Maryland Chesapeake Bay Tributary Water Quality Monitoring Program – 2019

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Maryland Department of Natural Resources, Resource Assessment Service
Publication_Date: 20200420
Title: MD DNR Chesapeake Bay Tributary Water Quality Monitoring Program 2019
Geospatial_Data_Presentation_Form: Spatial dataset
Online_Linkage: [https://www.chesapeakebay.net/what/data]

Description:
Abstract:

One of the main goals of the Chesapeake Bay restoration is to reduce the impacts of excess nutrients on the Bay and its tributaries. In accordance with this goal, the Chesapeake Bay Program jurisdictions have agreed to reduce nitrogen, phosphorus and sediment pollution to the Bay. The Maryland Chesapeake Bay Tributary Water Quality Monitoring Program evaluates the physical/chemical component of water quality at fifty-nine tributary stations. By measuring levels of nutrients and closely related habitat characteristics such as dissolved oxygen and water clarity, the monitoring program provides some of the most direct linkages to management actions that are reducing nutrient loads to the Bay.

Samples are collected monthly at each tributary station with one exception: samples are not routinely collected at station EE3.3 in January and February.

Note that prior to 2017, sixty stations were included in the Tributary Monitoring Program. Due to funding constraints, the number of sites sampled was reduced by one in 2017. Tributary water quality monitoring project sampling ceased in January 2017 at station: XHH4742.

Note that prior to 2014, sixty-nine stations were included in the Tributary Monitoring Program. Due to funding constraints, the number of sites sampled was reduced by nine in 2014. Tributary water quality monitoring project sampling ceased in January 2014 at the following stations: BXK0031, CCM0069, MNK0146, XDJ9007, POK0087, XAK7810, TRQ0088, TRQ0146 and XCI4078.

Note that the year 2013 tributary project station count was sixty-nine. The number of project sampling stations was incorrectly listed as seventy, instead of sixty-nine, in metadata records describing project years preceding 2013.

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 and its tidal tributaries.

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 also 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 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 four documents listed below. The first three documents may be obtained from The Chesapeake Bay Program Office. The fourth document is available via The Maryland Department of Natural Resources "Eyes on the Bay" web site.

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.

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].

Methods and Quality Assurance for Chesapeake Bay Water Quality Monitoring Programs. Chesapeake Bay Program, May 2017, CBP/TRS-319-17 [https://www.chesapeakebay.net/documents/CBPMethodsManualMay2017.pdf].

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, 2019 - June 30, 2020 [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/WQ_chemical.physical_QAPP2019.pdf].

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:
Beginning_Date: 20190107
Ending_Date: 20191221
Currentness_Reference: Ground Condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: As needed
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -79.4938
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). 2020. GCMD Keywords, Version 9.1 Greenbelt, MD: Earth Science Data and Information System, Earth Science Projects Division, 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
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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>TURBIDITY
Theme_Keyword: EARTH SCIENCE>TERRESTRIAL HYDROSPHERE>WATER QUALITY/WATER CHEMISTRY>WATER CHARACTERISTICS>WATER TEMPERATURE
Place:
Place_Keyword_Thesaurus: Producer Defined
Place_Keyword: Chesapeake Bay
Place_Keyword: Maryland
Place_Keyword: Monitoring Segment
Place_Keyword: Tidal Tributaries
Place_Keyword: Back River
Place_Keyword: Big Annemessex River
Place_Keyword: Bohemia River
Place_Keyword: Bush River
Place_Keyword: C&D Canal
Place_Keyword: Chester River
Place_Keyword: Choptank River
Place_Keyword: Eastern Bay
Place_Keyword: Elk River
Place_Keyword: Fishing Bay
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Place_Keyword: Nanticoke River
Place_Keyword: Northeast River
Place_Keyword: Patapsco River
Place_Keyword: Patuxent River
Place_Keyword: Pocomoke River
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Place_Keyword: Potomac River
Place_Keyword: Rhode River
Place_Keyword: Sassafras River
Place_Keyword: Severn River
Place_Keyword: South River
Place_Keyword: Susquehanna River
Place_Keyword: Tangier Sound
Place_Keyword: West River
Place_Keyword: Wicomico River

