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Mercury Concentrations in Estuarine Sediments, Lavaca and Matagorda Bays, Texas, 1992

Water-Resources Investigations Report 98–4038

U.S. Department of the Interior
U.S. Geological Survey

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By David S. Brown, Grant L. Snyder, and R. Lynn Taylor

U.S. GEOLOGICAL SURVEY
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Bruce Babbitt, Secretary

U.S. GEOLOGICAL SURVEY

Thomas J. Casadevall, Acting Director

For additional information write to:

District Chief
U.S. Geological Survey
8011 Cameron Rd.
Austin, TX 78754–3898

Copies of this report can be purchased from

U.S. Geological Survey
Branch of Information Services
Box 25286
Denver, CO 80225–0286

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Mercury Concentrations in Estuarine Sediments, Lavaca and Matagorda Bays, Texas, 1992

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Abstract

A preliminary assessment of the distribution and variability of total mercury concentrations in five sediment environments—open water, ship channel, dredged spoil, oyster reef, and salt marsh—of the Lavaca-Matagorda Bays estuarine system along the central Texas Gulf Coast shows that the largest total mercury concentrations in the bays are in the 10- to 20-centimeter sample-depth zone in 2 of the 3 sample areas (1 open water and 1 salt marsh) closest to Point Comfort. The concentrations range from 137 to 1,270 micrograms per kilogram in the open-water environment and 73.8 to 1,900 micrograms per kilogram in the salt-marsh environment. In the surface-sample-depth zones among all sediment environments, total mercury concentrations typically are largest in the open-water environment and smallest in the dredged-spoil and salt-marsh environments.

Open-water sample areas 1–01, 1–02 (middle Lavaca Bay), and 1–06 (upper Matagorda Bay) have median total mercury concentrations in all three sample-depth zones (0 to 2, 10 to 20, and 20 to 50 centimeters) greater than detection limits. Median concentrations for the different depth zones in the three sample areas range from 30.5 to 705 micrograms per kilogram.

Statistical tests indicate that in all three sample-depth zones in open-water sediments, median total mercury concentrations in some sample areas are significantly different from median total mercury concentrations in other sample areas. Another statistical test indicates that the variance in concentrations of open-water samples collected within 10 meters of each other is the same as the variance in concentrations of samples collected randomly within each 1 square kilometer. However, the degree to which a probable lack of independence among the closely spaced data affects the test result is not known.

Rank correlation coefficients between total mercury concentration and grain-size fractions (percentages of sand, silt, clay, and silt plus clay) and between total mercury concentration and total organic carbon concentration for open-water sample areas indicate that total mercury concentration has a significant positive correlation with clay percentage in 4 of the 8 open-water sample areas. In 6 of the 8 open-water sample areas, total mercury concentration has a significant positive correlation with silt-plus-clay percentage and total organic carbon concentration.

The use of a technique known as kriging to estimate total mercury concentrations at unmeasured sites on the basis of sampling sites where mercury concentrations are measured in open-water sediments in the 0- to 2-centimeter sample-depth zone was explored. Kriging to estimate concentrations in the areas between clusters of sample data points is not a practical solution for obtaining a distribution of concentrations in the bays.

U.S. Environmental Protection Agency Method 7471 (Cold Vapor Atomic Absorption) was an acceptable analytical method for determining the total mercury concentrations in the Lavaca-Matagorda Bays estuarine sediment samples. Measurement of additional trace metals would aid in the characterization of total mercury concentrations and in the identification of concentrator/collector relations that are principally responsible for the adsorption of mercurous compounds to particulates in the bottom sediments.

INTRODUCTION

The Lavaca-Matagorda Bays estuarine system is located along the central Texas Gulf Coast (fig. 1) and supports an important commercial and sport fishing industry. In May 1970, the Texas Department of Health (TDH) and the U.S. Food and Drug Administration began an investigation of large mercury concentrations in the Lavaca Bay area. In July 1970, large mercury concentrations in crabs and oysters [greater than 500 micrograms per kilogram (µg/kg), wet weight] prompted the closure of the oyster fishery located adjacent to Point Comfort (fig. 1). The oyster fishery was reopened for harvest, but in April 1988, the TDH closed the finfish and crab fishery located adjacent to Point Comfort. In 1992, the U.S. Geological Survey (USGS), in cooperation with the National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, Texas General Land Office, Texas Parks and Wildlife Department, and Texas Natural Resource Conservation Commission (hereafter referred to as the Technical Management Team), collected sediment data to assess possible natural resource damage caused by large mercury concentrations.

Purpose and Scope

This report presents the results of a preliminary assessment of the distribution and variability of total mercury concentrations in sediments of the Lavaca-Matagorda Bays estuarine system. Specifically, the report presents descriptive and statistical information about the distribution and variability of total mercury concentrations in five sediment environments (open water, ship channel, dredged spoil, oyster reef, and salt marsh). Emphasis is on the open-water environment because it accounts for about 85 percent of the study area. Descriptive and statistical information about the relations between total mercury concentration and grain size and total organic carbon concentration also is presented. The report also explores the applicability of a technique known as kriging to estimate total mercury concentrations at unmeasured sites on the basis of sampling sites where mercury concentrations are measured. Finally, the report presents an evaluation of the field and analytical methods used in the study.

Description and Hydrologic Setting

The Lavaca-Matagorda Bays estuarine system consists primarily of Lavaca, Matagorda, and Carancahua Bays (fig. 1). Smaller bays and estuaries are located within the estuarine system, but the focus primarily is on Lavaca Bay and the northwest part of Matagorda Bay. Major sources of freshwater inflows into the Lavaca-Matagorda Bay estuarine system are the Lavaca River, Garcitas Creek, and Placedo Creek (pl. 1). Lavaca, Matagorda, and Carancahua Bays are approximately 20, 25, and 18 kilometers (km) long and 5, 20, and 6 km wide, respectively. Also, typical water depths are 1 to 2, 3 to 4, and 1 to 2 meters (m), respectively. [Carancahua Bay was included in the study area to provide a reference area typical of the Lavaca-Matagorda Bays estuarine system (Lloyd and Associates, Inc., 1992, p. 1–6).]

The study area is in a moist subhumid climate about 40 km southeast of Victoria, Tex. (fig. 1). The mean annual temperature for Victoria is 21.2 degrees Celsius, and the annual precipitation averages 94 centimeters (cm) (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1991a). Prevailing winds usually are onshore from the southeast (McGowen and others, 1979, p. 6) and drive water circulation in the estuarine system.

In 1965, the 32-km-long by 13-m-deep Matagorda Ship Channel was completed on the eastern side of Lavaca Bay and now extends from the Gulf of Mexico to Point Comfort (fig. 1). The channel provides direct access from the Gulf of Mexico to the alumina plant [Aluminum Co. of America (ALCOA)] at Point Comfort. The channel also serves as a conduit for movement of denser, more saline water from the Gulf of Mexico during diurnal high tides (Holmes, 1977, p. 249).

The principal process for the redistribution of mercury within the estuarine system is the tidal currents in the navigation channels transporting mercury-enriched bottom sediments (Holmes, 1977, p. 243). Mean diurnal tidal ranges vary from 43 cm at Pass Cavallo (pl. 1) to 15 and 21.5 cm in Lavaca and Matagorda Bays, respectively (Wilkinson and Byrne, 1977). This tidal-dominated system has sufficient tidal velocities to resuspend fine-grained sediments resting on the channel bottom (Holmes, 1977, p. 246). Surface salinities range from 8 parts per thousand at the head of Lavaca Bay to 16 parts per thousand at the mouth (Shanker and Masch, 1970, p. 3). The denser, more saline water travels inland through the Matagorda Ship Channel to the turning basin at Point Comfort and then wells up, flowing over a sill at the north outlet of the channel. In 1971, the Texas Water Quality Board

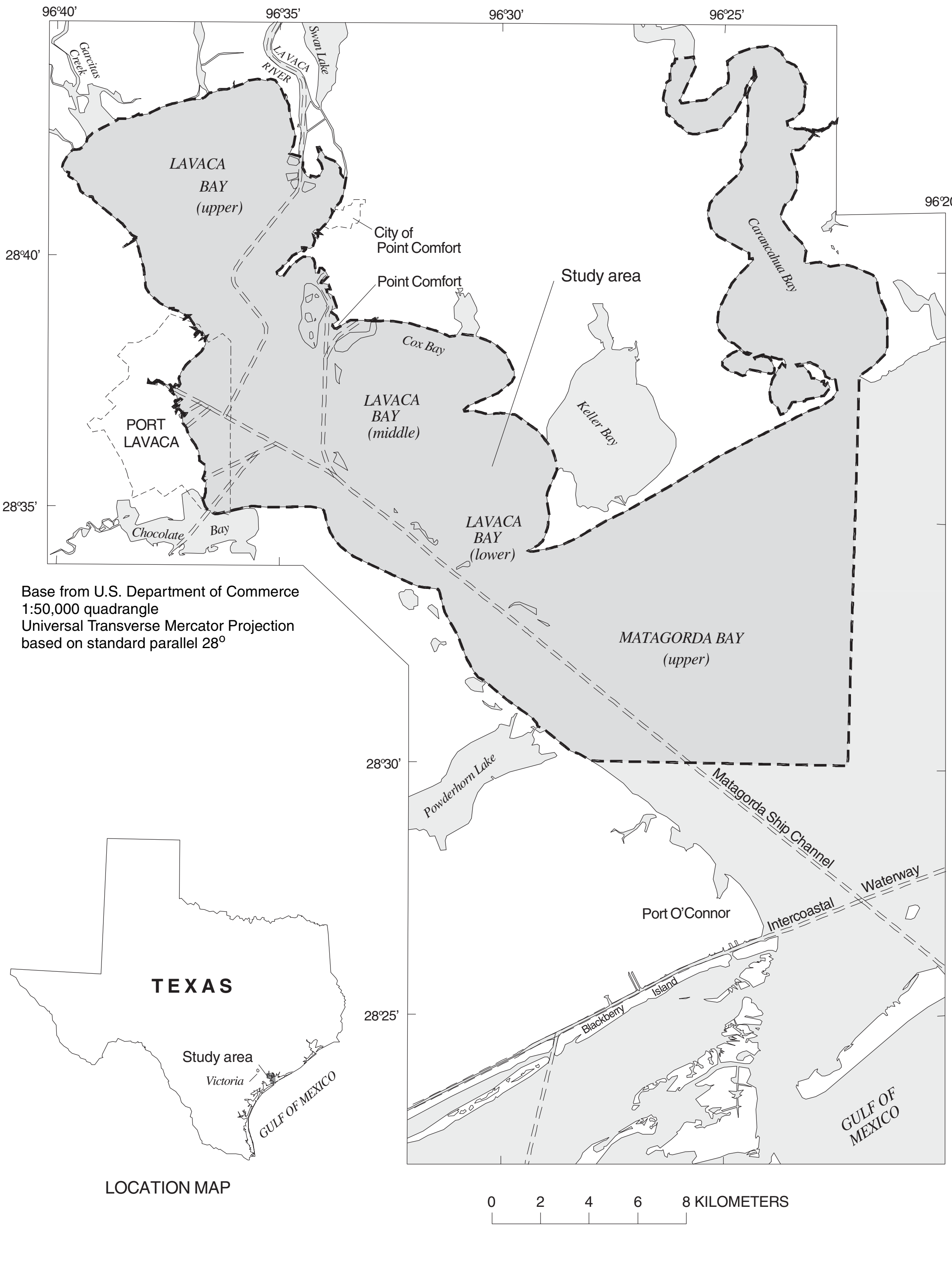

Figure 1. Location of study area.

measured mercury concentrations ranging from 7,000 to 22,000 µg/kg in sediments on the floor of the turning basin (Holmes, 1977, p. 245).

Lavaca and Matagorda Bays are typical of bays on the western part of the Texas Gulf Coast, with the central parts consisting of muds and fine silts surrounded by a rim of sandy sediment (McGowen and others, 1979, p. 4). Lavaca and Matagorda Bays are drowned valley complexes separated from the Gulf of Mexico by a post-glacial barrier spit and island. Wilkinson and Byrne (1977, p. 527) describe Lavaca and Matagorda Bays as underlain by Pleistocene deltaic and strand-plain sediments that were dissected by rivers during the late Wisconsin sea-level lowstand. Bays along the Texas Gulf Coast are the surficial expression of drowned fluvial-deltaic valleys partly filled with sands, muddy sands, bay-estuarine muds, and sandy muds.

Previous Investigations

Previous investigations addressing the geologic history, geochemistry, hydrology, sediments, and bathymetry have been made in the Lavaca-Matagorda Bays estuarine system. Recently, most of the investigations concentrated on the geochemistry in the area, particularly heavy metals in the estuarine sediments. Holmes (1977) developed a model for heavy metal migration in dredged navigation channels in the Lavaca-Matagorda Bays estuarine system. The Holocene depositional history of Matagorda Bay was investigated by Wilkinson and Byrne (1977). A comprehensive study of the geochemistry of bottom sediments in the Matagorda Bay was made by McGowen and others (1979). Holmes (1986) analyzed various seasonal and climatic controls on the variability of heavy metals in Texas marine sediments. Reigel (1990) investigated mercury uptake from Lavaca Bay sediments by indigenous marine life.

Acknowledgments

The authors thank Robert Trebatoski, Stage 1 Investigation Program Manager, for his continuous support with organization and field operations. The U.S. Fish and Wildlife Service rendered valuable field and office support during the selection of salt-marsh sample areas. The authors thank Lloyd and Associates, Inc., for their guidance toward successful completion of the sediment investigation. Willis Jackson, City of Port Lavaca, provided office space, equipment, and invaluable knowledge of the study area and local commerce. The authors also thank Michael R. Karlinger and Wilbur D. Grundy, U.S. Geological Survey, for providing invaluable assistance in developing mercury-concentration variograms.

Sampling

The Technical Management Team and ALCOA designed the study, including the sampling program, for the Lavaca-Matagorda Bays estuarine system, and Lloyd and Associates, Inc. (1992) described the study in detail. The Technical Management Team selected an independent contractor as the quality assurance/quality control (QA/QC) officer for the study. [All of the QA/QC objectives and goals were met or exceeded, with the exception of the precision associated with the grain-size analysis, which could be associated with the inherent sediment properties (Lloyd and Associates, Inc., written commun., 1992).]

Selection of Sample Areas

Five sediment environments were selected for sampling in the Lavaca-Matagorda Bays estuarine system: open water, ship channel, dredged spoil, oyster reef, and salt marsh. Emphasis was placed on the open-water environment because it comprises approximately 85 percent of the study area. Sample-depth zones were chosen on the basis of known habitat depths of selected marine organisms. The sediment environments were located on a base map (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1991b) and verified in the field.

The open-water sediment environment is smooth, with shallow areas (2- to 4-m depth at mean low tide) in the open-water embayments, and does not lie within any of the other sampling strata (ship channel, dredged spoil, oyster reef, or salt marsh). Direct historical disturbance has been limited mostly to trawling operations. Eight open-water sediment-sample areas were selected: 2 in upper Lavaca Bay; 4 in middle Lavaca Bay; and 2 in Matagorda Bay (pls. 2–4). A center-point data-collection site was selected randomly for each of the eight open-water sample areas. From each center point, 12 satellite data-collection sites were randomly selected within a circular area of 1 square kilometer (km^2) at bearings from 0 to 359 degrees and distances from 10 to 564 m. Two additional data-collection sites were located within 5 m of the center point at approximately 180 degrees from each other. In summary, 8 open-water areas were sampled at 15 data-collection sites each, for a total of 120 data-collection sites.

All ship-channel sediment environments were divided into 200-m segments in Lavaca and Matagorda Bays. A total of four 200-m-long ship-channel sample areas were selected: 3 in middle Lavaca Bay and 1 in lower Lavaca/upper Matagorda Bays (pls. 3, 4). Five data-collection sites were established in each sample area—1 at the center point; 2 on opposite sides of the center point, each 5 m from the center; and 2 more on opposite sides of the center point, each 100 m from the center. In summary, 4 ship-channel areas were sampled at 5 data-collection sites each, for a total of 20 data-collection sites.

A total of 4 dredged-spoil sample areas, 2 in middle Lavaca Bay and 2 in lower Lavaca/upper Matagorda Bays (pls. 3, 4), were selected randomly from among spoil islands that are major subaerial geographic features within the study area. Submerged dredged spoils were excluded from the selection process because of the inability to distinguish in the field between submerged dredged spoils and open-water sediments, the uncertainty regarding the areal extent of an individual submerged dredged spoil, and the time required for field verification. Each sample area consists of three data-collection sites approximately equidistant from each other and parallel to the major axis of the spoil island. Sediment samples were collected on the flanks (in water depths ranging from 0.3 to 0.6 m) of the islands between the mean low and mean high tide zone. In summary, 4 dredged-spoil areas were sampled at 3 data-collection sites each, for a total of 12 data-collection sites. Descriptions of measured sections of dredged-spoil sediment cores from the two bays are presented in table 1 (at end of report).

Oyster-reef sample areas were difficult to locate because of turbid water conditions and insufficient information on the base map. Additional maps (McGowen and others, 1974; Fish Finder Gulf Coast Maps, 1992; Pasadena Hot Spot, Inc., 1992) were used to identify 11 oyster reefs in Lavaca and Matagorda Bays. From the 11 areas identified, 4 oyster-reef sample areas were selected randomly and field verified: 2 in upper Lavaca Bay, 1 in middle Lavaca Bay, and 1 in lower Lavaca/upper Matagorda Bays (pls. 2–4). Five data-collection sites were selected, roughly centered equidistant along the major axes of the oyster reefs. In summary, 4 oyster-reef areas were sampled at 5 data-collection sites each, for a total of 20 data-collection sites.

A field reconnaissance of the shorelines was made to delineate the presence and relative dominance of salt marsh (*Spartina* sp.) within the study area. On the basis of the field reconnaissance, 11 potential salt-marsh sample areas were identified. During the random selection process, the 11 sample areas were given equal weight regardless of individual size. The boundaries of a sample area were determined by its depositional environment, fetch, density of *Spartina* sp., and spatial breaks in marsh stands. A tiered, random selection procedure was used in selecting four sample areas. The 4 sample areas, 3 in upper Lavaca Bay and 1 in middle Lavaca Bay (pls. 2, 3), were individually subdivided into a grid of 100-m segments with one center point per area. The center point was selected from an area that exhibited a *Spartina* sp. stand with at least 50-percent crown cover (visually estimated) over a 1-square meter (m^2) area and was located between the mean low and mean high tidal zone. Each sample area consisted of 5 data-collection sites (1 center point and paired sites at approximately 5 and 50 m parallel to the shoreline). In summary, 4 salt-marsh areas were sampled at 5 data-collection sites each, for a total of 20 data-collection sites.

Three sediment environments (open water, oyster reef, and salt marsh) were selected for sampling in Carancahua Bay (pl. 5) using the same approach as in the Lavaca-Matagorda Bays estuarine system. The sediment reference data randomly collected in Carancahua Bay consisted of 5 center-point open-water sites, 5 oyster-reef sites, and 5 salt-marsh sites, for a total of 15 data-collection sites.

Table 2 (at end of report) presents selected field observations of all data-collection sites in the three bays.

Sampling Methods

Sampling-equipment protocols were followed using the Stage 1 Quality-Assurance Plan (Lloyd and Associates, Inc., 1992), unless field conditions prevented their use.

Equipment decontamination procedures were designed to eliminate the introduction of contaminants that might arise from contaminated equipment and work surfaces by sampling team personnel. Water samples (rinsate samples) were collected and analyzed to demonstrate that equipment decontamination procedures yield rinsates free from contamination.

At each open-water and ship-channel data-collection site, a Shipek grab sampler was used to manually collect an undisturbed sample from the 0- to 2-cm sample-depth zone of the estuarine sediment. Estuarine sediments from the 10- to 20- and 20- to 50-cm sample-depth zones were collected manually using a 3-inch Benthos Model 2171 gravity corer with a cellulose acetate butyrate (CAB) plastic liner.

At each dredged-spoil data-collection site, a gasoline-powered cement vibrator, along with a 10.2-cm (inside diameter) aluminum irrigation pipe, a core tube extracting and stabilizing handle, a heavy duty truck jack, a pipe cutter, a polyvinyl chloride (PVC) extraction tray, and a core extractor were needed to collect sediment samples. The irrigation pipe was marked and cut at sampling intervals of 0 to 10, 10 to 20, 20 to 50, 50 to 100, 100 to 200, 200 to 300, 300 to 400, and 400 to 500 cm.

The oyster reefs sampled ranged in depth from 0.6 to 1.2 m below the water surface. Attempts to use the grab sampler to collect oyster-reef samples were unsuccessful because large oyster shells prevented closure of the sampler bucket. An alternate sampling method using an ordinary post-hole digger proved to be successful in collecting representative surface-sediment samples.

Salt-marsh sediment samples were collected manually using a CAB plastic liner, which was pressed into the sediment using a wooden shock-block and a sledge hammer. The CAB plastic liner was capped (to create a vacuum), pulled out of the sediment, and then marked and cut at sampling intervals of 0 to 10, 10 to 20, and 20 to 50 cm. Collection of undisturbed samples by hand augering was unsuccessful.

Field verification of the five sediment environments was important in collecting a consistent data set. Potential randomly selected sample areas were examined by two independent crews using protocols specified by the QA/QC officer. Most of the sediment data collected met project protocols, with the possible exception of one open-water sample area (1–01) that could have been compromised because it might be located on submerged dredged spoils composed of a melange of sands and clasts as shown on the field base map (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1991b).

The geographic location of each data-collection site (table 3 at end of report) was determined using a global positioning system (GPS). Quality-assurance protocols for geographic-location data consisted of surveying known benchmarks at the beginning and at the end of each surveying session and collecting duplicate measurements of selected data-collection sites. If any quality-assurance data were in error greater than 0.5 m, then the geographic location data were re-surveyed for that session. Data-collection sites were identified by flagged marker poles (5.5-m cane poles) and labeled with a sample identification number (Lloyd and Associates, Inc., 1992). Geographic locations were reported to the nearest meter (±2 m). The 2-m uncertainty resulted from physical limitations encountered by the sampling crew during sediment data collection. Geographic locations were correct for all data, although some sample numbers encoded a different location compared to the reported GPS location. The differences between the encoded and actual locations resulted from limitations with the field GPS navigation software program.

All sediment samples except salt marsh were collected using two customized 6.4-m aluminum tri-hull boats (twin outboard drives). A 4.9-m Boston Whaler was used in the salt-marsh sediment environment because marsh access was restricted to shallow (less than 0.2 m) draft boats.

Sample-Numbering System

Lloyd and Associates, Inc. (1992) developed a sample-numbering system to help identify the sediment samples. Each sediment sample was assigned a unique 11-digit number, which provided for effective data identification from a data base. The sediment-sample numbering was based on the following criteria:

Sample number: a–bb–ccc–ddd–e–f,

where

a = type of sediment environment (1–5):
- 1 = open water
- 2 = ship channel
- 3 = dredged spoil
- 4 = oyster reef
- 5 = salt marsh

bb = two-digit sequential number for sample area (example: 02 = second area sampled within a sediment environment)

ccc = distance from center point, in meters (example: 125 = sample taken 125 m from the center point)

ddd = azimuthal angle from the center point, in degrees (example: 090 = sample taken directly east of center point)

e = sample-depth zone, in centimeters, using the following codes:
1 = 0 to 2 (open water and ship channel)
1 = 0 to 10 (dredged spoil, oyster reef, and salt marsh)
2 = 10 to 20 (all except oyster reef)
3 = 20 to 50 (all except oyster reef)
4 = 50 to 100 (dredged spoil)
5 = 100 to 200 (dredged spoil)
6 = 200 to 300 (dredged spoil)
7 = 300 to 400 (dredged spoil)
8 = 400 to 500 (dredged spoil)

f = sample type:
1 = routine sediment sample
2 = second colocated sample at the center point
3 = third colocated sample at the center point
4 = archival sample
5 = quality-assurance sample or other sample described in field notebooks (example: field blank, rinsate, field duplicate).

Therefore, 5–03–050–230–3–1 encodes the following data about a sample:

5 = salt marsh
03 = third salt-marsh sample area
050 = 50 m from the center-point site
230 = an azimuthal angle of 230 degrees from center point
3 = depth of 20 to 50 cm
1 = routine sediment sample.

MERCURY CONCENTRATIONS IN ESTUARINE SEDIMENTS

Holmes (1977, p. 249) supports the contention that small mercury concentrations dissolved in water results from most of the mercury being immediately sorbed onto suspended matter. In Lavaca Bay, the suspended matter is incorporated in the zone of maximum turbidity. As the suspended material within the zone migrates up and down the bay, mercury-rich sediment is deposited, which accounts for the mercury-rich sediment within Lavaca Bay. The slightly smaller mercury concentrations in sediments in the upper reaches of Lavaca Bay and in southern Matagorda Bay reflect deposition during extremes in the climatic conditions: Drought conditions cause the zone of sediment entrapment to move into the upper reaches of Lavaca Bay, and flood conditions push this zone into Matagorda Bay. The deposition toward northern sections of Matagorda Bay results from the prevailing southeasterly winds. Once trapped within the sediment regime of the estuarine system, the mercury-rich suspended material is deposited by the forces acting within the system.

Distribution and Variability in Sediment Environments

The sediment samples collected were analyzed for total mercury concentration, grain-size distribution, and total organic carbon concentration (table 4 at end of report). [The water samples listed in table 4 (rinsate equipment blanks) were used solely for quality-assurance purposes.]

Total mercury concentrations for all sediment environments in all sample areas and all sample-depth zones are largest in sample areas 1–01, 1–02, 2–01, 2–02, 2–03, 3–01, and 5–04 (table 4). The largest total mercury concentrations are in the 10- to 20-cm sample-depth zone in open-water sample area 1–02 and salt-marsh sample area 5–04, where concentrations range from 137 to 1,270 µg/kg and 73.8 to 1,900 µg/kg, respectively. Boxplots (fig. 2) show total mercury concentrations aggregated by sediment environment in the surface sample-depth zone for the study area. The surface sample-depth zones for the five sediment environments are 0 to 2 cm (open water and ship channel) and 0 to 10 cm (dredged spoil, oyster reef, and salt marsh). In the surface sample-depth zones, the median total mercury concentration in the open-water environment is largest, and the median total mercury concentrations in the dredged-spoil and salt-marsh environments are smallest.

Samples collected in open-water, oyster-reef, and salt-marsh areas of Carancahua Bay were used as reference data for the investigation. Of 35 samples (excluding quality-assurance samples) collected in Carancahua Bay, 28 have total mercury concentrations less than laboratory detection limits.

Open-Water Sediments

Open-water sample areas 1–01, 1–02, and 1–06 have median total mercury concentrations in all three sample-depth zones (0 to 2 cm, 10 to 20, and 20 to 50 cm) greater than detection limits (fig. 3; table 5 at end of report). The relatively large mercury concentrations in the respective sample-depth zones in the three areas (except for the 0- to 2-cm zone in 1–06) are consistent with the findings of previous studies in these same geographically distinct areas (Holmes, 1977, p. 247;

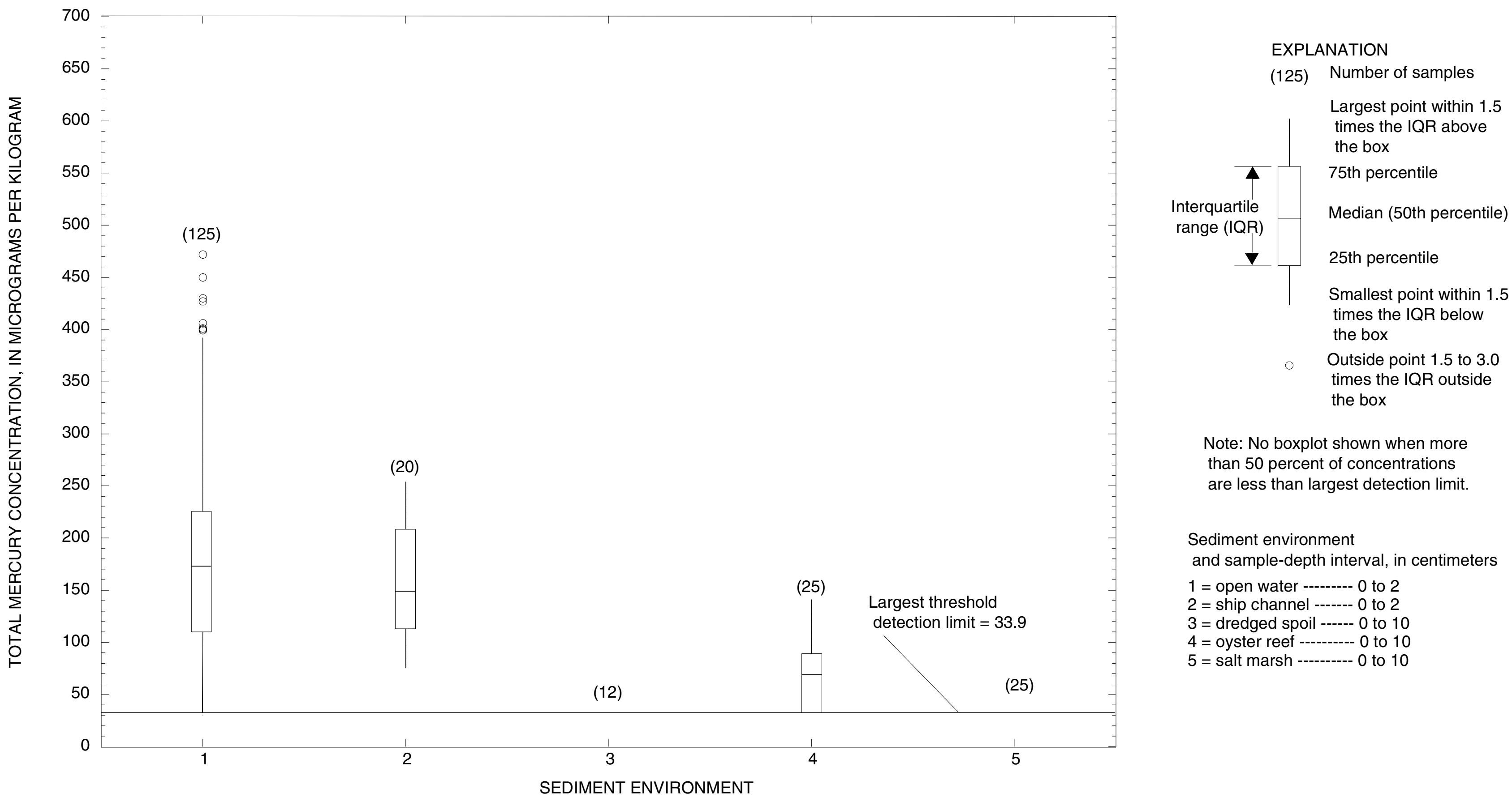

Figure 2. Range and distribution of total mercury concentrations by sediment environment in the surface sample-depth zones, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992.

