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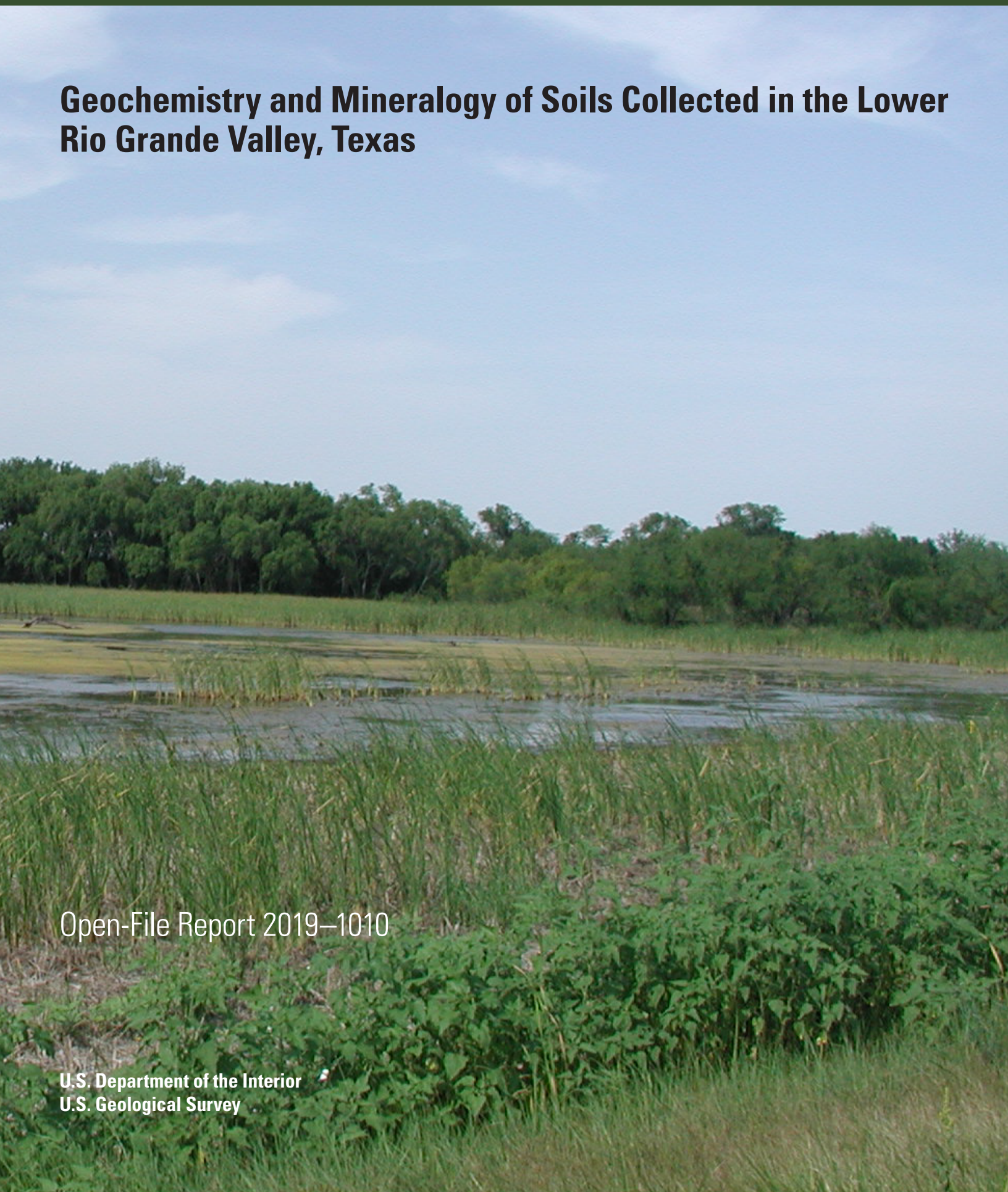
Geochemistry and Mineralogy of Soils Collected in the Lower Rio Grande Valley, Texas



Open-File Report 2019–1010

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

Cover. Photograph of the lower Rio Grande valley, spring 2003. Photograph by Helen A. Whitney, U.S. Geological Survey.

Geochemistry and Mineralogy of Soils Collected in the Lower Rio Grande Valley, Texas

By Helen A. Whitney, Federico Solano, and Bernard E. Hubbard

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DAVID BERNHARDT, Secretary

U.S. Geological Survey
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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)

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Abstract

Presented in this report are the chemical and mineralogical results of a soil study conducted in the lower Rio Grande valley, Texas. Samples were collected from soils formed on Holocene alluvial flood-plain and distributary channel deposits of the Rio Grande, flood plain and meander-belt deposits of the Pliocene Goliad Formation, and the Pleistocene Lissie and Beaumont Formations. The lower Rio Grande valley is located on the old distributary delta of the Rio Grande. The watersheds on the U.S. side of the delta no longer drain into the Rio Grande but are part of a complex system of irrigation channels and wastewater drains that flow into the lower Laguna Madre. The results of the study have been used to map concealed geologic units and identify potential mosquito breeding habitat.

Introduction

The lower Rio Grande valley (LRGV) refers to a four-county region (Hidalgo, Cameron, Starr, and Willacy) in Texas bounded by the Rio Grande river (also known as the Rio Bravo) to the south. The LRGV stretches from the Falcon Reservoir eastward to the Laguna Madre and the Gulf of Mexico (fig. 1; figs. 1–10 follow References Cited). This area was selected for study by the U.S. Geological Survey (USGS) Border Environmental Health Initiative (BEHI) because the area is experiencing rapid economic and population growth, which may have adverse effects on the health of the environment, wildlife, and human inhabitants. Much of this growth is in response to the favorable economic conditions generated by the North American Free Trade Agreement Implementation Act of 1993 (Public Law 103–182, 107 Stat. 2057).

Agriculture dominates the land use and the economy of the region; however, manufacturing, oil and gas production, and tourism are also major contributors to the economy. The population in the LRGV grew from 978,369 in the year 2000 (U.S. Census Bureau, 2000) to an estimated 1,368,269 in the year 2012 (Texas Department of State Health Services, 2012).

The upper centimeter (cm) interval of soil was selected because it is considered by the human health community as a critical zone—the zone where humans and animals may come in contact with toxins residing in soils through dermal, inhalation, and ingestion pathways (Brantley and others, 2007; Smith and others, 2009). This same soil interval is also most likely to be transported by wind or water from fields as sediment into the drainage canals and streams in the lower Rio Grande valley area.

Regional Setting

The LRGV is part of the West Gulf Coastal Plain, a belt of Late Cretaceous to Holocene marine sedimentary rocks that gently slopes toward the Gulf of Mexico. The climate is subtropical; high temperatures range from the mid 90s in degrees Fahrenheit (°F) in Brownsville and low 100s (in °F) near the Falcon Dam during the summer months to the mid 50s °F during winter months (Menne and others, 2012). The prevailing wind direction is from the southeast, except in the winter months when winds from the northwest prevail (National Oceanic and Atmospheric Administration, 2014). The average annual precipitation from 2010 to 2014 was 26 inches in Brownsville and 21 inches near the Falcon Dam (National Oceanic and Atmospheric Administration, 2014). The coastal areas are more humid and lush compared to the semi-arid climate of the Falcon Reservoir area, which is farther inland (fig. 1).

The oldest rock units in the study area are located to the north and west and the youngest are located along the present course of the Rio Grande and along the eastern coastline of the Laguna Madre (fig. 2). The oldest units are the fluvial sands of the Pliocene Goliad Formation, followed by the Pleistocene fluvial and meander belt sands of the Lissie Formation and the fluvial and deltaic deposits of the Beaumont Formation (Galloway and others, 2000). Organic-rich Holocene sediments consisting of silty-sandy alluvium, muddy flood-plain alluvium, and silty and sandy coastal deltaic deposits (Page and others, 2005) are located nearest to the Rio Grande and along the coastline of the Laguna Madre.

Previous Studies

Notable scientific studies of the area began in the early 1900s with the publication of soil surveys of the Brownsville area by Mangum and Lee (1907). In their report, they describe the region prior to the development of the Falcon Dam and the extensive irrigation network that now restricts the natural flow of the Rio Grande. Subsequently, soil surveys for Starr (Thompson and others, 1972), Cameron (Williams and others, 1977), Hidalgo (Jacobs, 1981), and Willacy (Turner, 1982) Counties were completed. Brown and others (1980) constructed detailed environmental geologic maps of the Brownsville-Harlingen coastal area as part of a larger study of the natural resources of the Texas coastal zone. The maps and discussions provided helpful background information on the geologic history, coastal processes, and resource development of the area.

The Border Environmental Health Initiative began in 2003 as a USGS-sponsored collaborative study involving many scientists from the United States and Mexico—including biologists, hydrologists, geochemists, geologists, and geographers. The primary goal of the project was to collect and integrate data useful for examining the environmental health of the binational border region and to release these integrated products to other researchers working in the area (Buckler and Strom, 2004; Papoulias and others, 2006; Parcher, 2008). This study reports the geochemistry and mineralogy of the surficial soil layer, and is one of many studies completed in the Basin 8 subregion (Papoulias and others, 2006).

A modified version of the geologic map compiled by Page and others (2005) was used as the base map in the following discussions of the geochemical and statistical results. Page and others (2005) used the digital geologic map of Texas (Bureau of Economic Geology, 1976) and map data provided by the Instituto Nacional de Estadística y Geografía (INEGI) in the compilation of their binational geologic map of southern Texas, United States, and Tamaulipas, Mexico, for the LRGV. The base map used in this report has been further modified to show only the U.S. side of the Rio Grande valley.

Preliminary results from this study were presented by Duval (2005), Folger and others (2006), Hubbard and others (2006), Page and others (2006), Merrill and others (2006), and Hubbard and others (2010).

Sample Collection and Analysis

In the early summer months of 2003, 2004, and 2007, 210 soil samples were collected from vacant lots, fallow agricultural fields, pastures, natural grasslands, and undeveloped lands on a scale of one sample per 4 square miles. Soil samples were collected from the upper 0–5 cm portion of the soil profile at 210 sites using stainless steel shovels, then double bagged to prevent contamination of samples while in transport. All soils were prepared in USGS laboratories where they were disaggregated by a soil juicer and sieved to a <2-millimeter (mm) grain size (<10-mesh) fraction. A split of the <2-mm soil sample was ground to <150-micrometer (µm) grain-size (<100-mesh) prior to geochemical analysis. The geochemical samples were analyzed by USGS laboratories in Denver, Colo., and by contract laboratories in Canada. A split (about 5 grams) of the <2-mm soil sample was micronized to <150-µm grain-size together with 10 weight percent zincite (ZnO) as an internal mineral standard prior to analysis using an x-ray diffractometer (XRD). Mineral identification and quantification were completed at the USGS laboratories in Reston, Va.

Geochemical Analysis

Analytical results are compiled into two tables; table 1 (tables 1–6 follow References Cited) contains the results for samples collected in 2003 and 2004, and table 2 contains the results from samples collected in 2007. Forty-two-element geochemistry (ICPAES-MS_42; Briggs and Meier, 2002) analyses were performed using inductively coupled plasma-atomic emission spectrometry (ICP-AES) and inductively coupled plasma-mass spectrometry (ICP-MS). Samples were digested in a multi-acid procedure prior to analysis by ICP-AES and ICP-MS methods. Analytical results are shown in tables 1 and 2, and limits of detection are listed in table 3. Elements analyzed by this combination ICP-MS and ICP-AES method have a prefix of "ICPMS-AES" before the element name; for example, ICPMS-AES_Mg. Note that there was a change in the detection limit for cesium (Cs) from 0.05 parts per million (ppm) to 5 ppm for the samples analyzed in 2007 compared to those analyzed in 2003 and 2004.

Sixteen major, minor, and trace elements (ICPAES_16, method 17 in U.S. Geological Survey [2011]) were measured by ICP-AES. Samples were fused with lithium metaborate in a graphite crucible and then aspirated into the spectrometer. These results are listed in table 1 and the limits of detection are listed in table 3.

Ten major elements were determined by wavelength dispersive x-ray fluorescence spectrometry (WDXRF; Taggart and Siems, 2002). Samples were fused with a flux containing equal parts of lithium metaborate and lithium tetraborate prior to irradiation and measurement of x-ray photons by the spectrometer. Elements measured by this method use the acronym XRF in table 2. The limits of detection are listed in table 4.

Samples collected in 2007 were digested in a multi-acid procedure to form arsenic or selenium hydrides that then were heated and analyzed by atomic absorption spectrometry (AAS; Hageman and others, 2002). This method can measure small concentrations of these elements in various sample media. The optimum concentration range for measurement is 0.1–4 ppm for selenium and 0.2–20 ppm for arsenic.

Mercury (Hg) was only measured in samples collected in 2007. The samples were first digested using a multi-acid digestion procedure, then measured by continuous-flow vapor-atomic absorption spectrometry (CVAAS; Brown and others, 2002). The results for mercury are listed in table 2 and the limits of detection are listed in table 4.

Geochemical Results

Statistical summaries of geochemical analytical results are shown in tables 3 and 4. The summary tables list univariate statistics calculated on all analyses. Percentiles were calculated on all the analyzed samples including those with concentrations below the lower limit of detection. These tables also list the maximum and minimum concentration measured for each element by method. Statistical tests on chemical and mineral results were run using JMP™ (ver. 10) software (SAS Institute Inc.; www.sas.com).

Mineral Analysis

Samples were analyzed for mineralogy using an XRD and quantified (table 5) using the Rietveld refinement of X'Pert High-score Plus™ version 2.25e software (Malvern Panalytical; www.malvernpanalytical.com). The sum of the refined phases has been normalized to 100 percent and excludes the amorphous phase. The term "amorphous phase" refers to the noncrystalline phases present in soils that could not be identified during the XRD analysis of the soil.

Results of Mineral Analyses

A statistical analysis of the mineralogy was conducted on the seven most common minerals or mineral groups identified within the soil samples, which were quartz, muscovite, kaolinite, smectite (dominantly montmorillonite), total plagioclase, total K-feldspar (potassium-bearing), and total carbonate group. Carbonate group minerals include calcite, dolomite, siderite, and aragonite. Summary statistics are listed in table 6. Figure 3*A*–*G* shows the graphical results of the statistical tests. Box plots show the relative distribution of each mineral group by geologic unit (Page and others, 2005). One-way analysis of variance and a Tukey-Kramer test was performed for each mineral or mineral group. The Tukey-Kramer test compared the means of the mineral data for each geologic unit to determine if there were significant differences in the mineral concentrations between the units. The test results are illustrated using circle symbols that plot about the sample mean value. Circles that nest within or very near other circles have similar sample means. Histograms of the mineralogy, illustrating the relative proportion of each mineral group by geologic unit, show the strong influence of quartz and calcium carbonate in interpreting the geochemistry of the area. Histograms of the seven dominant minerals (or mineral groups) are displayed for the Goliad (G), Lissie (L), Beaumont (B), and Holocene (H) geologic units described by Page and others (2005).

Thematic maps of mineral concentrations were created to convey the spatial relations between mineral concentrations and the geology and geography of the region. Mineral concentrations were gridded using an inverse distance weighted algorithm of Geosoft Oasis Montaj™. The quartz distribution (fig. 4) shows high concentrations in soils overlying the sandstone of the Goliad Formation (Tg) and sand-rich-fluvial channel deposits of the Beaumont Formation (Qb). The high quartz concentrations seen in the lower part of the Beaumont Formation (Qb) soils and the central portion of the Holocene soils (Qaf) appear to reflect the stabilized eolian-dune and sandy-loess deposits, which formed during the Holocene directly on Pleistocene and Holocene soils (Brown and others, 1980). The carbonate mineral map is influenced by three different sources of calcium carbonate material: calichified soils, detrital calcite, and shell fragments (aragonite) (fig. 5). Shell fragments are most prevalent in the Holocene soils closest to the Rio Grande and the coastline. Caliche, the calcium- and magnesium-carbonate cemented soil layer that lies just beneath or at the soil surface, is indicated in the localized high concentrations of carbonates over the Goliad, Lissie, and Beaumont Formations. The soils with high potassium-feldspar concentrations appear to be coincident with channels of older fluvial-deltaic sediments of the Beaumont and Lissie Formations (fig. 6). Soils with high concentrations of plagioclase are located on the younger Beaumont Formation and Holocene sediments (fig. 7) where the plagioclase has not been removed by weathering. Muscovite appears to be more abundant in soils that were developed on the Lissie Formation and the younger Holocene sediments (fig. 8). The concentrations of kaolinite (fig. 9) and smectite (fig. 10) are very low. The occurrences of both clay minerals appear to be greatest in the younger Beaumont Formation and Holocene fluvial-deltaic sediments. These low values, in large part, under-represent the total amount present and are a result of the limitations of the Rietveld software used to quantify the mineralogy.

Conclusions

This report describes the geochemical and mineral composition of 210 soil samples collected in the lower Rio Grande valley of Texas. These data have been used to better define geologic units (Page and others, 2006; Folger and others, 2006) and identify geographic areas that may be prone to mosquito breading (Hubbard and others, 2006).

Acknowledgments

The authors would like to thank Nadine Piatak, Bill Cannon, and Elizabeth Koozman of the U.S. Geological Survey (USGS) for their thoughtful comments. This research was supported by the USGS Landscape Geochemistry Project and the Border Environmental Health Initiative.

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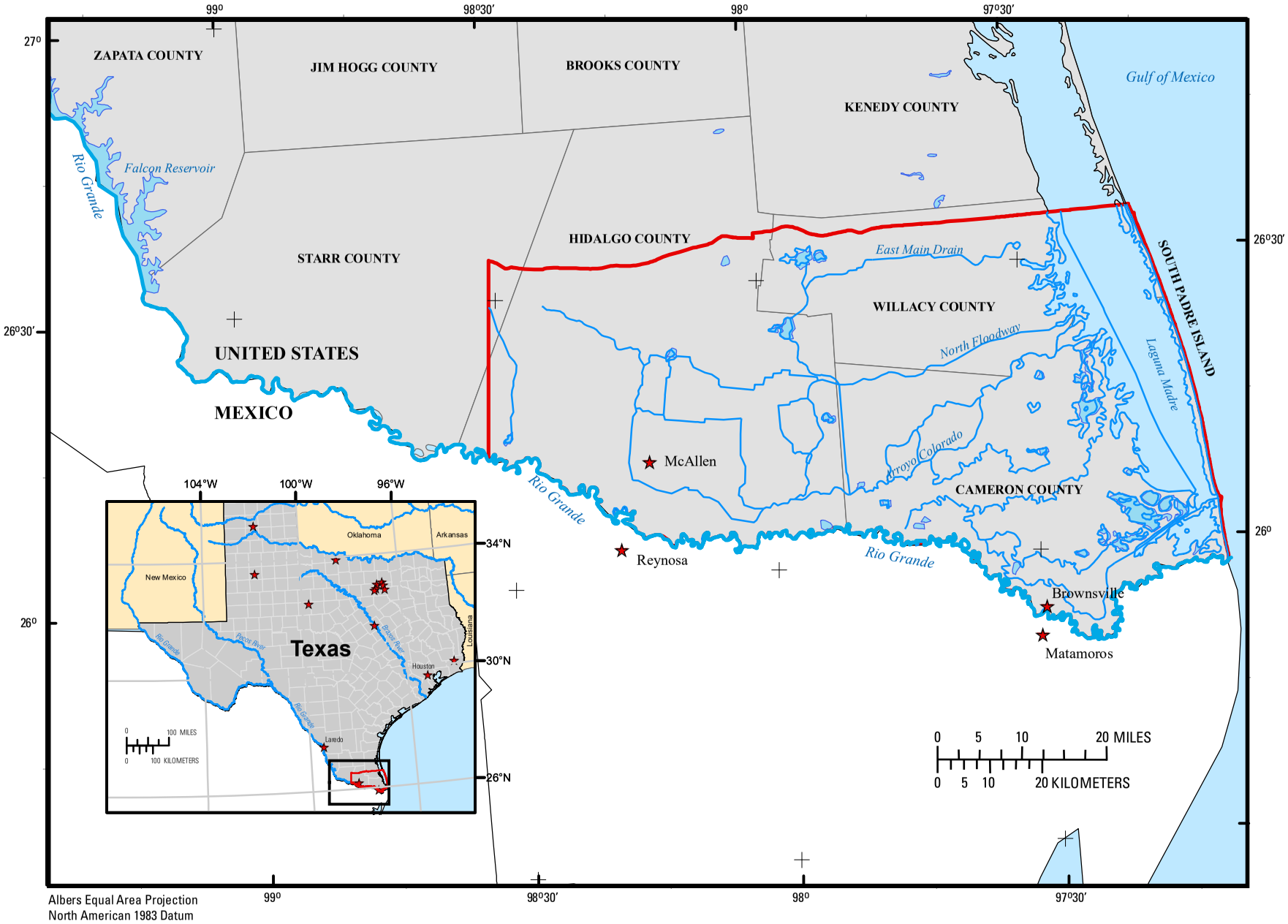


Figure 1. Study area in the lower Rio Grande valley, Texas. The red solid line represents the outer limit of the study area as shown in figures 4–10. Important cities are marked with a red star.

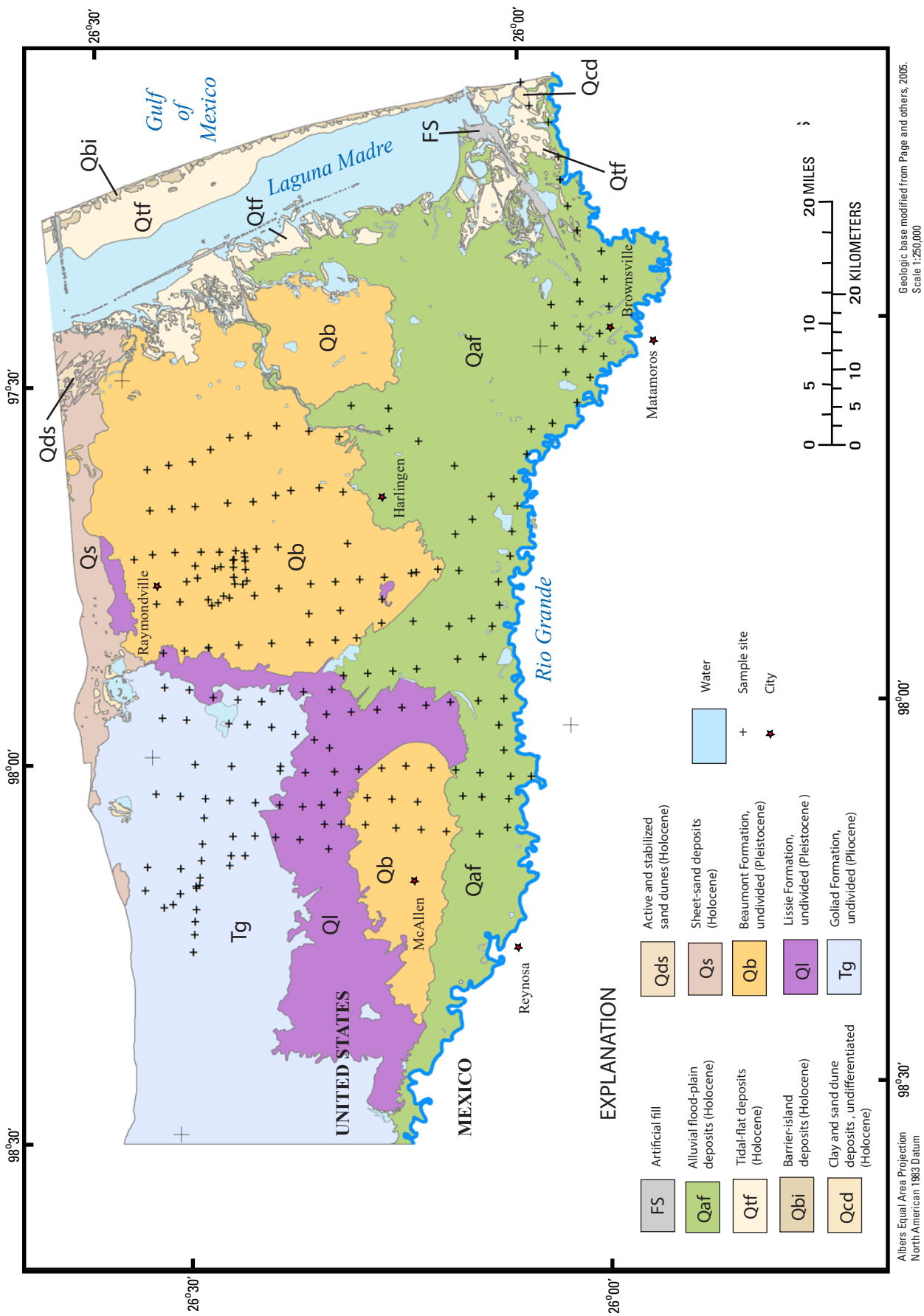


Figure 2. Geologic map of the lower Rio Grande valley, Texas showing the location of soil sample sites.

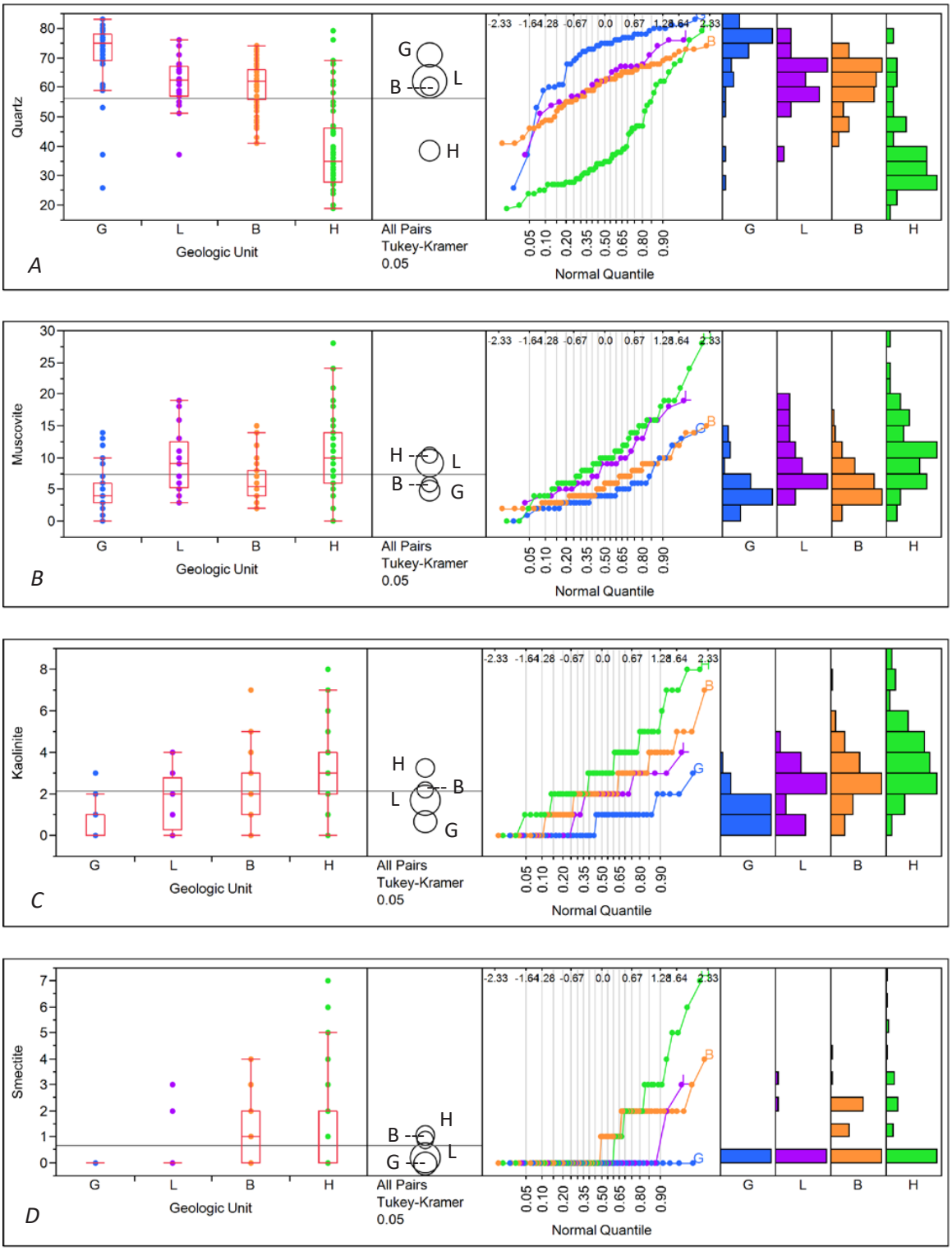
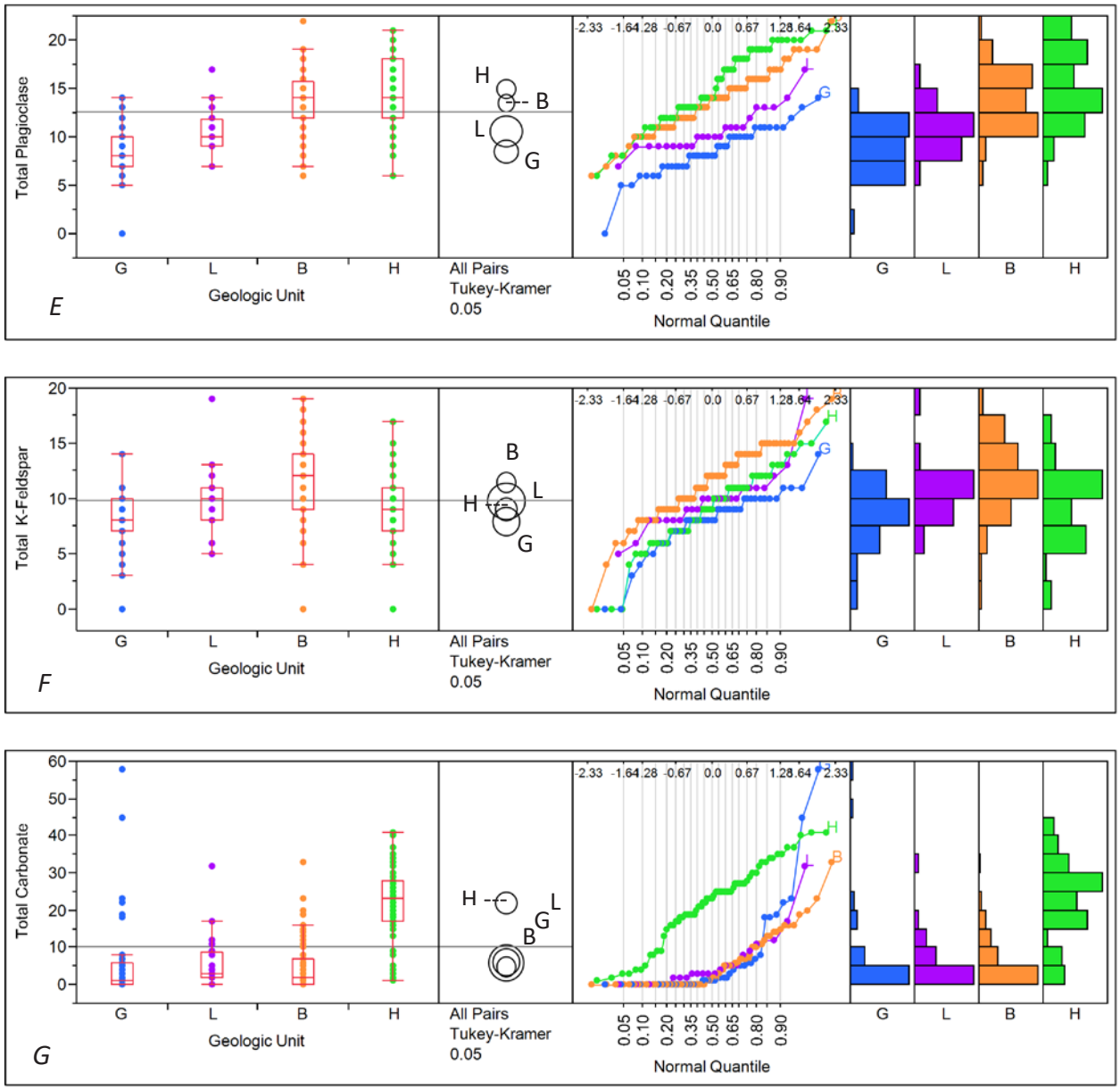


Figure 3. Univariate statistics for each of the seven major mineral groups (*A*–*G*) identified in the soils from the lower Rio Grande valley. Each figure has four statistical diagrams that show the distribution patterns of each mineral group by geologic units. These diagrams are (from left to right): box plots showing interquartile range, comparison circles from the Tukey-Kramer comparison of means test, a normal quantile plot showing the actual data on a log-transformed scale, and histograms showing the distribution of the sampled soil population. The geologic units have been abbreviated in these figures. The units are G for Goliad Formation, L for Lissie Formation, B for Beaumont Formation, and H for Holocene alluvium. They are listed from oldest to youngest. Statistical methods are described in Helsel and Hirsch (2002).



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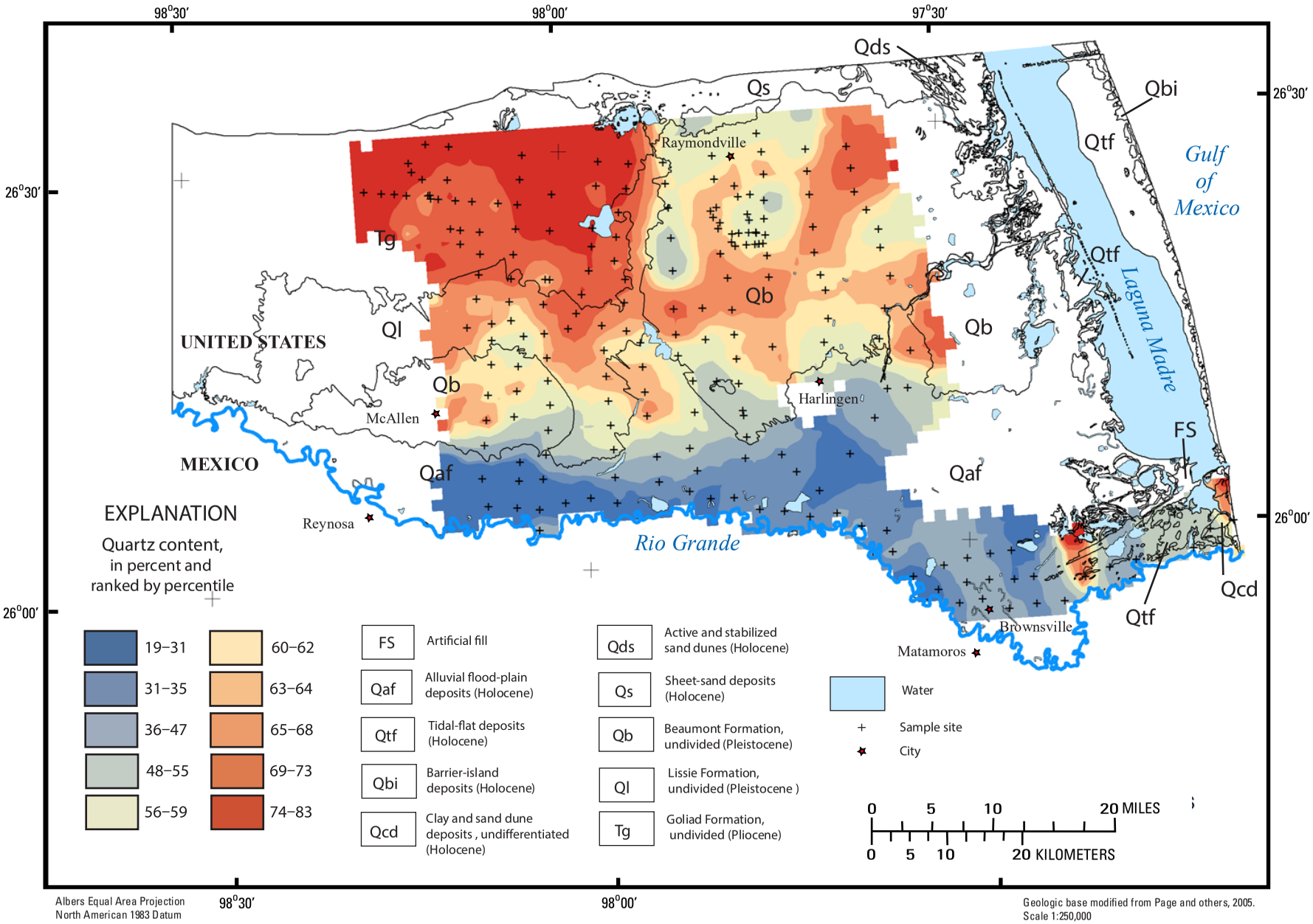

Figure 4. Quartz content in soils of the lower Rio Grande valley, Texas, using an inverse distance-weighted model grid.

