Maryland Chesapeake Bay Water Quality Monitoring Program:Mesozooplankton Monitoring Component

Metadata:

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Originator: Fred Jacobs
Originator: Versar Incorporated
Publication_Date: 20021031
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Maryland Chesapeake Bay Water Quality Monitoring Program:Mesozooplankton Monitoring Component
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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 mesozooplankton monitoring program is designed to detect and monitor changes in mesozooplankton and jellyfish abundance, species composition, biomass and biovolume in relation to changing water quality conditions in the Chesapeake Bay. Mesozooplankton are a critical link between primary producers and higher trophic levels in the bay. Samples are collected in conjunction with the Maryland Chesapeake Bay phytoplankton, C14 primary productivity, fluorometry, microzooplankton and water quality studies. Two stepped oblique tows with paired bongo nets are taken at each station through the entire water column. One of the nets is used for taxonomic purposes (counting), the other for biomass measurements. Samples were collected at 16 stations once a month from August 1984 to June 1986. Sampling at stations ET4.2 and EE3.1 was discontinued after June 1986. In 1992, the program was changed so that mesozooplankton samples would no longer be collected during January and February, but would be collected twice during May in anadromous fish spawning habitats (white perch and striped bass). The stations included in the second May sampling are CB1.1, CB2.2, TF2.3, RET2.2, ET5.1, ET5.2, TF1.5, and TF1.7. In 1993, the station CB2.1 in the upper mainstem was added to be sampled during the fish spawning period April to June (twice in May). In 1996 the sampling design was altered. Historical main bay stations CB1.1 and CB5.2 were dropped. Collections are conducted at main bay station CB2.1 near Turkey Point during the months of April, May, and June to characterize zooplankton during the striped bass spawning and nursery season. In addition, three stations were added to the tributary sampling for the spring anadromous spawning season to increase the program's spatial coverage of the striped bass nursery areas. These additional stations were located between the upper two stations in the Potomac (TF2.4) and Patuxent (TF1.6) and in the upper Choptank River (ET5.0). Samples are collected once a month at 12 regular (non-anadromous spawning stations) from March through October, and once in the month of December. A second series of collections are taken at spawning stations TF1.5, TF1.7, TF2.3, RET2.2, ET5.1, CB2.1, CB2.2, and the three new stations listed above. Replicate samples were still taken in the field, but the collections are composited into one sample for laboratory analysis of species abundance and biomass. All zooplankton sampling was terminated in October 2002.

Purpose:

The state of Maryland, in cooperation with the US EPA Chesapeake Bay Program, has monitored mesozooplankton species abundance, species composition, biomass and biovolume in the Maryland Chesapeake Bay mainstem and tributaries from August 1984 through October 2002. The program was designed to give comprehensive geographic and seasonal information on mesozooplankton, i.e. zooplankton caught in a 202 micrometer mesh plankton net excluding rotifers and copepod nauplii. The program also provided counts and biovolumes of Cnidaria (jellyfish) and Ctenophora (comb jellies) when they were present in the plankton. Sampling was performed in conjunction with the Maryland C14 primary production, fluorometry, phytoplankton, microzooplankton, jellyfish and water quality monitoring programs.

Supplemental_Information:

#STATION NAMES AND DESCRIPTIONS

CB1.1-Mouth Of Susquehanna River, Main Bay
CB2.1 -Near Turkey Point At The Mouth Of The Elk River, Main Bay
CB2.2 -West Of Still Pond Near Buoy R34, Main Bay
CB3.3C-North Of Bay Bridge, Main Bay
CB4.3C -East Of Dares Beach Near Buoy R64, Main Bay
CB5.2-East Of Point No Point, Main Bay
ET4.2 -Lower Chester R. South Of Eastern Neck Island At Buoy 9
WT5.1 -Patapsco River East Of Hawkins Point At Buoy 5M (Baltimore Harbor)
TF2.3 -Mid-Channel Off Indian Head At Buoy N54, Potomac River
TF2.4 -East Side Of Potomac River Adjacent To Moss Point Near Buoy 44
RET2.2-Mid-Channel Off Maryland Point At Buoy 19,Potomac River
LE2.2 -Off Ragged Point At Buoy BW51B, Potomac River (Prior To April1988, This Station Was Designated XBE9541)
ET5.0 -Mid-Channel Of Mouth Of Kings Creek On Choptank River
ET5.1-Upper Choptank River At Ganey's Wharf, Downstream Of Confluence With Tuckahoe Creek
ET5.2 -Lower Choptank R. Near Rt. 50 Bridge At Cambridge
EE3.1 -North Tangier Sound NW Of Haines Point 1,000 Yds. North Of Buoy R16
TF1.5 -Mid-Channel At Nottingham, Patuxent River
TF1.6 -Off Lower Marlboro Boat Launch On The Patuxent River
TF1.7 -Mid-Channel On A Transect Heading Of Approximately 115 Degrees From Jacks Creek, Patuxent River
LE1.1 -Mid-Channel SSW Of Jack Bay Sandspit And NE Of Sand Gates, Patuxent River

