Chapter 9

The Analysis of Mesodebitage and Mesofauna at Keatley Creek

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Introduction

As part of the research into the prehistoric socioeconomy at Keatley Creek, a program was established to systematically sample four subsquares within each two meter excavation square across all floor deposits (Vol. I, Chap. 1). The purpose of sampling the floor deposits in this fashion was to obtain information on relatively small cultural remains that would otherwise pass through the 6 mm mesh that was being used to screen all deposits. All floor samples were processed using water flotation thereby separating the light organic fraction from the heavier clasts, lithic, and faunal residues. Screens at the bottom of the flotation chamber retained all heavy material larger than 1 mm. Recovered remains included charred botanical remains (Vol. I, Chap. 9; Vol. II, Chaps. 4, 5), small mammal bone fragments, small fish bones and fragments, small debitage, occasional fragments of retouched stone tools, and very rare bone artifacts such as beads. Flotation samples were standardized at 1 liter of sediment. Because floor sediments were generally 3–5 cm thick, the taking of these samples from 50 × 50 cm subsquares frequently involved removing the majority of the floor sediments from sampled subsqures for flotation sampling purposes.

There were several reasons for undertaking the analysis of relatively small lithic and faunal remains. First, Schiffer (1987:267–269), Fladmark (1982) and others had argued that large cultural remains were those most likely to be picked up to be used elsewhere or cleaned up as secondary refuse to be dumped at a distance from the activity locations of manufacture and use. Thus, by monitoring the small size range of cultural remains, it should be possible to more accurately identify actual manufacturing loci on living surfaces and thus more accurately identify the activity areas on living floors that were critical for making inferences about the socioeconomic organization at Keatley Creek.

The second reason for using this approach is that the production of individual flakes is much more abundant, by several orders of magnitude, in the smaller size ranges than in the larger size ranges during tool manufacturing (Fladmark 1982). Therefore, Fladmark has proposed that the study of "microdebitage," that is, flakes less than 1 mm in size, should be highly sensitive to, and indicative of, site and activity locations. By extension, monitoring the small size range of flakes and fauna should provide a relative idea of the magnitude of manufacturing activities occurring at different locations on a living surface. We opted to modify Fladmark's original approach due to the excessive amount of time that the analysis of sediment samples less than 1 mm would require using microscopes, especially considering the large number of samples involved in our analyses. However, the same logic used by Fladmark should also be applicable to slightly larger lithic and faunal remains. Thus, we chose to examine the distribution of lithic and faunal remains in the 1–10 mm size range. To distinguish these remains

from Fladmark's "microdebitage" and the macro-sized remains recovered from the 6 mm mesh screens (Vol. I, Chaps. 12–16; Vol. II, Chaps. 11–14), we decided to refer to this size level of remains as "mesodebitage" and "mesofaunal remains." Separation of these remains from the heavy fraction of one liter soil samples could be accomplished relatively efficiently (in about an hour per sample) using jewelers' magnifying headglasses or large mounted magnifying glasses.

A third reason for undertaking this analyis was that contemporary studies had shown that significant information on faunal use could be missed by employing only 6 mm mesh screens, especially where fish and small rodents were present or economically important. Thus, we wanted to determine whether or not the macro-sized faunal remains that were recovered from the 6 mm mesh screens represented a biased view of faunal utilization or distribution across the floors.

A final reason for using these sampling procedures was that they represented a reasonable compromise between the time and effort-intensive procedures of screening all floor sediments through 1 mm mesh screens on the one hand, and the desirability of documenting the basic types of patterning represented by these remains across the housepit floors on the other hand. Without knowing what types of results might emerge, or even whether floor deposits were being successfully identified in the field, the taking of samples from each square meter across living floors seemed appropriate for providing adequate monitoring of any recurring prehistoric activities on those floors. While a more intensive level of sampling would have certainly increased the clarity of the patterns that emerged, it would have required greatly increased processing and analysis time as well as higher levels of funding to achieve any increased clarity. In the case of botanical remains, it simply would have been impractical to have any more material analyzed.

