CATALOG DOCUMENTATION
REGIONAL EMAP DATABASE
1993-1994 NEW YORK/NEW JERSEY HARBOR SYSTEM
MICROTOX TOXICITY TEST DATA BY SITE

TABLE OF CONTENTS

1. DATA SET IDENTIFICATION

1.1 Title of Catalog document

Regional EMAP Database
1993-1994 New York/New Jersey Harbor System
Microtox Toxicity Test Data by Site

1.2 Author of the Catalog entry

Melissa Hughes, OAO Corporation

1.3 Catalog revision date

7 January 1997

1.4 Data set name

MICROTOX TOXICITY TEST DATA BY SITE

1.5 Task Group

Regional Environmental Monitoring and Assessment Program

1.6 Data set identification code

224

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 EMAP-Estuaries 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

Ms. Darvene A. Adams
U.S. Environmental Protection Agency - Region II

2.2. Investigation Participant

Mr. Joel S. O'Connor
U.S. Environmental Protection Agency - Region II

3. DATA SET ABSTRACT

3.1 Abstract of the Data Set

The MICROTOX ASSAY TEST data set reports results of a toxicity test conducted using the luminescent bacterium, Photobacterium phosphoreum. The supernatant from sediment samples taken in the New York/New Jersey Harbor region was tested and results were compared to results from control samples.

3.2 Keywords for the Data Set

Microtox assay, rapid screening assay, bacteria, Photobacterium phosphoreum

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The project was designed to support resource management decisions related to pollution control and remediation throughout the New York/New Jersey (NY/NJ) Harbor and Bight Apex and to assist the

New York-New Jersey Harbor Estuary Program (HEP) in developing a contaminant monitoring strategy to be included in the Comprehensive Conservation and Management Plan (CCMP) for the NY/NJ Harbor system.

4.2 Data Set Objective

To provide results data from a toxicity test considered to be a rapid screening alternative to the standard acute toxicity testing with fish or invertebrates.

4.3 Data Set Background Discussion

The New York/New Jersey Harbor System has been susceptible to toxic contamination due to surrounding land uses. Harbor sediments are contaminant reservoirs which can function as a secondary source of these land use contaminants. Contaminated sediments pose a substantial threat to Harbor resources and are a management challenge. The ecological significance of contaminant levels documented from purely chemical surveys is unknown in the absence of biological communities, such as the benthos, being exposed to these materials. Areas where contaminant levels are high but biological availability and toxicity are low may be addressed best with management strategies different than those appropriate for areas where significant impacts to biota are evident.

4.4 Summary of Data Set Parameters

MICROTOX ASSAY data set values were based on calculations performed on replicate test results.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

Collect sediment grab samples suitable for conducting Microtox assays using the luminescent bacterium, Photobacterium phosphoreum.

5.1.2 Sample Collection Methods Summary

The grab sampler was lowered through the water column; the grab penetrated the sediment by gravity releasing a trigger allowing the jaws to close. When the grab was pulled from the sediment using the winch, the jaws closed, encapsulating the sediment sample.

Multiple grabs were required to collect enough volume for analysis. Overlying water was carefully drained. The remaining top 2 cm of sediment from each grab was removed using stainless steel spoons. A composite of all grabs was homogenized in a glass bowl for 10 minutes. A subsample was removed for toxicity tests and transferred to a sample container that was stored on ice.

5.1.3 Sampling Start Date

July 1993
July 1994

5.1.4 Sampling End Date

September 1993
September 1994

5.1.5 Platform

Sampling was conducted from two U.S.EPA research vessels, the R/V CLEAN WATERS and OSV PETER W. ANDERSON.

5.1.6 Sampling Gear

A 0.04-m2 or 0.1-m2, stainless steel, Young-modified Van Veen Grab sampler was used to collect sediment grabs. This grab sampled an area of 440 cm2 and a maximum depth of penetration in the sediment of 10 cm.

5.1.7 Manufacturer of Sampling Equipment

Young's Welding, Sandwich, MA

5.1.8 Key Variables

No data were recorded at the time of sample collection.

5.1.9 Collection Method Calibration

The sampling gear did not require any calibration. It required inspection for deformities incurred due to mishandling or impact on rocky substrates.

5.1.10 Sample Collection Quality Control

A successful grab had relatively level, intact sediment over the entire area of the grab and a sediment depth at the center of at least 5 centimeters. Unacceptable grabs included those with grossly slumped surfaces and those completely filled to the top, where the sediment was in direct contact with the hinged top.

Care was taken to avoid sediment that had touched the surface of the grab and to use only samples with undisturbed surfaces. Clean stainless steel spoons and glass mixing bowls were used to prevent accidental contamination. The van Veen Grab was rinsed with ambient seawater between grabs at a station and thoroughly cleaned with detergent and water between stations.

5.1.11 Sample Collection Method Reference

Reifsteck, D.M., C.J. Strobel and D.J. Keith. 1993. Environmental Monitoring and Assessment Program - Near Coastal Component: 1993 Virginian Province Field Operations and Safety Manual. U.S. EPA NHEERL-AED. Narragansett, RI.

5.2 Data Preparation and Sample Processing

5.2.1 Sample Processing Objective

Process sediment samples to prepare a supernatant for the Microtox assay.

5.2.2 Sample Processing Methods Summary

Excess water from the top of sediment samples was decanted and discarded. The sediment was homogenized and a 3.3 g wet wt. sample was dried and extracted with dichloromethane.

Freeze-dried luminescent bacterium, Photobacterium phosphoreum, were reconstituted in control and test solutions and incubated. Luminescence was measured on serial dilutions of control and toxicant extracts after 5 to 15 minute exposures. The percent inhibition of light transmission, converted to an EC50 value, is the measure of toxicity.

