CBP/TRS 305/12
EPA 003R 903R 12-002
ICBPR Report 12-05

The 2012 User's Guide to Chesapeake Bay Program Biological Monitoring Data

Chesapeake Bay Program
June 2012

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Prepared for

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United States Environmental Protection Agency
Chesapeake Bay Program Document
CBP/TRS 305/12
EPA 003R 903R 12-002

Interstate Commission on the Potomac River Basin Document
ICBPR Report 12-05

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Development of *The 2012 User's Guide to Chesapeake Bay Program Biological Monitoring Data* was supported by a grant from the U.S. Environmental Protection Agency (CB963057-01) and the Interstate Commission on the Potomac River Basin, an interstate compact river basin commission whose signatories are the U. S. Environmental Protection Agency, Maryland, Virginia, Pennsylvania, West Virginia and the District of Columbia.

SUMMARY

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

- Currently available Chesapeake Bay Program (CBP) biological monitoring and geographic information system (GIS) databases;
- Procedures for obtaining biological monitoring data online from the CBP- Bay Resource Library, online from other program partner web sitess, or directly from the Living Resources Data Manager and/or Living Resources GIS specialists;
- CIMS/CDE standards for publishing data to the public, including field names, attributes, and data dictionary tables;
- Guidance for organizations submitting biological data directly to the CBPO data center;
- Guidance for data usage and ecosystem indicator metrics.

Tidal Phytoplankton, Zooplankton and Benthos

All Chesapeake Bay phytoplankton, historic zooplankton (including microzooplankton, mesozooplankton and gelatinous zooplankton) and benthos monitoring data and data documentation for Maryland and Virginia from 1984 to present can be obtained directly from the Internet web site (http://www.chesapeakebay.net) or from the Living Resources Data Manager. In addition to monitoring data there are a variety of calculated biological metrics and indexes of biotic integrity data are also available. All data are published in standardized formats and are compatible with the CBP water quality and other databases. They are available online a) comma or tab delimited ASCII flat files or XML Schema formatted files. Other formats are available upon request.

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 SAV web site (http://www.vims.edu/bio/sav/index.html). These data are also accessible through a variety of Internet based mapping tools, including Chesapeake Stat (http://stat.chesapeakebay.net/) on the CBP web site.

Non-Tidal Benthic Macroinvertebrates

The Chesapeake Bay Program Office (CBPO) has acquired historical and current benthic macroinvertebrate, habitat, and water quality data for non-tidal streams and wadeable rivers from over 20 federal, state, regional, local, and academic monitoring programs throughout the Chesapeake Bay basin. Data from 1992-2010 have been obtained from the data providers, reprocessed, and quality checked and assured. The data are used to compute the annual Chessie B-IBI that serves as an indicator of local stream health for the watershed. Most data originators are allowing their raw monitoring data, as well as the biological metrics and Chessie B-IBI calculated by the Living Resources Data Manager to be distributed by the Bay Program Data Center. All data are published in standardized formats and are compatible with the CBP water quality and other databases. They are available online a) comma or tab delimited ASCII flat files or XML Schema formatted files from the internet web site (http://www.chesapeakebay.net) or from the Living Resources Data Manager. Other formats are available upon request.

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 online as GIS data layers (ftp://ftp.chesapeakebay.net/pub/Geographic/), static maps (http://www.chesapeakebay.net/maps) or via the Internet mapping tool Chesapeake Stat (http://stat.chesapeakebay.net/).

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INTRODUCTION

The *2012 User's Guide* is intended to help data user's access and use biological monitoring data collected in as part of the Chesapeake Bay Program monitoring network. This guide describes many of the biological databases currently available through the Chesapeake Data Enterprise (CDE) formerly the Chesapeake Information Management System (CIMS) in standardized structures and formats (CIMS/CDE databases). It describes where the data and data products reside and how to obtain them.

Background

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 called for partners in the Chesapeake Bay Program to develop and implement the Chesapeake Information Management System (CIMS). The intent of CIMS was to electronically link a variety of information about the Bay and its tributaries and make this information available electronically through the Internet to a variety of audiences. The information targeted for distribution through CIMS included technical and public information, educational material, environmental indicators, policy documents and scientific data.

As a result of the CIMS initiative the various federal, state, academic and non-governmental organizations worked to establish a system of distributed databases. Many of the data assets available through CIMS were hosted on the data originator's Internet sites. The intent of the CIMS system was to provide a single location from which all data assets would be available.

EXECUTIVE ORDER 13508

On May 12, 2009, President Barack Obama signed an Executive Order that recognizes the Chesapeake Bay as a national treasure and calls on the federal government to lead a renewed effort to restore and protect the nation's largest estuary and its watershed.

The Executive Order directs CBP partners to "identify the mechanisms that will assure that governmental and other activities, including data collection and distribution, are coordinated and effective, relying on existing mechanisms where appropriate".

In 2010, in response to the Executive Order, the partnership began development of the Chesapeake Data Enterprise (CDE) based on the CIMS foundation. The data enterprise shares many of the same principles of CIMS, but broadens the partnership to include new data exchange partners and new data themes. Additionally, the data enterprise effort seeks to upgrade data exchange methods, adopt new standards, and refresh partnership agreements based on newer technologies and approaches.

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, Geographic Information Systems (GIS), web development, modeling and technical support to program participants for the purpose of accomplishing the goals and objectives of the partnership. 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 one of many geographically distributed data centers in the Chesapeake Bay watershed. Recipients of Data Center services are the CBP goal implementation teams, CBP resource managers and the watershed's scientific community and stakeholders.

THE LIVING RESOURCES DATA MANAGEMENT PROGRAM

The Living Resources Data Management Program (LRDMP) has traditionally focused on the management of technical data and production of analyzed data products. 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/CDE standards and specifications, and to de-emphasize use of primary data in favor of "CIMS/CDE data."

- CBP Data: CBP monitoring databases or CIMS/CDE compliant databases which are available through the CIMS/CDE partners. All compliant databases follow common data dictionaries and data reporting standards. Biological point data become CIMS/CDE 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 in the data are resolved with the data providers. Biological point data in CIMS/CDE database structures are currently stored in relational databases on CBP Data Center servers and available to the public through a variety of interfaces on the Bay Program web site.

- Ecosystem Indicator data: Datasets of technical indicators derived from monitoring data are now available. The information is computed from water quality and biological data in available databases using accepted algorithms and/or GIS methods. These forms of the data have been demonstrated to be extremely useful to CBP participants, resource managers and the general public.

The LRDMP has been a major participant in the establishment of CIMS the network and continues to be a contributor to the CDE effort. The LRDMP has helped establish CIMS/CDE standards for data dictionaries, data documentation and uniform relational database designs. This document is part of the CBP data management guidance. The LRDMP has helped to improve the ability of data generators to produce quality data and establish a number of data generators as distributed CIMS/CDE data sites. In recent years the LRDMP has placed an increased emphasis on data analysis, development of data analysis tools and indicators.

MONITORING DATA CURRENTLY AVAILABLE THROUGH CIMS/CDE

CHESAPEAKE BAY TIDAL MONITORING AND HISTORICAL BAY MONITORING DATA

Point data collected as part of the CBP monitoring network are described briefly below. Point data are defined as data collected at a single point that can be referred to by a single latitude and longitude. Data collected as part of the monitoring network may be directly funded by CBP or matching grant funded by a program partner and reported as grant deliverables or funded by program partners and voluntarily reported. CBP funded and match grant funded monitoring data sets are subject to higher levels of quality assurance and data reporting requirements for data submission. Ideally all data (voluntary submissions and grant deliverables) submitted by the data generators are in a standardized table structure suitable for loading into the relational databases. The Living Resources Data Manager rigorously QA/QC's the data, loads them into the CIMS/CDE relational database structure, and updates the data documentation provided. The data are published through an online searchable database as a) comma or tab delimited ASCII flat files or XML Schema formatted files. Data in alterative formats or data on media (compact disc) are available upon request.

All monitoring data collected as part of the formal Maryland and Virginia Chesapeake Bay tidal monitoring programs including the current (1984-present) phytoplankton, fluorescence, tidal benthic and historic (1984-2002) zooplankton monitoring and Primary Production (1984-2009) data are available from the CBP Internet web page. Sampling was usually coordinated with the CBP water quality survey unless otherwise noted. Data from active monitoring programs 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. Monitoring data from voluntarily reporting programs are requested in biennial data calls. 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 Living Resources Data Manager (see Appendix D) for details and data set availability.

The URL of the CBP Internet web site is http://www.chesapeakebay.net/. Field names and attributes for data from the online databases are provided in Appendix A. A complete list of CIMS/CDE-compliant field names for biological data sets, their definitions and data types are provided in Appendix B. An explanation of field values and definitions of the parameter codes used in the CIMS/CDE databases are contained in Appendix C. A list of CBPO Data Center contacts are provided in Appendix D. A complete list of general CIMS/CDE data reporting standards and biological specific data reporting formats for CBP monitoring data submitters are included in Appendix E.

Chesapeake Bay Program Supported Monitoring Data

Phytoplankton

Maryland Phytoplankton Taxonomic Survey. Data have been collected at fixed sampling stations in the upper Chesapeake Bay and tidal tributaries in Maryland since July of 1984. The formal baywide plankton monitoring program in Maryland was defunded in 2009. However, piecemeal funding has maintained a reduced spring and summer sampling program through the present. The surveys examine phytoplankton community species composition and abundance. Data are collected by staff from Morgan State University (MSU) for the Maryland Department of the Environment (MDE)/Maryland Department of Natural Resources (MDDNR).

Virginia Phytoplankton Taxonomic Survey. Data have been 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 January1989. In 2010, sample collection in the tributaries was reduced to above pycnocline only sampling but continues through the present. The surveys examine phytoplankton community species composition and abundance. Presently data are collected by staff from Old Dominion University (ODU) for the Virginia Department of Environmental Quality (VADEQ).

Picoplankton

Maryland Picoplankton Abundance Survey. Beginning in May 2002, additional samples were collected for the enumeration of picoplankton during the months of June-September at the following stations: CB3.3C, CB4.3C, CB5.2, ET5.2, LE1.1, LE2.2, and WT5.1 (Figure 1). The baywide plankton monitoring program in Maryland was defunded in 2009. However, piecemeal funding has maintained a reduced spring and summer sampling program through the present. Data are collected by staff from MSU for MDE/MDDNR.

Virginia Picoplankton Abundance Survey. Data have been collected at fixed sampling stations in the Lower Chesapeake Bay mainstem, Virginia tidal tributaries and the Elizabeth River since January 1989. In 2010, sample collection in the tributaries was reduced to above pycnocline only sampling but continues through the present. The surveys provide epifluorescence counts of picoplankton abundance. Data are collected by staff from ODU for VADEQ.

Primary Productivity

Maryland Carbon-14 Primary Production Survey. Data were collected at fixed sampling stations in the upper Chesapeake Bay and tidal tributaries in Maryland starting in July 1984. All primary production monitoring was terminated in September 2009. The surveys consisted of measurements of photosynthetic (primary) production. Data were collected by staff MSU 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. All primary production monitoring was terminated in September 2009. The surveys consisted of measurements of photosynthetic (primary) production. Data prior to 1995 lacks concurrent measurements of chlorophyll for determination of assimilation ratio (production efficiency). Data were collected by staff from ODU for VADEQ.

Microzooplankton

Maryland Microzooplankton Taxonomic Survey. Data were collected at fixed sampling stations in the upper Chesapeake Bay and tidal tributaries in Maryland from July 1984 through September 2002. Between 1998 and 2000, additional whole water samples were collected March through September and enumerated for cilliates at the following mesohaline stations: CB3.3C, CB4.3C, CB5.2, ET5.2, LE1.1, LE2.2, TF1.5, TF2.3 and WT5.1 (Figure 1). The formal CBP baywide zooplankton monitoring program was terminated in September 2002. All historic data are available on the CBP web page. Survey data consist of counts of microzooplankton between 202 and 44 microns in size enumerated for species composition and abundance. Data were collected by staff of MSU 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 from July 1993 through October 2002. The formal baywide CBP zooplankton monitoring program was terminated in September 2002. Survey data consist of measurements of species composition and abundance. All microzooplankton less than 202 microns in size collected in whole water samples were enumerated to major taxonomic group. Data were collected by the staff from ODU for VADEQ.

Mesozooplankton and Gelatinous Zooplankton

Maryland Zooplankton Taxonomic Survey. Data were collected at fixed sampling stations in the upper Chesapeake Bay and tidal tributaries in Maryland from July 1984 through October 2002. The Baywide

CBP zooplankton monitoring program was terminated in September 2002. 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. The Baywide CBP zooplankton monitoringprogram was terminated in September 2002. 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. Measurements of gelatinous zooplankton counts and biovolumes were made sporadically between 1996 and 2002. Data were collected by staff from ODU for VADEQ.

Fluorescence

Maryland Vertical Fluorescence Survey. Surface-to-bottom *in situ* fluorescence measurements were made at fixed sampling stations in the upper Chesapeake Bay and tidal tributaries in Maryland from July 1984 through September 2009. The vertical fluorescence survey in Maryland was terminated in September 2009. Survey results consist of *in situ* chlorophyll *a* estimates. Data were collected by staff of MSU for MDE/MDDNR.

Virginia Vertical Fluorescence Survey. Surface-to-bottom *in situ* fluorescence measurements have been conducted at fixed sampling stations in the lower mainstem Chesapeake Bay since 1992. Survey results consist of *in situ* chlorophyll *a* 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 were 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 starting 1984. A special summertime (April-September) Potomac River Survey was conducted from 1990 to 2002. The horizontal fluorescence survey monitoring in Maryland was terminated in September 2009. Survey results consist of *in situ* chlorophyll *a* estimates. Data were collected by staff from MSU for MDE/MDDNR.

Virginia Horizontal Fluorescence Survey. *In situ* fluorescence measurements have been taken along surface transects between monitoring stations in the lower mainstem Chesapeake Bay since 1991. Survey results consist of *in situ* chlorophyll *a* 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.

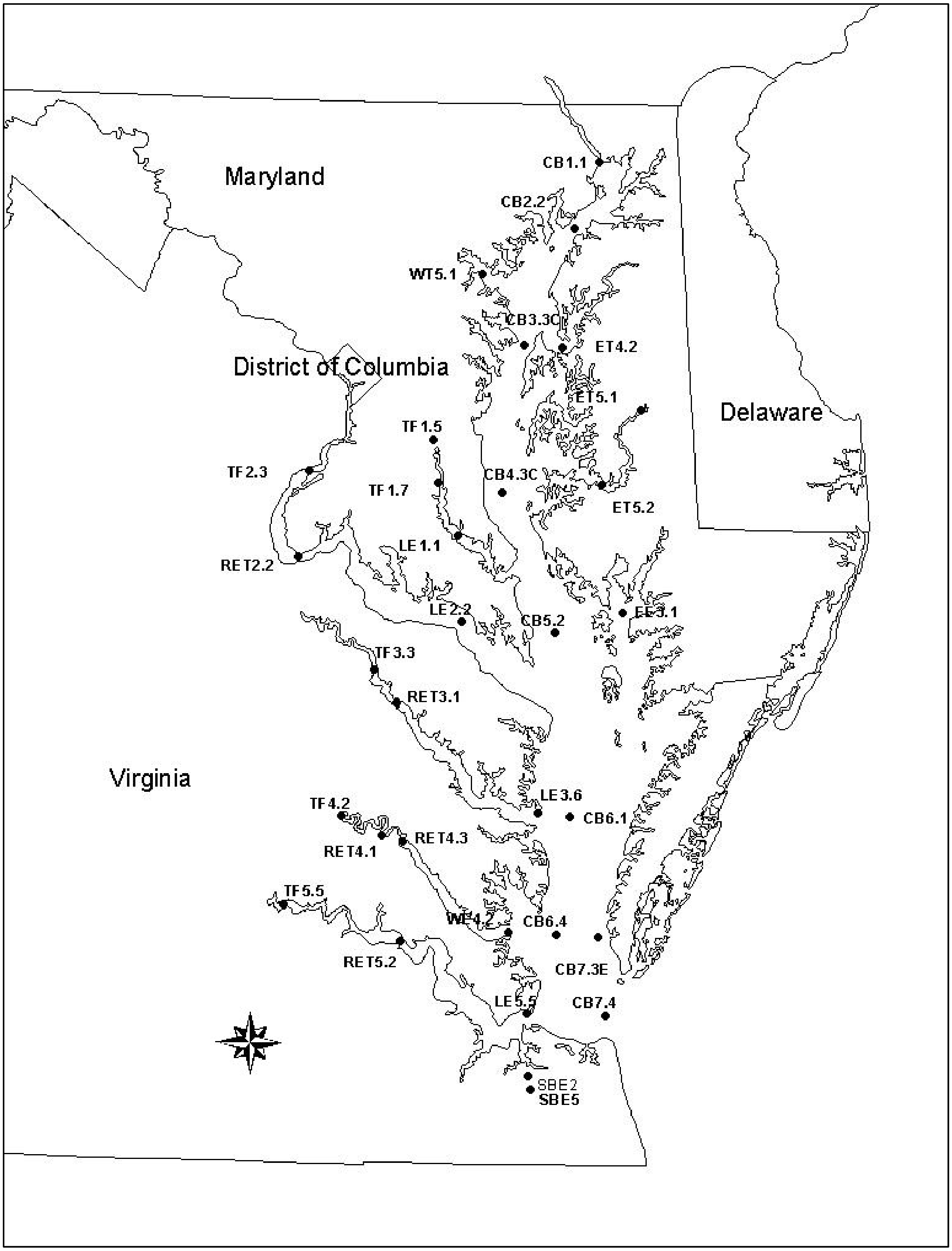

Figure 1. A Map of Chesapeake Bay Program Tidal Plankton Monitoring Stations

Tidal 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 and tidal tributaries since July 1984. Sampling was not conducted concurrently with the CBP water quality survey. The data (through 2011) are available on both the CBP (http://www.chesapeakebay.net/data) and Versar (http://www.baybenthos.versar.com/) web pages. The data include 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. Throught out the program 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. In 1996 sampling at existing fixed stations was cut back to twice a year, and a random site sampling component was added. The data (through the last calendar year) are available on the both the CBP (http://www.chesapeakebay.net/data) and ODU benthic (http://www.sci.odu.edu/chesapeakebay/data/benthic/index.shtml) web pages. Locations of the fixed sampling stations deviate slightly from those in the CBP water quality and plankton monitoring program. The files include taxonomic identifications and counts of species, biomass determinations, sediment analysis and hydrographic profiles. 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 benthic monitoring sample collection at all fixed and random sampling stations in the lower Chesapeake Bay and its Virginia tributaries between 1996 and 1998. Sampling is done twice annually and separately from the regular CBP water quality surveys. The data files include image analysis of the vertical sediment profiles. The data and actual images are also available by request. Data was collected by staff of VIMS for VADEQ.

NOAA Status and Trends Program Benthic Studies. In 1998, 1999, and 2001, NOAA National Status & Trends Program (NS&T) conducted a study to assess the environmental condition of Chesapeake Bay. A total of 210 randomly located stations were sampled during the month of September. The upper Maryland portion of the Bay was sampled in the first year of the study, and the lower Maryland and Virginia portions of the Bay were sampled in the second and third years of the study, respectively. The NS&T program collects synoptic measures of (1) general habitat condition (depth, physical properties of water, sediment grain size, organic carbon content), (2) pollution exposure (sediment contaminant concentrations, sediment toxicity, low dissolved oxygen in the water column), and (3) biotic conditions (diversity and abundance of macroinfauna). The data is only available from the Living Resources Data Manger/Analyst by request.

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 long term 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/CDE 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 through the CBP web page.

Submerged Aquatic Vegetation Surveys

Virginia Institute of Marine Sciences Chesapeake Bay Aerial Surveys

Chesapeake Bay SAV data were mapped from aerial photography, primarily at a scale of 1:24,000, for the following regions: western shore, Va. only - 1971 & 1974; lower Bay, Va. only - 1980 & 1981; upper Bay, selected sections, 1979; Baywide, 1978, 1984 - 1987, and 1989 - 2010. Each area of SAV was classified into one of four density classes by the percentage of cover as determined from the aerial photography. Starting in 2010, the SAV beds are stored as ArcGIS shapefiles using the quality control procedures documented in the individual metadata files. Data for prior years are stored as ArcInfo GIS coverages. Data were collected by the Virginia Institute of Marine Science (VIMS) and can be attributed by including a reference to the associated annual SAV distribution and abundance report.

The SAV data files for years prior to 2010 are in uncompressed ArcInfo (ESRI, Redlands, CA) export format. They have been compressed using pkzip compression to form .zip files for use on Windows-compatible personal computers and also compressed using UNIX standard compression to form .tar.Z files for use on UNIX platforms. Each file contains both the .e00 ARC/INFO export file and also a .txt metadata file. Starting in 2010, the .zip file contains a shapefile and metadata xml file. The Internet address for the VIMS SAV web page is: http://www.vims.edu/bio/sav/index.html

CHESAPEAKE BAY WATERSHED MONITORING DATA

Watershed Wide Non-Tidal Benthic Macroinvertebrates. The CBP Data Center has acquired historical and current benthic macroinvertebrate, habitat, and water quality data for non-tidal streams and wadeable rivers from over 20 federal, state, regional, local, and academic monitoring programs throughout the Chesapeake Bay basin. Only monitoring data collected using a version or modification of the US Environmental Protection Agency (US EPA) Rapid Bioassessment Protocols (RBP) (Barbour et.al. 1996) were included in the database. Data has been obtained from the data providers, reprocessed, and quality checked and assured. The data are used to compute the annual Chessie B-IBI an indicator of local stream health for the watershed. Most data originators are allowing their monitoring data, calculated biological metrics and Chessie B-IBI data to be distributed by the Bay Program. As of June 2012 from the following monitoring programs are available online:

AGENCY_PROGRAM_NAME	Begin Date	End_Date
Anne Arundel County Maryland- Watershed, Ecosystem, and Restoration Service	3/8/2004	4/14/2008
City of Baltimore- Stream Monitoring Program	4/3/2002	5/12/2011
Baltimore County Maryland- Watershed Management and Monitoring Program	4/1/2003	4/29/2008
District of Columbia-Stream Monitoring Program	6/19/2003	8/26/2009
State of Delaware- Biological Monitoring Program	3/20/2000	11/8/2010
Frederick County Maryland Watershed Management Program	6/7/1999	9/18/2009
Fairfax County Virginia-Stream Quality Assessment Program	4/18/1999	10/3/2008
Howard County Maryland Bio-Monitoring and Assessment Program	3/7/2001	3/30/2009
Loudoun County Virginia-Stream Quality Assessment Program	3/27/2009	10/12/2010
Montgomery County Maryland- Department of Environmental Protection	9/1/1989	4/13/2009
New York State Routine Statewide Monitoring Program	7/29/2002	8/7/2008
Pennsylvania Department of the Environment-Water Monitoring Programs	3/12/1999	8/9/2011
Prince Georges County Maryland-Programs and Planning Division	6/23/1994	4/7/2008
Susquehanna River Basin Commission-Watershed Assessment Programs	4/14/1986	2/8/2011
EPA-EMAP Wadeable Stream Assessment Program	4/27/1993	9/13/1996
EPA-Mid-Atlantic Highlands Assessment	5/21/1997	9/14/1998
EPA-Wadeable Stream Assessment Program	7/20/2004	11/10/2004
National Forest Service Stream Assessment Program	5/18/2000	5/8/2003
USGS-National Water Quality Assessment Program	6/2/1993	8/27/2008
Virginia Department of Environmental Quality- Non-Tidal Stream Monitoring Program	5/20/1992	6/8/2011
Virginia Commonwealth University- Interactive STream Assessment Resource Program	1/1/1999	11/3/2011
West Virginia Division of Water and Waste Management Stream Assessment Program	8/19/1996	8/9/2011

Table 2. Summary of Currently Available Non-Tidal Macroinverebrate Data by Program and Date Range.

Note: At this time, the Chesapeake Bay Program is unable to provide Maryland Department of Natural Resources Biological Stream Survey primary data to our users. We apologize for the inconvenience. Please contact the following individual for all MBSS data requests:

Michael Kashiwagi
Maryland Department of Natural Resources
Monitoring & Non-Tidal Assessment Division
580 Taylor Avenue, C-2
Annapolis, Maryland 21401
E-mail: mkashiwagi@dnr.state.md.us

GEOGRAPHIC INFORMATION SYSTEM MAPS, DATA AND SERVICES

The CBP Data Center generates a variety of geospatial data and related products that are relevant to Biological data applications. Biological data available from the CBP Resource Library (http://www.chesapeakebay.net/data#programs) include tidal benthic, plankton and fluorescence data as well as links to biological data developed and maintained by CBP Partner organizations. CBP also maintains the spatially referenced Chesapeake Bay water quality and point source data bases and a series of land cover and associated data products for the Chesapeake Bay watershed. Other categories of GIS data created by other agencies or organizations but maintained by CBP include boundaries, cultural resources, recreation, cadastral, elevation, hydrography, land resources and transportation.

The CBP maintains a suite of indicators that contain geospatial representations of Bay and Watershed Health. Online maps of these indicators are updated annually to reflect the most recent interpreted data. Geospatial data and map services are available for the following Bay and Watershed Health Indicators by contacting the CBP GIS Team.

- Bay Grass Abundance – Percent of Goal Achieve by Segment
- Phytoplankton – Monitoring Station Scores and Percent of Stations Passing by Segment
- Bottom Habitat – Monitoring Station Scores and Stations Passing by Segment
- Shad Abundance
- Health of Freshwater Streams in the Chesapeake Bay Watershed

In addition to annual tracking of health indicators throughout the Bay and the watershed, the CBPpublishes map services representing geospatial elements of the CBP Decision Framework through Chesapeake Stat (stat.chesapeakebay.net). Chesapeake Stat includes a public website that promotes improved accountability, fosters coordination, and promotes transparency by sharing performance information on goals, indicators, strategies, and progress towards goals. Where possible and appropriate, maps and geospatial data are presented for each of the CBP Goal Implementation Teams and their respective Workgroups. Maps published to Chesapeake Stat are continually updated and are accessible to partners and other users for incorporation into other applications. Geospatial data presented via Chesapeake Stat may be available by request from the CBP GIS Team provided the data is not maintained or under custodianship of another agency. Please check with the CBP GIS Team for specifics (See Appendix D).

Finally, the CBP is in the process of creating a comprehensive, integrated catalog to promote accessibility, discovery, interoperability, and reuse of key CBP data resources. This metadata catalog (anticipated to be available by the end of 2012) will be available to the public and will be integrated with Data.gov, as well as the U.S. Environmental Protection Agency enterprise metadata portal the Environmental Dataset Gateway.

OBTAINING MONITORING DATA

INFORMATION ACCESS THROUGH CHESAPEAKE DATA ENTERPRISE

A major component of the CDE and its predecessor the CIMS network is to establish user interfaces for information retrieval. The primary user interface is the data users World Wide Web browser. Users can search and download monitoring data, summary statistics and indicators, data documentation, key data management documents and data inventories from several interfaces via the CBP web site. The 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. Search results are returned to the user, as comma or tab delimited ASCII flat files or XML Schema formatted files. Routine monitoring data is also becoming increasingly accessible through the GIS based Bay Stats web application. This interface enhancement will allow for geographic and graphical analysis of data online. 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 web page server in installments.

CIMS/CDE WORLD WIDE WEB ACCESS

The CBP has developed user-friendly graphical web interfaces for its relational databases of monitoring data to allow data users self serve data retrieval. All biological point data sets and data documentation files are available online. A data user can now come to the web site, select 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 in an increasing number of formats.

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 **Bay Resource Library** pull down menu on front of the CBP web page. Select **Bay Data** from the menu.

5) Scroll down to the Data Download section and under the heading Living Resources where the following options are available:

Baywide Benthic Database
Baywide CBP Plankton Database
Baywide Fluorescence Database
Watershed Wide Benthic Invertebrate Database
Baywide CBP Aerial SAV Survey (Exit CBP)
Maryland Biological Stream Survey (Exit CBP)
NOAA Fisheries Statistics and Economics Database (Exit CBP)

6) Select from any of the biological CIMS/CDE in-house data bases (**Plankton, Benthos, Fluorescence, and Watershed Wide Invertebrate**) from the list. There are also links to CIMS/CDE partner databases not served by the CBPO Data Center. Selecting any of these links will take you to a program partners website and their data interfaces.

7) Once a CBP biological database has been selected, the user will reach a page providing a description of the database and other pertinent metadata. Select the down load data button for your database of interest.

8) A new browser window will open and you will be prompted to select the type of data you wish to retrieve from the living resources database of choice. (Table 3)

PLANKTON	TIDAL BENTHOS	FLUORESCENCE	NON-TIDAL BENTHOS
STATION INFORMATION	MONITORING EVENT DATA	HORIZONTAL FLUORESCENCE	MONITORING EVENT DATA
MONITORING EVENT DATA	BIOLOGICAL EVENT DATA	VERTICAL FLUORESCENCE	HABITAT ASSESSMENT DATA
PHYTOPLANKTON DATA	SEDIMENT DATA		TAXONOMIC DATA
MESOZOOPLANKTON DATA	BIOMASS DATA		WATER QUALITY DATA
MICROZOOPLANKTON DATA	TAXONOMIC DATA		
PICOPLANKTON DATA	WATER QUALITY DATA		*INDICATOR EVENT DATA
JELLYFISH DATA	BENTHIC INDEX OF BIOTIC INTEGRITY DATA		*INDICATORS AND CALCULATED METRICSDATA
PRIMARY PRODUCTION DATA			*WAREHOUSE DATA
COMPOSITE METRIC DATA			
PHYTOPLANKTON INDEX OF BIOTIC INTEGRITY DATA			

TABLE 3. Summary of Data Type Selections by Database. Note the * options are available by selecting the Indicators and Calculated Metrics option on the interface.

9) Once a data type has been selected, you will be asked to select how you wish to search data geographically. Geographic search options include USGS Hydrologic Unit Code (HUC), Federal Information Processing Code (FIPS), state, data generating agency, CBP monitoring segment (tidal data only), CBP monitoring station or water body. You will also be asked to select a 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.

10) 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.

11) Next, a user identification box 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. Next select an output format (comma or tab delimited ASCII flat files or XML Schema formatted files) and destination for your query output (file or popup window). See Appendices A through 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 online data retrieval process.

Data on Media

Individuals without Internet access and/or users wishing to obtain complete databases can request data directly from the Living Resources Data Manager. Data can be sent via FTP transfer or CD-ROM depending on the size of the data set requested. Requests for biological GIS coverages or other GIS products should be sent to the Living Resources Geographic Information Specialist. All requests must be made in writing or by email. Data Center contact address and phone numbers are provided in Appendix D.

DISCLAIMER NOTICE: The CBP web 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 growth of the Internet. The combination of increased data access and new mechanisms to store and distribute data has 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 take time to 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 Program long term monitoring programs and other long-term monitoring efforts are often used to assess status and intended to detect changes and/or trends in the status of biological communities on a large scale. They were designed to be used in a wide variety of analyses. These monitoring programs may not have a spatial or temporal scale fine enough to answer many site or time-specific questions. However, they are often 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.

MERGING CIMS/CDE DATA FILES

This section provides guidance on how to merge related files retrieved from the CBP web data interfaces. The Chesapeake Bay Program relational database structures and formats are discussed in the appendices of this document. Actual field names and attributes appear in Appendix A and online in the individual data set documentation files. A list of possible CBP field names for biological 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.

All data downloaded from the plankton database (Phytoplankton, Mesozooplankton, Microzooplankton, Picoplankton, Jellyfish, Primary Production, Composite Metric and Phytoplankton Index Of Biotic Integrity Data) can be merged with their sampling event files by linking directly on the SURVEY_ID field or the combination of the following fields:

SOURCE
SAMPLING_DATE
STATION
LAYER

Fluorescence data is collected concurrently with plankton sampling in many cases. The fluorescence and plankton data reside in separate data bases. Linking the plankton SURVEY_ID field with the fluorescence FIELD_DATA_INDEX will result in mismatched data. The Vertical Fluorescence files can be merged with plankton sampling event files by linking on the combination of the following fields:

STATION
SAMPLING_DATE

All data downloaded from the Tidal Benthic database (Benthic Taxon, Benthic Biomass, Sediment, Water Quality, Biota Event and Benthic Index of Biotic Integrity Data) can be merged with their Monitoring Event files by linking directly on the EVENT_ID field or the combination of the following fields:

SOURCE
STATION
SAMPLING_DATE
SAMPLE_NUMBER (for taxon, biomass, benthic index data)

All data downloaded from the Non-Tidal Macroinvertebrate database (Habitat Assessment, Taxonomic, Water Quality, Indicators and Calculated Metrics, and Warehouse Data) can be merged with their Monitoring Event files by linking directly on the EVENT_ID field or the combination of the following fields:

SOURCE
STATION
SAMPLING_DATE
SAMPLE_TIME

BIOLOGICAL DATA QUALITY ASSURANCE ISSUES

The goal of quality assurance is to provide the user with data of known high quality. The first stage of quality assurance is quality control (QC), which is performed by personnel in the field and laboratory to ensure that data meet quality standards. Quality assurance assessments for all data analyses measure two quantities, precision and accuracy. Precision is the repeatability of measurements, and accuracy is the closeness of analytical measurements to a "true" value. In the case of biological data, enumeration accuracy is often method and personnel dependant. Although the accuracy of taxonomic identifications can only truly tested through cost prohibitive genetic analysis, accuracy is approximated well by consultation with taxonomic experts and the use of voucher collections.

Intra-organization QAQC

Among the CBP biological programs, participating data providers have internal quality assurance/quality control programs. To assess within-organization precision and accuracy, most programs standard protocolise randomly selected and re-enumerated approximately 5-10% samples for quality assurance. The QA sample assess,emt must have a total density and dominant taxa densities within 10% of the original count. For CBPO funded or match programs, quality assurance recount data are submitted to CBP separately from the rest of the long term monitoring data and are maintained in an offline data base. The QA recount data are available upon request.

Inter-organization QAQC

Inter-organization precision and accuracy assessments have been problematic in the biological monitoring programs. The tidal benthic monitoring programs established and continue to maintain an informal quality assurance program between participating labs during the early phases of the program. However, a program of regular quality assurance /quality control and split-sample comparisons between laboratories was not part of either the phytoplankton or zooplankton long-term monitoring programs prior to 1998. From 1998 through 2008 a split-sampling program was conducted to compare results of the Maryland and Virginia mesozooplankton, microzooplankton and phytoplankton long-term monitoring programs. The non-tidal benthic monitoring programs currently have no mechanism for assessing precision and accuracy between data providers.

TITLE: Phytoplankton Counts
PARAMETER NAME: COUNTS
UNITS OF MEASURE: Number of Cells per liter
METHOD CODES: PH101, PH102, PH102M, PH103

GENERAL INFORMATION:
The Chesapeake Bay phytoplankton monitoring data from the mainstem and tidal tributaries of Maryland and Virginia collected prior to 2005 are not entirely comparable. While each lab used a version of the Utermohl counting methodology, differences in microscopic enumeration procedures produced data with significant method biases. In the Maryland phytoplankton program between 1984-2004 the counting procedure consisted of a two step procedure (USEPA Chesapeake Bay Program, 2006A). The primary counting magnification was 500X and 20 random fields were counted with a 200 cell count minimum. A secondary scan of 20 random fields to find the rarer, larger forms of the counting chamber was performed at 312X. In the Virginia phytoplankton monitoring program between 1985-2004 a three step counting procedure was used (USEPA Chesapeake Bay Program, 2006B). The primary counting magnification was at 300X and 10 random fields were counted with a 200 cell minimum. A secondary count of 10 random fields at 600X was performed to enumerate small cells not discernible at the 300x counted at 600X. In the final step, the entire counting chamber was scanned at 150X for previously unrecorded larger species in the chamber. Another fundamental difference in these counts was the definition of an algal unit for enumeration. Virginia considered each colony, trichome or filament to be a single algal unit. Maryland considered each cell within a colony, tricome or filament to be an algal unit. Based on comparison counts between the two labs, the end product of these counts at different magnifications was that Maryland produced higher counts of smaller cells (<5 microns) and less precise estimates of colonial or filamental forms due to lower raw counts. Virginia data consistently had higher species diversity. Based on this information and the results of the split sample comparisons, prior to 2005 Maryland and Virginia abundance data should be analyzed separately for baywide status and trends.

Maryland Enumeration protocol from 1984-2004

-Chesapeake Bay Program Analytical Method Code PH101
Samples are gently mixed and a 1-25 milliliter aliquot is transferred to a settling chamber. The aliquot is brought up to 10-50 milliliter with deionized water (depending on the volume of the settling chamber). After a settling period of 2-48 hours (depending on the volume of the settling chamber), the settled material is examined at 400X or 500X and 250X or 312X using a Leitz Diavertla inverted microscope. Identification and enumeration of the dominant taxa, including detailed counts of the species, are made yielding densities (cells/liter) of individual taxa as well as the total assemblage. A minimum of twenty random fields and 200 individual cells (not including blue-green spheres) are counted at 500X-400X. The 312X-250X count consists of the examination of twenty random fields counted for the rarer forms not encountered in the high magnification counts. In 1989 after doing a comparison with epifluorescence microscopy unidentified blue green spheres were no longer enumerated due to the inaccuracy of the Utermohl method in estimating numbers of these cells. The remainder of the sample is permitted to settle for at least 72 hours before concentrating the volume to 20-25 milliliters for archiving.

Virginia Enumeration protocols from 1985-2005

-Chesapeake Bay Program Sample Analysis Method PH102
The 500 ml replicate sample sets are mixed (1000 ml), then 500 ml are withdrawn and allowed to settle undisturbed for 72 hours, the original 500 ml is reduced by careful siphoning to approximately 200-250 ml. The samples are allowed to stand undisturbed for an additional 48 hours and are again siphoned to 20-40 ml concentrates. The final 20-40 ml concentrate is transferred to a previously labeled storage vial, where the label information from the collection bottle has been transferred and verified by the laboratory supervisor. A known volume of the entire concentrate will be placed in an Utermöhl settling chamber for

examination with an inverted plankton microscope. If the phytoplankton, and/or silt density is too great in the final concentrate for clear examination, a known volume of the concentrate is drawn off to provide a sub-sample suitable for analysis. The microscopic examination was done at 3 magnifications (Marshall and Alden, 1990). At 300/315X magnification, a combined random field (10) and minimum cell count (200) procedure will be followed where all taxa are counted to the lowest taxonomic category possible. This examination is repeated at 500/600x magnification for 10 randomly selected fields. Cells not clearly discernible at the 300x magnification are examined at 600X for identification. All species will be counted at only one of these magnifications. In addition, the entire chamber will be scanned at 150X for recording previously unrecorded larger species in the chamber. All phytoplankton categories will be included in this analysis, including colonies and algal filaments at 300/315X. Note that in August 2002, ODU purchased new inverted plankton microscopes changing their mid- and high magnification from 315/500X to 300/600X, with magnification constants adjusted accordingly. No apparent step trend have been noted in the data due to this change.

-Chesapeake Bay Program Analytical Method Code PH102M
Counting Method 102 was slightly modified in January 2005 for better agreement with the new counting methodology adopted in the Maryland Phytoplankton program. Beginnings in 2005, at 600X all cells were indentified using the following categories:

Centric Diatoms < 10 microns
Cryptomonas <10 microns
Pennate Diatoms< 10 microns
Unidentified Green Cells 3-5 microns
Unidentified Microphytoflagellates <10 microns
All other protocol for sample enumeration remained the same as method PH102.

The Chesapeake Bay Program Standard Enumeration protocol from 2005-Present

-Chesapeake Bay Program Analytical Method Code PH103
In January of 2005 in Maryland and October 2005 in Virginia, the following enumeration technique was instituted for all Chesapeake Bay Program supported phytoplankton enumerations. The final samples for enumeration are gently mixed and a 1-25 milliliter aliquot is transferred to a settling chamber. The aliquot is made up to 10-50 milliliter with deionized water (depending on the volume of the settling chamber). After a settling period of 2-48 hours (depending on the volume of the settling chamber), the settled material is examined at three magnifications inverted microscope. Identification and enumeration of the dominant taxa, including detailed counts of the species, are made yielding densities (cells/liter) of individual taxa as well as the total assemblage.

- Each subsample was enumerated using the standard 3 magnification protocol:
  - At high magnification (either 500X or 600X), only representatives within the size categories of the following groups were counted. At this magnification, 20 random fields were examined to obtain mean values.
    - Diatoms < 10 microns in length for pennates, or diameter for centrics
    - Cryptomonads < 10 microns in length
    - Unidentified micro-flagellates < 10 microns in size
    - Unidentified “green” cells <10 microns in size
  - At 300X or 312X, all common representatives of the phytoplankton not included above or at the lowest magnification were counted. At this magnification, a minimum of 10 random fields were counted and a minimum cell count of 200. In the unidentified pennate and centric diatom groups, the following size categories were used: 10-30, 31-60, and > 60 microns in size. This last category would not include the diatoms listed under the low magnification scan. Taxa with fewer than 3 cells identified at the mid magnification are counted at the lowest magnification.

- At the lowest magnification (e.g. 125X or150X) a scan of the entire settling chamber bottom is conducted. Counted will only be the rare rather large-sized taxa not included in the above analyses. These taxa are generally few in number compared to others and stand out for easy identification at this low magnification.

OTHER ISSUES:

1) The Virginia sample enumeration technique includes a special effort to identify smaller, rare species below 8 microns in size. This procedure was not added to the Maryland protocol until 2005. The resulting Virginia data will have greater species diversity compared to Maryland samples.

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 switched to the accepted species name. The Maryland phytoplankton monitoring program has previously used the *Agmenullum* name.

3) The Maryland method 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.

4) The Maryland method counts individual cells within filamentous and colonial forms toward the 200 minimum cell count, while Virginia method counts an entire filament or colony as one algal unit toward the 200 minimum count. Since precision is based on the number of homogeneous cells counted, Maryland samples where filaments and colonies occur would be expected to have a lower precision.

5) Composite samples: It should be noted that the CBP sampling protocol utilizes composite samples. There are no samples for individual depths. At each station, samples were pumped from five discrete depths in the surface layer above the pycnocline (or top half of the water column if a pycnocline is not evident) and composited in a 20-gallon carboy on shipboard. Plankton samples for enumeration are then drawn from the well mixed carboy.

6) 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.

7) August 2002: ODU purchased new inverted plankton microscopes changing their mid- and high magnification from 315/500X to 300/600X, with magnification constants adjusted accordingly. No apparent step trend has been noted in the data due to this change.

OTHER DOCUMENTATION:

Alden, R., H. Marshall, and K. Sellner. 1997. Phytoplankton indicators within the Chesapeake Bay Monitoring Program. Old Dominion University Research Foundation, AMRL Tech. Rpt. 3051. Norfolk, Va.,112 pp.

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Phytoplankton Monitoring Survey Data Dictionary. URL
ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/phyto/mdphdoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Phytoplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/phyto/vaphdoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). The 1998 - 1999 Split Sample Study for Chesapeake Bay Program Phytoplankton, Microzooplankton and Mesozooplankton Monitoring Components.URL ftp.chesapeakebay.net/Pub/Living_Resources/plank/qa/SplitSmplReport-1988-1989.pdf

USEPA Chesapeake Bay Program (2012, February 22). An Analysis of 2006 Chesapeake Bay Monitoring Program Phytoplankton Split Sample Data.URL ftp.chesapeakebay.net/Pub/Living_Resources/plank/qa/report_2006_final.pdf

TITLE: Picoplankton Counts
PARAMETER NAME (NEW): COUNTS
UNITS OF MEASURE: Number of Cells per liter
METHOD CODES: PP101, PP102

GENERAL INFORMATION:

The 2008 phytoplankton split sample program examined the comparability of picoplankton counts between program participants. The resulting split sample analysis showed high agreement (±5% difference) between laboratory counts. This suggest that despite the known differences in microscopes, filter cubes and internal laboratory procedures, if like volumes of sample are enumerated good precision between the labs can be obtained.

Virginia Enumeration protocol from 1998-Present

-Chesapeake Bay Program Sample Analysis Method PP101
When brought to the phytoplankton laboratory, samples (125 ml) will be stored in a refrigerator at 4^{o}C and the counting procedures will be completed within 7-14 days after their collection date. Using a millipore apparatus, a backing 0.45 um nuclepore filter, wetted with distilled water, is placed on the millipore stem. Then a blackened 0.20 um nuclepore filter, is placed over the other filter. 1-2 ml of the shaken water sample is added to the filter apparatus. Using a pump, and a maximum vacuum pressure of 10 cm OF Hg (13.3 kPa), the sample is filtered until the meniscus disappears from the top filter. The 0.2 um nuclepore filter is removed and placed immediately on a glass slide previously moistened with breath. A drop of immersion oil (Cargille type A, refractive index 1.515) is placed at the center of the filter, and then a cover glass is added, followed by another drop of immersion oil to the cover glass. The slide is examined immediately with an epifluorescence microscope equipped with a 100-W Hg lamp and a 100X oil immersion objective (Neofluar 100/1.30) at 1000X magnification. Using an appropriate filter set random field counts are made on both replicate samples, and averaged. A minimum coverage of 20 fields is the procedure followed for each slide. Cells not counted here are those previously identified and counted with the phytoplankton sample at 300x or 600X (e.g. some *Merismopedia* spp.).