Results

This section presents the results of our analyses of the heavy fractions of soil samples that we were able to analyze on a housepit by housepit basis. The squares depicted in the figures represent actual locations that soil samples were obtained from. Deviations from intended systematic sampling locations were due to local factors such as roots and pits, or to excavator forgetfulness, as well as to subjective assessments that some areas were important to sample due to the proximity of various features such as hearths or indications of activity areas using other excavational observations. The range of absolute frequencies represented by the shading of the sampled squares was determined by probability levels of random item occurrences established using Poisson distributions. Thus, shading used on these maps indicates that the lithic or faunal counts in those squares were below the 5% probability level of occurring on the basis of a Poisson distribution (white squares), that the actual counts fell within the 5–95% range of probability of occurring using a Poisson distribution (gray squares), or that the actual counts were above the 95% level of occurring as a non-random pattern on the basis of Poisson distributions (black squares). For instance, in HP 7, there are 109 sampled locations across the floor. A Poisson distribution predicts that there should be 5 sampled locations with counts below a 5% probability. In reality, there are 45. Summary data are provided in Tables 1 and 2.

Table 1. Summary Data for Heavy Fraction Floor Samples from Keatley Creek (EeR17); Housepits 3, 7, and 12 (1991)

	Number of Elements	Mean	S. Dev.
Housepit 3 N = 57 ssq			
Lithic	1,171	20.54	31.72
Salmon	670	11.75	24.87
Non-salmon Fauna	164	2.88	10.59
Housepit 7 N = 109 ssq			
Lithic	2,990	27.43	24.13
Salmon	2,260	20.73	39.13
Non-salmon Fauna	828	7.60	20.26
Housepit 12 N = 21 ssq			
Lithic	226	10.76	22.95
Salmon	310	14.76	31.56
Non-salmon Fauna	13	.62	1.32

Housepit 12

Housepit 12 is one of the smaller housepits to be completely excavated (Vol. III, Chap. 8). It corresponds to the poorer, more ephemeral, and more communally organized type of residence at Keatley Creek (Vol. II, Chap. 1).

Fauna (Fig. 1): Only salmon elements are shown because the very low numbers of non-salmon fauna rendered analysis of little use. The more abundant salmon remains, however, clearly cluster in a single area against the north wall of HP 12, very close to the location of the ephemeral hearth observed on the floor. This corresponds to a communal food preparation and consumption pattern, supporting similar inferences made on the basis of larger salmon and non-salmon remains recovered from the 6 mm mesh screens (Vol. II, Chap. 6).

Lithics (Fig. 2): As with the macrodebitage and artifact distribution, there are several localized occurrences of mesodebitage that correspond quite precisely in general to the major macrodebitage distributions, including a major concentration along the east wall and south of the hearth and against the north wall. The central and peripheral concentrations may simply reflect places where activities with different space requirements occurred. Activities that could be done in small spaces, such as basketry or clothes making or making foreshafts, probably occurred in bedding or eating areas, as in other housepits. In fact, utilized flakes are strongly concentrated in these areas in HP 12 as well as in HP 3 (Vol. II, Chap. 11). Activities requiring more space such as spear maintenance, probably occurred toward the center of the floor not far from the hearth locations and it is in these areas that notches are strongly concentrated in all three houses discussed here.

Table 2. Summary Data for Cumulative Poisson Distributions for Housepits 3, 7, and 12 for Lithic, Salmon, and Non-salmon Faunal Elements

	Actual <5%	Expected <5%	Actual Mean	Expected Mean	Actual >95%	Expected >95%
Housepit 3						
Lithic	25	3	24	51	8	3
Salmon	28	3	23	51	6	3
Non-salmon Fauna	0	3	54	51	3	3
Housepit 7						
Lithic	45	5	40	99	24	5
Salmon	69	5	21	99	19	5
Non-salmon Fauna	44	5	52	99	13	5
Housepit 12						
Lithic	11	1	8	19	2	1
Salmon	15	1	2	19	4	1
Non-salmon Fauna	0	1	19	19	2	1