Temporal:
Temporal_Keyword_Thesaurus: USGS Thesaurus
Temporal_Keyword: autumn
Temporal_Keyword: spring (season)
Temporal_Keyword: summer
Temporal_Keyword: winter

Access_Constraints: None
Use_Constraints: Acknowledgement of the MD Department of Natural Resources, Resource Assessment Service as a data source would be appreciated in products developed from these data. Please use the following citation: Maryland Department of Natural Resources, Resource Assessment Service. Eyes on the Bay. URL: [http://www.eyesonthebay.net].
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Renee Karrh
Contact_Position: Program Manager
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Address_Type: mailing and physical
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City: Annapolis
State_or_Province: Maryland
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Browse_Graphic:

Browse_Graphic_File_Name: MDDNR Tributaries Monitoring Project 2019 Station Map [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/metadata/MdDNR_TribsStns2019.pdf].

Browse_Graphic_File_Description: Map of fifty-nine year-2019 Maryland Chesapeake Bay Tributary 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 majority of samples and processed the data. The Nutrient Analytical Services Laboratory (NASL) at the University of Maryland Center for Environmental Science Chesapeake Biological Laboratory analyzed chlorophyll, nutrient and suspended solids samples. The Maryland Department of Health (MDH) analyzed biological oxygen demand, turbidity and alkalinity samples for Potomac River sites.

The project was made possible with funding provided by The State of Maryland.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

QUALITY ASSURANCE/QUALITY CONTROL

Maryland Department of Natural Resources followed specific procedures to ensure that the Tributary 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 used 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 and Hydrolab 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 2019: A pycnocline did not exist at station EE3.2 and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total station water column depth. Overnight rain fell the night before stations WXT0001, TF1.4 and TF1.3 were sampled. The Secchi disk depth measurement at station TF1.3 exceeded the station total water column depth. "Windowpane" ice was noted at station ET1.1. Station EE2.1 bottom and below pycnocline water samples were collected from the same bottle.

February 2019: Due to the absence of pycnoclines at stations EE3.1, EE3.2, ET5.2 and EE2.1, above and below pycnocline samples were collected from 1/3 and 2/3 of total station water column depths.

March 2019: There were no pycnoclines at stations RET2.4, EE3.2 and EE2.1. Therefore, water samples were collected at 1/3 and 2/3 total station depths.

April 2019: Thunderstorms occurred the night before water samples were taken at stations ET6.1, ET41.1 and WIW0141. The Secchi disk depth measurement at station TF1.3 exceeded the station total water column depth. Water samples were collected at 1/3 and 2/3 of station total depths, due to lack of pycnoclines, at the following stations: RET2.4, T6.1, WIW0141, ET10.1, ET5.2, EE2.1, EE3.1 and ET4.2.

May 2019: The station LE2.2 dissolved oxygen readings at 6 m - 11 m were double-checked. Rain fell the night before stations ET1.1, ET2.1 and ET2.3 were sampled. There were morning showers prior to sampling operations at stations TF1.3, TF1.4 and WXT0001. The Secchi disk depth measurement at station TF1.3 was greater than the station total water column depth. Water quality samples at stations EE2.1, EE3.1, ET1.1, ET2.1, ET2.3, ET4.2, ET5.2, LE2.2 and RET2.4 were collected at 1/3 and 2/3 of station water column depths.

June 2019: Heavy early morning rain fell prior to sampling at stations ET1.1, ET2.1, ET2.2 and ET2.3. Similarly, there were morning storms at stations WT1.1, WT2.1, WT3.1 and WT4.1. The Secchi disk depth measurement at station TF1.3 was greater than the station total water column depth and a sheen and scum were noted in field sheet comments. Stations EE2.1, EE3.1, EE3.2, ET5.2 and RET2.4 above pycnocline and below pycnocline samples were collected at 1/3 and 2/3 station total depths because there were no pycnoclines.

