CATALOG DOCUMENTATION
REGIONAL ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM - REGION 1
1993-1994 FISH TISSUE CONTAMINATION IN MAINE LAKES
LAKE ANION AND CATION DATA

TABLE OF CONTENTS

1. DATA SET IDENTIFICATION

1.1 Title of Catalog document

Regional Environmental Monitoring and Assessment Program - Region 1
1993-94 Fish Tissue Contamination in Maine Lakes
Lake Anion and Cation Data Set

1.2 Author of the Catalog entry

Melissa Hughes, OAO Corporation

1.3 Catalog revision date

10 March 1998

1.4 Data set name

REMAP93

1.5 Task Group

Region 1

1.6 Data set identification code

00004

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 Regional EMAP 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 Investigators

Barry Mower
Jeanne DiFranco
Linda Bacon
David Courtemanch
State of Maine Department of Environmental Protection

2.2 Investigation Participant-Sample Collection

Not applicable

3. DATA SET ABSTRACT

3.1 Abstract of the Data Set

The R-EMAP Region 1 Lake Anion and Cation data set provides data on concentrations of cations and anions. These samples were collected at the surface and bottom of each lake sampled. These are factors that may affect a fish's or lake's sensitivity to contamination.

3.2 Keywords for the Data Set

Lake, Maine, surface water, anions, cations, calcium, magnesium, potassium, sodium, nitrate, sulfate, true color, acid neutralizing capacity, air equilibrated pH

4. OBJECTIVES AND INTRODUCTION

4.1 Program and Project Objectives

4.1.1 Program Objective

Regional Environmental Assessment and Monitoring Program (R-EMAP) was initiated to test the applicability of the EMAP approach to answer questions about ecological conditions at regional and local scales. Using EMAP's statistical design and indicator concepts, R-EMAP conducts projects at smaller geographic scales and in shorter time frames.

4.1.2 Project Objective

The primary goal of this study was to estimate the levels of contamination in fish populations, and the risk these levels pose to human and wildlife consumers. The primary objective was to determine concentrations of cadmium, lead, mercury, PCBs and selected pesticides in fish collected from Maine lakes.

4.2 Data Set Objective

The objective of the this physical parameter data set was to characterize the each lake for its levels of cations, anions, pH and true color.

4.3 Data Set Background Discussion

From a population of 1800 Maine lakes that have been surveyed by the Maine (DIFW) and have principal fisheries, one hundred and fifty lakes were selected using the EMAP sampling design and 125 were sampled. Correlations with factors that may affect a fish's or lake's sensitivity to contamination were examined secondarily. These factors include species, size, age, geography, geology, water and sediment chemistry, hydrology, trophic state and air flow patterns. The results will be used to develop preventive actions and management techniques.

4.4 Summary of Data Set Parameters

Anions and cations were measured from surface and bottom water samples.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

Collect water samples for a suite of anion and cation measurements, as well as acid neutralizing capacity and air-equilibrated pH.

5.1.2 Sample Collection Methods Summary

DIFW bathymetric maps were used to determine the deepest part of each lake. Water samples were collected from this point. Kemmerer or Van Dorn water bottles were used to collect water samples. Water samples were collected at one meter below the surface and at one meter above the bottom. After collection, samples were placed in a cooler on ice.

5.1.3 Sampling Start Date

June 1993
September 1994

5.1.4 Sampling End Date

September 1993
September 1994

5.1.5 Platform

Not applicable.

5.1.6 Sampling Equipment

Kemmerer or Van Dorn water bottles

5.1.7 Manufacturer of Sampling Equipment

Not known

5.1.8 Key Variables

The data are based on the results of chemical analyses.

5.1.9 Sampling Method Calibration

Not applicable.

5.1.10 Sample Collection Quality Control

Water samples were collected first to ensure an undisturbed water column.

5.1.11 Sample Collection Method Reference

DiFranco et. al., 1995. Fish Tissue Contamination in Maine Lakes. Data Report. State of Maine Department of Environmental Protection, Bureau of Land and Water Quality, Division of Environmental Assessment. September 1995.

