocity approaches zero)
H	High tide (stage of water where the level is above mean and velocity approaches zero)
HF	High flood tide
HS	High slack tide
LS	Low slack tide

Table C-36. Tributary Code (TRIB_COD) and Basin Desinations (BASIN).

This is a three character code describing the position of a sampling station by tributary or mainstem. The codes for this field are as follows:

TRIB_COD	DESCRIPTION
BAL	Baltimore Harbor
BAY	Main Bay
CHP	Choptank River
CHS	Chester River
ELZ	Elizabeth River
JAM	James River
PAX	Patuxent River
POT	Potomac River
RAP	Rappahanock River
TAN	Tangier River
YRK	York River

Table C-37. Reported Units (UNITS).

This parameter describes the units in which a substance is measured. Some of the possible values for this field are as follows:

UNITS	DESCRIPTION
%	Parts per hundred; percent
absorbance	Spectrometer absorbance
cm	Centimeters
Cpm	Counts per minute
cfs	Cubic feet per second
Deg C	Degrees Celsius
g	Grams
g/m**2/day	Grams per square meter per day
g/m**2/yr	Grams per square meter per year
l	Liters
m	Meters
mg	Milligrams
mg/kg	Milligrams per kilogram (ppm)
mg/l	Milligrams per liter (ppm)
mg/m**2	Milligrams per square meter
mg/m**2/day	Milligrams per square meter per day
mg/m**3	Milligrams per cubic meter
mg/sample	Milligrams per sample
ml	Milliliters
mm	Millimeters
MPN/100ml	Most Probable Number (Coliform)
mV	Millivolts
ng/l	Nanograms per liter
number/liter	Number per liter
number/m**2	Number per square meter
number/m**3	Number per cubic meter
NTU	Nephelometric Turbidity Units
phi	Sediment particle size
ppb	Parts per billion
ppm	Parts per million
ppt	Parts per thousand (0/00)
pptr	Parts per trillion
su	Standard units
ug/g	Micrograms per gram
ug/kg	Micrograms per kilogram (ppb)
ug/l	Micrograms per liter (ppb)
um/cm	Micro mhos per centimeter

Table C-38. Measurement Type (AEPENETR or VALUE_TYPE).

Measurement type code.

VALUE_TYPE	DESCRIPTION
A	Actual measurement
E	Estimated measurement

Table C-39. Wave Height (WAVE_HEIGHT).

This code describes the height of the wave during a sampling period. Note that in the CIMS water quality database WAVE_HEIGHT is a field in the event table while in living resources databases it is a parameter in a weather table. Possible values for this field are given below:

WAVE_HEIGHT	DESCRIPTION
0	0 to 0.1 Meters - Calm
1	0.1 to 0.3 Meters
2	0.3 to 0.6 Meters
3	0.6 to 1.0 Meters
4	1.0 to 1.3 Meters
5	GT 1.3 Meters

Table C-40. Wind Direction (WIND_DIR).

This code describes the predominant direction of the wind. Note that in the CIMS water quality database WIND_DIR is a field in the event table while in living resources databases it is a parameter in a weather table. Possible values for this field are given below:

WIND_DIR	DESCRIPTION
N	0 degrees, winds from the north
NNE	22.5 degrees, winds from the north-northeast
NE	45 degrees, winds from the northeast
ENE	67.5 degrees, winds from the east-northeast
E	90 degrees, winds from the east
ESE	112.5 degrees, winds from the east-southeast
SE	135 degrees, winds from the southeast
SSE	157.5 degrees, winds from the south-southeast
S	180 degrees, winds from the south
SSW	202.5 degrees, winds from the south-southwest
SW	225 degrees, winds from the southwest
WSW	247.5 degrees, winds from the west-southwest
W	270 degrees, winds from the west
WNW	292.5 degrees, winds from the west-northwest
NW	315 degrees, winds from the northwest
NNW	337.5 degrees, winds from the north-northwest

Table C-41. Wind Speed (WINDSPEED).

This code describes the predominant speed of the wind during a sampling period. Note that in the CIMS water quality database WINDSPEED is a field in the event table while in living resources databases it is a parameter in a weather table. Possible values for these fields are given below.

WINDSPEED	DESCRIPTION
0	0 knots to 1 knot - Calm
1	greater than 1 knot to 10 knots
2	greater than 10 knots to 20 knots
3	greater than 20 knots to 30 knots
4	greater than 30 knots to 40 knots
5	greater than 40 knots

APPENDIX D – CHESAPEAKE BAY PROGRAM DATA CENTER CONTACTS

December 1999

The Chesapeake Bay Program Data Center Staff

Individuals without Internet access, users wishing to obtain SAS conversion scripts or users wishing to obtain the data files in Microsoft Access format can request datasets directly from the Biological Monitoring Data Manager. All requests must be made in writing. A data request form is provided in this appendix and can be sent to:

Jacqueline Johnson
Biological Monitoring Data Manager
Chesapeake Bay Program Data Center
410 Severn Ave.
Annapolis, MD 21403
Phone (local): 410-267-5729
Phone (long distance): 1-800-968-7229, ext. 729
FAX: 410-267-5777
E-mail: jjohnson@chesapeakebay.net

Individuals without Internet access wishing to obtain GIS data products can request datasets directly from the Living Resources GIS Specialist . All requests must be made in writing. A data request form is provided in this appendix and can be sent to:

Howard Weinberg
Living Resources GIS Specialist
Chesapeake Bay Program Office
410 Severn Avenue
Annapolis, Maryland 21403
Phone (local): 410-267-5735
Phone (long distance):1-800-968-7229 ext. 735
FAX: 410-267-5777
E-mail:hweinber@chesapeakebay.net

