

MD DNR Vertical Water Quality Profiler Project 2012

Metadata also available as - [[Parseable text](#)] - [[XML](#)]

Metadata:

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Identification_Information:

Citation:

Citation_Information:

Originator:

Maryland Department of Natural Resources, Resource Assessment Service (MD DNR RAS)

Publication_Date: 20130312

Title: MD DNR Vertical Water Quality Profiler Project 2012

Geospatial_Data_Presentation_Form: Spatial dataset

Description:

Abstract:

Water quality was monitored at a site in Harris Creek, a tributary of the Choptank River and the site of a large-scale oyster restoration project. A vertical profiling system (YSI 6951), equipped with a YSI (6600V2-M) data logger, was used to sample seven environmental parameters: water temperature, specific conductance, dissolved oxygen concentration, oxygen percent saturation, pH, turbidity, and fluorescence. Salinity and chlorophyll were derived from specific conductance and fluorescence, respectively. Profiles were conducted hourly, with measurements recorded at approximate 0.5 meter depth intervals throughout the entire water column. Total depth at this station measured between 2.5-3.0 meters.

Purpose:

Harris Creek is a tributary of the Choptank River, located on Maryland's eastern shore of the Chesapeake Bay. A designated oyster sanctuary, Harris Creek is the site of a large-scale oyster restoration project being conducted by the Maryland Department of Natural Resources (MD DNR), The National Oceanic and Atmospheric Administration (NOAA), and the U.S. Army Corps of Engineers (USACOE). The 2012 MD DNR Vertical Water Quality Profiler Project characterized the vertical and temporal variability of water quality at a single site in Harris Creek. Data from the project may help fisheries managers better understand how water quality affects the settlement of oyster larvae as well as the growth and survival of juvenile oysters.

Supplemental_Information:

In addition to hourly profile data, the profiler data logger also collected a surface water (1 meter depth) reading just prior to performing each hourly profile. The hourly surface readings from the profiler sonde are reported as part of the MD DNR Continuous Water Quality Monitoring Project for 2012.

Generally, the data logger (sonde) for the profiler was exchanged with a freshly calibrated sonde bi-weekly. When the data sonde was exchanged, water samples were collected for laboratory analysis of chlorophyll a and total suspended solids. At the same time, Secchi disk depth was measured and a HydroLab (series III or IV) water quality sonde was used to collect discrete water temperature, salinity, dissolved oxygen, and pH data. Light attenuation was also measured using a LiCor instrument. Details of the water quality data and laboratory analysis of the grab samples can be found in the documentation for the MD DNR Shallow Water Monitoring Program.

Citation information for the 2012 MD DNR Continuous Water Quality Monitoring Project is provided in the Cross Reference portion of this metadata record. Detailed information on the MD DNR Shallow Water Quality Monitoring Program can be found in the following documentation: MDDNR Continuous Water Quality Monitoring Project Metadata for 2011

[<<http://mddnr.chesapeakebay.net/eyesonthebay/documents/metadata/MdDNR2011CMonProj.html>>] Quality Assurance Project Plan for the Maryland Department of Natural Resources, Chesapeake Bay Shallow Water Quality Monitoring Program, for the period July 1, 2012 - June 30, 2013.
[<http://mddnr.chesapeakebay.net/eyesonthebay/documents/SWM_QAPP_2012_2013_Draft_v2.1.pdf>]

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 20120626

Ending_Date: 20130124

Currentness_Reference: Ground condition

Status:

Progress: Complete

Maintenance_and_Update_Frequency: As needed

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -76.303383

East_Bounding_Coordinate: -76.303383

North_Bounding_Coordinate: 38.743233

South_Bounding_Coordinate: 38.743233

Keywords:

Theme:

Theme_Keyword_Thesaurus:

Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodeau,2012. NASA/Global Change Master Directory (GCMD) Earth Science Keywords. Version 7.0.0.0.0 [online: <<http://gcmd.gsfc.nasa.gov/learn/keywords.html>>]

Theme_Keyword: Biosphere > Aquatic Ecosystems > Estuarine Habitat

Theme_Keyword:

Biosphere > Ecological Dynamics > Ecosystem Functions > Primary Production

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 > Oxygen

Theme_Keyword: Terrestrial Hydrosphere > Water Quality/Water Chemistry > pH

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

Place_Keyword: Choptank River

Place_Keyword: Harris Creek

Place_Keyword: Talbot County

Place_Keyword: USA

Place_Keyword: MD

Temporal:

Temporal_Keyword_Thesaurus: None

Temporal_Keyword: 2012

Temporal_Keyword: 2013

Access_Constraints: None

Use_Constraints:

Acknowledgement of the MD Department of Natural Resources, Resource Assessment Service as a data source would be appreciated in products developed from these data.

