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THEME STUDY

the earliest americans

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NPS Form 10-900-b OMB No. 1024-0018 (March 1992) United States Department of the Interior National Park Service National Register of Historic Places Multiple Property Documentation Form This form is used for documenting multiple property groups relating to one or several historic contexts. See instructions in How to Complete the Multiple Property Documentation Form (National Register Bulletin 16B). Complete each item by entering the requested information. For additional space, use continuation sheets (Form 10-900-a). Use a typewriter, word processor, or computer to complete all items. <u> X </u> New Submission <u> </u> Amended Submission NAME OF MULTIPLE PROPERTY LISTING THE EARLIEST AMERICANS THEME STUDY FOR THE EASTERN UNITED STATES ASSOCIATED HISTORIC CONTEXTS (Name each associated historic context, identifying theme, geographical area, and chronological period for each.) PALEOAMERICAN SITES IN THE EASTERN UNITED STATES (13,450-11,200B.P.) FORM PREPARED BY name/title: • David G. Anderson/Archeologist, Southeast Regional Archeology Center, National Park Service • David S. Brose/Director, Schiele Museum of Natural History • Dena F. Dincause/Archeologist, University of Massachusetts • Robert S. Grumet/Archeologist, Philadelphia Support Office, National Park Service • Michael J. Shott/Archeologist, University of Northern Iowa • Richard C. Waldbauer/Archeologist, Office of Archeology and Ethnography, National Park Service • Compiled and Edited by: Erika K. Martin Seibert/Archeologist, National Historic Landmarks Survey, National Park Service street & number: National Historic Landmarks Survey, NRHE, National Park Service telephone: 202/343-9513 city or town: Washington state: District of Columbia zip code: 20240		A, B, C, D sections E. statement of historic contexts F. associated property types G. geographical data H. summary of identification and evaluation methods I. major bibliographical references Figures and Tables Credits

CERTIFICATION

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR Part 60 and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. (___ See continuation sheet for additional comments.)

Signature and title of certifying official

Date

State or Federal agency and bureau

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Signature of the Keeper

Date

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▶ THE EARLIEST AMERICANS THEME STUDY	
INTRODUCTION <i>There is not anywhere upon the globe a large tract of country which we have discovered destitute of inhabitants, or whose first population can be fixed with any degree of historical certainty. And yet, as the most philosophical minds can seldom refrain from investigating the infancy of great nations, our curiosity consumes itself in toilsome and disappointed efforts.</i> (Edward Gibbon 1778:(I):188-189) Organization Since 1993 the Society for American Archaeology's National Historic Landmarks Archeology Committee, and the National Park Service (NPS) have worked together to develop a National Historic Landmark theme study on Paleoindian, or as it's also known here, Earliest American life in the eastern United States. The purpose of this theme study is to identify Paleoindian sites that best exemplify and illustrate nationally significant information about human occupation over vast regions of the eastern United States during the earliest periods of settlement, and where appropriate, develop National Historic Landmark (NHL) nominations for selected sites. In this theme study, the eastern United States has been divided into three regions: the Northeast, the Southeast, and the Midwest. This study is based on the evidence provided by archeological investigations and it therefore concentrates on the recoverable, physical remains of human, geological, technological, and environmental processes. When human beings reached the Americas is currently unknown, but permanent settlement, by populations that survived, and spread over the landscape, is currently believed to be prior to 13,500 years ago. Archeologists use three broad temporal and cultural periods to describe the Earliest American sites and assemblages: Initial Human Occupation (> ca. 13,450 B.P.), Widespread Settlement: Clovis and Related Assemblages (ca. 13,450–12,900 B.P.), and Terminal Paleoindian Occupations (ca. 12,900–11,200 B.P.). These are the time periods used in this document (see below under Chronological Considerations). Section E, Statement of Historic Contexts contains an introduction as well as detailed contexts including chronological, geographic, and environmental information for the three Paleoindian periods described above for each region, the Northeast, the Southeast and the Midwest. Section F., Associated Property Types, provides information about using the NHL and National Register Criteria. Though this is a theme study intended to identify properties as National Historic Landmarks, the National Register Criteria as well as the NHL Criteria are discussed because both sets of Criteria mutually support the different listings. National Register Criteria are also included so this study can be used for identifying those sites that are eligible to the National Register only. Because NHL Criterion 6 and National Register Criterion D will be used most often when evaluating sites, research needs and questions are examined in the introduction of Section F, and specifically for each region. Registration requirements are also detailed in this section. The introduction for Section F also offers an evaluation matrix that combines the NHL Criteria (research questions), registration requirements (including integrity), and the NHL thematic framework for ease in examining and evaluating these sites. An example of using the matrix is presented. A list of proposed Paleoindian sites is provided under each region in this section. Section G, Geographical Data provides the list of states that are covered in each region. Specific details about the history of this project are covered in Section H. Summary of Identification and Evaluations Methods. The table of contents lists major sections, subsections, and tables and figures for ease in the use of	E. statement of historic contexts introduction organization chronological considerations table 1 temporal and cultural subdivisions geography and environmental conditions interregional comparisons table 2 conclusions southeast context northeast context midwest context F. associated property types G. geographical data H. summary of identification and evaluation methods I. major bibliographical references Figures and Tables

this document. Also noted at the end of the table of contents, but worth repeating here, in this document, sites in **Bold** are **listed in the National Register**. Sites in ***Bold and Italics*** are ***listed in the National Register and designated NHLs***.

Chronological Considerations

When human beings reached the Americas is currently unknown but permanent settlement is currently believed to be prior to 13,500 years ago. Whether one migration or several occurred, and whether all were even successful is currently unknown. In this study, these first peoples are variously described as "Paleoindians," "Paleoamericans" or the "Earliest Americans." How far back in time initial colonization occurred, how many separate migrations took place, whether all these migrations were successful, and the geographical and biological affinities of these founding populations remains ambiguous, and are subjects currently under intensive investigation by archeologists.

As in the past, the fragmentary evidence used to reconstruct long-vanished landscapes and the identity, culture, and history of America's earliest occupants still spark interest and debate. Equally compelling are the faint images of people with unfamiliar cultural strategies coping with vastly different conditions in now familiar places. Today archeological sites preserve evidence of Paleoindian lives and times. Such sites are among the rarest and most threatened cultural resources in the nation and nowhere is this more true than in the eastern half of the country, where a few sites have dramatically transformed our ideas about America's deep past.

Until the 1920s, archeologists believed that people were relative newcomers to the Americas. Most Native peoples, on the other hand, believed their ancestors had been here from time immemorial. Archeologists' perspective changed with the discovery of human artifacts found in association with bones of now-extinct animals at the Folsom and Clovis sites in New Mexico. One of the investigators, Frank H.H. Roberts, is credited with first referring to these people as Paleoindians. Subsequent finds at the Lehner mammoth kill site in Arizona, demonstrated the antiquity of humans in North America, and fixed in the American imagination the image of the Paleoindians as Ice-Age big game hunters. This image guided the designation of Lehner and ten other sites as National Historic Landmarks in the first National Park Service archeological theme study. Prominent specialists, led by H. Marie Wormington, examined more than seventy sites dating to what were then regarded as the first millennia of human occupation. Acting on recommendations made by Wormington's team, the Secretary of the Interior designated nineteen of these as National Historic Landmarks on January 20, 1961.

Much has changed since the completion of that study. A surge of exploration often mandated by the National Historic Preservation Act of 1966 (as amended) and other preservation laws, resulted in the discovery of scores of Paleoindian sites and thousands of Paleoindian projectile point finds. Review of this research demonstrates reveals the need to update existing National Historic Landmark documentation and to nominate additional properties.

Indeed, new research has resulted in adding nine new Paleoindian properties as National Historic Landmarks during the past thirty years. Three of these, Virginia's ***Thunderbird District*** (designated in 1977), the ***Hardaway site*** in North Carolina (designated 1990), and the ***Hester site*** in Mississippi (designated 2000), are in the eastern half of the nation. In fact, nearly two-thirds of the seventy Paleoindian sites and districts listed in the National Register of Historic Places in that time lie east of the Mississippi. At the same time, archeological restudy of Missouri's ***Graham Cave***, the ***Modoc Rockshelter in Illinois***, and other places designated through Wormington's study have shown that several properties identified as Paleoindian date to more recent times. However, this document will deal with these sites because they were in an original theme study (*Prehistoric Hunters and Gatherers*, NPS 1960) that dealt with these early sites and should be located in the context of this updated version.

Archeologists analyzing new data drawn from these hundreds of Paleoindian properties are constructing a complex picture of Paleoindian life. Interdisciplinary teams of archeologists, geomorphologists, geophysicists, geochemists, palynologists, paleobiologists, and other specialists have devised techniques to recover previously overlooked tiny plant and animal remains through flotation and chemical analyses of soils. The charred nuts and plant remains, eggshells, and bones of turtles, birds, and other small animal bones from locales like ***Thunderbird*** National Historic Landmark and National Register properties such as Pennsylvania's ***Shawnee-Minisink site*** and the ***Metzig Garden site*** in Wisconsin, reveal that Paleoindians used more varied foods than previously

thought.

Increasingly accurate dating methods, and other innovative new techniques developed through these partnerships are shedding new light on the causes and consequences of the shift from Ice-Age adaptations towards more modern ways of life following the most recent retreats of glacial ice-sheets. Scholars meticulously analyzing well-stratified deposits at locales like Pennsylvania's **Meadowcroft Rockshelter** and Virginia's Cactus Hill site are challenging established notions about the age of the earliest sites.

Far from being simple big-game hunters, Paleoindians pursued a range of complex, flexible, and diverse survival strategies in a dynamic changing environment. And nowhere does that seem to have been more true than east of the Mississippi where new discoveries are altering our views of the continent's early occupation. And in the eastern United States, agriculture, land development and urban population expansion are creating new challenges for those responsible to interpret and protect the record of the ancient past.

In this document, calendar years before the present (BP) are employed in the text to describe dating of periods and events in the past. Radiocarbon dates or ages (rcbp) are also sometimes used, typically with a calibrated or calendar age provided. Tables accompany the text provide calendar and radiocarbon ages of the various temporal subdivisions employed in each part of the region, climatic events and cultural developments, and known radiocarbon dates. The reason for this is simple: the radiocarbon and calendar time scales are not in agreement this far back in the past.

That is, the further back in time we go, the greater the difference between calendar and radiocarbon years. During the Paleoindian era, radiocarbon ages are a thousand or more years too young, or recent, when compared with calendar time. Thus, for example, the traditional ending point for the Paleoindian era, 10,000 rcbp, is in reality 11,200 calendar years ago, a difference of 1200 years. This difference grows the further back in time we go, with profound implications for our interpretation of the archaeological record. A radiocarbon age of 11,500 years, for example, is actually 13,500 calendar years ago. Sound calibrations have recently been developed linking the radiocarbon and calendar timescales well back into the Late Pleistocene, to the limits of the radiocarbon dating technique (Hughen et al. 2000; Kitigawa and van der Plicht 1998; Stuiver et al. 1998). Paleoindian era, calendar years should be used whenever possible in interpretations and analyses (Anderson 2001:144; Fiedel 1999, 2000), and as noted above, in this document, we intend to provide radiocarbon years as well as calibrated dates throughout.

The Paleoindian archeological record in Eastern North America is discussed herein using the chronological and cultural historical conventions employed in each of the three regions examined, in the Northeast, Midwest, and Southeast. Specific stages or subperiods used in each region, together with information on associated cultural developments, climatic events, and associated calendar and radiocarbon ages, are provided in [Table 1](#). This concordance provides a basic frame of reference for Eastern North American Paleoindian assemblages, and is intended to make comparisons between the regions easier.

Paleoindian chronology in Eastern North America is based on a wide array of analytical procedures, including comparative typological analyses, specifically the cross-dating of distinctive artifacts found on Eastern sites with comparable specimens that have been found and dated elsewhere in the Americas. Absolute dating procedures that have been used include conventional and accelerator mass spectrometry (AMS) radiocarbon dating, optically stimulated luminescence (OSL) dating, and thermoluminescence (TL) dating. Conventional radiocarbon dating, based on the fixed rate of decay of the carbon-14 isotope, which is absorbed by all living organisms, is effective back to about 50,000 years.

A limitation of the procedure is that it requires fairly substantial amounts of carbon, in the tens of grams. AMS radiocarbon dating, in contrast, permits the use of very small carbon samples, on the order of a few hundred micrograms. As preservation of carbon on Eastern Paleoindian sites is often poor, due to their great age, the ability to date small fragments of charcoal through AMS dating makes the procedure an extremely important research tool.

Thermoluminescence and optically stimulated luminescence dating procedures provide measures of how much time has elapsed since certain materials were last exposed to high heat (i.e., >ca. 400 degrees Celcius) or sunlight, respectively. Quartz and feldspar are particularly sensitive materials

that these procedures can be applied to successfully, and have the advantage of being (typically) quite common on archeological sites. Great care must be taken in collecting these samples, however, since exposure to heat or light during collection will affect the results. Although less common than radiocarbon dating, in recent years these procedures are seeing increasing application in Paleoindian studies.

Other approaches used to determine the age of Paleoindian assemblages include geochronology and seriation. Geochronology focuses on the relative dating of cultural assemblages in geological strata, including the relationship of artifact-bearing assemblages to fixed, well dated geological strata, such as flooding events, ash deposits, or other readily recognizable strata. Seriation is a method of graphically and quantitatively exploring changes in artifact forms and assemblages over time. Based on the assumption that specific forms wax and wane in popularity, frequency diagrams or other analytical measures for specific artifact categories can be produced and compared, and the results used to order assemblage. While a great many sources of evidence and inference are used, the precise dating of many of the earliest assemblages in the Americas is highly imperfect or unknown. For this reason Paleoindian sites that can be securely dated are extremely important.

Temporal and Cultural Subdivisions

Three broad temporal and cultural periods are used to describe the sites and assemblages of Paleoindians.

- Initial Human Occupations (> ca. 13,450 B.P.)
- Widespread Settlement: Clovis and Related Assemblages (ca. 13,450–12,900 B.P.)
- Terminal Paleoindian Occupations (ca. 12,900–11,200 B.P.)

These intervals correspond to the period of the initial colonization of the Americas, the subsequent appearance of evidence for widespread settlement and, finally, the period of transition to a modern climatic and biotic regime.

Initial Human Occupations (> ca. 13,450 B.P., >11,500 rcbp)

When initial human occupation of the Eastern United States occurred is currently unknown, but is assumed to have been at least as early as 13,450 B.P. (i.e., > 11,500 rcbp). A number of sites that predate 13,450 B.P. are reported in the literature from the Eastern United States, but many remain controversial. Possible Initial Paleoindian sites in Eastern North America include Big Eddy in Missouri, Cactus Hill in Virginia, **Little Salt Spring** and Page-Ladson in Florida, **Meadowcroft Rockshelter** in Pennsylvania, and Topper in South Carolina. These and other sites are discussed in the regional summary chapters that follow.

During the twentieth century there was appreciable speculation about possible pebble tool industries and "pre-projectile point" horizons in the New World. Some of this followed on widely announced findings of Oldowan assemblages in East Africa, which led to questions as to whether human occupations in the New World could also have great antiquity. The debate also encompassed an issue that is important to this day, notably how does one recognize assemblages lacking distinctive bifacial forms, and use them in dating (e.g., Krieger 1962, 1964)?

The fact that assemblages dating to this period are comparatively uncommon in Eastern North America suggests human populations were themselves few and far between. Groups living within the region for any length of time, at least upwards of a few generations, would have almost certainly become visible archaeologically, through natural reproduction (Adams et al. 2001; Anderson and Gillam 2001). That this is not the case suggests population was extremely limited. Some of these assemblages may, accordingly, reflect "failed migrations," that is, the sites of groups who reached the region, but died out after one or a few generations, or else moved onward.

Widespread Settlement: Clovis and Related Assemblages (ca. 13,450–12,900 B.P., 11,500–10,800 rcbp)

The first unequivocal evidence for widespread human occupation in the New World dates to shortly after 13,450 B.P., when assemblages characterized by fluted points appear in many areas. Classic Clovis fluted points are a hallmark of these early assemblages. These points are typically relatively large lanceolates with nearly parallel sides, grinding on haft areas and up to one third or so of the

lateral margins, slightly concave bases, and single or multiple flutes that rarely extend more than a third of the way up the body (Sellards 1952; Wormington 1957). Clovis points have long been assumed to be the markers of the first populations to enter, explore, and settle in the hemisphere. Since it now appears that at least some people were in the New World prior to the widespread occurrence of Clovis technology, what may instead be represented is the radiation of a superior technological tradition. Clovis points have been dated to between ca. 13,250 and 12,900 B.P. at a number of locations in the southwest and lower plains (Fiedel 1999; Haynes 1987, 1992, 1993; Roosevelt et al. 1997; Taylor et al. 1996).

It has been suggested that within Paleoindian assemblages dating to this time, sites with prismatic blades and blade cores may be earlier than those without these artifacts, since this technology occurs on some western Clovis sites dated to at or before 13,000 B.P. (Ellis et al. 1998:159). Blades and blade cores are infrequent on northern Paleoindian sites, but they have been observed in some numbers at sites in the Southwest and Southeast (Anderson and Sassaman 1996; Faught 1996; Green 1963).

By shortly after 13,000 B.P., a diversification of projectile point forms occurred across North America, indicating a probable fragmenting of the widespread Clovis tradition, and the probable emergence of more geographically circumscribed subregional or regional cultural traditions. In the Plains, the Folsom culture appears to have emerged by or shortly after 13,000 B.P., and certainly by 12,850 B.P. (Fiedel 1999). It is probably safe to assume that similar successor cultures to Clovis were emerging about this same time. The end of this period is also the time of the sudden onset of the Younger Dryas, a period of intense cold worldwide, that continued through much of the ensuing terminal Paleoindian era. The fragmentation of Clovis culture and the emergence of more localized regional and subregional cultural traditions, it is argued, was brought about in part by the unexpected onset of these harsh conditions.

Terminal Paleoindian Occupations (ca. 12,900–11,200 B.P., 10,800–10,000 rcbp)

The final part of the Paleoindian era is dated from 12,900–11,200 B.P., and is a time of tremendous cultural and climatic change, trends that were probably closely related. The terminal Pleistocene extinctions were largely complete at the start of this period (Mead and Meltzer 1984), and human populations were likely quite low in many areas, while at its end, groups that appear to be fully adapted to Holocene biota and environmental conditions are present in large numbers. The Younger Dryas occurred during this time, from ca. 12,850–11,450 B.P., a major return to cold conditions whose onset appears to have occurred quite quickly, within a few years or decades (Hughen et al. 1998), and something that probably had a major impact on local cultures, as variously suggested in this chapter. A major radiocarbon plateau occurs during this interval, making the 800 radiocarbon "years" of the terminal Paleoindian era closer to 1400 calendar years. This greater span of time is more realistic given the dramatic changes in culture and biota that took place.

A wide range of projectile point forms appear and disappear in various parts of the continent during the terminal Paleoindian era, something that was puzzling prior to the recognition of the amount of time involved. Terminal Paleoindian point forms exhibit appreciable stylistic variability and in some cases fairly restricted spatial distributions, something interpreted as evidence for increasing regionalization or isolation of groups as population levels rose and group mobility decreased. The subperiod is interpreted as one in which regional and subregional cultural traditions became established, population levels grew dramatically, and technological organization changed to accommodate Holocene climate and biota (Anderson 1990a, 1995a, 1996; Ellis et al. 1998; Morse et al. 1996). The subsequent initial Holocene or Early Archaic period in the East is dated from 11,200 to 8,800 B.P. (10,000 to 8,000 rcbp). The beginning and ending dates correspond, roughly, to the Pleistocene/Holocene boundary and the onset of the Hypsithermal warming episode (Harland et al. 1982:44; Stoltman 1978:714). The 10,000 rcbp has long been in use, primarily because it is a distinctive and convenient number, and because a calibrated calendrical chronology simply did not exist until quite recently. However, no great changes in either climate or culture occur at this time, or after ca. 11,450 B.P. almost 1500 years earlier than the date implied using radiocarbon chronology. The end of the Younger Dryas and a return to warmer conditions, in fact, occurred about a century or two prior to this. It is suggested here that the end of the Younger Dryas may ultimately prove a more appropriate ending date for the Paleoindian era.

Geography and Environmental Conditions

During the period of presumed initial human settlement of Eastern North America, some time after the glacial maximum ca. 21,000 years ago, the Coastal Plain in many areas was almost twice its present size due to lowered sea levels. The Great Lakes did not exist, and in fact their locations were under massive ice sheets, which reached far into the United States, to the vicinity of the Ohio River in the Midwest and across almost all of New York and New England in the Northeast. Sea levels rose and fell dramatically in the Late Pleistocene, with vast areas alternately submerged and exposed, something that almost certainly profoundly affected early human settlement.

Plant and animal communities underwent profound changes during the Late Pleistocene, Paleoindian era. No modern analogs are known to exist for the plant and animal communities that were present in the region during the Late Pleistocene. Over 30 genera of large mammals that were present became extinct at the end of the Late Pleistocene era in North America, including animals such as dire wolves, saber-toothed tigers, giant ground sloths, horses, camels, mammoths, and mastodons (Martin 1984:361–363). While the hunting, butchering, and working of bone and ivory from large Pleistocene animals, the so-called megafauna, has been documented at a number of locations, the extent to which human predation contributed to these extinctions is unknown and subject to appreciable debate among archaeologists. Given that upwards of ten previous glacial cycles occurred earlier in the Pleistocene without any comparable extinctions, however, it is hard to imagine that humans did not have some impact (Diamond 1999:47). Great changes also occurred in the distribution and composition of vegetational communities over the region (Webb et al. 1993). In the Southeast, for example, while an oak-hickory hardwood forest was present during the glacial maximum across much of the lower part of the region, cold adapted northern tree species like spruce were present well into the midsouth in the interior, and on the Atlantic seaboard as far south as central South Carolina. As the climate warmed, these plant species spread north or died out locally.

Rapid glacial retreat in the north began during the Bolling, after ca. 14,500 B.P. (12,600 rcbp), and continued with comparatively minor fluctuations until the sudden onset of the Younger Dryas cold interval around 12,850 B.P. (10,900 rcbp). Assuming initial human entry occurred sometime during the Bolling, groups along the Atlantic and Gulf coasts would have been faced with a vast but slowly shrinking Coastal Plain, whose shoreline would be trending inland, save for comparatively minor movements in the other direction, during events like the Older Dryas (ca. 14,100–14,000 B.P.; 12,100–11,950 rcbp) and the Inter-Allerod Cold Period (ca. 13,400–13,150 B.P.; 11,400–11,100 rcbp). Likewise, groups in the upper Midwest and Northeast would have been faced with changes in the location of shorelines for glacial great lakes and, in the northeast, maritime incursions like the Champlain/Goldthwait seas. Clovis technology apparently appeared and spread widely during and immediately following the Inter-Allerod Cold Period, and had diversified into a number of subregional variants by or shortly after the start of the Younger Dryas (Fiedel 1999, 2000).

The Younger Dryas, from ca. 12,850–11,450 B.P. (ca. 10,900–10,100 rcbp), was a sudden and major return to colder conditions and dramatic climatic variability. Onset occurred almost instantaneously, within no more than ca. 10 to 40 years, well within the span of a human lifetime (Bjorck et al. 1996:1159; Graftenstein et al. 1999; Hughen et al. 1998). The changes in global climate that occurred during the Younger Dryas appear to have had a profound effect on both biota and human culture. 12,750 B.P. (10,800 rcbp), shortly after its onset, is the ending date assigned to both the megafaunal extinctions and the Paleoindian Clovis culture (Fiedel 1999; Grayson 1987; Mead and Meltzer 1984:447; Meltzer and Mead 1983; Taylor et al. 1996). The demise of key prey species, assuming megafaunal exploitation was an integral part of the Clovis adaptation, likely created appreciable subsistence uncertainty for human groups. These changes may have forced peoples to intensify the procurement of subsistence resources in smaller package sizes. This would have in turn almost certainly lessened the need for long-distance movement, and led to the increasing differentiation in assemblages observed at this time. That is, patterns of group movement over great distances to exploit presumably widely dispersed large sized prey packages changed, after the onset of the Younger Dryas, to more localized movements directed toward a wider range of smaller prey packages.

Increased use of plant foods may have also been brought about by these inferred changes in hunting strategies. If prey packages were smaller, they may have been less reliable on a regular basis, mandating experimentation and use of a wide array of resources. When first line resources were unavailable for whatever reason, early populations likely ate whatever was available, necessitating experimentation and the gradual expansion of knowledge about subsistence opportunities. These developments are traditionally assumed to have occurred over the course of the subsequent Archaic

stage (e.g., Caldwell 1958); in all likelihood, however, they began well back in the Paleoindian era (Curran and Dincauze 1977; Meltzer 1984a, 1988, 1993; Meltzer and Smith 1986; Walker 1997). As Late Pleistocene climatic events become better dated and their impacts on climate and physiography better understood, it is crucial that this information is used to interpret the archaeological record (Fiedel 1999; Haynes 1993; Taylor et al. 1996).

Paleoindian habitats have no strict analogues. Yet Midwestern Paleoindian habitats were roughly similar to modern ones found much further north. To some extent, the northern Midwest passed gradually from high Arctic to tundra to Subarctic conditions during the Paleoindian period. Further south glacial effects were attenuated but nevertheless felt. Very broadly, then, a modern latitudinal gradient from northern Minnesota to the Arctic Ocean encompasses some of the environmental variation that, at Pleistocene's end, was squeezed into the northern Midwest.

Landforms also differed. Today, the Great Lakes seem fixed and permanent. Yet their current form was set only within the past three millennia. If we recall their origins as, essentially, large lakes left behind by Pleistocene glaciers, we understand how the Great Lakes' extent and shorelines varied through time at Pleistocene's end. For the pre-13,500 B.P. period, the Michigan-Huron basin was occupied by a series of periglacial lakes higher than the modern level. A brief low stage was followed at the approximate start of the 13,500-10,800 B.P. period by Main Lake Algonquin, slightly higher than the modern lake levels. Later this high stage fell abruptly, exposing vast landscapes previously inundated. Then, the Great Lakes were smaller and Great Lakes states, especially Michigan, had much more land than they do now. The slow rise to the Nipissing high of ca. 6,000 B.P., reaching the earlier Algonquin stage, began during the terminal Paleoindian period.

Like the Midwest, the Paleoindian archaeological record of the Northeast region was profoundly reshaped during the Late Pleistocene. First the Atlantic Ocean rose, flooding across the Block Island Channel north of Long Island. The sea levels then dropped leaving a broad plain stretching many miles east of today's coastline. At the same time, large seas ("Champlain/Goldthwait Seas") filled the ice-depressed St. Lawrence lowland as far inland as western Vermont. It is likely that Paleoindians fishing and hunting sea mammals left sites on these once coastal but now high and dry or deeply drowned lands. The Younger Dryas climate reversal was very strongly expressed in the Northeast, where the temperate vegetation pulled back from its earlier northern limits, thereby reducing the biotic diversity on which people in the northeast once relied, just as archeology can demonstrate for Paleoindians farther west.

With the possible exception of eastern Beringia, no area of North America confronted people with greater challenges and opportunities than the northeast. River drainages were adapting to newly deglaciated landforms; large expanses of former glacial lake floors were filled by poorly drained swamps, and rivers running to the sea cut deeply into shore sediments. What is today New England was almost isolated from land areas to the west, almost a peninsula pendant from Vermont, with the deep Hudson trough carrying massive drainage by the deeply entrenched Hudson River carrying vast amounts of meltwater. Maine east of the Penobscot was apparently uninhabited, but the Maritime Provinces of Canada saw some use by Paleoindians. Although the Canadian Maritime Provinces were used by Paleoindians east of the Penobscot River, Maine seems not to have been occupied. Mammoths were apparently extinct in the region before the Younger Dryas, while mastodons died out just before or soon after people appeared. The only "Big Game" were cervids--elk, caribou, moose, white tail deer. The only large herbivores were elk, caribou, moose or white tail deer and the herds of caribou modeled for Ontario do not appear to have been present southeasterly at this time. North of the marine incursion lay St. Lawrence lowland seas, the waning Laurentide Ice Sheet affected climate in both summer and winter, partly offsetting the increased solar insolation of the time.

Interregional Comparisons

The three regional syntheses that follow, when compared, indicate that there were both appreciable similarities and differences between each area, both in the nature of the Paleoindian archaeological record, and in the kinds of climatic and biotic changes that were occurring, over the course of the Paleoindian era. These changes within Eastern North America, furthermore, exhibit similarities and differences with Paleoindian occupations in other parts of the Americas (e.g., Bonnicksen and Turnmire, eds., 1999).

One thing is immediately clear about the Paleoindian archaeological record in the Eastern United

States when compared with other parts of the Americas, and that is that it is far more extensive than perhaps traditionally assumed. The vast majority of fluted points documented to date in the 48 contiguous United States, for example, come from the East (Anderson and Faught 1998, 2000; see Table 2). Although fluting is sometimes considered a Great Plains Paleoindian tradition, there are far more of these artifacts in the East than in the West, and particularly in the Southeast. It has been suggested, in fact, that fluting technology probably originated somewhere in the Southeast or Midwest (Mason 1962).

Great variability in what is termed Paleoindian occurs over the Eastern United States. The Northeast Paleoindian culture area, for example, contrasts least with the Midwest and adjacent Canada, and most strongly with the Southeast. In very broad terms, two differing adaptational systems are thought to have been present in the East by some researchers. An earlier model consists of specialized hunters in the Northeast and upper Midwest, exploiting herd animals like caribou, and more generalized foragers in the Southeast, exploiting a wide array of resources (Meltzer 1988). More recent studies deal with considerably different strategies. Although Québec has no fluted point sites, Atlantic Canada and southern Ontario were contiguous territories for northeastern makers of fluted points and the lanceolate successors. The Great Lakes lowland and the St. Lawrence seas and lakes were major travel and transport routes into the Northeast; lying as they did just south of the Laurentide Ice Sheet they formed an influential limit on Paleoindian colonization of eastern North America. Canadian sites, geological dating, and tool typologies dominate Northeastern and Midwestern archaeology, but have been little noted or appreciated in the Southeast. The Debert, Nova Scotia site study (MacDonald 1968) was particularly influential in shaping the interpretation of northeastern Paleoindian culture; the monograph remains one of the finest Paleoindian site reports ever produced.

People moving into the uniquely dynamic environment of the northern lakes had to learn quickly how best to use the rapidly changing, often unpredictable ecology. They had to abandon skills and assumptions they relied on to the west and south. Initial recognition of these constraints on Paleoindians (e.g., Dincauze 1981c) was based on awareness of ecological patchiness. The dismissal of the constraints set northeastern Late Pleistocene studies into dead end debates for nearly two decades; the Northeast became viewed as marginal, a judgment unearned by Paleoindian behavior, and the rich local archaeological record. Once overextension of the "Clovis" terminology is abandoned, comparison of northeastern sites and cultural behavior is likely to be increasingly made to the Midwest, as differences in material culture and economies are seen more clearly to the south. It may eventually be possible to deal fully with the apparent delay in occupation of the glacial border areas of the continent. The Southeast takes prominence in comparisons in terminal Paleoindian times, when lanceolate bifaces were moved northeastward from both the northern Prairies and from Dalton and related cultures, and most definitively in the early Holocene as Early Archaic lifeways, exemplified by side and corner notched point traditions, extended northward. The resulting Cis-Appalachian Archaic cultural sphere apparently interrupted cultural influences from the west for several millennia.

Strong seasonal climate and the rarity of cave and rockshelter sites have made organic remains extremely scarce in the Northeast. Consequently, the status of claims for very early, Initial Paleoindian era sites cannot be evaluated. Research on Paleoindians in the Northeast is today colored by the extreme patchiness of environmental variables including knappable tool stones, by the private landholdings that characterize the area along with its early industrialization and intensive agriculture, and by the near invisibility of Native Americans until the last third of the twentieth century when consultation became possible and necessary. In addition, comparison with other areas has been delayed because of contrasting cultural histories north and south in the region. Especially in terminal Paleoindian and Early Archaic times, these differences have confounded comparisons.

What is needed are careful comparisons of settlement systems, site assemblages, and specific artifact types between differing parts of the East. At the present, for example, we do not have a good understanding of the chronological and possible cultural meaning of morphological variability within even the most classic Paleoindian artifact category, fluted points. It is clear that appreciable variability in the size and shape of fluted points exists within and between parts of Eastern North America, but with few exceptions (e.g., Meltzer 1984b), little systematic comparative investigation of the projectile point data that exists has been attempted.

Conclusions

Due to the general scarcity of Paleoindian materials, and the comparatively little that is known about these occupations, every effort should be made to increase knowledge of this period, and to preserve the information that remains. In this section a number of observations and explicit recommendations are advanced that can greatly improve our ability to locate, evaluate, understand, and preserve Paleoindian historic properties. These include expanding current efforts to locate and record Paleoindian artifacts, establishing procedures to systematically record materials in private collections, reanalyzing early professional archeological collections, preserving significant sites through National Register of Historic Places and National Historic Landmark designation, acquisition, or site stewardship programs, and standardizing the archaeological literature, site, and collections data in and between states.

The recording of information about Paleoindian artifacts in the Eastern United States has been and continues to be a largely voluntary, successful and noteworthy collaboration between avocational and professional archaeologists. This effort has tended to focus on fluted projectile points. With the exception of a few states, little effort has been made to record later Paleoindian notched or unfluted lanceolate points, and efforts directed to other possible artifact types have focused on rare or unusual tool forms, such as the Edgefield scraper (Michie 1968, 1972). Professional archaeologists working on National Historic Preservation Act (NHPA 1966 as amended, Section 106) and National Environmental Policy Act (NEPA 1969 as amended) compliance projects, or applying for state or federal grants should be encouraged to systematically document Paleoindian artifacts as they encounter them, and submit this data to central repositories in each state. In most states, information about Paleoindian artifacts is usually compiled by one or a few dedicated individuals, who examine the literature and collections. Ideally, such activities should be incorporated under the duties of state archaeological authorities, or undertaken voluntarily by teams of local professionals or avocationalists. An exceptional example of this kind of team multidisciplinary research effort, engaged in the compilation of Late Pleistocene archaeological and paleoenvironmental data, is that underway for the Northeast, with data available in electronic form (Bradley 2001; Newby 2001).

Another type of activity that would greatly improve our knowledge of Paleoindian occupations would be the re-analysis of collections from earlier professional archaeological projects for evidence of Paleoindian components. A particular focus for research would be the poorly reported materials gathered by projects such as the Smithsonian Institution's River Basin Survey projects. Measurements were only rarely provided for Paleoindian artifacts found during many of these projects, and in some cases, given the period in which this research took place, the antiquity of many of the specimens was not even recognized.

Avocational participation in the recording of Paleoindian diagnostics should also be strongly encouraged. Millions of Indian artifacts are in the hands of private collectors. These collections should be examined by either professional or knowledgeable avocational archaeologists for the presence of Paleoindian artifacts. When such artifacts are found they should be documented through measurement, drawing, and photography, with the resulting data curated at a responsible institution, and with a form filled out and filed with the state Paleoindian artifact survey project. Site forms should be completed for locations producing these diagnostics, and these locations should be visited and their conditions verified by someone with archaeological training. Such data can be useful for distributional and settlement analyses, as noted, and they can also be used to examine effects of collector activity, artifact visibility, and land use patterns (Lepper 1983a, b, 1985; Seaman and Prufer 1982, 1984). Care must attend the recording of private collection data, however, given the increasing number of replicas manufactured and sold to satisfy the antiquities market.

A limited amount of collections analysis is undertaken by members of the professional archaeological community. The amount of material in private hands is so great, however, that only a tiny fraction is ever examined. Most of the remaining artifacts are either lost, destroyed, or sold, and in almost every case once they have passed out of the discoverers' hands their context, and hence scientific usefulness, is lost. Collectors must be taught, through programs of public outreach, the importance of the materials they own. Booklets identifying key projectile point types, and particularly Paleoindian forms, together with instructions on how to document or donate such materials to state or university collections, could be produced to encourage this effort.

Reliable data on the nature and occurrence of Paleoindian assemblages is crucial to effective management and research. Compiling information about Paleoindian assemblages is a major task, and requires that at least one person or ideally a team in each state or region conscientiously reviews and compiles information about these occupations. Typically, such projects start out as artifact

recording projects, of which “fluted point surveys” are the best known. In no state, at present, is information about other Paleoindian artifact categories systematically recorded. Such work is crucial, however, and must be encouraged.

Information about Paleoindian site locations is routinely done by state site file managers. When coupled with detailed information about the kinds of artifacts found at each site, and particularly the periods of occupation represented by these artifacts, site file data can be used to generate distributional maps. When site locational data is incorporated into a GIS with a range of data layers, encompassing natural resources, hydrology, geology, and so on, this information can be further used to develop and test various models of site location and prehistoric settlement. Perhaps the finest example of this type of data compilation and analysis effort to date has been conducted in northeast Arkansas. There, in a test of existing Paleoindian settlement models, Gillam (1996a, 1996b, n.d.) plotted the distribution of Middle and Terminal Paleoindian fluted point and Dalton sites on the landscape. This research has generated a wealth of new insight into the kinds of resources that appear to have been targeted by these peoples, and how settlement changed over time. Critical to such analyses, however, will be having accurate data on the nature of the Paleoindian assemblages present on sites. While site file records are computerized in most states, the quality of this data varies appreciably (e.g., Anderson and Horak 1995).

To produce useful overviews of Paleoindian resources, greater effort directed to data collection and standardization will be needed. Thus, while at present it is simply not possible to easily generate more than a few distribution maps for major Paleoindian sites or artifact categories, it is possible to generate such maps in a number of states. As site file records improve, however, producing nationwide maps should prove increasingly feasible, and should serve as a major focus for research. As an aside, until Paleoindian sites are well published, they can contribute little to our understanding.

As part of this effort, a comprehensive search of the archaeological literature for mention of Paleoindian artifacts should be conducted, and the location of these artifacts determined. This information should be compiled and consolidated electronically and incorporated into a GIS. Given the vast number of unpublished CRM reports, and the masses of manuscripts, notes, and other project records in state, university, and private repositories, many of which are all but inaccessible, this will be an extended task. Such activity will eventually need to be undertaken, however, for evidence about Paleoindian as well as subsequent occupations. Paleoindian artifacts identified as the result of such a survey should be located and their curatorial disposition noted, and then they should be measured and photographed, with the resulting data entered into the Paleoindian artifact recording project files. Updated information from all of these kinds of data gathering activities should also be appended to state site forms, or used to generate new forms.

A number of strategies can be used to preserve significant Paleoindian sites. First, National Register of Historic Places and National Historic Landmark nominations should be prepared for significant sites. Second, the professional and avocational archaeological community should encourage and support the criminal prosecution of individuals who loot archaeological sites or knowingly excavate human remains on public or private lands. If existing statutes fail to address these activities, corrective legislation should be prepared and presented before state legislatures. Owners of archaeological sites should be encouraged to prosecute looters, and members of the avocational and professional archaeological community should be willing, if called upon, to provide testimony about the destructive consequences of this kind of activity. Third, educational programs should be initiated that are directed toward instilling a conservation/preservation ethic among the nation’s citizens. A segment on prehistory should be taught at the grade school and again at the high school level as a part of social studies and history classes. Fourth, states may wish to consider adopting a state landmark program, like the program currently in operation in Kentucky, where private landowners agree to preserve significant sites on their property (Henderson 1989). Such state programs would complement the NHL process, and assist in the collection of information needed to proceed with NHL nominations.

So few significant Paleoindian sites are known to exist that their acquisition and permanent protection should be considered whenever possible. Such sites could be purchased by state or local governments for use as parks or wildlife management areas, or by private organizations such as the Archaeological Conservancy or the Nature Conservancy, and maintained by these groups. If acquisition occurs, management of the property must be such as to preclude the possibility of looting. Provisions for regular monitoring should be set in place, and criminal proceedings should be

brought against individuals found trespassing or excavating on the property. Programs for professional archaeological investigations at acquired sites, furthermore, should be conducted only by individuals and organizations meeting the highest professional standards. Every SHPO has published explicit standards by which archaeological research is to proceed, and specific standards for Paleoindian sites have been included with some of the historic contexts that have been produced.

The specific recommendations advanced above should be implemented as soon as possible by the professional and avocational archaeological communities. We must never lose sight of the fact that the primary objective of this research is to shed light on the human groups that left these remains behind. The Paleoindian inhabitants of the Eastern United States are among the least understood of its occupants. Their proper investigation, therefore, is one of our greatest challenges.

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SOUTHEAST REGIONAL CONTEXT Introduction The Southeastern United States is a critical area for understanding early human occupation in the New World. Diagnostic Late Pleistocene era artifacts have been found in large numbers and on a wide range of site types, indicating the region was intensively occupied. The numbers of Paleoindian projectile points found in the Southeast are so high, and their morphological variation so great, in fact, that the region may have been among the earliest settled, and was unquestionably a center of technological and social innovation and differentiation throughout the period. Clear evidence for occupational continuity through time has been found in several areas, giving the region one of the best documented records in the New World of the changes that occurred during the transition from fluted to non-fluted industries. Major concentrations of Paleoindian sites and artifacts occur along the major drainages of the Midsouth and near quarry areas on the Gulf and Atlantic slopes, while other areas such as portions of the Gulf and Atlantic Coastal Plain have produced far fewer sites and artifacts, and hence appear to have been less intensively occupied or exploited throughout the period. Settlement and subsistence systems in the region, while the subject of innovative analysis, description and modeling, however, are still not well understood. We do not know whether Paleoindian populations were highly specialized hunters who regularly targeted megafauna, perhaps contributing to their extinction, or more generalized foragers who made use of a wide range of resources, or (more probably, as need dictated) both. Likewise, while sites and assemblages are widespread after 13,500 years ago, and evidence suggesting even older occupations has been found at several sites, we still do not know when people entered the region. How archaeological evidence about the earliest inhabitants of the Southeast is recognized, analyzed, and managed in the exploration and evaluation of these kinds of questions is a goal of this regional context. The National Historic Landmark (NHL) and National Register of Historic Places (NRHP) status of southeastern archaeological sites depends on their past contribution to the body of scientific inquiry and on their potential for answering current research questions. As our database about southeastern Paleoindian archaeology has expanded, so too have efforts to manage and organize the information. Historic contexts encompassing the Paleoindian archaeological record have been produced in a number of southeastern states, including Arkansas (Davis 1982), Florida (Dunbar n.d.), Georgia (Anderson et al.1990), Kentucky (Tankersley 1990a), Louisiana (Smith et al. 1983), Mississippi (McGahey n.d.), South Carolina (Anderson and Sassaman 1992; Anderson et al., eds., 1992), Tennessee (Broster 1987), and Virginia (Wittkofski and Reinhart, eds., 1989), and also for the entire region (Anderson et al., eds., 1992; Barnes n.d.). These studies range from detailed, monograph-length presentations of primary data, research approaches, and management strategies in Georgia, Kentucky, and South Carolina, to more limited position papers or outlines in the remaining states. All of these documents, however, are fundamental guides to research design and resource management in their respective states. This regional context is designed to synthesize, and complement, the results of this earlier work. Chronological Considerations for the Southeast In this section, the Paleoindian archaeological record in the Southeast is discussed in general terms, by the known or inferred age of the assemblages in question, without resorting to specific stages or subperiods. Initial Paleoindian occupation of the region is currently unknown, but is assumed to have been upwards of 13,450 B.P. (i.e., >11,500 rcbp). The first widespread evidence for human occupation is associated with Clovis and related fluted point assemblages, which are inferred to occur between roughly 13,450-12,900 B.P. (i.e., ca. 11,500-10,800 rcbp). Terminal Paleoindian occupations, closely associated with the Younger Dryas climate interval, the ending of which marked the onset of the Holocene, date from roughly 12,900-11,450 B.P. (ca.10,800-10,000 rcbp). These intervals have elsewhere been formalized into a new chronology for the period, consisting of	E. statement of historic contexts introduction southeast context figure 1 introduction chronological considerations for the southeast table 3 table 4 figure 2 geography and environmental conditions in the southeast figure 3 northeast context midwest context F. associated property types G. geographical data H. summary of identification and evaluation methods I. major bibliographical references Figures and Tables

Early, Middle, and Late Paleoindian subperiods (Anderson 2001, n.d.).

These temporal ranges are roughly comparable to chronological/stage formulations currently in use in the Southeast, such as the Early (11,500-10,750 rcbp) and Late (10,750-10,000 rcbp) Paleoindian framework advanced by Morse, Anderson, and Goodyear (1996) or the Early (11,500-10,900 rcbp), Middle (10,900-10,500 rcbp), and Late (10,500-10,000 rcbp) Paleoindian subperiods offered by Anderson (1990a). The important difference is the addition of an initial or Early Paleoindian subperiod to cover presumed pre-Clovis occupations. Goodyear (1999a:435-441) was the first to publicly call for the addition of a pre-Clovis stage in the Southeast, whose need was justified by accumulating evidence for occupations dating to this time. It is a testimony to the rate at which our thoughts about early occupations are changing that, prior to the widespread acceptance of Monte Verde's antiquity in the mid-1990s, occupations predating 13,450 B.P. in the region, that is, pre-Clovis in age, were not considered plausible enough to warrant a stage or subperiod designation in local sequences (e.g., see Anderson and Sassaman, eds., 1996). [Table 3](#) offers a combined radiocarbon/calendrical timescale for southeastern Paleoindian assemblages, while [Table 4](#) provides a listing of radiocarbon dates reported from Paleoindian sites in the region. [Table 4](#) must be viewed as a partial listing, because many dates are either not reported, or are incompletely reported. Examples of temporally diagnostic Paleoindian projectile point types from the Southeast are illustrated in [Figure 2](#).

Table 3. A Combined Radiocarbon /Calendrical Timescale for Southeastern Paleoindian Assemblages. (calibrated dates derived from Stuiver et al. 1998)

[\[Long description\]](#)

Calendar BP	Radiocarbon rcbp	Stage	Culture Complex	Climatic Event
8986; 8874; 8825; 8819	8,000			
	8,000 -9,000		Bifurcate	
10,189	9,000	Early Archaic		Boreal
10,736; 10,708; 10,702	9,500		Corner Notched	
11,254; 11,253; 11,234; 11,545; 11,512	9,900			
11,400; 11,391; 11,340; 11,687; 11,677	10,000			
11, 642	10,100			Younger Dryas ends / Preboreal
11,930; 11,804; 11,768	10,200	Late Paleoindian	Early Side Notched	
12,622; 12, 472; 12,390	10,500		Dalton	
	10,500 - 10,800		Quad / Beaver Lake	
12,899	10,800			
	10,800 - 10,900		Cumberland / Folsom	
12,944	10,900			Younger Dryas begins
13,132	11,100	Middle Paleoindian		Inter-Allerød Cold Period ends
13,155	11,200		Clovis widespread	
13,455	11,500			
	11,500 - 11,750		Clovis beginnings?	
13,811	11,750			Allerød
14,043; 13,923; 13,858	11,950			Older Dryas ends
14,065	12,000		Little Salt Spring / Page-Ladson	
	12,000 - 12,100	Early Paleoindian		
14,100	12,100			Older Dryas begins
	12,100 - 12,500		Monte Verde	
15,084; 14,731; 14,382	12,500			
15,231; 14,606; 14,449	12,600			Bølling begins

	12,600-16,000		Meadowcroft (?)	
19,091	16,000		Cactus Hill (?)	
21,392	18,000		Initial Colonization (?)	Glacial maximum

The Initial Human Occupation of the Southeast
(> ca. 13,450 B.P., >11,500 rcbp)

The nature of initial human settlement in the Southeast is largely an enigma at present. Assemblages that appear to predate 13,450 B.P. have been found at a number of locations, such as Cactus Hill (44SX202), **Little Salt Spring** (8So18), Saltville (44SM37), Page-Ladson (8Je591), and Topper (38AL23). Unfortunately, the dating of some of these sites, and in some cases the artifacts themselves, is somewhat equivocal at present (although, as we shall see below, recent evidence from three of them, Cactus Hill, Topper, and Saltville, increasingly supports an early dating). While there are thus tantalizing hints of early human occupation in the region, well dated sites with extensive artifact assemblages have yet to be found [with the possible exception of Cactus Hill, where work is ongoing, and where increasing evidence suggests a very early occupation (McAvoy et al. 2000)]. No diagnostic artifacts are currently known that unambiguously identify pre-11,500 rcbp (11,450 B.P.) assemblages in the Southeast and, indeed, few sites have been excavated that are widely accepted as dating to this period. Our sample of sites of this time period is thus in no way representative or complete, even to major type.

That human colonization and settlement of the Southeast occurred prior to 11,500 rcbp, however, must be considered possible, given the general acceptance of the dating of the Monte Verde site in Chile at ca. 12,000 to 12,500 rcbp (ca. 14,000 to 14,750 B.P.) (Bonnichsen and Turnmire 1999; Dillehay 1989, 1997; Meltzer et al. 1997). If people could have reached the southern cone of South America by some time prior to 12,000 rcbp, they probably could just as easily have reached the southeastern United States by this time or soon thereafter. Whether they were successful and survived, or died out (i.e., representing "failed migrations"), is currently unknown. The spotty nature of the archaeological record from this era, over both time and space, suggests the latter, or else extremely small populations, possibly occupying portions of the region now largely inaccessible, such as on the continental shelf.

When the first people arrived in the Southeast remains unknown, although a number of sites have yielded evidence suggesting initial occupation might have begun up to several thousand years prior to 11,500 rcbp (13,450 B.P.). About this time or shortly thereafter, however, Clovis assemblages occur widely across the region. Whether fluted point assemblages were present prior to this is currently unknown, although some data from the Southeast hints at such a possibility. Traditionally, sites occurring prior to the widespread appearance of fluted points are called "pre-Clovis," a term that can continue to be used quite effectively to describe possible pre-11,500 rcbp occupations in the Southeast, at least until specific assemblages or artifact categories can be recognized and named. While diagnostics remain elusive, there are indications at sites like Cactus Hill in Virginia and **Meadowcroft** in Pennsylvania that large and small blades, and possibly triangular and lanceolate point forms, may come to be recognized as diagnostic indicators of extremely early, pre-Clovis occupations (Adovasio et al. 1999:427-428; McAvoy and McAvoy 1997).

In light of the paradigm shift represented by the widespread acceptance of the antiquity of the Monte Verde site, a reevaluation of early assemblages should be made in the Southeast. Thus, while controversy has surrounded the dating of the **Meadowcroft** rock shelter deposits from southwestern Pennsylvania (e.g., Haynes 1992:367, but see Goldberg and Arpin 1999:340 and Adovasio et al. 1999, who appear to have effectively refuted arguments against the dating), more attention should be paid to the stratigraphic relationships evidenced at the site, and the viability of the Miller Lanceolate as a possible pre-Clovis point type (Adovasio et al. 1978, 1990, 1999; this is particularly important in light of the recent discovery of similarly unfluted "Early Triangular" points and a blade industry in apparent pre-Clovis context at Cactus Hill in Virginia). Equally important, increased effort should be made to look for early assemblages in stratigraphic contexts that are traditionally ignored in the Southeast, such as below late Pleistocene/early Holocene alluvium or colluvium (Goodyear 1999a, n.d.). Direct physical examination of individual specimens should also help resolve questions of their antiquity. Thus, the Natchez pelvis, which was found with Late Pleistocene megafaunal remains and initially thought on the basis of fluorine testing to have great antiquity, was recently AMS dated to 5580±80 rcbp (AA-4051) (Cotter 1991; M. Smith 1993:63).

A goal of all such work should be the development of Criteria for the relatively easy recognition of early, pre-Clovis age Paleoindian assemblages in the Southeast.

Widespread Settlement: Clovis and Related Assemblages in the Southeast
(ca. 13,450-12,900 B.P., 11,500-10,800 rcbp)

The first unequivocal evidence for widespread human occupation in the Southeast dates to shortly after 11,500 rcbp (13,450 B.P.), when assemblages characterized by fluted points appear widely over the region. While appreciable variation in size and shape is evident on local fluted forms, many of these points are indistinguishable from Clovis fluted points found on the Plains and in the Southwest, and many are called by that name. Other names sometimes used to describe Clovis-like points in the Southeast include Ross County, Eastern Clovis and Gainey (MacDonald 1983; Mason 1962; Perino 1985, 1991; Prufer and Baby 1963:15; Shott 1986a; Simons et al. 1984). Clovis points have long been assumed to be the markers of the first populations to enter, explore, and settle into the region. Since it now appears likely that at least some people were in the region prior to the widespread occurrence of Clovis technology, what may instead be represented is the radiation of a superior technological tradition, or the first successful (i.e., reproductively viable) extended settlement.

The widespread appearance of Clovis and related point forms is assumed to reflect the rapid growth and expansion of human populations within the region, with permanent settlement occurring in many areas. These peoples were highly mobile, ranging over large areas, and targeting a wide range of biota, including megafauna. There appears little doubt some parts of the region were highly favored, particularly the terrain along the major rivers of the Midsouth and Midwest, including the Mississippi, Ohio, Cumberland, and Tennessee, and portions of Florida and the Atlantic Coastal Plain. These settings are assumed to have been staging areas, locations rich in game, plant foods, and other resources of value to these early populations, where permanent settlements were established and distinctive subregional cultural traditions emerged (Anderson 1990, 1996). These resource-rich settings, with a well established human presence, would have been ideal places from which to explore and settle the larger region.

Settlement in the Southeast by peoples using Clovis and related assemblages also appears to have been shaped, to some extent, by the occurrence of high quality chert and other knappable stone types on the landscape, raw materials these populations preferred for their toolkits, which typically contained a wide range of well made, highly specialized forms, such as scrapers, gravers, and perforators (Gardner 1977, 1983, 1989; Goodyear 1979).

Few radiocarbon dates exist for Clovis and related assemblages in the Southeast (Table 4). At present, fluted Clovis and Clovis-like points are the only artifact category that can be used to unambiguously document sites created by these peoples. Another possible diagnostic artifact category, prismatic blades and blade cores (e.g., Collins 1999; Green 1963), are actually of somewhat doubtful utility. Blades and blade cores have been observed in some numbers at several presumed Clovis age sites in the Southeast, such as Adams, Carson-Conn-Short, and Wells Creek Crater, and possibly at the Pine Tree and Quad sites in Alabama and the LeCroy and Nuckolls sites in Tennessee (Broster and Norton 1996:290-293; Broster et al. 1994, 1996; Dragoo 1973; Nami et al. 1996; Sanders 1990:67). The presence of blade industries at Cactus Hill in possible pre-Clovis context (McAvoy and McAvoy 1997:111, 157) indicates that this technology may occur very early in the Southeast, and may eventually prove useful in seriating early from later Paleoindian assemblages. Given the presence of unequivocal blade technology in some extremely late Paleoindian contexts, such as at Dust Cave in Alabama (Meeks 1994), however, care must be taken to avoid equating blade industries with Clovis or pre-Clovis Paleoindian occupations. Other possible diagnostics, such as worked bone or ivory from extinct species, likewise suggest only use of these materials when these animals were still present in the region (i.e., >10,800rcbp; 12,900 B.P.), and even then care must be taken to differentiate fresh or green material from older scavenged bone and ivory used by later peoples (Dunbar and Webb 1996).

Terminal Paleoindian Occupations in the Southeast
(ca. 12,900-11,450 B.P., 10,800-10,000 rcbp)

The interval from 10,800 to 10,000 rcbp is a time of tremendous cultural and climatic change in the Southeast, roughly corresponding to the Younger Dryas climate interval, the completion of the late Pleistocene faunal extinctions, and the abandonment of Clovis fluting technology, in all probability closely related phenomena (Anderson 2001; Fiedel 1999; Taylor et al. 1996). A wide range of

projectile point forms appeared and disappeared in various parts of the region, something that was quite puzzling prior to the recognition of the vast amount of time represented by this interval. Projectile point forms exhibit appreciable stylistic variability and in some cases fairly restricted spatial distributions, something interpreted as evidence for increasing regionalization or isolation of groups as population levels rose and group mobility decreased. Regional and subregional cultural traditions became widely established, population levels grew dramatically, and technological organization changed to accommodate Holocene climate and biota (Anderson 1990a, 1995a, 1996, 2001; Ellis et al. 1998; Morse et al. 1996). Well made stone tools characterized by a variety of specialized tool forms continued to occur, although these were increasingly made on locally available and often lower quality raw materials than before. The decline in the use of high quality raw materials is thought due, in part, to a decrease in group mobility, specifically the areas over which these groups moved. A decrease in mobility would have meant these groups had less opportunity to visit stone sources at great distances, and would have also had less need for high quality materials, since they would rarely be ranging far from sources, assuming stone was available locally. Other factors prompting a switch to lower quality raw materials could have included the exhaustion of readily available high quality chert at source areas, the alluvial/colluvial covering of outcrops due to erosion, possibly resulting from changes in climate and biota, and the inundation of source areas due to rising sea levels, both on the now-submerged continental shelf and in the interior due to changes in stream gradients (Tesar 1994:88, 1996:38; see also Goodyear 1999a).

From ca. 10,800 to 10,500 rcbp/12,900-12,500 B.P., identifiable southeastern projectile point forms include fluted, basally thinned, and unfluted forms, including some or all of the following types: Beaver Lake, Clovis Variant, Cumberland, Dalton, Quad, Suwannee, and Simpson, as well as a number of Plains Paleoindian forms in the western part of the region such as Folsom, Plainview, Midland, and Angostura (Figure 2). Sometime around or after ca. 10,500 rcbp/12,500 B.P., however, Dalton points become common over much of the Southeast, with a number of distinct named subtypes or variants occurring in specific areas, such as Colbert, Greenbrier, Hardaway, and Nucholls, as well as related forms such as San Patrice vars. Hope and St. Johns. Only in Florida are Dalton points rare, although some researchers believe that the Suwannee point is a local equivalent. Dalton points may also be rare in parts of the Middle Atlantic region (Fiedel, personal communication); plotting the regional distribution of the form would appear to be potentially quite rewarding. By ca. 10,200 rcbp/11,850 B.P., side notched point forms appear, as documented by dates at both the Dust Cave and Page-Ladson sites, and by 10,000 rcbp/11,450 B.P. or soon thereafter this point form is found in large numbers in many parts of the region.

With the passing of megafauna, human populations would have had no choice but to target smaller game animals, a practice that might have led to a more diversified subsistence economy (if one or a few big game species were the prey of choice previously), although there can be little doubt that human populations have always made opportunistic use of a wide range of species when favored resources were not available. A fundamental reorganization in culture and technological organization, in fact, characterizes the Clovis to post-Clovis transition, something reflected in the appearance of notched and resharpened points, greater use of local lithic raw materials, and a marked increase in the number of sites scattered widely over the landscape, including in rockshelters (Anderson 1990a, 1996; Dunbar and Webb 1996:352; Walthall 1998). These changes are thought to reflect increasing population levels and decreasing group ranges, and a change in subsistence from the exploitation of Late Pleistocene to essentially modern floral and faunal communities. In particular, the change in point forms from lanceolate to serrated and notched types is thought to reflect a change from the occasional procurement of very large animals, such as mastodon, to a need to kill and process large numbers of much smaller and more dispersed game animals, such as deer.

Few absolute dates exist for Paleoindian point forms in the Southeast, particularly for the interval prior to ca. 10,500 rcbp/12,500 B.P. (Table 4). Our ideas on the dating of many point forms, accordingly, are tentative, and rely on stratigraphic evidence and on comparisons with morphologically similar forms securely dated in other regions. Thus, the Cumberland type, which is characterized by fine marginal pressure flaking and flutes running the length of the blade in many cases, is thought to be an Eastern Woodlands equivalent of Folsom technology, and hence occur about the same general time as that form occurs in the west, where it has been well dated to between ca. 11,000 to 10,300 rcbp/13,000 to 12,200 B.P. (Fiedel 1999; Tankersley 1990a:78). Some eastern Folsom points (Munson 1990) also resemble Barnes points, and all three types may be related. Daltons, in contrast, appear to span a much longer range, with some points exhibiting true fluting and hence perhaps occurring fairly early, while other Dalton points have pronounced shoulders,

beveling, and notches, attributes ubiquitous on succeeding Early Archaic forms, and are hence thought to be fairly late (Ellis et al. 1998:159). Likewise, fluted points with deeply indented bases have been dated to ca. 10,600 rcbp/12,725 B.P. at Debert and other sites in the Northeast (Levine 1990; see also Bonnicksen and Will 1999), and a comparable age for similar fluted point forms may be indicated in the Southeast. Given the great variety of point forms observed during this interval, and the restricted geographic distribution many of them have, there can be little doubt that many distinctive forms were contemporaneous during the last part of the Paleoindian era.

Initial Holocene Early Archaic Assemblages in the Southeast
(ca. 11,450-8900 B.P., 10,000-8,000 rcbp)

Dense populations were present across much of the Southeast during the Early Archaic period, as evidenced by large numbers of sites and artifacts, which occur widely over the landscape. Band level groups exploiting modern biota are assumed to have been present, making use of most if not all parts of the landscape, continuing the pattern of land use that began with Dalton (Gillam 1996, 1999; Morse 1973, 1977, 1997b; O'Steen 1983, 1996; O'Steen et al. 1986; Walthall 1998). The highly curated Paleoindian toolkit continued in use, although it was gradually replaced by more expedient tool forms in many areas by the end of the period. Group ranges were much diminished, to within single drainages if not portions of drainages. Lower quality raw materials were increasingly utilized in stone tool manufacture. A number of distinct subregional cultural traditions are present characterized by localized point forms, again like the pattern seen earlier, Dalton and related assemblages.

Early Archaic components in the Southeast are recognized by the occurrence of successive side- and corner-notched and bifurcate-based points (e.g., Bense 1994; Chapman 1985; Coe 1964). Some point forms that begin in the Paleoindian period, such as Dalton and side-notched types, and some western Plano forms, appear to extend into the Early Archaic period. Dalton points are thought to extend no later than about 9900 rcbp/11,250 B.P., although several later dates have been reported running as late as ca. 9000 rcbp/10,200 B.P. (c.f., Goodyear 1982; Walthall 1998). It is unlikely that Dalton continued much later than 10,000 rcbp, however, given the fairly appreciable numbers of radiocarbon dates that have accumulated for side and corner notched points beginning at ca. 10,200 rcbp/11,850 B.P. and particularly after 10,000 rcbp/11,450 B.P. (e.g., Chapman 1985; Driskell 1994, 1996; Dunbar et al. 1988), and the absence of evidence for a cooccurrence of Dalton with these notched forms. Side-notched points themselves appear to continue no later in time than ca. 9500 to 9000 rcbp/10,700 to 10,200 B.P., after which corner notched types such as the Palmer and Kirk types, and Hardin Stemmed points occur. These are in turn followed by a series of bifurcate forms, including the MacCorkle, St. Albans, LeCroy, and Kanawha types, dating from ca. 8900 to 7800 rcbp/10,025 to 8600 B.P. (Chapman 1985).

Geography and Environmental Conditions in the Southeast

The southeastern United States as defined in this study encompasses the modern political units of Alabama, Arkansas, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. This region, while demarcated by modern political and resource management considerations, closely corresponds to various definitions of a southeastern Native American culture area advanced by anthropologists over the past century. That is, the area contains a number of related societies whose cultural similarities are believed due, in part, to fundamental characteristics of environment and geography, and to a shared history. The Southeast retains such an identity to this day, although precise definitions of what constitutes its boundaries vary somewhat from person to person (see Smith 1986 for a map showing various scholarly definitions of the Native American southeastern cultural area, none of which, however, vary appreciably from one another).

The Southeast roughly corresponds to the lands south and east of the Ohio River and east of the Mississippi River, and from Chesapeake Bay south. It includes two major physiographic zones, the low lying and minimally dissected coastal plains, and the higher and more variegated interior hills, mountains, and plateaus (see also Bense 1994:17). These areas are, of course, subdivided into a number of smaller regions (Fenneman 1938; Hunt 1974) (Figure 3). Thus, the coastal plain includes the Atlantic and Gulf Coastal Plains, with the Mississippi Alluvial Valley sometimes set off within the latter. The interior encompasses the Piedmont, Blue Ridge, Ridge and Valley, Appalachian Plateau, and Interior Low Plateau regions. Generally Southeastern river drainages tend to flow to the south and southeast in the Gulf and Atlantic Coastal Plains and Piedmont, respectively, and to the

west and north in the Interior and Appalachian Plateaus. The orientation of these drainages has profoundly shaped movement and interaction throughout prehistory, as well as in the historic period (Anderson 1994; Tanner 1989). The loci of initial human colonization in the Southeast, and the directions these first peoples moved over the landscape, were profoundly influenced by the alignment of major drainages (Anderson and Gillam 2000); early peoples are assumed to have walked the margins or used watercraft directly on these waterways (Anderson 1990a, 1995a; Engelbrecht and Seyfort 1994; Faught 1996; Jodry 1999; Mason 1962; Williams and Stoltman 1965). In the lower Southeast, movement along drainages would have trended from the interior to the coast, in a north-south direction in the Gulf Coastal Plain, and in a roughly northwest-southeast to east-west direction in the Atlantic Coastal Plain. In the interior Midsouth, movement would have been east and west along rivers like the Tennessee, Cumberland, and Ohio and some of their tributaries, as well as north-south into and out from the lower Midwest. While the Appalachian Mountains were likely a major barrier to east-west population movement along the middle Atlantic seaboard, farther south in the Gulf and lower Atlantic Coastal Plains east-west movement would have been easier, and could have proceeded along major ecotones like the Fall Line between the Coastal Plain and Piedmont, or along the coastline itself.

During the period of presumed initial human settlement, some time after the glacial maximum ca. 18,000 rcbp (21,400 B.P.), the Coastal Plain was almost twice its present size due to lowered sea levels. Sea levels rose and fell dramatically in the Late Pleistocene, with vast areas alternately submerged and exposed, something that almost certainly profoundly affected early human settlement. Rapid glacial retreat in the north began during the Bølling, after ca. 12,600 rcbp (14,850 B.P.), and continued with comparatively minor fluctuations until the sudden onset of the Younger Dryas glacial readvance around 10,800 rcbp (12,900 B.P.). Assuming initial human entry occurred sometime during the Bolling or Allerød, these groups would have been faced with a vast but slowly shrinking Coastal Plain, whose shoreline would be trending inland, save for comparatively minor movements in the other direction, during events like the Older Dryas (ca. 12,100-11,950 rcbp; 14,100-13,950 B.P.) and the Inter-Allerød Cold Period (ca. 11,400-11,100 rcbp; 13,400-13,100 B.P.). A major readvance, the Younger Dryas, occurred from ca. 10,800-10,100 rcbp (ca. 12,900-11,650 B.P.), with pronounced cold conditions appearing suddenly, within a human lifetime (Bjorck et al. 1996:1159). If a sudden drop in sea-level occurred (something that needs to be verified), it would have exposed large areas of the previously submerged continental shelf, an area that may have taken some time to revegetate.

The region below the Ohio River is south of the area covered by continental ice sheets during the glacial maximum (Dyke and Prest 1987a, 1987b). Whether glaciers or other permanent ice masses were present in the southern Appalachians or elsewhere in the Southeast during the Late Pleistocene is unknown, but if present they would have likely been quite small, and occurring only during periods of extreme and prolonged cold. Their impact on human settlement, accordingly, would have been minimal. There were no tundra environments in the Southeast, and no major glacial or pluvial lakes (comparable to the large lakes present to the north and in the west at the end of the Pleistocene). As the major river system draining the midcontinent, however, the Mississippi carried vast amounts of glacial meltwater during warming intervals.

The volume of water led to the creation of braided stream channels in the lower Mississippi valley, which were abruptly replaced by a meander regime once meltwater discharge ceased (Saucier 1994:45, 93-98). With lowered sea levels, many Late Pleistocene river systems may have been much narrower and more deeply incised than at present. With post glacial sea level rise, silting would have occurred along many channels, burying potential locations for early sites, which in the larger systems may have subsequently been lost to meander scouring (Goodyear 1999a; Knox 1983). Late Pleistocene terraces are often found above modern flood plains, however, rendering detection of surfaces of this period difficult.

High quality knappable stone occurs unevenly over the region, and in fact tends to be uncommon in some parts of the Coastal Plain and Piedmont. Major outcrops of chert occur in parts of the south Atlantic Coastal Plain, in Georgia and South Carolina and the Florida Peninsula, while farther west they tend to occur as gravel deposits in the Coastal Plain portions of Alabama, Mississippi, Arkansas, and Louisiana. Outcrops of high quality chert and novaculite, in large tabular masses, occur in portions of the interior highlands, in the Ouachita and Ozark mountains, and in the interior plateaus. Metavolcanics are known from across the Piedmont, but whether many or only a few key sources saw extensive exploitation is unknown, although evidence currently favors the latter position

(Daniel 1998, 2001; Daniel and Butler 1991, Novick 1978). Lower quality cherts, quartz, and metavolcanics are more widespread in the interior, and as gravel deposits in portions of the Coastal Plain, but do not appear to have been the first choice of early populations, particularly those using Clovis technology (Goodyear 1979, 1989).

Boreal conifers like spruce and jack-pine dominated southeastern forests during the full glacial north of latitude 33, from about the vicinity of central South Carolina across to the Arkansas Louisiana line. With the onset of rapid deglaciation in the Bølling, mixed hardwood forests began to move northward from refugia in the lower Southeast. This expansion does not appear to have been affected much by the Younger Dryas readvance (M. Davis 1983:172-73; H. Delcourt and Delcourt 1985:19; P. Delcourt and Delcourt 1981, 1983, 1987, 1991; Jacobson et al. 1987; Overpeck et al. 1992; Steele et al. 1998:292; Watts 1971:687, 1980:195; Watts et al. 1996; T. Webb 1987, 1988; T.Webb et al. 1993). By 10,000 rcbp (11,450 B.P.), hardwood and mixed hardwood-pine forests were present across the entire southeast.

Late Pleistocene fauna in the Southeast encompassed a wide range of extinct and modern animal species. In addition to fauna such as mammoth, mastodon, horse, giant sloth, saber-toothed tiger, and camel, modern animals were also present such as white tailed deer, raccoon, and rabbit. The extent to which extinct fauna were exploited remains unknown, although there is no question they were at least occasionally targeted. The late Pleistocene extinctions were complete by ca. 10,800 rcbp or about 12,750 years ago (Mead and Meltzer 1984; Meltzer and Mead 1983), after which time local human populations had a much narrower array of animal resources to choose from.

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NORTHEAST REGIONAL CONTEXT Introduction As this overview demonstrates, the Northeast region is unique in Paleoindian studies for its dynamic marine borders—the northwest Atlantic Ocean transgressed overland north of Long Island and then regressed to leave a large emergent seaboard plain, and the inland Champlain/Goldthwait Seas filled the St. Lawrence Lowland and wrapped around to western Vermont. Although sites and hunting grounds have since been inundated, the potential for Paleoindians to take marine game and other resources is unproven but likely. The Younger Dryas climate reversal was very strongly expressed in the Northeast, where the temperate vegetation pulled back from its earlier northern limits, thereby reducing the biotic diversity on which people had no doubt relied farther west. With the possible exception of eastern Beringia, no other inhabited area of North America confronted people with such challenges and opportunities. River drainages were adapting to newly deglaciated landforms; large expanses of glacial lake floors lay as poorly drained swamps over many square miles, and rivers running to the changing sea level cut deeply into shore sediments. What is today New England was semi-isolated from land areas to the west, almost a peninsula pendant from Vermont, with the deep Hudson trough carrying massive drainage. Maine east of the Penobscot was apparently uninhabited, but the Maritime Provinces of Canada saw some use by Paleoindians. Mammoths were apparently extinct in the region before the Younger Dryas, while mastodons died out just before or soon after people appeared. The only "Big Game" were cervids—elk, caribou, moose, white tail deer. The herds of caribou modeled for Ontario do not appear to have been present southeasterly at this time. North of the marine incursion lay the waning Laurentide Ice Sheet that affected climate in both summer and winter, partly offsetting the increased solar insolation of the time. Strongly seasonal climate, and the rarity of caves, has made organic remains extremely scarce. Consequently, the status of claims for very early sites cannot be evaluated. Research on Paleoindians in the Northeast is today colored by the extreme patchiness of environmental variables including knappable tool stones, by the private landholdings that characterize the area along with its early industrialization and intensive agriculture, and by the near invisibility of Native Americans until the last third of the twentieth century when consultation became possible and necessary. In addition, comparison with other areas has been delayed because of contrastive cultural histories north and south in the region. Especially in Late Paleoindian and Early Archaic times, these differences confounded comparisons. Information about Paleoindian sites in the northeastern part of the United States has accumulated at an unprecedented rate in the last 15 years, apparently as a benefit of mandated Cultural Resource surveys in the several states. Most of the new discoveries are sites in the small class, significantly increasing knowledge of site distributions, single-component inventories, and density of footprints of phases of Paleoindian use of the landscapes. The region has long been notable for the presence of a few sites larger than the norm in any other region of the continent, all, however, lacking the megafaunal remains that characterize Paleoindian research in the public mind. For this study, the Northeast encompasses the six New England states, New York, Pennsylvania, New Jersey, and Delaware. Of these ten, only Delaware lacks deposits of the Wisconsinan glacier, but all were affected by glacial outwash downstream, adjustments of biotic ranges, and coastal regression and transgression during the Pleistocene. Paleoindian research has been lively in these states since the 1950s when very large sites were discovered. Both Shoop in Pennsylvania and Bull Brook in Massachusetts are multi-acre sites with hundreds of fluted points and fragments that recall Clovis in the West, where sites of such size and structure are unknown with Clovis points. The Folsom and Clovis excitement was slow to arrive in the Northeast because northeastern sites are never found with the spectacular megafaunal remains conspicuous in the West. Most Paleoindian sites have been damaged by surficial disturbance, and	E. statement of historic contexts introduction southeast context northeast context figure 4 introduction table 5 table 6 chronological considerations for the northeast table 7 figure 5 geography and environmental conditions in the northeast midwest context F. associated property types G. geographical data H. summary of identification and evaluation methods I. major bibliographical references Figures and Tables

often by active collecting or digging for private ownership. This latter activity has increased alarmingly in recent years, fueled by rising market prices commanded by exquisite and ancient artifacts.

The information available on northeastern Paleoindian sites is mainly published, since Paleoindian information reliably commands interest. The extant literature is large and varied in quality, ranging from antiquarian notices of finds of single specimens through a few detailed analyses of collections, summary site reports, proposed mobility models, and regional syntheses. Surveys undertaken for Section 106 reviews reveal many such sites, which are rarely broadly excavated. Published notices are likely to follow, with few details given, but the unpublished and somewhat more detailed reports are difficult to access. Few northeastern Paleoindian sites have been nominated to the National Register of Historic Places, probably because they are typically heavily damaged. For instance, the Bull Brook site, the nation's largest, is not listed, having been essentially destroyed by commercial gravel extraction and the collecting fever that accompanied it (Byers 1956). Recent large-scale summaries and interpretations include those by Anderson (1990a), Curran (1999), Custer (1996), Dincauze (1993a,b), Doyle et al. (1985), Ellis and Deller (1997), Ellis et al. (1998), Gramly and Funk (1990), Petersen (1995), and Spiess et al. (1998).

The Northeast enjoys a relatively large radiocarbon data set for Paleoindian sites. While not an unmitigated advantage to scholarship (see **Chronological Considerations for the Northeast**), it provides at least adequate correlation to the paleogeography and paleoclimatology of the period 11,500 to 13,000 years ago. Fortunately, northeastern archeologists have the benefit of a stylistic seriation developed in Michigan and Ontario that appears accurate as a sequence, supported by geological ages of the site situations north of the Great Lakes (Ellis and Deller 1997). This typology needs to be refined in the United States to accommodate complications not yet encountered in Ontario, which are presented by sites in the Maritime Provinces and northern New England ([Table 5](#)). Understanding Paleoindian sites and distributions requires familiarity with the diverse landforms, relief, and glacially deranged river patterns in the region. In addition, marine geomorphology is central to understanding the availability of landforms to Paleoindian occupants of the region. The section, **Geography and Environmental Conditions for the Northeast**, reviews the dynamics of landform and coastal evolution in the context of extreme climatic change and the changing flora and fauna adapting to the physical environment.

