Maryland Chesapeake Bay Mainstem Water Quality Monitoring Program - 2017

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Maryland Department of Natural Resources, Resource Assessment Service
Publication_Date: 20180630
Title: MD Dept. of Natural Resources, Chesapeake Bay Mainstem Water Quality Monitoring 2017
Geospatial_Data_Presentation_Form: Spatial dataset
Online_Linkage: [http://www.chesapeakebay.net/data/index.htm]

Description:
Abstract:
The physical/chemical component of the Maryland Chesapeake Bay Water Quality Monitoring Program consists of data collected at twenty-two stations located in Maryland's Chesapeake Bay mainstem. (Note the station count was incorrectly listed as twenty-one in 2009-2012 mainstem project metadata records).

In total, fifteen samplings were completed in the period of 17-Jan-2017 through 15-Dec-2017. Planned sampling was conducted twice monthly in June, July, August of 2016, and once monthly during January, February, March, April, May, September, October and December.

Bad weather and logistical issues prevented sampling at the five Northern mainstem stations (CB3.2, CB3.1, CB2.2, CB2.1 and CB1.1) during October. The five stations were sampled 1-Nov-2017 and again, as part of planned November sampling, 15-Nov-2017.

Sampling during the July cruise was limited to physical measurements collected to better assess dissolved oxygen levels in the mainstem deep waters. No samples were collected January, February, November or December at eastern and western transect stations, resulting in only twelve mainstem flanking station samplings during year 2017.

The water quality monitoring program began in 1984 and is ongoing. The program assesses the water quality by evaluating the levels of nutrients and closely related habitat impacts such as dissolved oxygen and water clarity. One of the main goals of the Chesapeake Bay restoration is to reduce the impacts of excess nutrients on the Bay and these measures provide some of the most direct linkages to management programs that are achieving this goal. The Chesapeake Bay Program jurisdictions have agreed to reduce nitrogen, phosphorus and sediment pollution to the Bay.

Purpose:

The Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program is part of a cooperative effort between the Federal government and State and local governments in the Chesapeake Bay watershed to assess the status and trends of nutrient and sediment concentrations in Maryland's Chesapeake Bay mainstem.

The information is integrated with data from other Bay water quality stations and living resources monitoring projects and used to understand linkages, temporal variation and long-term trends.

Water quality data are used to refine, calibrate and validate Chesapeake Bay ecological models. The models are used to develop and assess water quality criteria with the goal of removing the Chesapeake Bay and its tidal rivers from the list of impaired waters.

Supplemental_Information:

The target audiences for this information include Resource Managers, Technical/Scientific Users, Government, Educators, Students and the General Public.

Data users who desire very detailed information about Water Quality Monitoring data definition, sampling procedures and data processing are encouraged to refer to two documents listed below. The documents may be obtained from The Chesapeake Bay Program Office.

Water Quality Database - Database Design and Data Dictionary, Prepared For: U.S. Environmental Protection Agency, Region III, Chesapeake Bay Program Office, January 2004. [http://archive.chesapeakebay.net/pubs/cbwqdb2004_RB.PDF]. An updated version of the data dictionary is a Chesapeake Bay Program work in progress.

The Quality Assurance Project Plan for the Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program - Chemical and Physical Properties Component for the period July 1, 2017 - June 30, 2018. [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/MdDNR_MTQAPP2017.pdf]

Guide to Using Chesapeake Bay Program Water Quality Monitoring Data, EPA 903-R-12-001, February 2012, CBP/TRS 304-12 [http://www.chesapeakebay.net/documents/3676/wq_data_userguide_10feb12_mod.pdf]

Time_Period_of_Content:
  Time_Period_Information:
    Range_of_Dates/Times:
      Beginning_Date: 20170117
      Ending_Date: 20171215
  Currentness_Reference: Ground Condition
Status:
  Progress: Complete
  Maintenance_and_Update_Frequency: As needed
Spatial_Domain:

