Maryland Chesapeake Bay Mainstem Water Quality Monitoring Program - 2008

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Maryland Department Of Natural Resources, Resource Assessment Service
Publication_Date: Unpublished material
Title: Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program 2008.
Geospatial_Data_Presentation_Form: data set
Online_Linkage: <http://www.chesapeakebay.net/data/index.htm>

Description:
Abstract: The physical/chemical component of the Maryland Chesapeake Bay Water Quality Monitoring Program consists of data collected 14 times a year at 22 stations located in Maryland's Chesapeake Bay mainstem. This program assesses the water quality by evaluating the levels of nutrients and closely related habitat impacts such as dissolved oxygen and water clarity. One of the main goals of the Chesapeake Bay restoration is to reduce the impacts of excess nutrients on the Bay and these measures provide some of the most direct linkages to management programs that are achieving this goal. The Chesapeake Bay Program jurisdictions have agreed to reduce nitrogen, phosphorus and sediment pollution to the Bay.
Purpose:
The Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program is part of a cooperative effort between the Federal government and State and local governments in the Chesapeake Bay watershed to assess the status and trends of nutrient and sediment concentrations in Maryland's Chesapeake Bay mainstem.

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

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

Supplemental_Information:
The target audiences for this information include Resource Managers, Technical/Scientific Users, Government, Educators, Students and 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 the two documents listed below. The documents may be obtained from the Chesapeake Bay Program Office.

Water Quality Database - Database Design and Data Dictionary Prepared For: U.S. Environmental Protection Agency, Region III, Chesapeake Bay Program Office, January 2004. http://www.chesapeakebay.net/pubs/cbwqdb2004_RB.PDF

Quality Assurance Project Plan for the Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program for the period July 1, 2008 - June 30, 2009 http://mddnr.chesapeakebay.net/eyesonthebay/documents/MainStemTributaries2008-2009QAPP.pdf

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19840101
Ending_Date: 20081231
Currentness_Reference: Ground Condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: Monthly
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -80.53758
East_Bounding_Coordinate: -074.5759
North_Bounding_Coordinate: +42.979
South_Bounding_Coordinate: +36.66154
Keywords:
Theme:
Theme_Keyword_Thesaurus: CIMS Subject Keyword List
Theme_Keyword: Monitoring
Theme_Keyword: Nitrogen
Theme_Keyword: Nutrient
Theme_Keyword: Phosphorus
Theme_Keyword: Salinity
Theme_Keyword: Water Clarity
Theme_Keyword: Water Temperature
Theme_Keyword: Water Quality Data
Theme_Keyword: Chlorophyll
Theme_Keyword: Specific Conductance
Theme_Keyword: Dissolved Oxygen
Theme_Keyword: Particulates
Theme_Keyword: pH
Theme_Keyword: Secchi Depth
Place:
Place_Keyword_Thesaurus: User Defined Keyword List

Place_Keyword: Chesapeake Bay
Place_Keyword: Maryland
Place_Keyword: Monitoring Segment
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 Boulevard, D2
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21401
Country: USA
Contact_Voice_Telephone: 410-260-8630
Contact_Facsimile_Telephone: 410-260-8640
Contact_Electronic_Mail_Address: rkarrh_No_Spam_@dnr.state.md.us [Remove _No_Spam_ for valid email address]
Hours_of_Service: Monday-Thursday 8:00 am - 5:00 pm
Browse_Graphic:
Browse_Graphic_File_Name:
http://mddnr.chesapeakebay.net/eyesonthebay/documents/metadata/MainStns2008.pdf
Browse_Graphic_File_Description: Map of twenty-two 2008 Maryland Chesapeake Bay Mainstem Water Quality Monitoring Sites.
Browse_Graphic_File_Type: PDF
Data_Set_Credit:
Maryland Department of Natural Resources (MDDNR) Resource Assessment Service (RAS) staff collected the majority of samples and processed the data. The Maryland Department of Mental Health and Mental Hygiene (DHMH) analyzed chlorophyll samples. The Nutrient Analytical Services Laboratory (NASL) at the Chesapeake Biological Laboratory (Univ. of MD) analyzed nutrient and suspended solids samples.

The project was made possible with funding provided by The State of Maryland, the United States Environmental Protection Agency Chesapeake Bay Program, and the National Atmospheric and Oceanic Administration Chesapeake Bay Program Office.