Table 5. Stylistic Sequence for Northeastern Fluted Points

NE Early Paleoindians (YD age, possibly some bit older)
GROUP Ia: Gainey/Bull Brook
Ib: **Shoop**
GROUP II: Debert/**Vail**

NE Late Paleoindians (Late- or Post-YD; Late Glacial)
GROUP IIIa: Barnes/Parkhill/Neponset style
IIIb: Cumberland (mainly west and south)
GROUP IV: Crowfield (terminal Glacial)

NE Terminal Paleoindians (Early Holocene)
GROUP V: Holcombe/Nicholas/Turkey Swamp *
(basally thinned, not typically fluted)
GROUP VI: Lanceolate/ Agate Basin/ Ste Anne/...
(various borrowed names, no standard)

* The original definition of Steubenville Lanceolate points in the Ohio Valley and western Pennsylvania (Mayer-Oakes 1955) put them in this category. Subsequent evidence redates them to Middle Woodland throughout their range (Kaeser 1968).

Not every state has a State Plan, so there is no official index or inventory of Paleoindian Property Types for the region. Paleoindian categories in State Plans exist in Pennsylvania (Lantz 1985), New Jersey (Marshall 1982; Grumet 1990), and Massachusetts (published regional summaries). In the Property Types section, a purely heuristic set of distinctions is presented to highlight as much of the

essential site diversity as possible at this stage of research, to structure the discussion that follows, and to aid in the evaluation of significance for the sites and site clusters that are the topics of this report. Few detailed interpretative studies have been made of Paleoindian sites to support consideration of such anthropological topics as population densities, site demographics, site-specific and culture-specific activities, or degree of logistic mobility.

The section **Resource Distributions in the Northeast** builds on the descriptive data in the first four sections to work toward a predictive model for Paleoindian site distributions. The ambiguity in the term "resources" here emerges as a strength, permitting discussion of site locations in terms of the economic resources sought by the Paleoindians themselves. The priorities that correlate with Paleoindian sites in several distinct ecological zones display subregional differences in economic ecology and in population distributions and densities as now known. Much more careful, fine-grained analysis will be needed before we can begin to discuss confidently such topics as colonization strategies, seasonal resource extraction, responses to changes in prey numbers and kinds, or social structures in lightly populated, diverse, dynamic landscapes. So far we have recovered little evidence for more elusive categories of human activities, such as belief systems and ideologies.

In the last century, investigation into initial human colonization of the Northeast has been blighted or enlivened (according to one's taste) by notorious misconceptions, false claims, and outright frauds. These distractions have slowed the increase of knowledge and contributed to a second-tier literature that tenaciously holds onto some of them. I have chosen to acknowledge a selection of these phenomena in [Table 6](#), and to ignore the rest. Uncertainty remains about the integrity and even identification of some sites, specifically the **DEDIC/Sugarloaf** and Hannamann sites in Massachusetts, which cannot be considered candidates for protection until the mists are cleared.

Table 6. Unverified Claims of Northeastern Pleistocene Sites
UNVERIFIED CLAIMS OF NORTHEASTERN PLEISTOCENE SITES
(Specimen bibliographies)

Paleolithic Parallels

Lenape Stone Mercer, Henry C.
1885 *The Lenape Stone, or the Indian and the Mammoth*. New York: Putnam.

Trenton Gravels Abbott, Charles C.
1876 The Stone Age of New Jersey. *Annual Report of the Smithsonian Institution for 1875*: 246-380.

Holmes, William H.
1890 A quarry workshop of the flaked-stone implement makers in the District of Columbia. *American Anthropologist* 3(o.s.): 1-26.

1893 Are there traces of man in the Trenton gravels? *Journal of Geology*, vol. 1:15-37.

1898 Primitive man in the Delaware Valley. *Proceedings of the American Association for the Advancement of Science* 46:364-370.

Mercer, Henry C.
1892 Pebbles chipped by modern Indians as an aid to the study of the Trenton gravel implements. *Proceedings of the American Association for the Advancement of Science* 41:287-289.

1893 Trenton and Somme gravel specimens compared with ancient quarry refuse in America and Europe. *American Naturalist* :27:962-978.

1894 The nonexistence of Paleolithic culture. *American Naturalist* 28:90-92.

Mercer, H. C., E. D. Cope, and R. H. Harte
1897 Researches upon the antiquity of man in the Delaware Valley and the eastern United States. *Publications of the University of Pennsylvania, Series in Philology, Literature, and Archaeology* 6:87-109.

Putnam, F. W.

1888 Paleolithic man in eastern and central North America. *Proceedings of the Boston Society of Natural History* 23:247-254.

Shaler, N.

1893 Antiquity of man in eastern North America. *The American Geologist* 11:180-184.

Holly Oak Mammoth Custer, J.F., J. C. Kraft, and J. Wehmiller

1989 The Holly Oak Shell. *Science* 243:151.

Griffin, J. B., D. H. Meltzer, and B. D. Smith

1988 A mammoth fraud. *American Antiquity* 53:578. [radiocarbon date]

Kraft, J. C., and J. F. Custer

1985 Comments on the Holly Oak pendant. *Science* 227:244-246.

Kraft, J. C., and R. A. Thomas

1976 Early man at Holly Oak, Delaware. *Science* 192:766-761.

Meltzer, D. J., and W. C. Sturtevant

1983 The Holly Oak shell game: An historic archaeological fraud. In *Lulu linear punctate: Essays in honor of George Irving Quimby*. In *Anthropological Papers of the University of Michigan Museum of Anthropology* 72, edited by R. C. Dunnell and D. K. Grayson, pp. 325-352. Ann Arbor.

Timlin Site: Paleoliths/Eoliths Cole, J. R., and L. R. Godfrey (editors)

1977 *Archaeology and geochronology of the Schoharie and Susquehanna regions*. Oneonta, N.Y.: Yager.

Cole, J. R., R. E. Funk, L. R. Godfrey, and W. Starna

1978 On criticisms of "Some Paleolithic tools from Northeast North America.": rejoinder. *Current Anthropology* 19:665-669.

Cole, J. R., L. R. Godfrey, R. E. Funk, J. Kirkland, and W. Starna

1977 On "Some Paleolithic tools from Northeast North America." *Current Anthropology* 19:541-545, 588.

Raemsch, Bruce E., and William W. Vernon

1977 Some Paleolithic tools from Northeast North America. *Current Anthropology* 18: 97-99.

Paleoindian Inventions

Anderson and Faught 1998:174 "Unfortunately, the same characteristics that draw attention from legitimate researchers and responsible avocationals also make fluted points attractive to less scrupulous collectors, speculators, and artifact dealers, who frequently assign absurd 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. ..." Note: "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."

The Moosehorn Fluted Point

Bonnichsen, Robson, Bruce Bourque, and David E. Young

1983 The Moosehorn fluted point discovery, northern Maine. *Archaeology of Eastern North America* 11:36-48. [Reservations published in Spiess and Wilson 1987a: 200-201. Attempts at clarification of find spot unproductive.]

The Sycamore Site and Durham Cave

Tucci, Harry J.

1985 The Sycamore site and its role in Pennsylvania prehistory. *Current Research in the*

Pleistocene 2:29.

1986a The Sycamore site 1985: An update. *Current Research in the Pleistocene* 3:24-25. ("four Clovis points of...jasper")

1986b Archaeological investigations of Durham Cave No. 2. *Current Research in the Pleistocene* 3:25-26.

1987 Durham Cave, a Pre-Clovis occupation of Pennsylvania. *Current Research in the Pleistocene* 4:39-41.

1988 Letter to the editor. *Current Research in the Pleistocene* 5: xiv. Response to McConaughy.

McConaughy, Mark A.

1988 Letter to the editor. *Current Research in the Pleistocene* 5:ix-xiii. (Sycamore Clovis points are casts from other sites.)

Pure Showmanship

The Cardiff Giant, 1869 hoax perpetrated in Central New York by two business partners. The figure was carved from a block of gypsum quarried at Cardiff Glen, Iowa. Bibliography on the Internet, located through AltaVista. The published record consists mostly of small pamphlets.

Anonymous

1869 "The American Goliath [sic]: A wonderful geological discovery. A petrified giant, ten and one-half feet high, discovered in Onondaga County, N.Y. History of the discovery on October 16, 1869 of an image of stone, the same being a perfectly formed and well developed man. Descriptions of the petrification, with the opinions of scientific men thereon." Syracuse, N.Y.: Printed at the Journal Office. [author may be John C. Rankin, who owned an interest in the figure]

Anonymous

1870 *The Cardiff Giant humbug: A complete and thorough exposition of the greatest deception of the age. Richly illustrated with views of the giant from the quarry to the tomb.* Fort Dodge, Iowa: North West Book and Job Printing Establishment.

Boning, Richard A.

1972 *The Cardiff Giant*. Baldwin, N.Y.: Dexter and Westbrook. [story of the hoax]

Dunn, James Taylor

1948 *Cardiff Giant hoax*. Cooperstown, N.Y.: Farmers' Museum.

Shebar, Sharon Sigmond, and Judith Schoder

1983 *The Cardiff Giant*. New York: J. Messner. [story for children]

The Northeast Paleoindian area contrasts least with the Midwest and adjacent Canada, and most strongly with the Southeast. Although Québec has no fluted point sites, Atlantic Canada and southern Ontario were contiguous territories for northeastern makers of fluted points and the lanceolate successors. The Great Lakes lowland and the St. Lawrence seas and lakes were major travel and transport routes into the Northeast; lying as they did just south of the Laurentide Ice Sheet they formed an influential limit on Paleoindian colonization of eastern North America. Canadian sites, geological dating, and tool typologies dominate Northeastern and Midwestern archaeology, but have been little noted or appreciated in the Southeast. The Debert site study was particularly influential. People moving into the uniquely dynamic environment of the northern lakes had to learn quickly how best to use the rapidly changing, often unpredictable ecology. They had to abandon skills and assumptions they relied on to the west and south. Initial recognition of these constraints on Paleoindians (e.g., Dincauze 1981c) was based on awareness of ecological patchiness. The dismissal of the constraints set northeastern Late Pleistocene studies into dead end debates for nearly two decades; the Northeast became viewed as marginal, a judgment unearned by Paleoindian behavior. Once overextension of the "Clovis" terminology is abandoned, comparison of northeastern sites and

cultural behavior is likely to be increasingly made to the Midwest, as differences in material culture and economies are seen more clearly to the south. It may eventually be possible to deal fully with the apparent delay in occupation of the glacial border areas of the continent. The Southeast takes prominence in comparisons in later Paleoindian times, when lanceolate bifaces were moved northeastward from both the northern Prairies and from Dalton and related cultures, and most definitively in the early Holocene as Early Archaic lifeways extended northward. The resulting Cis-Appalachian Archaic cultural sphere apparently interrupted cultural influences from the west for several millennia.

Chronological Considerations for the Northeast

The northeastern United States offers five distinct but not independent routes to chronologies for Late Glacial and Early Holocene archeological complexes: 1) stratigraphy; 2) Great Lakes geomorphology; 3) radiocarbon assays; 4) stylistic seriation; and 5) the Younger Dryas climatic subchron with its direct ties to ice layer, varves, and U-Th dating elsewhere. Other possible methods such as faunal and pollen zone associations have so far failed for lack of preservation in the regional sites. Late-glacial placement in general is well established on the basis of a few scraps of cold-adapted faunal remains (Spiess et al. 1985), association with late-glacial landscape features and vegetation, and stylistic comparisons on a continental scale.

Radiocarbon ages for northeastern fluted point sites are all younger than Clovis ages in the western Plains and Southwest (Haynes et al. 1984). The difficulties of radiocarbon dating in the northeastern late Pleistocene go well beyond the problems of finding culturally-affiliated organic materials in sites of that age (Bonnichsen and Will 1999; McWeeney 1995). Limitations inherent in the radiocarbon method itself, deriving from its dependence upon variable atmospheric states, have made reliable and accurate ages very elusive in the Younger Dryas period, with its plateaus of indeterminacy at critical time spans (Bartlein et al. 1995; Fiedel 1999; Grafenstein et al. 1999).

Northeastern radiocarbon ages cluster into one group in the early Younger Dryas climatic interval and a second toward the end of the Younger Dryas. The clusters associate sites sharing distinct fluted point styles ([Table 5](#)), in the correct order. The Initial Holocene period, in contrast, groups many dissimilar cultural manifestations, some of which are sequential and others coeval.

Data so far support ages for the initial settlement of the Northeast sometime later than 13,500 years ago. There is a long and active history of older claims, not all of which are dismissible. The recent spate of new candidates for ages older than 14,000 years in North and South America assures that the debate remains healthy.

Stratigraphy

Stratified sequences containing fluted points of different styles are not reported in the Northeast. The longest stratigraphical sequences in the region are from the western and eastern edges of Pennsylvania. The oldest is at the **Meadowcroft Rockshelter** in the southwest. A second long stratigraphical sequence, at **Shawnee-Minisink**, has Paleoindian in a basal aeolian deposit, followed by alluvial deposits with Early and later Archaic cultural remains (Dent 1985, 1999). The Arc site in western New York lies on a weathered Late Glacial diamicton sealed under an early Holocene peat (Tankersley et al. 1997). The nearby Hiscock site is a Late Glacial organic deposit with stray isolated fluted points in it. These sites together imply a position for earliest Paleoindian artifacts coeval with the withdrawal of the Wisconsin ice from the United States. More detail is not now available.

Alluvial sequences in the valleys of rivers draining into the Atlantic typically begin at or subsequent to Paleoindian time (e.g., Crissel 1998; McNett 1985). Early Holocene sites buried in alluvium enclose unfluted lanceolate points with radiocarbon dates implying ages younger than 11,500 years ago (Maymon and Bolian 1992; Sanger et al. 1992). Most extant fluted point sites lie on Late Glacial topographic surfaces, few of which are sealed by later deposits. Sites with point styles IV to VI are situated near the surface, typically in plowzones (e.g., Plenge, Reagen, Potts, Nicholas). The implication is that Late Glacial sediment accumulation on northeastern upland surfaces ended before the close of the period of fluted points, and inland river aggradation intensified subsequent to it.

Geomorphological Dating

There are a number of Late-Glacial geomorphological landscape features dated by radiocarbon.

These offer some potential to assign relative dates to Paleoindian sites if they can be shown to be earlier, contemporary with, or later than those features. During the Younger Dryas, more than 13,000 years ago, the Laurentian ice margins stood near the north shore of the maritime Gulf of St. Lawrence. That precluded the possibility of fresh-water ice-margin lakes in Paleoindian time southeast of the Great Lakes. Several sites in central and northern New England are in or near sand dunes. Also, there has been research in Connecticut on the basic chronology of southern New England dune building, related to shifts in late-glacial climates and wind regimes. This work (Thorson and Schile 1995) supports the view that although there may have been some reactivation during the Younger Dryas episode, dune-building in that area had been essentially completed 13,000 years ago, prior to the arrival of humans. Farther north, dune-building has not been securely dated; the living surface at the **Hedden** site in Maine had charcoal aged 12,300-12,600 years ago underlying what appeared to be naturally deposited dune sands.

This very traditional geological method of dating by landform association is not without its problems when applied to Paleoindian chronology. The differing styles of fluted points in the Great Lakes and Midwest have been reasonably well associated with a series of strandlines of Late Glacial and ice-margin lakes in the eastern Great Lakes area and these geomorphological features have extensive suites of radiometric dates. In turn these Great Lakes dates have been used to approximate ages for the Northeast sites yielding similar fluted point styles but where radiocarbon ages exist for New England sites, the Great Lakes ages are older by substantial amounts. It is possible that these indirectly estimated geomorphological ages for the Great Lakes Paleoindian sites which yield the type specimens of fluted points will be modified by future research. It seems equally likely that those more westerly Great Lakes sites from which the fluted point styles come are indeed older than the sites yielding similar fluted point styles in the northeastern United States.

Radiocarbon Dating

Many of the radiocarbon ages for northeastern Paleoindian sites have large error ranges or other uncertainties (Bonnichsen and Will 1999; Curran 1996; Fiedel 1999; Levine 1990; Stuiver and Reimer 1993). Published radiocarbon ages, when $\delta^{13}\text{C}$ corrected for fractionation and calibrated to the Stuiver et al. (1998) curves, show older than uncorrected ages. The age and the rates of change implied by uncorrected and uncalibrated years are erroneous and misleadingly short, making time seem to move more quickly than it did in fact (Taylor et al. 1996). Also, computer bugs can affect calibrations under specified conditions (email alert from Belfast lab, 6/26/99); the literature is not clean. All this implies that precision in calendrical time in the Late Quaternary is still elusive. The choice made here is to use ages calibrated by the Stuiver et al. 1998 standard, leaving age ranges unspecified in expressions of "years ago."

In the Northeast, there are additional complications: northeastern acidic soils have been churned by freeze-thaw cycling, burrowing animals of many sizes, and tree roots, for all the years since Paleoindian occupation of the area. Consequently, there is a real contamination problem that first surfaced with efforts to date Bull Brook (Byers 1959; see Bonnichsen and Will [1999] for a disheartening catalog).

Great Lakes Style Sequence

A stylistic sequence developed for fluted point sites in the eastern Great Lakes area offers a basis for finer resolution. Ontario archeologists refined a point-style seriation defined in Michigan (Ellis and Deller 1990, 1997; Roosa 1963), providing a technique for discussing relative age among sites with fluted points ([Table 5](#)). It does not contradict in any way the radiocarbon ages available, and it is congruent with the geological ages of late-glacial landforms in Ontario. While the ages assigned to Paleoindian landforms in Ontario are presently older than the dated sites in the Northeast, there is no reason to assume a measurable time lag (see above). In order to introduce regional terminology, and to reduce the need to discuss terminological equivalences in the several states, I use six style groups to discuss the relative ages of sites. The groups are not cleanly discrete. There are intermediates between all of them, and more than one may appear in a given site. These two observations support the inference that Paleoindian use of the region was essentially continuous following the initial colonization.

Younger Dryas Chronology

With the Younger Dryas climate reversal securely dated by calibrated radiocarbon supported by ice-core and varve ages, U-Th, oxygen-isotope, and coralline rings chronologies (Ridge et al. 1999), it is

clear that fluted point-using Paleoindians date within the Younger Dryas period. No efforts at cross-dating from cultural sites to the absolute ages of Younger Dryas time have yet been successful. The absence of evidence for this dramatic climatic event in the **Meadowcroft** cultural, biological, and stratigraphic chronology is cause for some concern; it should be recognizable if the sediments are as old as claimed.

Paleoindian and Early Archaic sites in the Holocene

Style groups IV-VI fall into post-glacial time, in a period of rapid warming that must have stressed all living things at middle and high latitudes (Petersen et al. 2000). In the Northeast, this observation leads to terminological and chronological confusion, because the beginning of the Early Archaic Period is around 11,600 years ago, but unfluted "Paleoindian" bifaces and late tool kits are of the same age (Dincauze 1986; Funk 1991).

What is becoming clear is that the Early Archaic period is time-transgressive, being earlier in the south than in the north. In Delaware, southern Pennsylvania, New Jersey, and southeastern New York, and very rarely beyond there, the late Paleoindian/Early Archaic Hardaway-Dalton biface, rarely fluted, marks the transition (A.J. Anderson 1964; Carr 1998; Custer 1986). Northward, notably in Maine and eastern Canada, the unfluted lanceolate Group VI bifaces, assigned to Late Paleoindians, are apparently contemporary with the Early Archaic notched bifaces of the Kirk and Palmer suites, which reach into central New England (Doyle et al. 1985). Their dating is frequently controversial, but they are all dependably Holocene.

Geography and Environmental Conditions in the Northeast

The Northeast region of the United States for this study includes the New England states, Delaware, New Jersey, New York, and Pennsylvania. Northeastern Paleoindian studies normally include the Canadian Maritime Provinces, Quebec, and Ontario, whose important early sites and studies necessarily are cited here. This Northeast is bounded easterly by the Atlantic Ocean, northerly by the international boundary, westerly to the limit of the Allegheny Plateau, and southerly by the Mason-Dixon line, beyond the limits of Pleistocene glaciation.

Physiography

The Northeast is geologically diverse. Precambrian basement (craton) rocks of the Canadian Shield appear in the Adirondacks of New York. Complex folded structures of the mountain belts trending SSW to NNE directed glacial flow and river drainages west of Maine, while the structural trend of the coastal zone runs NW to SE. Paleozoic mid-continental seas deposited the fossiliferous rocks of the Allegheny Plateau and folded Appalachians. Continental collisions and related tectonic movements of Precambrian, Paleozoic, and Mesozoic ages, associated with extensive volcanism and opening and closing early versions of the Atlantic Ocean, built mountains now worn to roots: e.g., Appalachian Ridge-and-Valley uplands, Taconic, White, and Green Mountains. Igneous and sedimentary Paleozoic rocks accreted to eastern New England with fragments of continents colliding from the East. Mesozoic volcanic and detrital deposits lie east of the Appalachian spine from Newfoundland to New Jersey. Unconsolidated Tertiary sediments underlie the Coastal Plain from south of Manhattan and east at least to Martha's Vineyard (Hunt 1974; Skinner and Porter 1995).

The structural trends of eastern North America influenced travel of the earliest humans advancing from either the West or South. People entered from the West through the glaciated or unglaciated Allegheny Plateau, following tributaries of the Ohio River or the shores of ice-margin lakes. East of the Great Lakes rise the Adirondacks and the rugged mountain ranges of New England, with moderate to high relief. Rivers breach the Appalachian peaks in a few crucial places, dropping along the Fall Line to the Coastal Lowland (Hunt 1974). The ancient, rolling, unglaciated surface of the Piedmont begins the lower elevations toward the coast. The route from the South led along the Piedmont and Coastal Plain, or through the Great Valley of the Appalachians. During glacial time, the Coastal Lowland extended eastward to include the exposed inner Continental Shelf, but by the time of the Paleoindians the shoreline north from Massachusetts had moved west and was withdrawing again seaward (Belknap et al. 1987; Oldale 1985).

Glacial History

An unknown number of Quaternary glaciations gouged bedrock and sediments, enlarged valleys, and deposited sand and gravel over all of New England, most of New York, the northwestern and

northeastern corners of Pennsylvania, and northern New Jersey. In the latter two states earlier tills extend south of the Wisconsinan limit. Major valleys were choked with outwash. Glacially deranged drainage patterns poleward of the moraines left the area initially with abundant surface water and randomly exposed bedrock. During early stages of glacial melt, large ice-margin lakes filled major river valleys. After 14,000 years ago, an inland sea filled the St. Lawrence-Champlain lowland south of the ice sheet (Dyke and Prest 1987a). During the early Paleoindian period seacoast withdrawal dominated the eastern coastal areas, supporting pedestrian traffic across Long Island Sound and beyond the present limits of Martha's Vineyard and Nantucket islands, delaying the formation of biologically rich estuaries (Oldale 1985, 1986).

Paleoindian sites are associated with beaches of the Late Glacial Champlain Sea in Vermont, New York, and Ontario (Loring 1980), and the succeeding Goldthwait Sea (Dumais 2000). Along the Atlantic shore, where the sea has transgressed inland, sites are rare but there are indications in occasional dredgings that Paleoindians were active on the exposed continental shelf (Glynn 1969). The Hudson and Baltimore canyons slashed the exposed coastal zone, limiting latitudinal movement on those plains. Central Maine was flooded by the late-glacial Atlantic Ocean for some distance inland. Gravel deltas formed into that body of water and subsequently drained became favored locations for Paleoindian sites. Sea level rise and isostatic adjustments through the early Holocene caused river incision upstream and aggradation in the lower reaches, burying early sites deeply in alluvium.

Hydrography

The Ohio River basin drains the Allegheny plateaus to the Mississippi and the Gulf of Mexico; the rest of the Northeast drains into the Gulf of Maine and the Mid-Atlantic bight. Prior to ca. 14,000 years ago, meltwater torrents carried ice and sediment down the Ohio to the Mississippi River and the Gulf of Mexico (Kennett and Shackleton 1975) and down the Susquehanna, Delaware, and Hudson rivers to the Atlantic. Northern rivers participated later. Paleoindians moving east across New York would have confronted a deep Hudson trench even after its iceberg period (Dineen 1996). Early Holocene rivers incised rapidly, leaving Paleoindian sites on high alluvial terraces.

Water levels and shores of the deglaciating eastern Great Lakes fluctuated dramatically; their special names distinguish them from modern lakes. Briefly after 14,000 years ago, Lakes Erie and Ontario were at low water stages (Karrow and Warner 1988) as isostatic rise decanted them to the northeast. In contrast to the situation in Ontario, proglacial lakes in New England and New York drained prior to the appearance of fluted-point users (Curran and Dincauze 1977; Ridge and Larsen 1990). Biologically rich, extensive, swampy, post-lake inland basins attracted Paleoindians and later peoples (Nicholas 1988, 1998).

Climate

Although the evidence is soft, people could have entered the Northeast with warming climate prior to 13,000 years ago. The abrupt Younger Dryas climatic reversal, emphasizing the strong continental seasonality of the region, stunted vegetation and chilled the air (Cwynar and Levesque 1995; Grimm and Jacobson 1992; Peteet et al. 1993). With perihelion in summer (Kutzbach 1987), winters continued severe in the higher latitudes. I expect that fluted point makers did not linger in the immediate international boundary area when the climate reversed (Mandryk 1993; Mott et al. 1986; Stea and Mott 1989). Only the earliest fluted point styles (Groups I-II) are common there; Group III is notably absent.

Northeastern Holocene climatic regimes affect the condition and visibility of ancient sites (McWeeney 1994; Thorson and Schile 1995). Summer temperate climates promote biota, which churn sites. Mid-Holocene dryness spawned frequent forest fires that may account for the young radiocarbon samples in so many sites. Winter freeze restricts the activity of decomposers, preserving charcoal better than farther south, while churning sediments and destroying by cryoturbation most features and stratification.

Biota of the Fourteenth Millennium

By 14,000 years ago, the tundra zone south of the ice was reduced to a fringe north of the international boundary, except for high-altitude areas in the mountains (Dincauze 1988; Mayle et al. 1993). South of the tundra, a spruce-park woodland dominated northern New England (Gaudreau 1988), with hardwoods invading from the south during warm periods before and after the Younger

Dryas. Hardwoods show thinly on northeastern pollen diagrams before 13,000 years ago, but macrofossils were established well north of the pollen zones (McWeeney 1994). New Jersey, Delaware, and southern Pennsylvania had mappable densities of oak by 14,000 years ago (Jacobson et al. 1987), accompanied by temperate pine species (McWeeney 1994). Mountain heights were retarded in reforestation, in terms of southern species taking residence, but they were not significantly characterized by tundra within the span of human presence.

Soils development paces revegetation. Late Glacial warming speeded that process until the temperature reversal of the Younger Dryas (Anderson et al. 1990; Morgan 1987; Overpeck et al. 1992; Prentice et al. 1991). Postglacial thin and acid soils restricted the potential mix of vegetation in what was necessarily a patchy mosaic of microclimates and adapted vegetation. Until loamy soils developed, newly exposed glacial and coastal sediments were porous, deficient in soil moisture. Evidence for forest fires is consistent with this expectation.

Northeastern Pleistocene fauna included mastodont, giant beaver, and stag elk (Cervalces) until some time after 14,000 years ago; none, however, are reported in Paleoindian sites (Guilday 1982; Kurten and Anderson 1980). Paleoindian artifacts do occur among Pleistocene paleontological deposits at the Hiscock site in New York (Laub et al. 1996). Caribou were in the region from unspecified beginnings until they left Maine in the twentieth century. Virginia deer followed the hardwood species north from glacial refugia and were apparently present with the earliest Paleoindians in Pennsylvania (Guilday and Parmalee 1982: 171) and possibly New York (undated at Hiscock; Steadman et al. 1986). The now well-dated Younger Dryas episode marks the boundary for Pleistocene species in the Northeast (Elias 1999); subsequent faunas are entirely modern. In fact, the **Meadowcroft** record includes only modern fauna from the beginning (Guilday and Parmalee 1982).

Small temperate forest mammals dominate as raptor prey at **Meadowcroft** (Guilday and Parmalee 1982); beaver occurred at Bull Brook (Speiss et al. 1985:148). Fish occur in Late Glacial sediments of the Champlain Sea (Cronin 1977), but rarely in alluvium. **Shawnee-Minisink** exceptionally produced fish of unknown species (McNett 1985). Anadromous species recolonized from the sea; freshwater fish returned as spat or adults dropped by birds and other predators. There is no reason to suspect tardiness in their postglacial northward spread, beyond delays required for drainages to become biologically active.

The North Atlantic avian flyway, drastically shortened by glaciation, extended north as soon as vegetation and other food species permitted; recolonization by beetles of newly exposed land near the Great Lakes (Morgan 1987) shows how quickly that took place. Condors at the Hiscock site in New York may have been neighbors of Paleoindians (Steadman et al. 1986). In Champlain Sea sediments of Quebec, an eider duck has been dated to the Younger Dryas time span (Harington and Occhietti 1980).

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While the American Midwest lacks the remoteness in space and national culture that makes regions like the Southwest redolent of earlier times, the Midwest witnessed the entire span of North American prehistory. By common measures, it boasts an archaeological record as abundant and diverse as any other area. More Paleoindian sites are recorded, more fluted bifaces known, in the Midwest than in most other areas. Today the Midwest has more farmland than any other region, and cultivated farmland is exposed land that is well suited to archaeological study. Thus, the Midwest perhaps has the best combination of evidence and availability of any American region. Here the Paleoindian record can be well documented and can answer the questions about the past that continue to occupy us. As Paleoindian research continues, the Midwest surely will play a critical role in the process.

Chronological Considerations for the Midwest

Systematics

Ellis and Deller (1997:2) reluctantly called "phases" the basic time-space units of Great Lakes Paleoindian archaeology, taking pains to equate these with "archaeological culture." "Phase" and other systematic terms derive from McKern's taxonomy (1939), whose legacy, for better or worse, persists. There is broad agreement that components are recognizable distinct occupations of "sites" and that patterns like Paleoindian are the broadest time-space units. By McKern's definition, the intermediate units differed only by degree of similarity in assemblage or trait-list composition (Trigger 1989:190), and each higher unit vaguely covered larger time-space scales.

Under the heading of "Basic Archaeological Units" Willey and Phillips (1958) identified nothing between component and phase, defined as per McKern. They (1958:22) defined phase as a "unit possessing traits sufficiently characteristic to distinguish it from [similar] units...spatially limited to the order of magnitude of a locality or region, and chronologically limited to a relatively brief interval of time." In effect, phases are constructed empirically from components, and are cultural units with time-space integrity for analytical purposes. Willey and Phillips (ibid) also considered phase the most "practicable and intelligible unit of archaeological study."

As theory develops and fieldwork progresses, of course, phase definitions can change in their meaning and scale. But we speak legitimately of the Gainey or Parkhill Phases. Archaeologists sometimes use "complex" in favor of "phase"; neither McKern nor Willey and Phillips used this term. Kidder et al.'s definition of "complex" (quoted in Overstreet 1991a:209) implies temporal integrity no less than "phase."

Paleoindian Chronology

Chronology is archaeology's chief preoccupation and prerequisite. The Earliest Americans Theme Study recognizes three major Paleoindian intervals, a possible pre-Clovis one, and a post-Paleoindian one equivalent to what most archaeologists call the Early Archaic Period. Midwestern Paleoindian chronology rests on radiocarbon (and, secondarily, thermoluminescent) dating, typological cross-dating with well dated assemblages and industries elsewhere, geochronology and seriation. Despite the many sources of evidence and inference, Midwestern Paleoindian chronology is highly imperfect, to say the least. Few doubt that Paleoindian cultures arose more than 11,000 years ago and endured at least for centuries. But many continue to doubt that Paleoindians were the first people in the New World, instead claiming that they were preceded by ancestral cultures reaching back perhaps millennia. Thus, the antiquity of first human occupation must be distinguished from Paleoindian antiquity.

Pre-Clovis Claims in the Midwest. Paleoindian archaeology long has been enmeshed in claims for pre-Clovis human occupation of North America. The quality of most such claims is dubious, their staying power slight; the "shelf life" of pre-Clovis claims hovers around 10 years (Meltzer 1995:22). Midwestern places and assemblages have not figured prominently in such debates. Among Meltzer's (1995) sources published between 1964 and 1990 that advocated pre-Clovis claims, only the "Imlay Complex" of Michigan's Thumb (Baggerly 1954), championed by Krieger (1964:35, Fig. 1), lay in the Midwest. Alas, the "Complex" consisted of glacially worked but naturally fractured chert fragments; it soon lapsed into deserved obscurity. Fiedel's (2000) recent synthesis would add only the Big Eddy site, discussed below.

Rowlett (1981) reported a small assemblage of possible flake tools stratified beneath a fluted biface at Shriver in northwestern Missouri. Geochronology and thermoluminescence dating suggested that

the assemblage predates 13,000 B.P., but Shriver is not radiocarbon dated, nor are all of the illustrated specimens (Rowlett 1981:Fig. 5) obviously tools or even flakes (cf. Lepper 1999:367). Moreover, the ostensibly pre-Clovis artifacts and context "may in fact relate to the Early Paleoindian...component" (J. Morrow 1996:91).

Near the Upper Mercer sources in Coshocton County, Ohio, Eppley Rockshelter returned a 12,185±130 B.P. date (UCLA-2589C) (Brush 1993:6; see also Brush 1990:238) from feature charcoal. The feature contained no artifacts, but an end scraper was found nearby. A second sample from the same feature returned a considerably more recent date of 9,890±100 B.P. (UCLA-2859E). The latter may owe to organic contamination after excavation (Brush 1993:6), but on available evidence the earlier date cannot be accepted without question.

Southeastern Wisconsin's **Chesrow** Complex is a candidate for pre-Clovis, or at least early Paleoindian, occupation of the Midwest. Partly on typological grounds, Overstreet (1993) suggested that it preceded Clovis or regional middle Paleoindian taxa. **Chesrow** bifaces indeed are "highly variable" (Overstreet 1993:62) in technology and typology, but they resemble best late Paleoindian basally thinned, small lanceolate bifaces like Quad and Hi-Lo. Specimens (Overstreet 1993:62, Pl. I-VII) are lanceolate with edge and base grinding that varies in extent and degree, basally thinned or fluted, usually accomplished in several flake removals, sometimes shouldered or notched, or bearing basal ears. Most are made of local cherts, and some have collateral flaking. The **Chesrow** report is commendably well illustrated, and includes specimens from several nearby assemblages. Judging from their appearance and dimensions (Overstreet 1993:Table 3), these are not Holcombe bifaces (cf. Overstreet 1993:77). They seem much more like Hi-Lo ones, which themselves show "considerable morphological variation" (Ellis and Deller 1982:7), although Hi-Los have more pronounced shoulders. On haft elements, Hi-Los are ground, thinned to fluted, sometimes eared and sometimes laterally thinned below the shoulders (Ellis and Deller 1982:10); many **Chesrow** bifaces possess these attributes, including lateral thinning (Overstreet 1993:Pl. VIId, j).

On available evidence, **Chesrow** assemblages are few in number, limited in distribution, and documented chiefly from uncontrolled surface collection. Save distribution, they share these properties with the other components of the Midwestern Paleoindian record. **Chesrow** assemblages are confined to southeastern Wisconsin (Overstreet 1993:Fig. 3). Their association with proboscideans is inferred, not direct, and their typological affinities lie with late Paleoindian industries. This need not exclude association with mastodons, but by Overstreet and Stafford's (1997:70) reckoning, would postdate mammoths. Local proboscidean remains with associated tool are mammoths.

Big Eddy near **Rodgers Shelter** in southwestern Missouri is perhaps the Midwest's most promising deeply stratified site from which the timing and sequence of Paleoindian and possible pre-Clovis occupations might be established (Lopinot et al. 1998; Ray et al. 1998). It has yielded acceptable dates for Dalton/San Patrice and for early and middle Paleoindian occupations (N. Lopinot personal communication, 2000; Lopinot et al. 1998:Table 1; Ray et al. 1998:77), which overlie what the excavators identify as a Gainey occupation. Below the latter is a small cobble and flake assemblage that itself overlies charcoal dated to 12,940±120 B.P. (B-109008) (Lopinot et al. 1998:219-220; Ray et al. 1998:80). There also are more recent dates from the same contexts, so the integrity of dated samples and the age of the deposit remain uncertain. Indeed, a recently obtained date (AA-35460) from slightly deeper than B-109008 is slightly more recent than the radiocarbon age of that sample, and another deeper one (AA-29021) is considerably more recent (Lopinot personal communication, 2000; Lopinot et al. 1998:Table 7.1). There is "a good possibility" (Lopinot et al. 1998:220) that an intact, pre-Clovis deposit exists at Big Eddy. Until more is known about the site, this evidence is suggestive but not conclusive.

Radiocarbon Chronology. The western and eastern North American Paleoindian records differ in important respects. The west has comparatively few sites that possess contextual integrity, the east many sites that possess little integrity. C. Haynes (1993) concluded that most Clovis sites date to between roughly 11,500 and 10,800 rcbp, most Folsom ones to between roughly 10,900 and 10,300 rcbp. In a recent revision that added some assays and removed others, R. Taylor et al. (1996) were able to separate Clovis and Folsom occupation somewhat better (see especially 1996:Fig. 7).

Radiocarbon dates are reported from many fewer eastern Paleoindian sites than western ones (Ellis et al. 1998:Table 1; Fiedel 1999:Fig. 5). Omitting sites whose dated samples may not be associated with the Paleoindian occupation (e.g., **Dutchess Quarry Caves**, Michaud), C. Haynes (1993:223)

found that eastern sites occurred between roughly 10,600 and 10,200 rcbp, although some individual radiocarbon dates are considerably older than this range (e.g., from Whipple). Although Folsom bifaces are rare in the east, C. Haynes (1993:223) judged eastern Paleoindian occupation to be "penecontemporaneous with Folsom sites in the west", a judgment consistent with then available evidence. If it is correct that Paleoindians arrived in the eastern U.S. from the west, and if it is correct (as existing evidence would suggest) that Paleoindian occupations of the west do not antedate 11500 rcbp, then eastern Paleoindian sites should not pre-date 11500 rcbp and perhaps should be no older than 11300 or even 10500 rcbp. The validity of the logical statement is unimpeachable but as a scientific statement it is merely one unverified hypothesis among many other possible hypotheses.

In southwestern Missouri, Big Eddy is a deeply stratified deposit distinguished most by late Pleistocene and early Holocene deposits. Between its possible pre-Clovis deposits and its certain early Holocene ones, Lopinot et al. (1998; see also Ray et al. 1998) reported a suite of dates, and several others have been obtained more recently (N. Lopinot, personal communication 2000). Dates generally run consistently with depth (Lopinot et al. 1998:Table 7.1). There is Middle Paleoindian occupation at Big Eddy, represented by what the excavators identify as Gainey bifaces and one Folsom specimen. Most are out of context (Lopinot et al. 1998:212) but a fluted biface base and possible midsection (Lopinot et al. 1998:Fig. 8.48d, e) were recovered in situ, and several other likely Paleoindian tools were found at similar depths (Lopinot et al. 1998:215). To judge from the illustration and description, the Gainey assignment seems reasonable.

Big Eddy's Middle Paleoindian strata are dated by a suite of radiocarbon assays. Alas, within those strata the dates do not pattern clearly with depth (Table 8) (Lopinot, personal communication 2000; Lopinot et al. 1998:Table 7.1, 218) even if dates from the entire stratigraphic sequence are reasonably concordant. Three dated samples were located within 3 cm of the Gainey biface; Lopinot et al. (1998:218) associated the specimen with only one, 10,710±85 B.P., which does not nearly overlap at two σ with either the older or younger nearby date but apparently is the closest horizontally to the biface (Lopinot et al. 1998:Table 7.1).

Northeastern Ohio's **Paleo Crossing** (Brose 1994) is a Gainey-affinity occupation (Barrish 1995) quite similar to one reported earlier from Nobles Pond (Seeman et al. 1994b) a short distance southeast. One feature there yielded radiocarbon results that suggest, at face value, a four-millennium span between its filling and sealing, a span that brackets the Paleoindian interval. It does not, however, include any dates that lie in that interval. A second **Paleo Crossing** feature identified as a post mold yielded a result of 12,250±100 B.P. (AA8250; Brose 1994:63) that lies closer to the accepted Paleoindian interval but still is early (Brose 1994:64-65). Individual charcoal fragments from this post mold were assayed (AA8250B-F) to produce two distinct populations (Brose 1994:65). Samples AA-8250B and AA-8250F are indistinguishable statistically and yield an average date of 12,083±105 B.P. using Stuiver and Reimer's (1993) CALIB 3.0.3 program, which again is early for most Paleoindian archaeologists to accept. However, samples AA8250C-E produced an average of 10,979±81 B.P. (Using a different averaging technique, Brose [1994:65] reported an average that differs only trivially.) This **Paleo Crossing** date conforms to current understandings of eastern North America Paleoindian chronology and stands as the evidence for the age of Paleoindian occupation in the Great Lakes.

Even this conclusion, however, must be qualified by the observation that the dated context produced populations of charcoal of two statistically distinct ages, such that natural agents may have disturbed the original context and introduced either older or younger charcoal. The averaged 10,979±81 post mold date calibrates to the surprisingly old 12,989(12,897)12,805 B.P. at one sigma using Stuiver and Reimer's (1993) bidecadal data set. Stuiver and Reimer (1993:8-9) recommend this data set "for most non-marine samples" but it extends only to 9,840 cal B.P. or 11,440 cal B.P., depending on the dendrochronological sequence used. It is extended to reach and surpass the dates reported for **Paleo Crossing** only by statistical modeling of coral, not tree-ring, data (Edwards et al. 1993; Stuiver and Reimer 1993:0[sic]). Few if any eastern North American Paleoindian dates have been reported using modern calibrations, and the **Paleo Crossing** result is best reported in radiocarbon years to facilitate comparison to other sites.

About one hundred kilometers west, in north-central Ohio, Sheriden Cave has yielded many radiocarbon dates on archaeological and paleontological samples (Holman 1997; McDonald 1994; Tankersley 1999, personal communication 2000) (Table 8). Pending revision of stratigraphic interpretation and reporting of newly acquired dates (Tankersley, personal communication 2000),

Sheriden's cultural assemblage includes one Paleoindian biface identified as Holcombe in type and a worked-bone object, possibly a bone point (Tankersley 1999:70). Among Unit IIb's three populations of radiocarbon dates, Tankersley (1999:71) favored the 11,200 yr B.P. average of three. The biface was found in underlying Unit IIc, so should antedate that figure. That unit also apparently contains three populations among its set of at least nine dates, even the most recent of which is surprisingly old for inferred Holcombe occupation. But Tankersley (1999:71) noted that Holcombe was not yet dated directly. Fluoride relative dates agree with radiocarbon ones (Tankersley 1999:71-72).

Sheriden's faunal assemblage is large and diverse; detailed description of its association with cultural remains is eagerly awaited, although at least some dated faunal samples suggest butchering and hence direct human association (Tankersley, personal communication 2000). Nevertheless, association must be demonstrated on archaeological and taphonomic grounds. Cultural deposits seem bracketed between ca. 11,200-10,600 rcbp. They may be associated with caribou and Holocene species, but also with extinct Pleistocene species like giant beaver (*Castoroides ohioensis*) and peccary (*Platygonus* spp., *Mylohyus* spp.). Upon full reporting, Sheriden should be of great significance to Midwestern Paleoindian chronology, paleoenvironmental inference, and the study of human agency in Pleistocene extinctions.

Two western New York State sites yield radiocarbon dates relevant to Midwestern chronology. Arc returned dates from several strata which bracket the Gainey-affiliate Paleoindian occupation of the site and dates at between 11,700 and 10,300 rcbp (Ellis et al 1998:158). A suite of radiocarbon dates on bone/ivory and plants from Hiscock fall between 11,400 and 10,200 rcbp (Laub et al 1996; Tankersley et al 1998: Table 2). The Hiscock site's dates on mineralized bone generally agree with radiocarbon dates there and at Big Eddy, **Paleo Crossing** and Sheriden sites as well.

When sites have only one or few radiocarbon dates, the accuracy of individual assays and the details of occupational history cannot be gauged (Bird and Frankel 1991:179-180). Big Eddy and Sheriden stand out for the few aberrant dates among them. Radiocarbon dating is inherently probabilistic (Shott 1992a) and fraught with problems of association and calibration. In the interests of full reporting and to aid interpretation of Paleoindian chronology, we should report unaccepted radiocarbon results. Gainey, for instance, returned a date of 2830±175 B.P. on a pooled sample that evidently contained at least some charcoal more recent than the Paleoindian occupation (DIC-1564) (Simons et al. 1984:22). Unacceptably recent dates also were obtained at the nearby Parkhill Phase Leavitt site (Shott 1993:21), this time using the AMS technique with individual charcoal pieces identified as spruce.

Table 9 compiles unaccepted dates from several important Midwestern and Ontario Paleoindian sites. It excludes dates earlier than early or middle Paleoindian times from Big Eddy and Eppley. **Paleo Crossing** dates are excluded even though charcoal from a single probable postmold yielded two statistical populations circa 12,150 and 10,980 rcbp and assays from the lowest and uppermost stratum of another feature are statistically distinct from one another and the postmold dates (Brose 1994:63, 65). **Paleo Crossing** is geologically complex, yet no assay there clearly is aberrant. Intrusion, ambiguous association, or dating errors combine to explain the dates shown in Table 9. The nine assays there are gratifyingly few compared to the 13-15 (two are late Paleoindian in age) apparently reliable dates from Big Eddy, the 24-26 (two are pre-12,000 rcbp) from Sheriden, and **Paleo Crossing's** date. Accepting all Big Eddy, Sheriden and **Paleo Crossing** dates gives a figure of 42 acceptable dates against Table 9's nine unaccepted ones, a better average than radiocarbon ordinarily achieves (Buck et al. 1994:232). Yet it is possible that unacceptable dates from other Paleoindian sites have not been published. AMS dates seem disproportionately represented in Table 9; for Leavitt at least, AMS assays were obtained while the method still was somewhat untested.

Table 9: Unaccepted Dates from Midwestern and Nearby Paleoindian Sites.

[Long description]

Site	Date	Laboratory	AMS?	Source
CB-North	4,000± 90	ISGS-3406	no	Evans et al. 1997:162
CB-North	3,190±330	ISGS-3422	no	Evans et al. 1997:165
CB-North	4,180± 40	B-102243	yes?	Evans et al. 1997:165
Gainey	2,830±175	DIC-1564	no	Simons et al. 1984b:72
Halstead	6,030± 60	B-72120	yes	Jackson 1998:54
Leavitt	7,886±115	AA-1223	yes	Shott 1993:21

Leavitt	1,100±600	AA-1222	yes	Shott 1993:21
Sandy Ridge	735± 65	AA-5730	yes	Jackson1998:28
Zander	3,380±420	B-7308	no	Stewart 1984:50

Thermoluminescence (TL) dating is less precise than is radiocarbon dating in the Paleoindian time range (Aitken 1990:141; Dunnell and Feathers 1994:116) and it is not used often in North America. TL dates of ca. 12,400 B.P. and 11,400 B.P. were obtained from burned chert samples at Gainey. Both were reported with very large measures of uncertainty. (Perhaps the only other eastern North American TL-dated specimen is a fluted biface of uncertain typological affinity from Massachusetts' **Wapanucket Locus 8** [Robbins 1980:Plate 22C] TL-dated to 9,000 B.P. [Robbins 1980:281, 290] from a context of equally uncertain age in which Paleoindian and Archaic deposits are mixed.) For the Midwest, we can do no better than to echo Allen's (1994:342) judgment that "Obtaining paired samples of luminescence dates and radiocarbon determinations from diverse sites where reliable samples for both techniques occur...is a major priority." Given the poor resolution of the radiocarbon timescale during the period, Paleoindian sites which yield artifacts susceptible to thermoluminescent dating and which have samples appropriate for radiocarbon dating are likely to be of national significance in their ability to improve these techniques and correlate their applications.

Geochronology. The Midwest's Late Pleistocene history is well known, its glacial deposits reasonably well ordered and dated. Archeologists use this knowledge to infer maximum and minimum ages of archaeological deposits, and the gross patterning of these archaeological data on dated geological features illuminates some of the temporal and topographic limits to patterns of human activity.

Mason (1958, 1962) saw that Michigan fluted bifaces were confined to the southern half of the lower peninsula. He correlated the distributions with late Pleistocene glacial features, concluding that Paleoindians entered Michigan no earlier than approximately 12,000 B.P., when the ice front stood at the approximate northern boundary of the fluted-biface distribution. Quimby (1958) then noted similar patterning in the distribution of Late Pleistocene fauna, and the Mason-Quimby line was born. Since Mason's work, the northern limit of fluted-biface distribution has crept northward (Cleland et al. 1998).

Following Mason, similar studies appeared for Ohio (Prufer and Baby 1963; see also Seeman and Prufer 1983), and Indiana (Dorwin 1966). Studies of smaller scope concerned parts of southwestern lower Michigan (Peru 1965, 1967) and eastern Illinois (Henry and Nichols 1963). To the south, the latest Pleistocene features and the earliest human presence diverge in time. The validity and precision of chronological inferences in early studies are less important than the fact that they were reasonable efforts to ground Paleoindian chronology, and that they demonstrated some interpretive value to apparent patterning in the distribution of Paleoindian remains.

Based on the association of sites with fossil standlines of known age most archaeologists agree that Great Lakes Paleoindian occupation occurred between roughly 11,000 and 10,000 B.P. (Ellis and Deller 1997). Although data remain limited, regional specialists subdivide this interval into three successive phases—Gainey, Parkhill, and Crowfield—each marked by a diagnostic fluted-biface type and, to some extent, diagnostic tool kits. Gainey Phase occupation is thought to be the earliest, and to date to ca. 11,000 B.P. with an uncertainty of several centuries.

Typology

Paleoindian typology largely involves fluted bifaces and archaeologists doubtless invest more thought in fluting technology than its ancient practitioners did. Barrish (1995:40-53) and J. Morrow (1996:159-167) described the history of Midwestern Paleoindian typological studies, yet the established typological tradition has not solved our problems. As much today as thirty years ago "Formidable obstacles block the path of anyone attempting to assign specific type designations to individual fluted points" (Stoltman and Workman 1969:193).

Midwestern archaeologists commonly lament the "uncleanliness" of typological results as though it were an undesirable flaw. To J. Morrow (1996:158) we lack "clearly defined, quantitative measures of segregating the different [fluted biface] types." There remains much disagreement about what defines a type and whether individual fluted bifaces belong to one type or another (e.g., Barrish 1995:19-20; Lepper 1999:372). Compare Howard (1988) to J. Morrow (1996:175-186) on what

Clovis is and whether Ready site bifaces are Clovis.

Whether we reveal or construct types, typological approaches assume that all change is discrete. Where we draw the line between successive types in a time series of continuous variation is an arbitrary act. Where we seek continuous, not discrete patterns of variation obliterated in typological approaches, we create many transitional specimens that resist classification.

Paleoindian typology derives from the western taxonomic units Clovis and Folsom. As in other respects, the west exerts influence for largely historical reasons: it is where fluted points first were found in association with megafauna. Midwestern archaeologists recognize the following fluted-biface types, arranged in (possibly overlapping) order by time.

To J. Morrow and T. Morrow (1996:18-19), Clovis bifaces are the product of transverse percussion flaking from isolated platforms. Traditionally, archaeologists consider Clovis fluting to occur from bases steeply beveled to one face, but lacking prepared "nipple" platforms. J. Morrow and T. Morrow (1996) argued that Clovis fluting instead was from centrally bevelled bases that possessed nipples. Collins (1999:Fig. 3.3b-d) illustrated Clovis preforms from Texas that were beveled to one face and that lacked prepared platforms. Basal concavity is shallow, and the resulting bifaces are thick. Apparently, Clovis bifaces were fluted near the middle, not end, of the production process. Gainey bifaces are the product of medial percussion flaking. They were fluted by indirect percussion from bases beveled to one face, then the other, and also with prepared platforms. Fluting occurred late in the production process. Resulting concavities are deeper and Gainey bifaces are thinner overall. J. Morrow and T. Morrow's study was admirably detailed. As a minor criticism, the isolated lateral-margin platforms left to aid thinning and finishing that they identified with Clovis characterizes Ontario Parkhill assemblages (e.g., Deller and Ellis 1992:31-34).

Clovis bifaces (Barrish 1995:29-30; Howard 1990; J. Morrow 1995; J. Morrow and T. Morrow 1996) are comparatively large, wide, thick and therefore heavy. Sides are subparallel to slightly excurvate. Haft margins and modestly concave bases are heavily ground. Maximum width position (distance from the base to the point of maximum width) is near or below the mid-point. Fluting is from prepared bases, either simply beveled (Howard 1990:255) or with a prepared platform (J. Morrow 1995:171). Fluting usually is on both faces, can be multiple (Howard 1990:255) or single, and usually is fairly wide and short. Fluting may occur at an intermediate, not late, production stage (J. Morrow 1995:171; J. Morrow and T. Morrow 1996).

Gainey bifaces (Barrish 1995; Ellis and Deller 1997; J. Morrow 1996; J. Morrow and T. Morrow 1996; Shott 1986b; Simons et al. 1984) also are relatively large, wide and thick, with subparallel sides, and ground haft margins and modestly concave bases. Basal concavity is arched (Ellis and Deller 1997:2). Usually single, relatively short and wide flutes occupy both faces. Flutes may have been guided by fairly prominent median ridges produced by preform thinning on both faces. Basal finishing is by the Barnes technique (Ellis and Deller 1997:Table 1; J. Morrow 1996:176). Earlier-stage preforms and unfinished fluted preforms are rare at the Gainey type site and in most other assemblages, so fluting production details are poorly understood (J. Morrow and T. Morrow 1996). Gainey in the Midwest is roughly equivalent to Bull Brook in the northeast (J. Morrow 1996:175; Shott 1986b:111) but perhaps also **Vail** and Debert there (J. Morrow 1996:184).

Clovis and Gainey. However much they differ in typological methods and conclusions, most Paleoindianists agree that Clovis and Gainey are best distinguished as types or modes (Barrish 1995:55; Howard 1990; J. Morrow 1996:193-194; J. Morrow and T. Morrow 1996; Stoltman 1993:58). Alas, they disagree on how and why the modes differ. To Barrish (1995) Clovis is more selective of toolstone and more sparsely distributed in fewer sites than is Gainey, but is difficult to distinguish on technological grounds. To J. Morrow (1996; see also T. Morrow 1996b:3; J. Morrow and T. Morrow 1996), the key difference is in fluting technology, where Gainey follows Folsom techniques of fluting from prepared platforms, yet some typological disputes persist. Certainly in respects besides fluting, Gainey and Folsom bifaces differ very much. Ultimately following Roosa (1965), some argue that Clovis simply is not found in the Midwest (Howard 1990; Stoltman 1993). This makes major Midwestern Paleoindian assemblages near St. Louis (e.g., Ready, Martens) Gainey, not Clovis, in affinity. J. Morrow (1996) is the chief advocate of the opposing view that Clovis occurred in the Midwest, and that St. Louis-area sites are its chief expression.

Parkhill Phase *Barnes* bifaces are thinner and narrower, not necessarily shorter, than Clovis and Gainey ones (Ellis and Deller 1992, 1997; Shott 1986b). Margins are excurvate and bases eared, so

points have a fishtailed form. Basal concavities are modest to deep and straight rather than arched. Barnes bifaces are sufficiently similar to Cumberlands to be considered roughly equivalent. Barnes bifaces are more common in the Great Lakes, Cumberlands in the Ohio Valley and points south (Justice 1987:Map 6). Similar points extend east into the Northeast (Dincauze, this volume).

Folsom bifaces (J. Morrow 1996:177; T. Morrow 1996b; Munson 1990) are shorter and thinner than Gainey bifaces, have deeper basal concavities, straight to contracting margins, and long, wide, usually single flutes that occupy most of both faces. Ahler and Geib (in press) identified a thin, uniform transverse section from tip toward base as a key Folsom attribute. Munson (1990) plotted the distribution of Folsom bifaces across the region, confining it largely to the western half of the Midwest; he correlated it with the Prairie Peninsula (see also Justice 1987:Map 7). Folsom traditionally has been associated with bison hunting, a judgment strengthened by Ahler and Geib's (in press) argument that Folsom bifaces were highly specialized, renewable bison-hunting points. As a generalization subject to revision, Folsom indeed seems most abundant in the western Midwest, especially in western Iowa (Billeck 1999; T. Morrow 1996b) and rare further east.

Crowfield bifaces (Ellis and Deller 1984:97, 1997:3) are wide and remarkably thin, with contracting margins, and arched basal concavities and often sharp, wide or obtuse-angled tips. Individual flutes vary in length and especially width, and both faces tend to have several flutes. Crowfield bifaces often are pentagonal (sometimes called 'pumpkin-seed') in outline form, probably an incidental consequence of their near-constant wide tip angle, maintained in resharpening by oblique faceting (Ellis and Deller 1997:5), and their near-constant corner angles. Crowfields are best known and most abundant at the eponymous site, but occur elsewhere. Significantly, Ellis and Deller's (1997:Table 2) regional compendium identified Crowfield assemblages principally in Ontario, although they encompassed Vermont's Reagen (Ritchie 1953, DD:this volume) site as well. No sites were identified in the Midwest, although Prufer and Baby (1963:Fig. 4) illustrated one apparent Crowfield biface from Ohio. Surely they occur there and elsewhere but the distribution does seem centered on Ontario.

NEW FIGURE

Holcombe bifaces are best known and most abundant at the type site and nearby locations of southeastern Michigan (Fitting et al. 1966). Usually composed of Bayport chert, Holcombe bifaces are relatively narrow, small lanceolates whose basal treatment ranges from thinning to multiple fluting (Fitting et al. 1966:Figs. 6-7). Many specimens apparently are preforms and many finished ones are proximal fragments, but as best can be determined flutes, when present, are not especially long. To judge from illustrated specimens (Fitting et al. 1966:Fig. 6o), at least some Holcombe bifaces were fluted from prepared platforms. Although Holcombe bifaces are widely distributed at least in southeastern Michigan, the type's full range is unknown. Justice (1987:Map 5) confined it to the Great Lakes basin. Prufer and Baby (1963:Fig. 1) showed a possible Holcombe biface from Ohio, but Seeman and Prufer's later update excluded the Holcombe type (1983:157). McKibben may be a Holcombe assemblage, but illustrated specimens do not confirm the assignment (cf. Prufer and Sofsky 1965:12, Fig. 1a-h). Holcombe does not seem to be common in adjacent Ontario, where perhaps coeval technologically different Crowfield industries occur. In Ohio, Sheriden's unillustrated Holcombe biface (Tankersley 1999:70) may be as early as 10,900 rcbp. The Bostrom site in Illinois may partly be a Holcombe assemblage but likelier is earlier (Tankersley 1995; cf. Koldehoff 1999:2, J. Morrow 1996:108).

In the Midwest, Clovis and Gainey bifaces tend to be made on what are considered good toolstones (the highly variable Burlington for Clovis, Upper Mercer or Moline for Gainey), Folsom, Barnes and Crowfield bifaces on a wider variety of often local cherts. Thus, the earliest fluted types might be defined by toolstone as much as by size, form and technology. Patterns in archaeological distribution of toolstones are also used to infer settlement mobility, range size and other practices that might define phases.

Late Paleoindian Types

Dalton bifaces are late Paleoindian forms whose basal treatment ranges from thinning to short fluting. Basal curvature is pronounced. In plan form, Daltons are lanceolate but with somewhat expanding stem margins, usually have weak shoulders, and almost always have well defined corners that approximate ears. Dalton bifaces often are finely serrated. The Dalton horizon dates to ca. 10,500-10,000 rcbp (Goodyear 1982). O'Brien and Wood (1998:80) would extend its lower

boundary to 10,900 rcbp. Walthall and Koldehoff (1998:259) described the distribution of Dalton assemblages, which seem most abundant by far in the central Mississippi Valley; northeast Arkansas in particular boasts many Dalton assemblages. Yet Daltons occur to some extent in the Midwest, especially in its western portion. There are many in Missouri, especially south of the Missouri River (Chapman 1975:98-125; O'Brien and Wood 1998:73). Sizable Dalton assemblages were found at **Rodgers Shelter** (Kay 1982) and at nearby **Montgomery** (Collins et al. 1983:30-31). Indeed, Rodgers and **Graham Cave** (cf. O'Brien and Wood 1998:76-79) were instrumental in dating the Dalton horizon. Along with the typologically related and perhaps coeval San Patrice type, Dalton bifaces and other tools were found at Big Eddy (Lopinot et al. 1998:163-174, Figs. 8.34, 8.35, 8.37). Associated radiocarbon dates there (ibid: Table 7.1) cover the Dalton span noted above. The existence of at least 59 Dalton sites in four relatively small sections of southwestern Illinois also hints at considerable occupation (Walthall and Koldehoff 1999:28). Dalton assemblages are distinguished not just by Dalton bifaces *qua* points but also by large, thick, oval to subrectangular beveled bifaces that probably functioned as adzes (Morse and Goodyear 1973).

Among other Late Paleoindian types, *Agate Basin* bifaces seem to fall between 10,500-10,000 rcbp, *Hell Gap* bifaces between 10,000-9,500 rcbp, and Cody-Complex *Eden-Scottsbluff* specimens between 9,400-9,000 rcbp (Buckmaster and Paquette 1996:38-44). Broadly consistent with this view, Salzer's (1974:43) northern Wisconsin Flambeau Phase of Agate Basin affinity originally was dated to ca. 10,000-9,300 rcbp. Yet Salzer (1974:44-45) assigned his Minoqua Phase of Cody affinity to a subsequent Early Archaic time range. Radiocarbon and stratigraphic confirmation of these assignments remain elusive (Mason 1997:105-106), and a date of 9410±110 on Eden-Scottsbluff material from Maine (Petersen 1995:211) seems congruent more with Buckmaster and Paquette's than Salzer's Eden-Scottsbluff chronology. If this chronology is correct, then Agate Basin and Dalton are contemporaneous if not sympatric in distribution (O'Brien and Wood 1998:86). At **Metzig Garden** in eastern Wisconsin an Eden-Scottsbluff occupation overlaid possibly an Agate Basin/Plainview one (Behm 1986:3, Fig. 5), supporting the chronological relationship between these taxa. Agate Basin material is comparatively sparse in the midcontinent. O'Brien and Wood (1998:86-87) attributed few known Missouri bifaces to the Agate Basin taxon, and also questioned the Agate Basin assignment of Cherokee Sewer specimens from Iowa (Anderson and Semken 1980). Fishel (1988) plotted Agate Basin's distribution chiefly in the western half of the Midwest, roughly comparable to the Folsom distribution (Munson 1990) and overlapping with Dalton (cf. Justice [1987:Map 9], who extended the distribution much further east). Apparent Agate Basin locations include Patrow in northern Minnesota (Neumann and Johnson 1979:Fig. 6d), Cherokee in northwestern Iowa (Anderson and Semken 1980), northwestern lower Michigan's Samels Field (Cleland and Ruggles 1996), central Illinois (Luchterhand 1970:Fig. 13; Munson and Downs 1968:125-126), near Marquette in upper Michigan (Buckmaster and Paquette 1996) and across central and northern Ohio (Prufer and Baby 1963:20, Figs. 10, 20). Tomak (1994:120, Figs. 7.4-7.5) reported Agate Basin bifaces from southern Indiana's Alton, but illustrated specimens seem ambiguous. Cody Complex material has been found at Renier (Mason and Mason 1960) on Wisconsin's Door Peninsula, Pope in Wisconsin (Ritzenthaler 1972), and at Gorto (Buckmaster and Paquette 1988) in Michigan's nearby upper peninsula. All three assemblages apparently are from cremation mortuary contexts. Other finds near Gorto (Clark 1989), at Patrow (Neumann and Johnson 1979:Fig. 6c), in northern Wisconsin (Behm 1986; Clark 1982:Figs. 1-2; Kuehn 1998:464; Mason 1985) and at Sawmill in Ohio (Prufer and Baby 1963:32-33) document a wider range of Cody occupation. **Metzig Garden** is particularly significant because it contains undisturbed sub-plowzone deposits that include as many as 18 late Paleoindian features (Behm 1986:4). Alex (1980:114) reported one Eden-Scottsbluff biface from excavation context in Iowa.

The fluted and late Paleoindian point typology and the time series based upon it are poorly grounded in radiocarbon chronology. What grounding there is comes from sites in the west and, increasingly, the northeast. Only **Paleo Crossing**, Sheriden and Big Eddy among major assemblages with clear typological affinities are dated, and then not without questions, by radiocarbon.

Other Phase Diagnostics

Blade Technology. Green's 1963 report from Blackwater Draw made prismatic blades and polyhedral cores further Clovis diagnostics. In North America, Clovis blade technology is found most in the southern plains. Collins' (1999; see also Parry 1994) recent assay of blade technology rightly abandoned the formal definition of blades by arbitrary values of length-width ratios for one that emphasizes technology over product. Blade technology included selection for isotropic chert, core preparation and maintenance, and soft-hammer or indirect percussion. It made efficient use of

stone and yielded sharp, relatively uniform products capable of modification into a range of finished tools. Perhaps a better definition of blades than the traditional one is that they are flakes struck from prepared conical or wedge-shaped polyhedral cores, whose length is only weakly constrained by their width and thickness. Blades possessed small platforms, thin percussion bulbs, smooth interior surfaces, few, subparallel exterior facets normal to the longitudinal axis, and often curvature.

Collins (1999) described the time-space distribution of blade technology. He saw little evidence in midwestern assemblages, but considered blades from and near **Meadowcroft** possible Clovis antecedents. This view does not account for the persistent doubts about **Meadowcroft's** age nor its small assemblage's affinities to late, not early, Paleoindian industries. As above, Parry (1994) considered **Meadowcroft** specimens to be biface thinning flakes, not true blades at all. Judging from illustrations can be problematic, but blades and polyhedral cores may occur in several Midwestern assemblages, chiefly from the St. Louis area (e.g., Martens [J. Morrow 1996:Figs. 71-76], Faust [Koldehoff 1994:Fig. 3], and perhaps Mueller [Koldehoff 1977:27]). A possible blade core and blades were found in situ in buried deposits at Big Eddy (Lopinot et al. 1998:212-214, Fig. 8.49e, k). T. Morrow (1996a) reported a Clovis blade from southeastern Iowa. A few blades may pass unnoticed in large assemblages, and only recently have many midwestern archaeologists looked closely for them. Moreover, end scrapers and other tools probably made from blades abound in midwestern assemblages, so the distribution of Paleoindian blade technology may be wider than it seems, their paucity in midwestern Paleoindian assemblages more apparent than real. Only thorough inspection and publication of assemblages will determine if, for whatever reason, unmodified Paleoindian blades are confined to the St. Louis area or are more widely distributed in the Midwest. Blades sometimes were used without modification, but most were destined for working into endscrapers and other tools. It would be interesting to estimate how many tools could be fashioned from a typical blade, and the probability that a blade would be worked down to bifaces, endscrapers, or other tools.

Assemblage Measures

In a carefully and tightly constructed argument, Jackson (1998:49-50) used both discrete and metric variables to infer the affinities of two small Ontario assemblages that lacked fluted bifaces. Because they also lacked Onondaga chert, Jackson reasoned on comparative contextual grounds that the assemblages were earlier, not late, Paleoindian. Among early Paleoindian variants, he inferred Gainey affinity by discrete (the presence of quartz and bipolar cores) and metric (channel flake width) variables. Jackson also used negative evidence (absence of channel-flake points and other possible Parkhill Phase diagnostics) to infer Gainey affinity. Across the Midwest, use of quartz does not seem an exclusive Gainey Phase preference. Leavitt may be of Parkhill affinity, and it contains a quartzite fluted biface (Shott 1993:Fig. 6.4e). Certainly Hixton silicified sandstone, mechanically similar to quartzite if not quartz, is a common toolstone for Gainey bifaces at **Silver Mound** near the source assemblages (Hill 1994:230-231) but also for late Paleoindian types like Plainview and Agate Basin (Hill 1994:Figs. 6-7). Such materials do not seem confined to one particular Paleoindian phase. Obviously, in some cases geochronology can at least set limits on the possible age and therefore affinities of Paleoindian assemblages or at least the deposits in which they occurred.

Spurred end scrapers may be Paleoindian diagnostics (Rogers 1986; cf. Morris and Blakeslee 1987). In **Shawnee Minisink's** large assemblage, at least some spurs were fortuitous (Rule and Evans 1985:214). In the Midwest, spurring occurred on some specimens at Martens and Bostrom (e.g., J. Morrow 1996:601, 619) and at Leavitt (Shott 1993:Fig. 5.9c, 5.12a). Spurring at Leavitt seemed largely a by-product of resharpening (Shott 1993:72-73), at Parkhill a combination of resharpening and deliberate design (Ellis and Deller 2000:106-110). The frequent appearance of spurs on Paleoindian scrapers is undeniable, but the status and function of spurs remain in question. After all, end scraper spurs are described in ethnographic accounts (Shott 1995a:60) among people who definitely were not Paleoindians. For the Great Lakes, Ellis and Deller (1988) proposed a number of types considered diagnostic of Paleoindian age. Most occur in low frequencies and narrow geographic ranges so are not necessarily found in Paleoindian assemblages across the Midwest, and are defined empirically via an eclectic set of technological, formal and use Criteria. Yet Jackson (1998:49-50, 86) found such types useful in distinguishing Gainey and Parkhill assemblages.

Jackson (1998:122-127) also came down to the level of individual tools in an attempt to distinguish Gainey and Parkhill phase end scrapers. In general, metric variables distinguished only ambiguously. Divergence or expansion angle of the opposing sides of end scrapers, a blank attribute,

seem to differ between Gainey (values ca. 25°) and Parkhill (values ca. 30°) phases (Jackson 1998:122). Jackson could not distinguish Ontario Gainey and Parkhill Phase assemblages by length, weight or bit length (1998:125-126). He concluded that "dimensions do not appear to be a sensitive or reliable phase indicator" (1998:126). This is no surprise, since most such dimensions vary with amount of reduction experienced by specimens. Yet discrete variables distinguished phases fairly well. Jackson (1998:126-127) noted much higher frequencies of spurring, especially right-side spurring, and of double-pair notching in Gainey than Parkhill end scrapers.

Geography and Environmental Conditions for the Midwest

Paleoenvironment encompasses the landscapes and landforms, the climates, and the biota that Paleoindians encountered across the Midwest. In its northern half, land forms are chiefly Wisconsinan-age glacial ones; nearly all of Minnesota and Michigan, most of Wisconsin and parts, mostly northern fringes, of Iowa, Illinois, Indiana and Ohio were glaciated during at least the last Wisconsinan advance. Glacial landforms include eskers, till plains and moraines. Related landforms are the strandlines—beach ridges—of peri-glacial lakes. Climate involves patterns in the abundance and distribution of temperature and precipitation. Biota are plants and animals native to the Midwest. Although biota were in part determined by climate, historical factors and ecosystem dynamics mean that, especially for animals, it is difficult to interpret their occurrence and distribution just in terms of climate.

Paleoindian habitats have no strict (in some cases and respects not even rough) modern analogues. This is truer the further to the north that we go. Yet for purposes of description, and interpretation, it is helpful to point out that Midwestern Paleoindian habitats were roughly similar to modern ones found much further north. To some extent, the northern Midwest passed gradually from high Arctic to tundra to Subarctic conditions during the Paleoindian period, although any but the very earliest Paleoindians encountered tundra or parkland only in narrow periglacial zones. Further south glacial effects were attenuated but nevertheless felt. Very broadly, then, a modern latitudinal gradient from, say, northern Minnesota to the Arctic Ocean encompasses—over a wider geographic range—some of the environmental variation that, at Pleistocene's end, was squeezed into the northern Midwest.

Landforms

The chief issue regarding landform relates to the shapes and levels and flows of the Great Lakes. Although these aspects of the lakes seemed inalterable enough to serve as the "fixed and permanent" boundary between the United States and Canada, their current characteristics are less than 3,000 years old. If we recall their origins as, essentially, large puddles left behind by the Laurentide glacier, we understand how the Great Lakes' extent, levels, exact locations and outlets varied through time at Pleistocene's end as first the Laurentide glacier retreated then readvanced, then began its final retreat. Because Superior was glaciated during much of the Paleoindian period and Ontario falls outside the Midwest, emphasis here is on the middle lakes of Michigan and Huron.

Early twentieth century research established a basic sequence of fluctuations in the Michigan-Huron basin, today in reality a single lake (Larson T.2; Jackson et al. 2000; Larson 1987). For the early Paleoindian period, these basins were occupied by a series of periglacial lakes higher than the modern level. A brief low stage ("Kirkfield Low Stage") was followed at the approximate start of the middle Paleoindian period by Main Lake Algonquin, slightly higher than the modern lake levels. Circa 10,300 rcbp (Jackson et al. 2000) this high stage fell abruptly, exposing vast landscapes previously inundated. Then, the Great Lakes were comparative puddles, and Great Lakes states, especially Michigan, had much more dry land than they do now. The slow rise to the Nipissing high of ca. 6,000 ya, reaching the earlier Algonquin stage, began during the late Paleoindian period.

During most of the Paleoindian period, Lake Erie fluctuated within its modern boundaries; only after the Paleoindian period were large parts of Lake Superior ice-free (Larson 1987:28-30). Central to this sequence and its associated chronology was the concept of the "hinge-line" running roughly from Green Bay across Saginaw Bay and southeast into Ontario. North of this line, the modern land surface was subject to exponential isostatic rebound, which raised earlier landforms like glacial-lake strandlines above their original elevations. South of it, however, rebound did not occur; strandline elevations there would not have changed. If a strandline south of the hinge line today stands at, say, 175 masl [meters above sea level], then during the Pleistocene it stood at 175 masl. North of the hinge line, however, its elevation today would range from 175 masl upward.

A "revisionist" (Morgan et al. 2000:15) view developed in the 1980s. In this model "the hinge line...

is an invalid concept" (Larson 1987:2) and isostatic rebound simply rises exponentially everywhere that Wisconsin ice previously covered. If "revisionists" are correct, Main Lake Algonquin was confined much further north in both the Michigan and Huron basins. During the middle Paleoindian period, Lake Michigan first was higher—larger—than it is now, then considerably smaller and lower. Nowhere during the middle Paleoindian period did Lake Huron extend nearly as far south as it does today (Larson 1987:Figs. 16-17).

The different views are important not just in general terms but because many Great Lakes Paleoindian sites have been dated indirectly by their location on strandlines of known (or presumed) age. Fitting et al. (1966:1-4) used geochronology to infer Holcombe's age by associating its strandline with an extension of the Main Lake Algonquin. This view is not tenable, but the concentration of middle Paleoindian sites in southwestern Ontario (e.g., Deller and Ellis 1992; Ellis and Deller 1997:Fig. 5, 2000) long have been dated by association with strandlines of Main Lake Algonquin that themselves may or may not date to between roughly 11,000-10,300 rcbp. Yet recent syntheses of relevant geological data preserve the Ontario geochronology (Jackson et al. 2000; Morgan et al. 2000). Whether Main Lake Algonquin or not, there were "higher water levels in the southern Huron basin during the period from ca. 11,000 to 10,500 B.P." (Morgan et al. 2000:15).

