

CHAPTER 3

A SIMPLE METHOD FOR IDENTIFYING HOUSEHOLDS USING LITHIC ASSEMBLAGES: A CASE STUDY FROM A FOLSOM CAMPSITE IN MIDDLE PARK, COLORADO

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ABSTRACT

All people, past and present, construct shelter, yet for prehistoric hunter-gatherers, the archaeological record yields little direct evidence of the presence of household architecture. The residences of nomadic peoples are typically built in ways and with materials that leave few if any durable traces, but the physical delineation of interior and exterior space should impact activity patterns in ways that are likely to result in visible material signatures. In this paper, we develop a simple method for the identification of household areas using spatial properties of lithic assemblages. We simulated artifact accumulation within a household containing a central hearth feature, accounting for both primary and secondary discard activities. We then compare simulated patterns to spatial patterns at Barger Gulch Locality B, a Folsom campsite in Middle Park, Colorado. We argue that by examining the spatial distribution of only two variables, chipped stone artifact density and the percentage of burned artifacts, hearths, households, and exterior yard spaces can be distinguished.

In much of the archaeological record direct evidence of residential dwellings are absent. Countless sites, a percentage of which must certainly represent residential occupations, consist only of scattered stones and bones. Such is the record of millions of hunter-gatherer sites from across the globe and typical of the Early Paleoindian record of the Americas. The often complete lack of wall

remnants, prepared floors, post molds, and/or other distinct architectural features presents an undeniable example of when an absence of evidence does not provide evidence of absence. In the case of Paleoindians, we have little direct or indirect evidence of household structures (Frison 1982; Frison and Bradley 1980; Irwin-Williams et al. 1973; Jodry 1999; Robinson et al. 2009; Stiger 2006; Surovell and Waguespack 2007), yet it seems wholly illogical to presume that the vast majority of Paleoindian peoples did not utilize residential dwellings.

Based solely on preserved architectural elements, we are left to contemplate a Pleistocene landscape occupied by hunter-gatherers that were, quite literally, homeless. Considering that all people construct shelters, no matter how impermanent or hastily constructed they may be, indicates that an absence of architectural evidence should by no means imply an absence of architectural behaviors. The construction of shelters to insulate us from environmental forces is one of the fundamental components of the human cultural adaptation. As many others have done, we are left only to explore the material consequences of built structures in the absence of the structures themselves. Fortunately, previous archaeological (e.g.; Stapert 1989, 1990, 1991/92, 2003; Stapert and Johansen 1995/1996; Stapert and Terberger 1989), ethnoarchaeological (e.g., Bartram et al. 1991; Fisher and Strickland 1991; Graham 1998; Kamp 2000; O'Connell et al. 1991) and ethnographic (e.g., Binford 1990; Boismier 1991; Hendon 1996) work has identified some basic attributes of how residential dwellings impact the distribution and deposition of material culture.

In residential sites, household dwellings (i.e. houses) serve one very simple purpose; they create a contained space in which some behaviors, individuals, and conditions are meant to be kept in and others out. Houses can delineate private from public, friend from stranger, and warmth from cold by fundamentally demarcating space into the categories of "inside" and "outside." This straightforward division has broad implications for how the archaeological record forms in interior versus exterior spaces. We began to explore this issue after recognizing a consistent pattern in the spatial

distribution of burned artifacts at Barger Gulch, Locality B (BGB), an early Paleoindian site in Middle Park Colorado.

At BGB, spatial regularities in the density of burned and unburned artifacts surrounding hearths suggested that three of four hearth features were used in a consistent fashion. While it seems reasonable to expect that hearths would exhibit distinct artifact burning signatures, it is less intuitive to expect patterned differences in artifact frequencies and burning percentages well beyond hearth margins. Similarities in artifact distributions encircling multiple hearth features within a single site exhibiting spatial breaks at distances suggestive of behavioral margins (i.e. large enough to fall within reasonable dimensions of a forager house), led us to explore how structures would impact the formation of artifact assemblages. In this paper, we develop and apply a simple method for the identification of hearth and household features using the spatial distribution of two simple lithic variables that are frequently collected, artifact density and the percentage of burned artifacts.

BARGER GULCH, LOCALITY B

Composed of eleven known Paleoindian localities, the Barger Gulch (5GA195) site was an area of recurring human occupation during the late Pleistocene and early Holocene. Locality B is a large residential site of Folsom age that occurs on a high ridge east of Barger Gulch, approximately 40 m above the current stream level. Barger Gulch is a small southern perennial tributary of the Colorado River in the Middle Park, Colorado, a basin in the Southern Rocky Mountains that forms the headwaters of the Colorado River. The site occurs at 2,322 m ASL near the valley bottom in the western side of Middle Park, approximately 8 km east of the town of Kremmling, Colorado.

Over nine field seasons from 1997 through 2007, we excavated a total 164 m² of deposits. Excavations proceeded in 1x1 m units, which after the testing phase, were subdivided into 50 x 50 cm quads. Most excavation occurred in large contiguous excavation blocks (Figure 3.1), and this paper concerns three of those. The Main Block includes 68 m² of excavated area, and generated

more than 26,000 artifacts. Eight meters to the east southeast is the East Block, characterized by extremely high artifact density. From a contiguous area of 41 m², the East Block produced more than 36,000 pieces of chipped stone. Sitting 20 m to the south of the East and Main Blocks, the South Block was an area of low artifact density for BGB with only 3,270 pieces recovered, although our work there included only 26 m² of excavation. Other areas of the site bring the total excavated assemblage to over 75,000 pieces.