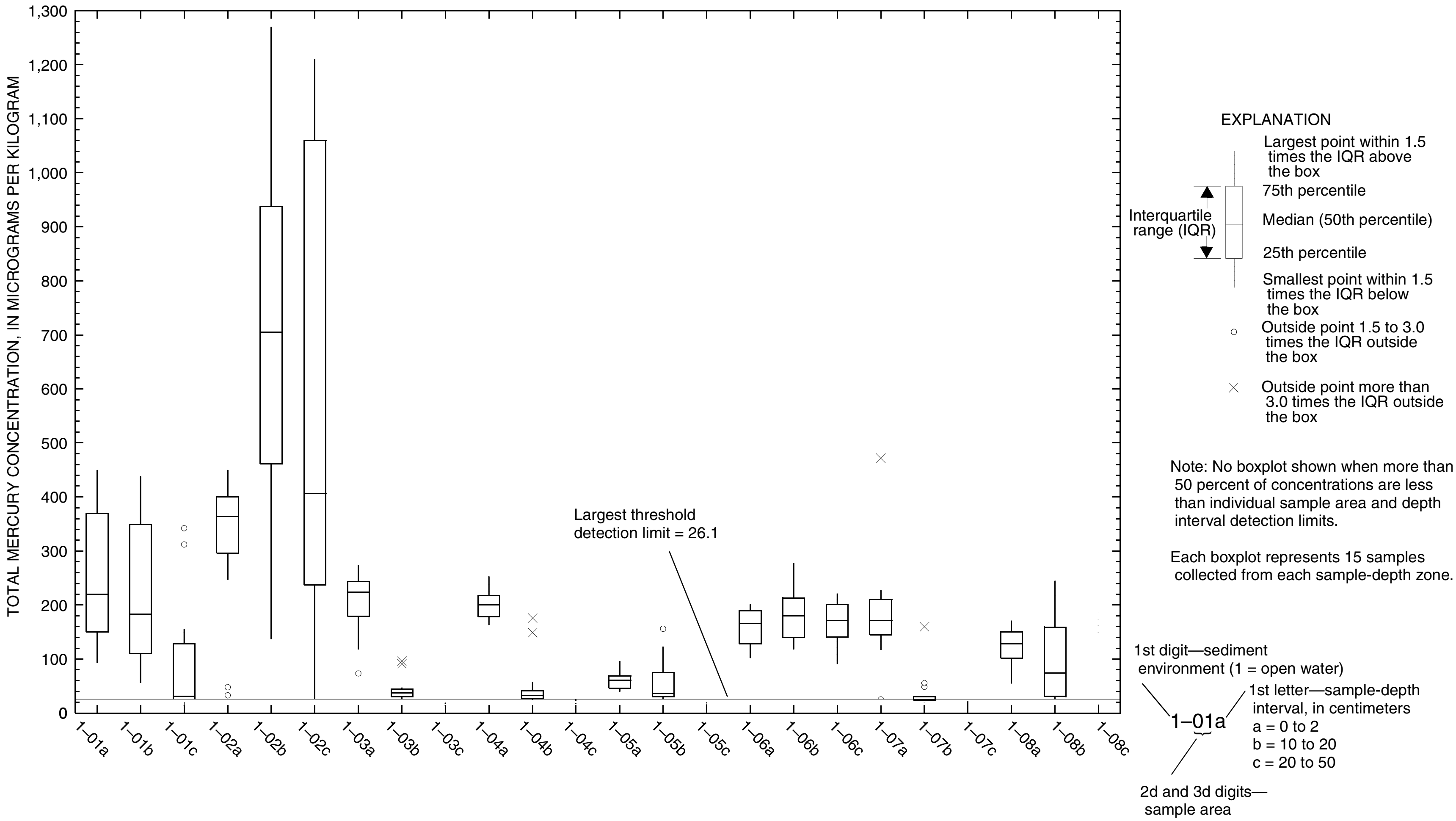

Figure 3. Range and distribution of total mercury concentrations in the open-water sediment environment, by sample area and sample-depth zone, Lavaca and Matagorda Bays, Texas, 1992.

McGowen and others, 1979, p. 36). In sample-depth zone 0 to 2 cm of all eight open-water sample areas, sample area 1–02 has the largest median mercury concentration (364 µg/kg), and 1–05 has the smallest median concentration (61 µg/kg). In sample-depth zone 10 to 20 cm, open-water sample area 1–02 has the largest median mercury concentration (705 µg/kg), and 1–07 has the smallest median concentration (20.3 µg/kg). In sample-depth zone 20 to 50 cm, open-water sample area 1–02 has the largest median mercury concentration (406 µg/kg), and 1–07 has no data greater than the detection limits.

On the basis of the limited open-water data collected in Carancahua Bay (one sample in each of five areas), total mercury concentrations appear to be substantially smaller in the reference area than in Lavaca and Matagorda Bays, although the largest total mercury concentration in the reference area (38.5 µg/kg) is from an open-water site.

The Kruskal-Wallis nonparametric rank test (Helsel and Hirsch, 1992) was used to determine whether total mercury concentrations in at least 1 of the 8 open-water sample areas (at least 1 of 8 sample groups) in Lavaca and Matagorda Bays are significantly different from concentrations in the other 7 areas (7 other sample groups) at the $\alpha = 0.05$ significance level. (Nonparametric tests do not require the data to be normally distributed.) Specifically, the test indicates whether all groups have the same median or at least one group has a significantly different median. The Kruskal-Wallis test was done separately on sediment sample-depth zones 0 to 2, 10 to 20, and 20 to 50 cm. Results of the Kruskal-Wallis tests indicate that at least one of the sample groups is significantly different for each of the three sample-depth zones. Fisher's Least Significant Difference (LSD) (Helsel, 1989) then was used to indicate which sample groups in each sample-depth zone are different at the $\alpha = 0.05$ significance level. For sample-depth zone 0 to 2 cm, Fisher's LSD test indicates that median total mercury concentrations in sample areas 1–05, 1–06, 1–07, and 1–08 are significantly different from median total mercury concentrations in sample areas 1–01, 1–02, 1–03, and 1–04; boxplots (fig. 3) show medians from areas 1–05 to 1–08 to be less than medians from areas 1–01 to 1–04. Fisher's LSD test for sample-depth zone 10 to 20 cm indicates that median total mercury concentrations in sample areas 1–03, 1–04, 1–05, 1–07, and 1–08 are significantly different from median total mercury concentrations in sample areas 1–01, 1–02, and 1–06; boxplots (fig. 3) show them to be less. Fisher's LSD test for sample-depth zone 20 to 50 cm indicates that median total mercury concentrations in sample areas 1–03, 1–04, 1–05, 1–07, and 1–08 are significantly different from median total mercury concentrations in sample areas 1–01, 1–02, and 1–06.

Another statistical test, the F-test (Ott, 1993), was done to determine whether the variance of total mercury concentrations at colocated open-water sampling sites (center-point site and two sites within 5 m of the center-point site) for sample-depth zone 0 to 2 cm is the same as the variance of total mercury concentrations at randomly selected open-water sites (sites within a 1-km^2 circular area around the center-point site) for sample-depth zone 0 to 2 cm. Data from the eight open-water sample areas were aggregated into the two groups: (1) colocated sites (8 areas times 3 sites per area equals 24 samples); and (2) randomly selected sites (8 areas times 12 sites per area equals 96 samples). The F-test is a parametric test, which requires the data to be normally distributed. The set of 24 colocated samples were tested for normality using the Shapiro-Wilk test (Gilbert, 1987); the test indicates that the data can be considered normally distributed (p-value = 0.36). The set of 96 samples was assumed to be normally distributed because of the relatively large number of samples in each group—as sample size increases, the data become more normally distributed, per the Central Limit Theorem (Iman and Conover, 1983). The F-test strongly indicates that the variance between colocated sample concentrations and the variance between randomly selected sample concentrations are the same (p-value = 0.93); that is, the variance in concentrations of samples collected within 10 m of each other is the same as the variance in concentrations of samples collected randomly within each 1 km^2. A caution regarding the test result, however: The test requires the data to be independent. As will be discussed later in the report, the data from colocated sites probably are not independent. The degree to which the probable violation of the independence requirement affects the test result is not known.

Ship-Channel, Dredged-Spoil, Oyster-Reef, and Salt-Marsh Sediments

Of the four ship-channel sample areas, 2–01 has the largest total mercury concentration (392 µg/kg in depth zone 20 to 50 cm), and 2–04 has the smallest concentration (75.3 µg/kg in depth zone 0 to 2 cm). With all four sample areas combined, the median concentrations for sample-depth zones 0 to 2, 10 to 20, and 20 to 50 cm are 149, 137, and 169.5 µg/kg, respectively. Total mercury concentrations generally decrease along the ship channel from sample areas 2–01 to 2–04 (fig. 4) as distance from Point Comfort (pl. 1) increases.

Dredged-spoil sample area 3–01 has the largest total mercury concentration (228 µg/kg in sample-depth zone 10 to 20 cm) of all four dredged-spoil sample areas (table 4). The minimum total mercury concentration is smaller than detection limits. With one exception, mercury concentrations were not detected below sample-depth zone 50 to 100 cm.

Of the four oyster-reef sample areas (excluding Carancahua Bay), sample area 4–02 has the largest total mercury concentration (141 µg/kg in depth zone 0 to 2 cm). Sample area 4–04 has the minimum mercury concentration (25.1 µg/kg in depth zone 0 to 2 cm) (table 4). Sample areas 4–03 and 4–04 typically have smaller concentrations than 4–01 and 4–02, which might be attributable to freshwater inflows from streams (pl. 1) flushing the estuarine system. Another possible explanation for the smaller total mercury concentrations could be the distance of sample areas 4–03 and 4–04 from previously identified areas of large mercury concentrations (Holmes, 1977, p. 247; McGowen and others, 1979, p. 36). All total mercury concentrations in the Carancahua Bay oyster-reef reference-area samples (sample area 4–05) are smaller than detection limits.

Salt-marsh sample area 5–04 has anomalously large total mercury concentrations (about 1,100 to 1,900 µg/kg in depth zone 10 to 20 cm) when compared with the other four salt-marsh sample areas. The largest measured total mercury concentration (1,900 µg/kg) in the entire study area is in sample area 5–04 in the 10- to 20-cm sample-depth zone. The remaining four sample areas (5–01, 5–02, 5–03, and 5–05) have concentrations less than 47 µg/kg for all three sample-depth zones (table 4). Fifteen of 16 salt-marsh reference samples in Carancahua Bay (sample area 5–05) have total mercury concentrations smaller than detection limits.

Relations Between Total Mercury Concentration and Grain Size and Total Organic Carbon Concentration

The occurrence and distribution of total mercury concentrations commonly are correlated with the occurrence and distribution of silt, clay, and total organic carbon. One of the most important factors controlling bed-sediment trace-metal concentrating capacity is grain size—as grain size decreases, metal concentrations increase (Horowitz and Elrick, 1988, p. 114). Because of the high positive charge of the trace-metal cations (greater than 2+) and the high density of negative charges of silt- and clay-size particles, the affinity between trace-metal cations and silt- and clay-size particles is relatively strong (Forstner and Wittmann, 1981, p. 121–124). The sediments in Lavaca and Matagorda Bays typically have increasing quantities of silt and clay as sample depths decrease, as shown by boxplots of the percent, by weight, of samples with grain-size diameter less than 74 micrometers (µm)[1] (fig. 5) and in table 6 (at end of report). The fining-upward sequence is an important characteristic because mercury typically adsorbs onto the silt- and clay-size particles in sediments.

The capacity of organic matter to concentrate trace metals on soils and on suspended and bottom sediments of water bodies is well recognized (for example, Gibbs, 1973; Horowitz and Elrick, 1987). In a recent study of mercury phase speciation in the waters of three Texas estuaries, Stordal and others (1996, p. 60) conclude that the processes that control organic carbon concentration in an estuary also can influence mercury cycling and that the binding of mercury to organic material is significant and could have important implications with respect to the availability of mercury to biota. In the open-water sediment environment of Lavaca and Matagorda Bays, total organic carbon concentrations generally decrease as sediment depth increases (fig. 6; table 7 at end of report). With data from all eight open-water sample areas combined (excluding quality-assurance data), median total organic carbon concentrations for sample-depth zones 0 to 2, 10 to 20, and 20 to 50 cm are 8,100, 6,185, and 4,795 milligrams per kilogram (mg/kg), respectively.

To obtain information about the relations between total mercury concentration and grain size and between total mercury concentration and total organic carbon concentration, various graphs of total mercury concentration as a function of grain-size fraction (percentage of clay and percentage of silt and clay) and total organic carbon concentration were examined. For graphing, the data were aggregated by sediment environment and sample area and by sediment environment, sample area,

[1]The sand/silt particle-size break commonly is defined as 63 µm; 74 µm is used herein because that was the sieve size most similar to the sand/silt break available for grain-size analyses.

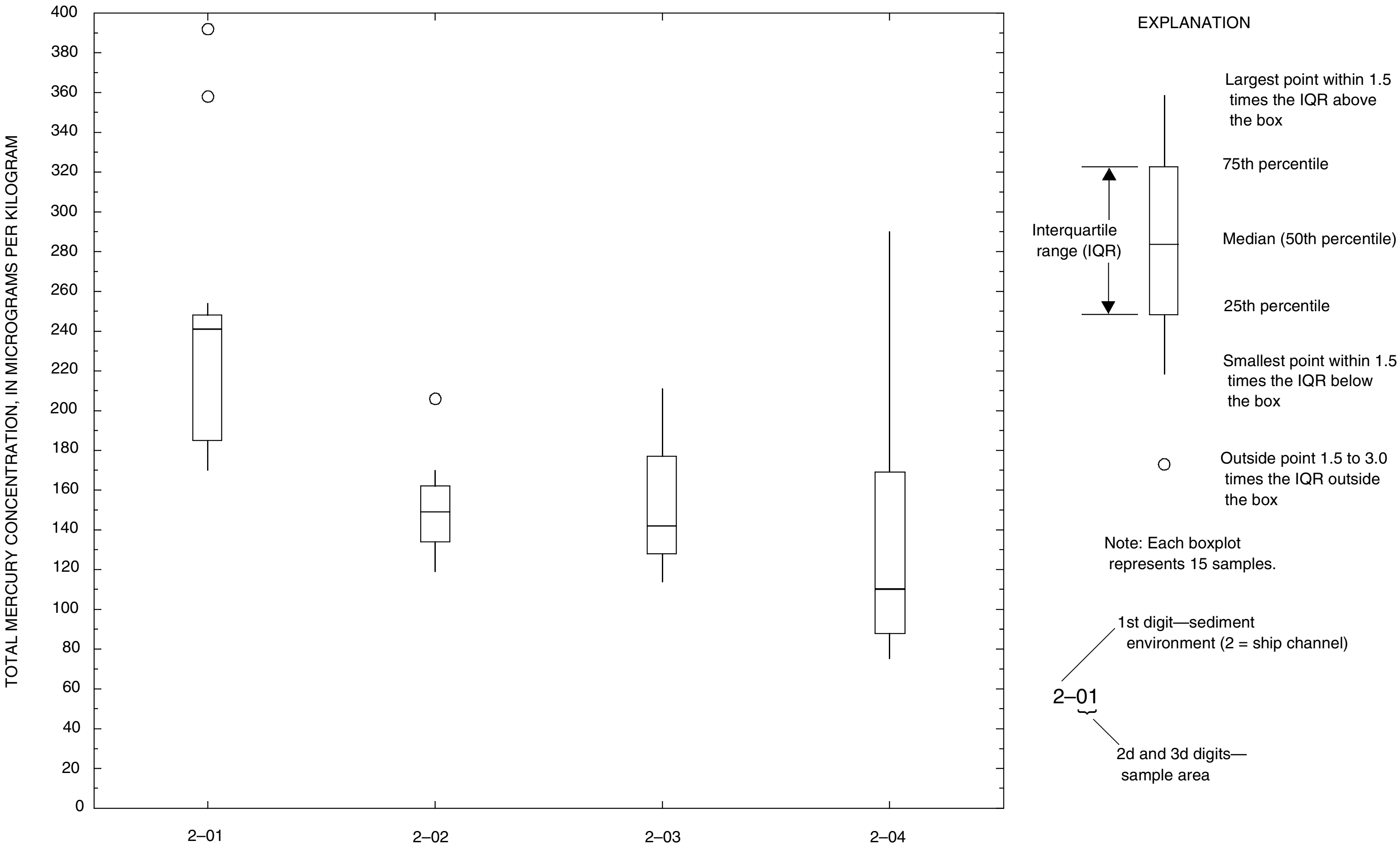

Figure 4. Range and distribution of total mercury concentrations in the ship-channel sediment environment, by sample area, combining sample-depth zones 0 to 2, 10 to 20, and 20 to 50 centimeters, Lavaca and Matagorda Bays, Texas, 1992.

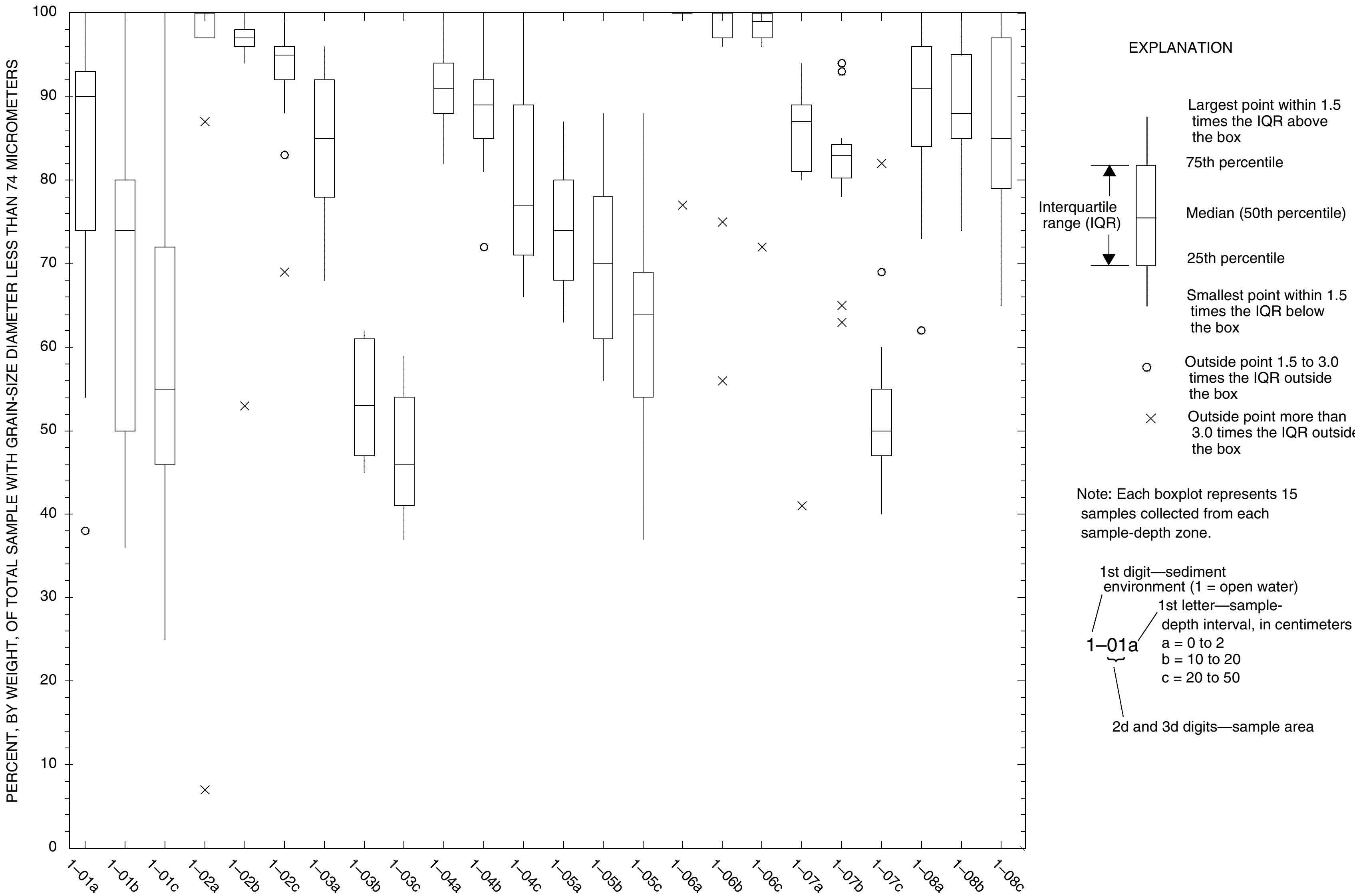

Figure 5. Range and distribution of grain size in the open-water sediment environment in percent, by weight, of total sample with grain-size diameter less than 74 micrometers, Lavaca and Matagorda Bays, Texas, 1992.

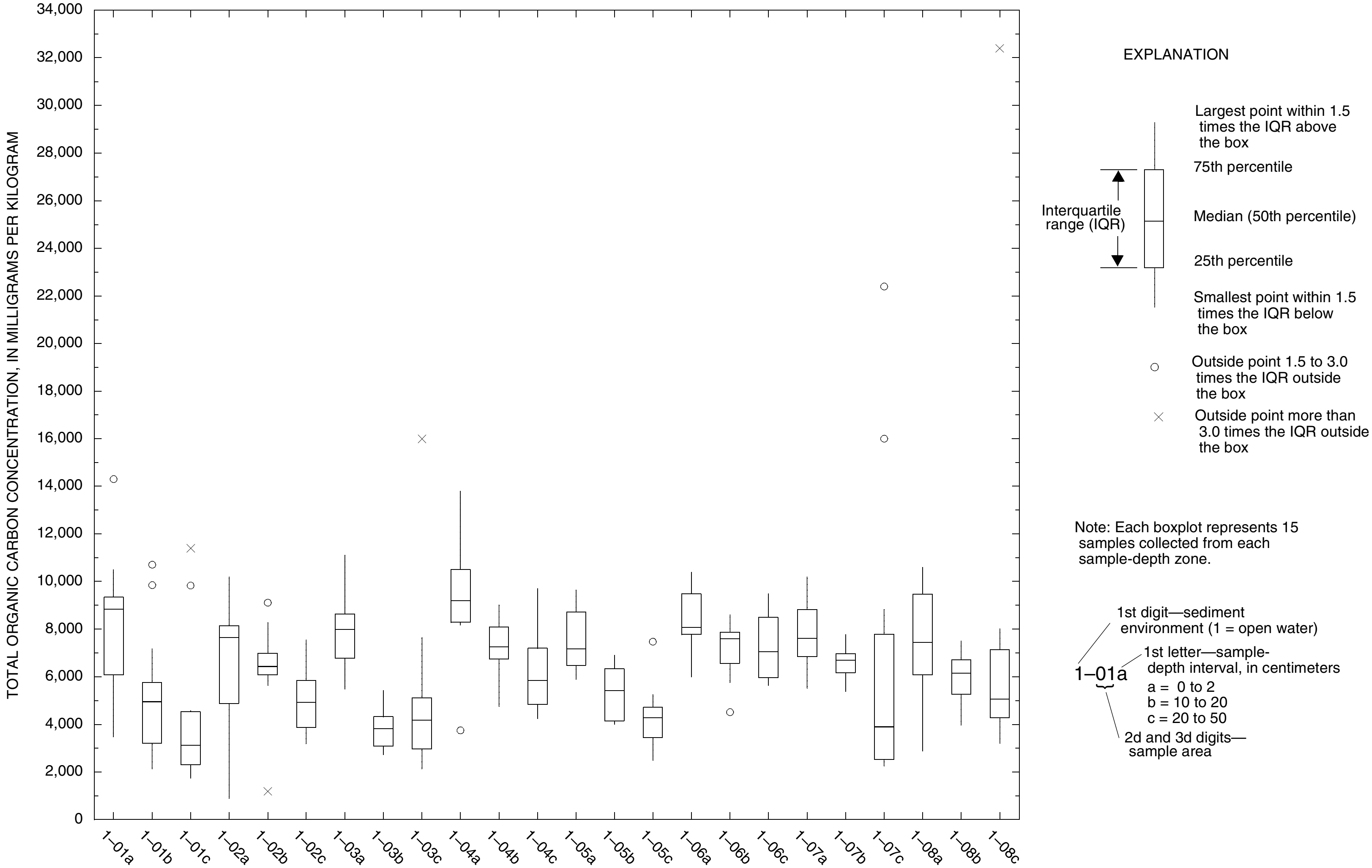

Figure 6. Range and distribution of total organic carbon concentrations in the open-water sediment environment, by sample area and sample-depth zone, Lavaca and Matagorda Bays, Texas, 1992.

and depth zone. Also, similar graphs of "transformed" total mercury concentration (total mercury concentration divided by the percentage of silt and clay) as a function of total organic carbon concentration for open-water and ship-channel environments were examined. A few linear or monotonic relations were indicated. For example, total mercury concentrations increase as the percentage of clay increases for open-water sample areas 1–01 and 1–08, 0- to 2-cm depth zone; for open-water sample area 1–01, 10- to 20-cm depth zone; and for open-water sample area 1–06, 20- to 50-cm depth zone; but no easily discernible linear or monotonic graphical relations were consistently indicated between total mercury concentration and grain size and between total mercury concentration and total organic carbon concentration.

A second method was applied to obtain information about the relations between total mercury concentration and grain size and between total mercury concentration and total organic carbon concentration. Rank correlation coefficients (Spearman's rho) (Iman and Conover, 1983) between total mercury concentration and grain-size fractions (percentages of sand, silt, clay, and silt plus clay) and between total mercury concentration and total organic carbon concentration for open-water sample areas were computed. The rank correlation coefficient is a measure of the strength of the monotonic relation between two variables—that is, a relation in which both variables increase together (positive correlation) or one variable increases as the other decreases (negative correlation). The rank correlation coefficient ranges from +1 to –1; the strength of the relation increases as the value approaches +1 or –1. A hypothesis test for the significance of the correlation can be done. For 45 samples (15 samples per depth zone times 3 depth zones per area) at the $\alpha = 0.05$ significance level, a correlation coefficient greater than 0.294 or less than –0.294 is statistically significant (Iman and Conover, 1983, p. 342). Table 8 (at end of report) shows the rank correlation coefficients between total mercury concentration and grain-size fractions and total organic carbon concentration for open-water sample areas, and whether each correlation is significant. In the majority of open-water sample areas, total mercury concentration has a significant negative correlation with sand percentage—that is, mercury concentration increases as the percentage of sand decreases. The correlation of total mercury concentration with the percentage of silt is mixed: Over one-half of the areas show no significant correlation; the other areas show significant correlation, of which 2 correlations are positive and 1 is negative. Total mercury concentration correlation with clay percentage is mixed; 4 of the 8 open-water sample areas indicate that as mercury concentration increases, the percentage of clay increases. In 6 of the 8 open-water sample areas, total mercury concentration has a significant positive correlation with silt-plus-clay percentage and total organic carbon concentration.

