CATALOG DOCUMENTATION
COASTAL BAYS DATABASE
1993 DELAWARE AND MARYLAND BAYS
SEDIMENT CHEMISTRY ANALYTE CONCENTRATION BY SITE

TABLE OF CONTENTS

1. DATA SET IDENTIFICATION

1.1 Title of Catalog document

Coastal Bays Database
1993 Delaware and Maryland Bays
Sediment Chemistry Analyte Concentrations by Site

1.2 Author of the Catalog entry

Melissa Hughes, OAO Corporation

1.3 Catalog revision date

11 December 1996

1.4 Data set name

CHEMRES

1.5 Task Group

Mid-Atlantic Integration and Assessment (MAIA)

1.6 Data set identification code

207

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

2.1 Principal Investigator

Dr. Frederick W. Kutz
U.S. Environmental Protection Agency - Region III

2.2. Investigation Participant-Sample Collection

Janis Chaillou
Versar, Inc.

3. DATA SET ABSTRACT

3.1 Abstract of the Data Set

The Sediment Chemistry Analyte Concentration data set presents the concentrations of a suite of analytes measured in a homogenized sediment sample. The National Oceanic and Atmospheric Administration (NOAA) National Status and Trends suite of contaminants were measured. Due to cost constraints, only a random subset of 11 samples from the dead-end canals and 10 samples from the remaining coastal bays were processed in the laboratory.

3.2 Keywords for the Data Set

Contaminants, sediment contaminant concentrations, PCBs, inorganic, organic, PAHs, DDT, chlorinated pesticides

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The objective of the Coastal Bays Joint Assessment was to assess the ecological condition of the Delaware and Maryland coastal bays, compare the current ecological condition of the bays with their historical condition and to evaluate indicators and sampling design elements that can be used to direct future monitoring activities in the system.

4.2 Data Set Objective

The objective of the Sediment Chemistry data set is to present the results of analyses conducted on a surficial sediment homogenate.

4.3 Data Set Background Information

The scientific and popular press have identified the presence of contaminants in estuaries as a problem contributing to degraded ecological resources and concerns about the safety of consuming fish and shellfish. Reducing contaminant inputs and concentrations, therefore, is often a major focus of regulatory programs for estuaries. The contaminants, however, originate from many sources and are generally poorly characterized. Most contaminants that are potentially toxic to biological resources tend to bind to particles and are deposited in the bottom of estuaries, thus accumulating in bottom sediments. Because of the complex nature of sediment geochemistry and possible additive, synergistic and antagonistic interactions among multiple pollutants, the ecological impact of elevated contaminant levels in bottom sediments is not well understood.

4.4 Summary of Investigation Parameters

The organic and inorganic compound concentrations measured included: 15 major and trace elements, 24 individual Poly-Aromatic Hydrocarbon (PAH) compounds, the pesticide DDT and its metabolites, 9 pesticides other than DDT, 18 individual Poly-Chlorinated Biphenyl (PCB) congeners, and tri-butyltin (MBT, DBT, TBT), Total Organic Carbon (TOC) and acid volatile sulfides (AVS). This suite of analytes is the same as that measured in NOAA's National Status and Trends (NS&T) program. Concentrations of all analytes are reported on a dry weight basis.

5. DATA ACQUISITION AND SAMPLING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

Collect sediment grab samples suitable for the removal and homogenization of surficial sediment to be used for later analysis of organic and inorganic contaminants.

5.1.2 Sample Collection Methods Summary

The grab sampler was lowered through the water column; the grab penetrated the sediment by gravity releasing a trigger allowing the jaws to close. When the grab was pulled from the sediment using the winch, the jaws closed, encapsulating the sediment sample.

The top 2 cm of sediment from multiple grabs was removed and placed in a Teflon bowl to obtain a final volume of about 1,500 ml of sediment. The composite sample was homogenized and distributed to separate containers to provide appropriate samples for analysis of organics, acid volatile sulfides and metals; all samples were frozen.

5.1.3 Sampling Start Date

12 July 1993

5.1.4 Sampling End Date

30 September 1993

5.1.5 Platform

Sampling was conducted from 7 m (21 ft) Privateer equipped with an electric winch with a 12-foot boom.

5.1.6 Sampling Gear

A 1/25 m2, stainless steel, Young-modified Van Veen Grab sampler was used to collect sediment grabs for chemical analyses. 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

Young's Welding, Sandwich, MA

5.1.8 Key Variables

No data were recorded at the time of sample collection.

