Maryland Chesapeake Bay Tributary Water Quality Monitoring Program – 2016

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Maryland Department of Natural Resources, Resource Assessment Service
Publication_Date: 20170414
Title: MD DNR Chesapeake Bay Tributary Water Quality Monitoring Program 2016
Geospatial_Data_Presentation_Form: Spatial dataset
Online_Linkage: [http://www.chesapeakebay.net/data/index.htm]

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 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 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 three documents listed below. The documents may be obtained from The Chesapeake Bay Program Office.

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

The Quality Assurance Project Plan for the Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program - Chemical and Physical Properties Component for the period July 1, 2016 - June 30, 2017 [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/MdDNR_MTQAPP2016.pdf].

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

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20160111
Ending_Date: 20161221
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). 2016. GCMD Keywords, Version 8.4. Greenbelt, MD: Global Change Data Center, Science and Exploration Directorate, Goddard Space Flight Center (GSFC) National Aeronautics and Space Administration (NASA). URL (GCMD Keyword Forum Page): [https://earthdata.nasa.gov/gcmd-forum].
Theme_Keyword: Biosphere > Ecosystems > Marine Ecosystems > Estuary
Theme_Keyword: Biosphere > Ecosystems > Freshwater Ecosystems > Rivers/Stream
Theme_Keyword: Biosphere > Ecological Dynamics > Ecosystem Functions > Nutrient Cycling
Theme_Keyword: Biosphere > Ecological Dynamics > Ecosystem Functions > Primary Production
Theme_Keyword: Terrestrial Hydrosphere > Surface Water > Surface Water Features > Rivers/Streams
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Chlorophyll
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Conductivity
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Light Transmission
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Nitrogen Compounds
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Nutrients
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Oxygen
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Organic Matter
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > pH
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Phosphorous Compounds
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Suspended Solids
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > Turbidity
Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > 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: Corsica River
Place_Keyword: Eastern Bay
Place_Keyword: Elk River
Place_Keyword: Fishing Bay
Place_Keyword: Gunpowder River
Place_Keyword: Little Choptank River
Place_Keyword: Magothy River
Place_Keyword: Middle River
Place_Keyword: Manokin River
Place_Keyword: Nanticoke River
Place_Keyword: Northeast River
Place_Keyword: Patapsco River
Place_Keyword: Patuxent River
Place_Keyword: Pocomoke River
Place_Keyword: Pocomoke Sound
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: None
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Renee Karrh
Contact_Position: Program Manager
Contact_Address:

Address_Type: mailing and physical.
Address: 580 Taylor Avenue, C2
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21401
Country: USA
Contact_Voice_Telephone: 410.260.8630
Contact_Electronic_Mail_Address: renee.karrh_nospam_@maryland.gov[Remove _nospam_ for valid email address]
Browse_Graphic:
Browse_Graphic_File_Name: MDDNR Tributaries Monitoring Project 2016 Station Map [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/metadata/MdDNR_TribsStns2016.pdf]. If the map URL raises a file not found error, drill down from [http://eyesonthebay.net].
Browse_Graphic_File_Description: Map of sixty year-2016 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 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 2016: The occurrence of scattered showers the day preceding sampling was noted on field data sheets for stations: WT8.2, WT8.3, WT8.1 and WT7.1. The surface and 1m samples at station ET6.2 came from one water sample. A Cryptomonas flagellate bloom of 62 million cells/L was noted at station XBF1986. There was no pycnocline at stations: ET5.2, EE3.1, EE3.2 and EE2.1 and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. The pH data values acquired at stations: RET2.4 and RET2.2 were considered unreliable.

February 2016: The station ET6.1 Secchi disk depth was measured in the sun instead of in the shade. Station WIW0141 sample water was collected by bucket from the wharf. Due to absence of pycnoclines at stations: EE3.1, EE3.2, EE2.2 and EE1.1, the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. Stations: EE2.2 and WT5.1 surface and 1m samples were pulled from water collected at the same depth. Meter scoping and ice on the vessel were noted at station WT5.1. Total depths at stations: ET7.1 and TF1.3 were not recorded. Station ET7.1 samples were collected from the ferry. A plankton sample was collected at station WT3.1 and dissolved oxygen readings were double-checked with a second meter. Snowfall preceding sampling was observed at stations: ET2.3, ET2.1 and ET2.2.

March 2016: Secchi disk depth and total depth were not recorded at station TF1.3 as the water level was deemed â€œtoo shallowâ€• . Pycnoclines did not exist at stations: EE3.1 and EE3.2, the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. Drizzling morning rain was noted during sampling operations at stations: WT7.1, WT8.1, WT8.2 and WT8.3. At station WIW0141 the ferry was out of service.

