Maryland Chesapeake Bay Tributary Water Quality Monitoring Program – 2022

Metadata:

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Citation:
Citation_Information:
Originator: Maryland Department of Natural Resources (MD DNR), Resource Assessment Service
Publication_Date: 20230517
Title: MD DNR Chesapeake Bay Tributary Water Quality Monitoring Program 2022
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, and

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.

The number of stations sampled by the MD DNR 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, TRQ0203, TRQ0224, WIW0141 and XCI4078. Sampling was reinstated at station WIW0141 in July 2014, and resumed at BXK0031, CCM0069, MNK0146, XDJ9007, POK0087, XAK7810, TRQ0088, TRQ0146 and XCI4078 in January 2020.

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 [https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/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 [https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/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://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Methods_Manual.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, 2022 - June 30, 2023 [https://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/MdDNR_MTQAPP2022_2023.pdf].

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20220110
Ending_Date: 20221220
Currentness_Reference: Ground Condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: As needed
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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
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:
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MDDNR Tributaries Monitoring Project 2022 Station Map [https://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/metadata/MdDNR_TribsStns2022.pdf].
Browse_Graphic_File_Description: Map of sixty-eight, year 2022, 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

In September 2021, the Baltimore Gas and Electric company began work rebuilding a transmission line that runs across the Bush River in Harford County, Maryland. The project involves the replacement of three double circuit steel lattice towers (one on each shore and one located within Bush River) and four single circuit wood H-frames (two on each side of the river) with nine steel galvanized monopoles. MD DNR tributary monitoring station WT1.1 is located on the Bush River within 1000ft downstream of the project, and water quality at that station may be impacted by the ongoing construction activities. Of particular note in 2022, the existing transmission line cables were removed during the period June 27 - July 8. Due to the nature of the cables, each cable dragged along the river bottom for approximately 10-15 minutes during the removal process.

January 2022: A pycnocline was not detected at stations EE1.1, EE2.1, EE3.1, EE3.2, and ET5.2. 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 station TF1.3 was greater than the total depth. The total depth was greater than 4.0 meters at station TRQ0088. At station LE2.2, specific conductance at the surface changed during sampling. Rain and snow fell on 16-Jan, several days before sampling at stations MAT0078 and PIS0033. The bridge was under construction at station CCM0069, and skim ice was reported at the site. At station TRQ0146, the water was reported as 90% frozen upstream, and 50% frozen downstream.

February 2022: Afternoon rain showers occurred the day before sampling at stations EE2.1 and EE2.2. Samples at stations EE3.2, ET5.2, and LE2.3 were collected at 1/3 and 2/3 depths due to the absence of a pycnocline. At station ET4.2, the bottom and below pycnocline samples were collected at the same depth. The Secchi disk depth measurement at station TF1.3 was greater than the total depth. The specific conductance and pH measurements at station TF2.4 were rechecked and confirmed. Frozen precipitation fell the night before sampling at station WT5.1. Skim ice was reported at station WT6.1.

March 2022: Due to the absence of pycnoclines at stations EE1.1, EE2.1, EE3.1, EE3.2, and ET5.2, above and below pycnocline samples were collected from 1/3 and 2/3 of total station water column depths. The pier was being removed during sampling at station CCM0069. The surface conductivity at station LE2.3 changed by 800 µS/cm during sampling. The Secchi disk

depth measurement at station TF1.3 was greater than the total depth. Rain earlier in the day was reported at stations TRQ0146, WT1.1, WT2.1, and WT3.1.

April 2022: Stations EE2.1, EE3.2, and LE2.3 were sampled at 1/3 and 2/3 depths due to the absence of a pycnocline. Morning rain was reported at stations LE1.1 and RET1.1. At station LE2.2, the surface and above pycnocline samples were collected at the same depth. A cargo ship passed while sampling at station WT5.1. The profile readings at station XAK7810 were double-checked.

May 2022: A pycnocline was not detected at stations EE3.1, EE3.2, and ET5.2. Above pycnocline and below pycnocline samples at these stations were collected at 1/3 and 2/3 depths, respectively. High water was reported at stations CCM0069, TRQ0088, and TRQ0146. Heavy rain occurred in the days prior to sampling at stations MAT0078 and PIS0033, and the water at these stations appeared muddy. Severe thunderstorms were reported at station ET5.2, and overnight thunderstorms were noted at station LE2.3. At station WIW0141, the total depth was greater than 4m, and the ferry was closed due to flooding. Dissolved oxygen and pH readings at stations BXK0031 and MAT0078, respectively, were double-checked with a second meter.

June 2022: Stations EE2.1, EE3.1, EE3.2, and ET5.2 were sampled at 1/3 and 2/3 depths due to the absence of a pycnocline. At station LE2.3, the surface conductivity changed during sampling. Scattered showers occurred during the day and continued through the night on the date prior to sampling at stations TF1.3, TF1.4, and WXT0001. Station EE1.1 was sampled during very rough seas.