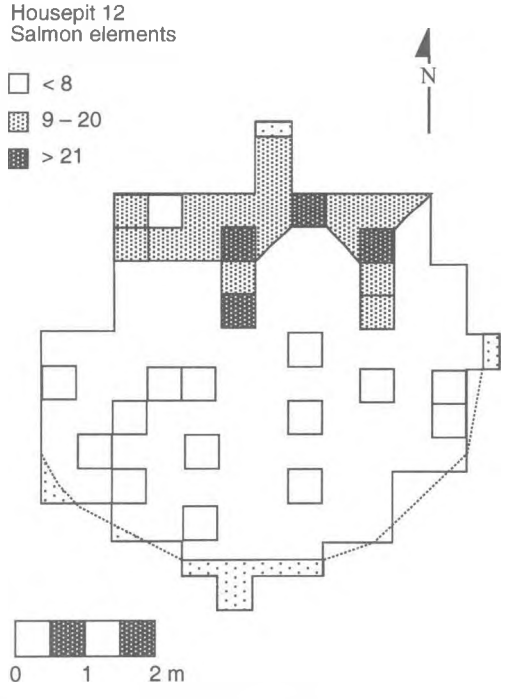

Figure 1. The distribution of fish bones (>1 mm) across the floor of HP 12, as recovered from the heavy fraction of flotation samples taken from the outlined squares.

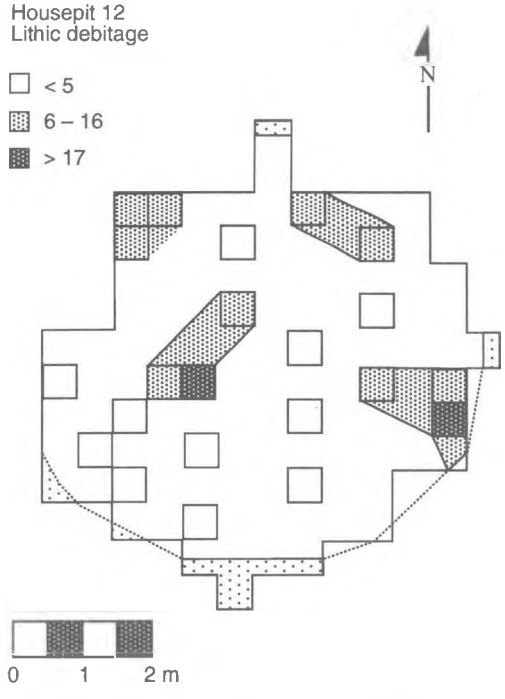

Figure 2. The distribution of mesodebitage across the floor of HP 12, as recovered from the heavy fraction of flotation samples taken from the outlined squares.

Housepit 3

Housepit 3 is a moderate sized housepit that corresponds to a moderately wealthy and enduring corporate group with some characteristics of both communal activities and hierarchical organization.

Fauna (Fig. 3): The distribution of salmon remains again corresponds relatively closely to the distribution of macro-sized salmon elements with several concentrations around the center of the floor plus one high concentration against the north wall. Some of the minor discrepancies between the macro-remain analyses and the flotation analysis of distributions can be attributed to the lack of samples taken from areas of high densities of macro-sized remains. The separateness of the observed concentrations of macro- and meso-sized remains probably reflects the independent domestic status of several domestic groups within HP 3, however, as discussed in Volume II, Chapters 1 and 7, the precise interpretation of salmon remains is consistent with several different scenarios. The non-salmon meso-faunal remains did not exhibit any interpretable patterning possibly due to the limited absolute counts of these remains; the results have not therefore been illustrated here.