Applicability of Kriging to Estimate Mercury Concentrations at Unmeasured Sites

The problem of estimating or interpolating total mercury concentrations at unmeasured sites can be addressed by several methods. Most estimation and interpolation problems are handled using proportionality on a manually-constructed or computer-estimated contour map. Other methods involve least-squares approximations or smoothing techniques. These methods of estimating or interpolating values of phenomena are sometimes adequate but might not give the best or most accurate estimates (Skrivan and Karlinger, 1980, p. 2). Kriging is an interpolation technique that incorporates the autocorrelation (the mutual relation among members of a series of observations in space or time) between known data values in its estimation of values at unmeasured sites (Dunlap and Spinazola, 1984). The technique is reproducible, can accept irregularly spaced data, and yields an error of estimate at each interpolated point.

Spatial data must be autocorrelated for kriging to adequately interpolate between the data points. The first and most critical step in applying kriging is to estimate a variogram from a data set. A variogram is a graph of the variance of paired sample-value differences as a function of the distance (lag) between sample points and, if applicable, of the direction between samples (Journal and Huijbregts, 1978; Isaaks and Srivastava, 1989; Englund, 1991). As the distance between paired sample points increases, the corresponding variance of paired sample-value differences also generally increases—to a point. Eventually, an increase in the distance between paired data points no longer causes a corresponding increase in the variance, and the variogram reaches a plateau. This plateau is called the "sill," and the distance between paired data points at which the variogram reaches this plateau is called the "range." Thus, paired data points spaced farther from one another than the range indicated by the variogram probably are not autocorrelated.

A minimum of 30 pairs of sample data points within a given distance between points is suggested to estimate a variogram value, and several variogram values are needed to develop a variogram (Journal and Huijbregts, 1978, p. 194). Typically, each depth zone in an open-water sample area contains 15 data points. Fifteen data points taken 2 at a time yields 105 possible pairs; thus, if it takes 30 pairs to estimate a variogram value, then only three values can be obtained for variogram development from each depth zone in a sample area—not enough values to develop an individual variogram for each depth zone. Thus, data for a given depth zone for all open-water sample areas were combined into one data set to develop a variogram. The four other sediment environments also lacked sufficient data points in each depth zone to allow development of individual variograms for each depth zone.

A data set of 119 samples and a computer program to apply kriging (Englund, 1991) was used to develop a small-scale (less than 1 km^2) estimated variogram for mercury concentrations in open-water sediments in the 0- to 2-cm sample-depth zone. (Location data for sample 1–03–327–039 are of questionable accuracy; therefore data from that sample were omitted from the variogram development.) A series of iterative computer runs were used to achieve a direction-independent (isotropic) estimated variogram. Various parameters (for example, lags, ranges, sills) and mathematical functions were systematically and iteratively varied to "fit" the variogram to one of several theoretical variogram model shapes—for example, linear, spherical, exponential, or Gaussian. Log transformations of the data also were used during the fitting process but did not improve the fit. Obvious spatial trends in concentrations in one or more directions (drift) were not apparent, as determined from preliminary analysis of data and the behavior of the computed variograms during the fitting process. A preliminary best-fit model for sample-depth zone 0 to 2 cm is a spherical model with a range of 350 m, a lag of 80 m, and a sill of 7,600 micrograms squared per square kilogram ($\mu g^2/kg^2$).

The final best-fit model was selected through a process of cross validation (Englund, 1991), which tests the validity of a variogram by suppressing measured data points and then estimating them using the remaining points. Large differences between estimated and measured data points can indicate the presence of spatial outliers, or points that do not seem to belong with the surrounding points. Spatial outliers are identified by computing the z-score—the estimation error divided by the kriging standard deviation—for the estimated data points. On the basis of this process, data from three samples were removed from the data set (1–02–314–035–1–1, 1–02–424–266–1–1, and 1–07–133–177–1–1). The final best-fit variogram, referred to as the local variogram, is a spherical model with a range of 350 m, a lag of 75 m, and a sill of 4,500 $\mu g^2/kg^2$ (fig. 7). The variogram range of 350 m indicates spatial autocorrelation among data points separated by distances as large as about 350 m; therefore, kriging could be useful to estimate unknown total mercury concentrations in open-water sediments in the 0- to 2-cm depth zone within 350 m of measured mercury data-collection sites.

Variograms for the 10- to 20- and 20- to 50-cm sample-depth zones also were attempted; however, no spatial structure to the data was apparent, which could result from (1) the absence of spatial autocorrelation among points, (2) an insufficient number of samples, and (3) noisy or erratic data.

Considering the expanse of bay sediment areas for which estimates of mercury concentration are desired, kriging to estimate concentrations within 350 m of measured open-water sites is not a practical solution for obtaining a distribution of concentrations throughout Lavaca and Matagorda Bays. Accordingly, estimation of a large-scale (global; greater than 1 km^2) variogram that would be applicable for interpolating between sample areas was developed by increasing the lags in the computer process. A best-fit global variogram was obtained (a spherical model with a range of 8,600 m, a lag of 2,550 m, and a sill of 9,400 $\mu g^2/kg^2$); however, increasing the lags amounted to a gross averaging of the points used in the small-scale variogram. Because of the large distances between sample areas (clusters of data points) and the "unbalanced" distribution of sample data points relative to the bay areas (clusters of closely spaced points separated by large expanses with no points), a large inherent interpolation error would be associated with the use of the global variogram. Thus, kriging to estimate concentrations in the areas between clusters of sample data points (on the basis of the global variogram) also is not a practical solution for obtaining a distribution of concentrations in the bays.

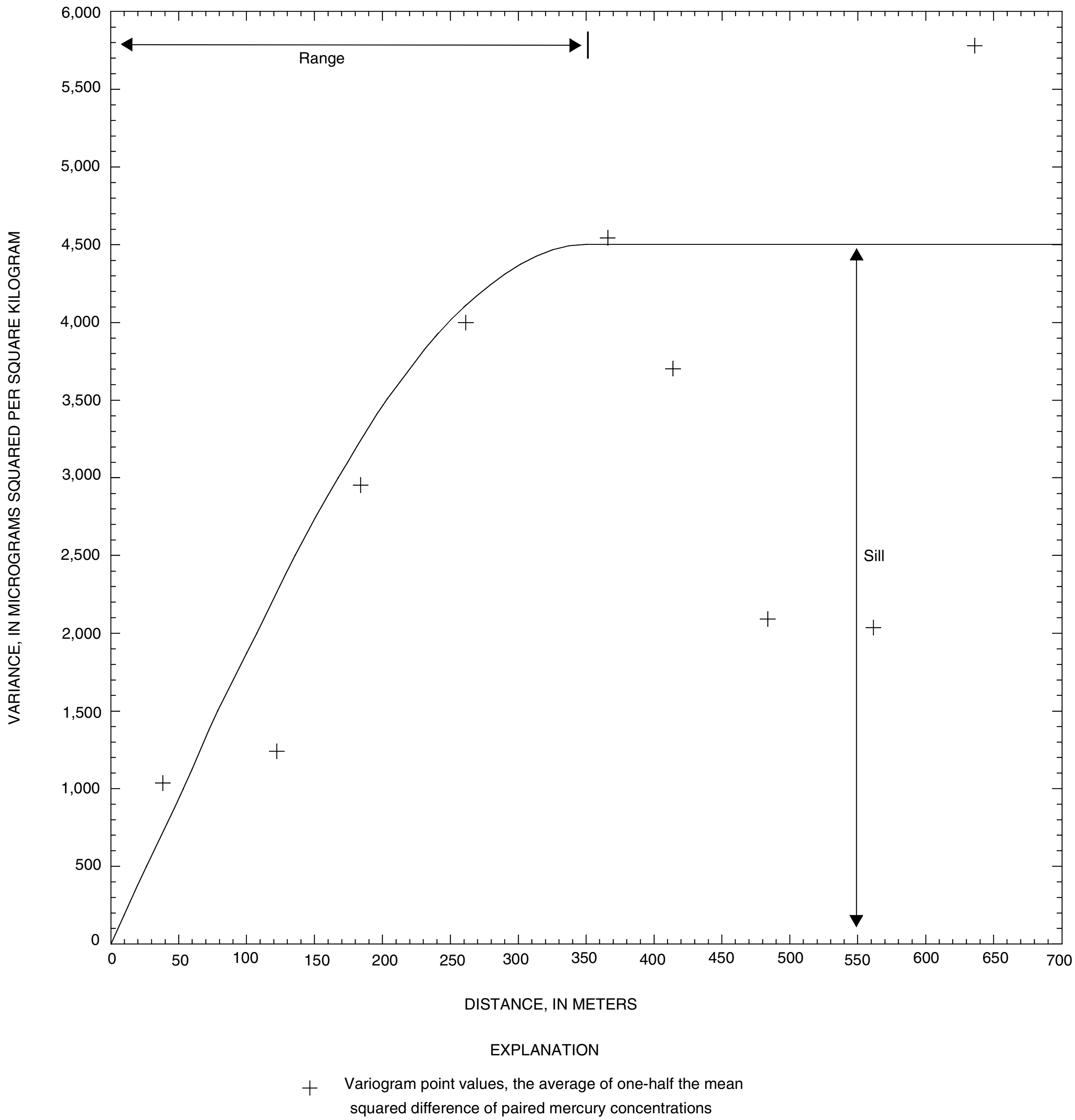

Figure 7. Isotropic total mercury concentration variogram for the 0- to 2-centimeter sample-depth zone, combining all eight open-water sample areas, Lavaca and Matagorda Bays, Texas, 1992.

Evaluation of Field and Analytical Methods

Field Methods

The data-collection sites were located using a GPS. The GPS methods used were accurate, yet cumbersome for several reasons. The methods were labor intensive (identification and placement of flagged marker poles), time consuming (required processing GPS data overnight), and susceptible to daily loss of data-collection site marker poles. In order to identify data-collection site locations, marker poles were required prior to data collection. Data-collection sites were determined to less-than-1-m accuracy, while the physical constraints associated with data collection restricted reporting locations to ±2 m. A more efficient approach to determine geographic locations would be to use a high-precision, real-time GPS. This method would provide real-time locations with an accuracy of ±3 to 5 m and remove the need for an extra surveying crew. The variability within the total mercury concentration data set collected during this study justifies the reporting of data-collection sites to ±3 to 5 m.

Weather and navigation conditions were monitored continuously by marine radio (U.S. Coast Guard bulletins) and National Weather Service data (compiled using a computer). The weather information was extremely helpful in planning daily activities. Routine maintenance of sampling equipment and boat repairs were readily available within 10 minutes of the base station. The base station (local marina) for field operations was centrally located, which kept travel time to and from data-collection sites to a minimum.

Analytical Methods and Possible Refinements

USEPA Method 7471 (Cold Vapor Atomic Absorption) (U.S. Environmental Protection Agency, 1986) was an acceptable analytical method for determining total mercury concentrations in the Lavaca-Matagorda Bays estuarine sediment samples. The analytical protocols used required that total mercury concentrations be measured on the composite sediment sample instead of a specific grain-size fraction. One of the most common causes of spatial and temporal variability in sediment trace-metal concentrations (for example, total mercury) is stratification of sediments by grain size (Horowitz and Elrick, 1987). In order to clarify relations between total mercury concentration and grain size, total mercury concentration could be measured after grain-size separation into sand and silt-plus-clay fractions. The correlations between total mercury concentration and grain size computed from the data after grain-size separation likely would be stronger than those reported in table 8.

Sediment grain surface-area measurements provide a correlation tool useful in delineating collector/concentrator relations with other measured constituents (Horowitz and Elrick, 1987). Surface area is important because sediments tend to collect, concentrate, and retain trace metals by means that fall into the general category of surface reactions or surface chemistry. Materials with large surface areas (small grain sizes) are the main sites for the transport and collection of these constituents (Krauskopf, 1956; Gibbs, 1973; Jenne, 1976; Jones and Bowser, 1978; Jenne and others, 1980; Forstner and Wittmann, 1981; Horowitz and Elrick, 1987). Adsorption is the process by which atoms, ions, or molecules adhere to the surface of solids and materials that have large surface areas. Jenne (1976) indicates that materials with large surface areas are simply mechanical substrates that concentrate inorganic constituents without any chemical interaction between the material and the constituent. Thus, deposited materials like organic matter and hydrous iron and manganese oxides, rather than the original surface, might act as a trace-metal collector (Horowitz, 1991). An additional analysis for total organic matter (loss on ignition) would be a refinement of the analysis of total organic carbon and could aid in quantifying the capacity of the sediment to act as a collector/concentrator of mercurous compounds (Horowitz and Elrick, 1987).

Measurement of additional trace metals would aid in the characterization of total mercury concentrations and identify concentrator/collector relations that principally are responsible for the adsorption of mercurous compounds to particulates in the bottom sediments. The most important trace metals, in order of their capacity to adsorb mercurous compounds, are iron, manganese, aluminum, and titanium (A.J. Horowitz, U.S. Geological Survey, oral commun., 1992). Horowitz (1991) indicates that many different sediment materials with large surface areas (such as clay minerals, iron hydroxides, manganese oxides, and organic matter) are capable of sorbing cations from solution and releasing equivalent amounts of other cations back into solution (cation exchange).

Reducing conditions in sediments of the Lavaca-Matagorda Bays estuarine system might be indicated by an abrupt color change of the sediments from buff at the sediment-water interface to darker gray at approximately the 0- to 1-cm depth zone (field observations of sediment samples). If reducing conditions do exist in the bay sediments, they might remobilize many trace metals in lower strata thereby “smearing” the geochemical record, which would seriously impair the prediction of heavy metal distribution below the redox horizon (A.J. Horowitz, U.S. Geological Survey, oral commun., 1992; Williams, 1992, p. 117). Field measurements were not taken to determine whether reducing or oxidizing conditions exist in the bay sediments. Use of an electrode to measure reducing or oxidizing conditions within the sediments would be beneficial in identifying areas where trace-metal remobilization could occur.

SUMMARY AND CONCLUSIONS

A preliminary assessment was made along the central Texas Gulf Coast of the distribution and variability of total mercury concentrations in sediments of the Lavaca-Matagorda Bays estuarine system. Data for 192 sites from selected depth zones in five specific sediment environments (open water, ship channel, dredged spoil, oyster reef, and salt marsh) in Lavaca and Matagorda Bays were collected and analyzed for total mercury concentration, grain size, and total organic carbon concentration. Eight open-water areas were sampled at 15 sites each, for a total of 120 sites. Four ship-channel areas were sampled at 5 sites each, for a total of 20 sites. Four dredged-spoil areas were sampled at 3 sites each, for a total of 12 sites. Four oyster-reef areas were sampled at 5 sites each, for a total of 20 sites. Four salt-marsh areas were sampled at 5 sites each, for a total of 20 sites. In addition to the 192 sites in Lavaca and Matagorda Bays, 5 open-water sites, 5 oyster-reef sites, and 5 salt-marsh sites were sampled in Carancahua Bay for reference.

The largest total mercury concentrations in Lavaca and Matagorda Bays are in the 10- to 20-cm sample-depth zone in open-water sample area 1–02 and salt-marsh sample area 5–04, where concentrations range from 137 to 1,270 μg/kg and 73.8 to 1,900 μg/kg, respectively. The 2 sample areas are among the 3 closest to Point Comfort.

In the surface sample-depth zones among all sediment environments (including those of Carancahua Bay), total mercury concentrations typically are largest in the open-water environment and smallest in the dredged-spoil and salt-marsh environments.

Open-water sample areas 1–01, 1–02 (middle Lavaca Bay), and 1–06 (upper Matagorda Bay) have median total mercury concentrations in all three sample-depth zones (0 to 2, 10 to 20, and 20 to 50 cm) greater than detection limits. Median concentrations for the three depth zones in the three sample areas range from 30.5 to 705 μg/kg. Relatively large mercury concentrations in the respective depth zones in the three areas (except for the 0- to 2-cm zone in 1–06) are consistent with the findings of previous studies in these same geographically distinct areas. Statistical tests indicate that in all three depth zones in open-water sediments, median total mercury concentrations in some sample areas are significantly different from median total mercury concentrations in other sample areas. Another statistical test indicates that the variance in concentrations of open-water samples collected within 10 m of each other is the same as the variance in concentrations of samples collected randomly within each 1 km^2. However, the degree to which a probable lack of independence among the closely spaced data affects the test result is not known.

Of the four ship-channel sample areas, 2–01 has the largest total mercury concentration (392 μg/kg in depth zone 20 to 50 cm). Total mercury concentrations generally decrease along the ship channel as distance from Point Comfort increases. Dredged-spoil sample area 3–01 has the largest total mercury concentration (228 μg/kg in sample-depth zone 10 to 20 cm) of all four dredged-spoil sample areas. Of the four oyster-reef sample areas, sample area 4–02 has the largest total mercury concentration (141 μg/kg in depth zone 0 to 2 cm). Salt-marsh sample area 5–04 has anomalously large total mercury concentrations (about 1,100 to 1,900 μg/kg in depth zone 10 to 20 cm) when compared with the other four salt-marsh sample areas.

Rank correlation coefficients between total mercury concentration and grain-size fractions (percentages of sand, silt, clay, and silt plus clay) and between total mercury concentration and total organic carbon concentration for open-water sample areas were computed. In the majority of open-water sample areas, total mercury concentration has a significant negative correlation with sand percentage. The correlation of total mercury concentration with the percentage of silt is mixed: Over one-half of the areas show no significant correlation; the other areas show significant correlation, of which 2 correlations are positive and 1 is negative. Total mercury concentration has a significant positive correlation with clay percentage in 4 of the 8 open-water sample areas. In 6 of the 8 open-water sample areas, total mercury concentration has a significant positive correlation with silt-plus-clay percentage and total organic carbon concentration.

The use of a technique known as kriging to estimate total mercury concentrations at unmeasured sites on the basis of sampling sites where mercury concentrations are measured in open-water sediments in the 0- to 2-cm depth zone was explored. Kriging is an interpolation technique that incorporates the autocorrelation (the mutual relation among members of a series of observations in space or time) between known data values in its estimation of values at unmeasured sites. Spatial data must be autocorrelated for kriging to adequately interpolate between the data points. Data points spaced farther from one another than the range indicated by a variogram (a graph of the variance of paired sample-value differences as a function of the distance between sample points) probably are not autocorrelated. A data set of 119 samples and a computer program to apply kriging was used to develop a small-scale (less than 1 km^2) estimated variogram for mercury concentrations in open-water sediments in the 0- to 2-cm sample-depth zone. The variogram range of 350 m indicates spatial autocorrelation among data points separated by distances as large as about 350 m; therefore, kriging could be useful to estimate unknown total mercury concentrations in open-water sediments in the 0- to 2-cm depth zone within 350 m of measured mercury data-collection sites.

Considering the expanse of bay sediment areas for which estimates of mercury concentration are desired, kriging to estimate concentrations within 350 m of measured open-water sites is not a practical solution for obtaining a distribution of concentrations throughout Lavaca and Matagorda Bays. Accordingly, estimation of a large-scale (global; greater than 1 km^2) variogram that would be applicable for interpolating between sample areas was developed. However, large inherent interpolation error would be associated with the use of the global variogram. Thus, kriging to estimate concentrations in the areas between clusters of sample data points (on the basis of the global variogram) also is not a practical solution for obtaining a distribution of concentrations in the bays.

A more efficient approach to determining geographic locations than the relatively cumbersome method used would be to use a high-precision, real-time GPS. This method would provide real-time locations with an accuracy of ±3 to 5 m and remove the need for an extra surveying crew.

USEPA Method 7471 (Cold Vapor Atomic Absorption) was an acceptable analytical method for determining total mercury concentrations in the Lavaca-Matagorda Bays estuarine sediment samples. However, total mercury concentration could be measured after grain-size separation into sand and silt-plus-clay fractions. The correlations between total mercury concentration and grain size computed from the data after grain-size separation likely would be stronger than those computed for this report.

Deposited materials like organic matter and hydrous iron and manganese oxides, rather than the original surface of sediment particles, might act as a trace-metal collector. An additional analysis for total organic matter (loss on ignition) would be a refinement of the analysis of total organic carbon and could aid in quantifying the capacity of the sediment to act as a collector/concentrator of mercurous compounds.

Measurement of additional trace metals would aid in the characterization of total mercury concentrations and identify concentrator/collector relations that principally are responsible for the adsorption of mercurous compounds to particulates in the bottom sediments.

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Table 1. Description of measured sections of dredged-spoil sediment cores, Lavaca and Matagorda Bays, Texas, 1992

[cm, centimeters; mm, millimeters]

Core number and description	Depth (cm)
3–01–000–000	
Silty clay, medium-gray, interbedded with light-brown to light-green compacted clay fragments, fine shell fragments throughout	0 to 10
Silty sand, medium-brown, fine-grained, interbedded with light-brown to light-green compacted clay fragments (green clay appears glauconitic)	10 to 20
Sand, medium-brown, fine-grained, interbedded with dark-gray to dark-brown compacted clay nodules	20 to 50
Sand, light-brown to light-green, fine-grained, with medium-brown compacted clay fragments	50 to 100
Sandy silt, light-brown to light-green to dark-gray, medium- to coarse-grained	100 to 200
Silty clay, dark-gray, some fine-grained sand, interbedded with shell fragments up to 25 mm	200 to 271
Clay, light- to medium-green, hard, compacted, with glauconite grains up to 1 mm (presumed Pleistocene surface)	271 to 283
3–01–402–166	
Silty sand, medium- to dark-gray, fine-grained, abundant shell fragments up to 10 mm	0 to 10
Clayey sand, medium- to dark-gray, fine-grained, abundant shell fragments up to 10 mm	10 to 20
Sand, clayey, silty, light-green to tan, fine- to medium-grained, interbedded with light-gray to dark-gray concreted sand nodules, streaks of iron staining in subhorizontal patterns (significant lateral variations in core)	20 to 50
Sand, clayey, silty, tan, fine to coarse silt, shell fragments up to 25 mm throughout	50 to 100
Silty sand, tan, fine-grained, some clay inclusions, few shell fragments	100 to 200
Silty sand, tan, medium- to fine-grained, some shell fragments up to 25 mm	200 to 268
Clay, slightly sandy, light-green, dense, compacted, glauconitic inclusions up to 1 mm (presumed Pleistocene surface)	268 to 274
3–01–402–346	
Sandy silt, medium-gray, slightly clayey, few oyster-shell fragments	0 to 10
Silty sand, medium-gray, well-sorted, fine-grained, interbedded with dark-gray silt nodules, few oyster-shell fragments	10 to 20
Sand, medium- to light-gray, well-sorted, fine-grained, few oyster-shell fragments	20 to 50
Sand, light-gray to medium-brown, fine-grained, interbedded with medium-gray clay nodules at base of depth	50 to 100
Sand, medium- to dark-gray, fine-grained, with medium-brown clay inclusions at base of depth	100 to 200
Silty clay, medium- to dark-gray, poorly sorted, slightly sandy, no shell fragments	200 to 300
Silty sand, medium-gray, medium- to fine-grained, medium clay fragments at base of depth	300 to 339
Clay, medium-brown, highly oxidized, hard, compacted, some coarse sand (presumed Pleistocene surface)	339 to 350
3–02–000–000	
Oyster-shell fragments and complete valves up to 50 mm, 25-percent medium-gray sand, coarse- to fine-grained	0 to 10
Sand, medium-gray, coarse- to fine-grained, little silt, abundant oyster-shell fragments up to 25 mm	10 to 20
Silty sand, medium-gray, medium- to fine-grained, some clay, some oyster-shell fragments	20 to 50
Sand, medium-gray, fine-grained, well-sorted, some small oyster-shell fragments	50 to 100

Table 1. Description of measured sections of dredged-spoil sediment cores, Lavaca and Matagorda Bays, Texas, 1992—Continued

Core number and description	Depth (cm)
Clayey sand, light- to medium-gray, fine-grained, abundant small shell fragments, medium- to dark-gray clay at base of depth	100 to 200
3–02–000–000—Continued	
Sand, silt, and clay, medium- to dark-gray, poorly sorted, abundant small shell fragments	200 to 300
Clayey sand, light-green to light-gray, poorly sorted, poorly compacted, abundant small oyster-shell fragments (no Pleistocene erosion at surface)	300 to 390
3–02–593–128	
Silty sand, dark-gray, medium-grained, oyster-shell fragments up to 25 mm, little clay	0 to 10
Silty sand, medium- to dark-gray, medium-grained, moderately sorted, oyster-shell fragments up to 25 mm, little clay	10 to 20
Silty sand, medium-gray, poorly sorted, oyster-shell fragments up to 25 mm, some clay	20 to 50
Clay, medium-gray, homogeneous throughout depth, no oyster-shell fragments or other structures	50 to 100
Clay, medium-gray, homogeneous throughout depth, no oyster-shell fragments or other structures	100 to 200
Clay, medium- to dark-gray, light-brown clay fragments at base of depth, no oyster-shell fragments	200 to 293
3–02–593–308	
Sand, medium-gray, medium- to fine-grained, moderately sorted, large oyster-shell fragments up to 50 mm	0 to 10
Sand, medium-gray, medium- to fine-grained, moderately sorted, decreasing silt, large oyster-shell fragments up to 50 mm	10 to 20
Sand, medium-gray, medium- to fine-grained, moderately sorted, decreasing silt and oyster-shell fragments	20 to 50
Sand, medium-gray, medium- to fine-grained, moderately sorted, decreasing silt and oyster-shell fragments to homogeneous fine sand at base of depth	50 to 100
Sand, medium-gray, fine-grained, well sorted, few oyster-shell fragments	100 to 177
3–03–000–000	
Shell, large oyster-shell fragments and complete valves up to 50 mm, 40-percent dark-gray sand, coarse- to medium-grained	0 to 10
Shell, large oyster-shell fragments and complete valves up to 50 mm, 40-percent dark-gray sand, coarse- to fine-grained	10 to 20
Shell, large oyster-shell fragments and complete valves up to 50 mm, 40-percent dark-gray sand, coarse- to fine-grained	20 to 50
Silty sand, medium-gray, coarse- to fine-grained, poorly sorted, abundant small shell fragments	50 to 100
Shell, dark-gray, fine to coarse oyster-shell fragments, highly compacted, little sand	100 to 200
Silty shell, dark-gray, fine to medium oyster-shell fragments, 20-percent dark-gray silt, highly compacted	200 to 231
3–03–286–050	
Shell, medium-gray, coarse to fine oyster-shell fragments, 50-percent coarse to fine medium-gray sand	0 to 10
Shell, medium-gray, large oyster-shell fragments up to 50 mm, 50-percent dark-gray sand	10 to 20
Shell, medium-gray, oyster-shell fragments up to 25 mm, interbedded with medium-gray sandy silt	20 to 50
Sandy silt, medium-gray, coarse to fine, some oyster-shell fragments, void space between 50–58 cm	50 to 100
Shell, medium-gray, abundant oyster-shell fragments, medium-gray, sandy silt matrix	100 to 200
Sandy silt, medium-gray, fine-grained, some clay, few oyster-shell fragments	200 to 300
Sandy silt, medium-gray, fine-grained, little clay, no oyster-shell fragments	300 to 400

Table 1. Description of measured sections of dredged-spoil sediment cores, Lavaca and Matagorda Bays, Texas, 1992—Continued

