

## THE DISTRIBUTION OF FLUTED PALEOINDIAN PROJECTILE POINTS: UPDATE 1998

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*Information on 11,257 Paleoindian projectile points, 11,103 with county-level provenience data, has been compiled through 1997 from the continental (i.e., lower 48) United States. The vast majority of the fluted points documented to date come from east of the Mississippi River. The irregular distribution and comparatively small numbers of these artifacts indicate that classic wave-advance models for the spread of fluted point peoples or technology are inappropriate. Instead, a leap-frog pattern of movement appears more probable, with certain areas highly favored. These are inferred to have been the loosely defined centers of group ranges and in many areas the nuclei of subsequent subregional cultural traditions. The apparent low incidence of fluted points near inferred initial human entry points suggests initial colonization was prior to the emergence of this technology, and possibly in the East, the southern Plains, or in the Far West, where major concentrations of these artifacts are documented. The continued compilation of primary data on Paleoindian projectile points from across the New World is absolutely crucial to understanding human occupations during this period.*

### INTRODUCTION

Fluted points epitomize the meaning of "index fossils." Fluted points are so distinctive, and occur during such a comparatively limited period of prehistory, that they make excellent chronological and cultural diagnostics. This, and the fact that they are so well made, has meant that they have come to be widely esteemed by professional and responsible avocational archaeologists alike, as objects of research and admiration. This aesthetic appeal and research value has meant that fluted points are widely sought-after and reported. In almost every state and Canadian province one or more dedicated individuals have made it a priority to locate and document these artifacts, through photographs, drawings, and measurements, and the publication of primary descriptive data. No other artifact category in New World archaeology has received such widespread attention.

Fluted points represent markers of terminal Pleistocene occupation. The current radiocarbon record for robustly dated fluted points ranges from 11,500 to approximately 10,000 reyp<sup>1</sup>. For many years they have been popularly associated with mammoth, bison, or caribou-focused big-game hunters newly settled into the New World, or actively colonizing it. The location and variation of these artifacts, and their associated sites, have been central to arguments about when and where people arrived, their technological organization and subsistence strategies, and even their cosmology and religious beliefs.

Indeed, the identification of fluted points at Folsom in New Mexico in 1926 quickly led archaeologists to propose that these kind of artifacts would be found in Alaska and Siberia, in the area of late glacial Beringia. It was believed that it would be only a matter of time before a time-transgressive array of sites and artifacts would be found, documenting the movement of early peoples into the continent from northeast Asia. Many scholars down through the years, in fact, have conducted archaeological research directed at finding fluted points or their ancestral technologies in the far north and along postulated movement corridors (e.g., Frison 1991a; Hibben 1946; Hoffecker 1988; Irwin-Williams et al. 1973; Kuzmin and Tankersley 1997; MacNeish 1964; Nelson 1937; Rainey 1940). Over the ensuing years since the important discovery linking extinct animals with human beings at Folsom, fluted points have been found from Alaska to the tip of South America, within assemblages and as isolates, on the surface and from excavated contexts.

In light of recent assessments of the age of the Monte Verde site in Chile at approximately 12,500 rcybp (Dillehay 1989, 1997; Meltzer et al. 1997), we now have compelling reason to believe that the makers of fluted points were not the first peoples to arrive in the New World. Monte Verde dates well before the earliest secure dates for fluted points, which are currently in the 11,500 rcybp range at the Aubrey Site in Texas (Ferring 1995; Taylor et al. 1996), and the site displays an array of material culture foreign to the Clovis assemblages farther north (Dillehay 1997). As a result, fluted point technology, and related culture, may well have emerged from within local populations or, alternatively, may represent a distinct migration of peoples. Untangling the origins of the fluted point technological tradition and its relationship to other early New World cultures will unquestionably occupy many subsequent generations of archaeologists. Crucial to such analyses, however, will be having reliable data on Clovis and related (and presumed descendant) fluted assemblages. Indeed, now perhaps more than ever, we can see the value in compiling and analyzing data on fluted point occurrence and variability. Such data will surely play a role in answering questions of where, how, and why this technological tradition, and assumed culture complex, originated and spread, and how it may have interacted with other New World populations.

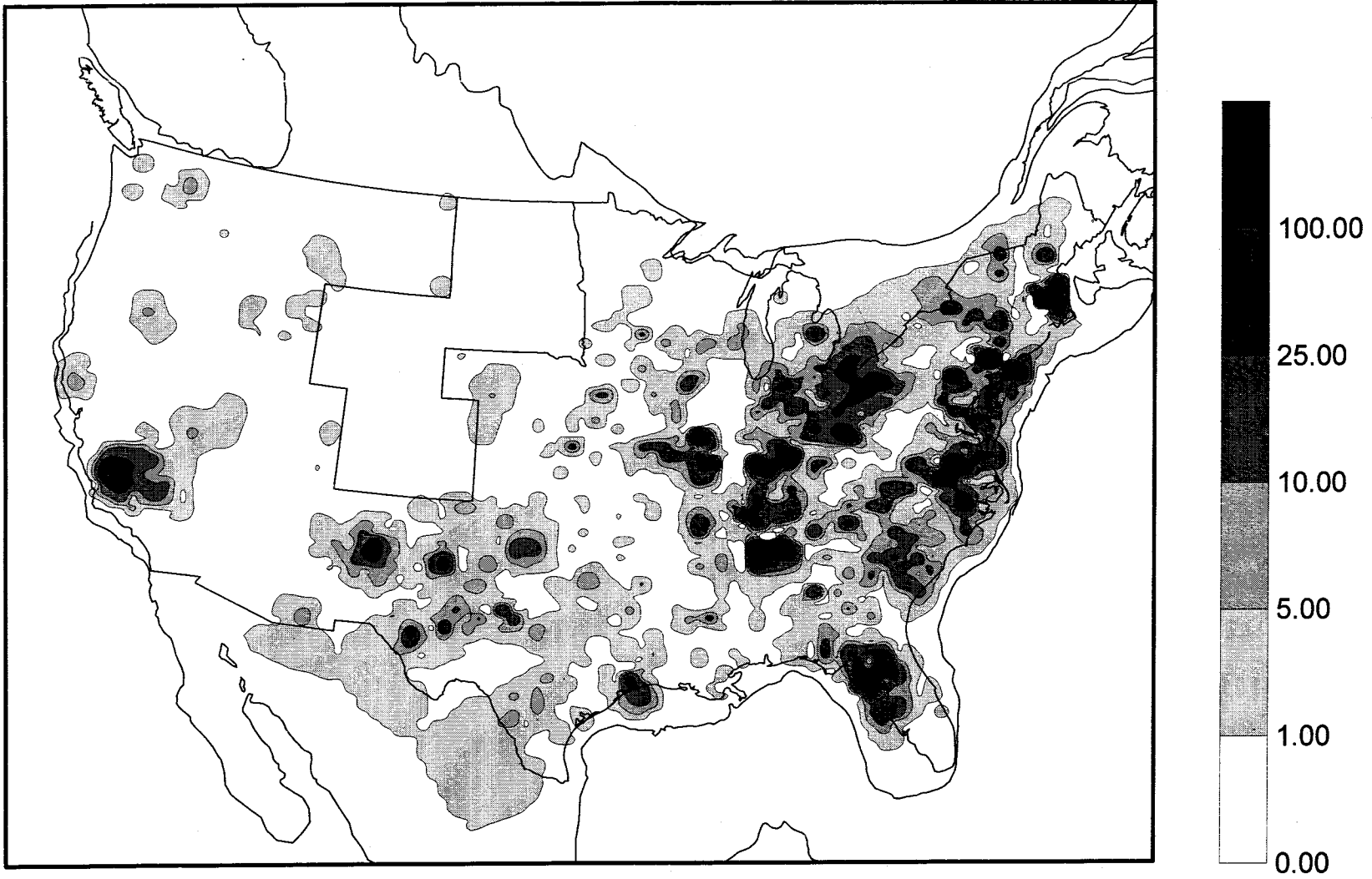
In this paper we present primary distributional information on the occurrence of fluted points across much of the lower 48 United States. Earlier papers have presented information on the distribution of Paleoindian projectile points from the eastern United States (Brennan 1982; Anderson 1990a, 1990b; 1991), and from across the lower 48 states in preliminary fashion (Faught et al. 1994; Faught 1996). The state-by-state compilation and the resulting maps presented here represent the data we had on hand as of late 1997. A full digital compilation, presenting area, type and count data by county, is available on request from the authors, and will also be posted on the Internet in 1998, with access links through the National Park Service Southeastern Archeological Center and Florida State University Anthropology homepages. Our dataset also includes primary attribute (i.e., drawings/photographs and measurements) and reference data on several thousand individual points that we have been compiling over the past decade, from publications and from data provided by the directors of a number of fluted point survey projects around the country.

