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REGIONAL ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM - REGION 6
1993-1994 TEXAS COAST RIVERS AND ESTUARIES STUDY
SEDIMENT GRAIN DATA

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1. DATA SET IDENTIFICATION

1.1 Title of Catalog Document

Regional Environmental Monitoring And Assessment Program - Region 6
1993-1994 Texas Coast Rivers And Estuaries Study
Sediment Grain Data

1.2 Authors of the Catalog entry

Melissa M. Hughes, OAO Corp.

1.3 Catalog Revision Date

March 31, 1998

1.4 Data File Name

SEDGRAIN

1.5 Task Group

Region 6

1.6 Data set identification code

00009

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 R-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 Investigator

Charlie Howell
U. S. Environmental Protection Agency - Region 6
Environmental Services Division

2.2 Investigation Participant-Sample Collection

Not applicable

3. DATA FILE ABSTRACT

3.1 Abstract of the Data File

The Sediment Grain Size data set presents the results of grain composition and characterization analyses. These analyses were conducted on a surface sediment sample collected at a station in the south Texas coast area.

The sediment samples were derived from either homogenate of the top 2 cm of sediment from several grabs or from small core samples taken from the 3 individual sediment grabs collected for benthic community assessments. The homogenate was divided into samples for sediment chemistry analysis, sediment full grain characterization and sediment toxicity testing. Grain composition includes per cent sand and per cent silt/clay.

3.2 Keywords for the Data Set

Sediment, grain composition, % sand, % silt/clay, TOC

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The R-EMAP Texas Coast project will:

1. Determine the extent and magnitude of tri-butyltin (TBT) contamination in Galveston Bay sediment and water column.
2. Determine the extent and magnitude of contaminant levels in the fish and sediment of the East Bay Bayou of Galveston Bay and whether the incidence of fish pathologies is correlated with sediment contamination.
3. Determine the levels of chlorinated hydrocarbons in fish tissue, conduct chemical and toxicity tests of sediments and determine benthic community structure in the tidal reaches of the Arroyo Colorado and the Rio Grande Rivers.
4. Determine the extent and magnitude of anoxia and concentrations of agriculture-related contaminants found in the tidal reaches of the Arroyo Colorado and Rio Grande Rivers.

4.2 Data Set Objective

The objective of the sediment grain data set is to present the results of analyses conducted to characterize the grain size distribution of sediments collected from estuaries in the Louisianian Province.

4.3 Data Set Background Information

The concentration of contaminants in sediments is dependent upon interactions between natural (e.g., physical sediment characteristics) and anthropogenic factors (e.g., type and volume of contaminant loadings). Sediment grain size determinations were made to supplement contaminant analyses.

4.4 Summary of Investigation Parameters

Grain size and composition parameters were measured from surface sediment collected at a station.

4.5 Year-Specific Information about Investigation Parameters

For the 1993 monitoring in the south Texas coast area, only sediment sand and silt/clay would be determined and that the sample would be taken from the composited homogenate.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

Collect sediment samples suitable for the analysis of sediment constituents.

5.1.2 Sample Collection Method Summary

The grab sampler was lowered through the water column such that travel through the last 5 meters was no faster than 1 m/sec. 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. The chance of sampling the exact same location twice was minimized. After three grabs were taken, the boat was moved five meters downstream by letting out the appropriate length of anchor line.

The samples (approximately 100 cc) were taken from a composited homogenate that consisted of the surficial layer of sediment removed from collective (5-6) grabs. A stainless steel spoon was used to carefully scoop the top 2-3 cm of sediment from the grab. The sediment was added to a stainless steel pan and the process was repeated until the pan contained approximately 4000 cc of sediment; each addition of sediment was thoroughly mixed in with that already contained in the pan to yield the final composite homogenate. Additional samples types were also taken from the homogenate, including those for sediment chemistry and sediment toxicity testing.

The sediment samples were held at near 4 degrees C to await laboratory analyses.

5.1.3 Beginning Sampling Dates

24 September 1993
10 August 1994

5.1.4 Ending Sampling Date

10 October 1993
16 August 1994

5.1.5 Platform

Each team was supplied with a 25-foot SeaArk work boat equipped with a 7.5 L gas engine fitted with a Bravo outdrive, an "A" frame boom assembly and hydraulic winch. On-board electronics consist of: a Loran C unit, GPS, radar unit, 2 VHF radios, cellular phone, compass, a depth finder, a tool kit, and all required and suggested safety equipment.

5.1.6 Sampling Equipment

A 1/25 m2, stainless steel, Young-modified Van Veen Grab sampler was used to collect sediment grabs for benthic analyses. This grab sampled an area of 413 cm2 with a maximum depth of penetration in the sediment of 10 cm.

