Maryland Shallow Water Monitoring Program – 2010 DATAFLOW

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Maryland Department of Natural Resources, Resource Assessment Service (MD DNR RAS)
Publication_Date: 20110301
Title: MD DNR Water Quality Mapping Project 2010
Geospatial_Data_Presentation_Form: Spatial dataset

Description:
Abstract:
This record describes one year of an on-going water quality monitoring project. Mapping surveys were performed monthly from April through October 2010.

A total of forty-two mapping cruises were conducted on Maryland water bodies. The spatial extent of water quality was measured on the following rivers: Corsica, Honga, and Patapsco. An open-water segment of the Chesapeake Bay, designated CBSEG_2003 CB3MH, was also surveyed.

Two surveys were required to map the Patapsco River. Data from the Upper and Lower Patapsco River surveys were combined. Similarly, data collected during the Eastern and Western surveys of Chesapeake Bay segment CBMH3 were combined.

Water quality mapping was conducted using DATAFLOW, a compact, self-contained surface water quality mapping system deployed in a small boat operating at planing speeds of up km/hr (25 kts). Measurements were made approximately every four seconds, or 30 meters (100 feet). Seven water quality parameters were measured: water temperature, salinity, conductivity, dissolved oxygen, turbidity, fluorescence and pH. Water depth was also measured. The DATAFLOW system sampled water at approximately 0.5-m depths below the surface.

Additional water-quality measurements were made at thirty calibration stations. Secchi disk depth, HydroLab (water temperature, pH, dissolved oxygen, specific conductance, and salinity) and photosynthetic active radiation measurements were made at five stations during each survey.

Water-quality calibration chlorophyll and total suspended solids 'grab' water samples were collected at five stations during each monthly mapping survey. The 'grab' samples were collected, after stopping the boat, at 0.5-m depth and filtered on site.

A suite of nutrient 'grab' water samples were also collected monthly at Corsica River stations: XHH4916, XHH4931, XHH4528, XHH3851 and COR0056. The Corsica survey was the only water quality mapping survey on which nutrient samples were collected

Laboratory analyses were performed on calibration 'grab' samples. Concentrations of chlorophyll a, 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 were determined.

Purpose:

The Maryland Department of Natural Resources Shallow Water 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 ambient water quality criteria for dissolved oxygen, chlorophyll and water clarity in shallow water habitats.

Water quality mapping provides data on variability and patchiness that is valuable in assessing water quality criteria, and in determining attainment of those criteria. For example, spatial information on turbidity can be correlated to the spatial coverage of living resources such as Submerged Aquatic Vegetation (SAV). This information can be used to determine and assess water clarity criteria necessary to support SAV growth, address the progress of meeting SAV restoration goals, and target specific locations for SAV restoration.

Spatially intensive data can also help pinpoint localized areas of water quality concern, such as areas of low dissolved oxygen that can cause fish kills, and their possible links to nearby land uses or point sources.

Water quality maps can capture localized areas of algae blooms, high turbidity, or low dissolved oxygen that may adversely affect living resources in shallow water habitats and spawning areas.

Spatial data can also be aggregated across watershed units to aid in the evaluation of entire systems. Water quality mapping data are 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 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://archive.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 Shallow Water Quality Monitoring Program, for the period July 1, 2010 - June 30, 2011. [http://mddnr.chesapeakebay.net/eyesonthebay/documents/SWM_QAPP_2010_2011_FINALDraft 1.pdf].

