The Paleoindian Occupation of Southern New England: Evaluating Sub-Regional Variation in Paleoindian Lifeways in the New England-Maritimes Region

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The Paleoindian period in the New England and Canadian Maritimes region [NEM] dates between 12,900 and 10,000 calendar years before present. Early and Middle Paleoindian occupations occur during the Younger Dryas. This time period is associated with latitudinally organized subarctic-like habitats in the NEM, which would have been ideal conditions for long-distance migratory caribou. Based on analogy to ethnographically documented subarctic foragers, caribou likely would have been an attractive resource for Paleoindians.

Using a multi-scalar approach, this dissertation investigates the Paleoindian occupations of the NEM with a focus on adaptive strategies related to environmental factors and the potential role that caribou played in Paleoindian subsistence. I analyze individual sites, geographic clusters of sites, sub-regions, and regional study areas. A data set inclusive of southern New England was obtained through three methodologies: my own excavations in Connecticut; reanalyses of Connecticut Paleoindian sites; and collaboration with researchers who shared data on Paleoindian sites in the Northeast.

On the scale of individual sites, I present site reports detailing the excavation and analysis of Ohomowauke and Templeton. At the scale of a geographic cluster, I investigate Paleoindian occupations of a geomorphic landscape associated with a wetland in a pro-glacial lake basin in southeastern Connecticut. On the sub-regional scale, I investigate patterning in NEM Middle Paleoindian sites with Michaud-Neponset fluted points to analyze whether Paleoindians
employed adaptive strategies predicated on the location and concentration of migratory caribou herds during their biannual migrations to calving grounds in the spring and over wintering grounds in the fall. Finally, on the regional scale, I compare Paleoindian adaptive strategies in the NEM to Paleoindian adaptive strategies hypothesized in neighboring regions of the eastern Great Lakes and the Middle Atlantic to investigate diversity in Paleoindian lifeways.

At each geographical level, analysis has included, the variables of age of occupation, settlement behavior, site organization, occupation size, tool using activities, and estimates of residential range mobility. By bringing to bear a plethora of analytical methodologies on a wealth of data from sites throughout the NEM, this dissertation intends to illuminate the adaptive strategies central to Paleoindian life in the NEM.
The Paleoindian Occupation of Southern New England: Evaluating Sub-Regional Variation in Paleoindian Lifeways in the New England-Maritimes Region

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The Paleoindian Occupation of Southern New England: Evaluating Sub-Regional Variation in Paleoindian Lifeways in the New England-Maritimes Region

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5.2 Mobility estimates of selected subarctic groups from Binford 2001:Table 5.01; Kelly 1983, 1995
Chapter 1: Introduction: The Role of Southern New England in the Paleoindian Occupation of the New England and Canadian Maritimes Region

The compilation of essays presented in this dissertation attempt to provide insight into the lifeways of early human occupants in northeastern North America. Although tentative evidence for even older occupations has been reported (Lothrop et al. 2016:194), the oldest well-documented archaeological sites in eastern North America date to around 13,000 calendar years before present (Kelly 2003).

Archaeologists refer to these early inhabitants of the Americas as “Paleo-Indians”, a term coined by F.H.H Roberts in 1940 to indicate “old” or “ancient” Indians (Ellis and Deller 1990:37; Roberts 1940). My use of “Paleoindians” throughout this dissertation refers to the well-documented groups of people who lived during the terminal Pleistocene and early Holocene. These people are recognized in the archaeological record by the distinctive types of stone tools they made, including lanceolate shaped projectile points that tend to be fluted or collaterally flaked, unifacial scraping tools, and gravers (Ellis and Deller 1990:38; Mason 1962; Ritchie 1957).

My dissertation addresses the research question “how do Paleoindian occupations in southern New England relate to Paleoindian occupations throughout the New England-Maritimes region [NEM]?” Prior to this dissertation, only two Paleoindian sites in Connecticut have been thoroughly published [i.e., Templeton (Moeller 1980, 1984, 1999, 2002) and Hidden Creek (Jones 1997)]. The place of southern New England in the NEM has remained nebulous based on the prior analyses of these two sites because the fluted point component at Templeton was interpreted as having closer affinities to the Middle Atlantic rather than to the NEM (Moeller
1984, 2002; Spiess et al. 1998:246; Spiess 2002), whereas, the Late Paleoindian component at Hidden Creek seemed more closely related to the NEM (Jones 1997:76; Spiess et al. 1998:212). Accordingly, the position of the southern boundary of the NEM has been suggested to change through time with southern New England included during some phases of the Paleoindian period and excluded during others (Spiess 2002:146; Spiess et al. 1998:246).

With the benefit of the accumulation of archaeological data generated from new excavations, refined techniques for studying material culture, and shifts in theoretical paradigms, I renew the investigation of the relationship of southern New England Paleoindian occupations to the NEM by using a multi-scalar approach, by which I analyze individual sites, geographic clusters of sites located in specific geomorphic landscapes, sub-regions, and regional study areas. A data set inclusive of southern New England Paleoindian occupations was obtained through three methodologies: my own excavations in Connecticut; reanalyses of other important Connecticut Paleoindian sites and isolated finds; and collaboration with researchers who shared published and unpublished data related to additional Paleoindian sites in the Northeast.

I believe that the most noteworthy contribution of my dissertation research is the compilation of Paleoindian data in Connecticut. Thorough descriptions of the sites that I analyzed I attempt to provide the information necessary for inclusion of these sites in future analyses by Paleoindian researchers. I conclude that Paleoindian occupations of southern New England can be integrated into annual settlement patterns associated with the exploitation of migratory caribou throughout the NEM. This finding supports the hypothesis that the lifeways of southern New England Paleoindians are much more closely related to those of northern New England Paleoindians than to neighboring regions of the Middle Atlantic and eastern Great
Lakes. Indeed it may be reasonable to understand southern New England as part of the territorial range of NEM Paleoindians.

1.1 Background: New England and Canadian Maritimes Region

The New England and Canadian Maritimes Region [NEM] was originally defined by Spiess and Wilson (1987:129-155). Based on the accumulation of data since the late 80s, the NEM region now includes the eastern portions of New York State, the six New England states, the Maritimes Provinces of Canada, and Quebec south of the St. Lawrence River and the Gulf of St. Lawrence (Bradley et al. 2008:120-121; Lothrop et al. 2011:547).

In the terminal Pleistocene, the NEM landscape consisted of a peninsula bounded to the east by the Atlantic Ocean and to the north by the Champlain Sea, which resulted from glacial isostatic adjustments from the Laurentide ice sheet (Lothrop et al. 2011:550; Lothrop et al. 2016:195–202). The NEM was one of the last regions colonized by people in North America (Newby and Bradley 2007:16; Spiess et al. 1998:249) and was likely inhospitable before 13,500 years ago because of ecological constraints associated with the deglaciation of the region after the Last Glacial Maxima (Chapdelaine and Boisvert 2012:1; Kitchel 2016: Ogden 1977:24; Ridge et al. 2012).

The Paleoindian period in the NEM dates between 12,900 and 10,000 calendar years before present (Bradley et al. 2008; Lothrop et al. 2011; Spiess et al. 1998). Poor organic preservation inhibits reliable radiocarbon dating from many NEM sites (Curran 1996; Dincauze 1988:8; Ellis 2012:xiii; Jordan 1975:71; Lothrop and Bradley 2012:15; Spiess et al. 1998:249). Nevertheless, chronological organization of the Paleoindian period in the NEM is constructed via projectile point typology that is supported by a limited number of radiocarbon dates (Bradley et al. 2008:123; Lothrop et al. 2016). Early and Middle Paleoindian occupations of the NEM occur
during the Younger Dryas [YD], 12,900–11,600 calendar years before present, and Late Paleoinadian manifestations occur in the early Holocene (Lothrop et al. 2011; Newby et al. 2005).

The onset of the YD resulted in increased seasonality and decreased overall temperatures and moisture for the region (Newby et al. 2009, 2011; Shuman et al. 2002, 2004; Williams et al. 2001:3358), which forced a rapid response of vegetation following a latitudinal gradient creating a second spruce maxima in southern New England (McWeeney 1999; Shuman et al. 2009) and expanding spruce parkland and open tundra environments in the northern NEM (Lothrop et al. 2011:562; Newby et al. 2005:145; Spiess and Newby 2002). The combinations of flora and fauna reconstructed for the YD in the NEM suggest that the NEM environment does not have direct modern analogs (Dincauze 1988:8; Levine 1997:233; Williams et al. 2001). Nevertheless, the YD-mediated environments likely would have been comparable to subarctic environments, which feasibly supported long distance migratory herds of caribou that would reasonably be a high ranked prey choice when available to NEM Paleoindians (Figure 1.1) (Chapdelaine and Boisvert 2012:1; Funk 1972; Lothrop et al. 2011; Meltzer 1988:41, Newby et al. 2005; Pelletier and Robinson 2005:165; Spiess et al. 1984:156; Spiess and Newby 2002:35).

The reconstructed annual range of migratory caribou during the YD likely consisted of the sedge tundra of northern Maine and the Canadian Maritimes down to the end of the spruce parkland zone located around the border between Vermont, New Hampshire, and Massachusetts and the adjacent area of northeastern New York (Spiess and Newby 2002; Newby et al. 2005:151). Satellite herds of locally migratory caribou may have occupied the highland tundra associated with the White Mountains and migrated following altitudinal gradients in habitats. Other satellite herds of locally migratory woodland caribou likely penetrated further south into the denser coniferous forests of southern New England and southeastern New York (Spiess and
Newby 2002:35; Newby et al. 2005). These woodland caribou are the caribou that likely would have been exploited by Paleoindians in southern New England.

The drying conditions associated with the onset of the YD transformed pro-glacial kettle ponds into marshes (Newby et al. 2000, 2009, 2011) with diverse wetland resources that may have attracted Paleoindian foragers (Boisvert 2012:91; Ellis et al. 2011:542; Jones and Forrest 2003; McWeeney 2013; Nicholas 1988).

The abrupt termination of the YD around 11,600 cal BP is evidenced by dramatic warming that would have decreased the extent of sedge tundra and spruce parkland and increased the extent of closed boreal and deciduous forests in the NEM. The post-YD environmental changes would have diminished the habitats favored by migratory caribou and may have caused a reorganization of Late Paleoindian subsistence and mobility strategies in the NEM (Lothrop et al. 2011:551; Newby et al. 2005:145).

Paleoindians exploited discrete cryptocrystalline stone outcrops in the NEM (See Figure 1). Consequently, the identification of the origin of the toolstones discarded at Paleoindian sites can be used to infer Paleoindian range mobility and social interaction (Ellis 2011; Lothrop et al. 2016:225; Meltzer 1989). The majority toolstone and first-tier minority toolstone in the assemblages likely reflect direct procurement and can be used as a proxy for Paleoindian range mobility. Additional minority toolstones may have been procured through a combination of direct procurement, acquisition through exchange, individual toolkit movement through mating networks, or logistic procurement by small parties dispersed from their residential groups. Accordingly, issues of equifinality arise when attempting to parse out the methods of procurement for minority toolstones (Ellis 1989, 2011; Meltzer 1989; Spiess and Wilson 1989). Nevertheless, the minority toolstones are likely monitoring both indirect procurement of
toolstone through social interactions and the remnants of toolstones acquired earlier in the annual round via serial direct procurement (Ellis 1989, 2011; Meltzer 1989; Spiess and Wilson 1989; Whallon 2006).

Paleoindian sites in the NEM are dominated by toolstones that have been transported long distances (Burke 2006; Ellis 2011; Lothrop et al. 2011:548; Spiess et al. 1998:239). The long distance movement of toolstones in the Northeast is considered a product of Paleoindian mobility strategies associated both with the maintenance of interaction networks that united dispersed low-density Paleoindian groups for the purpose of information exchange and finding acceptable mates (Anderson 1995:12; Speth et al. 2010:20), as well as with Paleoindian residential mobility, perhaps resulting from band movement associated with following caribou herds cyclically (Curran and Grimes 1989; Ellis 2011:398; Pelletier and Robinson 2005:171). NEM Paleoindian range mobility is larger than any range mobility documented in the ethnographic record; however, the closest analogs are subarctic caribou hunters (Ellis 2011:386). Accordingly, the long distance straight-line movements of majority toolstones in the NEM likely indicate rapid long distance residential movements related to Paleoindians employing herd following caribou hunting strategies that entail residential groups moving between the calving and wintering areas during caribou migrations (Ellis 2011:398; Koldehoff and Loebel 2009).

Poor organic preservation in the acidic soils of the NEM limits the recovery of zooarchaeological and archaeobotanical remains that could aid in the reconstruction of Paleoindian lifeways (Bonnichsen et al. 1991:28; Jordan 1975:71; Spiess et al. 1984:146; Gingerich and Kitchel 2015:298). Nevertheless, the few subsistence remains recovered from Paleoindian sites in the central and northern portions of the NEM confirm that Paleoindians subsisted on caribou, as well as small game and berries (Asch Sidell 1999:197; Spiess et al.
1984; Storck and Spiess 1994:135). No subsistence remains have been found in southern NEM sites to compare with remains from central and northern portions of the NEM.

In sum, the geographic and ecological settings of the NEM set the region apart as a distinct theatre in which to study Paleoindian adaptive responses to specific ecological niches, including sedge tundra, spruce parkland, closed boreal forest, mixed boreal and deciduous forest, wetland, and inland maritime zones (Chapdelaine and Boisvert 2012:1; Ellis 2012:xii; Meltzer 1988). Comparisons of Paleoindian material culture from the NEM region to Paleoindian material culture from neighboring regions (Lothrop et al. 2016), like the eastern Great Lakes (Ellis 2012; Jackson and McKillop 1991; Lemke 2015a) and the Middle Atlantic (Lowery 2002; Meltzer 1988, 1993) affirm that Paleoindians had unique adaptations in the NEM (Lothrop et al. 2011; Spiess et al. 1998), which are evidenced in the archaeological record by distinct projectile points (Bradley et al. 2008; Ellis 2004), toolkits (Ellis 2012:xii; Ellis and Deller 1988, 1997:21), mobility strategies (Burke 2006; Ellis 2011; Meltzer 1988, 1989, 1993), and site structure and settlement patterns (Ellis 2012:xii; Meltzer 1988; Spiess et al. 1998:232). Consequently, the determination of whether or not the Paleoindian occupations of southern New England reflect part of a larger adaptive strategy employed by Paleoindians throughout the NEM can be investigated through analysis of the settlement behaviors, site organization, occupation sizes, tool using activities, and estimates of residential range mobility inferred via studying southern New England Paleoindian sites and comparing them with sites throughout the NEM.

1.2 A Model of NEM Paleoindian Annual Rounds with the Inclusion of Southern New England

Inferences concerning NEM Paleoindian lifeways typically rely on general comparative ethnographic analogies (sensu Willey 1953:229). Although some researchers suggest that there
are no appropriate ethnographic analogs for NEM Paleoindians (Dincauze 1988:8; Levine 1997), ethnographic analogies for NEM Paleoindians are routinely drawn from examples of 19th and 20th century arctic and subarctic foragers, including the Nunamiut (Funk 1976:226), the Barren-Ground Eskimo (Gramly 1988:8), the Caribou-eater Chipewyan (Ellis 2011), the Dogrib (Ellis 2011), and the Neskapi (MacDonald 1968:129). Although modern and ethnohistorically documented subarctic forager lifeways must be considered in the dynamic context of the Contact Period (Gordon 1990; Loring 1997), generalizations based on analogies to subarctic foragers suggest that NEM Paleoindians likely organized their adaptive strategies around the exploitation of caribou, at least as a seasonal interior adaptation (Bergerud et al. 2008:71; Custer and Stewart 1990:310; Ellis 2011:398; Funk 1972; Lemke 2015b:75; Lothrop et al. 2011:562; Lothrop et al. 2016: 229-230; Meltzer 1988:41; F. Robinson 2012; Spiess et al. 1998:227; Spiess and Newby 2002).

Most ethnographically documented subarctic foragers follow seasonal rounds with a dependence on caribou during at least one season per year (Burch 1972, 1991; Spiess 1979). During times of the year when caribou are not the primary prey, subarctic people employ a variety of subsistence strategies like hunting solitary cervids or marine mammals, fishing in maritime or riverine setting, or practicing agriculture (Burch 1991; Spiess 1979). One tactic that some subarctic groups use to exploit long distance migrating caribou herds is herd following (*sensu* Burch 1991:440), which involves a highly mobile lifestyle that is used to relocate residential units to coincide with the location of caribou herds throughout their annual cycle (Carr 2012; Gordon 1990). Migratory caribou herds aggregate and disperse at regular intervals throughout their yearly round, which consists of long distance migrations traversing spruce parkland habitats to reach spring calving ranges located in northern tundra habitats and return
migrations to reach southern wintering ranges positioned in closed boreal forests. Consequently, ethnographic subarctic foragers practice cyclical nucleation (*sensu* Carlson and Bement 2013:93) to vary their group size to best exploit caribou throughout their seasonal round. In their summer range on the tundra, caribou bands typically disperse and aggregate multiple times; consequently subarctic foragers vary their group organizations into dispersed small family bands when the caribou are dispersed and into multi-family band aggregations and periodic macroband aggregations when the caribou are aggregated. In areas associated with caribou migration paths between the calving ground and wintering grounds, subarctic foragers aggregate into multi-family bands with periodic macroband aggregations facilitated by the exploitation of large bands of migrating caribou. In their winter range, caribou tend to disperse into small bands; consequently subarctic foragers also disperse into small family bands to exploit the dispersed caribou (Bergerud et al. 2008; Binford 2001:Table 8.01; Burch 1991; Boisvert 2012:80-81; Carr 2012; Heard 1997; Spiess 1979; Newell and Constandse-Westermann 1996:374).

Building on Carr’s (2012) “Residentially Organized Caribou Hunters Model” that he tested on lower Great Lakes Paleoindian assemblages, a model for herd following caribou hunters can be tested against NEM Paleoindian occupations (See Chapter 5). The hypothesis of this model is that if Paleoindians were moving in association with caribou migrations throughout the NEM, then Paleoindian annual residential mobility should have included movement between southern New England and northern portions of the NEM since caribou would have been migrating between calving grounds in the northern NEM and winter ground in the central NEM. In this model, southern New England may have been an important location for NEM Paleoindian groups to occupy while migratory caribou were in their wintering grounds. Support for this hypothesis should include Paleoindian settlement behaviors evidencing residential mobility
between the northern NEM and southern New England, cyclical nucleation including sites throughout the NEM and southern New England, Paleoindian toolkits reflecting episodic gearing up behavior associated with caribou hunting, and site locations conducive for caribou hunting.

A competing (null) hypothesis offered by Bradley and Boudreau (2006:69) suggests that Paleoindian occupations of southern New England and southeastern New York reflect a Paleoindian band territory that is separate from the Paleoindian occupation of the central and northern NEM. This hypothesis is based on the potential identification of two lithic conveyance zones. The southern NEM lithic conveyance zone is identified by the dominance of Normanskill chert from eastern New York in southern NEM Paleoindian sites and the central/northern NEM lithic conveyance zone is characterized by the dominance of Munsungun chert and New Hampshire rhyolites in central/northern NEM sites. In this hypothesis, Paleoindians in southern New England and southeastern New York sites may have been year round occupants of the closed boreal forests, exploiting a diverse array of resources rather than focused on caribou (Custer and Stewart 1990). Support for this hypothesis should include the lack of evidence linking Paleoindian settlement behaviors between southern New England and the central and northern portions of the NEM.

Post-YD environmental changes spread closed forest conditions northward, limiting the habitats favored by migratory caribou to northern NEM. The role of southern New England in the NEM, therefore, likely was altered since the territory for migratory caribou was restricted to the northern NEM, resulting in a constricted territory for Late Paleoindians (Jones 1998:135; Newby et al. 2005:145).

The multi-scalar organization of this dissertation highlights Paleoindian adaptive strategies on local and sub-regional scales in an attempt to test whether Paleoindian sites in
southern New England reflect part of a larger regional Paleoindian adaptation related to caribou herd following in the NEM or whether southern New England was included in a small territory of boreal forest foragers. Documenting Paleoindian adaptations via this multi-scalar approach allows refined interpretations of Paleoindian lifeways in the Northeast (Ellis and Deller 1997:2; Gingerich and Kitchel 2015; Lothrop et al. 2011:564).

1.2 Dissertation Outline

To investigate the relationship between Paleoindian occupations in southern New England and other areas of the NEM, my dissertation begins with the smallest geographic scale of the site and then widens to sub-regional and regional analyses.

I first present site-specific data on Paleoindian sites in southern New England. Chapter 2 reports on my excavation and analysis of the Michaud-Neponset fluted point component at the Ohomowauke site in southeastern Connecticut. The goals of my analyses are to provide information regarding the Paleoindian settlement behavior, site organization, occupation size, raw material use, tool using activities, and estimates of residential range mobility gleaned from the excavation. I then compare the Paleoindian behaviors reconstructed at Ohomowauke to Paleoindian sites throughout the NEM. My study of Ohomowauke indicates that the site exhibits attributes strongly related to NEM Paleoindian sites throughout the region.

In Chapter 3, I reanalyze the Templeton Paleoindian site, which was originally excavated and analyzed by Roger Moeller in the late 1970s and early 1980s (Moeller 1980, 1984, 1999, 2002). Moeller’s original interpretations of Templeton suggested that Connecticut and most of southern New England should be excluded from the NEM region because the site shared closer affinities to the Middle Atlantic rather than to the NEM (Moeller 1984, 2002; Spiess et al. 1998:246; Spiess 2002). However, in light of my study of Ohomowauke, I reanalyzed the
Michaud-Neponset fluted point component at Templeton to investigate the relationship of Templeton to other Paleoindian sites in southern New England and throughout the NEM. The results of my reanalysis of the Paleoindian settlement behavior, site organization, occupation size, raw material use, tool using activities, and estimates of residential range mobility suggest that Templeton shares more characteristics with the NEM settlements than with Middle Atlantic sites.

In Chapter 4, my scale of analysis increases to investigate the geographic cluster of Paleoindian sites around the Pequot Cedar Swamp in southeastern Connecticut. I compare the Middle Paleoindian occupation of Ohomowauke to the Late Paleoindian occupation of Hidden Creek to consider evidence for continuity and variability in Paleoindian settlement behavior, site organization, occupation size, raw material use, tool using activities, and estimates of residential range mobility associated with environmental changes in southern New England from the terminal Pleistocene and early Holocene (e.g., Spiess et al. 2012). The results of my analysis indicate that the sites reflect reuse of different landforms around the Pequot Cedar Swamp likely to target wetland resources. Differences in the raw material profiles of the sites and the site organization, however, suggest that the sites may have been occupied during different seasons.

In Chapter 5, my scale of analyses broadens to consider sub-regional patterning in Michaud-Neponset fluted point sites to test whether sites in southern New England were created as part of a seasonal round of herd following caribou hunters in the NEM. My analyses of sub-regional patterning investigate comparisons of Paleoindian settlement behaviors including site locations, site occupation size, tool using activities, and estimates of residential range mobility. The results of my sub-regional analysis suggest that Paleoindian sites in southern New England may be part of the large NEM territory exploited by Paleoindians during the Middle Paleoindian
period. Finally, by building on my sub-regional study, I also compare Paleoindian adaptive strategies in the NEM to Paleoindian adaptive strategies hypothesized in neighboring regions of the eastern Great Lakes (Ellis 2012; Jackson and McKillop 1991; Lemke 2015a; Lothrop et al. 2016) and the Middle Atlantic (Lothrop et al. 2016; Lowery 2002; Meltzer 1988, 1993) adding to our knowledge of diversity in Paleoindian lifeways.

1.3 Summary

Since the 1980s, the regional affiliations of the Paleoindian occupations of southern New England have been in a liminal state, sometimes thought to be a distinct band territory, sometimes considered to be part of a larger regional Paleoindian adaptation inclusive of northern New England and the Canadian Maritimes, and occasionally considered to be associated with the Middle Atlantic. Over the course of my dissertation research, I have been privileged to garner and analyze a broad set of data including the results of my own excavations, reanalyses of other important Connecticut Paleoindian sites and isolated finds; and collaboration with researchers who shared published and unpublished data related to additional Paleoindian sites in the Northeast.

In this dissertation, I employ multiple lines of evidence and multiple geographic scales to determine the role that southern New England Paleoindian sites play in the NEM study area and to test whether southern New England was included in a large territory exploited by NEM Paleoindians to hunt caribou at least as a seasonal interior adaptation (Lothrop et al. 2016: 229-230). Whenever possible, at each geographical level my dissertation analyses have included the variables of age of occupations, intra-site organization, occupation size, tool using activities, and estimates of residential range mobility. By compiling a wealth of data from sites throughout the NEM, this dissertation intends to illuminate the adaptive strategies central to Paleoindian life in
the NEM. It is my hope that in some small way this dissertation highlights the important work conducted by Paleoindian researchers in the Northeast (e.g. Papers in Chapdelaine 2012; Papers in Ellis and Lothrop 1989; Papers in Gingerich 2013, Papers in Gingerich in press; Lothrop et al. 2016; Spiess et al. 1998) and stimulates the inclusion of the NEM as a standalone Paleoindian study area in regional and continental studies of the Paleoindian period (e.g. Anderson et al. 2010; Meltzer 1988; O’Brien et al 2014; Lothrop et al. 2016; Waters and Stafford 2007).
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Chapter 2: Ohomowauke:
A Middle Paleoindian Site in Southeastern Connecticut

2.1 Introduction

The Ohomowauke site (72-137) is located on the Mashantucket Pequot Reservation in southeastern Connecticut, which is positioned in the southern portion of the New England and Canadian Maritimes Paleoindian study region [NEM]. The NEM is comprised of the eastern portions of New York State, the six New England states, Quebec south of the St. Lawrence River and the Gulf of St. Lawrence, and the Maritimes Provinces of Canada (Lothrop et al. 2011:547) (Figure 2.1).

Ohomowauke yielded a Michaud-Neponset fluted point component, which through the analyses of site location characteristics, raw material use, toolkit composition, and intra-site organization provided insight into the Middle Paleoindian occupation of Connecticut. Prior to the excavation of Ohomowauke, Connecticut had yielded only one other Michaud-Neponset aged Paleoindian site, Templeton (Moeller 1980), which was originally interpreted as indicating that Paleoindian occupations of Connecticut were more closely affiliated with the Middle Atlantic sub-region because of Templeton’s site location on a floodplain and the presumed Paleoindian use of local cobble toolstones at Templeton (Moeller 1984; 1999; 2002; Spiess and Wilson 1987:129–155; Spiess et al. 1998:246). The site location and raw material use previously suggested for Templeton and then generalized to Connecticut contrasted with patterns of Paleoindian behaviors typically observed in the NEM including site locations on well drained sandy terraces and long distance transportation of toolstones from bedrock outcrops. The

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1 This paper is based on a co-authored conference paper, with Noah Fellman, presented at the 2013 Annual Meeting of the Eastern States Archaeological Federation in South Portland, Maine. We are currently developing it into a journal article.
information generated by the excavation of Ohomowauke and the analysis of Michaud-Neponset fluted point sites and isolates finds from Connecticut (Figure 2.2) provided the opportunity to reexamine Connecticut’s potential placement in the southern NEM during the Middle Paleoindian period.

2.2 Physical Setting

Mashantucket is located in the Northeastern coastal zone as part of the Southern New England coastal hills and plains ecoregion, which represent a natural division of land, climate, and biota helpful in the organization of geographical and ecological space (Griffith et al. 2009). The topography of this ecoregion is characterized by plains with a few low hills. Forests in this ecoregion are comprised of central hardwoods with minor components of transition hardwoods and elm, ash, red maple, red pine, and white pine (Griffith et al. 2009).

In the context of ecoregions specific to Connecticut (Dowhan and Craig 1976:Figure 1), Mashantucket is located in the Eastern uplands of Connecticut within the Southeast Hills ecoregion (Dowhan and Craig 1976:26). The Southeast Hills ecoregion is a near-coastal upland characterized by low rolling hills lying within 30 miles of Long Island Sound (Dowhan and Craig 1976:37). Elevations in this region are generally between 150 and 500 feet with a maximum elevation of almost 800 feet (Dowhan and Craig 1976:37). Elevations at Mashantucket range from approximately mean sea level near the Thames River to around 350 feet. Bedrock in this region is predominantly metamorphic, consisting of Paleozoic gneisses and schists (Bell 1985:161; Dowhan and Craig 1976:37; Thornbury 1965:Figure 9.1). Mashantucket lies within the Shewville Brook drainage basin as part of the Thames Main Stem. Mashantucket also contains the Pequot Cedar Swamp, which is a rain fed mire that is centrally located within its 7.4 km² watershed (McElroy 1981; Thorson and Webb 1991:17). Nine small streams drain
into the Pequot Cedar Swamp and Shewville Brook, a perennial stream, enters and exits at the northern end of mire with little hydrological influence on the swamp (Thorson and Webb 1991:17). Soils in the uplands of the Southeast Hills ecoregion are developed on glacial till and soils in the valleys are developed on local deposits of stratified sand, gravel, and silt (Dowhan and Craig 1976:37). The surficial geology at Mashantucket is dominated by glacial till and the Pequot Cedar Swamp (Stone et al. 1992; Thorson and Webb 1991).

The Ohomowauke site is situated east of the 1.9km² Pequot Cedar Swamp on a south-facing hillside at 182ft asl that slopes between 2° and 10° (Figure 2.3). The Ohomowauke landform is mantled with very rocky soils of the Charlton-Chatfield complex comprised of glacial ablation till mixed with aeolian silt. Vegetation at the time of excavation consisted of a new growth forest dominated by pine, hemlock, and oak. A rock outcrop encompassed the western and northern margins of the site and a small spring-fed brook ran along the eastern and southern margins of the landform. The eastern margin of Ohomowauke also contained an ancillary swamp that formed over the past 250 years from the damming of a brook to redirect the flow of water via a sluiceway to a waterwheel used to power a historic sawmill (Kelly et al. 2016).

2.3 Environmental Reconstruction

During the terminal Pleistocene, glacial isostatic adjustments resulting from the Laurentide ice sheet influenced the NEM landscape by creating a peninsula bounded to the north by the Champlain Sea and to the east by the Atlantic Ocean where lower sea levels than present exposed additional habitable terrain (Lothrop et al. 2011:550; Lothrop et al. 2016:195–202). The Younger Dryas impacted the environment of the NEM by creating colder and drier conditions than present resulting in latitudinally organized subarctic-like habitats, including sedge tundra.
that was likely drier than modern arctic tundra, highland tundra in the mountains of northwestern Maine and the White Mountains, spruce parkland, and closed boreal forests (See Figure 2.1) (Hou et al. 2006; Lothrop et al. 2016:201; Newby et al. 2005; Shuman et al. 2004; Spiess and Newby 2002). The latitudinal organization of these subarctic-like habitats would have created ideal conditions for long-distance migratory caribou herds to move between summer calving grounds in the sedge tundra and wintering grounds near the boundary of the spruce parkland and closed forests for (Newby et al. 2005). Small bands of locally migratory caribou may have occupied the highland tundra and migrated following altitudinal gradients in habitats. Additional small bands of woodland caribou were likely present in the closed forests of southern New England (Spiess and Newby 2002:35).

Cores from the Pequot Cedar Swamp provide pollen, macrofloral, and sediment samples, which have been used to identify local environmental conditions at Mashantucket from deglaciation to the present (Jones 1997:48; McWeeney 1994, 1998, 2013; Newby et al. 2000; Thorson and Webb 1991). During the terminal Pleistocene, the Great Cedar Swamp basin contained a vegetated swamp with areas of open water (Jones 1997:48; Jones and Forrest 2003:76; Newby et al. 2000:365). Pollen data suggest a Younger Dryas spruce maximum in the region (McWeeney 1998:125). The presence of local deciduous flora is evidenced by hazelnut pollen (McWeeney 2013:46) and by the recovery of a hazelnut shell fragment from the Hidden Creek Late Paleoindian site at Mashantucket, which was radiocarbon dated to the Younger Dryas date (10,260 ± 70 RCYBP (Beta-126817)) (Jones and Forrest 2003:85).

Based on the analyses of the swamp cores, the Great Cedar Swamp likely was a productive wetland during the Younger Dryas that may have supported wetland flora including cattail, water lily, groundnut, and Indian cucumber (Jones and Forrest 2003:78; Perry 2000). The
wetland resources may have attracted large game including elk, moose, and woodland caribou and small game including turtles, beavers, and hares. The mosaic of floral and faunal resources available around the Cedar Swamp in the Younger Dryas likely enticed Paleoindian groups to camp at Mashantucket (Carr and Adavasio 2012:279; Jones and Forrest 2003:78; Nicholas 1988).

2.4 Field Methods and Results

Ohomowauke was identified in the winter of 2011 during a survey of a terrace scheduled for development on the eastern side of the Pequot Cedar Swamp. The initial 2011 walk-over reconnaissance survey of Ohomowauke identified above-ground historic features associated with an 18th century mill complex. Since the entire landform was considered to demonstrate the potential to yield information related to the 18th century occupation, sub-surface testing proceeded via the excavation of 1m² units placed on a grid at five meter intervals across the landform, rather than traditional 50cm² shovel test pits. During the initial sub-surface testing in the winter of 2011, a test unit yielded a large utilized flake of a material similar to spherulitic rhyolite from northern New Hampshire. This signaled the presence of a probable Paleoindian component, as lithics made of spherulitic rhyolite from New Hampshire rarely appear in southern New England outside of Paleoindian sites (Pollock et al. 2008). Subsequently, Mashantucket Pequot Museum and Research Center staff archaeologists and the 2012 and 2013 University of Connecticut Pre-Contact Archaeology Field Schools conducted joint excavations to study the archaeological components at Ohomowauke with a focus on documenting the Paleoindian component.

The goal of the field investigations was to delineate site boundaries with the systematic excavation of 1m² test units at five-meter intervals and then to intensively sample the occupation
areas via block excavations. Block excavations were comprised of contiguous 1m² units. Individual 1m² units were divided into four 50cm² quadrants that were excavated in 10 cm arbitrary levels within natural soil strata. Cultural features encountered during excavation were collected for soil flotation to recover organic material for radiocarbon dating. Since the landform was scheduled to be clear-cut of trees as part of a development project, the archaeological excavations employed professional arborists to fell trees located in the excavation blocks, thus permitting excavation around the tree roots.

Five areas of contiguous excavation and many 1x1 meter test excavation units were excavated for a total of 568.5m² excavated on the landform (Figure 2.4 and Table 2.1). The recovery of a Michaud-Neponset style projectile point base and characteristic Michaud-Neponset style fluted point production debris including a blunted preform tip and an overshot channel flake demonstrate that Ohomowauke was occupied during the Middle Paleoindian period circa 12,000 Cal yr BP (Boisvert 2008; Bradley et al. 2008:142; Lothrop et al. 2016:210; Spiess et al. 2012:104).

