

**DRAFT CATALOG DOCUMENTATION**  
**NATIONAL COASTAL ASSESSMENT- NORTHEAST DATABASE**  
**YEAR 2000 STATIONS**  
**SEDIMENT TOXICITY DATA: "SEDTOX"**

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**1. DATASET IDENTIFICATION**

**1.1 Title of Catalog document**

National Coastal Assessment-Northeast Region Database  
Year 2000 Stations  
SEDIMENT - TOXICITY DATA

**1.2 Authors of the Catalog entry**

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**1.3 Catalog revision date**

August, 2002

**1.4 Dataset name**

SEDTOX

**1.5 Task Group**

National Coastal Assessment-Northeast

**1.6 Dataset identification code**

006

**1.7 Version**

001

**1.8 Request for Acknowledgment**

EMAP requests that all individuals who download EMAP data acknowledge the source of these data in any reports, papers, or presentations. If you publish these data, please include a statement similar to: "Some or all of the data described in this article were produced by the U. S. Environmental Protection Agency through its Environmental Monitoring and Assessment Program (EMAP)".

## 2. INVESTIGATOR INFORMATION (for full addresses see Section 13)

### 2.1 Principal Investigators

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### 2.3 Sample Processing Investigators

Not applicable

Dan Johnson, TRAC Laboratories, Inc.

## 3. DATASET ABSTRACT

### 3.1 Abstract of the Dataset

The SEDTOX data file reports a measure of sediment toxicity for Northeast estuaries sampled during the summer of 2000. A static ten-day toxicity test is conducted using the amphipod *Ampelisca abdita*. One record is presented per sampling event. A record includes the results of the tests, and parameters indicating the statistical and biological significance of the results.

### 3.2 Keywords for the Dataset

Sediment toxicity, *Ampelisca abdita*, amphipod, whole sediments, interstitial pore water, biological significance

## 4. OBJECTIVES AND INTRODUCTION

### 4.1 Program Objective

The Coastal 2000 Initiative is a national EMAP effort. In Coastal 2000 we are demonstrating a consistent, integrated, probabilistic monitoring effort that will produce a national assessment of the condition of the U.S. marine estuaries. We partnered with EPA Regions, EPA's Office of Water, state resource/protection agencies in the 24 marine coastal states and Puerto Rico, USGS, and NOAA to conduct the sampling of estuaries during the late summer months of 2000 and 2001. A minimum of 50 sampling locations in each state have been established within EMAP's probabilistic sampling framework. From this we will develop a national report on the condition of the Nations's estuaries, as well as reports on the condition of the estuaries in each of the individual states and Puerto Rico. In 2002 we are beginning our assessment of the condition of the near-shore coastal environments to complement EPA's ongoing efforts to improve beach monitoring.

### 4.2 Dataset Objective

The purpose of the SEDTOX data file is to report the results and biological significance of the sediment toxicity test performed on sediment samples - the *Ampelisca* mortality assay.

#### 4.3 Background Discussion

The amphipod survival test is commonly used in North America to assess sediment quality. The test is simple in concept - amphipods are added to relatively unaltered sediment, and their survival rate is used as an indicator of sediment toxicity. *Ampelisca abdita* is used as the test organism because it is an ecologically important species in coastal waters and it is native to a wide range of waters along the U.S. eastern seaboard, along the eastern Gulf of Mexico, and along portions of the Californian coast. The amphipod survival test assesses the integrated effect of complex mixtures of compounds, but does not identify which compound or class of compounds may be the toxic agent. Ammonia in the porewater of the sediments can interfere with the assay; therefore the procedure calls for monitoring the ammonia concentration in the test sample and removal by flushing if above a threshold value.