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20100401
Ending_Date: 20091014
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:
Olsen, L.M., G. Major, K. Shein, J. Scialdone, R. Vogel, S. Leicester, H. Weir, S. Ritz, T. Stevens, M. Meaux, C.Solomon, R. Bilodeau, M. Holland, T. Northcutt, R. A. Restrepo, 2007 .
NASA/Global Change Master Directory (GCMD) Earth Science Keywords. Version 6.0.0.0.0 [online: http://gcmd.nasa.gov/Resources/valids//gcmd_parameters.html]
Theme_Keyword: Biosphere > Aquatic Ecosystems > Estuarine Habitat
Theme_Keyword: Biosphere > Aquatic Ecosystems > Rivers/Stream Habitat
Theme_Keyword: Biosphere > Ecological Dynamics > Ecosystem Functions > Nutrient Cycling
Theme_Keyword: Biosphere > Ecological Dynamics > Ecosystem Functions > Primary Production
Theme_Keyword: Terrestrial Hydrosphere > Surface Water > 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 > 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: United States
Place_Keyword: Maryland
Place_Keyword: Chesapeake Bay Watershed
Place_Keyword: Anne Arundel County
Place_Keyword: Baltimore County
Place_Keyword: Baltimore City County
Place_Keyword: Dorchester County
Place_Keyword: Kent County
Place_Keyword: Queen Anne's County
Place_Keyword: Chesapeake Bay
Place_Keyword: Corsica River
Place_Keyword: Honga River
Place_Keyword: Patapsco River
Access_Constraints: None
Use_Constraints: None
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Mark Trice
Contact_Position: Program Chief, Water Quality Informatics, Tidewater Ecosystem Assessment
Contact_Address:
Address_Type: Mailing Address
Address: Tawes State Office Building, 580 Taylor Avenue, D2
City: Annapolis
State_or_Province: MD
Postal_Code: 21401
Contact_Voice_Telephone: 410 260-8630
Contact_Electronic_Mail_Address: MTRICE_nospam_@dnr.state.md.us [Remove _nospam_ for valid email address]
Browse_Graphic:
Browse_Graphic_File_Name: [http://mddnr.chesapeakebay.net/eyesonthebay/documents/metadata/MdDNR_DFlowStns2010.pdf]

Browse_Graphic_File_Description: Overview map of thirty 2010 DATAFLOW calibration station sites located on Maryland Chesapeake Bay tributaries.
Browse_Graphic_File_Type: PDF
Data_Set_Credit:
Survey and calibration data were collected by MD DNR Resource Assessment Service (RAS) Annapolis Field Office staff.

The Nutrient Analytical Services Laboratory (NASL) at the Chesapeake Biological Laboratory (University of Maryland) analyzed chlorophyll, 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.

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
QUALITY ASSURANCE/QUALITY CONTROL

MD DNR followed specific procedures to ensure that the DATAFLOW component of the Shallow Water Quality Monitoring Program project 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 the proper use, calibration and maintenance of both field and laboratory equipment for the measurement of physical and chemical parameters.

YSI 6600 sondes were configured with the following probes: 6025 (chlorophyll); 6136 (turbidity); 6560 (spCond & temperature); 6561(pH); and 6150ROX (dissolved oxygen) during 2010. Resolution, range and accuracy specifications for the sonde and probes may be obtained from the manufacturer [http://www.ysi.com/accessories.php] - Sensors&Probes - 6-Series.

The procedures to control and assure the accuracy of field measurements involved the calibration of field instruments, the verification of calibrations, equipment maintenance, and collection of filter blanks. Most of the details of how data acquired with YSI sondes were quality assured and quality controlled are described in process description elements in the Lineage portion of this metadata record. The results of the water quality attribute data analyzed in the laboratories were also used to calibrate and crosscheck the sonde data for accuracy.

PAR sensors were returned to LICOR, Inc. prior to the field season for factory calibration.

Daily quality control checks (including 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.

Additionally, CBL NASL participated two times in 2010 in the United States Geologic Survey (USGS) Standard Reference Sample Project.

OTHER ATTRIBUTE ACCURACY INFORMATION

MAY 2010

Turbid water was noted in the vessel log at 08:05 during the 5-May-2010 Lower Patapsco River survey.

JUNE 2010

Most of the Lower Patapsco survey fathometer readings were considered unreliable.

Some of the fathometer readings during the CB3MH East survey were believed to be inaccurate.

Remarks about questionable turbidity data were made at 09:44, 09:59, 10:38 and 10:48 during the Corsica River survey.

Some of the fathometer readings during the Honga survey were considered suspect.