Maryland Enumeration protocol from 2002-Present

-Chesapeake Bay Program Analytical Method Code PP102
The field samples are returned to the lab and held in a refrigerator (4^{0}C) until processing begins (≤ 7 days). Using a 25-mm Millipore filtration apparatus, a 0.45 µm backing filter is placed on the filter holder and moistened with distilled water. A 0.2 µm Irgalan black-stained nucleopore filter is placed on top of the backing filter and the filter chimney attached to the base. An appropriate volume of sample water (generally 1-2 ml) is placed in the chimney and filtered at a low vacuum pressure (~ 5 kPa). The nucleopore filter is removed from the base and placed in the center of a glass microscope slide. A drop of immersion oil (Cargille type A) is placed in the middle of the filter, a cover slip placed on top and another drop of immersion oil added on top of the cover slip. The slide is gently tamped with a paper towel and either examined immediately or placed in a slide box in a freezer until microscopic inspection occurs. The glass slide holding the sample filter is placed on a Leitz Laborlux compound microscope outfitted with a 50-W mercury bulb and inspected at a magnification of 1250X. The autofluorescence characteristics of the phototrophic picoplankton cells are detected by using two different filter sets - one with an excitation wavelength of 450-490 nm which excites the chlorophyll a and type I phycoerythrins (common to the dominant group of picoplankton - cyanobacteria), the other a yellow-green wavelength of 520-560 nm which illuminates the type II phycoerythrins and the phycocyanins. A minimum of 200 cells and 20 random fields are counted.

OTHER ISSUES:

1) The picoplankton count data are all identified taxonomically as Autotrophic Picoplankton in data set.

2) Composite samples: It should be noted that the CBP sampling protocol utilizes composite samples. There are no samples for individual depths. At each station, samples were pumped from five discrete depths in the surface layer above the pycnocline (or top half of the water column if a pycnocline is not evident) and composited in a 20-gallon carboy on shipboard. Picoplankton samples for enumeration are then drawn from the well mixed carboy.

OTHER DOCUMENTATION:

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Phytoplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/phyto/mdphdoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Phytoplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/phyto/vaphdoc.pdf

USEPA Chesapeake Bay Program (2012, February 22) An Analysis of 2006 Chesapeake Bay Monitoring Program Phytoplankton Split Sample Data. URL- ftp.chesapeakebay.net/Pub/Living_Resources/plank/qa/

USEPA Chesapeake Bay Program (2012, February 22) An Analysis of 2008 Chesapeake Bay Monitoring Program Phytoplankton Split Sample Data. URL- ftp.chesapeakebay.net/Pub/Living_Resources/plank/qa/

TITLE: Primary Production
PARAMETER NAME (NEW): CARBONFIX
UNITS OF MEASURE: Microgram Carbon Per Liter Per Hour
METHOD CODES: PD101, PD 102

GENERAL INFORMATION:

It was determined that the Maryland and Virginia primary production measurements, should be analyzed separately due shipboard methodology differences. The historic Maryland protocol collected 15 liter samples and held the productivity samples at near-ambient temperatures and shipboard light conditions for 0.5 - 6 hours. Thus samples were able to begin acclimating to relatively high light levels on shipboard and samples may have experience above-ambient temperatures before they were placed in light-saturated, temperature-controlled incubation chambers in the laboratory. The historic Virginia protocol collected 1 liter samples and maintained productivity samples in a closed cooler on ice prior to being sent to the laboratory for analysis. Virginia's samples experienced below-ambient temperatures in all seasons but winter, and were acclimated to low light when they were placed in the incubation chambers. The end result of these protocol differences is that Maryland primary production rates appear to be consistently different (greater) than Virginia rates.

Maryland Sample Analysis Protocol From 1984-2009

-Chesapeake Bay Program Analytical Method Code PD101
At each station water column structure was assessed, water was pumped from five discrete depths above the pycnocline (or top half of the water column if a pycnocline is not evident) and composited in a 20-gallon carboy on shipboard. Two composite samples were collected at each station. Carboys were held in varying conditions, for <1 to >6 hours, depending on station, but procedures were consistent for each station. Pre-incubation history can be classified into four groups:

Group A - Samples immediately put in a shipboard incubator chamber.

- TF1.5 - Patuxent River, tidal fresh
- CB1.1 - mouth of the Susquehanna River, tidal fresh
- CB2.2 - upper Bay mainstem, oligohaline (After February 2000)
- CB3.3 - middle Bay mainstem, mesohaline
- CB4.3 - middle Bay mainstem, mesohaline (After to February 2000)
- WT5.1 - Baltimore Harbor, mesohaline

Group B - Unprotected samples which were taken immediately to shore, and transported between 1 - 2 hours in a van to the laboratory where they were placed immediately in the laboratory incubator. Air temperature in the van was somewhat warmer than ambient in winter. The van was not air conditioned in summer prior to 2005, and summer samples may have experience very warm temperatures. The samples also experience extremes in light conditions, from direct sunlight on shipboard to the interior darkness of a van.

- TF2.3 (~ 2 h) - upper Potomac River, tidal fresh
- LE2.2 (~1 h) - lower Potomac River, mesohaline
- CB5.2 (~1 h) - middle Bay, mesohaline

Group C - Samples were kept on shipboard in an unshaded, ambient temperature water bath anywhere between 1 and 5.5 hours, then put in a shipboard incubator.

- CB2.2 – (~?) upper Bay mainstem, oligohaline (Prior to February 2000)
- TF1.7 (~1 h) - middle Patuxent River, oligohaline
- LE1.1 (~2.5 h) - lower Patuxent River, mesohaline
- CB4.3 (~5.5 h) - middle Bay mainstem, mesohaline (Prior to February 2000)

Group D - Samples were held unprotected on shipboard & van (~ 5 hours) or in the van (~3-4 hours), then placed in the incubator. Samples experience temperature conditions that differ from the ambient, i.e. typically colder in winter and hotter in summer. The van was heated in winter but not air conditioned in summer prior to 2005. The samples also experienced extremes in light conditions, from direct sunlight on shipboard to the interior darkness of a van.

ET5.1 (~ 3 h) - upper Choptank, oligohaline
ET5.2 (~ 4 h) - lower Choptank, mesohaline
RET2.2 (~ 5 h) - middle Potomac River, oligohaline

Productivity incubation were performed either on shipboard, on a dock, or immediately upon returning to the laboratory. Four 100 ml subsamples per station were decanted from the two surface-layer composite samples into sample-rinsed Pyrex milk dilution bottles (or polycarbonate bottles after July, 1989). One was used for a time-zero C^{14} blank (t_0), one for an alkalinity determination, and one from each composite for C^{14} incubation. The incubation samples were placed in a constant light incubator (>250 µE m^{-2} sec^{-1}) receiving running water maintained at ambient temperature for an acclimation period of more than 0.5 h, and usually about 1 h. A 1-ml inoculate of 1-2 µCi labeled $NaHCO_3$ was added to each sample, and the samples were returned to the incubator for >1 h. After incubation, 15 ml was filtered through a 0.45 µm Millipore membrane filter, rinsed with filtered sample water, and fumed over concentrated HCl. Fifteen ml of the t_0 sample was similarly filtered and fumed, immediately following the addition of the radioisotope. The filters were placed in scintillation vials and stored in a freezer. Scintillation cocktail (Aquasol from August 1984 to October 1994; Cytoscint from October 1994 to present) was added to the scintillation vials and the samples were run on a Packard Tri-Carb 2500TR Liquid Scintillation Analyzer equipped with internal quench standards and serviced once a year by the Packard technician. Field stock solutions of radio-labeled $NaHCO_3$ were obtained from mixing portions of 25 mCi C^{14} $NaCO_3$ stock solutions with pH of 10-10.2 de-ionized water. Final field stock activities approximate 2 µCi C^{14} per ml, determined from liquid scintillation counting of field stocks in phenethylamine and Biofluor. Field stock activities for each dilution are then recorded in a laboratory log and were assigned a date interval corresponding to the period that the field stock is employed in the program.

Virginia Sample Analysis Protocol from 1998-2009

-Chesapeake Bay Program Sample Analysis Method PD102

At each station water column structure was assessed, then water was pumped from five discrete depths above the pycnocline (or from top half of water column if pycnocline is absent) and composited in a carboy. Two composite samples were collected at each station. Two 1-liter water samples were obtained from each of the two carboys (total of 4 per station) and placed in an iced cooler until their return to the laboratory. The Virginia protocol held all its samples for <1 to >6 hours on shipboard. Productivity incubation were performed immediately upon returning to the laboratory. Two 100 ml subsamples were obtained from each station's two 1-liter composite samples (four from each station). One was used for an alkalinity determination, one was used for a time-zero C^{14} blank (t_0) after acclimation, and one from each composite was used for the C^{14} incubation. Samples were placed in a water bath equipped with a bottle holder which rotated between banks of cool-white fluorescent lights. The light levels exceed the light saturation point of the phytoplankton. Temperature of the water bath was the same as the temperature at each station when the samples were taken. After one hour of acclimation, the bottles were inoculated with 2-5 Ci C^{14} $NaHCO_3$. One of the samples was analyzed for C^{14} activity immediately (time 0 sample). Two samples were returned to the water bath for approximately one hour. All inoculated samples were filtered through a 25 mm 0.45 pore-size Millipore filter under a vacuum pressure < 5 cm Hg pressure. The Millipore filters were fumed over concentrated HCl for 30 seconds and placed in scintillation vials. Scintillation fluid was added to each vial and C^{14} activity was determined using a Beckman Model LS 1701 scintillation counter. The amount of C^{14} in the stock bottle was determined by placing 20-50 µl of stock solution in scintillation vials containing 0.5 ml phenethylamine. Scintillation fluid was added to the vials, set in the dark overnight, and analyzed for C^{14} activity.

OTHER ISSUES:

1) 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.

2) Virgina data prior to 1995 lacks concurrent measurements of chlorophyll a for determination of assimilation ratio (production efficiency).

OTHER DOCUMENTATION:

Buchanan, C. (2006) Measurements of C:Chl *a*, Pmax, Topt, and Other Model Parameters in Natural Phytoplankton Populations of the Chesapeake Estuaries. ICPRB Report 06-1, Rockville Md. 70 pp.

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Primary Production Monitoring Survey Data Dictionary. URL
ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/prod/mdpddoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Primary Production Monitoring Survey Data Dictionary. URL
ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/prod/vapddoc.pdf

TITLE: Microzooplankton Counts
PARAMETER NAME (NEW): COUNTS
UNITS OF MEASURE: Number per liter
METHOD CODES: MI101, MI102, MI103

GENERAL INFORMATION:

There were many differences in the in the collection and enumeration protocols used by the states of Maryland and Virginia during the microzooplankton monitoring program. Methodological differences were so great that the two data sets are unsuitable to be combined for bay wide analyses. Furthermore the split sample comparisons of the 1989-2002 monitoring data revealed multiple data quality assurance issues with some of the data generated by the Virginia program. Baywide CBP sampling for microzooplankton at all stations ended in September 2002 due to the termination of the CBP zooplankton monitoring program in October 2002.

The microzooplankton monitoring programs in Chesapeake Bay were established with fundamentally different goals. The Virginia monitoring program which ran from 1993-2002 was a broad based survey and enumerated all major microzooplankton groupings. The Maryland program which ran from 1984-2002 was focused on enumerating the portion of the microzooplankton community which serves as larval fish food (>44um). Furthermore each state had differing definitions of what constituted microzooplankton. Virginia used a classical definition of microzooplankton as being zooplankton 20-200 μm in size and reported counts in eight taxonomic categories. The Virginia size cutoffs for tintinnids and non-loricate ciliates were 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 did not drop ciliates < 20 μm in width from counts. The Maryland program considers nauplii, polychaete larvae and cladocerans to be mesozooplankton and did not count any organisms from these groups. These organisms were enumerated in the Maryland mesozooplankton program. Maryland also counted the non-loricate ciliates and tintinnids that are less than 20 μm in size. Maryland used a net sampling protocol which was inappropriate for the identification and quantification of ciliates because of their size (often < 44μm) and fragile nature. Therefore, from 1998 through 2000, whole water microzooplankton samples were taken at the mesohaline stations between March - September, in order to quantify the ciliates. The Maryland performed taxonomic enumerations down to the lowest taxonomic level possible (generally genus or species). 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 μm	All
Rotifers	All, length <200 μm	All
Sarcodinids	All	All
Tintinnids	All >20 μm in width, length doesn't matter	All in mesohaline All > 44 μm lenght in other salinities
Non-loric ciliates	All > 20 μm in width, less than 200 μm in length	All in mesohaline, All > 44 μm length in other salinities
Barnacle nauplii	All < 200 μm in length	None
Polychaete larvae	All < 200 μm in length	None
Pelecypod larvae	All < 200 μm in length (In other category)	All
Gastropod larvae	All < 200 μm in length (In other category)	All
Cladocerans	All < 200 μm in length	None

Table 4. Comparison of Microzooplankton size classes

Maryland Enumeration protocols from 1984-2009

-Chesapeake Bay Program Laboratory Method Code MI101

Protocol for the enumeration of net collected microzooplankton samples. Samples were collected in the field by pumpling a known quantity of water through a 44 µm mesh net. All samples collected in 44 µm mesh nets are decanted into a jar containing buffered formaldehyde (final concentration of 2%) and transferred to the laboratory. Samples were gently mixed and a 1-milliliter aliquot is removed with a Stempel pipette and put into a Sedgewick-Rafter cell for enumeration with a compound microscope at 100X magnification. Beginning with samples collected in April 1986, a small drop of concentrated Rose Bengal stain was added to the cell prior to addition of the sub sample. The sub sample was allowed to set for 10 minutes before counting. At least one chamber (1 milliliter) was counted for each sample and if the total count did not reach 250 organisms, subsequent 1 milliliter aliquots were enumerated until a count of 250 or more organisms was obtained or 3 milliliter was examined. If a certain organism was abundant (more than 60 per chamber), it was not counted in the subsequent 1 milliliter aliquot for a given sample. For extremely abundant taxa, less than one milliliter could be counted. Species identification were made using the NODC species code. Microzooplankton smaller than 44 micrometers were noted on the original data sheet but not enumerated since estimates would not have been quantitative.

-Chesapeake Bay Program Laboratory Method Code MI103

Protocol for the enumeration of whole water collected microzooplankton samples. Samples are decanted from the replicate carboys of water collected at five discrete depths above the pycnocline. The whole water microzooplankton samples are preserved with acid Lugol's solution to a final concentration of 2 %. In the lab, 5-25 ml are subsampled from the sample jar for settling. This amount depends on how much detritus and plankton were in the sample. If 25 ml was used, the bottle was shaken gently (slowly inverted 5 times) and 25 ml poured into a graduated cylinder. This was put into a 50 ml settling chamber and the graduated cylinder rinsed 3X. The sample was allowed to settle 48 h before being counted. If less than 25 ml aliquots were used, these were poured into 25 ml settling chambers which settle for 24 hr before counting. To count, the entire chamber was examined at 200X with an inverted microscope to obtain a minimum count of 100 organisms. If 100 organisms were not counted, another subsample is settled. Any organism that was abundant in the first aliquot (more than 60) was not counted. The count program used for the net samples (see above) was currently being adapted for use with whole water counts. The ITIS taxonomic codes were used for the taxa that are enumerated. Biomass estimates for each taxon were applied to the normalized densities in order to fit into various ecosystem models and the zooplankton index of biotic integrity.

Virginia Enumeration protocol from 1993-2009

-Chesapeake Bay Program Laboratory Method Code MI102

Samples are decanted from the replicate carboys of water collected at five discrete depths above the pycnocline. Each 1-liter sample was allowed to settle for 72 hours and carefully siphoned down to a 300 ml concentrated sample, which were then combined. A two-step settling and siphoning steps followed to produce first a 250 ml concentrate, which was next concentrated to 100 ml. This concentrate was sieved through 73 micron mesh net to trap microzooplankton >73 microns which were washed into a beaker, then placed into a settling chamber #1 for examination and counts. The filtrate was mixed and 3- 5ml aliquots were removed and placed in settling chamber #2, with a buffered formalin solution (20%) added to bring the total volume to 25 ml. After 5 minutes of settling, 15 ml of the upper concentrate was removed and placed in settling chamber #3. The settling chambers were allowed to settle for 24 hours, and then counts were made. The entire bottom surface of the settling chambers was scanned at 100x for chamber #1 and at 200x for chamber #2 and #3 using an inverted plankton microscope. Chamber #1 provided counts for the larger microzooplankton (>73 microns), Chamber #2 for Microzooplankton groups between 40 and 73 microns in size, and Chamber #3 for small ciliates < 40 Microns. Counts were reported as number of organisms per liter. In theory, Virginia's MI102 organism counts for chambers #1 and #2 should reflect the same taxa and life stages found in the Maryland MI101 organism counts.

OTHER ISSUES:

1) Mesozooplankton counts are reported in organisms per cubic meters. Microzooplankton counts are reported in organisms per liter. One of the data sets must have its units converted before combining the data sets The conversion is for converting mesozooplankton into microzooplankton units is:
DEN_M3 / 1000 = DEN_L

2) 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.

3) Virginia Specific Issue-Analysis of the July-December 1999 data deliverables revealed abnormally high counts of Oligotrichs were found at numerous stations. It is unclear whether this increase was due to natural phenomena or some kind of taxonomist bias due to the introduction of new personnel.

4) Virginia Specific Issues-The 2002 split sample study revealed that the phytoplankton genus Ceratium was being mistaken as rotifers in routine and split sample counts. Phytoplankton samples with high Ceratium counts were identified and the corresponding microzooplankton samples were recounted and resubmitted from the time period between July 1999-December 2001. ODU taxonomists were also noted as finding high counts of Oligotrichs in split samples where Maryland personnel did not find these. No explanation for this finding has been determined to date.

OTHER DOCUMENTATION:

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Microzooplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/micro/mdmidoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Microzooplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/micro/vamidoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). The 1998 - 1999 Split Sample Study for Chesapeake Bay Program Phytoplankton, Microzooplankton and Mesozooplankton Monitoring Components.URL ftp.chesapeakebay.net/Pub/Living_Resources/plank/qa/SplitSmplReport-1988-1989.pdf

GENERAL INFORMATION:
TITLE: Mesozooplankton Counts
PARAMETER NAME (NEW): COUNTS
UNITS OF MEASURE: Number per liter
METHOD CODES: MZ101A, MZ101B. MZ101C, MZ102, MZ103

GENERAL INFORMATION:

After extensive examination of historic mesozooplankton monitoring data, and in consideration of the known methodological and data quality issues, the CBP is issuing the following data usage recommendation: Only mesozooplankton samples enumerated with Hensen-Stempel (HS) methodologies are recommended for use in quantitative analyses. These data have method codes MZ101A, MZ101B, MZ101C, and MZ103. Data quality issues have been identified for portions of the Virginia record. Virginia samples collected prior to 1993 and enumerated with method MZ102, as well as those samples collected between 1993 and 2000 and enumerated with method MZ102 or MZ102B, should only be used for qualitative purposes (Johnson 2007).Baywide sampling for mesozooplankton ended in September 2002 due to the termination of the CBP zooplankton monitoring program in October 2002.

Maryland Enumeration protocols from 1984-2009

-Chesapeake Bay Program Laboratory Method Code MZ101A, MZ101B, MZ101C
Mesozooplankton were collected in the field, with stepped oblique bongo net tows at each station. Bongo nets were deployed 0.5 meters above the bottom and nets were raised in 1-4 meter increments (usually 0.5 to 1.5 minutes/step) depending on station depth with a minimum of 5 steps per station. In the laboratory, samples were enumerated using a standard sub-sampling technique with a Hensen-Stempel pipette (HS) (Harris et.al. 2000). A hierarchical counting technique was employed to obtain density estimates. This procedure consists of first counting at least 60 individuals of the most dominant forms (e.g. Acartia tonsa) in a small sub sample (usually 1 - 2 milliliters), followed by 5- and 10- milliliter sub samples from which all species that had counts less than 60 in the previous sub sample were counted. The basic technique was modified slightly three times over the 18 year history of the program. The standard HS count and a whole sample scan for macrozooplankton (amphipods, shrimp, fish eggs, fish larvae and juvenile fish, etc.) was performed on each sample between 1984 and 1989. The macrozooplankton sample scan was temporarily discontinued from 1990 to 1996 (MZ101B). In 1996 the macro-zooplankton scan was reinstated and large bodied mesozooplankton species occurring in small numbers in the initial count were enumerated in special 850-micron sieve counts were again reported (MZ101C). Note that after 1 January 1999 smaller species occurring in small numbers in the standard count but occurred predominantly in the special 850-micron sieve counts were reported only in the method MZ 101C count.

Virginia Enumeration protocols from 1984-2009

-Chesapeake Bay Program Analytical Method Code-MZ102, MZ102B
Field samples were collected by taking five minute double-oblique pattern bongo net tows from bottom to surface. From1985 to 1992, the bongo nets used for field sampling were not equipped with flow meters to accurately estimate the volume of water filtered through the nets during a tow. The volume of water filtered during a tow was estimated using the length of the tow and area of the net’s opening. In 1993, a flow meter were mounted on the nets. From 1985 through 1997 a Controlled Variability Sampling (CVS) method (method MZ102) described by Alden et.al. 1982 was used for sample enumeration. The CVS technique used a connected series of five wet sieves (200, 300, 600, 850, and 2000 microns) and a mechanized shaking apparatus to separate and zooplankton were then counted by size fraction. Size classes in which the organisms were too numerous to count in their entirety were split with a Folsom plankton splitter until an appropriate sample size is reached for statistically valid counts of the dominant species. The chosen error level of 35% required that each species of interest be counted to achieve a

range of between 20 and 42 individuals in any given split. Species observed to be subdominant in the final split are counted until they achieved the range for the 35% error level. Split sampling tests in early 1998 revealed that smaller zooplankton slipped through the last 200 micron sieve and CVS enumerated samples were consistently reported lower plankton densities than the HS enumerated samples (ICPRB, 2000). Furthermore, the sieving process broke off fragile plankton appendages making taxa identifications more difficult. From March 1998 to January 2000 a 75 micron sieve was added to the sieve stack in hopes of capturing the smaller plankton lost by the original CVS method (method MZ102B). This modification to the CVS method was found to be ineffective (ICPRB 2000) and abandoned in 2000.

-Chesapeake Bay Program Analytical Method MZ103
From February 2000 to October 2002, Field samples were collected by taking five minute double-oblique pattern bongo net tows from bottom to surface. Bongo nets were equipped with flow meters. Samples were enumerated using a HS method (Harris et.al. 2000). This procedure consisted of first counting at least 60 individuals of the most dominant forms (usually Acartia tonsa) in a small sub sample (usually 1 - 2 milliliters), followed by 5- and 10- milliliter sub samples from which all species that had counts less than 60 in the previous sub sample were counted. Macro zooplankton (amphipods, shrimp, etc.) were identified when observed in sub samples. 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 sub samples and/or macro zooplankton were counted and identified.

METHOD CODE	DESCRIPTION	USAGE PERIOD	STATE/ LABOROTORY
MZ101A	Hensen-Stempel Count with macrozooplankton scan	July 1984 - December 1998	MD\VERSAR
MZ101B	Hensen-Stempel Count without macrozooplankton scan	January 1999 - December 2001	MD\VERSAR
MZ101C	Hensen-Stempel Count with macrozooplankton scan and special 850-micron sieve count *Note both MZ101B and MZ101C counts were reported from July 1996-December 2001	July 1996 - October 2002	MD\VERSAR
MZ102	Controlled Variability Sampling Method, data collected without flow meters on bongo nets to measure sample volume.	July 1985 - December 1992	VA\ ODU
MZ102	Controlled Variability Sampling Method	January 1993- December 1997	VA\ ODU
MZ102B	Controlled Variability Sampling Method with 75 mμ sieve modification	January 1998- April 2000	VA\ ODU
MZ103	Hensen-Stempel Count with macrozooplankton scan and special 850-micron sieve count	January 2000 - October 2002	VA\ ODU

Table 5. Composite list of mesozooplankton enumeration method used in the historic Chesapeake Bay zooplankton monitoring programs.

OTHER ISSUES:

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.

OTHER DOCUMENTATION:

Alden, R. W. III., Dahiya, R. C., & R. J. Young, Jr. (1982). A Method For The Enumeration Of Zooplankton Samples. Journal of Experimental Marine Biology & Ecology, 59, 185-209.

Harris, R, Wieber, P., Lenz, J., Shjoldal, H., & Huntley, M. (2000). ICES Zooplankton Methodology Manual. New York: Academic Press.

Interstate Commission on the Potomac River Basin. (2000). Split Sampling Study for the Maryland and Virginia Mesozooplankton Monitoring Programs. ICPRB Report 00-3 Final Report June 2000. ICPRB Report 00-3. 88 p.

Johnson, J M (2007). A Review of Historic Chesapeake Bay Program Zooplankton Data and Analysis of Recounted Archived Sample. Report prepared **by ICPRB** for the Chesapeake Bay Program Living Resources Data Analysis Workgroup, ICPRB REPORT 2007-2. URL: http://www.potomacriver.org/cms/publicationspdf/ICPRB07-02.pdf

ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/An%20Analysis%20of%20Archived%20Virginia%20Zooplankton%20Data_v2.pdf

USEPA Chesapeake Bay Program (2012, February 22). The 1998 - 1999 Split Sample Study for Chesapeake Bay Program Phytoplankton, Microzooplankton and Mesozooplankton Monitoring Components.URL ftp.chesapeakebay.net/Pub/Living_Resources/plank/qa/SplitSmplReport-1988-1989.pdf

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Mesozooplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/meso/mdmzdoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Microzooplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/meso/vamzdoc.pdf

TITLE: Gelatinous Zooplankton
PARAMETER NAME (NEW): COUNTS and BIOVOLUMES
UNITS OF MEASURE: Number of Organisms per Meter Cubed or Milliliters per meter Cubed
METHOD CODES: PP101, PP102

GENERAL INFORMATION:

Assessments of gelatinous zooplankton were made as a regular part of the mesozooplankton monitoring programs in Maryland from 1984-2002. There was a change in the reporting of gelatinous taxa in 1987. Overall Maryland measurements of gelatinous zooplankton are considered to be of acceptable quality for data analysis. Gelatinous zooplankton assessments were sporadically made in the corresponding Virginia program between 1996 and 2002. During a 2001 laboratory site visits to the Virginia lab revealed that gelatinous zooplankton were frequently being missed by field crews and being preserved with routine mesozooplankton samples. At best Virginia gelatinous zooplankton measurement should only be used for qualitative purposes. Baywide sampling for mesozooplankton ended in September 2002 due to the termination of the CBP zooplankton monitoring program in October 2002.

Maryland Enumeration protocols from 1984-2009

-Chesapeake Bay Program Analytical Method JF101
Prior to July 1987, Cnidarians (true jellyfish, hydromedusae) and ctenophores (comb-jellies) were removed from the zooplankton samples in the field and their numbers and biovolume (settled volume) measured from the bongo net that was used to collect count samples. All gelatinous zooplankton were reported as count and volumes in the two classes- Ctenophores (All *Beroe*, and *Mnemiopsis* specimens were combined) and Cnidarians (All Hydrozoas, and true Jellyfish specimens were combined). All gelatinous zooplankton were removed from samples in the field after sample preservation, and their numbers and settled volumes were recorded from the net that was used as the count sample.

-Chesapeake Bay Program Analytical Method JF102
After July 1987, Cnidarians (true jellyfish, hydromedusae) and ctenophores (comb-jellies) were removed from the zooplankton samples in the field and their numbers and biovolume (settled volume) measured from the bongo net that was used to collect count samples. All gelatinous zooplankton were reported as count and volumes in the four classes -Beroe, Hydrozoans, *Mnemiopsis*, and true Jellyfish. All gelatinous zooplankton were removed from samples and sorted in the field after sample preservation, their numbers and settled volumes were recorded from the net that was used as the count sample.

Virginia Enumeration protocols from 1984-2009

-Chesapeake Bay Program Analytical Method Code JF103
In the event that gelatinous zooplanktons were visible in the nets, the total volume is determined for the mesoglea remained after straining from the normal plankton sample. Care was taken to ensure that no residual plankton remains clinging to either the strainer or to the mesoglea. Percent composition of gelatinous zooplankton groups (ctenophore, moon jelly, stinging nettle) was determined and recorded by count and biovolume on the field log. Mesoglea were then discarded.

OTHER ISSUES:

OTHER DOCUMENTATION:

Harris, R, Wieber, P., Lenz, J., Shjoldal, H., & Huntley, M. (2000). ICES Zooplankton Methodology Manual. New York: Academic Press.

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Mesozooplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/meso/mdmzdoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Microzooplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/plank/meso/vamzdoc.pdf

TITLE: Horizontal and Vertical Fluorescence
PARAMETER NAME (NEW): CHL_F
UNITS OF MEASURE: micrograms chlorophyll per liter
METHOD CODES: 101, 102,103, 104,105,106,107,108,109,110

GENERAL INFORMATION:

After a series of quality assurance inquiries it has been determined that the horizontal and vertical fluorescence monitoring data has a variety of quality issues that users need to be aware of. Data quality issues include positional accuracy of horizontal fluorescence data collected prior to 2000 and calibration issues in the Maryland data associated with the regression curves used to covert fluorescence voltages to chlorophyll *a* values.

Sampling Site Position Determination Issues

The Maryland horizontal fluorescence data collected by Morgan State University between 1984 and April 1999 (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. Inaccuracies in the estimated station locations may be problematic in mapping or ground truthing applications.

For purposes of determining the actual geographical location of a reading, sampling station location along transects was determined using the simple geometry of right triangles to compute latitude and longitude. Calculations were based on the following assumptions: a) the transect was over a straight line from departure station to arrival station, b) boat speed was assumed to be constant, c) the Latitudes and Longitudes of end point stations were fixed points. Equations were based on the relationship of total strip recorder tape length being proportional to actual distance between stations. Sampling position was based on the distance from the starting position of the strip recorder tape of the at-sample time against the total length of the tape at the destination station.

Also note that all horizontal and vertical fluorescence with direct position reporting by LORAN-C collected in Virginia from 1991-1995 and Maryland from 1984-1999 does not meet current EPA sampling position policy. The current EPA sampling position policy requires that position be measured with a Global Positioning System (GPS). However locations determined with Loran-C and should be less problematic in mapping or ground truthing applications and reasonable approximations of actual location.

Fluorescence Value Calculation Issues

As part of a remote sensing ground truthing exercise in 1998, comparison of interpolated Maryland horizontal fluorescence and water quality surface chlorophyll *a* data was made. Comparisons revealed that the existing fluorescence chlorophyll *a* values were “orders of magnitude lower than corresponding water quality values”. These differences were not present in the corresponding Virginia data. While *in-situ* fluorescence values are generally accepted to be depressed measurements of chlorophyll, the magnitude of the differences warranted further investigation.

A comparison both the Maryland and Virginia sampling protocols revealed two significant issues affecting data values. Although both programs used periodic grab samples to create a regression to convert instrument voltage to chlorophyll *a* values, the regressions were calculated differently. Both Virginia laboratories were doing daily regression curves wile Maryland computed a single curve based on all 3 days of a sampling cruise. Additionally the Maryland laboratory analysis method for grab chlorophyll samples was determined to be significantly different from the standard CBP water quality chlorophyll protocol. Several changes were made to the Maryland program to remedy these issues. All fluorescence data collected by both states after 1998 was reported with its corresponding instrument voltages, to allow recalculation od daily fluorescence curves from alterative grab chlorophyll data. Maryland switched to computing daily regressions for fluorescence and adopted the standard CBP water quality method for analysis of grab chlorophyll samples in 2000.

OTHER ISSUES:

Please see individual project documentation for cruise notes for specifics on missing data and changes to standard regression calculation protocol for specific dates

OTHER DOCUMENTATION:

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Fluorescence Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/fluor/mdfldoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Microzooplankton Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/fluor/vafldoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Meeting Minutes from the Analytical Methods and Quality Assurance Workgroup 9 September 1999. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/fluor/AMQAW_99_09_09.PDF

TITLE: Tidal Benthic Macro Invertebrate Monitoring Sampling Design and Station Positions
PARAMETER NAME (NEW): LATITUDE, LONGITUDE
UNITS OF MEASURE: Decimal Degrees
METHOD CODES: NA

GENERAL INFORMATION:

The sampling designs of the Maryland and Virginia surveys have changed over time to accommodate changes in the objectives for these programs. In the current monitoring programs, two types of sites are sampled: (1) fixed sites to identify temporal trends in invertebrate community status and habitat health and (2) spatially random sites are sampled to assess bay-wide benthic macroinvertebrate community status. Although, the site selection criteria for random site stations have changed, the actual methods of sample collection and analysis have not changed significantly.

<u>Fixed Site Element</u>
A fixed sampling site is defined by geography (within a 1 km radius from a fixed location) and by specific habitat (depth and bottom sediment type) criteria. Samples were collected within the 1 kilometer radius of a fixed location.

Maryland

- July 1984- June 1988. Samples were collected from seventy fixed sites, on eight to ten occasions annually. Numbers ranging from 001 to 080 identifies the fixed stations. During each sampling event three samples were taken at each site, with varying types of gear.
- July 1989-June 1994. Fixed site sampling continued at 27 sites located within the small strata random sampling areas. Each area was visited on four to six sampling cruises annually and single benthic samples were collected from the fixed sites in each small area with varying types of gear.
- July 1994-Present. Samples were collected from 27 fixed sites. Twenty-three of these fixed sites have been sampled from beginning of program in 1984; they were among the 70 original fixed sites sampled from 1884-1989. Two of the other four were additional sites were added in 1989 and the last two were added in 1995. Three samples are collected at each site during a sampling trip with varying types of gear.

Virginia

- March 1985-Present. Samples collected from twenty-six fixed sites quarterly from 1985-1995, after which sampling was conducted twice annually using a box core grab.

<u>Probability-based sampling</u>
A probability based sampling component was added to the tidal benthic macroinvertebrate monitoring program with intended to estimate the area of the Bay's mainstem and tidal tributaries that met the Chesapeake Bay Program Community Restoration Goals (Ranasinghe et. a. 1994). This sampling program had two phases the Small Area/Strata sampling phase and the Large Area/Strata sampling phase. Samples were taken using van veen grab. In each phase, Stations were randomly selected from each stratum as follows:

1) Random stations were selected by overlay grids on navigational charts
2) Each stratum was mapped and numbers assigned to all grid locations falling within the stratum.
3) Sampling locations are chosen for each stratum at random by a computer generated random number. If a selected grid could not be sampled, another grid was randomly selected until the number of samples per strata desired was reached.

Maryland

- July 1984-June 1988. No random sampling was conducted.
- July 1989-June 1994. A small area random strata sampling element was added around 27 existing fixed site. Additionally four new strata were added in regions where sampling was previously absent, but were targeted for resource management activity. Samples were collected at random from approximately 25 kilometer^2 area surrounding fixed sites to assess the representatives-ness of the fixed locations. Stratum boundaries were determined by environmental factors, which impact benthic community compositions in the bay including salinity, sediment type, and bottom depth. Each area was visited on four to six sampling cruises annually and single benthic samples were collected from the fixed and three random sties in each small area.
- July 1994-June 1995. The habitat strata were redefined in 1994 using EMAP criteria to "piggy-back" on EMAP sampling results. Three sampling strata were defined, the mainstem (including Tangier and Pocomoke Sounds, the Potomac River and remaining tributaries. Twenty-seven samples were allocated to the mainstem, twenty-eight to the Potomac River and eleven to the other tributaries in Maryland.
- July 1995-Present. The habitat strata were redefined again in 1995 to better suit the state of Maryland information needs. Six strata were defined, the Potomac River, the Patuxnet River, the upper Maryland Bay (all Chesapeake Bay Mainstem above/north the Bay Bridge), the Lower Maryland Bay (all Chesapeake Bay Mainstem below/South of the Bay Bridge), the Eastern Tributaries (all tributaries to Chesapeake Bay on the Eastern shore), and the Western Tributaries (all tributaries to Chesapeake Bay on the Western shore, excluding the Potomac and Patuxnet Rivers). Twenty-five samples were allotted to each stratum. Regions on the Maryland Main stem deeper that 12 meters are excluded from sampling because the area has been consistently found to be azoic.

Virginia

- January 1985-December 1995. No random sampling was conducted.
- January 1996-Present. A probability-based sampling component was added in coordination with the random strata-sampling program in Maryland waters. Twenty-five stations were randomly selected in each of five strata, the Elizabeth, the James River, the York River, the Rappahannock River and the mainstem of Chesapeake Bay. In each stratum five additional sites were randomly selected as potential replacement sites for any station rejected in the field due to an inability to sample the site (e.g. an oyster reef, or inter-tidal site). Random stations were sampled between July 15 and September 31 of each year.

OTHER ISSUES:

Loran C Station Position Errors

All station positions in the Maryland portion of the data are based on actual sampling site location at time of sampling as determined by Loran C (prior to 1995) or GPS. Virginia fixed sites are reported as a standard station location and random sites are reported by their GPS determined position at sampling time. Loran C was subject to substantial positioning errors in regions of the Chesapeake Bay in areas close to radio transmission towers, military installations and intermittent system outages. Currently 173 sampling events (3% of all sampling event) in Maryland between 1984-1994 have been determined to have erroneous Loran station locations. Contact the CBP Living Resources Data Manager for further details.

OTHER DOCUMENTATION:

Ranasinghe, J. A., S. B. Weisberg, D. M. Dauer, L. C. Schaffner, R. J. Diaz, and J. B. Frithsen. 1994. Chesapeake Bay Benthic Community Restoration Goals. Prepared for the U.S. EPA Chesapeake Bay Program Office, the Governor's Council on Chesapeake Bay Research Fund, and the Maryland Department of Natural Resources by Versar, Inc., Columbia, MD.

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Benthic Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/benth/mdbedoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Benthic Monitoring Survey Data Dictionary. URL ftp://ftp.chesapeakebay.net/Pub/Living_Resources/benth/vabedoc.pdf .

TITLE: Tidal Benthic Macroinvertebrate Biomass- Maryland Data Only
PARAMETER NAME (NEW): AFDW,
UNITS OF MEASURE: GRAMS/SAMPLE
METHOD CODES: BM201, BM202. BM203, BM204

GENERAL INFORMATION:

The Chesapeake Bay Programs tidal benthic macroinvertebrate monitoring programs routinely perform measurement of benthic biomass. Unlike many programs the biomass determinations are made on a species specific basis. The Maryland portion of the program has used three different methods for assessing biomass over the history of the program.

Versar Enumeration protocols from 1984-Present
-Chesapeake Bay Program Analytical Method BM201
For data collected in 1984, actual biomass determinations were made by the groupings of mollusks, crustacean, worm and miscellaneous organisms. Actual determination of ash free dry weight by group was done by drying samples at 60 degrees C to a constant weight, ashing in a muffle furnace, and weighed.

-Chesapeake Bay Program Analytical Method BM202
For the period from 1985 to 1994, organisms were grouped into major taxonomic categories. Species specific biomasses were determined for 22 selected species. The 22 selected species have traditionally made up 90 % of all benthic biomass. All specimens were photographed and morphometric measurements of a species were made on photographic negative with a digital planimeter. The species specific morphometric measurements were subsequently entered into a nonlinear regression to obtain estimated values of ash free dry weight for each species. Nonlinear regressions between the body measurements and actual ash free dry weight were developed from the 1985-1986 data field data.
For the years 1985-1994 the species selected for biomass estimation were:

ACTEOCINA CANALICULATA	MACOMA BALTICA
CARINOMA TREMAPHOROS	MACOMA MITCHELLI
CORBICULA FLUMINEA	MARENZELLERIA VIRIDIS
CYATHURA POLITA	MICRURA LEIDYI
GAMMARUS SP.	MULINIA LATERALIS
GEMMA GEMMA	MYA ARENARIA
GLYCINDE SOLITARIA	NEANTHES SUCCINEA
HAMINOEA SOLITARIA	PARAPRIONOSPIO PINNATA
HETEROMASTUS FILIFORMIS	RANGIA CUNEATA
HYPERETEONE HETEROPODA	STREBLOSPIO BENEDICTI
LEPTOCHEIRUS PLUMULOSUS	TAGELUS PLEBEIUS

-Chesapeake Bay Program Analytical Method BM204
Since 1994 to present, ash-free dry weight biomass (grams/sample) is measured directly for each species (with the exceptions listed below) by drying the organisms to a constant weight at 60 C and ashing in a muffle furnace at 500 C for four hours and re-weighing (ash weight). The difference between dry weight and ash weight is the ash free weight. Because oligochaetes and chironomids require slide mounting for identification, species-specific biomass for Oligochaeta and Chironomidae is not provided except for Tubificoides spp., Branchiura sowerbyi, and Coelotanypus spp., which do not require slide mounting for identification. Bivalves are crushed to open the shells and expose the animal to drying and ashing (shells included).

OTHER ISSUES:

Note-Chesapeake Bay Program Analytical Method BM203 and BM204 were later determined to be equivalent. BM203 refers to the Virginia benthic biomass assessment protocol.

OTHER DOCUMENTATION:

USEPA Chesapeake Bay Program (2012, February 22). Maryland Chesapeake Bay Program Benthic Monitoring Survey Data Dictionary. URL
ftp://ftp.chesapeakebay.net/Pub/Living_Resources/benth/mdbedoc.pdf

USEPA Chesapeake Bay Program (2012, February 22). Virginia Chesapeake Bay Program Benthic Monitoring Survey Data Dictionary. URL
ftp://ftp.chesapeakebay.net/Pub/Living_Resources/benth/vabedoc.pdf .

TITLE: Non-Tidal Benthic Macroinvertebrate Taxa Counts
PARAMETER NAME (NEW): COUNTS
UNITS OF MEASURE: Number Per Sample
METHOD CODES: See Below

GENERAL INFORMATION:

The non-tidal stream macroinvertebrate data set is a recent acquisition at the CBPO Data Center. Data in this set is generated by numerous federal, state, local agencies and academic institutions. All collect data using some modification of the EPA Rapid Bioassessment protocol (Barbour et. al. 1999). The modifications include use of different sampling gear, sampling of different types of habitats, different subsample count and enumeration of taxonomy to varying levels. While there are documented ways to "work around" the effects of the varying levels of taxonomic level identifications and subsample count biases (Astin 2006, Astin 2007), the effects of field collection differences and other data quality biases have not been fully assessed at this time.

