Sub-Regional Patterning of Paleoindian Sites with Michaud-Neponset Points in New England and the Canadian Maritimes

Zachary L. F. Singer

To cite this article: Zachary L. F. Singer (2017): Sub-Regional Patterning of Paleoindian Sites with Michaud-Neponset Points in New England and the Canadian Maritimes, PaleoAmerica, DOI: 10.1080/20555563.2017.1381506

To link to this article: http://dx.doi.org/10.1080/20555563.2017.1381506

Published online: 11 Oct 2017.
Sub-Regional Patterning of Paleoindian Sites with Michaud-Neponset Points in New England and the Canadian Maritimes

Zachary L. F. Singer
University of Connecticut, Storrs, CT, USA

ABSTRACT
This paper examines sub-regional patterning in New England and the Canadian Maritimes to investigate whether Paleoindian settlement behaviors indicate the broad territorial range of one macroband or multiple macroband territories. 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. I attempt to minimize the effects of time averaging by focusing my analysis on Middle Paleoindian sites with Michaud-Neponset fluted points.

KEYWORDS
Paleoindian; northeastern North America; New England; Younger Dryas; settlement behavior

1. Introduction
Sub-regional patterning in Paleoindian settlement behaviors has been proposed for the American southwest (Amick 2000; Bement and Carter 2015), Great Lakes (Ellis and Deller 1997; Jackson 1997), and Middle Atlantic (Lowery 2002) regions, suggesting that Paleoindians adapted to regional variations in contemporary environments and available resources. The New England and Canadian Maritimes study region (NEM), comprising eastern New York, the New England states, the Canadian Maritime provinces, and southern Quebec, demonstrates sub-regional patterning during the Paleoindian period as well. This paper examines settlement behaviors associated with NEM Paleoindian macrobands, i.e., the largest social network of minimal bands that regularly interacted (Anderson 1995; Carr 2012, 205; Whallon 2006). I investigate whether these patterns indicate that the NEM comprised the broad territorial range of one Paleoindian macroband or rather supported two macroband territories.

Due to the paucity of organic remains at NEM Paleoindian sites (Bonnichsen, Keenlyside, and Turnmire 1991, 28; Gingerich and Kitchel 2015, 298; Spiess, Curran, and Grimes 1985, 146), studies of sub-regional variation in Paleoindian lifeways have focused on modeling aspects of Paleoindian settlement behaviors, including range mobility and interaction, site types, and on-site behaviors, and the relationship of these variables 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; Spiess and Wilson 1989).

Based on paleoenvironmental reconstructions of the NEM, Newby et al. (2005) argue that latitudinally organized subarctic-like habitats during the Younger Dryas (12,900–11,600 cal yr BP) likely fostered seasonal, long-distance migratory behaviors in caribou. Through investigating Paleoindian site distributions and lithic source use in connection to the potential distribution of habitats attractive to caribou, Newby et al. (2005) suggest that Paleoindian settlement behaviors in the NEM entailed caribou-focused subsistence in a broad territorial range, at least as a seasonal adaptation.

Bradley and Boudreau (2006, 69) propose an alternative model of Paleoindian settlement in the NEM, suggesting that the region contained two macroband territories, including southern and central/northern NEM lithic conveyance zones. The southern NEM macroband territory is recognized by a lithic conveyance zone of Normanskill chert from the Hudson Valley of New York and Champlain Valley chert from Vermont. The central/northern NEM macroband territory is identified by a lithic conveyance zone of Munsungun chert from northern Maine and spherulitic rhyolites from northern New Hampshire.

These two models focus on investigating the entire timespan of the Paleoindian settlement in the NEM including Early, Middle, and Late Paleoindian occupations and only briefly examine temporal subsets of the Paleoindian period. In this paper, I minimize the effects of time averaging by focusing my archaeological
analysis on Middle Paleoindian sites with Michaud-Neponset fluted points (Figure 1, Table 1) (Spiess, Wilson, and Bradley 1998, 231). 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 morphologically similar to Barnes points from the eastern Great Lakes and Cumberland points from the American Southeast (Lothrop et al. 2016, 207). Based on a radiocarbon dating analysis, Lothrop et al. (2016, 210) propose that Michaud-Neponset fluted points in the NEM date to the late Younger Dryas (YD), around 12,200–11,800 cal yr BP.