AUGUST 2010

A significant increase in turbidity at 10:59 on the Corsica River Survey was related to bottom disturbance caused a crab boat.

SEPTEMBER 2010

Bottom disturbances observed at 10:31 and 10:40 were noted in the Honga River survey log.

October 2010

Turbidity values, measured using the high-end 126 NTU standard, ten percent outside the range of acceptable values were observed during post-calibration checks of the turbidity probe used during the CB3MHEast, Corsica and Lower Patapsco surveys.

Logical_Consistency_Report:

MAY 2010

The Corsica River survey began at station XHH3851

JUNE 2010

There was a variation from the usual cruise track during the Eastern CB3MH survey. A collaborative, special project necessitated an intensive survey of an oyster lease between 08:44 and 09:47. At 09:48, the vessel resumed mapping, following the usual cruise track.

SEPTEMBER 2010
The Lower Patapsco survey cruise track was modified in order to map the mouth of the river before winds increased.

Completeness_Report:
COMPLETENESS_REPORT

The 2010 DATAFLOW project dataset includes mapping and calibration data acquired during monthly sampling runs, between April and October 2010.

Sampling-event, water-quality-calibration, pigment and suspended solids data from thirty stations are included in the dataset. Hydrolab, Secchi and photosynthetic active radiation measurements were made monthly at thirty stations during each of the following sampling runs: CB3MH East, CB3MH West, Corsica, Honga, Patapsco Lower, and Patapsco Upper.

Beginning in January 2010, samples for a full suite of nutrient measurement were no longer collected during most Water Quality Mapping Surveys. The exception was the collection of nutrient samples during Corsica River surveys at stations: COR0056, XHH4916, XHH4528, XHH3851 andXHH4931.

Samples from the five calibration stations on the Corsica River were collected and analyzed for the same suite of nutrients as those measured for the Chesapeake Bay Mainstem Program (chlorophyll a, phaeophytin, total dissolved nitrogen, particulate nitrogen, nitrite, nitrite + nitrate, ammonium, total dissolved phosphorus, particulate phosphorus, orthophosphate, particulate carbon, total suspended solids and volatile suspended solids) plus particulate inorganic phosphorus.

Contour maps based on 2010 Dissolved Oxygen, Salinity, Turbidity, Temperature and Chlorophyll data acquired during DATAFLOW monthly mapping cruises are available on-line. <http://mddnr.chesapeakebay.net/sim/dataflow_data.cfm>.

The user may discover a few interruptions in sonde datasets. These were related to short-term problems with flow, power or sonde operation.

Turbidity data were censored in cases where bottom sediment disturbances were determined to be caused by the sampling vessel or other vessels.

APRIL 2010
A problem with intermittent GPS signals during the Corsica River survey resulted in a dataset with approximately 20 percent less than the normal number of records for the cruise because records missing coordinates were deleted. A data sonde cable connection problem resulted in two data gaps during the CB3MH East survey. Issues with the DataFlow computer shutting down unexpectedly resulted in data gaps during the Corsica River April and the CB3MH West surveys. System water flow obstructions with unspecified causes were noted in cruise log of the Upper Patapsco April survey. Power failures were the source of data gaps during the Honga survey.

MAY 2010

A plastic trash bag was sucked into the system pump and caused a flow interruption during the Upper Patapsco River survey. System water flow obstructions with unspecified causes were noted in cruise log of the Honga River survey.

JUNE 2010

System water flow obstructions were noted in the Corsica River survey log. No cause was specified. Power failures were the cause of data gaps during theCB3MH East and CB3MH West surveys.

JULY 2010

Jelly fish obstructed the water flow through the DataFlow system and caused data gaps in the Honga River run.

AUGUST 2010

Power failures were the source of data gaps during the CB3MH East, Honga and Lower Patapsco surveys. Flow was obstructed by sea nettles during the Lower Patapsco and Corsica River cruises in August.