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:
Bounding_Coordinates:
West_Bounding_Coordinate: -77.2936
East_Bounding_Coordinate: -75.9222
North_Bounding_Coordinate: 39.4794
South_Bounding_Coordinate: 37.9947

Keywords:
Theme:
Theme_Keyword_Thesaurus: None
Theme_Keyword: Water
Theme_Keyword: Watersheds
Theme_Keyword: Mesozooplankton
Theme_Keyword: Water Quality
Theme_Keyword: Gelatinous Zooplankton
Theme_Keyword: Zooplankton

Theme_Keyword: Jellyfish
Place:
Place_Keyword_Thesaurus: None
Place_Keyword: Chesapeake Bay
Place_Keyword: Potomac River
Place_Keyword: Choptank River
Place_Keyword: Patuxent River
Place_Keyword: Maryland
Place_Keyword: Patapsco River
Place_Keyword: Chester River
Stratum:
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 Orignators
Security_Information:
Security_Classification_System: None
Security_Classification: None
Security_Handling_Description: None
Native_Data_Set_Environment:
Micrsoft Access Database
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

Back to Top

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Current Data Usage Recommendation After extensive examination of historic Chesapeake Bay Program (CBP) mesozooplankton monitoring data, and in consideration of the known methodological and data quality issues, the Chesapeake Bay Program is issuing the following data usage recommendation: Only mesozooplankton samples enumerated with Hensen-Stempel methodologies are recommended for use in quantitative analyses. These data have method codes MZ101A, MZ101B, MZ101C, and MZ103. Data quality issues have been identified for portions of the Virginia record. These issues do not affect data from the Maryland portion of the program. Maryland data were collected and enumerated under an EPA approved quality assurance plan. There are currently no known quality issues with this data set.

Quality assurance/quality control procedures have been implemented for field and laboratory aspects of the program. In brief, some of these procedures include: - maintenance of nets to minimize clogging and to ensure maximum filtration efficiency - maintenance, replacement and/or calibration of flowmeters - net tow of standard time at different depths - rejection of tows should flowmeter readings fall outside of pre-established number of revolutions - appropriate preservation of taxonomic samples - redundancy in availability of gear, equipment, and expendables to allow for most efficient utilization of field time - reprocess of 10% of the taxonomic samples for both total counts and identifications. Should sample fail QC protocol, samples sorted by technician are reprocessed. - verification of all field and laboratory sheets by laboratory supervisor - verification of all data entered into computer sheets by laboratory supervisor - computerized checks on variable ranges, incorrect taxonomic codes, stations, etc.
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:

The Layer sampled in this study is the whole water column, WC. TDEPTH (Total depth) for each station is based on a ten year average of Maryland Department of the Environment Water Quality Hydrographic data collected concurrently with the plankton samples.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: William Burton
Originator: Fred Jacobs
Originator: Versar Incorporated
Publication_Date: 20000101
Title:
Maryland Chesapeake Bay Water Quality Monitoring Program:Mesozooplankton Monitoring Component
Edition: Unknown
Geospatial_Data_Presentation_Form: database
Series_Information:
Series_Name: Unknown
Issue_Identification: Unknown
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:
Two stepped oblique, replicate tows with paired bongo nets are taken at each station through the entire water column. Steps are taken in 1-4 meter increments depending on total station depth. There are always 5 step levels per station. Tows last between 5 to 10 minutes depending on zooplankton abundance. One of the paired nets is
used for taxonomic purposes (counting), the other for biomass measurements. Upon completion of field sampling, mesozooplankton collections are inspected for proper labeling and logged into a master control notebook. Taxonomic samples are stored on shelves in the lab by sample date until processing. After processing, samples are boxed and labeled by date and moved to storage areas at Versar, Inc. Biomass samples are stored in the lab freezer until processing. Biomass samples that contain detritus are not processed and are disposed of after the final report for the sampling period is completed (the samples are retained as backup for count samples during the storage period).All sample are tracked on an archive log sheet which is maintained in the project files.

GELATINOUS ZOOPLANKTON ENUMERATION

When they occur, Cnidarians (true jellyfish, hydromedusae) and ctenophores (comb-jellies) are removed from the zooplankton samples in the field and their numbers and biovolume (settled volume) measured from the bongo net that was used to collect count samples.