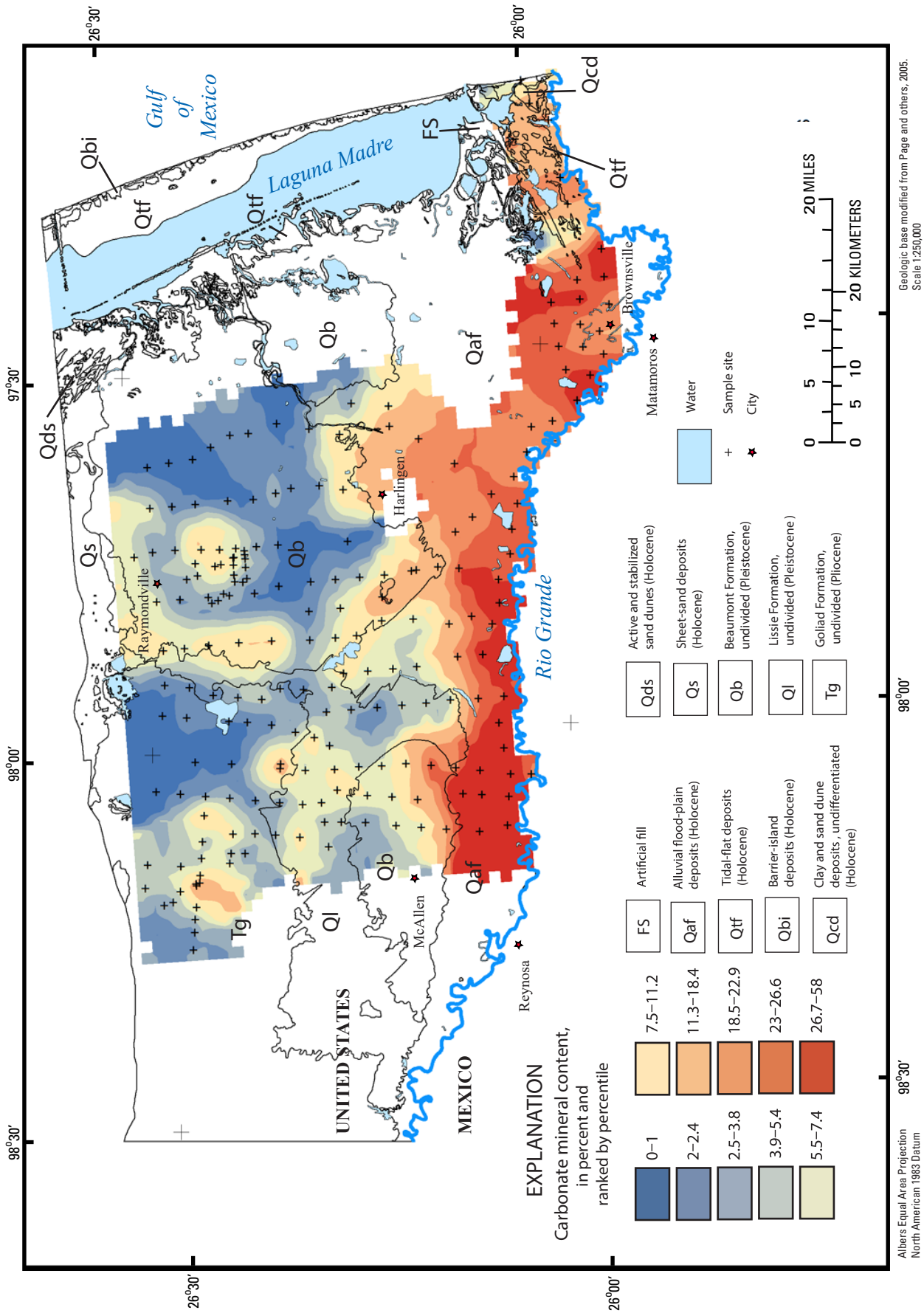

Figure 5. Carbonate mineral content in soils of the lower Rio Grande valley, Texas, by percentile, using an inverse distance-weighted grid.

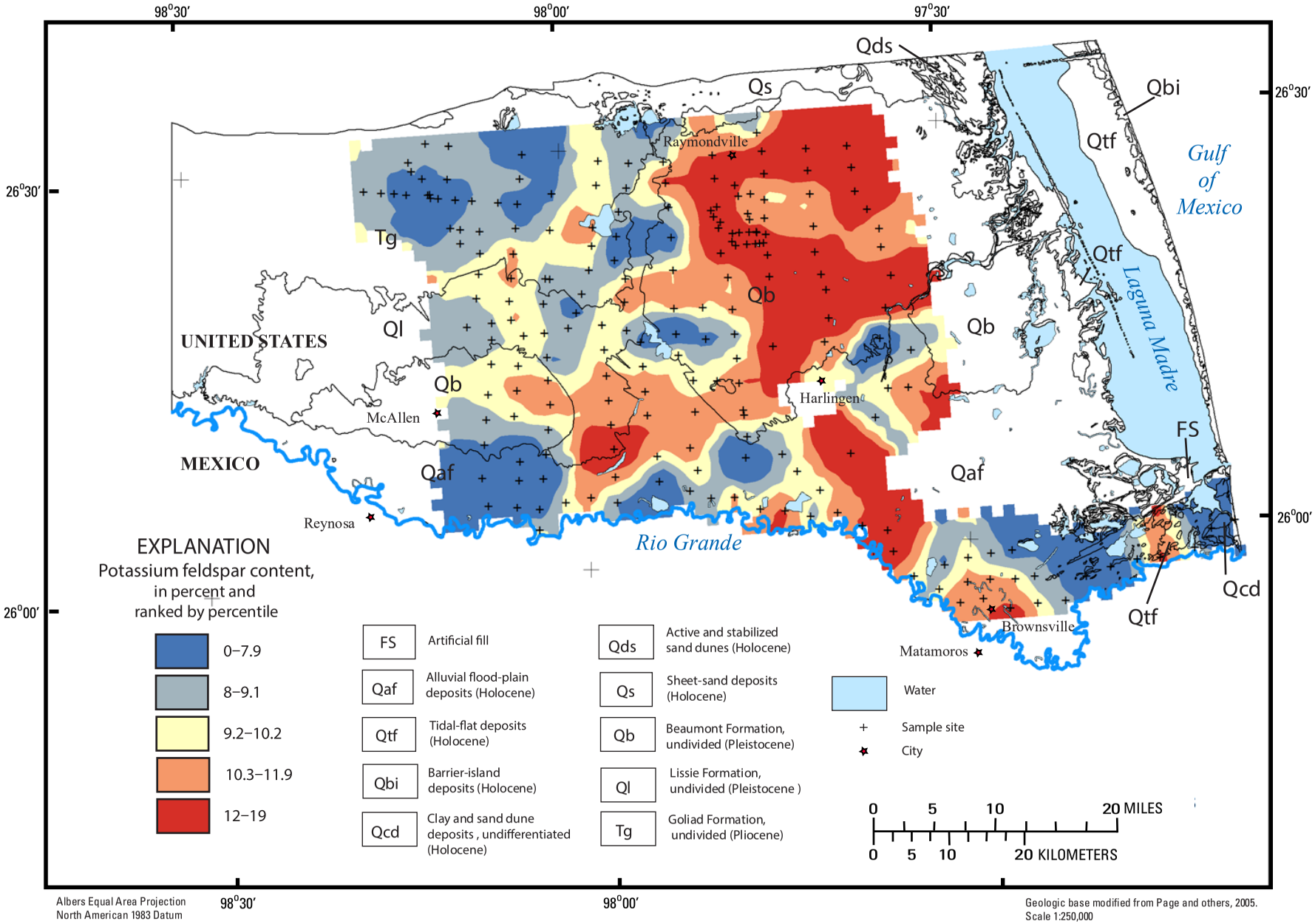

Figure 6. Potassium feldspar content in soils of the lower Rio Grande valley, Texas, by percentile, using an inverse distance-weighted grid.

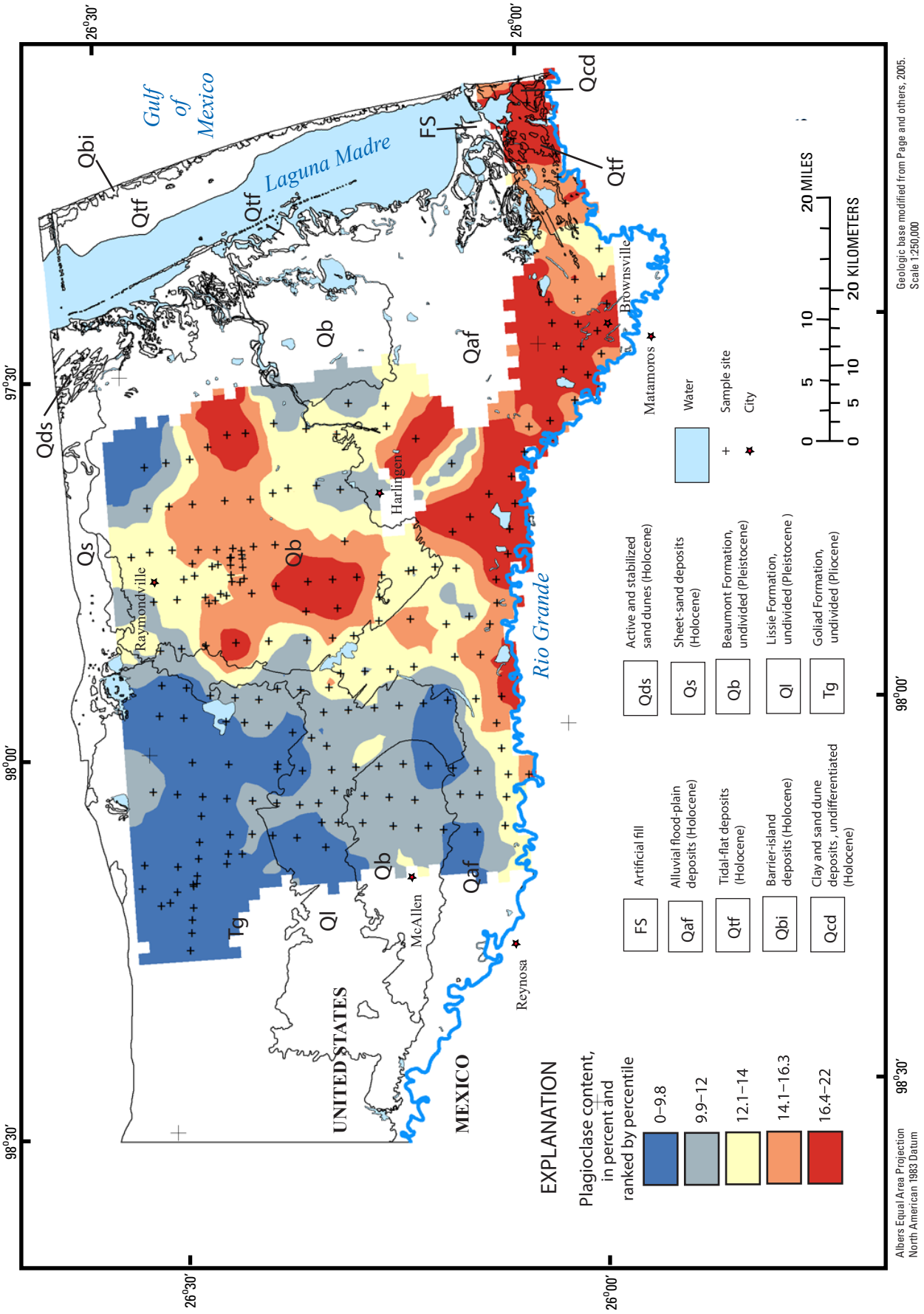

Figure 7. Plagioclase content in soils of the lower Rio Grande valley, Texas, by percentile, using an inverse distance-weighted grid.

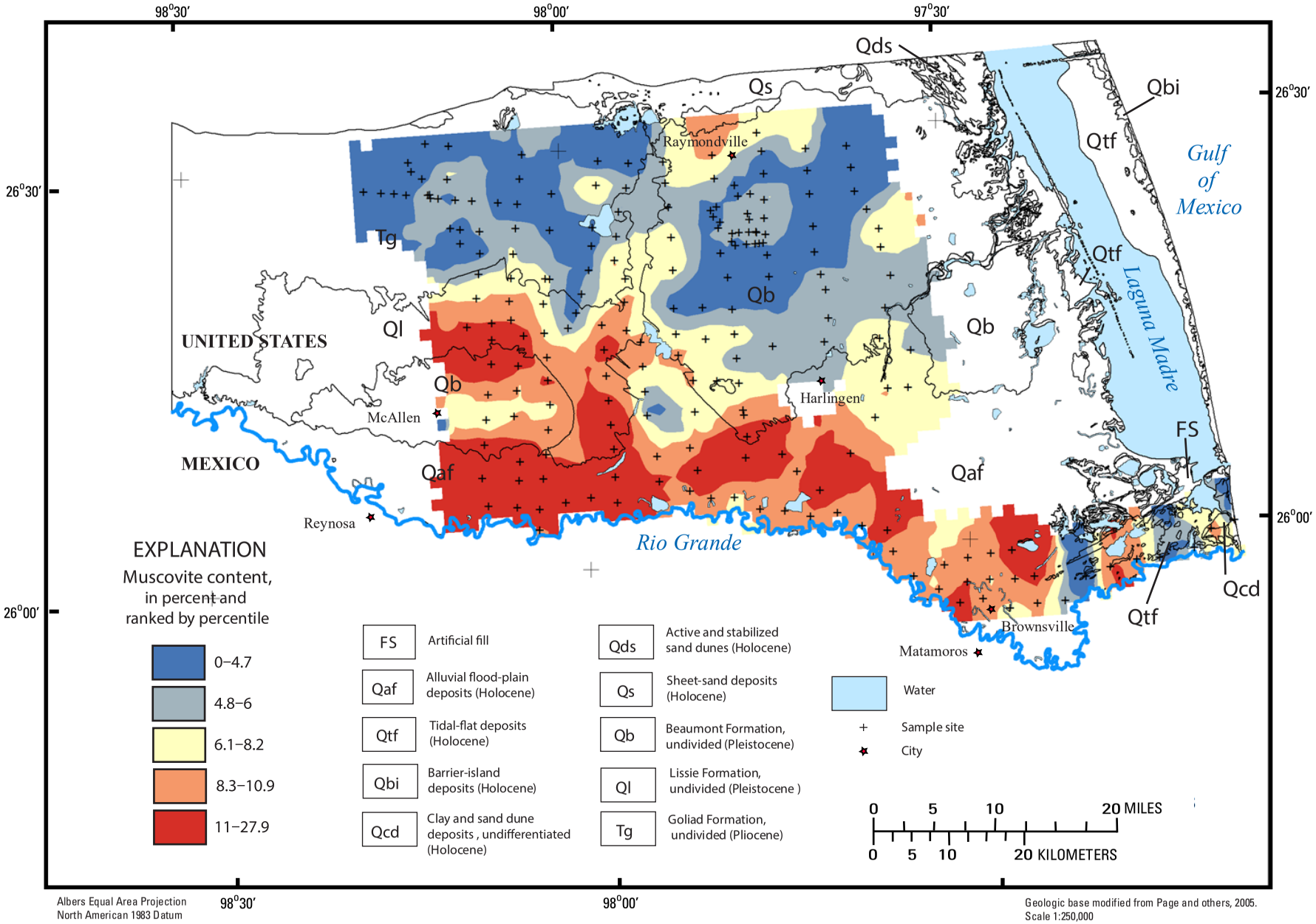

Figure 8. Muscovite content in soils of the lower Rio Grande valley, Texas, by percentile, using an inverse distance-weighted grid.

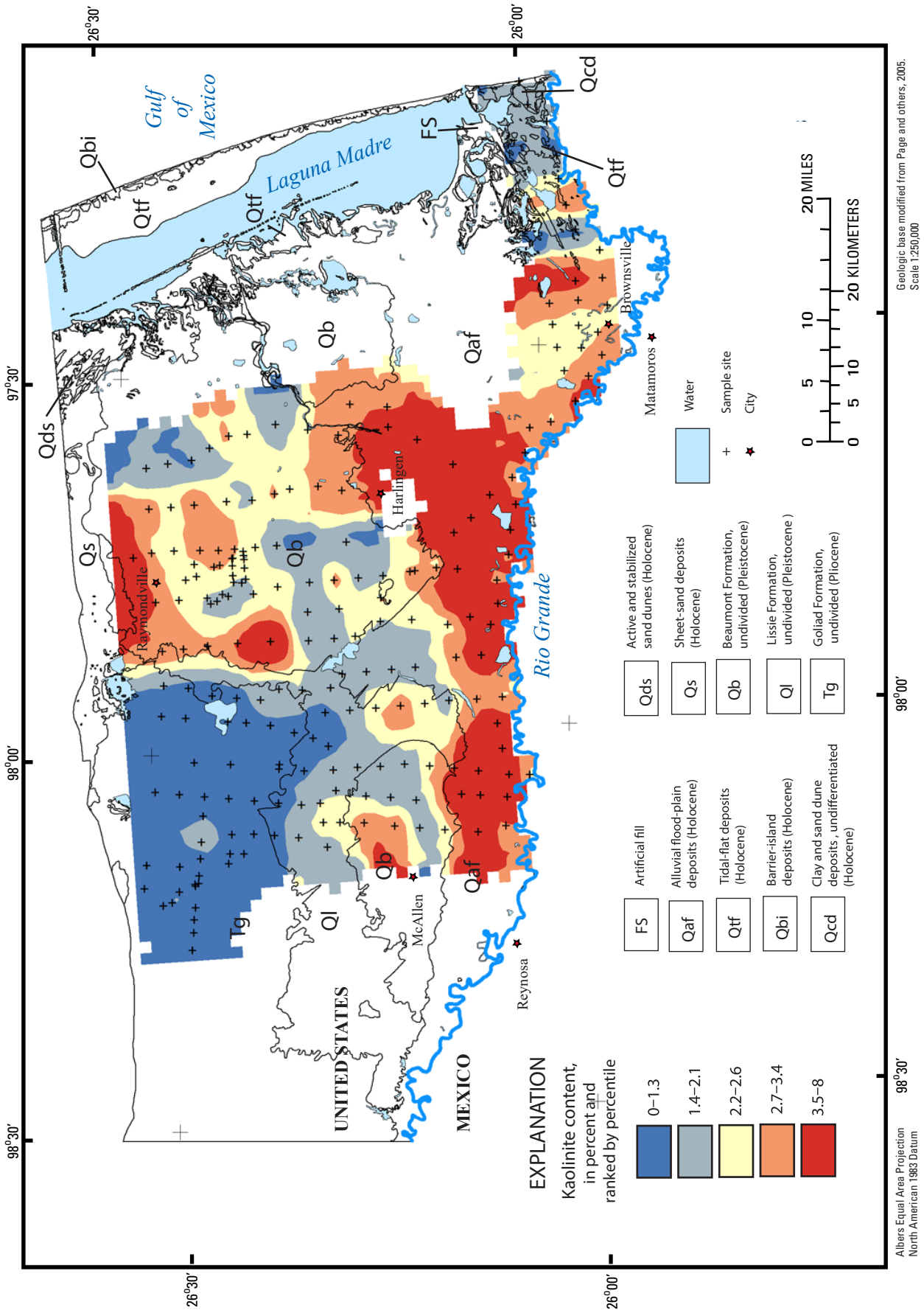

Figure 9. Kaolinite content in soils of the lower Rio Grande valley, Texas, by percentile, using an inverse distance-weighted grid.

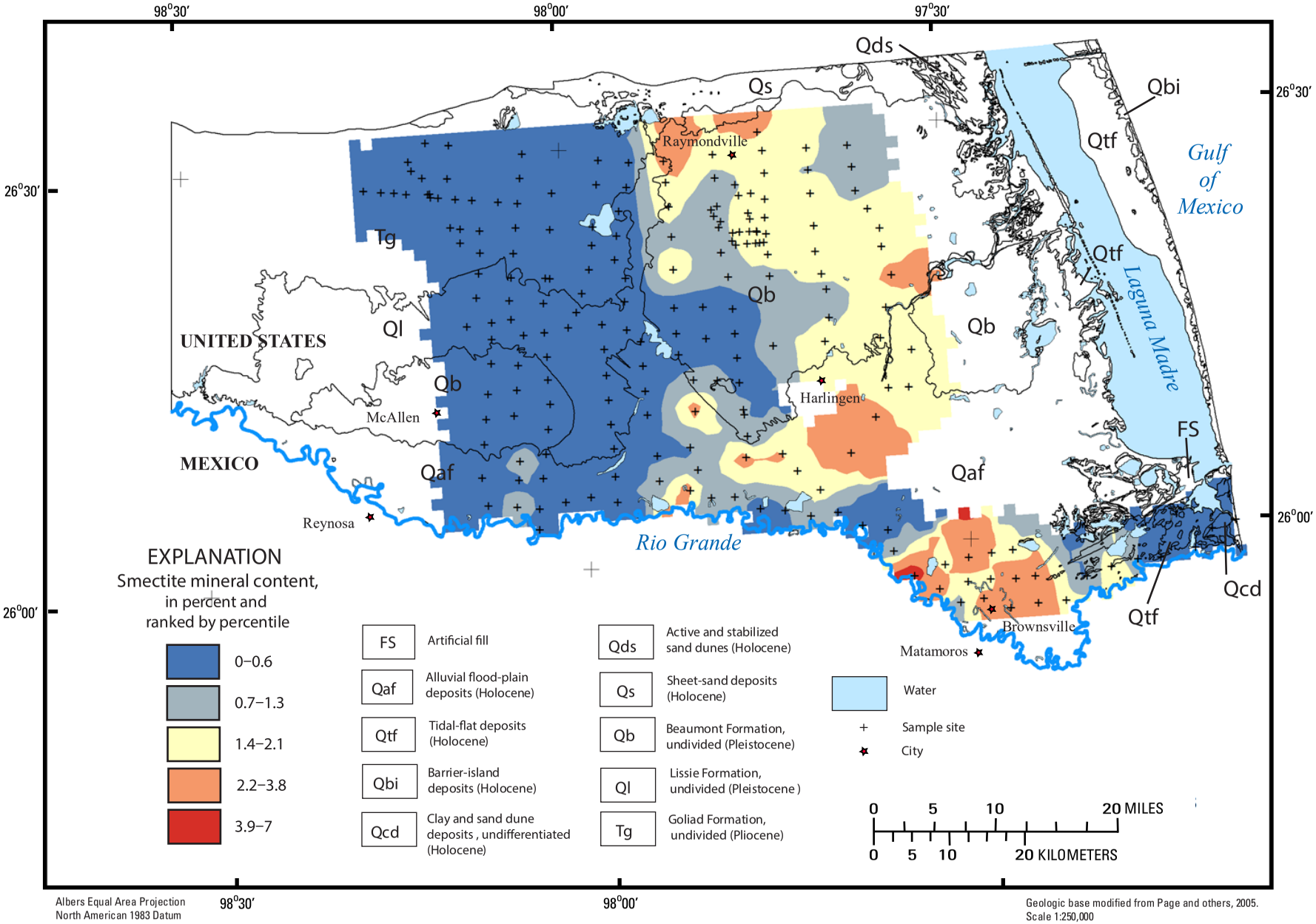

Figure 10. Smectite content in soils of the lower Rio Grande valley, Texas, by percentile, using an inverse distance-weighted grid.

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Al	ICPMS-AES_Ca	ICPMS-AES_Fe	ICPMS-AES_K	ICPMS-AES_Mg	ICPMS-AES_Na	ICPMS-AES_S
					percent	percent	percent	percent	percent	percent	percent
ST001	C-247982	26.4547	-98.1632	G	3.02	0.78	0.91	1.40	0.23	0.49	0.01
ST002	C-247984	26.4645	-98.2207	G	2.36	0.29	0.55	1.31	0.10	0.53	<0.01
ST003	C-247985	26.4699	-98.2609	G	2.20	0.95	0.55	1.21	0.14	0.42	<0.01
ST004	C-247986	26.0846	-97.8620	H	5.23	8.74	2.03	1.84	0.76	0.93	0.06
ST005	C-247987	26.0737	-97.8355	H	6.37	8.56	2.66	2.08	1.08	0.73	0.05
ST006	C-247988	26.0728	-97.8046	H	5.13	8.46	1.97	1.80	0.76	1.24	0.09
ST007	C-247989	26.0562	-97.7719	H	5.80	7.63	2.32	1.98	0.86	0.92	0.05
ST008	C-247990	26.0519	-97.7398	H	5.66	8.04	2.35	1.92	0.91	0.76	0.06
ST009	C-247991	26.0431	-97.7066	H	5.96	8.46	2.36	2.03	0.85	0.89	0.04
ST010	C-247992	26.0447	-97.6712	H	5.47	7.79	2.03	2.07	0.73	1.04	0.04
ST011	C-247993	26.0265	-97.6402	H	5.93	9.14	2.34	2.07	0.87	0.89	0.05
ST012	C-247994	26.0189	-97.6075	H	6.55	7.00	2.66	2.10	0.99	0.72	0.04
ST013	C-247995	25.9932	-97.6020	H	4.85	7.24	1.79	1.90	0.57	1.03	0.05
ST014	C-247996	25.9621	-97.5776	H	5.92	9.38	2.44	1.84	0.90	0.85	0.04
ST015	C-247997	25.9439	-97.5463	H	6.21	9.98	2.54	1.88	0.97	0.85	0.04
ST016	C-247998	25.9258	-97.5200	H	5.65	8.97	2.27	1.94	0.86	0.82	0.05
ST017	C-247999	25.9285	-97.4891	H	5.80	5.05	2.22	2.05	0.89	0.88	0.04
ST018	C-248000	25.9145	-97.4547	H	5.20	6.85	1.93	1.94	0.79	0.85	0.05
ST019	C-248001	25.9176	-97.4185	H	5.29	8.06	2.40	1.85	0.87	0.74	0.09
ST020	C-248002	25.9179	-97.3816	H	3.86	12.11	1.40	1.47	0.69	0.72	0.05
ST021	C-248003	25.9449	-97.3522	H	1.83	1.02	0.60	0.74	0.13	0.61	<0.01
ST022	C-248004	25.9539	-97.3191	H	5.94	7.02	2.24	1.93	1.29	0.91	0.08
ST023	C-248005	25.9604	-97.2835	H	5.20	7.68	1.84	1.74	0.86	1.38	0.06
ST024	C-248006	25.9600	-97.2534	H	4.54	4.59	1.31	1.79	1.17	1.15	0.04
ST025	C-248007	25.9680	-97.2069	H	3.70	8.12	1.18	1.50	0.70	2.25	0.48
ST026	C-248008	25.9894	-97.1829	H	4.98	5.36	1.78	1.85	1.51	2.94	0.56
ST027	C-248010	25.9970	-97.1513	H	2.23	1.77	0.66	0.97	0.15	0.74	0.01
ST028	C-248011	26.4601	-98.1765	G	2.97	13.97	1.06	1.08	0.66	0.33	0.02
ST029	C-248012	26.4602	-98.1741	G	3.24	16.92	1.25	1.04	0.87	0.27	0.02
ST030	C-248013	25.9723	-97.5364	H	5.14	8.38	1.78	1.88	0.69	1.02	0.04

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Al	ICPMS-AES_Ca	ICPMS-AES_Fe	ICPMS-AES_K	ICPMS-AES_Mg	ICPMS-AES_Na	ICPMS-AES_S
					percent	percent	percent	percent	percent	percent	percent
ST031	C-248014	25.9783	-97.5047	H	5.81	8.87	2.21	1.85	0.80	1.04	0.04
ST032	C-248015	25.9817	-97.4744	H	5.32	8.89	2.01	1.71	0.80	0.96	0.15
ST033	C-248016	25.9831	-97.4461	H	6.03	8.77	2.36	1.87	1.03	0.79	0.04
ST034	C-248017	25.9502	-97.4194	H	6.20	6.85	2.41	2.09	1.09	0.89	0.04
ST035	C-248018	25.9487	-97.4453	H	5.15	13.71	2.04	1.57	0.90	0.66	0.09
ST036	C-248019	25.9508	-97.4783	H	5.58	7.74	1.93	1.93	0.74	1.20	0.05
ST037	C-248020	25.9499	-97.5080	H	5.09	7.31	1.89	1.82	0.77	0.89	0.08
ST107	C-247780	26.1184	-97.7855	B	5.90	8.71	2.44	1.89	1.01	0.43	0.09
ST108	C-247781	26.1438	-97.7816	B	5.10	1.84	1.68	2.11	0.52	0.90	0.02
ST109	C-247783	26.1753	-97.7839	B	5.15	4.88	1.79	2.00	0.61	0.84	0.04
ST110	C-247784	26.2079	-97.7862	B	5.66	2.33	2.00	2.30	0.62	0.89	0.03
ST111	C-247785	26.2375	-97.7869	B	4.00	0.97	1.32	1.85	0.35	1.06	0.02
ST112	C-247786	26.2663	-97.7870	B	5.33	4.98	1.93	2.09	0.74	0.90	0.06
ST113	C-247787	26.2961	-97.7873	B	4.29	0.69	1.19	2.00	0.30	1.03	0.01
ST114	C-247788	26.3011	-97.8261	B	4.35	0.74	1.27	1.92	0.29	0.96	0.02
ST115	C-247789	26.2631	-97.8257	B	5.66	3.07	2.08	2.30	0.79	0.83	0.03
ST116	C-247790	26.2719	-97.8638	B	3.96	2.23	1.24	1.96	0.38	0.87	0.03
ST117	C-247791	26.3026	-97.8644	B	4.56	0.99	1.34	2.01	0.34	1.02	0.02
ST118	C-247792	26.3422	-97.9251	B	3.64	1.12	1.09	1.69	0.30	0.67	0.02
ST119	C-247793	26.3148	-97.9290	B	4.93	0.60	1.66	1.88	0.47	0.65	0.02
ST120	C-247794	26.2812	-97.9285	B	4.23	1.76	1.41	1.94	0.44	0.73	0.03
ST121	C-247795	26.2656	-97.9119	B	5.21	5.76	1.97	2.03	0.85	0.71	0.06
ST122	C-247796	26.2365	-97.9114	B	5.04	2.11	1.74	2.09	0.55	0.79	0.02
ST123	C-247797	26.2066	-97.9111	B	5.06	4.16	1.75	1.98	0.53	0.86	0.03
ST124	C-247798	26.1781	-97.9106	B	4.18	2.59	1.19	1.91	0.37	0.91	0.02
ST125	C-247799	26.1286	-97.9014	B	5.76	6.86	2.17	2.13	0.75	0.81	0.03
ST126	C-247800	26.0986	-97.9012	B	6.07	9.99	2.52	1.97	0.98	0.60	0.05
ST127	C-247801	26.1085	-97.8500	B	6.20	9.38	2.59	2.05	1.08	0.60	0.08
ST128	C-247802	26.1356	-97.8577	B	5.00	2.79	1.64	2.12	0.52	0.89	0.03
ST129	C-247803	26.1778	-97.8472	B	5.90	2.20	2.06	2.32	0.67	0.93	0.03

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Al	ICPMS-AES_Ca	ICPMS-AES_Fe	ICPMS-AES_K	ICPMS-AES_Mg	ICPMS-AES_Na	ICPMS-AES_S
					percent	percent	percent	percent	percent	percent	percent
ST130	C-247804	26.2155	-97.8466	B	5.71	1.90	1.98	2.36	0.67	0.87	0.04
ST131	C-247805	26.2466	-97.8634	L	4.87	4.79	1.92	1.98	0.66	0.79	0.03
ST132	C-247806	26.3655	-97.9374	B	4.74	3.82	1.71	1.98	0.64	1.01	0.12
ST133	C-247807	26.3937	-97.9325	B	3.51	1.99	1.15	1.55	0.28	0.75	0.03
ST134	C-247808	26.4227	-97.9267	B	3.67	1.22	1.16	1.69	0.34	0.62	0.02
ST135	C-247809	26.4504	-97.9144	B	3.58	1.28	1.12	1.49	0.34	0.63	0.04
ST136	C-247811	26.4795	-97.9088	B	2.62	0.33	0.67	1.32	0.14	0.54	<0.01
ST137	C-247812	26.4851	-97.9489	B	2.51	0.25	0.62	1.32	0.12	0.54	<0.01
ST138	C-247813	26.4564	-97.9539	B	3.76	1.18	1.23	1.52	0.34	0.58	0.06
ST139	C-247814	26.4063	-97.9628	B	2.65	1.61	0.65	1.35	0.57	1.52	0.72
ST140	C-247815	26.3845	-97.9662	B	3.10	0.49	0.86	1.53	0.18	0.67	0.01
ST141	C-247816	26.3559	-97.9724	B	3.43	0.86	0.98	1.57	0.26	0.73	0.04
ST142	C-247817	26.3282	-97.9843	B	3.30	0.39	1.02	1.51	0.24	0.60	0.01
ST143	C-247818	26.3067	-97.9931	B	2.77	7.33	0.80	1.38	0.40	0.92	0.05
ST144	C-247823	26.3202	-98.0355	B	3.21	0.51	0.91	1.59	0.20	0.73	0.01
ST145	C-247824	26.3497	-98.0306	B	3.62	6.97	1.26	1.54	0.67	0.62	0.05
ST146	C-247825	26.3490	-98.0245	B	2.63	8.94	0.87	1.27	0.35	1.18	0.05
ST147	C-247827	26.4070	-98.0197	B	3.11	0.38	0.87	1.49	0.18	0.61	0.01
ST148	C-247828	26.4502	-98.0135	B	2.87	0.25	0.84	1.38	0.18	0.51	<0.01
ST149	C-247829	26.2889	-98.0054	B	2.75	0.36	0.72	1.43	0.14	0.59	<0.01
ST150	C-247830	26.4997	-98.0487	B	2.80	0.29	0.77	1.46	0.15	0.51	<0.01
ST151	C-247831	26.4707	-98.0538	B	2.28	0.20	0.57	1.32	0.10	0.54	<0.01
ST152	C-247832	26.4410	-98.0593	B	2.37	0.40	0.53	1.35	0.10	0.56	<0.01
ST153	C-247833	26.4124	-98.0644	B	2.91	1.48	0.79	1.43	0.21	0.55	<0.01
ST154	C-247834	26.3825	-98.0699	B	4.14	0.66	1.29	1.83	0.33	0.71	0.02
ST155	C-247835	26.3534	-98.0751	B	3.51	0.28	1.08	1.56	0.23	0.62	<0.01
ST156	C-247836	26.3266	-98.0799	B	4.77	3.94	1.67	2.07	0.58	0.68	0.03
ST157	C-247837	26.3617	-98.1178	B	3.32	1.11	0.92	1.56	0.28	0.68	0.01
ST158	C-247838	26.3860	-98.1138	B	2.75	1.75	0.71	1.43	0.20	0.64	<0.01
ST159	C-247839	26.3995	-98.1385	B	2.78	0.28	0.65	1.50	0.15	0.66	<0.01

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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					percent	percent	percent	percent	percent	percent	percent
ST160	C-247840	26.4162	-98.1371	B	3.25	0.42	0.90	1.60	0.17	0.72	<0.01
ST161	C-247841	26.4123	-98.1120	B	3.02	6.69	1.04	1.29	0.49	0.46	0.02
ST162	C-247842	26.4184	-98.1501	L	2.95	2.35	0.88	1.38	0.28	0.52	0.01
ST163	C-247843	26.4665	-98.2377	B	2.62	0.87	0.75	1.36	0.21	0.51	<0.01
ST164	C-247844	26.4618	-98.2048	B	2.33	2.98	0.57	1.25	0.20	0.45	0.02
ST165	C-247845	26.4560	-98.1734	B	2.25	8.40	0.69	1.08	0.38	0.37	0.02
ST166	C-247846	26.4518	-98.1409	B	2.31	0.42	0.52	1.29	0.16	0.50	<0.01
ST167	C-247847	26.5165	-98.1443	H	2.01	2.72	0.49	1.12	0.20	0.38	<0.01
ST168	C-247848	26.5209	-98.1747	H	2.98	3.29	0.99	1.28	0.37	0.41	0.01
ST169	C-247849	26.5004	-98.1991	H	2.18	0.42	0.58	1.21	0.10	0.40	<0.01
ST170	C-247850	26.4894	-98.1960	H	2.64	0.52	0.73	1.33	0.14	0.39	<0.01
ST171	C-247851	26.4797	-98.1823	H	2.32	3.47	0.66	1.16	0.26	0.35	0.01
ST172	C-247852	26.4772	-98.1495	H	2.96	1.62	0.86	1.37	0.36	0.53	0.04
ST173	C-247853	26.4489	-98.1191	H	3.56	1.15	1.14	1.58	0.33	0.51	0.02
ST174	C-247854	26.4444	-98.0848	H	2.79	9.26	0.86	1.26	0.45	0.46	0.04
ST175	C-247855	26.2899	-97.9605	H	3.77	1.73	1.26	1.69	0.44	0.62	0.02
ST176	C-247857	26.2599	-97.9604	B	5.22	2.39	1.96	2.14	0.75	0.66	0.03
ST177	C-247858	26.2288	-97.9602	B	4.47	2.09	1.58	1.88	0.69	0.86	0.07
ST178	C-247859	26.1995	-97.9597	B	4.23	2.44	1.40	1.78	0.45	0.72	0.03
ST179	C-247860	26.1704	-97.9592	B	5.45	2.86	2.08	2.19	0.84	0.65	0.03
ST180	C-247861	26.1414	-97.9576	B	4.91	1.67	1.64	1.97	0.53	0.85	0.02
ST181	C-247743	26.1082	-97.9590	B	5.93	8.41	2.38	2.13	0.94	0.85	0.06
ST182	C-247744	26.0775	-97.9584	B	5.58	9.22	2.14	2.03	0.82	0.96	0.04
ST183	C-247746	26.0855	-97.9927	B	5.92	9.03	2.32	2.09	0.94	0.85	0.04
ST184	C-247747	26.0824	-98.0260	B	6.24	8.79	2.55	2.09	1.03	0.78	0.04
ST185	C-247748	26.0519	-98.0636	B	5.03	6.86	1.72	1.98	0.56	1.24	0.03
ST186	C-247749	26.0764	-98.0611	G	6.48	10.14	2.72	2.05	1.13	0.65	0.05
ST187	C-247750	26.1124	-98.0534	L	6.08	10.66	2.54	2.00	1.05	0.59	0.06
ST188	C-247751	26.1409	-98.0472	L	4.84	3.73	1.62	1.92	0.50	0.83	0.02
ST189	C-247752	26.1702	-98.0420	H	3.66	10.83	1.44	1.46	0.65	0.59	0.34

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Al	ICPMS-AES_Ca	ICPMS-AES_Fe	ICPMS-AES_K	ICPMS-AES_Mg	ICPMS-AES_Na	ICPMS-AES_S
					percent	percent	percent	percent	percent	percent	percent
ST190	C-247753	26.1999	-98.0368	H	4.45	2.72	1.49	1.97	0.53	0.81	0.06
ST191	C-247754	26.2290	-98.0375	H	4.87	3.27	1.74	2.15	0.71	0.81	0.08
ST192	C-247755	26.2565	-98.0361	H	4.32	1.26	1.38	1.89	0.44	0.71	0.02
ST193	C-247756	26.2856	-98.0373	H	3.76	3.54	1.10	1.77	0.43	0.88	0.12
ST194	C-247757	26.3041	-98.0799	H	4.74	2.57	1.64	2.09	0.64	0.68	0.04
ST195	C-247758	26.3329	-98.1230	H	4.23	5.02	1.42	1.85	0.58	0.90	0.07
ST196	C-247759	26.3020	-98.1054	H	4.38	2.21	1.50	1.97	0.55	0.73	0.04
ST197	C-247760	26.2844	-98.0649	H	4.94	4.46	1.82	2.04	0.73	0.62	0.03
ST198	C-247761	26.2490	-98.0747	B	4.56	4.42	1.60	1.97	0.69	0.73	0.03
ST199	C-247762	26.2199	-98.0793	B	4.38	1.93	1.45	1.96	0.47	0.79	0.02
ST200	C-247763	26.1895	-98.0855	G	4.87	6.57	1.71	1.94	0.68	0.78	0.04
ST201	C-247764	26.1351	-98.0821	G	6.43	11.93	2.73	1.90	1.14	0.48	0.05
ST202	C-247765	26.1125	-98.0856	G	6.00	11.60	2.50	1.93	1.05	0.60	0.05
ST203	C-247766	26.0810	-98.0908	G	6.21	10.23	2.55	1.98	1.01	0.68	0.05
ST204	C-247767	26.0849	-98.1279	G	5.85	10.83	2.36	1.97	1.03	0.72	0.05
ST205	C-247768	26.1185	-98.1334	G	6.55	11.81	2.79	1.98	1.10	0.57	0.18
ST206	C-247769	26.1578	-98.1270	G	5.30	6.68	2.02	2.08	0.93	0.63	0.04
ST207	C-247770	26.1876	-98.1222	G	3.39	1.56	0.96	1.66	0.24	0.77	0.02
ST208	C-247771	26.2176	-98.1177	G	4.86	2.91	1.80	2.07	0.64	0.73	0.03
ST209	C-247772	26.2533	-98.1102	G	5.26	1.28	1.89	2.22	0.66	0.66	0.02
ST210	C-247773	26.2823	-98.1069	G	5.84	1.86	2.20	2.31	0.90	0.60	0.03
ST211	C-247774	26.2994	-98.1385	L	4.70	1.89	1.65	1.98	0.55	0.64	0.02

