Exploring Variation in Paleoindian Life Ways: The Third Revised Edition of the Texas Clovis Fluted Point Survey

Michael R. Bever and David J. Meltzer

ABSTRACT

Over 20 years have passed since the Texas Clovis Fluted Point Survey (TCFPS) was initiated. The database has now grown to 544 points, representing 149 of Texas' 254 counties. The database by now contains a demonstrably representative sample of the known Clovis point record in Texas, and has developed into a productive research tool for addressing questions of Clovis adaptations and lifeways. Some regions of the state show an abundant record of Clovis points while others are quite poorly represented. We argue that in certain regions the scarcity of points results from poor preservation or archeological exposure, while in others it may be due to a sparse Clovis occupation. In this regard, the distribution of Clovis sites provides an informative counterpoint to the distribution of Clovis points. Raw material distributions continue to provide insight into variation in Clovis technology and land use, but concerns about the accurate identification of raw materials found outside Central Texas limit the analytical potential of this line of evidence. Although there is significant variation in the size and use histories of Clovis points, the latter evidenced by reworking and breakage, we find little indication of morphological variation in Texas Clovis points not related to technological or raw material constraints. We conclude by identifying several gaps in our knowledge of Texas Clovis archeology that, if pursued as future research topics, would make the TCFPS an even more productive tool, and would advance Texas Clovis scholarship generally.

INTRODUCTION

Over ten years have passed since the last report on the Texas Clovis Fluted Point Survey (hereafter TCFPS) (Meltzer and Bever 1995). Since then, the database has grown by over 30%. The number of counties reporting Clovis points has increased, patterns once vague are now stronger, and conclusions once qualified are now more secure. Despite this, there have not been many significant changes in the TCFPS since the last update: few new patterns have emerged and the increase in points largely confirms previously reported findings. We are comforted by this; it indicates that the TCFPS provides (in general) a remarkably representative picture of Clovis point distributions and characteristics across the state. However, as we discuss below, that is not equivalent to saying that it fully represents the distribution of Clovis groups on the landscape of Late Pleistocene Texas.

So why update the TCFPS? Most importantly, much has changed in Clovis archeology in the last decade. Long held ideas about Clovis and its place in the earliest prehistory of North America—including Texas—have changed dramatically. Most archeologists now acknowledge Clovis does not represent the initial colonizing population of the western hemisphere (e.g., papers in Bonnichsen et al. 2006; Jablonski 2002; Madsen 2004; Waters and Stafford 2007). The stereotype of Clovis as pan-continental big game hunter has all but disappeared, and we now see substantial diversity in Clovis adaptations across the country (Byers and Ugan 2005; Cannon and Meltzer 2004; Grayson and Meltzer 2002; cf. Waguespack and Surovell 2003). Newly reported Clovis sites, like Gault in Central Texas (Collins 1999, 2002), have contributed to a much richer view of Clovis adaptations. Where once it was argued that Clovis—and especially the diagnostic Clovis fluted point—was rather homogenous from coast to coast (e.g. Haynes 1982), most now believe that Clovis can no longer be viewed as a monolithic cultural phenomenon. Adopting this perspective, we might expect evidence of this variation will be discernible in the Texas Clovis point database.

As our understanding of Clovis has changed, so too have the questions we should ask of point databases such as the TCFPS. Here is where this iteration of the TCFPS departs slightly from earlier versions. Although we provide an update of previously discussed themes and patterns, we also undertake a more directed analysis of the database in light of these new ideas about Clovis. We refer the reader to previous publications on the TCFPS (Meltzer 1986a, 1986b, 1989; Meltzer and Bever 1995) for an overview of the database and its history, and a detailed discussion of its biases and limitations. This article begins by broadly examining the distribution of Clovis points across the state. We ask whether these spatial patterns are more reflective of: (1) past human behavior or (2) the vagaries of archeological preservation and discovery. We then use this spatial framework to narrow in on specific areas of the state and structure an examination of variation in raw material use, point morphology, and point life histories. Our overarching goal is to identify meaningful variation in the TCFPS data that might reflect differences in Clovis land use and life ways across the state.

THE SPATIAL DISTRIBUTION OF TEXAS CLOVIS POINTS

The total number of points in the TCFPS now stands at 544, a substantial increase over the 205 reported in the initial publication (Meltzer 1986b), and the 406 reported in the last update (Meltzer and Bever 1995). In the current sample, 149 (or 58.7%) of the state's 254 counties now have recorded Clovis points (Table 1 and Figure 1).

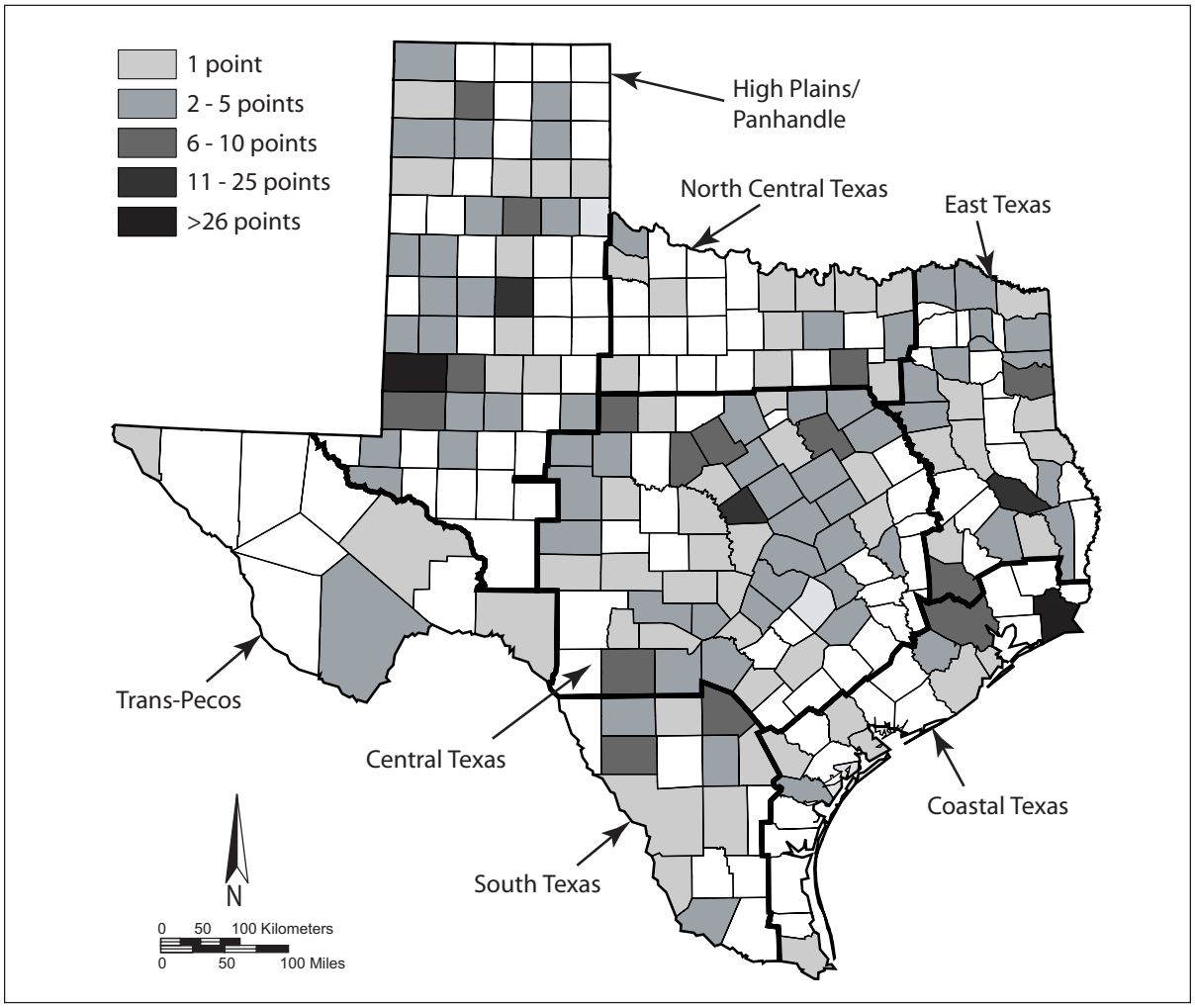

Figure 1. Number of Clovis points per county.

Table 1. Current and previous tallies of Texas Clovis points by county.

County	1986 tally	1995 tally	Current tally	Reference
Anderson	0	1	1	TCFPS
Andrews	2	3	6	TCFPS
Angelina	1	7	16	Brown 1994; TCFPS
Aransas	0	0	1	TCFPS
Armstrong	1	1	1	TCFPS
Atascosa	1	8	8	Hester 1974:Figure 1j; TCFPS
Bailey	1	1	3	TCFPS
Bandera	1	1	1	TCFPS
Bastrop	0	0	1	TCFPS
Baylor	0	0	1	TCFPS
Bee	1	1	1	Sellards 1940
Bell	1	3	5	Collins et al. 1991, 1992; TCFPS
Bexar	2	3	4	Henderson and Goode 1991; TCFPS
Blanco	1	1	1	Orchard and Campbell 1954; TCFPS
Borden	1	1	1	TCFPS
Bosque	1	1	1	TCFPS
Bowie	0	1	1	Story 1990:Table 44:8
Brazoria	0	1	1	Chandler and Rogers 1995
Brazos	1	2	2	TCFPS
Brewster	2	3	5	Enlow and Campbell 1955; Hester n.d.; TCFPS
Briscoe	0	8	8	TCFPS
Brown	4	5	6	TCFPS
Burnet	0	1	1	TCFPS
Calhoun	2	3	3	Suhm and Jelks 1962:Plate 89A, G; Hester 1988
Callahan	1	1	1	TCFPS
Cameron	1	1	1	Hester n.d.
Camp	1	1	3	TCFPS
Cass	0	1	2	TCFPS
Cherokee	1	1	1	Hester n.d.; TCFPS
Childress	0	0	1	TCFPS
Coke	2	4	4	TCFPS
Collingsworth	0	0	1	TCFPS
Comal	0	1	1	TCFPS
Comanche	2	7	9	TCFPS
Concho	1	1	1	Espey, Huston and Associates, Inc. 1981
Cooke	1	1	1	Jensen 1968
Coryell	0	4	4	TCFPS
Crosby	12	12	12	TCFPS
Dallam	3	3	4	TCFPS
Dallas	3	6	6	Crook and Harris 1955; Suhm and Jelks 1962:Plate 89C; TCFPS

Table 1. *(Continued)*

County	1986 tally	1995 tally	Current tally	Reference
Dawson	0	6	8	TCFPS
Deaf Smith	1	1	1	Suhm and Jelks 1962:Plate 89C
Denton	1	4	4	Crook and Harris 1957; Ferring 1990; TCFPS
DeWitt	1	1	1	Prewitt, unpublished
Dimmit	6	6	6	Hester n.d., 1974:Figure 1a, c, f-g
Donley	0	1	1	TCFPS
Duval	1	1	1	Hester n.d., 1974:Figure 1b
Ellis	2	3	3	TCFPS
El Paso	0	1	1	TCFPS
Erath	3	5	5	TCFPS
Falls	0	2	2	TCFPS
Fannin	0	0	1	TCFPS
Fayette	3	3	3	Meier and Hester 1972, 1976; Wilson 1979
Floyd	1	1	1	TCFPS
Foard	1	1	1	Etchieson et al. 1979
Fort Bend	0	0	2	Patterson 1997a, 1997b
Frio	0	0	1	TCFPS
Gaines	16	23	28	TCFPS
Galveston	0	1	1	TCFPS
Garza	1	1	1	TCFPS
Gillespie	0	0	1	TCFPS
Gonzales	1	1	1	Hester n.d.
Gray	2	2	2	TCFPS
Grayson	1	1	1	TCFPS
Hall	0	1	2	TCFPS
Hamilton	1	3	3	TCFPS
Hardeman	0	0	3	TCFPS
Harris	2	6	9	Hester 1980; Patterson 1986; Patterson et al. 1992a, 1992b; Suhm and Jelks 1962:Plate 89B; Wheat 1953; TCFPS
Harrison	5	6	8	Hayner 1955, Hester n.d.; TCFPS
Hartley	0	1	1	TCFPS
Hays	4	5	5	Hester n.d.; Takac 1991; TCFPS
Henderson	1	4	4	Story 1990:Table 44:29; TCFPS
Hill	2	6	6	TCFPS
Hockley	1	2	2	Walter 1990; TCFPS
Hood	1	1	1	Skinner and Rash 1969
Howard	3	4	5	TCFPS
Hunt	0	1	3	TCFPS
Jasper	2	2	3	TCFPS
Jefferson	10	70	97	Long 1977; Turner and Tanner 1994; TCFPS
Johnson	2	2	2	TCFPS
Jones	1	1	1	TCFPS

Table 1. *(Continued)*

County	1986 tally	1995 tally	Current tally	Reference
Kaufman	0	1	1	TCFPS
Kendall	1	3	4	Chandler 1983; TCFPS
Kerr	1	2	2	Saner 1995; TCFPS
Kimble	0	1	1	TCFPS
Lamar	2	4	4	TCFPS
Lamb	0	0	5	TCFPS
Lampasas	0	1	18	TCFPS
Lee	0	0	3	TCFPS
Limestone	0	0	1	TCFPS
Live Oak	0	1	1	House 1974
Llano	0	0	1	TCFPS
Lubbock	1	2	3	Johnson 1983; TCFPS
Marion	4	4	4	Hayner 1955; Story 1990:Table 44:20; TCFPS
Martin	2	2	2	TCFPS
McLennan	3	3	3	TCFPS
McMullen	2	3	3	Cooper 1974; Kelly 1983; TCFPS
Medina	1	3	3	TCFPS
Midland	5	5	5	TCFPS
Milam	0	1	2	TCFPS
Mills	0	1	1	TCFPS
Montague	1	1	1	TCFPS
Montgomery	0	4	8	Chandler and Rogers 1995; TCFPS
Moore	6	6	6	TCFPS
Navarro	1	3	3	Story 1990:Table 44:33;TCFPS
Nolan	2	2	2	TCFPS
Oldham	2	2	2	TCFPS
Panola	1	1	1	Scurlock and Davis 1962
Parker	1	1	1	TCFPS
Pecos	1	1	1	Hester n.d.
Polk	0	1	2	TCFPS
Potter	0	3	3	TCFPS
Real	0	0	1	Saner 2005
Red River	0	1	2	Skinner and Rash 1969; TCFPS
Roberts	3	3	3	Holliday et al. 1994; Sellards 1952
Robertson	1	1	1	TCFPS
Runnels	2	3	3	Espey, Huston and Associates, Inc. 1981; TCFPS
San Augustine	1	2	2	Brown 1994; TCFPS
San Patricio	2	2	2	Chandler 1982; Hester 1980
San Saba	0	1	1	TCFPS
Schleicher	2	2	2	TCFPS
Scurry	0	0	1	TCFPS

Table 1. *(Continued)*

County	1986 tally	1995 tally	Current tally	Reference
Shackleford	1	1	1	TCFPS
Shelby	0	0	1	TCFPS
Smith	0	0	1	TCFPS
Starr	1	1	2	Weir 1956; TCFPS
Sutton	0	0	1	TCFPS
Swisher	1	1	2	TCFPS
Taylor	5	6	6	Mallouf 1989; Ray 1930; Sellards 1952; TCFPS
Terry	0	4	4	TCFPS
Titus	0	2	3	Story 1990:Table 44:9-11; TCFPS
Tom Green	0	1	2	TCFPS
Travis	4	4	5	Alexander 1963; Hester n.d.; TCFPS
Tyler	1	1	1	Suhm and Jelks 1962:Plate 89E
Uvalde	1	7	7	Collins et al. 1989; Hester n.d.
Val Verde	1	1	1	Greer 1968
Van Zandt	2	2	2	Johnson 1961
Victoria	1	1	1	Hester 1974:Figure 1i
Walker	0	0	1	TCFPS
Ward	3	3	4	TCFPS
Webb	0	1	1	Mitchell and Winsch 1974
Williamson	2	2	2	Collins et al. 1993; Hays 1982; TCFPS
Wilson	0	1	1	TCFPS
Winkler	2	2	2	TCFPS
Wise	0	1	1	TCFPS
Wood	0	2	2	Story 1990:Table 44:19
Yoakum	1	2	2	TCFPS
Zapata	0	0	1	TCFPS
Zavala	1	2	2	Hester 1974: Figure 1d, e
Unknown	1	1	7	TCFPS
Totals	205	406	544	

Given the number of Clovis-point bearing counties added between the 1986 to 1995 surveys (33 counties), compared to the smaller number added between the 1995 survey and the present one (21 counties), a statistical trend seems clear: much of the Texas Clovis-by-county map has been filled in. Additional records will surely add more counties to the list, but the trend would suggest that number will not be large (and probably significantly less than 21 counties, at least over the next five or 10 years, were we to venture a prediction).

