CATALOG DOCUMENTATION
MAIA-ESTUARIES SUMMARY DATABASE
1997 and 1998 STATIONS
SEDIMENT CHEMISTRY DATA: “SEDCHEM”

TABLE OF CONTENTS

1. DATASET IDENTIFICATION
2. INVESTIGATOR INFORMATION
3. DATASET ABSTRACT
4. OBJECTIVES AND INTRODUCTION
5. DATA ACQUISITION AND PROCESSING METHODS
6. DATA MANIPULATIONS
7. DATA DESCRIPTION
8. GEOGRAPHIC AND SPATIAL INFORMATION
9. QUALITY CONTROL AND QUALITY ASSURANCE
10. DATA ACCESS AND DISTRIBUTION
11. REFERENCES
12. TABLE OF ACRONYMS
13. PERSONNEL INFORMATION

1. DATASET IDENTIFICATION

1.1 Title of Catalog document
MAIA-Estuaries Summary Database
1997 and 1998 Stations
Sediment Chemistry Data

1.2 Authors of the Catalog entry
John Kiddon, U.S. EPA NHEERL-AED
Harry Buffum, OAO Corp.

1.3 Catalog revision date
April 30, 2000

1.4 Dataset name
SEDCHEM

1.5 Task Group
MAIA Estuaries

1.6 Dataset identification code
007

1.7 Version
001

1.8 Requested Acknowledgment
EMAP requests that all individuals who download EMAP data acknowledge the source of these data in any reports, papers, or presentations. If you publish these data, please include a statement similar to: "Some or all of the data described in this article were produced by the U. S. Environmental Protection Agency through its Environmental Monitoring and Assessment Program (EMAP)”.

2. INVESTIGATOR INFORMATION (for full addresses see Section 13)

2.1 Principal Investigators
John Paul, U.S. Environmental Protection Agency, NHEERL-Atlantic Ecology Division (AED)
Charles Strobel, U.S. Environmental Protection Agency, NHEERL-Atlantic Ecology Division (AED)

2.2 Sample Collection Investigators
Charles Strobel, U.S. Environmental Protection Agency, NHEERL-Atlantic Ecology Division (AED)
John Macauley, U.S. Environmental Protection Agency, Gulf Ecology Division (GED)
Jeffrey L. Hyland, National Oceanographic and Atmospheric Admin.-Carolinian Province (NOAA-DB)
Michelle Harmon, National Oceanographic and Atmospheric Admin.-Delaware Bay (NOAA-DB)
Carl Zimmerman, National Park Service (NPS)
Dan Dauer, Chesapeake Bay Program, Old Dominion University (CBP-ODU)
J. Ananda Ranasinghe, Chesapeake Bay Program, Versar, Inc. (CBP-VER)

2.3 Sample Processing Investigators
J. Ananda Ranasinghe, Chesapeake Bay Program, Versar, Inc. (CBP-VER)
Terry L. Wade, GERG, Texas A&M
Courtney T. Hackney, University of North Carolina at Wilmington

3. DATASET ABSTRACT

3.1 Abstract of the Dataset
The SEDCHEM data file reports the concentrations of chemical contaminants in sediment samples collected in MAIA estuaries during the Summers of 1997 and 1998. The sediment samples were analyzed for 91 chemical constituents, including total metals, simultaneously extracted metals (SEMs), acid volatile sulfide (AVS), butyl tins, polynuclear aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), and pesticides. One record is presented for each analyte measured and includes the analyte name, station name, sampling date, the analyte concentration, unit of measurement, and method detection limit (MDL). Concentration values that are smaller than the MDL are reported as described in Section 4.3.

3.2 Keywords for the Dataset
Sediment chemical contaminants, method detection limit, MDL, inorganic and organic analytes, acid volatile sulfide, AVS, simultaneously extracted metals, SEM, polynuclear aromatic hydrocarbons, PAH, butyltins, TBT, polychlorinated biphenyls, PCB, organochlorine pesticides, DDT.

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective
The main objectives of the MAIA-Estuaries program are: (1) to evaluate the ecological condition of the Mid-Atlantic estuaries by measuring key properties of the water, sediment, and the community of organisms; (2) to focus attention on small estuaries in order to develop better monitoring approaches for these critical systems; and (3) to develop partnerships among federal and state environmental organizations.