BIO_ METHOD	BIO_METHOD_TITLE	SUBSAMPLE COUNT	HABITAT TYPE	TAXON LEVEL	GEAR DESCRIPTION
BE101A	PADEP Rapid Bio-Assessment Protocol	200	Riffle	Family	D-Frame Net
BE101B	PADEP Rapid Bio-Assessment Protocol With Replication	200	Riffle	Family	D-Frame Net
BE102	The NYSDEC Stream Biomonitoring- Kick Sample Protocol	100	Riffle	Genus & Species	Kick Net
BE103	Maryland Biological Stream Survey Bioassessment Protocol	100	Multi	Family & Genus	D-Frame Net
BE104	Maryland Core Trend Bioassessment Protocol	All Organisms Counted	Other	Family	Hester Dendy Multiplate Sample
BE104	Maryland Core Trend Bioassessment Protocol	All Organisms Counted	Other	Family	Surber Sampler
BE105	VADEQ Rapid Bio-Assessment Protocol: Single-Habitat Method	110	Riffle	Family	D-Frame Net
BE105G	VADEQ Rapid Bio-Assessment Protocol: Single-Habitat Method	110	Riffle	Genus	D-Frame Net
BE106	VADEQ Rapid Bio-Assessment Protocol: Multi- Habitat Method	110	Multi	Family	D-Frame Net
BE106G	VADEQ Rapid Bio-Assessment Protocol: Multi- Habitat Method	110	Multi	Genus	D-Frame Net
BE107	WVDEP Modified EPA RBP II, Single Habitat	100	Riffle	Genus	Rectangular Dip Net
BE107	WVDEP Modified EPA RBP II, Single Habitat	100	Riffle	Genus	Hand Pick
BE107	WVDEP Modified EPA RBP II, Single Habitat	100	Riffle	Genus	D-Frame Net
BE107B	WVDEP Modified EPA RBP II, Single Habitat-200 COUNT	200	Riffle	Genus	D-Frame Net
BE107B	WVDEP MODFIED EPA RBP II, Single Habitat-200 COUNT	200	Riffle	Genus	Rectangular Dip Net
BE108	Mid-Atlantic Coastal Streams Method	100	Multi	Genus	D-Frame Net
BE109	WVDEP EPA RBP II, Multi Habitat	100	Multi	Genus & Species	D-Frame Net
BE110	SRBC Rapid Bioassessment Protocol (RBP) III	200	Riffle	Genus	Surber Sampler
BE110	SRBC Rapid Bioassessment Protocol (RBP) III	200	Riffle	Genus	D-Frame Net
BE110	SRBC Rapid Bioassessment Protocol (RBP) III	200	Riffle	Genus	Kick Net
BE111	Montgomery County-unspecified protocol	100	Multi	Genus	Surber Sampler
BE111	Montgomery County-unspecified protocol	100	Multi	Genus	D-Frame Net

BIO_ METHOD	BIO_METHOD_TITLE	SUBSAMPLE COUNT	HABITAT TYPE	TAXON LEVEL	GEAR DESCRIPTION
BE113	Fairfax county-RBP for Coastal Plain physiographic provinces	200	Multi	Family	Kick Net
BE114	ICPRB Protocol-quantitative	200	Multi	Family	Rectangular Dip Net
BE116	EPA Wadeable Streams Assessment Protocol	500	Multi	Genus	D-Frame Net
BE117	District Of Columbia-Contractor Protocol	100	Unspecified	Genus & Species	D-Frame Net
BE118	Prince Georges County-unspecified	100	Multi	Genus	D-Frame Net
BE119	USFS Sampling Protocol	200	Riffle	Family	Kick Seine
BE120	The NYSDEC Stream Biomonitoring-JAB SAMPLE PROTOCOL	100	Multi	Genus & Species	Kick Net
BE121	LOUDEN COUNTY Single Habitat	100	Riffle	Family	D-Frame Net
BE122	DISTRICT OF COLUMBIA-In-house Protocol	100	Unspecified	Family	D-Frame Net
BE123	Virginia Commonwealth University Sampling Protocol	200	Multi	Genus & Species	D-Frame Net
BE124O	EPA EMAP-Unspecified Sampling Protocol	300	Other	Genus & Species	D-Frame Net
BE124P	EPA EMAP-POOL Sampling Protocol	300	Pool	Genus & Species	D-Frame Net
BE124R	EPA EMAP-RIFFLE Sampling Protocol	300	Riffle	Genus & Species	D-Frame Net
BE125A	USGS-RTH-NOSNAG Sampling Protocol	500	Multi	Genus & Species	D-Frame Net
BE125B	USGS-RTH-SNAG Sampling Protocol	500	Multi	Genus & Species	D-Frame Net

Table 6. Comparison of Non-Tidal Macroinvertebrate Enumeration Methods

OTHER ISSUES:

OTHER DOCUMENTATION:

Astin, L. E. 2007. Developing biological indicators from diverse data: The Potomac Basin-wide Index of Benthic Integrity (B-IBI). Ecological Indicators, 7: 895-908.

Astin, L.E. 2006. Data synthesis and bioindicator development for nontidal streams in the interstate Potomac River basin, USA. Ecological Indicators, 6: 664-685.

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. PA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C. Available online at: http://www.epa.gov/owow/monitoring/rbp/download.htm

Remember: Please Read the Data Documentation Files!

ECOSYSTEM INDICATORS

Teams of Chesapeake Bay Program scientists and natural resource managers have worked to develop indicators of Chesapeake Bay ecosystem health. These indicators are calculated from a broad range of monitoring data and provide an indication of status of the Bay ecosystem. The technical indicators are used primarily in the interpretation, synthesis and communication of monitoring results. The biological indicators are expected to provide quantitative information on food chain responses to nutrient and sediment 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 a number of technical indicators for various trophic groups currently under development or in peer review. Currently the Bay Program uses ten biological indicators (5 fisheries and 5 lower trophic level) to characterize bay and watershed health. The summaries below provide an overview of indicators currently used to report on the status ecosystem health based on data managed at the data center: macroinvertebrates and phytoplankton in tidal waters and macroinvertebrates in non-tidal waters. There was an additional Zooplankton community indicators developed in 2006 but is not described here because CBP zooplankton monitoring programs have been discontinued (Carpenter et al 2006).

THE BENTHIC INDEX OF BIOTIC INTEGRITY

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 the status of benthic macroinvertebrate communities in tidal waters. In subsequent years, a series of statistical and simulation studies were conducted to evaluate and optimize the B-IBI (Alden et al. 2002). The results of Alden et al. (2002) indicated that the B-IBI is sensitive, stable, robust, and statistically sound. New sets of metric and threshold combinations for the tidal freshwater and oligohaline habitats were also developed in Alden et al. (2002) with a larger dataset than was available to Weisberg et al. (1997) for these two habitats. Since its introduction, the index has been used in a variety of restoration and habitat targeting efforts (Dalal et al. 1999). It has been incorporated into the Chesapeake Bay Health Index developed by Williams et al. 2009. 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.

The Chesapeake Bay B-IBI is calculated by scoring each of several attributes of benthic macroinvertebrate community structure and function (abundance, biomass, diversity, etc.) according to thresholds derived from reference communities. The unweighted scores (on a 1 to 5 scale) are then averaged across attributes to calculate an index value. Samples with index values of 3.0 or more are considered to have good benthic condition indicative of good habitat quality. 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
Tolerance Score
Tanypodinae to Chironomidae percent abundance ratio

Two additional metrics are used only at fixed stations by the Virginia Benthic Monitoring Program:

Percent biomass of organisms found >5cm below the sediment-water interface
Percent number of taxa found >5cm below the sediment-water interface

The B-IBI is both habitat and season dependent. Therefore data must be selected for time of year and classified according to the habitat type from which the samples were collected. Habitats are defined by salinity and sediment type. The application of the B-IBI is limited to samples collected in summer, defined as July 15 through September 30.

Habitat Class	Bottom Salinity (psu)	Silt-clay (<62 μ) content by Weight (%)
Tidal freshwater (TF)	0-0.5	N/A
Oligohaline (OH)	≥0.5-5	N/A
Low mesohaline (LM)	≥5-12	N/A
High mesohaline (HM) sand	≥12-18	0-40
High mesohaline (HM) mud	≥12-18	>40
Polyhaline (PO) sand	≥18	0-40
Polyhaline (PO) mud	≥18	>40

Table 7. Tidal Benthic Habitat Classifications

Next selected summary statistics are scored on a ranking of 1, 3 or 5. Least-disturbed 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 Restoration Goal Index (RGI) value for the benthic community at each site by averaging the scored index metrics. The Chesapeake Bay Benthic Monitoring Program classifies benthic community condition into four levels: "meets goals", "marginally degraded", "degraded", and "severely degraded". B-IBI values of 3.0 are the breakpoint between non-degraded and marginal or degraded conditions.

B-IBI	Benthic Community Condition
≥3.0	Meets restoration goals
2.7-2.9	Marginal
2.1-2.6	Degraded
≤2.0	Severely degraded

Table 8. B-IBI ranges and Benthic Community Condition

For full details on calculation protocol for the tidal benthic index of biotic integrity please see the document Methods for calculating Benthic Index of Biotic Integrity at the following locations

http://www.baybenthos.versar.com/docs/ChesBayBIBI.PDF

ftp.chesapeakebay.net/Pub/Living_Resources/benth/ChesBayBIBI.pdf

http://sci.odu.edu/chesapeakebay/reports/benthic/BIBIcalc.pdf

THE PHYTOPLANKTON INDEX OF BIOTIC INTEGRITY AND CALCULATED METRICS

Phytoplankton (free-floating, microscopic algae) form the base of the estuarine food web and are stringly influenced by nutrient and light conditions in the water column. Planktonic organisms have long been used to assess pelagic environmental conditions (Stevenson & Pan, 1999). Plankton indicators have frequently been used in composite indexes of ecosystem health (Jordan & Vaas, 2000). Metrics calculated from the long term monitoring data have been developed to characterize “reference communities,” or populations of phytoplankton living in least-degraded water quality conditions (Alden et. al. 1997, USEPA 2003, Marshall et. al 2006). Attributes of the reference communities described in Buchanan et al. 2005 were used to create a Phytoplankton Index of Biotic Integrity (PIBI), or quantitative scale for assessing phytoplankton community status relative to water quality (Lacouture et al. 2006). The Chesapeake Bay PIBI is a tool for assessing the condition of the thidal phytoplankton communities in the bay. It has been incorporated into the Chesapeake Bay Health Index developed by Williams et al. 2009.

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

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

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

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

The Chesapeake Bay P-IBI is calculated by scoring each of several attributes of phytoplankton community structure and function (abundance, biomass, present/absence of HAB's etc.) according to thresholds established from data distributions. Currently twelve metrics are used to calculate the PIBI:

Phytoplankton Total Biomass to Chlorophyll Ratio
Surface Chlorophyll
Percent Cryptophytes Biomass
Cyanophyte Biomass
Diatom Biomass
Dinoflagellate Biomass
Dissolved Organic Carbon
Microcystis aeruginosa Abundance
Pheophyten
Picoplankton Abundance
Prorocentrum minimum Abundance
Total Phytoplankton Biomass

A PIBI score is calculated for each station-date sampling event in the index period, which is currently spring (March-May) and summer (July-September). A Salinity zone was assigned to each datum according to the layer's mean salinity using a standard Venice System: tidal fresh (F) (0.0 - 0.5 PSU), oligohaline (O) (>0.5 - 5.0 PSU), mesohaline (M) (>5.0 - 18.0 PSU), and polyhaline (P) (>18.0 PSU). Multiple parameters (metrics) in the databases are individually scored and then averaged. PIBI scores range from 1.0 (very degraded communities) to 5.0 (desirable, least-impaired communities). Analysis results are typically presented as: a) a median or average PIBI score, or b) the frequency of PIBI scores in a given rank. PIBI ranks are as follows:

P-IBI	Phytoplankton Community Condition
>4.0	Good
3.33-4.0	Fair-Good
2.67-3.32	Fair
2.0-2.66	Fair-Poor
<2.0	Poor

Table 9. P-IBI Ranges and Phytoplankton Community Condition

For full details on calculation protocol for all calculated metrics and scoring of the tidal Phytoplankton index of biotic integrity please see Lacouture et. a;. 2006 or the document Methodology Applied in the Calculation of Chesapeake Bay Program Phytoplankton Composite Metrics and Index of Biotic Integrity (PIBI) at the following locations

ftp.chesapeakebay.net/Pub/Living_Resources/plank/pibi_DOC.pdf

BASIN-WIDE BENTHIC INDEX OF BIOTIC INTEGRITY AND CALCULATED METRICS

Healthy freshwater streams and rivers have local and regional importance. Clean waterways are a benefit to residents who use them for drinking water, recreational activities, waste dilution and other purposes. The watershed's streams, creeks and rivers also eventually flow into the Chesapeake Bay, so their water quality has a direct impact on the health of the estuary. An effective way to measure the health of freshwater streams and rivers is to study the oraganisms that live in these waters. The abundance and diversity of snails, mussels, insects and other bottom-dwelling organisms - known as benthic macroinvertebrates - are good indicators of the health of streams because these creatures can't move very far and they respond in certain predictable ways to pollution and environmental stresses. The Chesapeake Bay basin-wide Benthic Index of Biological Integrity, or "Chessie B-IBI," was designed to evaluate macroinvertebrate community health in non-tidal streams and wadeable rivers in a uniform manner across state boundaries and in the context of the entire Chesapeake Bay basin.

As part of the development of Chessie BIBI raw data from over 25 stream monitoring programs were incorporated into a common database structure and a series of family-level macroinvertebrate metrics calculated from the data. Differences in monitoring program sampling and enumeration methodologies can strongly influence analysis done on raw data; however the differences may not greatly influence assessments when the monitoring programs have a common basis such as the US EPA RBP methods (Astin 2006), family-level metrics are employed, and the metrics are unit-less (percent) or standardized (100-count subsample). A suite of family-level metrics were calculated and tested as part of the Chessie BIBI development process. While the majority of these calculated values were not used in the Chessie BIBI, many users of monitoring data have found the variety of metrics available to be useful. Therefore the complete suite of these metrics is being made available as well as the scored Chessie BIBI metric data set. See Appendix A for details. The current list of available macroinvertebrate metrics are listed below. The "R_" suffix indicates the metric value is derived from a sample that has been randomly standardized to a 100-count subsample.

ASPT_MOD
ASPT_MOD_R
BECK
BECK_R
DIPTERA_TAXA_CNT
DIPTERA_TAXA_CNT_R
EPHEMEROPTERA_TAXA_CNT
EPHEMEROPTERA_TAXA_CNT_R
EPT_TAXA_ABUND
EPT_TAXA_ABUND_R
EPT_TAXA_COUNT
EPT_TAXA_COUNT_NO_TOL
EPT_TAXA_COUNT_NO_TOL_R
EPT_TAXA_COUNT_R
FBI
FBI_R
GOLD
GOLD_R
GRAND_SCORE
MARGALEFS
MARGALEFS_R
NCO_TAXA_CNT
NCO_TAXA_CNT_R
NON_INSECT_TAXA_CNT
NON_INSECT_TAXA_CNT_R
PCT_BURROWER
PCT_BURROWER_R
PCT_CHIRONOMIDAE
PCT_CHIRONOMIDAE_R
PCT_CLIMB
PCT_CLIMB_R
PCT_CLING
PCT_CLING_R
PCT_CLINGER_TAXA
PCT_CLINGER_TAXA_R
PCT_COLLECT
PCT_COLLECT_R
PCT_DIPTERA
PCT_DIPTERA_R
PCT_DOM1
PCT_DOM1_R
PCT_DOM2
PCT_DOM2_R
PCT_DOM3
PCT_DOM3_R
PCT_EPHEMEROPTERA
PCT_EPHEMEROPTERA_R
PCT_EPT
PCT_EPT_R
PCT_EPT_TAXA_RICH
PCT_EPT_TAXA_RICH_R
PCT_FILTERERS
PCT_FILTERERS_R
PCT_GATHER
PCT_GATHER_R
PCT_LIMESTONE
PCT_LIMESTONE_R
PCT_NET_CADDISFLY
PCT_NET_CADDISFLY_R
PCT_NON_INSECT
PCT_NON_INSECT_R
PCT_PLECOPTERA
PCT_PLECOPTERA_R
PCT_PREDATOR
PCT_PREDATOR_R
PCT_SCRAPER
PCT_SCRAPER_R
PCT_SENSITIVE
PCT_SENSITIVE_R
PCT_SHREDDER
PCT_SHREDDER_R
PCT_SIMULIIDAE
PCT_SIMULIIDAE_R
PCT_SWIMMER
PCT_SWIMMER_R
PCT_TOLERANT
PCT_TOLERANT_R
PCT_TRICHOPTERA
PCT_TRICHOPTERA_NO_TOL
PCT_TRICHOPTERA_NO_TOL_R
PCT_TRICHOPTERA_R
PLECOPTERA_TAXA_CNT
PLECOPTERA_TAXA_CNT_R
RATIO_SC_TO_CF
RATIO_SC_TO_CF_R
RATIO_SC_TO_SH
RATIO_SC_TO_SH_R
RATIO_SH_TO_CG
RATIO_SH_TO_CG_R
SCRAPER_TAXA_CNT
SCRAPER_TAXA_CNT_R
SENSITIVE_TAXA_COUNT
SENSITIVE_TAXA_COUNT_R
SIMPSON_DIVERSITY
SIMPSON_DIVERSITY_R
SW

SW_R
TAXA_RICH
TAXA_RICH_R
TOLERANT_TAXA_COUNT
TOLERANT_TAXA_COUNT_R
TOTAL_ABUNDANCE
TOTAL_ABUNDANCE_R
TOTAL_SCORE
TRICHOPTERA_TAXA_CNT
TRICHOPTERA_TAXA_CNT_R
TRICHOPTERA_TAXA_COUNT_NO_HYDR
TRICHOPTERA_TAXA_COUNT_NO_R

For the Chessie-BIBI only sampling sites from streams and wadeable rivers of Strahler stream order 1-4 (1:100,000NHD layer) are scored. The River Continuum concept (Vannote et al. 1980) predicts biological community changes as streams and rivers increase in size. Similarly, scoring criteria for each macroinvertebrate metrics is based on bioregion-specific reference communities. “Bioregions” are regions of similar topography, soils, geologic features, and vegetation. Regional classification is known to minimize or remove differences in stream biological communities caused by natural factors (Omernik 1995). Currently seventeen metrics are used to calculate the Chessie-BIBI:

IBI_PARAMETER	Ridges	Mid-Atlantic Coastal Plain	Northern Appalachian Plateau & Upland	Northern Central Appalachian	Piedmont	South-Eastern Coastal Plain	Valleys
BECK_R	X						X
EPT_TAXA_COUNT_NO_TOL_R				X			
EPT_TAXA_COUNT_R		X				X	
FBI			X		X		
FBI_R		X				X	
PCT_CLING_R		X				X	
PCT_COLLECT					X		
PCT_DIPTERA					X		
PCT_EPHEMEROPTERA	X			X			X
PCT_EPHEMEROPTERA_R		X				X	
PCT_EPT					X		
PCT_EPT_TAXA_RICH							X
PCT_GATHER			X				
PCT_PLECOPTERA			X				
PCT_SCRAPER	X			X			X
PCT_SWIMMER	X						
PCT_TRICHOPTERA_NO_TOL			X				
SW	X			X	X		X
TAXA_RICH_R		X	X	X		X	

Table 10. Chessie BIBI Metric Selection by Ecoregion.

For the Mid-Atlantic Coastal Plain and Southeastern Coastal Plain regions, a version of the Coastal Plain Macroinvertebrate Index (CPMI) developed by the Mid-Atlantic Coastal Streams Workgroup and adapted to family-level taxonomic identifications for the Virginia Department of Environmental Quality was used to score region data (Maxted et. al.2000). For the remaining ecoregions a task group of the CBP Non-Tidal Data Analysis Workgroup developed scoring thresholds for metrics according to their similarity to Reference sites in each bioregion (areas with different geomorphologic traits). All metrics are scored on a 0 to 100 scale and Index total scores are rated on a 5-tiered scale.

P-IBI	Phytoplankton Community Condition
>67	Good
67-50	Fair-Good
49-30	Fair
17-29	Poor
<17	Very Poor

Table 11. Chessie B-IBI Ranges and Macroinvertebrate Community Condition

For full details on calculation protocol for all calculated metrics and scoring of the Chesapeake Bay basin-wide Benthic Index of Biological Integrity please see the document Development of a Basin-wide Benthic Index of Biotic Integrity for Non-Tidal Streams and Wadeable Rivers in the Chesapeake Bay Watershed: Final Report to the Chesapeake Bay Program Non- Tidal Water Quality Workgroup. at the following locations:

http://www.chesapeakebay.net/documents/17686/chessiebibi_finalreport_05_09_2011.pdf

http://www.potomacriver.org/cms/publicationspdf/ICPRB11-01.pdf

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APPENDIX A – DATA SET STRUCTURES FOR AVAILABLE CIMS/CDE DATA

June 2012

This appendix lists the field names, attributes and descriptions for the phytoplankton, zooplankton and tidal and non-tidal benthos data available through www.chesapeakebay.net. 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. For complete data documentation, please see the data documentation files that accompany the data sets.

DISCLAIMER NOTICE: The CBP web 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.

Table A-1. Station Information File Format for All Plankton Data

This included phytoplankton, phytoplankton, mesozooplankton, microzooplankton, gelatinous zooplankton and primary production data.

Field Name	Type	Width	Description
STATION	Text	15	Sampling Station
LATITUDE	Number	8.5	Latitude in Decimal Degrees (NAD83)
LONGITUDE	Number	8.5	Longitude in Decimal Degrees (NAD83)
LL_DATUM	Text	5	Latitude-Longitude Datum Code
DESCRIPTION	Text	225	Sampling Station Description
WATER_BODY	Text	50	Water Body Description
CBP_BASIN	Text	30	Chesapeake Bay Program Basin
TS_BASIN	Text	30	Tributary Strategy Basin Designation
BASIN	Text	30	Major Basin Code
SUBBASIN	Text	30	Subbasin Code
FALL_LINE	Text	2	Fall Line Designation

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

Name	Type	Width	Description
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
LL_DATUM	Text	5	Latitude and Longitude Geographic Datum
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-2. Event Data File Format for All Plankton Data

This included phytoplankton, phytoplankton, mesozooplankton, microzooplankton, gelatinous zooplankton and primary production data.

Field Name	Type	Width	Description
SURVEY_ID	Number	8	Database Generated Event Identification Number
DATA_TYPE	Text	3	Sample Type Code
SOURCE	Text	10	Data Collection Agency
SAMPLE_TYPE	Text	2	Collection Type
SAMPLE_DATE	Date/Time	8	Sampling date (MM/DD/YYYY)
LAYER	Text	3	Layer of Water Column in Which Sample Was Taken
LATITUDE	Number	8.5	Latitude in Decimal Degrees (NAD83)
LONGITUDE	Number	8.5	Longitude in Decimal Degrees (NAD83)
P_DEPTH	Number	8.1	Composite Sample Cut-Off Depth
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)
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)

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-3. Phytoplankton and Picoplankton Count Data File Format

Field Name	Type	Width	Description
SURVEY_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	10	Data Collection Agency
SAMPLE_TYPE	Text	2	Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
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 (MM/DD/YYYY)

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-4. Primary Production Data File Format

Field Name	Type	Width	Description
SURVEY_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	10	Data Collection Agency
SAMPLE_TYPE	Text	2	Collection Type
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sample Date (MM/DD/YYYY)
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 µ/L)
ASMRATIO	Number	8.2	Production Efficiency (µg-C/µg-Chl)
SER_NUM	Text	12	Sample Serial Number
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-5. Microzooplankton, Mesozooplankton and Gelatinous Zooplankton Count Data File Format

Field Name	Type	Width	Description
SURVEY_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	10	Data Collection Agency
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
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
LIFE_STAGE	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 (MM/DD/YYYY)

Table A-5. Microzooplankton, Mesozooplankton and Gelatinous Zooplankton Count Data File Format-Continued

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-6. Composite Phytoplankton Metric Data File Format

Field Name	Type	Width	Description
SURVEY_ID	Number	8	Database Generated Event Identification Number
STATION	Text	15	CBP Sampling Station
SAMPLE_DATE	Date/Time	8	Phytoplankton Sampling Date
SAMPLE_TIME	Date/Time	8	Phytoplankton Sampling Time
UP_DATE	Date/Time	8	Upper End of 3 Day Data Matching Window
DN_DATE	Date/Time	8	Lower End of 3 Day Data Matching Window
WQ_DATE	Date/Time	8	Water Quality Sampling Date
SEASON	Text	6	CBP Season Designation
IBI_LAYER	Text	2	Sample Layer
IBI_SALZONE	Text	1	Water Layer Salinity Zone Designation
CHL_SURF	Number	12.4	Surface Chlorophyll A (0.5 M) µG/L
CHLORO_ABUND	Number	12.4	Chlorophyte Abundance in Number/Liter
CHLORO_BIOMASS	Number	12.4	Chlorophyte Biomass in µG Carbon/Liter
CHRYSO_ABUND	Number	12.4	Chrysophyte Abundance in Number/Liter
CHRYSO_BIOMASS	Number	12.4	Chrysophyte Biomass in µG Carbon/Liter
COCHLODINIUM_ HET_ABUND	Number	12.4	Cochlodinium Abundance in Number/Liter
COCHLODINIUM_ HET_BIOMASS	Number	12.4	Cochlodinium Biomass in µG Carbon/Liter
CRYPTO_ABUND	Number	12.4	Cryptophyte Abundance in Number/Liter
CRYPTO_BIOMASS	Number	12.4	Cryptophyte Biomass in µG Carbon/Liter
CYANO_ABUND	Number	12.4	Cyanophyte Abundance in Number/Liter
CYANO_BIOMASS	Number	12.4	Cyanophyte Biomass in µG Carbon/Liter
DIATOM_ABUND	Number	12.4	Diatom Abundance in Number/Liter
DIATOM_BIOMASS	Number	12.4	Diatom Biomass in µG Carbon/Liter
DINO_ABUND	Number	12.4	Dinoflaggelate Abundance in Number/Liter
DINO_BIOMASS	Number	12.4	Dinoflaggelate Biomass in µG Carbon/Liter
EUGLENO_ABUND	Number	12.4	Euglenophyte Abundance in Number/Liter
EUGLENO_BIOMASS	Number	12.4	Euglenophyte Biomass in µG Carbon/Liter
HAPTO_ABUND	Number	12.4	Haptophyte Abundance in Number/Liter
HAPTO_BIOMASS	Number	12.4	Haptophyte Biomass in µG Carbon/Liter
MICROCYSTIS_ AER_ABUND	Number	12.4	Microcystis Abundance in Number/Liter
MICROCYSTIS_ AER_BIOMASS	Number	12.4	Microcystis Biomass in µG Carbon/Liter
PICO_ABUND	Number	12.4	Picoplankton Abundance in Number/Liter
PICO_BIOMASS	Number	12.4	Picoplankton Biomass in µG Carbon/Liter
PRASINO_ABUND	Number	12.4	Prasinophyte Abundance in Number/Liter
PRASINO_BIOMASS	Number	12.4	Prasinophyte Biomass in µG Carbon/Liter
PROROCENTRUM_ MIN_ABUND	Number	12.4	Prorocentrum Minimum Abundance in Number/Liter
PROROCENTRUM_ MIN_BIOMASS	Number	12.4	Prorocentrum Minimum Biomass in µG Carbon/Liter
TOT_ABUND	Number	12.4	Total Phytoplankton Abundance in Number/Liter
TOT_BIOMASS	Number	12.4	Total Phytoplankton Biomass in µG Carbon/Liter
SALINITY	Number	12.4	Average Layer Salinity in PSU
PO4	Number	12.4	Average Layer PO4 in MG/L
DIN	Number	12.4	Average Layer Dissolved Organic N (NO2+NO3+NH4) In MG/L
SECCHI	Number	12.4	Secchi Depth in Meters
SECCHI_RANK	Text	8	Secchi Depth Rank-Relative Status Method
PO4_RANK	Text	8	PO4 Rank-Tom Fisher Nutrient Limitation Thresholds
DIN_RANK	Text	8	DIN Rank-Tom Fisher Nutrient Limitation Thresholds
CHLA	Number	12.4	Average Layer Chlorophyll a in µG /L
DO_VALUE	Number	12.4	Average Layer Dissolved Oxygen in MG/L
DOC	Number	12.4	Average Layer Dissolved Organic Carbon in MG/L
PC	Number	12.4	Average Layer Particulate Carbon in MG/L
PHEO	Number	12.4	Average Layer Pheophytin In µG /L
TSS	Number	12.4	Average Layer Total Suspended Solids MG/L
WTEMP	Number	12.4	Average Layer Water Temp Degrees Celsius
TOC	Number	12.4	Average Layer Total Organic Carbon in MG/L
BIOMASS_CHL_RATIO	Number	12.2	Total Phytoplankton Biomass to Surface Chlorophyll Ratio
CELL_SIZE	Number	12.2	Average Cell Size PG/Cell
CRYPTO_BIO_PCT	Number	12.2	Percent Cryptophyte Biomass
CYANO_BIO_PCT	Number	12.2	Percent Cyanophyte Biomass
DIATOM_BIO_PCT	Number	12.2	Percent Diatom Biomass
DINO_BIO_PCT	Number	12.2	Percent Dinoflaggelate Biomass
WQ_CATEGORY	Text	20	Fisher Water Quality Category

Table A-6. Composite Phytoplankton Metric Data File Format-Continued

Field Name	Type	Width	Description
LATITUDE	Number	8.5	Latitude in Decimal Degrees (NAD83)
LONGITUDE	Number	8.5	Longitude in Decimal Degrees (NAD83)

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-7. Phytoplankton Index of Biotic Integrity Metric Data File Format

Field Name	Type	Width	Description
SURVEY_ID	Number	8	Database Generated Event Identification Number
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)
IBI_PARAMETER	Text	15	IBI Parameter
IBI_VALUE	Number	8.4	Parameter Value
IBI_SCORE	Number	8.0	Value Reporting Units
IBI_SALZONE	Text	1	Water Layer Salinity Zone Designation
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)
SEASON	Text	6	CBP Season Designation
DATA_TYPE	Text	3	Sample Type Code
LATITUDE	Number	8.5	Latitude (Decimal Degrees-NAD83)
LONGIDUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
SITE_TYPE	Text	10	Sampling Site Type

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-8. In Situ Fluorescence Data File Format

FIELD_DATA_INDEX	Number	8	Database Generated Event Identification Number
SOURCE	Text	10	Data Collection Agency
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
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)
REPORTING_PARAMETER	Text	10	Reporting Parameter
REPORTING_VALUE	Number	8.2	Reporting Parameter Value
REPORTING_VOLTS	Number	8	Instrument Reporting Voltages
REPORTING_UNITS	Text	10	Parameter Reporting Units
QUALIFIER	Text	10	Chlorophyll A Detection Limit Qualifier
METHOD	Text	5	Chlorophyll A Method Code
PROJECT	Text	10	Chesapeake Bay Program Project Identifier
PROGRAM	Text	10	Chesapeake Bay Program Monitoring Program Identifier
R_DATE	Date/Time	8	Version Date of Data (MM/DD/YYYY)
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
SER_NUM	Text	12	Sample Serial Number
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation

Table A-9. Tidal Benthic Event Data Files

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

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-10. Tidal Benthic Biota Event Data Files

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

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-11. Tidal Benthic Count Data Files

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

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-12. Benthic Biomass Data Files

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

Table A-12. Benthic Biomass Data Files-Continued

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

A-13. Benthic Water Quality Data Files

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

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-14. Benthic Sediment Data Files

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

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-15. Benthic Index of Biotic Integrity Data Files

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

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

Name	Type	Width	Description
BASIN	Text	20	Chesapeake Bay Basin Designation
HUC8	Text	8	USGS Eight Digit Hydrologic Unit Code
CATALOGING_UNIT_DESCRIPTION	Text	50	USGS Cataloging Unit Code Description
FIPS	Text	5	Federal Information Processing Code
STATE	Text	3	Federal Information Processing Code State Designation
COUNTY_CITY	Text	30	Federal Information Processing Code City/County Designation
CBSEG_2003	Text	6	2003 Chesapeake Bay Segment Designation
CBSEG_2003_DESCRIPTION	Text	50	2003 Chesapeake Bay Segment Designation Description

Table A-16. Non-Tidal Benthic Event Data Files

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
AGENCY_CODE	Text	6	Data Collection Agency
STATION_ID	Text	50	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HHMM)
EVENT_TYPE	Text	3	Sampling Event Type
EVENT_LATITUDE	Number	8.5	Latitude (Decimal Degrees-NAD83)
EVENT_LONGITUDE	Number	8.5	Longitude (Decimal Degrees-NAD83)
LL_DATUM	Text	5	Latitude-Longitude Datum Code
ECOREGION_LEVEL3	Text	5	Level 3 EPA Ecoregion Code
ECOREGION_LEVEL3_NAME	Text	50	Level 3 EPA Ecoregion Description
CBP_IBI_REGION	Text	10	Chesapeake Bay Program IBI Region Code
CBP_IBI_REGION_NAME	Text	50	Chesapeake Bay Program IBI Region Code Description
FIPS	Text	5	Federal Information Processing Code
STATE_INITIALS	Text	3	Federal Information Processing Code State Designation
COUNTY_NAME	Text	30	Federal Information Processing Code City/County Designation
HUC_12	Text	8	USGS Twelve Digit Hydrologic Unit Code
HUC_8	Text	8	USGS Eight Digit Hydrologic Unit Code
SUBBASINT_DESCRIPTION	Text	50	USGS Eight Digit Hydrologic Unit Code Description
STRAHLER_STREAM_ORDER	Number	3	Strahler Stream Order Designation for Station
SITE_TYPE	Text	10	Sampling Site Type
HABITAT_TYPE	Text	10	Sampling Site Habitat Type
UTM_X	Number	8	UTM Zone 18 N X-Coordinate
UTM_Y	Number	8	UTM Zone 18 N Y-Coordinate
KARST	Text	10	USGS Karst Site Designation
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)

Table A-17. Non-Tidal Benthic Habitat Assessment Data Files

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
AGENCY_CODE	Text	6	Data Collection Agency
STATION_ID	Text	50	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HH:MM:SS)
SAMPLE_NUMBER	Number	8.0	Sample Number
REPORTING_PARAMETER	Text	15	Sample Reporting Parameter
REPORTING_VALUE	Number	8.4	Sample Reporting Parameter Value
HAB_METHOD	Text	10	Habitat Reporting Method
R_DATE	Text	8	Data Version Date (MM/DD/YYYY)
FIPS	Text	5	Federal Information Processing Code
STATE_INITIALS	Text	3	Federal Information Processing Code State Designation
COUNTY_NAME	Text	30	Federal Information Processing Code City/County Designation
HUC_8	Text	8	USGS Eight Digit Hydrologic Unit Code
SUBBASINT_DESCRIPTION	Text	50	USGS Eight Digit Hydrologic Unit Code Description
ECOREGION_LEVEL3	Text	5	Level 3 EPA Ecoregion Code
ECOREGION_LEVEL3_NAME	Text	50	Level 3 EPA Ecoregion Description

Table A-18. Non-Tidal Benthic Count Data Files

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HH:MM:SS)
SAMPLE_NUMBER	Number	8.0	Sample Number
TSN	Text	7	ITIS Taxon Serial Number
NODCCODE	Text	12	National Oceanographic Data Center Species Code
LATIN_NAME	Text	45	Species Latin Name
LIFE_STAGE	Text	45	Species Life Stage
REPORTING_PARAMETER	Number	12	Sample Reporting Parameter
REPORTING_VALUE	Number	12	Total Count of Given Taxa in Sample
REPORTING_UNITS	Text	15	Reporting Units of Value
BIO_METHOD	Text	3	Chesapeake Bay Program Biological Enumeration Method Code
G_METHOD	Text	3	Chesapeake Bay Program Gear Method Code
SAMPLE_TYPE	Text	2	Sample Collection Type
FIPS	Text	5	Federal Information Processing Code
STATE_INITIALS	Text	3	Federal Information Processing Code State Designation
COUNTY_NAME	Text	30	Federal Information Processing Code City/County Designation
HUC_8	Text	8	USGS Eight Digit Hydrologic Unit Code
SUBBASINT_DESCRIPTION	Text	50	USGS Eight Digit Hydrologic Unit Code Description
ECOREGION_LEVEL3	Text	5	Level 3 EPA Ecoregion Code
ECOREGION_LEVEL3_NAME	Text	50	Level 3 EPA Ecoregion Description

Table A-19. Non-Tidal Benthic Water Quality Data Files

Field Name	Type	Width	Descriptions
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HH:MM:SS)
SAMPLE_NUMBER	Number	8.0	Sample Number
SAMPLE_TYPE	Text	2	Sample Collection Type
SAMPLE_REPLICATE_TYPE	Text	2	Sample Replicate Type Code
LAYER	Text	3	Layer of Water Column in Which Sample Was Taken
DEPTH	Number	8.1	Sample Depth in Meters
REPORTING_PARAMETER	Number	12	Sample Reporting Parameter
REPORTING_VALUE	Number	12	Total Count of Given Taxa in Sample
REPORTING_UNITS	Text	15	Reporting Units of Value
QUALIFIER	Text	3	Chesapeake Bay Program Detection Limit Qualifier
WQ_METHOD	Text	3	Chesapeake Bay Program Analytical Method Code
PROBLEM_CODE	Text	3	Chesapeake Bay Program Analytical Problem Code
DETAILS	Text	3	Analytical Problem Code Details

Table A-19. Non-Tidal Benthic Water Quality Data Files-Continued

Field Name	Type	Width	Descriptions
FIPS	Text	5	Federal Information Processing Code
STATE_INITIALS	Text	3	Federal Information Processing Code State Designation
COUNTY_NAME	Text	30	Federal Information Processing Code City/County Designation
HUC_8	Text	8	USGS Eight Digit Hydrologic Unit Code
SUBBASINT_DESCRIPTION	Text	50	USGS Eight Digit Hydrologic Unit Code Description
ECOREGION_LEVEL3	Text	5	Level 3 EPA Ecoregion Code
ECOREGION_LEVEL3_NAME	Text	50	Level 3 EPA Ecoregion Description

Table A-20. Benthic Index of Biotic Integrity Data Files

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HH:MM:SS)
SAMPLE_NUMBER	Number	8.0	Sample Number
IBI_PARAMETER	Text	15	IBI Parameter
IBI_VALUE	Number	8.4	Parameter Value
IBI_SCORE	Number	8.0	Value Reporting Units
R_DATE	Date/Time	8	Data Version Date (MM/DD/YYYY)
IBI_METHOD	Text	3	Chesapeake Bay Program Index of Biotic Integrity Method Code
FIPS	Text	5	Federal Information Processing Code
STATE_INITIALS	Text	3	Federal Information Processing Code State Designation
COUNTY_NAME	Text	30	Federal Information Processing Code City/County Designation
HUC_8	Text	8	USGS Eight Digit Hydrologic Unit Code
SUBBASINT_DESCRIPTION	Text	50	USGS Eight Digit Hydrologic Unit Code Description
ECOREGION_LEVEL3	Text	5	Level 3 EPA Ecoregion Code
ECOREGION_LEVEL3_NAME	Text	50	Level 3 EPA Ecoregion Description

Table A-21. Composite Non-Tidal Benthic Metric Data File Format

Field Name	Type	Width	Description
EVENT_ID	Number	8	Database Generated Event Identification Number
SOURCE	Text	6	Data Collection Agency
STATION	Text	15	Sampling Station
SAMPLE_DATE	Date/Time	8	Sampling Date (MM/DD/YYYY)
SAMPLE_TIME	Date/Time	8	Sample Collection Time (HH:MM:SS)
ASPT_MOD	Number	8.4	Average tolerance Score per Taxon modified to family level
ASPT_MOD_R	Number	8.4	Average tolerance Score per Taxon modified to family level Calculated on Rarefaction Data
BECK	Number	8.4	Beck's Index-classical calculation
BECK_R	Number	8.4	Beck's Index-classical calculation-calculated on Rarefaction Data
DIPTERA_TAXA_CNT	Number	8.4	Number of Diptera Taxa
DIPTERA_TAXA_CNT_R	Number	8.4	Number of Diptera Taxa -calculated on Rarefaction Data
EPHEMEROPTERA_TAXA_CNT	Number	8.4	Number of Ephemeroptera Taxa
EPHEMEROPTERA_TAXA_CNT_R	Number	8.4	Number of Ephemeroptera Taxa-calculated on Rarefaction Data
EPT_TAXA_ABUND	Number	8.4	Total abundance of Ephemeroptera, Plecoptera & Trichoptera
EPT_TAXA_ABUND_R	Number	8.4	Total abundance of Ephemeroptera, Plecoptera & Trichoptera -calculated on Rarefaction Data
EPT_TAXA_COUNT	Number	8.4	Number of Ephemeroptera, Plecoptera & Trichoptera taxa
EPT_TAXA_COUNT_NO_TOL	Number	8.4	Number of Ephemeroptera, Plecoptera & Trichoptera taxa excluding tolerant taxa
EPT_TAXA_COUNT_NO_TOL_R	Number	8.4	Number of Ephemeroptera, Plecoptera & Trichoptera taxa excluding tolerant taxa-Calculated on Rarefaction Data
EPT_TAXA_COUNT_R	Number	8.4	Number of Ephemeroptera, Plecoptera & Trichoptera taxa-Calculated on Rarefaction Data
FBI	Number	8.4	Family level Hilsenhoff Biotic Index
FBI_R	Number	8.4	Family level Hilsenhoff Biotic Index-calculated on Rarefaction Data
GOLD	Number	8.4	1- relative percentage abundance of Gastropods, Oligochaeta and Diptera
GOLD_R	Number	8.4	1- relative percentage abundance of Gastropods, Oligochaeta and Diptera -calculated on Rarefaction Data
MARGALEFS	Number	8.4	Margalef Index of community diversity
MARGALEFS_R	Number	8.4	Margalef Index of community diversity-calculated on Rarefaction Data NCO_TAXA_CNT
	Number	8.4	Total Taxa Count omitting chironomidae and oligochaeta
NCO_TAXA_CNT_R	Number	8.4	Total Taxa Count omitting chironomidae and oligochaeta -calculated on Rarefaction Data
NON_INSECT_TAXA_CNT	Number	8.4	Non-Insect Taxa Count
NON_INSECT_TAXA_CNT_R	Number	8.4	Non-Insect Taxa Count-calculated on Rarefaction Data
PCT_BURROWER	Number	8.4	Percent Burrower Abundance
PCT_BURROWER_R	Number	8.4	Percent Burrower Abundance-calculated on Rarefaction Data
PCT_CHIRONOMIDAE	Number	8.4	Percent Chironomidae Abundance
PCT_CHIRONOMIDAE_R	Number	8.4	Percent Chironomidae Abundance-calculated on Rarefaction Data
PCT_CLIMB	Number	8.4	Percent Climbers Abundance
PCT_CLIMB_R	Number	8.4	Percent Climbers Abundance-calculated on Rarefaction Data
PCT_CLING	Number	8.4	Percent Clinger Abundance
PCT_CLING_R	Number	8.4	Percent Clinger Abundance-calculated on Rarefaction Data
PCT_CLINGER_TAXA	Number	8.4	Percent Clinger taxa
PCT_CLINGER_TAXA_R	Number	8.4	Percent Clinger taxa-calculated on Rarefaction Data
PCT_COLLECT	Number	8.4	Percent Collector Abundance
PCT_COLLECT_R	Number	8.4	Percent Collector Abundance-calculated on Rarefaction Data
PCT_DIPTERA	Number	8.4	Percent Diptera Abundance
PCT_DIPTERA_R	Number	8.4	Percent Diptera Abundance-calculated on Rarefaction Data
PCT_DOM1	Number	8.4	Percent Dominant taxa
PCT_DOM1_R	Number	8.4	Percent Dominant taxa-calculated on Rarefaction Data
PCT_DOM2	Number	8.4	Percent Two Dominant taxa
PCT_DOM2_R	Number	8.4	Percent Two Dominant taxa-calculated on Rarefaction Data
PCT_DOM3	Number	8.4	Percent Three Dominant taxa
PCT_DOM3_R	Number	8.4	Percent Three Dominant taxa-calculated on Rarefaction Data
PCT_EPHEMEROPTERA	Number	8.4	Percent Ephemeroptera Abundance
PCT_EPHEMEROPTERA_R	Number	8.4	Percent Ephemeroptera Abundance-calculated on Rarefaction Data
PCT_EPT	Number	8.4	Percent Ephemeroptera, Plecoptera & Trichoptera Abundance
PCT_EPT_R	Number	8.4	Percent Ephemeroptera, Plecoptera & Trichoptera Abundance -calculated on Rarefaction Data
PCT_EPT_TAXA_RICH	Number	8.4	Percent Ephemeroptera, Plecoptera & Trichoptera Taxa
PCT_EPT_TAXA_RICH_R	Number	8.4	Percent Ephemeroptera, Plecoptera & Trichoptera Taxa -calculated on Rarefaction Data

Table A-21. Composite Non-Tidal Benthic Metric Data File Format-Continued

Field Name	Type	Width	Description
PCT_FILTERERS	Number	8.4	Percent Filterer Abundance
PCT_FILTERERS_R	Number	8.4	Percent Filterer Abundance-calculated on Rarefaction Data
PCT_GATHER	Number	8.4	Percent Gatherer Abundance
PCT_GATHER_R	Number	8.4	Percent Gatherer Abundance-calculated on Rarefaction Data
PCT_LIMESTONE	Number	8.4	Percent Limestone Taxa (Isopod + Amphidoda + Ephemerella) Abundance
PCT_LIMESTONE_R	Number	8.4	Percent Limestone Taxa (Isopod + Amphidoda + Ephemerella) Abundance -calculated on Rarefaction Data
PCT_NET_CADDISFLY	Number	8.4	Percent Net Caddisflies Abundance
PCT_NET_CADDISFLY_R	Number	8.4	Percent Net Caddisflies Abundance-calculated on Rarefaction Data
PCT_NON_INSECT	Number	8.4	Percent Non-Insects Abundance
PCT_NON_INSECT_R	Number	8.4	Percent Non-Insects Abundance-calculated on Rarefaction Data
PCT_PLECOPTERA	Number	8.4	Percent Plecoptera Abundance
PCT_PLECOPTERA_R	Number	8.4	Percent Plecoptera Abundance-calculated on Rarefaction Data
PCT_PREDATOR	Number	8.4	Percent Predator Abundance
PCT_PREDATOR_R	Number	8.4	Percent Predator Abundance-calculated on Rarefaction Data
PCT_SCRAPER	Number	8.4	Percent Scrapers Abundance
PCT_SCRAPER_R	Number	8.4	Percent Scrapers Abundance-calculated on Rarefaction Data
PCT_SENSITIVE	Number	8.4	Percent Sensitive (TV<=3) Abundance
PCT_SENSITIVE_R	Number	8.4	Percent Sensitive (TV<=3) Abundance-calculated on Rarefaction Data
PCT_SHREDDER	Number	8.4	Percent Shredder Abundance
PCT_SHREDDER_R	Number	8.4	Percent Shredder Abundance-calculated on Rarefaction Data
PCT_SIMULIIDAE	Number	8.4	Percent Simulidate (Black fly) Abundance
PCT_SIMULIIDAE_R	Number	8.4	Percent Simulidate (Black fly) Abundance-calculated on Rarefaction Data
PCT_SWIMMER	Number	8.4	Percent Swimmers Abundance
PCT_SWIMMER_R	Number	8.4	Percent Swimmers Abundance-calculated on Rarefaction Data
PCT_TOLERANT	Number	8.4	Percent Tolerant (TV>=7) Abundance
PCT_TOLERANT_R	Number	8.4	Percent Tolerant (TV>=7) Abundance-calculated on Rarefaction Data
PCT_TRICHOPTERA	Number	8.4	Percent Trichoptera Abundance
PCT_TRICHOPTERA_NO_TOL	Number	8.4	Percent Trichoptera Abundance excluding Hydropsychidae
PCT_TRICHOPTERA_NO_TOL_R	Number	8.4	Percent Trichoptera Abundance excluding Hydropsychidae -calculated on Rarefaction Data
PCT_TRICHOPTERA_R	Number	8.4	Percent Trichoptera Abundance-calculated on Rarefaction Data
PLECOPTERA_TAXA_CNT	Number	8.4	Plecoptera Taxa count
PLECOPTERA_TAXA_CNT_R	Number	8.4	Plecoptera Taxa count-calculated on Rarefaction Data
RATIO_SC_TO_CF	Number	8.4	Ratio of Scrapers to Collector Filterers
RATIO_SC_TO_CF_R	Number	8.4	Ratio of Scrapers to Collector Filterers-calculated on Rarefaction Data
RATIO_SC_TO_SH	Number	8.4	Ratio of Scrapers to Shredders
RATIO_SC_TO_SH_R	Number	8.4	Ratio of Scrapers to Shredders-calculated on Rarefaction Data
RATIO_SH_TO_CG	Number	8.4	Ratio of Shredders to Collector Gatherers
RATIO_SH_TO_CG_R	Number	8.4	Ratio of Shredders to Collector Gatherers-calculated on Rarefaction Data
SCRAPER_TAXA_CNT	Number	8.4	Scraper Taxa Count
SCRAPER_TAXA_CNT_R	Number	8.4	Scraper Taxa Count-calculated on Rarefaction Data
SENSITIVE_TAXA_COUNT	Number	8.4	Sensitive Taxa Count (TV<=3)
SENSITIVE_TAXA_COUNT_R	Number	8.4	Sensitive Taxa Count (TV<=3)-calculated on Rarefaction Data
SIMPSON_DIVERSITY	Number	8.4	Simpson's Diversity Index
SIMPSON_DIVERSITY_R	Number	8.4	Simpson's Diversity Index-calculated on Rarefaction Data
SW	Number	8.4	Shannon Weiner Diversity Index
SW_R	Number	8.4	Shannon Weiner Diversity Index-calculated on Rarefaction Data
TAXA_RICH	Number	8.4	Total Taxa Count
TAXA_RICH_R	Number	8.4	Total Taxa Count -calculated on Rarefaction Data
TOLERANT_TAXA_COUNT	Number	8.4	Tolerant Taxa Count (TV>=7)
TOLERANT_TAXA_COUNT_R	Number	8.4	Tolerant Taxa Count (TV>=7)-calculated on Rarefaction Data
TOTAL_ABUNDANCE	Number	8.4	Total Abundance
TOTAL_ABUNDANCE_R	Number	8.4	Total Abundance-calculated on Rarefaction Data
TOTAL_SCORE	Number	8.4	Total IBI Score for Site
TRICHOPTERA_TAXA_CNT	Number	8.4	Trichoptera Taxa Count
TRICHOPTERA_TAXA_CNT_R	Number	8.4	Trichoptera Taxa Count-calculated on Rarefaction Data
TRICHOPTERA_TAXA_COUNT_NO_HYDR	Number	8.4	Trichoptera Taxa Count excluding Hydropsychidae
TRICHOPTERA_TAXA_COUNT_NO_R	Number	8.4	Trichoptera Taxa Count excluding Hydropsychidae-calculated on Rarefaction Data

APPENDIX B – BIOLOGICAL DATA DICTIONARY

June 2012

This appendix contains the data dictionary of terms used in defining data fields in the CIMS/CDE biological databases. Its purpose is to provide consistency within the CIMS/CDE 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 previous versions of this dictionary have changed as the Chesapeake Bay Program Data Center implemented 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.

