NOAA Technical Memorandum NMFS-SEFC- 29

NOAA/NMFS FINAL REPORT TO DOE

Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana, 1978-1979

A report to the Department of Energy on work conducted under provisions of Interagency Agreement EL-78-I-0-7146 during 1978-1979.

Volume V

SEDIMENTS

NOVEMBER 1980

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Center
Galveston Laboratory
Galveston, Texas 77550

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Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana, 1978-1979

VOL. V - DESCRIBE SURFICIAL SEDIMENTS AND SUSPENDED PARTICULATE MATTER

BY

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INTRODUCTION

In compliance with the Energy Policy and Conservation Act of 1975, Title 1, Part B (Public Law 94-163), the Department of Energy (DOE) implemented the Strategic Petroleum Reserve (SPR). The SPR program was implemented in August of 1977 with the goal of storing a minimum of one billion barrels of crude oil by December 22, 1982. After evaluating several physical storage possibilities, DOE determined that storage in commercially developed salt dome cavities through solution-mining processes was the most economically and environmentally advantageous option.

Six areas along the northwestern Gulf of Mexico were to be investigated as potential storage cavern sites. These areas are shown in Figure 1. This project, "Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana", deals with proposed disposal sites associated with two of the cavern sites, West Hackberry and Weeks Island. The Biological/ Chemical Survey was initiated in April 1978 and was completed in December 1979. Its major products are Final Reports available through the National Technical Information Service (NTIS), Springfield, Virginia; data files available through the Environmental Data and Information Service (EDIS), Washington, D.C., and any research papers that may be written by participating principal investigators and published in scientific or technical journals. Preliminary results were also made available through DOE/NOAA/NMFS project reviews and workshops attended by project participants and various governmental, private and public user groups.

The objectives of the Biological/Chemical Survey were: (1) to describe the biological, physical and chemical components of the marine ecosystem for each disposal site; and (2) to assess, by analysis of Gulf Coast shrimp data, the importance of the Louisiana shrimping grounds in the vicinity of the proposed salt dome brine disposal sites. These objectives were achieved using historical and new data to describe and quantify the biological, chemical, and physical characteristics and the temporal variations of these characteristics in the environments of each proposed disposal site.

The two proposed disposal sites have been extensively examined, using available meteorological, oceanographic, bathymetric and ecological data, in the following two reports:

Environmental Data Service, DOC/NOAA. 1977.

Analysis of Brine Disposal in the Gulf of Mexico, #2 West Hackberry. Report to Federal Energy Administration Strategic Petroleum Reserve Program Salt Dome Storage. Center for Experiment Design and Data Analysis, NOAA, EDS, Marine Assessment Division, Washington, D.C.

Environmental Data Service, DOC/NOAA. 1977.

Analysis of Brine Disposal in the Gulf of Mexico, #3 Capline Sector. Report to Federal Energy Administration Strategic Petroleum Reserve Program Salt Dome Storage. Center for Experiment Design and Data Analysis, NOAA, EDS, Marine Assessment Division, Washington, D.C.

The above reports and other pertinent documents are available from the Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22151.

Proposed locations of the West Hackberry (Texoma Sector) and Weeks Island (Capline Sector) brine disposal sites are shown in Figures 2 and 3, respectively. These sites are subject to change within the same geographic area pending results of baseline surveys presently underway.

The proposed West Hackberry disposal site is located approximately 9.7 km (6 miles) south off the coast from Mud Lake at Latitude 29°40' N and Longitude 93°28' W at a bottom depth of about 9 m (30 feet). Operational requirements and engineering limitations of the proposed brine diffuser at this site are as follows: length - 933.3 m (3070 feet); orientation -normal to coast; number of ports - 52; length between ports - 18 m (59 feet); port diameter - 7.6 cm (3 inches); orientation of port riser - 90° to bottom; and port exit velocity - 7.6 m/sec (25 ft/sec).

The proposed Weeks Island (Capline Sector) disposal site is located approximately 41.8 km (26 miles) off Marsh Island at Latitude 29°04'N and Longitude 91°45' W at a bottom depth of about 9 m (30 feet). Operational requirements and engineering limitations of the proposed brine diffuser at this site are as follows: length - 608 m (2000 feet); orientation -normal to coast; number of ports - 34; orientation to port riser - 90° to bottom, and port exit velocity - 7.6 m/sec (25 ft/sec).

The Biological/Chemical Surveys in the proposed salt dome brine disposal sites described seasonal abundance, distribution and community composition of major benthic, planktonic, bacterial and demersal finfish and macro-crustacean ecosystem components; the sediments; the hydrocarbons and trace metals composition and concentration in the marine ecosystem; and the seasonal variations in inorganic nutrients composition and concentration of the water column. The sampling scheme used for sample collections around the two sites is shown in Figure 4. A separate data analysis assessed the importance of shrimping grounds in the vicinity of the proposed brine disposal sites in terms of historical data on species composition, marketing size categories and location of commercial shrimp catches within statistical reporting zones off the Louisiana coast.

Information concerning data from this project is available through the Program Data Manager: Mr. Jack Foreman, Environmental Data and Information Service, Page Building No. 2, 3300 Whitehaven Street, N.W., Washington, D.C.

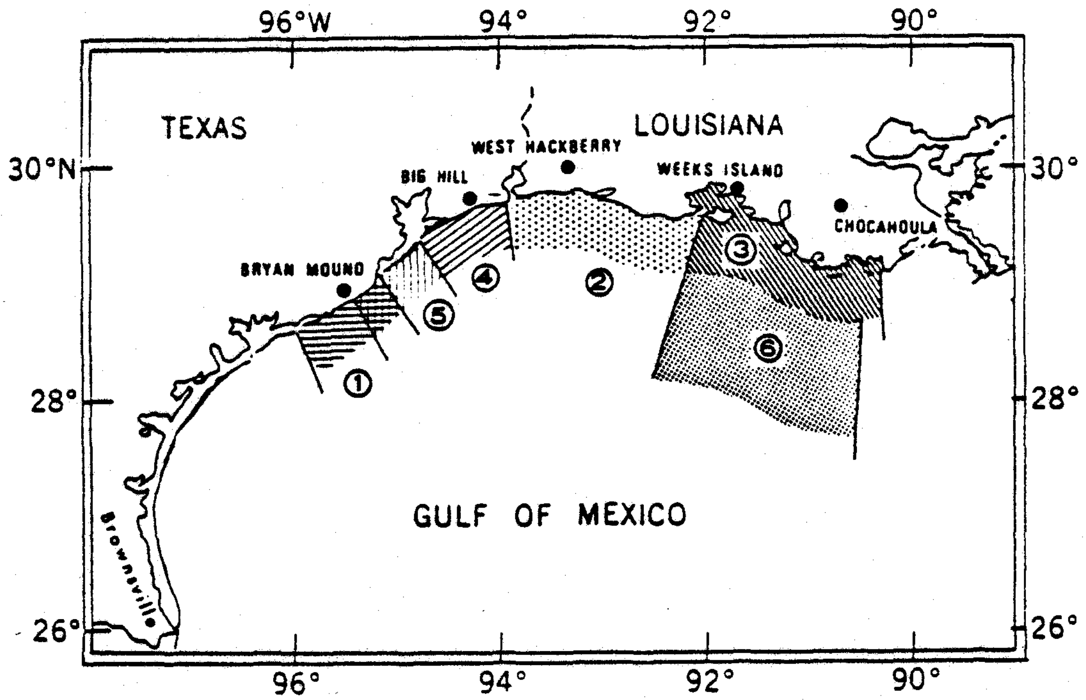

Figure 1. Regions of Study for Brine Disposal Assessment-DOE/NOAA Interagency Agreement (adapted from Environmental Data Service, DOC/NOAA. Analysis of Brine Disposal in the Gulf of Mexico, #2 West Hackberry. 1977.).

1 Texas Coastal Ocean, Colorado River to San Luis Pass (Bryan Mound)

2 Louisiana Coastal Ocean, Sabine Lake to S.W. Pass of Vermilion Bay (West Hackberry)

3 Louisiana Coastal Ocean, S.W. Pass, Vermilion Bay to Timbalier Island (Capline Sector)

4 Texas Coastal Ocean, Port Bolivar to Sabine Pass

5 Texas Coastal Ocean, Freeport Harbor to Galveston South Jetty

6 Louisiana Coastal Ocean, Offshore from Vermilion Bay to Terrebone Bay

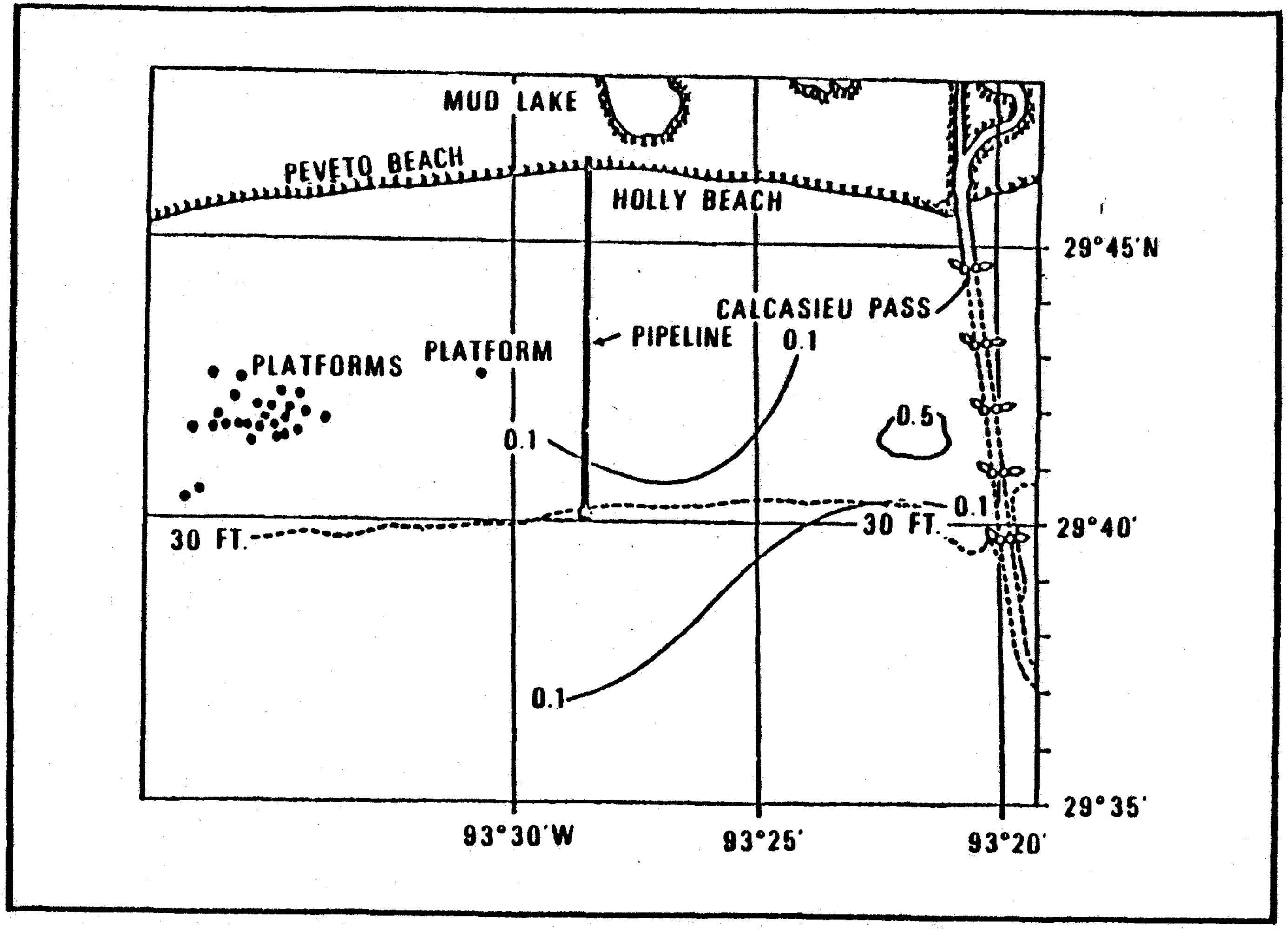

Figure 2. Proposed Texoma brine disposal site.

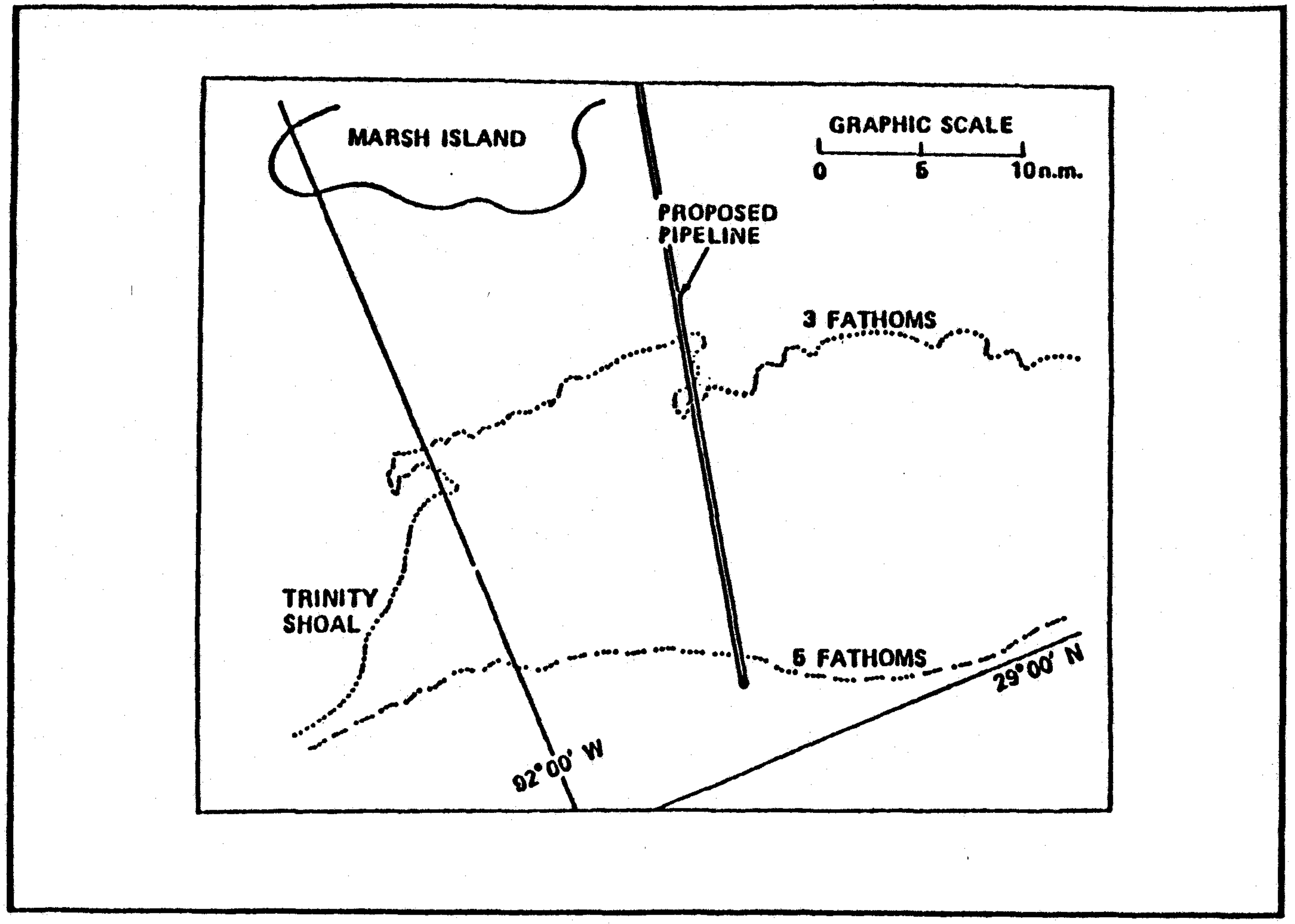

Figure 3. Proposed Capline brine disposal site.

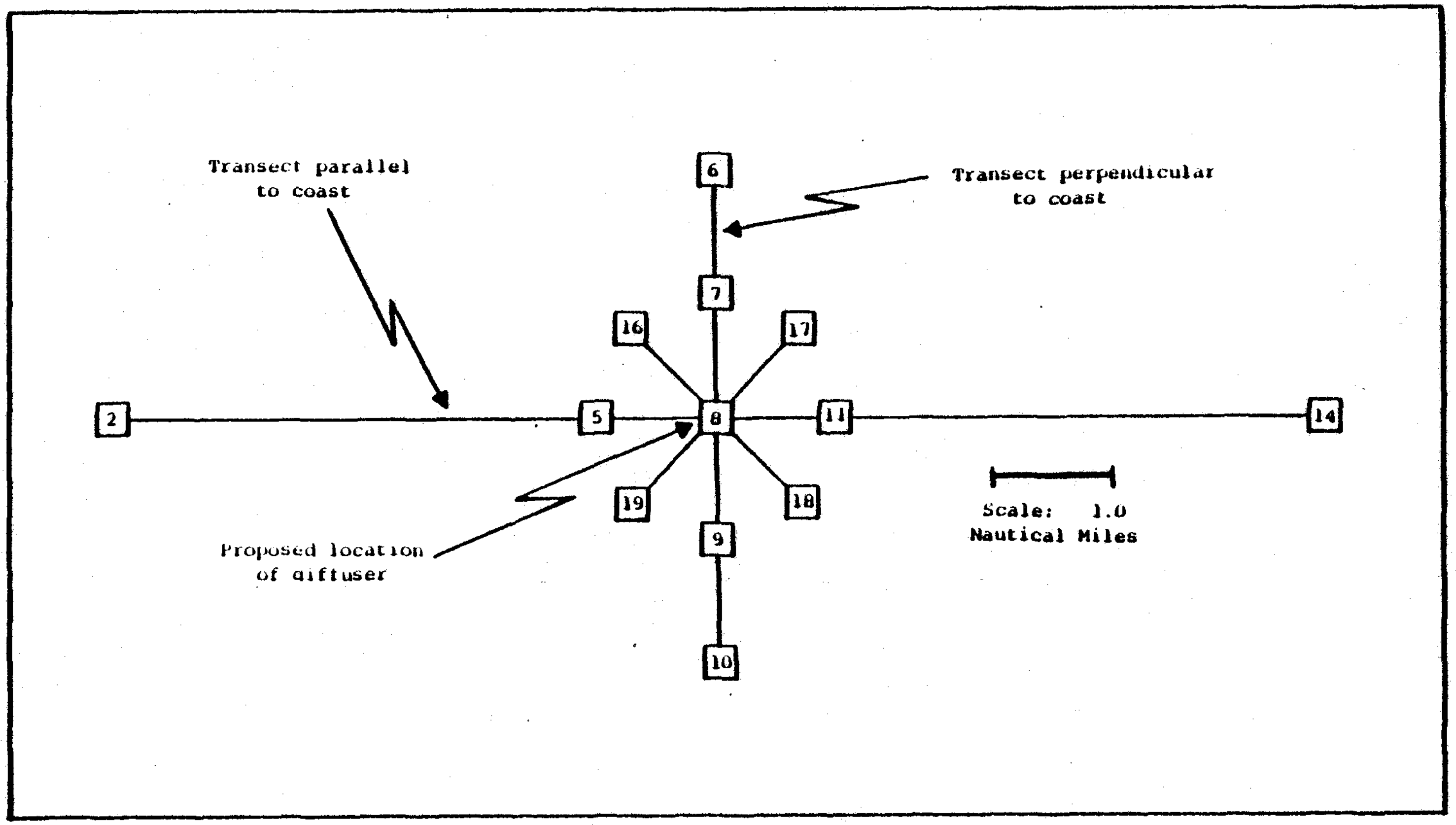

Figure 4. Sampling scheme for proposed salt dome brine disposal sites.

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II. PRINCIPAL INVESTIGATORS' SECTION

WORK UNIT 2.4 - DESCRIBE SURFICIAL SEDIMENTS AND SUSPENDED PARTICULATE MATTER

K. A. Hausknecht

Energy Resources Company, Inc.