However we understand the geological dynamics of the Great Lakes, Paleoindians witnessed the rise or fall of lakes, events that were instantaneous in geological terms and probably unfolded in years or perhaps decades. Consider for a moment how remarkable it would be if, say, Lake Michigan receded today, stranding Chicago and Milwaukee or, alternatively, if it rose, transforming them into Midwestern Venices if not deep lakebed. Paleoindians experienced comparable and comparably momentous changes. Exposed lakebeds increased available land and triggered rapid, complex patterns of biotic expansion and succession. These were disturbed habitats *par excellence*. Yet from an archaeological perspective, the complex fluctuations of Great Lakes levels came at a price: some early Paleoindian sites might be inundated or severely reworked.

Pollen Data and Vegetation

Shane (1994:11-13) summarized vegetation conditions and trends for the eastern Midwest, principally Ohio and Indiana. Her Phases IIa (13,000-11,000 rcbp; 15,631-13,000 B.P.) and IIb (11,000-10,000 rcbp; 13,000-11,450 B.P.) are roughly equivalent to the early and middle Paleoindian phases, respectively. Phase IIa began with essentially periglacial climate and vegetation, the latter dominated by spruce. A strong warming trend then caused hardwoods like oak and ash to increase at the expense of spruce, especially outside the Appalachian Plateau. Net above-ground productivity (NAP) declined in abundance from west to east, indicating more open conditions on the western till plain. Phase IIa vegetation communities were "without modern analogs" (Shane 1994:12). Inferred paleoclimatic conditions suggested mean January temperatures near -8-12°C and mean July temperatures of 23-21°C from west to east. A different longitudinal trend obtained in precipitation, which apparently rose to the east.

Phase IIb was "extremely complex" (ibid) in all climatic and vegetational properties, characterized less by average values than abrupt changes and major differences across time and space. This is no surprise for a period roughly commensurate with the Younger Dryas event. In this interval, the till plain and Appalachian Plateau experienced rather different sequences of change. In the former, Phase IIb opened with some apparent cooling, marked by a spike in spruce pollen from 10% to 30% in less than a century. Just as abruptly, spruce then was replaced by pine in an apparent warming trend perhaps also influenced by the historical factor of pine's slow colonization rate. July temperatures declined slightly, January ones more substantially, and precipitation declined across the till plain. In the Appalachian Plateau, no such dramatic changes occurred, although hardwoods and pine gradually replaced spruce through time. July temperatures were slightly cooler than previously, but January ones considerably warmer. Southern Wisconsin data from ca. 11,000 rcbp—the transition from Phase IIa to IIb—show spruce and net above—ground productivity (NAP) dominance, with minor representation of pine and hardwoods, essentially "open spruce parklands or woodlands" (Fredlund et al. 1996:88).

The best recent midcontinental paleoenvironmental research is from Canada, not the United States. For southwestern Ontario and adjacent parts of Michigan and Ohio, Muller (1999:21-46) compiled and synthesized data from 130 pollen cores. His chief conclusion was that spruce parkland became a nearly closed spruce forest before pine replaced spruce ca. 10,500 rcbp. That is, forests closed before they became dominated by pine. Otherwise, Muller's synthesis corroborates earlier studies,

and suggests that middle Paleoindian people experienced rather dramatic climatic and biotic changes from spruce parkland to closed spruce, then pine, forests. Significantly, he suggested (1999:45) that Gainey Phase middle Paleoindian occupation occurred in spruce parkland trending southward, by extension, to spruce forest in Ohio but that subsequent Parkhill Phase middle Paleoindians, at least in southwestern Ontario and, again by extension, across central lower Michigan, occupied a rough ecotone between "closing...spruce-dominant forest to the south, and an open spruce-parkland" to the north.

More broadly, spruce exhibited a pronounced longitudinal gradient across the Midwest ca. 12,000 rcbp from higher to lower values from east to west (Jackson et al. 1997: Fig. 13). At the same time, the Midwest was wetter in general than it is today and certainly than it would be during the subsequent Younger Dryas (ibid:57). On balance, late Pleistocene vegetation communities were "without modern analogs over much of eastern North America...[and] In the mid-continent, these assemblages suggest *Picea*-dominated woodlands" (ibid:62) with some hardwoods.

If our chronological inferences are correct, early Paleoindian people who may have appeared in the Midwest occupied relatively stable periglacial habitats trending to boreal forest and hardwood forests to the south. By contrast, middle Paleoindian people lived in a dynamic, rapidly changing environment. Across the region, they encountered spruce forests or parklands with some hardwood constituents and sedges and grasses. *Roughly* similar to modern habitats near Hudson Bay, the northern Midwest nevertheless differed in important respects; no modern habitats are equivalent to what middle Paleoindians found, nor did they experience the stasis characteristic of the post-Hypsilothermal Holocene. In environmental terms, these people lived in proverbially interesting times. Postglacial environment adjustments were occurring, and noticeable differences in climate and biota may have occurred within individual lifetimes.

By the later stages of the middle Paleoindian phase, continued change in the maturing postglacial ecosystems had erased the spruce parklands of the Great Lakes and replaced them with landscapes more similar to modern boreal forests. These probably varied latitudinally, those to the north being more open.

Fauna

Paleoindians surely used wood and plant fibers and must have eaten unknown amounts of plant food. Yet, their diets were most affected by the abundance and distribution of animals. Empirical data from northern Ohio (McDonald 1994) to southwestern Missouri sites like Boney Springs, Koch Springs and Trolinger Springs (McMillan 1976; O'Brien and Wood 1997:45-48) revealed a diverse late Pleistocene bestiary across the Midwest. It included extinct taxa like proboscideans, sloth, giant beaver, tapir and horse, extant but now-extinct taxa like moose and caribou, and many extant taxa like white-tailed deer and small mammals. It also included a surprisingly diverse assemblage of reptiles and amphibians (e.g., Holman 1997).

The FAUNMAP compilation (Graham and Lundelius 1994) shows that the Late Pleistocene Midwest of the early and middle Paleoindian periods contained both a full range of small and medium modern and Pleistocene fauna. Of course, each taxon had its own distribution and patterns of association. These data reveal complex patterns of association, distribution and change determined by climate, community relationships, and history. Taxa fluctuated in abundance and range individually, not as integrated communities. Thus, caribou occurred as far south as Alabama, modern taxa now confined to the east occurred well to the west, and modern plains taxa occurred as far east as Virginia (FAUNMAP Working Group 1996:1601). Over the span of the late Pleistocene and early Holocene, faunal communities were "continually emergent" (ibid), their taxonomic richness and composition only weakly correlated with climate. Such biogeographic furies made the late Pleistocene Midwest far more dynamic than the region is today, and its spatial heterogeneity was at any time then greater than in the Holocene (ibid:1603-1604). This quality makes faunal communities of Paleoindian age hard to infer from paleoclimatic data alone, and underscores the value of additional empirical evidence derived from Paleoindian sites.

All herpetofauna from late Pleistocene deposits at Sheriden are modern and suggest that "a boreal climate was not occurring in northwestern Ohio" (Holman 1997:1) circa 11,700 ya. That far north that early in time, climate apparently had ameliorated beyond the range of boreal habitats. Similarly, fossil *Coleoptera*—beetles—in southwestern Ontario suggest late Pleistocene climates more temperate than pollen data there would indicate (Muller 1999:38-38). The apparent disjunction between more

climatically and microenvironmentally differing controlled vegetation and more adaptable fauna is further evidence that late Pleistocene habitats were unlike any that exist today and faunal communities available to Paleoindians, have completely inadequate modern analogues. Indeed, Midwestern Paleoindians may have encountered and exploited habitats more diverse and spatially complex and heterogeneous than any extant in North America. Subsistence evidence, is sparse but broadly consistent with this conclusion.

Paleoenvironmental Summary. We engage in paleoenvironmental inference to situate Paleoindian cultures in environmental context. Yet knowledge of late Pleistocene environment across the Midwest may not yield better understanding of Paleoindian cultures' material context. As above, late Pleistocene faunal communities were emergent, and their character in specific time-space settings is difficult to infer absent local empirical data, which does not exist for most of the Midwest. Specific environmental and biotic parameters largely elude us, and we are forced to rely upon environmental generalizations that had little bearing on the lives of Paleoindians. Thus any Midwestern Paleoindian site able to yield data in context will be of national significance.

Inference of mobility parameters or population from general ecological parameters like net primary productivity or secondary biomass (Kelly 1995) assumes a correlation between climate and biota that we must deny for the Paleoindian case. The absence of modern analogues in paleoenvironments compromise much of the value of studying those environments in the first place. We are forced to conclude that Paleoindians adapted to habitats of unknown character in ways that we cannot know because our theory does not take account of such habitats. Thus, resolution of biotic data will be essential to more fully understand Paleoindians' economy and, in turn the functional nature of the sites they occupied.

People and Proboscideans

When people reached the Midwest, mammoths (*Mammuthus* sp.) and mastodons (*Mammut americanum*) inhabited the region. Obviously, the determination of whether Paleoindians hunted or scavenged these animals in the eastern U.S. would reveal many environmental contexts and temporal ranges of human occupation and it would certainly have profound implications for understanding the role of human societies in biological extinctions of the Late Pleistocene. And while it would naturally bear witness to Paleoindian diet and economy, as it is supposed to do in the west, the available evidence may be skewed toward the large kills, however intermittent or occasional, because "very large-bodied prey are greatly overrepresented relative to their actual importance in the diet" (O'Connell et al. 1992). Even if people hunted or scavenged proboscideans, they probably ate many other foods as well.

There are no constraints on the time-space distribution of proboscidean fossils in the southern Midwest. Across the northern tier of states, however, late Pleistocene proboscideans cannot predate ice retreat, so their fossil distribution is constrained in time. Yet half or more of dated proboscidean occurrences in Ohio are after human colonization (McDonald 1994:27-28). Fluted bifaces are largely confined to south of Michigan's Mason-Quimby line (Cleland et al. 1998:Fig. 3) and proboscideans entirely are (Abraczinskas 1993:Fig. 1). Human-proboscidean association at Hiscock may be partly a lag deposit owing to geological, not cultural, processes (Laub et al. 1988). Proboscideans may have been associated with stone tools at Koch Springs in western Missouri, although the association seems secondary (McMillan 1976:84, 92). Indeed, no direct evidence short of unmistakable human modification of bone—establishing association with bones, not necessarily living animals—or the smoking gun of stone tools protruding from proboscidean bone makes the case. Elsewhere, undocumented but tantalizing hints of association are part of Midwestern folklore; most archaeologists know a farmer who knew a farmer who had a father who said that his grandfather had a friend who long ago found "spear points" with fossils of an antediluvian beast. What, for instance, can we make of an Illinois collector's 1921 account that three fluted bifaces "were found with a tooth as big as your fist" (Munson and Tankersley 1991:3), unless the tooth was a mastodont molar?

The best Midwest associations are at Hebior, **Kimmswick**, Martins Creek and Schaefer which yielded proboscidean remains with stone tools of various kinds, although only **Kimmswick** has a fairly large assemblage (Brush and Smith 1994; Graham et al. 1981; Overstreet 1996, 1998; Overstreet and Stafford 1997). But **Kimmswick**'s faunal assemblage is large and diverse; stone tools there might be associated with mastodons, with other animals, or with none at all. Many earlier and poorly documented excavations (J. Morrow 1996:85-88) suggest that the original

Kimmswick assemblage was larger still. Tools and proboscidean bones may be associated at Willard in Ohio (Lepper 1999:Table 3) and at Boaz (Palmer and Stoltman 1976), but the latter's 1897 discovery and much later "documentation" render the association unknowable. Unquestionable Paleoindian tools were found at **Kimmswick** in the 1970s, but poorly documented work there nearly a century ago also may have recovered tools (J. Morrow 1996). McDonald (1994:28) reported possible human-proboscidean associations in Ohio. Fisher's various sites yielded no stone tools but taphonomic evidence suggestive of human agency (Fisher 1987:Table I; Kapp et al. 1990). The Rappuhn Mastodont site in Michigan also falls in this group (Kapp 1986; Wittry 1965). Just beyond the Midwest, there is tantalizing but inconclusive evidence from Ontario (McAndrews and Jackson 1988:170). Finally, at many sites there is no evidence of human association (e.g., Fisher 1987:Table I).

Efforts of Fisher (e.g., 1987) and Overstreet (e.g., 1993, 1998) stand out in the taphonomy of Midwestern proboscidean sites. Fisher reported proboscideans, mostly mastodonts, from southern Michigan and neighboring states, that bore evidence of hunting or scavenging. More recently, Overstreet reported a concentration of proboscidean occurrences in southeastern Wisconsin and adjacent Illinois. Taphonomic study revealed: 1) patterns of skeletal disarticulation plausibly explained as butchering, and articulation of elements plausibly explained as manageable cuts; 2) possible cut marks often crossing joints or where large muscles attached to bone, at Mud Lake for instance (Mason 1997:Fig. 5.6); 3) specimen age and inferred season of death skewed toward healthy adults in late fall (not always [Kapp et al. 1990], when hide and meat were in prime condition, fat was abundant, and animals were healthy; and 4) in some cases, possible caching of butchered segments using weighted intestines as sinkers. No stone tools or other conclusive evidence of human presence were found at 10 (Fisher 1987:Table 1) inferred kills. In Wisconsin, fragmentary tools were found at Schaefer and Hebior (Overstreet 1998:42-43).

G. Haynes (1991) considered the inferred butchering process to obtain bone tools improbable, since stone presumably was needed and, obviously, would work well enough in butchery themselves. The taphonomy of cut marks is a subject of dispute. Patterns of disarticulation seem determined more by skeletal anatomy than any difference between human and natural agents (Hill 1979; O'Connell et al. 1992:333). Most of Fisher's excavations measured in the tens of m², yet ethnoarchaeological data on large-animal butchering suggest that resulting scatters measure in the hundreds of m² (O'Connell et al. 1992:351). Small excavations leave much play for sampling error and cast doubt on any inference of butchering from absence of strategic skeletal elements.

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INTRODUCTION NHL Property Types as Categories The Earliest Americans theme study utilizes a property classification system that makes use of property classes and types. According to the Secretary of the Interior's Standards, "a property type is a grouping of individual properties based on shared physical or associative characteristics [that] link the ideas incorporated in the theoretical historic context with actual historic properties that illustrate these ideas." For purposes of recording, documentation, and management, property types are grouped into two major classes, sites and districts. Property Classes: • Sites: Deposit containing artifacts, features, or biocultural evidence associated with one or more Paleoindian components. • Districts: Multiple contiguous or discontinuous deposits associated with one or more Paleoindian components. That is, sites are deposits containing artifacts, features, or biocultural evidence associated with one or more Paleoindian components. As such, the term retains its traditional archaeological usage, albeit here with the inclusion of isolated finds as a particular subset. Districts are defined as multiple contiguous or discontinuous deposits associated with one or more Paleoindian components. As such, they may be considered groupings of sites or components. Groups of culturally related individually Paleoindian archeological resources found in connection with diagnostic land-forms or other paleogeological, geomorphological, or paleoenvironmental contexts may be nominated as contributing properties within a single site or discontinuous district. Associated buried or surface deposits must be identified in order to nominate individual findspots of projectile points and other Paleoindian materials. Property Type Categories include: • Isolated Finds • Caches • Bone beds and kill sites • Human burials • Rock Art and other petroglyphic or pictographic representations • Quarries and workshops • Occupations Each of these major property type categories is discussed in turn, with examples of specific sites or districts that illustrate the category. Because there is considerable overlap between property types, some sites are discussed under more than one category. Isolated Finds Isolated finds are individual artifacts that have been demonstrated to be Paleoindian in age through typological or other analyses. The distribution of isolated finds, when examined collectively over large areas, has done a great deal to improve our understanding of Paleoindian settlement, as documented in the section on resource distribution that follows. Once an isolated find has been collected, and its location as well as any relevant archaeological and environmental associations documented, typically there is little more that can be learned, assuming it can be convincingly	E. statement of historic contexts F. associated property types introduction NHL property types as categories research needs and questions / the thematic framework evaluation criteria establishing significance NHL property type and integrity evaluation standards: NRHP criteria evaluation criteria matrix / registration requirements figure 8 table 10a table 10b using the evaluation matrix table 11a table 11b southeast property types northeast property types midwest property types G. geographical data H. summary of identification and evaluation methods I. major bibliographical references Figures and Tables

demonstrated that the artifact is not part of a larger, undetected site. Because documenting isolated finds is so critical for research purposes, they are here viewed as a specific Paleoindian property type. It is also strongly recommended that all isolated finds of Late Pleistocene age should be formally recorded in state site files, as either sites or in a special isolated find category, and that they should receive the same level of written documentation as true sites. Several thousand isolated finds of Paleoindian artifacts have been recorded in the Eastern United States (Anderson and Faught 1998)

Caches

Caches are groups of artifacts or other resources intentionally left at a location for either ceremonial or utilitarian purposes. Paleoindian caches tend to fall into two types, elaborate finished tools presumably associated with burials or consumption-rituals of some kind, and hence permanently removed from the cultural system of which they were a part, or mundane tools, raw materials, or foodstuffs left at a particular place with the intent of being used at a later date.

Caches of Clovis culture artifacts consisting of spectacularly large or well made fluted points have been found in several parts of North America, sometimes in association with preforms and ivory or bone tools, and sometimes covered with red ochre. These caches are assumed to be ceremonial in nature, either votive offerings or grave goods. The best known Clovis caches are Anzick, Busse, Drake, Simon, and Richey-Roberts/East Wenatchee (45DO482), all from the western United States. Human skeletal remains were found only at Anzik (Lahren and Bonnicksen 1974), although whether they were once present at the other cache sites, and were not preserved, is unknown.

Caches of utilitarian tools or other materials are a common feature of later Paleoindian assemblages. The caching of materials in anticipation of later use is, in fact, a basic aspect of the technological organization of most human foraging populations (Binford 1979, 1980; Kelly 1994; Shott 1986b). Some tools, what Binford (1979) called "site furniture," may be too heavy to transport easily, or may be suited to specific locations, such as anvil stones used in quarrying or plant processing. Lithic raw materials are also cached, sometimes as little more than piles of raw unworked stone, and sometimes as clusters of tested to heavily worked pieces. Among Paleoindian populations, crude to well made bifacial cores were often widely transported and served as a primary source of material for the production of flaked stone tools (Cable 1982a; Morrow 1996). Intact bifacial core/preforms or large unifacial flakes have been found at a number of later Paleoindian sites, both at and away from quarry/reduction areas, and some of these artifacts are thought to be raw material caches. Prismatic blades and blade cores are also sometimes found on Paleoindian sites, and in some cases appear to have been cached in anticipation of future use (Green 1963).

Paleoindian populations may have also cached food for extended periods. While no unequivocal evidence for pit features has been found on Paleoindian sites, such features, if ultimately shown to be present at some sites, could have been used to store nuts, as they were in later times. Meat could have been frozen during winter, and buried under rock cairns, a strategy employed by some modern high latitude foragers, including Paleoindian populations, as indicated at the Colby site (Binford 1978; Frison and Todd 1986). Storing meat underwater is an even more effective method, with the caches less vulnerable to thaws and predation, and capable of lasting many months (Fisher 1995). At the Heisler site in Michigan, a partly disarticulated young mastodon was found that had been killed in late autumn, based on growth lines on the tusks (Fisher 1995:78). The animal had been partially butchered and the remains placed in a pond, weighed down by the placement of sand and gravel in the intestinal cavity, and marked with wooden posts. Faunal remains found in pond/spring settings could represent cool/cold weather meat caches.

Bone Beds and Kill Sites

The antiquity of Folsom and Clovis projectile points was first recognized by their association with extinct animals that had quite obviously been killed by spears tipped with these implements. From these early and occasionally repeated associations arose the belief that Clovis subsistence was primarily focused on big game. This perspective appears shaped in part by sampling considerations, notably that the bones of large game animals, and particularly megafauna like mammoth or mastodon, tend to be better preserved and attract greater research interest than the remains of smaller animals. Clovis-era "kill" sites in many areas, accordingly, almost invariably consist of points or other artifacts associated with the remains of large extinct fauna.

While not true kill sites, or even dense bone beds, Paleoindian sites with well preserved faunal and

floral remains are of crucial importance to understanding human adaptation during this period. We now know that these populations had a highly diversified subsistence economy, in which small game played an important if not primary role. It would be important to document, therefore, how important small game was to earlier Paleoindian populations, for which few sites with paleosubsistence remains other than megafauna have been found. Were Clovis points used to bring down or butcher white tailed deer, or even smaller mammals such as raccoons or rabbits? Blood residue immunological analyses undertaken to date, in fact, point to just such a possibility (Newman 1994, 1995). Care in the collection of artifacts in the field and in subsequent handling is essential if blood residue analyses are to be undertaken, since contamination is a distinct possibility, and indeed the method itself may be fraught with some peril (cf., Loy and Dixon 1998, with Downs and Lowenstein 1995; Eisele et al. 1995, and Fiedel 1996). Thus, while it has sometimes been suggested that Clovis points were used exclusively on large game animals, it appears this may not have been the case.

Human Burials

Human burials of Late Pleistocene age are rare in North America. Human burials of Late Pleistocene age may occur in unusual or unanticipated settings. Well preserved Late Pleistocene age human remains may also some day be found in submerged context or in peat deposits, as they have in other parts of the world. Large numbers of Archaic period burials dating from ca. 8300–5200 rcbp have been found in submerged settings in Florida in recent years, at sites like **Little Salt Spring** and **Windover** (Clausen et al. 1979; Doran et al. 1986). Paleoindian artifacts have been found at appreciable distances out onto the continental shelf, and skeletal materials may also be present (Faught 1996). These sites are amenable to examination using underwater archaeological techniques, and is a type of research that shows appreciable promise in the years to come. Some human skeletal specimens found and dismissed long ago might bear re-examination.

Rock Art and other Petroglyphic or Pictographic Representations

No examples of Late Pleistocene age rock art or other stationery artwork are currently known, although their existence cannot be ruled out. Parietal art, "the art restricted to the walls, roof and occasionally floors of caves and rock-shelters" (Clark 1967:67), can also only occur in areas where caves and rockshelters themselves are likely. Great antiquity, upwards of 15,000 rcbp, has been claimed for some petroglyphs from the western United States, based on the radiocarbon dating of constituent rock-varnish, although the procedure has fallen into disrepute (cf., Whitley and Dorn 1993, Dorn 1996). Evidence for Late Pleistocene age painting has been observed on the walls and ceiling of the Pedra de la Pintada rockshelter near Monte Alegre in Brazil, with painted fragments found in securely dated terminal Paleoindian age strata (Roosevelt et al. 1996).

Chattel art, or *arte mobilière*, consisting of small, portable items of carved or decorated wood, bone, and stone, are rare Late Pleistocene context. Indeed, the elaborately carved ivory and bone points and foreshafts found in Florida are considered by some to be works of art as well as utilitarian items. Similar aesthetic qualities are attached to unusually large or well made flaked stone tools, such as some of the more spectacular Clovis, Cumberland, or Dalton points. The fact that ochre was sometimes used to cover what appear to be ceremonial caches of artifacts, presumably to enhance their ritual or sacred context (Roper 1996), suggests ochre could have also been used in the production of Paleoindian parietal and chattel art. Great care, of course, must be used in evaluating any discoveries of Paleoindian era artwork, particularly given the number of frauds that have been perpetrated, both of artwork itself, and of fluted points for sale on the antiquities market.

Quarries and Workshops

Quarries and workshops comprise perhaps the best known and certainly among the most easily recognized Paleoindian property type. At these sites, lithic raw materials were extracted and initially processed for use at other locations. Paleoindian technological organization was based to a great extent on the use of high quality lithic raw materials, particularly during the Clovis period. The highly mobile lifestyle of these early peoples, which may have taken them far from lithic raw material source areas on occasion, placed a premium on having reliable tools whose behavior was predictable both in use and when undergoing rejuvenation and resharpening. Settlement and mobility was, therefore, to some extent constrained by the occurrence of high quality lithic raw materials on the landscape (Daniel 1998; Gardner 1977:258–260; Goodyear 1979, 1989). Sources of these materials were, accordingly, extensively exploited by Paleoindian populations, resulting in the accumulation of appreciable quantities of reduction and manufacturing debris, as well as discarded

and lost tools and other remains from associated occupations.

Some of these properties are quite extensive, with evidence for the occurrence of a number of distinct or overlapping activities at a number of locations. Many of these sites are also multicomponent, with evidence for Clovis era activity as well as later use as well. Accordingly, strict separation of quarry/workshop, and occupation property types is difficult or impossible in some cases, as is the resolution of Clovis and terminal Paleoindian assemblages from those of later Archaic and Woodland periods. Researchers examining these property types should make every effort to resolve intrasite spatial patterning, which may vary appreciably over relatively small areas. Differences of no more than a few meters vertical elevation and a few tens of meters horizontal elevation may separate Paleoindian period quarrying, workshop, and possible habitation areas. Research has also shown that some possible raw material sources are now submerged, due to sea level rise and a reduction in stream gradients. Other deposits were buried at appreciable depths under colluvial deposits. Thus, while quarry/workshop localities are traditionally perceived as being highly visible, care must be taken to ensure that a representative sample of what is actually present is recognized and collected.

Studies of Paleoindian assemblages taken collectively, at and up to appreciable distances from quarries, have begun to occur in recent years, and have proven to be extremely important to our understanding of raw material use and, hence, technological organization, settlement, and mobility strategies (e.g., Morrow 1996; Tankersley 1989, 1990b, 1991, 1994, 1998; Tankersley and Morrow 1993). Settlement analyses, encompassing the analysis of site locational data and/or assemblage composition from a great many sites, has demonstrated how the occurrence of lithic raw materials may shape Paleoindian settlement. Research employing GIS technology and computerized site file and assemblage data, permits the examination of large numbers of sites simultaneously. It offers the potential to resolve site types based on their environmental associations, which can then be verified and explored further with direct field work. Use of these kinds of analytical procedures should pinpoint areas where various site types might be expected to occur on the landscape, and can be used to suggest what kind of activities and assemblages might be expected at sites where only minimal information may currently exist.

While this discussion has focused on lithic quarry/workshop property types, bone, shell, or ivory "quarry" and workshop locales are also other types of possible workshop types. The collection of dead or green bone or ivory for use in tools could be considered a special type of quarrying behavior, for example, and site types or activity areas may exist where these resources were processed.

Occupations

A great many Paleoindian occupation sites, defined as habitation areas or residential base camps occupied for unknown but presumably fairly lengthy periods of time, are known. Many quarry/workshop sites also have occupation areas within them or nearby. There are also a number of presumed Paleoindian habitation sites that are not located in direct proximity to lithic raw material sources, yet that have been extensively examined and that are well published. These sites provide appreciable insight into Paleoindian lifeways. The assemblages at these sites can also be used to derive expectations of what habitation assemblages may be like within quarry/workshop sites, where lithic raw material quarrying and initial reduction occurred, and where the associated massive debris likely masks their easy recognition.

Clovis-era habitation sites, characterized by appreciable numbers of Clovis points, bifacial and unifacial tools, and other artifacts, have been documented in a number of areas. Comparative analyses of Clovis site assemblages have been conducted by a number of authors, and provide some insight into the characteristics of residential assemblages of this period, and the kinds of research questions they can address (e.g., Faught 1996; Meltzer 1984b, 1988; Sanders 1990:65–69; Shott 1986a). Sanders (1990:65–69) looked at the presence or absence of specific site physical attributes such as size class, evidence for single versus multiple occupations, and functional activities represented (i.e., quarrying, workshop, hunting camp, habitation), as well as for a series of technological attributes related to reduction/manufacturing practices. This comparison encompassed roughly a dozen major Eastern Paleoindian sites, with 12 sites classified according to physical and functional characteristics, and the same 12 plus one additional site for technological practices). Interestingly, the presence of true blades and blade cores was noted to be more common on southeastern sites than those in the Midwest and Northeast (Sanders 1990:67), a finding used to

suggest a fairly early date for these assemblages (Ellis et al. 1998:159). Raw material conservation was an essential aspect of life to these highly mobile peoples critically dependent on their stone tools, which was why they were made on predictable high quality materials and designed to maximize use-life (e.g., Goodyear 1979, 1989; Kelly and Todd 1988).

Research Needs and Questions / The Thematic Framework

In this section research issues and questions significant in understanding Earliest American life in the East are summarized in tabular format and subsequent text discussion within the National Historic Landmark Thematic Framework. Currently designated National Historic Landmarks and National Register properties whose *current* documentation records the existence of resources possessing levels of integrity capable to contributing or having the potential to contribute information affecting theories, concepts, and ideas at national, state, and local levels of significance are listed under appropriate thematic elements. Certainly, one major outcome of this new Theme Study should be the critical re-evaluation of the degree to which these existing NRHP properties can contribute significant data to address thematic elements (such as research issues dealing with Emerging Cultural Traditions, Territoriality and Identity) at a level worthy of Landmark designation. Portions of this section are adapted from Paleoindian Historic Contexts prepared from around the country.

Researchers and resource managers responsible for examining or managing Paleoindian properties should consider the research themes outlined below, which are adapted from the NHL thematic framework. These themes offer guidance by which Paleoindian sites may be found, examined, and evaluated for NRHP and NHL status. They discuss the major research questions facing Paleoindian researchers, and describe the kinds of information needed to answer these questions. Archaeological sites are traditionally evaluated for NRHP status under Criterion D, whether they "have yielded, or may be likely to yield, information important in prehistory or history." NHL designation under Criterion 6 additionally requires that this information must be "of major scientific importance."

The NHL research themes, accordingly, are designed to organize and make explicit the kinds of information we currently believe to be important, and need, to further our understanding of Paleoindian occupation. The relevance of many of the specific research questions advanced, of course, depends upon the nature of the investigation being undertaken and the kind of data available for consideration. Many of the questions and approaches raised in what follows, it should be noted, are derived from existing Paleoindian historic context studies. Some overlap between specific themes occurs, since many of the processes involved are interrelated.

Peopling Places

Research Issues: Demography.
Geography.

Key Questions: When did people arrive?
Who were they?
Where did they come from?
Where did they move?
How did they live?

National Historic Landmarks

Midwest: ***Graham Cave***
Modoc Rock Shelter
Northeast: None
Southeast: ***Hardaway***
Hester
Thunderbird

National Register: National Significance
Midwest: **Holcombe Beach**

- Kamrath**
- Kimmswick**
- Montgomery**
- Paleo Crossing/Old Dague Farm**
- Prairie Creek**
- Silver Mound**
- Northeast: **Flint Mine Hill**
- Meadowcroft**
- Munsungan-Chase**
- Vail**
- West Athens Hill**
- Southeast: **Allendale Quarries**
- Little Salt Spring**
- Manning**
- Warm Mineral Springs** (determined NHL eligible, 1988)
- Williamson**

National Register: State Significance

- Midwest: **Aebischer**
- Chesrow**
- Deadman Slough**
- Flint Ridge**
- Metzig Garden**
- Rodgers Shelter**
- White Oak Point**
- Northeast: **Dedic/Sugarloaf**
- Dutchess Quarry Cave**
- Hughes Early Man Complex**
- Hedden**
- Lamoreau**
- Shoop**
- Wapanucket**
- Southeast: **Conover**
- Flint Run**
- LaGrange Rockshelter**
- Nipper Creek**
- Taylor**
- Thomas Creek District**
- Youngblood**

National Register: Local Significance

- Midwest: **Adams County**
- Burrell Orchard**
- Lucas**
- Northeast: **The Weirs**
- Southeast: **Nolands Ferry I**

Discussion: This theme focuses on the initial settlement, diversification, and growth of human populations. Questions of general interest under this theme revolve around delimiting colonization

dates, routes of migration, site types, patterns of population growth and expansion, and ultimately how regional and subregional cultural traditions emerged. Tied up with this is examining how factors of demography and geography operated together to shape patterns of movement and interaction in these early populations. Key questions to be considered under this theme include when did people arrive, who were they, where did they come from, how did they move, and how did they live? Most of these questions deal with the processes of colonization and initial settlement, and as such can be best explored at sites that date to the Initial Paleoindian and subsequent Clovis-era, prior to ca. 12,900 B.P. After that time, in the Terminal Paleoindian, human populations are well established, and subregional cultural traditions had emerged in many areas. Terminal Paleoindian occupations are of interest for how they shed light on earlier occupations, by illustrating the results of the colonization process.

This theme is concerned, therefore, with understanding when human populations first arrived in the New World, and what happened to them up through the end of the Clovis culture, about 10,800 rcbp. Crucial to answering these question will be the careful consideration of evidence from across the continent concerning the timing of initial human entry. It is plausible that human populations could have been present in low numbers all across the area now known as the United States by ca. 14,500 B.P., given their presence at this time in southern South America at Monte Verde. The timing of initial human entry into the New World remains the subject of appreciable debate, with some investigators arguing that there is no conclusive evidence for human presence anywhere prior to ca. 14,500 B.P. (i.e., Fiedel 1999, n.d.), while others believe human entry may date to 20,000 B.P. or earlier (e.g., Meltzer 1997). The location and verification of early sites anywhere in the New World south of the ice sheets, accordingly, will provide a date for which it will be plausible to assume human occupation could have occurred in any region. Thus, if human occupation in South America or the on the Great Plains, or in the Far West is eventually shown to date as far back as 15,000 B.P. or more, then it is possible human groups could have reached all other regions by this time as well.

Resolving unequivocal archaeological signatures to easily recognize these occupations will be important. This may not be possible, if some or all of these early occupations made use of comparatively simple flake stone tool assemblages, particularly if the tools were forms used later in prehistory. Why are these occupations so elusive, archaeologically practically invisible? Were population levels extremely low, or making use of a technology that we are currently unable to recognize, perhaps because we assume it dates later in time when we find examples in surface context? Or is their low incidence related to factors of preservation, specifically that most areas where early occupations may have occurred are either deeply buried or eroded away (Butzer 1991)?

As Initial Paleoindian occupations are identified, another major research area that can be explored under the theme Peopling Places is understanding the nature of these adaptations. That is, what can we learn about their technological organization, mobility and interaction patterns, and subsistence practices, to name a few topics that could begin to be explored given such a perspective? Related to this is the question of the nature of the transition from these earlier occupations to the widespread appearance of Clovis culture. It is currently difficult to reconcile the widespread appearance of Clovis technology with the minimal evidence for settlement prior to this. Does Clovis reflect the dramatic radiation of people, or the spread of a highly advantageous technology within a pre-existing population? We need hard evidence about Initial Paleoindian occupations before we can understand how the emergence of Clovis came about.

Any securely dated site of Initial Paleoindian age will be of profound importance, and unquestionably eligible for NRHP and NHL status. Great care will have to be taken to verify the precise age on any Initial Paleoindian sites that are found. Multiple dates, ideally involving more than one dating procedure, will have to be obtained from these sites, and the early context will have to be supported by multiple lines of evidence, such as valid stratigraphic, artifactual, and paleovegetational associations (Dincauze 1984; Griffin 1977).

To ensure that evidence relevant to the theme Peopling Places is even collected, great care will also be needed to ensure that the possibility that Paleoindian components are present in a given area has been thoroughly evaluated. That is, are site survey, testing, and analysis/evaluation strategies sufficient to determine whether early components are present? Excavation units must be deep enough to ensure that buried deposits are not missed, and some should be carried well below artifact-bearing levels to ascertain that cultural deposits have indeed been fully documented. Paleoindian remains may occur at considerable depths in some settings, such as within floodplains, in ponded, swampy, or peat deposits, or on hill slopes and bases where colluviation may have

occurred. The absence of deeply buried deposits should be demonstrated rather than assumed wherever possible, particularly during CRM inventory and compliance projects. Field procedures should be designed to adequately reach and evaluate the differing depositional environments that occur in a study area. Where the potential for deeply buried deposits exists, deep stratigraphic column samples should be excavated using heavy machinery, with samples of the fill screened. In areas of shallow deposits, such as on eroded upland surfaces, in contrast, care must be taken to determine whether Paleoindian components may be present amid later remains. When Paleoindian assemblages are found, every effort should be made to recover datable materials that may help refine local chronologies.

Given these arguments, it is apparent that of critical importance to exploring the theme of Peopling Places is the question "What constitutes an Early Paleoindian site?" Equally important and related questions include "What constitutes later (Middle and Late) Paleoindian sites?" Given that even isolated artifacts can provide important information about early settlement systems, technological organization, and mobility strategies, and the finding from several areas that many so-called "isolated finds" are actually significant sites, it is important that these finds be formally recorded in state site files. Given the importance of recognizing and understanding the variability in Paleoindian assemblages, detailed descriptions of points and tools should be published whenever early assemblages are found. Since almost every state has an ongoing Paleoindian point survey, recording forms should be filled out for every projectile point found, and submitted with the site forms or reports to the appropriate authorities compiling this information. Where such surveys currently record information only about fluted points, they should be expanded to include all Paleoindian point forms, and eventually other artifact types as well, such as tools or cores. Given the comparatively low numbers of Paleoindian formal points and other tools known, this is not an unreasonable expectation.

Finally, of critical importance to exploring the theme of Peopling Places, as well as all the other research themes reported here, are the related questions "Where on the landscape did Paleoindian populations settle, and why?" That is, what specific landforms, soil types, and microenvironmental settings were used by Paleoindian populations? Are such settings sufficiently distinct or unusual that they can be used to predict the probability of finding early materials? What field methods are appropriate for these settings, to maximize the possibility of discovering and evaluating early components? As Paleoindian components are identified, their environmental associations should be noted and compared, with the goal of developing predictive models to help locate more such sites. GIS technology should prove invaluable in these analyses.

Creation of Social Institutions

Research Issues: Emerging Cultural Traditions.
Cultural Differentiation.

Key Questions: How are cultural traditions identified?
When and where do they emerge?
How is cultural change identified?
When and where do cultural traditions change?

National Historic Landmarks

Midwest:	None
Northeast:	None
Southeast:	<i>Thunderbird</i>

National Register: National Significance

Midwest:	None
Northeast:	None
Southeast:	None

National Register: State Significance

Midwest:	None
Northeast:	Shoop
Southeast:	None

National Register: Local Significance

Midwest:	None
Northeast:	None
Southeast:	None

Discussion: This theme examines the emergence of distinct cultural traditions. Key questions to be explored include determining how cultural traditions are identified, when and where they emerge, and how, when, and where do cultural traditions change? The clearest evidence for the emergence of subregional cultural traditions occurs after ca. 10,800 rcBP, during the Terminal Paleoindian period, when distinctive projectile point types or variants appear in a number of areas. Whether earlier Clovis or pre-Clovis cultures actually had a uniform culture is something that also warrants consideration under this theme. The Clovis toolkit is remarkable uniform across the continent, but how groups used it in differing areas remains largely unknown. At present, this theme can currently be best explored during the Terminal Paleoindian, given the many well documented artifacts and assemblages dating to this period. Appreciably more information about Initial and Clovis-era Paleoindian occupations, however, will be needed to explore this theme effectively during these periods.

To examine the "Creation of Social Institutions," we must carefully examine stylistic variability in site and artifact assemblages from across large areas. A crucial first step will be examining variation in Paleoindian projectile points, since the distribution of particular types or styles is already used to infer the existence of a number of discrete subregional cultural traditions (e.g., Anderson 1990a, 1995a, 1996). These distributions are interpreted as encompassing the area over which makers of these projectile points appear to have regularly or at least occasionally moved, and as such, are used as markers of group territories or ranges and, hence, cultural traditions. When the artifacts in question form highly distinctive categories, such as the Folsom or Cumberland types, typological classification and distributional analyses are relatively easy to accomplish. A bewildering array of Terminal Paleoindian period projectile point types and variants have been proposed, however, almost all of which are intuitively based. While many are valid and useful categories, some have questionable utility, since they overlap with other forms or appear to encompass highly localized or even idiosyncratic variation. Some of the variation appears due to resharpening stage or constraints on size or shape imposed by raw material. Existing typological constructs need to be rigorously evaluated through statistical analyses, and variation within existing assemblages needs to be explored the same way. It is probable that appreciable, behaviorally and temporally significant variation exists within Paleoindian projectile point assemblages, if we can just tease it out.

Until quite recently, the distribution of Paleoindian projectile point types was also intuitively based, reflecting impressions of where artifacts were found based on literature surveys, rather than on actual specimen counts. In the last decade this approach has changed, as maps based on actual artifact counts have appeared, making use of data from Paleoindian projectile point surveys from across the country (e.g., Anderson 1990a, 1990b, 1991, 1996; Anderson et al. 1998; Faught et al. 1994; Anderson and Faught 1998). These maps have provided insight into where people lived, and have been used to postulate areas of initial settlement and cultural diversification.

Quantitatively based typological and distributional analyses with Paleoindian assemblages need to be continued. Primary data must continue to be compiled, something that will require long term cooperative interaction between avocational and professional archaeologists. Specific questions of particular interest include delimiting where presumed cultural traditions actually occur within the larger landscape. Were different areas occupied at different times, or were some areas repeatedly occupied throughout the Paleoindian era? In many areas there is clear evidence for an expansion of settlement over the course of the Middle and Terminal Paleoindian period onto a wide range of landforms, suggesting the adoption of an increasingly diversified subsistence economy (e.g., Anderson 1990a; Gillam 1996b, n.d.; Lepper 1988, 1989, 1999; Meltzer and Smith 1986; O'Steen et al. 1986). Were there areas that remained unoccupied throughout most or all of the Paleoindian period, and, if so, why?

While we have a good handle on the distribution of Clovis and related fluted points, since most state surveys record these forms, our information on Terminal Paleoindian point forms is much more spotty. Locational and measurement data are not currently systematically recorded, something that must change if we are to understand the stylistic variation observed.

Another area to explore under the theme "Creation of Social Institutions" is how much time was actually involved in the emergence of local cultural traditions. The tremendous range of variation apparent in Terminal Paleoindian projectile point forms was disturbing to researchers for a number of years, since it implied extremely rapid cultural change. Even assuming high population growth rates, and a dramatic constriction in group ranges and interaction networks, there still appeared to be far more variability than expected. We now know that a major plateau occurs in the radiocarbon calibration between ca. 10,500–10,100 rcbp, so that the 800 radiocarbon years from 10,800 to 10,000 rcbp actually encompasses ca. 1500 calendar years, from ca. 12,750–11,200 B.P. There is thus a great deal more time involved in the Terminal Paleoindian period than we once thought, something that must be factored into our analyses and modeling of the processes by which the observed cultural differentiation came about.

Finally, to further explore the theme of the "Creation of Social Institutions" we need to ask what specifically can we learn about the lives of people in specific subregional cultural traditions that makes them distinctive? Answering a question such as this, of course, will necessitate the careful comparative analysis of individual site assemblages from within and between differing areas. While much of the information derived from any examination of specific site assemblages can be used to answer a wide array of research questions, some of the information that can be collected is directly relevant to this theme.

That is, what information about group size or duration of occupation can be determined from Paleoindian site assemblages? Can special activity areas be identified within larger assemblages (i.e., hunting, butchering, cooking, sleeping areas)? Are site remains that are found the result of one or a few visits, or numerous visits? The resolution of activity areas within individual sites typically requires the total excavation or effective sampling of large areas. Excavations at later prehistoric communities frequently encompass thousands of square meters, and exposures of this kind are deemed critical to understanding how these sites were used. Excavations at Paleoindian sites, in contrast, rarely exceed more than a few tens or hundred square meters. Use of small scale excavation blocks is due, in part, to an absence of obvious architectural features on sites dating to this period, and to the great depths at which early materials are sometimes located, often underneath appreciable later cultural material. It is also due, at least in part, to a research tradition more directed toward acquiring stratigraphic column samples of artifacts for purposes of typology and chronology, and the exploration of diachronic change, than the collection of assemblages from across large horizontal areas useful for documenting activity areas, site function, and the exploration of synchronic phenomena. This needs to change, and excavations should examine large areas on Paleoindian sites whenever feasible.

Large area excavations at several northeastern Middle Paleoindian sites such as Debert, Bull Brook I, and **Vail**, coupled with refitting analyses, for example, have demonstrated the contemporaneity of widely separated artifact clusters (MacDonald 1968; Gramly 1982; Grimes 1979; Grimes et al. 1984). At **Vail**, Gramly (1982) was able to fit projectile point tips found in a 'killing ground' with bases in a presumed domestic camp several hundred meters away. Outlines of structures have been inferred amid debris patterns at French Upper Paleolithic sites such as at Pincevent (Leroi-Gourhan and Brezillon 1966), and similar strategies have been used to infer the presence of a structure at the G. S. Lewis Early Archaic site (38AK228) in South Carolina (Anderson and Hanson 1988:275-276). At Sloan, anything short of total excavation would have made it impossible to understand the apparent use of marked graves by a local group for an appreciable period of time (Morse 1997a, b).

Accordingly, when well-defined hearth or other features, or appreciable scatters of debitage, fire cracked rock, bone, or other artifactual debris are encountered in Paleoindian deposits, large block units should be excavated when this is feasible. Minimally, the area up to several meters around such features should be examined for evidence of stone tool manufacture or repair, butchering, hideworking, toss zones, or other special activities. Excavation should not stop when low artifact density areas are encountered, until it can be determined that they represent site boundary areas, since these areas may be the only surviving evidence of structures, sleeping areas, or other low artifact activity areas.

Expressing Cultural Values

Research Issues: Belief.
Representation.

Key Questions: What were the belief systems of the Earliest Americans?
What is the evidence (i.e., Rock Art, Effigies) for them?
How is evidence interpreted?

National Historic Landmarks

Midwest: None
Northeast: None
Southeast: None

National Register: National Significance

Midwest: None
Northeast: None
Southeast: **Little Salt Spring**
Sloan
Warm Mineral Springs (determined NHL eligible, 1988)

National Register: State Significance

Midwest: None
Northeast: **Lamoreau**
Southeast: None

National Register: Local Significance

Midwest: None
Northeast: None
Southeast: None

Discussion: This theme addresses religious and ceremonial aspects of Paleoindian life, specifically their belief systems and means of representation. Key questions include what were the belief systems of the Earliest Americans, what is the evidence for these systems, and how has this evidence been interpreted? Among the subjects examined under this theme are the importance of prominent locations on the landscape for both sacred and secular activities, what kind of evidence is there for art and ritual, and what possible connections may exist between Paleoindians and modern American Indian origin sites, myths, legends, and beliefs.

Prominent locations on the landscape are known to have held a particular attraction for Paleoindian populations. Major Middle and Terminal Paleoindian assemblages have been found in close proximity to a number of dramatic physiographic features, such as near major shoals, sinkholes, or confluences, at extensive outcrops of high quality stone, at major ecotones, and at or near major mountain peaks. Many of these locations are rich in food or lithic resources, and would have been attractive for this reason alone. Most can also, however, be easily found on the landscape, something that would have facilitated rendezvous and interaction, a critical aspect of life to small, highly mobile groups occupying the vast, unpopulated landscape. The need to find mates and exchange information may have been more critical than finding high quality lithic raw materials to these peoples, and their movements were probably carefully calculated to enhance the possibility of social interaction. Over time areas that were repeatedly visited may have come to be imbued with a sacred status, perhaps because the interaction behavior that occurred included ceremony and ritual, or perhaps simply because the importance of the area was reinforced by weight of tradition.

There is no question that Middle and Terminal Paleoindian populations placed great value on their tools of stone, bone, and ivory. The workmanship on many specimens is superb, reflecting a level of expertise rarely achieved by the flintknappers of subsequent periods. The aesthetic appeal of these

artifacts to modern archaeologists and collectors alike no doubt helps to explain the widespread interest in these early peoples. Concern for exemplary craftsmanship was a major and widely shared Paleoindian cultural value, even in the production of everyday stone tools. Was the Paleoindian fascination with high quality lithic raw materials, accordingly, solely due to the needs of a highly curated toolkit, as Goodyear (1979, 1989) has argued? Or was it also shaped by the ceremonial potential of artifacts made from these materials, as exemplified by the presence of elaborate specimens in caches and burials, or their role in facilitating ceremony and interaction, as Walthall and Koldehoff (1998) have suggested for Sloan points in the central Mississippi Valley, markers of what they call a possible "Cult of the Long Blade." Visiting quarry areas, accordingly, may have been as much about promoting interaction as about procuring high quality stone, if groups knew they could find others at these locations at certain times of the year (Daniel 1998:194-195). Likewise, by procuring high quality stone, these same peoples were reinforcing a basic aspect of their culture.

How Paleoindian use of the landscape shaped their culture is a research topic to explore under the theme "Expressing Cultural Values." It has been suggested that Paleoindian populations were "technology-oriented" rather than "place-oriented," that is, able to range widely because of their highly portable and flexible toolkit (Kelly and Todd 1988). While probably an accurate description of initial colonizing populations, and particularly their scouting parties, appreciable evidence exists that once these people had spent some time within given areas, they became profoundly place-oriented, keying in on particular locations over and over again (Anderson 1990a, 1996). The distribution of Paleoindian sites and assemblages can be examined from such a perspective, much in the way predictive models of site location are developed. Gillam (1996a, 1996b, n.d.), for example, has shown that while settlement changed over time in northeast Arkansas from the Middle to the Terminal Paleoindian era, with later sites found over a much wider array of settings, both the fluted point and Dalton peoples made extensive use on the lithic raw material sources present in the area.

The importance of landscape features to the first Americans can also be explored through their impact on contemporary Indian peoples. Do the dramatic features on the landscape visited by Middle and Terminal Paleoindian populations appear in the oral tradition of contemporary peoples? Such research should be not only to see whether any traditions that might exist have great antiquity, but also to see how such locations are viewed by modern groups, perhaps shedding light on how they were perceived to the first peoples to see them. Whether or not such locations were considered sacred sites is not currently known, but could also be a subject for investigation with descendent populations.

Another area that can be explored under this theme is evidence for ceremonial and mortuary behavior. Walthall and Koldehoff (1998) have suggested that the exchange of elaborate ceremonial artifacts helped link Paleoindian groups together over large areas, in something akin to a Late Pleistocene Kula ring. We need to examine the settings in which human remains, ochre, or elaborate stone, bone and ivory tools or other decorative items are found. We also need to examine how unusual elaborate artifacts actually are, that is, whether our perceptions of Paleoindian craftsmanship have been colored by a few unusual cases. Likewise, we also need to consider whether additional sites with rich and elaborate artifact assemblages like the Sloan cemetery remain undiscovered, and how they may be located, preserved and protected or, if protection is not an option, carefully excavated. Are caches like Richey-Roberts/East Wenatchee or Anzik (Gramly 1993; Lahren and Bonnicksen 1974) common? What do cemetery and cache sites tell us about these cultures?

Possible burial settings, if threatened, should be examined during CRM compliance surveys, and not ignored. In addition to direct evidence for mortuary behavior, such as skeletal remains, researchers should be alert to indirect evidence. Unusual concentrations of artifacts in archaeological deposits dating to the Paleoindian and Early Archaic, particularly clusters of large, well made, or unused tools, may represent grave lot assemblages. In many soils poorly suited to the preservation of human remains, osteological materials will have likely long since deteriorated. Artifact distributional analyses may be the only means available in many settings to infer the existence of cemetery behavior. Artifact clusters, in fact, were initially used to infer the existence of Dalton cemetery behavior at the Sloan site in northeast Arkansas (Morse 1975a), a finding that was later supported by the identification of small human bone fragments hand-picked from and in soil samples from the site deposits. Where the possibility exists that a grave assemblage may be present, but no obvious bone is evident, close interval soil samples should be taken, and subjected to careful examination (i.e., soil chemistry, flotation) for traces of human remains. Finally, when dealing with human

remains and grave goods, full attention must be given to state and federal legislation protecting such assemblages.

Shaping the Political Landscape

Research Issues: Territoriality and Identity.
Interaction.

Key Questions: How did the Earliest Americans organize political life?
What is the evidence for territoriality, identity, and interaction?

National Historic Landmarks

Midwest:	None
Northeast:	None
Southeast:	<i>Thunderbird</i>

National Register: National Significance

Midwest:	None
Northeast:	None
Southeast:	None

National Register: State Significance

Midwest:	None
Northeast:	None
Southeast:	None

National Register: Local Significance

Midwest:	None
Northeast:	None
Southeast:	None

Discussion: This theme examines the emergence of group territories and ranges and the evolution of interaction strategies during the Paleoindian era. Key questions include how did the Earliest Americans organize political life, and what is the evidence for territoriality, group identify, and interaction? Paleoindian populations had to learn how to both interact with and avoid one another on the landscape, to ensure their own survival by acquiring mates, as well as to avoid exhausting critical plant and game resources. As discrete subregional cultural traditions emerged, as inferred by stylistic and distributional variability in projectile point and other artifact categories, important questions to consider are how did these groups interact, and how did interaction change over time? Are major aggregation sites where differing groups met present during the Paleoindian era, and if so, how are they to be recognized, and distinguished from other site types? If present, are aggregation sites more common at the center of group ranges, or it their margins?

In recent years considerable effort has been expended toward delimiting the extent of Paleoindian settlement systems through analyses of artifact stylistic variability and raw material sources. Projectile point distributions based on stylistic grounds and/or raw material type have been used to infer specific group ranges. Taking such analyses a step further, raw material fall off curves have been developed to show how far, and with what patterning, materials moved from quarry areas during various periods in prehistory, including during the Paleoindian era. This approach shows appreciable promise, and should be adopted wherever raw materials can be easily distinguished and occur in essentially fixed locations on the landscape.

Resolution of Paleoindian cultural entities as well as information about the scale or geographic extent of their movement thus appears to be possible employing distributional analyses. A number of Terminal Paleoindian subregional cultural traditions have been proposed in recent years, based on the occurrence of earlier fluted point concentrations, and the occurrence of distinctive descendent

types (Anderson 1990a, 1995a, 1996). These are intuitive formulations, however, whose boundaries can now be rigorously evaluated using primary data. Much more research, of course, will be necessary to delimit possible Paleoindian group ranges or territories. Detailed attribute based analyses using large samples of points, however, should be able to resolve the existence and spatial occurrence of morphologically distinct forms, which should perhaps be classified as subregional scale variants or varieties. When these distributions are combined with analyses of raw material fall off curves, extent of resharpening, breakage, or discard, or associated assemblage composition, it may provide more specific data on group ranges.

GIS-based analyses of site locational and associated assemblage data can also be used to explore these same questions, in an effort to resolve the seasonal and annual movements of Paleoindian groups within a given area, to see how those movements shaped the social and political landscape. If distinct artifact styles or markedly different patterns of raw material use are evident, with little intergradation, it might indicate the presence of groups living in relative isolation from one another. Where groups interacted with one another appreciably, in contrast, raw material use or artifact styles would be expected to overlap appreciably across the landscape. Using fall-off curve analyses the available evidence suggests that the existence of group boundaries was minimal.

Another question that can be explored under the theme "Shaping the Political Landscape" is determining whether and why some areas were more heavily occupied during various Paleoindian periods than other. There is no question that fluted point concentrations are almost invariably located along major transportation arteries, notably along or near major river channels, and in areas rich in floral, faunal, and lithic resources (Anderson 1990a). Some areas were clearly more favored than others during this period. The same thing is indicated for the later Paleoindian as well, at least within specific intensively examined localities, where preferences for certain landform types are indicated. Unfortunately, the larger, regional scale distribution of most Terminal Paleoindian point types is largely unknown at present. When these artifact types can be mapped the way we can now plot fluted points, no doubt concentrations and voids will be found within the regional landscape that will profoundly influence our understanding of these occupations.

It is also important to ask how regional physiography, specifically the orientation of river drainages and the location of mountain ranges and shorelines, may have shaped group movement, interaction, and the rise of subregional cultural traditions during the Paleoindian. Greater movement and interaction would have clearly been more likely in some directions than in others, and perhaps at some times rather than others. Little interaction or movement, for example, might be expected across the Appalachian mountains, or between groups occupying the Atlantic and the Gulf Coasts, save in intermediate areas.

It is also likely that group ranges shifted in response to the major changes in temperature, sea-level, and biota that were occurring during the late Pleistocene, although this form of diachronic analyses has received only minimal attention. The most sophisticated analysis of this type that has occurred to date is Claggett and Cable's (1982; Cable 1982a, 1996) "Effective Temperature/technological Organization" model, that examined how Paleoindian and Early Archaic technological organization shifted from logistical to residential mobility in response to post-glacial warming, specifically increases in effective temperature (Anderson and Sassaman 1996b:27–28; Cable 1982a, 1996). The theoretical foundation for this argument is based on analyses of hunter-gatherers from around the world, whose technological organization and mobility strategies have been found to be closely linked to local effective temperature (Binford 1980; Kelly 1983; Kelly and Todd 1994). Changes in technological organization over both space and time among hunter-gatherers, accordingly, can to some extent be predicted by examining effective temperature isotherms. This is not altogether surprising, but it does caution us to consider that there may be appreciable change, and variation in Paleoindian adaptations over time and in different parts of the continent, particularly moving from north to south.

How the settlement of the continent may have proceeded, given the changes in vegetation that were occurring at the regional scale, has also been the subject of some fairly extensive modeling in recent years (Steele et al. 1998). Diachronic analyses will undoubtedly prove an increasingly important means of resolving how and why change occurred during the Paleoindian period, including how the social landscape emerged and evolved.

Patterns of large scale interaction, specifically between Paleoindian populations in different regions, is also something that can be explored under this theme. Lithic raw materials as well as the

occurrence of particular point types have been used to track such long distance or large-scale interaction. A number of researchers have suggested that Paleoindian interaction was shaped first by a need to scout out new areas, and then, once these areas were settled, to maintain ties with peoples over large areas, to maintain mating networks and counter resource fluctuations or crashes (e.g., Anderson 1990a, 1995a; Anderson and Gillam 2000, 2001; L. Johnson 1989; M. Johnson 1996:21; Munson 1990; Spiess et al. 1998:245-248; Tankersley 1990b, 1991, 1994; Wykoff and Bartlett 1995). Interaction between the Middle Atlantic and Northeast has been specifically tied to caribou availability in the latter area, and the need for peoples to be able to move from one area to the other in the event of resource shortfalls (M. Johnson 1996:21). The likelihood that the Middle Atlantic, or possibly the upper Midwest, was the source for the first peoples to enter the Northeast is also thought to have shaped patterns of movement and interaction between the two areas (Dincauze and Jacobson 2001; Spiess et al. 1998:245-248). Similar arguments are used to explain the movement of materials and presumably peoples between the western part of the Southeast and the Great Plains (L. Johnson 1989; Wykoff and Bartlett 1995) and between the northern Southeast and the upper Midwest (Tankersley 1989, 1990b, 1991, 1994)

A final area that can be explored under the theme "Shaping the Political Landscape" are the relationships, if any, between the demise of the Clovis way of life, the emergence of subregional cultural traditions, the extinction of megafauna, and the sudden onset of the Younger Dryas cold period. All of these events occurred more or less simultaneously, about 12,900 B.P., and although it is likely that they are linked, how they were is currently poorly understood. The sudden and quite probably massive disruptions in climate and biota brought about by the onset of the Younger Dryas, when coupled with the extinction of megafauna about the same time, it was noted previously, likely created appreciable subsistence stress among Paleoindian populations. These changes created a feedback loop, forcing peoples to intensify, and increasingly diversify, the procurement of food resources in smaller package sizes, something that in turn would have reduced the need for long-distance movement, and led to the increasing regionalization. While these changes are assumed to have occurred gradually over the course of the Archaic period, it is possible that they were well underway by the start of the Terminal Paleoindian era.

Developing the American Economy

Research Issues: Extraction and Production.
Distribution and Consumption.

Key Questions: What materials were used?
Where were they found?
How were they modified and distributed?
How were they used and discarded?

National Historic Landmarks

Midwest: ***Graham Cave***
Modoc Rock Shelter
Northeast: None
Southeast: ***Hardaway***
Hester
Thunderbird

National Register: National Significance

Midwest: **Holcombe Beach**
Kamrath
Kimmswick
Montgomery
Prairie Creek
Silver Mound
Northeast: **Flint Mine Hill**

Meadowcroft

Munsungan-Chase

Vail

West Athens Hill

Southeast: **Allendale Quarries**

Little Salt Spring

Manning

Warm Mineral Springs (determined NHL eligible, 1988)

Williamson

National Register: State Significance

Midwest: **Aebischer**

Chesrow

Deadman Slough

Flint Ridge

Metzig Garden

Paleo Crossing/Old Dague Farm

Rodgers Shelter

White Oak Point

Northeast: **Dedic/Sugarloaf**

Dutchess Quarry Cave

Hughes Early Man Complex

Hedden

Lamoreau

Shoop

Wapanucket

Southeast: **Conover**

Flint Run

LaGrange Rockshelter

Nipper Creek

Taylor

Thomas Creek District

Youngblood

National Register: Local Significance

Midwest: **Adams County**

Burrell Orchard

Lucas

Northeast: **The Weirs**

Southeast: **Nolands Ferry I**

Discussion: Research topics that can be explored under this theme include resolving changes in patterns of resource extraction, production, distribution, consumption, and exchange, both of subsistence items, and raw materials used for tools, shelter, and other material goods. Key questions include what raw materials were used, where were they found, how were they modified and distributed, and how were they used and discarded? How were lithic materials located, quarried, and then shaped, and how were these activities shaped by the physical properties of specific materials? What is the relationship between Paleoindian site occurrence and lithic raw material availability? How do Paleoindian assemblages in areas where lithic raw materials are plentiful or of high quality compare with those found in areas where exploitable stone is rare or of poor quality? Does evidence

for tool attrition increase with distance from high quality raw material sources? When and will lower quality stone be used as a substitute for high quality stone?

Additional questions that can be examined include resolving the nature of Paleoindian subsistence. Paleoindian groups focused on areas rich in biotic resources, such as along major drainages or near shoals, as well as their proclivity for outcrops of high quality stone. What was the nature of their diet? Were Pleistocene megafauna a regular part of the Paleoindian diet, at least until they went extinct, or were these animals only occasionally exploited, with subsistence more diversified, including a fairly appreciable range of plants as well as animals? What was the role of the Paleoindian peoples in the extinction of Pleistocene fauna? What changes in subsistence occurred over time, and in various areas, particularly given the dramatic changes in climate and biota that were occurring?

Questions of Paleoindian subsistence, as we have seen, are difficult to address directly at present, primarily because the systematic collection of this kind of data is only a comparatively recent development. Given the importance of this kind of information, however, all fill from features found in deposits dating to the Paleoindian period should be saved and subjected to fine screening or flotation processing. Such procedures should apply particularly to fill around rock clusters, because traces of charcoal potentially indicative of firewood and food preferences may survive in such contexts. Late Pleistocene fossils should be examined for evidence of human modification (i.e., burning, tool cut marks, marrow extraction) wherever they are found, and fossil localities dating after ca. 15,000 B.P. should be routinely examined by both archaeologists and paleontologists. The possibility that well-preserved subsistence and other materials might be present in submerged deposits, such as in springs, sinkholes, ponds, peat bogs, or bays, also should be considered. Deposits of this kind examined during CRM compliance surveys should be directly inspected, ideally through deep coring or backhoe trenching. Archaeological investigations undertaken in rockshelter and cave deposits, which frequently offer favorable preservational conditions, should receive careful examination for paleosubsistence data.

Lithic raw material use can also be explored under this theme. A linkage or tethering (the restrictions of site distributions that result from dependence on fixed resources) of Paleoindian and possibly Early Archaic populations to high quality lithic raw material sources has been inferred by a number of investigators examining the Eastern North American archaeological record (Gardner 1977, 1983; Goodyear 1979, 1989; Meltzer 1984b, 1988). As we have seen, as far as the occurrence of occupation sites is concerned, this pattern is more the result of investigative activity directed to highly visible quarry areas than to actual site distributions. Nevertheless, Paleoindian populations were unquestionably attracted to and made extensive use of high quality stone, and the nature of this relationship needs to be carefully examined. That is, we need to explore at what times and in what areas the use of high quality lithic raw materials occurred, and how it shaped group technological organization and mobility (Meltzer 1989). If the inference about tethering is even generally true, it should facilitate the resolution of areas where Paleoindian artifacts and sites might be expected to occur in greater than expected numbers.

Another topic that can be explored under this theme is delimiting the source areas for raw materials used by Paleoindian and Early Archaic populations. How closely can we pinpoint the source areas of specific raw materials, using petrographic, microfossil, trace element, or other forms of analysis? Can fairly inexpensive testing Criteria be developed, to permit the sourcing of large numbers of artifacts? When sources are identified, over what geographic areas are these materials used, and what are possible reasons for these distributions? The accurate identification of lithic raw material source areas is critical to resolving prehistoric mobility patterns. The distance an artifact occurs from its source area indicates how far the material was carried by prehistoric populations, either directly as part of a regular settlement round, or indirectly through patterns of exchange. Lithic raw material source identification analyses should be conducted whenever possible.

Expanding Science and Technology

Research Issues: Material Culture and Technology.

Technological Organization.

Key Questions: What was the nature of the Earliest American tool kit?

How was their technology organized?

National Historic Landmarks

- Midwest: ***Graham Cave***
Modoc Rock Shelter
- Northeast: None
- Southeast: ***Hardaway***
Hester
Thunderbird

National Register: National Significance

- Midwest: **Holcombe Beach**
Kamrath
Kimmswick
Montgomery
Prairie Creek
Silver Mound
- Northeast: **Flint Mine Hill**
Meadowcroft
Munsungan-Chase
Vail
West Athens Hill
- Southeast: **Allendale Quarries**
Little Salt Spring
Manning
Warm Mineral Springs (determined NHL eligible, 1988)
Williamson

National Register: State Significance

- Midwest: **Aebischer**
Chesrow
Deadman Slough
Flint Ridge
Metzig Garden
Paleo Crossing/Old Dague Farm
Rodgers Shelter
White Oak Point
- Northeast: **Dedic/Sugarloaf**
Dutchess Quarry Cave
Hughes Early Man Complex
Hedden
Lamoreau
Shoop
Wapanucket
- Southeast: **Conover**
Flint Run
LaGrange Rockshelter
Nipper Creek
Taylor

Thomas Creek District
Youngblood

National Register: Local Significance

Midwest: **Adams County**

Burrell Orchard

Lucas

Northeast: **The Weirs**

Southeast: **Nolands Ferry I**

Discussion: This theme examines the material culture, technology, and technological organization of the Earliest Americans. Key questions include what was the nature of the tool kits of the Earliest Americans, and how was their technology organized? The elaborate and well made Paleoindian stone and bone toolkit was one of the most sophisticated ever to appear and questions about its emergence, evolution, and spread, in the ensuing Archaic period, have long fascinated researchers and the general public alike. The technology these early peoples developed is compelling evidence for a highly mobile lifestyle, by groups who carried much or all of what they possessed with them over the landscape. Technological organization, raw material procurement, and settlement and organization are closely linked aspects of culture, and can all be explored under this theme.

Specific questions that can be explored include the reasons for the appearance, wide distribution, and eventual disappearance of fluting technology. Wherever fluting technology emerged, how did it spread? Why were some areas, such as the Appalachian highlands and portions of the Gulf Coastal Plain, minimally visited by peoples using this technology? How and why did the transition from fluted to non-fluted points come about? What do toolkits look like at different times and places, and what are the reasons for the similarities and differences? Is the gradual abandonment of the highly curated Paleoindian toolkit directly related to emergence and increasing importance of foraging, generalist strategies during the Terminal Paleoindian and Early Archaic periods (Cable 1982a, 1996; Meltzer 1984b, 1988; Meltzer and Smith 1986; Morse 1973, 1975b, 1997b)?

Properties also may be nominated under this theme for contributions to the development of scientific thought and theory. Two of the most important topics which can be explored are technology history and interdisciplinary studies. First, the effort to understand the meaning of lithic technology development by Earliest Americans, as one of the great stories of human achievement, fostered many of the most significant advances in anthropological archeology. The interrelated concepts that underlie artifact typology, seriation, and chronology were defined systematically and tested rigorously in the hothouse glare of studies of Paleoindian sites and collections. This kind of work contributed to the growth of interdisciplinary scientific applications and formal research designs to be able to explain how stone tools were made, to what uses they had been put, and the history of technological change. New theoretical approaches using ethnographic analogy, experimental archeology, and cultural ecology all benefited from analyses of lithics, the most common archeological evidence about Paleoindian society and economy.

Second, our current understanding of the complex culture of the Earliest Americans is based upon far more extensive knowledge about a much more environmentally diverse range of sites containing the archeological evidence of what people had actually done in the distant past. The extraordinary expansion in the variety of inventoried and formally registered property types, containing an avalanche of data in multiple occupational components, began in the mid-1970s. Improved preservation and comprehensive research were the conjoined results of significant growth in cultural resources management and theoretical applications which began during that period. Today, the ability to conduct comparative analyses, the range of cultural elements which can be addressed, and the prospects for interdisciplinary studies are unprecedented. While isolated finds and single component sites are still important, their research utilities are measured increasingly against a rich tapestry of information and interpretation.

To address the development of scientific thought and theory, nominations may consider other NHL Criteria. For instance, nominations according to Criterion 1, association with events, would be appropriate for type sites or properties where testing of scientific methods and theories affected development of anthropological archeology to a major degree. Nominations according to Criterion

2, association with the lives of persons, would be appropriate for properties that exemplify the research locations of those who have made nationally significant contributions to understanding Paleoindian society and economy.

Transforming the Environment

Research Issues: Impacts.

Responses.

Key Questions: What was the impact of people on the environment?

How did environment affect the Earliest Americans?

National Historic Landmarks

Midwest: None

Northeast: None

Southeast: ***Thunderbird***

National Register: National Significance

Midwest: **Kimmswick**

Prairie Creek

Northeast: None

Southeast: **Little Salt Spring**

Warm Mineral Springs (determined NHL eligible, 1988)

National Register: State Significance

Midwest: **Deadman Slough**

Metzig Garden

Paleo Crossing/Old Dague Farm

Northeast: **Hedden**

Lamoreau

Southeast: **Youngblood**

National Register: Local Significance

Midwest: **Lucas**

Northeast: None

Southeast: None

Discussion: This theme examines the reactions of human groups to Late Pleistocene environmental change, as well as the impacts these human populations themselves produced on biotic communities. The Late Pleistocene was one of the most dramatic periods of environmental change in recent earth history, and how early populations met the challenges faced by glacial retreat, mass extinctions, sea-level rise, and extensive climatic and vegetational change can be examined under this theme. How critical, for example, was the human presence to changes observed in plant and animal distributions at this time? Are human populations directly implicated in the extinctions taking place at this time and, if so, how? Did the presence of human populations result in changes in fire frequency, with resulting changes in the distribution of vegetational communities? What strategies were adopted to exploit these changing resources, and what were the consequences of these actions? Did the passing of Pleistocene megafauna lead to a dramatic reduction of group mobility and the establishment of more tightly bounded cultural traditions? The paleoenvironmental focus of this theme highlights the importance of multidisciplinary research in the study of the Earliest Americans.

Specific questions that might be considered under this theme include what makes a cultural area, and is the concept even relevant during the Late Pleistocene? That is, are Paleoindian adaptations fairly unique in differing regions, or are they like those in other parts of the continent? How did

changes in shoreline affect Paleoindian adaptations?

Another area that can be examined under this theme is resolving the relationship between varying environmental conditions on local Paleoindian adaptations. Is it realistic to expect that Paleoindian adaptations were the same in the dissicated karst terrain of Florida, on the High Plains, or in Alaska? Almost certainly not. Is it possible that some of the diversity currently attributed to the Terminal Paleoindian period, specifically the emergence of distinctive subregional cultural, may have actually begun earlier, during Clovis times or even before? Related to this, why do fluted point assemblages continue fairly late in some area, such as the Northeast, to perhaps as late as ca. 11,200 B.P. (e.g., Lepper and Meltzer 1991; Levine 1990; Spiess et al.1998), when these forms are clearly gone from other regions by this time? Is a replacement of fluted point styles a time transgressive phenomenon in North America and, if so, is this related to environmental factors, such as the gradual retreat of the ice sheets, and the expansion of forest canopies of one kind or another?

Changing Role of the United States in the World Community

Research
Issues: Major Contributions to Knowledge.

Comparative Perspectives.

Key
Questions: How have Earliest American archeological studies contributed to major intellectual developments?

How do Earliest American resources contribute to development of broad intercontinental comparative perspectives?

National Historic Landmarks

Midwest: None
Northeast: None
Southeast: None

National Register: National Significance

Midwest: None
Northeast: **Meadowcroft**
Southeast: **Little Salt Spring**
Warm Mineral Springs (determined NHL eligible, 1988)

National Register: State Significance

Midwest: None
Northeast: None
Southeast: None

National Register: Local Significance

Midwest: None
Northeast: None
Southeast: None

Discussion: This final theme makes us consider a global perspective. That is, what was happening to Paleoindian populations in North America should be viewed in terms of cultural and environmental changes observed worldwide at the end of the Pleistocene. How do site and artifact assemblages and distributions from this time period in North America, for example, compare with those in other parts of the world? Can the observed similarities and differences give us insight about the relative uniqueness of North American cultures and adaptations? From a global perspective, how does initial colonization occur? Are there lessons that have been learned from the colonization and subsequent settlement of places such as Australia, for example, that can be applied? Australia was colonized upwards of 40,000 years ago, yet evidence for sites predating ca. 8,000 years ago is

minimal. What does this say about the visibility of pre-Clovis remains in the New World? Can Clovis itself be viewed as the technology of a colonizing population, or is it similar to technologies in areas long occupied by human populations elsewhere in the world? From a broad comparative perspective, what might precursor technologies look like? The attention given lithic assemblages in extreme northeastern Asia in recent years, the likely source of new World populations, has been an attempt to locate possible precursor industries (Fiedel n.d.).

Additionally, this theme makes us take a look at the way we have been conducting research in First American studies. Key questions include whether Paleoindian archeological studies have contributed to major intellectual developments in archaeology and anthropology, and how has what we have learned contributed to development of broad intercontinental comparative perspectives? How adequate are our existing models of various aspects of Paleoindian life, and can these be improved by adopting a broad comparative and theoretical perspective? What can First American studies learn from, and contribute to, multidisciplinary investigations of global climate change, both during the late Pleistocene and in the modern era? There is no question that Late Pleistocene human populations were profoundly affected by the dramatic changes in sea level, climate, and biota that were occurring. As we learn more details about what happened to these peoples, are there lessons that can be applied to today's world, which also appears to be entering a period of major climate change?

What will be the impact on archaeological research of using calendrical, rather than radiocarbon years, in our research, now that calibrations exist for the past 20,000 years or so? Archaeologists have employed radiocarbon years as a matter of convention when talking about Paleoindian sites and occupations for the past several decades. Thus, Clovis occupations are traditionally placed between ca. 11,200 and 10,800 rcbp, while the end of the Paleoindian era itself is placed at 10,000 rcbp. We now know, however, that use of radiocarbon time severely distorts our perspective, since calendrical dates for the Paleoindian period may be as much as 2000 years earlier, and because there are plateaus and reversals in the calibration. Researchers worldwide are going to have to come to grips with these problems, and start using calendrical time, which is itself distorted by radiocarbon reversals.

Another important question that can be considered under this theme is the effectiveness of our existing chronologies and culture sequences for the Paleoindian period. To refine our understanding of the relative and absolute placement of Paleoindian assemblages, far more primary fieldwork is needed.

An additional question that can be explored under this theme are our procedures for examining morphological variation in Paleoindian projectile point assemblages. At present, the identification of Early, Middle, and Terminal Paleoindian components suffers from considerable ambiguity, particularly in cases where supposedly well described and dated diagnostics like Clovis or Dalton points are lacking. As we have seen, however, appreciable morphological variation is subsumed under these types, much of which is poorly documented or understood at present. How much of this variation reflects temporal or cultural phenomena, and how much of it is due to constraints imposed by raw material, or the position of the artifact in a use-life cycle?