-Chesapeake Bay Program Analytical Method JF101
Prior to July 1987, all gelatinous zooplankton were reported as count and volumes in the two classes- Ctenophores (CTENO, CTENOVOL) [All Beroe, and Mnemiopsis specimens were combined] and Cnidarians (CNIDA, CNIDAVOL) [All Hydrozoas, and true Jellyfish specimens were combined]. All gelatinous zooplankton were removed from samples in the field after sample preservation, and their numbers and settled volumes were recorded from the net that was used as the count sample.

-Chesapeake Bay Program Analytical Method JF102
After July 1987, all gelatinous zooplankton were reported as count and volumes in the four classes -Beroe (BEROE, BEROEVOL), Hydrozoans (HYDRO, HYDROVOL), Mnemiopsis (MNEMIOP, MNEMVOL), and true Jellyfish ((JELLY, JELLYVOL). All gelatinous zooplankton were removed from samples and sorted in the field after sample preservation, their numbers and settled volumes were recorded from the net that was used as the count

sample.

ZOOPLANKTON SETTLED VOLUMES
-Chesapeake Bay Program Analytical Method BV101

VALUE_TYPE=A or actual
In the laboratory, the mesozooplankton taxonomic (count) samples (i.e. samples from which jellyfish have been removed) are poured into Imhoff cones and left undisturbed for 2 - 4 days as plankton settles to the bottom of the cone. Sample volumes are then either concentrated or diluted to achieve efficient sub sample counts. The volume of the total sample from which sub samples are taken is the dilution volume. Sub samples of mesozooplankton are taken with a Hensen-Stemple pipette and counted under a dissecting microscope.

VALUE_TYPE=E or estimated
In cases where field samples contained large amounts of detritus or algae, the biovolume could not be determined directly. The settled volumes were estimated by regressing total dry weight versus biovolume in detritus free samples.

ZOOPLANKTON SPECIES ENUMERATION

NOTE: CURRENTLY COUNTS USING BOTH METHOD MZ101B AND MZ101C VALUES ARE REPORTED

-Chesapeake Bay Program Analytical Method MZ101A
From July 1984 through January 1990, a hierarchical counting technique was employed to obtain density estimates. This procedure consists of first counting at least 60 individuals of the most dominant forms (e.g. Acartia tonsa) in a small sub sample (usually 1 - 2 milliliters), followed by 5- and 10- milliliter Sub samples from which all species that had counts less than 60 in the previous sub sample are counted. The entire sample was also scanned under a dissecting microscope and larger macro zooplankton (amphipods, shrimp, fish eggs, fish larvae and juvenile fish, etc.) was counted. Appropriate calculations are made to express counts for each species as numbers per cubic meter of water filtered.

-Chesapeake Bay Program Analytical Method MZ101B
From January 1990 through Present, A hierarchical counting technique is employed to obtain density estimates. This procedure consists of first counting at least 60 individuals of the most dominant forms (e.g. Acartia tonsa) in a small sub sample (usually 1 - 2 milliliters), followed by 5- and 10- milliliter sub samples from which all species that had counts less than 60 in the previous sub sample are counted. The scanning of the entire sample for larger macro zooplankton (amphipods, shrimp, etc.) was discontinued. Appropriate calculations are made to express counts for each species as numbers per cubic meter of water filtered.

-Chesapeake Bay Program Analytical Method MZ101C
From January 1998 to present, a hierarchical counting technique is employed to obtain density estimates. This procedure consists of first counting at least 60 individuals of the most dominant forms (e.g. Acartia tonsa) in a small sub

sample (usually 1 - 2 milliliters), followed by 5- and 10- milliliter sub samples from which all species that had counts less than 60 in the previous sub sample are counted. Macro zooplankton (amphipods, shrimp, etc.) that were scanned prior to 1990 are now identified when observed in sub samples. In addition, all samples, after the standard hierarchical counting technique, were filtered through an 850-micrometer sieve. Mesozooplankton that were retained in the 850-micrometer sieve that were not previously identified in the sub samples and/or macro zooplankton were counted and identified. Note that after 1 January 99 smaller species occurring in small numbers in the standard count but occurred predominantly in the special 850-micron sieve counts were reported only in the method MZ 101C count.

ZOOPLANKTON BIOMASS DETERMINATION

NOTE: biomass samples include nauplii and rotifers caught by the 202 micrometer mesh net. These groups are considered part of the microzooplankton by the Chesapeake Bay Program, but are difficult to remove from the mesozooplankton samples and are therefore included in mesozooplankton biomass measurement.

-Chesapeake Bay Program Analytical Method BM101

NOTE THAT BIOMASS IS BASED ON MZ101B ENUMERATED TAXA

VALUE_TYPE=A or actual
Biomass determination of dry weights and ash weights are measured by gravimetric methods for detritus-free samples. Samples containing detritus are not processed and are disposed of after the final report is completed. A regression-based computer program is used to estimate mesozooplankton biomass in samples containing detritus. In detritus contaminated samples values for dry weight are based on the known weight (from literature or by weighing of organisms) multiplied by the number present and summed across all taxa in the sample.