In this paper I examine sub-regional patterning in NEM Paleoindian sites with Michaud-Neponset points (MNPt sites) to test whether the region contained one macroband territory (Newby et al. 2005) or separate territories in the southern NEM and the central/northern NEM (Bradley and Boudreau 2006). I evaluate these alternate settlement models by comparing sub-regional patterning in Paleoindian settlement behaviors including (1) range mobility and interaction, (2) site types, and (3) site behaviors to generalized settlement behaviors of residentially mobile caribou hunters that employ “herd following” caribou hunting strategies (sensu Burch 1991; Gordon 1996), which would be expected if the NEM contained one macroband territory. Determining whether settlement behaviors in southern New England are similar to subarctic boreal forest dwellers (Custer and Stewart 1990) and wholly distinct from settlement behaviors in the central/northern NEM will test the alternative model of two macroband territories in the NEM.

2. Background: Habitats and migratory caribou behavior in the NEM during the YD

The YD, 12,900–11,600 cal yr BP, impacted the environment of the NEM by creating colder and drier conditions than the preceding Bølling-Allerød (Hou et al. 2006; Shuman et al. 2004). During the latter portion of the YD around 12,000 cal yr BP, the NEM contained both forested and open habitats organized by latitude, including (1) sedge tundra in extreme northern New England and the Canadian Maritimes; (2) highland tundra in the mountains of northwestern Maine and the White Mountains; (3) spruce parkland in the Canadian Maritimes, southern Maine, New Hampshire, Vermont, and northeastern New York; and (4) closed boreal forests in Massachusetts, Rhode Island, Connecticut, and southeastern New York (see Figure 1) (Newby et al. 2005, 150; Spiess and Newby 2002). Based on analogies to modern caribou herds, like the George River Herd (Bergerud, Luttich, and Camps 2008; Couturier et al. 1990), the latitudinal organization of these open and closed subarctic-like habitats would have fostered conditions for a large herd of caribou to occupy sedge tundra for spring calving grounds and summer range and to migrate through the open coniferous woodland to wintering habitat near the boundary of the spruce parkland and closed boreal forests (Newby et al. 2005, 150). In addition to the large long distance migratory caribou herd, smaller herds of caribou likely occupied the highland tundra in the mountains of northwestern Maine and the White Mountains and seasonally migrated following altitudinal gradients from denser to more open vegetation cover (Newby et al. 2005, 150). Small herds of locally migratory woodland caribou were also likely present in the closed forests of southern New England (Spiess and Newby 2002, 35).

3. Dataset of NEM sites with Michaud-Neponset points

Twenty MNPt sites are included in this study (see Figure 1 and Table 1). The dataset includes (1) sites comprising single occupations, (2) sites representing reoccupations of a single landform, and (3) geographic clusters of sites on several landforms across a geomorphic landscape (Lothrop et al. 2016, 231; Spiess, Cowie, and Barte 2012). Five sites are located near or beyond the southern limit of migratory caribou in the closed boreal forests of the southern NEM, which likely also supported locally migratory woodland caribou. Eight sites are located in boreal parkland in central and northern portions of NEM, where the large long distance migratory caribou herd would have seasonally roamed while moving between wintering and summer grounds. Seven sites are located in close proximity to highland tundra in the northern NEM that was within the territory for the large long distance migratory herd and also supported small satellite herds of caribou that migrated by elevation (Spiess and Newby 2002, 35). No MNPt sites have been identified in the sedge tundra, which may partially reflect discovery bias (Prasciunas 2011). Additionally, due to relative sea level rise during the Holocene, the Paleoindian marine shoreline on the Atlantic coast is now inundated (Kelley, Belknap, and Claesson 2010). Thus the dataset is biased toward interior settings, with the exception of the Champlain Sea coast (Loring 1980; F. Robinson 2012). Although biased, this dataset nevertheless provides insight on Middle Paleoindian settlement in the NEM.
4. Archaeological expectations

