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Experimental construction of hunter-gatherer residential features, mobility, and the costs of occupying "persistent places"

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ABSTRACT

Temporal and caloric costs associated with building common hunter-gatherer residential features – housefloors, housepits, storage pits, rock rings, and various types of wickiups – are presented based on experimental construction of these types of features. For subsurface features, excavation rates and associated labor costs are consistent regardless of feature type, soil type, or feature size. Labor costs for surface features are largely dependent on feature size, complexity, and availability of raw materials. In total, the per-family costs of building a single-family hunter-gatherer residential base are just under one 8-h day and approximately 2500 kcal per person. Combined, these data indicate relatively low costs are associated with hunter-gatherer investments in persistent places and in residential facilities made from locally-available resources. Implied by the study is that initial use of a place might reduce the costs of and thus encourage subsequent reoccupations and that raw material availability may have played as much of a role in decisions about when to move as density and distribution of subsistence resources.

1. Introduction

Although frequently difficult to discern in the archaeological record (Seymour, 2009; Surovell and Waguespack, 2007), mobile hunter-gatherers across the globe nearly always made residential features, and of course continue to do so wherever this type of lifeway persists (Anderson, 2006; Binford, 1990; Kelly, 2013). Residentially mobile hunter-gatherers (i.e., those leaning towards the forager end of Binford's (1980) forager-collector continuum), for example, constructed surface features like brush shelters and lean-tos (Binford, 2001), wickiups (White, 2006), tipi rings and other stone circles (Morgan et al., 2013), and food caches and granaries (Morgan, 2012). They also made subsurface features ranging from tent platforms (Morgan et al., 2012), to housepits (Larson, 1997), to subterranean storage pits and cysts (DeBoer, 1988; Plew, 2003). Investment in features like these is often regarded as a costly endeavor entailing tethering to persistent places (Bender, 2015; Schlanger, 1992; Smith and McNees, 2011), association with more intensive landscape use (Tushingham, 2009), trends towards increased sedentism (Eerkens, 2003; Henry, 1985; Kelly, 1998), and the development of increasingly complex hunter-gatherer lifeways (Price and Brown, 1985). Understanding exactly what types of investments these features represent is therefore of considerable consequence regarding the costs associated with persistent hunter-gatherer landscape use, increased sedentism, the development of storage based economies, and the evolution of sociocultural complexity. Within this context, this study assesses the costs of constructing features often found at hunter-gatherer residential sites: housepits, tent pads, rock rings, storage pits, wickiups, and brush shelters. Its approach is explicitly experimental: it uses actualistic time-energy studies as proxies for the amount of labor involved in constructing these types of features, with an eye towards quantifying hunter-gatherer investment in place.

2. Background

The impetus behind this research is High Rise Village (HRV), a large hunter-gatherer residential site at ca. 3350 m elevation in Wyoming's Wind River Range that was occupied mainly between 2300 and 850 cal BP (Morgan et al., 2016) (Fig. 1). It contains at least 52 ca. 3 m diameter residential features made by cutting into the steep slope of the site and filling in the downslope portion with excavated soil, behind a low retaining wall of small stacked boulders. It is unknown what type of superstructure was built atop these features, but two features partially encircled by overlying timbers suggest cribbed structures (Adams, 2010; Morgan et al.,

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2012). One of the questions driving the research at High Rise Village was how much time and energy its inhabitants invested in occupying the site, especially in relation to investments in similar residential facilities at lower elevations in the nearby Wyoming Valley. Here, such features were often made during the middle Holocene, but also in the period between 1800 and 900 cal BP, roughly the same time as the main residential occupations at High Rise Village (Larson, 1997; Metcalf, 1987; Smith and McNees, 1999, 2011; Smith and Reust, 2004). Importantly, investment in these types of features at lower elevations has been linked to stable, persistent land use patterns geared towards intensive plant and especially root exploitation during the drier parts of the middle Holocene (Smith and McNees, 2011); at High Rise Village, these patterns have been tentatively linked to population pressure and climate change (Losey, 2013; Morgan et al., 2012) and more clearly to root exploitation (Rankin, 2016).