It should be noted that this research represents a partnership between the authors, and grew from Anderson's initial compilation of the eastern data and Faught's independent compilation of the western data (Anderson 1990a, 1990b; Faught 1996). Working together, we have gone farther than either could have individually. Indeed, we hope to expand this database, and the maps resulting from it, to include other parts of the hemisphere, and to explore stylistic and chronological data. We welcome additional collaborators, particularly those willing to synthesize the data from Canada, and Middle and South America. We will, of course, do all we can to assist anyone undertaking such an effort.

As will be seen, the distribution of fluted points across the lower 48 states is not continuous, but is weighted to certain areas of North America, particularly in major river catchments east of the Mississippi, and on either side of the Appalachian Mountains. Other significant concentrations occur in the Southern Plains, and in central and southern California. We believe that these distributions have important implications about the origin and spread of this technology, and the peopling of the Americas in general. We also believe that resolving the stylistic and technological variability within these assemblages, in concert with other archaeological data, will ultimately prove important in understanding change in settlement and culture over the Paleoindian period.

### **THE 1998 FLUTED POINT DISTRIBUTION MAP AND ASSOCIATED DATABASE**

Figure 1 shows the frequency of fluted points per 1000 square miles in the coterminous United States using county-level data, and a compiled sample of 11,257 points (Table 1).<sup>2</sup> The map was constructed by digitizing the outline of the United States and estimating coordinates for the centers of the 3075 counties in



**Figure 1.** Points per 1000 square miles using county-level data. Data unavailable for Colorado, Wyoming, North and South Dakota.

the 48 contiguous United States (Faught 1996). We choose to standardize the data because of the unequal size of the counties forming the basic provenience unit. Individual data values were determined by dividing the number of fluted points (F) tallied in that county by the county area (CA) resulting in a "points per square mile" figure. Because this number was usually quite small, we multiplied it by 1000 to get more realistic numbers (e.g.  $F/CA * 1000 = \text{VALUE}$ ). The data set (x & y coordinates, number of points per 1000 square miles as the z coordinate) was then fed into SURFER®, a gridding and contouring program<sup>3</sup>. A second map gives the actual count data for these artifacts by county, offering another way of viewing this information (Figure 2). Controlling for the area of each county, as in Figure 1, reduces the size and visual impact of concentrations in the West, where counties are far larger than those in the East.

Before proceeding to offer our interpretations about what these maps may be telling us, some discussion of the limitations of the database is in order. While the total sample reported in Table 1 is 11,257 points, county-level provenience data is only available for 11,103 of these points; for the remaining 154 points we have only state-level provenience data, which was too coarse-grained spatially to include in the mapping effort. The database represents fairly complete reporting from 38 states where ongoing fluted point surveys are in progress or where literature syntheses exist. We have not compiled any data from four states at the time of this writing (Colorado, Wyoming, North Dakota, and South Dakota), and information from five other states is known to be incomplete due to data comparability problems, the absence of a fluted point survey, or a lack of access (Illinois, Louisiana, New Mexico, Oregon, and West Virginia). Finally, while for most states only fluted point data is used, Florida's record (n=537 points) includes a mixture of fluted and unfluted forms, including Suwannee (435), Simpson (n=27), and Clovis points (75).

The points used to generate this map include isolated surface discoveries, surface expressions with an assortment of associated chipped stone tools and debitage, and excavated contexts. The data base currently makes no distinction as to discovery context, but we have begun to document it in the individual specimen and county-level provenience records. In addition, the current version of the fluted point database is restricted to the continental United States south of the ice sheets. It glosses over variability in fluted point morphology, giving the number of points as a combined category. Our mapping procedure to date has been to include all "fluted" point forms. Thus, the western states data includes Folsom as well as Clovis and Clovis-like forms, while the eastern data includes the array of fluted point types described from that region. While we continue to compile information on individual specimens, and hope to eventually use these data to produce maps by point type or morphological class (e.g., Meltzer 1984; Morrow and Morrow 1997), we have not done so here. This is because appreciable reporting/typological ambiguity exists in the use of fluted point type categories from state to state, or else because more specific typological data (beyond "fluted" or "Clovis") is not readily available from many areas.

Another limitation of the current database is in the compilation of data on unfluted or basally-thinned Paleoindian forms, such as Dalton variants, which are not considered in most surveys. This has been primarily because in some areas, such as northeast Arkansas or northern Alabama, there are so many of these artifacts (estimates of the numbers of Daltons in collections from these areas are in the tens of thousands) that local researchers quite properly decided to focus first on earlier, unambiguously fluted forms, which comprise a more manageable sample. In some states, however, notably Tennessee, Mississippi, and Georgia, information on all Paleoindian era points, including Dalton variants, is being recorded. These data are not included in the present mapping sample, but are present in our database, thanks to the courtesy of the researchers compiling the data in these states (Anderson et al. 1990; Broster and Norton 1996; McGahey 1996). We have, in fact, attribute data on close to 3000 later Paleoindian and initial Early Archaic point types from these three states alone, a sample that is itself of appreciable research value.