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST001	C-247982	26.4547	-98.1632	G	0.12	<1	3	390	0.8	0.09	<0.1
ST002	C-247984	26.4645	-98.2207	G	0.09	<1	2	423	0.6	0.06	<0.1
ST003	C-247985	26.4699	-98.2609	G	0.08	<1	3	390	0.6	0.06	<0.1
ST004	C-247986	26.0846	-97.8620	H	0.24	<1	8	498	1.7	0.18	0.3
ST005	C-247987	26.0737	-97.8355	H	0.26	<1	20	441	2.1	0.23	0.4
ST006	C-247988	26.0728	-97.8046	H	0.26	<1	8	526	1.7	0.17	0.2
ST007	C-247989	26.0562	-97.7719	H	0.28	<1	17	489	1.8	0.19	0.3
ST008	C-247990	26.0519	-97.7398	H	0.24	<1	10	476	1.7	0.22	0.4
ST009	C-247991	26.0431	-97.7066	H	0.27	<1	8	478	1.8	0.20	0.3
ST010	C-247992	26.0447	-97.6712	H	0.23	<1	12	535	1.6	0.18	0.3
ST011	C-247993	26.0265	-97.6402	H	0.26	<1	13	479	1.7	0.20	0.3
ST012	C-247994	26.0189	-97.6075	H	0.24	<1	8	453	2.1	0.24	0.3
ST013	C-247995	25.9932	-97.6020	H	0.22	<1	5	519	1.7	0.16	0.3
ST014	C-247996	25.9621	-97.5776	H	0.25	<1	10	519	1.8	0.22	0.3
ST015	C-247997	25.9439	-97.5463	H	0.28	<1	11	505	1.9	0.23	0.4
ST016	C-247998	25.9258	-97.5200	H	0.23	<1	8	484	1.5	0.21	0.3
ST017	C-247999	25.9285	-97.4891	H	0.24	<1	6	495	1.8	0.20	0.3
ST018	C-248000	25.9145	-97.4547	H	0.21	<1	5	482	1.4	0.17	0.3
ST019	C-248001	25.9176	-97.4185	H	0.23	<1	13	471	1.6	0.22	0.5
ST020	C-248002	25.9179	-97.3816	H	0.17	<1	4	498	1.1	0.12	0.2
ST021	C-248003	25.9449	-97.3522	H	0.18	<1	3	300	0.6	0.04	<0.1
ST022	C-248004	25.9539	-97.3191	H	0.25	<1	6	468	1.6	0.20	0.2
ST023	C-248005	25.9604	-97.2835	H	0.23	<1	7	565	1.3	0.18	0.3
ST024	C-248006	25.9600	-97.2534	H	0.19	<1	4	544	1.2	0.13	0.1
ST025	C-248007	25.9680	-97.2069	H	0.17	<1	4	534	1.2	0.10	0.2
ST026	C-248008	25.9894	-97.1829	H	0.21	<1	6	637	1.3	0.15	0.2
ST027	C-248010	25.9970	-97.1513	H	0.17	<1	3	387	0.5	0.04	<0.1
ST028	C-248011	26.4601	-98.1765	G	0.12	<1	3	367	0.8	0.09	0.2
ST029	C-248012	26.4602	-98.1741	G	0.13	<1	2	363	0.7	0.10	0.3
ST030	C-248013	25.9723	-97.5364	H	0.23	<1	6	521	1.4	0.15	0.2

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST031	C-248014	25.9783	-97.5047	H	0.28	<1	7	578	1.7	0.19	0.2
ST032	C-248015	25.9817	-97.4744	H	0.24	<1	8	510	1.7	0.18	0.3
ST033	C-248016	25.9831	-97.4461	H	0.26	<1	8	538	1.9	0.21	0.3
ST034	C-248017	25.9502	-97.4194	H	0.27	<1	6	497	1.9	0.21	0.3
ST035	C-248018	25.9487	-97.4453	H	0.22	<1	6	495	1.6	0.17	0.3
ST036	C-248019	25.9508	-97.4783	H	0.26	<1	7	607	1.7	0.16	0.2
ST037	C-248020	25.9499	-97.5080	H	0.23	<1	5	484	1.5	0.18	0.3
ST107	C-247780	26.1184	-97.7855	B	0.23	<1	15	340	1.7	0.23	0.4
ST108	C-247781	26.1438	-97.7816	B	0.19	<1	4	476	1.4	0.18	0.2
ST109	C-247783	26.1753	-97.7839	B	0.20	<1	6	463	1.5	0.16	0.3
ST110	C-247784	26.2079	-97.7862	B	0.23	<1	5	453	1.5	0.17	0.2
ST111	C-247785	26.2375	-97.7869	B	0.17	<1	4	490	1.3	0.14	0.1
ST112	C-247786	26.2663	-97.7870	B	0.22	<1	11	432	1.4	0.18	0.3
ST113	C-247787	26.2961	-97.7873	B	0.16	<1	6	484	1.3	0.11	0.1
ST114	C-247788	26.3011	-97.8261	B	0.16	<1	5	479	1.2	0.13	0.1
ST115	C-247789	26.2631	-97.8257	B	0.24	<1	6	436	1.8	0.19	0.4
ST116	C-247790	26.2719	-97.8638	B	0.16	<1	5	500	1.1	0.11	0.1
ST117	C-247791	26.3026	-97.8644	B	0.17	<1	4	492	1.3	0.11	0.2
ST118	C-247792	26.3422	-97.9251	B	0.15	<1	4	407	1.0	0.10	0.1
ST119	C-247793	26.3148	-97.9290	B	0.19	<1	5	406	1.3	0.15	0.3
ST120	C-247794	26.2812	-97.9285	B	0.18	<1	7	456	1.1	0.13	0.2
ST121	C-247795	26.2656	-97.9119	B	0.23	<1	6	1080	1.4	0.18	0.3
ST122	C-247796	26.2365	-97.9114	B	0.21	<1	10	449	1.5	0.15	0.2
ST123	C-247797	26.2066	-97.9111	B	0.20	<1	5	486	1.4	0.15	0.2
ST124	C-247798	26.1781	-97.9106	B	0.13	<1	5	470	1.1	0.13	0.2
ST125	C-247799	26.1286	-97.9014	B	0.23	<1	11	438	1.5	0.18	0.3
ST126	C-247800	26.0986	-97.9012	B	0.25	<1	13	401	1.9	0.25	0.4
ST127	C-247801	26.1085	-97.8500	B	0.25	<1	14	433	1.9	0.25	0.5
ST128	C-247802	26.1356	-97.8577	B	0.18	<1	7	458	1.3	0.15	0.2
ST129	C-247803	26.1778	-97.8472	B	0.22	<1	9	464	1.8	0.21	0.5

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST130	C-247804	26.2155	-97.8466	B	0.21	<1	11	456	1.6	0.18	0.3
ST131	C-247805	26.2466	-97.8634	L	0.21	<1	8	429	1.5	0.17	0.3
ST132	C-247806	26.3655	-97.9374	B	0.20	<1	5	397	1.2	0.15	0.2
ST133	C-247807	26.3937	-97.9325	B	0.20	<1	4	480	0.9	0.09	<0.1
ST134	C-247808	26.4227	-97.9267	B	0.14	<1	5	400	0.8	0.11	0.1
ST135	C-247809	26.4504	-97.9144	B	0.13	<1	4	396	1.0	0.11	0.1
ST136	C-247811	26.4795	-97.9088	B	0.10	<1	4	377	0.7	0.08	<0.1
ST137	C-247812	26.4851	-97.9489	B	0.10	<1	3	376	0.6	0.06	<0.1
ST138	C-247813	26.4564	-97.9539	B	0.14	1	4	387	1.0	0.14	0.2
ST139	C-247814	26.4063	-97.9628	B	0.09	<1	3	389	0.6	0.07	<0.1
ST140	C-247815	26.3845	-97.9662	B	0.12	<1	3	414	0.8	0.08	<0.1
ST141	C-247816	26.3559	-97.9724	B	0.13	<1	3	412	1.0	0.09	0.3
ST142	C-247817	26.3282	-97.9843	B	0.14	<1	4	379	0.9	0.10	0.1
ST143	C-247818	26.3067	-97.9931	B	0.10	<1	4	393	0.7	0.08	0.2
ST144	C-247823	26.3202	-98.0355	B	0.14	<1	3	434	0.8	0.09	<0.1
ST145	C-247824	26.3497	-98.0306	B	0.14	<1	4	398	0.9	0.11	0.2
ST146	C-247825	26.3490	-98.0245	B	0.12	<1	3	425	0.7	0.11	0.2
ST147	C-247827	26.4070	-98.0197	B	0.12	<1	3	401	0.7	0.09	<0.1
ST148	C-247828	26.4502	-98.0135	B	0.11	<1	3	369	0.6	0.09	0.1
ST149	C-247829	26.2889	-98.0054	B	0.11	<1	3	388	0.7	0.07	<0.1
ST150	C-247830	26.4997	-98.0487	B	0.10	<1	3	432	0.8	0.08	<0.1
ST151	C-247831	26.4707	-98.0538	B	0.08	<1	3	387	0.5	0.13	<0.1
ST152	C-247832	26.4410	-98.0593	B	0.08	<1	3	371	0.6	0.05	<0.1
ST153	C-247833	26.4124	-98.0644	B	0.10	<1	3	394	0.7	0.08	<0.1
ST154	C-247834	26.3825	-98.0699	B	0.15	<1	4	481	1.0	0.12	0.7
ST155	C-247835	26.3534	-98.0751	B	0.14	<1	3	392	0.9	0.10	<0.1
ST156	C-247836	26.3266	-98.0799	B	0.19	<1	5	438	1.1	0.15	0.3
ST157	C-247837	26.3617	-98.1178	B	0.11	<1	6	403	0.9	0.09	0.1
ST158	C-247838	26.3860	-98.1138	B	0.10	<1	2	429	0.6	0.07	<0.1
ST159	C-247839	26.3995	-98.1385	B	0.09	<1	3	396	0.7	0.07	<0.1

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST160	C-247840	26.4162	-98.1371	B	0.13	<1	3	443	0.8	0.08	<0.1
ST161	C-247841	26.4123	-98.1120	B	0.12	<1	3	618	1.2	0.09	0.2
ST162	C-247842	26.4184	-98.1501	L	0.11	<1	6	390	1.1	0.10	0.1
ST163	C-247843	26.4665	-98.2377	B	0.12	<1	2	394	0.8	0.08	<0.1
ST164	C-247844	26.4618	-98.2048	B	0.07	<1	2	418	0.6	0.06	<0.1
ST165	C-247845	26.4560	-98.1734	B	0.08	<1	2	449	0.8	0.07	0.2
ST166	C-247846	26.4518	-98.1409	B	0.07	<1	3	398	0.7	0.06	<0.1
ST167	C-247847	26.5165	-98.1443	H	0.07	<1	2	403	0.5	0.05	<0.1
ST168	C-247848	26.5209	-98.1747	H	0.13	<1	3	414	0.8	0.09	<0.1
ST169	C-247849	26.5004	-98.1991	H	0.10	<1	2	380	0.5	0.06	<0.1
ST170	C-247850	26.4894	-98.1960	H	0.09	<1	2	374	0.7	0.07	<0.1
ST171	C-247851	26.4797	-98.1823	H	0.07	<1	2	392	0.5	0.06	<0.1
ST172	C-247852	26.4772	-98.1495	H	0.10	<1	3	412	0.7	0.08	0.1
ST173	C-247853	26.4489	-98.1191	H	0.12	<1	3	408	0.9	0.10	<0.1
ST174	C-247854	26.4444	-98.0848	H	0.10	<1	2	379	0.5	0.08	0.1
ST175	C-247855	26.2899	-97.9605	H	0.16	<1	5	412	0.8	0.13	0.2
ST176	C-247857	26.2599	-97.9604	B	0.19	<1	7	422	1.4	0.16	0.3
ST177	C-247858	26.2288	-97.9602	B	0.17	<1	4	451	1.3	0.14	0.2
ST178	C-247859	26.1995	-97.9597	B	0.16	<1	4	431	1.4	0.12	0.2
ST179	C-247860	26.1704	-97.9592	B	0.21	<1	7	418	1.7	0.19	0.4
ST180	C-247861	26.1414	-97.9576	B	0.18	<1	5	484	1.4	0.14	0.2
ST181	C-247743	26.1082	-97.9590	B	0.27	<1	10	452	2.1	0.22	0.4
ST182	C-247744	26.0775	-97.9584	B	0.25	<1	8	508	2.0	0.20	0.3
ST183	C-247746	26.0855	-97.9927	B	0.26	<1	10	443	1.8	0.23	0.4
ST184	C-247747	26.0824	-98.0260	B	0.27	<1	10	434	2.4	0.26	0.4
ST185	C-247748	26.0519	-98.0636	B	0.25	<1	12	588	1.5	0.14	0.2
ST186	C-247749	26.0764	-98.0611	G	0.28	<1	12	421	2.2	0.25	0.4
ST187	C-247750	26.1124	-98.0534	L	0.26	<1	13	397	2.3	0.23	0.4
ST188	C-247751	26.1409	-98.0472	L	0.18	<1	6	453	1.4	0.15	0.2
ST189	C-247752	26.1702	-98.0420	H	0.16	<1	6	508	1.1	0.12	0.4

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST190	C-247753	26.1999	-98.0368	H	0.19	<1	5	471	1.1	0.14	0.2
ST191	C-247754	26.2290	-98.0375	H	0.22	<1	6	476	1.3	0.16	0.3
ST192	C-247755	26.2565	-98.0361	H	0.17	<1	4	433	1.2	0.13	0.2
ST193	C-247756	26.2856	-98.0373	H	0.14	<1	4	421	1.0	0.12	0.2
ST194	C-247757	26.3041	-98.0799	H	0.19	<1	7	427	1.4	0.16	0.3
ST195	C-247758	26.3329	-98.1230	H	0.19	<1	5	448	1.1	0.13	0.2
ST196	C-247759	26.3020	-98.1054	H	0.19	<1	9	421	1.2	0.25	0.3
ST197	C-247760	26.2844	-98.0649	H	0.20	<1	7	474	1.4	0.19	0.3
ST198	C-247761	26.2490	-98.0747	B	0.19	<1	5	436	1.2	0.17	0.3
ST199	C-247762	26.2199	-98.0793	B	0.20	<1	5	457	1.2	0.14	0.2
ST200	C-247763	26.1895	-98.0855	G	0.21	<1	4	440	1.4	0.15	0.3
ST201	C-247764	26.1351	-98.0821	G	0.27	<1	13	353	1.8	0.25	0.5
ST202	C-247765	26.1125	-98.0856	G	0.26	<1	9	426	1.7	0.27	0.4
ST203	C-247766	26.0810	-98.0908	G	0.27	<1	20	440	1.9	0.24	0.4
ST204	C-247767	26.0849	-98.1279	G	0.26	<1	14	452	1.5	0.25	0.4
ST205	C-247768	26.1185	-98.1334	G	0.26	<1	12	372	1.8	0.26	0.5
ST206	C-247769	26.1578	-98.1270	G	0.24	<1	17	439	1.4	0.19	0.4
ST207	C-247770	26.1876	-98.1222	G	0.13	<1	4	440	0.9	0.13	0.2
ST208	C-247771	26.2176	-98.1177	G	0.22	<1	12	456	1.2	0.31	0.4
ST209	C-247772	26.2533	-98.1102	G	0.23	<1	10	412	1.4	0.19	0.3
ST210	C-247773	26.2823	-98.1069	G	0.26	<1	8	422	1.7	0.20	0.3
ST211	C-247774	26.2994	-98.1385	L	0.22	<1	9	459	1.1	0.18	0.2

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST001	C-247982	26.4547	-98.1632	G	29.0	2.4	12	2.47	6.1	6.6	<0.02
ST002	C-247984	26.4645	-98.2207	G	22.4	1.5	6	1.48	4.7	4.9	<0.02
ST003	C-247985	26.4699	-98.2609	G	21.1	1.6	6	1.59	3.1	4.8	<0.02
ST004	C-247986	26.0846	-97.8620	H	54.9	6.6	22	6.83	13.3	12.5	0.04
ST005	C-247987	26.0737	-97.8355	H	64.5	8.1	29	9.56	20.4	15.4	0.05
ST006	C-247988	26.0728	-97.8046	H	54.9	6.1	22	6.00	12.1	11.9	0.04
ST007	C-247989	26.0562	-97.7719	H	55.4	7.0	26	7.37	14.9	13.5	0.04
ST008	C-247990	26.0519	-97.7398	H	55.4	7.3	25	7.91	18.4	13.4	0.04
ST009	C-247991	26.0431	-97.7066	H	55.0	7.0	25	7.71	15.8	13.3	0.04
ST010	C-247992	26.0447	-97.6712	H	49.0	6.3	23	6.65	15.6	12.3	0.04
ST011	C-247993	26.0265	-97.6402	H	54.5	7.2	25	7.79	15.6	13.3	0.04
ST012	C-247994	26.0189	-97.6075	H	58.7	8.0	28	9.62	20.1	15.5	0.05
ST013	C-247995	25.9932	-97.6020	H	44.9	5.4	19	5.40	13.8	11.1	0.03
ST014	C-247996	25.9621	-97.5776	H	58.4	7.8	27	8.43	17.1	13.8	0.05
ST015	C-247997	25.9439	-97.5463	H	59.4	8.2	28	8.87	126.6	14.2	0.05
ST016	C-247998	25.9258	-97.5200	H	54.3	7.4	26	7.66	18.5	13.1	0.05
ST017	C-247999	25.9285	-97.4891	H	59.1	7.7	26	7.65	20.6	13.7	0.04
ST018	C-248000	25.9145	-97.4547	H	49.3	6.4	22	6.31	14.5	12.1	0.04
ST019	C-248001	25.9176	-97.4185	H	50.4	7.2	32	7.46	34.9	12.1	0.05
ST020	C-248002	25.9179	-97.3816	H	37.5	4.4	15	3.99	10.6	8.4	0.03
ST021	C-248003	25.9449	-97.3522	H	24.3	1.5	7	0.68	0.7	3.8	<0.02
ST022	C-248004	25.9539	-97.3191	H	54.2	7.3	25	7.70	14.7	13.5	0.05
ST023	C-248005	25.9604	-97.2835	H	47.9	6.4	21	5.96	10.9	11.3	0.04
ST024	C-248006	25.9600	-97.2534	H	40.4	4.1	15	3.99	9.0	9.8	0.03
ST025	C-248007	25.9680	-97.2069	H	36.3	3.7	11	3.47	5.8	8.0	0.02
ST026	C-248008	25.9894	-97.1829	H	42.3	5.5	19	5.71	9.4	10.6	0.03
ST027	C-248010	25.9970	-97.1513	H	28.1	2.0	6	1.01	1.2	4.5	<0.02
ST028	C-248011	26.4601	-98.1765	G	30.0	4.2	12	2.95	6.7	6.3	<0.02
ST029	C-248012	26.4602	-98.1741	G	28.4	4.9	16	3.39	7.7	7.0	0.02
ST030	C-248013	25.9723	-97.5364	H	48.4	5.9	21	5.36	11.3	11.0	0.03

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST031	C-248014	25.9783	-97.5047	H	58.1	7.1	25	6.59	12.3	12.3	0.04
ST032	C-248015	25.9817	-97.4744	H	51.8	7.0	25	6.64	12.3	12.1	0.04
ST033	C-248016	25.9831	-97.4461	H	58.1	8.2	28	8.01	15.8	13.5	0.05
ST034	C-248017	25.9502	-97.4194	H	59.3	8.3	28	7.70	19.7	13.6	0.05
ST035	C-248018	25.9487	-97.4453	H	47.5	6.5	22	6.67	15.0	11.1	0.04
ST036	C-248019	25.9508	-97.4783	H	51.0	6.1	20	5.63	10.9	11.5	0.04
ST037	C-248020	25.9499	-97.5080	H	48.2	6.3	21	5.81	15.4	10.9	0.04
ST107	C-247780	26.1184	-97.7855	B	50.2	7.8	40	7.98	29.5	12.4	0.06
ST108	C-247781	26.1438	-97.7816	B	42.4	5.9	19	4.48	15.4	10.4	0.04
ST109	C-247783	26.1753	-97.7839	B	41.9	6.2	20	5.11	14.5	10.8	0.04
ST110	C-247784	26.2079	-97.7862	B	48.4	6.4	23	5.50	18.7	11.4	0.04
ST111	C-247785	26.2375	-97.7869	B	34.4	4.2	13	3.19	25.5	9.0	0.03
ST112	C-247786	26.2663	-97.7870	B	48.4	6.5	21	5.29	17.1	11.1	0.04
ST113	C-247787	26.2961	-97.7873	B	35.6	3.8	12	3.16	9.4	8.6	0.03
ST114	C-247788	26.3011	-97.8261	B	40.0	4.0	14	3.30	20.7	8.4	0.03
ST115	C-247789	26.2631	-97.8257	B	49.1	7.5	24	5.69	21.7	11.9	0.05
ST116	C-247790	26.2719	-97.8638	B	31.4	3.9	14	3.29	13.9	8.0	0.02
ST117	C-247791	26.3026	-97.8644	B	35.9	4.2	14	3.36	10.2	9.0	0.03
ST118	C-247792	26.3422	-97.9251	B	29.3	3.4	13	2.69	9.6	7.1	0.02
ST119	C-247793	26.3148	-97.9290	B	41.9	5.6	20	4.22	18.3	9.7	0.03
ST120	C-247794	26.2812	-97.9285	B	35.7	4.5	17	3.48	12.9	8.5	0.03
ST121	C-247795	26.2656	-97.9119	B	45.9	6.5	24	5.23	17.7	10.5	0.04
ST122	C-247796	26.2365	-97.9114	B	40.2	5.4	21	4.52	15.5	10.0	0.04
ST123	C-247797	26.2066	-97.9111	B	42.3	5.3	16	4.94	13.3	10.2	0.04
ST124	C-247798	26.1781	-97.9106	B	31.6	3.9	12	3.32	10.8	8.5	0.03
ST125	C-247799	26.1286	-97.9014	B	45.4	7.2	23	6.23	16.0	11.8	0.05
ST126	C-247800	26.0986	-97.9012	B	52.7	8.9	27	8.24	23.7	12.7	0.06
ST127	C-247801	26.1085	-97.8500	B	52.9	9.2	30	8.27	22.6	13.7	0.06
ST128	C-247802	26.1356	-97.8577	B	40.2	5.2	18	4.54	13.6	10.2	0.04
ST129	C-247803	26.1778	-97.8472	B	43.7	6.5	23	5.88	20.9	11.9	0.04

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST130	C-247804	26.2155	-97.8466	B	45.9	6.1	22	5.69	17.6	11.5	0.04
ST131	C-247805	26.2466	-97.8634	L	43.0	6.5	21	5.46	15.4	11.3	0.04
ST132	C-247806	26.3655	-97.9374	B	38.0	5.5	19	3.93	15.2	8.9	0.03
ST133	C-247807	26.3937	-97.9325	B	28.0	2.9	11	2.17	10.1	6.4	0.02
ST134	C-247808	26.4227	-97.9267	B	30.7	3.7	13	2.92	10.9	7.3	0.03
ST135	C-247809	26.4504	-97.9144	B	30.3	3.6	13	2.89	12.0	7.1	0.02
ST136	C-247811	26.4795	-97.9088	B	22.2	2.0	8	1.73	6.9	4.9	<0.02
ST137	C-247812	26.4851	-97.9489	B	19.9	1.7	7	1.53	4.8	4.6	<0.02
ST138	C-247813	26.4564	-97.9539	B	32.5	4.1	14	3.22	12.2	7.8	0.03
ST139	C-247814	26.4063	-97.9628	B	21.6	1.9	7	1.69	6.6	5.0	<0.02
ST140	C-247815	26.3845	-97.9662	B	25.5	2.4	10	1.99	7.8	5.7	<0.02
ST141	C-247816	26.3559	-97.9724	B	28.7	3.1	12	2.50	7.7	6.9	0.02
ST142	C-247817	26.3282	-97.9843	B	26.4	3.0	11	2.37	8.8	6.5	0.02
ST143	C-247818	26.3067	-97.9931	B	22.5	2.4	8	1.92	8.1	4.9	<0.02
ST144	C-247823	26.3202	-98.0355	B	27.0	2.5	10	2.08	7.6	5.9	<0.02
ST145	C-247824	26.3497	-98.0306	B	29.6	4.3	12	3.20	9.8	7.0	0.03
ST146	C-247825	26.3490	-98.0245	B	24.6	3.0	8	1.95	7.3	5.0	<0.02
ST147	C-247827	26.4070	-98.0197	B	29.1	2.7	11	2.23	7.7	5.9	<0.02
ST148	C-247828	26.4502	-98.0135	B	26.1	2.5	10	2.18	9.7	5.5	<0.02
ST149	C-247829	26.2889	-98.0054	B	23.7	2.0	8	1.75	5.7	5.0	<0.02
ST150	C-247830	26.4997	-98.0487	B	23.7	2.1	10	2.05	7.3	5.3	<0.02
ST151	C-247831	26.4707	-98.0538	B	19.9	1.7	7	1.53	5.4	4.4	<0.02
ST152	C-247832	26.4410	-98.0593	B	20.9	1.5	5	1.38	4.3	4.3	<0.02
ST153	C-247833	26.4124	-98.0644	B	24.6	2.3	8	2.09	6.3	5.3	<0.02
ST154	C-247834	26.3825	-98.0699	B	36.2	4.4	15	3.35	10.3	8.3	0.03
ST155	C-247835	26.3534	-98.0751	B	29.1	2.9	13	2.66	6.6	6.9	0.02
ST156	C-247836	26.3266	-98.0799	B	43.7	5.8	20	4.06	13.6	9.5	0.04
ST157	C-247837	26.3617	-98.1178	B	27.9	3.0	10	2.37	10.8	6.4	<0.02
ST158	C-247838	26.3860	-98.1138	B	22.7	2.2	7	1.73	5.3	5.1	<0.02
ST159	C-247839	26.3995	-98.1385	B	21.7	1.8	7	1.71	4.1	5.2	<0.02

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST160	C-247840	26.4162	-98.1371	B	27.1	2.4	10	2.08	5.4	6.1	<0.02
ST161	C-247841	26.4123	-98.1120	B	28.5	3.4	12	2.69	7.1	6.7	<0.02
ST162	C-247842	26.4184	-98.1501	L	29.6	2.8	11	2.38	7.0	6.4	<0.02
ST163	C-247843	26.4665	-98.2377	B	24.6	2.1	8	1.80	4.4	5.3	<0.02
ST164	C-247844	26.4618	-98.2048	B	21.1	1.8	6	1.66	4.1	4.9	<0.02
ST165	C-247845	26.4560	-98.1734	B	21.6	2.4	8	1.95	4.3	5.0	<0.02
ST166	C-247846	26.4518	-98.1409	B	18.7	1.4	6	1.56	2.9	4.8	<0.02
ST167	C-247847	26.5165	-98.1443	H	17.0	1.5	6	1.45	18.4	4.1	<0.02
ST168	C-247848	26.5209	-98.1747	H	27.2	2.7	11	2.64	4.9	6.4	<0.02
ST169	C-247849	26.5004	-98.1991	H	21.1	1.6	7	1.53	3.2	4.4	<0.02
ST170	C-247850	26.4894	-98.1960	H	22.0	2.0	9	2.14	3.8	5.5	<0.02
ST171	C-247851	26.4797	-98.1823	H	19.0	2.1	7	1.91	4.2	4.8	<0.02
ST172	C-247852	26.4772	-98.1495	H	24.7	2.6	13	2.54	6.6	6.5	<0.02
ST173	C-247853	26.4489	-98.1191	H	31.8	3.4	14	3.14	7.4	7.7	0.02
ST174	C-247854	26.4444	-98.0848	H	22.8	2.9	9	2.40	5.4	5.9	<0.02
ST175	C-247855	26.2899	-97.9605	H	36.1	4.0	15	3.26	11.0	8.3	0.02
ST176	C-247857	26.2599	-97.9604	B	45.6	5.6	22	5.55	16.7	11.6	0.04
ST177	C-247858	26.2288	-97.9602	B	39.2	5.0	19	4.32	13.1	9.9	0.03
ST178	C-247859	26.1995	-97.9597	B	38.3	4.3	16	3.76	11.3	9.4	0.03
ST179	C-247860	26.1704	-97.9592	B	50.5	6.6	27	5.86	17.1	12.4	0.04
ST180	C-247861	26.1414	-97.9576	B	46.0	5.1	19	4.67	11.4	10.9	0.03
ST181	C-247743	26.1082	-97.9590	B	53.8	8.6	26	7.11	20.6	13.1	0.05
ST182	C-247744	26.0775	-97.9584	B	50.5	7.7	26	6.41	16.6	11.8	0.05
ST183	C-247746	26.0855	-97.9927	B	54.2	8.1	24	7.54	22.1	12.9	0.05
ST184	C-247747	26.0824	-98.0260	B	61.0	9.4	29	8.56	23.7	14.3	0.06
ST185	C-247748	26.0519	-98.0636	B	44.3	5.6	18	4.68	10.5	10.2	0.04
ST186	C-247749	26.0764	-98.0611	G	58.5	9.1	29	8.79	21.5	14.0	0.06
ST187	C-247750	26.1124	-98.0534	L	54.9	8.9	27	7.89	22.5	13.4	0.06
ST188	C-247751	26.1409	-98.0472	L	41.1	5.2	16	4.05	11.7	9.8	0.03
ST189	C-247752	26.1702	-98.0420	H	31.3	5.2	19	3.13	15.7	7.3	0.03

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST190	C-247753	26.1999	-98.0368	H	39.6	4.8	17	3.58	25.1	8.6	0.03
ST191	C-247754	26.2290	-98.0375	H	44.1	6.1	19	4.31	15.7	9.7	0.03
ST192	C-247755	26.2565	-98.0361	H	37.4	4.7	15	3.46	11.7	8.6	0.03
ST193	C-247756	26.2856	-98.0373	H	32.3	3.9	12	2.88	10.6	7.2	0.02
ST194	C-247757	26.3041	-98.0799	H	41.3	5.7	19	4.17	15.3	9.7	0.03
ST195	C-247758	26.3329	-98.1230	H	35.4	4.4	16	3.35	12.1	8.0	0.03
ST196	C-247759	26.3020	-98.1054	H	43.0	5.1	18	3.68	21.8	8.9	0.03
ST197	C-247760	26.2844	-98.0649	H	43.4	6.5	21	4.81	15.6	10.3	0.04
ST198	C-247761	26.2490	-98.0747	B	40.5	5.2	18	3.67	16.3	8.8	0.03
ST199	C-247762	26.2199	-98.0793	B	39.6	4.6	16	3.38	12.5	8.4	0.03
ST200	C-247763	26.1895	-98.0855	G	42.1	5.8	20	4.13	14.6	9.3	0.03
ST201	C-247764	26.1351	-98.0821	G	57.5	9.2	31	8.49	22.0	13.3	0.06
ST202	C-247765	26.1125	-98.0856	G	54.1	8.6	29	7.55	28.5	12.2	0.05
ST203	C-247766	26.0810	-98.0908	G	57.0	8.6	28	8.28	21.3	12.8	0.06
ST204	C-247767	26.0849	-98.1279	G	53.4	8.2	25	7.34	26.8	12.0	0.05
ST205	C-247768	26.1185	-98.1334	G	57.6	9.3	31	8.99	34.5	13.6	0.06
ST206	C-247769	26.1578	-98.1270	G	47.2	7.2	24	5.03	25.7	10.9	0.04
ST207	C-247770	26.1876	-98.1222	G	27.2	2.9	9	2.15	8.9	6.2	0.02
ST208	C-247771	26.2176	-98.1177	G	42.7	5.8	20	3.99	27.9	9.4	0.04
ST209	C-247772	26.2533	-98.1102	G	44.5	6.0	22	4.38	19.6	10.1	0.04
ST210	C-247773	26.2823	-98.1069	G	52.5	7.6	26	5.55	21.2	12.1	0.04
ST211	C-247774	26.2994	-98.1385	L	41.1	5.4	19	3.90	17.9	9.1	0.03

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST001	C-247982	26.4547	-98.1632	G	17.1	10	156	0.27	5.6	6.6	192
ST002	C-247984	26.4645	-98.2207	G	14.1	7	124	0.17	4.1	3.2	104
ST003	C-247985	26.4699	-98.2609	G	12.8	7	109	0.15	3.7	3.9	92
ST004	C-247986	26.0846	-97.8620	H	29.4	24	458	0.70	10.6	14.3	953
ST005	C-247987	26.0737	-97.8355	H	33.7	32	564	0.69	12.1	20.2	1,470
ST006	C-247988	26.0728	-97.8046	H	29.3	23	440	0.73	8.8	13.1	810
ST007	C-247989	26.0562	-97.7719	H	28.9	26	507	0.72	11.6	15.7	960
ST008	C-247990	26.0519	-97.7398	H	29.2	27	566	0.67	11.0	16.9	1,190
ST009	C-247991	26.0431	-97.7066	H	29.3	27	513	0.70	11.2	16.3	1,010
ST010	C-247992	26.0447	-97.6712	H	27.1	24	435	0.60	9.8	14.6	1,120
ST011	C-247993	26.0265	-97.6402	H	28.5	26	583	0.64	11.0	16.0	1,190
ST012	C-247994	26.0189	-97.6075	H	30.7	31	513	0.62	11.2	20.2	1,160
ST013	C-247995	25.9932	-97.6020	H	24.9	18	394	0.65	9.7	11.7	1,480
ST014	C-247996	25.9621	-97.5776	H	30.7	29	549	0.79	9.6	17.6	801
ST015	C-247997	25.9439	-97.5463	H	30.9	31	589	0.70	11.0	17.7	863
ST016	C-247998	25.9258	-97.5200	H	28.3	26	507	0.83	10.9	18.1	939
ST017	C-247999	25.9285	-97.4891	H	30.5	25	584	0.72	10.9	16.2	1,120
ST018	C-248000	25.9145	-97.4547	H	26.8	22	454	0.69	9.3	14.1	1,160
ST019	C-248001	25.9176	-97.4185	H	27.3	25	587	1.21	10.1	17.0	1,820
ST020	C-248002	25.9179	-97.3816	H	20.8	14	315	0.45	7.1	10.6	724
ST021	C-248003	25.9449	-97.3522	H	13.0	4	232	0.19	5.0	2.5	80
ST022	C-248004	25.9539	-97.3191	H	28.7	28	414	0.49	10.4	17.1	703
ST023	C-248005	25.9604	-97.2835	H	26.6	22	452	0.64	6.6	13.2	612
ST024	C-248006	25.9600	-97.2534	H	23.0	17	306	0.34	6.2	9.0	437
ST025	C-248007	25.9680	-97.2069	H	20.2	14	273	0.44	6.7	8.7	389
ST026	C-248008	25.9894	-97.1829	H	23.3	22	337	0.45	8.2	12.4	462
ST027	C-248010	25.9970	-97.1513	H	15.5	5	175	0.24	5.0	3.1	120
ST028	C-248011	26.4601	-98.1765	G	17.4	11	199	0.21	4.6	9.3	191
ST029	C-248012	26.4602	-98.1741	G	15.8	11	247	0.20	4.3	11.4	222
ST030	C-248013	25.9723	-97.5364	H	25.6	20	393	0.68	8.7	12.6	690

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST031	C-248014	25.9783	-97.5047	H	31.1	25	499	0.68	8.1	15.3	616
ST032	C-248015	25.9817	-97.4744	H	27.8	25	467	0.98	8.4	14.8	602
ST033	C-248016	25.9831	-97.4461	H	30.3	28	548	0.68	10.9	17.6	784
ST034	C-248017	25.9502	-97.4194	H	31.2	28	579	0.77	11.0	18.5	1,210
ST035	C-248018	25.9487	-97.4453	H	24.7	24	380	0.68	9.2	15.1	585
ST036	C-248019	25.9508	-97.4783	H	27.8	22	418	0.58	9.7	12.3	591
ST037	C-248020	25.9499	-97.5080	H	25.4	21	439	0.57	9.6	13.5	1,050
ST107	C-247780	26.1184	-97.7855	B	25.9	34	420	0.72	11.2	18.3	1,370
ST108	C-247781	26.1438	-97.7816	B	23.2	19	331	0.66	12.5	11.7	430
ST109	C-247783	26.1753	-97.7839	B	22.4	24	304	1.05	9.6	12.6	644
ST110	C-247784	26.2079	-97.7862	B	25.2	22	324	0.51	10.1	14.3	540
ST111	C-247785	26.2375	-97.7869	B	19.4	14	250	0.51	8.4	7.9	390
ST112	C-247786	26.2663	-97.7870	B	25.9	24	333	0.60	10.3	13.8	876
ST113	C-247787	26.2961	-97.7873	B	20.8	14	204	0.37	8.5	7.3	285
ST114	C-247788	26.3011	-97.8261	B	22.7	15	237	0.46	8.4	8.8	375
ST115	C-247789	26.2631	-97.8257	B	25.5	24	390	0.53	11.3	16.6	894
ST116	C-247790	26.2719	-97.8638	B	17.7	16	245	0.66	7.7	9.7	1,280
ST117	C-247791	26.3026	-97.8644	B	20.4	15	256	0.49	8.4	8.4	429
ST118	C-247792	26.3422	-97.9251	B	16.8	14	195	0.34	6.7	7.9	309
ST119	C-247793	26.3148	-97.9290	B	22.3	19	323	0.63	8.4	12.5	562
ST120	C-247794	26.2812	-97.9285	B	19.5	16	269	0.48	8.3	10.0	448
ST121	C-247795	26.2656	-97.9119	B	24.8	25	361	0.53	10.7	15.4	881
ST122	C-247796	26.2365	-97.9114	B	22.2	20	312	0.51	9.3	12.4	503
ST123	C-247797	26.2066	-97.9111	B	23.0	22	297	0.53	9.3	11.6	527
ST124	C-247798	26.1781	-97.9106	B	18.0	15	215	0.54	7.0	8.1	482
ST125	C-247799	26.1286	-97.9014	B	24.2	27	399	0.83	10.4	16.1	898
ST126	C-247800	26.0986	-97.9012	B	26.2	36	490	0.83	11.8	21.2	1,270
ST127	C-247801	26.1085	-97.8500	B	27.3	37	525	0.94	11.7	20.2	1,310
ST128	C-247802	26.1356	-97.8577	B	21.9	19	277	0.54	8.4	11.6	714
ST129	C-247803	26.1778	-97.8472	B	24.0	25	349	0.58	10.3	14.2	798

