ICE-AGE PEOPLING OF NEW MEXICO

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Abstract—Archaeological discoveries in New Mexico figure prominently in unraveling the story of the peopling of North America. The remains of “Paleoindian” occupations are common in many areas of the state. Most well-known and well-dated early sites are found on the Llano Estacado, typically associated with ancient water ways or ponds. Other high concentrations of sites include the Albuquerque Basin, Estancia Basin, Jornada del Muerto, and Plains of San Augustin, all areas that have a large river or had large lakes, important resources for humans. The earliest well documented occupation in New Mexico is named Clovis (11,300–10,900 yrs BP), often characterized as mammoth hunters due to the discovery of kill sites near the city of Clovis. The most widely distributed and best documented Paleoindian occupation is Folsom (10,900–10,200 yrs BP), with both bison-kill and camp sites common on the High Plains, along the Rio Grande valley, and around paleo-lake basins. The relative ubiquity of Folsom finds suggests a peak in Paleoindian population density. Later (10,200–8000 yr BP) Paleoindian occupations are known in New Mexico, again most commonly on the High Plains and in the Albuquerque Basin, but are not as well represented as Folsom. Paleoenvironmental reconstructions suggest that Clovis and Folsom time was near ideal for hunters and gatherers, but aridification probably began early in the Holocene.

INTRODUCTION

The questions regarding the peopling of the New World – when the first Americans arrived, how they got here, and where they came from – are some of the most controversial and vexing in North American archaeology. People were here at the close of the Pleistocene, just at the end of the last Ice Age, but exactly how long they were here in the late Pleistocene is hotly debated. Related issues are the nature of the environments the early Americans had to cope with and how those environments changed; issues also at the heart of much Pleistocene research world-wide. New Mexico has figured prominently in the history of research into the peopling of the New World. The antiquity of humans in the Western Hemisphere was confirmed near Folsom, and stratified sequences of early human occupations in association with evidence for dramatic environmental change were first studied near Clovis. More recently, a cave site near Carlsbad yielded controversial evidence for human presence in the Americas significantly earlier than most archaeologists usually accept.

This chapter is a review of the role New Mexico played and continues to play in the study of Paleoindian archaeology (that aspect of North American archaeology focused on the earliest occupants of the continent) and summarizes current interpretations of the Paleoindian record in the state. The focus will be on geoarchaeology and paleoenvironmental interpretations. The first part of the paper reviews the nature of the Paleoindian archaeological record in New Mexico including a sketch of the history of such work in the state. The rest of the paper presents summaries of Paleoindian archaeology grouped by physiographic region: the Great Plains, the Rio Grande Rift and Sacramento sections, the Colorado Plateau, the Datil-Mogollon section, and the Mexican Highlands (Fig. 1). This study is not an exhaustive review of all Paleoindian sites in the state. Rather, the focus is on those sites (Table 1) or site areas that proved significant in understanding Paleoindian geoarchaeology, geoarchaeology, and environments.

BACKGROUND

Debate over the antiquity of humans in North America raged among geologists, paleontologists, and anthropologists in the decades.

FIGURE 1. Physiographic subdivisions of New Mexico as identified in this chapter. Geomorphic features of archaeological significance include dunefields, draws (on the High Plains), and paleo-lake basins. Basins with ancient lakes include the Jornada del Muerto (J) with paleo-lake Trinity, the Tulerosa Basin (T) with paleo-lake Lucero, the San Augustine Basin (SA), the Animas Valley with paleo-lakes Animas and Clovendale, and the Playas basin with paleo-lake Playas. Archaeological sites include: Ake (A); Clovis (Blackwater Draw #1) (C); Eldida (E); Folsom (F); Lucy (L); Milnesand and Ted Williamson (M/TW); Mockingbird Gap (MG); Penelope Cave (P); Sandia Cave (S); Winkler-1 (W); and those on the Llano de Albuquerque (LA) in the Albuquerque Basin.

1To aid in readability of the chapter, references to specific sites are included in Table 1 and are cited minimally in the text.
### TABLE 1. Key Paleoindian site investigations in New Mexico.

<table>
<thead>
<tr>
<th>Years</th>
<th>Site</th>
<th>References</th>
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<tr>
<td>1926-1928</td>
<td>Folsom</td>
<td>Anderson 1975; Anderson &amp; Haynes 1979; Cook 1927, 1928; Figgins 1927; Meltzer et al. 2002</td>
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<tr>
<td>1928-1930</td>
<td>Burnet Cave</td>
<td>Howard 1935a</td>
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<td>1978</td>
<td>R-6</td>
<td>MacNeil &amp; Libby 2004; Chrisman et al. 1996</td>
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* Additional collections were probably made in the late 1950s and early 1960s.

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of the late 19th and early 20th centuries (Meltzer, 1983, 1991, 1994). The issue was finally resolved with excavations at the Folsom site, near the town of Folsom (Fig. 1), in the late 1920s (Table 1). In 1926, paleontologists Harold Cook and Jesse Figgins of the Colorado Museum of Natural History (subsequently known as the Denver Museum of Natural History and more recently as the Denver Museum of Nature and Science) were shown bones of extinct (late Pleistocene) Bison recovered from an arroyo near Folsom and decided to dig to recover museum specimens. The bones were found by Carl Swachholm and Fred Howarth, both of Raton. They had been put into the locality by George McJunkin, a local cowboy. When the excavations began no one suspected that the site was anything more than a paleontological locality. Figgins and Cook directed work at the site in 1926 and 1927. The American Museum of Natural History joined the work at Folsom in 1928 (Fig. 2A). In 1926, stone artifacts were recovered, but not in situ with the bone. In the 1927 season, however, stone tools were found in place in clear association with extinct bison (Fig. 2B). The work thus demonstrated that humans had been in North America since late Pleistocene times. The site also gave its name to the distinctive, finely-made, fluted, lanceolate Folsom projectile points found with the bone.

The results of the Folsom excavations prompted widespread research on Paleoindians in the New World. This work focused on further documentation of extinct faunas associated with human activity and on artifact typology and chronology (Wormington, 1957; Wilmson, 1965). The emphasis on recovery of megafauna with artifacts resulted in long held but probably skewed ideas about Paleoindian subsistence (Meltzer, 1993). Additional incontrovertible support for the association of human artifacts with Pleistocene fauna appeared repeatedly in the years from 1927 to the early 1940s (summarized by Holliday, 1997, 2000a). Indeed, the initial discoveries of many Paleoindian sites were by paleontologists who first recognized extinct megafauna and then found associated artifacts. Fluted points were found with the bones of extinct bison and with the remains of mammoth at sites in Colorado, Texas, and New Mexico. Moreover, well-made, lanceolate, but unfluted projectile points were found associated with extinct bison at sites in Nebraska, Wyoming, and New Mexico. The cultural and age relationships of the artifacts and associated vertebrate faunas were unclear, however.

