2017

BEFORE ABANDONMENT: SOCIAL CHANGE IN PRE-COLONIAL HOUSEPIT 54, BRIDGE RIVER SITE (EeRl4), BRITISH COLUMBIA

Kathryn L. Bobolinski
University of Montana, Missoula

BEFORE ABANDONMENT: SOCIAL CHANGE IN

PRE-COLONIAL HOUSEPIT 54, BRIDGE RIVER SITE (EeRl4), BRITISH COLUMBIA

By:

Kathryn Linda Bobolinski

Anthropology (B.S.), Iowa State University, Iowa, 2012
Journalism and Mass Communication (B.S.), Iowa State University, Iowa, 2012

Thesis Paper

presented in partial fulfillment of the requirements for the degree of:

Master of Arts
in Anthropology

The University of Montana
Missoula, MT

Official Graduation Date: December 2017

Approved by:

Scott Whittenburg, Dean of the Graduate School
Graduate School

Dr. Anna Marie Prentiss, Chair
Department of Anthropology

Dr. Randall Skelton
Department of Anthropology

Dr. Sarah J. Halvorson
Department of Geography

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

My deepest gratitude goes out to all of my family, my fellow graduate students and the professors who have given me such positive reinforcement and assistance during the making of this paper and beyond. Additionally, I would like to thank the members of the Bridge River Band (Xwísten) and the St'át'imc Nation for their collaboration on this project as well as allowing the University of Montana to investigate their archaeological history. Special thanks goes out to Kristen Barnett, Ashley Hampton, Ethan Ryan and Sarah Nowell for their input and support when things got crazy; and to Dr. Anna Prentiss who has unerringly been a foundational contributor to my continued learning and growth. I give further thanks to Dr. Randall Skelton, who has always been available to give me the statistical assistance I need, Dr. Sara Halvorson, who has contributed so much valuable time and effort in reading and commenting on my research, and, lastly, Kevin McManigal, who helped guide the way when I decided to take a trip down the winding rabbit-hole that is Geographic Information Systems (GIS). Finally, I want to thank my grandfather, Robert Bickel, who always valued education and supported his family's college careers even though he never had the opportunity to pursue such higher education himself.

I dedicate this thesis to my mother, Linda Bickel. Words are not enough to describe how much your loving support has meant to me throughout the years.

ABSTRACT

Bobolinski, Kathryn, M.A. Fall 2017 *Anthropology*

Before Abandonment: Social Change in Pre-Colonial Housepit 54, Bridge River Site (EeRl4), British Columbia

Chairperson: Dr. Anna Prentiss

Housepit 54 at the Bridge River pithouse village in south-central British Columbia provides a glimpse into the complex cultural practices that occurred in this area in the past. This village, which includes approximately 80 semi-subterranean structures, was occupied during four periods, approximately 1800- 1600 cal. B.P., 1600-1300 cal. B.P., 1300-1000 cal. B.P. and 500-100 cal. B.P, firmly placing the site within both a historic and a pre-Colonial context. The two pre-Colonial floors, IIb (1288-1058 cal B.P.) and IIa (1184-1050 cal B.P.), that represent the occupation of Housepit 54 directly prior to the pre-Colonial villages abandonment are the focus of this investigation. This focus is due to changes in resource abundance, in particular fish and mammal abundance, which differ between the IIb and IIa floors. This resource deprivation/instability could have cause socio-political and socioeconomic changes to occur between these two time periods and could potentially have contributed to the abandonment of the site. Two theoretical frameworks were utilized to guide this study: Dual-Processual theory and Household Archaeology. In particular, the dual-processual theoretical concepts of network and corporate socio-political strategies as well as the concepts of collectivist and communal social strategies were used to form hypotheses regarding the degree of cooperation and competition that was present within the household that lived in Housepit 54 during the IIb and IIa time periods. Geographic Information Systems (GIS) was used to explore the spatial distributions of faunal and lithic artifacts as well as the social structure of Housepit 54 during these different occupational periods. Specifically, the GIS tools used in this study were the Spline tool and the Optimized Hot Spot Analysis tool. Using these methods, residential units and shared activity areas were discovered within Housepit 54. Ultimately, this study revealed that during the IIb time period separate, but likely cooperative residential units were present in Housepit 54 while during the IIa time period shared activity areas and space were more prevalent. Additionally, during the IIa time period, the time period with had greater food stress, evidence indicates that activities associated with food resources may have been strictly structured around shared space.

Chapter 1: INTRODUCTION

This study investigates complex hunter-gatherer-fisher intra-household strategies, specifically those that are connected to competition and cooperation, which may be better understood through the spatial analysis of archaeological data. To explore this topic, I conduct a fine-grain examination of the spatial organization within a single pithouse using faunal and lithic data. I specifically emphasize the effects that increased resource deprivation/instability (Burns 2003; Carlson 2010; Kuijt and Prentiss 2004; Prentiss et al. 2007; Prentiss et al. 2012; Prentiss et al. 2014; Stryd 1971) can have on the socio-political and socioeconomic structure of a single pre-Colonial household as people attempt to cope with changing resource availability, a concept that is not exclusive to the past.

Three hypotheses are tested in this study, all of which indicate that a certain strategy developed within Housepit 54, the household of interest, due to pressures associated with resource deprivation/instability. The first of these household socio-political strategies is termed the network-collectivist strategy and it is one where individual power and status is derived from an individual's social and trade networks (Coupland et al. 2009; Feinman 1995, 2000; Mills 2000). It is generally considered the ‘most’ competitive of the three strategies considered in this study. The second of these household socio-political strategies is termed the corporate-communal strategy and it is one where power is derived from the group and an individual's status is deemphasized (Coupland et al. 2009; Feinman 1995, 2000; Mills 2000). This strategy is generally considered the ‘most’ cooperative of the three considered in this study. Finally, the corporate-collectivist strategy is the third used in this study and it is one where individuals within a household live and work together only because they recognize that their cooperation is the best way to accomplish common goals (Coupland et al. 2009; Mills 2000). This household socio-political strategy is generally considered 'less' competitive then the network-collectivist strategy and 'less' cooperative than the corporate-communal strategy.

Geographic information systems (GIS) is implemented to explore the spatial patterning of faunal and lithic artifacts within Housepit 54 in an attempt to discover residential units and activity areas. In the most general sense, a network-collectivist strategy may be recognized by separate residential units with an uneven distribution of uncommon and/or 'valued' materials between them. Alternatively, the pattern of a corporate-communal strategy is one that is dominated by the presence of shared activity areas rather than separate residential units while the patterning of a corporate-collectivist strategy is a combination of the two: evidence of separate residential units and potentially shared activity areas. Sometimes it is difficult to discern whether a network-collectivist or a corporate-collectivist strategy is present using only archaeological materials, but generally the greater the uneven distribution of uncommon/valued materials, the greater the possibility that a network-collectivist strategy is present while the greater the even distribution of uncommon/valued materials, the greater the possibility that a corporate-collectivist strategy is present (see Chapter 3 for more details).

Ultimately, this study reveals that the sociopolitical and socioeconomic strategies within the household of interest shifted from a more competitive strategy to a more cooperative one as stresses associated with resource deprivation/instability increase between the two time periods that occurred directly before the pre-Colonial housepit was abandoned. Potentially this shift may have made the household more stable, allowing it to persist longer than others in the area.

This thesis is organized into six chapters. Chapter 2 starts by introducing the geographic area of interest, namely the Middle Fraser region of British Columbia, the Bridge River pithouse village and, ultimately, Housepit 54, the pithouse that is the focus of this study. Background on the excavation history of the Middle Fraser housepits as well as information regarding past research done on sites in this region are also discussed in this chapter.

Chapter 3 covers the theoretical basis of this thesis – namely dual-processual theory and household archaeological theory – as well as the hypotheses and test expectations that are explored.

Chapter 4 discusses the relevant excavation, laboratory and analytical methods that are used in this study. Additionally, this chapter explains the GIS tools that are utilized in the spatial analysis of the archaeological materials within Housepit 54.

Chapter 5 covers the results and consequential discussion that comes from the analyses performed in this study. This chapter is organized into 4 major sections. The first section presents the faunal data as well as the results from the corresponding diversity statistics and GIS statistics. The second section presents the lithic data as well as the results from the corresponding diversity statistics and GIS statistics. The third section presents and discusses the results of the faunal GIS spatial analyses while the fourth section presents and discusses the results of the lithic GIS spatial analyses.

Lastly, chapter 6 provides a concluding summary of the results, discussion and hypotheses. This chapter also includes a brief review of the GIS tools used as well as possible avenues for future research. Additionally, the tables and GIS maps that resulted from this study can be located in the Appendices A, B, C and D.

Chapter 2: BACKGROUND and LITERATURE REVIEW

The Middle Fraser region is an archaeologically rich area containing dozens of sites within less than 24 km^2 (Prentiss et al. 2012b). It is situated in the geographic region of the Canadian Plateau and encompasses the Fraser River as well as the adjacent talus slopes, terraces, mountains and high valleys (Prentiss and Kuijt 2012). A majority of the archaeological sites within the Middle Fraser region can be found relatively near water features such as rivers, streams or creeks, many of which are or ultimately flow into the Fraser River (Prentiss et al. 2012b). Some of the major archaeological sites in the area that contain more than 30 housepits includes Seton, Bridge River, Bell, West Fountain, Keatley Creek, McKay Creek, Aker's/Chicken Gully, Kelly Lake/Pelteqet and Cavanaugh Creek/Lenlan'iten (Morin et al. 2009; Prentiss et al. 2012a) (Figure 1).

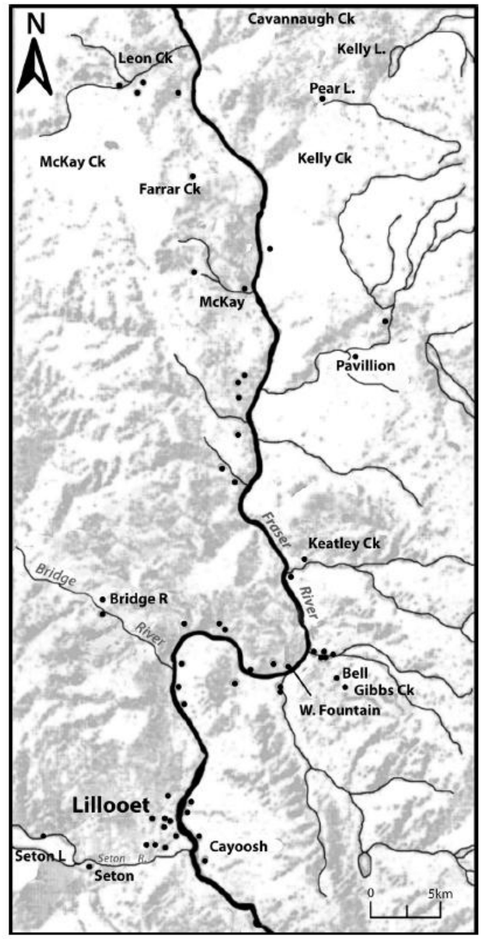


Fig. 1: Approximate locations of archaeological sites in the Middle Fraser Canyon region of British Columbia (redrafted by Carlson 2010).

Studies within the Mid-Fraser region can trace their roots back to the ethnographic work performed by James Teit in the early 20th century (Teit 1900, 1906, 1909, 1916). The knowledge gained from Teit's ethnographic documentation continues to inform current archaeological investigations. Additionally, this knowledge can equally be enhanced by the insights of the descendent populations in the area.

While general archaeological survey, test excavations and core samples have been taken at many locations within the Mid-Fraser region, little extensive excavation has taken place with the exception of the Bell site, the Keatley Creek site and the Bridge River site. Housepit 54 at the Bridge River site is the specific focus of this study.

Situated just north of the present-day city of Lillooet, B.C., the Bridge River site is a well-preserved complex hunter-gatherer-fisher pithouse village that lies near the convergence of the Bridge and Fraser rivers (Prentiss et al. 2008) (Figure 2). This village, which includes approximately 80 semi-subterranean structures, was occupied four times from approximately 1800- 1600 cal. B.P., 1600-1300 cal. B.P., 1300-1000 cal. B.P. and 500-100 cal. B.P, firmly placing the site within both a historic and a pre-Colonial context (Prentiss et al. 2008; Prentiss 2015) (Figure 3). Additionally, the archaeological knowledge gained from the excavations at this location can provide insight into the past of the St’át’imc Nation, specifically the Xwísten people, who still live in the area today (Prentiss and Kuijt 2012).

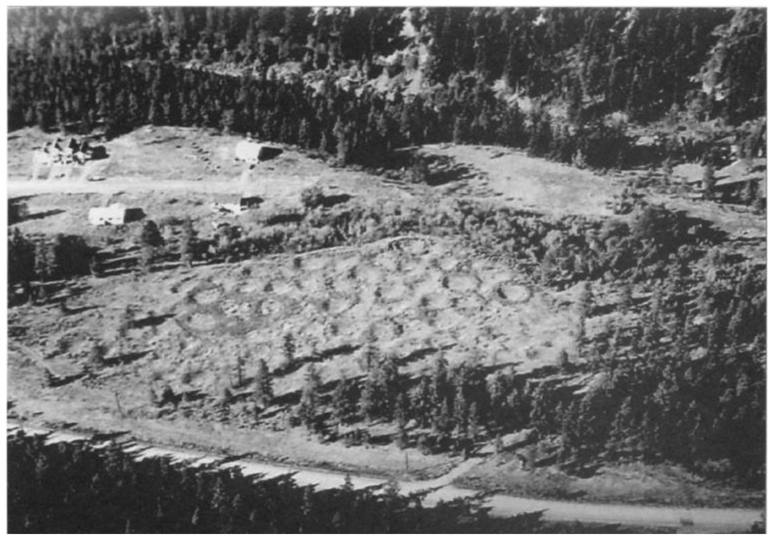


Fig. 2: Aerial photography of the Bridge River site (Prentiss et al. 2008).

Initial archaeological investigations at the Bridge River site began in 1974 and involved mapping and excavation, which occurred during the Lillooet Archaeological Project that was overseen by Arnoud Stryd (Stryd 1972; Stryd and Baker 1968; Stryd and Lawhead 1978). More recent investigations at the Bridge River site were initiated in 2003 by the University of Montana and have been continued intermittently since (Prentiss 2015). The University of Montana Bridge River Project, directed by Dr. Anna Prentiss, has worked in close collaboration with the Xwísten people in the past and continues to do so today (Prentiss 2015). While the first phase of this project was largely limited to preliminary investigations, including geophysical mapping and test excavations, the second phase has focused on the excavation of housepits 11, 16, 20, 24, 25 and 54 (Prentiss et al. 2008) (Figure 3). Currently, Housepit 54 is the most extensively excavated housepit at the Bridge River site. In total 17 intact occupational floors were uncovered within Housepit 54, each averaging a 20 year cycle per floor. Because of this extensive time-depth, Housepit 54 is ideal for testing questions pertaining to household relationships over time. The excavations at this housepit focus on recovering

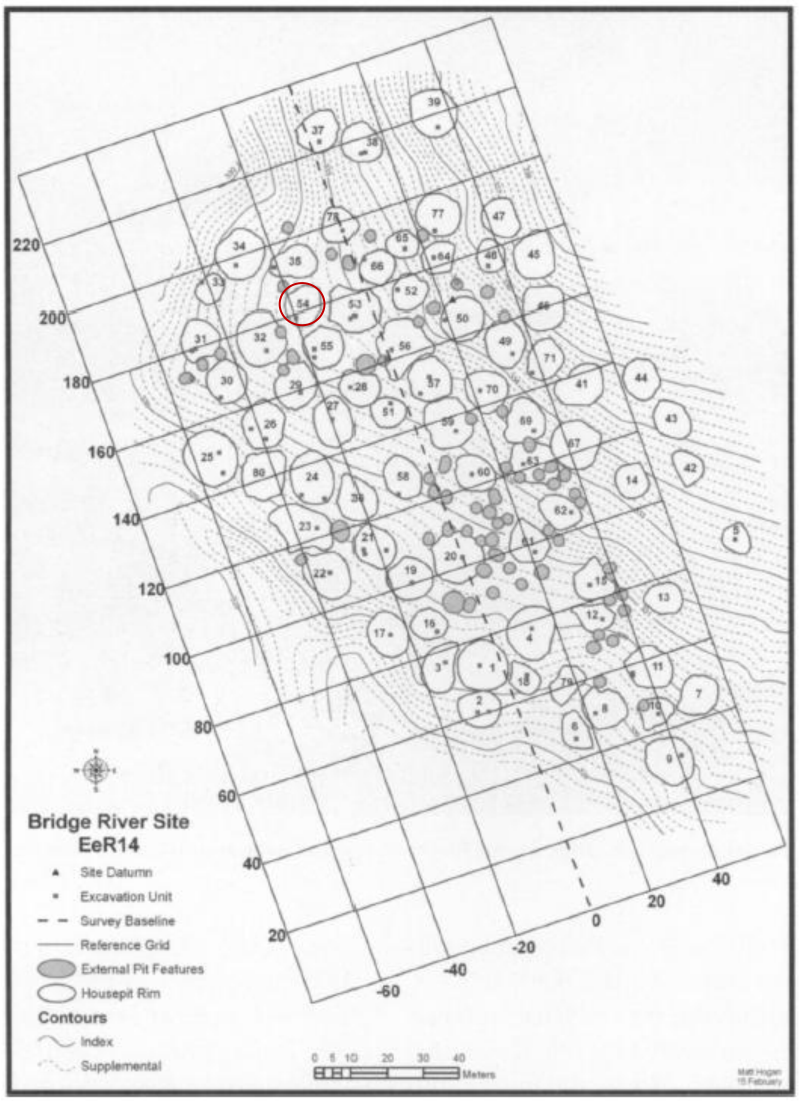


Fig. 3: Map of the Bridge River site showing the locations of the housepits. Highlighted red circle indicates Housepit 54 (Prentiss et al. 2008).

archaeological materials from a large portion of the structure's occupational floors, both horizontally and vertically (Prentiss 2014, 2015). This scale of excavation at Housepit 54 easily lends itself to intra-household investigations, including research regarding past socio-political and socioeconomic relationships. Additionally, Housepit 54 persisted throughout all four of the major time periods that the Bridge River village was occupied (Prentiss et al. 2008; Prentiss 2015). This unique characteristic allows for research regarding change over time to be conducted within the context of a single housepit, ensuring a continuity of data.

The Bridge River 3 (1300-1000 cal. B.P) occupational period – specifically occupational floors IIb and IIa, dated to a mean date of 1288-1058 and 1184-1050 cal B.P. respectively – is the focus of this study due to the demographic and ecological changes that occurred during this time. It has been postulated that during the Bridge River 3 period the population within the Bridge River village more than doubled (Prentiss et al. 2008), which caused certain resources such as deer to become scarce (Carlson 2010; Prentiss et al. 2012; Prentiss et al. 2014). Potentially, during this time period the population of the Middle Fraser Region could have grown to 8,000-10,000 people (Prentiss et al. 2014). This population growth along with resource depletion and fishery instability could have created a 'Malthusian Ceiling' event that ultimately led to the village's abandonment (Prentiss et al. 2014). An alternate theory has suggested that, while population growth was a factor, the ultimate reason for village abandonment in the Middle Fraser region was the geological disruption of the waterways, which affected the prosperity of the salmon runs in the area, resulting in the abrupt abandonment of the villages in the area (Hayden and Ryder 1991). Kuijt (2001) and Kuijt and Prentiss (2004) have since presented evidence that contradicts that a geological disruption was the primary factor for village abandonment in the Mid-Fraser region. However, instability in the salmon runs could have still been a contributing factor. While this study is not designed to test these opposing theories, it is clear that this period was a time of radical change for groups living within the Middle Fraser region.

Additionally, it had been argued that inequality developed during the Bridge River 3 occupation of the Bridge River site (1300-100 cal. B.P) due to population packing and resource deprivation (Prentiss et al. 2012; Prentiss et al. 2014). Additional research from the nearby pithouse village site of Keatley Creek supports the idea that growing populations could have caused over-exploitation of terrestrial and possibly riverine resources within the area, causing additional stresses for the people of the Middle Fraser to overcome (Kuijt and Prentiss 2004; Prentiss et al. 2007; Stryd 1971). This population packing and/or resource stress could then have caused greater competition for resources between competing residential units in a single household who potentially have personal network and trade relationships. Alternatively, these stresses may have caused greater cooperation between the residential units of a single household as the pithouse competed with other pithouses in the area.

Chapter 3: THEORY, HYPOTHESES and TEST EXPECTATIONS

Two theoretical frameworks will be utilized to guide this study: dual-processual theory and household archaeology. Both of these theories easily lend themselves to the research within this thesis. Dual-processual theory presents some cooperative and competitive strategies that may have existed and have been used in previous archaeological investigations to explore the social, political and economic relationships that could have occurred in the past. Since this study is interested in intra-household cooperative and competitive strategies, particularly those that are connected resource stress/instability, the concepts presented by dual-processual theory are a useful starting point. Furthermore, household archaeology presents conceptions of the 'household' and descriptions related to how households change dynamically based on the behaviors of its individual members. Studies that include a time element, like this archaeological investigation, are enriched by the concept of the responsive household that can change over time. Without this dynamic nature, which can be tracked in the archaeological record, household studies like this one would be irrelevant. In addition to theory, three hypotheses that build upon the theoretical concepts that are presented in this chapter will be included here along with test expectations.

DUAL-PROCESSUAL THEORY

Dual-processual theory (Blanton et al. 1996; Feinman 1995) will be utilized as a scaffolding that this study may build upon to better understand the socio-political and socioeconomic relationships present within Housepit 54 at the Bridge River Site. At its core dual-processual theory is a model, which has largely been implemented within the North American Southwest and Northern Central America, focusing on two leadership strategies termed network and corporate (Blanton 1998; Blanton et al. 1996; Feinman 1995, 1997a, 1997b, 1998, 2000; Pluckhahn 2013; Mills 2000). These two strategies represent alternative ends of a continuum with the network strategy on one end and the corporate strategy on the other. Additionally, it is possible for cultures to implement a blend of these two strategies in different aspects of social life (Coupland et al. 2009).

Specifically, a network strategy is one where individual power and status is derived from an individual's social and trade networks (Mills 2000). In the context of Housepit 54, this type of strategy would be indicated by the presence of status distinctions and therefore greater social inequality within the household. In contrast, a corporate strategy is one where power is derived from the group and the individual's status is deemphasized (Mills 2000). In a context where the household is equivalent to the 'group,' this type of strategy would be indicated by a lack of status distinctions between residential units, which in turn would equal greater social equality within the household (see Hypothesis section for more detail).

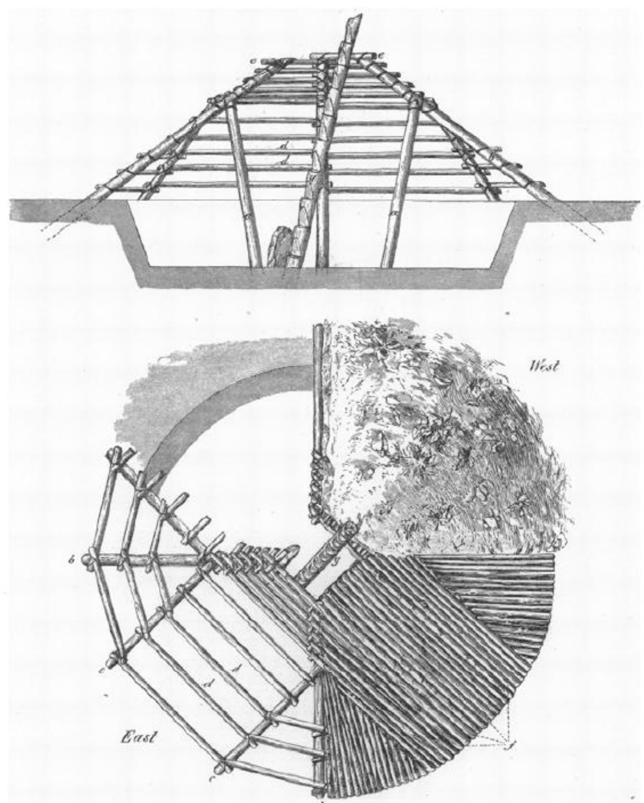


Fig. 4: Diagram of a pithouse from Teit (1900).

