Virginia Chesapeake Bay Water Quality Monitoring Program: Benthic Components

Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: Daniel Dauer
Originator: Old Dominion Univerisity
Publication_Date: 20080601
Title:
Virginia Chesapeake Bay Water Quality Monitoring Program: Benthic Components
Edition: Unknown
Geospatial_Data_Presentation_Form: database
Publication_Information:
Publication_Place: Annapolis Maryland, USA
Publisher: US EPA Chesapeake Bay Program Office
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Larger_Work_Citation:
Citation_Information:
Originator: Jacqueline Johnson
Publication_Date: 19981231
Title:
Chesapeake Bay Program Tidal Benthic Monitoring 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 purpose of the Benthic Biological Monitoring Program is to quantitatively characterize the estuarine macro benthic communities on a regional basis. Sedentary benthic organisms represent optimal indicator species because they are unable to leave or avoid stressed habitats. The relatively long life span of many macro benthic species enables an evaluation of previous water quality conditions. The community is composed of species that vary from being extremely tolerant to extremely sensitive to changes in water quality. Comparisons of the relative proportions of these different types of species allows an evaluation of the amount of environmental stress. The long-term goal of this study is to relate spatial and temporal trends of the benthic biota to changes in water quality within the Chesapeake Bay. Three regions of the lower Bay were identified to sample the major salinity-sedimentary regions of the estuarine gradient with-in the tributaries (Rappahannock, York, Elizabeth and James Rivers) and the mainstem of the lower Bay. Macro benthic communities at the stations for each of these regions had lower abundances, fewer species, and a shallower-dwelling fauna than communities in regions with similar salinity-sedimentary characteristics. Stress from hypoxic or anoxic events may result in such shallow-dwelling, low diversity, low abundance communities.
Purpose:
The state of Virginia, in cooperation with the US EPA Chesapeake Bay Program, has monitored benthic species abundance's in the Virginia Chesapeake Bay mainstem and tributaries since March 1985. The program is designed to give comprehensive spatial and temporal information on benthic biota. The sampling parameters include water quality measurements, benthic fauna identification, benthic fauna biomass determination, and sediment analysis. Sample collection is performed on a quarterly basis independent from the Virginia Plankton and Water Quality monitoring programs.
Supplemental_Information:
STATION NAMES AND DESCRIPTIONS
Please be aware that the sampling design of this survey has changed over time to accommodate changes in the overall objectives for this program. The site selection criteria for some sampling stations has changed but, the actual method of sample analysis has not changed significantly. Please read the station names and descriptions section carefully before trying to use this data.

* The fixed siteelement of the program consisted samples collected from twenty-six fixed sites from March 1985
through the present. Sampling was conducted quarterly from 1985-1995, after which sampling was conducted twice annually. Not all sites have been collected since project inception or are still being collected. During each sampling event three samples were taken at each site. A sampling site were defined by geography (within a 1 km radius from a fixed location) and by specific depth and substrata crieteria. Samples were collected randomly within the 1 KM radius. Stations have been moved from the Chesapeake Bay Program Water Quality station locations or created to better represent the dominant sediment, depth and salinity conditions of a region or to allow the larger sampling vessel required for benthic work on to the station.
CB5.4 -Main Channel,Mid-Bay, above mouth of Rappahannock River, South Bound Channel
CB5.5 -Main Channel, Mid-Bay, above mouth of Rappahannock River, South Bound Channel
CB6.1 -Main Channel, Mid-Bay, parallel to mouth of Rappahannock, South Bound Channel
CB6.3 -Main Channel. Mid-Bay, mid-way between York and Rappahannock River, south Bound Channel
CB6.4 -Main Channel, Mid-Bay, parallel to mouth of York River, South Bound channel
CB7.1S -Main Channel, Mid-Bay, parallel to mouth of Rappahannock, North Bound channel
CB7.2 -Main Channel, Mid-Bay, between Rappahannock and York River
CB7.3E -Main Channel, Mid-Bay, Between York and James River
CB8.1 -Main Channel, Mid-Bay, parallel to mouth of James River
LE3.2 -Rappahannock River, Long Point , upstream of Buoy #R8
LE3.4 -Rappahannock River, Orchard Point
#LE3.4B# -Rappahannock River, NEW 1994

