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Field methods, field descriptions, and laboratory data for selected dune and sand sheet sections

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This appendix provides stratigraphic descriptions and laboratory data for many of the localities investigated as part of this study of late Quaternary eolian stratigraphy of the Southern High Plains. Discussions (with descriptions) of the stratigraphy, soils, and geochronology of some of the archaeological sites are also provided elsewhere (Haynes, 1975, 1995; Frederick, 1993; Holliday and Meltzer, 1996; Holliday, 1997a).

Stratigraphic, sedimentologic, and pedologic data were collected from 48 sites in the sand dunes on and adjacent to the Southern High Plains (i.e., all sites are located on Figs. 1, 2, 6, 9). The exposures were created by wind deflation or by artificial excavation. Within larger sites (e.g., Plant X, Midland) several localities were identified. Individual sections described at each exposure were numbered consecutively according to the year they were investigated. At sites with several localities the numbering started over at each locality (e.g., Plant X). This appendix includes descriptions of all sites with age control (determined either on the basis of archaeology or from radiocarbon dating) and/or sites for which laboratory data are available. Lithostratigraphic nomenclature is included in the descriptions if published prior to this study or, for new sites, if easily correlatable to published stratigraphy.

All sections were measured and minimum basic descriptive data (i.e., pedologic horizonation and structure, boundaries, bedding, and color characteristics) were recorded in the field. Samples from selected cores and sections were also brought back to the laboratory for further description and characterization using standard pedologic and geologic nomenclature (AGI, 1982; Soil Survey Division Staff, 1993), with two exceptions. One modification was made regarding identification of buried soils: they were numbered with a suffix following the "b" according to their stratigraphic position below the surface (e.g., A-Bw-Ab1-Btb1-Cb1-Ab2-Btb2). A nomenclature also was developed to describe horizons with clay bands. Most of these horizons are a mix of illuvial clay (the clay bands) and unaltered sand; i.e., a combination of Bt and C horizon. The *Soil Survey Manual* (Soil Survey Division Staff, 1993) recommends the virgule (/) to designate such combinations (p. 121), then specifically states that clay bands be designated using "and" rather than the virgule (e.g., "E and Bt," p. 122). The use of "and" better conveys the characteristics of a clay band horizon and is used here, indicated by an ampersand (&), following Gile (1979, 1985), i.e., C&Bt or Bt&C, depending on the dominant characteristics. In the case of a typical Bt horizon with clay bands, the designation Bt&Bt is used. Horizons where all or most clay bands simply follow bedding planes (i.e., they may contain primary rather than secondary clay) are described as C horizons.

Laboratory analyses were carried out on samples from 21 sites. Those sites are indicated by ** on the field descriptions. The samples were placed in sealed plastic bags and brought to the soil and geomorphology lab in the Department of Geography, University of Wisconsin - Madison. Samples selected for laboratory investigation were analyzed for particle-size distribution, and organic-carbon and calcium carbonate content. All samples to be analyzed were air-dried and then crushed with a ceramic mortar and pestle, sieved through a 2 mm sieve, and stored in sealed plastic bags.

Particle-size analysis was performed by the pipette procedure (Janitzky, 1986a). Approximately 25 g samples were placed in 250 mL centrifuge tubes and pretreated to remove calcium carbonate and organic matter. Carbonates were removed by repeated digestion with 0.5 N HCl in a 60°C water bath (Jackson, 1969). A sink aspirator and pipette apparatus were used to remove the neutralized acid solution. Organic matter was oxidized by the addition of 5-10 mL H₂O₂ (30%) while in a hot water bath. Following pretreatment, the samples were washed with distilled water (DI) and centrifuged to remove any remaining acid or peroxide solution. Samples were dispersed with exactly 25 mL sodium pyrophosphate (50 g/L solution) and shaken overnight on a reciprocating shaker.

Dispersed samples were wet sieved through a 63 • m sieve using DI. The sand was oven dried and fractionated into very fine (63-125 • m), fine (125-250 • m), medium (250-500 • m), coarse (500- 1000 • m), and very coarse (1000-2000 • m) fractions on a sonic sifter. The silt and clay suspension passed into 1 L cylinders that were placed on a bench around a swinging pipette rack. At appropriate depths and times (Tanner and Jackson, 1947), 25 mL aliquots were drawn with a vacuum driven pipette, oven dried at >100°C, and weighed to the nearest thousandth gram on a digital balance.

The results of the sand fractionation were used to calculate some basic sedimentological statistics. Mean grain size was determined by calculating the "graphic mean" (Folk, 1980, p. 41) ($M_z = (.16 + .50 + .84)/3$). Sorting was calculated following Inman (1952) ($\sigma = .84 - .16/2$), which is also the "graphic standard deviation" (σ_G) of Folk (1980, p. 42) and is essentially one standard deviation.

Organic carbon content was determined by wet combustion (Walkley-Black method) (Janitzky, 1986b) using 1 N ferrous sulfate and calcium carbonate contents by gasometry with a Chittick apparatus (Machette, 1986).

Notes for Descriptions:

Color (Munsell): m = moist color (verbal description is for dry color)
 str = strong lt = light
 + = slightly redder than indicated hue

Texture: v = very f = fine m = medium
 S = sand C = clay L = loam SC = sandy clay
 SCL = sandy clay loam SL = sandy loam
 LS = loamy sand CL = clay loam SiC = silty clay
 SiL = silty loam SiCL = silty clay loam

Structure: Grade - wk = weak mod = moderate str = strong
 Class - f = fine med = medium cse = coarse
 Type - gr = granular sbk = subangular blocky abk = angular blocky
 pr = prismatic sg = single grain
 More than one designation for structure indicates compound structure.

Remarks: concr = concretions cont = continuous carb = carbonate
 discont = discontinuous OM = organic matter
 pri = primary thr = threads

Notes for Lab Data:

Sand Fractions: VCOS = very coarse COS = coarse MS = medium
 FS = fine VFS = very fine

Sorting: <0.35. = very well sorted 0.35-0.50. = well sorted
 0.50-0.71. = moderately well sorted 0.71-1.0. = moderately sorted
 1.0-2.0. = poorly sorted 2.0-4.0. = very poorly sorted

O.C. = organic carbon

SITES IN THE ANDREWS DUNES

BEDFORD RANCH ** (Andrews Co, TX; 32°06'N 102°50'W) is a series of small blowouts covering ~ 1 km² near the southern edge of the west-central Andrews Dunes (Fig. 9) (Holliday, 1997a). The description is a composite based on numerous exposures. Stratigraphic terminology follows Green (1961).

TABLE DR1. FIELD DESCRIPTION FOR THE BEDFORD RANCH SITE

Unit IX C, 100cm thick; loose fS, brownish yellow (10YR 6/6); clear smooth.

Ab1, 20cm thick; fS, brown (10YR 5/3 4/2m); v wk sbk; clear smooth. *Late Prehistoric artifacts* locally common.

ACb1, 22cm thick; loose fS, pale brown (10YR 6/3 4/3m); strongly bioturbated; clear irregular.

CAb1, 33cm thick; loose fS, pale brown (10YR 6/3 5/3m); strongly bioturbated; gradual.

Cb1, up to 150cm thick; loose fS, light gray (10YR 7/2 6/3m); few 1-2mm clay bands locally common; abrupt irregular.

Unit VIII **Bt&Cb2**, 100-200cm thick; loose fS matrix, lt yellowish brown to very pale brown (10YR 6/4 5/4m, 8/3 6/4m) w/30-35 prominent yellowish brown (10YR 5/4 4/4m) clay bands; 5-15mm thick, spaced 3-5cm apart, in upper section to 3-7mm thick, spaced 1-3cm in lower section; *late Paleoindian artifacts* locally common; clear smooth. *Radiocarbon age* on hearth at top of unit.

Unit VI **Btgb2**, up to 15cm thick; SC, lt yellowish brown to dk brown (10YR 6/4 5/4m, 10YR 3/3 2/2m); wk sbk; illuvial clay throughout but faint discont clay bands locally apparent; bone (bison?) locally common; abrupt smooth.

Unit V **2Cb2**, up to 15cm thick; sandy marl, white (10YR 8/1 6/2m 7/3m), bone (bison?) locally common; clear smooth.

Unit IV **3Cgb2**, 50-260cm thick, fS, white to pale yellow (2.5Y 7/4 7/2m, 5Y 8/2 6/2m, 10YR 8/2 6/3m); abrupt smooth.

Unit I **Blackwater Draw Fm** **4Btgb3**, SCL, str brown to brownish yellow to lt yellowish brown (7.5YR 4/6m, 10YR 6/6 5/4m, 7/2 7/1m, 2.5Y 6/4m).

SHIFTING SANDS ** (Winkler Co, TX; 32°03'N 102°57'W) is a series of large blowouts covering ~ 1.5 km² in the middle of the west-central Andrews Dunes (Fig. 9) (Amick and Rose 1990; Hofman et al. 1990; Holliday, 1997a). Most of the archaeological and stratigraphic data are from the "Main Blowout." Additional soil-stratigraphic data came from two yardangs (east and west) in an area called the "East Blowout" (two profiles were described on the east yardang, one profile on the west yardang). The description for the "Main Blowout" is a composite based on numerous exposures. Stratigraphic terminology follows Green (1961).

TABLE DR2. FIELD DESCRIPTION FOR THE SHIFTING SANDS SITE

Main Blowout

Unit IX C, 200-400cm thick; modern loose fS, v pale brown (10YR 7/4 6/4m); abrupt.

Unit VIII Bt&Cb1, 70cm thick, locally thicker; loose fS matrix, very pale brown (10YR 7/4 5/4m) w/25-30 prominent brownish yellow (7.5YR 6/6 4/6m) clay bands, 5-15mm thick (upper bands are thickest, lower bands are thinnest); localized gleying of sand (2.5Y 7/4 6/4m) and clay bands (2.5Y 6/4) in lower 10-20cm; bison bone and *Folsom* and *Midland* artifacts locally common; clear smooth.

Unit VIIb Bwb2, 30cm thick; fS, lt yellowish brown (10YR 6/4 5/3m); wk sbk; clear smooth.

Unit V 2Cb2, 10-15cm thick; sandy marl, white (10YR 8/1 7/3m); massive; clear smooth.

Unit IV 3Cgb2, typically 50 cm thick, locally up to 120cm thick; loose fS, white (10YR 8/2 7/2m), locally lt yellowish brown to brownish yellow (2.5Y 6/4m, 7.5YR 6/8); abrupt smooth.

Unit I Blackwater Draw Fm 4Btgb3, SCL, brownish yellow (10YR 6/6 5/4m).

East Blowout, East Yardang

(East Profile)

Unit IX C, 100-200cm thick; modern loose fS, v pale brown (10YR 7/4 6/4m); abrupt.

Unit VIII Bt1b1, 120cm thick; lfS, yellow (10YR 7/6 5/6m); wk pr & wk sbk; thin, discont. clay films on ped faces; clear smooth

C&Bt2b1, 30cm thick; massive fS matrix, very pale brown (10YR 7/4 5/4m); 8-10 brownish yellow (10YR 6/6 4/6m) clay bands (many are discontinuous), 3-5mm thick; abrupt.

