Laboratory data for calcic soils in central New Mexico: Background information for mapping Quaternary deposits in the Albuquerque Basin

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INTRODUCTION

Soils enriched in calcium carbonate are common throughout lower elevation (<1,830 m; <6,000 ft) sites in the Southwestern United States, especially where the climate is currently arid or semiarid. These soils, variously known as pedocals (old USDA nomenclature) and calcic soils (Machette, 1985), provide a means to determine the relative age of Quaternary deposits on a reconnaissance basis (see Birkeland, 1984; Birkeland and others 1991). If one could calibrate their rates of formation, then the development of calcic soils would provide a useful reconnaissance tool for mapping and deciphering the Quaternary history of regions, including tectonic and climatic events. This strategy has played an important part in regional analysis of Quaternary stratigraphy in the Southwest and specifically in the Rio Grande rift of New Mexico (Machette, 1985, table 2 and fig. 8).

During the mid to late 1970's, the U.S. Geological Survey conducted geologic mapping in the central part of the Rio Grande rift of New Mexico (Fig. 1). As part of this effort, we described, sampled and analyzed more than 50 soils on Quaternary deposits in order to establish criteria for mapping different ages of deposits and for using calcic soils as a relative-age tool (see Figs. 2 and 3). These data were used in two papers summarizing regional aspects of calcic soils (Bachman and Machette, 1977; Machette, 1985), as part of detailed 1:24,000-scale mapping of the San Acacia 7.5-minute quadrangle in the southern part of the Albuquerque basin (Machette, 1978a) and regional 1:250,000-scale mapping of the Socorro 1° x 2° quadrangle (Machette, 1978b). In addition, detailed soil analyses were made for dating movement on specific Quaternary faults (Machette, 1978c, 1978d; 1982, 1986a, 1988) and as a tool for deciphering timing of faulting on a regional basis (Machette and McGimsey, 1983). Although the soil data was fundamental to each of these studies, it was never archived nor released as a public document.

With the renewed interest in the Quaternary geologic and tectonic history of the middle Rio Grande drainage basin (current USGS cooperative project between Water Resources and Geologic Divisions and the New Mexico Bureau of Mines and Mineral Resources) it seems appropriate to publish this data as reference material for future stratigraphic work. This report includes basic geologic and geographic information, and laboratory and chemical data used to calculate the amount of secondary (pedogenic) calcium carbonate in 52 soil profiles (Appendix) from central New Mexico. These data may serve as reference for additional sampling and characterization of soil development as a relative dating tool for geologic studies.

METHODS

The basic strategy for assessing the content of secondary calcium content in a soil uses four fundamental measurements: 1) sample thickness, 2) grain-size distribution, 3) calcium carbonate content of the sample, and 4) bulk density of the sample. Using these data, one can calculate the concentration of calcium carbonate (g/cm^3) in a sample, in a sampled interval, and then sum all the sampled intervals for a total content in the soil. Then, by using data from the soil's parent material (Cu horizon), one can assess the primary (depositional) carbonate content. The secondary (pedogenic) component of the calcium carbonate is the difference between the total and primary contents. In our studies, we typically chose to describe and sample soils on noncalcareous parent materials, thereby minimizing the primary carbonate content. The procedure for calculating carbonate content is described in detail in Machette (1978c) and in general in Machette (1985).

Sample thickness comes from the physical description of the soil. Most soil profiles were sampled and described from hand-excavated pits in natural exposures or temporary excavations using the criteria of Harden (1986). However, our soil profile descriptions were not exhaustive and focused primarily on horizonation and carbonate morphology to guide our sampling. Calcium carbonate content was determined using a Chittick apparatus which measures the volume of CO2 evolved from acid digestion of the carbonate minerals as described by Machette (1986b). By maximizing the volume of CO2 evolved, the method yields an optimum error of ±3% of the reported value (ie, 50% ± 1.5%) (Bachman and Machette, 1977). The >2 mm versus <2 mm contents of the soil (either measured or estimated in the field) were used to calculate the measured and estimated carbonate content (<2 mm fraction) on a whole-sample basis. By avoiding limestone-bearing matter, most samples contained negligible secondary calcium carbonate in the gravel (>2 mm) fraction. Bulk density of soil peds were determined by the paraffin-clod method (Singer, 1986). Where peds were not developed (ie, parent material of weakly calcareous horizons), we estimated bulk density values based on grain-size distribution, and sediment type, and from comparisons with previously determined samples.

The descriptive and laboratory data are reported in tabular form in the Appendix. The calculations of total, primary and secondary carbonate concentrations (gm/cm^3) and the amount of secondary carbonate (gm/cm^2-column) in sampled intervals (typically subhorizons) and the whole profile were performed using an Excel spreadsheet with formulas embedded in cells, rows, and columns. These formulas are keyed to the example spreadsheet in Table 1 and explained in Table 2.

RESULTS

The data tabulated in the Appendix are for relict soils formed on surficial materials that range from Holocene to Pliocene in age. No attempt is made here to ascribe numerical ages to these soils, as Machette did in 1985, because of significant, but still unresolved, questions about the age of the Llano de Albuquerque, a regionally extensive geomorphic surface that was previously considered to be about 0.5 Ma (see Machette, 1985). It is becoming commonly accepted that the Llano de Albuquerque is older, perhaps 1 Ma or more. Also, its association with volcanic ashes of known age, or dated basalt flows is still subject to debate and no compelling paleomagnetic signatures have been obtained from deposits immediately underlying the Llano. In fact, the Llano may have a considerable age range owing to local faulting and regional changes to the position of the Rio Grande and its major tributary streams. Once the age(s) of the Llano de Albuquerque is better defined, these soil data can be used to refine the rates of carbonate accumulation published by Machette (1985) and to better estimate the relative ages of newly described soils on Quaternary deposits in the Albuquerque basin.

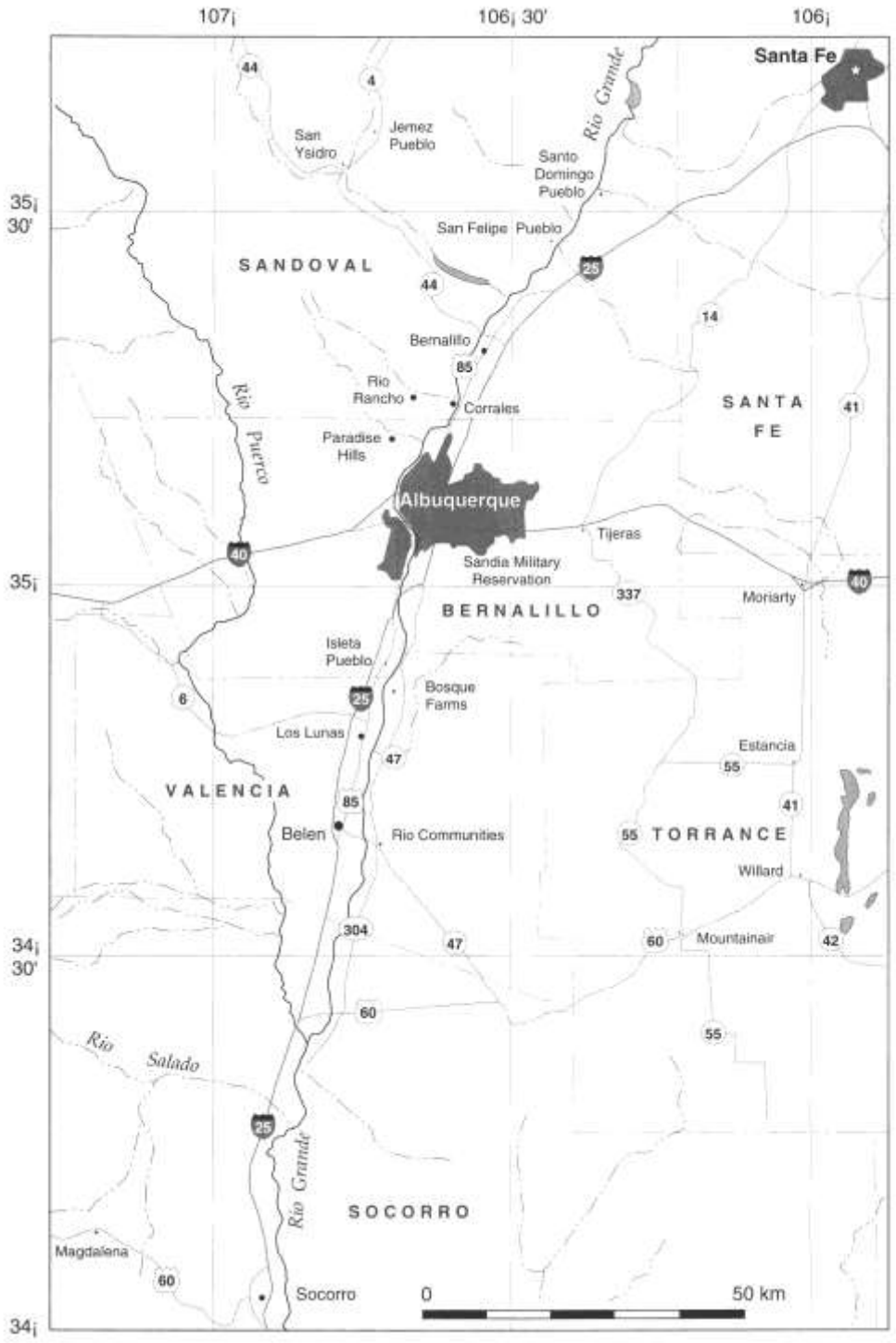
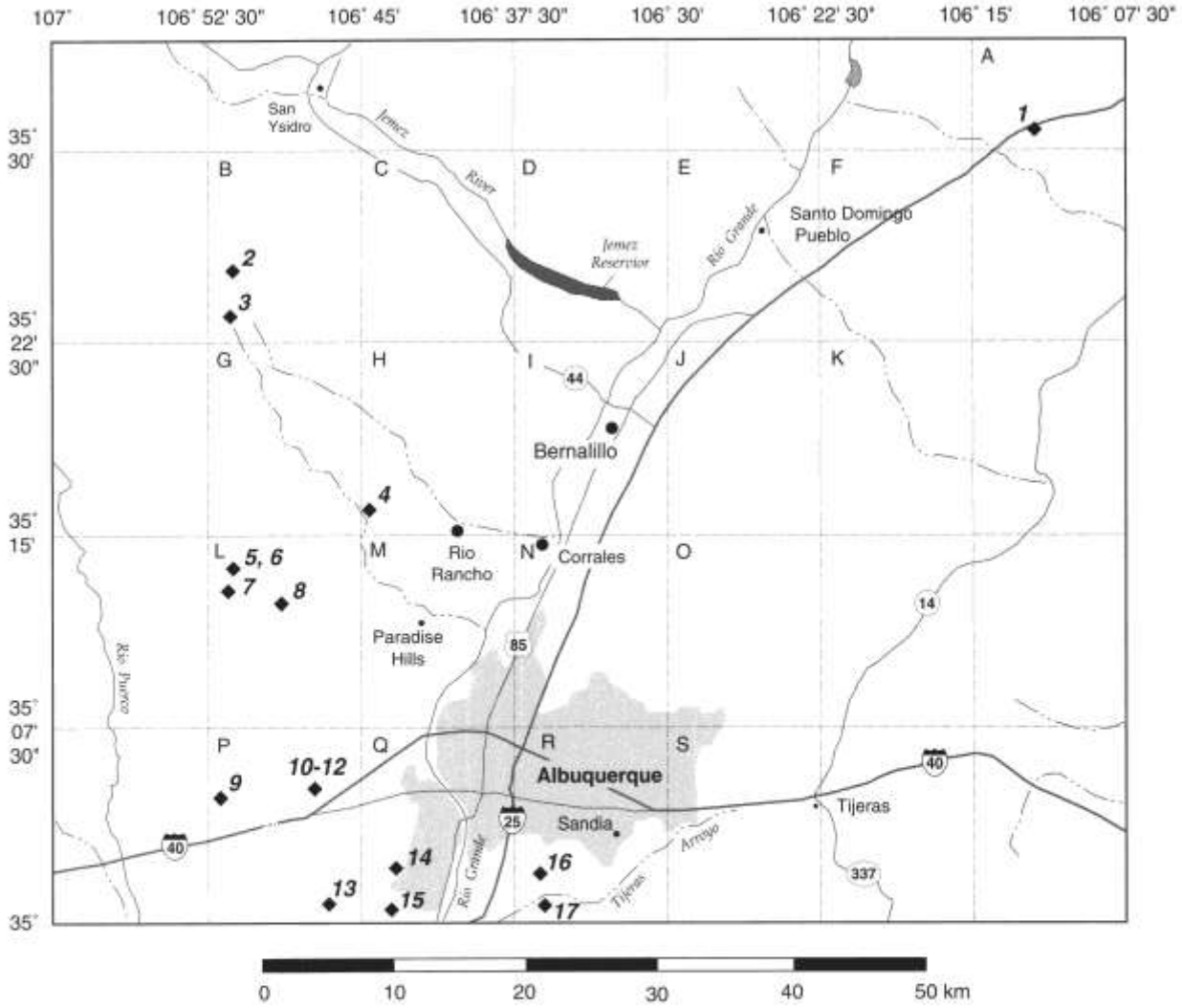


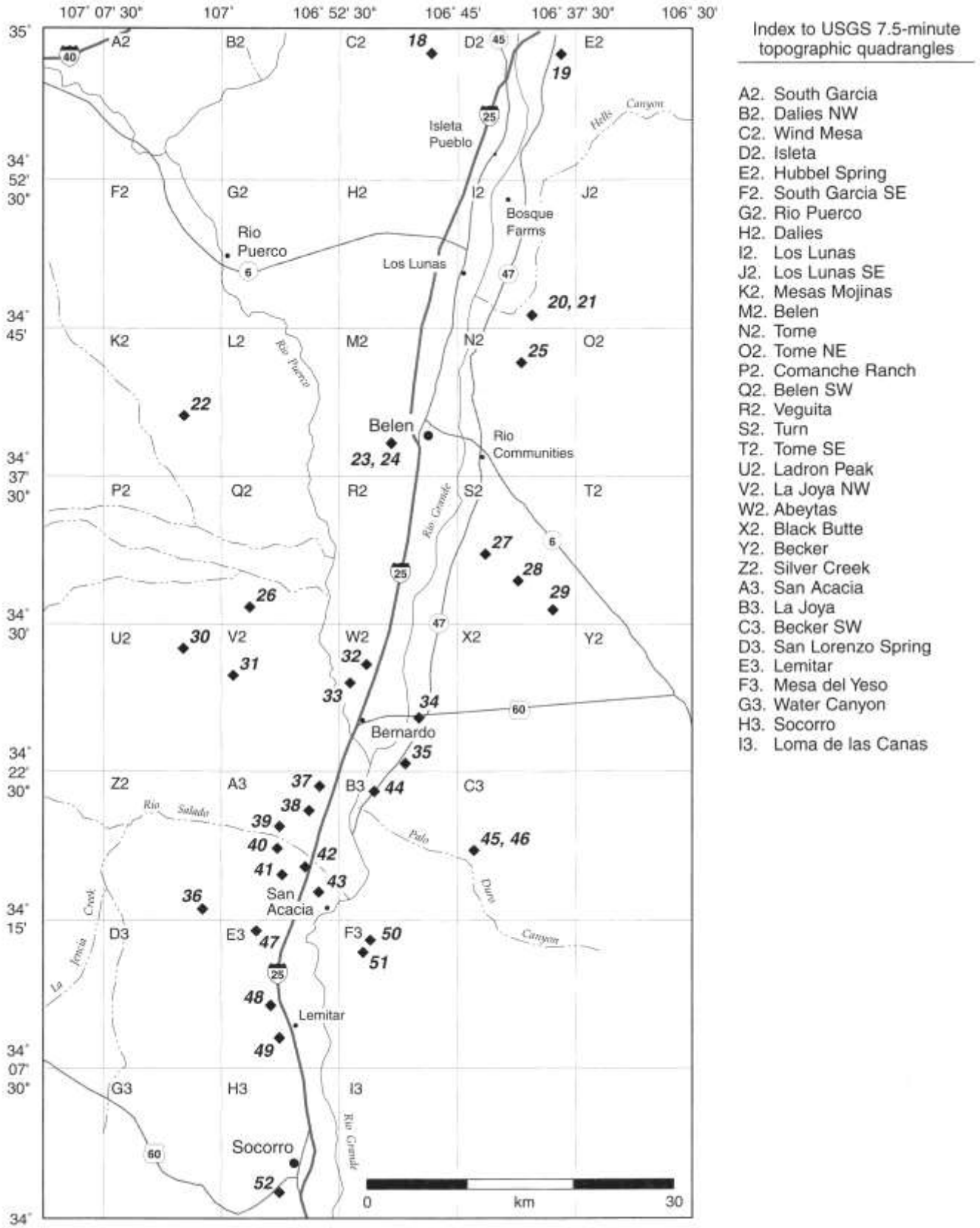
FIGURE 1—Index map of central New Mexico showing roads, towns and counties. Figures 2 and 3 show location of soil sampling sites.



Index to USGS 7.5-minute topographic quadrangles

A. Tetilla Peak
B. Sky Village NE
C. Bernalillo NW
D. Santa Ana Pueblo
E. San Felipe Pueblo
F. San Felipe Pueblo NE
G. Sky Village SE
H. Loma Machette
I. Bernalillo
J. Placitas
K. Hagan
L. Volcano Ranch
M. Los Griegos
N. Alameda
O. Sandia Crest
P. La Mesita Negra SE
Q. Albuquerque West
R. Albuquerque East
S. Tijeras

FIGURE 2—Index map to soil sampling sites in the northern part of the Albuquerque basin and adjacent areas. Sample localities (site nos.) are shown by diamonds and are keyed (by number) to descriptive information in the Appendix. Topographic names are keyed by letter.



Index to USGS 7.5-minute topographic quadrangles

A2. South Garcia
B2. Dalies NW
C2. Wind Mesa
D2. Isleta
E2. Hubbel Spring
F2. South Garcia SE
G2. Rio Puerco
H2. Dalies
I2. Los Lunas
J2. Los Lunas SE
K2. Mesas Mojinas
M2. Belen
N2. Tome
O2. Tome NE
P2. Comanche Ranch
Q2. Belen SW
R2. Veguita
S2. Turn
T2. Tome SE
U2. Ladron Peak
V2. La Joya NW
W2. Abeytas
X2. Black Butte
Y2. Becker
Z2. Silver Creek
A3. San Acacia
B3. La Joya
C3. Becker SW
D3. San Lorenzo Spring
E3. Lemitar
F3. Mesa del Yeso
G3. Water Canyon
H3. Socorro
I3. Loma de las Canas

FIGURE 3—Index map to soil sampling sites in the central and southern parts of the Albuquerque basin and adjacent areas. Sample localities (site nos.) are shown by diamonds and are keyed (by number) to descriptive information in the Appendix. Topographic map names are keyed by letter.