In prior work, we and others have described various aspects of the lithic assemblage (Daniele 2003; Kornfeld and Frison 2000; Kornfeld et al. 2001; Laughlin 2005; Surovell 2009; Surovell et al. 2000, 2001a, b, 2003; Waguespack et al. 2002, 2006; Zink 2007) and site geology and formation (Brantingham et al. 2007; Mayer et al. 2005, 2007; Surovell et al. 2005). In brief, the site is shallowly buried, and the Folsom occupation surface in our excavation areas was encountered on average 29 cm beneath the modern ground surface (ranging from 0 to 63 cm in depth). Not surprisingly, BGB shows evidence of disturbance, particularly in the form of upward displacement of artifacts (Brantingham et al. 2007; Laughlin 2005). Nonetheless, the site appears to retain a high degree of spatial integrity (Laughlin 2005; Surovell and Waguespack 2007).

In a prior paper (Surovell and Waguespack 2007), we examined spatial patterning in the Main Block, which at the time written, had an area 40% smaller than its current and final form. In that work we hypothesized that the hearth feature in the center of this excavation area occurred within a structure, and we are increasingly confident of that assessment today. Our arguments were based primarily on the application of ring and sector analysis (Stapert 1989), which examines artifact counts in concentric rings radiating out from a hearth's center. Since that paper was written, we have identified three additional hearth features at the site (Figure 3.1), although their identification was by no means straightforward. We begin within a brief description of how hearths were identified at BGB and then move on to spatial patterning associated with those hearths.

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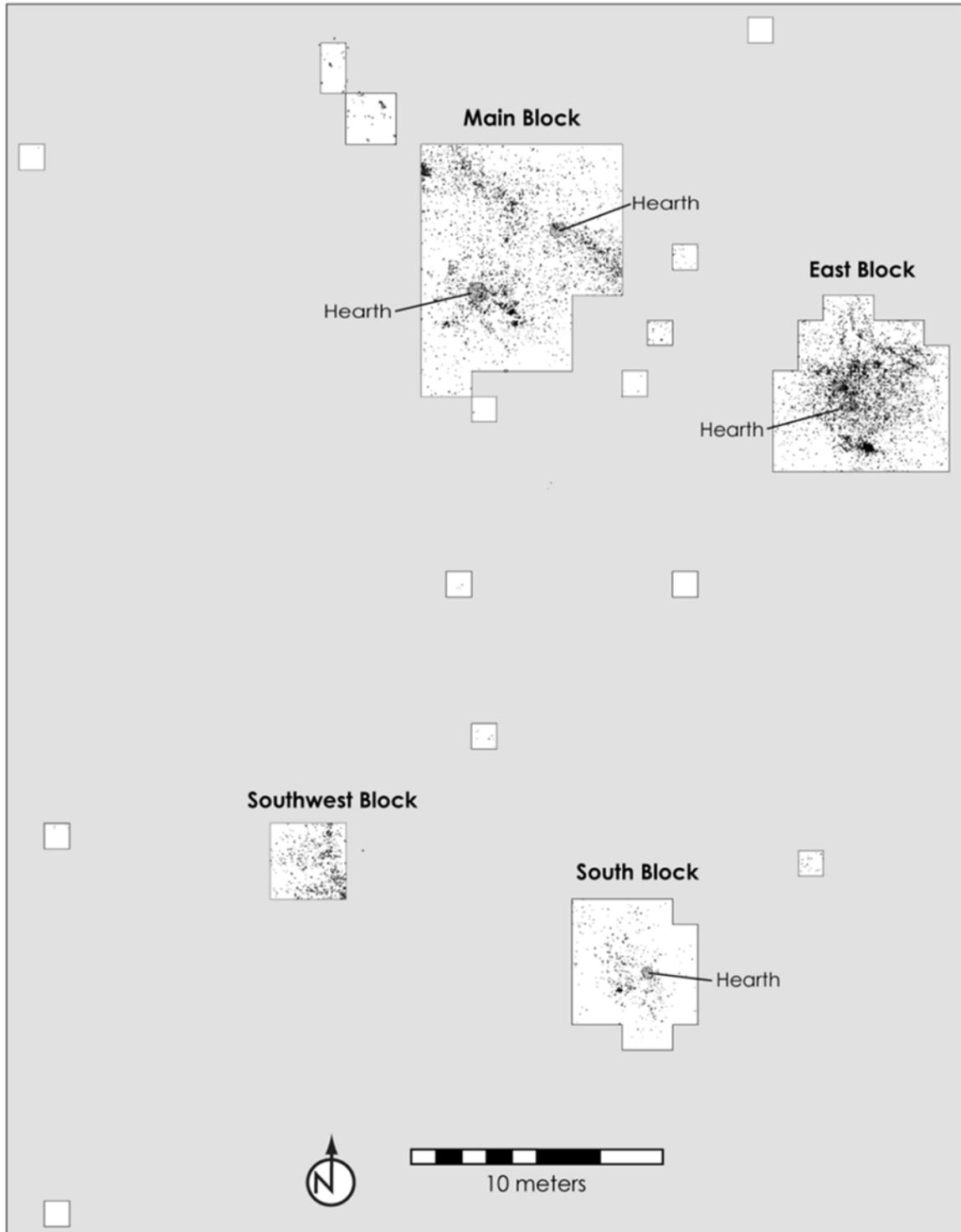


Figure 3.1. Plan map of excavations at Barger Gulch Locality B. Small black dots represent mapped chipped stone artifacts, and gray polygons indicate hearths.