Bounding_Coordinates:
West_Bounding_Coordinate: -80.53758
East_Bounding_Coordinate: -75.0405
North_Bounding_Coordinate: 39.7425
South_Bounding_Coordinate: 37.8713
Keywords:
Theme:
Theme_Keyword_Thesaurus: Global Change Master Directory (GCMD). 2018. GCMD Keywords, Version 8.6. Greenbelt, MD: Global Change Data Center, Science and Exploration Directorate, Goddard Space Flight Center (GSFC) National Aeronautics and Space Administration (NASA). URL (GCMD Keyword Forum Page): [https://earthdata.nasa.gov/gcmd-forum]
Theme_Keyword: EARTH SCIENCE>BIOSPHERE>ECOSYSTEMS>MARINE ECOSYSTEMS>ESTUARY
Theme_Keyword: EARTH SCIENCE>BIOSPHERE>ECOLOGICAL DYNAMICS>ECOSYSTEM FUNCTIONS>NUTRIENT CYCLING
Theme_Keyword: EARTH SCIENCE>BIOSPHERE>ECOLOGICAL DYNAMICS>ECOSYSTEM FUNCTIONS>PRIMARY PRODUCTION
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Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>WATER CHARACTERISTICS>CONDUCTIVITY
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Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>NUTRIENTS>NITROGEN COMPOUNDS
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Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>WATER CHARACTERISTICS>PHOSPHOROUS COMPOUNDS

Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>WATER CHARACTERISTICS>SALINE CONCENTRATION
Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>SOLIDS>SUSPENDED SOLIDS
Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>SOLIDS>TOTAL DISSOLVED SOLIDS
Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>WATER CHARACTERISTICS>WATER TEMPERATURE
Place:
Place_Keyword_Thesaurus: Common geographic areas
Place_Keyword: fUS = United States
Place_Keyword: fUS24 = Maryland
Place_Keyword: h02080101 = Lower Chesapeake Bay
Place_Keyword: h02060001 = Upper Chesapeake Bay
Place_Keyword: f24005 = Baltimore
Place_Keyword: f24029 = Kent
Place_Keyword: f24025 = Harford
Place_Keyword: f24035 = Queen Anne's
Temporal:
Temporal_Keyword_Thesaurus: USGS Thesaurus
Temporal_Keyword: summer
Temporal_Keyword: spring (season)
Temporal_Keyword: autumn
Temporal_Keyword: winter
Access_Constraints: None
Use_Constraints: None
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Renee Karrh
Contact_Position: Program Manager
Contact_Address:
Address_Type: Mailing and physical
Address: 580 Taylor Avenue, C2
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21401
Country: USA
Contact_Voice_Telephone: 410.260.8630
Contact_Electronic_Mail_Address: renee.karrh_nospam_@maryland.gov [Remove _nospam_ for valid email address]

Browse_Graphic:

Browse_Graphic_File_Name: MDDNR Mainstem Monitoring Project 2017 Station Map [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/metadata/MdDNR_MainstemStns2017.pdf]. If the map URL raises a file not found error, drill down from [http://eyesonthebay.net].

Browse_Graphic_File_Description: Map of twenty-two 2017 Maryland Chesapeake Bay Mainstem Water Quality Monitoring Sites.

Browse_Graphic_File_Type: PDF

Data_Set_Credit:

Maryland Department of Natural Resources (MDDNR) Resource Assessment Service (RAS) staff collected the samples and processed the data. The Nutrient Analytical Services Laboratory (NASL) at the Chesapeake Biological Laboratory (Univ. of MD) analyzed chlorophyll, nutrient and suspended solids samples.