REFERENCES CITED

Bachman, G. 0., and Machette, M. N., 1977, Calcic soils and calcretes of the southwestern United States: U.S. Geological Survey Open-file Report 77-794, 163 p.

Bachman, G. 0., and Mehnert, H. H., 1978, New K-Ar dates and the late Pliocene to Holocene geomorphic history of the central Rio Grande region, New Mexico: Geological Society of America Bulletin, v. 89, p. 283-292.

Birkeland, P. W., 1984, Soils and Geomorphology: New York, Oxford University Press, 372 p.

Birkeland, P. W., Machette, M. N., and Haller, K. M., 1991, Soils as a tool for applied Quaternary geology: Utah Geological and Mineral Survey Miscellan-eous Publication, 63 p.

Denny, C. S., 1940, Quaternary geology of the San Acacia area, New Mexico: Journal of Geology, v. 49, no. 3, p. 225-260.

Harden, Jennifer, 1986, Field Methods, *in* Singer, M. J., and Janitzky, Peter (eds.), Field and laboratory procedures used in a soil chronosequence study: U.S. Geological Survey Bulletin 1628, p. 3-7.

Lambert, P. W., 1968, Quaternary stratigraphy of the Albuquerque area, New Mexico: University of New Mexico, Unpublished PhD thesis, 300 p.

Machette, M. N., 1978a, Geologic map of the San Acacia quadrangle, Socorro County, New Mexico: U.S. Geological Survey Geologic Quadrangle Map GQ-1415, scale 1:24,000.

Machette, M. N., 1978b, Preliminary geologic map of the Socorro 1° x 2° quadrangle, New Mexico: U.S. Geological Survey Open-file Report 78-607, 2 plates, scale 1:250,000.

Machette, M. N., 1978c, Dating Quaternary faults in the southwestern United States using buried calcic paleosols: U.S. Geological Survey Journal of Research, v. 6, no. 3, p. 369381.

Machette, M. N., 1978d, Late Cenozoic geology of the San Acacia-Bernardo area (p. 135-136) and Bernalillo County Dump fault (p. 153-155) *in* Hawley, J. W. (ed.), Guide-book to Rio Grande rift in New Mexico and Colorado: New Mexico Bureau of Mines and Mineral Resources Circular 103, 241 p.

Machette, M. N., 1982, Quaternary and Pliocene faults in the La Jencia and southern part of the Albuquerque-Belen basins, central New Mexico *in* Grambling, J. A., and Wells, S. G. (eds.), Albuquerque Country, pt. 2: New Mexico Geological Society, Guidebook 33, p. 161-169.

Machette, M. N., 1985, Calcic soils of the southwestern United States *in* Weide, D. L. (ed.), Soils and Quaternary geology of the southwestern United States: Geological Society of America Special Paper 203, p. 1-21.

Machette, M. N., 1986a, History of movement and paleoseismicity along the La Jencia fault, central Rio Grande rift, New Mexico: Seismological Society of America Bulletin, v. 76, no. 1, p. 259-272.

Machette, M. N., 1986b, Laboratory methods-Calcium and magnesium carbonates *in* Singer, M.J., and Janitzky, Peter (eds.), Field and laboratory procedures used in a soil chronosequence study: U.S. Geological Survey Bulletin 1628, p. 30-33.

Machette, M. N., 1988, Quaternary tectonic history of the La Jencia fault, central New Mexico: U.S. Geological Survey Professional Paper 1440, 82 p.

Machette, M. N., and McGimsey, R. G., 1983, Quaternary and Pliocene faults in the Socorro and western part of the Fort Sumner 1° x 2° quadrangles, central New Mexico: U.S. Geological Survey Miscellaneous Field Studies Map MF1465-A, scale 1:250,000.

Singer, M. J., 1986, Bulk Density-Paraffin Clod Method, *in* Singer, M. J., and Janitzky, Peter (eds.), Field and laboratory procedures used in a soil chronosequence study: U.S. Geological Survey Bulletin 1628, p.18-19.

Table 1—Format of spreadsheet showing columns and headings.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ stage
	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	

Table 2—Explanation of spreadsheet columns and embedded calculations (values calculated by spreadsheet are rounded to accommodate format).

Column A Sample number (typically a number and letter for each sampled subhorizon.

Column B Horizon (or subhorizon) nomenclature used in the field (mid-1970s).

Column C Horizon (or subhorizon) nomenclature now used for geologic studies (Birkeland, 1984).

Column D. Depth to top of sample.

Column E. Depth to bottom of sample.

Column F Thickness of sampled interval. Cell calculation is E - D(cm).

Column G Percent of sample in >2 mm size fraction (gravel). Reported in cell as percent/100.

Column H Percent of sample in <2 mm size fraction (sand, silt, and clay). Reported in cell as percent/100.

Column I Percent calcium carbonate in present-day <2 mm size fraction (sand, silt, and clay). Reported in cell as percent/100.

Column J Percent calcium carbonate in present-day whole-soil fraction. Cell calculations I × H. Reposted in cell as percent/100.

Column K Percent primary (initial) calcium carbonate in whole soil. Value based on parent material in Cu horizon and on typical values obtained on similar materials from same lithologic and geologic environment. Because noncalcareous parent materials were commonly sought out, the primary carbonate content is commonly <2 percent, and does not exceed 5 percent. Cell is derived value from Cu horizon, reported as percent/100.

Column L Bulk density of percent-day whole soil (ped or clod representative of subhorizon). Reported in cell as g/cm^3.

Column M Bulk density of primary initial parent material (whole soil). Value based on parent material in Cu horizon and on typical values obtained on similar materials from same lithologic and geologic environment. Reported in cell as g/cm^3.

Column N Present (present-day) concentration of calcium carbonate in sampled interval. Cell calculation is K × L. Reported in cell as g/cm^3.

Column O Primary (initial) concentration of calcium carbonate in sampled interval. Cell calculation is K × M. Reported in cell as g/cm^3.

Column P Secondary (pedogenic) concentration of calcium carbonate in sampled interval. Cell calculation is N - O. Reported in cell as g/cm^3. Negative numbers reflect leaching (loss) of calcium carbonate.

Column Q Secondary (pedogenic) total accumulation of calcium carbonate in sampled interval. Cell calculation is F × P. Reported in cell as g/cm^2-column through soil horizon or subhorizon. Negative numbers reflect leaching (loss) of calcium carbonate. Sum of all secondary calcium carbonate in soil profile shown at bottom of column (marked "Total").

Column R Comments on calcium carbonate stage of morphology (see Machette, 1985). Base of column shows sum of all cells in Column Q. Reported as g/cm^2-column through soil profile. This value is commonly referred to as the total secondary calcium carbonate content of the soil (cS, Machette, 1985, p. 8).

APPENDIX

The following tables include geographic, geologic, and topographic information for soil sampling sites in the Albuquerque basin and adjacent areas. Site numbers (1-52) are labeled according to location, generally from north to south and west to east in the Albuquerque basin (see Figs. 2 and 3). Soil profile numbers are generally correlated to sampling date (month, day, year), although numerous sites may have been sampled in a single day, hence the use of hyphenated numbers (ie, 8/02/75-1). The names of the units (geologic) or surfaces (physiographic) are largely informal. Landform is the type of physiographic surface; ie, alluvial fan or piedmont slope.

Location information is given by USGS quadrangle (7.5-minute, 1:24,000 scale), by latitude and longitude, in the standard Township and Range system, and by UTM (Universal Transverse Mercator) system, which records a points location north and east of an established origin for individual zones (UTM zone 13 for this study). The latter type of location data is especially useful for entry of sampling sites in a Geographic Information System (GIS). In addition, we record the County and elevation of the site as determined from USGS 7.5-minute topographic quadrangle maps. The name of the person describing and sampling the soil profile is given, along with the sampling date. Finally, brief additional comments are made (where appropriate) about the geology, specific sampling location, and references.

The descriptive and laboratory data reported below include calculations of present-day, primary and secondary carbonate concentrations (g/cm^3) and the total amount of secondary carbonate (g/cm^2-column) in sampled intervals (typically soil subhorizons) and the whole soil profile as previously described in Tables 1 and Table 2. Measured values are shown in regular type, whereas values estimated from the soils physical appearance or modeled from values determined from adjacent samples are shown in italic type. These estimates introduce additional error in the analysis, but are needed to calculate the total amount of secondary carbonate in a soil.

Site No. 1

Profile No. 8/02/75-1 | Unit or Surface: La Bajada | Landform: Mesa (basalt covered)

Quadrangle: Tetilla Peak 7.5′ (A) | Lat. 35° 31′ 15″ N, Long. 106° 12′ 10″ W | NW¼ NW¼ NE¼ Sec. 21 T15N R7E, La Majada Grant

County: Santa Fe | UTM: 3,931,460 N; 390,905 E; Zone 13 | Elevation: 6000 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: August 2, 1975

Comments: Buried late Pliocene soil beneath 2.8 Ma basalt of the Cerros del Rio field (see Bachman and Mehnert, 1978). Sampled in north-facing roadcut along US Interstate Highway 25. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
8/02/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Bt	Bt	0	15	15	0.0	100.0	1.0	1.0	*1.0*	1.30	*1.6*	0.013	0.016	-0.003	-0.05	
-1a	Km	Km	15	110	95	3.0	97.0	33.4	32.4	*1.0*	1.24	*1.6*	0.402	0.016	0.386	36.64	Stg. III+
N.S.	Cca1	Bk1	110	150	40	0.0	*100.0*	*20.0*	*20.0*	*1.0*	*1.50*	*1.6*	0.300	0.016	0.284	11.36	Stg. III-
-1b	Cca2	Bk2	150	230	80	21.0	79.0	3.6	2.84	*1.0*	1.67	*1.6*	0.047	0.016	0.031	2.52	Stg. II
-1c	Cca3	Bk3	230	325	95	9.0	91.0	1.8	1.64	*1.0*	1.58	*1.6*	0.026	0.016	0.010	0.94	Stg. II
N.S.	Cn	Cu	325	N.E.	N.A.				0.0	*1.0*	1.60	*1.6*	0.00	0.016	0.00	0.00	
																51.41	Total

Site No. 2

Profile No. 8/18/75-2 | Unit or Surface: Unmapped | Landform: Piedmont slope

Quadrangle: Sky Village NE 7.5′ (B) | Lat. 35° 24′ 32″ N, Long. 106° 51′ 10″ W | SE¼ SE¼ Sec. 29 T14N R1E

County: Sandoval | UTM: 3,916,450 N; 331,650 E; Zone 13 | Elevation: 6665 ft

Described by George Bachman | Sampled by George Bachman | Sampling date: August 18, 1975

Comments: Sampling along road intersection on dissected portion of the Llano de Albuquerque. Parent material and geologic context unknown. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
8/18/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cn	Cu	0	23	23	0.0	100.0	*1.5*	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.00	0.00	
-2a	IIB	2B	23	53	30	1.0	99.0	1.0	1.0	*1.5*	1.68	*1.6*	0.016	0.024	-0.004	-0.24	
-2b	IICca	2Bk	53	73	20	0.8	99.2	6.0	6.0	*1.5*	1.67	*1.6*	0.096	0.024	0.08	1.44	Stg. II-
N.S.	IICn	2Cu	73	120	47	0.0	100.0	1.5	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.00	0.00	
-2c	IIICca	3Bk	120	164	44	0.2	99.8	18.8	18.8	*1.5*	1.63	*1.6*	0.306	0.024	0.28	12.41	Stg. II+
N.S.	IIICn	3Cu	164	N.E.	N.A.	*0.0*	*100.0*	*1.5*	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.00	0.00	
																13.61	Total

Site No. 3

Profile No. 8/18/75-1 | Unit or Surface: Unnamed alluvium of Jemez Creek(?) | Landform: Piedmont slope

Quadrangle: Sky Village NE 7.5' (B) | Lat. 35° 22' 42" N, Long. 106° 51' 13" W | SE¼ SE¼ Sec. 5 T13N R1E

County: Sandoval | UTM: 3,916,450 N; 331,650 E; Zone 13 | Elevation: 6560 ft

Described by George Bachman | Sampled by George Bachman | Sampling date: August 18, 1975

Comments: Sampling locality along La Ceja (the eyebrow, or edge). Parent material is reported as ancient alluvium of Jemez Creek by George Bachman, which is inset into the Llano de Albuquerque surface. Shown as dissected remanents of the Llano de Albuquerque by Bachman and Mehnert (1978). N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
8/18/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Spoil	Spoil	0	10	10	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.000	0.00	
-1a	Bt	Bt	10	27	17	6.0	94.0	4.2	4.0	*1.5*	1.67	*1.65*	0.067	0.0248	0.042	0.72	
-1b	Bca	Bk1	27	41	14	6.0	94.0	7.4	7.0	*1.5*	1.67	*1.65*	0.117	0.0248	0.092	1.29	N.R.
-1c	K2m	K2m	41	66	25	5.0	95.0	53.0	50.4	*1.5*	1.70	*1.65*	0.857	0.0248	0.832	20.80	N.R.
-1d	K3	K3	66	93	27	4.0	96.0	34.8	33.4	*1.5*	1.74	*1.65*	0.581	0.0248	0.556	15.02	N.R.
-1e	Cca	Bk2	93	113	20	2.0	98.0	14.1	13.8	*1.5*	1.84	*1.65*	0.254	0.0248	0.229	4.58	N.R.
N.S.	Cn	Cu	113	N.E.	N.A.	*0.0*	*100.0*	*1.5*	*1.5*	*1.5*	*1.65*	*1.65*	0.025	0.0248	0.000	0.00	
																42.41	Total

Site No. 4

Profile No. 7/18/75-2 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Loma Machete 7.5' (H) | Lat. 35° 15' 38" N, Long. 106° 44' 40" S | Unsurveyed, Town of Alameda Grant

County: Sandoval | UTM: 1,555,160 N; 341,313 E; Zone 13 | Elevation: 5560 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 18, 1975

Comments: Downdropped remanent of the Llano de Albuquerque surface (Machette, 1985). Location on west bank of south-trending tributary to Arroyo de las Calabacillas. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/18/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	K1m	K1m	0	15	15	0.0	100.0	50.0	50.0	*1.80*	1.75	*1.6*	0.875	0.0288	0.846	12.69	Stg. III+
N.S.	K2lm	K2m	15	20	5	*0.0*	*100.0*	*75.0*	*75.0*	*1.80*	*1.80*	*1.6*	1.350	0.0288	1.321	6.61	Stg. IV-
-2a	K2m	K3m	20	50	30	1.0	99.0	69.6	68.9	*1.80*	1.76	*1.6*	1.213	0.0288	1.184	35.52	Stg. III+
-2b	K31m	K4m	50	69	19	0.1	99.9	55.7	55.6	*1.80*	1.56	*1.6*	0.867	0.0288	0.839	15.93	Stg. III+
-2c	K32m	K5m	69	88	19	0.6	99.4	41.3	41.1	*1.80*	1.59	*1.6*	0.653	0.0288	0.625	11.87	Stg. III
-2d	K33	Bk1	88	143	55	1.0	99.0	14.6	14.5	*1.80*	*1.60*	*1.6*	0.232	0.0288	0.203	11.12	Stg. II+
-2e	Cca1	Bk2	143	193	50	1.0	99.0	10.8	10.7	*1.80*	*1.60*	*1.6*	0.171	0.0288	0.142	7.12	Stg. II
-2f	Cca2	Bk3	193	259	66	9.0	91.0	6.8	6.2	*1.80*	*1.70*	*1.6*	0.105	0.0288	0.077	5.06	Stg. II-
N.S.	Cn	Cu	259	N.E.	N.A.	*10.0*	*90.0*	*2.0*	*1.8*	*1.80*	*1.60*	*1.6*	0.029	0.0288	0.000	0.00	
																105.92	Total

Site No. 5

Profile No. 7/21/75A | Unit or Surface: Llano de Albuquerque, faulted | Landform: Mesa

Quadrangle: Volcano Ranch 7.5′ (L) | Lat. 35° 14′ 20″ N, Long. 106° 51′ 41″ W | NE¼ NE¼ SW¼ Sec. 29 T12N R1E

County: Sandoval | UTM: 3,900,950 N; 330,680 E; Zone 13 | Elevation: 6180 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 21, 1975

Comments: Sampled near Sandoval Microwave Station at north edge of west-facing reentrant on the western edge of the Llano de Albuquerque. Site is on east side of unnamed fault. Thick section of buried calcic soils on downdropped fault block may represent similar tectonic setting as at the Bernalillo County Dump (see Machette, 1978c). Used values from 9Cu horizon as model for parent material for soils above. N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thickness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/21/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1	Cn	Cn			0	0.0	100.0	1.2	1.2	*0.5*	*1.65*	*1.65*	0.020	0.008	0.012	0.00	
-2	IIC1ca	2Bk1	0	30	30	0.0	100.0	1.7	1.7	*1.0*	*1.65*	*1.65*	0.028	0.017	0.011	0.33	N.R.
-3	IIC2ca	2Bk2	30	95	65	0.0	100.0	11.9	11.9	*1.0*	*1.70*	*1.65*	0.202	0.017	0.185	12.04	N.R.
-4	IIC3ca	2Bk3	95	210	115	0.0	100.0	0.8	0.8	*1.0*	*1.65*	*1.65*	0.013	0.017	-0.004	-0.44	
-5	IIIK11	3K1	210	235	25	1.0	99.0	18.2	18.0	*1.0*	*1.75*	*1.65*	0.315	0.017	0.298	7.45	N.R.
-6	IIIK12	3K2m	235	270	35	3.0	97.0	30.5	29.6	*1.0*	1.92	*1.65*	0.568	0.017	0.551	19.30	N.R.
-7	IIIK2	3K3	270	300	30	2.0	98.0	21.7	21.3	*1.0*	1.60	*1.65*	0.341	0.017	0.324	9.71	N.R.
-8	IIIK3	3K4	300	320	20	2.0	98.0	26.0	25.5	*1.0*	1.81	*1.65*	0.462	0.017	0.445	8.89	N.R.
-9	IVBs	4Bs	500	537	37	2.0	98.0	0.6	0.6	*1.0*	1.74	*1.65*	0.010	0.017	-0.007	-0.24	
-10	IVBca	4Bk1	537	587	50	0.0	100.0	10.6	10.6	*1.0*	1.69	*1.65*	0.179	0.017	0.162	8.11	N.R.
-11	IVCca	4Bk2	587	647	60	4.0	96.0	23.2	22.3	*1.0*	1.84	*1.65*	0.410	0.017	0.393	23.60	N.R.
-12	IVK	4K	647	707	60	4.0	96.0	8.8	8.5	*1.0*	1.92	*1.65*	0.163	0.017	0.146	8.77	N.R.
-13	VBca	5Bk1	707	820	113	4.0	96.0	0.8	0.8	*1.0*	1.90	*1.65*	0.015	0.017	-0.002	-0.20	
-14	VK22m	5K1	820	840	20	1.0	99.0	13.6	13.5	*1.0*	1.97	*1.65*	0.266	0.017	0.249	4.98	N.R.
-15	VK23m	5K2m	840	865	25	2.0	98.0	35.2	34.5	*1.0*	1.90	*1.65*	0.656	0.017	0.639	15.96	N.R.
-16	VK32m	5K3	865	885	20	1.0	99.0	23.2	23.0	*1.0*	1.58	*1.65*	0.363	0.017	0.346	6.93	N.R.
-17	VK33m	5K4	885	910	25	2.0	98.0	11.5	11.3	*1.0*	1.81	*1.65*	0.205	0.017	0.188	4.69	N.R.
-18	VCca	5Bk2	910	1040	130	2.0	98.0	2.5	2.5	*1.0*	1.78	*1.65*	0.045	0.017	0.028	3.58	N.R.
-19	VIBca	6Bk1	1040	1115	75	4.0	96.0	1.3	1.3	*1.0*	1.86	*1.65*	0.024	0.017	0.007	0.53	
-20	VICca	6Bk2	1115	1135	20	3.0	97.0	3.4	3.3	*1.0*	1.85	*1.65*	0.061	0.017	0.044	0.88	N.R.
-21	VIK1m	6K1	1135	1155	20	5.0	95.0	10.5	10.0	*1.0*	1.90	*1.65*	0.190	0.017	0.173	3.46	N.R.
-22	VIK2m	6K2	1155	1195	40	1.0	99.0	16.3	16.1	*1.0*	1.92	*1.65*	0.309	0.017	0.292	11.68	N.R.
-23	VIK3	6K3	1195	1220	25	3.0	97.0	7.8	7.6	*1.0*	1.85	*1.65*	0.141	0.017	0.124	3.09	N.R.

