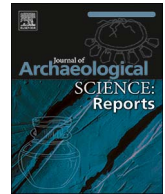




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Reconstructing prehistoric landscape use at a regional scale: A critical review of the lithic conveyance zone concept with a focus on its limitations

Geoffrey M. Smith*, David C. Harvey

Great Basin Paleoindian Research Unit, Department of Anthropology, University of Nevada, Reno, United States

ABSTRACT

Researchers commonly use the distances and directions that toolstone was conveyed from sources to archaeological sites to reconstruct lithic conveyance zones (LCZs). This approach, which has been most eloquently applied in the Great Basin by Charlotte Beck and George Jones, is a primary means through which researchers can consider prehistoric landscape use at a regional scale. For the past 15 years, the LCZ concept has generated productive debate about the scale and types of Paleoarchaic mobility; however, it remains unclear exactly what kinds of behavior(s) LCZs represent. Furthermore, it has become clear that LCZ reconstructions may be impacted by the type and number of artifacts on which they are based. In this paper, we track the development of the LCZ concept in the Great Basin, highlight some possible issues with the approach, and outline some guidelines that may help provide a better picture of how and why prehistoric groups conveyed toolstone.

1. Introduction

Source provenance analysis of lithic artifacts has been a common component of archaeological research for decades. A variety of methods (e.g., x-ray fluorescence analysis, instrumental neutron activation analysis, inductively coupled plasma emission spectroscopy) allow researchers to geochemically characterize artifacts made of obsidian and, increasingly, fine-grained volcanic rock (FGV) and cryptocrystalline silicate (CCS) (Hughes, 1986; Jones et al., 1997; Newlander, 2012; Page, 2008). Archaeologists seeking to address questions about mobility, territoriality, and exchange routinely employ source provenance data to calculate the distances and directions that prehistoric populations conveyed lithic raw materials (Jones et al., 2003; Kelly, 2011; Smith, 2010).

While attributing artifacts to toolstone sources can be relatively straightforward if raw materials possess unique geochemical signatures and well-documented geographic distributions, knowing which type(s) of prehistoric behavior were responsible for conveying toolstone remains difficult. As Kelly (1992:55) noted long ago, “the distribution of stone tools relative to the geological sources of their raw material... provides only a rough indicator of range, rather than mobility, since the raw material could have been acquired through residential or logistical movements, or trade”. Similarly, Hughes (2011:8–9) cautions that it can be difficult to untangle the influences of *effective distance* (the linear or least-cost distance to toolstone sources) and *social distance* (inter-

group relations, population density, etc.) on raw material conveyance. In some cases, toolstone conveyance may mark individual or group travel across effective distances; in others, it may mark the degree to which populations possessed socioeconomic ties with their neighbors or their neighbors' neighbors.

Kelly (1992) and Hughes (2011) correctly note that toolstone conveyance occurred within both physical and social landscapes. Obsidian and other raw materials could have been acquired via embedded procurement or exchange. Distinguishing which was the case, even in regions where lithic resources are well-documented, remains difficult. Fortunately, that is not the goal of our paper. Instead, we review how researchers working in North America's Great Basin have developed very different models of hunter-gatherer mobility, territoriality, and exchange during the terminal Pleistocene/early Holocene (TP/EH), 14,000–9000 cal. BP, using similar types of sourcing data. We highlight how although such data could reflect the types of short-term behavior that we often seek to understand (e.g., annual foraging rounds, long-distance hunting, periodic population aggregations, exchange), they could also mark an amalgam of processes that occurred over thousands of years. If the latter is the case, then source provenance data may offer only a coarse-grained view of prehistoric behavior. We also outline how interpretations of prehistoric mobility, territoriality, and/or exchange based on source provenance data may be biased by the type and number of artifacts that researchers submit for geochemical characterization. Finally, we present some guidelines that

* Corresponding author at: 1664 N. Virginia Street/MS096, Reno, NV 89557, United States.
E-mail address: geoffreys@unr.edu (G.M. Smith).