Cb1 40cm thick; massive fS, very pale brown (10YR 8/4 5/4m); abrupt

Unit I Blackwater Draw Fm 2Btgb2, SCL, brownish yellow (10YR 6/6 5/4m).

East Blowout, East Yardang

(West Profile)

Unit IX C, 100-200cm thick; modern loose fS, v pale brown (10YR 7/4 6/4m); abrupt.

Unit VIII Bt1 & Btb1, 50cm thick; fS, brownish yellow (10YR 6/6 5/6m); wk pr & wk sbk; ~6 clay bands, 3-5mm thick; clear smooth.

Bt2 & Cb1, 50cm thick; massive fS matrix, light yellowish brown (10YR 6/4 5/4m); ~20-25 prominent brownish yellow (10YR 6/6 4/6m) clay bands, 3-8mm thick (upper bands are thickest, lower bands are thinnest); clear smooth.

Cgb1, 60cm thick; massive fS, pale yellow (2.5Y 7/4 6/4m); abrupt.

Unit I Blackwater Draw Fm 2Btgb2, SCL, brownish yellow (10YR 6/6 5/4m).

SHIFTING SANDS site (cont'd)

East Blowout, West Yardang

Unit IX C, 100-200cm thick; modern loose fS, v pale brown (10YR 7/4 6/4m); abrupt.

Unit VIII *Bt1b1*, 25cm thick; light yellowish brown (10YR 6/4 4/4m); wk pr & str sbk; thin cont clay films on ped faces; clear smooth.

Bt2b1, 20cm thick; yellow (10YR 7/6 5/6m); v wk sbk; thin patchy clay films on ped faces; few faint clay bands; clear smooth.

Cb1, 40cm thick; massive fS, very pale brown (10YR 7/4 5/4m); few faint clay bands.

WINKLER-1 ** (Lea Co, NM; 32°02'N 103°01'W) is exposed in a linear series of blowouts (totaling >1 km length) along Monument Draw in the northwestern end of the Andrews Dunes (Fig. 9) (Blaine 1968; Holliday, 1997a). The description is a composite based on numerous exposures. Stratigraphic terminology follows Green (1961).

TABLE DR3. FIELD DESCRIPTION FOR THE WINKLER-1 SITE

Unit IX C, 200-400cm thick; loose modern fS, reddish yellow (7.5YR 6/6 4/6m); abrupt.

Unit VIIb *Ab1* (typically missing), 10cm thick; fS, brown (7.5YR 5/4 4/4m); v wk sbk; clear smooth.

Bwb1, 20cm thick; fS, brown (7.5YR 5/4 4/4m); mod med sbk; **Midland** artifacts locally common; abrupt.

Unit V *2C1b1*, up to 10cm thick; sandy marl, pinkish white (7.5YR 8/2 10YR 6/4m); massive; common horizontal and vertical carb tubules; clear smooth.

Unit IV *3C2b1*, 30-40cm thick; loose fS, pink (7.5YR 7/4 5/4m); mastodont teeth recovered from this unit; abrupt.

Unit III *4C3b1*, 10-20cm thick; sandy marl, white (10YR 8/2 7/3m); massive; remains of mammoth, bison, and horse locally common; clear smooth.

Unit I **Blackwater Draw Fm** *5Btgb2*, SL, reddish yellow, brownish yellow, lt gray, lt yellowish brown, and pale yellow (7.5YR 6/6 4/6m, 10YR 6/6 5/4m, 7/2 7/1m, 2.5Y 6/4m, 5Y 7/3 6/3m).

WYCHE RANCH ** (Andrews Co, TX; 32°08'N 102°40'W) site is a small blowout (<8000 km²) along the south edge of the central Andrews Dunes (Fig. 9) (Holliday, 1997a). The description is a composite based on numerous exposures. Stratigraphic terminology follows Green (1961).

TABLE DR4. FIELD DESCRIPTION FOR THE WYCHE RANCH SITE

Unit IX 0-40cm, A, fS, yellowish brown (10YR 5/4 3/4m); v wk sbk; diffuse.

40-100cm, C, loose fS, lt yellowish brown (10YR 6/4 4/6m); clear smooth.

Unit VIIb? 100-150cm, *Btb1*, LfS, brownish yellow (7.5YR 6/6 4/6m); mod sbk; thin patchy clay films on ped faces; *Midland* artifacts locally common; abrupt.

Unit I Blackwater Draw Fm *Btb2*, SCL, str brown (7.5YR 5/6 4/6m).

TABLE DR5. BEDFORD RANCH SITE, LABORATORY DATA												
Horizon	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
C	0	0	21	70	8	99	0	1	1.37	.45 mws	0	0.00
Ab1	0	2	41	53	2	98	1	1	1.10	.65 mws	0	0.11
ACb1	0	1	42	51	3	97	2	1	0.97	.70 mws	0	0.00
CAb1	0	0	38	56	2	96	3	1	1.20	.65 mws	0	0.00
Cb1	0	1	45	48	1	95	5	0	1.07	.65 mws	0	0.11
Bt&Cb2 clay band	0	0	46	46	2	94	2	4	---	---	0	0.13
Bt&Cb2 sand matrix	0	0	43	54	2	99	1	0	1.13	.60 mws	nd*	0.09
Btgb2	0	1	30	46	5	82	5	13	nd	nd	0	0.00
2Cb2	0	1	28	50	4	83	6	11	nd	nd	16	0.15
3Cgb2	0	0	3	71	5	79	12	9	nd	nd	0	0.00
4Btgb3	1	1	39	40	9	90	2	8	nd	nd	0	0.00

*nd = Not Determined.

TABLE DR6. SHIFTING SANDS SITE, LABORATORY DATA												
Horizon	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
Main Blowout												
C	0	0	50	46	1	97	2	1	1.03	.65 mws	0	0.04
Bt&Cb1 clay band	0	0	24	62	3	89	6	5	---	---	0	0.00
Bt&Cb1 sand matrix	0	0	18	70	3	91	8	1	1.43	.50 mws	0	0.05
2Cb2	0	0	28	55	3	86	9	5	1.37	.65 mws	4	0.17
3Cgb2	0	0	34	60	2	96	3	1	1.17	.60 mws	0	0.05
East Blowout												
East Yardang												
East Profile												
Bt1	0	0	26	67	3	96	3	1	nd	nd	nd	nd
Bt2	0	0	33	60	3	96	4	0	nd	nd	nd	nd
Bt3	0	0	28	66	3	96	4	0	nd	nd	nd	nd
East Blowout												
East Yardang												
West Profile												
Bt1	0	0	24	55	16	95	4	1	nd	nd	nd	nd
Bt2	0	0	29	51	16	96	4	0	nd	nd	nd	nd
East Blowout												
West Yardang												
Bt1	0	0	32	54	2	89	2	9	nd	nd	nd	nd
Bt2	0	0	38	57	2	96	2	2	nd	nd	nd	nd
C1	0	0	21	74	2	97	2	1	nd	nd	nd	nd
C2	0	0	17	72	7	97	3	0	nd	nd	nd	nd
C3	0	0	15	75	9	99	1	0	nd	nd	nd	nd
C4	0	0	44	54	2	100	0	0	nd	nd	nd	nd

TABLE DR7. WINKLER-1 SITE, LABORATORY DATA												
	----- % of < 2 mm Fraction -----											
Horizon	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay	Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
C	0	1	31	51	13	96	2	2	1.33	.70 mws	0	0.00
Ab1	0	1	23	55	13	92	4	4	1.50	.70 mws	0	0.14
Bwb1	0	1	17	49	23	90	5	5	1.73	.80 ms	0	0.08
2C1b1	0	1	18	47	17	83	13	4	1.83	1.05 ps	14	0.05
3C2b1	0	1	25	57	11	94	3	3	1.73	.65 mws	0	0.00
4C3b1	0	1	28	53	11	93	4	3	1.40	.70 mws	11	0.18
5Btgb2	0	1	20	58	9	88	3	9	1.50	.60 mws	0	0.00

TABLE DR8. WYCHE RANCH SITE, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting -	%CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
A	0-40	0	0	22	68	7	97	2	1	1.40	.50 mws	nd*	nd
upper C	40-90	0	0	20	66	11	97	2	1	1.40	.50 mws	nd	nd
lower C	90-100	0	0	21	72	7	100	0	0	1.37	.45 ws	nd	nd
Btb1	100-150	0	0	25	67	6	98	0	2	1.33	.50 mws	nd	nd
Btb2	150+	0	0	13	44	14	71	1	18		nd	nd	nd

SITES IN THE LEA-YOAKUM DUNES

ELIDA ** (Roosevelt Co, NM; 33°48'N 103°32'W) is an archaeological site in a large blowout (~30,000 m²) within a small sand dune field (~ 0.75 km²) that is a segment of the larger Lea-Yoakum dune field (Fig. 6). (Warnica, 1961; Hester 1962; Holliday, 1997a). The dunes and blowout are on uplands adjacent to a playa basin. Cores extracted from the basin fill provided additional data on the record of eolian sedimentation.

TABLE DR9. FIELD DESCRIPTION FOR THE ELIDA SITE

Uplands

Historic Sand Sheet C, up to 100cm thick, cross bedded fS, yellowish red (5YR 4/6 4/4m); clear smooth.

Early Holocene Sand Sheet *Btb1*, up to 50cm thick, LS, yellowish red (5YR 4/6 3/4m); wk sbk; clear smooth;

Cb1, up to 2m thick; fS, yellowish red (5YR 4/6 4/4m), abrupt.

Blackwater Draw Fm *Btb2/Bkb2* soil, SL, yellowish red (5YR 4/6 4/4m); **Folsom** artifacts in *Bt* horizon (via bioturbation from surface?).

Playa

Late Holocene Sand Sheet 0-12cm, C, modern loose fS, str brown (7.5YR 5/6 4/5m); abrupt. 12-22cm, A, fS, str brown (7.5YR 4/6 3/4m); wk sbk; clear smooth.

22-75cm, *Bt1*, fS, str brown (7.5YR 4/6 3/4m); common patchy clay films on ped faces; wk pr & wk sbk; gradual.

75-90cm, *Bt2*, (sand grading into playa mud), LS, str brown (7.5YR 4/6 3/4m); common patchy clay films on ped faces; mod pr & str sbk; gradual.

90-100cm, *Bt3*, (sand grading into playa mud), LS, str brown (7.5YR 4/6 3/4m); common patchy clay films on ped faces; mod pr & str sbk; clear.

100-115cm, *ABtb1*, (sand grading into playa mud), LS, dk brown (7.5YR 4/4 3/4m); nearly continuous clay films on ped faces; mod pr & str sbk; clear. **Radiocarbon age.**

Playa Mud 115-136cm, *2Btb1*, L, grayish brown (10YR 5/2 3/2m); continuous, thick clay films on ped faces; str pr & wk abk; clear. **Radiocarbon age.**

136-169cm, *2Btgb1*, SL, reddish yellow (7.5YR 6/6 5/4m) w/common lt gray mottles (10YR 7/2 6/2m); continuous, v thick clay films and organs on ped faces; str pr & wk abk; clear.