The Environmental Monitoring and Assessment Program (EMAP) is an EPA research and monitoring program designed to provide unbiased assessments of the condition of selected resources over a wide region. A key feature of the program is a probabilistic sampling strategy that randomly selects sampling sites and assigns weighting factors based on area to all measured results. EMAP's strategy was adopted by the Mid-Atlantic Integrated Assessment (MAIA) program,

which was designed to assess the conditions of the estuaries, forests, streams and lakes, and agricultural lands in the eight-state Mid-Atlantic region. This file contains data measured in MAIA estuaries during the Summers of 1997 and 1998. Samples were collected for water and sediment analyses primarily in 1997, with a few additional sites sampled in 1998. Fish samples were collected only in 1998. Several estuaries were designated as intensive sites and were sampled in greater detail (see STATIONS file).

The partners in MAIA-Estuaries program are: (1) The U.S. Environmental Protection Agency (USEPA), including both the Atlantic Ecology Division (AED) and the Gulf Ecology Division (GED); (2) National Park Service (NPS) under their project "Maryland Coastal Bays Monitoring"; (3) National Oceanographic and Atmospheric Administration (NOAA) which conducted sampling both in the Delaware Bay (DB) under their "National Status and Trends Program" and in the Carolinian Province (CP); and (4) The Chesapeake Bay Program (CBP), which is a consortium of federal, state, and local governments and nongovernmental organizations. Each partner was responsible for collecting, processing, and reviewing data. The USEPA Atlantic Ecology Division was responsible for final assembly and review of all data. Laboratories contracted to process samples are specified by the parameter LABCODE included in all data files (Section 4.4). Details regarding use of partner and LABCODE information are presented in the EVENTS metadata file.

4.2 Dataset Objective

The objective of the sediment chemistry data file is to report the concentrations of chemical contaminants measured in MAIA estuarine sediment samples. Method detection limits (MDLs) are also presented in certain cases (Section 4.3).

4.3 Dataset Background Discussion

The concentrations of 91 chemical contaminants were measured in each sediment sample. This information is useful both in characterizing the degree of contamination at a site, as well as providing information that may indicate the origin of the contaminants. By comparing the contaminant concentrations with the condition of benthic organisms and other indicators, ecologists hope to establish threshold concentrations that predict the onset of harmful effects.

The suite of analytes measured are very similar to the contaminants measured by NOAA's National Status and Trends program. The contaminants are generally categorized as either metallic or organic constituents. For metallic constituents, three methods of analysis were performed: (1) Total metals were analyzed by completely digesting sediment samples in an aggressive acid treatment, thereby releasing all metals for measurement, including metals comprising the sediments particles themselves. This method targets the heavy metals that are most toxic to estuarine organisms and are probably of anthropogenic origin. Non-toxic 'crustal' metals such as aluminum, iron, and silicon were also measured, and can be used to estimate the natural background levels of the toxic metals (see Strobel *et al.*, 1995). (2) In the second type of metals analysis, sediment samples were subjected to a relatively gentle acid treatment that releases only the metals that are adsorbed on the sediment particles or are present as simple compounds such as metallic sulfides. The digested sample was then analyzed to measure five "simultaneously extractable metals" or SEMs (Cd, Cu, Ni, Pb, and Zn), as well as the acid volatile sulfide (AVS). The AVS specifies the concentration of compounds that are capable of binding the metals and rendering them harmless. Theoretically, only SEM concentrations in excess of AVS concentration are toxic (DiToro *et al*., 1992). (3) Finally, four butyl-tins were measured, reflecting interest in the distribution of the anti-fouling agent tri-butyl tin and its breakdown products.

Three categories of organic contaminants were measured: PAHs, PCBs, and pesticides. Twenty-five polynuclear aromatic hydrocarbons (PAHs) were measured, consisting of the 16 priority pollutants defined by the Superfund program and several alkylated derivatives that prove to be useful in identifying sources of these compounds. The concentrations of 18 polychlorinated

biphenyls (PCBs) and 21 pesticides, all Superfund priority pollutants, were also measured. Sediment grain-size and Total Organic Carbon (TOC) measurements made on the same sediments are reported in the SEDGRAIN file.