We are encouraged to find that data in older fluted point compilations is gradually being replaced by new information, typically of much higher quality. Artifacts formerly tallied are now being relocated, measured, and photographed. To cite one excellent recent example, while the initial fluted point compilation

State	State Area in Square Miles	Location	Number of Points	County Level Data	Points Per 1000 Square Miles	Primary References
Alabama	51,609	E	1654	1654	32.05	Futato 1982, 1996; Futato et al. 1992
Arizona	113,909	W	135	135	1.19	Huckell 1982
Arkansas	53,104	W	102	89	1.92	Gillam 1995, 1996; Dan F. Morse: personal communication
California	158,693	W	506	506	3.19	Davis and Shuler 1969; Willig and Aikens 1988; Dillon 1994
Colorado	104,247	W	n/a	n/a	n/a	No Data Compiled
Connecticut	5,009	E	18	9	3.59	Moeller 1982:41
Delaware	2,057	E	55	48	26.74	Griffith 1982:37
District of Columbia	67	E	3	3	44.78	Meltzer 1988:12
Florida	58,560	E	537	535	9.17	Dunbar and Waller 1983:19; Dunbar 1991:193, 198-211, personal communication
Georgia	58,876	E	126	123	2.14	Anderson et al. 1990
Idaho	83,557	W	34	34	0.41	Timus and Woods 1988
Illinois	56,400	E	167	167	2.96	Winters 1962:15; Brad Koldehoff 1983, personal communication; Wiant 1993
Indiana	36,291	E	583	583	16.06	Tankersley et al. 1990
Iowa	56,290	W	135	135	2.40	Morrow and Morrow 1994
Kansas	82,264	W	38	38	0.46	Brown and Logan 1987:191
Kentucky	40,395	E	290	290	7.18	Rolingson 1964:23
Louisiana	48,523	W	48	48	0.99	Gagliano and Gregory 1965; Philip K. Rivet, personal communication
Maine	33,215	E	96	96	2.89	Sanger 1982:43-44; Gramly 1982: 22
Maryland	10,577	E	94	94	9.45	Brown n.d.; Tyler Bastion: personal communication
Massachusetts	8,257	E	428	427	51.83	Grimes and Bradley 1982:41
Michigan	58,216	E	101	101	1.73	Lepper 1983; 1986; Mason 1958; Shott 1986:160; Fitting 1975:41; Henry T. Wright: personal communication
Minnesota	84,068	W	54	54	0.64	Higginbottom n.d.
Mississippi	47,716	E	70	70	1.47	McGahey 1987:2, 1996, personal communication
Missouri	69,686	W	300	300	4.31	Chapman 1975:67
Montana	147,138	W	64	64	0.43	Leslie Davis 1988, personal communication
Nebraska	77,227	W	75	75	0.97	Meyers 1987:68
Nevada	110,540	W	149	149	1.35	Willig and Aikens 1988; Davis and Shuler 1969
New Hampshire	9,304	E	10	10	1.07	Sargent 1982:43
New Jersey	7,836	E	264	262	33.69	Kraft et al. 1982:38
New Mexico	121,666	W	240	240	1.97	Judge 1973; Hester 1972; Haynes 1955
New York	49,576	E	297	290	5.99	Wellman 1982:40
North Carolina	52,586	E	444	436	8.44	Peck 1988; Daniel 1997
North Dakota	70,665	W	n/a	n/a	n/a	No Data Compiled
Ohio	41,222	E	1056	1056	25.62	Seeman and Prufer 1982:165
Oklahoma	69,919	W	189	189	2.70	Hofman and Wyckoff 1991
Oregon	96,981	W	54	54	0.56	Willig and Aikens 1988:17 (Dietz site only)
Pennsylvania	45,333	E	256	256	5.65	Kent 1982:39
Rhode Island	1,214	E	4	4	3.29	Tumbaugh 1982:42
South Carolina	31,055	E	317	317	10.21	Charles 1986:16, personal communication; Goodyear et al. 1990
South Dakota	77,047	W	n/a	n/a	n/a	No Data Compiled
Tennessee	42,244	W	379	372	8.97	Broster and Norton 1996; John B. Broster: personal communication
Texas	267,339	W	735	734	2.75	Meltzer 1986; Meltzer and Bever 1995; Largent et al. 1991
Utah	84,916	W	42	42	0.49	Copeland and Fike 1988
Vermont	9,609	E	32	32	3.33	Loring 1980; Basa 1982:42
Virginia	40,817	E	956	868	23.42	McCary 1984; 1988; Johnson and Pearsall 1991a, 1996, 1993, 1995, 1996
Washington	68,192	W	36	36	0.53	Avey, nd; Gramly 1993
West Virginia	24,181	E	27	27	1.12	Dunneil 1972; Gardner n.d.
Wisconsin	56,154	E	51	51	0.91	Stollman and Workman 1969; Stollman 1993
Wyoming	97,914	W	n/a	n/a	n/a	No Data Compiled
<b>Grand Totals</b>	<b>3,022,261</b>		<b>11,257</b>	<b>11,103</b>	<b>3.72</b>	
(East of Mississippi River)	878,376		8321	8181	9.47	
(West of Mississippi Rive	2,143,885		2936	2922	1.37	

Table 1. Summary fluted point data by state.

for Alabama (Futato 1982) was based on a survey of collectors, and consisted only of count data by county, since 1992 measurements and photographs of individual points have been compiled by Eugene Futato, Charles Hubbert, and Van King (1992), offering a much more secure database<sup>4</sup>. While the older values from Alabama are used in this mapping exercise, as the modern survey database begin to accommodate the huge known backlog of points from the state, its data will be substituted. Similar efforts are underway in many states, with excellent data recently reported from California, North Carolina, Virginia, and Texas, to give a few examples (e.g., Daniel 1997; Dillon 1994; Johnson and Pearsall 1996; Meltzer and Bever 1995).

Finally, besides the limitations of the projectile point data sample itself, the patterning observed on these maps may also be influenced by factors such as differential geological visibility, modern population density and farming activities, and differences in lithic resource availability. That is, the vastly greater numbers of fluted points that have been found in some parts of the East, something clearly indicated on the maps, may be due, in part, to the fact that Pleistocene surfaces where Paleoindian sites are located may be more readily accessible, or geologically visible. In other areas early surfaces may be concealed by colluviation or alluviation (e.g., Bettis and Benn 1989; Chapman 1985:145-147; Frison 1991a; Goodyear n.d.; Huckell 1982; Waters 1992). The comparatively low incidence of fluted points along and near the lower Mississippi River in the sample, for example, may be due in part to extensive Holocene alluviation and channel migration and scouring. Another possibility is that modern population density is much higher in the East, and the region has a much longer history of farming, exposing artifacts for collection. The relationships between fluted point density, population levels, and farming practices have been explored in various parts of the country, and some linkages between these variables may be operating in parts of the East (e.g., Lepper 1983, 1985; but cf. Largent et al. 1991 and Seeman and Prufer 1984, whose studies found little evidence for a relationship between these variables in Ohio and Texas).

Likewise, the relationship between artifact incidence and fine-grained lithic raw material occurrence needs to be explored at a large scale. There are theoretical arguments as well as distributional data from some areas that suggest the makers of fluted points actively sought out high-quality stone sources (e.g., Gardner 1983:57; Goodyear 1979), a practice that could result in much higher artifact densities around these sources. Given these cautionary statements, we wish to emphasize that this is a "work in progress," with many additional refinements planned in the future.