5.1.7 Manufacturer of Sampling Equipment

Values were not measured at time of collection.

5.1.8 Key Variables

Values were not measured at time of collection.

5.1.9 Sampling 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

Field technicians were trained to follow Standard Operating Procedures to insure the collection of representative, uncontaminated and high quality samples. QA/QC measures were taken in the field to avoid or reduce contamination and insure the collection of representative samples. These included: use of stainless steel instruments, thorough cleaning of the sampler between grabs and use of pre-cleaned containers for sediment storage.

A successful grab had relatively level, intact sediment over the entire area of the grab and a sediment depth of 7-10 centimeters. Unacceptable grabs included those: containing no sediments, which were partially filled or had shelly substrates or grossly slumped surfaces. Grabs completely filled to the top, where the sediment was oozing out of the hinged top, were also unacceptable.

Additionally, each crew was visited during the sampling period by the QA Coordinator or Logistics Coordinator. Part of the review included observing sample collection procedures to ensure samples were being processed properly.

5.1.11 Sample Collection Method References

Macauley, J.M. 1991. Environmental Monitoring and Assessment Program-Near Coastal Louisianian Province: 1991 Monitoring Demonstration. Field Operations Manual. EPA/600/X-91/XXX. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

Macauley, J.M. 1992. Environmental Monitoring and Assessment Program: Louisianian Province: 1992 Sampling: Field Operations Manual. EPA/ERL-GB No. SR-119. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

5.1.12 Sample Collection Method Deviations

None

5.2 Data Preparation and Sample Processing

5.2.1 Sample Processing Objective

Process uncontaminated sediment samples to characterize the grain size distribution of the sediment samples.

5.2.2 Sample Processing Methods Summary

The sediment sample was homogenized before a sub-sample was removed for analysis. For sandy sediments (anticipated sand content of approximately 25% or more by weight), about 50 g wet weight was removed and placed in a beaker. For muddy sediments (anticipated sand content of less than approximately 25%), about 20 g wet weight was removed and placed in a beaker. Five mL of sodium hexametaphosphate (6.2 g/L) and 50 mL of distilled water were added to the sample and stirred on a magnetic stirrer for 1-5 minutes. The suspension was then sieved through a 63 um sieve.

The <63 um portion of the sample was transferred to a 1 L graduated cylinder and brought up to 1 L with distilled water. The cylinder was shaken to create an even suspension, then 40 mL were immediately removed and placed in a tared evaporating dish. This sub-sample was dried at 100 degrees Centigrade and weighed. The >63 um portion of the sample was transferred from the sieve to a tared evaporating dish, dried at 100 degrees Centigrade, and weighed.

The full analysis of grain size distribution was only conducted in 1991. The tedious procedures are based on a time series of extractions taken from a suspension of sediment (< 63 um fraction) as it is allowed to settle. For a detailed discussion refer to EMAP -Estuaries Laboratory Methods Manual Vol. 1.

Other Analytes

The concentration of total organic carbon (TOC) in each sediment sample was determined by TOC analyzer using combustion/non-dispersive infrared gas analysis.

5.2.3 Sample Processing Method Calibration

N/A

5.2.4 Sample Processing Quality Control

N/A

5.2.5 Sample Processing Method Reference

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

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Value

% SILTCLAY	SICL_PC
% SAND	SAND_PC

6.2 Data Manipulation Description

The data manipulations calculated the percentages of grain composition, based on the < 63 um and the > 63 um fraction weights.

6.3 Data Manipulation Examples

6.3.1 SILTCLAY

SICL_PC represents the arithmetic mean of the silt/clay content (%) of the sediments from each core of the benthic grab.

The silt-clay weight calculation is as follows using the < 63 um fraction:

Silt-clay weight = (gross wt. - tare wt.) * (total volume in cylinder)/(sample volume from cylinder)

The percent silt-clay calculation is as follows:

% silt-clay = silt-clay wt/(sand wt + silt-clay wt) * 100

6.3.2 SAND (%)

SAND_PC represents the arithmetic mean of the sand content (%) of the sediments from each core of the benthic grab.

The sand weight calculation is as follows using the >63 um fraction:

sand weight = (gross wt. - tare wt.)

The percent silt-clay calculation is as follows:

% sand = sand wt/(sand wt + silt-clay wt) * 100

7. DATA DESCRIPTION

7.1 Description of Parameters

Field Name	Data Type	Field Len	Format	Variable Field Label
STA_NAME	Char	8	$8.	The Station Identifier
SICL_PC	Num	8	5.1	Silt/Clay (%) in Sample
VST_DATE	Num	8	YYMMDD6.	The Date the Sample was Collected
SAND_PC	Num	8	5.1	Sand (%) in Sample
TOC	Num	8	13.6	Total Organic Carbon (%) in Sample

7.1.6 Precision to which values are reported

Precision of values is reported in 7.1.