169-185cm, *3Cgb1*, LS, 50% str brown (7.5YR 5/6 6/4m), 50% v pale brown (10YR 7/3 6/2m); massive.

LEWIS PIT (Cochran Co., TX; 33°37'N 103°02'W) is a borrow pit excavated on the north side of a large playa basin in the central Lea-Yoakum Dunes. The dated zone is mud probably linked to the playa. Description is a composite one based on two exposures in the pit.

TABLE DR10. FIELD DESCRIPTION FOR THE LEWIS PIT.

Late Holocene Sand C, ~100cm thick; lt brown (7.5YR 6/4 4/4m); modern loose fS.

Middle Holocene Sand Sheet? *Btb1*, 20cm thick; SL, reddish brown (5YR 5/4 4/4m); common clay films on ped faces; mod pr & str sbk; clear smooth.

Cb1, 10cm thick; SL, brown (7.5YR 5/4 4/4m); fS, wk sbk; clear smooth.

Late Pleistocene/Early Holocene Sand Sheet? *BAt1b2*, 20cm thick; SL, dk brown (10YR 4/3 3/3m); thin patchy clay films on ped faces; mod sbk; clear smooth.

BAt2b2, 40cm thick; SL, grayish brown (10YR 5/2 4/2m); nearly cont thin clay films on ped faces; str sbk; clear smooth.

ABtb2, 30cm thick; SL, grayish brown (10YR 5/2 4/2m); thin patchy clay films on ped faces; str sbk; abrupt. **Radiocarbon age.**

Blackwater Draw Fm? *K horizon*, 5-10cm thick; white (10YR 8/1 8/2m) w/ a few pink domains (5YR 8/3 7/4m); laminar; gradual.

MILNESAND (Roosevelt Co, NM; 33°41'N 103°18'W) ** and TED WILLIAMSON (Roosevelt Co, NM; 33°41'N 103°18'W) ** are two archaeological sites in a segment of the Lea-Yoakum Dunes, near a narrow, shallow reach of Sulphur Draw (Fig. 6). Both sites were in small blowouts (Milnesand = 50 m x 50 m; Williamson = 100 m x 75 m), exposing dense beds of *Bison antiquus* bone in association with large assemblages of stone tools (Sellards 1955; Johnson et al. 1986; Holliday, 1997a). The preserved portions of the Milnesand site are in a series of small dune remnants around the margin of the blowout. The description is a composite based on several exposures. The preserved portion of Ted Williamson is one edge of a dune that contained the site. The exposure thus provides a section through the dune. The description is for two sections: one at the center of the dune remnant, the other near the edge of the remnant.

TABLE DR11. FIELD DESCRIPTION FOR THE MILNESAND
AND TED WILLIAMSON SITES

Milnesand

Late Holocene Dune Sand C, 100cm thick; modern loose fS, lt yellowish brown (10YR 6/4 4/4m); abrupt.

Ab1, 40cm thick, fS, pale brown (10YR 6/3 4/3m), v wk sbk; gradual.

Cb1, 50cm thick, loose fS, lt yellowish brown (10YR 6/4 4/4m); abrupt.

Early Holocene Sand Sheet *Bt&Cb2*, 20cm thick, loose fS matrix, lt yellowish brown (10YR 6/4 4/4m) w/1 clay band 2.5cm thick, str brown (7.5YR 5/6 4/6m) bifurcating into ~12 bands, 1-2mm thick separated by S lenses 1-2mm thick; this sand unit probably encased the bone bed and *Milnesand* artifacts; abrupt.

Blackwater Draw Fm *Btb3*, SC, yellowish red (5YR 5/6 4/4m), with local gley mottling (*Btgb3*) (10YR 6/4, 8/2, 7/3 6/4m); *Ab3* up to 10cm thick, brown (7.5YR 5/6 4/6m, 5/4 4/4m), locally preserved at top, associated with bison bone bed and *Milnesand* artifacts.

Ted Williamson

Center Section

Late Holocene Dune Sand *C1* 60cm thick, modern loose fS, str brown (7.5YR 5/6 4/6m), abrupt smooth.

C2, 70cm thick (lower 12cm is reworked *Ab1*), modern loose cross bedded fS, lt yellowish brown (10YR 6/4 4/4m); abrupt irregular.

Late Pleistocene/Early Holocene Sand Sheet *A1b1*, 35cm thick, fS, lt brown (7.5YR 6/4 3/4m); massive; clear smooth.

A2b1, 25cm thick, fS, lt brown (7.5YR 6/4 4/4m); massive; gradual.

Eb1, 35cm thick, fS, str brown (7.5YR 5/6 4/6m); v wk sbk; clear smooth.

C&Btb1, 110cm thick, fS matrix, str brown (7.5YR 5/6 4/6m) w/5-8 yellowish red (5YR 4/6) clay bands, 6-10mm thick, more common in upper 60cm; some ***Plainview*** artifacts encased in lower sand; clear, smooth.

Bwb1, 40cm thick, fS, str brown (7.5YR 5/6 4/6m), but slightly more yellow than above; single grain; abrupt.

Blackwater Draw Fm *Btb2*, SC, yellowish red (5YR 4/6m) with local gley mottling (*Btgb2*) (10YR 6/4, 6/3m); bison bone bed with ***Plainview*** artifacts rested on top of this unit.

Flank Section

Late Holocene Dune Sand *C1* 60cm thick, modern loose fS, str brown (7.5YR 5/6 4/6m), abrupt smooth.

C2, 70cm thick (lower 12cm is reworked *Ab1*), modern loose cross bedded fS, lt yellowish brown (10YR 6/4 4/4m); abrupt irregular.

Late Pleistocene/Early Holocene Sand Sheet *A1b1*, 35cm thick, fS, lt brown (7.5YR 6/4 3/4m); massive; clear smooth.

A2b1, 25cm thick, fS, lt brown (7.5YR 6/4 4/4m); massive; gradual.

Eb1, 35cm thick, fS, str brown (7.5YR 5/6 4/6m); v wk sbk; clear smooth.

C&Btb1, 110cm thick, fS matrix, str brown (7.5YR 5/6 4/6m) w/5-7 yellowish red (5YR 4/6) clay bands, 2-3mm thick, more common in upper 60cm; abrupt.

Blackwater Draw Fm *Btb2*, SC, yellowish red (5YR 4/6m) with local gley mottling (*Btgb2*) (10YR 6/4, 6/3m).

RO-16 (Roosevelt Co, NM; 33°37'N 103°25'W) is an archaeological site exposed in a series of small deflation basins and gullies cut in a segment of the western Lea-Yoakum Dunes (Fig. 6) (Holliday, 1997a).

TABLE DR12. FIELD DESCRIPTION FOR THE RO-16 SITE

Late Pleistocene/Early Holocene Sand Sheet 0-30cm, *Bt*, LS, yellowish red (5YR 4/6); thin cont clay films on ped faces; wk pr & mod sbk; clear smooth.
 30-150cm, *Bw*, fS, yellowish red (5YR 5/6); wk sbk; *Clovis*, *Folsom*, *Midland*, and *Milnesand* artifacts locally common in lower 50cm; abrupt.
Blackwater Draw Fm *ABtb*, SCL, red (2.5YR 4/6 5/6m).

STUCK TRUCK ** (Cochran Co., 33°26'N 102°53'W) is a series of blowouts in the central Lea-Yoakum Dunes (Fig. 6). Description is a composite one based on several exposures.

TABLE DR13. FIELD DESCRIPTION FOR THE STUCK TRUCK SITE

Late Holocene Sand *C*, up to 200cm thick, loose modern fS, reddish yellow (7.5YR 7/6); clear smooth.
Middle Holocene Sand? *C&Bt1b1*, 100cm thick; loose fS matrix, brown (7.5YR 5/4 4/4m), w/~10 clay bands 1-3mm thick; mixed irregular.
Bt2b1, 20-30cm thick; fS, str brown (7.5YR 5/6 4/6m); mod sbk; thin patchy clay films on ped faces; unclear whether this is genetically related to *Bt1b1* or if it is an older *Btb*; abrupt.
Blackwater Draw Fm *Btb2*, SCL, str brown (7.5YR 5/6 4/6m); locally gleyed.

TATUM ** (Lea Co, NM: 33°28'N 103°28'W) is an archaeological site in a deflation basin in the Lea-Yoakum Dunes (Fig. 6) (Sellards and Evans 1960; Holliday, 1997a). The description is a composite of several exposures.

TABLE DR14. FIELD DESCRIPTION FOR THE TATUM SITE

Upper Sand *C&Bt*, 300-500cm thick, loose fS, lt yellowish brown (10YR 6/4 5/4m); *E* horizon (10YR 6/4 4/3m) locally common in upper 50cm; clay bands locally common in lower 1m, ~6 bands, 3-8mm thick; upper bands thickest, lower bands thinnest; prominent dark brown (7.5YR 3/4m) clay band 5-10cm thick at base of unit with *Folsom* artifacts locally common; clear smooth.
Lower Sand Compact, resistant fS up to 50cm thick with prominent color zonation: upper 10-15cm pale brown (10YR 6/3 5/2m), middle 10-15cm v pale brown (10YR 7/4 5/3m), and lower 20-30cm v pale brown (10YR 7/3 6/3m); common, very irregular clay bands 1-5mm thick throughout unit; clear smooth.