4.1. Herd-following caribou hunters in the NEM

Herd following involves residential bands undertaking rapid long-distance movements to maintain proximity to caribou herds during their long-distance seasonal migrations between boreal forest wintering grounds and tundra calving grounds (Carr 2012; Ellis 2011; Koldehoff and Loebel 2009). Due to the fluctuations in caribou band size throughout their annual round, herd-following strategies promote cyclical nucleation, which is the scheduled aggregation and dispersion of bands in forager societies (Binford 2001, table 8.01; Carlson and Bement 2013; Smith 1976). Herd-following caribou hunters also prepare for seasonal fluctuations in caribou band size and the quality of caribou meat and hides with the periodic intensification of certain activities, like the focused preparation of hunting equipment (i.e., "gearing up" (sensu Binford 1978, 360; Sellet 2013)) and intensive butchering and hide processing activities (Ellis and Poulton 2014; Lemke 2015; Loebel 2013, 328–329; Waguespack 2005; Carr 2012).

Based on ethnographic analogies from subarctic caribou hunters (Binford 1978; Burch 1972, 1991; Helm 1993; Jarvenpa and Brumbach 1988; Loring 1997; Parlee, Manseau, and Łutsel K'é Dene First Nation 2005; Spiess 1979; Waguespack 2005), herd-following strategies would result in sub-regional patterning in Paleoindian settlement behaviors throughout the NEM due to the seasonal latitudinal movements of long-distance migratory caribou and their patterns of herd aggregation and dispersal (Carr 2012; Curran and Grimes 1989; Jackson 1997; Pelletier and Robinson 2005). Settlement behaviors should indicate range mobility and interaction encompassing the NEM, cyclical nucleation in group sizes throughout the NEM as inferred by site types, and periodic intensification of specialized on-site behaviors throughout the NEM as inferred from tool assemblages (Carr 2012; Jackson and McKillop 1991).