Patrick Nowlan
Living Resources GIS Specialist
Chesapeake Bay Program Office
410 Severn Avenue
Annapolis, Maryland 21403
Phone (local): 410-267-5738
Phone (long distance): 1-800-968-7229 ext. 738
FAX: 410-267-5777
E-mail: pnolan@chesapeakebay.net

The Chesapeake Bay Program, maintains a computer support desk to assist in resolving hardware and software difficulties with Data Center equipment. You can contact the help desk at:

Phone (local): 410-267-5769
Phone (long distance): 1-800-968-7229, ext. 769
FAX: 410-267-5777

The Chesapeake Bay Program Data Center Manager is:

Lowell Bahner
Data Center Manager
Chesapeake Bay Program Data Center
410 Severn Avenue, Suite 109
Annapolis, MD 21403
Phone (long distance): 1-800-968-7229 EXT. 671
Phone (local): 410-267-5671
FAX: 410-267-5666
E-mail: bahner.lowell@epamail.epa.gov

List of Frequently Accessed Internet Addresses:

Chesapeake Bay Program Ftp Site:

ftp://cobia.chesapeakebay.net/pub/living_resources

The Chesapeake Bay Program Home Page:

http://www.chesapeakebay.net/

The Virginia Institute of Marine Sciences Sav Home Page:

http://www.vims.edu/bio/sav/index.html

The Virginia Institute of Marine Sciences Fisheries Home Page:

http://www.fisheries.vims.edu/

The National Oceanographic and Atmospheric Administration Chesapeake Bay Program Office-Ocean Data Acquisition System:

http://noaa.chesapeakebay.net/odas_sas.html

The National Oceanographic and Atmospheric Administration Chesapeake Bay Program Office-Chesapeake Bay Fisheries Page:

http://noaa.chesapeakebay.net/fisheries.htm

The National Marine Fisheries Statistics and Economics Division Home Page:

http://www.st.nmfs.gov

The Environmental Protection Agency Environmental Monitoring and Assessment Program (EMAP):

http://www.epa.gov/emap/

United States Fish and Wildlife Service National Wetlands Inventory (NWI):

http://www.nwi.fws.gov/

The Environmental Protection Agency- Multi-Resolution Land Characteristics Land Cover (MRLC):

http://www.epa.gov/mrlc/

NASA LANDSAT Imagery Program:

http://landsat7.usgs.gov/

Chesapeake Bay Land Margin Ecosystem Research-Trophic Interaction in Estuary System Study (LMER-TIES):

http://www.chesapeake.org/ties/

USGS Chesapeake Bay Region Information Home Page:

http://chesapeake.usgs.gov/chesbay/

The Integrated Taxonomic Information System (ITIS):

http://www.itis.usda.gov/plantproj/itis/

CHESAPEAKE BAY PROGRAM OFFICE
410 Severn Avenue, Suite 109
Annapolis, MD 21403
(410) 267-5700 or 1-800-YOUR-BAY
FAX (410)-267-5777

CHESAPEAKE BAY PROGRAM DATA ACCESS FORM

DATE REQUESTED:_____

SUBMITTED BY:_____

ORGANIZATION: _____

ADDRESS:_____

_____

_____

PHONE: (_____)_____ EXT. _____

EMAIL ADDRESS:_____

DESCRIPTION OF DATA AND ADDITIONAL DOCUMENTATION REQUESTED

_____

_____

INTENDED DATA USAGE:

_____

_____

FORMAT OF DATA TO BE RELEASED
POINT DATA FORMATS (CHECK ALL APPROPRIATE):

3 1/4" DISK_____ FTP_____ pkzip_____ mime compression_____

DELIMITED ASCII_____ DBF_____

GIS FORMATS (CHECK ALL APPROPRIATE):

COVERAGE _____ ARC/INFO EXPORT_____UNIX TAR _____ 8 MM TAPE_____

GZIP_____ UNIX COMPRESSION_____ FTP_____ 0 150MB QIC TAPE _____

I, the data requestor, agree to acknowledge the Chesapeake Bay Program and any other agencies and institutions as specified by the Chesapeake Bay Program Office as data providers. I agree to credit the data originators in any publications, reports or presentations generated from this data. I also accept that, although these data have been processed successfully on a computer system at the Chesapeake Bay Program, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly recommended that careful attention be paid to the contents of the data documentation file associated with these data. The Chesapeake Bay Program shall not be held liable for improper or incorrect use of the data described and/or contained herein.

SIGNATURE OF DATA REQUESTOR:_____
NO DATA REQUEST WILL BE HONORED WITHOUT SIGNATURE

APPENDIX E – SUBMITTERS' GUIDELINES FOR LIVING RESOURCES MONITORING DATA SUBMISSIONS

December 1999

This appendix describes the reporting requirements for all data, which are collected as part of the Chesapeake Bay Monitoring Program. It includes the CBP guidelines and policies data reporting requirement from the document *Chesapeake Bay Program Guidance for Data Management***.** In addition, there are living resource specific data reporting requirements. The tables list the field formats, field names, attributes and descriptions for phytoplankton, zooplankton and benthos data, which are collected as part of the Living Resource monitoring program. All data living resource deliverables are required to be sent as **comma delimited ASCII files** in formatted as described in this appendix.

CBP Guidelines and Policies

This section discusses the guidelines and policies that must be followed by all agencies participating in data and information collection, processing and submittal to the Chesapeake Bay Program. This includes not only the agencies contracted for CBP work, but also any agency that the contracting agency has involved in these activities. The CBP has adopted these guidelines and policies in order to improve coordination, compatibility, standardization and information access throughout the Program. In addition to these guidelines and policies, any activities funded with federal government funds, must also adhere to applicable Federal Information Processing Standards (FIPS) (http://www.itl.nist.gov/div897/pubs/).