Finally, this theme makes us consider the long term future of Paleoindian resources. What, for example, are the impacts of contemporary land-use practices on Paleoindian cultural resources? The archaeological record is degraded each year by erosion, development, and looting. The extent of this damage is difficult to assess, just as solutions are difficult to foresee or implement (Anderson and Horak 1993; Dincauze 1997; Ehrenhard 1990). The effects of reservoir construction and subsequent inundation on Paleoindian sites is a specific example of the kinds of loss to the record that can be explored under this theme. Reservoir construction has led to considerable erosion of floodpool shoreline deposits, although the effects of reservoir construction on permanently flooded deposits is not well known. Paleoindian assemblages that were deeply buried prior to inundation, for example, may be less likely to suffer erosional damage than sites in areas of fluctuating water levels. Vast numbers of Paleoindian and later period artifacts have been found along the shores of artificial lakes, indicating valuable information is being lost that should be documented. Agencies responsible for managing reservoirs should, accordingly, conduct periodic surveys of cultural resources exposed along shorelines, to assess erosional effects on archaeological deposits, and to obtain samples of materials that would otherwise be lost. Coupled with this, collections in the hands of private individuals obtained from these reservoirs should be examined, and all Paleoindian artifacts recorded.

Avocational collecting is also reducing the Paleoindian archaeological record, although when sites and collections are recorded, this can be a highly positive activity. Unfortunately, most collectors do not document their collections well, or make provisions to pass them on to responsible curatorial repositories. As these collectors pass away or disperse their materials, any associated provenience information is usually lost, rendering them nearly worthless for research purposes. The development of outreach programs directed to educating collectors, and recording their collections, should occur in every state. Likewise, what will the increasing output of modern Paleoindian replicas do to the sale of Paleoindian antiquities? Is it likely to depress the market sufficiently to discourage the looting of Paleoindian sites? Parenthetically, given the increasing incidence of replicas, some of which are sold to unwitting collectors, researchers recording Paleoindian points will have to be on their guard to avoid legitimizing artifacts of this kind by including them in their surveys (e.g. [Table 6](#)).

Evaluation Criteria

Information contained in this theme study may be used to evaluate significance of Paleoindian archeological resources as National Historic Landmarks and as properties possessing National, State, and Local significance in the National Register of Historic Places. Paleoindian archeological sites and districts considered for National Register nomination must possess integrity of location, design, setting, materials, workmanship, feeling, and association at national, state, or local levels of significance relating to one or more of the following Criteria:

- A. Association with events, activities or patterns;
- B. Associations with important persons;
- C. Distinctive physical characteristics of design, construction, or form; or
- D. Potential to yield important information.

NRHP eligibility is typically determined by Criterion D, the potential of a property to yield information important to understanding the past (Grumet 1988). Paleoindian property types, accordingly are evaluated for NRHP status under Criterion D, whether they "have yielded, or may be likely to yield, information important in prehistory or history."

National Historic Landmark Criteria reflect a similar but more rigorous evaluative framework appropriate for properties possessing the potential to contain information of the highest level of national significance. As set forth in 36 CFR 65.4, properties meeting these Criteria are those that:

- 1. Are associated with events that have made a significant contribution to, and are identified with, or that outstandingly represent, the broad national patterns of United States history and from which an understanding and appreciation of those patterns may be gained; or
- 2. Are associated importantly with the lives of persons nationally significant in the history of the United States; or
- 3. Represent some great idea or ideal of the American people; or
- 4. Embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for a study of a period, style or method of construction, or that represent a significant, distinctive and exceptional entity whose components may lack individual distinction; or
- 5. Are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic merit to warrant individual recognition but collectively compose an entity of exceptionally historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture; or
- 6. Have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those that have yielded, or which may be reasonably expected to yield data affecting theories, concepts, and ideas to a major degree.

Paleoindian resources, like all other archeological properties, are usually nominated under National Historic Landmarks Criterion 6. That is, NHL designation requires that the information the site contains must be "of major scientific importance." Application of Criterion 6 is at once the most critical and most challenging component of an archeological National Historic Landmark nomination. Nominations made under Criterion 6 must address two questions:

1. What information is the site likely to yield?
2. Is the information nationally significant?

Establishing Significance

Those nominating Paleoindian sites and districts as National Historic Landmarks or as listings in the National Register of Historic Places must show how information preserved within resource boundaries can make significant contributions to existing knowledge at the national, statewide, or local levels. This standard requires that potentially recoverable data are likely to revolutionize or substantially modify a major prehistoric or historic concept, resolve a substantial historical or anthropological debate, or close a serious gap in a major theme of United States prehistory or history.

The only way to document the significance of a particular property is through the development of research designs and historic context statements providing explicit procedures by which archaeological materials from a given property can address specific archeological research questions. In the case of archaeological NHLs, two questions in particular must be considered, what kinds of information is the site likely to yield, and is this information of national importance?

When fieldwork is contemplated, how a property can contribute important information is determined during the research design stage of the investigations, when strategies for data collection, analysis, and interpretation are drawn up. The evaluation of properties for possible inclusion on either the NHL or NRHP follows a similar procedure. The potential of the archaeological remains to yield important contributions to research must be explicitly stated and justified, even though fieldwork may not be immediately forthcoming or, indeed, may have already occurred on one or more prior occasions. Landowner consent is a crucial part of the NRHP and NHL nomination process, which cannot proceed without it in the case of individual properties, or a majority of the landowners in cases involving multiple property or district nominations. Likewise, the locations of designated properties can be withheld under Section 304 of the National Historic Preservation Act of 1966, as amended, if releasing this information may cause harm to the resource. Typically, NRHP or NHL status is not granted to properties that have been totally excavated or destroyed, although this sometimes happens where clearly outstanding contributions to knowledge were obtained, making them eligible under other NRHP and NHL Criteria (Grumet 1988, this volume). As such, NHL and NRHP nominations can be considered both management tools for designating and helping to preserve significant sites, and also blueprints for the conduct of future research at these properties.

Effectively evaluating the research potential of historic properties must be done using arguments developed from what Butler (1987) called the contemporary theoretical and substantive knowledge base of the discipline. The information and questions summarized in this historic context, and in other documents dealing with Paleoindian occupations, indicate the kinds of information currently considered of great research importance. For specific properties, NRHP and NHL evaluation should proceed by first completing a property designation matrix, which provides a basic overview of condition and research potential, and can serve as a guide to the preparation of detailed nomination statements. An example matrix is provided at the end of this section. How specific research questions and themes outlined in the matrix apply to Paleoindian properties, however, are given here and in the regional contexts.

NHL Property Type and Integrity

Linked with the evaluation of specific NHL property classes and categories is an assessment of their integrity. Property integrity refers to the physical condition of the remains under investigation, that is, their preservation, context, and ability to contribute important information. Assessing property integrity is thus a crucial aspect of the evaluation of NRHP and NHL status.

To be considered eligible for inclusion on the NRHP or designation as an NHL, Paleoindian properties must possess deposits with sufficient integrity to yield information capable of identifying discrete periods of occupation or utilization, property function or type, and clearly defined boundaries. A property's state of preservation integrity is linked to its ability to contribute information to address significant research needs and questions. Neither size nor quantity is a critical determinate; very small undisturbed intact features, feature remnants, pieces of living floors, and sealed strata have the potential to contribute significant new information about Paleoindian life.

Three levels of integrity are employed in the present NHL theme study, High, Moderate, and Low.

High

- Clearly identified Paleoindian component or components.
- Demonstrable context consisting of:
 - Identifiable sedimentary matrix.
 - Clearly identifiable intrusions or disturbances.
- Secure calendric dating.

Examples of locales whose deposits have been found to possess high integrity levels in the past include Big Eddy in Missouri, Wisconsin's **Chesrow**, **Lucas**, and **Metzig Garden sites**, and Ohio's **Paleo Crossing site** in the Midwest; the Bull Brook I site in Massachusetts, Pennsylvania's **Shawnee-Minisink site**, Templeton in Connecticut, and New Hampshire's Whipple site in the Northeast; and Adams and other Little River Complex sites in Kentucky, South Carolina's **Allendale Quarry sites**, Aucilla River Complex locales in Florida, Alabama's Dust Cave, Nottoway Valley Complex Cactus Hill and **Williamson** sites in Virginia, and the Sloan site in Arkansas.

High Integrity Properties whose integrity is High are potential NHLs or have national-level NRHP significance. Sites with High integrity have clearly identified Paleoindian component(s) in secure context, and with precise calendric dating. That is, the geologic and sedimentary context of the assemblage(s) are well documented, with sources of intrusion or disturbance recognized and controlled, and the age of the deposits ascertained using one or more absolute dating procedures, such as radiocarbon or thermoluminescent dating. Sufficient age determinations must, however, have been obtained from samples in secure context to ensure confidence in the results. Individual dates, accordingly, or even large numbers of dates from controversial associations, will probably not be considered sufficient, unless supported by other kinds of evidence, such as unambiguous geological or biotic associations.

Moderate

- Paleoindian component slightly mixed with later materials.
- Moderately intact context consisting of:
 - Identifiable sedimentary matrix that may or may not be contemporaneous with artifacts or features.
 - Possibly identifiable intrusions or disturbances.
- Indirect calendric or typological dating.

Examples of locales whose deposits have been found to possess moderate integrity levels in the past include Midwestern locales such as the Gainey site in Michigan, Ohio's Nobles Pond and Sandy Springs sites, the **Aebischer site** in Wisconsin, and the Lincoln Hills/Ready, Mueller, and Martens sites in Illinois; Northeastern sites such as Pennsylvania's **Meadowcroft Rockshelter**, Arc in New York, **Hedden** in Maine, and **Wapanucket 8** in Massachusetts; and Alabama's Quad site in the Southeast.

Moderate Integrity Properties whose integrity is Moderate are potential NHLs or have national- or state-level NRHP significance. Sites with Moderate integrity have Paleoindian component(s) that are to some extent mixed with later materials, in moderately secure context, and with relative rather than absolute dating. That is, the geologic and sedimentary context may be somewhat uncertain, with some mixing or reworking of the deposits. Control for disturbance is less secure. The age of the deposits is also somewhat less secure, and may depend upon stratigraphic relationships, seriation, or the cross-dating with materials securely dated elsewhere. That is, sites with Dalton points are assumed to date between ca. 10,500 and 9,900 rcbp (12,500 and 11,100 B.P.) regardless of where they are found, because that is the radiocarbon age range currently accepted based on an evaluation of known dates and contexts (Goodyear 1982). As we have seen, however, the actual temporal occurrence for Dalton points appears to vary appreciably, and may extend well beyond these inferred starting and ending dates, making use of cross-dating less secure than absolute dating.

Low

(Potential state- or local-level National Register listing):

- Paleoindian component mixed with numerous other materials.
- Highly disturbed context.
- No secure dating of any type associated with the Paleoindian component.

Sites identified as having low levels of integrity represent the majority of Paleoindian archeological resources in the East. Formerly intact locales whose deposits may have low integrity levels due to site damage, complete data recovery, inundation, or other factors include such Midwestern resources as Bostrom and C-B North in Illinois, **Holcombe Beach site** in Michigan, and Iowa's Rummels-Maske site; the Adkins and **Lamoreau** sites in Maine and New York's Twin Fields site in the Northeast; and now-flooded locales in the Southeast such as Parrish Village in Kentucky, the Haw River sites in North Carolina, and Georgia's Rucker's Bottom.

Low Integrity Properties whose integrity is Low are not considered NHL candidates. If they were to be considered eligible for inclusion on the NRHP, it would probably be at the state or local level of significance. Sites with Low integrity have presumed Paleoindian components that are in highly disturbed context, and whose age may be uncertain or questionable. Lithic scatters lacking diagnostics, absolute dates, or sound stratigraphic contexts are examples of such sites, as are sites with diagnostics whose deposits are severely disturbed or are thoroughly mixed with materials of later periods.

Isolated finds are a special Paleoindian property class of great importance for research purposes, but whose integrity is considered Low, and hence have minimal potential for inclusion on the NRHP, or designation as an NHL. If properly identified, however, isolated finds are typically not considered eligible for inclusion on the NRHP, unless the artifact itself is of exceptional significance. There is one exception to this. Groups of culturally related but otherwise isolated Paleoindian remains found in connection with diagnostic land-forms or other paleogeological, geomorphological, or paleoenvironmental contexts may be nominated as contributing properties within a district. That is, isolated finds, taken collectively, may under certain conditions (i.e., high density, significant paleoenvironmental associations) be considered important enough to warrant inclusion on the NRHP or as part of an NHL.

Evaluation Standards: NRHP Criteria

Although NHL designation is not the same thing as NRHP status, any successful NHL nomination will also have to meet NRHP Criteria. Since explicit Criteria by which Paleoindian properties may be considered eligible for inclusion on the NRHP have been presented in a number of state historic contexts, these Criteria are summarized and presented here. The National Historic Preservation Act of 1966, as amended, outlined four Criteria under which a historic or prehistoric site could be qualified for listing on the NRHP. These are listed in 36 CFR 60:

The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. that are associated with events that have made a significant contribution to the broad pattern of our history; or
- B. that are associated with the lives of persons significant in our past; or
- C. that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. that have yielded, or may be likely to yield, information important in prehistory or history.

Archeological site eligibility is normally considered under Criterion (D), the potential to yield information important to prehistory and history. Determining what information is important in prehistory or history can be accomplished only through explicit arguments linking the site(s) and cultural resources in question to theoretical and substantive questions and issues of archeological or historic knowledge. This process has been described in detail by Butler (1987:821-823):

The intent of the cultural resource laws dating from the 1890s... is to preserve and protect elements of our national patrimony. Protection includes physical protection as

well as the act of preserving the information contained in such resources. Preservation of information can be accomplished only by individuals properly trained to gather and interpret those data to generate knowledge. Thus, the preservation of knowledge from archaeological resources requires that information be gained and interpreted based on the current theoretical and substantive concerns of the discipline. ...Hence compliance with the cultural resources laws demands that National Register of Historic Places (NRHP) significance for archaeological properties be well understood... Importance is based on the theoretical and substantive knowledge (T&SK) of the discipline—nothing more, nothing less; i.e., what we know and what we do not know (Butler 1987:821-823).

These linking arguments, or significance justifications, must be present in NRHP and NHL nominations. The potential of identified Paleoindian properties to yield important contributions to research much be explicitly stated and justified.

The presence of any of the following characteristics on sites yielding Paleoindian artifacts would tend to automatically make them eligible for inclusion on the NRHP:

1. Intact buried deposits, particularly assemblages yielding features or preserved floral and faunal remains. These types of sites are extremely rare at this time level.
2. Stratified deposits, with components that can be isolated horizontally or vertically. This would facilitate detailed examination of single periods of occupation.
3. Major quarry sites with extensive reduction or manufacturing debris, and evidence for utilization during the Paleoindian period.
4. Areally extensive surface scatters from plowzone or eroded upland context, particularly if evidence for artifact relocation beyond more than a few meters is minimal. Controlled surface collection procedures can recover discrete occupational episodes or activity areas on sites of this kind.

To these attributes can be added consideration of Glassow's (1977) Criteria by which site significance can be assessed. By themselves, however, these are not eligibility Criteria, but only guidelines to consider when assessing the information potential of a Paleoindian property.

1. Degree of Integrity. What condition is the property in? Does the site contain intact remains which allow each component to be segregated and studied individually, or are the remains so badly disturbed as to preclude the recovery of information important to prehistory? Three levels of integrity have been provided in this study for use in the evaluation of Paleoindian properties, High, Moderate, and Low, together with explicit Criteria by which a property can be placed in one of these categories.
2. Degree of Preservation. Does the site possess cultural features, or faunal/floral remains, or skeletal remains, or materials suited to absolute dating techniques, which would allow this site to make important contributions to the study of prehistory?
3. Uniqueness. Can preservation or data recovery at a particular site yield information of a critical nature, or does this site possess information also possessed by numerous other archeological sites? Do better examples of this particular site type exist, or have better examples been excavated? Can this site present new and contributing information through uniqueness, preservation, integrity, or the application of new analytical techniques, or is the information available redundant?

When assessing NHL or NRHP significance, the important thing is not simply that a property may possess one or more of these characteristics, but how they contribute to its ability to contribute important information. This can only be done through the development of explicit statements detailing the kinds of information that can be learned, as well as how it can be collected and analyzed from this specific property or district. NRHP or NHL nominations are thus true research designs and syntheses, and not mere rote listings of physical attributes or general research questions.

The presence of any of the following characteristics tends to automatically make a site yielding Paleoindian materials ineligible for inclusion on the NRHP:

1. Sites consisting only of a single isolated artifact. Little information beyond that obtained at the time of collection can be derived from such assemblages. Care must be taken, however,

- to ensure that the presence of other deposits has been ruled out. Isolates may be the only detected evidence of a complex site.
2. Heavily disturbed surface scatters. This does not include plowzone scatters, from which significant assemblage and intra-site distributional information can be recovered given careful data collection. Care must be taken when examining presumably disturbed deposits that the presence of undisturbed deposits has been completely ruled out.
 3. Sites damaged by cultural or natural factors to the extent that deposit integrity is destroyed.

Following the arguments noted above, and given how rare these sites are, full justifications should also be provided in cultural resource management studies detailing why Paleoindian properties cannot yield information important to history or prehistory.

Evaluation Criteria Matrix/Registration Requirements

Properties considered for designation **MUST** possess deposits with integrity sufficient to yield information capable of addressing one or more research questions at National Historic Landmark or National Register national, state or local significance levels by identifying:

- Discrete periods of occupation or utilization.
- Property function or type.
- Clearly defined boundaries.
- Collection curatorial facility or location.

Properties considered for designation also **SHOULD** possess deposits with integrity sufficient to yield information capable of addressing one or more research questions at National Historic Landmark or National Register national, state or local significance levels by identifying:

- Intrasite variability.
- Relationships with other locales or communities.
- Environmental information.
- A time period or periods presently unrepresented or under-represented in National Historic Landmark or National Register listings.
- A culture or cultures presently unrepresented or under-represented in National Historic Landmark or National Register listings.
- A geographic area or areas presently unrepresented or under-represented in National Historic Landmark or National Register listings.
- A research theme or themes presently unrepresented or under-represented in National Historic Landmark or National Register listings.

Properties containing physical attributes and representational values capable of addressing research questions will be marked National Historic Landmark, N (for national), S (for state), or L (for local) levels of significance within appropriate grid boxes in the Designation Matrix below. Properties capable of addressing research questions must possess all required and one or more optional physical attributes or representational values. Properties meeting this requirement will be nominated for designation at the highest marked level of significance.

Figure 8. Earliest Americans Theme Study Property Designation Matrix

Property Name:
County: State:
Significance Level (circle one)
NationalHistoric Landmark
National State Local
Landowner Approval: (circle one) yes no
Preparer(s)
Name:
Title:
Address:
Telephone:
Date:

Data Curation Location:

Properties considered for designation must possess deposits with integrity sufficient to yield information to identify:

Table 10a. Earliest Americans Theme Study Property Designation Matrix

	Peopling Places	Creating Social Institu- tions	Express- ing Cultural Values	Shaping the Political Land- scape	Develop- ing the American Economy	Expand-ing Science and Techno- logy	Trans- forming the Environ- ment	Changing Role of US in the World
1. Discreet Periods of occupation or utilization								
2. Site Function								
Clearly Defined Boundaries								

Properties possessing these attributes also should yield or possess potential to yield information that can:

Table 10b. Earliest Americans Theme Study Property Designation Matrix

	Peopling Places	Creating Social Institu- tions	Express- ing Cultural Values	Shaping the Political Land- scape	Develop- ing the American Economy	Expand-ing Science and Techno- logy	Trans- forming the Environ- ment	Changing Role of US in the World
1. Reveal intrasite variability								
2. Identify relations with other locales								
3. Reveal environmental information								
4. Identify New Time Periods								
5. Identify new culture(s)								
6. Identify new geographic areas								
7. Identify new research themes								

Using the Evaluation Matrix — The Thunderbird Archeological District National Historic Landmark Example

Robert S. Grumet

The Evaluation Matrix is a grid showing in graphic form how information contained in a nomination form addresses key research questions at local, state, national, and National Historic Landmark levels of significance. The vertical grid column lists key research questions as National Historic Landmark thematic elements.

				Shaping		Expand-ing	Trans-	
--	--	--	--	---------	--	------------	--------	--

	Peopling Places	Creating Social Institu- tions	Express- ing Cultural Values	the Political Land- scape	Develop- ing the American Economy	Science and Techno- logy	forming the Environ- ment	Changing Role of US in the World
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Using this grid, properties nominated under the thematic element "Peopling Places," for example, can show how contributing resources address key demographic research questions on local, state, national or National Historic Landmark significance levels.

	Peopling Places
1. Reveal intrasite variability	XXX
2. Identify relations with other locales	XXX
3. Reveal environmental information	XXX
4. Identify New Time Periods	XXX
5. Identify new culture(s)	XXX
6. Identify new geographic areas	XXX
7. Identify new research themes	XXX

Horizontal rows list property integrity and representational values required to address key research questions.

	Peopling Places
1. Discreet Periods of occupation or utilization	XXX
2. Site Function	XXX
Clearly Defined Boundaries	XXX

A property nominated for its ability to shed light on peopling places, for example, *must* possess clearly identified, dated, and bounded intact resources. The property *should* also possess vertical or horizontal stratigraphic integrity, ability to indicate relations with other locales, or environmental information bearing upon demographic issues of particular levels of significance. Further, the information contained in the nomination form should show how the property addresses time periods, cultures, geographic areas, or research themes currently un-represented or under-represented at a particular significance level.

All information used to evaluate the abilities of designated properties to address key research questions in this theme study is drawn from the latest drafts of nomination forms on file in the National Register, History, and Education Division in the National Center for Cultural Resource Stewardship and Partnership, Washington, D.C. Each form contains information used to formally identify, evaluate, and designate the property as a National Historic Landmark or a listing in the National Register of Historic Places. Forms are periodically updated to reflect new findings, condition assessments, and other developments affecting a property's ability to represent significant

aspects of American history and culture.

The following example shows how information contained in the Thunderbird Archeological District National Historic Landmark nomination form addresses themes of exceptional national significance. Designated as a National Historic Landmark in 1977, the Thunderbird Archeological District encompasses three contributing properties; the Thunderbird, Fifty, and Fifty Bog sites on the South Fork of the Shenandoah River near Front Royal, Virginia. The three properties are components of the larger Flint Run Archeological District listed in the National Register of Historic Places a year earlier as a property preserving resources at the state level of significance.

Table 11a. The Thunderbird Matrix

	Peopling Places	Developing the American Economy	Expanding Science and Technology	Transforming the Environment	Changing Role of US in the World
1. Discreet Periods of occupation or utilization	XXX (radiocarbon dates associated with features, horizons, etc.)	XXX (charred seeds, nuts, and other organics, in association with stone artifacts)	XXX (tool kits tightly dated)	XXX (pollen samples and plant remains well preserved at Fifty Bog)	XXX (development of the first well-dated chronological sequence in the Southeast, Thunderbird places North American prehistory in broader worldwide context)
2. Site Function	XXX (base camps and quarry workshops)	XXX (activity areas revealed - house pattern, small hearths)	XXX (activity areas revealed - evidence of lithic reduction techniques over time)		
Clearly Defined Boundaries	XXX (delineated by artifact distributions and geomorphological boundaries)	XXX (activity areas defined by artifact and feature distributions)	XXX (activity areas defined by artifact and feature distributions)		

Table 11b. The Thunderbird Matrix

	Peopling Places	Developing the American Economy	Expanding Science and Technology	Transforming the Environment	Changing Role of US in the World
1. Reveal intrasite variability	XXX (revealed by differential artifact and feature distributions)	XXX (organic remains, stone artifacts, hearths, and house patterns delineate activity areas)	XXX (revealed by differential artifact and feature distributions)	XXX (pollen samples and plant remains well preserved at Fifty Bog)	
2. Identify relations with other locales	XXX (Widely spread tools made from exotic raw materials)				XXX (studies here have facilitated broader comparisons with peoples in other places and times)
3. Reveal environmental information	XXX (Bone and plant remains preserve environmental evidence)	XXX (big game bones and domesticated plants and animals reveal a mixed subsistence economy, importance of stone quarrying)		XXX (pollen samples and plant remains well preserved at Fifty Bog)	XXX (contribute new insights into worldwide climate changes during the Younger Dryas)
4. Identify New Time	XXX (Paleoindian)	XXX (Paleoindian)	XXX (Paleoindian)	XXX (Paleoindian)	XXX (Paleoindian)

Periods					
5. Identify new culture(s)	XXX (Paleoindian)	XXX (Paleoindian)	XXX (Paleoindian)	XXX (Paleoindian)	XXX (Paleoindian)
6. Identify new geographic areas	XXX (first of three - Southeast U.S.)			XXX (first of three - and only one with plant and animal remains - in the Southeast U.S.)	
4. Identify New Time Periods	XXX (see above)		XXX (Technological change over time)	XXX (Shed light on rapid environmental change at the dawn of the Holocene)	XXX (major role in placing North American prehistory within broader context of worldwide cultural development)

Discussion

The following introductory paragraphs of Thunderbird National Historic Landmark nomination forms' statement of significance, written by nomination form preparers Francine Weise, William Gardner, and Gary Haynes, succinctly describe the districts' contributing properties, components, and significance:

The first undisturbed Paleoindian site to be discovered in Eastern North America, Thunderbird also represents the first known base camp on the continent to exhibit stratification and cultural continuity between the beginning of the Paleoindian and the end of the Early Archaic periods. Excavations at the site have also revealed evidence for the earliest structures in the western hemisphere. The Fifty site represents the first known stratified Paleoindian to Early Archaic hunting-processing camp while the Fifty Bog is the only extinct late Pleistocene/Early Holocene habitat in Eastern North America known to be associated with human occupation and to contain well preserved organic materials.

The sites have helped to clarify the chronological sequence, primarily for the early periods, in the Middle Shenandoah Valley. This regional sequence has in turn influenced archeological theories for Eastern North America in general. Taken together, the sites have changed the archeological definition of the nature of the Eastern Paleoindian and have influenced thinking on the differences and similarities between Paleoindian and Early Archaic cultures. The potential exists for studying the nature of the various aspects of cultural systems and the changes which occurred in them during these periods. When viewed in relation to the larger area of the South Fork Valley, the sites have contributed greatly to an understanding of the settlement pattern for the early prehistoric periods of the East (ca. 9500 - 6500 B.C.).

Although subsequent researchers have since found additional examples of the above-cited property types, Thunderbird nevertheless remains a key evaluatory benchmark against which all potential Paleoindian and Early Archaic National Historic Landmark nominations are measured on both national and regional scales. Review of nomination documentation conducted through this theme study by Diversity Intern Andrew Bashaw reveals that the Thunderbird nomination form cites the presence of intact archeological resources contributing to the following five elements of National Historic Landmark level of significance;

Peopling Places:

A suite of radiocarbon dates securely associated with intact features, horizons, and diagnostic Paleoindian artifacts identifies Thunderbird as a locale occupied during the initial peopling of eastern North America. Site content, size, and distribution suggest that district locales functioned as base camps and quarry workshops. Artifact distributions and geomorphological boundaries clearly delimit areas occupied by the site's initial occupants. Differential artifact and feature distribution

reveal intra site variability. Discoveries of widely spread Paleoindian tools, several made from exotic raw materials, indicate contact with people from other places. Bone and plant remains preserve evidence of the kinds of environmental conditions encountered by Thunderbird's earliest occupants. Thunderbird is also the first of three designated National Historic Landmarks (and the only one possessing intact plant and animal remains) identifying a time period, culture, and group of themes unrepresented in National Historic landmarks located in the Southeast Region. As such, Thunderbird resources provide key data contributing to research shedding light on the first peopling of Eastern North America.

Developing the American Economy:

Charred seeds, nuts, and other organic remains, many in association with chipped stone artifacts near small hearths, activity area concentrations, and around the earliest known house-pattern in North America preserve evidence of Paleoindian hunting and gathering economic activities. The small size of site deposits and the absence of grinding tools, bones of big game, and domesticated plant and animal remains suggest that Thunderbird's occupants pursued a mixed subsistence economy focusing on the hunting of small game and the gathering of locally available wild plants. Close associations with outcrops of jasper stone used for tool manufacture further indicate that stone quarrying was an important component of the Paleoindian economy at Thunderbird.

Expanding Science and Technology:

Securely dated resources discovered at Thunderbird locales reveal that site occupants worked jasper stone quarries to obtain raw materials for projectile points, knives, scrapers, and other implements that constituted the preserved portion of Paleoindian technological tool kits in the East. Variations in lithic reduction techniques over time in turn suggest technological changes. Comparatively rapid replacement in site technological inventories of Paleoindian fluted points by Early Archaic small notched points suggest a shift from hand-held lances to smaller spear-throwers. The absence of axes, adzes, and other ground stone artifacts made by later peoples indicate that tools required by people living in dense Holocene forests were not used by Paleoindians inhabiting less densely timbered late Pleistocene environments.

Transforming the Environment:

Pollen samples and other plant remains preserved in Fifty Bog deposits have the potential to yield nationally significant insights into late Pleistocene and early Holocene environments at Thunderbird. Rapid environmental change at the end of the late Pleistocene may correlate with the equally swift technological shift from fluted points to smaller triangular notched points. Further analyses may also shed new light on human activities influencing or influenced by rapid environmental change at the dawn of the Holocene.

Changing Role of the United States in the World:

Development of the first well-dated chronological sequence in the Southeast at Thunderbird has played a major role in placing North American prehistory within the broader context of worldwide human cultural development. Identification of Paleoindian and Early Archaic settlement-subsistence patterns has further facilitated broader comparisons with peoples at similar levels of socio-cultural integration in other places and times. Future analysis of organic remains preserved within intact sealed strata at Fifty Bog may also contribute new insights into worldwide climate changes during Younger Dryas times.

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SOUTHEAST PROPERTY TYPES

NHL Property Types as Categories for the Southeast

Each of the major property type categories presented here is defined in the national context document. In the following paragraphs each property type is discussed in turn. Examples of specific sites or districts that illustrate the category in the Southeast are presented in the resource distribution section that follows. A listing of southeastern sites and localities by property type, and NRHP and NHL status, is provided in [Table 12](#). Because there is considerable overlap between property types, some sites are listed and subsequently discussed under more than one category.

Table 12. Major Southeastern Paleoindian sites by NHL Property Type

Caches:
Hawkins, Arkansas
Sloan, Arkansas*

Bone Beds and Kill Sites
Dust Cave, Alabama*
Guest Mammoth, Florida
Little Salt Spring, Florida*
Page-Ladson, Aucilla River District, Florida*
Silver Springs Run, Florida
Warm Mineral Springs, Florida*
Big Bone Lick, Kentucky*
Coats-Hindes, Tennessee

Human Burials
Sloan, Arkansas*
Little Salt Spring, Florida*
Warm Mineral Springs, Florida*
Windover, Florida*

Rock Art and Other Petroglyphic or Pictographic Representations
No sites are currently known in this category in the region

Quarries and Workshops
Lee County Quarry, Georgia
Theriault, Georgia
Adams, Little River District, Kentucky*
Mackafoonee, Georgia
Hardaway, North Carolina
Allendale Complex, South Carolina*
Carson-Conn-Short, Tennessee*
Wells Creek Crater, Tennessee*
Flint Run, Virginia
Williamson, Virginia*

Occupations
Belle Meade, Alabama
Heaven's Half Acre, Alabama

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NHL property types as categories for the southeast

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LaGrange Rockshelter, Alabama

Dust Cave, Alabama*

Quad, Alabama

Pine Tree, Alabama

Stanfield Worley, Alabama*

Brand, Arkansas

Ferguson, Arkansas

Lace, Arkansas

Bolen Bluff, Florida

Harney Flats, Florida*

Nalcrest, Florida

Page-Ladson, Aucilla River District, Florida*

Thomas Creek District, Florida

Upper Tampa Bay District, Florida

Albany Marine Corps Supply Center, Georgia

Barnett Shoals Complex, Georgia

Carmouche, Georgia

Clyde Gulley, Georgia

Feronia Locality, Georgia

Kinchafoonee, Georgia

Lowe, Georgia

Macon Plateau District, Georgia

Ocmulgee Bottom, Georgia

Pig Pen, Georgia

Rucker's Bottom

Standing Boy, Georgia

Taylor Hill, Georgia*

9GE309, Georgia

9GE534, Georgia

9MG28, Georgia

Youngblood, Kentucky

Avery Island, Louisiana

John Pearce, Louisiana

Hester-Standifer, Mississippi

Baucom, North Carolina

Haw River, North Carolina

Manning, South Carolina

Nipper Creek, South Carolina

Taylor, South Carolina*

Cactus Hill, Virginia*

Conover/Goose Neck, Virginia

Flint Run, Virginia

Williamson, Virginia*

* = Possible NHL candidate

NR listed

designated an NHL

Isolated Finds

Isolated finds are individual artifacts that have been demonstrated to be Paleoindian in age through typological or other analyses. In the Southeast isolated finds tend to be projectile points that either occur by themselves or are found on sites with materials whose age is known or assumed to be later in time. Several thousand isolated finds of Paleoindian points and other tools are currently known from the region (Anderson and Faught 1998, 2000). Typically the isolated points appear to reflect individual hunting/butchering episodes, or examples of artifact loss or discard. The distribution of isolated finds, when examined collectively over large areas, has done a great deal to improve our understanding of Paleoindian settlement in the Southeast (Anderson 1990a, 1990b, 1996; Williams and Stoltman 1965). It is crucial to determine, of course, whether isolated finds are parts of larger, unrecognized sites. For example in the Tennessee fluted point survey, on more than one occasion, the "isolated finds" of several individual collectors were found, upon cross checking, to come from the same location, and hence derive from significant sites (Broster et al. 1996:9). Likewise, as Tesar

(1996:22) has noted, "the collection and reuse of older artifacts should always be considered when they occur as minority elements in otherwise later assemblages." That is, isolated or small numbers of Paleoindian artifacts on sites with later components may represent scavenging and re-use rather than a primary occupation. Tesar (1994:7) has also argued that the replication of earlier tool forms by later occupants should also be considered when examining early materials.

Caches

Caches are groups of artifacts or other resources intentionally left at a location for either ceremonial or utilitarian purposes. Paleoindian caches tend to fall into two types, elaborate finished tools presumably associated with burials or consumption-rituals of some kind, and hence permanently removed from the cultural system of which they were a part, or mundane tools, raw materials, or foodstuffs left at a particular place with the intent of being used at a later date. Caches may be subsets of other property types if, for example, they occur on occupation sites, or as burial furniture.

No Paleoindian ceremonial caches predating roughly 10,800 rcbp/12,900 B.P. are known from the southeastern United States. Given the striking similarities of Clovis assemblages over much of the continent, and the presence of elaborate Clovis caches from a number of locations in the west, such caches probably do exist in the region. Ceremonial caches are well known from the Dalton culture of the central Mississippi Alluvial Valley (Morse 1997b; Walthall and Koldehoff 1998). Well published examples include Sloan and the Hawkins Cache from northeast Arkansas (Morse 1971a, 1975a; Morse 1997b).

Intact bifacial core/preforms or large unifacial flakes have been found at a number of southeastern Paleoindian sites, both at and away from quarry/reduction areas, and some of these artifacts are thought to be utilitarian raw material caches. Examples of these kind of artifacts have been reported in Hardaway/Dalton context at the Haw River sites in North Carolina (Cable 1982b:321), in Suwannee/Early Side Notched context at Harney Flats (8Hi507) in Florida (Daniel and Wisenbaker 1987:81-83), in Clovis context at the **Conover site** in southern Virginia (McAvoy 1992:108, 115), and in unknown but presumably Clovis context at the Big Pine Tree (38AL143) and Smith's Lake Creek (38AL135) sites at the **Allendale chert quarries** in South Carolina (Goodyear 1992, 1999a:458-462; Goodyear and Charles 1984; Goodyear et al. 1985), and at Wakulla Springs Lodge (8Wa329) in Florida (Jones and Tesar 2000; Tesar 2000).

In the Southeast, large blades and blade cores have been found with Clovis and related fluted point assemblages at the Carson-Conn-Short site in Tennessee (Broster and Norton 1996:290-293; Broster et al. 1994, 1996; Nami et al. 1996) and the Adams site in Kentucky (Sanders 1988, 1990). The large size of some of the specimens found at these sites suggest they may have been cached, although profligate use of readily available raw material has also been suggested as an explanation. The terminal Paleoindian levels at Dust Cave, Alabama, dating to after ca. 10,500 rcbp/12,500 B.P., contained a large number of scraping tools made on blades, some of which may have been cached in the rockshelter (Meeks 1994). Although just outside the Southeast as defined for purposes of this study, at **Rodgers Shelter** in Missouri river cobbles and the bones of a trumpeter swan were found in Dalton levels, and have been interpreted as raw material caches for stone and bone working (Walthall 1998:229). The Busse cache in Kansas, of presumed Clovis age, evinces both ceremonial and utilitarian functions, consisting as it does of a large quantity of lightly to heavily utilized chert bifaces, blades, and other flaked stone tools, some of which are streaked with red ochre (Hofman 1995; see also Roper 1996).

While no unequivocal evidence for pit features has been found on Paleoindian sites in the Southeast, such features, if ultimately shown to be present at some sites, could have been used to store nuts, as they were in later times. Some southeastern Paleoindian sites, particularly those found associated with springs, streams, or ponds, may have been subaqueous meat caches rather than strictly kill sites (cf., Fisher 1995).

Bone Beds and Kill Sites

No unambiguous pre-Clovis Paleoindian kill sites or bone beds are known from the Southeast, although a number of possible candidate sites exist, including Saltville in Virginia, **Little Salt Spring**, Page Ladson, and Sloth Hole in Florida, and Coats-Hines in Tennessee (Breitburg et al. 1996; Clausen et al. 1979; Dunbar et al. 1988; Hemmings 1998; McDonald 2000). A number of Clovis age sites exist where evidence for the killing or butchering of fauna has been found, and modified bone and ivory of extinct Pleistocene fauna have been found at a number of locations in

Florida (some of which may be pre-Clovis in age) (Dunbar and Webb 1996; Dunbar et al. 1989; Webb et al. 1984). Remains of essentially modern Holocene fauna have been found at a number of later Paleoindian sites, typically with Dalton occupations. These are usually from rockshelters, locations that offer better preservation, and that were first intensively utilized during this period (Goldman-Finn and Walker 1994; Styles and Klippel 1996; Walker 1997, 2000; Walthall 1998).

While not true kill sites, or even dense bone beds, Paleoindian sites with well preserved faunal and floral remains are of crucial importance to understanding human adaptation during this period. Well preserved later Paleoindian age faunal remains have been found in a number of rockshelters in the Southeast, including at Dust Cave and the Stanfield-Worley bluff shelter in Alabama (Goldman-Finn and Walker 1994; Parmalee 1962; Walker 1997, 2000). The faunal assemblages from these sites encompass a wide range of species, from a variety of environments. Of particular importance is the fact that appreciable numbers of small mammals, reptiles, fish, and birds are represented in these samples. At Dust Cave, in fact, birds are extremely common in the later Paleoindian Dalton assemblage (Walker 2000). Dincauze and Jacobson (2000) and Fiedel (n.d.) have each suggested that birds were important in Paleoindian diet, and that following migratory birds may have prompted and facilitated group movement and even colonizing behavior. White-tailed deer have traditionally been assumed to have been of great economic importance to Dalton populations, and the Dalton toolkit, in fact, was at one time interpreted largely in terms of its utility for the bulk processing of deer meat and hides (Goodyear 1974:14; Morse 1973). We now believe that these populations had a highly diversified subsistence economy, in which small game played an important if not primary role (Walker 1997, 2000).

It would be important to document how important small game was to earlier Paleoindian populations, for which few sites with paleosubsistence remains other than megafauna have been found. While it has sometimes been suggested that Clovis points were used exclusively on large game animals, it appears this may not have been the case. Artifacts such as stone tools may be examined to provide direct evidence about the range of animal and plant species exploited. Blood residue immunological analyses undertaken to date on materials from the Cactus Hill, Fifty (44WR50), and **Thunderbird** (44WR11) sites in Virginia suggest a wide range of species may have been exploited (Newman 1994, 1995). Positive results to deer and elk antiserum were identified on one fluted point from Cactus Hill, to cat antiserum on a fluted point from **Thunderbird**, and to rabbit and bear from separate fluted points from Fifty. Positive reactions for deer, elk, rabbit, and an unidentified bovid, possibly bison or muskox, were reported from several unifacial tools from Cactus Hill (reported in McAvoy and McAvoy 1997:Appendices F and G). While still somewhat controversial, blood residue analysis can provide direct evidence about the kinds of animals exploited by these early populations.

The limitations of blood residue analysis, however, mean these results will need to be considered carefully and, where possible, subject to additional verification through blind testing and independent replication (Eisele et al. 1996; Fiedel 1996). That is, care in the collection of artifacts in the field and in subsequent handling is essential if blood residue analyses are to be undertaken, since contamination is a distinct possibility, and indeed the method itself may be unreliable (cf., Loy and Dixon 1998, with Downs and Lowenstein 1995; Eisele et al. 1995, and Fiedel 1996). Phytolith analysis, a method of resolving patterns of plant use, has yet to be conducted on southeastern Paleoindian stone tools. Phytolith analysis has, however, been used to explore site formation processes at the Cactus Hill site, in a recent innovative analysis by McWeeney (McAvoy et al. 2000). Phytolith incidence was found to covary with cultural remains and soil phosphate content, indicating these remains may be useful in delimiting occupation floors.

Other kinds of special use or extraction sites, such as fish weirs, fishing or aquatic mammal hunting stations, or shellfish gathering sites, may also be present in coastal areas, although these would have likely been eroded and submerged by rising sea-levels (Tesar 1996:30-31). Submerged sites have been found at appreciable distances out from the Gulf and Atlantic coasts in recent years (Blanton 1996; Faught 1996; Faught and Carter 1998; Faught and Donoghue 1997; Faught et al. 1992). While shell midden sites dating prior to the Mid-Holocene in age are currently unknown in the region, their existence is considered possible (Russo 1996:196).

Human Burials

Human burials of Late Pleistocene age are rare in the Southeast, as indeed they are throughout North America. The only well documented, unequivocal burial assemblage of Paleoindian age

known from the region comes from the Sloan site in northeast Arkansas, where some 200 tiny, weathered bone fragments were found amid a remarkable assemblage of Dalton points and other tools (Condon and Rose 1997; Morse 1975a, Morse 1997b). The Sloan case indicates that human burials of Late Pleistocene and Early Holocene age may occur in unusual or unanticipated settings. Sloan was located well away from contemporaneous Dalton sites, for example, on a sand dune that saw only minor use in later prehistory. Although there are many other Dalton sites known from this part of northeast Arkansas, most are assumed to have been either habitation or special purpose resource extraction stations. Sloan, in contrast, appears to have been used only for mortuary behavior.

Large numbers of Archaic period burials dating from ca. 8300-5200 rcbp/9350-5930 B.P. have been found in submerged settings in Florida at sites like **Little Salt Spring** and **Windover** (Clausen et al. 1979; Doran et al. 1986). The earliest submerged human remains from the region at present have been dated from ca. 10,200 to 11,450 B.P./ 9000 to 10,000 rcbp, at the **Warm Mineral Springs** site in Florida (Clausen et al. 1975a, 1975b; Cockrell and Murphy 1978; Goodyear 1999a:445; Tesar 2000). A total of 33 dates were obtained from the zone where human remains were found, a ledge ca. 12 to 14 m below the surface, which average ca. 9630 rcbp/11,000 B.P. (Tesar 2000:12). Associated artifacts included Greenbrier/Bolen projectile points, suggesting a late Dalton/Early Side Notched cultural assemblage. Tesar (2000:13-14, citing arguments presented by Clausen et al. 1975a:31) has argued that, rather than intentional burials, the human remains are those of drowning victims who accidentally fell or deliberately climbed into the cenote but were subsequently unable to climb out. Recent investigations have focused on the central debris cone at the bottom of the sinkhole, in more than 150 feet of water, where relatively undisturbed deposits may exist (Purdy 1991:187-188; Tesar 2000:14). In the absence of a formal site report, interpretation of findings is difficult. Numerous burials (possibly >1000) have also been found at the nearby **Little Salt Spring site**, which yielded possible pre-Clovis artifacts, but the burials are Mid-Holocene in age, from ca. 6800 to 5200 rcbp/7650 to 5930 B.P. (Clausen et al. 1979:612; Tesar 2000:17-20).

The Page-Ladson site in Florida has yielded well preserved floral and fauna remains (Peres 1997, Peres and Carter 1999), and human remains may eventually be discovered as well. Early human remains may even be present in offshore contexts. A partially mineralized human bone fragment was found washed up on Edisto Beach, South Carolina, possibly derived from offshore Pleistocene deposits, and dated to Mid-Holocene age 6960±240 rcbp/7775 B.P. (Hemmings et al. 1973). Paleoindian artifacts have been found at appreciable distances out onto the continental shelf, and skeletal materials may also be present (Faught 1996; Goodyear 1999a:468-470). These sites are amenable to examination using underwater archaeological techniques, a type of research that shows great promise.

Other Paleoindian burials no doubt exist within the region, although when discovered, their context will need to be carefully evaluated. The Natchez pelvis, for example, was found in indirect association with Late Pleistocene fauna, but was radiocarbon dated to much later in time (Cotter 1991). Likewise, some human skeletal specimens found and dismissed long ago might bear re-examination, such as the human remains from Vero and Melbourne in Florida (Gidley and Loomis 1926; Sellards 1917).

Rock Art and other Petroglyphic or Pictographic Representations

No examples of Late Pleistocene age rock art or other stationery artwork are currently known from the Southeast, although their existence cannot be ruled out. Most known fixed artwork in the region, in fact, is quite late, dating from the Woodland or Mississippian periods, as exemplified by sites like Mud Glyph Cave in Tennessee (Faulkner 1986; Simak et al. 1997). Designs drawn into mud deposits in caves, in fact, appear at present to be more common than petroglyphs or pictographs in the Southeast. In the western and southwestern parts of the country, in contrast, petroglyphs and pictographs are quite common, and some appear to have great antiquity (Schaafsma 1996:599-600). This may reflect local cultural traditions as well as factors influencing preservation. Outside of isolated and climatically stable cave environments, the long term survival of rock art may be unlikely in the humid southeastern climate. Recent rock art surveys in southern states, however, indicate the record is more extensive than once thought, suggesting people may not have been looking in the right places, or carefully enough (e.g., Charles 1998).

Parietal art, "the art restricted to the walls, roof and occasionally floors of caves and rock-shelters" (Clark 1967:67), can also only occur in areas where caves and rockshelters themselves are likely.

Fortunately, geological formations conducive to cave and rockshelter formation occur over large parts of the Southeast, particularly in the interior highlands and plateaus. Only in the Coastal Plain are such settings rare, although a major exception is the karst topography in Florida. In this region, many of the caves and shelters that would have been exposed in the Late Pleistocene are now submerged, with unknown effects on the survival of possible artwork, as well as making the exploration of the question difficult. Evidence for Late Pleistocene age painting has been observed on the walls and ceiling of the Pedra Pintada rockshelter near Monte Alegre in Brazil, with painted fragments found in strata securely dated to ca. 10,500 rcbp/12,500 B.P. (Roosevelt et al. 1996). Given proper preservational conditions, artwork of a similar age may eventually be found in the Southeast. Surveys of rock art have been initiated in some southeastern states, such as South Carolina (Charles1998), and more information about the nature and age of these kind of remains should be forthcoming.

Chattel art, or *arte mobilière*, consisting of small, portable items of carved or decorated wood, bone, and stone, may also be discovered some day in Late Pleistocene context in the Southeast. Indeed, the elaborately carved ivory and bone points and foreshafts found in Florida are considered by some to be works of art as well as utilitarian items. Similar aesthetic qualities are attached to unusually large or well made flaked stone tools, such as Sloan points, or some of the more spectacular Clovis and Cumberland points found in the region.

Quarries and Workshops

Quarries and workshops comprise perhaps the best known and certainly among the most easily recognized Paleoindian property type in the Southeast. Major sites and localities include Theriault in Georgia (Brockington 1971), the Little River District in Kentucky (Sanders 1990; Freeman et al. 1996), **Hardaway** in North Carolina (Coe1964; Daniel 1998), the **Allendale quarries** in South Carolina (Goodyear and Charles1984), Carson-Conn-Short (Broster et al. 1994) and Wells Creek Crater (Dragoo 1973) in Tennessee, and the **Flint Run complex** (Gardner, ed., 1974) and the **Williamson site** (McCary 1951, 1975) in Virginia ([Table 12](#)). At these sites, lithic raw materials were extracted and initially processed for use at other locations. Many quarry/workshop sites are also multicomponent, with evidence for Clovis occupations, as well as later Paleoindian through Mississippian period use. Occupation or habitation by Paleoindian groups is explicitly stated to have occurred at almost all of these sites (e.g., Daniel 1998:145; Dragoo 1973:46; Gardner 1977:258-259; McAvoy 1992:142; Sanders1990:62). Accordingly, strict separation of quarry/workshop, and occupation property types is difficult or impossible in some cases, as is the resolution of discrete Paleoindian assemblages from those of much later periods. Researchers examining these property types should make every effort to resolve intrasite spatial patterning, which may vary appreciably over relatively small areas.

Occupations

A great many Paleoindian occupation sites, defined as habitation areas or residential base camps occupied for unknown but presumably fairly lengthy periods of time, are known from the Southeast ([Table 12](#)). Many quarry/workshop sites also appear to have occupation areas within them or nearby, such as at **Flint Run** in Virginia, where a possible structure has been identified (Gardner 1974), or **Hardaway** in North Carolina, where highly diversified tool assemblages have been found (e.g., Coe 1964; Daniel 1998). There are also a number of presumed Paleoindian habitation sites in the Southeast that are not located in direct proximity to lithic raw material sources, yet that have been extensively examined and that are well published. These include Dust Cave (Driskell 1996; Goldman-Finn and Driskell 1994) and Stanfield-Worley in Alabama (DeJarnette et al. 1962), Brand in Arkansas (Goodyear 1974), the Haw River sites in North Carolina (Claggett and Cable 1982), and **Taylor** in South Carolina (Michie 1996), to cite a few examples that provide appreciable insight into Paleoindian lifeways. The assemblages at Paleoindian occupation sites can also be used to derive expectations of what habitation assemblages may be like within quarry/workshop sites, where lithic raw material quarrying and initial reduction occurred, and where the associated massive debris likely masks their easy recognition.

Resource Distribution in the Southeast

In the preceding section, the kinds of Paleoindian property types that occur in the Southeast were described. In the pages that follow, the feasibility of developing comprehensive, regionwide datasets of Paleoindian property types, and conducting distributional and other analyses with them, is explored. This is followed by a discussion of specific sites and assemblages by property type

category.

Broad Trends

Using data collected in statewide recording projects, it is now possible to plot the occurrence of some classes of Paleoindian artifacts across the Southeast (e.g., Anderson 1990a) (Table 13). As of early 2000, in the 48 states comprising the continental United States, information on 12,791 fluted points exists in state-wide surveys (Anderson and Faught 1998, 2000). Of this total, over two thirds are located in states east of the Mississippi River with the remainder located in states to the west, with Minnesota placed in states to the west of the river. The density of fluted points in the East is over five times that in the West, measured in terms of points per 1000 square miles. Within the East, almost 60% of the fluted points that have been reported are located in the Southeast, as defined in this context (but with Louisiana and Arkansas, states west of the Mississippi, excluded).

Table 13. Summary Fluted Point Data by State in the Southeastern United States

[Long description]

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
Arkansas	53,104	W	102	89	1.92	Gilliam 1995, 1996; Dan F. Morse: personal communication
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
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
Mississippi	47,716	E	70	70	1.47	McGahey 1987:2, 1996, personal communication
North Carolina	52,586	E	444	436	8.44	Peck 1988; Daniel 1997
South Carolina	31,055	E	317	317	10.21	Charles 1986:16, personal communication; Goodyear et al. 1990
Tennessee	42,244	E	379	372	8.97	Broster and Norton 1996; John B. Broster: personal communication
Virginia	40,817	E	956	868	23.42	McCary 1984; 1988; Johnson and Pearsall 1991a, 1991b, 1993, 1995, 1996
Grand Totals	525,552		4,926	4,805	9.37	

Thus, while fluting is sometimes considered a western or even Great Plains Paleoindian tradition, there are far more of these artifacts in the East than in the West, and in the Southeast in particular.

To date, information is available to permit the generation of maps illustrating the occurrence of all fluted points (Figure 9), as well as two distinctive southeastern Paleoindian projectile point categories, Cumberland and Suwannee/Simpson (Figure 10). While there are admittedly many problems with these data, such as varying levels of recording from state to state, differing levels of geological visibility for these materials, inclusion of nonfluted points in Florida, where Suwannee and Simpson forms are counted, and so on (as discussed in Anderson and Faught 1998), the maps still probably accurately reflect the geographic distribution of these artifact types on the southeastern landscape.

When examining the incidence of all fluted points in the Southeast, major concentrations and voids

can be recognized ([Figure 9](#)). Large numbers of fluted points have been recorded in the Tennessee River Valley of northern Alabama, in portions of the Ohio and Cumberland drainages, and in parts of Florida, North Carolina, South Carolina, and Virginia. Some of these clusters reflect single, extremely rich sites or localities, while others, such as those in the major river valleys of the Midsouth, reflect large numbers of points from both sites and isolated finds. Over 1000 fluted points have been reported from four counties in northern Alabama alone, for example, from numerous locations both along and away from the Tennessee River (Futato 1982).

Several major point clusters occur along the eastern seaboard and in northwestern Florida, that may indicate regions where settlement may have continued onto the then-exposed continental shelf. Comparatively few points, in contrast, occur in portions of the Gulf Coastal Plain, lower peninsular Florida, and in the lower Mississippi River Valley (see also Dincauze 1993a). 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 been 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). Preservation conditions, notably the exposure of cultural materials on thin soil horizons, may have led to remains being severely eroded or masked in mountainous areas, meaning site formation processes will have to be carefully evaluated. Butzer (1991), for example, has argued that early occupations may have been present in these areas, but their sites have since been largely lost to erosion.

Examining the distribution of specific Paleoindian projectile point types is difficult, because this kind of information has not been systematically recorded across the region. Two exceptions exist, however, for the highly distinctive Cumberland and Suwannee/Simpson types, which are invariably identified in Paleoindian survey projects. [Figure 10](#) shows the distribution of these point types, based on a sample of 348 Cumberland, 490 Suwannee, and 51 Simpson points, with the latter two categories combined. Both groups have very tight, spatially restricted distributions. Cumberland points are found within and near the Cumberland and Tennessee River drainages of northern Alabama, Tennessee, and Kentucky, while Suwannee points occur primarily in central and northern Florida, south Georgia, and western South Carolina. Save for isolated outliers, the size of these concentrations are similar, roughly 300 km in maximum extent, a figure that may provide clues about the range of the people making these artifact categories. That is, these distributions may represent the regular use areas of distinctive later Paleoindian cultural traditions.

The distributional evidence suggests a number of things about Clovis and post-Clovis Paleoindian occupations in the Southeast (Anderson and Faught 1998:176-177). First and foremost, large numbers of people using fluted point technology were present in the region, and, given the evidence for a gradual evolution from fluted to unfluted forms in a number of areas, these occupations were highly successful. Given the impressive density, numbers, and diversity of fluted points present, in fact, it is possible that fluting technology could have originated in and spread from this region. Pre-Clovis populations, in contrast, may have been too small and scattered for diffusion to have been a significant factor, which may account for the spotty and disparate nature of the Early Paleoindian record.

Second, since fluted points are common in some areas and absent in others, this suggests that groups making these artifacts were themselves unevenly distributed over the landscape. Third, if Clovis reflects either the movement of an initial colonizing population or the radiation of a technology, movement appears to have proceeded in a leapfrog manner (e.g., Anthony 1990; Fiedel 2000). Fourth, concentrations of fluted points appear to represent staging areas, where initial populations settled and grew, and where subsequent Paleoindian subregional cultural traditions emerged, characterized by distinctive and spatially restricted point types (see also Anderson 1990a; Dincauze 1993b). The occurrence of Cumberland and Suwannee/Simpson points, in areas where concentrations of fluted points also occurred, certainly suggests such a possibility. Finally, the presence of staging areas, furthermore, would provide locations on the landscape where radiating groups could return to in the event of problems, such as catastrophic accident or even a lack of suitable mates, and know that other people would be present (cf., Anderson and Gillam 2001; Moore and Moseley 2001). Finally, given that large areas of the continental shelf along the Atlantic and Gulf coasts were exposed and habitable during the Paleoindian era, artifact concentrations near the modern coastline probably represent settlement systems that continued into areas now submerged.

A number of sites have been found in the Southeast that appear to predate 11,500 rcbp/13,450 B.P., representing the initial human occupation of the region. Perhaps the strongest candidates include Cactus Hill (44SX20) in southern Virginia (McAvoy and McAvoy 1997; McAvoy et al. 2000), Saltville (44SM37) in western Virginia (McDonald 2000), and Topper (38AL23) in South Carolina (Goodyear 1999b, 2000, n.d.), with the **Little Salt Spring** and Page Ladson sites in Florida (Clausen et al. 1979; Dunbar et al. 1988, 1989) and Coats-Hines (40Wm31) in Tennessee (Breitburg et al. 1996) plausible but somewhat more equivocal candidates.

FIGURE

FIGURE

At Cactus Hill, a true blade industry that includes small blades, polyhedral blade cores, retouched flakes, and abrading stones was found stratigraphically below a well defined Clovis occupation. The assemblage was documented in two separate parts of the site, in excavations by two different teams of researchers, led by Joseph and Lynn McAvoy and Michael F. Johnson (M. Johnson 1997; McAvoy and McAvoy 1997). Two unfluted lanceolate/triangular bifaces were also found that McAvoy and McAvoy (1997:136) have called Early Triangular. Seven quartzite flakes and three quartzite blade cores were found in and near an amorphous hearth-like scatter of white pine charcoal that yielded an AMS radiocarbon determination of $15,070 \pm 70$ rcbp (Beta 81590), suggesting a very early occupation (McAvoy and McAvoy 1997:167). Three additional early dates [$16,670 \pm 730$ rcbp (Beta 97708), $16,940 \pm 50$ rcbp (Beta 128330), and $19,700 \pm 130$ rcbp (Beta 128331)] and two anomalously recent dates of 9250 ± 60 rcbp (Beta 93899) and $10,160 \pm 60$ rcbp (Beta 92923) have also been obtained on charcoal from the pre-Clovis levels (McAvoy et al. 2000). The $16,670 \pm 730$ and $16,940 \pm 50$ rcbp dates are from hearth areas, while the $19,700 \pm 130$ rcbp date is near the base of the dune, below the cultural levels. The overlying Clovis assemblage is well defined, with numerous points and tools, and a hearth-like scatter of Southern pine charcoal from the same level has been radiocarbon dated to $10,920 \pm 250$ rcbp (Beta 81589) (McAvoy and McAvoy 1997:124, 167, 169).

The excavations conducted in both areas of Cactus Hill through 1996 have been superbly documented in a lengthy, well-illustrated monograph (McAvoy and McAvoy 1997), and extensive multidisciplinary follow up work is being conducted to verify the pre-Clovis occupation (McAvoy et al. 2000). The site deposits are comparatively shallow and loosely compacted sands, however, and at least five radiocarbon dates obtained from the Clovis levels ranging from ca. 5285 to 9790 rcbp have been rejected as too late due to "downdrift" (McAvoy and McAvoy 1997:169). The age of the earliest assemblage, at several thousand years before the Clovis occupation, accordingly, must be considered somewhat tentative at present. It is clearly below the Clovis level stratigraphically, however, and as such the Early Triangular point form and associated blade industry appear to be the first well defined pre-Clovis assemblage documented in the region. Given the small assemblage sample sizes and the concerns about the absolute dating, additional research will be necessary to document the nature and true age of this occupation, and whether artifacts associated with it have utility as unambiguous pre-Clovis temporal markers. Even given these caveats, Cactus Hill appears to be the oldest well defined Paleoindian occupation in the region.

Possible fire cracked rock, disarticulated mastodont bones (possibly from butchering and burning), and probable stone and bone tools have recently been reported from the Saltville River valley in southwest Virginia in lake deposits dated from ca. 13,000 to 15,000 rcbp/15,630 to 17,950 B.P.; the results of this work have been admirably summarized in a recent publication (McDonald 2000). The Saltville area has long been known as a rich Late Pleistocene fossil and archaeological locality. In the mid-1940s a fluted point base and three tools of modified mastodon bone and tusk were reportedly found in a bone-bearing bed exposed in a drainage ditch, and by the early 1950s four fluted points were reported from the same general area, three apparently from the same bone deposits (McCary 1951:11; Pickle 1946; Reinhart 1989:158). Extensive excavations have been conducted at Saltville over the past two decades by Jerry N. McDonald (2000), who found a number of possible artifacts during paleontological investigations in a 30 x 20 m excavation area beside the main river channel. Three horizons were recognized, dating from roughly 14,500, 13,900, and 13,000 rcbp/17360, 16675, and 15,630 B.P. (McDonald 2000; see also Goodyear n.d.). Collagen from a fractured and apparently use-worn tibia of a probable musk ox (*Bootherium bombifrons*) was AMS dated to $14,510 \pm 80$ rcbp (Beta 117541) from the lowest level; a second date on wood from the same level is nearly identical, at $14,480 \pm 300$ rcbp (Beta-5701) (McDonald 2000:8, 37-46). Among

the other possible artifacts recovered, where the disarticulated mastodon was found, include a small flat sandstone slab, a possible sandstone ax, a small chert chunk with possible use wear damage, a worn chert flake, and concretions that are inferred to have possibly formed from fat rendering (McDonald 2000:8, 33-34).

The middle horizon at the Saltville site included a cluster of pebbles and cobbles from a small depression, the uppermost stratum of which yielded 12 pieces of microdebitage and some fish bones. Twigs collected from a sand lens from within the block yielded a radiocarbon date of $13,950 \pm 70$ rcbp (Beta 65209); two other dates from the same stratum were similar in age, $13,460 \pm 420$ rcbp (SI-641) on tusk and $13,130 \pm 330$ rcbp (A-2985) on wood (McDonald 2000:8, 33). Seven concretions and one prismatic column of weathered bedrock were also found in a second, mud filled depression, and appeared to have been deliberately placed in an upright position. The latest horizon was a feature in an eroded rill into the middle horizon that contained a midden-like concentration containing over 200 clam shells, over 500 pieces of small vertebrate teeth and bones, and 125 pieces of chert microdebitage, some of which appear to be intentionally produced flakes. McDonald (2000:34-36) suggests that the debris formed by people harvesting shellfish and small animals from the lake during periods of low water. If created by human actions, the site would be the oldest shell midden in the New World. The chert is reported as extra-local, and not something found in other non-cultural riverine deposits in the area, arguing for a cultural origin for some or all of the site assemblage.

At the Topper site (38AL23), located at the **Allendale** County, South Carolina chert quarries, in a 2x2 m test unit opened in 1998, Goodyear (1999b, 2000, n.d., Goodyear et al. 1998) found a small concentration of chert cobbles at a depth of ca. 180 cm below the ground surface, that appeared to represent a Paleoindian cultural feature, possibly a raw material cache. Follow up excavations in 1999 and 2000 encompassed 78 square meters of area, as well as over 100 meters of deep backhoe trenches opened to facilitate geoarchaeological research. A microblade industry characterized by numerous small blades, burins and burin spalls, and microblade and blade cores was found, amid a number of rock clusters, and in one area five circular organic stains that may represent cultural features, possibly post holes.

The upper 100 to 140 cm of the deposits at Topper are colluvial slopewash, and encompass Clovis through historic era remains. Below that are alluvial sands roughly a meter in thickness, where the presumed pre-Clovis industry occurs, that in turn rest on a scoured gray Pleistocene terrace. The geological age and setting of the deposits are currently undergoing extensive examination, to determine when and how the deposits formed. Two dates on humic acids obtained from beneath the gray clay were $19,280 \pm 140$ rcbp (CAMS-59593) and $20,860 \pm 90$ rcbp (CAMS-58432) (Goodyear 1999b:10), while OSL (optically stimulated luminescence) dating yielded dates from ca 13,000 to 14,000 B.P. at the base of the colluvium, and from 15,000 to 16,000 B.P. at the top of the alluvial sand layer. These dates suggest the archaeological remains encountered in the alluvial sands date to at least 13,000 to 14,000 B.P. (immediately pre-Clovis), and possibly between ca. 15,000 B.P. (the age of the upper part of the alluvial sands) and ca. 20,000 rcbp/23,700 B.P. (the age of the deposits below the gray clay). Archaeological fieldwork has been ongoing at the **Allendale quarries** by Goodyear and his colleagues for over 15 years, and is planned for the foreseeable future; detailed publications on the work, however, have yet to appear, and will likely be deferred until the newly discovered possible pre-Clovis deposits have been thoroughly explored. Topper, if verified as pre-Clovis in age, would be an important example of a quarry/occupation property type

A number of other sites also suggest the existence of pre-Clovis occupations in the Southeast, although for the present they remain to be securely dated, yield remains in more ambiguous context, or are incompletely reported. At Coats-Hines (40Wm31), an apparent kill site in Tennessee, 10 chert tools and 24 flakes were found with the remains of a disarticulated mastodon. Butchering marks and other evidence for human modification were observed on a number of bones, and the tip of a bone projectile point was found between the ribs of the mastodon (Breitburg et al. 1996; John Broster: personal communication 2000). A radiocarbon date of $27,050 \pm 200$ rcbp (Beta-80169) was obtained from the base of the deposits, below the cultural level, and a second date, on material from within the dental cusps of the mastodon, was 6530 ± 70 rcbp (Beta-75403) (Breitburg et al. 1996:7). An AMS date on materials from the bone bed yielded a date of $12,030 \pm 40$ rcbp/14,076 B.P. (Beta 125350) (John Broster: personal communication 2000). The tools included a prismatic blade and a bifacial knife-like base, as well as graters and scrapers. A number of other faunal remains were also found, including horse, deer, turkey, muskrat, frog, turtle, and a single first phalanx that may be

from a domestic dog. The age and contemporaneity of the various remains reported as Paleoindian in age will need to be carefully demonstrated, given the location of the site by a small spring, and the great time range suggested by the existing dates for the deposition of the remains. An early kill site, possibly Clovis or even pre-Clovis in age does, however, appears indicated.

Two submerged sites from Florida provide additional evidence for possible pre-Clovis settlement in the Southeast, both possible kill or occupation site areas. Unfortunately, neither yielded remains that could be used to unambiguously date other sites to this time level. At Page-Ladson along the Aucilla River in northwest Florida, a series of radiocarbon dates between ca. 11,770±90 and 13,130±200 rcbp (ca. 13,816 to 15,784 B.P.) were obtained from a stratigraphic level that included a mastodon tusk with possible cut marks at its base, from possible detachment (Dunbar and Webb 1996; Dunbar et al. 1988, 1989; Faught 1996:162; Goodyear 1999a:467-468). At the **Little Salt Spring site**, a wooden spear associated with the remains of a giant tortoise was dated to 12,030±200 rcbp (TX-2636) (Clausen et al. 1979:611). While it was originally suggested that the tortoise had been cooked, reanalysis suggests the charcoal-like staining on several fragments is due to differential oxidation (Dunbar and Webb 1996:351). A bone from the tortoise itself was dated to 13,450±190 rcbp (TX-2635), suggesting the association between the tortoise and the spear may be equivocal (Clausen et al. 1979:611). Worked bone and ivory from extinct animals has been found at a number of locations in Florida (Dunbar 1991; Dunbar and Webb 1996; Webb et al. 1984, n.d.). When worked fresh or green, such finds unambiguously indicate a Pleistocene occupation, although absolute dating is still essential to determine exactly when in the Paleoindian era they were made. Dense concentrations of worked bone or ivory might indicate a special purpose quarry/resource extraction area.

Although just outside of the Southeast as defined here, a final possible pre-Clovis site, Big Eddy in Missouri, is currently undergoing excavation and may provide important information on pre-Clovis occupation in the general region. The 1997 and 1999 excavations at the site have been superbly documented in two monographs (Lopinot et al., eds., 1998, 2000). A remarkably complete stratified Paleoindian sequence was found that spans the entire continuum from Clovis through the Early Archaic. Below this, a number of unequivocal flakes (n=10) and a possible anvil stone were found (Ray and Lopinot 2000; Lopinot et al., eds., 1998, 2000). An extensive series of radiocarbon dates place these materials between ca. 12,000 and 13,000 rcbp (Hajic et al., eds., 2000:31; Lopinot et al., eds., 1998, 2000). The detailed reporting for this project, like that at Cactus Hill, serve as models for the rest of the profession.

Other sites provide less secure information about pre-Clovis Paleoindian occupations in the Southeast, or else remain to be fully published and hence evaluated. The Southeast has had its share of claims for putative pre-projectile point stone tool assemblages, invariably inferred to have great antiquity, well before Clovis occupations. The best documented presumed early lithic assemblage in the Southeast is from Alabama, the Lively (1965a, 1965b) pebble tool complex, named after its discoverer. These artifacts are now recognized as expedient cores and tools formed during initial lithic reduction activities, and most are now known to date to the Archaic or Woodland periods (Futato 1996:301; Steponaitis 1986:368).

Clovis and Related Assemblages and Diagnostics in the Southeast

Large numbers of Clovis sites and isolated finds have been found in the Southeast. There is some evidence that fluted point technology may have originated fairly early in the region, perhaps before 11,500 rcbp/13,450 B.P. Within the Southeast proper, dates for fluted points have been reported from the Johnson and Cactus Hill sites, although only the date from Cactus Hill falls within the range expected from the western half of the country, from between ca. 11,200 and 10,900 rcbp/13,150 to 12,900 B.P. (e.g., Haynes 1992, 1993; Stanford [1999:289] expands this range to between 11,500 to 10,900 rcbp/13,450 to 12,900 B.P.). Dates on fluted points resembling classic Clovis forms that fall within the traditionally accepted temporal range for the type, however, have been found at several sites just outside the boundaries of the Southeast as defined in this study, and include those from the Big Eddy (Hajic et al. 2000:31; Lopinot et al., eds., 1998, 2000; Ray et al. 1998:77, 80) and **Kimmswick** (Graham et al. 1982) sites in Missouri. Somewhat earlier dates, in the vicinity of 10,500 to 10,600 rcbp, have been reported from the Aubrey site in Texas (Ferring 1995).

At the Carson-Conn-Short (40BN190) site in Tennessee, a large number of Clovis and later Paleoindian points, together with a wide variety of tool forms, including large prismatic blades and polyhedral blade cores, formal unifaces, and bifaces, have been found on the surface and at depths of

up to 70 cm over a wide area (Broster and Norton 1993, 1996; Broster et al. 1994, 1996; Nami et al. 1996). Features that have been recognized include tight scatters of artifacts as well as deflated hearths and pits, some of which appear to derive from the intentional thermal alteration of local cherts. While the vast majority of the projectile point assemblage appears to be Clovis, a few presumably later Cumberland points have also been found. The blades and blade cores are exceptional in size, and represent one of the most dramatic Paleoindian blade assemblages ever recovered.

Another site suggesting a possible early starting date for fluted points is Johnson near Nashville, where deeply buried hearths with associated fluted preforms yielded dates of 11,700±980 (TX-7000), 11,980±110 (TX-7454), and 12,660±970 rcbp (TX-6999) (Broster and Barker 1992; Broster and Norton 1992:266, 1996:292-294; Broster et al.1991; see also Goodyear 1999a:448-449). Two of the three dates from the site have such large standard deviations as to preclude their use for dating the onset of fluted point technology, although with the third, and taken collectively, they suggest a possible starting point some time around or just after 12,000 rcbp/14,000 B.P. Early Archaic features and materials are present in the deposits overlying the Paleoindian remains, however, and the authors indicate that further corroboration of the dating is in order (Broster and Norton 1996:294).

Other sites that suggest an early onset for fluting technology include Big Eddy and Aubrey. At the Big Eddy site in Missouri, although just outside of the Southeast as defined here, a date of 11,900±80 rcbp was obtained from a level containing a Clovis assemblage, although six of the seven other dates from the same deposits ranged from ca. 11,400 and 10,700 rcbp/13,400 to 12,850 B.P., closer to the expected range for Clovis (Hajic et al. 2000:31; Lopinot et al., eds., 1998, 2000 Ray et al. 1998; the "outlying" date was 10,265±85). Additional evidence for an early initiation of Clovis technology comes from the Aubrey site north of Dallas, Texas, where two dates of 11,540±110 and 11,590±90 rcbp have been reported (Ferring 1995; Stanford 1999:291). All of these suggest Clovis could have originated around or just after 12,000 rcbp/14,000 B.P.

Terminal Paleoindian Assemblages and Diagnostics in the Southeast

Large numbers of Paleoindian sites postdating 10,500 rcbp/12,500 B.P. are documented from across the Southeast. Although quantification has not been attempted beyond the locality scale, the numbers of diagnostic artifacts reported are orders of magnitude greater than exist for Clovis and related fluted forms (Anderson1990a:199). Some terminal Paleoindian point forms, such as Dalton or early side-notched, in fact, are so common that they are not systematically recorded in most state artifact recording projects. Appreciable variability is evident in these projectile point forms, and a number of discrete Dalton and side notched types or varieties have been recognized that have restricted temporal or spatial distributions (Anderson et al.1996:15; Morse 1997a, b) ([Figure 2](#)). Specific diagnostics used to identify components that date to the interval from ca. 10,500 to 10,000 rcbp/12,500 to 11,450 B.P. are discussed in turn.

The Cumberland point, common in the Mid-South, is a distinctive waisted lanceolate with a narrow, recurved blade, an expanded base with pronounced ears and a slightly to deeply indented base, fine marginal retouch, and long flutes that run the length of the blade (Breitburg and Broster 1995; Lewis 1954:7). An age of from ca. 10,900 to 10,500 rcbp/12,950 to 12,500 B.P. or slightly later is inferred, given the resemblance to western Folsom points, which are assumed to be a related manufacturing tradition. A small fluted form, some of which may actually be extensively resharpened Clovis points, has been reported in Georgia and South Carolina, and has been provisionally called the Clovis Variant (Anderson et al. 1990:6; Michie 1977:62-65). The chronological placement of this type is unknown but, based on its resemblance to Clovis, it is assumed to be either contemporary or slightly later in age.

In north central Florida and immediately adjoining areas, two seemingly closely related point forms are found that are assumed to date to this interval, the Simpson and Suwannee types (Bullen 1975). Both are large waisted lanceolate points with broad recurved blades and narrow, straight to slightly expanding stems, a concave base, and faint-to-pronounced ears. Separating these forms is exceedingly difficult, since the type descriptions and illustrated specimens exhibit appreciable morphological overlap, with some of the separation apparently based on subtle differences in haft morphology and resharpening (Bullen 1958, 1962, 1975:55-56; Daniel and Wisenbaker 1987:53; Goodyear et al. 1983; Simpson 1948:11-15). While basal thinning has been reported for both forms, Suwannees apparently also exhibit lateral marginal thinning in basal areas on some specimens

(Goodyear et al. 1983:46). Because of this ambiguity, some investigators refer to these forms as "Suwannee/Simpson" while in the Georgia fluted point survey, the type Simpson was used to refer to fluted and Suwannee to nonfluted waisted and eared lanceolate points otherwise meeting the type Criteria (Anderson et al. 1990:8). The presence of basal thinning and even occasional true fluting on some Simpson/Suwannee-like forms suggests an appearance some time around or shortly after 10,800 rcbp/12,900 B.P., contemporary with late Clovis or appearing soon thereafter. A long temporal occurrence, however, is also indicated by stratigraphic evidence from sites such as Harney Flats, Silver Springs, and Wakulla Springs Lodge, that suggests these types continued until they were replaced by side notched forms, which are thought to appear ca. 10,200 rcbp/11,850 B.P. (Daniel and Wisenbaker 1987:37-40; Goodyear 1999a:465-467; Jones and Tesar 2000; Neill 1958). The near complete absence of Dalton points in Florida, furthermore, has led researchers to speculate that Suwannee/Simpsons are representative of a contemporaneous subregional variant, or even a somewhat distinct cultural tradition (e.g., Anderson 1990a, 1995a; Dunbar 1991). Accordingly, Suwannee/Simpson point manufacture may be a distinctive, thousand or more year tradition of point manufacture in the Florida area. Stanford (1991:9), in fact, thinks they may be contemporary with or older than Clovis. Resolving possible chronologically sensitive variation within this tradition should be a subject for future research.

