CATALOG DOCUMENTATION
EMAP-ESTUARIES PROVINCE LEVEL DATABASE
CAROLINIAN PROVINCE 1994-1997
BENTHIC INFAUNA DATA

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1. DATA SET IDENTIFICATION

1.1 Title of Catalog Document

EMAP-Estuaries Province Level Database
Carolinian Province
Benthic Infauna Data

1.2 Authors of the Catalog entry

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1.3 Catalog Revision Date

March 10, 1998

1.4 Data Set Name

CP_BEN_A.DAT, CP_BEN_S.DAT, CP_BEN_T.DAT, CP_BEN_C.DAT

1.5 Task Group

Estuaries

1.6 Data set identification codes

10, 11, 12, 13

1.7 Version

001

1.8 Requested Acknowledgment

If you plan to publish these data in any way, EPA requires a standard statement for work it has supported:

"Although the data described in this article have been funded wholly or in part by the U. S. Environmental Protection Agency through its EMAP-Estuaries Program, it has not been subjected to Agency review, and therefore does not necessarily reflect the views of the Agency and no official endorsement should be inferred."

2. INVESTIGATOR INFORMATION

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3. DATA SET ABSTRACT

3.1 Abstract of the Data set

The CP_BEN_A.DAT, CP_BEN_S.DAT, CP_BEN_T.DAT, CP_BEN_C.DAT data sets contain benthic infaunal data collected at each station in the EMAP Carolinian Province from 1994-1997. Two to four benthic grabs were collected at each station using a 0.04-m2 Young grab sampler. Samples were then live-sieved with a 0.5-mm mesh screen, fixed in 10% buffered formalin with rose bengal, and stored by grab in plastic containers in the field. Samples were then transferred to the laboratory for taxonomic identification and enumeration.

The CP_BEN_A.DAT data set contains unsummarized infaunal abundance data by grab and taxon. This data set is for use as the data source for subsequent infaunal analyses and summary calculations (e.g., CP_BEN_T.DAT, CP_BEN_C.DAT are calculated from the data in CP_BEN_A.DAT).

The CP_BEN_S.DAT data set contains taxonomic classification information for all infaunal taxa observed in benthic grabs throughout the Carolinian Province from 1993-1997. This data set is essential to resolve actual taxonomy and species names from the 8 digit code (variable COD_EMAP) used to identify taxa in the CP_BEN_A.DAT and CP_BEN_T.DAT data sets. Taxonomic information includes: phylum, general group, family, genus, and species.

The CP_BEN_T.DAT data set contains infaunal abundance data summarized by station and taxon. Summary results included are: number of grabs at station, total abundance of taxon, mean abundance of taxon, and standard deviation, by taxon for each station).

The CP_BEN_C.DAT data set contains summary metrics used to describe the benthic infaunal community at a station. The summary results included are: number of grabs, mean number of infaunal taxa (species richness) per grab, mean infaunal abundance per grab, and Shannon-Weaver Index (H' diversity) per grab, for each station.

The following reports are products of these and other data collected during the 1994-1997 Sampling period in the Carolinian Province. These reports may contain additional information and summary statistics that are not contained in this data set catalog or its respective data sets. We therefore recommend referring to them when using these data.

Hyland, J.L., T.J. Herrlinger, T.R. Snoots, A.H. Ringwood, R.F. Van Dolah, C.T. Hackney, G.A. Nelson, J.S. Rosen, and S.A. Kokkinakis. 1996. Environmental quality of estuaries of the Carolinian Province: 1994. Annual statistical summary for the 1994 EMAP-Estuaries Demonstration Project in the Carolinian Province. NOAA Technical Memorandum NOS ORCA 97. NOAA/NOS, Office of Ocean Resources Conservation and Assessment, Silver Spring, MD. 102 p.

Hyland, J.L., L. Balthis, C.T. Hackney, G. McRae, A.H. Ringwood, T.R. Snoots, R.F. Van Dolah, and T.L. Wade. 1998. Environmental quality of estuaries of the Carolinian Province: 1995. Annual statistical summary for the 1995 EMAP-Estuaries Demonstration Project in the Carolinian Province. NOAA Technical Memorandum NOS ORCA 123 NOAA/NOS, Office of Ocean Resources Conservation and Assessment, Silver Spring, MD. 143 p.