LE4.1 -York River, VIMS Slack Water Station #N44
LE4.3 -York River, Between AMOCO and Sarah Creeks
#LE4.3B# -York River, off of VIMS in Deep channel
LE5.2 -James River, off of Buoy C12-13
LE5.4 James River, Buoy 9
RET3.1 -Rappahannock River, North of Buoy #R10
RET4.3 -York River, VIMS Slack Water Station #C57
RET5.2 -James River, Swann's Point
#RET5.2A# -James River, Swann's Point
SBE2 -Elizabeth River, South Branch,
SBE5 -Elizabeth River, South Branch, off of VEPCO
TF3.3 -Rappahannock River, Buoy #N40
TF4.2 -York River tributary, Pamunkey River at White House
TF5.5 - James River, Red Buoy 10
Note Following:
Name- denotes station location has been moved slightly from regular Chesapeake Bay Water Quality monitoring station location.
#Name#- denotes station created for Benthic Monitoring Program

*The Probability-based sampling component was added in 1996 in coordination with the random strata sampling program in Maryland waters. Twenty-five stations each year are randomly selected in each of five strata, the Elizabeth, the James River, the York River, the Rappahanock River and the mainstem of Chesapeake Bay. In each stratum five additional
sites were randomly selected as potential replacement sites for any station rejected in the field due to an inability to sample the site (e.g. an oyster reef, or intertidal site). Random stations were sampled between July 15, 1996 and present.

*EPA-National Coast Assessment sampling was conducted during the 2005-2006 time frames. Sampling for this program used randomly selected Chesapeake Bay Program monitoring sites plus a number of additional sites. The additional sites were selected probabilistically, using the EMAP random tessellation stratified survey design. Rather than being completely random, the nested hexagon design assures that chance spatial groupings of nearby stations don't occur. The two DEQ-specified strata in our program include (1) Atlantic Coastal estuarine waters (Chincoteague to Back Bay) and (2) only 'minor tidal tributaries' within the Bay drainage - to exclude the mainstem Bay, Rappahannock, York and James. Major 'embayments', such as Mobjack Bay, Fleets Bay and Ingram Bay are included, as are tidal embayments on the Virginia side of the Potomac. We weight our total site distribution to receive 30% on the Atlantic side and 70% within the Bay drainage. Other than that, the distribution within the Bay drainage is completely un-weighted, all minor tidal tributary waters within the Bay drainage have an equal chance of being selected.

Time_Period_of_Content:
- *Time_Period_Information:*
  - *Range_of_Dates/Times:*
    - *Beginning_Date:* 19850101
    - *Ending_Date:* 20101231
  - *Currentness_Reference:*
    - ground condition

Status:
- *Progress:* Complete
- *Maintenance_and_Update_Frequency:* Annually

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  - *West_Bounding_Coordinate:* -77.2936
  - *East_Bounding_Coordinate:* -75.9222
  - *North_Bounding_Coordinate:* 37.9947
  - *South_Bounding_Coordinate:* 36.7697

Keywords:
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  - *Theme_Keyword:* Water
  - *Theme_Keyword:* Watersheds
  - *Theme_Keyword:* Water Quality
- *Place:*
  - *Place_Keyword_Thesaurus:* None
  - *Place_Keyword:* Virginia
  - *Place_Keyword:* Chesapeake Bay
  - *Place_Keyword:* York River
  - *Place_Keyword:* Rappahanock River
  - *Place_Keyword:* James River
  - *Place_Keyword:* Elizabeth River
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  - *Stratum_Keyword_Thesaurus:* None
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  - *Stratum_Keyword:* sediment
- *Temporal:*
  - *Temporal_Keyword_Thesaurus:* None
  - *Temporal_Keyword:* quarterly
  - *Temporal_Keyword:* annual
  - *Temporal_Keyword:* summer

