

US EPA ARCHIVE DOCUMENT

CATALOG DOCUMENTATION
EMAP-GREAT LAKES PROGRAM LEVEL DATABASE
1994 LAKE MICHIGAN NEARSHORE
BENTHIC INVERTEBRATE DATA

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1. DATA SET IDENTIFICATION

1.1 Title of Catalog document

EMAP-Great Lakes Program Level Database
1994 Lake Michigan Nearshore
Benthic Invertebrate Data

1.2 Authors of the Catalog entry

Jenny Kysely, ILS
Greg Elonen, ILS

1.3 Catalog revision date

17 April 1997

1.4 Data set name

LM_BEN

1.5 Task Group

Great Lakes

1.6 Data set identification code

504

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 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 has been funded wholly or in part by the U.S. Environmental Protection Agency through its EMAP-Great Lakes 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

Tom Nalepa
Great Lakes Environmental Research Lab
NOAA
Ann Arbor, Michigan

2.2 Investigation Participant - Sample Collection

Tom Nalepa
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3. DATA SET ABSTRACT

3.1 Abstract of the Data Set

The benthic invertebrate data set presents species composition data on each benthic taxon identified from all acceptable grab samples collected at a station. Total species abundance for each taxon identified from all grabs (generally 3) is reported. Mean abundance and standard deviation of mean abundance, number of grabs, sampling date and station identification are also reported.

3.2 Keywords for the Data Set

Lake Michigan, benthic invertebrates, total species abundance, mean species abundance, species composition, nearshore.

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

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 station sites randomly located in the Great Lakes. Three-fold enhanced sampling sites from nearshore Lake Michigan are included.

4.2 Data Set Objective

The objective of the benthic invertebrate species data set is to provide summary data for each taxon or species of benthic invertebrate identified from each station sampled in 1994 from the nearshore regions of Lake Michigan.

4.3 Background Discussion

Benthic invertebrate community structure is used extensively as a biomonitoring tool. These communities generally form stable associations that integrate and reflect environmental conditions. Owing to their diverse taxonomy, wide range of physiological response to stress and feeding modes, they tend to be sensitive to both natural and anthropogenic disturbances and stresses. For these reasons benthic invertebrate community structure is used as a tool for assessing the biological condition of the Great Lakes.

4.4 Summary of Data Set Parameters

Total species abundance, mean species abundance, the standard deviation of mean total abundance, and species composition at each station sampled.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

The primary objective was to collect sediment grab samples suitable for analysis of benthic invertebrates. Three replicate sediment samples were expected to be taken at each station.

5.1.2 Sample Collection Methods Summary

At sediment stations, three sediment samples were collected for benthic macroinvertebrates using a Ponar grab. Each sediment sample was washed with an elutriation device equipped with a 500 u Nitex screen. The residue was rinsed into a pint plastic jar. Samples were preserved 5% by volume formalin solution containing rose bengal stain.

5.1.3 Beginning Sampling Date

18 July, 1994

5.1.4 Ending Sampling Date

5 August, 1994

5.1.5 Platform

Sampling was conducted from the R/V Shanahan.

5.1.6 Sampling Equipment

Standard size Ponar.

5.1.7 Manufacturer of Instrument

Wildco Manufacturing Co.

5.1.8 Key Variables

The number of grab samples at each station was recorded at the time of collection.

5.1.9 Collection Method Calibration

The sampling gear did not require any calibration beyond inspection for damage due to rough handling or rock damage.

5.1.10 Collection Quality Control

Criteria for rejection of Ponar samples: Soft bottom- sampler must be at least 3/4 full and show minimal signs of disturbance. Hard bottom- presence of rocks, signs of disturbance, or sampler less than 1/4 full

5.1.11 Sample Collection Method Reference

Strobel, C.J. and S.C. Schimmel, 1991. Environmental Monitoring and Assessment Program-Near Coastal. 1991 Virginian Province, Field Operations and Safety Manual. U.S. EPA, NHEERL-AED, Narragansett, RI. June 1991.

5.2 Data Processing and Sample Processing

5.2.1 Sample Processing Objective

The primary sample processing objective was to accurately identify and enumerate all benthic macroinvertebrate organisms found to the lowest possible taxonomic category.