5.2.3 Sample Processing Method Calibration

Ethanol reagent blanks with no sediment and extraction blanks were prepared and tested. Percent decrease in luminescence relative to a reagent blank is calculated.

5.2.4 Sample Processing Quality Control

Extracts were tested in duplicate.

5.2.5 Sample Processing Method Reference

Long, E.R. and R. Markel. 1992. An evaluation of the extent and magnitude of biological effects associated with chemical contaminants in San Francisco Bay, CA. NOAA Technical Memorandum NOS ORCA 64. NOAA, Seattle, WA.

Microbics Corp. 1992. Microtox standard assay procedure. Carlesbad, CA.

6. DATA MANIPULATIONS

6.1 Name of new or modified values

EC50 - EC50 value (% light inhibition)

6.2 Data Manipulation Description

NA

6.3 Data Manipulation Examples

NA

7. DATA DESCRIPTION

7.1 Description of Parameters

#	Parameter SAS Name	Data Type	Len	Format	Parameter Label
1	STATION	Char	10	$10.	Station Identifier
2	EVNTDATE	Num	8	DATE7.	Date
3	SPECIES	Char	25	$25.	Species used in test
4	EC50	Num	8	4.	EC50 value (% light inhibition)
5	SIG_MIC	Num	8	1.	Microtox Significance (1=sig)

7.1.6 Precision to which values are reported

The precision is indicated by the attribute format reported under 7.1

7.1.7 Minimum value in data set

EC50 10

7.1.8 Maximum value in Data Set

EC50 1753

7.2 Data Record Example

7.2.1 Column Names for Example Records

STATION EVNTDATE SPECIES EC50 SIG_MIC

7.2.2 Example Data Records

STATION	EVNTDATE	SPECIES	EC50	SIG
BA002	030CT93	Photobacterium phosphoreum	1263	0
BA005	030CT93	Photobacterium phosphoreum	1161	0
BA007	040CT93	Photobacterium phosphoreum	244	0
BA010	040CT93	Photobacterium phosphoreum	308	0
BA012	040CT93	Photobacterium phosphoreum	1031	0

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-74 Degrees 16 Minutes 17.76 Decimal Seconds

8.2 Maximum Longitude

-73 Degrees 21 Minutes 0.72 Decimal Seconds

8.3 Minimum Latitude

40 Degrees 10 Minutes 35.00 Decimal Seconds

8.4 Maximum Latitude

41 Degrees 4 Minutes 53.22 Decimal Seconds

8.5 Name of area or region

New York/New Jersey Harbor System

Six sub-basins were sampled in the New York/New Jersey Harbor, including: Upper Harbor, Newark Bay, Lower Harbor (includes Raritan and Sandy Hook Bays), Jamaica Bay, western Long Island Sound and the New York Bight Apex. For purposes of this study, the region includes the lower portions of the Hudson, Passaic, Harlem, Hackensack and Raritan Rivers, upstream to a near-bottom salinity of 15 ppt, the East River to Long Island Sound and Lower Harbor to the Atlantic Ocean. The New York Bight Apex is defined as the area of ocean bounded on the northwest by the transect from Sandy Hook, NJ to Rockaway Point, NY, the east by 73 deg 30' W longitude and the south by 40 deg. 10'N latitude. The eastern boundary of the western Long Island Sound sub-basin is 73 deg 24' W longitude (from Eaton's Neck Point, NY to Norwalk, CT).

9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Data Quality Objectives

Quality assurance goals were developed and followed for each QA sample type and for each analysis.

9.2 Quality Assurance/Quality Control Procedures

Control sediment from the U.S. Army Corps of Engineers Long Island Sound (LIS) reference station was tested along with the Harbor samples. Reference toxicant testing using phenol was conducted with each set of sediment assays.

Final organism counts were confirmed by a second scientist.

9.3 Quality Assessment Results

The in-house QC measures met the requirements established in the QA Plan.

9.4 Unassessed Errors

NA

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the WWW server.

10.2 Data Access Restrictions

Data can only be accessed from the WWW server.

10.3 Data Access Contact Persons

Ms. Darvene A. Adams
U.S. EPA Region II

10.4 Data Set Format

NA

10.5 Information Concerning Anonymous FTP

Data cannot be accessed via ftp.

10.6 Information Concerning Gopher and WWW

Data can be downloaded from the WWW servers.

10.7 EMAP CD-ROM Containing the Data Set

Data are not available on CD-ROM

11. REFERENCES

Adams, D.A. and M. Hunt. 1993. Quality Assurance Project Plan for Environmental Monitoring Projects, "Sediment Quality of the NY/NJ Harbor." U.S. Environmental Protection Agency-Region 2. Edison, NJ.

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Long, E.R. and R. Markel. 1992. An evaluation of the extent and magnitude of biological effects associated with chemical contaminants in San Francisco Bay, CA. NOAA Technical Memorandum NOS ORCA 64. NOAA, Seattle, WA.

Microbics Corp. 1992. Microtox standard assay procedure. Carlesbad, CA.

Reifsteck, D.M., C.J. Strobel and D.J. Keith. 1993. Environmental Monitoring and Assessment Program - Near Coastal Component: 1993 Virginian Province Field Operations and Safety Manual. U.S. EPA NHEERL-AED. Narragansett, RI.

U.S. EPA. 1993. EMAP Laboratory Methods Manual: Estuaries. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring Systems Laboratory, Cincinnati, OH.

12. TABLE OF ACRONYMS

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