In addition to the Middle Paleoindian component, the expansive excavations at Ohomowauke recovered evidence for an Early Archaic Bifurcate Component, Middle Archaic Neville, Stark, and Merrimack components, Late Archaic narrow stemmed and Laurentian tradition components, Terminal Archaic Snook Kill and Orient Fishtail components, an Early Woodland Meadowood component, Middle Woodland Fox Creek and Jack’s Reef components, and a Late Woodland Levanna component. An ear possibly from a Vail-Debert fluted point or a Dalton point was recovered from Locus B as an isolated find suggesting an Early or Late Paleoindian component at Ohomowauke. Archaeologists also documented the 18th century Saw Mill complex (Kelly et al. 2016). Block excavations were expanded until concentrations of
Paleoindian lithics dissipated; however, due to time constraints associated with planned construction projects on the landform, absolute boundaries for the low-density portions of Paleoindian activity areas were not identified. Blocks A and B were screened with eighth inch mesh. Soil from the remaining blocks, C-H, was sifted through quarter inch mesh to increase the horizontal coverage across the site before the site was closed in the Fall of 2013. Loci C and D were primarily water-screened through quarter inch mesh because of saturated soil conditions near the mill dam located on the eastern boundary of the landform.

The soil at Ohomowauke consisted of an A_h-A1-B1-B2-C profile formed in glacial till (Figure 2.5). The landform was not plowed, so most of the Pre-Contact material culture recovered from the 568.5m² excavated at Ohomowauke was located in intact B horizon soils. Historic excavation of the sluiceway, however, disturbed the context of material culture located inside the sluiceway channel. All Pre-Contact artifacts including the Paleoindian lithics and later components followed the mature soil model of distribution by peaking in the top portion of the B1 soil before tapering off in the bottom portions of the B2 soil (Cremeens 2003:57) (Figure 2.6 A-B). This pattern indicated a lack of vertical cultural stratigraphy at the site.

Acidic soil conditions, typical of New England (Jordan 1975:71), resulted in poor preservation of dateable organic materials from Ohomowauke. No Paleoindian features were identified during excavation. Consequently, charred botanicals to be radiocarbon dated were collected from natural soil matrices associated with concentrations of lithics with potlid fractures signaling thermal damage (Patterson 1995:74). Two radiocarbon assays yielded dates that are too young to correspond with the Paleoindian component: a Corylus sp. shell fragment was dated to 1030 ± 30 BP (Beta-367680) and a Nymphaea sp. seed was dated to 1870 ± 30 BP (Beta-343714).
Most of the Pre-Contact components of the site occurred in spatially discrete clusters that facilitated the attribution of non-diagnostic lithics to specific components (Figure 2.7). However since Ohomowauke lacked vertical cultural stratigraphy, in cases of overlap among components, segregation of the Middle Paleoindian assemblage relied upon the discrimination of tool varieties associated with diagnostic lithics, as described in the Paleoindian Raw Material Use Section (Section 2.5.1.1).

As described in the Spatial Patterning Analysis (Section 2.5.3), refitting of lithics at Ohomowauke provided information regarding the integrity of the vertical and horizontal distributions of artifacts. Sets of refit lithics were separated by no more than three meters horizontally and up to 50cm vertically in non-uniform arrangements, likely as a result of bioturbation over 12,000 years (e.g. Courchesne et al. 2012). The distribution of refits within the non-uniformly organized artifact clusters at Ohomowauke indicate that site formation processes have blurred but not obliterated the integrity of the cultural spatial patterning at Ohomowauke (Thorson 1996; Jones and Forrest 2002:77).

Middle Paleoindian lithics were recovered in Locus A and Loci C-H, which comprise a total excavation area of 379 m² distributed across the eastern portion of the Ohomowauke landform (Figure 2.8; Tables 2.2 and 2.3). Loci A, C and D contained dense clusters of Paleoindian lithics suggesting three distinct occupation areas, whereas loci E, F, G, and H contained low density lithic scatters suggesting one or more additional occupation areas. The dispersed testing with 1m² test units on a five meter grid indicated that additional high density Middle Paleoindian activity areas were not likely present at Ohomowauke, however, there were likely additional portions of low density activities areas located outside the excavation.
boundaries thus suggesting that the Middle Paleoindian occupation covered a total area of over 1300 m².

2.5 Analysis of Middle Paleoindian Assemblage

The Middle Paleoindian assemblage was analyzed to provide insight into Paleoindian settlement behaviors and technological organization in Connecticut through the documentation of Paleoindian raw material use, artifact types, and spatial patterning at Ohomowauke.

2.5.1 Raw Material Analysis

2.5.1.1 Discrimination of Raw Material Use by Time Period

The goals of the raw material analysis were to discriminate the Middle Paleoindian lithic assemblage from the other Pre-Contact lithic assemblages at Ohomowauke and to identify the geologic sources of the Middle Paleoindian toolstones to investigate Paleoindian range mobility and social networks. Raw materials were sorted based on macroscopic characteristics and comparisons with geologic hand specimens. Samples of the Paleoindian raw materials at Ohomowauke were also geochemically sourced via nondestructive X-ray fluorescence as part of regional analyses of Paleoindian toolstone use (Kitchel 2016; Lothrop et al. In Review)

Discrimination of the Pre-Contact lithic assemblages relied upon the identification of the varieties of toolstones used to created diagnostic lithics like projectile points and channel flakes (Table 2.4). Diagnostic Paleoindian lithics like channel flakes and fluted points were made primarily of cryptocrystalline toolstones including a yellow and red jasper, a green chert, and a red chert. Additional toolstones including black chert, chalcedony, spherulitic rhyolite, and crystal quartz were assigned to the Ohomowauke Paleoindian assemblage because they were recovered in close proximity to diagnostic Paleoindian lithics. The majority of the other Pre-Contact components contain lithics manufactured from lower quality stones such as argillite,
rhyolite, white quartz, and quartzite that can be segregated from the high quality
cryptocrystalline toolstones that typified the Middle Paleoindian component (Figure 2.9).

The projectile point ear fragment possibly from a Vail-Debert point or a Dalton point
recovered in Locus B provides an exception to this generalization. This ear fragment, however,
was from made on a gray chert macroscopically similar to Devonian cherts from New York that
is not present in the Middle Paleoindian activity areas. Another exception is a Middle Woodland
Jack’s Reef locus, which contained jasper that is macroscopically similar to the jasper in the
Middle Paleoindian component. As described in the synthesis of Paleoindian spatial analysis
(section 2.5.3.6), the Middle Woodland locus is distinguished from the Paleoindian loci by the
presence of both a Jack’s Reef corner-notched projectile point and Middle Woodland dentate
stamped ceramic sherds, as well as the absence of diagnostic Paleoindian lithics and lithics made
of either green or red chert. The Middle Paleoindian activity areas containing jasper, on the other
hand, lacked both aboriginal ceramics and corner-notched projectile points and included both
classic Paleoindian tool forms and channel flakes made of jasper and lithics made of green chert
and red chert.

2.5.1.2 Source Identification of Middle Paleoindian Raw Materials

Kitchel (2016) included representative samples of the jasper, green chert, and red chert
from Ohomowauke in his X-ray fluorescence (XRF) study of NEM Paleoindian toolstones.
Based on geochemical similarities among samples in Kitchel’s database, the jasper sample from
Ohomowauke was identified as matching the geochemical signature for “Pennsylvania jasper”,
however no specific source area was identified. The green chert was classified as Normanskill
chert from the mid-Hudson Valley of New York and the red chert was designated as Munsungun
chert for northern Maine.
Lothrop et al. (In Review) included three green chert lithics from Ohomowauke in their study, which used XRF analysis to investigate whether tentatively identified Normanskill chert lithics were derived from the Paleoindian Normanskill chert quarry at West Athens Hill. Their analysis indicated that the three Normanskill chert lithics from Ohomowauke did not match the geochemical signature for the outcrops of Normanskill chert at West Athens Hill. The combined results of Kitchel’s (2016) and Lothrop et al.’s (In Review) XRF analyses indicate that the green chert from Ohomowauke is Normanskill chert from the mid-Hudson Valley, but not from the West Athens Hill quarry.

The other minor toolstones attributed to the Middle Paleoindian component have been tentatively attributed to source areas based on macroscopic comparison of the toolstones with hand samples from outcrops. The tertiary toolstones include chalcedony that may originate in outcrops near West Rock, CT (Sgarlata 2009:108), rhyolite that is macroscopically similar to spherulitic rhyolite from New Hampshire (Pollock et al. 2008), and black chert and crystal quartz from unidentified sources.

The toolstone profile at Ohomowauke is similar to other Paleoindian sites in the southern NEM. The Late Paleoindian Hidden Creek site, also located at Mashantucket, is dominated by Normanskill chert and contains Pennsylvania jasper and Munsungun chert as minority toolstones (Jones 1997; Singer and Jones in Press). Based on recent petrographic analyses (Singer In Prep), the Templeton site in western Connecticut also is dominated by Normanskill chert and contains Pennsylvania jasper as a minority toolstone. The abundance of Pennsylvania jasper and Normanskill chert on Paleoindian sites in the southern NEM suggests that Paleoindians tended to acquire stone from sources to the West and South of Connecticut before creating sites in Connecticut.
2.5.2 Middle Paleoindian Artifact Analysis

The Middle Paleoindian artifact assemblage at Ohomowauke consists of formal tools, expedient flake tools, and debitage (See Table 2.2). Artifact class identifications were based on previously established Paleoindian artifact typologies derived from morphological attributes (Deller and Ellis 1992:25–92; Lothrop 1988; 238–408). Twelve lithics were analyzed for use-wear via the “high powered magnification approach”, which observes edge damage, polishes, and striations to suggest the materials that were worked with the stone tools (Loebel 2015) (Table 2.5).

2.5.2.1 Fluted Points

One fluted point base made of red Munsungun chert is associated with the Middle Paleoindian component at Ohomowauke (Figure 2.10). The base retains distinct basal ears and a moderately deep, arc-shaped basal concavity. One face of the point has a flute extending past a transverse snap that removed the distal portion, while the other face has two shallow flutes that are reminiscent of the “Barnes finishing technique” (Bradley et al. 2008:142). The attributes of this fluted point most closely align with the Michaud-Neponset style, which dates to the Middle Paleoindian period (Bradley et al. 2008). The fluted point displays heavily ground lateral and basal edges suggesting that the point had been prepared for hafting. No additional use-wear was observed on the point.

2.5.2.2 Biface Fragments

Four biface fragments are attributed to the Middle Paleoindian component. Three of the biface fragments are fluted point preform fragments likely broken during late stage fluted point production. The preform fragments include a medial fragment, a lateral edge fragment and a distal fragment. The distal preform fragment was broken via a bending fracture, likely resulting
from a fluting attempt. The tip of the distal preform fragment is blunted and has been isolated by retouch resulting in narrowed or “tongued” (*sensu* Deller and Ellis 1992:32) lateral margins near the tip. This tip preparation is a characteristic associated with Michaud-Neponset style fluted point production (Bradley et al. 2008:142).

A fragment of a marginally retouched biface was also recovered at Ohomowauke. The marginally resharpened biface is a flake that was bifacially edged by minimally invasive retouch. Similar marginally resharpened bifaces are reported from the Parkhill site in Ontario and the Potts site in New York and may be a rare tool form that is diagnostic of Paleoindian occupations in the Northeast (Ellis and Deller 2000:95; Lothrop 1988:268–271).

2.5.2.3 Endscrapers

Endscrapers are the most abundant formal tool class in the Middle Paleoindian assemblage with 16 specimens. These tools are characterized by the location of their unifacial working edges at the distal flake end. The majority of the endscrapers are trianguloid in plan shape with the working bit as the widest portion and lateral edges tapering toward the proximal flake end, likely to aid in hafting. High powered use-wear analyses on two endscrapers indicate that these tools were used to scrap hides at Ohomowauke. Loebel’s (2013) use-wear analyses on a large sample of Paleoindian endscrapers from the Northeast indicate that the majority of these tools are used for scrapping hides. The dominance of endscrapers in the Ohomowauke toolkit, therefore, suggests that hideworking activities were relatively important during the Paleoindian occupation.

2.5.2.4 Sidescrapers

Four sidescrapers were recovered at Ohomowauke. These tools are distinguished by their unifacial working edges being located along their lateral margins. All four sidescrapers retain
steep, flat surfaces suggestive of backing to aid in handheld prehension. Three of the sidescrapers are backed by snapped fractures and the other is backed with a flat, planar cortical surface indicative of bedrock cortex. One sidescraper was subjected to high powered use-wear analysis, which indicated scraping and planning of bone or antler.

2.5.2.5 Uniface Fragments

This category is comprised of eight lithics that displayed unifacial retouch, but were too fragmentary to be assigned to formal tool classes. Most of the fragments appear to be from endscrapers or sidescrapers. Use-wear analysis of one of the scraper fragments indicated edge damage and polishes consistent with wear generated from scraping either bone or antler.

2.5.2.6 Utilized and Retouched Flakes

Forty-six utilized and edge retouched flakes were identified at Ohomowauke by the presence of fine continuous to intermittent retouch or edge damage on the margins of flakes. Some of these retouched flakes display lateral retouch on very thin flakes, approximating “raclettes” (Deller and Ellis 1992:72; Irwin and Wormington 1970:28; Lothrop 1988:332–336). One retouched flake fragment of red chert contains a simple notch that is similar in morphology to notching present on flake gravers, however the lithic is too fragmentary to determine whether the notch was part of a graver or perhaps a fragment of a delicate spokeshave.

2.5.2.7 Pièces Esquillées

Ohomowauke yielded three pièces esquillées. These tools were identified by their characteristic bipolar percussion with heavy concentric rippling and step fracturing (Lothrop and Gramly 1982:8). Replicative studies suggest that these tools were used as wedges for working bone, antler, and wood (de La Pena 2015).
2.5.2.8 Gravers

Two gravers were recovered. These tools are characterized by the presence of one or more small spurs created by unifacial retouch along the margin of flakes. One of the gravers is multi-spurred and the other graver has a single spur. Both gravers retained use-wear suggestive of working bone and/or antler.

2.5.2.9 Debitage

Debitage associated with the Middle Paleoindian component indicates that a variety of knapping activities occurred on site (For definitions of debitage categories see Table 2.6). Late stage biface shaping and fluted point finishing is signaled by the presence of channel flakes, biface resharpening flakes, and only a few biface reduction flakes. The recovery of uniface resharpening flakes indicates that scraping tools were retouched on site. Bipolar flakes and columnar spalls demonstrate pièces esquillées use at Ohomowauke. Flake fragments and angular debris lack the flake platforms necessary for indicating the knapping activity that produced these classes of debitage, however, the association of these flake categories with the other debitage classes suggests that they were likely produced during the same suite of activities. The presence of debitage suggesting that fluted point finishing, uniface resharpening, and tasks involving pièces esquillées were all conducted on site is typical for small Paleoindian sites located away from lithic sources in the NEM (Curran 1984).

The use of 1/4” mesh for portions of the excavation biased the recovery of debitage toward larger pieces; accordingly, small flakes from unifacial and bifacial resharpening and fragments of flakes are likely underrepresented in the debitage sample from Loci C-H. The low relative frequency of uniface resharpening flakes to unifaces, which is around three flakes per one uniface, seems to be an example of this recovery bias. Use-wear analysis conducted on three
unifacial resharpening flakes indicates that these flakes were removed to resharpen a uniface during the scraping of hides. Since ethnographic data suggests that frequent resharpening of scrapers is necessary to maintain proper working edges during hide scraping (Weedman 2002, 2006), large quantities of unifacial resharpening flakes would be expected at Ohomowauke.

The recovery of 27 channel flake fragments and the quantity of biface resharpening flakes and biface reduction flakes suggests that a few fluted points were finished at Ohomowauke. Although the recovery of small channel flake fragments including proximal fragments was biased by the use of 1/4” mesh for some of the excavation areas, the presence of four proximal channel flake fragments indicates that a minimum of two fluted points were made on site, if each face of the point was fluted once (Ellis and Payne 1995:468). Based on Sellet’s (2013:388) relative measure of fluted point production that considers the number of channel flake fragments attributed to distinct nodules of raw materials, between four and ten fluted points may have been produced at Ohomowauke.

2.5.2.10 Toolstone Use

Pennsylvania Jasper is the majority toolstone in the Paleoindian assemblage both by count and weight (Table 2.7). Normanskill chert is the first tier minority toolstone and Munsungun chert that is the second tier minority toolstone. Tertiary toolstones include a black chert, chalcedony, spherulitic rhyolite, and crystal quartz.

The majority of the tools in the Middle Paleoindian assemblage including biface fragments, unifaces, utilized and retouched flakes, pièces esquillées, and gravers are made of Pennsylvania jasper. Tools of Munsungun chert are the second most abundant, followed by tools of Normanskill chert. A few tools of black chert, chalcedony, spherulitic rhyolite, and crystal quartz are also present.
Fluted point production debris is mainly comprised of Normanskill chert and Pennsylvania jasper. The small amounts of bifacial debitage made of Munsungun chert, black chert, and chalcedony recovered at Ohomowauke indicate that these materials were only limitedly involved in fluted point production activities on site. Uniface tools and uniface resharpening flakes are dominated by Pennsylvania jasper and Munsungun chert. Pièces esquillées and bipolar flakes and spalls associated with pièce esquillée use are primarily made of Pennsylvania jasper and chalcedony.

The differential use of the toolstones at Ohomowauke may be related to Paleoindians practicing a staged tool production sequence that was scheduled based on the amount of time that had passed since a particular toolstone was procured via serial procurement (Spiess et al. 1998:243, Carr and Adovasio 2012:290). Since jasper is the majority toolstone at Ohomowauke, the Pennsylvania jasper outcrops were likely the last quarries visited before Paleoindians occupied Mashantucket. Normanskill chert was likely acquired before the jasper, since it is the second most abundant by weight and count. The small amount of Munsungun chert, crystal quartz, black chert, chalcedony, and spherulitic rhyolite indicates that these toolstones might have been acquired via a combination of direct embedded procurement, direct logistic procurement, and indirect procurement via exchange networks and movement of individuals among different bands (Ellis 2011; Lothrop and Bradley 2012:28; Speth et al. 2010:20).

2.5.3 Spatial Analysis

The Paleoindian assemblages recovered from Loci A and C-H, comprise a total of 379 m² units (See Figure 2.8). Dense concentrations of lithics were excavated to their boundaries in Loci A, C, and D and diffuse lithic scatters were sampled in Loci A, E, F, G, and H. The three dense lithic concentrations each ranged in size from around 5x5 meter clusters in Locus A and C to a
7x7 meter cluster in Locus D. The samples of diffuse lithic scatters in Loci A, E, F, G, and H and the dense lithic concentrations in Loci A, C, and D suggest that the total Middle Paleoindian occupation was distributed over a 44 meter (north-south) by 24 meter (east-west) area.

Each locus will be described in detail below in order to highlight intra-spatial patterning across the Ohomowauke landform.

2.5.3.1 Locus A

Locus A is a 73.75m² block located on a gently sloping portion of the landform approximately 20 meters west of the brook that forms the eastern boundary and positioned immediately south of the 18th century sluiceway and directly east of the sluiceway’s spillway (Figures 2.11 and 2.12; Appendix 1.1 and 1.2).

Locus A contains two discrete Paleoindian activity areas. A concentration ofdebitage including channel flake fragments and biface resharpening flakes was recovered in a 5x5 meter area in the southern half of the Locus, suggesting a fluted point production area. The majority of the recovereddebitage is made on Normanskill chert. Pennsylvania jasper, Munsungun chert, black, and chalcedony are also present in small amounts. The recovery of two utilized flakes and a jasper pièce esquillé without associateddebitage in the northern section of the block hints at a separate activity area where these tools were discarded, perhaps coinciding with a location where Paleoindians performed expedient cutting and wedging tasks.

No diagnostic projectile points (e.g. Bradley et al. 2008) nor diagnosticdebitage (e.g. Boisvert 2008) that might allow for the attribution of the Paleoindian assemblage to a particular subphase of the Paleoindian period were recovered in Locus A. Consequently, the Paleoindian assemblage in Locus A may represent the remains of an ephemeral fluted point production area unassociated with the other Paleoindian activity areas on site. However, the suite of toolstones
discarded in Locus A are similar to the toolstones recovered in the remainder of the Paleoindian assemblage from Ohomowauke; thus, the Locus A Paleoindian assemblage may be associated with Paleoindian activity areas recovered across Ohomowauke.

2.5.3.2 Locus D

Locus D is a 33 m² locus located in the north portion of a block that also contains Locus E (Figures 2.13 and 2.14; Appendix 1.3 and 1.4). The eastern boundary of Locus D abuts a rock outcrop of and the northern boundary coincides with the 18th century sluiceway. The southern and western boundaries of Locus D coincide with Locus E.

The soils in Locus D were saturated, perhaps as a result of the close proximity of Locus D to the historically constructed mill dam and sluiceway drainage. Consequently, most of Locus D was water screened through quarter inch mesh to allow artifacts to be recovered from the wet soils. Some of the excavation units reached the water table around 50 cm below surface. Excavations proceeded into the submerged soils below 50cm and continued to yield artifacts until the C₁ horizon appeared between 60cm and 70 cm below surface.

Locus D yielded a concentration of Paleoindian lithics located in a 7x7 meter area. The concentration consisted of a graver, a sidescraper, utilized flakes, and fluted point production debris including channel flakes and preform fragments. The majority toolstone in Locus D is Pennsylvania jasper. Normanskill chert is the second most abundant material in the locus. Many of the Normanskill chert flakes have potliddying and pinkish hues, indicating the flakes were likely burned (Lavin 1983:9; Patterson 1995:74).

Locus D is a second area of fluted point production paralleling the activities reconstructed for the southern portion of Locus A. Use-wear analysis of the graver indicates working of either bone or antler. The presence of a graver, a sidescraper, utilized flakes associated with fluted
point production debris may suggest that organic materials were processed in the locus, perhaps to facilitate the hafting of completed fluted points.

2.5.3.3 Locus E

Locus E is a 70.25 m² area situated south of Locus D on a gentle slope bounded by Locus A to the West and the incised brook channel to the East (Figures 2.13 and 2.15; Appendix 5 and 6). The artifact assemblage from Locus E consists almost entirely of discarded tools with minimal flaking debris. Tools recovered from Locus E include the base of a fluted point made of Munsungun chert, a marginally resharpened Pennsylvania jasper biface, chalcedony and Normanskill chert endscrapers, and utilized flakes.

The four endscrapers and a uniface fragment recovered in Locus E came from a 3.5x4.5 meter area located immediately south of the Locus D knapping concentration. The four endscrapers and the uniface fragment provide evidence for a localized area of uniface discard.

One of the utilized flakes recovered from Locus E refits to a graver recovered approximately four meters away in Locus D. This refit pair suggests that Loci D and E might have been produced during a single occupation. The presence of a Michaud-Neponset style projectile point in Locus E and the recovery of characteristic Michaud-Neponset style fluted point production debris in Locus D bolster the interpretation of contemporaneity between these loci.

Locus E contained discarded tools without a concentration of debitage, which is a pattern similar to the utilized flakes and pièces esquillées recovered without associated debitage in the northern portion of Locus A. Consequently, both Locus E and the northern portion of Locus A may reflect sampled portions of a large toss zone encompassing the gentle slope located south of the 18th century sluiceway (e.g. Gramly 2013).
2.5.3.4 Locus C

Locus C encompasses a 29m² block located on level ground immediately north and west of the 18th century sluiceway that acted as a barrier separating Locus C from Loci D and E.

The lithic assemblage recovered from Locus C is a 5x5 meter lithic concentration primarily comprised of endscrapers, sidescrapers, pièces esquillées, and uniface resharpening debitage (Figures 2.16 and 2.17; Appendix 1.7 and 1.8). The majority of uniface resharpening flakes are made of Munsungun chert with Pennsylvania jasper the second most abundant. A small amount of biface resharpening flakes in Locus C suggest that limited biface resharpening occurred in this locus. Use-wear indicative of working hides was identified on an endscraper and three uniface resharpening flakes. A sidescraper retained use-wear suggestive of working fresh or soaked antler. Accordingly, the composition of Locus C suggests an activity area focused on the use and maintenance of endscaper, sidescrapers, and pièces esquillées for processing antlers and hides, perhaps in association with tailoring tasks (Loebel 2013).

Burrow mottles in the Munsungun chert facilitated the refitting of unifacial resharpening flakes in Locus C (Figure 2.18). Sets of refits were separated by no more than three meters horizontally and up to 50cm vertically. None of the Munsungun chert unifaces recovered at Ohomowauke matched the burrow mottle patterns of the unifacial resharpening flakes suggesting that the uniface from which the resharpening flakes were derived was either discarded in an unexcavated portion of the site or was transported off site after resharpening.

2.5.3.5 Loci F, G, and H

Loci F, G, and H are located in the northern-most block at Ohomowauke, comprising 173m² units. The block is located on level ground north of Locus C and is bounded by a rock outcrop to the west and wetlands to the east. Many of the western units in Locus F overlap with a
domestic structure associated with the 18th century Mill Complex (Kelly et al. 2016). Loci F, G, and H contained similar Paleoindian lithic assemblages and have been aggregated as one diffuse activity area.

These loci yielded a diffuse scatter of endscrapers, uniface fragments, utilized flakes, uniface resharpening flakes, and a graver (Figures 2.19 and 2.20; Appendix 2.9 and 2.10). For instance, the seven endscrapers from the block are all separated by at least three meters. The recovery of only seven biface resharpening flakes suggests limited knapping of bifacial tools in the block. Pennsylvania jasper unifacial chipping debris dominates the southwest corner of the block, which corresponds to Locus H. Munsungun chert unifacial resharpening flakes cluster in the center of the block, which was designated Locus G. A second area of jasper unifacial debitage occurs east of the Munsungun chert cluster in Locus G.

Use-wear analysis indicated that a scraper bit likely from an endscraper was used for scraping bone or antler. The graver recovered from this block also retained use-wear indicative scraping or planing bone or antler. An endscraper yielded use-wear suggesting scraping of hides. The lithic patterning and use-wear results suggest a diffuse activity area associated with the maintenance and discard of unifacial tools used to work bone, antlers, and hides, likely in association with tailoring tasks (Loebel 2013).

A similar assemblage of unifaces and unifacial resharpening flakes was recovered in a dense concentration in Locus C, which is located a few meters south of Loci F, G, and H, demonstrating that uniface maintenance and discard activities likely associated with hide tailoring primarily occurred in the northern portion of the site and may have extended throughout the unexcavated area between Loci C, F, G, and H.
2.5.3.6 Synthesis of Spatial Analysis

Differences in the composition of the Ohomowauke loci reveal several specialized activity areas.

Two areas of biface resharpening and final stage fluted point production are present, one in the southern portion of Locus A and one in Locus D (Figure 2.21). The fluted point production areas in Locus A and Locus D are similar in the horizontal distributions of their concentrations and yielded similar quantities of fluted point production debris. Although the sample is small, none of the bifaces submitted for micro-wear analyses retained evidence for use, therefore, the areas associated with biface resharpening were likely primarily created during fluted point production rather than during butchery.

Upslope from the two biface knapping concentrations are multiple areas of uniface resharpening and uniface discard located in Loci C, F, G and H (Figure 2.22). Locus C contained a dense concentration of endscrapers, sidescrapers, and uniface resharpening flakes in a 5X5 meter area, whereas Loci F, G, and H yielded a more diffuse area of unifaces. Although the density of the uniface activity concentrations differs among the loci, the quantity of unifaces and uniface resharpening debitage is similar between Locus C and Loci F, G, and H. The small sample of unifaces and uniface resharpening flakes submitted for microwear analyses suggest that Paleoindians created these loci while conducting a variety of scraping tasks associated with working hide, bone, and antler.

The northern portion of Locus A and Locus E, which are located on the hillside between the two biface knapping concentrations, contained Paleoindian tools with an absence of resharpening flakes. The northern portion of Locus A yielded utilized flakes and a pièce esquillée, while Locus E yielded endscrapers, a fluted point, a marginally resharpening biface,
and utilized flakes. The recovery of these tools without associated debitage might indicate possible toss/discard zones. However, use-wear studies on a larger sample of tools could test whether this area was associated with processing organic materials that did not preserve in the archaeological record.

Mapping of raw material distributions throughout the blocks highlights differential knapping and discard patterns for the suite of Paleoindian toolstones suggesting that certain raw material types were linked to specific tasks at Ohomowauke (Figures 2.23 A-C). Pennsylvania jasper was a dominant toolstone used for both biface and uniface tasks at Ohomowauke with the exception of the fluted point production area in Locus A. Normanskill chert was predominately used for fluted point production tasks located in Loci A and D, whereas Munsungun chert was mostly employed in uniface maintenance tasks in Loci C, F, G, and H.

The separation of fluted point production areas, uniface resharpening and uniface discard areas, and potential toss zones and the vary proportions of toolstones in each locus may indicate a single occupation with different activities organized across the landform. Alternatively, the separate activity areas may be the result of repeated Paleoindian occupations with specialized activities conducted during separate visits to the site.

Based on the similar suite of toolstones present in vary proportions in each locus, the non-overlapping specialized activity areas, and the small size of the artifact assemblage, I suggest that Ohomowauke was occupied during a single occupation or a few occupations within a time period brief enough to allow for the patterned separation in space to remain evident without reoccupations causing overlap among activity areas (e.g. Spiess 1984).

In the single occupation scenario, the suite of unifacial and bifacial tools suggests a residential occupation. The dispersed separation of activities areas at Ohomowauke may derive
from Paleoindians spreading out their tasks during warmer weather (Singer and Jones In Press, Binford 1993:111). The separation in space between hideworking tasks associated with endscrapers and hunting tool production indicated by fluted point finishing activities might suggest a gendered division of space in the campsite. Based on analogies to ethnographic subarctic foragers (Ruth 2013; Waguespack 2005), women are usually responsible for working hides to make clothing and men typically make projectile points. The two concentrations of fluted point production debris indicate redundant knapping events separated in space and may suggest that Ohomowauke was occupied by two family groups or that fluted point production occurred in two locations during the occupation. The varying proportions of toolstones among the loci may suggest differential use of toolstone perhaps resulting from a staged tool production and reduction sequence.

In the reoccupation scenario, the separation in space between specialized activity areas may indicate multiple occupations of Ohomowauke by Paleoindian task groups who visited Ohomowauke to conduct different tasks during each occupation. Accordingly, the distribution of the two fluted point production locations, the diffuse toss zones, and the uniface resharpening and discard locations and the varying proportions of toolstones in each locus may have resulted from repeat visits to the same landform.

2.6 Regional Comparisons

The study of Ohomowauke added another Paleoindian site at the southern margin of the NEM and in close proximity to the Middle Atlantic Region, which is useful for investigating patterning in Paleoindian site locations, raw material use, assemblage composition, and intra-site patterning at the state level and sub-regionally.
2.6.1 Michaud-Neponset Fluted Point Sites in Connecticut

Different aspects of Paleoindian lifeways in Connecticut circa 12,000 Cal yr BP can be gleaned by comparing Ohomowauke and the other Michaud-Neponset fluted point sites and isolated finds from the state (Table 2.8, See Figure 2.2).

2.6.1.1 Site Locations

The recovery of isolated fluted points in a rockshelter (Manstan), near a pond (Preston Plains), and on a hillside (Lantern Hill) and the location of Ohomowauke near a wetland and Templeton in a riverine setting provides evidence for Middle Paleoindians occupying a variety of geomorphic landscapes in the closed boreal and transitional forests present in Connecticut during the latter portion of the Younger Dryas (Newby et al. 2005; McWeeney 1999).

2.6.1.2 Raw Material Use

The toolstones in the Connecticut Michaud-Neponset point sites link Connecticut to source areas throughout the New England-Maritimes region and the northern Middle Atlantic. The Cushman point, the Red Hill point, and the Manstan point are likely made of Normanskill chert from eastern New York. The Norris Bull Collection point from East Granby and the Preston Plains point from Ledyard are made of jasper, likely from eastern Pennsylvania. The point from Lantern Hill is made of a spherulitic rhyolite likely for northern New Hampshire. The Templeton site contains materials Normanskill chert and jasper likely from eastern Pennsylvania. Ohomowauke contains Pennsylvania jasper, Normanskill chert, and small amounts of Munsungun chert from northern Maine and New Hampshire rhyolite. The dominance of materials from southern sources like Normanskill chert and Pennsylvania jasper suggest that Connecticut was likely linked intra-regionally via the southern corridor, which connected the upper Susquehanna and Delaware/Wallkill valleys to the Hudson Valley before opening into
Connecticut (Lothrop et al. 2011:Figure 4; Newby and Bradley 2007:Figure 1B). The presence of materials from northern sources like New Hampshire rhyolite and Munsungun chert, however, also links the Connecticut Michaud-Neponset fluted point sites to northern habitats, which were likely seasonally attractive for caribou hunting (Curran and Grimes 1989; Newby et al. 2005; Pelletier and Robinson 2005:171).

2.6.1.3 Assemblage Composition

Variation in assemblage size and toolkit composition among the Connecticut Michaud-Neponset fluted point find spots and sites reveals that Paleoindians may have conducted different activities throughout the state. The isolated fluted point find spots may represent individual points discarded or lost during hunting episodes or may signal the presence of nearby campsites that remain undetected (Spiess and Bradley 1996). Templeton contains intensive fluted point production activities, however the few formal unifaces suggest a limited focus on scraping tasks in the excavation portion of the site. Conversely, Ohomowauke contained a few channel flakes suggesting limited fluted point production but a plethora of endscrapers and unifaces. Based on the current specimens from these sites, tasks involving endscrapers appear to have been more frequent at Ohomowauke than at Templeton, whereas fluted point production was more intensive at Templeton than at Ohomowauke.

2.6.1.4 Intra-Site Patterning

Block excavations at Ohomowauke and Templeton both revealed lithic clusters primarily comprised of fluted point production debris. This suggests that Michaud-Neponset fluted point manufacture during the Middle Paleoindian period in Connecticut may have been a specialized activity, which was conducted in areas separated from residential loci (e.g. Robinson et al. 2009:440)
2.6.2 Ohomowauke in the NEM Region

The location of Ohomowauke near the southern margin of the NEM provides the opportunity to investigate sub-regional patterning in Paleoindian site locations, raw material use, assemblage composition, and intra-site patterning in the Northeast (See Figure 2.1).

2.6.2.1 Site Locations

The location of Ohomowauke on a terrace overlooking a wetland provides additional evidence for Paleoindian wetland exploitation throughout the NEM (Boisvert 2012:91; Dincauze and Jacobson 2001; Nicholas 1988). Other Paleoindian sites are located in geomorphic landscapes that may have been strategic positions for caribou exploitation, like sites in the Israel River cluster (Boisvert 2013:154–155), Auburn Airport cluster (Spiess et al. 2012:99), and Megalloway Valley cluster (Gramly 1982). These sites indicate that Paleoindians likely employed a caribou-focused subsistence strategy, at least as a seasonal interior adaptation (Lothrop et al. 2016:229–230). The presence of Paleoindian sites along remnants of the Champlain Sea coastline in Vermont also suggests potential seasonal maritime adaptations (Loring 1980; F. Robinson 2012).