Site No. 5, continued

Profile No. 7/21/75A | Unit or Surface: Llano de Albuquerque, faulted | Landform: Mesa

Quadrangle: Volcano Ranch 7.5′ (L) | Lat. 35° 14′ 20″ N, Long. 106° 51′ 41″ W | NE¼ NE¼ SW¼ Sec. 29 T12N R1E

County: Sandoval | UTM: 3,900,950 N; 330,680 E; Zone 13 | Elevation: 6180 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 21, 1975

Comment: : Sampled near Sandoval Microwave Station at north edge of west-facing reentrant on the western edge of the Llano de Albuquerque. Site is on east side of unnamed fault. Thic : section of buried calcic soils on downdropped fault block may represent similar tectonic setting as at the Bernalillo County Dump (see Machette, 1978c). Used values from 9Cu horizon as model for parent material for soils above. N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/21/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-24	VIIBca	7Bk1	1390	1450	60	3.0	97.0	23.5	22.8	*1.0*	1.74	*1.65*	0.397	0.017	0.380	22.78	N.R.
-25	VIIC2ca	7Bk2	1450	1495	45	2.0	98.0	12.1	11.9	*1.0*	1.85	*1.65*	0.220	0.017	0.203	9.14	N.R.
-26	VIIC3ca	7Bk3	1495	1535	40	4.0	96.0	14.8	14.2	*1.0*	1.89	*1.65*	0.268	0.017	0.251	10.06	N.R.
-27	VIIIC1ca	8Bk1	1855	1920	65	0.0	100.0	13.0	13.0	*1.0*	1.74	*1.65*	0.226	0.017	0.209	13.60	N.R.
-28	VIIIC2ca	8Bk2	1920	1995	75	3.0	97.0	8.8	8.5	*1.0*	1.80	*1.65*	0.153	0.017	0.136	10.20	N.R.
-29	VIIIC3ca	8Bk3	1995	2170	175	4.0	96.0	12.3	11.8	*1.0*	1.79	*1.65*	0.211	0.017	0.194	34.00	N.R.
-30	IXCca	9Bk1	2390	2460	70	2.0	98.0	10.5	10.3	*1.0*	1.92	*1.65*	0.198	0.017	0.181	12.65	N.R.
-31	IXC2ca	9Bk2	2705	2815	110	1.0	99.0	9.2	9.1	*1.0*	1.83	*1.65*	0.167	0.017	0.150	16.45	N.R.
-31	IXC3ca	9Bk3	3225	3380	155	4.0	96.0	1.4	1.0	*1.0*	1.92	*1.65*	0.019	0.017	0.002	1.34	N.R.
-31	IXCn	9Cu	3380	N.E.	N.A.	*4.0*	*96.0*	*1.0*	*1.0*	*1.0*	*1.65*	*1.65*	0.017	0.017	0.000	0.00	
																283.26	Total

Site No. 6

Profile No. 7/22/75A | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Volcano Ranch 7.5′ (L) | Lat. 35° 13′ 55″ N, Long. 106° 51′ 43″ W | NW¼ NE¼ NW¼ Sec. 32 T12N R1E

County: Sandoval | UTM: 3,900,175 N; 330,620 E; Zone 13 | Elevation: 6180 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 22, 1975

Comments: Sampled near Sandoval Microwave Station on east side of fault. Weak to moderately developed soil beneath young eolian sand. Physiographic surface from Machette (1985). N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/22/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1	IIA/Cca	2A/Bk	0	65	65	0.0	100.0	3.8	3.8	*0.4*	1.62	*1.6*	0.062	*0.0064*	0.055	3.59	N.R.
-2	IIC1ca	2Bk1	65	100	35	0.0	100.0	4.3	4.3	*0.4*	1.70	*1.6*	0.073	*0.0064*	0.067	2.33	N.R.
-3	IIC2ca	2Bk2	100	215	115	0.0	100.0	3.3	3.3	*0.4*	1.74	*1.6*	0.057	*0.0064*	0.051	5.87	N.R.
-4	IIC2ca	2Cu	215	285	70	0.0	100.0	0.6	0.6	*0.4*	1.85	*1.6*	0.011	*0.0064*	0.005	0.33	
																12.12	Total

Site No. 7

Profile No. 7/22/75B | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Volcano Ranch 7.5′ (L) | Lat. 35° 13′ 53″ N, Long. 106° 51′ 48″ W | NW¼ NE¼ NW¼ Sec. 32 T12N R1E

County: Sandoval | UTM: 3,900,150 N; 330,475 E; Zone 13 | Elevation: 6200 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 22, 1975

Comments: Sampled near Sandoval Microwave Station at south edge of west-facing reentrant on the western edge of the Llano de Albuquerque. Site is on west (upthrown) side of unnamed fault. Section comprised of late Pleistocene eolian sand and two buried soils. Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/22/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cn	Cu	0	20	20	0.0	100.0	*1.5*	1.5	*0.4*	*1.60*	*1.6*	0.02	*0.006*	0.02	0.35	
-5	IIC1ca	2Bk1	20	35	15	0.0	100.0	3.1	3.1	*1.0*	1.61	*1.6*	0.05	*0.016*	0.03	0.51	Stg. I
-6	IIC2ca	2Bk2	35	85	50	0.4	99.6	6.2	6.2	*1.0*	1.71	*1.6*	0.11	*0.016*	0.09	4.50	Stg. II-
-7	IIC3ca	2Bk3	85	130	45	2.1	98.0	1.4	1.4	*1.0*	1.75	*1.6*	0.02	*0.016*	0.00	0.38	Stg. I
N.S.	IICn	2Cu	130	185	55	*0.0*	*100.0*	*1.0*	*1.0*	*1.0*	*1.65*	*1.6*	0.02	*0.016*	0.00	0.03	
-8	IIIC2ca	3Bk1	185	260	75	5.4	95.0	7.9	7.5	*1.0*	1.83	*1.6*	0.14	*0.016*	0.12	9.09	Stg. II
-9	IIIC3ca	3Bk2	260	310	50	1.7	98.0	7.0	6.9	*1.0*	1.69	*1.6*	0.12	*0.016*	0.10	5.03	Stg. II-
N.S.	IIICn	3Cu	310	N.E.	N.A.	0.0	100.0	1.0	*1.0*	*1.0*	*1.65*	*1.6*	0.02	*0.016*	0.00	0.00	
																19.89	Total

Site No. 8

Profile No. 7/22/75C | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Volcano Ranch 7.5′ (L) | Lat. 35° 13′ 30″ N, Long. 106° 48′ 57″ W | Unsurveyed, Town of Alameda Grant

County: Sandoval | UTM: 3,899,400 N; 334,890 E; Zone 13 | Elevation: 5950 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 22, 1975

Comments: Sampling locality at southern tip of eroded Llano de Albuquerque surface, from eastern side of road cut. Surface is south-sloping, but backtilted to the west (ie, reversing original southeasterly slope). Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thickness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/22/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	K1m, eroded	K1m	0	30	30	*0.0*	*100.0*	*30.0*	*30.0*	*1.0*	*1.60*	*1.6*	0.480	0.016	0.464	13.92	Stg. III
-10	K21m	K2m	30	40	10	3.0	97.0	39.2	38.0	*1.0*	1.58	*1.6*	0.600	0.016	0.584	5.84	Stg. III
-11	K22m	K3m	40	50	10	2.0	98.0	48.1	47.1	*1.0*	*1.60*	*1.6*	0.754	0.016	0.738	7.38	Stg. III+
-12	K3	K4	50	90	40	3.0	97.0	45.6	44.2	*1.0*	1.52	*1.6*	0.672	0.016	0.656	26.23	Stg. III+
-13	K3	K5	90	133	43	2.0	98.0	35.2	34.5	*1.0*	*1.60*	*1.6*	0.552	0.016	0.536	23.05	Stg. III
-14	C1ca	Bk1	133	165	32	4.0	96.0	29.7	28.5	*1.0*	*1.75*	*1.6*	0.499	0.016	0.483	15.45	Stg. II
-15	C2ca	Bk2	165	197	32	2.0	98.0	24.6	24.1	*1.0*	1.77	*1.6*	0.427	0.016	0.411	13.14	Stg. II
N.S.	C3ca	Bk3	197	230	33	*2.0*	*98.0*	*10.2*	*10.0*	*1.0*	*1.60*	*1.6*	0.160	0.016	0.144	4.75	Stg. II-
N.S.	Cn	Cu	230	N.E.	N.A.	*0.0*	*100.0*	*2.0*	*2.0*	*1.0*	*1.60*	*1.6*	0.032	0.016	0.016	0.00	
																109.76	Total

Site No. 9

Profile No. 6/03/74-3 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: La Mesita Negra SE 7.5' (P) | Lat. 35° 04' 17" N, Long. 106° 52' 10" W | Unsurveyed, Town of Atrisco Grant

County: Bernalillo | UTM: 3,882,400 N; 329,400 E; Zone 13 | Elevation: 5940 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 3, 1974

Comments: On western edge of the Llano de Albuquerque, just west of the West Mesa Radar Station (BM 5974). Relict soil, buried by eolian sand (sample -3a). Stable sampling site. Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/03/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-3a	Cca	Bk			0	0.0	100.0	3.4	3.4	*1.3*	*1.60*	*1.6*	0.054	0.021	0.033	0.00	
-3b	IIAca	2Ak	0	30	30	0.0	100.0	2.8	2.8	*1.3*	*1.70*	*1.6*	0.048	0.021	0.027	0.80	Stg. I
-3c	IIBsca	2Bsk	30	70	40	0.0	100.0	2.2	2.2	*1.3*	*1.70*	*1.6*	0.037	0.021	0.016	0.66	Stg. I
-3d	IICca	2Bk	70	160	90	0.0	100.0	5.3	5.3	*1.3*	*1.70*	*1.6*	0.090	0.021	0.069	6.22	Stg. II-
-3e	IIIK1m	3K1m	160	175	15	3.0	97.0	51.2	49.7	*1.3*	*1.50*	*1.6*	0.746	0.021	0.725	10.87	Stg. III
-3f	IIIK22m	3K2m	175	195	20	1.5	98.5	49.1	48.4	*1.3*	1.49	*1.6*	0.721	0.021	0.700	14.00	Stg. III
-3g	IIIK22m	3K3m	195	240	45	1.0	99.0	52.5	52.0	*1.3*	1.57	*1.6*	0.816	0.021	0.795	35.79	Stg. III
-3h	IIIK3m	3K4	240	350	110	1.0	99.0	24.2	24.0	*1.3*	1.58	*1.6*	0.379	0.021	0.358	39.40	Stg. III-
-3i	IIICca	3Bk2	350	450	100	*5.0*	*95.0*	*12.0*	*11.4*	*1.3*	*1.60*	*1.6*	*0.182*	0.021	0.161	16.14	Stg. II+
N.S.	IIICn	3Cu	450	N.E.	N.A.	10.0	90.0	1.4	1.3	*1.3*	*1.60*	*1.6*	*0.021*	0.021	0.000	0.00	Stg. II
																123.88	Total

Site No. 10

Profile No. 5/30/74-2 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: La Mesita Negra SE 7.5′ (P) | Lat. 35° 04′ 38″ N, Long. 106° 46′ 42″ W | Unsurveyed, Town of Atrisco Grant

County: Bernalillo | UTM: 3,882,800 N; 337,600 E; Zone 13 | Elevation: 5680 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: May 30, 1974.

Comments: Soil X, east of Bernalillo County Dump fault (see Machette, 1978c). Thick aggradational profile buries soil Y. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thickness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
5/30/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	K21m	K1m	0	30	30	*5.0*	*95.0*	*20.0*	*18.0*	*2.0*	*1.70*	*1.6*	0.306	0.032	0.274	8.22	Stg. III
-2a	K22m	K2m	30	88	58	7.0	93.0	19.6	18.2	*2.0*	1.73	*1.6*	0.315	0.032	0.283	16.41	Stg. III
-2b	K23m	K3m	88	118	30	1.0	99.0	46.3	45.8	*2.0*	1.96	*1.6*	0.898	0.032	0.866	25.97	Stg. III+
-2c	K3m	K4	118	170	52	2.0	98.0	24.4	23.9	*2.0*	1.85	*1.6*	0.442	0.032	0.410	21.33	Stg. III-
-2d	Cca1	Bk1	170	200	30	1.0	99.0	6.2	6.1	*2.0*	*1.70*	*1.6*	0.104	0.032	0.072	2.15	Stg. II-
-2e	Cca2	Bk2	200	250	50	4.0	96.0	8.7	8.4	*2.0*	*1.70*	*1.6*	0.143	0.032	0.111	5.54	Stg. II-
-2f	Cca3	Bk3	250	410	160	*3.0*	*97.0*	*4.1*	*4.0*	*2.0*	*1.65*	*1.6*	0.066	0.032	0.034	5.44	Stg. I
N.S.	Cn	Cu	410	N.E.	N.A.	*0.0*	*100.0*	*2.0*	*2.0*	*2.0*	*1.60*	*1.6*	0.032	0.032	0.000	0.00	
																85.06	Total

Site No. 11

Profile No. 6/04/74-3 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: La Mesita Negra SE 7.5' (P) | Lat. 35° 04' 40" N, Long. 106° 46' 45" W | Unsurveyed, Town of Atrisco Grant

County: Bernalillo | UTM: 3,882,875 N; 337,880 E; Zone 13 | Elevation: 5680 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 4, 1974

Comments: Relict soil from E end of Llano de Albuquerque surface at the Bernalillo County Dump. Sampled at K&P triangulation station, which is Machette's (1978c) plane table station A. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/04/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	K21m	K1m	0	15	15	0.0	100.0	*45.0*	*45.0*	*1.8*	*1.70*	*1.65*	0.765	0.030	0.735	11.03	Stg. III+
-3a	K22m	K2m	15	35	20	2.5	97.5	53.3	52.0	*1.8*	1.77	*1.65*	0.920	0.030	0.890	17.81	Stg. III+
-3b	K31m	K3m	35	75	40	1.0	99.0	47.1	46.6	*1.8*	1.53	*1.65*	0.713	0.030	0.683	27.32	Stg. III+
-3c	K32m	K4	75	150	75	3.0	97.0	29.1	28.2	*1.8*	1.71	*1.65*	0.482	0.030	0.452	33.92	Stg. III-
-3d	Cca	Bk	150	200	50	4.0	96.0	14.6	14.0	*1.8*	*1.70*	*1.65*	0.238	0.030	0.208	10.40	Stg. II
N.S.	Cn	Cu	200	N.E.	N.A.	*5.0*	*95.0*	*1.9*	*1.8*	*1.8*	*1.65*	*1.65*	0.030	0.030	0.000	0.00	
																100.48	Total

Site No. 12

Profile No. 78M-6 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: La Mesita Negra SE 7.5′ (P) | Lat. 35° 04′ 43″ N, Long. 106° 46′ 19″ W | Unsurveyed, Town of Alameda Grant

County: Bernalillo | UTM: 3,837,940 N; 338,555 E; Zone 13 | Elevation: 5660 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: December 14, 1978

Comments: Location approximate; sampling for U–Th analysis, bulk densities, and $CaCO_3$ contents; field notes unavailable. Comprises soils VXYZ of Machette (1978c). Soil U is 123 cm (4.8 ft) above top of sampled section. See also Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
78M	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-6g	K	K	63	0	63	3.4	96.6	30.0	29.0	*1.5*	*1.75*	1.7	0.508	0.026	0.482	30.33	Soil V
-6a	K11m	2K2m	0	35	35	1.3	98.7	38.1	37.6	*1.5*	1.75	1.7	0.658	0.026	0.632	22.12	Stg. III
-6b	K12m	2K3m	35	50	15	2.1	97.9	45.5	44.5	*1.5*	1.80	1.7	0.801	0.026	0.775	11.63	Stg. III
-6c	K22m	2K4m	50	75	25	0.6	99.4	51.0	50.7	*1.5*	1.72	1.7	0.872	0.026	0.846	21.15	Stg. III+
-6d	K23m	2K5m	75	92	17	0.3	99.7	37.3	37.2	*1.5*	1.70	1.7	0.632	0.026	0.606	10.31	Stg. III
-6e	K3	2K6	92	122	30	6.2	93.8	18.7	17.5	*1.5*	1.70	1.7	0.298	0.026	0.272	8.15	Stg. III-
-6f	Cca	2Bk	122	160	38	5.4	94.6	11.2	10.6	*1.5*	*1.75*	1.7	0.186	0.026	0.160	6.06	Stg. II
N.S.	Cn	2Cu	160	N.E.	N.A.	*5.4*	*94.6*	*1.6*	*1.5*	*1.5*	*1.75*	1.7	0.030	0.026	0.000	0.00	
Soil XYZ																79.52	Subtotal
Soil VXYZ																109.85	Total