4.2. Boreal forest foragers in the NEM

The two macroband territory model assumes a southern New England territory, which would have been located in closed boreal forest. Based on Custer and Stewart
<table>
<thead>
<tr>
<th>Site name</th>
<th>Site size (excavated area m²)</th>
<th>Tool kit composition (fluted bifaces/formal tools)</th>
<th>Primary toolstones (straight line distance from source (km)) [count]</th>
<th>Minority toolstones (straight line distance from source (km)) [count]</th>
<th>Site type (sensu Boisvert 2012)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sites near highland tundra</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cliche-Rancourt</td>
<td>5 loci (245)</td>
<td>Projectile point dominated (.32) [0.08]</td>
<td>Munsungun chert (172) [1287]</td>
<td>Quartz [–] [237]</td>
<td>Base camp</td>
<td>Chapdelaine (2012)</td>
</tr>
<tr>
<td>Vail Kill site 2</td>
<td>1 locus (surface)</td>
<td>Projectile point dominated (1) [0]</td>
<td>Munsungun chert (212) [1]</td>
<td>N/A</td>
<td>Kill site?</td>
<td>Gramly (1984, 2001); Spiess, Cowie, and Bartone (2012)</td>
</tr>
<tr>
<td>(Magalloway cluster)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morss (Magalloway cluster)</td>
<td>3 loci (156)</td>
<td>Broad range of tools (.2) [0]</td>
<td>Munsungun chert (212) [414]</td>
<td>Unidentified chert [–] [1]</td>
<td>Transient camp</td>
<td>Gramly (2001); Spiess, Cowie, and Bartone (2012); Boisvert (1999, 2008, 2012); Boisvert and Kitchel (forthcoming)</td>
</tr>
<tr>
<td>Colebrook</td>
<td>1 locus (25)</td>
<td>Fluted preform dominated (1) [0]</td>
<td>New Hampshire spherulitic rhyolite (–) [83]</td>
<td>New Hampshire spherulitic rhyolite (–) [137]</td>
<td>Transient camp</td>
<td></td>
</tr>
<tr>
<td>cluster)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Israel River cluster)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potter: Locus H</td>
<td>1 locus (10.5)</td>
<td>Projectile point dominated (.5) [21]</td>
<td>New Hampshire spherulitic chert (14) [2067]</td>
<td>Munsungun chert (283) [1160]</td>
<td>Base camp</td>
<td>Boisvert (2012); Boisvert et al. (forthcoming)</td>
</tr>
<tr>
<td><strong>Sites in boreal parkland</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
<table>
<thead>
<tr>
<th>Site</th>
<th>Loci</th>
<th>Tool Type</th>
<th>Raw Material</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamoreau (Auburn Airport cluster)</td>
<td>≥3 loci (?)</td>
<td>Fluted preform dominated</td>
<td>Munsungun chert (275)</td>
<td>New Hampshire spherulitic rhyolite (86), Normanskill chert (347), Champlain Valley chert (21). Transient camp Spiess and Wilson (1987); Spiess, Cowie, and Bartone (2012)</td>
</tr>
<tr>
<td>Beacon Hill (Auburn Airport cluster)</td>
<td>2 loci [only Locus 1 reported in detail] (25)</td>
<td>Broad range of tools</td>
<td>New Hampshire spherulitic rhyolite (86) [majority], Munsungun chert (275) [minority]. Transient camp Bartone, Cowie, and Grindall (2007); Spiess, Cowie, and Bartone (2012)</td>
<td></td>
</tr>
<tr>
<td>Taxiway (Auburn Airport cluster)</td>
<td>8 loci (228)</td>
<td>End scraper dominated</td>
<td>New Hampshire spherulitic rhyolite (86) [978], Munsungun chert (275) [494], Quartz (-) [138], Normanskill chert (152) [28], Pennsylvania Jasper (398) [8]. Transient camp (reoccupied) Bartone et al. (2010), Spiess, Cowie, and Bartone (2012)</td>
<td></td>
</tr>
<tr>
<td>Jackson-Gore</td>
<td>2 loci (49.5)</td>
<td>Projectile point dominated</td>
<td>Unidentified tan chert (-) [1242], Munsungun chert (442) [689], Champlain Valley chert (68) [664]. Normanskill chert (152) [28], Pennsylvania Jasper (398) [8]. Transient camp Crock and Robinson (2009, 2012)</td>
<td></td>
</tr>
<tr>
<td>Sites in boreal forest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neponset</td>
<td>≥6 loci (≥800)</td>
<td>Broad range of tools</td>
<td>New Hampshire spherulitic rhyolite (253) [1640], Normanskill chert (221) [257], Pennsylvania Jasper (398) [14], Munsungun chert (496) [1]. Base camp Carty and Spiess (1992)</td>
<td></td>
</tr>
<tr>
<td>Ohomowauge</td>
<td>≥4 loci (568.5)</td>
<td>End scraper dominated</td>
<td>Pennsylvania Jasper (317) [392], Normanskill chert (181) [378], Munsungun chert (394) [11], New Hampshire spherulitic rhyolite (?). Transient camp Singer and Jones (forthcoming)</td>
<td></td>
</tr>
<tr>
<td>DQC 1 &amp; 8</td>
<td>2 loci DQC 1 (100), DQC 8 (10)</td>
<td>Projectile point dominated</td>
<td>Pennsylvania Jasper (136) [2], Normanskill chert (115) [1], Esopus chert (-) [1], Munsungun chert ([202] [1]. Unknown Funk and Steadman (1994)</td>
<td></td>
</tr>
<tr>
<td>Manstan Rockshelter</td>
<td>1 loci (50)</td>
<td>Projectile point dominated</td>
<td>Normanskill chert (150) [1], N/A. Unknown Manstan (1983)</td>
<td></td>
</tr>
</tbody>
</table>
(1990), subarctic boreal forest dwellers do not organize their settlement behaviors around caribou hunting, but instead practice subsistence strategies of broad-based hunting, fishing, and gathering. If the southern NEM is a distinct macroband territory of boreal forest foragers, then settlement behaviors in the southern NEM should indicate range mobility restricted to the southern NEM and limited variability in site types and on-site behaviors. Accordingly, settlement behaviors in the southern New England territory would be expected to differ from the northern New England territory where caribou herd following may have occurred.