Deliverables

Grantees and contractors are required to submit deliverables in electronic format, whether or not this requirement is specified in the grant or contract. Electronic deliverables include reports, graphics, spreadsheets, imagery, data files, audio and digital video products. Deliverables must be submitted on time as specified in the grant or contract. All data and information funded by CBP agencies, whether direct CBP funding or indirect (matching funds), are the property of the CBP. All data and information funded directly or indirectly by the CBP is public information and shall be made available to the public, unless there is a grant or contract condition that specifies otherwise. In addition, source data that are collected and processed in the creation of a deliverable should also be submitted, if practical. Final details about how data and information must be submitted must be arranged with the CBP Grant or Contract Officer.

Deliverable text is preferred in WordPerfect 6.1 format. Microsoft Word or PageMaker formats are also acceptable, depending on the product. Graphic images for reports are preferred as TIF format. Images for web publication are preferred as GIF or JPEG format. GIS files are preferred as ARC/INFO noncompressed export (.E00) or ArcView (shape) formats. All deliverables must have companion metadata.

Locational Data Policy

The CBP adheres to the EPA's locational data policy which requires consistent use of latitude/longitude coordinates to identify the location of entities. All data, containing spatial and/or specific geographic locations, collected or assembled under a grant or contract vehicle, for use by the CBP, or to be served on the Internet via the Chesapeake Information Management System (CIMS), must have latitude and longitude information for each entity. Projects not creating or reporting spatial data, but confined to a given project location(s), shall include the latitude/longitude of the location(s) within the study/final report.

In accordance with CBP locational data policy, data generators/servers and grant/contract recipients agree to ensure that latitude and longitude coordinates (given in degrees and decimal degrees) are provided for all sites for which data are collected and are accurate to the level required for the purpose of the application of the data. Field measured locations shall be accurate to the best practical geographic positioning method. Currently, Differential Global Positioning System (GPS) equipment can reliably provide locational coordinates accurate to within 10-25 meters (5 decimal places in decimal degrees), and is the preferred method of point location determination. Applications such as station monitoring locations should provide locational data with accuracy to that level. Other applications, such as digitizing points or watershed boundaries from mylar-media maps, cannot provide accuracy better than that of the original map, and can not match the accuracy of GPS or surveyed locations. Remote sensing platforms can now collect sub-meter resolution data (6 decimal places in decimal degrees). Therefore, it is required that

metadata be provided for all data and must include a measurement of the accuracy of the coordinates and the original source material and methods for obtaining the coordinates. Use of the draft EPA “MAD” (Method, Accuracy, Description) (Appendix A) codes to document the locational accuracy of an entity (e.g., outfall, station, watershed boundary) is recommended. It is the responsibility of data generators/providers to provide coordinates accurate to the level that is practical for the intended application and to document the accuracy of those coordinates.

The data generator/provider/server further agrees to document, in writing, that locational data were derived using an approved method and recorded in accordance with federal regulations and other EPA requirements, noted in the “Authorities” section of the EPA's policy. Grantees shall include in their application an assurance to comply with this requirement. Contractors must comply with this requirement, and the contract workplan must include a discussion of the method for complying with this requirement.

Map Coordinate Datum Policy

The CBP has adopted the policy that all data generated or collected for, submitted to the CBP or served on the Internet via CIMS shall utilize the North American Datum 1983 (NAD83) horizontal reference and the North American Vertical Datum 1988 (NAVD88) vertical reference. Most likely, organizations have been using NAD27 horizontal reference since USGS maps were historically created using this reference. The requirement to use NAD83 will require conversion of latitudes and longitudes using NAD27 to NAD83. Metadata reporting requires specification of the horizontal and vertical datum where applicable.

Map Coordinate Projection Guidelines

The CBP has adopted the policy that the standard projection for geographic information system (GIS) files maintained at the CBPO shall be UTM Zone 18 (meters) for all data within the Chesapeake Bay Basin. For larger or national GIS data files, the standard projection for GIS files maintained at the CBPO shall be Albers Conical Equal Area (meters). This policy was established to provide consistency in computing distance and area calculations, map shapes, and to facilitate database design and maintenance, and based on the recommendation of USGS. GIS and data files containing spatial data, must have coordinates reported as latitude and longitude (decimal degrees) as per the Locational Data Policy. Ideally, it is requested that information containing projected coordinates, also report coordinates in UTM Zone 18. GIS files submitted to the Program or served by CIMS participants, are preferred in ARC/INFO noncompressed export or ArcView Shape format for compatibility with the majority of the Chesapeake Bay Program GIS databases. Partner organizations who have historically maintained GIS files in another projection or coordinate system are exempt from this policy (unless they are developing or providing data products as part of a Bay Program initiative) since the effort to convert large historical holdings would be prohibitive.

Metadata Policy

The CBP has adopted the policy, consistent with Presidential Executive Order #12906, that all data generated or collected using federal funds, submitted to the Chesapeake Bay Program, or served on the Internet via CIMS, shall be accompanied by metadata (descriptive information about the data, often referred to as documentation) that fully conforms to the Federal Geographic Data Committee’s requirements for metadata. Metadata created for CBP shall also be delivered to the EPA or another federal clearinghouse as a requirement to fulfilling this policy and related grant or contract conditions. The FGDC guide for creating metadata is the Content Standards for Digital Geospatial Metadata Workbook (http://www.mews.org/nsdi/#documents).

The CBP also has adopted the policy that all data generated or collected using federal funds, submitted to the CBP or served on the Internet via CIMS, shall adhere to the National Biological Information Infrastructure's (NBII) Metadata Standard, where applicable. The NBII Metadata Standard, popular for environmental programs, provides extensions to the FGDC Metadata Standard for documenting biological data and information. Currently this standard, the Draft Content Standard for National Biological Information Infrastructure Metadata, is in draft form (http://www.nbs.gov/nbii/non-spatial.html). FGDC is reviewing how these and other extensions can be added to the FGDC standard so that the standard is useful to a larger user population. Chemistry extensions would also be quite useful for CBP use.