ABSTRACT

This report summarizes measurements of surficial and suspended sediment characteristics which were made during four cruises to the West Hackberry and Weeks Island brine disposal sites in June and October of 1978 and January and May of 1979. The sites showed significant differences in sedimentology with the West Hackberry site being composed predominantly of fine-grained silt and clay (<40% sand) with characteristically high levels of total organic carbon (TOC) averaging 12-15 mg/g. Conversely, sediments at Weeks Island were primarily silty sand (>70% sand) with low levels of organic carbon (5-8 mg/g). Total organic carbon showed a significant inverse correlation with grain size (TOC increased with decreasing grain size). At West Hackberry, the inner (6, 7, 8, and 11) stations were primarily silt and clay (<10% sand) in all seasons, and the sand percentages increased to the south and west. At Weeks Island, stations near the shoal area had the highest sand content (>80%) and the percentage decreased to the southwest. The spatial distribution of TOC was essentially the inverse of the sand distribution.

Suspended particulate levels were low (2.6-3.5 mg/l) during summer and fall, but increased dramatically in winter. Mean levels were 42 and 34 mg/l at the West Hackberry and Weeks Island sites, respectively. The increased levels of total suspended matter (TSM) were accompanied by a shift in the suspended particle size distribution from clay-sized (<4 μ) to medium and fine silt-size particles (4-10 μ). High levels of TSM in winter at Weeks Island were accompanied by a decrease in the

silt percentage of the sediments. Gradients in TSM were small at both sites in summer and fall. In winter and spring, gradients in TSM decreased in the offshore direction.

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ACKNOWLEDGEMENTS

This report was written by Mr. Keith A. Hausknecht, Senior Scientist in the Aquatic Sciences Division of Energy Resources Co. Inc. (ERCO). Contents were, in part, drawn from the mid-term report prepared by Ms. Colleen Hogan. Assistance with field work and analyses were provided by Ms. Hogan, Ms. Elizabeth Silvestro, Mr. Reinier Courant, Mr. David Fiest, Mr. Chip Chandler, and Dr. Fred Passman. Dr. Jon C. Boothroyd (University of Rhode Island Department of Geology) provided sediment grain size analyses under subcontract to ERCO. Particle size distributions of water samples were conducted by Dr. Howard Schneider of Bioassay Systems (Cambridge, Massachusetts) under a similar subcontract. Mr. Greg Gitschlag, Mr. David Simmons, and the crew of the R/V GUS III worked diligently and tirelessly in planning and executing the sampling cruises under adverse conditions. This work was funded under NOAA Contract 03-78-D08-0021.

1. INTRODUCTION

This report summarizes results from Work Unit 3.1 (Sediments and Suspended Particulates) of the "Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites off Louisiana." The purpose of this multidisciplinary study was to describe the biological, chemical, and physical components of the marine ecosystems at each disposal site. The primary objectives of the work unit pertaining to sediments and suspended particulates were to describe the local sedimentary geology and give quantitative estimates of spatial and seasonal variability of measurements made at each diffuser site. These measurements provide baseline data which can be used to assess the impact of future brine disposal operations. Secondary objectives were to provide descriptive data needed by other investigators to evaluate the interaction of other components of the ecosystem with the sediments and to provide insight into possible sediment transport processes operating in the coastal Louisiana region.

The Texoma (West Hackberry) and Capline (Weeks Island) brine disposal sites are located in the Gulf Coast Salt Dome Province along the northern continental margin in the Gulf of Mexico (Antoine *et al*., 1974). This area is composed primarily of terrigenous sediments deposited in the Gulf Coast geosyncline. The sedimentary character of this region is influenced to a large degree by runoff from the Gulf Coastal Plain (primarily from the Mississippi and Atchafalaya River systems, but also from smaller systems such as the Sabine and Calcasieu) and the predominantly westward circulation (NOAA, 1976; Burroughs, 1977). Regional sediment maps prepared by the Bureau of Land Management and previous investigations by DOE (1978), Fisher et al. (1971), and Barrett (1971) portray the sediments at the West Hackberry site (29°40'N, 93°28'W) as sandy mud (sand-silt-clay) and those at the Weeks Island site (29°04'N, 91°45'W) as silty sand. Barrett (1971) describes the offshore Louisiana sediments as having very little clay, large percentages of fine and very fine sand, and good sorting, all characteristics of a high energy environment. Berryhill et al. (1977) also found that sand fractions dominated only in near-shore regions of the Texas coast and that silt-size particles were predominant over most of the outer-Texas shelf. Clay-size particles appeared to be dispersed to deeper Gulf waters.

Grain size distribution within the sediments is a good indicator of long-term ambient current energy in a given area and provides insight into transport processes which may be significant in accumulation or dispersal of anthropogenic waste constituents. Similarly, size distribution of suspended particulates can provide information regarding short-term responses to acute events such as storms which can greatly influence bottom sediments in shallow water. Studies in the Texas coastal region by Berryhill et al. (1977) showed the average size ranges of suspended particulates were from 9.37 ø (clay) to 5.30 ø (medium silt). In most cases, size distributions were wide and polymodal reflecting contributions from organic (plankton) and inorganic (silt and clay mineral) sources. Most areas showed a net increase in suspended matter concentration with depth and a layer of resuspended sediment was present near-bottom. Size distributions of suspended particulates were greatly influenced by runoff and storm events. Abrupt shifts in the prevailing winds, during the winter months (December through February) and in the hurricane season (late summer-early fall), which are common in this area (BLM, 1978; DOE, 1970; Fisher et al., 1971), result in increased transport of terrigenous materials and in reworking of sediments in the coastal region.

2. METHODS AND MATERIALS

2.1 Sample Collection and Processing

During each of the four sampling seasons, samples were collected at nine stations at each diffuser site (Figure 1). Dates of each sampling cruise are given in Table 1.

At each station, a water sample was collected at mid-depth in a 10-liter GO-FLO bottle (General Oceanics). From this sample, a 250-ml aliquot was drawn into a polyethylene bottle and preserved with 5 ml of Lugol's solution for later analysis of the suspended particulate size distribution. Samples were stored at ambient temperature in the dark. A separate aliquot (variable from 180 to 730 ml depending on suspended load) was vacuum-filtered through paired, 0.45 μm Millipore filters for determination of total suspended matter (Meade et al., 1975). Residual salts were removed by washing the filters at least five times with distilled water. The filters were stored frozen in individual Petri dishes.

Bottom sediments were collected with a stainless steel, modified Van Veen grab sampler. At each station, four replicate grabs were taken and a single pooled (composite) sample was prepared by adding equal volumes of surficial (<5 cm) sediment to a 1-quart acid-cleaned, solvent-rinsed Teflon jar. The sediment was frozen immediately. During two seasons (fall and spring), four replicate sediment samples, as well as a pooled sample, were taken at Stations 2, 8, and 14 at each site.

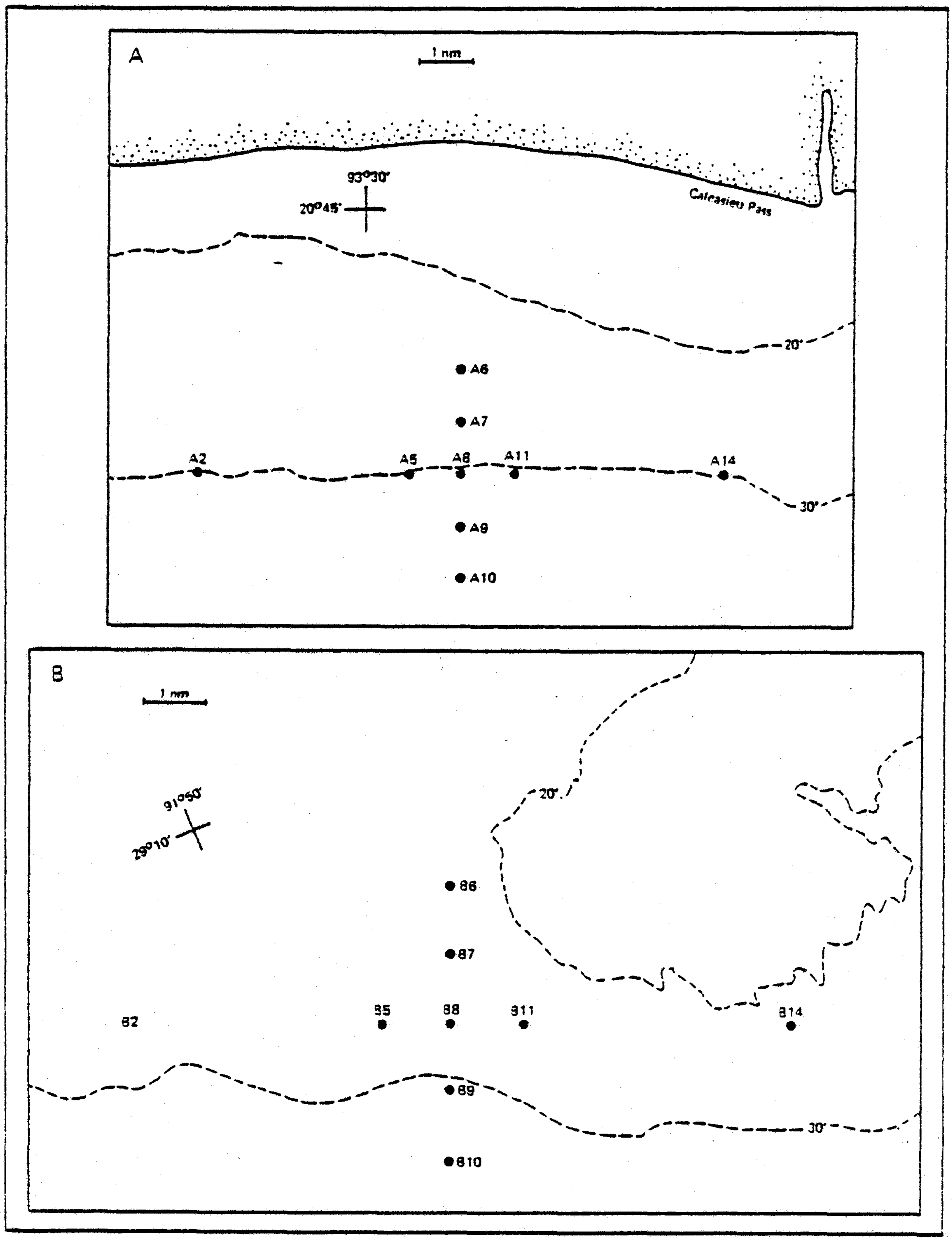

Figure 1. Sampling locations for collection of suspended sediment and surficial sediment samples. A—West Hackberry; B—Weeks Island.

TABLE 1

SAMPLING CRUISES TO WEST HACKBERRY AND WEEKS ISLAND SALT DOME BRINE DISPOSAL SITES DURING 1978 AND 1979

SAMPLING SEASON	DATES OF SAMPLING	
	WEST HACKBERRY	WEEKS ISLAND
Summer 1978 (Cruise 01)	6/23 - 6/27	6/28 - 6/29
Fall 1978 (Cruise 02)	10/3 - 10/12	11/9 - 11/10
Winter 1979 (Cruise 03)	1/25 - 1/26	1/27 - 1/28
Spring 1979 (Cruise 04)	5/1 - 5/2	4/30 - 5/1

Following shipment to the laboratory, each sediment sample was thawed and homogenized with a Teflon spatula. Subsamples were taken for analysis of the following parameters: total organic carbon and grain size (Work Unit 3.1), hydrocarbons (Work Unit 3.2), and trace metals (Work Unit 3.3). Quality control samples were also taken, frozen, and archived for future use. Samples were shipped to principal investigators of other work units (3.2 and 3.3) as required of the contractor for Work Unit 3.1.

2.2 Laboratory Methods

2.2.1 Total Suspended Matter

Each Petri dish containing the filter pair was thawed and rewashed three times with distilled water. Filters were dried to a constant weight in a laminar flow clean bench and weighed on a Cahn Model 4100 electrobalance. Changes in weight of the bottom filter were used as corrections for changes due to temperature, humidity, or salt retention (Meade *et al.*, 1975). Concentration were calculated in mg/l.

2.2.2 Suspended Particulate Size Distribution

Analysis of the particle size distribution was conducted on a Coulter TA particle counter operated according to the manufacturer's instructions. Each sample was preserved in Lugol's solution to prevent bacterial growth and shaken gently just prior to analysis to disrupt any agglomerates that may have formed due to settling of particles between time of collection and analysis. After initial scans to determine size ranges and the most frequently occuring sizes, 15 intervals were counted in quadruplicate. From these determinations, standard statistical grain size parameters (mean, median, mode, standard deviation, and skewness) were calculated (Folk, 1974).

2.2.3 Total Organic Carbon

Total organic carbon in sediments was determined using a Perkin-Elmer Model 240 Elemental Analyzer following the method of Gibbs (1977). After thawing, several grams of sediment were dried, ground to a fine powder using an agate grinding mill and treated with an excess of sulfurous acid to remove calcium carbonate ($CaCO_3$). The samples were then dried and reground if necessary. Aliquots of the powdered sample were weighed on a Cahn Model 4100 electrobalance and inserted into the combustion chamber of the instrument. The combustion temperature was 950° C. Cyclohexane-2,4 dinitrophenylhydrazone was used for calibration. Concentrations were calculated in mg/g on a carbonate-free basis.

2.2.4 Sediment Grain Size Distribution

Sediment grain size distribution was determined using the methods of Folk (1974). Sediment was sieved through a 62-μ (4ϕ) screen to separate sand from the silt and clay fractions. The sand fraction was then weighed and treated with acetic acid to remove $CaCO_3$. After drying, the sample was reweighed to determine weight loss due to $CaCO_3$. The remaining sand fraction was sieved through nested sieves at 0.25 ø intervals to determine the size distribution over the range of 1.0-4.0 ø. Sand, silt, and clay fractions were expressed as percentage of total theoretical sample weight.

The pipette method was used for the analysis of the silt-clay fraction. The portion of the sediment sample washed through the 62-μm sieve was poured into a liter cylinder and dispersant added to prevent flocculation. Distilled water was added to bring the water level up to 1,000 ml. The cylinder containing the silt-clay fraction was shaken vigorously for 30 seconds and placed in a constant temperature water bath. Pipette withdrawals were made at time intervals specified by Folk (1974) to delineate the silt and clay fractions of the sample, and the suspension was expelled into a preweighed 50-ml beaker. The pipette was then rinsed with distilled water and the rinse water was added to the beaker. The beaker was placed in an oven and dried for 24 hours at 105° C. When the sediment dried, the beakers were removed from the oven, cooled to room temperature, and weighted to 0.001 gm on the top-loading Mettler Balance.

2.3 Statistical Analysis

Statistical measurement of the sand fraction and suspended particle size distributions were analyzed using methods described by Folk (1974). These included mean and median grain size, inclusive graphic standard deviation (sorting), inclusive graphic skewness, and kurtosis. Other statistical analyses were performed according to methods outlined by Steel and Torrie (1960).

3. RESULTS AND DISCUSSIONS

3.1 Suspended Sediments

Investigations of suspended sediments included measurement of total suspended matter (TSM) and the size distribution of the suspended particles. The primary objectives of the study of suspended particulate matter were to determine concentration levels and gradients around each diffuser site and to determine whether seasonal differences in the quantity or composition of the suspended sediments were evident. Secondarily, data on concentrations and distributions of suspended particulates were used to provide insight into sediment transport processes and provide additional support to investigators from other work units.

Samples for analysis of TSM and size distribution were collected each season from one mid-depth sample at nine stations at both the West Hackberry and Weeks Island sites. The single data point at each station precludes investigation of the vertical distribution of TSM caused by thermohaline structure or resuspension, but provides data to examine horizontal distribution patterns, seasonal variability, and similarities between the diffuser sites.

The mean and standard deviation of all TSM analyses are summarized in Table 2. Raw data are tabulated in Appendix A. During summer and fall, average levels at each site ranged from 2.6-3.5 mg/l. These levels are consistent with those determined by other investigators in this region (DOE, 1978). In contrast, concentrations were elevated at

TABLE 2

AVERAGE CONCENTRATIONS OF TOTAL SUSPENDED MATTER AT WEST HACKBERRY AND WEEKS ISLAND SITES

SAMPLING SEASON	CONCENTRATION (mg/l)[a]	
	WEST HACKBERRY	WEEKS ISLAND
Summer 1978 (Cruise 01)	3.48 (2.22-4.74)	2.64 (1.16-4.12)
Fall 1978 (Cruise 02)	3.20 (0.96-5.44)	2.93 (0.17-5.69)
Winter 1979 (Cruise 03)	41.74 (0-87.70)	34.38 (0-106.86)
Spring 1979 (Cruise 04)	4.93 (1.37-8.49)	14.72 (3.66-25.78)

[a]Mean and 95% confidence interval.

both sites during winter and spring. Average levels were 42 and 34 mg/l at West Hackberry and Weeks Island respectively, and one station (Station 7 at Weeks Island) showed a concentration in excess of 100 mg/l in spring.

The geographic distribution of TSM at each site is shown in Figures 2 and 3. At the West Hackberry site (Figure 2), distributions of TSM showed small gradients during summer and fall due to the relative uniformity of the concentrations. In the summer, shallower, inshore stations were slightly higher than Station 10 (the station located offshore), and an increasing gradient in an east-to-west direction was observed in the fall. Stations 11 and 14 had levels about one-half (1.7 mg/l) those at the other stations (2.6-5.2 mg/l). In contrast, a sharp gradient was observed during the winter cruise. Concentrations ranged from 50-75 mg/l at the northern and eastern stations and decreased sharply to the west to about 8 mg/l at Station 2. The large increase in TSM may have been due to a storm event rather than runoff since average salinities were similar to those measured during summer and fall. Prevailing winds during this season are predominantly from the northeast (BLM, 1978) which is consistent with the data shown in Figure 2. The spring cruise, inshore stations generally had higher levels than the offshore stations, the high value at Station 9 (8.8 mg/l) being anomalous in this regard. The two-fold increase in TSM (compared to the summer and fall cruises) may be attributable to freshwater runoff since average salinities were 16-18 o/oo, about 5-9 o/oo lower than observed in earlier cruises.

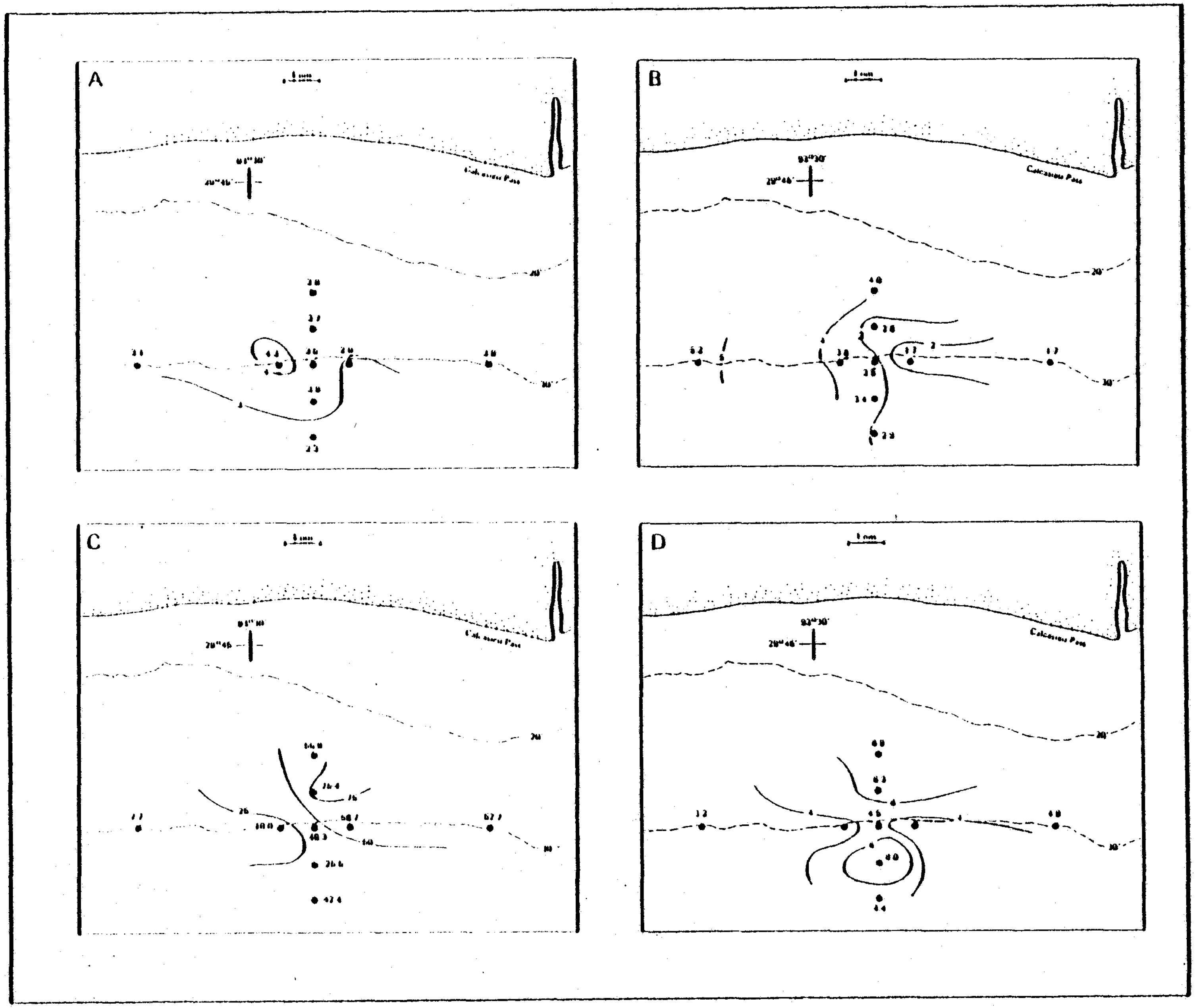

Figure 2. Distribution of total suspended matter (mg/l) at the West Hackberry site.
A-Summer; B-Fall; C-Winter; D-Spring.