5. Results of sub-regional patterning in NEM 
Michaud-Neponset point site settlement behaviors

5.1. Settlement behavior: Range mobility and interaction

Paleoindian Range mobility and social interaction is investigated by examining straight line distances from toolstone sources to sites. Based on remnant cortical surfaces on lithics in NEM sites, Paleoindians mostly procured toolstones from primary geologic outcrops rather than from secondary sources (Lothrop et al. 2011, 548), therefore toolstone acquisition from primary outcrop locations is assumed in this analysis. Most of the toolstone designations in this study are based on macroscopic identifications; however, some assemblages have also been subjected to geochemical testing and petrographic analyses (Burke 2006; Kitchel 2016a; Pollock, Hamilton, and Bonnichsen 1999; Pollock, Hamilton, and Boisvert 2008).

Following Ellis (2011), the majority toolstones in the assemblages likely reflects direct procurement and will be used as a proxy for Paleoindian range mobility. Discriminating the method of procurement for minority toolstones, however, is fraught with equifinality (Ellis 1989, 2011; Meltzer 1989). Minority toolstones may be obtained through a combination of direct procurement, acquisition through exchange, movements of individuals between bands, or logistic procurement by small parties dispersed from their residential groups (Curran and Grimes 1989; Custer and Stewart 1990, 318; Ellis 1989; Ingbar 1994; Lothrop and Bradley 2012, 28; Spiess and Wilson 1989). 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.

In the one band territory model, majority toolstones should indicate range mobility between northern and southern New England associated with residential groups rapidly moving long distances coinciding with seasonal migrations of caribou (Curran and Grimes 1989; Ellis 1989, 2011; Koldehoff and Loebel 2009; Pelletier and Robinson 2005, 171). Accordingly, long-distance movement of majority toolstones from southern sources to northern NEM sites would be associated with rapid movements of residential groups during the spring caribou migration, and the long-distance movement of northern toolstone sources to southern NEM sites would be associated with the fall caribou migration. Embedded procurement of toolstones throughout the seasonal round would also result in many northern NEM sites being dominated by northern toolstones with minor amounts of southern toolstones, and many southern NEM sites with a majority of southern toolstone and minor amounts of northern toolstones (Lothrop and Bradley 2012, 29).

In the two macroband territory model, majority toolstones in the southern NEM sites should be from southern NEM sources, and northern NEM sites should have majority toolstones from northern NEM sources indicating range mobility within but not between the territories. Interaction and exchange between the two macrobands may result in minority toolstones from sources in one territory being present in the other territory.

Figures 2 and 3 illustrate locations of sites and toolstone sources. Thirteen of the central/northern NEM sites are dominated by New Hampshire rhyolites and Munsungun chert, which outcrop in northern New England (Figure 2). While in one northern NEM site, Colebrook, Normanskill chert from the southern NEM is the majority toolstone. Four of the southern NEM sites are dominated by Normanskill chert and Pennsylvania jasper, which outcrop near or beyond the southern boundary of the NEM. One southern NEM site, Neponset, has New Hampshire rhyolite from the northern NEM as the majority toolstone. The majority toolstones in most of the NEM sites suggest that residential range mobility was distinct between northern New England and southern New England, which may support the model of two macroband territories or may indicate embedded procurement of toolstones through the seasonal round in one large territory.

Additionally, minor amounts of northern toolstones occur in three southern NEM sites, and small amounts of southern toolstones are present in three northern NEM sites (Figure 3). This pattern indicates that a regional network of toolstone movement links MNPt sites throughout the NEM. If the minority toolstones are monitoring exchange among bands, then the hypothesized southern NEM bands and central/northern NEM
bands were interacting with sufficient frequency that many sites retain evidence for these exchanges. If at least some of the minority toolstones are remnants of serial direct procurement, however, then the minority toolstones could also reflect long-distance annual residential mobility between northern and southern New England, which supports the one large macroband territory in the NEM model.

The model of one large macroband territory in the NEM is further supported by the range mobility reconstructed from the majority toolstones at the Colebrook site in New Hampshire and the Neponset site in Massachusetts. The long-distance transport of Normanskill chert north to Colebrook (∼343 km; Kitchel 2016a) and the long-distance movement of New Hampshire rhyolites south to Neponset (∼253 km; Pollock, Hamilton, and Boisvert 2008) indicate extensive residential mobility between northern and southern New England, which supports the one large macroband territory in the NEM.