VALUE_TYPE=E or ESTIMATED
Biomass determination was performed using a regression-based computer program to estimate mesozooplankton biomass in ALL samples containing detritus. Values for dry weight are based on the known weight (from literature or by weighing of organisms) multiplied by the number present and summed across all taxa in the sample.

-Chesapeake Bay Program Analytical Method BM101B

VALUE_TYPE=E or ESTIMATED
Biomass determination was performed using a regression-based computer program to estimate mesozooplankton biomass in ALL samples containing detritus. Values for dry weight are based on the known weight (from literature or by weighing of organisms) multiplied by the number present and summed across all taxa in the sample. NOTE THAT ALL TAXA ENUMERATED IN THE MZ101C METHOD ARE INCLUDED IN THESE ESTIMATES

FORMULAS, CALCULATIONS, AND CONVERSIONS

> Taxonomic Determination Formulas

The following equation is used to convert raw counts to density for each taxon identified:

DENSITY = A * (B/(C * FVOL_M3))

Where DENSITY = density in numbers per cubic meter
A = number of individuals counted in the subsample
B = volume in milliliters of sample from which sub samples are taken
C = subsample volume in milliliters
FVOL_M3 = volume of water filtered by the bongo nets in cubic meters = (3.14*(r**2)) * (Y*(26,873/999,999))
Where
r = radius of the bongo net
Y = flow meter count (i.e. difference between beginning count and end count)
26,873 = a rotor constant equal to the standard distance traveled in meters for 999,999 revolutions
Of the flow meter
999,999 = the maximum revolutions that can be read by flow meter

>Biomass Determination Formulas

AFDW = DRYWT - ASHWT
DRY_WT = DRYWT*1000 / FVOL_M3
ASH_WT = ASHWT * 1000 / FVOL_M3
ASH_FRWT = AFDW*1000 / FVOL_M3
Where DRY_WT = Total Dry Weight as Milligrams per Cubic Meter (Calculated Value)
DRYWT = Total Dry Weight as Grams per Sample (Measured Value)
ASH_WT = Total Ash Weight as Milligrams per Cubic Meter (Calculated Value)
ASHWT = Total Ash Weight as Grams per Sample (Measured Value)
ASH_FRWT = Ash Free Dry Weight as Milligrams per Cubic Meter (Calculated Value)
AFDW = Ash Free Dry Weight as Grams per Sample (Calculated Value)
FVOL_M3 = Volume Water Filtered Through Net, Calculated as (3.14*((net diameter)**2)/4) * (revolutions of rotor * rotor constant)/999999
And the rotor constant = 26.873 (Measured Value)

Dry weights of taxa used for estimation of zooplankton biomass in detritus contaminated samples.

SPECIES	LIFE_STAGE	WEIGHT (ug)
Cyclops biscuspidatus	adult	12.6
Cyclops biscuspidatus	copepodite	8.4
Cyclops vernalis	adult	9.6
Cyclops vernalis	copepodite	4
Eucyclops agilis	adult	2.8
Eucyclops agilis	copepodite	1.1
Halicyclops magnaceps		2.8
Mesocyclops edax	adult	7.2
Mesocyclops edax	copepodite	3.7
Oithona colcarva	adult	2.7
Oithona colcarva	copepodite	1.7
Paracyclops fibriatus	adult	3.5
Paracyclops fibriatus	copepodite	1.5
Acartia hudsonica	adult	12.3
Acartia hudsonica	copepodite	4.6
Acartia tonsa	adult	12.3
Acartia tonsa	copepodite	4.6
Centropages furcatus	adult	15.4
Centropages furcatus	copepodite	6.4
Centropages hamatus	adult	15.4
Centropages hamatus	copepodite	6.4
Diaptomus sp.	Adult	20.9
Diaptomus sp.	copepodite	9.4
Eurytemora affinis	adult	10
Eurytemora affinis	copepodite	5.5
Pseudodiaptomus coronatus	adult	9.9
Pseudodiaptomus coronatus	copepodite	4.6
Temora turbiniata	adult	15.4
Temora turbiniata	copepodite	6.4
Alona affinis		1.1
Alona costata		1.1
Alona spp.		1.1
Alonella sp.		1
Bosmina longirostris		2.3
Camptocercus rectirostris		2
Chydorus sp.		1.1
Daphnia retrocurva		3.1
Diaphanosona leuchtenbergia num		2.7
Eubosmina coregoni		2.3
Eubosminia longspina		2.3
Ilyocryptus spinifer		1.1
Ilyocryptus sp.		1.1
Leptodora kindtii		36.6
Monia		1.4
Monia micrura		1.4
Podon polyphemoides		1
Scapholeberis kingi		8.3
Sida crystallina		8
Monospilus dispar		2.3
Evadne sp.		1

