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

1.   DATA SET IDENTIFICATION

1.1 Title of Catalog Document
EMAP Surface Waters Stream Database
1997-1998 Mid-Atlantic Streams
Stream Fish Metrics Data Summarized by Stream

1.2 Authors of the Catalog Entry
U.S. EPA NHEERL Western Ecology Division
Corvallis, OR

1.3 Catalog Revision Date
October 2002

1.4 Data Set Name
FISHMET

1.5 Task Group
Surface Waters

1.6 Data Set Identification Code
147

1.7 Version
001

1.8 Requested Acknowledgment
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:

2.O   INVESTIGATOR INFORMATION

2.1   Principal Investigator

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2.2   Investigation Participant- Sample Collection

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

3.0 DATA SET ABSTRACT

3.1 Abstract of the Data Set

The primary function of the stream fish data are to provide a
snapshot of the fish assemblage present in the stream at the time
of sampling. The fish community represents an integral component
of stream biological integrity and represents a snapshot of a
publicly visible reflection of stream quality.

3.2 Keywords for the Data Set
Fish assemblage, fish community, fish species identification

4.0   OBJECTIVES AND INTRODUCTION

4.1 Program Objectives
The Environmental Monitoring and Assessment Program (EMAP) was
designed to periodically estimate the status and trends of the
Nation's ecological resources on a regional basis. EMAP provides
a strategy to identify and bound the extent, magnitude and
location of environmental degradation and improvement on a
regional scale based on a probability-based statistical survey
design.

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 fish assemblage taken
during spring low-flow.

4.3 Data Set Background Discussion

The fish community within a stream is an integral component of stream biological integrity and represents a publicly visible reflection of stream quality. 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.

4.4 Summary of Data Set Parameters

Fish Assemblage metrics include counts of individuals and species collected which can be grouped into several functional classifications, as well as percent of species collected in the same classifications. The classifications include feeding functions such as insectivores and piscivores, species similarities such as minnow species, native/non-native classification, and pollution tolerance or intolerance.

5.   DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

To obtain a sample of the fish assemblage within a stream during a two month sampling window from April through mid-June.

5.1.2 Sample Collection Methods Summary

The assemblage was sampled using single pass with a backpack electrofishing unit 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

5.1.6 Sampling Gear

Backpack electrofishing unit

5.1.7 Manufacturer of Instruments

5.1.8 Key Variables

5.1.9 Sampling Method Calibration

5.1.10 Sample Collection Quality Control

See Lazorchak, et al. 1998.

5.1.11 Sample Collection Method Reference
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.

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.

5.1.12 Sample Collection Method Deviations

5.2   DATA PREPARATION AND SAMPLE PROCESSING

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
81	ALIEN	Num	8		Nonindigenous individuals Metric(0-10)
17	ALIEN9	Num	8		Final IBI Alien Metric Score
71	BENTHIC	Num	8		Benthic species IBI Metric Score
14	BENTHIC9	Num	8		Final IBI NSBENT24 Metric Score
12	CARN9	Num	8		Final IBI PPRISCIN2 Metric Score
70	COLUMN	Num	8		Water column species IBI Metric Score
11	COTTID9	Num	8		Final IBI PCOTTID Metric Score