Paleoindian studies in New Mexico followed the Folsom work by just a few years and had a profound impact on archaeology and geoaarchaeology by providing insights into Paleoindian environments, subsistence, and artifact chronologies. Edgar B. Howard of the University of Pennsylvania Museum, a pioneering Paleoindian researcher, was pursuing "the problem of early man" (Howard, 1935a, p. 61) in the early 1930s at Burnet Cave in southern New Mexico. At the close of the 1932 season at the cave, Howard learned of fluted points found with extinct fauna near Clovis, New Mexico, in and near upper Blackwater Draw (Fig. 1). He decided to investigate the area because of the extensive local collections of fluted points, additional finds of Pleistocene fauna, and excavation of a gravel pit at one of the find spots. The results were such that four seasons of field work ensued (Table 1).

All of the research was co-sponsored by the Academy of Natural Sciences of Philadelphia (Howard, 1935a; Cotter, 1937, 1938; Hester, 1972). The field work focused on a gravel pit opened in 1932 between the towns of Clovis and Portales 2. The investigations also included nearby deflation basins ("blow outs"), now known as the Anderson Basin localities, which yielded a stratigraphic sequence, artifact styles, and extinct fauna similar to that found in the gravel pit.

From the outset in 1933 the field work at Clovis went beyond paleopecology. Other investigators were incorporated into the research, including geologists (Anlevs, 1935, 1949; Stock and Bode, 1936), vertebrate and invertebrate paleoentomologists (Lohman, 1935; Stock and Bode, 1936; Clarke, 1938; Patrick, 1938), and paleobotanists (Howard, 1935b). This research was the first interdisciplinary archaeological project in the region (perhaps the first in North America).

The finds at Clovis and surrounding sites came from sediments that filled Blackwater Draw and, at the gravel pit, deposits filling a basin that drained into the draw. The research produced some spectacular finds and provided some early clues to Paleoindian chronology, typology, and environments (Howard, 1935a; b; Cotter, 1937, 1938; Hester, 1972). Of primary importance to Howard was further documentation of the association of artifacts with extinct vertebrates. This goal was amply met. The remains of mammoth and extinct bison were found in several strata together with fluted projectile points (Fig. 3). The fluted points now are classified as Clovis and Folsom types (Figs. 4, 5), but were not so differentiated at the time. Beginning with the
Folsom and Clovis types were defined.

In 1941, a symposium on Paleoindian artifact terminology and typology was held in Santa Fe, New Mexico, sponsored by the University of Pennsylvania Museum and the Laboratory of Anthropology (Ray, 1942; Howard, 1943; Warrington, 1948, 1949, p. 51-53). One goal of the meeting was to differentiate the various fluted types; thus, the Folsom and Clovis types were defined.

As work was underway at Clovis, another important development in Paleoindian archaeology was the beginning of work at Sandia Cave in the mountains above Albuquerque (Figs. 1, 6). The work is most closely associated with Frank C. Hibben of the University of New Mexico, an influential and controversial figure in New Mexico archaeology through the middle decades of the 20th century (Stevens and Agogino, 1975, 1995). Preliminary work at the site was conducted by Hibben and Wesley L. Bliss, but subsequent work was under Hibben’s direction. Geologic research was carried out by Kirk Bryan. A key result of the archaeological research was discovery of a potential pre-Folsom occupation characterized by the distinctive Sandia point.

As noted by Haynes and Agogino (1986, p. 1), however, “almost from the start, the literature reporting the results of these investigations has been plagued with controversy and conflicting statements of reported facts... Further confusion pertaining to radiocarbon dating of cultural levels ensued in the late 1950s...” (see Stevens and Agogino, 1975; Haynes and Agogino, 1986; and Preston, 1995, for complete references and summaries of the issues). Bryan’s work focused on correlating the site stratigraphy with soils on the slopes outside the cave and attempting some paleoclimatic interpretation. The specifics of his approach do not hold up today, but this study was a milestone in applying principals of pedology and weathering to issues of Quaternary climate and archaeology.

Following the Second World War, another phase of work at the Clovis site (Table 1) resolved the questions of artifact and fauna associations and stratigraphy. This work was under the direction of E.H. Sellards, a paleontologist and Director of the Bureau of Economic Geology and the Texas Memorial Museum (both part of The University of Texas at Austin). Sellards was deeply involved in research on human antiquity in North America. Earlier in the century Sellards became involved in the debate when he thought he found human skeletal remains directly associated with Pleistocene megafauna near Vero, Florida (Sellards, 1916, 1917). Sellards probably was wrong and was harshly criticized (Hrdlicka, 1918; Meltzer, 1983). He became embarrased and emabted by the affair and upon moving to Texas he continued to seek evidence of human association with extinct Pleistocene species (Evans, 1986). He spent most of the rest of his life in this quest.

In 1949 and 1950, Sellards directed his attention to the Clovis gravel pit and to a similar site on the Texas side of the High Plains, Lubbock Lake. The field work instituted by Sellards was under the direction of Glen Evans, also of the University of Texas, in association with Grayson Meade of Texas Technological College (now Texas Tech University). The results of the work at Clovis were profound. A stratified succession of stone tools and bones of extinct fauna finally confirmed the superposition of Folsom over Clovis. Moreover, bone beds with lanceolate points were recovered stratigraphically above Folsom features, first establishing unfitted Paleoindian styles as later than the fluted points. Sellards’ (1952) data combined with that of Howard and Cotter resulted in the most definitive descriptions of the Paleoindian assemblages from the site as of 1952 (Hester, 1972, p. 39). The work at the gravel pit reported by Sellards’ in his influential 1952 book Early Man in America and in a subsequent paper with Evans (Sellards and Evans, 1960) established the first comprehensive Paleoindian succession in North America; one that served as a model of Paleoindian artifact sequences that is still more or less in use today. Unfortunately,
FIGURE 4. The type specimen for the Clovis point, recovered during excavations of the Philadelphia Academy of Natural Sciences. Modified from Sellards (1952, fig. 17a, b). Drawn by Hal Story and reproduced courtesy of the Texas Memorial Museum, The University of Texas at Austin.

Quarrying resumed at the site in the 1950s and it was largely destroyed by the 1960s, though some remnants of the basin fill survived around the margins of the gravel pit and in the channel that connects the basin to the draw proper.