Although this county-by-county examination broadens the spatial extent of Clovis points across the state, as before the majority of the counties that have produced Clovis points contain just one point (in the current sample, that is 64 counties, or 43% of the counties that have produced points); counties with three or fewer points account for 73.8% of the total. Only five counties have produced 10 or more

points (Table 2). Stated another way, roughly two-thirds of the state has no apparent Clovis presence, or at most a light scatter. Conversely, pronounced concentrations of Clovis evidence are restricted to a few areas. Figure 1, a plot of the number of points per county, shows this uneven distribution.

All of the physiographic regions of the state[1] have likewise seen an increase in Clovis points since the 1995 update (Table 3). With two notable exceptions, each region experienced a similar rate of growth: from 25.7% to 38.4%, which generally matches the overall increase in the database of 34%. This means that over the last decade new points have been reported from each region at roughly the same rate. As one might expect, regions with many points in 1995 showed a larger increase in absolute numbers, while regions with fewer points showed a correspondingly smaller increase. This proportional growth suggests to us that the database has statistically stabilized, and that the current tally probably provides a fairly accurate representation of the relative frequency of Clovis points in each region. Of course, we expect that the overall numbers of points in all regions will continue to increase, including examples from counties now lacking points. However, with such a large sample, derived from a variety of sources and over such a long span of time, the TCFPS probably has reached the point where the basic patterning in regional abundance and scarcity—like that of the county tallies—will not change appreciably in future versions.

To explore the distribution of points in greater detail, Table 4 shows the observed and expected

Table 2. Modal distribution of Clovis fluted points by county (total number of counties with occurrences = 149)

	Number of occurrences									
	1	2	3	4	5	6	7	8	9	≥10
Number of counties	64	27	19	11	8	7	1	5	2	5

Table 3. Tally of Texas Clovis fluted points by region, 1995 and current.

	Number of Clovis points		
Region	1995 tally	Current tally	Percent increase
1 Plains/Panhandle	109	137	25.7%
2 North Central	20	27	35.0%
3 East	48	74	54.2%
4 Coast	86	119	38.4%
5 South	23	26	13.0%
6 Trans-Pecos	6	8	33.3%
7 Central	113	151	33.6%
Unknown[a]	1	2	100.0%
Total	406	544	34.0%

a. The count of "Unknown" differs between Table 1 and this table because, while seven points are unassigned to a county, all but two can be assigned to a region.

Table 4. Distribution and density of Clovis fluted points by region against expected point frequency.

Region	Number of points	Area in square miles[a]	Density (points/ 10,000 mi^2)	Percent of total area	Expected number of points[b]	Standardized residual
1 Plains/Panhandle	137	65,388	21.0	24.9	135.0	0.17
2 North Central	27	24,719	10.9	9.4	50.9	-3.35
3 East	74	26,765	27.6	10.2	55.3	2.51
4 Coast	119/22[c]	21,527	55.3/10.2[c]	8.2	44.4	11.31/-3.36 [c]
5 South	26	21,683	12.0	8.3	45.0	-2.83
6 Trans-Pecos	8	34,797	2.3	13.3	72.1	-7.55
7 Central	151	67,235	22.5	25.7	139.3	0.99
Total	542	262,114	20.7	100.0	542.0	

Chi square = 208.91, df = 6, $p < 0.001$; significant residuals are underlined.

a. Data on area from Arbingast et al. (1976:78-79).

b. Obtained by multiplying the regional percent of the total area by the number of points (542) from all regions.

c. Indicates values with/without the points from McFaddin Beach. The chi square statistic is significant either way, and here the result *with* the McFaddin Beach points is shown.

numbers of Clovis points by region when the varying size of the regions is taken into account. Figure 2 portrays this graphically by showing the density of Clovis points across the state by county (in points per 1,000 km^2). The difference between regions is significant, as it was in 1995. The standardized residuals in Table 4 express the difference between observed and expected frequencies in standard deviations. Residuals greater than 1.96 (or less than -1.96) indicate significant deviations from expected frequencies. Regions with significantly greater than expected numbers of Clovis points include the Gulf Coast and East Texas. Central Texas and the Plains/Panhandle also have relatively high point densities, although they are not significantly higher than expected. These patterns can be seen quite clearly in Figure 2, where the Southern High Plains and portions of Central and East Texas show the greatest density of Clovis points. Areas with lower than expected frequencies include Southwest Texas, North Central Texas, and the Trans-Pecos. Each of these regions will be summarized in turn, noting especially differences between this and previous versions of the TCFPS.

Clovis Point Frequencies by Region

The Gulf Coast

The Gulf Coast has the highest density of Clovis points of any region in Texas (see Table 4). Taken at face value, however, this figure is misleading. Over 81% of the 119 points on the coast come from a single locale: McFaddin Beach in Jefferson County (this includes 27 of the 33 points reported from coastal counties since 1995). Though McFaddin Beach has produced Clovis points for several decades, it remains an enigma. Of course, the present location of McFaddin Beach would have been well inland (ca. 80 km) in Pleistocene times owing to lower sea levels, and the points are not in primary context but were collected from a 35 km stretch of beach. Almost certainly they were redeposited from one or more sites now submerged offshore, and the lack of wear and abrasion from stream or shoreline tumbling suggests they have not been transported far from their original location. Since the current collection contains primarily finished points and lacks associated habitation

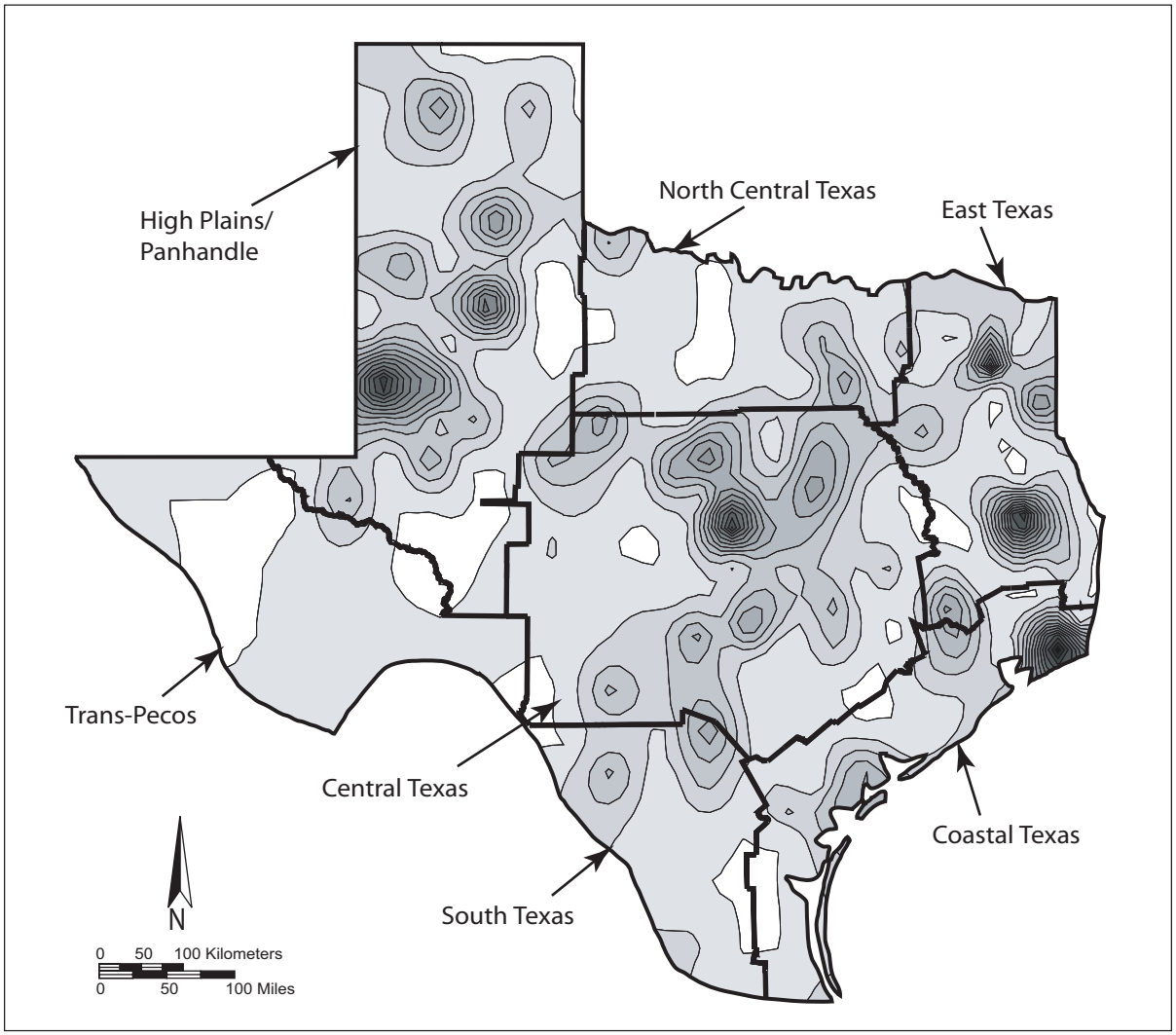

Figure 2. Contour map of Clovis point density (points per 1,000 km^2), plotted to the centroid of each county. Because of the large number of points, the density for Jefferson County was arbitrarily set at eight points per 1,000 km^2, placing it just above the next highest values in the state, Gaines and Angelina counties.

debris or other tools, it is not clear what type of site or sites account for the points washed up on McFaddin Beach (Hall 1998; Long 1977; Stright 1999; Turner and Tanner 1994).

Aside from McFaddin Beach, the coastal prairies and marshes of Texas actually have produced very few Clovis points. In fact, when the McFaddin Beach points are removed from the calculation, the coastal region has one of the lowest densities of Clovis points in the state (see Table 4). Figure 2 shows this quite clearly. Aside from Jefferson and Harris counties in the southeasternmost portion of the state, and a handful of counties from the central Texas coast, the remaining counties along the coast show a near absence of points. This absence of points extends across a broad swath of the Texas Coastal Plain, stretching from the Gulf Coast to the Balcones Escarpment, some 200 km inland to the northwest. Though this scarcity of Clovis points could indicate that the Coastal Plain was sparsely inhabited during Clovis times, there are clues to the contrary. McFaddin Beach and other instances where Clovis points have been washed ashore on modern beaches hint at a rich offshore record of Clovis habitation. Further, though rare, sites like Johnston-Heller (Birmingham and Hester 1976; Hester 2004) in Victoria County contain Clovis components that are deeply buried in fluvial terraces. Dissected by numerous drainages, post-glacial sea level rise would have caused rapid alluvial

deposition across large areas of the Coastal Plain. Rather than an absence of habitation, then, the scarcity of Clovis points (and sites) from the Coastal Plain might indicate that the Clovis record in this area of the state remains deeply buried beneath Holocene alluvial fill. This is dramatically illustrated at a site like Richard Beene, which is located on the Coastal Plain just south of the Balcones Escarpment and contains 20 m of stratified Holocene deposits (Thoms and Mandel 2007). Of course, it is also possible that just the opposite has occurred in some areas, and that actively meandering river systems have washed away the Clovis-aged deposits (Waters and Nordt 1995).

East Texas

The Gulf Coast aside, East Texas actually has the greatest density of Clovis points of any region in Texas (see Table 4). Furthermore, between 1995 and 2006, East Texas showed the highest rate of increase in Clovis points, well above the range of the other regions (see Table 3). A similar increase was seen from 1986 to 1995 (see Meltzer and Bever 1995:Table 3). For whatever reason, East Texas was not accurately represented in earlier versions of the TCFPS, and the surge in the number of points in the region represents one of the greatest changes in the data base. Consequently, East Texas now exhibits one of the richest Clovis point records in the state, which is all the more reason to lament the fact that no large scale investigation of a Clovis site has been undertaken there. The high incidence of Clovis points from East Texas should not be surprising in light of the larger continental distribution of Clovis points (e.g., Anderson and Faught 2000; Buchanan 2003). In general, the woodlands of the eastern United States show a much greater density of Clovis points than the central and western portions of the country. As the westernmost extension of the eastern Woodlands, East Texas might be expected to contain a similarly extensive Clovis record. Gauging from the continental pattern (Cannon and Meltzer 2004; Meltzer 1993), we might expect that the adaptations of these East Texas Clovis groups differed from more westerly groups as well.

Figure 2 shows that the distribution of Clovis points in East Texas is uneven. In the northeast, numerous points have been found as isolated occurrences along the North Sulphur River (see article by Bousman and Skinner, this volume), eroding from deeply buried alluvial contexts. Others have been exposed by erosion resulting from modern reservoir construction. In Angelina County, which has the greatest density of points in the state after Jefferson County (McFaddin Beach), over half of the 17 points were reported by a single avocational archeologist working in a restricted area. In general, where there has been good exposure of deposits of the proper age, large quantities of Clovis points have been found. Other such hot spots almost certainly exist in East Texas, and the region probably holds an even more robust record of Clovis occupation than that identified here.