HOUSEHOLD ARCHAEOLOGY

Household archaeology is the second theoretical framework that will be used to guide this study. The term 'household' can be convoluted in nature due to it being defined differently by different researchers over the years. To clarify, in this study ‘household’ refers to the entire population living within a single housepit. This differs from the term ‘residential unit,’ which refers to the separate family units that together make up a single household (i.e. multiple family units may make up a single household). Additionally, the term ‘pithouse’ refers to the physical structure that the household lived within while the term ‘housepit’ refers to the archaeological remains of that physical structure (Figure 4).

Household theory was first conceived by Wilk and Rathje in their seminal issue of American Behavioral Scientist in 1982. The fundamental component within this theoretical framework is that the study of households can be used to bridge the gap between high-level theories of social change and the material culture found through archaeological excavation (Foster and Foster 2012; Wilk and Rathje 1982). This emphasizes the dynamic nature of the household, which can vary in function and form over space and time and ultimately create a reflection of the past human activities that occurred (Wilk and Netting 1984). Because households are so responsive to social, economic and political change, cultural change can be measured when households are studied through time (John and Gonlin 2012). Wilk and Rathje (1982) originally defined the household as "the level at which social groups articulate directly with economic and ecological processes" (Wilk and Rathje 1982). In addition, Wilk and Rathje (1982) described three major morphological elements that they ascribed to households: "(1) social: the demographic unit including number and relationships of the members; (2) material: the dwelling, activity areas, and possessions; and (3) behavioral: the activities it performs." It is in such spaces as the household that expressions of culture such as gender roles, kinship and socialization articulate (Williams 2011; Netting et al. 1984). Ultimately, it is the household which is the product of the productive, distributive and reproductive needs of the individual members that form it (Wilk and Rathje 1982).

More specifically the function of a household can be broken down into five basic categories: production, distribution, transmission, reproduction and coresidence (Wilks and Netting 1984). In this case 'production' refers to the procurement of resources or the appreciation of resources value, 'distribution' refers to the redistribution of materials from producers to consumers, 'transmission' refers to the inheritance of material wealth and non-materials items such as titles, 'reproduction' refers to the biological reproduction of members of the household, and 'coresidence' refers to the structuring of families within the household and the structuring of the household as a whole (John and Gonlin 2012).

However, it is important to recognized that households are not archaeological in nature, but are rather an ethnographic phenomena (Williams 2011). While households are socioeconomic units that utilize material culture, archaeologists can excavate only the structure and the artifacts left behind, not the socioeconomic units (Wilk and Rathje 1982). Despite this disconnect, the household is still a useful tool that can be utilized to guide archaeological inquiry.

HYPOTHSES

Three hypotheses will be tested in this study:

1.) A network socio-political strategy within a collectivist household strategy where residential units competed and intra-household ranking was present developed within Housepit 54 between the IIb and IIa time periods due to pressures associated with increased resource deprivation/instability.

As resource stress increased village-wide at Bridge River, a network socio-political strategy might have developed within the collectivist household of Housepit 54 as separate residential units within the household competed with one another for the resources needed to survive (Puleston et al. 2014; Puleston and Tuljapurkar 2008; Winterhalder et al. 2015). In this case, sharing would be limited between residential units, meaning little to no redistribution would occur. Residential unit that were well-off could store surplus resources and/or used surplus resources to gain better trade/social ties, consequently giving them a better chance for survival. Resource surplus might not be possible to gain if sharing and redistribution was occurring. However, residential units that were not well-off could find themselves in dire straits simply trying to survive. Additionally, there is no guarantee that a residential unit would consistently be well-off, making this a relatively risky strategy that could be rewarding for some.

2.) A corporate socio-political strategy within a communal household strategy where residential units cooperated, the household was largely organized into shared activity areas and intra-household ranking was absent developed within Housepit 54 between the IIb and IIa time periods due to pressures associated with increased resource deprivation/instability.

As resource stress increased village-wide at Bridge River, a corporate socio-political strategy might have developed within the communal household of Housepit 54 as separate residential units within the household cooperated with one another to increase everyone's chances of survival (Angourakis et al. 2014). In this case, sharing of resources needed for survival would be absolute with the household redistributing those resources as needed. Because of this everyone in the household had an equal chance to survive. This strategy mitigated the risk of a failure while also lessening the personal reward gained by success.

3.) A corporate socio-political strategy within a collectivist household strategy where residential units cooperated, the household was largely organized into separate residential units and intra-household ranking was repressed developed within Housepit 54 between the IIb and IIa time periods due to pressures associated with increased resource deprivation/instability.

As resource stress increased village-wide at Bridge River, a corporate socio-political strategy developed within a collectivist household at Housepit 54 as separate residential units within the household cooperated when necessary to accomplish common goals such as survival (Angourakis et al. 2014). In this case, sharing of resources needed for survival is present, but competition for resources that are superfluous may also exist. Because of this, everyone in the household had an equal chance of survival, but inequalities might also appear. This mitigated the risk of a failure while also potentially allowing for some personal material gain.

TEST EXPECTATIONS

Overall, if a network socio-political strategy within a collectivist household was present, then separate residential units with private cache pits and hearths as well as indicators of unequal wealth distributions are expected (Figure 5.C). Separate residential units can be recognized in this context by hearth features with multiple archaeological materials around them, which would indicate multiple activities being performed in the space (Figure 5.C). Additionally, if inequality is present, then an uneven distribution of high-ranked fauna, exotic lithic materials and ornamental items would also be present in certain residential units. In this case, if resource deprivation/instability was key to the emergence of a network intra-household socio-political strategy in Housepit 54, then this strategy is expected to only be present on the more recent occupational floor of IIa (Prentiss et al. 2008; Prentiss et al. 2012; Prentiss et al. 2014).

Alternatively, there are two different household contexts for the operation of the corporate socio-political strategy that could have been present within Housepit 54. These are the communalist and collectivist households (Coupland et al. 2009; Williams 2013), and they may present with differing signatures in the archaeological record. Socially, it is possible to have a collectivist strategy and also a corporate system in which residential units cooperate, but individuals still via for status (Coupland et al. 2009). However, such individualized signals are hard to find archaeologically so this study will be focused on the larger social unit of the residential group. Additionally, it is possible for different activities, such as food processing and lithic production, be under the influence of contrasting socioeconomic strategies. This study will

Table 1: Hypothesis and test expectations.

Hypothesis	Strategies	Test Expectations	Spatial Expectations	Associated Methods
H1: Increased competition	Network-collectivist	Separate residential units with private	Hearth features with multiple types of archaeological materials clustered around them	Optimized Hot Spot Analysis, Spline for Density Analysis
		cache pits, hearths, activity areas, wealth items	Uneven distribution of high-ranked fauna, exotic lithic materials and ornamental items between residential units	Richness and Evenness, Optimized Hot Spot Analysis, Spline for Density Analysis
H2: Increased cooperation	Corporate - collectivist	Separate residential units with private	Hearth features with multiple types of archaeological materials clustered around them	Optimized Hot Spot Analysis, Spline for Density Analysis
		cache pits, hearths, wealth items	More even distribution of high-ranked fauna, exotic lithic materials and ornamental items between residential units	Richness and Evenness, Optimized Hot Spot Analysis, Spline for Density Analysis
			Possibly shared activity areas represented by a concentration of materials and tools that indicate a single type of activity occurred in only that space	Optimized Hot Spot Analysis, Spline Interpolation for Density Analysis
H3: Increased Cooperation	Corporate - communal	Residential units that shared cache pits, hearths and activity areas	Hearth features with a single type of archaeological material dominating the assemblage around them OR a single hearth present within the housepit that the entire household shared represented by multiple types of archaeological materials clustered around it.	Optimized Hot Spot Analysis, Spline Interpolation for Density Analysis
			More even distribution of high-ranked fauna, exotic lithic materials and ornamental items throughout the housepit	Richness and Evenness, Optimized Hot Spot Analysis, Spline for Density Analysis
			Shared activity areas represented by a concentration of materials and tools that indicate a single type of activity occurred in only that space	Optimized Hot Spot Analysis, Spline for Density Analysis
			Multiple hearths and cache pits may exist clustered together indicating shared space	Spline for Density/Spatial Analysis

take these possibilities into account by analyzing these materials separately in an attempt to discern activity areas and the socioeconomic signatures that influenced their creation.

Spatially, the signature(s) of a corporate-collectivist strategy are similar to that of a network-collectivist strategy except that intra-household ranking is generally absent or suppressed and therefore there is not a strong signal of unequal access to materials present in the archaeological record (Figure 5.C). In this case, members of the household live and work together only because they recognize that their cooperation is the best way to accomplish common goals.

On the other hand, the spatial signature(s) of a corporate-communal strategy include shared activity areas as well as an overall even distribution of all faunal materials, lithic artifacts and exotic items (Figure 5.A). Hearth features that have a single type of material culture dominating the assemblage around them will be present and multiple hearths and cache pits may exists clustered together indicating shared space (Figure 5.A). This pattern indicates that separate hearths were used for separate activities and therefore space and possibly goods were shared. Alternatively, there may also be a single hearth present within

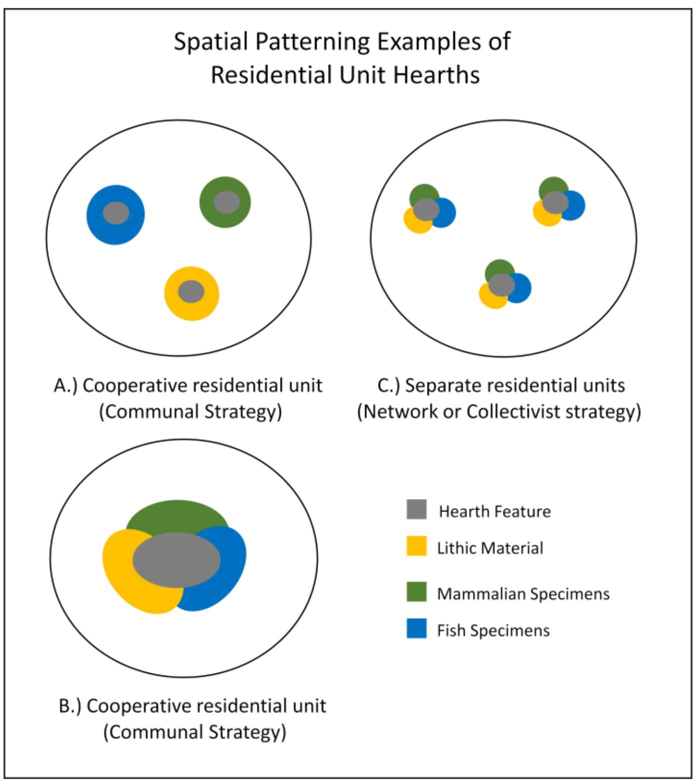


Fig. 5: Examples of how cooperative and competitive socioeconomic strategies may pattern spatially.

the housepit that the entire household shared (Figure 5.B). In general, in an intra-household setting the corporate-communal strategy is one where the household is a more like a single cohesive unit rather than separate residential units living together in a single housepit. In this case, if resource deprivation/instability was key to the emergence of one of the corporate intra-household strategies in Housepit 54, then this strategy in question is expected to only be present on the more recent occupational floor of IIa (Prentiss et al. 2008; Prentiss et al. 2012; Prentiss et al. 2014). (The expectations used to test the above hypotheses have been modified from several sources including Burns 2003, Carlson 2010, Prentiss et al. 2012 and Williams 2011).

Faunal and lithic data from Housepit 54 will be used to test the hypotheses described above. The specific data used in this study will be from the 2012, 2013, 2014 and 2016 field seasons. The overall distribution of these archaeological materials will indicate what activities took place in what areas of the housepit. In particular, how the archaeological materials group around hearths and cache pits may indicate the type of strategy that was present within the housepit.

Chapter 4: METHODS

This section presents a brief overview of the excavation methods at Housepit 54, the laboratory methods regarding the materials examined in this study and the analytical methods used to explore the archaeological data.

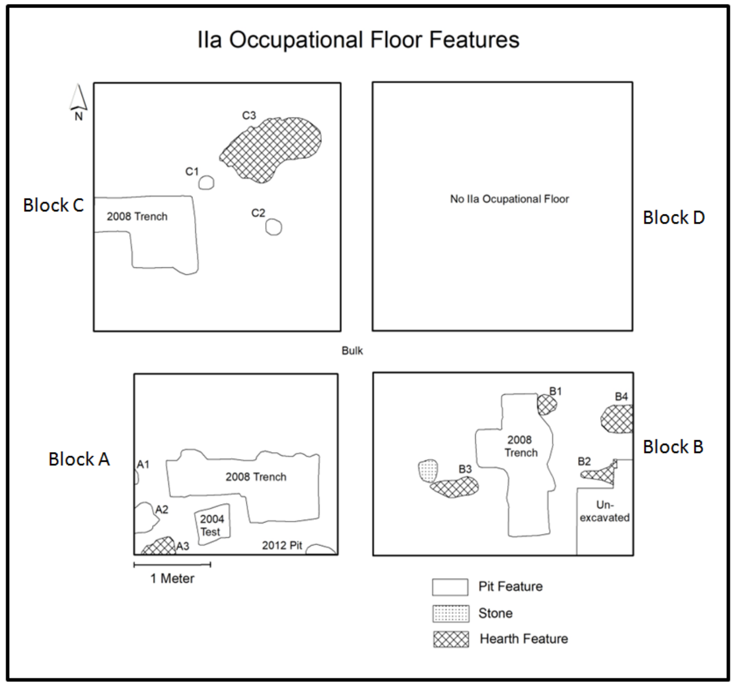


Fig. 6a: Map of the features on the IIa floor of Housepit 54.

EXCAVATION METHODS

This study will rely upon archaeological materials that were excavated from Housepit 54 at the Bridge River Site by the University of Montana. Excavation methods included the division of the excavated area into four quarters, designated as 'blocks.' Block A was the southwest block, Block B was the southeast block, Block C was the northwest block and Block D was the northeast block (Figures 6a and 6b). These blocks were then further divided into sixteen 100 x 100

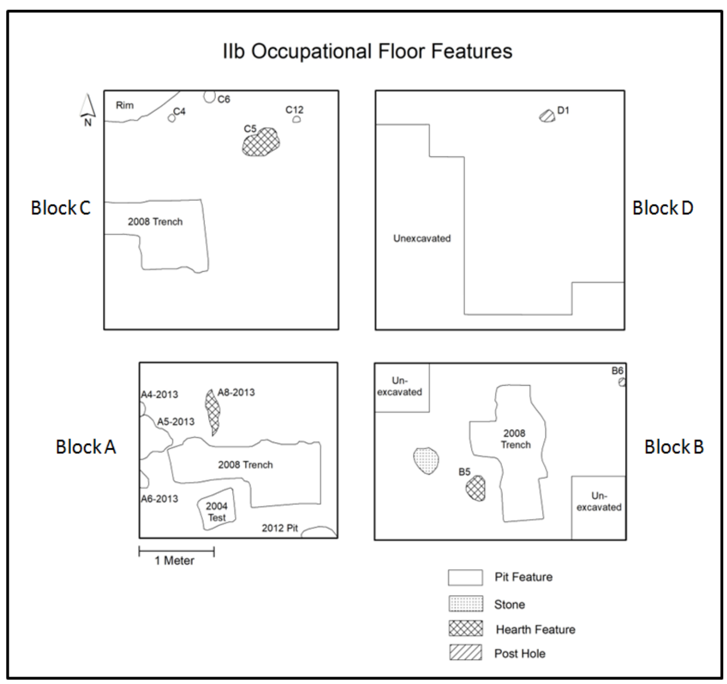


Fig. 6b: Map of the features on the IIa floor of Housepit 54.

centimeter units and these units were additionally divided into four 50 x 50 centimeter quadrants. Floor sediment was excavated in natural stratigraphic levels of 5 centimeter increments while features were excavated in natural stratigraphic levels of 10 centimeters increments. When the natural stratigraphy of features was difficult to discern the sediment was excavated in arbitrary levels of 10 centimeters. All sediment removed from the excavation area was screened through a 1/8 mesh. Furthermore, soil samples were taken for flotation, paleoethnobotanical analysis and geochemical analysis. The occupational floors and roof strata were photographed and mapped as was the stratigraphy present within the excavation walls. Additionally, all artifacts and faunal specimens one centimeters or larger in size were mapped when found in situ to provide detailed spatial data. Moreover, all features found within Housepit 54 were mapped, photographed and excavated separately from the occupational floors. These features were excavated in natural levels when possible and arbitrary 10 centimeter levels when needed. Fire cracked rock (FCR) was also recorded and collected in field. Recovered materials were stored in acid-free plastic bags with the exception of some FCR. Further details of the excavation of Housepit 54 can be found online in the Bridge River 2013 and 2014 final reports (Prentiss 2014; Prentiss 2015).

LABORATORY METHODS

Because this study includes the analysis of faunal and lithic materials from Housepit 54 at the Bridge River site, only the laboratory methods used to analyze these materials will be described below. Details on the analysis of other materials at the site can be found online in the Bridge River 2013 and 2014 final reports (Prentiss 2014; Prentiss 2015).

Faunal Analysis

Faunal materials were analyzed individually at the University of Montana, Missoula utilizing the comparative collection currently housed in the Phillip L. Wright Zoological Museum. Faunal specimens were identified to the most specific taxonomic classification possible. All specimens were also classified utilizing size classes. The bones were first determined as mammal, avian or fish in nature before being categorized via size class. Additionally, all of the faunal materials were analyzed for element type, completeness, side (right/left), end (proximal/distal), and age (sub adult/adult). Human modification including cut marks, trampling, abrasions and burning were noted (Buikstra and Swegle 1989; Fiorillo 1989; Micozzi 1991; Haglund and Sorg 1997; Shipman et al. 1984; Reitz and Wing 2008; White 2012). The fracture morphology (Sakek-Kooros 1975) as well as size grades (1-9cm, 10-19cm, etc.) of the bone materials may help to determine the intensity of processing being performed at the housepit. Measures of faunal processing intensity have proven useful in indicating access to resources and could also potentially be used as an indication of resource scarcity (Butler and Campbell 2004; Broughton 1994; Janetski 1997; Prentiss et al. 2012a). Additionally, the presence of highly fragmentary faunal materials with spiral fracturing on long bones has been connected to marrow and grease extractions (Klein and Cruz-Uribe 1984). Lastly, the presence of carnivore marks such as gnawing, punctures, pitting and digestion were noted (Faith et al. 2007; Micozzi 1991, Fernandez-Jalvo et al. 2014; Reitz and Wing 2008).

Additionally, updated utility indices, which were originally created by Binford (1978), may also used to assess the possibility of resource depression as well as the degree of inequality present within the housepit. Ultimately, greater inequality would present as an unequal access to more desired animals and/or animal parts, which may be determined through the uses of these utility indies. The specific utility indices used in this study were Madrigal and Holt's (2002) utility index for deer, Binford's (1978) utility index for domestic sheep, which will be used as a proxy for Big-horned sheep, and Prentiss et al.'s (2012b) utility

Table 2: High, moderate and low utility elements for fish, mammals and avian.

Element Utility	Fish	Mammal(large/medium)	Avian
High	Thoracic vertebra	Femur Humerus Tibia Radii Ulna Diaphaseal fragments Cancellous fragments	Sternum Femur Tibiotarsus Humerus Radius Ulna
Moderate	Precaudal vertebra Caudal vertebra Vertebral fragments	Vertebra Ribs Sternum Scapula Inominates	Vertebra Ribs Pectoral girdle Pelvic girdle
Low	Cranial element Pectoral girdle Pelvic girdle	Cranial elements Metapodials Carpals Tarsals Phalanges Small Mammals	Cranial

Table 3: High, moderate and low utility species for fish, mammal and avian.

Species Utility	Fish	Mammals	Avian
High	King Salmon Sockeye Salmon	Deer Big Horned Sheep Artiodactyle Large Mammals	
Moderate	Trout Salmonidae	Beaver Canids Medium Mammals	X-large Birds Large Birds Medium Birds
Low		Small Mammals Mouse-sized Rodents	

index for salmon. These utility indices have been chosen because of the prominence of these animals seen within the currently analyzed portion of Housepit 54's archaeological record.

Lithic Analysis

Lithic tools and debitage were analyzed individually at the University of Montana, Missoula. (The term 'debitage' refers to the lithic refuse created in the production of lithic tools). Data was collected regarding the material type, the presence or absence of trample damage (McBrearty et al. 1998; Pryor 1988; Tringham et al. 1974) and the presence or absence of thermal alteration (Rick and Chappell 1983). Thermal alteration was determined by color change, crazing and pot-lidding. Additionally, the artifacts were assigned to size classes (Prentiss 2001) and analyzed for flake completion (Morrow 1997; Prentiss 1998; Sullivan and Rozen 1985), fracture initiation (Cotterell and Kamminga 1987; Hayden and Hutchings 1989), and amount of cortex present (Bradbury and Carr 1995; Magne 1985; Mauldin and Amick 1989). Further use-wear analysis (Hayden 1979) was conducted on materials that were recognized as lithic tools. Recorded use-wear traits included directionality (parallel or perpendicular), polishing, rounding, striations and crushing. Retouch was also recorded regarding placement (dorsal, ventral, bifacial), invasiveness (abrupt, semi-abrupt, invasive) and termination type (scalar, hinge, step).These analyses may help to discern where certain past behaviors, such as hide scraping, may have been occurring within the structure of Housepit 54. Special attention was given to lithic artifacts that were recognized as tools. The length, height and thickness of the tools was measured with calipers and these artifacts were also drawn, both in profile and plan views. Additionally, the tool's edge angle was measured using a Ward's Contact Goniometer. Type of tool was determined through the employment of the Bridge River

Project's lithic typology (Prentiss 2014, 2015). Tools with more than one utilized edge were classified as having separate employable units (Knudson 1983). These lithic debitage and tool studies as well as the recognition of exotic material types and lithic artifacts were imperative for reconstructing the housepit's spatial organization, lithic economies and subsistence economies (Hayden and Spafford 1993; Prentiss et al. 2017; Spafford 2000).

ANALYTICAL METHODS

Several different analyses were conducted to better understand the assemblages under study. These analyses, both those that utilize statistics and those that utilize GIS are described below.

NISP, %NISP and Density

Number of Identified Specimens (NISP) is a simple measure abundance that is equivalent to the total count of material from a specific category found within an assemblage (Reitz and Wing 2008). An example of this would be the total count of bones in an assemblage that are deer.

Related to NISP is %NISP, which, in the case of this study, is the NISP divided by the total count of the overall assemblage. An example of this would be the number of deer specimens divided by the total number of faunal specimens and then multiplied by 100. In this case the result of this equation would be the percent of the lithics assemblage that is made up of jasper. %NISP can also be calculated using a subset of the total assemblage. For example, one can calculate what percent of the tool assemblage is made up of projectile point. For clarity, if %NISP is being calculated using a total assemblage it will be called '% of Total Assemblage' in the tables. Alternatively, if %NISP is being calculated using a subset of the total assemblage it will be call '% of (subset's designation) assemblage' in tables.

Lastly, the density of archaeological material can be calculated by taking the total of an assemblage and dividing it by the number of cubic meters^2 of matrix that was excavated. Information about the number of cubic meters^2 of matrix excavated at Housepit 54 can be found online in the Bridge River 2013 and 2014 final reports (Prentiss 2014; Prentiss 2015).

All of the above calculations are used in this study to describe the data that is being analyzed.

