Maryland Chesapeake Bay Water Quality Monitoring Program: Microzooplankton Component

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Stella Sellner
Originator: Academy of Natural Sciences Benedict Estuarine Reseach Labortory
Originator: Morgan State University
Publication_Date: 20000101
Title:
Maryland Chesapeake Bay Water Quality Monitoring Program: Microzooplankton Component
Publication_Information:
Publication_Place: Annapolis, Md
Publisher: US EPA Chesapkeay Bay Program Office
Other_Citation_Details:
none
Online_Linkage: www.chesapeakebay.net
Larger_Work_Citation:
Citation_Information:
Originator: Jacqueline Johnson
Publication_Date: 20080301
Title:
Chesapeake Bay Program Plankton Database
Edition: Version 3.0
Geospatial_Data_Presentation_Form: database
Publication_Information:
Publication_Place: Annapolis, MD
Publisher: US EPA Chesapeake Bay Program
Other_Citation_Details:
None
Online_Linkage: www.chesapeakebay.net
Description:

Abstract:

The overall microzooplankton monitoring program is designed to detect and monitor changes in microzooplankton abundances and species composition in relation to changing water quality conditions in the Chesapeake Bay. Microzooplankton are animal plankton between 20 and 200 micrometers in size and, in this study, include copepod nauplii, rotifers and protozoans. They are an important trophic link between phytoplankton and the higher trophic forms such as mesozooplankton and larval fish. In the present program, microzooplankton are collected with a 44 micrometer mesh net. Samples are collected in conjunction with the Maryland Chesapeake Bay phytoplankton, mesozooplankton, jellyfish, C14 primary production, fluorometry and water quality monitoring programs. Beginning in August 1984, composite samples were collected monthly (usually excluding February) from waters above and below the pycnocline at 16 stations in conjunction with 3 other plankton elements of ANS portion of the Maryland Chesapeake Bay Water Quality Monitoring Program. Five 10-liter volumes were pumped from above-pycnocline depths, composited (50 liters total volume), and filtered through a 44 micrometer mesh net. This effort was then repeated to obtain a field replicate. Two samples were similarly collected from below-pycnocline depths. After June 1986, stations ET4.2 and EE3.1 were no longer sampled. After March 1985, the two replicate above-pycnocline samples were combined at each station yielding one above-pycnocline composite sample which had 20 liters of water from each of five depths, for a total volume of 100 liters. Bottom replicates were also combined. Beginning July 1989, entire water column samples of 100 liters (10 liters from each of 10 depths) were collected for the tidal fresh and oligohaline stations RET2.2, TF1.7, TF1.5, ET5.1, CB1.1 and CB2.2. Between August 1984 and September 1985, 1 milliliters of 1% neosynephrine was added to each concentrated sample. The sample was allowed to set for about 30 minutes before formaldehyde was added. Following a study which showed no significant difference in contraction between microzooplankton treated or not treated with neosynephrine, the neosynephrine step was eliminated. Instead buffered formaldehyde (final concentration approximately 2.5%) was added to each sample jar prior to the addition of the sample. Numbers and species identifications were subsequently made using repeated counts on 1 milliliters aliquot in Sedgewick-Rafter cells and a compound microscope (total magnification =100X). Beginning with samples collected in April 1986, a small drop of concentrated Rose Bengal in formaldehyde was added to the Sedgewick-Rafter cell before adding the sample. The counting cell was allowed to set for 10 minutes before counting. The NODC species code was employed. Microzooplankton smaller than 44 micrometers were noted but not enumerated in counts after March 1985 since estimates would be non-quantitative. In May 1992, 1993 & 1994 microzooplankton samples for stations CB1.1, CB2.2, TF1.7, TF1.5, RET2.2, TF2.3, ET5.1 and ET5.2 were sampled twice to coincide with white perch and striped bass spawning periods. From April 1993 through June 1993 and again from April 1994 and June, 1994 and again in 1995 additional station CB2.1, in the upper Chesapeake Bay was also sampled to coincide with the spawning periods. In April, 1996, 3 more tidal fresh stations TF2.4 in the Potomac River, TF1.6 in the Patuxent River, and ET5.0 in the Choptank River were added for microzooplankton sampling in April, May, and June. Stations CB2.2,CB2.1, TF2.3, TF2.4, RET2.2, TF1.5, TF1.6, TF1.7, ET5.1, and ET5.0 were sampled twice in April and May, again to coincide with white perch and striped bass spawning periods. Main Bay stations CB1.1 and CB5.2 were no longer sampled as of March, 1996. Sampling in November was discontinued in 1996. Sampling in November was discontinued in 1996. The ciliates are an important component of the

