Chapter 8

Variations in Sediment Characteristics across Floors

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Since one of the major goals of the FRICGA Project was to identify activity and social areas within housepits, considerable attention was paid to distinguishing living floor deposits from overlying roof sediments in excavating housepits at Keatley Creek. Initially, we had assumed that roof and floor deposits might constitute homogenous but distinct types of deposits. However, as excavations extended out over larger areas of floors, it became evident that there were significant changes in the characteristics of deposits from one floor location to another. The roof deposits, while also exhibiting some variability, tended to be much more homogeneous. The purpose of this chapter is to document the nature of sediment variability across housepit floors, examine possible patterning in the variability and offer some explanations for observed patterning.

Given the unexpected variability in the floor deposits, we thought the changes in floor characteristics might be related to differences in the activities that took place on various parts of the floor. It therefore seemed desirable to monitor the variations in floor characterisitics, even though such information would be lacking for the initial phases of excavations that occurred before we realized how variable floor deposits could be. We attempted to apply quantitative measures such as recording Munsell colors, penetration measures, and bulk density sampling. However, none of these measures proved to be sensitive enough to record the kinds of differences that excavators could plainly see in the field. Munsell colors, especially when sediments were wet, were too coarse grained to differentiate the distinctions that were visually apparent, besides which the colors also varied depending upon the degree of drying of the sediments. The high gravel and cobble content of the sediments rendered penetration and bulk density measures far too variable for the kinds of fine distinctions that were apparent to excavators using trowels.

Thus, if we were going to monitor variations in floor sediments, it was necessary to rely on evaluations of excavators. Traditionally, such observations have been treated as subjective and therefore unreliable, difficult to assess, non-replicable, or non-scientific. In an attempt to standardize observations between excavators, I developed an information field to be filled out by every excavator every time that a straum of a subsquare was excavated (Fig. 1). When the stratum was identified as a floor deposit, a nested hierarchy of additional floor sediments descriptions also had to be filled out with simple check marks. Since the roof deposits were generally relatively homogeneous, and a major goal of the excavations was to distinguish roof from floor deposits the roof deposits were used as a standard measure against which observations of floor characteristics were made.

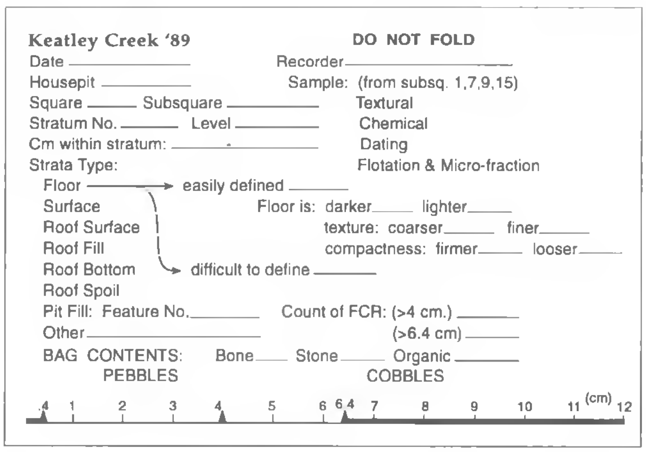
Thus, once having identified a floor stratum, the first question (and the only question during the 1987 excavations) that excavators had to answer was whether the floor was easily distinguishable from the roof deposits. I thought that this information would provide a means of monitoring the relative reliability of floor identifications and provide a general indication of the variability in floor deposits. After one season and further extensions into the floors, it became obvious that more detailed observations would be far more useful. Therefore, in field seasons after 1988, additional information fields were added to excavation identification tags. If the floor could not be easily distinguished, no further information needed to be recorded although many excavators went on to indicate what slight differences they thought they could perceive. If excavators indicated that floor deposits were easily distinguishable from the roof sediments, then they had to indicate which of three basic characteristics made such distinctions possible: 1) whether the floor was darker, lighter, or equal to the roof in color; 2) whether the floor was coarser, finer, or equal to the roof in texture; 3) whether the floor was more looser, compact, or equal to the roof in compactness.