Diversity Statistics

Richness (Reitz and Wing 2008) and Pielou's (1966) evenness statistic are calculated to better describe the diversity of the faunal and lithic assemblages under study. As an example, faunal species 'richness' refers to the number of species present within an assemblage, and species 'evenness' refers to whether or not the assemblage is dominated by one species. These diversity statistics were calculated for the faunal species assemblage, the faunal size class assemblage, the lithic material assemblage and the lithic tool type assemblage. Additionally, these statistics were also calculated for the separated 'block' assemblages of each of the categories mentioned above. To clarify, this means that the richness and evenness of the portion of the overall faunal species assemblage that was located in Block A of Housepit 54 was calculated. The same was performed for Block B, Block C and, when applicable, Block D. These statistics allow for not only the richness and evenness of the different occupational floors (IIb and IIa) to be compared, but also the difference between Housepit 54's blocks (i.e. separate areas of the housepit) to be compared. However, it must be pointed out that these 'blocks' are arbitrary in nature; they do not truly represent separate areas within the housepit. Rather they are a methodological tool that may be used to compare differences that occur spatially within the housepit.

GIS Analysis

GIS (Geographic Information Systems) was implemented in the spatial analysis of the archaeological materials under study. GIS is a type of computer program that has thus far proven very useful for the spatial analysis of regions and settlements (Fernandes et al. 2011; Fletcher 2008; Pugh 2003; Rua 2009). Additionally, it is also possible to utilize this tool in the spatial study of households, such as Housepit 54 at the Bridge River site. While GIS has largely been recognized for its mapping abilities, it also has several other functions such as the capability to merge and analyze multiple sets of data and the ability to perform statistical analyses (Conolly and Lake 2006). These capabilities are useful for understanding the spatial distribution of cultural materials. Moreover, the visual component of GIS can assist in the identification of patterns and trends within the archaeological data that might otherwise be overlooked.

This GIS analysis is possibly at Housepit 54 because of the carefully controlled excavation methods described above, allowing for the cultural materials to be mapped within a grid, which ultimately reveals the distribution of artifacts within the structure. Artifacts that were found in situ during excavation may be mapped to a particular point within the GIS grid. In contrast, artifacts collected from screening lack an exact location and were mapped to the center point of the quadrant or unit they were excavated from. While this method is not exact, it still reveals meaningful spatial patterns that may be analyzed. The spatial distribution of such artifacts, in particular clusters, may reveal possible residential units or activity areas. Ethnographic research regarding the lower Lillooet and Thompson tribes has indicated that housepits, such as those at the Bridge River site, were multi-family structures that were divided into separate domestic areas (Teit 1900, 1906). Depending on how evenly high-ranked fauna, exotic lithic materials and ornamental items are distributed between the different residential units, this pattern would be indicative of either a network-collectivist socioeconomic strategy or a corporate-collectivist socioeconomic strategy. In contrast, ethnographic research regarding the Shuswap and Lillooet within the general area has indicated that pithouse structures were comprised of multi-family units that shared activity areas; (Teit 1909) a pattern indicative of a corporate-communal socioeconomic strategy. However, ethnographic and archaeological patterns may differ. Because of this GIS analyses are used in this study to assess which of these patterns was present within Housepit 54 during the IIb and IIa time periods.

This study analyzes in particular the distribution of materials within the household and also looks for indicators of uneven wealth distributions such as clusters of exotic items/materials and rare/high-utility faunal specimens. Additionally, areas within the house designated for high status individuals/residential units may include larger/more cache pits, possibly demonstrating the presence of surplus; conversely, areas within the house designated for lower status individuals/residential units may include fewer/smaller cache pits (Coupland et al. 2009; Hayden 1997; Prentiss et al. 2012a). The types of activities undergone within areas of the Housepit 54 structure may be determined by clusters of artifact types and the presence of features within the structure. An activity area primarily devoted to the processing of food and cooking will contain high concentrations of burned animal bones and hearth features as well as lithic processing tools such as knives and hammers (Hayden 1997). In contrast, an area of lithic tool production will contain high concentrations of debitage, cores and possibly tools broken in manufacture (Spafford 2000). Additionally, an area devoted to hide processing will contain scrapers with use-wear, retouch flakes and possible butchered bones of large mammals (Cassell 2005; Frink 2004; Hayden and Spafford 1993).

As stated above, a pattern with multiple activity areas may suggest a corporate-communal intra-household social strategy. Additionally, a pattern with only a single hearth feature present in the housepit around which all activities were occurring may also be a signature of a corporate-communal intra-household socioeconomic strategy. Alternatively, a pattern with all activities occurring around multiple hearth features may suggest a network-collectivist or a corporate-collectivist intra-household socioeconomic strategy, depending on how evenly high-ranked fauna, exotic lithic materials and ornamental items are distributed between the different residential units.

Specifically, two tools within the GIS program ArcMap 10.5 were used in this study: the Spline tool and the Optimized Hot Spot Analysis tool. The archaeological data inputted into these tools were aggregate counts of faunal or lithic material which had been assigned the coordinates that coordinated to the center of the quadrants or the center of the units from which the material had been excavated. This allows for consistency within the spatial data, but also can cause some occasional visual aberration on the maps created. The most prevalent of these develops when one of test units or trenches, the data of which is not included in this study because the stratigraphy does not exactly match, bisects much of a unit, the edges of which were also excavated in the larger Housepit 54 excavation, the data of which is included in this study. Because the data analyzed in this study are aggregated at the center of quadrants or units, this sometimes causes the data to map into the area of one of the test units or trenches. Another visual aberration that can be found is when the spline interpolation maps display high densities of materials inside the balks, test units and trenches. This is the result of creating a 'smooth' raster surface (see below for more information). However, even with these occasional visual aberrations, the GIS analyses performed here are still useful for understanding the spatial distribution of the archaeological materials under study.

Spline Tool

Interpolation methods in general use known points of data to estimate the value of areas that do not contain data and create a continuous surface (ESRI Interpolation 2017). Ultimately, this process creates a surface that models both known and unknown points of data within a specific area of study (ESRI Interpolation 2017). The spline tool in ArcMap 10.5 is an interpolation method that uses a two-dimensional minimum curvature spline technique to create a 'smooth' raster surface that passes exactly through the known inputted points (ESRI Spline 2017). There are many different types of interpolation tools within ArcMap 10.5, but the spline tool is one that visually creates an easily understandable model surface. In this study the outputted spline surface was used to track the density of materials on the Housepit 54 occupational floors. To do this, zeros were added to all the center of quadrants and the center of units within the study area that did not contain data or had not been excavated. This mitigated the possibility of a density being generated by the spline tool where none should be. All presets within the spline tool were kept. Once generated the new spline surface was symbolized using the 'stretched' option and the 'Minimum-Maximum' 'type' option (rather than the default 'standard deviation'). The minimum value was set to zero and the maximum value was rounded up to a whole number. When there was too little data to use a spline interpolation (i.e. when there was less than 10 specimens or no higher aggregated number then 1 in an assemblage) the graduated symbols option was used to display the data instead. Graduated symbols show the quantitative difference between data points on a map by varying the size of the symbols displayed (ESRI Graduated Symbols 2017).

Optimized Hot Spot Analysis Tool

'Local' statistics are those that can identify variation within a dataset by focusing on individual points of data and their relationship to other nearby points of data (ESRI Hot Spot 2017). This type of statistics can identify where a pattern (i.e. a cluster) occurs within a dataset (ESRI Hot Spot 2017). The Optimized Hot Spot Analysis tool in ArcMap 10.5 is the local statistic used in this study. Using point (or feature) data, this tool creates a map of statistically significant spatial clusters (i.e. hot spots and cold stops) using the Getis-Ord Gi* statistic (Hot Spot 2017). To be statistically significant, the clusters, be it a hot or cold spot, have to be surrounded by points with similar values and also have to have higher and/or lower values than their neighboring points (ESRI Hot Spot 2017). This tool does not generate an overall z-score or p-value. Instead, the Optimized hot spot analysis tool generates a z-score and p-value for every data point in the data set, then compares them to discover patterns within the data (ESRI Hot Spot 2017). All presets within the high/low clustering tool were kept. The data inputted into the high/low clustering tool included zeros at all the center of quadrants or the center of units that had been excavated, but contained no archaeological material.

Chapter 5: RESULTS AND DISCUSSION

The following sections cover the results of the analyses performed in this study as well as a discussion of the distribution of densities and materials found in the spatial analyses. These spatial analyses ultimately expose patterns in the data that can in turn be interpreted; potentially revealing residential units, activity areas, etc. (see Test Expectations).

FAUNAL OVERVIEW

Overall, the IIa faunal assemblage is made up of 30.67% fish (scientific class: Oncorhynchus) and 69.01% mammal (scientific class: Mammalian) while the IIb faunal assemblage is 68.58% fish, 30.49% mammal and 0.09% avian (class: Aves). (Figure 7). 6.62 percent of the IIa faunal assemblage is burned and 2.00% of the IIb faunal assemblage is burned.

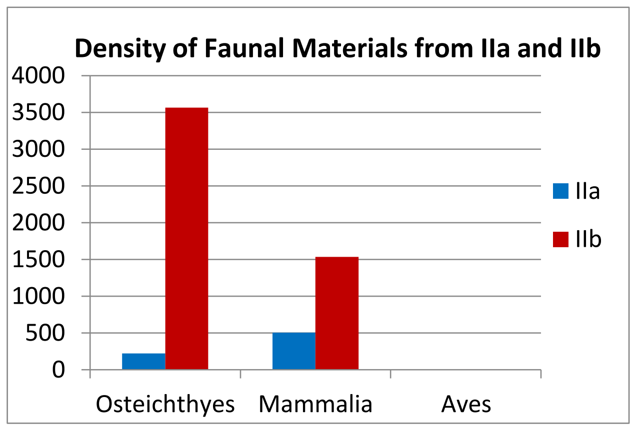


Fig. 7: Bar graph of the density of fish, mammal and avian faunal material on the IIa and IIb occupational floors.

A further break down of the faunal assemblage into the species represented reveals that king salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*Oncorhynchus nerka*) and rainbow trout (*Oncorhynchus mykiss*) are the fish species that can be identified in both the IIa and IIb faunal assemblages. In IIa king salmon makes up the majority (68.57%) of the fish assemblage that could be identified while in IIb sockeye salmon makes up the majority (98.16%) of the fish assemblage that could be identified. Additionally, the genus deer (genus: *Odocoileus*) makes up

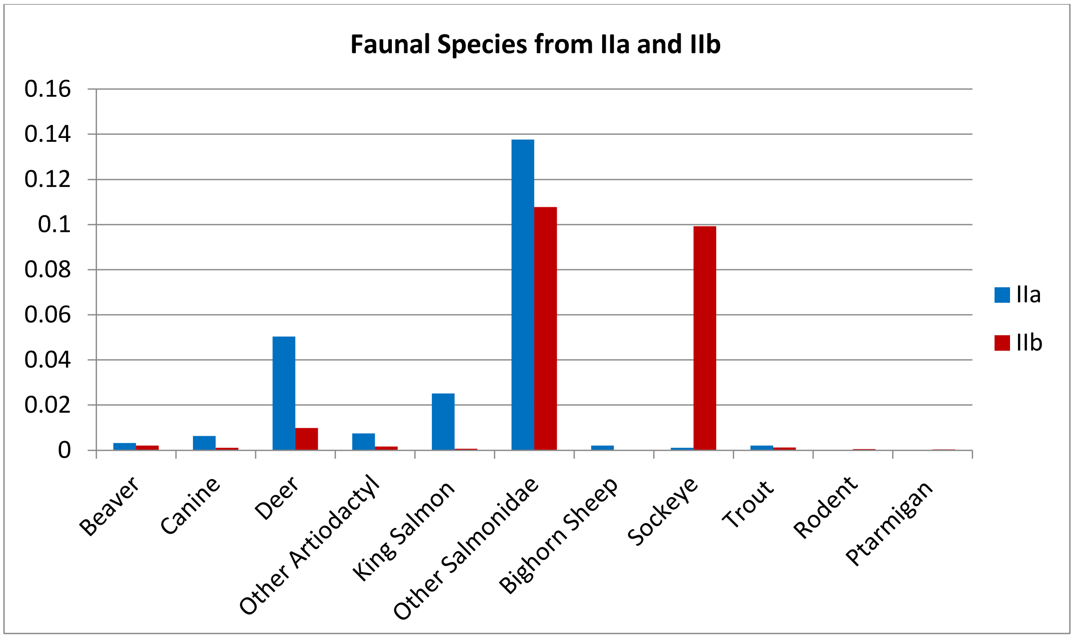


Fig. 8: Bar graph displays the proportion of the IIa and IIb faunal assemblage that are identified to a species. (The category 'Other Salmonidae' refers to fish specimens that were identified to the scientific family 'Salmonidae' while the category 'Other Artiodactyl' refers to mammal specimens that were identified to the scientific order 'Artiogactyla.' These categories help display the range of faunal materials present.

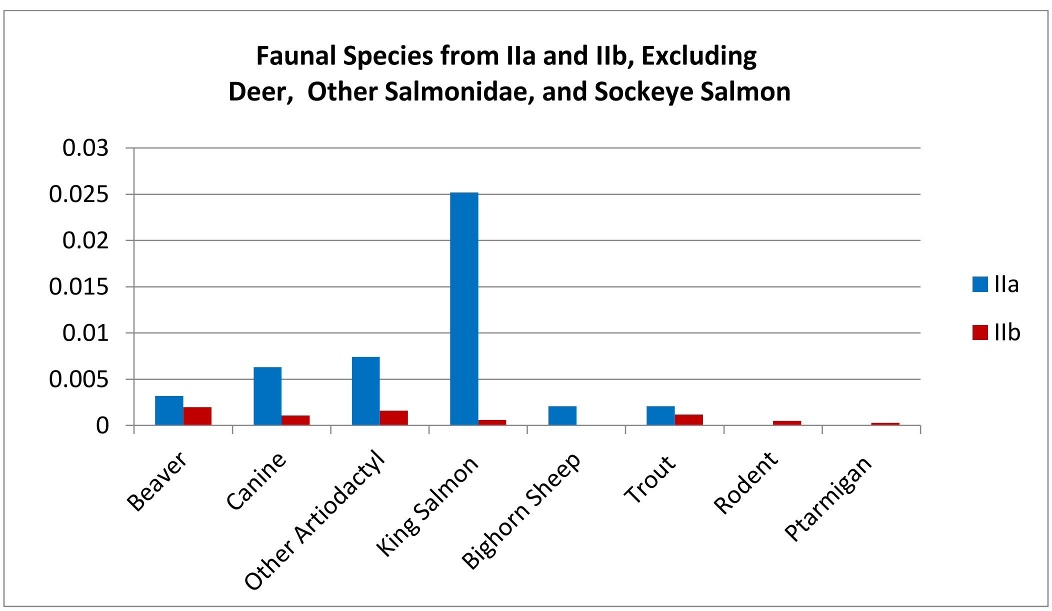


Fig. 9: Bar graph displays the proportions of the IIa and IIb faunal assemblage that are identified to a species, minus the categories of deer, other salmonidae and sockeye salmon. This graph is intended to better show the distribution of the other species in these assemblages, which were masked before by the extreme quantities present in the afore mentioned three categories.

the majority of the mammal assemblage that was identified in both the IIa (94.12%) and IIb (71.59%) assemblages. Other mammalian species present in the IIa faunal assemblage includes big-horn sheep (*Ovis canadensis*), canids (genus: *Canis*) and beavers (*Castor canadensis*) (Figure 8 and 9). In the IIb faunal assemblage the other mammalian species present includes canids, beavers and mouse-sized rodents. Ptarmigans (*Lagopus*) are also present in the IIb faunal assemblage (Figure 8 and 9). However, it is important to note that only 9.87% of the IIa assemblage was identified to species and only 11.48% of the IIb faunal assemblage was identified to species. Additionally it must be mentioned that these faunal materials were visually identified to species within a laboratory setting and the possibility of erroneous identification is present.

Table 4: Descriptions of the different faunal size classes.

Fauna	Size Class	Definition
Fish	SC 1	1/2 the size of trout and smaller
	SC 2	Between size class 1 and trout
	SC 3	Between trout and sockeye salmon
	SC 4	Between sockeye salmon and king salmon
	SC 5	Bigger than king salmon
Mammal	SC 1	Mouse-sized animals and smaller
	SC 2	Between mouse and muskrat
	SC 3	Between muskrat and beaver
	SC 4	Between beaver and deer
	SC 5	Bigger than deer
Avian	SC 1	Wood duck-sized animals and smaller
	SC 2	Between wood duck and mallard
	SC 3	Between mallard and Canadian goose
	SC 4	Between Canadian goose and turkey
	SC 5	Bigger than turkey

Since so few specimens in the faunal assemblages could be identified as belonging to a specific species or genus, size classes were also used in this study. These size classes assign a certain range of body sizes to the faunal specimens in question (Table 4). In general, size classes

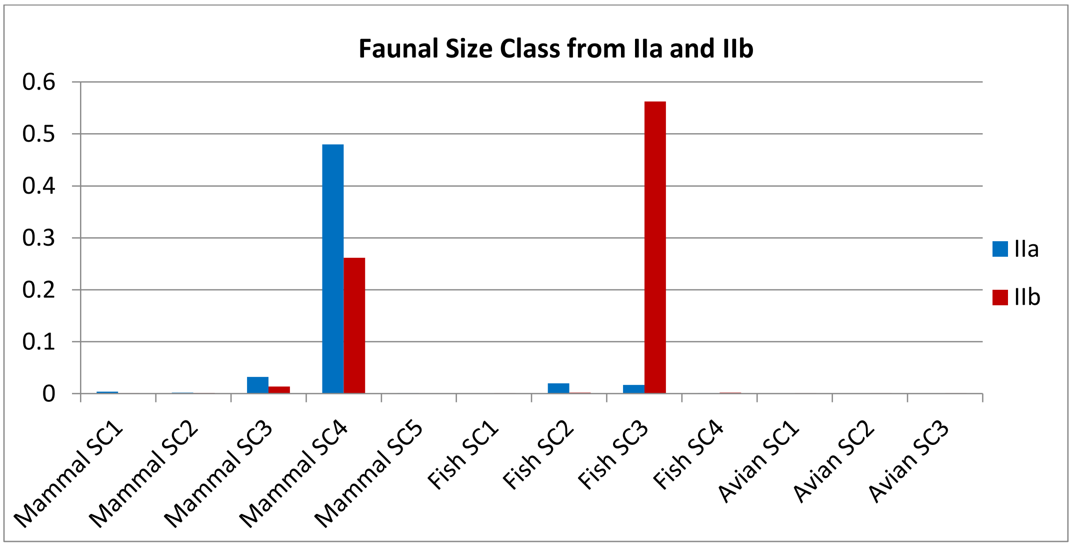


Fig. 10: Bar graph displays the proportions of the IIa and IIb faunal assemblages that are identified to a size class.

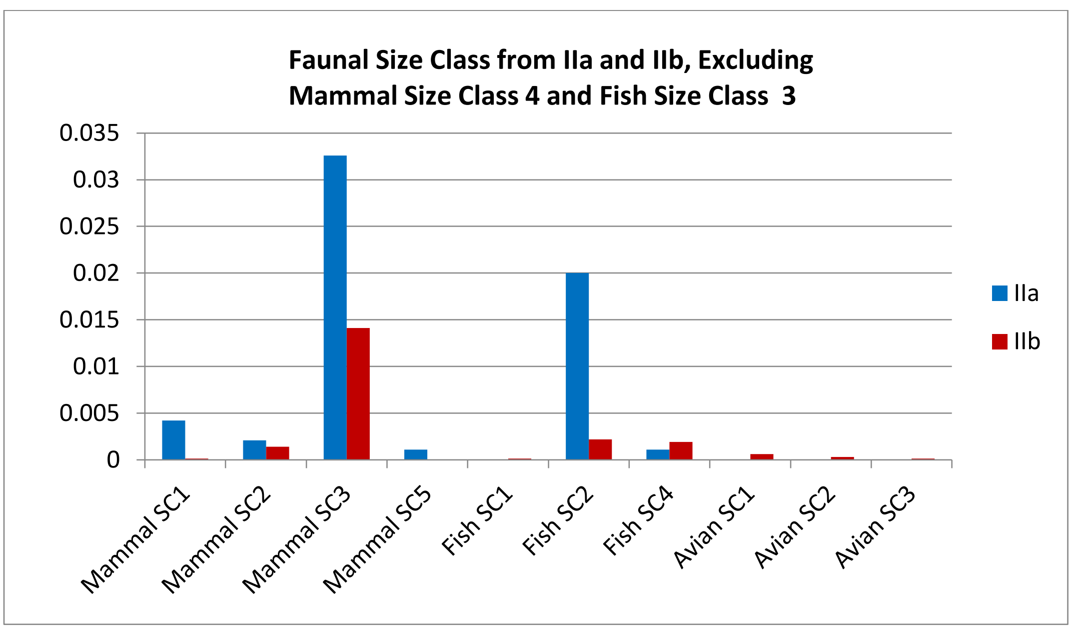


Fig. 11: Bar graph displays the proportions of the IIa and IIb faunal assemblage that are identified to a size class minus the categories of mammal size class 4 and fish size class 3. This graph is intended to better show the distribution of the other size classes in these assemblages, which were masked before by the extreme quantities present in the afore mentioned two categories.

are not as exact as identifying a faunal specimen to a species, but they are more easily identifiable and can still reveal useful trends in the data. Out of the IIa faunal assemblage, 58.19% of the specimens were identified to a size class category and out of the IIb faunal assemblage, 84.52% of the specimens were identified to a size class category. Fish size class 4 makes up the majority (54.55%) of the IIa fish assemblage that could be identified (Figure 10 and 11) while fish size class 3 makes up the majority (99.25%) of the IIb fish assemblage that could be identified (Figure 10 and 11). Alternatively, mammalian size class 4 makes up the majority of the mammalian assemblage that could be identified in both the IIa (92.32%) and IIb (94.34%) assemblages (Figures 10 and 11).

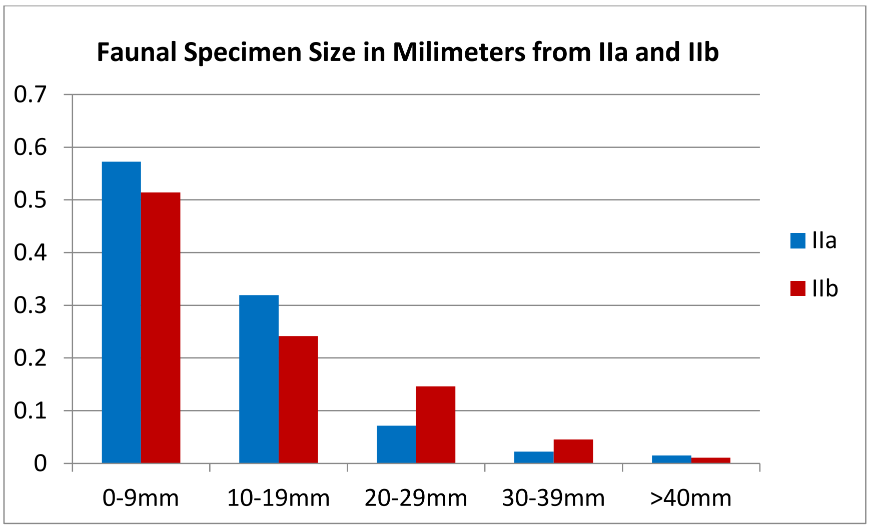


Fig. 12: Bar graph displays the proportion of the IIa and IIb faunal assemblages that are identified to a size grade category.

The physical size, or ‘size grade,’ the specimens in the faunal assemblages were also analyzed in this study. 89.18 percent of the IIa faunal assemblage was made up of specimens smaller than 20 mm while 75.53% of the IIb faunal assemblage was made up of specimens smaller than 20 mm (Figure 12).