July 2019: The pH sensor used for stations LE1.1, LE1.2, LE1.3, LE1.4, RET1.1, TF1.5, TF1.6 and TF1.7 failed post calibration tests. The odor of hydrogen sulfide was observed in the station LE1.1 sample water.

August 2019: The water at station ET3.1 was green and a plankton sample containing Microcystis was collected. Mats of seaweed were floating down river at station ET4.1. The above pycnocline and below pycnocline water samples at station LE2.2 should have been collected at 1 m deeper depths. There were no pycnoclines at stations RET2.4, ET5.2, EE3.1, EE3.2 and EE2.1 and above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total station water column depths respectively. The bottom sample at station EE1.1 had a strong hydrogen sulfide odor. The station EE1.1 bottom and below pycnocline samples were both collected at 11.6 m. Rain showers preceded sampling at stations EE1.1, ET1.1, ET2.3 and ET4.2. The Secchi disk depth was greater than total station depth at station TF1.3.

September 2019: No pycnoclines were extant at stations RET2.4, ET4.2, ET5.2, EE2.1, EE3.2 and EE3.1 therefore above pycnocline and below pycnocline samples were taken from 1/3 and 2/3 of total station depths. Stations LE2.2 and EE1.1 bottom and below pycnocline samples were both collected the same depths. Morning showers preceded sampling at stations EE1.1 and ET4.2. A dip in dissolved oxygen at 9 m was noted at station LE1.2.

October 2019: There were no pycnoclines at stations EE1.1, EE3.1, EE3.2, ET4.2, ET5.2 and RET2.4 and above pycnocline and below pycnocline samples were taken from 1/3 and 2/3 of total station depths.

November 2019: The Secchi disk measurement at station TF1.3 was greater than the total station depth. The station ET4.2 bottom and below pycnocline samples were collected at 9.7 m depth. No pycnoclines were found at stations ET5.2, RET2.4, EE3.1 and EE3.2 so above pycnocline and below pycnocline samples were taken from 1/3 and 2/3 of total station depth.

December 2019: The station TF1.3 Secchi disk depth measurement was made from the pier and was greater than total station depth. Pycnoclines were nonexistent at stations EE2.1, EE3.1, EE3.2, ET5.2 and LE2.2 and above pycnocline and below pycnocline samples were taken at 1/3 and 2/3 of total station depths. Rain fell the night before sampling at stations ET10.1, ET6.1, MAT0016, RET2.1, RET2.2, RET2.4, TF2.1, TF2.3, WIW0141 and XFB1986. Rain fell the morning before station EE2.1 was sampled. The pH 10 post-calibration results for the sonde used at stations ET3.1 and ET4.1 were outside acceptable limits.

Logical_Consistency_Report:

January 2019: Station TF1.3 was sampled from the pier. Station WIW0141 samples were collected from the ferry. Station ET7.1 was sampled from the shore south of the closed ferry. Station ET1.1 samples were collected 0.25 nm south southwest of the normal collection site.

February 2019: Station ET7.1 was sampled from the dock.

March 2019: Station ET7.1 was sampled at the park. Water samples for station MAT0078 were collected on the north bank upstream from the normal site at the Mason Springs Conservancy due to closure of the bridge. Station WIW0141 samples were collected from the shore because the ferry was closed.

April 2019: Station WIW0141 samples were collected from the ferry and station ET7.1 samples were taken at the park.

June 2019: Station ET7.1 was sampled at the park.

October 2019: Opportunistic phytoplankton samples were collected in a bloom north of station LE2.3. Station ET5.1 sampling was conducted from Ganey's Wharf.

November 2019: A cyanobacteria sample was collected at station ET3.1.

December 2019: Sampling of stations CB5.1W, LE1.4, LE1.3, LE1.2, LE1.1, RET1.1, TF1.7, TF1.6 and TF1.5 was moved to 4-Dec to avoid high winds on 5-Dec. A small boat was used as the sample collection platform instead of the RV Kerhin.

There were no known issues during sampling conducted during May, July, August, and September 2019.