TABLE DR15. ELIDA SITE, LABORATORY DATA													
		-----% of < 2 mm Fraction -----											
Horizon	Depth	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay	Sand Graphic Mean -	Sorting	%CaCO ₃	% OC
<u>Upland</u>													
C	ND*	1	1	7	69	25	96	0	4			0	nd
Bib1	ND	0	1	4	43	36	84	6	10	2.17	.75 ms	0	nd

Btb2	ND	0	1	6	46	29	82	2	16	2.10	1.0 ms	0	nd
Bkb2	ND	0	0	5	34	31	70	9	21	>2.27	>.80 ms	0	nd
Playa													
A	12-22	0	1	9	57	24	91	6	3	nd	nd	0	0.93
Bt1	22-75	0	1	11	59	25	96	1	3	nd	nd	0	0.22
Bt2	75-90	0	0	5	49	34	88	6	6	nd	nd	0	0.19
Bt3	90-100	0	0	4	49	32	85	9	6	nd	nd	0	0.12
Abtb1	100-115	0	0	4	43	33	80	12	8	nd	nd	0	0.23
2Btb1	115-136	0	1	2	24	22	49	31	20	nd	nd	0	0.37
2Btgb1	136-169	0	1	4	33	31	69	21	10	nd	nd	0	0.24
3Cgb1	169-185	0	1	5	40	32	78	16	6	nd	nd	0	0.00

TABLE DR16. MILNESAND SITE, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction -----								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
C	0 - 100	0	0	3	64	26	93	3	4	1.87	.70 ms	1	0.51
Ab1	100 - 140	0	0	15	64	16	95	2	3	1.60	.60 mws	1	0.98
Cb1	140 - 190	0	0	17	61	16	94	2	4	1.60	.60 mws	1	0.59

TABLE DR17. WILLIAMSON SITE (flank section), LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction -----								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
C1	0 - 60	0	0	16	65	14	95	1	4	1.50	.55 mws	1	0.05
C2	60 - 130	0	0	10	71	16	97	1	2	1.53	.50 mws	1	0.00
A1b1	130 - 163	0	0	15	63	17	95	2	3	1.60	.60 mws	1	0.05
A2b1	163 - 188	0	0	15	66	15	96	1	3	1.50	.50 mws	0	0.05
Eb1	188 - 223	0	0	17	64	15	96	1	3	1.50	.50 mws	0	0.00
C&Btb1 matrix	223 - 333	0	0	15	62	15	92	3	5	1.57	.60 mws	1	0.47
C&Btb1 clay band		0	0	15	63	12	90	7	3	---	-----	0	0.05

TABLE DR18. STUCK TRUCK SITE, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction -----								Sand Graphic Mean -	Sorting -	%CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
C	0-200	0	0	30	62	6	98	0	2	1.30	.55 mws	nd	nd
C&Bt1b1 sand matrix	200-300	0	0	16	66	12	94	1	5	1.53	.50 mws	nd	nd
Bt2b1	300-330	0	1	18	60	12	91	3	6	1.60	.60 mws	nd	nd
Btb2	330+	0	1	11	37	16	65	9	26	nd	nd	nd	nd

TABLE DR19. TATUM SITE, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction -----								Sand Graphic Mean -	Sorting -	%CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
E	0-50	0	0	18	78	4	100	0	0	1.40	.40 ws	nd	nd
C&Bt matrix	50-300	0	0	30	64	4	98	1	1	1.25	.55 mws	nd	nd
C&Bt band	300-310	0	0	21	63	4	88	0	12	---	-----	nd	nd
Lower Sand	310-325	0	0	25	60	5	90	5	5	nd	nd	nd	nd

MISCELLANEOUS DUNE LOCALITIES

CROSBY DUNES includes two sites, ROBERTSON (Crosby Co., TX; 33°32'N 101°28'W) and BIG SANDY (Crosby Co., TX; 33°30'N 101°25'W) (Fig. 1). Robertson is at the west end of the dune field. Big Sandy is at the east end. Both are in fields exposed to wind erosion. Robertson, which produced a large collection of artifacts (Holliday, 1997a), was described from a core. Big Sandy contains several deep blowouts and was described from these exposures.

TABLE DR20. FIELD DESCRIPTIONS FOR THE CROSBY DUNES

Robertson Site

Middle Holocene Sand? 0-25cm, *Ap*, loose fS, str brown (7.5YR 4/6 4/4m); clear.

25-50cm, *Bt1*, LfS, yellowish red (5YR 4/6 4/4m); wk pr & str sbk; thin patchy clay films on ped faces; clear.

50-65cm, *Bt2*, LfS, str brown (7.5YR 5/6 4/4m); wk sbk; gradual.

50-86cm, *C*, loose fS, str brown (7.5YR 5/6 4/4m); clear.

86-92cm, *Btb1*, LfS, yellowish red (5YR 4/6 4/4m); str sbk; possibly a thick clay band; clear.

Clovis, Folsom, Plainview, Milnesand, Firstview, Rex Rodgers, and other ***Paleoindian artifacts*** were recovered from the site, probably deflated from either the *C* or *Btb1*.

Blackwater Draw Fm *Btb2*, LfS, 5YR 5/6 4/6m); wk pr & str sbk; thin discount clay films

Big Sandy Site

Late Holocene Sand *A*, 30cm thick; fS, lt brown (7.5YR 6/4 4/4m); wk sbk; clear irregular.

C, 55cm thick; loose fS, pink (7.5YR 7/4 5/4m) w/few incipient discount 1mm thick clay bands; clear smooth.

Late Pleistocene/Early Holocene Sand *Ab1*, 15cm thick; loose fS, lt brown (7.5YR 6/4 4/4m); clear smooth.

C&Btb1, 55cm thick; fSL, str brown (7.5YR 5/6 4/6m); wk sbk; thin patchy clay films on ped faces; 4-5 clay bands, yellowish red (5YR 4/6 3/4m), 1-2cm thick; lowest clay band forms abrupt irregular boundary. ***Paleoindian artifacts*** from this zone.

Bwb1, 30 cm thick, LfS, reddish yellow (7.5YR 6/6 4/6m); v wk sbk; abrupt.

Blackwater Draw Fm *Btb2*, SCL, yellowish red (5YR 4/6 3/4m).

MIDLAND ** (Midland Co, TX; 31°53'N 102°07'W) archaeological site, also known as the Scharbauer site or Scharbauer Ranch site, is located in a narrow bend of Monahans Draw, adjacent to and partially buried by a dune field (Fig. 1) ((Wendorf et al., 1955; Wendorf and Krieger, 1959; Holliday and Meltzer, 1996; Holliday, 1995, 1997a). The site was exposed by deflation of the dune sediments along the draw and on uplands to the south. The draw locality is "Locality 1" of Wendorf et al. (1955), is exposed on the floor of Monahans Draw. The upland locality is at the west end of a blowout in the dunes; "Locality 3" of Wendorf et al. (1955). Stratigraphic description based on Holliday (1995). Stratigraphic terminology for the draw Locality 1 follows Holliday (1995); terminology for the upland Locality 3 (3W of Holliday, 1995, Holliday and Meltzer, 1996), follows Holliday and Meltzer (1996), modified from Wendorf et al. (1955).

TABLE DR21. FIELD DESCRIPTIONS FOR THE MIDLAND SITE
(SCHARBAUER DUNES)

Draw

Stratum 4s 0-5cm, A, loose fS, brown (7.5YR 5/4 4/4m); clear smooth.

5-15cm, ABw, fS, str brown (7.5YR 5/6 4/6m); wk med sbk; clear wavy.

15-50cm, Bw1, fS, reddish yellow (7.5YR 6/6 5/6m); wk med sbk; gradual.

50-96cm, Bw2, fS, reddish yellow (7.5YR 6/6 5/4m); wk med sbk; clear wavy.

Mixed Zone 3s & 4s 96-122cm, C1, fS, mottled v pale brown and lt brown (10YR 7/3 6/3m, 7.5YR 6/4 5/4m); clear wavy.

Stratum 3s C2, up to 100cm thick; loose fS, locally heavily mottled pink, yellowish brown, and brownish yellow (7.5YR 7/4 6/4m 6/6m, 10YR 5/6 4/3m, 6/8 6/6m); pockets of lake carbonate common; *Midland* projectile points and bones of bison, horse, and antelope locally common; rare human bone recovered; clear wavy.

Stratum 1 C3, at least 100cm thick; LS, pinkish white to pink (7.5YR 8/2 7/4); bones of mammoth, camel, horse, wolf, and antelope locally common.

Upland

Tan Sand 0-15cm, C, loose fS, pink (7.5YR 7/4 5/3m); abrupt.

Upper Red Sand 15-55cm, Ab1, fS, str brown (7.5YR 4/6 3/6m); wk med sbk; clear smooth. 55-100cm, Bt1b1, fS, yellowish red (5YR 5/8 4/6m); wk med sbk; thin patchy clay films on ped faces; clear smooth.

100-170cm, Bt2b1, fS, reddish yellow (5YR 6/8 4/8m); mod med sbk; thin patchy clay films on ped faces; clear smooth.

170-180cm, C&Bt1, fS, reddish yellow (5YR 6/8 4/8m); mod med sbk; ~6 clay bands 2-4 mm thick; clear smooth.

Lower Red Sand 180-250cm, Ab2, fS, reddish yellow (5YR 6/6 4/6m); wk med sbk; *Folsom* artifacts locally common; clear smooth.

250-300cm, Btb2, fS, yellowish red (5YR 5/8 4/6m); wk med pr & mod med sbk; clear smooth.

300-350cm, Bwb2, fS, reddish yellow (5YR 6/8 4/8m); mod med sbk.

RED LAKE ** (Martin Co., TX; 32°19'N 101°43'W) site is exposed along the northwest side of the Red Lake saline playa, just east of the eastern edge of the Southern High Plains, and just north of the mouth of Sulphur Springs Draw (Fig. 1) (Frederick, 1993). The exposed sediments are sand sheets that also drape over a large lunette on the east side of the lake.

TABLE DR22. FIELD DESCRIPTION FOR THE RED LAKE SITE

Late Holocene Sand Sheet 0-30cm, A, SL, brown (7.5YR 5/4 4/2); wk sbk & gr; gradual.

30-63cm, *Bw1*, SL, brown (7.5YR 5/4 4/2); wk pr & str sbk; clear smooth

63-81cm, *Bw2*, L, pink (7.5YR 7/4 5/4m); mod pr & str sbk; clear smooth.

Middle Holocene Sand Sheet 81-91cm, *Bt1b1*, L, lt brown (7.5YR 6/4 5/4); thin cont clay films on ped faces; mod pr & str sbk; clear smooth.

91-125cm, *Bt2b1*, L, pink (7.5YR 7/4 5/4m); thin cont clay films on ped faces; str pr & str sbk; gradual.

125-134cm, *BAtb2*, L, pale brown (10YR 6/3 5/3); wk pr & mod sbk; clear smooth.

Radiocarbon age.

134-153cm, *Ab2*, SL, gray brown (10YR 5/2 3/2m); sand filling root channels; mod sbk; abrupt.

Radiocarbon age.

Tahoka Fm 153-162cm, SL, v pale brown (10YR 8/3 8/4m).

TABLE DR23. MIDLAND SITE, LABORATORY DATA*													
Horizon	Depth	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
Draw													
A	0-5	0	1	33	44	17	95	2	3	1.20	.90 ms	1	0.7
ABw	5-15	0	0	42	47	2	91	2	7	1.27	.80 ms	1	0.2
Bw1	15-50	0	0	52	23	17	92	2	6	1.27	.80 ms	1	0.0
Bw2	50-96	0	0	65	26	2	93	2	5	1.40	.80 ms	1	0.0
C1	96-122	0	0	66	25	1	92	2	6	1.67	.70 ms	1	0.0
C2	135-140	0	0	10	77	1	88	6	6	1.50	.55 mws	1	0.1
C3	145-150	0	0	2	24	55	81	13	6	1.57	.90 ms	6	0.2
Upland													
C	0-15	0	0	27	46	21	96	3	1	1.53	1.0 ms	0.1	0.2
Ab1	15-55	0	1	39	43	12	95	3	2	1.23	.80 ms	0	0.3
Bw1b1	55-100	0	1	39	41	15	96	2	2	1.27	.90 ms	0.2	0.0
Bw2b1	100-170	0	0	32	55	10	97	1	2	1.37	.70 ms	0	0.0
C&Btb1	170-180	0	0	63	26	9	98	1	1	1.00	.70 ms	0	0.0
Ab2	180-250	0	1	38	43	11	93	5	2	1.30	.70 ms	0	0.0
Btb2	250-300	0	1	37	46	10	94	1	5	1.20	.80 ms	0	0.0
Bwb2	300-350	0	1	40	45	10	96	2	2	1.13	.70 ms	0	0.3

*From Holliday (1995).