Central Texas

Central Texas has produced the greatest number of points of any region in the state (see Table 4). However, Central Texas is also one of the largest regions in the state, at least as partitioned here; that noted, the frequency of Clovis points in the region does not diverge significantly from expected values. It is the case, however, that the distribution of points across this region is not continuous; there are portions with distinct concentrations and others with a virtual absence of points (see Figure 2). In general, Clovis points are distributed in an arc-like pattern, beginning near Abilene in the north and swinging clockwise through Austin, San Antonio, and ending in Uvalde County. A short spur also extends to the northeast toward the Dallas-Forth Worth area in North Central Texas (see Figure 2). In contrast, the area within this arc, and the entire western half of the Edwards Plateau southward to the lower Pecos, is nearly devoid of points.

As noted in previous versions of the TCFPS, the curvilinear distribution of points corresponds closely to the Balcones Escarpment (Meltzer 1986b; Meltzer and Bever 1995), at least on the eastern and southern portions of the arc. Marked by permanent freshwater springs and outcrops of high quality Edwards Formation chert, the Balcones Escarpment forms an ecotone between the uplifted Edwards Plateau to the west and the rolling prairies to the east and south (Ellis et al. 1995). A combination of factors, including reliable fresh water, ready access to the subsistence resources of two ecological zones, and a reliable source of lithic raw material, likely drew Clovis inhabitants to the area. It is surely no coincidence that the largest Clovis site ever recorded—the Gault site—is situated in this region at the head of a creek next to a high quality Edwards outcrop (Collins 2002). The northern periphery of the Edwards Pla-

teau also contains outcrops of high quality chert, from Abilene eastward, which probably accounts for the concentration of points there. These sources of chert might have been particularly valuable to groups inhabiting the raw material-poor Southern High Plains.

Although we believe this pattern is meaningful in terms of Clovis land use, we acknowledge that other factors complicate this simple picture. Two major interstate highways—I-35 on the eastern boundary and I-20 on the northern—pass through the area, and some of the largest urban areas in the state can be found there (originally settled in part for the same reason Clovis groups settled here: water and the escarpment boundary—though we hasten to add, not because of the lithic outcrops). The concentration of points through San Antonio, Austin, Waco, and Dallas corresponds precisely to the I-35 corridor, which cannot be mere coincidence.

Also, as noted in previous versions of the TCFPS (Meltzer 1986b), the fact that points are concentrated in raw material-rich areas does not necessarily mean that those areas saw more intense habitation. Instead, an abundance of high quality raw material might have had a strong effect on patterns of point discard and accumulation in the archeological record. For example, discard rates would have been high for groups visiting these sources to rejuvenate their tool kit. Further, groups inhabiting the area would not have needed to conserve their tools to the same degree as groups living in raw material-poor areas. Both of these factors would create a greater accumulation of points regardless of how many people exploited the area or how intensively they did so (Meltzer and Bever 1995; cf. Shiner 1983). This does not mean, of course, that these raw material-rich zones of Central Texas were unimportant to Clovis groups, or that they were not used differently than other areas. It simply highlights the difficulty in using point distributional data to address questions of prehistoric land use.

Plains/Panhandle

The Plains/Panhandle region also exhibits a high density of Clovis points, though not significantly higher than would be expected for a region of its size (see Table 4). Within the region, points are far more common on the Southern High Plains than the adjacent rolling plains to the east. This marks the Southern High Plains as one of the densest records of Clovis points in the state. The Southern High Plains has seen decades of continuous research by Paleoindian specialists (e.g., Holliday 1997) and its rich record of classic Clovis sites, like Miami, Blackwater Draw and Lubbock Lake, is well known. Perhaps because it has been systematically studied for so long, the Southern High Plains experienced a lower than average increase in the point tally since the last update (see Table 3). Despite this, it remains one of the better represented regions of the state, and for good reason. The Southern High Plains is sparsely vegetated, large areas are subject to repeated plowing, and it is crossed by numerous deeply incised intermittent streams (Holliday 1995). These factors have ensured good archeological exposure of Clovis-age deposits. During the latest Pleistocene the Southern High Plains was well watered, with permanently flowing streams and water-filled playas (Sabin and Holliday 1995). These would have served as magnets for the abundant game animals that wandered the Plains, and would have attracted Clovis hunters as well. Most Clovis sites from the region are associated with these water sources and evidence for the exploitation of these animals is well documented (Grayson and Meltzer 2002; Haynes 1995; Hester 1972; Holliday et al. 1994; Johnson 1987).

Trans-Pecos

In contrast to the preceding regions, the Trans-Pecos has by far the lowest number and density of Clovis points of any region in the state (see Table 4). We noted previously that the lack of points in the Trans-Pecos might be due to a lack of archeological scrutiny (Meltzer 1986b; Meltzer and Bever 1995). This conclusion probably remains true for portions of the Trans-Pecos. With few major highways, limited urban development, and a small population scattered across large tracts of private ranch land, the potential for discovering Clovis points is quite low. There are exceptions to this generalization, however, and the exceptions are informative. Numerous archeological surveys, including large scale projects on Fort Bliss and in the national and state parks in the Big Bend region, have produced very few Clovis points (Miller and Kenmotsu 2004). If Clovis points existed in these areas in any numbers, it seems likely that more would have been found by now. Perhaps even more telling is the presence of only one Clovis point from El Paso County. In the past few decades, the densely populated city

of El Paso has seen extensive archeological survey and excavation related to cultural resource management (CRM) projects. Indeed, more archeological sites are recorded in El Paso County than in any other county in Texas, despite its small size. That only one Clovis point has been found there, and none in the decade since the 1995 update, is quite telling. Finally, while Clovis materials are rare, Folsom and later Paleoindian materials are not at all uncommon in the Trans-Pecos region (such as Bonfire Shelter [Dibble and Lorrain 1968; Byerly et al. 2005; Byerly et al., this volume] and Chispa Creek [Amick and Hofman 1999]). The accumulation of evidence, then, seems to indicate that the low density of Clovis points in the Trans-Pecos may very well reflect a sparse Clovis occupation.

North Central Texas

In earlier versions of the TCFPS, we suggested that the absence of Clovis points from North Central Texas might be due to geological processes that deeply buried deposits of Clovis age. Surrounded by regions with abundant Clovis points—the Edwards Plateau to the south, the Southern High Plains to the west, and East Texas to the east (see Figure 2)—there seems to be little else that would explain the scarcity of points in this area of the state, particularly since it has seen an intensity of CRM projects that is equal to or greater than any other region of the state. We know Clovis groups inhabited North Central Texas, as indicated by a scatter of isolated points, and sites like Aubrey (Ferring 2001) and Lewisville (Crook and Harris 1957). Indeed, Aubrey provides a case in point. The site was deeply buried beneath 8 m of Holocene alluvium and would not have been found were it not for the construction and subsequent erosion of an artificial outlet channel below the Lake Ray Roberts dam (Ferring 2001). Corroborating evidence can be found in the single concentration of Clovis points in North Central Texas, seen in the eastern end of the region in the vicinity of the Dallas metropolitan area (see Figure 2). This is precisely the type of setting that has seen the degree of modern development (and accompanying archeological work) necessary to expose large tracts of deeply buried Clovis-aged deposits. As with the Gulf Coast, we conclude again that Clovis points in North Central Texas are otherwise underrepresented in the TCFPS because deposits of the proper age remain only sporadically accessible to archeologists.

South Texas

South Texas also displays a significantly lower than expected frequency of Clovis points (see Table 4). Predictably, most of the points in the region are found in counties skirting the Balcones Escarpment, indicating that Clovis points are even scarcer in the far south, approaching the Rio Grande. South Texas also showed the lowest increase in points over the 1995 version of the database, indicating that the initial and active recording of Clovis points in this area several decades ago—primarily by Thomas Hester, C. K. Chandler, and other members of the Southern Texas Archaeological Association—was quite thorough (Hester 1974, 2004). As with the Trans-Pecos, large areas of South Texas are covered by private ranch land and have seen minimal archeological scrutiny. However, even in those areas where archeologists have looked, Clovis points are rare, despite the fact that most of the region has minimal vegetation cover, and ancient deflated surfaces, largely unaffected by fluvial erosion or burial, cover large expanses of the region (Black 1989; Hester 2004). This scarcity of deeply stratified sites has long confounded attempts to develop a reliable culture-historical chronology for the area (Hester 2004). However, shallow deposits and good surface visibility seem to be precisely the characteristics that should ensure the discovery of *more* Clovis points, though not necessarily from secure contexts. Why the South Texas Clovis record remains sparse is unclear, but it appears that it might be a real phenomenon and not entirely a product of limited archeological scrutiny or geological processes that have obscured the Clovis record.

Clues from the Distribution of Clovis Sites

The patterning in the distribution of Texas Clovis points is intriguing. However, while we can make inferences about the meaning of the *presence* of Clovis points in a region, any inference about the *absence* of points from a particular region must be tempered with the fact that a good part of the patterning may have more to do with modern circumstance than variation in Clovis land use (Buchanan 2003; LaBelle 2005). Put another way: is the record of Clovis points representative of what was left behind by Clovis groups? This concern

should be abundantly clear from the previous discussion. A lack of points may be variously attributed to limited archeological investigation, erosion, or burial. Even if these concerns could be ruled out, a scarcity of points from a region need not necessarily indicate a low level of Clovis habitation. It might simply indicate an absence of the types of activities that led to the creation, use, and discard of Clovis points. Unfortunately, these issues are difficult, if not impossible, to resolve with simple distributional data.

There are, however, a couple of ways to come at this question. The first makes use of two independent but similar sets of data: the distribution of Clovis sites in Texas and the archeological context of the points in the TCFPS. The second makes use of variability inherent in the points themselves. We explore these themes in greater detail as both provide evidence for variation in Clovis land use.

To examine patterning in the distribution of sites, we compiled a comprehensive list of Clovis sites recorded in the Texas state files. We used two sources. The first is Bousman et al. (2004), which presents the results of a tabulation of all recorded Paleoindian sites on file at the Texas Archeological Research Laboratory of The University of Texas at Austin, one of the main repositories for archeological site records in the state. Conducted in 1994, the search found 81 Clovis sites (Bousman et al. 2004). To supplement this information, we conducted an online search of the more than 60,000 site records in the State of Texas Archeological Site Atlas, maintained by the Texas Historical Commission.[2] While most of the site records found in this search were redundant with those contained in Bousman et al. (2004), we did locate an additional 34 Clovis sites, producing an overall total of 115 sites.

A few words of explanation are in order concerning these data. Isolated points recorded as sites were not included in the site tally. Also, in compiling the list of sites, we erred on the side of caution. If the identification of a Clovis component at a site was suspect (usually meaning that the identification of a projectile point as a Clovis point was suspect), we did not include it in the final tally. We should also note that since we were not able to link all of the points in the TCFPS that came from archeological sites to specific recorded Clovis sites, we treat the two databases as independent sources. Finally, while neither the number of Clovis points nor Clovis point density by county correlates with county population or population density, respectively, this is not the case for Clovis sites. Where more people live, more Clovis sites have been found (Pearson correlation coefficient = .350, $p<.001$). This is not surprising. Many Clovis sites recorded in recent decades were found as a result of CRM work stemming from urban development, which is most prevalent in the heavily populated areas of the state. This bias must be kept in mind in the discussion that follows.

The 115 Clovis sites included in the database are plotted in Figure 3, superimposed over the density of Clovis points in the TCFPS. Visually, there is a strong correspondence between the distribution of Clovis points and sites.[3] This provides support for the patterns discussed previously: whether based on Clovis points or recorded Clovis sites, some areas of the state have a richer record of Clovis occupation than others. Table 5 shows the frequency and density of Clovis sites by region. The differences between regions are significant and the adjusted standardized residuals indicate which regions deviate most strongly from expected frequencies. The Trans-Pecos and Plains/Panhandle show significantly lower than expected frequencies, while East and Central Texas shows higher than expected frequencies.

Despite the similarity between the two records, the overall relationship between the number of Clovis points and the number of Clovis sites by county is not significant,[4] primarily because in some regions the two do not correspond. Most informative in this regard are the cases where there is a disjunction between points and sites. North Central Texas and the Coast, which have fewer points than expected, do not deviate significantly from expected frequencies in terms of sites. In other words, there are fewer points than expected, but about as many sites as expected. On the surface, this might indicate that sites in these regions contain relatively few points, a pattern that might have implications for Clovis adaptations. However, it might also be a function of poor archeological visibility, a factor argued above to have played a role in the low point density from these particular areas. Isolated points, presumably deeply buried in most instances, would not be as readily found upon exposure (though we are aware that the Aubrey site [Ferring 2001] is an exception to that rule: Ferring found the point first, which in turn led him to the site). Archeological sites, however, with their relatively greater visibility, might be more easily recognized—though not necessarily recognized immediately as Clovis sites. In any case, the result would be a bias toward an

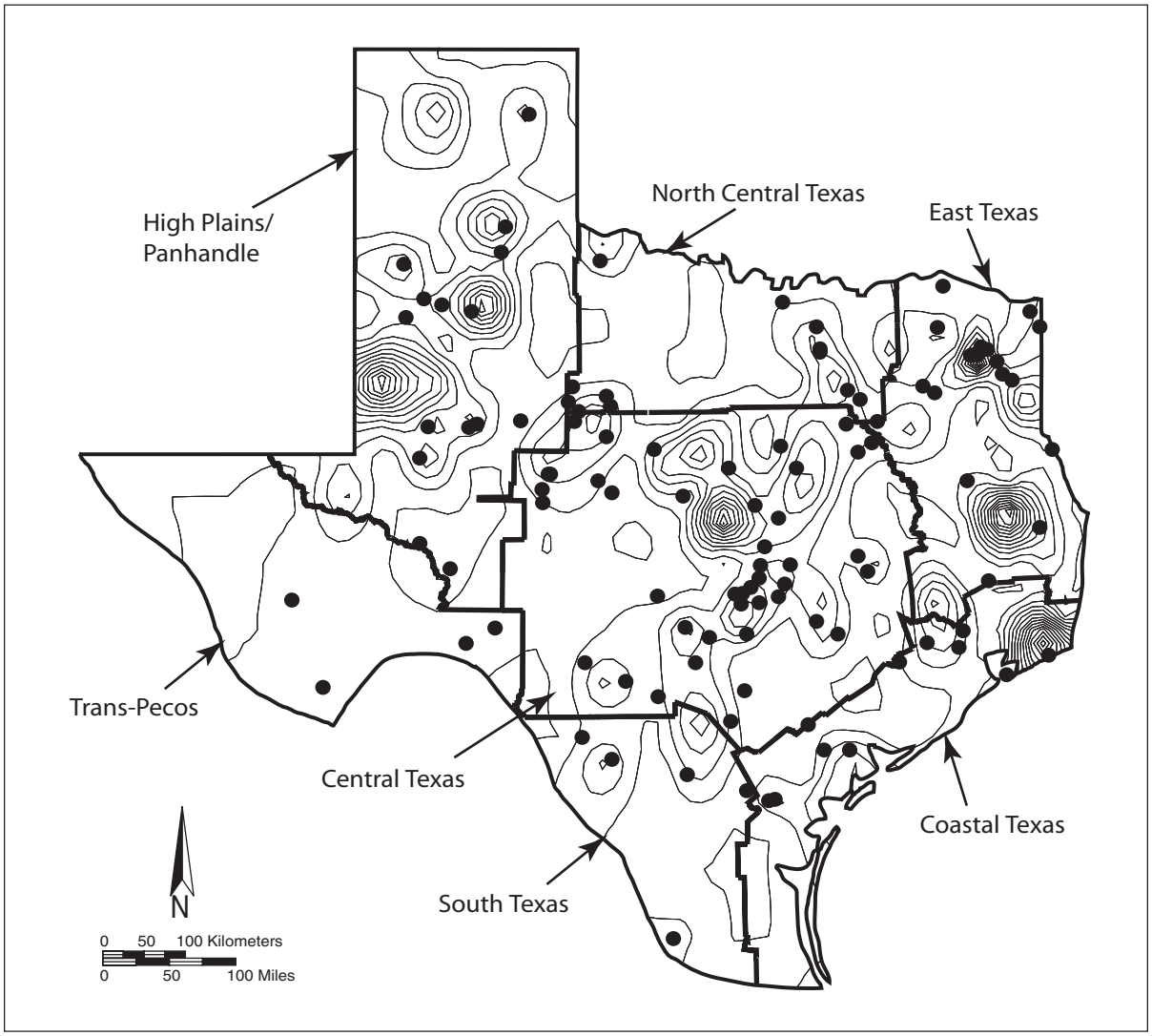

Figure 3. Clovis sites on file with the Texas Archeological Research Laboratory and the Texas Historical Commission, superimposed over Clovis point density by county.

archeological record consisting primarily of Clovis sites, and points derived from those site contexts. At present, however, and with such a small sample of both points and sites, the meaning of this pattern in North Central Texas and the Coastal region is not clear.