See also: Barry A. Vittor & Associates, Inc. (1997), McRae and Nelson (1996), Nelson (1995), Ringwood et al. (1995), Ringwood et al. (1997), Versar, Inc. (1998), Wheeler et al. (1995), Wheeler et al. (1996).

3.2 Keywords for the Data Set

benthic infauna, infaunal community, species composition, mean taxon abundance, mean number of taxa, richness, Shannon-Weaver Index, H' diversity, EMAP Carolinian Province

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

EMAP has three primary objectives:

1. To estimate the current status, extent, changes, and trends in indicators of the Nation's ecological resources on a regional basis;

2. To monitor indicators of pollutant exposure and habitat condition, and to seek correlative relationships between human-induced stresses and ecological condition that identify possible causes of adverse effects; and

3. To provide periodic statistical summaries and interpretive reports on ecological status and trends to the EPA Administrator and to the public.

4.2 Data Set Objective

The CP_BEN_A.DAT, CP_BEN_S.DAT, CP_BEN_T.DAT, and CP_BEN_C.DAT data sets report raw and summarized benthic infaunal data collected at each station in the EMAP Carolinian Province from 1994-1997. Results include abundances summarized by taxon, grab, and station, and various community measures by station.

4.3 Data Set Background Information

The CP_BEN_A.DAT, CP_BEN_S.DAT, CP_BEN_T.DAT, CP_BEN_C.DAT data sets contain benthic infaunal data collected at each station in the EMAP Carolinian Province from 1994-1997.

Two to four replicate bottom grabs were collected from each station with a 0.04-m2 Young grab sampler. Care was taken to avoid grabs that were partially filled, slumped or canted to one side, clogged with excessive amounts of shelly substrates, or overfilled to the point that sediment was being pushed through the top of the grab. Contents of the grabs were live-sieved in the field with a 0.5-mm mesh screen. Material retained on the screen was placed in plastic containers, fixed in 10% buffered formalin with rose bengal (to facilitate subsequent sorting), and transferred to the laboratory for further processing. Further details on infaunal sampling procedures are provided in the Carolinian Province Field Operations Manual (Kokkinakis et al. 1995a).

Once samples were received in the laboratory, they were transferred from formalin to 70% alcohol. Two samples from each station were further processed to characterize the infaunal assemblages and remaining replicates were archived (for possible future analysis). Samples were processed based on currently accepted practices in benthic ecology (e.g., Holme and McIntyre 1971) and on specific protocols described in the EMAP-E Lab Methods Manual (U.S. EPA 1995). Animals were sorted from sample debris under a dissecting microscope. Sorted specimens were identified to the lowest possible taxon, i.e. the species level wherever

possible. As species were identified, and the number of individuals per each species recorded, they were placed back in 70% alcohol and archived permanently by species.

4.4 Summary of Data Set Parameters

The CP_BEN_A.DAT data set contains unsummarized infaunal abundance data by grab and taxon. This data set is for use as the data source for subsequent infaunal analyses and summary calculations (e.g., CP_BEN_T.DAT, CP_BEN_C.DAT are calculated from the data in CP_BEN_A.DAT). In addition to abundance counts, this data set includes an important observation "flag" variable called SPEC_IGN. This variable uses one of two codes to flag specific observations that should not be included in certain further calculations. The use of this flag is described below in section 6.2 (Data Manipulation Description) of this document.

The CP_BEN_S.DAT data set contains taxonomic classification information for all infaunal taxa observed in benthic grabs throughout the Carolinian Province from 1993-1997. This data set is essential to resolve actual taxonomy and species names from the 8 digit code (variable COD_EMAP) used to identify taxa in the CP_BEN_A.DAT and CP_BEN_T.DAT data sets. Taxonomic information includes: phylum, general group, family, genus, and species.

The CP_BEN_T.DAT data set contains infaunal abundance data summarized by station and taxon. Summary results included are: number of grabs at station, total abundance of taxon, mean abundance of taxon, and standard deviation, by taxon for each station).