Data to be accessed on the Internet via CIMS must follow the CIMS Metadata Reporting Guidelines established by the CBP. These guidelines were established to facilitate entering consistent, accurate metadata to ensure the information about the Chesapeake Bay will be easily available, and used appropriately. The CIMS Metadata Reporting Guidelines also accessible on the CIMS Internet web page.

Common Station Names Guidelines

The CBP has adopted the guideline that all data generated or collected for, submitted to the CBP or served on the Internet via CIMS, should use a consistent set of common station names for identifying and reporting monitoring station locations. It is the data provider's responsibility to comply with this guideline. The purpose of this guideline is to create a master table of station names, to the extent possible, to reduce confusion among cooperating agencies. The station names table, maintained on the CBP web site, should serve as the master list. Updates to this table that are required by data submitters shall be coordinated with the CIMS Technical Information Access Team to maintain a consistent stations names list.

Common Data Dictionary Guidelines

The CBP has adopted the guideline that all data generated or collected for, submitted to the CBP or served on the Internet via CIMS should use the CBP common data dictionary for defining all data elements and units of measure. It is the data provider's responsibility to comply with this policy. The purpose of this guideline is to create one data dictionary, to the extent possible, to reduce confusion among cooperating agencies. Updates required by data submitters to the dictionary shall be coordinated with the CIMS Technical Information Access Team to maintain one consistent data dictionary.

Common Database Design Guidelines

The Chesapeake Bay Program has adopted the guideline that all data generated or collected for, submitted to the Chesapeake Bay Program, or served on the Internet via CIMS should utilize the CBP common database design for managing data. It is the data provider's responsibility to comply with this guideline. Its purpose is to use common database designs, to the extent possible, to simplify data formatting and sharing. Modifications to the common database design shall be coordinated with the CIMS Technical Information Access Team to maintain consistency in the database structure. If the CBP agencies do not have a pre-defined database that is acceptable for the work being conducted, the grantee/contractor should work with the funding agency to develop a database design that suits the requirements of the work, while maintaining maximum compatibility with other CBP database designs.

Calendar Date Policy

The CBP has adopted the standard that all data generated or collected for, submitted to the CBP or served on the Internet via CIMS should adhere to the Federal Information Processing Standard, Representation for Calendar Date and Ordinal Date for Information Interchange (FIPS PUB 4-1).

This standard states, "For purposes of electronic data interchange in any recorded form among U.S. government agencies, National Institute of Standards and Technology (NIST) highly recommends that four-digit year elements be used." The year should encompass a two-digit century that precedes, and is contiguous with, a two-digit year-of-century (e.g., 1999, 2000, etc.). In addition, optional two-digit year time elements specified in ANSI X3.30-1985(R1991) should not be used for the purposes of any data interchange among U.S. government agencies.

Therefore, it is required to report and store all dates using four digits for the year. In addition to facilitating data sharing, this requirement reduces the complications of processing date data after the millennium rollover at year 2000.

Common Method Codes Guidelines

The CBP has adopted the guideline that all data generated or collected for, submitted to the CBP or served on the Internet via CIMS should utilize the CBP Method Codes tables, which are defined in the *Guide to using CBP Water Quality Monitoring Data and The 2000 Users Guide to CBP Biological and Living Resources Monitoring Data*, as well as in the actual CBP relational database tables. It is the data provider's responsibility to comply with this guideline. Its purpose is to use standardized method codes, to the extent possible, to simplify data coding and sharing. The methods used by monitoring agencies and analytical laboratories are critical in providing accurate measurements. Knowing the field and laboratory methods used is critical during analysis and reporting, therefore capturing the methods is a high priority during database development. Modifications to the CBP Method Codes shall be coordinated with the CIMS Technical Information Access Team to maintain consistency in the table contents. If CBP agencies do not have a pre-defined method code that is acceptable for the work being conducted, the grantee/contractor should work with the funding agency to develop method codes that suits the requirements of the work, while maintaining maximum compatibility with other CBP codes.

Numeric Data Reporting Guidelines

The CBP has adopted the guideline that all data generated or collected for, submitted to the CBP or served on the Internet via CIMS should report numeric data elements at the same level of precision as that of the original measurement. The exact precision of recorded values must be maintained. This guideline has a significant impact on data analysis and the decisions made based on these analyses.

Values should not be zero-filled to greater precision than actually recorded. For instance, if the measured value is 0.03, then the reported value should be 0.03 and not 0.030, which would imply precision to the third decimal place. For values that are recorded as below or above detection, a detection flag (in a separate data field) shall be used to identify the value as below or above the detection limit of the method, and the value shall be reported as the detectable limit. Values should be reported as zero, only if the measured or recorded value is zero. Values that are missing shall be reported as missing or null or nil, to identify values that were sampled but where no value was obtained. Missing, null, or nil values are different than those that were never sampled, which should be recorded as a blank field, if they are recorded at all. It is the

responsibility of the data submitter to record in the metadata, how measurements are coded, as well as the accuracy of the measurements.

It is important to note that some software tools used in data processing may represent the data internally with more precision than the original measurement, and/or may round the value. For instance, even though a value of 0.3 was entered, the value may be stored and reported as 0.299999.

