RESEARCH BRIEFS

Paleoindian Colonization of the Recently Deglaciated Great Lakes: Mobility and Technological Organization in Eastern Wisconsin

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This study examines a robust sample of lithic assemblages from east-central Wisconsin, including both early and late Paleoindian components and younger Archaic and Woodland material. Average transport distances exceed 200 km in both the early and late Paleoindian samples, but with an important shift from north-south to east-west movement. The Paleoindian/Archaic transition also marks a dramatic change in mobility and toolstone utilization, as Archaic and Woodland assemblages are composed almost entirely of local raw materials.

Keywords Paleoindians, lithic technology, mobility, Great Lakes

The physical geography and ecology of the western Great Lakes have been profoundly shaped by glaciation. Major climatic shifts associated with the retreat of the Laurentide ice sheet after 17,000 cal yr BP left a landscape in ecological flux (Grimm and Jacobson 2004), and the first human groups to colonize the region would have been faced with a unique set of adaptive challenges. Archaeological evidence indicates that the region was first colonized by Clovis/Gainey groups at roughly 13,000 cal yr BP (Simons 1997), and later by Agate Basin and Cody Complex groups after the end of the Younger Dryas at 11,500 cal yr BP (Anderton et al. 2004). Here, our research focuses on evaluating how these hunter-gatherer populations used mobility to cope with the challenges presented by a recently deglaciated landscape.

Data generated through analysis of stone tool assemblages can be used as proxy measures of hunter-gatherer mobility (e.g., Ellis 2011; Surovell 2009). With this in mind, surface collections by avocational archaeologists constitute a large (and largely untapped) regional dataset relevant to this question. We analyzed seven large private collections from Calumet, Manitowoc, Fond du Lac, and Sheboygan Counties in east-central Wisconsin which provide a robust sample of chipped-stone tools ($n = 2885$) with both early (Clovis/Gainey, Folsom/Midland) and late Paleoindian (Agate Basin, Hell Gap, Dalton, Alberta, Cody), as well as younger Archaic and Woodland material. In all, material from 54 Paleoindian components was analyzed. Despite the fact that many of these artifacts were collected over the last 40–50 years, provenience data were surprisingly good (Figure 1). Most of these localities represent small surface sites with multicomponent lithic scatters, but assemblages from several large, previously recorded sites such as Forks View (47-CT-100; Dirst 1985) were also analyzed (Figure 2A).

Raw material transport patterns in both the early and late Paleoindian lithic samples indicate that late Pleistocene/early Holocene groups in eastern Wisconsin were highly mobile (Table 1). Due to the coarse-grained nature of these surface collections and the difficulty relating non-diagnostic tools and debitage to particular occupations, only diagnostic projectile points are included in the raw material frequencies. Toolstone derived from regional bedrock sources (Figure 1A); with sources > 50 km from a site being classified as exotic) dominates all time periods. Secondary raw materials introduced to the region via glacial outwash or drift are widely dispersed across northern and eastern Wisconsin, and would

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DOI 10.1179/2055557115Y.0000000002