13	CYPR9	Num	8	Final IBI NSCYPR4 Metric Score
75	GRAVEL	Num	8	Simple lithophil IBI Metric Score
15	GRAVEL9	Num	8	pgravel IBI Metric Score
85	HERBIV	Num	8	Herbivore IBI Metric Score
86	IBI	Num	8	Draft Index of Biotic Integrity
102	IBI_NEW	Num	8	Final IBI Score (McCormick et al)
69	INTOL	Num	8	Intolerant IBI Metric Score
10	INTOL9	Num	8	Final IBInsintol4 IBI Metric Score
76	INVERT	Num	8	Invertivore IBI Metric Score
103	LAT_DD	Num	8	X-Site Latitude (decimal degrees)
104	LON_DD	Num	8	X-Site Longitude (decimal degrees)
7	LWSKM2	Num	8	Log10 watershed area (km2)
80	NALIEN	Num	8	Calc. adjusted proportion of aliens
68	NATFAM	Num	8	Native family IBI Metric Score
59	NATIVFAM	Num	8	Number of families represented
67	NATSP	Num	8	Native species IBI Metric Score
77	NINDIV	Num	8	Abundance IBI Metric Score
82	NOMNI_H	Num	8	Adjusted proportion omnivore-herbivores
78	NPTOLE	Num	8	Adjusted proportion of tolerants
66	NREPROS	Num	8	Number of reproductive guilds
46	NSANGU	Num	8	Number of anguilla species
54	NSATHER	Num	8	Number of atherin species
90	NSBENT2	Num	8	Number of native bent_inv minus 3 taxa
100	NSBENT23	Num	8	Watershed Area Corrected NSBENT2
101	NSBENT24	Num	8	Offset & Watershed Corrected NSBENT2
57	NSBHAB	Num	8	Number of benthic habitat species
37	NSCATO	Num	8	Number of sucker species
91	NSCATO2	Num	8	Number of native intolerant Catostomids
38	NSCENT	Num	8	Number of sunfish species
56	NSCOLU	Num	8	Number of water column species
39	NSCOTT	Num	8	Number of sculpin species
40	NSCYPR	Num	8	Number of minnow species
87	NSCYPR2	Num	8	Number of native intolerant cyprinids
98	NSCYPR3	Num	8	Watershed Area Corrected NSCYPR
99	NSCYPR4	Num	8	Offset & Watershed Corrected NSCYPR
41	NSDART	Num	8	Number of darter species
47	NSDRUMX	Num	8	Number of drum species
53	NSESOXX	Num	8	Number of esox species
49	NSFUND	Num	8	Number of fundelis species
52	NSGAMB	Num	8	Number of gambusia species
42	NSICTA	Num	8	Number of ictalurid species
43	NSINTOL	Num	8	Number of intolerant species
96	NSINTOL3	Num	8	Watershed Area Corrected NSINTOL
97	NSINTOL4	Num	8	Offset & Watershed Corrected NSINTOL
45	NSLAMP	Num	8	Number of lamprey species
58	NSLUNK	Num	8	Number of charismatic megafauna
48	NSPERCO	Num	8	Number of percopsis species
50	NSPPER	Num	8	Number of perch species
55	NSSALM	Num	8	Number of salmon species
51	NSUMBR	Num	8	Number of umbridae species
65	NTROPH	Num	8	Number of trophic guilds
9	NUMFISH	Num	8	Number of individuals in sample
44	NUMNATSP	Num	8	Number of native species
8	NUMSPEC	Num	8	Total number of fish species