The CP_BEN_C.DAT data set contains summary metrics used to describe the benthic infaunal community at a station. The summary results included are: number of grabs, mean number of infaunal taxa (species richness) per grab, mean infaunal abundance per grab, and Shannon-Weaver Index (H' diversity) per grab, for each station.

4.5 Year-Specific Information about Data

1994 and 1995 Sample Processing

Samples from Virginia and North Carolina sites were processed by UNC-Wilmington. Samples from South Carolina and Georgia sites were processed by SCDNR/MRRI. Samples from Florida sites were processed by FDEP/FMRI.

1996 Sample Processing

All samples were processed by Barry A. Vittor & Associates, Inc., Mobile, Alabama

1997 Sample Processing

Samples from the 10 stations in the Chowan River, NC (CP97345-CP97354) were processed by Versar Inc., Columbia, MD. All other 1997 samples were processed by UNC-W.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

See section 4.3 (Data Set Background Information)

5.1.2 Sample Collection Method Summary

Two to four replicate bottom grabs were collected from each station with a 0.04-m2 Young grab sampler. Care was taken to avoid grabs that were partially filled, slumped or canted to one side, clogged with excessive amounts of shelly substrates, or overfilled to the point that sediment was being pushed through the top of the grab. Contents of the grabs were live-sieved in the field with a 0.5-mm mesh screen. Material retained on the screen was placed in plastic containers, fixed in 10% buffered formalin with rose bengal (to facilitate subsequent sorting), and transferred to the laboratory for further processing. Further details on infaunal sampling procedures are provided in the Carolinian Province Field Operations Manual (Kokkinakis et al. 1994b).

5.1.3 Beginning Sampling Dates

30 June 1994
05 July 1995
09 July 1996
07 July 1997

5.1.4 Ending Sampling Dates

31 August 1994
14 September 1995
19 September 1996
25 August 1997

5.1.5 Platform

Samples were collected from various gasoline or diesel powered boats equipped with at least the following equipment: "A" frame boom or davit, winch, LORAN-C or GPS for location, and a depth finder.

5.1.6 Sampling Equipment

A 1/25 m2, Kynar-coated stainless steel, Young Grab sampler. This grab sampled an area of 440 cm2 and a maximum depth of penetration in the sediment of 10 cm.

5.1.7 Manufacturer of Sampling Equipment

Ted Young
Falmouth, MA

5.1.8 Key Variables

5.1.9 Sample Collection Method Calibration

The sampling gear does not require any calibration. It required inspection for deformities incurred due to mishandling or impact on rocky substrates.

5.1.10 Sample Collection Quality Control

Field technicians were trained to follow Standard Operating Procedures to insure the collection of representative, and high quality samples.

Field site audits were conducted during sampling seasons by the QA Officer to determine compliance with the Quality Assurance Plan and Field Operations Manual.

See: Hyland et al. (1996),
Hyland et al. (1998),
Kokkinakis et al. (1994a)

5.1.11 Sample Collection Method References

See: Hyland et al. (1996),
Hyland et al. (1998),
Kokkinakis et al. (1994b)

5.1.12 Sample Collection Method Deviations

None

5.2 Data Preparation and Sample Processing

5.2.1 Sample Processing Objective

NA

5.2.2 Sample Processing Methods Summary

5.2.2.1 Field Summary

NA

5.2.2.2 Laboratory Summary

Once samples were received in the laboratory, they were transferred from formalin to 70% alcohol. Two samples from each station were further processed to characterize the infaunal assemblages and the remaining replicates were archived (for possible future analysis). Samples were processed based on currently accepted practices in benthic ecology (e.g., Holme and McIntyre 1971) and on specific protocols described in the EMAP-E Lab Methods Manual (U.S. EPA 1995). Animals were sorted from sample debris under a dissecting

microscope. Sorted specimens were identified to the lowest possible taxon, i.e. the species level wherever possible. As species were identified, and the number of individuals per each species recorded, they were placed back in 70% alcohol and archived permanently by species.