Core number and description	Depth (cm)
Silty clay, dark-gray, homogeneous in appearance, no oyster-shell fragments	400 to 410
3–03–286–230	
Shell, medium-gray, oyster-shell fragments and complete valves up to 50 mm, 50-percent coarse to medium sand	0 to 10
Shell, medium-gray, oyster-shell fragments and complete valves up to 50 mm, 40-percent coarse sand	10 to 20
Shell, medium-gray, fine- to medium-grained oyster-shell fragments, 40-percent coarse to medium sand	20 to 50
Shell, medium-gray, fine-grained oyster-shell fragments, fine sand and silt	50 to 100
Sandy silt, medium-gray, fine-grained, large oyster-shell fragments up to 50 mm	100 to 200
Silt, medium-gray, fine-grained to large oyster-shell valves and fragments with no matrix	200 to 256
3–04–000–000	
Shell, tan to medium-gray, oyster-shell fragments and complete valves up to 25 mm, fine sand matrix	0 to 10
Shell, tan to medium-gray, oyster-shell fragments and complete valves up to 25 mm, fine sand matrix	10 to 20
Silty sand, medium-gray, fine-grained, some oyster-shell fragments	20 to 50
Clayey sand, light-gray to medium-gray, medium- to fine-grained grading to silty clay with increasing oyster-shell fragments at bottom of depth	50 to 100
Silty sand, medium-gray, fine-grained, loosely packed, abundant oyster-shell fragments up to 25 mm	100 to 200
Silty sand, medium-gray, fine-grained, loosely packed, abundant oyster-shell fragments up to 50 mm	200 to 300
Silty clay, medium-gray, fine, firm, abundant oyster-shell fragments and complete valves	300 to 400
Silty clay, medium-gray, fine, firm, abundant oyster-shell fragments and complete valves	400 to 437
3–04–476–122	
Silty clay, light- to medium-brown, some sand, poorly sorted, some oyster-shell fragments	0 to 10
Silty clay, medium-brown, some sand, poorly sorted, some oyster-shell fragments	10 to 20
Silty sand and clay, medium-brown, some oyster-shell fragments, iron staining throughout	20 to 50
Silty clay and sand, medium-brown, some oyster-shell fragments, iron staining throughout	50 to 100
Sandy silt and clay, medium-brown, poorly sorted, clay fragments, light-green to light-brown, small oyster-shell fragments	100 to 200
Clayey silt, some fine sand, medium-brown, fine-grained, fine oyster-shell fragments	200 to 300
Sand, medium-brown, fine-grained, well-sorted, fine oyster-shell fragments, iron staining grading to medium-gray clay at base of depth, large oyster-shell valve at 390 cm	300 to 391
3–04–476–302	
Shell, medium-gray, oyster-shell fragments and complete valves up to 50 mm, 10-percent sand, medium-gray, coarse- to medium-grained	0 to 10
Shell, medium-gray, oyster-shell fragments and complete valves up to 50 mm, 10-percent sand, medium-gray, coarse- to medium-grained	10 to 20
Shell, medium-gray, oyster-shell fragments and complete valves up to 50 mm, 20-percent silt, medium-gray, fine-grained	20 to 50
Shell, medium-gray, firm clay matrix, grades up to 100-percent clay at base of depth	50 to 100
Silty clay, medium-gray, firm, compacted, fine oyster-shell fragments interbedded at base of depth	100 to 200
Silty clay, medium-gray, fine oyster-shell fragments, grades to homogeneous clay at base of depth	200 to 300
Clay, medium-gray, firm, compacted, no oyster-shell fragments	300 to 334

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992

[Field color from Munsell (1990) color charts; cm, centimeters; m, meters; * * * *, none]

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–01–000–000–1–1	06/25/92	5.0Y 4/2	78	2.0	* * * *
1–01–000–000–2–1		5.0Y 5/2			
1–01–000–000–3–1		5.0Y 5/2			
1–01–005–000–1–2	06/25/92	5.0Y 5/2	60	1.8	* * * *
1–01–005–000–2–2		5.0Y 5/2			
1–01–005–000–3–2		5.0Y 4/2			
1–01–005–180–1–3	06/25/92	5.0Y 5/2	59	1.8	* * * *
1–01–005–180–2–3		5.0Y 5/2			
1–01–005–180–3–3		5.0Y 4/2			
1–01–082–340–1–1	06/23/92	5.0Y 5/2	77	1.8	* * * *
1–01–082–340–2–1		5.0Y 5/2			
1–01–082–340–3–1		5.0Y 4/2			
1–01–203–210–1–1	06/23/92	5.0Y 5/2	88	1.8	* * * *
1–01–203–210–2–1		5.0Y 4/2			
1–01–203–210–3–1		5.0Y 4/2			
1–01–253–186–1–1	06/23/92	5.0Y 5/2	70	1.8	* * * *
1–01–253–186–2–1		5.0Y 5/2			
1–01–253–186–3–1		5.0Y 4/2			
1–01–277–050–1–1	06/23/92	5.0Y 4/2	82	1.8	* * * *
1–01–277–050–2–1		5.0Y 4/2			
1–01–277–050–3–1		5.0Y 3/2			
1–01–344–247–1–1	06/18/92	5.0Y 4/2	50	1.5	* * * *
1–01–344–247–2–1		2.5Y 4.0			
1–01–344–247–3–1		2.5Y 4.0			
1–01–385–003–1–1	06/23/92	5.0Y 4/4	70	1.8	* * * *
1–01–385–003–2–1		5.0Y 3/2			
1–01–385–003–3–1		5.0Y 4/2			
1–01–387–025–1–1	06/23/92	5.0Y 4/2	53	1.8	* * * *
1–01–387–025–2–1		5.0Y 5/2			
1–01–387–025–3–1		5.0Y 5/2			
1–01–392–237–1–1	06/18/92	10.0YR 4/2	51	1.8	* * * *
1–01–392–237–2–1		5.0Y 5/1			
1–01–392–237–3–1		5.0Y 5/1			
1–01–401–119–1–1	06/22/92	5.0Y 4/2	76	2.0	* * * *
1–01–401–119–2–1		5.0Y 4/2			
1–01–401–119–3–1		5.0Y 3/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–01–431–135–1–1	06/22/92	5.0Y 3/2	87	1.8	* * * *
1–01–431–135–2–1		5.0Y 4/2			
1–01–431–135–3–1		5.0Y 4/2			
1–01–493–201–1–1	06/22/92	5.0Y 4/2	97	1.8	* * * *
1–01–493–201–2–1		5.0Y 4/2			
1–01–493–201–3–1		5.0Y 4/2			
1–01–493–201–3–5		5.0Y 4/2			
1–01–528–232–1–1	06/23/92	5.0Y 5/2	60	1.8	* * * *
1–01–528–232–2–1		5.0Y 4/2			
1–01–528–232–3–1		5.0Y 3/2			
1–02–000–000–1–1	06/25/92	5.0Y 5/2	87	1.6	* * * *
1–02–000–000–2–1		5.0Y 4/2			
1–02–000–000–3–1		5.0Y 4/2			
1–02–005–015–1–2	06/25/92	5.0Y 5/2	83	1.6	* * * *
1–02–005–015–2–2		5.0Y 4/2			
1–02–005–015–3–2		5.0Y 4/2			
1–02–005–195–1–3	06/25/92	5.0Y 5/2	86	1.6	* * * *
1–02–005–195–2–3		5.0Y 5/2			
1–02–005–195–3–3		5.0Y 4/2			
1–02–041–289–1–1	06/24/92	5.0Y 5/2	88	1.6	* * * *
1–02–041–289–2–1		5.0Y 5/2			
1–02–041–289–3–1		5.0Y 5/2			
1–02–066–209–1–1	06/25/92	5.0Y 4/2	86	1.6	* * * *
1–02–066–209–1–5		5.0Y 4/2			
1–02–066–209–2–1		5.0Y 4/2			
1–02–066–209–3–1		5.0Y 6/2			
1–02–119–086–1–1	06/25/92	5.0Y 5/2	74	1.8	* * * *
1–02–119–086–2–1		5.0Y 5/2			
1–02–119–086–3–1		5.0Y 5/2			
1–02–222–105–1–1	06/23/92	5.0Y 4/2	75	1.8	* * * *
1–02–222–105–2–1		5.0Y 4/2			
1–02–222–105–3–1		5.0Y 4/2			
1–02–253–186–1–1	06/23/92	5.0Y 5/2	71	1.8	* * * *
1–02–253–186–2–1		5.0Y 5/2			
1–02–253–186–3–1		5.0Y 5/2			
1–02–314–035–1–1	06/24/92	5.0Y 5/4	88	1.6	* * * *
1–02–314–035–2–1		5.0Y 5/2			
1–02–314–035–3–1		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–02–347–321–1–1	06/24/92	5.0Y 5/4	70	1.3	* * * *
1–02–347–321–2–1		5.0Y 5/2			
1–02–347–321–3–1		5.0Y 5/2			
1–02–347–321–3–5		5.0Y 5/2			
1–02–368–169–1–1	06/24/92	5.0Y 4/2	70	1.6	* * * *
1–02–368–169–2–1		5.0Y 4/2			
1–02–368–169–3–1		5.0Y 4/2			
1–02–385–069–1–1	06/24/92	5.0Y 5/2	80	1.6	* * * *
1–02–385–069–2–1		5.0Y 5/2			
1–02–385–069–3–1		5.0Y 4/2			
1–02–424–266–1–1	06/24/92	5.0Y 4/4	82	1.6	* * * *
1–02–424–266–2–1		5.0Y 3/2			
1–02–424–266–3–1		5.0Y 4/2			
1–02–452–136–1–1	06/24/92	5.0Y 5/2	68	1.0	* * * *
1–02–452–136–2–1		5.0Y 4/2			
1–02–452–136–3–1		5.0Y 4/2			
1–02–562–101–1–1	06/24/92	5.0Y 5/2	66	1.6	* * * *
1–02–562–101–1–5		5.0Y 5/2			
1–02–562–101–2–1		5.0Y 4/2			
1–02–562–101–3–1		5.0Y 4/2			
1–03–000–000–1–1	07/08/92	5.0Y 4/2	71	1.8	* * * *
1–03–000–000–2–1		5.0Y 3/2			
1–03–000–000–3–1		5.0Y 3/2			
1–03–005–000–1–2	07/08/92	5.0Y 4/2	51	1.8	* * * *
1–03–005–000–2–2		5.0Y 4/2			
1–03–005–000–3–2		5.0Y 4/2			
1–03–005–180–1–3	07/08/92	5.0Y 4/4	72	1.8	* * * *
1–03–005–180–2–3		5.0Y 4/4			
1–03–005–180–3–3		5.0Y 4/4			
1–03–039–057–1–1	07/27/92	5.0Y 5/2	67	2.0	* * * *
1–03–039–057–2–1		5.0Y 5/2			
1–03–039–057–3–1		5.0Y 4/2			
1–03–048–005–1–1	07/27/92	5.0Y 4/2	74	2.0	* * * *
1–03–048–005–2–1		5.0Y 3/2			
1–03–048–005–3–1		5.0Y 4/2			
1–03–048–005–3–5		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–03–130–171–1–1	07/08/92	5.0Y 5/4	65	2.0	* * * *
1–03–130–171–2–1		5.0Y 4/2			
1–03–130–171–3–1		5.0Y 4/2			
1–03–161–159–1–1	06/25/92	5.0Y 4/2	87	1.8	* * * *
1–03–161–159–1–5		5.0Y 4/2			
1–03–161–159–2–1		5.0Y 3/2			
1–03–161–159–3–1		5.0Y 3/2			
1–03–270–170–1–1	07/08/92	5.0Y 5/4	61	1.8	* * * *
1–03–270–170–2–1		5.0Y 4/2			
1–03–270–170–3–1		5.0Y 4/4			
1–03–279–079–1–1	08/11/92	5.0Y 4/4	85	2.0	* * * *
1–03–279–079–2–1		5.0Y 4/2			
1–03–279–079–3–1		5.0Y 4/2			
1–03–327–039–1–1	06/25/92	5.0Y 4/2	65	2.0	* * * *
1–03–327–039–2–1		5.0Y 3/2			
1–03–327–039–3–1		5.0Y 3/2			
1–03–362–089–1–1	08/11/92	5.0Y 4/4	53	2.0	* * * *
1–03–362–089–2–1		5.0Y 4/2			
1–03–362–089–3–1		5.0Y 4/2			
1–03–403–130–1–1	07/08/92	5.0Y 4/2	64	2.0	* * * *
1–03–403–130–2–1		5.0Y 4/2			
1–03–403–130–3–1		5.0Y 4/2			
1–03–417–166–1–1	08/07/92	5.0Y 4/2	62	2.0	* * * *
1–03–417–166–2–1		5.0Y 4/2			
1–03–417–166–3–1		5.0Y 5/2			
1–03–507–072–1–1	07/09/92	5.0Y 4/2	72	2.0	* * * *
1–03–507–072–1–5		5.0Y 4/2			
1–03–507–072–2–1		5.0Y 3/2			
1–03–507–072–3–1		5.0Y 4/2			
1–03–520–150–1–1	07/27/92	5.0Y 3/2	68	1.8	* * * *
1–03–520–150–2–1		5.0Y 4/2			
1–03–520–150–3–1		5.0Y 3/2			
1–04–000–000–1–1	07/09/92	5.0Y 4/4	84	2.0	* * * *
1–04–000–000–2–1		5.0Y 4/2			
1–04–000–000–2–5		5.0Y 4/2			
1–04–000–000–3–1		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–04–005–108–1–2	07/09/92	5.0Y 4/4	84	2.0	* * * *
1–04–005–108–2–2		5.0Y 5/2			
1–04–005–108–3–2		5.0Y 4/2			
1–04–005–288–1–3	07/09/92	5.0Y 4/4	80	2.0	* * * *
1–04–005–288–2–3		5.0Y 4/2			
1–04–005–288–3–3		5.0Y 5/2			
1–04–024–306–1–1	06/29/92	5.0Y 4/2	80	2.0	* * * *
1–04–024–306–2–1		5.0Y 5/2			
1–04–024–306–3–1		5.0Y 4/2			
1–04–024–306–3–5		5.0Y 4/2			
1–04–025–135–1–1	07/09/92	5.0Y 4/4	89	2.0	* * * *
1–04–025–135–2–1		5.0Y 4/4			
1–04–025–135–3–1		5.0Y 4/4			
1–04–064–114–1–1	06/29/92	5.0Y 5/2	82	2.0	* * * *
1–04–064–114–2–1		5.0Y 5/2			
1–04–064–114–3–1		5.0Y 4/2			
1–04–064–114–3–5		5.0Y 4/2			
1–04–143–001–1–1	06/30/92	5.0Y 4/2	83	2.0	* * * *
1–04–143–001–2–1		5.0Y 4/2			
1–04–143–001–3–1		5.0Y 4/2			
1–04–165–214–1–1	06/30/92	5.0Y 4/2	85	2.0	* * * *
1–04–165–214–2–1		5.0Y 4/2			
1–04–165–214–3–1		5.0Y 4/2			
1–04–229–194–1–1	06/30/92	5.0Y 4/2	90	1.8	* * * *
1–04–229–194–2–1		5.0Y 4/2			
1–04–229–194–3–1		5.0Y 5/2			
1–04–311–321–1–1	06/30/92	5.0Y 4/2	51	2.0	* * * *
1–04–311–321–2–1		5.0Y 4/2			
1–04–311–321–3–1		5.0Y 4/2			
1–04–318–068–1–1	06/30/92	5.0Y 4/2	68	2.0	* * * *
1–04–318–068–1–5		5.0Y 4/2			
1–04–318–068–2–1		5.0Y 4/2			
1–04–318–068–3–1		5.0Y 5/2			
1–04–417–091–1–1	06/30/92	5.0Y 4/2	98	2.0	* * * *
1–04–417–091–2–1		5.0Y 4/2			
1–04–417–091–3–1		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–04–534–041–1–1	07/13/92	5.0Y 4/2	62	2.0	* * * *
1–04–534–041–2–1		5.0Y 4/2			
1–04–534–041–3–1		5.0Y 4/2			
1–04–554–203–1–1	07/13/92	5.0Y 4/2	64	2.0	* * * *
1–04–554–203–2–1		5.0Y 3/2			
1–04–554–203–3–1		5.0Y 3/2			
1–04–561–037–1–1	06/29/92	5.0Y 4/2	53	2.0	* * * *
1–04–561–037–2–1		5.0Y 4/2			
1–04–561–037–3–1		5.0Y 4/2			
1–05–000–000–1–1	08/11/92	5.0Y 4/4	78	1.6	* * * *
1–05–000–000–2–1		5.0Y 4/2			
1–05–000–000–3–1		5.0Y 4/2			
1–05–005–087–1–3	08/11/92	5.0Y 4/4	78	1.6	* * * *
1–05–005–087–2–3		5.0Y 4/2			
1–05–005–087–3–3		5.0Y 4/2			
1–05–005–267–1–2	08/11/92	5.0Y 4/2	94	1.6	* * * *
1–05–005–267–2–2		5.0Y 4/2			
1–05–005–267–3–2		5.0Y 4/2			
1–05–014–062–1–1	07/14/92	5.0Y 4/4	87	1.6	* * * *
1–05–014–062–2–1		5.0Y 5/2			
1–05–014–062–3–1		5.0Y 5/2			
1–05–043–256–1–1	07/14/92	5.0Y 4/2	79	1.7	* * * *
1–05–043–256–2–1		5.0Y 4/2			
1–05–043–256–3–1		5.0Y 4/2			
1–05–133–177–1–1	07/13/92	5.0Y 3/2	89	1.9	* * * *
1–05–133–177–2–1		5.0Y 3/2			
1–05–133–177–3–1		5.0Y 3/2			
1–05–148–021–1–1	07/15/92	5.0Y 5/2	57	2.0	* * * *
1–05–148–021–2–1		5.0Y 4/2			
1–05–148–021–3–1		5.0Y 4/2			
1–05–160–336–1–1	07/14/92	5.0Y 4/2	60	2.0	* * * *
1–05–160–336–2–1		5.0Y 4/2			
1–05–160–336–3–1		5.0Y 4/4			
1–05–276–220–1–1	07/14/92	5.0Y 5/2	60	1.6	* * * *
1–05–276–220–2–1		5.0Y 4/2			
1–05–276–220–3–1		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–05–318–308–1–1	07/15/92	5.0Y 4/2	51	1.9	* * * *
1–05–318–308–2–1		5.0Y 4/2			
1–05–318–308–3–1		5.0Y 4/2			
1–05–318–308–3–5		5.0Y 4/2			
1–05–335–132–1–1	07/14/92	5.0Y 4/4	89	1.7	* * * *
1–05–335–132–2–1		5.0Y 5/2			
1–05–335–132–3–1		5.0Y 4/2			
1–05–335–132–3–5		5.0Y 4/2			
1–05–429–122–1–1	07/14/92	5.0Y 4/2	98	1.6	* * * *
1–05–429–122–2–1		5.0Y 4/2			
1–05–429–122–3–1		5.0Y 4/2			
1–05–454–084–1–1	07/13/92	5.0Y 3/2	74	1.7	* * * *
1–05–454–084–2–1		5.0Y 3/2			
1–05–454–084–3–1		5.0Y 3/2			
1–05–509–204–1–1	07/14/92	5.0Y 5/2	84	1.6	* * * *
1–05–509–204–2–1		5.0Y 4/2			
1–05–509–204–3–1		5.0Y 4/2			
1–05–510–251–1–1	07/14/92	5.0Y 4/2	96	1.6	* * * *
1–05–510–251–2–1		5.0Y 4/2			
1–05–510–251–3–1		5.0Y 4/2			
1–06–000–000–1–1	07/28/92	5.0Y 4/2	64	3.8	* * * *
1–06–000–000–2–1		5.0Y 5/2			
1–06–000–000–2–5		5.0Y 5/2			
1–06–000–000–3–1		5.0Y 5/2			
1–06–005–163–1–3	07/28/92	5.0Y 3/2	70	3.8	* * * *
1–06–005–163–2–3		5.0Y 5/2			
1–06–005–163–3–3		5.0Y 4/2			
1–06–005–343–1–2	07/28/92	5.0Y 4/2	85	3.8	* * * *
1–06–005–343–2–2		5.0Y 5/2			
1–06–005–343–3–2		5.0Y 4/2			
1–06–054–270–1–1	07/15/92	5.0Y 4/2	56	4.0	* * * *
1–06–054–270–1–5		5.0Y 4/2			
1–06–054–270–2–1		5.0Y 3/2			
1–06–054–270–3–1		5.0Y 3/2			
1–06–117–007–1–1	07/15/92	5.0Y 4/2	58	4.0	* * * *
1–06–117–007–2–1		5.0Y 4/2			
1–06–117–007–3–1		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–06–150–114–1–1	07/21/92	5.0Y 4/4	74	4.0	* * * *
1–06–150–114–2–1		5.0Y 3/2			
1–06–150–114–3–1		5.0Y 4/2			
1–06–171–066–1–1	07/21/92	5.0Y 5/2	94	4.0	* * * *
1–06–171–066–2–1		5.0Y 3/2			
1–06–171–066–3–1		5.0Y 3/2			
1–06–175–297–1–1	07/15/92	5.0Y 4/4	57	4.0	* * * *
1–06–175–297–2–1		5.0Y 5/2			
1–06–175–297–3–1		5.0Y 4/2			
1–06–270–120–1–1	07/21/92	5.0Y 4/4	95	4.0	* * * *
1–06–270–120–2–1		5.0Y 4/2			
1–06–270–120–3–1		5.0Y 4/2			
1–06–345–218–1–1	07/21/92	5.0Y 3/2	91	4.0	* * * *
1–06–345–218–2–1		5.0Y 4/2			
1–06–345–218–3–1		5.0Y 4/2			
1–06–418–316–1–1	07/15/92	5.0Y 4/4	60	4.0	* * * *
1–06–418–316–2–1		5.0Y 3/2			
1–06–418–316–3–1		5.0Y 3/2			
1–06–448–145–1–1	07/15/92	5.0Y 3/2	54	4.0	* * * *
1–06–448–145–2–1		5.0Y 3/2			
1–06–448–145–2–5		5.0Y 3/2			
1–06–448–145–3–1		5.0Y 3/2			
1–06–491–056–1–1	07/21/92	5.0Y 4/2	81	4.0	* * * *
1–06–491–056–2–1		5.0Y 3/2			
1–06–491–056–3–1		5.0Y 4/2			
1–06–511–225–1–1	07/21/92	5.0Y 4/4	83	4.0	* * * *
1–06–511–225–1–5		5.0Y 4/4			
1–06–511–225–2–1		5.0Y 3/2			
1–06–511–225–3–1		5.0Y 4/2			
1–06–514–234–1–1	07/16/92	5.0Y 4/2	54	4.0	* * * *
1–06–514–234–2–1		5.0Y 4/2			
1–06–514–234–3–1		5.0Y 5/2			
1–07–000–000–1–1	08/11/92	5.0Y 4/4	42	2.0	* * * *
1–07–000–000–2–1		5.0Y 4/2			
1–07–000–000–3–1		5.0Y 4/2			
1–07–005–116–1–2	08/11/92	5.0Y 4/4	41	2.0	* * * *
1–07–005–116–2–2		5.0Y 4/2			
1–07–005–116–3–2		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–07–005–296–1–3	08/11/92	5.0Y 4/4	48	2.0	* * * *
1–07–005–296–1–5		5.0Y 4/4			
1–07–005–296–2–3		5.0Y 4/2			
1–07–005–296–3–3		5.0Y 4/2			
1–07–028–148–1–1	07/30/92	5.0Y 5/2	48	2.0	* * * *
1–07–028–148–2–1		5.0Y 5/2			
1–07–028–148–3–1		5.0Y 4/2			
1–07–043–256–1–1	07/29/92	5.0Y 4/2	36	1.8	* * * *
1–07–043–256–1–5		5.0Y 4/2			
1–07–043–256–2–1		5.0GY 7/2			Light-green, oxidized clay; presumed Pleistocene surface
1–07–043–256–3–1		5.0Y 5/2			
1–07–057–014–1–1	07/29/92	5.0Y 3/2	52	1.8	* * * *
1–07–057–014–2–1		5.0Y 4/2			
1–07–057–014–3–1		5.0Y 4/2			
1–07–133–177–1–1	07/29/92	5.0Y 4/2	42	1.8	* * * *
1–07–133–177–2–1		5.0Y 3/2			
1–07–133–177–3–1		5.0GY 7/2			Light-green, oxidized clay; presumed Pleistocene surface
1–07–160–336–1–1	07/29/92	5.0Y 3/2	42	2.2	* * * *
1–07–160–336–2–1		5.0Y 4/2			
1–07–160–336–3–1		5.0Y 4/2			
1–07–212–169–1–1	07/29/92	5.0Y 4/2	35	1.8	* * * *
1–07–212–169–2–1		5.0Y 5/2			
1–07–212–169–3–1		5.0GY 7/2			Light-green, oxidized clay; presumed Pleistocene surface
1–07–256–065–1–1	07/30/92	5.0Y 5/2	47	2.1	Hydrogen sulfide odor
1–07–256–065–2–1		5.0Y 4/2			
1–07–256–065–3–1		5.0Y 4/2			
1–07–318–308–1–1	07/29/92	5.0Y 2/2	39	1.8	* * * *
1–07–318–308–2–1		5.0Y 4/2			
1–07–318–308–3–1		5.0GY 7/2			Light-green, oxidized clay; presumed Pleistocene surface
1–07–429–090–1–1	07/30/92	5.0Y 3/2	55	1.8	* * * *
1–07–429–090–2–1		5.0Y 4/2			
1–07–429–090–3–1		5.0Y 4/2			
1–07–439–004–1–1	07/28/92	5.0Y 3/2	61	1.8	* * * *
1–07–439–004–2–1		5.0Y 4/2			
1–07–439–004–3–1		5.0Y 3/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–07–454–084–1–1	07/30/92	5.0Y 4/2	47	2.0	* * * *
1–07–454–084–2–1		5.0Y 4/2			
1–07–454–084–3–1		5.0Y 5/2			
1–07–507–348–1–1	07/28/92	5.0Y 3/2	56	1.8	Hydrogen sulfide odor
1–07–507–348–2–1		5.0Y 5/2			
1–07–507–348–3–1		5.0Y 4/2			
1–08–000–000–1–1	07/29/92	5.0Y 4/4	87	3.1	* * * *
1–08–000–000–2–1		5.0Y 4/2			
1–08–000–000–3–1		5.0Y 5/2			
1–08–005–131–1–2	07/29/92	5.0Y 4/4	87	3.1	* * * *
1–08–005–131–2–2		5.0Y 4/2			
1–08–005–131–3–2		5.0Y 4/2			
1–08–005–311–1–3	07/29/92	5.0Y 3/2	97	3.0	* * * *
1–08–005–311–2–3		5.0Y 4/2			
1–08–005–311–3–3		5.0Y 4/2			
1–08–054–223–1–1	07/22/92	5.0Y 3/2	61	3.0	* * * *
1–08–054–223–2–1		5.0Y 4/2			
1–08–054–223–3–1		5.0Y 3/2			
1–08–076–039–1–1	07/22/92	5.0Y 3/2	65	2.9	* * * *
1–08–076–039–2–1		5.0Y 3/2			
1–08–076–039–3–1		5.0Y 3/2			
1–08–120–238–1–1	07/21/92	5.0Y 4/4	94	3.0	* * * *
1–08–120–238–2–1		5.0Y 3/2			
1–08–120–238–3–1		5.0Y 4/2			
1–08–124–304–1–1	07/22/92	5.0Y 5/2	72	3.1	* * * *
1–08–124–304–2–1		5.0Y 3/2			
1–08–124–304–3–1		5.0Y 4/2			
1–08–234–145–1–1	07/22/92	5.0Y 4/2	74	3.0	* * * *
1–08–234–145–2–1		5.0Y 3/2			
1–08–234–145–3–1		5.0Y 3/2			
1–08–268–301–1–1	07/22/92	5.0Y 5/4	61	3.0	* * * *
1–08–268–301–2–1		5.0Y 4/2			
1–08–268–301–2–5		5.0Y 4/2			
1–08–268–301–3–1		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
1–08–297–171–1–1	07/22/92	5.0Y 5/4	52	3.0	* * * *
1–08–297–171–2–1		5.0Y 5/2			
1–08–297–171–3–1		5.0Y 5/2			
1–08–297–171–3–5		5.0Y 5/2			
1–08–344–205–1–1	07/22/92	5.0Y 5/4	71	3.0	* * * *
1–08–344–205–2–1		5.0Y 4/2			
1–08–344–205–3–1		5.0Y 2/2			
1–08–371–247–1–1	07/21/92	5.0Y 3/2	91	3.0	* * * *
1–08–371–247–2–1		5.0Y 3/2			
1–08–371–247–3–1		5.0Y 2/2			
1–08–474–272–1–1	07/22/92	5.0Y 4/4	85	2.9	* * * *
1–08–474–272–2–1		5.0Y 5/2			
1–08–474–272–3–1		5.0Y 5/2			
1–08–482–150–1–1	07/22/92	5.0Y 4/4	79	3.1	* * * *
1–08–482–150–2–1		5.0Y 4/2			
1–08–482–150–3–1		5.0Y 3/2			
1–08–495–245–1–1	07/22/92	5.0Y 4/2	73	3.0	* * * *
1–08–495–245–2–1		5.0Y 4/2			
1–08–495–245–3–1		5.0Y 4/2			
1–10–000–000–1–1	07/30/92	5.0Y 3/2	90	1.6	* * * *
1–10–000–000–2–1		5.0Y 5/2			
1–10–000–000–2–5		5.0Y 5/2			
1–10–000–000–3–1		5.0Y 4/2			
1–11–000–000–1–1	07/30/92	5.0Y 3/2	52	1.6	* * * *
1–11–000–000–2–1		5.0Y 5/2			
1–11–000–000–3–1		5.0Y 5/2			
1–12–000–000–1–1	07/30/92	5.0Y 4/2	78	1.8	* * * *
1–12–000–000–2–1		5.0Y 5/2			
1–12–000–000–3–1		5.0Y 5/2			
1–13–000–000–1–1	07/30/92	5.0Y 5/2	81	1.0	* * * *
1–13–000–000–2–1		5.0Y 4/2			
1–13–000–000–3–1		5.0Y 4/2			
1–16–000–000–1–1	08/20/92	5.0Y 4/4	66	1.3	* * * *
1–16–000–000–2–1	07/30/92	5.0Y 5/2			
1–16–000–000–3–1		5.0Y 5/2			
2–01–000–000–1–1	08/24/92	5.0Y 3/2	87	13.3	* * * *
2–01–000–000–2–1		5.0Y 3/2			
2–01–000–000–3–1		5.0Y 3/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
2–01–005–020–1–1	08/24/92	5.0Y 3/2	52	13.1	* * * *
2–01–005–020–2–1		5.0Y 3/2			
2–01–005–020–3–1		5.0Y 3/2			
2–01–005–020–3–5		5.0Y 3/2			
2–01–005–200–1–1	08/24/92	5.0Y 3/2	53	13.1	* * * *
2–01–005–200–1–5		5.0Y 3/2			
2–01–005–200–2–1		5.0Y 3/2			
2–01–005–200–3–1		5.0Y 3/2			
2–01–100–020–1–1	08/25/92	5.0Y 4/2	55	12.6	* * * *
2–01–100–020–2–1		5.0Y 3/2			
2–01–100–020–3–1		5.0Y 3/2			
2–01–100–020–3–5		5.0Y 3/2			
2–01–100–200–1–1	08/25/92	5.0Y 4/2	55	12.6	* * * *
2–01–100–200–2–1		5.0Y 3/2			
2–01–100–200–3–1		5.0Y 3/2			
2–02–000–000–1–1	08/25/92	5.0Y 4/2	62	13.1	* * * *
2–02–000–000–2–1		5.0Y 2/2			
2–02–000–000–3–1		5.0Y 2/2			
2–02–005–125–1–1	08/25/92	5.0Y 4/2	73	13.0	* * * *
2–02–005–125–2–1		5.0Y 2/2			
2–02–005–125–3–1		5.0Y 2/2			
2–02–005–305–1–1	08/25/92	5.0Y 4/2	71	12.9	* * * *
2–02–005–305–2–1		5.0Y 2/2			
2–02–005–305–3–1		5.0Y 2/2			
2–02–005–305–3–5		5.0Y 2/2			
2–02–100–125–1–1	08/25/92	5.0Y 4/4	78	12.6	* * * *
2–02–100–125–1–5		5.0Y 4/2			
2–02–100–125–2–1		5.0Y 2/2			
2–02–100–125–3–1		5.0Y 2/2			
2–02–100–305–1–1	08/25/92	5.0Y 4/4	71	12.3	* * * *
2–02–100–305–2–1		5.0Y 2/2			
2–02–100–305–3–1		5.0Y 2/2			
2–03–000–000–1–1	08/25/92	5.0Y 4/4	53	12.9	* * * *
2–03–000–000–2–1		5.0Y 2/2			
2–03–000–000–3–1		5.0Y 2/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
2–03–005–125–1–1	08/25/92	5.0Y 4/4	61	12.6	* * * *
2–03–005–125–1–5		5.0Y 4/2			
2–03–005–125–2–1		5.0Y 3/2			
2–03–005–125–3–1		5.0Y 2/2			
2–03–005–305–1–1	08/25/92	5.0Y 4/4	68	12.6	* * * *
2–03–005–305–2–1		5.0Y 3/2			
2–03–005–305–3–1		5.0Y 3/2			
2–03–100–125–1–1	08/25/92	5.0Y 4/4	79	12.6	* * * *
2–03–100–125–2–1		5.0Y 2/2			
2–03–100–125–3–1		5.0Y 2/2			
2–03–100–305–1–1	08/25/92	5.0Y 4/4	79	12.6	* * * *
2–03–100–305–2–1		5.0Y 2/2			
2–03–100–305–3–1		5.0Y 2/2			
2–03–100–305–3–5		5.0Y 2/2			
2–04–000–000–1–1	08/26/92	5.0Y 5/4	52	13.0	* * * *
2–04–000–000–2–1		5.0Y 5/4			
2–04–000–000–3–1		5.0Y 3/2			
2–04–000–000–3–5		5.0Y 3/2			
2–04–005–120–1–1	08/26/92	5.0Y 5/4	57	13.0	* * * *
2–04–005–120–2–1		5.0Y 3/2			
2–04–005–120–2–5		5.0Y 3/2			
2–04–005–120–3–1		5.0Y 3/2			
2–04–005–300–1–1	08/26/92	5.0Y 5/4	56	13.0	* * * *
2–04–005–300–2–1		5.0Y 2/2			
2–04–005–300–3–1		5.0Y 2/2			
2–04–100–120–1–1	08/26/92	5.0Y 5/4	55	12.3	* * * *
2–04–100–120–2–1		5.0Y 3/2			
2–04–100–120–3–1		5.0Y 3/2			
2–04–100–300–1–1	08/26/92	5.0Y 5/4	59	12.6	* * * *
2–04–100–300–1–5		5.0Y 5/4			
2–04–100–300–2–1		5.0Y 2/2			
2–04–100–300–3–1		5.0Y 2/2			
3–01–000–000–1–1	08/13/92	5.0Y 5/2	283	.3	* * * *
3–01–000–000–2–1		5.0Y 6/4			
3–01–000–000–3–1		5.0Y 6/4			
3–01–000–000–3–5		5.0Y 6/4			
3–01–000–000–4–1		5.0Y 7/2			
3–01–000–000–5–1		5.0Y 5/4			
3–01–000–000–6–1		5.0Y 3/2–7/2			Light-green, oxidized clay; presumed Pleistocene surface

