

US EPA ARCHIVE DOCUMENT

CATALOG DOCUMENTATION  
EMAP SURFACE WATERS PROGRAM LEVEL DATABASE  
1997-1998 Mid-Atlantic Integrated Assessment Program  
Stream Benthos Metrics Data

TABLE OF CONTENTS

1. DATA SET IDENTIFICATION
2. INVESTIGATOR INFORMATION
3. DATA SET 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 / QUALITY ASSURANCE
10. DATA ACCESS
11. REFERENCES
12. TABLE OF ACRONYMS
13. PERSONNEL INFORMATION

1. DATA SET IDENTIFICATION

1.1 Title of Catalog Document

1997-1998 Mid-Atlantic Integrated Assessment Program  
Stream Benthos Metrics Data

1.2 Authors of the Catalog Entry

U.S. EPA NHEERL Western Ecology Division  
Corvallis, OR

1.3 Catalog Revision Date

August 2000

1.4 Data Set Name

BENTMET

1.5 Task Group

Surface Waters

1.6 Data Set Identification Code

132

1.7 Version

001

1.8 Requested Acknowledgement

These data were produced as part of the U.S. EPA's Environmental Monitoring and Assessment Program (EMAP). If you publish these data or use them for analyses in publication, 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 Surface Waters Program, it has not been subjected to Agency review, and therefore does not necessarily reflect the views of the Agency and no official endorsement of the conclusions should be inferred."

## 2. INVESTIGATOR INFORMATION

### 2.1 Principal Investigator

Dr. John Stoddard  
U.S. Environmental Protection Agency  
NHEERL Western Ecology Division  
200 S.W. 35th Street  
Corvallis, OR 97333

### 2.2 Investigation Participants - Sample Collection

Oregon State University  
State of West Virginia  
State of Maryland  
University of Maryland  
U.S. Environmental Protection Agency  
Office of Research and Development  
Region III

## 3. DATA SET ABSTRACT

### 3.1 Abstract of the Data Set

This data set contains a list of metrics derived from the species composition within the stream at the time of sampling. The metrics summarize the species relative abundance information by collapsing it into a series of metrics representing trophic guilds, habitat preferences, tolerance capacities and measures of biodiversity.

### 3.2 Keywords for the Data Set

Benthos assemblage, benthos community, benthos species identification

## 4. OBJECTIVES AND INTRODUCTION

### 4.1 Program Objective

In 1997 and 1998 the Ecological Monitoring and Assessment Program (EMAP) Surface Waters Program became a collaborator in the Mid-Atlantic Integrated Assessment (MAIA) project, which is attempting to produce an assessment of the condition of surface water and estuarine resources. The MAIA project represents a follow-up to the MAHA study, with an expanded geographic scope (southern New York to northern North Carolina, with more sites located in the Piedmont and Coastal Plain regions) and a different index period (July-September).

### 4.2 Data Set Objective

This data set is part of a demonstration project to evaluate approaches to monitoring streams in EMAP. The data set contains the results of multi-habitat sample of the benthos assemblage.

#### 4.3 Data Set Background Discussion

The benthos community within a stream is an integral component of stream biological integrity. The primary function of the stream benthos data are to provide a snapshot of the benthos assemblage present in the stream at the time of sampling. The benthos community represents an integral component of stream biological integrity.

#### 4.4 Summary of Data Set Parameters

Benthic macroinvertebrate parameters include individual counts and percentages of the sample for certain families of taxa, functional feeding groups, and pollutions tolerant and intolerant taxa. In addition, for each sample the Modified Hilsenhoff Biotic Index and the Shannon-Weaver diversity index are reported.

### 5. DATA ACQUISITION AND PROCESSING METHODS

#### 5.1 Data Acquisition

##### 5.1.1 Sampling Objective

To obtain a sample of the benthos assemblage within a stream.

##### 5.1.2 Sample Collection Methods Summary

The assemblage was sampled using a modified kicknet with 595 micron mesh distributed in multiple habitats throughout the stream.