5.2.3 Sample Processing Method Calibration

NA

5.2.4 Sample Processing Quality Control

Several steps were taken to assure data quality and comparability. Each technician responsible for sorting samples needed to demonstrate initial proficiency by removing >=95% of the animals in each of five consecutive samples. Tests of ongoing sorting proficiency were performed by resorting 10% of the samples and checking to see that >=95% of the animals in each sample had been removed by the original sorter. Species identifications were performed by skilled taxonomists using standard taxonomic keys and reference collections. To catch potential misidentifications, a minimum of 10% of the samples was checked by independent qualified taxonomists. Data corrections were incorporated as necessary.

Lastly, species lists from the several participating taxonomy laboratories were carefully cross-checked in the process of merging the information into a common province-wide benthic data base. Inconsistencies in coding and nomenclature were corrected as necessary. Through this process, taxonomic codes (COD_EMAP) are consistently assigned throughout the CP_BEN_A.DAT, CP_BEN_S.DAT, and CP_BEN_T.DAT data sets.

5.2.5 Sample Processing Method Reference

U.S. EPA (1995)

5.2.6 Sample Processing Method Deviations

NA

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Value

Data set CP_BEN_A.DAT

SPEC_IGN	Ignore taxon flag

Data set CP_BEN_T.DAT

T_ABN	Total abundance (#)
M_ABN	Mean abundance (#)
SD_ABN	Std. dev. of mean abundance

6.1 Name of New or Modified Value, continued

Data set CP_BEN_C.DAT

I_TAXA	Mean number of infaunal taxa per grab
I_ORGS	Mean infaunal abundance per grab
I_HPRIME	Mean inf. H prime diversity per grab

6.2 Data Manipulation Description

Data set CP_BEN_A.DAT

The variable SPEC_IGN is an important "flag" that uses one of two codes to flag specific observations that should not be included in certain further calculations. Where no SPEC_IGN code is given (designated by a period "."), no special conditions exist and observations can be used in all calculations.

A SPEC_IGN code of "1" identifies observations where some individuals of a taxon could not be identified to as low a taxonomic level as others. This can occur for many reasons such as when several specimens appear to be the same taxon at a given stage of identification, but damage or missing body parts prevents further identification of some of the specimens. When this occurs it necessitates the assignment of different taxonomic codes (COD_EMAP) for each taxonomic level at which identification could no longer proceed. This creates a data storage problem in that there will then be two or more taxonomic codes that exist in a grabs data that are known to be taxonomically equivalent to a certain level, but that cannot be ruled either equivalent or different at lower taxonomic levels. In these cases, a SPEC_IGN code of "1" is assigned to the observation containing the taxon that could not be identified further. The utility of this flag becomes apparent when the calculation of taxonomic richness and related diversity measures are considered. For example, taxonomic richness (number of taxa) for a grab is now easily calculated by counting the number of unique taxonomic codes in the grab while excluding (or later subtracting) the taxonomic codes with a SPEC_IGN code of "1". If observations with a SPEC_IGN code of "1" had not been excluded from the calculation of taxonomic richness the result may have been an overestimation. Overestimation can result when taxa are wrongly counted twice due only to a difference in taxonomic codes for individuals that may actually be the same taxon. Note that observations with SPEC_IGN code of "1" should only be excluded from richness and related diversity measures, but not excluded from calculations of abundance. This code has no relation to abundance data.

A SPEC_IGN code of "2" indicates organisms that although captured in the benthic grab, are not typically considered members of the infaunal community. Therefore all observations with a SPEC_IGN code of "2" should be excluded in calculations that should only include infaunal organisms (e.g., these observations should be excluded from

calculations of infaunal abundance or diversity). These taxa were left in the CP_BEN_A.DAT data set because these data have a value as a presence/absence measure of non-infaunal organisms that were collected in benthic grabs. The following general groups were assigned a SPEC_IGN code of "2": obvious meiofaunal members (Ostracods, Nematodes, Harpacticoid Copepods, Kinorhyncs, Turbellarians); obvious water column members (Cladocerans, Calenoid Copepods, Chaetognaths, pelagic fish); adult flying insects; obvious epifaunal molluscs that attach to substrates and/or form clusters; barnacles; and highly motile epifaunal members (such as crabs of the genus Uca).

Due to an error in laboratory processing, grab data for station CP94082 cannot be reported in the CP_BEN_A.DAT data set. Abundance data for all four grabs at this station were mistakenly combined and reported as if they had come from only one grab. Although this error prevents valid data from being stored in the CP_BEN_A.DAT data set structure, valid calculations were possible for this station for reporting in the CP_BEN_T.DAT data set, and estimations were possible for the CP_BEN_C.DAT data set.