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83   OMNI           Num     8          Omnivore IBI Metric Score
16   OMNI9          Num     8          Final IBI Pmacro Metric Score
31   PATNG          Num     8          Proportion of ind. as attacher non-guarder
29   PBCLN          Num     8          Proportion of ind. - bc spwn clear substr.
28   PBCST          Num     8          Proportion of ind. as broadcast spawners
25   PBENT          Num     8          Proportion of fish as benthic insectivores
20   PBENTSP        Num     8          Proportion of benthic hab. sp. in native
                                          sp.
61   PCARN          Num     8          Proportion piscivore-invert. (piscinv +
                                          pisciv)
30   PCGBU          Num     8          Proportion of ind. as clear gravel buriers
92   PCOLD1         Num     8          Proportion of cold water ind.
93   PCOLD2         Num     8          Proportion of cold & cool water ind.
19   PCOLSP         Num     8          Proportion of column sp. in native sp.
88   PCOTTID        Num     8          Proportion of ind. as cottids
89   PCYPTL         Num     8          Proportion of ind. as tolerant cyprinids
22   PEXOT          Num     8          Proportion of ind. as introduced
63   PGRAVEL        Num     8          Proportion of simple lithophils
33   PHERB          Num     8          Proportion of ind. as herbivores
24   PINSE          Num     8          Proportion of ind. as native insectivores
62   PINVERT        Num     8          Proportion of invertivores
74   PISCINV        Num     8          Piscivore-invertivore IBI Metric Score
21   PLUNKSP        Num     8          Proportion of lunker sp. to native sp.
35   PMACRO         Num     8          Proportion of macro-omnivores
34   PMICRO         Num     8          Proportion of micro-omnivores
95   PMICRO2        Num     8          Proportion of micro-omnivores - RHINATRO
27   PNEST          Num     8          Proportion of ind. as nest associates
32   PNTGU          Num     8          Proportion of ind. as nester guarder
60   POMNI_H        Num     8          Proportion omni-herbiv.(pmicro + pmacro +
                                          herbiv)
26   PPISC          Num     8          Proportion of ind. as carnivores
94   PPISCIN2       Num     8          Proportion of piscivore-insectiv.-SEMOATRO
36   PPISCINV       Num     8          Proportion of piscivore-insectivores
23   PTOLE          Num     8          Proportion of ind. as tolerant
64   PTREPRO        Num     8          Proportion tolerant reproductive guild
                                          indiv
72   REPRO          Num     8          Reproductive guild IBI Metric Score
4    SAMPLED        Char    30         Site Sampled Code
1    SITE_ID        Char    15 $       Stream ID
6    SQRTAREA       Num     8          Square root of watershed area (km2)
18   TOLERNT9       Num     8          Final IBI PTOLE Metric Score
84   TOLREPR        Num     8          Tolerant reproductive IBI Metric Score
                                          (not in IBI)
79   TOLRNT         Num     8          Tolerant individual IBI Metric Score