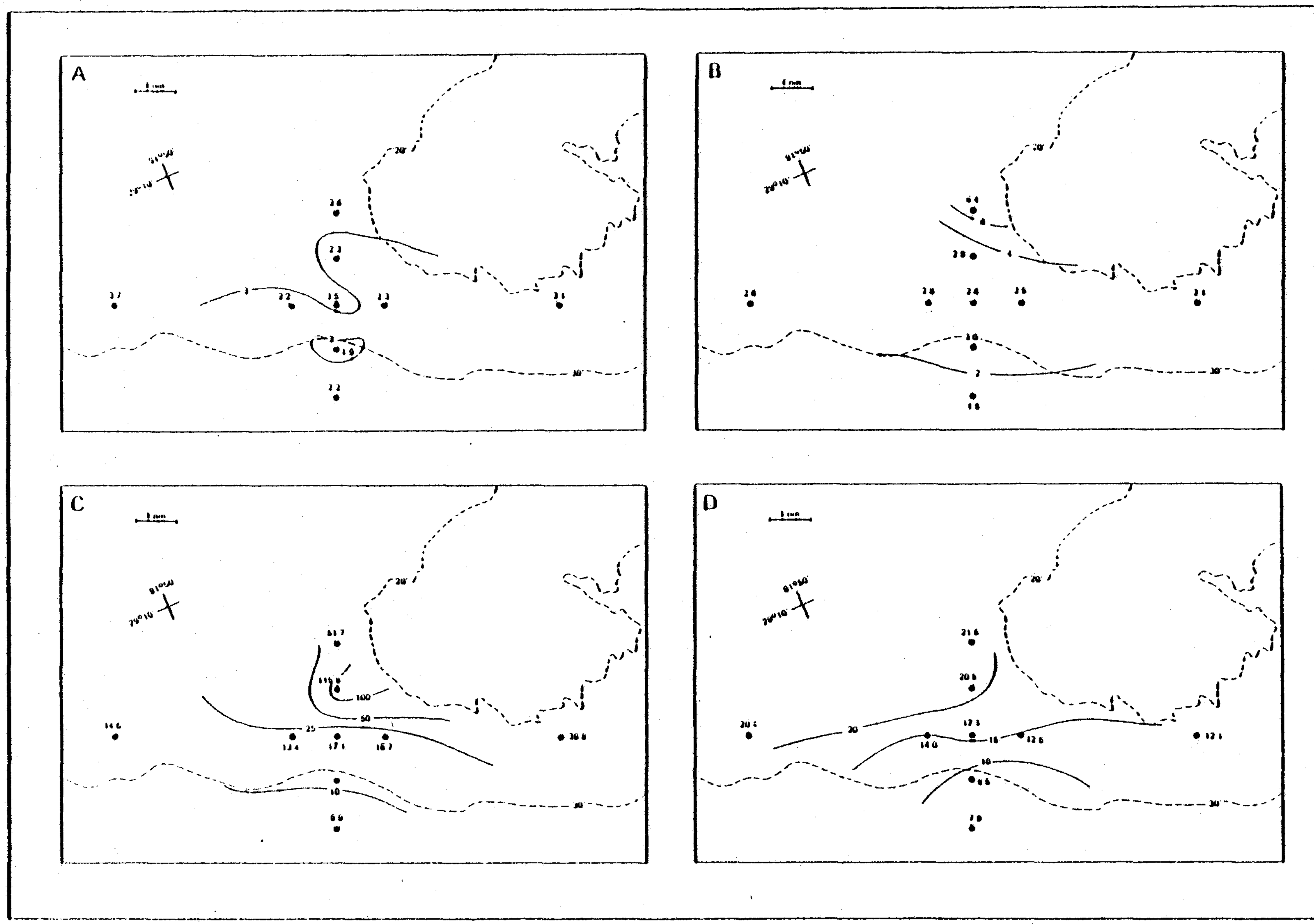

Figure 3. Distribution of total suspended matter (mg/l) at the Weeks Island site.
A-Summer; B-Fall; C-Winter; D-Spring.

The distributions observed at Weeks Island (Figure 3) showed spatial and temporal similarities to those described for West Hackb rry. During summer (Figure 3), gradients were small due to the uniformity of concentrations (1.9-3.7 mg/l). Concentrations during the fall cruise showed decreasing gradients from northeast to southwest (onshore-offshore) with levels decreasing from around 6 mg/l at Station 6 (nearest the shoal area) to 1.5 mg/l at station 10 (in deepest water). In the winter, high levels (>100 mg/l) were observed near the shoal area at station 7 and they decreased sharply to about 7 mg/l at Station 10. The direction of this gradient in TSM again corresponded to the predominant wind stress (northeasterly), though the average surface salinity was also about 6 ^{o}/oo lower than in the fall, indicating increased influence of riverine input. However, the average vertical salinity gradient (average surface salinity was lower than bottom salinity in all seasons) was smaller than that observed in summer (7.8 ^{o}/oo versus 11.4 ^{o}/oo) and the increased TSM concentrations at this time may have been due primarily to a winter storm event rather than runoff. During spring, TSM levels were still quite high at inshore stations (>20 mg/l) and levels decreased to less than 7 mg/l at Station 9. Hydrographic data indicated an unstratified water column and salinities at this time were 16-17 ^{o}/oo, the lowest measured during this study, most likely due to runoff from the Mississippi and Atchafalaya Rivers.

Further insight into the composition of the suspended material can be obtained from the analysis of the suspended particle size distribution. A summary of the "average" median particle diameter is shown in

TABLE 3

MEDIAN PARTICLE DIAMETER OF SUSPENDED PARTICULATE MATTER AT WEST HACKBERRY AND WEEKS ISLAND SITES

SAMPLING SEASON	MEDIAN PARTICLE DIAMETER (μ)[a]	
	WEST HACKBERRY	WEEKS ISLAND
Summer 1978 (Cruise 01)	3.02 (0-10.4)	1.17 (1.01-1.33)
Fall 1978 (Cruise 02)	6.96 (3.06-10.86)	12.45 (6.69-18.21)
Winter 1979 (Cruise 03)	7.07 (5.73-8.41)	6.54 (4.84-8.24)
Spring 1979 (Cruise 04)	9.47 (6.07-12.87)	11.02 (6.40-15.64)

[a]Mean and 95% confidence interval.

those median particle diameters. It should not be confused with the "mean particle diameter" which is a sepearate statistic calculated from the distribution. The raw data and statistical computations are compiled in Appendix A.

Comparison of the "average" median particle diameters showed significant changes on a seasonal basis. During the summer, the median particle diameters at West Hackberry ranged from 0.98-10.5 μ with an average of 3.02 μ. At all stations except 10 and 14, median particle diameter was less than 4 μ (clay-size). By contrast, median particle diameters during the other seasons ranged from 4.65-9.56 μ, 6.17-8.29 μ, and 7.29-12.47 μ with average values of 6.96 μ, 7.07 μ, and 9.47 μ respectively. The seasonal increase in the median particle diameters indicated the increased competence of the water column since coarser, silt-size particles were predominant.

The "average" size distributions (computed by taking the average percentage of the suspended particles that were found in a given size range) are shown in Figure 4. In the summer, the distribution at West Hackberry was bimodal with the predominant mode centered around 1.00-1.26 μ (clay). The secondary mode was located around 8.00-10.08 μ (fine-medium silt). During the fall cruise, the distribution was still bimodal, but the largest mass of particles was found in the silt-sized ranges. In winter and spring, the distributions showed only one mode centered around the silt-sized particles 5-8 μ.

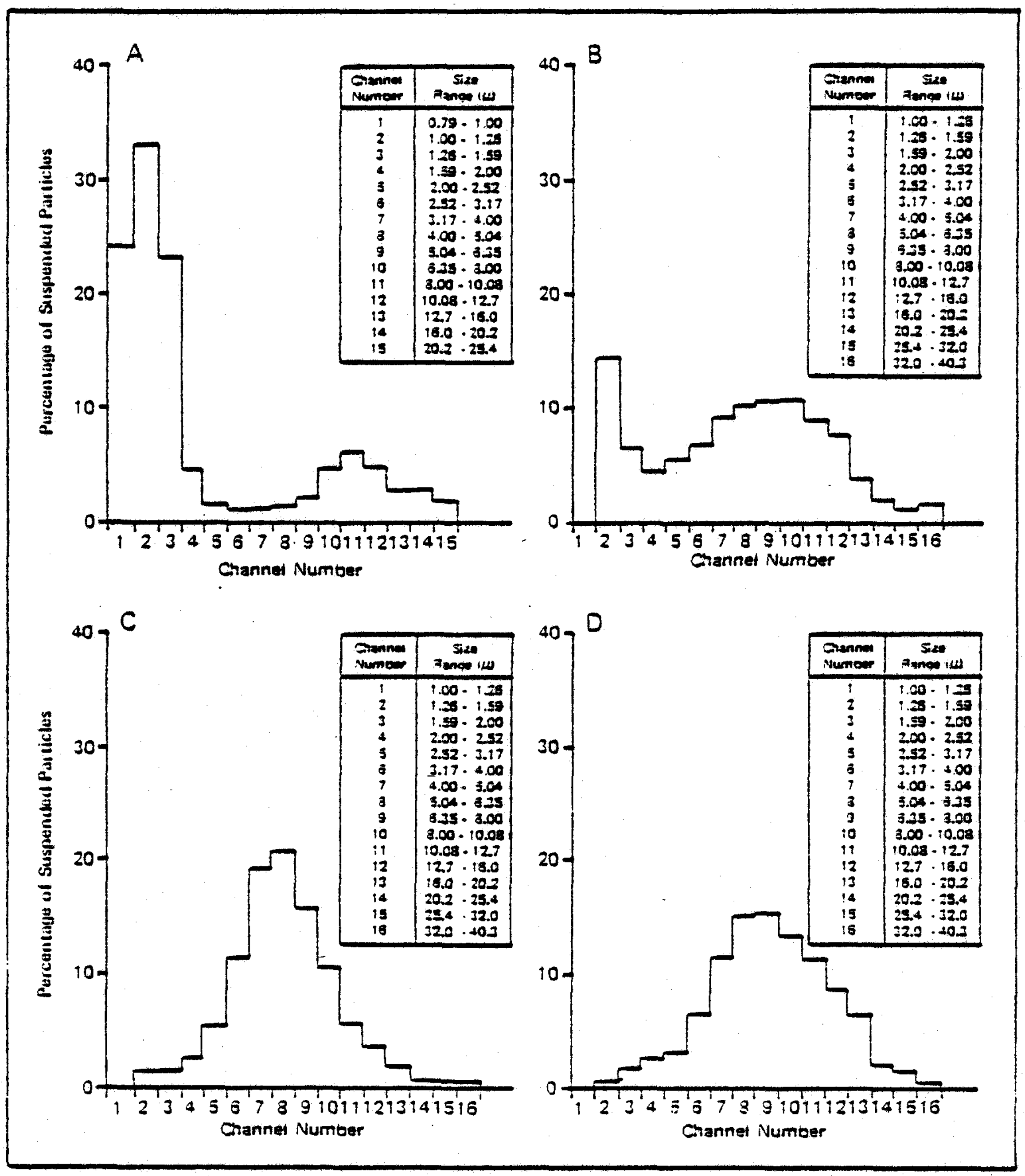

Figure 4. Average size distribution of mid-depth samples collected at the West Hackberry site. A-Summer; B-Fall; C-Winter; D-Spring.

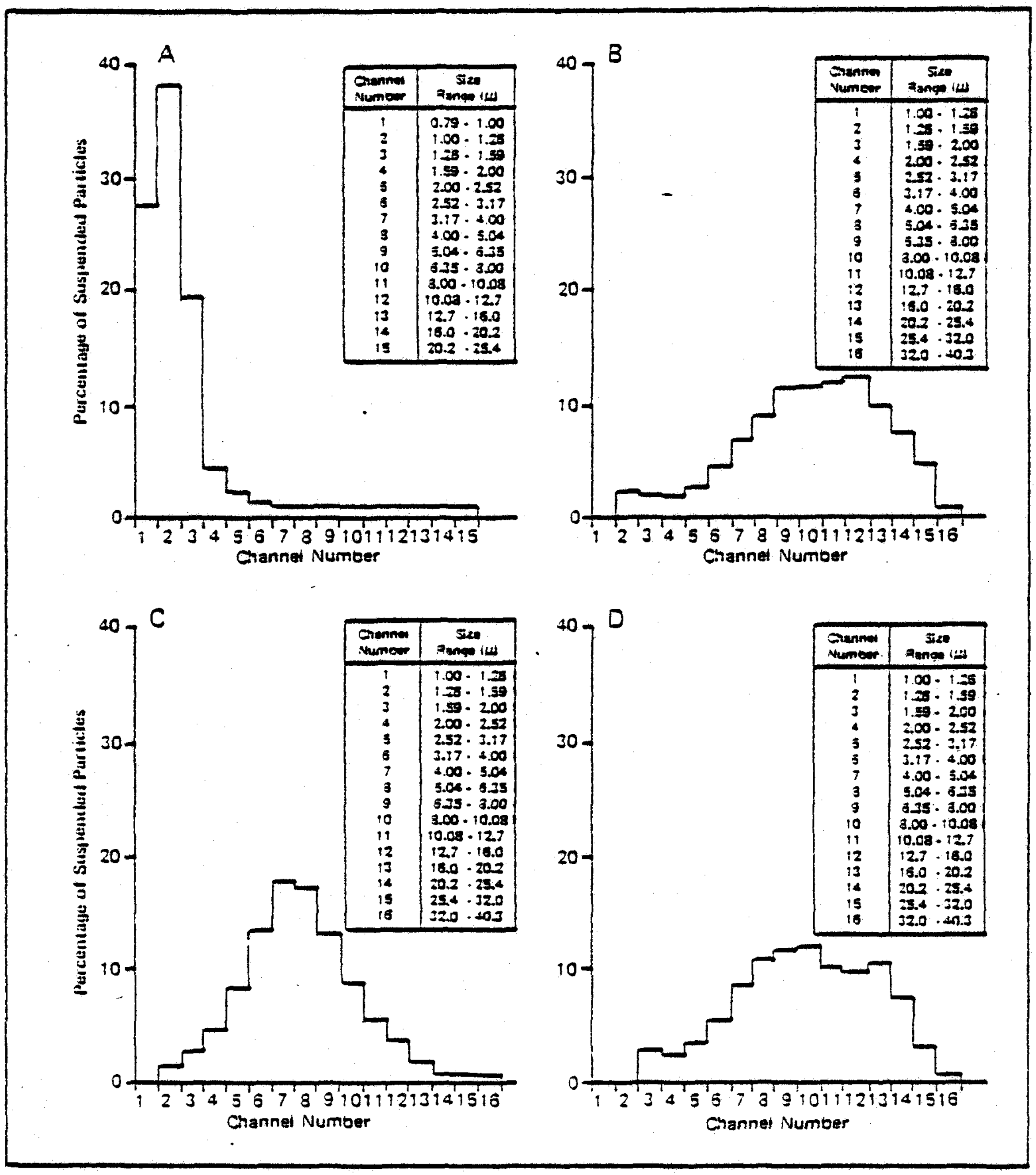

Figure 5. Average size distribution of suspended particulate matter in mid-depth samples collected at Weeks Island. A-Summer; B-Fall; C-Winter; D-Spring.

1.00-1.26μ in size (clay). During the fall, winter, and spring cruises, the predominant mode was centered around the coarser, silt-size particles. Distributions during fall and spring were broader and coarsely-skewed, while the distribution during winter was symmetrical around 4.00-6.35 μ.

3.2 Sediments

The analysis of surficial sediments at the West Hackberry and Weeks Island sites consisted of determinations of total organic carbon and grain size distribution. The primary objectives of this study were to describe the character of the surficial sediments at each site, determine seasonal variability in sediment characteristics, and determine spatial distributions around each site. Secondary objectives were to evaluate small-scale (intrastation) variability of the sediments by conducting a pooling experiment, to examine sediment transport processes, and to provide support to investigators from other work units.

3.2.1 Results of the Pooling Experiment

The establishment of environmental baselines for chemical and physical variables in sediments is a very complex task. The benthic ecosystem in the coastal region is extremely dynamic and is responsive to short-term perturbations (such as storm events), as well as longer-term processes of sedimentation and bioturbation. In addition, sampling and analytical variability must be assessed in order to clearly establish that observed differences are real and not artifacts of analysis.

In an effort to determine the sampling and analytical variability and to determine small-scale variability within a given station, pooling experiments were conducted during the fall and spring cruises at the West Hackberry and Weeks Island sites. During each season, four replicate surficial sediment samples (separate Van Veen grabs) were collected at three stations (2, 8, and 14) within each site. In addition, a pooled sample was collected which consisted of taking a subsample from each of the four replicate grabs and compositing them to form one sample. The pooled samples and replicates were then analyzed s parately for grain size distribution and total organic carbon.

Results of these analyses are presented in Table 4. Raw data are tabulated in Appendix A. The pooled analysis is shown along with the replicate average, 95% confidence interval and coefficient of variation based on four analyses. All grain size data were transformed using an arcsine transformation (θ = arcsine $\sqrt{P}$) prior to statistical calculations.