This information provided both a record of the reliability and accuracy that might be expected in distinguishing the floor from roof sediments in any particular housepit or portion of a housepit. It also provided us with a rough, but basic, quantifiable measure of variations in floor characteristics across the floor. We also found that the heavy fraction residue from the flotation samples taken across the floors of housepits provided an approximate measure of the relative abundance of the combined amount of coarse sands, gravels, and pebbles that occurred in different parts of the floor. Most flotation samples were standardized to 1 litre volumes. Therefore, student assistants simply weighed the heavy fraction that remained after each one litre sample had been floated (removing the light organic fraction and the fine clays, silts, and sands). We then plotted the weight of the coarse fractions across housepit floors. We also developed composite summary descriptions of each stratum for each housepit which are not being published due to their limited usefulness for the present purposes.

Certainly, the results presented below should be viewed with some reserve since the approach was entirely exploratory and considerable refinements appear possible in hindsight, especially in the realms of ensuring that all sample volumes were rigidly standardized, in recording the nature of the till deposits underlying the floors (since the floor was largely derived from these deposits and they could vary within a housepit from fine loams to gravels), field estimates of gravel and pebble contents of matrix, and other similar aspects. However, despite the many confounding factors, including observer subjectivity and differential observational abilities between excavators, there are some interesting patterns that emerge that are worth examining. These data are therefore discussed in the following pages. In all cases, observations made where floors could be easily distinguished from the roof should be more reliable than observations where it was difficult to distinguish the floors from the roofs.

Variation in Floor Color

There are substantial differences between housepits in the overall color differences between floors and roof deposits (Figs. 2–4). Floor deposits in the small housepit (HP 12) are uniformly darker than the roof deposits



Keatley Creek '89 DO NOT FOLD
Date ______ Recorder ______
Housepit ______ Sample: (from subsq. 1,7,9,15)
Square ______ Subsquare ______ Textural
Stratum No. ______ Level ______ Chemical
Cm within stratum: ______ Dating
Strata Type: Flotation & Micro-fraction
Floor → easily defined ______
Surface Floor is: darker ______ lighter ______
Roof Surface texture: coarser ______ finer ______
Roof Fill compactness: firmer ______ looser ______
Roof Bottom → difficult to define ______
Roof Spoil
Pit Fill: Feature No. ______ Count of FCR: (>4 cm.) ______
Other ______ (>6.4 cm) ______
BAG CONTENTS: Bone ______ Stone ______ Organic ______
PEBBLES COBBLES
.4 1 2 3 4 5 6 6.4 7 8 9 10 11 (cm) 12

Figure 1. Recording card format used for bagging all artifacts and samples at Keatley Creek. Note the subfields under floor stratum type dealing with the ease of identification of the floor (compared to roof) on the basis of color, texture, and compactness.

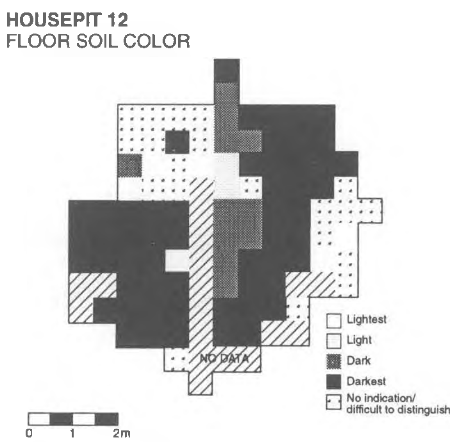


Figure 2. Color variation across the floor of HP 12. The almost uniform dark color of the floor in comparison to the roof is probably due to the low level of organic accumulation in the roof reflecting a relatively short occupation period and few if any reroofing events.

while the opposite is true of the larger housepits (HP's 3 and 7) where the floors tend to be lighter than the roof deposits. The difference between small and large housepits is undoubtedly due to the fact that the small housepits were probably only used at most for a generation or two while the larger housepits were continuously occupied for hundreds if not thousands of years. Thus, the roof deposits of the small houses were only slightly altered from the natural till color due to the short period that refuse and ash would have been discarded on the roofs and the very limited number (zero, one, or two) of reroofing events that would have incorporated the dark floor sediments into the roof matrix. Over the 10–20 years that a given floor deposit might have accumulated, however, considerable ash, charcoal, and other organic wastes would have been incorporated in the floor sediments darkening their color considerably.