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Mark Trice

Contact_Organization:

Maryland Department of Natural Resources, Resource Assessment Service

Contact_Position: Chief, Water Quality Informatics

Contact_Address:

Address_Type: Mailing and physical address

Address: Tawes State Office Building, 580 Taylor Avenue, D-2

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/newmontech/contmon/stn_map/Cmon_stns_2012.pdf

Browse_Graphic_File_Description:

Map of MD DNR Continuous Monitoring Sites for 2012. The vertical profiler is listed as "PRO - Harris Creek Profiler" (Station XFG4618).

Browse_Graphic_File_Type: PDF

Data_Set_Credit:

Maryland Department of Natural Resources, Resource Assessment Service staff maintained the profiler and the data sondes, and processed the data.

The project was made possible with funding provided by The State of Maryland and the National Oceanic and Atmospheric Administration Chesapeake Bay Program Office.

Cross_Reference:

Citation_Information:

Originator:

Maryland Department of Natural Resources, Resource Assessment Service

Publication_Date: 20130212

Title: MD DNR Continuous Water Quality Monitoring Project 2012

Geospatial_Data_Presentation_Form: Spatial dataset

Online_Linkage:

<http://mddnr.chesapeakebay.net/newmontech/contmon/archived_results2.cfm?year=2012>

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

MD DNR followed specific procedures to ensure that the Vertical Water Quality Profiler 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 field equipment for the measurement of physical and chemical parameters.

The vertical profiler system consisted of a YSI 6951 pontoon platform fitted with a YSI 6960 Controller Assembly and a YSI 6955 Winch Assembly. A YSI 6600V2-M monitoring sonde was suspended from the vertical profiler to measure water quality.

The YSI 6600V2-M sonde was configured with the following probes: 6560(conductivity/temperature); 6561(bulb pH) or 6579(tall pH) or 5091(flat pH); 6136(turbidity); 6150ROX(dissolved oxygen); 6025(fluorescence/chlorophyll).

Resolution, range and accuracy specifications for the sonde and probes may be obtained from the manufacturer.

[<<http://www.ysi.com/productsdetail.php?6600V2-1>>]

Procedures used to control and assure the accuracy of field measurements consisted of equipment maintenance, calibration of field instruments, and verification of calibrations. Details of how data acquired with YSI sondes were quality assured and quality controlled may be found in the process description elements in the Lineage portion of this metadata record.

Logical_Consistency_Report:

The vertical profiler conducted profiles every hour beginning at the top of the hour. Profiles were conducted in a "bottom up" manner, with the first reading for each profile sequence taken at 2m below the surface. As the instrument rose through the water column, additional readings were taken at designated depths. At initial deployment on June 26, 2012, the profiler was programmed to collect data at 2.0m, 1.0m, and 0.5m below the surface. On July 13, 2012, the profiler was reprogrammed to include an additional reading at 1.5m depth, for a total of four readings in each profile sequence. Actual depths varied slightly due to wave action and water currents displacing the sonde in the water column. The profiler moved to a new depth about every 2 minutes. A complete profile took approximately 8 minutes to complete.

Completeness_Report:

The 2012 Vertical Profiler Project dataset includes sonde records from June 26, 2012 to January 22, 2013.

On October 26, 2012 after the 1:00pm profile sequence, the profiler was removed from the water in advance of Hurricane Sandy. No data exist for the period October 27, 2012 to October 30, 2012. The profiler was redeployed on October 31, 2012, with regular profiles resuming at 11:00am.

Internal checks of profiler operation by the instrument detected conditions which caused an automatic switch into "Standby" mode on January 12, 2013 after 10:00am. Data are unavailable for the period January 13, 2013 to January 14, 2013. DNR staff were able to restart the profiler remotely on January 15, 2013 at 2:00pm. On January 22, 2013 after the 8:00am profile sequence, the profiler stopped conducting vertical profiles, likely due to ice buildup on the equipment. This marks the end of the data record, as no additional data were recorded until the equipment was removed on January 24, 2013.

Chlorophyll data are missing from November 19, 2012 to December 18, 2012 due to an electrical short in the

fluorescence/chlorophyll probe. All other sonde attribute values that are missing from the dataset were removed during the data quality control process. Analysts examined the data and masked values that were determined to be unreliable.