The concepts of element utility and species utility were used to analyze the faunal assemblages in this study. Specifically, element utility refers to the value of a faunal element, generally in meat and/or grease (Reitz and Wing 2008). Similarly, species utility refers to the value of a species of animal, generally in meat and/or grease (Reitz and Wing 2008). Out of the IIa faunal assemblage, 46.74% of the specimens were identified to an element utility category (Figure 13) and 76.68% of the specimens were identified to a species utility category (Figure 14). Alternatively, out of the IIb faunal assemblage 67.09% of the specimens were identified to an element utility category (Figure 13) and 85.89% of the specimens were identified to a species utility category (Figure 14). Moderate utility elements make up the majority (52.36%) of the faunal specimens from the IIa element utility assemblage, but high utility elements also make up a large portion (36.63%) of this assemblage (Figure 13).

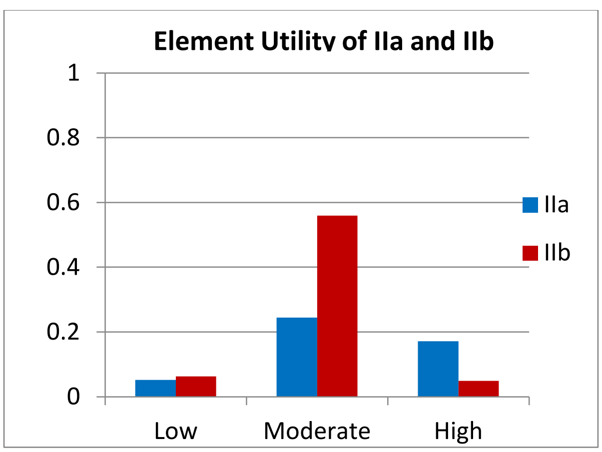


Fig. 13: Bar graph displays the proportion of the IIa and IIb faunal assemblage that are identified to an element utility category.

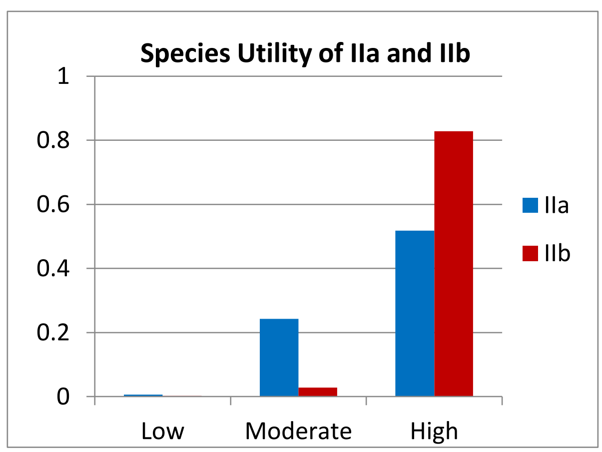


Fig. 14: Bar graph displays the proportion of the IIa and IIb faunal assemblage that are identified to a species utility category.

Alternatively, moderate utility elements make up the majority (83.34%) of the faunal specimens from the IIb element utility assemblage (Figure 13). In the IIa faunal assemblage high utility species make up the majority (67.53%) of the species utility assemblage, but moderate utility species also make up a large portion (31.64%) of this assemblage (Figure 15). In the IIb faunal assemblage high utility species make up the majority (96.4%) of these species utility assemblage (Figure 14).

A total of three bone tools were found in both the IIa faunal assemblage and IIb faunal assemblage (Table 5). In the IIa faunal assemblage these bone tools represent 0.32% of the assemblage while in the IIb faunal assemblage these bone tools represent 0.05% of the assemblage.

Table 5: Bone tools from the IIa and IIb occupational floors.

Stratum	Bone Tools (each = 1 tool)
IIa	Utilized fragment (polished) Awl (fragment) Compound tool (complete)
IIb	Utilized fragment (polished) Awl (fragment) Awl (complete)

FAUNAL RICHNESS AND EVENNESS

The following tables are the result of the richness and evenness calculations performed on the IIa and IIb faunal assemblages. In this case, the 'Category' column indicates whether the calculations were done on the faunal species assemblage or the faunal size class assemblage. The 'Block' column indicates the excavation block of the assemblage data used in the calculations with the exception of the 'All' category, which indicates that the calculation was performed on all the faunal data regardless of block. The 'Richness' column indicates how many species or faunal size classes were present in the assemblage analyzed while the 'Evenness' column contains the results of the evenness calculations; the closer to zero, the more the assemblage is dominated by one or a few faunal species/size classes.

As indicated below, the IIa faunal assemblage in Block C contains the greatest species richness and evenness (Table 6a). Additionally, this block in IIa has the greatest size class richness and close to the greatest size class evenness (Table 6a). (The actual greatest size class evenness being located in Block A). Alternatively, the IIb faunal assemblage in Block D contains

Table 6a: Faunal richness and evenness calculation results from the IIa occupational floor. Numbers highlighted in orange indicate the highest scores among the excavation blocks. Alternatively, numbers highlighted in blue indicate the lowest scores among the excavation blocks.

IIa Category	Block	Richness	Evenness
Faunal Species	A	2	0.4138
	B	2	0.6503
	C	7	0.7313
	D	0	0
	All	7	0.7019
Faunal Size Class	A	5	0.4825
	B	5	0.1556
	C	6	0.4196
	D	0	0
	All	8	0.3565

Table 6b: Faunal richness and evenness calculation results from the IIb occupational floor. Numbers highlighted in orange indicate the highest scores among the excavation blocks. Alternatively, numbers highlighted in blue indicate the lowest scores among the excavation blocks.

IIb Category	Block	Richness	Evenness
Faunal Species	A	4	0.8447
	B	2	0.4692
	C	6	0.224
	D	8	0.2712
	All	8	0.2725
Faunal Size Class	A	6	0.4965
	B	2	0.1623
	C	5	0.356
	D	11	0.3058
	All	11	0.3149

the greatest species richness and the greatest size class richness (Table 6b). The IIb the faunal assemblage in Block A contains the greatest spices evenness and the greatest size class evenness (Table 6b). This uneven distribution of faunal materials suggests that there is a difference between the assemblages in these different excavation blocks and ultimately around the subsequent hearths and potentially within the different residential units or activity areas that may lie within. However, further examination is needed to tell what these patterns actually mean.

FAUNAL OPTIMIZED HOT SPOT ANALYSIS

The following tables are the result of the faunal GIS Optimized hot spot analysis using the faunal IIa and IIb assemblage data. In this case, the 'Category' column indicates what type of faunal material was clustering to create the resulting hot/cold spot (ex: species). The number in parentheses beside the category designations indicates if the hot spot/high density was the first cluster or second cluster (etc.) found. Additionally, the 'Subcategory' column indicates the more specific sub category of the faunal data (ex: deer). The 'Block' column indicates the excavation block within which the resulting hot spot/high density was located. The 'Quadrant' column indicates which quadrant (north-east, north-west, south-east, south-west) of the block within which the resulting hot spot/high density was located. Additionally, the 'Central' column indicates if the hot spot/high density was located in the center of the block or between the quadrants (i.e. west [symbolized as 'w'] indicates the area between the north-west and south-west quadrants). The 'Hot Spot Significance' and 'Cold Spot Significance' columns indicate at what confidence level the hot/cold spot is statistically significant. Lastly, the 'Feature Overlap' column indicates if the hot/cold spot overlaps with an archaeological feature in the pithouse.

As will be seen in the spatial analysis section, many of the locations where there is a hot spot also aligns with a high density on the spline maps. These optimized hot spot analyses are good indicators of where a high density might appear on a Spline map. However, the lack of a

Table 7a: Table displays the results from the optimized hot spot analysis performed on the IIa faunal materials.

Category	Subcategory	Block	Area	Central	Hot Spot Significance	Cold Spot Significance	Feature Overlap
All	Fauna	C	NE	N	99%		Hearth
	Fish	C	NE	N	99%		Hearth
	Mammal (1)	C	NE		99%		Hearth
	Mammal (2)	B		N	95%		
Element Utility	High	C	NE		99%		Hearth
	Low	C	NW	N	99%		
	Moderate	C		N	99%		Hearth
Size Grade	> 40mm	C	NE	N	99%		Hearth
	0-9mm	C	NE	N	99%		Hearth
	10-19mm	B	NW	N	99%		
	20-29mm (1)	C	NE		99%		Hearth
	20-29mm (2)	B		E	95%		Hearth
	30-39mm	C	NE		99%		Hearth
Size Class	Mammal SC 1	C	NW		99%		
	Mammal SC 2	A	SW		99%		Hearth
	Fish SC 2	A	NW	W	99%		
	Fish SC 3	C	NE		99%		Hearth
	Fish SC 4	C	NW	N	95%		
	Mammal SC 3	C	NE	N	99%		Hearth
	Mammal SC 4	C	NW	N	95%		
	Mammal SC 5	B		S	99%		
Species	Beaver	C	NE	N	99%		Hearth
	Canine	C	NE	N	99%		Hearth
	Deer	C	NW		99%		
	King Salmon	C	NW	N	95%		
	Sheep (1)	C	NW		95%		
	Sheep (2)	A	SW		95%		Hearth
	Sockeye Salmon	C	NE		99%		Hearth
Species Utility	High	C	NE		99%		Hearth
	Low (1)	C	NW		90%		
	Low (2)	A	SW		95%		Hearth
	Moderate	C		N	99%		Hearth

Table 7b: Table displays the results from the optimized hot spot analysis performed on the IIb faunal materials.

Category	Subcategory	Block	Area	Central	Hot Spot Significance	Cold Spot Significance	Feature Overlap
All	Avian	D	NE		99%		
	Fauna	D		E	99%		
	Fish (1)	C		N	95%		
	Fish (2)	D		C	99%		
	Burned (1)	D	NW		99%		
	Burned (2)	B		W		90%	
	Burned (3)	A	NE			90%	
Element Utility	Low (1)	D	All		99%		
	Low (2)	A	SE			90%	Hearth
	Low (3)	B	NE			95%	Hearth
	Low (4)	C		W		90%	
	Moderate (1)	C		N	95%		
	Moderate (2)	D		NC	99%		
Size Grade	0-9mm	D		E	99%		
	10-19mm	D		E	99%		
	20-29mm	D		N	99%		
	30-39mm	D		E	99%		
Size Class	Avian SC 1 (1)	D		N	95%		
	Avian SC 1 (2)	A	NW		99%		
	Avian SC 2	D	NE		99%		
	Avian SC 3	D		C	99%		
	Mammal SC 1	D	NE		99%		
	Mammal SC 2 (1)	A	NW	W	95%		
	Mammal SC 2 (2)	D	NE		95%		Cache pit
	Mammal SC 3	C		N	99%		Hearth
	Mammal SC 4	D		W	90%		
	Fish SC 1	D		S	99%		
	Fish SC 2	A	NW		95%		Cache pit
	Fish SC 3 (1)	C		N	95%		
	Fish SC 3 (2)	D		N	99%		
Species	Beaver	D		E	99%		
	Canine	D	NE	C	99%		
	Deer (1)	C		N	99%		
	Deer (2)	D	NE		99%		
	King Salmon	D	SE		99%		
	Ptarmigan	D	NE		99%		
	Rodent (1)	C		N	95%		Hearth
	Rodent (2)	D		N	95%		

	Sockeye Salmon (1)	C		N	95%	
	Sockeye Salmon (2)	D	NE	C	99%	
	Trout	D	SE		99%	
Species Utility	Low (2)	D		NC	95%	Hearth
	Moderate	D		S, E	99%	
	High	D	NE	C	99%	
	Low (1)	A	SE		95%	

positive hot spot does not automatically negate the possibility for a high density of material to be visually present. The hot spots in this analysis only include those that are 90% confidence or higher. It is possible that the spline map high densities that do not align with a hot spot here, align with a lower confidence hot spot. Another possibility is that there was not enough specimens present in the category for a high density to be formed even though a hot spot was. Additionally, a hot spot that lacks a corresponding spline map high density may align with an area where there is a lot of archaeological material, but that material is visually diffuse and therefore does not show up as a high density.

LITHIC OVERVIEW

Overall, the IIa lithic assemblage is made up of 11.31% tools and 88.69% debitage while the IIb lithic assemblage is made up of 8.31% tools and 91.69% debitage (Figure 15). Two percent of the IIa lithic assemblage is thermally altered and 2.77% of the IIb lithic assemblage is thermally altered.

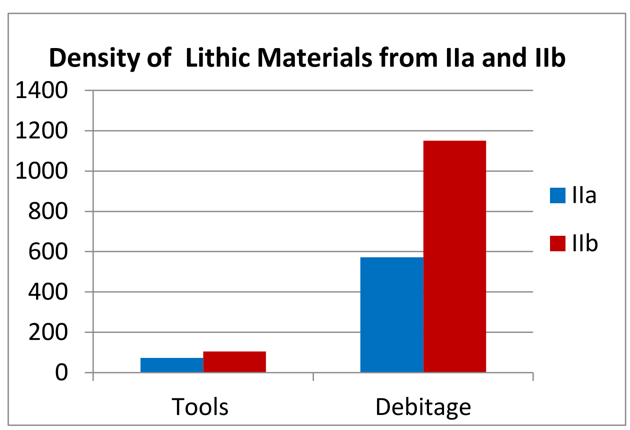


Fig. 15: Bar graph of the density of lithic tools and debitage on the IIa and IIb occupational floors.

A further break down of the lithic assemblage into the lithic raw materials represented reveals that dacite makes up the majority of both the IIa (77.02%) and IIb (69.80%) lithic assemblage (Figure 16). Slate is a far second, representing 9.29% of the IIa lithic assemblage and 15.59% of the IIb lithic assemblage (Figure 16). Other lithic raw materials present in both the IIa and IIb lithic assemblages includes basalt, chalcedony, chert, coarse basalt, coarse dacite, igneous intrusive, jasper, metamorphosed material, obsidian, ocher, pisolite, quartize and silicified shale (Figure 17). The IIa specific lithic raw material types includes mudstone, nephrite and schist while the IIb specific lithic raw material types includes conglomerates, gneiss, granite/diorite, greenstone, ortho-Quartzite, quartz, rhyolite, sandstone, shale and soapstone (Figure 17).

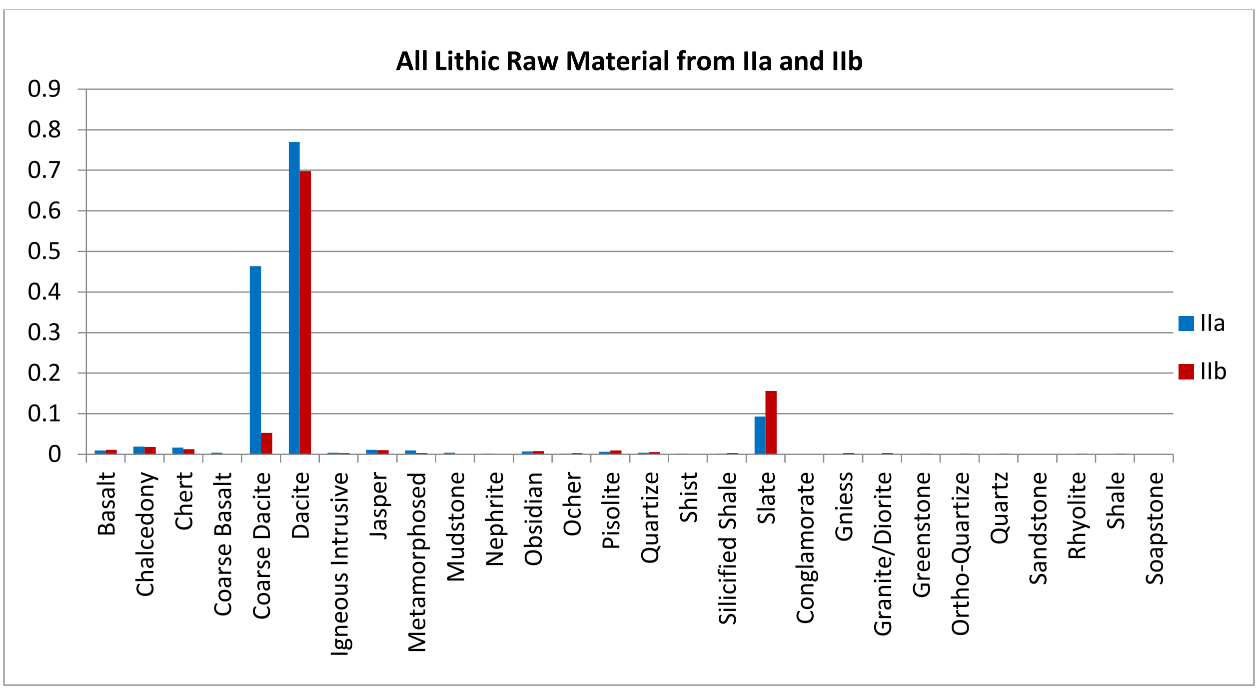


Fig. 16: Bar graph displays the proportion of the IIa and IIb lithic assemblages that are identified to a raw material type.

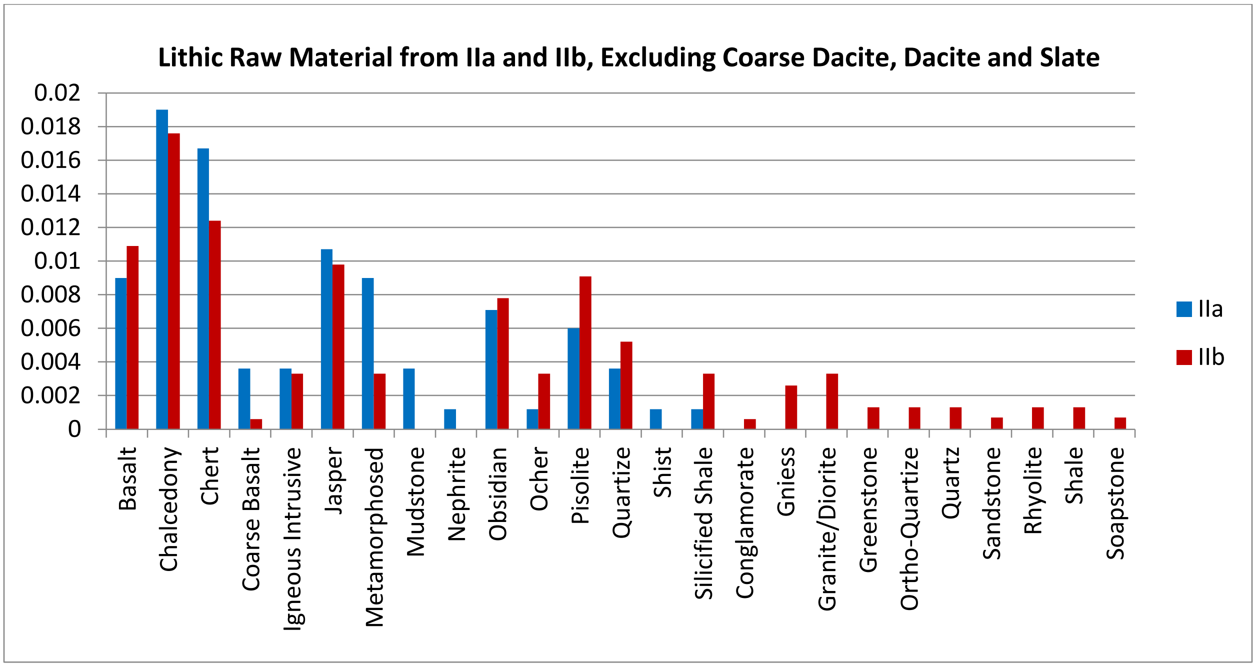


Fig. 17: Bar graph displays the proportions of the IIa and IIb lithic assemblage that are identified to a lithic raw material, minus the categories of coarse dacite, dacite and slate. This graph is intended to better show the distribution of the other lithic raw materials in these assemblages, which were masked before by the extreme quantities present in the afore mentioned three categories.

The portion of the lithic assemblage that was identified to the category 'tool' was also broken down into tools types by function. The tool types that were present in both the IIa and IIb lithic tool assemblages are abraders, cores, drilling implements, flake tools, groundstone tools, hide processing tools, informal knives, bifaces/formal knives, ornaments, unspecific slate tools, projectile points, sewing implements and bone/wood working tools (Figure 19). To quickly clarify, 'abrader' refers to lithic tools that worked similarly to sandpaper – to smooth surfaces or edges, 'core' refers to a piece of lithic raw material that had been used to make flakes and potentially other lithic tools, 'drilling implement' refers to lithic tools that were used to drill holes, 'flake tool' refers to lithic flakes that were visibly used as tools, 'groundstone' refers to lithic tools that were used to grind and abrade materials, 'hide processing tool' refers to tools that were used to prepare hides, 'informal knives' refers to tools that were not formally shaped as knives, but present with evidence of being used as a knife, 'formal knife' refers to tools that were both shaped like a knife and used as a knife, 'biface' refers to lithic tools that were flaked on both faces and generally have at least one sharp edge, 'ornaments' refers to unique lithic items such as beads and bowls, 'unspecific (or 'other') slate tool' refer to slate tools that do not present with a specific use-wear, 'projectile point' refers to shaped lithic points that were most often attached to a shaft to form a weapon, 'sewing implement' refers to lithic tools used to shape hides, and lastly, 'bone/wood working tool' refers to those tools that were used to shape hard materials other than rock. Pounding implements, such as mauls, are specific to the IIa tool type assemblage and flint knapping implements, such as hammer stones, are specific to the IIb tool type assemblage (Figure 18). In both IIa and IIb no single tool type dominates the assemblage. However the tool type that represents the greatest percent of both the IIa and IIb assemblages is the core.

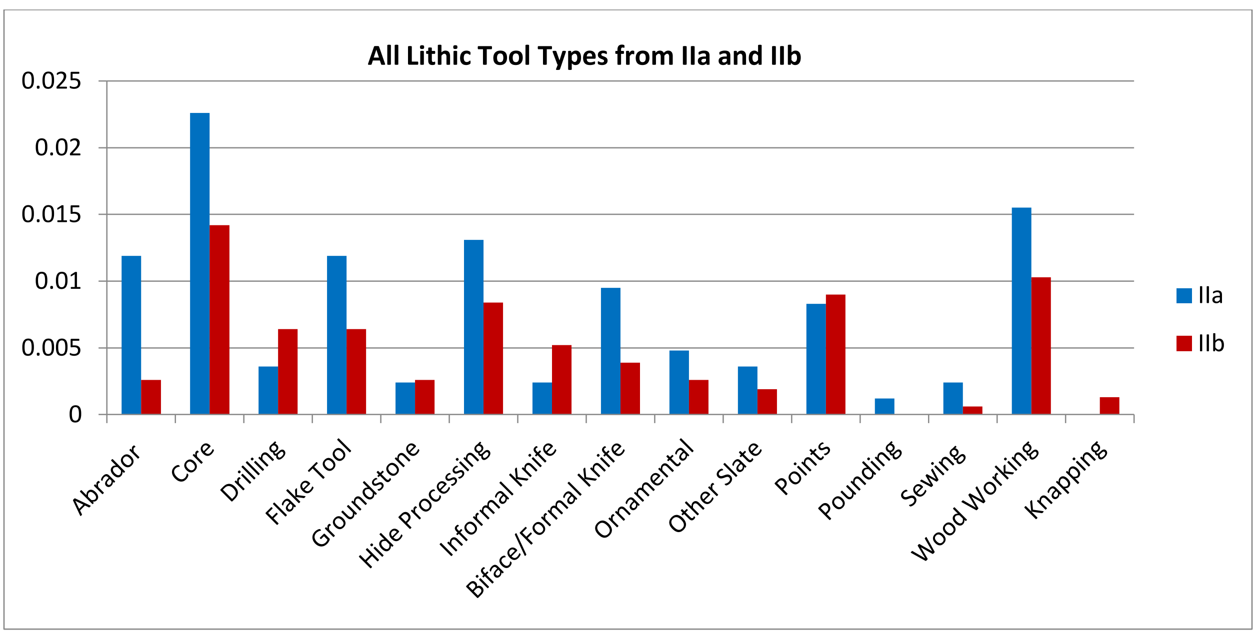


Fig. 18: Bar graph displays the proportion of the IIa and IIb lithic assemblages that are identified as a tool type.