In contrast, in the large houses, the greater total occupation length (hundreds or thousands of years) and the repeated reroofing events all would have built up rich organic concentrations of ash, charcoal, and organic wastes in the roof deposits making them quite dark, and in many areas darker even than the heavily stained sediments of the floors. In both HP 3 and 7, the peripheral areas, where the ease of distinguishing floor from roof is most pronounced, were uniformly observed as being lighter in color than the overlying roof. Unfortunately, observations on relative color were not recorded until 1989, after the major zones containing hearths in these housepits had already been excavated. However, photographs of sections near hearths clearly show that the floor zones near at least some of the major hearths were markedly darker in color than the overlying roof deposits (e.g., Fig. 5). This leads to the proposition that floor sediments should be darkest in the immediate areas surrounding hearths and perhaps in provisional ash or charcoal dump areas (possibly represented by the "dark" northwest corner of HP 7), while the peripheral zones of floors representing storage and/or bedding areas should be areas where the least amount of discoloration of floor deposits took place.

Variation in Floor Texture

There are two measures of floor texture: the subjective assessments of excavators and the measured weights of coarse sands, gravels, and pebbles from the litre flotation samples. Assuming a uniform till substrate from which both floor and roof sediments

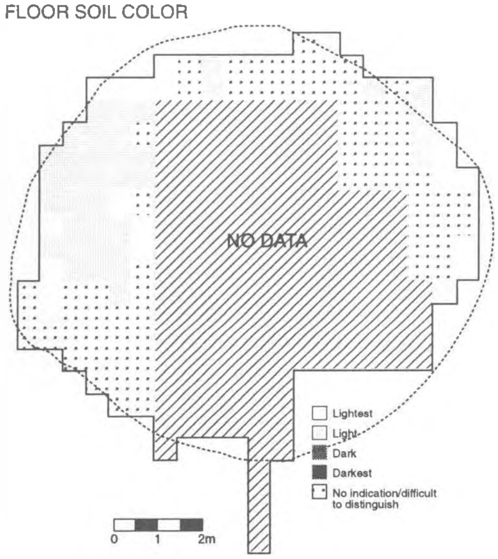


Figure 3. Color variation across the floor of HP 3. In this case, the generally lighter color of the perimeter floor in comparison to the roof may reflect the long-term accumulation of organic residues (especially ash and charcoal) in the roof compared to a relatively short use of the floor (since the last reroofing and cleaning event) prior to abandonment. Locations under benches or in storage areas may have also reduced organic accumulation in the perimeter zones. The lack of data from the first two seasons of excavation unfortunately prevents a more comprehensive analysis, especially in the center and the vicinity of the major hearths.

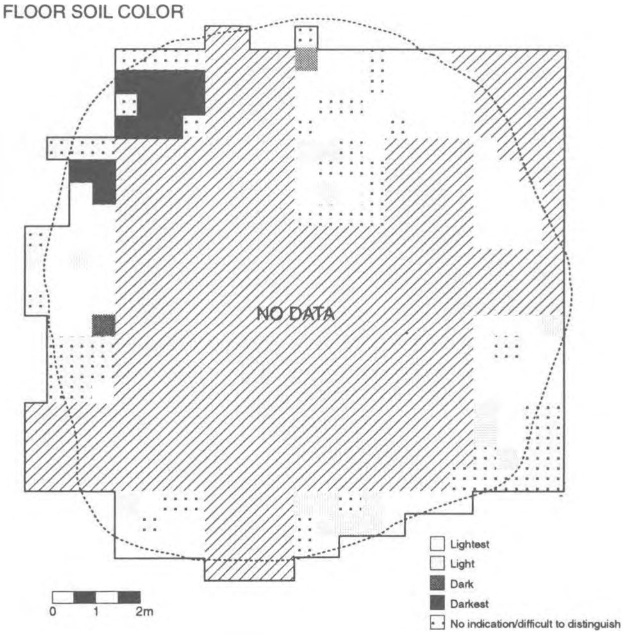


Figure 4. Color variation across the floor of HP 7. The generally lighter color of the perimeters of this floor probably is due to factors such as those suggested for HP 3 (Fig. 3). Of interest are the occurrence of dark patches in the northwest corner, and probaby the southwest corner (where only the "distinctiveness" of the floor was recorded). These locations are adjacent to two very large hearths which probably darkened floor sediments around them.

were derived, variations in sediment texture should reflect the differential effects of activities across floors. The subjective assessments of floor textures all indicate that floor deposits with finer textures than the roof tend to concentrate in the peripheral areas of the floors (Figs. 6–8). Some localized coarser zones also exist in peripheral locations, but the finer sediments seem uniformly confined to the peripheral zones. Again, it needs to be emphasized that we lack specific observations on most of the central floor areas of HP's 3 and 7, thus limiting the usefulness of these analyses. This is complicated by the fact that a very broad patch of unusually fine glacial loam comprised the till substrate from which the central area of the HP 7 floor was derived. This undoubtedly had a major biasing effect on activity differences in the relative coarseness of floor fabrics.