DETECTING HEARTHTHS

While limited evidence of hearth features were detected during excavation of BGB, three of the four hearths identified could easily be referred to as “invisible hearths” as described by Sergeant et al. (2006). The first hearth discovered, the central hearth of the Main Block (Figure 3.1), was found not in the field but through analyses of the spatial distribution of burned materials. The northeastern hearth in the Main Block, by contrast, looked as one would expect during excavation. It appeared as a charcoal stained and oxidized pit feature containing many burned artifacts. The hearths in the East and South Blocks, however, were of the “invisible” variety. Those two features exhibited extremely weak sedimentary expression during excavation and were very difficult to physically delineate. Field identification of hearth features, however, were later confirmed by a simple analytical technique using the observed relationship between artifact density and the percentage of burned artifacts by excavation unit.

Manifested as a wedge-shaped distribution (Figure 3.2), there is a general inverse relationship between artifact density and the percentage of burned artifacts by excavation unit in each BGB excavation area. In general, areas with low artifact densities exhibit a wide array of percentages of burned

artifacts. As artifact densities increase however, the percentage of burned artifacts shows a corresponding decline. Outliers to this trend are exclusively associated with hearths (Figure 3.2), clearly demonstrating the inordinately high percentage of burned items located within hearths regardless of the density of artifacts they contain. It is easy to conceive of areas of the site with

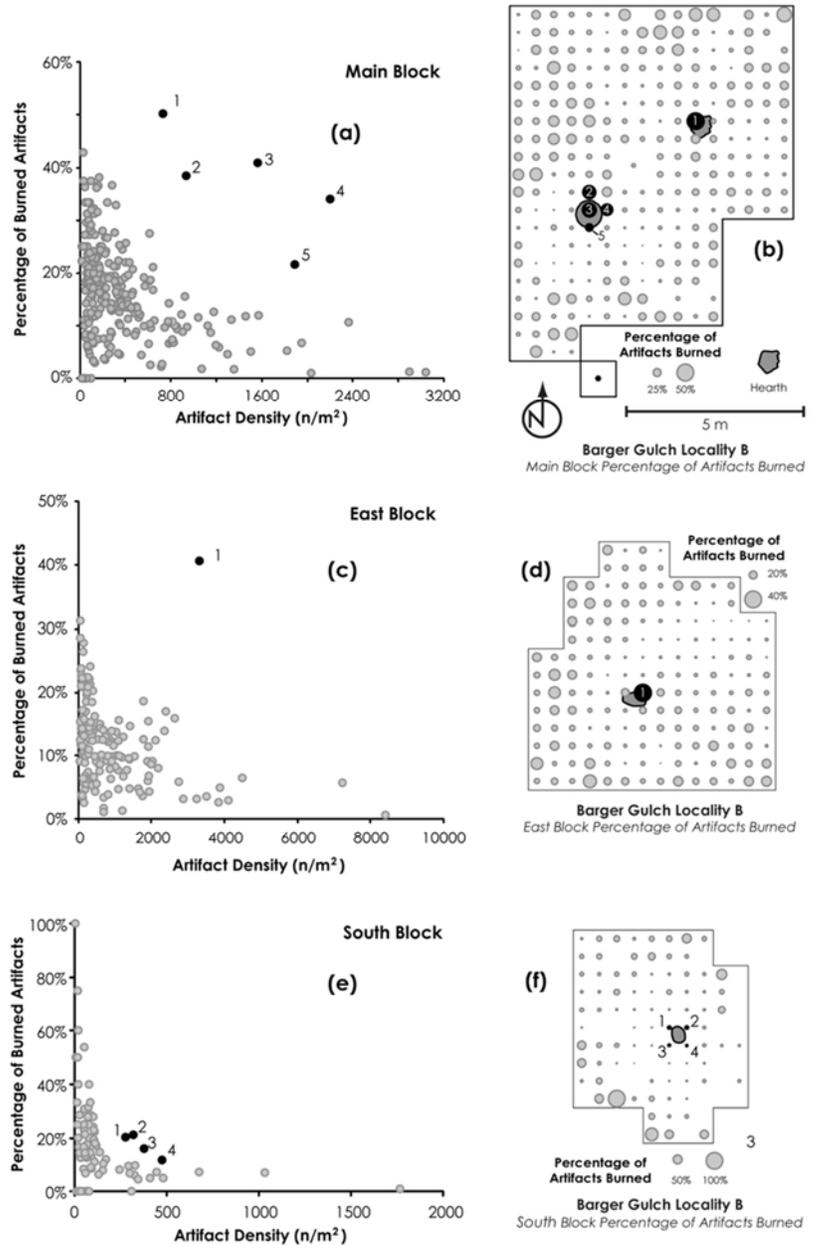


Figure 3.2. The relationship between artifact density and the percentage of burned artifacts for excavation quads (50 x 50 cm) or units (1 x 1 m) for the Main (a), East (c), and South (e) Blocks. Black dots indicate excavation quads associated with hearth features, as shown in the corresponding maps of percentage of burned artifacts to the right (b, d, and f).

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dense unburned artifact accumulations (up to thousands of pieces of chipped stone per m² in some areas) as representing primary work areas where flintknapping debris and discarded tools were deposited in high numbers. But why do some areas of the site contain low densities of artifacts but a high percentage of which are burned?

Our hypothesis is that portions of the site exhibiting low artifact densities and high relative burning frequencies represent the dispersal of materials through cleaning and dumping of hearth contents away from hearth associated work areas into secondary disposal areas. If so, the distinctive wedge shaped distribution between artifact density and burning percentage would be the result of two behavioral processes: the accumulation of largely unburned materials in work areas situated near hearths (which exhibit unusually high burning frequencies regardless of artifact density) and the cleaning and eventual discard of hearth/work related materials into refuse areas. Such a distinction implies that hearths create work spaces where artifact densities and burning frequency can vary dramatically and in a manner wholly distinct from non-hearth associated spaces where burned materials are only secondarily deposited. In the case of BGB, we argue that this pattern of artifact density and burning is the result of differential interior and exterior use of space by site occupants.