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
3–01–402–166–1–1	08/12/92	5.0Y 2/2	274	0.6	* * * *
3–01–402–166–2–1		5.0Y 2/2			
3–01–402–166–3–1		5.0GY 7/2			
3–01–402–166–4–1		5.0Y 8/2			
3–01–402–166–5–1		5.0Y 7/4			
3–01–402–166–5–5		5.0Y 7/4			
3–01–402–166–6–1		5.0Y 8/2			Light-green, oxidized clay; presumed Pleistocene surface
3–01–402–346–1–1	08/12/92	5.0Y 3/2	350	.3	* * * *
3–01–402–346–2–1		5.0Y 3/2			
3–01–402–346–3–1		5.0Y 5/2			
3–01–402–346–4–1		5.0Y 5/4			
3–01–402–346–5–1		5.0YR 6/4			
3–01–402–346–6–1		5.0Y 4/2			
3–01–402–346–7–1		5.0Y 4/2			Light-green, oxidized clay; presumed Pleistocene surface
3–02–000–000–1–1	08/18/92	5.0Y 4/2	390	.3	* * * *
3–02–000–000–2–1		5.0Y 4/2			
3–02–000–000–3–1		5.0Y 3/2			
3–02–000–000–4–1		5.0Y 4/2			
3–02–000–000–5–1		5.0Y 6/2			
3–02–000–000–5–5		5.0Y 6/2			
3–02–000–000–6–1		5.0Y 5/2			
3–02–000–000–7–1		5.0Y 7/2			
3–02–593–128–1–1	08/13/92	5.0Y 2/2	293	.3	* * * *
3–02–593–128–2–1		5.0Y 4/2			
3–02–593–128–3–1		5.0Y 4/2			
3–02–593–128–4–1		5.0Y 5/2			
3–02–593–128–5–1		5.0Y 5/2			
3–02–593–128–5–5		5.0Y 5/2			
3–02–593–128–6–1		5.0Y 4/2			
3–02–593–308–1–1	08/13/92	5.0Y 6/4	177	.3	* * * *
3–02–593–308–2–1		5.0Y 6/2			
3–02–593–308–3–1		5.0Y 5/2			
3–02–593–308–4–1		5.0Y 5/2			
3–02–593–308–4–5		5.0Y 5/2			
3–02–593–308–5–1		5.0Y 5/2			
3–03–000–000–1–1	08/18/92	5.0Y 2/2	231	.3	* * * *
3–03–000–000–2–1		5.0Y 2/2			
3–03–000–000–3–1		5.0Y 5/2			
3–03–000–000–4–1		5.0Y 4/2			
3–03–000–000–5–1		5.0Y 5/2			
3–03–000–000–6–1		5.0Y 5/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
3–03–286–050–1–1	08/18/92	5.0Y 2/2	410	0.3	* * * *
3–03–286–050–2–1		5.0Y 5/2			
3–03–286–050–3–1		5.0Y 4/5			
3–03–286–050–4–1		5.0Y 5/5			
3–03–286–050–4–5		5.0Y 5/5			
3–03–286–050–5–1		5.0Y 5/5			
3–03–286–050–6–1		5.0Y 5/5			
3–03–286–050–7–1		5.0Y 3/2			
3–03–286–050–8–1		5.0Y 3/2			
3–03–286–050–8–5		5.0Y 3/2			
3–03–286–230–1–1	08/18/92	5.0Y 3/2	256	.3	* * * *
3–03–286–230–2–1		5.0Y 3/2			
3–03–286–230–3–1		5.0Y 3/2			
3–03–286–230–4–1		5.0Y 3/2			
3–03–286–230–5–1		5.0Y 4/2			
3–03–286–230–6–1		5.0Y 5/2			
3–04–000–000–1–1	08/19/92	5.0Y 4/4	437	.3	* * * *
3–04–000–000–2–1		5.0Y 4/4			
3–04–000–000–3–1		5.0Y 4/4			
3–04–000–000–3–5		5.0Y 4/4			
3–04–000–000–4–1		5.0Y 4/4			
3–04–000–000–5–1		5.0Y 5/4			
3–04–000–000–6–1		5.0Y 4/2			
3–04–000–000–7–1		5.0Y 5/2			
3–04–000–000–8–1		5.0Y 5/2			
3–04–476–122–1–1	08/18/92	5.0Y 5/6	391	.3	* * * *
3–04–476–122–2–1		5.0Y 5/6			
3–04–476–122–3–1		5.0Y 5/6			
3–04–476–122–4–1		5.0Y 5/6			
3–04–476–122–5–1		5.0Y 6/8			
3–04–476–122–6–1		5.0Y 5/6			
3–04–476–122–7–1		5.0Y 5/6			
3–04–476–302–1–1	08/19/92	5.0Y 5/2	334	.3	* * * *
3–04–476–302–2–1		5.0Y 5/2			
3–04–476–302–3–1		5.0Y 5/2			
3–04–476–302–4–1		5.0Y 4/4			
3–04–476–302–5–1		5.0Y 4/4			
3–04–476–302–6–1		5.0Y 4/4			
3–04–476–302–7–1		5.0Y 4/4			
4–01–000–000–1–1	08/19/92	5.0Y 2/2		1.9	Live oysters; hydrogen sulfide odor

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
4–01–202–145–1–1	08/19/92	5.0Y 3/2		1.6	
4–01–202–145–1–5	08/19/92	5.0Y 3/2		1.6	
4–01–202–325–1–1	08/19/92	5.0Y 3/2		1.3	Live oysters
4–01–403–145–1–1	08/19/92	5.0Y 3/2		1.3	
4–01–403–325–1–1	08/19/92	5.0Y 3/2		1.9	
4–02–000–000–1–1	08/26/92	5.0Y 4/2		2.1	
4–02–110–038–1–1	08/26/92	5.0Y 3/2		1.6	Hydrogen sulfide odor
4–02–110–218–1–1	08/26/92	5.0Y 5/2		2.1	
4–02–221–038–1–1	08/26/92	5.0Y 2/2		1.6	Live oysters; small crabs
4–02–221–218–1–1	08/26/92	5.0Y 4/2		1.6	Hydrogen sulfide odor
4–02–221–218–1–5	08/20/92	5.0Y 5/2		1.6	
4–03–000–000–1–1	08/19/92	5.0Y 4/2		1.3	* * * *
4–03–266–176–1–1	08/19/92	5.0Y 3/2		1.3	
4–03–266–356–1–1	08/19/92	5.0Y 4/2		1.3	
4–03–532–176–1–1	08/19/92	5.0Y 4/2		1.3	Hydrogen sulfide odor
4–03–532–356–1–1	08/19/92	5.0Y 4/2		1.3	
4–04–000–000–1–1	08/19/92	5.0Y 3/2		1.6	Hydrogen sulfide odor
4–04–138–022–1–1	08/19/92	5.0Y 4/2		1.6	Hydrogen sulfide odor
4–04–138–202–1–1	08/19/92	5.0Y 3/2		1.6	
4–04–276–022–1–1	08/19/92	5.0Y 3/2		1.6	
4–04–276–202–1–1	08/19/92	5.0Y 4/2		1.6	
4–05–000–000–1–1	08/20/92	5.0Y 6/2	334	.6	* * * *
4–05–000–000–1–5	08/20/92	5.0Y 6/2		.6	
4–05–065–008–1–1	08/20/92	5.0Y 5/2–3/2		.6	
4–05–065–188–1–1	08/20/92	5.0Y 5/4–4/2		.6	
4–05–130–008–1–1	08/20/92	5.0Y 2/2 5.0YR 5/4		.3	Red, oxidized clay; presumed Pleistocene surface
4–05–130–188–1–1	08/20/92	5.0Y 3/2		.6	Live mussels, barnacles, worms, and oysters
5–01–000–000–1–1	08/04/92	5.0Y 4/4	52	.2	Hydrogen sulfide odor
5–01–000–000–2–1		5.0Y 4/2			
5–01–000–000–3–1		5.0Y 3/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
5–01–005–050–1–1	08/04/92	5.0Y 4/4	50	0.2	Hydrogen sulfide odor
5–01–005–050–2–1		5.0Y 4/2			
5–01–005–050–3–1		5.0Y 3/2			
5–01–005–230–1–1	08/04/92	5.0Y 4/4	50	.2	* * * *
5–01–005–230–2–1		5.0Y 4/2			
5–01–005–230–3–1		5.0Y 3/2			
5–01–050–050–1–1	08/04/92	5.0Y 4/4	72	.2	* * * *
5–01–050–050–2–1		5.0Y 4/2			
5–01–050–050–3–1		5.0Y 3/2			
5–01–050–050–3–5		5.0Y 3/2			
5–01–050–230–1–1	08/04/92	5.0Y 4/4	80	.2	* * * *
5–01–050–230–2–1		5.0Y 4/2			
5–01–050–230–3–1		5.0Y 3/2			
5–02–000–000–1–1	08/05/92	5.0Y 6/6	53	.2	* * * *
5–02–000–000–2–1		5.0Y 6/2			
5–02–000–000–3–1		5.0Y 4/2			
5–02–005–071–1–1	08/05/92	5.0Y 6/6	54	.2	Red, oxidized clay; presumed Pleistocene surface
5–02–005–071–2–1		5.0Y 6/2			
5–02–005–071–3–1		5.0Y 3/2			
5–02–005–251–1–1	08/05/92	5.0Y 6/6	51	.2	Red, oxidized clay; presumed Pleistocene surface
5–02–005–251–2–1		5.0Y 4/2			
5–02–005–251–3–1		5.0Y 5/2			
5–02–050–071–1–1	08/05/92	5.0Y 6/2	57	.2	Red, oxidized clay; presumed Pleistocene surface
5–02–050–071–2–1		5.0Y 5/2			
5–02–050–071–3–1		5.0Y 5/2			
5–02–050–071–3–5		5.0Y 5/2			
5–02–050–251–1–1	08/05/92	5.0Y 5/4	53	.2	Red, oxidized clay; presumed Pleistocene surface
5–02–050–251–2–1		5.0Y 4/4			
5–02–050–251–3–1		5.0Y 5/2			
5–03–000–000–1–1	08/05/92	5.0Y 4/2	52	.2	* * * *
5–03–000–000–2–1		5.0Y 3/2			
5–03–000–000–3–1		5.0Y 2/2			
5–03–005–074–1–1	08/05/92	5.0Y 4/2	54	.2	* * * *
5–03–005–074–2–1		5.0Y 3/2			
5–03–005–074–3–1		5.0Y 3/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
5–03–005–254–1–1	08/05/92	5.0Y 4/2	58	0.2	* * * *
5–03–005–254–2–1		5.0Y 3/2			
5–03–005–254–3–1		5.0Y 2/2			
5–03–050–074–1–1	08/05/92	5.0Y 4/2	58	.2	* * * *
5–03–050–074–2–1		5.0Y 3/2			
5–03–050–074–3–1		5.0Y 3/2			
5–03–050–074–3–5		5.0Y 3/2			
5–03–050–254–1–1	08/05/92	5.0Y 3/2	51	.2	* * * *
5–03–050–254–2–1		5.0Y 3/2			
5–03–050–254–3–1		5.0Y 5/2			
5–04–000–000–1–1	08/06/92	5.0Y 5/4	57	.2	Brown, oxidized clay; presumed Pleistocene surface
5–04–000–000–2–1		5.0Y 4/4			
5–04–000–000–3–1		5.0Y 3/2			
5–04–005–118–1–1	08/06/92	5.0Y 5/4	62	.2	Brown, oxidized clay; presumed Pleistocene surface
5–04–005–118–2–1		5.0Y 3/2			
5–04–005–118–3–1		5.0Y 2/2			
5–04–005–298–1–1	08/06/92	5.0Y 4/4	52	.2	Brown, oxidized clay; presumed Pleistocene surface
5–04–005–298–2–1		5.0Y 3/2			
5–04–005–298–2–5		5.0Y 3/2			
5–04–005–298–3–1		5.0Y 4/2			
5–04–050–118–1–1	08/06/92	5.0Y 6/4	66	.2	Brown, oxidized clay; presumed Pleistocene surface
5–04–050–118–2–1		5.0Y 5/2			
5–04–050–118–3–1		5.0Y 4/2			
5–04–050–298–1–1	08/06/92	5.0Y 4/4	51	.2	Brown, oxidized clay; presumed Pleistocene surface
5–04–050–298–2–1		5.0Y 4/4			
5–04–050–298–3–1		5.0Y 3/2			
5–05–000–000–1–1	08/20/92	5.0Y 7/4	79	.2	* * * *
5–05–000–000–2–1		5.0Y 3/2			
5–05–000–000–3–1		5.0Y 4/2			
5–05–005–077–1–1	08/20/92	5.0Y 7/2	64	.2	* * * *
5–05–005–077–2–1		5.0Y 3/2			
5–05–005–077–3–1		5.0Y 4/2			

Table 2. Selected field observations of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Date of sample	Field color	Core length (cm)	Water depth (m)	Remarks
5–05–005–257–1–1	08/20/92	5.0Y 7/2	67	0.2	* * * *
5–05–005–257–2–1		5.0Y 3/2			
5–05–005–257–3–1		5.0Y 4/2			
5–05–050–077–1–1	08/20/92	5.0Y 7/2	64	.2	* * * *
5–05–050–077–2–1		5.0Y 3/2			
5–05–050–077–3–1		5.0Y 3/2			
5–05–050–257–1–1	08/20/92	5.0Y 7/2	77	.2	* * * *
5–05–050–257–2–1		5.0Y 3/2			
5–05–050–257–3–1		5.0Y 4/2			

Table 3. Geographic location of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992

[NAD 1983, North American Datum of 1983; m, meters; N, north; W, west; *, location is ±5 meters; C, core sample location; G, grab sample location; e, location is estimated]

Field sample number	Latitude (NAD 1983)	Longitude (NAD 1983)	Texas State Plane coordinate (south-central zone)	
			Easting (m)	Northing (m)
1–01–000–000	28°37'47.09"N	96°35'58.05"W	834704	4090675
1–01–005–000	28°37'47.25"N	96°35'58.03"W	834704	4090680
1–01–005–180	28°37'46.93"N	96°35'58.08"W	834703	4090670
1–01–082–340	28°37'49.30"N	96°35'59.33"W	834668	4090742
1–01–203–210	28°37'41.32"N	96°36'01.98"W	834601	4090495
1–01–253–186	28°37'38.64"N	96°35'58.55"W	834696	4090415
1–01–277–050	28°37'51.26"N	96°35'49.37"W	834937	4090808
1–01–344–247	28°37'42.38"N	96°36'09.67"W	834391	4090524
1–01–385–003	28°38'00.78"N	96°35'58.23"W	834690	4091096
1–01–387–025	28°37'58.83"N	96°35'52.14"W	834857	4091040
1–01–392–237	28°37'39.40"N	96°36'09.99"W	834384	4090432
1–01–401–119	28°37'41.12"N	96°35'45.05"W	835061	4090499
1–01–431–135	28°37'37.91"N	96°35'47.12"W	835006	4090399
1–01–493–201	28°37'31.89"N	96°36'04.60"W	834536	4090204
1–01–528–232	28°37'35.69"N	96°36'13.42"W	834293	4090316
1–02–000–000	28°37'42.02"N	96°33'10.97"W	839244	4090613
1–02–005–015	28°37'42.13"N	96°33'10.91"W	839246	4090617
1–02–005–195	28°37'41.91"N	96°33'11.05"W	839242	4090609
1–02–041–289	28°37'41.13"N	96°33'12.34"W	839207	4090585
1–02–066–209	28°37'40.99"N	96°33'12.78"W	839196	4090580

Table 3. Geographic location of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Latitude (NAD 1983)	Longitude (NAD 1983)	Texas State Plane coordinate (south-central zone)	
			Easting (m)	Northing (m)
1–02–119–086	28°37'41.87"N	96°33'05.90"W	839382	4090611
1–02–222–105	28°37'40.00"N	96°33'02.76"W	839468	4090555
1–02–253–186	28°37'44.73"N	96°33'15.60"W	839117	4090694
1–02–314–035	28°37'49.44"N	96°33'04.34"W	839419	4090845
1–02–347–321	28°37'52.00"N	96°33'19.69"W	839001	4090915
1–02–368–169	28°37'30.61"N	96°33'08.12"W	839329	4090263
1–02–385–069	28°37'47.30"N	96°32'56.83"W	839625	4090783
1–02–424–266	28°37'42.65"N	96°33'27.60"W	838792	4090623
1–02–452–136	28°37'31.36"N	96°32'59.98"W	839549	4090291
1–02–562–101	28°37'38.10"N	96°32'50.52"W	839802	4090504
1–03–000–000	28°35'16.98"N	96°30'45.25"W	843296	4086233
1–03–005–000	28°35'17.14"N	96°30'45.23"W	843297	4086238
1–03–005–180	28°35'16.90"N	96°30'45.30"W	843295	4086230
1–03–039–057	28°35'19.16"N	96°30'43.88"W	843331	4086300
1–03–048–005	28°35'19.15"N	96°30'45.32"W	843292	4086299
1–03–130–171	28°35'13.20"N	96°30'43.93"W	843334	4086117
1–03–161–159	28°35'11.50"N	96°30'42.83"W	843365	4086065
1–03–270–170	28°35'07.20"N	96°30'43.60"W	843347	4085932
1–03–279–079	28°35'18.30"N	96°30'33.95"W	843602	4086280
1–03–362–089	28°35'25.29"N	96°30'55.67"W	843007	4086482
1–03–403–130	28°35'07.11"N	96°30'32.67"W	843644	4085936
1–03–417–166	28°35'05.15"N	96°30'41.99"W	843392	4085870
1–03–507–072	28°35'22.83"N	96°30'27.44"W	843776	4086423
1–03–520–150	28°35'03.94"N	96°30'36.13"W	843552	4085837
1–04–000–000	28°40'29.06"N	96°37'15.13"W	832509	4095617
1–04–005–108	28°40'29.01"N	96°37'14.94"W	832514	4095616
1–04–005–288	28°40'29.13"N	96°37'15.29"W	832505	4095619
1–04–024–306	28°40'29.59"N	96°37'15.55"W	832498	4095633
1–04–025–135	28°40'28.56"N	96°37'13.94"W	832542	4095603
1–04–064–114	28°40'28.19"N	96°37'13.39"W	832557	4095591
1–04–143–001	28°40'33.62"N	96°37'14.59"W	832521	4095758
1–04–165–214	28°40'27.47"N	96°37'15.41"W	832503	4095568
1–04–229–194	28°40'22.01"N	96°37'18.00"W	832436	4095399
1–04–311–321	28°40'37.62"N	96°37'21.34"W	832335	4095877
1–04–318–068	28°40'34.79"N	96°37'05.15"W	832777	4095799
1–04–417–091	28°40'28.43"N	96°36'59.46"W	832935	4095607
1–04–534–041	28°40'42.02"N	96°37'02.24"W	832851	4096023
1–04–554–203	28°40'36.88"N	96°36'59.55"W	832927	4095867
1–04–561–037	28°40'43.41"N	96°37'02.16"W	832852	4096066
1–05–000–000	28°41'34.01"N	96°38'43.97"W	830058	4097567

Table 3. Geographic location of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Latitude (NAD 1983)	Longitude (NAD 1983)	Texas State Plane coordinate (south-central zone)	
			Easting (m)	Northing (m)
1–05–005–087	28°41'34.00"N	96°38'43.84"W	830061	4097567
1–05–005–267	28°41'33.98"N	96°38'44.11"W	830054	4097567
1–05–014–062	28°41'32.71"N	96°38'43.29"W	830077	4097528
1–05–043–256	28°41'33.54"N	96°38'45.38"W	830020	4097552
1–05–133–177	28°41'29.32"N	96°38'42.84"W	830091	4097424
1–05–148–021	28°41'37.23"N	96°38'42.12"W	830106	4097668
1–05–160–336	28°41'38.64"N	96°38'45.42"W	830015	4097709
1–05–276–220	28°41'26.78"N	96°38'50.29"W	829891	4097342
1–05–318–308	28°41'41.33"N	96°38'52.39"W	829825	4097788
1–05–335–132	28°41'26.51"N	96°38'34.39"W	830322	4097342
1–05–429–122	28°41'25.04"N	96°38'30.92"W	830417	4097299
1–05–454–084	28°41'34.60"N	96°38'27.86"W	830494	4097594
1–05–509–204	28°41'20.03"N	96°38'52.13"W	829845	4097133
1–05–510–251	28°41'28.35"N	96°39'01.44"W	829587	4097384
1–06–000–000	28°32'34.94"N	96°26'38.89"W	850097	4081390
1–06–005–163	28°32'34.84"N	96°26'38.92"W	850097	4081387
1–06–005–343	28°32'35.06"N	96°26'38.91"W	850097	4081394
1–06–054–270	28°32'33.44"N	96°26'38.98"W	850096	4081344
1–06–117–007	28°32'38.71"N	96°26'38.13"W	850116	4081506
1–06–150–114	28°32'32.73"N	96°26'33.70"W	850240	4081325
1–06–171–066	28°32'37.66"N	96°26'33.50"W	850242	4081477
1–06–175–297	28°32'37.36"N	96°26'44.11"W	849954	4081461
1–06–270–120	28°32'31.14"N	96°26'31.12"W	850311	4081277
1–06–345–218	28°32'27.39"N	96°26'47.99"W	849855	4081152
1–06–418–316	28°32'43.88"N	96°26'48.22"W	849838	4081659
1–06–448–145	28°32'22.95"N	96°26'29.57"W	850359	4081026
1–06–491–056	28°32'43.80"N	96°26'22.75"W	850530	4081672
1–06–511–225	28°32'23.62"N	96°26'51.38"W	849766	4081034
1–06–514–234	28°32'24.14"N	96°26'53.28"W	849714	4081049
1–07–000–000	28°34'32.11"N	96°33'08.19"W	839442	4084770
1–07–005–116	28°34'32.22"N	96°33'08.20"W	839442	4084773
1–07–005–296	28°34'31.98"N	96°33'08.13"W	839444	4084766
1–07–028–148	28°34'31.18"N	96°33'06.26"W	839495	4084742
1–07–043–256	28°34'31.40"N	96°33'09.08"W	839418	4084747
1–07–057–014	28°34'34.05"N	96°33'06.97"W	839474	4084830
1–07–133–177	28°34'28.77"N	96°33'07.70"W	839457	4084667
1–07–160–336	28°34'36.89"N	96°33'10.25"W	839383	4084916
1–07–212–169	28°34'25.27"N	96°33'06.25"W	839499	4084560
1–07–256–065	28°34'34.56"N	96°32'58.79"W	839696	4084850
1–07–318–308	28°34'37.81"N	96°33'16.95"W	839200	4084940