Lithics (Fig. 4): The distribution of HP 3 mesodebitage also corresponds very closely to the distribution of macrodebitage and artifacts (Vol. II, Chap. 11) with most discrepancies accounted for by the lack of sampling in some areas of high macrodebitage occurrences. Of special note is the fact that most of the concentrations occur around areas that were interpreted as ephemeral peripheral hearths on other grounds, and that like macrodebitage, the mesodebitage concentrations occur between these hearth locations and the house walls. This strongly indicates that the preferred area for stone working or resharpening was in the general sleeping and in some cases eating areas. The relatively limited occurrence of mesodebitage near the center of the floor may indicate that working space in this larger house was generally adequate near the walls for most purposes.

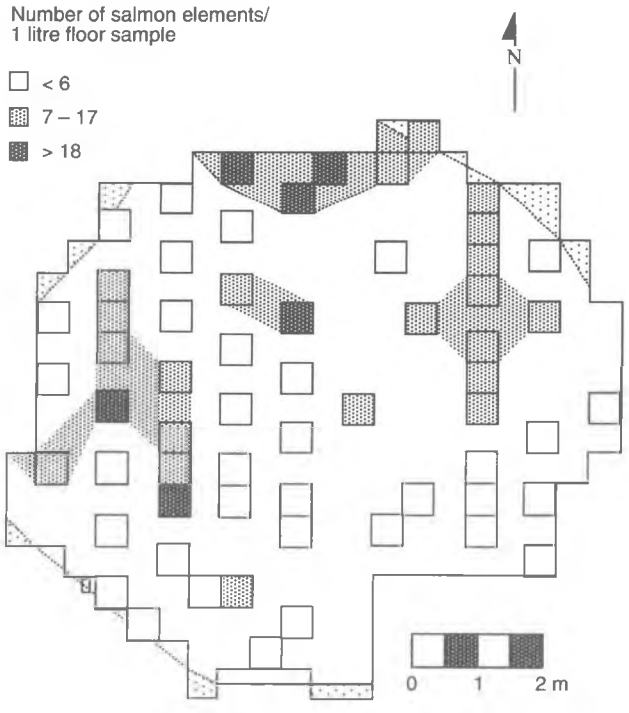

Figure 3. The distribution of fish bones (> 1mm) across the floor of HP 3, as recovered from the heavy fraction of flotation samples taken from the outlined squares.

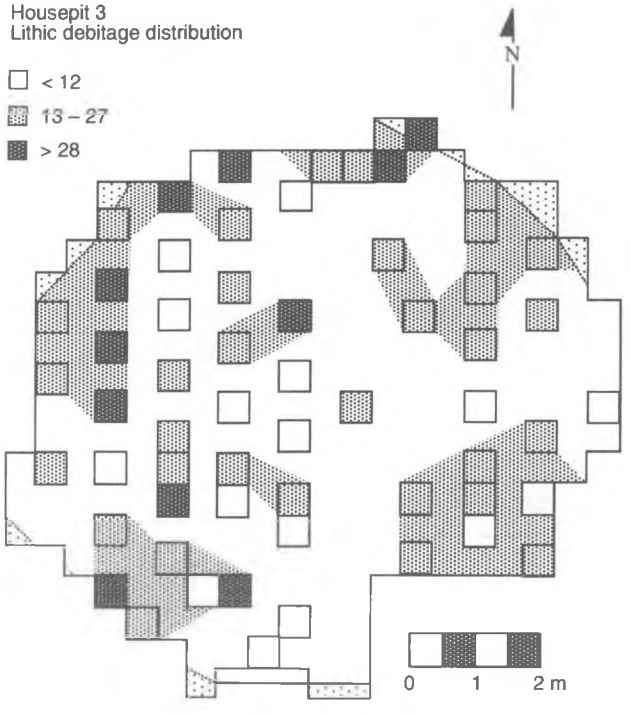

Figure 4. The distribution of mesodebitage across the floor of HP 3, as recovered from the heavy fraction of flotation samples taken from the outlined squares.

Housepit 7

Housepit 7 is the largest housepit that was completely excavated. It exhibits the most hierarchical internal organization of any housepit fully excavated and was also the wealthiest and probably the longest lasting.