Native_Data_Set_Environment: Windows
Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Quality Assurance/Quality Control. Maryland Department of Natural Resources followed specific procedures to ensure that the Mainstem component of the Chesapeake Bay Water Quality Monitoring Program design was properly implemented and managed with sufficient accuracy,

precision and detection limits. Accuracy (closeness to the true value) of collected data was controlled and assured by proper use, calibration and maintenance of both field and laboratory equipment for the measurement of physical and chemical parameters.

The procedures to control and assure the accuracy of field measurements involved the calibration of field instruments, the verification of calibrations, and equipment maintenance. Most of the details of how data acquired with YSI sondes and Hydrolabs 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) and Maryland Department of Health and Mental Hygiene Environmental Chemistry Division (DHMH ECD) laboratory 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.

Logical_Consistency_Report:

Post calibration of HydroLab Meter Z for dissolved oxygen during the January cruise was 0.72 mg/L low. Meter read 8.17 mg/L, post calibration reading at 9.89 mg/L. All other parameters were within acceptable limits.

Hydrolab Meter Z's circulator did not work properly during the March 21 cruise. The dissolved oxygen probe was calibrated, checked, and post-calibrated correctly, however, the circulator motor was partially seized and the impeller was not spinning at the correct rpms. A standard Clark Polaragraphic dissolved oxygen probe requires a flow of 1.0 feet/sec of sample water across the membrane surface. Thus, dissolved oxygen data from Meter Z should not be used for statistical analyses.

Post calibration of HydroLab Meter D for dissolved oxygen during the October cruise on 10/22/08 resulted in a dissolved oxygen reading of 15.34 mg/L and a calculated reading of 9.07 mg/L. As such, dissolved oxygen data collected the day before, 10/21/08, was flagged as questionable. Zero point for conductivity on HydroLab Meter D was reading 12.8, calibration check at 24820 read 24882 on 10/22/08.

Completeness_Report:

The 2008 Chesapeake Bay Mainstem Monitoring Program dataset includes physical and chemical water quality data along with ancillary information (weather, date, depth, etc.) acquired during monthly sampling cruises, between January and December 2008.

Sampling-event and physical properties, nutrient and suspended solid data from 22 Chesapeake Bay Mainstem stations are included in the dataset.

Fieldwork for this period commenced on January 15, 2008 with all samples collected on the January Cruise, January 15-17.

The February cruise, scheduled for February 12-13 was affected by weather and thus sampling was conducted on the 12th, 18th, and 19th of February. Stations CB5.3, LE2.3, CB5.2, CB5.1, CB4.4, along with station CB4.3C were sampled on the 12th during rough seas with ice build up on rigging and equipment. Sampling recommenced on the 18th and included tributary and Baltimore Harbor sampling along with station CB3.2, with the remainder of the upper Bay stations sampled on the 19th. Split samples were collected from station CB4.4 on February 12.

Sampling was scheduled for March 17-19, however, small craft warnings on March 17 resulted in sampling being postponed until March 18 and with bad weather predicted for March 19 and along with mechanical problems with vessel, sampling was put off until March 21. In order to maximize Main Bay sampling in the same week it was decided to drop flank stations and continue up the Bay on March 18. Phytoplankton samples were also collected for Morgan State University.

All samples were collected on the first April cruise, April 14-16. During this cruise Morgan State University phytoplankton samples and surface phytoplankton samples for Oxford Cooperative Laboratory were also collected. All samples were collected on the second April cruise, April 28-30 with phytoplankton samples collected for Morgan State University.

All samples were collected on the first May cruise, May 14, 15, and 16. The cruise was postponed for two days due to high winds and rough seas on May 12 and 13. Multi-lab split samples were collected from station CB4.4 on the first sampling day and phytoplankton samples for Morgan State University were also collected during the first cruise. During the second May cruise samples were collected on May 27 and 29. The main Bay was too rough to sample on the 28th so sampling was rescheduled for the 29th and flank stations were dropped due to time constraints. Phytoplankton samples for Morgan State University were also collected.

All samples were collected during the first June cruise, June 9-11 and phytoplankton samples were collected for Morgan State University. The second June cruise was June 23-25 with the first detection of hydrogen sulfide (measured by Hach kit) at stations LE2.3, CB4.3E, CB4.3C, CB4.2C, CB4.1E, CB4.1C, and CB3.3C. Phytoplankton samples were also collected for Morgan State University during the second June cruise.