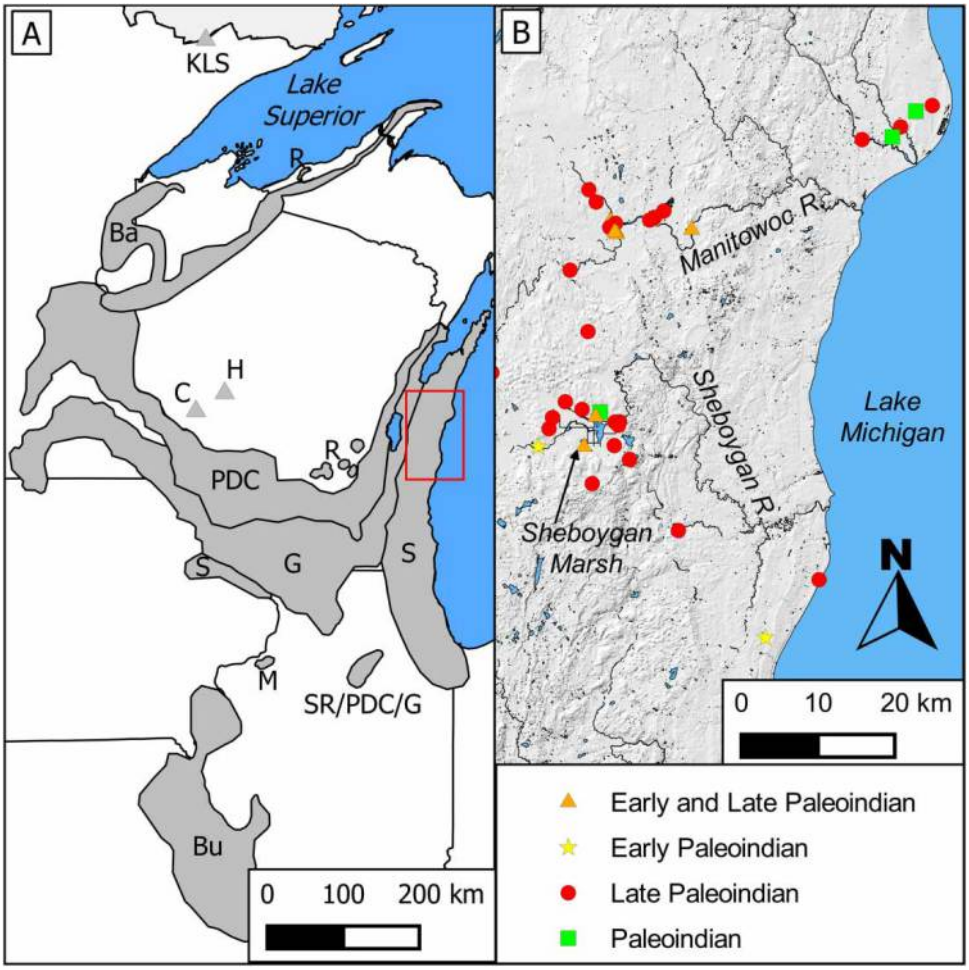

Figure 1 (A) Location of the study area in relation to major bedrock sources of lithic raw material represented in the sample (after Morrow 1994; Winkler et al. 2009): KLS = Knife Lake Siltstone, Ba = Basalt, R = Rhyolite, H = Hixton orthoquartzite, C = Cochrane chert, PDC = Prairie du Chien chert, G = Galena chert, S = Silurian chert, M = Moline chert, SR = Starved Rock chert (a subtype of PDC), and Bu = Burlington chert. (B) Early and late Paleoindian sites from east-central Wisconsin documented during the course of this study. In all, 54 Paleoindian components were analyzed during this study (41 with good provenience are shown).

also have been available in local till deposits. While it is possible to identify some of these raw materials (e.g., miscellaneous chert and quartzite) as till sources by their unusual characteristics or distinctive cortex, except in rare circumstances, basalt, rhyolite, and quartz from glacial till are very difficult to distinguish from more proximate bedrock sources. Secondary till sources are less than ideal for knapping due to both small nodule size (generally < 20 cm) and heavy weathering (Tankersley 1989), and their poor suitability for projectile point manufacture likely explains the very low frequency of these materials in all time periods represented in our sample.

While some Paleoindian projectile points were made with local raw materials, mainly Prairie du Chien (PDC) and Galena cherts, the majority was made with high-quality, exotic toolstones transported 300–500 km. Early Paleoindian assemblages in the sample, such as Aebischer (Loebel 2005), are dominated by Moline, Burlington, and PDC/Galena cherts – a package of raw materials that strongly implies a pattern of north/south seasonal movement between east-central Wisconsin and west-central Illinois. Interestingly, while transport distances and exotic raw material diversity in the late Paleoindian sample are still very high, patterns of lithic transport imply movement along an east/west axis between the Hixton orthoquartzite source in western Wisconsin and local sources (e.g., PDC/Galena cherts, Silurian chert, and rhyolite) in east-central Wisconsin (the Cody material from the Bergin Collection is a representative example, Figure 2B). This may reflect a shift in seasonal rounds associated with early Holocene warming, the expansion of deciduous forests into southern and central Wisconsin around 10,250 cal yr BP (Grimm and Jacobson 2004; Maher 1982) and a sharp drop in Lake Michigan water levels which would have opened up productive new habitats to the east of the study area (Chrzastowski et al. 1991). The Paleoindian/Archaic transition also marks a dramatic shift in patterns of mobility and toolstone utilization, as evidenced by Archaic and