The data were analyzed by applying a paired t-test (Steel and Torrie, 1960) to the transformed data in Table 4 and testing the null hypothesis that there is no significant difference between the values computed from pooled and replicate analyses. At the 95% confidence level (11 degrees of freedom), there was no significant difference between sand, silt, and clay percentages determined from the pooled analyses and those determined by averaging the four replicate analyses. Similarly, there was no significant difference (α = 0.05, 5 degrees of freedom) between the pooled and replicate average for TOC. Thus, it can be concluded that analysis of a single pooled sample will provide

TABLE 4

COMPARISON OF TOTAL ORGANIC CARBON AND GRAIN SIZE ANALYZES OF POOLED[a] AND REPLICATE[b] SEDIMENT SAMPLES COLLECTED AT THE WEST HACKBERRY AND WEEKS ISLAND SITES

SITE[c]	STATION NO.	SAMPLE TYPE	% SAND		% SILT		% CLAY		TOTAL ORGANIC CARBON (mg/g)	
			CRUISE 02	CRUISE 04	CRUISE 02	CRUISE 04	CRUISE 02	CRUISE 04	CRUISE 02	CRUISE 04
A	02	Pooled	36.8	42.4	34.8	26.8	28.4	30.8	-[e]	12.0
A	02	Repl.[d]	38.3 (36.7-39.9) (0.13)	43.2 (43.0-43.4) (0.04)	30.8 (29.2-32.4) (0.15)	26.0 (25.8-26.2) (0.04)	30.7 (30.5-30.9) (0.06)	30.4 (30.2-30.6) (0.04)	-[e]	10.3 (6.3-14.3) (0.19)
A	08	Pooled	8.8	4.9	36.7	32.7	54.5	62.5	-[e]	10.9
A	08	Repl.	17.6 (15.2-20.0) (0.26)	8.6 (7.4-9.8) (0.27)	31.7 (30.7-32.7) (0.12)	33.3 (33.1-33.5) (0.06)	50.7 (50.5-50.9) (0.04)	58.7 (57.5-59.9) (0.09)	-[e]	13.6 (10.2-17.0) (0.13)
A	14	Pooled	30.3	2.89	53.3	20.8	16.4	76.4	-[e]	14.2
A	14	Repl.	24.5 (23.3-25.7) (0.13)	0.73 (0.63-0.83) (0.26)	39.3 (38.1-40.5) (0.11)	23.0 (22.4-23.6) (0.11)	31.2 (30.8-31.4) (0.08)	75.8 (75.0-76.6) (0.06)	-[e]	17.5 (14.1-20.4) (0.10)
B	02	Pooled	73.2	72.2	19.8	19.8	7.0	8.0	-[e]	8.5
B	02	Repl.	74.9 (72.3-77.5) (0.11)	72.0 (69.8-74.2) (0.10)	18.0 (15.8-20.2) (0.24)	19.2 (18.4-20.0) (0.15)	7.2 (6.4-8.0) (0.25)	8.9 (7.5-10.3) (0.28)	-[e]	5.8 (1.8-9.8) (0.34)
B	08	Pooled	67.3	83.2	28.4	12.7	4.3	4.0	-[e]	8.3
B	08	Repl.	65.9 (63.1-68.7) (0.12)	84.0 (82.4-85.6) (0.08)	28.2 (26.2-30.2) (0.18)	13.3 (12.3-14.3) (0.19)	6.0 (5.6-6.4) (0.16)	2.7 (2.1-3.3) (0.25)	-[e]	5.9 (1.9-9.9) (0.34)
B	14	Pooled	89.1	92.0	6.8	7.6	4.0	0.39	-[e]	3.8
B	14	Repl.	91.3 (90.7-91.9) (0.04)	92.8 (92.6-93.0) (0.03)	5.1 (4.9-5.3) (0.23)	4.9 (4.5-5.3) (0.23)	3.7 (3.3-4.1) (0.23)	2.4 (1.8-3.0) (0.37)	-[e]	7.1 (3.3-10.9) (0.27)

[a]Pooled samples were composited by taking subsamples from each of four Van Veen grabs and combining them to form one sample.

[b]Replicates were separate subsamples from each Van Veen grab.

[c]Site A = West Hackberry, Site B = Weeks Island.

[d]Mean, 95% confidence interval (based on four replicates), and coefficient of variation. All data were transformed using an arcsine transformation (θ = arcsine $\sqrt{P}$) for calculation of confidence intervals and coefficients of variation.

[e]Not analyzed.

an analysis that will not be statistically different at the 95% confidence level from the analysis of four individual replicates.

The variability of replicate analyses at a station is given by the coefficient of variation shown for each replicate analysis in Table 4. At West Hackberry, where sediments were predominantly sandy mud, the coefficients of variation for replicate TOC analyses were 0.10-0.19 (mean-0.14). Conversely, the coefficients of variation were 0.27-0.34 (mean-0.32) at Weeks Island. The coefficients of variation for replicate analyses of the silt and clay fractions followed similar trends. Average coefficients at West Hackberry were 0.10 and 0.06 for silt and clay, respectively, while at Weeks Island they were 0.20 and 0.26. Coefficients for replicate sand analyses at West Hackberry were high (average - 0.18) and lower (0.08) at Weeks Island. As expected, the minor components of the sediment showed more variability since small changes in composition result in large variations around the mean, while variability of the predominant component is small.

3.2.2 Grain Size Distribution of Sediments

The sediments at the Weeks Island site were distinctly sandier (>70% sand) than those at the West Hackberry site (<40% sand) (Table 5). Ternary textural diagrams (Shepard, 1954) of the sediment characteristics (Figure 6) show that the sediments at Weeks Island were consistently sand or silty sand. In contrast, sediments at West Hackberry showed greater variability ranging from clay to sandy mud (sand-silt-clay).

Descriptions of the sediment characteristics at West Hackberry, based on the pooled samples, are shown in Figure 7. At West Hackberry, the innermost stations (6, 7, 8, and 11) consistently showed predominantly clay or silty clay characteristics and contained less than 15% sand in all seasons. The sand percentage was larger at all other stations. In general, the sand percentage increased moving south and west of the shallower, near-shore stations (Figure 8). The southern stations (9 and 10) were generally sandy mud (sand-silt-clay), although Station 10 showed silty-clay characteristics in spring. The westernmost (2 and 5) and two southern stations (9 and 10) contained 15-45% sand during all seasons except winter when station 5 had only 7% sand. The easternmost station (14) contained 16-40% sand in all seasons except winter when the sand percentage was about 3%.

The Weeks Island site was consistently silty sand during summer and fall except for Station 14 which was predominantly sand (Figure 9). During winter, however, the silt component was lower at all stations except Station 8, and the sediments fell in the sand category. In spring, the silt component was reestablished at all stations except

TABLE 5

AVERAGE SAND, SILT, AND CLAY PERCENTAGES IN SURFICIAL SEDIMENTS AT THE WEST HACKBERRY AND WEEKS ISLAND SITES[a]

	% SAND		% SILT		% CLAY	
	WEST HACKBERRY	WEEKS ISLAND	WEST HACKBERRY	WEEKS ISLAND	WEST HACKBERRY	WEEKS ISLAND
Cruise 01	19.9 (0-30.3) (0.54)	79.3 (76.1-82.5) (0.11)	40.5 (28.1-52.9) (0.38)	18.9 (16.9-21.9) (0.31)	39.6 (20.0-59.2) (0.46)	6.0 (5.4-6.6) (0.24)
Cruise 02	18.7 (9.3-28.1) (0.54)	73.4 (70.6-76.2) (0.12)	23.6 (10.2-37.0) (0.57)	21.2 (18.2-24.2) (0.26)	57.7 (44.3-71.1) (0.39)	5.4 (5.2-5.6) (0.11)
Cruise 03	11.7 (0-25.7) (1.04)	76.0 (67.4-84.6) (0.19)	23.8 (13.8-33.8) (0.47)	16.7 (13.7-19.7) (0.30)	64.5 (33.9-95.1) (0.50)	7.1 (2.5-11.7) (0.65)
Cruise 04	13.4 (2.8-24.0) (0.72)	79.0 (75.8-82.2) (0.11)	27.7 (27.1-28.3) (0.10)	16.5 (14.1-18.9) (0.27)	58.9 (52.7-65.1) (0.20)	4.5 (3.5-4.5) (0.34)

[a]Mean, 95% confidence interval, and coefficient of variation. All data were transformed using an arcsine transformation ($\theta = \text{arsine} \sqrt{P}$) for calculation of confidence intervals and coefficients of variation.

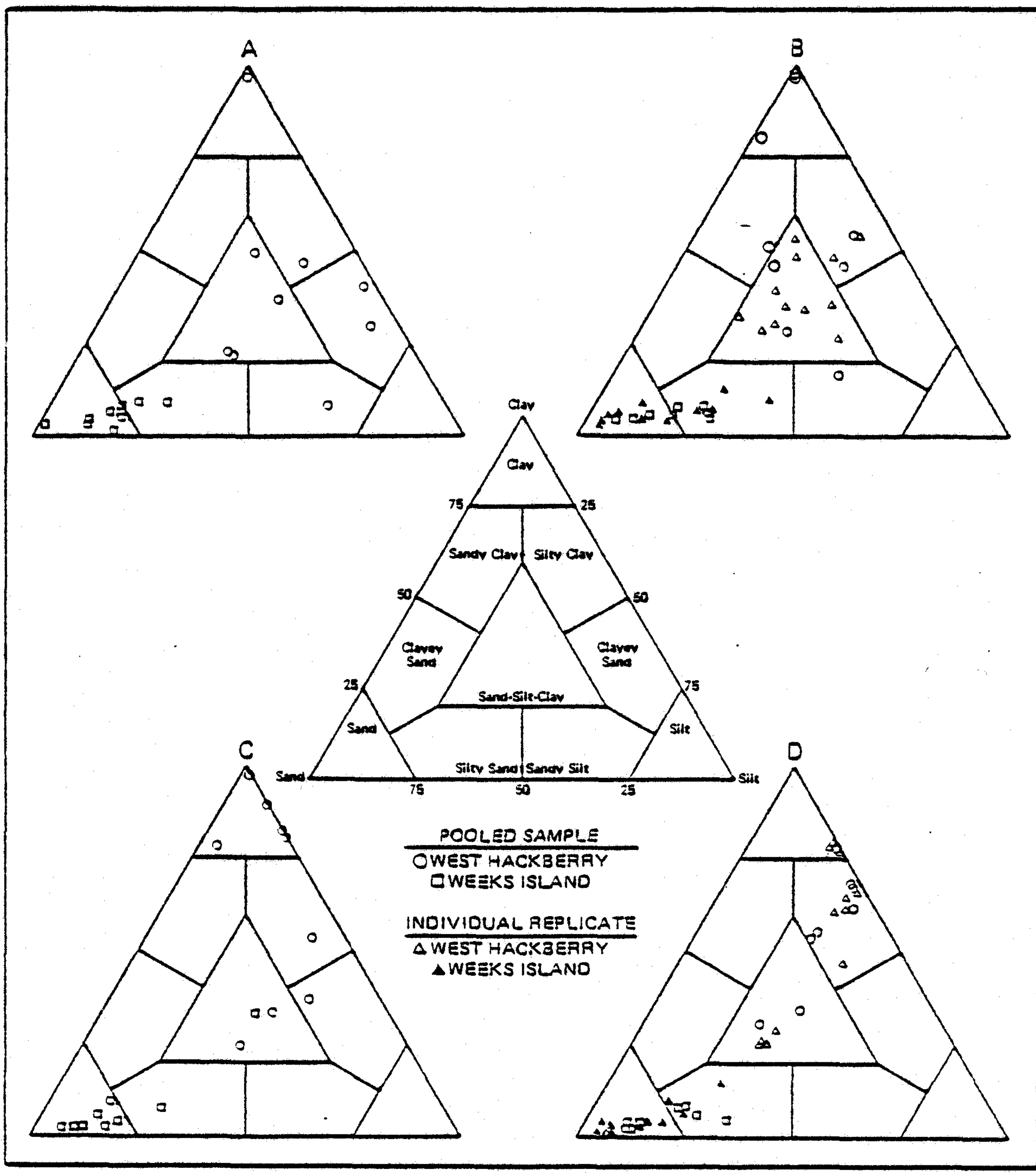

Figure 6. Ternary textural diagrams for surficial sediments at the West Hackberry and Weeks Island sites.

A-Summer; B-Fall; C-Winter; D-Spring.

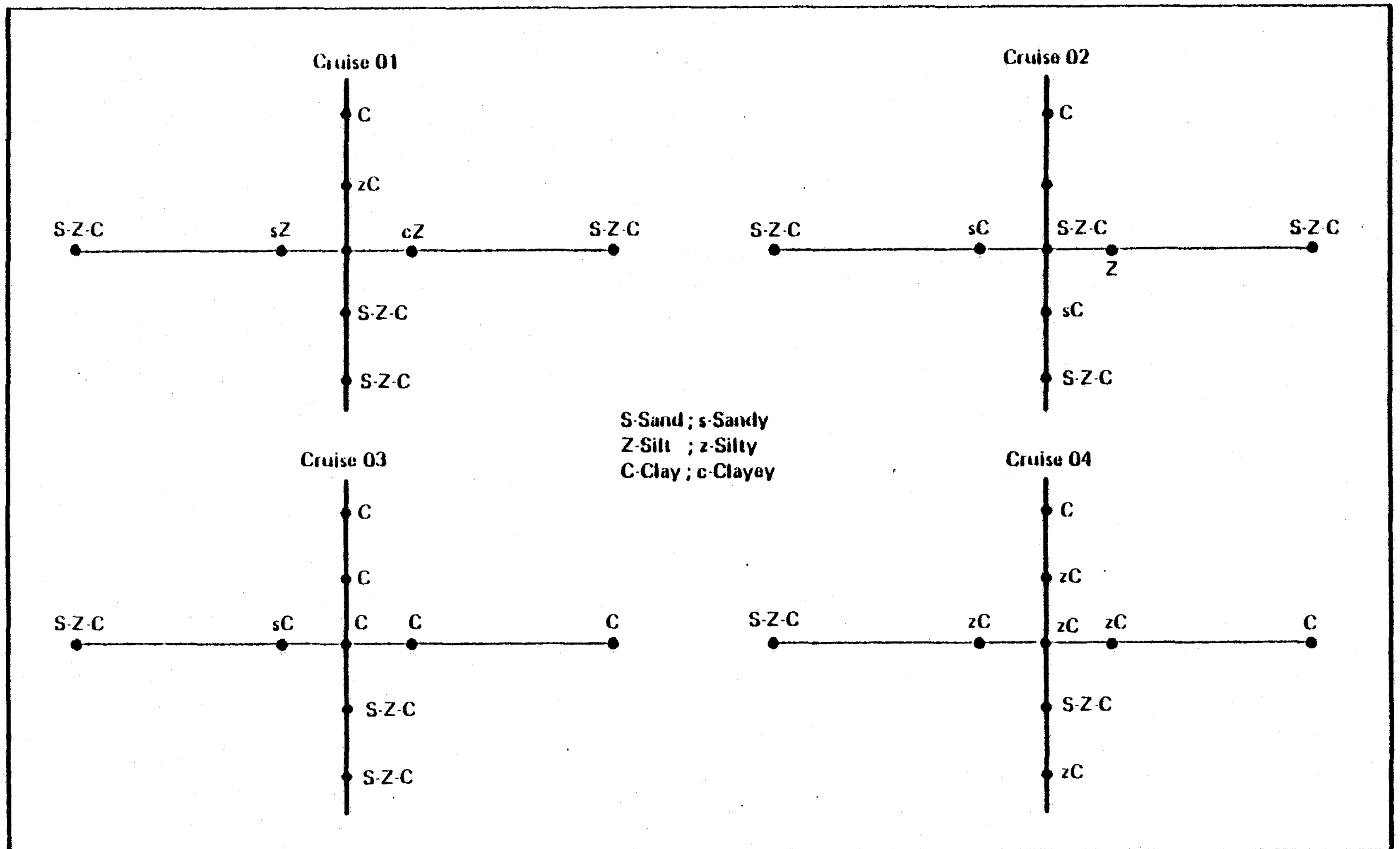

Figure 7. Sediment descriptions for surficial sediments at the West Hackberry site.

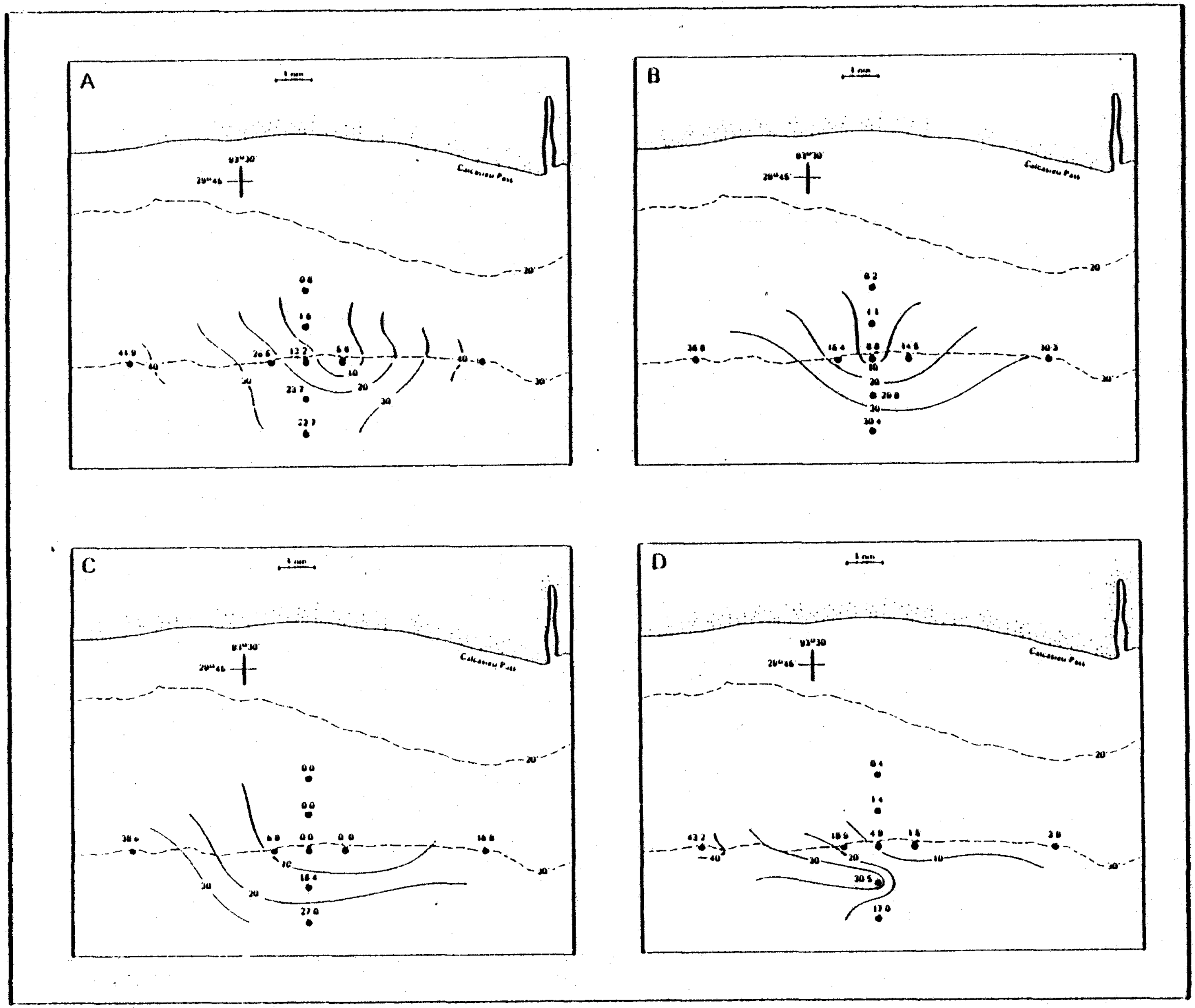

Figure 8. Distribution of sand (%) in surficial sediments at West Hackberry.
A-Summer; B-Fall; C-Winter; D-Spring.