ACCOUNTING_UNIT	USGS Six-Digit Hydrologic Units Code- Name changed to Basin Unit in 2000 See Appendix C Table 13 for Details	Field	Text	6
ACCOUNTING_UNIT_DESCRIPTION	USGS Six-Digit Hydrologic Unit Code Description-Name changed to Basin Unit in 2000 See Appendix C Table 13 for Details	Field	Text	40
ADDRESS	Physical Mailing Address of Contact	Field	Text	50
AEPENETR	Actual or Estimated Gear Penetration Depth Indicator	Field	Text	2
AGENCY_CODE	State or Federal Agency Responsible for a Monitoring Program	Field	Text	7
AGENCY_PROGRAM_NAME	State or Federal Agency Monitoring Program Name	Field	Text	50
ASMRATIO	Production Efficiency Ratio (ug-C/ug-chl A)	Field	Numeric	8.2
BASIN	USGS Six-Digit Hydrologic Units Code	Field	Text	6
BASIN_DESCRIPTION	Basin Described By the Six Digit USGS HUC Code	Field	Text	80
BIO_METHOD	CBP Non-Tidal Benthic Biological Enumeration Method Code	Value	Text	6
BIO_METHOD_DESCRIPTION	Description of Non-Tidal Benthic Biological Enumeration Method	Value	Text	100
BIO_METHOD_DETAILS	Detailed Description of Non-Tidal Benthic Biological Enumeration Protocol	Value	Text	MEMO
BIO_METHOD_TITLE	CBP Non-Tidal Benthic Biological Enumeration Method Title	Value	Text	100
BIO_PARAMETER_DESCRIPTION	CBP Description of Biological Reporting Parameter	Value	Text	100
BIO_REPORTING_PARAMETER	CBP Biological Reporting Parameter	Value	Text	15
BIO_REPORTING_UNITS	CBP Biological Reporting Parameter Units	Value	Text	15
BOUNDING_LATITUDE_NORTH	The northern-most coordinate of the limit of coverage expressed in latitude	Field	Numeric	8.5
BOUNDING_LATITUDE_SOUTH	The Southern-most coordinate of the limit of coverage expressed in latitude	Field	Numeric	8.5
BOUNDING_LATITUDE_EAST	The Eastern-most coordinate of the limit of coverage expressed in longitude	Field	Numeric	8.5
BOUNDING_LATITUDE_West	The Western-most coordinate of the limit of coverage expressed in longitude	Field	Numeric	8.5
CALCULATED_UNITS	Calculated Parameter Reporting Units	Field	Text	50
CALCULATED_VALUE	Calculated Parameter Reporting Value	Field	Numeric	8

CATALOGING_UNIT	USGS Eight-Digit Hydrologic Units Code-Name changed to Sub Basin Unit in 2000 See Appendix C Table 13 for Details	Field	Text	8
CATALOGING_UNIT_DESCRIPTION	USGS Eight-Digit Hydrologic Units Code Descriptor-Name changed to Sub basin Unit in 2000 See Appendix C Table 13 for Details	Field	Text	40
CARBFIX	Carbon Fixation Rate (Percent)	Field	Numeric	8.2
CBP_BASIN	CBP Monitoring Basin Designation	Field	Text	30
CBP_BASIN_DESCRIPTION	CBP Monitoring Basin Description	Field	Text	100
CBP_IBI_REGION	CBP Non-Tidal Benthic IBI Reporting Region Designation	Field	Text	30
CBP_IBI_REGION_DESCRIPTION	CBP Non-Tidal Benthic IBI Reporting Region Description	Field	Text	100
CB_SEG1985	CBP Segment Designation Code (1985 Scheme)	Field	Text	8
CB_SEG1985_Description	CBP Segment Designation Description (1995 Scheme)	Field	Text	50
CB_SEG1998	CBP Segment Designation Code (1998 Scheme)	Field	Text	8
CB_SEG1988_Description	CBP Segment Designation Description (1998 Scheme)	Field	Text	50
CB_SEG2003	CBP Segment Designation Code (2003 Scheme)	Field	Text	8
CB_SEG2003_Description	CBP Segment Designation Description (2003 Scheme)	Field	Text	50
CITY	City Name	Field	Text	50
COMMENT	Comment Field	Field	Memo	-
COMMON_NAME	Species Common Name	Field	Text	45
CONTACT	Monitoring Program Contact	Field	Text	25
CONVFACT	Converts Number Per Sample to Normalized Count	Field	Numeric	8.2
COUNTY_NAME	County	Field	Text	50
CRUISE	Chesapeake Bay Program Cruise Identifier	Field	Text	6
DATA_MANAGER	Agency Data Manager	Field	Text	50
DATA_MANAGER_EMAIL	Agency Data Manager Email	Field	Text	100
DATA_MANAGER_PHONE	Agency Data Manager Telephone Number	Field	Text	25
DATA_TYPE	Sampling Date Type Code	Field	Text	2
DATA_TYPE_DESCRIPTION	Sampling Date Type Code Description	Field	Text	2
DIRECTOR	Agency Director	Field	Text	50
DIVISION	Agency Reporting Division	Field	Text	100

DN_DATE	Lower End of Phytoplankton Index of Biotic Integrity Sample Date Matching Window	Field	Date/Time	
ECOREGION_LEVEL_4	EPA Level 4 Ecoregion Code	Field	Text	5
ECOREGION_LEVEL_4_NAME	EPA Level 4 Ecoregion Code Description	Field	Text	90
ECOREGION_LEVEL_3	EPA Level 3 Ecoregion Code	Field	Text	5
ECOREGION_LEVEL_3_NAME	EPA Level 4 Ecoregion Code Description	Field	Text	90
EPA_METHOD	EPA Analytical Method	Field	Text	50
EVENT_ID	Database Auto-Indexing Field	Field	Numeric	-
EVENT_TYPE	Sampling Event Type Code	Field	Text	15
EVENT_TYPE_DESCRIPTION	Sampling Event Type Code Description	Field	Text	50
FALL_LINE	Above/Below Fall Line Indicator	Field	Text	1
FIPS	Federal Information Processing Codes (ZIP CODES)	Field	Text	5
G_CONVERSION_FACT	Sampling Gear Conversion Factor (#/SAMPLE TO #/AREA)	Field	Text	3
G_CONVERSION_UNITS	Sampling Gear Code Conversion Factor Units	Field	Text	3
G_METHOD	Sampling Gear Code	Field	Text	3
G_METHOD_DESCRIPTION	Sampling Gear Description	Field	Text	30
G_METHOD_DETAILS	Sampling Gear Description Details	Field	Text	50
HAB_METHOD	Non-Tidal Benthic Habitat Assessment Method Code	Field	Text	6
HAB_METHOD_DESCRIPTION	Non-Tidal Benthic Habitat Assessment Method Description	Field	Memo	
HAB_METHOD_DETAILS	Non-Tidal Benthic Habitat Assessment Method Description Details	Field	Memo	
HAB_METHOD_TITLE	Non-Tidal Benthic Habitat Assessment Method Title	Field	Text	100
HABITAT_REPORTING_PARAMETER	Non-Tidal Benthic Habitat Assessment Reporting Parameter	Field	Text	15
HABITAT_REPORTING_PARAMETER_DESCRIPTION	Non-Tidal Benthic Habitat Assessment Reporting Parameter Description	Field	Text	50
HABITAT_TYPE	Non-Tidal Benthic Stream Habitat Characterization Code	Field	Text	15
HABITAT_TYPE_DESCRIPTION	Non-Tidal Benthic Stream Habitat Characterization Code Description	Field	Text	50

HUC_10	USGS 10-Digit Hydrologic Unit Code	Field	Text	10
HUC_12	USGS 12-Digit Hydrologic Unit Code	Field	Text	12
HUC_2	USGS 2-Digit Hydrologic Unit Code	Field	Text	2
HUC_4	USGS 4-Digit Hydrologic Unit Code	Field	Text	4
HUC_6	USGS 6-Digit Hydrologic Unit Code	Field	Text	6
HUC_8	USGS 8-Digit Hydrologic Unit Code	Field	Text	8
IBI_BOTTOM_TYPE	Tidal Benthic Index of Biotic Integrity Bottom Type	Field	Text	2
IBI_BOTTOM_TYPE_DESCRIPTION	Tidal Benthic Index of Biotic Integrity Bottom Type Description	Field	Text	10
IBI_LAYER	Phytoplankton Index of Biotic Integrity Layer Code	Field	Text	2
IBI_METHOD	Index of Biotic Integrity Method Analytical Method Code	Field	Text	10
IBI_METHOD_DESCRIPTION	Index of Biotic Integrity Method Analytical Method Description	Field	Memo	
IBI_METHOD_DETAILS	Index of Biotic Integrity Method Analytical Method Description Details	Field	Memo	
IBI_METHOD_TITLE	Index of Biotic Integrity Analytical Method Title	Field	Text	100
IBI_PARAMETER	Index of Biotic Integrity Metric Reporting Parameter	Field	Text	40
IBI_PARAMETER_DESCRIPTION	Index of Biotic Integrity Metric Reporting Parameter Description	Field	Memo	
IBI_SALZONE	Index of Biotic Integrity Salinity Zone Code	Field	Text	2
IBI_SALZONE_DESCRIPTION	Index of Biotic Integrity Salinity Zone Code Description	Field	Text	2
IBI_SCORE	Index of Biotic Integrity Metric Index Score	Field	Number	8
IBI_VALUE	Index of Biotic Integrity Metric Reporting Parameter Value	Field	Number	8.4
INSTRUMENTS	Analytical Instrument Description	Field	Text	10
KARST	USGS Karst Area Designation Code	Field	Text	10
KARST_DECSRIPTION	USGS Area Designation Code Description	Field	Text	50
LAB	CBP Analytical Laboratory Code	Field	Text	10
LAB_ADDRESS	Analytical Laboratory- Street or Mailing) address	Field	Text	100
LAB_DESCRIPTION	CBP Analytical Laboratory Code Description	Field	Text	150
LATIN_NAME	Species Latin Name	Field	Text	45
LATITUDE	Sampling Site Latitude	Field	Numeric	8.5
LAYER	CBP Water Column Sampling Layer Code	Field	Text	3
LAYER_DESCRIPTION	Water Column Sampling Layer Code Description	Field	Text	30
LIFE_STAGE	CBP Life Stages Code	Field	Text	3
LIFE_STAGE_DESCRIPTION	CBP Life Stages Code Description	Field	Text	50
LL_DATUM	CBP Geographic Datum Designation Code	Field	Text	8

LL_DATUM_DESCRIPTION	CBP Geographic Datum Designation Code Description	Field	Text	50
LONGITUDE	Sampling Site Longitude	Field	Numeric	8.5
METHOD	CBP Tidal Benthic and Plankton Biological Enumeration Method Code	Field	Text	6
METHOD_DESCRIPTION	CBP Tidal Benthic and Plankton Biological Enumeration Method Description	Field	Memo	
METHOD_DETAILS	CBP Tidal Benthic and Plankton Biological Enumeration Method Description Details	Field	Memo	
METHOD_TITLE	CBP Tidal Benthic and Plankton Biological Enumeration Method Title	Field	Text	50
NETMESH	Screen Mesh Width (Millimeters)	Field	Numeric	8.4
NODCCODE	NOAA-NODC Species Code	Field	Text	12
P_DEPTH	Composite Sample Cut-Off Depth (Meters)	Field	Numeric	8.1
PARAMETER	Reporting Parameter (Old Name-superseded by Reporting Parameter)	Field	Text	15
PARAMETER_DESCRIPTION	Reporting Parameter Description (Old Name-superseded by Reporting_Parameter_Description)	Field	Text	100
PENETR	Benthic Sampling Gear Penetration Depth in Centimeter	Field	Numeric	8.1
PENETR_VALUE_TYPE	Value Type Flag for Benthic Sampling Gear Penetration Depth	Field	Text	2
PHONE	General Data Provider Contact Phone Number	Field	Text	25
PI_EMAIL	Principal Investigator Contact EMAIL	Field	Text	100
PI_PHONE	Principal Investigator Contact Phone Number	Field	Text	50
PRINCIPAL_INVESTIGATOR	Principal Investigator Name	Field	Text	50
PROBLEM_CODE	CBP Analytical Problem Code	Field	Text	2
PROBLEM_CODE_DESCRIPTION	Description of CBP Analytical Problem Code	Field	Text	100
PROGRAM	Name of Agency or Agency Division Conducting Monitoring	Field	Text	50
PROGRAM_CODE	CBP Agency Program Code	Field	Text	6
PROGRAM_DESCRIPTION	General Description of Agency or Agency Division Monitoring Program	Field	Text	Memo
PROJECT	CBP Monitoring Project Code	Field	Text	10
PROJECT_DESCRIPTION	Agency Monitoring Project Detailed Description	Field	Text	Memo
PROJECT_NAME	Agency Monitoring Project Name	Field	Text	100
QUALIFIER	Analytical Detection Limit Qualifier	Field	Text	2
QUALIFIER_DESCRIPTION	Analytical Detection Limit Qualifier Description	Field	Text	100

R_DATE	Version Date of Data (MM/DD/YYYY)	Field	Date/Time	8
REFERENCE1	Technical Reference #1 for Analytical Method	Field	Text	Memo
REFERENCE2	Technical Reference #2 for Analytical Method	Field	Text	Memo
REFERENCE3	Technical Reference #3 for Analytical Method	Field	Text	Memo
REFERENCE4	Technical Reference #4 for Analytical Method	Field	Text	Memo
REGION	USGS Two-Digit Hydrologic Units Code	Field	Text	2
REGION_DESCRIPTION	USGS Two-Digit Hydrologic Unit Code Description	Field	Text	50
REP_TYPE	Sampling Replicate Type	Field	Text	5
REPORTED_VALUE	Superseded See Reporting_Parameter_Value	Field	Numeric	8.4
REPORTING_PARAMETER	CBP Code for Reporting Parameter Measured	Field	Text	20
REPORTING_PARAMETER_DECRIPTION	Parameter Measured Description	Field	Text	50
REPORTING_PARAMETER_VALUE	Reporting Value of Measured Parameter	Field	Numeric	8.4
REPORTING_UNITS	CBP Reporting Units Code for Unit of Measure for Reporting Parameter	Field	Text	25
REPORTING_UNITS_DESCRIPTION	Description of Reporting Units Code	Field	Text	50
REPORTING_VALUE	Superseded See Reporting_Parameter_Value	Field	Numeric	8.4
REPORTING_VOLTS	Instrument Reporting Voltage Associated with Reporting_Parameter_Value	Field	Numeric	8.4
SALZONE	CBP Code for Venice Salinity Category at Time of Sampling	Field	Text	2
SALZONE_DESCRIPTION	Description of Venice Salinity Category	Field	Text	50
SALZONE_RANGES	Numeric Range for Venice Salinity in PSU	Field	Text	20
SAMPLE_DATE	Date of Sample Collection (MM/DD/YYYY)	Field	Date/Time	
SAMPLE_DATE_TIME	Combined Date and Time of Sample Collection (MM/DD/YYYY HH:MM:SS)	Field	Date/Time	
SAMPLE_DEPTH	Sample Collection Depth in Meters	Field	Numeric	8.1
SAMPLE_NUMBER	Sample Replicate Number	Field	Numeric	8.0
SAMPLE_REPLICATE_TYPE				
SAMPLE_TIME	Sample Collection Time (HH:MM:SS-24 Hour Time)	Field	Date/Time	8
SAMPLE_TIME_END	End Sample Collection Time (HH:MM:SS-24 Hour Time)- Used when sampling is conducted over time interval	Field	Date/Time	8
SAMPLE_TIME_START	Start Sample Collection Time (HH:MM:SS-24 Hour Time)	Field	Date/Time	8
	Used when sampling is conducted over time interval	Field	Date/Time	8
SAMPLE_TYPE	Sample Collection Type	Field	Text	4
SAMPLE_TYPE_DESCRIPTION	Sample Collection Type Description	Field	Text	4
SAMVOL_L	Total Composite Sample Volume	Field	Numeric	8.2

SEASON	Index of Biotic Integrity- Season Classification	Field	Text	6
SEDIMENT_METHOD	CBP Benthic Sediment Analytical Method Code	Field	Text	6
SEDIMENT_METHOD_DESCRIPTION	CBP Benthic Sediment Analytical Method Code Description	Field	Text	50
SEDIMENT_METHOD_DETAILS	CBP Benthic Sediment Analytical Method Detailed Description	Field	Memo	
SEDIMENT_METHOD_TITLE	CBP Benthic Sediment Analytical Method Title			
SEDIMENT_TYPE	Benthic Sediment Profile Image Analysis Sediment Characterization Type	Field	Text	2
SEDIMENT_TYPE_DESCRIPTION	Benthic Sediment Profile Image Analysis Sediment Characterization Description	Field	Text	50
SER_NUM	Data Collection Agency Sample Serial Number	Field	Text	12
SITE_LOCATION	Source Agency Site Location Description	Field	Text	225
SITE_TYPE_CODE	CBP Sampling Site Type Code	Field	Text	5
SITE_TYPE_DESCRIPTION	Formal Description of Sampling Site Type	Field	Text	225
SITE_TYPE_NAME	Name of Sampling Site Type	Field	Text	25
SIZE_RANGE	Organism Size Range	Field	Text	50
SOURCE	CBP Data Source Code	Field	Text	10
SOURCE_DESCRIPTION	CBP Data Source Description	Field	Text	100
SOURCE_DETAILS	CBP Data Source Detailed Description	Field	Text	150
SOURCE_G_CODE	Data Generator In-house Sampling Gear Designation Code	Field	Text	10
SPEC_CODE	Data Generator In-house Species Identification Code	Field	Text	15
START_DATE	Start Date of Sampling Effort or Cruise (MM/DD/YYYY)	Field	Date/Time	8
STATE_INITIALS	FIPS State Alpha Code	Filed	Text	2
STATE_NAME	FIPS Formal State Name	Field	Text	50
STATION	Sampling Station Name	Field	Text	Variable
STATION_DESCRIPTION	Sampling Station Description	Field	Text	250
STATION_DETAILS	Detailed Sampling Station Description	Field	Test	Memo
STATION_ID	Sampling Station Idetifier	Field	Text	Variable
STORET_CODE	EPA STORET Analytical Parameter Code	Field	Text	5
STORET_STATION	EPA STORET Sampling Station Name	Field	Text	8
STRAHLER_STREAM_ORDER	Strahler Stream Order based on USGS NHD 1:100,000 scale Stream Coverage	Field	Numeric	1
STRATUM	CPB Tidal Benthic Sampling Stratum Code	Field	Text	6

STRATUM_DESCRIPTION	CPB Tidal Benthic Sampling Stratum Description	Field	Text	225
STREET_ADDRESS	Physical Mailing Address or Street Contact	Field	Text	100
SUBBASIN	USGS Eight-Digit Hydrologic Units Code	Field	Text	8
SUBBASIN_DESCRIPTION	USGS Eight-Digit Hydrologic Unit Code Description	Field	Text	50
SUBECOREGION_LEVEL4	EPA Level 4 Ecoregion Code	Field	Text	5
SUBECOREGION_LEVEL4_NAME	EPA Level 4 Ecoregion Description	Field	Text	90
SUBREGION	USGS Two-Digit Hydrologic Units Code	Field	Text	2
SUBREGION_DESCRIPTION	USGS Two-Digit Hydrologic Unit Code Description	Field	Text	50
SUBWATERSHED	USGS Ten-Digit Hydrologic Units Code	Field	Text	10
SUBWATERSHED_DESCRIPTION	USGS Ten-Digit Hydrologic Unit Code Description	Field	Text	50
SURVEY_ID	Database Auto-Indexing Field	Field	Numeric	-
TOTAL_DEPTH	Total Water Depth at Station in Meters (Bottom Depth)	Field	Numeric	8.1
TOTAL_SAMPLE_VOLUME	Total Field Sample Volume	Field	Numeric	8.2
TOTAL_SAMPLE_VOLUME_UNITS	Reporting Units for Field Sample Volume	Field	Text	25
TS_BASIN	Chesapeake Bay Program Tributary Strategy Basin Designation	Field	Text	
TSN	Integrated Taxonomic Information System (ITIS) Taxon Serial Number	Field	Text	7
UP_DATE	Upper End of Phytoplankton Index of Biotic Integrity Sample Date Matching Window	Field	Date/Time	
USGS_CODE	USGS Analytical Parameter Code	Field	Text	50
UTM_X	UTM Zone 18N- X Coordinate	Field	Numeric	8
UTM_Y	UTM Zone 18N- Y Coordinate	Field	Numeric	8
VALUE_TYPE	Parameter Value Type Code	Field	Text	2
VALUE_TYPE_DEFINITION	Parameter Value Type Definition	Field	Text	50
VALUE_TYPE_DESCRIPTION	Parameter Value Type Definition	Field	Text	50
WATER_BODY	Water body name	Field	Text	40
WATERBODY_NAME	Water body name	Field	Text	40
WATERSHED_DESCRIPTION	USGS Ten-Digit Hydrologic Unit Code Description	Field	Text	50
WEB_SITE	URL for Web Site Associated with Data Source	Field	Text	150

WQ_CATEGORY	Phytoplankton Index of Biotic Integrity Water Quality Category	Field	Text	20
WQ_DATE	Phytoplankton Index of Biotic Integrity Water Quality Sampling Date	Field	Date/Time	
WQ_DESCRIPTION	CBP Water Quality Analytical Method Description	Field	Memo	
WQ_DETAILS	CBP Water Quality Analytical Method Detailed Description	Field	Memo	
WQ_METHOD	CBP Water Quality Analytical Method Code	Field	Text	4
WQ_TITLE	CBP Water Quality Analytical Method Title	Field	Text	100
ZIP	US Postal Service ZIP Code	Field	Text	10

APPENDIX C – LOOK UP AND PARAMETER CODES

June 2012

This appendix contain explanations of the numeric and alphanumeric codes are used in the CIMS/CDE databases and data sets to identify specific sampling gears, analytical methods, collecting agencies, segments, cruise numbers, etc.

Table C-1. Sampling Agency or Source Codes (AGENCY or SOURCE).

The Agency or Source codes were added to the database to identify the entity that generates the monitoring data directly or under contract to a larger organization.

AGENCY OR SOURCE	AGENCY OR SOURCE NAME
AAC_DPW	Anne Arundel County-Department of Public Works
BAL_DPW	City of Baltimore-Department of Public Works
BC_DEP	Baltimore County Department of Environmental Protection
DC_DDOE	District of Columbia-District Department of the Environment
DNREC	Delaware Department of Natural Resources and Environmental Control
FC-DPW	Frederick County Department of Public Works
FC-SPS	Fairfax County Department of Public Works and Environmental Services
HC_DPW	Howard County Department of Public Works
LC-DBD	Loudon County Department Of Building And Development
MC-SPS	Montgomery County Department of Environmental Protection
MDDNR	Maryland Department of Natural Resources
MDE	Maryland Department Of The Environment
MSU	Morgan State University
NYDEC	New York Department Of Environmental Conservation
PADEP	Pennsylvania Department of Environmental Protection
PGC-DER	Prince George's County Department of Environmental Resources
SRBC	Susquehanna River Basin Commission
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USGS	United States Geological Survey
VADEQ	Virginia Department of Environmental Quality
VCU	Virginia Commonwealth University
VERSAR	Versar Incorporated
VIMS	Virginia Institute Of Marine Science
WVDEP	West Virginia Department of Environmental Protection

Table C-2. Chesapeake Bay Program 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. Bay Cruise numbers are used only in the Tidal Water Quality Monitoring Program Data. The cruise schedule was originally set up to group mainstem monitoring data from Maryland and Virginia into a synoptic view. Cruises were named specifically according to the mainstem samplings. Therefore, cruise number assignments do not work well when applied to tributary or non-tidal program samplings. As of 2008, the 1st-15th dates are the first cruise (A), and the16th-31st are the second (B) regardless of how many cruises or when they occured. The current CBP cruise numbers are as follows:

CRUISE	START_ DATE	END_ DATE
PRECBP	1/1/1960	6/14/1984
BAY001	6/15/1984	6/30/1984
BAY002	7/1/1984	7/15/1984
BAY003	7/16/1984	7/31/1984
BAY004	8/1/1984	8/15/1984
BAY005	8/16/1984	8/31/1984
BAY006	9/1/1984	9/15/1984
BAY007	9/16/1984	9/30/1984

CRUISE	START_ DATE	END_ DATE
BAY008	10/1/1984	10/15/1984
BAY009	10/16/1984	10/31/1984
BAY010	11/1/1984	11/30/1984
BAY011	12/1/1984	12/31/1984
BAY012	1/1/1985	1/31/1985
BAY013	2/1/1985	2/28/1985
BAY014	3/1/1985	3/15/1985
BAY015	3/16/1985	3/31/1985

CRUISE	START_ DATE	END_ DATE
BAY016	4/1/1985	4/15/1985
BAY017	4/16/1985	4/30/1985
BAY018	5/1/1985	5/15/1985
BAY019	5/16/1985	5/31/1985
BAY020	6/1/1985	6/15/1985
BAY021	6/16/1985	6/30/1985
BAY022	7/1/1985	7/15/1985
BAY023	7/16/1985	7/31/1985

CRUISE	START_ DATE	END_ DATE
BAY024	8/1/1985	8/15/1985
BAY025	8/16/1985	8/31/1985
BAY026	9/1/1985	9/15/1985
BAY027	9/16/1985	10/2/1985
BAY028	10/3/1985	10/14/1985
BAY029	10/15/1985	11/6/1985
BAY030	11/7/1985	11/30/1985
BAY031	12/1/1985	12/31/1985
BAY032	1/1/1986	1/31/1986
BAY033	2/1/1986	2/28/1986
BAY034	3/1/1986	3/15/1986
BAY035	3/16/1986	3/31/1986
BAY036	4/1/1986	4/15/1986
BAY037	4/16/1986	4/30/1986
BAY038	5/1/1986	5/15/1986
BAY039	5/16/1986	5/31/1986
BAY040	6/1/1986	6/15/1986
BAY041	6/16/1986	6/30/1986
BAY042	7/1/1986	7/15/1986
BAY043	7/16/1986	7/31/1986
BAY044	8/1/1986	8/15/1986
BAY045	8/16/1986	8/31/1986
BAY046	9/1/1986	9/15/1986
BAY047	9/16/1986	9/30/1986
BAY048	10/1/1986	10/15/1986
BAY049	10/16/1986	10/31/1986
BAY050	11/1/1986	11/30/1986
BAY051	12/1/1986	12/31/1986
BAY052	1/1/1987	1/31/1987
BAY053	2/1/1987	2/28/1987
BAY054	3/1/1987	3/15/1987
BAY055	3/16/1987	3/31/1987
BAY056	4/1/1987	4/15/1987
BAY057	4/16/1987	4/30/1987
BAY058	5/1/1987	5/15/1987
BAY059	5/16/1987	5/31/1987
BAY060	6/1/1987	6/15/1987
BAY061	6/16/1987	6/30/1987
BAY062	7/1/1987	7/17/1987
BAY063	7/18/1987	7/31/1987
BAY064	8/1/1987	8/15/1987
BAY065	8/16/1987	8/31/1987
BAY066	9/1/1987	9/15/1987
BAY067	9/16/1987	9/30/1987
BAY068	10/1/1987	10/15/1987
BAY069	10/16/1987	10/31/1987

CRUISE	START_ DATE	END_ DATE
BAY070	11/1/1987	11/30/1987
BAY071	12/1/1987	12/31/1987
BAY072	1/1/1988	1/31/1988
BAY073	2/1/1988	2/28/1988
BAY074	3/1/1988	3/15/1988
BAY075	3/16/1988	3/31/1988
BAY076	4/1/1988	4/15/1988
BAY077	4/16/1988	4/30/1988
BAY078	5/1/1988	5/15/1988
BAY079	5/16/1988	5/31/1988
BAY080	6/1/1988	6/14/1988
BAY081	6/15/1988	6/30/1988
BAY082	7/1/1988	7/15/1988
BAY083	7/16/1988	7/31/1988
BAY084	8/1/1988	8/15/1988
BAY085	8/16/1988	8/31/1988
BAY086	9/1/1988	9/13/1988
BAY087	9/14/1988	9/30/1988
BAY088	10/1/1988	10/15/1988
BAY089	10/16/1988	10/31/1988
BAY090	11/1/1988	11/30/1988
BAY091	12/1/1988	12/31/1988
BAY092	1/1/1989	1/31/1989
BAY093	2/1/1989	2/28/1989
BAY094	3/1/1989	3/15/1989
BAY095	3/16/1989	3/31/1989
BAY096	4/1/1989	4/15/1989
BAY097	4/16/1989	4/30/1989
BAY098	5/1/1989	5/15/1989
BAY099	5/16/1989	5/31/1989
BAY100	6/1/1989	6/15/1989
BAY101	6/16/1989	6/30/1989
BAY102	7/1/1989	7/15/1989
BAY103	7/16/1989	7/31/1989
BAY104	8/1/1989	8/15/1989
BAY105	8/16/1989	8/31/1989
BAY106	9/1/1989	9/15/1989
BAY107	9/16/1989	9/30/1989
BAY108	10/1/1989	10/15/1989
BAY109	10/16/1989	10/31/1989
BAY110	11/1/1989	11/30/1989
BAY111	12/1/1989	12/31/1989
BAY112	1/1/1990	1/31/1990
BAY113	2/1/1990	2/28/1990
BAY114	3/1/1990	3/15/1990
BAY115	3/16/1990	3/31/1990

CRUISE	START_ DATE	END_ DATE
BAY116	4/1/1990	4/15/1990
BAY117	4/16/1990	4/30/1990
BAY118	5/1/1990	5/15/1990
BAY119	5/16/1990	5/31/1990
BAY120	6/1/1990	6/15/1990
BAY121	6/16/1990	6/30/1990
BAY122	7/1/1990	7/15/1990
BAY123	7/16/1990	7/31/1990
BAY124	8/1/1990	8/15/1990
BAY125	8/16/1990	8/31/1990
BAY126	9/1/1990	9/15/1990
BAY127	9/16/1990	9/30/1990
BAY128	10/1/1990	10/15/1990
BAY129	10/16/1990	10/31/1990
BAY130	11/1/1990	11/30/1990
BAY131	12/1/1990	12/31/1990
BAY132	1/1/1991	1/31/1991
BAY133	2/1/1991	2/28/1991
BAY134	3/1/1991	3/15/1991
BAY135	3/16/1991	3/31/1991
BAY136	4/1/1991	4/15/1991
BAY137	4/16/1991	4/30/1991
BAY138	5/1/1991	5/15/1991
BAY139	5/16/1991	5/31/1991
BAY140	6/1/1991	6/15/1991
BAY141	6/16/1991	6/30/1991
BAY142	7/1/1991	7/15/1991
BAY143	7/16/1991	7/31/1991
BAY144	8/1/1991	8/15/1991
BAY145	8/16/1991	8/31/1991
BAY146	9/1/1991	9/15/1991
BAY147	9/16/1991	9/30/1991
BAY148	10/1/1991	10/15/1991
BAY149	10/16/1991	10/31/1991
BAY150	11/1/1991	11/30/1991
BAY151	12/1/1991	12/31/1991
BAY152	1/1/1992	1/31/1992
BAY153	2/1/1992	2/28/1992
BAY154	3/1/1992	3/15/1992
BAY155	3/16/1992	3/31/1992
BAY156	4/1/1992	4/15/1992
BAY157	4/16/1992	4/30/1992
BAY158	5/1/1992	5/15/1992
BAY159	5/16/1992	5/31/1992
BAY160	6/1/1992	6/15/1992
BAY161	6/16/1992	6/30/1992

CRUISE	START_ DATE	END_ DATE
BAY162	7/1/1992	7/15/1992
BAY163	7/16/1992	7/31/1992
BAY164	8/1/1992	8/15/1992
BAY165	8/16/1992	8/31/1992
BAY166	9/1/1992	9/15/1992
BAY167	9/16/1992	9/30/1992
BAY168	10/1/1992	10/15/1992
BAY169	10/16/1992	10/31/1992
BAY170	11/1/1992	11/30/1992
BAY171	12/1/1992	12/31/1992
BAY172	1/1/1993	1/31/1993
BAY173	2/1/1993	2/28/1993
BAY174	3/1/1993	3/15/1993
BAY175	3/16/1993	3/31/1993
BAY176	4/1/1993	4/15/1993
BAY177	4/16/1993	4/30/1993
BAY178	5/1/1993	5/15/1993
BAY179	5/16/1993	5/31/1993
BAY180	6/1/1993	6/15/1993
BAY181	6/16/1993	6/30/1993
BAY182	7/1/1993	7/15/1993
BAY183	7/16/1993	7/31/1993
BAY184	8/1/1993	8/15/1993
BAY185	8/16/1993	8/31/1993
BAY186	9/1/1993	9/15/1993
BAY187	9/16/1993	9/30/1993
BAY188	10/1/1993	10/15/1993
BAY189	10/16/1993	10/31/1993
BAY190	11/1/1993	11/30/1993
BAY191	12/1/1993	12/31/1993
BAY192	1/1/1994	1/31/1994
BAY193	2/1/1994	2/28/1994
BAY194	3/1/1994	3/15/1994
BAY195	3/16/1994	3/31/1994
BAY196	4/1/1994	4/15/1994
BAY197	4/16/1994	4/30/1994
BAY198	5/1/1994	5/15/1994
BAY199	5/16/1994	5/31/1994
BAY200	6/1/1994	6/15/1994
BAY201	6/16/1994	6/30/1994
BAY202	7/1/1994	7/15/1994
BAY203	7/16/1994	7/31/1994
BAY204	8/1/1994	8/15/1994
BAY205	8/16/1994	8/31/1994
BAY206	9/1/1994	9/15/1994
BAY207	9/16/1994	9/30/1994

CRUISE	START_ DATE	END_ DATE
BAY208	10/1/1994	10/15/1994
BAY209	10/16/1994	10/31/1994
BAY210	11/1/1994	11/30/1994
BAY211	12/1/1994	12/31/1994
BAY212	1/1/1995	1/31/1995
BAY213	2/1/1995	2/28/1995
BAY214	3/1/1995	3/15/1995
BAY215	3/16/1995	3/31/1995
BAY216	4/1/1995	4/15/1995
BAY217	4/16/1995	4/30/1995
BAY218	5/1/1995	5/15/1995
BAY219	5/16/1995	5/31/1995
BAY220	6/1/1995	6/15/1995
BAY221	6/16/1995	6/30/1995
BAY222	7/1/1995	7/15/1995
BAY223	7/16/1995	7/31/1995
BAY224	8/1/1995	8/15/1995
BAY225	8/16/1995	8/31/1995
BAY226	9/1/1995	9/15/1995
BAY227	9/16/1995	9/30/1995
BAY228	10/1/1995	10/15/1995
BAY229	10/16/1995	10/31/1995
BAY230	11/1/1995	11/30/1995
BAY231	12/1/1995	12/31/1995
BAY232	1/1/1996	1/31/1996
BAY233	2/1/1996	2/29/1996
BAY234	3/1/1996	3/15/1996
BAY235	3/16/1996	3/31/1996
BAY236	4/1/1996	4/15/1996
BAY237	4/16/1996	4/30/1996
BAY238	5/1/1996	5/15/1996
BAY239	5/16/1996	5/31/1996
BAY240	6/1/1996	6/15/1996
BAY241	6/16/1996	6/30/1996
BAY242	7/1/1996	7/15/1996
BAY243	7/16/1996	7/31/1996
BAY244	8/1/1996	8/15/1996
BAY245	8/16/1996	8/31/1996
BAY246	9/1/1996	9/15/1996
BAY247	9/16/1996	9/30/1996
BAY248	10/1/1996	10/15/1996
BAY249	10/16/1996	10/31/1996
BAY250	11/1/1996	11/30/1996
BAY251	12/1/1996	12/31/1996
BAY252	1/1/1997	1/31/1997
BAY253	2/1/1997	2/28/1997

CRUISE	START_ DATE	END_ DATE
BAY254	3/1/1997	3/15/1997
BAY255	3/16/1997	3/31/1997
BAY256	4/1/1997	4/13/1997
BAY257	4/14/1997	4/30/1997
BAY258	5/1/1997	5/15/1997
BAY259	5/16/1997	5/31/1997
BAY260	6/1/1997	6/15/1997
BAY261	6/16/1997	6/30/1997
BAY262	7/1/1997	7/17/1997
BAY263	7/18/1997	7/31/1997
BAY264	8/1/1997	8/15/1997
BAY265	8/16/1997	8/31/1997
BAY266	9/1/1997	9/15/1997
BAY267	9/16/1997	9/30/1997
BAY268	10/1/1997	10/17/1997
BAY269	10/18/1997	10/31/1997
BAY270	11/1/1997	11/30/1997
BAY271	12/1/1997	12/31/1997
BAY272	1/1/1998	1/31/1998
BAY273	2/1/1998	2/28/1998
BAY274	3/1/1998	3/15/1998
BAY275	3/16/1998	3/31/1998
BAY276	4/1/1998	4/15/1998
BAY277	4/16/1998	4/30/1998
BAY278	5/1/1998	5/15/1998
BAY279	5/16/1998	5/31/1998
BAY280	6/1/1998	6/14/1998
BAY281	6/15/1998	6/30/1998
BAY282	7/1/1998	7/15/1998
BAY283	7/16/1998	7/31/1998
BAY284	8/1/1998	8/15/1998
BAY285	8/16/1998	8/31/1998
BAY286	9/1/1998	9/13/1998
BAY287	9/14/1998	9/30/1998
BAY288	10/1/1998	10/15/1998
BAY289	10/16/1998	10/31/1998
BAY290	11/1/1998	11/30/1998
BAY291	12/1/1998	12/31/1998
BAY292	1/1/1999	1/31/1999
BAY293	2/1/1999	2/28/1999
BAY294	3/1/1999	3/14/1999
BAY295	3/15/1999	3/31/1999
BAY296	4/1/1999	4/15/1999
BAY297	4/16/1999	4/30/1999
BAY298	5/1/1999	5/15/1999
BAY299	5/16/1999	5/31/1999