Taxonomic Data Reporting Guidelines

The CBP recognizes that access to consistent, scientifically credible taxonomic information is essential to many Program activities. The CIMS Technical Information Team recognizes that the National Integrated Taxonomic Information System (ITIS) program is best equipped to provide this kind of taxonomic standardization and support. ITIS is a partnership of federal agencies formed to satisfy their mutual needs for scientifically credible taxonomic information. ITIS provides taxonomic data and a directory of taxonomic expertise that will organize and provide access to, standardized nomenclature support a national taxonomic inventory system. Therefore, in order to facilitate the need for uniform quality taxonomic information exchange within the Chesapeake Bay Program and other national programs, the ITIS Standards have been adopted. Therefore the CBP requires that data submitters and CIMS partners serving data on the Internet should utilize the ITIS TSNs for species identification. Detailed information about ITIS and access to its taxonomic database can be found at URL: http://www.itis.usda.gov/plantproj/itis/index.html .

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Required Data Format for Living Resources Monitoring Data Deliverables

Table E-1. Phytoplankton and Picoplankton Count Data

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	COLTYPE	Character	2	Sample Collection Type
3	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
4	DATE	Character	8	Sampling Date (MM/DD/YY)
5	DEN_L	Numeric	12	Density of a Taxon (#Individual per liter)
6	GMETHOD	Character	3	Chesapeake Bay Program Gear Method Code
7	LAYER	Character	2	Layer of Water Column in which Sample was Taken
8	LBL	Character	45	Species Latin Name (with size groupings when taken)
9	MAXDEPTH	Numeric	8.1	Maximum Depth of Composite Sample (meters)
10	R_DATE	Character	8	Version Date of Data (YYYYMMDD)
11	REP_NUM	Numeric	8	Replicate Number
12	REP_TYPE	Character	3	Replicate Type
13	SER_NUM	Character	12	Sample Serial Number
14	NODCCODE	Character	12	National Oceanographic Data Center Species Code
15	SPECCODE	Character	14	Agency Species Code
16	STATION	Character	8	Sampling Station
17	TDEN_L	Numeric	12	Total Density (# all individuals per liter)
18	TRIB_COD	Character	3	Tributary Code
19	TSN	Character	7	ITIS Taxon Serial Number

Table E-2. Phytoplankton and Picoplankton Event Data Files.

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	COLTYPE	Character	2	Collection Type
3	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
4	DATE	Character	8	Sampling Date (YYYYMMDD)
5	LAYER	Character	2	Layer of Water Column in which Sample was Taken
6	LAT	Numeric	9.4	Latitude in Decimal Degrees(NAD83)
7	LONG	Numeric	9.4	Longitude in Decimal Degrees (NAD83)
8	P_DEPTH	Numeric	8.1	Composite Sample Cut Off Depth (meters)
9	R_DATE	Character	8	Data Version Date (YYYYMMDD)
10	SALZONE	Character	2	Salinity Zone
11	SAMVOL_L	Numeric	8.1	Total Volume of Sample (liters)
12	SER_NUM	Character	12	Sample Serial Number
13	STATION	Character	8	Sampling Station
14	TDEPTH	Numeric	8.1	Total Station Depth (meters)
15	TIME	Character	8	Sample Collection Time (HHMM)
16	TRIB_COD	Character	3	Tributary Code

Table E-3. Primary Production Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	ASMRATIO	Numeric	8.2	Production Efficiency (ug-c/ug-chl)
3	C14_D	Character	2	C.I. Limits Method
4	C14_M	Character	7	Chesapeake Bay Program Analytical Method Code
5	CARBFIX	Numeric	8.2	Carbon Fixed (ug/l/hr)
6	CHLA	Numeric	8.2	Chlorophyll A (ug/l)
7	COLTYPE	Character	2	Collection Type
8	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
9	DATE	Character	8	Sample date (YYYYMMDD)
10	GMETHOD	Character	3	Chesapeake Bay Program Gear Method
11	INS_CODE	Character	5	Chesapeake Bay Program Instrument Code for C14 Measurement
12	LAYER	Character	2	Layer in Water Column From Which Sample was Taken
13	MAXDEPTH	Numeric	8.1	Maximum Depth of Composite Sample (meters)
14	R_DATE	Character	8	Data Version Date (YYYYMMDD)
15	REP_NUM	Numeric	8	Replicate Number
16	REP_TYPE	Character	4	Replicate Type
17	SER_NUM	Character	12	Sample Serial Number
18	STATION	Character	8	Sampling Station
19	TRIB_COD	Character	3	Tributary Code

Table E-4. Primary Production Event Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	COLTYPE	Character	2	Collection Type
3	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
4	DATE	Character	8	Sampling Date (YYYYMMDD)
5	LAYER	Character	2	Layer in Water Column Which Sample was Taken
6	LAT	Numeric	9.4	Latitude in Decimal Degrees (NAD83)
7	LONG	Numeric	9.4	Longitude in Decimal Degrees (NAD83)
8	PDEPTH	Numeric	8.1	Composite Sample Cut Off Depth (meters)
9	R_DATE	Character	8	Data Version Date (YYYYMMDD)
10	SALZONE	Character	2	Salinity Zone
11	SAMVOL_L	Numeric	8.1	Total Volume of Sample (liters)
12	SER_NUM	Character	12	Sample Serial Number
13	STATION	Character	8	Sampling Station
14	TDEPTH	Numeric	8.1	Total Station Depth (meters)
15	TIME	Character	8	Sampling Time (HH:MM:SS)
16	TRIB_COD	Character	3	Tributary Code

Table E-5. In Situ Fluorescence Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	CHL_F	Numeric	8.2	Fluorescence Value (micrograms Chlorophyll a per liter)
3	CHL_F_D	Character	2	Chlorophyll a Detection Limit Code
4	CHL_F_M	Character	7	Chlorophyll a Method Code
5	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
6	DATE	Character	8	Sampling Date (YYYYMMDD)
7	LAT	Numeric	9.4	Latitude in Decimal Degrees
8	LONG	Numeric	9.4	Longitude in Decimal Degrees
9	P_DEPTH	Numeric	8.1	Composite Sample Cut Off Depth
10	R_DATE	Character	8	Version Date of Data (YYYYMMDD)
11	SALZONE	Character	2	Salinity Zone
12	SDEPTH	Numeric	8.1	Sample Collection Depth (meters)
13	SER_NUM	Character	12	Sample Serial Number
14	STATION	Character	8	Sampling Station
15	TDEPTH	Numeric	8.1	Total Station Depth (meters)
16	TIME	Character	8	Sample Collection Time (HH:MM:SS)
17	TRIB_COD	Character	3	Tributary Code