73   TROPH          Num     8          Trophic guild IBI Metric Score
3    VISIT_NO       Num     8          Visit Number
5    WS_AREA        Num     8          Watershed area (km2)
2    YEAR           Num     8          Sample Year
```

7.1.6 Precision to which values are reported

Name	Min
ALIEN	0
ALIEN9	0
BENTHIC	0
BENTHIC9	0
CARN9	0
COLUMN	0
COTTID9	0
CYPR9	0
GRAVEL	0
GRAVEL9	0
HERBIV	.
IBI	0
IBI_NEW	0
INTOL	0
INTOL9	0
INVERT	0
LAT_DD	35.182938
LON_DD	-83.555659
LWSKM2	-1.176056517
NALIEN	0.0555555556
NATFAM	0
NATIVFAM	0
NATSP	0
NINDIV	0
NOMNI_H	0
NPTOLE	0
NREPROS	0
NSANGU	0
NSATHER	0
NSBENT2	0
NSBENT23	-11.81958974
NSBENT24	-6.540589744
NSBHAB	0
NSCATO	0
NSCATO2	0
NSCENT	0
NSCOLU	0
NSCOTT	0
NSCYPR	0
NSCYPR2	0
NSCYPR3	-14.29234721
NSCYPR4	-8.005347209
NSDART	0
NSDRUMX	0
NSESOXX	0
NSFUND	0
NSGAMB	0
NSICTA	0
NSINTOL	0
NSINTOL3	-2.689881586

NSINTOL4	-1.219881586
NSLAMP	0
NSLUNK	0
NSPERCO	0
NSPPER	0
NSSALM	0
NSUMBR	0
NTROPH	0
NUMFISH	0
NUMNATSP	0
NUMSPEC	0
OMNI	0
OMNI9	0
PATNG	0
PBCLN	0
PBCST	0
PBENT	0
PBENTSP	0
PCARN	0
PCGBU	0
PCOLD1	0
PCOLD2	0
PCOLSP	0
PCOTTID	0
PCYPTL	0
PEXOT	0
PGRAVEL	0
PHERB	0
PINSE	0
PINVERT	0
PISCINV	0
PLUNKSP	0
PMACRO	0
PMICRO	0
PMICRO2	0
PNEST	0
PNTGU	0
POMNI_H	0
PPISC	0
PPISCIN2	0
PPISCINV	0
PTOLE	0
PTREPRO	0
REPRO	0
SQRTAREA	0.2582092175
TOLERNT9	0
TOLREPR	.
TOLRNT	0
TROPH	0
VISIT_NO	0
WS_AREA	0.066672
YEAR	1997

7.1.7 Maximum Value in Data Set

Name	Max
ALIEN	10
ALIEN9	10
BENTHIC	10
BENTHIC9	10
CARN9	10
COLUMN	10
COTTID9	10
CYPR9	10
GRAVEL	10
GRAVEL9	10
HERBIV	.
IBI	92.962806424
IBI_NEW	98.909281533
INTOL	10
INTOL9	10
INVERT	10
LAT_DD	42.567163
LON_DD	-74.688136
LWSKM2	5.0118742737
NALIEN	1
NATFAM	10
NATIVFAM	11
NATSP	10
NINDIV	10
NOMNI_H	1
NPTOLE	1
NREPROS	4
NSANGU	1
NSATHER	1
NSBENT2	16
NSBENT23	9.0621523708
NSBENT24	14.341152371
NSBHAB	19
NSCATO	7
NSCATO2	6
NSCENT	9
NSCOLU	17
NSCOTT	3
NSCYPR	14
NSCYPR2	8
NSCYPR3	6.9263340661
NSCYPR4	13.213334066
NSDART	11
NSDRUMX	1
NSESOXX	2
NSFUND	1
NSGAMB	2
NSICTA	3
NSINTOL	8
NSINTOL3	6.3417729978

NSINTOL4	7.8117729978
NSLAMP	1
NSLUNK	13
NSPERCO	1
NSPPER	1
NSSALM	1
NSUMBR	1
NTROPH	5
NUMFISH	3869
NUMNATSP	32
NUMSPEC	33
OMNI	10
OMNI9	10
PATNG	0.6585365854
PBCLN	0.8645833333
PBCST	0.6893854749
PBENT	1
PBENTSP	1
PCARN	1
PCGBU	1
PCOLD1	1
PCOLD2	1
PCOLSP	1
PCOTTID	0.8977272727
PCYPTL	1
PEXOT	0.9444444444
PGRAVEL	1
PHERB	0.5185810811
PINSE	1
PINVERT	1
PISCINV	10
PLUNKSP	1
PMACRO	0.8854166667
PMICRO	1
PMICRO2	1
PNEST	0.7816091954
PNTGU	1
POMNI_H	1
PPISC	0
PPISCIN2	1
PPISCINV	1
PTOLE	1
PTREPRO	1
REPRO	10
SQRTAREA	320.58052577
TOLERNT9	10
TOLREPR	.
TOLRNT	10
TROPH	10
VISIT_NO	3
WS_AREA	102771.8735
YEAR	1998

7.2 Data Record Example

7.2.1 Column Names for Example Records
"ALIEN","ALIEN9","BENTHIC","BENTHIC9","CARN9","COLUMN","COTTID9","CYPR9",
"GRAVEL","GRAVEL9","HERBIV","IBI","IBI_NEW","INTOL","INTOL9","INVERT",
"LAT_DD","LON_DD","LWSKM2","NALIEN","NATFAM","NATIVFAM","NATSP","NINDIV",
"NOMNI_H","NPTOLE","NREPROS","NSANGU","NSATHER","NSBENT2","NSBENT23",
"NSBENT24","NSBHAB","NSCATO","NSCATO2","NSCENT","NSCOLU","NSCOTT","NSCYPR",
"NSCYPR2","NSCYPR3","NSCYPR4","NSDART","NSDRUMX","NSESOXX","NSFUND","NSGAMB",
