Maryland Chesapeake Bay Tributary Water Quality Monitoring Program – 2020

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Maryland Department of Natural Resources, Resource Assessment Service
Publication_Date: 20210413
Title: MD DNR Chesapeake Bay Tributary Water Quality Monitoring Program 2020
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 sixty-eight 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 the following exceptions:
1) Samples are not routinely collected at stations EE3.3 and XAK7810 in January and February.
2) For logistical reasons, station LE2.3 is routinely sampled as part of the Chesapeake Bay mainstem monitoring project. Thus, station LE2.3 follows the mainstem sampling schedule and is sampled twice monthly during June, July, and August. The second sampling in July at station LE2.3 includes field readings only, no samples are collected for laboratory analyses.

Due to the COVID-19 pandemic, all field-related activities were suspended by MD DNR on 13-Mar-2020, including sampling surveys planned by the Chesapeake Bay Tributary Water Quality Monitoring Program. MD DNR resumed monitoring and field activities during the week of 26-May-2020, with a sampling survey of the Chesapeake Bay mainstem. Chesapeake Bay tributary sampling resumed in June 2020 as scheduled.

The number of stations sampled by the Maryland Chesapeake Bay Tributary Water Quality Monitoring Program has fluctuated through the years. Due to changes in funding availability and/or information needs, sampling at some stations has been interrupted or discontinued over the course of the program as follows:

1) Tributary water quality monitoring project sampling ceased in January 2014 at stations BXK0031, CCM0069, MNK0146, XDJ9007, POK0087, XAK7810, TRQ0088, TRQ0146, WIW0141 and XCI4078. Sampling was reinstated at station WIW0141 in July 2014. In January 2020, sampling resumed at BXK0031, CCM0069, MNK0146, XDJ9007, POK0087, XAK7810, TRQ0088, TRQ0146 and XCI4078.

2) In January 2017, sampling was discontinued at station XHH4742.

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, 2020 - June 30, 2021 [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/QAPP_MT_2020-2021_wApp.pdf].

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20200106
Ending_Date: 20201221
Currentness_Reference: Ground Condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: As needed
Spatial_Domain:
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West_Bounding_Coordinate: -79.4938
East_Bounding_Coordinate: -75.0405
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South_Bounding_Coordinate: 37.8713
Keywords:
Theme:
Theme_Keyword_Thesaurus: Theme_Keyword_Thesaurus: Global Change Master Directory (GCMD). 2021. GCMD Keywords, Version 10.1. 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://wiki.earthdata.nasa.gov/display/gcmdkey].
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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
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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].
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Browse_Graphic:
Browse_Graphic_File_Name: MDDNR Tributaries Monitoring Project 2020 Station Map [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/metadata/TribsStns2020.pdf].
Browse_Graphic_File_Description: Map of sixty-eight year-2020 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 2020: A pycnocline was not detected at stations EE3.1, EE3.2, ET5.2, LE2.2, EE2.1, and RET2.4. Above pycnocline and below pycnocline samples at these stations were collected at 1/3 and 2/3 depths, respectively. The Secchi disk depth measurement at TF1.3 was greater than the total depth. Dense fog was noted during sampling at stations RET2.1, RET2.2, RET2.4, and TF2.4.

February 2020: Rain earlier in the day was noted at stations LE1.1, LE1.2, LE1.3, LE1.4, RET1.1, TF1.6, and TF1.7. Due to the absence of pycnoclines at stations EE1.1, EE2.1, and ET4.2, above and below pycnocline samples were collected from 1/3 and 2/3 of total station water column depths. Foggy conditions were present during sampling at stations EE1.1, EE2.2, EE2.2, and ET4.2. Similarly, fog with visibility less than 1/4 mile was noted at stations MAT0016, RET2.1, RET2.2, RET2.4, and TF2.4. Station LE2.2 bottom and below pycnocline water samples were collected at the same depth.

March 2020: Samples at station RET2.4 were collected at 1/3 and 2/3 depths due to the absence of a pycnocline. LI-COR data at LE1.2 were flagged as questionable by the monitoring crew. The Secchi disk depth measurement at station TF1.3 was greater than the total depth. At station TF1.6, meter F stopped working at 3m depth. Sampling up from 3m was completed with meter E instead. While positioning the boat at station TF1.7, the bottom sediments were stirred up.

April 2020: No sampling due to the COVID-19 pandemic.

May 2020: No sampling due to the COVID-19 pandemic.