Site No. 13

Profile No. 6/03/74-2 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: La Mesita Negra SE 7.5′ (P) | Lat. 35° 00′ 45″ N, Long. 106° 46′ 18″ W | Unsurveyed, Town of Atrisco Grant

County: Bernalillo | UTM: 3,875,640 N; 338,300 E; Zone 13 | Elevation: 5480 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 3, 1974

Comments: Location about 0.9 km (0.55 mi) N of Good triangulation station (USCGS, #1071, 1969) on eastern margin of the Llano de Albuquerque. Natural exposure of eolian sand over slightly pebbly alluvium (upper Santa Fe Group sediment). Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/03/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cca	Bk1	0	20	20	*0.0*	*100.0*	*2.5*	*2.5*	*1.5*	*1.60*	*1.6*	0.040	0.024	0.016	0.32	N.R.
-2a	IIK1m	2K1	20	43	23	7.0	93.0	15.3	14.2	*1.5*	1.90	*1.6*	0.270	0.024	0.246	5.66	Stg. II+
-2b	IIK2m	2K2m	43	86	43	4.0	96.0	45.9	44.1	*1.5*	1.88	*1.6*	0.830	0.024	0.806	34.62	Stg. III+
-2c	IIK3m	2K3m	86	126	40	0.0	100.0	34.4	34.4	*1.5*	1.74	*1.6*	0.599	0.024	0.575	22.98	Stg. III-
-2d	IIC2ca	2Bk2	126	160	34	1.0	99.0	19.2	19.0	*1.5*	*1.70*	*1.6*	0.332	0.024	0.299	10.17	Stg. III to II
-2e	IIICca	3Bk1	160	175	15	3.0	97.0	20.0	19.4	*1.5*	*1.70*	*1.6*	0.330	0.024	0.306	4.59	Stg. II
-2f	IIIK2m	3K2m	175	205	30	1.0	99.0	36.9	36.5	*1.5*	1.86	*1.6*	0.679	0.024	0.655	19.65	Stg. III
-2g	IIIK3m	3K3m	205	245	40	1.0	99.0	24.6	24.4	*1.5*	1.75	*1.6*	0.427	0.024	0.403	16.12	Stg. III- to II
-2h	IIIC2ca	3Bk2	245	315	70	2.0	98.0	5.2	5.1	*1.5*	*1.70*	*1.6*	0.087	0.024	0.063	4.39	Stg. II
N.S.	IIICn	3Cu	315	N.E.	N.A.	*2.0*	*98.0*	*1.5*	*1.5*	*1.5*	*1.60*	*1.6*	0.000	0.024	0.000	0.00	
																118.50	Total

Site No. 14

Profile No. 7/23/75-1 Unit or Surface: Primero Alto Landform: Terrace

Quadrangle: Albuquerque West 7.5' (Q) Lat. 35° 03' 16" N, Long. 106° 42' 25" W Unsurveyed, Town of Atrisco Grant

County: Bernalillo UTM: 3,880,300 N; 344,250 E; Zone 13 Elevation: 4990 ft

Described by Michael Machette Sampled by Michael Machette Sampling date: July 23, 1975

Comments: Sampled in north end of gravel pit west of Coors Road and east of the San Jose cemetery in Arenal. Location from Machette's notes for soil profile no. 8/10/74. Terrace is about 14 m (45 ft) above the Rio Grande. Physiographic surface named by Lambert (1968); see also Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/23/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	A/Bs	A/Bs	0	35	35	*0.0*	*100.0*	*0.0*	*0.5*	*1.0*	*1.65*	*1.7*	0.008	0.017	-0.009	-0.32	
-1a	C1ca	Bk1	35	53	18	2.0	98.0	6.9	6.8	*1.0*	1.65	*1.7*	0.112	0.017	0.095	1.71	Stg. II-
-1b	C21ca	Bk2	53	90	37	14.0	86.0	12.2	10.5	*1.0*	1.77	*1.7*	0.186	0.017	0.169	6.25	Stg. II
-1c	C22ca	Bk3	90	123	33	35.0	65.0	16.8	10.9	*1.0*	1.90	*1.7*	0.207	0.017	0.190	6.27	Stg. II+
-1d	C3ca	Bk4	123	143	20	17.0	83.0	3.6	3.0	*1.0*	*1.75*	*1.7*	0.053	0.017	0.036	0.71	Stg. II-
N.S.	Cn	Cu	143	N.E.	N.A.				*1.0*	*1.0*	*1.70*	*1.7*	0.017	0.017	0.000	0.00	
																14.62	Total

Site No. 15

Profile No. 7/23/75-2 | Unit or Surface: Primero Alto | Landform: Terrace

Quadrangle: Albuquerque West 7.5' (Q) | Lat. 35° 00' 58" N, Long. 106° 43' 18" W | Unsurveyed, Town of Atrisco Grant

County: Bernalillo | UTM: 3,875,910 N; 342,930 E; Zone 13 | Elevation: 4980 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 23, 1975

Comments: Sampled about 580 m (1900 ft) W of Coors Road and 1.6 km (1.0 mi) south of Barcelona Road. Older alluvium (Qao) of Lambert (1968) forms Primero Alto terrace, which is about 15 m (50 ft) above the Rio Grande. See also Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/23/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	A/Bs	A/Bs	0	43	43	0.0	100.0	1.0	1.0	*1.0*	*1.70*	*1.7*	0.017	0.017	0.000	0.00	
-2a	C1ca	Bk1	43	65	22	22.0	78.0	13.5	10.5	*1.0*	1.72	*1.7*	0.181	0.017	0.164	3.60	N.R.
-2b	C2ca	Bk2	65	90	25	16.0	84.0	18.5	15.5	*1.0*	1.78	*1.7*	0.276	0.017	0.259	6.47	N.R.
-2c	C3ca	Bk3	90	115	25	43.0	57.0	4.7	2.7	*1.0*	*1.75*	*1.7*	0.047	0.017	0.030	0.76	N.R.
N.S.	Cn	Cu	115	N.E.	N.A.	25.0	75.0	*2.0*	1.5	*1.0*	*1.70*	*1.7*	0.034	0.017	0.007	0.00	
																10.83	Total

Site No. 16

Profile No. 7/10/74-3 | Unit or Surface: Sunport (Albuquerque Airport) | Landform: Distal piedmont slope

Quadrangle: Albuquerque East 7.5' (R) | Lat. 35° 01' 52" N, Long. 106° 36' 40" W | $SW^1/_4$ $SW^1/_4$ $SE^1/_4$ Sec. 3 T9N R3W

County: Bernalillo | UTM: 3,877,500 N; 352,975 E; Zone 13 | Elevation: 5300 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 10, 1974

Comments: Sampled on north side of Tijeras Arroyo at south end of N–S runway for Albuquerque International airport. Surface probably equivalent to Llano de Manzano of Machette (1985). Total secondary $CaCO_3$ does not include sample 7/10/74-3a in calculation. Physiographic surface projects to about 114 m (375 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/10/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-3a	Cn	Cu	0	0	0	0.0	100.0	1.0	1.0	*1.0*	*1.60*	*1.6*	0.016	0.016	0.000	0.00	
-3b	IICca	2Bk	0	20	20	2.0	98.0	6.6	6.5	*1.0*	1.60	*1.6*	0.104	0.016	0.088	1.76	Stg. II-
-3c	IIK1m	2K1m	0	45	45	3.0	97.0	42.8	41.5	*1.0*	1.73	*1.6*	0.718	0.016	0.702	31.59	Stg. III
-3d	IIK2m	2K2m	45	65	20	2.0	98.0	54.1	53.0	*1.0*	1.66	*1.6*	0.880	0.016	0.864	17.28	Stg. III+
-3e	IIK3m	2K3	65	105	40	1.5	98.5	27.7	27.3	*1.0*	*1.65*	*1.6*	0.450	0.016	0.434	17.38	Stg. III-
-3f	IICca	2Bk	105	170	65	2.0	98.0	10.1	*9.9*	*1.0*	*1.60*	*1.6*	0.158	0.016	0.142	9.26	Stg. II
N.S.	IICn	2Cu	170	N.E.	N.A.	*2.0*	*98.0*	*1.0*	*1.0*	*1.0*	*1.60*	*1.6*	0.016	0.016	0.000	0.00	
																77.27	Total

Site No. 17

Profile No. 8/07/76-1 | Unit or Surface: Llano de Manzano | Landform: Distal piedmont slope

Quadrangle: Albuquerque East 7.5′ (R) | Lat. 35° 00′ 29″ N, Long. 106° 36′ 40″ S | Approx. SW¼ NE ¼ Sec. 15 T9N R3E

County: Bernalillo | UTM: 3,874,950 N; 352,950 E; Zone 13 | Elevation: 5295 ft

Described by George Bachman | Sampled by George Bachman | Sampling date: August 7, 1976

Comments: Location approximate at head of south-trending swale, south margin of Tijeras Canyon north of E–W landing strip. Soil is probably overthickened and overdeveloped owing to landscape position (ie, some surface groundwater component to secondary $CaCO_3$). Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
8/07/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cca	Bk	0	80	80	*0.0*	*100.0*	*8.0*	*8.0*	2.50	*1.60*	1.65	0.128	0.041	0.087	6.96	Stg. II
-1a	IIK21m	2K1m	80	155	75	0.0	100.0	16.2	16.2	2.50	1.77	1.65	0.289	0.041	0.246	18.41	Stg. III-
-1b	IIK22m	2K2m	155	255	100	0.0	100.0	47.6	47.6	2.50	1.69	1.65	0.804	0.041	0.763	76.34	Stg. III+
-1e	IIK23m	2K3m	255	305	50	0.0	100.0	43.1	43.1	2.50	1.62	1.65	0.698	0.041	0.657	32.85	Stg. III+
-1c	IIK3	2K4	305	370	65	0.0	100.0	15.6	15.6	2.50	1.83	1.65	0.285	0.041	0.244	15.89	Stg. III-
-1d	IICca	2Bk	370	380	10	0.0	100.0	10.2	10.2	2.50	1.67	1.65	0.170	0.041	0.129	1.29	Stg. II
N.S.	IICn	2Cu	380	N.E.	N.A.	*0.0*	*100.0*	*2.5*	*2.5*	2.50	*1.65*	1.65	0.041	0.041	0.000	0.00	
																151.76	Total

Site No. 18

Profile No. 6/03/74-1 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Wind Mesa 7.5′ (C2) | Lat. 34° 59′ 50″ N, Long. 106° 46′ 03″ W | Unsurveyed, Parajito Grant

County: Bernalillo | UTM: 3,873,950 N; 338,700 E; Zone 13 | Elevation: 5390 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 3, 1974

Comments: West of US Interstate Highway 25, opposite Isleta Pueblo. Sampling locality along eastern edge of the Llano de Albuquerque in natural exposure. Base covered, so total secondary $CaCO_3$ is an estimate. Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/03/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	Cca	Bk	0	33	33	0.0	100.0	3.2	3.2	*1.5*	*1.65*	*1.65*	0.053	0.025	0.028	0.92	N.R.
N.S.	IICca	2Bk1	33	53	20	*5.0*	*95.0*	*25.0*	*23.8*	*1.5*	1.70	*1.65*	0.405	0.025	0.380	7.59	N.R.
-1b	IIK2m	2K1m	53	83	30	5.0	95.0	39.2	37.2	*1.5*	1.66	*1.65*	0.618	0.025	0.593	17.78	N.R.
-1c	IIK3m	2K2m	83	128	45	7.0	93.0	25.0	23.2	*1.5*	1.80	*1.65*	0.418	0.025	0.393	17.67	N.R.
-1d	IICca	2Bk2	128	178	50	5.0	95.0	18.9	18.0	*1.5*	1.70	*1.65*	0.306	0.025	0.281	14.05	N.R.
N.S.	IICca	2Bk3	178	250	72	*5.0*	*95.0*	*10.0*	*9.5*	*1.5*	*1.70*	*1.65*	0.162	0.025	0.137	19.83	N.R.
N.S.	IICn	2Cu	250	N.E.	N.A.	*5.0*	*95.0*	*1.60*	*1.5*	*1.5*	*1.65*	*1.65*	0.025	0.025	0.000	0.00	
																67.84	Total

Site No. 19

Profile No. 7/10/74-1 | Unit or Surface: Llano de Manzano | Landform: Distal piedmont slope

Quadrangle: Isleta 7.5′ (D2) | Lat. 34° 59′ 35″ N, Long. 106° 37′ 54″ W | NW¼ NE¼ SW¼ Sec. 21 T9N R 3W

County: Bernalillo | UTM: 3,873,280 N; 351,100 E; Zone 13 | Elevation: 5300 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 10, 1974

Comments: Sampled on south side of Tijeras Arroyo along northern margin of the Llano de Manzano. Surface probably equivalent to Sunport surface according to Machette (1985) (see soil profile 7/10/74-3). Physiographic surface is about 117 m (385 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/10/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	C1ca	Bk1	0	25	25	*5.0*	*95.0*	*5.1*	4.8	*1.5*	*1.60*	*1.6*	0.077	0.024	0.053	1.32	Stg. I
-1f	C2ca	Bk2	25	50	25	9.0	91.0	5.2	*10.0*	*1.5*	*1.60*	*1.6*	0.160	0.024	0.136	3.40	Stg. II
-1a	IIK1m	2K1	50	62	12	2.0	98.0	23.4	22.9	*1.5*	1.58	*1.6*	0.362	0.024	0.338	4.05	Stg. III-
-1b	IIK2m	2K2m	62	82	20	1.0	99.0	54.9	54.4	*1.5*	1.61	*1.6*	0.876	0.024	0.852	17.04	Stg. III+
-1c	IIK32	2K3	82	102	20	4.0	96.0	31.6	30.3	*1.5*	*1.60*	*1.6*	0.485	0.024	0.461	9.22	Stg. III-
-1d	IIK33	2K4	102	145	43	3.0	97.0	25.8	25.0	*1.5*	1.52	*1.6*	0.380	0.024	0.356	15.31	Stg. III-
-1e	IICca	2Bk	145	210	65	2.0	98.0	9.5	9.3	*1.5*	*1.60*	*1.6*	0.149	0.024	0.125	8.11	Stg. II
N.S.	IICn	2Cu	210	N.E.	N.A.	*2.0*	*98.0*	*1.5*	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
																58.45	Total

Site No. 20

Profile No. 7/16/74-2 | Unit or Surface: Unmapped Quaternary alluvium | Landform: Terrace

Quadrangle: Los Lunas 7.5′ (I2) | Lat. 34° 46′ 07″ N, Long. 106° 39′ 57″ W | SW¼ SW¼ SE¼ Sec. 6 T6N R3E

County: Valencia | UTM: 3,848,375 N; 347,480 E; Zone 13 | Elevation: 5010 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 16, 1974

Comments: Same sampling location as soil profile no. 6/05/74-2. Thick cover of recent eolian sand over a well-preserved soil on late(?) or middle Pleistocene terrace cut into Llano de Manzano. Terrace forms broad south-sloping surface graded to a position about 55 m (180 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/16/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-2a	Cn	Cu	100+	0	0	5.0	95.0	2.4	2.3	*2.0*	*1.65*	*1.65*	0.038	0.033	0.005	0.00	
-2b	IICca	2Bk1	0	18	18	6.0	94.0	19.3	18.1	*1.0*	1.76	*1.65*	0.319	0.017	0.302	5.43	Stg. II-
-2c	IIK1m	2K1m	18	36	18	4.0	96.0	25.1	24.1	*1.0*	1.64	*1.65*	0.398	0.017	0.378	6.85	Stg. III-
-2d	IIK2m	2K2m	36	64	28	3.0	97.0	27.1	26.3	*1.0*	1.63	*1.65*	0.429	0.017	0.412	11.53	Stg. III-
-2e	IIK3m	2K3m	64	100	36	4.0	96.0	16.2	15.6	*1.0*	1.74	*1.65*	0.271	0.017	0.254	9.16	Stg. II+
-2f	IICca	2Bk2	100	150	50	10.0	90.0	8.8	7.9	*1.0*	*1.70*	*1.65*	0.134	0.017	0.117	5.87	Stg. II
-2g	IIC2ca ox	2Bsk	150	190	40	1.0	99.0	1.6	1.6	*1.0*	*1.65*	*1.65*	0.026	0.017	0.009	0.38	Stg. II to I
N.S.	IICn	2Cu	190	N.E.	N.A.	*1.0*	*99.0*	*1.0*	*1.0*	*1.0*	*1.65*	*1.65*	0.017	0.017	0.000	0.00	
																39.22	Total

Site No. 21

Profile No. 6/05/74-2 | Unit or Surface: Unmapped Quaternary alluvium | Landform: Terrace

Quadrangle: Los Lunas 7.5′ (I2) | Lat. 34° 46′ 07″ N, Long. 106° 39′ 57″ W | SW¼ SW¼ SE¼ Sec. 6 T6N R3E

County: Valencia | UTM: 3,848,375 N; 347,480 E; Zone 13 | Elevation: 5010 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 16, 1974

Comments: Same sampling location as soil profile no. 7/16/74-2. Thick cover of recent eolian sand over a well-preserved soil on late(?) or middle Pleistocene terrace cut into Llano de Manzano. Terrace forms broad south-sloping surface graded to a position about 55 m (180 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/05/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-2a	Cn	Cu	100+	0	0	5.0	95.0	2.4	2.3	*2.0*	*1.65*	*1.65*	0.038	0.033	0.005	0.00	
-2b	IICca	2Bk1	0	18	18	6.0	94.0	19.3	18.1	*1.0*	1.76	*1.65*	0.319	0.017	0.302	5.44	Stg. II-
-2c	IIK1m	2K1m	18	36	18	4.0	96.0	25.1	24.1	*1.0*	1.64	*1.65*	0.395	0.017	0.378	6.81	Stg. III-
-2d	IIK2m	2K2m	36	64	28	3.0	97.0	27.1	26.3	*1.0*	1.63	*1.65*	0.428	0.017	0.412	11.53	Stg. III-
-2e	IIK3m	2K3m	64	100	36	4.0	96.0	16.2	15.6	*1.0*	1.74	*1.65*	0.271	0.017	0.254	9.16	Stg. II+
-2f	IICca	2Bk2	100	150	50	10.0	90.0	8.8	7.9	*1.0*	*1.70*	*1.65*	0.134	0.017	0.117	5.87	Stg. II
-2g	IIC2caox	2Boxk	150	190	40	1.0	99.0	1.6	1.6	*1.0*	*1.65*	*1.65*	0.026	0.017	0.009	0.38	Stg. II to I
N.S.	IICn	2Cu	190	N.E.	N.A.	*1.0*	*99.0*	*1.0*	*1.0*	*1.0*	*1.65*	*1.65*	0.017	0.017	0.000	0.00	
																39.21	Total