Routinely, the concentration values from clean sites were reported as smaller than the method detection limit (MDL). In this file, these 'non-detects' are reported as zero and the QACODE is set to CHM-A to indicate the assignment. While the concentration of the analyte is clearly small, it is not strictly zero. The MDL is therefore listed as a guideline to users who wish to substitute values other than zero, *i.e.*, setting the non-detect value to the MDL value, half the MDL value, *etc.* Furthermore, the analyses of organic analytes routinely report non-zero concentration values that are less than the MDL. This apparent inconsistency is possible because, by convention, the MDLs for organic analyses are calculated to indicate the threshold of reliable measurements, rather than the stricter limit of instrumental detection. In these cases, the best estimate of the concentration is reported (*i.e.*, the value reported by the analytical laboratory), the QACODE is set to CHM-B, and the MDL is listed. The user can be confident that the analyte is present, but there is a high degree of uncertainty in the reported concentration. Note that the value of the MDL depends on the dilution history of the sample; therefore its magnitude can differ widely among samples. Most results in this file are larger than the MDL and are reported directly without MDL values or QACODEs. Finally, records flagged with CHM-C indicate that the concentration value is uncertain because an interference was noted in the blank analysis performed with the sample; caution is advised in interpreting these results. To summarize:

QACODE	INTERPRETATION	CONC reported	MDL reported
<none>	result is detectable and > MDL	as measured	<none>
CHM-A	result is < MDL and undetectable	zero	MDL is listed
CHM-B	result is < MDL but detectable	best estimate	MDL is listed
CHM-C	result may be affected by interference	best estimate	<none>

4.4 Summary of Dataset Parameters

*STATION	Station name
*EVNTDATE	Event date
*ANALYTE	Name of analyte measured. A list of the ANALYTE codes and their full chemical names is presented in the file ANALYTES; also see Section 7.1.3.
CONC	Concentration of analyte. Results fall into one of three categories: 1) the analyte concentration was large and reliably reported; 2) the analyte was below the method detection level, but the best estimate of the concentration is reported; and 3) and the analyte was not detected and is reported as zero. See Section 4.3 for further discussion.
CHMUNITS	Concentration units used to report results, reported as the mass of analyte per dry mass of sediment: Metals, SEM, AVS — ug/g Butlytins — ng Sn/g PAHs, PCBs, Pesticides — ng/g
MDL	Method Detection Limit; reported only when measured concentration is < MDL
QACODE	QA/QC codes: <blank> — CONC > MDL; concentration value is reliable CHM-A — CONC is undetectable; value set to zero (user may wish to substitute another value) CHM-B — CONC # MDL, but is detectable; best estimate reported CHM-C — failed QA criteria: an interference was noted in the blank analysis performed with the sample; caution is advised in interpreting the result

4.4 Summary of Dataset Parameters, continued

LABCODE	Code identifying laboratory responsible for performing chemical analyses	
	CHM-1	USEPA contract to TAMU/GERG
	CHM-2	NOAA (Carolinian Provence)
	CHM-4	NOAA (Delaware Bay)
YEAR	Year of sample collection: 1997 or 1998	

* denotes parameters that should be used as key fields when merging data files

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

The sample collection methods used by USEPA field crews will be described here. Any significant variations by other MAIA partners are noted in Section 5.1.12. Details regarding MAIA partners are reported in the EVENTS data file.

5.1.1 Sampling Objective

Sediment sub-samples were collected for the analysis of metallic and organic chemical constituents. Separate samples from the same sediment were collected for sediment grain-size analyses and toxicity testing.

5.1.2 Sample Collection: Methods Summary

Multiple sediment grabs were collected from each site using a Young-modified Van Veen grab sampler. Each grab was nominally 440 cm^2 in area and up to 10 cm in depth, but only the top two-centimeter section of a grab was retained for the chemical analyses. Multiple grabs were processed until three liters of sediment were collected. Any large organisms encountered were removed, but otherwise the sample included resident organisms. The sediment composite was homogenized and separated into two fractions for storage until analysis. One fraction was frozen and used in the chemical analysis reported in this file, and for the total organic carbon and percent moisture parameters reported in the SEDGRAIN file. The second fraction was chilled but never frozen during storage, and was used for the grain size analyses reported in the file SEDGRAIN, and for toxicity analyses reported in the TOXICITY file.

5.1.3 Beginning Sampling Dates

8 July 1997
13 July 1998

5.1.4 Ending Sampling Dates

8 October 1997
8 October 1998

5.1.5 Sampling Platform

Samples were collected from gasoline or diesel powered boats, 18 to 133 feet in length.

5.1.6 Sampling Equipment

A 1/25 m2, stainless steel (coated with Kynar), Young-modified Van Veen grab sampler was used to collect sediments.