Stronger and probably more meaningful discrepancies between the site and individual point records occur in the Plains/Panhandle and Central Texas regions. Both of these regions have abundant point records, but have opposing site frequencies. The Plains/Panhandle, and particularly the Southern High Plains, has fewer sites than expected for a region of this size. Given the rich record of Clovis points, and the well known sites that occur here (and just across the border on the Southern High Plains of New Mexico), it is rather surprising to note that the region actually has one of the lowest densities of Clovis sites anywhere in the state, approaching those of South Texas and the Trans-Pecos. This pattern indicates that either there are many more points per site in the Plains/Panhandle (the opposite of the situation in North Central Texas), or that substantially more points do not come from site contexts.

To explore this in greater detail we can make use of another line of evidence, which is the archeological context of the points in the TCFPS. Each point in the TCFPS is coded according to one of four possible contexts (see Meltzer and Bever

Table 5. Distribution and density of Clovis sites by region against expected site frequency.

Region	Number of sites	Area in square miles[a]	Density (sites/ 10,000 mi^2)	Percent of total area	Expected number of sites[b]	Standardized residual
1 Plains/Panhandle	16	65,388	2.45	24.9	28.6	-2.36
2 North Central	11	24,719	4.45	9.4	10.8	0.06
3 East	20	26,765	7.47	10.2	11.7	2.43
4 Coast	10	21,527	4.65	8.2	9.4	0.20
5 South	5	21,683	2.31	8.3	9.5	-1.46
6 Trans-Pecos	5	34,797	1.44	13.3	15.3	-2.63
7 Central	48	67,235	7.14	25.7	29.6	3.38
Total	115	262,114	4.39	100.0	115.0	

Chi square = 31.98, df = 6, $p < 0.001$; significant residuals are underlined.
a. Data on area from Arbingast et al. (1976:78-79).
b. Obtained by multiplying the regional percent of the total area by the number of sites (115) from all regions.

1995 for a more detailed discussion): as isolated occurrences (*isolates*), in well defined Clovis site contexts (*Clovis site*), as part of a mixed surface scatter of artifacts of various ages (*surface scatter*), or in an unreported or ambiguously reported context (*unknown*).The category 'surface scatter' likely includes mostly disturbed site contexts, but could also represent a Clovis isolate in the midst of later archeological materials. To err on the safe side, we tallied only those Clovis points from clear—generally meaning stratigraphically sound—contexts as Clovis sites. Table 6 shows the frequency of points from the different contexts by region. Points from unknown contexts, which account for 39% of the points in the TCFPS, are not included in the chi square statistic and are tabulated separately.

While variation in the context of Clovis points by region is significant, Table 6 shows that the significance is driven primarily by opposing deviations in Central Texas and the Plains/Panhandle. As noted above, the Clovis point record from the Plains/Panhandle is dominated by Clovis isolates. This agrees with the Clovis site database, which shows that recorded Clovis sites are rare from the region. Taken together, this pattern places the Southern High Plains in strong contrast with other areas of the state, and indicates that the Clovis record from the Southern High Plains is made up of a very ephemeral record of Clovis isolates. This pattern could mean that Clovis groups on the Southern High Plains did not engage in the types of redundant or repetitive activities that would have left a distinct record of sites. While it is generally recognized that the Clovis archeological record is ephemeral, a point noted in previous versions of the TCFPS (Meltzer 1986b; Meltzer and Bever 1995), this seems to be especially true of the Southern High Plains. If this pattern is real—and we make no guarantees—it is interesting to note that it mirrors a finding emerging in recent studies of Folsom and later Paleoindian period land use (LaBelle 2005): namely, that the Plains may have more than its share of kill sites, relatively speaking, but that Paleoindian groups at this time may have spent much of their time in sites off the Plains, which provide a greater variety of food resources than the Plains proper. Assuming, that is, that the pattern is real.

Of course, a bias in site reporting from the Southern High Plains could also contribute to the pattern. For example, Gaines County, which produced 28 points (20.4% of the total from the Plains/Panhandle), does not have a single recorded site. It seems that at least some of these points must derive from unreported sites.[5] Perhaps a lack of site recording (but not Clovis point reporting) has created the high point:site ratio, though why this would

Table 6. Archeological context of Clovis points in the TCFPS by region.

Region		Clovis site	Mixed scatter	Isolate	Unknown[a]	Total
1 Plains/Panhandle	count	6	29	29	73	137
	adj. residual	-2.1	-1.8	3.8		
2 North Central	count	5	5	6	11	27
	adj. residual	1.4	-1.9	1.0		
3 East	count	6	22	11	35	74
	adj. residual	-.5	.2	.2		
4 Coast	count	0	6	1	15	22
	adj. residual	-1.3	1.7	-.8		
5 South	count	1	5	6	14	26
	adj. residual	-.9	-.9	1.8		
6 Trans-Pecos	count	0	1	2	5	8
	adj. residual	-.8	-.7	1.6		
7 Central	count	25	61	9	56	151
	adj. residual	2.6	2.4	-5.0		
Total		43	129	64	209	445[b]

Chi square = 40.23, df = 12, $p < 0.001$; significant residuals are underlined.

a. Not included in the chi square calculation.

b. This number is smaller than other totals because the 97 points from McFaddin Beach are not included in the tabulation.

affect the Southern High Plains more than other regions of the state is not clear.

In contrast to the Plains/Panhandle, Central Texas shows the opposite pattern: isolates are rare while Clovis sites are more common than expected (see Table 5). This, too, diverges from the more typical view of Clovis. We mentioned above the types of resources that would have attracted Clovis groups to Central Texas, and particularly its abundance of accessible chert in areas where both Clovis points and sites are concentrated. This pattern fits with the notion that, for Clovis groups visiting or residing in these areas of Central Texas, there would have been repeated use of specific spots on the landscape favorable for acquiring raw material and other resources. Discard rates of points would have been high, as new tools were manufactured from abundant raw material, and the result of this more structured use of the landscape would have been a robust, site-dominated Clovis record. The contrast between the Southern High Plains and Central Texas is strong and will be explored in greater detail in the following sections.

This brief examination of the distribution of Clovis sites and points clearly provides clues for exploring variation in Clovis adaptations, particularly when comparing those areas displaying rich records of individual points, like the Southern High Plains and the chert-rich areas of Central Texas. Despite these provocative patterns, however, biases in preservation and discovery must remain a concern, and little can be said about those regions lacking abundant points, like North Central Texas and the Coast.

One of the strengths of the TCFPS, however, is that it contains more than simple provenience data. It also contains data on characteristics inherent to the points themselves that are not directly affected by biases affecting point recovery (see LaBelle 2005). Patterning in these aspects of the point record—raw material, point morphology, and patterns of breakage, for example—holds further clues for understanding variation in Clovis land sue.

FORM, FUNCTION, AND TECHNOLOGY OF TEXAS CLOVIS POINTS

Raw Material Variation in Texas Clovis Points

Texas Clovis points are made on a variety of raw materials, although fewer than half (42%) can be positively identified to a specific source or type of material (Table 7). In this context, the term 'type' indicates that a material can be classified to a kind of stone (e.g., quartzite or petrified wood) but the precise geological source or formation is unknown. This contrasts with materials that can be assigned to a known source (e.g., Edwards chert, Alibates Agate, and Manning Fused Glass). Although the raw material for over half of the points in the TCFPS is recorded as *unknown*, this does not necessarily mean they are made on unknown materials or even materials different from those listed in Table 7. In most cases, a designation of unknown simply indicates that either the information was not provided by the TCFPS contributor or the material was described but not identified to a particular type. Accordingly, if raw material descriptions were imprecise, we coded those points as unknown. That said, there are points in the TCFPS that truly are made from unknown materials. This is particularly apparent in East Texas and the Trans-Pecos, regions distant from the major Texas stone sources. We suspect that a good number of these points are made from materials derived from geological sources outside Texas.

Of the 229 points identifiable to source or type, Edwards chert accounts for 76%. Based on descriptions provided by contributors to the TCFPS, many of the points listed as unknown in Table 7 probably are Edwards chert as well. The dominance of Edwards chert is not unexpected. The chert-bearing formations of the Edwards uplift cover a substantial portion of Central Texas, with primary outcrops discontinuously scattered over an area covering well over 160,000 square kilometers. Though usually readily recognizable and quite common throughout Texas, Edwards chert is diverse in appearance and chemistry. Importantly, since it outcrops over such a large area, it should not be treated as a single point source. While variations in color, ultraviolet fluorescence (Hofman et al. 1991), isotope chemistry (Roberson 2005), and trace elements (Frederick et al. 1994) offer promise for identifying specific outcrops or variants within the larger formations, this fine-grained resolution is not available for points in the TCFPS. While it can be said that the majority of Clovis points in the TCFPS

Table 7. Count of raw material types by region.

	Region[a]								
Source/type	1	2	3	4	5	6	7	Unknown	Total
Edwards	54	11	11	17	4	0	77	1	175
Alibates	22	2	0	1	0	0	4	1	30
Tecovas	6	1	0	0	0	0	0	0	7
Alibates or Tecovas	2	0	0	1	0	0	0	0	3
Quartzite	4	1	1	1	0	0	0	0	7
Petrified Wood	0	0	2	1	0	1	0	0	4
Obsidian	0	0	0	1	0	0	1	0	2
Manning Fused Glass	0	0	1	0	0	0	0	0	1
Unknown	49	12	59	97	22	7	69	0	315
Total	137	27	74	119	26	8	151	2	544

a. Region designations follow Table 3.

are made from a single material, Edwards chert, in reality these points potentially derive from countless outcrops and secondary deposits scattered across a broad swath of Central Texas.

Other identified raw materials are much less common in the TCFPS. Alibates agatized dolomite, which outcrops in the vicinity of the Canadian River in the northern Panhandle, accounts for 30 Clovis points, or 13% of those identified to type. The remaining raw materials occur in lesser frequencies and include Tecovas jasper, another Southern High Plains source, various types of quartzite and petrified wood, obsidian (including one point base from Kincaid Shelter in Uvalde County linked to a source in central Mexico [Hester 1988]), and Manning Fused Glass from East Texas (Brown 1976).

Despite the limitations in the data on raw material in the TCFPS, some intriguing patterns emerge, particularly for those regions and raw materials with robust samples. For the following analyses, we have collapsed the raw material information into four categories: Edwards chert, Alibates agatized dolomite and Tecovas jasper combined (representing High Plains sources), all other identifiable materials, and unknown or unidentified materials. Table 8 presents a chi square of these revised raw material categories by region, a relationship which is significant. The Trans-Pecos is not included because the low number of points would compromise the validity of the chi square statistic. In any case, seven of the eight points from the region are made from unidentified materials. The McFaddin Beach points also are not included since most are unidentified to raw material and others may be incorrectly identified (Turner and Tanner 1994).

Table 8 shows quite clearly that Edwards chert dominates in Central Texas. It is also common (though not at greater than expected amounts) in the Plains/Panhandle, which is otherwise dominated by points made of Alibates/Tecovas. East Texas, South Texas, and the Coast, in contrast, are significantly under-represented in Edwards and Alibates/Tecovas points, and instead are dominated by a variety of unknown materials. Two possibilities might account for this. First, it seems sensible that

Table 8. Combined raw material groups by region.

Region[a]		Edwards	Alibates/ Tecovas	Other identified	Unknown	Total
1 Plains/Panhandle	count	54	30	4	49	137
	adj. residual	1.0	6.8	.2	-4.8	
2 North Central	count	11	3	1	12	27
	adj. residual	.5	.5	.3	-.9	
3 East	count	11	0	4	59	74
	adj. residual	-4.2	-2.9	1.5	5.1	
4 Coast[b]	count	1	0	2	19	22
	adj. residual	-3.2	-1.5	1.9	3.3	
5 South	count	4	0	0	22	26
	adj. residual	-2.3	-1.6	-.9	3.4	
7 Central	count	77	4	1	69	151
	adj. residual	4.7	-3.2	-1.9	-2.1	
Total		158	37	12	230	437

Chi square = 111.59, df = 15, $p < 0.001$; significant residuals are underlined.

a. The Trans-Pecos has been omitted because of its low point frequency (n=8).

b. Does not include the 97 McFaddin Beach points.

as distance to the Edwards source area increases, Edwards-manufactured points decrease in frequency. A simple distance-decay phenomenon is not unexpected in this sort of situation. Second, it might also be the case that archeologists are less apt to conclude that a point is made from Edwards chert in those areas of Texas distant from the Edwards Plateau, particularly if the archeologists involved are not that familiar with the many varieties of Edwards chert. The opposite likely would occur were the point found in Central Texas: the assumption would be that a point on a questionable material probably is Edwards unless satisfactorily demonstrated otherwise. These factors probably account for the low frequency of Edwards chert points and correspondingly high frequency of unknown materials in South, East, and Coastal Texas (and the Trans-Pecos as well, though it is not included in Table 8).