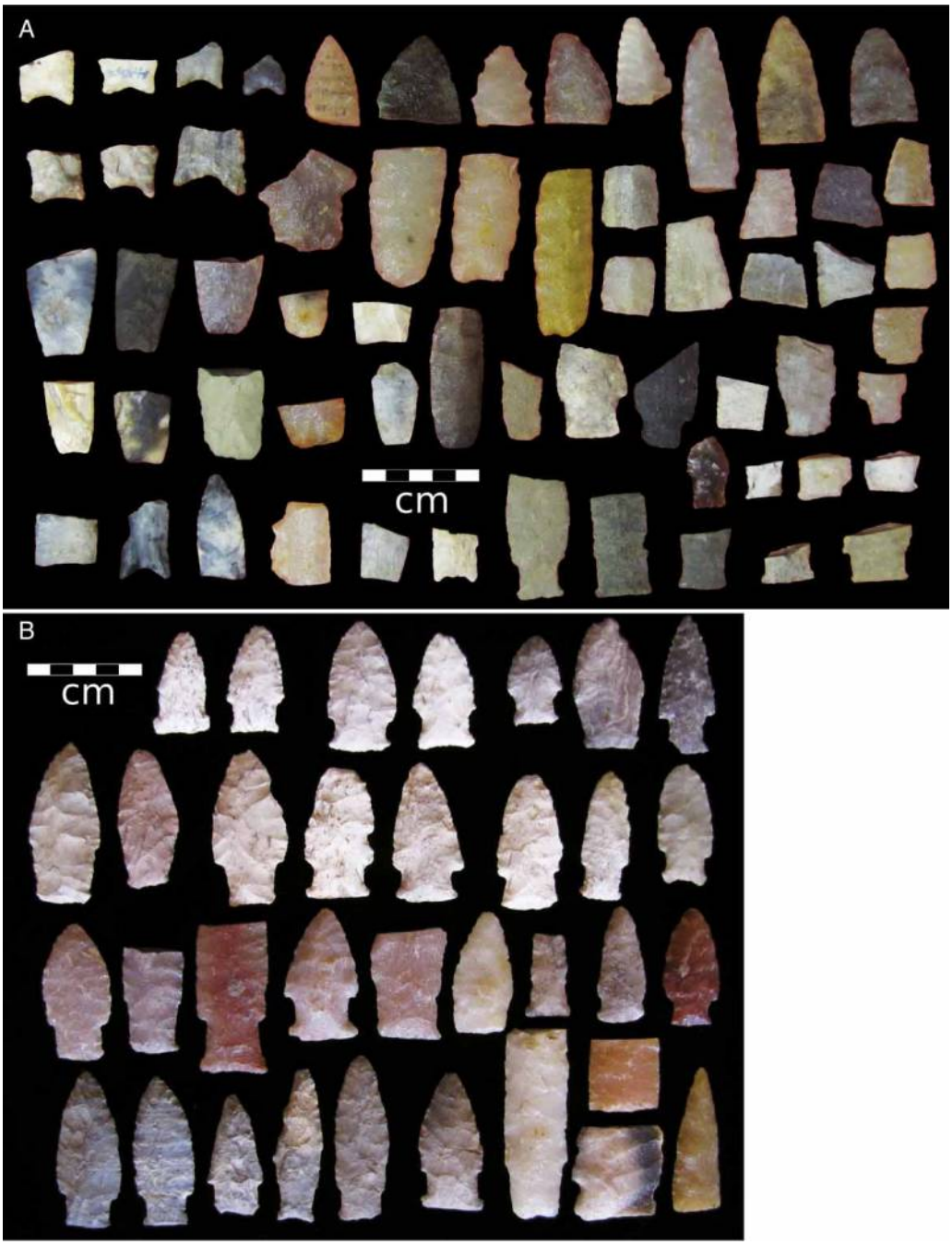

Figure 2 (A) Paleoindian projectile points and preforms in the Babler collection from the Forks View site (47-CT-100), including Clovis/Gainey ($n = 3$), Folsom ($n = 1$), Midland ($n = 2$), Alberta ($n = 1$), Agate Basin ($n = 11$), Scottsbluff ($n = 14$), Upper Valley Dalton ($n = 7$), and several point and preform proximal ($n = 4$), medial ($n = 10$), and distal ($n = 8$) fragments. Note: several projectile points in the collection are not included in this image. (B) Cody/Scottsbluff points from the Bergin collection (south side of Sheboygan Marsh) made on Hixton ($n = 13$), PDC ($n = 12$), Silurian chert ($n = 3$), rhyolite ($n = 4$), and siltstone ($n = 1$).

Woodland components composed almost entirely of local raw materials.

The heavy emphasis on bifacial technology in the early and late Paleoindian sample also supports the argument that these groups were highly mobile (e.g., Kelly 1988), although this may also reflect some collector bias. Relating other formal tools to particular occupations represented in these surface collections is particularly challenging; as such, only tools which could be confidently associated with Paleoindian components (e.g., by context, morphology, or raw material) were recorded. End scrapers are ubiquitous in Great Lakes Paleoindian sites and occur in very high frequencies in many of the sites considered here. Microwear analysis indicates that this class of hide-working tool was likely used in the manufacture of fitted leather clothing (Loebel 2013), a crucial technology for winter-mobile hunter-gatherer groups (Osborn 2004, 2014). Late Paleoindian components in the sample also consistently include distinctive bifacial chipped stone adzes, which are diagnostic for the time period in Wisconsin (Behm 1988) and occur in

Table 1
Raw material frequencies by period for diagnostic projectile points in the sample