5.1.7 Manufacturer of Sampling Equipment

Young's Welding, Sandwich, MA

5.1.8 Key Variables

Not applicable

5.1.9 Sample Collection: Calibration

The sampling gear does not require any calibration, although it was inspected regularly for damage by mishandling or impact on rocky substrates.

5.1.10 Sample Collection: Quality Control

Care was taken to minimize disturbance to the sediment grabs. Grabs that were incomplete, slumped, less than 7 cm in depth, or comprised chiefly of shelly substrates were discarded. The chance of sampling the same location was minimized by repositioning the boat (five meters downstream) after three sampling attempts.

5.1.11 Sample Collection: References

Strobel, C.J. 1998. Environmental Monitoring and Assessment Program - Mid-Atlantic Integrated Assessment. Estuaries Component, Field Operations and Safety Manual. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. July 1998.

Kokkinakis, S.A., J.L. Hyland, and A. Robertson. 1994. Carolinian Demonstration Project - 1994 Field Operations Manual. Joint National Status and Trends/Environmental Monitoring and Assessment Program. NOAA/NOS/ORCA, Silver Spring, MD.

5.1.12 Sample Collection: Alternate Methods

Not applicable

5.2 Data Preparation and Sample Processing

The processing methods used by USEPA contracts will be described here (LABCODE = CHM-1). Any significant variations by other MAIA partners are noted in Section 5.2.6.

5.2.1 Sample Processing Objective

Sediment samples were analyzed for total metals, simultaneously extracted metals (SEM), AVS, butyltins, PAHs, PCBs and pesticides.

5.2.2 Sample Processing: Methods Summary

All analyses were performed on samples that were stored frozen. Sediments analyzed for total metals were dried and completely digested in nitric/hydrofluoric acids (acid persulfate for mercury). The analytical methods used to measure analyte concentrations were: cold vapor atomic analysis (AA) for mercury; flame AA for silicon; graphite furnace AA for silver, arsenic, cadmium, lead, antimony, tin and thallium; hydride generation atomic fluorescence for selenium; and optical-emission ionically coupled plasma (ICP) for the remaining metals. The acid volatile sulfide (AVS) and simultaneously extracted metals (SEM) analyses followed the EPA 'purge and trap' method (EPA 1991). Briefly, the wet sediments were treated with 1M HCl to release the AVS and metals, the AVS was collected in strong base and measured calorimetrically, and the SEM analytes were analyzed by ICP. Concentrations are reported on a dry weight basis. For the organic analyses, sediments were extracted using the procedures of NOAA National Status and Trends Program (Lauenstein ***et al***., 1993). The PAHs were analyzed by gas-chromatography / mass-spectrometry (GC/MS); pesticides and PCBs were analyzed by GC/ECD (electron capture detector); and the butyltins were analyzed by GC/FID (flame ionization detector).

5.2.3 Sample Processing: Calibration

The analytical instruments were calibrated by standard laboratory procedures including: constructing calibration curves, running blank and spiked quality control samples, and analyzing standard reference materials.

5.2.4 Sample Processing: Quality Control

Each batch of samples was accompanied by QC analyses consisting of method blanks, matrix spikes, matrix spike duplicates, and standard reference materials (SRMs). In total,

approximately 5% of all analyses were QC analyses. Processing quality was considered acceptable if the following criteria were met: blanks were less than three times the minimum detection limit; accuracy, as determined by analysis of certified reference materials, was within 30% for organic analytes and within 15% for inorganic analytes; and precision, as determined by replicate analyses, was within 30% for organic analytes and within 15% for inorganic analytes. Additional specifications and guidelines are presented in Valente and Strobel (1993).

5.2.5 Sample Processing: References

Environmental Protection Agency. 1991. Draft analytical method for determination of acid volatile sulfide in sediment. Office of Water. Washington, DC. 18pp.

Lauenstein, G. G. and A. Y. Cantillo (eds.). 1993. Sampling and analytical methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects 1984-1992: Comprehensive descriptions of trace organic analytical methods, Volume IV NOAA Technical Memorandum NOS ORCA 71, Silver Spring, MD. 182 pp.

Texas A & M University, Geochemical and Environmental Research Group. 1990. NOAA Status and Trends, Mussel Watch Program, Analytical Methods. Submitted to NOAA. Rockville (MD): U.S. Dept. of Commerce, National Oceanic & Atmospheric Administration, Ocean Assessment Division.