5.1.9 Collection Method Calibration

The sampling gear did 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

A successful grab had relatively level, intact sediment over the entire area of the grab and a sediment depth at the center of at least 5 centimeters. Unacceptable grabs included those with grossly slumped surfaces and those completely filled to the top, where the sediment was in direct contact with the hinged top.

Care was taken to avoid sediment that had touched the surface of the grab and to use only samples with undisturbed surfaces. The Teflon bowl was placed on ice in a closed cooler between grabs to reduce the temperature of the sample and prevent accidental contamination. All samples were frozen into aliquots for sample analysis.

5.1.11 Sample Collection Method Reference

Weisberg, S.B., A.F. Holland, K.J. Scott, H.T. Wilson, D.G. Heimbuch, S.C. Schimmel, J.B. Frithsen, J.F. Paul, J.K. Summers, R.M. Valente, J. Gerritsen and R.W. Latimer. 1993. EMAP-Estuaries, Virginian Province 1990: Demonstration Project Report. EPA/600/R-92/100. U.S. Environmental Protection Agency, Washington, D.C.

5.1.12 Sample Collection Method Deviations

NA

5.2 Data Preparation and Sample Processing

5.2.1 Sample Processing Objective

Process sediment samples to accurately measure organic and inorganic contaminants and acid volatile sulfides.

5.2.2 Sample Processing Methods Summary

The samples were analyzed by standard methods.

5.2.3 Sample Processing Method Calibration

NA

5.2.4 Sample Processing Quality Control

NA

5.2.5 Sample Processing Method Reference

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.

5.2.6 Sample Processing Method Deviations

NA

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Value

NA

6.2 Data Manipulation Description

NA

6.3 Data Manipulation Examples

NA

7. DATA DESCRIPTION

7.1 Description of Parameters

#	Parameter SAS Name	Data Type	Len	Format	Parameter Label
1	SITE	Num	4	4.	Station Number where Sample Collected
2	EVNTDATE	Num	8	MMDDYY8.	Date when Sample Collected
3	EVNTNUM	Num	4	4.	Unique Number to Define Sampling Event
4	STRATUM	Num	2	1.	Stratum (#) of Station
5	RANDOM	Num	2	1.	Station is Lagoon (1) Site or Not (0)
6	LAGOON	Num	2	1.	Station is Random (1) Site or Not (0)
7	ANALYTE	Char	8	$8.	Name of Compound Measured
8	CONC	Num	8	13.4	Conc. (ng/g,ug/u,%,umoles/g) of Compound

7.1.6 Precision to which values are reported

Measurements are accurate to three significant figures.

7.1.7 Minimum Value in Data Set

ANALYTE CODE	Minimum
ACENTHE	0
ACENTHY	0
AG	0
AL	12800.00
ALDRIN	0
ALPHACHL	0
ANTHRA	0
AS	0
AVS	0
BENANTH	0
BENAPY	0
BENEPY	0
BENZOFL	0
BENZOP	0
BIPHENYL	0
BT_TOT	0
CD	0
CHL_TOTC	0
CR	4.75
CU	0
DBT	0
DDD_TOT	0
DDE_TOT	0
DDT_STOT	0

7.1.7 Minimum Value in Data Set, continued

ANALYTE CODE	Minimum
DDT_TOT	0
DIBENZ	0
DIELDRIN	0
DIMETH	0
ENDOSUL1	0
ENDOSUL2	0
ENDOSULF	0
ENDRIN	0
ENDRIN_A	0
ENDRIN_K	0
FE	3550.00
FLUORANT	0
FLUORENE	0
HEPTACHL	0
HEPTAEPO	0
HEXACHL	0
HG	0
INDENO	0
LINDANE	0
MBT	0
MENAP1	0
MENAP2	0
MEPHEN1	0
MIREX	0
MN	64.0
MTLSTOTC	17100
NAPH	0
NI	0
OPDDD	0
OPDDE	0
OPDDT	0
OPDDTTOT	0
PAH_HMWC	0
PAH_LMWC	0
PAH_TOTC	0
PB	8.20
PCB101	0
PCB105	0
PCB118	0
PCB128	0
PCB138	0
PCB153	0
PCB170	0
PCB18	0
PCB180	0
PCB187	0
PCB195	0
PCB206	0
PCB209	0
PCB44	0
PCB52	0
PCB66	0