This is not true in the Plains/Panhandle, however, where points on unknown materials are relatively (and to a statistically significant degree) uncommon. Exposures of high quality raw material of any type are rare on the Southern High Plains, and those that do occur there, like Edwards chert and Alibates agate, are usually readily recognizable (Holliday and Welty 1981). Indeed, these materials account for the majority of Clovis points from the region.

The relative frequency of Edwards and Alibates/Tecovas on the Southern High Plains versus Central Texas is of particular interest, given they are essentially somewhat asymmetrical. On the one hand, both Alibates/Tecovas and Edwards chert occur in greater than expected frequencies on the Southern High Plains and Central Texas, respectively. On the other hand, Alibates/Tecovas is significantly under-represented in Clovis points in Central Texas, while Edwards chert occurs in the statistically expected amounts (that is, it is neither significantly under- nor over-represented) on the Southern High Plains.

A common interpretation of Clovis raw material use on the Southern High Plains is that Clovis groups tracked between high quality sources, in particular the Alibates/Tecovas source areas while in the Panhandle, and the Edwards sources while on the southern fringe of the Plains. This would have supplied them with high quality material as they made their rounds through the extensive areas of the Southern Plains that lack knappable stone. The data in the TCFPS do not support this interpretation, however. Were this the case, we would expect high frequencies of worn and discarded Edwards tools at the Alibates and Tecovas sources, or at least in the northern portion of the Panhandle approaching these source, and a corresponding peak in worn Alibates/Tecovas tools at Edwards sources to the south. A map of the distribution of Clovis points by raw material, however, shows this is not the case (Figure 4).

If these patterns are genuine indications of technological organization among Texas Clovis groups, they reveal that Clovis groups commonly transported Edwards points to the north and northwest onto the High Plains, but they did not bring Alibates/Tecovas to the south and southeast into Central Texas (or other parts of the state) with comparable regularity. The upper map in Figure 4 (Figure 4a) shows the distribution of Clovis points made from Edwards chert by county. Though concentrated in Central Texas and the southern portion of the Southern High Plains—in counties at or near source outcrops—Edwards chert shows up everywhere in the state with the exception of the Trans-Pecos. The abundance and widespread distribution of Edwards chert is not surprising. This high quality material was heavily exploited throughout prehistory and, especially during the Paleoindian period, was commonly transported hundreds of kilometers from Central Texas (Banks 1990).

In contrast, the lower map in Figure 4 (Figure 4b) shows that the combined distribution of High Plains sources—Alibates and Tecovas—is much more restricted than that of Edwards chert. Aside from a light scatter of points across North Central Texas and a few possible Alibates points from McFaddin Beach, they do not show up outside the Southern High Plains, at least in Texas.[6] Furthermore, some of those occurrences south and east of the primary outcrops shown on the map possibly reflect the use of Alibates cobbles carried eastward by the Canadian River. Both Tecovas and Alibates occur as secondary deposits, and possibly even in primary exposures, hundreds of kilometers away from the better described source areas depicted in Figure 4b (e.g., Kraft 1997; Wyckoff 1993).

What is particularly interesting about the distribution of Edwards chert in Figure 4a, however, is that, while common on the Southern High Plains, points made from Edwards chert are restricted to the southern half of the region. In contrast, Alibates/Tecovas is primarily restricted to the northern half. This shows that for the most part points were not transported nearly as far on the Southern High Plains

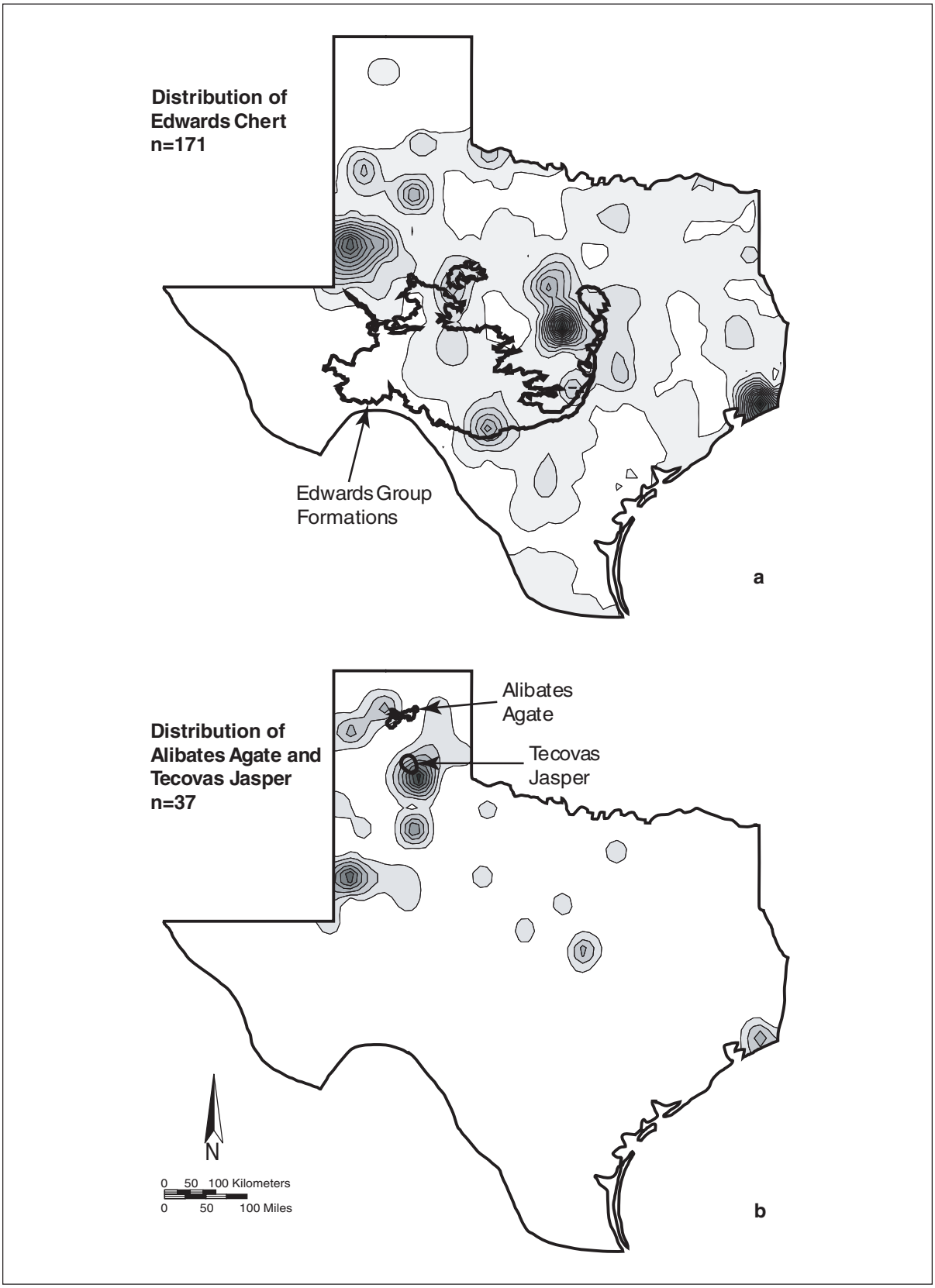

Figure 4. Distribution of Clovis points made on Edwards chert, derived from Central Texas sources (upper figure), and Alibates agate and Tecovas jasper combined, derived from High Plains sources (lower figure).

as is often presumed, a pattern which is masked by the summary data in Table 8. More importantly, the distributions shown in Figure 4 definitely do not support the expectation outlined above of Clovis groups in the Panhandle tracking between the Edwards and Alibates/Tecovas sources. Instead, the minimal overlap between the two distributions suggests that those groups using Alibates/Tecovas restricted their movement to the northernmost portion of the Panhandle and points further north, while those making use of Edwards chert did not move beyond the southernmost portion of the Plains, within 200 km of the Edwards Plateau.

It is not clear that there was strong territoriality during this time in prehistory; indeed, given how relatively few people were likely on the landscape, a strongly territorial posture would have been decidedly disadvantageous. However, given the two apparent spheres of raw material use on the High Plains of Texas (one in the north and one in the south), these groups were clearly starting to form geographic habits and possibly establishing 'home' ranges (similar to processes occurring elsewhere about this time, e.g., Jones et al. 2003). This distinction between a northern and southern sphere on the Southern High Plains manifests itself in other aspects of the TCFPS as well, and will be discussed in more detail in the next section.

Doubtless, other similar pattern in raw material distribution exist in the Texas Clovis point record, but given the coarse level of material identification of many of the points in the TCFPS, these patterns remain hidden. Particularly informative would be a detailed, first-hand examination of raw material characteristics of Clovis points from East Texas. In the absence of more such data, however, we turn to a discussion of Clovis point morphology and the further light it might shed on variation in the Texas Clovis record.

Morphology and Patterns of Breakage in Texas Clovis Points

As mentioned at the outset, one of the more notable developments in Clovis studies in recent years has been the widespread acceptance that Clovis groups were doing different things—adaptively speaking—in different areas of the continent. These differences are reflected in various aspects of the Clovis archeological record writ large: site size, assemblage composition, tool types, and faunal remains (e.g., Cannon and Meltzer 2004; Collins 1999; Ellis and Deller 1997; Meltzer 1993; for a discussion of how this plays out in later Paleoindian times, see Bamforth [2002]). We can see aspects of this adaptive variation within the smaller microcosm of Texas as well. Classic Southern High Plains sites like Miami (Holliday et al. 1994; Sellards 1952), Lubbock Lake (Johnson 1987), and (though technically just beyond Texas' borders) the Clovis type site at Blackwater Draw (Hester 1972) are primarily kill, processing, or scavenging sites. They provide evidence of rather brief, specialized use by Clovis groups. They differ markedly from Clovis sites along the Balcones Escarpment, like Gault (Collins 2002) and Kincaid Shelter (Collins 1990), which were long term or repeat-occupation habitation sites. Evidence of these differences can be seen in the patterns in raw material use and distribution discussed above.

As argued in previous publications on the TCFPS (Meltzer 1986b; Meltzer and Bever 1995), we might expect regional differences like these to show up in point morphology and life histories as well. If Clovis points were an important component of the Clovis toolkit—and there is no reason to think that they were not—it follows that they may have been created and used differently depending on the types of tasks undertaken. As such, variation in Clovis point use, rejuvenation, and breakage might be expected to correspond with regional variation in adaptation. We might also expect point form to display regional variation as a function of stylistic variability corresponding to interaction spheres, ranges, or regions of shared life ways. We explore these issues here, although our discussion is brief since few of our conclusions have changed since the last update.

As with raw material, approximately half of the points in the TCFPS contain a complete or nearly complete set of morphological data, although the counts range widely depending on the variable (Figure 5). Table 9 provides summary statistics for metric and categorical variables recorded in the TCFPS. By all accounts, Texas Clovis points are quite variable in their morphology. However, as shown by the coefficients of variation in Table 9, several attributes vary much more than most, while others show very little variation. Length, of course, is one of the most widely varying measures, due primarily to the effects of breakage and reworking. The distance from the point of maximum width to the base also varies widely; like length, this dimension can be affected by tip reworking, particularly

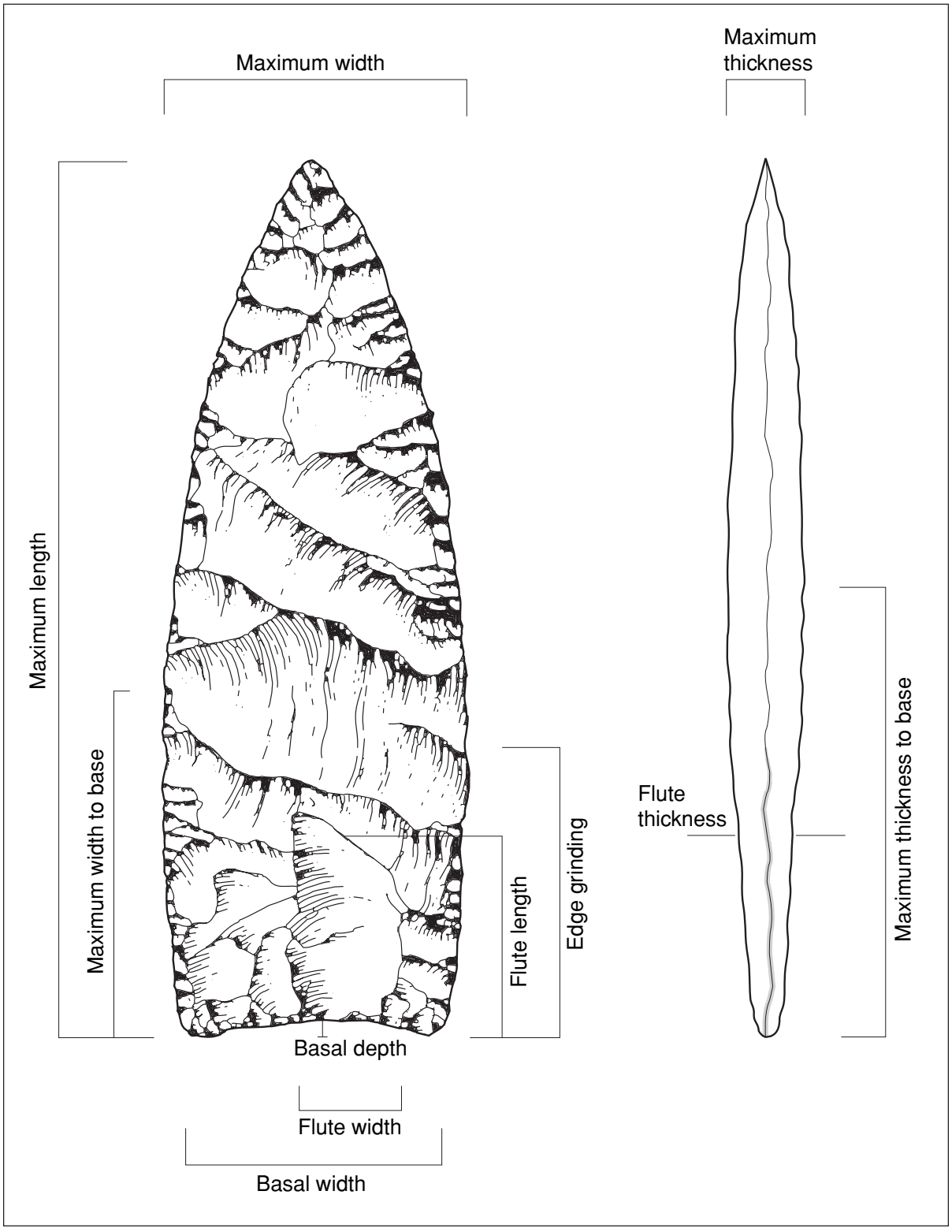

Figure 5. Schematic diagram showing metric attributes recorded on Texas Clovis fluted points.

Table 9. Morphological data for Texas Clovis points.