Valente, R.M. and C.J. Strobel, 1993. EMAP-Estuaries Virginian Province: Quality Assurance Project Plan for 1993. EPA 600/X-93/XXX. United States Environmental Protection Agency, Office of Research and Development, Narragansett, RI. (http://www.epa.gov/emap/html/pubs/docs/estuary/93qaplan.htm).

5.2.6 Sample Processing: Alternate Methods
Not applicable

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Values
Not applicable

6.2 Data Manipulation Description
Concentrations of metallic analytes smaller than the method detection limit were reported as zero (see Section 4.3 for details).

7. DATA DESCRIPTION

7.1 Description of Parameters

7.1.1 Components of the Dataset

PARAMETER	TYPE	LENGTH	LABEL
ANALYTE	Char	8	Code for Analyte Measured
CONC	Num	8	Concentration of Analyte in Sample
CHMUNITS	Char	10	Unit of Measure
MDL	Num	8	Method Detection Limit
STATION	Char	10	Station Name
EVNTDATE	Num	8	Event Date
QACODE	Char	8	QA Code(s)
LABCODE	Char	5	Contract/Lab Identifier
YEAR	Num	4	Year of sampling

7.1.2 Precision of Reported Values

Metals, SEM, AVS	variable ug/g
Butlytins	0.01 ng Sn/g
PAHs	0.1 ng/g
PCBs	0.01 ng/g
Pesticides	0.01 ng/g

All values have been rounded to three significant digits. To accommodate the wide range of values, all concentration values have been formatted to the thousandth unit (0.001). The actual precision is as listed above.

7.1.3 Minimum Value in Dataset

ANALYTE	NAME	MIN	MAX	UNITS
Total metals				
AG	Silver	0.001	17	ug/g
AL	Aluminum	1510	120000	ug/g
AS	Arsenic	0.08	44.3	ug/g
CD	Cadmium	0.002	4.4	ug/g
CR	Chromium	0.8	249	ug/g
CU	Copper	0.36	634	ug/g
FE	Iron	234	108000	ug/g
HG	Mercury	0.004	10.5	ug/g
MN	Manganese	12.5	10900	ug/g
NI	Nickel	0.7	95.4	ug/g
PB	Lead	0.52	181	ug/g
SB	Antimony	0.01	8.06	ug/g
SE	Selenium	0.006	3.96	ug/g
SI	Silicon	31900	465000	ug/g
SN	Tin	0.01	102	ug/g
TL	Thallium	0.05	1.76	ug/g
ZN	Zinc	0.9	844	ug/g
Simultaneously extracted metals				
SEM_CD	SEM- Cadmium	0.001	6.34	ug/g
SEM_CU	SEM- Copper	0.001	321	ug/g
SEM_NI	SEM- Nickel	0.014	72.5	ug/g
SEM_PB	SEM- Lead	0.011	183	ug/g
SEM_ZN	SEM- Zinc	0.007	550	ug/g
AVS	acid volatile sulfide	0.01	11500	ug/g
Butyl Tins				
MBT	Monobutyltin	0.08	596	ng Sn/g
DBT	Dibutyltin	0.13	2420	ng Sn/g
TBT	Tributyltin	0.1	1820	ng Sn/g
TETBT	Tetrabuyltin	0.2	31.2	ng Sn/g