TABLE DR24. RED LAKE SITE, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting -	%CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
A	0-30	0	0	7	23	27	57	33	10	nd	nd	9	0.56
Bw1	30-63	0	0	7	29	22	58	27	15	nd	nd	16	0.23
Bw2	63-81	0	1	7	22	22	52	36	12	nd	nd	15	0.18
Bt1b1	81-91	0	1	8	17	20	48	39	15	nd	nd	13	0.17
Bt2b1	91-125	0	1	7	16	20	46	44	10	nd	nd	13	0.22
BAtb2	125-134	0	1	8	17	22	48	44	8	nd	nd	12	0.27
Ab2	134-153	0	1	10	17	18	46	48	6	nd	nd	9	0.33
Tahoka Fm	153-162	1	3	18	28	16	66	28	6	nd	nd	10	0.19

SITES IN THE MULESHOE DUNES

ANDERSON BASIN #2 (Roosevelt Co, NM; 34°14'N 103°12'W) is an archaeological site in the western Muleshoe Dunes on the north side of Blackwater Draw (Fig. 2) (Howard 1935; Haynes, 1975; Hester 1975; Holliday, 1995, 1997a). The site is a blowout (~130,000 m²) where dune sand and valley fill were deflated locally down to Pleistocene lake carbonates. The western half of the site was destroyed by installation of center-pivot irrigation. Stratigraphic nomenclature follows Holliday (1995).

TABLE DR25. FIELD DESCRIPTION FOR THE ANDERSON BASIN #2 SITE

Dune Sand Up to 200cm thick; includes *C1*, loose fS, pale brown (10YR 6/3 5/2m); clear smooth; and *C2*, loose fS, lt yellowish brown (10YR 6/4 4/3m); clear smooth.

Stratum 3 Sandy marl up to 50cm thick, lt gray (10YR 7/1, 7/2, 5/1m, 5/2m), with zones of organic matter accumulation (10YR 5/1 3/1m, 6/3 8/1m), probable *Ab* horizons; clear wavy.

Stratum 2s or 3s 33cm thick, fS, grayish brown (10YR 5/2 7/1m), with localized staining by organic matter (10YR 7/1 8/1m); abrupt irregular.

Stratum 2d Interbedded diatomite and diatomaceous mud, lt gray to gray (10YR 5/1 3/1m, 7/1 5/1m); 10-20 cm thick, locally missing; **Folsom** artifacts found within this zone and unfluted lanceolate (possibly **Plainview**) projectile points on top; abrupt irregular.

Stratum 1 83cm thick, fS, lt gray (10YR 7/2 5/1m) with gray *Ab* horizon (10YR 6/1 3/1m) in upper 33cm; bones of mammoth, horse, and bison common; abrupt irregular.

Stratum B Indurated lacustrine carbonate; white (10YR 8/1 8/2m).

BURNS (Roosevelt Co, NM; 34°15'N 103°23'W) is an elongate blowout of ca. 45,000m² in the western Muleshoe Dunes on the south side of Blackwater Draw (Fig. 2).

TABLE DR26. FIELD DESCRIPTION FOR THE BURNS SITE

Upper Sand ~200 cm thick; *C*, cross bedded f&mS, yellowish red (5YR 5/6); common clay bands 2-3mm thick following bedding; *Bw* locally preserved in top of section; <100cm thick; S, str brown (7.5YR 5/6 4/4m); wk sbk; clear smooth

White Sand 100 to 200cm thick; *Bt* & *Cb1*, S, v pale brown (10YR 7/3); upper half of section has ~3 clay bands 3-5mm thick, lower half has ~12 clay bands 5-7mm thick; bands are str brown (7.5YR 5/6); **Hell Gap** artifacts from this zone; *cumulic Ab1* horizon locally preserved at top, ~100cm thick, str brown (7.5YR 4/6); clear smooth.

Lower Sand <100cm thick; *Btb2*, SCL, reddish yellow (5YR 5/6); mod sbk; common thin clay films on ped faces.

CAGE EAST ** (Lamb Co., TX; 34°10'N 102°28'W) is a large blowout (~400 m diameter) on the north side of the central Muleshoe Dunes (Fig. 2). The description is a composite one based on a number of exposures around the edge of the deflation basin.

TABLE DR27. FIELD DESCRIPTION FOR THE CAGE EAST SITE

Late Holocene Sand Dune *C*, up to 500cm thick; modern loose cross bedded fS, reddish yellow (7.5YR 7/8 6/8m); clear smooth.

A1b1, up to 50cm thick; fS, yellowish brown (10YR 5/4 4/4m); v wk sbk; clear smooth.

A2b1, up to 50cm thick; fS, brownish yellow (10YR 6/6 5/6m); v wk sbk; clear smooth.

Cb1, up to 400cm thick; loose cross bedded fS, reddish yellow (7.5YR 7/8 6/8m); 12-15 clay bands 1-2mm thick following bedding planes common in lower 70cm; a few bands are irregular and cross cut bedding; clear smooth.

Blackwater Draw Fm

CAGE WEST ** (Bailey Co., TX; 34°09'N 102°46'W) is a large blowout (~ 300 m x 100 m) near the southern edge of the central Muleshoe Dunes (Fig. 2). The description is from the west end where the most complete stratigraphic record was exposed (93-2 to *Bwb2*, 93-1 to *Btb4*). Soil-stratigraphic nomenclature is based on correlation with Gile (1979, 1985) (see Fig. 3).

TABLE DR28. FIELD DESCRIPTION FOR THE CAGE WEST SITE

Fairview Soil 0-70cm, *C1*, loose non-cross bedded fS (mixed by roots); brownish yellow (10YR 6/6 3/6m); gradual.
 70-145cm, *C2*, loose cross bedded fS, brownish yellow (10YR 6/6 4/6m); clear smooth.
Muleshoe Soil 145-180cm, *Ab1*, fS, brownish yellow (10YR 6/6 3/4m); wk cse sbk; gradual.
 180-210cm, *Cb1* (*E?*), loose fS, brownish yellow (10YR 6/6 4/4m); clear smooth.
 210-260cm, *C&Btb1*, loose fS, brownish yellow matrix (10YR 6/6 4/6m) w/8 1-2mm str brown clay bands (7.5YR 4/6 3/4m); clear smooth.
Longview Soil 260-300cm, *Ab2*, loose fS, lt brownish yellow matrix (10YR 6/4 4/4m) w/1-2 mm clay bands; v wk sbk; gradual.
 300-360cm, *Cb2*, loose fS, brownish yellow (10YR 6/6 4/6m); gradual.
Birdwell Soil? 360-368cm, *BAtb3*, fSL, yellowish brown (10YR 5/8 4/6m); wk pr & mod med abk; cont thin clay films on ped faces; clear smooth
 368-379cm, *Bt&Cb3*, fS matrix, yellow (10YR 7/6 6/6m) w/5 yellowish brown clay bands (10YR 5/6 4/6m), 5-8mm thick; 8mm and continuous in the upper section, thinning to 5mm and somewhat discontinuous in the lower section; abrupt wavy (lower boundary is lowest clay band).
 379-434cm, *Cb3*, loose fS, v pale brown (10YR 8/3 7/3m), w/2mm clay band @ 409cm & 2 discont 1mm clay bands @ 419 & 424cm; abrupt, v irregular.
 434-449cm, *Btb4*, dense fS, brownish yellow (10YR 6/6 5/6m); thin cont clay films on ped faces; mod med sbk; strongly bioturbated; clear smooth. **Radiocarbon age (434-439cm)**

CAR BODY ** (Roosevelt Co, NM; 34°14'N 103°17'W) (also the "Model-T" site of Haynes 1975) is a large blowout (~ 300 m x 200 m) along the south side of Blackwater Draw in the western Muleshoe Dunes (Fig. 2) (Holliday, 1995, 1997a). Wind deflation excavated a steep-walled depression up to 5 m deep, exposing late Quaternary valley fill including eolian facies. The late Holocene dunes, resting on the prominent Bt horizon, were exposed ~1km to the south (no colors). Stratigraphic terminology follows Holliday (1995).

TABLE DR29. FIELD DESCRIPTION FOR THE CAR BODY SITE

Late Holocene Sand Dune

C up to 100cm thick; fS, clear smooth.

Ab1, ~30cm thick; clear smooth.

Cb1, up to 200cm thick, cross bedded fS, ~10 clay bands, 1-3mm thick, following bedding planes; clear smooth.

Stratum C 0-25cm, *Ab2*, fS, dk brown (7.5YR 4/4 3/4m); wk med sbk; clear smooth.

25-40cm, *ABb2*, fS, dk brown (7.5YR 4/4 3/4m); mod med sbk; clear smooth.

40-60cm, *Bt1b2*, fS, brown (7.5YR 5/4 4/4m); thin, cont clay films on ped faces; wk med pr & str med sbk; clear smooth.

60-80cm, *Bt2b2*, fS, brown (7.5YR 5/4 4/4m); thin, discont clay films on ped faces; wk med pr & mod med sbk; clear smooth.

80-100cm, *Bt3b2*, fS, brown (7.5YR 5/4 4/4m); thin, patchy clay films on ped faces; wk med sbk; clear smooth.

100-125cm, *C1b2*, fS (*Ab horizon* 20cm thick locally present between *Bt3* and *C1*), lt yellowish brown (10YR 6/4 5/4m); faint bedding preserved; v wk sbk; clear, smooth.

125-250cm, *C2b2*, white fS (10YR 8/2 6/2m); massive; clear smooth.

250-280cm, *C3b2*; interbedded white fS & lenses of mud; mammoth and *Clovis* artifacts exposed at the surface toward draw where rest of unit is missing (never deposited?); abrupt.

Stratum B Marl; white (10YR 8/1, 2.5Y 7/2m); typically 100cm thick over olive fS (10YR 8/1, 2.5Y 6/2).