Additionally, the tools in the lithic assemblages were analyzed for completeness. In some cases fragmented tools are potentially still usable, but are not as serviceable as complete, unbroken tools. The IIa lithic tool assemblages is made up of 90.53% complete tools and 7.37% fragmented tools while the IIb lithic tool assemblage is made up of 88.37% complete tools and 10.85% fragmented tools (Figure 19).

The physical size or 'size grade' of the specimens in the lithic assemblages were also analyzed in this study. 77.5 percent of the IIa lithic assemblage was made up of specimens smaller that 20mm while 87.19% of the IIb lithic assemblage was made up of specimens smaller that 20mm (Figure 20).

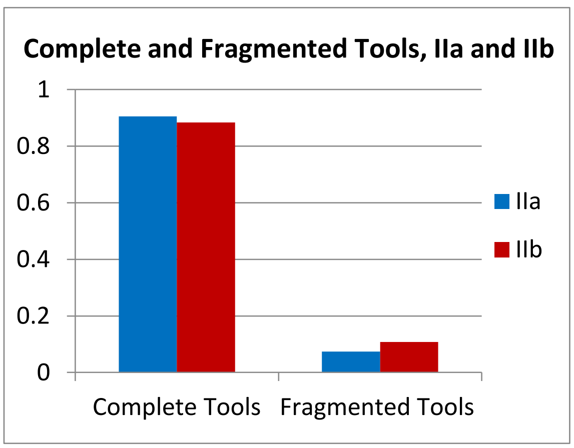


Fig. 19: Bar graph displays the proportion of the IIa and IIb lithic tool assemblage that is comprised of complete and fragmented lithic tools.

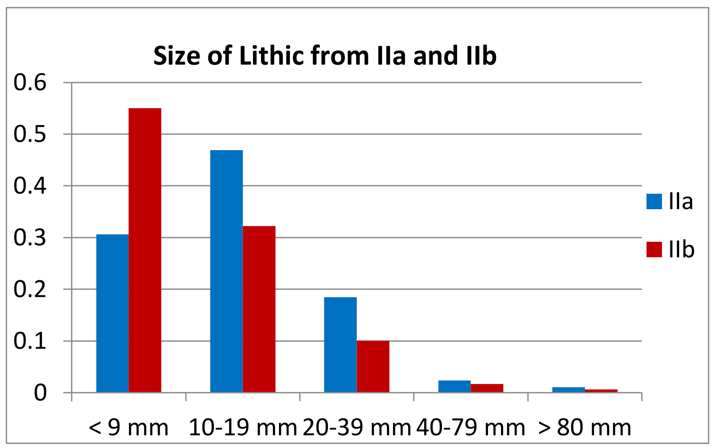


Fig. 20: Bar graph displays the proportion of the IIa and IIb lithic assemblages that are identified to a size grade category.

LITHIC RICHNESS and EVENNESS

The following tables are the result of the richness and evenness calculations performed on the IIa and IIb lithic assemblages. The 'Category' column indicates whether the calculations were done on the lithic material type assemblage or the lithic tool type assemblage. The 'Block' column indicates the excavation block of the data used in the calculations with the exception of the ‘All’ category, which indicates that the calculation was performed on all of the lithic data regardless of block. The ‘Richness’ column indicates how many material types or tool types are present in the assemblages analyzed while the ‘Evenness’ column contains the results of the evenness calculations; the closer to zero the resulting evenness is, the more the assemblage is dominated by one or a few lithic materials/tool types.

As indicated below, the IIa lithic assemblage in Block B contains the greatest lithic material richness and evenness (Table 8a). Additionally, this block in IIa has the greatest lithic tool type evenness while Block A has the greatest lithic tool type richness (Table 8a). Alternatively, the IIb lithic assemblage in Block D contains the greatest lithic material richness while Block A contains the greatest lithic material evenness (Table 8b). The IIb the lithic

Table 8a: Lithic richness and evenness calculation results from the IIa occupational floor. Numbers highlighted in orange indicate the highest scores among the excavation blocks. Alternatively, numbers highlighted in blue indicate the lowest scores among the excavation blocks.

Stratum IIa	Block	Richness	Evenness
Lithic Material	A	12	0.3606
	B	16	0.382
	C	13	0.3735
	D	0	0
	All	18	0.3446
Lithic Tool Type	A	7	0.9693
	B	11	0.7944
	C	9	0.918
	D	0	0
	All	14	0.8027

Table 8b: Lithic richness and evenness calculation results from the IIb occupational floor. Numbers highlighted in orange indicate the highest scores among the excavation blocks. Alternatively, numbers highlighted in blue indicate the lowest scores among the excavation blocks.

Stratum IIb	Block	Richness	Evenness
Lithic Material	A	9	0.5131
	B	10	0.3533
	C	11	0.4391
	D	24	0.4006
	All	25	0.3787
Lithic Tool Type	A	10	0.4054
	B	9	0.9412
	C	9	0.9036
	D	11	0.9412
	All	14	0.9036

assemblage in Block D contains the greatest lithic tool type richness and evenness, the latter of which Block D shares with Block B (Table 8b). This uneven distribution of lithic materials suggests that there is a difference between the assemblages in these different excavation blocks and ultimately around the subsequent hearths and potentially within the different residential units or activity areas. However, further examination it needed to tell what this pattern actually means.

LITHIC OPTIMIZED HOT SPOT ANALYSIS

The following tables are the result of the GIS optimized hot spot analysis using the lithic IIa and IIb assemblage data. In this case, the ‘Category’ column indicates what type of lithic material was clustering to create the resulting hot/cold spot (ex: raw material type). The number in parentheses beside the category designations indicates if the hot spot/high density was the first cluster or second cluster (etc.) found. Additionally, the ‘Subcategory’ column indicates the more specific sub category of the lithic data (ex: jasper). The ‘Block’ column indicates the excavation block within which the resulting hot spot/high density was located. The ‘Quadrant’ column indicates which quadrant (north-east, north-west, south-east, south-west) of the block within which the resulting hot spot/high density was located. Additionally, the ‘Central’ column indicates if the hot spot/high density was located in the center of the block or between the quadrants (i.e. west [symbolized as ‘w’] indicates the area between the north-west and south-west quadrants). The ‘Hot Spot Significance’ and ‘Cold Spot Significance’ columns indicate at what confidence level the hot/cold spot is statistically significant. Lastly, the ‘Feature Overlap’ column indicates if the hot/cold spot overlaps with an archaeological feature in the pithouse.

Table 9a: Table displays the results from the optimized hot spot analysis performed on the IIa lithic materials.

Category	Subcategory	Block	Area	Central	Hot Spot Significance	Cold Spot Significance	Feature Overlap
All	Debitage	C	SW		95%		
	Lithic	C	SW		90%		
	Lithic Tools (1)	A	SW		90%		Hearth
	Lithic Tools (2)	A	NE			90%	
	Lithic Tools (3)	B		SC	90%		Hearth
	Lithic Tools (4)	C		E		90%	Hearth
	Thermal Altered	C	SW		90%		
Material	Chalcedony	C	SW		99%		
	Chert	A	SW		99%		Hearth
	Coarse Basalt	B	SE		99%		
	Jasper	B	SW		99%		
	Metamorphosed	B	NE		95%		Hearth
	Mudstone	B	NW		99%		
	Nephrite	B	SW		99%		
	Obsidian	B		S	99%		Hearth
	Ocher	C	NW		99%		
	Other Slate	A	NW		99%		
	Schist	B		W, C	99%		Hearth
	Silicified Shale	A		C	99%		
Size Grade	20-39mm (1)	A	SW		95%		
	20-39mm (2)	B		N	95%		
	10-19mm	C		W	95%		
	> 80mm	B	NE		95%		Hearth
	> 9mm	C	SW		99%		
Tool type	Abrading (1)	A	NE			95%	
	Abrading (2)	B	All		99%		Hearth
	Abrading (3)	C		S		95%	
	Drilling	B	SW		99%		
	Formal Knives/Bifaces	A		W	99%		Hearth
	Groundstone (1)	C	SW		95%		
	Groundstone (2)	C		N	90%		
	Hide Processing	A			99%		Hearth
	Informal Knives (1)	B	SE		99%		Hearth
	Informal Knives (2)	B	NW		90%		
	Pounding	C	NE		99%		
	Flake tools	B	NE		99%		Hearth
	Faunal Tools	B		E	99%		Hearth
	Sewing	B	NE		99%		

Tools	Complete Tools (1)	A	SW		90%		Hearth
	Complete Tools (2)	A	NE			90%	
	Complete Tools (3)	B		E	90%		Hearth
	Complete Tools (4)	C		E,C		90%	Hearth

Table 9b: Table displays the results from the optimized hot spot analysis performed on the IIb lithic materials.

Category	Subcategory	Block	Area	Central	Hot Spot	Cold Spot	Feature Overlap
All	Debitage (1)	A	NE			99%	Hearth
	Debitage (2)	B	W			99%	Hearth
	Debitage (3)	C		S		99%	
	Debitage (4)	D	All		99%		
	Lithic (1)	A	NE			99%	Hearth
	Lithic (2)	B	W			99%	Hearth
	Lithic (3)	C		S		99%	
	Lithic (4)	D	All		99%		
	Thermally Altered (1)	C	NE		95%		Hearth
	Thermal Altered (2)	D	NE		99%		
	Tools (1)	A	NE			95%	
	Tools (2)	B	NW			90%	
	Tools (3)	C	SW			95%	
	Tools (4)	D	All		99%		
Material	Basalt	D	All		99%		
	Chalcedony	D		E	99%		
	Chert	B	NW		99%		
	Coarse Basalt	B	SW		99%		Hearth
	Coarse Dacite	D	All		99%		
	Conglomerate	C		C	99%		
	Dacite (1)	A	NE			95%	Hearth
	Dacite (2)	B		W		90%	
	Dacite (3)	C	SE			99%	
	Dacite (4)	D	All		99%		
	Gneiss	D	NE		99%		
	Granite/Diorite	D	NE		99%		
	Greenstone (1)	C	NW		95%		
	Greenstone (2)	D		N,C	95%		
	Groundstone (1)	A		N		95%	
	Groundstone (2)	B		E	99%		Hearth
	Groundstone (3)	C	SW			95%	
	Jasper	C		N	90%		
	Metamorphosed	D		E	99%		

	Obsidian	D	NE		99%		
	Ocher (1)	D		C	99%		
	Ocher (2)	C	SW		90%		
	Ortho Quartzite	D		E	99%		
	Pisolite	C	NE	N	99%		Hearth
	Quartz (1)	C		S	90%		
	Quartz (2)	D		C	90%		
	Quartzite (1)	A	SW		95%		
	Quartzite (2)	D	NE		99%		
	Rhyolite	D	NE		99%		
	Sandstone	D		N	99%		
	Shale (1)	B	NE		95%		
	Shale (2)	D		S	95%		
	Silicified Slate	D		E	95%		
	Slate	D	NE	S	99%		
	Soapstone (1)	D	SW		95%		
	Soapstone (2)	D		C	99%		
Size Grade	40-79mm	D	NE		99%		
	20-39mm	D	NE		99%		
	10-19mm	D		E	99%		
	> 80mm (1)	A	NE		95%		
	> 80mm (2)	D	NE		99%		
	< 9mm (1)	A	NE			95%	Hearth
	< 9 mm (2)	B		W		95%	Hearth
	< 9 mm (3)	C	SE			95%	
	< 9 mm (4)	D	All		99%		
Tool type	Cores	D	NE		99%		
	Drilling	D	NE		95%		
	Formal Knives/ Bifaces	D	NE		99%		
	Formal Tools (1)	C		E	95%		
	Formal Tools (2)	D	All		99%		
	Fragmented Tools	D		E	99%		
	Hide Processing	D	SE		99%		
	Informal Knives	D	NE		99%		
	Ornamental	D		E	99%		
	Other Slate	A	NW		99%		Hearth
	Points	D	SE		99%		
	Sewing	B	SW		99%		Hearth
	Faunal Tools	D	SE		99%		
	Flake Tools	D	NE		95%		
	Wood Processing	D	NE		99%		

Tools	Complete Tools (1)	A	SW			90%
	Complete Tools (2)	A	NE			95%
	Complete Tools (3)	C	SE	E		95%
	Complete Tools (4)	D	All		99%	
	Fragmentary Tools	D		e	99%	

As will be seen in the spatial analysis section, many of the locations where there is a hot spot also aligns with a high density on the spline maps. These optimized hot spot analyses are good indicators of where a high density might appear on a Spline map. However, the lack of a positive hot spot does not automatically negate the possibility for a high density of material to be visually present. The hot spots in this analysis only include those that are 90% confidence or higher. It is possible that the spline map high densities that do not align with a hot spot here, align with a lower confidence hot spot. Another possibility is that there was not enough specimens present in the category for a high density to be formed even though a hot spot was. Additionally, a hot spot that lacks a corresponding spline map high density may align with an area where there is a lot of archaeological material, but that material is visually diffuse and therefore does not show up as a high density.

SPATIAL RESULTS and DISCUSSION

Different types of archaeological data are used here to explore the spatial patterning of Housepit 54 during the IIa and IIb time periods (Table 10). The overall spatial distribution of these materials is analyzed as well as the positioning of high density clusters.

Faunal Classes and Species

The proportion of fish and mammal specimens within the faunal assemblages is drastically different within Housepit 54 between the IIa and IIb time periods. In fact these proportions almost flip completely (Figure 21). Overall, there is more fish and fewer mammals

Table 10: Table displays the types of archaeological materials that can be used to explore different types of socioeconomic patterns spatially.

Data	**Spatial Patterns**
Faunal Species	Activity Areas Residential Units
Faunal Size Classes	Activity Areas Residential Units
Faunal Element Utility	Uneven Access to Resources
Faunal Species Utility	Uneven Access to Resources
Faunal Size Grades	Cleaning Activities Dump Zones Storage Zones Activity Areas
Burned Fauna	Cleaning Activities Dump Zones Storage Zones Activity Areas
Lithic Debitage	Activity Areas
Lithic Raw Material Types	Uneven Access Activity Areas
Lithic Tool Types	Residential Units Activity Areas Uneven Access to Resources
Lithic Size Grades	Cleaning Activities Dump Zones Storage Zones Activity Areas
Thermally Altered Lithics	Cleaning Activities Dump Zones Activity Areas
Fragmented Lithic Tools	Dump Zones Storage Zones

present in the IIb faunal assemblage and more mammals and fewer fish present in the IIa faunal assemblage (Figure 21). This drastic change indicates that for some reason fish resources became limited. This could have been due to a bad salmon run or more likely several bad salmon runs, which could have ultimately influenced the abandonment of the pithouse and potentially the Bridge River village. Ethnographically, salmon were an important resource for the people in the Lilloet area for it was a winter staple (Mercer 1892) as well as a valued trade item (Teit 1906). Once caught, salmon were wind-dried for preservation (Teit 1906) and it was this dried salmon as well as salmon oil which was commonly used as trade items (Teit 1906). Additionally, Teit's (1906) records indicate that famines were commonly attributed to poor salmon runs in the past, underscoring the importance of this resource. The type of resource availability shift that can be seen between the IIb and IIa times periods in Housepit 54 could potentially create an environment ripe for social and economic change, making these two occupational floors ideal areas of study to explore the questions asked in this thesis. To better understand the socioeconomic organization of Housepit 54, the spatial distribution of faunal material clusters was explored.

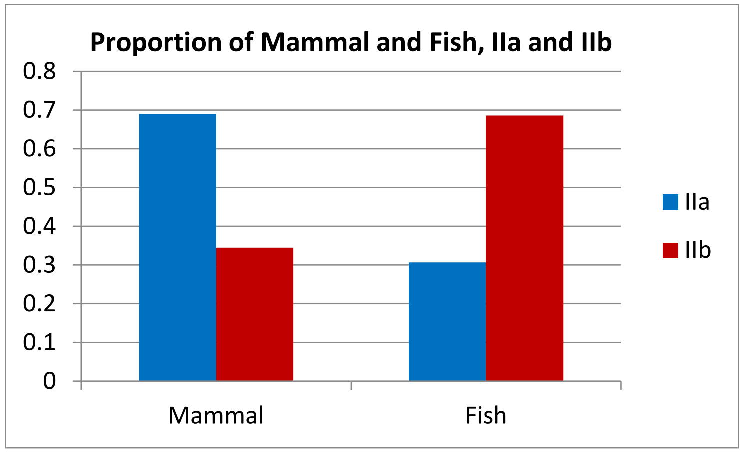


Fig. 21: Bar graph displays the proportion of the IIa and IIb faunal assemblages that are made up of mammal and fish specimens.

In the IIa faunal assemblage, fish specimens cluster in two high density areas, both of which are located in Block C (Figure A.23a in Appendix A). The first of these high density clusters overlaps with the northeast portion of the large hearth in Block C (Figure A.23a). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). The second of these high density clusters can be found in the northwest quadrant of Block C along the northern excavation wall, near the large hearth, but not directly adjacent to it (Figure A.23a). This high density cluster is also supported by a 99% confidence hot spot (Table 7a). Additionally, there is a diffuse scattering of fish materials near the hearths in Block A and Block B (Figure A.23a).

The mammal specimens from the IIa faunal assemblage also cluster around the large hearth in Block C, albeit slightly to the right of the fish cluster in the same area (Figure A.24a in Appendix A). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). A second cluster of mammal specimens can be found in the northern section of Block B, near to, but not directly adjacent to a hearth (Figure A.24a). This high density cluster is supported by a 95% confidence hot spot (Table 7a). Additionally, there is a diffuse scattering of mammal materials near the hearths in Block A, Block B and Block C (Figure A.24a).

Alternatively, in the IIb faunal assemblage, fish specimens are clustered in two high densities (Figure A.23b in Appendix A). The first of these high density clusters is located in the northwest quadrant of Block C along the northern excavation wall, near the hearth, but not directly adjacent to it (Figure A.23b). This high density cluster is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second of these high density clusters can be found in the central portion of the northern quadrant of Block D (Figure A.23b). This high density cluster is supported by a 99% confidence hot spot (Table 7b). Additionally, there is a diffuse scattering of fish specimens throughout the eastern side of Block D (Figure A.23b).

Meanwhile, the mammal specimens from the IIb faunal assemblage are in a high density cluster in a single area, located along the central portion of the eastern excavation wall in Block D (Figure A.24b in Appendix A).

Lastly, the avian specimens from the IIb faunal assemblage are clustered in two high densities, both in Block D (Figure A.26 in Appendix A). The first of these high density clusters is located in the northeast quadrant of Block D along the eastern excavation wall (Figure A.26). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second of these high density clusters can be found in the center of Block D (Figure A.26). This high density cluster is supported by a 99% confidence hot spot (Table 7b).

These results display the spatial clustering of faunal materials across the floor of the housepit, but only at the grossest level. To better understand the patterns within the Housepit 54, a more fine grain analysis must be done and so the faunal species are analyzed.

In the IIa faunal assemblage, beaver specimens are cluster in high density in a single area: one that overlaps with the northern portion of the large hearth in Block C (Figure A.27a in Appendix A). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). However, it is important to note that this high density was created by a total of 3 specimens. Because of this, it is hard to say if this high density can in reality be called a ‘cluster.’ Regardless, the distribution of this material is still relevant to this study.

The IIa canid specimens also clustered in a high density in a single area that overlaps with the northern portion of the large hearth in Block C and therefore with the beaver specimens (Figure A.28a in Appendix A). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). However, it is important to note that this high density was created by a total of 5 specimens Because of this, it is hard to say if this high density can in reality be called a 'cluster.' Regardless, the distribution of this material is still relevant to this study.

Similarly, the IIa sockeye salmon specimens also cluster in a high density in a single area that is adjacent to the northeast portion of the large hearth in Block C, directly next to the cluster of beaver and canid specimens (Figure A.29a in Appendix A). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a).

The pattern shifts slightly when the IIa deer specimens are considered, which cluster in the northwestern quadrant of Block C, near the large hearth, but not directly adjacent to it (Figure A.30a in Appendix A). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). There also exists a low density cluster in the southwest quadrant of Block A, near, but again not directly adjacent to a hearth (Figure A.30a). Additionally, there is a diffuse scattering of deer specimens throughout western and northern sides of Block C and in the northeast quadrant of Block B (Figure A.30a).

Finally, the IIa king salmon specimens cluster into two high densities, both of which are near, but nor directly adjacent to the large Block C hearth (Figure A.31 in Appendix A). The first of these clusters is in the northwestern quadrant of Block C along the northern excavation wall, just northeast of the deer cluster and just west of the beaver/canid cluster (Figure A.31). This high density cluster is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). The second king salmon high density cluster can be found directly south of the Block C hearth (Figure A.31).

The distribution of the different species clusters around the large hearth in Block C suggests that during the IIa time period this hearth might have been used as a shared work space with different types of animals being processed in different areas around it.

In the IIb faunal assemblage, beaver specimens are clustered in three areas (Figure A.27b in Appendix A). The first of these high density clusters is located in Block D (Figure A.27b). There are three disconnected clustered within Block D, but these clusters are not secluded to a single quadrant within the block (Figure A.27b). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second lower density cluster can be found in the central portion of Block C along the northern excavation wall (Figure A.27b). This high density cluster is near the large Block C hearth, but is not directly adjacent to it (Figure A.27b). Lastly, there are two diffuse clusters in the northwest quadrant of Block A, near the hearth and the cache pit (Figure A.27b).

The IIb canid specimens also cluster in three areas within the housepit (Figure A.28b in Appendix A). The first of these high density clusters is located in the northwest quadrant of Block D (Figure A.28b). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second, lower density cluster can be found overlapping the northern portion of the large hearth in Block C (Figure A.28b). Lastly, the third lower density cluster is located between the hearth and cachepot in Block A (Figure A.28b). This last lower density cluster overlaps with the cluster of beaver specimens located in the same area.

The sockeye salmon specimens from the IIb faunal assemblage are located in two areas (Figure A.29b in Appendix A). The highest density cluster is located in the central portion of Block D along the eastern excavation wall (Figure A.29b). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). Additionally, there is a diffuse scattering of sockeye salmon specimens throughout the eastern portion of Block D (Figure A.29b). The second high density cluster is located in the northern portion of Block C along the northern excavation wall, near, but not directly adjacent to the hearth (Figure A.29b). This high density cluster overlaps with the beaver specimens in the same area. Additionally, this high density cluster is supported by a 95% confidence hot spot (Table 7b).

Interestingly, deer is the only species that is represented in all the blocks on the IIb floor (Figure A.30b in Appendix A). There are two high density clusters of deer and two low/diffuse density clusters of deer (Figure A.30b). The first of the high density clusters is located in the central portion of Block C along the north excavation wall, near to the hearth, but not directly adjacent to it (Figure A.30b). This high density area overlaps with the beaver and sockeye salmon clusters described above. Additionally, this high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second of these high density clusters is located in the northeast quadrant of Block D (Figure A.30b). This high density area visually looks diffuse but statistically it is supported by a 95% confidence hot spot (Table 7b). This suggests that even though the cluster is spread out over a large area, it still contains a high density of materials. Alternatively, the low density cluster in the central portion of Block B along the southern wall visually looks like a high density cluster, but statistically it is not (Figure A.30b). This high density cluster is directly south of the Block C hearth. The last lower density cluster of deer can be found in the central portion of Block A along the northern excavation wall (Figure A.30b). This cluster is directly north of the Block A hearth.