7.1.3 Minimum Value in Dataset, continued

ANALYTE	NAME	MIN	MAX	UNITS
Polynuclear aromatic hydrocarbons				
ACENTHE	Acenaphthene	0.1	324	ng/g
ACENTHY	Acenaphthlylene	0.1	2030	ng/g
ANTHRA	Anthracene	0.1	7950	ng/g
BENANTH	Benz(a)anthracene	0.1	9670	ng/g
BENAPY	Benz(a)pyrene	0.1	8680	ng/g
BENEPY	Benz(e)pyrene	0.1	4420	ng/g
BENZOBFL	Benzo(b)fluoranthene	0.1	11300	ng/g
BENZOKFL	Benzo(k)fluoranthene	0.1	3910	ng/g
BENZOFL	Benzo(b+k)fluoranthene	0.1	3230	ng/g
BENZOP	Benzo(g,h,i)perylene	0.1	3730	ng/g
BIPHENYL	Biphenyl	0.1	103	ng/g
CHRYSENE	Chrysene	0.1	8980	ng/g
DIBENZ	Dibenz(a,h)anthracene	0.1	1390	ng/g
FLUORANT	Fluoranthene	0.1	23500	ng/g
FLUORENE	Fluorene	0.1	1960	ng/g
INDENO	Indeno(1,2,3-c,d)pyrene	0.1	5250	ng/g
NAPH	Naphthalene	0.4	1570	ng/g
MENAP1	1-methylnaphthalene	0.1	232	ng/g
MENAP2	2-methylnaphthalene	0.2	526	ng/g
DIMETH	2,6-dimethylnaphthalene	0.1	232	ng/g
TRIMETH	2,3,5-trimethylnaphthalene	0.1	122	ng/g
PERYLENE	Perylene	0.1	2440	ng/g
PHENANTH	Phenanthrene	0.1	14700	ng/g
MEPHEN1	1-methylphenanthrene	0.1	1060	ng/g
PYRENE	Pyrene	0.1	15300	ng/g
Polychlorinated biphenyls				
PCB8	2,4'-dichlorobiphenyl	0.02	8.24	ng/g
PCB18	2,2',5-trichlorobiphenyl	0.01	127	ng/g
PCB28	2,4,4'-trichlorobiphenyl	0.01	23.3	ng/g
PCB44	2,2',3,5'-tetrachlorobiphenyl	0.01	59.2	ng/g
PCB52	2,2',5,5'-tetrachlorobiphenyl	0.01	26.7	ng/g
PCB66	2,3',4,4'-tetrachlorobiphenyl	0.01	37.3	ng/g
PCB101	2,2',4,5,5'-pentachlorobiphenyl	0.01	42.2	ng/g
PCB105	2,3,3',4,4'-pentachlorobiphenyl	0.01	5.89	ng/g
PCB118	2,3',4,4',5-pentachlorobiphenyl	0.01	19.7	ng/g
PCB128	2,2',3,3',4,4'-hexachlorobiphenyl	0.01	14.3	ng/g
PCB138	2,2',3,4,4',5'-hexachlorobiphenyl	0.01	44.4	ng/g
PCB153	2,2',4,4',5,5'-hexachlorobiphenyl	0.01	62.9	ng/g
PCB170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.01	262	ng/g
PCB180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.01	53.4	ng/g
PCB187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.01	36.7	ng/g
PCB195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.01	20.4	ng/g
PCB206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.01	54.7	ng/g
PCB209	decachlorobiphenyl	0.01	93.2	ng/g

7.1.3 Minimum Value in Dataset, continued

ANALYTE	NAME	MIN	MAX	UNITS
Pesticides				
ABHC	alpha-Hexachlorohexane	0.01	2.35	ng/g
BBHC	beta-Hexachlorohexane	0.01	5.58	ng/g
DBHC	delta-Hexachlorohexane	0.01	0.97	ng/g
ALDRIN	Aldrin	0.01	8.69	ng/g
DIELDRIN	Dieldrin	0.01	6.08	ng/g
CISCHL	alpha-Chlordane	0.01	6.96	ng/g
OXYCHL	Oxychlordane	0.01	0.32	ng/g
ENDOSUII	Endosulfan II	0.01	14.3	ng/g
ENDRIN	Endrin	0.01	2.19	ng/g
HEPTACHL	Heptachlor	0.01	3.96	ng/g
HEPTAEPO	Heptachlor epoxide	0.01	5.14	ng/g
HEXACHL	Hexachlorobenzene	0.01	10.3	ng/g
LINDANE	Lindane (gamma-BHC)	0.01	2.57	ng/g
MIREX	Mirex	0.01	2.23	ng/g
OPDDD	2,4'-DDD	0.01	40.7	ng/g
OPDDE	2,4'-DDE	0.01	29.1	ng/g
OPDDT	2,4'-DDT	0.01	2.84	ng/g
PPDDD	4,4'-DDD	0.01	134	ng/g
PPDDE	4,4'-DDE	0.01	266	ng/g
PPDDT	4,4'-DDT	0.01	117	ng/g
TNONCHL	trans-Nonachlor	0.01	5.24	ng/g