Table 3. Geographic location of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Latitude (NAD 1983)	Longitude (NAD 1983)	Texas State Plane coordinate (south-central zone)	
			Easting (m)	Northing (m)
1–07–429–090	28°34'32.06"N	96°32'52.04"W	839881	4084777
1–07–439–004	28°34'46.51"N	96°33'06.88"W	839468	4085214
1–07–454–084	28°34'33.37"N	96°32'51.66"W	839890	4084818
1–07–507–348	28°34'49.09"N	96°33'12.08"W	839325	4085290
1–08–000–000	28°33'55.98"N	96°26'26.87"W	850369	4083890
1–08–005–131	28°33'55.85"N	96°26'26.79"W	850372	4083887
1–08–005–311	28°33'56.04"N	96°26'26.97"W	850367	4083893
1–08–054–223	28°33'54.99"N	96°26'28.68"W	850321	4083859
1–08–076–039	28°33'57.30"N	96°26'24.63"W	850429	4083933
1–08–120–238	28°33'53.97"N	96°26'30.12"W	850283	4083827
1–08–124–304	28°33'58.71"N	96°26'30.81"W	850261	4083973
1–08–234–145	28°33'49.83"N	96°26'32.84"W	850212	4083698
1–08–268–301	28°33'58.85"N	96°26'35.25"W	850140	4083974
1–08–297–171	28°33'46.26"N	96°26'24.13"W	850450	4083594
1–08–344–205	28°33'46.07"N	96°26'32.77"W	850216	4083582
1–08–371–247	28°33'50.88"N	96°26'38.26"W	850063	4083727
1–08–474–272	28°33'56.35"N	96°26'44.55"W	849889	4083892
1–08–482–150	28°33'42.00"N	96°26'19.56"W	850578	4083465
1–08–495–245	28°33'49.79"N	96°26'44.43"W	849897	4083690
1–10–000–000	28°41'53.40"N	96°23'47.01"W	854386	4098680
1–11–000–000	28°38'53.08"N	96°22'24.53"W	856749	4093181
1–12–000–000	28°39'28.32"N	96°24'28.61"W	853356	4094190
1–13–000–000	28°43'08.91"N	96°24'48.66"W	852662	4100967
1–16–000–000	28°38'53.17"N	96°22'45.38"W	856183	4093171
2–01–000–000*	28°36'24.72"N	96°34'01.33"W	837926	4088205
2–01–005–020C*	28°36'23.72"N	96°34'01.46"W	837923	4088175
2–01–005–020G*	28°36'23.94"N	96°34'01.80"W	837914	4088181
2–01–005–200C*	28°36'23.49"N	96°34'01.67"W	837918	4088167
2–01–005–200G*	28°36'23.54"N	96°34'01.66"W	837918	4088169
2–01–100–020C*	28°36'21.33"N	96°34'01.73"W	837917	4088101
2–01–100–020G*	28°36'21.35"N	96°34'01.69"W	837918	4088101
2–01–100–200C*	28°36'26.80"N	96°34'02.08"W	837904	4088269
2–01–100–200G*	28°36'26.81"N	96°34'02.05"W	837905	4088269
2–02–000–000C*	28°34'48.74"N	96°32'33.57"W	840372	4085301
2–02–000–000G*	28°34'48.94"N	96°32'33.78"W	840366	4085307
2–02–005–125C*	28°34'48.58"N	96°32'33.51"W	840373	4085296
2–02–005–125G*	28°34'48.58"N	96°32'33.57"W	840372	4085296
2–02–005–305C*	28°34'49.13"N	96°32'33.83"W	840364	4085313
2–02–005–305G*	28°34'49.13"N	96°32'33.87"W	840363	4085313
2–02–100–125C*	28°34'47.15"N	96°32'31.89"W	840418	4085253

Table 3. Geographic location of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Latitude (NAD 1983)	Longitude (NAD 1983)	Texas State Plane coordinate (south-central zone)	
			Easting (m)	Northing (m)
2–02–100–125G*	28°34'47.07"N	96°32'31.94"W	840417	4085251
2–02–100–305C*	28°34'50.75"N	96°32'37.00"W	840277	4085361
2–02–100–305G*	28°34'50.79"N	96°32'36.99"W	840278	4085362
2–03–000–000C*	28°34'35.25"N	96°32'15.59"W	840869	4084896
2–03–000–000G*	28°34'35.19"N	96°32'15.69"W	840866	4084894
2–03–005–125C*	28°34'34.54"N	96°32'14.71"W	840893	4084875
2–03–005–125G*	28°34'34.62"N	96°32'14.94"W	840887	4084877
2–03–005–305C*	28°34'34.84"N	96°32'15.35"W	840876	4084884
2–03–005–305G*	28°34'35.06"N	96°32'15.69"W	840866	4084890
2–03–100–125C*	28°34'33.77"N	96°32'12.25"W	840961	4084853
2–03–100–125G*	28°34'33.89"N	96°32'12.41"W	840956	4084856
2–03–100–305C*	28°34'37.46"N	96°32'18.73"W	840782	4084962
2–03–100–305G*	28°34'38.13"N	96°32'19.11"W	840771	4084983
2–04–000–000C*	28°31'34.96"N	96°27'59.09"W	847958	4079496
2–04–000–000G*	28°31'35.03"N	96°27'59.11"W	847957	4079498
2–04–005–120C*	28°31'34.83"N	96°27'58.92"W	847963	4079493
2–04–005–120G*	28°31'34.86"N	96°27'58.82"W	847965	4079494
2–04–005–300C*	28°31'35.07"N	96°27'59.26"W	847953	4079500
2–04–005–300G*	28°31'35.27"N	96°27'59.12"W	847957	4079506
2–04–100–120C*	28°31'32.82"N	96°27'55.27"W	848063	4079433
2–04–100–120G*	28°31'32.95"N	96°27'55.46"W	848058	4079437
2–04–100–300C*	28°31'36.51"N	96°28'00.54"W	847917	4079543
2–04–100–300G*	28°31'36.51"N	96°28'00.26"W	847925	4079543
3–01–000–000	28°37'39.13"N	96°33'38.01"W	838512	4090509
3–01–402–166	28°37'26.95"N	96°33'39.63"W	838475	4090133
3–01–402–346	28°37'47.79"N	96°33'39.86"W	838456	4090774
3–02–000–000	28°34'29.63"N	96°31'47.20"W	841644	4084740
3–02–593–128	28°34'20.59"N	96°31'29.45"W	842132	4084471
3–02–593–308	28°34'39.54"N	96°31'58.78"W	841323	4085038
3–03–000–000	28°33'51.65"N	96°30'51.47"W	843183	4083603
3–03–286–050	28°33'54.40"N	96°30'47.09"W	843300	4083690
3–03–286–230	28°33'49.30"N	96°30'56.70"W	843042	4083527
3–04–000–000	28°33'01.17"N	96°29'31.66"W	845385	4082096
3–04–476–122	28°32'54.70"N	96°29'15.43"W	845830	4081906
3–04–476–302	28°33'03.56"N	96°29'49.01"W	844912	4082159
4–01–000–000	28°35'09.87"N	96°33'54.22"W	838167	4085906
4–01–202–145	28°35'06.25"N	96°33'51.23"W	838251	4085796
4–01–202–325	28°35'14.75"N	96°33'55.15"W	838139	4086055
4–01–403–145	28°35'00.64"N	96°33'46.75"W	838376	4085626
4–01–403–325	28°35'21.64"N	96°34'03.86"W	837898	4086262

Table 3. Geographic location of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Latitude (NAD 1983)	Longitude (NAD 1983)	Texas State Plane coordinate (south-central zone)	
			Easting (m)	Northing (m)
4–02–000–000	28°33'37.00"N	96°31'21.43"W	842378	4083135
4–02–110–038	28°33'39.20"N	96°31'24.02"W	842307	4083201
4–02–110–218	28°33'33.72"N	96°31'18.42"W	842462	4083035
4–02–221–038	28°33'41.53"N	96°31'24.92"W	842280	4083272
4–02–221–218	28°33'31.37"N	96°31'16.35"W	842520	4082964
4–03–000–000	28°41'34.69"N	96°36'41.44"W	833383	4097656
4–03–266–176	28°41'25.73"N	96°36'40.94"W	833402	4097380
4–03–266–356	28°41'43.46"N	96°36'40.58"W	833400	4097926
4–03–532–176	28°41'18.89"N	96°36'40.59"W	833415	4097170
4–03–532–356	28°41'50.98"N	96°36'41.28"W	833376	4098157
4–04–000–000	28°41'21.75"N	96°38'25.81"W	830558	4097200
4–04–138–022	28°41'25.41"N	96°38'22.33"W	830650	4097315
4–04–138–202	28°41'18.80"N	96°38'27.90"W	830503	4097108
4–04–276–022	28°41'29.00"N	96°38'20.89"W	830687	4097426
4–04–276–202	28°41'17.43"N	96°38'28.70"W	830482	4097065
4–05–000–000	28°42'02.78"N	96°24'34.39"W	853094	4098941
4–05–065–008	28°42'04.91"N	96°24'34.32"W	853094	4099006
4–05–065–188	28°42'00.72"N	96°24'34.47"W	853093	4098877
4–05–130–008	28°42'06.94"N	96°24'34.25"W	853095	4099068
4–05–130–188	28°41'58.59"N	96°24'34.54"W	853093	4098811
5–01–000–000	28°37'55.52"N	96°37'00.80"W	832995	4090900
5–01–005–050	28°37'55.60"N	96°37'00.73"W	832996	4090902
5–01–005–230e	28°37'55.42"N	96°37'00.93"W	832991	4090896
5–01–050–050	28°37'56.26"N	96°36'59.48"W	833030	4090923
5–01–050–230	28°37'54.37"N	96°37'02.15"W	832959	4090863
5–02–000–000	28°42'52.45"N	96°37'56.04"W	831309	4100008
5–02–005–071	28°42'52.47"N	96°37'55.87"W	831314	4100009
5–02–005–251	28°42'52.43"N	96°37'56.20"W	831305	4100007
5–02–050–071	28°42'52.97"N	96°37'54.32"W	831356	4100025
5–02–050–251	28°42'51.94"N	96°37'57.77"W	831263	4099991
5–03–000–000	28°41'48.92"N	96°34'39.70"W	836677	4098162
5–03–005–074	28°41'48.97"N	96°34'39.55"W	836681	4098163
5–03–005–254	28°41'48.90"N	96°34'39.83"W	836674	4098161
5–03–050–074	28°41'49.53"N	96°34'38.06"W	836721	4098181
5–03–050–254	28°41'49.08"N	96°34'41.59"W	836626	4098166
5–04–000–000	28°39'57.91"N	96°34'16.67"W	837373	4094758
5–04–005–118	28°39'57.87"N	96°34'16.58"W	837376	4094757
5–04–005–298	28°39'58.00"N	96°34'16.83"W	837369	4094761
5–04–050–118	28°39'58.52"N	96°34'18.07"W	837335	4094776
5–04–050–298	28°39'56.77"N	96°34'15.38"W	837409	4094724

Table 3. Geographic location of data-collection sites, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	Latitude (NAD 1983)	Longitude (NAD 1983)	Texas State Plane coordinate (south-central zone)	
			Easting (m)	Northing (m)
5–05–000–000	28°44'14.93"N	96°24'00.30"W	853928	4103028
5–05–005–077	28°44'15.01"N	96°24'00.16"W	853932	4103031
5–05–005–257	28°44'14.86"N	96°24'00.40"W	853926	4103026
5–05–050–077	28°44'15.69"N	96°23'58.71"W	853971	4103052
5–05–050–257	28°44'14.78"N	96°24'01.92"W	853885	4103022

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992

[RMAL, Rocky Mountain Analytical Laboratory; I–M, Inberg–Miller Laboratory; µg/kg, micrograms per kilogram; >, greater than; µm, micrometers; <, less than; mg/kg, milligrams per kilogram; --, no data available for water sample; U, undetected at specified detection limit; J, estimated amount/limited data use; 3, holding time not met, possible low/low bias; 1, blank contamination, possible high bias/false positives; 4, other outside of quality-control control limit, bias to be evaluated; a, Inberg–Miller Laboratory duplicate; A,B,C,D, equipment rinsate sample; ++, data missing]

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight)			Total organic carbon[1] (mg/kg)
					Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	
1–01–000–000–1–1	023664–0004	52	Sediment	220	17	37	46	9,090
1–01–000–000–2–1	023664–0005	53	Sediment	97.6	53	29	18	3,220
1–01–000–000–3–1	023664–0006	54	Sediment	20.1	44	37	19	3,120
1–01–005–000–1–2	023668–0010	118	Sediment	274	13	34	53	8,840
1–01–005–000–2–2	023668–0011	119	Sediment	55.8	40	32	28	5,300
1–01–005–000–3–2	023668–0012	120	Sediment	17.4	45	42	13	2,090
1–01–005–180–1–3	023654–0011	40	Sediment	245	10	59	31	8,120
1–01–005–180–2–3	023654–0012	41	Sediment	171	28	34	38	4,740
1–01–005–180–3–3	023654–0013	42	Sediment	21.1	49	33	18	2,450
1–01–082–340–1–1	023660–0013	28	Sediment	185	26	41	33	7,320
1–01–082–340–2–1	023660–0014	29	Sediment	406	25	34	41	5,650
1–01–082–340–3–1	023660–0015	30	Sediment	23.0	40	28	32	3,010
1–01–203–210–1–1	023660–0004	19	Sediment	401	8	26	66	9,340
1–01–203–210–2–1	023660–0005	20	Sediment	438	20	34	46	7,190
1–01–203–210–3–1	023660–0006	21	Sediment	14.7	47	43	10	2,310
1–01–253–186–1–1	023660–0010	25	Sediment	450	4	45	51	8,840
1–01–253–186–2–1	023660–0011	26	Sediment	349	26	41	33	4,350
1–01–253–186–3–1	023660–0012	27	Sediment	42.4	28	40	32	3,710

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–01–277–050–1–1	023660–0007	22	Sediment	369	8	40	52	10,400
1–01–277–050–2–1	023660–0008	23	Sediment	113	26	38	36	4,950
1–01–277–050–3–1	023660–0009	24	Sediment	19.9	11	46	43	3,850
1–01–344–247–1–1	023647–0001	43	Sediment	105	46	33	21	4,520
1–01–344–247–2–1	023647–0002	44	Sediment	68.6	63	30	7	2,130
1–01–344–247–3–1	023647–0003	45	Sediment	156	61	26	13	2,970
1–01–385–003–1–1	023670–0004	97	Sediment	92.7	62	23	15	3,480
1–01–385–003–2–1	023670–0005	98	Sediment	110	64	18	18	3,210
1–01–385–003–3–1	023670–0006	99	Sediment	66.4	75	14	11	1,930
1–01–387–025–1–1	023660–0001	16	Sediment	427	7	30	63	8,390
1–01–387–025–2–1	023660–0002	17	Sediment	341	20	32	48	5,180
1–01–387–025–3–1	023660–0003	18	Sediment	30.5	49	43	8	3,950
1–01–392–237–1–1	023647–0004	46	Sediment	115	35	37	28	6,050
1–01–392–237–1–5	023647–0009	--	Water	.4 U	--	--	--	.94 J3
1–01–392–237–1–5	023647–0010	--	Water	.4 U	--	--	--	1.5 J3
1–01–392–237–1–5	023647–0011	--	Water	.9	--	--	--	1,380 J3
1–01–392–237–2–1	023647–0005	47	Sediment	119	50	34	16	2,650
1–01–392–237–3–1	023647–0006	48	Sediment	13.6 U	54	40	6	1,750
1–01–392–237–3–5	023647–0007	--	Water	.4 U	--	--	--	.55 J3
1–01–392–237–3–5	023647–0008	--	Water	.4 U	--	--	--	2.6 J3
1–01–401–119–1–1	023664–0001	49	Sediment	201	0	21	79	14,300
1–01–401–119–2–1	023664–0002	50	Sediment	200	1	24	75	10,700
1–01–401–119–3–1	023664–0003	51	Sediment	312	1	20	79	11,400
1–01–431–135–1–1	023664–0010	58	Sediment	217	1	37	62	10,500
1–01–431–135–2–1	023664–0011	59	Sediment	366	16	28	56	9,850
1–01–431–135–3–1	023664–0012	60	Sediment	342	1	29	70	9,830
1–01–493–201–1–1	023664–0013	61	Sediment	350	7	28	65	9,170
1–01–493–201–2–1	023664–0014	62	Sediment	334	13	57	30	5,760
1–01–493–201–3–1	023664–0015	63	Sediment	128	31	51	18	4,580
1–01–493–201–3–5	023664–0016	--	Water	.2 U	--	--	--	1.5
1–01–528–232–1–1	023662–0014	91	Sediment	150	15	43	42	6,070 J1
1–01–528–232–2–1	023662–0015	92	Sediment	183	41	36	23	2,830 J1
1–01–528–232–3–1	023662–0016	93	Sediment	35.5	55	35	10	4,530 J1

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–02–000–000–1–1	023664–0007	55	Sediment	406	0	24	76	8,080
1–02–000–000–2–1	023664–0008	56	Sediment	1,190	3	32	65	6,610
1–02–000–000–3–1	023664–0009	57	Sediment	23.7	4	38	58	3,850
1–02–005–015–1–2	023654–0008	37	Sediment	399	0	24	76	7,650
1–02–005–015–2–2	023654–0009	38	Sediment	699	3	43	54	5,640
1–02–005–015–3–2	023654–0010	39	Sediment	286	12	33	55	3,190
1–02–005–195–1–3	023668–0013	121	Sediment	364	3	37	60	7,740
1–02–005–195–2–3	023668–0014	122	Sediment	961	6	29	65	6,370
1–02–005–195–3–3	023668–0015	123	Sediment	1,060	7	40	53	4,930
1–02–041–289–1–1	023666–0014	76	Sediment	348	0	39	61	6,650
1–02–041–289–2–1	023666–0015	77	Sediment	481	4	28	68	6,350
1–02–041–289–3–1	023666–0016	78	Sediment	20.6 U	6	37	57	3,320
1–02–066–209–1–1	023654–0005	34	Sediment	392 J4	1	21	78	7,320
1–02–066–209–2–1	023654–0006	35	Sediment	705	2	23	75	6,730
1–02–066–209–3–1	023654–0007	36	Sediment	395	5	27	68	5,340
1–02–119–086–1–1	023668–0004	112	Sediment	296	0	32	68	5,980
1–02–119–086–2–1	023668–0005	113	Sediment	907	0	27	73	6,090
1–02–119–086–3–1	023668–0006	114	Sediment	1,100	1	41	58	4,350
1–02–222–105–1–1	023670–0001	94	Sediment	400	1	37	62	8,130
1–02–222–105–2–1	023670–0002	95	Sediment	798	3	37	60	7,520
1–02–222–105–3–1	023670–0003	96	Sediment	406	6	36	58	6,660
1–02–253–186–1–1	023668–0007	115	Sediment	430	0	32	68	7,840
1–02–253–186–2–1	023668–0008	116	Sediment	938	6	34	60	6,670
1–02–253–186–3–1	023668–0009	117	Sediment	1,070	8	39	53	3,880
1–02–314–035–1–1	023662–0011	88	Sediment	47.8	3	25	72	4,680 J1
1–02–314–035–2–1	023662–0012	89	Sediment	231	3	17	80	6,430 J1
1–02–314–035–3–1	023662–0013	90	Sediment	813	4	18	78	7,560 J1
1–02–347–321–1–1	023662–0007	85	Sediment	450	13	29	58	4,530 J1
1–02–347–321–2–1	023662–0008	86	Sediment	747	3	16	81	6,090 J1
1–02–347–321–3–1	023662–0009	87	Sediment	213	17	25	58	3,860 J1
1–02–347–321–3–5	023662–0010	--	Water	.2 U	--	--	--	.5 U

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight)			Total organic carbon[1] (mg/kg)
					Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	
1–02–368–169–1–1	023670–0013	106	Sediment	391	2	26	72	8,470
1–02–368–169–2–1	023670–0014	107	Sediment	352	0	28	72	8,290
1–02–368–169–3–1	023670–0015	108	Sediment	1,210	1	29	70	5,850
1–02–385–069–1–1	023670–0007	100	Sediment	247	0	44	56	4,880
1–02–385–069–2–1	023670–0008	101	Sediment	461	2	33	65	6,990
1–02–385–069–3–1	023670–0009	102	Sediment	1,050	5	28	67	6,290
1–02–424–266–1–1	023670–0010	103	Sediment	32.8	93	4	3	890
1–02–424–266–2–1	023670–0011	104	Sediment	137	47	42	11	1,190
1–02–424–266–3–1	023670–0012	105	Sediment	312	31	25	44	5,390
1–02–452–136–1–1	023668–0001	109	Sediment	355	0	25	75	8,140
1–02–452–136–2–1	023668–0002	110	Sediment	496	1	34	65	5,960
1–02–452–136–3–1	023668–0003	111	Sediment	451	4	26	70	4,660
1–02–562–101–1–1	023654–0001	31	Sediment	343	0	21	79	10,200
1–02–562–101–1–5	023654–0004	--	Water	.2 U	--	--	--	1.1
1–02–562–101–2–1	023654–0002	32	Sediment	1,270	2	49	49	9,110
1–02–562–101–3–1	023654–0003	33	Sediment	237	3	27	70	5,320
1–03–000–000–1–1	023783–0007	130	Sediment	234	7	55	38	8,640
1–03–000–000–2–1	023783–0008	131	Sediment	34.9	39	37	24	2,720
1–03–000–000–3–1	023783–0009	132	Sediment	16.1 U	61	19	20	7,660
1–03–005–000–1–2	023786–0001	133	Sediment	227	4	45	51	8,620
1–03–005–000–2–2	023786–0002	134	Sediment	91.9	53	18	29	3,920
1–03–005–000–3–2	023786–0003	135	Sediment	13.5 U	50	22	28	2,750
1–03–005–180–1–3	023786–0004	136	Sediment	274	15	40	45	8,170
1–03–005–180–2–3	023786–0005	137	Sediment	22.5	46	23	31	4,300
1–03–005–180–3–3	023786–0006	138	Sediment	19.2	60	19	21	16,000
1–03–039–057–1–1	024193–0011	652	Sediment	230	11	26	63	7,770 J
1–03–039–057–2–1	024193–0012	653	Sediment	24.5	39	15	46	3,410 J
1–03–039–057–3–1	024193–0013	654	Sediment	15.5 U	52	14	34	5,430 J
1–03–048–005–1–1	024193–0008	649	Sediment	224	16	28	56	6,770 J
1–03–048–005–2–1	024193–0009	650	Sediment	47.3	39	15	46	5,440 J
1–03–048–005–3–1	024193–0014	651	Sediment	14.8 U	54	17	29	2,970 J
1–03–048–005–3–5	024193–0010	655 a	Sediment	14.9 U	52	18	30	2,920 J

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–03–130–171–1–1	023786–0007	139	Sediment	263	11	48	41	11,100
1–03–130–171–2–1	023786–0008	140	Sediment	42.3	38	41	21	4,860
1–03–130–171–3–1	023786–0009	141	Sediment	14.9 U	48	27	25	2,770
1–03–161–159–1–1	023786–0001	79	Sediment	205	22	37	41	6,600 J
1–03–161–159–2–1	023662–0002	80	Sediment	38.2	46	19	35	4,160
1–03–161–159–3–1	023662–0003	81	Sediment	20.6	41	24	35	4,320
1–03–270–170–1–1	023786–0010	142	Sediment	243	5	43	52	10,000
1–03–270–170–1–5	023786–0013	--	Water	.2 U	--	--	--	1.0
1–03–270–170–2–1	023786–0011	143	Sediment	33.4	47	24	29	2,870
1–03–270–170–3–1	023786–0012	144	Sediment	16.5 U	46	24	30	5,110
1–03–279–079–1–1	024501–0010	430	Sediment	118	32	35	33	7,990
1–03–279–079–2–1	024501–0011	431	Sediment	38.0	55	16	29	3,080
1–03–279–079–3–1	024501–0012	432	Sediment	14.3	55	21	24	3,460
1–03–327–039–1–1	023662–0004	82	Sediment	272	23	32	45	5,490
1–03–327–039–2–1	023662–0005	83	Sediment	21.1	55	19	26	3,700 J1
1–03–327–039–3–1	023662–0006	84	Sediment	112	45	17	38	4,220 J1
1–03–362–089–1–1	024501–0013	433	Sediment	177	20	28	52	8,010
1–03–362–089–2–1	024501–0014	434	Sediment	37.1	54	21	25	3,010
1–03–362–089–3–1	024501–0015	435	Sediment	14.5 U	57	31	12	3,280
1–03–362–089–3–5A	024501–0016	--	Water	.2 U	--	--	--	.66
1–03–362–089–3–5B	024501–0017	--	Water	.2 U	--	--	--	.89
1–03–362–089–3–5C	024501–0018	--	Water	.2 U	--	--	--	.72
1–03–362–089–3–5D	024501–0019	--	Water	.2 U	--	--	--	.5 U
1–03–403–130–1–1	023783–0004	127	Sediment	73.2	8	33	59	8,920
1–03–403–130–2–1	023783–0005	128	Sediment	30.6	50	21	29	3,820
1–03–403–130–3–1	023783–0006	129	Sediment	15.1 U	59	22	19	4,430
1–03–417–166–1–1	023783–0001	124	Sediment	216	19	46	35	6,480
1–03–417–166–2–1	023783–0002	125	Sediment	44.4	47	20	33	4,320
1–03–417–166–3–1	023783–0003	126	Sediment	15.0 U	45	27	28	3,000
1–03–507–072–1–1	023862–0001	145	Sediment	179 J4	28	46	26	7,120
1–03–507–072–1–5	023862–0017	145 a	Sediment	203	33	42	25	5,020
1–03–507–072–2–1	023862–0002	146	Sediment	30.2	53	29	18	3,180
1–03–507–072–3–1	023862–0003	147	Sediment	16.8 U	63	17	20	2,140

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–03–520–150–1–1	024193–0001	646	Sediment	207	14	25	61	7,560 J
1–03–520–150–2–1	024193–0002	647	Sediment	96.4	47	11	42	5,390 J
1–03–520–150–3–1	024193–0003	648	Sediment	14.5 U	54	19	27	4,170 J
1–03–520–150–3–5A	024193–0004	--	Water	.2 U	--	--	--	.5 UJ
1–03–520–150–3–5B	024193–0005	--	Water	.2 U	--	--	--	.5 UJ
1–03–520–150–3–5C	024193–0006	--	Water	.2 U	--	--	--	.5 UJ
1–03–520–150–3–5D	024193–0007	--	Water	.2 U	--	--	--	.5 UJ
1–04–000–000–1–1	023862–0013	157	Sediment	198	12	46	42	9,270
1–04–000–000–1–5	023862–0016	--	Water	.2 U	--	--	--	1.0 U
1–04–000–000–2–1	023862–0014	158	Sediment	32.5	6	50	44	9,020
1–04–000–000–2–5	023862–0018	158 a	Sediment	46.0	5	63	32	8,650
1–04–000–000–3–1	023862–0015	159	Sediment	21.4 U	17	45	38	7,190
1–04–005–108–1–2	023862–0007	151	Sediment	189	6	49	45	10,500
1–04–005–108–2–2	023862–0008	152	Sediment	33.1	10	41	49	6,750
1–04–005–108–3–2	023862–0009	153	Sediment	21.8 U	11	14	75	6,690
1–04–005–288–1–3	023862–0010	154	Sediment	200	12	56	32	8,680
1–04–005–288–2–3	023862–0011	155	Sediment	30.8	12	38	50	8,090
1–04–005–288–3–3	023862–0012	156	Sediment	22.0 U	29	46	25	5,930
1–04–024–306–1–1	023666–0001	64	Sediment	176	14	34	52	8,380
1–04–024–306–2–1	023666–0002	65	Sediment	21.7 U	1	26	73	7,470
1–04–024–306–3–1	023666–0003	66	Sediment	17.6 U	20	28	52	6,190
1–04–025–135–1–1	023862–0004	148	Sediment	232	12	48	40	8,180
1–04–025–135–2–1	023862–0005	149	Sediment	34.1	8	39	53	8,330
1–04–025–135–3–1	023862–0006	150	Sediment	19.8 U	26	34	40	5,690
1–04–064–114–1–1	023666–0004	67	Sediment	218	9	32	59	11,000
1–04–064–114–2–1	023666–0005	68	Sediment	41.4	14	28	58	7,260
1–04–064–114–3–1	023666–0006	69	Sediment	18.5	30	42	28	5,300
1–04–064–114–3–5	023666–0007	--	Water	.2 U	--	--	--	1.7
1–04–143–001–1–1	023649–0010	10	Sediment	202	11	47	42	9,200
1–04–143–001–2–1	023649–0011	11	Sediment	31.8	9	40	51	7,920
1–04–143–001–3–1	023649–0012	12	Sediment	33.9	31	33	36	5,080
1–04–165–214–1–1	023649–0001	1	Sediment	163	18	46	36	8,250
1–04–165–214–2–1	023649–0002	2	Sediment	26.5	15	33	52	7,280
1–04–165–214–3–1	023649–0003	3	Sediment	17.9 U	34	45	21	5,850