Lineage:

Process_Step:

Process_Description:

SONDE CALIBRATION and POST-CALIBRATION:

The Yellow Springs Instrument (YSI) 6600V2-M data sondes were maintained and calibrated before and after each deployment in accordance with YSI recommendations: <http://www.ysi.com/support.php>. Ecowatch(tm) software (a YSI product) was used to calibrate the instruments.

FIELD MEASUREMENTS:

The vertical profiling system consisted of the YSI 6951 pontoon platform fitted with the YSI 6960 Controller assembly and the YSI 6955 Winch assembly. A YSI 6600V2-M data sonde was suspended from the profiler system to monitor water quality. The monitoring sonde at the profiler site recorded seven water quality parameters at each 0.5 meter depth of the vertical profile. Profiles were conducted every hour, with a new depth and parameter reading recorded approximately every 2 minutes. The seven water quality parameters measured were: water depth, water temperature, specific conductance (used to calculate salinity), dissolved oxygen, turbidity (NTU), fluorescence (used to estimate chlorophyll a), and pH.

The YSI 6600V2-M sonde was configured with the following probes: 6560(conductivity/temperature); 6561(bulb pH) or 6579(tall pH) or 5091(flat pH); 6136(turbidity); 6150ROX(dissolved oxygen); 6025(fluorescence/chlorophyll). The sonde logged data onto an internal memory, where it was stored until retrieval. Data were uploaded to DNR's web site <http://www.eyesonthebay.net> shortly after retrieval. The station was also equipped with a cellular telemetry unit, which allowed data to be accessed remotely and transmitted to a server computer at DNR.

SONDE DATA CHECKS:

The monitoring sonde was retrieved, calibrated and replaced bi-weekly from June to October and monthly from November through January. At each deployment, sondes were replaced with clean, recalibrated units and data from the data loggers were downloaded to a computer. Dates of sonde replacement in 2012 were: June 26 (initial deployment), July 2, July 16, July 30, August 13, August 27, September 10, September 26, October 9, October 22, November 19, December 18, January 24 (sonde removed).

In the field, before an instrument was replaced, field staff allowed both the new (freshly calibrated) sonde and the old (deployed) sonde to log simultaneous readings side by side at the same depth. In addition, data were recorded from a discrete instrument - usually a HydroLab sonde. This three-way comparison assured that the "new" and "old" sondes were both reading each parameter within a certain tolerance. The HydroLab reading was used as a "double-check", and since it was a discrete reading, it allowed staff to watch the display and note whether the parameters were fluctuating or stable.

Data were evaluated using both three-way in-situ comparison results and data from sonde calibrations. The comparison tolerances were as follows - for both pre- post- calibration and in-situ comparisons: Temperature (deg C) +- 0.2; Specific Conductance (uM/cm) +- 5%; Dissolved Oxygen (mg/l) +- 0.5 mg/l; pH +- 0.2; Turbidity (NTU) +- 5% or 5.0 NTU (whichever is greater); Chlor (ug/l) +- 5% or 5.0 ug/l.

Excessive drift between pre- and post- calibration values of sonde probes, variance from in-situ measurements or probe failures caused data to be flagged. When post-calibration drift exceeded the limits stated above in both the post-calibration and the in-situ comparables, the "bad data" were masked within the data set with an error code.

Process_Date: Unknown

Process_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Sally Bowen

Contact_Organization:

Maryland Department of Natural Resources, Resource Assessment Service

Contact_Position: Project Chief, Monitoring Field Office

Contact_Address:

Address_Type: mailing and physical address
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:

SONDE DATA FILE POST-PROCESSING:

Data downloaded from the sonde were subjected to quality assurance/quality control checks to ensure that values outside the range of possibility were not displayed on the DNR web site.

Loggernet(tm) software (a Campbell Scientific product <<http://www.campbellsci.com>>) was used to upload the data collected by the profiler. Then, the "raw" .txt file of sonde data was imported into an Access(tm) program. The data were queried to select values that corresponded to a profile measurement (code=105). Data columns were rearranged to achieve a format expected by the Excel(tm) macro, and the resulting data file was saved as a .csv file.

Each .csv file of sonde data was then post-processed using an Excel(tm) Macro. The file was opened and renamed. Rows of data acquired before and after deployment were deleted. Records (if any) were also deleted if instrument error codes indicated "garbage" data. The macro rearranged columns and inserted error-tracking columns and headings. Macro statements flagged negative values, missing values and highlighted values outside each parameter's normal range. The macro also returned a report summarizing range exceedances. Event and instrument information was appended to each record.

Flagged values were evaluated. Profiler data management software provided by YSI was used to view the data. Common anomalies included spikes in fluorescence and turbidity, dips in specific conductance, and 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) were documented with error codes and comments. Unreliable data were masked. No data were discarded. Only data considered reliable were published in reports.