7.1.4 Maximum Value in Dataset
See Section 7.1.3

7.2 Data Record Example

7.2.1 Column Names for Example Records

STATION	EVNTDATE	ANALYTE	CONC	CHMUNITS	MDL	QACODE	LABCODE	YEAR

7.2.2 Example Data Records

STATION	EVNTDATE	ANALYTE	CONC	CHMUNITS	MDL	QACODE	LABCODE	YEAR
MA97-0001	8/25/97	ABHC	0	ng/g	0.0682	CHM-A	CHM-1	1997
MA97-0001	8/25/97	ACENTHE	33.6	ng/g	.	CHM-1		1997
MA97-0001	8/25/97	ACENTHY	25.8	ng/g	.	CHM-1		1997
MA97-0001	8/25/97	AG	0.073	ug/g	.	CHM-1		1997

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude (Westernmost)
-77.4339 decimal degrees

8.2 Maximum Longitude (Easternmost)
-74.7230 decimal degrees

8.3 Minimum Latitude (Southernmost)
34.9670 decimal degrees

8.4 Maximum Latitude (Northernmost)
40.1470 decimal degrees

8.5 Name of area or region
MAIA Region. The geographic area covered by this research includes the Delaware Estuary, the Chesapeake Bay, the Delmarva coastal bays, the Albemarle-Pamlico Sound and their contiguous estuaries.

9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Measurement Quality Objectives
The measurement quality objectives of the EMAP-Estuaries program specify accuracy and precision requirements of 30% for organic analytes and 15% for inorganic analytes (see Valente and Strobel, 1993).

9.2 Data Quality Assurance Procedures
QA procedures include running blanks, spiked samples, and standard reference materials with each batch of samples. Any batch failing to meet the specifications presented in Section 9.1 would be reanalyzed or rejected.

9.3 Actual Measurement Quality
All of the data reported in this data file met the QA specifications listed in Section 9.1.

10. DATA ACCESS

10.1 Data Access Procedures
Data can be downloaded from the web

10.2 Data Access Restrictions
None

10.3 Data Access Contact Persons
John Paul, Principal Investigator
U.S. EPA NHEERL-AED
401-782-3037, 401-782-3099 (FAX), paul.john@epa.gov

Harry Buffum, Data Manager/ MAIA-Estuaries
U.S. EPA NHEERL-AED
401-782-3183, 401-782-3030 (FAX), buffum.harry@epa.gov

10.4 Dataset Format
ASCII (CSV) and SAS Export files.

10.5 Information Concerning Anonymous FTP
Not available

10.6 Information Concerning WWW
No gopher access, see Section 10.1 for WWW access

10.7 EMAP CD-ROM Containing the Dataset
Data not available on CD-ROM

11. REFERENCES

DiToro, D. M., J. D. Mahoney, D. J. Hansen, K. J. Scott, A. R. Carlson, and G. T. Ankley. 1992. Acid volatile sulfide predicts the acute toxicity of cadmium and nickel in sediments. Environ. Sci. Technol. 26: 96-101.

Holland, A.F., ed. 1990. Near Coastal Program Plan for 1990: Estuaries. EPA 600/4-90/033. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. November 1990.

Kokkinakis, S.A., Hyland, J.L., and Robertson, A. 1994. Carolinian Demonstration Project - 1994 Field Operations Manual. Joint National Status and Trends/Environmental Monitoring and Assessment Program. NOAA/NOS/ORCA, Silver Spring, MD.

Plumb, R.H. 1981. Procedures for Handling and Chemical Analysis of Sediment and Water Samples. Prepared for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee on Criteria for Dredge and Fill Material. Published by Environmental Laboratory, U.S. Army Waterways Experiment Station, Vicksburg, MS. Technical Report EPA/CE-81-1.

Strobel, C.J. 1998. Environmental Monitoring and Assessment Program - Mid-Atlantic Integrated Assessment. Estuaries Component, Field Operations and Safety Manual. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. July 1998.

Strobel, C.J. 1998. Mid Atlantic Integrated Assessment / Environmental Monitoring and Assessment Program - Estuaries: Virginian Province Quality Assurance Project Plan. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. June 1998.

Strobel, C.J., H.W. Buffum, S.J. Benyi, E.A. Petrocelli, D.R. Reifsteck, and D.J. Keith. 1995. Statistical Summary: EMAP-Estuaries Virginian Province - 1990 to 1993. U.S. Environmental Protection Agency, NHEERL-AED, Narragansett, RI. EPA/620/R-94/026.