#### 4.4 Summary of Dataset Parameters

NAME	LABEL
*STATION	Coastal 2000 Station Name
*STAT_ALT	Alternate Site Code (A,B,C)
*EVNTDATE	Event Date
SRVPCCON	Ampelisca Survival as % of Control
SRVPC_SG	Statistical Significance (p<.05)
ATOX_SIG	Ampelisca Toxicity Test Significance
LABCODE	Lab/Contract Identifier
QACODE	Qa Qualifier Code

\* denotes parameters that should be used as key fields when merging data files

### 5. DATA ACQUISITION AND PROCESSING METHODS

#### 5.1 Data Acquisition / Field Sampling

##### 5.1.1 Sampling Objective

Sediment sub-samples were collected for the measurement of toxicity in the sediments. The sub-samples were prepared from a homogenate of the upper two-centimeters of sediment grabs. The remaining portions of the grabs were used for grain size and chemical analyses.

##### 5.1.2 Sample Collection: Methods Summary

Multiple sediment grabs were collected from each site using a Young-modified Van Veen grab or similar sampler. The primary purpose of these grabs was to characterize the chemical and toxicological properties of the sediment. Each grab was nominally 440 cm<sup>2</sup> in area and up to 10 cm in depth, but only the top two centimeters of a grab were retained for

the analyses described here. A sufficient number of grabs were processed to provide three liters of sediment. The sediment composite was homogenized and separated into two fractions for storage until analysis. One fraction was frozen and used in the measurement of total organic carbon (TOC) and chemical contaminants. The second fraction was chilled but not frozen during storage, and was used for grain-size and toxicity analyses.

5.1.3 Beginning Sampling Dates  
8 July 2000

5.1.4 Ending Sampling Dates  
8 October 2000

5.1.5 Sampling Platform  
Samples were collected from gasoline or diesel powered boats, 18 to 133 feet in length.

5.1.6 Sampling Equipment  
A 1/25 m<sup>2</sup>, stainless steel (coated with Kynar), Young-modified Van Veen grab sampler was used to collect sediments.

5.1.7 Manufacturer of Sampling Equipment  
Young's Welding, Sandwich, MA

5.1.8 Key Variables  
Not applicable

5.1.9 Sample Collection: Methods Calibration  
The sampling gear does not require calibration, although it was inspected regularly for damage by mishandling or impact on rocky substrates.

5.1.10 Sample Collection: Quality Control  
Care was taken to minimize disturbance to the sediment grabs. Grabs that were incomplete, slumped, less than 7 cm in depth, or comprised chiefly of shelly substrates were discarded. The chance of sampling the same location was minimized by repositioning the boat five meters downstream after three sampling attempts.

5.1.11 Sample Collection: References

Strobel, C.J. 1998. Environmental Monitoring and Assessment Program - Mid-Atlantic Integrated Assessment. Estuaries Component, Field Operations and Safety Manual. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. July, 1998.

Strobel, C.J. 2000. Environmental Monitoring and Assessment Program: Coastal 2000 - Northeast component: field operations manual. Narragansett (RI): U.S. Environmental Protection Agency, National Health

and Environmental Effects Research Laboratory, Atlantic Ecology Division. Report nr EPA/620/R-00/002. 68 p.

#### 5.1.12 Sample Collection: Alternate Methods

Different grab samplers used by NCA partners include the Smith-MacIntyre and Ponar grab samplers.

### 5.2 Data Preparation and Sample Processing

#### 5.2.1 Sample Processing Objective

Determine the toxicity of sediment samples using a 10-day *Ampelisca abdita* mortality assay performed on whole sediments.