Intermittently through the 1940s, 1950s, and 1960s, a series of archaeological site discoveries, excavations, and surveys took place across New Mexico, indicating the breadth and time depth of early human activity in the region (Table 1). A common theme through much of this work is that sites were discovered and reported to professional archaeologists by local artifact collectors, amateur archaeologists, and other informants. This was and still is common across the U.S., and New Mexico provides numerous examples. Near San Jon, on the northwestern edge of the Llano Estacado (Fig. 1), a local rancher found some bone and stone artifacts eroding out of deep ravines cut into playa sediments along the Caprock Escarpment. He contacted the University of New Mexico and in the spring of 1940, Hibben examined the locality (Roberts, 1942; Judson, 1953). The work was turned over to Frank H. H. Roberts of the Smithsonian Institution (Table 1). Stratigraphic studies at and in the vicinity of the San Jon site were conducted by Shelton Judson, a graduate student in geology at Harvard University studying with Kirk Bryan (Judson, 1953, p. 3). The work included discovery of a bone bed with the remains of extinct bison associated with a lanceolate point named San Jon by Roberts (1942, p. 8). Otherwise, the work raised questions concerning the relationship of lanceolate styles with modern bison, and did not clarify the stratigraphic relationship between Folsom and lanceolate styles (Wormington, 1957, p. 113, 122-123; Wheat, 1972, p. 143).

During the drought years of the 1950s, several important sites and collections were revealed in the eroding dune fields of the Llano Estacado. Ted Williamson, a rancher at Milnesand, reported bone and artifacts to E.H. Sellards, who excavated at what became known at the Milnesand site (Fig. 1, Table 1). At about the same time, Williamson found a similar site nearby, which Sellards also tested and named the Ted Williamson site (Fig. 1, Table 1). Both of these sites contained beds of extinct bison buried by eolian sand. They are significant because Milnesand produced a new artifact type and because both yielded two of the most extensive Paleoindian bone beds and two of the largest collections of individual Paleoindian projectile-point styles on the Southern High Plains or in the Southwest.

In the years following Sellards' work at Milnesand and Ted Williamson, both sites were monitored and tested by James Warnica of...
Portales. Warnica was an amateur archaeologist, who, as a teenager, worked for Sellards at the Clovis gravel pit, became a keen observer of the regional landscape and Paleoindian sites, and made significant contributions to Paleoindian archaeology. He helped document the Milnesand assemblage, together with another important Folsom collection from the Elida site near Portales (Fig. 1, Table 1), and other collections from sites in the area, and helped salvage some of the Paleoindian occupation sites at the Clovis site as it was undergoing destruction in the early 1960s. Warnica also shared his considerable data base of Paleoindian sites in New Mexico and Texas for inventory by James Hester (then at the Museum of New Mexico) (Hester, 1975a,b; Hester and Grady, 1977). Hester was part of the High Plains Paleoecology Project, directed by Fred Wendorf (also at the Museum of New Mexico at the time) (Wendorf, 1961; Wendorf and Hester, 1975) in the late 1950s and early 1960s.

Also beginning in the 1960s, Jay Blaine, an amateur archaeologist from the Dallas area, began collecting the Winkler-1 Midland site (Fig. 1, Table 1) in a dune field in extreme southeastern New Mexico, east of Jal. The Midland style is similar to Folsom, but contains no central flute. The technological, typological, and chronometric relationships of Folsom and Midland have been debated for decades (e.g., Agogino, 1969; Judge, 1970; Hofman et al., 1990; Amick, 1995) and, therefore, an extensive Midland assemblage is an important find. Winkler-1 was found as it was first eroding. In ensuing years, Blaine carefully mapped and recorded individual artifacts as they were exposed by wind erosion. As a result, Winkler-1 is one of the few pure Midland assemblages found anywhere and it is also one of the best documented long-term collections from an active eolian context.

Several important sites were also investigated in central New Mexico in the 1950s and 1960s. In 1954, Frank Hibben and graduate student William Roosa found a Sandia point on the surface of the Lucy site (Figs. 1, 7; Table 1) on the southeastern side of the Estancia Basin (Fig. 1). Subsequent field work by Roosa resulted in recovery of additional Sandia points, other Paleoindian artifacts, and the remains of extinct fauna. Several Sandia points were reported as coming stratigraphically below both Folsom and Clovis, raising the possibility that Sandia was the earliest well-defined artifact tradition in the Americas. The results of the work at Lucy were never fully published, however, and like Sandia cave, the work at the site was mired in controversy (Stevens and Agogino, 1975; Preston, 1995).

To the south on the margins of the Jornada del Muerto, Robert Weber discovered the Mockingbird Gap site (Fig. 1, Table 1). Weber, a geologist with the New Mexico Bureau of Mines and Mineral Resources, had a life-long interest in archaeology and identified many Paleoindian sites in the course of geologic mapping. Weber and George Agogino, an archaeologist at Eastern New Mexico University, excavated the site. It was a rare Clovis campsite that yielded an extensive collection of Clovis artifacts.

This section will close by mentioning a remarkable series of Paleoindian collections from the Albuquerque basin (Fig. 1). From 1963 to 1967, Ele Baker, an Albuquerque school teacher and archaeologist, his son Tony, and Jerry Dawson recorded and collected dozens of Paleoindian sites throughout the area. Their data combined with that from several collectors formed the basis for the study of regional Paleoindian occupations and settlement patterns by Judge (1973). In addition, the survey work resulted in discovery and testing of the Rio Rancho Folsom site.

Definitions of the term “Paleoindian” have been many and varied since the term was first used (but not defined) by Roberts (1940). The Paleoindian period as a formal subdivision of the archaeological record is very poorly defined, probably because the full range of Paleoindian subsistence and settlement is so poorly known compared to later periods. The Paleoindian period in the very late Pleistocene and very early Holocene (using 10,000 radiocarbon years B.P. for the Pleistocene-Holocene boundary), very late in the “Ice Age.” It was a
time of climate very different from today and undergoing rapid change when humans lived as hunter-gatherers, co-existed with now extinct large mammals, and prepared a variety of distinctive, lanceolate, unnotched projectile points (modified from Hofman, 1989, p. 25).  “Biggame hunting” often is cited as a characteristic of the Paleoindian stage (e.g., Stephenson, 1965; Willey, 1966; Wedel, 1983), but the native inhabitants of the Great Plains hunted “big game” until the 19th century and there is ample evidence of a more diverse Paleoindian subsistence (Johnson, 1986, 1991; Meltzer, 1993; Meltzer and Smith, 1986).