SEPTEMBER 2010

Power failures were the source of data gaps during the CB3MH West and Lower Patapsco surveys. LICOR samples were not taken at stations: XHH3851, XHH4528, XHH4916 and XHH4931 during the Corsica River survey. Due to equipment problems, LICOR samples were not taken at stations: WT5.1, XHF9808, XIE2581, XIF2929 and XIF4705 on the Lower Patuxent survey. Rough seas prevented LICOR sampling at Station XIE4876 on the Upper Patuxent survey.

OCTOBER 2010

Water flow obstructions with unspecified causes were noted in cruise log of the CB3MH West survey. Equipment problems during the Corsica River survey resulted in no LICOR sampling at stations: COR0056, XHH3851, XHH4528, XHH4916, and XHH4931. Heavy seas prevented LICOR sampling at station WT5.1 on the Lower Patapsco survey and at station XIE4876 on the Upper Patapsco survey. Rough weather conditions also resulted in no LICOR sampling at stations: XIF0691 and XIF1736 during the CB3MH West survey.

All other missing attribute values were masked because the data were determined to be unreliable during quality control processes.

Lineage:

Process_Step:

Process_Description:

SONDE CALIBRATION and POST-CALIBRATION:

YSI 6600 data sondes equipped with a 6560 conductivity/temperature probe, a 6136 turbidity probe, a 6025 chlorophyll probe, a 6561 pH probe and a 6150ROX (Optical) Dissolved Oxygen probe were maintained and calibrated before and after each deployment in accordance with YSI recommendations. [http://www.ysi.com/resource-library.php]

CONTINUOUS SURFACE WATER QUALITY MAPPING:

DATAFLOW Mapping System DATAFLOW is a compact, self-contained surface water quality mapping system, suitable for use in a small boat operating at planing speeds of about 25 knots. The system collects water through a pipe ("ram") deployed on the transom of the vessel, pumps it through an array of water quality sensors, and then discharges the water overboard. Orientation of the sonde vertically, with probes upward, ensures that no air bubbles are conveyed to the sensors, preventing errors that might be caused by such bubbles.

Water quality instrumentation consisted of a YSI 6600 Sonde equipped with a flow-through chamber. The system was configured with conductivity/temperature, turbidity, chlorophyll, pH and Dissolved Oxygen probes. The sonde transmitted data collected from the sensors to a YSI 650 data logger.

Positioning and depth instrumentation consisted of a Garmin GPS/MAP 168 Sounder. The data logger matched the position data with water-quality sensor data for each observation. The Garmin 168 GPS transmitted NMEA data to a small form factor computer. A DATAFLOW/Labview program was used to merge position and depth data with data collected by the logger and create an output file.

The system was equipped with an inline flow meter. Although the flow rate did not affect sensor readings, decreased flow was an indication of either a partial blockage or an interruption of water flow to the instrument. Flow data were used in the field as a diagnostic tool to ensure that the system was working properly and, later, as a quality assurance tool to verify that water flow was uninterrupted. A boat horn was wired to the flow meter. If the flow-rate fell below 3.0 L s-1, the horn sounded and warned operators that a problem needed to be corrected.

Cruise tracks varied depending on the water body being mapped. In general, a square-wave pattern was followed by alternately sampling shallow shoreline areas, and open, deeper waters while traveling up and down river. Alternative cruise paths were followed if water body size, shape impediments, or obstructions dictated otherwise. Cruise patterns were selected to obtain representative coverage of shallow water habitats and open waters so that segment-wide criteria could be assessed as accurately as possible. Navigational issues and placement of representative calibration sites also determined ultimate cruise tracks.

WATER QUALITY CALIBRATION SAMPLES:

At each calibration station, 'grab' water quality samples were collected from the outflow of the DATAFLOW unit.

'Grab' samples were collected at the same time as the HydroLab surface sample was recorded. Numbered two quart bottles were triple-rinsed and filled with water for chlorophyll and total suspended solids samples and, on the Corsica River survey, "whole" and "filtered" nutrient samples.

Nutrient, chlorophyll and suspended-solid water-samples were filtered on station or shortly thereafter. Sample waters and filters were placed on ice immediately after filtration.