Before turning to the analysis of the heavy fractions, it is worth noting that as with color, the north edge of the HP 3 floor stands out as an unusual zone for reasons that are currently difficult to determine. It is similarly notable that in the small housepit (HP 12), the zones with finer or indeterminate floor sediments are confined entirely to the north and east half of the house. This is consistent with other indicators of a basic spatial division within the house supporting a communal organization and use of space, especially with food preparation, sleeping, and minor craft activities (employing utilized flakes) taking place in the north and east parts of the housepit, while traffic and more energetic activities appear to have taken place in the remainder of the house space (Vol. II, Chaps. 1 and 11).

Analysis of the heavy fractions of the small and medium housepits (HP's 12 and 3) shows that the highest weights of coarse clasts tends to occur in the center of the floors, although there are also some localized peripheral occurrences (Figs. 9 and 10). This is consistent with the subjective observations made about floor textures compared to roof textures. In fact, where relatively complete data exist as in the case of HP 12, the results of the subjective and quantified analyses are remarkably consistent. I interpret concentrations of coarser fractions to most likely reflect areas of heavy foot traffic and other activities that would stir up floor sediments. Such activities would act to concentrate the heavier clasts while dispersing the finer elements as dust or dirt to the less actively used parts of the house where the fine elements would settle and tend to remain due to low levels of activity. Accumulation areas for finer sediments would characteristically be storage areas and bedding areas, especially if beds were raised off the floor.

The above analyses are based on the presumption of a uniform till substrate from which floor sediments were largely derived. Some of the minor departures