The Paleoindian period is subdivided on the basis of projectile point styles (e.g., Worthington, 1957; Hoffman, 1989; Holliday, 1997), due to the lack of other obvious archaeological traits. The principal subdivisions used in this report and common on the Great Plains and Southwest are Clovis, Folsom, and Late Paleoindian. The Clovis and Folsom periods are defined by the presence of distinctive fluted point styles that occupy relatively discrete time intervals. Archaeological sites or features that date to one of these two discrete time intervals but lack diagnostic artifacts are referred to as “Clovis age” or “Folsom age.” The Late Paleoindian period is defined by the occurrence of a variety of generally lanceolate, unfluted, well made projectile points. “Late Paleoindian” is equivalent to the “Plano Complex” of Jennings (1955, cited in Krieger, 1964, p. 34). There seems to be considerable temporal overlap among some of the unfluted, lanceolate styles and some temporal overlap with fluted styles, noted below. Moreover, Late Paleoindian projectile point types, typology, and nomenclature present some vexing problems in dealing with this period, discussed below and in Hofman (1989) and Holliday (1997). In the absence of more or other kinds of data, however, these gross subdivisions based on artifact styles provide the best first approximation of Paleoindian culture history in New Mexico.

PALEOINDIAN ARCHAEOLOGY OF NEW MEXICO

The following discussion presents summaries of the Paleoindian archaeology and geoarchaeology of key sites and regions, many mentioned in the historical sketch above. The discussion is organized on the basis of the physiographic regions of New Mexico, more or less as defined by Hawley (this volume) (Fig. 1). The discussion begins in the east with the Great Plains and moves to the west.

The Great Plains

The Great Plains in eastern New Mexico include the High Plains, the Pecos River Valley, and the Raton Section (Fig. 1). Almost all investigated and reported Paleoindian sites in the Great Plains of New Mexico are on the High Plains, specifically the Southern High Plains or “Llano Estacado” (Fig. 1). Paleoindian sites on the Llano Estacado are reported from the three principal loci of late Pleistocene and early Holocene deposition: draws, playas, and sand dune fields (Holliday, 1997).

The draws are now-dry tributaries of major drainages to the east: the Red, Brazos, and Colorado rivers. Most of the draws head on the New Mexico portion of the Llano Estacado (Fig. 1), where they are typically narrow and shallow (Holliday, 1995). A notable exception is upper Blackwater Draw, situated in the Portales Valley, a major reentrant on the western side of the High Plains escarpment (Holliday, 1995). The draw has well-stratified late Quaternary fill containing a number of Paleoindian localities (e.g., Howard, 1935a; Sellards, 1952; Hester, 1972; Haynes, 1975, 1995).

The best-known Paleoindian site in the draw and one of the best-known Paleoindian sites in North America is the Clovis site. Clovis is also the most intensively investigated Paleoindian site in the New Mexico High Plains (Table 1). The long-term research at the site, in spite of its often chaotic and salvage nature (well described by Hester, 1972, and Stevens, 1973) yielded the most complete well-dated Paleoindian chronology of any site in the region and provided an early, detailed glimpse of Paleoindian environments, among other achievements. The near-by Anderson Basin localities, also in the draw, have a similar stratigraphic record, but a more poorly known and investigated archaeological record. The stratigraphic terminology and geochronology used below follows Haynes (1975, 1995). The Paleoindian archaeology and geoarchaeology is summarized from Haynes (1975, 1995) and Holliday (1997).

The Clovis site is in a basin 2 km north of and draining into upper Blackwater Draw, connected to it by a small channel. The basin is inset against the Blackwater Draw Fmuration and younger late Pleistocene lake carbonates. It formed between ~23,000 and ~13,000 yrs BP and contains a stratified sequence of late Quaternary deposits. The oldest fill is spring-laid sand divided into Unit B (13,000-11,500 yrs BP) and Unit C (11,500-11,000 yrs BP) and separated by an erosional unconformity (Fig. 8). The Unit B and C sands are significant archaeologically because they yielded the type Clovis artifacts and associated bone assemblages. Most of the Clovis features are from Unit B, but some Clovis materials are found on top of and in upper B (Fig. 8). Whether the materials in upper B are in situ or intrusive still is debated (e.g., Green, 1992; Haynes et al., 1992), exemplifying the confusion imposed by the quarrying and by the destruction of stratigraphic sections.

Clovis features recovered from the sands include the remains of mammoth, Bison antiquus bone beds, and camps. The mammoth features, each consisting of one individual, all were near the margins of the paleo-depression (Hester, 1972). The spectacular series of mammoth kills reported by Warnica (1966) were associated with spring conduits (Haynes and Agogino, 1966). Mammoth was also recovered at the head of the outlet channel. The mammoth found at Clovis in 1936 (Cotter, 1937) are the “fossils upon which the concept of mammoth hunting in North America was established” (Saunders and Daeschler, 1994, p. 1). But as Saunders and Daeschler (1994) show, the mammoth from this famous feature probably were scavenged rather than hunted by Clovis people.

Most of the Paleoindian features at Clovis were found in the pond and marsh deposits of Units D and E (Fig. 8). Unit D is diatomaceous earth, which includes beds of pure diatomite, lenses of diatomite interbedded with mud or sand, and diatomaceous mud. The interbedding resulted from fluctuating pond levels, expansion and contraction of marshes, and periodic addition of sand from spring discharge, colluvial deposition, and slopewash. Unit E is the “carbonaceous silt” which is an organic-rich sandy mud, representing the accumulation of colluvial silt and sand in an upgradient, marshy environment. Along the basin margins Unit B, like D, includes organic-rich silt and interbedded colluvial sand. Upland colluvial facies of both D and E are also known. Unit D dates from 10,800 to 10,000 yrs BP. Unit E is not well dated but at most spans the period 10,500 to 8500 yrs BP.

Folsom features in the gravel pit largely were associated with Unit D and most were Bison antiquus bone beds (Fig. 9). For those features where data are available, the number of bison involved varies from one to five. The bone beds were found in muddy interbeds of the diatomite, denoting times of low or subsurface water, or found in basin margin settings away from deep water or mud. The diatomite ponds undoubtedly were fed by some of the same spring conduits active during Clovis time (Haynes and Agogino, 1966). Folsom camping areas also were reported. The most extensive and best known is in a sheet-like colluvial layer on the uplands on the northwest side of the ancient basin. The site yielded thousands of bone artifacts and is interpreted as a base camp used by Folsom hunters (Boldurian, 1990).