CRUISE	START_ DATE	END_ DATE
BAY300	6/1/1999	6/13/1999
BAY301	6/14/1999	6/30/1999
BAY302	7/1/1999	7/16/1999
BAY303	7/17/1999	7/31/1999
BAY304	8/1/1999	8/15/1999
BAY305	8/16/1999	8/30/1999
BAY306	9/1/1999	9/15/1999
BAY307	9/15/1999	9/30/1999
BAY308	10/1/1999	10/15/1999
BAY309	10/16/1999	10/31/1999
BAY310	11/1/1999	11/30/1999
BAY311	12/1/1999	12/31/1999
BAY312	1/1/2000	1/31/2000
BAY313	2/1/2000	2/29/2000
BAY314	3/1/2000	3/15/2000
BAY315	3/16/2000	3/31/2000
BAY316	4/1/2000	4/15/2000
BAY317	4/16/2000	4/30/2000
BAY318	5/1/2000	5/15/2000
BAY319	5/16/2000	5/31/2000
BAY320	6/1/2000	6/15/2000
BAY321	6/16/2000	6/30/2000
BAY322	7/1/2000	7/15/2000
BAY323	7/16/2000	7/31/2000
BAY324	8/1/2000	8/15/2000
BAY325	8/16/2000	8/30/2000
BAY326	9/1/2000	9/15/2000
BAY327	9/16/2000	9/30/2000
BAY328	10/1/2000	10/15/2000
BAY329	10/16/2000	10/31/2000
BAY330	11/1/2000	11/30/2000
BAY331	12/1/2000	12/31/2000
BAY332	1/1/2001	1/31/2001
BAY333	2/1/2001	2/28/2001
BAY334	3/1/2001	3/15/2001
BAY335	3/16/2001	3/31/2001
BAY336	4/1/2001	4/15/2001
BAY337	4/16/2001	4/30/2001
BAY338	5/1/2001	5/15/2001
BAY339	5/16/2001	5/31/2001
BAY340	6/1/2001	6/15/2001
BAY341	6/16/2001	6/30/2001
BAY342	7/1/2001	7/15/2001
BAY343	7/16/2001	7/31/2001
BAY344	8/1/2001	8/16/2001
BAY345	8/17/2001	8/31/2001
BAY346	9/1/2001	9/15/2001
BAY347	9/16/2001	9/30/2001
BAY348	10/1/2001	10/18/2001
BAY349	10/19/2001	10/31/2001
BAY350	11/1/2001	11/30/2001
BAY351	12/1/2001	12/31/2001
BAY352	1/8/2002	1/31/2002
BAY353	2/1/2002	2/28/2002
BAY354	3/1/2002	3/15/2002
BAY355	3/16/2002	3/31/2002
BAY356	4/1/2002	4/15/2002
BAY357	4/16/2002	4/30/2002
BAY358	5/1/2002	5/15/2002
BAY359	5/16/2002	5/31/2002
BAY360	6/1/2002	6/15/2002
BAY361	6/16/2002	6/30/2002
BAY362	7/1/2002	7/15/2002
BAY363	7/16/2002	7/31/2002
BAY364	8/1/2002	8/15/2002
BAY365	8/16/2002	8/31/2002
BAY366	9/1/2002	9/15/2002
BAY367	9/16/2002	9/30/2002
BAY368	10/1/2002	10/15/2002
BAY369	10/16/2002	10/31/2002
BAY370	11/1/2002	11/30/2002
BAY371	12/1/2002	12/31/2002
BAY372	1/1/2003	1/31/2003
BAY373	2/1/2003	2/28/2003
BAY374	3/1/2003	3/15/2003
BAY375	3/16/2003	3/31/2003
BAY376	4/1/2003	4/15/2003
BAY377	4/16/2003	4/30/2003
BAY378	5/1/2003	5/15/2003
BAY379	5/16/2003	5/31/2003
BAY380	6/1/2003	6/15/2003
BAY381	6/16/2003	6/30/2003
BAY382	7/1/2003	7/15/2003
BAY383	7/16/2003	7/31/2003
BAY384	8/1/2003	8/15/2003
BAY385	8/16/2003	8/31/2003
BAY386	9/1/2003	9/15/2003
BAY387	9/16/2003	9/30/2003
BAY388	10/1/2003	10/15/2003
BAY389	10/16/2003	10/31/2003
BAY390	11/1/2003	11/30/2003
BAY391	12/1/2003	12/31/2003
BAY392	1/6/2004	1/30/2004
BAY393	2/1/2004	2/29/2004
BAY394	3/1/2004	3/30/2004
BAY396	4/1/2004	4/15/2004
BAY397	4/16/2004	4/30/2004
BAY398	5/1/2004	5/15/2004
BAY399	5/16/2004	5/31/2004
BAY400	6/1/2004	6/15/2004
BAY401	6/16/2004	6/30/2004
BAY402	7/1/2004	7/14/2004
BAY403	7/15/2004	7/31/2004
BAY404	8/1/2004	8/15/2004
BAY405	8/16/2004	8/31/2004
BAY406	9/1/2004	9/15/2004
BAY407	9/16/2004	9/30/2004
BAY408	10/1/2004	10/15/2004
BAY409	10/16/2004	10/31/2004
BAY410	11/1/2004	11/30/2004
BAY411	12/1/2004	12/31/2004
BAY412	1/5/2005	1/31/2005
BAY413	2/1/2005	2/28/2005
BAY414	3/1/2005	3/17/2005
BAY415	3/18/2005	3/31/2005
BAY416	4/1/2005	4/15/2005
BAY417	4/16/2005	4/30/2005
BAY418	5/1/2005	5/15/2005
BAY419	5/16/2005	5/31/2005
BAY420	6/1/2005	6/15/2005
BAY421	6/16/2005	6/30/2005
BAY422	7/1/2005	7/15/2005
BAY423	7/16/2005	7/31/2005
BAY424	8/1/2005	8/15/2005
BAY425	8/16/2005	8/31/2005
BAY426	9/1/2005	9/15/2005
BAY427	9/16/2005	9/30/2005
BAY428	10/1/2005	10/15/2005
BAY429	10/16/2005	10/31/2005
BAY430	11/1/2005	11/30/2005
BAY431	12/1/2005	12/31/2005
BAY432	1/1/2006	1/31/2006
BAY433	2/1/2006	2/28/2006
BAY434	3/1/2006	3/15/2006
BAY435	3/16/2006	3/31/2006
BAY436	4/1/2006	4/15/2006
BAY437	4/16/2006	4/30/2006
BAY438	5/1/2006	5/15/2006

CRUISE	START_ DATE	END_ DATE
BAY439	5/16/2006	5/31/2006
BAY440	6/1/2006	6/15/2006
BAY441	6/16/2006	6/30/2006
BAY442	7/1/2006	7/15/2006
BAY443	7/16/2006	7/31/2006
BAY444	8/1/2006	8/17/2006
BAY445	8/18/2006	8/31/2006
BAY446	9/1/2006	9/15/2006
BAY447	9/16/2006	9/30/2006
BAY448	10/1/2006	10/15/2006
BAY449	10/16/2006	10/31/2006
BAY450	11/1/2006	11/30/2006
BAY451	12/1/2006	12/31/2006
BAY452	1/3/2007	1/31/2007
BAY453	2/1/2007	2/28/2007
BAY454	3/1/2007	3/15/2007
BAY455	3/16/2007	3/30/2007
BAY456	4/1/2007	4/15/2007
BAY457	4/16/2007	4/30/2007
BAY458	5/1/2007	5/15/2007
BAY459	5/16/2007	5/31/2007
BAY460	6/1/2007	6/15/2007
BAY461	6/16/2007	6/30/2007
BAY462	7/1/2007	7/15/2007
BAY463	7/16/2007	7/31/2007
BAY464	8/1/2007	8/15/2007
BAY465	8/16/2007	8/31/2007
BAY466	9/1/2007	9/15/2007
BAY467	9/16/2007	9/30/2007
BAY468	10/1/2007	10/15/2007
BAY469	10/16/2007	10/31/2007
BAY470	11/1/2007	11/30/2007
BAY471	12/1/2007	12/31/2007
BAY472	1/1/2008	1/15/2008
BAY473	1/16/2008	1/31/2008
BAY474	2/1/2008	2/15/2008
BAY475	2/16/2008	2/29/2008
BAY476	3/1/2008	3/15/2008
BAY477	3/16/2008	3/31/2008
BAY478	4/1/2008	4/16/2008
BAY479	4/17/2008	4/30/2008
BAY480	5/1/2008	5/15/2008
BAY481	5/16/2008	5/31/2008
BAY482	6/1/2008	6/15/2008
BAY483	6/16/2008	6/30/2008
BAY484	7/1/2008	7/15/2008

CRUISE	START_ DATE	END_ DATE
BAY485	7/16/2008	7/31/2008
BAY486	8/1/2008	8/15/2008
BAY487	8/16/2008	8/31/2008
BAY488	9/1/2008	9/14/2008
BAY489	9/15/2008	9/30/2008
BAY490	10/1/2008	10/15/2008
BAY491	10/16/2008	10/31/2008
BAY492	11/1/2008	11/15/2008
BAY493	11/16/2008	11/30/2008
BAY494	12/1/2008	12/15/2008
BAY495	12/16/2008	12/31/2008
BAY496	1/1/2009	1/15/2009
BAY497	1/16/2009	1/31/2009
BAY498	2/1/2009	2/15/2009
BAY499	2/16/2009	2/28/2009
BAY500	3/1/2009	3/15/2009
BAY501	3/16/2009	3/31/2009
BAY502	4/1/2009	4/15/2009
BAY503	4/16/2009	4/30/2009
BAY504	5/1/2009	5/15/2009
BAY505	5/16/2009	5/31/2009
BAY506	6/1/2009	6/15/2009
BAY507	6/16/2009	6/30/2009
BAY508	7/1/2009	1/15/2009
BAY509	7/16/2009	7/30/2009
BAY510	8/1/2009	8/15/2009
BAY511	8/16/2009	8/31/2009
BAY512	9/1/2009	9/15/2009
BAY513	9/16/2009	9/30/2009
BAY514	10/1/2009	10/15/2009
BAY515	10/16/2009	10/31/2009
BAY516	11/1/2009	11/15/2009
BAY517	11/16/2009	11/30/2009
BAY518	12/1/2009	12/15/2009
BAY519	12/16/2009	12/31/2009
BAY520	1/1/2010	1/15/2010
BAY521	1/16/2010	1/31/2010
BAY522	2/1/2010	2/15/2010
BAY523	2/16/2010	2/28/2010
BAY524	3/1/2010	3/15/2010
BAY525	3/16/2010	3/31/2010
BAY526	4/1/2010	4/15/2010
BAY527	4/16/2010	4/30/2010
BAY528	5/1/2010	5/15/2010
BAY529	5/16/2010	5/31/2010
BAY530	6/1/2010	6/15/2010

CRUISE	START_ DATE	END_ DATE
BAY531	6/16/2010	6/30/2010
BAY532	7/1/2010	7/15/2010
BAY533	7/16/2010	7/30/2010
BAY534	8/1/2010	8/15/2010
BAY535	8/16/2010	8/31/2010
BAY536	9/1/2010	9/15/2010
BAY537	9/16/2010	9/30/2010
BAY538	10/1/2010	10/15/2010
BAY539	10/16/2010	10/31/2010
BAY540	11/1/2010	11/15/2010
BAY541	11/16/2010	11/30/2010
BAY542	12/1/2010	12/15/2010
BAY543	12/16/2010	12/31/2010
BAY544	1/1/2011	1/15/2011
BAY545	1/16/2011	1/31/2011
BAY546	2/1/2011	2/15/2011
BAY547	2/16/2011	2/28/2011
BAY548	3/1/2011	3/15/2011
BAY549	3/16/2011	3/31/2011
BAY550	4/1/2011	4/15/2011
BAY551	4/16/2011	4/30/2011
BAY552	5/1/2011	5/15/2011
BAY553	5/16/2011	5/31/2011
BAY554	6/1/2011	6/15/2011
BAY555	6/16/2011	6/30/2011
BAY556	7/1/2011	7/15/2011
BAY557	7/16/2011	7/31/2011
BAY558	8/1/2011	8/15/2011
BAY559	8/16/2011	8/31/2011
BAY560	9/1/2011	9/15/2011
BAY561	9/16/2011	9/30/2011
BAY562	10/1/2011	10/15/2011
BAY563	10/16/2011	10/31/2011
BAY564	11/1/2011	11/15/2011
BAY565	11/16/2011	11/30/2011
BAY566	12/1/2011	12/15/2011
BAY567	12/16/2011	12/31/2011
BAY568	1/1/2012	1/15/2012
BAY569	1/16/2012	1/31/2012
BAY570	2/1/2012	2/15/2012
BAY571	2/16/2012	2/29/2012
BAY572	3/1/2012	3/15/2012
BAY573	3/16/2012	3/31/2012
BAY574	4/1/2012	4/15/2012
BAY575	4/16/2012	4/30/2012
BAY576	5/1/2012	5/15/2012

CRUISE	START_ DATE	END_ DATE
BAY577	5/16/2012	5/31/2012
BAY578	6/1/2012	6/15/2012
BAY579	6/16/2012	6/30/2012
BAY580	7/1/2012	7/15/2012
BAY581	7/16/2012	7/31/2012

CRUISE	START_ DATE	END_ DATE
BAY582	8/1/2012	8/15/2012
BAY583	8/16/2012	8/31/2012
BAY584	9/1/2012	9/15/2012
BAY585	9/16/2012	9/30/2012
BAY586	10/1/2012	10/15/2012

CRUISE	START_ DATE	END_ DATE
BAY587	10/16/2012	10/31/2012
BAY588	11/1/2012	1/15/2012
BAY589	11/16/2012	11/30/2012
BAY590	12/1/2012	12/15/2012
BAY591	12/16/2012	12/31/2012

Table C-3. 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-4. ITIS Taxon Serial Numbers (TSN) and NOAA Species Code (NODCCODE)

CIMS/CDE databases use 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. The NODC code was that a code that changed over time to reflect current changes in taxonomic classifications. 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

In 1996, NODC released the final version (#8) of the NODC Taxonomic Code. Version 8 provided the old NODC codes along with their new ITIS Taxonomic Serial Numbers to facilitate the transition to a new Integrated Taxonomic Information System (ITIS). From that point in time, the NODC code was frozen and ITIS assumed responsibility for assigning new TSN codes, and verifying accepted scientific names and synonyms. However, it still provides data analysts with a very useful tool for sorting organisms into taxonomic groups.

Please see the current taxonomic database on www.chesapeakebay.net or the document a *Comprehensive List of Chesapeake Bay Basin Species, 2007* for a full listing.

Table C-5. 1985 Chesapeake Bay Program Segment Scheme (CB_SEG85).

The original Chesapeake Bay Segmentation Scheme, published in the appendices of Chesapeake Bay: A Profile of Environmental Change was developed in the late 1970s and early 1980s. This initial segmentation scheme formed the spatial aggregation scheme for station network design of the baywide water quality and biological monitoring programs that were initiated in the mid-1980s. The 1983–1985 scheme was based primarily on salinity, circulation and natural features, and secondarily on biological factors and management objectives. The salinity data record on which the scheme was based extends to the late 1940s, but for many parts of the Chesapeake Bay, the data were at best patchy in time and space.
The currently accepted CB_SEG85 values and descriptions are as follows:

CBSEG85	SEGMENT 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

CBSEG85	SEGMENT DESCRIPTION
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-6. The 2003 Chesapeake Bay Program Segment Designation (CB_SEG2003).

Due to the limitations of the original 1985 segmentation scheme (CB_SEG85), it was revised as part of the 1997 Nutrient Reevaluation in 1997. The new segmentation systems based on an additional 10 plus years of data was designed better representation of biological habitat conditions. An interim segmentation scheme was released in 2007 and finalized in 2008. Later, technical errors were found and the segment scheme received revisions in 2003. Segment names did not differ from 2007 & 2008 versions however segment boundaries were modified. Please see the document a *Chesapeake Bay Program Analytical Segmentation Scheme: Revisions, Decisions and Rationales1983-2003* for complete details. A current segment map can be found at http://www.chesapeakebay.net/maps/map/chesapeake_bay_2003_segmentation_scheme_codes

The currently accepted CB_SEG2003 values and descriptions are as follows:

Segment	Description
ANATF	Anacostia River
APPTF	Appomattox River
BACOH	Back River
BIGMH	Big Annemessex River
BOHOH	Bohemia River
BSHOH	Bush River
C&DOH	C&D Canal
CB1TF	Northern Chesapeake Bay
CB2OH	Upper Chesapeake Bay
CB3MH	Upper Central Chesapeake Bay
CB4MH	Middle Central Chesapeake Bay
CB5MH	Lower Central Chesapeake Bay
CB6PH	Western Lower Chesapeake Bay
CB7PH	Eastern Lower Chesapeake Bay
CB8PH	Mouth of Chesapeake Bay
CHKOH	Chickahominy River
CHOMH1	Lower Choptank River
CHOMH2	Mouth of the Choptank River
CHOOH	Middle Choptank River
CHOTF	Upper Choptank River
CHSMH	Lower Chester River
CHSOH	Middle Chester River
CHSTF	Upper Chester River
CRRMH	Corrotoman River
EASMH	Eastern Bay
EBEMH	Eastern Branch Elizabeth River
ELIPH	Mouth to mid-Elizabeth River
ELKOH	Elk River
FSBMH	Fishing Bay
GUNOH	Gunpowder River
HNGMH	Honga River
JMSMH	Lower James River
JMSOH	Middle James River
JMSPH	Mouth of the James River
JMSTF	Upper James River
LAFMH	Lafayette River
LCHMH	Little Choptank River
LYNPH	Lynnhaven River
MAGMH	Magothy River
MANMH	Manokin River
MATTF	Mattawoman Creek
MIDOH	Middle River
MOBPH	Mobjack Bay
MPNOH	Lower Mattaponi River
MPNTF	Upper Mattaponi River
NANMH	Lower Nanticoke River
NANOH	Middle Nanticoke River
NANTF	Upper Nanticoke River
NORTF	Northeast River
PATMH	Patapsco River
PAXMH	Lower Patuxent River
PAXOH	Middle Patuxent River
PAXTF	Upper Patuxent River
PIAMH	Piankatank River
PISTF	Piscataway Creek
PMKOH	Lower Pamunkey River
PMKTF	Upper Pamunkey River
POCMH	Lower Pocomoke River
POCOH	Middle Pocomoke River
POCTF	Upper Pocomoke River
POTMH	Lower Potomac
POTOH	Middle Potomac
POTTF	Upper Potomac River
RHDMH	Rhode River
RPPMH	Lower Rappahannock River
RPPOH	Middle Rappahannock River
RPPTF	Upper Rappahannock River
SASOH	Sassafras River
SBEMH	Southern Branch Elizabeth River
SEVMH	Severn River
SOUMH	South River
TANMH	Tangier Sound
WBEMH	Western Branch Elizabeth River
WBRTF	Western Branch Patuxent River
WICMH	Wicomico River
WSTMH	West River
YRKMH	Middle York River
YRKPH	Lower York River

Table C-7 Data Type (DATA_TYPE).

This table stores information related to DATA_TYPE codes in the CBP 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	TIDAL BENTHIC
FL	FLUORESCENCE
MI	MICROZOOPLANKTON
MZ	MESOZOOPLANKTON
NB	NON-TIDAL BENTHIC
PD	PRIMARY PRODUCTION
PH	PHYTOPLANKTON
PP	PICOPLANKTON

Table C-8. Ecological Regions (ECOREGION_LEVEL_4).

This table stores information related to Ecoregion_Level_4 codes in the CBP Non-Tidal Benthic database. The US EPA has established ecoregions as a classification framework to group similar ecosystems into classes with components of relatively homogeneous quality and quantity (Olmernik 2004). Ecoregions are defined by phenomena include geology, physiographic, vegetation, climate, soils, land use, wildlife, and hydrology. Ecoregions were used as a site classification tool in the development of the Chessie BIBI in 2010. More details can be found in Omernik, J. M. (2004). *Perspectives on the Nature and Definition of Ecological Regions*. p. 34 - Supplement 1, pp.27–38. Maps of the current ecoregions in the Chesapeake Bay water shed can be found at http://www.chesapeakebay.net/maps/map/omernik_ecoregions.

Currently recognized EPA Level 4 Ecological Regions and level 3 descriptions are as follows:

Sub ecoregion_ level4	subecoregion_level_4_name	subecoregion_level_3_name
45C	Carolina Slate Belt	Piedmont
45E	Northern Inner Piedmont	Piedmont
45F	Northern Outer Piedmont	Piedmont
45G	Triassic Basins	Piedmont
58H	Reading Prong	Northeastern Highlands
60A	Glaciated Low Plateau	Northern Appalachian Plateau and Uplands
60B	Northeastern Uplands	Northern Appalachian Plateau and Uplands
60D	Finger Lakes Uplands and Gorges	Northern Allegheny Plateau
60E	Glaciated Allegheny Hills	Northern Allegheny Plateau
61B	Mosquito Creek/Pymatuning Lowlands	Erie Drift Plain
61C	Low Lime Drift Plain	Erie Drift Plain
62A	Pocono High Plateau	North Central Appalachians
62B	Low Poconos	North Central Appalachians
62C	Glaciated Allegheney High Plateau	North Central Appalachians
62D	Unglaciated Allegheney High Plateau	North Central Appalachians
62E	Low Catskills	North Central Appalachians
63A	Delaware River Terraces and Uplands	Middle Atlantic Coastal Plain
63B	Chesapeake-Pamlico Lowlands and Tidal Marshes	Middle Atlantic Coastal Plain
63C	Swamps and Peatlands	Middle Atlantic Coastal Plain
63D	Virginian Barrier Islands and Coastal Marshes	Middle Atlantic Coastal Plain
63E	Mid-Atlantic Flatwoods	Middle Atlantic Coastal Plain
63F	Delmarva Uplands	Middle Atlantic Coastal Plain

Sub ecoregion_ level4	subecoregion_level_4_name	subecoregion_level_3_name
64A	Triassic Lowlands	Northern Piedmont
64B	Trap Rock and Conglomerate Uplands	Northern Piedmont
64C	Piedmont Uplands	Northern Piedmont
64D	Piedmont Limestone/Dolomite Lowlands	Northern Piedmont
65M	Rolling Coastal Plain	Southeastern Plains
65N	Chesapeake Rolling Coastal Plain	Southeastern Plains
66A	Northern Igneous Ridges	Blue Ridge
66B	Northern Sedimentary and Metasedimentary Ridges	Blue Ridge
66C	New River Plateau	Blue Ridge
66D	Southern Crystalline Ridges and Mountains	Blue Ridge
66E	Southern Sedimentary Ridges	Blue Ridge
66F	Limestone Valleys and Coves	Blue Ridge
67A	Northern Limestone/Dolomite Valleys	Ridge and Valley
67B	Northern Shale Valleys	Ridge and Valley
67C	Northern Sandstone Ridges	Ridge and Valley
67D	Northern Dissected Ridges and Knobs	Ridge and Valley
67E	Anthracite Subregion	Ridge and Valley
67F	Southern Limestone/Dolomite Valleys and Low Rolling Hills	Ridge and Valley
67G	Southern Shale Valleys	Ridge and Valley
67H	Southern Sandstone Ridges	Ridge and Valley
67I	Southern Dissected Ridges and Knobs	Ridge and Valley
69A	Forested Hills and Mountains	Central Appalachians
69B	Uplands and Valleys of Mixed Land Use	Central Appalachians
69C	Greenbriar Karst	Central Appalachians
69D	Dissected Appalachian Plateau	Central Appalachians
69E	Cumberland Mountain Thrust Block	Central Appalachians

Table C-9. Sampling Event Type (EVENT_TYPE).

This table contains information to type of samples collected during tidal and non-tidal benthic sampling events. The following list of data types represent those which either directly measured in the field or analyzed in the laboratory.

EVENT_TYPE	EVENT_TYPE_DESCRIPTION
BEN	Benthic Taxa Assessment Only
BEN\BIOM\SED	Benthic Taxa, Benthic Biomass And Sediment Assessments
BEN\HAB	Benthic Taxa And Habitat Assessment
BEN\SED	Benthic Taxa And Sediment Assessments
BIOM	Benthic Biomass Assessment Only
HAB	Habitat Only
IMG	Sediment Image Analysis
QBEN	Qualitative Benthic Taxa Assessment Only
QBEN\HAB	Qualitative Benthic\Habitat
SED	Sediment Assessment Only
WQ	Water Quality Assessment Only
WQ\BEN	Water Quality And Benthic Taxa Assessment
WQ\BEN\BIOM	Water Quality, Benthic Taxa And Biomass Assessment
WQ\BEN\BIOM\SED	Water Quality, Benthic Taxa, Biomass And Sediment Assessments
WQ\BEN\HAB	Water Quality, Benthic Taxa And Habitat Assessment
WQ\BEN\SED	Water Quality, Benthic taxa And Sediment Analysis
WQ\HAB	Water Quality And Habitat Assessment
WQ\QBEN	Water Quality And Qualitative Benthic Taxa Assessment
WQ\QBEN\HAB	Water Quality, Qualitative Benthic Taxa And Habitat
WQ\SED	Water Quality And Sediment Analysis

Table C-10. Fall Line Designation (FALL_LINE).

Designation of sampling station position relative to fall line. These codes are found in the stations table of the plankton database.

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

Table C-11. 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	24019	MD	DORCHESTER
10003	DE	NEW CASTLE	24021	MD	FREDERICK
10005	DE	SUSSEX	24023	MD	GARRETT
11001	DC	DISTRICT OF COLUMBIA	24025	MD	HARFORD
24001	MD	ALLEGANY	24027	MD	HOWARD
24003	MD	ANNE ARUNDEL	24029	MD	KENT
24005	MD	BALTIMORE	24031	MD	MONTGOMERY
24009	MD	CALVERT	24033	MD	PRINCE GEORGES
24011	MD	CAROLINE	24035	MD	QUEEN ANNES
24013	MD	CARROLL	24037	MD	SAINT MARYS
24015	MD	CECIL	24039	MD	SOMERSET
24017	MD	CHARLES	24041	MD	TALBOT

FIPS	STATE	NAME	FIPS	STATE	NAME
24043	MD	WASHINGTON	42099	PA	PERRY
24045	MD	WICOMICO	42105	PA	POTTER
24047	MD	WORCESTER	42107	PA	SCHUYLKILL
24510	MD	BALTIMORE CITY	42109	PA	SNYDER
36003	NY	ALLEGANY	42111	PA	SOMERSET
36007	NY	BROOME	42113	PA	SULLIVAN
36011	NY	CAYUGA	42115	PA	SUSQUEHANNA
36015	NY	CHEMUNG	42117	PA	TIOGA
36017	NY	CHENANGO	42119	PA	UNION
36023	NY	CORTLAND	42127	PA	WAYNE
36025	NY	DELAWARE	42131	PA	WYOMING
36043	NY	HERKIMER	42133	PA	YORK
36051	NY	LIVINGSTON	51001	VA	ACCOMACK
36053	NY	MADISON	51003	VA	ALBEMARLE
36065	NY	ONEIDA	51005	VA	ALLEGHANY
36067	NY	ONONDAGA	51007	VA	AMELIA
36069	NY	ONTARIO	51009	VA	AMHERST
36077	NY	OTSEGO	51011	VA	APPOMATTOX
36095	NY	SCHOHARIE	51013	VA	ARLINGTON
36097	NY	SCHUYLER	51015	VA	AUGUSTA
36101	NY	STEUBEN	51017	VA	BATH
36107	NY	TIOGA	51019	VA	BEDFORD
36109	NY	TOMPKINS	51023	VA	BOTETOURT
36123	NY	YATES	51029	VA	BUCKINGHAM
42001	PA	ADAMS	51031	VA	CAMPBELL
42009	PA	BEDFORD	51033	VA	CAROLINE
42011	PA	BERKS	51036	VA	CHARLES CITY
42013	PA	BLAIR	51037	VA	CHARLOTTE
42015	PA	BRADFORD	51041	VA	CHESTERFIELD
42021	PA	CAMBRIA	51043	VA	CLARKE
42023	PA	CAMERON	51045	VA	CRAIG
42025	PA	CARBON	51047	VA	CULPEPER
42027	PA	CENTRE	51049	VA	CUMBERLAND
42029	PA	CHESTER	51053	VA	DINWIDDIE
42033	PA	CLEARFIELD	51057	VA	ESSEX
42035	PA	CLINTON	51059	VA	FAIRFAX
42037	PA	COLUMBIA	51061	VA	FAUQUIER
42041	PA	CUMBERLAND	51065	VA	FLUVANNA
42043	PA	DAUPHIN	51069	VA	FREDERICK
42047	PA	ELK	51071	VA	GILES
42055	PA	FRANKLIN	51073	VA	GLOUCESTER
42057	PA	FULTON	51075	VA	GOOCHLAND
42061	PA	HUNTINGDON	51079	VA	GREENE
42063	PA	INDIANA	51085	VA	HANOVER
42065	PA	JEFFERSON	51087	VA	HENRICO
42067	PA	JUNIATA	51091	VA	HIGHLAND
42069	PA	LACKAWANNA	51093	VA	ISLE OF WIGHT
42071	PA	LANCASTER	51095	VA	JAMES CITY
42075	PA	LEBANON	51097	VA	KING AND QUEEN
42079	PA	LUZERNE	51099	VA	KING GEORGE
42081	PA	LYCOMING	51101	VA	KING WILLIAM
42083	PA	MCKEAN	51103	VA	LANCASTER
42087	PA	MIFFLIN	51107	VA	LOUDOUN
42093	PA	MONTOUR	51109	VA	LOUISA
42097	PA	NORTHUMBERLAND	51111	VA	LUNENBURG

FIPS	STATE	NAME
51113	VA	MADISON
51115	VA	MATHEWS
51119	VA	MIDDLESEX
51121	VA	MONTGOMERY
51125	VA	NELSON
51127	VA	NEW KENT
51131	VA	NORTHAMPTON
51133	VA	NORTHUMBERLAND
51135	VA	NOTTOWAY
51137	VA	ORANGE
51139	VA	PAGE
51145	VA	POWHATAN
51147	VA	PRINCE EDWARD
51149	VA	PRINCE GEORGE
51153	VA	PRINCE WILLIAM
51157	VA	RAPPAHANNOCK
51159	VA	RICHMOND
51161	VA	ROANOKE
51163	VA	ROCKBRIDGE
51165	VA	ROCKINGHAM
51171	VA	SHENANDOAH
51177	VA	SPOTSYLVANIA
51179	VA	STAFFORD
51181	VA	SURRY
51187	VA	WARREN
51193	VA	WESTMORELAND
51199	VA	YORK
51510	VA	ALEXANDRIA CITY
51530	VA	BUENA VISTA CITY
51540	VA	CHARLOTTESVILLE CITY
51550	VA	CHESAPEAKE CITY
51560	VA	CLIFTON FORGE CITY
51570	VA	COLONIAL HEIGHTS CITY
51580	VA	COVINGTON CITY

FIPS	STATE	NAME
51600	VA	FAIRFAX CITY
51610	VA	FALLS CHURCH CITY
51630	VA	FREDERICKSBURG CITY
51650	VA	HAMPTON CITY
51660	VA	HARRISONBURG CITY
51670	VA	HOPEWELL CITY
51678	VA	LEXINGTON CITY
51680	VA	LYNCHBURG CITY
51683	VA	MANASSAS CITY
51685	VA	MANASSAS PARK CITY
51700	VA	NEWPORT NEWS CITY
51710	VA	NORFOLK CITY
51730	VA	PETERSBURG CITY
51735	VA	POQOUSON CITY
51740	VA	PORTSMOUTH CITY
51760	VA	RICHMOND CITY
51790	VA	STAUNTON CITY
51800	VA	SUFFOLK CITY
51810	VA	VIRGINIA BEACH CITY
51820	VA	WAYNESBORO CITY
51830	VA	WILLIAMSBURG CITY
51840	VA	WINCHESTER CITY
54003	WV	BERKELEY
54023	WV	GRANT
54027	WV	HAMPSHIRE
54031	WV	HARDY
54037	WV	JEFFERSON
54057	WV	MINERAL
54063	WV	MONROE
54065	WV	MORGAN
54071	WV	PENDLETON
54077	WV	PRESTON
54093	WV	TUCKER

Table C-12. 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	GEAR METHOD DESCRIPTION	GEAR METHOD DETAILS
01	HAND DREDGE	
02	DREDGE	
03	ARTIFICIAL SUBSTRAIT	UNSPECIFIED
04	DIATOMER SLIDES	
05	CLARKE-BUMPUS SAMPLER	
06	PLANKTON TRAP	UNSPECIFIED
07	PLANKTON PUMP	UNSPECIFIED
08	PLANKTON NET	UNSPECIFIED
09	PLANKTON NET	500µ MESH
10	PLANKTON NET	NO. 20, 80µ MESH
11	PLANKTON NET	10µ MESH

G_METHOD	GEAR METHOD DESCRIPTION	GEAR METHOD DETAILS
12	BEAM PLANKTON LINE	
13	ANCHOR DREDGE	
14	HYDRAULIC GRAB	1200 SQ. CM
15	HAND CORE	45 SQ. CM
16	POST-HOLE DIGGER	200 SQ. CM
17	PONAR GRAB	200 SQ. CM
18	PONAR GRAB	1000 SQ. CM
19	PONAR GRAB	50 SQ. CM
20	BOX CORE GRAB	0.018 M2
21	VAN VEEN GRAB	0.07 M2
22	SHIPEK GRAB	0.04 M2
23	SEINE HAUL	UNSPECIFIED
24	SMITH-MACINTIRE GRAB	1000 SQ CM
25	SEINE NET	15 FT, 1/8 IN STRECH MESH
26	SEINE NET	50 FT, 1/2 IN STRECH MESH
27	SEINE NET	50 FT, 1/4 IN STRECH MESH
28	SEINE NET	200 FT , 1/2 IN STRECH MESH, NET 200X 20
29	SEINE NET	10 FT , 1/4 IN STRECH MESH, NET 10X4
30	TRAWL	UNSPECIFIED
31	OTTER TRAWL	6 FT, 1 IN. MESH, W/ 1/2 IN INNER LINER
32	OTTER TRAWL	25 FT, 1.24 IN. MESH, W/ 1/2 IN INNER LINER
33	TRAWL	15 FT SEMI-BALLON
34	TUCKER TRAWL	2 MM. MESH, 1 SQ. METER
35	CARGO_SLED	Cargo jellyfish sled
36	TRAWL	16 FT SEMI-BALLON, 1/2 IN MESH
37	OTTER TRAWL	10 FT, 1/4 IN. MESH, W/500 µ IN INNER LINER
38	MID-WATER TRAWL	5 FT, 1/4 IN. MESH, W/500 µ IN INNER LINER
39	VISUAL COUNT	
41	ELECTROSHOCKER	
42	ECKMAN CAGE	
43	CAGE	
44	CATFISH TRAP	
45	CRAYFISH TRAP	
46	CRAB TRAP	
47	ANIMAL TRAP	
48	HOOK AND LINE FISHING	
49	DIP NET	
50	DIVER	
51	DIAPHRAGM PUMP	
52	CENTRIFUGAL PUMP	
53	RESERVED	
54	POUND NET	
55	EPIFAUNA PANELS	
56	PONAR GRAB	UNSPECIFIED
57	D-FRAME NET	500 MICRON MESH, 12 INCH DIAMETER
58	RETANGULAR DIP NET	0.5 METER BY 0.5 METERS
59	HAND PICK	
60	ENDICO CURRENT METER	
61	BRAINCON CURRENT METER	
62	SEDIMENT TRAP ARRAY	6- 3"X30" CUPS {BOYTON-CBL}
63	SEINE NET	50 FT, 1/4 IN MESH, NET 100X4 FT
64	BONGO NET	UNSPECIFIED
65	PURSE SEINE	
66	FYKE AND HOOP NETS	
67	POTS	

G_METHOD	GEAR METHOD DESCRIPTION	GEAR METHOD DETAILS
68	BOX TRAP	
69	PUSH NET	
70	GREAT LAKE SHOAL	1-2 INCHES
71	GREAT LAKE SHOAL	2-4 INCHES
72	GREAT LAKE SHOAL	4-7 INCHES
73	GREAT LAKE SHOAL	7-14 INCHES
74	BEAM TRAWL	
75	BONGO NET	202 µ, 20 CM OPENING, 0.76 M LENGTH
76	BONGO NET	202 µ, 50 CM OPENING, 4 M LENGTH
77	RESERVED	
78	SLAT TRAP	
79	RESERVED	
80	GIL NETS	
81	USNOL SPADE CORE	0.06 M2 SPADE BOX CORE
82	PONAR GRAB-ODU	
83	DOUBLE PONAR GRAB-VA DEQ	50 SQ CM
84	RESERVED	
86	KICK NET	23 CM x 46 CM, MESH OPEN SIZE 0.8MM BY 0.9 MM
87	KICK NET	UNSPECIFIED
88	RESERVED	
89	D-FRAME NET	UNSPECIFIED
90	HESTER DENDY MULTIPLATE SAMPL	
91	SURBER SAMPLER	
92	KICK SEINE	
93	D-FRAME NET	600 MICRON, 12 INCH DIAMETER
94	KICK NET	600 MICRON, 1 SQUARE METER KICK SCREEN
96	HYDROLIC VAN VEEN GRAB	0.1 SQUARE METERS
97	YOUNG MODIFIED VAN VEEN GRAB	0.04 SQ M
98	PETITE PONAR GRAB	25 SQUARE CM
99	SMITH-MACINTIRE GRAB	0.3 SQUARE METER
100	SMITH-MACINTIRE GRAB	0.2 SQUARE METER

Table C-13. USGS Hydrologic Unit Codes (HUC_8).

As part of the geographic referencing of stations, locations have been matched with its corresponding USGS hydrologic unit code (HUC). In 2010, USGS revised their HUC system to a six levels in the hierarchy, represented by hydrologic unit codes from 2 to 12 digits long, called regions, subregions, basins, subbasins, watersheds, and subwatersheds. The original delineation of units, down to subbasins (cataloging units), was done using 1:250,000 scale maps and data. The newer delineation work on watersheds and subwatersheds was done using 1:24,000 scale maps and data. As a result, the subbasin boundaries were changed and adjusted in order to conform to the higher resolution watersheds within them. Changes to subbasin boundaries resulted in changes in area sizes.

Digits	Old Reporting Units	New Reporting Units	Average size (square miles)	Number of New Units in Watershed
2	Region	Region	177,560	1
4	Subregion	Subregion	16,800	5
6	Accounting Unit	Basin	10,596	8
8	Cataloging Units	Subbasin	700	57
10	Not Available	Watershed	277	427
12	Not Available	Subwatershed	40	1980

Currently in the Chesapeake Bay watershed Data bases focusing on sampling in tidal areas are georeferenced to the 8 Digit Hydrologic unit. Non-tidal databases are georeferenced to the full 12 digit hydrologic unit. Please see online data dictionaries for full details.

The following are currently accepted 8-digit HUC and SUBBASIN_UNIT_DESCRIPTIONS appearing in tidal databases:

HUC_8	SUBBASIN_UNIT_DESCRIPTION	HUC_8	SUBBASIN_UNIT_DESCRIPTION
02040303	CHINCOTEAGUE	02070011	LOWER POTOMAC
02040304	EASTERN LOWER DELMARVA	02080101	LOWER CHESAPEAKE BAY
02050306	LOWER SUSQUEHANNA	02080102	GREAT WICOMICO-PIANKATANK
02060001	UPPER CHESAPEAKE BAY	02080104	LOWER RAPPAHANNOCK
02060002	CHESTER-SASSAFRAS	02080105	MATTAPONI
02060003	GUNPOWDER-PATAPSCO	02080106	PAMUNKEY
02060004	SEVERN	02080107	YORK
02060005	CHOPTANK	02080108	LYNNHAVEN-POQUOSON
02060006	PATUXENT	02080109	WESTERN LOWER DELMARVA
02060007	BLACKWATER-WICOMICO	02080110	EASTERN LOWER DELMARVA
02060008	NANTICOKE	02080205	MIDDLE JAMES-WILLIS
02060009	POCOMOKE	02080206	LOWER JAMES
02060010	CHINCOTEAQUE	02080207	APPOMATTOX
02070010	MIDDLE POTOMAC-ANACOSTIA-OCCOQUAN	02080208	HAMPTON ROADS

Table C-14. B-IBI BOTTOM_TYPE Characterization (IBI_BOTTOM).

These codes store information identifying bottom type classifications used in the calculation of Tidal 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-15. B-IBI METHOD Description (IBI_METHOD).

These codes store information identifying analytical method used in the calculation of benthic IBI metric values. Method codes currently exist for benthic indexes only. The current IBI_METHOD codes are as follows:

IBI_METHOD	IBI_METHOD_TITLE
CBP_2010	CHESAPEAKE BAY PROGRAM CHESSIE NON TIDAL BIBI 2010
CBP_MACS	MID-ATLANTIC COASTAL STREAM IBI
PADEP	PENSYLVANIA DEPARTMENT OF THE ENVIRONMENT PROTOCAL
CBP	CBP 2004 IMPLEMENTATION OF THE TIDAL CHESAPEAKE BAY B-IBI
VERSAR	VERSAR IMPLEMENTATION OF THE TIDAL CHESAPEAKE BAY B-IBI

Table C-16. Calculated Biological Metrics Description IBI_PARAMETER).