April 2016: Above pycnocline and below pycnocline samples at stations: LE2.2, ET5.2, WT5.1, EE1.1, EE2.1, ET4.2, EE3.2 and EE3.1 were collected from one third and two thirds of station water column depth. Station TF1.7 surface and 1m samples were taken from water collected at the same depth. Samples for station TF1.3 were collected from the pier at Patuxent Wetland Park. Secchi disk depth at station TF1.3 was greater than station total water depth. Rainfall preceded sampling at stations: ET2.1 and ET2.2.

May 2016: Dissolved oxygen sensor readings at stations: CB5.1W, LE1.4, LE1.3 and LE1.2 were considered unreliable and sonde D was replaced with sonde J during sampling at station LE1.2. No pycnoclines were observed at stations: EE2.1 and EE3.2. Rain occurred the night before stations EE3.0, EE3.1 and ET6.2 were sampled. StationWIW0141 samples were collected from the ferry. Station TF1.3 samples were collected from the bridge.

June 2016: There was no pycnocline at stations: RET2.4, ET4.2, EE1.1, EE3.2, ET5.2 and EE3.1 and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. Station WIW0141 samples were collected from the ferry.

July 2016: The thermometer used to measure air temperature was in the sun due to loss of an awning during a windstorm. There was no pycnocline at stations: ET5.2, EE2.1 and EE3.1, and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. Dissolved oxygen readings at station WT3.1 were double checked. Thunderstorms occurred the night before samples were collected at station XHH4742.

August 2016: The thermometer used to measure air temperature was in the sun due to loss of an awning during a windstorm. The smell of hydrogen sulfide was noted in water collected from the bottom and below pycnocline bottles at station LE2.2. There was no pycnocline at stations: EE1.1, EE2.1, EE3.1, EE3.2, ET4.2, ET5.2, RET2.4, and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. There were green flocs in the center of the river when station ET3.1 sampling operations were conducted.

September 2016: The 0.1m LI-COR reading at station LE1.1 was not considered reliable. There was no pycnocline at stations: EE1.1, EE2.1, EE3.1, ET3.2, and ET4.2. The above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively.

October 2016: There was no pycnocline at stations: EE1.1, EE3.1, EE3.2, ET3.2 and ET4.2; and the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. A station ET3.1 field log note observed that dissolved oxygen readings were high.

November 2016: There was no pycnocline at stations: EE1.1, EE2.1, EE3.1, ET3.2, ET4.2 and Ret4.2. Therefore, the above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, respectively. Meter scoping issues were noted at stations ET3.2 and ET10.1. The bottom sample at station EE3.2 was collected from water at the 25m depth.

December 2016: Rain, during the night preceding sampling, was noted on field log sheets for stations: LE1.1, LE1.2, LE1.3, LE1.4, RET1.1, TF1.3, TF1.4, TF1.7, TF1.6, TF1.5 and WXT0001. Construction around the creek was noted when station PIS0033 was sampled. The

above pycnocline and below pycnocline samples were collected from 1/3 and 2/3 of total water column depths, due to no pycnocline, at stations: EE1.1, EE2.1, EE3.1, EE3.2, ET5.2, LE2.2 and RET2.4. The pH sensor was slow to equilibrate at station ET6.1. The water level at Station ET4.1 was very shallow.

Logical_Consistency_Report:

Beginning in 2014, due to funding, nine stations sampled in previous years were dropped from the tributary water quality monitoring program: BXK0031, CCM0069, MNK0146, POK0087, TRQ0088, TRQ0146, XAK7810, XCI4078 and XDJ9007.

January 2016: Station ET7.1 was sampled from the shore on the Princess Anne side of the river. Station WIW0141 samples were collected from the ferry.

February 2016: Station WIW0141 samples were collected from the ferry.

May 2016: Station WIW0141 samples were collected from the ferry. Station WIW0141 samples were collected from the bridge.

June 2016: Station WIW0141 samples were collected from the ferry.

September 2016: Station TF1.3 was sampled from the bridge. Station WIW0141 was sampled from the ferry.

October 2016: Station WIW0141 samples were collected from the ferry.

November 2016: Scoping issues, at stations EE3.2 and ET10.1, resulted in bottom samples collected from shallower-than-normal depths.

December 2016: Station ET1.1 samples were collected Â¾ of a mile South due to ice coverage. Sampling operations at Station ET5.1 were conducted from Ganey wharf.