5.2 Data Preparation and Sample Processing

See Project Work/QA Plan.

6. DATA MANIPULATIONS

Not applicable

6.1 Name of new or modified values

Not applicable

6.2 Data Manipulation Description

Not applicable

6.3 Data Manipulation Examples

Not applicable.

7. DATA DESCRIPTION

7.1 Description of Parameters

CONTENTS

Data Set Name: REMAP93 Observations: 278
Engine: V612 Variables: 19

#	Parameter SAS Name	Data Type	Len	Format	Parameter Label
1	QA	Char	6	$6.	Q.A. sample flag
2	SAMPDATE	Num	8	MMDDYY8.	Sample date
3	MIDAS	Char	9	$9.	Lake identification number
4	DEPTH	Num	8	11.1	Depth of sample
5	QUAL	Char	7	$7.	BG=bottom grab;SG=surface grab; EB=equipment blank
6	REP	Char	7	$7.	LD=laboratory dup;FD=field dup
7	EQPH	Num	8	10.2	Air equilibrated pH
8	ANC_UEQL	Num	8	13.1	Acid neutralizing capacity (ueq/l)
9	TCOL_PCU	Num	8	12.	True (filtered) color (platinum cobalt units)
10	CA_UEQL	Num	8	10.	Calcium (ueq/l)
11	MG_UEQL	Num	8	8.	Magnesium (ueq/l)
12	K_UEQL	Num	8	9.1	Potassium (ueq/l)
13	NA_UEQL	Num	8	11.	Sodium (ueq/l)

7.1 Description of Parameters, continued

#	Parameter SAS Name	Data Type	Len	Format	Parameter Label
14	CL_UEQL	Num	8	10.	Chloride (ueq/l)
15	NO3_UEQL	Num	8	10.1	Nitrate (ueq/l)
16	SO4_UEQL	Num	8	6.	Sulfate (ueq/l)
17	SUMPOS	Num	8	8.	Sum of cations
18	SUMNEG	Num	8	9.	Sum of anions
19	RATIO	Num	8	9.2	Ratio of cations to anions

7.1.6 Precision to which values are reported

Data were reported to one or two decimal places, as noted in 7.1

7.1.7 Minimum values in data set

Variable	Minimum
DEPTH	1.0
EQPH	5.77
ANC_UEQL	-1.0
TCOL_PCU	0
CA_UEQL	1
MG_UEQL	0
K_UEQL	0.3
NA_UEQL	0
CL_UEQL	2
NO3_UEQL	0.0
SO4_UEQL	0
SUMPOS	3
SUMNEG	5
RATIO	0.49

7.1.8 Maximum values in data set

Variable	Maximum
DEPTH	167.0
EQPH	8.60
ANC_UEQL	3030.0
TCOL_PCU	135
CA_UEQL	2680
MG_UEQL	328
K_UEQL	49.9
NA_UEQL	1562
CL_UEQL	1875
NO3_UEQL	17.0
SO4_UEQL	544
SUMPOS	3046
SUMNEG	3285
RATIO	1.24

7.2 Data Record Example

7.2.1 Column Names for Example Records

QA;SAMPDATE;MIDAS;DEPTH;QUAL;REP;EQPH;ANC_UEQL;TCOL_PCU;CA_UEQL;MG_UEQL;K_UEQL;
NA_UEQL;CL_UEQL;NO3_UEQL;SO4_UEQL;SUMPOS;SUMNEG;RATIO;