The distribution of different species clustered within the area of Block D, the only block that lacks a hearth, suggests that this might have been a shared animal processing or dump site within the housepit. Alternatively, the distribution of deer specimens at the hearths in each block suggests that these hearths might represent separate residential units. However, there are no fish, canid or beaver specimens at the hearth in Block B. Potentially this could mean that there were only two residential units within the housepit since both the assemblage of the hearth in Block A and the assemblage of the hearth in Block C present with a portion of all the species discussed above. The hearth in Block B could have been an ancillary feature or used for a different purpose. However, it is hard to say with any certainty if this is true. To get a better understanding of these patterns, the distributions of faunal size class high density clusters are analyzed.

(The species that were not mentioned in this section were deemed to belong to assemblages that were too small to cluster into meaningful densities. Often this was because the specimens aggregated into totals equal to 2 or fewer).

Faunal Size Class

Unlike species, faunal size classes are generally easier to recognize archaeologically. Because of this, a larger portion of the IIa and IIb faunal assemblages was identified to a size class compared to the portion of the IIa and IIb faunal assemblages that was identified to a species. While size class categories are not as fine grained as species classifications, they represent a larger portion of the overall faunal assemblage and can therefore sometimes better represent larger patterns within the data.

In the IIa assemblage the faunal specimens that are of the mammalian size class 3 are clustered in a high density in a single area (Figure A.33a in Appendix A). This high density cluster overlaps with the northern portion of the large hearth in Block C (Figure A.33a). Additionally, this high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a).

The IIa faunal specimens that are of the mammalian size class 4 cluster in a similar pattern as above. However, there are also several lower density clusters present (Figure A.34a in Appendix A). Visually, the high density cluster is located over the northeastern half of the large Block C hearth, which is in the northeast quadrant of the block (Figure A.34a). Statistically, the greatest clustering is in the northwest quadrant of Block C. This high density cluster is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). Additionally, there is another lower, diffuse density of material in the southwest quadrant of Block C (Figure A.34a). There is also a diffuse scattering of mammalian size class 4 materials in Blocks A and C (Figure A.34a). In Block A the low density cluster is located mostly in the western half of the block, some of which overlaps with the hearth (Figure A.34a). Alternatively, there are two low density clusters in Block B: one in the north-central portion of the block and one in the central portion of the block along the eastern excavation wall (Figure A.34a). This second high density cluster overlaps with two of the hearths in the block.

In the IIa assemblage the faunal specimens that are of the fish size class 2 clustered in a high density in a single area (Figure A.35a in Appendix A). This high density cluster is found in the west-central portion of Block A, near to the hearth, but not directly adjacent to it (Figure A.35a). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). Additionally, there is a diffuse scattering of size class 2 fish specimens near the hearths in Block B and Block C (Figure A.35a).

A single high density cluster of fish size class 3 specimens can be found on the IIa floor (Figure A.36a in Appendix A). This high density cluster is located in the northeast quadrant of Block C, directly adjacent to the large hearth (Figure A.36a). This area is directly east of the size class 3 and 4 mammalian high density clusters. This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). Additionally, there are some low density clusters of size class 3 fish in the southwest quadrant of Block C, the northwest quadrant of Block A and the north-central portion of Block B (Figure A.36a).

In the IIa assemblage, faunal specimens that are of the fish size class 4 are clustered in two high densities, both in Block C (Figure A.37a in Appendix A). The first of these high density clusters is in the northwest quadrant of Block C along the northern excavation wall (Figure

A.37a). This cluster is directly west of the size class 3 and 4 mammalian high density clusters and is near, but not directly adjacent to the large hearth in that block. Additionally, this high density cluster is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). The second of the fish size class 4 high density clusters is located directly south of the large hearth in Block C (Figure A.37a). This high density cluster is also near, but not directly adjacent to the hearth in that block.

This spatial distribution of the different faunal size classes clustering around the large hearth in Block C again suggests that during the IIa time period this hearth may have been used as a shared work space with different types of animals being processed in different areas around it.

In the IIb assemblage the faunal specimens that are of the mammalian size class 2 are clustered in two areas of the housepit (Figure A.32 in Appendix A). The first high density cluster is located in the northeast quadrant of Block D (Figure A.32). This high density cluster is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second of these high density clusters can be found in the central area of Block A overlapping the southern portion of the hearth (Figure A.32). This high density cluster is also supported by a 95% confidence hot spot (Table 7b).

There is only one high density cluster from the IIb mammalian size class 3 assemblage, but there are also some lower, diffuse clusters around the housepit as well (Figure A.33b in Appendix A). The high density cluster is located in the northwest quadrant of Block C, near the eastern edge of the hearth, but not directly adjacent to it (Figure A.33b). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The other diffuse scatterings of size class 3 mammal specimens are located in the northwest quadrant of Block D (adjacent to the hearth), the northern portion of Block C and the northeast quadrant of Block D (Figure A.33b).

A single high density cluster of IIb mammalian size class 4 specimens is present within the housepit (Figure A.34b in Appendix A). This high density cluster can be found in the eastern portion Block D along the eastern excavation wall (Figure A.34b). This high density cluster is supported by a 90% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b).

In the IIb assemblage the faunal specimens that are fish size class 2 are clustered in two areas of the housepit (Figure A.35b in Appendix A). The first of these high density clusters is located in the southwest quadrant of Block A, adjacent to the cache pit (Figure A.35b). This high density cluster is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second high density cluster can be found in the southeast quadrant of Block D along the eastern excavation wall (Figure A.35b). Other diffuse clusters can be found near the hearths in Blocks A and C as well as in the northern and southern portions of Block D (Figure A.35b).

There are two high density clusters of IIb fish size class 3 specimens present within the housepit (Figure A.36b in Appendix A). The first of these high density clusters is located in the central portion of Block C along the northern excavation wall (Figure A.36b). This high density is close to, but not directly adjacent to the hearth in Block C. Additionally, it is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second high density cluster can be found in the north-central portion of Block D

(Figure A.36b). This high density cluster is supported by a 99% confidence hot spot (Table 7b). Additionally, there are some diffuse clusters of materials in the northeast quadrant and along the southern section of the eastern excavation wall in Block D (Figure A.36b).

Finally, there are also two high density clusters of IIb fish size class 4 specimens present within the housepit (Figure A.37b in Appendix A). The first of these high density clusters is located in the northeast quadrant of Block C along the northern excavation wall (Figure A.37b). This high density is near, but not directly adjacent to the hearth in Block C. The second of these high density clusters is located in the southeastern quadrant of Block D, along the southern excavation wall (Figure A.37b). There is also a low density cluster in the northeast quadrant of Block D (Figure A.37b).

The distribution of different size class material clustered within the area of Block D, the only block that lacks a hearth, again suggests that this might have been a shared animal processing area and/or dump site within the housepit. Additionally, there are no faunal materials around the hearth in Block B. Again, this could potentially mean that there were only two residential groups within the housepit since both the assemblage of the hearth in Block A and the assemblage of the hearth in Block C present with some of the mammalian and fish size classes. However, unlike the species assemblages, not all of the faunal size classes are located around each of these hearths. Considering the mammalian size class specimens, the hearth in Block A has very few specimens of the size class 3. Alternatively, the hearth in Block C has a high concentration of mammal specimens of size class 3. Neither of these hearths have high density clusters of mammalian size class 4, but Block D does. This might suggest that larger mammals were initially processed in the Block D area before the materials were moved to the residential unit hearths. Considering the fish size class specimens, both the Block A and Block C hearths have size class 2 materials around them, but only the hearth in Block C has concentrations of fish size class 3 and 4. In this case, it seems that the Block C hearth is the 'richer' of the two. In the next section we will consider the faunal element utility and species utility assemblages to see if an uneven distribution of higher ranked resources can be found using the faunal data.

(The size classes that were not mentioned in this section were deemed to belong to assemblages that were too small to cluster into meaningful densities. Often this was because the specimens aggregated into totals equal to 2 or fewer).

Faunal Element and Species Utility

The concepts of faunal element utility and species utility may be used to better understand if differential access to higher ranked food resources was present within Housepit 54. The idea behind these concepts is that the higher the utility of a bone or animal, the more desirable that bone or animal becomes. Because of this, an uneven distribution of high utility fauna among residential groups may indicate differential status within the household. Faunal element utility will be discussed first for both the IIa and IIb floors followed by a discussion of the faunal species utility assemblages.

In the IIa assemblage the faunal specimens that are of low element utility are clustered to varying degrees in four areas of the housepit (Figure A.38.a in Appendix A). The highest density cluster of low element utility specimens is located in the northeast quadrant of Block C and overlaps with the northern portions of the large hearth in that block (Figure A.38.a). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). Additionally, this block contains a second high density cluster located in the northwest quadrant (Figure A.38.a). This high density cluster is also supported by a 99% confidence hot spot (Table 7a). The third, lower density cluster is in the southwest quadrant of Block A, near, but not adjacent to the hearth in that block (Figure A.38.a). Lastly, the least dense cluster is visually located in the north-central portion of Block B, near, but not adjacent to a hearth (Figure A.38.a).

The IIa faunal specimens that are of moderate element utility are clustered in Block C (Figure A.39.a in Appendix A). Two high density clusters are apparent: the first in the northeast quadrant of the block, overlapping with the northwest portion of the large hearth, and the second in the northwest quadrant of the block along the northern excavation wall (Figure A.39.a). Both of these high densities are supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a).

Finally, the IIa faunal specimens that are of high element utility are largely clustered around the northern portion of the large hearth in Block C (Figure A.40.a in Appendix A). This high density cluster is supported by a 99% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7a). Additionally, there is a lower density cluster in the northeast quadrant of Block C along the eastern excavation wall and adjacent to the large hearth (Figure A.40.a). There is also a diffuse scattering of high element utility specimens in the western portion of Block A (adjacent to that blocks hearth), the northeast quadrant of Block B and the northeastern and southeastern quadrants of Block C (Figure A.40.a).

Since the large hearth in Block C has been indicated as a shared animal processing area, it is expected that specimens of all utility levels be present around it, which is what is seen in the data. Interestingly, the diffuse patterning of high element utility specimens in all the blocks also suggests that the residential units and perhaps even individuals had equal access to the higher ranked food resources during the IIa time period.

The IIb faunal specimens that are of low element utility are clustered in Block D (Figure A.38b in Appendix A). Most of the block contains some diffuse scattering of these materials with a high density cluster located in the center of the block and in the southeast quadrant of the block along the eastern excavation wall (Figure A.38b). Both these high density clusters area supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). There is also some diffuse scattering of specimens around the Block A and Block C hearths (Figure A.38b).

Alternatively, the IIb faunal specimens that are of moderate element utility are largely clustered in Block C (Figure A.39b in Appendix A). There is a high density cluster located in the central portion of the block along the northern excavation wall, near to, but not directly adjacent to the Block C hearth (Figure A.39b). This high density cluster is supported by a 95% confidence hot spot which resulted from the optimized hot spot analysis performed on the data (Table 7b). In addition, there is a diffuse scattering of moderate element utility specimens throughout Block D (Figure A.39b). This overall concentration of materials in Block D is supported by a 99% confidence hot spot (Table 7b).

In the IIb assemblage the faunal specimens that are of high element utility are clustered in two areas of the housepit (Figure A.40b in Appendix A). The first high density cluster is located in the central portion of Block D along the eastern excavation wall (Figure A.40b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). Additionally, there is a diffuse scattering of high element utility specimens throughout the rest of Block D (Figure A.40b). The second high density cluster is located in the northeast quadrant of Block C, adjacent to the southeast portion of the Block C hearth (Figure A.40b). There is also a diffuse scattering of high element utility specimens around the hearth in Block A (Figure A.40b).

The distribution of all the element utility specimens during the IIb time period suggests that there was uneven access to higher ranked food resources. The Block C hearth has the highest density of high element utility specimens and the highest density of moderate element utility specimens. However, this pattern might be falsely creates since the Block C hearth area contains more faunal material then either the Blocks A or B hearths. Because of this we will use the concept of faunal species utility to check if an uneven distribution of high-ranked faunal materials is consistent between the two utility assemblages.

In the IIa assemblage the faunal specimens that are of low species utility are clustered in five discrete high densities (Figure A.41.a in Appendix A). The first of these high density clusters is in the southwest quadrant of Block A, near, but not directly adjacent to the hearth in that block (Figure A.41.a). This high density cluster is supported by a 95% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7a). The second high density cluster is located in the north-central portion of Block B, again near, but not directly adjacent to one of the hearths in that block (Figure A.41.a). The last three high density clusters are located in Block C: one in the central portion of the block located along the northern excavation wall, one in the center of the northwest quadrant of the block and the last in the east-central portion of the block, directly south of the Block C hearth (Figure A.41.a). All of these high density clusters in Block C are near, but not directly adjacent to the hearth in that block and the two in the northern portion of the block are supported by 99% confidence hot spots (Table 7a).

The IIa moderate species utility specimens cluster into two high densities in one area of the housepit (Figure A.42.a in Appendix A). One of these high density clusters overlaps with the northeastern portion of the Block C hearth and the second is in the northwest quadrant of Block C, located along the northern excavation wall (Figure A.42.a). Both of these high density clusters are supported by 99% confidence hot spots, which resulted from the optimized hot spot analysis performed on these data (Table 7a). Additionally, there is also some diffuse scattering of specimens in the southwest quadrant of Block C, the southwest quadrant of Block A (near, but not directly adjacent to the hearth) and in the north-central portion of Block B (also near, but not directly adjacent to one of the hearths in that block) (Figure A.42.a).

Finally, there is one high density cluster of IIa high species utility specimens (Figure A.43.a in Appendix A). This high density cluster is located over the northeastern portion of the large hearth in Block C (Figure A.43.a). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7a). There is also a lower density cluster in the north-central portion of Block B, near, but not directly adjacent to one of the hearths in that block (Figure A.43.a). Additionally, there is a diffuse scattering of specimens in the eastern portion of Block A (near, but not directly adjacent to the hearth), the northeast quadrant of Block B (directly adjacent to two of the hearths in that block) and in the western portion of Block C (Figure A.43.a).

Again, since the large hearth in Block C has been indicated as a shared animal processing area, it is expected that the high density clusters of all the species utilities be focused around it, which is what is seen in the data. Additionally, the diffuse scattering of high species utility specimens throughout all the blocks is similar to the patterning of the high element utility specimens. This again suggests that residential units and perhaps even individuals had equal access to the higher ranked food resources during the IIa time period.

In the IIb assemblage the faunal specimens that are of low species utility are clustered in high densities in two areas of the housepit (Figure A.41b in Appendix A). The first of these high density clusters is located in the northwest quadrant of Block A, adjacent to the southern portion of the hearth in that block (Figure A.41b). This high density cluster is supported by a 90% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second high density cluster of low species utility specimens can be found in the northeastern quadrant of Block D (Figure A.41b). This high density cluster is supported by a 95% confidence hot spot (Table 7b). There is also some diffuse scattering of specimens around the Block C hearth and in the southern portion of Block D (Figure A.41b).

The IIb moderate species utility specimens cluster in a high density in one area of the housepit (Figure A.42b in Appendix A). This high density cluster is located in the southeast quadrant of Block D along the eastern excavation wall (Figure A.42b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). Additionally, there is some diffuse scattering of moderate species utility specimens throughout the rest of Block D and around the Block C hearth (Figure A.42b).

Lastly, in the IIb high species utility specimens are clustered in high densities in two areas of the housepit (Figure A.43b in Appendix A). The first of these high density clusters is located in the central portion of Block D, along the eastern excavation wall (Figure A.43b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). Additionally, there is some diffuse scattering of high species utility specimens throughout the northeast quadrant of Block D (Figure A.43b). There is also a lower density cluster in the central portion of Block C located along the northern excavation wall (Figure A.43b). This cluster is near, but not directly adjacent to the northwestern portion of the Block C hearth (Figure A.43b).

While the patterning of the IIb low element utility specimens and the low species utility specimens differs, the patterning of the moderate and high element utility specimens and the moderate and high species utility specimens is very similar with much of the material located in Block D or around the Block C hearth. This pattern suggests possible unequal access between the different residential units to the higher ranked resources unless the Block D area proves to be a shared space. Further analysis will be used to discern this.

Faunal Size Grades and Burned Materials

While in use, pithouse structures had a relatively short lifespan of approximately 20 years (Alexander 2000; Hayden 1997; Prentiss and Kuijt 2012; Williams 2013). After this time a buildup of rot within the wooden structure of the pithouse as well as a buildup of old food and human waste would attract enough pests, such as mice, that a decision to rebuild the pithouse would be enacted (Alexander 2000; Hayden 1997; Prentiss and Kuijt 2012; Williams 2013). Before the destruction of the previous pithouse, which often occurred through burning, residents would regularly salvaged useable timbers and other items from within the pithouse (Alexander 2000; Hayden 1997; Prentiss and Kuijt 2012; Williams 2013). Cleaning of the interior depression would follow the destruction if/when the pithouse was to be put into use again (Alexander 2000; Hayden 1997; Prentiss and Kuijt 2012; Williams 2013). Much of this debris and sometimes even the pervious dirt floor was moved to the rim circling the interior depression of the pithouse (Alexander 2000; Hayden 1997; Prentiss and Kuijt 2012; Williams 2013). Next the roof structure was rebuilt and often a new floor surface was created using 'fresh' dirt (Alexander 2000; Hayden 1997; Prentiss and Kuijt 2012; Williams 2013). In the case of Housepit 54, the new floor surface often 'capped' the materials left from the previous occupation of the pithouse, creating the archaeological occupational floors. These occupational floors likely represent a small time-slice directly pervious to the destruction of the pithouse for rebuilding purposes. Cleaning activities might have also occurred during the pithouses life and these activities can mask archaeological signatures so they should be addressed, which is one of the main purposes of this section.

Naturally it is harder to find and therefore clean up smaller items; thus, it is more likely that smaller faunal materials would have gotten left in place if cleaning did occur within Housepit 54. Because of this, even if cleaning did occur in the housepit in the past, there still would be a record of where activities originally took place in the form of the small archaeological specimens. Alternatively, if cleaning did not occur in the housepit in the past, then both large and small lithic specimens are expected to be jumbled together in discrete locations. Overall, the presence or absence of cleaning activities must be addressed and potentially can be addressed by analyzing where small and large archaeological specimens exist spatially. To accomplish this goal both the IIa and IIb lithic size grade assemblages will be used to test for the presence (or absence) cleaning activities and potentially the presence of activity areas.

In the IIa assemblage the faunal specimens that are of the 1-9mm size grade are clustered in three high densities around the housepit (Figure A.44a in Appendix A). One of these high densities directly overlaps with the northern portion of the large hearth that is in the northeast quadrant of Block C (Figure A.44a). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7a). A second high density cluster can be found in the northwest quadrant of Block C along the northern excavation wall, near the large hearth, but not directly adjacent to it (Figure A.44a). This second high density cluster is also supported by a 99% confidence hot spot (Table 7a). The last high density cluster can be found in the northern section of Block B, near to, but not directly adjacent to a hearth (Figure A.44a).

The IIa faunal specimens that are of the 10-19mm size grade cluster in similar places as the 1-9 size grade specimens, but not always in as dense of quantities (Figure A.45a in Appendix A). The highest density of these materials is located in the northern section of Block B, near to, but not directly adjacent to a hearth (Figure A.45a). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7a). Two lower density clusters can be found visually within the housepit. The first of these low density clusters directly overlaps with the northern portion of the large hearth that is in the northeast quadrant of Block C while the second of these low density clusters is located in the northwest quadrant of Block C along the northern excavation wall, near the large hearth, but not directly adjacent to it (Figure A.45a). Note that all these material densities overlap directly with the 1-9mm size grade clusters.

The pattern shifts slightly when the IIa 20-29mm faunal specimens are considered. However, all of the faunal materials are still located near hearths. The highest density of this material can be found along the eastern excavation wall of Block B, directly adjacent to a hearth (Figure A.46a in Appendix A). This high density cluster is supported by a 95% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7a). Alternatively, there are two lower density clusters and, like the two smaller faunal size grades discussed above, one of these high densities directly overlaps with the northern portion of the large hearth in the northeast quadrant of Block C while the other lies in the northwest quadrant of Block C along the northern excavation wall, near to the large hearth, but not directly adjacent to it (Figure A.46a). Even though these densities visually look low, they both are supported by 99% confidence hot spots, suggesting that, while these clusters look defused, they actually quite dense when the material is considered altogether (Table 7a). Additionally, there is a diffuse scattering of 20-29mm faunal specimens in the western half of Block A, most of which is near the hearth (Figure A.46a).

Again, the high density pattern shifts slightly when the IIa 30-39mm faunal specimens are considered. However, there is also still much overlap with the high densities previously discussed. The highest density of this material again directly overlaps with the northern portion of the large hearth that is in the northeast quadrant of Block C (Figure A.47a in Appendix A). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7a). Lower densities of materials can be found in the southwest quadrant of Block C and along the western portion of Block A, near the hearth (Figure A.47a).

Lastly, the IIa faunal specimens that are of the > 40 mm size grade are found in highest density directly overlapping with the northern portion of the large hearth that is in the northeast quadrant of Block C (Figure A.48a in Appendix A). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7a). Lower density clusters of this material are scattered within Block C and can be found in the northeast quadrant of Block B along the eastern excavation wall and adjacent to a hearth as well as in the southwest quadrant of Block B, along the southern excavation wall (Figure A.48a).

Potentially, if faunal bones were being processed everywhere in the housepit, then it is expected that the smallest size grades of faunal materials should be present everywhere in low quantities even if cleaning occurred. Instead there are discrete clusters around the housepit in IIa, suggesting that these areas were where the most intense processing of animal bones occurred. If the smallest size grades of faunal materials were scattered throughout the housepit, then these dense concentrations might have alternatively been dump zones. However, we do not see this pattern in the IIa faunal size grade assemblages. Overall, the high density patterns and hot spot analyses suggest that the hearth in Block C and the hearths in Block B were the major areas of animal processing during the IIa time period.

In the IIb assemblage the faunal specimens that are of the 1-9mm size grade are clustered in one area of the housepit: along the central section of the eastern excavation wall of Block D (Figure A.44b in Appendix A). This high density cluster is supported by a 99%

confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). There are also some small scatterings of specimens elsewhere, but in very minute quantities (Figure A.44b).

This pattern shifts slightly when the IIb 10-19mm faunal specimens are considered. However, most of the faunal materials are still located in Block D (Figure A.45b in Appendix A). There are two large high density clusters within the housepit (Figure A.45b). One of these high densities is located in the southeast quadrant of Block D along the eastern excavation wall (Figure A.45b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). The second high density cluster can be found along the central section of the northern excavation wall in Block C, near the hearth, but not directly adjacent to it (Figure A.45b). Unlike the size grade described above, there is quite a bit of diffuse clustering also found in the rest of Block D.

Again, the high density pattern shifts slightly when the IIb 20-29mm faunal specimens are considered (Figure A.46b in Appendix A). However, there is also still much overlap with the high densities previously discussed. The largest high density cluster is located in the north central portion of Block D (Figure A.46b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). Lower density clusters can be found along the eastern excavation wall of the southeastern quadrant of Block D and along the western portion of the hearth in Block C (Figure A.46b).

These high densities stay in the same general area as before when the IIb 30-39mm faunal specimens are considered (Figure A.47b Appendix A). The highest density cluster is again in the northeast quadrant of Block D (Figure A.47b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 7b). Additionally, there is a much lower density cluster that can be found along the central section of the northern excavation wall of Block C, near to the hearth, but not directly adjacent to it (Figure A.47b).

Lastly, the IIb faunal specimens that are of the > 40mm size grade are clustered in three high densities around the housepit (Figure A.48b in Appendix A). The first of these high densities is located along the central portion of the northern wall of Block C, near to the hearth, but not directly adjacent to it (Figure A.48b). The second high density cluster can be found in the central portion of Block D and the third high density cluster is located in the southeast quadrant of Block D, along the eastern excavation wall (Figure A.48b). These two high densities in Block D are supported by 99% confidence hot spots (Figure A.48b).