Argulus sp. 56.6
Branchyurian 45.2
Corophium lacustre 347.8
Gammarus fasciatus 120.2
Leptocheirus plumulosus 120.2
Monoculodes edwardsi 61
Mysid 303.6
Palaemonetes sp. 136.1
Ampelisca abdita 347.8
Barnacle nauplii 2.9
Copepod nauplii 0.1
Chaoborus sp. 143.5
Chironomid larvae 109
Dipterian larvae 542.5
Harpacticoida larvae 4.7
Hydracarina sp. 1
Ostracod 1
Polychaete larvae 9.2
Sagitta sp. 36.3

Species excluded from biomass estimates:

Aemaceae	All fish larvae
Alteutha depressa	Anisoptera
Arachnida	Brachyuran
Ceriodaphinia lacustria	Ceriodaphinia quadrangula
Coleptera	Collembola
Corixidae	Cyathura polita
Cyclops varicans	Ectocyclops phaleratus
Ephemeroptera	Ergasilus sp.
Eubosmina sp.	Euceramus praelongus
Eucyclops speratus	Flat Worm
Gastropoda	Hemiptera
Hirudinea	Isopoda
Labidocera aestiva	Lathonura rectirostris
Latona setifera	Leydigia quadrangularis
Lucifer faxoni	Macrocyclops abdidus
Macrothrix laticornus	Mollusca
Oligochaete	Oxyurosilus smithi
Paracaprella tenuis	Parathemisto compressa
Piscicolidae	Saphirella sp.
Trichopthera	Tropocyclops prasinus
Tubellaria	

The regression to estimate ash-free dry weight in detritus contaminated samples based on sum of dry weights for all taxa is as follows:

$Y = 0.783(X) - 0.013$

Where:
Y= Ash -free dry weight in grams
X= Total dry weight in grams

> Biovolume Determination Formulas

SET_VOL = SETVOL / FVOL_M3 = Settled Volume of all Non Gelatinous Zooplankton and Detritus
(Milliliters per Cubic Meter)
SET_VOLZ = SETVOLZ / FVOL_M3 = Estimated Settled Volume of Zooplankton
(Milliliters per Cubic Meter)

Where
SETVOL = Settled Volume of zooplankton and detritus (ml/sample)
SETVOLZ = Settled Volume of Zooplankton (ml/sample)
BEROEVOL = Volume of Beroe (ml/sample)
CNIDAVOL = Cnidaria Volume (ml/sample) ###
CTENOVOL = Ctenophore Volume (ml/sample) ###
HYDRAVOL = Volume of Hydromedusae (ml/sample)
JELLYVOL = Volume of Jellyfish (#/sample)
MNEMVOL = Volume of Mnemiopsis (ml/sample)
FVOL_M3 = Volume Water Filtered Through Net, Calculated as (3.14*((net diameter)**2)/4) * (revolutions of rotor * rotor constant)/999999
And the rotor constant = 26.873

SEE BIOLOGICAL PARAMETERS SECTION FOR CHANGES IN REPORTING

In cases where field samples contained large amounts of detritus or algae, the biovolume and biomass could not be determined directly. The settled volumes were estimated by regressing total dry weight versus biovolume in detritus free samples.

The regression to estimate biovolume is as follows:

Y=24.96(X)

Where

Y= Settled biovolume in milliliters
X= Total sample dry weight in grams.

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\xml7D.tmp
Process_Date: 20090313
Process_Time: 08300400

Back to Top

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

Back to Top

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

Back to Top

Entity_and_Attribute_Information:
Overview_Description:
Entity_and_Attribute_Overview:
The following Station had their names changed to the standard Chesapeake Bay Program station names in July 1998. Alternate names appearing in previous versions of the Living Resources Data Sets are as follows:

LR NAME	CBP NAME
XDE5339	LE1.1
XED4892	TF1.7
PXT0402	TF1.5
XEA6596	TF2.3
XDA1177	RET2.2
MET4.2	ET4.2
MWT5.1	WT5.1
MLE2.2	LE2.2
MET5.1	ET5.1
MET5.2	ET5.2
MEE3.1	EE3.1
XEA1840	TF2.4
MET5.0	ET5.0
XED9490	TF1.6

10/31/95 - As part of the serial number correction problem of 07/31/95, two serial numbers were erroneously changed. The result was three serial numbers assigned twice. This was corrected in the data sets by
changing serial numbers as follow:

Serial Number	Sample date	Serial Number reassigned
CZMPX86034B	12/03/86	No Change
CZMPX86035A	12/03/86	No Change
CZMPX86035B	12/03/87	No Change
CZMPX86034B	06/08/87	CZMPX87034B
CZMPX86035A	06/08/87	CZMPX87035A
CZMPX86035B	06/08/87	CZMPX87035B

There were no changes to actual data values.