SIMULATING THE FORMATION OF HOUSEHOLD LITHIC ASSEMBLAGES

To examine the factors underlying the formation of the wedged shaped relationship between artifact density and the relative frequency of burned artifacts, we created a simple simulation of artifact discard as it might occur within and outside of a household. Discard is driven by probability distributions that were created, admittedly, largely intuitively but reflect realistic household parameters and BGB artifact densities. We assume a circular 3 m diameter structure with a hearth in its center based on common hunter-gatherer residential structural dimensions (Binford 1990; Gamble & Boismier 1991; Kroll & Price 1991). The modeled household is

roughly divided into three zones radiating outward from its midpoint (Figure 3.3). The hearth occupies a small circular area 0.5 m in diameter in the center of the structure. The area from 0.25 m to 1 m from hearth center, we call the “work zone,” the area where common activities such as flintknapping are most likely to take place. The remaining area, a 0.5 m wide ring against the wall of the structure, we call the “wall zone,” an area where little primary discard takes place, but artifact accumulation occurs due to the secondary displacement of items into low utility spaces against walls and storage of bulky items. Outside of the structure is a ring 2 m in diameter that we call the “yard zone,” an area in which materials removed from the hearth and interior space are discarded.

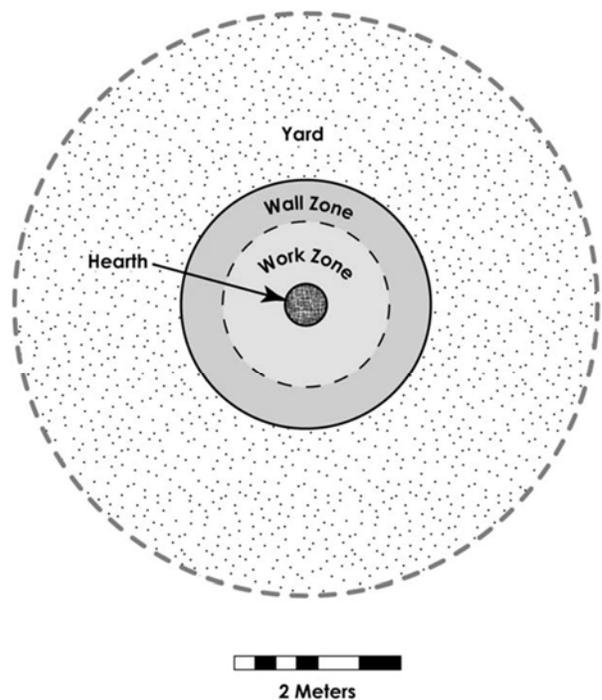


Figure 3.3. The spatial layout of the hearth, household, and yard area used in the simulation.

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The simulation includes three subroutines that run sequentially. First, artifacts are discarded during flintknapping. While numerous refuse producing activities are likely to occur around hearth features, we focus on the production and discard of lithic debris simply because of the durability and ubiquity of chipped stone artifacts in the prehistoric record. The exact number of artifacts can be varied, however we simulated arbitrary production scenarios of 2,000 and 10,000 pieces. The location of a particular artifact is determined by distance and angle from the hearth center; for simplicity in the simulation, angle was chosen randomly from a uniform distribution (0 to 360°). Distance was chosen from a probability distribution (Figure 3.4a) where any value between 0 and 1.5 m is possible, but discard is mostly likely to occur within the work zone between 0.25 and 1 m from hearth center. After an artifact's location was determined, it was assigned a value of "burned" or "not burned" on the basis of a probability distribution that declines from hearth center (Figure 3.4b). In our modeled assemblages, all artifacts have a chance of being burned or not, but the likelihood of an artifact exhibiting burning declines sharply beyond the edge of the hearth. Occasionally, artifacts well outside of the hearth zone are burned, an assumption we feel is justified because hearths can slowly migrate over the course of an occupation and because burned lithic artifacts can be ejected from hearth features when they are thermally fractured. Using this particular distribution, roughly 75% of burned artifacts occur within 0.5 m of the center of the hearth. Likewise some artifacts within the hearth feature itself are not burned. We are also comfortable with this assumption since at Barger Gulch, we identified artifacts as being burned only if they exhibited clear thermal fractures.

Once primary discard is completed, the artifact assemblage is subjected to two cleaning routines. First, some artifacts within the work zone are removed to the

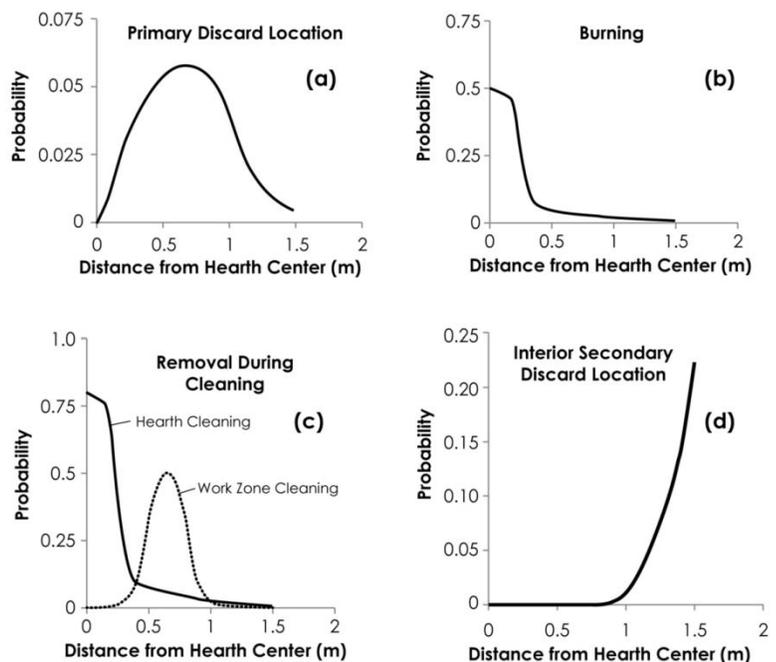


Figure 3.4. Probability distributions governing the artifact discard, burning, and cleaning, as a function of distance from hearth center, used in the simulation. a. The probability of primary discard location. b. The probability of an artifact exhibiting burning. c. The probabilities of an artifact being displaced during cleaning of the hearth and work zone. d. The probability of discard location within the wall zone following cleaning of the hearth.