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST130	C-247804	26.2155	-97.8466	B	24.9	24	350	0.62	10.1	14.1	812
ST131	C-247805	26.2466	-97.8634	L	22.7	24	332	0.53	10.8	14.0	838
ST132	C-247806	26.3655	-97.9374	B	21.2	19	321	0.47	8.8	12.7	512
ST133	C-247807	26.3937	-97.9325	B	15.6	14	179	0.37	7.1	6.3	167
ST134	C-247808	26.4227	-97.9267	B	17.4	14	200	0.33	6.7	9.8	285
ST135	C-247809	26.4504	-97.9144	B	17.3	15	180	0.40	6.3	8.3	221
ST136	C-247811	26.4795	-97.9088	B	12.7	10	111	0.31	4.6	5.3	170
ST137	C-247812	26.4851	-97.9489	B	11.9	9	109	0.20	4.5	4.0	91
ST138	C-247813	26.4564	-97.9539	B	18.5	16	224	0.48	7.1	9.7	292
ST139	C-247814	26.4063	-97.9628	B	12.1	13	125	0.34	4.3	4.4	325
ST140	C-247815	26.3845	-97.9662	B	14.4	11	144	0.35	5.5	5.6	180
ST141	C-247816	26.3559	-97.9724	B	16.5	13	165	0.36	6.4	7.1	146
ST142	C-247817	26.3282	-97.9843	B	14.9	12	186	0.41	6.9	6.3	219
ST143	C-247818	26.3067	-97.9931	B	12.8	11	121	0.30	4.3	6.4	326
ST144	C-247823	26.3202	-98.0355	B	15.1	11	163	0.35	6.6	5.6	201
ST145	C-247824	26.3497	-98.0306	B	16.3	16	214	0.36	6.1	11.9	346
ST146	C-247825	26.3490	-98.0245	B	14.2	11	160	0.49	5.7	6.5	190
ST147	C-247827	26.4070	-98.0197	B	16.2	12	149	0.38	5.9	6.3	164
ST148	C-247828	26.4502	-98.0135	B	15.0	12	143	0.30	5.1	5.9	153
ST149	C-247829	26.2889	-98.0054	B	14.1	10	123	0.27	5.0	4.4	128
ST150	C-247830	26.4997	-98.0487	B	14.7	11	118	0.25	4.8	5.2	171
ST151	C-247831	26.4707	-98.0538	B	11.7	9	97	0.24	3.3	3.3	120
ST152	C-247832	26.4410	-98.0593	B	13.1	8	88	0.22	3.4	3.0	88
ST153	C-247833	26.4124	-98.0644	B	14.7	11	114	0.27	4.2	5.4	130
ST154	C-247834	26.3825	-98.0699	B	20.0	15	249	0.40	6.9	9.1	308
ST155	C-247835	26.3534	-98.0751	B	16.3	13	152	0.35	6.4	6.8	136
ST156	C-247836	26.3266	-98.0799	B	22.9	17	306	0.43	8.7	13.1	576
ST157	C-247837	26.3617	-98.1178	B	15.3	11	157	0.31	5.3	6.7	162
ST158	C-247838	26.3860	-98.1138	B	14.0	10	133	0.28	4.8	4.0	151
ST159	C-247839	26.3995	-98.1385	B	12.7	8	103	0.22	4.5	3.6	103

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST160	C-247840	26.4162	-98.1371	B	15.7	11	146	0.27	5.4	5.1	92
ST161	C-247841	26.4123	-98.1120	B	15.9	11	213	0.41	4.9	7.6	199
ST162	C-247842	26.4184	-98.1501	L	16.7	10	180	0.24	4.8	8.1	190
ST163	C-247843	26.4665	-98.2377	B	14.9	8	145	0.17	4.5	4.9	163
ST164	C-247844	26.4618	-98.2048	B	13.1	7	99	0.23	3.4	4.6	145
ST165	C-247845	26.4560	-98.1734	B	13.4	8	130	0.27	3.8	6.2	167
ST166	C-247846	26.4518	-98.1409	B	11.5	7	92	0.12	3.2	4.7	127
ST167	C-247847	26.5165	-98.1443	H	10.6	7	90	0.16	2.8	4.4	97
ST168	C-247848	26.5209	-98.1747	H	16.0	12	158	0.24	4.9	9.8	110
ST169	C-247849	26.5004	-98.1991	H	13.5	7	108	0.13	3.7	3.7	104
ST170	C-247850	26.4894	-98.1960	H	13.7	9	114	0.19	3.9	5.3	128
ST171	C-247851	26.4797	-98.1823	H	11.8	9	103	0.19	3.2	5.3	137
ST172	C-247852	26.4772	-98.1495	H	14.6	9	210	0.27	5.0	6.3	406
ST173	C-247853	26.4489	-98.1191	H	18.1	12	213	0.24	5.5	8.9	259
ST174	C-247854	26.4444	-98.0848	H	13.8	10	143	0.74	4.1	7.3	324
ST175	C-247855	26.2899	-97.9605	H	19.5	13	244	0.38	6.6	9.7	395
ST176	C-247857	26.2599	-97.9604	B	24.3	17	280	0.33	8.4	14.6	950
ST177	C-247858	26.2288	-97.9602	B	21.5	16	327	0.35	7.6	12.5	577
ST178	C-247859	26.1995	-97.9597	B	21.3	14	260	0.38	7.3	10.9	483
ST179	C-247860	26.1704	-97.9592	B	26.9	19	427	0.44	9.2	17.4	1,050
ST180	C-247861	26.1414	-97.9576	B	24.9	16	304	0.42	8.1	11.5	619
ST181	C-247743	26.1082	-97.9590	B	28.2	32	509	1.08	11.5	16.9	1,220
ST182	C-247744	26.0775	-97.9584	B	26.3	29	447	0.77	10.8	15.4	927
ST183	C-247746	26.0855	-97.9927	B	27.7	33	535	0.81	11.9	16.9	1,090
ST184	C-247747	26.0824	-98.0260	B	31.7	36	523	0.98	12.4	20.1	1,270
ST185	C-247748	26.0519	-98.0636	B	24.3	23	395	0.72	8.2	10.6	654
ST186	C-247749	26.0764	-98.0611	G	29.5	39	513	0.90	11.8	20.6	1,220
ST187	C-247750	26.1124	-98.0534	L	27.8	36	526	0.91	10.7	19.0	1,010
ST188	C-247751	26.1409	-98.0472	L	22.4	20	284	0.62	8.2	12.1	440
ST189	C-247752	26.1702	-98.0420	H	17.2	16	270	0.75	6.9	13.0	547

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST190	C-247753	26.1999	-98.0368	H	21.7	17	290	0.49	8.3	11.2	515
ST191	C-247754	26.2290	-98.0375	H	23.2	20	330	0.52	9.4	14.0	550
ST192	C-247755	26.2565	-98.0361	H	20.7	15	267	0.43	8.0	10.6	367
ST193	C-247756	26.2856	-98.0373	H	18.0	14	206	0.52	6.1	8.6	404
ST194	C-247757	26.3041	-98.0799	H	22.6	19	313	0.48	8.3	14.0	565
ST195	C-247758	26.3329	-98.1230	H	19.1	19	259	0.50	7.7	10.5	273
ST196	C-247759	26.3020	-98.1054	H	23.3	18	273	0.65	8.5	12.3	436
ST197	C-247760	26.2844	-98.0649	H	23.0	22	328	0.56	9.1	14.9	662
ST198	C-247761	26.2490	-98.0747	B	22.1	19	301	0.50	8.2	12.2	621
ST199	C-247762	26.2199	-98.0793	B	21.8	16	258	0.44	8.4	10.0	320
ST200	C-247763	26.1895	-98.0855	G	22.8	21	341	0.56	8.4	13.3	497
ST201	C-247764	26.1351	-98.0821	G	28.9	38	496	0.89	12.0	20.8	1,080
ST202	C-247765	26.1125	-98.0856	G	27.5	35	513	0.90	10.0	20.7	924
ST203	C-247766	26.0810	-98.0908	G	28.6	37	603	0.96	12.5	19.1	1,320
ST204	C-247767	26.0849	-98.1279	G	27.6	33	502	0.85	11.6	17.3	1,180
ST205	C-247768	26.1185	-98.1334	G	28.8	39	524	1.33	7.4	21.2	1,070
ST206	C-247769	26.1578	-98.1270	G	25.0	25	379	0.61	9.6	16.0	701
ST207	C-247770	26.1876	-98.1222	G	15.3	11	172	0.37	6.0	6.1	318
ST208	C-247771	26.2176	-98.1177	G	23.2	18	322	0.49	9.6	12.6	808
ST209	C-247772	26.2533	-98.1102	G	24.1	20	363	0.45	9.4	14.4	499
ST210	C-247773	26.2823	-98.1069	G	26.9	23	453	0.58	11.4	17.4	675
ST211	C-247774	26.2994	-98.1385	L	22.2	17	297	0.52	9.4	13.2	411

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Pb	ICPMS-AES_Rb	ICPMS-AES_Sb	ICPMS-AES_Sc	ICPMS-AES_Sn	ICPMS-AES_Sr	ICPMS-AES_Te
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST001	C-247982	26.4547	-98.1632	G	11.3	50.2	0.60	2.7	1.1	83.0	<0.1
ST002	C-247984	26.4645	-98.2207	G	7.9	45.7	0.42	1.6	0.6	75.1	<0.1
ST003	C-247985	26.4699	-98.2609	G	7.5	44.5	0.47	1.6	0.4	64.3	<0.1
ST004	C-247986	26.0846	-97.8620	H	16.3	75.6	0.93	6.7	1.6	346.3	<0.1
ST005	C-247987	26.0737	-97.8355	H	22.3	91.0	1.14	8.6	2.0	337.5	<0.1
ST006	C-247988	26.0728	-97.8046	H	13.6	70.8	0.83	6.1	1.4	364.4	<0.1
ST007	C-247989	26.0562	-97.7719	H	20.6	79.1	1.05	7.2	2.2	329.8	<0.1
ST008	C-247990	26.0519	-97.7398	H	36.4	79.9	1.13	7.4	2.2	302.8	<0.1
ST009	C-247991	26.0431	-97.7066	H	17.2	80.1	1.00	7.2	1.6	327.3	<0.1
ST010	C-247992	26.0447	-97.6712	H	24.2	73.3	1.02	6.4	5.3	327.5	<0.1
ST011	C-247993	26.0265	-97.6402	H	18.8	79.3	1.15	7.2	1.8	315.7	<0.1
ST012	C-247994	26.0189	-97.6075	H	21.0	89.6	1.04	8.8	2.7	292.0	<0.1
ST013	C-247995	25.9932	-97.6020	H	26.8	69.3	1.45	5.3	2.8	285.7	<0.1
ST014	C-247996	25.9621	-97.5776	H	22.9	78.0	1.21	7.7	2.7	335.2	<0.1
ST015	C-247997	25.9439	-97.5463	H	18.3	81.2	1.14	8.2	2.1	360.6	<0.1
ST016	C-247998	25.9258	-97.5200	H	32.5	76.7	1.02	7.3	2.5	322.7	<0.1
ST017	C-247999	25.9285	-97.4891	H	36.0	84.0	0.98	7.4	1.7	249.7	<0.1
ST018	C-248000	25.9145	-97.4547	H	18.7	73.7	0.82	6.2	2.3	259.7	<0.1
ST019	C-248001	25.9176	-97.4185	H	37.1	71.9	9.16	6.8	3.7	335.3	<0.1
ST020	C-248002	25.9179	-97.3816	H	20.3	53.0	0.66	4.1	1.3	259.2	<0.1
ST021	C-248003	25.9449	-97.3522	H	5.4	24.9	0.33	1.5	0.5	115.3	<0.1
ST022	C-248004	25.9539	-97.3191	H	17.9	79.4	0.83	7.7	1.6	294.6	<0.1
ST023	C-248005	25.9604	-97.2835	H	20.4	68.4	0.96	6.1	1.3	322.5	<0.1
ST024	C-248006	25.9600	-97.2534	H	11.9	66.1	0.58	4.4	1.2	247.8	<0.1
ST025	C-248007	25.9680	-97.2069	H	11.5	53.5	0.64	3.7	1.0	304.0	<0.1
ST026	C-248008	25.9894	-97.1829	H	15.0	67.1	0.77	5.6	1.2	281.3	<0.1
ST027	C-248010	25.9970	-97.1513	H	6.5	33.6	0.30	1.7	1.0	141.5	<0.1
ST028	C-248011	26.4601	-98.1765	G	7.4	42.6	0.55	3.3	0.9	156.7	<0.1
ST029	C-248012	26.4602	-98.1741	G	7.3	42.9	0.57	3.9	0.8	138.5	<0.1
ST030	C-248013	25.9723	-97.5364	H	17.2	69.2	0.81	5.7	1.3	304.2	<0.1

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Pb	ICPMS-AES_Rb	ICPMS-AES_Sb	ICPMS-AES_Sc	ICPMS-AES_Sn	ICPMS-AES_Sr	ICPMS-AES_Te
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST031	C-248014	25.9783	-97.5047	H	14.5	73.4	0.86	6.8	1.6	340.2	<0.1
ST032	C-248015	25.9817	-97.4744	H	15.0	72.8	0.92	6.8	1.5	357.8	<0.1
ST033	C-248016	25.9831	-97.4461	H	18.3	81.8	0.97	8.1	1.9	303.8	<0.1
ST034	C-248017	25.9502	-97.4194	H	18.1	84.9	1.00	8.1	1.7	346.3	<0.1
ST035	C-248018	25.9487	-97.4453	H	20.0	66.6	0.95	6.7	1.6	315.9	<0.1
ST036	C-248019	25.9508	-97.4783	H	15.2	72.7	0.82	6.0	1.6	345.6	<0.1
ST037	C-248020	25.9499	-97.5080	H	35.6	69.0	0.87	6.1	2.2	335.4	<0.1
ST107	C-247780	26.1184	-97.7855	B	21.6	79.7	1.20	8.3	1.9	272.4	<0.1
ST108	C-247781	26.1438	-97.7816	B	16.1	82.1	0.82	5.5	1.4	163.2	<0.1
ST109	C-247783	26.1753	-97.7839	B	15.2	78.4	0.76	5.9	1.6	227.4	<0.1
ST110	C-247784	26.2079	-97.7862	B	16.5	82.9	0.82	6.4	1.7	166.7	<0.1
ST111	C-247785	26.2375	-97.7869	B	15.9	71.8	0.66	3.8	1.4	168.4	<0.1
ST112	C-247786	26.2663	-97.7870	B	15.9	79.9	0.87	6.4	1.5	233.0	<0.1
ST113	C-247787	26.2961	-97.7873	B	12.4	72.7	0.61	3.5	1.0	149.1	<0.1
ST114	C-247788	26.3011	-97.8261	B	22.2	70.5	0.78	3.6	4.1	146.8	<0.1
ST115	C-247789	26.2631	-97.8257	B	24.1	86.5	0.86	7.0	2.5	195.5	<0.1
ST116	C-247790	26.2719	-97.8638	B	12.2	65.6	0.66	3.6	1.1	178.9	<0.1
ST117	C-247791	26.3026	-97.8644	B	12.0	72.1	0.65	3.9	1.0	172.8	<0.1
ST118	C-247792	26.3422	-97.9251	B	11.0	58.6	0.59	3.3	1.1	112.0	<0.1
ST119	C-247793	26.3148	-97.9290	B	15.5	73.9	0.78	5.2	1.5	132.4	<0.1
ST120	C-247794	26.2812	-97.9285	B	28.8	67.7	0.71	4.4	1.4	122.1	<0.1
ST121	C-247795	26.2656	-97.9119	B	15.1	75.5	0.85	6.2	1.5	251.5	<0.1
ST122	C-247796	26.2365	-97.9114	B	13.9	77.7	0.77	5.3	1.3	160.1	<0.1
ST123	C-247797	26.2066	-97.9111	B	21.2	75.7	0.70	5.2	1.3	205.8	<0.1
ST124	C-247798	26.1781	-97.9106	B	16.5	68.8	0.65	3.7	1.1	173.1	<0.1
ST125	C-247799	26.1286	-97.9014	B	15.2	81.6	0.85	6.9	1.8	281.2	<0.1
ST126	C-247800	26.0986	-97.9012	B	20.6	85.8	1.11	8.4	2.2	323.5	<0.1
ST127	C-247801	26.1085	-97.8500	B	27.2	89.3	1.19	8.6	2.3	340.5	<0.1
ST128	C-247802	26.1356	-97.8577	B	16.8	75.0	0.68	5.0	2.9	191.9	<0.1
ST129	C-247803	26.1778	-97.8472	B	15.2	86.3	0.90	6.7	1.6	197.3	<0.1

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Pb	ICPMS-AES_Rb	ICPMS-AES_Sb	ICPMS-AES_Sc	ICPMS-AES_Sn	ICPMS-AES_Sr	ICPMS-AES_Te
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST130	C-247804	26.2155	-97.8466	B	24.4	84.2	0.93	6.4	1.7	172.5	<0.1
ST131	C-247805	26.2466	-97.8634	L	14.8	81.6	0.85	6.4	1.6	204.1	<0.1
ST132	C-247806	26.3655	-97.9374	B	15.4	66.0	0.70	5.0	1.3	183.6	<0.1
ST133	C-247807	26.3937	-97.9325	B	10.2	52.5	0.56	2.8	1.4	131.9	<0.1
ST134	C-247808	26.4227	-97.9267	B	11.0	57.9	0.61	3.5	1.0	106.3	<0.1
ST135	C-247809	26.4504	-97.9144	B	16.5	58.7	0.61	3.3	0.9	114.3	<0.1
ST136	C-247811	26.4795	-97.9088	B	11.1	45.9	0.48	1.7	0.6	80.7	<0.1
ST137	C-247812	26.4851	-97.9489	B	9.6	44.7	0.44	1.6	0.5	70.1	<0.1
ST138	C-247813	26.4564	-97.9539	B	15.1	60.3	0.60	4.0	1.1	117.4	<0.1
ST139	C-247814	26.4063	-97.9628	B	11.5	46.8	0.51	1.7	0.7	375.6	<0.1
ST140	C-247815	26.3845	-97.9662	B	20.7	52.2	0.51	2.3	0.9	92.0	<0.1
ST141	C-247816	26.3559	-97.9724	B	16.9	58.9	0.56	3.0	0.9	105.4	<0.1
ST142	C-247817	26.3282	-97.9843	B	10.9	55.8	0.61	2.9	0.9	91.8	<0.1
ST143	C-247818	26.3067	-97.9931	B	15.3	44.4	0.48	2.1	1.0	181.4	<0.1
ST144	C-247823	26.3202	-98.0355	B	13.7	55.0	0.55	2.3	0.8	95.6	<0.1
ST145	C-247824	26.3497	-98.0306	B	11.0	53.9	0.61	3.6	1.1	154.2	<0.1
ST146	C-247825	26.3490	-98.0245	B	10.7	42.2	0.52	2.3	0.9	280.3	<0.1
ST147	C-247827	26.4070	-98.0197	B	11.8	55.2	0.53	2.5	1.0	91.1	<0.1
ST148	C-247828	26.4502	-98.0135	B	11.0	51.2	0.51	2.4	2.7	77.0	<0.1
ST149	C-247829	26.2889	-98.0054	B	11.3	47.9	0.47	1.9	0.6	77.0	<0.1
ST150	C-247830	26.4997	-98.0487	B	10.3	51.0	0.47	2.2	0.8	75.1	<0.1
ST151	C-247831	26.4707	-98.0538	B	8.1	46.0	0.38	1.4	0.5	68.7	<0.1
ST152	C-247832	26.4410	-98.0593	B	8.9	45.3	0.42	1.3	0.5	72.7	<0.1
ST153	C-247833	26.4124	-98.0644	B	8.7	50.6	0.42	2.1	0.6	84.3	<0.1
ST154	C-247834	26.3825	-98.0699	B	11.8	69.3	0.57	3.9	1.0	110.7	<0.1
ST155	C-247835	26.3534	-98.0751	B	9.7	59.0	0.53	3.1	1.0	95.2	<0.1
ST156	C-247836	26.3266	-98.0799	B	13.2	72.0	0.75	5.2	1.3	196.1	<0.1
ST157	C-247837	26.3617	-98.1178	B	10.6	58.4	0.53	2.6	0.9	114.6	<0.1
ST158	C-247838	26.3860	-98.1138	B	8.5	50.8	0.46	1.8	0.7	111.2	<0.1
ST159	C-247839	26.3995	-98.1385	B	8.3	50.2	0.41	1.8	0.6	97.0	<0.1

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST160	C-247840	26.4162	-98.1371	B	9.1	56.6	0.47	2.3	0.7	97.5	<0.1
ST161	C-247841	26.4123	-98.1120	B	10.3	47.8	0.63	2.9	1.1	113.5	<0.1
ST162	C-247842	26.4184	-98.1501	L	20.1	51.6	0.67	2.6	0.7	85.5	<0.1
ST163	C-247843	26.4665	-98.2377	B	7.7	46.6	0.49	1.8	0.6	77.5	<0.1
ST164	C-247844	26.4618	-98.2048	B	8.1	43.8	0.47	1.5	0.6	78.0	<0.1
ST165	C-247845	26.4560	-98.1734	B	10.5	39.5	0.52	1.9	0.5	116.4	<0.1
ST166	C-247846	26.4518	-98.1409	B	6.9	44.5	0.42	1.4	0.4	81.2	<0.1
ST167	C-247847	26.5165	-98.1443	H	7.3	39.5	0.42	1.3	2.0	77.8	<0.1
ST168	C-247848	26.5209	-98.1747	H	9.1	48.2	0.53	2.8	0.7	120.1	<0.1
ST169	C-247849	26.5004	-98.1991	H	8.0	42.7	0.49	1.6	0.7	55.9	<0.1
ST170	C-247850	26.4894	-98.1960	H	7.9	49.2	0.49	2.2	0.5	53.5	<0.1
ST171	C-247851	26.4797	-98.1823	H	9.7	42.8	0.47	2.0	0.4	74.1	<0.1
ST172	C-247852	26.4772	-98.1495	H	20.6	51.6	0.60	2.9	0.6	99.6	<0.1
ST173	C-247853	26.4489	-98.1191	H	12.2	56.0	0.64	3.5	0.8	160.5	<0.1
ST174	C-247854	26.4444	-98.0848	H	10.3	44.1	0.56	2.6	0.8	136.3	<0.1
ST175	C-247855	26.2899	-97.9605	H	20.7	58.5	0.75	3.9	1.6	126.2	<0.1
ST176	C-247857	26.2599	-97.9604	B	18.6	74.6	0.93	6.5	1.5	158.6	<0.1
ST177	C-247858	26.2288	-97.9602	B	20.2	69.1	0.76	5.3	1.4	174.2	<0.1
ST178	C-247859	26.1995	-97.9597	B	20.5	65.4	0.71	4.5	1.1	147.8	<0.1
ST179	C-247860	26.1704	-97.9592	B	19.9	79.3	0.91	7.2	3.8	171.7	<0.1
ST180	C-247861	26.1414	-97.9576	B	15.2	74.8	0.78	5.3	1.8	174.5	<0.1
ST181	C-247743	26.1082	-97.9590	B	23.1	89.1	0.95	8.1	1.9	348.8	<0.1
ST182	C-247744	26.0775	-97.9584	B	16.9	81.4	0.90	7.1	1.7	359.3	<0.1
ST183	C-247746	26.0855	-97.9927	B	26.4	91.7	0.97	8.1	2.0	368.4	<0.1
ST184	C-247747	26.0824	-98.0260	B	20.8	99.4	1.09	9.5	2.1	341.8	<0.1
ST185	C-247748	26.0519	-98.0636	B	23.8	74.1	0.83	5.3	1.4	357.8	<0.1
ST186	C-247749	26.0764	-98.0611	G	19.2	94.7	1.06	9.3	2.0	360.8	<0.1
ST187	C-247750	26.1124	-98.0534	L	18.2	86.7	0.99	8.8	2.3	350.0	<0.1
ST188	C-247751	26.1409	-98.0472	L	15.1	73.0	0.70	5.0	1.5	203.8	<0.1
ST189	C-247752	26.1702	-98.0420	H	21.4	54.1	0.84	4.1	1.4	205.4	<0.1

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Pb	ICPMS-AES_Rb	ICPMS-AES_Sb	ICPMS-AES_Sc	ICPMS-AES_Sn	ICPMS-AES_Sr	ICPMS-AES_Te
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST190	C-247753	26.1999	-98.0368	H	15.7	68.2	0.72	4.6	2.1	159.5	<0.1
ST191	C-247754	26.2290	-98.0375	H	17.7	75.2	0.77	5.6	1.4	161.9	<0.1
ST192	C-247755	26.2565	-98.0361	H	12.8	72.6	0.66	4.3	1.1	129.5	<0.1
ST193	C-247756	26.2856	-98.0373	H	12.6	62.2	0.59	3.4	1.0	203.5	<0.1
ST194	C-247757	26.3041	-98.0799	H	14.2	75.5	0.76	5.5	1.2	170.5	<0.1
ST195	C-247758	26.3329	-98.1230	H	11.6	60.4	0.59	4.2	1.1	213.3	<0.1
ST196	C-247759	26.3020	-98.1054	H	99.2	69.4	3.62	5.0	2.0	143.7	<0.1
ST197	C-247760	26.2844	-98.0649	H	18.1	77.1	0.79	6.3	1.7	178.1	<0.1
ST198	C-247761	26.2490	-98.0747	B	17.3	67.0	1.07	4.9	2.8	173.6	<0.1
ST199	C-247762	26.2199	-98.0793	B	13.8	67.7	0.71	4.5	1.5	139.2	<0.1
ST200	C-247763	26.1895	-98.0855	G	15.8	67.9	0.64	5.3	1.5	208.5	<0.1
ST201	C-247764	26.1351	-98.0821	G	19.7	89.7	1.05	9.4	1.9	365.2	<0.1
ST202	C-247765	26.1125	-98.0856	G	19.5	83.4	0.92	8.5	2.3	352.7	<0.1
ST203	C-247766	26.0810	-98.0908	G	19.8	84.6	1.09	8.5	1.9	371.8	<0.1
ST204	C-247767	26.0849	-98.1279	G	19.8	81.3	1.05	7.8	2.2	357.5	<0.1
ST205	C-247768	26.1185	-98.1334	G	19.4	88.8	1.04	9.5	3.2	397.0	<0.1
ST206	C-247769	26.1578	-98.1270	G	16.5	76.0	0.87	6.7	1.6	241.8	<0.1
ST207	C-247770	26.1876	-98.1222	G	20.4	57.5	0.59	2.5	1.1	133.1	<0.1
ST208	C-247771	26.2176	-98.1177	G	28.5	73.3	1.12	5.4	5.7	168.9	<0.1
ST209	C-247772	26.2533	-98.1102	G	17.0	76.2	0.83	5.7	2.0	134.9	<0.1
ST210	C-247773	26.2823	-98.1069	G	20.4	85.9	0.94	7.3	2.0	136.3	<0.1
ST211	C-247774	26.2994	-98.1385	L	15.7	72.4	0.79	5.0	1.4	133.6	<0.1

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST001	C-247982	26.4547	-98.1632	G	4.4	0.3	0.8	24	0.4	7.5	28
ST002	C-247984	26.4645	-98.2207	G	3.0	0.3	0.7	16	0.2	5.3	16
ST003	C-247985	26.4699	-98.2609	G	2.8	0.2	0.6	15	0.2	5.6	20
ST004	C-247986	26.0846	-97.8620	H	8.8	0.6	2.2	64	0.9	18.8	68
ST005	C-247987	26.0737	-97.8355	H	10.8	0.7	2.5	81	1.2	21.9	96
ST006	C-247988	26.0728	-97.8046	H	9.0	0.5	2.3	65	0.8	18.1	57
ST007	C-247989	26.0562	-97.7719	H	9.3	0.6	2.4	73	1.0	18.8	82
ST008	C-247990	26.0519	-97.7398	H	9.8	0.6	2.4	69	1.0	19.6	102
ST009	C-247991	26.0431	-97.7066	H	9.8	0.6	2.4	73	1.1	19.2	85
ST010	C-247992	26.0447	-97.6712	H	8.5	0.5	2.2	65	0.9	17.2	77
ST011	C-247993	26.0265	-97.6402	H	9.6	0.6	2.2	67	1.0	19.4	92
ST012	C-247994	26.0189	-97.6075	H	10.8	0.7	2.5	82	1.1	20.5	99
ST013	C-247995	25.9932	-97.6020	H	7.8	0.5	2.0	53	0.8	16.3	85
ST014	C-247996	25.9621	-97.5776	H	10.2	0.6	2.6	78	1.0	20.1	83
ST015	C-247997	25.9439	-97.5463	H	10.7	0.6	2.7	80	1.1	21.4	79
ST016	C-247998	25.9258	-97.5200	H	9.7	0.6	2.3	70	1.0	18.9	87
ST017	C-247999	25.9285	-97.4891	H	9.9	0.6	2.0	66	1.0	19.6	97
ST018	C-248000	25.9145	-97.4547	H	8.4	0.5	1.9	59	0.8	16.5	86
ST019	C-248001	25.9176	-97.4185	H	9.3	0.6	2.8	67	1.0	17.6	220
ST020	C-248002	25.9179	-97.3816	H	6.4	0.4	1.6	41	0.6	12.7	60
ST021	C-248003	25.9449	-97.3522	H	2.5	0.2	0.6	17	0.2	7.6	10
ST022	C-248004	25.9539	-97.3191	H	10.0	0.6	2.8	73	0.9	18.0	70
ST023	C-248005	25.9604	-97.2835	H	8.5	0.5	2.2	61	0.8	16.8	60
ST024	C-248006	25.9600	-97.2534	H	6.6	0.4	1.9	44	0.5	13.2	39
ST025	C-248007	25.9680	-97.2069	H	5.7	0.4	1.9	37	0.5	11.9	33
ST026	C-248008	25.9894	-97.1829	H	7.4	0.5	2.0	57	0.7	14.4	51
ST027	C-248010	25.9970	-97.1513	H	2.8	0.2	0.7	20	0.2	7.9	14
ST028	C-248011	26.4601	-98.1765	G	4.4	0.3	1.4	30	0.4	9.8	25
ST029	C-248012	26.4602	-98.1741	G	4.6	0.3	1.3	33	0.4	10.2	31
ST030	C-248013	25.9723	-97.5364	H	8.2	0.5	2.1	54	0.8	16.2	59

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST031	C-248014	25.9783	-97.5047	H	10.2	0.6	2.4	72	0.8	18.6	60
ST032	C-248015	25.9817	-97.4744	H	9.1	0.6	2.5	70	0.9	18.5	59
ST033	C-248016	25.9831	-97.4461	H	10.2	0.6	2.4	76	1.0	20.0	81
ST034	C-248017	25.9502	-97.4194	H	10.1	0.6	2.3	71	1.0	20.1	86
ST035	C-248018	25.9487	-97.4453	H	8.5	0.5	2.5	64	1.1	17.0	66
ST036	C-248019	25.9508	-97.4783	H	8.9	0.5	2.3	58	0.9	17.3	52
ST037	C-248020	25.9499	-97.5080	H	8.3	0.5	2.0	54	0.9	16.3	96
ST107	C-247780	26.1184	-97.7855	B	8.7	0.7	2.3	72	1.1	17.1	95
ST108	C-247781	26.1438	-97.7816	B	6.6	0.5	1.4	46	0.8	13.4	51
ST109	C-247783	26.1753	-97.7839	B	6.7	0.5	1.7	55	1.2	13.9	55
ST110	C-247784	26.2079	-97.7862	B	7.5	0.6	1.5	52	0.7	14.4	61
ST111	C-247785	26.2375	-97.7869	B	5.4	0.4	1.4	33	0.5	10.6	42
ST112	C-247786	26.2663	-97.7870	B	7.7	0.5	1.7	52	0.8	14.9	57
ST113	C-247787	26.2961	-97.7873	B	5.4	0.4	1.2	29	0.5	10.6	33
ST114	C-247788	26.3011	-97.8261	B	5.8	0.4	1.4	30	0.5	10.9	42
ST115	C-247789	26.2631	-97.8257	B	7.7	0.6	1.6	52	0.8	16.3	73
ST116	C-247790	26.2719	-97.8638	B	4.9	0.4	1.4	39	0.6	9.8	46
ST117	C-247791	26.3026	-97.8644	B	5.7	0.4	1.5	33	0.5	11.0	40
ST118	C-247792	26.3422	-97.9251	B	4.6	0.4	1.1	27	0.4	8.6	31
ST119	C-247793	26.3148	-97.9290	B	6.7	0.5	1.9	39	0.6	12.5	51
ST120	C-247794	26.2812	-97.9285	B	5.7	0.4	1.2	37	0.5	10.9	50
ST121	C-247795	26.2656	-97.9119	B	7.6	0.5	1.9	56	0.8	15.1	62
ST122	C-247796	26.2365	-97.9114	B	6.3	0.5	1.5	46	0.6	12.8	52
ST123	C-247797	26.2066	-97.9111	B	6.6	0.5	1.6	49	0.7	13.0	51
ST124	C-247798	26.1781	-97.9106	B	4.9	0.4	1.2	33	0.5	10.1	40
ST125	C-247799	26.1286	-97.9014	B	7.7	0.6	2.0	64	0.8	15.9	61
ST126	C-247800	26.0986	-97.9012	B	9.3	0.7	2.7	78	1.1	18.5	81
ST127	C-247801	26.1085	-97.8500	B	9.5	0.7	2.5	83	1.0	18.4	92
ST128	C-247802	26.1356	-97.8577	B	7.2	0.5	1.7	45	0.6	12.3	53
ST129	C-247803	26.1778	-97.8472	B	7.2	0.6	1.8	56	0.8	14.6	63

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST130	C-247804	26.2155	-97.8466	B	7.5	0.6	1.6	52	0.8	14.0	72
ST131	C-247805	26.2466	-97.8634	L	7.3	0.5	1.7	53	0.9	15.0	57
ST132	C-247806	26.3655	-97.9374	B	7.4	0.4	1.4	41	0.6	12.6	51
ST133	C-247807	26.3937	-97.9325	B	4.4	0.3	1.1	29	0.4	8.0	28
ST134	C-247808	26.4227	-97.9267	B	4.5	0.4	1.0	29	0.4	8.7	33
ST135	C-247809	26.4504	-97.9144	B	4.7	0.4	1.0	28	0.4	8.9	34
ST136	C-247811	26.4795	-97.9088	B	3.0	0.3	0.8	18	0.3	5.7	20
ST137	C-247812	26.4851	-97.9489	B	3.0	0.3	0.7	16	0.3	4.9	19
ST138	C-247813	26.4564	-97.9539	B	5.0	0.4	1.1	30	0.4	10.0	47
ST139	C-247814	26.4063	-97.9628	B	3.1	0.3	1.6	18	0.3	6.0	22
ST140	C-247815	26.3845	-97.9662	B	3.9	0.3	0.9	22	0.3	6.6	28
ST141	C-247816	26.3559	-97.9724	B	4.5	0.4	0.9	26	0.4	8.7	29
ST142	C-247817	26.3282	-97.9843	B	4.2	0.4	1.1	26	0.4	7.6	29
ST143	C-247818	26.3067	-97.9931	B	3.4	0.3	1.0	24	0.3	7.0	27
ST144	C-247823	26.3202	-98.0355	B	4.0	0.3	1.0	25	0.3	6.8	28
ST145	C-247824	26.3497	-98.0306	B	4.5	0.4	1.2	39	0.4	9.6	34
ST146	C-247825	26.3490	-98.0245	B	3.9	0.3	1.0	24	0.4	7.5	25
ST147	C-247827	26.4070	-98.0197	B	4.1	0.3	0.9	22	0.4	7.6	27
ST148	C-247828	26.4502	-98.0135	B	3.8	0.3	0.8	20	0.3	7.0	25
ST149	C-247829	26.2889	-98.0054	B	3.5	0.3	0.8	18	0.3	6.2	19
ST150	C-247830	26.4997	-98.0487	B	3.5	0.3	0.7	18	0.3	6.1	23
ST151	C-247831	26.4707	-98.0538	B	2.8	0.3	0.6	14	0.2	4.7	15
ST152	C-247832	26.4410	-98.0593	B	2.7	0.3	0.6	13	0.2	5.4	14
ST153	C-247833	26.4124	-98.0644	B	3.4	0.3	0.8	20	0.2	6.7	22
ST154	C-247834	26.3825	-98.0699	B	5.3	0.4	1.1	31	0.4	10.4	37
ST155	C-247835	26.3534	-98.0751	B	4.5	0.4	1.0	27	0.4	7.7	28
ST156	C-247836	26.3266	-98.0799	B	6.8	0.5	1.4	42	0.5	12.7	52
ST157	C-247837	26.3617	-98.1178	B	4.1	0.4	0.9	23	0.3	7.6	29
ST158	C-247838	26.3860	-98.1138	B	3.4	0.3	0.8	20	0.2	6.7	20
ST159	C-247839	26.3995	-98.1385	B	3.2	0.3	0.7	16	0.2	5.7	16