Site No. 22

Profile No. 7/24/75 | Unit or Surface: Frost Ranch | Landform: Piedmont slope

Quadrangle: Mesas Mojinas 7.5' (K2) | Lat. 34° 40' 34" N, Long. 107° 01' 35" W | Boundary of Sec. 10/11 T5N R2W

County: Valencia | UTM: 3,836,800 N; 314,500 E; Zone 13 | Elevation: 5600 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 24, 1975

Comments: On boundary of two sections, ca 0.4 km (0.25 mi) S of north edge of sections. Uplifted post-Llano de Albuquerque surface on southwest margin of the Gabaladon badlands (source is unpublished mapping by Machette, ca 1975). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/24/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Bsca	Bsk	0	30	30	0.0	100.0	*5.0*	*5.0*	*2.0*	*1.60*	*1.65*	0.080	0.033	0.047	1.41	Stg. I+
-1	K1m	K1m	30	48	18	11.0	89.0	32.7	29.1	*2.0*	1.80	*1.65*	0.521	0.033	0.491	8.83	Stg. III
-2	K2m	K2m	48	80	32	23.0	77.0	23.2	17.9	*2.0*	1.91	*1.65*	0.309	0.033	0.309	9.88	Stg. III
-3	K31m	K3m	80	110	30	3.0	97.0	14.9	14.5	*2.0*	1.65	*1.65*	0.204	0.033	0.206	6.19	Stg. III- to II
-4	K32m	K4m	110	170	60	4.0	94.0	18.8	17.7	*2.0*	1.71	*1.65*	0.303	0.033	0.270	16.18	Stg. III-
-5	Cca	Bk	170	190	20	2.0	98.0	12.0	11.8	*2.0*	1.66	*1.65*	0.196	0.033	0.163	3.26	Stg. II-
N.S.	Cn	Cu	190	N.E.	N.A.	*5.0*	*95.0*	*2.1*	*2.0*	*2.0*	*1.65*	*1.65*	0.033	0.033	0.000	0.00	
																45.75	Total

Site No. 23

Profile No. 5/30/74-1 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Belen 7.5′ (M2) | Lat. 34° 39′ 02″ N, Long. 106° 48′ 38″ W | Unsurveyed, Belen Grant

County: Valencia | UTM: 3,835,475 N; 334,025 E, Zone 13 | Elevation: 5175 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: May 30, 1974

Comments: Resampled on January 13, 1976 (soil profile no. 1/13/76-4). Location on eastern margin of the Llano de Albuquerque on N side of Camino del Llano road, west of Belen dump (now abandoned). Surface is about 116 m (380 ft) above the Rio Grande. Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
5/30/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	Cca	Bk	0	38	38	1.0	99.0	9.9	9.8	*1.5*	*1.70*	*1.6*	0.167	0.024	0.143	5.42	Stg. II
-1b	IIAca	2Ak	38	60	22	3.0	97.0	3.2	3.1	*1.5*	*1.70*	*1.6*	0.053	0.024	0.029	0.63	Stg. I
-1c	IICca	2Bk	60	75	15	5.0	95.0	16.1	15.3	*1.5*	*1.70*	*1.6*	0.260	0.024	0.236	3.54	Stg. II
-1d	IIK21m	2K1m	75	85	10	2.0	98.0	35.8	35.1	*1.5*	*1.75*	*1.6*	0.614	0.024	0.590	5.90	Stg. III
-1e	IIK22m	2K2m	85	110	25	0.5	99.5	50.7	50.5	*1.5*	*1.80*	*1.6*	0.909	0.024	0.885	22.13	Stg. III+
-1f	IIK23m	2K3m	110	130	20	1.0	99.0	45.6	45.1	*1.5*	*1.75*	*1.6*	0.798	0.024	0.765	15.31	Stg. III+
-1g	IIK3	2K4	130	180	50	2.0	98.0	23.1	22.6	*1.5*	*1.70*	*1.6*	0.384	0.024	0.360	18.01	Stg. II+
N.S.	IIICca	3Bk	180	285	105	*0.0*	*100.0*	14.0	*14.0*	*1.5*	*1.65*	*1.6*	*0.231*	0.024	0.207	21.74	Stg. II+ to II
N.S.	IVCca	4Bk	285	350	65	*75.0*	*25.0*	20.0	*5.0*	*1.5*	*1.60*	*1.6*	*0.080*	0.024	0.056	3.64	Stg. II
N.S.	VCn	5Cu	350	N.E.	N.A.	*75.0*	*25.0*	6.0	*1.5*	*1.5*	*1.60*	*1.6*	*0.024*	0.024	0.000	0.00	
																96.32	Total

Site No. 24

Profile No. 1/13/76-4 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Belen 7.5′ (M2) | Lat. 34° 39′ 02″ N, Long. 106° 48′ 38″ W | Unsurveyed, Belen Grant

County: Valencia | UTM: 3,835,475 N; 334,025 E; Zone 13 | Elevation: 5175 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: January 13, 1976

Comments: Resampling of soil profile no. 5/30/74-1. Location on eastern margin of the Llano de Albuquerque on N side of Camino del Llano road, west of Belen dump (now abandoned). Surface is about 116 m (380 ft) above the Rio Grande. Physiographic surface from Machette (1985). N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1/13/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-4a	Cca	Bk	0	75	75	0.0	100.0	7.1	7.1	*1.5*	1.53	*1.6*	0.109	0.024	0.085	6.35	N.R.
-4b	IIK21m	2K1m	75	85	10	2.0	98.0	56.1	55.0	*1.5*	1.41	*1.6*	0.776	0.024	0.752	7.52	N.R.
-4c	IIK21m	2K2m	85	110	25	1.0	99.0	42.8	42.4	*1.5*	1.40	*1.6*	0.594	0.024	0.570	14.25	N.R.
-4d	IIK23m	2K3m	110	130	20	1.0	99.0	35.8	35.4	*1.5*	1.42	*1.6*	0.503	0.024	0.478	9.59	N.R.
-4e	IIK31	2K4	130	155	25	0.0	100.0	35.8	35.8	*1.5*	1.62	*1.6*	0.580	0.024	0.556	13.90	N.R.
-4f	IIK32	2K5	155	180	25	1.0	99.0	20.4	20.2	*1.5*	1.52	*1.6*	0.307	0.024	0.283	7.08	N.R
-4g	IIICca	3Bk1	180	230	50	0.0	100.0	9.0	9.0	*1.5*	*1.60*	*1.6*	0.144	0.024	0.120	6.00	N.R.
-4h	IICca2	3Bk2	230	285	55	0.0	100.0	*9.0*	*9.0*	*1.5*	*1.60*	*1.6*	0.144	0.024	0.120	6.60	N.R.
-4i	IVCca	4Bk	285	317	32	0.0	100.0	4.5	4.5	*1.6*	*1.60*	*1.6*	0.072	0.026	0.048	1.47	N.R.
-4j	VCn	5Cu	317	350	33	0.0	100.0	*1.5*	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
																72.76	Total

Site No. 25

Profile No. 7/03/74-3 | Unit or Surface: Llano de Manzano | Landform: Distal piedmont slope

Quadrangle: Tome 7.5′ (N2) | Lat. 34° 43′ 28″ N, Long. 106° 40′ 52″ W | Unsurveyed, Tome Grant

County: Valencia | UTM: Not shown on map. | Elevation: 4990 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 3, 1974

Comments: About 2.4 km (1.5 mi) E of El Cerro and Tome cemetery. May represent distal portion of piedmont slope (Llano de Manzano) or fluvial terrace (?) that is about 54 m (180 ft) above the Rio Grande. Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/03/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cca	Bk	*50+*	*0*	*50*	*0.0*	*100.0*	*3.0*	*3.0*	*1.5*	*1.70*	*1.6*	0.051	0.024	0.027	1.35	N.R.
-3a	IIK1m	2K1m	0	20	20	1.0	99.0	27.6	27.3	*1.5*	1.71	*1.6*	0.467	0.024	0.443	8.86	N.R.
-3b	IIK2m	2K2m	20	42	22	1.0	99.0	24.0	23.8	*1.5*	1.74	*1.6*	0.414	0.024	0.390	8.58	N.R.
-3c	IIK3	2K3	42	112	70	4.0	96.0	15.9	14.3	*1.5*	*1.70*	*1.6*	0.243	0.024	0.219	15.34	N.R.
N.S.	IICca	2Bk	112	162	50	*5.0*	*95.0*	*8.4*	8.0	*1.5*	*1.60*	*1.6*	0.128	0.024	0.104	5.20	N.R.
N.S.	IICn	2Cu	162	N.E.	N.A.	*5.0*	*95.0*	*1.6*	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
																39.33	Total

Site No. 26

Profile No. 6/09/76-1 | Unit or Surface: Canada Mariana pediment | Landform: Piedmont slope

Quadrangle: Belen SW 7.5′ (Q2) | Lat. 34° 31′ 00″ N, Long. 106° 58′ 08″ W | SW¼ SE¼ NW¼ Sec. 5 T3N R1W

County: Socorro | UTM: Not shown on map. | Elevation: 5120 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 9, 1976

Comments: Sampling locality is on the north bank of Mariano Draw in thin piedmont-slope alluvium that is unconformable across axial river gravels of the upper Santa Fe Group. Denny (1940) mapped this piedmont slope surface as part of the Canada Mariana pediment, which is graded to a position about 15 m (50 ft) above the Rio Grande. As this site, the soil is about 13 m (45 ft) above Mariano Draw (local base level). The soil is formed on an anomalous slope that may be an ancient highly eroded fault scarp, but this relation has not been proven. Another second soil located 1.5–1.8 m (5–6 ft) below sample -1f may represent burial from scarp erosion processes. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/09/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	Aca	Ak	0	15	15	6.0	94.0	13.6	12.8	*1.5*	1.51	1.65	0.193	0.025	0.168	2.52	
-1b	IICca	2Bk1	15	30	15	9.0	91.0	27.2	24.8	*1.5*	*1.60*	1.65	0.397	0.025	0.372	5.58	Stg. III
-1c	IIK2m	2K1m	30	52	22	4.0	96.0	52.9	50.8	*1.5*	*1.70*	1.65	0.864	0.025	0.839	18.45	Stg. III+
-1d	IIK31	2K2	52	70	18	24.0	76.0	32.5	24.7	*1.5*	*1.70*	1.65	0.420	0.025	0.395	7.11	Stg. III
-1e	IIK32	2K3	70	83	13	6.0	94.0	24.5	23.0	*1.5*	*1.70*	1.65	0.391	0.025	0.366	4.76	Stg. III-
-1f	IICca	2Bk2	83	105	22	10.0	90.0	18.1	16.3	*1.5*	1.76	1.65	0.287	0.025	0.262	5.76	Stg. III-
N.S.	IICn	2Cu	105	N.E.	N.A.	*10.0*	*90.0*	*1.7*	*1.5*	*1.5*	*1.65*	1.65	0.025	0.025	0.000	0.00	
																44.18	Total

Site No. 27

Profile No. 1/13/76-6

Quadrangle: Turn 7.5′ (S2)

County: Valencia

Described by Michael Machette

Unit or Surface: Unmapped

Lat. 34° 34′ 35″ N, Long. 106° 42′ 12″ W

UTM: Not shown on map.

Sampled by Michael Machette

Landform: Distal piedmont slope or terrace

Unsurveyed, Tome Grant

Elevation: 4950 ft

Sampling date: January 13, 1976

Comments: Location ca 750 m (2,500 ft) SE of Turn triangulation station, elev. 4953 ft, in railroad cut south of switch box, ca one-third the way NW through railroad cut. Soil is formed on Quaternary deposit that is either a downdropped element of the Llano de Manzano or a younger inset alluvial terrace of the Rio Grande. Surface is about 52 m (170 ft) above the Rio Grande. If downfaulted, the soil may be equivalent to soil profiles at sites 7/03/74-1 and 7/03/74-2 to the southeast. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1/13/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Bs	Bs	0	20	20	*0.0*	*100.0*	*2.0*	*2.0*	*2.0*	*1.65*	*1.6*	0.033	0.032	0.001	0.02	
N.S.	Bsca	Bsk	20	40	20	*0.0*	*100.0*	*4.0*	*4.0*	*2.0*	*1.65*	*1.6*	0.066	0.032	0.034	0.68	Stg. I
-6a	C1ca	Bk1	40	75	35	2.0	98.0	7.9	7.7	*2.0*	1.78	*1.6*	0.137	0.032	0.105	3.70	Stg. II
-6b	C2ca	Bk2	75	113	38	3.0	97.0	8.6	8.3	*2.0*	1.85	*1.6*	0.154	0.032	0.122	4.65	Stg. II
-6c	K1m	K1m	113	125	12	3.0	97.0	28.5	27.7	*2.0*	1.72	*1.6*	0.476	0.032	0.444	5.33	Stg. III-
-6d	K22m	K2m	125	143	18	2.0	98.0	28.6	28.0	*2.0*	1.77	*1.6*	0.496	0.032	0.464	8.34	Stg. III-
-6e	K23m	K3m	143	158	15	5.0	95.0	37.0	35.2	*2.0*	1.65	*1.6*	0.581	0.032	0.549	8.23	Stg. III
-6f	K31m	K4m	158	176	18	1.0	99.0	35.2	34.9	*2.0*	1.63	*1.6*	0.569	0.032	0.537	9.66	Stg. III
-6g	K32m	K5m	176	210	34	1.0	99.0	29.4	29.1	*2.0*	1.78	*1.6*	0.518	0.032	0.486	16.52	Stg. III-
-6h	K33	K6	210	256	46	1.0	99.0	14.3	14.2	*2.0*	1.69	*1.6*	0.240	0.032	0.208	9.57	Stg. II
-6i	Cca	Bk3	256	276	20	0.0	100.0	5.0	5.0	*2.0*	1.60	*1.6*	0.080	0.032	0.048	0.96	Stg. II-
N.S.	Cn	Cu	276	N.E.	N.A.		100.0	2.0	2.0	*2.0*	1.60	*1.6*	0.032	0.032	0.000	0.00	
																67.60	Total

Site No. 28

Profile No. 7/03/74-2 | Unit or Surface: Llano de Manzano | Landform: Distal piedmont slope

Quadrangle: Turn 7.5′ (S2) | Lat. 34° 32′ 29″ N, Long. 106° 39′ 57″ W | Unsurveyed, Casa Colorado (Belen) Grant

County: Valencia | UTM: Not shown on map. | Elevation: 5050 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 3, 1974

Comments: In railroad cut, ca 1.5 km (1 mi) SW of Bogeda siding. Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/03/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cca	Bk	0	25	25	*5.0*	*95.0*	*15.7*	*15.0*	*1.5*	*1.65*	*1.65*	0.248	0.025	0.222	5.56	Stg. II
-2a	IIK11	2K1	25	43	18	5.0	95.0	32.5	30.9	*1.5*	*1.65*	*1.65*	0.510	0.025	0.485	8.73	Stg. III-
-2b	IIK12m	2K2m	43	63	20	9.0	91.0	42.5	38.7	*1.5*	1.66	*1.65*	0.642	0.025	0.617	12.35	Stg. III
-2c	IIK2m	2K3m	63	93	30	9.0	91.0	43.1	39.2	*1.5*	1.62	*1.65*	0.635	0.025	0.610	18.30	Stg. III
-2d	IIK32m	2K4m	93	103	10	3.0	97.0	35.9	34.8	*1.5*	1.74	*1.65*	0.606	0.025	0.581	5.81	Stg. III-
-2e	IIK33	2K5	103	170	67	5.0	95.0	18.0	17.1	*1.5*	1.68	*1.65*	0.287	0.025	0.262	17.57	Stg. III- to II+
-2f	IICca	2Bk	170	200	30	12.0	88.0	5.1	4.5	*1.5*	*1.65*	*1.65*	0.074	0.025	0.049	1.48	Stg. II
N.S.	IICn	2Cu	200	N.E.	N.A.	*10.0*	*90.0*	*1.7*	*1.5*	*1.05*	*1.65*	*1.65*	0.025	0.025	0.000	0.00	
																69.80	Total

Site No. 29

Profile No. 7/03/74-1 | Unit or Surface: Llano de Manzano | Landform: Distal piedmont slope

Quadrangle: Turn 7.5′ (S2) | Lat. 34° 30′ 43″ N, Long. 106° 38′ 05″ W | Unsurveyed, Casa Colorado (Belen) Grant

County: Valencia | UTM: Not shown on map | Elevation: 5140 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 3, 1974

Comments: 2.4 km (1.5 mi) NW of Becker railroad siding on SW side of tracks in cut. Physiographic surface from Machette (1985). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/03/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	A/C	A/C	0	20	20	*10.0*	*90.0*	*1.1*	*1.0*	*2.0*	*1.60*	*1.6*	0.016	0.032	-0.016	-0.32	
-1a	Bs	Bs	20	30	10	14.0	86.0	1.2	1.0	*2.0*	1.70	*1.6*	0.017	0.032	-0.005	-0.15	
-1b	IICca	2Bk1	30	90	60	4.0	96.0	9.3	8.9	*2.0*	1.71	*1.6*	0.152	0.032	0.120	7.21	Stg. I+
-1c	IIK1m	2K1m	90	125	35	3.0	97.0	27.9	27.1	*2.0*	1.72	*1.6*	0.466	0.032	0.434	15.19	Stg. III-
-1d	IIK2m	2K2m	125	167	42	5.0	95.0	23.7	22.5	*2.0*	1.68	*1.6*	0.378	0.032	0.346	14.53	Stg. III-
-1e	IIK3m	2K3m	167	197	30	4.0	96.0	20.7	19.9	*2.0*	1.72	*1.6*	0.342	0.032	0.310	9.31	Stg. III-
-1f	IICca2	2Bk2	197	257	60	5.0	95.0	14.5	13.8	*2.0*	1.72	*1.6*	0.237	0.032	0.205	12.32	Stg. II
N.S.	IICca3	2Bk3	257	287	30	0.0	100.0	5.0	*5.0*	*2.0*	*1.60*	*1.6*	0.080	0.032	0.048	1.44	Stg. II-
N.S.	IICn	2Cu	287	N.E.	N.A.	*5.0*	*95.0*	*2.1*	*2.0*	*2.0*	*1.60*	*1.6*	0.032	0.032	0.000	0.00	
																59.53	Total

Site No. 30

Profile No. 6/02/77-2 | Unit or Surface: Valle de Parida pediment | Landform: Proximal piedmont slope

Quadrangle: Ladron Peak 7.5' (U2) | Lat. 34° 28' 39" N, Long. 107° 03' 38" W | SE¼ SW¼ SW¼ Sec. 16 T3N R2W

County: Socorro | UTM: 1,268,700 N; 310,810 E; Zone 13 | Elevation: 5705 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 2, 1977