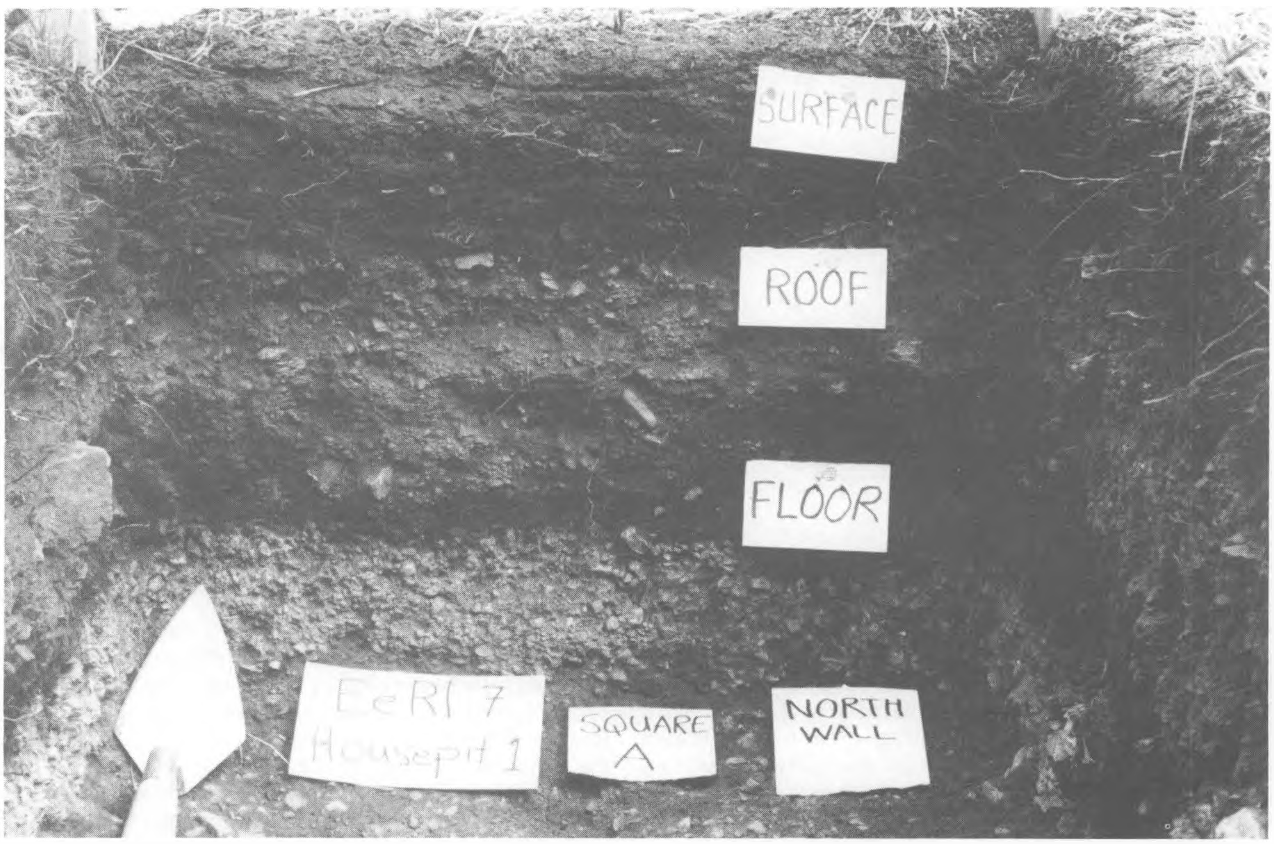


Figure 5. A photograph showing the contrasting dark color of some floor sediments compared to roof sediments.

from the major trends (Figs. 9–11) may be due to localized variations in clast content in the underlying tills. Unfortunately, this variation was not monitored, although the striking occurrence of a loam patch within the till substrate of the center of the HP 7 floor provided a clear example of the impact that such variation could have in extreme situations. Once again, we lack adequate observations on the precise extent and position of this loam patch, although it occurred in most of Squares A, B, E, and F (Fig. 11). The low values of clast weights in these and portions of some adjacent squares undoubtedly clearly reflect the influence of the loam patch. Similar variability may be responsible for some of the other localized and difficult-to-interpret clast concentrations across the HP 7 floor.

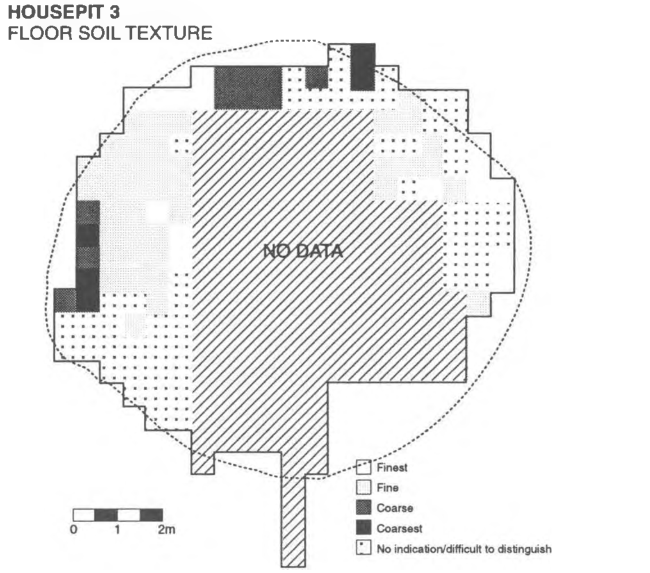


Figure 7. Texture variation across the floor of HP 3. The most distinctive fine textured sediments again occur in the peripheral areas of the floor, probably indicating sheltered areas. Unfortunately, critical data from the first two seasons was not recorded for most of the central part of the floor, however, see Fig. 10.

Variations in Floor Compactness

Because roof sediments by their very nature have been churned up a number of times and have subsequently undergone either a gradual filtering or catastrophic collapse, it can be expected that they would be among the most unconsolidated sediments anywhere in housepit village sites. And indeed, only highly organic rim deposits and large single event pit fill deposits surpassed roof deposits in terms of looseness and lack of consolidation. Therefore, it is not surpising that some floor deposits could uniformly exhibit greater compactness than the overlying roof deposits (Fig. 12). The only important exceptions to this pattern tend to occur relatively close to housepit walls where either sleeping platforms could provide protected environ-