Late Paleoindian occupations generally are associated with Unit E. The late Paleoindian features are characterized by a variety of unfluted, lanceolate projectile point styles. The oldest of these artifact styles are identified as Agate Basin, but they have poor association with activity areas. Some Agate Basin material was recovered from spring conduits on the North Bank in association with Folsom material, suggesting a temporal overlap of the two styles and likely occurrence of Agate Basin material in Unit D (Haynes and Agogino, 1966).
Additional Agate Basin material was found directly above Folsom occupations in Unit D and in spring-laid sands, but no associated features are reported (Green, 1963, p. 160; Hester, 1972, p. 59; J. Warnica, pers. comm. 1994). Agate Basin artifacts also recovered from Unit E in a bison bone bed along the South Bank area of the outlet channel (Agoogino and Rovner, 1969; Stanford et al., 1990) (Fig. 8). Five late Paleoindian bone beds of Bison antiquus are reported or at least noted in Unit E. Associated artifacts are all unfluted lanceolate styles including Plainview, Cody/Firstview, and Milnesand.

The youngest Paleoindian features at Clovis may be from Unit F, which buries Unit E (Haynes, 1995). The features are associated with weakly developed buried soils formed in eolian sediments. The stratigraphy is indicative of increased eolian sedimentation on the surrounding uplands, but vegetated and perhaps damp lowlands. The latest Paleoindian features are not well-dated but are in the range of 8,500 to 8,000 yrs BP (Haynes, 1995).

The overall environmental trend from 11,500 to 8000 yrs BP at the Clovis site is clearly indicative of drying as flowing spring-fed water gave way to standing bodies of water, eventually evolving into wet meadow conditions. Eolian sedimentation, which began during Folsom time, also increased, indicative of regional aridity. This drying trend was not unidirectional, as indicated by fluctuating levels of the diatomite ponds.

The plays of the High Plains are small (typically 5-15 km²) circular to subcircular basins that today hold water during the wet seasons (Gustavson et al., 1995). Most of the basins probably formed in the late Pleistocene (Hollday et al., 1996). They filled with a variety of sediments but the most typical is gray to dark gray mud. Eolian sediments in the form of dunes and sand sheets are common along the Pecos River Valley and in dune fields that extend eastward across the High Plains into Texas (Hollday, 2001). Paleoindian artifacts and sites are found in association with both the plays and dune fields, but only a few sites have been investigated and reported (Hollday, 1997).

The San Jon site is in a playa basin within a few hundred meters of the northwestern High Plains escarpment (Fig. 1) and yielded evidence for Paleoindian through late Prehistoric occupations (Table 1). The basin is heavily dissected by a canyon cut deep into the escarpment. The playa fill containing the archaeological material is preserved in several peninsulas or promontories isolated between arroyo tributaries of the canyon. The San Jon playa basin is inset into the Blackwater Draw Formation and filled with playa muds, eolian sand, and slopewash.

Two Paleoindian or possible Paleoindian occupation layers were investigated at San Jon. The most intensively studied is in playa mud. Roberts tested a bone bed consisting of butchered remains of extinct bison. At least five Bison antiquus were represented (Hill et al., 1995). A notable characteristic of some of the bone is that lower limb units were recovered articulated and in an upright position in the gray silty loam (Roberts, 1942, plate 3.1; Hill et al., 1995, fig. 7). This situation suggested that animals were mired in mud, died, and subsequently were butchered. Data are not available to indicate whether the animals died naturally and then were scavenged or were purposely killed by hunters. A single projectile point was recovered from this feature: a lanceolate projectile point named "San Jon" by Roberts (1942, 8) (Hill et al., 1995, fig. 8; Knudson, 1995, p. 1e). Muds collected from near the San Jon bone bed at the same stratigraphic position yielded a radiocarbon age of ~8360 yrs BP.

Approximately 150 m away "a portion of a true Folsom point was found weathering out of this same layer in association with fragments of similarly fossilized bone" (Roberts, 1942, p. 8) (Knudson, 1995, p. 1e). This area was not tested and the Folsom artifact was not found in place. The precise lithostratigraphic relationship between Area II and the Folsom area is impossible to determine because of a wide and deep canyon that separates the two areas.

Four important Paleoindian sites are reported from dune fields on the High Plains of eastern New Mexico. The Eldia site (Fig. 1) is in a small dune field which is a segment of the larger Lea-Yakum dune field. Archaeological material was exposed by wind deflation of the sand and was acquired over a number of years of surface collecting (Table 1). No systematic excavations were carried out. The site is significant because it was a Folsom campsite, which is rare, and because it is a "pure" Folsom lithic collection (Hester, 1962, p. 92), i.e., a single-component collection. No obvious activity areas (camps, kill sites) were reported, but the site is immediately adjacent to a small playa which must have attracted the Folsom people as well as game.

Winkler-1, in the Andrews Dunes in far southeastern New Mexico (Fig. 1), is similar in age to Eldia, producing artifacts of the Midland style (Fig. 1, Table 1). The exact age and technological relationship of Midland to Folsom is unclear but has been debated for decades (e.g.,
The dune fields obviously attracted Paleoindians. In the case of Milnesand and Williamson, bison herds must have been the attraction, but why the herds were where they were is unclear. Sellards (1955, n.d.a,b) believed they probably were in shallow ponds or perhaps marshes. The underlying Blackwater Draw Formation shows clear evidence of a formerly high water table (in the form of gleying) but determining when this happened is not possible. The bonebeds are located in microtopographic lows, and there is minimal evidence at Milnesand of relatively enrichment of organic matter in the sand associated with the bone bed. A reasonable hypothesis is that a high water table during the Milnesand-Plainview occupation of the area produced shallow ponds or marshes in the depressions at each site (Holliday, 1997). Those conditions and nearby upper Sulphur Draw may have attracted bison. Paleo- 

The Milnesand and Ted Williamson (Fig. 1, Table 1) are two late 

The volcanic uplands of the Raton section contains one known 

The Folsom site brought considerable archaeological notoriety 

Other Paleoindian sites are recorded for the Raton Section, most 

Few Paleoindian sites are reported from the Pecos Valley. In part 

The Milnesand bone bed covered at least 300 m². The size of the 

Milnesand and Ted Williamson (Fig. 1, Table 1) are two late 

FIGURE 9. Bone bed of extinct *Bison antiquus* in diatomite (Unit D) at the Clovis 

Agogino, 1969; Judge, 1970; Amick, 1995). Midland almost certainly 

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At the Elida site the adjacent playa was likely an attraction, but the attraction at Winkler-1 (and at other sites in the Andrews Dunes to the east in Texas) is not clear. There are no stratigraphic or sedimentologic clues to indicate attractions such as vegetation or water that would draw Paleoindians; the obvious lacustrine sediments pre-date the human occupation. Perhaps seepage continued in the area once humans arrived, but the associated deposits were diluted with eolian sand and subsequently deflated or otherwise obliterated by weathering due to the high permeability of the younger sand.