wall zone. This initial movement of artifacts could occur through intentional removal of debris out of the hearth associated work area or through the inadvertent migration of artifacts due to human movement (e.g., scuffage [Schiffer 1987:127]). The probability that an artifact is displaced during this process is roughly normally distributed and spans the entirety of the work zone (Figure 3.4c). Artifacts cleaned or displaced in this manner are removed to the wall zone, their exact location again being determined by a probability distribution, which declines from a maximum value at the wall to a value of zero near the edge of the wall zone (Figure 3.4d).

In the second cleaning routine, the hearth is cleaned, and its contents are removed to the exterior of the

structure, a behavior that has been repeatedly observed in ethnographic settings (e.g. Bartram et al. 1991:97; Fisher and Strickland 1991: 223; Hitchcock 1987:401; Hodder 1982; Mallol et al. 2007; O’Connell 1987; O’Connell et al. 1991:67). Again, a probability distribution (Figure 3.3c) governs the likelihood that any given artifact is removed to the exterior of the household during hearth cleaning. Artifacts within 0.5 m of the hearth are most likely to be removed during cleaning, but beyond that distance probability declines sharply. Artifacts removed during hearth cleaning are relocated to a randomly chosen location on the outside of the structure within 2 m of the wall. After each procedure, the density and percentage of burned artifacts are tallied in each 50x50 cm grid square containing at least one artifact.

In actuality, the formation of household assemblages is unlikely to occur in three serial steps as we have simulated the process. Instead, cleaning most likely occurred episodically as varying rates of materials accumulate in the hearth and associated work area. However, changing the simulation to more realistically reflect the actual sequence of flintknapping and cleaning events would not change the results. As long as our basic assumptions hold true— that proximity to the hearth determines the likelihood of an artifact being burned in interior spaces, that interior hearths and adjacent work areas are cleaned, and that hearth debris is deposited in “outside” spaces, the general spatial distribution of burned and unburned artifacts remains consistent.

SIMULATED ARTIFACT DENSITY AND BURNING

In Figure 3.5, we present maps of burned and unburned artifacts along with scatter plots relating artifact density to the relative frequency of burned artifacts for each step in the progression of a simulation run involving the discard of 2,000 artifacts. Prior to any secondary displacement of items, artifact densities are highest in the hearth area at the center of the household and steadily decline in density toward the wall (Figure 3.5b). Despite a relatively low probability of discard within the hearth itself, the hearth zone is characterized by the highest artifact density as it has the smallest

area. When viewed in scatter plot form, the hearth appears as an outlier both in terms of density and percentage of burned artifacts with high values for both variables (Figure 3.5a). Among the remaining areas of the structure, initially there is no relationship between density and relative burning frequency but the relationship begins to emerge once cleaning begins.

After the work zone cleaning subroutine is run, artifacts become more dispersed within the household as artifacts occur in greater frequencies in the wall zone and adjacent to the wall itself (Figure 3.5d). The wedge-shaped distribution begins to emerge, but the hearth area still occurs as an outlier with respect to density since no artifacts are displaced from the hearth itself during the cleaning of the work zone (Figure 3.5c). Once artifacts are removed from the hearth to the exterior of the structure, a low density halo of artifacts spans the entirety of the yard area (Figure 3.5f) and the inverse relationship between artifact density and burning percentage becomes fully formed (Figure 3.5e). Due to removal of artifacts from the hearth feature, its density declines to intermediate values, although the percentage of artifacts exhibiting burning in the hearth does not change.

In the simulation the inverse wedge-shaped relationship between artifact count and relative burning frequency emerges, therefore, as a byproduct of cleaning behaviors, which act as a sampling phenomenon. When artifacts are removed from the hearth and work zone, samples of artifacts are displaced from areas of high density and are dispersed to zones of low density. Although the sample drawn from each area should be representative of the area as a whole (e.g., if 50% of artifacts from a hearth exhibit thermal damage, on average 50% of those in the sample should as well), because artifacts that are removed from these areas are dispersed during secondary discard, the result is that they occur in excavation areas characterized by relatively low density and a wide of range burning percentages.