These codes store information identifying calculated metrics used in indexes of biotic integrity and other indicators. Method codes currently exist for benthic indexes only. Currently accepted IBI_PARAMETER and IBI_PARAMETER_DESCRIPTION designations are as follows:

IBI_PARAMETER	IBI_PARAMETER_DESCRIPTION
ASPT_MOD	Average of each individual's family-level tolerance score
ASPT_MOD_R	Average of each individual's family-level tolerance score calculated on Rarefaction Data
BECK	Becks Index based on family-level taxonomy-classical calculation
BECK_R	Becks Index based on family-level taxonomy-classical calculation-calculated on Rarefaction Data
BIOMASS_CHL_RATIO	Total Phytoplankton Biomass To Chl Ratio
CELL_SIZE	Average Cell Size PG/Cell
CHL_SURF	Surface Chlorophyll A (0.5 M)
CHLA	Ave Layer Chla In µG/L
CHLORO_ABUND	Total Chlorophyte Abundance In Number/Liter
CHLORO_BIOMASS	Total Chlorophyte Biomass In µG Carbon/Liter
CHRYSO_ABUND	Total Chrysophyte Abundance In Number/Liter
CHRYSO_BIOMASS_	Total Chrysophyte Biomass In µG Carbon/Liter
COCHLODINIUM_HET_ABUND	Total Cochlodinium Abundance In Number/Liter
COCHLODINIUM_HET_BIOMASS	Total Cochlodinium Biomass In µG Carbon/
CRYPTO_ABUND	Total Cryptophyte Abundance In Number/Liter
CRYPTO_BIO_PCT	Percent Cryptophyte Biomass
CRYPTO_BIOMASS	Total Cryptophyte Biomass In µG Carbon/Liter
CYANO_ABUND	Total Cyanophyte Abundance In Number/Liter
CYANO_BIO_PCT	Percent Cyanophyte Biomass
CYANO_BIOMASS	Total Cyanophyte Biomass In µG Carbon/Liter
DIATOM_ABUND	Total Diatom Abundance In Number/Liter
DIATOM_BIO_PCT	Percent Diatom Biomass
DIATOM_BIOMASS	Total Diatom Biomass In µG Carbon/Liter
DIN	Ave Layer Dissolved Organic N (NO2+NO3+NH4) In Mg/L
DINO_ABUND	Total Dinoflaggelate Abundance In Number/Liter
DINO_BIO_PCT	Percent Dinoflaggelate Biomass
DINO_BIOMASS	Total Dinoflaggelate Biomass In µG Carbon/Liter
DIPTERA_TAXA_CNT	Count Of Diptera Families
DIPTERA_TAXA_CNT_R	Count Of Diptera Families -Calculated On Rarefaction Data
DO	Average Layer Dissolved Oxygen In Mg/L
DOC	Average Layer Dissolved Organic Carbon Conc. In Mg/L
EPHEMEROPTERA_TAXA_CNT	Count Of Ephemeroptera Families
EPHEMEROPTERA_TAXA_CNT_R	Count Of Ephemeroptera Families-Calculated On Rarefaction Data
EPT_TAXA_ABUND	Total Abundance Of Ephemeroptera, Plecoptera & Trichoptera Individuals
EPT_TAXA_ABUND_R	Total Abundance Of Ephemeroptera, Plecoptera & Trichoptera Individuals-Calculated On Rarefaction Data
EPT_TAXA_COUNT	Number Of Ephemeroptera, Plecoptera & Trichoptera Families
EPT_TAXA_COUNT_NO_TOL	Number Of Ephemeroptera, Plecoptera & Trichoptera Families Excluding Those With Tolerance Values >=7
EPT_TAXA_COUNT_NO_TOL_R	Number Of Ephemeroptera, Plecoptera & Trichoptera Families Excluding Those With Tolerance Values >= 7-Calculated On Rarefaction Data
EPT_TAXA_COUNT_R	Number Of Ephemeroptera, Plecoptera & Trichoptera Families-Calculated On Rarefaction Data
EUGLENO_ABUND	Total Euglenophyte Abundance In Number/Liter Above Pycnocline
EUGLENO_BIOMASS	Total Euglenophyte Biomass In µG Carbon/Liter Above Pycnocline
FBI	Hilsenhoff Family-Level Biotic Index
FBI_R	Hilsenhoff Family-Level Biotic Index -Calculated On Rarefaction Data

IBI_PARAMETER	IBI_PARAMETER_DESCRIPTION
GOLD	1- Relative Percentage Abundance Of Gastropods, Oligochaeta And Diptera Individuals
GOLD_R	1- Relative Percentage Abundance Of Gastropods, Oligochaeta And Diptera Individuals-Calculated On Rarefaction Data
GRAND_SCORE	Fixed Station Replicate Averaged Total Benthic Restoration Goal Score
HAPTO_ABUN	Total Haptophyte Abundance In Number/Liter Above Pycnocline
HAPTO_BIOMASS	Total Haptophyte Biomass In µG Carbon/Liter Above Pycnocline
MARGALEFS	Margalef's Index Based On Family-Level Taxonomy
MARGALEFS_R	Margalef's Index Based On Family-Level Taxonomy-Calculated On Rarefaction Data -Calculated On Rarefaction Data
MICROCYSTIS_AER_ABUND	Total Microcystis Abundance In Number/Liter Above Pycnocline
MICROCYSTIS_AER_BIOMASS	Total Microcystis Biomass In µG Carbon/Liter Above Pycnocline
NCO_TAXA_CNT	Count Of Families In Sample Minus Chironomidae And Oligochaete Families
NCO_TAXA_CNT_R	Count Of Families In Sample Minus Chironomidae And Oligochaete Families-Calculated On Rarefaction Data
NON_INSECT_TAXA_CNT	Count Of Non-Insect Families
NON_INSECT_TAXA_CNT_R	Count Of Non-Insect Families-Calculated On Rarefaction Data
PC	Ave Layer Particulate Carbon Conc. In Mg/L
PCT_BIO_DP05	Percent Total Biomass Found greater Than 5 Cm Below Sediment Water Interface
PCT_BURROWER	Percent Of Individuals That Are Adapted For Burrowing
PCT_BURROWER_R	Percent Of Individuals That Are Adapted For Burrowing-Calculated On Rarefaction Data
PCT_CARN_OMN	Percent Carnivores And Omnivores
PCT_CHIRONOMIDAE	Percent Of Individuals That Are Chironomids
PCT_CHIRONOMIDAE_R	Percent Of Individuals That Are Chironomids -Calculated On Rarefaction Data
PCT_CLIMB	Percent Of Individuals That Are Adapted For Climbing
PCT_CLIMB_R	Percent Of Individuals That Are Adapted For Climbing-Calculated On Rarefaction Data
PCT_CLING	Percent Of Individuals That Are Adapted For Clinging
PCT_CLING_R	Percent Of Individuals That Are Adapted For Clinging-Calculated On Rarefaction Data
PCT_CLINGER_TAXA	Count Of Clinger Families Expressed As A Percent Of The Total Number Of Families Present In Sample
PCT_CLINGER_TAXA_R	Count Of Clinger Families Expressed As A Percent Of The Total Number Of Families Present In Sample-Calculated On Rarefaction Data
PCT_COLLECT	Percent Of Individuals That Are Collectors (Filterers + Gatherers)
PCT_COLLECT_R	Percent Of Individuals That Are Collectors (Filterers + Gatherers)-Calculated On Rarefaction Data
PCT_DEPO	Percent Deep Deposit Feeders
PCT_DIPTERA	Percent Of Individuals That Are Diptera
PCT_DIPTERA_R	Percent Of Individuals That Are Diptera -Calculated On Rarefaction Data
PCT_DOM1	Percent Of Individuals That Belong To The Most Common Families
PCT_DOM1_R	Percent Of Individuals That Belong To The Most Common Families-Calculated On Rarefaction Data
PCT_DOM2	Percent Of Individuals That Belong To The Two Most Common Families
PCT_DOM2_R	Percent Of Individuals That Belong To The Two Most Common Families-Calculated On Rarefaction Data
PCT_DOM3	Percent Of Individuals That Belong To The Three Most Common Families
PCT_DOM3_R	Percent Of Individuals That Belong To The Three Most Common Families-Calculated On Rarefaction Data
PCT_EPHEMEROPTERA	Percent Of Individuals That Are Ephemeroptera
PCT_EPHEMEROPTERA_R	Percent Of Individuals That Are Ephemeroptera -Calculated On Rarefaction Data

IBI_PARAMETER	IBI_PARAMETER_DESCRIPTION
PCT_EPT	Percent Of Individuals That Are Ephemeroptera, Plecoptera And Trichoptera (EPT)
PCT_EPT_R	Percent Of Individuals That Are Ephemeroptera, Plecoptera And Trichoptera (EPT) -Calculated On Rarefaction Data
PCT_EPT_TAXA_RICH	Count Of EPT Families Expressed As A Percent Of The Total Number Of Families Present In Sample
PCT_EPT_TAXA_RICH_R	Count Of EPT Families Expressed As A Percent Of The Total Number Of Families Present In Sample-Calculated On Rarefaction Data
PCT_FILTERERS	Percent Of Individuals That Are Adapted For Filtering Fine Particles
PCT_FILTERERS_R	Percent Of Individuals That Are Adapted For Filtering Fine Particles-Calculated On Rarefaction Data
PCT_GATHER	Percent Of Individuals That Are Adapted For Gathering
PCT_GATHER_R	Percent Of Individuals That Are Adapted For Gathering-Calculated On Rarefaction Data
PCT_LIMESTONE	Percent Of Individuals That Are Isopods, Amphipods, And Ephemeralla
PCT_LIMESTONE_R	Percent Of Individuals That Are Isopods, Amphipods, And Ephemeralla - Calculated On Rarefaction Data
PCT_NET_CADDISFLY	Percent Of Individuals That Are Net-Spinning Caddisflies
PCT_NET_CADDISFLY_R	Percent Of Individuals That Are Net-Spinning Caddisflies-Calculated On Rarefaction Data
PCT_NON_INSECT	Percent Of Individuals That Are Not Insects
PCT_NON_INSECT_R	Percent Of Individuals That Are Not Insects -Calculated On Rarefaction Data
PCT_PI_ABUND	Percent Pollution Indicative Species Abundance-Tidal Benthic
PCT_PI_BIO	Percent Pollution Indicative Species Biomass-Tidal Benthic
PCT_PI_F_ABUND	Percent Pollution Indicative Species Abundance-Tidal Fresh Benthic
PCT_PI_F_BIO	Percent Pollution Indicative Species Biomass-Tidal Fresh Benthic
PCT_PI_O_ABUND	Percent Pollution Indicative Species Abundance-Oligohaline Benthic
PCT_PI_O_BIO	Percent Pollution Indicative Species Biomass-Oligohaline Benthic
PCT_PLECOPTERA	Percent Of Individuals That Are Plecoptera
PCT_PLECOPTERA_R	Percent Of Individuals That Are Plecoptera-Calculated On Rarefaction Data
PCT_PREDATOR	Percent Of Individuals That Are Predatory
PCT_PREDATOR_R	Percent Of Individuals That Are Predatory-Calculated On Rarefaction Data
PCT_PS_ABUND	Percent Pollution Sensitive Species Abundance-Tidal Benthic
PCT_PS_BIO	Percent Pollution Sensitive Species Biomass-Tidal Benthic
PCT_PS_O_ABUND	Percent Pollution Sensitive Species Abundance-Oligohaline Benthic
PCT_PS_O_BIO	Percent Pollution Sensitive Species Biomass-Oligohaline Benthic
PCT_SCRAPER	Percent Of Individuals That Are Adapted For Scraping Periphyton From Hard Surfaces
PCT_SCRAPER_R	Percent Of Individuals That Are Adapted For Scraping Periphyton From Hard Surfaces-Calculated On Rarefaction Data
PCT_SENSITIVE	Percent Of Individuals That Have Family Level Tolerance Values < 3
PCT_SENSITIVE_R	Percent Of Individuals That Have Family Level Tolerance Values < 3-Calculated On Rarefaction Data
PCT_SHREDDER	Percent Of Individuals That Are Adapted For Shredding Coarse Organic Material
PCT_SHREDDER_R	Percent Of Individuals That Are Adapted For Shredding Coarse Organic Material-Calculated On Rarefaction Data
PCT_SIMULIIDAE	Percent Of Individuals That Are Simuliidae (Black flies)
PCT_SIMULIIDAE_R	Percent Of Individuals That Are Simuliidae (Black flies) -Calculated On Rarefaction Data
PCT_SWIMMER	Percent Of Individuals That Are Adapted For Swimming
PCT_SWIMMER_R	Percent Of Individuals That Are Adapted For Swimming-Calculated On Rarefaction Data
PCT_TANYPODINI	Percent Tanypodinae To Chironomidae-Tidal Benthic
PCT_TOLERANT	Percent Of Individuals That Have Family-Level Tolerance Values >= 7

IBI_PARAMETER	IBI_PARAMETER_DESCRIPTION
PCT_TOLERANT_R	Percent Of Individuals That Have Family-Level Tolerance Values >= 7 - Calculated On Rarefaction Data
PCT_TRICHOPTERA	Percent Of Individuals That Are Trichoptera
PCT_TRICHOPTERA_NO_TOL	Percent Of Individuals That Are Trichoptera Excluding Hydropsychidae
PCT_TRICHOPTERA_NO_TOL_R	Percent Of Individuals That Are Trichoptera Excluding Hydropsychidae - Calculated On Rarefaction Data
PCT_TRICHOPTERA_R	Percent Of Individuals That Are Trichoptera -Calculated On Rarefaction Data
PHEO	Average Layer Pheophytin Concentration In Mg/L
PHYTO_TOT_ABUND	Total Phytoplankton Abundance In Number/Liter
PHYTO_TOT_BIOMASS	Total Phytoplankton Biomass In µG Carbon/
PICO_ABUND_	Total Picoplankton Abundance In Number/Liter Above Pycnocline
PICO_BIOMASS	Total Picoplankton Biomass In µG Carbon/Liter
PLECOPTERA_TAXA_CNT	Count Of Plecoptera Families
PLECOPTERA_TAXA_CNT_R	Count Of Plecoptera Families-Calculated On Rarefaction Data
PO4	Average Layer PO4 Concentration In Mg/L
PRASINO_ABUND	Total Prasinophyte Abundance In Number/Liter
PRASINO_BIOMASS	Total Prasinophyte Biomass In µG Carbon/
PROROCENTRUM_MIN_ABUND	Prorocentrum_Minimum Abundance In Number/Liter
PROROCENTRUM_MIN_BIOMASS	Prorocentrum_Minimum Biomass In µG Carbon/Liter
RATIO_SC_TO_CF	Ratio Of Scrapers To Collector-Filterers
RATIO_SC_TO_CF_R	Ratio Of Scrapers To Collector-Filterers-Calculated On Rarefaction Data
RATIO_SC_TO_SH	Ratio Of Scrapers To Shredders
RATIO_SC_TO_SH_R	Ratio Of Scrapers To Shredders-Calculated On Rarefaction Data
RATIO_SH_TO_CG	Ratio Of Shredders To Collector-Gatherers
RATIO_SH_TO_CG_R	Ratio Of Shredders To Collector-Gatherers-Calculated On Rarefaction Data
SALINITY_	Ave Layer Salinity In PSU
SCRAPER_TAXA_CNT	Count Of Scraper Families
SCRAPER_TAXA_CNT_R	Count Of Scraper Families-Calculated On Rarefaction Data
Secchi	Secchi Depth In Meters
SENSITIVE_TAXA_COUNT	Count Of Families That Have Family-Level Tolerance Values <= 3
SENSITIVE_TAXA_COUNT_R	Count Of Families That Have Family-Level Tolerance Values <= 3-Calculated On Rarefaction Data
SIMPSON_DIVERSITY	Simpson Diversity Index Based On Family-Level Taxonomy
SIMPSON_DIVERSITY_R	Simpson Diversity Index Based On Family-Level Taxonomy-Calculated On Rarefaction Data
SW	Shannon Wiener Index -Taxonomic Level Will Vary By Index
SW_R	Shannon Wiener Index Based On Family-Level Taxonomy-Calculated On Rarefaction Data
TAXA_RICH	Count Of Families In Sample
TAXA_RICH_R	Count Of Families In Sample -Calculated On Rarefaction Data
TOC	Average Layer Total Organic Carbon Conc. In Mg/L
TOLERANCE	Tidal Benthic Pollution Tolerance Index
TOLERANT_TAXA_COUNT	Count Of Families That Have Family-Level Tolerance Values >= 7
TOLERANT_TAXA_COUNT_R	Count Of Families That Have Family-Level Tolerance Values >= 7-Calculated On Rarefaction Data
TOT_BIOMASS	Total Species Biomass In (Units Will Vary)
TOT_TXA_DP05	Species Abundance Found Greater Than 5 Cm Below Sediment Water Interface
TOTAL_ABUNDANCE	Total Number Of Individuals (Units Will Vary)
TOTAL_ABUNDANCE_R	Total Number Of Individuals In Sample-Calculated On Rarefaction Data
TOTAL_SCORE	Total Benthic Restoration Goal Score For Sample
TRICHOPTERA_TAXA_CNT	Count Of Trichoptera Families
TRICHOPTERA_TAXA_CNT_R	Count Of Trichoptera Families -Calculated On Rarefaction Data
TRICHOPTERA_TAXA_COUNT_NO_HYDR	Trichoptera Taxa Count Excluding Hydropsychidae

IBI_PARAMETER	IBI_PARAMETER_DESCRIPTION
TRICHOPTERA_TAXA_COUNT_NO_R	Count Of Trichoptera Families Excluding Hydropsychidae -Calculated On Rarefaction Data
TSS	Average Layer Total Suspended Solids
WTEMP	Average Layer Water Temperature in Celsius

Table C-17. B-IBI SALZONE Designation (IBI_SALZONE).

These codes identify the various salinity classifications used in the calculation of Tidal plankton and Tidal Benthic IBI 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 PSU
LM	Low Mesohaline	=>5.0 TO 12 PSU
M	Mesohaline	=>5.0 TO 18 PSU
O	Oligohaline	=>0.5 TO 5.0 PSU
P	Polyhaline	=>18 PSU
TF	Tidal Fresh	< 0.5 PSU

Table C-18. Karst Designation (KARST).

These codes identify area of Karst geology. Information is based on the USGS Preliminary Map of Potentially Karstic Carbonate Rocks in the Central and Southern Appalachian States: complete OF 2008-1154 map plate. (http://pubs.usgs.gov/of/2008/1154/) Currently accepted KARST codes and KARST DESCRIPTION designations are as follows:

KARST	KARST_DECSRIPTION
CPU	Coastal Plain Unconsolidated Sediments
FFC	Folded Faulted Carbonated Rock
FFCG	Folded Faulted Carbonated Rock With Glacial Cover
GC	Gently Folded Carbonated Rock
GCG	Gently Folded Carbonated Rock With Glacial Cover
IC	Carbonates Embedded With Non-Soluble Rock
M	Marble And Meta-Limestone
NONE	Non-Carst Area
TJB	Triassic-Jurassic Aged Basin

Table C-19. Analytical Laboratory (LAB).

The lab code identifies the laboratory that analyzed the water samples. This table contains information to parameter names. Currently accepted LAB and LAB_DESCRIPTION designations are as follows:

LAB	LAB_DESCRIPTION
AMRL	Old Dominion University Applied Marine Research Laboratory (This Lab Became The ODU Lab In May, 2000)
BPFL	Blue Plains Field Laboratory
CBL	University Of Maryland Chesapeake Biological Laboratory
CRL	US EPA-Central Regional Laboratory (Moved To Ft Meade 1999)
DENREC	Delaware Department Of Natural Resources And Environmental Control
ELB	District Of Columbia Dept Of Health Environmental Laboratory Branch At EPA
EPA-UNSP	EPA Laboratory-Unspecified
FIELD	Field Parameter-No Lab Associated With Sample
MDHMH	Maryland Department Of Health And Mental Hygiene
MDHMH-WM	Maryland Department Of Health And Mental Hygiene-Western Maryland Lab
NYDEC	Columbia Analytical Services

LAB	LAB_DESCRIPTION
ODU	Old Dominion University Laboratory
OWML	Occoquan Watershed Monitoring Laboratory
PADEP	Pennsylvania Department Of Environmental Protection Lab
SMRP	St Mary's River Project
SRBC	Susquehanna River Basin Commission Lab
UMCES-AL	University Of Maryland Appalachian Laboratory
UNKNOWN	Unknown Or Lab Not Specified
USGS-KDSL	United States Geological Survey Kentucky District Sediment Laboratory
USGS-NWQL	United States Geological Survey National Water Quality Laboratory
USGS-SED	USGS Sediment Laboratory In Kentucky
VADCLS	Virginia Division Of Consolidated Laboratory Services
VCU	Virginia Commonwealth University
VIMS	Virginia Institute Of Marine Science

Table C-20. Sample Layer (LAYER).

These codes are 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-21. Life Stage (LIFE_STAGE).

This table stores information in relating to the identification of species life stages in taxonomic data. The currently accepted LIFE_STAGE values and DESCRIPTIONS are as follows:

LIFE_STAGE _CODE	LIFE_STAGE_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	Hatchery Marked Organism
26	Year Class 2 Or Older
27	Age 0 MDDNR Hatchery Marked Organism
28	Age 1 MDDNR Hatchery Marked Organism
29	Age 2 Or Greater MDDNR Hatchery Marked Organism
30	Prezoea
31	Zoea
32	Metazoea
33	Megalops
34	Male, Unspecified Age
35	Female, Adult
36	Female, Juvenile
37	MDDNR Hatchery Marked Organism
38	Male, Age Class 0
39	Male, Age Class 1
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	Embryo
65	Neonites
66	Male, Age Class 2
67	Female, Immature Age Class 0
68	Female, Immature Age Class 1
69	Female, Mature Age Class 1
70	Female, Mature Age Class 2
71	Female, Mature Age Class 0
72	Female, Immature Age Class 2
73	Salps
74	Male, Adult
75	Female, Unspecified Age
76	Group
77	With Cap. Setae
78	Without Cap. Setae
79	Spp.
80	Molted
81	Unmolted
82	Large
83	Large-Full
84	Large-Empty
85	Full
86	Empty
87	Medium
88	Small
89	Not Specified
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
99	Not Applicable
100	20:49um Length <20um Width
101	20:49um Length
102	20:49um Length 50:99um Width
103	20:49um Length 20:49um Width Cup
104	20:49um Length 20:49um Width Cone
105	20:49um Length 20:49um Width
106	20:49um Length >20um Width
107	>200um Length

LIFE_STAGE_CODE	LIFE_STAGE_DESCRIPTION
108	20:49um Length <20um Width Cone
109	50:99um Length <20um Width
110	100:199um Length >20um Width
111	>20um Width
112	<20um Length
113	<20um Length <20um Width Cup
114	<20um Length <20um Width Cone
115	<20um Length <20um Width
116	<20um Length Cone
117	20:49um Length <20um Width Cup
118	50:99um Length Empty
119	Species C 100:199um Length 100:199um Width
120	Species B 50:99um Length 50:99um Width
121	Species B 50:99um Length 20:49um Width
122	Parvula Group Full
123	Parvula Group
124	20:49um Length Full
125	Beroidea Group
126	Species C 100:199um Length 20:49um Width
127	50:99um Length
128	50:99um Length 50:99um Width Cup
129	50:99um Length 50:99um Width Cone
130	50:99um Length 20:49um Width Cup
131	50:99um Length 20:49um Width Cone
132	50:99um Length >20um Width
133	<20um Length 100:199um Width
134	<20um Length 100:199um Width Cone
135	<20um Length 100:199um Width Cup
136	<20um Length 20:49um Width
137	<20um Length 20:49um Width Cone
138	<20um Length 20:49um Width Cup
139	<20um Length 50:99um Width
140	<20um Length 50:99um Width Cone
141	<20um Length 50:99um Width Cup
142	<20um Length Cup
143	<20um Length Empty
144	<20um Length Full
145	<20um Width
146	<20um Width Empty
147	<20um Width Full
148	>200um
149	>200um Empty
150	>200um Full
151	>200um Length <20um Width
152	>200um Length <20um Width Empty
153	>200um Length <20um Width Full
154	>200um Length >20um Width
155	>200um Length >20um Width Empty
156	>200um Length >20um Width Full
157	>200um Length Empty
158	>200um Length Full
159	>20um Width Empty
160	>20um Width Full
161	100:199um Length <20um Width
162	100:199um Length <20um Width Cone
163	100:199um Length <20um Width Cup
164	100:199um Length <20um Width Empty
165	100:199um Length <20um Width Full
166	100:199um Length >20um Width Empty
167	100:199um Length >20um Width Full
168	100:199um Length 100:199um Width Cone
169	100:199um Length 100:199um Width Cup
170	100:199um Length 20:49um Width Cone
171	100:199um Length 20:49um Width Cup
172	100:199um Length 50:99um Width Cone
173	100:199um Length 50:99um Width Cup
174	100:199um Length Cone
175	100:199um Length Cup
176	100:199um Length
177	100:199um Length Empty
178	100:199um Length Full
179	20:49um Length <20um Width Empty
180	20:49um Length <20um Width Full
181	20:49um Length >20um Width Empty
182	20:49um Length >20um Width Full
183	20:49um Length 100:199um Width
184	20:49um Length 100:199um Width Cone
185	20:49um Length 100:199um Width Cup
186	20:49um Length 50:99um Width Cone
187	20:49um Length 50:99um Width Cup
188	20:49um Length Cone
189	20:49um Length Cup
190	20:49um Length Empty
191	Reserved For Future Use
192	50:99um Length <20um Width Cone
193	50:99um Length <20um Width Cup
194	50:99um Length <20um Width Empty
195	50:99um Length <20um Width Full
196	50:99um Length >20um Width Empty
197	50:99um Length >20um Width Full
198	50:99um Length 100:199um Width Cone
199	50:99um Length 100:199um Width Cup
200	50:99um Length Cone
201	50:99um Length Cup
202	Reserved For Future Use
203	Reserved For Future Use
204	50:99um Length Full
205	Beroidea Group Empty
206	Beroidea Group Full
207	Larvae 20:49um Length
208	Parvula Group Empty
209	Small Empty
210	Small Full
211	Species B 50:99um Length
212	Species B 50:99um Length <20um Width
213	Species B 50:99um Length 100:199um Width
214	Species C 100:199um Length
215	Species C 100:199um Length <20um Width
216	Species C 100:199um Length 50:99um Width
217	Species V
218	Species W
219	Species X
220	Species Y
221	Species Z
222	Species 1
223	Species 2
224	Species 3
225	Complex
226	Species G
227	Species H

LIFE_STAGE _CODE	LIFE_STAGE_DESCRIPTION	LIFE_STAGE _CODE	LIFE_STAGE_DESCRIPTION
228	Species I	240	Species U
229	Species J	241	Species 4
230	Species K	242	Species 5
231	Species L	243	Species 6
232	Species M	244	Polyps
233	Species N	245	Type
234	Species O	246	Variety
235	Species P	247	Immature With Cap. Chaete
236	Species Q	248	Immature Without Cap. Chaete
237	Species R	249	Fragments
238	Species S	250	Ephyra
239	Species T	251	Post Ephyra

Table C-22. 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
WGS84	World Geodetic System 1984

Table C-23. Biological Enumeration and Biomass Determination Methods (BIO_METHOD).

BIO_METHOD identified the method for enumeration of taxa or biomass determination in the field and laboratory. Currently accepted BIO_METHODS designations are as follows:

BIO_METHOD	BIO_METHOD_TITLE
BE101A	PADEP Rapid Non Tidal Stream Bio-Assessment Protocol
BE101B	PADEP Rapid Non Tidal Stream Bio-Assessment Protocol With Replication
BE102	The NYSDEC Non Tidal Stream Biomonitoring- Kick Sample Protocol
BE103	Maryland Biological Stream Survey Non Tidal Bioassessment Protocol
BE104	Maryland Core Trend Stream Non Tidal Bioassessment Protocol
BE105	VADEQ Rapid Non Tidal Stream Bio-Assessment Protocol: Single-Habitat Method-Family Level Ids
BE105G	VADEQ Rapid Non Tidal Stream Bio-Assessment Protocol: Single-Habitat Method, Genus Level Ids
BE106	VADEQ Rapid Non Tidal Stream Bio-Assessment Protocol: Multi- Habitat Method Family Level Ids
BE106G	VADEQ Rapid Non Tidal Stream Bio-Assessment Protocol: Multi- Habitat Method-Genus Level Ids
BE107	WVDEP Modified EPA RBP II, Non Tidal Stream Single Habitat Protocol
BE107B	WVDEP Modified EPA RBP II, Non Tidal Stream Single Habitat-200 Count Subsample
BE108	Mid-Atlantic Coastal Streams Method For Non Tidal Streams
BE109	WVDEP EPA RBP II, Multi Habitat Protocol For Non Tidal Streams
BE110	SRBC Rapid Bioassessment Protocol (RBP) III For Non Tidal Streams
BE111	Montgomery County-Unspecified Non Tidal Streams Assessment Protocol
BE112	Fairfax County-RBP For Non Tidal Streams In Piedmont/Triassic Physiographic Provinces
BE113	Fairfax County-RBP For Non Tidal Streams In Coastal Plain Physiographic Provinces

BIO_METHOD	BIO_METHOD_TITLE
BE114	ICPRB Quantitative Non Tidal Streams Benthic Assessment
BE115	ICPRB Qualitative Non Tidal Streams Benthic Assessment Protocol
BE116	EPA Wadeable Streams Assessment Protocol For Non Tidal Streams
BE117	District Of Columbia-Unspecified Non-Tidal Wadable Stream Assessment Method
BE118	Prince Georges County-MBSS Compliant Non-Tidal Stream Assessment Protocol
BE119	USFS Non Tidal Stream Assessment Protocol
BE120	The NYSDEC Non Tidal Streams Biomonitoring- Jab Sample Protocol
BE121	Loudon County Single Habitat (Riffle) Stream Assessment Protocol For Non Tidal Streams
BE122	District Of Columbia-In-house Non Tidal Streams Assessment Protocol
BE123	VCU Non Tidal Stream Assessment Protocol
BE124O	EPA EMAP-Other Assessment Protocol For Non Tidal Streams
BE124P	EPA EMAP-Pool Assessment Protocol For Non Tidal Streams
BE124R	EPA EMAP-Riffle Assessment Protocol For Non Tidal Streams
BE125A	USGS-RTH-No snag Assessment Protocol For Non Tidal Streams
BE125B	USGS-RTH-Snag Assessment Protocol For Non Tidal Streams
BM201	Versar Tidal Benthic Biomass Determination Protocol
BM202	Versar Tidal Benthic Biomass Estimation Protocol
BM203	ODU Tidal Benthic Biomass Determination Protocol
BM204	Versar Tidal Benthic Group Biomass Determination Protocol
BE201	Versar Tidal Benthic Taxa Enumeration Protocol
BE202	ODU Tidal Benthic Taxa Enumeration Protocol
BE203	VIMS Generalized Tidal Benthic Taxa Enumeration Protocol
BM101	Versar Mesozooplankton Biomass Determination Protocol-1984 To 1998
BM101B	Versar Mesozooplankton Biomass Estimation Protocol- 1999 To 2002
BM102	ODU Mesozooplankton Biomass
BV101	Versar Mesozooplankton Settled Volumes
JF101	Versar Gelatinous Zooplankton Enumeration Protocol- 1984- July 87
JF102	Versar Gelatinous Zooplankton Enumeration Protocol- August 1987 -2002
JF103	ODU Gelatinous Zooplankton Enumeration Method
MI101	MSU/ANS Microzooplankton Enumeration Method
MI102	ODU Microzooplankton Enumeration Method
MI103	MSU/ANS Microzooplankton Whole Water Sample Enumeration Method
MZ101A	Versar Mesozooplankton Enumeration Method-1984 To 1989
MZ101B	Versar Mesozooplankton Enumeration Method-1990 To 2002
MZ101C	Versar Mesozooplankton Small Organism Screen Enumeration Method- 1998-2002
MZ102	ODU Mesozooplankton CVS Enumeration Method
MZ102B	ODU Mesozooplankton Modified CVS Enumeration Method
MZ103	ODU Mesozooplankton Henson-Stemple Enumeration Method
PD101	MSU/ANS Primary Production Estimation Method
PD102	ODU Primary Production Estimation Method
PH101	MSU/ANS Phytoplankton Enumeration Method
PH102	ODU Phytoplankton Enumeration Method
PH102M	ODU Phytoplankton Enumeration Method-2005 Modification
PH103	Uniform Chesapeake Bay Program Phytoplankton Enumeration Method
PP101	ODU Picoplankton Enumeration Method
PP102	MSU/ANS Picoplankton Enumeration Method

Table C-24. Non Tidal Stream Habitat Condition Assessment Methods (HAB_METHOD).

The HAB_METHOD codes identify methods for field evaluation of non-tidal stream habitat conditions. Currently accepted HAB_METHODS designations are as follows:

HAB_METHOD	HAB_METHOD_TITLE
HAB101	EPA Rapid Habitat Assessment Protocol
HAB102	Montgomery County-Unspecified Protocol
HAB103	Fairfax County-RSAT And Modified RBP For Piedmont/Triassic Physiographic Provinces
HAB104	Fairfax County-RSAT And Modified RBP For Coastal Plain Physiographic Provinces
HAB105	MACS Workgroup Modified EPA Rapid Habitat Assessment Protocol
HAB106	Virginia Commonwealth University Fast Habitat Assessment
HAB107	Virginia Commonwealth University

Table C-25. Sediment and Water Quality Parameter Methods (WQ_METHOD or SED_METHOD).

The WQ_METHOD or SED_METHOD codes identify methods for field or laboratory evaluation of sediment or water quality parameters. Currently accepted WQ_METHOD or SED_METHOD designations are as follows:

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
ACIDITY	L01	Acidity; Titrimetric
AL	L01	Total Aluminum; Atomic Emission Spectrometric
ANC	L01	Acid Neutralizing Capacity
ANC	L02	Acid Neutralizing Capacity
ANC	L03	Acid Neutralizing Capacity, Unspecified Lab Method
AS	L01	Total Arsenic Atomic Absorption Furnace Technique
ATEMP	F02	Air Temperature, Unspecified Field Method
BATT	NA	Battery Voltage
BIOSI	L01	Particulate Biogenic Silica
BOAT_SPEED	NA	Boat Speed In Knots
BOD20F	L01	20 Day BOD; Filtered
BOD20W	L01	20 Day BOD; Unfiltered
BOD5F	L01	5-Day Biochemical Oxygen Demand (Filtered)
BOD5W	L01	5-Day Biochemical Oxygen Demand
CA	L01	Calcium
CAF	L01	Calcium, Wf, Direct AAS
CAF	L02	Metals, Wf, ICP-AES
CD	L01	Total Cadmium; Atomic Emission Spectrometric
CDOM_440	L01	Dissolved Organic Matter Absorption Coefficient (Gelbstoff)
CDOM_SLOPE	L01	Slope Of CDOM Absorption Coefficient Spectrum (400 To 500 Nm)
CHL_A	L01	Trichromatic Chlorophyll A
CHL_B	L01	Trichromatic Chlorophyll B
CHL_C	L01	Trichromatic Chlorophyll C
CHLA	F01	Fluorometric Chlorophyll Using Probe
CHLA	L01	Monochromatic; Spectrophotometric
CHLA	L02	Monochromatic; Spectrophotometric
CHLA	L03	Fluorometric; In-Vitro Chlorophyll A
CLAY	L01	Sediment Clay Percentage, Folk Sediment Grain Size Analysis Protocol
CLF	L01	Chloride Filtered
CLF	L02	Chloride Filtered-Determination Of Inorganic Anions By Ion Chromatography
CLW	L01	Titrimetric; Mercuric Nitrate

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
CLW	L02	Total Chloride By Ion Chromatography
CLW	L03	Total Chloride By Automated Colorimetry - Automated Ferricyanide Aii
COD	L01	Titrimetric; Mid-Level
COD	L02	Titrimetric; High Level For Saline Waters
COD	L03	Colorimetric; Automated Or Manual
COLOR	L01	Visual Comparison Do Color Disc
CR	L01	Total Chromium; Atomic Emission Spectrometric
CU	L01	Total Copper; Atomic Emission Spectrometric
DCA	L01	Dissolved Metals - Calcium, Magnesium, Potassium & Sodium
DCU	L01	Dissolved Copper
DIC	L01	Dissolved Inorganic Carbon
DIN	D01	Database Calculated DIN - Method 1
DIN	D01A	Database Calculated DIN - Method 1 – MDL
DIN	D01B	Database Calculated DIN - Method 1 - 1/2 MDL
DIN	D01D	Database Calculated DIN - Method 1
DIN	D02	Database Calculated DIN - Method 2
DIN	D02A	Database Calculated DIN - Method 2 – MDL
DIN	D02B	Database Calculated DIN - Method 2 - 1/2 MDL
DIN	D02D	Database Calculated DIN - Method 2
DO	F01	In-Situ Membrane Electrode
DO	F02	Dissolved Oxygen
DO	F03	Dissolved Oxygen; Modified Winkler
DO	F04	In-Situ Dissolved Oxygen; Optical Do Probe
DO	F05	Dissolved Oxygen, Specific Conductance, Unspecified Field Method
DO_SAT_M	D01	Database Calculated DO_SAT = Method 1
DO_SAT_P	F01	Do Relative To Theoretical Value At Saturation (%)
DO_SAT_P	F05	Dissolved Oxygen Percent Saturation, Specific Conductance, Unspecified Field Method
DOC	L01	Combustion Infrared Method
DOC	L02	Wet Oxidation Method
DOC	L03	UV Or Heated Persulfate Oxidation
DOC	L04	Doc, 0. 45u Silver, Persulfate LR
DON	D01	Database Calculated DON - Method 1
DON	D01A	Database Calculated DON - Method 1 – MDL
DON	D01B	Database Calculated DON - Method 1 - 1/2 MDL
DON	D01D	Database Calculated DON - Method 1
DON	D02	Database Calculated DON - Method 2
DON	D02A	Database Calculated DON - Method 2 – MDL
DON	D02B	Database Calculated DON - Method 2 - 1/2 MDL
DON	D02D	Database Calculated DON - Method 2
DON	D03	Database Calculated DON - Method 3
DON	D03A	Database Calculated DON - Method 3 – MDL
DON	D03B	Database Calculated DON - Method 3 - 1/2 MDL
DON	D03D	Database Calculated DON - Method 3
DON	L01	Dissolved Organic Nitrogen, Unspecified Lab Method
DOP	D01	Database Calculated DOP - Method 1
DOP	D01A	Database Calculated DOP - Method 1 – MDL
DOP	D01B	Database Calculated DOP - Method 1 - 1/2 MDL
DOP	D01D	Database Calculated DOP - Method 1
DZN	L01	Dissolved Zinc
EPAR_S	F01	EPAR At Surface
EPARD_Z	F01	In-Situ; Light Sensor Down; Upwelling Par
EPARU_Z	F01	In-Situ; Light Sensor Up; Down welling Par
FCOLI_C	L02	Fecal Coliform Membrane Filter; M-FC Medium

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
FCOLI_M	L01	Fecal Coliform - EC Medium; MPN
FCOLI_M	L03	Fecal Coliform-Direct Test; A-1 Medium
FE_M	L01	Total Iron; Phenanthroline Method
FE_M	L02	Total Iron; Atomic Emission Spectrometric
FE_U	L02	Total Iron; Atomic Emission Spectrometric
FE_U	L03	Metals, Wf, ICP-AES
FLOW_AVG	F01	Stream flow; Mean Daily
FLOW_INS	F01	Stream flow; Instantaneous
FLOW_INS	F02	Stream flow; Instantaneous, Unspecified Field Method
FLUORESCENCE	F01	Fluorometric Insitu Probe
FS	L01	Fixed Solids
FSS	L01	Fixed Suspended Solids
HARDNESS	F01	Unspecified Field Method
HARDNESS	L01	Titrimetric; EDTA
HARDNESS	L02	Colorimetric; Automated EDTA
HARDNESS	L03	Unspecified Laboratory Method
HG	L01	Total Mercury; Automated Cold Vapor Technique
IBOD5F	L01	Carbonaceous Bod5; Inhibited; Filtered
IBOD5W	L01	Carbonaceous Bod5; Inhibited; Unfiltered
INTSAL	L02	Sediment Interstitial Salinity- Army Corp Of Engineers Sediment Grain Size Analysis Protocol
K	L01	Potassium
K	L02	Metals - Calcium, Magnesium, Potassium & Sodium
KD	D01	Database Calculated Kd - SAV 2 Point Method
KD	F01	Light Attenuation
KF	L01	Potassium, Wf, Direct AAS
KURTOSIS	L01	Kurtosis-Folk Sediment Grain Size Analysis Protocol
MEANDIAM	L01	Mean Sediment Diameter-Folk Sediment Grain Size Analysis Protocol
MEASURED_DEPTH	NA	Shallow Water Measured Depth Method
MEDDIAM	L02	Median Sediment Diameter-Army Corp Of Engineers Sediment Grain Size Analysis Protocol
MEDDIAM	L03	Median Sediment Diameter-VIMS Undocumented
MGF	L01	Magnesium
MGF	L02	Metals - Calcium, Magnesium, Potassium & Sodium
MN	L01	Total Manganese Atomic Emission Spectrometric
MOIST	L02	Sediment Moisture Percentage- Army Corp Of Engineers Sediment Grain Size Analysis Protocol
NAF	L01	Sodium
NAF	L02	Metals - Calcium, Magnesium, Potassium & Sodium
NH4F	L01	Colorimetric; Automated Phenate (Indophenol)
NH4F	L02	Colorimetric; Auto Salicylate-Hypochlorite
NH4F	L03	Ammonium Nitrogen, Unspecified Lab Method
NH4F	L04	Ammonium Nitrogen, Filtered, Unspecified Lab Method 2
NH4W	L01	Colorimetric; Automated Phenate (Indophenol)
NH4W	L02	Ammonium Nitrogen, Whole Water, Unspecified Lab Method
NH4W	L03	Ammonium Nitrogen, Whole Water, Unspecified Lab Method 2
NI	L01	Nickel By Inductively Coupled Plasma - Mass Spectrometry
NO23F	C01A	Calculated By Addition At Region VADEQ/NRO
NO23F	D01	Database Calculated NO23f - Method 1
NO23F	D01A	Database Calculated NO23f - Method 1 – MDL
NO23F	D01B	Database Calculated NO23f - Method 1 - 1/2
NO23F	D01D	Database Calculated NO23f - Method 1
NO23F	L01	Colorimetric; Automated Cadmium Reduction
NO23F	L02	Spectrophotometric; Manual Cadmium Reduction

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
NO23F	L03	Enzymatic Nitrate Method
NO23W	D01	Database Calculated NO23w
NO23W	D01A	Database Calculated NO23w - Method 1 – MDL
NO23W	D01B	Database Calculated NO23w - Method 1 - 1/2 MDL
NO23W	D01D	Database Calculated NO23w - Method 1
NO23W	L01	Colorimetric; Automated Cadmium Reduction
NO23W	L02	Manual; Spectrophotometric; Cadmium Reduction
NO23W	L03	Nitrate+Nitrite, Whole Water, Unspecified Lab Method
NO2F	L01	Automated; Colorimetric; Diazotization
NO2F	L02	Manual; Spectrophotometric; Diazotization
NO2F	L03	Dissolved Nitrite By Ion Chromatography
NO2F	L04	Nutrients, Wf, Colorimetric
NO2W	L01	Automated; Colorimetric; Diazotization
NO2W	L02	Manual; Spectrophotometric; Diazotization
NO2W	L03	Total Nitrite By Ion Chromatography
NO3F	C01	Calculated NO3F (Submitted To CBPO)
NO3F	D01	Database Calculated NO3f - Method 1
NO3F	D01A	Database Calculated NO3f - Method 1 – MDL
NO3F	D01B	Database Calculated NO3f - Method 1 - 1/2 MDL
NO3F	D01D	Database Calculated NO3f - Method 1
NO3F	L01	Nitrate By Ion Chromatography
NO3F	L02	Nitrite, Filtered, Unspecified Lab Method
NO3F	L03	Nitrite, Filtered, Unspecified Lab Method 2
NO3W	D01	Database Calculated NO3w - Method 1
NO3W	D01A	Database Calculated NO3w - Method 1 – MDL
NO3W	D01B	Database Calculated NO3w - Method 1 - 1/2 MDL
NO3W	D01D	Database Calculated NO3w - Method 1
NO3W	L01	Total Nitrate By Ion Chromatography
ORP	F01	Oxidation Reduction Potential
PB	L01	Total Lead; Atomic Absorption; Furnace Technique
PC	L01	Particulate Carbon (Inorg+Organic)
PH	F01	In-Situ Electrode Method
PH	F02	Electrode Method
PH	F03	Ph, Unspecified Field Method
PH	L01	Ph Of Wet Deposition -Electrolytic Determination 600/4-86-024
PH	L02	Ph, Lab, Auto Glass Electrode
PHEO	L01	Monochromatic; Spectrophotometric
PHEO	L02	Monochromatic; Spectrophotometric
PHEO	L03	Monochromatic; Fluorometric
PIC	L01	Particulate Inorganic Carbon
PIP	L01	Particulate Inorganic Phosphorus
PN	L01	Particulate Nitrogen
PO4F	L01	Orthophosphate; Automated; Ascorbic Acid
PO4F	L02	Ortho-P; Manual; Ascorbic Acid; Single Reagent
PO4F	L03	Orthophosphate Manual; Ascorbic Acid; Two Reagent
PO4F	L04	Orthophosphate Phosphorus As P, Whole Water, Unspecified Lab Method
PO4F	L05	Orthophosphate Phosphorus As P, Whole Water, Unspecified Lab Method 2
PO4W	L01	Orthophosphate; Automated; Ascorbic Acid
POC	D01	Database Calculated POC - Method 1
POC	D01A	Database Calculated POC - Method 1 – MDL
POC	D01B	Database Calculated POC - Method 1 - 1/2 MDL
POC	D01D	Database Calculated POC - Method 1
POC	D01E	POC, Calculated
POC	L02	Soc, 0. 45u Silver, Wet Oxidation

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
PON	D01	Database Calculated PON - Method 1
PON	D01A	Database Calculated PON - Method 1 – MDL
PON	D01B	Database Calculated PON - Method 1 - 1/2 MDL
PON	D01D	Database Calculated PON - Method 1
PP	D01	Database Calculated PP - Method 1
PP	D01A	Database Calculated PP - Method 1 - MDL
PP	D01B	Database Calculated PP - Method 1 - 1/2 MDL
PP	D01D	Database Calculated PP - Method 1
PP	L01	Particulate Phosphorus; Semi-Automated; Direct
QUARTDEV	L02	Sediment Quartile Deviation- Army Corp Of Engineers Sediment Grain Size Analysis Protocol
SALINITY	F01	In-Situ Measurement With Probe
SALINITY	F02	Calculated From SPCOND
SALINITY	F03	Calculated From SPCOND
SALINITY	F04	UNESCO '83 Calculation
SAND	L01	Sediment Percent Sand-Folk Sediment Grain Size Analysis Protocol
SAND	L02	Sediment Percent Sand-Army Corp Of Engineers Sediment Grain Size Analysis Protocol
SAND	L03	Sediment Percent Sand-VIMS Undocumented Method
SE	L01	Total Selenium; Atomic Absorption; Furnace Technique
SECCHI	F01	20 CM Secchi Depth
SECCHI	F02	30 CM Secchi Depth
SIF	L01	Colorimetric; Automated; Molybdenum Blue
SIF	L02	Spectrophotometric; Manual; Molybdosilicate
SIF	L03	Silica; Atomic Absorption Spectrometry; Direct
SIF	L04	Metals, Wf, ICP-AES
SIGMA_T	D01	Database Calculated Sigma_T - Method 1
SILT	L01	Folk Sediment Grain Size Analysis Protocol
SILTCLAY	L01	Percent Silt clay-Folk Sediment Grain Size Analysis Protocol
SILTCLAY	L02	Percent Silt clay -Army Corp Of Engineers Sediment Grain Size Analysis Protocol
SILTCLAY	L03	Percent Silt clay -VIMS Undocumented Method
SIW	L01	Colorimetric; Automated; Molybdenum Blue
SIW	L02	Spectrophotometric; Manual; Molybdosilicate
SIW	L03	Silica By Inductively Coupled Plasma - Mass Spectrometry
SKEWNESS	L01	Folk Sediment Grain Size Analysis Protocol
SKEWNESS	L02	Army Corp Of Engineers Sediment Grain Size Analysis Protocol
SO4F	L01	Sulfate; Turbidimetric Method
SO4F	L02	Sulfate By Ion Chromatography
SO4F	L03	Automated Colorimetric; Methylthymol Blue
SO4F	L04	Sulfate By Ion Chromatography-Similar To 300. 0
SO4W	L01	Sulfate; Turbidimetric Method
SO4W	L02	Anions, Wf, IC
SORT	L01	Folk Sediment Grain Size Analysis Protocol
SPCOND	F01	In-Situ Specific Conductance At 25 C
SPCOND	F02	Specific Conductance At 25 C - Field Grab
SPCOND	F03	Specific Conductance, Unspecified Field Method
SPCOND	F04	Specific Conductance, Unspecified Field Method 2
SPCOND	L01	Laboratory Measured Conductivity
SPCOND	L02	Specific Conductivity, Lab, Auto Bridge
SSC_%FINE	D01	Percent Of Suspended Sediment Particles Passing Through 0. 062 Mm Sieve
SSC_%SAND	D01	Percent Of Suspended Sediment Particles Retained On 0. 062 Mm Sieve
SSC_FINE	L01	Suspended Sediment Particles Passing Through A 0. 062 Mm Sieve
SSC_FINE	L02	Suspended Sediment Particles Passing Through A 0. 062 Mm Sieve
SSC_SAND	L01	Suspended Sediment Particles Retained On A 0. 062 Mm Sieve