The project was made possible with funding provided by The State of Maryland and the United States Environmental Protection Agency Chesapeake Bay Program.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

QUALITY ASSURANCE/QUALITY CONTROL Maryland Department of Natural Resources followed specific procedures to ensure that the Mainstem component of the Chesapeake Bay Water Quality Monitoring Program design was properly implemented and managed with sufficient accuracy, precision and detection limits. Accuracy (closeness to the true value) of collected data was controlled and assured by proper use, calibration and maintenance of both field and laboratory equipment for the measurement of physical and chemical parameters. The procedures to control and assure the accuracy of field measurements involved the calibration of field instruments, the verification of calibrations, and equipment maintenance. Most of the details of how data acquired with YSI sondes were quality assured and quality controlled are described in the process description elements in the Lineage portion of this metadata record.

Daily quality control checks, which included the running of blanks and standards, were used to control and assure laboratory accuracy. Accuracy of Chesapeake Biological Laboratory, Nutrient Analytical Services Laboratory (CBL NASL) results was also assessed through DNR's participation in the Chesapeake Bay Coordinated Split Sample Program (CSSP) a split sampling program in which five laboratories involved in Chesapeake Bay monitoring analyze the coordinated split samples. CSSP was established in June 1989 to establish a measure of comparability between sampling and analytical operations for water quality monitoring throughout the Chesapeake Bay and its tributaries. DNR followed the protocols in the Chesapeake Bay Coordinated Split Sample Program Implementation Guidelines (EPA 1991) and its revisions. Split samples were collected quarterly. Results were analyzed by appropriate statistical methods to determine if results differed significantly among labs. If a difference occurred, discussions began regarding techniques and potential methods changes to resolve discrepancies.

ADDITIONAL COMMENTS

January 2017: Water for both the surface and the 1.0 m samples at stations CB5.1 and CB3.3C was collected at the same depth. Pycnoclines were not evident at stations: CB5.3, CB5.2, CB5.1, CB4.3C, CB4.2C and CB3.3C. Therefore, the above pycnocline and below pycnocline water samples were collected at 1/3 and 2/3 of total water column depth, respectively.

February 2017: The absence of a pycnocline at stations CB4.4, CB5.1, CB5.2 and CB5.3, led to above pycnocline and below pycnocline water sample collections at 1/3 and 2/3 of total water column depth, at each station. Surface and 1m sonde readings were taken at the same depth at stations CB5.1 and CB5.2.

March 2017: At station CB3.1, water for both the above pycnocline and the surface sample was collected from the same bottle. Scoping is a term used to describe situations when strong currents and or winds make it difficult to maintain the water quality data sonde at a depth long enough for readings to stabilize. Meter scoping was noted at station: CB4.3. A ship passed while samples were collected at station CB4.4.

April 2017: A note in the station CB4.1 station log stated that surface conductivity changed 1500 micro Siemens/cm from start of sampling to end. The sampling vessel drifted out of depth at station CB4.3E and it was necessary to re-position in order to collect the above pycnocline sample water. Shortly prior to beginning sampling at station CB4.3C, a cargo ship passed nearby. Due to no pycnocline, above pycnocline and below pycnocline water samples were collected at 1/3 and 2/3 of the total water column depth, respectively, at station CB2.2. Conductivity readings, at 7 meters depth, at station CB3.1, scrolled from 2000 micro Siemens/cm to 6000 micro Siemens/cm.

May 2017: Surface and 0.5m samples were collected at the same depth. Water for both the above pycnocline and the surface sample was collected from the same bottle at station CB5.3. Station CB4.1E surface conductivity changed 1500 micro Siemens/cm from start of sampling to end of sampling. The sample freezer door was not closing completely on the by the end of the second day of the survey due to excessive ice. Ice was chipped enough to allow the freezer door to close. Freezer samples were removed to the field office overnight.

June 2017: The first June cruse was conducted June 6-8. Meter scoping was noted at stations: CB5.3, CB5.2, CB5.1, CB4.3E, CB4.1C and CB4.1E. The problem of meter scoping lessened at station CB4.4.