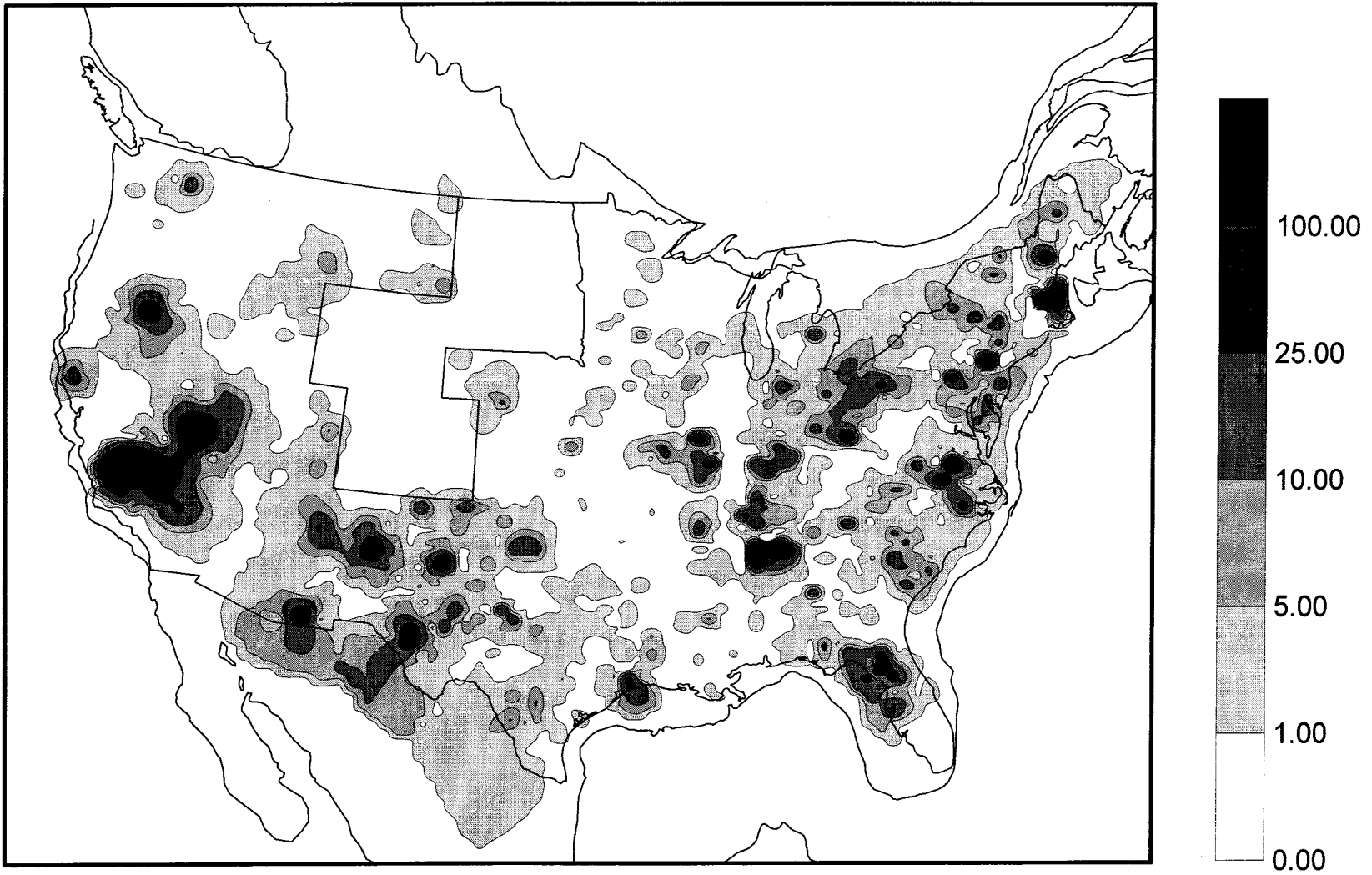
## VARIABILITY IN NORTH AMERICAN FLUTED POINTS

### Numbers of Fluted Points and Fluted Point Types

"First, by actual count: Does anyone know how many fluted point types have been found east or west of the Mississippi River?" E. B. Sayles (1962:266, in his comments on Mason's classic article on "The Paleo-Indian Tradition in Eastern North America" that appeared in *Current Anthropology* in 1962).

While we might not express it in quite the same way today, by any honest appraisal we still have a long way to go before we can claim to have documented the frequency and distribution of major stylistic and technological variants of New World fluted points, be they from the Eastern or Western United States, or elsewhere in the hemisphere. Major strides have, however, been made in defining fluted point variability over the three quarters of a century that has passed since the Folsom discovery. In many parts of the continent, as briefly outlined below, significant variation has been documented in fluted point assemblages. In addition, examples of regional and larger scale analyses using large samples of artifacts are starting to occur that are directed to resolving patterning in fluted point morphology (e.g., Meltzer 1984; Morrow and Morrow 1997).

Sayles' question was somewhat ambiguously worded, however, and the full text of his original comment indicated he was also referring to total numbers of fluted *points*, in addition to fluted point *types*. Happily,



**Figure 2.** Points per county. Controlling for the area of each county, as in Figure 1, reduces the size and visual impact of concentrations in the West, where counties are far larger than those in the East. Data unavailable for Colorado, Wyoming, North and South Dakota.

sample of artifacts, we should be able to examine the morphological variability within fluted points in general (or within specific regions) for possible temporal and behavioral significance, and resolve some significant patterning. It will admittedly take a great deal of hard work and creative thought to analyze this data; some of the resulting patterns will reinforce what we already know, others will provide new insights, and still others will likely be uninterpretable given present knowledge and point the way in which we must proceed. Any results that are forthcoming from such analyses, of course, will have to be viewed as hypotheses to be tested, subject to a long verification process that will unquestionably involve much new analysis and fieldwork. Again, this data is available for anyone who would like to explore these challenges.

### **Classifications of North American Fluted Points**

While a comprehensive classification of fluted points incorporating all parts of North America has yet to be developed and published, a great many type names have been proposed. Some are used over much of the continent, such as Clovis itself, while other taxa are more narrowly applied, to artifacts from particular areas that appear to represent regional or subregional variants on the fluted point theme. In some parts of North America a temporal sequence of fluted point forms has been demonstrated or hypothesized, and type names and ages assigned to specific forms; in other areas distinct morphological variants have been assigned type names even though their temporal position may be uncertain; and in still other areas fluted point variants remain unnamed and their chronological positions unclear.