July 2022: Due to the absence of a pycnocline, samples were collected at 1/3 and 2/3 depths at the following stations: EE1.1, EE2.1, EE3.1, EE3.2, ET4.2, ET5.2, LE2.3, and RET2.4. The meter used at stations EE3.3, ET5.1, LE2.2, WT5.1, and XAK7810 was unable to be post-calibrated for dissolved oxygen.

August 2022: A strong hydrogen sulfide odor was detected with the bottom and below pycnocline samples at station LE2.2. Stations EE1.1, EE2.1, EE3.1, EE3.2, ET4.2, and ET5.2 were sampled at 1/3 and 2/3 depths due to the absence of a pycnocline. Scattered showers occurred the night before sampling at stations TF1.2, TF1.3, TF1.4, and WXT0001. The pH readings at station WT4.1 were confirmed with a second meter.

September 2022: A pycnocline was not detected at stations EE3.1, EE3.2, ET4.2, ET5.2, and RET2.4; therefore, samples at these stations were collected at 1/3 and 2/3 depths. Fog was reported at station RET2.4. At station WT8.1, a sewage truck spill occurred the day before sampling and was followed by heavy rain.

October 2022: A barge was on top of the sample site at station WT1.1. Stations ET4.2, ET5.2, EE1.1, EE2.1, EE3.1, EE3.2, LE2.3, and RET2.4 were sampled at 1/3 and 2/3 depths due to the absence of a pycnocline. Bridge construction was ongoing at station RET2.4. The readings at station WT4.1 were confirmed with a second meter. The Secchi disk depth measurement at station TF1.3 was greater than the total depth.

November 2022: A pycnocline was not detected at stations ET5.2, EE1.1, EE2.1, EE3.1, EE3.2, LE2.3, and RET2.4. Above and below pycnocline samples at these stations were collected at 1/3 and 2/3 depths, respectively. Because the surface conductivity changed during sampling, station LE2.2 was sampled as if no pycnocline was present, with samples collected at 1/3 and 2/3 depths. At station RET2.4, bridge construction was complete and demolition work on the old bridge was not active on the sample date. The Secchi disk depth measurement at station TF1.3 was greater than the total depth.

December 2022: Stations ET4.2, ET5.2, EE2.1, EE3.1, EE3.2, and LE2.3 were sampled at 1/3 and 2/3 depths due to the absence of a pycnocline. At station TRQ0146, upstream coverage of skim ice was estimated as 50%, with some ice downstream. The Secchi disk depth measurement at station TF1.3 was greater than the total depth. At station RET2.4, the Rt. 301 bridge construction was complete and demolition of the old bridge was active on the sample date.

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.

Enhanced safety protocols and social distancing guidelines adopted during the COVID-19 pandemic required the Potomac River and Patuxent River monitoring to be conducted by two separate boat crews beginning with the June 2020 cruises. On the Potomac cruises, these protocols resulted in sample filtration at stations MAT0016, TF2.3, TF2.2, TF2.1, and XFB1986 being done with equipment that was used for all programs instead of the dedicated Potomac equipment. In addition, the holding times for all Potomac samples increased. In April 2022, sampling on the Potomac River returned to using just one boat. Sampling on the Patuxent River continued to use two boats throughout 2022.

In 2022, samples collected at station RET2.4 on the Potomac River had increased holding times (~3 hours) due to construction activities at the Rt. 301 bridge that restricted marina access.

ADDITIONAL COMMENTS

January 2022: Stations ET7.1 and WIW0141 were sampled from the ferry.

February 2022: Water samples collected at stations ET3.1 and ET4.1 were processed off-site, at Toal Park and Kent Narrows, respectively. Station ET7.1 was sampled from the shore. At station WT5.1, the above pycnocline sample should have been collected at 10.0m depth.

March 2022: Station EE2.2 was sampled 72yds southwest of the station location. Station WIW0141 was sampled from the ferry.

April 2022: (None)

May 2022: The below pycnocline sample at station WT5.1 should have been collected at 11.0m depth.

June 2022: The bottom sample at station ET4.1 should have been collected at 4.2m depth. At station LE2.3, the above pycnocline and below pycnocline samples collected on 6-Jun should have been at 1.0m and 12.0m depth, respectively. Station WIW0141 was sampled from the bulkhead.

July 2022: The Secchi disk was lost during sampling, so a modified method for measuring Secchi disk depth was used at stations CCM0069, ET6.1, TRQ0146, WIW0141, and XDJ9007. At station TF2.4, the sample bottles for BOD, turbidity, and total alkalinity were filled at the wrong depths and then later relabeled to correct the error.

August 2022: The below pycnocline sample at station WT5.1 should have been collected at 15.0m depth.