microzooplankton assemblage in Chesapeake Bay. The net sampling is inappropriate for the identification and quantification this taxonomic group because of their size (often < 44µm) and their fragile nature. Therefore, from 1998 through 2000, whole water microzooplankton samples were taken at the mesohaline stations between March - September, in order to quantify the ciliates. The mesohaline stations were designated as CB3.3C, CB4.3C, CB5.2, LE1.1, LE2.2, AND ET5.2. Whole water samples were decanted from the replicate carboys that were collected from five discrete depths above the pycnocline. The whole water microzooplankton samples were preserved with acid Lugol's solution to a final concentration of 2 % and returned to the lab for enumeration. Sampling for microzooplankton at all stations ended in September 2002 due to the termination of the zooplankton portion of the monitoring program in October 2002.

Purpose:

The state of Maryland, in cooperation with the US EPA Chesapeake Bay Program, has monitored microzooplankton species abundance and composition in the Maryland Chesapeake Bay mainstem and tributaries since August 1984. The program is designed to give comprehensive time and geographical information on microzooplankton. Microzooplankton in this survey refer to copepod nauplii, rotifers, and protozoans. Sampling is performed in conjunction with the Maryland phytoplankton, C14 primary production, fluorometry, mesozooplankton, jellyfish and water quality monitoring programs.

Supplemental_Information:

CB1.1-mouth of Susquehanna River, main Bay
CB2.1-southwest of Turkey Point, main Bay
CB2.2-west of Still Pond near buoy R34, main Bay
CB3.3C-north of Chesapeake Bay Bridge, main Bay
CB4.3C-east of Dares Beach near buoy R64, main Bay
CB5.2-east of Point No Point, main Bay
LE1.1-mid-channel south-southwest of Jack Bay sandspit and northeast of Sandgates, Patuxent River
TF1.7-mid-channel on a transect heading of approximately 115 degrees from Jacks Creek, Patuxent River
TF1.6-mid-channel off the wharf at Lower Marlboro, Patuxent River
TF1.5-mid-channel at Nottingham, Patuxent River
TF2.3-mid-channel off Indian Head at buoy N54, Potomac River
TF2.4 -Buoy 44 between Possoum Point and Moss Point Potomac River
RET2.2-mid-channel off Maryland Point at buoy 19, Potomac River
LE2.2-off Ragged Point at buoy BW51B, Potomac River (prior to October 1988 data tape, this station was designatedXBE9541)
ET4.2-south of Eastern Neck Island at Buoy 9, Chester River
ET5.0-mid-channel off the mouth of Kings Creek, Choptank River
ET5.1-at Ganey's Wharf, downstream of confluence with Tuckahoe Creek, Choptank River
ET5.2-near Rt 50 bridge at Cambridge, Choptank River
EE3.1-1000 yards north of buoy R16, Tangier Sound northwest of Haines Point, main Bay
WT5.1-east of Hawkins Point at buoy 5M, Patapsco River (Baltimore Harbor)

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 19840701

Beginning_Time: unknown
Ending_Date: 20021031
Ending_Time: unknown
Currentness_Reference:
ground condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: None planned
Spatial_Domain:
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East_Bounding_Coordinate: -75.9222
North_Bounding_Coordinate: 39.4794
South_Bounding_Coordinate: 37.9947
Keywords:
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Theme_Keyword_Thesaurus: None
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Theme_Keyword: Watersheds
Theme_Keyword: Microzooplankton
Theme_Keyword: Water Quality
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Place_Keyword_Thesaurus: None
Place_Keyword: Chesapeake Bay
Place_Keyword: Potomac River
Place_Keyword: Choptank River
Place_Keyword: Patuxent River
Place_Keyword: Maryland
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Stratum_Keyword_Thesaurus: None
Stratum_Keyword: Water Column
Temporal:
Temporal_Keyword_Thesaurus: None
Temporal_Keyword: monthly
Temporal_Keyword: bimonthly
Access_Constraints: None
Use_Constraints:
Dataset credit required
Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Jacqueline Johnson
Contact_Organization: Interstate Commission on Potomac River Basin
Contact_Position: Chesapeake Bay Program Living Resources Data Manager
Contact_Address:
Address_Type: mailing and physical address
Address:
410 Severn Avenue, Suite 109
City: Annapolis