##### 5.1.3 Sampling Start Date

May 1997

##### 5.1.4 Sampling End Date

September 1998

##### 5.1.5 Platform

NA

##### 5.1.6 Sampling Gear

Modified kicknet with 595 micron mesh

##### 5.1.7 Manufacturer of Instruments

NA

##### 5.1.8 Key Variables

NA

##### 5.1.9 Sampling Method Calibration

NA

##### 5.1.10 Sample Collection Quality Control

See Lazorchak, et al. 1998.

5.1.11 Sample Collection Method Reference

Chaloud, D.J. and D.V. Peck. 1994. Environmental Monitoring and Assessment Program: Integrated Quality Assurance Project Plan for the Surface Waters Resource Group, 1994 Activities. EPA 600/X-91/080, Rev. 2.00 U.S. Environmental Protection Agency, Las Vegas, Nevada.

Lazorchak, J.M., Klemm, D.J., and Peck D.V. (editors). 1998. Environmental Monitoring and Assessment Program- Surface Waters: Field Operations and Methods for Measuring the Ecological Condition of Wadeable Streams. EPA/620/R-94/004F. U.S. Environmental Protection Agency, Washington, D.C.

5.1.12 Sample Collection Method Deviations

NA

5.2 Data Preparation and Sample Design

5.2.1 Sample Processing Objective

See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.2 Sample Processing Methods Summary

See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.3 Sample Processing Method Calibration

See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.4 Sample Processing Quality Control

See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

5.2.5 Sample Processing Method Reference

See Lazorchak, et al. (1998) and Chaloud and Peck (1994).

6. DATA MANIPULATIONS

6.1 Name of New or Modified Values

None

6.2 Data Manipulation Description

See Chaloud and Peck (1994).

7. DATA DESCRIPTION

7.1 Description of Parameters

Parameter SAS Name	Data Type	Len	Format	Parameter Label
CHIRPIND	Num	8		Chironomid % Individuals
CHIRPTAX	Num	8		Chironomid % Distinct Taxa
CHIRRICH	Num	8		Chironomid Distinct Taxa Richness
COFIPIND	Num	8		Collector-Filter % Individuals
COFIPTAX	Num	8		Collector-Filter % Distinct Taxa
COFIRICH	Num	8		Collector-Filter Distinct Taxa Richness
COGAPIND	Num	8		Collector-Gather % Individuals

7.1 Description of Parameters, continued

COGAPTAX	Num	8		Collector-Gather % Distinct Taxa
COGARICH	Num	8		Collector-Gather Distinct Taxa Richness
COM_IM	Char	80		IM Personnel Comment
COM_LAB	Char	50	\$CHAR	Lab Personnel Comment
DATE_COL	Num	8	MMDDYY	Date Stream Visited
DN_FINIS	Num	8	TIME	Drift net - end time
DN_START	Num	8	TIME	Drift net - start time
DN_TRANS	Char	1		Drift net - transect station
DN_VELOC	Num	8		Drift net - Velocity ft/sec
DOM1PIND	Num	8		Percent of Individuals in Dominant Taxa
DOM1TAXA	Char	50		Dominant Taxa
DOM3PIND	Num	8		Percent of Individuals in Top 3 Taxa
DOM5PIND	Num	8		Percent of Individuals in Top 5 Taxa
EPHEPIND	Num	8		Ephemeroptera % Individuals
EPHEPTAX	Num	8		Ephemeroptera % Distinct Taxa
EPHERICH	Num	8		Ephemeroptera Distinct Taxa Richness
EPT_PIND	Num	8		EPT % Individuals
EPT_PTAX	Num	8		EPT % Distinct Taxa
EPT_RICH	Num	8		EPT Distinct Taxa Richness
FACLPIND	Num	8		Facultative % Individuals
FACLPTAX	Num	8		Facultative % Distinct Taxa
FACLRICH	Num	8		Facultative Distinct Taxa Richness
FLOWTYPE	Char	20	\$CHAR	Pool/Riffle/Shore/Midchannel/Drift/Ponar
HBI	Num	8		Hilsenhoff Biotic Index
HPRIME	Num	8		Shannon Diversity
INTLPIND	Num	8		Intolerant % Individuals
INTLPTAX	Num	8		Intolerant % Distinct Taxa
INTLRICH	Num	8		Intolerant Distinct Taxa Richness
LAT_DD	Num	8		X-Site Latitude (decimal degrees)
LON_DD	Num	8		X-Site Longitude (decimal degrees)
MEGLPIND	Num	8		Megaloptera % Individuals
MEGLPTAX	Num	8		Megaloptera % Distinct Taxa
MEGLRICH	Num	8		Megaloptera Distinct Taxa Richness
MIXDPIND	Num	8		Mixed Functional % Individuals
MIXDPTAX	Num	8		Mixed Functional % Distinct Taxa
MIXDRICH	Num	8		Mixed Functional Distinct Taxa Richness
NOINPIND	Num	8		Non-Insect % Individuals
NOINPTAX	Num	8		Non-Insect % Distinct Taxa
NOINRICH	Num	8		Non-Insect Distinct Taxa Richness
NUMTRANS	Num	8		Number of Transects Counted
OLLEPIND	Num	8		Oligochaete/Leech % Individuals
OLLEPTAX	Num	8		Oligochaete/Leech % Distinct Taxa
OLLERICH	Num	8		Oligochaete/Leech Distinct Taxa Richness
OMNIPIND	Num	8		Omnivore % Individuals
OMNIPTAX	Num	8		Omnivore % Distinct Taxa
OMNIRICH	Num	8		Omnivore Distinct Taxa Richness
PARAPIND	Num	8		Parasite % Individuals
PARAPTAX	Num	8		Parasite % Distinct Taxa
PARARICH	Num	8		Parasite Distinct Taxa Richness
PIERPIND	Num	8		Piercer-Herbivore % Individuals
PIERPPTAX	Num	8		Piercer-Herbivore % Distinct Taxa