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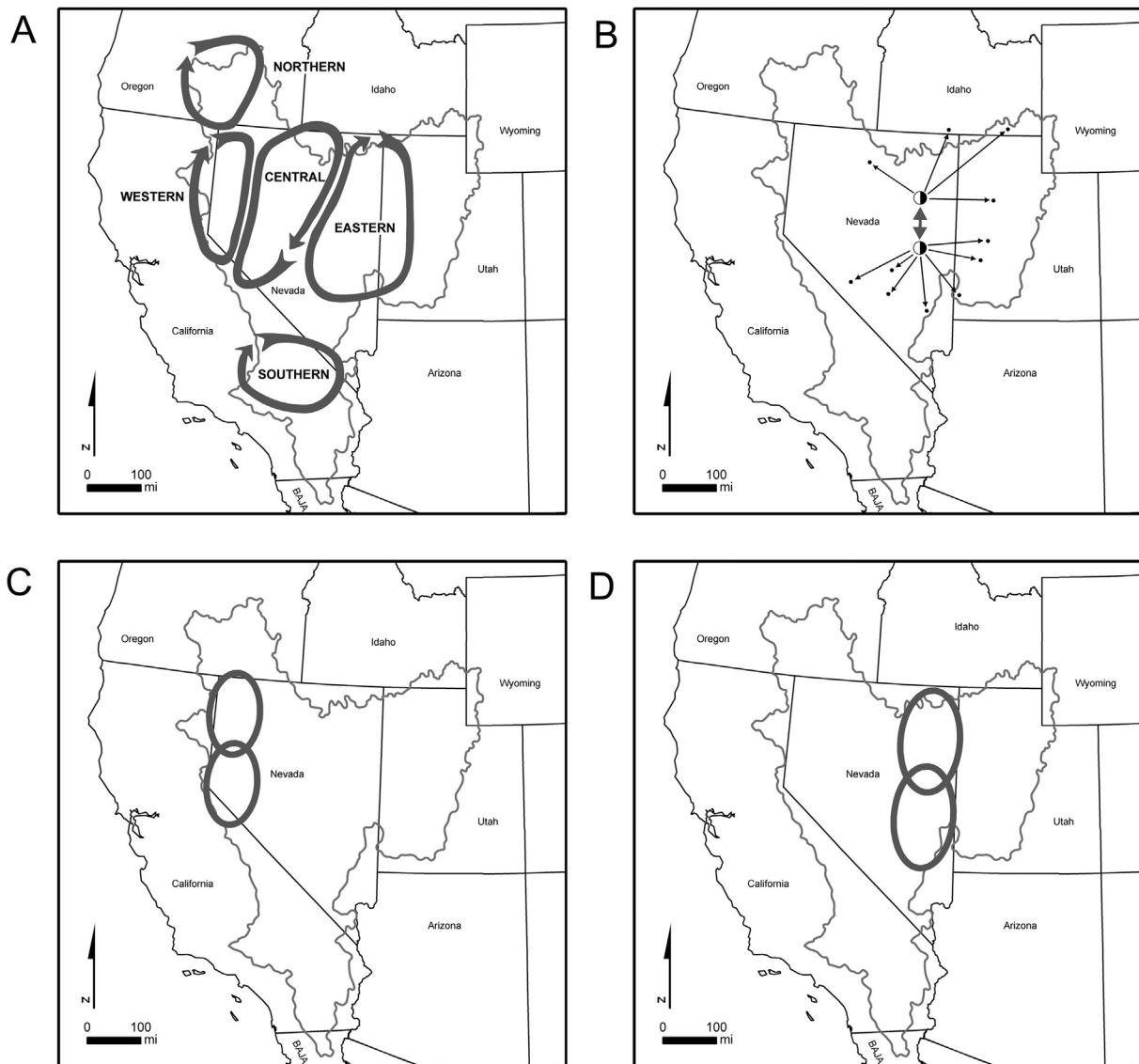


Fig. 1. Models of Paleoarchaic toolstone conveyance in the Great Basin: (A) Jones et al.'s (2003) original LCZs; (B) Madsen's (2007) logistical movements and periodic gatherings; (C) Smith's (2010) revised western LCZ; and (D) Jones et al.'s (2012) revised eastern LCZ. Figure adapted from Madsen et al. (2015a) and used with authors' permission.

may help researchers interested in reconstructing LCZs using source provenance data develop better pictures of how and why prehistoric groups conveyed toolstone.

2. The lithic conveyance zone concept

Over the past 15 years, George Jones, Charlotte Beck, and colleagues (Jones et al., 2003, 2012) have used the distances and directions that Paleoarchaic populations conveyed toolstone (mostly obsidian but also FGV) to reconstruct lithic conveyance zones (LCZs) in the eastern Great Basin. Smith (2010; Smith and Kielhofer, 2011) has used a similar approach to model Paleoarchaic territoriality in the northwestern Great Basin. Researchers delineate LCZs by creating ellipsoids that encompass the closest geologic sources of the raw materials represented in one or more assemblages within a given region (Fig. 1A, C, D). Jones et al. (2003, 2012) further developed the concept examining how toolstone frequencies varied between sites within their eastern LCZ as well as how those raw materials are represented (i.e., as finished tools or unmodified flakes). By examining the relationship between toolstone types and artifact types at a number of sites, Jones et al. (2003) reconstructed the sequence in which groups visited raw material

sources. In doing so, they were able to speculate about the routes that Paleoarchaic populations traveled through the north-south valleys of eastern Nevada (see Fig. 1A).

Since Jones et al. (2003) first introduced the LCZ concept to the Great Basin, several researchers (e.g., Madsen, 2007; Newlander, 2012, 2015; Rosenthal, 2014; Simms, 2008; Smith, 2010) have questioned different aspects of their model. Some critiques have highlighted other behaviors that are capable of producing patterning in source provenance data that could mimic those produced by extensive and cyclical residential moves. Madsen (2007) has noted that the large territories implied by Jones et al.'s (2003) sourcing data could be a product of long-distance logistical forays undertaken by male hunters within a less residentially-mobile system (Fig. 1B). He further suggested that large assemblages containing toolstone from different distances and directions might reflect periodic population aggregations where exchange occurred. Both possibilities could generate source profiles that mirror those produced by extensive residential movements through large territories. Simms (2008:132) has argued that Jones et al.'s (2003) large LCZs probably each encompassed several smaller foraging ranges that shifted over many generations' lifetimes. Similarly, Rosenthal (2014) has modeled how shorter residential moves by related bands

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