Texas A & M University, Geochemical and Environmental Research Group. 1990. NOAA Status and Trends, Mussel Watch Program, Analytical Methods. Submitted to NOAA. Rockville (MD): U.S. Dept. of Commerce, National Oceanic & Atmospheric Administration, Ocean Assessment Division.

U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual-Estuaries, Volume 1: Biological and Physical Analyses. U.S. Environmental Protection Agency, Office of Research and Development, Narragansett, RI. EPA/620/R-95/008.

Valente, R. and Strobel, C.J. 1993. Environmental Monitoring and Assessment Program- Estuaries: 1993 Virginian Province Quality Assurance Project Plan. U.S. EPA,NHEERL-AED, Narragansett, RI. May 1993

12. TABLE OF ACRONYMS

AED	Atlantic Ecology Division
CP	Carolinian Province
CBP	Chesapeake Bay Program
DB	Delaware Bay
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
GED	Gulf Ecology Division
GERG	Geochemical and Environmental Research Group
MAIA	Mid-Atlantic Integrated Assessment
ng/g	Nanograms per gram
NHEERL	National Health and Environmental Effects Research Laboratory

12. TABLE OF ACRONYMS, continued

NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
ODU	Old Dominion University
QA/QC	Quality Assurance/Quality Control
ppb	Parts per billion (equiv. to ng/g)
ppm	Parts per million (equiv. to ug/g)
SRM	Standard Reference Material
TOC	Total Organic Carbon
TAMU	Texas A&M University
ug/g	Micrograms per gram
USEPA	United States Environmental Protection Agency
VER	Versar, Inc.
WWW	World Wide Web

13. PERSONNEL INFORMATION

Harry Buffum, Database Manager, OAO Corp.
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3183, 401-782-3030 (FAX), buffum.harry@epa.gov

Don Cobb, Chemist
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-9616, 401-782-3030 (FAX), cobb.donald@epa.gov

Dan Dauer, Dept. of Biological Sciences
Old Dominion University, Norfolk, VA 23529-0266
757-683-3595, 757-683-5283 (FAX), ddauer@odu.edu

Courtney T. Hackney, Dept. of Biological Sciences
University of North Carolina at Wilmington, Wilmington, NC 28403-3297
910-962-3759, hackney@uncwil.edu

Steve Hale, EMAP Information Manager
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3048, 401-782-3030 (FAX), hale.stephen@epa.gov

Michelle Harmon, Program Manager
NOAA/NOS
1305 East West Highway, 10200 SSMC4, Silver Spring, MD 20901-3281
301-713-3034 x619, 301-713-4388 (FAX), michelle.harmon@noaa.gov

Melissa M. Hughes, Data Librarian, EMAP-Estuaries
OAO Corp., U.S. EPA NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3184, 401-782-3030 (FAX), hughes.melissa@epa.gov

Jeffrey L. Hyland, Carolinian Province Manager
NOAA/NOS/ORCA/CMBAD, NOAA/EPA Joint Nat. Coastal Research and Monitoring Program
217 Fort Johnson Rd. (P.O. Box 12559), Charleston, SC 29422-2559
843-762-5415, 843-762-5110 (FAX), jeff.hyland@noaa.gov

John Kiddon, AED Oceanographer
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3044, 401-782-3030 (FAX), kiddon.john@epa.gov

Joe LiVolsi, AED QA Officer
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3163, 401-782-3030 (FAX), livolsi.joseph@epa.gov

John Macauley, Field Coordinator
U.S. Environmental Protection Agency, NHEERL-Gulf Ecology Division (GED)
One Sabine Island Drive, Gulf Breeze, FL 32561
850-934-9200, 850-934-9201 (FAX), macauley.john@epa.gov

John Paul, Principal Investigator
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3037, 401-782-3099 (FAX), paul.john@epa.gov

J. Ananda Ranasinghe, Program Manager
Versar, Inc.
9200 Rumsey Rd., Columbia, MD 21045-1934
410-964-9200, 410-964-5156 (FAX), ranasinghana@versar.com

Charles J. Strobel, Field Coordinator
U.S. Environmental Protection Agency, NHEERL-AED
27 Tarzwell Drive, Narragansett, RI 02882-1197
401-782-3180, 401-782-3030 (FAX), strobel.charles@epa.gov

Carl S. Zimmerman, Chief, Division of Resource Management
Assateague Island National Seashore
7206 National Seashore Lane, Berlin, MD 21811
410-641-1443 x213, 410-641-1099 (FAX), carl_zimmerman@nps.gov