The assignment of specific type names to fluted point morphological variants, and the development of temporal sequences, appears to be more common in the Eastern as opposed to the Western United States. In the Plains and portions of the West, the classic Clovis-Folsom dichotomy suffices for most researchers, while in the East a great many typological variants have been proposed, and in some areas, such as in the Great Lakes and Northeast, a clear temporal sequence of these forms has been documented. In the paragraphs that follow we briefly review some of this variability at the regional and subregional level. This review is presented for organizing and illustrative purposes only, and is not meant to be comprehensive nor to document the whole of the published primary literature from each area. It is, however, intended to support our position that comparable temporally and behaviorally significant morphological variability exists, but is currently unresolved, within New World fluted point assemblages<sup>5</sup>. As we all are aware, or should be, of course, types developed by archaeologists do not necessarily reflect past human cognition or intent; their utility lies in how they help us better understand the cultures under study.

The concept of a "classic" Clovis type (hereafter described as "Classic Clovis"<sup>6</sup>) representing the earliest of the fluted point tradition, both by stratigraphic position and radiocarbon dating, remains a foundation for the study of Paleoindian archaeology. Unfortunately, unambiguous sorting criteria for Classic Clovis remain to be developed, although useful type descriptions have been proposed (e.g., Bradley 1993:252-54; Goodyear et al. 1990; Haury et al. 1959; Hester 1972; Howard 1990; Justice 1987; Morrow 1996; Sellards 1952:42; Wormington 1957). Sellards (1952:42) used the points from the Miami, Texas, Blackwater Draw, New Mexico, and Dent, Colorado sites/localities, as "typical" for the Clovis type. Other sites that exhibit, and have been used to define, Classic Clovis points include: Lehner Ranch and Murray Springs (San Pedro sites) in Arizona, and Domebo in Oklahoma. Appreciable variability is evident even within these assemblages, however, within what are clearly discrete behavioral events, such as the points found in individual mammoths (i.e., at Naco or Lehner Ranch in Arizona). The term "Clovis" has accordingly been widely and loosely applied and therefore can encompass appreciable morphological variability. Down through the years, in fact, many lanceolate points have been classified as Clovis simply because they were fluted. The significance of the morphological variability that occurs within fluted point forms classified as Clovis remains to be fully understood, even among so called "classic" assemblages (e.g., Taylor et al. 1996), and we (as well as many others) believe a more systematic and problem-oriented approach to classification, employing much larger samples, is in order.



A number of attributes characterize what might be called Classic Clovis points, although again, it must be cautioned that these do not always differentiate these forms from other fluted variants. Classic Clovis points are made from biface preforms, generally with flakes traversing the entire face of the biface, although some points from early contexts have flaking scars meeting in the middle of the blade. The bases are only slightly concave, and the sides are either straight or slightly "waisted" (i.e., recurved or convex). Light, probable soft hammer, percussion, and possibly some pressure flaking brought the item into shape, and there is general concern for regularity and detail. The flutes are taken off at the end of the shaping/reduction process, they occur on both sides of the biface, and extend from a third to half of the length of the point. Multiple flutes may be present, but there is usually a single, major flute on each side. Points exhibiting robust, overshot percussion flaking scars with regular blow sequence patterns are most characteristic. Grinding of basal margins is also a hallmark, as it is with other varieties of fluted points.

Classic Clovis points are known, but remain undated, from many localities in the East, including Wells Creek Crater in Tennessee (Dragoo 1973), the Adams site in Kentucky (Sanders 1990), the Thunderbird site in Virginia (Gardner 1974), and the Shawnee-Minisink site in Pennsylvania (McNett et al. 1985). The Ross County projectile point type is identical to Classic Clovis (Justice 1987; Prufer and Baby 1963:15). In the Far West good examples have been found at Borax Lake in California (Meighan and Haynes 1968), Alkali Lake in Oregon (Willig 1988), and possibly Richie-Roberts in Washington (East Wenatchee) as well as in other caches known from the West (Gramly 1993; Mehringer 1989, 1990; Stanford 1991:5).

According to Frison (1991a:146), Classic Clovis points occur in low frequency in the High Plains. A range of fluted and other lanceolate projectile points with silhouettes similar to Clovis are also present in the area, and include Folsom, Goshen, and a less frequent variety known as Colby (Frison 1983; Frison and Todd 1986). The chronological relationships among these point forms is in some question, although available radiometric dates and stratigraphic evidence indicate that Folsoms follow Classic Clovis (with some overlap); that Colby is likely contemporaneous with Classic Clovis and reflects a stylistic variant; and that Goshen is contemporaneous with late Clovis, and overlaps with and is perhaps transitional into Folsom (Bradley 1991; Fiedel 1997; Dillon 1991b; Frison 1991b; Haynes nd; Taylor et al. 1996). A number of probable post-Folsom lanceolates are also present on the High Plains, of course, such as the Plainview, Agate Basin and Hell Gap types. The variability observed in the High Plains is of interest because of the apparent contemporaneity of fluted and nonfluted lanceolate forms; something that may reflect an early emergence of distinct cultural traditions.

In the Great Lakes, a time sequential series within local fluted points has been defined which includes the Gainey, Barnes, and Crowfield types, respectively (Deller and Ellis 1984, 1988:255, 1992; Shott 1986, 1993; Storck 1983, 1991:154). The Gainey type has parallel to slightly recurvate sides; typically single short flutes, and frequently a deep concave base (Simons et al. 1984:268-269; Storck 1991:154). Some Gainey points are virtually indistinguishable from points found in the Northeast at sites like Debert, Vail, and Bull Brook, where these forms have been dated to around 10,600 rcybp. Radiocarbon control for the series is unclear, however, and some specimens also resemble older Classic Clovis forms; indeed, if the type represents the first fluted point-using peoples into the Great Lakes area, an earlier age would be expected. Barnes points are more waisted, and typically occur with shallow basal concavities and long single flutes that sometimes run much of the length of the blade; multiple flutes are also sometimes observed (Wright and Roosa 1966; Roosa 1965:96-97). Storck (1991:154) has suggested that Barnes is probably related to the Cumberland type from the Midsouth and Folsom to the west on the basis of style and technological attributes of flute removal. The Crowfield type (Deller and Ellis 1982, 1988), the latest in the series, commonly has bulging, excurvate sides with flat to concave bases and multiple basal thinning flakes or flutes.

The Great Lakes fluted point sequence, and the closely related sequence of point types in the Northeast, comprise the best documented fluted point sequences in Eastern North America. Indeed, almost all of the reliably dated fluted point sites in the East are from the Northeast (Levine 1990). These Northeastern fluted

point assemblages are sometimes described in terms of Shoop-Debert, Cumberland-Barnes/Parkhill, and Crowfield complexes, paralleling the Gainey-Barnes-Crowfield Great Lakes sequence (Gramly and Funk 1990; see Spiess et al. this volume for the most current synthesis). In the Northeast, presumably late Paleoindian age, weakly fluted (more appropriately, basally thinned) and non-fluted lanceolate forms are also present (Cavello 1981:8; Keenlyside 1991:171). A transition from fluted to basally-thinned forms also occurs further to the south, particularly in Dalton assemblages, which may exhibit both kinds of basal reduction (Goodyear 1974:23-24; Bradley 1997:54-55).