5.2.2 Sample Processing Methods Summary

Field samples returned to the lab were rinsed and preserved with 80 % ethanol.

5.2.3 Sample Processing Method Calibration

Not applicable.

5.2.4 Sample Processing Quality Control

Data validation by Principal Investigator

5.2.5 Sample Processing Method Reference

Nalepa, T.F. 1987. Long Term changes in the Macrobenthos of Southern Lake Michigan. Can. J. Fish. Aquat. Sci. 44:515-524.

5.2.6 Sample Processing Method Deviations

None reported.

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Values

T_ABN, M_ABN, SDABN

6.2 Data Manipulation Description

Species enumeration of samples on a "per grab" basis were received from a taxonomy laboratory. The values reported in this data set were calculated by 1) Summing replicate abundance over "n" samples, 2) calculating the mean abundance across "n" replicates, 3) generating a standard deviation based on the replicate abundance of each taxon.

6.3 Data Manipulation Examples

6.3.1 Total abundance for a taxon.

Abundance counts for a taxon were summed for all replicates collected at a station.

6.3.2 Mean abundance and Standard Deviation (SD) values of abundance.

The mean for each taxon identified at a station was calculated by summing the replicate abundance and dividing by the number of grabs collected. The SD was then calculated.

7. DATA DESCRIPTION

7.1 Description of Parameters

#	Name	Type	Length	Format	Parameter Label
1	STA_NAME	Char	10	10.	Station Name
2	DATE	Num	6	6.	Sampling Date (YYMMDD)
3	LATIN NAME	Char	30	30.	Latin Name of the Taxon
4	# G	Num	1.	1.	Number of Replicate Samples Taken
5	T_ABN	Num	3	4.	Total Number of Organisms of a Taxon at a Station
6	M_ABN	Num	5	3.2	Mean Number of Organisms/Grab
7	SDABN	Num	5	3.2	Standard Deviation of Mean Abundance of Organisms/Grab

7.1.1 Precision to which values are reported

Total abundance is reported as a whole number. Mean abundance and standard deviation are reported to 2 decimal places.

7.1.2 Minimum Value in Data Set

T ABN	1
M_ABN	0.33
SD_ABN	0.00

7.1.3 Maximum Value in Data Set

T ABN	2040
M_ABN	680.00
SD_ABN	163.72

7.2 Data Record Example

7.2.1 Column Names for Example Records

STA_NAME, DATE, LATIN NAME, #G, T_ABN, M_ABN, SD_ABN

7.2.2 Example Data Records

LM94-73452	940725	Diaporeia sp.	3	579	193.00	16.64
LM94-73492	940725	Stylodrilus heringianus	3	3	1.00	1.00

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-87.922667

8.2 Maximum Longitude

-85.025

8.3. Minimum Latitude

40.666667

8.4 Maximum Latitude

46.000667

8.5 Name of Area or Region

Nearshore Lake Michigan;
Stations were located within the Nearshore resource class of Lake Michigan. The nearshore sites were located within the 85 meter depth contour.

9. QUALITY CONTROL/QUALITY ASSURANCE

9.1 Measurement Quality Objectives

90% correct identification.

9.2. Data Quality Assurance Procedures

For worms and midges: Michael Winnell, Freshwater Benthic, Inc.,
Krause Rd., Petosky, MI.;
for all others: Tom Nalepa, GL-ERL, NOAA, Ann Arbor, MI.

9.3 Actual Measurement Quality

None reported.

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the EMAP Website.

10.2 Data Access Restrictions

Not applicable.

10.3 Data Access Contact Persons

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10.4 Data Set Format

Data from the Website are in ASCII fixed format.

10.5 Information Concerning Anonymous FTP

Not accessible.

10.6 Information Concerning WWW

Data can be downloaded from the EMAP Website.

10.7 EMAP CD-ROM Containing the Data Set

Data are not available on CD-ROM.

11. REFERENCES

Hedtke, S., A. Pilli, D. Dolan, G. McRae, B. Goodno, R. Kreis, G. Warren, D. Swackhamer, and M. Henry. 1992. Great Lakes Monitoring and Research Strategy: Environmental Monitoring and Assessment Program. USEPA, Office of Research and Development, ERL-Duluth, Duluth, Minnesota. EPA/602/R-92/001. 204 p.

12. TABLE OF ACRONYMS

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