The second June cruise was conducted June 26-28. Meter scoping was noted at stations CB4.3C, CB3.3C and CB3.1. Hydrogen sulfide odors were observed in bottom sample waters collected at stations CB5.1, CB4.4, CB4.3C, CB4.2C, CB4.1C and CB4.1E. A pycnocline was not evident at station CB2.2 and therefore, the above pycnocline and below pycnocline water samples were collected at 1/3 and 2/3 of total water column depth, respectively. A shift in conductivity results was seen after the below pycnocline sample at station CB5.3 was collected.

July 2017: During the first July survey (July 10-12), hydrogen sulfide odors were noted in bottom and below pycnocline sample waters collected at stations CB4.2C, CB4.1C, CB4.1E and CB3.3C. Logs for stations CB4.1C and CB4.1E recorded meter scoping. No pycnocline was evident at station CB2.2. Therefore, station CB2.2 above pycnocline and below pycnocline water samples were collected at 1/3 and 2/3 of total water column depth, respectively.

Second July 2017 cruise was water column sonde readings only (no nutrient samples were collected).

August 2017: On the first survey (August 8-10), meter scoping was a challenge at stations CB5.3, CB5.2 and CB5.1. A slight odor of hydrogen sulfide was detected in the station CB3.3C bottom water sample. Conductivity instability at 11 meters was remarked at station CB5.3.

During the second cruise (August 30 and 31), the water appeared red at station CB4.3W. Station CB5.3 bottom and below pycnocline samples were collected from the same bottle. Surface and above pycnocline samples were collected from a single bottle at station CB3.1. Due to pycnocline absence at station CB2.2, above pycnocline and below pycnocline water samples were collected at 1/3 and 2/3 of total water column depth, respectively.

September 2017: Meter scoping was noted at stations CB4.3C, CB4.3E, CB4.2C and CB4.1C. Results of conductivity sensor post-calibration checks were 5.6 percent higher than the conductivity standard at the following stations: CB3.1, CB2.2, CB2.1 and CB1.1.

October 2017: Pycnoclines were not extant at stations CB5.2, CB5.1, CB4.4, CB4.3C, CB4.3E, CB4.2C, CB4.1C, CB4.1E and CB3.3C. Therefore, at each station, above pycnocline and below pycnocline water samples were collected at 1/3 and 2/3 of total water column depth, respectively.

November 2017: A change in surface conductivity from the beginning to the end of sampling at station CB2.2 was noted 1–Nov-2017 at station CB2.2. Absence of pycnoclines at station CB3.2 on 1–Nov-2017 and stations CB5.2, CB4.3C CB4.2C and CB4.1C on 17–Nov-2017 made it necessary to collect above and below pycnocline samples from 1/3 and 2/3 of total water column depth, respectively. At stations CB5.2 and CB4.2C, both surface and 1 meter water samples were collected from the same parcel of water. At station CB3.1 on 17-Nov-2017, above pycnocline and surface water samples were collected from the same bottle. When station CB1.1 was sampled on 17-Nov-2017, the data sonde hit bottom at 5 meters depth. At stations CB4.2C and CB4.1C, meter scoping was observed. The weight, on the instrument-bottle array, may have touched bottom at station CB4.2C. Rain preceded sampling at stations CB5.3, CB5.2, CB5.1 and CB4.4.

December 2017: Pycnoclines were not evident at stations: CB5.2, CB5.1 and CB2.2. Therefore the above pycnocline and below pycnocline water samples were collected at 1/3 and 2/3 of total water column depth, respectively.

Logical_Consistency_Report:

For logistical reasons, station LE2.3, a Potomac River water quality sampling project station, is routinely sampled during Chesapeake Bay mainstem sampling cruises. Tributaries monitoring project boat stations are sampled using small boats for most of the year. The larger mainstem sampling vessel is used when weather and safety are concerns. In addition to mainstem stations sampling, one or more of the following tributaries project stations may be sampled using the larger vessel during December, January and February surveys: EE2.2, EE2.1, EE1.1, ET4.2 and WT5.1. For logistical reasons, water samples for mainstem project station CB5.1W are routinely collected on the Tributaries project Patuxent boat survey. Two surveys were scheduled and conducted in each of months: June, July and August 2017.