7.2.2 Example Data Records

```
QA;SAMPDATE;MIDAS;DEPTH;QUAL;REP;EQPH;ANC_UEQL;TCOL_PCU;CA_UEQL;MG_UEQL;K_UEQL;
NA_UEQL;CL_UEQL;NO3_UEQL;SO4_UEQL;SUMPOS;SUMNEG;RATIO;
Y;08/12/93;1008;1.0;SG;FD;8.57;1990.0;13;1881;206;12.8;43;66;0.0;139;2143;2195;0.98;
Y;08/12/93;1008;13.0;BG;FD;8.58;3030.0;11;2680;290;19.4;57;96;0.0;159;3046;328 5;0.93;
Y;08/19/93;EQBL;999.9;EB; ;5.77;1.8;0;1;0;0.3;0;3;0.0;0;3;5;0.70;
Y;08/26/93;EQBL;999.9;EB; ;6.33;10.0;0;3;1;0.3;1;2;0.0;0;6;12;0.49;
Y;09/03/93;EQBL;999.9;EB; ;6.36;8.1;0;8;2;0.5;4;10;0.0;2;16;20;0.78;
```

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-71 Degrees 00 Minutes 47 Decimal Seconds

8.2 Maximum Longitude

-67 Degrees 10 Minutes 30 Decimal Seconds

8.3 Minimum Latitude

43 Degrees 15 Minutes 21 Decimal Seconds

8.4 Maximum Latitude

47 Degrees 07 Minutes 11 Decimal Seconds

8.5 Name of area or region

EPA Region 1

The sampling area included the entire state of Maine.

9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Data Quality Objectives

The data quality objective for aqueous samples was to have no more than a 30% relative percent difference.

9.2 Data Quality Assurance Procedures

Collection of one set of field duplicate samples for each region ensured that duplicates were collected from a minimum of 5% of the project lakes for all parameters sampled, as required in the Project Work/QA Plan.

A sample duplicate is a second sample obtained following the same procedures as for the first sample. It provides information on the homogeneity of the matrix and the consistency with which samples are collected, preserved and analyzed.

Duplicates were assigned unique identification numbers for use in laboratory analyses. Pre-labeled containers were identified as additional samples, not as duplicates, to reduce analytical bias. The duplicate results were not averaged with the sample, but were maintained in the data base as quality control indicators.

Equipment blanks samples were collected for magnesium and calcium and were noted as such in field records. After routine decontamination of equipment upon completion of sampling a lake, each team submitted one equipment blank for these parameters in the form of a water bottle.

9.3 Quality Assessment Results

All water sample field duplicates met the stated data quality objective with the exception of one calcium sample.

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the WWW site or contact personnel listed in Section 10.3.

10.2 Data Access Restrictions

Not Applicable

10.3 Data Access Contact Persons

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10.4 Data Set Format

Data files are in ASCII semi-colon delimited format.

10.5 Information Concerning Anonymous FTP

Data cannot be accessed via ftp.

10.6 Information Concerning WWW

Data can be downloaded from the WWW site.

10.7 EMAP CD-ROM Containing the Data Set

Data are not available on CD-ROM

11. REFERENCES

DiFranco et. al., 1995. Fish Tissue Contamination in Maine Lakes. Data Report. State of Maine Department of Environmental Protection, Bureau of Land and Water Quality, Division of Environmental Assessment. September 1995.

Maine Department of Environmental Protection et al. 1993. Project Work/ Quality Assurance Plan. Maine Department of Environmental Protection, Maine Department of Inland Fisheries and Wildlife and USEPA Region 1 Environmental Services Division. September 20, 1993.

12. TABLE OF ACRONYMS

ACRONYM	DESCRIPTION
DEP	Maine Department of Environmental Protection
DIFW	Maine Department of Inland Fisheries and Wildlife
EMAP	Environmental Monitoring and Assessment Program
EPA	Environmental Protection Agency
HetL	Maine Department of Human Services Health and Environmental Testing Laboratory
MIDAS	Maine Information Display Analysis System - unique number assigned to each Maine lake
PCBs	polychlorinated biphenyls
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
REMAP	Regional Environmental Monitoring and Assessment Program
UMO	National Biological Survey and Sawyer Environmental Chemistry Laboratories at the University of Maine at Orono

13. PERSONNEL INFORMATION

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