7.1 Description of Parameters, continued

PIERRICH	Num	8		Piercer-Herbivore Distinct Taxa Richness
PLECPIND	Num	8		Plecoptera % Individuals
PLECPTAX	Num	8		Plecoptera % Distinct Taxa
PLECRICH	Num	8		Plecoptera Distinct Taxa Richness
PREDPIND	Num	8		Predator % Individuals
PREDPTAX	Num	8		Predator % Distinct Taxa
PREDRICH	Num	8		Predator Distinct Taxa Richness
SAMPLED	Char	30		Site Sampled Code
SCAVPIND	Num	8		Scavenger % Individuals
SCAVPTAX	Num	8		Scavenger % Distinct Taxa
SCAVRICH	Num	8		Scavenger Distinct Taxa Richness
SCRPPIND	Num	8		Scraper % Individuals
SCRPTAX	Num	8		Scraper % Distinct Taxa
SCRPRICH	Num	8		Scraper Distinct Taxa Richness
SHRDPIND	Num	8		Shredder % Individuals
SHRDPTAX	Num	8		Shredder % Distinct Taxa
SHDRICH	Num	8		Shredder Distinct Taxa Richness
SIMPSON	Num	8		Simpson Index
SQ_POSS	Num	8		Squares Possible
SQ_SORT	Num	8		Squares Sorted
STRM_ID	Char	10	\$CHAR	Stream ID
TOLRPIND	Num	8		Tolerant % Individuals
TOLRPTAX	Num	8		Tolerant % Distinct Taxa
TOLRRICH	Num	8		Tolerant Distinct Taxa Richness
TOTLDENS	Num	8		Macroinvertebrate Density (number/m2)
TOTLNIND	Num	8		Total Number of Individuals
TOTLRICH	Num	8		Total Distinct Taxa Richness
TRICPIND	Num	8		Trichoptera % Individuals
TRICPTAX	Num	8		Trichoptera % Distinct Taxa
TRICRICH	Num	8		Trichoptera Distinct Taxa Richness
UNKNPIND	Num	8		Unknown Function % Individuals
UNKNPTAX	Num	8		Unknown Function % Distinct Taxa
UNKNRICH	Num	8		Unknown Function Distinct Taxa Richness
VISIT_NO	Num	8		Visit Number
YEAR	Num	8		Sample Year