January 2017: It was not possible, due strong currents, to lower the sensor-bottle array to depths normally sampled. At station CB4.1C the sampling array did not reach the depth of 35 meters. Similarly, the normally sampled depth, 32 meters, at station CB4.1C was not attained.

August 2017 - survey 1: RV Kerhin, the vessel normally used for mainstem surveys, was unavailable for the third day of the survey. Two smaller vessels, RV Fishhawk and RV The Pride of Denton served as sampling platforms on August 9th. Samples were stored in coolers on the smaller vessels and processed upon return to the docks. Stations CB3.2, CB3 and CB2.2 samples were collected using RV Fishhawk and RV The Pride of Denton sampled stations Cb2.1 and CB1.1.

August 2017 - survey 2: Bad weather delayed RV Kerhin sampling until August 30th and 31st. Stations CB3.2, CB3, CB2.2, CB2.1 and CB 1.1 samples were collected using RV Fishhawk. RV Fishhawk water samples were stored in a cooler and processed when collected except the PC and PN samples which, due to missing filter pads, were processed at the Annapolis Field Office.

October 2017: Normally, mainstem samples are collected during the span of three succeeding days. Persistent bad weather and logistical complications were significant challenges to mainstem October 2017 sampling efforts. Stations CB5.3, CB5.2, CB5.1 and CB4.4 were sampled 23-Oct-2017 using RV Kerhin. Stations CB4.3C, CB4.3E, CB4.3W, CB4.2C, CB4.2E, CB4.2W, CB4.1C, CB4.1E, CB4.1W, CB3.3C, CB3.3E and CB3.3W were sampled, using RV Rachel Carson, 31-Oct-2017. It was not possible to sample stations CB3.2, CB3.1, CB2.2, CB2.1 and CB1.1 in October.

November 2017: An effort was made to collect the missed samples that was as close-in-time as possible to the other mainstem samples that were collected in October. Stations CB3.2, CB3.1, CB2.2, CB2.1 and CB1.1 were sampled 1-Nov-201, using RV Rachel Carson.

All stations, normally scheduled for sampling in November were sampled during the span of 13-15 November (stations: CB5.3, CB5.2, CB5.1, CB4.4, CB4.3C, CB4.2C, CB4.1C, CB3.3C, CB3.2, CB3.1, CB2.2, CB2.1 and CB1.1). When station CB4.3C was sampled, sea-state was a concern, in order to avoid disturbing bottom sediments, the bottom sample was collected at the depth of 26 meters.

December 2017: RV Kerhin was used to collect samples at stations CB5.2, CB5.1, CB4.4, CB4.3C, CB4.2C, CB4.1C and CB3.3C on 11-Dec-2017 and at stations CB3.2, CB3.1, CB2.2 and CB2.1 on 15-Dec-2017.

Completeness_Report:

NOTE: Water samples for mainstem project station CB5.1W are routinely collected on the Tributaries Patuxent Boat survey for logistical reasons. Two surveys were conducted in each of months: June, July, and August 2017.

February 2017: Samples were not collected at stations CB3.3C, CB3.1, CB2.2, CB2.1 and CB1.1 because of high winds, rough seas and sampling vessel unavailability.

March 2017: The survey was postponed twice due to foul weather. High winds and lack of sampling vessel precluded collecting samples at stations CB5.3, CB5.2, CB5.1, CB4.3E, CB4.3W, CB4.2E, CB4.2W, CB4.1E, CB4.1W and CB3.3W.

May 2017: Li-COR remarks were not logged when measurements were taken at station CB4.2W.

June 2017: Li-COR readings were not taken during the first June survey due to equipment failure. Li-COR readings were not taken during the second June cruise at the following stations: CB4.1W, CB3.3E, CB3.3C, CB3.3W, CB3.2, CB3.1, CB2.2, CB2.1 and CB1.1.