The inferred straight-line distances of residential movement of ∼253 km for Neponset and ∼343 km for Colebrook suggest round trip residential movements greater than 500–680 km, since straight-line distances between toolstone sources and sites underestimate residential mobility (Ellis 2011). These long-distance toolstone movements in the NEM indicate that the annual residential range mobility of Middle Paleoindians was similar to or greater than the annual distances moved by subarctic residential groups (Binford 2001, table 5.01; Ellis 2011; Kelly 1983).

The territory size necessary to incorporate the MNPt sites and toolstone sources in the NEM would encompass an area around 240,000 km² (see Figure 1). This territory size is comparable to the total land area occupied by subarctic forager groups (Binford 2001, table 5.01). Accordingly, the residential range mobility, social interactions, and total land area of Middle Paleoindian occupations inferred from toolstone transportation to the MNPt sites suggest settlement behaviors associated with herd-following caribou hunting strategies and are therefore compatible with the model for one large macroband territory in the NEM.

### Table 1: Site Names

<table>
<thead>
<tr>
<th>Site Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dutchess Quarry Caves 1 &amp; 8</td>
</tr>
<tr>
<td>2. Templeton</td>
</tr>
<tr>
<td>3. Manstan Rockshelter</td>
</tr>
<tr>
<td>4. Ohomowauke</td>
</tr>
<tr>
<td>5. Neponset</td>
</tr>
<tr>
<td>6. Jackson-Gore</td>
</tr>
<tr>
<td>7. Fairfax Sandblows</td>
</tr>
<tr>
<td>8. Israel River Cluster</td>
</tr>
<tr>
<td>9. Potter (Block H)</td>
</tr>
<tr>
<td>10. Colebrook</td>
</tr>
<tr>
<td>11. Auburn Airport Cluster</td>
</tr>
<tr>
<td>12. Lautman</td>
</tr>
<tr>
<td>13. Magalloway Cluster</td>
</tr>
<tr>
<td>14. Cliche-Rancourt</td>
</tr>
<tr>
<td>15. Misery Stream</td>
</tr>
</tbody>
</table>

### Figure 2: Majority toolstones in Michaud-Neponset fluted point sites (20 majority toolstone examples in the database; mean distance is 159.25 km; standard deviation is 98.02; minimum distance transported is 14 km; maximum distance transported is 343 km)
5.2. Settlement behavior: Site types

Middle Paleoindian residential group sizes are evaluated by comparing the number of loci and the quantity of lithics at each site (Carr 2012, 207–209; Spiess 1984). 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. I have added periodic regional aggregation sites to this list based on the work of Robinson et al. (2009) at Bull Brook.

The three types of residential campsites are as follows:

- **Transient camps** are residential campsites during the most dispersed phase of cyclical nucleation. Transient camps are expected to have small residential occupation sizes based on the presence of between one and four loci and relatively small lithic assemblages.

- **Multi-family basecamps** are residential campsites created during the aggregated phase of cyclical nucleation. 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 those found in transient camps, thus indicating deposition by a larger residential group comprised of a few family bands.

- **Periodic regional aggregation sites** refer to the residential campsites that are formed during macroband aggregations that periodically occur. Periodic regional aggregation sites should contain more than 10 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, in this study I have employed detailed analyses of intra-site patterning, toolstone use, and toolkit composition in an attempt to cautiously parse the sites into site types.

If the NEM contained one large macroband territory of Middle Paleoindians who employed herd-following caribou hunting strategies, then site types should yield...
evidence for cyclical nucleation with multi-family basecamps and regional macroband aggregations to facilitate communal caribou hunts expected in the portions of the NEM occupied by migratory caribou herds. Transient camps would be expected to occur throughout the NEM and may have been created during times when groups lacked direct access to caribou herds. If the NEM contained separate band territories in southern and northern New England, then the southern NEM sites and northern NEM would be expected to contain evidence for separate patterns of cyclical nucleation.

The dataset contains evidence for one kill site, thirteen short-term transient camps, and four potential large multi-family basecamps, but there are no candidates for regional macroband aggregation sites (Table 2).