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
SSC_SAND	L02	Suspended Sediment Particles Retained On A 0. 062 Mm Sieve
SSC_TOTAL	D01	Total Sediment
SSC_TOTAL	L01	Gravimetric Filtration Method; Dried At 90-105
SSC_TOTAL	L02	Gravimetric Evaporation Method; Dried At 90-105 Degrees C
SSC_TOTAL	L03	Total Suspended Sediment Concentration, Unspecified Lab Method
TALK	L01	Alkalinity; Titrimetric; Ph 4. 5
TALK	L02	Alkalinity, Unspecified Lab Method
TALK	L03	Alkalinity, Unspecified Lab Method 2
TC	L02	Total Sediment Carbon- Army Corp Of Engineers Sediment Grain Size Analysis Protocol
TCHL_PRE_CAL	F01	Precalibrated Fluorescence Probe Reading
TCOLI_C	L02	Total Coliform Membrane Filter; M-FC Medium
TCOLI_M	L01	Std. Fermentation Technique (MPN)
TDN	D01	Database Calculated TDN - Method 1
TDN	D01A	Database Calculated TDN - Method 1 – MDL
TDN	D01B	Database Calculated TDN - Method 1 - 1/2 MDL
TDN	D01D	Database Calculated TDN - Method 1
TDN	D02	Database Calculated TDN - Method 2
TDN	D02A	Database Calculated TDN - Method 2 – MDL
TDN	D02B	Database Calculated TDN - Method 2 - 1/2 MDL
TDN	D02D	Database Calculated TDN - Method 2
TDN	L01	Alkaline Persulfate Wet Oxidation + EPA 353. 2 Or EPA 353. 4
TDN	L02	Alkaline Persulfate Wet Oxidation + Enzyme Catalyzed Nitrate Reduction
TDN	L03	Total Dissolved Nitrogen, Unspecified Lab Method
TDP	L01	Alkaline Persulfate Wet Oxidation + EPA365. 1or EPA 365
TDP	L02	Alkaline Persulfate Wet Oxidation + EPA 365. 2
TDP	L03	Alkaline Persulfate Wet Oxidation + EPA 365. 3
TDP	L04	Colorimetric; Automated; Ascorbic Acid
TDP	L05	Block Digestion; Automated Ascorbic Acid
TDP	L06	Total Dissolved Phosphorus, Unspecified Lab Method
TDS	L01	Tot. Dissolved Solids; Gravimetric; Dried At 180 C
TIC	L02	Total Sediment Inorganic Carbon- Army Corp Of Engineers Sediment Grain Size Analysis Protocol
TKNF	L01	TKN Colorimetric; Automated Phenate (Indophenol)
TKNF	L02	Semi-Automated Block Digester; Colorimetric; Nitro
TKNF	L03	Colorimetric;Nessler;Titrimetric Or Potentiometric
TKNF	L04	Total Kjeldahl Nitrogen, Filtered, Unspecified Lab Method
TKNW	L01	TKN Colorimetric; Automated Phenate (Indophenol)
TKNW	L02	Semi-Automated Block Digester; Colorimetric; Nitro
TKNW	L03	Colorimetric:Nessler;Titrimetic Or Potentiometric
TKNW	L04	Total Kjeldahl Nitrogen , Whole Water, Unspecified Lab Method
TN	D01	Database Calculated TN - Method 1
TN	D01A	Database Calculated TN - Method 1 – MDL
TN	D01B	Database Calculated TN - Method 1 - 1/2 MDL
TN	D01D	Database Calculated TN - Method 1
TN	D02	Database Calculated TN - Method 2
TN	D02A	Database Calculated TN - Method 2 – MDL
TN	D02B	Database Calculated TN - Method 2 - 1/2 MDL
TN	D02D	Database Calculated TN - Method 2
TN	D03	Database Calculated TN - Method 3
TN	D03A	Database Calculated TN - Method 3 – MDL
TN	D03B	Database Calculated TN - Method 3 - 1/2 MDL
TN	D03D	Database Calculated TN - Method 3
TN	D04	Database Calculated TN - Method 4

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
TN	D04A	Database Calculated TN - Method 4 - MDL l
TN	D04B	Database Calculated TN - Method 4 - 1/2 MDL
TN	D04D	Database Calculated TN - Method 4
TN	D05	Database Calculated TN - Method 5
TN	D05A	Database Calculated TN - Method 5
TN	D05B	Database Calculated TN - Method 5
TN	DO5D	Database Calculated TN - Method 5
TN	L01	Alkaline Persulfate Digestion + EPA Method 353. 2
TN	L02	Total Nitrogen, Unspecified Lab Method
TN	L03	Total Sediment Nitrogen- Army Corp Of Engineers Sediment Grain Size Analysis Protocol
TOC	D01	Database Calculated Toc - Method 1
TOC	D01A	Database Calculated Toc - Method 1 - MDL l
TOC	D01B	Database Calculated Toc - Method 1 - 1/2 MDL
TOC	D01D	Database Calculated Toc - Method 1
TOC	L01	Combustion Infrared Method
TOC	L02	Wet Oxidation Method
TOC	L03	UV Or Heated Persulfate Oxidation
TOC	L04	Total Organic Carbon, Unspecified Lab Method
TOC	L05	Total Sediment Organic Carbon- Army Corp Of Engineers Sediment Grain Size Analysis Protocol
TON	D01	Database Calculated Ton - Method 1
TON	D01A	Database Calculated Ton - Method 1 – MDL
TON	D01B	Database Calculated Ton - Method 1 - 1/2 MDL
TON	D01D	Database Calculated Ton - Method 1
TON	D02	Database Calculated Ton - Method 2
TON	D02A	Database Calculated Ton - Method 2 - MDL l
TON	D02B	Database Calculated Ton - Method 2 - 1/2 MDL
TON	D02D	Database Calculated Ton - Method 2
TON	D03	Database Calculated Ton - Method 3
TON	D03A	Database Calculated Ton - Method 3 – MDL
TON	D03B	Database Calculated Ton - Method 3 - 1/2 MDL
TON	D03D	Database Calculated Ton - Method 3
TON	L01	Total Organic Nitrogen, Specific Conductance, Unspecified Lab Method
TOTAL_DEPTH	F01	Total Depth
TOTAL_DEPTH	F02	Total Depth
TOTAL_DEPTH	F03	Total Depth
TOTAL_DEPTH	NA	Shallow Water Total Depth Method
TP	D01	Database Calculated TP - Method 1
TP	D01A	Database Calculated TP - Method 1 – MDL
TP	D01B	Database Calculated TP - Method 1 - 1/2 MDL
TP	D01D	Database Calculated TP - Method 1
TP	L01	Colorimetric; Automated; Block Digester AAII
TP	L02	Colorimetric; Manual; Ascorbic Acid; Single Reagent
TP	L03	Colorimetric; Manual; Ascorbic Acid; Two Reagent
TP	L04	Colorimetric; Automated; Ascorbic Acid
TP	L05	Alkaline Persulfate Digestion And EPA365. 1
TP	L06	Total Phosphorus, Unspecified Lab Method
TP	L07	Phosphorus, Wu, Microkj ASF, Hg
TS	L01	Total Solids Dried At 103-105 Degrees
TSS	L01	Gravimetric; Dried At 103-105 C
TURB_FTU	L01	Formazin Turbidity Units
TURB_JTU	L01	Jackson Turbidity Units
TURB_NTU	F01	In-Situ Nephelometric (YSI 6136)

REPORTING_ PARAMETER	SEDIMENT/WQ_ METHOD	SEDIMENT/WQ_METHOD_TITLE
TURB_NTU	F02	In-Situ Nephelometric (YSI 6026)
TURB_NTU	L01	Nephelometric
TURB_NTU	UNK	In-Situ Nephelometric-Unknown YSI
VELOCITY	F01	Stream Current Velocity
VELOCITY	F02	Stream Current Velocity
VOLORG	L01	Volatile Organics-ODU Undocumented Method
VSS	L01	Gravimetric; Ignition At 550 C
WIDTH	F01	Total Channel Width
WTEMP	F01	In-Situ Thermistor
WTEMP	F02	Thermometric
WTEMP	F03	Water Temperature, Unspecified Field Method
ZN	L01	Total Zinc; Atomic Emission Spectrometric
ZNF	L02	Dissolved Zinc

Table C-26. Reporting Parameters (REPORTING_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. Additional codes may be added as needed. Currently accepted REPORTING_PARAMETERS and REPORTING_DESCRIPTION designations are as follows:

REPORTING_ PARAMETER	REPORTING_PARAMETER_DECRIPTION
ACIDITY	Acidity
AG	Total Silver
AL	Total Aluminum
ANC	Acid Neutralizing Capacity
AS	Total Arsenic
ASH_FRWT	Sample Ash Free Dry Weight (Mg/M**3)
ASH_WT	Sample Total Ash Weight Sample (Mg/M**3)
ASHFREWT	Sample Ash Free Dry Weight Sample (G/Sample)
ASHWT	Sample Total Ash Weight (G/Sample)
BATT	Battery Voltage
BIOSI	Biogenic Silica
BIOVOLUME	Biovolume(Ml/Sample)
BOAT_SPEED	Boat Speed In Knots
BOD20F	20-Day Biochemical Oxygen Demand (Filtered Sample)
BOD20W	20-Day Biochemical Oxygen Demand (Whole Sample)
BOD5F	5-Day Biochemical Oxygen Demand (Filtered Sample)
BOD5W	Whole 5-Day Biochemical Oxygen Demand
CA	Calcium, Total
CAF	Dissolved Calcium As Ca
CD	Total Cadmium
CDOM_440	Absorption Due To Dissolved Organic Matter
CDOM_SLOPE	Slope Of CDOM Absorption Coefficient Spectrum (400-500 Nm)
CHL_A	Trichromatic Chlorophyll A
CHL_B	Chlorophyll B
CHL_C	Chlorophyll C
CHLA	Active Chlorophyll-A
CLAY	Clay Content, Percent
CLF	Total Chloride
CLW	Total Chloride
COD	Chemical Oxygen Demand
COLOR	True Water Color

REPORTING_ PARAMETER	REPORTING_PARAMETER_DECRIPTION
COUNT	Number Per Unit Measure
COUNT_7	Seven Day Average Count
CR	Total Chromium
CU	Total Copper
DCA	Dissolved Calcium
DCU	Dissolved Copper
DIC	Carbon, Inorganic, Total
DIN	Dissolved Inorganic Nitrogen
DO	Dissolved Oxygen In Mg/L
DO_SAT_M	Do Saturation Concentration In Mg/L
DO_SAT_P	Do Saturation Using Probe Units In Percent
DOC	Dissolved Organic Carbon
DON	Dissolved Organic Nitrogen
DOP	Dissolved Organic Phosphorus
DRYWT	Sample Total Dry Weight
DZN	Dissolved Zinc
EPAR_S	Par Measured In Air Or On Deck
EPARD_Z	Par With Sensor Pointing Down; Measures Upwelling
EPARU_Z	Par With Sensor Pointed Up; Measures Down welling
FCOLI_C	Fecal Coliforms (Colonies)
FCOLI_M	Fecal Coliforms (Most Probable Number)
FE_M	Total Iron
FE_U	Total Iron
FLOW_AVG	Stream Flow; Mean Daily
FLOW_INS	Stream Flow; Instantaneous
FLUORESCENCE	Fluorescence
FS	Fixed Solids
FSS	Fixed Suspended Solids
GAGE_HEIGHT	Stream Stage In Feet
HARDNESS	Hardness As CaCO3
HG	Total Mercury
IBOD5F	Inhibited 5-Day Biochemical Oxygen Demand (Filtered Sample)
IBOD5W	Inhibited 5-Day Biochemical Oxygen Demand (Whole Sample)
INTSAL	Interstitial Salinity
K	Potassium, Total
KD	Light Attenuation
KF	Dissolved Potassium As K
KURTOSIS	Kurtosis
MEANDIAM	Mean Sediment Diameter
MEASURED_DEPTH	Measured Depth
MEDDIAM	Median Sediment Diameter
MGF	Dissolved Magnesium As Mg
MN	Total Manganese
MOIST	Moisture Content
NAF	Dissolved Sodium As Na
NH4F	Ammonium Nitrogen As N (Filtered Sample)
NH4W	Ammonium Nitrogen As N (Whole Sample)
NI	Total Nickel
NO23F	Nitrite+Nitrate Nitrogen As N (Filtered Sample)
NO23W	Nitrite+Nitrate Nitrogen As N (Whole Sample)
NO2F	Nitrite Nitrogen As N (Filtered Sample)
NO2W	Nitrite Nitrogen As N (Whole Sample)
NO3F	Nitrate Nitrogen As N (Filtered Sample)
NO3W	Nitrate Nitrogen As N (Whole Sample)

REPORTING_ PARAMETER	REPORTING_PARAMETER_DECRIPTION
ORP	Oxidation Reduction Potential
PB	Total Lead
PC	Particulate Carbon; Inorganic + Organic
PENETR	Gear Penetration Depth
PERIPHY	Periphyton Biomass; Water
PH	Ph Corrected For Temperature (25 Deg C)
PHEO	Pheophytin
PHI25	25 Percent Quartile Diameter(Phi)
PHI50	50 Percent Quartile Diameter(Phi)
PHI75	75 Percent Quartile Diameter(Phi)
PIC	Particulate Inorganic Carbon
PIP	Particulate Inorganic Phosphorus
PN	Particulate Nitrogen
PO4F	Orthophosphate Phosphorus As P (Filtered Sample)
PO4W	Orthophosphate Phosphorus As P (Whole Sample)
POC	Total Suspended Organic Carbon
PON	Particulate Organic Nitrogen
PP	Particulate Phosphorus
QUARTDEV	Quartile Deviation
SALINITY	Salinity Units Are Parts Per Thousand (PPT) And Are Equal To Practical Salinity Units (PSU).
SAND	Sand Content, Percent
SE	Total Selenium
SECCHI	Secchi Depth
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)
SI	Total Silicon As Si
SIF	Silica As Si (Filtered Sample)
SIGMA_T	Water Density; Dependent On Salinity And Water Temperature
SILT	Silt Content, Percent
SILTCLAY	Silt Clay Content, Percent
SIW	Silica As Si (Whole Sample)
SKEWNESS	Skewness
SN	Total Tin
SO3	Total Sulfite As SO3
SO4F	Sulfate
SO4W	Total Sulfate As SO4
SORT	Sorting
SPCOND	Conductivity Corrected For Temperature (25 Deg C) And Salinity
SSC_%FINE	Calculated Percent Fine Sand
SSC_%SAND	Calculated Percent Sand
SSC_FINE	Suspended Sediment Particles Passing Through A 0. 062 Mm Sieve
SSC_SAND	Suspended Sediment Particles Retained On A 0. 062 Mm Sieve
SSC_TOTAL	Total Suspended Sediment Concentration
TALK	Total Alkalinity As CaCO3
TC	Total Carbon Content
TCHL_PRE_CAL	Total Chlorophyll; From A Precalibrated Fluorescence Probe Reading
TCOLI_C	Total Coliforms (Colonies)
TCOLI_M	Total Coliforms (Most Probable Number)
TDN	Total Dissolved Nitrogen
TDP	Total Dissolved Phosphorus
TDS	Total Dissolved Solids;Gravimetric;Dried At 180 C
TDZN	Total Dissolved Zink

REPORTING_ PARAMETER	REPORTING_PARAMETER_DECRIPTION
TIC	Total Inorganic Carbonate Content
TKNF	Total Kjeldahl Nitrogen (Filtered Sample)
TKNW	Total Kjeldahl Nitrogen (Whole Sample)
TN	Total Nitrogen
TOC	Total Organic Carbon
TON	Total Organic Nitrogen
TOP	Total Organic Phosphorus
TOTAL_DEPTH	Total Station Depth
TP	Total Phosphorus
TS	Total Solids
TSS	Total Suspended Solids
TURB_FTU	Turbidity; Turbidimeter (Formazin Units)
TURB_JTU	Turbidity; Jackson Candle Method (Forward Scatter)
TURB_NTU	Turbidity; Nephelometric Method
VELOCITY	Current Velocity
VOLORG	Volatile Organic, Percent
VSS	Volatile Suspended Solids
WIDTH	Total Stream Channel Width
WTEMP	Water Temperature
ZN	Total Zinc
ZNF	Dissolved Zinc

Table C-27. 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-28. Analytical Problem Codes (PROBLEM).

This two-character code indicates when the there has been a reported problem with a measured value by the analytical laboratory or data provider. Currently accepted PROBLEM_CODES and **PROBLEM_CODE_DESCRIPTION** designations are as follows:

PROBLEM_CODE	PROBLEM_CODE_DESCRIPTION
A	Laboratory Accident
AA	Field Accident
B	Chemical Matrix Interference
BB	Torn Filter Pad
C	Instrument Failure
D	Insufficient Sample
DD	Sample Size Not Reported (Assumed)
E	Sample Received After Holding Time
F	Post-Calibration Failure Likely Due To Equipment Damage After Sampling; Data Appear Normal
FF	Mean Reported Due To Poor Replication Between Pads
GG	Sample Analyzed After Holding Time
I	Suspect Value Has Been Verified Correct
J	Incorrect Sample Fraction For Analysis
JJ	Volume Filtered Not Recorded (Assumed)
L	Licor Calibration Off By >= 10% Per Year. Use With Calc Kd Where Probe Of Lu, Ls, Lb Exist In Raw
LB	Licor Calibration Off By >= 10% Per Year For Both Air And Upward Facing Sensors
LS	Licor Calibration Off By >= 10% Per Year For Air Sensor
LU	Licor Calibration Off By >= 10% Per Year For Upward Facing Sensor
MM	Over 20% Of Sample Adhered To Pouch And Outside Of Pad
N	None
NN	Particulates Found In Filtered Sample
P	Provisional Data
Q	Analyte Present; Reported Value Is Estimated; Conc. Is Below The Range For Accurate Quantification
QQ	Part Exceeds Whole Value Yet Difference Is Within Analytical Precision
R	Sample Contaminated
RR	No Sample Received By Lab From Field Office
SS	Sample Rejected Due To High Suspended Sediment Concentration
U	Matrix Problem Resulting From The Interrelationship Between Variables Such As Ph And Ammonia
UN	For DCDOH Data, These Values Are Issues Or Are Nulls With No Assigned Problem Codes.
V	Sample Results Rejected Due To QC Criteria
WW	High Optical Density (750 Nm); Actual Value Recorded
X	Sample Not Preserved Properly

Table C-29. Sampling Program Codes (PROGRAM).

Within a given agency or organization there may be a subgroup or division who is responsible for processing and storing collected data. Program_Code refers to the group within an entity responsible for data collection. Currently accepted PROGRAM_CODEs and PROGRAM_DESCRIPTIONS are as follows:

AGENCY	PROGRAM	PROGRAM_DESCRIPTION
AAC_DPW	AAWERS	Anne Arundel County-Watershed Ecosystem and Restoration Services
BAL_DPW	BALSMP	City Of Baltimore- Stream Monitoring Program
BC_DEP	BCWMP	Baltimore Co. Watershed Management and Monitoring
DC_DDPE	DCSMP	District of Columbia-Stream Monitoring Program
DNREC	DEBM	Delaware Biological Monitoring Program
FC_DPW	FCWMP	Frederick County Watershed Management Program
FC_SPS	FCSQAP	Fairfax County Stream Quality Assessment Program
HC_DPW	HCBMSA	Howard Co Bio-Monitoring and Assessment Program
ICPRB	HISTORIC	Pre-Chesapeake Bay Tidal Monitoring Programs
LC_DBD	LCSAP	Loudoun County Stream Quality Assessment Program
MC_SPS	MCSMP	Montgomery Co Dept. of Environmental Protection
MDDNR	WQMP	Chesapeake Bay Mainstem And Tidal Tributary Water Quality Monitoring Program
MDE	MDCT	Maryland Department of Environment Core/Trend Monitoring Network
MDMNR	MBSS	Maryland Biological Stream Survey
NYDEC	RSMP	New York Routine Statewide Monitoring Program
PADEP	PAOWQA	Pennsylvania DEP Other Water Quality Assessments
PADEP	PASWM	Pennsylvania DEP Surface Water Monitoring Program
PADEP	PAUW	Pennsylvania DEP Unassessed Watersheds
PGC_DER	PGCSS	Prince Georges Co Programs and Planning Division
SRBC	TMDL	SRBC-Watershed Assessment and Protection-TMDL
SRBC	WA	SRBC-Watershed Assessment Program
USEPA	EMAP	EPA-EMAP Wadeable Streams Assessment
USEPA	EPA\NCAS	EPA EMAP National Coastal Assessment Program
USEPA	MAHA	EPA-Mid-Atlantic Highlands Assessment
USEPA	WSA	EPA-Wadeable Stream Assessment Program
USFS	NFSSA	National Forest Service Stream Assessment
USGS	NAWQA	USGS-National Water Quality Assessment Program
USGS	PAUSGS	Pennsylvania USGS Monitoring Program
VADEQ	ERMP	Elizabeth River Monitoring Program
VADEQ	SA	Virginia DEQ Non Tidal Stream Assessment Monitoring Program
VADEQ	WQMP	Chesapeake Bay Mainstem And Tidal Tributary Water Quality Monitoring Program
VCU	INSTAR	INteractive STream Assessment Resource
WVDEP	SA	West Virginia Div. of Water and Waste Management

Table C-30. Sampling Project Codes (PROJECT).

Many monitoring programs organize their various monitoring efforts as individual projects based on the purpose of the monitoring effort. Note: the non-tidal benthic data does not use formal project codes. Currently accepted PROJECT_CODEs and PROJECT_DESCRIPTIONS are as follows:

AGENCY	PROGRAM	PROJECT_CODE	PROJECT_DESCRIPTION
AAC_DPW	AAWERS		Anne Arundel County Aquatic Biological Monitoring Program
BAL_DPW	SMP		City of Baltimore NPDES Assessment Program
BC_DEP	BCWMP		County of Baltimore NPDES Assessment Program
DC_DDOE	SMP		District of Columbia NPDES Assessment Program
DNREC	DEBM		Delaware Biological Monitoring Program
FC-DPW	FCWMP		Frederick County Stream Assessment Program
FC-DPW	FCWMP		Frederick County Stream Restoration Monitoring Program
FC-SPS	FCSQAP		Fairfax County Stream Protection Strategy
HC_DPW	HCBMSA		Howard County Biological Monitoring and Assessment Program
ICPRB	HISTORIC	VA/HIST	Virginia Historic Tidal Benthic Data Recovery
LC-DBD	LCSAP		Loudoun County STREAM ASSESSMENT Program
MC-SPS	MCSMP		Montgomery County Countywide Stream protection Strategy
MDDNR	MBSS		Maryland Biological Stream Survey 2000-2001
MDDNR	MBSS		Maryland Biological Stream Survey 2000-2004
MDDNR	MBSS		Maryland Biological Stream Survey 2005-present
MDDNR	MBSS		Maryland Stream Waders Program
MDDNR	MDCT		Maryland Core/Trend Monitoring Network
MDDNR	WQMP	MAINSTEM	Chesapeake Bay Mainstem Monitoring Program
MDDNR	WQMP	POTOMAC	Potomac River Special Survey
MDDNR	WQMP	MAIN/TRIB	Long-Term Benthic Monitoring Program
NYDEC	RSMP		Stream Biomonitoring Program
PADEP	PAOWQA		319 Funded Project
PADEP	PAOWQA		Effluent Dominated Study
PADEP	PAOWQA		Fish IBI
PADEP	PASWM		Antidegradaton Survey
PADEP	PASWM		Basin Survey
PADEP	PASWM		Cause Effect
PADEP	PASWM		ICE Survey
PADEP	PASWM		Intensive Unassessed Follow-up
PADEP	PASWM		Point of First Use
PADEP	PASWM		Probabilistic Survey
PADEP	PASWM		Use Attainability
PADEP	PAUSGS		WQN – Macroinvertebrates
PADEP	PAUW		Unassessed Watersheds
PGC-DER	PGCSS		Biological Assessment and Monitoring Program
SRBC	TMDL		AMD sampling
SRBC	TMDL		AMD Sampling for TMDL Development-2000
SRBC	TMDL		AMD Sampling for TMDL Development-2000B
SRBC	TMDL		AMD Sampling for TMDL Development-2001
SRBC	TMDL		AMD Sampling for TMDL Development-2002
SRBC	TMDL		AMD Sampling for TMDL Development-2003
SRBC	TMDL		Beaverdam Branch and Mill Run TMDL
SRBC	TMDL		Conestoga River Watershed TMDL
SRBC	TMDL		Frankstown Branch Juniata River ICE/TMDL
SRBC	TMDL		Octoraro Creek TMDL
SRBC	TMDL		Water Quality Sampling for TMDL Development alias: AMD Sampling

AGENCY	PROGRAM	PROJECT_CODE	PROJECT_DESCRIPTION
SRBC	WA		Chemung Subbasin Survey Year 1 – 1997
SRBC	WA		Chemung Subbasin Survey Year 1 – 2006
SRBC	WA		Chemung Subbasin Survey, Year 2 - Cohocton River Watershed
SRBC	WA		ICE sampling in the Yellow Breeches
SRBC	WA		Interstate Stream Water Quality Network
SRBC	WA		Juniata Subbasin Survey Year 1 – 1995
SRBC	WA		Juniata Subbasin Survey Year 1 – 2004
SRBC	WA		Juniata Subbasin Survey, Year 2 - Morrison Cove
SRBC	WA		Large River Assessment 2005
SRBC	WA		Large River Assessment 2007
SRBC	WA		Large River Assessment Pilot Project
SRBC	WA		Large River Assessment Programs-Ongoing
SRBC	WA		Lower Susquehanna Subbasin Survey Year 1 – 1996
SRBC	WA		Lower Susquehanna Subbasin Survey, Year 1 – 2005
SRBC	WA		Lower Susquehanna Subbasin Survey, Year 2 - Yellow Breeches Watershed
SRBC	WA		Middle Susquehanna Subbasin Survey - Year 2 (Wyalusing Creek)
SRBC	WA		Middle Susquehanna Subbasin Survey Year 1 – 2001
SRBC	WA		Middle Susquehanna Subbasin Survey-Ongoing
SRBC	WA		New York EWS
SRBC	WA		Science in Motion 2006
SRBC	WA		Targeted Watershed Grant - Paxton Creek
SRBC	WA		Upper Susquehanna Subbasin Survey Year 1 – 1998
SRBC	WA		Upper Susquehanna Subbasin Survey Year 2 – 2000
SRBC	WA		Upper Susquehanna Subbasin Survey Year 2 - Whitney Point
SRBC	WA		Upper Susquehanna Subbasin Survey, Year 1
SRBC	WA		West Branch Subbasin Survey, Year 2 - Morgan Run
SRBC	WA		West Branch Susquehanna Subbasin Survey Year 1 – 2002
SRBC	WA		West Branch Susquehanna Subbasin Survey, 1994
SRBC	WA		Whitney Point Lake and Watershed Adaptive Management and Monitoring Plan
USEPA	EMAP		EPA Wadeable Streams Assessment
USEPA	EPA\NCAS	MAIN/TRIB	Long-Term Benthic Monitoring Program
USEPA	EPA\NCAS	VA/CBAY	Virginia Coastal Bay Monitoring
USEPA	MAHA		Mid-Atlantic Highlands Assessment
USEPA	WSA		Wadeable Stream Assessment Program
USFS	SA		Jefferson/George Washington National Forest Stream Assessment
USGS	NAWQA		National Water-Quality Assessment Program
VADEQ	SA		ProbMon
VADEQ	SA		Special Study &/Or Monitoring 2000-Ongoing
VADEQ	SA		Special Study &/Or Monitoring 2003-2007
VADEQ	SA		TMDL
VADEQ	WQMP	MAINSTEM	Chesapeake Bay Mainstem
VADEQ	WQMP	MAIN/TRIB	Long-Term Benthic Monitoring Program
VCU	INSTAR		Virginia Commonwealth University Instar Program
WVDEP	SA		Ambient Monitoring Network
WVDEP	SA		Long Term Monitoring Stations
WVDEP	SA		Random Surveys
WVDEP	SA		TMDL
WVDEP	SA		Unassessed Watersheds
WVDEP	SA		Watershed Assessment Protocol (WAP)

Table C-31. Detection Limit Codes (QUALIFIERS).

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

QUALIFIERS	QUALIFIERS_DESCRIPTION
#	Trace (less than an unknown detectable value)
<	Less than the detection limit of the method
<0	Less than the detection limit of the method value set to 0
>	Greater than detection limit of method
A	Acceptable Value-Within Range
C	Data suspect use caution
J	Estimated value
N	Not detected
NA	Not recorded/parameter value not acceptable

Table C-32. Reporting Parameter Prevalence (REPORTING_PARAMETER_PREVALENCE)

In some cases in non-tidal benthic studies the abundance of benthic organism were reported in abundance categories instead of actual organism counts. REPORTING_PARAMETER_PREVALENCE abundance classes are as follows:

REPORTING_ PARAMETER_ PREVALENCE	REPORTING_PARAMETER _PREVALENCE_NAME	REPORTING_PARAMETER _PREVALENCE__RANGE
A	Abundant	25-100
C	Common	10-24
P	Present	3-9
R	Rare	<3
VA	Very Abundant	>100

Table C-33. Salinity Zone (SALZONE).

Sampling Salinity Zone codes are used in numerous places in the tidal monitoring data and indexes of biotic integrity. If these data are collected, they are located in the EVENT DATA FILE.

SALZONE	DESCRIPTION
F	Freshwater- less than 0. 5 PSU
O	Oligohaline- 0. 5 to 5. 0 PSU
M	Mesohaline- 5. 1 to 18. 0 PSU
LM	Low Mesohaline- 5. 1 to 12. 5 PSU
HM	High Mesohaline- 12. 5 to 18. 0 PSU
P	Polyhaline- greater than 18. 0 PSU
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-34. Sample Replicate Type (SAMPLE_REPLICATE_TYPE).
The current CBP Water Quality and Non-tidal benthic databases describe water quality samples by sample replicate type. This parameter combines the sample replicate number with a sample type descriptor. Currently accepted SAMPLE_REPLICATE_TYPE designations are as follows:

SAMPLE_ REPLICATE _TYPE	SAMPLE_REPLICATE_TYPE _DESCRIPTION
CTRL	CONTROL SAMPLE
FL	FIELD AND LAB REPLICATES
FLD	FIELD REPLICATE
FS_AVG	AVERAGE OF TWO FIELD SPLIT SUBSAMPLE VALUES
FS1	FIELD SPLIT SUBSAMPLE 1
FS1/LAV	LABORATORY AVERAGE FOR FIELD SPLIT 1
FS1/LS1	FIELD SPLIT SUBSAMPLE 1/LAB SPLIT SUBSAMPLE 1
FS1/LS2	FIELD SPLIT SUBSAMPLE 1/LAB SPLIT SUBSAMPLE 2
FS1_AVG	AVERAGE OF LAB SPLITS GENERATED FROM FIELD SPLIT SUBSAMPLE 1
FS2	FIELD SPLIT SUBSAMPLE 2
FS2/LAV	LABORATORY AVERAGE FOR FIELD SPLIT TWO
FS2/LS1	FIELD SPLIT SUBSAMPLE2 /LAB SPLIT SUBSAMPLE 1
FS2/LS2	FIELD SPLIT SUBSAMPLE 2/LAB SPLIT SUBSAMPLE 1LAB SPLIT SUBSAMPLE 2
FS2_AVG	AVERAGE OF LAB SPLITS GENERATED FROM FIELD SPLIT SUBSAMPLE 2
FS3	FIELD SPLIT SUBSAMPLE 3
FS4	FIELD SPLIT SUBSAMPLE 4
LAB	LAB REPLICATE
LS1	LAB SPLIT SUBSAMPLE 1
LS2	LAB SPLIT SUBSAMPLE 2
LS3	LAB SPLIT SUBSAMPLE 3
M1	FIELD MEASUREMENT 1
M2	FIELD MEASUREMENT 2
M3	FIELD MEASUREMENT 3
M4	FIELD MEASUREMENT 4
METH	METHOD COMPARISON
S1	SAMPLE 1
S1/LS1	SAMPLE 1/LAB SPLIT SUBSAMPLE 1
S1/LS2	SAMPLE 1/LAB SPLIT SUBSAMPLE 2
S1/LS3	SAMPLE 1/LAB SPLIT SUBSAMPLE 3
S2	SAMPLE 2
S2/LS1	SAMPLE 2/LAB SPLIT SUBSAMPLE 1
S2/LS2	SAMPLE 2/LAB SPLIT SUBSAMPLE 2
S2/LS3	SAMPLE 2/LAB SPLIT SUBSAMPLE 3
S3	SAMPLE 3
SPK	SPIKE SAMPLE
SPK1	SPIKE SAMPLE SUBSAMPLE 1
SPK2	SPIKE SAMPLE SUBSAMPLE 2
SPLT	FIELD SPLIT

Table C-35. Sample Collection Type (SAMPLE_TYPE).

The sample type describes how a sample was physically collected. Currently accepted Sample collection Type codes are as follows:

SAMPLE_TYPE	SAMPLE_TYPE_DESCRIPTION
C	COMPOSITE SAMPLE, MADE UP OF SUBSAMPLES FROM MULTIPLE DEPTHS
CS	COMPOSITE SAMPLE COLLECTED SPATIALLY
CT	COMPOSITE SAMPLE COLLECTED TEMPORALLY
D	DISCRETE SAMPLE, SAMPLE TAKEN FROM SINGLE DEPTH
HVIC	HORIZONTAL AND VERTICALLY INTEGRATED COMPOSITE SAMPLE
ISM	IN-SITU MEASUREMENT AT DEPTH, NO SAMPLE COLLECTED
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-36. 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-37. Sampling Stratum (STRATUM).

In the current tidal benthic sampling program, two types of sites are sampled: (1) fixed sites to identify temporal trends and (2) spatially random sites are sampled to assess bay-wide benthic status. While a variety of strata designs have been used over the history of the program, the current sampling stratum consists of 17 Strata (Denoted by bold and underlined type). Current and historic stratum codes and descriptions are as follows:

STRATUM	STRATUM_DESCRIPTION	STRATUM	STRATUM_DESCRIPTION
101	Calvert Cliffs		
102	Calvert Cliffs	BAY	Virginia Lower Bay
103	Calvert Cliffs	ELZ	Elizabeth River
104	Holland Point	JAM	James River
105	Holland Point	LAR	Large Estuary
106	Bloody Point	MET	Maryland Eastern Tributaries
107	Bodkin Point	MMS	Maryland Mainstem
108	Poole's Island	MWT	Maryland Western Tributaries
109	Turkey Point	PAR	Paradise Creek
110	Point Lookout	PAT	Baltimore Harbor, Patapsco River
111	Point Lookout	PMR	Potomac River
112	St Clements Island	PXR	Patuxent River
113	St Clements Island	RAP	Rappahannock River
114	Morgantown	SML	Small Estuary
115	Morgantown	TID	Tidal River
116	Maryland Point	UPB	Maryland Upper Bay
117	Rosier Bluff	VACB	VIRGINIA COASTAL BAYS
118	Todd's Point	YRK	York River
119	Todd's Point		
120	Jamaica Point		
121	King's Creek		
122	Piney Point		
123	Frying Pan Point		
124	Sparrows Point		
125	Bear Creek		
126	Curtis Bay		
127	Middle Branch		
128	Broomes Island		
129	Broomes Island		
130	Chalk Point		
131	Jug Bay		

Table C-38. Site Selection Type (SITE_TYPE).

This Site_Type code provides general information on user how a sampling site was selected. Please see individual monitoring program documentation for details on site selection. The currently accepted SITE_TYPE_CODES and SITE_TYPE_DEFINITIONS are as follows:

SITE_TYPE_CODE	SITE_TYPE_DEFINITIONS
F	Long term Fixed sample Site
QC	Quality Control Site
R	Randomly selected site within a habitat strata
RR	Randomly Selected Site- Found to be a Reference Site
TB	Target-Baseline Site
TD	Target-Downstream of Known Impairment
TR	Target-Reference Site
TS	Target-Systematic Site selected
U	Unspecified

Table C-39. Data Collecting Agency (SOURCE).

The Agency or Source codes were added to the database to identify the entity that generates the monitoring data directly or under contract to a larger organization.

AGENCY OR SOURCE	AGENCY OR SOURCE NAME
AAC_DPW	Anne Arundel County-Department of Public Works
BAL_DPW	City of Baltimore-Department of Public Works
BC_DEP	Baltimore County Department of Environmental Protection
DC_DDOE	District of Columbia-District Department of the Environment
DNREC	Delaware Department of Natural Resources and Environmental Control
FC-DPW	Frederick County Department of Public Works
FC-SPS	Fairfax County Department of Public Works and Environmental Services
HC_DPW	Howard County Department of Public Works
LC-DBD	Loudon County Department Of Building And Development
MC-SPS	Montgomery County Department of Environmental Protection
MDDNR	Maryland Department of Natural Resources
MDE	Maryland Department Of The Environment
MSU	Morgan State University
NYDEC	New York Department Of Environmental Conservation
PADEP	Pennsylvania Department of Environmental Protection
PGC-DER	Prince George's County Department of Environmental Resources
SRBC	Susquehanna River Basin Commission
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USGS	United States Geological Survey
VADEQ	Virginia Department of Environmental Quality
VCU	Virginia Commonwealth University
VERSAR	Versar Incorporated
VIMS	Virginia Institute Of Marine Science
WVDEP	West Virginia Department of Environmental Protection

Table C-40. 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
MSUCODE	Morgan State University
ODUCODE	Old Dominion University
VERCODE	Versar Incorporated–Maryland Power Plant Sighting Codes
VIMSCODE	Virginia Institute of Marine Sciences

Table C-41. 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 biological and water quality data sets and data users guides are as follows:

AGENCY	AGENCY_STATION	STATION	AGENCY	AGENCY_STATION	STATION	AGENCY	AGENCY_STATION	STATION
MDDNR	MEE3. 1	EE3. 1	MDDNR	XDF0407	LE1. 3	PADEP	WQN0201	WQN0202
MDDNR	MET4. 2	ET4. 2	MDDNR	XEA1840	TF2. 4	PADEP	WQN0204	WQN0206
MDDNR	MET5. 1	ET5. 1	MDDNR	XEA6596	TF2. 3	PADEP	WQN0214	WQN0241
MDDNR	MET5. 2	ET5. 2	MDDNR	XED4892	TF1. 7	PADEP	WQN0217	WQN0218
MDDNR	MLE2. 2	LE2. 2	MDDNR	XED9490	TF1. 6	PADEP	WQN0302	WQN0303
MDDNR	MWT5. 1	WT5. 1	MDDNR	XFB1433	TF2. 2	PADEP	WQN0303	WQN0304
MDDNR	MET5. 0A	ET5. 0A	MDDNR	XFB2470	TF2. 1	PADEP	WQN0311	WQN0312
MDDNR	CHO0626	ET5. 0	MDDNR	XHF1373	CB3. 3C	PADEP	WQN0426	WQN0436
MDDNR	PR01	TF2. 0	MDDNR	XJH6680	CB2. 1	USGS	01491000	ET5. 0
MDDNR	PXT0402	TF1. 5	ODU	1	LE5. 5	USGS	01578310	CB1. 0
MDDNR	PXT0456	TF1. 4	ODU	2	CB8. 1	USGS	01594440	TF1. 0
MDDNR	PXT0494	TF1. 3	ODU	3	CB8. 1E	USGS	01646580	TF2. 0
MDDNR	PXT0603	TF1. 0	ODU	4	CB7. 4	USGS	01668000	TF3. 0
MDDNR	SUS0109	CB1. 0	ODU	5	CB7. 4N	USGS	01673000	TF4. 0P
MDDNR	TF1. 1	TF1. 0	ODU	6	CB7. 3	USGS	01674500	TF4. 0M
MDDNR	WXT0045	TF1. 2	ODU	7	CB7. 3E	USGS	02035000	TF5. 0J
MDDNR	XCF8747	LE1. 4	ODU	8	CB6. 4	USGS	02041650	TF5. 0A
MDDNR	XCF9575	CB5. 1W	ODU	9A	CB5. 4	VADEQ	TF3. 1	TF3. 0
MDDNR	XCG8613	CB5. 1	ODU	9B	LE3. 7	VADEQ	TF4. 1	TF4. 0P
MDDNR	XDA1177	RET2. 2	ODU	9C	WE4. 1	VADEQ	TF4. 3	TF4. 0M
MDDNR	XDA4238	RET2. 1	ODU	9D	WE4. 4	VADEQ	TF5. 1	TF5. 0J
MDDNR	XDB3321	RET2. 3	ODU	9E	CB7. 2E	VADEQ	TF5. 4A	TF5. 0A
MDDNR	XDC1706	RET2. 4	ODU	9F	WE4. 2	VIMS	EE3. 1	EE3. 4
MDDNR	XDE2792	LE1. 2	ODU	9G	WE4. 3	VIMS	EE3. 2	EE3. 5
MDDNR	XDE5339	LE1. 1	ODU	9H	CB7. 1N			
MDDNR	XDE9401	RET1. 1	ODU	9I	CB7. 1S			

Table C-42. Sampling Station Identifier (STATION).

Provided here is a current list of the tidal fixed monitoring stations for all CBP monitoring programs is given here. All latitudes and longitudes are in NAD83 coordinates. These sites are given unique station identifiers in the databases and are not included in the following list.