07/31/95 - In several cases the sample serial number had been assigned to sampling events on two different dates. As part of the data corrections made on 05/19/95 a number of sample SER_NUM's were changed as follows:

OLD SER_NUM	NEW SER_NUM	SAMPLE DATE
CZM85TN004A	CZM85TN012A	05/12/85
CZM85TN004B	CZM85TN012B	05/12/85
CZM85CO018A	CZM85CO024A	10/19/85
CZM85CO018B	CZM85CO024B	10/19/85
CZM86PT025A	CZM86PT034A	10/14/86
CZM86PT025B	CZM86PT034B	10/14/86
CZM86PT026A	CZM86PT036A	10/14/86
CZM86PT026B	CZM86PT036B	10/14/86

5/31/95 - GMETHOD was changed to 75. Code 75 refers 202 micrometer mesh Bongo net with 0.2 meter opening. For an extensive gear code list see Table 17, PAGE F-9 APPENDIX F, of the Living Resources Data Management Plan, 1989. This is a change from GMETHOD code in previous versions of the data set. This does not represent a change in actual sampling gear.

5/31/93 - Spelling of all species Latin Names (LBL) have been corrected to the National Oceanographic Data Center (NODC) accepted spelling.

05/19/95 - A total of 237 pairs of DUPLICATE RECORDS were found in the mesozooplankton monitoring data during routine QA/QC checks at the CBP Data Center. Versar confirmed the duplicate records and made corrections to the affected files. These corrections affected the entire 1984-1994 TAXON data sets and the EVENT, BIOMASS AND BIOVOLUME data sets for 1985 - 1987. The CBPO Data Center recommends discontinuing use of mesozooplankton TAXON data sets without R_DATES or with R_DATE prior to 07/01/95.

05/05/95 - The VERSAR BAY CRUISE NUMBERS deviate from the standard CBPO CRUISE numbers. The Academy of Natural Sciences (ANS) has requested and was granted permission to match Bay Cruise dates with sampling trip effort. By doing this, the occurrence of a station to be sampled twice during a cruise period is avoided. Since ANS applied this correction to all of their data, it was also necessary to apply the same correction to the Versar originated mesozooplankton data because they are collected
at the same time and the sets are frequently merged. The table of variation from the CBPO Cruise dates can be found in the general Living Resources data documentation text. For a complete listing of BAY CRUISE
NUMBERS, see The 2000 Data Users Guide

03/21/95- The record SER_NUM = CZM85MB021A, STATION = CB2.2, DATE =05/22/85 had the species code T626, with the identification of CHYDORUS. A duplication of codes was identified between T625 and T626 therefore all codes were changed to T629 CHYDORUS, with NODCCODE = 6190702.

03/21/85 - Two pairs of records were found that appeared to be unintentional duplicates. In one pair, all fields but the species density were identical; in the other, all fields were identical:

DATE	CRUISE	SAMPLE_NUM	LBL	DEN_M3
7/7/86	BAY042	2	MYSIDAE	133.200
7/7/86	BAY042	2	MYSIDAE	35.467
3/13/89	BAY094	2	EUCYCLOPS AGILIS	17.544
3/13/89	BAY094	2	EUCYCLOPS AGILIS	17.544

VERSAR found that an error in organism identification had been made during counting and then corrected. A final correction to the data set was required. In each case the two fields were summed to produce a final count.

01/10/95 - Life stages were removed from four records, because the life stage was inconsistent with the species identification.

SER_NUM	STATION	LIFE STAGE	VERCODE	LBL
CZM85MB020A	CB2.2	11	T585	Unid. fish larvae
CZM85CH005B	MET4.2	11	T585	Unid. fish larvae
CZM86MB045A	CB5.2	11	T871	Gastropod larvae
CZM85PT014B	XDA1177	31	T2038	Diaphanosoma leuchtenbergianum

SUMMER 1997 - Salinity zones, have been provided by Versar incorporated. However in the following cases salinity zones were replaced with values provided by the Maryland Department of the Environment. Values were derived from Water Quality Hydrographic data collected concurrently with the mesozooplankton. If data was not available for the of sampling but was collected within a one week window of sampling date, the water quality data was used to determine a salinity zone. However the salinity zone is marked with an E to denote being estimated.