Another apparent subregional terminal Paleoindian projectile point variant is the Beaver Lake type, a distinctive waisted lanceolate with a recurved blade, an expanded base with weak to pronounced ears and a slight to deeply indented base, slight to extensive basal thinning on some specimens, and fine marginal retouch (Cambron and Hulse 1964:9; DeJarnette et al. 1962:47, 84; Justice 1987:35-36). Many specimens appear to be unfluted Cumberland points, and the type has a similar center of apparent popularity in the Mid South from northern Alabama through Kentucky, although Beaver Lake points appear at least occasionally over a much broader area, in the eastern and central Southeast. The age of the type is currently unknown, although like Cumberland it is thought to have appeared soon after Clovis ended, ca. 10,800 rcbp/12,900 B.P. Another form, the Quad point, is a waisted lanceolate essentially identical to the Beaver Lake points in most respects, save for the presence of more pronounced, large lobed ears, and a fairly deep basal concavity (Cambron and Hulse 1964:98; Justice 1987:35-36; Perino 1985:310; Soday 1954:9). Some Quads exhibit pronounced basal thinning, sometimes to the point of appearing fluted. Whether Quad and Beaver Lake points are contemporaneous with Cumberland or later in time is unknown, although the presence of basal thinning rather than fluting suggests some or all of these forms may be later in time. Many Quad and Beaver Lake points, particularly the latter specimens, would probably be classified as Suwannee/Simpson if found in Florida.

The terminal Paleoindian point form that occurs most widely over the Southeast is the Dalton, with subregional morphological variants found everywhere save perhaps parts of Florida. Dalton points are lanceolates with straight to slightly excurvate lateral margins on the blade, sometimes with serrations and beveling; straight to slightly expanding bases with slight to more typically deeply indented bases that may be fluted, basally thinned, or simply retouched; and weak to pronounced shoulders with well ground basal and lateral margins (Bradley 1997; Chapman 1948:138; Goodyear 1974; Justice 1987:35-44; Perino 1985:97). Some exhibit evidence for extensive resharpening, and extreme cases may have pronounced bevels and incurvate blade edges, and may resemble drills. Distinct morphological variants have been recognized in a number of parts of the Southeast, such as Breckenridge, Colbert, Greenbrier, Hardaway, Nucholls, and some of the varieties of San Patrice (i.e., vars. Hope and St. Johns) (Ensor 1987; Goodyear 1974, 1999a:440-41; Morse 1973, 1997a, 1997b).

Dalton points are common across the Southeast, and in some areas are found in numbers an order of magnitude or more greater than the point types that presumably preceded them (Anderson 1990a:199). Distributions have never been examined at a large scale, however, to see where distinctive variants and point concentrations occur on the regional landscape, although excellent distributional analyses, employing hundreds of sites, have been conducted in the central Mississippi Valley and particularly in northeast Arkansas (e.g., Gillam 1996a, 1996b, 1999; Morse 1971b, 1973, 1975a, 1975b, 1977; Redfield 1971; Schiffer 1975a, 1975b). Detailed attribute based analyses using large samples of points from across the region should be able to resolve the existence, similarities and differences, and spatial occurrences of morphologically distinct forms, which perhaps should be classified as subregional variants or varieties.

Dalton forms appear to have a long temporal occurrence in the Southeast. Goodyear (1982;

1999a:440-441) argued for a range of from ca. 10,500-9900 rcbp (ca.12,500-11,250 B.P.) for Dalton, based on an inspection of radiocarbon dates, stratigraphic occurrence, and associations. The radiocarbon plateau that occurs in this interval means that as many as 2250 calendar years are actually represented. This is quite a long time, which might explain the appreciable diversification in morphology that is observed, probably as populations became increasingly localized (see also Ellis et al. 1998:159). Some Dalton points are characterized by true fluting, others have pronounced basal thinning scars, and still others exhibit little more than fine retouch of the basal margins. It is tempting to suggest that the fluted Daltons are earlier than basally thinned forms, which in turn are older than unfluted forms. Both fluted and unfluted Dalton points were found at the Sloan (3GE94) site in northeastern Arkansas (Bradley 1997; Morse 1975a; Morse, ed., 1997), however, suggesting an overlap of thinning strategies occurred, and that any such trends may be more apparent at the assemblage or regional level, than at the level of individual artifacts.

Given the presence of true fluting on some northeast Arkansas Dalton points, and a paucity of intermediate types, it is possible that Dalton evolved directly out of Clovis in the central Mississippi River valley. If so, the starting date for this form may have to be pushed back, perhaps to 10,800 rcbp/12,900 B.P. or so, at least in this area. Located along the continent's greatest river system, in an area that was almost certainly fabulously rich in exploitable natural resources, the central Mississippi River valley likely would have been settled quite early in the colonization process, and would have been an area of impressive population growth and technological innovation. Over 1000 Dalton sites have been found in this area, together with evidence for an elaborate interaction network stretching for several hundred kilometers along the river, demarcated archaeologically by ceremonial Sloan "long blades" (Gillam 1996b; Morse 1997; Walthall and Koldehoff 1998). Like the Florida Suwannee/Simpson types, Dalton points, at least in some areas, may have existed for a long time.

Toward the end of the Paleoindian era, side-notched points occur widely over the Southeast. These have been variously described, with named types including Bolen in the Florida area (Neill 1963:99), Early Side Notched in the Tennessee River Valley of northern Alabama (Driskell 1994, 1996), Hardaway Side-Notched in North Carolina (Coe 1964:67), Kessel Side-Notched in the West Virginia area (Broyles 1966), San Patrice vars. St. Johns and Dixon in the Louisiana and southern Arkansas area (Duffield 1963; Thomas et al. 1993a:35-36), and Taylor in South Carolina (Michie 1966:123). A range of from ca. 10,000 to 9000 rcbp/11,450 to 10,200 B.P. is traditionally assigned these forms, although there are indications that they may appear somewhat earlier, around ca. 10,200 rcbp/11,850 B.P., based on dates in this time range obtained at Page Ladson, Florida and Dust Cave (1LU496), Alabama (Chapman 1985:146-147; Driskell 1994:25-26, 1996; Dunbar et al. 1988; Driskell, however, believes the side-notched forms postdate 10,000 rcbp/11,450 B.P. at Dust Cave, with the points in earlier strata intrusive). An early appearance is also suggested by the association of Bolen and Suwannee points at Harney Flats in Florida, although the cooccurrence is thought due to the presence of a stabilized land surface and, hence, compressed or conflated stratigraphy (Daniel and Wisenbaker 1987:37-40). Individual side-notched points found in surface or mixed excavation contexts in the Southeast cannot be unequivocally placed in a Paleoindian or Early Archaic time level, however, since side-notched points also occur later in time in a number of parts of the region, in particular during the Middle Archaic period in the case of the Big Sandy type in the Mid South (Kneberg 1956:25; Perino 1985:36), the Cache River Side-Notched type in eastern Arkansas (Cloud 1969:119; Morse and Morse 1983:110), and the Godar type in Illinois (Perino 1963:95). Hafted unifacial tool forms that appear to be contemporaneous with these early side-notched forms include Edgefield scrapers (Michie 1968a, 1972) and Albany scrapers (Webb 1946).

San Patrice varieties found in the Louisiana-southern Arkansas-east Texas area reflect the evolutionary continuum observed elsewhere in the Southeast, from lanceolate Dalton-like forms to side- and then corner-notched forms of the Big Sandy/Bolen and Palmer/Kirk clusters. Thus, San Patrice var. Hope is clearly a local Dalton equivalent, while var. St. Johns, var. Dixon, and var. Keithville represent later side- and corner-notched forms within the same cultural tradition. Points designated San Patrice are common in east Texas (Prewitt 1995:128), Louisiana, and contiguous portions of Arkansas and Mississippi. San Patrice var. Hope points are lanceolates with deeply indented bases and weak shoulders and (in some cases) side-notching and/or extensive resharpening of the blade area (Duffield 1963). In all but the most early-stage specimens, the shoulders are the widest part of the artifact. Basal and lateral margins are ground, and the base may exhibit thinning resembling fluting on some specimens. The variety appears closely related to classic Dalton points from the central Mississippi Valley (Ensor 1987; Morse 1973; Morse and Morse 1983). At the Big

Eddy site in Missouri, a San Patrice var. Hope point is associated with a date of $10,185 \pm 75$ rcbp (AA-26653) (Ray et al. 1988:77; see also Lopinot et al., eds., 1998, 2000). San Patrice var. St. Johns and classic Dalton points were also found in this stratum, which yielded dates from general level fill of 9450 ± 61 , $10,400 \pm 75$, $10,340 \pm 100$, $10,430 \pm 70$, and $10,336 \pm 110$ rcbp (Hajic et al. 2000:31; Lopinot et al., eds., 1998, 2000).

San Patrice var. St. Johns points have more varied, flat to indented basal morphology, and pronounced side- to corner-hafting notches; with extensive resharpening and basal attrition these notches increasingly resemble corner-notched forms (Duffield 1963). An additional side notched San Patrice variety, var. Dixon, has recently been proposed, characterized by pronounced side-notches, and replacing the type Edgewood var. Dixon (Thomas and et al. 1993a:35-36). A fourth San Patrice variety, var. Keithville, is characterized by a straight base and corner-notching rather than side-notching (Duffield 1963; Thomas et al. 1993b:46; Webb et al. 1971). Neither the side-notched var. Dixon nor the corner-notched var. Keithville forms exhibit evidence for pronounced basal thinning resembling fluting, something more commonly observed on the presumably earlier Hope and St. Johns varieties. San Patrice are assumed to be contemporaneous with Dalton and initial Holocene side and corner-notched horizons, with an estimated span of from ca. 10,800 to 9000 rcbp/12,900 to 10,200 B.P. San Patrice var. Hope is assumed to be earlier (probably pre-10,000 rcbp) and vars. St. Johns, Dixon, and Keithville later (post 10,200 rcbp/11,850 B.P.), reflecting an evolution from lanceolate to first side- and then corner-notched forms.

Finally, in the western part of both the Southeast and the lower Midwest, lanceolate projectile points occur in low incidence that resemble classic Great Plains Paleoindian fluted and Plano-like forms, such as Folsom, Scottsbluff, Midland, Agate Basin, and Angostura. These artifacts indicate movement or interaction occurred between these two regions, although the nature of this behavior is not well understood at present (Anderson 1995a; L. Johnson 1989; Munson 1990; Wykoff and Bartlett 1995). Folsom points occur in small numbers east of the Mississippi River (Munson 1990), and are usually described using that type name, although some are reported using local names, such as the Sedgwick type in northeast Arkansas (Morse and Morse 1983:63; Gillam 1996a:406). Folsom points are, however, extremely rare to the east of the Mississippi River, with no more than a few dozen specimens known. In some places where they are present, such as in western Illinois, their distribution appears to parallel the occurrence of Late Pleistocene grasslands, suggesting they represent an eastern extension of their inferred Plains adaptation (Munson 1990). When Plains tradition forms are found in the East they are assumed to have the same age as those in the West. Care must be taken when identifying these types, however, since some "Plano" forms found in the East are actually early stage manufacturing rejects of common fluted or unfluted forms, or else later forms like the Guilford Lanceolate or Brier Creek Lanceolate types (Coe 1964:43; Michie 1968b).

Occasionally, however, finished-looking Plano-like forms are found much further to the east, such as at the Smith Mountain site (44PY154) in Virginia, where a quartz unfluted lanceolate point described as "Plano-like" was found at a depth of three meters below the surface, in the Roanoke River floodplain (Childress and Blanton 1997; Goodyear 1999a:451). An AMS date of $10,150 \pm 70$ rcbp (Beta 93017) was obtained from charcoal found in the same 2.5 cm vertical level and 50 cm horizontally from the base of the point (Childress and Blanton 1997:12).

Resource Distribution: Caches

Paleoindian ceremonial artifact caches are extremely rare in the Southeast. The largest and most unusual example, without question, is the Sloan site in northeast Arkansas, a Dalton cemetery (Morse, ed., 1997). At Sloan, artifacts were found in shallow deposits in an area about 14 by 14 meters in extent on a sand dune. Were it not for the presence of the human bone fragments, Sloan might have been interpreted as an example of spectacular caching behavior. The tools included a wide range of utilitarian items such as points, preforms, adzes, scrapers, and abraders, as well as a few unusually elaborate oversized bifaces that have come to be known as Sloan points (Perino 1985:356). Most of the points and other tools found at Sloan were well made and buried in mint condition, with working edges that were either freshly resharpened or unused (Gaertner 1994; Yerkes and Gaertner 1997:69-71). The artifacts and bone fragments at Sloan cluster in such a way as to suggest the presence of two to three dozen burials. This in turn implies that a formal marked cemetery was present and was in use for a fairly long time.

The Hawkins Cache, also from northeast Arkansas, was a single cluster of 40 Dalton tools, including 18 points, 11 preforms, 2 grooved abraders, 3 adzes, 3 utilized flakes, 1 chisel, 1 end

scraper, and 1 backed blade. These artifacts were found by an avocational archaeologist, who said they came from an area under a square meter in extent amid a much larger Dalton site scatter that was interpreted as a base camp (3LW89) (Morse 1971a:19). No human remains were found in association, although their preservation was considered unlikely due to high local soil acidity. The assemblage, which was described in detail by Morse (1971a), was considered to be a man's toolkit used for a variety of tasks, including hunting, butchering, and the working of wood and bone. Whether Hawkins was a ceremonial burial cache or utilitarian cache will probably never be known. Morse (1997a:2) later noted that the context of the find was probably inaccurately reported to him at the time, and speculated that the cache may have actually come from a burial site like Sloan. A possible candidate site, 3LW505, had, in fact, been looted about this time nearby. The Hawkins cache materials resemble some of the artifact clusters found at Sloan and may well have come from one or more burials. Given the ambiguous nature of its recovery, had tiny bone fragments like those found at Sloan been present, they may not have been noted or recovered.

A number of other Dalton caches have been found in the Central Mississippi Valley, in an area extending some 700 km from northeast Arkansas to south central Illinois. The scattered occurrence of Sloan points over this area, in caches and as well as isolated finds, many of them made on Burlington chert from the Crescent Quarries near the Missouri-Mississippi confluence, has been used to infer the existence and extent of a possible Late Paleoindian prehistoric ceremonial and alliance network (Walthall and Koldehoff 1998). The existence of adzes in Dalton toolkits has long been thought to reflect appreciable woodworking skills, including for the manufacture of dugout canoes (Morse and Goodyear 1973), and watercraft are inferred to have been the way these groups were linked together (Walthall and Koldehoff 1998:261; see also Engelbrecht and Seyfort 1994 and Jodry 1999 for discussions of the evidence for the probable use of watercraft by Paleoindian populations). An analysis of edge wear on Dalton adzes from Sloan indicates that these tools were likely used to work charred wood (Yerkes and Gaertner 1997:63-66).

Utilitarian caches of raw material and tools have been described previously, and appear to have been fairly common on Clovis and later, post-Clovis Paleoindian sites. The Adams mastodon site (15Hr18) in Kentucky is one possible candidate for a submerged meat cache (Walters 1988). At this site, the disarticulated remains of an adult animal were found in pond deposits, together with a number of limestone rocks. A number of the bones exhibited cut marks, and it is possible that the rocks were used to help keep the remains submerged.

Resource Distribution: Kill Sites and Bone Beds

Paleoindian sites yielding paleosubsistence remains are comparatively rare in the Southeast, although increasing effort is being directed to their detection and careful analysis (Goodyear 1999a:444-445). Evidence for the exploitation of megafauna has been found at a number of locations across the region, indicating some level of predation did occur. Mastodon butchery has been reported from the Coats-Hines site in Tennessee (Breitburg et al. 1996) and butchering or other tooling marks on mammoth bones, as well as finished points, foreshafts, and other objects carved from green bone or ivory, have been found at several locations in Florida (Bullen et al. 1970; Dunbar and Webb 1996). A possible mammoth kill site has been reported from the Silver Springs Run, although whether a projectile point found with the partially disarticulated bones was actually associated with them has been considered problematic given the location of the find, in a submerged stream channel (Hoffman 1983; Rayl 1974). At Sloth Hole along the Aucilla River, a possible association between Clovis and mastodon has recently been documented; work at this site and with materials from it is ongoing (Hemmings 1998). Immediately beyond the boundaries of the Southeast, a mastodon kill site has been reported at **Kimmswick** in Missouri (Graham et al. 1981), and mastodon butchery has been inferred at Martin's Creek in Ohio (Brush and Smith 1994). An elephant rib with possible cut marks has been reported from Edisto Beach, South Carolina, where it probably washed up from offshore deposits (Goodyear et al. 1990:8-9). A *Bison antiquus* skull with an apparent stone point fragment broken off in its forehead was found in the Wacissa River, providing just about the clearest association between humans and extinct fauna possible (Webb et al. 1984). Finally, at **Little Salt Spring** in Florida, a giant land tortoise (*Geochelone crassiscutata*) was found that appeared to have been speared with a wooden stake (Clausen et al. 1979:609-610), although the dark staining on the shell that the authors attributed to cooking has since been shown to be due to differential oxidation (Dunbar and Webb 1996:352). Late Pleistocene faunal remains have been found in a number of areas, such as at **Big Bone Lick**, Kentucky (Tankersley 1985, 1990a), and care must always be taken when exploring paleontological deposits of this age to be on the lookout for possible human activity (Breitburg and Broster 1994; Michie 1977; Williams and

Stoltman 1965).

The least ambiguous southeastern "kill" site comes from the Wacissa River, where a *Bison antiquus* skull was found with an apparent projectile point fragment embedded in the frontal bone (Webb et al. 1984). Whether the animal actually died of this wound and was consumed by Paleoindians is unknown, but the association is unequivocal, and certainly indicates the species was targeted. The disarticulated remains of a young male mastodon were found at the Coats-Hines site in western Tennessee, together with a number of stone tools. The materials are in former pond/stream deposits, yet the presence of stone tools suggests it was not a submerged meat cache but a butchering area. Bones or teeth from a number of other species are reported from the same deposits, including:

horse (*Equus spp.*) teeth, deer (*Odocoileus sp.*) antler, muskrat (*Ondatra zibethicus*) humerus and metapodial, dog-sized (*Canis sp.*) first phalanx, turkey (*Meleagris gallopavo*) phalanx, frog (*Rana sp.*) humeri, painted turtle (*Chrysemys cf. picta*) plastron, and carapace and plastron fragments of indeterminate semiaquatic turtles (Breitburg et al. 1996:6).

If these species can be shown to have been exploited by the Paleoindian people who dismembered the mastodon, this site may provide some of the first evidence for a diversified Clovis age (or earlier) Paleoindian subsistence strategy in the Southeast. Equally important, the remains suggest the presence of domestic dog and the hunting of white-tailed deer, aspects of life well documented in subsequent periods. Dunbar and Webb (1996:351-352), in contrast, note that evidence for the use of white-tailed deer in Florida does not proliferate until after the megafaunal extinctions, although they also take care to point out that the presence of a possible mammoth bone digging stick suggests these people were likely generalized foragers.

Florida's rivers and springs have produced numerous examples of tools made on green bone and ivory from now-extinct Late Pleistocene animals, points and foreshafts, anvils, abraders, awls, and digging tools, providing additional evidence for hunting or scavenging (Dunbar and Webb 1996). Ostensible butchering/cut marks on bones from extinct species are fairly common in Florida, although many specimens remain to be professionally described (Bullen et al. 1970; Dunbar and Webb 1996:351). Similar remains may be present in submerged contexts in other parts of the region.

The giant land tortoise (*Geochelone crassiscutata*) found in **Little Salt Spring**, if actually speared, would clearly be a Paleoindian kill site; another example of this species that is thought to have been intentionally killed was found in the Hillsborough River (Clayton 1981; Dunbar and Webb 1996:352). The **Little Salt Spring** specimen was found on a ledge in direct association with the remains of numerous other extinct and modern fauna, including ground sloth, bison, rabbit, rattlesnake, wood ibis, freshwater turtles, land tortoise, and an immature elephant (Clausen et al. 1979:610). Later Paleoindian and Early Archaic occupations at the site, dated to ca. 9000 to 10,000 rcbp/10,200 to 11,450 B.P., reportedly yielded the remains of white-tailed deer and other game. How many of these remains may represent animals that fell into the sinkhole and were trapped there, rather than hunted and processed by local populations, is unknown. The Late Paleoindian assemblage at **Little Salt Spring** also included a "nonreturning oak boomerang" as well as "a socketed antler projectile point with the tip of the dart shaft still in its base and the basal portion of a carved oak mortar" (Clausen et al. 1979:611; the mortar was dated to 9080±250 rcbp [TX-2594]). A variety of implements were apparently used to kill game, and fairly extensive plant processing would also appear indicated given the presence of the carved wooden mortar. Numerous crudely sharpened stakes or pins were found driven into the ground near the edge of the drop off to the lower part of the sinkhole; two were dated, yielding determinations of 9645±160 rcbp (I-6460) and 9500±120 rcbp (TX-2460) (Clausen et al. 1979:611). The function of these stakes is unknown, although use as a barrier or a tie-off point for raising water from the cenote has been suggested (Clausen et al. 1975a:31). The investigations at **Little Salt Spring**, like those at **Warm Mineral Springs**, have not been reported in detail, rendering interpretation difficult.

At **Big Bone Lick** in Kentucky, three Clovis points were found together with a number of mastodon teeth and bones in the early years of the nineteenth century, but whether they were directly associated is unknown (Tankersley 1985:28, 1990a:74). Other Late Pleistocene fossil localities in the Southeast have also yielded evidence of possible associations between humans and Late Pleistocene fauna, such as at Yarbrough Cave, Georgia, where a stone tool was found amid animal bones (Elliott and Martin 1991). All such sites should be carefully examined by both archaeologists

and paleontologists.

One of the most remarkable assemblages of Late Pleistocene flora and fauna, some of which are directly associated with human remains, occurs in the Aucilla River basin of northern Florida. For the past two decades a multidisciplinary team of researchers under the overall direction of James Dunbar and David Webb (1996; Dunbar 1991; Dunbar et al. 1988, 1989; Goodyear 1999a:467-468; Hemmings 1998) have been examining a number of submerged locations along this drainage. The Page-Ladson site is currently the best known and reported, although excavations have occurred at a number of other localities as well, research popularly reported for over a decade in an extensive annual newsletter put out by the research team, The Aucilla River Times. The Page-Ladson excavations as well as the Dust Cave excavations in northwest Alabama have made use of extensive fine screen and flotation work, directed to the recovery of paleosubsistence remains (Dunbar et al. 1988; Goldman-Finn and Driskell 1994; Peres 1997; Peres and Carter 1999; Walker 1997, 2000). Detailed technical monographs describing the work at both localities are currently in preparation, and should provide new insight into the collection and interpretation of Paleoindian paleosubsistence remains in the Southeast. Care must, of course, always be taken to recognize and collect paleosubsistence information whenever sites of this time period are examined in the region.

Resource Distribution: Human Burials

Few human burials of unequivocal Paleoindian age have been found in the Southeast. The Sloan site in northeast Arkansas, however, appears to be the earliest formal cemetery currently known in the New World. Sloan consisted of several hundred finished stone tools and almost 200 tiny weathered fragments of human bone in a series of discrete clusters that appear to be grave lots, although given the nature of the surviving bone it is impossible to determine whether single or multiple inhumations were present in any one grave or, given the absence of burial pit outlines, whether there were burials without associated grave goods. The identification of the clusters themselves, although based on statistical analyses and supporting the excavator's impressions, will doubtless be subject to appreciable testing, speculation, and possibly refinement in the years to come, as the authors themselves admit (Morse et al. 1997:91). A large presumed Dalton habitation site some 1.5 km away is suggested as having been the likely location "where the people buried at Sloan lived" (Morse 1997:127). It is not known why the Sloan cemetery was located well away from the likely habitation area, nor can we say whether Dalton burials are likely to be found in habitation sites. Given the problems with its discovery, unfortunately, the Hawkins cache cannot help us in this regard. The contexts of other Dalton caches need to be carefully explored for the presence of burials (Walthall and Koldehoff 1998). Submerged human burials of terminal Paleoindian/initial Early Archaic age were reported at **Warm Mineral Springs** in Florida, but few details were provided and the site remains only minimally reported (Clausen et al. 1979); as noted previously, whether these remains even reflect intentional interment is debatable.

Resource Distribution: Rock Art and other Petroglyphic or Pictographic Representations

No examples are known from the Southeast.

Resource Distribution: Quarries and Workshops

Large numbers of quarry/workshop sites or districts are known from the Southeast, and many are also occupation loci, as discussed below. Among the best known quarry/workshop sites in the region are the **Allendale quarries** in South Carolina (Goodyear 1992, 1999a:458-462; Goodyear and Charles 1984; Goodyear et al. 1985); Carson-Conn-Short in Tennessee (Broster and Norton 1993, 1996; Broster et al. 1994, 1996; Nami et al. 1996); the **Flint Run Complex** in Virginia, including the Fifty, Rudacil, and **Thunderbird** sites (Carr 1985; Gardner 1974, 1977; Walker 1974); **Hardaway** in North Carolina (Coe 1964; Daniel 1998); the Little River Site Complex in Kentucky, including the Adams, Boyd, Ezell, and Roeder sites (Freeman et al. 1996; Gramly and Yahnig 1991; Sanders 1988, 1990); Wells Creek Crater in Tennessee (Dragoo 1973); Theriault in Georgia (Brockington 1971); and the Nottoway River/ **Williamson site** area in Virginia (McAvoy 1992; McCary 1951, 1991; Peck 1985). Some of these properties are quite extensive, with evidence for the occurrence of distinct or overlapping activities at a number of locations.

The first detailed exploration of assemblage variation in a quarry area in the Southeast was Gardner's (1974; 1977:258-259, 1983, 1989) examination of the **Flint Run** Paleoindian Complex in northern Virginia. A series of sites were found along both sides of the South Fork of the Shenandoah River, at or in close proximity to major jasper outcrops, and to one another. Three major site types

were identified: quarries, where initial mining and reduction occurred, right at the source of the material; quarry workshop/reduction sites, located at or a short distance away from the source, where further reduction occurred to prepare material for transport; and quarry-related base camps, where the groups exploiting the quarries stayed, and where a wide range of activities occurred. Within the complex, Rudacil (44WR5) and *Thunderbird* both appear to have been base camps where appreciable reduction activity, characteristic of a workshop, also occurred (Gardner 1974; Walker 1974). The research prompted the idea that Paleoindian occupations in the Southeast were in large measure tethered to lithic raw material sources, with range mobility greatly shaped by the need to return to these sources periodically (Gardner 1977, 1983, 1989). This position has been widely adopted although, as we shall see in the discussion of occupations below, some of the inferences derived from it, namely that occupation sites away from quarry areas tend to be small, have not proven correct. The **Flint Run Complex** research, however, also convincingly demonstrated that assemblages could vary greatly at quarry areas, something that subsequent investigators have explored in detail in other parts of the Southeast.

An extended, multiyear research program at the **Allendale chert quarries** in South Carolina, for example, has shown that assemblage composition can vary markedly depending on fairly subtle variation in topography and local raw material quality (Goodyear 1992, 1999a, 1999b, 2000, n.d.; Goodyear and Charles 1984; Goodyear et al. 1985). Paleoindian populations apparently focused on chert boulders freshly exposed in stream beds rather than on more weathered materials on nearby hillsides. Differences of no more than a few meters vertical elevation and a few tens of meters horizontal distance appear to separate Paleoindian period quarrying, workshop, and possible habitation areas within the locality. The research has also shown that some extensively exploited channel raw material sources are now submerged, due to sea level rise and a reduction in stream gradients. Other cultural deposits and chert cobbles and boulders were buried at appreciable depths under colluvial sediments washed down from nearby hillsides. Thus, while quarry/workshop localities are traditionally perceived as being highly visible, care must be taken to ensure that a representative sample of what is actually present is recognized and collected.

Studies of Paleoindian assemblages taken collectively, employing data from multiple sites at and up to appreciable distances from quarries, have begun to occur in various regions in recent years, and have proven to be extremely important to our understanding of raw material use and, hence, technological organization, settlement, and mobility strategies (e.g., Morrow 1996a; Tankersley 1989, 1990b, 1991, 1994, 1998; Tankersley and Morrow 1993). Perhaps the finest example of this kind of research conducted to date in the Southeast is that by McAvoy (1992) in southern Virginia, in the vicinity of the Nottoway River and its tributaries. Using extensive and well controlled surface and excavation data from over 100 sites, including the well known **Williamson site**, the author advanced a series of detailed observations about culture change over time, differing site types, differing activities that occurred on these sites, patterns of settlement movement within the study locality, and possible group territories/ranges in the larger region of southern Virginia and northern North Carolina. The importance of this study lies in its extensive presentation of primary data, its use of well documented avocational collections for serious research, and in highlighting the variability in local Paleoindian site assemblages. Ten different Clovis site types were identified (McAvoy 1992:142-144), and are listed in [Table 14](#).

Table 14. Middle Paleoindian Clovis Culture Site Types in Southern Virginia (from McAvoy 1992:142-144)

- I. The large chert quarry with associated very large base camp and small satellite camps (i.e., **Williamson site**).

Comment: This site type is the same as Gardner's (1989) quarry site, quarry reduction site, quarry related base camp, and base camp maintenance areas all combined.

- II. The small chert quarry with associated small hunting camp or base camp (i.e., Mitchell Site).

Comment: This site type was not defined by Gardner (1989) as part of the **Flint Run Complex** or associated sites, but he does acknowledge that this site type exists

elsewhere.

III. The small chert quarry with minimal related camp function (i.e., Bolster's Store).

Comment: This site type is almost the same as Gardner's (1989) quarry site, which is isolated from other types of related sites; although, it is somewhat different as some bifaces were made here and completed to fluted points.

IV. The hunting related base camp and strategic lithic cache (i.e., **Conover Site**, perhaps Hollowell).

Comment: This site type is something similar to Gardner's (1989) outlying non-quarry associated base camp, but it functioned quite differently from a "...habitation loci by groups on their way from or to the ...quarry" (Gardner 1989:24). This site type actually may have aided in preventing unnecessary trips to the quarry, thus serving a strategic function.

V. Large hunting related base camp not associated with a quarry (i.e., Greensville County Site)

Comment: Large sites of this type are considered by Gardner not to exist in Virginia. It is his opinion that "It is these larger non-quarry dependent sites with their multiple, apparently contemporary and interacting use areas which are absent from the southern area" (Gardner 1989:30). Clearly such sites, in a somewhat scaled down version, do exist in southeastern Virginia, and appear to be somewhat similar to their northern counterparts.

VI. Periodically revisited small (hunting) camp-one or two artifact clusters at the same site (i.e., Slade, Tomko).

Comment: This site type is now defined by Gardner (1989) as the outlying, non-quarry associated base camp used by groups on their way to and from a quarry. Gardner's definition with perhaps some less emphasis on the quarry relationship seems to be applicable to these sites in southeastern Virginia.

VII. Infrequently visited small (hunting) camp-one small cluster or scatter of artifacts (i.e., Baskerville, Carpenter, Harris Creek, Sunflower). Comment: These sites were previously defined by Gardner (1989) as periodically revisited hunting sites or subsequently as outlying hunting/processing locations and outlying hunting stations. This site type fits into his 1989 model as the periodically revisited small camp or outlying non-quarry associated base camp. On the Nottoway River the author has defined this site type as a small hunting/food procurement locality.

VIII. Hunting camp with associated non-chert (quartzite) quarry function (i.e., Fannin, Hill).

Comment: This site type was not defined by Gardner, as existing in the northern Shenandoah Valley, but appears to exist as a matter of convenience on the southern interior Coastal Plain.

IX. Possible kill site (i.e., Baskerville low grounds)

Comment: Isolated kill sites were not reported by Gardner, nor have they been proven to exist in this work, but circumstantial evidence pointing to their existence is strong.

X. Isolated point finds (mostly along or near first order and second order streams).

Comment: These discoveries are also recognized by Gardner in the Shenandoah Valley.

composition from a great many sites, has shown how the occurrence of lithic raw materials can, to some extent, shape Paleoindian settlement, as Gardner (1983, 1989) and others have suggested (e.g., Daniel 1998; Goodyear 1979, 1989). The distribution of fluted point and Dalton sites in northeast Arkansas, for example, has been shown to be influenced by the location of knappable chert gravels (Gillam 1996a, 1996b). This research, employing GIS technology and computerized site file and assemblage data, permits the examination of large numbers of sites simultaneously. As such, it offers the potential to resolve site types based on their environmental associations, which can then be verified and explored further with direct field work. These kinds of analytical procedures can pinpoint areas on the landscape where various site types might be expected to occur, and can be used to suggest the kinds of activities and assemblages that might be expected at such sites, where only minimal information may currently exist.

While the examination of localities or districts is emerging as a particularly useful approach to understanding Paleoindian occupations in an area, a number of discrete Paleoindian quarry/workshop sites have also witnessed appreciable data collection, analysis, and reporting. These include Adams (Sanders 1988, 1990), Carson-Conn-Short (Broster and Norton 1993, 1996; Broster et al. 1994, 1996; Nami et al. 1996), **Hardaway** (Coe 1964; Daniel 1998), Theriault in eastern Georgia (Brockington 1971), Wells Creek Crater (Dragoo 1973), and **Williamson** (McCary 1951, 1975, 1991; Peck 1985). Some of these, such as Adams and **Williamson**, have been incorporated into larger districts, and have been used in comparative analyses employing sites from the surrounding area. The detailed reports and papers describing these particular sites are crucial sources of information about southeastern Paleoindian life. The production of such reports, in fact, is an essential part of research, and until Paleoindian sites are well published, they can contribute little to our understanding.

In closing, while this discussion has focused on lithic quarry/workshop property types, bone, shell, or ivory "quarry" and workshop locales might well be discovered at some point in the Southeast. The collection of old or green bone or ivory for use in tools could be considered a special type of quarrying behavior, for example, and site types or activity areas may exist where these resources were processed. At present, the most likely area where such sites may be found is in submerged contexts, either underwater or in marsh or peat deposits. The presence of such sites is certainly plausible, given the discovery in Florida of anvils, digging sticks, and a possible beamer made on mastodon bones, an awl made from extinct horse tibia, as well as numerous bone and ivory point and foreshafts (e.g., Dunbar and Webb 1996; see also Clausen et al. 1979).

Resource Distribution: Occupations

No pre-Clovis habitation sites are currently known from the Southeast, although the Cactus Hill site in Virginia may well prove to be one such location, once sufficient area can be examined (M. Johnson 1997; McAvoy and McAvoy 1997; McAvoy et al. 2000). Topper may ultimately provide evidence for an occupation, given the presence of possible features, and a diverse and unusual toolkit. Our understanding of settlement and site types will remain minimal for this subperiod, however, until we are able to more readily identify these early assemblages.

Major Clovis era occupation sites were once thought to be rare in the Southeast away from quarry areas, something thought due to the early adoption of a generalized foraging adaptation to effectively exploit the widespread hardwood forests present in the lower Southeast at this time (Lepper and Meltzer 1991:177; Meltzer 1984a, 1988, 1993; Meltzer and Smith 1986). The large number of isolated finds of fluted points that occur in the region are thought to reflect extensive residential mobility, with habitation areas away from lithic source areas occupied only briefly and hence leaving behind a minimal archaeological record. This perspective was shaped, in part, because many of the best known inferences about Clovis lifeways and particularly residential camps in the Southeast, at least until quite recently, came from research conducted at quarry/workshop assemblages (e.g., Anderson and Sassaman 1996a:23-28; Gardner 1977, 1989; Goodyear et al. 1990). The inferred low visibility of Clovis residential sites in the region, however, is more apparent than real once the total record is examined (Anderson 1990a, 1995b, 1996). Habitation sites characterized by appreciable numbers of Clovis points, bifacial and unifacial tools, and other artifacts, have been documented in a number of areas. McAvoy (1992:142-144), for example, delimited several kinds of non-quarry Clovis residential sites in southern Virginia, and gave examples of sites that fell into each category ([Table 14](#)).

Major non-quarry presumed Clovis residential sites in the Southeast include Belle Mina, Heaven's

Half Acre, Joe Powell, and Quad in Alabama (Cambron and Hulse 1960; Ensor 1985, 1992; Futato 1996; Hubbert 1989); the Barnett Shoals and Feronia localities in Georgia (Anderson et al. 1990; Ledbetter et al. 1996); Parrish Village in Kentucky (Webb 1951); Avery Island and John Pearce in Louisiana (Gagliano 1967; Webb et al. 1971); the **Taylor** and **Manning sites** in South Carolina (Anderson 1979; Anderson and Sassaman 1996b; Goodyear et al. 1990; Michie 1996); the Pierce (40Cs24) and Twelkemeier (40Hs173) sites in Tennessee (Broster 1982; Broster and Norton 1990); and the **Conover** and Greensville County sites in Virginia (McAvoy 1992). While residential sites do occur away from quarry areas in the Southeast, their recognition and precise delimitation is often difficult or impossible due to the extensive reoccupation that sometimes occurred (Anderson 1990a). Thus, while sites like **Manning**, **Taylor**, and Quad, for example, have yielded appreciable numbers of fluted points and formal stone tools, they have also produced thousands or even tens of thousands of later points and tools, rendering identification of specific occupational assemblages difficult or impossible, particularly if most of the materials derive from surface context. Carefully recording where surface materials came from within a site, however, is a way to delimit specific occupation areas, as Michie (1996:242, 267-269) demonstrated at the **Taylor site**, and O'Steen and her colleagues (1986:40) did at Barnett Shoals in Georgia.

Comparative analyses of eastern and southeastern Clovis site assemblages has been conducted by a number of authors, and provide some insight into the characteristics of residential assemblages of this period, and the kinds of research questions they can address (e.g., Faught 1996; Meltzer 1984b, 1988; Shott 1986a). Sanders (1990:65-69), in an analysis of a dozen major eastern Paleoindian sites that included several southeastern sites, looked at the presence or absence of specific site physical attributes such as size class, evidence for single versus multiple occupations, and the kinds of functional activities that were apparently represented (i.e., quarrying, workshop, hunting camp, habitation), as well as a series of technological attributes related to reduction/manufacturing practices. Interestingly, the presence of true blades and blade cores was noted to be more common on southeastern sites than those in the Midwest and Northeast (Sanders 1990:67), a finding used to suggest a fairly early date for these assemblages (Ellis et al. 1998:159). The four southeastern sites examined, Adams, **Thunderbird**, Wells Creek Crater, and **Williamson**, were considered to be combination habitation and manufacturing sites, while most of the remaining northern sites were interpreted as hunting camps.

In this same analysis, Adams was found to be so similar to the Wells Creek Crater that the two sites could possibly "be attributed to the same cultural group" (Sanders 1990:69). The difference was that Wells Creek Crater almost certainly represented a number of separate episodes of site use while Adams appeared to be the result of a single occupation. Interestingly, even though outcrops were close at hand, at both sites extensive lithic raw material conservation strategies were employed, to seemingly maximize the utility of every piece of knappable stone. Sanders (1990:68-69) pointed out how this was contrary to the expectation that raw material use should be relatively prolific on Paleoindian sites in source areas, and that conservation strategies should increase with increasing distance from source areas (e.g., Gardner 1974:5-6 and MacDonald 1968:128-129, cited in Sanders 1990:68). He suggested instead that the assemblages might be due to the recent movement of peoples accustomed to having limited lithic raw materials into a stone-rich environment. As such, Adams and Wells Creek Crater might be the signatures of initial colonizing groups. Alternatively, raw material conservation may have been routinely practiced in all locations, since it was an essential aspect of life to highly mobile peoples critically dependent on their stone tools; this was why they were made on predictable, high quality materials, and were designed to maximize use-life (e.g., Goodyear 1979, 1989; Kelly and Todd 1988).

Paleoindian sites postdating Clovis which are separated from quarry areas are fairly common in the Southeast, although well reported examples are less common. Among the best known occupation sites are Dust Cave and Stanfield Worley Bluff Shelter in Alabama (DeJarnette et al. 1962; Driskell 1996; Goldman Finn and Driskell 1994); Brand and Lace Place in Arkansas (Goodyear 1974; Redfield and Moselage 1970); Harney Flats in Florida (Daniel and Wisenbaker 1987); Taylor Hill in Georgia (Elliott and Doyon 1981; Ledbetter et al. 1996:273); **Hester** in Mississippi (Brookes 1979; McGahey 1996:371-372); the Haw River sites in North Carolina (Claggett and Cable 1982); **Taylor** in South Carolina (Michie 1996); and Nuckolls, Nuckolls Extension, Puckett, and Twelkemeier in Tennessee (Broster and Norton 1990, 1991; Lewis and Kneberg 1958; Norton and Broster 1992, 1993). With the exception of the Suwannee/Bolen assemblage from Harney Flats, most of these sites produced Dalton assemblages, sometimes with earlier or later Paleoindian/Early Archaic components present as well (Walthall 1998). Where later materials were present, these were almost

invariably side notched projectile points.

Research Needs and Questions for the Southeast

The research themes described below offer guidance by which southeastern Paleoindian sites may be found, examined, and evaluated for NRHP and NHL status. They discuss the major research questions facing Paleoindian researchers in the region, and describe the kinds of information needed to answer these questions. What follows is intended to complement, and supplement, the discussion of research themes presented in the national context. Many of the questions and approaches raised in what follows, it should be noted, are derived from existing southeastern Paleoindian historic context studies. Some overlap between specific themes occurs, since many of the processes involved are interrelated.

Historical Background

Formal recognition of human late Pleistocene occupation in the Southeast, like everywhere else in North America, post-dates the 1926 Folsom, New Mexico discovery. Prior to this time, evidence for early human occupation had been noted in a number of parts of the region, but had been considered somewhat equivocal. Possible associations of humans with extinct fauna, for example, had been noted at **Big Bone Lick**, Kentucky, and at **Kimmswick**, Missouri in the early and middle part of the nineteenth century, respectively (Freeman et al. 1996:391-394; Tankersley 1985, 1990a:74-76). Human skeletal remains of putative great antiquity were found near Natchez, Mississippi in the 1840s (Cotter 1991) and at Vero and Melbourne in Florida in the early years of this century (Dunbar 1991:186; Gidley and Loomis 1926; Sellards 1917). Finds such as these were viewed with appreciable skepticism, however, by the professional archaeological community of the time (e.g., Hrdlicka 1918; Meltzer 1983).

The importance of the Folsom discovery for southeastern archaeology, accordingly, lay in the fact that the projectile points found with the extinct bison had a distinctive basal flaking pattern, or fluting, that made this kind of artifact an unambiguous marker of a Late Pleistocene age site. Prior to this time, of course, fluted points had been found in various parts of the Southeast, but their great antiquity was not recognized. Fluted or more accurately, basally thinned lanceolate points were, in fact, advanced as a distinctive artifact type in Mississippi, where they were described as Coldwater points in Calvin Brown's (1926:132-134) volume *The Archaeology of Mississippi*. The Coldwater type is used to describe a distinctive, presumably Late Paleoindian lanceolate point found in northeast Mississippi and adjacent parts of Arkansas. It should not, however, be used to describe local fluted points (e.g., McGahey 1981, 1996:354; McGahey: personal communication 2000).

By the mid-1930s fluted projectile points were being recognized in a number of parts of the Southeast, and interpreted as artifacts left behind by early occupants. Most of these points were surface finds, and the papers describing them (e.g., Bushnell 1935:35, 1940; Wauchope 1939) were the first of what has proven to be an increasingly extensive and important descriptive literature on the regional Paleoindian projectile point record (as summarized in Anderson 1990a, 1991; Anderson and Faught 1998, 2000; Anderson and Sassaman, eds., 1996c; Brennan 1982; Mason 1962; and Williams and Stoltman 1965). The vast majority of fluted points found to this day in the Southeast, in fact, are from surface context, and having good locational and descriptive information about them is essential to understanding variability within these early occupations.

For the first two to three decades after 1926, fluted points in the Southeast tended to be described as Folsomoid or Folsom-like by local archaeologists. By the 1950s, southeastern fluted points tended to be referred to as Clovis or Clovis-like, since most eastern variants lacked the full length fluting and fine retouch characteristic of true Plains Folsom points. It was about this time as well that a number of distinctive subregional variants began to be named, such as the Cumberland, Redstone, and Wheeler types (e.g., Cambron 1955; Cambron and Hulse 1964:30, 99; Kneberg 1956; Lewis 1954:7). In recent years, as data on thousands of points has accumulated from across the region, appreciation for the range of variation evident has increased, although efforts to untangle it are still in their infancy. Given the thousands of points from the region that have been measured, in fact, it is surprising how little analysis has actually been done with this primary attribute data from a regional scale (Meltzer 1984b, and Morrow and Morrow 1999 are important exceptions), although appreciable excellent work has done as part of site, locality, or state level analyses (e.g., Anderson et al. 1990; Breitburg and Broster 1995; Daniel 1998; Daniel and Wisenbaker 1987; Goodyear 1974; Morse, ed., 1997; to cite a few examples).

Following the Folsom discovery, some Paleoindian materials were found comparatively early on in secure excavation context in the Southeast. An early stone tool industry characterized by heavily weathered chert was found during the New Deal era excavations at Macon Plateau. While numerous points, tools and debitage dating to the later Paleoindian and Early Archaic Dalton, Taylor/Bolen, and Palmer/Kirk complexes were found, only a single fluted point was recovered, in 1935 (Kelly 1938; Waring 1968:237). A more extensive Paleoindian assemblage, characterized by eight fluted points and some 280 unifacial tools, was found in surface and excavation context at the Parrish Village site (15HK45) in western Kentucky, excavated by WPA crews from 1938 to 1940 (Freeman et al. 1996:395-396; Rolingson and Schwartz 1966; Tankersley 1990a; Webb 1951). These excavations remain among the most extensive ever undertaken in the Southeast that had as a goal the recovery of Paleoindian materials.

By the late 1940s, excavations began to occur in the region's rockshelters and floodplains, with the goal of locating deeply stratified deposits, and hence the recovery of assemblages dating to specific and progressively more ancient periods. Important work was done at sites such as **Hardaway** in North Carolina (Coe 1964; Daniel 1998), Russell Cave in Alabama (Griffin 1974; Miller 1956); and the Stanfield-Worley Bluff shelter in Alabama (DeJarnette et al. 1962), and at similar sites in adjacent areas, such as at the **Modoc Rock Shelter** in Illinois (S. R. Ahler 1993; Fowler 1959). This work accelerated in the ensuing decades, particularly with the rise of CRM archaeology in the 1970s. Important research directed to or documenting Paleoindian components has occurred in floodplain settings in the Little Tennessee River of eastern Tennessee (Chapman 1985), the Haw River of North Carolina (Claggett and Cable 1982), and in rockshelter deposits at Dust Cave in Alabama (Driskell 1996). Once again, projects in nearby areas, such as at Koster in Illinois (Struever and Holton 1979), St. Albans in West Virginia (Broyles 1966, 1971), and **Rodgers Shelter** in Missouri (S. A. Ahler 1971; McMillan 1971; Wood and McMillan 1976) have contributed markedly to our understanding of late Pleistocene or immediate post-Pleistocene, Holocene occupations in the Southeast.

Also beginning in the late 1940s, with McCary's (1984, 1991; Hranicky 1989) pioneering work in Virginia, the systematic recording of all known fluted projectile points began to occur in various parts of the region. This work, typically conducted within individual states by avocational and professional archaeologists working in tandem, has accelerated markedly within the past two decades. Fluted point recording projects are currently ongoing in almost every state in the Southeast. At present, almost 6000 Paleoindian points have been documented in the region by these surveys (Table 13), and detailed measurement data has been recorded for over two thirds of this sample, and is typically readily available from the researchers generating it in each state.

Since the early 1970s, extensive survey and excavation work has been conducted across the Southeast under the mandate of federal environmental legislation. Millions of acres of land have been examined, and almost 200,000 archaeological sites have been recorded (Anderson and Horak, eds., 1995). A great many Paleoindian sites have been found and excavated and, perhaps most importantly, detailed technical reports on the work have been prepared. Crucial to effective cultural resource management archaeology is making determinations of site significance, that is, knowing how a site can provide information that can help us better understand the past. The NHL research themes discussed below offer a framework by which significance may be evaluated, by suggesting specific areas where research is needed.

Peopling Places

This theme focuses on the initial settlement, diversification, and growth of human populations within the Southeast. Assuming that the entry of initial human populations into the Southeast appreciably predates 11,500 cal BP/13,450 B.P., determining whether unequivocal archaeological signatures (i.e., diagnostic artifact types) exist that can be used to easily recognize these early occupations is critically important. This may not be possible where early occupations only made use of comparatively simple flake stone tools, particularly since these kinds of tools were used extensively in later prehistory. The Early Triangular projectile points found at Cactus Hill or the Miller Lanceolates found at and near **Meadowcroft Rockshelter**, however, may prove to be readily identifiable, unambiguous pre-Clovis diagnostics. The existence of an early blade industry is also documented at both **Meadowcroft** (Adovasio et al. 1999:427-28) and Cactus Hill (McAvoy and McAvoy 1997), and apparently at Topper in South Carolina as well (Goodyear 1999b, 2000, n.d.). While blades occur in later Paleoindian assemblages, some aspects of these assemblages may prove to be temporally diagnostic. The southeastern archaeological record also adds uncertainty to the

origins of Clovis technology. While Clovis assemblages are well dated in the western United States, perhaps to as narrow an interval as ca. 11,200 and 10,900 rcbp/13,150 to 12,900 B.P. (e.g., Haynes 1992, 1993; Fiedel 1999; but see Stanford 1999:289, who argues for a broader range, from 11,500 to 10,900 rcbp), there is some evidence from sites like Johnson and Carson-Conn-Short in Tennessee that this technology may occur appreciably earlier in the Southeast.

Any artifact-rich site securely dated to more than ca. 11,500 rcbp/13,450 B.P., and ideally yielding unequivocal diagnostics, will be crucial to addressing this theme. As such, properties like Cactus Hill, Page-Ladson, Saltville, and Topper, if convincingly shown to be pre-Clovis in age and culture, will be of profound importance, and unquestionably eligible for NRHP and NHL status. Of critical importance to exploring the theme of Peopling Places, therefore, is determining "What constitutes early Paleoindian sites in the Southeast?" A related question would be "What constitutes later Paleoindian sites in the Southeast?"

To better understand initial occupations, we also need to know what specific landforms, sediment types, and microenvironmental settings were used by Paleoindian populations in the Southeast. Are such settings sufficiently distinct or unusual that they can be used to predict the probability of finding early materials? What field methods are appropriate for these settings, to maximize the possibility of discovering and evaluating early components? Geoarchaeological research in the Southeast in recent years has shown that Paleoindian sites may be found in specific floodplain terrace settings, around Carolina Bays, and in areas of extensive colluviation (e.g., Brooks and Sassaman 1990; Brooks et al. 1996; Goodyear 1999a). Site survey data has been used to resolve areas favored by early populations as well, such as in the vicinity of prominent shoals (O'Steen et al. 1986). Fall Line locations across the Southeast have long been known to possess major Paleoindian assemblages, as have areas around chert or other high quality stone outcrops. As Paleoindian components are identified in the Southeast, GIS technology has proven a highly effective means of evaluating and refining Paleoindian settlement models, as demonstrated in northeast Arkansas (Gillam 1996a, 1996b, 1999).

Tesar (1996:27-34) has provided an excellent overview of where sites throughout the Paleoindian era are likely to be located in the Florida area (see also Dunbar 1991). Of particular interest, Tesar (2000:28) also suggests that "in marine and estuarine settings shell offered an alternative cutting tool with which to fashion bone and wooden artifacts. The biodegrading of organic based artifacts has favored an interpretive bias focused on stone artifacts." Early coastal sites may thus be particularly difficult to discern, if lithics were not as commonly utilized.

How the settlement of the continent may have proceeded, given the changes in vegetation that were occurring at the regional scale, has also been the subject of some fairly extensive modeling in recent years (Steele et al. 1998). In brief, the early emergence of hardwood forests across much of the Southeast would have made the area attractive to early populations, something clearly indicated by the fluted point distributions. Such analyses can also be conducted at the regional and locality scale, as Gillam's (1996a, 1996b) research in northeast Arkansas has shown, where population distributions over much of the Paleoindian period was shown to be, at least in part, constrained by lithic raw material locations.

Creation of Social Institutions

This theme examines the emergence of distinct cultural traditions within the Late Pleistocene Southeast. The clearest evidence for the emergence of subregional cultural traditions in the region occurs after ca. 10,800 rcbp/12,900 B.P., when distinctive projectile point types or variants appear in a number of areas. This diversification occurs about the same time as the megafaunal extinctions and the onset of the Younger Dryas, events that appear related. The localized distribution of particular point types or styles is commonly used to infer the existence and extent of prehistoric cultural traditions, during the Paleoindian era and after (e.g., Anderson 1990a, 1995a, 1996). The distribution of Suwannee projectile points, for example, is restricted almost exclusively to Florida (Dunbar 1991), while Cumberland points occur primarily in the Mid South (Anderson and Faught 2001). These distributions are interpreted as encompassing the area over which makers of these projectile points appear to have regularly or at least occasionally moved, and as such, are used as markers of group territories or ranges and, hence, cultural traditions. Is it possible that some of the diversity currently attributed to the post-10,800 rcbp/12,900 B.P. era, specifically the emergence of distinctive subregional cultural traditions, may have actually begun earlier? That is, whether Clovis or pre-Clovis cultures were actually uniform over an area as large as the Southeast is something that also

warrants consideration. Given the amount of time and space involved, and the changes in climate and biota that were occurring, such an assumption seems highly unlikely.

Where distinctive Paleoindian artifact categories exist, such as the Cumberland type, typological classification and distributional analyses are relatively easy to accomplish. A bewildering array of Paleoindian projectile point types and variants, not all mutually exclusive, have been defined in the Southeast. Almost all of these, furthermore, are intuitively rather than quantitatively based, and extremely difficult for differing researchers to consistently sort (Morse 1997:134). Collections analysis should help standardize our systematics, and help resolve identifiable tool forms, whose age can then be determined through excavation.

While we have a good handle on the geographic distribution of Paleoindian fluted point types, since most state surveys record these artifact categories, our information on the occurrence of later Paleoindian point forms, particularly Daltons and side notched forms, is much more spotty. Locational and measurement data are not systematically recorded for these point types in many southeastern states. This is because, quite simply, so many Dalton and side notched points are known to exist in some areas that the task of recording them appears quite overwhelming, with the result that effort is typically directed to earlier or less common artifact types, like fluted points, or fluted and unfluted lanceolates. This selective approach to data recording must change if we are to understand what the stylistic variation observed within Dalton or the early side notched horizon actually means. If we include some of the San Patrice varieties, there are currently over a dozen named Dalton types and variants (Ensor 1987; Goodyear 1974, 1982; Justice 1987; Morse 1997). Likewise, while Dalton points are described as common in many areas, at least compared with presumably earlier Paleoindian forms, because primary data have not been systematically collected, exactly how common they are, or where they occur, is not well known. Other than in northeast Arkansas, where the distribution of Dalton assemblages have been explored for decades (e.g., Gillam 1996a, 1996b, 1999; Morse 1971b, 1973, 1997a; Redfield 1971), we currently know less about the geographic occurrence of Dalton points in the Southeast than we do about fluted points. The same is also true about our knowledge of the occurrence of side notched points.

Expressing Cultural Values

This theme addresses religious and ceremonial aspects of Paleoindian life, specifically belief systems and means of representation. Prominent locations on the landscape are known to have held a particular attraction for Paleoindian populations in the Southeast. Large assemblages have been found in close proximity to dramatic physiographic features, such as near major shoals, sinkholes, or confluences, at extensive outcrops of high quality stone, at Fall Line locations across the region, and at or near high peaks or other unusual geological features. Were these sacred areas as well as convenient locations for group rendezvous and aggregation? Do the dramatic features on the landscape visited by Clovis and later populations, such as Wells Creek Crater in Tennessee, Eagle Hill in Louisiana, and Stone Mountain in Georgia appear in the oral tradition of contemporary peoples?

Likewise, what role did specific artifact categories play in defining cultural identity? There is no question that Paleoindian populations in the Southeast placed great value on their tools of stone, bone, and ivory. The workmanship on many specimens is superb, reflecting a level of expertise rarely achieved by the flintknappers of subsequent periods. The aesthetic appeal of these artifacts to modern archaeologists and collectors alike no doubt helps to explain the widespread interest in these early peoples. Concern for exemplary craftsmanship was a major and widely shared Paleoindian cultural value, even in the production of everyday stone tools. Was the Paleoindian fascination with high quality lithic raw materials, accordingly, solely due to the needs of a highly curated toolkit, as Goodyear (1979, 1989) has argued? Or was it also shaped by the ceremonial potential of artifacts made from these materials, as exemplified by the presence of elaborate specimens in caches and burials, or their role in facilitating ceremony and interaction, as Walthall and Koldehoff (1998) have suggested for Sloan points in the central Mississippi Valley, markers of what they call a possible "Cult of the Long Blade?" Visiting quarry areas, accordingly, may have been as much about promoting interaction as about procuring high quality stone, if groups knew they could find other groups at these locations at certain times of the year (Daniel 1998:194-195; 2001). Likewise, by procuring high quality stone, and using it to make elegant tools, these peoples may have been reinforcing a basic aspect of their culture.

How Paleoindian use of the landscape shaped their culture is a research topic to explore under the

theme "Expressing Cultural Values." The distribution of Paleoindian sites and assemblages can be examined from such a landscape perspective, much in the way predictive models of site location are developed. Gillam (1996a, 1996b, 1999), for example, has shown that settlement changed in northeast Arkansas over the course of the Paleoindian era, with later sites found in a much wider array of settings. Some aspects of land use continued more or less unchanged, however, since both fluted point and Dalton assemblages indicate extensive use of the same lithic raw material sources.

Evidence for Paleoindian mortuary behavior, another aspect of how people express their cultural values, is rare in the Southeast. The Sloan site is a spectacular exception, albeit one with minimal skeletal preservation. The earliest well preserved human remains from the region are from **Warm Mineral Springs** site in Florida, dated to between ca. 9000 and 10,000 rcbp (Cockrell and Murphy 1978), although whether these are intentional burials is unknown. Excavations at a number of wet sites in Florida, such as **Windover** (Doran and Dickel 1988; Doran et al. 1988), have found numerous well-preserved human remains, indicating that cemetery behavior dates at least as far back as the end of the Early Archaic period. The Sloan data indicate collective burial practices extend even further back in time, albeit in this case in a dry rather than wet or submerged settings. What the use of cemeteries implies in terms of group residential permanence in an area, territoriality, kin groupings, and so on are all subjects that must be considered. In a related manner, are there Clovis age ceremonial or burial artifact caches like Richey-Roberts/East Wenatchee (Gramly 1993) or Anzik (Lahren and Bonnicksen 1974) present in the Southeast? The answer is almost certainly yes, given their presence in later Dalton times at Sloan and other locations in the central Mississippi Valley (Walthall and Koldehoff 1998). Do additional Dalton cemeteries like Sloan exist awaiting discovery? Again almost certainly.

Shaping the Political Landscape

This theme examines the emergence of group territories and ranges and the evolution of interaction strategies during the Paleoindian era. In recent years considerable effort has been expended toward delimiting the extent of southeastern Paleoindian settlement systems through analyses of artifact stylistic variability and the distribution of raw materials away from source areas (Anderson 1990a, 1995a, Anderson and Faught 1998, 2000; Daniel 1998, 2001; Goodyear et al. 1990; Sassaman 1996; Tankersley 1989, 1990b, 1991, 1994, 1998). Raw material fall-off curves have been developed using temporally diagnostic projectile points from North and South Carolina, for example, to show how far, and with what patterning, materials moved from quarry areas during various periods in prehistory, including during the Paleoindian era (Anderson and Hanson 1988; Daniel 1998:170-186, 2001; Sassaman 1996:64-71; Sassaman et al. 1988; Tippet 1992). This research is feasible because two major sources appear to have supplied an appreciable proportion of the stone used by local Paleoindian populations, the **Allendale chert quarries** in southwestern South Carolina, and the Uwharrie rhyolite quarries at and near the **Hardaway site** in south central North Carolina (Daniel 1998; Goodyear et al. 1990). The later Paleoindian and Early Archaic fall-off curves exhibit gradual rather than step-like patterns, suggesting fairly even group movement, down-the-line exchange or movement of stone at best, and fluid interaction, rather than rapid long distance moves, massive raw material exchange between groups over appreciable distances, and fixed, impermeable social or territorial boundaries. Comparable research should be conducted in other parts of the Southeast.

Another topic that can be explored under the theme "Shaping the Political Landscape" is whether and why some portions of the Southeast were more heavily occupied during some Paleoindian periods than during others. There is no question that fluted point concentrations are almost invariably located along major transportation arteries, notably along or near major river channels, and in areas rich in floral, faunal, and lithic resources ([Figure 1](#)). Why were these areas more favored than others during this time? Likewise, why were some areas, such as the Appalachian highlands and portions of the Gulf Coastal Plain, minimally visited by peoples using fluted point technology? Preferences for certain landform types are also indicated during later Paleoindian times as well, at least within specific intensively examined localities (e.g., Gillam 1996a, 1996b; O'Steen et al. 1986). Unfortunately, the distribution of most Paleoindian point types at a larger, regional scale is largely unknown at present. Our understanding of where Dalton occupations or sites with side notched points occur across the region, for example, remains intuitively based (e.g., Justice 1987; Morse 1997), even though these are the most common Paleoindian point types known. When these artifact types can be mapped the way we can now plot fluted points, no doubt concentrations and voids will be found within the regional landscape that will profoundly influence our understanding of these occupations.

It is also important to ask how regional physiography, specifically the orientation of river drainages and the location of mountain ranges and shorelines, may have shaped group movement, interaction, and the rise of subregional cultural traditions during the Paleoindian (Anderson and Gillam 2000, 2001). Greater movement and interaction would have clearly been more likely in some directions than in others, and perhaps at some times rather than others (Anderson 1995a; Meltzer n.d.). Little interaction or movement, for example, might be expected across the Appalachian mountains, or between groups occupying the Atlantic and the Gulf Coasts, save in intermediate areas. The Feronia locality in south Georgia, at the interface between the Atlantic and Gulf coastal watersheds, is in an area ideally suited for interaction between Paleoindian groups occupying these two major regions. The presence of extensive Paleoindian remains in this area, some made on raw materials that come from appreciable distances, suggests such interaction actually occurred (Blanton and Snow 1986). Likewise, the restricted distributions of Cumberland points primarily to within the Tennessee and Cumberland river drainages, and Suwannee/Simpson points primarily to within the karst rich areas of the Florida peninsula (with an extension up the Atlantic Coastal Plain as far as southwestern South Carolina), suggests the peoples making these artifacts ranged within these areas and no farther. Within these habitual use areas, where do sites with these diagnostics themselves occur, and how does this compare to the occurrence of sites in other areas? Are distinctive subregional adaptations forming or present? Why do some point types occur primarily within areas no more than a few hundred kilometers in maximum extent, while other point types appear to occur much more widely across the region?

Finally, diachronic analyses will prove an increasingly important means of resolving how and why the social landscape evolved during the Paleoindian period. As noted previously, changes over time in artifact distributions and raw material fall off curves have been used to explore changes in group range and settlement organization over the course of the Archaic period (e.g., Sassaman et al. 1988). Similar approaches can be attempted during the Paleoindian era, once our temporal resolution improves. Related to this, we need to ask why fluted point assemblages continue fairly late in the Northeast, to perhaps as late as ca. 10,200 rcbp/11,850 B.P. (e.g., Bonnicksen and Will 1999; Lepper and Meltzer 1991; Levine 1990; Spiess et al. 1998), when fluted points are clearly gone from across the Southeast by this time?

Developing the American Economy

Research topics that can be explored under this theme include resolving changes in patterns of resource extraction, production, distribution, consumption, and exchange, both of subsistence items, and raw materials used for tools, shelter, and other material goods. Questions of Paleoindian subsistence in the Southeast are difficult to address directly at present, first because sites with well preserved paleosubsistence remains are rare, and second because the systematic collection of these kind of data is a comparatively new development. The recent paleosubsistence data collection efforts at Dust Cave, entailing extensive fine screening and flotation work, are a model in this regard (Driskell 1996; Goldman-Finn and Driskell 1994; Walker 1997). Any Paleoindian site yielding paleosubsistence information in good context will be extremely important. Beside data collection directed to bone, shell, and plant macrofossil remains-traditional paleosubsistence data categories-pollen and phytolith samples should also be routinely collected and examined.

Raw material source analyses comprise another important area for research. Where did the materials found on Paleoindian sites originate? Appreciable research has been directed to delimiting lithic raw material sources in the Southeast using trace element, petrographic, or fossil microfauna data (e.g., Anderson et al. 1982; Banks 1990; Daniel and Butler 1991; Goodyear and Charles 1984; Upchurch 1984). Such analyses are critical, since many materials are difficult or impossible to distinguish macroscopically. In Georgia, for example, there are cherts in the Piedmont that are identical in appearance to cherts from the Coastal Plain over 100 km away (Ledbetter et al. 1981). The Piedmont cherts lack the microfossil inclusions ubiquitous in cherts from the Coastal Plain, however, and a microscope is needed to differentiate the materials.

Expanding Science and Technology

This theme examines the material culture, technology, and technological organization of the Earliest Americans. What are the nature of the technological changes that occur during the Paleoindian period in the Southeast, and why do these changes occur? How and why did the transition from fluted to non-fluted points come about in the Southeast? What do toolkits look like at different times and places over the region, and what are the reasons for the similarities and differences? Why

are adzes, for example, fairly common on Dalton sites in the central Mississippi Valley, yet quite rare everywhere else in the region (e.g., Goodyear 1974; Michie 1996:260-261; Morse and Goodyear 1973)? Are tools like the Aucilla adze in Florida equivalent forms? If these tools were used to build watercraft, or build fairly substantial dwellings, as has been suggested (e.g., Goodyear 1974:113), what does their uneven distribution over the landscape mean? Were other tool forms used, or were different types of structures and methods of transportation employed?

Over the course of the later Paleoindian, point manufacture in the Southeast appears to have proceeded from predominantly fluted to basally thinned to unfluted types, and from straight sided lanceolates to broad, recurvate forms, and then to more straight sided or triangular beveled and increasingly more pronounced notched forms (Gardner 1974:18,1989; Gardner and Verrey 1979; Goodyear et al. 1979:90-96; Morse and Morse 1983:60-65). Such patterning, if it can be refined through stratigraphic and absolute dating, can be used to infer the relative ages of specific points and assemblages. Throughout the Southeast it appears that a waisted lanceolate tradition-characterized by Cumberland, Quad, Beaver Lake, and Suwannee/Simpson types, was replaced by the lanceolate, lightly shouldered and notched Dalton tradition sometime around or after ca. 12,500 B.P./10,500 rcbp. This trend is indicated everywhere save in Florida, where waisted Suwannee/Simpson forms are thought to have continued in use until they were replaced by side notched types. Throughout the region, these side-notched forms replaced the (for the most part unnotched) lanceolates prevalent for the preceding two millennia.

The dramatic increase in sites and assemblages over the course of the Paleoindian and into the Early Archaic periods in the region has been used to infer rapid population growth and landscape filling (Anderson 1990a, 1996; McAvoy 1992:157-163). This would have lead to increasing pressure on resources, and the need for new methods by which groups could exploit them. Later Paleoindian projectile points retain many characteristics of earlier assemblages, but they also evince evidence for extensive resharpening, suggesting a major difference in the use of these bifaces when compared with earlier points. This has been attributed to a need to kill and process large numbers of comparatively smaller animals (at least when compared with megafauna), such as white tailed deer (Goodyear 1974:14, 103, 1982; Michie 1973; Morse 1971b, 1973, 1975b, 1997b). This assumption, of course, leaves unanswered how earlier populations performed similar cutting and butchering tasks, whether megafauna were indeed their prey of choice, and whether the extinction of megafauna actually contributed to changes in these peoples toolkits. The gradual abandonment of the highly curated Paleoindian toolkit is believed to be directly related to emergence and increasing importance of foraging, generalist strategies over the region during the later Paleoindian and Early Archaic periods (Cable 1982a, 1996; Meltzer 1984a, b, 1988; Meltzer and Smith 1986; Morse 1973, 1975b, 1997b). Is this view actually correct and, if so, how did the process proceed?

Transforming the Environment

This theme examines the reactions of human groups to Late Pleistocene environmental change, as well as the impacts these human populations themselves produced on biotic communities. What role did human populations play in the megafaunal extinctions that occurred? Did Paleoindian populations help shape southeastern biota through the controlled use of fire, as their descendants are known to have done? What makes the Southeast a cultural area, and is the concept even relevant during the Late Pleistocene, a period of dramatic environmental and physiographic change? As Kroeber (1939:1) noted, the recognition of culture areas is a means by which we can come to a better understanding of the cultures themselves, and the causes of cultural change. Thus, environmental factors should be examined for their effect on cultural systems, with our goal the recognition of important relationships between the two (e.g., Anderson 2001; Smith 1986).

How did changes in shoreline, particularly the fluctuations that occurred between ca 13,000 and 10,000 rcbp/15,630 to 10,450 B.P., and particularly changes that may have occurred during the Younger Dryas between 10,800 to 10,100 rcbp/12,900 to 11,650B.P., affect Paleoindian adaptations? What effect did changes in vegetational communities have on human and animal populations, such as the emergence of a hardwood canopy over much of the region after ca. 11,000 rcbp/13,000 B.P.? Was there a change in technological organization, from logistically organized collectors to residually mobile foragers, as has been suggested by some investigators (Anderson et al. 1996:6-7; Cable 1982a, 1996; see also Binford 1980)? Were residually mobile foraging populations present at an earlier period in the lower Southeast, south of latitude 33°N, which appears to have been covered by a fairly homogeneous hardwood forest over much of the late Pleistocene (excluding Florida, which appears to have had fairly xeric plant communities away from streams)

(Delcourt and Delcourt 1981, 1987; Jacobson et al. 1987; Watts et al. 1996; Webb et al. 1993)? Is the scarcity of Clovis sites in the Gulf Coastal Plain due to the fact that the hardwood canopy assumed to have been present in this area in the Late Pleistocene (Webb et al. 1993:448-450) was not particularly attractive to these peoples? Or are sites present, but just masked in some fashion? Were Paleoindian peoples exploiting the Coastal Plain living primarily out on the continental shelf, closer to the coastline (Faught 1996; Faught et al. 1992; Tesar 1996:27-34)? Is it realistic to expect that Paleoindian adaptations were the same in the dissipated karst terrain of Florida, on the Atlantic Coastal Plain, or along the major drainages of the Mid-South?

Changing Role of the United States in the World Community

This theme examines how what was happening to Paleoindian populations in North America, and specifically within the Southeast, relates to cultural and environmental changes observed worldwide at the end of the Pleistocene. That is, how do assemblages from this time period in the Southeast compare with those in other parts of the world? How does this relate to the dramatic changes in global climate that were occurring?

Another important question that can be considered under this theme is the effectiveness of our existing chronologies and culture sequences for the Paleoindian period. The relative temporal placement of Paleoindian and Early Archaic projectile points and associated toolkits has been determined through excavations at stratified alluvial and rockshelter sites. Radiocarbon dates have sometimes provided absolute chronological controls to these sequences, but many of the dates that have been obtained are considered unacceptably early or late, blurring our resolution. Thus, while there is agreement that parallel sided Clovis lanceolates precede the more waisted or eared fluted or nonfluted lanceolates, which were in turn replaced by notched points, even approximate temporal ranges remain to be determined for many of these forms (e.g., see commentary on this problem by Griffin 1977:5; Meltzer 1988:15). While this relative sequence has been documented in stratigraphic columns from a number of locations in and near the Southeast, the only point forms that may be considered fairly well dated in the region are the terminal Paleoindian early side notched types. Even Dalton points, whose temporal range was once thought to be fairly well known, to between ca. 10,500 and 9900 rcbp/12,500 to 11,250 B.P. (Goodyear 1982), appear to date earlier and possibly later than this in parts of the region.

Models of the kind of fieldwork and data needed to answer these kinds of questions exist in the record of past research. Major excavations in the Southeast that have provided stratigraphic columns spanning appreciable portions of the Paleoindian and ensuing Early Archaic periods, and that have had a major role in shaping the culture sequence, include **Hester** in Mississippi (Brookes 1979); the Haw River and **Hardaway** sites in North Carolina (Claggett and Cable 1982; Coe 1964; Daniel 1998); Page-Ladson and Silver Springs in Florida (Dunbar et al. 1988, Neill 1958); Stanfield-Worley Bluff Shelter and Dust Cave in Alabama (Driskell (1994;Goldman-Finn and Driskell 1994), to name a few of the more prominent examples.

Research at deeply stratified sites in areas just beyond the Southeast, at sites like **Rodgers Shelter** in Missouri (Wood and McMillan 1976) and St. Albans in West Virginia (Broyles 1966, 1971) have also provided important cultural historical information. When new examples of deeply stratified Paleoindian sites are found in and near the Southeast, like the recently discovered Big Eddy site in southwest Missouri (Lopinot et al., eds., 1998, 2000; Ray et al. 1988), or Wakulla Springs Lodge in Florida (Jones and Tesar 2000), they should receive extensive examination.

At the present, the identification of Paleoindian components across the Southeast suffers from considerable ambiguity, particularly in cases where supposedly well described and dated diagnostics like Clovis or Dalton points are lacking. As we have seen, however, appreciable morphological variation is subsumed under these types, much of which is poorly documented or understood at present. How much of this variation reflects temporal or cultural phenomena, and how much of it is due to constraints imposed by raw material, or the position of the artifact in a use-life cycle? Similar typological ambiguity pervades the use of many other Paleoindian forms, such as the Clovis Variant, Suwannee, Simpson, Quad, Beaver Lake, and Cumberland types. In an outstanding example of the type of research essential to untangling this variability, Breitburg and Broster (1995) examined a sample of 234 Cumberland and 654 Clovis points from Tennessee, explicitly documenting how these types differed from one another, as well as how point size within each category varied in differing parts of the state, something attributed to the distance they were from raw material source areas. Classificatory systems for Paleoindian artifacts in the Southeast should be based on

quantitative analyses directed toward resolving and understanding the reasons behind observed morphological variation. While type and variety systems will continue to remain useful tools, such classification must be perceived as only a first, and to some extent limiting (since they constrain the study of variation) step in our analyses of Paleoindian assemblages.

National Historic Landmark Criterion 6 and National Register Criterion D / Registration Requirements

For specific properties, NRHP and NHL evaluation should proceed by first completing a property designation matrix, which provides a basic overview of condition and research potential under National Historic Landmark Criterion 6 and National Register Criterion D, and can serve as a guide to the preparation of detailed nomination statements. Procedures by which the matrix is to be used are provided in the Evaluation Criteria Matrix/Registration Requirements section above. How specific research questions and themes outlined in the matrix apply to southeastern Paleoindian properties, however, were discussed previously in this regional context.