Note that in the CP_BEN_A.DAT data set, observations occasionally have a missing taxonomic code (COD_EMAP = " ") and an abundance of zero (ABUNDANC = 0). These observations are correct, and are used to identify valid benthic grabs that contained no fauna (i.e. azoic).

Data set CP_BEN_S.DAT

Because several different taxonomy laboratories participated in sample processing, and several years of data are reported in the benthic infaunal data sets (CP_BEN_A.DAT, CP_BEN_S.DAT, CP_BEN_T.DAT, CP_BEN_C.DAT), the taxonomic codes (COD_EMAP) used in these data sets have been continuously scrutinized and standardized with each new addition of data. Inconsistencies in coding and nomenclature were corrected as necessary. Through this process, taxonomic codes are consistently assigned throughout all of these infaunal data sets.

In the CP_BEN_S.DAT data set, some variables and data entries require further explanation. First, the variable GROUP is used to report a generalized taxonomic group name in place of a specific taxonomic level. It was decided to use this GROUP variable to allow enough flexibility to refer to groups of taxa in accepted, commonly used terms rather than adding the numerous variables that would have been needed for a rigid classification (i.e., class, subclass, superorder, order, suborder, etc.). Secondly, the following abbreviations are used in the CP_BEN_S.DAT data set: "UNID." = unidentified at this level, "JUV" = juvenile, "FRAG" = fragment/incomplete specimen. Lastly, the following abbreviations are used frequently in the SPECIES variable of the CP_BEN_S.DAT data set: "SPP" = one or more unidentified species; "SP" = one unidentified species; "SP1", "SP2", "SPA", "SPB", etc. = unidentified species, but known to be different from one another (e.g., although SP1, and SP2 cannot be identified to

the species level, they can be distinguished from one another, and are likely different species).

Data sets CP_BEN_T.DAT and CP_BEN_C.DAT

Both the data sets CP_BEN_T.DAT and CP_BEN_C.DAT contain results of summary calculations performed on the CP_BEN_A.DAT data set. However, to assure comparability between stations and years, several important data manipulations and standardizations were applied to the data prior to calculating any of the results reported in CP_BEN_T.DAT and CP_BEN_C.DAT. Because sample processing laboratories varied by year and region (see section 4.5 Year-Specific Information about Data), some differences in the level of taxonomic resolution exist in the CP_BEN_A.DAT data set. For example, if one lab identified oligochaetes to the species level, but another lab stopped at "Oligochaeta", then comparisons of taxonomic richness between samples processed by the different labs would be meaningless. To compensate for these differences when comparing results over all years and stations, we recommend that several taxonomic codes (COD_EMAP) be "lumped" or "rolled-up" to higher level taxonomic codes. Although this "common denominator" approach results in conservative (low) estimates of species richness for some samples, it is necessary to make meaningful comparisons between all stations over all years. The following table gives those taxonomic codes (COD_EMAP) that we recommend lumping into a higher taxonomic level:

Lump these	Into this	Description
LIMNHOFF	XXXXOLIG	Oligochaetes
NAISXXSP	XXXXOLIG	Oligochaetes
TUBIHETE	XXXXOLIG	Oligochaetes
TUBIXSPP	XXXXOLIG	Oligochaetes
XXXXTUBI	XXXXOLIG	Oligochaetes
AUTOPIQU	XXXXOLIG	Oligochaetes
AUTOXSP2	XXXXOLIG	Oligochaetes
DERODIGI	XXXXOLIG	Oligochaetes
HABESPEC	XXXXOLIG	Oligochaetes
HETEXXSP	XXXXOLIG	Oligochaetes
ISOCFREY	XXXXOLIG	Oligochaetes
ISOCHETE	XXXXOLIG	Oligochaetes
LIMNBARN	XXXXOLIG	Oligochaetes
LIMNRUBI	XXXXOLIG	Oligochaetes
PARALITO	XXXXOLIG	Oligochaetes
TECTSQUA	XXXXOLIG	Oligochaetes
TECTXXSP	XXXXOLIG	Oligochaetes
LIMNPROF	XXXXOLIG	Oligochaetes
AMPHXSP7	XXXXNEME	Nemerteans
CARIXSP1	XXXXNEME	Nemerteans
CARIXSP2	XXXXNEME	Nemerteans
LINEXSP6	XXXXNEME	Nemerteans
LINEXSP7	XXXXNEME	Nemerteans
TUBUXSP1	XXXXNEME	Nemerteans
TUBUXSP3	XXXXNEME	Nemerteans