State_or_Province: Maryland
Postal_Code: 21403
Country: USA
Contact_Voice_Telephone: 1-800-968-7229
Contact_Voice_Telephone: 410-267-5729
Contact_Facsimile_Telephone: 410-267-5777
Contact_Electronic_Mail_Address: jjohnson@chesapeakebay.net
Hours_of_Service: 8:00 a.m. to 4:00 p.m. Monday Through Friday
Contact Instructions:
unavailable
Data_Set_Credit:
Data Orginators
Security_Information:
Security_Classification_System: None
Security_Classification: None
Security_Handling_Description: None
Native_Data_Set_Environment:
Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.0.1770
Cross_Reference:
Citation_Information:
Originator: Jacqueline Johnson
Publication_Date: 20000101
Publication_Time: Unknown
Title:
2000 Users' Guide to Chesapeake Bay Program Biological and Living Resources Data
Edition: Version 1
Publication_Information:
Publication_Place: Annapolis, MD
Publisher: USEPA CHESAPEAKE BAY PROGRAM OFFICE
Other_Citation_Details:
Unknown
Online_Linkage: https://archive.chesapeakebay.net/pub/living_resources/guide2000.pdf
Cross_Reference:
Citation_Information:
Originator: Jacqueline Johnson
Publication_Date: 20000101
Publication_Time: Unknown
Title:
2000 Users' Guide to Chesapeake Bay Program Biological and Living Resources Data
Edition: Version 1
Publication_Information:
Publication_Place: Annapolis, MD
Publisher: USEPA CHESAPEAKE BAY PROGRAM OFFICE
Other_Citation_Details:
Unknown
Online_Linkage: https://archive.chesapeakebay.net/pub/living_resources/guide20 00.pdf

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Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Microzooplankton samples were collected by a staff member of the Academy of Natural Sciences\MSU, Benedict Estuarine Research Center biomonitoring section and are transferred to the ANS BERC/MSU microzooplankton taxonomist on return to the laboratory. Sample concentrates are archived after counts and identifications are made.

Logical_Consistency_Report:

Not Applicable

Completeness_Report:

For each monthly microzooplankton collection, one sample was randomly selected as the QA/QC sample. Two separate counts of the one sample were performed using the same enumeration techniques.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

Station positions in data set are approximations of actual positions in the field. Station latitudes and longitudes are input into a Loran-C or GPS receiver and sampling begins when boat reaches pre-programmed coordinates. Loran-C is accurate to plus or minus 1500 feet. The actual Loran or GPS coordinates for each sampling event are not currently recorded in data set.
COLLECTION METHODS: Loran-C, NAD27 from July 1984 to June 1997; GPS NAD83 from June 1997 to October 2002.

Vertical_Positional_Accuracy:

Vertical_Positional_Accuracy_Report:

Composited water samples pumped from 5 depths above the pycnocline and 5 depths below the pycnocline. : Water column conductivity is recorded immediately before plankton sampling. P_DEPTH is set at 0.5 meters above the pycnocline and is used as the cutoff depth between upper (AP) and lower (BP) water column layers. The pycnocline is determined to be the depth at which the greatest conductivity change is observed. The minimum threshold change is 1000 umhos/cm. WC is the entire water column from surface to bottom without regards to P_DEPTH. P_DEPTH-Composite Sample cut off Depth-Depth 0.5 Meters Above the Pycnocline

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Richard Lacouture
Originator: Stella Sellner
Publication_Date: 20030101
Publication_Time: Unknown
Title:
Maryland Chesapeake Bay Water Quality Monitoring Program:Mainstem and Tributary Living Resource Component
Publication_Information:
Publication_Place: Annapolis, Maryland USA
Publisher: US EPA Chesapeake Bay Program

Other_Citation_Details:
Unknown
Online_Linkage: http://www.chesapeakebay.net
Larger_Work_Citation:
Citation_Information:
Originator: Jacqueline Johnson
Publication_Date: 20080301
Title:
Chesapeake Bay Program Plankton Database
Edition: Version 3.0
Geospatial_Data_Presentation_Form: database
Publication_Information:
Publication_Place: Annapolis, MD
Publisher: US EPA Chesapeake Bay Program
Other_Citation_Details:
None
Online_Linkage: www.chesapeakebay.net
Type_of_Source_Media: digital database file
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19840701
Beginning_Time: unknown
Ending_Date: 20000101
Ending_Time: unknown
Source_Currentness_Reference:
ground condition
Source_Citation_Abbreviation:
None
Source_Contribution:
None
Process_Step:
Process_Description:
FIELD METHODS
NET SAMPLES
-COLLECTION METHODS: Composited water samples pumped from 5 depths above the pycnocline and 5 depths below the pycnocline were filtered through a 44-micrometer mesh net and rinsed into a jar. After February 1985, the two above-pycnocline replicates were combined, as were the two below-pycnocline replicates. Beginning July 1985, waters from the above-pyncocline depths and below-pycnocline depths were pumped directly through the net and rinsed into their respective jars two times rather than first being composited. Beginning July 1989, entire water column samples from 10 depths were collected from stations RET2.2, TF1.7, TF1.5, ET5.1, CB1.1, CB2.2 and CB2.1 (when sampled).