Again, if faunal bones were being processed everywhere in the housepit, then it is expected that the smallest size grades of faunal materials should be present everywhere in low quantities even if cleaning was occurring. Instead we see discrete clusters around the housepit in the IIb faunal assemblage, with the exception of Block D, which has some diffuse scattering of materials as well as clusters. This suggests that Block D and possible the area along the western side of the hearth in Block C were where the most intense processing of animal bones was occurring during the IIb time period.

Interestingly, the burned specimens from the IIa faunal assemblage are quite diffuse throughout the housepit with the exception of a high density cluster in the north-central portion of Block B and a lower density cluster in the southwest quadrant of Block C (Figure

A.49a in Appendix A). A similar pattern can be seen in the distribution of the IIb burned faunal specimens with one high density cluster in the northeast quadrant of Block C, a diffuse scattering of specimens throughout Block D and C and a smaller scattering in the northwest quadrant of Block A (Figure A.49b in Appendix A). These patterns suggest that cleaning activities were occurring within the housepit during both the IIa and IIb time periods since, if they were not, all the burned faunal materials would be near the hearths, the causation of their burnt state.

The faunal materials discussed here only make up one element of the spatial patterns on the floor of Housepit 54. To get a clearer picture of what might have been going on socially during the IIa and IIb time periods, the lithic materials are also analyzed in this study (see below).

Lithic Debitage and Tools

The proportion of the debitage and tool specimens within the lithic assemblages of the IIa and IIb floors is quite similar. Overall there is more debitage then tools present in the IIa and IIb lithic assemblages (Figure 22). This suggests that perhaps lithic materials were treated similarly during these two time periods within Housepit 54. To help assess this possibility, the spatial distribution of lithic material clusters is explored.

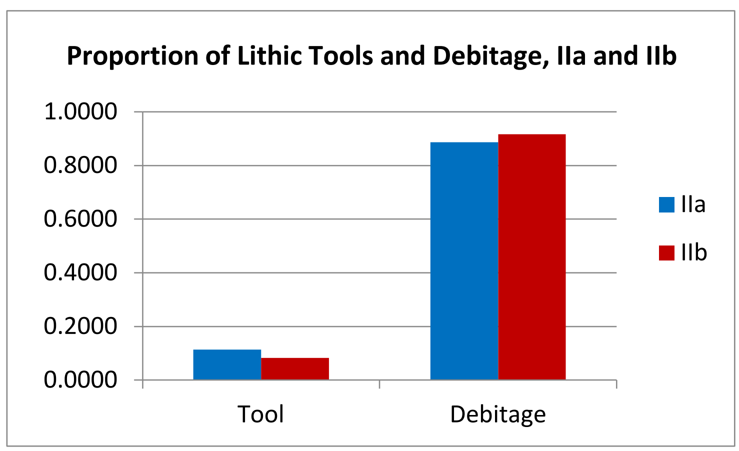


Fig. 22: Bar graph displays the proportion of the IIa and IIb lithic assemblages that are made up of tools and debitage.

In the IIa lithic assemblage the debitage is clustered in a high density in a single area and is diffuse throughout the rest of the housepit (Figure B.50a in Appendix B). This high density cluster is located in the southwest quadrant of Block C (Figure B.50a). Additionally, this high density cluster is supported by a 95% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9a).

The IIa lithic tool assemblage is clustered in high densities in two areas within the housepit and in a lower density in one area of the housepit (Figure B.51a in Appendix B). These two high density clusters are located in the west central portion of Block A and in the southeast quadrant of Block B, both near to, but not directly adjacent to a hearth (Figure B.51a). Both of these high density clusters are supported by 90% confidence hot spots, which resulted from the optimized hot spot analysis performed on the data (Table 9a). Visually there is another high density cluster in the southwest quadrant of Block C (Figure B.51a). However, this high density cluster did not result in a hot spot suggesting that statistically it is of a lower density then the other two higher density clusters discussed here.

Alternatively, in the IIb lithic assemblage the debitage is clustered in a single high density and is diffuse throughout the rest of the housepit (Figure B.50b in Appendix B). This high density cluster is located in the southeast quadrant of Block D along the eastern excavation wall (Figure B.50b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b).

The IIb lithic tool assemblage is also clustered in Block D and is diffuse throughout the rest of the housepit. However, two high density clusters are apparent, unlike among the IIb lithic debitage specimens (Figure B.51b in Appendix B). The first of these high density clusters is located in the northeastern quadrant of Block D and the second of these high density clusters is located in the southeast quadrant of Block D along the eastern excavation wall (Figure B.51b). Both of these high densities are supported by 99% confidence hot spots, which resulted from the optimized hot spot analysis performed on these data (Table 9b).

These results display the spatial clustering of lithic materials around the housepit, but only at the grossest level. To better understand the patterns within the housepit, a more fine grain analysis must be done and so the lithic material types and lithic tool types were also analyzed.

Lithic Material Types

Dacite, coarse dacite and slate dominate the IIa and IIb lithic raw material assemblages. Lithic raw materials other than these are uncommon and should be analyzed closely to determine if uneven access to them was present. If uneven access to uncommon materials was present, then these materials are expected to appear in a high(er) density cluster in one residential unit. If uneven access to these materials was not present, then these materials are expected to be evenly distributed thought the housepit and/or be present in shared activity areas. Additionally, the common lithic raw material types of dacite, coarse dacite and slate are expected to be diffuse throughout the housepit with the exception of dump areas, shared production/processing areas and storage areas.

On the IIa floor chalcedony specimens are clustered in high density in a single area of the housepit (Figure B.53a in Appendix B). This high density cluster is located in the southwest quadrant of Block C (Figure B.53a). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9a). Additionally, there is a scattering of small discrete clusters of chalcedony in the rest of the housepit, many of which area near or adjacent to hearths (Figure B.53a). However, it is important to note that the high density cluster seen here was created by four specimens. Because of this, it is hard to say if this high density can in reality be called a ‘cluster.’ Regardless, the distribution of these materials is still relevant to this study.

This pattern shifts slightly when the IIa jasper and chert specimens are considered. The chert specimens cluster visually in a high density in a single area located in the southwest quadrant of Block A, directly adjacent to the hearth in that block (Figure B.54a in Appendix B). Additionally, there is a scattering of jasper and chert specimens throughout the rest of the housepit, often located near or adjacent to hearths (Figure B.54a). However; it is important to note that the high density cluster seen here was created by three specimens. Because of this, it is hard to say if this high density can in reality be called a ‘cluster.’ Regardless the distribution of these materials is still relevant to this study.

The coarse dacite specimens from the IIa lithic raw material assemblage appear in diffuse clusters throughout the housepit. However, the highest density clusters appear near to the hearths in each of the blocks (Figure B.55a in Appendix B).

The IIa lithic material assemblage dacite specimens are clustered visually in a high density in a single area, which is in the southwestern quadrant of Block C (Figure B.56a in Appendix B). Additionally, there is a diffuse scattering of dacite materials throughout the rest of the housepit, often located near or adjacent to hearths (Figure B.56a).

The obsidian specimens from the IIa lithic raw material assemblage cluster in a high density in one area of the housepit (Figure B.57a in Appendix B). This high density cluster is located in the central portion of Block B, overlapping with one of the hearths in this block (Figure B.57a). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9a). Additionally, there are also a few obsidian specimens scattered in the southwest quadrant of Block C (Figure B.57a). However; it is important to note that the high density cluster seen here was created by three specimens. Because of this, it is hard to say if this high density can in reality be called a 'cluster.' Regardless, the distribution of these materials is still relevant to this study.

Slate specimens cluster in a high density in a single area on the IIa floor (Figure B.58a in Appendix B). This high density cluster is located in the southwest quadrant of Block C (Figure B.58a). Additionally, the slate materials also appear in diffuse clusters throughout much of the rest of the housepit, many of which are near or adjacent to hearths (Figure B.58a). Interestingly, the slate materials appear to be less dense in Block A when compared to the patterns seen in Blocks B and C (Figure B.58a).

All of the other IIa lithic raw material types were made up of assemblages too small to cluster into meaningful densities and thus density maps were not created. Often this was because the specimens aggregated into 'clusters' equal to 1 or fewer. However, these lithic materials were plotted on maps so that their spatial distribution could be analyzed (Figure B.60a in Appendix B). Overall, no one block or hearth in IIa that exclusively contains a large portion of any of these uncommon lithic raw materials (Figure B.60a).

The diffuse distribution of the common lithic raw materials dacite, coarse dacite and slate throughout the IIa floor suggests that these materials were equally accessible by all who resided in the housepit. This pattern further suggests that these lithic materials were used in production and/or processing activities throughout the housepit. Additionally, the uncommon lithic raw materials analyzed in this study also appear in discrete low densities throughout the housepit. This again suggests that these lithic materials were equally accessible by all who resided in the housepit during the IIa time period.

Chalcedony specimens are clustered in a high density in a single area of the IIb floor (Figure B.53b in Appendix B). This high density cluster is located in the eastern portion of Block D along the eastern excavation wall (Figure B.53b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b). Additionally, there is a scattering of small discrete clusters of the material in the rest of the housepit, many of which are near or adjacent to hearths (Figure B.53b).

This pattern shifts slightly when the IIb jasper and chert specimens are considered. Two high density clusters appear: one in the southwestern quadrant of Block C and one the eastern portion of Block D along the eastern excavation wall (Figure B.54b in Appendix B). Additionally, there is a scattering of small discrete clusters of this material in the rest of the housepit, many of which are near or adjacent to hearths (Figure B.54b).

Coarse dacite specimens are found in a single high density cluster on the IIb floor (Figure B.55b in Appendix B). This high density cluster is located mostly in the northeast quadrant of Block D (Figure B.55b). Additionally, there is a diffuse scattering of coarse dacite materials throughout the rest of the housepit, often located near or adjacent to hearths (Figure B.55b).

Dacite specimens are clustered visually into two high densities on the IIb floor (Figure B.56b in Appendix B). The first of these high density clusters is located mostly in the southeastern quadrant of Block D (Figure B.56b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b). The second high density cluster can be found in the north-central portion of Block C, directly adjacent to the western edge of the hearth (Figure B.56b). Additionally, there is a diffuse scattering of dacite materials throughout the rest of the housepit, often located near or adjacent to hearths (Figure B.56b).

The obsidian specimens from the IIb lithic raw material assemblage cluster in a high density in one area of the housepit (Figure B.57b in Appendix B). This high density cluster is located in the northeast quadrant of Block D (Figure B.57b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b). Additionally, there is a very low density of obsidian specimens south of the hearth in Block C (Figure B.57b).

In the IIb lithic raw material assemblage slate specimens were clustered in a high density in a single area of the housepit (Figure B.58b in Appendix B). This high density cluster is located in the southeast quadrant of Block D (Figure B.58b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b). Additionally, the slate materials also appear in diffuse clusters throughout much of the rest of the housepit, many of which are near or adjacent to hearths (Figure B.58b).

The IIb lithic material assemblage coarse basalt specimens are clustered exclusively into high density clusters within Block D (Figure B.59 in Appendix B). Most of these high densities clusters are located in the eastern portion of the block (Figure B.59).

Finally, frequencies of the other IIb lithic raw material types were deemed too small to cluster into meaningful density areas thus spline maps were not created. Often this was because the specimens aggregated into ‘clusters’ equal to 1 or fewer. However, these lithic materials were plotted on maps so that their spatial distribution could be analyzed (Figure B.60b and B.60c in Appendix B). Overall, much of these uncommon lithic raw materials are located in Block D (Figure B.60b and B.60c). Each of the other blocks also had a small scattering of these specimens, with Block C having the most (Figure B.60b and B.60c).

The distribution of the common lithic raw materials of dacite, coarse dacite and slate in diffused clusters around the IIb floor with the exception of the high density clusters present in Block D suggests that these materials were equally accessible by all the residential groups within the housepit. Furthermore, this pattern suggests that these lithic materials were used in production and/or processing activities throughout the housepit. Additionally, the uncommon lithic raw materials of chalcedony and jasper also appear in low density discrete clusters around each of the hearths within the housepit, suggesting again that these hearths might represent separate residential units. However, very little of the other uncommon lithic raw materials are located around these hearths. Instead most of these uncommon lithic raw materials are located in Block D, the only block that does not have a hearth. This suggests that there was little unequal access between the residential groups to these uncommon lithic raw materials if the

Block D area is considered shared space. In additional, this pattern might indicate that Block D was a shared processing and storage area.

Lithic Tool Types

Since such a small portion of the IIa and IIb lithic assemblages are made up of tools and therefore the corresponding lithic tool type assemblages are so small, spline density maps were not created for these materials. Instead the lithic tool types were plotted on maps so that their spatial distribution could be analyzed. This was done for all the tool types. If separate competing residential units were present within the housepit, then it is expected that every residential unit or their corresponding hearth have a private set of lithic tools. Alternatively, if shared activity areas were present within the housepit, then it is expected that tool types will group within the areas in which they were used. In addition, if unequal status was present between the residential units, then ornamental items are expected to be unevenly distributed between the residential units or their corresponding hearths.

The groundstone specimens from the IIa lithic assemblage are solely distributed in Block B around the multiple hearths in that block (Figure B.61a in Appendix B). Similarly, the IIa lithic abraders are solely distributed in Block C; one specimen located next to the large hearth in that block and one specimen located in the southwest quadrant of the block (Figure B.61a). The IIa lithic cores are distributed throughout the housepit, but none of them are near the large hearth in Block C (Figure B.62a). Utilized flakes from the IIa floor are located in Block B and Block C, along with high densities of faunal materials (Figure B.63a). Hide processing tools, such as scrapers, lithic piercers and bone awls are located in all of the IIa blocks (Figure B.64a). The knives, bifaces and other slate tools likely used to hunt animals and process animal flesh, are located primarily in Blocks A and B of IIa (Figure B.65a). Ornamental items are located in Blocks A and B of the IIa floor (Figure B.66a). Additionally, the only piece of ocher on the IIa floor is located in Block C (Figure B.66a). Most of the lithic projectile points from IIa are located in Blocks A and C, with one lithic projectile point being located in Block B (Figure B.67a). The wood/bone working tools, such as scrapers, are located primarily in Block B and around the hearth in Block A of IIa (Figure B.68a). Lastly, the only maul (called a pounding tool in the tables) is located close to the large hearth in Block C on IIa (Figure B.68a).

Overall, the distribution of the groundstone tools on the IIa floor suggests that the heath area in Block B was probably a shared activity area where groundstone activities, among others, occurred. The distribution of the lithic abraders suggests that the hearth area in Block C and the southwest quadrant of Block C might also be shared activity areas. The distribution of lithic cores throughout the housepit suggests that lithic production activities were performed anywhere within the housepit except for the area around the large hearth in Block C. The distribution of the utilized flakes suggests that they were potentially connected to animal processing activity areas. The distribution of the hide processing tools suggests that this activity could have been preformed anywhere within the housepit. The distribution of knives, bifaces, slate tools and the maul along with the faunal materials suggests that the area around the large hearth in Block C was likely an space where intensive bone and grease processing was occurring as well as meat processing. The distribution of ornamental items suggests that Block C might have been primarily a workspace while Blocks A and B might have been more of a work/living space. And finally, the distribution of woodworking tools suggests that the hearth area in Block B might have been a shared activity area or storage zone.

The groundstone specimens are distributed evenly throughout the IIb blocks (Figure B.61b in Appendix B). Alternatively, the IIb lithic abraders are distributed only between Blocks C and D (Figure B.61b). The IIb lithic cores are distributed mostly in Block D, but with at least two near each of the hearths (Figure B.62b). Utilized flakes are mostly located in Block D, but at least one is near each of the hearths (Figure B.63b). Hide processing tools, items such as scrapers, lithic piercers and bone awls, are located mostly in Block D with a few items scattered around the hearths in Block A and B (Figure B.64b). Most of the IIb knives, bifaces and other slate tools, tools that were likely used to hunt animals and process animal flesh, are distributed in Block D, but each block hearth has at least one knife located near it (Figure B.65b). Ornamental items are located in exclusively in Block D (Figure B.66b). Additionally the ocher is distributed in both Blocks D and C (Figure B.66b). Most of the lithic projectile points from are located in Block D, but each hearth has at least one projectile point located near it (Figure B.67b). The wood/bone working tools from the IIb lithic tool assemblage are located primarily in Block D, but each hearth has at least one wood scraping tool and one drilling tool located near it (Figure B.68b). Lastly, the two hammer stones are located in Block C, but one of them is located quite close to the center of the housepit (Figure B.69).

Overall, the low quantities of certain lithic tools (groundstone, cores, utilized flakes, knives, projectile points, wood/bone working tools and drilling tools) around each of the IIb hearths suggest that these hearths represent separate residential units. Additionally, the large distribution of different lithic tools (cores, utilized flakes, hide processing tools, knives, bifaces, projectile points, wood/bone working tools and drilling tools) in Block D suggests that this area might potentially be a shared activity area and possibly shared storage. The tools that only are present around one or a few of the hearths (abraders and hide processing tools) do not necessarily represent unequal access if every residential unit had access to the 'surplus' tools in the Block D area. Furthermore, the distribution of all the ornamental items being located in Block D suggests that these items might have 'belonged' to the household rather than the individual residential units if this area was indeed a shared space.

Lithic Size Grades, Thermally Altered Materials and Fragmentary Tools

Cleaning activities may affect the distribution of lithic materials within Housepit 54 differently than they affected the faunal materials and therefore these issues will be revisited in this section. To reiterate, it is harder clean up smaller items; thus, it is more likely that smaller lithic materials would get left in place if cleaning occur. Because of this, even if cleaning did occur in the housepit in the past, there still is potentially a record of where activities originally took place in the form of the small archaeological specimens. Alternatively, if cleaning did not occur in the housepit in the past, then both large and small lithic specimens are expected to be jumbled together in discrete locations. Both the IIa and IIb lithic size grade assemblages will be used to test for cleaning activities and potentially the presence of activity areas. (See the Faunal Size Grades and Burned Materials section for more information on the formation of occupational floors).

In the IIa assemblage the lithic specimens that are of the > 9 mm size grade are clustered in three high densities around the housepit (Figure B.70a in Appendix B). The highest of these densities is in the southwest quadrant of Block C (Figure B.70a). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9a). The second lower density cluster can be found along the northern excavation wall of Block C, near, but not directly adjacent to the hearth and along the eastern excavation wall of Block B, directly overlapping with two of the hearths in that block (Figure B.70a). Additionally, there is a diffuse scattering of > 9 mm size grade lithic material throughout the rest of the housepit (Figure B.70a).

The IIa lithic specimens that are of the 10-19mm size grade cluster in similar places, but not always in as dense of quantities as the < 9mm size grade specimens (Figure B.71a in Appendix B). The highest of these densities is located in the southwest quadrant of Block C (Figure B.71a). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9a). Additionally, there is a diffuse scattering of 10-19 mm size grade lithic materials throughout the rest of the housepit (Figure B.71a). However, this diffuse pattern is overall denser and covers more area then that created by the > 9 mm size grade lithic materials.

The pattern shifts slightly when the IIa 20-39mm lithic size grade specimens are considered. There are several high density clusters throughout the housepit (Figure B.72a in Appendix B). The first of these high density clusters is located in the southwest quadrant of Block A, near to, but not directly adjacent to the hearth (Figure B.72a). This high density cluster is supported by a 95% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9a). Two high density clusters are located in Block B: one in the north-central portion of the block, near to, but not directly adjacent to a hearth, and one in the southwest quadrant of the block, again near to, but not directly adjacent to a hearth (Figure B.72a). The former of these two high density clusters is supported by a 95% confidence hot spot (Table 9a). The last of these high density clusters can be found in the southwest quadrant of

Block C (Figure B.72a). Additionally, there is a diffuse scattering of 10-19 mm size grade lithic materials throughout the rest of the housepit (Figure B.72a). This diffuse pattern is overall denser and covers more area then the > 9 mm size grade lithic materials.

Visually, there are two high density clusters of 40-79 mm lithic size grade specimens in the IIa assemblage (Figure B.73a in Appendix B). The first high density cluster is in the northwest quadrant of Block A along the northern excavation wall (Figure B.73a). The second of these high density clusters can be found along the eastern excavation wall of Block B (Figure B.73a). Additionally, there is a scattering of small discrete clusters throughout the rest of the housepit (Figure B.73a).

Lastly, the IIa lithic specimens that are of the > 80 mm size grade are located in one high density cluster (Figure B.74a in Appendix B). This cluster is located in the north-central section of Block B, near to, but not directly adjacent to a hearth (Figure B.74a). This high density cluster is supported by a 95% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9a). Additionally, there is a scattering of small discrete clusters throughout the rest of the housepit, many of which are near, but not directly adjacent to hearths (Figure B.74a).

Potentially, if lithic raw materials were being produced or used everywhere in the housepit, then it is expected that the smallest size grades of lithic materials should be present everywhere in low quantities even if cleaning occurred. This pattern does exist within the distribution of IIa lithic materials. Because of this, the clusters we see in the IIa lithic data could be describe as multiple intense activity areas and/or, in some cases, areas where materials were set aside for later use. Interestingly, all the high density clusters, with the exception of the one in the southwest quadrant of Block C, are located near hearths. This suggests that these high density areas were either areas for lithics production and/or use or areas where potentially useful lithic materials were put for later use. Looking at the distribution of lithic specimens sized 20-39 mm map in particular, two high density clusters appear between the multiple hearths in Block B. It is possible that this area was a lithic production and mammal processing area. It is even possible that the majority of the mammal processing was being performed in the northern portion of the block while the majority of the lithic production was being performed in the southern portion of the block. Additionally, looking at the distribution of lithic specimens sized 20-39 mm map, a high cluster appears near the hearth in Block A. This hearth had very little faunal material near it and may have exclusively been a lithic production/retouch area. Lastly, the high density area in the southwest quadrant of Block C may have been another intense lithic production zone. These separate potential lithic production areas suggest that lithics production might not have been a communal activity. Along with this it is interesting to note that all the high density clusters of lithic size grade materials are located away from the large, and possibly shared, animal processing hearth in Block C.

In the IIb assemblage the lithic specimens that are of the > 9 mm size grade are clustered in three high densities around the housepit (Figure B.70b in Appendix B). One of these high densities directly overlaps with the western edge of the hearth in Block C (Figure B.70b). The other two high densities are located in Block D: the first of which is located in the center of the block and the second of which is located in the southeast quadrant of the block, along the eastern excavation wall (Figure B.70b). These high density clusters are both supported by a 99%

confidence hot spots, which resulted from the optimized hot spot analysis performed on these data (Table 9b). Additionally, there is a diffuse scattering of > 9 mm size grade lithic materials throughout the rest of the housepit (Figure B.70b).

The IIb lithic specimens that are of the 10-19mm size grade cluster in one high density within the housepit (Figure B.71b in Appendix B). This high density cluster is located in the eastern portion of Block D (Figure B.71b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b). Additionally, there is a diffuse scattering of 10 -19 mm size grade lithic material throughout the rest of the housepit, the density and area of which is similar to the pattern displayed by the > 9 mm size grade lithic materials (Figure B.71b).

Similar to the pattern of the 10-19 mm size grade lithic materials, the IIb lithic specimens that are of the 20-39 mm size grade cluster in one high density within the housepit (Figure B.72b in Appendix B). This high density cluster is located in the northeast quadrant and the eastern portion of Block D (Figure B.72b). This high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b). Additionally, there is a diffuse scattering of 20-39 mm size grade lithic materials throughout the rest of the housepit (Figure B.72b).

There are three high density clusters of 40-79 mm lithic size grade specimens in the IIb assemblage (Figure B.73b in Appendix B). Two of these high density clusters are located in Block D: one in the northeast quadrant and one in the southeast quadrant, along the eastern excavation wall (Figure B.73b). Both of these high density clusters are supported by 99% confidence hot spots, which resulted from the optimized hot spot analysis performed on these data (Table 9b). The last lower density cluster can be found in the northwest quadrant of Block A, located between the cache pit and hearth in that block (Figure B.73b). Additionally, there is a scattering of a few small discrete clusters of this material in the rest of the housepit, many of which are near, but not directly adjacent to hearths (Figure B.73b).