7.1.6 Precision to which values are reported

7.1.7 Minimum Value in Data Set

Name	Min
-----	
CHIRPIND	0
CHIRPTAX	0
CHIRRICH	0
COFIPIND	0
COFIPTAX	0
COFIRICH	0
COGAPIND	0
COGAPTAX	0
COGARICH	0

7.1.7 Minimum Value in Data Set, continued

DATE\_COL 05/20/1997  
DN\_FINIS 12720  
DN\_START 4500  
DN\_VELOC 0  
DOM1PIND 7.1111111111  
DOM3PIND 19.130434783  
DOM5PIND 29.130434783  
EPHEPIND 0  
EPHEPTAX 0  
EPHERICH 0  
EPT\_PIND 0  
EPT\_PTAX 0  
EPT\_RICH 0  
FACLPIND 0  
FACLPTAX 0  
FACLRICH 0  
HBI 2.6368217054  
HPRIME 0  
INTLPIND 0  
INTLPTAX 0  
INTLRICH 0  
LAT\_DD 35.182938  
LON\_DD -83.555659  
MEGLPIND 0  
MEGLPTAX 0  
MEGLRICH 0  
MIXDPIND 0  
MIXDPTAX 0  
MIXDRICH 0  
NOINPIND 0  
NOINPTAX 0  
NOINRICH 0  
NUMTRANS 1  
OLLEPIND 0  
OLLEPTAX 0  
OLLERICH 0  
OMNIPIND 0  
OMNIPTAX 0  
OMNIRICH 0  
PARAPIND 0  
PARAPTAX 0  
PARARICH 0  
PIERPIND 0  
PIERPPTAX 0  
PIERRICH 0  
PLECPIND 0  
PLECPTAX 0  
PLECRICH 0  
PREDPIND 0  
PREDPTAX 0  
PREDRICH 0



7.1.7 Minimum Value in Data Set, continued

SCAVPIND 0  
 SCAVPTAX 0  
 SCAVRICH 0  
 SCRPPIND 0  
 SCRPTAX 0  
 SCRPRICH 0  
 SHRDPIND 0  
 SHRDPTAX 0  
 SHRRICH 0  
 SIMPSON 0.0323358025  
 SQ\_POSS 0  
 SQ\_SORT 0  
 TOLRPIND 0  
 TOLRPTAX 0  
 TOLRRICH 0  
 TOTLDENS 0  
 TOTLNIND 0  
 TOTLRICH 0  
 TRICPIND 0  
 TRICPTAX 0  
 TRICRICH 0  
 UNKNPIND 0  
 UNKNPTAX 0  
 UNKNRICH 0  
 VISIT\_NO 0  
 YEAR 1997

7.1.7 Maximum Value in Data Set

Name	Max
CHIRPIND	98.431372549
CHIRPTAX	85.714285714
CHIRRICH	40
COFIPIND	87.781350482
COFIPTAX	50
COFIRICH	17
COGAPIND	100
COGAPTAX	100
COGARICH	26
DATE_COL	09/30/1998
DN_FINIS	79200
DN_START	61200
DN_VELOC	5.15
DOM1PIND	100
DOM3PIND	100
DOM5PIND	100
EPHEPIND	100
EPHEPTAX	100
EPHERICH	16

7.1.7 Maximum Value in Data Set, continued

EPT\_PIND 100  
EPT\_PTAX 100  
EPT\_RICH 28  
FACLPIND 100  
FACLPTAX 100  
FACLRICH 49  
HBI 7.2175925926  
HPRIME 3.7735823431  
INTLPIND 100  
INTLPTAX 100  
INTLRICH 31  
LAT\_DD 42.600349  
LON\_DD -74.662034  
MEGLPIND 30.952380952  
MEGLPTAX 28.571428571  
MEGLRICH 3  
MIXDPIND 72.549019608  
MIXDPTAX 50  
MIXDRICH 11  
NOINPIND 100  
NOINPTAX 100  
NOINRICH 13  
NUMTRANS 11  
OLLEPIND 51.851851852  
OLLEPTAX 31.578947368  
OLLERICH 8  
OMNIPIND 84.333333333  
OMNIPTAX 25  
OMNIRICH 5  
PARAPIND 6.0402684564  
PARAPTAX 16.666666667  
PARARICH 2  
PIERPIND 17.627118644  
PIERPPTAX 7.6923076923  
PIERRICH 2  
PLECPIND 82.558139535  
PLECPTAX 27.272727273  
PLECRICH 7  
PREDPIND 100  
PREDPTAX 100  
PREDRICH 22  
SCAVPIND 50.925925926  
SCAVPTAX 28.571428571  
SCAVRICH 8  
SCRPPIND 80  
SCRPPPTAX 33.333333333  
SCRPRICH 14  
SHRDPIND 82.170542636  
SHRDPTAX 33.333333333  
SHRDRICH 9  
SIMPSON  
SQ\_POSS 120