The one kill site is located in the highland tundra. Transient camps are distributed throughout the NEM with three sites in close proximity to the highland tundra, eight sites in the boreal parkland, and two sites in the boreal forest. Candidates for multi-family basecamps include three sites in the highland tundra and one site in the boreal forest. Although periodic regional macroband aggregation sites were not recognized in the MNPt site dataset, potential macroband aggregation sites have been identified in eastern Great Lakes Barnes point sites including Fisher (Storck 1997) and Parkhill (Ellis and Deller 2000), which are likely contemporaneous to the Michaud-Neponset point occupations of the NEM. The lack of macroband aggregation sites in the MNPt site dataset therefore may be a result of discovery bias or may reflect differences in settlement behaviors and cyclical nucleation strategies in these neighboring regions of the glaciated Northeast.

The dataset consisting of one kill site, thirteen short-term transient campsites, and four potential large multi-family basecamps may reflect cyclical nucleation settlement behavior associated with herd-following caribou hunting strategies since dispersed phases of group organization occur across the region and aggregated phases occur in habitats conducive for caribou hunting (Burch 1972, 1991; Carr 2012, 243–255; Gordon 1996; B. Robinson 2012, 139; Spiess 1979, 220–226; Spiess 1984, 282). The model for one large macroband territory in the NEM therefore is tentatively supported. The two macroband territory model cannot be dismissed based on the current dataset, because the small sample of sites from southern New England limits the interpretations of possible cyclical nucleation for a distinct southern New England territory.

### Table 2 Summary of tool kit composition and site types for Michaud-Neponset sites in the New England and Canadian Maritimes region.

<table>
<thead>
<tr>
<th>Habitat location</th>
<th>Tool kit composition</th>
<th>Site type (sensu Boisvert 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Broad range of tools</td>
<td>Fluted preform dominated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kill site</td>
</tr>
<tr>
<td>Highland tundra</td>
<td>Morriss Colebrook</td>
<td>Cliche-Rancourt Vail Kill Site 2</td>
</tr>
<tr>
<td>Boreal parkland</td>
<td>Michaud Beacon Hill</td>
<td>Misery Stream Fairfax Sandblows Jackson-Gore</td>
</tr>
<tr>
<td>Boreal forest</td>
<td>Neponset Templeton Ohomowauke</td>
<td>DOC 1 &amp; 8 Manston Rockshelter</td>
</tr>
</tbody>
</table>

5.3. Settlement behavior: On-site behaviors

I examine the geographic distribution of Middle Paleoindian tool using activities indicating on-site behaviors by calculating the proportions of end scrapers and fluted bifaces to the sum of formal tools at each site (sensu Ellis and Poulton 2014, figure 12). Although duration of site occupations and archaeological excavation sample sizes impact tool composition at sites (Shott 1997, 2010; Surovell 2009, 58–98), 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 formal tools including fluted points, preforms, backed bifaces, alternatively beveled bifaces, end scrapers, side scrapers, gravers, and wedges may have been created by residential groups performing a
wide range of domestic tasks, whereas sites dominated by a narrow selection of tool types (> 30% end scrapers or fluted bifaces) may suggest encampments created during the intensification of specific tasks (Ellis and Poulton 2014; Jones 1998, table 7.1; Sellet 2013). Sites with > 30% end scrapers suggest intensive hide working (Loebel 2013; Ruth 2013), sites with > 30% fluted bifaces where the majority of the fluted bifaces are preforms suggest focused preparation of hunting equipment (i.e., “gearing up” (sensu Binford 1978, 360), and sites with > 30% fluted bifaces dominated by fluted points suggest hunting camps.

If Middle Paleoindians in the NEM employed a herd-following strategy in one large territory, then heterogeneity should be present in the relative tool form frequencies among toolkits recovered at MNPt 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 higher proportions of specific tool types resulting from periodic intensification of gearing up, hunting, and hide processing. 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. If the two macroband model is to be supported, then southern NEM sites should all contain diverse toolkits associated with domestic tasks associated with broad-based foraging.

The relative proportions of tool types among the MNPt sites indicate a range of on-site behaviors throughout the NEM (Table 2). Four sites contained a broad range of tools indicating daily residential activities, including one site in close proximity to the highland tundra, two sites in the boreal parkland, and one site in the boreal forest. Sixteen sites yielded high proportions of specific tool types like end scrapers (two sites), fluted points (ten sites), or fluted preforms (four sites), likely signaling the periodic intensification of specific activities (Figure 2). One end scraper-dominated site is located in the boreal parkland, and one is located in the boreal forest. Fluted point-dominated sites include five in the highland tundra, three in the boreal parkland, and two in the boreal forest. Sites with tool assemblages dominated by fluted preforms include one site in the highland tundra, two sites in the boreal parkland, and one site in the boreal forest.