CLOVIS ** (Roosevelt Co, NM; 34°17'N 103°20'W), also known as Blackwater Draw Locality 1, is an archaeological site in a small basin on the north edge of the western Muleshoe Dunes, 2 km north of and draining into Blackwater Draw (Fig. 2) (Howard, 1935; Sellards, 1952; Haynes and Agogino, 1966; Hester, 1972; Haynes, 1975, 1995; Holliday, 1997a). Mining destroyed much of the site; a large pit now occupies most of the topographic basin that originally marked the locality. Remnants of the basin fill are exposed along the margins of the pit and extensive deposits remain in the "outlet channel" that connected the basin with the draw proper. Eolian sediments comprised some of the basin fill and were described by Haynes (1975) prior to the final phases of quarrying. Eolian sands in dunes and sheets also are on the uplands adjacent to and surrounding the quarry pit, and several sections were recorded. Correlations of stratigraphy and samples between sections is difficult, however, owing to the mining. There are at least three dated sections: on the southeast uplands, at the South Bank, and on the West Bank, including the Mitchell locality. These sections are described below. The southeast upland is here described for the first time. The South Bank section was described and dated by Holliday (1985) and Haynes (1995). Haynes' correlation of the South Bank profile (1995, p. 378) supercede those of Holliday (1985). On the uplands at the north end of the West Bank is a sand sheet with *Folsom* artifacts reported by Hester (1972) and investigated by Stanford and Broilo (1981) and Boldurian (1990), and identified as the Mitchell locality. The section described for the Mitchell locality is profile Bw-72 in Holliday (1995, p. 101). No lab data are available. All stratigraphic nomenclature follows Haynes (1995).

TABLE DR30. FIELD DESCRIPTIONS FOR THE CLOVIS SITE

Southeast Upland Mining Spoil, 50-100cm thick

Unit G2 0-7cm, *A1*, fS, brown (10YR 5/3 3/3m); wk sbk; clear smooth.

7-15cm, *A2*, fS, yellowish brown (10YR 5/4 3/3m); v wk sbk; clear smooth.

15-73cm, *Bw*, fS, lt yellowish brown (10YR 6/4 4/3m); v wk sbk; clear smooth.

73-90cm, *Bk*, fS, brown (7.5YR 6/4 5/4m); weakly expressed subhorizontal zone of carb 73-80cm, thin films & patches of carb below; possibly developed in upper cumulic *Ab1*; otherwise massive; clear smooth

90-110cm, *Ab1* cumulic horizon composed of two faintly expressed A-C profiles; fS, brown (7.5YR 5/4 4/4m); v wk sbk; clear irregular.

110-120cm, *Cb1*, loose fS, lt brown (7.5YR 6/4 5/4m).

Unit G1 120-142cm, *Ab2*; upper 5cm mixed with *Cb1*; fS, dark brown (10YR 4/3 3/3m); wk sbk; clear smooth. **Radiocarbon age.**

Unit A9 lacustrine carbonate (stratum B of Holliday, 1995).

CLOVIS site (cont'd)

South Bank Mining Spoil, 50-100cm thick

Unit G2 0-20cm, A, fS, brown (10YR 5/3 7.5YR 4/4m); massive; clear wavy.
20-48cm, C, fS, brown (7.5YR 5/4 5/4m); massive, clear smooth.
48-59cm, *Ab1*, LfS, dark brown (7.5YR 4/4 4/4m); wk cse sbk; clear smooth.
59-81cm, *Bt1*, LfS, brown (7.5YR 5/4 4/5m); wk cse sbk; thin, patchy clay films; clear smooth.

Unit G1 81-91 cm, *A1b2*, fSL, dark brown (7.5YR 4/4 4/4m); wk cse pr & wk med sbk; clear wavy.

91-118cm, *A2b2*, fSL, brown (10YR 5/3 7.5YR 4/4m); wk cse pr & wk med sbk, gr wavy.

118-138cm, *A3/Bwb2*, fSL, brown (10YR 5/3 4/4m); wk cse pr & wk med sbk; clear wavy.

138-148cm, *2Ab3*, fSL, brown (10YR 5/3 3/3m); wk cse pr & wk med sbk; clear wavy.

Radiocarbon age.

148-185cm, *2Ak1b3*, SCL, pinkish gray (7.5YR 6/2 10YR 3/3m); massive; common thr & films of carb; clear wavy.

185-195+cm, *3Ak2b3*, L, lt brownish gray (10YR 6/2 3/2m); massive; common thr & films of carb.

West Bank

Unit G 0-15cm, *Ap*, LfS, dark brown (10YR 4/2); sg; clear smooth.

15-30cm, C, fS, brown (10YR 5/3); sg; abrupt irregular.

Late Pleistocene Sand Sheet (stratum C of Holliday, 1995)

30-38cm, *Bt1b1*, fSL, brown (7.5YR 5/4 4/3m); wk med pr & mod med sbk; thin discount clay films; clear smooth. ***Folsom*** artifacts found within this zone.

38-47cm, *Bt2b1*, fSL, brown (7.5YR 5/4 4/3m); mod med pr & mod cse sbk; thin cont clay films; some OM stains (Abt?); clear smooth. ***Folsom*** artifacts found within this zone.

47-57cm, *Bt3b1*, fSL, brown (7.5YR 5/3 3/3m); wk med pr & mod cse sbk; thin cont clay films; clear smooth. ***Folsom*** artifacts found within this zone.

Lacustrine Carbonate (stratum B of Holliday, 1995).

GILE's STUDY AREA was in a series of blowouts in western Bailey County (~34°10'N ~102°55'W), along the southern edge of the Muleshoe Dunes (Figs. 1, 2). A paper (Gile, 1979) and a monograph (Gile, 1985) provide considerable data and discussion, and detailed descriptions of the soil-geomorphology and soil-stratigraphy. This area was not accessible during the 1992- 1996 field work.

JORDE ROAD CUT** (Roosevelt Co., NM; 34°10'N 102°24'W) is exposed in a cut along a county road near the north edge of the western Muleshoe Dunes (Fig. 2).

TABLE DR31. FIELD DESCRIPTION FOR THE JORDE ROAD CUT

Late Holocene Dunes modern fS, up to 100cm thick; clear smooth.

Middle Holocene Sand Sheet? *Ab1*, LS ~10cm thick; (7.5YR 4/4 3/4m); wk sbk; clear smooth.

Bt1b1, fSL ~10cm thick; (7.5YR 5/8 4/6m); wk pr & mod sbk; common thin clay films; clear smooth.

Bt2b1, fSL ~50cm thick; (7.5YR 4/6 3/4m); wk pr & wk sbk; thin patchy clay films; clear smooth.

Bwb1, LS ~20cm thick; (7.5YR 5/8 4/6m); mod sbk; clear smooth.

Late Pleistocene Sand Sheet *BAtb2*, SL ~50cm thick; (7.5YR 4/4 3/4m); wk pr & mod sbk.

Blackwater Draw Fm

PLANT X

** (Lamb Co., TX; 34°10'N 102°24'W) is in the central Muleshoe Dunes where they cross Blackwater Draw, just north of the Gibson Ranch site (see above) (Fig. 2). The draw locality (composite section) is a blowout (~100 m x 75 m) on the floor of Blackwater Draw, exposing dune sands resting on early Holocene valley fill. The upland locality (composite section) is just west of the draw. It was a sand quarry excavated in a small dune field. Stratigraphic terminology for valley fill follows Holliday (1995).

TABLE DR32. FIELD DESCRIPTIONS FOR THE PLANT X SITE

Draw (93-7 to 380cm, 93-3 380+cm)

Late Holocene Sand 0-300cm, C, modern loose fS, weakly cross bedded, brownish yellow (10YR 6/6 5/6m); clear smooth.

300-315cm, *Ab1*, fS; yellowish brown (10YR 5/4 3/3m); wk sbk; gradual.

315-330cm, *Cb1* loose fS, v pale brown (10YR 7/4 4/4m); clear irregular.

330-430cm, *Ab2*, fS, dk yellowish brown (10YR 4/4 3/2m); faint bedding in upper 5cm; wk sbk; clear smooth. **Radiocarbon age** (335-340cm)

430-730cm; *Cb2*, loose fS, yellow matrix (10YR 7/6 5/6m) w/ brownish yellow clay bands (10YR 6/8 4/6m) following bedding planes; ~6 in upper half, 1-2mm thick; ~6 in lower half, up to 3mm thick; clear smooth

Stratum 3 Marl and sandy marl, up to 100cm thick, lt gray (10YR 7/2 4/2m); clear smooth.

Stratum 2 LS mud, 20cm thick, dk brown (10YR 3/3 3/2m). **Radiocarbon age.**

PLANT X site (cont'd)

Upland (93-4 to *Cb1*, 93-1 to *ABtb5*, 93-2 & 94-1 to *Btb6*)

Late Holocene Sand Dune 0-100cm, *C*, modern fS, lt yellowish brown (10YR 6/4 5/4m); clear smooth.

100-120cm, *Ab1*, fS, lt yellowish brown (10YR 6/4 4/3m); v wk sbk; clear smooth.

120-320cm (locally up to 400cm thick), *Cb1*, cross bedded fS, lt yellowish brown (10YR 6/4 5/4m); clear smooth.

320-330cm, *Ab2*, LS, yellowish brown (10YR 5/4 3/3m); wk sbk; clear smooth. **Radiocarbon age.**

330-355cm, *Eb2*, loose fS, lt yellowish brown (10YR 6/4 4/3m); clear smooth.

355-400cm, *C&Btb2* (*dune facies*), matrix is brownish yellow fS (10YR 6/6 3/6m); v wk sbk; 6 yellowish brown (10YR 5/6 3/6m) clay bands 1-2mm thick; clear wavy.

Btb2 (*playa facies*), 10cm thick, fS, yellowish brown (10YR 5/4 4/3m); common clay films

400-407cm, *Ab3*, fS, yellowish brown (10YR 5/4 4/4m); v faint; v wk sbk; clear wavy.

407-442cm, *C&Btb3*, fS, yellowish brown (10YR 5/6 4/4m); v wk sbk; one clay band at top, 1-2mm thick, one clay band at bottom 5cm thick; abrupt irregular.

442-452cm, *Ab4*, LS, dk yellowish brown (10YR 4/4 3/4m); wk sbk; clear smooth. **Radiocarbon age.**

452-476cm, *ACb4*, fS, lt yellowish brown (10YR 6/4/ 4/4m); v wk sbk; diffuse.

Middle Holocene Sand 476-496cm, *A1b5*, SL, dk yellowish brown (10YR 4/4 3/2m); mod sbk; clear smooth. **Radiocarbon age.**

496-514cm, *A2b5*, SL, dk yellowish brown (10YR 4/4 3/3m); mod sbk; clear smooth.

514-539cm, *ABtb5*, cumulized A horizon w/thin, patchy clay films; SCL, dk yellowish brown (10YR 4/4 4/3m); mod cse pr; clear smooth. **Radiocarbon age.**

539-549cm, *ABkb5*, SL, pale brown (10YR 6/3 5/2m); thin, common carb films; mod med sbk; clear smooth. **Radiocarbon age.**

549-562cm, *Cb5*, SL, white (10YR 8/1 7/2); massive marl; abrupt.

Tahoka Fm 75cm thick; *2Cgb5*, SL, white (10YR 8/1 8/2m).

RABBIT ROAD** (Bailey Co., TX; 34°11'N 102°45'W) site is a series of five blowouts scattered over an area of ~ 600 m x 300 m in the central Muleshoe Dunes (Fig. 2). All blowouts were <8000 km². The described sections are for blowouts that yielded reliable radiocarbon ages. Soil- stratigraphic nomenclature is based on correlation with Gile (1979, 1985) (see Fig. 3).