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–04–229–194–1–1	023649–0013	13	Sediment	178	13	64	23	8,290
1–04–229–194–2–1	023649–0014	14	Sediment	149	28	24	48	6,820
1–04–229–194–3–1	023649–0015	15	Sediment	17.2 U	28	26	46	4,780
1–04–311–321–1–1	023649–0007	7	Sediment	169	7	43	50	8,740
1–04–311–321–2–1	023649–0008	8	Sediment	176	15	47	38	6,500
1–04–311–321–3–1	023649–0009	9	Sediment	38.8	2	27	71	9,710
1–04–318–068–1–1	023666–0011	73	Sediment	209	1	33	66	3,750
1–04–318–068–2–1	023666–0012	74	Sediment	57.9	11	31	58	7,250
1–04–318–068–3–1	023666–0013	75	Sediment	20.5	17	30	53	4,510
1–04–417–091–1–1	023649–0004	4	Sediment	220	6	54	40	10,200
1–04–417–091–2–1	023649–0005	5	Sediment	30.7	14	45	41	5,870
1–04–417–091–3–1	023649–0006	6	Sediment	17.3 U	23	44	33	4,240
1–04–534–041–1–1	023865–0004	163	Sediment	207	5	35	60	10,600
1–04–534–041–2–1	023865–0005	164	Sediment	19.1 U	19	56	25	4,760
1–04–534–041–3–1	023865–0006	165	Sediment	22.7 U	5	25	70	7,980
1–04–554–203–1–1	023865–0001	160	Sediment	253	8	52	40	9,910
1–04–554–203–2–1	023865–0002	161	Sediment	39.3	6	49	45	8,280
1–04–554–203–3–1	023865–0003	162	Sediment	25.0 U	1	25	74	7,540
1–04–561–037–1–1	023666–0008	70	Sediment	188	3	32	65	13,800
1–04–561–037–2–1	023666–0009	71	Sediment	26.8	11	31	58	6,870
1–04–561–037–3–1	023666–0010	72	Sediment	19.5 U	25	34	41	4,850
1–05–000–000–1–1	024501–0001	421	Sediment	65.1	35	35	30	5,950
1–05–000–000–2–1	024501–0002	422	Sediment	156	28	32	40	4,690
1–05–000–000–3–1	024501–0003	423	Sediment	19.6	31	28	41	5,240
1–05–005–087–1–3	024501–0007	427	Sediment	68.8	32	30	38	7,170
1–05–005–087–2–3	024501–0008	428	Sediment	123	29	30	41	4,150
1–05–005–087–3–3	024501–0009	429	Sediment	17.3	32	36	32	4,710
1–05–005–267–1–2	024501–0004	424	Sediment	61.3	35	28	37	8,900
1–05–005–267–2–2	024501–0005	425	Sediment	75.5	39	35	26	4,280
1–05–005–267–3–2	024501–0006	426	Sediment	13.2	63	22	15	2,490

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight)			Total organic carbon[1] (mg/kg)
					Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	
1–05–014–062–1–1	023900–0007	192	Sediment	75.4	26	36	38	6,480
1–05–014–062–2–1	023900–0008	193	Sediment	24.7	16	33	51	6,340
1–05–014–062–3–1	023900–0009	194	Sediment	15.6 U	33	39	28	4,440
1–05–043–256–1–1	023902–0001	198	Sediment	46.0	22	17	61	5,890
1–05–043–256–2–1	023902–0002	199	Sediment	35.2	38	30	32	4,070
1–05–043–256–3–1	023902–0003	200	Sediment	17.4 U	39	42	19	4,640
1–05–133–177–1–1	023865–0010	169	Sediment	61.0	24	35	41	9,020
1–05–133–177–2–1	023865–0011	170	Sediment	94.0	40	31	29	4,120
1–05–133–177–3–1	023865–0012	171	Sediment	20.2 U	39	25	36	5,260
1–05–133–177–3–5	023865–0013	--	Water	.2 U	--	--	--	.5 U
1–05–148–021–1–1	023929–0004	176	Sediment	94.9	23	54	23	8,720
1–05–148–021–2–1	023929–0005	177	Sediment	30.3	24	27	49	6,910
1–05–148–021–3–1	023929–0006	178	Sediment	17.4 U	33	40	27	4,040
1–05–160–336–1–1	023902–0010	207	Sediment	96.5	13	42	45	9,640
1–05–160–336–2–1	023902–0011	208	Sediment	36.6	12	34	54	6,480
1–05–160–336–3–1	023902–0012	209	Sediment	16.4 U	43	24	33	7,470
1–05–276–220–1–1	023900–0010	195	Sediment	54.3	20	47	33	7,930
1–05–276–220–2–1	023900–0011	196	Sediment	17.4 U	44	27	29	5,790
1–05–276–220–3–1	023900–0012	197	Sediment	18.5 U	22	27	51	4,200
1–05–318–308–1–1	023929–0007	179	Sediment	64.2	29	33	38	6,280
1–05–318–308–1–5	023929–0010	--	Water	.2 U	--	--	--	.5 U
1–05–318–308–2–1	023929–0008	180	Sediment	30.6	15	42	43	6,420
1–05–318–308–3–1	023929–0009	181	Sediment	15.2 U	46	29	25	3,450
1–05–318–308–3–5	023929–0015	182	Sediment	17.4	41	46	13	4,620
1–05–335–132–1–1	023900–0004	189	Sediment	41.8	20	44	36	8,190
1–05–335–132–2–1	023900–0005	190	Sediment	30.3	30	30	40	5,800
1–05–335–132–3–1	023900–0006	191	Sediment	17.1	46	38	16	4,280
1–05–335–132–3–5	023900–0013	191 a	Sediment	16.5 U	38	39	23	4,180
1–05–429–122–1–1	023900–0001	186	Sediment	44.3	37	36	27	6,700
1–05–429–122–2–1	023900–0002	187	Sediment	37.1	35	30	35	6,120
1–05–429–122–3–1	023900–0003	188	Sediment	15.3	48	46	6	2,630

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–05–454–084–1–1	023865–0007	166	Sediment	55.4	32	34	34	7,070
1–05–454–084–2–1	023865–0008	167	Sediment	45.4	42	30	28	5,350
1–05–454–084–3–1	023865–0009	168	Sediment	16.6 U	36	32	32	3,980
1–05–509–204–1–1	023902–0004	201	Sediment	52.9	19	42	39	6,800
1–05–509–204–2–1	023902–0005	202	Sediment	18.6 U	22	40	38	5,430
1–05–509–204–3–1	023902–0006	203	Sediment	17.2 U	12	30	58	4,580
1–05–510–251–1–1	023902–0007	204	Sediment	39.5	27	38	35	7,390
1–05–510–251–2–1	023902–0008	205	Sediment	66.8	36	20	44	4,000
1–05–510–251–3–1	023902–0009	206	Sediment	24.2	25	28	47	3,130
1–06–000–000–1–1	024195–0007	411	Sediment	163	0	39	61	10,200
1–06–000–000–2–1	024195–0016	420	Sediment	192	4	34	62	7,810
1–06–000–000–2–5	024195–0008	412	Sediment	200	8	48	44	9,010
1–06–000–000–3–1	024195–0009	413	Sediment	206	1	39	60	6,170
1–06–005–163–1–3	024195–0010	414	Sediment	189	0	39	61	8,770
1–06–005–163–2–3	024195–0011	415	Sediment	180	0	35	65	7,500
1–06–005–163–3–3	024195–0012	416	Sediment	147	4	43	53	5,680
1–06–005–343–1–2	024195–0013	417	Sediment	192	0	31	69	9,490
1–06–005–343–2–2	024195–0014	418	Sediment	278	3	36	61	7,870
1–06–005–343–3–2	024195–0015	419	Sediment	183	3	34	63	5,960
1–06–054–270–1–1	023929–0001	172	Sediment	177	0	55	45	7,990
1–06–054–270–1–5	023929–0014	173	Sediment	220	0	48	52	7,560
1–06–054–270–2–1	023929–0002	174	Sediment	264	0	45	55	7,760
1–06–054–270–3–1	023929–0003	175	Sediment	162	0	34	66	8,640
1–06–117–007–1–1	023931–0004	213	Sediment	102	0	31	69	8,000
1–06–117–007–2–1	023931–0005	214	Sediment	195	0	43	57	8,180
1–06–117–007–3–1	023931–0006	215	Sediment	182	0	35	65	9,490
1–06–150–114–1–1	024046–0010	231	Sediment	166	0	31	69	9,670
1–06–150–114–2–1	024046–0011	232	Sediment	159	0	41	59	8,610
1–06–150–114–3–1	024046–0012	233	Sediment	221	0	37	63	7,860
1–06–171–066–1–1	024046–0001	222	Sediment	128	0	39	61	8,050
1–06–171–066–2–1	024046–0002	223	Sediment	120	0	39	61	7,590
1–06–171–066–3–1	024046–0003	224	Sediment	90.8	1	33	66	6,140

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight)			Total organic carbon[1] (mg/kg)
					Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	
1–06–175–297–1–1	023931–0007	216	Sediment	175	0	40	60	8,780
1–06–175–297–2–1	023931–0008	217	Sediment	216	0	31	69	6,100
1–06–175–297–3–1	023931–0009	218	Sediment	171	3	45	52	8,500
1–06–270–120–1–1	024046–0007	228	Sediment	121	0	49	51	7,710
1–06–270–120–2–1	024046–0008	229	Sediment	121	0	38	62	7,160
1–06–270–120–3–1	024046–0009	230	Sediment	113	1	52	47	5,630
1–06–345–218–1–1	024046–0004	225	Sediment	142	0	40	60	7,780
1–06–345–218–2–1	024046–0005	226	Sediment	140	0	42	58	7,870
1–06–345–218–3–1	024046–0006	227	Sediment	157	0	31	69	7,120
1–06–418–316–1–1	023929–0011	183	Sediment	165	0	38	62	8,080
1–06–418–316–2–1	023929–0012	184	Sediment	213	0	39	61	6,900
1–06–418–316–3–1	023929–0013	185	Sediment	172	1	48	51	7,050
1–06–448–145–1–1	023931–0001	210	Sediment	128	23	34	43	6,430
1–06–448–145–2–1	023931–0002	211	Sediment	118	25	35	40	4,510
1–06–448–145–2–5	023931–0013	++	Sediment	48.3	++	++	++	6,250
1–06–448–145–3–1	023931–0003	212	Sediment	15.6	28	40	32	8,820
1–06–491–056–1–1	024048–0001	234	Sediment	201	0	23	77	10,400
1–06–491–056–2–1	024048–0002	235	Sediment	178	0	34	66	8,240
1–06–491–056–3–1	024048–0003	236	Sediment	201	0	35	65	7,480
1–06–511–225–1–1	024048–0014	237	Sediment	197	0	45	55	9,090
1–06–511–225–1–5	024048–0004	237 a	Sediment	212	0	35	65	8,260
1–06–511–225–2–1	024048–0005	238	Sediment	201	2	50	48	6,570
1–06–511–225–3–1	024048–0006	239	Sediment	220	2	32	66	5,860
1–06–514–234–1–1	023931–0010	219	Sediment	168	0	48	52	5,990
1–06–514–234–2–1	023931–0011	220	Sediment	164	44	34	22	5,760
1–06–514–234–3–1	023931–0012	221	Sediment	141	28	21	51	6,610
1–07–000–000–1–1	024507–0001	436	Sediment	131	20	31	49	8,550
1–07–000–000–2–1	024507–0002	437	Sediment	48.6	17	36	47	6,680
1–07–000–000–3–1	024507–0003	438	Sediment	16.5 U	48	22	30	2,520
1–07–005–116–1–2	024507–0004	439	Sediment	150	12	35	53	7,550
1–07–005–116–2–2	024507–0005	440	Sediment	30.3	22	28	50	6,220
1–07–005–116–3–2	024507–0006	441	Sediment	16.5 U	53	27	20	2,290

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–07–005–296–1–3	024507–0007	442	Sediment	25.2	17	30	53	5,520
1–07–005–296–1–5	024507–0010	445	Sediment	153	16	40	44	8,110
1–07–005–296–2–3	024507–0008	443	Sediment	160	19	38	43	6,620
1–07–005–296–3–3	024507–0009	444	Sediment	13.8 U	53	25	22	2,260
1–07–028–148–1–1	024311–0001	318	Sediment	145	14	36	50	8,730
1–07–028–148–2–1	024311–0002	319	Sediment	24.3	16	29	55	6,880
1–07–028–148–3–1	024311–0003	320	Sediment	13.3 U	45	37	18	2,400
1–07–043–256–1–1	024228–0001	276	Sediment	227	11	28	61	8,820
1–07–043–256–1–5	024228–0004	279	Sediment	170	13	35	52	7,280
1–07–043–256–2–1	024228–0002	277	Sediment	24.8	15	29	56	6,680
1–07–043–256–3–1	024228–0003	278	Sediment	16.2 U	55	17	28	22,400
1–07–057–014–1–1	024228–0011	286	Sediment	117	12	31	57	7,610
1–07–057–014–2–1	024228–0012	287	Sediment	20.0 U	16	31	53	5,410
1–07–057–014–3–1	024228–0013	288	Sediment	14.9 U	51	21	28	3,690
1–07–057–014–3–5	024228–0014	--	Water	.2 U	--	--	--	.5 U
1–07–133–177–1–1	024228–0005	280	Sediment	472	17	30	53	7,510
1–07–133–177–2–1	024228–0006	211	Sediment	19.9 U	++	++	++	6,990
1–07–133–177–3–1	024228–0007	282	Sediment	17.5 U	31	36	33	7,780
1–07–160–336–1–1	024231–0013	345	Sediment	203	6	49	45	6,850
1–07–160–336–2–1	024231–0014	346	Sediment	20.3	35	32	33	5,380
1–07–160–336–3–1	024231–0015	347	Sediment	15.0 U	60	19	21	2,870
1–07–212–169–1–1	024228–0008	283	Sediment	171	20	34	46	6,650
1–07–212–169–2–1	024228–0009	284	Sediment	20.0 U	18	35	47	6,970
1–07–212–169–3–1	024228–0010	285	Sediment	20.4 U	40	25	35	5,140
1–07–256–065–1–1	024311–0004	321	Sediment	211	6	32	62	9,980
1–07–256–065–2–1	024311–0005	322	Sediment	19.6 U	7	40	53	5,600
1–07–256–065–3–1	024311–0006	323	Sediment	20.4 U	52	25	23	3,890
1–07–318–308–1–1	024231–0010	342	Sediment	173	59	8	33	7,060
1–07–318–308–2–1	024231–0011	343	Sediment	20.1 U	6	42	52	6,330
1–07–318–308–3–1	024231–0012	344	Sediment	16.1 U	18	42	40	8,830
1–07–429–090–1–1	024311–0010	327	Sediment	214	11	30	59	9,420
1–07–429–090–2–1	024311–0011	328	Sediment	26.1 U	17	27	56	7,780
1–07–429–090–3–1	024311–0012	329	Sediment	19.9 U	47	22	31	4,440

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (μg/kg)	Grain size[1] (percent by weight) Sand (>74 μm)	Silt (74–2 μm)	Clay (<2 μm)	Total organic carbon[1] (mg/kg)
1–07–439–004–1–1	024195–0001	405	Sediment	157	19	37	44	6,750
1–07–439–004–2–1	024195–0002	406	Sediment	55.4	37	25	38	6,170
1–07–439–004–3–1	024195–0003	407	Sediment	19.5 U	48	23	29	4,150
1–07–454–084–1–1	024311–0007	324	Sediment	184	10	32	58	10,200
1–07–454–084–2–1	024311–0008	325	Sediment	22.3 U	18	15	67	7,020
1–07–454–084–3–1	024311–0009	326	Sediment	21.5 U	50	28	22	3,880
1–07–507–348–1–1	024195–0004	408	Sediment	163	13	33	54	8,630
1–07–507–348–2–1	024195–0005	409	Sediment	25.6	16	32	52	6,770
1–07–507–348–3–1	024195–0006	410	Sediment	15.9 U	55	20	25	16,000
1–08–000–000–1–1	024231–0004	336	Sediment	116	16	34	50	6,290
1–08–000–000–2–1	024231–0005	337	Sediment	17.5 U	12	50	38	4,710
1–08–000–000–3–1	024231–0006	338	Sediment	14.6 U	29	41	30	4,210
1–08–005–131–1–2	024231–0001	333	Sediment	99.9	5	47	48	6,950
1–08–005–131–2–2	024231–0002	334	Sediment	118	9	45	46	6,110
1–08–005–131–3–2	024231–0003	335	Sediment	14.5 U	21	52	27	3,470
1–08–005–311–1–3	024231–0007	339	Sediment	102	16	39	45	6,080
1–08–005–311–2–3	024231–0008	340	Sediment	39.5	15	49	36	5,260
1–08–005–311–3–3	024231–0009	341	Sediment	15.6 U	14	51	35	4,280
1–08–054–223–1–1	024075–0007	270	Sediment	127	16	36	48	9,340
1–08–054–223–2–1	024075–0008	271	Sediment	32.3	17	38	45	3,980
1–08–054–223–3–1	024075–0009	272	Sediment	16.1 U	35	48	17	32,400
1–08–076–039–1–1	024077–0007	252	Sediment	134	14	31	55	8,590
1–08–076–039–2–1	024077–0008	253	Sediment	77.7	13	36	51	6,660
1–08–076–039–3–1	024077–0009	254	Sediment	15.2 U	33	39	28	5,570
1–08–120–238–1–1	024049–0010	243	Sediment	125	4	31	65	10,600
1–08–120–238–1–5	024048–0013	--	Water	.2 U	--	--	--	1.3
1–08–120–238–2–1	024048–0011	244	Sediment	122	12	40	48	6,700
1–08–120–238–3–1	024048–0012	245	Sediment	147	3	30	67	6,630
1–08–124–304–1–1	024075–0010	273	Sediment	94.7	27	40	33	5,010
1–08–124–304–2–1	024075–0011	274	Sediment	20.6	15	42	43	5,540
1–08–124–304–3–1	024075–0012	275	Sediment	15.4 U	20	57	23	4,910

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–08–234–145–1–1	024075–0004	267	Sediment	171	1	31	68	10,400
1–08–234–145–2–1	024075–0005	268	Sediment	168	1	47	52	7,230
1–08–234–145–3–1	024075–0006	269	Sediment	194	0	37	63	8,020
1–08–268–301–1–1	024077–0001	246	Sediment	159	0	32	68	9,470
1–08–268–301–2–1	024077–0013	247	Sediment	245	1	42	57	7,520
1–08–268–301–2–5	024077–0002	247 a	Sediment	179	1	45	54	6,970
1–08–268–301–3–1	024077–0003	248	Sediment	161	0	17	83	7,540
1–08–297–171–1–1	024073–0001	258	Sediment	55.0	38	49	13	4,290
1–08–297–171–2–1	024073–0002	259	Sediment	187	5	36	59	6,140
1–08–297–171–3–1	024073–0008	260	Sediment	16.9	14	16	70	4,980
1–08–297–171–3–5	024073–0003	260 a	Sediment	16.5 U	19	10	71	4,560
1–08–344–205–1–1	024075–0001	264	Sediment	144	0	28	72	10,400
1–08–344–205–2–1	024075–0002	265	Sediment	159	0	41	59	6,730
1–08–344–205–3–1	024075–0003	266	Sediment	181	0	37	63	7,140
1–08–371–247–1–1	024048–0007	240	Sediment	152	5	41	54	7,440
1–08–371–247–2–1	024048–0008	241	Sediment	19.6	21	41	38	5,240
1–08–371–247–3–1	024048–0009	242	Sediment	14.9 U	19	57	24	3,200
1–08–474–272–1–1	024077–0004	249	Sediment	150	9	46	45	7,330
1–08–474–272–2–1	024077–0005	250	Sediment	30.6	26	17	57	6,720
1–08–474–272–3–1	024077–0006	251	Sediment	104	15	47	38	5,050
1–08–482–150–1–1	024073–0004	261	Sediment	130	6	16	78	8,230
1–08–482–150–1–5	027073–0007	--	Water	.2 U	--	--	--	.5 U
1–08–482–150–2–1	024073–0005	262	Sediment	59.8	9	30	61	5,830
1–08–482–150–3–1	024073–0006	263	Sediment	15.5 U	11	47	42	4,810
1–08–495–245–1–1	024077–0010	255	Sediment	128	18	34	48	2,870
1–08–495–245–2–1	027077–0011	256	Sediment	74.1	14	36	50	6,200
1–08–495–245–3–1	024077–0012	257	Sediment	15.5 U	20	58	22	6,840
1–10–000–000–1–1	024313–0010	356	Sediment	35.9	4	43	53	11,700
1–10–000–000–2–1	024313–0011	357	Sediment	22.8	20	44	36	3,450
1–10–000–000–2–5	024313–0013	359	Sediment	22.4	24	52	24	3,610
1–10–000–000–3–1	024313–0012	358	Sediment	24.3	20	56	24	3,960
1–10–000–000–3–5	024313–0014	--	Water	.2 U	--	--	--	.5 U

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
1–11–000–000–1–1	024313–0007	353	Sediment	38.5	4	49	47	8,240
1–11–000–000–2–1	024313–0008	354	Sediment	28.1	5	51	44	4,330
1–11–000–000–3–1	024313–0009	355	Sediment	14.2 U	41	41	18	2,730
1–12–000–000–1–1	024313–0001	348	Sediment	21.6 U	3	80	17	5,610
1–12–000–000–2–1	024313–0002	349	Sediment	16.1 U	1	67	32	3,770
1–12–000–000–3–1	024313–0003	350	Sediment	15.6 U	9	71	20	2,960
1–13–000–000–1–1	024311–0013	330	Sediment	23.2 U	15	40	45	6,400
1–13–000–000–2–1	024311–0014	331	Sediment	17.5 U	16	52	32	3,770
1–13–000–000–3–1	024311–0015	332	Sediment	33.6 U	10	30	60	9,070
1–16–000–000–1–1	024687–0006	562	Sediment	33.9 U	7	36	57	9,870
1–16–000–000–2–1	024313–0005	351	Sediment	17.0	18	50	32	4,610
1–16–000–000–3–1	024313–0006	352	Sediment	14.1 U	30	58	12	3,030
2–01–000–000–1–1	024804–0007	636	Sediment	254	0	17	83	9,680
2–01–000–000–2–1	024804–0008	637	Sediment	244	0	16	84	12,200
2–01–000–000–3–1	024804–0009	638	Sediment	170	0	28	72	10,400
2–01–005–020–1–1	024797–0005	593	Sediment	209	0	18	82	11,300
2–01–005–020–2–1	024797–0006	594	Sediment	171	0	20	80	12,200
2–01–005–020–3–1	024797–0007	595	Sediment	184	0	19	81	11,500
2–01–005–020–3–5	024797–0008	596	Sediment	189	0	38	62	11,100
2–01–005–200–1–1	024804–0010	639	Sediment	248	0	11	89	10,200
2–01–005–200–1–5	024804–0013	642	Sediment	257	0	30	70	10,400
2–01–005–200–2–1	024804–0011	640	Sediment	193	0	32	68	10,600
2–01–005–200–3–1	024804–0012	641	Sediment	392	0	32	68	8,630
2–01–100–020–1–1	024799–0001	601	Sediment	243	0	22	78	9,770
2–01–100–020–2–1	024799–0002	602	Sediment	246	0	23	77	10,800
2–01–100–020–3–1	024799–0003	603	Sediment	241	0	37	63	11,900
2–01–100–020–3–5	024799–0004	604	Sediment	244	0	33	67	11,000
2–01–100–200–1–1	024804–0014	643	Sediment	227	0	32	68	10,300
2–01–100–200–2–1	024804–0015	644	Sediment	185	0	31	69	10,900
2–01–100–200–3–1	024804–0016	645	Sediment	358	0	32	68	7,020
2–02–000–000–1–1	024794–0007	580	Sediment	152	3	36	61	11,000
2–02–000–000–2–1	024794–0008	581	Sediment	146	0	14	86	11,300
2–02–000–000–3–1	024794–0009	582	Sediment	131	0	35	65	11,500

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
2–02–005–125–1–1	024801–0005	619	Sediment	206	2	11	87	10,200
2–02–005–125–2–1	024801–0006	620	Sediment	119	0	9	91	12,300
2–02–005–125–3–1	024801–0007	621	Sediment	149	0	16	84	11,300
2–02–005–305–1–1	024801–0001	615	Sediment	146	5	35	60	10,400
2–02–005–305–2–1	024801–0002	616	Sediment	140	7	21	72	10,600
2–02–005–305–3–1	024801–0003	617	Sediment	156	0	18	82	9,830
2–02–005–305–3–5	024801–0004	618	Sediment	154	0	17	83	9,910
2–02–100–125–1–1	024801–0008	622	Sediment	170	1	13	86	10,300
2–02–100–125–1–5	024801–0011	625	Sediment	178	0	38	62	9,530
2–02–100–125–2–1	024801–0009	623	Sediment	170	0	33	67	10,800
2–02–100–125–3–1	024801–0010	624	Sediment	162	0	34	66	10,900
2–02–100–305–1–1	024794–0001	574	Sediment	134	0	37	63	12,000
2–02–100–305–2–1	024794–0002	575	Sediment	133	0	15	85	12,300
2–02–100–305–3–1	024794–0003	576	Sediment	157	0	16	84	12,000
2–03–000–000–1–1	024794–0004	577	Sediment	156	0	35	65	11,400
2–03–000–000–2–1	024794–0005	578	Sediment	139	0	32	68	11,600
2–03–000–000–3–1	024794–0006	579	Sediment	211	0	37	63	8,590
2–03–005–125–1–1	024797–0001	589	Sediment	128	0	20	80	11,800
2–03–005–125–1–5	024797–0004	592	Sediment	133	0	29	71	10,800
2–03–005–125–2–1	024797–0002	590	Sediment	128	0	20	80	11,900
2–03–005–125–3–1	024797–0003	591	Sediment	161	0	22	78	8,060
2–03–005–305–1–1	024804–0004	633	Sediment	142	0	26	74	9,710
2–03–005–305–2–1	024804–0005	634	Sediment	129	0	24	76	9,650
2–03–005–305–3–1	024804–0006	635	Sediment	210	1	33	66	6,830
2–03–100–125–1–1	024799–0013	612	Sediment	189	3	31	66	10,900
2–03–100–125–2–1	024799–0014	613	Sediment	177	2	41	57	10,700
2–03–100–125–3–1	024799–0015	614	Sediment	155	1	35	64	10,700
2–03–100–305–1–1	024797–0009	597	Sediment	122	0	39	61	11,600
2–03–100–305–2–1	024797–0010	598	Sediment	135	0	22	78	11,600
2–03–100–305–3–1	024797–0011	599	Sediment	114	0	18	82	10,800
2–03–100–305–3–5	024797–0012	600	Sediment	119	0	23	77	11,400

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight)			Total organic carbon[1] (mg/kg)
					Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	
2–03–100–305–3–5A	024797–0013	--	Water	0.2 U	--	--	--	1.0
2–03–100–305–3–5B	024797–0014	--	Water	.2 U	--	--	--	1.4
2–03–100–305–3–5C	024797–0015	--	Water	.2 U	--	--	--	1.1
2–03–100–305–3–5D	024797–0016	--	Water	.2 U	--	--	--	.96
2–04–000–000–1–1	024799–0005	605	Sediment	99.4	10	49	41	6,850
2–04–000–000–2–1	024799–0006	606	Sediment	119	1	43	56	8,830
2–04–000–000–3–1	024799–0007	607	Sediment	214	0	38	62	8,530
2–04–000–000–3–5	024799–0008	608	Sediment	162	0	42	58	8,260
2–04–005–120–1–1	024799–0009	609	Sediment	110	5	26	69	8,900
2–04–005–120–2–1	024799–0010	610	Sediment	111	1	39	60	8,250
2–04–005–120–3–1	024799–0011	611	Sediment	181	0	24	76	7,760
2–04–005–300–1–1	024804–0001	630	Sediment	79.3	8	41	51	7,390
2–04–005–300–2–1	024804–0002	631	Sediment	87.9	1	39	60	8,600
2–04–005–300–3–1	024804–0003	632	Sediment	290	1	38	61	7,030
2–04–100–120–1–1	024794–0010	583	Sediment	75.3	9	31	60	7,980
2–04–100–120–2–1	024794–0011	584	Sediment	83.1	2	46	52	8,490
2–04–100–120–3–1	024794–0012	585	Sediment	169	2	37	61	8,280
2–04–100–300–1–1	024801–0012	626	Sediment	105	10	48	42	6,940
2–04–100–300–1–5	024801–0015	629	Sediment	81.8	12	48	40	6,610
2–04–100–300–2–1	024801–0013	627	Sediment	113	2	39	59	9,450
2–04–100–300–3–1	024801–0014	628	Sediment	167	3	39	58	6,940
3–01–000–000–1–1	024581–0004	472	Sediment	18.0 U	16	32	52	1,850
3–01–000–000–2–1	024581–0005	473	Sediment	13.1 U	22	25	53	1,010
3–01–000–000–3–1	024581–0006	474	Sediment	12.6 U	63	16	21	500 U
3–01–000–000–3–5	024581–0010	478	Sediment	12.1 U	79	13	8	500 U
3–01–000–000–4–1	024581–0007	475	Sediment	12.8 U	55	25	20	850
3–01–000–000–5–1	024581–0008	476	Sediment	14.8 U	19	43	38	539
3–01–000–000–6–1	024581–0009	477	Sediment	15.3 U	18	34	48	6,450
3–01–402–166–1–1	024526–0001	446	Sediment	29.7	79	13	8	1,040
3–01–402–166–2–1	024526–0002	447	Sediment	38.3	81	7	12	870
3–01–402–166–3–1	024526–0003	448	Sediment	27.1	62	16	22	500 U
3–01–402–166–4–1	024526–0004	449	Sediment	13.3 U	34	26	40	500 U
3–01–402–166–5–1	024526–0005	450	Sediment	13.2 U	46	27	27	500 U
3–01–402–166–5–5	024526–0007	452	Sediment	12.8 U	44	22	34	500 U
3–01–402–166–6–1	024526–0006	451	Sediment	13.7 U	43	27	30	500 U