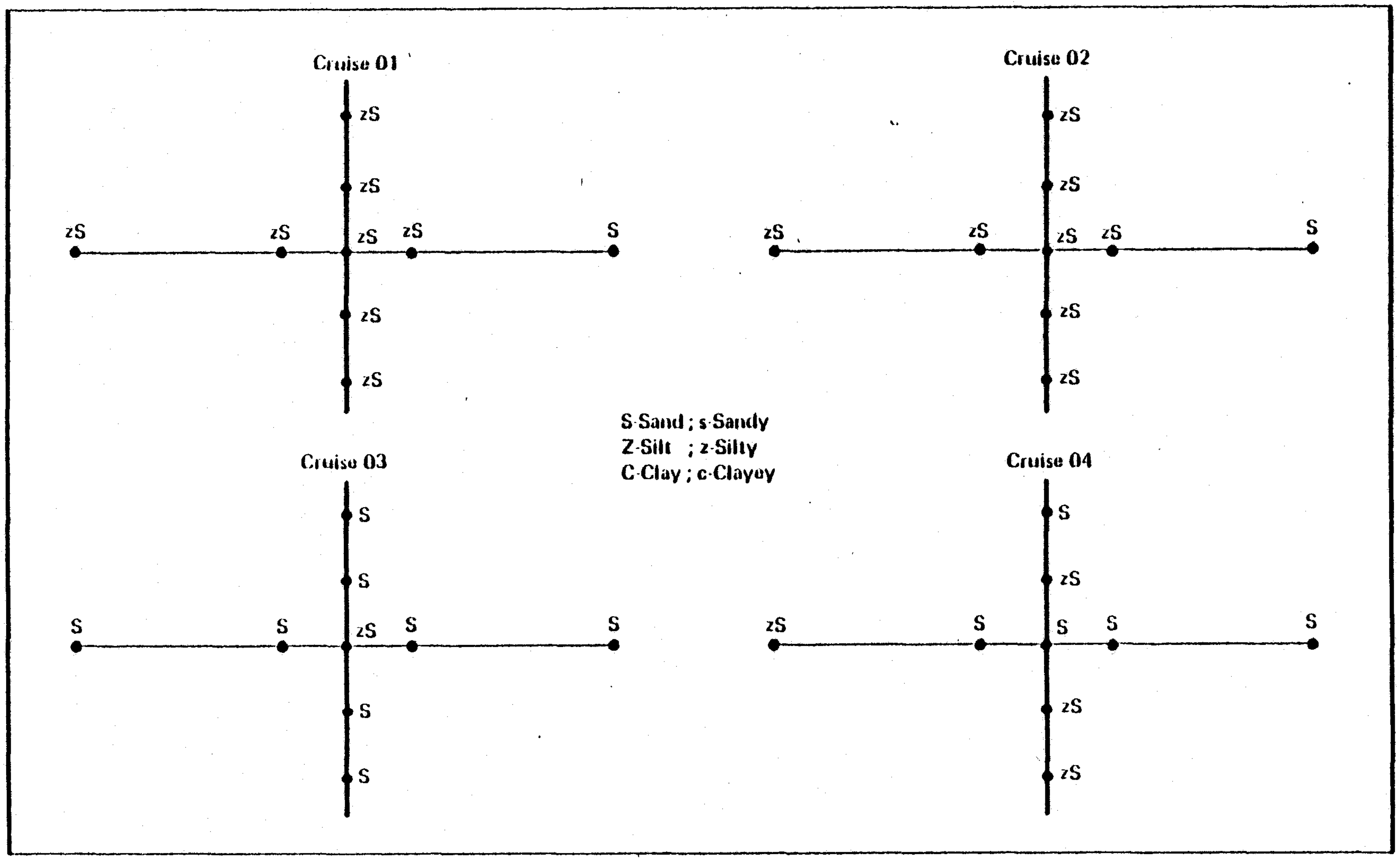

Figure 9. Sediment descriptions for surficial sediments at the Weeks Island site.

5, 8, and 11. The sand content of the sediments was spatially coherent, tending to decrease away from the shoal area in every season (Figure 10). This distribution was essentially the inverse of that observed for organic carbon.

Results of the statistical analysis of the sand fraction at the Weeks Island site showed that the sediments were well or very well sorted at all stations during the summer, fall, and spring cruises. In the winter, however, the sand fraction was only moderately well sorted. The sand fraction was nearly symmetrical in all seasons with predominant modes ranging from 3.25-3.75 ø.

At West Hackberry, the sand fraction was moderately or moderately well sorted during all seasons. Distributions were broad and multi-modal during the first three cruises. In the spring, the predominant mode, at stations where the sand function was detectable, was from 3.75-4.0 ø, and greater than 70% of the sand was in that interval.

3.2.3 Distributions and Concentrations of Organic Carbon

The concentrations and distributions of total organic carbon were determined at nine stations during four seasons at both the West Hackberry and Weeks Island brine disposal sites. These data are summarized in Table 6. Raw data are presented in Appendix A. The average organic carbon levels at West Hackberry were roughly twice those determined at Weeks Island. There was little seasonal variation in the average levels at either site, ranging from 11.99-13.84 mg/g at West Hackberry and from 5.33-7.87 mg/g at Weeks Island, although at

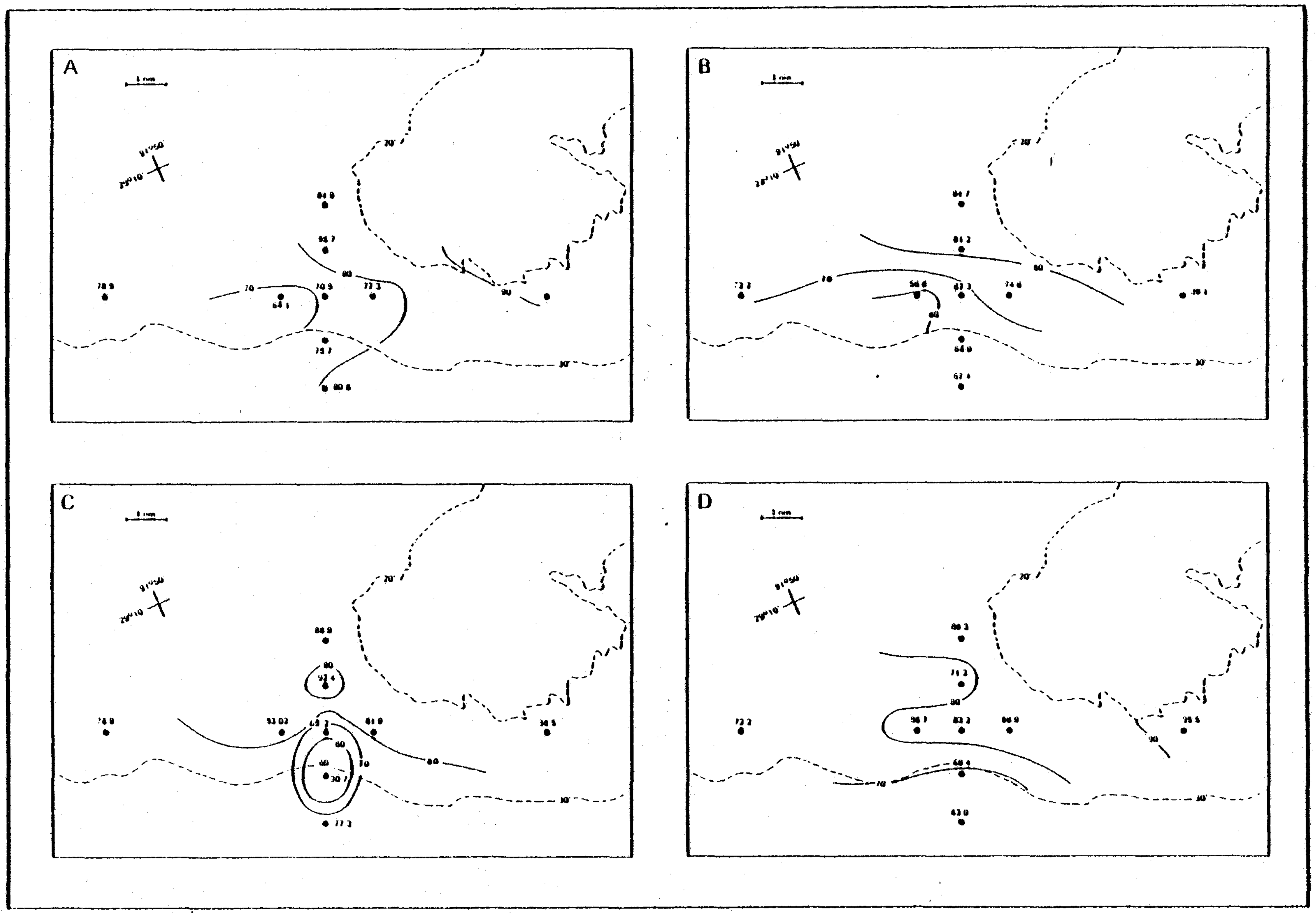

Figure 10. Distribution of sand (%) in surficial sediments at Weeks Island.
A-Summer; B-Fall; C-Winter; D-Spring.

TABLE 6

AVERAGE SEASONAL CONCENTRATIONS OF ORGANIC CARBON IN SURFICIAL SEDIMENT AT WEST HACKBERRY AND WEEKS ISLAND SITES

SAMPLING SEASON	CONCENTRATION (mg/g)[a]	
	WEST HACKBERRY	WEEKS ISLAND
Summer 1978 (Cruise 01)	13.72 (8.42-19.02)	6.53 (4.47-8.59)
Fall 1978 (Cruise 02)	13.84 (9.04-18.64)	7.87 (5.09-10.65)
Winter 1979 (Cruise 03)	11.99 (5.75-18.23)	5.33 (1.08-9.63)
Spring 1979 (Cruise 04)	12.26 (7.58-16.94)	6.52 (1.88-11.16)

[a]Mean and 95% confidence interval.

both sites, the organic carbon levels tended to be lowest during winter when suspended sediments reached their highest levels. This may have resulted from resuspension of organic-rich clays and silts, thus decreasing the carbon content of the sediments.

The spatial distribution of organic carbon is shown in Figure 11 for the West Hackberry site and in Figure 12 for Weeks Island. At West Hackberry, the concentrations generally were highest at th near shore stations and decreased moving offshore (north-south gradient). Distributions were generally the inverse of the sand distribution. Levels shoreward of the 30' contour ranged from 6-12 mg/g.

Distributions at Weeks Island were less systematic. During summer, there was a slight increasing gradient (5-8 mg/g) in a northeast-to-southwest direction, but this was not evident during either fall or winter. In the spring, the values again appeared to increase to the west and southwest.

The distributions reflected here were, as expected, related to the grain size of the sediments. Finer grained sediments at West Hackberry had higher carbon contents than those at Weeks Island. This is reflected in Figure 13 which shows a significant correlation ($r > 0.47$ for $n = 18$ is significant at the 95% confidence level) between total organic carbon content and grain size (represented in this case by sand percentage of the sediment). As the percentage of sand increases (percentage of fines decreases), the amount of organic carbon decreases. This is consistent with results of previous investigations (DOE, 1978).

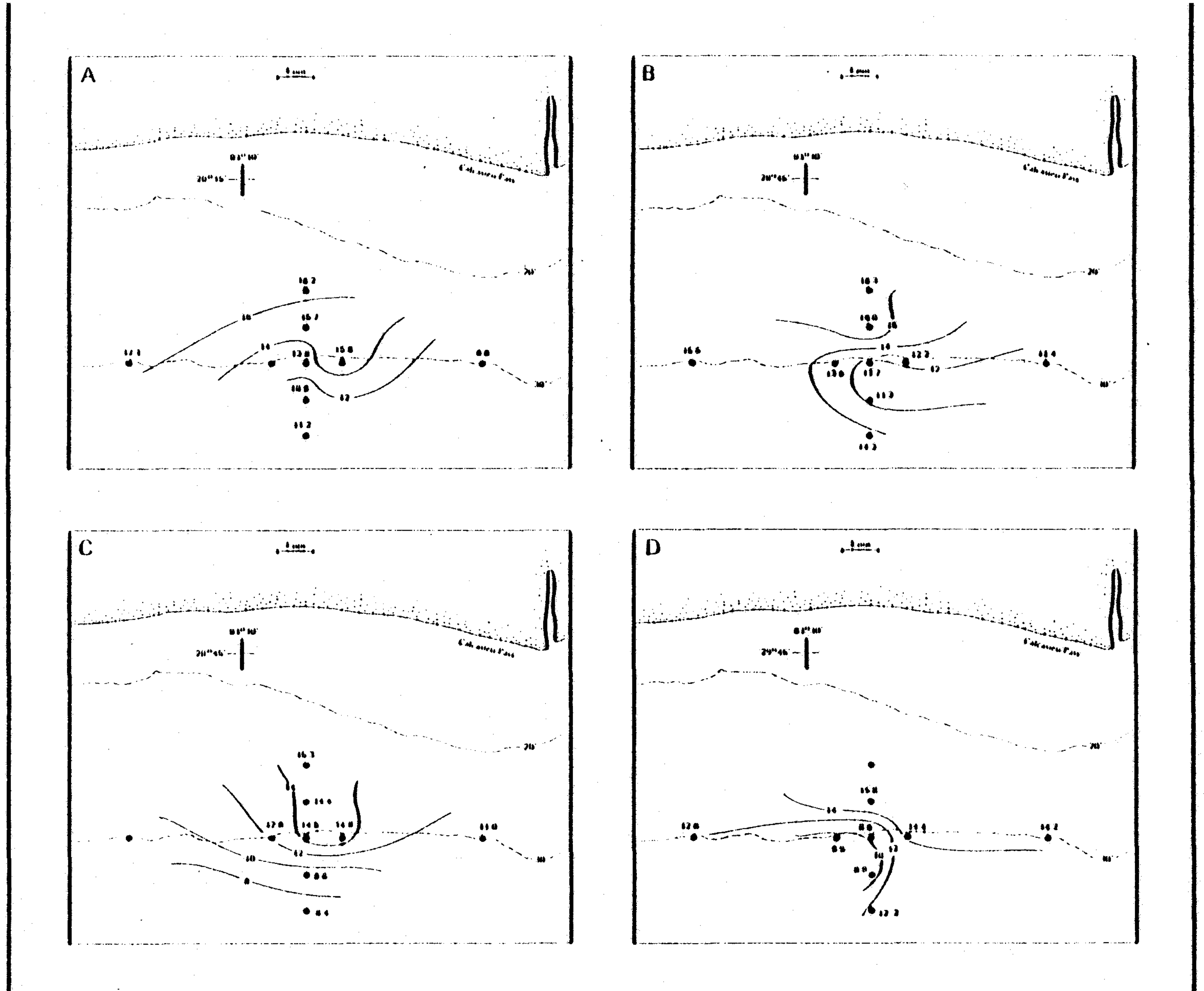

Figure 11. Distribution of organic carbon (mg/g) in surficial sediments at the West Hackberry Site.
A-Summer; B-Fall; C-Winter; D-Spring.

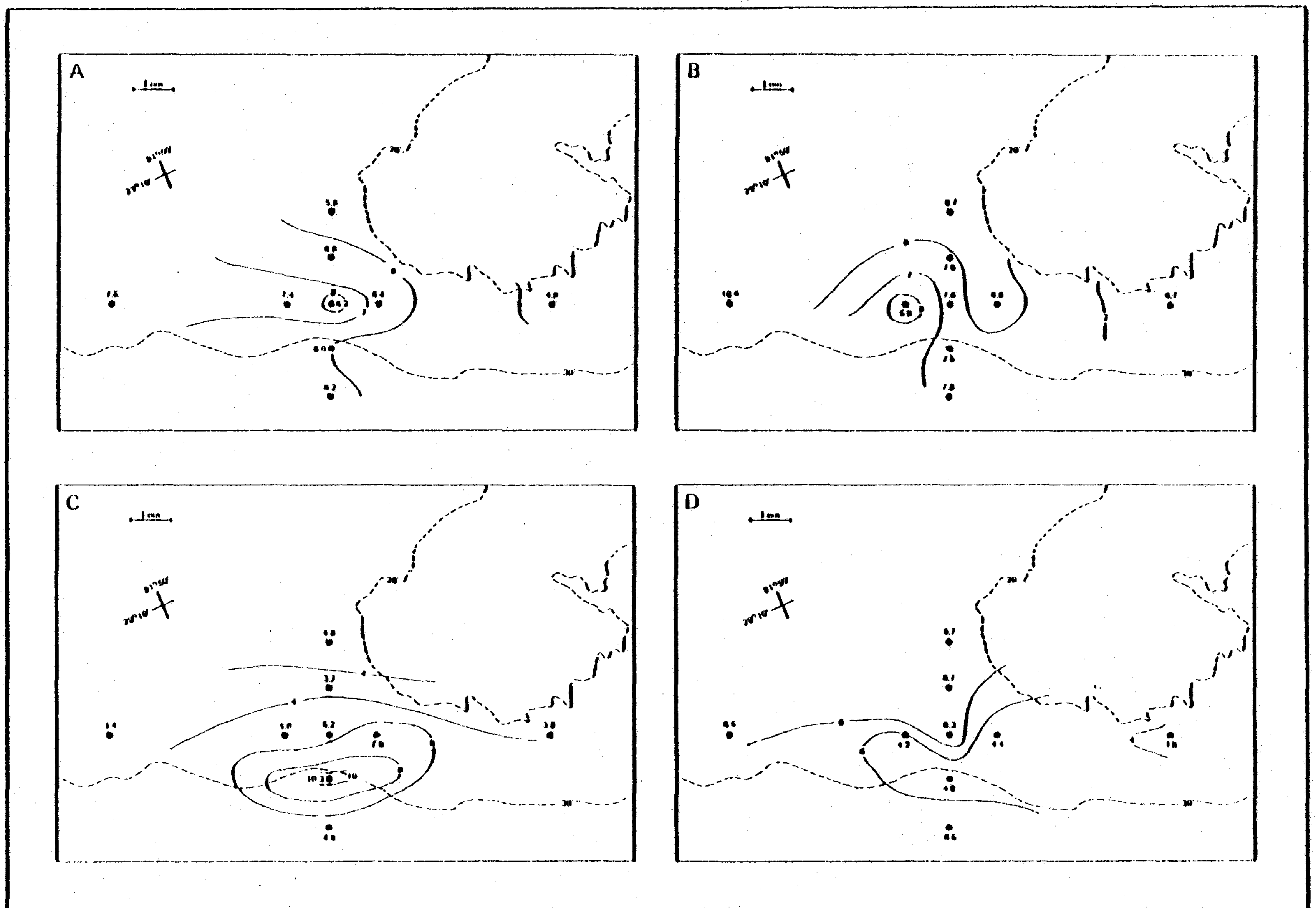

Figure 12. Distribution of organic carbon (mg/g) in surficial sediments at the Weeks Island site.

A-Summer; B-Fall; C-Winter; D-Spring.

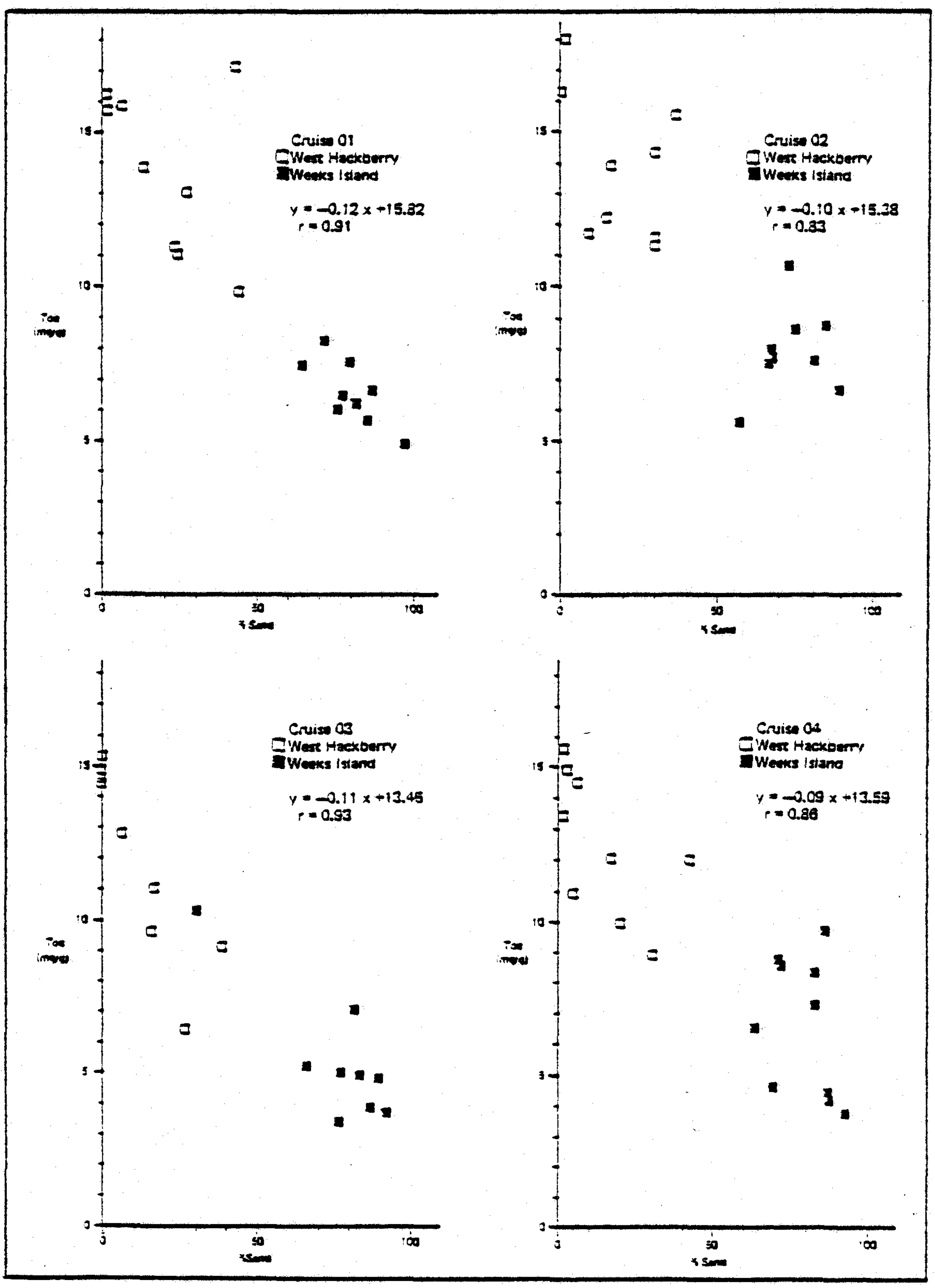

Figure 13. Plot of total organic carbon versus sand percentage in surficial sediments at the West Hackberry and Weeks Island Sites.