Field staff and Tawes Office staff reviewed profiler monitoring data weekly. If a problem was identified, a field team member was dispatched to replace the instrument as soon as possible.

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 data were plotted and 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 were consulted regarding possible legitimate causes for the values. In cases where values were not considered legitimate, error codes were assigned. All data were retained in the archive data set. After field staff and the Quality Assurance Officer reviewed error flags, the values were masked within the published dataset.

Process_Date: Unknown

Process_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Mark Trice

Contact_Organization:

Maryland Department of Natural Resources, Resource Assessment Service

Contact_Position: Chief, Water Quality Informatics

Contact_Address:

Address_Type: mailing and physical address
Address: Tawes State Office Building, 580 Taylor Avenue, D2
City: Annapolis
State_or_Province: Maryland
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]

Spatial_Data_Organization_Information:

Indirect_Spatial_Reference: Chesapeake Bay, 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

Vertical_Coordinate_System_Definition:

Depth_System_Definition:

Depth_Datum_Name: No correction
Depth_Resolution: 0.001
Depth_Distance_Units: meters
Depth_Encoding_Method: Attribute values

Entity_and_Attribute_Information:

Overview_Description:

Entity_and_Attribute_Overview:

This metadata record is a description of a vertical profiler water quality monitoring project for Harris Creek, a tidal tributary of the Chesapeake Bay. Water quality data were collected at 0.5 meter depth intervals at a single station (XFG4618) during 2012.

The data are comprised of the attributes:

STATION: Station name (text)
DATE: date (month/day/year)
TIME: time, 24 hour format (hour:minutes)
TEMP: water temperature (degrees Celsius)
SALINITY: salinity (parts per thousand)
DEPTH: depth below water surface (meters)
PH: pH (pH units)
TURBIDITY: turbidity (Nephelometric Turbidity Units)

CHLOROPHYLL: chlorophyll a (micrograms per liter)
DO_PCTSAT: dissolved oxygen percent saturation (percent)
DO: dissolved oxygen (milligrams per liter)

Entity_and_Attribute_Detail_Citation:

The Vertical Water Quality Profiler Project was conducted in a manner consistent with the procedures established for the MD DNR Shallow Water Monitoring Program. Data users who desire very detailed information about data-definition, sampling-procedures, and data-processing are encouraged to refer to the document listed below. Quality Assurance Project Plan for the Maryland Department of Natural Resources, Chesapeake Bay Shallow Water Quality Monitoring Program, for the period July 1, 2012 - June 30, 2013.
<http://mddnr.chesapeakebay.net/eyesonthebay/documents/SWM_QAPP_2012_2013_Draft_v2.1.pdf>

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Mark Trice

Contact_Organization:

Maryland Department of Natural Resources, Resource Assessment Service

Contact_Position: Chief, Water Quality Informatics

Contact_Address:

Address_Type: mailing and physical address

Address: Tawes State Office Building, 580 Taylor Avenue, D-2

City: Annapolis

State_or_Province: Maryland

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]

Resource_Description: Downloadable data

Distribution_Liability:

None of the Maryland Department of Natural Resources (MD DNR) partners or any of their employees, contractors, or subcontractors makes any warranty, expressed or implied, nor assumes 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 MD DNR partners.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Format_Name: ASCII file, formatted for text attributes, declared format

Format_Information_Content: Vertical profiler monitoring sonde data

File-Decompression_Technique: No compression applied

Digital_Transfer_Option:

Online_Option:

Computer_Contact_Information:

Network_Address:

Network_Resource_Name:

http://mddnr.chesapeakebay.net/newmontech/contmon/profiler/profile_download.cfm

Access_Instructions:

Vertical profiler data (sonde data) for 2012 are available through the "Continuous Monitoring - Water Column Profiler Data Download" page of the MD DNR "Eyes on the Bay" website. Access sonde data through the link provided under "Network Resource Name" in this metadata record. Click on the dates of interest to retrieve .csv files of the data. For the 2012 monitoring season (June 2012 to January 2013), individual files range in size from 23 kb to 45 kb. Download times will vary depending on computer connection speed.

Fees: None

Metadata_Reference_Information:

Metadata_Date: 20130410

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Diana Domotor

Contact_Organization:

Maryland Department of Natural Resources, Resource Assessment Service

Contact_Address:

Address_Type: mailing and physical 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:

ddomotor_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

Generated by [mp](#) version 2.9.12 on Wed Apr 10 11:35:21 2013