Some fluted points in California, the Far Northwest and the Great Basin tend to have sharp angled (i.e., inverted "v") basal concavities and are often smaller or more narrow than Classic Clovis points. On some specimens from this region there is less regularity of shape and attention to detail than on Classic Clovis points, and the edges and silhouette of these bifaces are often irregular. Many of these examples are heavily reworked, either by the people who made them or by later prehistoric peoples. They are made from both chert and obsidian. More typical Classic Clovis points are also known from this region, and local investigators appear to consider that all of the fluted point variants fall within the general range of Clovis. The existence of appreciable, and as of yet incompletely understood, variability is acknowledged (Willig 1991:94, 98; Willig and Aikens 1988:17). Parenthetically, some points known from Sonora, Mexico resemble sharp-angled base fluted forms from California and the Great Basin, although apparent examples of Classic Clovis points are also present down there as well (Ortiz 1974; Ortiz and Taylor 1972).

Fluted points from the vicinity of the Ice-Free Corridor of western Canada exhibit additional variation, including some possible Classic Clovis and Folsom representatives (Carlson 1991:82). Presumed late/terminal Paleoindian points from this area that have been dated to after ca. 10,500 rcybp are typically triangular, stubby, concave based and multiply fluted or more properly basally thinned (Carlson 1983:83; 1991:82; Kehoe 1966; Fladmark et al. 1988). These stubby, excurvate sided forms are present at Sibbald Creek (Fladmark et al. 1988), and are similar to some examples in the Northwest and Great Basin, from such sites as Fort Rock Cave (Carlson 1983:79, his Figure 6.03), Dietz (Willig 1988) and Danger Cave (Homer 1986:94-95). In Alaska fluted points are almost exclusively made of obsidian, and typically exhibit multiple basal thinning flakes (Clark 1991:38). These points are generally smaller than Classic Clovis points, and are interpreted as being slightly later in time, probably in the neighborhood of 10,500 rcybp (Clark 1991:40). Haynes has also commented on the similarity of presumably late fluted point forms from Alaska to the Great Basin (Haynes 1982:396; cf. Goebel et al. 1991:74).

Classic Clovis points have been widely reported in the southeastern and lower midwestern United States, and along the middle Atlantic seaboard. Appreciable numbers of fluted points are known from this area (over two-thirds of the total we have compiled to date), and it is no exaggeration to state that this region has more distinct named varieties of fluted and related forms than any other part of the United States (as variously noted in Mason 1962; Williams and Stoltman 1966; Brenman 1982; Anderson 1990b; Morse 1997:134). Some of these forms have distinct morphologies and highly restricted distributions, and appear to represent distinct subregional technological and possibly cultural traditions. Among the best known and most distinctive fluted variants are the Cumberland and Redstone types, the flutes for which extend along the entire face, not unlike techniques associated with Folsom and (sometimes) Barnes point manufacture. Cumberland points include some of the most spectacular examples of Paleoindian flint knapping known.

Dalton points, which are occasionally fluted, are probably the most familiar and geographically widespread fluted point variant besides Folsoms, occurring widely over Eastern North America and well into the Great Plains. Daltons share a number of technological similarities with Clovis (Bradley 1997:57). An evolution from fluting to basal thinning to non-fluting appears indicated within this form, which itself has a great many named variants (Anderson et al. 1990; Goodyear 1982:383-384; Morse 1997). Other fluted point variants in the lower Southeast include the typically strongly waisted (concave sided) Simpson and Suwannee types that occur primarily in Florida and nearby areas of Alabama and Georgia, and extend into

we can say that we are rapidly approaching a fairly accurate, if still somewhat approximate, answer to this question. That is, when the data from fluted point surveys as well as other primary sources are compiled (i.e., from site reports, journal articles, and so on where synthetic fluted point survey efforts have been conducted), some understanding of the numbers of fluted points that have been found to date is beginning to emerge. As documented, we have been able to obtain fairly reliable provenience data on 11,257 fluted points, and we are indeed now able to state how many of these occur east and west of the Mississippi, north and south of the Mason-Dixon line, and so on. In the current sample of 11,257 points, 8321 (73.9 %) are located in states east of the Mississippi River and 2963 (26.1 %) are located in states to the west of the river, with Minnesota's total placed in states to the west of the river. The density of fluted points in the East is 9.47 per 1000 square miles, while in the West it is 1.37 points per 1000 square miles (Table 1).

These are not, of course, *all* of the fluted points that have been found to date. In many states the fluted point surveys operate in fits and starts, and are only updated intermittently. In some states we have only partial figures, since the most recent compilations do not provide primary data in such a way (i.e., number of diagnostics by county or site) as to be comparable with information gathered in other states. Likewise, we have not attempted to pull together the primary data from those states where such information is missing altogether, partially because we lack both the geographic proximity and expertise to do so, and also from the hope that the continuing absence of these data will inspire, or perhaps embarrass, the professionals and avocationalists in the areas in question into pulling this information together.

While we thus do not have an accurate compilation of all the fluted points that have *ever* been found, nor indeed are likely to ever have such a figure (some data will invariably be missed, and new information will be appearing all the time), *for the first time we are beginning to sense the magnitude of the total*. That is, even when all the data from missing states and areas is added in, and the backlog in public and private collections is documented, it is unlikely that the current figure ( $n=11,257$ ) will do much more than double. For the first time, therefore, *we can state with some assurance that the total number of fluted points of all kinds found to date in the 150+ years of archaeology and collecting in the lower 48 states, and for which general (i.e., county or state level) provenience information can be compiled, is probably under 30,000 artifacts*.

Of course, how this figure relates to the total number of fluted points actually produced by Paleoindian peoples is unknown, but we can now begin to explore such questions with some idea of the nature of the extant sample we have to work with. The sample compiled to date, just over 11,000 points, certainly contrasts markedly with Haynes' (1966:112) estimate that between 2 and 14 million fluted points were likely manufactured, numbers based on an inferred rapid rate of biological reproduction by these peoples, and a high rate of projectile point production, use, and discard. Whether the sample represents 0.1%, 1%, 10%, or an even greater percentage of all the fluted points ever made is, of course, currently unknown, but is something that will have to be explored. Such analyses will be crucial to developing models of Paleoindian settlement and population growth. Martin's (1973; Mosimann and Martin 1975) wave-advance or overkill model, for example, posits rapid population growth and large numbers of people during the Paleoindian era. Reconciling the low numbers of known artifacts with the large numbers of people predicted by this model will be a challenge, as it will be in the development and evaluation of other colonization/settlement models advanced for fluted point peoples.