Lump these	Into this	Description, continued
XXX1CARI	XXXXNEME	Nemerteans
EMPLXSP1	XXXXNEME	Nemerteans
XXX4AMPH	XXXXNEME	Nemerteans
MEDIAMBI	MEDIXSPP	Mediomastus spp.
MEDICALI	MEDIXSPP	Mediomastus spp.
PHORARCH	PHORXSPP	Phoronis spp.

Prior to the calculations for both the CP_BEN_T.DAT and CP_BEN_C.DAT data sets, the following steps were taken to prepare the data and assure results would be comparable across all years of data (note that the order is essential): 1) removed all observations with SPEC_IGN = 2 as these are not infauna; 2) performed the lumping of taxonomic codes as described above; 3) change SPEC_IGN = 1 to SPEC_IGN = "." for all taxonomic codes that were just lumped (because this code is no longer applicable for taxa that have been lumped); 4) proceed with calculations while making sure to exclude observations with SPEC_IGN = 1 when richness or diversity measures are being calculated in CP_BEN_C.DAT.

Data set CP_BEN_T.DAT

Variable T_ABN (Total abundance) was calculated by summing abundances by taxon (COD_EMAP) over all grabs at a station.

Variable M_ABN (Mean abundance) of the taxon was calculated by dividing its total abundance over all grabs at a station (T_ABN) by the number of grabs at the station (N_GRABS).

Variable SD_ABN (Std. dev. of abundance) is the standard deviation associated with M_ABN.

Unsampled stations are identified in this data set by a missing species code and N_GRABS = 0.

Data set CP_BEN_C.DAT

Variable I_TAXA (Mean number of infaunal taxa per grab) was calculated by counting the number of unique taxa (COD_EMAP) in each grab, summing these grab counts, and then dividing by the number of grabs (N_GRABS) at the station.

Variable I_ORGS (Mean infaunal abundance per grab) was calculated by finding the total abundance of all taxa in each grab, summing these grab abundances, and then dividing by the number of grabs (N_GRABS) at the station.

Variable I_HPRIME (Mean inf. H prime diversity per grab) was calculated by first calculating H prime for each grab as given in Shannon and Weaver (1949), then summing these

H prime values for the grabs, and then dividing by the number of grabs at the station. H prime diversity (Shannon-Weaver Index) values that we have reported were calculated using base 2 logarithms.

Note that the values of I_TAXA and I_HPRIME for station CP94082 are estimations. Although we believe these values are reasonable estimates based on the available data for this station, the true accuracy is unknown. The need for estimation at this station has been discussed above.

Unsampled stations are identified in this data set by all variables containing missing data with the exception of N_GRABS = 0.

6.3 Data Manipulation Examples

NA

7. DATA DESCRIPTION

7.1 Description of Parameters

CP_BEN_A.DAT Data Set

Variable	Type	Format	Label
STA_NAME	Char	7.	Carolinian Province Office Station Name
DATE	Num	YYMMDD6.	Sample collection date (YYMMDD)
GRABREP	Num	2.	Grab replicate number
COD_EMAP	Char	8.	Carolinian Province Office Taxonomic Code
ABUNDANC	Num	4.	Abundance of taxon
SPEC_IGN	Num	1.	Ignore taxon flag

CP_BEN_S.DAT Data Set

Variable	Type	Format	Label
COD_EMAP	Char	8.	Carolinian Province Office Taxonomic Code
PHYLUM	Char	30.	Phylum
GROUP	Char	30.	General Taxonomic Group (Class, Order)
FAMILY	Char	30.	Family
GENUS	Char	30.	Genus
SPECIES	Char	30.	Species