September 2022: The bottom sample and readings at station ET6.1 should have been collected at 3.0m depth. Station WIW0141 was sampled from the bulkhead.

October 2022: The above pycnocline sample at station WT5.1 should have been collected at 5.0m depth.

November 2022: At station LE2.2, the above and below pycnocline samples should have been collected at 0.5m and 2.0m depth, respectively. The sample collected at station CCM0069 was processed at Vienna.

December 2022: Station TRQ0088 was sampled at the boat ramp downstream from the bridge. The below pycnocline sample at station RET2.4 should have been collected at 7.0m depth.

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.

ADDITIONAL COMMENTS

January 2022: Because stations ET7.1 and WIW0141 were sampled from the ferry, total depth was not measured. A bottom sample was not collected at station ET7.1. Due to ice and safety concerns, the following stations were not sampled: EE3.3, ET1.1, ET2.1, ET2.2, ET2.3, WT1.1, WT2.1, WT3.1, WT4.1, WT6.1, and XAK7810. Licor readings were not collected at stations LE1.2, LE1.3, and LE1.4 due to instrument malfunction.

February 2022: Because station ET7.1 was sampled from the shore, a bottom sample was not collected. Stations EE3.3 and XAK7810 were not sampled. Licor readings were not collected at stations LE1.1, RET1.1, TF1.5, TF1.6, and TF1.7. Dissolved oxygen readings at station TF1.0 were not recorded correctly.

March 2022: Because station WIW0141 was sampled from the ferry, total depth was not measured.

April 2022: Licor readings were not collected at station RET1.1 due to instrument malfunction.

May 2022: Secchi disk depth was not recorded at station LE1.4. Total depth at station WIW0141 could not be determined because the depth exceeded the 4m length of line used for measurement. The meter used at stations EE1.1, EE3.2, EE3.3, ET1.1, ET2.1, ET2.2, ET2.3, ET4.2, ET5.1, ET5.2, ET8.1, ET9.1, WT5.1, and XAK7810 failed post-calibration for pH. Following QA/QC protocols, the pH values at these stations were deleted.

June 2022: Secchi disk depth was not recorded at station EE1.1 due to rough seas. Because station WIW0141 was sampled from the bulkhead, total depth was not measured. Due to rough conditions, Licor readings were not collected at station LE2.3 on June 28.

July 2022: Licor readings were not collected at station LE1.4 and LE2.3 (12-July) due to rough seas. A battery failure prevented collection of Licor readings at stations LE1.2 and LE1.3. Total depth was not recorded at stations TRQ0088, TRQ0146, and WIW0141.

August 2022: Wind direction and velocity were not recorded at station MNK0146. Licor data were not collected at station LE2.3 on August 8.

September 2022: Wave height was not recorded at station XCI4078. Because station WIW0141 was sampled from the bulkhead, total depth was not measured.

October 2022: Stations EE2.2 and WIW0141 were not sampled.

November 2022: Secchi disk depth readings were not recorded at stations ET10.1, BXK0031, POK0087, and MNK0146. Station WT6.1 was not sampled due to rough seas. Licor readings were not recorded at station LE2.3 due to rough seas.

December 2022: Station WIW0141 was not sampled because the sample site was inaccessible.

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 2022, YSI series 6820 V2, YSI EXO1, YSI EXO2, 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 (Jerome) Frank

Contact_Position: Manager, Nutrient Analytical Services Laboratory

Contact_Address:

Address_Type: mailing and physical

Address: University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, 146 Williams Street, 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: 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

Contact_Voice_Telephone: 410.260.8630

Contact_Electronic_Mail_Address: mark.trice_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: Lara Phillips
Contact_Position: Supervisor, Inorganics Laboratory
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: 443.681.3863
Contact_Electronic_Mail_Address: lara.johnson_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 sixty-eight Maryland tributaries stations during 2022.

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, CBSeg2003, CBSegmentShed2009, Cruise, Depth, Details, EventId, FIPS, HUC8, HUC12, 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, CBSeg2003, CBSegmentShed2009, CloudCover, Cruise, Details, EventId, FieldActivityEventType, FieldActivityRemark, FIPS, FlowStage, GaugeHeight, HUC8, HUC12, 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, CBSeg2003, CBSegmentShed2009, Cruise, Depth, Details, EventId, FIPS, HUC8, HUC12, 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, CBSeg2003, CBSegmentShed2009, Cruise, Depth, Details, EventId, FIPS, HUC8, HUC12, 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 [https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/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, 2022 - June 30, 2023 [https://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/MdDNR_MTQAPP2022_2023.pdf].

Methods and Quality Assurance for Chesapeake Bay Water Quality Monitoring Programs. Chesapeake Bay Program, May 2017, CBP/TRS-319-17 [https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Methods_Manual.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: 1750 Forest Drive, Suite 130
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21401
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: 16.3

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: 20230523

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