Comments: Sampled in SCS (now NRCS) soil pit, ca 12 m (40 ft) N of dirt road to old fire-watch station (BLM) and ca 80 m (260 ft) E of boundary between Sec. 16 and Sec. 17. Mapped as Valle de Parida pediment by Denny (1940), but may be equivalent to piedmont unit E (Qpe) of Machette (1978a). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/02/77	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	A, B21t	A, Bt1	0	20	20	0.0	100.0	*3.5*	*3.5*	*3.5*	*1.75*	*1.6*	0.061	0.056	0.005	0.10	
-2a	B22t	Bt2	20	28	8	0.0	100.0	4.2	4.2	*3.5*	*1.75*	*1.6*	0.074	0.056	0.018	0.14	
-2b	B3tca	Bt3k	28	40	12	7.5	92.5	13.3	12.3	*3.50*	*1.70*	*1.6*	0.209	0.056	0.153	1.84	Stg. II
-2c	K21m	Bk1m	40	54	14	9.1	90.9	35.4	32.2	*3.5*	*1.70*	*1.6*	0.547	0.056	0.491	6.88	Stg. III-
-2d	K22m	Bk2m	54	68	14	14.4	85.6	48.4	41.4	*3.5*	*1.75*	*1.6*	0.725	0.056	0.669	9.37	Stg. III
-2e	K31m	Bk3m	68	88	20	22.4	77.6	36.5	28.3	*3.5*	*1.70*	*1.6*	0.481	0.056	0.425	8.50	Stg. III-
-2f	Cca2	Bk4	88	108	20	32.4	67.6	14.0	9.5	*3.5*	*1.65*	*1.6*	0.157	0.056	0.101	2.02	Stg. II
-2g	Cca3	Bk5	108	115	7	29.9	70.1	7.9	5.5	*3.5*	*1.60*	*1.6*	0.088	0.056	0.032	0.22	Stg. I
N.S.	Cn	Cn	115	N.E.	N.A.	*30.0*	*70.0*	*5.0*	*3.5*	*3.5*	*1.60*	*1.6*	0.056	0.056	0.000	0.00	
																29.06	Total

Site No. 31

Profile No. 6/02/77-1 | Unit or Surface: Ladron Mountains piedmont | Landform: Proximal piedmont slope

Quadrangle: La Joya NW 7.5′ (V2) | Lat. 34° 27′ 28″ N, Long. 106° 59′ 30″ W | SE¼ SE¼ NE¼ Sec. 25 T3N R2W

County: Socorro | UTM: 3,814,520 N; 317,150 E; Zone 13 | Elevation: 5345 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 2, 1977

Comments: Weakly developed soil exposed in road cut 75 m (250 ft) W of boundary between R1W and R2W. Road leads SW to Armijo Ranch. Denny (1940) mapped this surface as the Canada Mariana piedmont; in this area there are several distinct alluvial surfaces within his Canada Mariana. N.S., not sampled.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/02/77	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	A	A	0	7	7	19.7	80.3	0.9	0.7	3.5	1.61	1.5	0.011	0.053	-0.042	-0.29	
-1b	Bs/Bt	Bs/Bt	7	21	14	10.8	89.2	0.8	0.7	3.5	1.41	1.5	0.01-	0.053	-0.043	-0.60	
-1c	C22ca	Bk1	21	40	19	0.0	100.0	16.1	16.1	3.5	*1.50*	1.5	0.242	0.053	0.189	3.58	Stg. II
-1d	C23ca	Bk2	40	61	21	14.2	85.8	11.3	9.7	3.5	1.45	1.5	0.141	0.053	0.088	1.84	Stg. II
-1e	C3ca	Bk3	61	76	15	12.7	87.3	5.6	4.9	3.5	*1.50*	1.5	0.074	0.053	0.021	0.31	Stg. II-
-1f	C4n	Cu	76	90	14	10.4	89.6	4.1	3.7	3.5	1.51	1.5	0.056	0.053	0.003	0.04	
N.S.	C5n	2Cu	90	108	18	0.0	100.0	3.5	3.5	3.5	*1.50*	1.5	0.053	0.053	0.000	0.00	
																4.88	Total

Site No. 32

Profile No. 7/01/74-2 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Abeytas 7.5' (W2) | Lat. 34° 28' 43" N, Long. 106° 50' 10" W | Unsurveyed, Belen Grant

County: Socorro | UTM: 3,816,600 N; 331,400 E; Zone 13 | Elevation: 5075 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 1, 1974

Comments: Location near southeastern end of east edge of Llano de Albuquerque, ca 0.9 km (0.55 mi) N of powerlines. Upper part of profile probably eroded before burial by parent material 1. Physiographic surface is about 102 m (335 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/01/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-2a	Cca	Bk	0	50	50	0.0	100.0	11.8	11.8	*1.5*	1.53	*1.6*	0.181	0.024	0.157	7.83	Stg. I+
-2b	IIK1	2K1	50	75	25	4.0	96.0	36.3	34.9	*1.5*	1.56	*1.6*	0.544	0.024	0.520	13.01	Stg. III
-2c	IIK21m	2K2m	75	95	20	3.0	97.0	51.6	50.1	*1.5*	1.67	*1.6*	0.837	0.024	0.813	16.25	Stg. III+
-2d	IIK22m	2K3m	95	115	20	8.0	92.0	43.5	40.0	*1.5*	1.61	*1.6*	0.644	0.024	0.620	12.40	Stg. III+
-2e	IIK3m	2K4	115	140	25	6.0	94.0	27.7	26.0	*1.5*	*1.60*	*1.6*	0.416	0.024	0.392	9.80	Stg. III-
N.S.	IIC1ca	2Bk1	140	185	45	*5.0*	*95.0*	*13.6*	*12.9*	*1.5*	*1.60*	*1.6*	0.206	0.024	0.182	8.21	Stg. II+
-2f	IIC2ca	2Bk2	185	230	45	11.0	89.0	3.2	2.9	*1.5*	*1.60*	*1.6*	0.046	0.024	0.022	1.01	Stg. II
N.S.	IICn	2Cu	230	N.E.	N.A.	10.0	*90.0*	*1.7*	*1.5*	*1.5*	*1.60*	*1.6*	0.027	0.024	0.003	0.00	
																68.51	Total

Site No. 33

Profile No. 7/01/74-1 | Unit or Surface: Llano de Albuquerque | Landform: Mesa

Quadrangle: Abeytas 7.5' (W2) | Lat. 34° 27' 43" N, Long. 106° 50' 46" W | Unsurveyed, Belen Grant

County: Socorro | UTM: 3,814,780 N; 330,490 E; Zone 13 | Elevation: 5095 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 1, 1974

Comments: Location at southern end of west edge of the Llano de Albuquerque, just west of powerlines. Soil on parent material 2 may be eroded, sampling incomplete. Physiographic surface is about 110 m (360 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/01/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	Cca	Bk1	0	45	45	0.0	100.0	10.0	10.0	*1.5*	*1.60*	*1.6*	0.160	0.024	0.136	6.12	Stg. II
-1b	C2ca	Bk2	45	70	25	3.0	97.0	6.4	6.2	*1.5*	*1.60*	*1.6*	0.099	0.024	0.075	1.88	Stg. II-
N.S.	Cox	Bs	70	100	30	*3.0*	*97.0*	*2.1*	*2.0*	*1.5*	*1.60*	*1.6*	0.032	0.024	0.008	0.24	
-1c	IIK1	2K1	100	118	18	3.4	96.0	33.0	31.7	*1.5*	*1.70*	*1.6*	0.539	0.024	0.515	9.27	Stg. III
-1d	IIK2m	2K2m	118	155	37	4.0	96.0	42.6	40.9	*1.5*	*1.70*	*1.6*	0.695	0.024	0.671	24.84	Stg. III+
N.S.	IICca	2Bk	155	205	50	*4.0*	*96.0*	*20.8*	*20.0*	*1.5*	*1.60*	*1.6*	0.320	0.024	0.296	14.80	Stg. II+
N.S.	IIICca	3Bk	205	265	60	*4.0*	*96.0*	*10.4*	*10.0*	*1.5*	*1.60*	*1.6*	0.160	0.024	0.136	8.16	Stg. II
N.S.	IIICn	3Cu	265	N.E.	N.A.	*0.0*	*100.0*	1.5	1.5	*1.5*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
																65.31	Total

Site No. 34

Profile No. 6/27/74-1 | Unit or Surface: Canada Mariana pediment | Landform: Terrace of Rio Grande

Quadrangle: Abeytas 7.5′ (W2) | Lat. 34° 25′ 04″ N, Long. 106° 47′ 18″ W | Unsurveyed, Sevilleta Grant

County: Socorro | UTM: 3,809,700 N; 335,750 E; Zone 13 | Elevation: 4800 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 27, 1974

Comments: Location in gravel pit about 0.6 km (0.4 mi) east of E end of bridge over Rio Grande; 0.8 km (0.5 mi) W of junction of US Highway 60 and New Mexico Highway 47. Soil on late Pleistocene terrace about 23 m (75 ft) above the Rio Grande. This is part of the Canada Mariana pediment of Denny (1940), which to the south is graded to a position about 15 m (50 ft) above the Rio Grande. Higher terrace(?) to east forms surface about 34 m (110 ft) above Rio Grande. See also soil profile no. 6/06/74-2 (site 35) from low alluvial fan south of this site. N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/27/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cn	Cu	0	8	8	*0.0*	*100.0*	*1.5*	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
-1a	IIK2	2K	8	34	26	4.0	96.0	25.9	24.9	*1.5*	*1.70*	*1.6*	0.423	0.024	0.399	10.38	N.R.
-1b	IIK3	2Bk1	34	54	20	0.0	100.0	8.5	8.5	*1.5*	*1.60*	*1.6*	0.136	0.024	0.112	2.24	N.R.
N.S.	IICca	2Bk2	54	90	36	*0.0*	*100.0*	4.0	*4.0*	*1.5*	*1.60*	*1.6*	0.064	0.024	0.040	1.44	N.R.
N.S.	IICn	2Cu	90	N.E.	N.A.	*0.0*	*100.0*	*1.5*	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
																14.06	Total

Site No. 35

Profile No. 6/06/74-2 | Unit or Surface: Canada Mariana pediment | Landform: Distal alluvial fan

Quadrangle: Abeytas 7.5′ (W2) | Lat. 34° 23′ 09″ N, Long. 106° 48′ 08″ W | Unsurveyed, Sevilleta Grant

County: Socorro | UTM: 3,806,150 N; 334,200 E; Zone 13 | Elevation: 4785 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 6, 1974

Comments: Late(?) Pleistocene alluvial fan about 20 m (65 ft) above the Rio Grande. Sampling location about 0.5 km (0.31 mi) NE of Conteras on south bank of arroyo. See also soil profile no. 6/27/74-1 (site 34) from low terrace north of this site. This site is part of the Canada Mariana pediment of Denny (1940), which is graded to a position about 15 m (50 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density $(g/cm)^3$		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/06/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	C1ca	Bk1	0	15	15	*10.0*	*90.0*	*9.0*	*8.1*	*1.0*	*1.65*	*1.6*	0.134	0.016	0.118	1.76	Stg. I
-2a	C21ca	Bk2	15	25	10	22.0	78.0	14.5	11.3	*1.0*	*1.65*	*1.6*	0.187	0.016	0.170	1.70	Stg. II-
-2b	C22ca	Bk3	25	75	50	18.0	82.0	10.9	8.9	*1.0*	*1.65*	*1.6*	0.147	0.016	0.131	6.54	Stg. II
-2c	C3caox	Bk4	75	100	25	55.0	45.0	10.7	4.8	*1.0*	*1.60*	*1.6*	0.077	0.016	0.061	1.52	Stg. I
N.S.	Cox	Bs	100	N.E.	N.A.	*50.0*	*50.0*	*2.0*	*1.0*	*1.0*	*1.60*	*1.6*	0.016	0.016	0.000	0.00	
																11.52	Total

Site No. 36

Profile No. 7/04/74-4 | Unit or Surface: Unnamed alluvial fan | Landform: Proximal piedmont slope

Quadrangle: Silver Creek 7.5′ (Z2) | Lat. 34° 15′ 35″ N, Long. 107° 01′ 37″ W | Unsurveyed, projected on boundary of Secs. 34/35 T1N R2W

County: Socorro | UTM: 3,792,625 N; 313,313 E; Zone 13 | Elevation: 5680 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 4, 1976

Comments: Sampled about 100 m (330 ft) S of road along drainage divide between Silver Creek (to the north) and San Lorenzo Arroyo (to the south). Location is ca 800 m (2625 ft) WNW of VABM 5934. Unit may be equivalent to piedmont unit E (Qpe) of Machette (1978a). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/04/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	A	A	0	5	5	0.0	100.0	0.0	0.0	*1.5*	*1.60*	*1.65*	0.000	0.025	-0.025	-0.13	
-4a	Btca	Btk	5	25	20	8.0	92.0	10.0	8.0	*1.5*	1.66	*1.65*	0.133	0.025	0.108	2.16	Stg. II-
-4b	Bca	Bk1	25	35	10	*7.0*	93.0	18.4	17.1	*1.5*	1.44	*1.65*	0.246	0.025	0.22	2.21	Stg. II+
-4c	K2	K1	35	75	40	*7.0*	93.0	32.4	30.1	*1.5*	*1.70*	*1.65*	0.512	0.025	0.491	19.47	Stg. III-
-4d	K3	K2	75	105	30	15.0	85.0	33.1	28.1	*1.5*	1.83	*1.65*	0.514	0.025	0.489	14.68	Stg. III-
N.S.	Cca	Bk2	105	120	15	*25.0*	*75.0*	*15.0*	*11.3*	*1.5*	*1.70*	*1.65*	0.192	0.025	0.167	2.51	Stg. II
N.S.	Cn	Cu	120	N.E.	N.A.	*35.0*	*65.0*	*2.3*	*1.5*	*1.5*	*1.65*	*1.65*	0.025	0.025	0.000	0.00	
																40.90	Total

Site No. 37

Profile No. 5/31/74-1 | Unit or Surface: Cliff surface | Landform: Eroded fault scarp/piedmont slope

Quadrangle: San Acacia 7.5′ (A3) | Lat. 34° 21′ 54″ N; Long. 106° 53′ 46″ W | Unsurveyed, Sevilleta Grant

County: Socorro | UTM: 3,804,050 N, 325,6400 E; Zone 13 | Elevation: 5000 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: May 31, 1974

Comments: Soil formed on Cliff surface, an eroded fault scarp that grades west into a piedmont slope. Upper soil postdates movement on Cliff fault, lower soil predates movement on Cliff fault. Also see description and figures by Machette (1978d, 1982). Earlier basis for fault timing was based on 500 k.y. of soil formation, with 35 gm of secondary $CaCO_3$ in the upper soil and 110 gm of secondary $CaCO_3$ in the lower soil. These analyses suggest a slightly different timing, with 28 percent of the soil formation (30 gm of 109 gm) occurring after faulting and 72 percent of the soil formation (79 gm of 109 gm) occurring before faulting. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
5/31/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	K1	K1	0	17	17	*5.0*	*95.0*	21.0	*20.0*	*1.5*	*1.75*	*1.65*	0.350	0.025	0.325	5.53	Stg. II+
-1a	K2m	K2m	17	60	43	7.0	97.0	26.3	25.5	*1.5*	*1.75*	*1.65*	0.446	0.025	0.421	18.11	Stg. III-
N.S.	K3	K3	60	80	20	*2.0*	*98.0*	20.4	*20.0*	*1.5*	*1.70*	*1.65*	0.340	0.025	0.315	6.30	Stg. II
	Upper soil															29.94	Subtotal
-1b	IIK22m	2K1m	80	110	30	1.0	99.0	32.5	32.2	*1.5*	1.76	*1.65*	0.567	0.025	0.542	16.25	Stg. III
-1c	IIK23m	2K2m	110	130	20	4.0	96.0	29.4	28.2	*1.5*	1.84	*1.65*	0.519	0.025	0.494	9.88	Stg. III
-1d	IIK24m	2K3	130	160	30	3.0	97.0	24.1	23.4	*1.5*	1.79	*1.65*	0.419	0.025	0.394	11.82	Stg. III-
-1e	IIC1ca	2Bkl	160	190	30	8.0	92.0	8.9	8.2	*1.5*	*1.70*	*1.65*	0.139	0.025	0.114	3.43	Stg. II
-1f	IIC2ca	2Bk2	190	315	125	0.0	100.0	8.0	8.0	*1.5*	1.70	*1.65*	0.136	0.025	0.111	13.88	Stg. II
-1g	IIC3ca	2Bk3	315	390	75	0.0	100.0	17.6	17.6	1.5	1.70	*1.65*	0.299	0.025	0.274	20.57	Stg. II+
N.S.	IIICca	3Bk	390	450	60	*0.0*	*100.0*	*5.0*	*5.0*	*1.5*	*1.65*	*1.65*	0.083	0.025	0.058	3.45	Stg. II
N.S.	IIICn	3Cu	450	N.E.	N.A.	*0.0*	*100.0*	*1.5*	*1.5*	*1.5*	*1.65*	*1.65*	0.025	0.025	0.000	0.00	Stg. II
	Lower soil															79.28	Subtotal
																109.22	Total

Site No. 38

Profile No. 10/02/75-1 | Unit or Surface: Alluvial unit G (Qag) | Landform: Terrace of Rio Salado

Quadrangle: San Acacia 7.5' (A3) | Lat. 34° 20' 23" N, Long. 106° 54' 08" W | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,801,265 N; 325,095 E; Zone 13 | Elevation: 5008 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: October 2, 1975

Comments: Sampled at northern edge of southern of two gravel pits (abandoned) west of old US Highway 85 (abandoned). Surface ca 63 m (200 ft) above Rio Salado. Part of Denny's (1940) dissected Quaternary surfaces (undifferentiated). See geologic map of Machette (1978a) for Quaternary geologic units. N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
10/02/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	K11m	K1m	0	11	11	20.0	80.0	34.7	27.8	*4.6*	*2.00*	*1.7*	0.556	0.032	0.524	5.76	Stg. III
-1b	K12m	K2m	11	21	10	9.0	91.0	38.0	34.6	*4.6*	2.04	*1.7*	0.706	0.032	0.674	6.74	Stg. III+
-1c	K22m	K3m	21	37	16	15.0	85.0	33.3	28.3	*4.6*	1.68	*1.7*	0.475	0.032	0.443	7.10	Stg. III
-1d	K23m	K4m	37	53	16	13.0	87.0	29.6	25.8	*4.6*	1.68	*1.7*	0.433	0.032	0.401	6.42	Stg. III
-1e	K31m	K5m	53	65	12	15.0	85.0	25.2	21.4	*4.6*	1.73	*1.7*	0.370	0.032	0.338	4.06	Stg. III
-1f	K32m	K6m	65	78	13	13.0	87.0	30.9	26.9	*4.6*	*1.70*	*1.7*	0.457	0.032	0.425	5.53	Stg. III
-1g	Cca1	K7	78	107	29	27.0	73.0	30.8	22.5	*4.6*	*1.70*	*1.7*	0.383	0.032	0.351	10.16	Stg. III
-1h	Cca2	K8	107	136	29	16.0	84.0	42.3	35.5	*4.6*	*1.70*	*1.7*	0.604	0.032	0.572	16.57	Stg. III+
-1i	IICn	2Cu	136	N.E.	N.A.	62.0	38.0	12.2	4.6	*4.6*	*1.70*	*1.7*	0.032	0.032	0.000	0.00	
																62.34	Total