Variable	No. in database	Mean (cm)	Minimum (cm)	Maximum (cm)	Standard Deviation	Kurtosis	Coefficient of Variation
Maximum length	408	6.50	1.10	16.40	2.69	-.05	41.43
Length (whole points only)[a]	257	7.33	1.64	16.4	2.32	.52	31.69
Maximum width	413	2.80	1.71	6.30	.54	5.11	19.14
Base width	381	2.39	1.38	4.50	.46	1.28	19.14
Maximum width to base	329	3.05	.00	8.13	1.39	.79	45.61
Maximum thickness	397	.74	.30	1.40	.15	1.01	20.20
Flute thickness	92	.57	.16	.94	.13	1.28	23.75
Maximum thickness to base	106	3.76	1.10	7.30	1.15	.30	30.66
Basal concavity	289	.31	.00	.95	.17	.51	54.47
Average length of edge grinding	229	2.62	.65	5.72	.78	1.35	29.57
Average flute length	222	2.52	.27	6.89	.83	2.91	32.99
Average flute width	236	1.35	.57	2.39	.35	.02	25.97

a. While all variables show a difference between the full database and the subsample of whole points, only length has a difference of more than 1-2 mm.

when the point of maximum width is found forward of the hafting elements, as is the case with many Texas Clovis points. For reasons which are unclear, the depth of the basal concavity shows the greatest variation (see Taylor-Montoya, this volume for a similar conclusion regarding later Paleoindian points in Texas). In contrast, width, base width, thickness, and fluting thickness show the least amount of variation (see Table 9). As discussed in previous versions of the TCFPS, most of these attributes pertain to the hafting element of the point. The low degree of variation is probably due to hafting constraints, and specifically the need to manufacture points to fit pre-existing hafts of a specific dimension (an observation first made by Judge [1973]). This implies that the hafting material (perhaps bone or wood) may have been harder to come by than stone, or perhaps the hafts were more difficult to make—relative to fashioning a point, and flaking or grinding it to tight tolerances. As the portion contained within a haft, the suite of basal attributes comprising the haft element are also the least affected by expedient, in-the-haft reworking (see Meltzer and Bever [1995] for a full treatment of this topic). Why basal concavity—seemingly a hafting element as well—is the most variable of attributes is unclear. Perhaps it has little effect on the mechanics of hafting and other aspects of functionality.

Clearly there is substantial variation in the metric dimensions of Clovis points. This comes as no surprise, however: a casual glance at any collection of more than a few Clovis points will confirm the truth of this. Clovis sites that have produced multiple points (e.g., Miami [Sellards 1952], Blackwater Draw [Hester 1972], and Gault [Collins 2002]), including those reflecting a single event (like Naco in Arizona [Haury et al. 1953]), show appreciable variation in raw material, degree of reworking, and overall size. A more appropriate question to ask of the TCFPS, then, is whether co-variation in certain attributes are patterned in such a way that discrete sub-groups can be identified. In exploring the correlation between different metric variables in the TCFPS, it quickly becomes apparent that the overall shape of Clovis points actually is quite homogenous. With the exception of basal concavity, all

Table 10. Point breakage by region.

Region		Whole (including reworked)	Basal portion	Tip or midsection	Preform	Total
1 Plains/Panhandle	count	92	27	5	0	124
	adj. residual	.5	.8	-1.2	-1.8	
2 North Central	count	17	5	3	1	26
	adj. residual	-.8	.0	1.1	.8	
3 East	count	36	14	6	0	56
	adj. residual	-1.5	1.1	1.4	-1.1	
4 Coast	count	56	5	7	0	68
	adj. residual	2.0	-2.7	1.5	-1.2	
5 South	count	19	5	0	0	24
	adj. residual	.8	.2	-1.3	-.7	
6 Trans-Pecos	count	4	2	0	0	6
	adj. residual	-.3	.9	-.6	-.3	
7 Central	count	97	28	7	7	139
	adj. residual	-.9	.3	-.8	3.5	
Total		321	86	28	8	443

Chi square = 30.46, df = 18, p = 0.033; significant residuals are underlined.

metric measures in the TCFPS correlate significantly with each other. Rather than true variation in form, the dominant pattern seems to reflect a single size-scaled trajectory. Further, the range of variation along this trajectory is continuous, with no discernable breaks or gaps. Longer points tend to be wider, thicker, and have wider bases, longer and wider flutes, and longer ground edges. Points with wider bases also tend to have more flutes on average, and deeper basal concavities, although basal concavity and flute form are some of the more freely varying attributes in Texas Clovis points. Similarly, shorter (or narrower or thinner) points are proportionally smaller in all attributes. In this regard, little has changed in the current version of the TCFPS and we refer readers to the previous report (Meltzer and Bever 1995) for a more detailed discussion of the fine-grained variation in Texas Clovis points.

What we wish to convey here is that this variation in size is neither unusual nor unexpected, and despite our efforts (here and in earlier articles) to explore the data using various quantitative clustering, data reduction and classification techniques, and to partition the database in different ways (e.g., by region or raw material), we have been unable to discern meaningful morphological variation in the TCFPS. At most, there is minor variation in point size between some regions. For example, in South Texas, points tend to be shorter and narrower, which is not surprising given the scarcity of large nodules of good quality raw material in the region. In contrast, points from Central Texas, East Texas, and the coast (primarily McFaddin Beach) tend to be slightly larger, as do points manufactured from Edwards chert regardless of where they are found. Again, much of this likely has to do with the quality and size of available raw material. In any case, none of this variation is statistically significant. While regional (and possibly temporal) variation might be present in variables not recorded in the TCFPS, like the presence of basal "ears," for example, or flaking and fluting technology (see Collins 1999; Collins et al., this

volume), we suspect these differences will be expressed in degree rather than kind. But perhaps this is not surprising: viewed on a continental scale, there are clear differences in the morphology of Clovis and related forms (as, for example, Colby and Gainey fluted points). That variation likely bespeaks alterations in form due in part to the effects of use and re-sharpening of the points, but also to the divergence of populations and knapping styles and techniques over time and space. Think of it as a kind of cultural "drift," as kin and descendants experimented with and introduced their own variations on the Clovis theme (Meltzer, in press). But that is on a continental scale: on a smaller scale, the variation is less apparent.

While we find little evidence of morphological patterning in the TCFPS database, there is more insight to be had from an examination of point life histories as identified by breakage and reworking. Table 10 shows breakage categories by region. Although the chi square statistic is significant at the .05 level, this significance must be viewed with caution since over half the cells in the table have expected frequencies less than five. The adjusted residuals are most informative here and show that, in general, breakage does not vary significantly between most regions. For reasons that may have to do with collector preferences along McFaddin Beach, whole points are more common and basal portions less common than expected along the coast. More readily meaningful is the higher than expected frequency of preforms in Central Texas. In one regard this is to be expected. Given the abundance of high quality Edwards chert in the area, many of the sites found there are quarries and workshops (e.g., Pavo Real [Collins et al. 2003], Gault [Collins 2002], and Yellowhawk [Mallouf 1989]). It is also worth noting that the TCFPS only contains preforms that have been fluted, for obvious reasons having to do with identification. The pattern nevertheless provides further confirmation that Clovis habitation of the Central Texas region differed in a number of ways from other areas of Texas.

Aside from these few deviations, however, the basic picture in Table 10 shows that most of the points in the TCFPS are complete or nearly complete specimens. Considering the source of the majority of the sample—private collections—the high frequency of whole points is not unexpected. Also, the low frequency of tips and midsections (see Table 10) can be explained by the fact that only whole or basal portions retaining flute scars are typically identified as Clovis points. While flaking pattern may be an equally valuable criterion for identifying Clovis bifacial technology (see Collins et al., this volume), it does not factor into the identification of Clovis points in the TCFPS.

One final pattern of note is the incidence of reworking and impact fractures in the TCFPS. Table 11 shows that reworked points are present on the Southern High Plains in greater than expected frequencies, while unreworked whole points are less common than expected. This fits well with the notion that groups on the Southern High Plains conserved raw material as they ranged across areas devoid of tool stone. In contrast, Central Texas shows a lower than expected frequency of reworking, due no doubt to the abundance of high quality raw material in the area and the correspondingly less pressing need to conserve material. Both of these patterns fit with the interpretation offered in the preceding section whereby two distinctly different patterns of raw material and probably landscape use were identified on the Southern High Plains and in Central Texas.

Also apparent in Table 11 is the fact that impact fractures are extremely rare in the database–and, for that matter, in Clovis points across North America–and are almost entirely restricted to the Southern High Plains and Central Texas. Impact fractures occur when stone meets bone at high velocity. Their scarcity in most areas, and presence in others, are further hints to differences in the use of this technology.

Focusing further on the Southern High Plains, there are also interesting differences in reworking by raw material. Although a chi square statistic of the overall relationship between reworking and raw material is not significant, adjusted residuals show that several deviations are significant. Specifically, on the Southern High Plains, Alibates/Tecovas points show a significantly higher incidence of reworking than expected, while points on Edwards chert in the same region show a lower than expected frequency of reworking. In the preceding section on raw material distributions, it was noted that Alibates/Tecovas Clovis points are largely restricted to the northern portion of the Panhandle while Edwards Clovis points are restricted to the southern portion. Two zones of raw material use (reflective of Clovis group mobility and organization?) were identified on the Southern High Plains. It now appears that those groups in the northern sphere, relying heavily on Alibates agate, Tecovas

Table 11. Reworking and impact fractures by region.

Region		Whole	Reworked	Impact fractured[a]	Total
1 Plains/Panhandle	count	61	31	6	98
	adj. residual	-2.9	2.8	.6	
2 North Central	count	12	5	0	17
	adj. residual	-.2	.8	-1.0	
3 East	count	24	12	1	37
	adj. residual	-1.2	1.6	-.7	
4 Coast	count	52	4	1	57
	adj. residual	3.4	-3.0	-1.2	
5 South	count	12	7	0	19
	adj. residual	-1.0	1.6	-1.0	
6 Trans-Pecos	count	4	0	1	5
	adj. residual	.4	-1.2	1.5	
7 Central	count	82	15	8	105
	adj. residual	1.4	-2.3	1.5	
Total		247	74	17	338

Chi square = 30.57, df = 12, p = 0.002; significant residuals are underlined.
a. All impact fractured points in the database are also reworked. In most instances, combining the two categories of reworked points has the effect of amplifying significant deviations.

jasper, and as yet unidentified materials, ranged more widely into raw material-poor areas, relying on conservation and heavy reuse of projectile points. Groups occupying the southern sphere, by contrast, appear to have been less concerned with raw material conservation, and may have had more ready access to Edwards chert sources along the southern periphery of the Plains. Though also occupying an area devoid of raw material, the pattern in the southern portion of the Plains differs appreciably from that in the northern portion, and both are distinct from the patterns seen in the raw material-rich zones of Central Texas. Importantly, these fine distinctions in raw material and landscape use between Central Texas and the northern and southern portions of the South High Plains—whatever they might ultimately represent—are not manifest in 'stylistic' aspects of point form. Rather, they only become apparent through a close examination of several lines of evidence. Unfortunately, the TCFPS currently lacks the quality of data needed to search for similar patterns of variation in other areas of the state, though it seems they likely exist.

SUMMARY AND CONCLUSIONS

Briefly, conclusions of note in this latest version of the TCFPS include the following:

1) The TCFPS currently contains 544 points, reflecting an increase of 138 points since 1995, and 339 points since 1986. Thirty-three new counties have been added to the database, and 149 of Texas' 254 counties have produced at least one point. Now over 20 years old, growth in the TCFPS appears to have reached a plateau, indicating that the database probably provides a fairly representative sample of the known Clovis point record. The relative frequencies of points by region have changed little since the last version, and patterns in raw material and morphological variation remain virtually unaffected. We suspect that future growth in the database will not significantly alter the general patterns identified here. That said, the continued addition of new points can only

help to fine tune and strengthen these patterns, and is a worthwhile goal.

2) Three regions of the state—the Southern High Plains; East Texas; and the northern, eastern and southeastern periphery of the Edwards Plateau in Central Texas—show the greatest frequency (and density) of Clovis points in the state. The prairies and savannahs of North Central Texas and the Coastal Plain have relatively fewer points, but we suspect that, as predominantly fluvial environments, Clovis-aged deposits in these areas are either deeply buried or entirely eroded. In contrast, the absence of points from the Trans-Pecos and South Texas may be a real phenomenon, meaning that these areas experienced relatively sparse habitation by Clovis groups. McFaddin Beach remains an enigma, and will likely stay that way until the source (sources?) of these points is found.

3) The statewide distribution of Clovis sites generally mirrors that of Clovis points. However, determining whether concentrations of Clovis materials—whether sites, isolated points, or points found in sites—indicate that these areas were attractive to Clovis groups, or that they simply are areas with preserved (and exposed) Clovis-aged deposits, is a difficult issue to resolve. Regardless, two lines of Clovis site evidence—the context of points in the TCFPS and an independent database of officially recorded Clovis sites—show that the structure of the Clovis record differs regionally. Most notably, the Southern High Plains has a record dominated by isolated Clovis points, while Central Texas has a site-dominated record. North Central Texas and the Coast also show interesting deviations that seem to indicate that, although site-dominated like Central Texas, Clovis sites in these areas generally contain very few points. These patterns have clear implications for variation in Clovis land use. Contrary to the general belief that the Clovis way of life consisted of small groups of highly-mobile hunter-foragers leaving behind an ephemeral archeological record (perhaps as exemplified by the Clovis record on the Southern High Plains), it appears that in certain places, like Central Texas and maybe East Texas, Clovis groups engaged in the types of activities that left a structured, site-based archeological record.

4) Fully 76% of the points in the TCFPS that can be identified to raw material are made from Edwards chert. Alibates agate comes in a distant second. However, since fewer than half of the points in the TCFPS can actually be identified to raw material, it probably is premature to conclude that Edwards chert dominates the Texas Clovis point record, at least in all areas of the state. Furthermore, the certainty with which Edwards chert can be identified seems to decline as one moves away from Central Texas. This severely limits the information that can be gained from an examination of raw material in those areas outside Central Texas (and the Southern High Plains to a lesser degree).

5) Given these limitations, detailed observations of raw material use are restricted to Central Texas and the Southern High Plains. The patterns that emerge are suggestive, however. It appears there were two spheres of raw material use on the Southern High Plains: one in the northern portion of the Panhandle focused on the use of Alibates agate, and one in the south making use of Edwards chert (presumably derived from outcrops along the northern fringe of the Edwards Plateau). There is little overlap between the two raw material distributions, and there is no support for the notion that Clovis groups tracked between these two source areas as they ranged across the Southern Plains.

6) Only in the northern portion of the Southern High Plains is there evidence for pronounced conservation of raw material as reflected by a high incidence of point reworking. Groups to the south seem to have had more reliable access to Edwards source areas. Finally, in Central Texas, with its abundant sources of raw material, the incidence of reworking is significantly lower than elsewhere in the state and, not surprisingly, direct evidence of point production—in the form of preforms—is most common.