Fairly reliable information thus exists on just over 11,000 fluted points at present, and data on another several thousand will likely be compiled in the next few years, as the remaining states report in. Measurement data as well as drawings or photographs exist for an appreciable fraction of this total and we have been trying, with some limited success, to compile this information (we have stacks of primary data; entering it is a chore). Given the existence of attribute-level data from a great many specimens from across the country, though, it is our opinion that much of the data needed to answer the other half of Sayles' query, about the numbers of fluted points *types* that might be present, is already on hand. That is, given our present

southwestern South Carolina (Dunbar 1991; Goodyear et al. 1990). These points are sometimes, but not invariably fluted. Simpson points, for example, are occasionally fluted or basally thinned, while Suwannee points are more typically thinned laterally, from the lower sides rather than from the base (Goodyear et al. 1983:46). Both are concave based. Waisted fluted point forms are not exclusively found in the lower Southeast, however, although they are clearly common there. Examples are known from the Lange-Ferguson site, South Dakota (Hannus 1990), Lehner Ranch and Murray Springs, Arizona (Haury et al. 1959), and McFadden Beach, Texas (Long 1977; Hester et al. 1992). Additional detail on fluted point variability in the Southeast may be found in a recent overview (Anderson and Sassaman 1996), and descriptions of a great many Eastern Paleoindian types can be found in Perino (1985, 1991).

Classic Clovis points are reported from Central America, but other concave sided, concave based varieties known as Fish Tail or Magellan points appear to be more common (Ardila Calderon 1991; Faught and Dunbar 1997; Ranere and Cooke 1991; Snarskis 1979). Fluted or basally thinned points with concave bases, and concave (excurvate) lateral margins are found in Columbia, Ecuador (Mayer-Oakes 1984, 1986), and in the southern and southeastern portions of the South American continent, in Chile, Argentina, and Uruguay (Politis 1991). Often the blades of these concave based, basally thinned points are shouldered, and exhibit a narrow basal stem, and they are as a result commonly called stemmed or tanged points. Some Suwannee/Simpson points from the lower Southeast closely resemble examples of these concave base, concave sided points from Central and South America, suggesting a common, and widespread, technological tradition, minimally extending around the continental margins of the Gulf of Mexico, and possibly much further. No Classic Clovis points are reported from South America to our knowledge, although some artifacts are quite suggestive (Ardila Calderon 1991:272; Jackson 1997).

As this abbreviated typological review has hopefully illustrated, fluting occurs on a wide array of point forms in the Americas. Some of these forms exhibit appreciable geographical circumscription, suggesting the boundaries of past social groups. If we are ever to understand what this variability means, however, we need to document and analyze the primary data across wide areas (*sensu* Meltzer 1984; Morrow and Morrow 1997). Accordingly, data compilation efforts like those summarized here are crucial if such research is to proceed. While new and innovative methods are being developed for recording measurement data from individual artifacts, particularly computerized scanning and digitization routines (e.g., Tompkins 1994), for such analyses to proceed we must have data on the existence and locations of the specimens themselves. This is a primary purpose of the current recording project.

Unfortunately, the same characteristics that draw attention from legitimate researchers and responsible avocationalists also make fluted points attractive to less scrupulous collectors, speculators, and artifact dealers, who frequently assign absurd<sup>7</sup> monetary values to them. This has meant that fluted points are widely faked and sold, rendering the provenance, documentation, and scientific value of some specimens problematic. Careful assessment of the authenticity of specimens is now as important a part of fluted point surveys as accurate measurement. Fortunately, the majority of specimens known to exist have reliable proveniences, which renders the continued gathering and refining of information in fluted point surveys of tremendous scientific value.

As we come to recognize the variability within our sample, it should be soon possible to produce maps of some of the more unambiguous fluted point variants. In particular, we are close to having the data on hand to be able to produce distributional maps for particularly distinctive forms such as Cumberland and Folsom. Data on Folsom points, for example, the most widely reported fluted variant other than Clovis itself (n=755 in the sample), is currently available from Arizona, Idaho, Kansas, Missouri, Montana, New Mexico, Oklahoma, Texas, and Utah. We look forward to producing maps of this and other types in the future, when comparable data is available from more states.

## LARGE-SCALE PATTERNING IN FLUTED POINT OCCURRENCE

Major concentrations and voids in Figures 1 and 2 can be easily recognized. Numerous dense fluted point concentrations are evident in the Eastern United States, for example, far more than occur to the west of the Mississippi River. The highest density of fluted points in the East comes from the Tennessee River Valley of northern Alabama, followed closely by portions of the Ohio and Cumberland drainages, eastern Massachusetts, and portions of Florida, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, and Virginia. In the West, appreciable numbers of fluted points are indicated only in south-central California and adjoining areas of Nevada, and in the southern Great Plains. The dense clusters in Texas and New Mexico are due in part to the large numbers of Folsom points recorded from these states.

Some clusters reflect single extremely rich sites or localities. Three clusters in the Far West, for example, represent the Richey-Roberts (East Wenatchee) Clovis cache in Washington (Mehring 1990), the Dietz site in eastern Oregon (Willig 1988), and the Borax Lake locality in California (Meighan and Haynes 1968). The dense cluster on the northeast coast of Texas is caused by the large numbers of points recorded from the McFadden Beach site (Long 1977; Hester et al. 1992), while the dense concentration in eastern Massachusetts is influenced by the Bull Brook sites (Byers 1955; Grimes 1979; Grimes et al. 1983). Other clusters, such as those in the major river valleys of the Midsouth, reflect large numbers of points from numerous locations within those areas, including both sites and isolated finds. Over 1000 points come from four counties in northern Alabama alone, from numerous locations both along and away from the Tennessee River.

Some of the clusters are directly associated with major environmental features, and reflect extensive exploitation of these areas. Dense concentrations of points occur in the East in portions of the Tennessee, Cumberland, and Ohio River valleys, or in the karstic terrain of northwest Florida. The association of Paleoindian sites in the Great Lakes with former shorelines is also well documented (Deller and Ellis 1988), as is the fact that major concentrations of fluted points in the Pacific Northwest and in the Great Basin (i.e., China Lake, Tulare Lake, Alkali Lake/Dietz, Borax and Clear Lakes, Tonopah and Mud Lakes, and the Sunshine locality) occur near the strandlines of former Pluvial lake beds (Davis and Shutler 1969; Meighan and Haynes 1968; Willig 1988, 1991:105; Willig et al. 1988).

Fluted points in the Southwest reflect Clovis, Folsom and other variants found in controlled excavations at the well known San Pedro river kill sites in southern Arizona, such as Lehner Ranch and Murray Springs, as well as isolated occurrences in the east-central area of the state (Huckell 1982; Longacre and Graves 1976). Farther east, the Folsom and Clovis type sites contribute to the concentrations in New Mexico (Hester 1972; Judge 1973; Stuart and Gauthier 1981).

A series of major clusters occur along the eastern seaboard and in northwestern Florida. These clusters may point to regions where settlement may have continued onto the then-exposed continental shelf, suggesting offshore areas where it might be profitable to search for Paleoindian sites underwater (Faught 1996; Faught and Donoghue 1997). The Borax Lake cluster in California might also indicate areas where fluted points are likely in offshore areas along that coast, perhaps in the San Francisco Bay area. The area of exposed continental shelf along the West coast was, however, far less than in the East.

Comparatively few points occur in portions of the southeastern Coastal Plain, lower peninsular Florida, the lower Mississippi River Valley, and across large areas of the West. Sampling considerations aside, these areas may have been less attractive to fluted point-using populations. Population levels or intensity of use of these areas, accordingly, is unlikely to have even remotely comparable to that in areas of dense artifact concentration. The Appalachian Mountains stand out as a particularly noticeable void in the otherwise densely covered East, indicating use of this area by fluted point using peoples was comparatively minimal (Lane and Anderson n.d.).