### 17.1.7 Maximum Value in Data Set, continued

SQ\_SORT 120  
TOLRPIND 96  
TOLRPTAX 83.333333333  
TOLRRICH 18  
TOTLDENS 27760  
TOTLNIND 420  
TOTLRICH 74  
TRICPIND 80.769230769  
TRICPTAX 50  
TRICRICH 12  
UNKNPIND 68.674698795  
UNKNPTAX 22.222222222  
UNKNRICH 6  
VISIT\_NO 3  
YEAR 1998

### 7.2.1 Column Names for Example Records

"CHIRPIND", "CHIRPTAX", "CHIRRIC", "COFIPIND", "COFIPTAX", "COFIRICH", "COGAPIND",  
"COGAPTAX", "COGARICH", "COM\_IM", "COM\_LAB", "DATE\_COL", "DN\_FINIS", "DN\_START",  
"DN\_TRANS", "DN\_VELOC", "DOM1PIND", "DOM1TAXA", "DOM3PIND", "DOM5PIND", "EPHEPIND",  
"EPHEPTAX", "EPHERICH", "EPT\_PIND", "EPT\_PTAX", "EPT\_RICH", "FACLPIND", "FACLPTAX",  
"FACLRICH", "FLOWTYPE", "HBI", "HPRIME", "INTLPIND", "INTLPTAX", "INTLRICH",  
"LAT\_DD", "LON\_DD", "MEGLPIND", "MEGLPTAX", "MEGLRICH", "MIXDPIND", "MIXDPTAX",  
"MIXDRICH", "NOINPIND", "NOINPTAX", "NOINRICH", "NUMTRANS", "OLLEPIND", "OLLEPTAX",  
"OLLERICH", "OMNIPIND", "OMNIPTAX", "OMNIRICH", "PARAPIND", "PARAPTAX", "PARARICH",  
"PIERPIND", "PIERPPTAX", "PIERRICH", "PLECPIND", "PLECPTAX", "PLECRICH", "PREDPIND",  
"PREDPPTAX", "PREDRICH", "SAMPLED", "SCAVPIND", "SCAVPTAX", "SCAVRICH", "SCRPPIND",  
"SCRPPPTAX", "SCRPRICH", "SHRDPIND", "SHRDPTAX", "SHRDRICH", "SIMPSON", "SQ\_POSS",  
"SQ\_SORT", "STRM\_ID", "TOLRPIND", "TOLRPTAX", "TOLRRICH", "TOTLDENS", "TOTLNIND",  
"TOTLRICH", "TRICPIND", "TRICPTAX", "TRICRICH", "UNKNPIND", "UNKNPTAX", "UNKNRICH",  
"VISIT\_NO", "YEAR"

### 7.2.2 Example Data Records

75.609756098,61.904761905,13,9.756097561,14.285714286,3,26.829268293,  
19.047619048,4," "," ",09/08/1997,.,.," ",.,12.195121951,  
"Parakiefferiella sp.1",31.707317073,46.341463415,2.4390243902,4.7619047619,1,  
2.4390243902,4.7619047619,1,82.926829268,76.19047619,16,"POOL",5.2634146341,  
2.8831578143,4.8780487805,9.5238095238,2,38.247943,-81.886602,0,0,0,  
9.756097561,4.7619047619,1,2.4390243902,4.7619047619,1,6,0,0,0,2.4390243902,  
4.7619047619,1,0,0,0,0,0,0,0,0,0,36.585365854,38.095238095,8,"Yes",0,0,0,  
2.4390243902,4.7619047619,1,0,0,0,0.0648423557,120,40,"MAIA97-001",  
12.195121951,14.285714286,3,82,41,21,0,0,0,12.195121951,14.285714286,3,1,1997  
  