The volcanic uplands of the Raton section contains one known and reported Paleoindian site, the type Folsom site (Fig. 2; Table 1). The site is on Wild Horse Arroyo in the headwaters of the Dry Cimarron River (Fig. 1). The modern arroyo is cut into late Quaternary sediment that in turn fills a late Pleistocene paleo-arroyo cut into the local Cretaceous bedrock. The bison kill at the site took place in a small and relatively shallow tributary to the Pleistocene paleovalley of Wild Horse Arroyo. Preliminary butchering of ~32 *Bison antiquus* took place near where the animals were dropped. The bone bed dates to ~10,500 yrs BP and is buried within silty, probably eolian sediment (i.e., a loess). Shortly after the kill, conditions in the valley became wetter and the drainage began to fill with organic-rich muds.

The Folsom site brought considerable archaeological notoriety to the Folsom/Raton region, but the data suggests that the site is a rarity in the area. Archaeological survey in the Upper Dry Cimarron drainage in the Folsom area yielded very little evidence of Paleoindian or later occupation (Anderson, 1975). The reasons for this are unclear, as outlined by Meltzer et al. (2002). Today the area has abundant game and water. Suitable plant resources are rare and may have been in the past. Winters are harsh, however, and may have been unsuitable for bison. Folsom peoples were classic bison hunters of the High Plains. One scenario has Folsom hunters following bison up the Dry Cimarron into an area that bison rarely traverse. With bison and plant resources otherwise rare in the area, the area may not have been attractive to hunters and gatherers.

Other Paleoindian sites are recorded for the Raton Section, most notably just below the High Plains escarpment and at the foot of the Rocky Mountains (Stuart and Gauthier, 1996, p. 295, 296, 298), but only one is reported. R-6 (Fig. 1, Table 1) is a late Paleoindian site near the Sante de Cristo Mountains. The site is one of four Cody/Firstview localities in the area, though the other three are unreported. R-6 and the other sites are apparently ancient camps buried in stratified alluvium. R-6 also yielded evidence of a structure in the form of a semicircle of rocks 2.5m in diameter. Little else can be said, but the site is rare in being one of the very few in situ and excavated Cody/Firstview sites west of the Pecos, and one of the few known Cody/Firstview camp sites reported in North America (most Cody sites are bone beds representing kills).

Few Paleoindian sites are reported from the Pecos Valley. In part this is likely due to few systematic surveys. In the survey by Jelinek
out the valley in the form of well-preserved terraces, pediments, alluvial fans, and bajadas (e.g., Gile et al., 1981; Pazzaglia and Wells, 1990; Dethier and Reneau, 1995; Connell and Love, 2001). Locally on these surfaces are sand sheets and dune fields. Few Paleoindian sites are reported in association with any of these settings, however. There are probably several reasons for this. Many of the late Pleistocene strata in the mainstream and fan deposits for this time accumulated under high energy conditions. Sites in these settings would not preserve well. Further, shortly before the Paleoindian occupation of the region the Rio Grande was deeply entrenched and then began to aggrade (Connell and Love, 2001). Occupations in this setting, if they survived the alluvial processes, will now be deeply buried and invisible. Finally, a significant problem may be the lack of systematic surveys of the area.

The one region of the Upper Rio Grande Valley in the Basin and Range that has undergone systematic study is the Albuquerque Basin (Fig. 1). Depositionally, the area is dominated by alluvium from the Rio Grande, with contributions from the Rio Puerco and Rio San Jose. All of these drainages incised thick basin fills, forming broad floodplains, and a series of terraces and pediments. Upper Pleistocene basalt flows locally mantle the higher surfaces. Both the basalt and the older, high alluvial surfaces are covered by eolian sands.

The setting and artifact assemblages of 59 Paleoindian sites in the area were investigated by Judge (1973), including several sites that were tested or excavated (Dawson and Judge, 1969; Judge and Dawson, 1972). Since the survey reported by Judge (1973), additional Paleoindian sites have come to light (e.g., Huckle and Kilby, 2000). Approximately half of the sites include Folsom assemblages. Most of the rest are Clovis/Plainview/Cody/Firstview. One Clovis site is reported.

A large proportion of the sites are located on the Llano de Albuquerque (or West Mesa), a relatively high, flat, open landscape between the Rio Grande and Rio Puerco (Fig. 10). A notable characteristic of this landscape is the presence of numerous depressions that apparently acted as lake or playa basins. Most of the Paleoindian sites are near these depressions. The sites themselves, however, are in the sand sheets and dune fields and generally shallowly buried (Fig. 11). As such, the artifact assemblages were likely subjected to some mixing, and most faunal and flury remains are not preserved. Nevertheless, the sites appear to represent occupations during discrete periods (i.e., Plainview occupations are not mixed with Folsom occupations). Analysis of site distributions (Judge, 1973) shows that Folsom occupations are in proximity to the playas while later occupations are more widely dispersed. This pattern apparently reflects relatively wet conditions during the Folsom occupation, which made the playas particularly attractive resources, but post-Folsom drying and dispersion of occupations across the landscape as the playas became less attractive resources.

The other principal locus of known Paleoindian occupations in the Rio Grande Rift/Sacramento sections is along shore-lines and related landforms in paleo-lake basins. These lakes, all of which are named, were located in the Tulareo Basin, Jornada del Muerto Basin, and the Estancia Basin (Fig. 1, Table 1). Geoarchaeologic data indicate that many if not most of these lakes were at their maximum elevation during or just after the last glacial maximum (Wilkins and Currey, 1997; Allen and Anderson, 2000; Anderson et al., 2002; Langford, 2003). Water levels were falling by the time of Clovis occupations (~11,500 C14 yrs BP), but the basins still held significant amounts of water. Paleoindian materials are reported from most of these basins, but the published records are very spotty and few systematic surveys have been reported. The settings of reported sites seem to vary from basin to basin. The Lucy site (Roosa, 1956, 1968) in the Estancia Basin (Figs. 1, 7), is one of the few widely known and published (albeit minimally) Paleoindian sites in any of the paleo-lake basins, although the geologic context is unclear (Miller, 2000). The site is along the sloping margins of the ancient basin, well above the highest level of paleo-lake Estancia (Fig. 7). The site was exposed in blowouts among a sand sheet then

(1967), however, along the middle Pecos, only a few scattered surface finds of Paleoindian artifacts are reported. Further, much of the east side of the valley is buried under extensive eolian sand of the Mescalero Dunes (Holliday, 2001; Hall, 2002). Some of the known and reported sites were exposed along arroyos or in dune blow-outs immediately below the High Plains escarpment in southeastern New Mexico. Smith (1966), Smith et al. (1966a,b), and Stuart and Gauthier (1996, p. 285) report a series of localities in this area producing Clovis, Folsom, Midden, and a wide array of post-Folsom Paleoindian artifacts. Folsom and particularly Midden artifacts are especially common. None of these Paleoindian occupations were systematically investigated, however.