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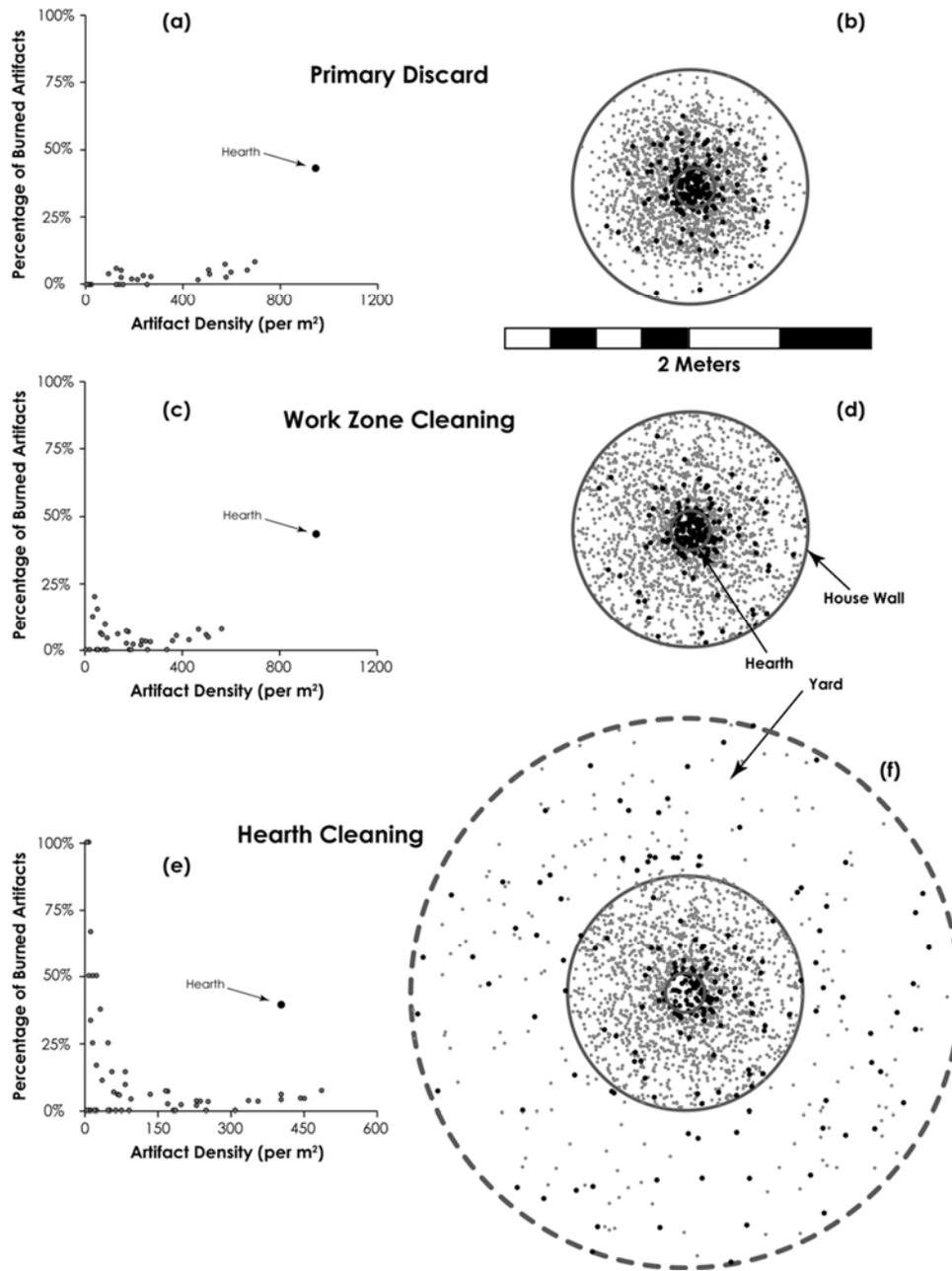


Figure 3.5. The relationship between artifact density and the percentage of burned artifacts for a simulation run using 2,000 artifacts after the primary discard (a), work zone cleaning (c), and hearth cleaning (e) subroutines have run.. Black dots in scatter plots indicate the 50 x 50 cm grid unit associated with the hearth. The associated maps to the right (b, d, & f) show the location of burned (black dots) and unburned (gray dots) artifacts following each subroutine.

Under the simulated conditions, it is expected that work and secondary discard areas within the house should be characterized by intermediate to high artifact densities with low percentages of burned artifacts. The hearth area should be characterized by intermediate densities and high percentages of burning, and the exterior yard area should have low artifact densities and extremely variable relative frequencies of burned items.

SIMULATED AND ACTUAL SPATIAL PATTERNING

Having demonstrated that hearth-centered discard within interior spaces coupled with cleaning behaviors can produce inverse relationships between artifact density and the percentage of burned artifacts similar to those observed at Barger Gulch, we now turn to spatial comparisons between simulated and actual artifact distributions. To do so, we combine the power of both variables into a single variable, which we call the *Density and Burning Index* (DABI):

$$DABI = \frac{b \cdot 10^3}{\ln(d)}$$

where b is the relative frequency of burned artifacts and $\ln(d)$ is the natural logarithm of artifact density (per m^2). Artifact density is log-transformed to normalize its distribution. The ratio of these two terms is multiplied by 1,000 (essentially converting it to a permil value) to produce more intuitive numbers as the ratio without the multiplier typically results in decimal values. Large values of the DABI occur in areas that exhibit relatively low densities and high percentages of burned artifacts, and small values occur where artifact densities are high but relatively few of those pieces are burned. In other words, the index should provide a way of characterizing space as a continuum from areas dominated by cleaning and dumping of hearth contents (high values) to areas dominated by primary or secondary unburned