TABLE DR33. FIELD DESCRIPTIONS FOR THE RABBIT ROAD SITE

Northeast Blowout

Fairview Soil 0-300cm, *C*, modern fS, brownish yellow (10YR 6/6 6/4m); clear smooth.

Muleshoe Soils 300-340cm, *Ab1*, fS, yellowish brown (10YR 5/4 3/4m); upper 20cm is most strongly expressed; wk sbk; clear smooth. ***Radiocarbon age.***

340-440cm (locally up to 300cm thick), *C&Btb1*, loose fS, lt yellowish brown (10YR 6/4 5/4m); 2-3 clay bands 4-5mm thick in lower 30cm; clear smooth.

440-500cm, *A&Btb2*, fS, yellowish brown (10YR 5/4 4/4m); 3-4 faint clay bands, 2-3mm thick; wk sbk; clear smooth

500-600cm (locally up to 200cm thick), *Cb2*, fS, brownish yellow (10YR 6/6 5/6m), w/5-10 v faint clay bands 1-3mm thick following bedding in lower 100 cm; massive; clear smooth.

Birdwell Soil? 600-650cm (locally >100cm), *Ab3*, fS, yellowish brown (10YR 5/4 4/4m); v wk sbk; clear smooth.

650-700cm, *Eb3*, loose fS, lt yellowish brown (10YR 6/4 4/4m); clear smooth.

700-800cm, *Bt&Btb3*, fS matrix, str brown (7.5YR 5/6 4/6m); wk sbk; thin cont. clay films on ped faces; ~12 str brown (7.5YR+ 5/6 4/6m) clay bands; upper bands are 7-8mm thick, lower bands are 3-5mm thick; clear smooth.

800-830cm, *Cb3*, white (10YR 8/1) fS (clay bands from *Btb3* locally apparent).

Southwest Blowout (south side except where noted)

Fairview Soil 0-100cm, *C*, loose fS, brownish yellow (10YR 6/6 4/6m); clear smooth.

Muleshoe Soil 100-140cm, *Ab1*, fS, yellowish brown (10YR 5/4 3/6m); v. wk sbk; clear smooth.

140-200cm, *C&Btb1*, loose fS, yellowish brown (10YR 5/4 4/4m) w/2-3 1-2mm clay bands; clear smooth.

Longview Soil? North Side: 200-365cm, *Bt&Cb2*, loose fS matrix, v pale brown (10YR 7/4 5/4m); ~25 yellowish brown (10YR 5/6 4/6m) clay bands, 5-15mm thick; clear smooth.

South Side: 200-220cm, *Ab2*, fS, yellowish brown (10YR 5/4 3/4m); v. wk sbk; gradual boundary

220-270cm, *Btb2* (divided into *Bt1b2* and *Bt2b2* for sampling), LS, yellowish brown (10YR 5/6 4/6m); v. wk pr & wk sbk, thin, patchy clay films; clear smooth.

270-290cm, *Cb2*, loose fS, lt yellowish brown (10YR 6/4 5/4m); clear smooth.

290-300cm, *Cgb2*, fS, dk yellowish brown (10YR 4/4 3/4m); massive; common krotovinas; irregular abrupt.

300-325cm, *Agb3*, dense SC, dk yellowish brown (10YR 3/4 3/2); mod sbk; common Mn concretions, common krotovinas. ***Radiocarbon age.***

TOBOSA RANCH** (Bailey Co., TX; 34°07'N 102°58'W) is between Coyote Lake and Arch Lake, two saline playas in the Portales Valley (see Holliday, 1995), and just south of the main belt of the Muleshoe Dunes (Fig. 2). The exposures are in a very heavily eroded lunette adjacent to a shallow playa basin (see also Holliday, 1997b). Late Holocene eolian sands are draped over

the lunette sediments. Two sections were described: one along an old road cut through the back (east) side of the lunette, and the other in a large blowout in the middle of the lunette (locally known as the "castle").

TABLE DR34. FIELD DESCRIPTIONS FOR THE TOBOSA RANCH SITE

Road Cut

Late Holocene Sand 0-150cm, C, historic loose fS, pale brown (10YR 6/3 5/3m) w/numerous weakly expressed bioturbated brown A horizons (10YR 5/3 4/3m) (3 betw 55-75cm & 5 betw 120-150cm); clear smooth.

150-166cm, Ab1, LfS, gray (10YR 5/1 3/1m); prominent stratigraphic marker in all exposures; lower half more strongly expressed; wk sbk; clear smooth. ***Radiocarbon age.***

166-173cm, Bwb1, SL, gray (10YR 6/1 4/1m); mod sbk; clear smooth.

173-184cm, Ab2, SL, grayish brown (10YR 5/2 4/2m); 3 welded A horizons; strongly bioturbated; wk sbk; clear smooth. ***Radiocarbon age.***

184-197cm, 2Bkb2, SL, pale brown (10YR 6/3 5/3m) w/finely divided carb; top of lunette sediments; wk pr & mod sbk; clear wavy.

Blowout

Late Holocene Sand C, historic loose fS, 100-200cm thick; pale brown (10YR 6/3 5/3m); clear smooth.

Ab1 & Ab2 (as above), 30-40cm thick.

Bwb2 (as above), 50cm thick.

Cb2, 200-300cm thick; massive sand. ***Radiocarbon age on bone***

TABLE DR35. CAGE EAST SITE, LABORATORY DATA												
Horizon	% OF < 2 mm Fraction								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
A1b1	0	1	33	55	6	95	4	1	1.23	.60 mws	nd	ND
A2b1	0	0	31	43	4	76	23	1	1.67	>1.2 ps	nd	ND
Cb1 sand matrix	0	1	49	36	2	88	10	2	1.10	.75 ms	nd	ND

TABLE DR36. GAGE WEST SITE, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
C1	0-70	0	3	24	63	9	99	1	0	1.30	.55 mws	0	0.00
C2	70-145	0	5	37	50	6	98	1	1	1.13	.70 ms	0	0.00
Ab1	145-180	0	3	30	46	16	95	5	0	1.40	.80 ms	0	0.13
Cb1	180-210	0	2	33	58	7	100	0	0	0.83	.65 ms	1	0.21
C&Btb1 clay band	210-260	0	4	28	43	7	82	5	13	---	---	0	0.00
C&Btb1 matrix		0	1	21	65	12	99	1	0	1.40	.55 mws	0	0.00
Ab2	260-300	0	3	29	54	11	97	2	1	1.27	.65 mws	0	0.10
BAtb3	360-368	0	1	19	41	9	70	11	19	1.87	>1.05 ps	0	1.63
Bt&Cb3 clay band	368-379	0	3	25	49	8	85	4	11	---	---	0	1.05
Bt&Cb3 matrix		0	2	29	50	8	89	4	7	1.47	.90 ms	0	0.19
Cb3	379-434	0	1	25	57	15	98	1	1	1.40	.60 mws	0	0.03
Btb4	434-449	0	3	34	49	6	92	1	7	1.23	.70 mws	0	0.00

TABLE DR37. CAR BODY SITE, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting -	%CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
Ab1	-----	1	4	17	57	13	92	2	6	nd	nd	nd	nd
Ab2	0-25	0	5	18	57	16	96	1	3	1.47	.65 mws	nd	nd
ABb2	25-40	0	4	18	57	16	95	1	4	1.50	.70 mws	nd	nd
Bt1b2	40-60	0	3	19	56	17	95	1	4	1.47	.65 mws	nd	nd
Bt2b2	60-80	0	3	16	60	14	93	2	5	1.53	.60 mws	nd	nd
Bt3b2	80-100	0	3	16	59	15	93	2	5	1.50	.60 mws	nd	nd
C1b2	100-125	0	3	22	58	12	95	1	4	1.37	.65 mws	nd	nd
C2b2	125-160	0	1	18	69	9	97	1	2	1.43	.50 ws	nd	nd
C3b2	250-280	0	1	12	70	13	96	1	3	1.53	.45 ws	nd	nd

TABLE DR38. CLOVIS, LABORATORY DATA													
		----- ----- % of < 2 mm Fraction ----- -----											
Horizon	Depth	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay	Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
<u>SE Upland</u>													
A1	0 - 7	0	10	28	44	11	93	5	2	1.20	.85 ms	nd	nd
A2	7 - 15	0	6	29	48	12	95	4	1	1.23	.80 ms	nd	nd
Bw	15 - 73	0	4	28	54	11	97	2	1	1.27	.70 mws	nd	nd
Bk	73 - 90	0	3	25	50	18	96	2	2	1.40	.80 ms	nd	nd
Ab1	90 - 110	0	2	15	56	22	95	3	2	1.63	.65 mws	nd	nd
Cb1	110 - 120	0	3	18	64	14	99	1	0	1.40	.55 mws	nd	nd
Ab2	120 - 142	0	6	18	48	18	90	6	4	1.57	.90 ms	nd	nd
<u>South Bank</u>													
A	0 - 20	0	2	15	55	23	95	3	2	1.67	.70 mws	0	0.18
C	20 - 48	0	0	11	59	22	92	4	4	1.70	.65 mws	0	0.16
Ab1	48 - 59	0	3	10	45	26	84	10	6	1.97	.95 ms	0	0.17
Btb1	59 - 81	0	6	15	37	19	77	13	10	>1.87	>1.10 ps	0	0.20
A1b2	81 - 91	0	6	15	31	20	72	19	9	>2.03	>1.30 ps	0	0.14
A2b2	91 - 118	0	6	17	27	13	63	25	12	>2.03	>1.35 ps	0	0.07
A3/Bwb2	118 - 138	0	11	25	29	12	77	14	9	>1.67	>1.60 ps	0	0.11
2Ab3	138 - 148	1	13	16	37	11	78	14	8	nd	nd	0	0.14
2Ak1b3	148 - 185	1	10	12	37	14	74	17	9	nd	nd	6	0.15
2Ak2b3	185 - 195	0	5	7	26	16	54	40	6	nd	nd	10	0.21
* From Holliday (1985).													
† ND=Not Determined.													

* From Holliday (1985).

! ND=Not Determined.