The Rio Grande Rift and Sacramento Sections

In this section, two adjacent and related physiographic regions are discussed together: the Rio Grande Rift and, to the east, the Sacramento section (Fig. 1). Hydrologically this combined region can be divided into the Rio Grande valley and adjacent basins. For the purposes of this paper, the Rio Grande Valley is defined as that part of the Rift with alluvial landforms and sediments related to the mainstem Rio Grande. The other principal hydrologic system, located on the east side of the rift and on the east side of the Sacramento section (Fig. 1) is the series of closed depressions or basins in the structural basins along the flanks of the rift. Though dry now, these basins contained lakes in the late Pleistocene.

Along the Upper Rio Grande and its tributaries are a variety of specific landscape and stratigraphic contexts with the potential for preserved Paleoindian sites. Thick deposits of alluvium are present throughout the valley in the form of well-preserved terraces, pediments, alluvial fans, and bajadas (e.g., Gile et al., 1981; Pazzaglia and Wells, 1990; Dethier and Reneau, 1995; Connell and Love, 2001). Locally on these surfaces are sand sheets and dune fields. Few Paleoindian sites are reported in association with any of these settings, however. There are probably several reasons for this. Many of the late Pleistocene strata in the mainstream and fan deposits for this time accumulated under high energy conditions. Sites in these settings would not preserve well. Further, shortly before the Paleoindian occupation of the region the Rio Grande was deeply entrenched and then began to aggrade (Connell and Love, 2001). Occupations in this setting, if they survived the alluvial processes, will now be deeply buried and invisible. Finally, a significant problem may be the lack of systematic surveys of the area.

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mantles the basin margin. Roosa (1956, 1968) suspected that the area was once the site of seeps or springs, as indicated by the presence of bedded sands and gravels, and evidence of a high water table. (D.J. Melzzer, pers. comm., 1998; V.T. Holliday field notes, 1998). Lyons (1970) in an unpublished dissertation on the Estancia Basin, recorded numerous other Paleoindian sites in the area, all above the obvious shoreline features (Fig. 7).

A number of Paleoindian sites are reported from paleo-lakes Trinity and Lucero (Fig. 1, Table 1). A Clovis site (Mockingbird Gap) and several later Paleoindian sites are known around paleo-lake Trinity (Fig. 1) (Kirkpatrick and Weber, 1996; Weber and Agogino, 1997; Eyre, 2004). Mockingbird Gap and at least six other sites producing Folsom and Cody artifacts are along or near a drainage that flowed in the paleo-lake. Langford (2003) mentions Folsom sites above the highest Holocene shoreline of paleo-lake Otero. A systematic survey of less than 1% of the Tularosa Basin yielded nine (mostly multi-component) sites with Paleoindian occupations: 2 Clovis, 4 Folsom, 2 late Paleoindian, and 6 unspecified Paleoindian components (Wessel et al., 1997). Wessel et al. note a trend similar to that seen on the West Mesa: The Folsom occupations are in closer proximity to the lakes compared to the later Paleoindian sites, which are more widely scattered throughout the basin. These later sites may represent occupations designed to maximize resources in both lacustrine and montane environments, as the former disappear. Langford (2003) raises an important point about site preservation in the Tularosa/Otero basin that can apply to any of the basins. Though sites may be found along or above high shorelines today, they may well have existed lower in the basins, perhaps along the water’s edge. But because the basin floors are often subject to deflation, such sites were destroyed (or perhaps buried by eolian sediments deflated from the basin).

In the mountains on the east side of the Tularosa Basin, archaeological research focused on Pendejo Cave (Fig. 1, Table 1). The site includes a Clovis or Clovis-age occupation, but most of the attention garnered by the site has focused on claims of multiple occupations purportedly spanning 58,000 to 12,000 years BP (MacNeish and Libby, 2003). Such claims are highly controversial and have raised questions and doubts about the integrity of the deposits and associated radiocarbon ages, and the nature of the purported artifacts (i.e., are they true artifacts or geofacts?) (Chrisman et al., 1996, 1997; Dinauze, 1997; Macneish and Libby, 2003). The Clovis-age occupation represents a rare Clovis camp, but is poorly represented. Otherwise, the significance of the site rests with individual interpretations of the claims for pre-Clovis activity.

Datil-Mogollon Section and The Mexican Highlands

This region is an area of structural desert basins and mountain ranges at elevations somewhat higher than the Rio Grande Rift to the east and the Mojave-Sonoran Desert to the west (Fig. 1). Most known Paleoindian sites are from the Plains of San Augustin (Fig. 1), a large structural basin on the southeast flank of the Colorado Plateau that held a lake in the late Pleistocene. The Plains of San Augustin consists of three basins: the largest and deepest is the Horse Springs basin, the other two are the White Lake and C-N basins (Weber, 1994). Paleoindian artifacts are reported from a number of localities in the basin (Hurt and McKnight, 1949), but most Paleoindian sites are associated with the two smaller basins (R. Weber, pers. comm., 2003). Weber (pers. comm., 2002) proposed that by the time of the Paleoindian occupation of the area, the paleo-lake had dropped to the point where most water was in the Horse Springs Basin and that the two smaller basins were characterized by shallow ponds and marshes. Preliminary field work in the White Lake and C-N basins suggests that this scenario is likely correct (V.T. Holiday, unpub. notes, 2003). Moreover, most Folsom sites appear to be associated with eolian deposits or are redeposited contexts (R. Weber, 1980, pers. comm., 2003).

The Ake site (Fig. 1, Table 1) is the only Paleoindian site on the Plains that was excavated and reported. It is along the margin of the C-N basin. The site was believed to be a Folsom camp, but Weber (1980), the geologist during excavation, believes that most of the artifacts were redeposited from a site slightly upslope.