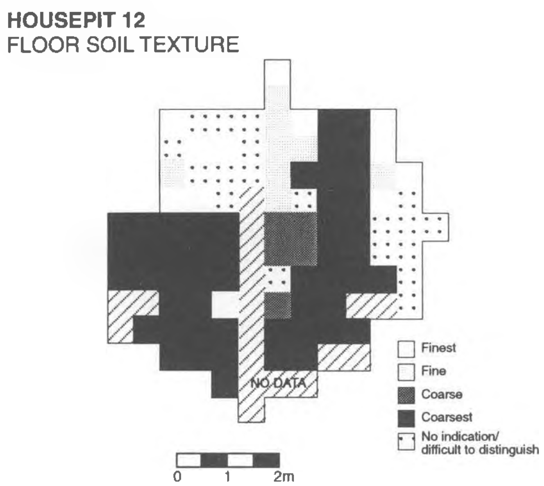


Figure 6. Texture variation across the floor of HP 12. Note the occurrence of finer textures in peripheral areas probably indicating areas that were sheltered from active use in the north, while most areas in the south had relatively coarser texture, probably reflecting active use areas.

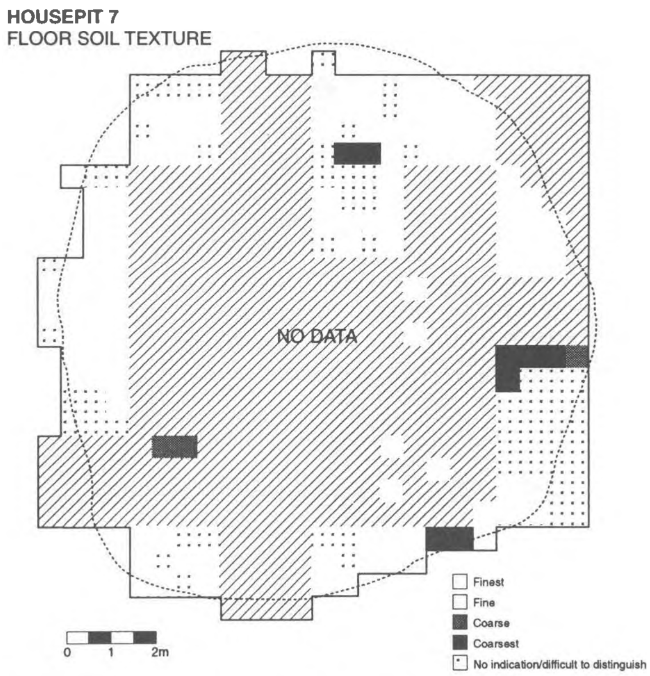


Figure 8. Texture variation across the floor of HP 7. Aside from a few small pockets, the peripheral areas of the floors again appear to have a distinctively finer texture than the roof materials. Lack of data for the center areas, hampers full interpretation, however, see Fig. 11.

ments for the accumulation of fine sediments and/or rim sediments could have sloughed off of walls and accumulated along the adjacent parts of floors. In some peripheral floor areas it became especially difficult to distinguish floor from overlying roof and/or sloughed materials. On the basis of my own excavation work in these areas I often concluded that there had been significant sloughing off of wall material that had accumulated at the base of the wall and rendered the identification of floors difficult in these zones. Roof sediments in parts of other housepits, such as HP's 3 and 7, seem to have compacted over time to the extent that they could not generally be distinguised from floors on the basis of compactness, except near the peripheries (Figs. 13 and 14).

Summary

Thus, in sum, the preliminary results of these techniques for investigating formation processes and activity induced variations in sediments across floor deposits have been both insightful and encouraging. Despite many uncontrolled factors, general patterns have emerged that not only make logical sense but are consistent with and support other types of analyses and inferences about the activity areas within housepits. Factors that complicated this analysis were the incomplete data sets and data of varying quality; the uncontrollable nature of subjective evaluations; the uncontrolled variability in our measurement standard (roof sediments); and the uncontrolled influence of variations in the till substrate on floor deposits. Despite these uncontrolled factors, it has been possible to show that 1) color variations can be expected to occur across floors, especially with proximity to hearths and in little used storage or bedding locations; 2) that floor colors should be particularly distinctive in small housepits with relatively short use-lives; 3) that high activity areas probably tend to concentrate heavier clasts while low activity areas act as accumulation areas for finer sediments (at least in dry, dusty environments); 4) and that floors can be more compact than collapsed dirt roofs except where protected floor areas permit the accumulation of fine sediments or materials sloughed off of walls. Having demonstrated the utility of this basic approach, I am confident that considerable refinement is possible and that even more powerful and significant results can be attained especially if underlying variations in the till substrate can be monitored simply and efficiently. Simple measures of gravels and pebbles remaining in screens from standardized pail screening samples might be one efficient way to achieve this level of monitoring for texture.