-SAMPLE PRESERVATIVES: Between August 1984 and September 1985, 1 milliliter of neosynephrine was added to each concentrated sample. The sample was allowed to set for 30 minutes and then buffered formaldehyde was added. The neosynephrine step was eliminated after this time and buffered formaldehyde was added to each sample jar prior to the addition of the sample

(final concentration of fixative was approximately 2.5%).
-SAMPLE STORAGE ENVIRONMENT: Laboratory
-TIME IN STORAGE: Indefinite
-LAB TECHNIQUES WITH REFERENCES: Standard Methods

WHOLE WATER SAMPLES
-COLLECTION METHODS: Whole water samples, are collected at the same time and at the same stations as the net microzooplankton samples using a diaphragm pump and hose connected to a sampling tube (missile) that is lowered to ten depths over the water column (depths will include 0.5 m below the surface and 1 m above the bottom). Water is pumped into a carboy and the sample is decanted into a 500 ml sample bottle.
-SAMPLE PRESERVATIVES: Whole water samples are preserved in acid Lugol's solution (final concentration 2%).
-SAMPLE STORAGE ENVIRONMENT: Laboratory
-TIME IN STORAGE: Indefinite
-LAB TECHNIQUES WITH REFERENCES: Standard Methods

BIOLOGICAL ENUMERATION TECHNIQUES
-Chesapeake Bay Program Laboratory Method Code MI101-NET SAMPLES

Samples are gently mixed and a 1-milliliter aliquot is removed with a Stempel pipette and put into a Sedgewick-Rafter cell for enumeration with a compound microscope at 100X magnification. Beginning with samples collected in April 1986, a small drop of concentrated Rose Bengal stain was added to the cell prior to addition of the sub sample. The sub sample is allowed to set for 10 minutes before counting. At least one chamber (1 milliliter) is counted for each sample and if the total count does not reach 250 organisms, subsequent l milliliter aliquots are enumerated until a count of 250 or more organisms is obtained or 3 milliliter are examined. If a certain organism is abundant (more than 60 per chamber), it is not counted in the subsequent 1 milliliter aliquot for a given sample. For extremely abundant taxa, less than one milliliter can be counted. Species identification is made using the NODC species code. Microzooplankton smaller than 44 micrometers are noted on the original data sheet but not enumerated since estimates would not be quantitative.

-Chesapeake Bay Program Laboratory Method Code MI103-WHOLE WATER SAMPLES

In the lab, 5-25 ml are subsampled from the sample jar for settling. This amount depends on how much detritus and plankton are in the sample. If 25 ml are used, the bottle is shaken gently (slowly inverted 5 times) and 25 ml poured into a graduated cylinder. This is put into a 50 ml settling chamber and the graduated cylinder rinsed 3X. The sample is allowed to settle 48 h before being counted. If less than 25 ml aliquots are used, these are poured into 25 ml settling chambers which settle for 24 hr before counting.

To count, the entire chamber is examined at 200X with an inverted microscope to obtain a minimum count of 100 organisms. If 100 organisms are not counted, another subsample is settled. Any organism that is abundant in the first aliquot (more than 60) is not counted. The count program used for the net

samples (see above) is currently being adapted for use with whole water counts. The ITIS taxonomic codes will be used for the taxa that are enumerated. Biomass estimates for each taxon will be applied to the normalized densities in order to fit into various ecosystem models and the zooplankton index of biotic integrity.

#FORMULAS, CALCULATIONS, AND CONVERSIONS

The following equation is used to convert raw counts to density for both enumeration methods
(# Per liter) for each taxon identified:

DENSITY = ((RAWCNT/MLSCNT)*CONCENT)/TOTVCOMP

Where
DENSITY = density of a given taxonomic group (# individuals/liter)
RAWCNT = raw count of taxonomic group per sub sample
MLSCNT = milliliters of sub sample counted
CONCENT = volume of concentrated sample
TOTVCOMP = # of liters filtered though net or total volume of Composite sample

If the sample was counted by rows, MLSCNT is determined by dividing the number of rows by 28.4.