DATE	STATION	LAYER	VERSAR SALZONE	CBP SALZONE
1/9/85	XDE5339	WC	P	ME
1/9/85	XED4892	WC	M	OE
2/20/85	XDE5339	WC	P	ME
2/26/85	XDA1177	WC	M	FE
3/26/85	XDE5339	WC	P	ME
5/20/85	PXT0402	WC	O	FE
9/9/85	XEA6596	WC	O	FE
10/15/85	PXT0402	WC	O	FE
11/18/85	PXT0402	WC	O	FE
11/18/85	XDE5339	WC	P	ME
11/19/85	MLE2.2	WC	P	ME
11/19/85	XEA6596	WC	O	FE
12/11/85	CB1.1	WC	O	FE
12/16/85	XED4892	WC	M	OE
2/10/86	XDE5339	WC	P	ME
6/11/86	CB2.2	WC	O	FE
8/11/86	XEA6596	WC	O	FE
9/8/86	XDA1177	WC	M	ME
11/5/86	XDE5339	WC	P	ME
11/17/86	XDA1177	WC	M	ME

11/17/86 XEA6596 WC O OE
12/3/86 XDE5339 WC P ME
1/19/87 XED4892 WC O ME
3/16/87 XED4892 WC O ME
7/6/87 XDA1177 WC F OE
7/13/87 PXT0402 WC F OE
9/1/87 XEA6596 WC O FE
10/5/87 XEA6596 WC O FE
11/9/87 PXT0402 WC O FE
1/6/88 XDE5339 WC P ME
3/7/88 XDE5339 WC P ME
4/4/88 PXT0402 WC O FE
4/4/88 XDE5339 WC P ME
6/7/88 MET5.1 WC F OE
6/13/88 XED4892 WC F OE
9/13/88 PXT0402 WC O FE
9/13/88 XED4892 WC O ME
10/3/88 XDA1177 WC F O
11/28/88 XDE5339 WC P ME
12/12/88 PXT0402 WC O FE
12/12/88 XDE5339 WC P ME
1/9/89 PXT0402 WC O FE
1/9/89 XDE5339 WC P ME
3/13/89 XDE5339 WC P ME
4/10/89 XDE5339 WC P ME
4/10/89 XED4892 WC O FE
10/10/89 XEA6596 WC O FE
12/18/89 XDE5339 WC P ME
1/16/90 XDE5339 WC P ME
2/13/90 XDE5339 WC P ME
9/10/90 XDA1177 WC O F
4/20/92 XDE5339 WC P ME

JANUARY 1998
Macrozooplankton (amphipods, shrimp, etc.) that were scanned prior to 1990 are now identified when observed in subsamples. In addition, all samples, after the standard hierarchical counting technique, were filtered through an 850 micrometer sieve. Mesozooplankton that were retained in the 850 micrometer sieve that were not previously identified in the subsamples and/or macrozooplankton were counted and identified.

NOTE THAT SINCE JANUARY OF 1998 BOTH METHOD MZ101B AND MZ101C COUNTS ARE REPORTED IN THE DATA SET. THESE ARE NOT DUPLICATE COUNTS. BOTH METHODS ARE REPORTED TO ALLOW BACK COMPATABILITY WITH OLD DATA.

07 July 1998
Method codes were added to the data set to clearly delineate the modifications in the Biological Enumeration Techniques over time.

SUMMER 2000- Biomass Data now available by request from Living Resources Data Only.

SUMMER 2000- All Latitude and Longitude positions converted to NAD83 coordinates.

April 2002
The Maryland and Virginia mesozooplankton monitoring programs implemented modifications to their respective laboratory counting protocols in 1998 in order to better estimate species richness in Maryland and to eliminate large sieving losses of smaller taxa in Virginia. A 1998 - 1999 Mesozooplankton Split Sample Study indicates the desired outcomes of the modifications were only partially accomplished. The "new" Versar counting method (Method code MZ101C) has improved Versar's ability to measure species richness, an important Bay-wide indicator, and the "new" ODU counting method (Method code MZ102B) has increased ODU's taxa counts per sample. However, the "new" ODU method still produces split sample results with significantly lower total counts than those of Versar. It appears to selectively undercount key taxa, particularly the immature (copepodite) life stage of calanoid copepods, a common and frequently dominant taxonomic group. The study determined that counts produced with the "new" ODU protocol have variances that are much higher than counts produced with the Versar protocol, hence the ODU counts are less precise. Furthermore, the number of taxa identified per sample was on average lower in the ODU counts. The "old" (Method Code MZ102A) and "new" (Method code MZ102B) ODU counting protocols should be discontinued and a counting protocol patterned after the ICES recommended protocol (Harris et al. 2000) should be instated (Method Code MZ103). Backward comparability with the pre-1998 Chesapeake Bay Program mesozooplankton data will unfortunately be lost in Virginia for most mesozooplankton taxa, but Maryland and Virginia results will become comparable and the CBP monitoring programs should be able to calculate and use multiple, Bay-wide mesozooplankton indicators. For extensive details in regards to quality assurance issues please see the CBP Phytoplankton Split sample portion of the Chesapeake Bay Quality Assurance Program at:

http://www.chesapeakebay.net/qualityassurance.htm

WINTER 2002- This monitoring program was terminated in October of 2002.