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
3–01–402–346–1–1	024526–0008	453	Sediment	156	47	47	6	1,550
3–01–402–346–2–1	024526–0009	454	Sediment	228	45	45	10	2,170
3–01–402–346–3–1	024526–0010	455	Sediment	215	51	43	6	1,290
3–01–402–346–4–1	024526–0011	456	Sediment	27.0	59	29	12	720
3–01–402–346–5–1	024526–0012	457	Sediment	13.7 U	20	54	26	920
3–01–402–346–6–1	024526–0013	458	Sediment	14.4 U	20	34	46	5,650
3–01–402–346–7–1	024526–0014	459	Sediment	12.8 U	48	41	11	2,190
3–02–000–000–1–1	024646–0003	481	Sediment	13.4	21	4	0	970
3–02–000–000–2–1	024646–0004	482	Sediment	20.6	56	9	0	1,350
3–02–000–000–3–1	024646–0005	483	Sediment	81.9	64	26	10	2,090
3–02–000–000–4–1	024646–0006	484	Sediment	15.4	83	16	1	500 U
3–02–000–000–5–1	024646–0007	485	Sediment	17.6 U	54	21	25	5,740
3–02–000–000–5–5	024648–0001	496	Sediment	14.2 U	32	18	23	2,040
3–02–000–000–6–1	024646–0008	486	Sediment	13.3 U	41	29	30	1,970
3–02–000–000–7–1	024646–0009	487	Sediment	14.3 U	50	24	26	23,500
3–02–593–128–1–1	024579–0001	460	Sediment	13.5	67	31	2	26,500
3–02–593–128–2–1	024579–0002	461	Sediment	16.7	78	12	10	740
3–02–593–128–3–1	024579–0003	462	Sediment	49.7	59	23	18	23,200
3–02–593–128–4–1	024579–0004	463	Sediment	16.2 U	8	24	68	3,510
3–02–593–128–5–1	024579–0005	464	Sediment	16.6 U	4	38	58	3,310
3–02–593–128–6–1	024579–0006	465	Sediment	13.9 U	28	50	22	2,870
3–02–593–308–1–1	024579–0010	468	Sediment	14.2	94	6	0	500 U
3–02–593–308–2–1	024581–0001	469	Sediment	12.1 U	86	11	3	24,100
3–02–593–308–3–1	024581–0002	470	Sediment	13.1	89	8	3	25,300
3–02–593–308–4–1	024579–0009	467	Sediment	12.4 U	88	10	2	500 U
3–02–593–308–4–5	024579–0008	466	Sediment	12.4 U	92	8	0	500 U
3–02–593–308–5–5	024579–0007	--	Water	.2 U	--	--	--	713
3–03–000–000–1–1	024652–0001	522	Sediment	12.2 U	22	1	5	46,200
3–03–000–000–2–1	024652–0002	523	Sediment	12.0 U	16	2	5	1,320
3–03–000–000–3–1	024652–0003	524	Sediment	12.3 U	21	5	6	1,380
3–03–000–000–4–1	024652–0004	525	Sediment	13.7 U	52	36	12	2,110
3–03–000–000–5–1	024652–0005	526	Sediment	12.0 U	8	1	0	36,000
3–03–000–000–6–1	024652–0006	527	Sediment	12.9 U	15	13	8	1,950

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (μg/kg)	Grain size[1] (percent by weight)			Total organic carbon[1] (mg/kg)
					Sand (>74 μm)	Silt (74–2 μm)	Clay (<2 μm)	
3–03–286–050–1–1	024648–0002	497	Sediment	14.0 U	27	6	2	1,190
3–03–286–050–2–1	024648–0003	498	Sediment	11.5 U	18	7	1	1,030
3–03–286–050–3–1	024648–0004	499	Sediment	11.6 U	13	18	16	24,900
3–03–286–050–4–1	024648–0005	500	Sediment	13.7 U	15	33	52	16,000
3–03–286–050–4–5	024646–0010	488	Sediment	16.4 U	21	39	40	3,700
3–03–286–050–5–1	024648–0006	501	Sediment	12.5 U	24	9	13	2,070
3–03–286–050–6–1	024648–0007	502	Sediment	13.9 U	26	55	19	2,520
3–03–286–050–7–1	024648–0008	503	Sediment	13.9 U	11	64	25	4,040
3–03–286–050–8–1	024648–0009	504	Sediment	14.3 U	9	58	33	4,140
3–03–286–050–8–5	024648–0010	505	Sediment	14.2 U	9	58	33	3,920
3–03–286–230–1–1	024652–0010	531	Sediment	11.8 U	19	3	0	870
3–03–286–230–2–1	024646–0001	479	Sediment	16.5	21	4	0	1,380
3–03–286–230–3–1	024646–0002	480	Sediment	21.1	26	5	0	1,370
3–03–286–230–4–1	024652–0007	528	Sediment	13.5 U	35	15	9	2,320
3–03–286–230–5–1	024652–0008	529	Sediment	16.1 U	39	39	22	40,200
3–03–286–230–6–1	024652–0009	530	Sediment	13.0 U	27	7	10	960
3–04–000–000–1–1	024683–0001	532	Sediment	12.8 U	84	12	4	940
3–04–000–000–2–1	024683–0002	533	Sediment	12.3 U	87	11	2	740
3–04–000–000–3–1	024683–0003	534	Sediment	12.5 U	67	33	0	620
3–04–000–000–3–5	024683–0009	540	Sediment	61.4 J	68	28	4	500 U
3–04–000–000–4–1	024683–0004	535	Sediment	12.3 U	71	29	0	500 U
3–04–000–000–5–1	024683–0005	536	Sediment	12.4 U	67	30	3	760
3–04–000–000–6–1	034683–0006	537	Sediment	16.6 U	10	19	10	3,040
3–04–000–000–7–1	024683–0007	538	Sediment	15.8 U	11	34	19	2,780
3–04–000–000–8–1	024683–0008	539	Sediment	15.3 U	15	28	17	13,700
3–04–476–122–1–1	024646–0011	489	Sediment	13.0 U	34	23	43	1,440
3–04–476–122–2–1	024646–0012	490	Sediment	13.7 U	32	24	44	16,000
3–04–476–122–3–1	024646–0013	491	Sediment	13.4 U	48	19	33	18,600
3–04–476–122–4–1	024646–0014	492	Sediment	12.7 U	30	33	37	14,400
3–04–476–122–5–1	024646–0015	493	Sediment	13.2 U	21	34	45	500
3–04–476–122–6–1	024646–0016	494	Sediment	13.4 U	20	35	45	500 U
3–04–476–122–7–1	024646–0017	495	Sediment	12.2 U	70	23	7	500 U

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
3–04–476–302–1–1	024695–0001	567	Sediment	13.1	32	3	3	660
3–04–476–302–2–1	024695–0002	568	Sediment	11.1 U	24	3	0	770
3–04–476–302–3–1	024695–0003	569	Sediment	11.5 U	18	3	0	870
3–04–476–302–4–1	024695–0004	570	Sediment	79.9	18	8	3	2,340
3–04–476–302–5–1	024695–0005	571	Sediment	14.1	33	26	20	3,850
3–04–476–302–6–1	024695–0006	572	Sediment	13.4 U	45	42	13	2,010
3–04–476–302–7–1	024695–0007	573	Sediment	15.7 U	3	52	45	4,720
3–04–476–302–7–5A	024687–0011	--	Water	.2 U	--	--	--	.95
3–04–476–302–7–5B	024687–0012	--	Water	.2 U	--	--	--	1.7
3–04–476–302–7–5C	024687–0013	--	Water	.2 U	--	--	--	.66
4–01–000–000–1–1	024650–0003	508	Sediment	76.9	24	15	12	5,180
4–01–202–145–1–1	024650–0004	509	Sediment	108	24	14	16	5,010
4–01–202–145–1–5	024650–0005	510	Sediment	127	63	8	29	4,450
4–01–202–325–1–1	024650–0001	506	Sediment	95.0	27	22	23	4,520
4–01–403–145–1–1	024650–0006	511	Sediment	33.3	89	11	0	1,840
4–01–403–325–1–1	024650–0002	507	Sediment	122	36	20	26	3,980
4–02–000–000–1–1	024794–0013	586	Sediment	141	28	36	36	4,730
4–02–110–038–1–1	024794–0014	587	Sediment	70.1	43	34	23	8,160
4–02–110–218–1–1	024794–0015	588	Sediment	126	31	36	33	4,410
4–02–221–038–1–1	024687–0010	566	Sediment	83.2	28	15	19	2,500
4–02–221–218–1–1	024687–0008	564	Sediment	128	34	29	37	4,480
4–02–221–218–1–5	024687–0009	565	Sediment	102	34	27	39	4,010
4–03–000–000–1–1	024650–0009	514	Sediment	73.4	19	15	4	3,180
4–03–266–176–1–1	024650–0010	515	Sediment	69.0	19	18	3	3,900
4–03–266–356–1–1	024650–0008	513	Sediment	83.3	28	11	16	3,680
4–03–532–176–1–1	024650–0011	516	Sediment	68.6	39	35	26	5,900
4–03–532–356–1–1	024650–0007	512	Sediment	79.9	33	9	17	3,470
4–04–000–000–1–1	024650–0014	519	Sediment	25.1	69	25	6	1,840
4–04–138–022–1–1	024650–0013	518	Sediment	49.5	50	17	0	2,200
4–04–138–202–1–1	024650–0015	520	Sediment	43.4	27	5	8	2,870

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
4–04–276–022–1–1	024650–0012	517	Sediment	33.1	86	12	2	2,240
4–04–276–202–1–1	024650–0017	521	Sediment	31.8	61	3	15	2,740
4–05–000–000–1–1	024687–0003	559	Sediment	12.1 U	26	24	4	1,590
4–05–000–000–1–5	024687–0007	563	Sediment	12.7 U	24	25	6	1,560
4–05–065–008–1–1	024687–0002	558	Sediment	14.1 U	21	57	11	2,420
4–05–065–188–1–1	024687–0004	560	Sediment	13.0 U	18	30	5	1,980
4–05–130–008–1–1	024687–0001	557	Sediment	13.8 U	17	48	18	3,120
4–05–130–188–1–1	024687–0005	561	Sediment	13.8 U	22	26	4	2,450
5–01–000–000–1–1	024361–0004	363	Sediment	16.3	13	58	29	6,160
5–01–000–000–2–1	024361–0005	364	Sediment	19.5	20	70	10	3,820
5–01–000–000–3–1	024361–0006	365	Sediment	13.0 U	25	63	12	1,690
5–01–005–050–1–1	024361–0001	360	Sediment	15.6 U	13	80	7	7,730
5–01–005–050–2–1	024361–0002	361	Sediment	13.9 U	19	66	15	4,230
5–01–005–050–3–1	024361–0003	362	Sediment	13.6 U	23	51	26	1,090
5–01–005–230–1–1	024361–0007	366	Sediment	14.1 U	3	59	38	3,990
5–01–005–230–2–1	024361–0008	367	Sediment	13.8 U	20	43	37	3,740
5–01–005–230–3–1	024361–0009	368	Sediment	13.7 U	25	45	30	1,820
5–01–050–050–1–1	024361–0013	372	Sediment	31.6	13	46	41	7,520
5–01–050–050–2–1	024361–0014	373	Sediment	46.7	20	46	34	3,940
5–01–050–050–3–1	024361–0015	374	Sediment	13.1 U	25	51	24	3,580
5–01–050–050–3–5	024361–0016	--	Water	.2 U	--	--	--	.5 U
5–01–050–230–1–1	024361–0010	369	Sediment	25.4	14	43	43	5,820
5–01–050–230–2–1	024361–0011	370	Sediment	15.1 U	6	45	49	4,900
5–01–050–230–3–1	024361–0012	371	Sediment	15.0 U	21	43	36	3,120
5–02–000–000–1–1	024384–0007	381	Sediment	22.0	10	76	14	8,770
5–02–000–000–2–1	024384–0008	382	Sediment	29.2	26	57	17	5,740
5–02–000–000–3–1	024384–0009	383	Sediment	15.8 U	20	64	16	1,970
5–02–005–071–1–1	024386–0001	301	Sediment	19.9	6	82	12	10,700
5–02–005–071–2–1	024386–0002	302	Sediment	23.7	21	59	20	8,950
5–02–005–071–3–1	024386–0003	303	Sediment	30.5	7	86	7	3,040

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight)			Total organic carbon[1] (mg/kg)
					Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	
5–02–005–251–1–1	024384–0004	378	Sediment	19.9	20	72	8	17,200
5–02–005–251–2–1	024384–0005	379	Sediment	24.6	37	52	11	6,470
5–02–005–251–3–1	024384–0006	380	Sediment	16.1	9	67	24	1,700
5–02–050–071–1–1	024386–0004	304	Sediment	13.8 U	21	75	4	7,840
5–02–050–071–2–1	024386–0005	305	Sediment	13.2 U	21	74	5	2,140
5–02–050–071–3–1	024386–0006	306	Sediment	14.0 U	16	35	49	1,100
5–02–050–251–1–1	024384–0001	375	Sediment	29.3	18	52	30	10,200
5–02–050–251–2–1	024384–0002	376	Sediment	27.5	19	47	34	5,380
5–02–050–251–3–1	024384–0003	377	Sediment	15.4	27	50	23	3,080
5–03–000–000–1–1	024388–0004	393	Sediment	15.6 U	24	43	33	7,080
5–03–000–000–2–1	024388–0005	394	Sediment	14.9 U	22	44	34	5,770
5–03–000–000–3–1	024388–0006	395	Sediment	18.4	17	43	40	4,460
5–03–005–074–1–1	024386–0011	311	Sediment	15.1 U	9	61	30	7,490
5–03–005–074–2–1	024386–0012	312	Sediment	14.8 U	16	49	35	4,860
5–03–005–074–3–1	024386–0013	313	Sediment	15.0 U	12	50	38	3,610
5–03–005–254–1–1	024388–0007	396	Sediment	15.0 U	22	42	36	5,280
5–03–005–254–2–1	024388–0008	397	Sediment	14.2 U	21	44	35	3,730
5–03–005–254–3–1	024388–0009	398	Sediment	17.5 U	11	35	54	4,020
5–03–050–074–1–1	024386–0014	314	Sediment	15.9 U	27	47	26	6,590
5–03–050–074–2–1	024386–0015	315	Sediment	14.2 U	1	45	54	4,880
5–03–050–074–3–1	024386–0016	316	Sediment	16.1 U	22	47	31	3,610
5–03–050–254–1–1	024388–0001	390	Sediment	29.6	12	54	34	13,000
5–03–050–254–2–1	024388–0002	391	Sediment	25.6	7	39	54	13,100
5–03–050–254–3–1	024388–0003	392	Sediment	16.1 U	11	45	44	3,410
5–04–000–000–1–1	024384–0013	387	Sediment	285	23	65	12	10,600
5–04–000–000–2–1	024384–0014	388	Sediment	1,060	35	46	19	8,890
5–04–000–000–3–1	024384–0015	389	Sediment	21.2	8	52	40	3,030
5–04–005–118–1–1	024388–0010	399	Sediment	564	27	55	18	10,600
5–04–005–118–2–1	024388–0011	400	Sediment	1,900	34	34	32	7,770
5–04–005–118–3–1	024388–0012	401	Sediment	21.5	7	49	44	2,420

Footnote at end of table.

Table 4. Summary of concentrations of total mercury and total organic carbon and grain-size distribution, Lavaca, Matagorda, and Carancahua Bays, Texas, 1992—Continued

Field sample number	RMAL sample number	I–M sample number	Sample matrix	Total mercury[1] (µg/kg)	Grain size[1] (percent by weight) Sand (>74 µm)	Silt (74–2 µm)	Clay (<2 µm)	Total organic carbon[1] (mg/kg)
5–04–005–298–1–1	024386–0007	307	Sediment	808	35	51	14	10,800
5–04–005–298–2–1	024386–0008	308	Sediment	73.8	23	58	19	5,840
5–04–005–298–2–5	024386–0010	310	Sediment	177	40	46	14	5,970
5–04–005–298–3–1	024386–0009	309	Sediment	44.5	19	45	36	2,920
5–04–050–118–1–1	024388–0013	402	Sediment	661	50	30	20	5,260
5–04–050–118–2–1	024388–0014	403	Sediment	677	39	43	18	8,180
5–04–050–118–3–1	024388–0015	404	Sediment	266	30	52	18	2,700
5–04–050–298–1–1	024384–0010	384	Sediment	408	23	66	11	13,600
5–04–050–298–2–1	024384–0011	385	Sediment	1,150	49	43	8	11,200
5–04–050–298–3–1	024384–0012	386	Sediment	37.4	18	48	34	2,660
5–05–000–000–1–1	024685–0001	541	Sediment	12.6 U	13	87	0	1,320
5–05–000–000–2–1	024685–0002	542	Sediment	27.7	31	69	0	2,420
5–05–000–000–3–1	024685–0003	543	Sediment	12.4 U	30	70	0	1,020
5–05–005–077–1–1	024685–0008	548	Sediment	13.3 U	19	81	0	1,030
5–05–005–077–2–1	024685–0009	549	Sediment	12.8 U	16	84	0	1,350
5–05–005–077–3–1	024685–0010	550	Sediment	13.9 U	15	85	0	1,340
5–05–005–257–1–1	024685–0004	544	Sediment	12.6 U	19	81	0	960
5–05–005–257–2–1	024685–0005	545	Sediment	12.6 U	15	79	6	2,540
5–05–005–257–3–1	024685–0006	546	Sediment	12.6 U	30	70	0	1,060
5–05–005–257–3–5	024685–0007	547	Sediment	12.6 U	43	57	0	2,030
5–05–050–077–1–1	024685–0011	551	Sediment	13.2 U	4	95	1	1,360
5–05–050–077–2–1	024685–0012	552	Sediment	13.6 U	9	87	4	1,760
5–05–050–077–3–1	024685–0013	553	Sediment	13.5 U	12	79	9	3,300
5–05–050–257–1–1	024685–0014	554	Sediment	14.7 U	11	85	4	1,140
5–05–050–257–2–1	024685–0015	555	Sediment	13.0 U	7	87	6	2,390
5–05–050–257–3–1	024685–0016	556	Sediment	13.1 U	15	85	0	1,180

[1] Analytical methods used were as follows: total mercury [USEPA method 7471 (U.S. Environmental Protection Agency, 1986)]; grain size [ASTM D422 (U.S. Environmental Protection Agency, 1986)]; and total organic carbon [USEPA method 415.1 (U.S. Environmental Protection Agency, 1986)].

Table 5. Summary statistics for total mercury concentrations in the open-water sediment environment, Lavaca and Matagorda Bays, Texas, 1992

[cm, centimeters; ND, number of concentrations less than detection limits of the 15 total samples for each depth; µg/kg, micrograms per kilogram; IQR, interquartile range; <, largest detection limit for that sample; *, concentration not estimated when more than 50 percent of concentrations are less than detection limits; X, indeterminant concentration; ++, no data greater than detection limits]

Sample area	Sample depth (cm)	ND	Minimum (µg/kg)	Maximum (µg/kg)	Percentile (µg/kg)			IQR (µg/kg)
					25th	50th (median)	75th	
1–01	Surface (0 to 2)	0	92.7	450	150	220	369	219
	Middle (10 to 20)	0	55.8	438	110	183	349	239
	Bottom (20 to 50)	1	<13.6	342	19.9	30.5	128	108.1
1–02	Surface (0 to 2)	0	32.8	450	296	364	400	104
	Middle (10 to 20)	0	137	1,270	461	705	938	477
	Bottom (20 to 50)	1	<20.6	1,210	237	406	1,060	823
1–03	Surface (0 to 2)	0	73.2	274	179	224	243	64.0
	Middle (10 to 20)	0	21.1	96.4	30.2	37.1	44.4	14.2
	Bottom (20 to 50)	11	<13.5	112	*	*	*	*
1–04	Surface (0 to 2)	0	163	253	178	200	218	40
	Middle (10 to 20)	2	<19.1	176	26.8	32.5	41.4	14.6
	Bottom (20 to 50)	11	<17.2	38.8	*	*	*	*
1–05	Surface (0 to 2)	0	39.5	96.5	46.0	61.0	68.8	22.8
	Middle (10 to 20)	2	<17.4	156	30.3	36.6	75.5	45.2
	Bottom (20 to 50)	9	<15.2	24.2	*	*	*	*
1–06	Surface (0 to 2)	0	102	201	128	166	189	61.0
	Middle (10 to 20)	0	118	278	140	180	213	73.0
	Bottom (20 to 50)	0	15.6	221	141	171	201	60.0
1–07	Surface (0 to 2)	0	25.2	472	145	171	211	66.0
	Middle (10 to 20)	7	<19.6	160	*	20.3	30.3	X
	Bottom (20 to 50)	15	<13.3	<21.5	++	++	++	++
1–08	Surface (0 to 2)	0	55.0	171	102	128	150	48.0
	Middle (10 to 20)	1	<17.5	245	30.6	74.1	159	128.4
	Bottom (20 to 50)	9	<14.5	194	*	*	*	*

Table 6. Summary statistics for grain-size distribution in the open-water sediment environment in percent, by weight, of total sample with grain-size diameter less than 74 micrometers, Lavaca and Matagorda Bays, Texas, 1992

[cm, centimeters; VM, number of values missing of the 15 total samples for each depth; %s+c, percent, by weight, of total sample with grain-size diameter less than 74 micrometers (silt-plus-clay fraction); IQR, interquartile range]

Sample area	Sample depth (cm)	VM	Minimum (%s+c)	Maximum (%s+c)	Percentile (%s+c)			IQR (%s+c)
					25th	50th (median)	75th	
1–01	Surface (0 to 2)	0	38	100	74	90	93	19
	Middle (10 to 20)	0	36	99	50	74	80	30
	Bottom (20 to 50)	0	25	99	46	55	72	26
1–02	Surface (0 to 2)	0	7	100	97	100	100	3
	Middle (10 to 20)	0	53	100	96	97	98	2
	Bottom (20 to 50)	0	69	99	92	95	96	4
1–03	Surface (0 to 2)	0	68	96	78	85	92	14
	Middle (10 to 20)	0	45	62	47	53	61	14
	Bottom (20 to 50)	0	37	59	41	46	54	13
1–04	Surface (0 to 2)	0	82	99	88	91	94	6
	Middle (10 to 20)	0	72	99	85	89	92	7
	Bottom (20 to 50)	0	66	99	71	77	89	18
1–05	Surface (0 to 2)	0	63	87	68	74	80	12
	Middle (10 to 20)	0	56	88	61	70	78	17
	Bottom (20 to 50)	0	37	88	54	64	69	15
1–06	Surface (0 to 2)	0	77	100	100	100	100	0
	Middle (10 to 20)	0	56	100	97	100	100	3
	Bottom (20 to 50)	0	72	100	97	99	100	3
1–07	Surface (0 to 2)	0	41	94	81	87	89	8
	Middle (10 to 20)	1	63	94	80	83	84	4
	Bottom (20 to 50)	0	40	82	47	50	55	8
1–08	Surface (0 to 2)	0	62	100	84	91	96	12
	Middle (10 to 20)	0	74	100	85	88	95	10
	Bottom (20 to 50)	0	65	100	79	85	97	18

Table 7. Summary statistics for total organic carbon concentrations in the open-water sediment environment, Lavaca and Matagorda Bays, Texas, 1992

[cm, centimeters; ND, number of concentrations less than detection limits of the 15 total samples for each depth; mg/kg, milligrams per kilogram; IQR, interquartile range]

Sample area	Sample depth (cm)	ND	Minimum (mg/kg)	Maximum (mg/kg)	Percentile (mg/kg)			IQR (mg/kg)
					25th	50th (median)	75th	
1–01	Surface (0 to 2)	0	3,480	14,300	6,070	8,840	9,340	3,270
	Middle (10 to 20)	0	2,130	10,700	3,210	4,950	5,760	2,550
	Bottom (20 to 50)	0	1,750	11,400	2,310	3,120	4,530	2,220
1–02	Surface (0 to 2)	0	890	10,200	4,880	7,650	8,130	3,250
	Middle (10 to 20)	0	1,190	9,110	6,090	6,430	6,990	900
	Bottom (20 to 50)	0	3,190	7,560	3,860	4,930	5,850	1,990
1–03	Surface (0 to 2)	0	5,490	11,100	6,770	7,990	8,640	1,870
	Middle (10 to 20)	0	2,720	5,440	3,080	3,820	4,320	1,240
	Bottom (20 to 50)	0	2,140	16,000	2,970	4,170	5,110	2,140
1–04	Surface (0 to 2)	0	3,750	13,800	8,290	9,200	10,500	2,210
	Middle (10 to 20)	0	4,760	9,020	6,750	7,260	8,090	1,340
	Bottom (20 to 50)	0	4,240	9,710	4,850	5,850	7,190	2,340
1–05	Surface (0 to 2)	0	5,890	9,640	6,480	7,170	8,720	2,240
	Middle (10 to 20)	0	4,000	6,910	4,150	5,430	6,340	2,190
	Bottom (20 to 50)	0	2,490	7,470	3,450	4,280	4,710	1,260
1–06	Surface (0 to 2)	0	5,990	10,400	7,780	8,080	9,490	1,710
	Middle (10 to 20)	0	4,510	8,610	6,570	7,590	7,870	1,300
	Bottom (20 to 50)	0	5,630	9,490	5,960	7,050	8,500	2,540
1–07	Surface (0 to 2)	0	5,520	10,200	6,850	7,610	8,820	1,970
	Middle (10 to 20)	0	5,380	7,780	6,170	6,680	6,970	800
	Bottom (20 to 50)	0	2,260	22,400	2,520	3,890	7,780	5,260
1–08	Surface (0 to 2)	0	2,870	10,600	6,080	7,440	9,470	3,390
	Middle (10 to 20)	0	3,980	7,520	5,260	6,140	6,720	1,460
	Bottom (20 to 50)	0	3,200	32,400	4,280	5,050	7,140	2,860

Table 8. Rank correlation coefficients between total mercury concentrations and grain-size fractions and total organic carbon concentrations in the open-water sediment environment, Lavaca and Matagorda Bays, Texas, 1992

[n, number of samples after combining data from the three sample-depth zones (0 to 2, 10 to 20, and 20 to 50 centimeters); sand, greater than 74 micrometers grain-size fraction; silt, 74 to 2 micrometers grain-size fraction; clay, less than 2 micrometers grain-size fraction; TOC, total organic carbon; (Y), significant correlation (correlation coefficient greater than 0.294 or less than –0.294 is significant at the $\alpha = 0.05$ significance level); (N), not significant correlation]

Open-water sampling area	n	Total mercury concentration and sand percentage	Total mercury concentration and silt percentage	Total mercury concentration and clay percentage	Total mercury concentration and silt-plus-clay percentage	Total mercury concentration and TOC concentration
1–01	45	–0.696 (Y)	–0.123 (N)	0.741 (Y)	0.696 (Y)	0.752 (Y)
1–02	45	–.072 (N)	.196 (N)	.046 (N)	.072 (N)	.264 (N)
1–03	45	–.803 (Y)	.516 (Y)	.709 (Y)	.803 (Y)	.664 (Y)
1–04	45	–.500 (Y)	.349 (Y)	.083 (N)	.500 (Y)	.712 (Y)
1–05	45	–.316 (Y)	.134 (N)	.267 (N)	.316 (Y)	.450 (Y)
1–06	45	–.152 (N)	–.047 (N)	.273 (N)	.152 (N)	.103 (N)
1–07	45	–.595 (Y)	.278 (N)	.663 (Y)	.595 (Y)	.499 (Y)
1–08	45	–.783 (Y)	–.465 (Y)	.738 (Y)	.783 (Y)	.655 (Y)