Table E-6. Microzooplankton Count Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	COLTYPE	Character	2	Collection Type
3	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
4	DATE	Character	8	Sampling date (YYYYMMDD)
5	DEN_L	Numeric	12.2	Density of a Taxon (# individuals per liter)
6	GMETHOD	Character	3	Chesapeake Bay Program Gear Method Code
7	LAYER	Character	2	Layer in Water Column Which Sample was Taken
8	LBL	Character	45	Species Latin Name with Size Grouping
9	LIFE_STG	Character	3	Life stage, Chesapeake Bay Program Code
10	MAXDEPTH	Numeric	8.1	Maximum Depth of Composite Sample (meters)
11	R_DATE	Character	8	Version Date of Data (YYYYMMDD)
12	REP_NUM	Numeric	8	Replicate Number
13	REP_TYPE	Character	4	Replicate Type
14	SER_NUM	Character	12	Sample Serial number
15	NODCCODE	Character	12	NODC Species code
16	SPECCODE	Character	14	Agency Taxon code
17	STATION	Character	8	Sampling station
18	TDEN_L	Numeric	12.2	Total Density (# all individuals per liter)
19	TRIB_COD	Character	3	Tributary Code
20	TSN	Character	7	ITIS Taxon Serial Number

Table E-7. Microzooplankton Event Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	COLTYPE	Character	2	Collection Type
3	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
4	DATE	Character	8	Sampling Date (YYYYMMDD)
5	LAYER	Character	2	Layer in Water Column Which Sample was Taken
6	LAT	Numeric	9.4	Latitude in Decimal Degrees
7	LONG	Numeric	9.4	Longitude in Decimal Degrees
8	PDEPTH	Numeric	8.1	Composite Sample Cut Off Depth (meters)
9	R_DATE	Character	8	Data Version date (YYYYMMDD)
10	SALZONE	Character	2	Salinity Zone
11	SAMVOL_L	Numeric	8.1	Total Volume of Sample (liters)
12	SER_NUM	Character	12	Sample Serial Number
13	STATION	Character	8	Sampling Station
14	TDEPTH	Numeric	8.1	Total Station Depth (meters)
15	TIME	Character	8	Sample Collection Time (HHMM)
16	TRIB_COD	Character	3	Tributary Code

Table E-8. Mesozooplankton Count Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Characte	6	Data Collection Agency
2	COLTYPE	Character	2	Collection Type
3	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
4	DATE	Character	8	Sampling Date (YYYYMMDD)
5	DEN_M3	Numeric	12.3	Density of a Taxon (# individual per meter cubed)
6	GMETHOD	Character	3	Chesapeake Bay Program Gear Method Code
7	LAYER	Character	2	Layer in Water Column in Which Sample was Taken
8	LBL	Character	45	Species Latin Name
9	LIFE_STG	Character	3	Chesapeake Bay Program Life Stage Code
10	MAXDEPTH	Numeric	8.1	Maximum Depth of Composite Sample (meters)
11	R_DATE	Character	8	Data Version Date (YYYYMMDD)
12	REP_NUM	Numeric	8	Replicate Number
13	REP_TYPE	Character	4	Replicate Type
14	SER_NUM	Character	12	Sample Serial Number
15	NODCCODE	Character	12	NODC Species Code
16	SPECCODE	Character	14	Agency Species Code
17	STATION	Character	8	Sampling Station
18	TDEN_M3	Numeric	12.3	Total Density (# all individual per meter cubed)
19	TRIB_COD	Character	3	Tributary Code
20	TSN	Character	7	ITIS Taxon Serial Number

Table E-9. Mesozooplankton Biomass Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AEASH	Character	1	Actual or Estimated Ash Free Dry Weight
2	AEDRY	Character	1	Actual or Estimated Dry Weight
3	AGENCY	Character	6	Data Collection Agency
4	ASH_FRWT	Numeric	10.5	Ash Free Dry Weight (mg/m**3)
5	ASH_WT	Numeric	9.4	Total Ash Weight (mg/m**3)
6	AFDW	Numeric	9.4	Ash Free Dry Weight (g/sample)
7	ASHWT	Numeric	9.4	Total Ash Weight (g/sample)
8	COLTYPE	Character	2	Collection Type
9	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
10	DATE	Character	8	Sampling Date (YYYYMMDD)
11	DRY_WT	Numeric	10.5	Total Dry Weight (mg/m**3)
12	DRYWT	Numeric	9.4	Total Dry Weight (g/sample)
13	GMETHOD	Character	3	Chesapeake Bay Program Gear Method Code
14	LAYER	Character	2	Layer in Water Column Which Sample was Taken
15	MAXDEPTH	Numeric	8.1	Maximum Depth of Composite Sample (meters)
16	R_DATE	Character	8	Version date of data (YYYYMMDD)
17	REP_NUM	Numeric	8	Replicate Number
18	REP_TYPE	Character	4	Replicate Type
19	SER_NUM	Character	12	Sample Serial number
20	STATION	Character	8	Sampling Station
21	TRIB_COD	Character	3	Tributary Code