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST160	C-247840	26.4162	-98.1371	B	4.3	0.4	0.8	24	0.3	7.1	23
ST161	C-247841	26.4123	-98.1120	B	4.2	0.3	1.0	30	0.9	8.8	34
ST162	C-247842	26.4184	-98.1501	L	4.4	0.3	0.9	24	0.3	8.2	30
ST163	C-247843	26.4665	-98.2377	B	3.4	0.3	0.7	19	0.3	6.8	21
ST164	C-247844	26.4618	-98.2048	B	3.2	0.3	0.7	16	0.3	5.9	19
ST165	C-247845	26.4560	-98.1734	B	3.2	0.3	0.9	22	0.3	6.8	24
ST166	C-247846	26.4518	-98.1409	B	2.8	0.2	0.6	14	0.2	5.0	16
ST167	C-247847	26.5165	-98.1443	H	2.6	0.2	0.6	15	0.2	4.3	21
ST168	C-247848	26.5209	-98.1747	H	4.4	0.3	0.9	33	0.3	7.2	28
ST169	C-247849	26.5004	-98.1991	H	3.1	0.3	0.7	16	0.2	5.2	18
ST170	C-247850	26.4894	-98.1960	H	3.2	0.3	0.7	19	0.3	5.9	20
ST171	C-247851	26.4797	-98.1823	H	2.9	0.3	0.7	18	0.2	5.8	27
ST172	C-247852	26.4772	-98.1495	H	3.9	0.3	0.8	22	0.4	7.9	52
ST173	C-247853	26.4489	-98.1191	H	4.9	0.4	0.9	29	0.4	8.8	37
ST174	C-247854	26.4444	-98.0848	H	3.6	0.3	1.2	26	0.3	7.5	27
ST175	C-247855	26.2899	-97.9605	H	5.9	0.4	1.2	34	0.5	10.4	50
ST176	C-247857	26.2599	-97.9604	B	7.2	0.5	1.6	47	0.7	14.7	72
ST177	C-247858	26.2288	-97.9602	B	6.3	0.4	1.5	40	0.7	13.2	65
ST178	C-247859	26.1995	-97.9597	B	6.1	0.4	1.3	36	0.5	11.6	52
ST179	C-247860	26.1704	-97.9592	B	8.5	0.6	1.9	57	0.7	16.2	83
ST180	C-247861	26.1414	-97.9576	B	6.7	0.5	1.6	44	0.6	13.5	54
ST181	C-247743	26.1082	-97.9590	B	8.7	0.6	2.6	72	1.0	18.9	84
ST182	C-247744	26.0775	-97.9584	B	8.4	0.6	2.3	63	0.9	18.1	69
ST183	C-247746	26.0855	-97.9927	B	8.7	0.6	2.3	68	1.0	19.3	74
ST184	C-247747	26.0824	-98.0260	B	10.2	0.7	2.8	76	1.1	21.4	80
ST185	C-247748	26.0519	-98.0636	B	7.1	0.5	1.9	53	0.7	15.2	50
ST186	C-247749	26.0764	-98.0611	G	9.6	0.7	2.6	83	1.3	20.5	81
ST187	C-247750	26.1124	-98.0534	L	9.1	0.6	2.6	80	1.0	19.7	75
ST188	C-247751	26.1409	-98.0472	L	6.3	0.5	1.5	43	0.6	12.1	47
ST189	C-247752	26.1702	-98.0420	H	4.8	0.4	1.5	44	0.6	11.5	125

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST190	C-247753	26.1999	-98.0368	H	5.9	0.4	1.4	41	0.6	11.2	52
ST191	C-247754	26.2290	-98.0375	H	6.9	0.5	1.4	47	0.7	13.4	55
ST192	C-247755	26.2565	-98.0361	H	5.5	0.5	1.2	34	0.5	11.0	41
ST193	C-247756	26.2856	-98.0373	H	4.7	0.4	1.0	30	0.4	9.0	37
ST194	C-247757	26.3041	-98.0799	H	6.2	0.5	1.4	42	0.6	12.1	51
ST195	C-247758	26.3329	-98.1230	H	5.5	0.4	1.2	39	0.5	11.0	39
ST196	C-247759	26.3020	-98.1054	H	6.3	0.4	1.4	38	0.6	12.5	46
ST197	C-247760	26.2844	-98.0649	H	6.9	0.5	1.5	55	0.7	13.5	57
ST198	C-247761	26.2490	-98.0747	B	5.9	0.5	1.5	41	0.6	12.0	52
ST199	C-247762	26.2199	-98.0793	B	6.0	0.4	1.2	38	0.5	10.9	43
ST200	C-247763	26.1895	-98.0855	G	6.6	0.5	1.5	48	0.6	12.7	50
ST201	C-247764	26.1351	-98.0821	G	9.7	0.7	2.8	88	1.1	19.8	78
ST202	C-247765	26.1125	-98.0856	G	9.1	0.6	2.5	81	1.0	18.9	77
ST203	C-247766	26.0810	-98.0908	G	9.5	0.7	2.7	80	1.2	19.3	76
ST204	C-247767	26.0849	-98.1279	G	8.8	0.6	2.6	74	1.0	17.9	77
ST205	C-247768	26.1185	-98.1334	G	9.8	0.7	2.8	92	0.9	20.0	90
ST206	C-247769	26.1578	-98.1270	G	7.8	0.5	1.8	56	0.7	15.3	62
ST207	C-247770	26.1876	-98.1222	G	4.0	0.4	1.0	24	0.4	7.2	45
ST208	C-247771	26.2176	-98.1177	G	6.6	0.5	1.6	44	0.6	12.6	131
ST209	C-247772	26.2533	-98.1102	G	6.6	0.5	1.3	45	0.6	13.4	57
ST210	C-247773	26.2823	-98.1069	G	8.1	0.6	1.6	53	0.8	16.5	66
ST211	C-247774	26.2994	-98.1385	L	6.3	0.5	1.3	43	0.6	12.0	49

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Al	ICP16_Ca	ICP16_Fe	ICP16_K	ICP16_Mg	ICP16_Na	ICP16_P	ICP16_Si
					percent	percent	percent	percent	percent	percent	percent	percent
ST001	C-247982	26.4547	-98.1632	G	3.10	0.75	1.00	1.51	0.21	0.56	0.02	36.67
ST002	C-247984	26.4645	-98.2207	G	2.40	0.26	0.60	1.40	0.09	0.59	0.01	38.64
ST003	C-247985	26.4699	-98.2609	G	2.17	0.89	0.58	1.28	0.13	0.46	0.01	37.29
ST004	C-247986	26.0846	-97.8620	H	5.35	8.97	2.25	1.89	0.77	1.00	0.10	23.32
ST005	C-247987	26.0737	-97.8355	H	6.31	8.27	2.80	2.09	1.04	0.75	0.14	21.68
ST006	C-247988	26.0728	-97.8046	H	5.17	8.34	2.16	1.83	0.73	1.35	0.08	24.03
ST007	C-247989	26.0562	-97.7719	H	5.69	7.36	2.46	1.99	0.83	0.98	0.09	24.02
ST008	C-247990	26.0519	-97.7398	H	5.68	8.06	2.52	1.96	0.90	0.80	0.12	22.54
ST009	C-247991	26.0431	-97.7066	H	5.67	8.13	2.43	1.94	0.82	0.88	0.10	22.67
ST010	C-247992	26.0447	-97.6712	H	5.40	7.50	2.16	2.06	0.70	1.06	0.11	24.88
ST011	C-247993	26.0265	-97.6402	H	5.52	8.69	2.37	1.92	0.83	0.87	0.11	22.03
ST012	C-247994	26.0189	-97.6075	H	6.50	6.69	2.85	2.16	0.96	0.77	0.11	22.99
ST013	C-247995	25.9932	-97.6020	H	4.87	7.19	2.20	1.93	0.61	1.08	0.14	25.05
ST014	C-247996	25.9621	-97.5776	H	5.81	9.25	2.61	1.83	0.88	0.86	0.08	22.16
ST015	C-247997	25.9439	-97.5463	H	5.92	9.86	2.60	1.70	0.92	0.84	0.08	21.21
ST016	C-247998	25.9258	-97.5200	H	5.55	8.69	2.43	1.82	0.83	0.83	0.09	22.10
ST017	C-247999	25.9285	-97.4891	H	5.97	5.01	2.49	2.05	0.88	0.94	0.11	25.51
ST018	C-248000	25.9145	-97.4547	H	5.21	6.60	2.15	1.89	0.76	0.88	0.11	24.64
ST019	C-248001	25.9176	-97.4185	H	5.46	8.26	2.69	1.88	0.86	0.79	0.18	21.64
ST020	C-248002	25.9179	-97.3816	H	3.82	12.00	1.50	1.43	0.68	0.79	0.07	21.60
ST021	C-248003	25.9449	-97.3522	H	1.86	0.97	0.81	0.77	0.13	0.61	<0.01	37.99
ST022	C-248004	25.9539	-97.3191	H	5.93	6.97	2.48	1.92	1.26	0.95	0.07	23.85
ST023	C-248005	25.9604	-97.2835	H	5.21	7.66	2.03	1.72	0.85	1.46	0.06	25.06
ST024	C-248006	25.9600	-97.2534	H	4.59	4.38	1.45	1.77	1.11	1.22	0.04	29.96
ST025	C-248007	25.9680	-97.2069	H	3.73	7.88	1.35	1.46	0.68	2.31	0.04	26.26
ST026	C-248008	25.9894	-97.1829	H	4.71	5.04	1.89	1.67	1.40	2.91	0.04	25.86
ST027	C-248010	25.9970	-97.1513	H	2.21	1.64	0.88	0.97	0.14	0.77	0.01	37.45
ST028	C-248011	26.4601	-98.1765	G	2.93	14.03	1.13	1.02	0.64	0.33	0.02	22.46
ST029	C-248012	26.4602	-98.1741	G	3.21	17.22	1.31	0.98	0.84	0.27	0.02	18.64
ST030	C-248013	25.9723	-97.5364	H	4.94	8.16	1.89	1.77	0.65	1.01	0.07	24.84

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Al	ICP16_Ca	ICP16_Fe	ICP16_K	ICP16_Mg	ICP16_Na	ICP16_P	ICP16_Si
					percent	percent	percent	percent	percent	percent	percent	percent
ST031	C-248014	25.9783	-97.5047	H	5.48	8.49	2.35	1.70	0.76	1.02	0.06	24.08
ST032	C-248015	25.9817	-97.4744	H	5.36	8.91	2.23	1.68	0.77	1.02	0.06	23.39
ST033	C-248016	25.9831	-97.4461	H	5.87	8.41	2.49	1.78	0.98	0.79	0.07	22.34
ST034	C-248017	25.9502	-97.4194	H	6.00	6.43	2.56	2.08	1.03	0.89	0.12	24.04
ST035	C-248018	25.9487	-97.4453	H	4.90	13.02	2.10	1.50	0.86	0.63	0.06	19.33
ST036	C-248019	25.9508	-97.4783	H	5.15	6.94	1.98	1.83	0.69	1.16	0.06	26.28
ST037	C-248020	25.9499	-97.5080	H	4.85	6.92	2.04	1.79	0.73	0.88	0.11	22.87
ST107	C-247780	26.1184	-97.7855	B	5.40	8.75	2.39	1.76	1.03	0.41	0.14	18.07
ST108	C-247781	26.1438	-97.7816	B	4.77	1.82	1.73	2.03	0.52	0.89	0.04	30.81
ST109	C-247783	26.1753	-97.7839	B	4.81	4.96	1.82	1.89	0.61	0.84	0.06	27.33
ST110	C-247784	26.2079	-97.7862	B	5.23	2.33	2.05	2.15	0.64	0.84	0.05	29.29
ST111	C-247785	26.2375	-97.7869	B	4.25	0.88	1.21	1.84	0.32	0.95	0.04	29.22
ST112	C-247786	26.2663	-97.7870	B	4.96	5.06	1.97	1.98	0.77	0.90	0.09	26.90
ST113	C-247787	26.2961	-97.7873	B	3.85	0.63	1.20	1.85	0.31	1.01	0.03	31.38
ST114	C-247788	26.3011	-97.8261	B	3.95	0.69	1.23	1.83	0.28	0.93	0.04	32.12
ST115	C-247789	26.2631	-97.8257	B	5.36	3.18	2.21	2.25	0.82	0.83	0.09	27.36
ST116	C-247790	26.2719	-97.8638	B	3.78	2.27	1.25	1.96	0.40	0.87	0.11	32.27
ST117	C-247791	26.3026	-97.8644	B	4.16	0.96	1.35	1.92	0.34	0.97	0.04	31.76
ST118	C-247792	26.3422	-97.9251	B	3.29	1.09	1.06	1.61	0.31	0.66	0.03	33.96
ST119	C-247793	26.3148	-97.9290	B	4.47	0.58	1.60	1.82	0.46	0.64	0.05	31.25
ST120	C-247794	26.2812	-97.9285	B	3.87	1.72	1.46	1.86	0.45	0.71	0.04	31.69
ST121	C-247795	26.2656	-97.9119	B	4.69	5.57	1.89	1.84	0.84	0.67	0.08	25.86
ST122	C-247796	26.2365	-97.9114	B	4.62	2.09	1.74	1.94	0.56	0.74	0.05	30.43
ST123	C-247797	26.2066	-97.9111	B	4.37	3.97	1.66	1.73	0.53	0.78	0.05	27.85
ST124	C-247798	26.1781	-97.9106	B	3.86	2.59	1.18	1.84	0.38	0.87	0.05	31.69
ST125	C-247799	26.1286	-97.9014	B	5.16	6.95	2.11	1.93	0.76	0.75	0.09	24.43
ST126	C-247800	26.0986	-97.9012	B	5.61	10.73	2.47	1.79	1.05	0.57	0.12	19.16
ST127	C-247801	26.1085	-97.8500	B	5.83	9.81	2.58	1.91	1.12	0.59	0.13	19.44
ST128	C-247802	26.1356	-97.8577	B	4.62	2.83	1.65	2.00	0.55	0.84	0.07	29.95
ST129	C-247803	26.1778	-97.8472	B	5.17	2.07	1.96	2.13	0.67	0.85	0.07	28.98

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Al	ICP16_Ca	ICP16_Fe	ICP16_K	ICP16_Mg	ICP16_Na	ICP16_P	ICP16_Si
					percent	percent	percent	percent	percent	percent	percent	percent
ST130	C-247804	26.2155	-97.8466	B	5.11	1.81	1.92	2.19	0.66	0.84	0.08	29.02
ST131	C-247805	26.2466	-97.8634	L	4.90	4.40	1.72	1.92	0.64	0.71	0.07	22.48
ST132	C-247806	26.3655	-97.9374	B	4.25	3.72	1.60	1.83	0.66	0.93	0.05	27.99
ST133	C-247807	26.3937	-97.9325	B	3.06	1.83	1.17	1.44	0.28	0.69	0.02	33.56
ST134	C-247808	26.4227	-97.9267	B	3.48	1.20	1.14	1.74	0.35	0.63	0.03	33.31
ST135	C-247809	26.4504	-97.9144	B	3.30	1.20	1.06	1.47	0.33	0.62	0.02	33.41
ST136	C-247811	26.4795	-97.9088	B	2.38	0.32	0.65	1.27	0.14	0.51	0.02	36.29
ST137	C-247812	26.4851	-97.9489	B	2.31	0.23	0.61	1.31	0.12	0.54	<0.01	36.14
ST138	C-247813	26.4564	-97.9539	B	3.61	1.18	1.23	1.57	0.35	0.58	0.03	31.78
ST139	C-247814	26.4063	-97.9628	B	2.45	1.54	0.61	1.28	0.56	1.44	0.03	30.14
ST140	C-247815	26.3845	-97.9662	B	2.85	0.49	0.82	1.50	0.18	0.66	0.02	34.52
ST141	C-247816	26.3559	-97.9724	B	3.29	0.87	0.99	1.57	0.27	0.75	0.01	34.45
ST142	C-247817	26.3282	-97.9843	B	3.15	0.38	1.02	1.54	0.25	0.60	0.02	34.85
ST143	C-247818	26.3067	-97.9931	B	2.53	7.29	0.76	1.28	0.40	0.85	0.03	27.86
ST144	C-247823	26.3202	-98.0355	B	2.93	0.49	0.93	1.53	0.20	0.68	0.02	35.09
ST145	C-247824	26.3497	-98.0306	B	3.40	7.19	1.22	1.45	0.71	0.57	0.04	27.11
ST146	C-247825	26.3490	-98.0245	B	2.52	9.64	0.88	1.20	0.39	1.09	0.02	26.16
ST147	C-247827	26.4070	-98.0197	B	3.00	0.38	0.87	1.51	0.19	0.59	0.02	36.02
ST148	C-247828	26.4502	-98.0135	B	2.81	0.26	0.84	1.39	0.19	0.52	0.01	36.45
ST149	C-247829	26.2889	-98.0054	B	2.57	0.35	0.71	1.40	0.15	0.56	0.01	36.39
ST150	C-247830	26.4997	-98.0487	B	2.63	0.29	0.75	1.47	0.16	0.50	0.02	36.58
ST151	C-247831	26.4707	-98.0538	B	2.37	0.20	0.58	1.19	0.09	0.48	<0.01	32.92
ST152	C-247832	26.4410	-98.0593	B	2.12	0.40	0.51	1.26	0.11	0.50	<0.01	35.73
ST153	C-247833	26.4124	-98.0644	B	2.65	1.45	0.76	1.38	0.22	0.50	0.01	34.60
ST154	C-247834	26.3825	-98.0699	B	3.95	0.66	1.29	1.86	0.34	0.68	0.03	33.60
ST155	C-247835	26.3534	-98.0751	B	3.32	0.27	1.10	1.54	0.24	0.59	0.01	35.08
ST156	C-247836	26.3266	-98.0799	B	4.42	3.93	1.61	1.96	0.60	0.63	0.06	29.11
ST157	C-247837	26.3617	-98.1178	B	3.23	1.16	0.96	1.61	0.30	0.67	0.02	34.44
ST158	C-247838	26.3860	-98.1138	B	2.58	1.74	0.69	1.43	0.21	0.58	0.02	34.88
ST159	C-247839	26.3995	-98.1385	B	2.58	0.26	0.63	1.45	0.15	0.61	<0.01	36.16

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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					percent	percent	percent	percent	percent	percent	percent	percent
ST160	C-247840	26.4162	-98.1371	B	3.02	0.41	0.89	1.59	0.18	0.69	<0.01	35.14
ST161	C-247841	26.4123	-98.1120	B	3.00	6.57	1.13	1.30	0.47	0.48	0.02	30.31
ST162	C-247842	26.4184	-98.1501	L	3.10	2.39	1.00	1.48	0.28	0.57	0.02	35.12
ST163	C-247843	26.4665	-98.2377	B	2.54	0.78	0.79	1.40	0.19	0.54	0.02	37.41
ST164	C-247844	26.4618	-98.2048	B	2.34	2.90	0.62	1.28	0.20	0.47	0.01	36.24
ST165	C-247845	26.4560	-98.1734	B	2.38	8.33	0.77	1.15	0.38	0.39	0.02	30.07
ST166	C-247846	26.4518	-98.1409	B	2.35	0.39	0.57	1.38	0.14	0.56	0.01	38.53
ST167	C-247847	26.5165	-98.1443	H	2.04	2.66	0.52	1.15	0.19	0.40	0.01	37.08
ST168	C-247848	26.5209	-98.1747	H	2.91	3.12	1.11	1.29	0.36	0.41	0.01	34.53
ST169	C-247849	26.5004	-98.1991	H	2.13	0.39	0.63	1.23	0.10	0.43	<0.01	37.52
ST170	C-247850	26.4894	-98.1960	H	2.65	0.50	0.80	1.40	0.14	0.42	0.01	38.00
ST171	C-247851	26.4797	-98.1823	H	2.25	3.22	0.70	1.18	0.24	0.36	0.01	35.55
ST172	C-247852	26.4772	-98.1495	H	3.07	1.62	0.96	1.52	0.36	0.58	0.04	33.16
ST173	C-247853	26.4489	-98.1191	H	3.53	1.09	1.25	1.65	0.32	0.55	0.02	34.82
ST174	C-247854	26.4444	-98.0848	H	2.68	8.83	0.87	1.20	0.43	0.46	0.03	28.66
ST175	C-247855	26.2899	-97.9605	H	3.78	1.66	1.39	1.78	0.43	0.66	0.04	34.28
ST176	C-247857	26.2599	-97.9604	B	5.14	2.26	2.07	2.22	0.71	0.69	0.09	30.96
ST177	C-247858	26.2288	-97.9602	B	4.51	2.02	1.73	1.96	0.66	0.90	0.05	31.27
ST178	C-247859	26.1995	-97.9597	B	4.28	2.35	1.53	1.89	0.44	0.79	0.05	32.58
ST179	C-247860	26.1704	-97.9592	B	5.44	2.75	2.28	2.25	0.79	0.67	0.10	29.61
ST180	C-247861	26.1414	-97.9576	B	4.85	1.62	1.75	1.96	0.52	0.89	0.06	32.60
ST181	C-247743	26.1082	-97.9590	B	5.50	8.40	2.38	1.90	0.97	0.79	0.12	21.87
ST182	C-247744	26.0775	-97.9584	B	5.17	9.57	2.16	1.82	0.86	0.87	0.09	22.17
ST183	C-247746	26.0855	-97.9927	B	5.56	9.12	2.34	1.91	0.99	0.80	0.11	21.52
ST184	C-247747	26.0824	-98.0260	B	5.92	8.90	2.56	1.89	1.06	0.75	0.13	21.34
ST185	C-247748	26.0519	-98.0636	B	4.80	6.95	1.79	1.82	0.59	1.20	0.06	26.46
ST186	C-247749	26.0764	-98.0611	G	6.01	10.20	2.68	1.81	1.17	0.59	0.12	19.52
ST187	C-247750	26.1124	-98.0534	L	5.73	11.12	2.54	1.79	1.08	0.55	0.10	19.34
ST188	C-247751	26.1409	-98.0472	L	4.49	3.70	1.65	1.76	0.52	0.79	0.04	30.35
ST189	C-247752	26.1702	-98.0420	H	3.43	11.11	1.46	1.34	0.67	0.54	0.05	23.12

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Al	ICP16_Ca	ICP16_Fe	ICP16_K	ICP16_Mg	ICP16_Na	ICP16_P	ICP16_Si
					percent	percent	percent	percent	percent	percent	percent	percent
ST190	C-247753	26.1999	-98.0368	H	4.08	2.61	1.51	1.82	0.52	0.75	0.05	31.31
ST191	C-247754	26.2290	-98.0375	H	4.54	3.26	1.79	2.01	0.72	0.80	0.06	29.48
ST192	C-247755	26.2565	-98.0361	H	3.80	1.18	1.32	1.68	0.42	0.64	0.03	31.11
ST193	C-247756	26.2856	-98.0373	H	3.54	3.55	1.13	1.67	0.46	0.87	0.04	30.37
ST194	C-247757	26.3041	-98.0799	H	4.41	2.50	1.67	1.95	0.70	0.64	0.06	30.31
ST195	C-247758	26.3329	-98.1230	H	3.77	4.69	1.38	1.65	0.57	0.81	0.03	25.18
ST196	C-247759	26.3020	-98.1054	H	4.10	2.16	1.53	1.88	0.56	0.72	0.04	31.18
ST197	C-247760	26.2844	-98.0649	H	4.74	4.55	1.86	1.95	0.77	0.62	0.06	26.88
ST198	C-247761	26.2490	-98.0747	B	4.12	4.18	1.56	1.79	0.68	0.67	0.06	29.41
ST199	C-247762	26.2199	-98.0793	B	3.99	1.81	1.44	1.88	0.45	0.76	0.03	32.59
ST200	C-247763	26.1895	-98.0855	G	4.34	6.37	1.66	1.71	0.66	0.70	0.05	26.56
ST201	C-247764	26.1351	-98.0821	G	5.91	12.26	2.64	1.69	1.18	0.46	0.11	17.48
ST202	C-247765	26.1125	-98.0856	G	5.47	11.85	2.39	1.72	1.04	0.57	0.09	18.56
ST203	C-247766	26.0810	-98.0908	G	5.72	10.47	2.53	1.80	1.05	0.65	0.13	19.42
ST204	C-247767	26.0849	-98.1279	G	5.28	10.59	2.29	1.79	1.03	0.69	0.11	19.83
ST205	C-247768	26.1185	-98.1334	G	5.96	12.01	2.67	1.78	1.12	0.54	0.10	17.24
ST206	C-247769	26.1578	-98.1270	G	4.88	6.68	2.08	1.94	0.95	0.62	0.07	24.82
ST207	C-247770	26.1876	-98.1222	G	3.09	1.45	0.93	1.59	0.24	0.71	0.03	34.19
ST208	C-247771	26.2176	-98.1177	G	4.42	2.82	1.79	1.95	0.64	0.69	0.08	29.87
ST209	C-247772	26.2533	-98.1102	G	4.58	1.17	1.77	2.04	0.62	0.63	0.05	30.78
ST210	C-247773	26.2823	-98.1069	G	5.43	1.85	2.20	2.44	0.88	0.65	0.07	28.13
ST211	C-247774	26.2994	-98.1385	L	4.24	1.80	1.62	1.87	0.54	0.62	0.04	31.15

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Ti	ICP16_Ba	ICP16_Cr	ICP16_Mn	ICP16_Nb	ICP16_Sr	ICP16_Y	ICP16_Zr
					percent	percent	percent	percent	percent	percent	percent	percent
ST001	C-247982	26.4547	-98.1632	G	0.18	410	19	152	<10	89	13	266
ST002	C-247984	26.4645	-98.2207	G	0.13	425	<10	128	<10	80	<10	189
ST003	C-247985	26.4699	-98.2609	G	0.10	395	<10	114	<10	66	<10	199
ST004	C-247986	26.0846	-97.8620	H	0.32	534	28	474	16	364	22	188
ST005	C-247987	26.0737	-97.8355	H	0.33	457	32	558	15	340	25	157
ST006	C-247988	26.0728	-97.8046	H	0.35	547	28	445	16	369	23	265
ST007	C-247989	26.0562	-97.7719	H	0.34	508	31	510	16	325	24	234
ST008	C-247990	26.0519	-97.7398	H	0.31	502	31	579	18	309	23	189
ST009	C-247991	26.0431	-97.7066	H	0.33	496	29	509	17	319	23	211
ST010	C-247992	26.0447	-97.6712	H	0.32	560	27	436	17	329	21	198
ST011	C-247993	26.0265	-97.6402	H	0.31	494	26	549	17	298	22	164
ST012	C-247994	26.0189	-97.6075	H	0.33	470	36	518	17	291	26	184
ST013	C-247995	25.9932	-97.6020	H	0.30	560	27	461	14	287	22	229
ST014	C-247996	25.9621	-97.5776	H	0.33	539	31	546	17	330	24	185
ST015	C-247997	25.9439	-97.5463	H	0.32	494	31	578	18	360	24	160
ST016	C-247998	25.9258	-97.5200	H	0.32	509	29	508	17	334	23	177
ST017	C-247999	25.9285	-97.4891	H	0.33	538	32	619	19	272	24	190
ST018	C-248000	25.9145	-97.4547	H	0.29	517	26	451	16	277	22	212
ST019	C-248001	25.9176	-97.4185	H	0.32	527	66	592	18	365	22	177
ST020	C-248002	25.9179	-97.3816	H	0.23	517	21	316	13	265	16	207
ST021	C-248003	25.9449	-97.3522	H	0.26	299	20	269	<10	117	11	482
ST022	C-248004	25.9539	-97.3191	H	0.33	478	30	411	17	306	23	191
ST023	C-248005	25.9604	-97.2835	H	0.32	577	34	457	16	334	23	217
ST024	C-248006	25.9600	-97.2534	H	0.26	539	18	307	14	260	17	257
ST025	C-248007	25.9680	-97.2069	H	0.25	593	16	288	13	315	15	237
ST026	C-248008	25.9894	-97.1829	H	0.26	673	23	332	13	278	18	204
ST027	C-248010	25.9970	-97.1513	H	0.25	386	<10	202	14	144	11	365
ST028	C-248011	26.4601	-98.1765	G	0.16	379	20	194	<10	155	11	184
ST029	C-248012	26.4602	-98.1741	G	0.18	376	20	236	<10	138	12	188
ST030	C-248013	25.9723	-97.5364	H	0.28	551	26	385	18	300	19	179

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Ti	ICP16_Ba	ICP16_Cr	ICP16_Mn	ICP16_Nb	ICP16_Sr	ICP16_Y	ICP16_Zr
					percent	percent	percent	percent	percent	percent	percent	percent
ST031	C-248014	25.9783	-97.5047	H	0.35	574	31	489	22	334	25	275
ST032	C-248015	25.9817	-97.4744	H	0.32	555	27	459	19	372	22	194
ST033	C-248016	25.9831	-97.4461	H	0.32	550	32	520	16	303	23	170
ST034	C-248017	25.9502	-97.4194	H	0.34	508	34	559	19	342	24	213
ST035	C-248018	25.9487	-97.4453	H	0.26	501	33	373	14	303	19	141
ST036	C-248019	25.9508	-97.4783	H	0.31	544	27	401	16	320	22	245
ST037	C-248020	25.9499	-97.5080	H	0.30	499	33	440	16	323	20	222
ST107	C-247780	26.1184	-97.7855	B	0.25	346	47	410	<10	250	19	113
ST108	C-247781	26.1438	-97.7816	B	0.24	459	26	327	<10	157	16	187
ST109	C-247783	26.1753	-97.7839	B	0.26	446	29	301	11	215	17	224
ST110	C-247784	26.2079	-97.7862	B	0.29	458	32	331	11	156	19	231
ST111	C-247785	26.2375	-97.7869	B	0.20	442	21	234	<10	167	11	197
ST112	C-247786	26.2663	-97.7870	B	0.28	439	34	332	10	219	18	263
ST113	C-247787	26.2961	-97.7873	B	0.20	470	18	231	<10	137	20	217
ST114	C-247788	26.3011	-97.8261	B	0.19	463	18	233	<10	136	13	181
ST115	C-247789	26.2631	-97.8257	B	0.30	433	57	411	<10	188	19	213
ST116	C-247790	26.2719	-97.8638	B	0.20	460	20	252	<10	172	13	169
ST117	C-247791	26.3026	-97.8644	B	0.21	484	20	259	<10	160	13	225
ST118	C-247792	26.3422	-97.9251	B	0.18	405	17	186	<10	103	11	240
ST119	C-247793	26.3148	-97.9290	B	0.23	402	26	310	<10	122	15	223
ST120	C-247794	26.2812	-97.9285	B	0.25	444	25	274	<10	113	16	271
ST121	C-247795	26.2656	-97.9119	B	0.27	1110	33	335	<10	230	18	241
ST122	C-247796	26.2365	-97.9114	B	0.25	443	46	319	<10	150	16	228
ST123	C-247797	26.2066	-97.9111	B	0.22	455	22	275	<10	180	15	153
ST124	C-247798	26.1781	-97.9106	B	0.16	474	19	211	<10	160	12	153
ST125	C-247799	26.1286	-97.9014	B	0.26	433	32	400	11	254	18	177
ST126	C-247800	26.0986	-97.9012	B	0.29	401	34	499	14	301	21	141
ST127	C-247801	26.1085	-97.8500	B	0.30	389	35	532	12	322	22	166
ST128	C-247802	26.1356	-97.8577	B	0.22	449	22	287	<10	177	15	146
ST129	C-247803	26.1778	-97.8472	B	0.25	452	43	325	11	182	17	157

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Ti	ICP16_Ba	ICP16_Cr	ICP16_Mn	ICP16_Nb	ICP16_Sr	ICP16_Y	ICP16_Zr
					percent	percent	percent	percent	percent	percent	percent	percent
ST130	C-247804	26.2155	-97.8466	B	0.24	441	34	329	10	157	16	139
ST131	C-247805	26.2466	-97.8634	L	0.23	409	23	303	<10	177	15	152
ST132	C-247806	26.3655	-97.9374	B	0.23	399	25	311	<10	170	16	223
ST133	C-247807	26.3937	-97.9325	B	0.27	457	26	184	<10	117	12	426
ST134	C-247808	26.4227	-97.9267	B	0.19	402	21	197	<10	101	12	243
ST135	C-247809	26.4504	-97.9144	B	0.17	376	17	174	<10	106	11	191
ST136	C-247811	26.4795	-97.9088	B	0.13	367	13	112	<10	73	<10	187
ST137	C-247812	26.4851	-97.9489	B	0.13	366	16	118	<10	67	<10	220
ST138	C-247813	26.4564	-97.9539	B	0.19	387	19	228	<10	114	15	196
ST139	C-247814	26.4063	-97.9628	B	0.12	383	14	128	<10	349	<10	130
ST140	C-247815	26.3845	-97.9662	B	0.16	398	16	140	<10	86	10	217
ST141	C-247816	26.3559	-97.9724	B	0.16	404	15	163	<10	103	10	194
ST142	C-247817	26.3282	-97.9843	B	0.19	375	19	188	<10	88	11	287
ST143	C-247818	26.3067	-97.9931	B	0.13	389	16	120	<10	168	<10	155
ST144	C-247823	26.3202	-98.0355	B	0.20	423	17	162	<10	90	<10	322
ST145	C-247824	26.3497	-98.0306	B	0.19	417	22	218	<10	148	12	206
ST146	C-247825	26.3490	-98.0245	B	0.17	420	17	164	<10	272	<10	287
ST147	C-247827	26.4070	-98.0197	B	0.17	405	17	154	<10	88	<10	268
ST148	C-247828	26.4502	-98.0135	B	0.15	380	15	144	<10	76	<10	165
ST149	C-247829	26.2889	-98.0054	B	0.14	383	15	125	<10	73	<10	216
ST150	C-247830	26.4997	-98.0487	B	0.13	433	15	119	<10	72	<10	205
ST151	C-247831	26.4707	-98.0538	B	0.10	386	10	<100	<10	72	<10	134
ST152	C-247832	26.4410	-98.0593	B	0.12	367	<10	<100	<10	67	<10	191
ST153	C-247833	26.4124	-98.0644	B	0.13	384	18	115	<10	79	<10	168
ST154	C-247834	26.3825	-98.0699	B	0.22	454	21	251	<10	107	14	231
ST155	C-247835	26.3534	-98.0751	B	0.20	386	19	172	<10	92	11	279
ST156	C-247836	26.3266	-98.0799	B	0.24	421	24	304	<10	186	15	199
ST157	C-247837	26.3617	-98.1178	B	0.16	414	14	160	<10	112	<10	177
ST158	C-247838	26.3860	-98.1138	B	0.15	438	13	131	<10	105	<10	154
ST159	C-247839	26.3995	-98.1385	B	0.12	391	11	100	<10	91	<10	194

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Ti	ICP16_Ba	ICP16_Cr	ICP16_Mn	ICP16_Nb	ICP16_Sr	ICP16_Y	ICP16_Zr
					percent	percent	percent	percent	percent	percent	percent	percent
ST160	C-247840	26.4162	-98.1371	B	0.20	419	18	145	<10	93	<10	348
ST161	C-247841	26.4123	-98.1120	B	0.15	612	18	216	<10	110	11	231
ST162	C-247842	26.4184	-98.1501	L	0.17	392	13	197	<10	99	12	220
ST163	C-247843	26.4665	-98.2377	B	0.16	391	11	152	<10	80	<10	260
ST164	C-247844	26.4618	-98.2048	B	0.10	436	<10	103	<10	84	<10	129
ST165	C-247845	26.4560	-98.1734	B	0.13	439	13	133	<10	130	<10	135
ST166	C-247846	26.4518	-98.1409	B	0.09	385	<10	<100	<10	88	<10	132
ST167	C-247847	26.5165	-98.1443	H	0.10	400	<10	<100	<10	83	<10	149
ST168	C-247848	26.5209	-98.1747	H	0.21	422	16	179	12	126	11	417
ST169	C-247849	26.5004	-98.1991	H	0.15	366	11	113	<10	58	<10	262
ST170	C-247850	26.4894	-98.1960	H	0.13	369	10	119	<10	57	<10	202
ST171	C-247851	26.4797	-98.1823	H	0.11	373	<10	111	<10	76	<10	160
ST172	C-247852	26.4772	-98.1495	H	0.15	422	16	220	<10	110	10	161
ST173	C-247853	26.4489	-98.1191	H	0.17	406	15	222	<10	170	12	194
ST174	C-247854	26.4444	-98.0848	H	0.13	368	12	145	<10	135	<10	152
ST175	C-247855	26.2899	-97.9605	H	0.24	401	21	257	12	134	15	323
ST176	C-247857	26.2599	-97.9604	B	0.27	421	25	277	14	168	19	222
ST177	C-247858	26.2288	-97.9602	B	0.26	450	24	326	15	189	17	276
ST178	C-247859	26.1995	-97.9597	B	0.22	433	24	259	12	160	15	217
ST179	C-247860	26.1704	-97.9592	B	0.29	408	28	430	16	180	20	209
ST180	C-247861	26.1414	-97.9576	B	0.24	521	22	306	13	180	18	258
ST181	C-247743	26.1082	-97.9590	B	0.32	451	39	493	11	328	21	184
ST182	C-247744	26.0775	-97.9584	B	0.31	505	34	442	11	342	20	177
ST183	C-247746	26.0855	-97.9927	B	0.31	444	35	524	12	354	21	168
ST184	C-247747	26.0824	-98.0260	B	0.32	441	38	519	10	334	29	178
ST185	C-247748	26.0519	-98.0636	B	0.31	587	29	404	10	352	19	248
ST186	C-247749	26.0764	-98.0611	G	0.30	415	37	504	11	342	22	152
ST187	C-247750	26.1124	-98.0534	L	0.30	401	36	523	<10	335	21	147
ST188	C-247751	26.1409	-98.0472	L	0.23	445	25	298	<10	194	15	182
ST189	C-247752	26.1702	-98.0420	H	0.22	511	30	265	<10	219	15	229