Process_Date: Unknown

Process_Step:

Process_Description:

Metadata imported.

Source_Used_Citation_Abbreviation:

C:\DOCUME~1\jjohnson\LOCALS~1\Temp\xml49B.tmp

Process_Date: 20081208

Process_Time: 13133200

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Spatial_Data_Organization_Information:

Indirect_Spatial_Reference_Method:

Chesapeake Bay and its Tidal Tributaries in the State of Maryland

Direct_Spatial_Reference_Method: Point

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point

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Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:
Latitude_Resolution: 30
Longitude_Resolution: 30
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1983
Ellipsoid_Name: Geodedic Reference System 80
Semi-major_Axis: 6378206.4
Denominator_of_Flattening_Ratio: 294.98
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Datum_Name: North American Vertical Datum of 1988
Altitude_Resolution: .1
Altitude_Distance_Units: meters
Altitude_Encoding_Method: Attribute Values
Depth_System_Definition:
Depth_Datum_Name: Chart datum; datum for sounding reduction
Depth_Resolution: .1
Depth_Distance_Units: meters
Depth_Encoding_Method: Attribute Values

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Entity_and_Attribute_Information:
Overview_Description:
Entity_and_Attribute_Detail_Citation:
Maryland Chesapeake Bay Program Water Quality Monitoring:Microzooplankton Monitoring Component Project Documentation
https://archive.chesapeakebay.net/Living_Resources/plank/micro/mdmidoc.pdf

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Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Jacqueline Johnson
Contact_Organization: Interstate Commission on Potomac River Basin
Contact_Position: Chesapeake Bay Program Living Resources Data Manager
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Address_Type: mailing and physical address
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410 Severn Avenue, Suite 109
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State_or_Province: Maryland
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Hours_of_Service: 8:00 a.m. to 4:00 p.m. Monday Through Friday
Contact Instructions:
unavailable
Resource_Description: Downloadable Data
Distribution_Liability:
I, the data requestor, agree to acknowledge the Chesapeake Bay Program and any other agencies and institutions as specified by the Chesapeake Bay Program Office as data providers. I agree to credit the data originators in any publications, reports or presentations generated from this data. I also accept that, although these data have been processed successfully on a computer system at the Chesapeake Bay Program, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly recommended that careful attention be paid to the contents of the data documentation file associated with these data. The Chesapeake Bay Program shall not be held liable for improper or incorrect use of the data described and/or contained herein.
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: ASCII
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: http://www.chesapeakebay.net
Access_Instructions:
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Online_Computer_and_Operating_System:
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Offline_Media: CD-ROM
Recording_Capacity:
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Recording_Format: ISO 9660
Compatibility_Information:
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Fees: None
Ordering_Instructions:
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Turnaround: 5 Working Days
Standard_Order_Process:
Fees: None
Ordering_Instructions:
All Requests for data on media must be made in writing to the Living Resources Data Manager
Turnaround: Two Weeks
Custom_Order_Process:

None
Technical_Prerequisites:
None
Available_Time_Period:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19840701
Beginning_Time: unknown
Ending_Date: 20000101
Ending_Time: unknown

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Metadata_Reference_Information:
Metadata_Date: 20081208
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Jacqueline Johnson
Contact_Organization: Interstate Commission on Potomac River Basin
Contact_Position: Chesapeake Bay Program Living Resources Data Manager
Contact_Address:
Address_Type: mailing and physical address
Address:
410 Severn Avenue, Suite 109
City: Annapolis
State_or_Province: Maryland
Postal_Code: 21403
Country: USA
Contact_Voice_Telephone: 1-800-968-7229
Contact_Voice_Telephone: 410-267-5729
Contact_Facsimile_Telephone: 410-267-5777
Contact_Electronic_Mail_Address: jjohnson@chesapeakebay.net
Hours_of_Service: 8:00 a.m. to 4:00 p.m. Monday Through Friday
Contact Instructions:
unavailable
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Time_Convention: local time
Metadata_Access_Constraints: None
Metadata_Use_Constraints:
None
Metadata_Security_Information:
Metadata_Security_Classification_System: None
Metadata_Security_Classification: Unclassified
Metadata_Security_Handling_Description:
None
Metadata_Extensions:
Online_Linkage: http://www.esri.com/metadata/esriprof80.html
Profile_Name: ESRI Metadata Profile

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