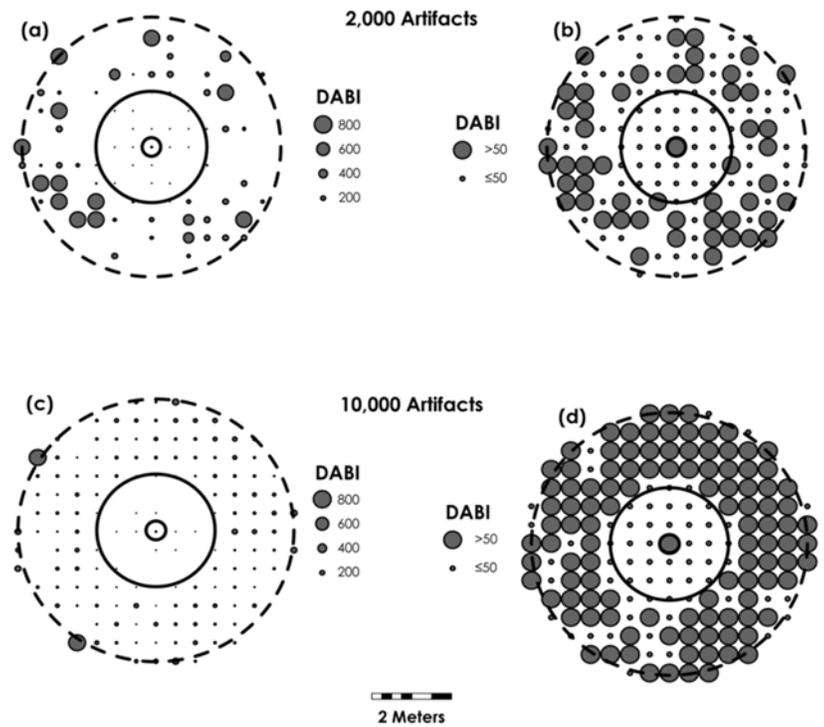


Figure 3.6. The spatial distribution of DABI values in simulation runs with 2,000 (a & b) and 10,000 (c & d) artifacts. The figures to the left show raw DABI values, and those on the right show DABI relative to a threshold value of 50.

flintknapping debris (low values), except that low values can also occur in areas characterized by low artifact densities and little burning.

In Figure 3.6, we present mapped DABI values for simulation runs involving 2,000 and 10,000 artifacts. Both show similar patterning, although it is more clearly expressed with larger numbers of artifacts. In both versions of the simulation, DABI values exhibit a wide range from 0 to over 700 (Figure 3.6a and 3.6c), and when raw values are mapped the spatial patterning that results is not particularly clear. When values are mapped relative to a threshold value however, in this case DABI values of greater or less than 50, the distinction between work and refuse areas becomes apparent (Figure 3.6b and 3.6d). Except for the hearth itself, all areas within the household are characterized by low DABI values. In

the yard area, a mixture of high and low DABI values occurs depending upon the percentage of burned artifacts present. The position of the wall is roughly demarcated by a transition from an area of continuously low DABI values surrounding the hearth to an area of mostly high but mixed DABI values outside.

The patterning in DABI associated with all four hearths at Barger Gulch is very similar and appears to delineate work areas from refuse zones (Figure 3.7). Associated with the central hearth in the Main Block is an oval work area of low DABI roughly 3.5 x 4 m in dimension. The hearth itself, as in our simulations, is characterized by a high DABI value as are a handful of excavation quads to its north. Work zones associated with the northeastern hearth in the Main Block are also evident but take on a long linear shape stretching from southeast to northwest along a zone approximately 1.5 m in width and 6 m in length. We suggest that the differences in shape and size result from the central hearth having occurred within a structure (Surovell and Waguespack 2007), while the northeastern hearth was outdoors. The narrow, linear, and directional pattern of discard associated with the northeastern hearth is likely a byproduct of smoke avoidance and bidirectional prevailing winds common in mountain valleys. Within the confines of a structure, the effects of wind on the positioning of flintknapping are mitigated resulting in a work zone that completely encircles the hearth. The remaining areas of the Main Block appear clearly as refuse zones dominated by high DABI values, although as in the simulation, low values occur sporadically as well.

Patterning associated with hearths in the East and South Blocks is remarkably similar to that of the central hearth of the Main Block (Figure 3.7). A large work zone surrounding the East Block hearth is evidenced by a contiguous zone of low DABI values 3.5 m in width and 5 m in length. The hearth and a few quads to its southeast and adjacent peripheral areas are characterized by high DABI values. The same pattern is present in the South Block, but it occurs at a smaller scale where the work zone is only 2.5 x 3 m in size. We hypothesize that like the Main Block central hearth, the East and South Block features also occurred within structures.

CONCLUSIONS

In our simulation and interpretation of DABI values, we have approached the spatial distribution of chipped stone as a reflection of interior and exterior behavioral patterns. Analyses of lithic materials segregated by raw materials, tool and debitage types, manufacturing strategy, morphology, and design attributes have proven invaluable to Paleoindian studies, but based on the data presented here, we have approached lithic artifacts more simply as objects distributed between interior and exterior spaces. Approaching chipped stone artifacts so mundanely and with complete disregard for their technological and typological attributes is admittedly a bit unorthodox. But our argument for the identification of interior and exterior spaces relies on assumptions that concern only the accumulation of material within hearths, houses, and exterior spaces. What those materials *are* in that light does not impact the delineating function of structures. As discussed, artifact density and burning frequencies may not provide suitable evidence of built structures in all archaeological contexts. Likewise, our assumptions regarding artifact accumulation and cleaning behaviors cannot be supported as universally realistic. However, the ability to potentially analyze and compare lithic assemblages both within and between households and interior/exterior spaces, provides a unique scale of insight into the hunter-gatherer archaeological record.

In environments where conditions favor the majority of debris producing tasks to be performed in indoor spaces near hearth features and site occupation span is long enough to subsume multiple cleaning episodes, clear patterns in artifact density and burning percentages seem reasonable to expect. Ethnoarchaeological studies have demonstrated that preferred activity locations, hearth cleaning behaviors and discard locations (e.g., Bartram Kroll and Bunn 1991:97; Fisher and Strickland 1991: 223; Hitchcock 1987:401; Hodder 1982; O'Connell 1987; O'Connell et al. 1991:67) are coarsely consistent among nomadic peoples (albeit derived from a small sample) but also subject to cultural and situational variables.