"NSICTA","NSINTOL","NSINTOL3","NSINTOL4","NSLAMP","NSLUNK","NSPERCO",
"NSPPER","NSSALM","NSUMBR","NTROPH","NUMFISH","NUMNATSP","NUMSPEC","OMNI",
"OMNI9","PATNG","PBCLN","PBCST","PBENT","PBENTSP","PCARN","PCGBU","PCOLD1",
"PCOLD2","PCOLSP","PCOTTID","PCYPTL","PEXOT","PGRAVEL","PHERB","PINSE",
"PINVERT","PISCINV","PLUNKSP","PMACRO","PMICRO","PMICRO2","PNEST","PNTGU",
"POMNI_H","PPISC","PPISCIN2","PPISCINV","PTOLE","PTREPRO","REPRO",
"SAMPLED","SITE_ID","SQRTAREA","TOLERNT9","TOLREPR","TOLRNT","TROPH",
"VISIT_NO","WS_AREA","YEAR"

7.2.2   Example Data Records
10,10,7.2736214704,10,0,4.891021517,0,10,0.25,0,.,.,51.484390079,54.331689591,0,
8.8985206317,0,38.247943,-81.886602,-0.661344334,1,5.7838153636,1,6.87674532,
0.8,0.975,0,1,0,0,0,1.6958565863,6.9748565863,1,0,0,0,1,0,2,0,3.6706388347,
9.9576388347,0,0,0,0,0,0,0,-0.09933714,1.3706628599,0,1,0,0,0,0,2,40,2,2,10,
10,0,0,0,0,0.5,0.975,0.025,0,0,0.5,0,1,0,0.025,0,0,0,10,0.5,0,0.025,0.025,0,
0.975,0.025,0,0,0.975,1,0.975,6.2029424391,"Yes","MAIA97-001",0.4670117772,
0,.,.,0,10,1,0.2181,1997

10,10,10,10,3.1028678256,9.5872619625,0,10,5.8762886598,6.6044321779,.,.,
83.002629956,70.626067805,6.997547567,10,10,38.550017,-82.144807,1.633596705,
1,6.7265165472,5,10,5.82,0.7663230241,0.295532646,4,0,0,8,3.6812842899,
8.9602842899,10,2,1,5,9,0,6,2,0.8087398825,7.0957398825,5,1,0,0,0,0,2,
0.7182771072,2.1882771072,0,9,0,0,0,0,5,291,19,19,9.5790378007,10,
0.1271477663,0.0309278351,0.0034364261,0.2749140893,0.5263157895,
0.2164948454,0.206185567,0,0,0.4736842105,0,0.560137457,0,0.587628866,
0.0859106529,0.264604811,0.5395189003,10,0.4736842105,0,0.147766323,
0.147766323,0.2233676976,0.4089347079,0.2336769759,0,0.0274914089,
0.2164948454,0.704467354,0.412371134,10,"Yes","MAIA97-002",6.5584068187,
3.8561610211,.,.,3.2836960672,8.3333333333,1,43.0127,1997

9.0909090909,6.2405986038,9.2307692308,8.0492534201,5.1303098707,9,0,0,
3.1363636364,0,.,.,76.031357531,.,.,7.5,10,9.5454545455,39.067885,-81.388766,
3.5996374953,0.9090909091,8.8888888889,8,8,4.4,0.5636363636,0.6954545455,4,
0,0,9,-0.471307549,4.8076924508,12,6,5,3,9,0,3,3,-8.069743707,-1.782743707,
2,1,0,0,0,2,3,0.7053453675,2.1753453675,1,9,0,0,0,0,5,220,20,22,7.0454545455,
0,0.0181818182,0.1954545455,0.1772727273,0.3909090909,0.5454545455,
0.0454545455,0.0954545455,0,0.0136363636,0.4545454545,0,0.0909090909,
0.0909090909,0.3136363636,0.1590909091,0.0863636364,0.4772727273,4.5454545455,
0.4545454545,0.2590909091,0.0181818182,0.0181818182,0.0045454545,0.2227272727,
0.4363636364,0,0.0454545455,0.0454545455,0.3045454545,0.4,10,"Yes",
"MAIA97-003",63.069407005,9.6859263186,.,.,7.7272727273,8.3333333333,1,
3977.7501,1997

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 41 Minutes 17 Seconds West (-74.688136 Decimal Degrees)

8.3 Minimum Latitude
35 Degrees 10 Minutes 58 Seconds North (35.182938 Decimal Degrees)

8.4 Maximum Latitude
42 Degrees 34 Minutes 1 Seconds North (42.567163 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
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.

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.

12. TABLE OF ACRONYMS

13. PERSONNEL INFORMATION

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