Fauna (Fig. 5): The distribution of small salmon elements bears a strong resemblance to the distribution of macro-sized elements (Vol. II, Chap. 7). Both distributions show a very strong concentration in the southeast, the northeast and the northwest sectors. As discussed in Volume II, Chapter 1 , there are a number of scenarios that can account for these concentrations. Irrespective of which scenario is chosen, however, these results indicate that the preparation or consumption of boney parts of salmon was occurring on both sides of the house, with the greatest intensity on the east side of the house. However, a few additional details are of interest. These include the localized clusters of small salmon remains along the southern and western walls in sleeping or storage areas. For the most part, these also appear to correspond to separate domestic groups as indicated by hearth locations in front of these concentrations. Other concentrations also occur in proximity to hearths, including the extensions into the center of the floor near small hearths in the floor center. The lack of dense macroremains in some areas where meso-remains are strongly represented (e.g., along the southwest wall) may be due to the more fastidious and systematic cleanup of the higher status individuals in these domestic areas as documented ethnographically (Vol. II, Chaps. 1, 7).

Figure 5. The distribution of fish bones (> 1mm) across the floor of HP 7, as recovered from the heavy fraction of flotation samples taken from the outlined squares.

The non-salmon faunal elements (Fig. 6) also correspond generally to the macro-sized faunal element distribution (Vol. II, Chap. 7). However, in contrast to the macroremains, the distribution of mesoremains makes it abundantly clear that the most intensive reduction of bone occurred in the south and southwest, i.e., in sectors where other indicators suggest that the highest status domestic groups may have resided (Vol. II, Chap. 1). Since deer meat was of exceptionally high value, this distribution would seem to support inferences of high status for residents in these sectors. The discrepancy between these meso-sized concentrations and the weak occurrence of macro-sized remains in the south and southwest may again be due to the more fastidious cleanup behavior of the higher ranking domestic groups. The lack of any concentration in the northeast and east also reinforces other inferences about these areas being the least desirable or the lowest status domestic locations within HP 7.

Lithics (Fig. 7): The distribution of mesodebitage again corresponds quite closely to the distribution of macrodebitage (Vol. II, Chap. 7). As in the previous housepit floors, it is interesting to observe that there are strong concentrations associated with hearth areas and that many of the densest occurrences occur between the hearths and the walls thereby indicating that considerable

stone working did, in fact, occur in these sleeping and eating locations. That is, the occurrence of lithics in these areas is not primarily due to storage of material produced elsewhere along the walls. Similarly, if sweeping had displaced significant amounts of material, this would be expected to concentrate small remains in the least used middle of the floors rather than in the intensively used sleeping and eating peripheral zones. What we observe is exactly the opposite and it therefore seems unlikely that sweeping constituted a significant factor in the formation of deposits inside houses.