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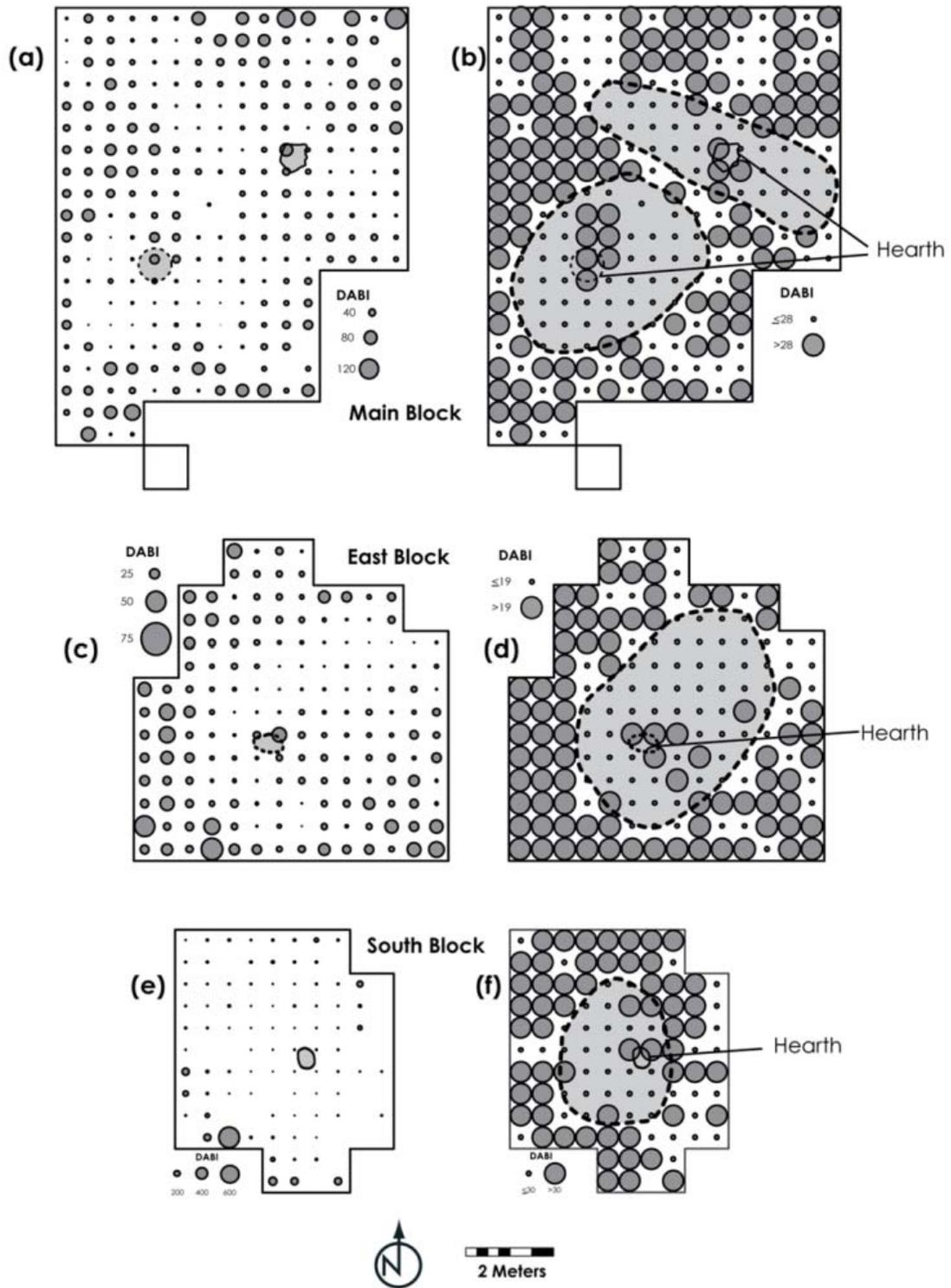


Figure 3.7. The spatial distribution of DABI in the Main (a & b), East (c & d), and South (e & f) Blocks. The figures to the left show raw DABI values, and those on the right show DABI relative to threshold values. Gray polygons on the maps to the right indicate the locations of hypothesized work zones.

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One can easily imagine situations where household structures lack interior hearths and where primary discard occurs preferentially or exclusively in exterior spaces. The consistent wedge-shaped relationship between these two critical variables across the site remains compelling however, and this pattern even if explained some other way, implies the repetitive and patterned use of areas associated with hearth features. While a multitude of processes could be responsible for this pattern at BGB, in a residential site located in the Rocky Mountains occupied during the Younger Dryas, houses would seem to present a practical necessity and a reasonable interpretation given the evidence.

With caveats in mind, we suspect that DABI values are likely to vary in a manner consistent with BGB at other residential sites in the archaeological record well beyond Middle Park and the terminal Pleistocene. Beyond the assumptions inherent to our simulation, our analyses are also contingent upon the archaeological data available. At BGB, we are fortunate that the horizontal scale and precise provenience control of excavations and the quantity of artifacts recovered provide a suitable sample for detecting spatial use. Sites with extremely low artifact densities (not uncommon in the Paleoindian record) and/or with small or dispersed excavation areas are unlikely to exhibit sufficient variation in DABI values regardless of whether hearth and/or houses were present. Lithic raw material at BGB, primarily Troublesome Formation chert, shows clear signs of burning in the form of crazing, potlidding, and highly angular fractures. In assemblages composed of raw materials where the designation of burned versus unburned is difficult to determine it may be impossible to reliably derive DABI values. Yet we have no reason to consider the BGB site wholly unique, as countless other hunter-gatherer sites are likely to represent residential occupations with interior hearths. In such cases, the distributional properties of burned and unburned artifacts may provide a simple and widely available means of distinguishing interior from exterior spaces and their associated behaviors.

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