CATALOG DOCUMENTATION
EMAP-GREAT LAKES PROGRAM LEVEL DATABASE
1994 LAKE ONTARIO NEARSHORE AND OFFSHORE
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 Ontario Nearshore and Offshore
Benthic Invertebrate Data

1.2 Authors of the Catalog entry

Greg Elonen, ILS

1.3 Catalog revision date

9 April 1997

1.4 Data set name

LOBEN94

1.5 Task Group

Great Lakes

1.6 Data set identification code

514

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

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2.2 Investigation Participant - Sample Collection

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2.5 Investigation Participant - Sample Processing

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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 Ontario, 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. Base grid and three-fold enhanced sampling sites from nearshore and offshore regions of Lake Ontario are included in this data set.

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 and offshore regions of Lake Ontario.

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, sediment samples were collected for benthic macroinvertebrates using a Ponar grab. Each sediment sample was washed with an elutriation device equipped with a 500u m mesh Nitex screen. The residue was rinsed into a pint plastic jar. An equal volume of 10% formalin solution containing rose bengal stain was added to achieve a final concentration of 5% formalin.

The EMAP sampling strategy uses a global grid to identify sampling sites. This grid is divided into sub-grids in accordance with the needs of the ecosystem type. The baseline grid used in EMAP is an hexagonal plate containing a triangular grid approximately 12,600 grid points distributed randomly over the conterminous United States. These grid points are about 27 km equidistant and large, contiguous hexagons can be scribed around each grid point, each with an area of 635 sq. km. Initial randomization of the grid on the United States establishes the systematic sample (i.e., uniform and regular grid point and small hexagons) as a probability sample. The grid structure reflects the importance of achieving geographic coverage of ecological resources. The uniformity of spatial coverage provided by a grid ensures that each ecological resource can be sampled in proportion to its geographic presence in the United States and that all ecological resources can be included in the monitoring program.

5.1.3 Beginning Sampling Date

3 September 1994

5.1.4 Ending Sampling Date

19 September 1994

5.1.5 Platform

Sampling was conducted from the R/V Guardian.

5.1.6 Sampling Equipment

Standard size Ponar.

5.1.7 Manufacturer of Instrument

Wildco Manufacturing Company

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

None reported.

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 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	1832
M_ABN	610.67
SD_ABN	147.00

7.2 Data Record Example

7.2.1 Column Names for Example Records

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

7.2.2 Example Data Records

L094-81	940906	Pisidium sp.	3	220	77.33	22.19
L094-82	940907	Diaporeia sp.	2	318	159.00	32.53

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-79 deg 29' 59"

8.2 Maximum Longitude

-76 deg 19' 22"

8.3. Minimum Latitude

42 deg 27' 29"

8.4 Maximum Latitude

43 deg 52' 57"

8.5 Name of Area or Region

Nearshore and Offshore Lake Ontario;
Stations were located within the Nearshore and Offshore resource class of Lake Ontario. The nearshore sites were within the non-depositional zone (13 sites) and the offshore sites were within the depositional zone (45 sites).

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, GLERL, NOAA, Ann Arbor, MI.

9.3 Actual Measurement Quality

Not 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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