NHL Property Type and Integrity Levels for the Southeast

Linked with the evaluation of specific NHL property classes and categories is an assessment of their integrity. Property integrity refers to the physical condition of the remains under investigation, that is, their preservation, context, and ability to contribute important information under Criterion 6 for NHL designation and Criterion D for the National Register. Assessing property integrity is thus a crucial aspect of the evaluation of NRHP and NHL status. To be considered eligible for inclusion on the NRHP or designation as an NHL, Paleoindian properties must possess deposits with sufficient integrity to yield information capable of identifying discrete periods of occupation or utilization, property function or type, and have clearly defined boundaries.

High Integrity. Three levels of integrity are employed in the present NHL theme study, High, Moderate, and Low. Properties whose integrity is High are potential NHLs or have national-level NRHP significance. Sites with High integrity have clearly identified Paleoindian component(s) in secure context, and with precise calendric dating. That is, the geologic and sedimentary context of the assemblage(s) are well documented, with sources of intrusion or disturbance recognized and controlled, and the age of the deposits ascertained using one or more absolute dating procedures, such as radiocarbon or OSL dating. Sufficient age determinations must, however, have been obtained from samples in secure context to ensure confidence in the results. Individual dates, accordingly, or even large numbers of dates from controversial associations, will probably not be considered sufficient, unless supported by other kinds of evidence, such as unambiguous geological or biotic associations. Where materials for absolute dating are not available, the assemblage(s) must be of highly unusual significance. In the Southeast, properties with high integrity and national level significance include Cactus Hill, Sloan, Dust Cave, and various sites in the Allendale, South Carolina, Aucilla River, Florida, Christian County, Kentucky, and Nottoway River, Virginia localities.

Moderate Integrity. Properties whose integrity is Moderate are potential NHLs or have national- or state-level NRHP significance. Sites with Moderate integrity have Paleoindian component(s) that are to some extent mixed with later materials, in moderately secure context, and with relative rather than absolute dating. That is, the geologic and sedimentary context may be somewhat uncertain, with some mixing or reworking of the deposits. Control for disturbance is less secure. The age of the deposits is also somewhat less secure, and may depend upon stratigraphic relationships, seriation, or cross-dating with materials securely dated elsewhere. That is, sites with Dalton points are assumed to date between ca. 10,500 and 9,900 rcbp/12,500 to 11,250 B.P., regardless of where they are found, because that is the age range currently accepted based on an evaluation of known dates and contexts (Goodyear 1982). As we have seen, however, the actual temporal occurrence for Dalton points appears to vary appreciably, and may extend well beyond these inferred starting and ending dates, making use of cross-dating less secure than absolute dating. Southeastern sites with moderate integrity are widespread, and include most assemblages found on conflated surfaces, where distinguishing Paleoindian remains from materials dating later is sometimes difficult or impossible. The Quad locality in northern Alabama, which yielded numerous Paleoindian points, but also tens of thousands of later diagnostics as well, is one such example.

Low Integrity. Properties whose integrity is Low are not considered NHL candidates. If they were to be considered eligible for inclusion on the NRHP, it would probably be at the state or local level of significance. Sites with Low integrity have presumed Paleoindian components that are in highly

disturbed context, and whose age may be uncertain or questionable. Lithic scatters lacking diagnostics, absolute dates, or sound stratigraphic contexts are examples of such sites, as are sites with diagnostics whose deposits are severely disturbed or are thoroughly mixed with materials of later periods. Sites yielding low numbers of Paleoindian points as well as later materials in surface context would tend to have Low integrity.

Isolated diagnostic projectile point finds, of which thousands are known from the Southeast, are a special Paleoindian property class of great importance for research purposes, but whose integrity is considered Low, and hence have minimal potential for inclusion on the NRHP, or designation as an NHL. Isolated finds are thus typically not considered eligible for inclusion on the NRHP, unless the artifact itself is of exceptional significance. There is one exception to this. Groups of culturally related but otherwise isolated Paleoindian remains found in connection with diagnostic land-forms or other paleogeological, geomorphological, or paleoenvironmental contexts may be nominated as contributing properties within a district. That is, isolated finds, taken collectively, may under certain conditions (i.e., high density, significant paleoenvironmental associations) be considered important enough to warrant inclusion on the NRHP or as part of an NHL.

Evaluation Standards: NRHP Criteria

Although NHL designation is not the same thing as NRHP status, any successful NHL nomination will also have to meet NRHP Criteria. Explicit Criteria by which Paleoindian properties may be considered eligible for inclusion on the NRHP have been presented in a number of southeastern state historic contexts (e.g., Anderson and Sassaman 1992; Broster 1987; Davis 1982; Dunbar n.d.; McGahey n.d.; Smith et al. 1983; Tankersley 1990a; Wittkovski and Reinhart 1989), and are summarized here. The presence of any of the following characteristics on southeastern sites yielding Paleoindian artifacts would tend to automatically make them eligible for inclusion on the NRHP:

1. Intact buried deposits, particularly assemblages yielding features or preserved floral and faunal remains, and materials suitable for radiocarbon or multiple dating procedures. These types of sites are extremely rare at this time level in the Southeast, as well as anywhere in Eastern North America.
2. Stratified deposits, with components that can be isolated horizontally or vertically. This would facilitate detailed examination of single periods of occupation.
3. Major quarry sites with extensive reduction or manufacturing debris, and evidence for utilization during the Paleoindian period.
4. Areally extensive surface scatters from plowzone or eroded upland context, particularly if evidence for artifact relocation beyond more than a few meters is minimal. Controlled surface collection procedures can recover discrete occupational episodes or activity areas on sites of this kind. Barnett Shoals, Wells Creek Crater, and **Williamson** are two examples of major southeastern Paleoindian sites where extensive information has been found in plowzone context (Dragoo 1973; McCary 1951, 1975, 1991; O'Steen et al. 1986).

To these attributes can be added consideration of Glassow's (1977) Criteria by which site significance can be assessed, as discussed in the national context chapter (see also Butler 1987).

The presence of any of the following characteristics tends to automatically make a southeastern site yielding Paleoindian materials ineligible for inclusion on the NRHP:

1. Sites consisting only of a single isolated artifact. Little information beyond that obtained at the time of collection can be derived from such assemblages. Care must be taken, however, to ensure that the presence of other deposits has been ruled out. Isolates may be the only detected evidence of a complex site.
2. Heavily disturbed surface scatters. This does not include plowzone scatters, from which significant assemblage and intra-site distributional information can be recovered, given careful data collection. Care must be taken when examining presumably disturbed deposits to ensure that the presence of undisturbed deposits has been completely ruled out.
3. Sites damaged by cultural or natural factors to the extent that deposit integrity is destroyed.

Detailed reasons why sites meet NRHP or NHL eligibility status should accompany all such determinations, and should be expressed in terms of how they can yield information important to history or prehistory. Given how rare Paleoindian sites are in the region, full justification should

also be provided when Paleoindian properties are determined to be ineligible for inclusion on the NRHP, or for designation as an NHL.

Possible or Proposed Southeastern NHLs

At present, three Paleoindian sites within the Southeast have been designated NHLs by the Secretary of the Interior. These are the **Thunderbird District**, in Virginia, designated on May 5, 1977, the **Hardaway site**, in North Carolina, proclaimed on June 21, 1990, and the **Hester site**, in Mississippi, designated on January 3, 2001. **Warm Mineral Springs**, in Florida, while not formally designated an NHL due to owner objections, was determined to be nationally significant in 1988. In the preparation of this regional context, the author had the opportunity to examine the literature and site records for Paleoindian sites from across the region. A number of properties have yielded outstanding information, and in the author's opinion warrant nomination for NHL status. These properties, by specific type, are listed in [Table 12](#). Individual sites that are believed to be strong NHL candidates include Salt Mine Valley on Avery Island, Cactus Hill, Carson-Conn-Short, Dust Cave, John Pearce, **Little Salt Spring**, **Manning**, **Nipper Creek**, Quad, Sloan, Stanfield-Worley, **Taylor**, Taylor Hill, Wakulla Springs Lodge, Wells Creek Crater, and **Williamson**. Candidates for NHL district status include the **Allendale Quarries** in Allendale County, South Carolina, the Aucilla River area of northern Florida, the Little River/Adams Paleoindian site complex in Christian County, Kentucky, and some or all of the sites in the Nottoway River area of southern Virginia, including **Williamson**.

An effort to assess the condition and present integrity of the above sites, prior to the development of NHL nominations should be accomplished. It goes without saying that these sites and localities need to be protected from looting. Some of these sites, such as Stanfield Worley, have been extensively looted, and the condition of their archaeological deposits is unknown. Some sites or localities are currently under reservoirs and hence inaccessible, such as the Parrish Village site in Kentucky, the Haw River sites in North Carolina, or Rucker's Bottom in Georgia. These properties may be worthy of NHL status for their contributions to the history of archaeology in the region. If these sites ever become accessible, the condition of their archaeological deposits should be carefully evaluated. Additional data collection at such sites, even if they remain submerged, is also possible (Anderson et al. 1994; Faught 1996).

Conclusions

Reliable data on the nature and occurrence of Paleoindian assemblages is crucial to effective management and research. Compiling information about Paleoindian assemblages in the Southeast is a major task, and typically requires that at least one person in each state conscientiously reviews and compiles information about these occupations. Typically, such projects start out as artifact recording projects, of which "fluted point surveys" are the best known. Every state in the Southeast except Louisiana currently has an active fluted point recording project. In some states these encompass other types of Paleoindian points, although this is less common. Only in Georgia (Anderson et al. 1990, 1994), Florida (Carter et al. 1998), Mississippi (McGahey 1996), and Tennessee (Broster 1989; Broster and Norton 1991, 1996) at present do the ongoing surveys attempt to record information about all known Paleoindian projectile point types. In no southeastern state at present, however, is information about other Paleoindian artifact categories systematically recorded. Such work is crucial, however, and must be incorporated into the state site files.

Information about Paleoindian site locations is routinely compiled by state site file managers. When coupled with detailed information about the kinds of artifacts found at each site, and particularly the periods of occupation represented by these artifacts, site file data can be used to generate distributional maps. When site locational data are incorporated into a GIS with a range of data layers, encompassing natural resources, hydrology, geology, and so on, this information can be further used to develop and test various models of site location and prehistoric settlement. The finest example of this type of data compilation and analysis effort to date in the region has been conducted in northeast Arkansas. There, in a test of existing Paleoindian settlement models, Gillam (1995, 1996a, 1996b, 1999) plotted the distribution of fluted point and Dalton sites on the landscape. This research has generated a wealth of new insight into the kinds of resources that appear to have been targeted by these early peoples, and how settlement changed over time.

At present, in addition to Arkansas, comparable GIS-based analyses of Paleoindian site data can be conducted in Alabama, Florida, Georgia, South Carolina, and Tennessee, and should be possible in every state in the Southeast within another few years. Critical to such analyses, however, will be

having accurate data on the nature of the Paleoindian assemblages present on sites. While site file records are computerized in most southeastern states, the quality of these data varies appreciably (Anderson and Horak, eds., 1995). To produce useful overviews of Paleoindian resources in the region, greater effort directed to data collection and standardization will be needed. Thus, while at present it is simply not possible to easily generate regionwide distribution maps for Paleoindian sites or artifact categories, beyond the examples noted here, it is possible to generate such maps in a number of states. As site file records improve, however, producing regionwide maps should prove increasingly feasible, and should serve as a major focus for research.

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THE EARLIEST AMERICANS THEME STUDY

NORTHEAST PROPERTY TYPES

In the ten northeastern states, fourteen NRHP listings mention Paleoindian resources; no established Historic Districts are devoted specifically to them. This situation is partly due to the loss of integrity of most prehistoric sites in the region, given its lengthy history of Euro-American development and landform destruction and the intensity of private collecting on sites. Compromised integrity will continue to limit resource interpretation, listing, and protection in the region.

NHL Property Types as Categories for the Northeast

[Sites and Districts](#)

Table 15. National Register Paleoindian Sites by State in the Northeast

Delaware: **Hughes Early Man Complex** (mainly post-fluted point age)

Maine: **Chase-Munsungun Lakes, Hedden, Lamoreau, Vail**

Massachusetts: **DEDIC, Wapanucket 8, Riverside Archaeological District**

New Hampshire: **The Weirs** (a Late Paleoindian site in NH Veterans' Association Historic District)

New Jersey: **Abbott Farm NHL**

New York: **Dutchess Quarry Caves, Flint Mine Hill District (Kings Road), West Athens Hill**

Pennsylvania: **Meadowcroft, Shoop**

Among these sites, the **Dutchess Quarry Caves** must be reconsidered, as the association between a Paleoindian artifact and the caribou bone in Cave #1, dated to 14,300-15,200 years ago, is no longer considered supportable (Steadman and Funk 1987).

Two National Register Districts and one Landmark include Paleoindian sites and find spots: the **Riverside Archeological District** in central Massachusetts, the New Hampshire Veterans' Association Historic District at the **Weirs** in New Hampshire, and the **Abbott Farm National Historical Landmark district** in New Jersey. All three listings recognize extensive areas of dense prehistoric sites, including Paleoindian artifacts.

The record of non-listed Paleoindian sites, expanding at an unprecedented rate, defies counting. Publication, descriptive or interpretive, lags badly, but news of finds is quickly disseminated.

[Categories](#)

Sites listed on the NRHP, inventoried at the state level and/or represented in the literature, exemplify several categories, displayed on [Table 16](#). Quarry sites and lithic workshops are the least problematic categories for this review. The 'occupations' category, however, is problematic; few sites have been investigated and interpreted with sufficient thoroughness to demonstrate specific domestic activities on site. Here, only sites with domestic features or clearly distinct tool clusters are listed as occupation sites. Small sites interpreted provisionally as 'hunting stands' may be in fact small

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G. geographical data

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Figures and Tables

camp, and therefore occupation sites.

Table 16. Major Northeastern Paleoindian sites by NHL Property Type

Caches:

Adkins *

DEDIC/Sugarloaf

Lamb, NY?

Yarmouth lanceolates

Kill sites

Hiscock?*

Vail*

Rock art:

no parietal art, weak claims for portable art

Quarries:

identified as stone used for fluted points

Chase-Munsungun Lakes

Delaware Chalcedony Complex

Emanon Pond*

Flint Mine Hill

Macungie Jasper

Mt. Jasper

Munsungun Lakes

Nevers

Saugus

Vera Cruz jasper

West Athens Hill

Workshops:

Paleoindian knapping debris

Arc*

Chase-Windy City

Corditaape

Emanon Pond*

Flint Mine Hill?

Kings Road

West Athens Hill

36WH351 Cross Creek lanceolate

Occupation sites:

must present some integrity to be so classified

Arc*

Bull Brook I & II

DEDIC/Sugarloaf

Michaud

Neponset

Plenge

Shoop*

Templeton

Vail*

many inadequately published small sites

hunting camps, bivouacs, etc.

* = Possible NHL candidate

NR listed
designated an NHL

Isolated Finds and Small Sites

Small sites in the Northeast might be dismissed lightly as stray finds except that when opportunity to confirm the finds is taken, additional artifacts are typically found—flakes of exotic cryptocrystalline rock, uniface tools, bifacial trimming flakes of characteristic forms, channel flakes, scrapers, or pièces esquillées. Some few have demonstrable stratigraphical integrity and association with datable organics (e.g., Sanger et al. 1992). Distribution maps of such small finds provide a richer documentation of Paleoindian spatial activities than do accounts of areas called "sites" (e.g., Custer 1984b, 1986; Lantz 1984; Lyon 1989). In Rhode Island (SHPO office), Long Island (Saxon 1973), Delaware (Custer 1984a), and coastal Massachusetts (Mahlstedt 1987), isolated finds constitute the entire record of Paleoindian activities (Table 17). In Ohio, Lepper (1989a) showed that information about land use can be teased out of inventories of isolated finds, carefully examined and recorded. No comparable study exists in the Northeast, where identifying and contacting owners is difficult.

Table 17. Published or Inventoried Paleoindian and Early Archaic Sites by State in the Northeast

Connecticut

- 6LF-21/Templeton (Moeller 1980)
- Allen's Meadows (Spiess et al. 1998:212)
- Hidden Creek (Jones 1997)
- Lebanon (Pfeiffer and Parkos 1995)
- Liebman (Pfeiffer 1994 n.d.; Spiess et al. 1998:212)
- Robbins Swamp group (Nicholas 1988)
- Isolates: (Bellantoni: State files; Pfeiffer 1986)

Early Archaic (pre-Bifurcate)

- Dill Farm (Pfeiffer 1986)
- Lewis-Walpole (Starbuck 1980)
- _____ (Moeller 1985)
- Robbins Swamp (Nicholas 1988, 1998)

Delaware

- Everett (Crozier 1939)
- Linn Woods Site (Custer 1991)
- Mitchell Farm (Custer and DeSantis 1985)
- Isolates: (Custer 1984b, 1996, 1998; Custer et al. 1983; Griffith 1982; Mason 1959; Thomas 1966)
- Maps: Custer 1983:49, 1996:100

Early Archaic (pre-Bifurcate)

- Delaware Chalcedony Complex (Custer et al. 1986)
- Hughes Early Man Complex:** EA only (Custer 1984b, 1986; Custer et al. 1983)

Maine

- ME 12.23, 36.6, 51.3
- ME 39.1 (Hamilton and Pollock 1996; Speiss et al. 1998:214)
- Adkins* (Gramly 1988a)
- Avon (Spiess and Hedden 2000)
- Blackman Stream (Sanger et al. 1992)
- Boothbay (ME16.37, ME16.86: Speiss et al. 1998:218)
- Janet Cormier (Moore and Will 1998)
- Dam (Spiess et al. 1998:214; Wilson & Spiess 1989)
- Esker (Spiess et al. 1998:218)
- Flagstaff Lake (Spiess and Wilson 1987)
- Fluted Point (Bonnichsen et al. 1991)
- Hedden** (Spiess and Mosher 1994; Spiess et al. 1995)
- Lamoreau** (Spiess et al. 1998:213)
- Michaud (Spiess and Wilson 1987)

Munsungun Lakes (Bonnichsen 1984; Hamilton and Pollock 1996)

Neal Garrison (Kellogg, n.d.)

Nicholas (Wilson et al. 1995)

Point Sebago (Hamilton and Pollock 1996; Spiess et al. 1998:218)

Sebago Lake (Spiess and Wilson 1987)

Spiller Farm (Hamilton and Pollock 1996; Spiess et al. 1998:217)

Vail* (Gramly 1982, 1995)

Varney Farm (Cox and Petersen 1997; Petersen 1995; Petersen and Cox 1998; Petersen et al. 2000)

Windy City (Bonnichsen et al. 1991; Payne 1987)#

Isolates: (Doyle et al. 1985; Hamilton et al. 1984; Petersen et al. 1986; Spiess 1990b; Spiess and Wilson 1987; Wilson and Spiess 1990)

Early Archaic (pre-Bifurcate)

Gulf of Maine Tradition? (Robinson et al. 1992)

Massachusetts

Bull Brook (Grimes 1979)

Bull Brook II (Grimes et al.1984)

DEDIC/Sugarloaf (Gramly 1998)

Fort River (Curran and Dincauze 1977)

Hannamann (Hasenstab 1988)

Laurenitis (Lyon 1989:11)

Merrimack Group (Spiess and Bradley 1996)

Neponset (Carty and Spiess 1992)

Paisley (State files)

Riverside (K. Curran 1999)

Saugus Quarry (Grimes et al. 1984:183)

Wapanucket 8 (Robbins and Agogino 1964)

Yarmouth cache (Dunford and O'Brien 1997:34).

Isolates: Bouck et al. 1983; Curran and Dincauze 1977; Fowler 1972; Lyon 1989; Mhlstedt 1987; Mello 1975; Sargent and Ledoux 1973; Spiess and Bradley 1996; Young1969:38-39

Early Archaic (pre-Bifurcate)

Riverside (K. Curran 1999)

Map: Dincauze and Mulholland 1977: Figure 1

New Hampshire

Colebrook: (Boisvert 1999; Bunker et al. 1997)

Israel River complex (Boisvert 1998, 1999; Bouras and Bock 1997)

Neville-Smyth (Dincauze 1976)

Thorne (Curran 1994:45)

Thornton's Ferry sites: 27HB1 & 2 (Curran 1994)

Whipple (Curran 1984, 1994)

Sunapee Lake group (Curran 1994)

Massabesic cluster (Curran 1994)

Isolates: (Boisvert 1999; Sargent and Ledoux 1973)

Early Archaic (pre-Bifurcate)

Weirs Beach (Bolien 1977; Maymon and Bolian 1992)

New Jersey

Abbott Farm NHL (Meltzer 1993: 45-48; Stewart and Cavallo 1983)

28-OC-100 (Mounier et al. 1993)

A.C. site (28AT105) (Stanzeski 1998)

Carpentersville (Grumet 1990)

Coastal Plain (Bello and Pagoulatos 1995)

Kandy Bar (Grossman et al. 1982)

Logan (Stanzeski 1998)

Plenge (Kraft 1973, 1977b)
 Port Mobil (Kraft 1977a, 1977b)
 Timber Swamp (Grumet 1990)
 Turkey Swamp (Cavallo 1981)
 Zierdt (Werner 1964)
 state plan: (Marshall 1982)
 Isolates: (Kraft 1977a; Stanzeski 1996, 1998)
 Map: Kraft 1977b: Fig. 3

Early Archaic (pre-Bifurcate)

Harry's Farm (Kraft 1975)
 Logan (Stanzeski 1998)
 West Creek (Stanzeski 1998)

New York

Arc* (Tankersley et al. 1997; Vanderlaan 1986)
 Baldwinsville (Ritchie 1965:Pl. 1)
 Bear Paw* [J Holland, pers. comm. 7/23/98] and nearby Bush* complex, #s 1-4
 Corditaie (Funk and Wellman 1984)
 Cross Lake (Ritchie 1965: Pl. 1; J. W. Bradley, pers. comm.)
 Davis (Ritchie 1965)
 Devil's Nose (Tankersley 1994b)
 Diver's Lake* (Prisch 1976; Tankersley 1994b)
Duchess Quarry Caves* (Funk and Steadman 1994; Kopper et al. 1980)
 Emanon Pond* (Tankersley 1995)
Flint Mine Hill (Parker 1924)
 Haiti Island (Ritchie 1965: Pl. 1; J. W. Bradley, pers. comm.)
 Hiscock* (Laub et al. 1988; Laub 1995a & b)
 Kilmer (Tankersley et al. 1995, 1996)
 Kings Road (Weinman and Weinman 1978)
 Lamb (Gramly 1988b, c)
 Oneida Lake (3 groups near western end, J. W. Bradley, pers. comm.)
 Piping Rock (Brennan 1977)
 Port Mobil group (Kraft 1977a)
 Potts (Gramly and Lothrop 1984; Lothrop 1989; Ritchie 1965)
 Seneca River sites/finds (J.W. Bradley, pers. comm.)
 Swale site (Funk letter of 9/27/98) Tom Weinman. PZ
 Twin Fields (Eisenberg 1978)
West Athens Hill (Funk 1973)
 four small sites on Lake Ontario plain (Smith 1995)
 Zappavigna (Funk and Wellman 1998)
 Isolates: Calkin and Miller 1977; Funk and Schambach 1964; Kraft 1977a;
 Ritchie 1957, 1969: Ch. 1; Saxon 1973; A. Smith 1952; K. Smith 1995;
 Wellman 1982; Whitney 1977
 Maps: Calkin and Miller 1977; Levine 1989; Ritchie 1965; Saxon 1973

Early Archaic (pre-Bifurcate)

Dumont 1981
 ____Funk 1996
 Haviland (Ferguson 1995)
 Mid-Hudson (Levine 1989)
 Old Place, Staten Island (Anderson 1964; Ritchie and Funk 1971)
 Russ (Funk 1979; Funk and Wellman 1984)
 Muddy Brook Rockshelter, Putnam Cty. Palmer Point. Letter from C. Tompkins,
 10/10/77

Pennsylvania

36LA336 (Smoker and Custer 1986; Custer and Smoker 1987)
 36PE16 (Carr 1998:53) [Paleo component below EA]
 36WH351 (Adovasio 1983:9)

Allegheny Paleo-Indian Corridor (Lantz 1984)
Honey Brook (Schrader 1978)
Kellogg Farm (McConaughy et al. 1977)
Krajacic (Boldurian 1985; Carr et al. 1996)
Liverpool (Crisell, R. 1999)
Meadowcroft* (Adovasio et al. 1975, 1978)
Narvon (Schrader 1978; Custer 1996:124)
Pocono Lake (Carr et al. 1996)
Poirier (Fogelman and Poirier 1989)
Russo (George 1976)
Shawnee-Minisink (McNett 1985)
Shoop* (Witthoft 1952; Carr 1989; Cox 1986; Fogelman 1986)
Shultz (Carr et al. 1996)
Sugar Creek Valley sites (McCracken 1986)
Tobyhanna Creek (Kraft 1977b:267)
Trojan (McCracken 1989)
Warrier Spring (W branch Susq.) Warrior's Run Complex ? (Fogelman 1988a; 1988b)
Wilheim (Carr et al. 1996)
 Isolates: (Adovasio et al. 1975:27; Burkett 1981; Custer 1996: 116-118; Kinsey 1956, 1958, 1959; Lantz 1984; Mason 1956, 1957, 1959; Mayer-Oakes 1955; McCracken 1986; Witthoft 1950)
Maps: Carr 1998; Custer 1986, 1996:100; Kraft 1977b; Lantz 1984

Early Archaic (pre-Bifurcate)
36ME105 (Carr 1998)
Central Builders (Carr 1998)
Sheep Rock (Michels and Smith 1967)
West Creek (Stanzetski 1998)
West Water Street (Carr 1998)

Rhode Island
no sites; only specimens
 Isolates (Anonymous 1936; Turnbaugh 1982)

Early Archaic (pre-Bifurcate)
____ (Turnbaugh 1980)

Vermont
Manning (Loring 1980)
Reagen (Ritchie 1953)
VT-CH-197/Mahan (Thomas in prep.)
VT-CH-230 (Thomas in prep.)
 Isolates: (Basa 1982; Bazilchuk 1998; Haviland and Power 1981:29; Loring 1980)
Map: Loring 1980

Early Archaic (pre-Bifurcate)
John's Bridge? (Thomas and Robinson 1983) dates after 9000
Map: Thomas 1992: Fig. 8

* = Possible NHL candidate
NR listed
designated an NHL
? uncertainties

Caches

Four instances of Paleoindian caching behavior are reported in the Northeast, three of them by a single investigator. At the **DEDIC/Sugarloaf** site in Massachusetts, a deposit of biface preforms and raw material was discovered close to other artifacts (Gramly 1998:34). The Lamb site in western New York was originally interpreted as a dwelling site with bifaces dispersed among a restricted

inventory of other tools (Gramly 1988b: 273) but later reported as a biface cache (Gramly and Funk 1990: Figure 1 caption; Tankersley et al. 1997:31). At the Adkins site in Maine a boulder pile on the shore of an artificial lake was declared a "meat cache" (Gramly 1988a, d). Despite the resemblance to an arbitrary subset of a massive boulder deposit on an ice-plowed shore, no chemical or other critical tests were applied, nor were artifacts associated to attest to caching behavior. Selected boulders were airlifted to the Maine State Museum and installed in an attractive display. A cache of twelve lanceolate points of Late Paleoindian (Early Holocene) style is reported from Yarmouth on Cape Cod (Dunford and O'Brien 1997:34).

Bone beds and kill sites

Uncalcined boney materials preserve poorly outside of northeastern bogs or caves. Mastodont remains have been found in Massachusetts, New York, New Jersey, and Pennsylvania bogs, none associated with artifacts or other clear evidence of human intervention (e.g., Hoff 1969; Kurten and Anderson 1980: 344-346; Lepper and Meltzer 1991; Moeller 1984c). Mastodont and mammoth remains are dragged from the inner continental shelf, also without artifacts (Edwards and Emery 1977; Edwards and Merrill 1977; Oldale et al. 1987). In Pennsylvania and New York, limestone caves and crevices have yielded late Pleistocene fauna, all without evidence of human intervention in the life cycle (Guilday 1982, 1984). The association of caribou bone and fluted point at the Dutchess Quarry Cave #1 has been dismissed as fortuitous (Steadman and Funk 1987). At the Hiscock paleontological site in NY some Paleoindian tools have been found among Pleistocene fauna, without evidence of direct kills (Laub et al. 1988, 1996). The claimed caribou kill site near **Vail** meets the Criteria for such a site despite lack of organic remains: numerous tip fragments of fluted points, some of which match bases from the domestic site across the river (Ewing 1981; Gramly 1984a). Lepper and Meltzer suggest (1991) that searching for kill sites in the East may be a futility supported only by hopes of matching dramatic western slaughters.

Human burials

Within the region, no human remains of great age have been found because of poor preservation conditions. However, the late Paleoindian Crowfield site in Ontario may be a cremation burial (Deller and Ellis 1984); others might be found.

Rock art and other representations

No Paleoindian rock wall art has been recognized in the Northeast, although late prehistoric examples are numerous. Engraved steatite pendants at the Reagen site in Vermont are unique and dubious (Ritchie 1953: Fig. 89). A soft pebble with scratch marks has been noted at the **DEDIC/Sugarloaf** site in MA (Gramly 1998:19, 63). An equally enigmatic scratched quartzite pebble was found in the Paleoindian context at **West Athens Hill**, NY (Funk 1973:27, 30). Drilled stone beads, conventionally considered items of personal adornment, possibly talismanic, are reported in poor context from **DEDIC/Sugarloaf** and Hiscock (Gramly 1998; Laub 1995a); their recovery at two sites commands attention.

Quarries and workshops

Northeastern stone quarry sites are more diverse than those of the Southeast and rarely closely associated with living sites. Research interest in bedrock has swelled lately (Hatch 1994; King et al. 1997; La Porta 1994; Luedtke 1987, 1993; Pollock et al. 1996; Pollock et al. 1999), powered by interest in tracing Paleoindian movements; the inventory cited here will likely expand. Sources of raw materials utilized by Paleoindians are known approximately, without direct evidence of Paleoindian quarrying, notably in Vermont (Mt. Independence, Hathaway/St. Albans, Colchester 'jasper,' and Cheshire quartzite), Mt. Jasper in New Hampshire, **Flint Mine Hill** in NY, and numerous small quarry areas in Pennsylvania, Delaware, and elsewhere (cf. Wray 1948). Paleoindians in the Northeast quickly learned to identify non-cherty siliceous rocks: fine-grained metarhyolites, crystal quartz, silicified siltstones. Some of these have point sources certified by lithological Criteria alone, but lack evidence of Paleoindian mining. **West Athens Hill** in New York, the Saugus 'jasper' quarry area in Massachusetts, and bedrock sources in the Munsungun Lakes region of Maine do have Paleoindian quarry debris (Bonnichsen et al. 1980; Funk 1973; Grimes et al. 1984). Additionally, in glaciated and periglacial areas appropriate rock available in colluvium, outwash gravels and alluvium was apparently utilized; more analysis is needed to confirm this (Crissel 1999; Custer et al. 1983; Holland and Dincauze 1999; Moeller 1980). Boulder-field quarries are entering awareness (Boisvert 1998).

Major known quarry sites are listed in [Table 16](#). Sources at the scale of the Onondaga escarpment and **Flint Mine Hill** required no great skill for recent immigrants to find, but some are truly cryptic, requiring not only an eye for lithologies (e.g., Nevers), but effort for recovery (e.g., Gramly 1984b). The actual scale of Paleoindian quarry activity may be beyond knowing, given the millennia of recurrent human activities at the sites; studies of long-distance transport will be informative as petrological studies expand (e.g., Pollock on Mt. Jasper and Munsungun sources). Gravel quarry sources in alluvium of the Delaware and Susquehanna rivers, and the Housatonic River (La Porta 1994:55), remain to be studied, along with suspected sources in western Connecticut (Moeller 1980).

Débitage from tool-making and repairing is expectable on any Paleoindian site. Criteria for recognizing 'workshops' as a special class of site vary with the reporter. Famous spreads of Paleoindian flaking debris characterize sites in proximity to quarries, among which are the Chase-Windy City group in Maine (Payne 1987), **West Athens Hill**, Kings Road, Corditaie, Emanon Pond, and Arc in New York. Other prehistoric debris-spreads (e.g., **Flint Mine Hill** NY, Conklin RI, Vera Cruz PA) cannot be associated specifically with Paleoindian activities, although close to bedrock known to have been used in that remote time.

Occupations

Given the high percentage of damaged sites in the Northeast and the infrequent professional excavation accorded them, attribution of occupational function dominates the literature as a default category. Some sites such as Bull Brook I, Arc, and **Shoop** clearly qualify by size and redundant clusters of tools. Adkins, Bull Brook II, Lamb, Michaud, Neponset, Templeton, **Vail**, and Whipple most probably are. **DEDIC/Sugarloaf** may be of this class but that has not been clearly demonstrated. Lanceolate point occupation sites are especially elusive (Nicholas?). Careful excavation at small camps such as Hidden Creek in Connecticut (Jones 1997) can reveal domestic sites replete with other functions. A large area mapped in Vermont (Mahan site, VT-CH-197) is notable for the numerical dominance of scraper forms in a site yielding only one fluted point (Thomas et al. 1998); it has not been demonstrated to have been uncollected prior to investigation. Plowed sites, such as Potts, Twin Fields, and Plenge can be interpreted functionally only by analysis of the tools. Functional analysis of stone tools is a research approach grossly underutilized in the Northeast. The largest northeastern sites, clearly with some residential function, have been variously interpreted as aggregation sites for seasonal hunts and/or for seasonal gatherings for socializing people otherwise separated during the year (Curran and Grimes 1989; Spiess 1984). They are also proposed as a special kind of colonizing site (Dincauze 1993b). All have point styles in Groups I and II as defined below ([Table 18](#)).

Small sites yield point styles of all groups, most typically Group III (Jacobson 2001; Table 11). This is probably significant; large sites with Group III points are known only in Ontario, where they are convincingly modeled as seasonal aggregation sites (Ellis and Deller 1997; Storck 1997). In northeastern US, activity evidence tends to be less diverse at the small sites than at the large ones, indicative of shorter, more focused, residence. Several sites with Group III and later points are multi-component compilations: e.g., **Wapanucket 8**, Plenge, Potts, Reagen, and others. Numerous small sites in Pennsylvania are considered short-stay camps, but the point styles are not emphasized in the literature (Carr et al. 1996; Lantz 1984).

No northeastern cave occupations are reported with fluted points. Most paleontological caves are predator collections or natural traps (e.g., Dutchess Quarry Cave #1, a fissure). Rockshelters typically lack evidence of Paleoindian use, and may be mainly Holocene phenomena. Two rockshelter finds of fluted points are reported in Connecticut (Moeller in Brennan 1982:41) without details. The unique Pleistocene lanceolate biface at **Meadowcroft** emphasizes this point; Clovis-style bifaces occur in the Cross Creek vicinity, but not in the shelter.

Resource Distributions in the Northeast

Sub-regional variation in relief, altitude, hydrography, and climate complicates efforts to generalize about site locations favored by Paleoindians. Isolated fluted points are found widely across the region, restricted only by available data which varies directly with the density of archeologically informed searchers. The Paleoindian Northeast, as summarized above, was bounded by sea on the east and northwest, as well as by glacial lakes northwest. The northern boundary is political. The grain of the country follows subparallel mountain ranges trending mainly NE-SW; the slopes of

mountain ranges and coastal plains define the routes of rivers. Sea level was low throughout the period in reference to today, except for a Late-Glacial intrusion into Central Maine that may have been partly visible to the earliest Paleoindians. Late-glacial marine eustatic transgression, slowed by the Younger Dryas climatic reversal, was much less dramatic than it had been and would become; in places it was reversed by isostatic rebound (Belknap et al. 1987). After 13,000 years ago, prevailing winds relaxed from the Late-Glacial northwest and blew more equably from the west (Thorson and Schile 1995). Climate and seasonality in the Late Glacial period became responsive to altitude and proximity to the sea. Land surfaces tilted and rose with isostatic rebound that followed the ice melt and drainage of the large lakes. Continental and mountain glaciers and meltwater had scoured valleys in the north of the region, bringing river channels to very low elevations that were buried anew by late-glacial lake deposits and/or rising sea levels backing up major drainages such as the Susquehanna, Delaware, Hudson, Connecticut, and Penobscot rivers. Rivers draining toward the Mississippi, such as the Ohio, Allegheny and Monongahela systems, similarly cut deeply during glacial time, leaving high old terraces on their valley flanks, later raising the channels and bringing early Holocene alluvium over the lowest Late-Glacial terraces (e.g., Broyles 1966). The dynamism of Late-Glacial alluvial deposition may explain why rockshelter utilization is so rare among Paleoindians in North America.

Distributions of resources that sustained life for Paleoindians—plant and animal foods, potable water, well-drained living surfaces, and tool-quality lithics—were not static throughout the deglacial millennia. Boulders and gravel, moved southward by ice and water, made tool materials available at various distances from their bedrock sources. North of glacial moraines, the accessibility of bedrock outcrops buried under ice, glacial sediments, or lakes gradually improved. The dynamism of the northeastern Late-Glacial environment makes prediction of Paleoindian distributions particularly difficult. The following discussion is framed in terms of environmental categories rather than modern political divisions.

Coasts and shores

Seacoast defined the eastern limit of the Paleoindian Northeast from Delaware to Maine, and the northwestern limit in Vermont, where the Champlain lowland was briefly an arm of the sea. West of the Champlain Sea lay the freshwater Great Lakes, whose shores shifted markedly throughout the millennia, from early extensive overflows of the land to later lowstands that permitted Paleoindian exploration on surfaces now underwater (Karrow and Calkins 1985; Laub et al 1988; MacDonald 1995). We only glimpse Paleoindian life near New York shores, in contrast to the rich record in Ontario. Marine transgression began in the south, where the isostatic depression was shallowest and briefest. The transgression is still being expressed north of the Gulf of St. Lawrence. In Maine the uplifted Paleoindian coastal zone, now being eroded (Kelley et al. 1992), accounts for the southern Maine sites on deltas and dunes such as Michaud, **Lamoreau**, and **Hedden** (Petersen 1995; Spiess et al. 1998). The generalizations offered by Spiess and Wilson (1987:130-132) apply only to coastal southwestern Maine, which has marine deltas and associated landforms of the appropriate age. Elsewhere, coastal and inland dune building was earlier (Thorson and Schile 1995) and the marine deltas older and lower. Two of the rare northeastern large sites—Bull Brook and Debert—are situated near, but not on, their coeval coastal plains, which were exposed by the Younger Dryas low sea (Oldale 1985, 1986). There may have been unique resource attractions on the expanded plains, but huge herds of migrating caribou are unlikely to be among them (see "Game" section below).

South from Maine, site densities decline coastwards, reflecting the loss of sites directly on the transgressing coast. Lower courses of rivers that ran into the Late Glacial sea are now deep in alluvium or marine muds, any sites buried with them. Off the south coast of Connecticut at Hammonasset State Park, an "eastern Clovis" point appeared in sand dredged from under 16-18 feet of water (Glynn 1969:70), lost on land since inundated by Long Island Sound. Rhode Island has very few known Paleoindian find-spots and no sites, although the range of point styles is representative. Massachusetts' Cape Cod and islands show the same situation (Mahlstedt 1987; Richardson and Petersen 1992). Long Island has many finds, but no sites (Saxon 1973). In New Jersey and Delaware, known sites and find spots cluster on uplands landward of today's coast (Custer 1984a, 1996; Custer et al. 1983; Marshall 1982; Mounier et al. 1993). In contrast to the stray finds elsewhere, the Inner Coastal Plain of New Jersey, with rivers draining west toward the Delaware River, has most of the sites (Custer 1996; Grumet 1990).

Significant numbers of Group I and II points in the dunes of the Champlain seacoast of Vermont are noteworthy (Loring 1980). Marine environments had marine animals which could have been taken

by the Paleoindians. Utilization of the fresh water Great Lakes shores of New York and Pennsylvania is not attested in the literature, perhaps because of subsequent inundation by rising Holocene water levels (Anderson and Lewis 1985). The Late-Glacial Younger Dryas period Champlain Sea probably possibly featured icebergs, though unlikely as the glacial front was farther north. The Late Paleoindian Reagen site at the north end of the Champlain basin is below the elevation of the marine incursion; but within the shore area for brackish or freshwater successors. The Davis site on the New York shore of the basin has yielded a few broken fluted points that may belong in Group III. The findspot lies below the Champlain Sea water level (Ritchie 1965:19-21). The age of the site and its setting requires clarification (Snow 1980:142).

Hydrography

Much has been made of Paleoindian sites clustering in river valleys (e.g., Anderson 1990a; Anderson and Faught 1998), but in the Northeast large valleys have find spots and small sites, whereas upland low-order streams have the larger sites (Arc, Bull Brook, **Vail**, **Shoop**, etc.) and numerous small sites (e.g., Lantz 1984). If **DEDIC/Sugarloaf** on the Connecticut River is really a big site, as claimed (Gramly 1998), it will be an exception to a well-established rule. The big river valleys, and valley passes through mountains, were travel routes for both people and game, but not preferred places for domiciles.

Significantly, no Paleoindian sites or findspots are reported on the immediate eastern shore of the Hudson River trench, where the topography appears to have been appropriate (Haviland and Power 1981: 35; Ritchie 1957:11; Funk, pers. comm. 1999, concurs with this). This observation bears on initial colonizing routes (see **Research Needs and Questions for the Northeast**). Hudson Valley cherts on Paleoindian sites in Massachusetts correlate strongly with the presence of Group III points. The Hudson trench was formidable during the low marine levels (Dineen 1996); people might well have been willing to walk north to find better crossing places. The known distribution of Group Ia points in New England is heavily skewed toward the north (Table 18; Dincauze and Jacobson 2001).

Like their prey or because of it, Paleoindians were attracted to springs, including mineral springs in western New York (Arc, Hiscock), and to the shores of lakes and swamps (**Wapanucket 8**, Bull Brook). Even **Shoop** in its mountain valley may reflect an attraction to nearby upland wetlands (Custer 1996:120). Low-order (headwater) streams are implicated as chosen places on Long Island (Saxon 1973). Wetlands in drained glacial lakes may have been attractors, as clusters of isolated finds imply (**Research Needs and Questions for the Northeast**; Curran and Dincauze 1977; Nicholas 1988); however, large Paleoindian sites have not yet been found near them. Drained lake basins do appear to have been favored during the drier climates of the Early Holocene, especially by users of early notched points (Nicholas 1988; Webb et al. 1993:111).

Because some Paleoindian sites are buried, inundated, ablated, or eroded away, accessible sites cannot be the full record of original site locations and preferred landscapes. Schuldenrein (1994) has properly employed the Schumm (1977) model of stream basin development to argue that Paleoindian and later sites along the middle reach of the Delaware are on alluvial surfaces of appropriate age, which are knowable. Along major river valleys Paleoindians spent their time and lost their signature artifacts on well-drained elevated surfaces such as delta plains, dune fields, and high terraces (e.g., Curran and Dincauze 1977). These may be the areas where Post-Pleistocene erosion has removed less of the surface, and buried less of it, than in areas neighboring higher-order streams. What is clear from the upland sites we know throughout the region is that they lie predominantly on droughty soils, possibly chosen for edge habitats as well as for warmth and dryness. McWeeney (1994) has discussed and speculated about Criteria for locating Paleoindian sites by analysis of landscape age; just such an analysis sent a survey team to **DEDIC** looking for Paleoindian remains. Many such areas are fire-prone, which might explain some of the visibility problems and troubles with radiocarbon dates (e.g., Spiess et al. 1995). Fires in Paleoindian times may explain how Paleoindians found and quarried boulders at New Hampshire's Nevers site (Boisvert 1998), which otherwise seem to be small phenomena, easily overlooked.

Some Paleoindian find spots are located away from living places favored by people who occupied the region after 11,500 years ago, probably because of the reorganized hydrography that followed incision of the major rivers into glacial deposits. This is not an iron-clad rule: Plenge, Twin Fields, Bull Brook, Potts, Davis, **Shoop**, **Wapanucket**, Neponset, Port Mobil, Kings Road, **DEDIC** and others also yield scatters of later artifacts. The deeply stratified **Meadowcroft** and **Shawnee-**

Minisink sites are exceptional in this respect, with their long histories of post-Paleoindian use.

Vegetation

No fluted point sites have been reported north of the St. Lawrence east of Ontario, where the glacial front halted at the St. Narcisse moraine for much of the Younger Dryas (Dincauze and Jacobson 2001). Nor have any been reported from the tundra zone immediately south of the St. Lawrence trench; all are within the zone of coeval parkland vegetation. However, the northernmost sites, **Vail** in Maine and Debert and smaller areas in Nova Scotia, were not far from the narrow tundra belts of their time, especially during the Younger Dryas period (Dincauze 1988; Mayle et al. 1993).

McWeeney's research into the vegetation of northeastern Paleoindian landscapes is the richest to date. Relying more on macrofossils than on pollen, she was able to show the absence of coeval tundra near sites, their situation within spruce parkland mosaic landscapes, an unexpected diversity of hardwood species, and great instability in plant associations during the thirteenth millennium (McWeeney 1994). Her research confirmed a major warming episode prior to the Younger Dryas, cooling during it, and a subsequent rapid and early return of hardwoods and temperate forest elements in southern New England. She speculates that the northeastern Paleoindians arrived prior to fourteen thousand years ago (1994: 146), that their distributions contracted south during the Younger Dryas cold, and that shortly after 12,000 years ago, at the time of Group III styles, Holocene climate regimes with hardwood tree species prevailed into central New England and farther south (1994: 139-141; Kutzbach and Webb 1991). This radical revision of cherished notions fits well with the absence of evidence for caribou in Group III and younger sites in the United States. A critical test will require direct radiocarbon dating of organics strongly associated with Paleoindian features, evidence that has been elusive to date.

Recent AMS dates from **Shawnee-Minisink** fireplaces set that site, with temperate forest plant remains and a Group Ia point, into the early Younger Dryas at 12,900 years ago, in a southern location (Dent 1999). The generalizations we have lived with clearly mislead. It is critical to control for time, latitude, and altitude when modeling paleoecology for Paleoindians (Gaudreau 1988; Kutzbach and Webb 1991); the extant literature falls below that standard.

Game

Radiocarbon complications make difficult also the evaluation of claims for big-game hunting in the Northeast. Mastodont remains are numerous from Massachusetts south and west, and east onto the continental shelf (Edwards and Merrill 1977). The latest proboscidian dates fall into the Younger Dryas millennium, but are there hung up on a radiocarbon plateau with some of the early site ages. No mastodont finds in the Northeast have Paleoindian artifacts associated, although a case has been made for a mastodont tusk artifact dated 13,000 years ago (Laub et al. 1996). New information implies that the elephants were among the last Pleistocene fauna to go extinct, close to 13,000 years ago (Elias 1999). The convergence of fluted point finds and wetlands, reflecting shared needs for water between prey and predators, guaranteed encounters as long as those were chronologically possible.

The allopatric Late Pleistocene assemblage of animals at the Hiscock site, including extinct and exotic species, is well dated to the thirteenth and fourteenth millennia, although the human associations are loose within the envelope (Laub et al. 1988). The conventional notion of Paleoindians as maniacal hunters of big game is being abandoned for more realistic expectations for adaptive behavior appropriate to the lightly forested terrains of the Late Pleistocene Northeast (Dincauze and Curran 1983; Lepper and Meltzer 1991). Huge herds of caribou are a Holocene arctic development (Loring 1997), and therefore not available as Paleoindian prey concentrations. Spiess argues eloquently to the contrary, but unpublished. A few Group Ia sites have yielded calcined caribou bone (Grimes et al. 1984; Spiess et al. 1985); a cervid at Group III Templeton may be *Odocoileus*. Pleistocene *cervalces* has not been found in human association, while beaver and fish appear in Group Ia sites (Arc, Bull Brook II, Whipple, **Shawnee-Minisink**).

We can populate the regional woodlands by analogy, but we have little direct evidence for what was taken from among what was likely present (Curran 1999; Curran and Dincauze 1977). Proboscidian attraction to wetlands and rivers, especially when ill, increased encounter probabilities and opportunities for scavenging carcasses. By the time of Paleoindian residence in the Northeast, there had been several millennia during which fish could return to inland lakes and rivers. Late Pleistocene flyways terminated northward at the Great Lakes and ice front, potentially creating high

concentrations of birds in season (Dincauze and Jacobson 2001). The lesson from scant evidence is that Paleoindians were taking animals that were available; the degree of selection is beyond calculating. Again, latitude, altitude, and age are the critical variables for modeling.

Lithics

The defining role of bedrock quarries in the distribution and adaptation of Paleoindians is less obvious in the Northeast than it is in Virginia (Gardner 1977, 1981), with the possible exception of the Delaware coastal plain. Given discontinuous distributions of high quality cryptocrystalline rocks favored by Paleoindians, exploration and discovery was likely initially intensive, revealing outcrops and boulder fields of knappable volcanic and sedimentary rocks used throughout the remaining span of fluted point manufacture. Prior to awareness of the need for petrographic support for source attributions, it was easy for archeologists to claim, without controls, that Paleoindians depended upon long-distance transport or trade in high-quality exotic lithics.

Research is moving from ‘eye-ball’ identification of bedrock sources in terms of color and grain into more responsible intensive physical-chemical research that will ultimately reliably indicate the directions of movement of Paleoindian groups, and help delineate the range sizes characteristic of different time periods (Hamilton and Pollock 1996; La Porta 1994; Pollock et al. 1999; Tankersley 1988). Exotic distant lithics occur most often in sites with Group I spearheads; by the time of Group III, local or regional sources of stone dominate assemblages throughout the region (Jacobson 2001). Sources for the materials of Group II points remain notably enigmatic, although local sources are becoming more likely. Continuing work on the identification of both bedrock quarries and sequential styles of Paleoindian spear points will provide details of diachronic change and exploration patterns.

As a consequence of the sobering new realities, models of social and economic groups and ranges for Paleoindian hunters based on lithic utilization patterns need reevaluation or at least caution (e.g., Curran 1999; Dincauze 1993a; Gramly 1988b; Spiess and Wilson 1987a; Spiess et al. 1998). In contrast to Gardner's ‘lithic tethering’ model of Paleoindian territoriality, north of Virginia Custer's serial model (1986) is a better fit to available data on Paleoindian use and distribution of lithic raw materials (Carr 1998). This supports the ‘embedded procurement’ model of lithic exploitation propounded by Seeman (1994) in Ohio.

Distributions of point styles

Table 18: Styles in Sites for the Northeast

GROUP Ia: Gainey/Bull Brook
A.C. site, Arc, Boothbay, Bull Brook, Bull Brook II, Champlain strays, Cornell U Campus, Dam, DEDIC/Sugarloaf , Delaware Valley strays, Emanon Pond, Hiscock, Ide (RI), Kilmer, King's Road, Long Island strays, Manchester/Massabesic, Martha's Vineyard, Mitchell Farm, Ossipee, Paisley Farm, Point Sebago, Poirier, Port Mobil and Cutting, Potts, Saugus Quarry, Seneca River: Baldwinsville, Shawnee-Minisink , Slippery Rock, Thornton's Ferry, Trojan, Twin Fields?, VT-CH-197, Wapanucket 8 , West Athens Hill, Whipple, Windy City, Zierdt
GROUP Ib: Shoop
Bull Brook?, Shoop , King's Road, Honey Brook
GROUP II: Debert/Vail
Adkins, Vail , Lamb, Plenge, Martha's Vineyard, Morss, New Jersey coastal plain, Point Sebago; Sebago Lake, Bull Brook, Whipple, Spiller Farm, Tonawanda Creek, W. Penn.
GROUP IIIa: Barnes/Parkhill/Neponset style
Champlain strays, Cornell U Campus, Delaware Valley strays, Devil's Nose, Esopus/Kingston cluster, Lamoreau , Martha's Vineyard, Michaud, Neponset, Plenge, Port Mobil, Potts, Slippery Rock, Spiller Farm?, Templeton, Wapanucket 8 , West Athens Hill , Windy City, 28-OC-100, Seneca River sites: Baldwinsville, Cross Lake, Haiti Island, Van Buren; Oneida River and

Lake sites: Caughdenoy Creek, Oneida Lake outlet, Muskrat Bay

GROUP IIIb: Cumberland (mainly west and south)

DQC #1; Western Penn.

GROUP IV: Crowfield

Janet Cormier, Plenge, Port Mobil, Reagen, Trull Brook

GROUP V: Holcombe/Nicholas/Turkey Swamp

Allen's Meadows, Esker, Janet Cormier, Kilmer, Nicholas, Reagen, Piping Rock, Port Mobil, Turkey Swamp, VT-CH-230, VT-CH-197?

GROUP VI: Lanceolate (at least two distinct styles recognizable, but not named)

Blackman Stream, Esker, Hidden Creek, **Lamoreau?**, Logan, Lynch cache (Yarmouth), Thorne, Varney Farm, **Weirs Beach**, Basin Island, Black Hawk Is., East Branch, Grand Lake Thoroughfare, Graveyard Point, Leighton, Moose River, Pittston Farm, West Grand.

Early Archaic

HARDAWAY-DALTON

Logan, NJ; Robbins Swamp, MA; Staten Island, NY

KIRK CORNER NOTCHED

36ME105, Central Builders, West Creek, West Water Street, PA; Russ?

PALMER CORNER NOTCHED

Riverside, MA; Lewis-Walpole, CT; Muddy Brook Rockshelter, Putnam Cty., NY

The observed density of fluted point sites and find spots, low in comparison to later cultural periods (except for late Paleoindian and EA), is impressive given the intensity of land disturbance and artifact collecting in the northeastern US ([Table 17](#)). One can conclude that fluted points are widely distributed in the Northeast, controlled by the distribution of rivers, lakes and wetlands, with secondary control by outcrops of useful stone types and relatively stable landforms. While suggestive, these observations are not yet supportive of strong research orientations. Many authors try to infer patterns of movement by Paleoindian groups coming into the region or, alternatively, pursuing resources in seasonal cycles (Curran and Grimes 1989; Custer 1996; Dincauze 1993b; Dincauze and Jacobson 2001; Ellis et al. 1998; Gramly 1988b; Gramly and Funk 1990; Lantz 1984; Spiess and Wilson 1987a; Spiess et al. 1998; Tankersley 1991, 1995). Recently, such studies appear close to exhausting the information potential of the regional data, where organic materials and intact patterning internal to sites are lacking. However, very different results are obtainable when the stylistic sequence in fluted points is added. For example, Lantz's classic study (1984) of Paleoindian immigration through western Pennsylvania to western New York maps all fluted point styles as equals. Now that Group I styles are acknowledged older than Group III, and Group IV is seen to belong to the Pleistocene/Holocene boundary, while Groups V and VI are Early Holocene, lumping them all together as immigrants clearly distorts the information.

The style groups of [Table 18](#) are not cleanly discrete. There are intermediates between all of them, and more than one may appear in a given site. These two observations support the inference that Paleoindian use of the region was essentially continuous following the initial colonization. However, the fact that none of the fluted point style groups after II appears in the Canadian Maritimes or the area directly south of the international boundary may indicate a withdrawal of occupation from the northern fringe during the coldest YD times (this inference depends on the ultimate dating of Group II). New England, New York and western Pennsylvania fluted points fit well within the Great Lakes style clusters, but individual specimens are not always close to named styles defined there. The intermediates, especially, are difficult to classify. This variable degree of independence between regions weakens any arguments for more than one pioneering episode in the greater Northeast, while implicating the maintenance of wide-ranging communication and mating networks throughout the thirteenth millennium.

Group Ia points are distributed continuously from northwestern Pennsylvania through New York, especially along the lake fronts, northeasterly across northern Vermont, New Hampshire, and Maine, and south into Massachusetts, Connecticut, Rhode Island and the coastal plain, located on well

drained Late-Glacial landforms near watercourses. They leave a trail of Ohio cherts in western Pennsylvania (Lantz 1984) and western New York (Gramly 1988b; Tankersley 1994c, 1995), of Onondaga cherts across north-central New York, eastern New York and Vermont cherts in the Hudson and Champlain valleys, and Munsungun cherts south along the coastal plain into eastern New England (Pollock et al. 1999), along with a few exotic lithics (i.e., Spiess et al. 1998). Vermont cherts occur in western New England beyond the limits of the Munsungun distribution (Dincauze and Jacobson 2001). In the study area, Group Ia points are the most frequently reported and most widespread style of fluted point.

Group Ib, the Shoop-like style group, has proven difficult to define with certainty; the manufacturing sequence is still debated (Callahan 1979; Carr 1989; Cox 1986:128-129; Fogelman 1986; Gardner and Verrey 1979; Painter 1973; Witthoft 1952, 1954, 1962). The distribution is mainly south of the New York/Pennsylvania border ([Table 18](#)). If it does indeed represent a population intrusive from the south, using locally deposited cherts rather than bringing bedrock from New York, its slight degree of stylistic strangeness in the Northeast may be actually unproblematic (cf. Moeller 1989).

Group II points dominate in northern New England, being possibly more numerous there than the Group Ia styles. In the main sites they appear to be made of fairly local cherts. The type is not yet well defined, limiting the incisiveness of comparisons, but there seems to be a wide distribution of single specimens with the typical deep basal indentation southwest in Vermont and across New York along the lakes, with a trickle south toward New Jersey and interior Pennsylvania (Custer 1996:121, 130). Whether this tail-off distribution represents more than stylistic insouciance or trading in exotics remains for rigorous analysis, and more secure ages, to determine (Morrow and Morrow 1999).

Group III points have a distribution more southerly, being rare to absent in the international border area where Group II may be partly coeval with them, and extending south into Pennsylvania and New Jersey but becoming rare in that direction (Custer 1996:130). They do not occur on sites larger than Michaud, in contrast to the situation in Ontario. They appear in small sites near water or wetlands; their spatial relationships in the coastal zone are not yet clear. Hudson Valley cherts appear with Barnes points in southern New England, but local sources of stone are more typical. Barnes points may ultimately be recognized widely at small, dispersed quarries throughout the region.

Groups IV and V styles, dated at the Pleistocene/Holocene boundary, are considerably less frequently reported than are the earlier styles. They retain a stronger presence in the north of the region, but occur as strays into Pennsylvania and New Jersey. Crowfield and Holcombe distributions have been extended easterly from the Great Lakes states, on good grounds (Spiess et al. 1998). Holcombe points, with slight or no fluting, have been reported mostly in Maine and Vermont, and seem not to occur south of New England, in contrast to Crowfield which occur south to New Jersey. Spiess et al. (1998), however, see Holcombe points at sites otherwise considered to have stubby lanceolates, supported by recent work at the Nicholas site in Maine (Wilson et al. 1995). In the Middle Atlantic states, New Jersey has the Turkey Swamp group (Cavallo 1981); New York has them at Piping Rock (Brennan 1977) and Port Mobil. The very similar Pennsylvania Miller point style, at **Meadowcroft Rockshelter** and along the west-flowing Cross Creek drainage (Adovasio 1983; Carr et al. 1996; Lantz 1984), may be earlier, around fourteen thousand years ago (Boldurian 1985).

Group VI, a heterogeneous group labeled "lanceolate," extends northeastward to the St. Lawrence lowland where it replaces or displaces the apparently coeval Early Archaic notched points. Sites of this tradition in Québec are found on the south shore of the St. Lawrence along the coast of the post-glacial Goldthwait Sea that succeeded the Champlain Sea of the fluted point sites farther west (Dumais 2000:105). Until they are studied comparatively, the many names by which lanceolates are tagged in the northeastern literature will be subject to revision. Agate Basin, Dalton, Eden, Hell Gap, Hi-Lo, Plano, and Scottsbluff have been invoked, while the type name "Ste. Anne" is gaining currency well beyond its origin area on the south shore of the St. Lawrence into northern Maine (Cox and Petersen 1997; Dumais 2000; Petersen et al. 2000). While the Western typology may be questioned, some specimens could be rare trade goods. Except for reaching farther north, lanceolate biface distributions are remarkably similar to the earlier Group I points, being clustered in the Great Lakes area, and northern New England (Doyle et al. 1985:Figure 23). These latest Paleoindian styles are less numerous southward from central New York and Massachusetts (Cox and Petersen

1997; Doyle et al. 1985; Fowler 1972; Funk and Schambach 1964; Jones 1997; Maymon and Bolian 1992; Petersen and Putnam 1992; Sanger et al. 1992, Spiess 1992; Stanzeski 1996; Tankersley et al. 1996), and are so far scarce in Vermont (Thomas 1992:188). Rarely solidly dated, they are nevertheless dependably Early Holocene in age ([Table 6](#)). There is a serious need for analysis and subdivision of this category.

Several different styles of Early Archaic notched points trickle into the Northeast between 11,500 and 10,000 years ago, contemporary with style groups V and VI. In Delaware, New Jersey, and coastal New York, notched Early Archaic points (Hardaway-Dalton, Kirk, Palmer) dominate at the time when the lanceolates occur to the north (Funk and Wellman 1984; Levine 1989; McNett 1985; Ritchie and Funk 1971; Stanzeski 1998). All have strong southern relationships, and are increasingly rare northward (Carr 1998; Custer 1996; Dincauze and Mulholland 1977; Pfeiffer 1986; chapters in Robinson et al. 1992). Geographically between the lanceolate points in Canada and the notched point Early Archaic in southern New England are early Holocene sites dominated by quartz tools and debitage and apparently lacking bifacial weapon tips; unless their ages remain in the ninth millennium they may force revision of current notions of early Holocene cultural dynamics (Curran 1994: 46; Robinson et al. 1992; Sanger et al. 1992). While diminishing in numbers north of New Jersey, notched Early Archaic points have been reported as isolates into northern New Hampshire and the central coast of Maine. Such strays may be trade items among coeval peoples, in parallel to the western styles of lanceolate points noted above.

In the Delaware valley at Plenge and **Shawnee-Minisink**, Paleoindian and Early Archaic components occur at the same sites, as is normal farther south. Farther north, in glaciated terrain, Paleoindian and Early Archaic sites are typically separated. This change occurs near the southern limit of Wisconsinan moraines and probably records nothing more cultural than the relative stability of landforms south of the moraines, where uplift ended earlier.

Large Sites and Clusters

Within the Northeast, some areas stand out as relative concentrations of Paleoindian and Early Archaic sites. Counts of Paleoindian points by state are skewed by such large sites as Vail and Bull Brook with their large artifact populations. Other clusters are groups of isolated point finds or small sites. Spiess et al. (1998:232) note differences with states south of New York, and affinities with the Great Lakes area, in both site types and distributions, but these may be superficial given the weakness of analytical studies to date. The Magalloway cluster near the **Vail** site includes also Adkins, two sites near Wheeler Dam, and the Cox, Morss, and Wight sites, inter alia (Gramly 1988a; Spiess et al. 1998:213). The Munsungun cluster is undoubtedly related to outcrops of good lithic material; at least ten sites are listed in the area in the Maine State inventory (Spiess et al. 1998:213). The sites are not yet well published, however (Bonnichsen 1981, 1984; Payne 1987; Pollock 1987a, Pollock et al. 1999).

Vermont Paleoindian sites and finds cluster west of the Green Mountains near the Late Glacial Champlain Sea (Loring 1980; P. Thomas pers. comm.), where both coastal biotic resources and good cherts were to be found. The large Mahan site should encourage research in this area (Thomas et al. 1998). Little evidence of Paleoindians has been reported in the northern Connecticut Valley in Vermont. New Hampshire has isolated finds clustering in the lower Merrimack drainage near Manchester and the Massabesic lakes (Curran 1994), with the Israel River group dominating the north (Boisvert 1999) and little between. The Whipple site accounts for most Paleoindian finds in the upper Connecticut Valley, where the valley floor is to date devoid of sites of that age.

Massachusetts has produced more fluted points than the literature now shows, with the Bull Brook/Ipswich group (Bull Brook I and II and Paisley) leading all of the northeast for sheer numbers of fluted points (Spiess et al. 1998). In Concord, within the basin of Glacial Lake Sudbury, at least six fluted points have been reported (Lyon 1989:10). The basin of Glacial Lake Hitchcock in the northern Connecticut Valley of Massachusetts has a cluster in the towns of Deerfield, Greenfield, Gill and Montague (Curran and Dincauze 1977; Lyon 1989:10), whether or not **DEDIC/Sugarloaf** is a large site (Gramly 1998). In the central part of the state is another sizable group including the unpublished Flanders/Winnimisset site and finds related to the Ware River drainage (Johnson and Mahlstedt 1985:26-28; Lyon 1989:11). In the southeastern corner, strays and the **Wapanucket 8** site indicate early use of the area of the large lakes.

New York state offers an important cluster near the Onondaga escarpment in Genesee County,

including the Arc, Hiscock, the unpublished Bear Paw/Bush sites, and others (Gramly 1988b; Holland 1994; Smith 1995; Tankersley et al.1997; Vanderlaan 1986). Finds along the Seneca River have indicated regular Paleoindian use at locations such as Baldwinsville, Cross Lake, Haiti Island, and Van Buren (J. Bradley pers. comm.; Spiess et al. 1998), and the Oneida River and Lake have produced a few finds (Caughdenoy Creek, Oneida Lake outlet, Muskrat Bay; J. Bradley pers. comm.). In eastern New York, near famous chert outcrops and the swampy beds of several glacial lakes, are Paleoindian sites such as Kings Road, Swale, and **West Athens Hill**, and the scattered finds near the **Dutchess Quarry Caves** (Funk 1973; Funk et al. 1969a,b,c; Funk and Steadman 1994; Kopper et al. 1980). Farther south on the Hudson estuary is the Port Mobil group (Kraft 1977a).

New Jersey Paleoindian sites cluster in the Delaware River drainage; the multi-component Plenge site and Zierdt (Kraft 1977b: 267; Werner 1964) are on the upper drainage. Isolates tend to be in the same drainage, or on higher elevations on the ocean side of the divide (Bello and Pagoulatos 1995; Grumet 1990).

On the Pennsylvania side of the Delaware River, a few known sites occur: Poirier, **Shawnee-Minisink**. More should be found when appropriate search methods are applied to landforms of Late Glacial age. An important group, including the **Shoop site**, occupies the Susquehanna River basin. In western Pennsylvania, Lantz (1984) has proposed the Allegheny Paleoindian Corridor, but the claim needs to be confirmed with disciplined studies of lithic sources and point styles. He noted that Crawford County has 24 sites/finds recorded and six are in Erie County south of Waterford (Lantz 1984:219). His survey found that sites "are twice as dense in the glaciated Allegheny Plateau than on the unglaciated Plateau" (1984: 213-4), where sites were "thickest" in Washington, Armstrong, and Indiana Counties (1984: 215). Carr et al. (1996) confirm that site distributions vary among the physiographic provinces of the state. The **Meadowcroft site** stands in splendid isolation, claiming neither related assemblages with early dates, nor fluted points (Adovasio et al. 1988; 1992).

Delaware has no single-component Paleoindian sites, but finds cluster on the central uplands and toward the Delaware River (Custer 1984b, 1986; Custer et al. 1983). The Delaware Chalcedony complex and **Hughes Early Man Complex** are quarry-related clusters of finds of both Paleoindian and Early Archaic points.

The Northeast emerges as an important area for Paleoindian sites and distributions, and continues to contribute information as the analytical vocabulary and theoretical perspectives mature and stabilize. Site types and distribution patterns differ significantly from those characterizing areas to the south and west. Glaciation and isostatic landform adjustments, glacial lakes, mountain ranges, and the sea contribute, with a dynamic Late Glacial climate, to the uniqueness of the area and the experience of its initial human populations.

Research Needs and Questions for the Northeast

Historical Background

The aesthetic specialness of fluted points of cherts and chalcedonies is so obvious to the casual observer that before there was any awareness of the issue of 'first comers' or 'big game hunters' there were names for these things. Among collectors in the Northeast they were called 'Seneca points,' apparently in recognition of a Great Lakes connection. After the Folsom clarification, that name took over (Anon. 1936), although Edgar Howard in Pennsylvania was refreshingly careful (1934, 1942). As the Clovis terminology diffused, both 'Clovis' and 'Folsom' were used casually as envelope terms in the Northeast, preventing awareness of that diversity in time and space that now provides crucial insight into processes of colonization and adaptation. After mid-century, field investigations were dominated by museum professionals, among whom J. Witthoft (1952), W. A. Ritchie (1953, 1957), and D. Byers (1954), have pride of place by virtue of publishing and publicizing the **Shoop**, Reagen, and Bull Brook sites. Before those influential reports, these same archeologists had contributed to the growing avocational literature on fluted point distributions. Byers' experience with the Bull Brook site led to his involvement in excavation of the Debert site in eastern Canada that provided impetus for anthropological perspectives on early sites (MacDonald 1968) and, along with Jordan's attempt at interpreting the Bull Brook site (1960), set the tone for frustrations in dating sites by either radiocarbon, organic associations, or geochronology. An even more complicated, multi-component, site was reported about the same time (Robbins and Agogino 1964), raising interest nationally. Survey reports and site counts began to be available (e.g., Mason 1959). Emery and Edwards (1966) called attention to the importance for early cultural histories of

the inundated continental shelves. Environmental determinism crept in as Ritchie joined J. Fitting in Michigan to ponder the chronological gap both perceived between fluted points and the nearly ubiquitous mid- to late-Holocene cultural remains in their respective research areas (Fitting 1968; Ritchie and Funk 1971). Neither at that time was able to identify elements of Early Archaic cultures, despite clear demonstrations to the south (Broyles 1966; Coe 1964). Mason (1962) saw the crucial difference between the frequency of fluted points in the East, versus their comparative rarity in the West, and sounded the call for explanation.

Prosperity and the boom in graduate education rapidly expanded the corps of researchers in the United States and Canada, initiating the era of University-based research. In Michigan, Roosa (1965), Fitting et al. (1966) and Wright and Roosa (1966) established a vocabulary for fluted point variation that reached the Northeast only later, after being expanded and grounded on geochronology in eastern Canada (Ellis and Deller 1988). By the middle of the 1970s northeastern Paleoindian studies, firmly wedded to paleoenvironmental research, were raising enduring issues: Callahan (1979) laid out a formal sequence for fluted biface manufacture; Dent (1985) and Eisenberg (1978) countered the Big Game Hunting model with evidence and a model of generalized foraging; Grimes (1979) elaborated the Debert issues of single vs. multiple occupations at big sites. New research was showcased at a seminal conference sponsored by the New York Academy of Sciences (Newman and Salwen 1977). Nearly every issue that has enlivened Paleoindian research in the region since then was presented or discussed there. Basic research on Paleoindian sites and site distributions expanded and engaged audiences, putting the region on national maps.

Building on Mason (1962), Brennan called for a fluted point census of eastern states (Brennan 1982). The response and the publication that followed galvanized research, albeit on weak grounds given the poor controls on sampling and the hasty conclusion that large numbers demonstrate an eastern origin for fluted points (see caveats in Cotter [1983], Griffin [1983], Haynes [1983], and Purdy [1983]). Northeastern researchers were aware of the problems and potentials (Adovasio 1983; Funk 1983; Gramly 1983; Grimes 1983; Moeller 1983; Ritchie 1983), but the tone of Paleoindian research had changed, not entirely for the better, as a strain of fanaticism appeared in academic and avocational communities alike ([Table 15](#)). Market forces came into play, inciting increases in both scale and intensity of looting.

Since 1980, Paleoindian research in the Northeast has intensified with contributions from compliance surveys and site evaluations, and more academic attention. Anthropological interpretive issues have been added to the old questions of 'how old?' and 'how many?'. The special complications of eastern archeology—small, selective, and scattered samples, competition with looters and market pressures on fluted points, and the predominance of private lands—explain some of the problems that have beset Paleoindian studies. Tankersley (1989:264) highlighted the problems with interpreting private collections. Chronological ambiguities related to radiocarbon dating and poor preservation bedevil everyone (Fiedel 1999; Levine 1990), while the disturbed state of most sites prevents good interdisciplinary and ecological studies (Dincauze 1996; McWeeney 1994). The scarcity of petrographical studies of lithic raw materials complicates and burdens models of mobility. These issues color discussion of the topical categories and research directions that follow.

Peopling Places

In this context, it is necessary to keep in mind that Native Americans strongly hold that their ancestors emerged anciently on the continent, not being derived from any elsewhere. Anthropologically, such special creation is difficult to deal with, but the idea is powerfully held.

The oldest site question. The **Meadowcroft Rockshelter** burst into national awareness in 1975 (Adovasio et al. 1975), with claims for a tightly dug sequence of cultural deposits dating back to 20,000 years ago. At first euphorically welcomed, the claims were soon challenged on several issues. Taphonomic and contamination problems have been addressed in various reports and discussions over the years. As early publications contain some erroneously cited ages that were corrected in 1984 (Adovasio et al. 1984: 355, 357), only selected earlier publications are cited or discussed here, with recent reviews emphasized (Adovasio et al. 1980, 1981, 1982, 1984, 1988, 1990, 1992; Carlisle and Adovasio 1982).

The age of the 'Miller' point biface from **Meadowcroft** Zone IIa is bracketed between two radiocarbon dates that represent a conservative estimate of the radiocarbon age of cultural materials: 12,800±870 (SI-2489) and 11,300±700 (SI-2491) (Adovasio et al. 1988: 48). At face value, this

indicates an age for the Miller point between thirteen and fifteen thousand years ago. It implies entry into southwestern Pennsylvania, at the western edge of the Appalachians on the unglaciated Allegheny Plateau, prior to the Younger Dryas while the glacier was shrinking toward the Great Lakes basins and the Ohio and Mississippi rivers were carrying heavy loads of outwash and meltwater.

There are several reasons why these radiocarbon ages are controversial, some technical, others contextual (Dincauze 1981a,b; Haynes 1980, 1991; Mead 1980; Tankersley and Munson 1992). For instance, the Miller point resembles the styles of Early Holocene Group V (Lantz 1984; Table 3), and no closely comparable style has been found to the west, the putative direction of origin (Boldurian 1985). Additionally, the rockshelter is in coal country, and in the past has been suspect for contamination by ancient carbons (Haynes 1980, 1991; Tankersley and Munson 1992). These issues are crucially important for the question of the initial peopling of the Northeast (Adovasio et al. 1992, 1999). The final report is eagerly awaited.

Trails east and north. Because Clovis sites in the West carry ages older than any yet reported in the East for fluted points, the conventional understanding of human settlement in the East is people moving from west to east and then dispersing northward and southward (e.g., Anderson 1990: Figure 4; Dincauze 1993b; Ellis et al. 1998; Funk 1972; Gramly and Funk 1990; Kelly and Todd 1988; Steele et al. 1998; Tankersley 1994c). During the rapid meltback of the Laurentide ice sheet in the Late Glacial warming preceding the Younger Dryas, the Mississippi River could have presented a barrier to west-east movement while it was carrying torrential meltwater with gravel (Kennett and Shackleton 1975). Consequently, it is not irresponsible to posit some delay between the ages of Clovis sites in the west and those to the east (but see Fiedel 1998), despite the closely analogous lithic technology of what seem to be the earliest fluted points in the East (e.g., Morrow 1995). Anderson and Faught (1998) show that the heights of the southern Appalachians were essentially unutilized and may represent another barrier; people apparently tracked around the Blue Ridge, splitting into southern and northern groups there or at the confluence of the Ohio and Tennessee Rivers. Whatever the routes, evidence currently available shows that people were in the East at least as early as the beginning of the Younger Dryas, perhaps sooner.

From the perspective of the Northeast, it is worth considering some alternative scenarios of pioneering movements: (1) from the west into the Allegheny Plateau and southern shores of the Great Lakes, thence along the lake fronts and southern edge of the Adirondacks into northern New England; and (2) north along the Great Valley or Piedmont and Coastal Plain from Virginia. These two directions are not mutually exclusive, but considering them separately illuminates some observations about eastern fluted points that have been puzzling to date (Boisvert 1999; Dincauze and Jacobson 2001). This distinction is becoming possible because of the addition to the data base of the sequential style series of fluted points and more reliable lithic identifications ([Table 18](#)).