#### 5.2.2 Sample Processing: Methods Summary

In the 10-day *Ampelisca abdita* assay, amphipods were exposed to sediments for 10 days under static conditions following EMAP procedures (EPA 1994, 1995). Sediment samples were stored in the dark at 4 °C prior to analysis. Control sediments were obtained from a clean site in Perdido Bay. Each sediment sample was passed through a 1 mm mesh to remove resident organisms, pebbles, etc., and was stirred to homogenize. Five replicate tests were performed with each field sample along with a test using the control sediment. For each test, 200 mL of sediment sample were placed in a glass container and covered with 600 mL of clean, filtered water (maintained at 20 °C, a salinity of 30ppt, and a dissolved oxygen concentration >60% of saturation). Total ammonia concentration was measured colorimetrically on filtered pore water taken from a sixth replicate. For concentrations greater than 20 mg/L, the sediment was flushed until ammonia levels fell below 20 mg/L. Twenty juvenile amphipods (between 0.7 and 1.5 mm in length) were added to each test chamber for a ten-day exposure. The surviving amphipods were counted, and the results reported as the average number of amphipods surviving in the sample tests divided by the number of amphipods surviving in the control sediment, expressed as a percent. Lower values of this result indicate higher toxicity. The result was considered to be statistically significant if sample and control values were distinct with a p-value  $\leq 0.05$  in a one-tailed t-test. The assay was taken to indicate toxicity if the survival rate was less than 80% of the control and the test was statistically significant.

#### 5.2.3 Sample Processing: Methods Calibration

Not applicable

#### 5.2.4 Sample Processing: Quality Control

Positive controls for the amphipod assays were performed as follows. Representative amphipods were routinely tested for response by determining the LC50 concentration of the reference toxicant sodium dodecyl sulfate. The amphipods were considered viable if the measured LC50 fell within the 95% confidence interval of previous QC checks. Each batch of assays was also accompanied by a negative control assay, which was identical to the routine procedures but the amphipods were

exposed to sediments that were certified as clean. Five replicates were included in the control run. Batch results were accepted if the mean survival was equal to or greater than 85% and survival in the individual replicate chambers was not less than 80% (ASTM 1993).

#### 5.2.5 Sample Processing: References

U.S. EPA. 1994. Methods for Assessing the Toxicity of Sediment-Associated Contaminants with Estuarine and Marine Amphipods. Narragansett, RI: U.S. Environmental Protection Agency, Office of Research and Development. EPA/600/R-94/025.

U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Manual-Estuaries, Volume 1: Biological and Physical Analyses. Narragansett, RI: U.S. Environmental Protection Agency, Office of Research and Development, EPA/620/R-95/008.

### 6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Values  
Not applicable

6.2 Data Manipulation: Description  
SRVPCCON (survival as percent of control; result for amphipod survival assay) was calculated as the average number of amphipods surviving in the five replicate sample tests divided by the number of amphipods surviving in the control sediment, expressed as a percent.

SRVPC\_P (statistical significance of amphipod survival result) is reported as 'Y' if SRVPCCON is statistically significant as indicated by a p-value less than 0.05 in Dunnett's multiple range test, and 'N' if otherwise.

ATOX\_SIG (biological significance of amphipod survival result) is reported as '< 60%' if SRVPCCON is less than 60% and SRVPC\_P is 'Y' (this indicates high toxicity); as '<80%' if SRVPCCON is less than 80% but greater than 60% and SRVPC\_P is 'Y' (this indicates biologically significant toxicity); and otherwise as 'NT' (non-toxic).

### 7. DATA DESCRIPTION

#### 7.1 Description of Parameters

##### 7.1.1 Components of the Dataset

NAME	TYPE	LENGTH	LABEL
STATION	Char	9.00	Coastal 2000 Station Name
STAT_ALT	Char	1.00	Alternate Site Code (A,B,C)
EVNTDATE	Num	8.00	Event Date

SRVPCCON	Num	8.00	Ampelisca Survival as % of Control
SRVPC_SG	Char	3.00	Statistical Significance (p<.05)
ATOX_SIG	Char	4.00	Ampelisca Toxicity Test Significance
LABCODE	Char	7.00	Lab/Contract Identifier
QACODE	Char	7.00	Qa Qualifier Code

#### 7.1.2 Precision of Reported Values

The values are reliable to no more than three significant digits; however more significant digits may be reported in the dataset because of formatting restrictions.