7.1.7 Minimum Value in Data Set, continued

ANALYTE CODE	Minimum
PCB8	0
PCBTOTC	0
PERYLENE	0
PHENANTH	0
PPDDD	0
PPDDE	0
PPDDT	0
PPDDTTOT	0
PYRENE	0
SB	0
SE	0
SEM_CD	0
SEM_CU	0
SEM_NI	0
SEM_PB	0
SEM_ZN	1.45
SN	0
T2PAHC	0
T3PAHC	0
T4PAHC	0
T5PAHC	0
T6PAHC	0
TBT	0
TNONCHL	0
TOC	1860.0
TRIMETH	0
ZN	5.35

7.1.7 Maximum Value in Data Set

ANALYTE CODE	Maximum
ACENTHE	31.8
ACENTHY	11.9
AG	0.367
AL	85600.0
ALDRIN	4.81
ALPHACHL	7.74
ANTHRA	463.0
AS	16.8
AVS	4100.0
BENANTH	1860.0
BENAPY	336.0
BENEPY	359.0
BENZOFL	1080.0
BENZOP	220.0
BIPHENYL	104.0
CD	1.1
CHL_TOTC	11.2
CHRYSENE	2130
CR	87.1

7.1.7 Maximum Value in Data Set, continued

ANALYTE CODE	Maximum
CU	88.1
DBT	17.1
DDD_TOT	11.3
DDE_TOT	12.4
DDT_TOT	23.7
DIBENZ	66.0
DIELDRIN	9.04
DIMETH	64.6
ENDOSUL1	2.27
ENDOSUL2	6.81
ENDOSULF	9.70
ENDRIN	1.65
ENDRIN_A	1.43
ENDRIN_K	4.74
FE	41500.0
FLUORANT	1670.0
FLUORENE	109.0
HEPTACHL	3.61
HEPTAEPO	0.339
HEXACHL	1.19
HG	0.111
INDENO	300.0
LINDANE	5.32
MBT	0
MENAP1	4000000
MENAP2	59.8
MEPHEN1	102.0
MIREX	0.496
MN	630.0
MTLSTOTC	117851.00
NAPH	131.0
NI	27.0
OPDDD	4.99
OPDDE	5.02
OPDDT	2.57
OPDDTTOT	8.60
PAH_HMWC	9061.0
PAH_LMWC	1135.6
PAH_TOTC	10196.6
PB	66.2
PCB101	3.54
PCB105	3.27
PCB118	5.72
PCB128	3.45
PCB138	2.06
PCB153	6.92
PCB170	3.86
PCB18	3.64
PCB180	3.82
PCB187	7.61
PCB195	3.72
PCB206	0.796

7.1.7 Maximum Value in Data Set, continued

ANALYTE CODE	Maximum
PCB209	1.63
PCB28	16.3
PCB44	3.63
PCB52	15.4
PCB66	4.14
PCB8	2.06
PCBTOTC	47.26
PERYLENE	157.0
PHENANTH	329.0
PPDDD	8.80
PPDDE	9.85
PPDDT	2.19
PPDDTTOT	18.6
PYRENE	1210.0
SB	0.786
SE	1.48
SEM_CD	1.78
SEM_CU	16.7
SEM_NI	18.2
SEM_PB	23.7
SEM_ZN	163.0
SN	3.21
T2PAHC	439.2
T3PAHC	1003.0
T4PAHC	4740.0
T5PAHC	4101.0
T6PAHC	220.0
TBT	153.0
TNONCHL	3.31
TOC	88600.0
TRIMETH	23.8
ZN	245.0

7.2 Data Record Example

7.2.1 Column Names for Example Records

```
SITE  EVNTDATE  EVNTNUM  STRATUM  RANDOM  LAGOON  ANALYTE  CONC
```

7.2.2 Example Records

```
  OBS  SITE  EVNTDATE  EVNTNUM  STRATUM  RANDOM  LAGOON  ANALYTE
CONC

    1   108  07/14/93   2014       1        1       0     ACENTHE
0.0000
    2   108  07/14/93   2014       1        1       0     ACENTHY
0.0000
    3   108  07/14/93   2014       1        1       0     AG
0.1980
    4   108  07/14/93   2014       1        1       0     AL
57600.0000
```

7.2.2 Example Records, continued

```
    5   108  07/14/93   2014       1       1       0     ALDRIN
0.0000
    6   108  07/14/93   2014       1       1       0     ALPHACHL
0.8330
    7   108  07/14/93   2014       1       1       0     ANTHRA
35.8000
    8   108  07/14/93   2014       1       1       0     AS
11.9000
    9   108  07/14/93   2014       1       1       0     AVS
152.0000
   10   108  07/14/93   2014       1       1       0     BENANTH
78.7000
   11   108  07/14/93   2014       1       1       0     BENAPY
35.4000
   12   108  07/14/93   2014       1       1       0     BENEPY
38.3000
   13   108  07/14/93   2014       1       1       0     BENZOFL
103.0000
   14   108  07/14/93   2014       1       1       0     BENZOP
48.6000
   15   108  07/14/93   2014       1       1       0     BIPHENYL
9.9000
   16   108  07/14/93   2014       1       1       0     BT_TOT                 .
```