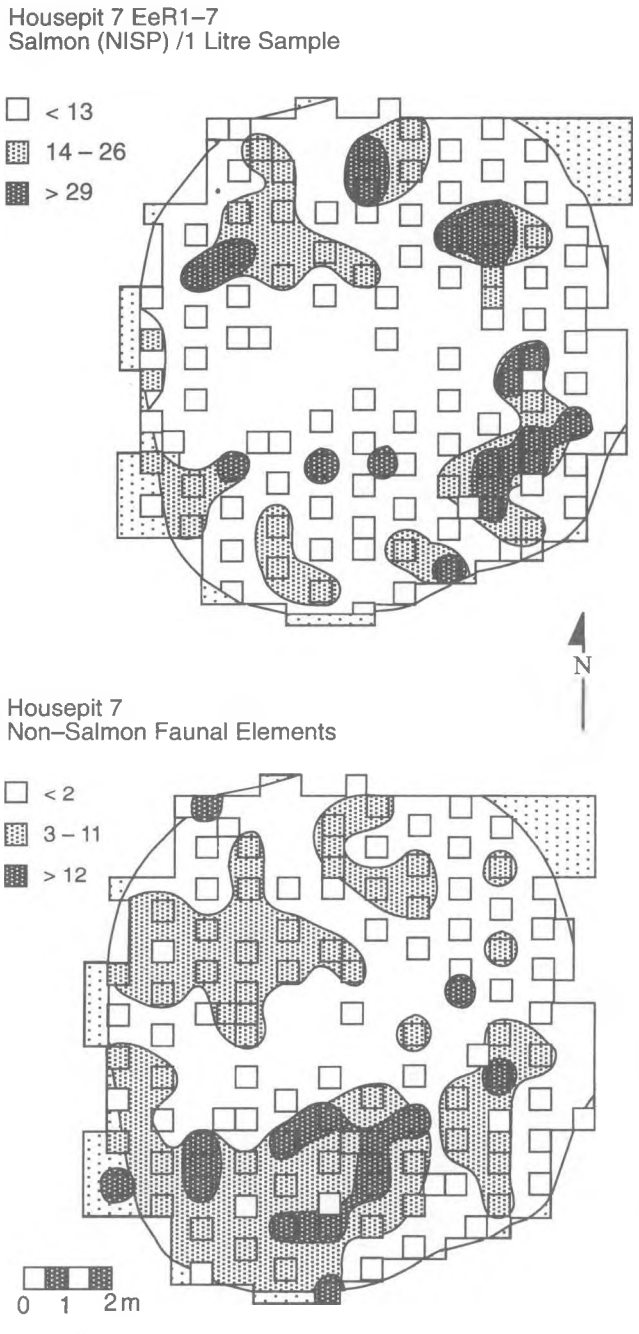

Figure 6. The distribution of non-fish bone fragments (>1 mm) across the floor of HP 7, as recovered from the heavy fraction of flotation samples taken from the outlined squares.

There are also considerable concentrations of mesodebitage around the hearths even extending into the central floor area in some cases. These probably represent people taking advantage of the warmth and light of fires when they were lighted. Of special interest is the heavy concentration represented in the southeast sector, which is also the locus for the single most important concentration of salmon remains. Since other indicators for this domestic group are more consistent with a low ranking family within the house, this evidence for high levels of food and stone processing may support the inference that slaves were doing many of the most onerous tasks in the household such as cooking and much of the simple repetitive wood-working, basketry preparation, and hide working tasks, as documented ethnographically (Vol. II, Chap. 1). The much more pronounced indication of stoneworking in the southern half of the house as compared to the north is also intriguing since this is not apparent in the much more balanced overall distribution of macrodebitage around all of the peripheral hearths of HP 7. It is possible that more stoneworking activity was taking place in the south but that, like the faunal remains, domestic groups in the south cleaned up the larger pieces of waste more systematically and regularly.

Conclusions

The analysis of the mesoremains at Keatley Creek has provided extremely valuable confirmation of many of the results obtained from the analysis of macroremains and in some cases has added interesting refinements to interpretations based on those analyses. In particular, analysis of the faunal remains from the heavy fraction of the flotation samples has shown that the assemblage recovered from the 6 mm mesh screens is not biased in any significant way and has not left out or misrepresented any species or their relative importance. Moreover, both the mesofauna and mesodebitage have displayed a very high degree of correspondence with their macro-sized complements. Distribution patterns at both size levels of analysis display consumption and production activites primarily focused around hearths and sleeping areas, as might be expected. All analyses indicate that the central floor areas were not frequently used for any of these activities except in the smallest house where headspace and working space would have been

especially constrained except for the central areas of the house. Some of the more interesting new insights that the analysis of mesoremains have provided are the indications that fish bones were also being consumed in the southwest and south sectors of HP 7 and that almost the entire southern half of the HP 7 floor seems to have been the site of much more intensive bone reduction and stone working activities than the northern half of the house. This may be related to different status-related activities and productivity levels of the south versus the north domestic groups. It will certainly be interesting to see if other large housepits exhibit a similar kind of dichotmous organization.