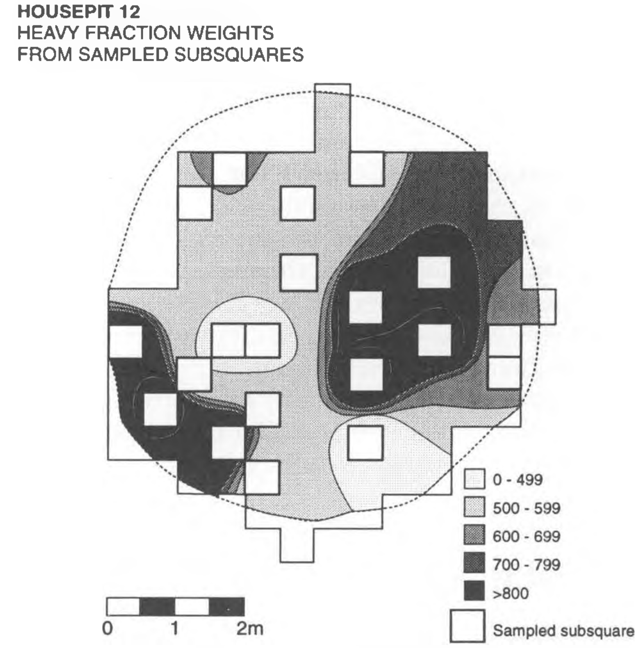


Figure 9. Variation in the weight of heavy fractions of flotation samples across the floor of HP 12 reveals a pattern that generally corresponds to the field identification of coarse textures (Fig. 6.), and clearly shows the concentration of coarse sediments in the center of the housepit.

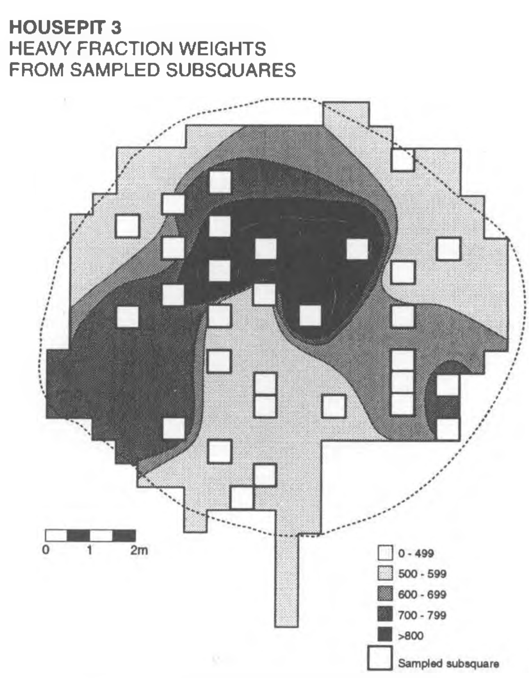


Figure 10. Similar monitoring of the heavy fraction weight across the floor of HP 3 also generally corresponds to the field assessments of coarse versus fine textures (Fig. 7), and again clearly show the concentration of coarse sediments in the center of the floor.

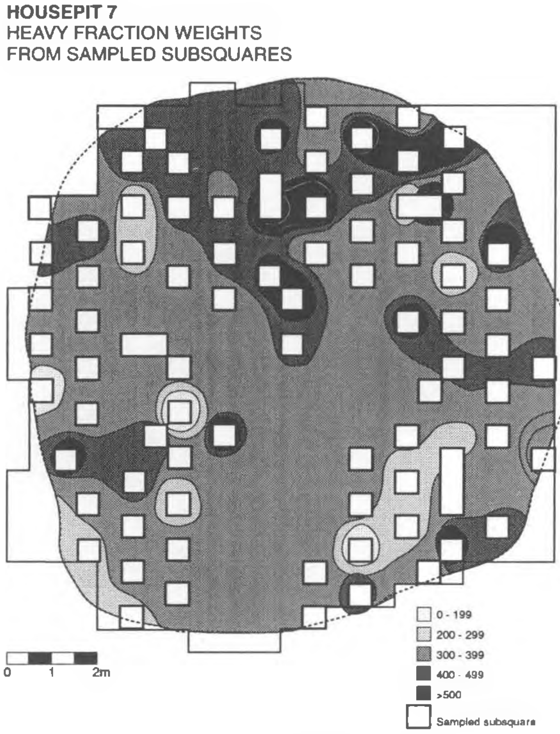


Figure 11. Although considerably more complex because of its size and multiple hearths, heavy fraction weights from the floor of HP 7 also display a general correspondence to the field determinations of texture (Fig. 8), again with some of the highest concentrations of coarse sediments occurring toward the central zone of the floor.