Completeness_Report:

Biological Oxygen Demand, turbidity and alkalinity samples were collected at a subset of Potomac River Tributaries project stations: MAT0016, MAT0078, PIS0033, RET2.4, RET2.2, RET2.1, TF2.4, TF2.3, TF2.2, TF2.1 and XFB1986. When the Monday following Biological Oxygen Demand sample collection was a holiday, samples were not collected.

January 2019: There are no LI-COR results for stations LE1.1, LE1.2, LE1.3, LE1.4, RET1.1, TF1.5, TF1.6 and TF1.7 because the instrument was not working.

February 2019: Station TF1.5 was not sampled because shallow water precluded vessel entry to the site.

March 2019: A low tide rendered station TF1.5 inaccessible and samples were not collected.

April 2019: Air temperature was not recorded at station ET5.1.

May 2019: Station WIW0141 was sampled from the ferry and total depth was not measured.

June 2019: The LI-COR meter was not working when stations LE1.1, LE1.2, RET1.1, TF1.5, TF1.6 and TF1.7 were sampled.

August 2019: Wave height was not recorded at station WXT0001. The wind was light at station TF1.3 and direction was undetermined.

September 2019: Station TF1.4 wind direction and velocity were not recorded.

October 2019: Wave height was not recorded at station TF1.3. It was not possible to measure Secchi disk depth at station ET4.1 due to inadequate water depth at the shoreline.

November 2019: LI-COR readings were not measured at stations LE1.1, RET1.1, TF1.5, TF1.6 and TF1.7 due to equipment malfunction. Wave height was not recorded at station LE1.1. Station EE1.1 was not sampled for unstated reasons.

There were no known completeness issues in February, July and December 2019.

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

The Yellow Springs Instrument (YSI) data sondes and HydroLab multi-parameter sondes were maintained and calibrated before and after each cruise in accordance with manufacturer's recommendations. During 2019, YSI series 6820 V2, Hydrolab series 5 and HL4 sondes were deployed. Field sheet dissolved oxygen method and equipment-set unit number values were used to track sondes used for station water quality measurements.

SONDE PROFILE SAMPLING PROTOCOLS:

A profile of temperature, specific conductance, dissolved oxygen, and pH was obtained from the water column at 0.5 m, 1.0 m, 2.0 m and 3.0 m depth intervals below the surface. Thereafter readings were taken at 2.0 m intervals and at the bottom. Tributary bottom equals total depth minus one meter (not rounded). 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 2.0 m interval, readings were taken at 1.0 m intervals between these two readings. For total depths less than or equal to 10.0 m, readings were taken at 1.0 m intervals.

GRAB SAMPLING DEPTH PROTOCOLS:

At stations where two depths were sampled, collections were taken at 0.5 m below the surface, and 1.0 m above the bottom. If the station total depth was equal to 1.5 m, the bottom sample was also collected at 0.5 m. 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 0.5 m below the surface, 1.5 m above the upper boundary of the pycnocline, 1.5 m below the lower boundary of the pycnocline, and 1 m above the bottom.

At stations where 4 depths were sampled and there was no discernable pycnocline, samples were taken at 0.5 m below the surface, at the closest profile depth one third the distance from the surface to the bottom, at the closest profile depth two thirds the distance from the surface to the bottom, and 1 m above the bottom.

Note that six Patuxent River stations, at which samples are also collected from four depths, use a different fixed-depth protocol for sampling mid-water depths. At station TF1.5 and RET1.1, samples are collected at 3 m and 6 m. Mid-water-column samples at stations LE1.1 and LE1.4 are collected at 3 m and 9 m. Samples are collected at 3 m and 12 m depths at stations LE1.2 and LE1.3.

LIGHT ATTENUATION SENSOR CALIBRATION

Once every two years, per LI-COR® Bioscientific recommendations, the ambient and underwater sensors (used to measure Photosynthetic Active Radiation (PAR)) were factory re-calibrated. Upon return from the factory, updated, sensor specific, correction values were entered into the displays before the equipment was deployed. A LI-COR® equipment tracking maintenance log was used to provide a permanent record of all re-calibrations, battery replacements, lowering-line checks and equipment repairs.