Table 1. Geochemical analyses of soil samples collected in 2003–04, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat, latitude in decimal degrees; Long, longitude in decimal degrees; Geo_unit, geologic unit described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 major elements; ICP16, inductively coupled plasma - atomic emission spectrometry for 16 major elements; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICP16_Ti	ICP16_Ba	ICP16_Cr	ICP16_Mn	ICP16_Nb	ICP16_Sr	ICP16_Y	ICP16_Zr
					percent	percent	percent	percent	percent	percent	percent	percent
ST190	C-247753	26.1999	-98.0368	H	0.24	445	24	282	<10	150	14	249
ST191	C-247754	26.2290	-98.0375	H	0.30	456	31	334	<10	156	17	290
ST192	C-247755	26.2565	-98.0361	H	0.21	396	24	254	<10	118	13	229
ST193	C-247756	26.2856	-98.0373	H	0.18	419	16	218	<10	200	11	187
ST194	C-247757	26.3041	-98.0799	H	0.24	416	33	315	<10	163	15	241
ST195	C-247758	26.3329	-98.1230	H	0.23	422	24	267	<10	194	15	219
ST196	C-247759	26.3020	-98.1054	H	0.25	412	30	274	<10	137	16	282
ST197	C-247760	26.2844	-98.0649	H	0.25	452	28	334	<10	177	16	226
ST198	C-247761	26.2490	-98.0747	B	0.25	409	28	291	<10	163	15	247
ST199	C-247762	26.2199	-98.0793	B	0.25	452	29	253	<10	131	16	382
ST200	C-247763	26.1895	-98.0855	G	0.25	423	28	333	<10	190	16	255
ST201	C-247764	26.1351	-98.0821	G	0.29	360	39	488	<10	340	21	117
ST202	C-247765	26.1125	-98.0856	G	0.29	408	35	491	<10	324	20	135
ST203	C-247766	26.0810	-98.0908	G	0.31	444	36	606	11	344	22	146
ST204	C-247767	26.0849	-98.1279	G	0.29	454	34	515	10	319	21	141
ST205	C-247768	26.1185	-98.1334	G	0.29	353	37	508	<10	357	22	120
ST206	C-247769	26.1578	-98.1270	G	0.30	440	35	371	<10	222	19	265
ST207	C-247770	26.1876	-98.1222	G	0.15	438	15	171	<10	123	<10	182
ST208	C-247771	26.2176	-98.1177	G	0.27	438	32	319	<10	157	16	287
ST209	C-247772	26.2533	-98.1102	G	0.27	398	31	337	<10	120	18	263
ST210	C-247773	26.2823	-98.1069	G	0.32	419	37	447	11	130	20	251
ST211	C-247774	26.2994	-98.1385	L	0.27	403	28	288	<10	122	15	286

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Al	ICPMS-AES_Ca	ICPMS-AES_Fe	ICPMS-AES_K	ICPMS-AES_Mg	ICPMS-AES_Na	ICPMS-AES_S
					percent	percent	percent	percent	percent	percent	percent
ST07_001	C-304058	26.3345	-97.7899	L	4.16	0.52	1.22	1.89	0.26	0.99	0.02
ST07_002	C-304059	26.3637	-97.7969	G	3.23	0.48	0.79	1.61	0.15	0.84	0.02
ST07_003	C-304060	26.3637	-97.7969	G	4.93	0.71	1.57	2.08	0.34	0.91	0.03
ST07_004	C-304061	26.3940	-97.7971	G	4.83	2.26	1.67	2.12	0.51	0.93	0.02
ST07_005	C-304062	26.4193	-97.7975	G	4.39	0.85	1.38	1.76	0.28	0.95	<0.01
ST07_006	C-304063	26.4153	-97.8056	L	3.97	0.51	1.12	1.77	0.21	0.96	<0.01
ST07_007	C-304064	26.4080	-97.8026	G	3.98	1.02	1.1	1.54	0.27	0.95	0.01
ST07_008	C-304065	26.4008	-97.7945	G	3.25	1.27	0.79	1.6	0.17	0.89	0.02
ST07_009	C-304066	26.4083	-97.7570	G	5.18	6.19	2.02	1.89	0.77	0.77	0.02
ST07_010	C-304067	26.4009	-97.7558	G	5.12	7.17	2.03	1.87	0.79	0.73	0.03
ST07_011	C-304068	26.3864	-97.7792	G	4.52	0.88	1.33	2.1	0.32	1.05	0.01
ST07_012	C-304069	26.3865	-97.7704	L	4.63	0.72	1.5	2.04	0.37	0.99	0.01
ST07_013	C-304070	26.3862	-97.7573	L	5.39	4.09	2.11	2.17	0.74	0.8	0.03
ST07_014	C-304071	26.3851	-97.7476	L	5.46	4.65	2.22	1.86	0.79	0.73	0.03
ST07_015	C-304072	26.3862	-97.7477	G	5.13	6.24	2.04	1.91	0.78	0.74	0.02
ST07_016	C-304073	26.3819	-97.7356	G	4.34	0.77	1.35	1.96	0.31	0.95	<0.01
ST07_017	C-304074	26.3719	-97.7397	G	4.39	0.61	1.36	1.94	0.31	0.97	0.01
ST07_018	C-304075	26.3719	-97.7454	G	3.53	0.45	0.95	1.65	0.17	0.95	<0.01
ST07_019	C-304076	26.3719	-97.7503	G	4.68	3.17	1.61	1.6	0.43	0.89	0.02
ST07_020	C-304077	26.3719	-97.7617	G	5.52	3.41	2.13	2.18	0.71	0.79	0.02
ST07_021	C-304078	26.3718	-97.7767	G	3.91	0.46	1	1.79	0.18	1.03	<0.01
ST07_022	C-304079	26.3766	-97.7808	G	4.02	0.5	1.25	1.77	0.23	0.97	<0.01
ST07_023	C-304080	26.4531	-97.7976	G	5.16	1.4	2	2.19	0.59	0.81	0.02
ST07_024	C-304081	26.4808	-97.7977	G	5.16	3.16	1.92	2.1	0.72	0.77	0.02
ST07_025	C-304082	26.4779	-97.8630	G	4.52	4.59	1.69	1.84	0.63	0.65	0.03
ST07_026	C-304083	26.4523	-97.8627	G	5.08	3.33	1.93	2.09	0.71	1.09	0.11
ST07_027	C-304084	26.4231	-97.8609	G	4.71	4.51	1.78	1.87	0.65	0.77	0.04
ST07_028	C-304085	26.3875	-97.8607	G	5.35	4.36	2	2.1	0.68	0.82	0.02
ST07_029	C-304086	26.3482	-97.8615	G	5.59	5.8	2.2	1.87	0.86	0.72	0.02

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Al	ICPMS-AES_Ca	ICPMS-AES_Fe	ICPMS-AES_K	ICPMS-AES_Mg	ICPMS-AES_Na	ICPMS-AES_S
					percent	percent	percent	percent	percent	percent	percent
ST07_030	C-304087	26.4429	-97.7716	G	4.15	1.03	1.2	1.89	0.24	1.02	0.02
ST07_031	C-304088	26.4301	-97.7677	G	4.13	2.74	1.22	1.82	0.4	0.95	0.01
ST07_032	C-304089	26.4316	-97.7518	L	4.13	0.69	1.24	1.86	0.3	0.92	0.02
ST07_033	C-304090	26.5035	-97.7365	L	5.22	3.1	2.03	2.07	0.79	0.9	0.13
ST07_034	C-304091	26.4812	-97.7322	L	4.64	1.9	1.44	2.11	0.43	1.19	0.09
ST07_035	C-304092	26.4543	-97.7318	L	3.95	0.53	1.12	1.76	0.21	0.99	<0.01
ST07_036	C-304093	26.4229	-97.7336	L	5.48	6.98	2.21	1.99	0.88	0.77	0.03
ST07_037	C-304094	26.4015	-97.7357	L	4.54	0.71	1.39	2.1	0.33	1.04	0.01
ST07_038	C-304095	26.3571	-97.7356	H	4.26	0.88	1.31	1.82	0.31	0.94	<0.01
ST07_039	C-304096	26.3312	-97.7357	H	3.88	0.53	1.07	1.77	0.22	1.03	0.01
ST07_040	C-304097	26.3294	-97.6673	H	4.88	2.37	1.75	2	0.55	0.86	0.02
ST07_041	C-304098	26.3566	-97.6731	H	4.84	0.66	1.67	2.08	0.38	0.93	0.01
ST07_042	C-304099	26.3871	-97.6724	H	4.01	0.88	1.15	1.84	0.29	0.93	0.01
ST07_043	C-304100	26.4257	-97.6733	H	4.37	0.9	1.37	2	0.35	1	0.01
ST07_044	C-304101	26.4539	-97.6737	H	4.18	0.59	1.35	1.87	0.27	0.93	0.01
ST07_045	C-304102	26.4801	-97.6740	H	5.42	3.73	2.1	2.18	0.75	0.77	0.02
ST07_046	C-304103	26.4792	-97.6195	B	3.46	0.79	0.86	1.74	0.13	1	0.01
ST07_047	C-304104	26.4533	-97.6163	B	3.41	0.41	0.88	1.62	0.13	0.94	<0.01
ST07_048	C-304105	26.4245	-97.6138	B	3.44	0.42	0.87	1.67	0.13	0.95	<0.01
ST07_049	C-304106	26.4022	-97.5999	L	4.76	0.9	1.66	2	0.46	0.91	0.02
ST07_050	C-304107	26.3781	-97.5863	L	5.18	3.46	1.91	2.06	0.68	0.88	0.02
ST07_051	C-304113	26.3559	-97.5860	L	4.88	1.64	1.78	1.99	0.54	0.89	0.02
ST07_052	C-304114	26.3212	-97.5759	L	4.64	0.54	1.63	2.03	0.41	0.84	0.01
ST07_053	C-304115	26.2834	-97.5864	L	4.54	1.33	1.49	1.98	0.4	0.92	0.01
ST07_054	C-304116	26.2476	-97.5965	L	4.8	4.51	1.91	1.7	0.71	0.52	0.03
ST07_055	C-304117	26.1696	-97.7833	B	4.68	6.41	1.74	1.81	0.78	1.25	0.71
ST07_056	C-304118	26.2126	-97.8149	B	4.06	10.9	1.58	1.45	0.68	0.58	0.07
ST07_057	C-304119	26.2486	-97.7383	B	4.18	1.26	1.55	1.92	0.38	0.95	0.02
ST07_058	C-304120	26.2487	-97.6699	H	4.79	5.03	1.9	1.87	0.62	0.73	0.03

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Al	ICPMS-AES_Ca	ICPMS-AES_Fe	ICPMS-AES_K	ICPMS-AES_Mg	ICPMS-AES_Na	ICPMS-AES_S
					percent	percent	percent	percent	percent	percent	percent
ST07_059	C-304121	26.2768	-97.6619	H	4.81	0.88	1.66	2.1	0.4	0.91	0.02
ST07_060	C-304122	26.3103	-97.6627	H	4.34	0.72	1.14	2.01	0.28	1.05	0.02
ST07_061	C-304123	26.2310	-97.5573	H	4.47	1.29	1.68	1.79	0.48	0.61	0.02
ST07_062	C-304124	26.1864	-97.5646	H	4.9	3.89	1.96	1.97	0.67	0.7	0.03
ST07_063	C-304125	26.1878	-97.5916	B	5.49	6.04	2.28	1.96	0.89	0.59	0.04
ST07_064	C-304126	26.1544	-97.6114	B	6.35	6.71	2.66	2.12	0.93	0.9	0.03
ST07_065	C-304127	26.1138	-97.6478	B	6.88	6.95	2.99	2.25	1.11	0.67	0.04
ST07_066	C-304128	26.0733	-97.6916	B	6.54	8.28	2.83	2.04	1.11	0.65	0.05
ST07_067	C-304129	26.0979	-97.7194	L	5.92	6.21	2.39	2.11	0.85	0.97	0.04
ST07_068	C-304130	26.1194	-97.7373	L	6.61	8.3	2.85	2.07	1.07	0.64	0.04

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST07_001	C-304058	26.3345	-97.7899	L	0.15	<1	5	518	1.8	0.12	0.1
ST07_002	C-304059	26.3637	-97.7969	G	0.1	<1	4	479	1.1	0.1	<0.1
ST07_003	C-304060	26.3637	-97.7969	G	0.18	<1	5	534	2	0.17	0.2
ST07_004	C-304061	26.3940	-97.7971	G	0.2	<1	6	505	1.8	0.15	0.2
ST07_005	C-304062	26.4193	-97.7975	G	0.18	<1	6	535	1.6	0.13	0.1
ST07_006	C-304063	26.4153	-97.8056	L	0.15	<1	4	519	1.4	0.1	0.1
ST07_007	C-304064	26.4080	-97.8026	G	0.14	<1	6	522	1.4	0.1	0.1
ST07_008	C-304065	26.4008	-97.7945	G	0.1	<1	4	482	1.2	0.07	0.1
ST07_009	C-304066	26.4083	-97.7570	G	0.23	<1	8	464	2.1	0.19	0.3
ST07_010	C-304067	26.4009	-97.7558	G	0.22	<1	10	449	2	0.19	0.3
ST07_011	C-304068	26.3864	-97.7792	G	0.17	<1	4	540	1.6	0.12	0.1
ST07_012	C-304069	26.3865	-97.7704	L	0.18	<1	6	534	1.7	0.17	0.2
ST07_013	C-304070	26.3862	-97.7573	L	0.23	<1	10	474	2.1	0.2	0.3
ST07_014	C-304071	26.3851	-97.7476	L	0.24	<1	6	452	2	0.22	0.3
ST07_015	C-304072	26.3862	-97.7477	G	0.22	<1	10	440	2	0.21	0.3
ST07_016	C-304073	26.3819	-97.7356	G	0.18	<1	6	530	1.5	0.14	0.2
ST07_017	C-304074	26.3719	-97.7397	G	0.17	<1	6	513	1.6	0.13	0.2
ST07_018	C-304075	26.3719	-97.7454	G	0.14	<1	4	499	1.2	0.1	<0.1
ST07_019	C-304076	26.3719	-97.7503	G	0.2	<1	4	498	1.7	0.15	0.3
ST07_020	C-304077	26.3719	-97.7617	G	0.24	<1	7	456	2.1	0.22	0.3
ST07_021	C-304078	26.3718	-97.7767	G	0.14	<1	4	526	1.2	0.1	<0.1
ST07_022	C-304079	26.3766	-97.7808	G	0.17	<1	4	509	1.2	0.1	0.1
ST07_023	C-304080	26.4531	-97.7976	G	0.21	<1	8	520	1.9	0.21	0.3
ST07_024	C-304081	26.4808	-97.7977	G	0.21	<1	5	534	1.9	0.19	0.3
ST07_025	C-304082	26.4779	-97.8630	G	0.2	<1	7	465	1.5	0.18	0.3
ST07_026	C-304083	26.4523	-97.8627	G	0.23	<1	10	486	1.8	0.23	0.3
ST07_027	C-304084	26.4231	-97.8609	G	0.21	<1	8	483	1.7	0.18	0.3
ST07_028	C-304085	26.3875	-97.8607	G	0.22	<1	6	496	1.8	0.18	0.3
ST07_029	C-304086	26.3482	-97.8615	G	0.23	<1	10	518	1.8	0.21	0.3

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST07_030	C-304087	26.4429	-97.7716	G	0.16	<1	7	527	1.2	0.12	0.1
ST07_031	C-304088	26.4301	-97.7677	G	0.16	<1	5	579	1.2	0.11	0.1
ST07_032	C-304089	26.4316	-97.7518	L	0.15	<1	5	493	1.4	0.12	0.1
ST07_033	C-304090	26.5035	-97.7365	L	0.22	<1	7	476	1.8	0.21	0.3
ST07_034	C-304091	26.4812	-97.7322	L	0.18	<1	6	555	1.4	0.13	0.1
ST07_035	C-304092	26.4543	-97.7318	L	0.16	<1	5	530	1.1	0.1	<0.1
ST07_036	C-304093	26.4229	-97.7336	L	0.25	<1	10	480	1.9	0.22	0.3
ST07_037	C-304094	26.4015	-97.7357	L	0.17	<1	5	531	1.5	0.13	0.2
ST07_038	C-304095	26.3571	-97.7356	H	0.17	<1	5	661	1.3	0.12	0.1
ST07_039	C-304096	26.3312	-97.7357	H	0.15	<1	3	522	1.2	0.11	<0.1
ST07_040	C-304097	26.3294	-97.6673	H	0.21	<1	6	467	1.5	0.16	0.2
ST07_041	C-304098	26.3566	-97.6731	H	0.21	<1	6	532	1.6	0.15	0.2
ST07_042	C-304099	26.3871	-97.6724	H	0.14	<1	4	512	1.4	0.12	0.1
ST07_043	C-304100	26.4257	-97.6733	H	0.17	<1	7	519	1.2	0.14	0.1
ST07_044	C-304101	26.4539	-97.6737	H	0.18	<1	6	517	1.2	0.11	0.2
ST07_045	C-304102	26.4801	-97.6740	H	0.24	<1	7	453	1.6	0.2	0.3
ST07_046	C-304103	26.4792	-97.6195	B	0.13	<1	7	610	1	0.09	0.1
ST07_047	C-304104	26.4533	-97.6163	B	0.13	<1	4	472	1.1	0.07	<0.1
ST07_048	C-304105	26.4245	-97.6138	B	0.13	<1	5	511	1	0.08	<0.1
ST07_049	C-304106	26.4022	-97.5999	L	0.19	<1	8	505	1.6	0.18	0.2
ST07_050	C-304107	26.3781	-97.5863	L	0.22	<1	13	445	1.5	0.21	0.3
ST07_051	C-304113	26.3559	-97.5860	L	0.2	<1	6	474	1.5	0.16	0.2
ST07_052	C-304114	26.3212	-97.5759	L	0.17	<1	5	466	1.5	0.16	0.2
ST07_053	C-304115	26.2834	-97.5864	L	0.17	<1	4	500	1.3	0.14	0.2
ST07_054	C-304116	26.2476	-97.5965	L	0.2	<1	8	385	1.6	0.17	0.3
ST07_055	C-304117	26.1696	-97.7833	B	0.18	<1	8	394	1.4	0.23	0.2
ST07_056	C-304118	26.2126	-97.8149	B	0.16	<1	7	437	1.2	0.22	0.3
ST07_057	C-304119	26.2486	-97.7383	B	0.16	<1	7	492	1.3	0.18	0.2
ST07_058	C-304120	26.2487	-97.6699	H	0.18	<1	8	451	1.3	0.18	0.2

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ti	ICPMS-AES_Ag	ICPMS-AES_As	ICPMS-AES_Ba	ICPMS-AES_Be	ICPMS-AES_Bi	ICPMS-AES_Cd
					percent	ppm	ppm	ppm	ppm	ppm	ppm
ST07_059	C-304121	26.2768	-97.6619	H	0.18	<1	6	508	1.4	0.2	0.2
ST07_060	C-304122	26.3103	-97.6627	H	0.16	<1	17	564	1.1	0.22	0.1
ST07_061	C-304123	26.2310	-97.5573	H	0.17	<1	7	411	1.2	0.2	0.2
ST07_062	C-304124	26.1864	-97.5646	H	0.21	<1	8	443	1.3	0.21	0.3
ST07_063	C-304125	26.1878	-97.5916	B	0.23	<1	7	405	1.6	0.22	0.4
ST07_064	C-304126	26.1544	-97.6114	B	0.27	<1	12	532	1.8	0.24	0.3
ST07_065	C-304127	26.1138	-97.6478	B	0.29	<1	10	465	2.3	0.27	0.4
ST07_066	C-304128	26.0733	-97.6916	B	0.27	<1	15	427	2.1	0.44	0.4
ST07_067	C-304129	26.0979	-97.7194	L	0.26	<1	14	510	1.9	0.29	0.3
ST07_068	C-304130	26.1194	-97.7373	L	0.27	<1	12	421	2	0.3	0.4

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_001	C-304058	26.3345	-97.7899	L	33.8	4.2	16	<5	8.2	9.26	0.02
ST07_002	C-304059	26.3637	-97.7969	G	24.8	2.4	11	<5	8.6	6.86	<0.02
ST07_003	C-304060	26.3637	-97.7969	G	39.1	6	21	<5	16.6	11.2	0.03
ST07_004	C-304061	26.3940	-97.7971	G	35.4	5.2	22	<5	16.7	10.7	0.03
ST07_005	C-304062	26.4193	-97.7975	G	38.1	4.6	18	<5	18.6	10.1	0.03
ST07_006	C-304063	26.4153	-97.8056	L	31.6	3.6	14	<5	8.4	8.46	0.02
ST07_007	C-304064	26.4080	-97.8026	G	29	3.4	14	<5	8.8	8.56	0.02
ST07_008	C-304065	26.4008	-97.7945	G	22.5	2.4	10	<5	4.6	6.83	<0.02
ST07_009	C-304066	26.4083	-97.7570	G	41.3	6.7	24	5	14.8	11.5	0.04
ST07_010	C-304067	26.4009	-97.7558	G	42.9	7.3	26	6	15.2	11.8	0.04
ST07_011	C-304068	26.3864	-97.7792	G	36	4.1	16	<5	8.6	9.76	0.03
ST07_012	C-304069	26.3865	-97.7704	L	38.1	4.9	19	<5	10.5	10.2	0.03
ST07_013	C-304070	26.3862	-97.7573	L	44.2	7.4	29	6	19.7	12.6	0.04
ST07_014	C-304071	26.3851	-97.7476	L	45.1	7.7	30	6	20.4	12.6	0.05
ST07_015	C-304072	26.3862	-97.7477	G	41.4	7.4	29	6	16.6	12.5	0.04
ST07_016	C-304073	26.3819	-97.7356	G	39.7	4.6	18	<5	10.7	10.2	0.03
ST07_017	C-304074	26.3719	-97.7397	G	39	4.7	18	<5	10.5	10	0.03
ST07_018	C-304075	26.3719	-97.7454	G	26.9	2.7	12	<5	4.6	7.75	<0.02
ST07_019	C-304076	26.3719	-97.7503	G	36.3	5.2	21	<5	10.1	10.4	0.03
ST07_020	C-304077	26.3719	-97.7617	G	42.8	7.7	27	6	18.1	12.3	0.04
ST07_021	C-304078	26.3718	-97.7767	G	28.5	2.9	12	<5	7.1	7.99	<0.02
ST07_022	C-304079	26.3766	-97.7808	G	29.9	3.8	15	<5	7.4	8.42	0.02
ST07_023	C-304080	26.4531	-97.7976	G	42.3	6.6	25	5	18.3	11.8	0.04
ST07_024	C-304081	26.4808	-97.7977	G	43.1	6.6	25	5	16.1	12	0.04
ST07_025	C-304082	26.4779	-97.8630	G	39.7	6.1	24	<5	15.4	10.3	0.04
ST07_026	C-304083	26.4523	-97.8627	G	42.2	6.5	27	<5	19.1	11.5	0.04
ST07_027	C-304084	26.4231	-97.8609	G	39.7	5.9	24	<5	13.1	10.7	0.04
ST07_028	C-304085	26.3875	-97.8607	G	42.1	6.5	27	5	15	11.5	0.04
ST07_029	C-304086	26.3482	-97.8615	G	42.4	7	30	6	16.4	12.2	0.04

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_030	C-304087	26.4429	-97.7716	G	31.4	3.6	15	<5	9.3	8.72	0.02
ST07_031	C-304088	26.4301	-97.7677	G	32.3	3.7	15	<5	6.9	8.76	0.02
ST07_032	C-304089	26.4316	-97.7518	L	33.2	3.7	15	<5	9.8	8.79	0.02
ST07_033	C-304090	26.5035	-97.7365	L	41.8	6.6	28	6	19.2	11.9	0.04
ST07_034	C-304091	26.4812	-97.7322	L	37.3	4.3	18	<5	8.9	9.59	0.03
ST07_035	C-304092	26.4543	-97.7318	L	30.4	3.2	15	<5	5.6	8.51	0.02
ST07_036	C-304093	26.4229	-97.7336	L	47	7.5	30	6	15.7	12.9	0.05
ST07_037	C-304094	26.4015	-97.7357	L	34.6	4.5	17	<5	10.7	10.4	0.03
ST07_038	C-304095	26.3571	-97.7356	H	36.2	4.2	16	<5	7.6	9.42	0.02
ST07_039	C-304096	26.3312	-97.7357	H	28.3	2.9	13	<5	8.5	8.12	<0.02
ST07_040	C-304097	26.3294	-97.6673	H	37.9	5.7	23	<5	12.2	10.5	0.04
ST07_041	C-304098	26.3566	-97.6731	H	40.5	5.8	21	<5	12.9	10.7	0.03
ST07_042	C-304099	26.3871	-97.6724	H	35	3.7	14	<5	7.5	8.88	0.02
ST07_043	C-304100	26.4257	-97.6733	H	34.3	4.2	17	<5	10.1	9.21	0.03
ST07_044	C-304101	26.4539	-97.6737	H	32	4.1	17	<5	8.5	8.58	0.02
ST07_045	C-304102	26.4801	-97.6740	H	43.6	6.6	29	5	18	11.7	0.04
ST07_046	C-304103	26.4792	-97.6195	B	29	2.9	11	<5	5.7	7.2	<0.02
ST07_047	C-304104	26.4533	-97.6163	B	28.2	2.5	11	<5	4.8	7.06	<0.02
ST07_048	C-304105	26.4245	-97.6138	B	27	2.5	11	<5	4.8	7.1	<0.02
ST07_049	C-304106	26.4022	-97.5999	L	37.7	5.4	22	<5	15	10.5	0.03
ST07_050	C-304107	26.3781	-97.5863	L	39.5	6.2	24	<5	17.6	11.1	0.04
ST07_051	C-304113	26.3559	-97.5860	L	38.6	5.6	22	<5	13.3	10.5	0.03
ST07_052	C-304114	26.3212	-97.5759	L	36.7	5	18	<5	11.5	10.5	0.03
ST07_053	C-304115	26.2834	-97.5864	L	37.4	4.5	17	<5	10.4	10	0.03
ST07_054	C-304116	26.2476	-97.5965	L	35.6	6.2	25	<5	13.3	10.5	0.04
ST07_055	C-304117	26.1696	-97.7833	B	41.1	6	23	5	17.6	10.5	0.04
ST07_056	C-304118	26.2126	-97.8149	B	33.5	5.9	21	<5	21.6	9.16	0.03
ST07_057	C-304119	26.2486	-97.7383	B	34.1	4.5	17	<5	18.4	9.58	0.03
ST07_058	C-304120	26.2487	-97.6699	H	34.8	5.5	23	<5	18.8	10.4	0.04

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Ce	ICPMS-AES_Co	ICPMS-AES_Cr	ICPMS-AES_Cs	ICPMS-AES_Cu	ICPMS-AES_Ga	ICPMS-AES_In
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_059	C-304121	26.2768	-97.6619	H	42.4	5.8	22	<5	19.2	11.2	0.03
ST07_060	C-304122	26.3103	-97.6627	H	40.7	3.8	15	<5	14.6	9.3	0.03
ST07_061	C-304123	26.2310	-97.5573	H	35.7	4.7	22	<5	16.2	9.75	0.03
ST07_062	C-304124	26.1864	-97.5646	H	40.9	6.2	25	<5	15.8	10.5	0.04
ST07_063	C-304125	26.1878	-97.5916	B	44.7	7.7	31	6	16.5	12.3	0.04
ST07_064	C-304126	26.1544	-97.6114	B	52.4	9.1	32	7	17.4	14.2	0.05
ST07_065	C-304127	26.1138	-97.6478	B	56.8	10.3	37	9	19.9	16.5	0.06
ST07_066	C-304128	26.0733	-97.6916	B	54.3	9	38	10	44	15.4	0.06
ST07_067	C-304129	26.0979	-97.7194	L	49.7	7.9	30	7	27.6	13.4	0.05
ST07_068	C-304130	26.1194	-97.7373	L	51.5	9.8	38	9	27.5	15.3	0.06

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_001	C-304058	26.3345	-97.7899	L	18.7	15	237	0.53	8	7	200
ST07_002	C-304059	26.3637	-97.7969	G	14	11	151	0.34	5.8	4.5	250
ST07_003	C-304060	26.3637	-97.7969	G	23	19	386	0.47	9.8	10.5	420
ST07_004	C-304061	26.3940	-97.7971	G	21.5	19	295	0.41	9.2	11.8	700
ST07_005	C-304062	26.4193	-97.7975	G	20.5	17	265	0.47	8.9	8.6	150
ST07_006	C-304063	26.4153	-97.8056	L	17.5	13	222	0.38	7.1	6.3	110
ST07_007	C-304064	26.4080	-97.8026	G	15.9	13	195	0.34	6.9	6.1	190
ST07_008	C-304065	26.4008	-97.7945	G	12.9	11	155	0.36	5.4	4.2	230
ST07_009	C-304066	26.4083	-97.7570	G	24	28	354	0.4	10	13.8	630
ST07_010	C-304067	26.4009	-97.7558	G	24.7	29	352	0.38	10.3	13.6	770
ST07_011	C-304068	26.3864	-97.7792	G	20.6	16	236	0.37	8.3	7.2	350
ST07_012	C-304069	26.3865	-97.7704	L	22.1	17	290	0.42	8.7	9	330
ST07_013	C-304070	26.3862	-97.7573	L	25.5	26	443	0.48	10.6	16.2	970
ST07_014	C-304071	26.3851	-97.7476	L	26.1	27	466	0.43	10.5	17.4	980
ST07_015	C-304072	26.3862	-97.7477	G	24.2	28	371	0.48	10.7	15.1	820
ST07_016	C-304073	26.3819	-97.7356	G	24.3	16	240	0.37	8.8	8.4	290
ST07_017	C-304074	26.3719	-97.7397	G	20.9	16	273	0.47	8.5	8.6	330
ST07_018	C-304075	26.3719	-97.7454	G	14.7	12	175	0.36	6.5	4.3	120
ST07_019	C-304076	26.3719	-97.7503	G	22.1	20	296	0.48	9.2	10.2	330
ST07_020	C-304077	26.3719	-97.7617	G	25.2	26	375	0.45	10.4	16.1	790
ST07_021	C-304078	26.3718	-97.7767	G	15.9	13	199	0.35	6.7	4.8	120
ST07_022	C-304079	26.3766	-97.7808	G	16.3	13	246	0.39	7	6.4	170
ST07_023	C-304080	26.4531	-97.7976	G	24.6	22	350	0.48	10.1	13.3	800
ST07_024	C-304081	26.4808	-97.7977	G	25.1	25	348	0.41	8.5	13.5	690
ST07_025	C-304082	26.4779	-97.8630	G	23.2	23	328	0.42	8.1	13.3	480
ST07_026	C-304083	26.4523	-97.8627	G	24.4	25	371	0.51	10.2	16.2	520
ST07_027	C-304084	26.4231	-97.8609	G	23.8	25	307	0.38	9.4	11.7	460
ST07_028	C-304085	26.3875	-97.8607	G	23.2	25	340	0.45	4.6	14.2	670
ST07_029	C-304086	26.3482	-97.8615	G	24.7	33	360	0.44	9.8	14.7	840

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_030	C-304087	26.4429	-97.7716	G	17.1	16	233	0.46	7	7.4	160
ST07_031	C-304088	26.4301	-97.7677	G	17.8	15	229	0.37	7.3	6.6	210
ST07_032	C-304089	26.4316	-97.7518	L	18.2	16	229	0.4	7.3	6.9	290
ST07_033	C-304090	26.5035	-97.7365	L	24.6	28	373	0.51	9.6	14.9	800
ST07_034	C-304091	26.4812	-97.7322	L	21.3	18	265	0.41	8.2	8.2	340
ST07_035	C-304092	26.4543	-97.7318	L	16.9	14	202	0.42	6.8	6.4	120
ST07_036	C-304093	26.4229	-97.7336	L	26.9	33	404	0.63	11.1	15	750
ST07_037	C-304094	26.4015	-97.7357	L	21.4	17	273	0.44	8.7	7.9	350
ST07_038	C-304095	26.3571	-97.7356	H	19.4	16	251	0.4	8.3	7	250
ST07_039	C-304096	26.3312	-97.7357	H	15.8	13	192	0.36	6.8	7.5	210
ST07_040	C-304097	26.3294	-97.6673	H	22.6	21	315	0.45	9	11.6	530
ST07_041	C-304098	26.3566	-97.6731	H	24	18	395	0.45	9.7	9.7	410
ST07_042	C-304099	26.3871	-97.6724	H	19	14	226	0.37	7.2	6.7	250
ST07_043	C-304100	26.4257	-97.6733	H	19.8	16	273	0.39	7.8	9	320
ST07_044	C-304101	26.4539	-97.6737	H	19.3	15	295	0.44	7.8	7.6	260
ST07_045	C-304102	26.4801	-97.6740	H	25.4	26	378	0.48	7	15.6	650
ST07_046	C-304103	26.4792	-97.6195	B	16	12	220	0.42	6.6	4.6	150
ST07_047	C-304104	26.4533	-97.6163	B	15.6	12	169	0.36	6.1	4.2	120
ST07_048	C-304105	26.4245	-97.6138	B	14.6	12	154	0.38	6.1	4.8	100
ST07_049	C-304106	26.4022	-97.5999	L	22.2	19	338	0.44	8.8	11.8	560
ST07_050	C-304107	26.3781	-97.5863	L	23.3	25	379	0.41	9.5	15.3	750
ST07_051	C-304113	26.3559	-97.5860	L	22.6	22	341	0.45	9.2	11.3	500
ST07_052	C-304114	26.3212	-97.5759	L	21.6	19	272	0.42	8.9	9.9	410
ST07_053	C-304115	26.2834	-97.5864	L	19.9	18	249	0.36	8.1	8.8	380
ST07_054	C-304116	26.2476	-97.5965	L	19.3	24	348	0.38	8.5	12.9	560
ST07_055	C-304117	26.1696	-97.7833	B	20.8	30	297	0.87	8.6	14.7	660
ST07_056	C-304118	26.2126	-97.8149	B	17.7	23	279	0.74	7	16.9	580
ST07_057	C-304119	26.2486	-97.7383	B	20.7	17	277	0.59	8.1	15.7	390
ST07_058	C-304120	26.2487	-97.6699	H	20.9	23	258	0.56	8.1	14	480

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_La	ICPMS-AES_Li	ICPMS-AES_Mn	ICPMS-AES_Mo	ICPMS-AES_Nb	ICPMS-AES_Ni	ICPMS-AES_P
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_059	C-304121	26.2768	-97.6619	H	24.8	19	344	0.45	9.4	14.9	370
ST07_060	C-304122	26.3103	-97.6627	H	23.3	16	214	0.52	7.9	10.3	200
ST07_061	C-304123	26.2310	-97.5573	H	21.1	21	277	0.39	7.3	11	470
ST07_062	C-304124	26.1864	-97.5646	H	24	24	358	0.54	9.4	13.3	830
ST07_063	C-304125	26.1878	-97.5916	B	25.6	30	408	0.46	10.4	16.1	1,030
ST07_064	C-304126	26.1544	-97.6114	B	30	38	502	1.09	12	16.2	850
ST07_065	C-304127	26.1138	-97.6478	B	31.7	43	534	0.7	14.2	20.3	1,240
ST07_066	C-304128	26.0733	-97.6916	B	29.9	46	457	0.62	12	43	1,010
ST07_067	C-304129	26.0979	-97.7194	L	28.6	34	505	0.85	11.9	21.2	1,020
ST07_068	C-304130	26.1194	-97.7373	L	29.1	42	534	0.87	12.6	23.8	1,400

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Pb	ICPMS-AES_Rb	ICPMS-AES_Sb	ICPMS-AES_Sc	ICPMS-AES_Sn	ICPMS-AES_Sr	ICPMS-AES_Te
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_001	C-304058	26.3345	-97.7899	L	14	71.3	0.6	3.8	1	137	<0.1
ST07_002	C-304059	26.3637	-97.7969	G	15.7	57.8	0.62	2.2	0.9	119	<0.1
ST07_003	C-304060	26.3637	-97.7969	G	21	79.5	0.75	5.2	1.4	144	<0.1
ST07_004	C-304061	26.3940	-97.7971	G	16.7	72.8	0.69	5.3	1.4	162	<0.1
ST07_005	C-304062	26.4193	-97.7975	G	14.8	69.4	0.65	4.3	1.1	153	<0.1
ST07_006	C-304063	26.4153	-97.8056	L	12.3	64.5	0.52	3.2	0.9	133	<0.1
ST07_007	C-304064	26.4080	-97.8026	G	12.3	54.5	0.58	3.4	0.9	139	<0.1
ST07_008	C-304065	26.4008	-97.7945	G	10.1	55.5	0.49	2.3	0.9	133	<0.1
ST07_009	C-304066	26.4083	-97.7570	G	16.5	74.4	0.79	6.8	4.7	206	<0.1
ST07_010	C-304067	26.4009	-97.7558	G	16.5	74.9	0.82	7.1	1.5	213	<0.1
ST07_011	C-304068	26.3864	-97.7792	G	14.4	72.8	0.6	4.1	1	155	<0.1
ST07_012	C-304069	26.3865	-97.7704	L	15.2	72.9	0.66	4.7	1.2	145	<0.1
ST07_013	C-304070	26.3862	-97.7573	L	17.1	83.5	0.91	7.2	1.5	193	<0.1
ST07_014	C-304071	26.3851	-97.7476	L	16.8	82.9	0.82	7.5	1.5	196	<0.1
ST07_015	C-304072	26.3862	-97.7477	G	15.7	77.3	0.87	7.2	1.4	208	<0.1
ST07_016	C-304073	26.3819	-97.7356	G	14.9	72.1	0.63	4.5	1.1	138	<0.1
ST07_017	C-304074	26.3719	-97.7397	G	15.2	73.1	0.64	4.4	1.2	145	<0.1
ST07_018	C-304075	26.3719	-97.7454	G	11.8	59.9	0.49	2.7	0.7	129	<0.1
ST07_019	C-304076	26.3719	-97.7503	G	14	63.3	0.62	5.3	1.3	172	<0.1
ST07_020	C-304077	26.3719	-97.7617	G	16.5	81.1	0.83	7	2.1	171	<0.1
ST07_021	C-304078	26.3718	-97.7767	G	14.1	62.1	0.58	2.8	0.8	137	<0.1
ST07_022	C-304079	26.3766	-97.7808	G	13.6	60.7	0.51	3.3	0.8	138	<0.1
ST07_023	C-304080	26.4531	-97.7976	G	20.8	79.2	0.88	6.4	2.1	147	<0.1
ST07_024	C-304081	26.4808	-97.7977	G	19.3	79.5	0.7	6.6	1.5	180	<0.1
ST07_025	C-304082	26.4779	-97.8630	G	14.6	68.1	0.74	5.7	1.9	192	<0.1
ST07_026	C-304083	26.4523	-97.8627	G	17.5	76.6	0.87	6.3	1.4	190	<0.1
ST07_027	C-304084	26.4231	-97.8609	G	17	69.8	0.75	5.9	1.2	165	<0.1
ST07_028	C-304085	26.3875	-97.8607	G	15.9	75.9	0.67	6.4	2.6	195	<0.1
ST07_029	C-304086	26.3482	-97.8615	G	17.1	74.3	0.83	7.3	1.6	250	<0.1