Particulate samples included: Chlorophyll, Particulate Carbon, Particulate Nitrogen, Particulate Phosphorus (PP), Particulate Inorganic Phosphorous (PIP), Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS).

Filtrate collected from TSS/VSS or PP/PIP filtrations was used for dissolved nutrient samples. Nitrate, Nitrite, Ammonia, Orthophosphate and Dissolved Organic Carbon samples were collected.

HYDROLAB PROFILE:

The first reading of the HydroLab water-column profile at each Calibration station was recorded at the same time the water quality bottle sample was collected. The first HydroLab record logged was for the 0.5-meter depth. The sonde was then lowered to the bottom. A reading was taken at 0.3-meters above the bottom. The sonde was raised and measurements were recorded at 0.5-meter or 1.0-meter increments until it reached the surface. (In cases where station depth was greater than 3-meters, the sonde was raised in 1-meter increments).

SECCHI DEPTH:

Secchi Disk Depth was measured at each calibration station. Readings with the Secchi disk were made in situ without the aid of sunglasses. The Secchi disk was lowered into the water, on the shady side of the boat, and the depth at which it was no longer visible was recorded. The Secchi depth reading was taken near the stern of the vessel, and the time at which the reading was taken was noted (to the second) from the Global Positioning System. This facilitated later matching of Secchi depth readings with turbidity probe data.

PAR MEASUREMENT:

Underwater Photosynthetically Active Radiation (PAR, 400-700nm)

At each calibration station, down-welling light penetrating the water column (PAR) was measured underwater at several depths to calculate the light attenuation coefficient, Kd. Simultaneous deck and submersed PAR intensity measurements were taken to account for variability in incident surface irradiance due to changes in cloud cover. Data collected from this procedure were used to estimate the depth of the photic zone.

The equipment used was manufactured by LI-COR, Inc. and consisted of a LI-192SA, flat cosine Underwater Quantum Sensor, a LI-190SA air (deck) reference sensor and a Data Logger (LI-1000 or LI-1400).

Deck and underwater readings were recorded simultaneously. Readings were allowed to stabilize before being recorded. If the station depth was less than 3 meters, readings were taken at 0.1 meter and at 0.25-meter intervals until 10% of the 0.1-meter reading was reached. If the station

depth was greater than 3 meters, a reading was taken at 0.1-meter and at 0.5-meter intervals until 10% of the 0.1-meter reading was reached.

DATAFLOW FILE POST-PROCESSING:

Each raw .txt file, created by DATAFLOW/LabView during 2010 mapping cruises on all water bodies was post-processed in the following manner.

Each file was opened in Microsoft Excel(tm) and renamed. Rows of data acquired before and after mapping were deleted. Records (if any) were also deleted if they did not have associated GPS values. A macro was executed that rearranged columns and inserted error-tracking columns and headings. Next, negative values were flagged, and values outside each parameter's normal range were highlighted. The macro also returned a form summarizing exceedances. Finally, mapping cruise event and instrument information were appended to each record.

Flagged values were evaluated for common anomalies including spikes in fluorescence and turbidity, dips in specific conductance, and extremely high dissolved oxygen readings. Instrument post-calibration results, in situ comparisons with HydroLab, LI-COR readings, historical data from nearby locations, and survey crew remarks were used to determine whether sensor values were acceptable.

In cases where data were determined to be unreliable, the reason(s) values were determined to be "bad" were documented with error codes and comments. Unreliable data were masked. No data were discarded. All DATAFLOW data for each mapping cruise, both "good" and "bad", were retained in an archival file. Only data considered reliable were published in reports.