2.6.2.2 Raw Material Use

The use of Pennsylvania jasper and Normanskill chert as majority toolstones is a common trait of Middle Paleoindian assemblages recovered in the northern Mid-Atlantic (Custer 1996:127) and southern NEM (Lothrop and Bradley 2012), including Ohomowauke, the Pocono Lake site in eastern Pennsylvania (Carr and Adovasio 2002:34; Fogelman and Lantz 2006:255; Lothrop and Bradley 2012:Table 2.5), and the Plenge site in northern New Jersey (Gingerich 2013). Similar suites of toolstones dominate Early Paleoindian sites in the southern NEM including the Turners Falls site in central Massachusetts (Binzen 2005), Wapanucket Locus 8 in
southeastern Massachusetts (Bradley and Boudreau 2006), and sites in the Hudson Valley (Lothrop and Bradley 2012:30). The dominance of Pennsylvania jasper and Normanskill chert in these sites may indicate band-related movements throughout southeastern New York, eastern Pennsylvania and southern New England (Bradley and Boudreau 2006:69).

The presence of limited quantities of Munsungun chert and possible New Hampshire rhyolite in southern NEM sites including Ohomowauke, Hidden Creek near the Pequot Cedar Swamp (Jones 1997), the Neponset site in eastern Massachusetts (Pollock et al. 1999:289), the Dutchess Quarry Caves site in eastern New York (Lothrop et al. In Press), and the Plenge site in New Jersey (Gingerich 2013; Pollock et al. 1999:281) links Paleoindians sites in southern New England to resources in northern New England. Perhaps the Munsungun chert at these sites derived from the direct procurement of the toolstone during Paleoindian transhumance between the tundra and boreal parkland environments of northern New England and the closed boreal forests of southern New England and the Mid-Atlantic (Bradley and Boudreau 2006:69; Pelletier and Robinson 2005). This proposition is bolstered by the raw material profiles from sites with in the central and northern NEM. The Vail site in the Magalloway River Valley in Maine is dominated by Normanskill chert from the Hudson Valley (Kitchel 2016). Normanskill chert is also the most abundant toolstone at the Colebrook site in northern New Hampshire (Boisvert and Kitchel In Press; Kitchel 2016:129–131). Additionally, many of the northern NEM sites are dominated by northern NEM toolstones including New Hampshire rhyolites and Munsungun chert and yield minor amounts of Pennsylvania jasper and Normanskill chert (Bradley et al. 2008:146), including the Neponset site in Massachusetts (Pollock et al. 2008; Singer et al. 2014) and the Michaud site in Maine (Spiess and Wilson 1987:37).
Alternatively, the small quantities of toolstones from northern NEM sources in southern sites and from southern NEM and northern Mid-Atlantic sources in northern sites may have been acquired through deliberate exchange or personal toolkit movement during shifts in band membership. Exchange of toolstones and fluid band membership were likely associated with the maintenance of social networks that united dispersed Paleoindian groups for the purpose of information exchange and finding acceptable mates (Anderson 1995:12; Lothrop and Bradley 2012:28).

2.6.2.3 Assemblage Composition

The composition of the toolkit recovered at Ohomowauke, which is dominated by endscrapers and contains small quantities of sidescrapers, gravers, fluted points, and pièce esquillée is a pattern that is common for short-term residential camps in the NEM (Lothrop et al. 2016:227). Additionally, similar fluted point production debris blunted preform tips and overshot channel flakes has been recovered at Michaud-Neponset fluted point sites throughout the NEM including Ohomowauke, the Templeton site in Connecticut (Moeller 1980), the Neponset site in Massachusetts (Carty and Spiess 1992:27, 34), the Lamoreau site in Maine (Spiess and Wilson 1987:125–128; Spiess et al. 2012:104), the Colebrook site in New Hampshire (Boisvert 2008:62), the Fairfax Sandblows site and the Jackson-Gore site in Vermont (Robinson and Crock 2008:22), and the Cliche-Rancourt site in Quebec (Chapdelaine 2012:158). The occurrence of analogous fluted point production debris indicates that Middle Paleoindians employed similar strategies for producing Michaud-Neponset points throughout the NEM.

2.6.2.4 Intra-Site Patterning

The segregation of biface production/discard areas from uniface maintenance/discard areas recorded at Ohomowauke has also been documented at many Paleoindian sites in the
Northeast (Curran 1984). For instance, spatial patterning at Bull Brook has been reconstructed to show a concentric pattern with a distinction between biface-dominated loci in the interior of the site and endscraper-dominated loci positioned around the exterior of the site (Robinson and Ort 2013). Debert has a small number of biface-dominated loci downslope from a larger number of uniface-dominated loci (MacDonald 1968:133) and Whipple (Curran 1984:31) and Neponset (Carty and Spiess 1992:26, Singer et al. 2014) also contain distinct endscrapper dominated loci and biface dominated loci. The consistent separation of unifacial and bifacial activities in space, perhaps, reflects a gendered division of labor at Paleoindian residential campsites throughout the Northeast (Chilton 1994; Deller and Ellis 2011:148–149; Robinson et al. 2009:439).

Additionally, the intra-site patterning at Ohomowauke with low-density, widely distributed loci divided into bifacial and unifacial activity areas provide evidence for Paleoindian campsite organization in a diffuse pattern, perhaps associated with a warmer weather occupation. The presumed warm weather patterning at Ohomowauke provides a contrast to Hidden Creek (Singer and Jones In Press) and the Tenant Swamp site in New Hampshire (Goodby et al. 2014:160–161; Goodby et al. In Press), where intra-site patterning of oval shaped, dense lithic clusters is suggestive of a cold weather occupations inside structures. Comparisons of campsite organization patterns throughout the NEM may provide clues to the potential annual rounds of Paleoindians in the far Northeast.

2.7 Conclusion and Future Research Directions

Ohomowauke provides information on Middle Paleoindian lifeways circa 12,000 yr cal BP in southern New England. Comparisons of Ohomowauke to other Paleoindian sites in Connecticut and throughout the northeast have highlighted some of gaps in the current data set of sites and isolated finds in the NEM. Very few Paleoindian sites have been thoroughly
investigated in southern New England, which means that the current data set is biased towards NEM sites located in the spruce parkland and tundra environments of the northern NEM. Based on the low density and small loci sizes at Ohomowauke, standard archaeological survey procedures of excavating 50cm$^2$ test unit every ten to fifteen meters are likely failing to identify Paleoindian sites because of their low archaeological visibility (Jones 1998:142). Accordingly, surveys conducted in archaeological sensitive locations are recommended to employ closer intervals between test pits, larger test unit sizes, and screening with 1/8” mesh to attempt to identify additional Paleoindian sites in the NEM. Continued investigations of Paleoindian occupations in southern New England will bridge the divide between New England and Mid-Atlantic Paleoindian studies to provide a more nuanced approach to understanding Paleoindian lifeways in Northeastern North America.
Figure 2.2 Paleoindian sites and isolated with Michaud-Neponset fluted points from Connecticut. 1. Ohomowauke. 2. Templeton. 3. Lantern Hill. 4. Preston Plains. 5. Manstan Rockshelter. 6. Cushman Site. 7. Red Hill Site. 8. Bull Collection Point.
Figure 2.3 Topographic map of the Pequot Cedar Swamp and surrounding landforms.
Figure 2.4 Excavation loci at Ohomowauke.
Figure 2.5 Idealized soil profile from Ohomowauke.

<table>
<thead>
<tr>
<th>Soil</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A₀</td>
<td>10 YR 2/2 very dark brown moderately decomposed plant material</td>
</tr>
<tr>
<td>A₁</td>
<td>10 YR 3/4 dark yellowish brown fine sandy loam</td>
</tr>
<tr>
<td>Bw₁</td>
<td>10 YR 3/6 dark yellowish brown fine sandy loam with gravel and cobbles</td>
</tr>
<tr>
<td>Bw₂</td>
<td>10 YR 4/6 dark yellowish brown fine sandy loam with gravel and cobbles</td>
</tr>
<tr>
<td>C</td>
<td>10 YR 5/4 yellowish brown fine sandy loam with gravel, cobbles and boulders</td>
</tr>
</tbody>
</table>

Figure 2.6a Diagnostic projectile point counts by depth at Ohomowauke.
Figure 2.6b Paleoindian lithic counts by depth at Ohomowaukee.
Figure 2.7 Horizontal distribution of diagnostic projectile points at Ohomowauke.
Figure 2.8 Horizontal distribution of Paleoindian lithics at Ohomowaukee.
Figure 2.9 Projectile Points from Other Components at Ohomowauke: A Meadowood; B Jack’s Reef Corner Notched Point; C Levanna; D Narrow Stemmed Point; E Wading River Point; F,G Broad Spear Points, H Parallel Stem Point; I,J Neville Points; K possible Dalton projectile point ear; L, M Bifurcate Points.
Figure 2.10 Michaud-Neponset style fluted point base from Locus E.
Figure 2.11 Horizontal distribution of Paleoindian debitage and tools in Locus A.
Figure 2.12 Paleoindian tools and channel flakes in Locus A: A Utilized flake; B *Piece Esquillee*; C-H Utilized flakes; I-T channel flake fragments.
Figure 2.13 Horizontal distribution of Paleoindian debitage and tools in Loci D and E.
Figure 2.14 Paleoindian tools and channel flakes in Locus D: A Distal Fragment of Overshot Channel flake; B Biface Tip; C Biface fragment, D-P Channel Flake Fragments; Q-R Chunks; S Sidescraper.
Figure 2.15 Paleoindian tools in Locus E: A Fluted Point Base; B Biface Fragment; C-G Utilized Flakes; H Marginally Resharpened Biface; I Utilized flake; J-K Graver with Retouched Lateral Margins; L-O Endscrapers.
Figure 2.16 Horizontal distribution of Paleoindian debitage and tools in Locus C.
Figure 2.17 Paleoindian tools and debitage in Locus C. A-B *Pieces Esquillees*; C-D Bipolar Spalls Likely From *Pieces Esquillees*. E-G Utilized Flakes; H-J Sidescrapers; K-P Endscrapers.
Figure 2.18 Refit uniface resharpening flakes from Locus C.
Figure 2.19 Horizontal distribution of Paleoindian debitage and tools in Loci F, G, and H.
Figure 2.20 Paleoindian tools in Locus F, G, and H. A-B Utilized Flakes; C-D Uniface Fragments; E Retouched Flake; F-I Utilized Flakes; J Retouched Flake; K Graver; L-R Endscrapers
Figure 2.21 Horizontal distribution of Paleoindian channel flakes, biface finishing flakes, and biface reduction flakes.
Figure 2.22 Horizontal distribution of Paleoindian uniface resharpening flakes.
Figure 2.23A Horizontal distribution of Pennsylvania jasper lithics in the Paleoindian component.
Figure 2.23B Horizontal distribution of Normanskill chert lithics in the Paleoindian component.
Figure 2.23C Horizontal distribution of Munsungun chert lithics in the Paleoindian component.
## Table 2.1 Excavation loci at Ohomowauke.

<table>
<thead>
<tr>
<th>Loci</th>
<th>Date of Excavation</th>
<th>General Site Location</th>
<th>Square Meters Excavated</th>
<th>Total Artifact Counts</th>
<th>Prehistoric Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Locus</td>
<td>Winter 2011</td>
<td>Test Units, Trenches, and Block excavations associated with 18th Century component</td>
<td>189.5</td>
<td>1185</td>
<td>Early Archaic (Parallel Stem) Late Archaic (Brewerton, Squibnocket Triangle) Terminal Archaic (Perkiomen)</td>
</tr>
<tr>
<td>A</td>
<td>Summer 2012</td>
<td>Immediately South and East of sluiceway on a gentle slope</td>
<td>73.75</td>
<td>1416</td>
<td>Middle Paleoindian (Michaud-Neponset) Early Archaic (Parallel Stem) Middle Archaic (Neville) Late Woodland (Levanna)</td>
</tr>
<tr>
<td>B</td>
<td>Summer 2012</td>
<td>Western margin of landform below hill</td>
<td>20</td>
<td>393</td>
<td>Paleoindian (Vail-Debert(?)-Dalton(?)), Middle Archaic (Merrimack) Late Archaic (Wading River) Terminal Archaic (Orient Fishtail, Susquehanna Broad)</td>
</tr>
<tr>
<td>C</td>
<td>Summer 2012</td>
<td>Immediately North of sluiceway on level surface</td>
<td>29</td>
<td>521</td>
<td>Middle Paleoindian (Michaud-Neponset), Middle Archaic (Neville) Terminal Archaic (Orient Fishtail)</td>
</tr>
<tr>
<td>D</td>
<td>Summer 2012 through Spring 2013</td>
<td>Immediately south of sluiceway on level surface. East of Locus A</td>
<td>33</td>
<td>181</td>
<td>Middle Paleoindian (Michaud-Neponset) Early Archaic (Bifurcate)</td>
</tr>
<tr>
<td>E</td>
<td>Summer 2012 through Spring 2013</td>
<td>Immediately south of sluiceway on gentle slope. East of Locus A</td>
<td>70.25</td>
<td>367</td>
<td>Middle Paleoindian (Michaud-Neponset) Early Archaic (Bifurcate) Middle Archaic (Merrimack)</td>
</tr>
<tr>
<td>F</td>
<td>Winter 2011 through Summer 2012</td>
<td>North of Locus C on level surface</td>
<td>67</td>
<td>3651</td>
<td>Middle Paleoindian (Michaud-Neponset) Early Archaic (Parallel Stem) Middle Archaic (Neville, Stark, Merrimack) Late Archaic (Brewerton, Wading River, Squibnocket Stem, Squibnocket Triangle) Terminal Archaic (Orient Fishtail) Early Woodland (Rossville) Middle Woodland (Greene, Jack’s Reef) Late Woodland (Levanna)</td>
</tr>
<tr>
<td>G</td>
<td>Summer 2013</td>
<td>North of Locus C on level surface</td>
<td>74</td>
<td>542</td>
<td>Middle Paleoindian (Michaud-Neponset) Middle Archaic (Merrimack) Late Archaic (Brewerton, Vosburg, Wading River, Squibnocket Stem, Squibnocket Triangle)</td>
</tr>
</tbody>
</table>
Table 2.2 Paleoindian lithics by Loci at Ohomowauke. *One endscraper refit from two fragments for a total of 85 tools and tool fragments.

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Locus A Count</th>
<th>Locus C Count</th>
<th>Locus D Count</th>
<th>Locus E Count</th>
<th>Loci F, G, and H Count</th>
<th>Total Assemblage Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluted Points</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Biface Fragments</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Endscrapers</td>
<td>0</td>
<td>5*</td>
<td>4</td>
<td>7</td>
<td>16*</td>
<td></td>
</tr>
<tr>
<td>Side scrapers</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Uniface Fragments</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Utilized and Retouched Flakes</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>46</td>
</tr>
<tr>
<td>Pieces Esquillees</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Gravers</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8</td>
<td>16*</td>
<td>12</td>
<td>19</td>
<td>30</td>
<td>84*</td>
</tr>
</tbody>
</table>

Debitage Type

<table>
<thead>
<tr>
<th>Debitage Type</th>
<th>Locus A Count</th>
<th>Locus C Count</th>
<th>Locus D Count</th>
<th>Locus E Count</th>
<th>Loci F, G, and H Count</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Biface Resharpening Flakes</td>
<td>128</td>
<td>2</td>
<td>50</td>
<td>7</td>
<td>4</td>
<td>191</td>
</tr>
<tr>
<td>Large Biface Resharpening Flakes</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Proximal Biface Resharpening Flakes</td>
<td>22</td>
<td>5</td>
<td>63</td>
<td>3</td>
<td>1</td>
<td>94</td>
</tr>
<tr>
<td>Biface Reduction Flakes</td>
<td>2</td>
<td>0</td>
<td>12</td>
<td>1</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Channel Flake Fragments</td>
<td>13</td>
<td>0</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>Unifacial Resharpening Flakes</td>
<td>0</td>
<td>33</td>
<td>12</td>
<td>4</td>
<td>40</td>
<td>89</td>
</tr>
<tr>
<td>Bipolar/PE Spalls</td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Flake Fragments</td>
<td>105</td>
<td>37</td>
<td>153</td>
<td>20</td>
<td>52</td>
<td>367</td>
</tr>
<tr>
<td>Angular Debris</td>
<td>20</td>
<td>6</td>
<td>20</td>
<td>1</td>
<td>4</td>
<td>51</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>301</td>
<td>88</td>
<td>325</td>
<td>37</td>
<td>103</td>
<td>854</td>
</tr>
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</table>

Table 2.3 Counts and density of Paleoindian artifacts by Loci.

<table>
<thead>
<tr>
<th>Locus</th>
<th>Excavation Size</th>
<th>Paleoindian Artifact Count</th>
<th>Artifact Density per M²</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>73.75</td>
<td>309</td>
<td>4.2</td>
</tr>
<tr>
<td>C</td>
<td>29</td>
<td>105</td>
<td>3.6</td>
</tr>
<tr>
<td>D</td>
<td>33</td>
<td>56</td>
<td>1.7</td>
</tr>
<tr>
<td>E</td>
<td>70.25</td>
<td>337</td>
<td>4.8</td>
</tr>
<tr>
<td>F, G H</td>
<td>173</td>
<td>133</td>
<td>.77</td>
</tr>
</tbody>
</table>
Table 2.4 Raw materials of diagnostic projectile points (PP) and channel flakes (CF).

<table>
<thead>
<tr>
<th>Material</th>
<th>Paleo-Indian</th>
<th>Early Archaic PP</th>
<th>Middle Archaic PP</th>
<th>Late Archaic: Laurentian PPs</th>
<th>Late Archaic: Narrowstem PPs</th>
<th>Terminal Archaic PPs</th>
<th>Early Woodland PP</th>
<th>Middle Woodland PP</th>
<th>Late Woodland PP</th>
<th>Un-identified PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munsungun Chert</td>
<td>1 PP</td>
<td>2 CF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normanskill Chert</td>
<td>18 CF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onondaga Chert</td>
<td>4 CF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jasper</td>
<td></td>
<td>4 CF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartzite</td>
<td>7</td>
<td>26</td>
<td>3</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Argillite</td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhyolite</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>
Table 2.5 Paleoindian lithic use-wear results. Table modified from Loebel 2015.

<table>
<thead>
<tr>
<th>INV #</th>
<th>Tool</th>
<th>Raw Material</th>
<th>Use Motion</th>
<th>Contact Material</th>
<th>Polish</th>
<th>Edge Condition</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>6121</td>
<td>Fluted Point</td>
<td>Munsungun</td>
<td>Unidentifiable</td>
<td>Unidentifiable</td>
<td>Patinated</td>
<td>Lateral Edge Grinding</td>
<td>Heavy Pseudo Polish from Patination</td>
</tr>
<tr>
<td>6151</td>
<td>Overshot</td>
<td>Normanskil</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Tip Abrasion</td>
<td>Unused Preform</td>
</tr>
<tr>
<td></td>
<td>Channel Flake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4897</td>
<td>Lateral Biface</td>
<td>Jasper</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Abraded-Platform Prep</td>
<td>Unused-Manufacturing Failure</td>
</tr>
<tr>
<td></td>
<td>Fragment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6345</td>
<td>Endscraper</td>
<td>Jasper</td>
<td>Scraping</td>
<td>Grease/Dry Hide</td>
<td>Dull, Greasy, Pitted</td>
<td>Irregular, Worn and Rounded Distal</td>
<td>Well Developed, Grease or Drier Hide</td>
</tr>
<tr>
<td>5682</td>
<td>Endscraper</td>
<td>Jasper</td>
<td>Scraping</td>
<td>Dry Hide</td>
<td>Dull, Pitted</td>
<td>Worn, Eroded</td>
<td>Bone/Antler Haft Wear</td>
</tr>
<tr>
<td>6475</td>
<td>Distal Scraper</td>
<td>Jasper</td>
<td>Scraping</td>
<td>Bone</td>
<td>Small Bright Spots Along Edge of Damage Area</td>
<td>Irregular, Light Wear, Areas of Heavy Step Fractures and Crushing</td>
<td>Heavy Over Hanging Step Fractures, Patinated</td>
</tr>
<tr>
<td></td>
<td>Fragment (Possible Endscraper)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6570</td>
<td>Sidescraper</td>
<td>Jasper</td>
<td>Scraping</td>
<td>Antler</td>
<td>Bright, Smooth, Linked Polish Along Edges and Adjacent Interior</td>
<td>Irregular, Asymmetric Edge Damage</td>
<td>Scaping/Planing Fresh OR Soaked Antler</td>
</tr>
<tr>
<td>5690, 5712, 5779</td>
<td>Uniface Resharpening Flakes</td>
<td>Munsungun</td>
<td>Scraping</td>
<td>Grease Hide</td>
<td>Dull, Greasy, Pitted</td>
<td>Crushing, Half Moon Breaks</td>
<td>Trample Damage</td>
</tr>
<tr>
<td>6299</td>
<td>Graver</td>
<td>Jasper</td>
<td>Scraping</td>
<td>Bone/Antler</td>
<td>Bright, Localized Step Fractures, Crushing</td>
<td>Small Discontinuous Patches of Polish on Distal Edge</td>
<td></td>
</tr>
<tr>
<td>6343</td>
<td>Graver</td>
<td>Jasper</td>
<td>Scraping</td>
<td>Antler</td>
<td>Bright, Smooth, Localized Minor Step Fractures, Crushing</td>
<td>Damage Oriented Ventral to Dorsal</td>
<td></td>
</tr>
</tbody>
</table>

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Table 2.6 Debitage class definitions.

<table>
<thead>
<tr>
<th>Debitage Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small Biface Resharpening Flakes</strong> (Biface Finishing Flakes)</td>
<td>Whole flakes with acute-angled platforms exhibiting flake scars from bifacial knapping; Flake removing the mainly the biface edge with little surface area removed from the biface.</td>
</tr>
<tr>
<td><strong>Large Biface Resharpening Flakes</strong> (Biface Thinning Flakes)</td>
<td>Whole flakes with acute-angled platforms exhibiting flake scars from bifacial knapping; Flake removing the biface edge and some surface area from the biface.</td>
</tr>
<tr>
<td><strong>Proximal Biface Resharpening Flakes</strong></td>
<td>Proximal fragments of flakes with acute-angled and faceted platforms.</td>
</tr>
<tr>
<td><strong>Biface Reduction Flakes</strong></td>
<td>Whole or proximal fragments of flakes with large acute-angled platforms with pronounced lips and flake scars from bifacial knapping. Large flake produced during earlier stages of biface knapping intended to reduce the thickness of a biface.</td>
</tr>
<tr>
<td><strong>Channel Flake Fragments</strong></td>
<td>Long, parallel sided flakes with transverse dorsal flake scars forming a medial ridge; Flakes tend have no curvature. Platforms are acute, heavily ground, faceted and isolated.</td>
</tr>
<tr>
<td><strong>Unifacial Resharpening Flakes</strong></td>
<td>Whole or proximal fragments of flakes with nearly right-angled plain platforms. Flake removing step and hinge fractures from the working edge of unifacial tools.</td>
</tr>
<tr>
<td><strong>Bipolar/PE Spalls</strong></td>
<td>Nearly right-angled platforms exhibiting heavy crushing. Dorsal surfaces have step and hinge fractures. Ventral surfaces have heavy rippling. Flake created during bipolar knapping.</td>
</tr>
<tr>
<td><strong>Flake Fragments</strong></td>
<td>All medial and distal flake fragments that cannot otherwise be categorized.</td>
</tr>
<tr>
<td><strong>Angular Debris</strong></td>
<td>Blocky flake fragments where dorsal and ventral surfaces cannot be distinguished.</td>
</tr>
</tbody>
</table>
Table 2.7 Paleoindian lithic totals by toolstone variety. *One endscraper refit from two fragments for a total of 85 tools and tool fragments.

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Jasper Count [Weight g]</th>
<th>Green Chert Count [Weight g]</th>
<th>Red Chert Count [Weight g]</th>
<th>Black Chert Count [Weight g]</th>
<th>Chalcedony Count [Weight g]</th>
<th>Spherulitic Rhyolite Count [Weight g]</th>
<th>Crystal Quartz Count [Weight g]</th>
<th>Total Assemblage Count [Weight g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluted Points</td>
<td>0</td>
<td>0</td>
<td>1 (3)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Biface Fragments</td>
<td>3 (21)</td>
<td>1 (9)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4 (26)</td>
</tr>
<tr>
<td>Endscrapers</td>
<td>8 (43.3)</td>
<td>3 (29.8)</td>
<td>3* (11.2)</td>
<td>0</td>
<td>0</td>
<td>1 (2.6)</td>
<td>0</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Sidescrapers</td>
<td>4 (72.7)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (7)</td>
<td>2 (19.1)</td>
<td>6 (181.7)</td>
</tr>
<tr>
<td>Uniface Fragments</td>
<td>5 (6.7)</td>
<td>3 (8.1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8 (14.8)</td>
</tr>
<tr>
<td>Utilized and Retouched Flakes</td>
<td>20 (104.5)</td>
<td>11 (31.2)</td>
<td>11 (22.7)</td>
<td>1 (3.5)</td>
<td>1 (7)</td>
<td>2 (19.1)</td>
<td>0</td>
<td>46 (181.7)</td>
</tr>
<tr>
<td>Pieces Shattered</td>
<td>2 (14.7)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (8)</td>
<td>0</td>
<td>0</td>
<td>3 (15.5)</td>
</tr>
<tr>
<td>Gravers</td>
<td>2 (5.2)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (5.2)</td>
</tr>
<tr>
<td>Total</td>
<td>44 (268.2)</td>
<td>15 (66)</td>
<td>18* (45)</td>
<td>1 (3.5)</td>
<td>3 (6.1)</td>
<td>2 (18.1)</td>
<td>1 (6)</td>
<td>84* (411.9)</td>
</tr>
</tbody>
</table>

Table 2.8 Connecticut Paleoindian sites with Michaud-Neponset fluted points.

<table>
<thead>
<tr>
<th>Site/Isolated Find</th>
<th>Location</th>
<th>Drainage Basin</th>
<th>Geomorphic Landscape</th>
<th>Raw Materials</th>
<th>Assemblage Composition</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Preston Plains</td>
<td>Preston</td>
<td>Thames</td>
<td>Pond, Glacial Outwash</td>
<td>Pennsylvania Jasper</td>
<td>Isolated Fluted Point</td>
<td>Ives 2010</td>
</tr>
<tr>
<td>5. Manstan Rockshelter</td>
<td>Killingworth</td>
<td>South Central Coast</td>
<td>Rockshelter</td>
<td>Normanskill Chert</td>
<td>Isolated Fluted Point</td>
<td>Manstan 1983</td>
</tr>
<tr>
<td>6. Cushman Site</td>
<td>Lebanon</td>
<td>Thames</td>
<td>Unknown</td>
<td>Normanskill Chert</td>
<td>Isolated Fluted Point</td>
<td>Bouchard 2014</td>
</tr>
</tbody>
</table>
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Singer, Zachary, Arthur Spiess, and Frederick Carty.

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Chapter 3: Beyond a Stone’s Throw from the Lithic Source:
Reconsidering Paleoindian Toolstone Use at Templeton and throughout the New England-Maritimes Region

3.1 Introduction

   The accumulation of archaeological data generated from new excavations, refined techniques for studying material culture, and shifts in theoretical paradigms provide opportunities to reevaluate previously excavated sites. When Moeller discovered, excavated, and analyzed the Paleoindian assemblage from the Templeton site in the late 1970s and early 1980s (Moeller 1980, 1984, 1999, 2002), only a handful of Paleoindian sites in the Northeast had been studied. By 2011, an additional 90 Paleoindian sites had been reported in the New England and Canadian Maritimes region [NEM], providing a robust database with which to study Paleoindian lifeways in the region (Lothrop et al. 2011:555).

   The location of the Templeton site in western Connecticut places the site in the southern portion of the NEM, which encompasses the eastern portions of New York State, the six New England states, Quebec south of the St. Lawrence River and the Gulf of St. Lawrence, and the Maritimes Provinces of Canada (Lothrop et al. 2011:547) (Figure 3.1). During the original formulation of the NEM by Spiess and Wilson (1987:129–155), however, Templeton and most of Connecticut were excluded from the region because Moeller’s analysis of Templeton seemingly indicated that the site shared affinities to the Middle Atlantic rather than to the NEM (Moeller 1984, 2002; Spiess et al. 1998:246; Spiess 2002). Specifically, the supposed presence

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2 This paper is based on a co-authored conference poster, with Peter Leach, Heather Rockwell, Tiziana Matarazzo, Krista Dotzel, and Roger Moeller, presented at the 2017 Annual Meeting of the Society for American Archaeology in Vancouver, British Columbia, CA. We are currently developing it into a journal article.
transport from discrete bedrock outcrops across the region (Bradley et al. 2008:145–146; Lothrop et al. 2011:561). Additionally, the location of Templeton in a flood plain setting diverged from the well-drained sandy terrace locations that are common in the NEM (Spiess et al. 1998:246).

Subsequent discoveries of Paleoindian sites in Connecticut, including the Liebman Site (Pfeiffer 1994), Allen’s Meadows (Wiegand 2016), and Hidden Creek (Jones 1997; Singer and Jones in press), as well as isolate fluted points (Bellantoni and Jordan 1995; Bouchard 2014; Manstan 1983) indicated that most of the Connecticut sites suggest Paleoindian lifeways corresponding to those reconstructed for the NEM; noteworthy characteristics include high residential mobility as indicated by long distance toolstone transport from bedrock outcrops, and site placement on well-drained terraces. The contrast between the Paleoindian behaviors proposed for the Michaud-Neponset fluted point component at Templeton and the Paleoindian sites from other sub-periods in Connecticut suggested that the southern boundary of the NEM may have shifted through time, with Connecticut included during some Paleoindian sub-periods and excluded during others (Spiess et al. 1998:246).

The excavation and analysis of the Middle Paleoindian Ohomowauke site (Singer and Jones in press), however, provided another Michaud-Neponset fluted point site in Connecticut to compare with Templeton. Ohomowauke’s raw materials are comprised of cherts acquired from primary geologic outcrops across the NEM, including Pennsylvania jasper, Normanskill chert, and Munsungun chert, which is the typical pattern seen in NEM Paleoindian sites (e.g. Lothrop et al. 2011:548–549). Consequently, most of the Paleoindian sites studied in Connecticut after Templeton seemed to indicate that Paleoindian lifeways in Connecticut fit in with the NEM. A reanalysis of the Paleoindian component at Templeton was thus undertaken to evaluate
Templeton’s place among other Middle Paleoindian sites in the NEM and to compare toolstone movement observed at Templeton to that documented elsewhere in the region.

Background information on the site’s physical setting and environmental setting and Moeller’s investigations of Templeton are presented below, followed by the results of the reanalysis, including macroscopic and petrographic analyses of the toolstones at Templeton and reanalyses of the artifact composition and intrasite patterning at the site. Since the results of the reanalysis indicate that Templeton should be considered as part of the Paleoindian occupation of southern New England, Michaud-Neponset fluted point sites in southern New England will be compared to sites in northern New England to investigate the relationship among these sites.

3.2 Physical Setting

Templeton is located in the southern New England coastal plains and hills ecoregion, which is part of the Northeastern coastal zone (Griffith et al. 2009). This ecoregion is characterized by plains with a few low hills and forests comprised of central hardwoods with minor components of transition hardwoods and elm, ash, red maple, red pine, and white pine (Griffith et al. 2009). In relation to Connecticut ecoregions (Dowhan and Craig 1976: Figure 1), Templeton is located in the Western uplands of Connecticut within the Northwest Hills ecoregion (Dowhan and Craig 1976: 26). The Northwest Hills ecoregion is an interior upland with a moderately hilly landscape including narrow valleys and local areas of rugged topography (Dowhan and Craig 1976: 31). Elevations in this region are generally between 750 and 1,000 feet with a maximum elevation of over 1,200 feet (Dowhan and Craig 1976:31). Bedrock in this region is predominantly metamorphic, consisting of Paleozoic gneisses, schists, and granites (Bell 1985: 161; Dowhan and Craig 1976: 31; Thornbury 1965: Figure 9.1). Templeton lies along the Shepaug River within the Shepaug River watershed, which covers an area of
approximately 45,400 acres in western Connecticut. The Shepaug River originates in the town of Warren, Connecticut and runs south before joining the Housatonic River at Lake Lillinonah (McElroy 1981). Soils in the uplands are developed on glacial till and soils in the valleys are developed on local deposits of stratified sand, gravel, and silt (Dowhan and Craig 1976: 31).

The Templeton site is situated on a floodplain south of the intersection between Mallory Brook and the Shepaug River (Moeller 1980:19; Patton 1978) (Figures 3.2 and 3.3). The surficial geology at Templeton is dominated by Windsor loamy sand that has been alluvially deposited by the Shepaug River and Mallory Brook (Patton 1978; Stone et al. 1992). At the time of Moeller’s excavations, the landform was a grassy field that had developed after the landform ceased to be plowed for agricultural use (Figure 3.4) (Moeller 1980:19).

3.3 Environmental Reconstruction

The NEM landscape consisted of a peninsula bounded to the north by the Champlain Sea and to the east by the Atlantic Ocean, which resulted from glacial isostatic adjustments from the Laurentide ice sheet during the terminal Pleistocene (Lothrop et al. 2011:550; Lothrop et al. 2016:195–202). The Younger Dryas influenced the organization of the NEM environment resulting in subarctic-like habitats arranged by latitude and elevation (See Figure 3.1) (Hou et al. 2006; Lothrop et al. 2016:201; Newby et al. 2005; Shuman et al. 2004; Spiess and Newby 2002). Based on Newby et al.’s (2005) reconstruction, the southern NEM region in which Templeton is located would have had denser coniferous forests when compared to central and northern New England. The presence of oak pollen suggests that in southern New England may have been covered in mixed forest with coniferous and deciduous tree species (Spiess and Newby 2002:36-37).
Charcoal identified from sediment samples collected during the Templeton excavations has been used to reconstruct local environmental conditions at the site (Moeller 1980:36–40; McWeeney 1994: 150–180; McWeeney 2007:160–162). One fragment of oak charcoal recovered near Paleoindian artifacts between 99 and 102 cm below datum was directly AMS dated to 10,215 +/- 90 RCYBP (McWeeney 1994:Table 5.1). The AMS date is statistically comparable to Moeller’s initial bulk date of 10,190+/- 300 discussed below. Based on Lothrop et al.’s (2016:Table 3) chronometric hygiene dating analysis, sites with Michaud-Neponset fluted points date to circa 12,000 cal bp, which suggests the age of the AMS dated oak is likely coeval with the Michaud-Neponset fluted point component at Templeton. The local presence of oak at Templeton is in accord with regional reconstructions of vegetational communities around 12,000 cal bp in the NEM, which indicate that southern New England was a region dominated by coniferous forests with the presence of some oak (Newby et al. 2005; Spiess and Newby 2002).