June 2020: The water surface at station MAT0078 had a slimy appearance and was covered in pollen. The surface and above pycnocline samples at RET2.4 were collected at the same depth. The dissolved oxygen profile at station TF2.3 was checked using Hydrolab instrument C. Hydrogen sulfide odor was detected at station EE1.1 at below pycnocline and bottom depths. At station ET4.2, the bottom and below pycnocline samples were collected from the same bottle. Stations ET5.2, WT5.1, EE3.2, and EE3.1 were sampled at 1/3 and 2/3

depths due to the absence of a pycnocline. Overnight rain was noted at station ET3.1, and heavy overnight rain was noted at stations TF1.0, TF1.2, TF1.3 and WXT0001. Bridge work was underway at station ET10.1. The Secchi disk depth measurement at station TF1.3 was greater than the total depth.

July 2020: A pycnocline did not exist at stations RET2.4, EE2.1, ET5.2, EE3.1, and EE3.2; and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total station water column depth. Hydrogen sulfide odor was detected with the bottom and below pycnocline samples at stations EE1.1 and ET4.2. Thunderstorms occurred the night before water samples were taken at stations EE1.1, EE2.1, EE2.2, and ET5.2. At station ET4.2, the bottom and below pycnocline samples were collected at the same depth.

August 2020: Hazy skies were reported at stations RET2.1, RET2.2, RET2.4, TF2.2, and EE2.2. Bridge construction was noted at station RET2.4. There were no pycnoclines at stations EE2.1, EE3.2, EE1.1, and EE3.1; therefore, water samples were collected at 1/3 and 2/3 total station depths. At station ET4.2, the surface and above pycnocline samples were collected out of separate bottles.

September 2020: The weather was foggy during sampling at station RET2.4. At station EE1.1, the bottom and below pycnocline samples were collected out of different bottles, and a hydrogen sulfide odor was detected with both samples. A pycnocline was not detected at stations EE2.1, EE3.1, EE3.2, and LE2.3; therefore, samples at these stations were collected at 1/3 and 2/3 depths. Hazy conditions were noted at station ET10.1. The reported cloud cover at station EE3.1 was due to smoke. Due to rough seas, readings for 0.5m and 1.0m depths at station LE1.4 were measured at the same depth. An EXO meter was used to collect readings at station LE2.3.

October 2020: The bottom and below pycnocline samples at station ET4.2 were collected at the same depth. The surface and 1.0m readings at station LE2.3 were taken at the same depth. Strong currents prevented the instrument from reaching bottom at station TRQ0088, thus the total depth was estimated. Stations EE3.1 and EE3.2 were sampled at 1/3 and 2/3 depths due to the absence of a pycnocline. It rained the night before sampling took place at stations TF1.0, TF1.2, TF1.3, TF1.4, and WXT0001.

November 2020: Heavy overnight rain occurred prior to sampling at stations MAT0016, TF2.1, TF2.2, TF2.3, and XFB1986. The bottom and below pycnocline samples at station RET2.4 were collected at the same depth. The Secchi disk depth measurement at station XFB1986 was noted as closer to 0.0m than 0.1m. Rain fell the night before sampling at stations ET2.1 and ET2.3. The boat ramp at station XDJ9007 was under construction. A pycnocline was not detected at stations EE1.1, ET4.2, and LE2.3. Above and below pycnocline samples at these stations were collected at 1/3 and 2/3 depths, respectively. An EXO unit was used to sample station LE2.3.

December 2020: It was snowing during sampling at Station RET2.2. Heavy rain was noted onshore at station ET6.1, and sampling at station ET10.1 also reported heavy rain. At station TF1.3, the Secchi disk depth measurement was greater than the total depth. A

pycnocline did not exist at stations EE1.1, EE3.2, ET4.2, and LE2.3; and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total station water column depth. At stations ET3.1 and ET4.1, pH readings were unstable with meter Y, so meter J was used to measure pH. An EXO meter was used to collect readings at stations EE2.1 and LE2.3. The surface and above pycnocline samples at EE3.1 were collected out of different bottles.

Logical_Consistency_Report:

For logistical reasons, station LE2.3, a Potomac River water quality sampling 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. One or more of the following tributaries project stations may be sampled using the larger vessel during December, January and February surveys: EE1.1, EE2.2, EE2.1, ET4.2 and WT5.1.

Due to the COVID-19 pandemic, all water quality monitoring activities in Maryland were suspended from 13-Mar-2020 to 26-May-2020. When sampling resumed in late May, it was with enhanced safety protocols and social distancing guidelines in place. These additional safety measures required the Potomac River sampling to be conducted by two separate boat crews beginning with the June 2020 monitoring cruise.

ADDITIONAL COMMENTS

January 2020:

Station TF1.3 was sampled from the park. Water depth at station TF1.5 was too shallow for the RV Carson on 6-Jan, and the station was sampled from the pier instead. Station ET7.1 was sampled from the south side of the ferry landing. Station MNK0146 was sampled from the pier.