At least one influx of people directly from the prairie states is strongly supported by the distribution of Gainey (Eastern Clovis) style points and the western lithics with which they appear in the Allegheny River basin of Pennsylvania (Lantz 1984; Lepper and Meltzer 1991). Lantz plots evidence for movement from both the southwest and the northwest into the upper Ohio River drainage. The evidence is, however, complicated by the fact that his fluted point compilation includes all style groups, so cannot represent only early, initial immigrants; two-way traffic is implicated. Gramly (1988b) maps many artifacts of Ohio cherts in the Lake Erie area of New York state, supporting Lantz's inference of movement from the west, as well as some stone that seems to come from as far as North Dakota. Tankersley (1988) also demonstrated some movement from the northwest. Better petrographic data are essential for development of this topic.

The earliest northeastern fluted point sites (Clovis/Gainey style points of Group Ia) occur frequently in the band of country immediately south of the Great Lakes, congruent with assumptions of movement from west to east. The Ohio River route east of the Tennessee River naturally bifurcates at modern Pittsburgh, with the Allegheny leading thence northeastward, the Monongahela leading southeast (Carr et al. 1996). Paleoindians initially following the southeastern route could subsequently have utilized Appalachian passes and moved north along river valleys among the mountains or the Coastal Plain through Delaware and New Jersey. Equally, people entering by the northern routes could have moved south from New York.

In the Mid-Atlantic states the southern routes to the Northeast are not challenged. Gardner and his students see many connections between the *Thunderbird sites* in Virginia and fluted points in the

Pennsylvania valleys and the coastal upland sites of Delaware (Carr 1989, 1998; Custer 1986, 1996; Custer et al. 1983). Such southern affiliations could be evaluated by an intensive examination of fluted point manufacturing styles in southern Pennsylvania, New Jersey, and Delaware (e.g., Callahan 1979; Painter 1973), perhaps also Staten Island. Distributions of lithic types are less useful here, as the numerous potential bedrock sources are themselves difficult to differentiate and subject to over-generalization on that account (Hatch and Miller 1985; Kraft 1977b; La Porta 1994).

These alternative routes bear importantly on issues of chronology, demography, adaptation, and stylistic trends. For instance, the enigmatic **Shoop site** in Pennsylvania may be (1) a southern outlier of a northern population, established from the northwest, or equally (2) a northern outlier of a southern population, and thus indicative of entry from a second direction. While no critical study of **Shoop** technology has been done to compare it to assemblages northwestward, the **Shoop** assemblage is discussed in the literature as stylistically close to early fluted points in Virginia (Group Ib on [Table 18](#); Cox 1986; Gardner and Verry 1979).

During research for his 1984 dissertation, D. Meltzer became aware of north-south differences in Paleoindian tool assemblages. Trying to explain this without benefit of the serial typology, he posited a paleoecological contrast, in terms of tundra environments north of the Wisconsin end moraines and forest south of them, with corresponding differences in prey. This proposition, although developed later on ecological principles (Meltzer and Smith 1986) was insensitive to the available paleoenvironmental data for the region (see Dincauze 1988). The assemblage differences, however, are likely real (i.e., Group Ia vs. Group Ib fluted points and other details), and may have a socio-cultural basis in subsets of Late Glacial populations. Paleoindian movement early into the Southeast likely resulted in lifeways different from those adapted to the Ohio River/Great Lakes corridor. Colonization movement out of the south, east of the Appalachian peaks, brought northward an adaptive tradition different from that established near the Great Lakes, along with distinguishable lithic techniques and point styles, site location Criteria, group sizes, seasonal activities, and possibly even dialect differences (see chapters and discussions in Anderson and Sassaman 1996c).

The **Shoop site** near the Susquehanna River in central Pennsylvania seems less odd when it is reunited with its relatives to the south, rather than being connected to the Onondaga escarpment in New York (Holland and Dincauze 1999; Moeller 1989). Sites in eastern Pennsylvania, most of New Jersey, and all of Delaware (Mid-Atlantic bight drainage) seem to belong to the southern set which is typified by **Shoop/Williamson** and **Thunderbird**. The sheer dynamic of northern environments, especially in the Younger Dryas period, was likely an important contributing, if not defining, factor in the differences. Although the Delaware River could have been followed northward from Chesapeake Bay, early Paleoindian fluted points in the Upper Delaware basin, including Zierdt and **Shawnee-Minisink**, seem at home in the northern set (Ia).

Paleoindians carrying fluted points of Groups Ia and II into the Northeast may have turned north west of the Hudson gorge, following the lake shores with their abundant wildlife (Dincauze and Jacobson 2001). In Vermont, fluted points are notably rare east of the Green Mountains, but numerous near the Champlain Sea (Loring 1980). There is little evidence in southern New England for Group Ia points made of Hudson Valley cherts, which was expected for the model bringing the initial movement from due west. Instead, we find in Group Ia points lithic materials from Maine, Vermont, and northern New Hampshire, and a variety of local and exotic lithics among the Groups II and III points and later styles (Jacobson 2001 and diverse sources). The **Wapanucket 8** site in southeastern Massachusetts has Barnes points (Group III) with Hudson Valley cherts, while the Munsungun outcrops are represented at the earlier Bull Brook site (Group Ia) along with stone types originating in Vermont (Curran 1999). The Neponset site (MA) has Munsungun chert and Mt. Jasper rhyolite with Group III points. The situation at **DEDIC/Sugarloaf** (Gramly 1998) is too confused to support interpretation; reports of lithic materials conflict from observer to observer.

The history and origins of Paleoindian Group II points is unexamined. They are conventionally associated with the extreme northeastern distributions of fluted points, in Maine (**Vail**, Adkins) and Nova Scotia (Debert and others). More recently their deeply indented bases are recognized south of the Great Lakes at the Lamb site (Gramly 1997), as far as western Pennsylvania in Lantz's sample (1984), and east to Martha's Vineyard. Did they come into the Northeast on the heels of the Gainey type and end up on the northern margin? If the style developed originally in northern Maine and Nova Scotia, as the use of regionally specific lithics implies, how do we explain the wide distribution of strays? Radiocarbon dates place them among the earliest points in the Northeast (Levine 1990: Table 1), but their relationship to the development of the Younger Dryas cold period

remains unclear. The rare, small, triangular late fluted points of the eastern Maritime Provinces and northern New England, with their deep basal indentations, seem to derive from this style (Keenlyside 1985).

From the time of Group III bifaces in the Northeast, the patterns of site distributions and lithic utilization indicate some territorial restrictions on the populations (Jacobson 2001: 'settling in'). The distribution extends into Ontario and the Midwestern Cumberland style of the same relative age. Group IV points are less widely distributed, centered near the eastern Great Lakes and St. Lawrence, into Maine. As strays they show up in New Jersey and coastal New York. Lanceolate bifaces of Groups V and VI are not typically made of exotic raw materials, although there clearly continued to be selection for excellent flaking properties; dark to black cherts were notably favored, just the rocks that are notoriously difficult to trace to ground.

There is no evidence supporting the long-held notion that Paleoindians moved north out of New England to follow the glacial margin. North of the St. Lawrence River, there are no fluted points (Keenlyside 1985: Figure 1). Late Paleoindian tool kits of recognizable New England styles do not spread northward (Keenlyside 1985); they do not appear in higher latitudes even with a migration lag (Dumais 2000; Tuck 1984).

The lack of such evidence northward, therefore, makes enigmatic the change of biface styles that marks the beginning of the subsequent Early Archaic period. The earliest Early Archaic tool styles—the notched Hardaway-Daltons, Palmers, and Kirks—seem, like the first fluted point styles, to be intrusive into the Northeast, this time definitely from the south. There are no antecedents to these styles north of West Virginia, and no unique regional point styles in the eleventh millennium of the Northeast. The clearly southern suite of Early Holocene styles is also discontinuously distributed; more numerous in the south, rare to vanishing in the north (Robinson et al. 1992). Until investigators in the Northeast were forced to recognize the southern types and understand their distant origins, they depended on an environmentally determined depopulation hypothesis to account for a 'gap' in the human presence in the Northeast after the time of fluted points (Ritchie and Funk 1971:56; see Dincauze and Mulholland [1977] for a discussion of this). Dumont (1981) posited a continuum from Paleoindians on the basis of ecology and the bare outline of settlement patterning, as did Dincauze (1990), using as Criteria significant continuity in selective uniface tools from the Paleoindian to Early Archaic periods; only the bifaces change.

The origins and connections of human societies are not equivalent to those of projectile points. B. Robinson surprised New England archeologists by demonstrating Early Archaic cultural assemblages near the Gulf of Maine that lack bifacial stone weapon tips and are thus incomparable to Early Archaic complexes in southern New England (Robinson 1992). Northern New England Early Archaic cultural remains show as quartz debitage and ground stone rods, themselves not traceable far to the south. Relationships with southern-derived bifaces are therefore unclear.

The highly visible Bifurcate-base points, horizon styles of the early Holocene, are attributed variously to either the Early or Middle Archaic, depending on latitude. Their ages seem to decrease to the north, where the styles diverge from those of the southeast. Because they date younger than 10,000 years ago, too late to contribute substantially to issues of interest here, they are not considered further.

In the Northeast, the problem of explaining the distribution and origins of Iroquoian and Algonquian speaking peoples and their purportedly 'distinct' cultures has exercised anthropologists for generations, and continues to do so today. Consequently, the region offers no models or analogs helpful for understanding or testing processes of cultural replacement or socio-cultural blending or separation (Dincauze and Hasenstab 1989; Snow 1992). Indeed, the North American continent is similarly bereft of explanatory models (Hall 1995) beyond the Native American origin tales.

Creation of Social Institutions

Thinking about the formation of social institutions should be easier in the vacuum of Paleoindian time than in the more complex case of the exotic Early Archaic material culture, but it is no simple challenge. Late Glacial oscillations between cold and warm periods, and the Pleistocene-Holocene environmental transition were apparently very rapid as measured in the real time of Greenland ice layers (Mayewski et al. 1993; Taylor et al. 1993, 1997). While pollen sequences do not express rapid change well, they do show us highly dynamic biotic mosaic environments responding to the far more rapid climatic change (Gaudreau and Webb 1985; Jacobson et al. 1987; Peteet et al 1993), and

macrofossils reveal more of the details (FAUNMAP Working Group 1996; McWeeney 1994; Miller and Thompson 1979; Morgan 1987). Hardwood mast species were established in New England as early as Group III fluted points and continued to increase in density and diversity. What kinds of social institutions can we expect in such circumstances? How do we understand change in such situations among small, mobile, human societies (see MacDonald [1997] and Wright [1989] with references cited there)? Early models of seasonal cycling relied on inadequate paleoenvironmental reconstructions and are now mostly discredited, along with the conclusions drawn about settlement sizes, durations, and functions. The archeological record for this time remains impoverished in the Northeast, where organic remains are rare and the lithic assemblages—scattered, collected and looted, sold, illustrated, and speculated about—are the greater part of the evidence.

Anthropological kinds of questions about social change should be based on demographic data at minimum (Laughlin and Harper 1988; Straus et al. 1996; Wright 1989:348), and reasonably good control of time. Notwithstanding, issues of coresident group size, frequency of moves, openness of social groups, economic specializations, gender roles, and technological innovation have been raised for the Paleoindian Northeast (Chilton 1994; Curran 1984; Curran and Grimes 1989; Custer 1996; Custer and Stewart 1990; Dincauze 1993b; Dincauze and Curran 1983; Eisenberg 1978; Fitting 1977; Funk 1991; Gramly 1988b; Gramly and Funk 1990; Grimes and Grimes 1985; Kuhn 1994; Lothrop 1989; Meltzer 1984a; Moeller 1984a; Spiess 1984; Spiess and Wilson 1987; among others). Several authors in the Ellis and Lothrop collection (1989) use exotic lithics as evidence for, variously, exchange, social signaling and banking, marriage networks, and residential mobility. Postulated differences between collectors and foragers are explored as controls on movement. The conclusions, elusive at best, must be pursued.

In the Northeast, shrinkage of the resident populations apparently occurred in the Early Holocene, between the end of fluted point manufacturing and the establishment in the Northeast of the Bifurcate base point style after 11,000 years ago. Paleoindian biface styles of Groups IV, V, and VI are as rare as the coeval Early Archaic notched points. This observation, and the dynamics of replacement or population regrowth, are not yet firmly established as research topics in the region. This neglect is crucial, as our concepts of relative or absolute population sizes are partly artifacts of radiocarbon warping of time—the Late Pleistocene and Early Holocene chronological plateaus (Fiedel 1999). The long spans of real time constricted in the radiocarbon envelopes of the twelfth and fourteenth millennia encourage us to imagine unrealistically greater population densities than were in fact the case. When we open the envelopes to deal in calendar time, the apparent populations shrink severely.

The reigning assumptions that enable speculations and arguments about social groupings are that artifact styles and lithic raw material classes reflect ideas and knowledge shared within a bounded social group. These concepts, well grounded in ethnology and social anthropology, lack analogical support for thin, mobile populations such as those of Late Glacial North America. We should be prepared for surprises here. In the meantime, biface styles, the only clues we have, are utilized as talismans of social groups. We classify them into discrete time units, despite observing that styles intergrade, changing as morphing forms. Gross point form and lithic material suites have been used by Curran (1999), Custer and Stewart (1990), Gramly (1988), Grimes et al. (1984) and Spiess and Wilson (1987) to define archeological 'phases' which are also conceived as territorial ranges, as is customary for later time periods in the archeological record. Even if the assumptions are correct, the social meaning of style change frequency and distributions is probably not constant in differing demographic densities and various times.

The practice of lumping all fluted points as 'Clovis' obscured until recently the diversity in point forms and distributions. If such differences do have social correlates, one can play with interesting patterns. The fundamental one is whether continuous or intermittent stylistic variation occurred, or whether, indeed, major changes represent separate group immigrations into the Northeast. For example, was the Debert style (Group II) a native development from Gainey in the far Northeast, or brought separately from the West, with its share of exotic lithics, into western Pennsylvania and New York? Similar questions arise at the Paleoindian-Early Archaic transitions in the region.

Custer et al. (1983) present lithic procurement as a control on site distributions, using the cyclical model of procurement developed by Gardner in Virginia. Custer found it necessary to posit an alternative, "serial," system for upland and inland areas of the Middle Atlantic States, where dispersed outcrops are readily available during the annual round. It is not uncommon to find archeologists working with lithic distributions in a social-system mode to overlook diversity in

artifact styles within 'social' spaces defined by stone types.

Issues of settlement mobility and seasonal mobility were raised early in the Northeast, with the publication of the Debert site (MacDonald 1968), and have received continuing attention. They are prominent in all efforts to understand the unique size of the Bull Brook site. These large sites have been modeled as seasonal destinations used repeatedly by small groups returning over a period of years (Curran and Grimes 1989), or as special-purpose aggregations for (1) intercepting game, (2) seeking mates and information, or (3) scouting newly encountered lands (Curran 1999; Dincauze 1993b; D. MacDonald 1997; G. MacDonald 1968; Spiess 1984; Sullivan 1992; Tankersley 1995). Spiess and Wilson (1987) make a good case for more than one visiting group at Michaud, but can't tell whether they were there together or separately. Behind the inconclusiveness of these models is the assumption of fixed ranges. If we conceive of ranges as social arrangements that developed in place over time, the meaning of aggregations will change. Our task is to know when and where.

From the perspective of a resident of New England, the transition zones that reflect distributions of culturally contrastive assemblages are eerily familiar. The differences in Paleoindian assemblages of the twelfth and thirteenth millennia between northern and southern New England, and between the northern Northeast and southern Pennsylvania, are paralleled in later prehistoric as well as modern social affiliations and even in the citing circles of Northeastern archeologists. How much the modern phenomena affect our perceptions of the ancient ones demands examination.

Several regional authors agree that the Early Archaic period shows little change, socially and culturally, from Paleoindian (e.g., Dincauze [1990] groups both together; Carr 1998:48; Custer 1996: "Hunter-Gatherer I period"; etc.). This correspondence derives from the fact that sites with the early notched bifaces are small, scattered, rare, and not infrequently in the same places as Paleoindian sites, as well as sharing many lithic tool types except for the bifaces (e.g., Logan, Plenge, Reagen, Twin Fields,). This consensus is subject to change whenever archeologists agree about recognizing Early Archaic artifacts, pace Funk (1996). In the Northeast, the similarities end in the period of Bifurcate base points, when subregional diversification of Archaic cultures gains speed. Quarry sites are not important in the Early Archaic period north of Pennsylvania, where local rocks from rivers, ground moraine, and bedrock were used without much discrimination. No long-distance transport of lithic materials has been demonstrated for Early Archaic. In that respect, the societies seem more settled than were the Paleoindians. More attention should be paid to finding and examining Early Archaic sites as if they mattered.

Expressing Cultural Values

There is very little among the Paleoindian sites of the Northeast that can be considered evidence of cultural value systems. Clearly, there was culture: an effective set of shared behaviors to maintain communication, nurturance, physical reproduction, and social groupings in the region for nearly two millennia in very challenging times of environmental lability. We stand in awe of the achievements. But of ephemeral things like values, we have little in hand. The typological standardization of the fluted bifaces and later lanceolates suggests to anthropologists that people used them not only as tools but also as social symbols (Wobst 1977). Nevertheless, the broad spatial scale at which early styles were distributed cannot indicate a very intimate level of symbolization, either to members of groups or to practitioners of particular economies. The spatial scale is comparable to those of language groups today. The earliest Clovis-like styles, defined closely by southwestern Criteria, have a continental scale of distribution. Second-tier style units are at best regional and sub-regional in scale, as the Gainey/Bull Brook, Shoop, Debert/Vail, Barnes and later northeastern types show.

Some artifacts that may have carried symbolic meanings significant to Paleoindian observers are miniature fluted points that accompany fluted point assemblages (Ellis 1994), enigmatic and possibly spurious talc pendants reputedly from the Reagen site in Vermont (Ritchie 1957), and stone beads from the **DEDIC/Sugarloaf** and Hiscock sites, probably of the thirteenth millennium (Gramly 1998:27; Laub 1995a:28). Imputing original cultural meanings to these ancient, rare and scattered items can be no more than unbounded speculation. For example, the miniature fluted points have been interpreted variously as children's toys and shamans' paraphernalia—very different scales of signification. In the study area, they occur at the Arc, Bull Brook, Neponset, Port Mobil, Templeton, and **Vail** sites, and at sites in Ontario and Nova Scotia, as well as from Clovis and Folsom sites in the West (Storck 1991:157). The doughnut-shaped stone beads, with no known correlates elsewhere, have only context-free, intrasite proveniences, precluding interpretation.

No Paleoindian burials are known in northeastern United States, nor are art forms that communicate to us. The scratched rocks mentioned in the [Property Types](#) section are not obviously representational. In the absence of cave utilization, parietal art cannot be expected to survive. Whether lithic materials as such were considered representative of their places of origin, as is the case among Australians (Gould 1980), is unknown and so far untestable. The visual beauty of some fluted points made of exotic stones that must have been carefully selected, for example the Lamb site bifaces and the famous Intervale point from New Hampshire, strongly implies some meaning less mundane than tools for the hunt. Whether social status, magical significance, aesthetic delight, or genealogical claims invested them with meaning, we have at the moment no incisive clues (Ellis 1989).

In Ontario, the Crowfield site appears to have been a cremation burial with burned offerings (Deller and Ellis 1984). In this context, then, it may be significant that an Early Archaic cremation burial has been reported in New Jersey, with Kirk Corner Notched points (Stanzeski 1998). In New England, the first known mortuary sites are dated within the eighth millennium, outside the range of this study (Doucette and Cross 1998; Robinson 1992).

Shaping the Political Landscape

"No one has succeeded in devising an acceptable direct method for assessing population variability for Pleistocene foraging groups, knowledge of which is critical for assessing questions of alliance and communication" (Wright 1989: 348). Wright continues by offering suggestions for improving this situation, which are daunting and not yet feasible. We must open by restating that political units develop only after the achievement of a degree of sedentism; in the particular case, that would have been during and after the time of Group III points, at earliest. We can take comfort in noticing that by that time we can demonstrate the existence of sub-regional styles with increasing numbers and decreasing sizes of stylistic provinces. So, it is likely that political landscapes were taking form in the twelfth millennium; research to define them awaits.

If weapon tips are considered icons of social or political affiliation (Wobst 1977), then the several style groups discussed above may be tentatively considered elements of successive political landscapes, alternative to the social groups discussed above in [Creation of Social Institutions](#). At any one time within the Late Glacial Northeast there were at most two or three such. Finer subdivisions have been posited by Curran (1999), Custer (1996), Gramly (1988), and Spiess and Wilson (1987), on the basis of equivalences in biface forms and types of stone utilized for tools. These groupings are smaller than style provinces and geographically more realistic as territories or ranges for human communities. However, there are problems: (1) some of the spatially defined groups are based on sites belonging to more than one time period or style cluster, and (2) the size and borders of the units, as defined, must be revised every time a new technique is applied to the identification and sourcing of utilized rocks.

Large-scale patterns within the regional set of sites may indicate territorial affiliations more fundamental and, at the same time, short-lived. If the occupants of the **Shoop site** in central Pennsylvania can be absolved from the necessity of obtaining Onondaga cherts from the bedrock outcrops of western New York, and be allowed to collect from nearby outwash gravels of the Susquehanna River (Holland and Dincauze 1999), then the southern affiliation of the point style can be taken seriously (see above, Group Ib). In such case, **Shoop** may lie near the northern limit of immigration from the south within the chain of the folded Appalachians, and sites to the north and west of that can be seen as the southern limit of immigrants from those directions. Pennsylvania may, therefore, be the location of an important political/demographic watershed between the Northeast and the Southeast, as discussed above. This notion is supported by Lantz's observation in western Pennsylvania that despite a very eclectic mix of lithic materials in the area, some from great distances away, "Almost none of the available lithic sources in southwestern Pennsylvania were finding their way up to the northwestern counties" (1984:213). A suite of subtle behavioral traits may be interpreted the same way; these lie behind Meltzer's recognition of differences north and south that he explained by positing a major environmental boundary (Meltzer 1984a).

Early in Paleoindian times, contrasts in social and stylistic entities east and west of the Appalachians may be explained by migration models, not fundamentally political. Increasingly thereafter, differences emerge on opposite sides of the Appalachian mountains that set the stage for normalcy in the Archaic periods. The first Early Archaic artifact styles in the Northeast patently arrive, whether from hand-to-hand exchange or by pedestrian traffic, from the south. By the end of the

Early Archaic period, Bifurcate base points had spilled from the Tennessee Valley over the mountains north of the Blue Ridge, and Dalton-related side-notched points had arrived from the mid-continent into Vermont (Thomas and Robinson 1983). Thereafter, socio-cultural and economic contacts occurred within the Northeast and from the west, south, and north.

Politically, both Maine and Pennsylvania appear as important border zones in Paleoindian and Early Archaic times. A strong cultural demarcation between southern-derived and northern-derived cultural groups crosses Maine throughout most of prehistory. Northern Maine, arguably less heavily surveyed than any comparably-sized area in the region, nevertheless shows sites of the fourteenth millennium with Gainey and Debert-style points (Groups Ia and II), and a Maine presence to the south in numerous sites exhibiting Munsungun cherts (Pollock et al. 1999). These recent realizations premise widespread revision in the region. The area seems to have been more lightly utilized in the early twelfth millennium than it was either earlier or later. Group III points do not occur in the Maritimes or adjacent northeast Maine, an observation delayed by the famous Intervale, NH, point (Boisvert 1999). Groups IV and V are rare everywhere, so that their relative frequency in Maine cannot be closely interpreted, except to note that they are strongest in the southwest. Group VI points are increasingly reported in Maine, while their numbers to the south are augmenting much more slowly. By Early Archaic time a divide lay again in central Maine (Dincauze and Mulholland 1977; Robinson et al. 1992), although it was even then a permeable border with lanceolates coming south, notched points going north, as strays.

Far more precise data on artifact traits, lithic sources, site distributions, and chronologies of site occupation and resource use are needed before any of these arguments can be carried much further (cf. Dincauze 1991:6). Imputation to ancient communities of territoriality and political boundaries carries heavy freight in terms of social organization and human interaction—too heavy to be cavalierly imposed on scant data. Research into these issues is important and, with the fragility of private collections, urgent.

Developing the American Economy

Human beings have a fundamental set of economic needs: food, raw materials, finished goods, shelter. Shelter has last place here because for short times and in special cases, humans are ingenious enough to get along with minimal formal shelter. The absence of shelter evidence in the Paleoindian record should not be taken as evidence of absence; it is more likely to be a product of loss of site integrity in the long time spans between deposition and recovery. Investigation of Paleoindian economies in the Northeast has been devoted mainly to the search and utilization of raw materials for tools, the best preserved set of economic evidence. Tankersley and Isaac (1990) lay out a well conceived research strategy for Paleoindian economies, based on descriptions of production, consumption, distribution, and exchange. However, analyses such as they recommend require a data base with more integrity than is now available in the Northeast, for both sites and lithic sources.

Tankersley and Isaac (1990) argue for reducing the importance given to paleoenvironmental modeling in Paleoindian economic studies. However, they go on to praise Weissner's (1982) essay on risk management as a complement to acquisition strategies. Paleoenvironments set the contexts within which risks are expressed and assessed—scarcity or plenty, stability or instability are crucial elements in strategizing; sound paleoenvironmental modeling is essential to economic studies. Curran and Grimes (1989), Meltzer (1984a), and Meltzer and Smith (1986) have produced some of the most ambitious efforts at economic modeling south of the Canadian border, but all err when modeling seasonality and game populations (Custer and Stewart 1990; Dincauze 1996).

Discussions of food selection and procurement are inseparable from models of settlement patterns, which, in the Northeast, are founded on lithic procurement. Full consideration is delayed to below. Evidence for food choices is elusive. Organic remains have been recovered at the **Shawnee-Minisink**, Bull Brook, Nevers, Hiscock, Whipple, Neponset, and Templeton sites, mainly as fragments of calcined bone (Spiess et al. 1985). The faunal richness of the Hiscock site cannot be interpreted to represent human collection (Laub 1995b). Seeds at **Shawnee-Minisink** and **Meadowcroft** may be either human food remains or insect caches. Organics are even rarer at Early Archaic sites. Pollen studies are usually done off-site, with dating essential for relating humans and vegetation.

The idea that Paleoindians predominantly hunted and ate Big Game is fading from northeastern archeology (Custer and Stewart 1990; Dincauze 1981c; Meltzer and Smith 1986). There is no

denying that caribou were present, but not in huge herds (Spiess is preparing a refutation of this idea). Caribou are not larger than other cervids that were present in the forest edges: moose, elk. No doubt cervids were taken when offered, but to posit specialization on such solitary and moderately sized game is to distort available data without justification. Small animals were also important (e.g., beaver at Bull Brook, fish at **Shawnee-Minisink**), and edible plants in season were crucial to maintaining healthy human body functions. Large-scale processing of seed plants is unlikely in the absence of heavy tools for such activity. In general, Paleoindians can be seen as living fairly high on the food pyramid, where predation comes into its own.

Wear studies on endscrapers show both woodworking and hide working functions, and possibly work on bone and ivory (Funk 1976:214-215). Division of labor is fundamentally an economic question: the frequency of scrapers in sites has been proposed as an indicator of women's activities (Chilton 1994). Wooden hafts, containers, house poles, and perhaps boats (Engelbrecht and Seyfert 1994) were essential goods. Wood, bone and ivory small hand tools could fill several essential functions from sewing to trapping. Prepared hides and skins were needed for clothing, houses, and boats. The discovery of twine and net impressions in European Upper Paleolithic sites (Adovasio et al. 1996; Pringle 1997) reminds us that plant fiber industries contribute to life support, and were likely used in the northeastern US as well. The supposition is supported by finds at Fishbone Cave in Nevada, associated with radiocarbon ages in the late Pleistocene (Orr 1956, 1965).

The economics of lithic material procurement dominates the Paleoindian literature to a degree that must over-represent its prehistoric importance. The sheer diversity of lithics in most northeastern sites belies our assumptions about the difficulty of acquiring suitable materials. Nevertheless, lithics are what we have dependably to work with, so their importance is central.

Bedrock sources of the fine-grained siliceous materials favored for fluted point manufacture are not ubiquitous in the Northeast, but they are massive and were apparently discovered early. Gainey points arrived as finished goods made from Midwestern cherts of very high quality (Dincauze 1993b; Gramly 1988b; Lantz 1984). People who moved into New York state utilized the Onondaga outcrops in the west (Ennis et al. 1995; Tankersley et al. 1996) as well as the Normanskill/Deepkill outcrops west of the Hudson River trench (Funk 1973; La Porta 1994). Moving north into Vermont along the Hudson-Champlain lowlands, they could select from Fort Ann and Mt. Independence cherts (Wray 1948; Haviland and Power 1981) and outcrops of Normanskill-like stone of the Mount Merino formation near the New York/Vermont border (Brumbach 1987). In the Green Mountains they found Cheshire quartzite, Colchester jasper, and St. Albans/Hathaway cherts (Haviland and Power 1981; Loring 1980). Farther east they encountered siliceous rhyolites in New Hampshire and the extensive colored beds of Munsungun cherts in Maine (Boisvert 1992; Pollock et al. 1996; Pollock et al. 1999). Those who went into Pennsylvania and New Jersey had bedrock sources of dark cherts in the Kittatinny, Helderberg, and Kalkberg mountains in the east (Kraft 1977b; La Porta 1994), and various jaspers in central and eastern Pennsylvania (Hatch 1994; Hatch and Maxham 1995; Hatch and Miller 1985). Bedrock jasper has been located in Rhode Island (Waller 1999) and suspected in the Berkshire hills in western Massachusetts and Connecticut (Moeller 1984a). Chalcedonies were available in northern Delaware (Custer 1984b; Griffith 1982). Materials in the western and northern Appalachian mountains and the Allegheny Plateau occur in various Paleozoic marine formations. More attention is needed to learn whether Paleoindians opened quarries at these sources. Most source attributions are to formation only, but with intensified fieldwork, Paleoindian quarry sites are now recognized in New York, Pennsylvania, and New Jersey (Funk 1973; Hatch and Maxham 1995; P. La Porta, pers. comm.).

Non-cherty bedrock with good flaking qualities occurs in the fine-grained Paleozoic volcanics (rhyolites and metavolcanic tuffs and silicified siltstones) of the Green and White Mountains, the Boston and Narragansett Basins, and locally in the Mesozoic formations of central Massachusetts and Connecticut (e.g., Calogero and Philpotts 1995; Gramly 1984b; Jones 1997; Luedtke 1993; Pollock et al. 1996). Quartz crystal in pegmatite dikes was used, as was the very pure quartzites of the Green Mountain and Berkshire ranges (Calogero and Philpotts 1995; Dickson 1967; Loring 1980; Haviland and Power 1981:29; Spiess et al. 1998:Table 7). Delaware chalcedonies were important (Custer 1984b; Griffith in Brennan 1982).

Long distance transport of lithic raw materials, widely acknowledged in the region, is now under revision as new studies of lithic sources refine attributions (Calogero and Philpotts 1995; Hatch and Maxham 1995; Hatch and Miller 1985; King et al. 1997; La Porta 1994; Luedtke 1987; Pollock et al. 1999; Spiess et al. 1998). As indicated above (Property Types), these will revolutionize the

picture of migration into the region and subsequent patterning of settlement and distribution. For now, patterns of distribution of raw materials and finished goods among Paleoindian societies are matters of controversy (see especially papers in Ellis and Lothrop [1989] and Tankersley and Isaac [1990]). Debate typically takes the form of dichotomous categories: direct vs. indirect procurement, cyclical vs. serial quarry visits, embedded vs. logistical procurement, acquisition of raw material vs. finished goods. Opinion is moving strongly away from trade as a mechanism for the distribution of lithic materials among Paleoindians. Meltzer (1989), arguing that not all transport is exchange, concluded that exchange would have been unreliable among populations so thin on the land. Curran and Grimes (1989), Moeller (1984a), and Spiess and Wilson (1987) also dismiss exchange, making exceptions for rare exotics. No analyst has been able to discern distance-decay patterns in the Northeast, in contrast to what Anderson (this volume) reports in the Southeast. Lothrop (1989) argued for exotic lithics representing band member fluidity. In this context it is relevant to note that finished goods, purposely modified for transport, may travel separately from quarried raw materials, being distributed as biface preforms or finished tools. At the Dam site in Maine, represented lithic materials differed between tools and flakes (Spiess et al. 1998:214; Wilson and Spiess 1989). It is also important that utilization patterns varied in time. Gainey style points were frequently made of exotic stones, while Barnes and later styles tend to appear in local materials (Jacobson 2001). Munsungun chert is a notable exception, appearing in New England and to the south in style Groups I, II, and III. Black cherts, whose provenience is rarely established, seem to have been favored especially for the Paleoindian lanceolate points of Group VI.

No intensive study has been made of the economic roles of lithic tools. Lothrop's analysis of the Potts assemblage (1989) is a first effort at interpreting tool kit organization, building on good work to the west. Use and discard studies are rarely undertaken and even more rarely published, and use-wear analyses are rare (see Grimes and Grimes [1985] on limaces for the potential of these). A recurrent problem in comparative studies of northeastern Paleoindian assemblages is the lack of standard analytical or descriptive vocabularies (Curran 1984). This problem is exacerbated by sub-regional typologies for cultural periods that fragment archeological communication in the region.

Paleoindian settlement patterns are not well understood; in fact, they are controversial. Settlement patterning is the basis for understanding mobility and acquisition of essential goods, a first step toward modeling economies. Paleoindian settlement pattern proposals in the Northeast, when not simply transferred analogies (Levine 1997), are based either on lithic acquisition or predation pattern models; most include speculations about seasonal mobility (e.g., Carr 1998; Curran and Grimes 1989; Custer 1986; Custer et al. 1983; Eisenberg 1978: 138-9; Gramly 1988b; Grimes et al. 1984; Meltzer 1984b; Spiess et al. 1998; Spiess and Wilson 1987). In the southern parts of the region, Gardner's Thunderbird model of lithic tethering and cyclical settlement moves has been influential. "The use of a staged biface reduction lithic technology and a curated tool assemblage are also significant characteristics of this adaptation" (Carr 1998:48). For areas north of Maryland, this model does not work. In the course of sequential settlement moves emphasizing locations optimal for acquiring foods (wetlands and river terraces), Paleoindians used many small quarries or other lithic sources (e.g., McCracken 1986; Wilson and Spiess 1989). Base camps are not preferentially located close to quarries, and the distribution of a single lithic type does not trace a group's annual round. Several types of stone are typically found together on sites. Efforts to define band territories stumble on this difficulty. More thought and evidence must be devoted to understanding Paleoindian settlement patterns in the Northeast; success requires control of both lithic sourcing and time, which are only now coming within our grasp.

Too few Early Archaic sites are known or excavated to support regional-scale study of economies (Bolian 1980; Carr 1998; Dincauze and Mulholland 1977; Funk 1996; Michels and Smith 1967; Moeller 1985; Robinson and Petersen 1993; Spiess et al. 1983; Turnbaugh 1980). The sites are everywhere small, and the tool classes include uniface styles carried over from Paleoindian. Organic materials in Early Archaic sites are almost unknown, leaving diets unreported. By the Early Archaic period utilized lithic raw materials are typically very local throughout the region.

Expanding Science and Technology

The exploration of a continent has been extolled for centuries as a heroic undertaking, even though the mere fact of extolling indicates that it is done by people from literate civilizations, most of whom had native guides. Prehistorically, it was truly exploration, and truly historic, as the explorers were occasionally entering areas without any human presence; this is comparable to a moon walk, or settling islands in the Pacific Ocean, relying entirely on one's own collective ingenuity.

Paleoindians, as survivors, showed themselves equal to the challenge. They created mental maps and gazetteers for naming and organizing knowledge about landforms, sources of useful lithics, vegetation, and fauna. Although Beringian fauna were familiar wherever encountered, most of the biota were unprecedented and needed names and behavioral study. The biota changed in both time and space at short durations, because of rapid climate change and topographical diversity. Paleoindians established a cultural geography while themselves dealing with the consequences of rapid climate change. That's science. The absence of permanent records doomed these achievements to anonymity.

Tool kits and technological organization have been addressed only recently and lightly in the Northeast (Dincauze [1991] reviewing papers in Ellis and Lothrop [1989]). Tool kit organization is addressed by Lothrop (1989) at Potts, building on the work of Bamforth (1986), Ellis (1984, 1989), Knudson (1983) and Shott (1989b, c). The critical variables in this aspect of economics are not yet understood, with the result that there is little control on speculative scenarios. The growing literature on mobility scheduling and toolkit diversity (Kuhn 1994) has been used in the Northeast by Curran and Grimes (1989), Custer and Stewart (1990), Ellis et al. (1998), and Spiess et al. (1998).

The use and preparation of fluted points has been addressed from Ontario, where the sequence of biface styles appears "to represent temporal markers in a fairly continuous and incremental evolution of Palaeoindian point styles in the region" (Deller 1989:193). Ellis and Deller (1997) see styles varying with changes in the environment and economy, linking them through changing availability of prey species and hunting fields. Other more cultural reasons have not been explored, although Lepper's argument for multiple uses for fluted points (Lepper 1986c) could be embellished with a model of change over time. Tankersley (1994a) considers the effects of raw material and technology on point form. His argument supports conscious technological capabilities and effective heuristics in Paleoindian tool manufacture and use, which should be more widely acknowledged.

Ellis and Deller (1997:21) have noted that "pièces esquillées, fluted/twist drills, and limaces/flake shavers are very common in reported assemblages from the New England sites... these types are rare to nonexistent in the eastern Great Lakes." Shott, working mostly in the Midwest, is on the frontier of use and curation studies for Paleoindian tool kit elements, with studies of pièces esquillées and scrapers (1989a,b,c; 1990; 1995). Shott (1989a) presented an ethnographic survey supporting the origin of pièces esquillées as exhausted cores in situations of raw material shortage. A detailed study of pièces esquillées at the **Vail** site by Lothrop and Gramly (1982), with a review from a global perspective, concluded that they were not cores for usable flakes, that they work as wedges for splitting bone and wood (see also Goodyear 1993), but that a unique functional interpretation is not possible. Scrapers (Shott 1995a), twist drills (Jordan 1960), limaces (Grimes and Grimes 1985), and flake tools with denticles (Lothrop and Gramly 1982: note 1; Tomenchuk and Storck 1997) have been given close attention in the Northeast. This clearly productive line of research should be pursued; it demands exhaustive collection during excavation at discrete sites.

Selected Paleoindian tool kit elements continue in use after the end of fluted point making. Some forms of unifacial scrapers, and pièces esquillées, continue with lanceolate points and endure into Early Archaic assemblages. This observation does not contribute to the debate about evolution in place or renewed immigration to explain the changes that demand recognition with a new cultural period. Lanceolate point use may develop in place, later than in the Southeast, although the styles in the Northeast relate to large Dalton-affiliated bifaces in the southern Prairies and lanceolate styles in the Great Lakes. Early Archaic notched bifaces are clearly introduced into the region, directly or indirectly, from the south and west (Ellis et al. 1998; see citations to review articles for Early Archaic). The rarity of such styles in coastal Maine and eastern Canada is an enigma; presently implying a cultural frontier to the north.

Transforming the Environment

Paleoindians entering the Northeast from the Plains confronted daunting topographical contrasts and unfamiliar plants and animals. From the southeast, the terrain was not more diverse, but the biota would have been increasingly different with latitude. Reliable paleoenvironmental and paleoecological reconstructions have appeared only recently; in the 1970s researchers depended upon analogues of climate change borrowed from western Europe, and descriptions of Contact period vegetation (Funk 1972). As a consequence, debates about paleoecology and adaptations were initially misleading; efforts to import a Big Game tundra-hunting model to the forested, mountainous Northeast were accepted (Funk 1972; Kelly and Todd 1988; Meltzer 1984a).

Unsuitable ethnographic analogies were chosen from the Barren Grounds and Boreal Forest peoples of the nineteenth century (see critiques by Dincauze [1981] and Levine [1997]).

Well informed current paleoenvironmental modeling is essential to the task, but still premature as information on dating and climate is changing radically (e.g, Clark et al. 2001; Dincauze 1996). Only generalities can be limned at present; models of Paleoindian ecology and behavior must be provisional, and should be specific to special types of landscape throughout the Northeast, with an eye to differences in climatic expression by latitude and altitude. Alert to the influence of topography on climates at human scales, Gaudreau (1988:245) warned that lack of fine-scale resolutions in time and space prevent any observation of human impacts on vegetation in the Paleoindian time period. Given the dry cold of the Younger Dryas period, human fires likely increased the rate of natural fire stress on both vegetation and fauna at the time.

Humans entering the Northeast during the retreat of Wisconsin glaciers (Dyke and Prest 1987a) represented to the resident fauna a major new predator and competitor. Acrimonious debates about generalist vs. specialist resource strategies by Paleoindians enlivened the literature in the 1970s and into the late 1980s, before a consensus emerged that in rapidly changing, diverse and challenging environments, one ate whatever was available (Curran 1987; Dent and Kaufman 1985; Dincauze 1981c, 1993a; Eisenberg 1978; Gramly and Funk 1990; Meltzer 1988; and others). To this extent we can confidently say that environment affected culture.

Travel itself was likely affected by the extraordinary climates of the Younger Dryas and melting glaciers. The trail along the southern shores of the Great Lakes, with those at either high or low water stages, would have been facilitated by the use of boats (Engelbrecht and Seyfert 1994). Boats may not have been enough to conquer the challenges of the Hudson Trench, which was apparently a barrier for the earliest immigrants carrying Gainey and Debert style points (see [Peopling Places](#)). Crossing the unfrozen Hudson posed no problem for later Paleoindians with Group III points, when Hudson Valley cherts were moved east in significant amounts.

What effect did the Paleoindians have upon the environment? Within the Northeast there is little evidence that humans contributed to the extinctions of the Pleistocene megafauna that were already well under way by the time hunters appeared (Meltzer and Mead 1983, 1985). However, it is unlike humans to leave any area on the face of the earth unmodified by their presence. Nicholas (1999) reviews the kinds and degrees of effects that low density, highly mobile human populations can have on patchy environments, and concludes for a "light footprint." Site data for Paleoindians so far confirms a low visibility of impact at most (McWeeney 1994). At the **Hedden** site in central Maine, artifacts lie under dunes on a buried soil containing evidence of burning (Spiess and Mosher 1994; Spiess et al. 1995). Anthropogenic burning is difficult to distinguish from natural fires on droughty sites, which **Hedden** clearly was (Patterson and Sassaman 1988), particularly when only one site is at issue. The rapid environmental perturbations attendant on the Younger Dryas period create a probably impenetrable 'noise' complicating recognition of anthropogenic factors.

Modification of vegetation succession by both intentional burning and escaped campfires is to be expected wherever human groups gather. Activities such as fishing, hunting and trapping, collecting and transporting and quarrying, change landscapes from their prehuman states. Such activities, with burning, affect the distributions and densities of keystone species, both faunal and floral. Farming, of course, has a stronger imprint. At the time of European contact, the North American forests and prairies were cultural landscapes subjected for millennia to human burning and harvesting. Evidence for Paleoindian influence is still elusive because recovery of any organic remains from such sites is rare. The animal species identified so far in Paleoindian sites on both sides of the US-Canadian border include no extinct Pleistocene species; even one example would change the prevailing evidence that people arrived after their demise. The worked mammoth tusk at Hiscock is still only circumstantial evidence, and not in an archeological context (Laub et al. 1996).

Awareness of the Younger Dryas climate changes and their now excellent dating has not filtered into the Paleoindian literature significantly. Issues still to be addressed include (1) human responses to Younger Dryas change at different latitudes, (2) efforts to refine radiocarbon calibration by linking sites to climate episodes themselves better dated, (3) the suitability of now submerged coastal areas for Paleoindian habitation (were they as xeric as coasts to the south appear to have been?), (4) Paleoindian use of the resources of the Champlain Sea coast, and (5) the apparent abandonment during part of the Younger Dryas of the easternmost international border area.

The Early Holocene was perhaps equally dynamic in terms of landscape change, perhaps even more challenging for human adaptations, if the scattered, small sites of late Paleoindian and Early Archaic times are reliable witnesses. The period is little explored in the paleoenvironmental literature, leaving archeologists to the inadequacies of the scant archeological record.

Changing Role of the United States in the World Community

In recognition that the existence of the United States has little relevance in Younger Dryas and Early Holocene times, this section addresses the question "How do Earliest American cultural resources contribute to development of broad intercontinental comparative perspectives?" The largest issue at stake is probably the complexities around adaptation by humans to the pressures of living in newly opened lands during the climate changes of Late Glacial and Early Holocene times. Vastly more detailed information is needed before social issues can be addressed at intercontinental scales.

Colonization of the northwest European plains occurred within the time spans of the colonization of North America. Even the environments in northwest Europe were comparable to those in Late Glacial eastern North America, with differences defined by specific resources and population size. The fauna in both areas were nearly modern in composition, with dramatic range adjustments underway. Similarly organized human groups, with remarkably similar equipment, moved into both areas. The largest differences at first were that the Europeans had fairly large, settled populations at their backs, no great distances to the south (e.g., Gamble 1983 and later surveys), while in the Americas, explorer pioneers were expanding the frontiers of human occupation.

The Americas were the last major continents to be inhabited by people. After the inundation of Beringia, the inhabitants lived in relative biological and linguistic isolation from people on the other major continents until contacts at very high latitudes resumed by the middle Holocene. Late Paleoindians were contemporaries with similarly organized Late Paleolithic and Mesolithic people in Europe and elsewhere. The people and their languages derived, evidence strongly indicates, from Arctic and subarctic peoples of Eurasia. How did it happen that northeastern North Americans changed so little in succeeding millennia, retaining flexible economies and small-scale negotiated social structures for several thousands of years? Native American leaders today insist that they did not 'migrate' to the Americas, and that their culture has changed little because it was ordained. Whatever one's viewpoint, the issues are important for understanding human beings-in-the-world. Paleoindian studies matter.

Clive Gamble (1993:316) reported on "a straw poll conducted by electronic mail" that asked where, in the Americas, was the heartland of Paleoindian studies, "comparable to the Russian Plain and Franco-Cantabria...? There was no consensus except that the Eastern Paleo-Indian distribution was generally thought to be less important than the Western." In the complex, diverse, and fascinating record of the earliest people in the East—whether North or South, I find no justification for this widely held belief.

National Historic Landmark Criterion 6 and National Register Criterion D — Evaluation Criteria Matrix / Registration Requirements

For specific properties, NRHP and NHL evaluation should proceed by first completing a property designation matrix, which provides a basic overview of condition and research potential under National Historic Landmark Criterion 6 and National Register Criterion D, and can serve as a guide to the preparation of detailed nomination statements. Procedures by which the matrix is to be used are provided in the Evaluation Criteria Matrix / Registration Requirements section above. How specific research questions and themes outlined in the matrix apply to Northeastern Paleoindian properties, however, were discussed previously in this regional context.

NHL Property Type and Integrity Levels for the Northeast

Linked with the evaluation of specific NHL property classes and categories is an assessment of their integrity. Property integrity refers to the physical condition of the remains under investigation, i.e., their preservation, context, and ability to contribute important information under Criterion 6 for NHL designation and Criterion D for the National Register. To be considered eligible for designation as an NHL, Paleoindian properties must possess deposits with sufficient integrity to yield information capable of identifying discrete periods of occupation or utilization, property function or type, and must have clearly defined boundaries.

High Integrity. High integrity sites in the Northeast generally possess identifiable components; sites

of Paleoindian age may occur on landforms less utilized in later times. In order to be recognized at all, sites have suffered damage; among the damaged sites, **Shoop**, Bull Brook I, **Vail**, and Arc are notable for their size and the clarity of artifact clustering within them.

The Criterion of 'identifiable sedimentary matrix' characterizes northeastern sites in alluvium, such as Templeton (Moeller 1980) and **Shawnee-Minisink** (McNett 1985). Others in glacial or aeolian sands, such as **DEDIC/Sugarloaf**, and Bull Brook in MA, Whipple in NH and **Hedden** and Michaud in ME, are tightly enclosed in a singular matrix but may not retain precise spatial relationships because of intense cryo- and bioturbation (Lyford 1963; Stein 1983). When intensive archeological excavation has been lavished on northeastern Paleoindian sites, e.g., Whipple (Curran 1984), the disturbances and intrusions that shift artifacts or introduce datable organic material can be demonstrated, but not easily interpreted. Evidence of intrusions is blurred along with the original site patterning. Additional research on the timing of eolian activity (e.g., Thorson and Schile 1995) should help in evaluating sites that appear to be under sand sheets, such as **Hedden**.

DEDIC/Sugarloaf artifacts are within Late Glacial aeolian sand, clustered south of a dune. More rigorous attention to site taphonomy during excavation is necessary to demonstrate integrity in sandy soils (Schiffer 1987; Thomas and Robinson 1983).

'Secure calendric dating' is very elusive in the Northeast, where no directly calendrical methods are applicable to sites of Paleoindian age. Radiocarbon dating is inherently imprecise in the Paleoindian millennium, even without the complicating factors of reworked matrices and introduced younger particles. Better times seem to be coming, as the Younger Dryas climate interval facilitates cross-dating and radiocarbon calibration ([Table 7](#); Bjork et al. 1996; Stuiver et al. 1998). The best dating achieved so far in northeastern sites is based on multiple radiocarbon assays, as at Debert and Whipple (Levine 1990) and, on this Criterion, at **Meadowcroft**.

Moderate Integrity. Moderate integrity, supporting Landmark or National Register listings, is more generally accessible in the Northeast. Components only 'slightly mixed with later materials' occur; but always present problems, as with the intrusive Archaic features at **Wapanucket** (Robbins and Agogino 1964), and the many plowzone sites (e.g., Potts in NY and Plenge in NJ).

Moderately intact contexts are probably typical of the region; the precision of interpretation is rarely adequate to evaluate the claims. Sedimentary matrices are usually at least nearly coeval with the enclosed artifacts or features, but it is well known that soil biota, especially earthworms and ants, move sediments from beneath larger particles, which can then drop, while depositing minerals grain by grain at the surface (Lyford 1963; Stein 1983; Thomas and Robinson 1983). Consequently, judging the degree of intactness of sediments is a major challenge to site interpretation in the Northeast. Prehistoric reuse of Paleoindian sites complicates both excavation and interpretation, as at the Neponset and **Wapanucket** sites in MA. Larger agents of disturbance, notably collectors and looters, are endemic in the densely populated region. Even disturbance created by heavy machinery can be difficult to record in well mixed sands (e.g., Spiess and Wilson 1987).

Northeastern archeologists are gaining expertise in indirect dating. Several sites have recently been bracketed between bounding dates, as at the **Hedden**, Arc, and **Meadowcroft** sites ([Table 7](#)). The limitations of radiocarbon dating impose a no-surprises situation at fluted point sites: the artifacts are dated to the thirteenth millennium. Typological dating for Paleoindian sites promises refinements, but requires improvement in the skill and rigor devoted to analyses of stone tools ([Research Needs and Questions for the Northeast](#)).

Low Integrity. Low integrity sites of state and local significance abound in the region. They occur as single or few artifacts with site provenience in collections, as diagnostic pieces in severely disturbed plowzones (e.g., Twin Fields, NY), and as associations of artifacts, mainly in private or old collections, which offer no opportunities for dating or contextual interpretation. The usefulness of single finds and sites devoid of integrity lies in their distributions, clustering, lithic materials, and typology. Information is there, even though sites may not deserve protection.

Evaluation Standards: NRHP Criteria

Although NHL designation is not the same thing as NRHP status, any successful NHL nomination will also have to meet NRHP Criteria. NRHP significance Criteria are well established, and only briefly summarized here. Possessing any of the following qualities probably would qualify sites for inclusion on the NRHP:

1. Intact buried deposits, particularly assemblages yielding features or preserved floral and faunal remains, and materials suitable for radiocarbon or multiple dating procedures. Such sites are extremely rare for this time period in the Northeast. The literature yields only the Templeton site in Connecticut and the **Meadowcroft** and Shawnee-Minisink sites in Pennsylvania as examples.
2. Stratified deposits, with components that can be isolated horizontally or vertically. This would facilitate detailed examination of single periods of occupation. Again, the Templeton site is a rare example in the Northeast. The shallow Whipple site in New Hampshire and the Michaud in Maine were promising but disturbed. The late Paleoindian Hidden Creek site in Connecticut may qualify.
3. Major quarry sites with extensive reduction or manufacturing debris, and evidence for utilization during the Paleoindian period. Northeastern sites such as the Israel River group in New Hampshire, **West Athens Hill** and nearby sites in New York, and the **Munsungun** group in central Maine may fit this Criterion if given the scrutiny required.
4. Areal extensive surface scatters from plowzone or eroded upland context, particularly if evidence for artifact relocation beyond more than a few meters is minimal. Controlled surface collection procedures can recover discrete occupational episodes or activity areas on sites of this kind. Single-component plowzone sites such as Davis, Potts, Twin Fields and Arc in New York, Mahan in Vermont, **Shoop** in Pennsylvania, possibly Nicholas in Maine, and Bull Brook in Massachusetts could have yielded activity-area information but have suffered significant damage from undocumented collecting.

To these attributes can be added Glassow's (1977) Criteria by which site significance can be assessed, as discussed in this and the national context chapter. The presence of any of the following characteristics tends to automatically make a Northeastern site yielding Paleoindian materials ineligible for inclusion on the NRHP:

1. Sites consisting only of a single isolated artifact. Little information beyond that obtained at the time of collection can be derived from such assemblages. Care must be taken, however, to ensure that the presence of other deposits has been ruled out. Isolates may be the only detected evidence of a complex site.
2. Heavily disturbed surface scatters. This does not include plowzone scatters, from which significant assemblage and intra-site distributional information can be recovered given careful data collection. Care must be taken when examining presumably disturbed deposits that the presence of undisturbed deposits has been completely ruled out.
3. Sites damaged by cultural or natural factors to the extent that deposit integrity is destroyed. The Bull Brook sites I and II are examples of large extraordinary sites that lost significant integrity to uncontrolled collecting and gravel quarrying.

Detailed reasons why sites meet NRHP or NHL eligibility status should accompany all such determinations, and should be expressed in terms of how they can yield information important to history or prehistory. Given how rare Paleoindian sites are in the region, full justifications should also be provided when Paleoindian properties are determined to be ineligible for inclusion on the NRHP, or for designation as an NHL.

Possible or Proposed Northeastern NHLs

At present, there is only one Paleoindian property in the Northeast already designated an NHL, the **Abbott Farm District**, located in Mercer County, New Jersey, listed on December 8, 1976. [Tables 9](#) and [15](#) list other prospective Northeastern NHL paleoindian properties. The Megalloway Cluster in Maine (Adkins, Cox, Morss, **Vail**, and Wheeler Dam), of which **Vail** is currently listed on the National Register, may be a good candidate for an NHL district, although the integrity of these sites should be reevaluated. Adkins and **Vail** have on-shore ice damage. However, the proximity of the sites in combination with the unusual diversity in site functions may warrant recognition. The Arc/Hiscock/Bear Paw/Bush Complex/Emanon Pond/Diver's Lake sites in New York could also be a possible NHL candidate when considered as a district as this group could harbor some of the very oldest sites in the Northeast. **Dutchess Quarry Cave**, currently on the National Register, may also have potential as an NHL district in combination with the megafauna sites of the Glacial Lake Albany beds in Orange County and several nearby damaged small sites. If not included into a district, **Dutchess Quarry Cave** should be considered for delisting because of reinterpretation of its age and context. In Pennsylvania, the **Meadowcroft** and **Shoop** sites may both be recognized for stimulating discussion at the national level. Recent interpretations of **Shoop** argue that the site is a

southern Paleoindian outlier, not a Great Lakes area derivative, although this has not been demonstrated conclusively. However, if the interpretation holds the site will gain additional importance because it defines two socio-cultural provinces in the East. Small sites and quarries in northern New England could emerge with further study as marking a major route into the region in the Late Pleistocene. In particular, bedrock quarries and finds on Champlain Sea beaches in Vermont and New York may eventually qualify for NHL district status.

There is potential for invisible Paleoindian sites to gain importance in the future. South of Maine, the Atlantic coast was farther East during some of the Paleoindian period. Sites are likely to exist on the submerged shelf, and in fact fluted pints have been found on beaches in Rhode Island, Connecticut, and Delaware, where sites are rare inland, and along coastal streams in New York (Edwards and Emery 1977; Edwards and Merrill 1977; Emery and Edwards 1966; Stright 1990). The Massachusetts Bay, Buzzards Bay, Narragansett Bay, Chesapeake Bay, and Delaware River embayments should all be suspect. Dredging and offshore developments are likely to disturb sites that may be essentially intact underwater.

Conclusions

The paucity of northeastern Paleoindian sites obviously eligible for NHL status reflects the lack of care and attention their excavation has been given. Sites yielding fluted points are typically destroyed by enthusiasts or even commercial looters before they can receive the detailed care and study they require for responsible interpretation. If the National Register program could meet the promise of protection its advocates sought, such losses would be reduced (e.g., Dincauze 1997). As matters stand, Paleoindian sites in some states are excavated quickly upon discovery to remove them from looting, and thereby not given the full scrutiny that informed excavation and study requires. Where not quickly removed from enclosing sediments, they disappear by attrition in a few years.

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THE EARLIEST AMERICANS THEME STUDY MIDWEST PROPERTY TYPES The Earliest Americans theme study employs a single system for the classification, identification and description of Paleoindian property types (Anderson 2000). According to the Secretary of the Interior's Standards, "a property type is a grouping of individual properties based on shared physical or associative characteristics [that] link the ideas incorporated in the theoretical historic context with actual historic properties that illustrate these ideas." Property types in this study include isolated finds (ineligible for NHL listing), caches, bone beds and kill sites, human burials, rock art and other petroglyphs or pictographs, quarries and workshops, and occupations. For purposes of NHL recording, documentation, and management, property types are grouped into two major classes, sites and districts. Sites are deposits containing artifacts, features, or biocultural evidence associated with one or more Paleoindian components. As such, the term retains its traditional archaeological usage, albeit here with the inclusion of isolated finds as a particular subset. Districts are defined as multiple contiguous or discontinuous deposits associated with one or more Paleoindian components. They are groupings of sites or components. <u>Identifying Property Types for the Midwest</u> Organic preservation is quite poor generally in the Midwest. With few exceptions as noted above, the Paleoindian record is a record of stone tools and features. Stone tools occur in sets that we identify as assemblages and ordinarily treat as registers of single or few brief occupations to particular places. Stone-tool assemblages are described by their size and composition (Shott in press); analysis is the measurement and interpretation of assemblage size and composition. The traditional archaeological view is that assemblages are categorical things, whether ethnic calling cards or functional toolkits, assemblage variation a simple thing. Assemblage analysis in this tradition typically involves simple inspection of tool frequencies because patterns of variation and the formation processes underlying them are equally simple, variation is categorical, and assemblages fall neatly into types. Although the number of and meaning assigned to types differ, most studies identify at least quarries where raw material was obtained and reduced toward finished tools, residences where many Paleoindians performed many tool-using activities, and hunting camps where smaller groups of men sought and killed game. Although not recorded, there may especially be where women or men used stone tools for plant procurement or process. There is no doubt that quarries existed nor that Paleoindians killed animals and established homes, and they did these things at different places in the landscapes. The question instead is how these activities accumulated an archaeological record over long periods. The traditional view assumes no reoccupation of places, or at least reoccupation for purposes different from the original, and a simple and direct relationship between tools and activities. It creates a Paleoindian past that consists of neat ethnographic tableaux. Thus, traditional archaeological understanding of assemblages is essentialist, regarding them as fundamental kinds of entities that represent entire cultures or discrete parts of them. But processes that governed assemblage variation are the complex product of interactions between activity and formation processes. Places could have been occupied at various times by groups of various size and composition for various purposes. Tool types varied in their use lives, mapping relations and consequent patterns of covariation with one another. The tools that we find together and take to represent an assemblage may or may not have been used and discarded in the course of a single occupation of a place. However, their present propinquity may result from their having been associated initially complex, overlapping deposits of some number of brief occupations undertaken in approximately the same location for various purposes and at unknown times. Great Lakes Paleoindian assemblages exhibit continuous variation between assemblage "types" that is consistent with time-averaging (Shott 1997; cf. Muller 1999). There is nearly as much variation within	E. statement of historic contexts F. associated property types introduction southeast property types northeast property types midwest property types NHL property types as categories for the midwest resource distributions in the midwest table 19 table 20 table 21 table 22 research needs and questions for the midwest national historic landmark criterion 6 and national register criterion D / registration requirements evaluation standards: NRHP criteria possible or proposed midwestern NHLs table 23 conclusions G. geographical data H. summary of identification and evaluation methods I. major bibliographical references Figures and Tables

assemblage types as between them. However Shott (1997) tested the validity of assemblage types was tested, it was found wanting. Assemblage variation is real and informative but does not correspond neatly to types. However, if we assume a priori that assemblage types exist, and if we use analytical methods commensurate with that assumption, we always will find types.

NHL Property Types as Categories for the Midwest

Isolated finds are individual artifacts that have been demonstrated to be Paleoindian in age "through typological or other analyses" (Anderson 2000:5). Midwestern state journals and newsletters are filled with accounts of isolated Paleoindian finds. Back issues of *Wisconsin Archaeologist* are a particular source of such reports. Their number and distribution certainly inform about the incidence and distribution of tool-using activity across the Paleoindian landscape. No doubt some fluted discoveries are legitimate isolated artifacts, lost in hunting or by some other accident. Such discoveries form a regional background distribution to the better known elements of the record that we know as sites. By definition, individual artifacts are the units of observation and description in the case of isolated finds. Thus, isolated finds are the sole exception to the received view that the Paleoindian record occurs in the form of discrete sites.

Yet some, perhaps many, isolated finds are the tips (no pun intended) of larger icebergs (Bintliff et al. 1999). Often locations are revisited, other Paleoindian tools are found, isolated finds growing into assemblages *qua* sites.

Caches

Caches are special deposits where tools and other goods were placed deliberately. Collins (1999:147-167) defined votive, ritual and utilitarian classes of caches. Among the latter, he (1999:176) distinguished seasonal from insurance caches, both useful where people were scattered thinly across unstable habitats. Obviously, purely food caches are difficult if not impossible to recover archaeologically, since food long since has perished. Fisher's (1987) Great Lakes mastodont meat caches are possible but not yet confirmed. Otherwise, there is no Midwestern evidence for Paleoindian food caches.

Relatively few in number, highly concentrated so as to occupy small spaces, and deliberately concealed by burial, caches pose acute sampling problems, practically defying discovery via systematic survey. Indeed, no Paleoindian caches anywhere were discovered other than accidentally, either when dislodged by plowing or construction, or in the course of excavation of larger sites.

Therefore, few Paleoindian caches are known in the Midwest. Excluding possible caches of nondiagnostic tools noted above, most relevant assemblages are from Ontario (Deller and Ellis 1984; Deller and Ellis 1992:26,97; Storck and Tomenchuk 1990). In the Midwest, Rummels-Maske (Anderson and Tiffany 1972), a Clovis or Gainey-affinity in eastern Iowa, is the sole apparently major early or middle Paleoindian cache. Significantly, it was not found by archaeologists and is known only because it was reported at once. No doubt other, perhaps many, caches have been discovered but not reported, so we cannot know how unusual Rummels-Maske is. Rummels-Maske appears to be a utilitarian cache (*sensu* Collins 1999:175) of fluted bifaces or fragments. Any organic objects that may have existed decomposed before discovery. Although the size and composition of cache assemblages varies considerably across North America (see above), Rummels-Maske is not exceptional in the kind or number of its constituents.

Among late Paleoindian industries, Dalton caches, comparatively abundant in the southeast, extend into southern Missouri and southwestern Illinois. The American Bottom's Nocht yielded four Dalton adze blanks in an apparent cache (Higgins 1990:43, Plate 9). Nearby Jens's Feature 30 contained one Dalton point, one adze, six end scrapers and two other unifaces (Walthall and Holley 1997:156-157). In far southern Illinois, Olive Branch apparently produced two caches; one was not reported in detail but the other contained an adze blank, seven biface preforms and one retouched flake (Gramly 1995:42, Fig. 19). Other Dalton caches have been found in southern Illinois but remain sketchily documented (Walthall and Koldehoff 1998:262-263). Chapman (1975:102) reported a cache of nine Dalton bifaces from St. Francois County, southeast of St. Louis.

Bone Beds/Kill Sites

The only documented Midwestern Paleoindian bone bed is Missouri's **Kimmswick** (Graham et al. 1981) unless we accept the possible evidence of proboscidean butchery from Michigan (Fisher

1987) and the **Chesrow Complex** of southeastern Wisconsin (Overstreet 1993). Only Holcombe (Fitting et al. 1966) among well-associated Midwestern Paleoindian sites has yielded bone of any kind, and that calcined cervid (probably caribou) bone (Cleland 1966) from a single feature. Ontario's Gainey Phase Udora (Storck and Spiess 1994) and several northeastern sites also have yielded animal bones in small quantities. Whatever big-game orientation Paleoindians may have maintained, in the faunal record, fish and small game are as common as caribou.

Kill sites are assemblages that are dominated by fluted bifaces and channel flakes, and/or that lie above or near strand lines, valley bluffs or other locations thought to be especially suitable for spying and ambushing game; places where Paleoindians killed and butchered animals and left behind tools and debris. Deller and Ellis (2000:150-187) argued at length for Parkhill's Areas B and C as kill sites, and Fisher (Storck 1997) also is interpreted as a kill site. In the Midwestern United States, Barnes (Voss 1977), and Holcombe also suggest use as kill sites.

Burials

In a material record impoverished by organic decay, there is no definite evidence of early and middle Paleoindian human remains anywhere in the Midwest. Caches may sometimes consist of offerings placed with human remains; Ontario's late Paleoindian Crowfield site (Deller and Ellis 1984) is the best such example from near the Midwest. As above, possible cremations of late Paleoindian Eden-Scottsbluff affinity were found in northern Wisconsin (Mason and Mason 1960; Ritzenthaler 1972) and upper Michigan (Buckmaster and Paquette 1988).

Rock Art

Petroglyphs and other forms of rock art are not uncommon in the Midwest, although all seem much more recent than the Paleoindian period to judge from settings, motifs, styles and subjects, and cultural associations (e.g., Lothson 1976; Swauger 1984; Zurel 1999). There is no reason to doubt that Midwestern Paleoindians executed rock art. Alas, rock art is ravaged by exposure and weathering and art the age of Paleoindian cultures will preserve only under special conditions not yet found in the Midwest. Taphonomic studies suggest that much prehistoric rock art is destroyed by natural agents that act over time (Bednarik 1994). Typical is Swauger's assumption that Midwestern rock art older than 3,000 years would have eroded away by now (Swauger 1984:267). This unsupported dismissal of potential data is all too characteristic of Paleoindian studies. In fact, any Midwestern site with the potential for yielding evidence of rock art, either still in place or in a datable secondary deposit would be of national significance. If and when Swauger's assumption is shown incorrect, we may gain wonderful insights into the Paleoindian symbolic world.

Quarries and Workshops

Prominent Midwestern Paleoindian quarry/workshop sites include Welling (Prufer and Wright 1970) at Ohio's Upper Mercer source, **Silver Mound** (Hill 1994) near western Wisconsin's Hixton source, and Ready (J. Morrow 1996) near Burlington sources at the confluence of the Illinois and Mississippi Rivers. Major Paleoindian sites that probably include quarry/workshop components also occur near Ontario chert sources (Storck 1997). Like the Welling site, Honey Run (PiSunyer et al 1967) and McConnel (Prufer 1963) are two of the many late Paleoindian workshops that lie near the well-surveyed Upper Mercer outcrops in Coshocton County, Ohio. This makes it likely that poor sampling is responsible for the failure to identify major Paleoindian workshops near Hornstone sources or Attica chert sources in southern and central Indiana, respectively, or near the Bayport chert source near Saginaw Bay in Michigan, or near the Flint Ridge sources in central Ohio (Tankersley 1990) although local Middle Woodland mining of the latter outcrops, along with their prehistoric projectile point collecting may well have obscured such evidence.

To varying degrees but always considerably, Midwestern quarries/workshops have been analyzed usefully (Prufer and Wright 1970; J. Morrow 1996; Koldehoff 1983; Hill 1994). Yet more synthetic work would be more valuable still by comparing and contrasting quarry/workshop assemblages for their nature and scale of tool production. We may find that similar reduction practices characterized all quarries/workshops or that reduction changed through time or varied with natural properties like fracture mechanics or the size and form of cobbles. Certainly, experiments (Bradbury and Franklin 2000) suggest that the latter properties greatly influence reduction practices. Such studies at Midwestern Paleoindian quarries/workshops should be supplemented by survey or excavation of natural outcrops to sample the range of variation in original cobble size and form. Welling, Honey Run and McConnel are just a few workshops among the many that probably exist at the Upper

Mercer source area (e.g., Lepper 1988). That area is perhaps the best candidate for extensive and detailed study of Paleoindian quarry practices and reduction technology.

Occupations

In the Midwest, relatively extensive Paleoindian occupations include Gainey (Simons 1997; Simons et al. 1984) and probably Grogitsky (Zurel 1979) in Michigan, **Paleo Crossing** (Brose 1994) and Nobles Pond (Seeman 1994; Seeman et al. 1994a,b) in Ohio, Big Eddy and Martens in Missouri, and **Aebischer** (Mason 1988) in Wisconsin. Smaller but significant and documented occupations include Leavitt (Shott 1993) in Michigan, and Bostrom (Tankersley 1995) and CB-North (Evans et al. 1997) in Illinois.

Resource Distributions in the Midwest

The Midwestern Paleoindian record is an historical document compiled by many types of investigation over a century or more. We must use it to the fullest, by studying individual tools, assemblages and deposits, and regional distributions of assemblages. But we misuse the record if we do not assay both its strengths and weaknesses. Cowgill (1970:163) distinguished between the available material evidence and the collections and observations we make from it. He called the former archaeology's *physical-finds population*, the latter its *physical-finds sample*. We have only the latter, which certainly grows in size and may change in character over time, and we must estimate how well the sample represents the population. This is "representativity."

Halén's (1994:29-35; see also Kristiansen 1985) representativity model included numerical and essentially categorical components, identified various dimensions of representation of the material record in archaeological data, and proposed measures of them. Dimensions include time, space, degree of preservation, classification effects on recognition and abundance of legitimate categories, kind and amount of data acquired previously, and incidental and deliberate modern destruction. Halén's numerical representativity signifies what fraction or percentage of the population the available sample comprises. Sample representativeness includes fraction (How big is the sample?) and composition (How typical is the sample in proportional abundance?). If sample fraction is difficult to estimate, its composition seems more difficult still. The high esteem in which collectors hold fluted bifaces and the heavy contributions that they have made to the recorded sample suggests that those artifacts are represented disproportionately to their abundance in the original physical-finds population. But it remains very difficult to estimate how disproportionate is the overrepresentation of fluted bifaces.

Collector Effects

Yet even the recorded physical-finds sample is a social product. More than a century ago, the British prehistorian Daniel Wilson described then-extant stone tool collections in the Ohio Valley. An unknown but probably small fraction of the collections were of Paleoindian provenance, but Wilson's account is at once illuminating and sobering. Compared to Europe, Wilson (1876 I:56) considered "the abundance of flint and stone implements in the virgin soil of the New World...almost marvelous." Visiting the **Flint Ridge** quarries in Ohio, he amassed a sizable collection within two hours (ibid:8). Wilson inspected many private collections from near Cincinnati, one of whose "enthusiastic" owners reported finding as many as 70 stone tools in a day's collecting (ibid:79). Wilson also met dealers in antiquities, proving if nothing else that the market scourge beset North American archaeology from its beginnings. He observed ruefully of a specimen purchased from a dealer that "information on the locality and the circumstances attendant to its discovery could not be obtained" (ibid:60), a conclusion too familiar to modern archaeologists and understandable to them if not to Wilson; the antiquities trade destroys, not preserves, information. Even much more recently, Springer found it necessary to hurry to the field each spring "to precede the activities of collectors" (1985:10-12).

We know neither the size nor the current location of Wilson's collections, so cannot determine how many Paleoindian specimens it contains. A Paris museum holds at least 16 fluted bifaces, most from the Midwest, among a large collection of North American artifacts amassed in the first half of the twentieth century (Smith 1961). Documentation is poor, but at least some specimens were purchased from dealers. The British Museum holds at least seven fluted bifaces from Midwestern states (N. Ashton, personal communication 2000) in its substantial North American artifact collections.

One Illinois case suggests how abundant the Paleoindian record once was (Munson and Tankerley

1991). Thomas Kiley of DeWitt County in central Illinois became interested in archaeology in 1909. He began compiling records of artifacts found there, developing a special affinity for "grooved" points. His descriptions make it clear that these were fluted bifaces which, by Kiley's account, comprised about 1% of all bifaces found. But 1% of many bifaces is a large number. Over the next 50 years, Kiley faithfully recorded information that came to him (Who knows how many fluted bifaces found in DeWitt County escaped his notice?) when fluted bifaces were discovered in fields, in streambanks, in building excavations. One, for instance, was found "three feet deep in clay" (Munson and Tankersley 1991:4). Many of the finds were incidental discoveries by local residents, but Kiley reported that serious collectors traveled to the area in search of specimens. Kiley's efforts indeed were "the oldest and longest fluted point survey" (ibid:6) on record, and they documented an astonishing 332 fluted bifaces in this one county.

The implications of such data are clear for settlement interpretations, since DeWitt County would not by any current understanding be considered prime Paleoindian habitat. Another implication is that the closer or longer we look, the more we find. Kiley's records, after all, were compiled over 50 years, a period much longer than archaeologists can devote to survey areas. About 330 bifaces recorded in 50 years gives an annual yield of 6.6 bifaces. In three typical years, the yield would reach about 20 bifaces, respectable but not remarkable. Thus, the number is a product of the length of study as much as any other factor. The unsuspected number of fluted bifaces in one obscure Illinois county suggests that the patterns we see of both abundance and distribution of Paleoindian "sites" are not well controlled for sample error and other biases. By all means we should compile and examine those patterns, but always from a "source-critical" (Baudou 1985) perspective. Another example is the apparently marked concentration of Folsom sites in the southwestern corner of Iowa (Billeck 1998; T. Morrow and J. Morrow 1994). Perhaps the documented distribution faithfully reflects the underlying archaeological one, but Billeck (1998:401) attributed it at least in part to the sustained, systematic work there of Paul Rowe over forty years.

The character of the record includes not just its size but also its distribution and contents. The record of known sites may be biased by systematic factors (Lepper 1983b) as well as chance. In Michigan, Barnes was found because it lay about 100 m from Wallace Hill's house. Leavitt was found because the Leavitt family collected their fields for years, and Donna Leavitt Sanford later joined the Michigan Archaeological Society and reported the site. Gainey and Butler were found because they were about 2 km from D.B. Simons' house, and he could revisit them repeatedly. Holcombe was found because Jerry DeVisscher lived nearby and reported because he knew Wayne State University archaeologists. Local resident D. Wymer found several Gainey sites in south-central Michigan. In Wisconsin, the large **Silver Mound** collection took Gary Steele 20 years to accumulate (Hill 1994:224). Most fluted bifaces by far near St. Louis were found by private collectors, and many of their collections already had been dispersed, the information they contained lost, by the mid-20th century (Smail 1951:11).