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-75 Degrees 17 Minutes 4.80 Decimal Seconds

8.2 Maximum Longitude

-75 Degrees 04 Minutes 18.60 Decimal Seconds

8.3 Minimum Latitude

38 Degrees 49 Minutes 54.60 Decimal Seconds

8.4 Maximum Latitude

38 Degrees 38 Minutes 33.00 Decimal Seconds

8.5 Name of area or region

Delaware and Maryland Coastal Bays

Stations were located in coastal bays along the East Coast of the United States in the States of Delaware and Maryland. Four major subsystems included Rehobeth Bay, Indian River Bay, Assawoman Bay and Chincoteague Bay. Areas of interest included Indian River, St. Martin River, Trappe Creek and artificial lagoons.

9. QUALITY CONTROL/ QUALITY ASSURANCE

9.1 Measurement Quality Objectives

Measurement quality objectives were the same for EMAP-Estuaries indicators and are outlined below:

Sediment Contaminant Analyses:	Maximum Allowable Accuracy Goal	Precision Goal	Completion Goal
Organics	30 %	30%	90%
Inorganics	15 %	15%	90%
Total organic carbon	10 %	10%	90%
Acid volatile sulfide	10 %	10%	90%

9.2 Quality Assurance/Control Methods

9.2.1 Sample Collection Quality Control

At least once during the field season, QA evaluation of each field crew will be performed by either the QA officer or a designee to insure compliance with prescribed protocols. Field crews will be re-trained whenever discrepancies are noted.

9.2.2 Sample Processing Quality Control

The QA/QC procedures for the laboratory chemical methods will follow a performance-based approach, which involves continuous laboratory evaluation through the use of accuracy-certified reference materials (CRMs), laboratory-fortified sample matrices, reagent blanks, calibration standards and laboratory and field replicates. The results from the QA/QC samples will be compared to the warning and control limit criteria listed below. If the limits are not met, corrective actions, including instrument recalibration, will be taken before processing additional samples.

For total organic carbon and acid volatile sulfide:

QA Sample Type	Frequency of Use	Data Generated for Measurement Quality Definition
Duplicates and analysis of standards	Each batch	Duplicate results and standard recoveries

9.3 Quality Assessment Results

These in-house QC measures met the requirements established in the QA Plan.

9.4 Unassessed Errors

NA

10. DATA ACCESS

10.1 Data Access Procedures

Data can be requested from a contact under Section 10.3.
Data can be downloaded from the WWW site.

10.2 Data Access Restrictions

10.3 Data Access Contact Persons

Dr. Frederick W. Kutz
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(410)305-2742 (Tel.)

10.4 Data Set Format

The data sets are in a fixed column format.

10.5 Information Concerning Anonymous FTP

Not accessible

10.6 Information Concerning WWW

Data can be downloaded from the WWW.

10.7 EMAP CD-ROM Containing the Data Set

Data not available on CD-ROM.

11. REFERENCES

Chaillou, J.C., S.B. Weisberg, F.W. Kutz, T.E. DeMoss, L. Mangiaracina, R. Magnien, R. Eskin, J. Maxted, K. Price and J.K. Summers. 1996. Assessment of the Ecological Condition of the Delaware and Maryland Coastal Bays. U.S. Environmental Protection Agency. Prepared by Versar, Inc., Columbia, MD.

Frithsen, J.B., L.C. Scott and M. Young 1994. Methods for processing estuarine benthic macroinvertebrate samples from the EMAP Estuaries Virginian Province. Versar, Inc, Columbia, MD.

Strobel, C.J. 1990. Environmental Monitoring and Assessment Program-Near Coastal Component: 1990 Demonstration Project Field Operations Manual. U.S. EPA NHEERL-AED, Narragansett, RI. October 1990.

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., C.J. Strobel, J.E. Pollard, K.M. Peres, T.C. Chiang and J. Rosen. 1990. Quality Assurance Project Plan for Near Coastal: 1990 Demonstration Project. U.S. EPA NHEERL-AED, Narragansett, RI.

12. TABLE OF ACRONYMS

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