Additional charcoal recovered from the soil matrix at depths associated with the Paleoindian component may be coeval with the Paleoindian occupation, including white and red oak, juniper, aspen, and white pine (McWeeney 1994:150-180; Moeller 1980:35). If this suite of undated charcoal is assumed to be the same age as the Paleoindian component, then the local habitat during the Paleoindian occupation likely consisted of an area where meadows bordered a transitional forest with boreal and deciduous elements (McWeeney 2007:161–162; Moeller 1980:5). Edible flora seasonably available in this environment might have included hazelnut, wild cherry, hawthorne, and raspberries (McWeeney 2007:162). Additional radiocarbon dating of charcoal recovered from the soil matrix would be useful to test whether the charcoal tentatively attributed to the occupation can be used as a proxy for the terminal Pleistocene environment.
3.4 1977 and 1982 Excavation and Results

Roger Moeller, then the director of research at the Institute for American Indian Studies [IAIS] (formerly the American Indian Archaeological Institute), selected the Templeton site as the location for an archaeological field school in 1977 based on Ned Swigart’s (co-founder of IAIS) report that a buried Late Archaic component was present at Templeton (Moeller 1980:10–11). The original goal of the field school was to excavate the Late Archaic component. The discovery of a deeply buried component containing chert lithics that included a fluted point preform and channel flakes, however, resulted in the excavation being reoriented to focus on investigating the Paleoindian component.

The excavation was located on a flood plain immediately downstream from the confluence of Mallory Brook and the Shepaug River and adjacent to an alluvial fan that was thought to have protected the site from erosion. Moeller conducted a block excavation in an area of the site positioned along the side of the terrace adjacent to the Shepaug river with back dirt piles located between the bank and the excavation block (Moeller 1980:16) (Figures 3.4 and 3.5). The site grid established by Moeller oriented grid north to southeast of magnetic north. Moeller’s block excavation was comprised of 79 1.5x1.5m units (including 41 units excavated in 1977 and 38 units in 1982) for a total excavation sample of 177.75 m².

During the 1977 excavation, 1.5x1.5-meter units were excavated in 5-cm levels and soil was screened with 6-mm (quarter inch) hardware cloth. Flotation was done on all features and in select units. All formal artifacts found in situ were piece plotted (Figure 3.6). Modifications to the excavation tactics were made for the 1982 excavation, including excavating the 1.5x1.5-meter units in quadrants by three-centimeter levels. Systematic flotation and geological sieving of one-eighth of each unit also was employed.
In the laboratory, all material culture was cataloged via handwritten inventory cards that recorded the unit, quadrant (in 1982 excavation), and depth of the recovered artifacts. Lithics were separated by material type, however red shale was lumped together with the chert. Stone tools were analyzed individually. The debitage from the 1977 excavation was counted and weighed in bulk per 5 cm level of each unit. Bags with large quantities of debitage from the 1982 excavation were weighted, but not counted. Moeller did not conduct in-depth morphological analyses of individual flakes of debitage (Moeller 1980:96).

The Paleoindian component sampled during the 1977 excavation is described in detail in 6LF21: A Paleo-Indian Site in Western Connecticut (Moeller 1980). Data from the 1982 excavation has been published in a preliminary form (McWeeney 1994:149–179; Moeller 1984, 1999).

Based on Moeller’s catalog, over 42,700 artifacts including over 41.427 lithics were recovered during the 1977 and 1982 excavations (Table 3.1). Diagnostic artifacts included Late Woodland triangle projectile points, Terminal Archaic broad spears, Late Archaic narrowstem points, Squibnocket triangles, and Brewerton points, a Middle Archaic Neville point, an Early Archaic bifurcate point, and a Paleoindian fluted point base (Tables 3.2 and 3.3).

Excavations indicated that the site was stratified with cultural components located at different depths in the soil. Moeller identified five layers in the alluvial soil at Templeton (Figures 3.7 and 3.8) (Moeller 1980:Figures 3-6). The Paleoindian artifacts were recovered from deeply buried contexts around a meter below the modern ground surface. Paleoindian artifacts occurred in the “clay-coated sand” layer and the mixture of clay-coated sand, gravel, and cobbles that defined the base of excavation (Moeller 1980:18). The excavations at Templeton also recovered Archaic and Woodland components that were located stratigraphically above the
Paleoindian component in the top-soil, orange-brown subsoil, and white sand with gravel strata (Moeller 1980:3, 1999:68).

A possible Paleoindian post-mold containing charcoal was documented in the clay-coated sand level (Moeller 1980:32–33). A bulk sample of charcoal from the feature was radiocarbon dated to 10,190 +/- 300 years B.P (W3931)(Moeller 1980:Table 16). The broad calibrated sigma of this date is poor for discerning the Paleoindian sub-period associated with the Templeton occupation (Lothrop et al. 2016:2010). However, the presence of this presumed cultural feature does suggest that other Paleoindian features may have been preserved at Templeton.

Based on the excavation sample of the Paleoindian component, the large quantity of debitage, and the presence of “bifacial rejects” and flake tools including gravers, sidescrapers, and retouched and utilized flakes, Moeller interpreted the Paleoindian component as a short-term basecamp where fluted points were manufactured for future use and scraping tools were used and discarded in a variety of domestic tasks (Moeller 1980:83–84).

Due to the large quantity of debitage at the site and Moeller’s identification of “several small flint cobbles” and quartz cobbles in the bed of the Shepaug River, Moeller concluded that the toolstones used in the Paleoindian component had been procured from local secondary deposits in the river (Moeller 1980:28–31). Moeller indicated that the “source of physically similar chert in other contexts had frequently been attributed to well known quarries in the Hudson River Valley more than 100km away” (Moeller 1984:240). However, archived correspondence with E-an Zen a geologist with the United States Geological Survey (USGS) suggested that the cobble chert in the Shepaug River may have derived from nearby outcrops of the Stockbridge Marble Formation near Marbledale, Connecticut, less than 3km from the site (Moeller 1980:30–31; Moeller 2002:92). Re-inspection of Zen’s letter to Moeller indicates that
the Stockbridge Formation outcrops near Marbledale, could not be the source of chert because
the “Stockbridge Formation strata East of the Taconic Range or in the Dutchess County area are
not suitable sources because the rocks there have been metamorphosed” (Zen to Moeller

3.5 Reanalysis of Middle Paleoindian Assemblage

The goal of my reanalysis was to investigate toolstone use in the Paleoindian component
at Templeton. To accomplish this goal, I discriminated raw material use by cultural components,
employed macroscopic and microscopic analyses to identify the source of the majority toolstones
in the Paleoindian component, compiled the raw material profile in the Paleoindian component,
documented the artifact composition in the Paleoindian component, and studied the intrasite
patterning in the Paleoindian component. I began the reanalysis by creating a digital database for
Moeller’s Templeton assemblage via transcribing 6811 hand written catalog cards. After the
creation of the database, I conducted a thorough reanalysis of the Paleoindian assemblage from
Moeller’s 1977 excavation by performing a debitage analysis and reanalyzing the Paleoindian
tools. I also preliminary analyzed the other cultural components documented in the 1977
excavation and all materials recovered in the 1982 excavation. A detailed description of the 1982
Paleoindian materials is planned for the future.

3.5.1 Raw Material Analysis

The goals of the raw material reanalysis were to discriminate the Paleoindian lithic
assemblage from the other Pre-Contact lithic assemblages at Templeton and to identify the
geologic source of the majority chert toolstone. Raw material analysis included (1) comparison
of all excavated diagnostic and non-diagnostic artifacts to geologic hand samples of regional
lithic types, (2) petrographic analysis of select artifacts that were characteristic of the majority
Paleoindian toolstone and geologic source specimens, and (3) stratigraphic analysis of artifact distributions (e.g. Burke 2000; Calogero and Philpotts 1995; Prothero and Lavin 1990; Robinson et al. 2009:427).

3.5.1.1 Discrimination of Raw Material Use by Time Period

Discrimination of the Pre-Contact lithic assemblage by component relied upon the identification of diagnostic lithics like projectile points and channel flakes (See Tables 3.1-3.3). These diagnostic Paleoindian lithics were made exclusively of a radiolarian chert that grades from green to blue to tan to black. Moeller attributed additional minority toolstones including white quartz, jasper, rhyolite, and siltstone to the Paleoindian assemblage because he felt they were recovered in close proximity to diagnostic Paleoindian lithics. The majority of the other Pre-Contact components contain diagnostic lithics manufactured from lower quality stones such as white quartz, quartzite, argillite, rhyolite, siltstone, and shale that can be easily segregated from the high quality chert dominating the Middle Paleoindian component (Figure 3.9). A radiolarian chert similar to the chert in the Paleoindian component, however also occurred in the Early Archaic, Late Archaic, Terminal Archaic, and Woodland components.

Fortunately, since the Paleoindian component at Templeton is deeply buried in relation to the Archaic components, the distribution of materials by depth provides an additional means for discriminating toolstone use by component. Based on the analyses of the 1977 materials, the chert in the Paleoindian component can be segregated from the chert in the Terminal Archaic based on the co-occurrence of red shale and chert in the Terminal Archaic component and the lack of red shale in the Paleoindian component (Figure 3.10). Since Moeller’s inventory combined red shale and gray chert when they were recovered together, plotting the distribution of these toolstones indicates that Terminal Archaic diagnostics is confined to the upper portions
of the soil from the topsoil to around 40 cm below datum. The gray chert peak that occurs deeper than 40 cm below datum is associated with Paleoindian diagnostics and are not associated with red shale or Terminal Archaic diagnostics.

While Moeller attributed quartz use to the Paleoindian component, he also raised the question of whether “all of the quartz [in the Paleoindian component could] have been intrusive due to settling from subsequent occupations which used quartz almost exclusively?” (Moeller 1980:88–89). The comparison of the vertical distribution of the radiolarian “gray” chert from the Terminal Archaic and Paleoindian components and the quartz recovered during the 1977 excavation indicate that the peaks in the distribution do not overlap (Figure 3.11). Quartz lithics are most prevalent from the topsoil to around 40 cm below datum and the chert lithics are most prevalent between 45 cm below datum and the base of excavation around 1.05 meters below datum.

Horizontal distributions of Paleoindian chert (greater than 30 cm below datum) and quartz also suggest that the materials are associated with different components at Templeton (Figures 3.12 and 3.13). The largest concentrations of Paleoindian chert occur grid north of the largest concentration of quartz, indicating that the quartz and chert distributions do not overlap. Additionally, the Paleoindian chert is less widely distributed throughout the block than the quartz, which also suggests that these toolstones are associated with different occupations at Templeton.

Based on the large quantity of quartz in the upper soil levels that are associated with a Late Archaic narrowstem component and the small quantity of quartz in the deeper levels associated with large quantities of Paleoindian chert, I conclude that the quartz lithics previously
attributed to the Paleoindian component from the 1977 excavation may all be intrusive due to settling from subsequent occupation.

3.5.1.2 Source Identification of the Middle Paleoindian Majority Toolstone

Reanalysis to determine the source of the majority chert toolstone in the Paleoindian component began with macroscopic comparisons of the Paleoindian toolstone to geologic hand samples of regional chert toolstones from Lucianne Lavin’s collection curated at the Institute for American Indian studies (See Prothero and Lavin 1990 for descriptions of regional toolstone sources in Lavin’s collection).

Although in a correspondence letter to Moeller (Zen to Moeller 9/1/1977), E-an Zen, UGSG geologist, reported the existence of chert in the Stockbridge Formation near East Hillsdale, New York, no quarries of the chert are known to archaeologists (Moeller 1980:30–31, Moeller 2002:92). Consequently, we could not directly compare hand specimens of Stockbridge Formation chert to the Paleoindian assemblage. Zen, however, was shown a photograph of the Paleoindian toolstone at Templeton and in a subsequent correspondence that was relayed to Moeller via Peter Patton (Patton to Moeller 11/29/77), Zen states that “although there is chert in the Stockbridge, [He] thought that it was darker in color than the green-gray chert that the Paleo-Indian point was made out of”. Accordingly, E-an Zen, one of the only people with direct, first-hand knowledge of the Stockbridge formation (Zen 1965), considered the Paleoindian chert to be macroscopically different from the Stockbridge Formation chert.

Based on macroscopic comparisons with hand samples of toolstones and my familiarity with Normanskill chert, I concluded that this material represented the majority toolstone at Templeton was macroscopically similar to Normanskill chert from the Hudson Valley of New York. This is based on the similarities in chert artifacts from Templeton with the macroscopic
characteristics of Normanskill chert, including the presence of (1) radiolarian microfossils, (2) annealed joint faults, and (3) ground mass colors, including green, gray, blue, tan, and black (Figure 3.14). Importantly, Prothero and Lavin’s (1990:562) survey of cherts from the Mid-Atlantic and Hudson Valley of New York (Prothero and Lavin 1990:562) suggests that the green variety of Normanskill chert can be unambiguously recognized in hand sample and distinguished from other cherts in the Mid-Atlantic and Hudson Valley, thus strengthening the designation of the Templeton toolstone as Normanskill chert based on macroscopic analysis.

Remnants of planar bedrock outcrop cortex found on two Paleoindian sidescrapers indicate that some the toolstone had been acquired from primary bedrock sources (Figure 3.15). Additionally, macroscopic analysis of the “chert cobble” samples collected from the Shepaug River by Moeller suggested that the “chert cobbles” were macroscopically different from the Paleoindian toolstone assemblage and that the “chert cobbles” appears not be chert after all (Figure 3.16).

Calogero and Philpott’s (2016) conducted petrographic analysis on (1) a “chert cobble” collected by Moeller from the Shepaug River, (2) six flakes of the majority Paleoindian toolstone at Templeton, and (3) four samples of Normanskill chert to characterize their microscopic textural and mineralogical features (Calogero and Philpotts 2016) (Figure 3.17). Based on their thin-section petrography, they concluded that the “chert cobble” was an extremely fine-grained, thinly bedded (~0.5 mm) siltstone (Figure 3.18). The six flakes of the Paleoindian toolstone all had extremely fine grained matrices, abundant fine clays showing green coloring under polarized light, annealed joint fractures, and the presence of well-preserved Radiolaria microfossils (Figure 3.19). The petrographic characteristics of the Paleoindian chert at Templeton, therefore match the characteristics of Normanskill chert (Prothero and Lavin 1990: 565) (Figure 3.20).
In sum, the results of macroscopic examination and microscopic petrographic analysis indicate that the majority toolstone in the Paleoindian component at Templeton was procured from bedrock outcrops of Normanskill chert located ca. 90km to the northwest. Macroscopic and microscopic petrographic analyses of the “chert cobbles” collected by Moeller from the Shepaug River suggest that these stones are not chert.

3.5.1.3 The Middle Paleoindian Toolstone Profile

The diagnostic Paleoindian artifacts recovered during Moeller’s excavations were only made of Normanskill chert. A few lithics of jasper, rhyolite, siltstone, shale, and quartz also were recovered at depths associated with the Paleoindian assemblage. Based on the conclusion that the quartz lithics are likely Late Archaic artifacts that have descended through the soil profile to be in association with Paleoindian lithics, the few lithics of jasper, rhyolite, siltstone, and shale can only tentatively be ascribed to the Paleoindian component. Fortunately, subsequent excavations in 2016 yielded a channel flake fragment of jasper. Based on macroscopic comparison of the toolstones with hand samples from outcrops the jasper toolstone attributed to the Middle Paleoindian component likely derived from sources in the middle or upper Delaware Valley.

The majority toolstone and first-tier minority toolstone in Paleoindian assemblages likely reflect direct acquisition that occurred when residential occupations were located nearby toolstone source, therefore the majority toolstone and first-tier minority toolstone can be used as a proxy for residential range mobility (Ellis 1989, 2011:390; Lothrop and Bradley 2012:28; Lothrop et al. 2016:225). Additional minority toolstones may have been procured through a combination of direct procurement, acquisition through exchange, individual toolkit movement through mating networks, or logistic procurement by small parties dispersed from their residential groups. Accordingly, issues of equifinality arise when attempting to parse out the
methods of procurement for minority toolstones (Ellis 1989, 2011; Meltzer 1989; Spiess and Wilson 1989). Nevertheless, the minority toolstones are likely monitoring both indirect procurement of toolstone through social interactions and the remnants of toolstones acquired earlier in the annual round via serial direct procurement (Ellis 1989, 2011; Meltzer 1989; Spiess and Wilson 1989; Whallon 2006).

Since Normanskill chert from the Hudson Valley is the majority toolstone in the Templeton Paleoindian assemblage, it was likely directly procured during a residential occupation in the Hudson Valley that occurred before the Paleoindians journeyed to Templeton. The small amount of jasper in the Templeton assemblage may have been acquired through a number of avenues including: 1) serial direct procurement suggesting that the Paleoindian residential group that visited Templeton had previously occupied a campsite in eastern Pennsylvania near jasper outcrops before moving to the Hudson Valley and then moving again to Templeton, 2) an individual changed residential bands to join the residential group that occupied Templeton and the individual brought jasper in their toolkit, 3) the group that occupied Templeton had previously interacted with another Paleoindian group and had exchanged items including the jasper toolstone.

The proposed Paleoindian toolstone profile at Templeton – consisting primarily of Normanskill chert with a minor amount of Pennsylvania jasper and a few potential tools of rhyolite and siltstone – is similar to other Paleoindian sites in the southern NEM. Ohomowauke and the Late Paleoindian Hidden Creek site both located at Mashantucket are dominated by Normanskill chert and Pennsylvania jasper (Singer and Jones in press). The DEDIC/Sugarloaf site and the Bull Brook site in Massachusetts also are primarily comprised of Normanskill chert with minor amounts of Pennsylvania Jasper, New Hampshire Rhyolites, and Munsungun chert.
In sum, while Moeller expressed concerns that the Normanskill source was too distant to have likely been used by the Paleoindian occupants of the Templeton site, comparisons to more recently identified Paleoindian sites indicate 1) that the use of this material was common in the region and 2) that other assemblages dominated by this material are located much further from the quarry source than is Templeton (Lothrop et al. in review).

3.5.2 Middle Paleoindian Artifact Analysis

In addition to determining the source of the Paleoindian raw materials, I also reanalyzed the Paleoindian lithic assemblage to reconsider toolstone use at Templeton. Based on the reanalysis, the Middle Paleoindian artifact assemblage at Templeton consists of fluted point production debris, formal tools, expedient flake tools, and debitage (Tables 3.5 and 3.6). Previously established Paleoindian artifact class identifications based on morphological attributes were employed to describe the Templeton Paleoindian assemblage (i.e. Deller and Ellis 1992:25–92; Lothrop 1988; 238–408). Heather Rockwell conducted a micro-wear analysis of all of the Paleoindian tools and a sample of debitage recovered from Moeller’s excavations via the “low powered magnification approach,” which observes edge damage, polishes, and striations to suggest the materials that were worked with the stone tools (Table 3.6).

The use of 6-mm mesh for the excavations likely biased the recovery of debitage toward larger pieces, therefore small flakes from unifacial and bifacial resharpening and fragments of flakes are likely underrepresented in the assemblage compared to more recently excavated examples where 4mm (1/8 inch) mesh was utilized (Ellis and Payne 1995:468).
3.5.2.1 Fluted Point Production Debris

The majority of the Templeton Paleoindian assemblage consists of debris associated with fluted point production, including fluted preform fragments, biface fragments, and debitage comprising channel flakes, biface reduction flakes and biface finishing flakes. Moeller’s excavation block did not yield any finished fluted points, recognizable by fine edge retouch and grinding on the basal portion likely to facilitate hafting (Callahan 1979; Crabtree 1966).

Six fluted point preform fragments made of Normanskill chert were recovered by Moeller (Figure 3.21 B, C, E, H-J). The most complete fluted preform consists of two refit fragments (Figure 3.21E) (Table 3.7). The base of the preform has distinct basal ears and a moderately deep, arc-shaped basal concavity. Both faces of the point have a single flute extending over two thirds of the length of the point. Although annealed faulting fractures near the base of the preform may have hindered the completion of this fluted point, the attributes of this preform most closely align with the Michaud-Neponset style, which dates to the Middle Paleoindian period and is consistent with radiocarbon dates from the site (Bradley et al. 2008).

Three basal fragments of fluted preforms (Figure 3.21H-J) made of Normanskill chert were recovered. One of the base fragments retains an isolated nipple platform (Figure 3.21I). Both of the distal preform tip fragments recovered (Figure 3.19 B&C) were likely broken during fluting attempts. Both tips have blunted distal edges that are isolated by retouch, resulting in “tongued” lateral margins (*sensu* Deller and Ellis 1992:32), which is a fluted preform tip preparation method common in Michaud-Neponset style fluted point production (Bradley et al. 2008:142). One of the tips (Figure 3.21C) is the result of an over-shot channel flake, which commonly occurs during Michaud-Neponset style fluted point production (Boisvert 2008). Low-powered microwear on one of the preform tips (Figure 3.21B) indicates severe crushing on a hard material.
like bone or antler that may have been associated with use of the tip in a cutting motion or perhaps the crushing resulted from supporting the tip on an anvil during fluting.

Based on their stratigraphic association, seven biface fragments of Normanskill chert, one biface fragment of Pennsylvania jasper, and one fragment of rhyolite from an undetermined source are attributed to the Middle Paleoindian component. These biface fragments are also likely debris created during fluted point production.

Reanalysis of the debitage recovered during the 1977 excavation at Templeton resulted in the identification of 163 channel flake fragments of Normanskill chert (Table 3.8), and 4081 Normanskill chert flakes and 7 Pennsylvania jasper flakes associated with biface reduction and finishing (Figure 3.22, See Figure 3.14). An additional 3112 medial and distal flake fragments of Normanskill chert and 2 flake fragments of Pennsylvania jasper are also likely debitage from fluted point manufacturing. The lengths of the refit channel flakes indicate that some of the points had flute lengths over 7 cm long (Table 3.9). The length of the channel flakes is in the range of Michaud-Neponset fluted points, for instance a complete refit channel flake including an overshot tip at Colebrook is around 5 cm long (Boisvert 2008) and the flutes on the Intervale point from New Hampshire indicate that channel flakes from this point would have been between 8 and 10 cm long (Boisvert 1998). Based on three methods for estimating fluted point production via channel flake analyses, Moeller’s 1977 excavated area yielded evidence for the production of between 15 and 49 fluted points (Table 3.10).

In addition to fluted point production debris, two miniature fluted points made of Normanskill chert were identified at Templeton (Figure 3.23B&E). Similar miniature fluted points have been reported from Middle Paleoindian assemblages in the Great Lakes and New England (Ellis 1994).
3.5.2.2 Flake Tools

A small assemblage of flake tools was also recovered in Moeller’s block (Figure 3.23 and see Figure 3.15).

Gravers are the most abundant formal tool class in the Middle Paleoindian assemblage with nine specimens. These tools are characterized by the presence of one or more small spurs created by unifacial retouch along the margin of flakes. Low powered use-wear analyses on the gravers indicates that these tools were used for boring soft materials like hide and hard materials like wood, antler, and bone and for engraving wood.

Three sidescrapers occur in the Paleoindian assemblage. Low powered use-wear analysis indicates that one of the sidescrapers was used for whittling wood and the other sidescraper was used for scraping a hard material like bone or antler. One hundred and one uniface resharpening flakes of Normanskill chert were recovered at Templeton, attesting to the maintenance of sidescrapers and perhaps endscrapers. The relatively low proportion of unifacial resharpening flakes, however further emphasizes the focus on bifacial tool production at the site.

A fragment of a marginally retouched biface of Normanskill chert was identified at Templeton. The marginally resharpened biface is a bifacially edged flake created via minimally invasive retouch. Similar marginally resharpened bifaces are reported from the Ohomowauke site in southeastern Connecticut (Singer and Jones In Press), the Parkhill site in Ontario (Ellis and Deller 2000:95), and the Potts site in New York (Lothrop 1988:268–271).

Templeton yielded one pièces esquillé of Normanskill chert. Low powered microwear analysis did not identify wear on this tool; however, replicative studies suggest that they were used as wedges for working bone, antler, and wood (de La Pena 2015).

Forty-seven utilized and edge retouched flakes were identified at Templeton. Microwear
analysis suggests that they were used for a variety of cutting and scraping tasks on hard material like bone, antler, and wood and soft material like hide.

Endscrapers are notably absent from the flake tool assemblage.

3.5.2.3 Toolstone Use

Normanskill chert is the majority toolstone in the Paleoindian assemblage both by count (99.8%) and weight (96.1%). Very small amounts of Pennsylvania jasper, rhyolite, and siltstone are also likely part of the Paleoindian assemblage (See Table 3.1). The large quantity of fluted point manufacturing debris, mostly of Normanskill chert, indicates that Moeller excavated an intensive fluted point production area. Based on the large quantity of small biface reduction flakes, the low number of larger early-stage reduction flakes, and the large size of recovered biface fragments at Templeton, I surmise that Paleoindians carried biface preforms to Templeton, which were then produced into fluted points on site. The recovery of a flake blank and large unifaces made of Normanskill chert that retain plain platforms and bedrock outcrop cortex on their dorsal surfaces indicate that flake blanks derived from blocky cores were also transported to Templeton and manufactured into unifaces (Lothrop 1988).

The large quantity of fluted point production debris and lack of discarded completed fluted points suggests that Moeller excavated a location where fluted points were produced, perhaps during a gearing up event to prepare for a future hunting foray (Sellet 2013). The presence of formal and informal flake tools of Normanskill chert, Pennsylvania jasper, and siltstone from an undetermined source indicates that tasks involving the processing of hide, wood, bone, and antler also occurred in Moeller’s block, but to a limited degree compared to similar sites in the region. Since Templeton contains a large quantity of fluted point production
debris, perhaps some of the organic processing indicated by the microwear on the flake tools was associated with preparing the organic components related to Paleoindian hunting weapons.

3.5.3 Spatial Analysis

During the 1977 excavation, the majority of the Paleoindian assemblage was recorded to the horizontal provenience of the 1.5x1.5-meter units and the vertical provenience of 5cm levels. Therefore, the resolution of the spatial analyses at Templeton are on a coarser scale than the typical 50cm horizontal control associated with most recent Paleoindian excavations in the Northeast (Boisvert 2012; Singer and Jones in press). Nevertheless, based on plotting of the Paleoindian lithics in Moeller’s block, multiple activity areas have been tentatively identified.

The horizontal distribution of Paleoindian chert debitage by 1.5x1.5-meter units indicates three or more concentrations, which may correspond to individual knapping events (See Figure 3.13). Two of the concentrations seem to partially overlap in the northern portion (grid south) of Moeller’s block, with one unit containing 2273 pieces of chert debitage and the other unit yielding 1500 pieces of chert debitage. A third activity area that may have been encountered is suggested by a concentration of debitage in the southeast corner (grid north/northwest) of the block where chert counts climb to between 201 and 500 flakes in a unit. A possible fourth activity area may have been identified in Moeller’s 3-meter wide trench, since one unit yielded between 101 and 200 flakes of chert.

Mapping of all channel flake fragments from the 1977 excavation and channel flakes identified in the preliminary reanalysis of the 1982 excavation supports the interpretation of multiple concentrations of fluted point production activities (Figure 3.24). One concentration is noted by the presence of 55 channel flakes in a unit. A second concentration is recognized by a unit yielding 16-20 channel flakes that is separated by a 1.5x1.5-meter unit from the unit with 55
channel flakes. A third concentration of fluted point production is indicated by the presence of a
channel flake recovered in a separate area from the main channel flake concentrations. The third
area is located in the 1982 excavation block, which has yet to be thoroughly analyzed, so the
results presented here are preliminary and additional channel flake fragments may yet be
identified.

The distribution of Paleoindian tools in Moeller’s block also suggests multiple activity
areas (Figure 3.25). The concentrations of tools in the northern portion (grid south) of Moeller’s
block indicate two main clusters, which are associated with the highest concentrations of chert
channel flakes and debitage. These clusters are separated by a 1.5 meter gap, where tools are
uncommon and debitage counts decrease. A cluster of Normanskill chert tools in the
southeastern (grid north/northwest) portion of the block overlaps with the third suggested peak in
Paleoindian chert counts. In the south (grid northeast) portion of the block, the recovery of a tool
cluster containing a jasper biface fragment, jasper retouched flake, and two utilized/retouched
flakes of Normanskill chert suggests another potential activity area.

Distributions of the Paleoindian tools retaining microwear indicate that tools used for
processing hide, bone/antler, and wood are distributed among the two main tool clusters in the
northern portion (grid south) of Moeller’s block (Figure 3.26). A cluster of tools with microwear
indicated of woodworking in the southeastern (grid north/northwest) portion of the block may
indicate that this activity area was used for preparing wood artifacts.

Data on refitting of channel flake fragments from Moeller’s 1977 excavation area was
used to investigate the spatial integrity the debitage clusters at Templeton (e.g. Villa 1982)
(Figure 3.27). Mapping the horizontal distribution of the refits shows that refit channel flake
fragments were distributed among adjacent 1.5x1.5-meter units. Vertically, the majority of the
refits were separated by between 5 to 10 centimeters. The refits from the 1977 excavation indicate that debitage clusters retain good spatial integrity. Thus, the multiple concentrations of tools, channel flakes, and debitage are likely indicative of separate activity areas at Templeton. Thorough analysis of the 1982 debitage combined with additional refitting studies will be useful to determine whether the activity areas were created during one or more occupations of Templeton.

3.5.3.6 Synthesis of Spatial Analysis

Clusters of Paleoindian lithics dominated by fluted preform fragments, biface fragments, channel flakes, and debitage suggest at least three fluted point production areas at Templeton. The presence of flake tools with microwear suggestive of working a variety of materials including hides, bone/antler, and wood in clusters dominated by fluted point production debris suggests that organic materials were also being prepared in association with the creation of fluted points. Perhaps the organic materials being processed formed the organic components of Paleoindian hunting technology.

All of the activity areas are dominated by Normanskill chert lithics. The small cluster of Pennsylvania jasper lithics near the southeast area of the excavation (Figure 3.25) (grid northeast), however, suggests that Moeller may have encountered the edge of a different knapping event associated with this minority toolstone.

The fluted point production areas identified in Moeller’s block may indicate a single occupation with a few contemporaneous knappers positioned in close proximity to one another. Alternatively, the separate lithic clusters may be the result of repeat Paleoindian use of the landform. In the repeat land use scenario, each lithic cluster could have been created during a
separate knapping event that may have occurred over hours or days during one visit or via reoccupation of the site.

Since the activity areas are all dominated by Normanskill chert lithics resulting from Michaud-Neponset fluted point manufacture and the areas are in close proximity but not overlapping, I suggest that Templeton was occupied during a single occupation or a few occupations within a time period brief enough to allow for the patterned separation in space (e.g. Spiess 1984).

In both the single occupation and reoccupation scenarios, the excavation block sampled an activity area dominated by Middle Paleoindian fluted point production. My preliminary excavations at Templeton in 2016 recorded additional Paleoindian loci, which will be explored during future field seasons. Consequently, comprehensive interpretations of the spatial patterning and site function at Templeton await additional investigations. Given the small excavation block at Templeton, it is currently unclear whether the Paleoindian activity areas recovered are part of a larger residential occupation(s), or whether the entire site reflects the specialized activity focus on fluted point production.

Nevertheless, the Paleoindian assemblage in Moeller’s block suggests one or multiple “gearing up” events, based on the evidence for intensive hunting weaponry production activities that exceed the quantity needed for immediate replacement of spent points on site (Ellis and Poulton 2004:98; Sellet 2004:1561). Gearing up typically precedes long expedition hunting trips in the ethnographic record (Binford 1978:360; Sellet 2013:390-391). Accordingly, the lithics documented in Moeller’s excavation block suggest that Paleoindian at Templeton prepared for future hunting events by producing at least 15 fluted points.
3.6 Regional Comparisons

The reanalysis of Templeton indicates that Paleoindian toolstone use at Templeton matches the pattern of long distance toolstone transportation seen in other NEM sites. The Michaud-Neponset fluted point occupation at Templeton, therefore is related to Michaud-Neponset occupations in the NEM (see Figure 3.1). Based on Lothrop et al.’s (2016) chronometric hygiene dating, the calendar time span for the Michaud-Neponset fluted point occupation in the NEM appears to be fairly restricted to perhaps a century or two on either side of 12,000 Cal BP. Accordingly, patterning in Michaud-Neponset fluted point sites throughout the NEM is likely monitoring geographic trends in Paleoindian behaviors on a somewhat less time-averaged scale than comparing all Early or Middle Paleoindian occupations in the region. Below geographic trends in seasonal mobility and/or interaction during the Michaud-Neponset fluted point occupation of the NEM are investigated via analysis of toolstone transport in sites throughout the NEM.

3.6.1. Toolstone Use in Michaud-Neponset Fluted Point Sites in the NEM

Fifteen data points from Michaud-Neponset fluted point occupations including individual sites and geographic clusters of sites are included in this analysis (Table 3.11). In the case of geographic clusters, general trends regarding toolstone movement were inferred by combining data on the Michaud-Neponset occupations in the clusters. Most of the toolstone designations used in this study are based on macroscopic identifications; however, some assemblages have also been subjected to geochemical testing and petrographic analyses (Burke 2006; Kitchel 2016; Lothrop et al. In Review; Pollock et al. 1999, 2008).

As mentioned in the Templeton Raw Material Profile section (Section 3.5.1.3), The majority toolstone and first-tier minority toolstone in Paleoindian assemblages are used as a
proxy for residential range mobility (Ellis 1989; Ellis 2011:390; Lothrop and Bradley 2012:28; Lothrop et al. 2016:225). Minority toolstones, on the other hand, were likely procured by both direct and indirect procurement, however distinguishing between these methods is fraught with equifinality. The minority toolstones therefore are monitoring both indirect procurement of toolstone through social interactions and the remnants of toolstones acquired earlier in the annual round via serial direct procurement (Ellis 1989, 2011; Meltzer 1989; Spiess and Wilson 1989; Whallon 2006).

Comparisons of the majority (Figure 3.28) and minority toolstones (Figure 3.29) in the Michaud-Neponset fluted point sites shows that minority toolstones were transported a significant amount (P=.001) further than majority toolstones (Table 3.12). The mean distance that majority toolstones were transported is 161.2km, whereas the mean distance of minority toolstones is 296km, which is around double the distance of the majority toolstones. The significant difference between the distance of the majority and minority toolstones may be the result of the minority toolstones representing exchanged materials among bands. Alternatively, the first-tier minority toolstones may be the result of serial direct procurement of toolstones indicating that the minority toolstones were procured earlier in the seasonal round and thus transported further to the sites.