DISCUSSION AND CONCLUSIONS

Several trends are apparent in the record from Paleoindian archaeology in New Mexico, in terms of the distribution of sites and artifacts, the character of the sites, and the interpretations based on the sites. Perhaps the most obvious characteristic is that buried sites in undisturbed, stratified contexts are most common on the High Plains. This is essentially a function of local late Quaternary geologic processes. In the last two millennia of the Pleistocene and the first two millennia of the Holocene environmental settings attractive to hunter-gatherers (i.e., draws and playas) were slowly upgrading, generally low-energy depositional settings. Archaeological debris left in these settings was more or less undisturbed and sealed in place. Moreover, these settings generally continued to upgrade throughout the Holocene. Indeed, most all of the known Paleoindian sites in draws and playas were exposed due to human action (e.g., quarrying at the Clovis site), not natural exposure from erosion. The one notable exception is the San Jon site, which was exposed by erosion owing to the proximity of the playa to the High Plains escarpment.

Throughout most of the rest of New Mexico, and indeed the Southwest, most reported sites are in thin deposits (e.g., the many sites in the Albuquerque Basin) or heavily disturbed deposits (e.g., Sandia cave) or both. Settings attractive to Paleoindians, with slow rates of deposition, and not subjected to Holocene erosion seem to be rare or at least not in obvious or accessible settings (e.g., deeply buried under the modern Rio Grande floodplain). Two exceptions to this generalization highlight other aspects of the Paleoindian record of New Mexico. In the Ration Section, the Folsom site is in a geologic context similar to the sites on the High Plains: low energy, slowly aggrading setting. It is in an ideal setting for preserving a stratified Paleoindian record, but such is not the case. No other buried sites (and very few surface finds) are known from the many exposures of the Upper Dry Cimarron, strongly suggesting that Paleoindian hunter/gatherers seldom made use of the area. To the south, in the Jornada del Muerto, the Mockingbird Gap site is in a buried stratified context along Chupadero Arroyo, and younger (mostly Folsom sites) are also known nearby. These considerations suggest that tributary drainages of paleo-lake basins may be likely settings for finding other sites, if the tributaries were sites of low-energy deposition and not subjected to cycles of Holocene cutting and filling.
Another characteristic of the Paleindian record of New Mexico is that long records of occupation are rare in the far west or southwest; a characteristic that maintains on into Arizona (Faught and Freeman, 1998). This appears to be a function of the early evolution of the Desert Archaic in the Southwest (Cordell, 1997; Mahry and Faught, 1998). In Arizona, early Archaic subsistence appears to have evolved soon after the Clovis occupation. Folsom and later occupations are common in the Rio Grande Valley and eastward onto the High Plains.

Folsom artifacts and Folsom sites appear to be the most common among Paleoindian sites recorded in New Mexico. This trend is also apparent on the Southern High Plains (Hollday, 1997). In part this may be a function of interest in fluted points among artifact collectors. But the number of Folsom sites recorded in the Albuquerque Basin (representing almost half of the known sites) compared to other styles suggests that the trend represents something of a peak in Paleoindian population. Clovis peoples were the first colonizers and thus likely were scattered across the landscape; Folsom were more established and apparently very successful inhabitants. Clovis artifacts also seem to represent perhaps half the duration of Folsom, but Folsom sites and artifacts represent far more than twice the number of Clovis occurrences. The duration of the post-Folsom occupation of the Albuquerque Basin is unknown, but based on data from the High Plains (Hollday, 1997, 2000a) it was likely at least as long as Folsom and perhaps twice as long. Thus, the Folsom occupation was probably was more intense than the post-Folsom occupation. On the High Plains the post-Folsom reduction in occupation intensity was attributed to the onset of warming and drying conditions and probably the decline in bison populations (Hollday, 1997). Whether this was the case in Central New Mexico is unclear because the nature of post-Folsom environments is poorly known. An alternative though related possibility is that like peoples farther west, the post-Folsom occupants of the Albuquerque Basin and Central New Mexico began to adopt an Archaic life way, either parallel with late Paleoindian activity or utilizing late Paleoindian artifact styles.

The character of the environment during the Paleoindian occupation of the Southwest has long been the subject of research and debate (e.g., Wendorf, 1961; Wendorf and Hester, 1975; Hollday, 1987, 2000b; Haynes, 1991). Broadly speaking, following the last glacial maximum, the Southwest was clearly drying and warming through the late Pleistocene and into the early Holocene. The details of this trend are less clear, however, Haynes (1991) proposed that the Clovis period witnessed drought conditions that may have contributed to the extinction of Pleistocene megafauna, followed by wetter conditions during the Folsom occupation. These interpretations were based on the stratigraphy at Murray Springs, Arizona, the Clovis site, and the Miami site, Texas.

Data presented above and elsewhere (Hollday, 2000b) suggest that relative to subsequent periods, effective moisture and runoff was significantly higher during the Clovis occupation of the state. The rains on the High Plains had active springs and competent streams and the closed basins in the structural depressions contained large lakes. The lakes were declining, however, part of the more general drying trend that continued throughout the Paleoindian occupation of New Mexico. This trend can be seen in the dramatic changes in hydrology on the High Plains (Hollday, 1997, 2000b), where shifts from the flowing water conditions of Clovis time to standing water conditions of Folsom time. By the end of the Folsom occupation (~10,000 yrs BP) the standing water was gone and only marshes, were present. On the uplands of the High Plains, the dune fields began forming during the Folsom occupation, suggestive of arid conditions (Hollday, 2000b). Paleoenvironmental trends in the rest of New Mexico are less clear, although drying was clearly under way. For example, the Estancia Basin was subjected to severe wind erosion sometime between ~11,500 and ~9600 yrs B.P. (Allen and Anderson, 2000; Anderson et al., 2002). In several areas,olian sedimentation due to aridity seems to be associated with Folsom and later Paleoindian occupations, but not Clovis. This is apparent on the Plains of San Augustin and at the Moseskingbird Gap site, and perhaps on the West Mesa in the Albuquerque Basin.

New Mexico has witnessed a substantial amount of research effort devoted to Paleoindian archaeology and related issues since the first discoveries at the Folsom site. It has been a key region in the evolution of thinking about Paleoindians and Paleoindian times. Many significant research questions remain to be answered, however. Simply establishing the basic chronology and character of Paleoindian activity remains to be done in many areas, largely dependent on discovery of in situ and datable Paleoindian occupations. Relatedly, the timing of changes in subsistence to Archaic lifeways appears to vary significantly across the state, but this issue likewise require much more field data. And, as just described, the evolution of regional and local environmental trends beginning before the Paleoindian occupation and continuing through to the early Holocene is unclear and almost certainly variable across the state. Equally variable is the degree of preservation and visibility of the Paleoindian archaeological and paleoenvironmental record.

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