Site No. 39

Profile No. 10/02/75-3 | Unit or Surface: Alluvial unit E (Qae) | Landform: Terrace of Rio Salado

Quadrangle: San Acacia 7.5' (A3) | Lat. 34° 19' 04" N, Long. 106° 55' 21" W | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,796,240 N; 322,980 E; Zone 13 | Elevation: 4945 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: October 2, 1975

Comments: Described from auger hole under powerline, ca 30 m (100 ft) N of southern edge of terrace. See geologic map of Machette (1978a) for Quaternary geologic units. Surface ca 38 m (125 ft) above the Rio Salado. Denny (1940) mapped this terrace as part of the Canada Mariana surface, which is graded to a position about 15 m (50 ft) above the Rio Grande, but it seems to relate better to the Valle de Parida surface. Soil horizonation not applicable (N.A.) because of a lack of exposure. Sample -3p is a resampling of -3k. N.E, not exposed; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
10/02/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-3a	N.A.	N.A.	0	5	5	3.0	97.0	1.7	1.7	*2.0*	*1.50*	*1.6*	0.026	0.032	-0.006	-0.03	N.R
-3b	N.A.	N.A.	5	16	11	0.0	100.0	8.8	8.8	*2.0*	*1.50*	*1.6*	0.132	0.032	0.100	1.10	N.R
-3c	N.A.	N.A.	16	27	11	0.0	100.0	11.7	11.7	*2.0*	*1.50*	*1.6*	0.176	0.032	0.144	1.58	N.R
-3d	N.A.	N.A.	27	38	11	1.0	99.0	12.0	11.9	*2.0*	1.52	*1.6*	0.181	0.032	0.149	1.64	N.R
-3e	N.A.	N.A.	38	45	7	1.0	99.0	11.0	10.9	*2.0*	1.67	*1.6*	0.182	0.032	0.150	1.05	N.R
-3f	N.A.	N.A.	45	53	8	3.0	97.0	10.1	9.8	*2.0*	1.61	*1.6*	0.158	0.032	0.126	1.08	N.R
-3g	N.A.	N.A.	53	78	25	40.0	60.0	15.7	9.4	*2.0*	*1.65*	*1.6*	0.155	0.032	0.123	3.08	N.R
-3h	N.A.	N.A.	78	98	20	7.0	93.0	7.5	7.0	*2.0*	1.80	*1.6*	0.126	0.032	0.099	1.88	N.R
-3i	N.A.	N.A.	98	123	25	10.0	90.0	8.6	7.7	*2.0*	1.90	*1.6*	0.146	0.032	0.114	2.86	N.R
-3j	N.A.	N.A.	123	144	21	30.0	70.0	12.5	8.8	*2.0*	1.84	*1.6*	0.162	0.032	0.130	2.73	N.R
-3p (3k)	N.A.	N.A.	144	154	10	7.0	93.0	22.9	21.3	*2.0*	1.78	*1.6*	0.379	0.032	0.347	3.47	N.R
-3l	N.A.	N.A.	154	162	8	46.0	54.0	9.0	4.9	*2.0*	*1.60*	*1.6*	0.078	0.032	0.046	0.37	N.R
-3m	N.A.	N.A.	162	170	8	36.0	64.0	9.5	6.1	*2.0*	*1.60*	*1.6*	0.098	0.032	0.066	0.52	N.R
-3n	N.A.	N.A.	170	185	15	60.0	40.0	11.2	4.5	*2.0*	*1.60*	*1.6*	0.072	0.032	0.040	0.60	N.R
-3o	N.A.	N.A.	185	N.E.	N.A.	41.0	59.0	3.6	2.1	*2.0*	*1.60*	*1.6*	0.034	0.032	0.000	0.00	N.R
																21.86	Total

Site No. 40

Profile No. 6/06/74-4 | Unit or Surface: Piedmont unit D (Qpd) | Landform: Piedmont slope

Quadrangle: San Acacia 7.5′ (A3) | Lat. 34° 17′ 46″ N, Long. 106° 55′ 09″ W | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,797,602 N; 323,265 E; Zone 13 | Elevation: 4915 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 6, 1974

Comments: Location 1.05 km (0.65 mi) SSE of windmill at 4827 ft elevation. Top of piedmont-slope deposits graded to position about 100-110 ft (30-33 m) above Rio Salado. See geologic map of Machette (1978a) for Quaternary geologic units. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/06/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cca	Bk	0	30	30	*5.0*	*95.0*	1.0	*1.0*	*1.5*	*1.70*	*1.6*	0.017	0.024	-0.007	-0.21	Stg. II
-4a	IIK1m	2K1m	30	40	10	5.0	95.0	18.7	17.8	*1.5*	*1.70*	*1.6*	0.303	0.024	0.279	2.79	Stg. III-
-4b	IIK2m	2K2m	40	65	25	5.0	95.0	24.0	22.8	*1.5*	*1.75*	*1.6*	0.399	0.024	0.375	9.38	Stg. III
-4c	IIK3	2K3	65	88	23	2.0	98.0	14.4	14.1	*1.5*	*1.70*	*1.6*	0.240	0.024	0.216	4.96	Stg. III- to II
N.S.	IICca	2Bk	88	118	30	*2.0*	*98.0*	6.1	*6.0*	*1.5*	*1.70*	*1.6*	0.102	0.024	0.078	2.34	Stg.II-
N.S.	IICn	2Cu	118	N.E.	N.A.	*2.0*	*98.0*	1.5	*1.5*	*1.5*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
																19.26	Total

Site No. 41

Profile No. 10/03/75-1 | Unit or Surface: Piedmont unit D (Qpd) | Landform: Eolian dunes on piedmont slope

Quadrangle: San Acacia 7.5′ | Lat. 34° 17′ 04″ N, Long 106° 55′ 00″ W | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,795,960 N; 323,495 E; Zone 13 | Elevation: 4855 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: October 3, 1975

Comments: Sampled beneath thin eolian sand (Qss) using hand auger. Remanents of piedmont graded to position about 100 ft (30 m) above Rio Salado. See geologic map of Machette (1978a) for Quaternary geologic units. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
10/03/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cn	Cn	0	26	26	0.0	100.0	2.0	2.0	*1.6*	*1.50*	*1.6*	0.030	0.026	0.004	0.10	
-1a	IICca1	2Bk1	26	39	13	9.0	91.0	19.8	18.0	*1.6*	*1.60*	*1.6*	0.288	0.026	0.262	3.41	Stg. II+
-1b	IICca2	2Bk2	39	52	13	8.0	92.0	16.6	15.3	*1.6*	*1.60*	*1.6*	0.245	0.026	0.219	2.84	Stg. II
-1c	IIK21	2K1	52	65	13	2.0	98.0	27.4	26.9	*1.6*	*1.70*	*1.6*	0.457	0.026	0.431	5.61	Stg. III
-1d	IIK22	2K2	65	78	13	1.0	99.0	24.8	24.6	*1.6*	*1.70*	*1.6*	0.418	0.026	0.392	5.10	Stg. III
-1e	IIK32	2K3	78	91	13	2.0	98.0	20.6	20.2	*1.6*	*1.70*	*1.6*	0.343	0.026	0.317	4.13	Stg. III-
-1f	IIK33	2K4	91	104	13	2.0	98.0	17.9	17.5	*1.6*	1.75	*1.6*	0.306	0.026	0.280	3.64	Stg. III-
-1g	IIICca1	3Bk1	104	117	13	14.0	86.0	11.0	9.5	*1.6*	*1.60*	*1.6*	0.152	0.026	0.126	1.64	Stg. II
-1h	IIICca2	3Bk2	117	130	13	21.0	79.0	7.9	6.2	*1.6*	*1.60*	*1.6*	0.099	0.026	0.073	0.95	Stg. II-
N.S.	IIICn	3Cn	130	N.E.	N.A.	*20.0*	*80.0*	*2.0*	*1.6*	*1.6*	*1.60*	*1.6*	0.026	0.026	0.000	0.00	
																27.42	Total

Site No. 42

Profile No. 6/06/74-3 | Unit or Surface: Alluvial unit C (Qac) | Landform: Piedmont slope/terrace transition

Quadrangle: San Acacia 7.5′ (A3) | Lat. 34° 17′ 13″ N, Long. 106° 53′ 47″ W | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,795,265 N; 325,265 E; Zone 13 | Elevation: 4775 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 6, 1974

Comments: Sampled in west road cut of Interstate Highway 25, ca 1800 ft (550 m) south of the incised channel of the Rio Salado. Surface is about 11 m (35 ft) above the Rio Salado. See geologic map of Machette (1978a) for Quaternary geologic units. Compare to soil profile no. 10/17/76-2 (site 43). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/06/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-3a	Bca	Bk1	0	22	22	14.0	86.0	11.2	9.6	*1.5*	*1.65*	*1.65*	0.158	0.025	0.133	2.93	Stg. I to II+
-3b	C2ca	Bk2	22	52	30	9.0	91.0	12.3	11.2	*1.5*	*1.70*	*1.65*	0.190	0.025	0.165	4.96	Stg. II
-3c	C3ca	Bk3	52	112	60	5.0	95.0	*7.7*	7.3	*1.5*	*1.65*	*1.65*	0.120	0.025	0.095	5.73	Stg. II- to I-
N.S.	Cn	Cn	112	N.E.	N.A.	*0.0*	*100.0*	*1.5*	*1.5*	*1.5*	*1.65*	*1.65*	0.025	0.025	0.000	0.00	
																13.62	Total

Site No. 43

Profile No. 10/17/76-2 | Unit or Surface: Alluvial unit C (Qac) | Landform: Terrace of Rio Salado

Quadrangle: San Acacia 7.5′ (A3) | Lat. 34° 16′ 02″ N, Long. 106° 53′ 27″ W | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,793,190 N; 325,900 E; Zone 13 | Elevation: 4730 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: October 17, 1976

Comments: Sampled from arroyo cut, 40 m (130 ft) N of N/NW jog in arroyo that parallels dirt road from US Interstate Highway 25 southeast to the northern basalt-covered butte at San Acacia dam. See geologic map of Machette (1978a) for Quaternary geologic units. Alluvium forms terrace surface about 8 m (25 ft) above the Rio Salado. Thick soil profile suggests aggradation during development. Compare to soil profile no. 6/06/74-3 (site 42).

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
10/17/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-2a	Cn	Cu	150	0	150	0.0	100.0	2.6	2.6	2.6	*1.50*	*1.5*	0.039	0.039	0.000	0.00	
-2b	IIA	2A	0	6	6	0.6	99.4	3.0	3.0	2.6	*1.50*	*1.6*	0.045	0.042	0.003	0.02	
-2c	IIBs	2Bs	6	16	10	0.6	99.4	4.8	4.8	2.6	1.56	*1.6*	0.075	0.042	0.033	0.33	
-2d	IIBsca	2Bsk	16	28	12	0.0	100.0	6.1	6.1	2.6	1.69	*1.6*	0.103	0.042	0.061	0.73	Stg. II
-2e	IIC1ca	2Bk1	28	42	14	0.0	100.0	8.7	8.7	2.6	1.54	*1.6*	0.134	0.042	0.092	1.29	Stg. II
-2f	IIC2ca	2Bk2	42	56	14	5.6	94.4	8.1	7.7	2.6	*1.60*	*1.6*	0.123	0.042	0.081	1.14	Stg. II
-2g	IIIAca	3Ak	56	64	8	22.5	77.5	9.6	7.4	3.5	*1.60*	*1.7*	0.118	0.060	0.062	0.50	Stg. II+
-2h	IIIC11ca	3Bk1	64	86	22	3.9	96.1	6.4	6.2	3.5	1.70	*1.7*	0.105	0.060	0.049	1.09	Stg. II
-2i	IIIC12ca	3Bk2	86	108	22	3.4	96.6	7.1	6.9	3.5	*1.70*	*1.7*	0.117	0.060	0.061	1.35	Stg. II
-2j	IIIC21ca	3Bk3	108	125	17	9.3	90.7	11.4	10.3	3.5	*1.70*	*1.7*	0.175	0.060	0.119	2.02	Stg. II
-2k	IIIC22ca	3Bk4	125	142	17	16.2	83.8	13.5	11.3	3.5	*1.70*	*1.7*	0.192	0.060	0.136	2.31	Stg. II+
-2l	IIIC23cam	3Bk5m	142	157	15	30.5	69.5	18.4	12.8	3.5	1.75	*1.7*	0.224	0.060	0.168	2.52	Stg. III-
-2m	IIIC3n	3Cu	157	200	43	22.0	78.0	4.5	3.5	3.5	*1.70*	*1.7*	0.060	0.060	0.000	0.00	
																13.30	Total

Site No. 44

Profile No. 7/16/74-1 | Unit or Surface: Low terrace (unmapped) | Landform: Terrace of the Rio Grande

Quadrangle: La Joya 7.5′ (B3) | Lat. 34° 23′ 23″ N, Long. 106°48′ 32″ W | Unsurveyed, Sevilleta Grant

County: Socorro | UTM: 3,808,525 N; 333,700 E; Zone 13 | Elevation: 4740 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: July 16, 1974

Comments: Sampled just W of New Mexico Highway 47 on S side of Conteras Arroyo. Terrace is about 3.5 m (10 ft) above arroyo bottom. Sampling is coarse and may not adequately represent secondary $CaCO_3$ accumulation. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/16/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	Cca	Bk	0	75	75	2.0	98.0	11.5	11.3	*2.0*	1.39	*1.6*	0.157	0.032	0.125	9.38	Stg. II- .
-1b	IICca	2Bk1	75	150	75	20.0	80.0	11.5	9.2	*2.0*	1.75	*1.6*	0.161	0.032	0.129	9.68	Stg. II-
-1c	IIC2ca	2Bk2	150	190	40	19.0	81.0	2.5	2.0	*2.0*	1.84	*1.6*	0.037	0.032	0.005	0.20	Stg. I
N.S.	IICn	2Cu	190	N.E.	N.A.	*20.0*	*80.0*	*2.5*	*2.0*	*2.0*	*1.60*	*1.6*	0.032	0.032	0.000	0.00	
																19.26	Total

Site No. 45

Profile No. 8/14/75 | Unit or Surface: Unmapped | Landform: Piedmont slope

Quadrangle: Becker SW 7.5′ (C3) | Lat. 34° 19′ 50″ N, Long. 106° 43′ 36″ W | Unsurveyed, Sevilleta Grant

County: Socorro | UTM: Not shown on map. | Elevation: 5275 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: August 14, 1975

Comments: Sampled on north side of Palo Duro Canyon. This surface is clearly older than the Llano de Manzano surface (to the north) and may be older than the Llano de Albuquerque based on the advanced stage of calcium carbonate morphology and large amount of total secondary $CaCO_3$. It may represent the an erosional surface that formed in upper Santa Fe time (late Pliocene or early Quaternary). The soil is extremely well developed (best in the Albuquerque basin), and is clearly better developed than those on the Llano de Albuquerque. See also soil profile no. 5/04/761 (site 46). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
8/14/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1	K2m	K1m	+30	0	30	*0.0*	*100.0*	*50.0*	*50.0*	*2.5*	*1.75*	*1.65*	0.875	0.042	0.834	25.02	Stg. III+
-2	K2lm	K2m	0	60	60	0.0	100.0	70.2	70.2	*2.5*	1.77	*1.65*	1.243	0.042	1.202	72.09	Stg. IV+
-3	K3	K3	60	120	60	0.0	100.0	55.6	55.6	*2.5*	1.86	*1.65*	1.034	0.042	0.993	59.59	Stg. IV-
-4	Cca	Bk	120	180	60	8.0	92.0	27.6	25.4	*2.5*	1.69	*1.65*	0.429	0.042	0.388	23.30	Stg. III- to II
N.S.	Cn	Cu	180	N.E.	N.A.	0.0	100.0	*2.5*	2.5	*2.5*	*1.65*	*1.65*	0.041	0.042	0.000	0.00	
																180.00	Total

Site No. 46

Profile No. 5/04/76-1 | Unit or Surface: Unnamed | Landform: Piedmont slope

Quadrangle: Becker SW 7.5′ (C3) | Lat. 34° 19′ 51″ N, Long. 106° 43′ 35″ W | Unsurveyed, Sevilleta Grant

County: Socorro | UTM: Not shown on map. | Elevation: 5280 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: May 4, 1976

Comments: Sampled on north side of Palo Duro Canyon. This surface is clearly older than the Llano de Manzano surface (to the north) and may be older than the Llano de Albuquerque based on the advanced stage of calcium carbonate morphology and large amount of total secondary $CaCO_3$. It is probably an early erosional surface that was cut across the Permian Yeso Formation in upper Santa Fe time (late Pliocene or early Quaternary). The soil is well developed and is clearly better developed than most of those on the Llano de Albuquerque. See also soil profile no. 8/14/75-1 (site 45). N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
5/04/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	K21lm	K1m	0	5	5	0.0	100.0	75.0	*75.0*	2.5	*2.00*	1.65	1.500	0.041	1.459	7.30	Stg. IV+
-1b	K22m	K2m	5	15	10	0.0	100.0	79.0	79.0	2.5	1.95	1.65	1.541	0.041	1.500	15.00	Stg. IV+
-1c	K23m	K3m	15	25	10	0.0	100.0	81.3	*70.0*	2.5	2.01	1.65	1.407	0.041	1.366	13.66	Stg. IV+
-1d	K32m	K4m	25	50	25	0.0	100.0	65.4	65.4	2.5	1.90	1.65	1.243	0.041	1.202	30.04	Stg. IV-
-1e	K33	K5	50	87	37	0.0	100.0	47.3	47.3	2.5	1.82	1.65	0.861	0.041	0.820	30.33	Stg. III+
N.S.	Csca	Bsk	87	117	30	0.0	*100.0*	25.0	*25.0*	2.5	*1.75*	1.65	0.438	0.041	0.397	>11.90	Stg. II+
N.S.	Cn	Cu	N.E.	N.E.	N.A.	0.0	*100.0*	2.5	2.5	2.5	*1.65*	1.65	0.041	0.041	0.000	0.00	Stg. II+
																>108.23	Total