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Pb	ICPMS-AES_Rb	ICPMS-AES_Sb	ICPMS-AES_Sc	ICPMS-AES_Sn	ICPMS-AES_Sr	ICPMS-AES_Te
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_030	C-304087	26.4429	-97.7716	G	13.3	65.1	0.57	3.3	1.1	152	<0.1
ST07_031	C-304088	26.4301	-97.7677	G	13.2	64.5	0.63	3.6	1	165	<0.1
ST07_032	C-304089	26.4316	-97.7518	L	13.4	65.3	0.57	3.6	0.8	135	<0.1
ST07_033	C-304090	26.5035	-97.7365	L	17.5	75.4	0.82	6.8	1.6	194	<0.1
ST07_034	C-304091	26.4812	-97.7322	L	14.5	70	0.64	4.3	1	181	<0.1
ST07_035	C-304092	26.4543	-97.7318	L	11.7	63.5	0.54	3.1	0.7	136	<0.1
ST07_036	C-304093	26.4229	-97.7336	L	16.7	79.6	0.87	7.6	5.8	252	<0.1
ST07_037	C-304094	26.4015	-97.7357	L	15	73.8	0.65	4.4	1.2	152	<0.1
ST07_038	C-304095	26.3571	-97.7356	H	13.4	66.3	0.57	3.9	1.1	143	<0.1
ST07_039	C-304096	26.3312	-97.7357	H	12.3	61.9	0.58	2.9	0.7	144	<0.1
ST07_040	C-304097	26.3294	-97.6673	H	14.6	70.5	0.69	5.5	1.4	164	<0.1
ST07_041	C-304098	26.3566	-97.6731	H	17.3	73.7	0.75	5.1	1.5	141	<0.1
ST07_042	C-304099	26.3871	-97.6724	H	13.1	65.9	0.56	3.5	0.8	129	<0.1
ST07_043	C-304100	26.4257	-97.6733	H	13.3	67.1	0.63	3.7	2	152	<0.1
ST07_044	C-304101	26.4539	-97.6737	H	13.2	63.3	0.6	3.5	1	133	<0.1
ST07_045	C-304102	26.4801	-97.6740	H	15.2	75.2	0.75	6.5	1.5	164	<0.1
ST07_046	C-304103	26.4792	-97.6195	B	15.3	59.7	0.54	2.1	0.7	131	<0.1
ST07_047	C-304104	26.4533	-97.6163	B	11.2	55.7	0.52	2.2	0.6	128	<0.1
ST07_048	C-304105	26.4245	-97.6138	B	11.1	58.3	0.49	2.2	0.7	126	<0.1
ST07_049	C-304106	26.4022	-97.5999	L	23.4	72.9	0.82	5	4.2	138	<0.1
ST07_050	C-304107	26.3781	-97.5863	L	17.5	74.3	0.91	5.9	1.7	164	<0.1
ST07_051	C-304113	26.3559	-97.5860	L	16.5	73.2	0.7	5.3	1.3	157	<0.1
ST07_052	C-304114	26.3212	-97.5759	L	14.6	75.2	0.63	5	1.1	125	<0.1
ST07_053	C-304115	26.2834	-97.5864	L	15	69.6	0.63	4.5	0.9	137	<0.1
ST07_054	C-304116	26.2476	-97.5965	L	14.9	68	0.76	6	1.7	156	<0.1
ST07_055	C-304117	26.1696	-97.7833	B	15.1	68.5	0.74	5.8	1.5	342	<0.1
ST07_056	C-304118	26.2126	-97.8149	B	90.9	57.6	0.96	5	1.6	245	<0.1
ST07_057	C-304119	26.2486	-97.7383	B	34.2	70.8	0.7	4.1	1.5	151	<0.1
ST07_058	C-304120	26.2487	-97.6699	H	20.8	69.5	0.76	5.3	1.4	170	<0.1

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Pb	ICPMS-AES_Rb	ICPMS-AES_Sb	ICPMS-AES_Sc	ICPMS-AES_Sn	ICPMS-AES_Sr	ICPMS-AES_Te
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_059	C-304121	26.2768	-97.6619	H	18.3	79.1	0.69	5.2	1.5	138	<0.1
ST07_060	C-304122	26.3103	-97.6627	H	15.3	69.1	0.98	3.5	1.2	157	<0.1
ST07_061	C-304123	26.2310	-97.5573	H	42.1	67.2	0.74	4.9	1.9	129	<0.1
ST07_062	C-304124	26.1864	-97.5646	H	20.6	73	0.83	5.6	7.4	162	<0.1
ST07_063	C-304125	26.1878	-97.5916	B	17.9	78.4	0.88	7.1	2.6	223	<0.1
ST07_064	C-304126	26.1544	-97.6114	B	24.1	86.9	0.91	7.9	2.5	313	<0.1
ST07_065	C-304127	26.1138	-97.6478	B	20.9	100	1.02	10.1	2.3	279	<0.1
ST07_066	C-304128	26.0733	-97.6916	B	20.2	92.4	1.23	9.4	2.5	306	<0.1
ST07_067	C-304129	26.0979	-97.7194	L	19.8	86.8	1.04	7.5	1.9	321	<0.1
ST07_068	C-304130	26.1194	-97.7373	L	20.3	90.4	1.05	9.3	2.3	324	<0.1

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_001	C-304058	26.3345	-97.7899	L	5.4	0.4	1.2	31	0.5	11.3	31
ST07_002	C-304059	26.3637	-97.7969	G	4.1	0.4	1	20	0.4	7.9	24
ST07_003	C-304060	26.3637	-97.7969	G	7	0.5	1.5	35	0.7	15.6	49
ST07_004	C-304061	26.3940	-97.7971	G	6.6	0.5	1.4	40	0.7	13.9	51
ST07_005	C-304062	26.4193	-97.7975	G	6.1	0.5	1.3	35	0.5	12.2	38
ST07_006	C-304063	26.4153	-97.8056	L	5	0.4	1.1	27	0.6	9.9	28
ST07_007	C-304064	26.4080	-97.8026	G	4.7	0.4	1.1	25	0.4	9.5	29
ST07_008	C-304065	26.4008	-97.7945	G	3.5	0.4	0.9	19	0.4	7.4	21
ST07_009	C-304066	26.4083	-97.7570	G	7.5	0.6	1.5	56	0.8	16.2	53
ST07_010	C-304067	26.4009	-97.7558	G	7.9	0.6	1.6	55	0.8	16.9	56
ST07_011	C-304068	26.3864	-97.7792	G	5.6	0.5	1.2	31	0.5	12.1	35
ST07_012	C-304069	26.3865	-97.7704	L	6.5	0.5	1.3	35	0.6	13.2	40
ST07_013	C-304070	26.3862	-97.7573	L	8	0.6	1.6	52	0.8	17.4	66
ST07_014	C-304071	26.3851	-97.7476	L	8.3	0.6	1.6	53	0.9	17.5	69
ST07_015	C-304072	26.3862	-97.7477	G	7.7	0.6	1.6	55	0.9	16.9	59
ST07_016	C-304073	26.3819	-97.7356	G	6.8	0.5	1.4	33	0.5	12.9	36
ST07_017	C-304074	26.3719	-97.7397	G	6.3	0.5	1.4	33	0.6	12.9	37
ST07_018	C-304075	26.3719	-97.7454	G	4.4	0.4	1	25	0.4	8	22
ST07_019	C-304076	26.3719	-97.7503	G	6.7	0.5	1.3	33	0.7	14.3	42
ST07_020	C-304077	26.3719	-97.7617	G	7.8	0.6	1.5	51	1	17.2	63
ST07_021	C-304078	26.3718	-97.7767	G	4.7	0.4	1.1	26	0.4	8.4	26
ST07_022	C-304079	26.3766	-97.7808	G	4.9	0.4	1.1	32	0.4	9.2	28
ST07_023	C-304080	26.4531	-97.7976	G	7.7	0.6	1.5	46	0.8	15.7	72
ST07_024	C-304081	26.4808	-97.7977	G	7.6	0.6	1.6	46	0.3	16.3	57
ST07_025	C-304082	26.4779	-97.8630	G	7.2	0.5	1.4	44	0.7	14.4	44
ST07_026	C-304083	26.4523	-97.8627	G	7.7	0.6	1.5	47	0.9	15.9	52
ST07_027	C-304084	26.4231	-97.8609	G	7.6	0.5	1.4	36	0.9	14.7	44
ST07_028	C-304085	26.3875	-97.8607	G	7.6	0.6	1.5	52	0.6	16.2	56
ST07_029	C-304086	26.3482	-97.8615	G	8.2	0.6	1.6	65	0.8	16.3	61

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_030	C-304087	26.4429	-97.7716	G	5.2	0.4	1.2	30	0.4	10	29
ST07_031	C-304088	26.4301	-97.7677	G	4.9	0.4	1.2	31	0.6	10.5	29
ST07_032	C-304089	26.4316	-97.7518	L	5.6	0.4	1.1	23	0.5	10.8	32
ST07_033	C-304090	26.5035	-97.7365	L	7.9	0.6	1.6	37	0.9	15.6	62
ST07_034	C-304091	26.4812	-97.7322	L	6.6	0.5	1.3	36	0.6	12	37
ST07_035	C-304092	26.4543	-97.7318	L	4.9	0.4	1	24	0.4	9.6	25
ST07_036	C-304093	26.4229	-97.7336	L	8.6	0.6	2	52	1	18.3	59
ST07_037	C-304094	26.4015	-97.7357	L	6.2	0.5	1.3	32	0.6	12.8	39
ST07_038	C-304095	26.3571	-97.7356	H	5.8	0.5	1.3	32	0.6	11.6	33
ST07_039	C-304096	26.3312	-97.7357	H	4.5	0.4	1	20	0.4	9.1	25
ST07_040	C-304097	26.3294	-97.6673	H	6.9	0.5	1.4	45	0.7	13.6	48
ST07_041	C-304098	26.3566	-97.6731	H	7.1	0.5	1.5	37	0.7	15.1	44
ST07_042	C-304099	26.3871	-97.6724	H	5.1	0.5	1.2	29	0.5	10.8	31
ST07_043	C-304100	26.4257	-97.6733	H	5.6	0.5	1.8	32	0.5	12.6	35
ST07_044	C-304101	26.4539	-97.6737	H	5.6	0.4	1.2	33	0.5	11.4	34
ST07_045	C-304102	26.4801	-97.6740	H	7.6	0.6	1.5	53	0.7	16.2	59
ST07_046	C-304103	26.4792	-97.6195	B	4.6	0.4	1.2	22	0.4	8.7	23
ST07_047	C-304104	26.4533	-97.6163	B	4.3	0.4	1	23	0.4	7.8	20
ST07_048	C-304105	26.4245	-97.6138	B	4	0.4	1	24	0.3	8	20
ST07_049	C-304106	26.4022	-97.5999	L	6.6	0.5	1.3	42	0.7	13.3	50
ST07_050	C-304107	26.3781	-97.5863	L	7.1	0.5	1.4	45	0.7	15.1	52
ST07_051	C-304113	26.3559	-97.5860	L	6.7	0.5	1.3	43	0.7	14.1	50
ST07_052	C-304114	26.3212	-97.5759	L	6.4	0.5	1.3	40	0.7	13.1	46
ST07_053	C-304115	26.2834	-97.5864	L	5.9	0.5	1.2	37	0.6	12.2	41
ST07_054	C-304116	26.2476	-97.5965	L	6.6	0.5	1.3	54	0.8	13.4	52
ST07_055	C-304117	26.1696	-97.7833	B	6.2	0.5	1.6	53	0.7	13.5	49
ST07_056	C-304118	26.2126	-97.8149	B	5.4	0.4	1.6	48	0.6	12.3	53
ST07_057	C-304119	26.2486	-97.7383	B	5.6	0.5	1.3	34	0.6	12	44
ST07_058	C-304120	26.2487	-97.6699	H	6.1	0.5	1.3	46	0.8	13.4	55

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	ICPMS-AES_Th	ICPMS-AES_Tl	ICPMS-AES_U	ICPMS-AES_V	ICPMS-AES_W	ICPMS-AES_Y	ICPMS-AES_Zn
					ppm	ppm	ppm	ppm	ppm	ppm	ppm
ST07_059	C-304121	26.2768	-97.6619	H	7.2	0.5	1.5	41	0.7	14.8	49
ST07_060	C-304122	26.3103	-97.6627	H	6.1	0.5	1.3	28	0.7	11.3	30
ST07_061	C-304123	26.2310	-97.5573	H	6	0.5	1.1	43	0.6	11.7	65
ST07_062	C-304124	26.1864	-97.5646	H	7	0.5	1.4	52	0.8	14.8	70
ST07_063	C-304125	26.1878	-97.5916	B	7.9	0.6	1.7	61	1	16.8	67
ST07_064	C-304126	26.1544	-97.6114	B	9.4	0.6	2.2	76	1.1	19.3	75
ST07_065	C-304127	26.1138	-97.6478	B	10.8	0.8	2.4	84	1.4	23.4	93
ST07_066	C-304128	26.0733	-97.6916	B	10	0.7	2.4	88	1.4	21.1	87
ST07_067	C-304129	26.0979	-97.7194	L	9.1	0.6	2.2	64	1.1	19.7	76
ST07_068	C-304130	26.1194	-97.7373	L	9.5	0.7	2.4	85	1.3	21.5	89

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	XRF_Al2O3	XRF_CaO	XRF_Cr2O3	XRF_Fe2O3	XRF_K2O	XRF_LOI	XRF_MgO
					percent	percent	percent	percent	percent	percent	percent
ST07_001	C-304058	26.3345	-97.7899	L	8.01	0.7	<0.01	1.82	2.4	3.4	0.47
ST07_002	C-304059	26.3637	-97.7969	G	6.31	0.68	<0.01	1.19	2.02	3.52	0.28
ST07_003	C-304060	26.3637	-97.7969	G	8.62	1.31	<0.01	2.05	2.36	8.32	0.55
ST07_004	C-304061	26.3940	-97.7971	G	8.84	3.01	<0.01	2.33	2.51	6.16	0.86
ST07_005	C-304062	26.4193	-97.7975	G	8.22	1.14	0.01	2.06	2.27	3.75	0.49
ST07_006	C-304063	26.4153	-97.8056	L	7.57	0.71	<0.01	1.64	2.17	2.64	0.37
ST07_007	C-304064	26.4080	-97.8026	G	7.44	1.38	<0.01	1.58	2.3	3.55	0.48
ST07_008	C-304065	26.4008	-97.7945	G	6.28	1.8	<0.01	1.22	1.96	4.12	0.31
ST07_009	C-304066	26.4083	-97.7570	G	9.56	8.56	0.01	2.84	2.26	12.2	1.3
ST07_010	C-304067	26.4009	-97.7558	G	9.88	10.3	<0.01	2.97	2.24	14	1.41
ST07_011	C-304068	26.3864	-97.7792	G	8.47	1.17	<0.01	1.99	2.44	3.73	0.54
ST07_012	C-304069	26.3865	-97.7704	L	8.78	0.95	<0.01	2.2	2.53	4.15	0.63
ST07_013	C-304070	26.3862	-97.7573	L	10.1	5.71	<0.01	3.05	2.65	10.1	1.29
ST07_014	C-304071	26.3851	-97.7476	L	10.4	6.74	<0.01	3.27	2.65	11.4	1.41
ST07_015	C-304072	26.3862	-97.7477	G	9.85	8.91	<0.01	2.99	2.33	13	1.38
ST07_016	C-304073	26.3819	-97.7356	G	8.45	1.05	<0.01	2.05	2.5	3.68	0.56
ST07_017	C-304074	26.3719	-97.7397	G	8.53	0.83	<0.01	2.1	2.47	4.18	0.54
ST07_018	C-304075	26.3719	-97.7454	G	6.89	0.63	<0.01	1.51	2.17	1.94	0.33
ST07_019	C-304076	26.3719	-97.7503	G	8.66	4.3	<0.01	2.31	2.28	7.2	0.76
ST07_020	C-304077	26.3719	-97.7617	G	10.4	4.69	<0.01	3.04	2.72	9.14	1.22
ST07_021	C-304078	26.3718	-97.7767	G	7.21	0.6	<0.01	1.45	2.2	2.27	0.32
ST07_022	C-304079	26.3766	-97.7808	G	7.43	0.68	<0.01	1.92	2.16	2.89	0.39
ST07_023	C-304080	26.4531	-97.7976	G	9.75	1.93	<0.01	2.86	2.69	6.58	1
ST07_024	C-304081	26.4808	-97.7977	G	9.45	4.39	0.03	2.71	2.49	8.9	1.2
ST07_025	C-304082	26.4779	-97.8630	G	8.34	6.41	<0.01	2.37	2.21	9.84	1.09
ST07_026	C-304083	26.4523	-97.8627	G	8.99	4.3	<0.01	2.64	2.3	9.22	1.13
ST07_027	C-304084	26.4231	-97.8609	G	8.58	6.17	<0.01	2.47	2.12	9.91	1.08
ST07_028	C-304085	26.3875	-97.8607	G	9.67	5.94	<0.01	2.78	2.48	9.61	1.11
ST07_029	C-304086	26.3482	-97.8615	G	10	7.78	<0.01	3.07	2.27	11.9	1.45

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	XRF_Al2O3	XRF_CaO	XRF_Cr2O3	XRF_Fe2O3	XRF_K2O	XRF_LOI	XRF_MgO
					percent	percent	percent	percent	percent	percent	percent
ST07_030	C-304087	26.4429	-97.7716	G	7.29	1.26	<0.01	1.66	2.23	3.09	0.4
ST07_031	C-304088	26.4301	-97.7677	G	7.34	3.6	<0.01	1.73	2.13	5.34	0.66
ST07_032	C-304089	26.4316	-97.7518	L	7.56	0.88	<0.01	1.7	2.33	3.11	0.49
ST07_033	C-304090	26.5035	-97.7365	L	9.72	4.37	<0.01	2.89	2.56	9.68	1.34
ST07_034	C-304091	26.4812	-97.7322	L	8.38	2.53	<0.01	2.01	2.42	5.92	0.72
ST07_035	C-304092	26.4543	-97.7318	L	7.36	0.72	<0.01	1.57	2.12	2.46	0.41
ST07_036	C-304093	26.4229	-97.7336	L	10.2	9.95	0.01	3.19	2.36	13.4	1.54
ST07_037	C-304094	26.4015	-97.7357	L	8.59	0.98	<0.01	2.1	2.58	4.09	0.61
ST07_038	C-304095	26.3571	-97.7356	H	8.15	1.22	<0.01	1.99	2.31	3.66	0.57
ST07_039	C-304096	26.3312	-97.7357	H	7.15	0.7	<0.01	1.6	2.25	2.24	0.36
ST07_040	C-304097	26.3294	-97.6673	H	9.65	3.51	<0.01	2.71	2.64	7.39	1.02
ST07_041	C-304098	26.3566	-97.6731	H	9.1	0.9	<0.01	2.34	2.63	5.13	0.66
ST07_042	C-304099	26.3871	-97.6724	H	7.72	1.21	<0.01	1.74	2.33	3.5	0.5
ST07_043	C-304100	26.4257	-97.6733	H	8.06	1.2	<0.01	1.95	2.44	3.7	0.59
ST07_044	C-304101	26.4539	-97.6737	H	8.12	0.82	<0.01	2.02	2.41	3.91	0.51
ST07_045	C-304102	26.4801	-97.6740	H	9.97	5.3	<0.01	2.98	2.59	9.45	1.31
ST07_046	C-304103	26.4792	-97.6195	B	6.63	1.09	<0.01	1.27	2.18	2.61	0.25
ST07_047	C-304104	26.4533	-97.6163	B	6.56	0.56	<0.01	1.36	2.14	2.03	0.26
ST07_048	C-304105	26.4245	-97.6138	B	6.62	0.56	<0.01	1.35	2.14	1.67	0.25
ST07_049	C-304106	26.4022	-97.5999	L	9.07	1.23	<0.01	2.49	2.58	5.25	0.77
ST07_050	C-304107	26.3781	-97.5863	L	9.55	4.85	<0.01	2.68	2.55	8.67	1.14
ST07_051	C-304113	26.3559	-97.5860	L	9.26	2.2	0.01	2.59	2.49	6.06	0.92
ST07_052	C-304114	26.3212	-97.5759	L	8.87	0.73	<0.01	2.36	2.49	4.58	0.71
ST07_053	C-304115	26.2834	-97.5864	L	8.41	1.81	<0.01	2.13	2.4	5.51	0.68
ST07_054	C-304116	26.2476	-97.5965	L	9.06	6.41	0.01	2.77	2.1	11.9	1.23
ST07_055	C-304117	26.1696	-97.7833	B	8.57	8.94	<0.01	2.51	1.92	13.6	1.36
ST07_056	C-304118	26.2126	-97.8149	B	7.62	15.7	0.01	2.35	1.69	19.2	1.22
ST07_057	C-304119	26.2486	-97.7383	B	8.3	1.71	<0.01	2.02	2.44	4.99	0.78
ST07_058	C-304120	26.2487	-97.6699	H	8.67	6.79	<0.01	2.45	2.17	10.4	1.01

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	XRF_Al2O3	XRF_CaO	XRF_Cr2O3	XRF_Fe2O3	XRF_K2O	XRF_LOI	XRF_MgO
					percent	percent	percent	percent	percent	percent	percent
ST07_059	C-304121	26.2768	-97.6619	H	9.42	1.22	<0.01	2.46	2.59	5.72	0.71
ST07_060	C-304122	26.3103	-97.6627	H	7.96	0.75	<0.01	1.71	2.42	3.11	0.43
ST07_061	C-304123	26.2310	-97.5573	H	8.56	1.79	<0.01	2.41	2.21	5.7	0.91
ST07_062	C-304124	26.1864	-97.5646	H	9.24	5.52	<0.01	2.96	2.4	10.1	1.18
ST07_063	C-304125	26.1878	-97.5916	B	10.2	8.41	<0.01	3.26	2.32	14	1.55
ST07_064	C-304126	26.1544	-97.6114	B	11.5	9.34	<0.01	3.77	2.48	13.2	1.59
ST07_065	C-304127	26.1138	-97.6478	B	12.7	9.93	<0.01	4.2	2.67	16	1.9
ST07_066	C-304128	26.0733	-97.6916	B	12.4	12.1	0.01	4.12	2.36	17.8	1.97
ST07_067	C-304129	26.0979	-97.7194	L	11.2	9.01	<0.01	3.53	2.6	13.2	1.52
ST07_068	C-304130	26.1194	-97.7373	L	12	11.6	<0.01	4	2.48	17	1.82

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

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Field no.	Lab no.	Lat	Long	Geo_unit	XRF_MnO	XRF_Na2O	XRF_P2O5	XRF_SiO2	XRF_TiO2	As_AAS	Se_AAS	Hg_CVAAS
					percent	percent	percent	percent	percent	ppm	ppm	ppm
ST07_001	C-304058	26.3345	-97.7899	L	0.03	1.46	0.05	80.3	0.36	3.6	<0.2	<0.01
ST07_002	C-304059	26.3637	-97.7969	G	0.02	1.18	0.04	83.4	0.22	2.8	<0.2	<0.01
ST07_003	C-304060	26.3637	-97.7969	G	0.06	1.19	0.09	74.1	0.35	3.7	0.3	0.02
ST07_004	C-304061	26.3940	-97.7971	G	0.05	1.17	0.16	73.8	0.42	3.9	0.3	<0.01
ST07_005	C-304062	26.4193	-97.7975	G	0.05	1.33	<0.01	79.7	0.41	4.7	<0.2	<0.01
ST07_006	C-304063	26.4153	-97.8056	L	0.04	1.3	0.03	82.2	0.33	3	<0.2	<0.01
ST07_007	C-304064	26.4080	-97.8026	G	0.03	1.27	0.05	80.2	0.33	4.4	<0.2	<0.01
ST07_008	C-304065	26.4008	-97.7945	G	0.03	1.22	0.06	81.8	0.24	2.7	<0.2	<0.01
ST07_009	C-304066	26.4083	-97.7570	G	0.05	1.02	0.14	61.3	0.48	7.7	0.3	<0.01
ST07_010	C-304067	26.4009	-97.7558	G	0.04	1.04	0.18	56.2	0.5	9.6	0.2	<0.01
ST07_011	C-304068	26.3864	-97.7792	G	0.04	1.41	0.08	79	0.43	3.3	<0.2	<0.01
ST07_012	C-304069	26.3865	-97.7704	L	0.05	1.39	0.08	78.4	0.4	3.5	<0.2	<0.01
ST07_013	C-304070	26.3862	-97.7573	L	0.07	1.05	0.19	64.3	0.53	7.5	0.2	0.01
ST07_014	C-304071	26.3851	-97.7476	L	0.07	1	0.22	61.7	0.53	4.9	0.2	<0.01
ST07_015	C-304072	26.3862	-97.7477	G	0.06	0.98	0.19	59.1	0.5	7.2	0.2	<0.01
ST07_016	C-304073	26.3819	-97.7356	G	0.04	1.38	0.06	78.8	0.44	3.7	<0.2	<0.01
ST07_017	C-304074	26.3719	-97.7397	G	0.04	1.34	0.07	79.1	0.41	5.2	<0.2	<0.01
ST07_018	C-304075	26.3719	-97.7454	G	0.03	1.33	0.02	83.8	0.34	2.3	<0.2	<0.01
ST07_019	C-304076	26.3719	-97.7503	G	0.04	1.19	0.07	71.3	0.42	4.1	<0.2	<0.01
ST07_020	C-304077	26.3719	-97.7617	G	0.05	1.09	0.18	66.2	0.52	6	0.2	0.01
ST07_021	C-304078	26.3718	-97.7767	G	0.04	1.38	0.03	83.3	0.31	2.8	<0.2	<0.01
ST07_022	C-304079	26.3766	-97.7808	G	0.04	1.25	0.04	82.1	0.42	3.7	<0.2	<0.01
ST07_023	C-304080	26.4531	-97.7976	G	0.05	1.15	0.18	73.2	0.48	5.8	0.2	0.01
ST07_024	C-304081	26.4808	-97.7977	G	0.05	1.05	0.15	68.1	0.48	5	0.2	0.01
ST07_025	C-304082	26.4779	-97.8630	G	0.04	0.85	0.11	67.9	0.42	4.4	<0.2	<0.01
ST07_026	C-304083	26.4523	-97.8627	G	0.05	1.38	0.11	68.8	0.49	4.7	<0.2	<0.01
ST07_027	C-304084	26.4231	-97.8609	G	0.05	1.02	0.1	67.6	0.45	7.1	<0.2	<0.01
ST07_028	C-304085	26.3875	-97.8607	G	0.05	1.12	0.15	65.6	0.47	5.5	<0.2	<0.01
ST07_029	C-304086	26.3482	-97.8615	G	0.06	0.96	0.18	61.7	0.49	6.9	<0.2	<0.01

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	XRF_MnO	XRF_Na2O	XRF_P2O5	XRF_SiO2	XRF_TiO2	As_AAS	Se_AAS	Hg_CVAAS
					percent	percent	percent	percent	percent	ppm	ppm	ppm
ST07_030	C-304087	26.4429	-97.7716	G	0.03	1.34	0.04	81.6	0.35	5.2	<0.2	<0.01
ST07_031	C-304088	26.4301	-97.7677	G	0.03	1.2	0.04	76.6	0.35	3.8	<0.2	<0.01
ST07_032	C-304089	26.4316	-97.7518	L	0.05	1.29	0.08	82	0.31	4.2	<0.2	<0.01
ST07_033	C-304090	26.5035	-97.7365	L	0.13	1.24	0.19	66.2	0.49	7.3	<0.2	0.01
ST07_034	C-304091	26.4812	-97.7322	L	0.04	1.57	0.07	74.9	0.4	4.7	<0.2	<0.01
ST07_035	C-304092	26.4543	-97.7318	L	0.04	1.37	0.04	83.2	0.32	4.4	<0.2	<0.01
ST07_036	C-304093	26.4229	-97.7336	L	0.06	1.05	0.18	57.5	0.52	8.5	0.3	<0.01
ST07_037	C-304094	26.4015	-97.7357	L	0.05	1.42	0.09	78.4	0.38	3.3	<0.2	<0.01
ST07_038	C-304095	26.3571	-97.7356	H	0.04	1.38	0.06	80.4	0.4	2.9	<0.2	<0.01
ST07_039	C-304096	26.3312	-97.7357	H	0.04	1.37	0.06	82.9	0.35	3.4	<0.2	<0.01
ST07_040	C-304097	26.3294	-97.6673	H	0.06	1.22	0.12	70.9	0.5	5.5	<0.2	<0.01
ST07_041	C-304098	26.3566	-97.6731	H	0.06	1.25	0.09	76.6	0.44	4.5	0.2	0.01
ST07_042	C-304099	26.3871	-97.6724	H	0.04	1.36	0.05	80.2	0.34	3.8	<0.2	<0.01
ST07_043	C-304100	26.4257	-97.6733	H	0.04	1.38	0.07	79.4	0.37	3.9	<0.2	<0.01
ST07_044	C-304101	26.4539	-97.6737	H	0.04	1.34	0.06	79.5	0.41	3.9	<0.2	<0.01
ST07_045	C-304102	26.4801	-97.6740	H	0.06	1.01	0.15	66.2	0.51	5.5	<0.2	<0.01
ST07_046	C-304103	26.4792	-97.6195	B	0.03	1.39	0.04	83.4	0.3	5.2	<0.2	<0.01
ST07_047	C-304104	26.4533	-97.6163	B	0.03	1.34	0.03	84.8	0.31	2.5	<0.2	<0.01
ST07_048	C-304105	26.4245	-97.6138	B	0.03	1.36	0.02	85.4	0.32	2.4	<0.2	<0.01
ST07_049	C-304106	26.4022	-97.5999	L	0.06	1.32	0.13	76.3	0.47	5.6	<0.2	0.01
ST07_050	C-304107	26.3781	-97.5863	L	0.06	1.18	0.18	68.8	0.49	10.1	<0.2	0.01
ST07_051	C-304113	26.3559	-97.5860	L	0.06	1.26	0.11	74.5	0.49	4.4	<0.2	0.01
ST07_052	C-304114	26.3212	-97.5759	L	0.03	1.07	0.08	78.3	0.4	3.9	<0.2	<0.01
ST07_053	C-304115	26.2834	-97.5864	L	0.04	1.2	0.09	76.4	0.4	3.7	<0.2	<0.01
ST07_054	C-304116	26.2476	-97.5965	L	0.05	0.76	0.13	64.5	0.44	6.6	0.2	0.01
ST07_055	C-304117	26.1696	-97.7833	B	0.05	1.54	0.15	60.3	0.4	5	<0.2	0.01
ST07_056	C-304118	26.2126	-97.8149	B	0.05	0.73	0.14	50.6	0.35	5.2	0.2	0.01
ST07_057	C-304119	26.2486	-97.7383	B	0.06	1.43	0.09	77.8	0.37	5	<0.2	<0.01
ST07_058	C-304120	26.2487	-97.6699	H	0.05	0.96	0.11	66.6	0.38	7.1	<0.2	<0.01

Table 2. Geochemical analyses of soil samples collected in 2007, by element and method of analysis, lower Rio Grande valley, Texas.—Continued

[No., number; Lat., latitude, in decimal degrees; Long., longitude in decimal degrees; Geo_unit, geologic units described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; ICPMS-AES, inductively coupled plasma mass spectrometry-atomic emission spectrometry for 42 elements; XRF, wavelength dispersive x-ray fluorescence for 10 major elements and LOI (loss on ignition); As_ppm_AAS and Se_ppm_AAS, atomic absorption spectrometry for arsenic and selenium; Hg_ppm_CVAAS, cold vapor - atomic absorption spectrometryfor mercury; ppm, parts per million; <, value is less than the limit of detection to the right]

Field no.	Lab no.	Lat	Long	Geo_unit	XRF_MnO	XRF_Na2O	XRF_P2O5	XRF_SiO2	XRF_TiO2	As_AAS	Se_AAS	Hg_CVAAS
					percent	percent	percent	percent	percent	ppm	ppm	ppm
ST07_059	C-304121	26.2768	-97.6619	H	0.06	1.28	0.08	76.3	0.44	4.4	0.2	0.01
ST07_060	C-304122	26.3103	-97.6627	H	0.03	1.46	0.04	81.9	0.39	3.1	<0.2	<0.01
ST07_061	C-304123	26.2310	-97.5573	H	0.06	0.74	0.11	77.6	0.4	5.8	<0.2	0.02
ST07_062	C-304124	26.1864	-97.5646	H	0.06	0.93	0.19	66.9	0.51	6.2	0.2	0.04
ST07_063	C-304125	26.1878	-97.5916	B	0.07	0.84	0.23	58.9	0.51	5.4	0.3	0.01
ST07_064	C-304126	26.1544	-97.6114	B	0.07	1.12	0.19	55.8	0.57	10.8	0.3	0.02
ST07_065	C-304127	26.1138	-97.6478	B	0.08	0.87	0.28	50.6	0.58	9.1	0.4	0.02
ST07_066	C-304128	26.0733	-97.6916	B	0.07	0.87	0.24	47.3	0.56	11	0.4	0.01
ST07_067	C-304129	26.0979	-97.7194	L	0.08	1.27	0.24	56.8	0.61	11	0.4	0.02
ST07_068	C-304130	26.1194	-97.7373	L	0.08	0.81	0.3	49	0.57	9.7	0.5	0.02

Table 3. Univariate statistics and percentiles of analytical results for soil samples collected in 2003 and 2004, lower Rio Grande valley, Texas.

[ICPMS-AES, inductively coupled plasma-mass spectrometry-atomic emission spectrometry for 42 elements; ICP16, inductively coupled plasma-atomic emission spectrometry for 16 major elements; %, percent; ppm, parts per million; <, value is less than the lower limit of detection shown to the right]

Element	Units	Minimum	Maximum	Range	Median	Arithmetic mean	Geometric mean	Standard deviation	Percentiles						Lower limit of detection	Sample count
									5	25	50	75	95	99		
ICPMS-AES_AL	%	1.83	6.55	4.72	4.63	4.40	4.19	1.29	2.30	3.24	4.63	5.47	6.21	6.55	0.01	142
ICPMS-AES_CA	%	0.20	16.92	16.72	3.28	4.67	2.86	3.82	0.31	1.28	3.28	8.06	11.14	14.21	0.01	142
ICPMS-AES_FE	%	0.49	2.79	2.30	1.61	1.55	1.40	0.64	0.58	0.98	1.61	2.03	2.55	2.74	0.01	142
ICPMS-AES_K	%	0.74	2.36	1.62	1.88	1.76	1.73	0.33	1.19	1.49	1.88	2.00	2.17	2.32	0.01	142
ICPMS-AES_MG	%	0.10	1.51	1.41	0.58	0.58	0.48	0.31	0.14	0.30	0.58	0.84	1.08	1.31	0.01	142
ICPMS-AES_NA	%	0.27	2.94	2.67	0.73	0.76	0.72	0.31	0.41	0.60	0.73	0.88	1.19	2.31	0.01	142
ICPMS-AES_S	%	0.01	0.72	0.71	0.04	0.06	0.04	0.09	<0.01	0.02	0.03	0.05	0.12	0.57	0.01	122
ICPMS-AES_TI	%	0.07	0.28	0.21	0.19	0.18	0.17	0.06	0.08	0.13	0.19	0.23	0.27	0.28	0.01	142
ICPMS-AES_AS	ppm	2	20	18	5	6.3	5.4	3.8	2	3	5	8	13	20	1	142
ICPMS-AES_BA	ppm	300	1,080	780	438.5	449.5	444.4	77.3	372	401	439	480	552	672	5	142
ICPMS-AES_BE	ppm	0.5	2.4	1.9	1.3	1.25	1.16	0.46	0.6	0.8	1.3	1.6	1.9	2.3	0.1	142
ICPMS-AES_BI	ppm	0.04	0.31	0.27	0.145	0.146	0.134	0.06	0.06	0.09	0.15	0.19	0.25	0.27	0.04	142
ICPMS-AES_CD	ppm	0.1	0.7	0.6	0.3	0.27	0.25	0.11	<0.1	0.1	0.2	0.3	0.4	0.5	0.1	112
ICPMS-AES_CE	ppm	17	64.5	47.5	40.3	39.318	37.257	12.357	21.10	28.40	40.30	49.30	58.44	61.28	0.05	142
ICPMS-AES_CO	ppm	1.4	9.4	8	5.2	5.023	4.457	2.238	1.66	2.90	5.20	6.60	8.72	9.31	0.1	142
ICPMS-AES_CR	ppm	5	40	35	18	17.50	15.76	7.45	6.6	11.0	18.0	23.0	29.0	32.6	1	142
ICPMS-AES_CS	ppm	0.68	9.62	8.94	3.99	4.442	3.840	2.285	1.53	2.47	3.99	6.00	8.45	9.57	0.05	142
ICPMS-AES_CU	ppm	0.7	126.6	125.9	12.7	14.18	11.60	11.70	4.1	7.7	12.7	17.7	26.1	42.2	0.5	142
ICPMS-AES_GA	ppm	3.83	15.5	11.67	9.33	9.218	8.668	3.073	4.72	6.44	9.33	11.90	13.70	15.41	0.05	142
ICPMS-AES_IN	ppm	0.02	0.06	0.04	0.04	0.038	0.036	0.011	<0.02	<0.02	0.03	0.04	0.06	0.06	0.02	105
ICPMS-AES_LA	ppm	10.6	33.7	23.1	22.2	21.40	20.56	5.85	12.7	15.9	22.2	26.3	30.6	31.9	0.5	142
ICPMS-AES_LI	ppm	4	39	35	17	18.7	16.9	8.4	7	12	17	24	36	39	1	142
ICPMS-AES_MN	ppm	88	603	515	297	307.1	269.9	146.8	106	179	297	427	565	590	5	142
ICPMS-AES_MO	ppm	0.12	1.33	1.21	0.49	0.516	0.460	0.237	0.19	0.34	0.49	0.68	0.95	1.22	0.05	142
ICPMS-AES_NB	ppm	2.8	12.5	9.7	8.3	7.91	7.43	2.60	3.7	5.6	8.3	10.1	11.8	12.5	0.1	142
ICPMS-AES_NI	ppm	2.5	21.2	18.7	11.7	11.406	10.163	4.969	3.82	6.8	11.7	15.1	20.2	21.2	0.5	142
ICPMS-AES_P	ppm	80	1,820	1,740	501	575.5	432.8	394.7	104	201	501	876	1,274	1,507	50	142
ICPMS-AES_PB	ppm	5.4	99.2	93.8	15.7	16.78	15.23	9.40	7.6	11.3	15.7	20.1	28.6	42.1	0.5	142

Table 3. Univariate statistics and percentiles of analytical results for soil samples collected in 2003 and 2004, lower Rio Grande valley, Texas.—Continued

[ICPMS-AES, inductively coupled plasma-mass spectrometry-atomic emission spectrometry for 42 elements; ICP16, inductively coupled plasma-atomic emission spectrometry for 16 major elements; %, percent; ppm, parts per million; <, value is less than the lower limit of detection shown to the right]

Element	Units	Minimum	Maximum	Range	Median	Arithmetic mean	Geometric mean	Standard deviation	Percentiles						Lower limit of detection	Sample count
									5	25	50	75	95	99		
ICPMS-AES_RB	ppm	24.9	99.4	74.5	69.25	66.51	64.60	15.24	42.8	53.0	69.3	78.4	89.2	95.1	0.2	142
ICPMS-AES_SB	ppm	0.3	9.16	8.86	0.75	0.826	0.733	0.778	0.42	0.56	0.75	0.93	1.14	4.06	0.05	142
ICPMS-AES_SC	ppm	1.3	9.5	8.2	5	4.872	4.270	2.286	1.6	2.8	5.0	6.7	8.6	9.5	0.1	142
ICPMS-AES_SN	ppm	0.4	5.7	5.3	1.4	1.513	1.319	0.853	0.5	1.0	1.4	1.9	2.8	5.3	0.1	142
ICPMS-AES_SR	ppm	53.5	397	343.5	172.95	201.19	175.95	99.82	74.7	115.3	173.0	303.8	360.7	377.3	0.5	142
ICPMS-AES_TH	ppm	2.5	10.8	8.3	6.3	6.339	5.874	2.359	2.9	4.4	6.3	8.5	10.1	10.8	0.2	142
ICPMS-AES_TL	ppm	0.2	0.7	0.5	0.5	0.455	0.435	0.132	0.3	0.3	0.5	0.6	0.7	0.7	0.1	142
ICPMS-AES_U	ppm	0.6	2.8	2.2	1.5	1.555	1.415	0.654	0.7	1	1.5	2.1	2.7	2.8	0.1	142
ICPMS-AES_V	ppm	13	92	79	41.5	44.29	39.15	20.89	16	26	42	61	80	88	1	142
ICPMS-AES_W	ppm	0.2	1.3	1.1	0.6	0.625	0.551	0.292	0.2	0.4	0.6	0.9	1.1	1.2	0.1	142
ICPMS-AES_Y	ppm	4.3	21.9	17.6	12.4	12.508	11.495	4.877	5.5	7.9	12.4	16.8	20.0	21.4	0.1	142
ICPMS-AES_ZN	ppm	10	220	210	51	52.76	45.60	28.91	17	29	51	72	96	138	1	142
ICP16_AL	%	1.86	6.5	4.64	4.31	4.178	3.987	1.215	2.29	3.09	4.31	5.21	5.92	6.33	0.01	142
ICP16_CA	%	0.2	17.22	17.02	3.2	4.614	2.791	3.841	0.31	1.20	3.20	8.06	11.41	14.29	0.01	142
ICP16_CR	%	10	66	56	25.5	25.567	23.941	9.306	<0.01	17.00	24.50	31.00	38.40	57.72	0.01	134
ICP16_FE	%	0.51	2.85	2.34	1.6	1.591	1.442	0.656	0.61	1.00	1.60	2.16	2.60	2.80	0.01	142
ICP16_K	%	0.77	2.44	1.67	1.78	1.699	1.670	0.300	1.19	1.47	1.78	1.91	2.14	2.27	0.01	142
ICP16_MG	%	0.09	1.40	1.31	0.595	0.580	0.481	0.310	0.14	0.31	0.60	0.82	1.09	1.27	0.01	142
ICP16_MN	%	100	619	519	299.5	313.268	279.776	141.848	111.60	184.00	289.50	436.00	552.60	607.04	0.01	138
ICP16_NA	%	0.27	2.91	2.64	0.695	0.754	0.711	0.308	0.42	0.58	0.70	0.87	1.18	2.36	0.01	142
ICP16_P	%	0.01	0.18	0.17	0.05	0.058	0.045	0.038	0.01	0.02	0.05	0.08	0.12	0.14	0.01	135
ICP16_SI	%	17.24	38.64	21.4	29.545	28.815	28.226	5.691	19.34	24.03	29.55	33.60	37.34	38.54	0.01	142
ICP16_TI	%	0.09	0.35	0.26	0.24	0.234	0.222	0.070	0.12	0.17	0.24	0.30	0.33	0.35	0.01	142
ICP16_BA	ppm	299	1,110	811	434.5	448.479	442.581	83.492	367.00	401.00	434.50	474.00	565.60	707.96	10	142
ICP16_NB	ppm	10	22	12	14	14.35	14.04	2.99	<10	<10	<10	13	18	19	10	55
ICP16_SR	ppm	57	372	315	168	195.89	171.55	97.41	73	113	168	301	353	369	10	142
ICP16_Y	ppm	10	29	19	17	17.43	16.85	4.43	<10	11	15	20	24	26	10	113
ICP16_ZR	ppm	113	482	369	203	212.25	204.62	61.04	135	170	203	241	322	430	10	142

Table 4. Univariate statistics and percentiles of analytical results for soil samples collected in 2007, lower Rio Grande valley, Texas.