7.1 Description of Parameters, continued

CP_BEN_T.DAT Data Set

Variable	Type	Format	Label
STA_NAME	Char	7.	Carolinian Province Office Station Name
DATE	Num	YYMMDD6.	Sample collection date (YYMMDD)
COD_EMAP	Char		Carolinian Province Office Taxonomic Code
N_GRABS	Num	1.	Number of grabs
T_ABN	Num	4.	Total abundance (#)
M_ABN	Num	7.2	Mean abundance (#)
SD_ABN	Num	7.2	Std. dev. of mean abundance

CP_BEN_C.DAT Data Set

Variable	Type	Format	Label
STA_NAME	Char	7.	CPO Sampling Station Code
DATE	Num	YYMMDD6.	Sample collection date (YYMMDD)
N_GRABS	Num	1.	Number of grabs
I_TAXA	Num	5.2	Mean number of infaunal taxa per grab
I_ORGS	Num	7.2	Mean infaunal abundance per grab
I_HPRIME	Num	5.2	Mean inf. H prime diversity per grab

Note the conventions used in the Format columns above:

For character (Char) variables, the number given is the maximum width (number of characters) for that variable.

For numeric (Num) variables, the format is given in W.D format, where W = maximum width (number of characters) for the number (including all digits and the decimal point), and D = number of digits to the right of the decimal point.

7.1.6 Precision to which values are reported

All values are accurate to the full precision that they are reported to.

7.1.7 Minimum Value in Data Set

CP_BEN_A.DAT Data Set

Variable	Minimum
ABUNDANC	0
GRABREP	0

7.1.7 Minimum Value in Data Set, continued

CP_BEN_T.DAT Data Set

Variable	Minimum
N_GRABS	0
T_ABN	0
M_ABN	0.00
SD_ABN	0.00

CP_BEN_C.DAT Data Set

Variable	Minimum
N_GRABS	0
I_TAXA	0.00
I_ORGS	0.00
I_HPRIME	0.00

7.1.8 Maximum Value in Data Set

CP_BEN_A.DAT Data Set

Variable	Maximum
ABUNDANC	1337
GRABREP	4

CP_BEN_T.DAT Data Set

Variable	Maximum
N_GRABS	4
T_ABN	2293
M_ABN	1146.50
SD_ABN	269.41

CP_BEN_C.DAT Data Set

Variable	Maximum
N_GRABS	4
I_TAXA	77.00
I_ORGS	1577.50
I_HPRIME	4.78

7.2 Data Record Example

7.2.1 Column Names for Example Records

CP_BEN_A.DAT Data Set

```
STA_NAME;DATE;GRABREP;COD_EMAP;ABUNDANC;SPEC_IGN
```

CP_BEN_S.DAT Data Set

```
COD_EMAP;PHYLUM;GROUP;FAMILY;GENUS;SPECIES
```

CP_BEN_T.DAT Data Set

```
STA_NAME;DATE;COD_EMAP;N_GRABS;T_ABN;M_ABN;SD_ABN
```

CP_BEN_C.DAT Data Set

```
STA_NAME;DATE;N_GRABS;I_TAXA;I_ORGS;I_HPRIME
```

7.2.2 Example Data Records

CP_BEN_A.DAT Data Set

```
CP94001;940815;1;ACTECANA;19;.
CP94001;940815;1;ALPHAMBL;1;.
CP94001;940815;1;AMAETRIL;1;.
CP94001;940815;1;AMPEVADO;1;.
CP94001;940815;1;APHEXSP1;2;.
```

CP_BEN_S.DAT Data Set

```
NERELAME;ANNELIDA;POLYCHAETA;NEREIDAE;NEREIS;LAMELLOSA
NERERIIS;ANNELIDA;POLYCHAETA;NEREIDAE;NEREIS;RIISEI
NEREXSPP;ANNELIDA;POLYCHAETA;NEREIDAE;NEREIS;SPP
NIMBXSPP;ARTHROPODA;DIPTERA;CHIRONOMIDAE;NIMBOCERA;SPP
NOETPOND;MOLLUSCA;BIVALVIA;ARCIDAE;NOETIA;PONDEROSA
```