The subject of what drives greater investment in place is associated with broader questions relating to what drives people to adopt at least a modicum of sedentism, a topic entailing a vast amount of literature in the field of hunter-gatherer studies (e.g., Bettinger, 1999; Cannon and Yang, 2006; Henry, 1985; Kelly, 1998; Rocek and Bar-Yosef, 1998). A comprehensive review of this largely theoretical topic is obviously outside the purview of this empirically-focused paper, but it is clear that changes in mobility and associated investments in place are linked, at a minimum, to resource dynamics, demography, and social factors. Hunter-gatherers are predicted to invest in place and associated residential facilities, for example, when resources are irregularly distributed across space and especially through time, which results in concentrations of abundant resources (usually, but not always plants) which generally require costly processing and/or storage behaviors to effectively exploit in bulk; this in turn has a tendency to tether people to storage locations (Binford, 1980; Testart, 1982). Why people adopt more costly processing and storage-based subsistence strategies is the subject of copious debate, much of which focuses on demographic pressure. The reasoning here is that the additional calories required by growing populations are available at lower trophic-levels (usually primary producers) per given unit of land. But without innovation or adoption of efficiency-enhancing technologies (Bettinger et al., 2006; Richerson et al., 2009; Shennan, 2001; Ziman, 2003), it takes more effort per kcal to garner this lower trophic-level energy than it does to capture higher trophic-level organisms like large game (Binford, 1990, 2001; Keeley, 1988; Kelly, 1992; Morgan, 2015). Often overlooked in much of the thinking on the subject is that switching to a storing economy requires a reconfiguration of the social relations of production to allow for the recognition of private property in hunter-gatherer societies that nearly always share or at least "tolerate" theft (Bettinger, 2006, 2015; Blurton Jones, 1987; Morgan, 2012).

Investment in the actual features that comprise residential locations is therefore of consequence because these costs are *in addition* to the costs associated with exploiting lower-ranked foodstuffs. Ethnographic syntheses for residential investments are scanty at best. Binford's (1990) ethnological generalizations make the important distinction between portable, transportable shelter (tents and the like) versus the types of non-portable, expedient shelters made from local materials that are the subject of this paper, but do not quantify the differences in labor between these different modes of sheltering. Binford (2001: 338–344), while noting that intensifying, larger populations ought to make greater investments

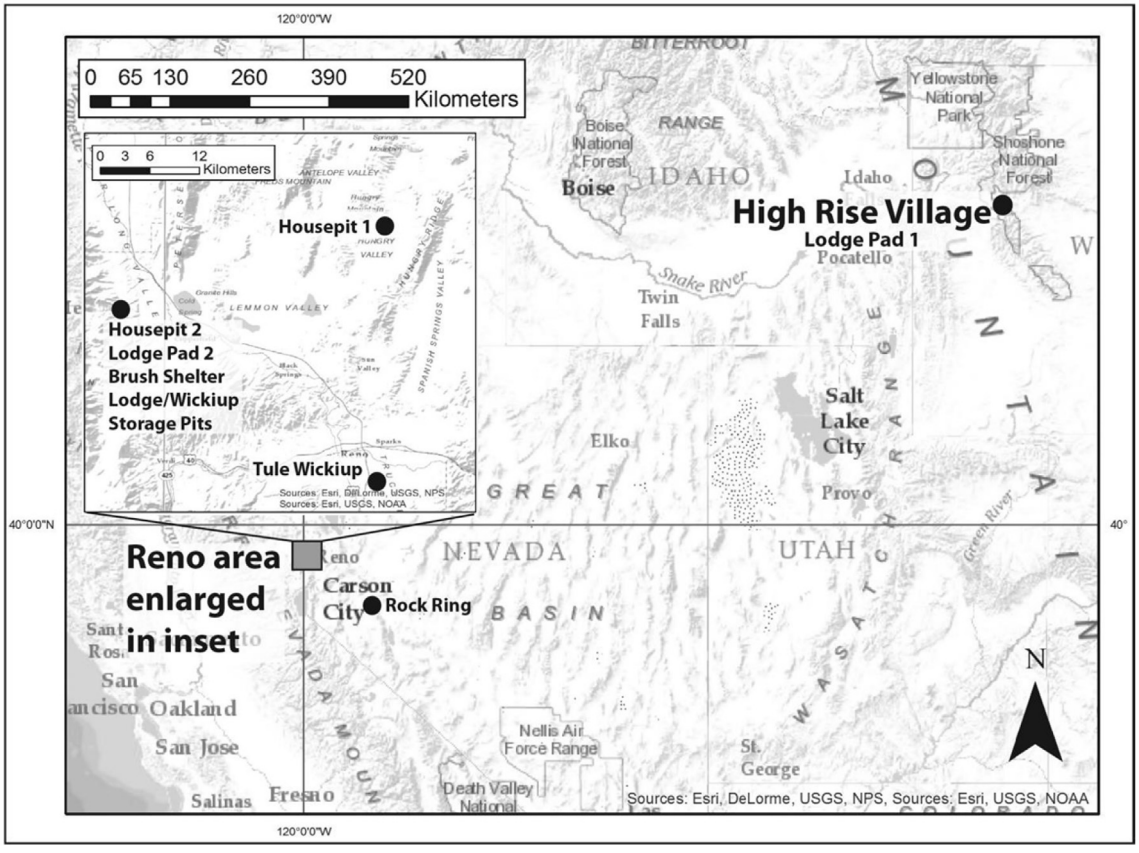

Fig. 1. Map showing location of HRV, Wyoming and experimental study areas in and near Reno, Nevada.