LIGHT ATTENUATION SAMPLING PROTOCOLS

Vertical profiles of light penetration were obtained. An initial reading with the underwater sensor just below the surface of the water (0.1 m) was followed by measurements at either 0.25 m or 0.5 m intervals until a value less than ten percent (10 %) of the surface reading (0.1 m) was attained.

SECCHI DEPTH:

Water transparency was determined, to the nearest 0.1 m using a 20 cm standard Secchi disk 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: 410.263.3369
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 Center for Environmental Science (UMCES) Chesapeake Biological Laboratory (CBL), Nutrient Analytical Services Laboratory (NASL) analyzed total dissolved nitrogen, particulate nitrogen, nitrite, nitrite + nitrate, ammonium, total dissolved phosphorus, particulate phosphorus, orthophosphate, dissolved organic carbon, particulate carbon, total suspended solids, and volatile suspended solids.

The NASL began performing chlorophyll analyses in the year 2009. Prior to 2009, chlorophyll analyses were performed by the Maryland Department of Health and Mental 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 conducted data QA/QC procedures. All of the water quality calibration "grab" sample data were plotted. Outliers and anomalous values were thoroughly researched. Staff compared unusual values to historic values from the site and values from nearby sites. Weather events were considered, event logs were reviewed and CBL analytical laboratory staff and DNR field staff members were consulted regarding possible legitimate causes for outlying values. In cases where values were not considered to be legitimate, they were masked from 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: Diana Domotor
Contact_Position: Data Analyst
Contact_Address:
Address_Type: mailing and physical
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City: Annapolis
State_or_Province: MD
Postal_Code: 21401
Contact_Voice_Telephone: 410.260.8630
Contact_Electronic_Mail_Address: diana.domotor_nospam_@maryland.gov[Remove _nospam_ for valid email address]

Process_Step:
Process_Description:
MDH DES ECL LABORATORY ANALYSIS

Maryland Department of Health, Division of Environmental Sciences, Environmental Chemistry Laboratory, Baltimore, MD, analyzed biological oxygen demand, total alkalinity and turbidity for Potomac River stations.
Process_Date: Unknown
Process_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Shahla Ameli
Contact_Position: Inorganics/Air Quality Supervisor
Contact_Address:
Address_Type: mailing and physical
Address: 1770 Ashland Ave.
City: Baltimore
State_or_Province: Maryland
Postal_Code: 21205
Country: USA
Contact_Voice_Telephone: 433.681.3855
Contact_Electronic_Mail_Address: shahla.ameli_nospam_@maryland.gov[Remove _nospam_ for valid email address]

Spatial_Data_Organization_Information:
Indirect_Spatial_Reference: Back River, Big Annemessex River, Bohemia River, Bush River, C&D Canal, Chesapeake Bay, Chester River, Choptank River, Corsica River, Eastern Bay, Elk River, Fishing Bay, Gunpowder River, Little Choptank River, Magothy River, Manokin River, Middle River, Nanticoke River, Northeast River, Patapsco River, Potomac River, Patuxent River, Pocomoke River, Pocomoke Sound, Rhode River, Sassafras River, Severn River, South River, Tangier Sound, West River and Wicomico River.

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 Tributaries. Project data are an aggregation of data collected at fifty-nine Maryland tributaries stations during 2019.

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, 2019 - June 30, 2020 [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/WQ_chemical.physical_QAPP2019.pdf].

Methods and Quality Assurance for Chesapeake Bay Water Quality Monitoring Programs. Chesapeake Bay Program, May 2017, CBP/TRS-319-17 [https://www.chesapeakebay.net/documents/CBPMethodsManualMay2017.pdf].

Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Mike Mallonee
Contact_Position: Water Quality Database 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_Data, Station_Information and Water_Quality_Data.
File_Decompression_Technique: No compression applied
Transfer_Size: 11.1

Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name:
[https://www.chesapeakebay.net/what/downloads/cbp_water_quality_database_1984_present]
Access_Instructions: Data are available through the Chesapeake Bay Programs CIMS 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: 20200421
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