Table E-10. Mesozooplankton Biovolume Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	BEROE	Numeric	8	Number of Beroe (#/sample)
3	BEROEVOL	Numeric	8	Volume of Beroe (ml/sample)
4	COLTYPE	Character	2	Collection Type
5	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
6	CTENO	Numeric	8	Number of Ctenophores (#/sample)
7	CTENOVOL	Numeric	8	Ctenophores Volume (ml/sample)
8	DATE	Character	8	Sampling date (YYYYMMDD)
9	GMETHOD	Character	3	Chesapeake Bay Program Gear Code
10	HYDRA	Numeric	8	Number of Hydromedusae (#/sample)
11	HYDRAVOL	Numeric	8	Volume of Hydromedusae (ml/sample)
12	JELLY	Numeric	8	Jellyfish Volume (ml/sample)
13	JELLYVOL	Numeric	8	Number of Jellyfish (#/sample)
14	LAYER	Character	2	Layer in Water Column in Which Sample was Taken
15	MAXDEPTH	Numeric	8.1	Maximum Depth of Composite Sample (Meters)
16	MNEMIOP	Numeric	8	Number of Mnemiopsis (#/sample)
17	MNEMVOL	Numeric	8	Volume of Mnemiopsis (ml/sample)
18	R_DATE	Character	8	Data Version Date (YYYYMMDD)
19	REP_NUM	Numeric	8	Replicate Number
20	REP_TYPE	Character	4	Replicate Type
21	SER_NUM	Character	12	Sample Serial Number
22	SET_VOL	Numeric	8.4	Settled Volume All Non-Gelatinous Material (ml/m**3)
23	SET_VOLZ	Numeric	8.4	Settled Volume of Zooplankton (ml/m**3)
24	SETVOL	Numeric	8	Settled Volume All Non-Gelatinous Material (ml/sample)
25	SETVOLZ	Numeric	8	Settled Volume of Zooplankton (ml/sample)
26	STATION	Character	8	Sampling Station
27	TRIB_COD	Character	3	Tributary Code

Table E-11. Mesozooplankton Event Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	AGENCY	Character	6	Data Collection Agency
2	COLTYPE	Character	2	Collection Type
3	CRUISE	Character	6	Chesapeake Bay Program Cruise Number
4	DATE	Character	8	Sampling Date (YYYYMMDD)
5	LAYER	Character	2	Layer in Water Column Which Sample was Taken
6	FVOL_M3	Numeric	8.2	Volume Filtered (M**3)
7	LAT	Numeric	9.4	Latitude in Decimal Degrees (NAD83)
8	LONG	Numeric	9.4	Longitude in Decimal Degrees(NAD83)
9	P_DEPTH	Numeric	8.1	Composite Samples Cut Off Depth (meters)
10	R_DATE	Character	8	Data Version Date (YYYYMMDD)
11	SALZONE	Character	2	Salinity Zone
12	SER_NUM	Character	12	Sample Serial Number
13	STATION	Character	8	Sampling Station
14	TDEPTH	Numeric	8.1	Total Station Depth (meters)
15	TIME	Character	5	Sample Collection Time (HHMM)
16	TRIB_COD	Character	3	Tributary Code

Table E-12. Benthic Count Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Text	15	Sampling Station
2	SAMPLE_DATE	Date	8	Sampling Date (YYYYMMDD)
3	SAMPLE_TIME	Date/Time	8	Sample Collection Time (24 HH:MM)
4	SAMPLE_NUMBER	Numeric	8	Sample Replicate Number
5	SPEC_CODE	Character	14	Agency Species Code
6	PARAMETER	Character	15	Sampling Parameter (Count)
7	VALUE	Numeric	8	Sampling Parameter Value
8	UNITS	Character	15	Reporting Units of Value (count/sample)
9	SER_NUM	Character	12	Sample Serial Number
10	SOURCE	Character	6	Data Collection Agency
11	YEARCODE	Character	8	Sampling Year Code (optional)
12	CRUISENO	Character	8	Benthic Sampling Cruise Number (optional)
13	STAEQ85	Character	8	Pre-1989 Station Designation (optional)
14	STAEQ89	Character	8	Post-1989 Station Designation (optional)
15	SITE	Character	8	Sampling Site Number (optional)
16	SAMPTYPE	Character	8	Sample Collection Type
17	TSN	Character	7	ITIS Taxon Serial Number
18	GMETHOD	Character	5	Chesapeake Bay Program Gear Method Code
19	NET_MESH	Numeric	8.1	Screen Mesh Width (millimeter)
20	SKIP	Character	1	Fragment \ Partial Organism Indicator

Table E-13. Benthic Biomass Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Character	15	Sampling Station
2	SAMPLE_DATE	Date	8	Sampling Date (YYYYMMDD)
3	SAMPLE_NUMBER	Numeric	8	Sample Replicate Number
4	VALUE_TYPE	Character	10	Actual or Estimated Ash Free Dry Weight
5	SPEC_CODE	Character	14	Agency Species Code
6	PARAMETER	Character	15	Sampling Parameter (AFDW))
7	VALUE	Numeric	8	Sampling Parameter Value
8	UNITS	Character	15	Reporting Units of Value (grams/sample)
9	SER_NUM	Character	12	Sample Serial Number
10	SOURCE	Character	6	Data Collection Agency
11	SAMPTYPE	Character	8	Sample Collection Type
12	GMETHOD	Character	5	Chesapeake Bay Program Gear Method Code
13	NET_MESH	Numeric	8.1	Screen Mesh Width (millimeter)
14	TSN	Character	7	ITIS Taxon Serial Number
15	YEARCODE	Character	8	Sampling Year Code (optional)
16	CRUISENO	Character	8	Benthic Sampling Cruise Number (optional)
17	STAEQ85	Character	8	Pre-1989 Station Designation (optional)
18	STAEQ89	Character	8	Post-1989 Station Designation (optional)
19	SITE	Character	8	Sampling Site Number (optional)