86.06557377,70.833333333,17,6.5573770492,8.333333333,2,15.573770492,  
33.333333,8," "," ",07/12/1997,.,.," ",.,47.82608696,"Polypedilum scalaenum gr.",  
60.869565217,70.434782609,4.0983606557,8.333333333,2,6.5573770492,12.5,  
3,93.442622951,79.166666667,19,"POOL",5.387704918,2.1920866391,4.0983606557,  
12.5,3,38.550017,-82.144807,0,0,0,49.180327869,12.5,3,0,0,0,6,0,0,0,0,0,  
0,0,0,0,0,0,2.4590163934,4.166666667,1,14.754098361,29.166666667,7,"Yes",  
0,0,0,13.114754098,16.666666667,4,0.8196721311,0,0,0.2479395085,120,40,  
"MAIA97-002",2.4590163934,8.333333333,2,244,122,24,0,0,0,0,0,0,0,1,1997

## 8. GEOGRAPHIC AND SPATIAL INFORMATION

### 8.1 Minimum Longitude

-83 Degrees 33 Minutes 20 Seconds West (-83.555659 Decimal Degrees )

### 8.2 Maximum Longitude

-74 Degrees 39 Minutes 43 Seconds West (-74.662034 Decimal Degrees )

### 8.3 Minimum Latitude

35 Degrees 10 Minutes 58 Seconds North (35.182938 Decimal Degrees )

### 8.4 Maximum Latitude

42 Degrees 36 Minutes 1 Seconds North (42.600349 Decimal Degrees )

### 8.5 Name of Area or Region

Mid Atlantic: EPA Region III which includes Delaware, Maryland, New York, Virginia, and West Virginia

## 9. QUALITY CONTROL / QUALITY ASSURANCE

### 9.1 Data Quality Objectives

See Chaloud and Peck (1994).

### 9.2 Quality Assurance Procedures

See Chaloud and Peck (1994).

### 9.3 Unassessed Errors

NA

## 10. DATA ACCESS

### 10.1 Data Access Procedures

### 10.2 Data Access Restrictions

### 10.3 Data Access Contact Persons

### 10.4 Data Set Format

### 10.5 Information Concerning Anonymous FTP

### 10.6 Information Concerning WWW

### 10.7 EMAP CD-ROM Containing the Data

## 11. REFERENCES

Chaloud, D.J. and D.V. Peck. 1994. Environmental Monitoring and Assessment Program: Integrated Quality Assurance Project Plan for the Surface Waters Resource Group, 1994 Activities. EPA 600/X-91/080, Rev. 2.00 U.S. Environmental Protection Agency, Las Vegas, Nevada.

Lazorchak, J.M., Klemm, D.J., and Peck D.V. (editors). 1998. Environmental Monitoring and Assessment Program- Surface Waters: Field Operations and Methods for Measuring the Ecological Condition of Wadeable Streams. EPA/620/R-94/004F. U.S. Environmental Protection Agency, Washington, D.C.

## 12. TABLE OF ACRONYMS

## 13. PERSONNEL INFORMATION

Project Manager  
Dr. John Stoddard  
U.S. Environmental Protection Agency  
NHEERL Western Ecology Division  
200 S.W. 35th Street  
Corvallis, OR 97333  
541-754-4441  
541-754-4716(FAX)  
stoddard.john@epa.gov

Quality Assurance Officer  
Dave Peck  
U.S. Environmental Protection Agency  
NHEERL Western Ecology Division  
200 S.W. 35th Street  
Corvallis, OR 97333  
541-754-4426  
541-754-4716(FAX)  
peck.david@epa.gov

Information Management, EMAP-Surface Waters  
Marlys Cappaert  
OAO c/o U.S. Environmental Protection Agency  
NHEERL Western Ecology Division  
200 S.W. 35th Street  
Corvallis, OR 97333  
541-754-4467  
541-754-4716(FAX)  
cappaert.marlys@epa.gov