4. CONCLUSION

The sedimentary geology of the coastal region is influenced by complex interactions between a number of biological, physical, and chemical processes. Establishment of baseline conditions must necessarily be an exhaustive task, considering those variables likely to be of major importance and conducting well-designed sampling programs to determine the predominant mechanisms and processes controlling the observed distributions. While the primary role of this program is descriptive in nature, that is, to determine major sedimentary characteristics of the two brine disposal sites, the data provide some insight into processes which may influence the geochemistry of the region.

The results described in the preceding section demonstrated that there are significant differences in the sedimentary characteristics of the West Hackberry and Weeks Island sites. In general, sediments at West Hackberry are finer (<40% sand) and contain roughly twice as much TOC as the Weeks Island site. While measurements of the concentration and size distribution of the suspended sediments show similar patterns at each site, the depositional patterns suggest that the ambient hydraulic regimes controlling sediment deposition are quite different. The West Hackberry site appears to be a net depositional area while the sediments at Weeks Island are apparently reworked so that most of the fines are transported away from the immediate area of the disposal site. Plots of grain size versus TOC show a significant correlation, which suggests that the two sites are in the same sedimentary province with TOC content being controlled by grain size and depositional characteristics of the site, rather than different source regions with sedimentary material of varying composition. The enrichment of TOC at West Hackberry is a natural geochemical process resulting from the accumulation of fine-grained materials in a low energy environment, while the relative depletion at Weeks Island results from reworking of the sediments and loss of the organic-rich silt and clay fraction. Plots of hydrocarbon concentration versus TOC (shown in Work Unit 3.2 report) and previous work (DOE, 1978) on correlation of sedimentary trace metals with TOC and iron show similar patterns.

The nature of the depositional areas of the two sites may result in another significant difference between the sediments. At West Hackberry, the sediments generally showed an anoxic layer near the seawater/sediment interface and oxygen levels in the near-bottom layer were less than 1 ml/l in summer (NOS, 1979). Reducing conditions were not apparent at the Weeks Island site. Changes in the redox potential of the sediments are of importance since many trace metals (for example, Zn, Cu, Ag, Pb, Ni) will precipitate as sulfides thereby enriching the sediments, while other elements, such as manganese and iron, will be solubilized in the pore waters and the diffusive flux to the bottom water will increase. Injection of dense brines into the bottom water may prolong these anoxic conditions since the stability of the water column will be greatly increased.

Effects of acute events such as storms are clearly difficult to evaluate because of the short time-scal of the phenomena and the difficulty in obtaining samples. Data collected during this survey were presumably representative of longer-term seasonal processes, but may in fact have been significantly influenced by events of much shorter time-scales. Water column data indicated an unusually high suspended load in January 1979 at both West Hackberry and Weeks Island. The predominant gradients were located in a northeast-to-southwest direction (shallow-to-deep water), presumably in response to prevailing wind-generated currents or run-off. Particle sizes in the water column were silt-sized (mostly in the 6-10 μ range) in contrast to the smaller, clay-size particles which were prevalent in summer. At Weeks Island, much of the silt component of the sediment was lost during this time, apparently due to resuspension and reworking of the bottom sediments. Similarly, the TSM distributions in spring were markedly different from those observed in the summer and fall.

Monitoring of future changes at the sites must consider the seasonal variability of the system. The relationship between increased suspended loads and transport of constitutents of interest (such as trace metals or organic compounds) to other regions must be established to determine probable areas of maximum impact. Additional statistical and correlation analyses of data generated by investigators from different work units should be performed to determine the most useful quantitive measures for monitoring purposes. Based on these relationships, refined sampling programs can be designed to better describe effects of events of short time scales. Additionally, the quantitative relationships which are found to be useful for monitoring purposes should be evaluated with regard to the magnitude of the changes which are anticipated in order to ascertain that those changes will fall outside the variability of the measurements.

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APPENDIX A

SEDIMENTOLOGICAL AND SUSPENDED SEDIMENT DATA FROM TEXOMA/CAPLINE SURVEY

The appendix contains tabulations of all raw analytical data for sediments and suspended particulate samples collected during the four surveys conducted during this study. Also included are statistical computations that were made as part of the data analysis.

The sedimentological data consist of total organic carbon (TOC); percent sand, silt, and clay; size distribution of the sand fraction [1.0 ϕ (gravel) to 4.0 ϕ (sand) in 1/4 ϕ increments; and statistical analyses (median ϕ, mean ϕ, standard deviation, skewness, and kurtosis). Suspended particulate data consist of total suspended matter; number of particles/µl; size distribution of suspended particles from 1.0-40.3 μ (Cruise 01 was determined over the range of 0.79-25.4 μ); and statistical analyses (median and mean particle diameter, mode, standard deviation, and skewness). Only mean particle diameter was computed for Cruise 01.

TABLE 1

SEDIMENTOLOGICAL DATA FROM CRUISE 01 - TEXOMA/CAPLINE SURVEY

SITE[a]	STATION #	SAMPLE TYPE[b]	TOC (mg/g)	% SAND	% SILT	% CLAY	SIZE DISTRIBUTION Φ OF SAND FRACTION (% RETAINED BY SCREEN MESH OF GIVEN Φ SIZE) 4.0	3.75	3.50	3.25	3.00	2.75	2.50	2.25	2.00	1.75	1.50	1.25	1.00	MEDIAN Φ	MEAN Φ	σ_I[c]	Sk_I[d]	K_G[e]
A	02	Pooled	17.1	41.9	36.1	22.0	9.1	18.0	11.6	12.8	18.4	9.3	6.8	5.8	4.2	2.1	1.3	0.47	0.18	3.03	2.98	0.66	-0.08	0.90
A	05	Pooled	13.0	26.6	65.3	8.1	7.1	14.8	10.3	10.1	16.2	12.7	10.8	9.0	3.6	2.6	1.9	0.55	0.27	2.88	2.90	0.69	-0.03	0.83
A	06	Pooled	16.2	0.84	1.19	98.0	26.2	27.2	7.8	3.9	5.8	5.8	5.8	5.8	6.8	3.9	0.97	0.0	0.0	3.52	2.86	0.67	-0.99	0.92
A	07	Pooled	15.7	1.6	57.1	41.3	10.4	19.0	12.3	6.6	5.7	0.95	7.6	7.6	7.7	9.0	9.5	3.6	0.0	2.93	2.62	1.04	-0.30	0.60
A	08	Pooled	13.8	13.2	39.5	47.3	10.8	18.7	14.6	10.2	9.6	6.3	7.6	8.2	7.4	3.0	2.0	1.4	0.32	3.11	2.87	0.81	-0.38	0.70
A	09	Pooled	10.9	23.7	39.1	37.2	18.8	22.7	10.4	9.2	11.6	7.6	5.9	5.2	4.0	2.1	1.6	0.23	0.63	3.29	3.06	0.71	-0.33	0.85
A	10	Pooled	11.2	22.7	27.4	49.9	18.3	27.1	11.7	7.0	8.2	6.1	6.0	5.5	4.9	3.0	1.8	0.31	0.11	3.39	3.02	0.75	-0.50	0.83
A	11	Pooled	15.8	5.8	64.4	29.8	29.4	31.2	8.6	6.0	3.6	5.5	3.1	2.6	2.8	2.3	2.5	1.1	1.1	3.70	3.69	0.11	-0.09	1.00
A	14	Pooled	9.8	43.0	34.2	22.8	7.1	12.5	13.6	15.2	17.3	10.3	9.5	8.0	3.5	1.1	0.86	0.30	0.59	3.40	2.93	0.63	-0.75	0.86
B	02	Pooled	7.5	78.9	15.4	5.7	6.0	24.1	59.5	7.5	0.97	0.19	0.34	0.38	0.34	0.23	0.26	0.27	0.03	3.43	3.45	0.17	0.12	1.29
B	05	Pooled	7.4	64.1	26.9	9.0	7.7	15.8	50.2	22.3	1.6	0.44	0.40	0.40	0.36	0.27	0.25	0.18	0.12	3.02	3.39	0.22	0.07	1.28
B	06	Pooled	5.6	84.9	11.0	4.1	6.0	17.9	43.2	20.7	3.2	0.32	2.2	2.4	1.4	0.94	0.85	0.31	0.66	3.35	3.32	0.27	-0.13	2.13
B	07	Pooled	6.6	85.7	11.2	3.1	5.2	17.3	46.1	26.6	1.8	0.21	0.49	0.69	0.39	0.21	0.22	0.13	0.55	3.35	3.36	0.22	0.02	1.14
B	08	Pooled	8.2	70.9	20.1	9.0	7.8	20.7	49.4	14.6	1.8	0.46	1.5	1.2	0.69	0.48	0.54	0.71	0.05	3.40	3.40	0.23	0.0	1.97
B	09	Pooled	6.0	75.1	17.3	7.6	9.7	21.2	42.2	14.8	5.4	1.6	1.1	1.4	0.74	0.50	0.45	0.37	0.29	3.39	3.37	0.29	-0.07	1.54
B	10	Pooled	6.2	80.8	18.3	8.6	9.2	20.5	38.2	12.4	17.8	2.0	3.6	3.0	1.7	1.1	0.98	1.3	0.60	3.37	3.27	0.39	-0.27	1.74
B	11	Pooled	6.4	77.3	18.4	4.3	8.8	30.9	46.3	8.8	2.1	0.56	0.54	0.58	0.47	0.24	0.41	0.12	0.27	3.45	3.48	0.21	0.12	1.21
B	14	Pooled	4.9	96.2	1.3	2.5	2.7	11.1	36.4	22.2	6.4	1.7	4.3	6.1	3.6	1.8	1.7	0.76	1.3	3.25	2.89	0.59	-0.61	1.62

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Pooled samples were composited by taking subsamples from each of four Van Veen grabs and combining them to form one sample.

[c]σ_I = Inclusive Graphic Standard Deviation

[d]Sk_I = Inclusive Graphic Skewness

[e]K_G = Graphic Kurtosis

TABLE 2

SUSPENDED SEDIMENT DATA FROM CRUISE 01 - TEXOMA/CAPLINE SURVEY

SITE[a]	STATION #	DEPTH (m)	TOTAL SUSPENDED MATTER (mg/l)[b]	MEDIAN PARTICLE DIAMETER (μ)	SIZE DISTRIBUTION (μ) OF SUSPENDED PARTICLES (% OF SUSPENDED PARTICLES IN GIVEN SIZE RANGE)															NUMBER OF PARTICLES PER ml[c]
					0.794-1.00	1.00-1.26	1.26-1.59	1.59-2.00	2.00-2.52	2.52-3.17	3.17-4.00	4.00-5.04	5.04-6.35	6.35-8.00	8.00-10.00	10.00-12.7	12.7-16.0	16.0-20.2	20.2-25.4	
A	02		3.05	1.05	45.7	27.6	6.7	2.4	1.2	1.7	1.5	1.9	1.9	2.8	0.95	2.3	1.9	1.7	<1	58,680
A	05		4.30	0.98	60.0	32.0	3.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	1.0	0.5	1.0	1.0	<0.5	<0.5	815,682
A	06		3.90	1.18	22.0	47.0	28.5	2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	1,295,668
A	07		3.71	1.21	18.0	43.0	34.0	4.4	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1,318,732
A	08		3.48	1.24	17.0	42.0	35.5	4.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2,239,692
A	09		3.87	1.40	8.0	26.0	40.0	16.0	1.0	<0.5	0.5	1.0	1.0	1.5	2.0	2.0	0.5	0.0	1.0	1,188,698
A	10		2.26	8.4	<0.5	<0.5	6.5	2.8	2.0	1.7	1.9	1.9	6.5	20.5	31.2	13.0	2.8	9.3	<0.5	1,207,026
A	11		2.90	1.2	21.0	46.0	29.0	2.0	0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	0.5	<0.5	<0.5	25,576
A	14		3.82	10.5	--	--	--	3.9	1.0	1.5	2.0	3.4	6.4	10.8	17.6	22.0	13.7	7.8	3.4	1,204,960
B	02		3.70	1.21	19.0	45.0	27.0	3.2	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	<0.5	<0.5	1,981,670
B	05		2.18	1.33	9.7	30.0	44.4	12.5	1.0	1.0	<0.5	<0.5	<0.5	<0.5	0.5	0.5	0.5	<0.5	<0.5	1,312,610
B	06		3.62	1.13	28.0	48.0	18.0	3.5	2.0	1.0	<0.5	<0.5	<0.5	<0.5	1.0	0.5	<0.5	<0.5	<0.5	1,089,180
B	07		2.28	1.25	16.0	44.5	35.0	3.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1,678,564
B	08		3.50	1.12	37.8	25.0	7.4	4.4	3.9	3.7	2.8	2.8	2.8	2.8	2.0	2.0	1.0	0.5	0.5	857,594
B	09		1.88	1.08	45.0	25.0	6.6	3.8	2.8	1.9	1.4	1.4	1.4	1.0	1.0	1.9	1.2	<0.5	5.5	788,436
B	10		2.15	1.12	35.0	41.0	5.7	2.7	1.9	1.7	1.0	1.0	1.0	1.4	1.4	1.9	1.9	1.9	<0.5	1,358,006
B	11		2.32	1.14	33.0	41.0	8.6	2.9	1.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.9	2.9	1,587,437
B	14		2.13	1.17	24.0	46.0	21.5	2.8	3.0	2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1,095,444

[a] Site A = West Hackberry, Site B = Weeks Island.

[b] Total suspended matter was determined gravimetrically by filtration through pre-weighed 0.45 μ Millipore filters.

[c] Number of particles/ml was determined using a Coulter Counter.

[d] This size range was not analyzed due to instrument malfunction.

TABLE 3

SEDIMENTOLOGICAL DATA FROM CRUISE 02 - TEXOMA/CAPLINE SURVEY

SITE[a]	STA-TION #	SAMPLE TYPE[b]	TOC (mg/g)	% SAND	% SILT	% CLAY	SIZE DISTRIBUTION ø OF SAND FRACTION (% RETAINED BY SCREEN MESH OF GIVEN ø SIZE) 4.0	3.75	3.50	3.25	3.00	2.75	2.50	2.25	2.00	1.75	1.50	1.25	1.00	MEDIAN ø	MEAN ø	σ_I[c]	Sk_I[d]	K_G[e]
A	02	Pooled	15.5	36.8	34.8	28.4	0.78	12.1	10.7	9.7	16.7	10.5	8.4	8.6	6.5	2.1	4.3	2.0	0.05	2.85	2.79	0.77	-0.08	0.80
A	02	Rep. 1	f	47.7	20.8	32.1	4.2	14.2	10.4	12.5	16.0	12.7	9.8	9.3	6.5	2.8	1.3	0.20	0.07	2.87	2.93	0.70	-0.04	0.82
A	02	Rep. 2	f	29.0	35.5	35.0	0.0	16.8	11.6	13.0	16.1	10.4	7.8	7.4	5.3	2.3	0.66	0.42	0.08	3.00	2.86	0.68	-0.10	0.82
A	02	Rep. 3	f	43.0	28.6	28.4	3.0	18.6	9.8	11.3	15.0	13.1	9.2	9.1	5.8	2.7	1.6	0.04	0.03	2.88	2.91	0.70	-0.04	0.78
A	02	Rep. 4	f	33.7	38.9	27.4	6.3	18.5	10.9	11.8	14.6	12.4	8.4	8.2	5.2	2.2	1.1	0.26	0.07	2.96	2.79	0.69	-0.07	0.80
A	05	Pooled	13.9	16.4	2.4	81.2	4.3	13.7	8.8	9.3	15.9	16.8	10.6	9.7	5.8	2.9	1.8	0.25	0.06	2.29	2.85	0.70	0.09	0.96
A	06	Pooled	16.3	0.2	2.8	97.2	40.0	0.0	10.0	0.0	15.0	0.0	10.0	0.0	15.0	0.0	10.0	0.0	0.0	3.00	2.68	0.93	-0.34	0.96
A	07	Pooled	18.0	1.1	1.0	98.1	72.1	0.0	7.8	0.0	7.1	0.0	5.7	0.0	7.1	0.0	0.0	0.0	0.0	3.57	3.22	0.47	-0.76	2.65
A	08	Pooled	11.7	8.8	36.7	54.5	23.1	0.0	19.1	0.0	35.7	0.0	15.8	0.0	5.5	0.0	0.83	0.0	0.0	2.90	2.95	0.60	0.08	0.80
A	08	Rep. 1	f	15.6	36.0	48.4	28.5	0.0	22.0	0.0	33.5	0.0	12.1	0.0	4.4	0.0	0.34	0.0	0.23	3.02	3.03	0.55	0.01	0.81
A	08	Rep. 2	f	24.6	27.8	47.6	2.6	16.6	10.9	9.7	16.1	15.2	9.7	9.1	5.5	2.4	1.6	0.30	0.22	2.85	2.86	0.68	0.01	0.82
A	08	Rep. 3	f	7.4	38.5	54.2	19.3	0.0	17.1	0.0	35.3	0.0	19.5	0.0	8.1	0.0	0.66	0.0	0.0	2.82	2.88	0.65	0.09	0.82
A	08	Rep. 4	f	22.0	24.6	52.6	2.3	15.6	9.7	10.8	17.2	15.3	8.5	8.4	5.0	3.4	3.4	0.19	0.13	2.58	2.82	0.70	0.34	0.91
A	09	Pooled	11. 3	29.9	18.8	51.3	7.3	13.6	7.0	8.8	14.1	12.7	11.1	10.8	7.7	4.1	2.3	0.34	0.17	2.77	2.81	0.80	0.0f	0.79
A	10	Pooled	14. 3	30.4	23.2	46.4	7.1	29.3	12.0	7.6	9.2	9.0	6.9	7.5	5.4	3.1	2.3	0.30	0.25	3.20	2.9	0.75	-0.40	0.77
A	11	Pooled	12. 2	14.5	39.3	46.8	26.7	0.0	23.4	0.0	34.4	0.0	12.7	0.0	4.1	0.0	0.53	0.0	0.21	2.98	3.01	0.56	0.05	0.78
A	14	Pooled	11. 4	30.3	53.3	16.4	4.9	23.0	19.3	22.8	18.7	7.0	1.9	1.1	0.55	0.37	0.21	0.03	0.0	3.22	3.22	0.39	-0.01	0.88
A	14	Rep. 1	f	39.1	31.4	29.5	4.4	24.6	20.5	21.3	18.9	8.0	1.7	0.66	0.15	0.07	0.07	0.04	0.0	3.27	3.25	0.36	-0.08	0.74
A	14	Rep. 2	f	30.2	35.5	34.3	4.1	25.4	21.2	21.6	20.0	5.1	1.1	0.59	0.59	0.05	0.0	0.0	0.0	3.22	3.18	0.39	-0.07	0.80
A	14	Rep. 3	f	26.2	48.0	25.7	3.9	21.5	21.4	22.4	16.9	5.0	8.1	0.37	0.31	0.12	0.06	0.06	0.0	3.30	3.23	0.43	-0.10	0.91
A	14	Rep. 4	f	22.6	42.3	35.2	8.6	26.4	17.6	20.0	14.3	3.8	1.3	1.0	6.7	0.37	0.33	0.04	0.04	3.22	3.22	0.39	-0.16	1.23

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Pooled samples were composited by taking subsamples from each of four Van Veen grabs and combining them to form one sample; Replicates (abbreviated "Rep.") were separate subsamples taken from each Van Veen grab.