TABLE DR39, JORDE ROAD CUT, LABORATORY DATA												
	----- -----% of < 2 mm Fraction ----- -----											
Horizon	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay	Sand Graphic Mean -	Sorting -	%CaCO ₃	% OC
Ab1	0	1	6	38	37	82	7	11	nd	nd	1	0.6
Bt1b1	0	0	4	37	36	77	9	14	nd	nd	1	0.6
Bt2b1	0	0	2	51	31	84	4	12	nd	nd	1	0.8
Bwb1	0	1	17	35	33	86	4	10	nd	nd	1	0.7
Btb2	0	0	3	27	37	67	17	16	nd	nd	1	1.4

TABLE DR40. PLANT X SITE, LABORATORY DATA													
		----- ----- % of < 2 mm Fraction ----- -----											
Horizon	Depth	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay	Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
Draw													
C	0-300	0	1	30	59	8	98	2	0	1.23	.65 mws	0	0.00
Ab1	300-315	0	0	10	47	34	91	8	1	1.93	.80 ms	0	0.16
Cb1	315-330	0	0	19	67	12	98	2	0	1.47	.55 mws	0	0.00
Ab2	330-430	0	1	19	53	20	93	6	1	1.60	.75 ms	0	0.24
Cb2 matrix	430-730	0	0	32	64	3	99	0	1	1.23	.60 mws	0	0.00
Cb2 clay bands	ND*	0	1	30	55	12	98	0	2	---	-----	ND	ND
Stratum 3	ND	0	1	14	43	26	84	9	7	nd	nd	21	0.44
Stratum 2	ND	0	1	23	51	14	89	5	6	nd	nd	0	nd
Upland													
C	0-100	0	0	36	58	3	97	2	1	1.20	.60 mws	0	nd
Ab1	100-120	0	0	28	54	13	95	4	1	1.33	.70 ms	0	0.20
Cb1	120-320	0	0	30	61	7	98	0	2	1.23	.60 mws	0	0.26
Ab2	320-330	0	0	18	42	26	86	10	4	1.83	1.00 ms	0	0.20
Eb2	330-355	0	0	20	64	11	95	3	2	1.43	.55 mws	0	0.16
C&Btb2 clay band	355-400	0	0	21	63	7	91	3	6			0	nd
C&Btb2 sand matrix	NA ¹	0	0	23	62	10	95	1	4	1.40	.60 mws	0	nd
Btb2 playa facies	NA	0	0	30	53	9	92	3	5	---	-----	0	nd
Ab3	400-407	0	0	20	57	15	92	4	4	1.57	.70 mws	0	0.63

C&Btb3	407-442	0	0	20	67	9	96	1	3	1.37	.55 mws	0	0.56
Ab4	442-452	0	0	15	39	25	79	14	7	>1.93	>1.0 ps	0	ND
ACb4	452-476	0	1	23	55	13	92	5	3	1.50	.70 ms	0	0.08
A1b5	476-496	0	1	18	31	19	69	19	12	nd	nd	0	0.28
A2b5	496-514	0	0	15	31	16	62	21	17	nd	nd	0	0.27
ABtb5	-----	0	0	15	26	14	55	22	23	nd	nd	0	0.28
ABkb5	539-549	0	1	19	27	13	60	23	17	nd	nd	9	0.45
Cb5	549-562	0	1	25	30	12	66	20	14	nd	nd	5	0.26

TABLE DR41. RABBIT ROAD SITE, LABORATORY DATA												
	----- % of < 2 mm Fraction -----											
Horizon	VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay	Sand Graphic Mean -	Sorting	% CaCO ₃	% OC
<u>NE Blowout</u>												
Ab1	0	3	42	47	4	96	2	2	1.10	.65 mws	1	0.14
C&Btb1	0	3	52	39	4	98	0	2	0.93	.65 mws	2	0.06
A&Btb2	0	3	42	48	4	97	1	2	1.13	.70 mws	1	0.15
Cb2	0	4	58	32	4	98	0	2	0.90	.65 mws	1	0.06
Ab3	0	3	40	45	7	95	3	2	1.17	.75 ms	1	0.06
Eb3	0	7	57	30	3	95	0	5	0.83	.65 mws	0	0.06
Bt&Btb3 clay band	0	3	42	42	5	92	3	5	---	-----	2	0.05
Bt&Btb3 matrix	0	4	43	42	5	94	3	3	1.07	.75 ms	2	0.05
<u>SW Blowout*</u>												
C	0	3	49	41	3	97	1	2	1.00	.70 mws	0	0.00
Ab1	0	4	44	43	5	97	1	2	1.10	.70 mws	0	0.16
C&Btb1	0	3	37	49	8	97	1	2	1.13	.70 mws	0	0.06
Ab2	0	6	46	39	5	96	2	2	1.00	.70 mws	0	0.16
Bt1b2	0	5	48	38	4	95	3	2	1.00	.70 mws	0	0.00
Bt2b2	0	4	43	43	4	94	3	3	1.10	.70 mws	0	0.05
Cb2	0	4	46	41	4	95	3	2	1.07	.70 mws	1	0.00

* south side of blowout.

TABLE DR42. TOBOSA RANCH ROAD CUT, LABORATORY DATA													
Horizon	Depth	% of < 2 mm Fraction								Sand Graphic Mean -	Sorting	% CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
C	0-150	0	1	20	60	15	96	0	4	1.50	.60 mws	nd	nd
Ab1	150-166	0	0	7	43	32	82	12	6	2.10	.85 ms	nd	nd
Bwb1	166-173	0	0	7	36	32	75	19	6	>2.17	>.85 ms	nd	nd
Ab2	173-184	0	0	7	33	30	70	22	8	>2.20	>.85	nd	nd
2Bkb2	184-197	0	1	11	34	28	74	20	6	>2.17	>.95 ms	nd	nd

SITES IN THE SEMINOLE SAND SHEET

E&M ** (Midland Co, TX; 32°03'N 101°47'W) is a road cut on the north side of Mustang Draw at the intersection of FM 137 and FM 307, and just north and northeast of the Evans & Meade site of Holliday (1995) (Fig. 1). Section is a composite of the west and east wall sections.

TABLE DR43. FIELD DESCRIPTION FOR THE E&M SITE

Middle Holocene Sand Sheet A, 15cm thick, LfS, yellowish brown (10YR 5/4 3/4m); wk sbk & wk gr; clear smooth.

ABt, 15cm thick, SL, dk brown (7.5YR 4/4 3/4m); thin patchy clay films on ped faces; mod sbk; clear smooth.

Bt, 35cm thick, SL, brown (7.5YR 5/4 4/4m); thin patchy clay films on ped faces; str sbk; clear smooth.

Btk, 35cm thick, SCL, lt brown (7.5YR 6/4 5/4m); str sbk; ped faces have thin discont clay films & common films & thr carb; clear smooth. **Archaic artifacts** are common throughout the *Bt/Btk* horizon.

Blackwater Draw Fm *Btb/Btkb*, SCL, str brown (7.5YR 4/6 4/4m).

MONUMENT DRAW (Andrews Co., TX; 32°34'N 102°52'W) is a road cut through a dune that borders the south edge of Monument Draw, about 1km south of the SR-181 site of Holliday (1995) (Fig. 9).

TABLE DR44. FIELD DESCRIPTION FOR THE MONUMENT DRAW SITE

Late Pleistocene Sand Dune? 0-50cm, A, LfS, dk brown (7.5YR 4/4 4/3m); wk sbk; clear smooth.

50-80cm, *Bt1*, fSL, yellowish red (5YR 4/6 4/6m); v wk pr & str sbk; almost cont clay films on ped faces; clear smooth.

80-120cm, *Bt2*, fSL, yellowish red (5YR 5/6 4/6m); v wk pr & str sbk; almost cont clay films on ped faces; clear smooth.

120-170cm, *Bt3*, LfS, 5YR yellowish red (5/6 4/6m); wk sbk; thin patchy clay films; clear smooth.

170-300cm, C, loose fS, yellowish red (5YR 5/6 4/6m); clear smooth.

Blackwater Draw Fm 300-330cm, *Btb*, SCL, yellowish red (5YR 4/6 4/6m).

TERRY COUNTY AUXILIARY AIRFIELD ** (Terry Co., TX; 33°22'N 102°22'W), formerly an auxiliary airfield for Reese Air Force Base, is in a thin sand sheet east of the eastern edge of the Lea-Yoakum Dunes (Fig. 6). Archaeological research at the airfield resulted in excavation of a series of backhoe trenches (Johnson et al., 1997). In the descriptions below, the “playa exposure” is from a trench cut high along the margins of a playa basin that exposed middle Holocene eolian sediments (Trench 3 of Holliday, 1997c), and the “upland exposure” is from a trench cut on the uplands that exposed a late Holocene sand sheet (Trench 7 of Holliday, 1997c).

TABLE DR45. FIELD DESCRIPTION FOR THE TERRY COUNTY SITE

Upland Exposure

Historic Sand Sheet 0-15cm, C, LS, dk brown (7.5YR 4/4); primary bedding locally preserved; abrupt irregular.

Late Holocene Sand Sheet 15-20cm, *Ab1*, LS, dk brown (7.5YR 3/4); wk sbk; clear smooth. 20-25cm, *Bwb1*, LS, dk brown (7.5YR 4/4); wk sbk; abrupt. ***Radiocarbon age*** from hearth and ***late Prehistoric*** archaeological material correlated to this stratum.

Blackwater Draw Formation 25-55cm, *Ab2*, SCL, dk brown (7.5YR 3/2).

Playa Exposure

Middle Holocene Sand Sheet 0-15cm, A, SCL, dk brown (7.5YR 4/2); wk sbk; clear smooth. 15-55cm, *Bt1*, SCL, dk brown (7.5YR 4/4); mod pr & str sbk; thin, patchy clay films on ped faces; clear smooth.

55-73cm; *Bt2*, dk brown (7.5YR 4/2); mod pr & str sbk; thin, patchy clay films on ped faces; clear smooth.

Playa Fill 73-110cm, *2Btb1*, SiC, brown (7.5YR 5/2); thin cont clay films on ped faces; f pr & f abk; clear smooth.

110-125cm, *2Bkb1*, SiC, brown (7.5YR 5/2); cse pr & cse abk; common films & thr of carb on ped faces; abrupt irregular. ***Radiocarbon age***

Blackwater Draw Formation *3Btkb2*, SCL, brown (7.5YR 5/4).

TABLE DR46. E&M SITE (EAST WALL), LABORATORY DATA													
Horizon	Depth	-----% of < 2 mm Fraction-----								Sand Graphic Mean -	Sorting -	% CaCO ₃	% OC
		VCOS	COS	MS	FS	VFS	% Sand	% Silt	% Clay				
A	0	0	0	19	39	29	87	2	11	nd	nd	nd	nd
ABt	15-20	0	0	12	39	26	79	6	15	nd	nd	nd	nd
Bt	20-35	0	0	14	37	28	79	4	17	nd	nd	nd	nd
Btk	35-50	0	0	20	27	25	72	4	24	nd	nd	nd	nd

TABLE DR47. TERRY COUNTY AUXILLIARY AIRFIELD SITE, LABORATORY DATA						
Horizon	Depth	-----% of < 2 mm Fraction-----			% CaCO ₃	% OC
		% Sand	% Silt	% Clay		
<u>Upland</u>						
C	0-15	87	6	7	1	0.34
Bwb1	20-25	78	16	6	1	0.25
Ab2	25-55	69	1	30	1	0.33
<u>Playa</u>						
A	0-15	77	14	9	1	0.42
Bl1	15-55	72	17	11	1	0.42
Bt2	55-73	47	34	19	1	0.33
2Btb1	73-110	48	43	9	1	0.17
2Bkb1	110-125	67	27	6	1	0.04
3Btkb2	125-180	70	24	6	1	0.04

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