Table E-14. Benthic Water Quality Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Text	15	Sampling Station
2	SAMPLE_DATE	Date	8	Sampling Date (YYYYMMDD)
3	SAMPLE_TIME	Date/Time	8	Sample Collection Time (24 HH:MM)
4	SAMPLE_NUMBER	Numeric	8	Sample Replicate Number
5	SAMPLE_DEPTH	Numeric	8.1	Sample Collection Depth
6	PARAMETER	Character	15	Sampling Parameter
7	VALUE	Numeric	8	Sampling Parameter Value
8	UNITS	Character	15	Reporting Units of Value
9	INS_CODE	Character	5	Chesapeake Bay Program Instrument Code
10	SOURCE	Character	6	Data Collection Agency
11	YEARCODE	Character	8	Sampling Year Code (optional)
12	CRUISENO	Character	8	Benthic Sampling Cruise Number (optional)
13	STAEQ85	Text	8	Pre-1989 Station Designation (optional)
14	STAEQ89	Character	8	Post-1989 Station Designation (optional)
15	SITE	Character	8	Sampling Site Number (optional)
16	SAMPTYPE	Character	8	Sample Collection Type

Table E-15. Benthic Sediment Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Text	15	Sampling Station
2	SAMPLE_DATE	Date	8	Sampling Date (YYYYMMDD)
3	SAMPLE_TIME	Date/Time	8	Sample Collection Time (24 HH:MM)
4	SAMPLE_NUMBER	Numeric	8	Sample Replicate Number
6	PARAMETER	Character	15	Sampling Parameter
7	VALUE	Numeric	8	Sampling Parameter Value
8	UNITS	Character	15	Reporting Units of Value
10	SOURCE	Character	6	Data Collection Agency
11	YEARCODE	Character	8	Sampling Year Code (optional)
12	CRUISENO	Character	8	Benthic Sampling Cruise Number (optional)
13	STAEQ85	Character	8	Pre-1989 Station Designation (optional)
14	STAEQ89	Character	8	Post-1989 Station Designation (optional)
15	SITE	Character	8	Sampling Site Number (optional)
16	SAMPTYPE	Character	8	Sample Collection Type

Table E-16. Benthic Event Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Character	15	Sampling Station
2	SAMPLE_DATE	Date	8	Sampling Date (YYYYMMDD)
3	STRATUM	Character	4	Sampling Stratum or Tributary Designation
4	LATITUDE	Numeric	8.4	Latitude (Decimal Degrees) (NAD83)
5	LONGITUDE	Numeric	8.4	Longitude (Decimal Degrees) (NAD83)
6	SITE_TYPE	Character	2	Sampling Site Type
7	SAMPLE_TIME	Date/Time	8	Sample Collection Time (24 HH:MM)
8	SOURCE	Character	8	Data Collection Agency
9	TOTAL_DEPTH	Numeric	8.1	Total Station Depth (Meters)
10	YEARCODE	Character	8	Sampling Year Code (optional)
11	CRUISENO	Character	8	Benthic Sampling Cruise Number (optional)
12	STAEQ85	Character	8	Pre-1989 Station Designation (optional)
13	SITE	Character	8	Sampling Site Number (optional)
14	SAMPTYPE	Character	8	Sample Collection Type

Table E-17. Benthic Biota Event Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Character	15	Sampling Station
2	SAMPLE_DATE	Date	8	Sampling Date (YYYYMMDD)
3	SAMPLE_TIME	Date/Time	8	Sample Collection Time (24 HH:MM)
4	SAMPLE_NUMBER	Numeric	8	Sample Replicate Number
5	GMETHOD	Character	5	Chesapeake Bay Program Gear Method Code
6	NET_MESH	Numeric	8.1	Screen Mesh Width (millimeter)
7	PENETR	Numeric	8.2	Sampling Gear Penetration Depth (centimeters)
9	SER_NUM	Character	12	Source Sample Serial Numbers
10	SOURCE	Character	8	Data Collection Agency
11	YEARCODE	Character	8	Sampling Year Code (optional)
12	CRUISENO	Character	8	Benthic Sampling Cruise Number (optional)
13	STAEQ85	Character	8	Pre-1989 Station Designation (optional)
14	STAEQ85	Character	8	Post-1989 Station Designation (optional)
15	SITE	Character	8	Sampling Site Number (optional)

Background

This document is one of several CBP products designed to implement the management goals set forth in the Living Resources Monitoring Plan (Chesapeake Bay Program Agreement Commitment Report, July 1988) and adopted by the Executive Council. As called for in the 1987 Chesapeake Bay Agreement, the plan provides a framework for a baywide, living resources monitoring program based on existing programs. The plan was viewed as one step towards the goal of fully integrating living resources, habitat and water quality monitoring.

The plan specifically charges the CBP with instituting a data management and reporting system for the living resources monitoring program. The system would build on the facilities of the existing CBP Computer Center and ultimately provide:

- ***A large quantity of consistent data of known quality, in standardized formats and structures;***
- ***Ready access to the data for analytical and reporting purposes; and***
- ***thorough data documentation.***

The plan recognizes that monitoring programs cannot achieve their ultimate goals of providing information to the Bay community and serving the restoration and management of the Bay if their data are inaccessible, poorly managed, inadequately documented or not analyzed or reported in a timely manner.

In response to the charge, and to a restructuring of the Bay Program Computer Center in 1993, the Living Resources Subcommittee hired three staff persons to continue implementing a data management and reporting system for biological and living resources monitoring data. These staff are responsible for: creating, maintaining and updating key databases and GIS coverages; facilitating use of the databases and coverages and providing data analysis support to the Living Resources Subcommittee and other CBP participants. Contact the Living Resources Subcommittee coordinator at 1-800-YOURBAY for more information.

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