Sites in southern New England tend to be dominated by Normanskill chert and Pennsylvania jasper, which outcrop near or beyond the southern boundary of the NEM. Northern NEM sites tend to be dominated by New Hampshire rhyolites and Munsungun chert, which outcrop in northern New England. The exceptions to this generalization are the Colebrook site in New Hampshire, which has a large quantity of Normanskill chert (Kitchel 2016) and the Neponset site in Massachusetts, which is dominated by New Hampshire rhyolites (Pollock
If the majority toolstones are monitoring residential mobility, then perhaps the general trend of northern sites dominated by northern toolstones and southern sites dominated by southern toolstones indicates two distinct residentially mobile bands of Michaud-Neponset fluted point making Paleoindians: one in the Northern NEM and one in the Southern NEM, as has been suggested by Bradley and Boudreau (2006:69). Conversely, the exceptions to this generalization identified by the northern movement of Normanskill chert to Colebrook and the southern movement of New Hampshire rhyolites to Neponset may indicate long distance residential mobility inclusive of both northern and southern New England, perhaps as part of seasonal mobility for NEM bands.

Minority toolstones at Michaud-Neponset aged sites indicate long distance transport of toolstones throughout the NEM. Sources from the south like Pennsylvania jasper and Normanskill chert appear in central and northern NEM sites in Massachusetts, Vermont, New Hampshire, and Maine. Northern sources including Munsungun chert and New Hampshire rhyolite occur in central and southern NEM sites in Vermont, Massachusetts, Connecticut, and southeastern New York. The occurrence of northern toolstones in southern NEM sites and southern toolstones in northern NEM sites indicates that a regional network of toolstone movement links Michaud-Neponset sites throughout the NEM. If the minority toolstones are monitoring exchange among bands, then the hypothesized southern NEM band and northern NEM band were interacting with enough frequency that the vast majority of Michaud-Neponset sites retain evidence for these interactions. If the minority toolstones are remnants of serial direct procurement, however then they indicate long distance residential mobility between northern and southern New England.
Comparisons of Paleoindian toolstone movement to ethnographically documented hunter-gatherers provides the opportunity to further consider the behaviors that may be associated with long distance toolstone transportation over 300km. Newlander (2015:126) indicates that the ethnographic record only documents toolstone movements over 300km as resulting from social and ideological pursuits and exchange, not residential mobility (Also see Speth et al. 2013:114-121). Newlander and Speth, however, rely mainly on ethnographic data from Australian Aborigines, who inhabited environments distinct from the environments in which Paleoindians lived in northeastern North America. Since environmental reconstructions for the NEM during the Michaud-Neponset fluted point occupations around 12,000 cal bp indicate subarctic-like conditions (Newby et al. 2005), general analogies to ethnographically documented subarctic foragers seem most appropriate. Ellis (2011:398) considers subarctic ethnographic data on residential mobility and notes that while residential movements beyond 250km are rare, they have been reported in ethnographic studies of subarctic Chipewyan groups and are associated with herd following caribou hunting strategies that entail residential groups moving between the calving and wintering areas during caribou migrations (Ellis 2011:398; Koldehoff and Loebel 2009).

The distribution of toolstones seen in the Michaud-Neponset fluted point sites in the NEM, therefore, may result from residential mobility strategies similar to the seasonal mobility recorded for herd following subarctic foragers (Lothrop et al. 2016:225). Since the Michaud-Neponset dataset is monitoring a time frame of a few centuries, the distribution of toolstones may reasonably be compared to lifetime ranges documented for subarctic foragers, which consider the cumulative annual ranges used by a group over the lifetimes of the individuals that comprise the group (Binford 1983:42). The lifetime territory size necessary to incorporate the
Michaud-Neponset sites and toolstone sources in the NEM would encompass an area around 240,000 km$^2$ (Figure 3.30). Based on Binford’s (2001:Table 5.01) estimates of subarctic forager lifetime territory sizes, the Michaud-Neponset NEM territory size is comparable to subarctic foragers (Table 3.13).

In sum, the distribution of toolstones in NEM Michaud-Neponset sites seem to indicate that Middle Paleoindians were occupying both southern and northern New England as part of a lifetime range of residentially mobility. Paleoindian annual residential mobility throughout the NEM region feasibly included only small portions of the overall NEM territory, however the annual residential movements likely included movements between northern and southern New England based on the long distance movement of majority toolstones between the sub-regions. Nevertheless, some of the minority toolstones in NEM Paleoindian sites likely do reflect exchange among bands for social networking.

### 3.7 Conclusion and Future Research Directions

The reanalyses of the Paleoindian component at Templeton indicate that the site is typical of others in the NEM study area. The location of Templeton in the southern portion of the NEM provides an important example of a site located in a denser forest environment that may reflect one portion of an annual round, with Paleoindians occupying the spruce parkland and tundra environments of the northern NEM during other seasons (Newby et al. 2005; Pelletier and Robinson 2005; Singer *In Review*). Continued investigations of Paleoindian occupations in southern New England are necessary to provide a fuller picture of Paleoindian occupations of the region, since the dataset of NEM Paleoindian sites is currently weighted to northern portions of the NEM. Better documentation of these sites is expected to shed light on broader patterns of mobility, site function, and seasonal variation during the Middle Paleoindian period. Future
excavations and multi-disciplinary analyses are planned for Templeton to attempt to locate additional Paleoindian loci and to study the Paleoindian materials in more detail.
Figure 3.1 Map of New England-Maritimes region with Michaud-Neposet fluted point sites and approximate boundaries of subarctic-like environments around 12,000 cal bp.
Figure 3.2 Orthophotograph mosaic of the Templeton landform.
Figure 3.3 Digital elevation models of the Templeton landform.
Figure 3.4 Photograph of Moeller’s 1977 excavation.
Figure 3.5 Location of Moeller’s excavation block.
Figure 3.6 Roger Moeller piece plotting a fluted preform base during the 1977 excavation.
Figure 3.7 Stratigraphic profile of east wall between 10.5N0W and 6N0W, based on Moeller 1980:Figure 5.
Figure 3.8 Photo including stratigraphic profile of east wall between 10.5N0W and 6N0W in the background.
Figure 3.9 Late Archaic quartz projectile points and Terminal Archaic Broadspears made of red shale and chert. A. Siltstone Terminal Archaic Susquehanna Broad; B. Quartz Late Archaic Wading River; C. Quartz Late Archaic Brewerton Side-Notched; D. Quartz Late Archaic Brewerton Eared Triangle; E-F. Chert Terminal Archaic Broadspears
Figure 3.10 Graph comparing the quantity of lithics catalogued as red shale/gray chert and the quantity of lithics catalogued as only gray chert by depth. * Some depth measurements were made above datum (ad).
Figure 3.11 Graph comparing the quantity of gray chert lithics and quartz lithics by depth. * Some depth measurements were made above datum (ad).
Figure 3.12 The horizontal distribution of quartz in Moeller’s excavation block.
Figure 3.13 The horizontal distribution of Paleoindian chert (greater than 30 centimeters below datum) in Moeller’s excavation block.
Figure 3.14 Chert biface reduction flakes from Moeller’s 1977 excavation. These flakes are macroscopically similar to Normanskill chert. A-F. Biface reduction flakes.
Figure 3.15 Sidescrapers from Moeller’s 1977 excavation block. All Normanskill chert.

A-B. Chert sidescrapers with planar outcrop cortex on dorsal surface. C. Chert sidescraper.
Figure 3.16 Cobbles and flakes of stream rolled materials recovered from Templeton and the Shepaug River. A. Cobble “jasper”; B. Flake of siltstone with cobble cortex; C. Siltstone pebble; D. Stream rolled cobble of unidentified material; E. Utilized flake of chert (?) with cobble cortex; F. Siltstone pebble. G. “Jasper” siltstone pebble.
Figure 3.17 Paleoindian flakes and “chert cobble” collected from the Shepaug River. A-C, E-G. Paleoindian chert flakes. D. “Chert” cobble recovered in Shepaug River by Moeller.
Figure 3.18 Thin section of “chert cobble”. A. Overview of thin section (scale = 5mm).
B. Thin section in plane light (scale = 500 µm). C. Thin section in cross polarized light scale (scale = 500 µm).
Figure 3.19 Thin section of Paleoindian chert flake. A. Overview of thin section (scale = 5mm). B. Thin section in plane light (scale = 500 µm). C. Thin section in cross polarized light scale (scale = 500 µm).
Figure 3.20 Thin section of Normanskill chert. A. Overview of thin section (scale = 5mm). B. Thin section in plane light (scale = 500 µm). C. Thin section in cross polarized light scale (scale = 500 µm).
Figure 3.21 Biface fragments from fluted point production. All Normanskill chert. A. Large biface fragment with refits; B. Preform distal fragment, arrow indicates isolated tip; C. Overshot channel flake retaining distal preform fragment, arrows indicate isolated tip; D. Biface lateral fragment; E. Fluted preform refit from two fragments; F. Preform medial fragment; G. Biface lateral fragment; H-J. Fluted preform basal fragments.
Figure 3.22 Refit Channel Flake Fragments of Normanskill chert. A. Channel flake from two refit fragments; B. Channel flake from two refit fragments; C. Channel flake from three refit fragments; D. Channel flake from four refit fragments; E. Channel flake from four refit fragments; F. Channel flake from four refit fragments; G. Channel flake from two refit fragments.
Figure 3.23 Flake tools and miniature fluted points. All are made of Normanskill chert.

A. Retouched flake/possible miniature fluted point preform; B. Miniature fluted point; C. Graver; D. Cutter; E. Graver/possible miniature fluted point; F. Graver; G. Graver; H. Marginally resharpened biface.
Figure 3.24 Horizontal distribution of channel flakes in Moeller’s block.
Figure 3.25 Horizontal distribution of Paleoindian tools in Moeller’s block.
Figure 3.26 Horizontal distribution of microwear on Paleoindian tools in Moeller’s block.
Figure 3.27 Horizontal distribution of channel flake refits in Moeller’s block. Each color represents a refit set.
Figure 3.28 Majority toolstones in Michaud-Neponset Fluted Point Sites.
Figure 3.29 Minority toolstones in Michaud-Neponset Fluted Point Sites.
Figure 3.30 Estimated NEM territory size. Measures 239,169.4 km$^2$ in area using Lambert Conformal Conic projection. Toolstone sources: A. Pennsylvania jasper; B. Normanskill Chert; C. Champlain Valley chert; D. New Hampshire Rhyolites; E. Munsungun Chert.
Table 3.1 Lithic artifacts from 1977 and 1982 excavations at Templeton.

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<th>Material Type</th>
<th>Projectile Points</th>
<th>Bifaces</th>
<th>Scrapers</th>
<th>Utilized/Retouched Flakes</th>
<th>Chunks</th>
<th>Cores</th>
<th>Chips</th>
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Table 3.2 Diagnostic projectile points by raw material.

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Table 3.3 Depths of diagnostic artifacts below datum including projectile points (PP) identified by Moeller and channel flakes (CF) identified by Singer.

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<th>Middle Archaic PPs</th>
<th>Late Archaic-Laurentian PPs</th>
<th>Late Archaic-Narrowstem PPs</th>
<th>Terminal Archaic PPs</th>
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<td>.9-.95</td>
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<td>11 CF</td>
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<td>1-1.05</td>
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<td>1.05-1.1</td>
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<td>1 CF</td>
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<td>1.15-1.2</td>
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<td></td>
<td></td>
<td>2 CF</td>
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</table>
Table 3.4 Paleoindian Assemblage from Moeller’s 1977 and 1982 excavations.

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Normanskill</th>
<th>Jasper</th>
<th>Rhyolite</th>
<th>Siltstone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count (Weight g)</td>
<td>Count (Weight g)</td>
<td>Count (Weight g)</td>
<td>Count (Weight g)</td>
<td>Count (Weight g)</td>
</tr>
<tr>
<td>Fluted Point Preform</td>
<td>6 (26.13)</td>
<td></td>
<td></td>
<td></td>
<td>6 (26.13)</td>
</tr>
<tr>
<td>Fragments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biface Fragments</td>
<td>7 (69.3)</td>
<td>1 (6.88)</td>
<td>1 (2.52)</td>
<td></td>
<td>9 (78.7)</td>
</tr>
<tr>
<td>Flake Blank</td>
<td>1 (84.29)</td>
<td></td>
<td></td>
<td></td>
<td>1 (84.29)</td>
</tr>
<tr>
<td>Miniature Fluted Points</td>
<td>2 (1.15)</td>
<td></td>
<td></td>
<td></td>
<td>2 (1.15)</td>
</tr>
<tr>
<td>Cutters</td>
<td>1 (10.66)</td>
<td></td>
<td></td>
<td></td>
<td>1 (10.66)</td>
</tr>
<tr>
<td>Gravers</td>
<td>9 (29.8)</td>
<td></td>
<td></td>
<td></td>
<td>9 (29.8)</td>
</tr>
<tr>
<td>Marginally Resharpened Bifaces</td>
<td>1 (1.45)</td>
<td></td>
<td></td>
<td></td>
<td>1 (1.45)</td>
</tr>
<tr>
<td>Piece Esquille</td>
<td>1 (6.25)</td>
<td></td>
<td></td>
<td></td>
<td>1 (6.25)</td>
</tr>
<tr>
<td>Sidescrapers</td>
<td>3 (117.84)</td>
<td></td>
<td></td>
<td></td>
<td>3 (117.84)</td>
</tr>
<tr>
<td>Utilized/Retouched Flakes</td>
<td>43 (122.25)</td>
<td>1 (1.41)</td>
<td>3 (95.19)</td>
<td></td>
<td>47 (218.85)</td>
</tr>
<tr>
<td>Tool Total</td>
<td>74 [92.5%]</td>
<td>2 [2.5%]</td>
<td>1 [1.25%]</td>
<td>3 [3.75%]</td>
<td>80 (575.12)</td>
</tr>
<tr>
<td></td>
<td>(469.12) [81.6%]</td>
<td>(8.29) [1.4%]</td>
<td>(2.52) [.4%]</td>
<td>(95.19) [16.6%]</td>
<td></td>
</tr>
<tr>
<td>Debitage</td>
<td>7458 [99.9%]</td>
<td>9 [0.1%]</td>
<td></td>
<td></td>
<td>7467 (2151.46)</td>
</tr>
<tr>
<td></td>
<td>(2150.33) [99.9%]</td>
<td>(1.13) [0.1%]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Total</td>
<td>7532 [99.8%]</td>
<td>11 [.1%]</td>
<td>1 [&gt;.1%]</td>
<td>3 [&gt;.1%]</td>
<td>7547 (2726.58)</td>
</tr>
<tr>
<td></td>
<td>(2619.45) [96.1%]</td>
<td>(9.42) [.3%]</td>
<td>(2.25) [&gt;.1%]</td>
<td>(95.19) [3.5%]</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.5 Paleoindian debitage from Moeller’s 1977 excavation.

<table>
<thead>
<tr>
<th>Flake Type</th>
<th>Material</th>
<th>Count (Weight g)</th>
<th>Count (Weight g)</th>
<th>Count (Weight g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel Flake Fragments</td>
<td>Normanskill</td>
<td>164 (103.55)</td>
<td>0</td>
<td>164 (103.55)</td>
</tr>
<tr>
<td>Biface Reduction Flakes</td>
<td></td>
<td>372 (624.79)</td>
<td>0</td>
<td>372 (624.79)</td>
</tr>
<tr>
<td>Biface Finishing Flakes</td>
<td></td>
<td>2123 (399.25)</td>
<td>6 (.63)</td>
<td>2129 (399.88)</td>
</tr>
<tr>
<td>Proximal Fragments of Biface Resharpening</td>
<td></td>
<td>1586 (415.86)</td>
<td>1 (.24)</td>
<td>1587 (416.10)</td>
</tr>
<tr>
<td>Medial Flake fragments</td>
<td></td>
<td>1826 (330.23)</td>
<td>1 (.16)</td>
<td>1827 (330.39)</td>
</tr>
<tr>
<td>Distal Flake fragments</td>
<td></td>
<td>1286 (239.16)</td>
<td>1 (.1)</td>
<td>1287 (239.26)</td>
</tr>
<tr>
<td>Uniface resharpening flakes</td>
<td></td>
<td>101 (37.49)</td>
<td>0</td>
<td>101 (37.49)</td>
</tr>
<tr>
<td><strong>Total Debitage</strong></td>
<td></td>
<td>7458 [99.9%]</td>
<td>9 [0.1%]</td>
<td>7467 (2151.46)</td>
</tr>
<tr>
<td></td>
<td>Normanskill</td>
<td>(2150.33) [99.9%]</td>
<td>(1.13) [0.1%]</td>
<td></td>
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</table>
Table 3.6 Microwear Analysis of Paleoindian tools.

<table>
<thead>
<tr>
<th>INV #</th>
<th>Tool</th>
<th>Raw Material</th>
<th>Use Motion</th>
<th>Contact Material</th>
<th>Polish</th>
<th>Flake Pattern</th>
<th>Edge Condition</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.22.1</td>
<td>Biface tip (Buted point preform)</td>
<td>Normanskill</td>
<td>Cutting</td>
<td>Hard material (likely bone or antler)</td>
<td>Slight polish development</td>
<td>Obscured via crushing</td>
<td>Severely crushed</td>
<td>Slight weathering has made more exact identification difficult</td>
</tr>
<tr>
<td>22.15.1</td>
<td>Utilized flake</td>
<td>Normanskill</td>
<td>Cutting</td>
<td>Soft material (likely hide)</td>
<td>Bright, glossy polish</td>
<td>Small bidirectional feather scars</td>
<td>Likely a handheld tool, no evidence for hafting</td>
<td></td>
</tr>
<tr>
<td>16.20.1</td>
<td>Retouched flake</td>
<td>Jasper</td>
<td>Scraping</td>
<td>Bone or antler</td>
<td>Slight glossy polish</td>
<td>Broken lines of medium and large sized step and hinge scars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.21.1.1</td>
<td>Retouched flake</td>
<td>Normanskill</td>
<td>Shaving</td>
<td>Wood</td>
<td>Unifacial run of step and hinge fractures</td>
<td>Very slight edge rounding</td>
<td>Likely a short term use tool</td>
<td></td>
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<tr>
<td>17.27.1</td>
<td>Retouched flake</td>
<td>Siltstone</td>
<td>Scraping</td>
<td>Wood</td>
<td>Unifacial run of step and hinge fractures</td>
<td>Very slight edge rounding</td>
<td>Likely a short term use tool</td>
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<tr>
<td>20.22.1</td>
<td>Sidescraper</td>
<td>Normanskill</td>
<td>Scraping</td>
<td>Hard material (likely bone or antler)</td>
<td>Unifacial run of medium to large step fractures</td>
<td>Slight edge rounding</td>
<td></td>
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<tr>
<td>9.25.3.2</td>
<td>Sidescraper</td>
<td>Normanskill</td>
<td>Whittling</td>
<td>Wood</td>
<td>Very slight polish</td>
<td>Bifacial run of medium step fractures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.18.1</td>
<td>Graver</td>
<td>Normanskill</td>
<td>Boring</td>
<td>Soft material (likely hide)</td>
<td>Bright, glossy polish on spur point</td>
<td>Slight edge rounding, very slight damage to spur point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.21.2</td>
<td>Graver</td>
<td>Normanskill</td>
<td>Engraving</td>
<td>Wood</td>
<td>Slight polish on spur point</td>
<td>Unifacial scarring, mostly feather scars with occasional hinge scars</td>
<td>Distinct edge rounding on spur point</td>
<td></td>
</tr>
<tr>
<td>14.20.1.1</td>
<td>Graver (1 spur)</td>
<td>Normanskill</td>
<td>Engraving</td>
<td>Wood</td>
<td>Slight polish on spur point</td>
<td>Unifacial scarring, feather scars</td>
<td>Distinct edge rounding on spur point</td>
<td></td>
</tr>
<tr>
<td>24.17.1</td>
<td>Graver (2 spurs)</td>
<td>Normanskill</td>
<td>Boring</td>
<td>Hard material (likely antler)</td>
<td>Dull polish on spur point</td>
<td>Small and medium feather and step scars</td>
<td>Distinct edge rounding on spur point, scars undercutting edge</td>
<td></td>
</tr>
<tr>
<td>31.21.1</td>
<td>Graver (1 spur)</td>
<td>Normanskill</td>
<td>Boring</td>
<td>Hard material (Likely wood)</td>
<td>Bright polish on spur point</td>
<td>Small and medium feather and step scars</td>
<td>Distinct edge rounding on spur point, scars undercutting edge</td>
<td>Made on a channel flake</td>
</tr>
<tr>
<td>9.21.1.1</td>
<td>Graver (1 spur)</td>
<td>Normanskill</td>
<td>Boring</td>
<td>Hard material (Likely wood)</td>
<td>Bright polish on spur point</td>
<td>Small and medium feather and step scars</td>
<td>Distinct edge rounding on spur point, scars undercutting edge</td>
<td></td>
</tr>
<tr>
<td>12.15.3</td>
<td>Graver (2 spurs)</td>
<td>Normanskill</td>
<td>Boring</td>
<td>Hard material (Likely antler or bone)</td>
<td>Dull polish on spur points</td>
<td>Small and medium feather and step scars</td>
<td>Severe edge rounding on spur points, scars undercutting edge</td>
<td>Both spurs utilized for the same purpose</td>
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Table 3.7 Metrics for most complete fluted preform at Templeton. See Figure 21E.

<table>
<thead>
<tr>
<th>Fluted Preform Metrics</th>
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<tr>
<td>Maximum Length (mm)</td>
<td>60.21</td>
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<tr>
<td>Maximum Width (mm)</td>
<td>31.17</td>
</tr>
<tr>
<td>Maximum Thickness (mm)</td>
<td>8.63</td>
</tr>
<tr>
<td>Medial Width (mm)</td>
<td>32.26</td>
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<tr>
<td>Basal Width (mm)</td>
<td>28.08</td>
</tr>
<tr>
<td>Basal Concavity (mm)</td>
<td>3.87</td>
</tr>
<tr>
<td>Face Angle 1 (degrees)</td>
<td>100</td>
</tr>
<tr>
<td>Face Angle 2 (degrees)</td>
<td>95</td>
</tr>
<tr>
<td>Flute # on Face 1 (length mm)</td>
<td>1 (32.7)</td>
</tr>
<tr>
<td>Flute # on Face 2 (length mm)</td>
<td>1 (35.77)</td>
</tr>
<tr>
<td>Ear Projection 1 (mm)</td>
<td>2.37</td>
</tr>
<tr>
<td>Ear Projection 2 (mm)</td>
<td>2.37</td>
</tr>
<tr>
<td>Barnes Basal Finishing?</td>
<td>No</td>
</tr>
<tr>
<td>Basal Concavity Ground?</td>
<td>No</td>
</tr>
<tr>
<td>Basal Lateral Edges Ground?</td>
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Table 3.8 Channel flake metrics from 1977 excavation at Templeton (See Figure 22).

<table>
<thead>
<tr>
<th></th>
<th>Primary Channel Flakes</th>
<th>Secondary Channel Flakes</th>
<th>All Channel Flakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Count</td>
<td>137</td>
<td>26</td>
<td>163</td>
</tr>
<tr>
<td>Proximal Fragments</td>
<td>35</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Medial Fragments</td>
<td>93</td>
<td>18</td>
<td>111</td>
</tr>
<tr>
<td>Distal Fragments</td>
<td>9</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Total Length (mm)</td>
<td>2424.64</td>
<td>481.05</td>
<td>2905.69</td>
</tr>
<tr>
<td>Average Length (mm)</td>
<td>17.7</td>
<td>18.5</td>
<td>17.83</td>
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<tr>
<td>Average Width (mm)</td>
<td>13.22</td>
<td>14.81</td>
<td>13.48</td>
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<tr>
<td>Average Thickness (mm)</td>
<td>2.23</td>
<td>2.32</td>
<td>2.25</td>
</tr>
<tr>
<td>Minimum Length (mm)</td>
<td>4.06</td>
<td>6.23</td>
<td>4.06</td>
</tr>
<tr>
<td>Maximum Length (mm)</td>
<td>48.94</td>
<td>34.28</td>
<td>48.94</td>
</tr>
<tr>
<td>Minimum Width (mm)</td>
<td>4.48</td>
<td>9.7</td>
<td>4.48</td>
</tr>
<tr>
<td>Maximum Width (mm)</td>
<td>20.05</td>
<td>20.5</td>
<td>20.5</td>
</tr>
<tr>
<td>Minimum Thickness (mm)</td>
<td>.75</td>
<td>1.27</td>
<td>.75</td>
</tr>
<tr>
<td>Maximum Thickness (mm)</td>
<td>4.77</td>
<td>3.87</td>
<td>3.87</td>
</tr>
</tbody>
</table>
Table 3.9 Channel flake refit metrics from 1977 excavation at Templeton (See Figure 22).

<table>
<thead>
<tr>
<th>Refit Channel Flakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (mm)</td>
</tr>
<tr>
<td>Fig. 22A</td>
</tr>
<tr>
<td>Fig. 22B</td>
</tr>
<tr>
<td>Fig. 22C</td>
</tr>
<tr>
<td>Fig. 22D</td>
</tr>
<tr>
<td>Fig. 22E</td>
</tr>
<tr>
<td>Fig. 22F</td>
</tr>
<tr>
<td>Fig. 22G</td>
</tr>
</tbody>
</table>

Table 3.10 Fluted point production estimates based on channel flake data.

<table>
<thead>
<tr>
<th>Fluted Point Production Index</th>
<th>Equation</th>
<th>Estimated Fluted Points</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td># Proximal Primary Channel Flakes / 2</td>
<td>35 /2</td>
<td>17.5</td>
<td>Ellis and Payne 1995:468</td>
</tr>
<tr>
<td>Total Length of Primary Channel Flakes / Average Flute Length of Middle Paleoindian Points</td>
<td>2424.64/ 106.6 (Parkhill)</td>
<td>22.7</td>
<td>Ellis and Payne 1995:468</td>
</tr>
<tr>
<td></td>
<td>2424.64/ 156 (Windy City)</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>Total # of Channel Flakes X 0.3</td>
<td>137 X 0.3</td>
<td>48.9</td>
<td>Sellet 2013:388</td>
</tr>
<tr>
<td>Estimate Total Number of Fluted Points</td>
<td></td>
<td></td>
<td>15-49 Fluted Points</td>
</tr>
</tbody>
</table>
Table 3.11 Distances to majority and minority toolstones in Michaud-Neponset fluted point sites in the NEM. Organized by Latitude.

<table>
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<tr>
<th>Site Name</th>
<th>Primary Toolstones (Count)</th>
<th>Primary Toolstone Distances (KM)</th>
<th>Minority Toolstones (Count)</th>
<th>Minority Toolstones Distances (KM)</th>
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<td>102</td>
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<td>Munsungun Chert (1287)</td>
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<td>Chapdelaine 2012</td>
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<td>(1)</td>
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<td>Boisvert 2008, 2012</td>
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167
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<td>Munsungun Chert</td>
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<td>(4,191)</td>
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<tr>
<td></td>
<td>(Minority)</td>
<td></td>
<td>-</td>
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<tr>
<td></td>
<td>(494)</td>
<td></td>
<td>-</td>
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<td>Count</td>
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<td>Reference</td>
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<tr>
<td>Jackson-Gore</td>
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<td>Neponset</td>
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<td>Normanskill Chert</td>
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<td>Munsungun Chert</td>
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<td>Ohomowauke</td>
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<td>(392)</td>
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<td>(110)</td>
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<td>Funk and Steadman 1994</td>
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<td>Esopus Chert (1)</td>
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<td>Munsungun Chert (1)</td>
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Table 3.12. Summary statistics comparing majority and minority toolstone distances in Michaud-Neponset fluted point sites. The most abundant toolstones in an assemblage by count are considered to be majority toolstones. In cases where two toolstones were approximately equal in their abundance as the dominant toolstones, both toolstones were included as majority toolstones. Minority toolstones are the remaining toolstones in the assemblage including the first-tier minority and additional minority toolstones.

<table>
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<th></th>
<th>N</th>
<th>Mean Distance (km)</th>
<th>Std. Deviation</th>
<th>Minimum Distance (km)</th>
<th>Maximum Distance (km)</th>
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<td>161.2</td>
<td>97.9</td>
<td>14</td>
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<td>Minority</td>
<td>26</td>
<td>296</td>
<td>153</td>
<td>52</td>
<td>702</td>
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</tbody>
</table>

P = .001
Table 3.13. Mobility estimates of selected subarctic groups from Binford 2001:Table 5.01; Kelly 1983, 1995.

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Territory Size (km²)</th>
<th>Annual Distance Moved (km)</th>
<th>Total Area Per Year (km²)</th>
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<td>724.2</td>
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<tr>
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<tr>
<td>Kuyokon</td>
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<tr>
<td>Beaver</td>
<td>194,700</td>
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<tr>
<td>Slave</td>
<td>245,370</td>
<td>716.1</td>
<td>-</td>
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<td>Kutchin</td>
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<td>Attawapiskat Cree</td>
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<td>Mistassini Cree</td>
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<td></td>
<td></td>
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<td>3,900</td>
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<tr>
<td>Waswanipi Cree</td>
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<td>4,870</td>
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<td>Chipewyan</td>
<td>619,400</td>
<td>798.2</td>
<td>-</td>
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<td></td>
<td></td>
<td>1,750</td>
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</tr>
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<td>Montagnais</td>
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<td></td>
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<td>1,800-3,600</td>
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2009  

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Spiess, Arthur and Deborah Wilson


Chapter 4: Hidden Creek and Ohomowauke: Documenting Continuity and Variability Between Two Paleoindian Sites on the Mashantucket Pequot Reservation in Southeastern Connecticut

4.1 Introduction

Archaeological surveys conducted on the Mashantucket Pequot Reservation since 1983 provide evidence for one of the oldest continuously occupied cultural landscapes in the United States (Jones and McBride 2006). More than thirty years of excavations have identified over 250 archaeological sites at Mashantucket, creating a unique opportunity to study local land use patterns (e.g. Nicholas 1988:264).

Evidence for Paleoindian occupations at Mashantucket include two thoroughly excavated Paleoindian sites, the Late Paleoindian Hidden Creek site and the Middle Paleoindian Ohomowauke, as well as isolated Paleoindian finds. The abundance of Paleoindian material culture at Mashantucket positions Mashantucket as the southernmost geographic cluster (sensu Spiess et al. 2012:99) of Paleoindian sites for the New England Maritimes Regions. This chapter reports on the Hidden Creek and Ohomowauke sites to document continuity and variability in Paleoindian technological organization and land use at Mashantucket.

4.2 Geographic and Environmental Setting

4.2.1 The New England and Canadian Maritimes Region

The Mashantucket Pequot Reservation is located in southeastern Connecticut along the southern margin of the New England and Canadian Maritimes region (NEM), comprising eastern portions of New York, the six New England states, Quebec south of the St. Lawrence River and

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3 This paper has been accepted as a co-authored publication, with Brian Jones, to appear in In the Eastern Fluted Point Tradition, Volume II, edited by Joseph Gingerich.
4.2.2 Mashantucket

The Reservation is centered on the 1.9 km² Pequot Cedar Swamp located in the near-coastal uplands of southeastern Connecticut. Paleoenvironmental reconstructions of Mashantucket from the Last Glacial Maximum to the present are facilitated by extensive sediment coring of Pequot Cedar Swamp, which has provided pollen, macrofloral, and sediment data used to reconstruct local water tables, as well as environmental conditions (Jones 1997:48; McWeeney 1994, 1998, 2013; Newby et al. 2000; Thorson and Webb 1991). Paleoenvironmental reconstructions of the terminal Pleistocene environment of Mashantucket are also facilitated by archaeobotanical analyses of charred remains dated to the terminal Pleistocene, which have been recovered on nearby archaeological sites (Jones 1997; Jones and Forrest 2003; McWeeney 2013).

Sediment core analyses indicate that the Pequot Cedar Swamp developed from a proglacial lake that was formed by a stranded block of stagnant ice during deglaciation (Thorson and Webb 1991:29). Sediment analyses suggest that the Pequot Cedar Swamp consisted of a vegetated swamp during the terminal Pleistocene, with some areas of open water (Jones 1997:48; Jones and Forrest 2003:76). A lack of sediment accumulation during the Younger Dryas may have resulted from a lowered water table (McWeeney 1998:136; Newby et al. 2000:365), consistent with the drying trend observed during the Younger Dryas throughout the NEM (Newby et al. 2009; Newby et al. 2011; Shuman et al. 2004). A water lily seed AMS dated to 10,050 ± 70 ^{14}C BP, however, provides evidence for some open water in the Pequot Cedar Swamp basin around the end of the YD (McWeeney 1998:136).

Pollen data recovered from the sediment cores shows a typical Younger Dryas spruce maximum (McWeeney 1998:125). In addition to the spruce maximum, pollen data provide
evidence for hazelnut shrubs (McWeeney 2013:46), suggesting the presence of deciduous flora near the wetland margin. A hazelnut shell fragment from Hidden Creek AMS dated to 10,260 ± 70 $^{14}$C BP provides further evidence for the local presence of hazelnut shrubs near the Pequot Cedar Swamp during the late Younger Dryas (Jones and Forrest 2003:85).

The presence of two Paleoindian sites and additional Paleoindian isolated finds in close proximity to the Pequot Cedar Swamp suggests that Paleoindians repeatedly occupied Mashantucket to exploit its productive wetland resources (Figure 4.2) (Jones and Forrest 2003:78; McWeeney 2013:46). Accordingly, the comparison of Paleoindian technological organization and land use at Hidden Creek and Ohomowauke provides insight into the diversity of terminal Pleistocene land-use associated with wetland exploitation in the southern segment of the NEM.

4.3 Site Recovery and Lithic Analyses

The following section discusses the excavation and analyses of Hidden Creek and Ohomowauke, highlighting Paleoindian technological organization and land use at each site. The site summaries also provide the basis for identifying continuity and variability between the two sites.

4.3.1 Hidden Creek

4.3.1.1 Discovery, Excavation Strategy, and Material Culture

The Hidden Creek Site is a small, single-locus Late Paleoindian site. The site was identified in June 1992 during a reconnaissance survey associated with proposed development on the Mashantucket Pequot Reservation. During this survey, four small chert flakes and a chert scraper were found in a single test pit. Other nearby test pits lacked cultural material. The chert scraper was consistent with unifacial tools of the Paleoindian period, and the tribe granted permission to
excavate an exploratory 1x1-meter unit in the fall of the same year. This time using a 1/8-inch mesh screen, Jones and fellow UConn graduate student David George recovered 283 chert flakes, four additional chert flake tools and three bifaces, two of chert, the other of a red “siliceous siltstone”. The significance of the site was immediately apparent, and excavation continued through October and November with the help of additional graduate student volunteers. During that time a fluted preform and a collaterally-flaked lanceolate projectile point base were recovered, verifying the Paleoindian age of the site.

Excavation of the site continued through 1993 and 1994, with the aid of students from UConn archaeology field schools and graduate assistants. Excavators continued to use 1/8-inch mesh screens and excavated 50x50cm quadrants in 5cm levels to a depth of 80cm. An effort was made to piece-plot any artifact larger than 2cm, a strategy helped greatly by the site’s extremely fine sediments. The core site area fell within a contiguous block of twenty-seven and a half square meters. Twelve square meters were excavated elsewhere across the landform, many as individual quarter-meter shovel test pits. No Paleoindian artifacts were found outside of the core excavation block, indicating that site use was limited to the single locus investigated.