Sites with a broad range of tools and sites with high proportions of specific tool types occur throughout all habitats in the NEM, 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 suggests settlement behaviors related to herd-following caribou hunters and therefore supports the one macroband territory model for the NEM instead of the two macroband territory model.

6. Discussion and conclusion

The sub-regional patterning among the Michaud-Neponset fluted point sites is compatible with generalized expectations for settlement behaviors associated with caribou hunters that employ herd-following strategies in one large territory. The long-distance toolstone movements documented among the sites suggest annual residential movements between northern and southern portions of the NEM, perhaps related to Middle Paleoindian foragers undertaking rapid long-distance movements to pursue caribou during their seasonal migrations. The distribution of site types indicates latitudinally organized cyclical nucleation associated with family bands aggregating and dispersing in conjunction with caribou migrations. The on-site behaviors indicated by tool using activities signal periodic intensification of tasks related to the preparation for hunts and processing of hides, scheduled to coincide with caribou migrations.

Based on the current dataset and my proxies for settlement behaviors, the alternative hypothesis that the NEM includes separate southern and central/northern Michaud-Neponset occupations is not supported. This hypothesis cannot be completely dismissed, however, since the main link between the southern and northern NEM sites relies on the assumption that majority toolstones were procured and transported by residential groups. If the majority toolstones were procured via other mechanisms, then the toolstone transportation between the southern and northern NEM may be monitored social interaction rather than residential mobility. Investigations of the separate southern band territory are also currently limited by the small dataset, which provides limited data regarding settlement behaviors inferred from site types and on-site behaviors for southern New England. Nevertheless, based on the comparable size of the estimated NEM territory to the total land area occupied by subarctic forager groups (Binford 2001, table 5.01), the preferable hypothesis is that the northern and southern NEM are both part of the macroband territory of NEM Paleoindians, rather than separate regions.

Further investigations into the sub-regional patterning of NEM settlement behaviors should employ expanded datasets generated by studying new sites and employing advanced analytical techniques like residue
analyses (Boisvert and Milligan 2014) to compensate for the limited preservation of organic remains in the region.

Note

1. Maps throughout this article were created using ArcGIS® software by Esri. ArcGIS® and ArcMap™ are the intellectual property of Esri and are used herein under license. Copyright © Esri. All rights reserved. For more information about Esri® software, please visit www.esri.com.

Acknowledgements

I thank Ted Goebel and Jon Lothrop for their diligence in organizing this thematic issue of PaleoAmerica. I also thank Jon for co-chairing the 2016 Eastern States Archaeological Federation symposium for which an earlier iteration of this paper was drafted. I owe debts of gratitude to fellow researchers who shared their research and insights including: Dick Boisvert, Jim Bradley, Dillon Carr, Kurt Carr, Claude Chapdelaine, Chris Ellis, Krista Dotzel, Joe Gingerich, Bob Goodby, Mike Gramly, Habe Grydnick, Brian Jones, Nathaniel Kitchel, Peter Leach, Darrin Lowery, Alan Levellell, Jon Lothrop, Roy Manstan, Kevin McBride, Roger Moeller, Jennifer Ort, Jennifer Rankin, Heather Rockwell, and Brian Robinson (in memoriam), Jess Robinson, Art Spiess, Michael Stewart, and Ernie Wiegang. I thank two anonymous reviewers, Dan Adler, Brian Jones, Kevin McBride, and Jon Lothrop for their comments on earlier drafts, which strengthened the arguments in this paper. However, I alone am responsible for any shortcomings in this paper.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

Zachary L. F. Singer received his PhD from the University of Connecticut. He is a research associate at the Institute for American Indian Studies. His research interests include eastern North American archaeology, Paleoindian lithic technology, and three-dimensional digital modeling of artifacts.

References


Helm, June. 1993. “‘Always with Them Either a Feast or a Famine’: Living off the Land with Chipewyan Indians, 1791–1792.” Arctic Anthropology 30: 40–60.