July 2017: Two mainstem surveys were conducted in July 2017. Station CB5.3 was not sampled 10-Jul-2017 due to rough sea conditions. Li-COR readings were not taken 10-Jul-2017 at stations CB5.2, CB5.1 and CB4.4 due to dangerous conditions.

No calibration samples were collected during the second July mainstem water quality monitoring survey. Sampling on the second cruise consisted of just water column profiles using the data sonde. Profiles were taken (24-Jul-2017) at stations CB5.3, CB5.2, CB5.1 and CB4.4. On 26-Jul-2017, profiles were taken at stations CB4.3C, CB4.2C, CB4.1C, CB3.3C, CB3.2, CB3.1, CB2.2 and CB2.1. Li-COR readings were not taken 24-Jul-2017 at station CB5.3 due to rough conditions. No second July survey sampling was conducted at mainstem flanking stations CB4.3E, CB4.3W, CB4.2E, CB4.2W, CB4.1E, CB4.1W, CB3.3E and CB3.3W because of limited sampling vessel availability. Station CB1.1 was not sampled due to the vessel captain's legal requirement of a minimum of 10 hours rest in any 24-hour period.

September 2017: Li-COR was not measured at station CB3.2.

October 2017: Air temperature readings were not taken at stations CB4.3C, CB4.3E and CB4.3W because there was no thermometer. It was not possible to sample stations CB3.2, CB3.1, CB2.2, CB2.1 and CB1.1 in October.

November 2017: A pycnocline calculation was not made at station CB4.3C.

December 2017: Stations CB5.3 and CB1.1 were not sampled due to weather and logistical constraints.

There are no known completeness issues for the months: January, April, and August 2017.

Lineage:
Process_Step:
Process_Description:
SONDE CALIBRATION and POST-CALIBRATION

The Yellow Springs Instrument (YSI) 6820 v2 data sondes were maintained and calibrated before and after each cruise in accordance with manufacturer's recommendations.

WATER COLUMN PROFILE SAMPLING PROTOCOLS:

A profile of temperature, specific conductance, dissolved oxygen, and pH was obtained from the water column by deploying the data sonde at 0.5m, 1.0m, 2.0m and 3.0m depth intervals below the surface. Thereafter readings were taken at 2.0m intervals and at the bottom. If the change in dissolved oxygen exceeded 1.0 mg/L or if the change in specific conductance equaled or exceeded 1,000 micromhos/cm over any 2.0m interval, readings were taken at 1.0m intervals between these two readings. For total depths less than or equal to 10.0m, readings were taken at 1.0m intervals.

GRAB SAMPLING DEPTH PROTOCOLS:

At stations where two depths were sampled, collections were taken at 0.5m below the surface, and 1.0m above the bottom. If the station total depth was equal to 1.5m, the bottom sample was also collected at 0.5m. Great caution was exercised when taking bottom samples; if the bottom was disturbed and bottom sediments appeared to have been included, the sample was dumped out and collected after the sediments had settled. Alternately, the sample was collected slightly higher in the water column and the new bottom sample depth was noted.

At stations where 4 depths were sampled and a pycnocline existed, collections were taken at 0.5m below the surface, 1.5m above the upper boundary of the pycnocline, 1.5m below the lower boundary of the pycnocline, and 1.0m above the bottom.

At stations where 4 depths were sampled and there was no discernable pycnocline, samples were taken at 0.5m below the surface, at the closest profile depth one third of the distance from the surface to the bottom, at the closest profile depth two thirds of the distance from the surface to the bottom, and 1.0m above the bottom.

SECCHI DEPTH:

Water transparency was determined, to the nearest 0.1m using a 20-cm standard Secchi disc lowered into the water column with a calibrated rope. Observations were made on the shady side of the sampling location.