7) Despite substantial variation in the size of Clovis points (some of which is no doubt due to reworking), variation in virtually all metric attributes is scaled and continuous, and we find no clear evidence of morphological subgroups within the TCFPS. The variation that

is present seems to relate primarily to the nature and availability of tool stone. Even variation in size shows only subtle and statistically insignificant patterning by region. Indeed, both small and large points are found in all regions. Of course, it is possible that meaningful variation might exist in attributes not recorded in the TCFPS, or that 'stylistic' variants, if such exist, do not correspond to the environmental regions used here (as, indeed, they might not). Ultimately, getting a better handle on Clovis adaptive variation requires that we go beyond the projectile points themselves, and look more broadly at tool kits, particularly as they might occur in habitation sites like Gault where—by virtue of longer periods of occupation and greater numbers of activities—a wider range of tool classes would be expected. But for that, we need more sites.

Indeed, this exploration of the TCFPS highlights several gaps in our knowledge of the Texas Clovis record that beg for focused research and data collection. These concern topics that, had we more knowledge of them, would make the TCFPS a more robust tool for asking meaningful questions. Though the list could be nearly endless, we limit ourselves to a few areas of research that spring most directly from the themes explored in this article:

1) More work could be done with raw material identification and sourcing. As seen, one of the more fruitful lines of evidence in the TCFPS relates to the raw material characteristics of Clovis points. In Central Texas and the Southern High Plains, areas where raw materials are rather more reliably identifiable, we were able to identify detailed and behaviorally meaningful patterns. A better understanding of raw materials outside of Central Texas would go a long way toward identifying similar variation in Clovis land use across the state. This is particularly true for East Texas, which has a robust sample of Clovis points but where so many points in the TCFPS are tabulated as raw material 'unknown.' Even knowing with confidence which points are made from Edwards chert and which are not would be quite valuable. The work would, of course, require exploration of raw material sources outside the state. It is also worth stressing that more could be learned about Central Texas raw material sources as well, including a better understanding of chemical, visual, and fluoroscopic variation within the quite complex chert-bearing formations of the Edwards Plateau.

2) It would be worthwhile examining more closely those regions in Texas with a scarcity of Clovis points (and sites). Specifically, it would be useful to know whether the lack of points in these areas is due to issues of preservation and discovery, or to an actual scarcity of Clovis habitation. Is it true that Clovis-aged deposits are deeply buried in North Central Texas and along the coastal prairie? If so, how might we efficiently explore those deposits for evidence of Clovis occupation? Along the same lines, if the absence of points in South Texas and the Trans-Pecos truly does reflect an absence of Clovis habitation, then what was it about these areas that was unattractive to humans at the close of the Pleistocene?

3) It has become increasingly clear in recent years that the Southeastern Woodlands of the United States hold a rich record of Clovis habitation. Despite this, little is known of Clovis adaptations in this vast area. The current version of the TCFPS demonstrates that the Texas portion of the Southeastern Woodlands has a rich Clovis record as well. However, while Clovis points have been found in site contexts, not a single Clovis site has been thoroughly excavated and documented in East Texas (Fields 2004; Perttula 2004; Story 1990). While we continue to refine our understanding of Clovis in the better studied areas of the Southern High Plains and Central Texas, our understanding of Clovis lifeways in the east remains woefully underdeveloped. While it is all too easy to call for the discovery and excavation of more Clovis sites in good context, it is true that concerted efforts in East Texas, resulting in even a modicum of success, would go a long way towards rectifying a major deficiency in our understanding of Clovis archeology.

Point databases such as the TCFPS provide valuable insight into Clovis prehistory. We undertook this revision on the TCFPS partly in response to the many changes that have taken place in Clovis archeology over the past decade. As the TCFPS has continued to grow and develop into a robust source

of information, we have found that its greatest value is as a tool for asking pointed questions about the technology, adaptive strategies, and life ways of Clovis hunter-gatherers. Future developments in the field of Clovis archeology will no doubt point to new questions that can be asked of the TCFPS, and new ways to use it more productively.

Although we do not expect the basic patterns in the TCFPS to change substantially in future versions, we do intend to continue adding points to the database and to refine the quality of the data it contains. At the end of this article is the standard TCFPS recording form (metric variables correspond to those shown in Figure 5). A digital version of the form can also be obtained by contacting either of the authors. To facilitate its use as a research tool, we have made the TCFPS database available online at http://www.smu.edu/anthro/faculty/dmeltzer/research.htm. We encourage the members of the Texas archeological community to continue to submit information on Clovis points, and we encourage other researchers to continue to explore, in new and productive ways, the Clovis Paleoindian occupation of Texas.

ACKNOWLEDGMENTS

Once again, we must thank the many contributors to the TCFPS, amateur and professional alike, whose efforts and generosity have made the database possible. We have acknowledged most of these contributors in previous publications on the TCFPS; here we thank them again and list those who have contributed to this most recent version of the database:

David L. Calame, Sr.
C. K. Chandler
Donald Clayton
James E. Corbin
Wilson W. "Dub" Crook
William N. German
Keith C. Glasscock
Connie Hodges
Rusty Lilljedahl
Robert J. Mallouf
Bo Nelson
Leland W. Patterson
Stephen Post
Bryant Saner, Jr.
Cal Smith
Paul Tanner
Darrell Woods

We also thank Britt Bousman and Tim Perttula for a careful reading of an earlier version of the article, and Judy Cooper for help in preparing Figure 1. In addition, David Meltzer would like to acknowledge the support of the Potts and Sibley Foundation, Midland, and the support of the QUEST Archaeological Research Program.

END NOTES

1. Region divisions are the same as those used in previous versions of the TCFPS and follow Suhm et al. (1954), with modifications from Arbingast et al. (1976) and Brown et al. (1982). The seven regions are shown in Figure 1.

2. We conducted multiple keywords searches of the online database, the most productive being those using "Clovis" and "Fluted."

3. The slight mismatch between peaks in point density and Clovis site locations in Figure 3 results from the way in which provenience was recorded in the two databases. Clovis points in the TCFPS are recorded by county, and the contour map uses the centroid of the county as the coordinate for each tally. In contrast, Clovis sites are precisely plotted by latitude and longitude.

4. The same holds true for point and site density by county.

5. It has also been suggested that some of the points from Gaines County may be well-made, modern forgeries, thereby accounting for the unusually high frequency of points from that county. Since we have not examined all of the points firsthand, we cannot evaluate the veracity of this claim. We do acknowledge that a small number of points in the TCFPS may very well be forgeries.

6. While Alibates Paleoindian points are rare south of the Southern High Plains, their occurrence to the north of Texas in the central Plains is well documented, as, for example, in the Drake Clovis cache, which occurs more than 400 km north of the Alibates source (Stanford 1999).

REFERENCES CITED

Alexander, H. J.
1963 The Levi Site: A Paleo-Indian Campsite in Central Texas. *American Antiquity* 28:510-528.

Amick, D. S. and J. L. Hofman
1999 Joe Ben Wheat's Investigations at Chispa Creek in Trans-Pecos, Texas. *Current Research in the Pleistocene* 16:3-5.

Anderson, D. G. and M. Faught
2000 Palaeoindian Artifact Distribution: Evidence and Implications. *Antiquity* 74:507-513.

Arbingast, S. A., L. G. Kennamer, R. H. Ryan, J. R. Richardson, W. L. Hezlep, L. T. Ellis, T. G. Jordan, C. T. Cranger, and C. P. Zlatkovich
1976 *Atlas of Texas*. Bureau of Business Research, The University of Texas at Austin.

Bamforth, D.
2002 High-tech Foragers? Folsom and Later Paleoindian Technology on the Great Plains. *Journal of World Prehistory* 16:55-98.

Banks, L. D.
1990 *From Mountain Peaks to Alligator Stomachs: A Review of Lithic Sources in the Trans-Mississippi South, the Southern Plains, and Adjacent Southwest.* Memoir No. 4. Oklahoma Anthropological Society, Oklahoma City.

Birmingham, W. W. and T. R. Hester
1976 Late Pleistocene Archaeological Remains from the Johnston-Heller Site, Texas Coastal Plain. In *Papers on Paleo-Indian Archaeology in Texas*, edited by T. R. Hester, pp. 15-33. Special Report 3. Center for Archaeological Research, University of Texas at San Antonio.

Black, S. L.
1989 South Texas Plains. In *From the Gulf to the Rio Grande: Human Adaptation in Central, South, and Lower Pecos, Texas*, by T. R. Hester, S. L. Black, D. G. Steele, B. W. Olive, A. A. Fox, K. J. Reinhard, and L. C. Bement, pp. 39-62. Research Series No. 33. Arkansas Archeological Survey, Fayetteville.

Bonnichsen, R., B. T. Lepper, D. Stanford, and M. Waters (editors)
2006 *Paleoamerican Origins: Beyond Clovis*. Center for the Study of the First Americans, Texas A&M University Press, College Station.

Bousman, C. B., B. W. Baker, and A. C. Kerr
2004 Paleoindian Archeology in Texas. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 15-97. Texas A&M University Press, College Station.

Brown, K.M.
1976 Fused Volcanic Glass from the Manning Formation. *Bulletin of the Texas Archeological Society* 47:189-207.
1994 Four Clovis points from San Augustine County, Texas. *La Tierra* 21:24-39.

Brown, T., K. Killen, H. Simons, and V. Wulfkuhle
1982 *Resource Protection Planning Process for Texas*. Texas Historical Commission, Austin.

Buchanan, B.
2003 The Effects of Sample Bias on Paleoindian Fluted Point Recovery in the United States. *North American Archaeologist* 24:311-338.

Byerly, R. M., J. R. Cooper, D. J. Meltzer, M. E. Hill, and J. M. LaBelle
2005 On Bonfire Shelter (Texas) as a Paleoindian Bison Jump: An Assessment Using GIS and Zooarchaeology. *American Antiquity* 70:595-629.

Byers, D. A. and A. Ugan
2005 Should We Expect Large Game Specialization in the Late Pleistocene? An Optimal Foraging Perspective on Early Paleoindian Prey Choice. *Journal of Archaeological Science* 32:1624-1640.

Cannon, M. D. and D. J. Meltzer
2004 Early Paleoindian Foraging: Examining the Faunal Evidence for Large Mammal Specialization and Regional Variability in Prey Choice. *Quaternary Science Reviews* 23 (18/19):1955-1987.

Chandler, C.K.
1982 Paleo-Indian Projectile Points from San Patricio County, Texas. *La Tierra* 9(3): 26-28.
1983 Paleo-Indian Projectile Points from Kendall County, Texas. *La Tierra* 10(4):36-37.

Chandler, C.K. and D. Rogers
1995 Clovis Points from Montgomery and Brazoria Counties in Southeast Texas. *La Tierra* 22(4):12-14.

Collins, M. B.
1990 The Archaeological Sequence at Kincaid Rockshelter, Uvalde County, Texas. *Transactions of the 25th Regional Archeological Symposium for Southeastern New Mexico and Western Texas*, edited by P. Brothers, pp. 25-33. Midland Archeological Society, Midland.
1999 *Clovis Blade Technology*. The University of Texas Press, Austin.
2002 The Gault site, Texas, and Clovis Research. *Athena Review* 3:31-41.

Collins, M. B., C. B. Bousman, P. Goldberg, P. Takac, J. Guy, J. L. Lanata, T. W. Stafford, and V. T. Holliday
1993 The Paleoindian Sequence at the Wilson-Leonard Site, Texas. *Current Research in the Pleistocene* 10:10-12.

Collins, M. B., G. E. Evans, T. N. Campbell, M. C. Winans, and C. E. Mear
1989 Clovis Occupation at Kincaid Shelter, Texas. *Current Research in the Pleistocene* 6:3-4.

Collins, M. B., T. R. Hester, and P. Headrick
1992 Engraved Cobbles from the Gault Site, Central Texas. *Current Research in the Pleistocene* 9:3-4.

Collins, M. B., T. R. Hester, D. Olmstead, and P. Headrick
1991 Engraved Cobbles from Early Archaeological Contexts in Central Texas. *Current Research in the Pleistocene* 8:13-15.

Collins, M. B., D. B. Hudler, and S. L. Black
2003 *Pavo Real (41BX52): A Paleoindian and Archaic Camp and Workshop on the Balcones Escarpment, South-Central Texas.* Studies in Archeology 41, Texas Archeological Research Laboratory, The University of Texas at Austin, and Archeological Studies Program, Report 50, Environmental Affairs Division, Texas Department of Transportation, Austin.

Cooper, B.
1974 A Fluted Point from McMullen County, Texas. *La Tierra* 1(3):18.

Crook, W. W. and R. K. Harris
1955 Scottsbluff Points in the Obshner Site near Dallas, Texas. *Bulletin of the Texas Archeological Society* 26:75-100.

1957 Hearths and Artifacts of Early Man near Lewisville, Texas, and Associated Faunal Material. *Bulletin of the Texas Archeological Society* 28:7-97.

Dibble, D. and D. Lorrain
1968 *Bonfire Shelter: A Stratified Bison Kill Site, Val Verde County, Texas*. Miscellaneous Papers 1. Texas Memorial Museum, The University of Texas at Austin.

Espey, Huston and Associates, Inc.
1981 *A Cultural Resource Inventory and Assessment of the Proposed Stacy Reservoir, Concho, Coleman, and Runnels Counties, Texas.* 3 Vols. Espey, Huston and Associates, Inc., Austin.

Ellis, C. J. and D. B. Deller
1997 Variability in the Archaeological Record of Northeastern Early Paleoindians: A View from Southern Ontario. *Archaeology of Eastern North America* 25:1-30.

Ellis, L., G. L. Ellis, and C. Frederick
1995 Implications of Environmental Diversity in the Central Texas Archeological Region. *Bulletin of the Texas Archeological Society* 66:401-426.

Enlow, D. and T. N. Campbell
1955 Some Paleo-Indian Projectile Points from the Southeastern Periphery of the Great Plains. *The Panhandle-Plains Historical Review* 28:29-38.

Etchieson, G., R. Speer, and J. Hughes
1979 *Archaeological Investigations in the Crowell Reservoir Area, Cottle, Foard, King, and Knox Counties, Texas.* Report submitted to the U.S. Army Corps of Engineers, by the Archaeological Research Laboratory, Killgore Research Center, West Texas State University, Canyon, Texas.

Ferring, C. R.
1990 The 1989 Investigations at the Aubrey Clovis Site, Texas. *Current Research in the Pleistocene* 10:10-12.

2001 *The Archaeology and Paleoecology of the Aubrey Clovis Site (41DN479), Denton County, Texas*. Center for Environmental Archaeology, University of North Texas, Denton.

Fields, R. C.
2004 The Archeology of the Post Oak Savanna of East-Central Texas. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 347-369. Texas A&M University Press, College Station.