Raw material		Early Paleoindian		Late Paleoindian		Archaic/Woodland	
		n	Proportion	*n*	Proportion	*n*	Proportion
Exotic	Hixton orthoquartzite	1	0.045	60	0.345	33	0.041
	Moline chert	13	0.591	0	–	0	–
	Starved Rock chert	0	–	0	0.011	0	–
	Burlington chert	2	0.091	7	0.040	3	0.004
	Siltstone	0	–	10	0.057	0	–
	Knife River flint	0	–	3	0.017	0	–
Local	Prairie du Chien/Galena chert	3	0.136	70	0.402	756	0.936
	Silurian chert	0	–	3	0.017	7	0.009
	Basalt	0	–	1	0.006	0	–
	Rhyolite	0	–	9	0.052	2	0.002
	Quartz	0	–	0	–	2	0.002
	Other (misc./unid. quartzite and chert)	3	0.136	9	0.052	5	0.006
	Total	22		174		808	

very high frequencies in regional late Paleoindian assemblages (e.g., Mason 2011). These heavy-duty woodworking tools may have been used in the production of dugout canoes, an assertion that is supported by the placement of a number of Great Lakes late Paleoindian sites in locations that would have been islands during the early Holocene (Engelbrecht and Seyfert 1994), the transport of lithic raw materials across major drainages (Morrow 2014), and microscopic use-wear analysis on contemporary Dalton adzes which documents their use on wood and charred wood (Gaertner 1994). Watercraft would have reduced travel, search, and transport costs for these early Holocene foragers (Jodry 2005), and may have led to short site residence times (Charnov 1976) and continued reliance on high mobility. In our dataset, two main clusters of Paleoindian sites are evident in the areas surrounding Sheboygan Marsh and the fork between the North and South branches of the Manitowoc River (Figure 1B). Significantly, many of the region's lake and wetland ecosystems developed during the early Holocene (Smith 1997), and these areas experienced extensive marsh formation. These lake and wetland patches would have been highly productive throughout the Holocene, providing habitat for a number of high-ranked prey species, including large game (e.g., caribou), fish, and waterfowl. The high density of sites in these areas indicates that the exploitation of these emerging habitats (perhaps with the aid of watercraft) may have been a major draw for foraging groups during this time period.

Documenting these lithic collections is a crucial step toward answering questions about diachronic changes in hunter-gatherer mobility during the Pleistocene/Holocene transition. Through this large-scale, regional approach, questions surrounding a number of other hunter-gatherer systems, including social organization, foraging, and lithic procurement can also eventually be addressed. The behavior of late Pleistocene and early Holocene hunter-gatherers in the recently deglaciated Great Lakes landscape will also shed light on adaptive strategies employed by foragers faced with similar environments, serving as an important test for hypotheses about the behavior of colonizing populations in other regions undergoing extreme environmental change at the end of the last ice age.

Acknowledgements

This project was generously supported by a Wisconsin Archeological Society Research Award (WASRA). We would also like to thank Curly Babler, Jeff Steiner, Gary and Rosalie Henschel, Jeremy Cobble, Jerome Steffes, and the staffs at the Plymouth Historical Society and Sheboygan County Museum for their time and access to their collections. This research would simply not be possible without their collaboration.

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Paleoamerican Artifacts from Cerro Largo, Northeastern Uruguay

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A research program directed at deepening the knowledge and understanding of Paleo-American "Fishtail" points is being carried out. In pursuit of this goal, lithic remains from Cerro Largo Department, northeastern Uruguay were examined. One of the samples comes from Paso Centurión, a surface site that has yielded the greatest number of Fishtail points in Uruguay. There, and at the Paso Taborda site, several examples were reworked as scraping tools, constituting a peculiar case of stone-tool recycling and reclaiming by post-Pleistocene hunter-gatherers. The examined collection sheds new light on regional lithic assemblages, stone-tool use, and the early colonization of southeastern South America.

Keywords Fishtail points, projectile technology, morphological variation, South America, Uruguay

Since the early 1980s, we have conducted a research program directed at deepening the knowledge and understanding of the morphological variation, technology, and function of early stone tools, with particular focus on Fishtail or Fell points (~11,000–10,000 ^{14}C yr BP). This paper reports new data obtained on Paleo-South American lithic remains from Cerro Largo Department (CL), northeastern Uruguay. These include a sample ($n = 23$) from the collections of Mr J. Rendo (Montevideo) and the Museo Histórico Regional de Cerro Largo (MHRCL), Melo, which comes from the surface of known and unknown sites (Figure 1).

Paso Taborda (PT) is situated along the main course of Bañados de Medina creek, 15 km southeast of

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DOI 10.1179/2055557115Y.0000000005