Process_Date: Unknown
Process_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Kristen Heyer
Contact_Position: Manager, Water Quality Monitoring
Contact_Address:
Address_Type: Mailing and physical
Address: 1919 Lincoln Drive
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21401
Country: USA
Contact_Voice_Telephone: 410.990.4600
Contact_Electronic_Mail_Address: kristen.heyer_nospam_@maryland.gov[Remove _nospam_ for valid email address]

Process_Step:
Process_Description:
LABORATORY ANALYSIS - CBL

University of Maryland's Chesapeake Biological Laboratory (CBL), Nutrient Analytical Services Laboratory (NASL) analyzed total dissolved nitrogen, particulate nitrogen, nitrite, nitrite + nitrate, ammonium, total dissolved phosphorus, particulate phosphorus, particulate inorganic phosphorus, orthophosphate, dissolved organic carbon, particulate carbon, total suspended solids, and volatile suspended solids.

The NASL also performed chlorophyll analyses. Prior to 2009, chlorophyll analyses were performed by the Maryland Department of Mental Health and Hygiene.

Further information about laboratory analytical procedures may be obtained from the "Process_Contact".
Process_Date: Unknown
Process_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Jerry Frank
Contact_Position: Manager of Analytical Services
Contact_Address:
Address_Type: Mailing and physical
Address: Chesapeake Biological Laboratory, Center for Environmental and Estuarine Studies, The University of Maryland System, 146 Williams St; P.O. Box 38
City: Solomons
State_or_Province: Maryland
Postal_Code: 20688
Country: USA

Contact_Voice_Telephone: 410.326.7252
Contact_Electronic_Mail_Address: frank _nospam_@umces.edu[Remove _nospam_ for valid email address]

Process_Step:
Process_Description:
VERIFICATION AND DATA MANAGEMENT:

Each month DNR Tawes Office and Field Office personnel conduct data QA/QC procedures. All of the water quality calibration "grab" sample data are plotted. Outliers and anomalous values are thoroughly researched. Staff members compare unusual values to historic values from the site and values from nearby sites. Weather events are considered, event logs are reviewed and CBL analytical laboratory staff members and DNR field staff members are consulted regarding possible legitimate causes for outlying values. In cases where values are not considered to be legitimate, they were masked in the published dataset with the approval of the field staff and the Quality Assurance Officer.
Process_Date: Unknown
Process_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Renee Karrh
Contact_Position: Program Manager
Contact_Address:
Address_Type: Mailing and physical
Address: 580 Taylor Ave., C2
City: Annapolis
State_or_Province: MD
Postal_Code: 21401
Contact_Voice_Telephone: 410.260.8630
Contact_Electronic_Mail_Address: renee.karrh_nospam_@maryland.gov[Remove _nospam_ for valid email address]

Spatial_Data_Organization_Information:
Indirect_Spatial_Reference: Chesapeake Bay, Maryland
Direct_Spatial_Reference_Method: Point
Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Geographic:
Latitude_Resolution: 0.0001
Longitude_Resolution: 0.0001
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1983
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257

Entity_and_Attribute_Information:

Overview_Description:

Entity_and_Attribute_Overview:

This metadata record is a description of the Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program - Chemical and Physical Properties Component Database for the Maryland Chesapeake Bay Mainstem. Project data are an aggregation of data collected at twenty-two Maryland mainstem stations during 2017.

The data are contained in five related entities (tables): Light_Attenuation_Data, Monitoring_Event_Data, Optical_Density_Data, Station_Information, and Water_Quality_Data. Each table contains attributes (fields).

The entity Light_Attenuation_Data is comprised of the attributes: Agency, BiasPC, Cruise, Depth, Details, EventId, Lab, Latitude, Layer, Longitude, LowerPycnocline, MeasureValue, Method, MonitoringStation, Parameter, PrecisionPC, Problem, Program, Project, Qualifier, SampleDate, SampleReplicateType, SampleTime, SampleType, Source, Station, TotalDepth, Unit and UpperPycnocline.