All samples were collected on the first July cruise with phytoplankton samples collected for Morgan State University and Vibrio samples collected for Oxford Laboratory at surface samples. Hydrogen sulfide (measured by Hach kit) was recorded in below pycnocline and bottom samples at

six mid-Bay stations, and stations CB4.3E and CB4.1E. All samples were collected during the second July cruise, July 21-23 with phytoplankton samples collected for Morgan State University.

All samples were collected during the first August cruise, August 11-13. Morgan State University phytoplankton samples were also collected and a multi-lab split sample was collected at station CB4.4 on August 11. During the August 13 cruise the crew was short of hands and thus Hach kits were not done for hydrogen sulfide. All samples were collected on the second August cruise, August 25-27 and Morgan State University phytoplankton samples were collected.

All samples were collected on the September cruise, September 15-18 and Morgan State University phytoplankton samples were collected. The odor of hydrogen sulfide was detected at only one station (CB4.1C) but no Hach kit measurements were done.

All samples were collected on the October cruise, October 20-22. Morgan State University phytoplankton samples were collected and Vibrio samples were also collected for Oxford Laboratory at surface samples. Post calibration checks of dissolved oxygen on October 22 were outside lines and dissolved oxygen data collected on the 21st was flagged as questionable.

Stations CB4.2C and CB4.1C were not sampled during the November cruise (November 17-19) due to rough seas. A multiple lab split sample was collected at station CB4.4 November 17 at 1330. Duplicate chlorophyll pad for Chesapeake Biological Laboratory comparison was done at all stations.

All samples were collected on the December cruise, December 16-18. Morgan State University phytoplankton samples were collected as were duplicate chlorophyll samples for Chesapeake Biological Laboratory. Extra chlorophyll samples were treated with MgCO3.

Hydrolab sensors were calibrated as outlined in the Work/Quality Assurance Project Plan and documented in log books that accompany each instrument. The practice of collecting samples for routine field splits of grab samples was continued in order to track the precision of the chemical analysis scheme from collection through processing, storage and chemical analysis.

The University of Maryland's Chesapeake Biological Laboratory continued to provide chemical analysis of grab samples for nitrogen, phosphorus, carbon, silica and total suspended solids for the Mainstem Water Quality Monitoring Program.

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

The Yellow Springs Instrument (YSI) 6000 data sondes and HydroLabs were maintained and calibrated before and after each cruise in accordance with manufacturers' recommendations.

HYDROLAB 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. Mainstem bottom equals total depth minus one meter, rounded to a whole meter. 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 are sampled collections were taken at 0.5 m below the surface, 1.0 m above the bottom to nearest 1.0 m that was at least one full meter from the bottom. If station total depth was greater than 1.5 m, a bottom sample was also taken at 0.5 m. Great caution was exercised when taking bottom samples; if disturbed bottom samples appeared to have been included in a sample, the station was resample after sediments had settled or a sample was taken slightly higher in the water column.

At stations where 4 depths were sampled and a pycnocline exists, collections were taken at 0.5 m below the surface, 1.5 m above upper boundary of pycnocline, 1.5 m below lower boundary of pycnocline, and 1.0 m above bottom to nearest 1.0 m that was at least one full m from 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 closest profile depth one third the distance from the surface to the bottom, at closest profile depth two thirds the distance from the surface to the bottom, and 1. m above the bottom to the nearest 1.0 m that was at least one full meter from the bottom.

HYDROGEN SULFIDE PROTOCOLS:

At mainstem stations when there was an order of hydrogen sulfide present in bottom samples or below the pycnocline samples, a Hach Hydrogen Sulfide Test Kit (Model HS-6) test was performed for the presence of hydrogen sulfide.

SECCHI DEPTH:

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

Process_Date: Unknown
Process_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Sally Bowen
Contact_Position: Project Chief, Monitoring Field Office, DNR
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: SBOWEN_nospam_@dnr.state.md.us[Remove _nospam_ for valid email address]

Process_Step:
Process_Description:
Laboratory analysis - MD DHMH.
Chlorophyll a samples were analyzed by Maryland Department of Health and Mental Hygiene's (DHMH) Environmental Chemistry Division.