January 2007- When all sampling terminated in October 2002, approximately 1,000 archived split samples dating from 1996 to 2002 were in storage at Old Dominion University. In 2005, the Bay Program took formal custody of these sample in hopes that in the future these archived samples could be reprocess with the pipette sub-sampling technique. Funding for recounting a portion of the archive samples became available form CBPO in early 2006. 72 archived Virginia mesozooplankton samples were recounted by Versar, Inc., the contractor to the State of Maryland for the entire historic Maryland zooplankton program. Samples target for recount in this effort were samples collected during the summer (July- September) in mesohaline and polyhaline waters since their was a need for validation samples for the zooplankton Indexes of Biotic integrity in various stages of development at that time. Both the original Old Dominion University count data and the recounted data from Versar appear in the database. Versar recount data will have a method code of MZ101C. Please refer to the

Virginia Mesozooplankton monitoring program project documentation station location and collection details. The following samples were part of the 2006 recount effort.

STATION SAMPLE_DATE
CB6.1 7/9/1996
CB6.1 7/24/1996
CB6.1 8/5/1996
CB6.1 8/26/1996
CB6.1 9/8/1997
CB6.1 7/6/1998
CB6.1 7/6/1999
CB6.1 9/11/2000
CB6.1 8/14/2002
CB6.1 9/16/2002
CB6.4 7/24/1996
CB6.4 8/5/1996
CB6.4 8/12/1997
CB6.4 7/6/1998
CB6.4 8/7/2000
CB6.4 9/14/2000
CB6.4 7/15/2002
CB7.3E 8/7/1996
CB7.3E 7/15/1997
CB7.3E 9/3/1998
CB7.3E 7/6/1999
CB7.3E 8/5/1999
CB7.3E 9/21/1999
CB7.3E 7/11/2000
CB7.3E 9/19/2002
CB7.4 7/22/1996
CB7.4 8/13/1997
CB7.4 8/10/1998
CB7.4 9/3/1998
CB7.4 7/6/1999
CB7.4 8/5/1999
CB7.4 9/21/1999
CB7.4 9/11/2000
LE3.6 7/9/1996
LE3.6 7/24/1996
LE3.6 8/5/1996
LE3.6 8/26/1996
LE3.6 7/15/1997
LE3.6 7/6/1998
LE3.6 9/1/1998
LE3.6 7/6/1999
LE3.6 8/9/2000
LE5.5 7/22/1996
LE5.5-W 9/21/1999
RET3.1 8/5/1998

RET3.1 7/8/1999
RET3.1 8/5/1999
RET3.1 8/9/2001
RET3.1 9/12/2002
RET4.3 7/10/1996
RET4.3 7/24/1996
RET4.3 8/6/1996
RET4.3 7/10/1997
RET4.3 7/23/1997
RET4.3 7/20/1998
RET4.3 8/19/1998
RET4.3 9/9/1998
RET5.2 9/23/1997
RET5.2 8/17/1999
SBE5 7/8/1996
SBE5 7/23/1996
SBE5 7/8/1997
SBE5 9/15/1999
SBE5 9/21/2000
TF3.3 7/8/1999
TF3.3 8/24/1999
WE4.2 7/24/1996
WE4.2 8/5/1996
WE4.2 7/6/1998
WE4.2 9/1/1998

Entity_and_Attribute_Detail_Citation:
Maryland Chesapeake Bay Program Water Quality Monitoring:Microzooplankton Monitoring Component Project Documentation
https://archive.chesapeakebay.net/pub/Living_Resources/plank/meso/mdmzdoc.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
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

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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:
None
Online_Computer_and_Operating_System:
None
Offline_Option:
Offline_Media: CD-ROM
Recording_Capacity:
Recording_Density: 750
Recording_Density_Units: megabytes
Recording_Format: ISO 9660
Compatibility_Information:
None
Fees: None
Ordering_Instructions:
None
Turnaround: 5 Working Days

Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: ACC
Format_Version_Number: 97
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:

Network_Resource_Name: www.chesapeakebay.net
Offline_Option:
Offline_Media: CD-ROM
Recording_Capacity:
Recording_Density: 700
Recording_Density_Units: megabytes
Recording_Format: ISO 9660
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: 20021031
Ending_Time: unknown

Back to Top

Metadata_Reference_Information:
Metadata_Date: 20000308
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
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

Back to Top