The entity Monitoring_Event_Data is comprised of the attributes: Agency, CloudCover, Cruise, Details, EventId, FieldActivityEventType, FieldActivityRemark, FlowStage, GaugeHeight, Latitude, Longitude, LowerPycnocline, MonitoringStation, PrecipType, Pressure, Program, Project, SampleDate, SampleTime, Source, Station, TideStage, TotalDepth, UpperPycnocline, WaveHeight, WindDirection and WindSpeed.

The entity Optical_Density is comprised of the attributes: Agency, BiasPC, Cruise, Depth, Details, EventId, Lab, Latitude, Layer, Longitude, LowerPycnocline, MeasureValue, Method, MonitoringStation, Parameter, PrecisionPC, Problem, Program, Project, Qualifier, SampleDate, SampleReplicateType, SampleTime, SampleType, Source, Station, TotalDepth, Unit and UpperPycnocline.

The entity Station_Information is comprised of the attributes: CBSeg2003, CBSeg2003Description, CBSegmentShed2009, CBSegmentShed2009Description, CountyCity, FallLine, FIPS, HUC12, HUC8, Latitude, LLDatum, Longitude, State, Station, StationDescription, USGSGage, UTMX, and UTMY.

The entity Water_Quality_Data is comprised of the attributes: Agency, BiasPC, Cruise, Depth, Details, EventId, Lab, Latitude, Layer, Longitude, LowerPycnocline, MeasureValue, Method, MonitoringStation, Parameter, PrecisionPC, Problem, Program, Project, Qualifier, SampleDate, SampleReplicateType, SampleTime, SampleType, Source, Station, TotalDepth, Unit and UpperPycnocline.

Entity_and_Attribute_Detail_Citation:

Water Quality Database - Database Design and Data Dictionary, Prepared For: U.S. Environmental Protection Agency, Region III, Chesapeake Bay Program Office, January 2004.

[http://archive.chesapeakebay.net/pubs/cbwqdb2004_RB.PDF]. An updated version of the data dictionary is a Chesapeake Bay Program work in progress.

The Quality Assurance Project Plan for the Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program - Chemical and Physical Properties Component for the period July 1, 2017 - June 30, 2018. [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/MdDNR_MTQAPP2017.pdf]

Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Mike Mallonee
Contact_Position: Water Quality Data Manager
Contact_Address:
Address_Type: Mailing and physical
Address: 410 Severn Avenue, Suite 109
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21403
Country: USA
Contact_Voice_Telephone: 410.267.5785
Contact_Electronic_Mail_Address: mmallone@_no_spam_chesapeakebay.net[Remove _nospam_ for valid email address]
Resource_Description: Downloadable data
Distribution_Liability: None of the Chesapeake Bay Program partners nor any of their employees, contractors, or subcontractors make any warranty, expressed or implied, nor assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or data contained within the web site. Reference to any specific commercial products, processes, or services or the use of any trade, firm, or corporation name is for the information and convenience of the public and does not constitute endorsement, recommendation or favoring by the Chesapeake Bay Program partners.

Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: ASCII file, formatted for text attributes, declared format
Format_Information_Content: Light_Attenuation_Data, Monitoring_Event_Data, Optical_Density, Station_Information, and Water_Quality_Data.
File_Decompression_Technique: No compression applied
Transfer_Size: 7.9

Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:

Network_Resource_Name: [http://www.chesapeakebay.net/data]

Access_Instructions: Data are available through the Chesapeake Bay Program's Data Hub. Select Water Quality Database (1984-Present). Access the data by following web site (see network resource name) instructions.

Fees: None

Metadata_Reference_Information:

Metadata_Date: 20180718

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Ben Cole

Contact_Organization: Maryland Department of Natural Resources, Resource Assessment Service

Contact_Position: Natural Resource Biologist

Contact_Address:

Address_Type: Mailing and physical

Address: 580 Taylor Avenue, D2

City: Annapolis

State_or_Province: Maryland

Postal_Code: 21401

Country: USA

Contact_Voice_Telephone: 410.260.8630

Contact_Electronic_Mail_Address: benjamin.cole_nospam_@maryland.gov[Remove _nospam_ for valid email address]

Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998