7.1.7 Minimum Value in Data Set

Variable	Minimum
SICL_PC	2.6
SAND_PC	0.7

7.1.8 Maximum Value in Data Set

Variable	Maximum
SICL_PC	99.3
SAND_PC	97.4

7.2 Data Record Example

7.2.1 Column Names for Example Records

STA_NAME VST_DATE SAND_PC SICL_PC TOC

7.2.2 Example Data Records

STA_NAME	VST_DATE	SAND_PC	SICL_PC	TOC
LA93AC1	931007	3.3	96.7	2.111
LA93AC10	931008	9.4	90.6	1.791
LA93AC2	931007	14.3	85.7	1.642
LA93AC3	931007	21.2	78.8	0.895
LA93AC4	931008	90.0	10.0	0.854

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-97 Degrees 36 Minutes 16.20 Decimal Seconds

8.2 Maximum Longitude

-94 Degrees 24 Minutes 33.00 Decimal Seconds

8.3 Minimum Latitude

25 Degrees 57 Minutes 28.80 Decimal Seconds

8.4 Maximum Latitude

29 Degrees 43 Minutes 49.80 Decimal Seconds

8.5 Name of area or region

Coastal distribution of sampling is in Galveston Bay, the East Bay Bayou of Galveston Bay and the Arroyo Colorado and the Rio Grande River systems in Texas.

9. QUALITY CONTROL AND QUALITY ASSURANCE

9.1 Method Quality Objectives

The MQOs for particle size (% silt/clay) analysis are to maintain precision within a variance of 10% relative percent difference (RPD) between replicate measurements; a goal of 100% completeness was established in respect to obtaining sample results. Accuracy was not applicable for this analysis.

9.2 Quality Control Methods

QC checks for sediment particle size analysis are based on the reanalysis of a portion of each technician's work. Approximately 10% of samples from a batch are randomly selected for reanalysis and the results are compared against those for the original sample. To pass the QC check the absolute difference between the original value and the second must be#10%. If the reanalysis failed the QC check, the entire batch would be reanalyzed, providing there was an adequate volume of sample.

9.3 Actual Measurement Quality

The laboratories routinely met the QC criteria for sediment particle size determinations; the agreement between replicate analysis for all QC samples resulted RPDs of <- 10%.

9.4 Sources of Error

NA

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the WWW site.

10.2 Data Access Restrictions

Data can only be accessed from the WWW site.

10.3 Data Access Contact Persons

Charles Howell
U.S. EPA - Region 6
Environmental Services Division
(214) 655-8354

10.4 Data file Format

Data can be downloaded as ASCII fixed format files.

10.5 Information Concerning Anonymous FTP

Not accessible

10.6 Information Concerning WWW

Data can be downloaded from the WWW

10.7 EMAP CD-ROM Containing the Data file

Data not available on CD-ROM.

11. REFERENCES

Heitmuller, P.T. and R. Valente. 1991. Environmental Monitoring and Assessment Program: EMAP-Estuaries South Texas coast: 1991 quality assurance project plan. EPA/ERL-GB No. SR-120. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

Macauley, J.M. 1991. Environmental Monitoring and Assessment Program-Near Coastal Louisianian Province: 1991 Monitoring Demonstration. Field Operations Manual. EPA/600/X-91/XXX. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

Macauley, J.M. 1992. Environmental Monitoring and Assessment Program: Louisianian Province: 1992 Sampling: Field Operations Manual. EPA/ERL-GB No. SR-119. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

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

12. TABLE OF ACRONYMS

ACRONYM	DESCRIPTION
EMAP	Environmental Monitoring and Assessment Program

EPA	Environmental Protection Agency
FTP	File Transfer Protocol
GPS	Global Positioning System
REMAP	Regional Environmental Monitoring and Assessment Program
WWW	World Wide Web

13. PERSONNEL INFORMATION

Charlie Howell
U.S. Environmental Protection Agency
Region 6, Environmental Services Division
First Interstate Bank Tower at Fountain Place
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733
(214) 655-8354
howell.charlie@epamail.epa.gov

Melissa M. Hughes
EMAP-Information Management
OAO Corp. c/o U.S. EPA NHEERL-AED
27 Tarzwell Drive
Narragansett, RI 02882-1197
(401) 782-3184 (Tele)
(401) 782-3030 (FAX)
hughes.melissa@epa.gov