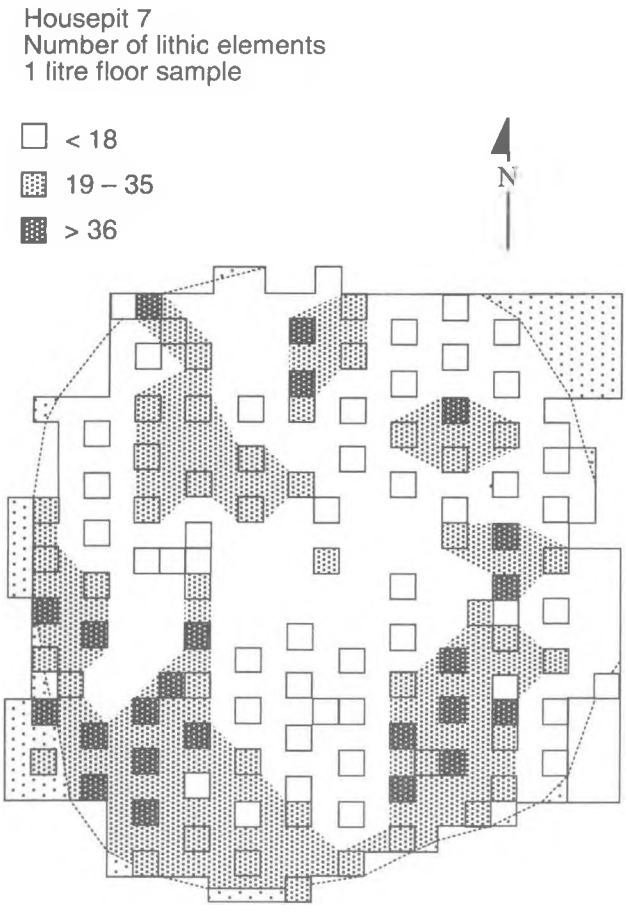

Figure 7. The distribution of mesodebitage across the floor of HP 7, as recovered from the heavy fraction of flotation samples taken from the outlined squares.

These strongly patterned results reinforce the conclusion that floor deposits were accurately identified by excavators and that there has not been significant mixing of deposits. Moreover, as in the analysis of floor materials at the Ozette site on the Coast (Samuels 1991:268), the results of the mesodebitage analysis indicate that there has not been any significant lateral displacement of sediments or cultural remains between floor sectors or zones. This strongly supports the suggestion that sweeping was of minimal importance in the cleanup of materials on the floors and, if used at all, may have only been used to clean off mats used for sitting and eating (Vol. I, Chap. 17). The results also indicate that most of the macrodebitage recovered from the floor was, in fact, left at the place of production, although clearly the largest elements from core reductions were removed from the assemblage and stored or used elsewhere (Vol. I, Chap. 13). This helps explain the generally small size of the debitage and tool fragments in the housefloor assemblages.

Finally, given the generally high absolute amounts of debitage in the 1–10 mm range produced by most core reduction activities, the absolute levels of mesodebitage recovered from all the housepit floors indicates a rather surprisingly low intensity of reduction activities, and even of resharpening activity. For a single 50 cm square to contain less than 40 pieces of mesodebitage as the cumulative result of an entire winter's occupation, not to mention 10–20 such winter occupations, seems remarkably little. Yet this is roughly the level used for identifying the most intense activity areas and there are very few sampled squares that manage to exceed this level of occurrence. The great majority of sampled squares fall well below this level. The same observation can be made of the even lower levels of bone fragmentation reflected in these samples, especially considering the fact that the vast majority of mammal bones were heavily reduced. To us, the low incidence of small remains indicates that indoor winter manufacturing activities were episodic and infrequent at best and that relatively few animals were killed and butchered during the average winter occupations of housepits, an inference also derived from environmental considerations and macroremains (Vol. I, Chaps. 10, 17). Undoubtedly, some lithic-using and manufacturing activity took place outside when weather permitted (Vol. I, Chap. 14). All these observations are valuable insights for understanding what life inside pithouses was like during the coldest and darkest part of the year.

References

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