### IMPLICATIONS FROM THE ANALYSIS

We believe that the fluted point distributional evidence has a number of important implications for the study of early human occupation in North America. Examining artifact distributions across space and through time is a traditional archaeological method of reconstructing prehistoric settlement patterns. In spite of the very real sources of bias in the dataset described previously, we like to think that Figures 1 and 2 represent a fairly accurate representation of the "real" distribution of fluted points, and therefore past population densities or clusters of the people who made them. Given this, a number of implications follow, that should be the focus of research and testing in the years to come:

First, given the impressive density and numbers of fluted points in the East, and the diversity of fluted point types present, the origins of fluting technology may well lie in this region. In the absence of better radiocarbon control from this area, and stratigraphic exposures to indicate sequences, however, this kind of "age-area" hypothesis remains unproven. Minimally, the data indicate that large numbers of people using fluting technology were present in the East. Given the evidence for a direct transition from fluted to unfluted technologies in several parts of the region, furthermore, this adaptation also appears to have been highly successful.

Second, since fluted points are distributed unevenly, with pronounced concentrations in some areas and voids in others, this suggests that human populations in the Late Pleistocene were themselves unevenly distributed over the landscape. It further suggests that these peoples were tied to given areas, albeit loosely, possibly due to resource availability. That is, group ranges, while extensive, were nonetheless centered in certain areas and around certain parts of the landscape. Models describing fluted point populations as essentially free-wandering, accordingly, will likely have to be reconsidered. Why some areas were preferred and others seemingly avoided appears tied to major aspects of regional resource and physiographic structure, such as the availability of game and fresh water, the quantity and quality of accessible lithic and other raw materials, and the development and proximity of transportation, mating, and communications networks.

Third, if fluted points are indeed evidence for initial human settlement, the clustered distribution of these artifacts suggests that colonization more likely proceeded in a leapfrog, rather than wave-of-advance pattern (cf., Anderson and Gillam 1997; Dincauze 1993; and Faught and Anderson 1996 with Martin's (1973) and Martin and Mosimann's (1975) wave of advance colonization model). The recent dating of Monte Verde to well before the era when fluted points appeared, however, suggests fluted points are not markers of the first colonists, but instead the remains of a later and quite obviously wildly successful and archaeologically highly visible adaptation. It is this adaptation, the data suggest, that spread in a leap-frog pattern. The fluted point adaptation may have moved among pre-existing populations, although this possibility seems unlikely across the board, given the lack of unequivocal evidence for pre-Clovis cultures in the areas of greatest fluted point frequency. The nature of the fluted point adaptation may, in fact, have prompted the first movement of peoples into many of the areas where concentrations are observed. The technological organization and hunting preferences of fluted point peoples, in fact, would have likely caused them to gravitate into areas where large game animals and high quality stone could both be found in quantity.

Fourth, the concentrations of fluted points that are documented may hold clues to the subsequent emergence of discrete subregional cultural traditions. The eastern fluted point concentrations, for example, have previously been interpreted as staging areas, the territorial ranges of Paleoindian social groups, where initial populations settled and grew; many of these areas are also inferred to have been the nuclei of subsequent subregional cultural traditions (Anderson 1990b, 1995; Dincauze 1993). This interpretation might hold for portions of the Western United States as well, except in areas where dramatic changes in environmental conditions (i.e., the desiccation of Pluvial Lakes) rendered these areas less attractive (Willig et al. 1988); in the Far West the answer to this question is also tied to the resolution of what the relationships were, if any, between fluted point and Western Stemmed point archaeological cultures. More research, of

course, will be necessary to distinguish social boundaries, temporal differences, or even functional variability within and between fluted point concentrations (cf., Anderson 1990b with Cable 1996:144ff, who suggests the concentrations reflect areas where greater bulk processing of favored resources occurred). The careful comparison of fluted and post-fluted point Paleoindian assemblages in areas of concentrations should help confirm or refute arguments for cultural continuity.

Fifth, the existence of a number of concentrations near the continental shelf suggests areas where inundated sites dating to this period may occur in offshore waters (Dunbar et al. 1992; Faught 1988, 1996; Faught and Donoghue 1997).

Sixth, if movement during initial colonization proceeded down the ice-free corridor, or along the Pacific Rim, this movement did not leave a strong signal, if fluted points are indeed a marker of these colonizing populations. That is, there are fewer fluted points recorded in the West, and particularly in the High Plains, than might be expected if this was the Clovis heartland, or the area where these peoples first settled if they arrived through the ice-free corridor or along the Northwest Coast. While our understanding of fluted point densities in the High Plains is severely handicapped by the four state area of missing data, the inventories of the surrounding states are reliable yet exhibit low frequencies. The fluted point distributional data can, in this view, be interpreted as supporting an earlier, pre-fluted point era dating for the colonization of the New World. Fluted point sites and artifacts are simply not present in large numbers in the areas where peoples are thought to have entered the continent and initially settled. Of course, the evidence for earlier materials (i.e., pre-fluted occupations) is even scantier, and indeed all but nonexistent, mandating that fluted point assemblages will remain a focus for research for some time to come.

#### ENDNOTES

<sup>1</sup> In this article rcybp refers to uncalibrated radiocarbon years before the present. B.P. refers to calibrated, or calendar years before the present. At the Paleoindian time level there is a considerable divergence between these two measures, A date of 11,500 rcbp, for example, is equivalent to 13,416 B.P., while a date of 10,000 rcybp is approximately 11,179 B.P. (Struiver and Reimer 1993).

<sup>2</sup>This dataset may be accessed via <http://www.cr.nps.gov/seac/paleoind.htm> while documentation for the county level data may be found at <http://www.cast.uark.edu/local/catalog/national/html/Archaeology.html/USflutedens.html>. The earliest computer-generated versions of these maps were produced by Anne Gisiger of the Center for Advanced Spatial Technology, University of Arkansas, Fayetteville, whose help is deeply appreciated. State area data in Table 1 was derived from the Encyclopedia Britannica Atlas (1980:I-10 to I-13).

<sup>3</sup>The gridding method used was "Inverse Distance" with a weight of 2.

<sup>4</sup>As of November 1997, attribute information on 239 points had been compiled from Alabama, 106 from a single locality, Heaven's Half Acre (Eugene Futato: personal communication).

<sup>5</sup>We believe, for example, that the morphological variability evident in the almost 9000 fluted points known from the Eastern United States has a great deal more to tell us. Analyses examining large regional samples are beginning to appear and are inspirational in this regard (e.g., Meltzer 1984; Morrow and Morrow 1997).

<sup>6</sup>The term Classic Clovis is offered for heuristic purposes only and is not intended to be used as a new type.

<sup>7</sup>Absurd given the relative ease with which these artifacts can be manufactured by skilled flintknappers, of whom there are now hundreds in North America alone.

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