PARAMETER	LABEL	MIN	MAX
SRVPCCON	Ampelisca Survival as % of Control	6.50	107.00

#### 7.1.3 Minimum Value in Dataset See Section 7.1.2

#### 7.1.4 Maximum Value in Dataset See Section 7.1.2

### 7.2 Data Record Example

#### 7.2.1 Column Names for Example Records

STATION	STAT_ALT	EVNTDATE	SRVPCCON	SRVPC_SG
ATOX_SIG	LABCODE	QACODE		

#### 7.2.2 Examples of Data Records

STATION	STAT_ALT	EVNTDATE	SRVPCCON	SRVPC_SG
CT00-0001	A	08/17/00	104.00	NO
CT00-0005	A	09/18/00	95.70	NO
CT00-0007	A	08/10/00	81.70	YES
ATOX_SIG	LABCODE	QACODE		
NT	EPA TOX			
NT	EPA TOX			
NT	EPA TOX			

## 8. GEOGRAPHIC AND SPATIAL INFORMATION

### 8.1 Minimum Longitude (Westernmost) -75.7737 decimal degrees

8.2 Maximum Longitude (Easternmost)  
-67.0939 decimal degrees

8.3 Minimum Latitude (Southernmost)  
38.4521 decimal degrees

8.4 Maximum Latitude (Northernmost)  
44.9456 decimal degrees

8.5 Name of Region  
The National Coastal Assessment Northeast Region covers the  
northeastern US coastline from Maine to Delaware

## 9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Measurement Quality Objectives  
The measurement quality objectives of the NCA program do not specify  
accuracy or precision requirements for toxicity measurements.

9.2 Data Quality Assurance Procedures  
QA procedures include running a positive reference toxicant (sodium  
dodecyl sulfate) and a negative reference sample (clean sediment from  
Perdido Bay) See Section 5.2.4

9.3 Actual Measurement Quality  
All of the data reported in this data file met the QA specifications  
listed in Section 5.2.4.

## 10. DATA ACCESS

10.1 Data Access Procedures  
Data can be downloaded from the web

10.2 Data Access Restrictions  
None

10.3 Data Access Contact Persons  
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10.4 Dataset Format  
ASCII (CSV) and SAS Export files.



10.5 Information Concerning Anonymous FTP  
Not available

10.6 Information Concerning WWW  
No gopher access, see Section 10.1 for WWW access

10.7 EMAP CD-ROM Containing the Dataset  
Data not available on CD-ROM

## 11. REFERENCES

Strobel, C.J. 2000. Coastal 2000-Northeast Component: Field Operations Manual  
U. S. Environmental Protection Agency, National Health and Environmental  
Effects Research Laboratory, Atlantic Ecology Division, Narragansett, RI.  
EPA/620/R-00/002.

Strobel, C.J. 1998. Environmental Monitoring and Assessment Program - Mid-  
Atlantic Integrated Assessment. Estuaries Component, Field Operations and  
Safety Manual. U.S. EPA, Office of Research and Development, NHEERL-AED,  
Narragansett, RI. Forthcoming.

U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP):  
Laboratory Methods Manual-Estuaries, Volume 1: Biological and Physical  
Analyses. U.S. Environmental Protection Agency, Office of Research and  
Development, Narragansett, RI. EPA/620/R-95/008.

## 12. TABLE OF ACRONYMS

AED	Atlantic Ecology Division
C	Degrees Celsius
CP	Carolinian Province
CBP	Chesapeake Bay Program
DB	Delaware Bay
DCM	Dichloromethane
DMSO	Dimethylsulfoxide
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
GED	Gulf Ecology Division
GERG	Geochemical and Environmental Research Group
MAIA	Mid-Atlantic Integrated Assessment
mg	Milligram
mg/L	Milligrams per liter
mL	Milliliter
NHEERL	National Health and Environmental Effects Research Laboratory
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
ODU	Old Dominion University

QA/QC	Quality Assurance/Quality Control
TOC	Total Organic Carbon
TAMU	Texas A&M University
USEPA	United States Environmental Protection Agency
VER	Versar, Inc.
WWW	World Wide Web

### 13. PERSONNEL INFORMATION

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