In addition to the diagnostic bifaces noted above, artifacts included end scrapers, side-scrapers, utilized flakes, and large quantities of production and tool rejuvenation debitage. Excavators also recovered a modest number of artifacts and features dating to the Late Archaic through Late Woodland periods. The variety of projectile point styles unearthed attests to intermittent short-term use of the site throughout prehistory. After its initial Late Paleoindian occupation, the location was used again most intensively during the Terminal Archaic period. Six Snook Kill style points and fragments are likely associated with two hearths and pit feature, all dated to about 3,500 years B.P. The depth of these finds (ca. 20 to 30 cm below surface) is
also marked by an intermittent, pavement-like occurrence of fire-cracked rock, as well as small post-molds. The site’s Archaic, and possibly later, occupants used lithic materials consisting primarily of argillite and siltstone, in addition to some quartz, quartzite, and black chert. These material types are readily distinguishable from those of the deeper Late Paleoindian horizon that consists primarily of exotic cherts.

4.3.1.1 Geographic Setting

The site rests on a small glacial kame terrace adjacent to Cedar Swamp overlooking a small stream. The site’s excellent preservation is an aspect of its gently accreting depositional context. Although the landform was likely used for grazing through the 19th century, it is too small to have been effectively farmed, therefore plowing has not disturbed the pre-Contact material culture, which was primarily recovered from intact B horizon sediments.

The site’s very fine sediments were easily screened through 1/8-inch mesh hardware cloth. Pebbles and stones larger than about 2cm were generally considered cultural in origin. Raw materials associated with the Late Paleoindian component of the site followed a vertical bell-curve distribution typical of sites that have undergone long-term small-scale bioturbation under conditions of slow accretion (e.g. Cremeens et al. 2003). These minor soil disturbances likely shifted some artifacts up to 50cm above and 30cm below their original vertical context. It is reasonable to assume that a similar degree of horizontal artifact movement resulted as well. These relatively minor artifact translocations do not appear to have masked the robust pattern of distribution observed at the site.

4.3.1.2 Paleoindian Lithic assemblage

With a few exceptions, the Hidden Creek site tool assemblage is comparable to other Paleoindian assemblages in the Northeast. Six bifacial artifacts larger than 2 cm were recovered,
most of which appear to represent tools broken during manufacture. The base of a collaterally flaked lanceolate projectile point is the only biface that has a finished quality, and it was likely broken during use. A thin biface preform, with two channel flake removals from its dorsal surface, has a beveled concave base and only light modification to the ventral surface. Although discarded at an early stage of production, the knapping technology used to produce this artifact is evident, and lends itself to comparison with that observed in Crowfield and Holcombe Paleoindian assemblages of the Great Lakes region and to the Cormier-Nicholas type from the NEM (Bradley et al. 2008). Twelve additional biface fragments smaller than 2 cm were also recovered. One of these likely represents the ear of a concave-based projectile point, while seven of the small biface fragment appear to be small basal portions of flat-based lanceolate projectile points. The presence of small basal portions of bifaces likely reflects the discard of projectile points broken in the haft during use. These base fragments indicate the Late Paleoindian occupants at Hidden Creek produced lanceolate projectile points with both squared-off and concave bases (i.e. Bradley et al. 2008:152-161).

Unifacial tools and fragments make up the majority of the Hidden Creek site’s Late Paleoindian assemblage. Informal utilized and retouched flakes are common. Nine complete side scrapers and eight scraper fragments were found at the site. Some fragments have been refit, showing that the broken tool continued to be used and further retouched. Eleven whole and broken end scrapers were recovered. These vary in length from 2 to 4.8 cm for complete specimens. Significantly, the two jasper artifacts recovered from the site were end scrapers, one of which is also the smallest example. Heavy damage to the working edge of many of the end scrapers at the Hidden Creek site suggests they may have been used on materials harder than hide, although the heavy crushing may have been produced by knapping blows during final
attempts at edge rejuvenation (Loebel 2013:328). While some small angular chert and crystal quartz chunks were recovered, none could be described unequivocally as spent cores or core fragments. Nevertheless, the use of two core types is indicated by tool and flake morphology. The first type was a large ovate biface core. The second type was a block core probably associated with the production of end scraper blanks (e.g. Lothrop 1989). Six heavy-duty quartz and quartzite chopping tools were also found, as well as a basalt anvil stone in the form of a massive flake. These rough stone tools were located primarily along the west edge of the site in association with high counts of angular quartz debris and shatter.

Perhaps as important as the tools represented in the Late Paleoindian assemblage are the tool types not found. In particular, limaces, pièces esquillée, and gravers are noticeably absent at the Hidden Creek site. This may be an artifact of the small size of this assemblage: statistically, rare tool types might be expected to be absent. Gravers, however, are generally common elements of most Paleoindian assemblages in the Northeast (e.g. Osborn 2014; Shott 1997:229). Their absence may suggest that tasks requiring gravers were not performed at this site or that this tool type was no longer typical of the Late Paleoindian tool kit.

4.3.1.3 Paleoindian Raw Material Use

The Late Paleoindian material types in the tool assemblage provide potential information concerning patterns of lithic procurement, use, and discard (Table 4.1). Debitage to tool rations indicate that gray-green and tan cherts were the focus of knapping oriented towards new tool production, especially of bifaces. Tools manufactured from a glassy dark green chert, on the other hand, were apparently reaching the limits of their usefulness, resulting in a higher rate of discard, as was the case with red-brown “siliceous siltstone”. Jasper is a special case. Represented by only two end scrapers, this material was not used for tool rejuvenation or
production at all. Quite possibly these were the last pieces that the occupants of the site had on hand.

These observations suggest a diachronic pattern of lithic procurement. Site occupants appear to have most recently visited the source of the gray-green, glassy green, and tan cherts, which likely originated in the Normanskill formation in the Hudson Valley (Singer 2013). These materials seem to be partitioned in their technological organization, however, with gray-green and tan chert used for new tool production, while the glassy green chert assemblage was comprised primarily of tools that had reached the end of their use-lives and were being discarded. The red-brown siliceous siltstone, which is macroscopically similar to Munsungun chert (Spiess et al. 1998:212), was being readily discarded. A large plane-scraper of this material could easily have been reworked, but was instead left behind. The small size of the two end scrapers made of eastern Pennsylvania jasper suggests that they had been discarded after a long use-life. They were likely acquired, either directly or through trade, earlier than the other materials left at the site.

4.3.1.4 Artifact Distribution and Spatial Patterning

Figures 4.3 and 4.4 reflect the horizontal distribution of Paleoindian lithics from the site. Artifacts, both debitage and tools, were confined to a ca. four-by-five meter area oriented in a northeast-southwest direction. Within this small space, debitage expressed two strong nodes of concentration spaced just a meter apart (Figure 4.3). Most of the tools recovered from the site were found within one or two meters of these core areas, but expressed some variation by type (Figure 4.4). Biface fragments were closely associated with the southern knapping area and most appear to have been discarded as they broke during manufacture. With one exception, end scrapers were found in the eastern half of the site. End scraper retouch flakes were also most
common in the eastern portion of the site, suggesting use and resharpening occurred close to the location of tool discard. Retouched and utilized flakes and scrapers were found throughout the site, and do not express distinctive spatial patterning. In sum, the debitage and tool distributions reflect a very tightly constrained pattern of discard consistent with activities occurring within a shelter, possibly during winter months. The slight separation of bifaces and end scrapers may reflect gendered organization of space within this small space (e.g. Deller and Ellis 2011:148-149; Robinson et al. 2009:439).

4.3.1.5 Radiocarbon Dating

The Hidden Creek site has produced a variety of radiocarbon dates, although they do not provide a definitive age of the Paleoindian occupation (Table 4.2). The earliest date, 10260±70\(^{14}\)C BP, was assayed on a carbonized hazelnut shell fragment found horizontally within a meter of many of the biface fragments from the site, but about 25cm below the depth of the majority of Paleoindian artifacts. A date of 9150±40\(^{14}\)C BP on probable carbonized cattail root comes from the same excavation unit, and is vertically associated with chert artifacts. A statistically identical date of 9150±50\(^{14}\)C BP was returned on carbonized conifer wood spatially associated with the site’s greatest concentration of thermally-altered chert flakes. The two early 8\(^{th}\) millennium BP dates are believed to be too late to be associated with the Paleoindian assemblage.

The oldest date is close to one from the Cormier site in Maine associated with a technological tradition comparable to that of Hidden Creek (Bradley et al. 2008: 150). Elsewhere in New England, similar dates are associated with Michaud-Neponset phase assemblages (Boisvert 2012:87; Bradley et al. 2008:146; McWeeney 1994:Table 5.1; Moeller 1980:31). In Eastern Pennsylvania, the Crowfield-related Nesquehoning Creek
Site returned dates of 10,480±30 \(^{14}\)C BP, 10340±40 \(^{14}\)C BP, and 9940±50 \(^{14}\)C BP, which encompass the oldest Hidden Creek date (Stewart et al. this Volume). While it is possible that several typological forms were contemporaneous, most scholars posit that these three projectile point types represent a chronological series with the Michaud-Neponset type being the oldest, then the Crowfield-related type, and finally the Cormier-Nicholas type as the most recent (e.g. Bradley et al. 2008).

The two 9150 dates appear to reflect similar origins; their tight temporal correlation provides compelling evidence of contemporaneity, and the association of one of the dates with burnt chert flakes links them strongly to the Paleoindian assemblage. The two dates around 9150 \(^{14}\)C BP fall within the range of dates associated with Paleoindian sites that contain lanceolate points in the NEM. Though imprecise by modern standards, a date of 9615±225 \(^{14}\)C BP was associated with the Weir’s Beach lanceolate point fragment (Bolian 1980). Bradley et al. (2008:161) suggest that similar Agate Basin-like tapered lanceolate types also date to the mid-tenth millennium BP, while the more delicate and narrow Ste. Anne-Varney type dates to the late tenth millennium (Bradley et al. 2008:161). Other dated lanceolate sites in the region, including the eponymous Varney Farm site, suggest that this tradition persisted well into the 9\(^{th}\) radiocarbon millennium BP, and probably later along the lower St. Lawrence River (Chapdelaine 1996:274; Petersen et al. 2000; Pintal 2012). The Hidden Creek lanceolates are arguably transitional between the Cormier-Nicholas and Ste. Anne Varney types, suggesting the 9150 \(^{14}\)C BP dates are reasonably associated with the artifact assemblage.
4.3.2 Ohomowauke

4.3.2.1 Discovery

The Ohomowauke site (72-137) is a multi-component site containing multiple Paleoindian loci, likely derived from a Middle Paleoindian (Michaud-Neponset) occupation. The site was discovered in the winter of 2011 during an archaeological survey of a landform scheduled to be developed at Mashantucket. The Paleoindian component of the site was identified during the survey by the recovery of a large utilized flake of possible New Hampshire rhyolite and a few concentrations of high-quality chert and jasper debitage. Subsequently, the 2012 and 2013 University of Connecticut Pre-Contact Archaeology Summer Field Schools and Mashantucket Pequot Museum and Research Center (MPMRC) staff archaeologists conducted joint excavations with the aid of many volunteers to document the Paleoindian component.

4.3.2.2 Geographic Setting

Ohomowauke is situated to the east of the Pequot Cedar Swamp about 750m north of the Hidden Creek Site. The immediate setting of Ohomowauke is glacial ablation till mixed with aeolian silt above a small spring-fed brook that drains into the Pequot Cedar Swamp. The drainage was dammed in the early 18th century to redirect the brook to power a small sawmill. This was facilitated by a sluiceway cut across the site, which disturbed the context of material culture within the sluiceway channel. Fortunately, since the landform was used to support mill operations, the area was not plowed, although the site was likely used periodically for grazing through the historic period. Accordingly, most of the lithic artifacts recovered from the site were found between twenty and fifty centimeters below surface in intact B horizon soils.

4.3.2.3 Excavation Strategy

Eight excavation blocks and many smaller test units were excavated totaling 568.5m$^2$
Excavation protocols consisted of dividing 1m$^2$ units into four 50cm$^2$ quadrants that were excavated using 10 cm arbitrary levels with depths measured below surface and halted at the interfaces between natural soil horizons. Blocks A and B were screened with 1/8” mesh, while the remaining blocks, C-H, were screened with 1/4” mesh to facilitate the screening of the coarse till sediments as the construction deadline approached. Loci C and D were typically water-screened through 1/4” mesh because of saturated soil conditions near the mill dam. Locus B, the most westerly-excavated block, did not produce diagnostic Paleoindian lithics, and consequently will not be discussed below.

Locus A, a 71.5m$^2$ block, was excavated by the 2012 University of Connecticut Field School in conjunction with Mashantucket Pequot Museum and Research Center (MPMRC) staff archaeologists. Locus C, a 28m$^2$ block located immediately north of the sluiceway was excavated in the summer of 2012 by volunteers and MPMRC archaeologists. Loci D and E, which were excavated in the summer of 2012 and winter and spring of 2013 by volunteers and MPMRC archaeologists, are located within a single 103m$^2$ block positioned immediately south of the sluiceway. The northern-most block of 177.5m$^2$ encompasses Loci F, G, and H, excavated by the 2013 University of Connecticut Field School in conjunction with MPMRC archaeologists and many volunteers.

4.3.2.4 Material Culture

The excavations at Ohomowauke recovered diagnostic cultural material from the Paleoindian, Early Archaic, Middle Archaic, Late Archaic, Terminal Archaic, Early Woodland, Middle Woodland, Late Woodland, Contact, and historic periods. Although the site is not stratified, the majority of the pre-Contact components contain lithics manufactured from lower
quality raw materials, like quartzite, felsite, argillite, and quartz that can be segregated easily from the high quality cryptocrystalline toolstones that typify the Middle Paleoindian component.

One exception is a Middle Woodland Jack’s Reef locus, which contains jasper similar to that of the Paleoindian component (e.g. Thornton’s Ferry Site: Boisvert et al. 2012:22). The Middle Woodland locus, however, is distinguished from the Paleoindian loci by the presence of both a Jack’s Reef corner-notched projectile point and Middle Woodland dentate stamped ceramic sherds, as well as the absence of diagnostic Paleoindian lithics and lithics made of a red chert that was only used during the Paleoindian occupation at Ohomowauke (e.g. Deller and Ellis 2011:36). Similarly, a crystal quartz endscraper that was utilized as a pieces esquillee was recovered in close proximity to a cluster of Paleoindian unifaces and unifacial resharpening flakes made of red chert and jasper. Therefore, it was assigned to the Paleoindian period.

4.3.2.5 Paleoindian Lithic Assemblage

The Paleoindian assemblage totals 939 lithics made up of 85 tools and tool fragments and 854 pieces of debitage (Table 4.3). The assemblage weighs 664.7 grams, with discarded tools accounting for 411.9 grams (Table 4.4) and the remaining 252.8 grams constituting debitage (Table 4.5). The broad distribution of this small, low-density Paleoindian assemblage recovered suggests that the Ohomowauke assemblage was created over one or a few brief visits.

Five bifacial artifacts were recovered at Ohomowauke (Figure 4.6). These include the base of a Michaud-Neponset style projectile point and a marginally retouched biface (e.g. Ellis and Deller 2000:95), as well as three preform fragments, the latter likely broken during final stage fluted point production. Two of the preform fragments are medial segments and one is a distal section that retains a narrowed, blunted, and ground tip, suggestive of Middle Paleoindian fluted point manufacture (Bradley et al. 2008:142, Spiess et al. 2012:104). An over-shot channel
flake recovered at Ohomowauke also retains a blunted and ground tip. Similar blunted preform tips have been recovered from Middle Paleoindian sites in the Great Lakes region like Parkhill (Ellis and Deller 2000:81-82) and Thedford II in Ontario (Deller and Ellis 1992:32-33) and in the NEM region like the Neponset site in Massachusetts (Carty and Spiess 1992:27, 34), the Lamoreau site in Maine (Spiess and Wilson 1987:125-128; Spiess et al. 2012:104), and possibly the Clinche-Rancourt site in Quebec (Chapdelaine 2012:139).

Like Hidden Creek, unifacial tools and tool fragments comprise the majority of the Paleoindian tool assemblage. Sixteen endscrapers (one refit from two fragments), four sidescrapers, eight undifferentiated uniface fragments, and two unifacially flaked gravers were recovered at the site, along with many utilized and edge retouched flakes. Three pieces esquillee also were recovered.

In addition to tools and tool fragments, debitage was recovered across the site indicating uniface resharpening and final stage fluted point production, which was evidenced by concentrations of biface resharpening flakes and twenty-seven channel flake fragments identified by the occurrence of dorsal flake scars running perpendicular to the axis of flake propagation.

4.3.2.6 Paleoindian Raw Material Use

Diagnostic Paleoindian artifacts, like channel flakes, occur on jasper that is macroscopically similar to Pennsylvania Jasper (Hatch and Miller 1985), a gray-green chert that is macroscopically similar to Normanskill chert (Hammer 1976), and a red chert that is macroscopically similar to Munsungun chert (Pollock et al. 1999). Jasper is the majority toolstone in the Paleoindian assemblage both by count and weight (Count: 392 pieces, weight: 416.2 grams). Gray-green chert is the first tier minority toolstone (count: 378 pieces, weight: 119.2 grams), and red chert is the second tier minority toolstone (count: 111 pieces, weight: 77.2
grams). Tertiary toolstones assigned to the Paleoindian assemblage because they were recovered in close proximity to these materials include forty pieces of unidentified chalcedony (weight: 20.4 grams), fourteen flakes of unidentified black chert (6.1 grams), one crystal quartz uniface (6.0 grams), and three rhyolite artifacts (19.6 grams), which are macroscopically similar to Jefferson rhyolite in New Hampshire (Pollock et al. 2008).

4.3.2.7 Artifact Distribution and Spatial Patterning

Multiple Paleoindian activity areas were recognized based on the identification of diagnostics like channel flakes and clusters of tools and debitage made on the aforementioned cryptocrystalline materials (Figures 4.7 and 4.8). The Paleoindian activity areas encompass Loci A, C, D, E, F, G, and H, which comprise 380 1x1 meter units. The majority of the activity areas are low density, with an average of 2.47 lithics recovered per m² unit; however, lithic concentrations were denser in areas of biface knapping.

Two areas of fluted point production, one in the southern portion of Locus A and one in Locus D, were determined by the recovery of channel flakes, biface resharpening flakes, and biface fragments. Multiple areas of uniface resharpening and discard, located in Loci C, F, G, and H, were identified by the recovery of endscrapers, sidescrapers, undifferentiated uniface fragments, and uniface resharpening flakes. Additionally, two possible toss/discard zones, one in the northern section of Locus A and one in Locus E, were recognized by the recovery of Paleoindian tools with a notable absence of resharpening flakes (e.g. Gramly 2013).

Mapping of raw material distributions highlights differential knapping and discard patterns for the suite of Paleoindian toolstones. Jasper appears in all aspects of the Paleoindian assemblage, including over half of the tools discarded at the site (44/84) (Figure 4.9a). A large concentration of jasper chipping debris is recognized in Locus D, which is an area associated
with fluted point production. Jasper also appears in Locus A as isolated tools and in Loci C, F, G, and H, which are areas associated with uniface resharpening and discard. Gray-green and green chert is primarily associated with late-stage fluted point production in the southern portion of Locus A and in Locus D (Figure 4.9b). Three gray-green chert endscrapers recovered from Locus E comprise the rest of the gray-green and green chert assemblage. The distribution of red chert is primarily associated with uniface resharpening in Locus C and tool discard in Loci E, F, G, and H, with limited use in biface production suggested by one channel flake recovered in Locus A (Figure 4.9c).

Burrow mottles and other biogenic features in the red chert recovered from Locus C facilitated the refitting of ten sets of uniface resharpening flakes. Additional debitage and tool fragment refits within the remaining loci suggest limited taphonomic dispersal of the Paleoindian assemblage across the site. Most refit fragments are separated by three meters or less horizontally and thirty centimeters or less vertically. The distribution of artifacts therefore appears to have been minimally altered by post-depositional site formation processes, such as small-scale bioturbation, resulting in the slight vertical and horizontal dispersal of lithics. The overall pattern of refits suggests that the distribution of Paleoindian tools and debitage across Ohomowauke likely reflect relatively intact Paleoindian activity areas that maintained a separation of biface production/discard and uniface resharpening/discard.

4.3.2.8 Radiocarbon Dating

The poor preservation of organics hampered the recovery of datable material from the Paleoindian component of Ohomowauke (e.g. Dincauze 1993). Since no definitive Paleoindian features were identified, charred botanicals were collected from natural soil matrices associated with concentrations of burned Paleoindian lithics. Two attempts to date the botanicals associated
with burned Paleoindian lithics returned dates that are unacceptably young for the Paleoindian component with a *Corylus sp.* shell fragment dated to $1030 \pm 30 \text{ } ^{14} \text{C BP}$ (Beta-367680) and a *Nymphaea sp.* seed dated to $1870 \pm 30 \text{ BP}$ (Beta-343714). Potential additional materials for radiocarbon dating will be identified after an analysis of the total assemblage of charred botanical and calcined faunal remains recovered from Ohomowauke.

### 4.4 Comparison of Hidden Creek and Ohomowauke

The intensive excavation of the Late Paleoindian Hidden Creek site and the Middle Paleoindian Ohomowauke site permit direct comparison of the technological organization and land use patterns employed during the two Paleoindian occupations at Mashantucket.

#### 4.4.1 Site Locations

The two sites are located ~750 meters apart on the east side of the Pequot Cedar Swamp. Hidden Creek and Ohomowauke share similar elevations on their respective landforms with close proximity to streams containing fresh running water draining into the Cedar Swamp. Although the sites are only separated by ~750m, the soil matrices differ markedly. The soil at Hidden Creek is composed primarily of redeposited aeolian silt with few naturally occurring pebbles, expressing a well-drained sandy context similar to many Paleoindian localities in the Northeast (Gramly and Funk 1990:12; Spiess et al. 1998:230). Contrary to the sandy well-drained soils present at Hidden Creek, Ohomowauke is located on glacial ablation till, comprised of very stony, poorly-drained soils. While not typical of most Paleoindian site contexts, it is comparable to that of many of the loci investigated in the Israel River complex in northern New Hampshire (Boisvert 1998:102). Bioturbation within the fine sediments at Hidden Creek was unlikely to alter artifacts significantly, while at Ohomowauke, a degree of edge damage caused
by artifact drift in the stony sediments was likely, and may in part explain the large number of flakes that that appear to express use-wear (e.g. Sala 1986).

Finally, the terrace bench on which Hidden Creek is located is a small landscape feature providing little room for additional work or habitation areas. In short, the size of the landform directly limited the number of individuals who could have stayed there (e.g. Bamforth et al. 2005:571). Ohomowauke is situated across a much broader terrace slope that provided ample room for multiple activity and habitation areas.

4.4.2 Lithic Technological Organization

Direct comparison between the lithic assemblages at Hidden Creek and at Ohomowauke is hampered by the different screening techniques employed at each site. Hidden Creek was screened exclusively through 1/8” mesh, while Ohomowauke was screened primarily through 1/4” mesh (Locus A alone was screened through 1/8” mesh). As flake size production is skewed exponentially toward small shatter and dust (Patterson 1990:551), 1/8” mesh yields much moredebitage than 1/4” mesh (Ozbun 2011; Price 2012). Consequently, examination of the artifact assemblages requires consideration that the excavations at Ohomowauke did not capture a portion of the very small lithic fragments and debitage present at the site. Discarded tools and tool fragments, however, tend to be large enough to be captured in 1/4” mesh, so that comparison between tool assemblages may be made with some certainty. Since intra-assemblage raw material profiles are based on total assemblage toolstone proportions from each site, they are also considered to be comparable, even with the different recovery techniques.

In order to compare the debitage assemblages from the two sites, we assume that knapping activities were similar and that 1/4” mesh will fail to capture between 60%-99% of the flakes that would be captured in 1/8” mesh (Price 2012:20). A speculative comparison of the debitage
between Hidden Creek and Ohomowauke can be standardized accordingly, with the debitage numbers from Ohomowauke increased by 5 times to simulate a 20% sample recovered via the 1/4” inch mesh. The 3,313 debitage total from Hidden Creek is relatively comparable to Ohomowauke’s 1/8”-recovered debitage estimate of 3,066.

Ohomowauke’s assemblage of 85 tools and tool fragments is also comparable to the 74 tools and fragments recovered at Hidden Creek (Table 4.6). Both sites have similar numbers of discarded unifacial tools and biface fragments, including a few discarded preforms and probable projectile point bases. Differences between the tool assemblages include the presence of gravers and pieces esquillee at Ohomowauke, which are absent at Hidden Creek, and the presence of the small biface fragments and heavy-duty expedient tools at Hidden Creek, which are absent at Ohomowauke. Also, the Ohomowauke assemblage contains a much higher proportion of utilized flakes (54% of the tool assemblage), which may in part be attributed to the site’s stony sediments where bioturbation likely resulted in edge damage to some artifacts.

The absence of small biface fragments and heavy-duty expedient tools at Ohomowauke may relate to the excavation strategy employed at Ohomowauke. The predominant use of 1/4” mesh at Ohomowauke may have resulted in small biface fragments falling through the screen aperture. The lack of recognized heavy-duty expedient tools at Ohomowauke results from the inability to assign expedient tools of local toolstone to specific cultural traditions at the multi-component site. Also, since natural cobbles were absent at Hidden Creek, all stone larger than about 2cm was considered cultural and was usually collected. The lack of gravers and pieces esquillee at Hidden Creek, on the other hand, likely results from Paleoindians failing to actually use and discard these tools in the excavated site area.
Macroscopically similar toolstones are used in both Paleoindian assemblages, though they are used in different proportions (See Figure 4.1 for quarry locations). The majority toolstone at Hidden Creek is a gray-green chert that is likely Normanskill chert, the first-tier minority toolstone is a red “siliceous siltstone” that may be Munsungun chert, and the second-tier minority toolstone is jasper that probably originated in eastern Pennsylvania. The raw material profile at Ohomowauke, on the other hand, consists of jasper as the majority toolstone, gray-green chert as the first-tier minority toolstone, and red chert as the second-tier minority toolstone.

4.4.3 Site Area and Intrasite Patterning

The total site area and density of Paleoindian lithics is notably different at Ohomowauke and Hidden Creek. At Ohomowauke, Paleoindian lithics were recovered in low densities over 380 1x1 meter units an average of just over two lithics per m² unit, whereas, the main concentration of Paleoindian lithics at Hidden Creek were recovered in a high density concentration from a small block of 27.5 m² units that averaged over one hundred lithics per m² unit. Differential screening techniques employed at Hidden Creek and Ohomowauke somewhat affect the comparison between overall densities per m² unit at the sites; nevertheless, Hidden Creek contained a much higher density of lithics than Ohomowauke. Although the tool assemblages of Ohomowauke and Hidden Creek are comprised of similar types and quantities of tools, the separation of areas associated with biface production/discard and uniface resharpening/discard differs between the two sites. Ohomowauke has clear spatial segregation between biface production/discard and uniface resharpening/discard, even among areas where 1/4” mesh screening may have missed a substantial portion of small resharpening flakes. Areas of biface production/discard and uniface resharpening/discard both occur in the single dense
Hidden Creek locus, where they appear to have been spatially separated as well, but at a much smaller scale.

The separation of biface production/discard areas from uniface resharpening/discard areas has been observed at many Paleoindian sites in the New England Maritimes region (Curran 1984, Robinson et al. 2009) and the Great Lakes (Ellis and Deller 2000:191), including Bull Brook (Robinson and Ort 2013), Debert (MacDonald 1968:133), Whipple (Curran 1984:31), Neponset (Carty and Spiess 1992:26), Murphy (Jackson 1996:35), Halstead (Jackson 1998), and Parkhill (Ellis and Deller 2000). The intrasite patterning at Ohomowauke and Hidden Creek provides additional evidence that Paleoindians often maintained a separation of biface-dominated activities from uniface dominated activities. The consistent separation of these activities may reflect a gendered division of labor at Paleoindian campsites throughout the Northeast (Chilton 1994; Deller and Ellis 2011:148-149; Robinson et al. 2009:439).

4.5 Explanations for Variability in Mashantucket Paleoindian Sites

The small lithic assemblages from Hidden Creek and Ohomowauke suggest that both sites are likely to have been short-term occupations. Spatial patterning at these sites appears not to have been blurred by long-term occupations or many reoccupations. Differences between the sites can therefore be examined in terms of diachronic change, site function, occupation parameters, and seasonality.

4.5.1 Change Over Time

Since the Late Paleoindian Hidden Creek site was occupied after the Middle Paleoindian Ohomowauke site, the differences in the raw material profiles, tool assemblages, and spatial organization of the sites should reflect changes in Paleoindian mobility patterns and material acquisition strategies over time (e.g. Ellis and Deller 1997). Although Hidden Creek and
Ohomowauke contain similar toolstones, the difference in the proportions of each lithic raw material in the assemblages may reflect changes in transport vectors over time (Ellis and Deller 1997:15, Ellis 2011). For instance, the decrease in jasper use between the two sites may reflect reduced access to eastern Pennsylvania jasper by the Late Paleoindian period because of demographic packing (Lothrop and Bradley 2012:30). However, if the red chert present at both Hidden Creek and Ohomowauke is Munsungun, then the Hidden Creek raw material profile does not suggest decreased toolstone transport distance to the north. This observation could be linked with the continuation of seasonal ranges that included the exploitation of northern resources, such as caribou (Curran and Grimes 1989, Pelletier and Robinson 2005).

The lack of pieces esquillee and gravers in the Hidden Creek assemblage, which are present at Ohomowauke, may relate to a change in Paleoindian lithic technology over time (Ellis and Deller 1997:17, Jones 1997:59). Similarly, the change in projectile point forms from the systematic full face fluting of points at the Middle Paleoindian Ohomowauke site to the production of collaterally flaked projectile points results from well-documented diachronic changes in Paleoindian technological and stylistic traditions (Bradley et al. 2008; Buchanan and Hamilton 2009; Newby et al. 2005:152).

Differences in landform choice and spatial organization between Hidden Creek and Ohomowauke also may correlate to the different ages of the sites. The selection of the Hidden Creek and Ohomowauke landforms may have resulted from local, temporally short-lived, environmental conditions affecting the desirability of each campsite (Spiess 1984; Spiess et al. 2012). The physical difference in land form size between the two sites also limited how they could be used and the number of people who could occupy the available space.
4.5.2 Site Function

Potential site functions also may explain similarities and differences between the Hidden Creek and Ohomowauke Paleoindian occupations. The similar tool kits recovered from Hidden Creek and Ohomowauke suggest that onsite production and discard of projectile points and maintenance and discard of unifacial scraping tools occurred at both sites. Accordingly, the range of formal and expedient tools and the similar quantities of debitage recovered suggest that Hidden Creek and Ohomowauke both functioned as short term residential camp sites (Lothrop and Bradley 2012:19). The difference in spatial organization of activities areas between the two sites - with the clear separation of biface production/discard and uniface resharpening/discard at Ohomowauke and the single locus containing both uniface and biface related tasks at Hidden Creek – likely relates to the different spacing of individuals performing a variety of domestic tasks. At Hidden Creek, all of the domestic activities were performed in a confined space, whereas, at Ohomowauke, the same domestic activities were dispersed and segregated across the landform.

4.5.3 Site Occupation Parameters

Additional similarities and differences between Hidden Creek and Ohomowauke may be related to variation in occupation parameters, such as occupation duration, number of site occupants, and instances of reoccupation (Bamforth et al. 2005; O’Connell 1987:103-104; Shott 1997; Spiess 1984; Surovell 2009:99). If we assume that both sites were created with the same constant lithic discard rate and that no additional loci failed to be recovered at either site, then the similarity in overall lithic assemblage counts between Hidden Creek and Ohomowauke, once standardized for differential screening technique, implies a similar number of person days were spent at both locations (Robinson et al. 2009:428; Spiess 1984:282). Since person days account
for occupation duration, number of site occupants, and reoccupations, variation in any of these parameters may have resulted in the documented assemblages. The small size of the Hidden Creek landform likely limited the number of site occupants, while occupation on the Ohomowauke landform was less constrained. Consequently, a smaller group likely occupied Hidden Creek for a longer duration to create the similar overall lithic assemblage when compared to Ohomowauke.

4.5.4 Seasonality

Variation in the technological and spatial organization of Hidden Creek and Ohomowauke may largely result from seasonal differences between the two occupations. The raw material profiles observed may arise from the amount of time passed since the last visit to specific quarry sites (Curran and Grimes 1989, Pelletier and Robinson 2005). The contrasting proportions of jasper at Hidden Creek and Ohomowauke, for example, may suggest that jasper was acquired seasonally during band-related movements south of the NEM. Consequently, the Ohomowauke Paleoindians may have arrived at Mashantucket from the southwest shortly after procuring jasper before trekking north in the spring, whereas the exhausted supply of jasper at Hidden Creek might suggest that this group of Paleoindians may have stopped at Mashantucket on a southern return trip during the fall or winter after exploiting areas further north.

The presence of pieces esquillee and gravers at Ohomowauke and the lack of these tools at Hidden Creek may relate to differences in seasonal tasks at each site. Pieces esquillee (Lothrop and Gramly 1982) and gravers (Osborn 2014) are postulated to be used for fabricating bone and antler tools employed in clothing manufacture. The presence of gravers and pieces esquillee at Ohomowauke and their absence at Hidden Creek may simply reflect seasonal differences in hide working (Loebel 2013:329; Monks 1981:221; Osborn 2014:58; Spiess 1984:284).
The contrasting intrasite organization and lithic densities at Ohomowauke and Hidden Creek may also stem from seasonal differences in Paleoindian campsite organization. The cleanly bounded dense concentration encompassing the entire lithic assemblage at Hidden Creek with an absence of activity areas outside the main locus suggests that the Hidden Creek occupants were clustered inside a shelter during a cold weather occupation (Goodby *This Volume*; Robinson et al. 2009:439). Conversely, the low-density concentrations of lithics dispersed across the landform at Ohomowauke may derive from Paleoindians spreading out their campsite during warm weather (e.g. Binford 1993:111). The many dispersed activity areas at Ohomowauke also could result from a larger group size related to seasonal fluctuations in group membership (Amick 1996:422).

4.6 Conclusion

Analysis of Hidden Creek and Ohomowauke suggests that both sites are likely small upland campsites that were occupied near the Pequot Cedar Swamp to exploit wetland resources during the terminal Pleistocene and early Holocene. Given the significant environment changes that occurred during the Younger Dryas and Early Holocene (e.g. Jones 1998, Newby et al. 2005, Lothrop et al. 2011), the continuity of Paleoindian land use at Mashantucket was unexpected (Jones and Forrest 2003:79). Nevertheless, the comparison between Hidden Creek and Ohomowauke highlights overarching similarities in the two site occupations that suggest a conservative pattern of landuse practiced by Paleoindians from the Terminal Pleistocene into the Early Holocene.