Completeness_Report:

January 2016: Station EE3.3 is not sampled in January. LI-COR was not measured at stations: CB5.1W, LE1.4, LE1.3, LE1.2, LE1.1, RET1.1, TF1.7, TF1.6 or TF1.5. The station EE1.1 water sample was insufficient for the normal duplicate sample.

February 2016: EE3.3 is not sampled in February. Rough weather conditions precluded LI-COR readings at stations: CB5.1W, LE1.4, LE1.3, LE1.2, LE1.1, RET1.1 and TF1.7. Station ET1.1 was not sampled due rough sea conditions. Secchi disk depth was not measured at station ET4.1. The 0.5m and 1m samples were taken from water collected at the same depth at stations: LE1.3, LE1.2, LE1.1 and RET1.1. Total depth at station TF1.3 was not recorded.

March 2016: LI-COR was not measured at stations: CB5.1W, RET1.1, TF1.7 and TF1.6 due to rough conditions. Too shallow water level at station TF1.3 precluded Secchi disk depth and total depth measurements.

April 2016: Total depth was not recorded at station WIW0141. LI-COR was not measured at stations: RET1.1, TF1.7 and TF1.6 due to rough conditions. Air temperature was not recorded at stations ET9.1 and WT1.1. The 0.5m and 1m samples were taken from water collected at the same depth at station TF1.7.

May 2016: Routine phytoplankton sample collection at station RET2.1 was discontinued beginning in May 2016. Total Depth was not recorded at station WIW0141. Station TF1.3 was collected from the bridge and it was not possible to measure Secchi disk depth and total depth.

June 2016: Air temperature was not recorded at stations PIS0033 and MAT0078. Total Depth was not recorded at station WIW0141. LI-COR was not measured at station LE1.4 due to rough water conditions.

July 2016: Station TF1.5 was not sampled because low water levels made the site inaccessible. Total depth was not recorded when station WIW0141 was sampled.

August 2016: Secchi disk depth was not recorded at station XHH4742. Station WIW0141 was sampled from the ferry and total depth was not recorded.

September 2016: Rough water conditions precluded LI-COR sample collection at stations CB5.1W and LE1.4. Secchi disk depth and total depth were not recorded at station TF1.3 Total depth was not measured at station WIW0141.

October 2016: Total water depth was not recorded at stations: TF1.3 and WIW0141.

November 2016: LI-COR readings were not measured at stations LE1.4 due to rough conditions. Secchi disk depth and total water depth were not recorded at stations TF1.3 and WIW0141. Station XHH4742 was not sampled. Water temperature was not recorded at station EE3.0.

December 2016: Air Temperature was not recorded at Stations EE3.1, EE3.0, ET6.2 and ET7.1 due to a lost thermometer.

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 2016, YSI series 6820 V2, Hydrolab series 4A and Hydrolab series 5 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 0.5m, 1.0m, 2.0m and 3.0m depth intervals below the surface. Thereafter readings were taken at 2.0m intervals and at the bottom. 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 2.0m interval, readings were taken at 1.0m intervals between these two readings. For total depths less than or equal to 10.0m, readings were taken at 1.0m intervals.

GRAB SAMPLING DEPTH PROTOCOLS:

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

At stations where 4 depths were sampled and a pycnocline existed, collections were taken at 0.5m below the surface, 1.5m above the upper boundary of the pycnocline, 1.5 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 0.5m 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 3m and 6m. Mid-water-column samples at stations LE1.1 and LE1.4 are collected at 3 m and 9m. Samples are collected at 3m and 12m depths at stations LE1.2 and LE1.3.

LIGHT ATTENUATION SENSOR CALIBRATION

Once every two years, per LI-CORÂ® 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-CORÂ® 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 0.50-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 0.1m using a 20-cm standard Secchi disc lowered into the water column with a calibrated rope. Observations were made on the shady side of the sampling location.

Process_Date: Unknown
Process_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Kristen Heyer
Contact_Position: Manager, Water Quality Monitoring
Contact_Address:
Address_Type: mailing and physical
Address: 1919 Lincoln Drive
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21401
Country: USA
Contact_Voice_Telephone: 410.263.3369
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, Nutrient Analytical Services Laboratory, FRA IV
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
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]

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 Maryland tributary stations during 2016.

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

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 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 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.

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.

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, 2016 - June 30, 2017 [http://eyesonthebay.dnr.maryland.gov/eyesonthebay/documents/MdDNR_MTQAPP2016.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: 71403
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: Station Information data, Monitoring Event data, Water Quality data and Light Attenuation data.
File_Decompression_Technique: No compression applied
Transfer_Size: 8.7

Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name:
[http://www.chesapeakebay.net/data/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: 20170515
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