[c]σ_I = Inclusive Graphic Standard Deviation

[d]Sk_I = Inclusive Graphic Skewness.

[e]K_G = Graphic Kurtosis.

[f]Analysis not complete due to loss of sample during laboratory processing.

[g]Average value computed from replicate analyses.

TABLE 3 (CONT.)

SEDIMENTOLOGICAL DATA FROM CRUISE 02 - TEXOMA/CAPLINE SURVEY

SITE[a]	STA-TION #	SAMPLE TYPE[b]	TOC (mg/g)	% SAND	% SILT	% CLAY	SIZE DISTRIBUTION ø OF SAND FRACTION (% RETAINED BY SCREEN MESH OF GIVEN ø SIZE) 4.0	3.75	3.50	3.25	3.00	2.75	2.50	2.25	2.00	1.75	1.50	1.25	1.00	MEDIAN ø	MEAN ø	σ_I[c]	Sk_I[d]	K_G[e]
B	02	Pooled	10.6	73.2	19.8	7.0	6.2	19.4	55.5	14.5	1.1	0.48	0.44	0.56	0.66	0.53	0.38	0.22	0.0	3.39	3.40	0.18	0.06	1.36
B	02	Rep. 1	f	75.3	20.2	4.5	2.4	19.4	26.9	45.1	2.4	0.40	0.52	0.63	0.86	0.68	0.49	0.16	0.03	3.25	3.33	0.23	0.33	0.96
B	02	Rep. 2.	f	81.3	10.5	8.2	1.9	5.9	62.2	24.7	1.3	0.50	0.76	0.83	0.77	0.56	0.37	0.24	0.01	3.32	3.30	0.15	-0.17	1.57
B	02	Rep. 3.	f	82.8	12.8	4.4	0.47	1.2	22.4	68.9	2.5	0.20	0.55	0.97	0.88	0.49	0.34	0.15	0.0	3.17	3.19	0.12	0.13	1.53
B	02	Rep. 4.	f	60.2	28.3	11.5	3.1	28.1	57.0	6.4	1.4	0.56	0.45	0.54	0.79	0.69	0.58	0.34	0.02	3.44	3.44	0.17	0.00	2.50
B	05	Pooled	5.6	56.6	36.7	6.7	2.0	26.9	56.9	11.5	1.6	0.24	0.19	0.18	0.19	0.13	0.11	0.06	0.01	3.41	3.42	0.16	0.06	1.17
B	06	Pooled	8.7	84.7	11.0	4.3	0.10	0.20	8.0	29.7	59.1	10.4	0.44	0.79	0.63	0.36	0.14	0.06	0.0	2.95	2.92	0.25	-0.12	0.80
B	07	Pooled	7.6	81.2	14.0	4.9	1.3	5.1	10.2	76.5	5.5	0.70	0.38	0.44	0.46	0.18	0.12	0.06	0.02	3.15	3.15	0.10	0.00	1.81
B	08	Pooled	7.6	67.3	28.4	4.3	4.1	13.7	60.8	9.8	0.64	0.56	0.47	0.43	0.43	0.41	0.38	0.24	0.0	3.39	3.40	0.13	0.08	1.59
B	08	Rep. 1	f	50.6	40.7	8.6	5.2	20.1	60.3	9.3	1.6	0.68	0.64	0.60	0.60	0.64	0.64	0.04	0.0	3.41	3.43	0.17	0.09	1.60
B	08	Rep. 2	f	68.7	25.7	5.5	3.9	13.3	68.6	9.4	2.2	0.45	0.39	0.39	0.34	0.32	0.42	0.24	0.0	3.39	3.39	0.13	0.00	2.05
B	08	Rep. 3	f	66.3	27.9	5.8	4.6	22.1	58.9	11.2	1.4	0.43	0.27	0.31	0.30	0.33	0.30	0.19	0.0	3.40	3.42	0.16	0.10	1.42
B	08	Rep. 4	f	77.3	18.6	4.1	2.0	10.6	63.1	16.4	2.7	0.45	1.0	2.2	0.92	0.45	0.16	0.0	0.0	3.34	3.32	0.17	-0.15	2.14
B	09	Pooled	7.5	66.9	27.6	5.4	3.0	38.0	49.0	5.4	2.8	0.95	0.28	0.22	0.16	0.10	0.08	0.05	0.0	3.47	3.47	0.17	-0.03	1.25
B	10	Pooled	7.9	67.4	25.6	6.9	0.90	9.6	64.4	18.7	3.3	1.7	0.63	0.33	0.13	0.10	0.08	0.04	0.0	3.59	3.56	0.16	-0.19	1.59
B	11	Pooled	8.6	74.6	20.6	4.8	0.89	13.1	66.4	17.4	1.0	2.20	0.13	0.20	0.31	0.17	0.16	0.06	0.01	3.28	3.36	0.13	-0.08	1.25
B	14	Pooled	6.7	89.1	6.8	4.0	0.94	4.6	13.9	59.5	9.6	3.6	2.1	2.5	1.4	0.75	0.69	0.37	0.11	3.12	3.04	0.21	-0.14	2.70
B	14	Rep. 1	f	93.0	4.3	2.6	1.5	8.3	15.3	56.9	7.8	3.8	1.8	1.6	1.3	0.82	0.74	0.43	0.04	3.15	3.16	0.22	0.05	2.38
B	14	Rep. 2	f	94.2	3.8	2.0	0.71	3.8	18.2	60.8	7.3	3.4	1.8	1.5	0.99	0.58	0.51	0.28	0.09	3.15	3.15	0.17	0.00	2.41
B	14	Rep. 3	f	89.6	5.2	5.1	1.2	7.6	55.5	18.2	6.2	4.3	1.9	1.7	1.2	0.83	0.71	0.58	0.0	3.38	3.20	0.25	-0.40	1.95
B	14	Rep. 4	f	88.2	6.9	4.9	2.4	6.5	27.4	49.4	8.0	3.3	4.0	1.0	0.64	0.39	0.36	0.27	0.04	3.20	3.22	0.20	0.10	1.51

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Pooled samples were composited by taking subsamples from each of four Van Veen grabs and combining them to form one sample; Replicates (abbreviated "Rep." were separate subsamples taken from each Van Veen grab.

[c]σ_I = Inclusive Graphic Standard Deviation.

[d]Sk_I = Inclusive Graphic Skewness.

[e]K_G = Graphic Kurtosis.

[f]Individual replicates were analyzed for grain size distribution only.

TABLE 4

SUSPENDED SEDIMENT DATA FROM CRUISE 02 - TEXOMA/CAPLINE SURVEY

SITE[a]	STATION #	DEPTH (m)	TOTAL SUSPENDED MATTER (mg/l)[b]	MEDIAN PARTICLE DIAMETER (μ)	SIZE DISTRIBUTION (μ) OF SUSPENDED PARTICLES (% OF SUSPENDED PARTICLES IN A GIVEN SIZE RANGE)															
					1.00-1.26	1.26-1.59	1.59-2.00	2.00-2.52	2.52-3.17	3.17-4.00	4.00-5.04	5.04-6.35	6.35-8.00	8.00-10.08	10.08-12.7	12.7-16.0	16.0-20.2	20.2-25.4	25.4-32.0	32.0-40.3
A	02		5.2	8.80	0.0	4.6	3.7	3.7	4.6	6.5	10.2	12.0	12.0	13.0	11.1	9.3	2.8	1.9	0.0	4.6
A	05		3.8	4.74	0.0	24.5	10.4	4.7	5.7	6.6	8.5	8.5	10.4	8.5	4.7	3.8	1.9	1.9	0.0	0.0
A	06		4.0	6.66	0.0	4.7	5.6	6.5	8.4	10.3	12.1	12.1	11.2	8.4	7.5	3.7	2.8	3.7	0.0	2.8
A	07		2.6	9.56	0.0	3.6	2.7	3.6	5.5	6.4	9.1	10.9	10.9	11.8	10.9	10.0	6.4	4.5	3.6	0.0
A	08		3.5	4.74	0.0	26.9	10.2	3.7	4.6	6.5	8.3	9.3	9.3	7.4	5.6	3.7	2.8	0.0	1.9	0.0
A	09		3.4	6.54	0.0	19.2	5.8	4.8	5.8	5.8	7.7	8.7	9.6	11.5	8.7	8.7	3.8	0.0	0.0	0.0
A	10		2.9	4.65	0.0	33.9	8.3	2.8	2.8	3.7	4.6	6.4	7.3	8.3	11.0	9.2	1.8	0.0	0.0	0.0
A	11		1.7	8.19	0.0	6.4	4.5	4.5	5.5	7.3	10.0	10.9	10.0	10.0	9.1	10.0	7.3	2.7	1.8	0.0
A	14		1.7	8.80	0.0	4.6	3.7	3.7	4.6	6.5	10.2	12.0	12.0	13.0	11.1	9.3	2.8	1.9	0.0	4.6
B	02		2.6	11.11	0.0	3.6	2.7	2.7	3.6	4.5	7.2	9.9	10.0	12.6	12.6	12.6	11.7	5.4	0.0	0.0
B	05		2.8	12.83	0.0	2.7	1.8	1.8	1.8	3.6	6.3	7.2	12.6	11.7	12.6	14.4	10.8	8.1	4.5	0.0
B	06		6.4	8.97	0.0	3.6	3.6	3.6	4.5	7.3	10.0	10.9	13.6	11.8	10.0	8.2	5.5	7.3	0.0	0.0
B	07		2.9	10.76	0.0	1.9	0.9	0.9	1.9	2.8	3.7	4.7	6.5	7.5	9.3	15.0	15.9	17.8	11.2	0.0
B	08		2.6	14.64	0.0	0.9	0.9	0.9	2.7	4.5	6.4	8.2	9.1	10.0	10.9	10.0	8.2	10.0	10.9	6.4
B	09		3.0	10.08	0.0	1.8	0.7	2.7	3.6	5.5	8.2	10.9	14.5	10.9	13.6	14.5	7.3	3.6	0.0	0.0
B	10		1.5	11.47	0.0	1.8	1.8	1.8	2.8	4.6	7.3	10.1	11.9	14.7	11.9	14.7	9.2	1.8	5.5	0.0
B	11		2.5	11.39	0.0	1.8	1.8	1.8	2.7	4.5	6.4	10.0	12.7	16.4	14.5	10.0	8.2	5.5	3.6	0.0
B	14		2.1	12.83	0.0	1.8	1.8	1.8	2.7	4.5	6.3	9.0	11.7	9.9	12.6	11.7	11.7	7.2	7.2	0.0

[a] Site A = West Hackberry, Site B = Weeks Island.

[b] Total suspended matter was determined gravimetrically by filtration through pre-weighed, 0.45 μ Millipore filters.

TABLE 4 (CONT.)

SITE[a]	STA-TION #	DEPTH (m)	TOTAL SUSPENDED MATTER (mg/l)[b]	MEDIAN PARTICLE DIAMETER (μ)	NUMBER OF PARTICLES PER ml[c]	MEAN PARTICLE DIAMETER (m)	MODE	STANDARD DEVIATION	SKEW-NESS
A	02		5.2	8.80	32,680	9.99	10.08	8.4	2.18
A	05		3.8	4.74	218,708	5.89	1.59	5.15	1.68
A	06		4.0	6.66	72.307	8.33	6.35	7.73	2.39
A	07		2.6	9.56	31,485	10.42	10.08	7.37	1.18
A	08		3.5	4.74	163,995	6.11	1.59	5.86	2.14
A	09		3.4	6.54	40,116	7.89	1.59	5.24	0.81
A	10		2.9	4.65	106,551	6.3	1.59	5.29	0.81
A	11		1.7	8.19	36,169	9.27	6.35	6.77	1.16
A	14		1.7	8.80	32,680	9.99	10.08	8.4	2.18
A	02		2.6	11.11	15,594	10.95	16.0	6.49	0.54
B	05		2.8	12.83	10,692	12.87	16.0	7.7	0.72
B	06		6.4	8.97	14,761	9.68	8.0	6.53	1.01
B	07		2.9	18.76	15,893	16.9	25.4	8.8	0.11
B	08		2.6	14.64	7,773	16.15	32.0	10.86	0.75
B	09		3.0	10.08	9,294	10.29	16.0	5.87	0.68
B	10		1.5	11.47	8,356	11.76	16.0	7.31	1.11
B	11		2.5	11.39	11,458	11.65	10.08	7.12	1.06
B	14		2.1	12.83	13,887	13.17	12.7	8.29	0.77

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Total suspended matter was determined gravimetrically by filtration through pre-weighed, 0.45 μ Millipore filters.

TABLE 5

SEDIMENTOLOGICAL DATA FROM CRUISE 03 - TEXOMA/CAPLINE SURVEY

SITE[a]	STATION #	SAMPLE TYPE[b]	TOC (mg/g)	% SAND	% SILT	% CLAY	4.0	3.75	3.50	3.25	3.00	2.75	2.50	2.25	2.00	1.75	1.50	1.25	1.00	MEDIAN ø	MEAN ø	σ_I[c]	Sk_I[d]	K_G[e]
							SIZE DISTRIBUTION ø OF SAND FRACTION (% RETAINED BY SCREEN MESH OF GIVEN ø SIZE)																	
A	02	Pooled	9.1	38.62	37.01	24.37	11.21	21.24	12.21	12.29	14.55	8.27	6.9	6.81	4.02	1.64	0.74	0.12	0.0	3.15	3.02	0.79	-0.17	0.73
A	05	Pooled	12.8	6.85	39.24	53.93	34.90	0.0	22.03	0.0	22.90	0.0	15.35	0.0	4.33	0.0	0.50	0.0	0.0	3.16	3.00	0.75	-0.21	0.74
A	06	Pooled	15.3	0.0	17.20	82.80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	f	f	f	f	f
A	07	Pooled	14.4	0.0	18.53	81.47	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	f	f	f	f	f
A	08	Pooled	14.5	0.0	9.97	90.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	f	f	f	f	f
A	09	Pooled	9.6	16.39	46.37	37.23	10.34	20.00	11.69	10.38	16.10	9.36	6.98	6.93	4.34	2.26	1.17	0.37	0.09	3.12	2.98	0.81	-0.18	0.81
A	10	Pooled	6.4	26.97	39.97	33.05	13.41	24.36	10.86	7.52	9.94	8.39	7.30	7.82	5.65	2.69	1.58	0.49	0.0	f	f	f	f	f
A	11	Pooled	14.8	0.0	1.61	98.39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.23	2.96	0.85	-0.32	0.75
A	14	Pooled	11.0	16.77	4.26	78.96	20.35	0.0	0.0	66.59	0.0	12.07	0.0	0.53	0.0	0.23	0.23	0.0	0.0	3.30	3.32	0.57	0.03	1.02
B	02	Pooled	3.4	76.89	16.54	3.47	9.62	38.79	47.46	3.17	0.48	0.15	0.10	0.10	0.08	0.08	0.07	0.05	0.0	3.50	3.53	0.55	0.05	0.93
B	05	Pooled	4.9	83.02	11.62	5.36	7.76	28.55	56.13	6.36	0.56	0.13	0.13	0.11	0.11	0.09	0.04	0.06	0.0	3.45	3.49	0.55	0.06	1.00
B	06	Pooled	4.8	88.92	9.28	1.80	4.74	17.16	51.21	21.10	3.13	1.04	0.42	0.52	0.44	0.18	0.07	0.0	0.0	3.37	3.37	0.56	0.00	1.39
B	07	Pooled	3.7	92.35	6.53	1.96	3.90	14.47	54.21	23.14	2.63	0.70	0.28	0.32	0.21	0.09	0.04	0.04	0.0	3.35	3.35	0.56	0.00	1.25
B	08	Pooled	5.2	66.20	27.16	6.63	7.72	23.91	61.02	4.70	0.98	1.32	0.10	0.10	0.02	0.02	0.02	0.0	0.0	3.45	3.49	0.55	0.06	1.27
B	09	Pooled	10.3	30.72	36.72	32.56	6.00	20.55	47.79	21.45	2.52	0.85	0.32	0.25	0.12	0.05	0.05	0.05	0.0	3.38	3.42	0.56	0.07	1.08
B	10	Pooled	4.9	77.26	14.12	8.62	5.80	19.75	45.16	11.62	7.12	3.78	2.77	2.20	1.02	0.39	0.19	0.18	0.04	3.37	3.27	0.61	-0.16	1.01
B	11	Pooled	7.0	81.88	16.41	1.72	7.21	29.71	53.91	6.40	0.69	0.12	0.15	0.02	0.10	0.02	0.02	0.0	0.0	3.44	3.48	0.55	0.06	1.23
B	14	Pooled	3.8	86.51	11.89	1.61	5.61	24.56	46.12	15.21	6.18	1.39	0.39	0.33	0.10	0.10	0.02	0.02	0.0	3.40	3.39	0.57	-0.02	1.51

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Pooled samples were composited by taking subsamples from each of four Van Veen grabs and combining them to form one sample.

[c]σ_I = Inclusive Graphic Standard Deviation

[d]Sk_I = Inclusive Graphic Skewness.

[e]K_G = Graphic Kurtosis.

[f]Calculation could not be made due to absence of sand fraction.

TABLE 6

SUSPENDED SEDIMENT DATA FROM CRUISE 03 - TEXOMA/CAPLINE SURVEY

SITE[a]	STATION #	DEPTH (m)	TOTAL SUSPENDED MATTER (mg/l)[b]	MEDIAN PARTICLE DIAMETER (μ)	SIZE DISTRIBUTION (μ) OF SUSPENDED PARTICULATES (% OF SUSPENDED PARTICLES IN A GIVEN SIZE RANGE)															
					1.00-1.26	1.26-1.59	1.59-2.00	2.00-2.52	2.52-3.17	3.17-4.00	4.00-5.04	5.04-6.35	6.35-8.00	8.00-10.08	10.08-12.7	12.7-16.0	16.0-20.2	20.2-25.4	25.4-32.0	32.0-40.3
A	02	5	7.73	6.22	0.0	9.0	3.7	5.2	8.2	10.4	14.9	14.9	10.4	7.5	5.2	5.2	2.2	1.5	0.0	1.5
A	05	6	9.95	7.07	0.0	1.5	2.3	4.5	6.8	11.4	15.9	17.4	13.6	11.4	5.3	5.3	3.0	0.8	0.8	0.0
A	06	6	56.90	6.70	0.0	0.0	0.8	1.5	5.3	12.9	24.2	25.0	15.9	7.6	3.8	2.3	0.8	0.0	0.0	0.0
A	07	5	75.43	7.18	0.0	0.0	0.8	1.5	4.6	10.7	20.6	23.7	16.8	9.9	5.3	3.1	2.3	0.8	0.0	0.0
A	08	5	46.32	8.29	0.0	0.0	0.8	0.8	2.3	6.9	14.6	21.5	22.3	16.9	8.5	3.0	1.5	0.0	0.0	0.0
A	09	5	25.50	7.72	0.0	0.8	0.8	2.3	4.5	9.0	15.8	20.3	18.8	12.8	6.8	4.5	2.3	0.0	0.0	0.0
A	10	5	42.35	7.11	0.0	0.0	0.8	2.3	6.2	12.3	19.2	20.0	14.6	10.0	6.9	4.6	2.3	0.8	0.0	0.0
A	11	4	58.72	7.15	0.0	0.0	0.8	1.5	3.8	10.8	20.8	25.4	20.0	10.8	3.8	1.5	0.8	0.0	0.0	0.0
A	14	5	52.72	6.17	0.0	0.0	0.8	2.3	7.0	17.8	25.6	19.4	10.9	7.0	3.9	2.3	1.6	0.8	0.8	0.0
B	02	4	14.60	7.08	0.0	0.7	2.2	3.7	6.7	11.2	17.2	18.7	15.7	9.7	6.0	4.5	1.5	1.5	0.0	0.7
B	05	3	13.43	7.87	0.0	0.8	1.5	3.0	4.5	8.3	14.4	18.9	18.2	13.6	8.3	5.3	2.3	0.8	0.0	0.0
B	06	5	51.69	6.78	0.0	0.0	0.8	2.3	5.3	13.7	22.1	22.1	14.5	8.4	5.3	3.1	1.5	0.8	0.0	0.0
B	07	4	115.8	7.25	0.0	0.0	0.8	1.6	5.4	13.2	19.4	17.8	15.5	11.6	8.5	4.7	1.6	0.0	0.0	0.0
B	08	4	17.07	6.71	0.0	1.5	3.0	4.5	7.6	12.1	17.4	17.4	12.9	9.1	6.1	4.5	2.3	0.0	0.0	0.8
B	09	7	-	5.8	0.0	2.3	5.3	7.6	12.1	14.4	14.4	12.9	9.8	6.8	5.3	3.8	2.3	0.8	2.3	0.0
B	10	5	6.06	5.26	0.0	3.8	6.8	9.8	12.9	14.4	13.6	9.8	6.8	5.3	3.0	3.8	2.3	2.3	1.5	3.0
B	11	4	15.74	6.51	0.0	2.2	3.7	5.2	7.4	11.9	17.8	20.0	15.6	8.1	3.7	3.0	1.5	0.0	0.0	0.0
B	14	4	39.83	5.57	0.0	0.8	2.3	5.3	11.5	20.6	23.7	16.8	8.4	4.6	2.3	2.3	0.8	0.0	0.8	0.0

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Total suspended matter was determined gravimetrically by filtration through pre-weighed, 0.45 μ Millipore filters.