STATION	LATITUDE	LONGITUDE	STATION_DESCRIPTION
CB1. 0	39. 658719	-76. 17412	SUSQUEHANNA RIVER AT CONOWINGO DAM
CB1. 1	39. 544835	-76. 081339	MOUTH OF SUSQUEHANNA RIVER; HEAD OF BAY; MID-CHANNEL
CB2. 1	39. 440114	-76. 024669	SOUTHWEST OF TURKEY POINT; UPPER LIMIT OF TRANSITION ZONE; MID-CHANNEL
CB2. 2	39. 346776	-76. 174674	WEST OF STILL POND NEAR BUOY R-34; MIDDLE OF TRANSITION ZONE; MID-CHANNEL
CB3. 1	39. 248164	-76. 237732	SOUTHEAST OF GUNPOWDER NECK BETWEEN BUOY 24A AND 24B; LOWER LIMIT OF TRANSITION ZONE; MID-CHANNEL
CB3. 2	39. 163165	-76. 306067	NORTHWEST OF SWAN POINT NEAR BUOY R-10; LOWER ESTUARINE REACH; MID-CHANNEL
CB3. 3C	38. 995945	-76. 359679	NORTH OF BAY BRIDGE; CHARACTERIZES MID-CHANNEL
CB3. 3E	39. 001778	-76. 346068	NORTHEAST OF BAY BRIDGE; CHARACTERIZES EASTERN SHORE
CB3. 3W	39. 003167	-76. 388014	NORTHWEST OF BAY BRIDGE; CHARACTERIZES WESTERN SHORE
CB4. 0C	38. 927058	-76. 394401	SOUTH OF BAY BRIDGE; CHARACTERIZES MID-CHANNEL
CB4. 0E	38. 927058	-76. 386901	SOUTHEAST OF BAY BRIDGE; CHARACTERIZES EASTERN SHORE
CB4. 0W	38. 927336	-76. 432735	SOUTHWEST OF BAY BRIDGE; CHARACTERIZES WESTERN SHORE
CB4. 1C	38. 825116	-76. 399676	SOUTHWEST OF KENT POINT; CHARACTERIZES MID-CHANNEL
CB4. 1E	38. 816505	-76. 371064	SOUTH OF KENT POINT; BOUNDARY BETWEEN CB4 AND EE1; RIVER CHANNEL
CB4. 1W	38. 81345	-76. 462733	SOUTHEAST OF HORSESHOE POINT; CHARACTERIZES WESTERN SHORE
CB4. 2C	38. 644842	-76. 417729	SOUTHWEST OF TILGHMAN ISLAND NEAR BUOY CR; CHARACTERIZES MID-CHANNEL
CB4. 2E	38. 644842	-76. 399951	SOUTHWEST OF TILGHMAN ISLAND; CHARACTERIZES EASTERN SHORE
CB4. 2W	38. 643453	-76. 501343	NORTHWEST OF PLUM POINT; CHARACTERIZES WESTERN SHORE
CB4. 3C	38. 55651	-76. 434673	EAST OF DARES BEACH NEAR BUOY R-64; CHARACTERIZES MID-CHANNEL
CB4. 3E	38. 55651	-76. 389672	MOUTH OF CHOPTANK RIVER; BOUNDARY BETWEEN CB4 AND EE2
CB4. 3W	38. 556511	-76. 493008	EAST OF DARES BEACH; CHARACTERIZES WESTERN SHORE
CB4. 4	38. 413178	-76. 343003	NORTHEAST OF COVE POINT; MID-CHANNEL
CB5. 1	38. 318457	-76. 292724	EAST OF CEDAR POINT AND PR BUOY; MID-CHANNEL
CB5. 1W	38. 325124	-76. 375505	MID-CHANNEL BETWEEN CEDAR POINT AND COVE POINT; CHARACTERIZES LOWER ESTUARINE
CB5. 2	38. 136791	-76. 227998	EAST OF POINT NO POINT; MID-CHANNEL
CB5. 3	37. 911793	-76. 167718	NORTHEAST OF SMITH POINT AT VIRGINIA STATE LINE; MID-CHANNEL; OVERLAP STATION WITH VIRGINIA
CB5. 4	37. 8	-76. 175	CENTRAL CHESAPEAKE BAY (DEEP MAIN CHANNEL)

STATION	LATITUDE	LONGITUDE	STATION_DESCRIPTION
CB5. 4W	37. 813333	-76. 295	CENTRAL CHESAPEAKE BAY AT THE MOUTH OF THE GREAT WICOMICO RIVER
CB5. 5	37. 691667	-76. 19	CENTRAL CHESAPEAKE BAY (MAIN CHANNEL)
CB6. 1	37. 588333	-76. 1625	LOWER WEST CENTRAL CHESAPEAKE BAY (MAIN CHANNEL OFF LOWER END OF THE RAPPAHANNOCK RIVER)
CB6. 2	37. 486667	-76. 156667	LOWER WEST CENTRAL CHESAPEAKE BAY
CB6. 3	37. 411389	-76. 16	LOWER WEST CENTRAL CHESAPEAKE BAY (WOLFTRAP)
CB6. 4	37. 236389	-76. 208333	CENTRAL CHESAPEAKE BAY OFFSHORE FROM MOUTH OF YORK RIVER
CB7. 1	37. 683333	-75. 99	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE CHANNEL)
CB7. 1N	37. 775	-75. 975	LOWER EAST CENTRAL CHESAPEAKE BAY (TANGIER SOUND CHANNEL)
CB7. 1S	37. 581111	-76. 058333	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE CHANNEL)
CB7. 2	37. 411389	-76. 08	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE CHANNEL)
CB7. 2E	37. 411389	-76. 025	LOWER EAST CENTRAL CHESAPEAKE BAY (EASTERN SHORE, SIDE CHANNEL)
CB7. 3	37. 116667	-76. 125556	MAINSTEM YORK SPIT CHANNEL
CB7. 3E	37. 228611	-76. 054167	LOWER EASTERN SHORE CHANNEL AREA
CB7. 4	36. 995556	-76. 020833	BALTIMORE CHANNEL AT THE BAY BRIDGE/TUNNEL
CB7. 4N	37. 062222	-75. 983333	NORTH CHANNEL AT THE BAY BRIDGE/TUNNEL
CB8. 1	36. 995278	-76. 178333	BETWEEN JAMES RIVER MOUTH AND THIMBLE SHOALS CHANNEL
CB8. 1E	36. 947222	-76. 035278	THIMBLE SHOALS CHANNEL AT BAY BRIDGE/TUNNEL
EE1. 1	38. 883448	-76. 249673	EASTERN BAY BETWEEN TILGHMAN POINT AND PARSONS ISLAND, NORTH OF BUOY R-4; CHARACTERIZES EMBAYMENT
EE2. 1	38. 65012	-76. 274669	CHOPTANK EMBAYMENT BETWEEN TODDS POINT AND NELSON POINT; MIDWAY BETWEEN BUOY BWN63B AND R-12
EE2. 2	38. 533455	-76. 308003	LITTLE CHOPTANK RIVER MID-CHANNEL WEST OF RAGGED POINT, WEST OF BUOY FIG-"3"; CHARACTERIZES EMBAYMENT
EE3. 0	38. 283456	-76. 016325	FISHING BAY AT DAYMARK 3, WEST OF ROASTING EAR POINT; CHARACTERIZES EMBAYMENT
EE3. 1	38. 200123	-75. 974656	NORTH TANGIER SOUND, NORTHWEST OF HAINES POINT, 100 YARDS NORTH OF BUOY R-16; CHARACTERIZES EMBAYMENT
EE3. 2	37. 792627	-75. 932991	SOUTH TANGIER SOUND, MID-CHANNEL; EAST OF SMITH ISLAND, 500 YARDS NNW OF BUOY R-8; CHARACTERIZES EMBAYMENT
EE3. 3	37. 941792	-75. 76632	POCOMOKE SOUND, MID-CHANNEL NEAR BUOY W-"A" PLACE; STATE LINE; CHARACTERIZES EMBAYMENT
EE3. 4	37. 908333	-75. 791667	POCOMOKE SOUND NORTHWEST OF LONG POINT
EE3. 5	37. 796389	-75. 844722	CHESAPEAKE BAY SOUTHEAST OF TANGIER ISLAND
ET1. 1	39. 575114	-75. 958	NORTHEAST RIVER AT BUOY F1R-12 OFF HANCE POINT; MID-CHANNEL; TIDAL FRESH WATER STATION
ET10. 1	38. 083455	-75. 566314	UPPER POCOMAKE RIVER NEAR ALTERNATE ROUTE 13 BRIDGE AT POCOMAKE CITY; TIDAL FRESH WATER STATION
ET2. 1	39. 525113	-75. 816326	BACK CREEK NEAR ROUTE 213 BRIDGE AT CHESAPEAKE BAY; TIDAL FRESH WATER STATION

STATION	LATITUDE	LONGITUDE	STATION_DESCRIPTION
ET2. 2	39. 46678	-75. 874662	BOHEMIA RIVER OFF OLD HACK POINT AT BUOY F1R-4; MID-CHANNEL; TIDAL FRESH WATER STATION
ET2. 3	39. 508448	-75. 899664	ELK RIVER, SOUTHEAST OF OLDFIELD POINT AT B-15; MID-CHANNEL; TIDAL FRESH WATER STATION
ET3. 1	39. 366779	-75. 882995	SASSAFRAS RIVER NEAR ROUTE 213 BRIDGE; TIDAL FRESH WATER STATION
ET4. 1	39. 258443	-75. 924662	CHESTER RIVER AT CRUMPTON NEAR ROUTE 290 BRIDGE; TIDAL FRESH WATER STATION
ET4. 2	38. 991779	-76. 216341	LOWER CHESTER RIVER, SOUTH OF EASTERN NECK ISLAND AT BUOY FIG-9; CHARACTERIZES LOWER ESTUARINE
ET5. 0A	38. 775	-75. 9683	CHOPTANK RIVER, MID-CHANNEL OF MOUTH OF KINGS CREEK
ET5. 1	38. 807059	-75. 911881	UPPER CHOPTANK RIVER AT GANEY WHARF, DOWNSTREAM OF CONFLUENCE; TUCKAHOE CIRCLE; TIDAL FRESH WATER STATION
ET5. 2	38. 580118	-76. 057995	LOWER CHOPTANK RIVER NEAR ROUTE 50 BRIDGE AT CAMBRIDGE; CHARACTERIZES LOWER ESTUARINE
ET6. 1	38. 533449	-75. 71632	UPPER NANTICOKE RIVER NEAR ROUTE 313 BRIDGE AT SHARPTOWN; MID-CHANNEL; TIDAL FRESH WATER STATION
ET6. 2	38. 333454	-75. 882989	LOWER NANTICOKE RIVER; MID-CHANNEL NEAR BUOY FIG-11; CHARACTERIZES LOWER ESTUARINE
ET7. 1	38. 266788	-75. 791319	LOWER WICOMICO RIVER AT WHITEHEAVEN OFF OF FERRY ROAD; CHARACTERIZES LOWER ESTUARINE
ET8. 1	38. 14179	-75. 81632	MANOKIN RIVER AT UPPER EXTENT OF CHANNEL NEAR BUOY R-8; CHARACTERIZES LOWER ESTUARINE
ET9. 1	38. 058457	-75. 807987	BIG ANNEMESSEX RIVER, NORTHWEST OF LONG POINT; 250 YARDS EAST OF DAY BEACON G-5; CHARACTERIZES LOWER ESTUARINE
LE1. 1	38. 425124	-76. 601625	MID-CHANNEL; SSW OF JACK BAY SANDSPIT AND NORTHEAST OF SANDGATES; CHARACTERIZES LOWER ESTUARINE
LE1. 2	38. 378735	-76. 511065	MID-CHANNEL 1600 METERS; SOUTHWEST OF PATERSONS POINT; CHARACTERIZES LOWER ESTUARINE
LE1. 3	38. 34068	-76. 488009	MID-CHANNEL 1200 METERS DUE NORTH OF POINT PATIENCE; ENE OF HALF PONE POINT; CHARACTERIZES LOWER ESTUARINE
LE1. 4	38. 312069	-76. 42134	MID-CHANNEL BETWEEN DRUM POINT AND FISHING POINT; CHARACTERIZES LOWER ESTUARINE
LE2. 2	38. 166795	-76. 583013	POTOMAC RIVER OFF RAGGED POINT AT BUOY 51B; LOWER ESTUARINE ZONE
LE2. 3	38. 021516	-76. 347725	MOUTH OF POTOMAC RIVER; BOUNDARY BETWEEN CB5 AND LE2; RIVER CHANNEL
LE3. 1	37. 760695	-76. 620789	VIMS SLACK WATER, BUOY #11
LE3. 2	37. 670418	-76. 554119	LONG POINT UPSTREAM OF BUOY #R8
LE3. 2N	37. 667362	-76. 540785	LONG POINT UPSTREAM OF BUOY #R8 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE3. 2S	37. 647085	-76. 569953	LONG POINT UPSTREAM OF BUOY #R8 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE3. 3	37. 693472	-76. 473005	CORROTOMAN RIVER, BUOY #R6
LE3. 3A	37. 666806	-76. 483005	CORROTOMAN RIVER, 1984 STATION LOCATION
LE3. 4	37. 633471	-76. 463004	ORCHARD PT, VIMS SLACK WATER
LE3. 4B	37. 624338	-76. 461871	ORCHARD PT, MOVED FROM VIMS SLACK WATER FOR BENTHIC SAMPLING
LE3. 6	37. 596667	-76. 2850	MOUTH OF THE RAPPAHANNOCK RIVER
LE3. 6N	37. 6068	-76. 282998	RAPPAHANNOCK RIVER NORTH SIDE

STATION	LATITUDE	LONGITUDE	STATION_DESCRIPTION
LE3. 6S	37. 572633	-76. 292998	RAPPAHANNOCK RIVER SOUTH SIDE
LE3. 7	37. 530556	-76. 306944	MOUTH OF THE PIANKATANK RIVER
LE4. 1	37. 418478	-76. 693013	VIMS SLACK WATER, #N44
LE4. 2	37. 291811	-76. 558008	VIMS SLACK WATER, #N34
LE4. 2N	37. 295422	-76. 558563	VIMS SLACK WATER, #N34 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE4. 2S	37. 275145	-76. 578564	VIMS SLACK WATER, #N34 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE4. 3	37. 235144	-76. 484672	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS
LE4. 3B	37. 229544	-76. 472472	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS
LE4. 3N	37. 253476	-76. 439115	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE4. 3S	37. 223477	-76. 432448	YORK RIVER BETWEEN AMOCO AND SARAH CREEKS (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE5. 1	37. 206813	-76. 651344	VIMS SLACK WATER, RED BUOY #36
LE5. 2	37. 057925	-76. 583009	BUOY #C12-13
LE5. 2N	37. 084314	-76. 573842	BUOY #C12-13 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE5. 2S	37. 036259	-76. 604954	BUOY #C12-13 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
LE5. 3	36. 990148	-76. 459671	NH-15 JAMES RIVER BRIDGE, VIMS
LE5. 4	36. 955148	-76. 391335	BUOY #9, HAMPTON ROADS, VIMS
LE5. 5	36. 99681	-76. 303	MOUTH OF THE JAMES RIVER
LE5. 5-W	36. 99903	-76. 31328	MOUTH OF THE JAMES RIVER, WEST OF LE5. 5, STARTED IN 9/1/1996
LE5. 5A	36. 975703	-76. 287441	MOUTH OF THE JAMES RIVER
LE5. 5B	36. 971813	-76. 203549	MOUTH OF THE JAMES RIVER
LE5. 6	36. 903481	-76. 332998	RED BUOY #18
MAT0016	38. 56508	-77. 19345	ATTAWOMAN CREEK AT BLACK DAY BEACON 1; CHARACTERIZES TIDAL FRESH ZONE
RET1. 1	38. 490679	-76. 664128	MID-CHANNEL, 5000 METERS ENE OF LONG POINT; CHARACTERIZES TRANSITION ZONE
RET2. 1	38. 403458	-77. 269147	BUOY 27 SOUTHWEST OF SMITH POINT; CHARACTERIZES TRANSITION ZONE
RET2. 2	38. 35207	-77. 204423	BOUY 19 MID-CHANNEL OFF MARYLAND POINT; CHARACTERIZES TRANSITION ZONE
RET2. 3	38. 38818	-77. 130533	BOUY 13 OFF MOUTH OF NANJEMOY CREEK; CHARACTERIZES TRANSITION ZONE
RET2. 4	38. 362626	-76. 990529	MID-CHANNEL AT MORGANTOWN BRIDGE (U. S. ROUTE 301); CHARACTERIZES LOWER ESTUARINE
RET3. 1	37. 920136	-76. 821351	RAPPAHANNOCK RIVER NORTH OF BUOY R10, VIMS SLACK
RET3. 1N	37. 924302	-76. 812739	RAPPAHANNOCK RIVER NORTH OF BUOY R10, VIMS SLACK (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET3. 1S	37. 915413	-76. 824684	RAPPAHANNOCK RIVER NORTH OF BUOY R10, VIMS SLACK (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET3. 2	37. 808472	-76. 713014	RAPPAHANNOCK RIVER (VIMS SLACK WATER #N16)
RET4. 1	37. 525145	-76. 869686	PAMUNKEY RIVER AT SOUTHERN END OF LEE MARSH

STATION	LATITUDE	LONGITUDE	STATION_DESCRIPTION
RET4. 2	37. 57181	-76. 793017	MATTAPONI RIVER AT MUDDY POINT
RET4. 3	37. 506812	-76. 788017	YORK RIVER (VIMS SLACK WATER #C57)
RET4. 3N	37. 510418	-76. 558563	YORK RIVER, VIMS SLACK WATER #C57 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET4. 3S	37. 510423	-76. 799684	YORK RIVER, VIMS SLACK WATER #C57 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET5. 1	37. 342369	-76. 872741	CHICKAHOMINY RIVER, 1984-1988 ONLY
RET5. 1A	37. 312092	-76. 872463	CHICKAHOMINY RIVER ABOVE SHIPYARD LANDING
RET5. 2	37. 210148	-76. 793015	SWANN'S POINT, JAMES RIVER WQMP STA#19
RET5. 2A	37. 207947	-76. 703879	SWANN'S POINT, JAMES RIVER WQMP STA#19- BENTHIC MONITORING STATION
RET5. 2N	37. 215426	-76. 778848	SWANN'S POINT, JAMES RIVER WQMP STA#19 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
RET5. 2S	37. 190426	-76. 791904	SWANN'S POINT, JAMES RIVER WQMP STA#19 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
SBE2	36. 812648	-76. 305774	SOUTHERN BRANCH ELIZABETH RIVER - ADJACENT TO ATLANTIC WOOD
SBE5	36. 769871	-76. 296051	SOUTHERN BRANCH ELIZABETH RIVER - ADJACENT TO VIRGINIA POWER
TF1. 0	38. 955945	-76. 693022	FROM UPSTREAM SIDE OF THE MD ROUTE 50 BRIDGE; USGS GAGE NO. 59440; CHARACTERIZES TIDAL FRESH ZONE
TF1. 2	38. 814281	-76. 750802	MIDSTREAM AT WATER STREET IN UPPER MARLBORO; CHARACTERIZES TIDAL FRESH ZONE
TF1. 3	38. 810392	-76. 712189	MID-CHANNEL FROM MD ROUTE 4 BRIDGE NEAR WAYSONS CORNER; CHARACTERIZES TIDAL FRESH ZONE
TF1. 4	38. 772893	-76. 709966	WEST SHORE FROM MAIN PIER AT JACKSON LANDING; CHARACTERIZES TIDAL FRESH ZONE
TF1. 5	38. 710117	-76. 701354	MID-CHANNEL AT NOTTINGHAM; CHARACTERIZES TIDAL FRESH ZONE
TF1. 6	38. 657896	-76. 684408	MID-CHANNEL OFF WHARF AT LOWER MARLBORO; CHARACTERIZES TRANSITION ZONE
TF1. 7	38. 581787	-76. 680241	MID-CHANNEL ON A TRANSSECT OF APPROXIMATE 115 DEGREE FROM JACK'S CREEK; CHARACTERIZES TRANSITION ZONE
TF2. 1	38. 706505	-77. 048588	AT FL BOUY 77 OFF MOUTH OF PISCATAWAY CREEK; CHARACTERIZES TIDAL FRESH ZONE
TF2. 2	38. 690672	-77. 11109	BOUY 67 OFF MOUTH OF PISCATAWAY CREEK; CHARACTERIZES TIDAL FRESH ZONE
TF2. 3	38. 608174	-77. 173869	BOUY N 54 MID-CHANNEL OFF INDIANHEAD; CHARACTERIZES TIDAL FRESH ZONE
TF2. 4	38. 529843	-77. 265259	BOUY 44 BETWEEN POSSUM POINT AND MOSS POINT; CHARACTERIZES TIDAL FRESH/TRANSITION ZONE
TF3. 0	38. 320128	-77. 471373	RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA (ROUTE 95)
TF3. 1A	38. 255407	-77. 41165	RAPPAHANNOCK RIVER BELOW MASSAPONAX STP
TF3. 1B	38. 245684	-77. 23359	RAPPAHANNOCK RIVER DOWNSTREAM OF FREDERICKSBURG, VA AT BUOY # 89
TF3. 1C	38. 282906	-77. 433595	RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA
TF3. 1D	38. 287628	-77. 448595	RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA
TF3. 1E	38. 245129	-77. 326092	RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA
TF3. 2	38. 174853	-77. 188311	RAPPAHANNOCK RIVER JUST DOWNSTREAM OF THE PORT ROYAL BRIDGE, #N74
TF3. 2A	38. 112077	-77. 051917	RAPPAHANNOCK RIVER ONE MILE DOWNSTREAM OF THE PORT ROYAL BRIDGE

STATION	LATITUDE	LONGITUDE	STATION_DESCRIPTION
TF3. 3	38. 018745	-76. 908022	RAPPAHANNOCK RIVER AT JONES CREEK? (VIMS SLACK WATER #N40)
TF4. 0M	37. 884027	-77. 163031	MATTAPONI RIVER NEAR BEULAHVILLE, VA (SOUTH OF BOILER RUN)
TF4. 0P	37. 76792	-77. 331924	PAMUNKEY RIVER NEAR HANOVER, VA (NORTH OF BECHUMPS CREEK)
TF4. 1A	37. 667365	-77. 136362	PAMUNKEY RIVER AT ROUTE 360 BRIDGE
TF4. 2	37. 579867	-77. 021635	PAMUNKEY RIVER AT WHITE HOUSE, VA
TF4. 4	37. 72292	-77. 023581	MATTAPONI RIVER AT WALKERTON, VA
TF4. 4A	37. 653754	-76. 897743	MATTAPONI RIVER MIDWAY BETWEEN WEST POINT, VA AND WALKERTON, VA
TF5. 0A	37. 225428	-77. 476096	APPOMATTOX RIVER AT MATOACA, VA (SR600)
TF5. 0J	37. 67098	-78. 085833	JAMES RIVER AT CARTERSVILLE, VA
TF5. 2	37. 530702	-77. 433594	JAMES RIVER AT MAYO'S BRIDGE (JRWQMP STATION #2)
TF5. 2A	37. 44987	-77. 419705	JAMES RIVER AT BUOY # 166
TF5. 3	37. 403204	-77. 391648	JAMES RIVER AT BUOY #157 (JRWQMP STATION #8)
TF5. 4	37. 311538	-77. 296645	APPOMATTOX RIVER AT BUOY #8 (JRWQMP STATION #20A)
TF5. 5	37. 312926	-77. 232754	JAMES RIVER AT RED BUOY #107 (JRWQMP STATION #13)
TF5. 5A	37. 300148	-77. 124694	JAMES RIVER AT BUOY # 91
TF5. 5AN	37. 309037	-77. 13025	JAMES RIVER AT BUOY # 91 (NORTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
TF5. 5AS	37. 298204	-77. 126916	JAMES RIVER AT BUOY # 91 (SOUTH SHORE) - SPECIAL 1994 NEAR-SHORE STUDY ONLY
TF5. 6	37. 27487	-76. 9883	JAMES RIVER NORTH OF BUOY #74, JAMES RIVER WQMP STATION #17
TF5. 6A	37. 221815	-76. 923297	JAMES RIVER - NEW LOCATION FOR TF5. 6?, 1994-1995 ONLY
WE4. 1	37. 311667	-76. 346667	CENTRAL MOBJACK BAY
WE4. 2	37. 241667	-76. 386667	MOUTH OF THE YORK RIVER, MID-CHANNEL
WE4. 2N	37. 251809	-76. 390501	MOUTH OF THE YORK RIVER, NORTH SHORE
WE4. 2S	37. 236809	-76. 386335	MOUTH OF THE YORK RIVER, SOUTH SHORE
WE4. 3	37. 176667	-76. 373333	MOUTH OF THE POQUOSON RIVER EAST OF YORK POINT
WE4. 4	37. 11	-76. 293333	MOUTH OF THE BACK RIVER OFF NORTHEND POINT
WT1. 1	39. 433442	-76. 241344	BUSH RIVER, EAST OF GUM POINT AT FL G LT; CHARACTERIZES SALINITY TRANSITION
WT2. 1	39. 383441	-76. 341625	GUNPOWDER RIVER, 200 YARDS EAST OF OLIVER POINT AT BUOY G-"15"; CHARACTERIZES SALINITY TRANSITION
WT3. 1	39. 300108	-76. 399682	MIDDLE RIVER, EAST OF WILSON POINT AT CHANNEL JUNCTION DAY-MARKER; CHARACTERIZES SALINITY TRANSITION
WT4. 1	39. 283441	-76. 449683	BACK RIVER, EAST OF STANSBURY POINT AT DAY BEACON 12; CHARACTERIZES LOWER ESTUARINE
WT5. 1	39. 208442	-76. 524685	PATAPSCO RIVER, EAST OF HAWKINS POINT AT BUOY 5M; CHARACTERIZES LOWER ESTUARINE
WT6. 1	39. 07511	-76. 474683	MAGOTHY RIVER, NORTH OF SOUTH FERRY POINT AT BUOY FL R12; CHARACTERIZES LOWER ESTUARINE
WT7. 1	39. 016778	-76. 508017	SEVERN RIVER, 200 YARDS UPSTREAM OF ROUTE 50-301 BRIDGE; CHARACTERIZES LOWER ESTUARINE

STATION	LATITUDE	LONGITUDE	STATION_DESCRIPTION
WT8. 1	38. 933446	-76. 516349	SOUTH RIVER, SOUTH OF POPLAR POINT AT DAY MARKER R-"16"; CHARACTERIZES LOWER ESTUARINE
WT8. 2	38. 883448	-76. 533015	RHODE RIVER BETWEEN FLAT ISLAND AND BIG ISLAND; CHARACTERIZES LOWER ESTUARINE
WT8. 3	38. 850115	-76. 533014	WEST RIVER JUST UPSTREAM OF DAY MARKER R-"6"; CHARACTERIZES LOWER ESTUARINE
XCI4078	38. 23379	-75. 86963	ISLAND POINT IN CHANNEL AT BUOY FL 14 CHARACTERIZES LOWER ESTUARINE
XDJ9007	38. 48375	-75. 82098	SITE OF OLD RT 50 BRIDGE AT VIENNA (BRIDGE NO LONGER EXISTS) CHARACTERIZES TIDAL FRESH
XGG8251	38. 971224	-76. 247453	KENT ISLAND NARROW AT DRAWSPAN ON ROUTE 50 BRIDGE; CHARACTERIZES FREE-FLOWING FRESHWATER
XJH6680	39. 44317	-76. 032448	CHESAPEAKE BAY 2100 YARDS NORTHEAST OF SANDY POINT; MID-CHANNEL

Table C-43. 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:

REPORTING_UNITS	REPORTING_UNITS_DESCRIPTION
1/M	UNITS PER METER
1/NM	UNITS PER NANOMETER
ABS	OPTICAL DENSITY
CFS	CUBIC FEET PER SECOND
COL/100 ML	NUMBER OF COLONIES PER 100 MILLILITERS
DEG C	DEGREES CELSIUS
FT	FEET
FTU	FORMAZIN UNITS
G/M**2	GRAMS PER SQUARE METER
JTU	JACKSON TURBIDITY UNITS
KG/DAY	KILOGRAMS PER DAY
KG/MONTH	KILOGRAMS PER MONTH
KG/YEAR	KILOGRAMS PER YEAR
KNOTS	SPEED
LBS/DAY	POUNDS PER DAY
LBS/MONTH	POUNDS PER DAY
LBS/YEAR	POUNDS PER YEAR
M	METERS
M/S	METERS PER SECOND
MEQ/L	MICRO EQUIVELENTS PER LITER
MG/L	MILLIGRAMS PER LITER
MPN/100 ML	MOST PROBABLE NUMBER PER 100 MILLILITERS
MV	MILLIVOLTS
NONE	PARAMETER HAS NO ASSOCIATED UNITS
NTU	NEPHELOMETRIC UNITS
PCT	PERCENT
PCT_FS	PERCENT FULL SCALE
PER SAMPLE	NUMBER OF INDIVIDUALS PER SAMPLE
PPT	PARTS PER THOUSAND
SU	SPECIFIC UNITS
TONS/DAY	TONS PER DAY
TONS/MONTH	TONS PER MONTH
TONS/YEAR	TONS PER YEAR
UE/M**2/S	MICROEINSTEINS PER METER SQUARED PER SECOND
UG/L	MICROGRAMS PER LITER
UM/M**2/S	MICROMOLES PER METER SQUARED PER SECOND
UMHOS/CM	MICROHMS PER CENTIMETER
VOLTS	VOLTAGE

Table C-44. Measurement Type (AEPENETR or VALUE_TYPE).

Measurement type code.

VALUE_TYPE	DESCRIPTION
A	Actual measurement
E	Estimated measurement

APPENDIX D – CHESAPEAKE BAY PROGRAM DATA CENTER CONTACTS

June 2012

The Chesapeake Bay Program Data Center Staff

Individuals without Internet access, users wishing to obtain SAS conversion scripts or users wishing to obtain off line historical data holdings can request datasets directly from the Living Resources Data Manager. All requests must be made in writing or email. All data request can be sent to:

Jacqueline Johnson
Living Resources Data Manager/Analyst
EPA Chesapeake Bay Program Office
410 Severn Avenue Suite 112
Annapolis, MD 21403
Phone (local): 410-267-5729
Phone (long distance): 1-800-968-7229, ext. 75729
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 or GIS Team leader. 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 Suite 112
Annapolis, Maryland 21403
Phone (local): 410-267-5735
Phone (long distance):1-800-968-7229 ext. 75735
FAX: 410-267-5777
E-mail:hweinber@chesapeakebay.net

John Wolf
GIS Team Leader
Chesapeake Bay Program Office
410 Severn Avenue Suite 112
Annapolis, Maryland 21403
Phone (local): 410-267-5739
Phone (long distance): 1-800-968-7229 ext. 75739
FAX: 410-267-5777
E-mail: jwolf@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. 75769
FAX: 410-267-5777

The Chesapeake Bay Program Data Center Manager is:

Brian Burch
Data Center Manager
Chesapeake Bay Program Data Center
410 Severn Avenue, Suite 112
Annapolis, MD 21403
Phone (long distance): 1-800-968-7229 EXT. 75736
Phone (local): 410-267-5739
FAX: 410-267-5666
E-mail: bburch@chesapeakebay.net

APPENDIX E – DATA SUBMITTERS' GUIDELINES

June 2012

This appendix describes the required 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 specific biological 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 Chesapeake Bay monitoring program. All biological data deliverables are required to be sent as **comma delimited ASCII files** in formatted as described in this appendix. New in 2012 are recommended guidance for submission of voluntarily reported data. **Please note the guidance for data management will be subject to numerous changes as the Chesapeake Data Enterprise evolves and new requirements are developed. Please refer to** http://www.epa.gov/region03/chesapeake/grants.htm for the most recent guidance.

CBP Data Submission 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/)
.

The *Chesapeake Bay Program Guidance and Policies for Data, Information and Document Outputs Submission* describes the guidelines and policies governing the submission of electronic outputs to the Chesapeake Bay Program. Electronic outputs can be submitted directly to the Chesapeake Bay Program Office or served on the Internet as part of the Chesapeake Information Management System (CIMS).

The full guidance document "Chesapeake Bay Program Guidance for Data Management" is available in electronic format on the web at **http://www. chesapeakebay. net/data**. **Below are excerpts from that guidance as of 1 MARCH 2012.**

Applicability

These guidelines and policies must be followed by all agencies, institutions, and organizations participating in data and information collection, processing, document generation and submittal to the Chesapeake Bay Program under grant or cooperative agreement funding. The Chesapeake Bay Program has adopted these guidelines and policies in order to improve coordination, compatibility, standardization, and information access across all the Bay Program partners. In addition to these guidelines and policies, any activities funded with Federal Government funds, must also adhere to applicable Federal Information Processing Standards (FIPS). Information on FIPS is located at http://www. itl. nist. gov/fipspubs/.

CBP Data/Information Management and Document Outputs Guidelines and Policies

The Chesapeake Bay Program has adopted the following guidelines and policies pertaining to data and information collection, processing, document generation and submittal to the Chesapeake Bay Program under grant or cooperative agreement funding. Any deviations from these guidelines and policies must be documented in the work plan and approved by the EPA Project Officer. Specific guidelines and policies include:

- Data, Information, and Document Outputs Requirements
- Output Serving vs. Submission Policy
- Locational Data Policy
- Map Coordinate Datum policy
- Map Coordinate Projection Guideline
- Metadata Policy
- Common Station Names Guideline
- Common Data Dictionary Guideline
- Common Database Design Guideline
- Calendar Date Policy
- Common Method Codes Guideline
- Data Reporting Guideline
- ITIS Biological Nomenclature Policy

Data, Information, and Document Outputs Requirements

Recipients are required to submit data, information, and document outputs in electronic format unless exceptions are specified in the grant or cooperative agreement work plan. Electronic outputs include but are not limited to reports, graphics, spreadsheets, imagery, data files, audio, and digital video products.

All data, information, and documents funded by the Chesapeake Bay Program whether through direct Chesapeake Bay Program funding or indirect matching funds are public information and shall be made available to the public unless there is a grant/cooperative agreement award condition that specifies otherwise. In addition, source data collected and processed in the creation of an output should also be submitted when practical. If source data is submitted, it should also be delivered in electronic format. All outputs must have associated metadata.

Document Type	Acceptable Formats
Text	**Preferred:** Microsoft Word (DOC) Portable Document Format (PDF) * ASCII Text Extensible Markup Language (XML)
Spreadsheet	**Preferred:** Microsoft Excel 97 or higher **With Prior Approval:** PageMaker Lotus 1-2-3 QuatroPro Tab/Comma delimited text files
Database	**Preferred:** Microsoft Access 97 or higher Microsoft SQL Server Extensible Markup Language (XML) **ASCII delimited text files**
Graphics	**Preferred:** TIFF GIF JPEG SVG PNG
Geographic Information System	**Preferred:** ESRI Spatial Database Engine- Personal **or File** geodatabase ESRI, grids, shape files **With Prior Approval:** KML, KMZ

* Data tables within PDF documents must be delivered in one of the spreadsheet formats.

Output Serving vs. Submission Policy

Recipients can submit outputs directly to the Chesapeake Bay Program or serve outputs from a data/web server. The preferred method for serving data is through an extensible markup language (XML) web service. Beginning October 2010, State recipients will submit specific data via EPA's National Environmental Information Exchange Network (NEIEN) state node based upon EPA-approved schemas and governed by trading partnership agreements where Chesapeake Bay partners have collaborated on data sets realizing burden reduction by eliminating redundant reporting requirements or where the State recipients are also recipients of NEIEN funding for such purposes. Recipients who plan to directly serve their grant/cooperative agreement outputs through their own data server/web site must have signed a CIMS Memorandum of Understanding with the Chesapeake Bay Program.

EPA National Geospatial Data Policy

The Chesapeake Bay Program adheres to the EPA's **national geospatial** data policy, which requires consistent use of latitude/longitude coordinates to identify the location of entities. **Please see http://www. epa. gov/nerlesd1/gpc/pdf/epa_natl_geo_data_policy. pdf for a copy of the policy.** All data, containing spatial and/or specific geographic locations, collected or assembled under a Chesapeake Bay Program grant or cooperative agreement or to be served on the Internet via the Chesapeake Information Management System, 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 Chesapeake Bay Program locational data policy, the 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 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 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 cannot 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. 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 recipient 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. Recipient shall include in their work plan an assurance to comply with this requirement.

Map Coordinate Datum Policy

The Chesapeake Bay Program has adopted the policy that all data generated or collected using federal funds, submitted to the Chesapeake Bay Program, or served on the Internet via CIMS shall utilize either the North American Datum 1983 (NAD83) or World Geodetic System 1984 (WGS84) 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 or WGS84 will require conversion of latitudes and longitudes using NAD27 to NAD83/WGS84. Metadata reporting requires specification of the horizontal and vertical datum where applicable.

Map Coordinate Projection Guideline

The Chesapeake Bay Program has adopted the policy that the standard projection for geographic information system (GIS) files maintained at the Chesapeake Bay Program Office (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. 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. Partner organizations that 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 Chesapeake Bay Program initiative) since the effort to convert large historical holdings would be prohibitive.

Metadata Policy

The Chesapeake Bay Program 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, 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 Chesapeake Bay Program shall also be delivered to the EPA or other federal Clearinghouse as a requirement to fulfilling this policy and related grant or contract conditions. The FGDC guide for creating metadata is the *Content Standard for Digital Geospatial Metadata Workbook* (www. fgdc. gov/metadata).

The Chesapeake Bay Program has also adopted the policy that all data generated or collected using federal funds, submitted to the Chesapeake Bay Program, or served on the Internet, 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 for documenting biological data and information. The NBII Biological Data Profile is located on the NBII website at: www. nbii. gov .

Data to be accessed on the Internet must follow the *CIMS Metadata Reporting Guidelines* established by the Chesapeake Bay Program. This Guideline was 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* is also accessible on the CBP Data Hub Web Page at **http://www. chesapeakebay. net/data**.

Common Station Names Guideline

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 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 one master table of station names, to the extent possible, to reduce confusion among cooperating agencies. The Station Names table, maintained on the Chesapeake Bay Program web site, should serve as the master list. Updates to this table that are required by data submitters shall be coordinated with the Information Management Subcommittee and/or the Monitoring and Assessment Subcommittee to maintain one consistent stations names list.

Common Data Dictionary Guideline

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 should utilize 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 Workgroup to maintain one consistent data dictionary.

Common Database Design Guideline

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 should utilize the CBP common database design for managing data. It is the data provider's responsibility to comply with this guideline. The purpose of this guideline 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 Workgroup to maintain consistency in the database structure. If the Chesapeake Bay Program 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. The database design should maintain maximum compatibility with other Chesapeake Bay Program database designs.

Calendar Date Policy

The Chesapeake Bay Program has adopted the standard that all data generated or collected for, submitted to the Chesapeake Bay Program, or served on the Internet 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(RI991) 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 Guideline

The Chesapeake Bay Program 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. The method codes are defined in the *Guide to using CBP Water Quality Monitoring Data,* and *The 2012 Users Guide to CBP Biological Monitoring Data.* Both documents are accessible through the CBP Data Hub at **http://www. chesapeakebay. net/data**. It is the data provider's responsibility to comply with this guideline. The purpose of this guideline 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; therefore capturing the methods is a high priority during database development. Modifications to the CBP Method Codes shall be coordinated with the CIMS Workgroup 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 Guideline

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 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 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.

ITIS Biological Nomenclature Policy

The Chesapeake Bay Program has adopted the policy that all data generated or collected for, submitted to the Chesapeake Bay Program, or served on the Internet via CIMS should utilize the ITIS (www. itis. usda. gov/) biological names for identifying and reporting species. It is the data provider's responsibility to comply with this policy. The purpose of this policy is to create one master table of species names, to the extent possible, to reduce confusion among cooperating agencies. The ITIS taxonomy table, maintained on the ITIS web site, should serve as the master list. Updates to this table that are required by data submitters shall be coordinated with the CIMS Workgroup to maintain one consistent species name list.

REFERENCE MATERIAL

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Federal Geographic Data Committee. June 1994. *Content Standards for Digital Geospatial Metadata*. (http://www. fgdc. gov/metadata/csdgm). Federal Geographic Data Committee. Washington, D. C.

Biological Data Working Group Federal Geographic Data Committee and USGS Biological Resources Division. June 1999. *Content Standard Digital Geospatial Metadata: Part 1 Biological Profile for National Biological Information Infrastructure Metadata* (http://www. fgdc. gov/standards/projects/FGDC-standards-projects/metadata/biometadata/standards/projects/metadata/biometadata/bionwrev. pdf).

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U. S. Environmental Protection Agency. August 1989. *Living Resources Data Management Plan, Revision 1*. Chesapeake Bay Program, Annapolis, MD, CBP/TRS 33/89.

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U. S. Environmental Protection Agency. September 1996. *Designing an Integrated, Accessible Information Management System for the Chesapeake Bay Region*. Chesapeake Bay Program, Annapolis, MD. SAIC Contract 68-C4-0072, Work Assignment EC-1-8.

Required Data Format for Biological 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	SAMPLE_DATE	Character	10	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 (MM/DD/YYYY)
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	SAMPLE_DATE	Character	10	Sampling Date (MM/DD/YYYY)
5	LAYER	Character	2	Layer of Water Column in which Sample was Taken
6	LATITUDE	Numeric	9. 4	Latitude in Decimal Degrees(NAD83)
7	LONG ITUDE	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 (MM/DD/YYYY)
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	SAMPLE_TIME	Character	8	Sample Collection Time (HHMM)
16	TRIB_COD	Character	3	Tributary Code

Table E-3. 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	SAMPLE_DATE	Character	10	Sampling Date (MM/DD/YYYY)
7	LATITUDE	Numeric	9. 4	Latitude in Decimal Degrees
8	LONGITUDE	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 (MM/DD/YYYY)
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	SAMPLE_TIME	Character	8	Sample Collection Time (HH:MM:SS)
17	TRIB_COD	Character	3	Tributary Code

Table E-4. Benthic Event Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Character	15	Sampling Station
2	SAMPLE_DATE	Date	10	Sampling Date (MM/DD/YYYY)
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-5. Benthic Biota Event Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Character	15	Sampling Station
2	SAMPLE_DATE	Date	10	Sampling Date (MM/DD/YYYY)
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)

Table E-6. Tidal Benthic Count Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Text	15	Sampling Station
2	SAMPLE_DATE	Date	10	Sampling Date (MM/DD/YYYY)
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-7. Benthic Biomass Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Character	15	Sampling Station
2	SAMPLE_DATE	Date	10	Sampling Date (MM/DD/YYYY)
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-8. Benthic Water Quality Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Text	15	Sampling Station
2	SAMPLE_DATE	Date	10	Sampling Date (MM/DD/YYYY)
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-9. Benthic Sediment Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Text	15	Sampling Station
2	SAMPLE_DATE	Date	8	Sampling Date (MM/DD/YYYY)
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-10. Benthic Index of Biotic Integrity Data Files

	Field Name	Field Type	Width (dec)	Descriptions
1	STATION	Text	15	Sampling Station
2	SAMPLE_DATE	Date	10	Sampling Date (MM/DD/YYYY)
3	SAMPLE_NUMBER	Numeric	8	Sample Replicate Number
4	IBI_SALZONE	Character	2	IBI Salinity Zone Designation
5	IBI_BOTTOM_TYPE	Character	2	IBI Bottom Type Designation
6	IBI_PARAMETER	Character	15	IBI Sampling Parameter
7	IBI_VALUE	Numeric	8. 4	IBI Sampling Parameter Value
8	IBI_SCORE	Numeric	8	IBI Sampling Parameter Score

Recommended Guidance for Voluntary Reporting of Non-Tidal Benthic Stream Monitoring Data

The Chesapeake Bay Program's non-tidal water quality workgroup (NTWQW) has developed a standardized regional benthic index of biotic integrity (Chessie B-IBI) that serves as an indicator of local stream health for the Chesapeake Bay watershed. The results from this work were published in the annual Chesapeake Bay's Bay Barometer. The underlying methodology used to develop this indicator built on previous efforts to create a standardized basin-wide B-IBI for the Potomac River watershed and is documented in a recent Interstate Commission on the Potomac River Basin report.

The Chessie B-IBI is an important tool for Chesapeake Bay water quality managers because it provides a comparable look across jurisdictional boundaries at the health of rivers and streams in the entire Chesapeake Bay watershed. The Chessie B-IBI assists managers and watershed groups in their ability to focus efforts to restore streams needing improvement and protect the quality of the healthiest streams. We are asking that you help continue to make this tool as useful as possible by contributing your most recent non-tidal benthic, water quality, and habitat data.

Periodically the Chesapeake Bay Program office will request the information and primary data listed in the attached document in Table E11. This includes site and sample collection information and measurements of key water quality, habitat, and benthic parameters. Please feel free to submit any other data that you feel is relevant. We can receive data sets in numerous data formats but would prefer comma-delimited text files or MS Access databases if you can export data to those formats. We also would like to request the most recent data documentation and quality assurance plans for these data sets, in order to accurately rename fields, correctly import data tables to the uniform database structure, and correctly calculate metrics. We intend to merge these datasets with those previously sent by your agency. Once this data is in our database, you have the ability to review that database at anytime. When this database is circulated to outside individuals, we will provide you documentation of who has received the data and any other information you would like regarding its release.

Table E11. Requested Station Information and Benthic Monitoring Data.
Please send data for your entire jurisdiction. **Bolded items denote key information needed,** other information is useful but not required in the data sets if it is described in data documentation or can be captured with GIS tools. **Please also send along any updated quality assurance plans.**

Data Element	Description
Site Information	
Station	**Station identification**
Coordinates	**Latitude and longitude (preferably in decimal degrees), projection and datum**
Stream Name	**Name of stream sampled**
Location	Descriptive information on station location
Stream Gradient	Low gradient, high gradient
Stream Type	e. g. , coldwater, warm water, freestone, limestone, coastal plain
Sample Collection	
Program	**Program or study name (e. g. , MBSS, NAWQA)**
Study Objectives	**Purpose of study (e. g. , 303(d), stream health assessment)**
Site Type [1]	**Site selection approach**
Sample Date	**Date on which the sample was collected**
Sample Time	**Time at which the sample was collected**
Sample Gear	**Equipment used to collect sample (e. g. , D-frame, Hydrolab)**
Sample ID	Sample Identifier
Sample Number	Number of samples collected from the same site on the same date (i. e. , replicate samples)
Method 1	Field collection procedures (e. g. , RBP II, MACS, single-habitat, multi-habitat)

Method 2	Water quality laboratory analysis
Method 3	Water quality field collection method
Habitat Parameters	
Parameter	**Anthropogenic Alteration, Bank Stability, Channel Alteration, Habitat Heterogeneity (Riffle Frequency, Sinuosity, pool/glide/eddy), Instream Condition (Epifaunal substrate and cover), Riparian Zone, Substrate Quality (embeddedness, pool substrate), and any other habitat parameters collected**
Value	**If the parameter is measured or calculated**
Units	**Units of parameter value**
Score	**If the parameter was scored**
Scoring Scale	**Minimum and maximum score (e. g. , 0-10, 0-20)**
Habitat Type	Habitat sampled (e. g. , pool, riffle, run)
Benthic Parameters	
Taxon	**Taxon identification to family level (i. e. , Latin name)**
Count	**Number of individuals counted or relative abundance**
TSN	ITIS Taxon Serial Number
Replicate Number	Sample Replicate number(if applicable)
Master Taxa list	Table that identifies taxa in the dataset
Units	Unit of parameter value
Count Method	Qualitative (e. g. , present/absent), quantitative (e. g. , #/m^2)
Water Quality Parameters	
Parameter	**pH, specific conductivity, DO, temperature,** acid neutralizing capacity (ANC**),** nutrients, sediment, any other parameters collected synoptically with benthic sample
Value	**Value of parameter**
Unit	**Unit of parameter value**
Replicate Number	Sample Replicate Number (If applicable)
Detection Limit	Value of detection limit

CBPO staff will be attempting to classify stream sampling sites according to the approach you used to identify and select them. These classifications will later be used to decide which sites can be grouped to represent watershed status and which can be used to track trends. We can make these classifications based on your monitoring program documentation, or you can insert the class you feel best represents the site selection approach.

Random: A random or random-stratified design was applied to select the site for its first sampling (this can include sites that are resampled in subsequent years)

Random-reference: A random or random-stratified design was applied to select the site for its first sampling; it was subsequently identified as a reference site

Targeted-baseline: Tthe site is considered representative of some landscape feature and was selected for long-term monitoring purposes in a non-random fashion (includes sites established upstream of a known, suspected, or pending impairment)

Targeted-reference: The site was selected for its first sampling because it was known or suspected of being reference quality

Targeted-systematic: A systematic (grid, stream node, etc) sampling design was applied to select the site for its first sampling

Targeted-downstream:	The site was first sampled because of a known or suspected impairment or BMP implementation *upstream* of the site (site is usually part of a study)

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