By most recent count, Illinois and Missouri together have yielded about 500 fluted bifaces (Anderson and Faught 2000). Yet half a century ago, Smail (1951) documented more than 500, just from the St. Louis environs alone, and much of the modern total probably includes bifaces from major sites (e.g., J. Morrow 1996) found since Smail's survey. Thus, much of Smail's evidence is lost to modern study. None of these sites was found in systematic survey. Absent such survey over large areas, we simply never will know the true distribution and abundance of Paleoindian remains across the landscape. Collectors have made fine contributions to the accumulated record, but not even their efforts are a substitute for the systematic, large-scale work needed.

Empirical Distributions

Paleoindian tools and sites are widely distributed across the Midwest, and are or were more abundant there than often supposed. Apart from these valid generalizations we have much to learn about the validity of accumulated patterns and the nature of original ones. The Paleoindian archaeological record patterns according to original physical-finds population distribution among other factors. The latter include the modern taphonomic agents noted above, as well as natural agents like slope erosion and alluviation.

"Sites." "Site" is an inference or construction, not an empirical property of the archaeological record (e.g., Shott 1995b). For purposes of this study, I take sites as reported at face value. One way to estimate the number of Paleoindian sites (the physical-finds population at the site level) is from available published sources. Peru's (1967:7) map of Allegan and Kent Counties, Michigan was

unscaled, so that source was omitted. [Table 19](#) compiles figures on Paleoindian sites in several reported survey areas across the Midwest.

Table 19. Paleoindian Site Density Estimates from Survey Data in the Midwest.

[\[Long description\]](#)

Source	Region	sites / km ²	km ² / site
SELECTIVE SURVEYS			
Harrison et al. 1977	southern IN	0.0064	156
Lepper 1988	central OH	0.0455	22
Mallam 1971	northeastern IA	0.0026	388.9
Munson and Downs 1968	central IL	0.0147	68
Payne 1982	northern Ohio	0.0051	195.5
Peru 1967	southwestern MI	0.0192	52
Smith 1990	southern IN	0.0122	81.7
Wendt 1985	southern WI	0.0133	75
PROBABILISTIC SURVEYS			
Peebles and Shott 1981:6	southeastern MI	0.0231	-----
Goldstein 1987:85-96	southeastern WI	0.1154	-----

Mallam (1971) reported seven or nine Paleoindian sites depending on how locations are aggregated as sites. Area surveyed was taken as the entire Upper Iowa River watershed. Similar areas were mapped by Peru (1967:Fig. 1), Wendt (1985:Fig. 1), Smith (1990:Fig. 7), Lepper (1988:Fig. 1) and Harrison et al. (1977:Fig. 16), and reported by Munson and Downs (1968:122). It would be surprising if as much as half of each area was surveyed (e.g., Jackson 1998:4), but in the absence of precise figures mapped area was treated as surveyed area. Site figures are minimum values as well. Several sources reported only sites that yielded fluted bifaces, but Harrison et al. (1977) and Wendt (1985) defined "Paleoindian" more liberally. Only fluted bifaces and sites from which they derive were used from those sources, as were Munson and Downs's (1968) Paleoindian but not Plano figures. Coshocton County, Ohio sites were tabulated from Lepper (1988:Fig. 3). Henry and Nichols's (1963:Fig. 52) eastern Illinois survey area is omitted from uncertainty over its size, but it shows at least four and perhaps seven fluted-biface sites in an area that measures about 6 km². Jonathan Bowen (personal communication, 1988) amassed considerable information on Paleoindian and Early Archaic artifacts and sites in northern Ohio, but those data could not be included.

As much as anything, [Table 19](#) suggests how rare are probabilistic data on Paleoindian site frequency, available in sources consulted only for southeastern Michigan (Peebles and Shott 1981) and southeastern Wisconsin (Goldstein 1987). The received wisdom is that Paleoindian sites are rare, may owe to sample effects or taphonomy in Plains studies (Sheehan 1995). [Table 19](#) shows that site density is higher in both systematic surveys reported than in any selective one. Partly this may owe to uncertainty in areas surveyed in sources that report selective survey, as above.

Whatever the case, in selective surveys mean Midwestern Paleoindian site density=0.0149/km² (s.d.=0.0140). Little of eastern North America has been intensively surveyed for Paleoindian sites, so comparative data are few. Yet McAvoy's (1992:12, 23) survey in southern Virginia found 23 Paleoindian sites in 780 km², yielding a density of 0.0295 sites/km². This figure is higher than all but one Midwestern value reported in [Table 19](#), and nearly twice the Midwestern mean. It might be discounted because McAvoy's survey area deliberately included the environs of the famous **Williamson** site, known to be thick with Paleoindian workshops. Yet Lepper's Coshocton County study area is similarly situated near Upper Mercer quarries (e.g., Welling [Prufer and Wright 1970]). Many Nottoway sites apparently were not quarries or workshops and McAvoy may have surveyed more of his area than did most Midwestern sources. In probabilistic surveys, mean site density=0.0693/km² (s.d.=0.0653). For both selective and systematic survey, the standard deviation nearly equals the mean, so parameter estimates are very imprecise.

Even McAvoy's figures may underrepresent Paleoindian site density. In Ontario, Jackson (1998:4-5) found 24 Paleoindian sites in 83 km². The resulting density is 0.2893 sites/km², more than twice the nearest figure and nearly an order of magnitude greater than results obtained in most selective surveys. Yet Jackson could survey only 25% of this area (still a substantial area). Similarly,

sustained work by Ellis, Deller and colleagues near the south shore of Lake Huron in Ontario (Ellis and Deller's 2000 Figure 1.2) shows 17 Paleoindian sites in an area 20 km in diameter. There is no reason not to suppose the that the Midwestern record is equally abundant.

Table 19 data are subject to revision as fieldwork continues. Harrison et al.'s Kishwaukee Basin survey area in northern Illinois is especially instructive in this respect. A subsequent report there showed that much less than the entire area was surveyed (Springer 1985:Fig. 3). Moreover, the later report included 24 Paleoindian sites, defining Paleoindian as liberally as did the original authors (ibid: Fig. 4). The combination of a smaller area surveyed and more sites found would increase site density. Finally, Harrison et al.'s survey area subsequently yielded yet another Clovis-Gailey site [Koldehoff 1999:12]. To be conservative, only estimates from Harrison et al. (1977) appear in Table 19.

Since the Midwest's northern margins were icebound or only recently deglaciated during the early and middle Paleoindian periods, the northern one-third of Minnesota and Wisconsin, and all of the Upper Peninsula and the northern one-third of Michigan's Lower Peninsula are omitted. This yields an area for the Midwest of 1,063,702 km². Estimated mean density from selective surveys yields its own estimate of 1,063,702 x 0.0149±0.0140 sites/km² = 15,849±14,892 Paleoindian sites. The figure from probabilistic surveys yields an estimate of 1,063,702 x 0.0693±0.0653 sites/km² = 73,715±69,460 Paleoindian sites. At the upper end, there may be nearly 150,000 Midwestern Paleoindian sites, which seems impossibly high; at the lower end there may be as few as 1,000. Perhaps a reasonable if broad estimate would be a range from the minimum of 2,000 to the mean of about 17,000 from selective surveys.

Indiana, Iowa, Michigan, Ohio and Wisconsin SHPOs responded to queries with figures on Paleoindian sites, and Wiant (1993) for Illinois and Seeman and Prufer (1982) for Ohio supplemented these figures. Combined, areas of these states habitable by Paleoindians comprise about 732,000 km². From above density estimates, Paleoindian sites over this area might total from about 2,900 to 8,300. Together, these states report 1,676 Paleoindian sites, although Indiana's total of 469 may include many late Paleoindian sites. This total is about three-quarters of the conservative estimate of all Paleoindian sites in those states but barely 20% of the higher estimate. Still, considering the degree to which modern land use has destroyed the Midwestern archaeological record, such fractions of the estimated total are encouragingly large.

Discoveries in Time

Kristiansen (1985:8) gauged representativity via "finds curves," essentially histograms of the number of sites discovered by time interval. Curves showing a past peak followed by a steady decline to the present suggest that the subject is well sampled. But curves that continue to rise to the present suggest that many, perhaps most, subjects remains to be found.

Table 20 shows Paleoindian sites recorded by twentieth century decade for several Midwestern states, compiled from figures kindly provided by SHPOs. (A few Wisconsin records from the 1890s were omitted.) Sources were careful to explain that "Paleoindian" was defined broadly or narrowly at different times in the past century, so some sites may be very late Paleoindian or Early Archaic in age. The Ohio SHPO reported no Paleoindian sites recorded before 1980. For the state where Shetrone (1936) long ago reported 140 fluted bifaces and Prufer and Baby (1963) documented an impressive Paleoindian data base, this seems an artifact of record-keeping.

Table 20. Paleoindian Sites Reported by Decade in Selected Midwestern States

Decade	IN	IA	MI	OH	WI	ALL (except OH)
1910s				1		1
1920s				1		4
1930s				2		1
1940s				8		2
1950s			1	23		1
1960s	3	8	49		3	63
1970s	26	45	103		21	195
1980s	97	30	75	408	38	240

1990s	56	16	40	150	55	167
TOTAL	182	100	302	558	126	720

Ohio has by far the most sites, geographically larger Iowa the fewest. There is a perfect rank-correlation between 1990 state population (United States Bureau of the Census 1999) and number of Paleoindian sites (Fig. 1). In area Ohio is the smallest state, in population the largest. Modern population seems to bear on the probability of discovering Paleoindian sites. Excluding Ohio as above, a "finds curve" of these data (Fig. 2) shows very low recording rates until the 1960s with a steeply rising rate through the 1980s. The rise is especially steep between the 1960s and 1970s, when modern preservation law and the enormous survey efforts it inspired took effect. The modest decline in the 1990s suggests either that the Paleoindian site sample is approaching completion or that systematic survey declined then. Whichever is the case, even the 1990s figure is high, suggesting that many Paleoindian sites remain to be found before the upper tail of the distribution is reached.

Table 20 compiles 1,268 of the 1,676 sites reported in these states for which date of recording is known. Probably some records are apocryphal, or of poor quality regarding location, contexts, associations and artifact assemblages. Some, perhaps many, records register classification effects whereby Early Archaic diagnostics are classified as Paleoindian. (This problem may be especially acute in Indiana, where as many as 565 Paleoindian sites of whatever description but only 48 early Paleoindian ones are recorded and date of recording is reported only for 182 (K. Tinkham, personal communication 16 March 2000). Yet a considerable portion of the total probably are early or middle Paleoindian sites, indicating a substantial archaeological record across the Midwest. Well studied and published Midwestern Paleoindian assemblages, by contrast, practically can be counted on two hands. They comprise a tiny fraction of even the recorded total, so Table 20 points out how much work remains to do just with existing records.

Geomorphology and Geological History

Large rivers and their floodplains grace the Midwestern landscape. As much as anything, the Midwest is a land of major rivers. Alas, this quality imposes its archaeological cost, since Paleoindian sites that occur in floodplains may be deeply buried. Big Eddy (Lopinot et al. 1998) is merely the most prominent example of such buried Paleoindian deposits. CB-North in the American Bottom is buried by aeolian and alluvial deposits (Evans et al. 1997). In the Ohio Valley, **Manning** has Early Archaic and perhaps Paleoindian deposits, to judge from Occupation 2's soil-humate date of 10,240±110 B.P. (B-17774) (Lepper 1994:146). Also in the Ohio Valley, Sandy Springs (Cunningham 1974; Seeman et al. 1994a) is a surface Paleoindian site, but one that lies on a Pleistocene terrace. Geoarchaeological studies of portions of the Mississippi Valley show that much of the Paleoindian surface there is deeply buried or eroded. In one study area in Iowa and Illinois, nearly two-thirds of deposits of Paleoindian age are buried or gone (Bettis and Benn 1989:86). From Billeck's (1998:405) account, Missouri River floodplain surface deposits in western Iowa all postdate Paleoindian occupation. In the Cairo Lowlands just downstream of the Ohio-Mississippi confluence, practically the entire modern surface postdates 3,000 B.P., such that "sites that date earlier than the Late Archaic period are unlikely to be present" (Lafferty 1998:132; see also O'Brien and Wood 1998:58). Thus, the American Bottoms area is rich in sites but surface surveys there revealed not a single Paleoindian assemblage (Munson and Harn 1971:4, 21), yet CB-North shows that they exist. The Mississippi is merely the largest of Midwestern rivers, and has buried or destroyed much of its Paleoindian surface.

Until detailed geological histories are compiled for other floodplains the most conservative assumption is that their Paleoindian surfaces also are essentially destroyed. The absence of Paleoindian sites in surface contexts of geologically active regions says nothing about Paleoindian occupation since the occupational record may have existed but been destroyed. Similarly, wetlands are or were common in the Midwest; ordinarily they are not considered likely places in which to find any, let alone Paleoindian, sites. Yet Clark (1982:118, 121) found several late Paleoindian sites in central Wisconsin wetlands only recently drained at the time of his survey, which suggests that remaining wetlands may contain many Paleoindian sites yet undiscovered.

"Mountainous" may seem an oxymoron in Midwestern context, yet old, small mountain ranges are scattered across it. The mountainous Appalachian uplands are geologically dynamic in ways that can expose but also obscure the Paleoindian physical-finds sample. Among the reasons for the

apparent paucity of Paleoindian sites there is geological taphonomy, not just the reluctance of Paleoindians to venture there. In part, the paucity of Paleoindian sites in Appalachia "is likely the result of geological active landscapes" (Tankersley et al. 1996:93). Southern Illinois, southwestern Indiana and western upper Michigan also are mountainous; the number of Paleoindian sites recorded in those areas, even where considerable (Wiant 1993:Fig. 1), may underestimate the true abundance of sites. (McCracken 1986).

Land Use

Modern land use influences kind and amount of archaeological remains known. Extent of gravel mining and even method of mining influenced the number of Paleolithic artifacts discovered in southern England (Hosfield 1996). The extent and duration of cultivation affected the number and condition of Danish mounds preserved for recording (Baudou 1985). As in Scandinavia, cultivation and other kinds of land use in the Midwest promote discovery of some kinds of remains and damage or destroy others (Halén 1994:30; Kristiansen 1985:8).

The Midwest is an agricultural region and much of its land is under cultivation, yet pockets of covered ground exist in and near cities and extensive tracts of forest and pasture are interspersed through the region. The northern halves of Minnesota, Wisconsin and Michigan mostly are forested, as is much of southern Missouri. The Shawnee National Forest occupies considerable land in southern Illinois. Much covered ground near cities already is altered sufficiently to destroy whatever archaeological remains it may have possessed. But forests and pasture often are unaltered, their archaeological record largely intact; indeed, many such tracts never were plowed so their archaeological deposits are better preserved than in plowed fields.

Yet such covered ground poses special challenges to discovery. Shovel-testing is the preferred survey method in such contexts. It is a perfectly valid sample method but highly inadequate at discovery; shovel-testing will discover some sites but fail to discover most. Indeed, controlled comparison of shovel-testing and surface survey suggest that shovel-testing discovers about one site for every 14 that surface survey would if survey tracts were cultivated (Shott 1985:78-79). Shovel-testing's inadequacies are particularly acute where sites are small in area and sparse in artifacts (e.g., Lewis 1993), qualities that describe a fair part of the Paleoindian record (Shott 1997; Jackson 1998).

The Appalachian Plateau seems impoverished in Paleoindian sites (Anderson and Faught 1998:Figs. 1-2; Seeman and Prufer 1982:Fig. 2). This condition may reflect a small physical-finds population but also the taphonomic effects of a low rate of cultivation and surface exposure there. Certainly the perception of a sparse record is belied by the surprising number of sites in one Pennsylvania county in Appalachia, a number revealed only by sustained efforts of local collectors (McCracken 1986).

The Appalachian Plateau covers only the southeastern corner of Ohio among Midwestern states. But the argument can be extended to any areas where ground cover is forest or pasture which, as above, are common in the Midwest. If type and amount of ground cover influence the probability of site discovery and the size and composition of the accumulated physical-finds sample (Lewis 1993:51), then we must control for their effects on the Paleoindian sample.

Collections History

An apparent concentration of fluted bifaces near St. Louis (e.g., Smail 1951) may register the effects of St. Louis collectors, not Paleoindian site distributions. Thus, O'Brien and Wood (1998:58) interpreted the distribution of fluted bifaces in Missouri as some compound product of original distribution and varying degrees of collection intensity. Similarly, Henry and Nichols (1963:122) suggested that the observed distribution of Paleoindian sites in Vermilion County, Illinois, may owe as much to where collectors worked as to original site distributions. As above, the abundance and distribution of Paleoindian sites and artifacts changed considerably in northern Illinois between Harrison et al.'s (1977) and Springer's (1985) studies.

Taphonomic Effects Upon Resource Abundance and Distribution

Geology, land use and collecting history bear on the accumulated Paleoindian record. These effects urge caution in interpreting tool and site distributions, and due regard for taphonomy. Indeed, Graham and Lundelius (1994:290) counseled no less in the interpretation of Pleistocene fossil distributions across the Midwest. If modern land use and other factors that condition distribution of research affect the size and character of fossil collections, no less seems reasonable to assume for

archaeological distributions.

Lepper compiled fluted-biface frequencies in Indiana, Kentucky, Michigan, Ohio, Tennessee and West Virginia and considered the possibility that they were partly determined by amount of cultivated land and modern population. He (1983b:276) concluded that "the documented distribution of fluted points is a contemporary phenomenon" although his data measured biface frequency, not distribution. Lepper's analysis stood in part on Ohio data reported by Seeman and Prufer (1982). Referring to that state, Seeman and Prufer (1984) disputed Lepper's judgment. They noted that Lepper's data treatment minimized the number of independent observations (i.e., gross physiographic zones rather than the more numerous and smaller counties). Recompiling fluted-biface frequencies by county, Seeman and Prufer (1984:228, Figs. 1-2) suggested at least that fluted-biface frequency was influenced by modern population.

Obviously, the relationship is crude since some collectors travel great distances to seek artifacts; the margins of large cities should not necessarily yield the greatest number of artifacts just by virtue of their populations. Extent of cultivation may not covary with archaeological remains in part because most Ohio counties (except near cities and in the southeast) are extensively cultivated in the first place. These qualities render moot Seeman and Prufer's (1984:228) regression analysis to show the failure of modern population to completely determine biface frequency. Lepper did not claim the "straightforward situation" (ibid) charged of him.

Distributional Representativity

One way to gauge representativity of the Paleoindian physical-finds population is to measure the distribution of remains on a regional scale. Random distributions imply either randomness in the underlying population or some combination of patterned original distribution and random taphonomic effects. Nonrandom distributions are more problematic to interpret, since nonrandom patterning may register the properties of the physical-finds population or again, some combination of original distribution and modern taphonomic effects that are themselves nonrandom.

Table 21 shows fluted bifaces or sites per county for states having available data. Some data are from published sources, others from SHPOs. County totals for Michigan and Wisconsin are for counties below the late Pleistocene glacial front. For Michigan, this roughly corresponds to the famous Mason-Quimby Line. For bifaces, Iowa values are combined Clovis and Folsom specimens, not either separately (T. Morrow and J. Morrow 1994). (T. Morrow and J. Morrow's [1994:47] Folsom map seems to show 28 specimens, yet they [1994:48] reported 27.) The Poisson model tests such frequency data by quadrat (county in this case) for randomness, using the χ^2 statistic (Harvey 1966). Frequencies are compiled from 0-5, with all higher values grouped as 6+. Thus, the threshold $\chi^2_{.05, df=6}=12.6$. All results are significantly nonrandom. Both bifaces and sites are distributed nonrandomly, probably in clustered distributions.

Table 21. Frequency Distributions of Fluted Bifaces or Sites per County

[Long description]

FLUTED BIFACES							SITES			
N	IN ¹	IN ²	MI ³	OH ⁴	OH ⁵	IA ⁶	IA ⁷	IL ⁸	MI ⁹	WI ¹⁰
0	45	21	26	18	11	64	53	35	6	1
1	20	15	5	10	1	16	18	17	6	3
2	6	9	7	7	11	5	16	16	6	2
3	4	6	2	6	5	7	6	11	4	0
4	4	7	0	9	5	0	2	5	3	3
5	2	3	3	8	5	1	1	3	4	3
6+	11	31	4	30	50	6	3	15	18	14
Σ	92	92	47	88	88	99	99	102	47	26

¹Dorwin 1966

²Tankersley et al. 1990

³

⁶T. Morrow and J. Morrow 1994

⁷W. Green, personal communication

⁸

Mason 1958 Wiant 1993:Fig. 1
⁴Seeman and Prufer 1982:Fig. 1 ⁹Cleland et al. 1998:Fig. 3
⁵Seeman and Prufer 1982:Fig. 2 ¹⁰R.Birmingham, personal comm.

Physical-Finds Population: Fluted Bifaces

Trends in sample rate can be supplemented by gauging sample fraction. One way is to estimate the size of the physical-finds population, expressed as number of either sites or tools, especially fluted bifaces. As above, our imperfect knowledge of the range of diagnostic Paleoindian tool types makes it practically impossible to estimate the size of the Paleoindian tool population across the Midwest. Even estimating either the number of sites or of fluted bifaces is difficult enough, but at least worth the effort. It belabors the point to note that the following estimates are of unknown accuracy. Only the heuristic nature of this exercise justifies the attempt.

The physical-finds population of fluted bifaces is determined by three quantities: number of tool-using Paleoindians, rate of discard (Ammerman and Feldman's [1974] "dropping rate") per person per unit time (discard/person/time) and the duration of the Paleoindian period or any of its subdivisions. We can estimate the size of Paleoindian populations by intelligent use of ethnographic data on population density and its relationship to environmental variables that can be measured or inferred for Paleoindian contexts. Discard rate is more difficult to estimate, since we utterly lack ethnographic data for the two quantities that determine it: number in use per person and object use life.

Shott (n.d.) discussed these questions at greater length. Table 22 shows different results depending upon whether only men (Scenarios I and II) or men and women (Scenarios III and IV) used fluted bifaces. The result is estimates of the physical-finds population, not the human population. If the middle Paleoindian period's duration were much shorter, the estimated number of fluted bifaces would be less. If use life were longer or dropping rate lower, again the estimate would decline.

Table 22. Estimated Number of Early and Middle Paleoindian Fluted Bifaces Discarded in the Midwest.

Duration Scenario	Concurrent (years) Users	Systemic Number	Dropping Rate	Person-years (duration x users)	Population (dropping rate x person-years)
700	500	4	16/year	350,000	5,600,000
700	500	10	40/year	350,000	14,000,000
700	1000	4	16/year	700,000	11,200,000
700	1000	10	40/year	700,000	28,000,000

Yet input values either were given (phase duration) or estimated conservatively. The figure of approximately 8,500 fluted bifaces recently documented east of the Mississippi River (Anderson and Faught 1998:170) is impressive but comprises a tiny fraction of the lowest value estimated in Table 22. The 8,500 bifaces also includes early and late Paleoindian bifaces, not just the middle Paleoindian ones the subject of these calculations. Anderson and Faught's (2000) most recent data include 2,551 fluted bifaces from Midwestern states, the great majority identified as "Clovis-like." If C. Haynes's (1966; cited in Anderson and Faught 1998:170) estimate of millions of fluted bifaces seems high, Anderson and Faught's compilation is less than 1% of the minimum estimate. This is a criticism of neither source, which had other purposes than this exercise's. Anyway, Anderson and Faught compiled empirical figures, not estimates; 4,250 bifaces is probably a suitably large sample for many analytical purposes. Yet it may be a small fraction of the total made, used and discarded.

Research Needs and Questions for the Midwest

Thematic Research Issues for the Midwest

The Midwestern Paleoindian record is sufficiently large and diverse to accommodate research projects from many empirical and theoretical approaches. It would be folly to propose a comprehensive set of questions to guide all future research. Instead, the following questions and problems might help direct Midwestern Paleoindian research and provide a framework for NRHP

and NHL evaluation of Midwestern sites. They also identify some kinds and amounts of evidence needed for their answers. The questions complement the research themes presented in the national context. Obviously, there is some overlap between themes owing to their complex and related natures.

Peopling Places

On a continental scale the Midwest literally was in the middle of the peopling process; although the earliest Midwestern prehistory cannot be learned in isolation, the history of peopling other parts of the continent take second place here.

The long and contested history of pre-Clovis claims and evidence was reviewed briefly above, more thoroughly by Dincauze (1984) and Fiedel (2000). If the **Chesrow Complex** indeed is early Paleoindian in age, the Midwest's first human occupation occurred as early as 13,500 rcbp. Until this possibility is confirmed, there are claims but no conclusive evidence of people in the Midwest before circa 11,000 rcbp, roughly the end of the early Paleoindian period. One of the beauties of archaeology is that this judgment can be mooted in the time required to discover and document a site, so it is never more than a contingent judgment.

From wherever they came, the first people surely reached the Midwest on foot or in very small watercraft. How they moved in and occupied the Midwest remains unknown. Martin's (1973) melodramatic wave-advance model rests on dubious assumptions about population size, distribution, hunting rates and practices, colonization rates, and the adaptability of animals to hunting; in any event, there is no Midwestern evidence for the suggestion that many people were crowded into an assault front that ravaged vulnerable megafauna. It is more reasonable to assume that Paleoindians colonized the Midwest intelligently. The available evidence and radiocarbon chronology are far too inadequate to reveal details of the timing, let alone the manner and direction, of colonization. Anderson and Gillam's (2000:Figs. 2-3) suggestion of first entry from the Missouri-Mississippi confluence area eastward and northward seems reasonable.

After the first people colonized the Midwest, their Paleoindian descendants occupied it for at least centuries. In that span, what were the trends in settlement and population? Was human population small until the Midwest was filled at some threshold value? Did it increase thereafter and, if so, how fast? Such questions are valid not just for historical but also theoretical reasons, for understanding the subsequent history of colonizing populations.

Again leaving aside proboscidean sites, Table 8's radiocarbon dates are a rough index of Paleoindian population trends through time, but the evidence comes from three sites only, almost all from two, and is the product of justified but nonrandom selection. The nature and scale of perceptible chronological trends depend upon our ability to measure and resolve past time. Radiocarbon dating probably is too coarse to resolve time sufficiently to gauge Paleoindian population trends. A more promising approach is refined typological dating, especially if trends are expressed in continuous terms in metric variables. Ellis and Deller (1997:5-8) proposed as much for Great Lakes fluted bifaces, postulating an empirical trend to reduced size of fluted bifaces through time. Variables that define the trend—principally thickness, base width, and basal concavity—are not subject to change during the use life of specimens, so the apparent trend is not the by-product of the differential reduction of individual tools. As we find, excavate and study more Paleoindian lithic assemblages, we might observe similar trends in other types. Doing this, we might resolve time in near-continuous terms and so begin to measure population changes through time, among other things.

Creation of Social Institutions

Archaeology in the 1960s was a sincere attempt to plumb the material record for its social dimensions. It foundered largely on the difficulties of teasing social units from remains governed by complex formation processes, not by any theoretical deficiency (Shott 1998). One early extension to lithics was in Voss's (1976:269-272) analysis of fluted bifaces and channel flakes from the Barnes site (see also Wilmsen and Roberts 1978). His cluster analysis identified four social units there.

Shaping the Political Landscape

In preindustrial societies, politics involves alliance and accommodation for various material and social purposes. Ethnography documents patterns of interaction between forager cultures on near-continental scales, interaction often symbolized in sumptuary items. Presumably, the scale of

distribution of such items reflects the scale of political alliance and the pattern of distribution—abundance with distance from sources—reflects its character.

Hayden (1982) used this general approach to argue that Paleoindian colonists of the midcontinent required active negotiation of political alliances as they expanded and even as they simply persisted in their ordinary ranges. In his view, as population and social density increased during the Paleoindian period, band ranges declined. Thus, progressively through the Paleoindian interval material markers of social identity—practically, stone tool types or "styles"—should have grown more localized, the number of styles greater on a regional scale. In part Hayden grounded his thesis in a view of alliance and formation of political landscapes as insurance on the scale of bands.

Uneven Midwestern evidence makes it difficult to assess Hayden's thesis for the early and middle Paleoindian phases. Yet the character—scarcity, fine workmanship, size and thinness—and distribution of Sloan points or "blades" in midcontinental Dalton assemblages suggest that they might have circulated among Dalton bands as material symbols of alliance (Walthall and Koldehoff 1998).

Toolstone and Paleoindian Mobility. To move beyond ethnographic analogies, we must use existing theory that links environmental parameters to forager mobility (e.g., Kelly 1995:111-160) and so reasonably infer Paleoindian mobility practices on theoretical grounds. Then we must develop the theory of technological organization (e.g., Shott 1986a) that links mobility practices to materials remains, and so test mobility theory in archaeological evidence. Paleoindian studies are ideally suited to the problem.

Mobility is a set of practices expressed in frequency, the number of residential moves made per unit time, and magnitude, the cumulative distance covered in those moves (Shott 1986a:21-22). Both in theory and practice (Shott 1986a, 1986b, 1989b) frequency and magnitude have different effects and groups can differ in mobility frequency or magnitude despite having similar ranges. In the Great Lakes, mobility frequencies reveal greater differences than do mobility magnitudes suggesting they reflect differences in how often people moved to acquire tool stone rather than differences in how far people moved to acquire it.

Almost always, archaeologists assume direct acquisition by users, as opposed to trade. But direct acquisition is ambiguous if only some members of a society actually acquired toolstone and then distributed it to their fellows. Thus, the direct-indirect distinction applies at the level of minimum social groups; from the start, toolstone distribution is socially implicated.

Direct acquisition may be purposive involving travel expressly to obtain stone. Binford (1979:259) considered this practice rare in forager cultures, arguing that toolstone acquisition was embedded or accomplished incidental to other activities during travel. Embedded acquisition must be sometimes but not always the practice, extended travel to stone sources equally possible. Ethnographic documentation of purposive travel for food and other resources is legion, the observation banal. Toolstone is a common good like food, so it should not surprise that people sometimes travelled to acquire it. More likely, most travel was for many reasons and embedded toolstone acquisition no more nor less than other activities. Indirect acquisition involves exchange for social or economic reasons, the latter varying greatly in scale and pattern (e.g., "down-the-line," gravity). Society-wide large-scale and individual small-scale exchange can be distinguished, as well perhaps as Meltzer's (1989:23) gift and ceremonial exchange.

Since toolstone acquisition implicates social conditions, it reflects them in the archaeological record. Consequently, archaeologists long have struggled to identify the often subtle differences between variants of direct and indirect acquisition. Sometimes we distinguish between possibilities via properties of assemblages like abundance, technology and context. If more toolstone is acquired directly than indirectly, a source's abundance might imply direct acquisition. If sources occur in archaeological deposits in proportion to their natural abundance (perhaps adjusted for quality), then direct embedded acquisition is implicated; people simply acquired stone incidentally to other land uses. Meltzer (1989: Table 2.1) has catalogued general Criteria than can affect the presences, abundance and typological richness, stylistic properties and reduction processes of local/nonlocal stone (within reason, the more such archaeological Criteria applicable, the better). All else being equal, the greater the distance between source and archaeological occurrence, the likelier that toolstone was exchanged (see Brose 1989). What is local for high-latitude foragers may be quite exotic for densely settled farmers. Even in roughly similar contexts, archaeologists use many

different threshold values between local and nonlocal, although ca. 30-40 km seems common.

Meltzer's (1989) Table 2.1 is a catalogue of often undetermined factors that determine the presence, abundance and typological richness, stylistic properties and reduction process of local/nonlocal stone. Within reason, the more archaeological Criteria used the better.

Toolstone Distribution. Most Paleoindian stone tools were made of chert, although metamorphics like quartzite sometimes were used. Major Midwestern toolstones include Burlington chert in the St. Louis area, Hixton silicified sandstone, quarried at **Silver Mound** in western Wisconsin, Attica chert in western Indiana, Harrison County chert from southern Indiana, and Upper Mercer and **Flint Ridge** cherts from eastern Ohio. Pennsylvanian chert very similar to Upper Mercer outcrops in Moline, Illinois and in southern Missouri (Ray 1983), and was dominant in Paleoindian assemblages as distant as **Aebischer** in eastern Wisconsin (Mason 1988). It may be the "dark, almost black" (Clark 1985:118) chert of another possible Gainey biface from that area although Moline chert is nodular rather than tabular (Birmingham and Van Dyke 1981:348). Collingwood chert, near southern Georgian Bay in Ontario, was a common Paleoindian toolstone in Ontario, but occurs rarely in neighboring American states. Many cherts were distributed in secondary deposits like glacial drift or the channels of major streams (Shott 1986b:125-126). To use distance-to-source we must be sure of toolstone and sources. Most identifications are visual, which is problematic for some of the sources: **Flint Ridge** and Upper Mercer are notoriously variable in color, luster and other visible properties. Short of neutron-activation analysis or the study of diagnostic fossil inclusions, many other sources cannot be distinguished.

Ingbar (1994) examined the distribution and relative abundance of chert sources across the landscape, varying only mobility frequency and size of tool inventory between three different situations. He found that source proportions varied widely between "sites" and that frequently no tool from sources used at a "site" was left there as evidence of use. Ingbar (1994:46) concluded "there is not a good correlation between raw material source proportions and territory" and that range is underestimated by the distance between material and cultural occurrence of sources found in many assemblages. Bradbury and Carr's (2000) recent simulation included debris as well as tools and showed that replacement (using tool reserves kept ready for use versus returning to source, reduction technology), and artifact use life affected the abundance and distribution of toolstone independently of "mobility."

Of course, range can be as easily overestimated by wrongly inferring that exchanged stone was obtained directly, even if sources are properly identified. The Gainey assemblage (Simons et al. 1984) lies over 300 km from its chief source of toolstone. Sheridan's chief source lies 400 km away (Tankersley 1999:70). Such distances are reported elsewhere (Paton 1994:177), and the quantity of this chert and the full range of reduction products represented make direct acquisition the likeliest mode here. Taking this distance as the maximum travelled in a circular range yields roughly a 70,000 km² area. Curran and Grimes (1989) inferred a Paleoindian range encompassing much of New England and roughly 140,000 km² on the strength of toolstone distribution in five major assemblages. Even the lower of these two values greatly exceeds the highest reported ethnographically (Kelly 1995:Table 4-1).

In Michigan, early Paleoindian Gainey Phase assemblages are dominated by Upper Mercer chert. Subsequent Parkhill Phase assemblages are dominated by the local Bayport chert, occasionally supplemented by Upper Mercer and rarely perhaps by Collingwood chert. This shift is interpreted as evidence for lessened mobility in the sense of more restricted range. Most archaeologists argue that later Paleoindian cultures, certainly Early Archaic ones, were even less mobile (i.e., ranged more narrowly). Yet many Early Archaic Michigan (LeCroy) bifaces were made on Upper Mercer chert. Some might argue that Upper Mercer was obtained via trade by Early Archaic groups, but that its abundance among industrial debris in assemblages like Gainey's testifies to direct acquisition. Until more Early Archaic assemblages are excavated in Michigan, northern Ohio and Indiana, we will not know enough about their industrial character to settle the question.

Ingbar's simulation, and perhaps Curran and Grimes' data, show that any single system of use and technology can create wide intra-assemblage variation in source presence and proportion. Only when important assumptions are met can material distance serve as a measure of range. We already have the theory (Nelson 1991; Shott 1986a) and have begun to develop the methods (Brosowski 1996; Shott 1986b, 1989b) to distinguish magnitude and frequency. We must get beyond sole, even primary, reliance upon distance-to-source because it is an inherently crude measure.

Developing the American Economy

If Paleoindians were the first Americans and Midwesterners, they developed the first economies here. Economy includes socially organized subsistence. We know little about how subsistence was socially organized. We know little more about what was eaten. In the Northeast, it is now formulaic to describe Paleoindian subsistence as broad as it was once described as narrowly focused on megafauna. In the Midwest, most archaeologists still view Paleoindians as hunting specialists (e.g., Ellis and Deller 2000:255). Caribou figure prominently in most reconstructions. Indeed, Jackson and Thatcher's (1997) volume practically enshrined this view. Mason (1981:99) reported a fluted biface lodged in an elk rib (*Cervalces* sp.). Nevertheless, exclusive focus on large mammals is questionable (even the earliest Clovis sites in the southern Plains yielded a variety of small mammals and reptiles, although bison and ground sloth were present [Ferring 1995:277]). Lacking "better-preserved representative diet samples, we cannot assess the relative importance of hunting and other Midwestern Paleoindian subsistence activities" (Fiedel 2000:77).

Smaller mammals and other classes are much less abundant in the archaeological record, though fairly abundant in the fossil one (e.g., McDonald 1994). Udora, a Gainey-affinity assemblage in southwestern Ontario has yielded hare (*Lepus* spp.), Arctic fox (*Alopex lagopus*) and caribou (*Rangifer tarandus*) (Storck and Spiess 1994:126-128). Fourteen bones, most calcined and all apparently mammalian, were found at Halstead, and cervid and unidentified mammal bone was found at Sandy Ridge, both Gainey-affinity and also in southwestern Ontario (Table 9; Jackson 1998:27, 56-57). None was recovered from feature context, but calcining suggests human agency and Halstead and Sandy Ridge are single-component Gainey deposits. Possible antler and other elements identify at least one cervid, likely *Odocoileus* sp. but perhaps *Rangifer* sp. One uncalcined incisor is from *Castor* sp. Ohio's Sheriden Cave yielded probable Paleoindian artifacts in deposits rich in Pleistocene and Holocene fauna that include reptiles and fish as well as small mammals, caribou, deer, stag moose, and giant beaver (Holman 1997; McDonald 1994; Tankersley 1999a:68-69). One mammal long bone was worked into a point, but other remains may combine natural and cultural occurrences. The **Chesrow** occupation at **Lucas** yielded unidentified calcined bones (Overstreet 1998:39). Hiscock's culture-bearing deposit also contains a surprisingly diverse biota with mastodons, cervids and California condor (*Gymnogyps californianus*) (Steadman 1988). The late Paleoindian **Holcombe Beach site** yielded caribou, probably *R. tarandus* (Cleland 1965). More broadly, Kuehn's (1998) survey of late Paleoindian subsistence evidence from northern Wisconsin revealed a broad range of Holocene species. Although there are natural occurrences of caribou in the Midwest (e.g., McAndrews and Jackson 1988) there are no known kill or butcher sites of caribou or other game (O'Connell et al. 1992).

There are few if any plant remains from Midwestern Paleoindian sites. *Chenopodium* (*Chenopodium* spp.) and perhaps acorn (*Quercus* spp.) occurred in late Paleoindian deposits, and wild grape (*Vitis* spp.) in middle to late Paleoindian contexts at Big Eddy (Lopinot et al. 1998:284). Small amounts of hickory (sp.) shell were recovered from a Paleoindian feature at CB-North in the American Bottom (Evans et al. 1997:170). Paucity of evidence owes partly to the few intact Paleoindian deposits like features ever examined thoroughly for subsistence evidence using fine screening or flotation. Where this has been attempted (e.g., at PaleoCrossing [Brose 1994]) no floral remains were recovered other than fragments of possible posts.

The Midwestern Paleoindian record substantially is a lithic one. To determine Paleoindian economic development, our first task is to identify the economic properties of toolstone. One is *abundance* although Paleoindian consumption was far less than the supply. Abundance can be measured by number of cobbles or tabular pieces, by their volume or weight. *Cobble size and form* constrain size and form of finished objects, but mostly affect technology and efficiency of reduction (Bradbury and Franklin 2000). We must thoroughly sample outcrop and secondary deposit sources to ascertain the natural ranges of variation in these properties. Studying only those samples recovered from cultural sites, selectively acquired and used by Paleoindian and later knappers, has skewed the original distribution. Finally, fracture and other mechanical properties of toolstones (McCutchen and Dunnell 1998), these bear on the selection, technology, tool design, use and discard of tools.

Expanding Science and Technology

How Paleoindians fluted can be understood, in part from Midwestern evidence. Even now we cannot agree on fluting failure rates (Ellis and Payne 1995; Storck 1983). Length and width of flute channels perhaps rose from Gainey to Parkhill Phases, then graded into basal thinning by the late

Paleoindian period. Since extent of fluting varied over time, the reason for fluting perhaps varied also, at least by degree. In some sense, fluting may have been done to increase the surface area of contact between point and foreshaft, thus to improve fixing in hafts. Residue analysis might be attempted on flute channels, although we need not expect blood residues or antibodies there unless Paleoindians mixed animal blood to form mastics. If fluting ability were valued arbitrarily, then the best fluters would enjoy social advantage, perhaps excluding others from the activity as a way to reinforce status or even to control the distribution of fluted bifaces.

A great unanswered question in Paleoindian studies is how fluted bifaces were used as projectiles. Did they tip hand-held spears, thrown ones, or atlatl-launched darts? Hutchings's (1997) method poorly distinguished dart and arrow use, but seems able to distinguish dart use from use as hand-held or thrown spear. It should be applied to Midwestern Paleoindian fluted bifaces.

Technological Organization. Technology involves not just the tools people made or how they used them, nor just the social dimensions of production and use. It involves organization as well, how tool production and use are integrated into larger cultural wholes. Studies in the Midwest showed how Paleoindians planned their tool use to avoid shortages as they moved away from sources (Ellis 1984), and how mobility, especially its frequency, influenced tool design and the kind and number of tools used (Shott 1986a, 1989b). Midwestern Paleoindian sites can demonstrate via organizational studies that technology is deeply embedded in cultural contexts. This lesson may encourage us to view our own technology properly in its social context.

Transforming the Environment

Our view of hunter-gatherers vacillates between the romance of Rousseau—primitive paragons of virtue in sweet harmony with their environment—and the gloomy judgment of the cynic—that despoilation is a timeless human activity. In the 1980s it became fashionable to argue that even hunter-gatherers were polluters: our equals in kind who lacked only the means to wreak environmental havoc so thoroughly as we. But people always have been ambivalent about changing the environment, and much of our history celebrates triumphs which control and thus transform nature. If hunter-gatherers are not gentle stewards of nature neither are they passive ciphers in it.

Anthropologists have come to recognize how hunter-gatherers among others used fire to transform their environments, sometimes subtly and always in complex ways. Perhaps Paleoindians did as much, a practice whose effects would be hard to distinguish among the major climatic and historical changes wrought at Pleistocene's end. Otherwise the question of environmental effect reduces to the possible role that Paleoindians played in the extinction of Pleistocene megafauna. After decades of avid searching, however, there are surprisingly few certain human associations with proboscideans. Fisher's and colleagues' taphonomic virtuosity makes a suggestive but not conclusive case. Liberally accepting all such claims, half or more of analyzed proboscideans remain natural deaths without human intervention. Mammoths had rather narrow ecological tolerances that almost certainly doomed them in the late Pleistocene's climatic furies even had humans never reached North America. Broader diet and habitat preferences made mastodons a hardier species, but one already experiencing natural stresses that invited extinction (King and Saunders 1984:331) before humans arrived. At Pleistocene's end, the Midwest was populated also by short-faced bears, sloths, horses, giant beavers and other megafauna now extinct. These too have been found at Sheridan (Tankersley 1999), yet we do not routinely ascribe their demise to Paleoindian hunters. Moreover, we have direct evidence that Midwestern and nearby Paleoindians hunted caribou, hare and Arctic fox, yet these species survive today.

Significant Research Concerns for the Midwest

Typology. The theoretical basis of Paleoindian fluted-biface typology is largely underspecified. We must construct typologies (not reveal types), defined by fairly strong patterns of association between metric and discrete variables; at least broadly, fluted biface typology captures and summarizes simultaneous variation in biface technology, size and form.

Fluted-biface typology must be grounded in theory of biface size and form and production technology governed by functional or social constraints. We should ground our typologies in theories of whole-object form, and the functional requirements of hafted bifaces probably used as weapon tips. Such approaches require us to determine which variables register which functional constraints, and how they register them and to distinguish functional from stylistic variables if in fact they are different. Over time, ratio variables under functional constraints should trend

monotonically stylistic variables should vary at random. Categorical variables under functional constraint should fix at constant proportions over time; stylistic ones should form the chronologically normal curves of mid-twentieth century models (Beck 1998). In fluted bifaces, typology usually rests upon gross size, plan form, and details of fluting and base form. But until we identify relevant functional variables, we cannot be certain if these measure functional or other design constraints. Hughes's (1998) consideration of engineering theory led her to identify mass, perimeter, and cross-section area as important functional variables in points. Paleoindian biface mass sometimes is reported, but the other variables rarely if ever are.

J. Morrow (1996:159-173) noted the deficiencies of earlier typologies and was careful to remove reduction effects from her own typology of biface finished form (1996:193-194). She also advocated replicable typologies based on quantification. In her own typology, Morrow used four variables (basal concavity, base width, maximum thickness on the flute, and maximum width) to compute two ratios (concavity-to-base-width, maximum-thickness-to-maximum-width), and defined her types on the strength of patterns in the ratios. In this way, she (1996:194-200) distinguished Clovis from Gainey from Vail/Debert. Of necessity, Gainey was represented chiefly by the Lamb site (Gramly 1999) because too little data were available from the type site. Two ratios seem reasonable but were not justified by any theory that linked variables to technology, form or intended or actual use. Also, if the variables that underlay the ratios were correlated, then the patterns in them identified as typological may be continuous; these types may be arbitrary subdivisions of continuous variation.

Barrish (1995) compared bifaces from the early Paleoindian **Paleo Crossing**, Nobles Pond and Gainey sites, the latter subdivided into Upper Mercer and Ten Mile Creek specimens. First she (1995: Figs. 12-19) compared the assemblages by basic metric variables. Then Barrish (1995:92-93) performed principal-component analysis on metric variables except length, because length is affected by resharpening. Finally she (1995:96) distinguished the three assemblages via discriminant analysis. Barrish (1995:104) concluded interestingly that **Paleo Crossing**, Nobles Pond and Gainey formed a time series within a broader Gainey type, thus combining discrete and continuous approaches.

Recognition of data limitations (Barrish's multivariate analyses were performed on 27 specimens apportioned among three assemblages) suggests small samples might be unusually affected by sample error. Barrish omitted length from analysis because it is affected by reduction, but she included position of maximum width (distance from base to point of maximum width) and flute length, which also can be sensitive to resharpening. Principal component 1 was size (Barrish 1995: Table 10) as it often is in metric data. Barrish (1995:93) interpreted component 2 as a haft dimension involving flute length and basal concavity (Simons et al. [1984:268] noted a similar correlation between flute width and concavity), but specimens that scored low on the component seemed heavily reworked (1995: Fig. 21). If their original flute length was reduced by resharpening, then measured flute length is influenced by resharpening and should be excluded from analysis. Barrish's discriminant analysis did not include thickness, although this variable is as significant as those included. Her study did demonstrate significant metric differences between Gainey subtypes defined by different toolstones.

Ellis and Deller (e.g., 1997) did not use multivariate methods to classify fluted bifaces, but did use many technological and formal variables to justify the three successive early to middle Paleoindian biface types Gainey, Barnes and Crowfield. Their study ordered the types in a time series independently confirmed by contextual data (geochronology, toolstone availability and selection, typological cross-dating). It also demonstrated that toolstone selection, resharpening, function and discard patterns do not produce or even complicate the time series. Thus, Ellis and Deller argued that patterning owed to time, not extraneous factors. Their views on discard (1997:6) should be strengthened by a more thorough consideration of discard processes and their effects on tool size and form (e.g., Shott 1989a:173-183). On balance, however, Ellis and Deller's typology is grounded in a relatively comprehensive set of relevant shape and size variables.

Darwent et al. (2000) performed cladistic analysis on attributes from 500+ southeastern fluted and other bifaces. Results (2000:7) suggested a great deal of "homoplasy"—convergence, independent invention or diffusion of attributes—much surely for functional reasons. Cladograms rather freely mixed defined types (e.g., one "clade" grouped Cumberlands, most Quads and some Daltons) that, at least in the Midwest, contextual evidence clearly distinguishes. Darwent et al. did not entirely control for the confounding effects of resharpening but cladistics is an innovative way to perceive

and interpret historical patterns of change in biface morphometrics. It may revise type definitions and reveal unsuspected complexities in the time order of Paleoindian biface traditions.

Survey Standards

The Midwest probably has the greatest expanse of cultivated land in the United States, and most Paleoindian sites were found by surface inspection of plowed fields. But cultivated surfaces are complex sampling domains subject to considerable random and systematic variation between plowings. Further, no one surface collection is faithful to a site's properties. Several documents of one Michigan record varied enough to make it change from "hunting camp" to "processing site" to "armament site" (Shott 1995b:Fig. 7) using Judge's (1973) taxonomy. A considerable literature shows that an adequate sample of a site requires at least five collections of its surface (e.g., Shott 1995b).

Archaeologists' systematic surveys across the Midwest occasionally discover Paleoindian sites. But practically all professional surveys involved single passes across the surface. Collectors often are local and energetically visit the same site many times. It is no surprise, therefore, that collectors have discovered more Paleoindian sites and probably more fluted bifaces by far than have professional archaeologists. Southwestern Ontario near Toronto probably boasts the largest concentration of Paleoindian sites and certainly the fullest range of variation in assemblage size, density and location in areas near the Midwest. The record (e.g., Ellis and Deller 1997) is the product of decades of sustained collaboration by local collectors and nearby professional archaeologists. Perhaps the southwestern Ontario Paleoindian record truly is exceptional. Until similar efforts are made across the American Midwest, however, we never will know. Paleoindian sites often require two, three or more visits before the discovery of the first diagnostic artifact. Morrow-Hensel and Gail Stone in western Wisconsin were visited by local collectors many times before significant collections were amassed (D. Amick, personal communication 2000). Missouri's Walter site was found only on the second visit there (Nichols 1970). Among the nine Paleoindian sites in southern Wisconsin's Yahara Valley, only one would have been found in a single-pass survey (Wendt 1985:245). It took eighteen years of collection to discover fewer than 10 fluted bifaces among the 19 Paleoindian and late Paleoindian bifaces found near Danville in eastern Illinois (Henry and Nichols 1963). Hawk's Nest required "Repeated surface collection" over four years to yield a Gainey assemblage of about 80 tools (Amick et al. 1997:4). Anderson in northern Illinois required "more than two decades" (Koldehoff 1999:12) of collecting to produce a modest but significant assemblage.

Also in northern Illinois, Kishwaukee Basin sites tend to be diffuse and relatively unproductive. "In order to acquire a reasonable idea of the sequence and intensity of occupation, numerous visits are necessary" (Springer 1985:10). Culloden Acres was known since the 1960s and presumably was visited many times before the first diagnostic Paleoindian artifacts were found there (Ellis and Deller n.d.:8). Discovery of other small Ontario sites required intensive survey sustained over many years (Ellis 1994:423). To Jackson (1996:13), "literally years" of repeated survey were required to locate, define and compile substantial collections from Ontario Paleoindian sites. Twenty years of collection were necessary before so many as 25 fluted bifaces were found at Martens (O'Brien and Wood 1998:60). In Illinois "intensive, multi-year surveys are necessary when studying the remains of mobile foragers since the archaeological signature of such groups is only faintly represented...and is likely to be missed during short term surveys" (Walthall and Koldehoff 1999:30). Elsewhere, Virginia's Nottoway Valley survey spanned nearly 30 years, 12 of which involved intensive efforts (McAvoy 1992:13).

We might survey the regional Paleoindian record using both conventional and new techniques. The former includes intensive surface survey of cultivated fields. The latter includes extensive mechanical excavation, for which efficient methods have been developed to process (Steinberg 1996; Van Horn 1988). Using a purpose-made machine in Denmark, Steinberg (1996:Fig. 2) sampled plowzone volumes vastly greater than would be practical by hand. Using similar methods in the Midwest, we could efficiently define the regional dimensions of the Paleoindian record free of the constraints but not the virtues of the site concept. Thus we could identify concentrations that might legitimately be treated as sites but also measure continuous background densities of Paleoindian remains. Such methods would demonstrate resourcefulness and technological ingenuity. We too can be innovative under difficult conditions.

Obviously, the accumulated Midwestern Paleoindian record is substantial. As above, there should be

many opportunities to collect regional assemblage data. The nearest extant Midwestern version seems Lepper's (1988) report on Coshocton County, Ohio assemblages near Upper Mercer chert sources. Regional survey may be selective or probabilistic in design. The effort to compile the necessary data may require some fundamental reordering of institutional arrangements for fieldwork. I argued (Shott 1992b) that general preservation needs would best be served by reorganizing toward sustained regional survey, not project-specific measures. This is the archaeological equivalent of fire management and systematic prevention over putting out brushfires.

Improved survey standards will have useful consequences and would produce regional-scale assemblage data, heretofore unknown in the Midwest. Paleoindian land use and cultural organization were regional in scale and a single system obviates the problems of typological comparability. Such data exist in the southwest (Judge 1973) and southeast (McAvoy 1992), but not in the Midwest. Sustained fieldwork in southwestern Ontario is approaching this goal, but elsewhere in the region the nearest equivalent is studies that combine primary sources of varying quality and detail (Shott 1997).

Another likely advantage of survey standards would be correcting small site underrepresentation in conventional survey (Shott 1985). Illinois survey records suggested that small sites of every age are discovered at lower rates than larger ones (Lewis 1993:48). Find spots of single fluted bifaces seem fairly common among Paleoindian sites, although they can become sites yielding many artifacts upon repeated inspection. Many Paleoindian sites have few artifacts and are small in extent, and they may be underrepresented in professional survey and study. In Ontario, small Paleoindian sites were most commonly found only after intensive survey (Ellis 1994:423). To Ellis and Deller (n.d.:3-4) the understandable emphasis on large sites biases the accumulated data base and somewhat distorts our view of Paleoindian cultures. Small Paleoindian sites may reveal brief occupational episodes and exhibit greater integrity in their spatial distributions.

Collections Salvage

Vast artifact collections molder in barn lofts and basements across the Midwest. We must systematically inventory the invaluable data that such old collections possess. Doing so will require effort sustained over many years, and funding to support the necessary work by students and SHPO offices. Such efforts must aim toward the documentation of collections in their entirety, not just their Paleoindian components. There are practical and ethical obstacles to purchasing collections, but owners might be encouraged to donate them to responsible repositories via the inducement of tax deductions.

Collections are lost to archaeology far too easily and often. Surely hundreds of collections are at risk today; our inaction will allow the problem to solve itself, but only at great cost to the interests of knowledge and preservation. There is no time to waste in rescuing collections from neglect and eventual oblivion. As part of the NHL Theme Study, the Society for American Archaeology and the National Park Service might launch a collections documentation and preservation project consistent with the public education and outreach goals espoused by both organizations.

In the absence of systematic data, we cannot know how many fluted bifaces, let alone other Paleoindian tools, are held by universities and museums and how many by private collectors. A rough estimate of the proportions might be gained by comparing the number of Midwestern Paleoindian sites found by archaeologists and by collectors; we are apt to learn that archaeologists control 5% or less of the accumulated sample. That is approximately the percentage of the sample of diagnostic artifacts identified in one Swedish study area about which professional archeologists were aware. They control about that percentage of diagnostic Neolithic artifacts in one Swedish study area (Karsten 1990:36).

One way to gauge the compositional representativity of Paleoindian assemblages would be to compare tool type proportions in systematic collections to private collections. Probably fluted bifaces would be overrepresented in the latter. For instance, most fluted bifaces in the Leavitt assemblage (Shott 1993) were found by collectors in the family over decades; only a few were found in systematic work there. Obviously, we cannot know how many fluted bifaces were found by other collectors and then lost to documentation. Yet even this measure would be limited because the available excavation sample surely is not probabilistic and therefore may be unrepresentative. We tend to excavate where we know or expect that there are many artifacts to find, and such locations are not necessarily typical.

Another interesting exercise would be to compile tool counts by type from Midwestern and other Paleoindian caches. Obviously, caches often contain fluted biface but also other tools. Some, like Udora (Storck and Tomenchuk 1990), contain no fluted bifaces at all. At any rate, type proportions from caches might reflect proportions in use free of the effects of use rates and use life. If type proportions from private collections and perhaps from systematic surface surveys differ from cache proportions, they may be biased and the sites from which they were drawn a nonrepresentative sample of Paleoindian assemblages.

National Historic Landmark Criterion 6 and National Register Criterion D / Registration Requirements

For specific properties, NRHP and NHL evaluation should proceed by first completing a property designation matrix, which provides a basic overview of condition and research potential under National Historic Landmark Criterion 6 and National Register Criterion D, and can serve as a guide to the preparation of detailed nomination statements. Procedures by which the matrix is to be used are provided in the Evaluation Criteria Matrix / Registration Requirements section above. How specific research questions and themes outlined in the matrix apply to Midwestern Paleoindian properties, however, were discussed previously in this regional context.

NHL Property Types and Integrity Levels for the Midwest

Linked with the evaluation of specific NHL property classes and categories is an assessment of their integrity. Property integrity refers to the physical condition of the remains under investigation, i.e., their preservation, context, and ability to contribute important information under Criterion 6 for NHL designation and Criterion D for the National Register. To be considered eligible for designation as an NHL, Paleoindian properties must possess deposits with sufficient integrity to yield information capable of identifying discrete periods of occupation or utilization, property function or type, and must have clearly defined boundaries.

Three levels of integrity are recognized in the NHL theme study: High, Moderate, and Low.

High Integrity. Properties possessing high integrity are potential NHLs or have national-level NRHP significance. Such sites have clearly identified Paleoindian component(s) in secure context, and with precise calendric dating. That is, the geologic and sedimentary context of the assemblage(s) are well documented, with sources of intrusion or disturbance recognized and controlled, and the age of the deposits ascertained using one or more absolute dating procedures, such as radiocarbon or thermoluminescent dating. Sufficient age determinations must, however, have been obtained from samples in secure context to ensure confidence in the results. Individual dates, accordingly, or even large numbers of dates from controversial associations, will probably not be considered sufficient, unless supported by other kinds of evidence, such as unambiguous geological or biotic associations. In the Midwest, sites with high integrity and national level significance include Big Eddy, and perhaps Sheriden Cave and **Chesrow Complex** sites.

Moderate Integrity. Properties of moderate integrity are potential NHLs or have national- or state-level NRHP significance. Sites with Moderate integrity have Paleoindian component(s) that are to some extent mixed with later materials, in moderately secure context, and with relative rather than absolute dating. Thus, geologic and sedimentary context may be somewhat uncertain, with some mixing or reworking of the deposits. Control for disturbance is less secure. The age of the deposits is also somewhat less secure, and may depend upon stratigraphic relationships or typological cross-dating with materials securely dated elsewhere. Many midwestern sites possess moderate integrity are widespread, and include most assemblages found on conflated, usually plowed, surfaces, where distinguishing Paleoindian remains from materials dating later is sometimes difficult or impossible. Nevertheless, such assemblages often retain great research potential and considerable sub-plowzone integrity. Moderate-integrity sites are many, but Gainey and perhaps Grogitsky in Michigan, Nobles Pond, **Paleo Crossing** and perhaps Sandy Springs in Ohio, **Aebischer** in Wisconsin, Lincoln Hills/Ready, Mueller and Martens in Illinois, and perhaps Walter in Missouri.

Low Integrity. Properties whose integrity is Low are not considered NHL candidates. If they were to be considered eligible for inclusion on the NRHP, it would probably be at the state or local level of significance. Low-integrity sites have presumed Paleoindian components that are in highly disturbed context, and whose age may be uncertain or questionable. Lithic scatters lacking diagnostics, absolute dates, or sound stratigraphic contexts are examples of such sites, as are sites with diagnostics whose deposits are severely disturbed or are thoroughly mixed with materials of

later periods. Sites yielding low numbers of Paleoindian points as well as later materials in surface context, would tend to have Low integrity. Many Midwestern Paleoindian sites that might have possessed higher integrity now possess little or none. These include Holcombe in Michigan, Bostrom and CB-North in Illinois and Rummels-Maske in Iowa because the sites either are destroyed or completely recovered.

Isolated diagnostic projectile point finds, abundant in the Midwest, are a special property class of great importance for research purposes. Yet they are not considered eligible for inclusion on the NRHP, unless the artifact itself is of exceptional significance. However, groups of culturally related but otherwise isolated Paleoindian remains found in connection with diagnostic land-forms or other paleogeological, geomorphological, or paleoenvironmental contexts may be nominated as contributing properties within a district. That is, isolated finds, taken collectively, may under certain conditions (i.e., high density, significant paleoenvironmental associations) be considered important enough to warrant inclusion as part of an NHL.

Finally, although most other Midwestern Paleoindian sites possess moderate integrity, some might qualify for NHL status individually or as districts. Individual sites of moderate integrity but arguably great significance include Gainey (perhaps the largest Paleoindian excavation in North America), **Paleo Crossing**, which is reasonably well dated for a site that falls in the moderate-integrity category, Nobles Pond, also extensively excavated and subject to perhaps the most intensive taphonomic efforts of any North American Paleoindian site (Seeman et al. 1994b), Lincoln Hills/Ready, and perhaps **Aebischer** and Mueller. But some Midwestern sites are linked thematically despite the distance separating them. **Silver Mound** in western Wisconsin and Coshocton County, Ohio sites like Welling, Honey Run, McConnel and McKibben all are Paleoindian quarry/workshop assemblages. Recognized as individual NHLs, but discussed comparatively in each nomination, the properties might attract research along common lines and produce educational and interpretive results of common interest.

Evaluation Standards: NRHP Criteria

Although NHL designation is not the same thing as NRHP status, any successful NHL nomination will also have to meet NRHP Criteria. NRHP significance Criteria are well established, and only briefly summarized here. Possessing any of the following qualities probably would qualify sites for inclusion on the NRHP:

1. Intact buried deposits, particularly assemblages yielding features or preserved floral and faunal remains, and materials suitable for radiocarbon or multiple dating procedures. These types of sites are extremely rare at this time level in the Midwest.
2. Stratified deposits, with components that can be isolated horizontally or vertically. This would facilitate detailed examination of single periods of occupation.
3. Major quarry sites with extensive reduction or manufacturing debris, and evidence for utilization during the Paleoindian period.
4. Areally extensive surface scatters from plowzone or eroded upland context, particularly if evidence for artifact relocation beyond more than a few meters is minimal. Controlled surface collection procedures can recover discrete occupational episodes or activity areas on sites of this kind.

To these attributes can be added Glassow's (1977) Criteria by which site significance can be assessed, as discussed in this and the national context chapter. The presence of any of the following characteristics tends to automatically make a Midwestern site yielding Paleoindian materials ineligible for inclusion on the NRHP:

1. Sites consisting only of a single isolated artifact. Little information beyond that obtained at the time of collection can be derived from such assemblages. Care must be taken, however, to ensure that the presence of other deposits has been ruled out. Isolates may be the only detected evidence of a complex site.
2. Heavily disturbed surface scatters. This does not include plowzone scatters, from which significant assemblage and intra-site distributional information can be recovered given careful data collection. Care must be taken when examining presumably disturbed deposits that the presence of undisturbed deposits has been completely ruled out.
3. Sites damaged by cultural or natural factors to the extent that deposit integrity is destroyed.

Given how rare Paleoindian sites are in the Midwest, full justifications should also be provided in cultural resource management studies detailing why Paleoindian properties cannot yield information important to history or prehistory.

Possible or Proposed Midwestern NHLs

Modoc Rockshelter and **Graham Cave** already are Midwestern Paleoindian NHLs (Archeological National Historic Landmark Committee 1997:Appendix 3). They are extremely important sites but, as neither are predominantly Paleoindian, do not exhaust the prospects for Midwestern representation among NHLs. Table 23 lists other prospective Midwestern Earliest American NHL properties. Big Eddy clearly possesses high integrity and is perhaps the strongest Midwestern candidate for recognition. Sheriden also might be considered for NHL status. If uncertainty about the age and typological affinities of **Chesrow** diagnostics can be dispelled, then **Chesrow Complex sites** like **Lucas** should receive recognition as an NHL district. **Metzig Garden** preserves intact late Paleoindian deposits, including features, that surely merit NHL recognition. Indeed, the concentration of late Paleoindian Agate Basin and Eden-Scottsbluff components near Lake Winnebago suggests the wisdom of a thematic regional NHL in that area.

Table 23. Major Midwestern Paleoindian Sites by NHL Property Type

<i>Caches</i>
Rummels-Maske, Iowa
Jens, Illinois
Patrow?
Pelland?
<i>Bone Beds and Kill Sites</i>
Kimmswick, Missouri
Barnes, Michigan
<i>Possible Bone Beds/Kill Sites</i>
Heisler, Michigan
New Hudson, Michigan
Coats-Hindes, Tennessee
Pleasant Lake, Michigan
Rappuhn, Michigan
Burning Tree, Ohio
Martins Creek, Ohio
Boaz, Wisconsin
Chesrow Complex, Wisconsin
<i>Human Burials</i>
Gorto, Michigan
Renier, Wisconsin
Pope, Wisconsin
Deadman Slough?, Wisconsin
<i>Rock Art and Other Graphic Representations</i>
There are no known Midwestern sites in this type.
<i>Quarries and Workshops</i>
Coshocton County, Ohio (Welling*, Honey Run*, McConnel*, McKibben*)
Silver Mound, Wisconsin*
Pewangoing, Michigan
<i>Occupations</i>
Bostrom, Illinois
CB-North, Illinois
Hawk's Nest, Illinois
Lincoln Hills/Ready, Illinois*
Martens, Illinois*

Modoc Rockshelter, Illinois

Mueller, Illinois?

Nochta, Illinois

Olive Branch, Illinois*

Barnes, Michigan* (also listed under Quarries)

Butler, Michigan*

Gainey, Michigan*

Grogitsky, Michigan*

Hi-Lo, Michigan

Holcombe, Michigan

Leavitt, Michigan*

Samels Field, Michigan*

Big Eddy, Missouri*

Graham Cave, Missouri

Montgomery, Missouri*

Rodgers Shelter, Missouri*

Eppley Rockshelter, Ohio

Manning, Ohio

Nobles Pond, Ohio*

Paleo Crossing, Ohio*

Sandy Springs, Ohio?

Sheriden Cave, Ohio*

Aebischer, Wisconsin*

Gail Stone, Wisconsin*

Lucas, Wisconsin*

Metzig Garden, Wisconsin*

Morrow-Hensel, Wisconsin*

* = Possible NHL candidate

**NR listed
designated an NHL**

Conclusions

As elsewhere, Midwestern Paleoindian studies are short on "good, hard dirt archeology" (Collins 1999:40). We should dig more sites. We should survey more widely but also thoroughly, both probabilistically and selectively. When we survey, we should repeatedly visit the same places, so that "findspots" grow into "sites" or collectors' few tools grow into large assemblages. Once we have compiled large assemblages, we must analyze them thoroughly. All Paleoindian scholars know of important assemblages never studied or published. In the meantime, perhaps we might become more circumspect in imposing patterns that we favor or imagine upon a Paleoindian archaeological record of unknown size and character, biased in unknown ways to unknown degrees.

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▶ THE EARLIEST AMERICANS THEME STUDY		Geographical data defines the boundaries of an area in which the properties for a multiple property group or theme study exist or are likely to exist. For the purposes of National Register properties and NHLs nominated under the Earliest Americans Theme Study for the Eastern United States, the Northeast project area boundaries encompass the states of Connecticut, Delaware, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The Southeast project area includes the states of Alabama, Arkansas, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia, and the Midwest project area is comprised of the states of Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. ◀ section F section H ▶					A, B, C, D sections E. statement of historic contexts F. associated property types G. geographical data H. summary of identification and evaluation methods I. major bibliographical references Figures and Tables Credits	
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PROJECT HISTORY Recognizing the need to inform the public and its elected officials of the urgency in identifying and preserving Paleoindian sites, the SAA’s National Historic Landmark Archeology Committee's first chair, David S. Brose, proposed development of a new theme study on the Earliest Americans to the National Park Service in 1993. The National Park Service approved the proposed project and designated Philadelphia Support Office archeologist Robert S. Grumet as the NPS project coordinator. The National Historic Landmark’s Archeology Committee established an Earliest Americans Theme Study Sub-Committee with David Brose as the SAA’s project coordinator. Project coordinators met with colleagues to discuss the project and request participation at the Society for American Archaeology’s annual meeting in Anaheim, California on April 22, 1994. Shortly thereafter, key National Park Service and national-level and regional project staff and National Historic Landmark Archeological Committee liaisons were appointed. Earliest Americans Theme Study Sub-Committee staff began selection of specialists to prepare regional Historic Contexts. State Historic Preservation Offices were asked to appoint state coordinators to act as links between the project and professional and avocational archeologists. State Historic Preservation coordinators further furnished copies of statewide Paleoindian Historic Contexts and other pertinent survey and planning documentation. Information provided during this initial survey was used to prepare project announcement brochures and a brief printed project description. More than one thousand of these brochures and several hundred draft project descriptions were distributed by State Historic Preservation Offices and by key project development staff attending professional and scholarly meetings. Requests for public and professional input were also placed in theme study project announcements published in the <i>Federal Archeology Report</i>, <i>CRM Bulletin</i>, and the <i>Mammoth Trumpet</i>. Responses to these efforts helped project staff develop the following theme study goals formally presented to the National Park System Advisory Board’s Landmarks Committee at its’ August 12, 1994 meeting in Washington, D.C.: • Gather multi-disciplinary evidence on a nationwide scale. • Organize it into historic contexts to systematically identify, evaluate, and nominate properties. • Assess the status of existing National Historic Landmark and National Register property documentation. • Develop and refine data to maximize use by federal, tribal, state, and local governments and others to recognize, preserve, and commemorate properties associated with the initial peopling of America. • Make theme study findings widely available. Project Report 1, containing a draft theme study framework outline and a preliminary summary of State Historic Preservation Office Paleoindian period Historic Context planning documentation, was distributed for review during the autumn of 1994. A symposium detailing project organization and reporting results of initial public participation activities was presented at the Society for American Archaeology annual meetings in Minneapolis, Minnesota, May 7, 1995. Additionally, in 1995, the National Park Service coordinated with the National Museum of the American Indian to provide advice, guidance, and perspective in the study. From this coordination, three individuals representing the museum, Joe Brusheck, Clara Sue Kidwell, and Joe Watkins, were asked to act as consultants to the National Park Service. Clara Sue Kidwell and Joe Watkins provided extensive, written comments that were incorporated into the study.	E. statement of historic contexts F. associated property types G. geographical data H. summary of identification and evaluation methods project history acknowledgments I. major bibliographical references Figures and Tables

Kidwell and Watkins noted in consultation with the National Park Service that sites can have both archeological and traditional cultural significance. Because the identification of traditional values for all the sites identified here is beyond the scope of this theme study, each property identified for individual nomination will be examined on a case by case basis for recognition of these traditional cultural values. Additionally, all tribes affiliated with an individual site will be identified and given the opportunity to advise and comment on the documentation before a property is presented to the National Park System Advisory Boards, Landmarks Committee.

It should also be noted that restricting sensitive information is of mutual concern to the NPS, Native Americans, and all persons interested in preserving American history. Section 304 of the National Historic Preservation Act, as amended, provides the authority to restrict information that may cause a significant invasion of privacy, that may risk harm to the historic resource, or that may impede the use of a traditional religious site by practitioners (National Historic Preservation Act of 1966, as amended; Section 304; 16 U.S.C. 470w-3(a)).

The National Park Service and its partners consulted with a variety of governmental and non-governmental parties, including Tribal Historic Preservation Officers, for the states discussed in the theme study. Systematic survey of State Historic Preservation Office planning documentation undertaken at the same time revealed that thirty five states had developed Historic Contexts to identify, evaluate, and designate Paleoindian cultural resources. Twenty four of these provided statewide guidance; eleven others developed Historic Contexts for one or more regional subdivisions within state boundaries. Of the thirty-five fully developed Historic Contexts, eighteen had been developed after 1990.

Survey of extant Historic Contexts and other information submitted by State Historic Preservation Office Coordinators who responded to the inquiries of theme study staff, identified nearly six hundred sites and districts containing intact deposits or other substantial evidence of Paleoindian occupation which were noted to possess information of potential significance for understanding Earliest American life. This list did not include thousands of individual finds, and it could not include data from sites not entered in or not accessible in site inventories. Some states reported no intact deposits within their borders. Others, like Virginia, noted that systematic examination of state site file folders would reveal considerably larger numbers of properties than those initially supplied to theme study staff. Seventy of the properties identified during this preliminary survey were listed in the National Register of Historic Places.

Project Report 2, containing the fully developed nationwide theme study framework, was formally presented to the Landmarks Committee on January 10, 1997. Formal theme study documentation guidance, entitled Project Report 3.1, was distributed to State Historic Preservation Office Coordinators for public review and comment on May 30, 1997. A revised draft of the report was placed on the National Park Service's *History & Culture* internet website in 1998. Theme study geographic coverage was shifted to focus on developments in the eastern half of the nation only during the fall of 1999 because the National Park Service secured commitments for participation in the theme study from scholars in these areas. Consequently, regional boundaries were revised to reflect the number of those scholars willing to participate and their areas of expertise. Existing Historic Context drafts written by University of Massachusetts archeologist Dena F. Dincauze for the Northeast and National Park Service Southeast Archeological Center archeologist David G. Anderson for the Southeast were revised to reflect this new geographic framework. Northeast project area boundaries were shifted to encompass the states of Connecticut, Delaware, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. Alabama, Arkansas, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia comprised the new Southeast project area. University of Northern Iowa archaeologist Michael J. Shott was selected to develop a new Historic Context for a Midwest project area consisting of the states of Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Each of the Historic Context authors also began work with theme study coordinators Brose and Grumet to develop a comprehensive overview of Earliest American Life in the Eastern United States.

National Park Service regional coordinators distributed drafts of the Midwest, Northeast, and Southeast Historic Contexts throughout their service regions during the spring of 2000. Electronic versions were also posted on the *History & Culture* website. Articles summarizing key features of each Historic Context were published in the Spring/Summer 2000 issue of *Common Ground* devoted to the theme study. Preparations for final development of the study were completed at a final project

meeting held at the U. S. Fish and Wildlife Service's National Conservation Training Center in Shepherdstown, Maryland on August 14-16, 2001.

The National Historic Landmarks Archeology Committee submitted the final theme study document to the National Park Service on September 30, 2001. The final draft version was made available for comment in January, 2004 on the National Register's web site. Notice of its availability was published in the National Register's weekly list and in the Federal Register. National Park Service National Register of Historic Places and National Historic Landmarks Survey staff in Washington, D.C. subsequently converted the theme study to the National Register Multiple Property Documentation Format.

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Theme Study Participants

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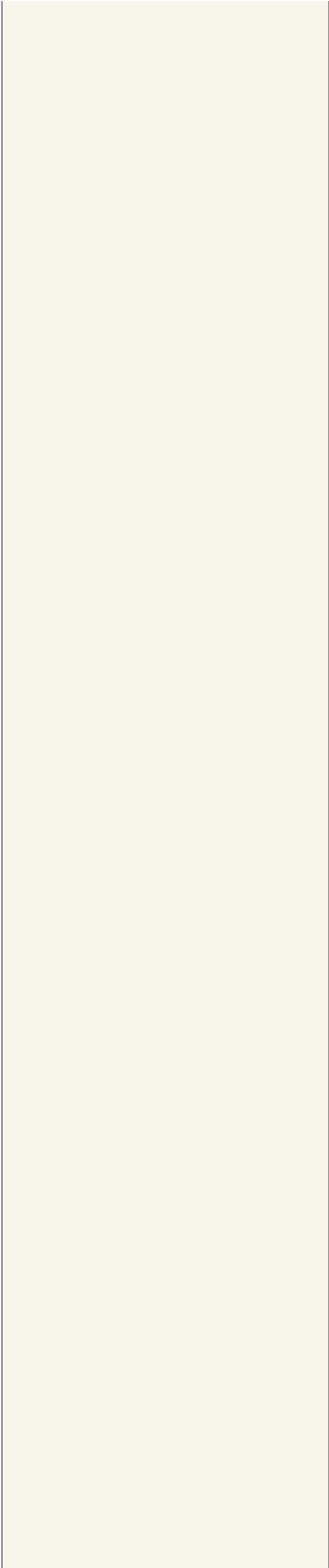
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