February 2020:

Station ET7.1 was sampled from the dock. The sample at station WIW0141 was collected from the bank. Sampling at stations TF2.2, TF2.2, TF2.3, and XFB1986 was delayed until the second day due to fog. The above pycnocline sample at station WT5.1 should have been collected at 10 meters. Station MNK0146 was sampled from the pier.

March 2020:

Station TF1.3 was sampled from the park.

April 2020:

No sampling due to the COVID-19 pandemic.

May 2020:

Per standard sampling protocols, station LE2.3 was sampled as part of the May mainstem monitoring survey which commenced on 26-May. Due to the late start date for the May mainstem survey, the May sampling at station LE2.3 did not occur until 2-Jun.

July 2020:
Station MNK0146 was sampled from the pier.

October 2020: Samples collected at stations CCM0069, ET6.1, TRQ0088, TRQ0146, WIW0141, and XDJ9007 for particulate nitrogen and particulate carbon analyses were filtered after returning to the office. Station WIW0141 was sampled from the ferry.

November 2020: Station TF1.3 was sampled from the bridge. The above pycnocline sample at station RET2.4 should have been collected at 1.0m depth.

There were no known logical consistency issues during sampling conducted in June, August, September, and December 2020.

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.

Tributary samples are not routinely collected at stations EE3.3 and XAK7810 during January and February.

The second sampling in July at station LE2.3 includes readings only; no samples are collected.

Due to the COVID-19 pandemic, all monitoring and field activities were suspended by MD DNR from 13-Mar-2020 to 26-May-2020, including sampling surveys planned by the Chesapeake Bay Tributary Water Quality Monitoring Program. Chesapeake Bay tributary sampling resumed in June 2020 as scheduled.

ADDITIONAL COMMENTS

March 2020: All water quality monitoring activities ceased in mid-March due to the COVID-19 pandemic and the associated state of emergency in the State of Maryland. March tributary data are limited to stations that were sampled prior to 13-Mar-2020: CB1.0, RET2.4, LE1.1, LE1.2, LE1.4, TF1.3, TF1.6, and TF1.7. Only field data are available for these stations. Laboratory samples could not be processed within the required holding times and were discarded. Conditions were too rough to collect LI-COR readings at station LE1.4.

April 2020: No sampling due to the COVID-19 pandemic.

May 2020: With enhanced safety protocols in place to protect against transmission of the COVID-19 virus, water quality monitoring activities resumed on 26-May. The only tributary station sampled in May was station LE2.3. Station LE2.3 was sampled as part of the May mainstem monitoring survey.

June 2020: Total depth could not be determined at station TRQ0088 due to strong currents. A locked gate prevented sampling at station TF1.4.

July 2020: Due to strong currents at TRQ0088, the total depth of the water column could not be determined.

August 2020: Station LE2.3 was not sampled due to a multitude of setbacks, including severe weather. Total depth at station TRQ0088 could not be determined due to strong tidal currents.

September 2020: Conditions were too rough to collect LI-COR readings at station LE1.4. The LI-COR instrument was not working and no LI-COR readings were collected at station RET1.1.

October 2020: The surface sample at EE2.2 for laboratory analysis of total dissolved nitrogen was accidentally left in the supply bin and later discarded. Total depth was not recorded at station WIW041. No LI-COR readings were collected at station TF1.5 due to instrument malfunction. Readings for 1.0m depth were not collected at station TF1.6.

November 2020: Station ET1.1 was not sampled due to rough conditions. Due to bad weather and COVID-related staffing shortages, the following stations were not sampled in November: EE2.1, EE2.2, EE3.0, EE3.1, EE3.2, EE3.3, ET6.2, ET7.1, ET8.1, ET9.1, XAK7810, and XCI4078.

December 2020: The test tube for the total dissolved nitrogen sample at station XDJ9007 broke during transport. Due to a malfunctioning instrument, LI-COR readings were not collected at the following stations: LE1.1, LE1.2, LE1.3, LE1.4, RET1.1, TF1.5, TF1.6, and TF1.7.

There were no known completeness issues in January and February 2020.

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 2020, 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
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Country: USA
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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
Address: 580 Taylor Ave., D2
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: Cynthia Stevenson
Contact_Position: Supervisor, Inorganics/Air Quality Laboratories
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: 433.681.3851
Contact_Electronic_Mail_Address:
cynthia.stevenson_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, TierLevel, 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, TierLevel, 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, TierLevel, 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, TierLevel, 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, 2020 - June 30, 2021 [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/QAPP_MT_2020-2021_wApp.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: 9.9

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: 20210728

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Mark Trice

Contact_Organization: Maryland Department of Natural Resources, Resource Assessment Service

Contact_Position: Program Chief, Water Quality Informatics

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: mark.trice_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