Access_Constraints: None

Use_Constraints:
- Data Set 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: 7:00 a.m. to 2:00 p.m. Monday Through Friday
Contact Instructions:
unavailable
Data_Set_Credit:
Data originators
Security_Information:
Security_Classification_System: None
Security_Classification: None
Security_Handling_Description: None
Native_Data_Set_Environment:
Unknown
Cross_Reference:
Citation_Information:
Originator: Jacqueline Johnson
Publication_Date: 19981231
Title:
Chesapeake Bay Program Tidal Benthic Monitoring 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
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

Back to Top

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Water column salinity, temperature and depth is recorded prior to benthic sampling. using a YSI CTD. Each station was sampled one with either a spade-type box-coring, a Young Modified Box Core or a Double Petite Ponar Grab. Any sample, which appeared disturbed, was discarded. At each station once each date, an 8-dram sub-sample of surface sediment was taken from each grab for analysis prior to sieving for organisms. Samples are transferred in to a 0.5 mm sieve bucket. The bottom of the bucket is immersed in a 30-gallon trash can filled with water and shaken and swirled to suspend large material allowing silt and fine sand to pass through the sieve. The residual material is washed into the pre-labeled cloth sample bags. Samples are relaxed for 15 minutes in an Isopropyl alcohol solution. Samples are then fixed in a 10 % buffered ambient water-formalin solution. A 1% solution of rose Bengal stain is premixedinto the formalin solution. All sample sediment grab samples for benthic community analyses are washed into pre-labeled cloth bags. Each bag label consists of a code that identifies the sample as collected (1) from one of the tributaries or main bay, (2) the collection site with in the tributary or mainstem and (3) the replicate number. All samples from a particular tributary or mainstem are placed in to a 5 gallon bucket prelabeled with a tributary or mainstem code. After each sampling station is completed the bucket is sealed. After all stations of each tributary or the mainstem are sampled the bucket is sealed and stored below deck until off loaded at the end of the cruise. Achieved samples are handled as above except that all archived samples are placed into a separate 5 gallon bucket that is prelabeled to record the date of the cruise. Cruise dates are not indicated on the pre-labeled bags for buckets for the non-achieved replicates. All replicates from one cruise are completely analyzed prior to the next cruise and the prelabeled bags are reused. Sediment samples for particle size and total volatile solids analysis are placed into a prelabeled plastic bags that use the same labels as above. New pre- labeled bags are used for each cruise. All sediment samples are analyzed prior the next cruise. The chief scientist is responsible for ensuring that all samples are placed into the proper pre-labeled bags, into the proper prelabeled sealed buckets and securely stored on shipboard. On return of the vessel to the dock the chief scientist is responsible for the loading of all samples onto the trucks, the transportation of the samples to the lab, and storage of samples upon arrival at the lab. Water quality measurements of bottom salinity, temperature, dissolved oxygen are collected prior to sediment sample collection. The chief scientist is responsible for ensuring that all sample information is recorded correctly on to field data sheets. On return of the vessel to the dock the chief scientist is responsible for the loading of all samples and field log onto the trucks the transportation of the samples to the lab and storage of samples upon arrival at the lab.
Logical_Consistency_Report:
Not Applicable
Completeness_Report:
At each station, three replicate box core samples were collected and processed individually. At least 5% of all samples identified by each technician are reworked by the Benthic Ecology Lab manager for quality control of taxonomic identification, enumeration, and biomass estimation. If error exceeds 5%, as second sample is QC'd; if the second QC fails, all samples previously sorted by that technician are resorted. A discrepancy of less than 0.1% in ash free weight calculations is considered acceptable. The personnel sorting and identifying each sample are recorded on lab data sheets.
Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:

Fixed Station positions in data set are approximations of actual positions in the field. Station latitudes and longitudes are input into a Loran-C/GPS receiver and sampling begins when boat reaches preprogrammed coordinates. Loran-C is accurate to +/- 1500 ft. Random station positions are the actual GPS coordinates for each sampling event. Loran-C and NAD27 coordinates were used to establish sampling position from 1985-1996; from 1996 to present GPS and NAD83 coordinates were used. All postions reported in the database have been convered to NAD83. oordinates.

Vertical_Positional_Accuracy:

Vertical_Positional_Accuracy_Report:

Benthic grabs are taken at the sediment surface. Total station depth is determined by a ship depth meter only bottom samples are taken for water quality parameters.