The similar suites of toolstones in the Hidden Creek and Ohomowauke assemblages suggest that both groups of Paleoindians maintained a consistent sphere of socioeconomic contact resulting in both direct and indirect acquisition of toolstones. At both sites these
materials likely derived from outcrops located in eastern Pennsylvania, eastern New York, and northern Maine. Differences in the proportions of these materials observed at each site suggest that Ohomowauke was approached from the southwest, while Hidden Creek was arrived at from the northwest. These differences may relate more to the seasonality of each occupation than to significant changes in band territoriality over time. The northeast movement of the majority toolstone at Ohomowauke may relate to the group of Paleoindians traveling north into the NEM during warm seasons, whereas the southeast movement of the primary toolstone at Hidden Creek suggests a Paleoindian band traveling south, perhaps to an overwinter range. The different spatial organization of Hidden Creek and Ohomowauke suggests that Paleoindians were flexible in structuring their short term campsites. The major differences between spatial organization at these sites likely relates to different seasons of occupation, with the one concentrated activity area at Hidden Creek inferred to be a cold weather occupation and the many dispersed loci at Ohomowauke presumed to result from a warm weather occupation.

The identification of these two Paleoindian sites is the result of intensive efforts to locate late Pleistocene and early Holocene archaeological sites at Mashantucket using high-resolution archaeological survey methods advocated by Jones (1997:77, 1998:142). The product of these efforts is the generation of data highlighting local diversity in Paleoindian occupations in terms of their lithic assemblage composition, intrasite spatial patterning, and site locations, that likely reflect flexibility in Paleoindian technological and social organization on a seasonal scale.
Figure 4.1 Location of Mashantucket and major Northeastern lithic outcroppings.
Figure 4.2 Topographic map of Mashantucket illustrating the location of Hidden Creek and Ohomowauke to the east of the Pequot Cedar Swamp.
Figure 4.3 Distribution of Paleoindian debitage at Hidden Creek.
Figure 4.4 Distribution of tools at Hidden Creek. (Left) Distribution of endscrapers, preforms, points and biface fragments. (Right) Distribution of sidescrapers and retouched/utilized flakes.
Figure 4.5 Ohomowauke site map showing location of the loci within the site boundaries.
Figure 4.6 Ohomowauke Bifaces and Biface fragments: (A) base of Michaud-Neponset style fluted point; (B) preform distal fragment; (C) overshot channel flake with remnant preform tip; (D) marginally retouched biface; (E-F) medial fragment of preforms.
Figure 4.7 Distribution of tools at Ohomowuke. (Right) Distribution of the fluted point, bifaces, endscrapers and channel flakes. (Left) Distribution of gravers, pieces esquillee, sidescrapers, and retouched/utilized flakes.
Figure 4.8 Distribution of bifacial and unifacial debitage at Ohomowauke.
Figure 4.9a Distribution of jasper at Ohomowuke.
Figure 4.9b Distribution of green chert at Ohomowauke.
Figure 4.9c Distribution of red chert at Ohomowauke.
Table 4.1 Raw material profile for Paleoindian assemblage at Hidden Creek.

<table>
<thead>
<tr>
<th>Raw Material</th>
<th>Count</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray-Green, Glassy Green &amp; Tan Chert</td>
<td>3,267</td>
<td>97.67%</td>
</tr>
<tr>
<td>Red-Brown “Siliceous Siltstone”</td>
<td>76</td>
<td>2.27%</td>
</tr>
<tr>
<td>Jasper</td>
<td>2</td>
<td>.06%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,345</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Table 4.2 Radiocarbon dates from Hidden Creek.

<table>
<thead>
<tr>
<th>Lab #</th>
<th>$^{14}$C Age</th>
<th>$1\sigma$ Calibration (BP)</th>
<th>$2\sigma$ Calibration (BP)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-126817</td>
<td>10260 ± 70</td>
<td>12135-11824</td>
<td>12384-11756</td>
<td>N7W1 NW. 70-75cm below surface. Hazelnut shell fragment identified by Lucinda McWeeney</td>
</tr>
<tr>
<td>Beta-149920</td>
<td>9150 ± 40</td>
<td>10375-10239</td>
<td>10420-10229</td>
<td>N7W1 SW. 50-55cm below surface. Cattail fragment identified by D. Perry</td>
</tr>
<tr>
<td>Beta-121846</td>
<td>9150 ± 50</td>
<td>10378-10238</td>
<td>10486-10225</td>
<td>N9E1 SW. 45-50cm below surface. Conifer charcoal identified by L. McWeeney collected from unit containing a concentration of burned chert flakes, associated charcoal included additional pine and oak</td>
</tr>
<tr>
<td>Beta-57274</td>
<td>7800 ± 80</td>
<td>8695-8452</td>
<td>8971-8413</td>
<td>N9W1 SE. 50-60cm below surface. Non-feature wood charcoal from Paleoindian artifact-bearing horizon (non-AMS)</td>
</tr>
<tr>
<td>Beta-60979</td>
<td>7630 ± 120</td>
<td>8560-8339</td>
<td>8702-8177</td>
<td>N9W1 SE. 40-50cm below surface. Non-feature wood charcoal from Paleoindian artifact-bearing horizon (non-AMS)</td>
</tr>
</tbody>
</table>

*Note: Calibration ranges obtained from IntCal13 (Reimer et al. 2013).*
### Table 4.3 Toolstone distribution among the loci at Ohomowauke.

<table>
<thead>
<tr>
<th>Raw Material</th>
<th>Locus A</th>
<th>Locus C</th>
<th>Locus D</th>
<th>Locus E</th>
<th>Loci F,G,H</th>
<th>Total Assemblage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray-Green &amp; Green Chert</td>
<td>32.3</td>
<td>0.1</td>
<td>31</td>
<td>49.7</td>
<td>6.3</td>
<td>119.2</td>
</tr>
<tr>
<td>Jasper</td>
<td>16.5</td>
<td>119.5</td>
<td>117</td>
<td>227</td>
<td>30.8</td>
<td>132.4</td>
</tr>
<tr>
<td>Red Chert</td>
<td>9.7</td>
<td>17.1</td>
<td>1.3</td>
<td>8</td>
<td>16.6</td>
<td>111</td>
</tr>
<tr>
<td>Spherulitic Rhyolite</td>
<td>18.6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>19.6</td>
</tr>
<tr>
<td>Black chert</td>
<td>4.2</td>
<td>0</td>
<td>0.1</td>
<td>7</td>
<td>0.2</td>
<td>1</td>
</tr>
<tr>
<td>Chaledony</td>
<td>11.9</td>
<td>25</td>
<td>4.3</td>
<td>0.4</td>
<td>3</td>
<td>20.4</td>
</tr>
<tr>
<td>Quartz</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>93.2</td>
<td>309</td>
<td>147</td>
<td>104</td>
<td>151.2</td>
<td>664.7</td>
</tr>
</tbody>
</table>

### Table 4.4 Tools organized by raw material at Ohomowauke.

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Gray-Green &amp; Green Chert</th>
<th>Jasper</th>
<th>Red Chert</th>
<th>Black Chert</th>
<th>Chaledony</th>
<th>Spherulitic Rhyolite</th>
<th>Crystal Quartz</th>
<th>Total Assemblage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biface Fragments</td>
<td>66</td>
<td>15</td>
<td>268.2</td>
<td>45</td>
<td>18</td>
<td>3.5</td>
<td>1</td>
<td>411.9</td>
</tr>
<tr>
<td>Small Biface Fragments</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Endscrapers</td>
<td>28.8</td>
<td>3</td>
<td>43.4</td>
<td>8</td>
<td>11.2</td>
<td>3*</td>
<td>0</td>
<td>111</td>
</tr>
<tr>
<td>Side Scrapers</td>
<td>0</td>
<td>0</td>
<td>72.7</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>72.7</td>
</tr>
<tr>
<td>Uniface Fragments</td>
<td>0</td>
<td>0</td>
<td>6.7</td>
<td>5</td>
<td>8.1</td>
<td>3</td>
<td>0</td>
<td>14.8</td>
</tr>
<tr>
<td>Utilized and Edge Retouched Flakes</td>
<td>31.2</td>
<td>11</td>
<td>104.5</td>
<td>20</td>
<td>22.7</td>
<td>11</td>
<td>3.5</td>
<td>111</td>
</tr>
<tr>
<td>Pieces Equilibrated</td>
<td>0</td>
<td>0</td>
<td>14.7</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15.5</td>
</tr>
<tr>
<td>Gravers</td>
<td>0</td>
<td>0</td>
<td>5.2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5.2</td>
</tr>
<tr>
<td>Heavy Duty Expedient Tools</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>15</td>
<td>268.2</td>
<td>45</td>
<td>18</td>
<td>3.5</td>
<td>1</td>
<td>411.9</td>
</tr>
</tbody>
</table>

*One endscraper refit from two fragments for a total of 85 tools and tool fragments.

### Table 4.5 Debitage organized by raw material at Ohomowauke.

<table>
<thead>
<tr>
<th>Debitage Type</th>
<th>Gray-Green and Green Chert</th>
<th>Jasper</th>
<th>Red Chert</th>
<th>Black Chert</th>
<th>Chaledony</th>
<th>Spherulitic Rhyolite</th>
<th>Total Assemblage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Biface Resharpening Flakes</td>
<td>15.9</td>
<td>149</td>
<td>6.6</td>
<td>35</td>
<td>5</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Large Biface Resharpening Flakes</td>
<td>3.1</td>
<td>6</td>
<td>2.8</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Proximal Biface Resharpening Flakes</td>
<td>5.9</td>
<td>45</td>
<td>12.5</td>
<td>41</td>
<td>2</td>
<td>1.6</td>
<td>7</td>
</tr>
<tr>
<td>Biface Reduction Flakes</td>
<td>5.2</td>
<td>1</td>
<td>10.1</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>1.2</td>
</tr>
<tr>
<td>Channel Flakes Fragments</td>
<td>9.6</td>
<td>18</td>
<td>1.7</td>
<td>2</td>
<td>2.2</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>Unilateral Resharpening Flakes</td>
<td>4.5</td>
<td>5</td>
<td>17.2</td>
<td>56</td>
<td>11.8</td>
<td>27</td>
<td>0.4</td>
</tr>
<tr>
<td>Bipolar/PE Spalls</td>
<td>0</td>
<td>0</td>
<td>8.7</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>5.6</td>
</tr>
<tr>
<td>Flake Fragments</td>
<td>12.5</td>
<td>129</td>
<td>41.7</td>
<td>168</td>
<td>14.4</td>
<td>52</td>
<td>1.6</td>
</tr>
<tr>
<td>Angular Debris</td>
<td>9</td>
<td>10</td>
<td>46.7</td>
<td>26</td>
<td>2.8</td>
<td>5</td>
<td>7.1</td>
</tr>
<tr>
<td>Total</td>
<td>53.5</td>
<td>363</td>
<td>148</td>
<td>348</td>
<td>31.9</td>
<td>92</td>
<td>2.6</td>
</tr>
</tbody>
</table>

*One endscraper refit from two fragments for a total of 85 tools and tool fragments.
Table 4.6 Comparison of Hidden Creek and Ohomowauke tool assemblages.

<table>
<thead>
<tr>
<th>Tool assemblage</th>
<th>Hidden Creek</th>
<th>Ohomowauke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biface Fragments</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Small Biface Fragments</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Endscrapers</td>
<td>11</td>
<td>16*</td>
</tr>
<tr>
<td>Side-Scrapers</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Uniface Fragments</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Utilized and Edge retouched Flakes</td>
<td>22</td>
<td>46</td>
</tr>
<tr>
<td>Pieces Esquillees</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Gravers</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Heavy Duty Expedient Tools</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
<td><strong>84</strong>*</td>
</tr>
</tbody>
</table>

*One endscraper refit from two fragments for a total of 85 tools and tool fragments.
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Chapter 5: Sub-Regional Patterning of Paleoindian Sites with Michaud-Neponset Points in New England and the Canadian Maritimes

5.1 Introduction

Sub-regional patterning in subsistence strategies, settlement behaviors, and technological organization has been recognized in Paleoindian occupations of the Southwest (Amick 2000; Bement and Carter 2015), Great Lakes (Carr 2012, Ellis and Deller 1997; Jackson 1997), and Middle Atlantic (Lowery 2002), suggesting that Paleoindians adapted to regional variations in resources. Sub-regional variation within study regions indicates that Paleoindian groups compiled knowledge concerning local and regional landscapes, which they used to schedule resource procurement throughout the year (Cannon and Meltzer 2004; Jones 1998; Kitchel 2016b; Sellet 2013).

In the New England and Canadian Maritimes study region (NEM), acidic soils have limited the preservation of organic remains that might aid in the reconstruction of sub-regional patterning in Paleoindian lifeways (Bonnichsen et al. 1991, 28; Gingerich and Kitchel 2015, 298; Jordan 1975:71; Spiess et al. 1985, 146). Due to the paucity of preserved organic remains in the NEM, studies of sub-regional variation in Paleoindian adaptations have focused on modeling Paleoindian settlement behaviors by investigating Paleoindian site locations and lithic distribution patterns and their relationship to resource distributions based on local and regional environmental reconstructions (Curran and Grimes 1989; Jones 1998; Lothrop et al. 2016, 228; Newby et al. 2005; Pelletier and Robinson 2005; Spiess and Wilson 1989). Paleoenvironmental reconstructions of the NEM indicate subarctic-like habitats that would have probably fostered

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4 This paper has been submitted to *PaleoAmerica.*
long-distance migratory behaviors in caribou (Newby et al. 2005). Based on general analogy to subarctic foragers, caribou was a primary prey target, however additional resources including maritime resources from the Champlain Sea (F. Robinson 2012), moose, birds, and fish may have also been procured as shortfall resources or seasonally (Burch 1972). The few recovered calcined bone fragments from NEM sites (Spiess et al. 1985; Lothrop et al. 2016, Table 7) suggest that Paleoindian groups hunted caribou, at least as a seasonal interior adaptation (Lothrop et al. 2016, 229).

Newby and colleagues (2005) and Lothrop et al. (2011) offer the most comprehensive models of Paleoindian settlement behaviors in relation to hypothesized caribou predation as a primary prey species by investigating Paleoindian site distributions and lithic source use in connection to the potential distribution of habitats attractive to caribou. Both of these models indicate that Paleoindian settlement behaviors in the NEM are suggestive of caribou-focused subsistence throughout the NEM, at least as a seasonal interior adaptation. An alternative model to explain Paleoindian settlement behaviors in the NEM is posited by Bradley and Boudreau (2006, 69), who suggest that the NEM region contains two band territories identified by a southern NEM lithic conveyance zone and a central/northern NEM lithic conveyance zone. In this model, the southern NEM lithic conveyance zone is recognized by the dominance of Normanskill chert in the Hudson Valley and Champlain Valley chert from Vermont. The central/northern NEM lithic conveyance zone is characterized by the dominance of Munsungun chert from northern Maine and spherulitic rhyolites from northern New Hampshire.

These previous models focus on investigating the entire timespan of the Paleoindian occupation of the NEM, therefore they only briefly examine temporal subsets of the Paleoindian period to compare settlement behaviors through time. In this paper, I attempt to minimize the
time averaging effects that might be caused by comparing sites with different fluted point styles via focusing my analysis on one temporal subset of the Paleoindian occupation in the NEM (Spiess et al. 1998, 231). The temporal subset that I use in this study is Middle Paleoindian sites with Michaud-Neponset fluted points (Figure 5.1, Table 5.1). These sites contain fluted points that are characterized by their prominent basal ears, long channel flake scars that often extend the full length of the point, slightly divergent lateral margins, and moderately deep basal concavities (Bradley et al. 2008, 141–146; Lothrop et al. 2011:554). Michaud-Neponset points are similar to Barnes points from the Eastern Great Lakes and Cumberland points from the southeast (Lothrop et al. 2016, 207). Based on the chronometric hygiene radiocarbon dating study conducted by Lothrop et al. (2016, 210), sites with Michaud-Neponset fluted points in the NEM date to a century or two on both sides of 12,000 Cal yr BP. The relatively restricted dates for sites with Michaud-Neponset fluted points indicate that the settlement behaviors reconstructed for these sites may reasonably be compared to settlement behaviors associated with the lifetime ranges of ethnographically documented foragers, which comprise the cumulative annual ranges used by a group over the lifetimes of the individuals that comprise the group (Binford 1983:42).

This paper investigates the sub-regional patterning in NEM Paleoindian sites with Michaud-Neponset points to test whether the region contained one large territory or separate band-related territories in the southern NEM and the central/northern NEM. These alternate hypotheses will be investigated by comparing sub-regional patterning in settlement behaviors to general models of residentially mobile caribou hunters that employ “herd following” caribou hunting strategies (sensu Burch 1972, 1991), which involve foragers undertaking rapid long distance movements to stay in close proximity with caribou during their seasonal migrations between wintering grounds in the boreal forest and calving grounds on the tundra (Carr 2012;
Based on ethnographic analogies from subarctic caribou hunters (Binford 1978, 2001; Burch 1972, 1991; Helm 1993; Jarvenpa and Brumbach 1988; Loring 1997; Parlee et al. 2005; Smith 1976; Spiess 1979; Waguespack 2005), herd following strategies would result in sub-regional patterning in Paleoindian settlement behaviors due to the seasonal latitudinal movements of migratory caribou and their patterns of herd aggregation and dispersal (Carr 2012; Curran and Grimes 1989; Jackson 1997; Pelletier and Robinson 2005).

Paleoindian settlement behaviors will be reconstructed through inferring range mobility and interaction (Sections 5.2.2 and 5.4.1), examining site location characteristics (Sections 5.2.3 and 5.4.2), estimating residential group occupation sizes (Sections 5.2.4 and 5.4.3) and determining the tasks conducted throughout the region by investigating the relative proportions of tool types distributed among the sites (Sections 5.2.5 and 5.4.4; Figure 5.5).

5.2 Archaeological Expectations for Herd Following Caribou Hunters in the NEM

5.2.1 Habitats and Migratory Caribou Behavior in the NEM

The Younger Dryas (YD), 12,900–11,600 calendar years before present, impacted the environment of the NEM by creating colder and drier conditions than present (Hou et al. 2006; Lothrop et al. 2016:201; Shuman et al. 2004). During the latter portion of the YD around 12,000 Cal yr BP, the NEM contained latitudinally organized subarctic-like habitats, including sedge tundra that was likely drier than modern arctic tundra, highland tundra in the mountains of northwestern Maine and the White Mountains, spruce parkland, and closed boreal forests (See Figure 5.1) (Newby et al. 2005; Spiess and Newby 2002). The latitudinal organization of these subarctic-like habitats would have created ideal conditions for long-distance migratory caribou herds to occupy the sedge tundra during the summer and migrate to the boundary of the spruce
parkland and closed forests for wintering grounds (Newby et al. 2005). Small bands of locally migratory caribou may have occupied the highland tundra and migrated following altitudinal gradients in habitats. Additional small bands of woodland caribou were likely presented in the closed forests of southern New England (Spiess and Newby 2002:35).

5.2.2 Settlement Behavior: Range Mobility and Interaction

If Middle Paleoindians in the NEM were following migratory caribou throughout their seasonal migrations between calving areas and wintering grounds in a similar manner as do some ethnographically documented subarctic foragers (Binford 2001, Table 5.01; Burch 1972, 1991; Ellis 2011; Kelly 1983; Parlee et al. 2005; Smith 1976), then M-N sites would be expected to contain varying proportions of northern and southern toolstone sources indicative of extensive range mobility including rapid long distance movement between caribou calving areas and wintering areas (Curran and Grimes 1989; Ellis 1989, 2011; Koldehoff and Loebel 2009; Pelletier and Robison 2005, 171).

Paleoindian range mobility and social interaction will be investigated by examining relative proportions of toolstones among the sites. Most of the toolstone designations are based on macroscopic identifications; however, some assemblages have also been subjected to geochemical testing and petrographic analyses (Burke 2006; Kitchel 2016a; Lothrop et al. In Review; Pollock et al. 1999, 2008). The majority toolstone and first-tier minority toolstone in the assemblages likely reflect direct procurement and will be used as a proxy for Paleoindian range mobility (Curran and Grimes 1989; Ellis 1989, 2011). Minority toolstones may be obtained through a combination of direct procurement, acquisition through exchange, individual toolkit movement among bands, or logistic procurement by small parties dispersed from their residential groups (Custer and Stewart 1990, 318; Lothrop and Bradley 2012, 28; Ingbar 1994; Spiess and
Accordingly, the minority toolstones are likely monitoring both indirect procurement of toolstone through social interactions and the remnants of toolstones acquired earlier in the annual round via serial direct procurement, however discriminating the method of procurement for minority toolstones is fraught with equifinality (Ellis 1989, 2011; Meltzer 1989).

Based on Ellis’s (2011) study of Paleoindian range mobility in the Northeast, majority toolstone transportation including instances of straight-line movements over 300km are considered to reflect residential mobility. Newlander (2015:126) indicates that the ethnographic record only documents toolstone movements over 300km as resulting from social and ideological pursuits and exchange, not residential mobility (Also see Speth et al. 2013:114-121). Newlander and Speth, however, rely mainly on ethnographic data from Australian Aborigines, who inhabited environments distinct from the environments in which Paleoindians lived in northeastern North America. Since environmental reconstructions for the NEM during the Michaud-Neponset fluted point occupations indicate subarctic-like conditions, general analogies to ethnographically documented subarctic foragers seem most appropriate. Subarctic caribou hunters have the highest levels of annual residential mobility and largest annual and lifetime territory sizes of ethnographically documented foragers without the aid of equestrian or motor transportation (Table 5.2) (Binford 1983, 2001, Table 5.01; Burch 1972; Ellis 2011; Kelly 1983), therefore Paleoindian toolstone movement is expected to reflect high levels of residential range mobility and large annual and lifetime territory sizes.

5.2.3 Settlement Behavior: Site Location

If Middle Paleoindians in the NEM were following migratory caribou in a similar fashion as some ethnographically documented subarctic foragers, then sites in the central and northern
portions of the NEM would be expected to be associated with geomorphic landscapes conducive for caribou hunting during seasons when aggregated caribou herds were present (Binford 1978; Burch 1991; Helm 1993; Loring 1997; Jarvenpa and Brumbach 1988; Parlee et al. 2005). Sites in the northern and central NEM should also be associated with geomorphic landscapes where alternative resources could be procured during seasons of caribou dispersion. If, like some ethnographically documented subarctic foragers, Middle Paleoindians were occupying the southern NEM forest coinciding with the winter dispersal of migratory caribou, then the site locations in this area are expected to be associated with geomorphic landforms conducive for winter hunting of satellite herds of woodland caribou, solitary cervids, bear, and small game.

Paloindian settlement behavior will be examined by investigating the geomorphic landforms associated with the locations of site. The geomorphic landforms associated with the locations of sites will be characterized by their surficial geology and local environmental reconstructions.

5.2.4 Settlement Behavior: Residential Group Occupation Size

If Middle Paleoindians in the NEM were following migratory caribou, as do some ethnographic subarctic foragers, then M-N sites are expected to contain evidence for cyclical nucleation, which is the scheduled aggregation and dispersion of bands in forager societies (Binford 2001, Table 8.01; Carlson and Bement 2013; Carr 2012; Jackson 1997, 140; Jarvenpa and Brumbach 1988; F. Robinson 2012, 207; Smith 1976; Spiess 1979, 103–139). Boisvert (2012) defines Paleoindian site types in the NEM based on lithic data, which is used to estimate residential group occupation sizes and activities conducted on sites. Boisvert’s site types include quarry-lithic extraction sites, lithic workshops, kill sites, small-scale hunter-forager transient camps, and aggregated basecamps. Periodic regional aggregation sites should be added to this
list based on the work of Brian Robinson and colleagues (2009) at Bull Brook. Transient camps correlate with residential campsites during the most dispersed phase of cyclical nucleation, basecamps are equivalent to residential campsites created during the aggregated phase of cyclical nucleation, and periodic regional aggregation sites refer to the residential campsites that are formed during macroband aggregations that periodically occur. Multi-family basecamps and regional macroband aggregations to facilitate communal caribou hunts would be expected in the northern and central portions of the NEM occupied by migratory caribou herds. Transient camps would be expected to occur throughout the NEM, including the southern NEM, and may have been created during times when groups lacked direct access to caribou herds.

Middle Paleoindian residential group sizes will be evaluated by comparing the number of loci and the quantity of lithics at each site (Boisvert 2012; Carr 2012, 207–209; Spiess 1979, 1984). Transient camps are expected to have small residential occupation sizes based on the presence of between one and four loci and discarded lithic assemblages that reflect deposition during an occupation of between a few days to a few weeks for a family band. Multi-family basecamps are expected to comprise between six and ten loci with at least four residential loci. Discarded lithic assemblages should be larger than the transient camps, thus indicating deposition by a larger residential group comprised of a few family bands. Periodic regional aggregation sites should contain more than ten residential loci with the largest discarded lithic assemblages, which attest to an occupation by many family bands. Distinguishing whether occupations at sites are the result of single episodes or palimpsests from multiple visits to the site over time can be an issue of equifinality, however detailed analyses of sites based on intra-site patterning, toolstone use, and toolkit composition have been employed in an attempt to cautiously parse the M-N sites into site types (e.g. Boisvert 2012:81; Spiess 1984).
5.2.5 Settlement Behavior: Tool Using Activities

If Middle Paleoindians in the NEM employed a herd-following strategy similar to some ethnographically documented subarctic foragers, then heterogeneity should be present in the relative tool form frequencies among toolkits recovered at M-N sites (Binford 1978; Ingold 1993; Jarvenpa and Brumbach 1988, 2009). Many sites should contain diverse toolkits associated with daily domestic tasks in residential sites. Other sites should indicate increased proportions of specific tool types resulting from periodic intensification of certain activities, like the focused preparation of hunting equipment (i.e. “gearing up” (Sensu Binford 1978, 360)) for hunts and intensive butchering and hide processing after successful hunts (Carr 2012; Ellis and Poulton 2014; Ruth 2013; Waguespack 2005). Since gearing up may be conducted well in advance of a hunt (Sellet 2013) and processing of dried hides may take place long after a hunt (Loebel 2013; Ruth 2013, 226–231), the heterogeneity in relative tool form frequencies among sites would be expected to be present throughout the NEM.

The geographic distribution of Paleoindian tasks throughout the region will be examined by comparing the proportional frequencies of endscrapers and fluted bifaces to the total formal toolkits at sites (sensu Ellis and Poulton 2014, Figure 12). Although sample size bias may affect the dataset (Shott 1997, 2010), the relative tool form frequencies likely also relate to differences in site activities throughout the region (Ellis and Poulton 2014, 98). Sites containing a broad range of tools may have been created by residential groups performing a wide range of domestic tasks, whereas sites dominated by a narrow selection of tool types may suggest encampments created during the intensification of specific tasks (Ellis and Poulton 2014; Jones 1998, Table 7.1; Sellet 2013).
5.3 Dataset of Sites with Michaud-Neponset Points

Twenty sites with components attributed to Michaud-Neponset point making Paleoindians are included in this study (See Figure 5.1 and Table 5.1). The data set contains sites comprised of single occupations or a few reoccupations of a landform and geographic clusters of sites that consist of several sites on landforms within specific geomorphic features (Spiess et al. 2012; Lothrop et al. 2016, 231). Five sites (Figure 5.1:1–5) are located in what were closed forests in the southern NEM, below the estimated southern limit of long-distance migratory caribou. Fifteen sites (Figure 5.1:6–15) are located further North in areas that were boreal parkland, likely suitable for long-distance migratory herds of caribou (Newby et al. 2005) and highland tundra, likely occupied by small herds of caribou that migrated by elevation (Spiess and Newby 2002). No M-N sites have been identified in the sedge tundra habitat, which may partially reflect the low modern population density of northern Maine and adjacent regions of the Canadian Martimes (Prasciunas 2011). Additionally, due to relative sea level rise during the Holocene, the Paleoindian marine shoreline on the Atlantic coast is now inundated (Kelley et al. 2010); thus the dataset is biased toward interior settings, with the exception of the Champlain Sea coast (Loring 1980; F. Robinson 2012).

The investigations of many of the sites in this dataset have resulted from the concerted efforts by dedicated researchers to study Paleoindian occupations in the NEM (e.g. papers in Chapdelaine 2012). Even so, the data set is small, contains large gaps in the geographic distribution of sites, and includes sites with varying levels of archaeological investigation. Consequently, the sub-regional patterning examined in this dataset likely reflects an incomplete view of Paleoindian technological organization and settlement patterns (Prasciunas 2011). Nevertheless, the data set may provide clues to Middle Paleoindian lifeways in the NEM.
5.4 Results

Based on generalized analogies with ethnographic subarctic foragers, if Paleoindians used herd-following strategies to exploit migratory caribou in the NEM, then the M-N fluted point sites should contain sub-regional patterning reflecting adaptations to the latitudinally organized distribution of resources in the subarctic habitats in the region. Sub-regional patterning should indicate range mobility encompassing the NEM, latitudinal variability in the topographic and ecological contexts of site locations, cyclical nucleation in group sizes throughout the NEM, and ubiquitous site functions in the NEM (Carr 2012; Jackson and McKillop 1991; Jones 1998). If, on the other hand, the M-N fluted point sites do not contain sub-regional patterning indicating latitudinally distributed variability in settlement behaviors throughout the NEM, then the alternative model suggesting separate southern and central/northern band territories in the NEM may be supported.

5.4.1 Settlement Behavior: Range Mobility and Interaction

The data set contains latitudinal variation in the relative proportions of toolstones among the M-N sites, suggesting that Paleoindian settlement behavior included long distance residential movements between northern and southern portions of the NEM (Figures 5.2 and 5.3).

Northern NEM sites tend to be dominated by New Hampshire rhyolites and Munsungun chert, which outcrop in northern New England. Sites in the southern NEM tend to be dominated by Normanskill chert and Pennsylvania jasper, which outcrop near or beyond the southern boundary of the NEM. The exceptions to this generalization are the Colebrook site in New Hampshire, which is dominated by Normanskill chert (Kitchel 2016) and the Neponset site in Massachusetts, which is dominated by New Hampshire rhyolites (Pollock 2008). If the majority toolstones are monitoring residential mobility, then the general trend of northern sites dominated
by northern toolstones and southern sites dominated by southern toolstones perhaps indicates two
distinct lithic conveyance zones as suggested by Bradley and Boudreau (2006:69). Conversely,
the exceptions to this generalization identified by the long distance northern movement of
Normanskill chert to Colebrook (~343km) and the long distance southern movement of New
Hampshire rhyolites to Neponset (~253km) may indicate rapid long distance residential mobility
inclusive of both northern and southern New England, perhaps as part of a herd following
strategy where residential groups rapidly moved long distances coinciding with seasonal
migrations of caribou between calving areas and wintering grounds.

Minority toolstones at M-N sites indicate long distance transport of toolstones throughout
the NEM. The occurrence of northern toolstones in southern NEM sites and southern toolstones
in northern NEM sites indicates that a regional network of toolstone movement links M-N sites
throughout the NEM. If the minority toolstones are monitoring exchange among bands, then the
hypothesized southern NEM band and central/northern NEM band were interacting with enough
frequency that the vast majority of Michaud-Neponset sites retain evidence for these interactions.
If at least some of the minority toolstones are remnants of serial direct procurement, however,
then they tentatively suggest long distance annual residential mobility between northern and
southern New England.

The lifetime territory size necessary to incorporate the Michaud-Neponset sites and
toolstone sources in the NEM would encompass an area around 240,000 km² (See Figure 5.1).
Based on estimates of subarctic forager lifetime territory sizes, the Michaud-Neponset NEM
territory size is comparable to subarctic foragers (Table 5.2). The inferred straight-line distances
of residential movement of ~253km at Neponset and ~343km at Colebrook suggest Middle
Paleoindian round trip residential movements greater than 500-680km. Based on comparisons
with ethnographically documented subarctic foragers, these long distance toolstone movements in the NEM suggest that the annual residential range mobility of Middle Paleoindians was similar to or slightly more than the annual distances moved by subarctic residential groups, which suggests that Middle Paleoindian in the NEM were also employing herd following caribou hunting strategies (Ellis 2011; Koldehoff and Loebel 2009).

5.4.2 Settlement Behavior: Site Location

M-N sites are located in a variety of geomorphic landscapes and ecological contexts suggesting latitudinal patterning in Paleoindian settlement behavior.

In the highland tundra and boreal parkland habitats of the NEM, many sites are positioned in locations that may have been advantageous for hunting migratory caribou herds. Sites in close proximity to the highland tundra including localities in the Israel River cluster (Boisvert 2013, 154–155), the Potter site (Boisvert et al. In Press), Cliche-Rancourt (Chapdelaine 2012, 138), and the Magalloway cluster (Gramly 1984, 111) and the Jackson-Gore in the boreal parkland (Crock and Robinson 2012, 56) are located near corridors that could have acted as funnels for migrating herds, thus creating opportunities for Paleoindians to intercept migrating caribou. Other northern NEM sites are positioned on topographic rises that may have been used as geographic overlooks to monitor caribou herd movements; these sites include Beacon Hill in the Auburn Airport cluster (Spiess et al. 2012) and sites in the Israel River cluster (Boisvert 2012, 154). The location of the Fairfax Sandblows site near a paleoestuary of the Champlain Sea suggests that Paleoindians in the northern NEM also may have seasonally procured estuarine resources potentially including marine mammals, fish, birds and plants (Loring 1980, 1997; Dincauze and Jacobson 2001). Other sites in the northern NEM are located on terraces in close proximity to wetlands and drained proglacial lakes/ponds that likely also contained wetlands.
Wetlands could have provided access to fresh water and may have hosted caribou, bear, moose, elk, small game, and edible wetland plants that may have attracted Paleoindians (Nicholas 1998, 722; Spiess and Wilson 1987, 131).

Site clusters consisting of multiple M-N sites within specific geomorphic landscapes including the Auburn Airport cluster, the Israel River cluster, and the Magalloway cluster indicate reuse of localities likely to target subsistence resource on a seasonal basis (Boisvert 2012; Lothrop et al. 2011, 561; Lothrop et al. 2016, 231; Spiess et al. 2012). The geomorphic and ecological contexts of these clusters indicate that Middle Paleoindians likely seasonally hunted migratory caribou in these locations (Spiess et al. 2012). The locations of the Israel River cluster and the Magalloway cluster in proximity to highland tundra suggests that Middle Paleoindians may have been occupying these clusters to also exploit small bands of locally migratory caribou.