[ICPMS-AES, inductively coupled plasma-mass spectrometry on 40 elements; XRF, wavelength dispersive x-ray fluorescence spectrometry on 12 elements; AS_AA and SE_AA, atomic absorption spectrometry on arsenic and selenium; HG_CV, cold vapor - atomic absorption spectrometry on mercury; %, percent; ppm, parts per million; <, value is less than the limit of detection shown to the right. Note ICPMS-AES Ag and Te were omitted from the table because all results were below the detection limit of 1 and 10 ppm, respectively]

Element	Units	Minimum	Maximum	Range	Median	Arithmetic mean	Geometric mean	Standard deviation	Percentiles						Lower limit of detection	Sample count
									5	25	50	75	95	99		
ICPMS-AES_AL	%	3.23	6.88	3.65	4.66	4.696	4.635	0.772	3.437	4.155	4.66	5.16	6.369	6.831	0.01	68
ICPMS-AES_CA	%	0.41	10.9	10.49	1.365	2.782	1.757	2.552	0.459	0.715	1.365	4.51	7.281	10.432	0.01	68
ICPMS-AES_FE	%	0.79	2.99	2.2	1.645	1.645	1.569	0.506	0.869	1.245	1.645	2	2.677	2.965	0.01	68
ICPMS-AES_K	%	1.45	2.25	0.8	1.93	1.92	1.912	0.178	1.6	1.8	1.93	2.075	2.18	2.239	0.01	68
ICPMS-AES_MG	%	0.13	1.11	0.98	0.43	0.507	0.435	0.264	0.148	0.285	0.43	0.715	0.944	1.11	0.01	68
ICPMS-AES_NA	%	0.52	1.25	0.73	0.91	0.877	0.864	0.144	0.608	0.77	0.91	0.965	1.054	1.239	0.01	68
ICPMS-AES_S	%	0.01	0.71	0.7	0.02	0.039	0.023	0.093	<0.01	0.01	0.02	0.03	0.092	0.606	0.01	58
ICPMS-AES_TI	%	0.1	0.29	0.19	0.18	0.19	0.185	0.041	0.13	0.16	0.18	0.22	0.27	0.286	0.01	68
ICPMS-AES_AS	ppm	3.00	17.00	14.00	6.00	6.99	6.51	2.84	4	5	6	8	13.1	16.64	1	68
ICPMS-AES_BA	ppm	385	661	276	499.5	495.029	492.742	48.055	410.4	465	499.5	524	565.5	651.82	5	68
ICPMS-AES_BE	ppm	1	2.3	1.3	1.5	1.547	1.514	0.324	1.1	1.25	1.5	1.8	2.1	2.264	0.1	68
ICPMS-AES_BI	ppm	0.07	0.44	0.37	0.17	0.169	0.158	0.062	0.089	0.12	0.17	0.21	0.272	0.415	0.04	68
ICPMS-AES_CD	ppm	0.1	0.4	0.3	0.2	0.225	0.203	0.092	<0.1	0.1	0.2	0.3	0.4	0.4	0.1	61
ICPMS-AES_CE	ppm	22.5	56.8	34.3	38	37.882	37.264	6.874	26.99	33.65	38	42.15	51.59	56.35	0.05	68
ICPMS-AES_CO	ppm	2.4	10.3	7.9	5.3	5.374	5.056	1.848	2.5	3.95	5.3	6.6	9.01	10.21	0.1	68
ICPMS-AES_CR	ppm	10	38	28	21	21.206	20.107	6.891	11	15.5	21	25.5	32.5	38	1	68
ICPMS-AES_CS	ppm	5	10	5	6	6.3	6.163	1.455	<5	<5	<5	5	7.2	9.82	5	20
ICPMS-AES_CU	ppm	4.6	44	39.4	13.95	13.84	12.489	6.473	4.8	8.7	13.95	17.6	22.19	41.048	0.5	68
ICPMS-AES_GA	ppm	6.83	16.5	9.67	10.4	10.421	10.236	2.006	7.096	9.02	10.4	11.6	14.31	16.302	0.05	68
ICPMS-AES_IN	ppm	0.02	0.06	0.04	0.03	0.034	0.033	0.01	<0.02	0.02	0.03	0.04	0.051	0.06	0.02	60
ICPMS-AES_LA	ppm	12.9	31.7	18.8	21.85	21.653	21.253	4.123	14.69	18.85	21.85	24.5	29.18	31.394	0.5	68
ICPMS-AES_LI	ppm	11	46	35	19	21.294	20.001	7.963	12	16	19	25.5	38.4	45.46	1	68
ICPMS-AES_MN	ppm	151	534	383	295	306.956	293.494	92.201	167.6	236.5	295	365.5	502.3	534	5	68
ICPMS-AES_MO	ppm	0.34	1.09	0.75	0.44	0.472	0.456	0.14	0.359	0.385	0.44	0.48	0.852	1.05	0.05	68
ICPMS-AES_NB	ppm	4.6	14.2	9.6	8.55	8.651	8.469	1.795	6.07	7.25	8.55	9.75	12	13.912	0.1	68
ICPMS-AES_NI	ppm	4.2	43	38.8	11.15	11.618	10.42	5.925	4.48	7.3	11.15	14.9	20.39	39.544	0.5	68
ICPMS-AES_P	ppm	100	1,400.00	1,300.00	415	495.147	402.746	303.799	120	250	415	725	1,021.00	1,371.20	50	68

Table 4. Univariate statistics and percentiles of analytical results for soil samples collected in 2007, lower Rio Grande valley, Texas.—Continued

[ICPMS-AES, inductively coupled plasma-mass spectrometry on 40 elements; XRF, wavelength dispersive x-ray fluorescence spectrometry on 12 elements; AS_AA and SE_AA, atomic absorption spectrometry on arsenic and selenium; HG_CV, cold vapor - atomic absorption spectrometry on mercury; %, percent; ppm, parts per million; <, value is less than the limit of detection shown to the right. Note ICPMS-AES Ag and Te were omitted from the table because all results were below the detection limit of 1 and 10 ppm, respectively]

Element	Units	Minimum	Maximum	Range	Median	Arithmetic mean	Geometric mean	Standard deviation	Percentiles						Lower limit of detection	Sample count
									5	25	50	75	95	99		
ICPMS-AES_PB	ppm	10.1	90.9	80.8	15.3	17.634	16.444	10.23	11.65	14	15.3	17.5	25.11	82.116	0.5	68
ICPMS-AES_RB	ppm	54.5	100	45.5	71.7	71.432	70.885	9.006	57.41	65.2	71.7	75.65	87.25	98.632	0.2	68
ICPMS-AES_SB	ppm	0.49	1.23	0.74	0.695	0.721	0.706	0.156	0.508	0.6	0.695	0.825	1.022	1.198	0.05	68
ICPMS-AES_SC	ppm	2.1	10.1	8	5.05	5.134	4.799	1.843	2.2	3.6	5.05	6.45	8.04	9.974	0.1	68
ICPMS-AES_SN	ppm	0.6	7.4	6.8	1.4	1.615	1.394	1.143	0.7	1	1.4	1.7	4.25	7.112	0.1	68
ICPMS-AES_SR	ppm	119	342	223	155.5	174.176	167.745	53.598	127.8	138	155.5	192.5	313.8	338.76	0.5	68
ICPMS-AES_TH	ppm	3.5	10.8	7.3	6.6	6.554	6.381	1.516	4.28	5.5	6.6	7.6	9.41	10.656	0.2	68
ICPMS-AES_TL	ppm	0.4	0.8	0.4	0.5	0.509	0.502	0.088	0.4	0.4	0.5	0.6	0.61	0.782	0.1	68
ICPMS-AES_U	ppm	0.9	2.4	1.5	1.35	1.415	1.38	0.335	1	1.2	1.35	1.55	2.22	2.4	0.1	68
ICPMS-AES_V	ppm	19	88	69	37	41.426	38.843	15.54	21.8	31	37	52	76.8	87.46	1	68
ICPMS-AES_W	ppm	0.3	1.4	1.1	0.7	0.679	0.64	0.242	0.4	0.5	0.7	0.8	1.12	1.4	0.1	68
ICPMS-AES_Y	ppm	7.4	23.4	16	13.35	13.553	13.103	3.51	7.99	11.3	13.35	16.05	19.84	23.058	0.1	68
ICPMS-AES_ZN	ppm	20	93	73	45	46.559	43.315	17.578	21.9	31.5	45	58	77.1	92.28	1	68
XRF-AL2O3	%	6.28	12.7	6.42	8.605	8.785	8.68	1.389	6.614	7.84	8.605	9.66	11.55	12.646	0.10	68
XRF-CAO	%	0.56	15.7	15.14	1.87	3.885	2.416	3.636	0.627	0.965	1.87	6.29	10.43	15.052	0.02	68
XRF-CR2O3	%	0.01	0.03	0.02	0.01	0.013	0.011	0.007	<0.01	<0.01	<0.01	<0.01	0.01	0.026	0.01	8
XRF-FE2O3	%	1.19	4.2	3.01	2.345	2.374	2.273	0.703	1.342	1.87	2.345	2.85	3.793	4.186	0.04	68
XRF-K2O	%	1.69	2.72	1.03	2.36	2.357	2.348	0.204	2.014	2.21	2.36	2.495	2.652	2.715	0.02	68
XRF-LOI	%	1.67	19.2	17.53	5.82	7.348	6.076	4.459	2.219	3.67	5.82	10.1	16.1	18.948	0.01	68
XRF-MGO	%	0.25	1.97	1.72	0.765	0.879	0.761	0.452	0.278	0.495	0.765	1.225	1.613	1.957	0.10	68
XRF-MNO	%	0.02	0.13	0.11	0.05	0.05	0.047	0.017	0.03	0.04	0.05	0.06	0.08	0.121	0.01	68
XRF-NA2O	%	0.73	1.57	0.84	1.23	1.191	1.172	0.205	0.805	1.045	1.23	1.36	1.46	1.565	0.15	68
XRF-P2O5	%	0.02	0.3	0.28	0.09	0.113	0.093	0.068	0.029	0.06	0.09	0.17	0.24	0.296	0.05	67
XRF-SIO2	%	47.3	85.4	38.1	75.6	72.034	71.277	10.076	50.6	65.9	75.6	80.2	83.44	85.292	0.10	68
XRF-TIO2	%	0.22	0.61	0.39	0.42	0.425	0.416	0.084	0.309	0.355	0.42	0.49	0.57	0.605	0.02	68
AS_AA	ppm	2.3	11	8.7	4.7	5.26	4.871	2.19	2.68	3.7	4.7	6.1	10.17	11	0.20	68
SE_AA	ppm	0.2	0.5	0.3	0.2	0.268	0.256	0.089	<0.1	<0.1	<0.1	0.2	0.4	0.482	0.10	22
HG_CV	ppm	0.01	0.04	0.03	0.01	0.014	0.013	0.007	<0.01	<0.01	<0.01	0.01	0.02	0.036	0.01	22

Table 5. Mineralogy of all soil samples collected in 2003, 2004, and 2007, lower Rio Grande valley, Texas.

[Geo_unit, geologic unit as described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; Total_Plag, combined total of all plagioclase minerals present in the sample; Total_Kspar, combined total of all potassium-bearing feldspar minerals present in the sample; Total_Carb, combined total of all carbonate minerals present in the sample (may include some shell fragments)]

Sample number	Latitude	Longitude	Geo_unit	Percent						
				Quartz	Muscovite	Kaolinite	Smectite	Total_Plag	Total_Kspar	Total_Carb
ST001	26.4547	-98.1632	G	83	2	1	1	9	3	1
ST002	26.4645	-98.2207	G	80	1	1	0	13	6	0
ST003	26.4699	-98.2609	G	78	2	1	0	6	9	3
ST004	26.0846	-97.8620	H	34	6	3	4	20	8	25
ST005	26.0737	-97.8355	H	27	10	8	0	14	7	34
ST006	26.0728	-97.8046	H	37	5	2	1	19	12	25
ST007	26.0562	-97.7719	H	35	10	3	0	19	8	24
ST008	26.0519	-97.7398	H	32	8	4	0	16	14	25
ST009	26.0431	-97.7066	H	32	11	3	1	20	7	26
ST010	26.0447	-97.6712	H	38	8	2	0	20	13	19
ST011	26.0265	-97.6402	H	35	10	4	0	18	12	21
ST012	26.0189	-97.6075	H	31	14	3	0	15	13	23
ST013	25.9932	-97.6020	H	39	7	2	0	19	15	19
ST014	25.9621	-97.5776	H	27	12	4	7	13	10	28
ST015	25.9439	-97.5463	H	27	6	4	3	19	8	33
ST016	25.9258	-97.5200	H	31	15	3	0	13	13	25
ST017	25.9285	-97.4891	H	39	9	3	3	20	11	15
ST018	25.9145	-97.4547	H	38	6	2	2	19	15	18
ST019	25.9176	-97.4185	H	33	10	3	5	12	9	29
ST020	25.9179	-97.3816	H	35	4	2	1	13	9	37
ST021	25.9449	-97.3522	H	79	0	1	0	13	6	1
ST022	25.9539	-97.3191	H	35	13	4	3	17	7	21
ST023	25.9604	-97.2835	H	44	10	2	0	14	7	22
ST024	25.9600	-97.2534	H	54	4	1	0	18	14	9
ST025	25.9680	-97.2069	H	47	4	1	0	18	8	22
ST026	25.9894	-97.1829	H	47	12	2	0	20	7	13
ST027	25.9970	-97.1513	H	76	1	1	0	14	5	3
ST028	26.4601	-98.1765	G	37	12	0	0	6	0	45
ST029	26.4602	-98.1741	G	26	14	2	0	0	0	58
ST030	25.9723	-97.5364	H	40	8	2	0	19	6	25
ST031	25.9783	-97.5047	H	36	8	2	6	14	11	23
ST032	25.9817	-97.4744	H	34	9	2	2	20	7	27
ST033	25.9831	-97.4461	H	30	16	4	1	17	6	27
ST034	25.9502	-97.4194	H	34	14	5	2	19	7	19
ST035	25.9487	-97.4453	H	25	11	3	5	10	11	35
ST036	25.9508	-97.4783	H	47	4	1	1	18	11	17
ST037	25.9499	-97.5080	H	34	14	3	1	17	11	20
ST107	26.1184	-97.7855	H	29	19	7	3	11	0	32
ST108	26.1438	-97.7816	B	57	12	1	0	14	10	6
ST109	26.1753	-97.7839	B	50	10	2	0	12	13	13

Table 5. Mineralogy of all soil samples collected in 2003, 2004, and 2007, lower Rio Grande valley, Texas.—Continued

[Geo_unit, geologic unit as described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; Total_Plag, combined total of all plagioclase minerals present in the sample; Total_Kspar, combined total of all potassium-bearing feldspar minerals present in the sample; Total_Carb, combined total of all carbonate minerals present in the sample (may include some shell fragments)]

Sample number	Latitude	Longitude	Geo_unit	Percent						
				Quartz	Muscovite	Kaolinite	Smectite	Total_Plag	Total_Kspar	Total_Carb
ST110	26.2079	-97.7862	B	59	7	2	0	14	13	5
ST111	26.2375	-97.7869	B	66	4	1	0	19	9	1
ST112	26.2663	-97.7870	B	59	8	4	0	17	7	4
ST113	26.2961	-97.7873	B	66	4	1	0	17	12	0
ST114	26.3011	-97.8261	B	67	3	1	0	17	12	0
ST115	26.2631	-97.8257	B	55	8	2	0	22	7	7
ST116	26.2719	-97.8638	B	73	6	1	0	16	0	4
ST117	26.3026	-97.8644	B	73	3	1	0	8	14	1
ST118	26.3422	-97.9251	G	73	3	1	0	9	11	1
ST119	26.3148	-97.9290	L	66	9	2	0	9	13	0
ST120	26.2812	-97.9285	L	65	5	2	0	17	8	3
ST121	26.2656	-97.9119	H	52	10	2	0	13	6	16
ST122	26.2365	-97.9114	H	65	9	1	0	11	11	4
ST123	26.2066	-97.9111	H	62	5	1	0	13	11	8
ST124	26.1781	-97.9106	H	68	2	1	0	14	11	4
ST125	26.1286	-97.9014	H	46	8	3	0	13	10	19
ST126	26.0986	-97.9012	H	28	12	5	1	16	4	34
ST127	26.1085	-97.8500	H	27	24	4	0	6	11	27
ST128	26.1356	-97.8577	H	61	6	2	0	14	12	5
ST129	26.1778	-97.8472	H	58	6	2	3	16	12	3
ST130	26.2155	-97.8466	B	63	10	2	0	14	8	2
ST131	26.2466	-97.8634	B	52	9	2	0	12	12	12
ST132	26.3655	-97.9374	G	61	13	3	0	11	5	8
ST133	26.3937	-97.9325	G	70	6	1	0	14	4	5
ST134	26.4227	-97.9267	G	74	4	1	0	10	9	2
ST135	26.4504	-97.9144	G	76	6	1	0	8	8	1
ST136	26.4795	-97.9088	G	78	2	1	0	10	8	0
ST137	26.4851	-97.9489	G	80	2	1	0	8	10	0
ST138	26.4564	-97.9539	G	68	10	1	0	8	10	2
ST139	26.4063	-97.9628	G	75	3	1	0	6	14	0
ST140	26.3845	-97.9662	G	75	3	1	0	11	10	0
ST141	26.3559	-97.9724	G	75	3	1	0	11	10	0
ST142	26.3282	-97.9843	G	77	4	1	0	9	9	0
ST143	26.3067	-97.9931	L	62	3	2	0	11	5	17
ST144	26.3202	-98.0355	L	76	6	1	0	9	8	1
ST145	26.3497	-98.0306	G	53	10	2	0	8	9	18
ST146	26.3490	-98.0245	G	59	4	1	0	7	7	23
ST147	26.4070	-98.0197	G	75	4	1	0	10	10	0
ST148	26.4502	-98.0135	G	79	4	1	0	8	8	0
ST149	26.2889	-98.0054	L	76	4	1	0	9	10	0

Table 5. Mineralogy of all soil samples collected in 2003, 2004, and 2007, lower Rio Grande valley, Texas.—Continued

[Geo_unit, geologic unit as described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; Total_Plag, combined total of all plagioclase minerals present in the sample; Total_Kspar, combined total of all potassium-bearing feldspar minerals present in the sample; Total_Carb, combined total of all carbonate minerals present in the sample (may include some shell fragments)]

Sample number	Latitude	Longitude	Geo_unit	Percent						
				Quartz	Muscovite	Kaolinite	Smectite	Total_Plag	Total_Kspar	Total_Carb
ST150	26.4997	-98.0487	G	77	5	1	0	11	5	0
ST151	26.4707	-98.0538	G	78	3	1	0	8	10	0
ST152	26.4410	-98.0593	G	81	2	1	0	10	7	0
ST153	26.4124	-98.0644	G	76	6	1	0	8	7	2
ST154	26.3825	-98.0699	G	69	7	1	0	12	11	0
ST155	26.3534	-98.0751	L	74	5	1	0	10	11	0
ST156	26.3266	-98.0799	L	57	13	1	0	11	10	9
ST157	26.3617	-98.1178	L	71	6	1	0	9	11	2
ST158	26.3860	-98.1138	G	73	3	1	0	10	8	4
ST159	26.3995	-98.1385	G	76	4	1	0	11	8	0
ST160	26.4162	-98.1371	G	75	3	1	0	10	10	0
ST161	26.4123	-98.1120	G	61	6	1	0	6	7	18
ST162	26.4184	-98.1501	G	72	5	1	0	8	8	6
ST163	26.4665	-98.2377	G	78	4	1	0	7	9	1
ST164	26.4618	-98.2048	G	72	4	1	0	7	10	7
ST165	26.4560	-98.1734	G	60	5	1	0	5	6	22
ST166	26.4518	-98.1409	G	77	4	1	0	11	6	0
ST167	26.5165	-98.1443	G	77	1	1	0	7	8	6
ST168	26.5209	-98.1747	G	73	5	1	0	7	9	5
ST169	26.5004	-98.1991	G	81	3	1	0	7	8	0
ST170	26.4894	-98.1960	G	80	3	2	0	5	9	1
ST171	26.4797	-98.1823	G	74	4	1	0	7	8	5
ST172	26.4772	-98.1495	G	68	9	1	0	9	11	2
ST173	26.4489	-98.1191	G	71	6	2	0	10	9	1
ST174	26.4444	-98.0848	G	60	5	1	0	8	8	19
ST175	26.2899	-97.9605	L	67	10	1	0	9	10	3
ST176	26.2599	-97.9604	L	57	16	1	0	11	11	3
ST177	26.2288	-97.9602	L	67	7	3	0	13	10	0
ST178	26.1995	-97.9597	L	58	13	4	0	10	11	5
ST179	26.1704	-97.9592	L	54	19	2	0	10	9	5
ST180	26.1414	-97.9576	L	61	9	1	0	7	19	2
ST181	26.1082	-97.9590	H	32	16	4	0	13	10	25
ST182	26.0775	-97.9584	H	31	15	2	0	18	7	27
ST183	26.0855	-97.9927	H	29	10	5	0	14	12	30
ST184	26.0824	-98.0260	H	27	21	3	1	12	10	27
ST185	26.0519	-98.0636	H	46	6	2	0	18	10	18
ST186	26.0764	-98.0611	H	27	16	5	1	12	6	35
ST187	26.1124	-98.0534	H	28	14	5	0	9	6	37
ST188	26.1409	-98.0472	H	62	8	2	0	8	11	9
ST189	26.1702	-98.0420	B	41	9	2	0	6	8	33

Table 5. Mineralogy of all soil samples collected in 2003, 2004, and 2007, lower Rio Grande valley, Texas.—Continued

[Geo_unit, geologic unit as described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; Total_Plag, combined total of all plagioclase minerals present in the sample; Total_Kspar, combined total of all potassium-bearing feldspar minerals present in the sample; Total_Carb, combined total of all carbonate minerals present in the sample (may include some shell fragments)]

Sample number	Latitude	Longitude	Geo_unit	Percent						
				Quartz	Muscovite	Kaolinite	Smectite	Total_Plag	Total_Kspar	Total_Carb
ST190	26.1999	-98.0368	B	63	6	2	0	13	11	5
ST191	26.2290	-98.0375	B	55	14	2	0	11	12	7
ST192	26.2565	-98.0361	L	67	10	2	0	13	6	2
ST193	26.2856	-98.0373	L	63	4	2	0	12	10	8
ST194	26.3041	-98.0799	L	62	9	3	0	9	12	5
ST195	26.3329	-98.1230	L	59	7	2	0	10	9	12
ST196	26.3020	-98.1054	L	68	9	2	0	9	9	4
ST197	26.2844	-98.0649	L	51	16	2	0	10	10	12
ST198	26.2490	-98.0747	B	57	12	2	0	10	9	10
ST199	26.2199	-98.0793	B	67	5	1	0	10	12	5
ST200	26.1895	-98.0855	B	54	9	1	0	11	9	16
ST201	26.1351	-98.0821	H	20	19	7	1	12	0	40
ST202	26.1125	-98.0856	H	24	16	4	0	11	5	41
ST203	26.0810	-98.0908	H	25	19	4	1	13	9	30
ST204	26.0849	-98.1279	H	28	18	3	0	13	5	33
ST205	26.1185	-98.1334	H	19	28	4	1	8	0	41
ST206	26.1578	-98.1270	B	46	14	2	0	9	9	19
ST207	26.1876	-98.1222	B	72	3	1	0	12	8	3
ST208	26.2176	-98.1177	B	60	9	4	0	12	9	6
ST209	26.2533	-98.1102	B	61	15	3	0	10	11	0
ST210	26.2823	-98.1069	L	55	18	3	0	13	8	3
ST211	26.2994	-98.1385	L	67	11	2	0	9	8	3
ST07-001	26.3345	-97.7899	B	65	3	3	1	19	8	0
ST07-002	26.3637	-97.7969	B	70	3	2	1	14	10	0
ST07-003	26.3637	-97.7969	B	63	4	3	2	15	14	0
ST07-004	26.3940	-97.7971	B	59	6	3	1	14	14	2
ST07-005	26.4193	-97.7975	B	65	4	2	1	16	12	0
ST07-006	26.4153	-97.8056	B	67	4	1	0	13	14	0
ST07-007	26.4080	-97.8026	B	68	4	1	0	18	10	0
ST07-008	26.4008	-97.7945	B	71	2	1	0	11	15	0
ST07-009	26.4083	-97.7570	B	49	6	3	3	12	11	16
ST07-010	26.4009	-97.7558	B	41	8	3	2	13	9	23
ST07-011	26.3864	-97.7792	B	64	6	1	1	10	18	0
ST07-012	26.3865	-97.7704	B	62	4	2	1	18	13	0
ST07-013	26.3862	-97.7573	B	49	7	2	4	15	12	11
ST07-014	26.3851	-97.7476	B	48	10	5	2	13	9	14
ST07-015	26.3862	-97.7477	B	46	9	3	2	14	10	15
ST07-016	26.3819	-97.7356	B	63	5	1	1	14	15	0
ST07-017	26.3719	-97.7397	B	64	4	2	1	14	15	0
ST07-018	26.3719	-97.7454	B	70	2	2	1	14	11	0

Table 5. Mineralogy of all soil samples collected in 2003, 2004, and 2007, lower Rio Grande valley, Texas.—Continued

[Geo_unit, geologic unit as described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; Total_Plag, combined total of all plagioclase minerals present in the sample; Total_Kspar, combined total of all potassium-bearing feldspar minerals present in the sample; Total_Carb, combined total of all carbonate minerals present in the sample (may include some shell fragments)]

Sample number	Latitude	Longitude	Geo_unit	Percent						
				Quartz	Muscovite	Kaolinite	Smectite	Total_Plag	Total_Kspar	Total_Carb
ST07-019	26.3719	-97.7503	B	56	4	2	2	15	14	6
ST07-020	26.3719	-97.7617	B	56	7	4	2	12	12	7
ST07-021	26.3718	-97.7767	B	69	2	1	1	13	14	0
ST07-022	26.3766	-97.7808	B	64	6	2	1	15	12	0
ST07-023	26.4531	-97.7976	B	59	7	3	1	14	15	1
ST07-024	26.4808	-97.7977	B	55	10	4	2	11	11	7
ST07-025	26.4779	-97.8630	L	55	6	3	3	14	8	11
ST07-026	26.4523	-97.8627	B	62	7	3	2	7	15	5
ST07-027	26.4231	-97.8609	B	57	5	3	2	16	8	10
ST07-028	26.3875	-97.8607	B	53	7	3	1	19	6	10
ST07-029	26.3482	-97.8615	B	47	7	7	2	13	10	14
ST07-030	26.4429	-97.7716	B	68	3	2	1	12	13	0
ST07-031	26.4301	-97.7677	B	63	4	2	1	12	12	5
ST07-032	26.4316	-97.7518	B	66	4	2	1	16	11	0
ST07-033	26.5035	-97.7365	B	56	9	5	2	12	8	7
ST07-034	26.4812	-97.7322	B	61	4	2	2	14	15	2
ST07-035	26.4543	-97.7318	B	67	3	2	2	13	14	0
ST07-036	26.4229	-97.7336	B	43	8	4	2	16	6	20
ST07-037	26.4015	-97.7357	B	63	3	4	1	15	13	0
ST07-038	26.3571	-97.7356	B	65	4	2	1	15	11	1
ST07-039	26.3312	-97.7357	B	67	3	1	1	15	14	0
ST07-040	26.3294	-97.6673	B	59	6	3	2	11	14	5
ST07-041	26.3566	-97.6731	B	65	2	2	2	16	13	0
ST07-042	26.3871	-97.6724	B	67	2	2	2	16	10	1
ST07-043	26.4257	-97.6733	B	65	4	4	2	15	10	1
ST07-044	26.4539	-97.6737	B	65	4	1	1	16	13	0
ST07-045	26.4801	-97.6740	B	53	8	4	2	10	15	8
ST07-046	26.4792	-97.6195	B	68	3	1	1	8	19	0
ST07-047	26.4533	-97.6163	B	74	2	2	1	10	12	0
ST07-048	26.4245	-97.6138	B	68	3	1	1	13	14	0
ST07-049	26.4022	-97.5999	B	62	4	2	2	17	14	0
ST07-050	26.3781	-97.5863	B	57	9	3	2	16	10	3
ST07-051	26.3559	-97.5860	B	59	6	2	2	19	9	2
ST07-052	26.3212	-97.5759	B	65	5	1	2	11	16	0
ST07-053	26.2834	-97.5864	B	62	5	3	1	12	15	1
ST07-054	26.2476	-97.5965	B	57	7	3	2	15	4	11
ST07-055	26.1696	-97.7833	B	49	8	5	2	11	9	16
ST07-056	26.2126	-97.8149	L	37	5	3	2	11	10	32
ST07-057	26.2486	-97.7383	B	64	6	1	1	14	15	0
ST07-058	26.2487	-97.6699	B	55	5	3	1	12	10	13

Table 5. Mineralogy of all soil samples collected in 2003, 2004, and 2007, lower Rio Grande valley, Texas.—Continued

[Geo_unit, geologic unit as described by Page and others (2005) below soil sample; G, Goliad Formation (Pliocene); L, Lissie Formation (Pleistocene); B, Beaumont Formation (Pleistocene); H, Holocene alluvium; Total_Plag, combined total of all plagioclase minerals present in the sample; Total_Kspar, combined total of all potassium-bearing feldspar minerals present in the sample; Total_Carb, combined total of all carbonate minerals present in the sample (may include some shell fragments)]

Sample number	Latitude	Longitude	Geo_unit	Percent						
				Quartz	Muscovite	Kaolinite	Smectite	Total_Plag	Total_Kspar	Total_Carb
ST07-059	26.2768	-97.6619	B	61	6	3	1	11	17	0
ST07-060	26.3103	-97.6627	B	63	4	2	1	15	15	0
ST07-061	26.2310	-97.5573	H	69	6	3	1	11	9	2
ST07-062	26.1864	-97.5646	H	55	7	3	2	12	12	8
ST07-063	26.1878	-97.5916	H	45	9	5	2	12	10	17
ST07-064	26.1544	-97.6114	H	38	7	4	2	21	8	19
ST07-065	26.1138	-97.6478	H	29	11	6	3	10	17	23
ST07-066	26.0733	-97.6916	H	24	15	7	2	17	9	25
ST07-067	26.0979	-97.7194	H	37	10	5	2	21	10	16
ST07-068	26.1194	-97.7373	H	28	11	8	2	17	9	25

Table 6. Summary statistics of mineral content of soils by geologic formation (Page and others, 2005) as determined by x-ray diffraction.

[N, number of samples in the group; N Zero, number of samples with no measurable content; Std. Dev., standard deviation; Min., minimum content measured; Max., maximum content measured]

	N	N Zero	Mean	Std. Dev.	Min.	percentile				Max.
						25	50	75	90	
Quartz										
Goliad	43	0	71.2	11.2	26	69	75	78	80	83
Lissie	24	0	62.3	8.8	37	57	62.5	67	75	76
Beaumont	80	0	60.4	7.6	41	56	62	66	68.9	74
Holocene	63	0	38.9	14.0	19	28	35	46	62	79
All	210	0	56.4	16.2	19	45.75	61	68	76	83
Muscovite										
Goliad	43	0	4.9	3.1	1	3	4	6	10	14
Lissie	24	0	9.2	4.6	3	5.25	9	12.5	17	19
Beaumont	80	0	6.0	3.0	2	4	5.5	8	10	15
Holocene	63	1	10.5	5.5	0	6	10	14	18.6	28
All	210	1	7.5	4.7	0	4	6	10	14	28
Kaolinite										
Goliad	43	1	1.1	0.4	0	1	1	1	2	3
Lissie	24	0	2.0	0.9	1	1	2	2.75	3	4
Beaumont	80	0	2.3	1.2	1	1	2	3	4	7
Holocene	63	0	3.3	1.7	1	2	3	4	5.6	8
All	210	1	2.3	1.5	0	1	2	3	4	8
Smectite										
Goliad	43	42	0.0	0.2	0	0	0	0	0	1
Lissie	24	22	0.2	0.7	0	0	0	0	1	3
Beaumont	80	25	1.1	0.9	0	0	1	2	2	4
Holocene	63	30	1.2	1.6	0	0	1	2	3	7
All	210	119	0.8	1.2	0	0	0	1	2	7
Plagioclase										
Goliad	43	1	8.5	2.5	0	7	8	10	11	14
Lissie	24	0	10.6	2.2	7	9	10	11.75	13.5	17
Beaumont	80	0	13.6	3.0	6	12	14	15.75	17	22
Holocene	63	0	15.0	3.7	6	12	14	18	20	21
All	210	1	12.6	3.9	0	10	12	15	18	22
Potassium feldspar										
Goliad	43	2	8.0	2.7	0	7	8	10	10.6	14
Lissie	24	0	9.8	2.6	5	8	10	11	12.5	19
Beaumont	80	1	11.5	3.2	0	9	12	14	15	19
Holocene	63	3	9.1	3.5	0	7	9	11	13	17
All	210	6	9.9	3.4	0	8	10	12	14	19
Carbonate										
Goliad	43	17	6.2	12.0	0	0	1	6	20.8	58
Lissie	24	4	5.9	7.2	0	2	3	8.75	14.5	32
Beaumont	80	32	5.0	6.6	0	0	2	7	14.9	33
Holocene	63	0	22.1	10.2	1	17	23	28	35	41
All	210	53	10.4	11.9	0	0	5	19	27	58

For additional information, contact:

Director, Eastern Mineral and Energy Resources Center
U.S. Geological Survey
12201 Sunrise Valley Drive, MS 954
Reston, Virginia 20192

Or visit our website at:
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