Lineage:

Source_Information:

Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 19850101
Beginning_Time: unknown
Ending_Date: 20071231
Ending_Time: unknown

Source_Currentness_Reference:

ground condition

Process_Step:

Process_Description:

In the lab, field samples are rinsed in fresh water and emptied onto a 0.5mm sieve. For course sediments an elutriation technique is used to wash out and concentrate small organisms. All macro benthic specimens are removed and placed into pre-labeled vials containing 70% Isopropyl alcohol. Organisms are then sorted using a dissecting microscope. All specimens are then identified to the lowest practical taxonomic level. Identification was aided by stereoscopic zoom dissecting microscopes, fiber optic illuminators, magnifying lamps and a phase contrast compound microscope. Determination of ash free dry weight is made on sorted detritus-free samples are processed. Dried samples are ignited in a muffle furnace (550 C) for approximately eight hours. Samples are removed to a desiccator and weighed when cool. Weights are reported by species.

Sediment samples are analysed for particle size using methods of Folk (1974), MCBRIDE in Carver 71, and the Math Tables Handbook. The sand fraction was dry sieved and the silt-clay fraction was quantified by pipit analysis. Particle size distribution was determined by graphic and moment measures methods using a computer program
A Ten-milliliter sub-samples of sediment is placed in pre-weighed pans. Sediments are weighed and placed in a muffle furnace. Samples are dried and ash free dry weight is then determined. Organic content of the sediment is estimated as the ash-free dry weight of the sediment expressed as a percentage of the dry weight of the sediment.

```
>DATA ENTRY METHOD: Raw data files are created by an in-house data entry program entitled Benthic. The program has
```

For additional details please refer to http://archive.chesapeakebay.net/pubs/subcommittee/amqawg/VAbenthicQAPP.PDF

Process_Date: Unknown

Process_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

Process_Step:

Process_Description:

Metadata imported.

Source_Used_Citation_Abbreviation:

C:\DOCUME~1\jjohnson\LOCALS~1\Temp\xml1A0.tmp

Back to Top

Spatial_Data_Organization_Information:

Indirect_Spatial_Reference_Method:

Chesapeake Bay and tidal tributaries in the state of Virginia

Direct_Spatial_Reference_Method: Point

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

Back to Top

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:
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Latitude_Resolution: .30
Longitude_Resolution: .30
Geographic_Coordinate_Units: Decimal Degrees
Geodetic_Model:
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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

Back to Top

Entity_and_Attribute_Information:
Overview_Description:
Entity_and_Attribute_Overview:
All Virginia Monitoring data is housed in the Chesapeake Bay program benthic data base
please see the BENTHIC MONITORING DATABASE: Version 3.0.2 MICROSOFT ACCESS DATABASE DESIGN AND DATA DICTIONARY for details.

https://archive.chesapeakebay.net/Pub/Living_Resources/benth/RDBMS.PDF

Additional information on Virginia specific attributes can be fount in the Virginia Chesapeake Bay Program Benthic Monitoring Project Documentation at fhttps://archive.chesapeakebay.net/Pub/Living_Resources/benth/VABEDOC.PDF

Back to Top

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
Contact_Address:
Address_Type: mailing and physical address
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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
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: www.chesapeakebay.net
Offline_Option:
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Recording_Capacity:
Recording_Density: 650
Recording_Density_Units: megabyte
Recording_Format: ISO 9660

Compatibility_Information:
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Fees: None
Ordering_Instructions:
All requests for data on media must be made in writing to the LR Data manager
Turnaround: 5 Working Days
Custom_Order_Process:
All request for data on media must be made in writing.
Technical_Prerequisites:
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Available_Time_Period:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19850101
Ending_Date: Present

Back to Top

Metadata_Reference_Information:
Metadata_Date: 20000526
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: NBII Content Standard for National Biological Information Infrastructure Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
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Metadata_Use_Constraints:
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Metadata_Security_Information:
Metadata_Security_Classification_System: None
Metadata_Security_Classification: Unclassified
Metadata_Security_Handling_Description:
None

Back to Top