VERIFICATION AND DATA MANAGEMENT:

At the end of the monitoring season, DNR Tawes Office and Field Office personnel conducted additional 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 in the Bay. Weather events were considered, event logs were reviewed and 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: 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 - CBL

University of Maryland's Chesapeake Biological Laboratory (CBL), Nutrient Analytical Services Laboratory (NASL) analyzed chlorophyll, total dissolved nitrogen, particulate nitrogen, nitrite, nitrite + nitrate, ammonium, total dissolved phosphorus, particulate phosphorus, particulate inorganic phosphorus, orthophosphate, dissolved organic carbon, 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 Analytical Services/Quality Assurance Officer
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: 410 326-7252
Contact_Electronic_Mail_Address: carlz _nospam_@cbl.umces.edu[Remove _nospam_ for valid email address]

Spatial_Data_Organization_Information:
Indirect_Spatial_Reference: CB_2003 CB3MH, Chesapeake Bay, Corsica River, Honga River, Patapsco River, Maryland, USA.
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 describes water collected during a water-quality mapping project. Project data are an aggregation of 2010 data collected during forty-two DATAFLOW mapping cruises.

The data are contained in five related entities (tables): Station_Information, Monitoring_Event_Data, Water_Quality_Data, Light_Attenuation_Data and SONDE_DATA. Each table contains attributes (fields). NOTE: SONDE_DATA were not served by the Chesapeake Bay Program at this metadata record was developed.

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.

The entity Light_Attenuation_Data is comprised of the attributes: EVENT_ID, SOURCE, PROJECT, STATION, SAMPLE_DATE, SAMPLE_TIME, SAMPLE_REPLICATE_TYPE, DEPTH, EPAR_S, EPARU_Z, EPARD_Z, UNIT, METHOD, DETAILS, WATER_BODY, TOTAL_DEPTH, UPPER_PYCNOCLINE, and LOWER_PYCNOCLINE.

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DRAFT -TO BE DETERMINED when sonde data are served by Chesapeake Bay Program. (SONDE_DATA were not available for download from the Chesapeake Bay Program when this metadata record was developed).

The entity SONDE_DATA is comprised of the attributes: SAMPLE_DATE, SAMPLE_TIME, WATER_BODY, SECTION, PRI_SEG, SONDE, LATITUDE, LONGITUDE, TOTAL_DEPTH, BOAT_SPEED, BATT, WTEMP, SPCOND, SALINITY, DO_SAT, DO, PH, TURB_NTU, FLUOR, TCHL_PRE_CAL and COMMENTS.

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Maps created by interpolating the Dissolved Oxygen, Turbidity, Chlorophyll a, Salinity and Temperature data acquired during mapping cruises may be viewed and downloaded from http://mddnr.chesapeakebay.net/sim/dataflow_data.cfm

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]

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 Shallow Water Quality Monitoring Program, for the period July 1, 2010 - June 30, 2011. [http://mddnr.chesapeakebay.net/eyesonthebay/documents/SWM_QAPP_2010_2011_FINALDraft 1.pdf].

Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Michael Mallonee
Contact_Position: Water Quality Data Manager
Contact_Address:
Address_Type: mailing
Address: 410 Severn Avenue, Suite 112
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21403
Contact_Voice_Telephone: 800 968-5785
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, Monitoring Event data, Light Attenuation data and Water Quality data.
File_Decompression_Technique: No compression applied
Transfer_Size: 1.5
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: [http://www.chesapeakebay.net/data_waterquality.aspx]
Access_Instructions: 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.
Digital_Form:
Digital_Transfer_Information:
Format_Name: ASCII file, formatted for text attributes, declared format
Format_Information_Content: Water quality mapping sonde data
File_Decompression_Technique: No compression applied
Transfer_Size: 19.2

Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: [http://www.chesapeakebay.net/data_waterquality.aspx]
Access_Instructions: UNKNOWN ++++++++++++++ TO BE DETERMINED when data are served by CBP
Fees: None

Metadata_Reference_Information:
Metadata_Date: 20110321
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Ben Cole
Contact_Address:
Address_Type: Mailing and physical address
Address: Maryland Department of Natural Resources, D-2

580 Taylor Avenue
City: Annapolis
State_or_Province: MD
Postal_Code: 21401
Contact_Voice_Telephone: (410) 260-8630
Contact_Electronic_Mail_Address: bcole_nospam_@dnr.state.md.us[Remove _nospam_ for valid email address]
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998