The majority of the M-N sites in the forests of the southern NEM are located on terraces in close proximity to wetlands. Paleoindians may have camped near the southern NEM wetlands to hunt woodland caribou and moose and gather edible wetland flora (McWeeney 1994; Nicholas 1998, 722). The M-N points recovered from Dutchess Quarry Caves 1 and 8 (Funk and Steadman 1984; Lothrop and Bradley 2012, 23–24) and the Manstan Rockshelter (Manstan 1983) suggest that Paleoindians in the southern NEM occasionally occupied landforms associated with rock shelters perhaps as temporary refuges during cold weather (Walthall 1998, 235).

The latitudinal organization of Paleoindian settlement behavior inferred from the M-N site locations is consistent with settlement behaviors generalized from ethnographically documented subarctic herd-following caribou hunters, including occupations in boreal forest,

5.4.3 Settlement Behavior: Residential Group Occupation Size

The data set contains evidence for many short-term transient camps and a few possible large multi-family basecamps, but there are no candidates for regional macroband aggregation sites. The presence of both transient camps and basecamps suggests cyclical nucleation during the Middle Paleoindian occupation of the NEM.

The transient camps are distributed throughout the NEM suggesting that dispersed phases of group organization occurred across the region. Multi-family basecamps may have been present in the highland tundra and boreal parkland of the northern and central NEM in areas that may have been strategically occupied for seasonal communal caribou drives (B. Robinson 2011, 139). Cliche-Rancourt in Quebec is likely a multi-family base camp positioned in tundra habitat between two mountain passes that may have presented a strategic location for communal caribou drives (Chapdelaine 2012, 137). The Jefferson III and Potter sites in northern New Hampshire (Boisvert 2013) may be multi-family basecamps that would have been located in close proximity to highland tundra along likely caribou travel corridors. Similarly, the Michaud and Taxiway sites in the Auburn Airport cluster may be multi-family basecamps located in the boreal parkland along likely caribou travel corridors (Spiess et al. 2012). The Neponset site in may also be a multi-family basecamp located near the boundary between the boreal parkland and the closed forests, which may have been an advantageous location for intercepting migrating caribou as they departed from and returned to their wintering range.

Although periodic regional macroband aggregation sites were not recognized in the M-N dataset, potential macroband aggregation sites have been recognized in the eastern Great Lakes
at Barnes point sites including Fisher (Storck 1997) and Parkhill (Ellis and Deller 2000), which are likely contemporaneous to the M-N occupations of the NEM. The lack of macroband aggregation sites in the M-N dataset may be a result of archaeological sampling or may reflect differences in Middle Paleoindian settlement behaviors and cyclical nucleation strategies in neighboring regions of the Northeast.


5.4.4 Settlement Behavior: Tool Using Activities

The relative proportions of tool types among the M-N sites suggest that many sites contained a broad range of tool types indicative of daily residential activities and some sites yielded high proportions of specific tool types like endscrapers, fluted points, or fluted preforms, which likely signal the periodic intensification of specific activities including gearing up, hunting, and hide preparation.

Sites with a broad range of tools and sites with high proportions of specific tool types are not organized by habitat type, suggesting that tool-using activities were similar throughout the NEM. The presence of sites indicating periodic intensification of specific activities including gearing up, hunting, and hide preparation in the M-N dataset is suggestive of settlement behaviors related to herd following caribou hunters since the seasonal aggregations of caribou result in the periodic increase of prey availability, which may precipitate the intensified
production of hunting tools and the subsequent intensification of hide processing tasks after successful hunts (Binford 1978; Lemke 2015; Loebel 2013, 328–329; Sellet 2013).

5.5 Conclusion

The sub-regional patterning among the M-N fluted point sites in this dataset is compatible with generalized expectations for settlement behaviors associated with caribou hunters that employ herd-following strategies. The long distance toolstone movements documented in the sites suggest annual residential movements between northern and southern portions of the NEM, which may be related to Middle Paleoindian foragers undertaking rapid long distance movements to stay in close proximity with caribou during their seasonal migrations between wintering grounds in the boreal forest and calving grounds on the sedge tundra. The locations of the M-N sites demonstrate land use patterns associated with geomorphic landscape likely conducive for intercepting migratory caribou. The estimates of residential group occupation sizes indicate latitudinally organized cyclical nucleation, which may be associated with Middle Paleoindian family bands aggregating and dispersing in conjunction with caribou aggregations and dispersals. The tool using activities signal periodic intensification of tasks, which may also be related to the seasonal patterns of caribou migrations.

The alternative hypothesis that the NEM includes separate southern and central/northern M-N occupations cannot be completely dismissed. Since the strongest link between the southern and northern NEM occupations relies on assumptions related to the mechanisms of toolstone movement throughout the NEM, if assumptions of direct procurement are proven incorrect, then the suggested range mobility linking the southern and northern NEM may be wrong. Nevertheless, based on the comparable size of the estimated NEM territory to lifetime territory sizes of ethnographic subarctic foragers (Figure 5.1 and Table 5.2), I prefer the hypothesis that
the northern and southern NEM are both part of the lifetime territory size of NEM Paleoindians rather than separate regions.

Based on Spiess’s (1979:131) generalization that “there is such a diversity of ethnographically known peoples with caribou-dependent seasonal adaptations in their seasonal rounds that we cannot realistically say that caribou hunting tells us *anything* about the rest of the year’s adaptations”, my suggestion that sub-regional patterning in NEM Middle Paleoindian settlement behaviors can be explained by modeling herd following caribou subsistence strategies, does not firmly indicate that NEM Middle Paleoindians were only hunting caribou, year round. Whether the sub-regional patterning in NEM settlement behaviors related to herd-following caribou based subsistence strategies represents a seasonal interior adaptation that was paired with a seasonal coastal adaptation remains to be determined based on the accumulation of information regarding Paleoindian sites located in coastal settings along the Champlain Sea and Atlantic Coast (F. Robinson 2012; Loring 1997, 211; Lothrop et al. 2016, 229–230).
Figure 5.1. Sites with Michaud-Neponset fluted point components. Estimated NEM territory size to encompass sites and toolstone measures 239,169.4 km$^2$ in area using Lambert Conformal Conic projection. Toolstone sources: A. Pennsylvania jasper; B. Normanskill Chert; C. Champlain Valley chert; D. New Hampshire Rhyolites; E. Munsungun Chert.
Figure 5.2. Majority toolstones in Michaud-Neponset fluted point sites. 22 majority toolstone examples in the database. Mean distance is 161.2km. Standard deviation is 97.9. Minimum distance transported is 14km. Maximum distance transported is 343km.
Figure 5.3. Minority toolstones in Michaud-Neponset fluted point sites. 26 minority toolstone examples in the database. Mean distance is 296km. Standard deviation is 153. Minimum distance transported is 52km. Maximum distance transported is 702km.
Table 5.1. Sites with Michaud-Neponset Fluted Points in the New England and Canadian Maritimes Region

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Location</th>
<th>Site Size (Excavated area m²)</th>
<th>Assemblage Size</th>
<th>Tool Kit Composition (Fluted Bifaces / Formal Tools)</th>
<th>Assemblage Size</th>
<th>Tool Kit Composition (Fluted Bifaces / Formal Tools)</th>
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<th>Tool Kit Composition (Fluted Bifaces / Formal Tools)</th>
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<tr>
<td>Location/Cluster</td>
<td>Environment</td>
<td>Loci</td>
<td>Formal Tools</td>
<td>Expedient Tools</td>
<td>Channel Flakes</td>
<td>Debitage</td>
<td>Projectile Point</td>
<td>Normanskill Chert (in cm)</td>
<td>Unknown Rhyolite (in cm)</td>
<td>Transient Camp</td>
<td>Reference(s)</td>
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<tr>
<td>Location</td>
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<td>Loci</td>
<td>Formal Tools:</td>
<td>Expedient Tools:</td>
<td>Channel Flakes:</td>
<td>Debitage:</td>
<td>Broad Range of Tools:</td>
<td>Munsungun Chert</td>
<td>Green Chert</td>
<td>Transient Camp</td>
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<td>Lautman Terrace near stream</td>
<td>2 Loci (32.75)</td>
<td>33</td>
<td>15</td>
<td>21</td>
<td>210</td>
<td></td>
<td>(.36) [18]</td>
<td>(275) [252]</td>
<td>(-)</td>
<td>Transient Camp</td>
<td>Wilson 2003</td>
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<tr>
<td>Site</td>
<td>Location</td>
<td>Loci</td>
<td>Formal Tools</td>
<td>Expeditent Tools</td>
<td>Channel Flakes</td>
<td>Debitage</td>
<td>Tools Dominated</td>
<td>Unidentified Chert</td>
<td>Chert</td>
<td>Transient Camp</td>
<td>Reference</td>
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<tr>
<td>Neponset</td>
<td>Terrace near wetlands</td>
<td>≥ 6 Loci</td>
<td>218</td>
<td>96</td>
<td>55</td>
<td>1651</td>
<td>Broad Range of Tools</td>
<td>New Hampshire Spherulitic Rhyolite</td>
<td>Normanskill Chert</td>
<td>Base Camp</td>
<td>Carty and Spiess 1992</td>
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Sites in Denser Forest

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<th>Expeditent Tools</th>
<th>Channel Flakes</th>
<th>Debitage</th>
<th>Tools Dominated</th>
<th>Unidentified Chert</th>
<th>Chert</th>
<th>Transient Camp</th>
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<tr>
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<td>Terrace near wetlands</td>
<td>≥ 6 Loci</td>
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<td>Broad Range of Tools</td>
<td>New Hampshire Spherulitic Rhyolite</td>
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<td>Base Camp</td>
<td>Carty and Spiess 1992</td>
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<td>Site Name</td>
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<td>Loci</td>
<td>Formal Tools</td>
<td>Channel Flakes</td>
<td>Debitage</td>
<td>Projectile Point Dominated</td>
<td>Material Type</td>
<td>Material Type</td>
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<tr>
<td>Manstan Rockshelter</td>
<td>Rock-shelter near wetlands</td>
<td>1 Loci (~50)</td>
<td>Formal Tools: 1 Channel Flakes: 0 Debitage: 0</td>
<td>Projectile Point Dominated (1) [0]</td>
<td>Normanskil Chert (150) [1]</td>
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<td>*</td>
<td>manstan 1983</td>
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Table 5.2. Mobility estimates of selected subarctic groups from Binford 2001:Table 5.01; Kelly 1983, 1995.

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Lifetime Territory Size (km²)</th>
<th>Annual Territory Size (km²)</th>
<th>Annual Distance of Residential Moves (km)</th>
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<td>Hare</td>
<td>173,400</td>
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<td>180,900</td>
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<td>3,900</td>
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<td>4,870</td>
<td>-</td>
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<td>Montagnais</td>
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<td></td>
<td>1,800-3,600</td>
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</table>
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Chapter 6: Conclusion: The Paleoindian Occupation of Southern New England is Part of the Life Time Territory of Paleoindians in the New England and Canadian Maritimes Region

6.1 Introduction

In this dissertation, I have employed multiple lines of evidence and multiple geographic scales to consider the position of southern New England in the Eastern Paleoindian landscape. Building on general analogies to ethnographic subarctic foragers who move residential camps to coincide with the location of caribou throughout their migrations, I hypothesized that southern New England may have been part of a large territory exploited by NEM Paleoindians during their annual rounds that ranged between northern New England and the Canadian Maritimes and southern New England and southeastern New York. The alternative to this hypothesis was that southern New England was part of a smaller band-related territory mostly constrained to southern Massachusetts, Connecticut, Rhode Island, southeastern New York, northern New Jersey, and northwestern Pennsylvania.

I tested my hypothesis by accumulating a wealth of data from my own excavations, reanalyses of other important Connecticut Paleoindian sites and isolated finds, and collaboration with researchers who shared published and unpublished data related to additional Paleoindian sites in the Northeast. I reviewed evidence for Paleoindian adaptive strategies in southern New England by taking a multi-scalar approach and considering individual sites in southern New England (Chapters 2 and 3), a geographic cluster of Paleoindian sites in southern New England (Chapter 4), sub-regional patterning throughout the NEM (Chapter 5), and comparisons with neighboring regions in the Middle Atlantic and eastern Great Lakes (Chapter 5).
My analyses take into consideration the variables of age of occupations, intra-site organization, occupation sizes, tool-using activities, and estimates of residential range mobility. The results of my study tentatively suggest that southern New England is part of a large regional territory exploited by NEM Paleoindians, at least during the Middle Paleoindian period by Paleoindians who created Michaud-Neponset style fluted points.

6.2 Site Specific Analyses

My excavation and analysis of the Ohomowauke site in southeastern Connecticut and my reanalysis of the Templeton site in western Connecticut generated new data on Michaud-Neponset fluted point sites in Connecticut to compare with Michaud-Neponset fluted point sites throughout the NEM.

The site locations of Ohomowauke and Templeton are both uncommon when compared to the general pattern of NEM Paleoindian sites being located on well-drained sandy soils near small drainages (Spiess et al. 1998:230). Ohomowauke is located in glacial till and Templeton is located in a riverine setting. Nevertheless, sites that are clearly in the heart of the NEM in northern New Hampshire have also been reported in glacial till and riverine settings (Boisvert 2012; Boisvert and Kitchel in press). Additionally, the wetland association documented for Ohomowauke is also noted for many NEM sites.

Both Ohomowauke and Templeton contained toolstones procured from bedrock outcrop sources that were transported long distances to the sites. The suite of toolstones at Templeton is dominated by Normanskill chert and has minor amounts of Pennsylvania jasper, whereas the Ohomowauke assemblage is dominated by Pennsylvania jasper and Normanskill chert and has a minor amount of Munsungun chert. This pattern of long distance toolstone movement of Normanskill chert, Pennsylvania jasper, and Munsungun chert is typical throughout the NEM
and indicates that a regional network of toolstone movement links Michaud-Neponset sites throughout the NEM (Kitchel 2016; Lothrop et al. in review; Spiess et al. 1998:239).

The tool-using activities at both Ohomowauke and Templeton are in line with expectations for NEM sites. Ohomowauke is dominated by unifaces (specifically endscrapers) with only a few bifaces, which is typical for the NEM (Lothrop et al. 2016:227). The large numbers of endscrapers typically recovered on NEM sites suggests that tasks associated with these tools, like hideworking (Loebel 2013), were routinely conducted throughout the NEM, likely as a result of the importance of tailored hide clothing for surviving in the colder than present NEM environments associated with the Younger Dryas (Lothrop et al. 2016: 227; Osborn 2014:49). The previous excavations at Templeton yielded a toolkit dominated by fluted preform fragments with a few tools including sidescrapers and gravers. Additional excavations may reveal other tool types in yet undiscovered activity areas. Nevertheless, the toolkit recovered from the excavated sample at Templeton indicates gearing up activities to prepare for future hunting events. Gearing up suggests preparation for hunting events perhaps associated with communal hunting of large game (Sellet 2013:394), which in the NEM would have consisted of caribou herds. Accordingly, the documentation of a gearing up event in southern New England may indicate that Paleoindians at Templeton anticipated residential movements to hunt caribou either in the closed forests of southern New England or further afield in central and northern New England.

Ohomowauke and Templeton both yielded potential evidence for the separation in space between fluted point production areas and uniface maintenance/discard areas, which is a recurrent pattern in NEM campsite organization (Curran 1984; Robinson et al. 2009). The large block excavations at Ohomowauke unearthed fluted point production areas separate in space
from uniface maintenance/discard areas, whereas the lack of uniface clusters recovered from Moeller’s excavation of fluted point production areas at Templeton suggests a similar separation in space. The consistent separation of unifacial and bifacial activities in space including the sites in southern New England, perhaps, reflects a gendered division of labor at Paleoindian residential campsites throughout the NEM (Chilton 1994; Deller and Ellis 2011:148–149; Robinson et al. 2009:439).

Estimates of occupation sizes based the quantity of lithics and number of loci at each site indicate that both Ohomowauke and Templeton were likely short-term occupations that could have been produced during a single occupation or a few brief reoccupations. These short-term occupations are common for most Paleoindian sites in the NEM and suggest high residential mobility throughout the NEM, inclusive of southern New England (Spiess 1984).

In sum, the data generated from site specific analyses indicated that both Ohomowauke and Templeton yielded Paleoindian occupations that are mostly in line with characteristics of NEM Paleoindian behaviors (Lothrop et al. 2016; Spiess et al. 1998). The identification of long distance transportation of Normanskill chert from eastern New York and Pennsylvania jasper from eastern Pennsylvania as primary toolstones in the Michaud-Neponset fluted point Paleoindian sites in Connecticut, indicate Paleoindian residential mobility inclusive of eastern New York, eastern Pennsylvania, and Connecticut, which suggests band related movements throughout southern New England. The presence of Munsungun chert as a minority toolstone at Ohomowauke, indicates that the site was linked to northern New England resources either via mobility or exchange.
6.3 Geographic Cluster Analysis

The analysis of the geographic cluster of Paleoindian sites around the Pequot Cedar Swamp indicated reuse of the landforms around this pro-glacial lake basin during the terminal Pleistocene and early Holocene (Jones and Forrest 2003; Lothrop et al. 2016:231; Spiess et al. 2012). The identification of a Michaud-Neponset fluted point component at Ohomowauke as well as isolated Michaud-Neponset fluted points from the Lantern Hill site (Jones 1998:218) and the Preston Plains site (Ives 2010:97) and a Late Paleoindian component at Hidden Creek suggest that subsistence resources from the Pequot Cedar Swamp were targeted by Paleoindians during both the later portion of the Younger Dryas and the Early Holocene.

The site locations in the geographic cluster are varied. Both Ohomowauke and Hidden Creek are located on terraces near the wetland. However the surficial geology at Hidden Creek is well-drained sandy soil associated with glacial outwash, whereas Ohomowauke is located on poorly drain soils associated with glacial till. The isolated Michaud-Neponset point at Preston Plains was recovered in well-drained sandy soils in close proximity to Avery Pond, which is a glacial kettle (Ives 2010:76). The Lantern Hill Michaud-Neponset point was recovered on an upland hill, which may have been used as a look out to monitor the surrounding areas of the Cedar Swamp. The isolated fluted point find spots may represent individual points discarded or lost during hunting or scouting episodes or may signal the presence of nearby campsites that remain undetected (Spiess and Bradley 1996). The diverse settings of these sites may coincide with the locations where different resources were exploited (Spiess 1984; Spiess et al. 2012:108).

All of the sites around the Pequot Cedar Swamp contain toolstones procured from bedrock outcrop sources that were transported long distances from around the NEM to the sites. The proportions of the varieties of toolstones however are different at each site. Ohomowauke is
dominated by Pennsylvania jasper and Normanskill chert and yielded a small amount of Munsungun chert. Hidden Creek on the other hand is dominated by Normanskill chert and Munsungun chert and yielded a small amount of Pennsylvania jasper. The Michaud-Neponset point from Preston Plains is made of Pennsylvania jasper and the Michaud-Neponset point from Lantern Hill is made of a spherulitic rhyolite, likely from northern New Hampshire. The different proportions of toolstones at these sites suggest that these sites were likely created by groups who travelled via different directions across the NEM before camping near the Pequot Cedar Swamp.

Both Hidden Creek and Ohomowauke contain diverse toolkits dominated by unifaces with a few bifaces. The diversity of the tool assemblages, the presence of endscrapers that are associated with hide processing, typically a female task in ethnographic subarctic forager groups, and projectile points, usually associated with big game hunting by males in the ethnographic record, suggest that these sites are small residential camp sites (Ellis and Poulton 2014:104; Lothrop et al. 2016:221). Gravers and pieces esquillees, however, are present at Ohomowauke but absent at Hidden Creek, which suggests that tasks involving these tools were conducted at Ohomowauke but not at Hidden Creek. The toolkit variability in these sites may be related to the season of occupation or to the different environmental and cultural contexts of the YD-aged Ohomowauke when compared to Hidden Creek, which dates to the Early Holocene (Singer and Jones In Press). Expanded microwear studies on the lithics from Ohomowauke and Hidden Creek may be able to test whether these sites were occupied in different seasons (Loebel 2013; Rockwell 2014), whereas the documentation of additional Late Paleoindian sites in southern New England would provide data to investigate whether the lack of gravers and pieces esquillees at Hidden Creek is a recurrent pattern in southern New England Late Paleoindian sites.
Analysis of the intra-site patterning at Ohomowauke and Hidden Creek confirms that Paleoindians maintained the patterned separation of uniface and biface activities at the southern extremity of the NEM (Curran 1984). Ohomowauke is comprised of several low-density Paleoindian loci spread over 500 meters of a gentle slope and contains projectile point production-dominated loci separated a few meters downslope from loci primarily comprised of endscrapers and uniface resharpening flakes. Hidden Creek consists of one high-density locus in a 33m$^2$ contiguous block with endscrapers in the eastern portion and projectile points and biface preform fragments in the western portion of the locus (Jones 1997:Figure 4). I argue that the Paleoindian assemblages at Ohomowauke and Hidden Creek were each created during single occupations because of the small size of their assemblages (e.g. Spiess 1984). The dispersed pattern of loci at Ohomowauke and the dense single locus at Hidden Creek, therefore are suggested to result from Paleoindians occupying landforms associated with the Pequot Cedar Swamp to exploit available biotic resources during a warm season at Ohomowauke and a cold season at Hidden Creek (Singer and Jones In Press). However, even if each of the sites is the result of multiple reoccupations, the separation of uniface and biface activities in space indicates that Paleoindians conducted these tasks differentially over space and perhaps time.

Estimates for the occupation duration of Hidden Creek and Ohomowauke suggest that both sites are short-term transient camps likely created by one or a few families (Carr 2012:277; Ellis and Poulton 2014; Spiess 1984). Hidden Creek has one locus and Ohomowauke has four activity areas. Additionally, the tool assemblages from Hidden Creek and Ohomowauke both have around 40 formal tools consisting primarily of unifacial scraping tools with a few discarded bifaces (Singer and Jones In Press). Accordingly, the diverse resources available around the
Great Cedar Swamp during the YD and early Holocene supported short-term transient campsites occupied by family bands during periods of population dispersion.

In sum, study of the Paleoindian sites recovered around the Pequot Cedar Swamp established them as the southern-most geographic cluster of Paleoindian sites in the NEM. The data generated from the analyses of the geographic cluster of sites around the Pequot Cedar Swamp indicate Paleoindians in the later portion of the YD and the early Holocene were occupying the landscape likely to exploit wetland resources. The settlement behaviors reconstructed from these sites including the long distance transport of majority toolstones from eastern New York and eastern Pennsylvania suggests that the Paleoindian occupations of the landforms around the Pequot Cedar Swamp may be part of larger NEM Paleoindian settlement behaviors that included the exploitation of large territories throughout southern New England. The presence of Munsungun chert at both Ohomowauke and Hidden Creek links the southern NEM occupations to resources located in the northern portions of the NEM via exchange or residential mobility.

6.4 Sub-Regional Analyses

Comparison of Michaud-Neponset fluted point sites throughout the NEM suggests that the data set is compatible with generalized expectations for lifeways associated with seasonal caribou hunters using herd-following strategies. Annual residential movements between northern and southern portions of the NEM are suggested based on raw material movement throughout the NEM. Estimates of occupation sizes based on the number of loci and quantity of lithics at sites suggest latitudinally organized cyclical nucleation with larger sites present in the central and northern NEM when compared to southern New England. Patterns based on the geomorphic landscapes associated with site locations suggest sub-regional variation in land use, perhaps
related to seasonal variation in resource structures associated with caribou migration patterns (Lothrop et al. 2011: 563). Patterns in Middle Paleoindian tool-using activities based on toolkit composition at sites suggests periodic intensification of hunting tool production and hide working, which, based on ethnographic analogy to subarctic foragers, are likely associated with the preparation for caribou hunts and processing of caribou skins after successful hunts (Ellis and Poulton 2014:98; Loebel 2013: 328-329). Accordingly, the Michaud-Neponset sites in southern New England, including Templeton and Ohomowauke may have been formed as part of the annual movements of Middle Paleoindians throughout their territory in the NEM. Whether this patterning represents a seasonal interior adaptation that was paired with a seasonal coastal adaptation remains to be determined based on the accumulation of information regarding Paleoindian sites located in coastal settings along the Champlain Sea and Atlantic Coast (F. Robinson 2012; Loring 1997:211; Lothrop et al. 2016; 229–230).

The alternative hypothesis that the Michaud-Neponset occupations of southern New England are the result of separate groups that are different from northern and central NEM occupations cannot be completely dismissed based on the current dataset since links between the southern and northern NEM occupations rely on assumptions related to the mechanisms of toolstone movement throughout the NEM. The toolstone movement may result from a combination of exchange and serial direct procurement, therefore northern and southern NEM may be linked through social networks or residential mobility (Ellis 1989; Meltzer 1989).

Since the Michaud-Neponset site dataset is monitoring a time frame of a few centuries, the distribution of toolstones in the sites may reasonably be compared to lifetime ranges documented for subarctic foragers, which consider the cumulative annual ranges used by a group over the lifetimes of the individuals that comprise the group (Binford 1983:42). The lifetime
territory size necessary to incorporate the Michaud-Neponset sites and toolstone sources documented in the NEM would encompass an area around 240,000 km², which is a comparable lifetime territory size to ethnographic subarctic foragers (Binford 2001:Table 5.01). Based on the comparable size of the estimated NEM territory to lifetime territory sizes of ethnographic subarctic foragers, I prefer the hypothesis that the northern and southern NEM are both part of the lifetime territory size of NEM Paleoindians rather than separate regions. Based on comparisons with annual territory sizes of ethnographically documented subarctic peoples, Paleoindian annual residential mobility throughout the NEM feasibly included only small portions of the overall NEM territory. Based on the long distance movement of majority toolstones between northern and southern portions of the NEM, the Paleoindian range mobility likely included rapid long distance movements between northern and southern New England, likely as part of a caribou herd following strategy coinciding with caribou migrations between their wintering ranges and calving grounds (Ellis 2011; Koldehoff and Loebel 2009).

6.5 Regional Analyses

The NEM is a distinct Paleoindian region that is differentiated from neighboring regions (Lothrop et al. 2016), like the eastern Great Lakes (EGL) (Ellis 2012; Jackson and McKillop 1991; Lemke 2015a) and the Middle Atlantic (Lowery 2002; Meltzer 1988, 1993) by distinct projectile points (Bradley et al. 2008; Ellis 2004; Lowery 2002), toolkits (Ellis 2012:xii; Ellis and Deller 1988, 1997:21; Lowery 2002), mobility strategies (Burke 2006; Ellis 2011; Gardner 1989; Meltzer 1988, 1989, 1993; Lowery 2002), and site structure and settlement patterns (Custer et al. 1983; Ellis 2012:xii; Meltzer 1988; Spiess et al. 1998:232; Lowery 2002). These differences indicate regionalization of Paleoindian groups (Meltzer 1993; Gingerich and Kitchel 2015; Lothrop et al. 2016).
This regionalization was likely influenced by the habitats present in these regions. During the YD, the NEM contained latitudinal organized sedge tundra (north), spruce parkland (central), and closed boreal forest (south) (Lothrop et al. 2016:Table 1; Newby et al. 2005). During the YD, closed pine forests dominated the neighboring eastern Great Lakes region to the west of the NEM (Ellis et al. 2011:538; Lothrop et al. 2016: Table 1). The habitat of the Mid-Atlantic region to the south of the NEM was a mixed boreal and deciduous forest (Lothrop et al. 2016:Table 1). Although the YD environments were different among the regions, similar styles of fully fluted Middle Paleoindian point forms are present in the NEM, EGL, and Mid-Atlantic. In the NEM, these point forms are called Michaud-Neponset points (Bradley et al. 2008). In the EGL, these point forms are identified as Barnes points from the Parkhill complex (Ellis et al. 2011). In the Mid-Atlantic, Lowery has documented fully fluted points similar in shape to Barnes/Cumberland points (Lowery 2002:126, Figure 59), however a summary of modal forms of these point types in the Mid-Atlantic awaits future research. The similarities of the fully fluted point types in the NEM, EGL, and Mid-Atlantic suggest information sharing among the Paleoindian groups in these regions (Anderson 1995:12; Speth et al. 2010:20). Accordingly, in order to get a fuller picture of Paleoindian occupations of the northeast, Paleoindian researchers must practice similar long distance information sharing by expand beyond their region of interest and communicating with researchers in other regions.

6.6 Future Considerations

The premise of the overarching question that I sought to answer in this dissertation “how do Paleoindian occupations in southern New England relate to Paleoindian occupations throughout the New England-Maritimes region [NEM]?” was based on prior interpretations of southern New England Paleoindian sites primarily derived from comparisons of Templeton and
Hidden Creek (Spiess et al. 1998). My inclusion of Ohomowauke as a new site in southern New England, my reinterpretation of Templeton, and my comparisons with isolated fluted points from southern New England provided a somewhat larger dataset from which to interpret southern New England Paleoindian adaptations. Nevertheless, the dataset from which I draw my conclusions remains small and contains large spatial gaps in southern New England. Notably my database does not contain Michaud-Neponset fluted point sites from Rhode Island or the Lower Connecticut Valley and when considering the Late Paleoindian occupation of southern New England, Hidden Creek is the sole representative. Accordingly, the documentation of additional Paleoindian sites in southern New England is imperative for refining our understanding of Paleoindian lifeways throughout the NEM.

Both Hidden Creek and Ohomowauke were identified as the result of intensive efforts designed to locate late Pleistocene and early Holocene archaeological sites around the Pequot Cedar Swamp by using high-resolution archaeological survey methods including excavating test pits at 5-meter intervals or closer and using 1/8inch mesh for screening all soils (1997:77, 1998:142). The low archaeological visibility of these sites perhaps partially explains the small number of Paleoindian sites that have been identified in southern New England. The low visibility of these sites also suggests that the identification of new Paleoindian sites in southern New England will likely require successful partnerships among stakeholders in the archaeology community including avocation archaeologists, CRM archaeologists, government archaeologists, and academic archaeologists (Ellis and Poulton 2014; Lothrop et al. 2016: 240; Shott and Pitblado 2015).

The close examination of archaeological sites using a multi-scalar approach seems a fruitful methodology with respect to assessing Paleoindian lifeways. All archaeological data
begins with documentation of material culture recovered from individual locations typically called “sites”, which are “places on the modern landscape where archaeologists find concentrations of human debris” (Dewar and McBride 1992:231). Examination of data on the site level provides insight into Paleoindian use of a specific location with the possibility to study individual events at the site, single occupations, and reuse of the landform. The accumulation of site specific data related to many Paleoindian sites located on different landforms within a specific geomorphic landscape provides information on geographic clusters of Paleoindian sites, which allow for the study of reuse of specific locales likely related to Paleoindians targeting specific resources (Lothrop et al. 2016:231; Spiess et al. 2012). Combining the data generated by the study of individual sites and geographic clusters of sites throughout a region can then provide information related to sub-regional and regional patterning in Paleoindian landscape use (Lothrop et al. 2011). Through this multi-scalar approach, archaeologists can study remnants of Paleoindian behaviors at the scale individuals, families, bands, and macro-band, which provide a fuller picture of the lives of the earliest occupants of New England.
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Osborn, Alan  

Pelletier, Bertrand and Brian Robinson  

Robinson, Brian, Jennifer Ort, William Eldridge, Adrian Burke, and Bertrand Pelletier  

Rockwell, Heather  

Shott, Michael and Bonnie Pitblado  

Singer, Zachary and Brian Jones  
Speth, John, Khor Newlander, Andrew White, Ashley Lemke, and Larrs Anderson
2010 Early Paleoindian big-game hunting in North America: provisioning or politics?
*Quaternary International* 285:111-139.

Spiess, Arthur

Spiess, Arthur

Spiess, Arthur, and James Bradley

Spiess, Arthur and Deborah Wilson

Spiess, Arthur, Deborah Wilson, and James W. Bradley

Spiess, Arthur, Ellen Cowie, and Robert Bartone
Appendix 1: Ohomowauke Paleoindian Locus Information

Table A1.1. Paleoindian debitage in Locus A.

<table>
<thead>
<tr>
<th>Debitage Type</th>
<th>Jasper</th>
<th>Green Chert</th>
<th>Red Chert</th>
<th>Black Chert</th>
<th>Chalcedony</th>
<th>Total Assemblage</th>
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<tbody>
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<td>Small Biface Resharpening Flakes</td>
<td>1</td>
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<td>0</td>
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Table A1.2. Paleoindian tools in Locus A.

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<th>Black Chert</th>
<th>Spherulitic Rhyolite</th>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
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<td>Pieces Esquillees</td>
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<td>1</td>
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### Table A1.3. Paleoindian debitage in Locus D.

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<th>Red Chert</th>
<th>Black Chert</th>
<th>Chalcedony</th>
<th>Total Assemblage</th>
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<td>Channel Flake Fragments</td>
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### Table A1.4. Paleoindian tools in Locus D.

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</thead>
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<tr>
<td>Endscrapers</td>
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<td>Sidescrapers</td>
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</tr>
<tr>
<td>Uniface Fragments</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Utilized and Retouched Flakes</td>
<td>5</td>
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<td>8</td>
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<tr>
<td>Pieces Esquillees</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gravers</td>
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<td>1</td>
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<td><strong>Total</strong></td>
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Table A1.5. Paleoindian debitage in Locus E.

<table>
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<th>Jasper</th>
<th>Green Chert</th>
<th>Red Chert</th>
<th>Black Chert</th>
<th>Chalcedony</th>
<th>Total Assemblage</th>
</tr>
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<tbody>
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<td>Small Biface Resharpening Flakes</td>
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<td>0</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
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<td>Biface Reduction Flakes</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
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Table A1.6. Paleoindian tools in Locus E.

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<td>4</td>
</tr>
<tr>
<td>Sidescrapers</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Utilized and Retouched Flakes</td>
<td>3</td>
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<td>Pieces Esquillees</td>
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<td>0</td>
</tr>
<tr>
<td>Gravers</td>
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<td>0</td>
</tr>
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<th>Chalcedony</th>
<th>Total Assemblage</th>
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<td>0</td>
<td>0</td>
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</tr>
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<td>Large Biface Resharpening Flakes</td>
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<td>0</td>
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<td>Channel Flake Fragments</td>
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*Two fragments refit into one endscraper

Table A1.8. Paleoindian tools in Locus C.

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<th>Tool Type</th>
<th>Jasper</th>
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<td>0</td>
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<td>Biface Fragments</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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</tr>
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<td>Utilized and Retouched Flakes</td>
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<td>5</td>
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<td>Pieces Esquillees</td>
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<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Gravers</td>
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*Two fragments refit into one endscraper
Table A1.9. Paleoindian debitage in Loci F, G, and H.

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<th>Red Chert</th>
<th>Black Chert</th>
<th>Chalcedony</th>
<th>Spherulitic Rhyolite</th>
<th>Total Assemblage</th>
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<td>Count</td>
<td>Count</td>
<td>Count</td>
<td>Count</td>
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<td>0</td>
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<td>Large Biface Resharpening Flakes</td>
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<td>0</td>
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<td>0</td>
<td>1</td>
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<td>Channel Flake Fragments</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
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<td>12</td>
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Table A1.10. Paleoindian tools in Loci F, G, and H.

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