TABLE 6 (CONT.)

SITE	STATION #	DEPTH (m)	TOTAL SUSPENDED MATTER (mg/l)[b]	MEDIAN PARTICLE DIAMETER (μ)	NUMBER OF PARTICLES PER ml[c]	MEAN PARTICLE DIAMETER (μ)	MODE	STANDARD DEVIATION	SKEWNESS
A	02	5	7.73	6.22	91,820	7.23	6.35	6.29	2.76
A	05	6	9.95	7.07	66,568	7.07	6.35	4.94	1.95
A	06	6	56.90	6.70	239,566	6.70	6.35	2.95	1.74
A	07	5	75.43	7.18	258,218	7.18	6.35	3.87	1.95
A	08	5	46.32	8.29	101,793	8.29	8.00	3.36	1.14
A	09	5	25.50	7.72	99,898	7.72	6.35	5.2	3.8
A	10	5	42.35	7.11	228,642	7.11	6.35	4.13	1.66
A	11	4	58.72	7.15	199,018	7.15	6.35	2.82	1.53
A	14	5	52.72	6.17	302,451	6.17	5.04	4.32	2.94
B	02	4	14.60	7.08	68,209	7.08	6.35	5.1	2.82
B	05	3	13.43	7.87	66,161	7.87	6.35	4.19	1.36
B	06	5	51.69	6.78	239,150	6.78	6.35	3.76	2.04
B	07	4	115.8	7.25	338,221	7.25	5.04	3.71	1.22
B	08	4	17.07	6.71	89,760	6.71	6.35	5.42	2.93
B	09	7	-	5.8	107,285	5.8	5.04	5.82	2.41
B	10	5	6.86	5.26	105,237	5.26	4.00	8.21	2.54
B	11	4	15.74	6.51	132,458	6.51	6.35	3.52	1.5
B	14	4	39.83	5.57	277,195	5.57	5.04	3.82	3.5

[a] Site A = West Hackberry; Site B = Weeks Island.

[b] Total suspended matter was determined gravimetrically by filtration through pre-weighed, 0.45 μ Millipore filters.

[c] Number of particles/ml were determined using a Coulter Counter.

TABLE 7

SEDIMENTOLOGICAL DATA FROM CRUISE 04 - TEXOMA/CAPLINE SURVEY

SITE[a]	STATION #	SAMPLE TYPE[b]	TOC (mg/g)	% SAND	% SILT	% CLAY	SIZE DISTRIBUTION ø OF SAND FRACTION (% RETAINED BY SCREEN MESH OF GIVEN ø SIZE) 4.0	3.75	3.50	3.25	3.00	2.75	2.50	2.25	2.00	1.75	1.50	1.25	1.00	MEDIAN ø	MEAN ø	σ_I[c]	Sk_I[d]	K_G[e]
A	02	Pooled	12.0	42.39	26.80	30.80	4.19	14.71	17.44	20.79	11.93	11.34	6.63	4.98	3.26	1.96	1.38	0.61	0.37	3.06	2.95	0.58	-0.19	1.06
A	02	Rep. 1	9.3	44.80	25.34	29.85	8.85	16.38	9.87	13.16	16.10	10.33	8.25	8.78	4.57	2.05	1.10	0.32	0.14	2.98	2.93	0.70	-0.07	0.79
A	02	Rep. 2	8.6	45.76	24.87	27.42	8.75	18.10	12.09	14.28	16.83	8.32	7.17	7.41	3.77	1.88	1.22	0.24	0.12	3.05	2.96	0.66	-0.14	0.84
A	02	Rep. 3	13.1	43.08	25.00	31.92	8.39	18.87	7.85	19.61	18.40	6.39	7.44	6.39	3.62	2.13	0.71	0.20	0.0	3.07	2.99	0.64	-0.13	0.93
A	02	Rep. 4	10.0	39.13	28.59	32.28	9.17	15.33	10.57	14.11	20.04	8.96	8.49	6.22	4.14	1.79	0.92	0.27	0.0	3.00	2.99	0.64	-0.02	0.86
A	05	Pooled	9.9	19.92	26.13	53.95	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.96	2.79	0.69	-0.07	0.88
A	06	Pooled	13.6[f,g]	0.40	21.14	78.45	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.00	2.68	0.93	-0.34	0.60
A	07	Pooled	15.6	1.38	29.71	68.89	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.57	3.22	0.47	-0.76	2.65
A	08	Pooled	10.9	4.89	32.66	62.46	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.90	2.95	0.60	0.08	0.80
A	08	Rep. 1	14.5	6.11	32.05	61.84	17.39	28.65	15.35	12.79	23.26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.02	3.03	0.55	0.01	0.81
A	08	Rep. 2	(f)	9.42	31.27	61.31	12.98	23.24	13.90	14.12	30.52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.25	3.13	0.58	0.22	0.91
A	08	Rep. 3	14.6	4.40	31.25	64.35	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	2.82	2.88	0.65	0.09	0.82
A	08	Rep. 4	11.6	14.27	38.47	47.26	54.65	0.0	0.0	0.0	45.35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.58	2.82	0.78	0.34	0.91
A	09	Pooled	8.9	30.52	35.23	34.31	11.53	18.20	9.52	10.11	15.46	9.46	8.17	6.94	4.61	2.97	2.07	0.63	0.20	2.98	2.94	0.84	-0.05	0.83
A	10	Pooled	12.2	17.04	27.06	55.90	16.27	23.55	10.13	8.19	41.87	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.20	2.90	0.75	-0.40	0.77
A	11	Pooled	14.4	1.53	29.72	68.74	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.98	3.01	0.56	0.05	0.78
A	14	Pooled	14.2	2.89	20.76	76.35	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.22	3.22	0.39	-0.01	0.88
A	14	Rep. 1	16.4	0.33	21.35	78.32	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.27	3.25	0.36	-0.08	0.74
A	14	Rep. 2	15.9	0.59	20.69	78.72	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.22	3.18	0.39	-0.07	0.80
A	14	Rep. 3	17.8	0.82	20.01	79.18	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.30	3.23	0.43	-0.10	0.91
A	14	Rep. 4	19.7	1.16	29.75	67.07	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.22	3.22	0.39	-0.16	1.23

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Pooled samples were composited by taking subsamples from each of four Van Veen grabs and combining them to form one sample; Replicates (abbreviated "Rep.") were separate subsamples taken from each Van Veen grab.

[c]σ_I = Inclusive Graphic Standard Deviation

[d]Sk_I = Inclusive Graphic Skewness.

[e]K_G = Graphic Kurtosis.

[f]Analysis not complete due to loss of sample during laboratory processing.

[g]Average value computed from replicate analyses.

TABLE 7 (CONT.)

SITE[a]	STA-TION #	SAMPLE TYPE[b]	TOC (mg/g)	% SAND	% SILT	% CLAY	SIZE DISTRIBUTION ø OF SAND FRACTION (% RETAINED BY SCREEN MESH OF GIVEN ø SIZE) 4.0	3.75	3.50	3.25	3.00	2.75	2.50	2.25	2.00	1.75	1.50	1.25	1.00	MEDIAN ø	MEAN ø	σ_I[c]	Sk_I[d]	K_G[e]
B	02	Pooled	8.5	72.24	19.76	8.01	9.44	19.60	4.09	65.08	0.62	0.24	0.22	0.22	0.16	0.13	0.13	0.04	0.02	3.20	3.38	0.59	0.30	0.73
B	02	Rep. 1	7.5	59.04	25.71	15.25	9.71	25.88	55.75	6.56	0.99	0.29	0.27	0.19	0.12	0.10	0.04	0.04	0.04	3.45	3.49	0.19	0.21	1.07
B	02	Rep. 2	7.5	72.15	21.01	6.84	9.78	37.51	44.77	6.64	0.71	0.19	0.13	0.11	0.09	0.06	0.04	0.02	0.02	3.49	3.51	0.19	0.11	1.04
B	02	Rep. 3	4.1	74.70	15.90	9.40	21.60	30.08	39.54	6.47	1.60	0.08	0.14	0.12	0.08	0.08	0.06	0.04	0.04	3.52	3.55	0.23	0.13	0.82
B	02	Rep. 4	4.1	81.93	14.03	4.04	7.93	43.11	42.40	4.99	0.92	0.16	0.11	0.08	0.08	0.06	0.06	0.05	0.03	3.50	3.51	0.17	0.03	0.97
B	05	Pooled	4.2	86.70	10.90	2.40	5.70	31.35	45.93	12.79	2.44	0.46	0.46	0.38	0.17	0.17	0.08	0.04	0.02	3.45	3.45	0.20	0.00	0.12
B	06	Pooled	9.7	86.33	9.52	4.16	3.51	9.02	4.38	76.13	4.72	0.74	0.43	0.41	0.25	0.14	0.18	0.06	0.04	3.15	3.18	0.20	0.20	2.14
B	07	Pooled	8.7	71.34	20.72	7.93	5.90	27.41	49.27	12.18	2.71	0.51	0.51	0.63	0.47	0.21	0.13	0.04	0.02	3.42	3.43	0.20	0.05	1.21
B	08	Pooled	8.3	83.24	12.72	4.04	6.21	29.09	7.67	53.93	2.14	0.30	0.26	0.20	0.08	0.06	0.04	0.02	0.0	3.23	3.37	0.27	0.52	0.72
B	08	Rep. 1	7.0	85.58	14.42	0.0	6.11	23.69	53.01	12.60	3.00	0.43	0.24	0.25	0.07	0.13	0.09	0.05	0.07	3.40	3.42	0.19	0.11	1.26
B	08	Rep. 2	7.9	83.00	12.77	4.23	6.39	28.72	48.49	12.84	2.19	0.22	0.22	0.22	0.14	0.14	0.08	0.03	0.06	3.43	3.45	0.20	0.10	1.09
B	08	Rep. 3	3.6	78.19	18.41	3.39	6.47	1.32	80.25	8.02	2.34	0.49	0.36	0.28	0.15	0.11	0.09	0.02	0.02	3.36	3.36	0.09	0.00	2.24
B	08	Rep. 4	4.9	89.11	7.62	3.26	2.29	8.60	6.28	79.30	2.11	0.45	0.29	0.22	0.19	0.16	0.10	0.02	0.0	3.17	3.19	0.12	0.13	1.92
B	09	Pooled	4.6	69.39	24.38	6.24	8.91	41.28	37.39	7.68	3.18	0.52	0.42	0.23	0.08	0.11	0.08	0.05	0.03	3.50	3.48	0.20	-0.10	1.18
B	10	Pooled	6.5	63.00	32.35	4.65	13.98	48.43	22.05	9.21	4.03	1.02	0.62	0.28	0.12	0.03	0.06	0.06	0.03	3.57	3.50	0.25	-0.28	1.16
B	11	Pooled	4.4	86.88	10.17	2.95	2.42	10.79	31.62	48.32	2.13	0.62	0.64	2.01	0.41	0.70	0.25	0.05	0.02	3.23	3.28	0.20	0.25	1.31
B	14	Pooled	3.8	91.97	7.64	0.39	3.13	21.39	38.32	19.56	11.27	3.93	1.11	0.63	0.30	0.11	0.09	0.06	0.04	3.35	3.27	0.32	-0.27	1.03
B	14	Rep. 1	6.4	95.45	2.97	1.58	5.65	26.98	30.17	18.95	12.62	2.90	1.32	0.69	0.26	0.45	0.26	0.08	0.05	3.35	3.30	0.33	-0.17	0.96
B	14	Rep. 2	9.5	91.24	5.72	3.04	5.67	28.12	33.86	17.71	10.52	2.06	1.09	0.54	0.22	0.07	0.05	0.05	0.02	3.38	3.34	0.30	-0.15	0.99
B	14	Rep. 3	5.0	91.86	7.47	0.67	5.06	24.52	33.62	19.36	11.37	2.78	1.64	0.90	0.34	0.17	0.13	0.05	0.03	3.35	3.30	0.32	-0.16	1.02
B	14	Rep. 4	7.5	92.46	3.28	4.26	2.55	8.37	49.73	25.85	8.58	2.38	1.03	0.59	0.28	0.13	0.07	0.02	0.02	3.30	3.25	0.20	-0.25	1.32

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Pooled samples were composited by taking subsamples from each of four Van Veen grabs and combining them to form one sample; Replicates (abbreviated "Rep.") were separate subsamples taken from each Van Veen grab.

[c]σ_I = Inclusive Graphic Standard Deviation

[d]Sk_I = Inclusive Graphic Skewness.

[e]K_G = Graphic Kurtosis.

[f]Analysis not complete due to loss of sample during laboratory processing.

[g]Average value computed from replicate analyses.

TABLE 8

SUSPENDED SEDIMENT DATA FROM CRUISE 04 - TEXOMA/CAPLINE SURVEY

					SIZE DISTRIBUTION (µ) OF SUSPENDED PARTICULATES (% OF SUSPENDED PARTICLES IN A GIVEN SIZE RANGE)															
SITE[a]	STATION #	DEPTH (m)	TOTAL SUSPENDED MATTER (mg/l)[b]	MEDIAN PARTICLE DIAMETER (µ)	1.00-1.26	1.26-1.59	1.59-2.00	2.00-2.52	2.52-3.17	3.17-4.00	4.00-5.04	5.04-6.35	6.35-8.00	8.00-10.08	10.08-12.7	12.7-16.0	16.0-20.2	20.2-25.4	25.4-32.0	32.0-40.3
A	02		3.23	9.53	0.0	0.0	1.5	2.3	3.8	6.8	10.6	14.4	14.4	14.4	11.4	8.3	6.0	2.3	3.0	0.0
A	05		3.30	8.08	0.0	0.0	2.2	3.0	3.7	7.5	11.9	15.7	14.2	11.2	9.0	8.2	7.5	3.0	2.2	0.7
A	06		6.86	12.47	0.0	0.0	1.5	1.5	1.5	3.0	6.0	9.0	11.9	17.2	17.2	14.2	8.2	6.0	1.5	1.5
A	07		6.34	7.92	0.0	2.3	2.3	3.0	3.8	8.3	14.4	16.7	15.2	12.9	8.3	6.1	3.0	2.3	0.8	0.0
A	08		4.50	10.3	0.0	0.7	1.5	2.2	2.9	5.1	8.8	12.5	14.7	17.6	14.7	8.1	7.4	2.2	1.5	0.0
A	09		8.00	11.45	0.0	0.0	0.8	1.5	2.3	3.8	8.3	11.3	13.5	16.5	15.8	12.8	9.0	2.3	2.3	0.0
A	10		4.44	9.33	0.0	0.7	1.5	2.2	3.7	5.9	11.1	14.8	15.6	14.1	11.1	9.6	7.4	2.2	0.0	0.0
A	11		2.84	7.29	0.0	0.0	2.3	3.1	4.7	10.1	17.1	22.5	20.2	12.4	4.7	2.3	0.8	0.0	0.0	0.0
A	14		4.88	8.09	0.0	0.0	2.2	3.0	3.7	8.2	14.2	17.9	16.4	12.7	7.5	6.7	4.5	2.2	0.7	0.0
B	02		20.43	15.4	0.0	0.0	0.7	0.7	0.7	1.5	3.0	6.0	9.7	14.2	16.4	17.2	17.9	6.7	5.2	0.0
B	05		13.98	9.89	0.0	0.0	2.4	2.4	4.0	6.4	10.4	12.8	12.8	12.0	9.6	10.4	10.4	6.4	0.0	0.0
B	06		21.55	12.3	0.0	0.0	1.5	1.5	3.0	5.3	9.1	10.6	10.6	9.8	6.8	9.8	11.4	9.8	5.3	5.3
B	07		20.49	8.27	0.0	0.0	3.1	3.8	5.3	8.4	13.0	14.5	14.5	11.5	8.4	6.1	7.6	3.0	0.0	0.0
B	08		17.10	11.8	0.0	0.0	2.3	3.0	3.8	5.3	8.3	9.8	9.8	12.0	10.5	8.3	11.3	9.0	6.8	0.0
B	09		6.47	8.42	0.0	0.0	3.0	3.8	6.0	9.0	12.0	13.5	12.8	9.8	5.3	4.5	9.0	7.5	3.0	0.0
B	10		7.94	11.39	0.0	0.0	0.8	1.5	2.3	3.8	6.9	11.5	15.3	16.0	16.0	11.5	7.6	6.1	0.8	0.0
B	11		12.47	9.17	0.0	0.0	4.3	3.6	5.1	7.2	10.1	13.0	11.6	10.1	5.1	8.7	8.0	8.0	4.3	0.7
B	14		12.08	12.53	0.0	0.0	7.7	2.3	2.3	3.1	5.4	7.7	10.0	12.3	11.5	12.3	11.5	11.5	2.3	0.0

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Total suspended matter was determined gravimetrically by filtration through pre-weighed, 0.45 µ Millipore filters.

TABLE 8 (CONT.)

Site	State	Depth	TSM	MPD	NUMBER OF PARTICLES PER ml[c]	MEAN PARTICLE DIAMETER (μ)	MODE	STANDARD DEVIATION	SKEW-NESS
A	02		3.23	9.53	9,497	10.23	10.08	6.51	1.46
A	05		3.30	8.08	14,911	10.12	6.35	6.98	1.61
A	06		6.86	12.47	8,732	12.52	12.7	7.12	1.33
A	07		6.34	7.92	50,776	8.55	6.35	5.46	1.61
A	08		4.50	10.3	9,307	10.28	10.08	5.86	1.25
A	09		8.00	11.45	9,512	11.35	10.00	6.15	1.1
A	10		4.44	9.33	11,668	9.62	8.0	5.38	0.95
A	11		2.84	7.29	20,870	6.96	6.35	3.12	1.21
A	14		4.88	8.08	20,324	8.73	6.35	5.38	1.61
B	02		20.43	15.4	1,556	14.67	20.2	6.98	0.66
B	05		13.98	9.89	4,439	10.67	8.0	6.47	0.8
B	06		21.55	12.3	10,426	14.4	20.2	10.15	1.0
B	07		20.49	8.27	16,641	9.1	8.0	5.85	1.18
B	08		17.10	11.8	6,109	12.89	10.08	8.49	0.78
B	09		6.47	8.42	12,079	10.51	6.35	7.91	1.2
B	10		7.94	11.39	7,366	11.41	12.7	6.1	0.95
B	11		12.47	9.17	7,179	11.25	6.35	8.42	1.16
B	14		12.08	12.53	20,639	12.62	16.0	7.74	0.55

[a]Site A = West Hackberry, Site B = Weeks Island.

[b]Total suspended matter was determined gravimetrically by filtration through pre-weighed, 0.45 μ Millipore filters.

[c]Number of particles/ml were determined using a Coulter Counter.