CP_BEN_T.DAT Data Set

```
CP94016;940808;COELXSPP;1;1;1.00;.
CP94016;940808;LITTMONR;2;13;6.50;2.12
CP94016;940808;MYTILEUC;1;3;3.00;.
CP94016;940808;RANGCUNE;1;1;1.00;.
CP94016;940808;XXXXBIVA;1;1;1.00;.
CP94016;940808;XXXXOLIG;2;4;2.00;1.41
CP94017;940809;ETEOHETE;1;1;1.00;.
CP94017;940809;GRANBONN;1;1;1.00;.
```

CP_BEN_C.DAT Data Set

```
CP94001;940815;2;54.00;573.00;3.76
CP94002;940815;2;3.00;6.50;1.36
CP94003;940816;2;77.00;1229.50;4.07
CP94004;940816;2;40.50;418.50;3.60
CP94005;940802;2;31.50;281.00;3.69
```

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-81 Degrees, 43.83 Minutes West Longitude

8.2 Maximum Longitude

-75 Degrees, 33.82 Minutes West Longitude

8.3 Minimum Latitude

27 Degrees, 12.07 Minutes North Latitude

8.4 Maximum Latitude

36 Degrees, 43.43 Minutes North Latitude

8.5 Name of area or region

Coastal distribution of sampling is along the southeastern US from Cape Henry, VA, through St. Lucie Inlet, FL. States represented: Virginia, North Carolina, South Carolina, Georgia, and Florida.

9. QUALITY CONTROL/QUALITY ASSURANCE

9.1 Measurement Quality Objectives

See section 5.1.9 (Sample Collection Method Calibration) and section 5.1.10 (Sample Collection Quality Control) above.

9.2 Quality Assurance/Control Methods

See section 5.1.9 (Sample Collection Method Calibration) and section 5.1.10 (Sample Collection Quality Control) above.

9.3 Quality Assessment Results

NA

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the WWW site.

10.2 Data Access Restrictions

Data can only be accessed from the WWW site.

10.3 Data Access Contact Persons

For programmatic/policy matters, contact:
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10.4 Data file Format

Delimited ASCII Text

10.5 Information Concerning Anonymous FTP

Not accessible

10.6 Information Concerning Gopher and WWW

Data can be downloaded from the WWW.

10.7 EMAP CD-ROM Containing the Data file

Data not available on CD-ROM.

11. REFERENCES

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12. TABLE OF ACRONYMS

BVA	Barry A. Vittor & Associates, Inc., Mobile, Alabama
C	Degrees Celsius
cm2	Square centimeters
CMBAD	Coastal Monitoring and Bioeffects Assessment Division
CU	Clemson University
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
EPA-AED	EPA-Atlantic Ecology Division
EPA-GED	EPA-Gulf Ecology Division
EPA-RTP	EPA-Research Triangle Park, NC

FLDEP	Florida Dept. of Environmental Protection
FMRI	Florida Marine Research Institute
FTP	File Transfer Protocol
GIS	Geographical Information System
JCWS	Johnson Controls Word Services
km2	Square kilometers
m2	Square meters
mg/L	Milligrams per liter
mS/cm	MilliSiemens per centimeter (equiv. to milliohms/cm)
MRRI	Marine Resources Research Institute
NCNERR	North Carolina National Estuarine Research Reserve
NCSU	North Carolina State University, NC
NA	Not Applicable
ng/g	Nanograms per gram
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
ORCA	Office of Ocean Resources Conservation and Assessment
QA/QC	Quality Assurance/Quality Control
ppb	Parts per billion (equiv. to ng/g)
ppm	Parts per million (equiv. to ug/g)
ppt	Parts per thousand
SAIC	Science Applications International Corporation
SCDNR	South Carolina Dept. of Natural Resources
TOC	Total Organic Carbon
TAMU/GERG	Texas A&M University, Geochemical and Environmental Research Group
TPMC	Technology Planning and Management Corporation
ug/g	Micrograms per gram
um	Micrometers
UC	University of Charleston, SC
UGA	University of Georgia, GA
UNC-W	University of North Carolina - Wilmington, NC
USGS-GB	US Geological Survey - Gulf Breeze, FL
wt.	Weight
WWW	World Wide Web -Internet

13. PERSONNEL INFORMATION

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