Site No. 47

Profile No. 7/26/74-M

Unit or Surface: Piedmont unit E (Qpe)

Landform: Piedmont slope

Quadrangle: Lemitar 7.5′ (E3)

Lat. 34° 14′ 42″ N, Long. 106° 59′ 28″ W

Unsurveyed, Sevilleta Grant, NW¼ NE¼ NE¼ Sec. 7 T1S R1W (projected)

County: Socorro

UTM: 3,789,952 N; 318,178 E; Zone 13

Elevation: 5200 ft

Described by Michael Machette

Sampled by Michael Machette

Sampling date: July 26, 1974

Comments: Sampled ca 30 m (100 ft) N of abandoned jeep trail at head of tributary to Arroyo Vivarosa, 793 m (2600 ft) N of elevation mark 5083 (Lemitar 7.5′ quadrangle) on Sevilleta grant boundary (fence). Contiguous with surficial unit mapped as Qpe by Machette (1978a). N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
7/26/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-M3a	Cca	Bk	0	30	30	32.0	68.0	9.7	6.6	*1.0*	1.43	*1.7*	0.094	0.017	0.077	2.32	Stg. II
-M3b	IIK1m	2K1m	30	50	20	19.0	81.0	34.9	28.3	*1.0*	1.72	*1.7*	0.488	0.017	0.470	9.40	Stg. III
-M3c	IIK2m	2K2m	50	85	35	30.0	70.0	26.8	18.8	*1.0*	1.79	*1.7*	0.337	0.017	0.320	11.18	Stg. III-
-M3d	IICca	2K3	85	140	55	70.0	30.0	6.5	*2.0*	*1.0*	1.70	*1.7*	0.034	0.017	0.017	0.94	Stg. II
-M3e	IICn	2Cu	140	N..E.	N.A.	*75.0*	*25.0*	*4.0*	*1.0*	*1.0*	*1.70*	*1.7*	0.017	0.017	0.000	0.00	
																23.84	Total

Site No. 48

Profile No. 10/16/76-1 | Unit or Surface: Unmapped alluvium | Landform: Distal piedmont slope

Quadrangle: Lemitar 7.5′ (E3) | Lat. 34° 10′ 49″ N, Long. 106° 55′ 50″ W | SW¼ SW¼ NE¼ Sec. 3 T1 S R1W

County: Socorro | UTM: 3,783,575 N, 322,030 E; Zone 13 | Elevation: 4730 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: October 16, 1976

Comments: Sampled from north side of small arroyo, 640 m (2100 ft) W of frontage road on W side of US Highway 85. Location ca 213 m (700 ft) E of double powerlines on N side of road to microwave station. Information from unpublished mapping of Machette, ca 1976. N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
10/16/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	Cca	Bk	0	35	35	27.0	73.0	4.9	3.6	*2.0*	1.70	*1.6*	0.061	0.032	0.029	1.02	N.R.
-1b	Cn	Cu	35	67	32	57.0	43.0	3.2	1.4	*2.0*	*1.60*	*1.6*	0.022	0.032	-0.010	-0.32	N.R.
-1c	IIBsca	2Bsk	67	79	12	6.0	94.0	3.7	3.5	*2.0*	1.40	*1.6*	0.049	0.032	0.017	0.20	N.R.
-1d	IIC1ca	2Bk1	79	84	5	3.0	97.0	7.7	7.5	*2.0*	*1.40*	*1.6*	0.105	0.032	0.073	0.37	N.R.
-1e	IIC2ca	2Bk2	84	103	19	0.0	100.0	11.6	11.6	*2.0*	1.38	*1.6*	0.160	0.032	0.128	2.43	N.R.
-1f	IIC3ca	2Bk3	103	116	13	11.0	89.0	16.0	14.2	*2.0*	*1.50*	*1.6*	0.213	0.032	0.181	2.35	N.R.
-1g	IIIK	3Bk	116	123	7	67.0	33.0	16.2	5.4	*2.0*	*1.65*	*1.6*	0.089	0.032	0.057	0.40	N.R.
-1h	IVC2ca	4Bk	123	167	44	4.0	96.0	6.3	6.1	*2.0*	*1.60*	*1.6*	0.098	0.032	0.066	2.89	N.R.
N.S.	IVC3ca	5Bk	167	180	13	*10.0*	*90.0*	4.2	3.8	*2.0*	*1.60*	*1.6*	0.061	0.032	0.029	0.37	N.R.
N.S.	IVCn	5Cu	180	N.E.	N.A.	*10.0*	*90.0*	2.2	*2.0*	*2.0*	*1.60*	*1.6*	0.032	0.032	0.000	0.00	N.R.
																9.71	Total

Site No. 49

Profile No. 10/17/76-1 | Unit or Surface: Unmapped | Landform: Distal alluvial fan

Quadrangle: Lemitar 7.5′ (E3) | Lat. 34° 09′ 10″ N, Long. 106° 55′ 09″ W | SE¼ SW¼ NW¼ Sec. 11 T2S R1W

County: Socorro | UTM: 3,785,952 N; 323,000 E; Zone 13 | Elevation: 4736 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: October 17, 1976

Comments: Sampled from north side of alluvial channel ca 350 m (1150 ft) W of US Interstate Highway 25. Alluvial sequence forms surface 3 m (10 ft) above floor of intermittent stream channel. Inset terrace to south is lower (1 m [3 ft] above stream channel) and younger. Sampled soil is on fan alluvium that buried older, strongly developed soil (not sampled). Physiographic surface from unpublished mapping of Machette, ca 1976. N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
10/17/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	Aca	Ak	0	8	8	8.0	92.0	6.2	5.7	*2.0*	*1.60*	*1.5*	0.091	0.030	0.061	0.49	N.R.
-1b	C22ca	Bk1	8	23	15	30.0	70.0	6.8	4.8	*2.0*	*1.50*	*1.5*	0.072	0.030	0.042	0.63	N.R.
-1c	C23ca	Bk2	23	36	13	21.0	79.0	9.3	7.4	*2.0*	*1.50*	*1.5*	0.111	0.030	0.081	1.05	N.R.
-1d	C3ca	Bk3	36	49	13	38.0	62.0	13.5	8.4	*2.0*	*1.50*	*1.5*	0.126	0.030	0.096	1.25	N.R.
-1e	C4ca	Bk4	49	59	10	73.0	27.0	11.2	3.0	*2.0*	*1.50*	*1.5*	0.045	0.030	0.015	0.15	N.R.
-1f	C5n	Cu	59	220	161	63.0	37.0	5.4	2.0	*2.0*	*1.50*	*1.5*	0.030	0.030	0.000	0.00	N R.
	Upper soil															3.57	Total
N.S.	IIBtb	2Bt1	220	233	13												
N.S.	IIBtcab	2Btk2	233	248	15												
N.S.	IIKm	2Km	248	306	58												

Site No. 50

Profile No. 8/13/75 | Unit or Surface: Valle de Parida pediment | Landform: Distal piedmont slope

Quadrangle: Mesa del Yeso 7.5' (F3) | Lat. 34° 14' 29" N, Long. 106° 51' 17" | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,790,195 N; 329,222 E; Zone 13 | Elevation: 4940 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: August 13, 1975

Comments: Site similar to that of soil profile no. 5/11/76-1 (site 51), but this is from natural exposure, is deeper and contains two discrete soils. Sampled along west margin of eroded piedmont slope, ca 0.8 km (0.5 mi) N of BM 4962. Piedmont slope (pediment of Denny) is formed along western margin of La Joyita Hills, a small series of elongate N–S hills east of the Rio Grande. At this site, the surface is ca 82 m (270 ft) above the Rio Grande. Denny (1940) mapped this as the Valle de Parida pediment, which is graded to a position about 46 m (150 ft) above the Rio Grande. However, this site is probably on Denny's (1940) Tio Bartolo surface, which is graded to a position 76 m (250 ft) above the Rio Grande N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
8/13/75	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	K1 eroded	K1m	0	41	41	*15.0*	*85.0*	*41.2*	35.0	2.5	*1.50*	*1.6*	0.525	0.040	0.485	19.89	Stg. III+
-3	K21	K2m	41	66	25	7.0	93.0	50.3	46.8	2.5	*1.60*	*1.6*	0.749	0.040	0.709	17.72	Stg. IV
-4	K22	K3m	66	106	40	0.9	99.1	65.4	64.8	2.5	1.48	*1.6*	0.959	0.040	0.919	36.76	Stg. IV
-5	K23	K4	106	143	37	0.8	99.2	20.8	20.6	2.5	1.54	*1.6*	0.317	0.040	0.277	10.26	Stg. III-
-6	Cca	Bk	143	153	10	25.0	75.0	15.7	11.8	2.5	*1.50*	*1.6*	0.177	0.040	0.137	1.37	Stg. II
	Upper soil															86.00	
-7	IIK2	2K	153	190	37	1.0	99.0	23.2	23.0	2.5	1.78	*1.6*	0.409	0.040	0.369	13.67	Stg. III
N.S.	IICca	2Bk	190	218	28	0.0	100.0	15.0	15.0	2.5	*1.60*	*1.6*	0.240	0.040	0.200	5.60	Stg. II
N.S.	IICn	2Cu	218	N.E.	N.A.	*0.0*	*100.0*	2.5	2.5	2.5	*1.60*	*1.6*	0.040	0.040	0.000	0.00	
	Lower soil															19.27	
	Both soils															105.27	Total

Site No. 51

Profile No. 5/11/76-1 | Unit or Surface: Tio Bartolo pediment | Landform: Medial piedmont slope

Quadrangle: Mesa del Yeso 7.5' (F3) | Lat. 34° 14' 17" N, Long. 106° 51' 23" W | Unsurveyed, Sevilleta Land Grant

County: Socorro | UTM: 3,789,925 N; 329,060 E; Zone 13 | Elevation: 4945 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: May 11, 1976

Comments: Site similar to that of soil profile no. 8/13/72-2 (site 50), but this is from a hand-dug pit and thus is shallower. Piedmont slope (pediment of Denny) is formed along western margin of La Joyita Hills, a small series of elongate N–S hills east of the Rio Grande. At this site, the surface is ca 84 m (275 ft) above the Rio Grande. Denny (1940) mapped this as the Valle de Parida pediment, which is graded to a position about 46 m (150 ft) above the Rio Grande. However, this site is probably on Denny's (1940) Tio Bartolo surface, which is graded to a position 76 m (250 ft) above the Rio Grande. N.S., not sampled; N.E., not exposed; N.A., not applicable.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
5/11/76	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
-1a	K2m	K1m	0	18	18	3.0	97.0	49.9	48.4	*1.50*	*1.50*	*1.6*	0.726	0.024	0.702	12.64	Stg. IV-
-1b	K31m	K2m	18	35	17	3.0	97.0	35.8	34.7	*1.50*	1.57	*1.6*	0.545	0.024	0.521	8.85	Stg. III+
-1c	K32m	K3m	33	49	16	3.0	97.0	35.7	34.6	*1.50*	1.50	*1.6*	0.519	0.024	0.495	7.92	Stg. III+
-1d	K33	K4	49	66	17	0.0	100.0	27.5	27.5	*1.50*	1.58	*1.6*	0.435	0.024	0.411	6.98	Stg. III
-1e	Cca1	Bk1	66	86	20	6.0	94.0	19.7	18.5	*1.50*	1.69	*1.6*	0.313	0.024	0.289	5.77	Stg. II+
-1f	Cca2	Bk2	86	106	20	35.0	65.0	18.8	12.2	*1.50*	*1.60*	*1.6*	0.301	0.024	0.277	5.54	Stg. II+
-1g	Cca3	Bk3	106	125	19	43.0	57.0	3.5	2.0	*1.50*	*1.60*	*1.6*	0.032	0.024	0.008	0.15	Stg. I
N.S.	Cn	Cu	125	N.E.	N.A.	*40.0*	*60.0*	*2.5*	1.5	*1.50*	*1.60*	*1.6*	0.024	0.024	0.000	0.00	
																47.85	Total

Site No. 52

Profile No. 6/06/74-6 | Unit or Surface: Socorro High School (informal) | Landform: Distal piedmont slope

Quadrangle: Socorro 7.5′ (H3) | Lat. 34° 02′ 35″ N, Long. 106° 54′ 28″ W | Unsurveyed, Town of Socorro Grant

County: Socorro | UTM: 3,767,500 N; 323,820 E; Zone 13 | Elevation: 4780 ft

Described by Michael Machette | Sampled by Michael Machette | Sampling date: June 6, 1974

Comments: Sampled in SE road cut on US Highway 60 near Socorro High School. Physiographic surface based on unpublished mapping by Machette, ca 1974. N.S., not sampled; N.E., not exposed; N.A., not applicable; N.R., not recorded.

Sample number	Horizon nomenclature		Depth (cm)		Thick-ness	Grain size (percent)		$CaCO_3$ (percent)			Bulk Density (g/cm^3)		$CaCO_3$ accumulation				$CaCO_3$ Stage
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
6/06/74	Old system	New system	top	bottom	(cm)	>2mm	<2mm	(<2mm)	Present day	Primary	Present day	Primary	Total g/cm^3	Primary g/cm^3	Second. g/cm^3	Second. g/cm^2	
N.S.	Cca	Bk1	0	25	25	*5.0*	*95.0*	*21.1*	*20.0*	*0.02*	*1.65*	*1.65*	0.330	0.033	0.297	7.43	N.R.
-6a	K2m	K2m	25	50	25	5.0	95.0	55.6x	52.8	*0.02*	*1.75*	*1.65*	0.924	0.033	0.891	22.28	N.R.
-6b	K3m	K3m	50	65	15	2.0	98.0	63.1	61.8	*0.02*	*1.80*	*1.65*	1.112	0.033	1.079	16.19	N.R.
N.S.	Cca	Bk2	65	140	75	*2.0*	*98.0*	*20.4*	*20.0*	*0.02*	*1.70*	*1.65*	0.340	0.033	0.307	23.03	N.R.
N.S.	Ccacs	Bky	140	165	25	*2.0*	*98.0*	*5.1*	*5.0*	*0.02*	*1.65*	*1.65*	0.083	0.033	0.050	1.24	N.R.
N.S.	Cn	Cu	165	N.E.	N.A.	*2.0*	*98.0*	*2.0*	*2.0*	*0.02*	*1.65*	*1.65*	0.033	0.033	0.000	0.00	N.R.
																70.17	Total

Selected conversion factors*

TO CONVERT	MULTIPLY BY	TO OBTAIN	TO CONVERT	MULTIPLY BY	TO OBTAIN
Length			**Pressure stress**		
inches, in	2.540	centimeters, cm	lb in^{-2} (= lb/in^2), psi	7.03×10^{-2}	kg cm^{-2} (= kg/cm^2)
feet, ft	3.048×10^{-1}	meters, m	lb in^{-2}	6.804×10^{-2}	atmospheres, atm
yards, yds	9.144×10^{-1}	m	lb in^{-2}	6.895×10^{3}	newtons (N)/m^2, N m^{-2}
statute miles, mi	1.609	kilometers, km	atm	1.0333	kg cm^{-2}
fathoms	1.829	m	atm	7.6×10^{2}	mm of Hg (at 0° C)
angstroms, Å	1.0×10^{-8}	cm	inches of Hg (at 0° C)	3.453×10^{-2}	kg cm^{-2}
Å	1.0×10^{-4}	micrometers, μm	bars, b	1.020	kg cm^{-2}
Area			b	1.0×10^{6}	dynes cm^{-2}
in^2	6.452	cm^2	b	9.869×10^{-1}	atm
ft^2	9.29×10^{-2}	m^2	b	1.0×10^{-1}	megapascals, MPa
yds^2	8.361×10^{-1}	m^2	**Density**		
mi^2	2.590	km^2	lb in^{-3} (= lb/in^3)	2.768×10^{3}	gr cm^{-3} (= gr/cm^3)
acres	4.047×10^{3}	m^2	**Viscosity**		
acres	4.047×10^{-1}	hectares, ha	poises	1.0	gr cm^{-1} sec^{-1} *or* dynes cm^{-2}
Volume (wet and dry)			**Discharge**		
in^3	1.639×10^{1}	cm^3	U.S. gal min^{-1}, gpm	6.308×10^{-2}	l sec^{-1}
ft^3	2.832×10^{-2}	m^3	gpm	6.308×10^{-4}	m^3 sec^{-1}
yds^3	7.646×10^{-1}	m^3	ft^3 sec^{-1}	2.832×10^{-2}	m^3 sec^{-1}
fluid ounces	2.957×10^{-2}	liters, l *or* L	**Hydraulic conductivity**		
quarts	9.463×10^{-1}	l	U.S. gal day^{-1} ft^{-2}	4.720×10^{-7}	m sec^{-1}
U.S. gallons, gal	3.785	l	**Permeability**		
U.S. gal	3.785×10^{-3}	m^3	darcies	9.870×10^{-13}	m^2
acre-ft	1.234×10^{3}	m^3	**Transmissivity**		
barrels (oil), bbl	1.589×10^{-1}	m^3	U.S. gal day^{-1} ft^{-1}	1.438×10^{-7}	m^2 sec^{-1}
Weight, mass			U.S. gal min^{-1} ft^{-1}	2.072×10^{-1}	l sec^{-1} m^{-1}
ounces avoirdupois, avdp	2.8349×10^{1}	grams, gr	**Magnetic field intensity**		
troy ounces, oz	3.1103×10^{1}	gr	gausses	1.0×10^{5}	gammas
pounds, lb	4.536×10^{-1}	kilograms, kg	**Energy, heat**		
long tons	1.016	metric tons, mt	British thermal units, BTU	2.52×10^{-1}	calories, cal
short tons	9.078×10^{-1}	mt	BTU	1.0758×10^{2}	kilogram-meters, kgm
oz mt^{-1}	3.43×10^{5}	parts per million, ppm	BTU lb^{-1}	5.56×10^{-1}	cal kg^{-1}
Velocity			**Temperature**		
ft sec^{-1} (= ft/sec)	3.048×10^{-1}	m sec^{-1} (= m/sec)	°C + 273	1.0	°K (Kelvin)
mi hr^{-1}	1.6093	km hr^{-1}	°C + 17.78	1.8	°F (Fahrenheit)
mi hr^{-1}	4.470×10^{-1}	m sec^{-1}	°F – 32	5/9	°C (Celsius)

**Divide by* the factor number to reverse conversions.
Exponents: for example 4.047×10^{3} (see acres) = 4,047; 9.29×10^{-2} (see ft^2) = 0.0929.

Editor: Nancy Gilson

Typeface: Palatino

Presswork: 40 inch Komori
Four Color Offset

Binding: Saddle stitch with softbound cover

Paper: Cover on 12-pt. Kivar
Text on 70-lb White Matte

Ink: Cover—PMS 320
Text—Black

Quantity: 1,000