Frederick, C., M. D. Glascock, H. Neff, and C. M. Stevenson
1994 *Evaluation of Chert Patination as a Dating Technique: A Case Study from Fort Hood, Texas*. Research Report No. 32. Archeological Resource Management Series. U.S. Army, Fort Hood.

Grayson, D. K. and D. J. Meltzer
2002 Clovis Hunting and Large Mammal Extinction: A Critical Review of the Evidence. *Journal of World Prehistory* 16:313-359.

Greer, J. W.
1968 Some Unusual Artifacts from Val Verde County, Texas. *Texas Journal of Science* 20:183-192.

Hall, D.
1998 Clovis Site on Gulf Coast Yields Booty Only to Waves: Highway Project Focuses New Interest on McFadden Beach. *Mammoth Trumpet* 13(4):7-12.

Haury, E. W., E. Antevs, and J. Lance
1953 Artifacts with Mammoth Remains, Naco, Arizona. *American Antiquity* 19:1-24.

Hayner, E. W.
1955 Research in East Texas Projectile Points. *Bulletin of the Texas Archeological Society* 26:235-243.

Haynes, C. V.
1982 Were Clovis Progenitors in Beringia? In *Paleoecology of Beringia*, edited by D. M. Hopkins, J. Matthews, C. Schweger, and S. Young, pp. 383-398. Academic Press, New York.

1995 Geochronology of Paleoenvironmental Change, Clovis Type Site, Blackwater Draw, New Mexico. *Geoarchaeology* 10:317-388.

Hays, T.
1982 *Archaeological Investigations of the San Gabriel Reservoir Districts, Central Texas*. Volume 1. Institute of Applied Sciences, North Texas State University, Denton.

Henderson, J. and G. Goode
1991 Pavo Real: An Early Paleoindian Site in South-Central, Texas. *Current Research in the Pleistocene* 8:26-28.

Hester, J.
1972 *Blackwater Locality No. 1: A Stratified Early Man Site in Eastern New Mexico*. Fort Burgwin Research Center, Dallas.

Hester, T. R.
n.d A Distributional Study of Paleo-Indian Projectile Point Types in Texas. Unpublished paper, on file with the author (prepared 1967).

1974 On Fluted Points and South Texas Archaeology. *Texas Archaeology* (The Newsletter of the Texas Archeological Society) 18(2):11-14.

1980 A Survey of Paleo-Indian Archaeological Remains along the Texas Coast. In *Papers on the Archaeology of the Texas Coast*, edited by L. Highly and T. R. Hester, pp. 1-12. Special Report No. 11. Center for Archaeological Research, The University of Texas at San Antonio.

1988 Paleoindian Obsidian Artifacts from Texas: A Review. *Current Research in the Pleistocene* 5:27-29.

2004 The Prehistory of South Texas. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 127-151. Texas A&M University Press, College Station.

Hofman, J. L., L. W. Todd, and M. B. Collins
1991 Identification of Central Texas Edwards Chert at the Folsom and Lindenmeier Sites. *Plains Anthropologist* 36:297-308.

Holliday, V. T.
1995 *Stratigraphy and Paleoenvironments of Late Quaternary Valley Fills on the Southern High Plains*. Memoir 186. Geological Society of America, Boulder.

1997 *Paleoindian Geoarchaeology of the Southern High Plains*. University of Texas Press, Austin.

Holliday, V. T., C. V. Haynes, J. L. Hofman, and D. J. Meltzer
1994 Geoarchaeology and Geochronology of the Miami (Clovis) Site, Southern High Plains of Texas *Quaternary Research* 41:234-244.

Holliday, V. T. and C. Welty
1981 Lithic Tool Resources of the Eastern Llano Estacado. *Bulletin of the Texas Archeological Society* 52:201-214.

House, K.
1974 A Paleo-Indian Fluted Point from Live Oak County, Texas. *The Texas Archeological Society Newsletter* 18(1):17-19.

Jablonski, N. (editor)
2002 *The First Americans: The Pleistocene Colonization of the New World.* Memoir No. 27. California Academy of Sciences, San Francisco.

Jensen, H.
1968 Report on Excavations at the Field Ranch Site (X41CO-10), Cooke County, Texas. *Bulletin of the Texas Archeological Society* 39:133-146.

Johnson, E.
1983 The Lubbock Lake Paleoindian Record. In *Guidebook to the Central Llano Estacado*, edited by V.T. Holliday. Center for Arid Land Studies, Lubbock.

Johnson, E. (editor)
1987 *Lubbock Lake: Late Quaternary Studies on the Southern High Plains*. Texas A&M University Press, College Station.

Johnson, L.
1961 The Yarbrough and Miller Sites of Northeastern Texas, with a Preliminary Definition of the La Harpe Aspect. *Bulletin of the Texas Archeological Society* 32:141-284.

Jones, G. T., C. Beck, E. Jones, and R. Hughes
2003 Lithic Source Use and Paleoarchaic Foraging Territories in the Great Basin. *American Antiquity* 68:5-38.

Judge, W. J.
1973 *Paleoindian Occupation of the Central Rio Grande Valley in New Mexico*. University of New Mexico Press, Albuquerque.

Kelly, T. C.
1983 The Brom Cooper Paleo-Indian Collection from McMullen County, Texas. *La Tierra* 10(3):17-40.

Kraft, K. C.
1997 The Distribution of Alibates Silicified Dolomite Clasts along the Canadian River. *Current Research in the Pleistocene* 14:106-109.

LaBelle, J. M.
2005 Hunter-Gatherer Foraging Variability During the Early Holocene on the Central Plains of North America. Ph.D. dissertation, Department of Anthropology, Southern Methodist University, Dallas.

Long, R. J.
1977 *McFaddin Beach*. The Patillo Higgins Series of Natural History and Anthropology, Number 1. Spindletop Museum, Lamar University, Beaumont.

Madsen, D. (editor)
2004 *Entering America: Northeast Asia and Beringia before the Last Glacial Maximum*. University of Utah Press, Salt Lake City.

Mallouf, R. J.
1989 A Clovis Quarry Workshop in the Callahan Divide: the Yellow Hawk Site, Taylor County, Texas. *Plains Anthropologist* 34:81-103.

Meier, C. J. and T. R. Hester
1972 Notes on the Meier Site, Fayette County, Texas. *Bulletin of the Lower Plains Archeological Society* 3:69-72.

1976 Paleo-Indian Artifacts from the Meier Site, Southeast Texas. *La Tierra* 3(1):16-19.

Meltzer, D. J.
1986a A Study of Texas Clovis Points. *Current Research in the Pleistocene* 3:33-36.

1986b The Clovis Paleoindian Occupation of Texas: Results of the Texas Clovis Fluted Point Survey. *Bulletin of the Texas Archeological Society* 57:27-68.

1989 An Update on the Texas Clovis Fluted Point Survey. *Current Research in the Pleistocene* 6:31-33.

1993 Is There *a* Clovis Adaptation? In *From Kostenki to Clovis: Upper Paleolithic—Paleo-Indian Adaptations*, edited by O. Soffer and N. Praslov, pp. 293-310. Plenum Press, New York

In press *American Origins: Colonizing the Ice Age Continent*. University of California Press, Berkeley.

Meltzer, D. J. and M. R. Bever
1995 Paleoindians of Texas: An Update on the Texas Clovis Fluted Point Survey. *Bulletin of the Texas Archeological Society* 66:17-51.

Miller, M. R. and N. A. Kenmotsu
2004 Prehistory of the Jornada Mogollon and Eastern Trans-Pecos Regions of West Texas. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 205-265. Texas A&M University Press, College Station.

Mitchell, J. B. and J. Winsch
1973 A Paleo-Indian Point from South Texas. *Ohio Archeologist* 23(2):9.

Orchard, C. and T. Campbell
1954 Evidences of Early Man from the Vicinity of San Antonio, Texas. *Texas Journal of Science* 4:454-465.

Patterson, L. W.
1986 Site 41HR571, a Long Prehistoric sequence in Harris County, Texas. *Journal of the Houston Archeological Society* 88:15-18.

1997a *The Wheeless Archeological Collections, Fort Bend County, Texas.* Report No. 4. Fort Bend Archaeological Society, Richmond, Texas.

1997b *The Meitzen Collection, 41FB249, Fort Bend County, Texas.* Report No. 6. Fort Bend Archaeological Society, Richmond, Texas.

Patterson, L. W., J. D. Lockwood, R. L. Gregg, and S. M. Kindall
1992a The Lockwood Collection (41HR343), Harris County, Texas. *Journal of the Houston Archeological Society* 104:16-24.

1992b Prehistoric Sites 41HR354, 730, 731, 732, Harris County, Texas. *Journal of the Houston Archeological Society* 104:25-30.

Perttula, T. K.
2004 The Prehistoric and Caddoan Archeology of the Northeastern Texas Pineywoods. In *The Prehistory of Texas*, edited by T. K. Perttula, pp. 370-407. Texas A&M University Press, College Station.

Ray, C. N.
1930 Report on Some Recent Archaeological Researches in the Abilene Section. *Bulletin of the Texas Archeological and Paleontological Society* 2:45-58.

Roberson, J.
2005 Stable Isotope Analysis of Some Texas Cherts. Paper presented at the 76th Annual Meeting of the Texas Archeological Society, Austin, Texas.

Sabin, T. J. and V. T. Holliday
1995 Playas and Lunettes on the Southern High Plains: Morphometric and Spatial Relationships. *Annals of the Association of American Geographers* 85:286-305.

Saner, B., Jr.
1995 An in situ Clovis Point Find from Kerr County. *La Tierra* 22(3):20-23.

2005 Clovis Manufacture Failure from Real County, Texas. *La Tierra* 32(2):29-31.

Scurlock, J. and W. Davis
1962 Appraisal of the Archeological Resources of Toledo Bend Reservoir, Panola, Newton, Sabine, and Shelby Counties, Texas; Sabine and De Soto Parishes, Louisiana. Report submitted to the National Park Service by the Texas Archeological Salvage Project, The University of Texas at Austin.

Sellards, E. H.
1940 Pleistocene Artifacts and Associated fossils from Bee County, Texas. *Bulletin of the Geological Society of America* 51:1627- 1658.

1952 *Early Man in America.* University of Texas Press, Austin.

Shiner, J. L.
1983 Large Springs and Early American Indians. *Plains Anthropologist* 28:1-7.

Skinner, S. A. and R. Rash
1969 A Clovis Fluted Point from Hood County, Texas. *Bulletin of the Texas Archeological Society* 40:1-2.

Stanford, D.
1999 Paleoindian Archaeology and Late Pleistocene Environments in the Plains and Southwestern United States. In *Ice Age People of North America:*

Environments, Origins, and Adaptations, edited by. R. Bonnichsen and K. L. Turnmire, pp. 281-339. Center for the Study of the First Americans, Corvallis.

Story, D. A.
1990 Culture History of the Native Americans. In *The Archeology and Bioarcheology of the Gulf Coastal Plain*, by D. A. Story, J. A. Guy, B. A. Burnett, M. D. Freeman, J. C. Rose, D. G. Steele, B. W. Olive, and K. J. Reinhard, pp. 163-366. Research Series No. 38. 2 Vols. Arkansas Archeological Survey, Fayetteville.

Stright, M. J.
1999 Spatial Data Analysis of Artifacts Redeposited by Coastal Erosion: A Case Study of McFaddin Beach, Texas. Ph.D. dissertation, Department of Anthropology, American University, Washington, D.C.

Suhm, D. A. and E. B. Jelks (editors)
1962 *Handbook of Texas Archeology: Type Descriptions*. Special Publication 1, Texas Archeological Society, and Bulletin 4, Texas Memorial Museum, Austin.

Suhm, D. A., A. D. Krieger, and E. B. Jelks
1954 An Introductory Handbook of Texas Archaeology. *Bulletin of the Texas Archeological Society* 25:1-562.

Takac, P.
1991 Underwater Excavations at Spring Lake: A Paleoindian Site in Hays County, Texas. *Current Research in the Pleistocene* 8:46-48.

Thoms, A. V. and R. D. Mandel (editors)
2007 *Archaeological and Paleoecological Investigations at the Richard Beene Site, 41BX831, South-Central Texas*. Reports of Investigations No. 8. Center for Ecological Archaeology, Texas A&M University, College Station.

Turner, E. S. and P. Tanner
1994 The McFaddin Beach Site on the Upper Texas Coast. *Bulletin of the Texas Archeological Society* 65:319-336.

Waguespack, N. and T. Surovell
2003 Clovis Hunting Strategies, or How to Make Out on Plentiful Resources. *American Antiquity* 68:333-352.

Walter, R. W.
1990 Similarities Between Two Texas Clovis Fluted Points Found on the South Plains. *The South Plains Archeological Society Newsletter* 99.

Waters, M. R. and L. C. Nordt
1995 Late Quaternary Floodplain History of the Brazos River, Texas. *Quaternary Research* 43:311-319.

Waters, M. R. and T. W. Stafford, Jr.
2007 Redefining the Age of Clovis: Implications for the Peopling of the Americas. *Science* 315:1122-1126.

Weir, F.
1956 Surface Artifacts from La Perdida, Starr County, Texas. *Bulletin of the Texas Archeological Society* 27:59-78.

Wheat, J. B.
1953 *An Archaeological Survey of the Addicks Dam Basin, Southeast Texas.* River Basin Surveys Papers 4, Bulletin 154:143-252. Bureau of American Ethnology, Smithsonian Institution, Washington D.C.

Wilson, J.
1979 A Preliminary Report on the Little Pin Oak Creek Site (41FY53): A Campsite with Clovis, Plainview, and Subsequent Artifacts in Fayette County, Texas. *Bulletin of the Texas Archeological Society* 50:135-140.

Wyckoff, D. G.
1993 Gravel Sources of Knappable Alibates Silicified Dolomite. *Geoarchaeology* 8:35-58.

Sequence _____ County _____

TEXAS CLOVIS FLUTED POINT SURVEY FORM

Please attach a tracing of the outline (or a photocopy) of both faces of the fluted point. Be sure to show the outline of the flute(s), broken areas, and the extent of edge grinding. If possible, please take measurements in centimeters.

1. Maximum length		2. Maximum width	
3. Width of base		4. Distance from maximum width to base	
5. Maximum thickness		6. Distance from maximum thickness to base	
7. Maximum flute thickness		8. Basal concavity depth	
9. Obverse flute length		10. Obverse flute width	
11. Reverse flute length		12. Reverse flute width	
13. Number of flutes obverse		14. Number of flutes reverse	
15. Length of grinding left edge		16. Length of grinding right edge	
17. Basal grinding	Yes No	18. Measurements in	cm in

19. Location where point was discovered: _____
_____
_____
(Please be as specific as possible, and include county name)

20. Artifacts or features found with the point: _____
_____
_____

21. Color and type of stone material: _____
_____
_____

22. Please print name and address:
_____
_____
_____
_____

Please return the completed form to:
David J. Meltzer
Department of Anthropology
Southern Methodist University
Dallas, Texas 75275-0336