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: Asoka Katumuluwa
Contact_Position: Chief, Division of Environmental Chemistry, Laboratory Administration, Maryland Department of Health and Mental Hygiene
Contact_Address:
Address_Type: mailing and physical
Address: Department of Health and Mental Hygiene, 201 West Preston Street
City: Baltimore
State_or_Province: Maryland
Postal_Code: 21201
Country: USA
Contact_Voice_Telephone: 410-767-5839
Contact_Electronic_Mail_Address: KatumuluwaA_nospam_@dhmh.state.md.us[Remove _nospam_ for valid email address]

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

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: Carl Zimmerman
Contact_Position: Director of Chesapeake Biological Laboratory Analytical Laboratories.

Contact_Address:
Address_Type: mailing and physical
Address: Chesapeake Biological Laboratory, Center for Environmental and Estuarine Studies, The University of Maryland System, 1 Williams St; P.O. Box 38
City: Solomons
State_or_Province: Maryland
Postal_Code: 20688
Country: USA
Contact_Voice_Telephone: 410 326-4281
Contact_Electronic_Mail_Address: carlz _nospam_@cbl.umces.edu[Remove _nospam_ for valid email address]

Spatial_Data_Organization_Information:
Spatial_Reference_Information:
Entity_and_Attribute_Information:
Overview_Description:
Entity_and_Attribute_Overview:

This metadata record is a description of the Maryland Department of Natural Resources Chesapeake Bay Water Quality Monitoring Program - Chemical and Physical Properties Component Database for the Maryland Chesapeake Bay Mainstem . Project data are an aggregation of data collected at 22 Maryland mainstem stations during 2008.

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

The entity Station_Information is comprised of the attributes: STATION, DESCRIPTION, WATER_BODY, CBP_BASIN, TS_BASIN, BASIN, CBSEG_2003, CBSEG_2003_DESCRIPTION, HUC8, CATALOGING_UNIT_DESCRIPTION, HUC11, WATERSHED, FIPS, STATE, COUNTY/CITY, FALL_LINE, LATITUDE, LONGITUDE, LL_DATUM, UTM_X and UTM_Y.

The entity Monitoring_Event_Data is comprised of the attributes: EVENT_ID, SOURCE, AGENCY, PROGRAM, PROJECT, STATION, EVENT_START_DATE, EVENT_START_TIME, CRUISE, TOTAL_DEPTH, UPPER_PYCNOCLINE, LOWER_PYCNOCLINE, AIR_TEMP, WIND_SPEED, WIND_DIRECTION, PRECIP_TYPE, TIDE_STAGE, WAVE_HEIGHT, CLOUD_COVER, GAGE_HEIGHT, PRESSURE, FLOW_STAGE, DETAILS and WATER_BODY.

The entity Water_Quality_Data is comprised of the attributes: EVENT_ID, SOURCE, PROJECT, STATION, SAMPLE_DATE, SAMPLE_TIME, DEPTH, LAYER, SAMPLE_TYPE, SAMPLE_ID, PARAMETER, QUALIFIER, VALUE, UNIT, METHOD, LAB, PROBLEM,

DETAILS, TOTAL_DEPTH, UPPER_PYCNOCLINE, LOWER_PYCNOCLINE, LAT, and LONG.

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://www.chesapeakebay.net/pubs/cbwqdb2004_RB.PDF

The most current version of the Water Quality Data Dictionary - Online may be found at: [http://archive.chesapeakebay.net/data/data_dict.cfm?DB_CODE=CBP_WQDB].

Quality Assurance Project Plan for the Maryland Department of Natural Resources, Chesapeake Bay Water Quality Monitoring Program, for the period July 1, 2008 - June 30, 2009. [http://mddnr.chesapeakebay.net/eyesonthebay/documents/MainstemTributaries2008-2009QAPP.pdf]

Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Michael 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: 800-968-5785
Contact_Facsimile_Telephone: 410-267-5777
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.

Data are available though 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.
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, and Water Quality data
File_Decompression_Technique: No compression applied
Transfer_Size: 6.1
Fees: None
Metadata_Reference_Information:
Metadata_Date: 20090608
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Michael Weldon
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, D-2
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21401
Country: USA
Contact_Voice_Telephone: 410-260-8630
Contact_Facsimile_Telephone: 410-260-8640
Contact_Electronic_Mail_Address: mweldon _Nospam_@dnr.state.md.us [Remove _Nospam_ for valid email address]
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998