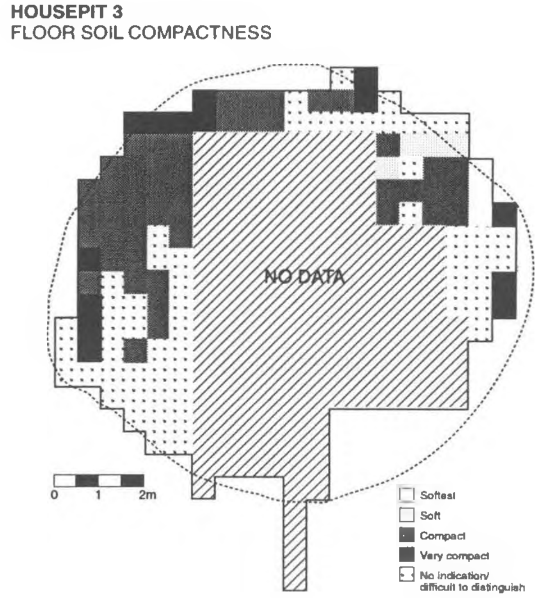


Figure 13. The compactness of the HP 3 floor displays general uniformity of compactness similar to roof deposits except near the walls. Lack of data from the first two seasons renders conclusions tentative.

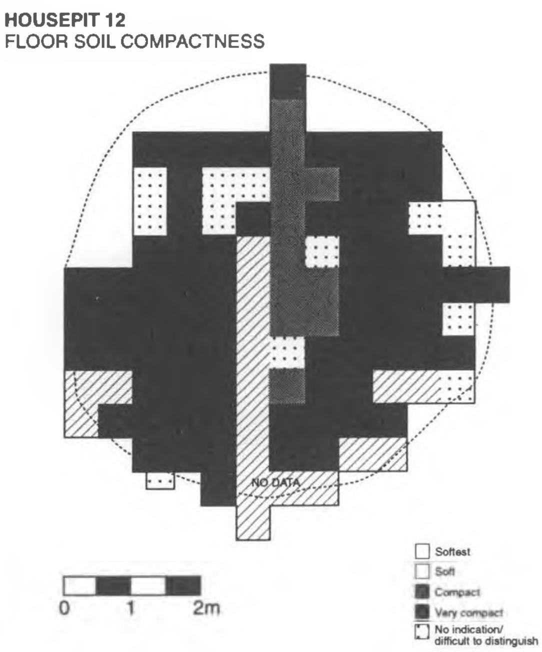


Figure 12. Compactness across the floor of HP 12 displays little variation.

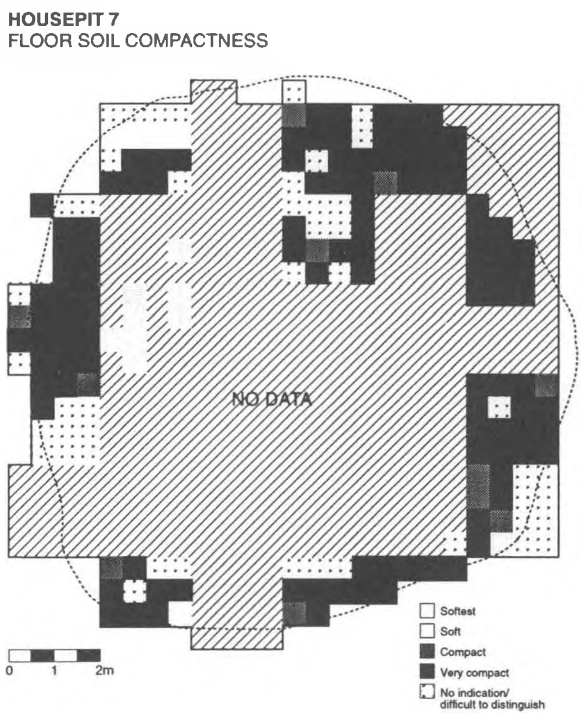


Figure 14. The compactness of the HP 7 floor is similar in its uniformity to HP 3. The lack of full data across the floor center similarly limits our inferences.