Lastly, the IIb lithic specimens that are of the > 80 mm size grade are present in a few discrete clusters throughout the housepit (Figure B.74b in Appendix B). However, it is important to note that these clusters are made up of at most 2 specimens. Because of this, it is hard to say if they can in reality be called a 'cluster.' Regardless, an interesting pattern appears with each block contains at least one of these small clusters near, but not directly adjacent to a hearth (Figure B.74b).

Again, if lithic raw materials were being processed or used everywhere in the housepit, then it is expected that the smallest size grades of lithic materials should be present everywhere in low quantities even if cleaning was occurring. This pattern does exist within the distribution of IIb lithic materials. However, the majority of the lithic materials are located in Block D. Because of this, it is possible that each hearth could represent a separate residential unit where the cleaning of lithic material refuse was performed regularly. If this cleaning was performed regularly, it might account for the low amount of faunal materials around the hearth in Block A and the lack of faunal materials around the hearths in Block B. Additionally, it is possible that the Block B hearth was a communal lithic processing space. However, the distribution of lithic specimens of the size grades 40-79mm and > 80mm suggests otherwise. These size grades represent lithic materials that could potentially be used or crafted into tools. Interestingly, there seems to be a 'cache' of these size grades near all the hearths, suggesting that these were private lithic tool reserves for each of the potential residential units in the housepit. Alternatively, the Block D area, which contains the highest density clusters of lithic materials, could have been a shared activity area and potentially a storage area for useful lithic materials.

Interestingly, the thermally altered lithic specimens from the IIa floor are quite diffuse with the exception of a high density cluster in the southwestern quadrant of Block C (Figure B.75a in Appendix B). A similar pattern can be seen among the IIb thermally altered lithic assemblage with only two high density clusters, this time in the northeast quadrant of Block D and in the central portion of the Block C along the northern excavation wall (Figure B.75b in Appendix B). Additionally there is a diffuse scattering of thermally altered specimens throughout the rest of the housepit during the IIb time period. (The IIb high density cluster in Block D is supported by a 99% confidence hot spot and the IIb high density cluster in Block C is supported by a 95% confidence hot spot [Table 9b]). No hearth is located near the IIa high density cluster suggesting that this area might have been an activity area focused on lithic production since the thermally altered lithic materials had to be transported to this area of the block for it to be located there. Likewise, Block D in IIb has no hearth and yet contains an area with a high density cluster of thermally altered lithic materials. This again suggests that Block D was an activity area where lithic production was performed since the thermally altered lithics had to be transported to the block for it to be located there.

The condition of the lithic tools will also be considered in this section to see if the distribution of the complete and fragmentary tools can help to discern activity areas within the housepit. The distribution of fragmentary tools is of particularly interest since these tools represent potentially unusable or not as useable materials as complete tools. These fragmentary tools are scattered throughout the IIa floor, but the total of the IIa fragmentary tool assemblage is seven specimens so it is hard to tell if this distribution is more than a random pattern (Figure B.76a in Appendix B). However, the fragmentary tools from the IIb lithic assemblage are mostly distributed in Block D (Figure B.76b in Appendix B). Additionally, this high density cluster is supported by a 99% confidence hot spot, which resulted from the optimized hot spot analysis performed on the data (Table 9b). This suggests that during the IIb time period Block D was at least in part an activity area for lithic production and/or an area where broken, but potentially useful tools were set aside for later use.

Chapter 6: CONCLUSION

In this thesis I drew from multiple lines of data to test alternative hypotheses regarding the socio-political structure of Housepit 54 during the IIb and IIa time periods to ultimately better understand the socioeconomic organization of the household living within the housepit.

During the IIa time period, the large hearth in Block C seems to have been a shared activity area where animals were processed, indicating that it was potentially an area used by all members of the household. Such shared activity areas are generally those where an activity (or multiple overlapping activities) was predominately performed within the pithouse. This conclusion is supported by the faunal species, size class, element utility, species utility, and size grade data. Additionally, the faunal data and the lithic knife data suggests that this hearth may have been used for meaty bone/grease processing as well as meat processing while the general lithic data and lithic core data suggest that lithic production was performed away from this hearth. The ornamental lithic data also suggests that the Block C hearth may have been more of a work zone than a living zone.

Furthermore, the IIa hearths in Block B also seem to have been a part of a shared activity area. However, this hearth area appears to have been used for different purposes than the Block C hearth. While the Block C hearth is surrounded by both fish and mammalian materials and lacks high densities of lithic materials, the Block B hearth area is surrounded by only mammalian and lithic materials. Additionally, this hearth area contains the only groundstone and wood/bone working lithic tools. This suggests that the Block B hearth area could have been a shared multi-use activity area where work on some of the mammalian materials as well as work with certain lithic tools was performed.

Alternatively, the hearth in Block A could have potentially been a lithic production/retouch activity area. However, since lithic debitage is present throughout the housepit, this is not a certain conclusion.

One last area in the housepit could have also been a shared activity area during the IIa time period. This is the section of the southwest quadrant in Block C that contains concentrated high densities of lithic materials. Since thermally altered lithic materials are present in this area, despite the fact that it is away from any hearth, it represents an area to which thermally altered lithic materials and perhaps other lithic materials were transport. It is hard to tell for certain if this area represents a dump zone, a storage zone, a production zone or a combination of the three. However, it does seem to be another shared activity areas within the housepit.

In general, during the IIa time period there seems to have been equal access to all of the materials that were studied in this thesis. This conclusion is supported by the distribution of high element and species utility data and the lithic raw material type data. However, during the IIa time period it seems probable that faunal and lithic materials were subject to different social rules. In particular, food resource faunal materials show up in high densities exclusively in communally shared activity areas. In contrast, lithic debitage and hide processing lithic tools are present throughout the housepit. This suggests that initial faunal processing activities associated with food resources were strictly structured and only done in certain shared areas of the housepit while activities that were not directly connected to food resources were performed almost anywhere in the housepit. Because of this, it is possible that the act of making, maintaining and/or transporting lithic tools was not a shared activity. However, there was equal access to the materials to make said lithic tools.

Overall, the patterns seen in the IIa data suggest that a corporate-communal strategy was present with Housepit 54 during the IIa time period (Coupland et al. 2009; Williams 2013). Additionally, food resources are exclusively found in shared spaces within the housepit, which is a logical pattern if such resources were limited and shared as suggested by the data.

Now, during the IIb time period separate residential units seem to be present, most likely focused around each of the hearths in the housepit. This conclusion is mostly supported by the deer, jasper/chert, large lithic size grade materials and lithic tools. This last line of data is the strongest support for separate residential units since each hearth seems to have had a 'private' set of tools close to it.

Alternatively, the area of Block D seems to have been a shared space. This is supported by the faunal species, size class and size grade data as well as the lithic raw material type, tools, size grade, thermally altered and fragmentary tool data. Ultimately, it is hard to tell for certain if this area of the housepit was an activity area and/or a storage area. However, the fact that all the ornamental lithic items are located within this area suggests that potentially these 'wealth' items within the housepit were considered to belong to the household rather than any one residential unit if Block D does represent shared space. At a glance one may alternatively infer that the hearth in Block C was a 'wealthy' hearth with high concentrations of fish size class 3 and 4 materials, and high concentrations of moderate and high element/species utility materials. However, this does not necessarily hold true if there was equal access to the materials in Block D, which contained high density concentrations of both of the Block C hearth exclusive materials. However, it must be noted that this pattern may be the result of the area sampled within the Housepit 54. There is a possibility that Block D does have a hearth that was not uncovered through excavation. If this is so, then the interpretation of Block D might shift, most probably to the block with a fourth, very rich residential unit. This possibility is presented here since the data to confirm or deny it is not available.

Overall, the patterns seen in the IIb data suggest that a corporate-collectivist strategy was present with Housepit 54 during this time period (Coupland et al. 2009; Williams 2013). However, if Block D were to be considered a separate residential unit, then it would suggest that a network-collectivist socio-political strategy may have been present within Housepit 54 during the IIb time period (Coupland et al. 2009; Mills 2000; Williams 2013).

Ultimately, the data presented supports the idea that between the IIb and IIa time periods there was a shift to a more cooperative household strategy within Housepit 54. Additionally, the strict structuring of the food resources during the IIa time period suggests that resource deprivation/instability could have been the cause of this shift in social strategies. This supports the second hypothesis presented in this paper; that a corporate socio-political strategy developed in the communal household of Housepit 54 during the IIa time period due to increased resource deprivation/instability. Potentially this shift in strategies between the IIb and IIa time periods may have made the household more stable, allowing Housepit 54 to persist longer than others in the area.

Altogether the conclusions of this study support the previous theories that argue that resource deprivation/instability developed at the Bridge River site during the Bridge River 3 (1300-1000 cal. B.P) occupational period (Carlson 2010; Kuijt and Prentiss 2004; Prentiss et al. 2007; Prentiss et al. 2012; Prentiss et al. 2014) and that this resource deprivation/instability could have potentially been a contributing factor in the pre-Colonial sites abandonment.

Alternatively, since this study did not include all of the Bridge River 3 occupational floors, it is still unclear when, how and to what degree inequality developed within households at the Bridge River site. However, it can be said that by the IIa time period, when resource deprivation/instability potentially was at its greatest, evidence of inequality had all but disappeared from the archaeological record of Housepit 54. This in turn implicates that during times of stress, in particular resource stress, households and potentially societies may opt to socially become more cooperative in order to mitigate the dire consequences that may be connected to failure (Angourakis et al. 2014; Coupland et al. 2009; Feinman 1995, 2000).

In addition, methodologically, the spline interpolation maps and the optimized hot spot analysis turned out to be complimentary GIS tools. This is because visually two high density clusters on a spline map can look the same, but the percent confidence level resulting from the optimized hot spot analysis can help to determine if one is of a greater density than the other. Additionally, a density area may visually look diffuse, but the optimized hot spot analysis can again help to discern if there is actually a cluster present within the data. Alternatively, the spline maps can visually show nuances in the data that are lost by the statistical analysis. This is because the optimized hot spot analysis only presents hot and cold spots that are of a 90% confidence level or above while the spline interpolation maps show the distribution of all the data. Ultimately, these two tools are a useful pair to use together since they can be used to check one another.

The faunal and lithic assemblages from Housepit 54 still hold much potential for further research. Research is needed to discover what socio-political and household strategies were present within the housepit during the years that came before IIa and IIa time periods.

Additionally, this study shows that it is important for multiple types of data to be used in analyses such as the one performed here. If only faunal or only lithic data was analyzed in this study, the conclusions made would likely have been very different and potentially misled by the dearth of data. Other types of data that might prove useful in future studies include fire-cracked rock, geochem and botanical data just to name a few.

Ultimately, this study contributes to the body of household archaeological research in the Middle Fraser region in general as well as more specifically enhancing our understanding of how the people of the Bridge River pithouse village may have coped with changing resource availability. This study also presents an example of why faunal and lithic materials should be considered together when asking large social questions that are not specifically tied to only one of these materials. Lastly, this study provides a thorough explanation and exploration of two GIS tools that both complement each other as well as compliment the spatial analysis of households. While in large this study resulted in a more in-depth understanding of this archaeological assemblage and the social strategies that created it, it is also hoped that this research will be meaningful to the native communities that still hold close ties to the Bridge River site, the home of their ancestors.

References Cited

Alexander, Diana

2000 Pithouses on the Interior Plateau of British Columbia: Ethnographic Evidence and Interpretation of the Keatley Creek Site. In *The Ancient Past of Keatley Creek, Volume II Socioeconomy*, edited by Brian Hayden, pp. 29-66. Archaeology Press, Burnaby, B.C.

Ames, Kenneth M.

2010 Comments on the Emergence and Persistence of Inequality in Premodern Societies. *Current Anthropology* 51(1): p.95-96.

Angourakis, Andreas, José I. Santos, José M. Galan and Andrea L. Balbo

2014 Food for all: An agent-based model to explore the emergence and implications of cooperation for food storage. *The Journal of Human Palaeoecology* 20(4): 349-363.

Atalay, Sonya

2012 *Community Based Archaeology: Research with, by, and for Indigenous and Local Communities.* University of California Press.

Austin, Darrell A.

2007 *A Lithic Raw Materials Study of the Bridge River Site, British Columbia, Canada.* Master's Thesis, Department of Anthropology, University of Montana, Missoula.

Betzenhauser, Alleen

2016 Measures of Inequality in the Mississippian Heartland. Paper presented at the 81st Annual Meeting of the Society for American Archaeology, Orlando.

Binford, L.R.

1968 Post-Pleistocene adaptations. *In* New Perspectives in Archeology. Binford, S.R., Binford, L.R. (Eds.). Aldine Publishing Co., Chicago, pp. 313–341.

Blanton, Richard E.

1998 Beyond Centralization: Step toward a Theory of Egalitarian Behaviors in Archaic States. *In* Archaic States. Gary M Feinman and Joyce Marcus (Ed.) School of American Research Press, Santa Fe, N.M, pp. 135-172.

Blanton, Richard E., Gary M. Feinman, Stephen A. Kowalewski, and Peter N. Peregrine

1996 A Dual-Processual Theory for the Evolution of Mesoamerican Civilization. *Current Archaeology* 37:1-14.

Bochart, Jessica Carol

2005 *Interpreting the Past Through Faunal Analysis at the Bridge River Site*. Master's thesis, Department of Anthropology, University of Montana, Missoula.

Bradbury, Andrew P. and Philip J. Carr
1995 Flake Typologies and Alternative Approaches: An Experimental Assessment. *Lithic Technology* 20(2):100-115.

Broughton, J.M.
1994 Late Holocene resource intensification in the Sacramento River Valley: the vertebrate evidence. *Journal of Archaeological Science* 21, 501–514.

Bruchac, Margaret M., Siobhan M. Hart, and H. Martin Wobst
2010 *Indigenous Archaeologies: A Reader on Decolonization*. Left Coast Press.

Buikstra, J. E. and M. Swegle
1989 Bone Modification Due to Burning: Experimental Evidence. In *Bone Modification*, edited by R. Bonnichsen and M. H. Sorge, pp. 247-258. Orono: University of Maine Center for the Study of the First Americans.

Burns, Melissa R. P.
2003 *Changing Times, Changing Economics: A Faunal Resource History of Housepit 7 at the Keatley Creek Site.* Master's Thesis, Department of Anthropology, University of Montana, Missoula.

Butler, V. L.
2000 Resource Depression on the Northwest Coast of North America. *Antiquity* 74(295): 649-661.

Butler, V. L. and S. K. Campbell
2004 Resource Intensification and Resource Depression in the Pacific Northwest of North America: A Zooarchaeological Review. *Journal of World Prehistory* 18(4)327-404.

Cail, Hannah S.
2011 *Feasting on Fido: Cultural Implications of Eating Dogs at Bridge River.* Master's Thesis, Department of Anthropology, University of Montana, Missoula.

Cannon, Debbi Yee
1987 Marine Dish Osteology: A Manual for Archaeologists. Simon Fraser University Burnaby, B.C.

Carlson, Eric S.
2010 *Subsistence Change and Emergent Social Inequality in an Early Complex Hunter-Gatherer winter Village: A Zooarchaeological Assessment of the Bridge River Site (EeRl4), Middle Fraser B.C.* Master's Thesis, Department of Anthropology, University of Montana, Missoula.

Cannon, Debbi Yee
1987 Marine Dish Osteology: A Manual for Archaeologists. Simon Fraser University Burnaby, B.C.

Clark, David S.
2006 *An Organizational and Functional Classification of the Stone Tool Assemblage from the Bridge River Archaeological Site (EeRl4) (2003 and 2004 Field Season).* Master's thesis, Department of Anthropology, University of Montana, Missoula.

Cohen, N.
1981 Pacific Coast Foragers: Affluent or Overcrowded. *Senri Ethnological Studies* 9, 275–295.

Colwell-Chanthaphonh, Chip, T.J. Ferguson, Dorothy Lippery, Randall H. McGuire, George P. Nicholas, Joe Watkins, and Larry J. Zimmerman
2010 The Premise and Promise of Indigenous Archaeology *American Antiquity* Vol. 75 No. 2 pp. 228-238.

Conolly, J. and M. Lake
2006 *Geographical Information Systems in Archaeology*. Cambridge University Press.

Coupland, Gary, Terence Clark, and Amanda Palmer
2009 Hierarchy, Communalism, and the Spatial Order of Northwest Coast Plank Houses: A Comparative Study. *American Antiquity* 74:77-106.

Cotterell, Brian and Johan, Kamminga
1987 The Formation of Flakes. *American Antiquity* 52: 675-708.

Croes, D.R., Hackenberger, S.
1988 Hoko river archaeological complex: modeling prehistoric northwest coast economic evolution. *In* Research in Economic Anthropology: Prehistoric Economies of the Pacific Northwest Coast. Isaac, B.L. (Ed.) JAI Press, Greenwich, CT, pp. 19–86.

Dodge, Yadolah
2010 *The Concise Encyclopedia of Statistics*. Springer-Verlag, New York.

Douglass, John G. and Nancy Gonlin (ed.)
2012 *Ancient Households of the Americas: Conceptualizing What Households Do*. University Press of Colorado, Boulder.

Environmental Systems Research Institute (ESRI)
2017 *Graduated Symbols.* Website, http://pro.arcgis.com/en/pro-app/help/mapping/symbols-and-styles/graduated-symbols.htm, accessed October 15, 2017.

2017 *How Optimized Hot Spot Analysis Works*. Website, http://pro.arcgis.com/en/pro-app/tool-reference/spatial-statistics/how-optimized-hot-spot-analysis-works.htm, accessed October 15, 2017.

2017 *Comparing interpolation methods.* Website, http://pro.arcgis.com/en/pro-app/tool-reference/3d-analyst/comparing-interpolation-methods.htm, accessed October 15, 2017.

2017 *How Spline works*. Website, http://pro.arcgis.com/en/pro-app/tool-reference/3d-analyst/how-spline-works.htm, accessed October 15, 2017.

Faith, J. Tyler, Curtis W. Marean and Anna K. Behrensmeyer
2007 Carnivore competition, bone destruction, and bone density. *Journal of Archaeological Science* 34: 2025-2034.

Feinman, Gary M.
1995 The Emergence of Inequality: A Focus on Strategies and Processes. *In* Foundations of Social Inequality. T. Douglas Price and Gary M Feinman (Ed.) Plenum Press, New York, pp. 255-279.

1997a Corporate/Network: A New Perspective on Leadership in the American Southwest. Paper prepared for "Hierarchies in Action: Who Benifits?" 14th Annual Visiting Scholar Conference, Southern Illinois University, Carbondale.

1997b Corporate/Network: A New Perspective on Models of Political Action and the Puebloan Southwest. Paper prepared for "Social Theory in Archaeology:Setting the Agenda Conference," University of Utah, Press.

1998 Corporate Hierarchies: An Application to the American Southwest. Paper presented at "No Longer in the Whispers-Discussing Non-Hierarchically-Centralized Concepts of Cultural Evolution," 63rd Annual Meeting of the Society of American Archaeology, Seattle.

2000 Dual- Processual Theory and Social Formations in the Southwest. *In* Alternative Leadership Strategies in the Prehispanic Southwest. Barbara J. Mills (Ed.) The University of Arizona Press, Tucson, pp. 207-224.

Fernandez-Jalvo , Y., P. Andrews, P. Sevilla and V. Requejo
2014 Digestion versus abrasion features in rodent bones. *Lethaia* 47: 323-336.

Fernandes, Ricardo, Geert Geeven, Steven Soetens, and Vera Klontza-Jaklova.
2011 Deletion/Substitution/Addition (DSA) Model Selection Algorithm Applied to the Study of Archaeological Settlement Patterning. *Journal of Archaeological Science* 38: 2293-2300.

Fiorillo, A. R.
1989 An experimental study of trampling: Implications for the fossil record. In *Bone modification*. Edited by R Bonnichsen and M. H. Sorg, pp. 61-72. Center of the Study of the First Americans, University of Maine, Orono.

Fletcher, Richard
2008 Some Spatial Analyses of Chalcolithic Settlement in Southern Israel. *Journal or Archaeological Science* 35: 2048-2058.

Foster, Bradley J., and Catherine P. Foster
2012 Introduction: Household Archaeology in the Near East and Beyond. *In* New Perspectives on Household Archaeology, edited by Bradley J. Parker and Catherine P. Foster, pp. 1-14. Eisenbrauns, Wiona Lake.

Frink, L.
2005 Gender and Hide Production Process in Colonial Western Alaska. In Gender and Hide Production, editors W. Frink and K. Weedman, pp. 105-123. Altamira Press.

Gilbert, B. Miles
1990 Mammalian Osteology. Missouri Archaeological Society, Columbia.

Goodale, Nb., Kuijt, I., Prentiss, A.M.
2008 Demography of prehistoric fishing–hunting people: a case study of the upper Columbia area. *In* Recent Advances in Paleodemography: Data, Techniques, and Patterns. Bocquet-Appel(Ed.) Springer-Verlag, New York, pp. 179–207.

Grayson, D.
1979 On the Quantification of Vertebrate Archaeofaunas. In *Advances in Archaeological Method and Theory Vol. 2*, edited by M. B. Schiffer. Academic Press, New York.

1984 *Quantitative Zooarchaeology: Topics in the Analysis of Archaeological Faunas.* Academic Press, London.

Haglund, William D. and Marcella H. Sorg.
1997 *Forensic Taphonomy: The Postmortem Fate of Human Remains.* CRC Press, New York.

Hayden, Brian

1981 Research and development in the stone age: technological transitions among hunter–gatherers. *Current Anthropology* 22, 519–548.

1997 The Pithouses of Keatley Creek: Complex Hunter-Gatherers of the Northwest Plateau. Harcourt Brace College Publishers.

Hayden, Brian and W. Karl Hutchings

1989 Whither the Billet Flake? *In* Experiments in Lithic Technology, edited by D. Amick and R. Mauldin, pp. 235-257. BAR International Press Series 528, Oxford.

Hayden, Brian and June M. Ryder

1991 Prehistoric Cultural Collapse in the Lillooet Area. *American Antiquity* 56(1): 50-65.

Hayden, B. and J Spafford

1993 The Keatley Creek Site and Corporate Group Archaeology. In Changing Times in British Columbian Archaeology, edited by Knut Fladmark, pp. 106-139. BC Studies, Theme Issue No. 99.

Ingold, T.

1983 The significance of storage in hunting societies. *Man* 18, 553–571.

Janetski, J.C.

1997 Fremont hunting and resource intensification in the eastern Great Basin. *Journal of Archaeological Science* 24, 1075–1088.

Klein, R.G., and K. Cruz-Uribe

1984 *The Analysis of Bones of Archaeological Sites.* Chicago: University of Chicago Press.

Knudson, R.

1983 *Organizational Variability in Late Paleo-Indian Assemblages.* Washington State University, Laboratory of Anthropology, Reports of Investigations, No. 60.

Kohler, Tim

2016 Gini Coefficients and the Measurement of Inequality: An Introduction. Paper presented at the 81st Annual Meeting of the Society for American Archaeology, Orlando.

Kuijt, Ian

2001 Reconsidering the Cause of Cultural Collapse in the Lillooet Area of British Columbia, Canada: A Geoarchaeological Perspective. American Antiquity 66:692-703.

Kuijt, I., Prentiss, W.C.

2004 Villages on the edge: Pithouses, cultural change, and the abandonment of aggregate Pithouse villages. *In* Complex Hunter–Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America. Prentiss, W.C., Kuijt, I. (Eds.) University of Utah Press, Salt Lake City, pp. 155–170.

Lee, R.D.

1986 Malthus and Boserup: a dynamic synthesis. *In* The State of Population Theory: Forward from Malthus. Coleman, D., Schofield, R. (Eds.) Basil Blackwell, New York, pp. 96–130.

Lee, R.D.

1993 Accidental and systematic change in population history: homeostasis in a stochastic setting. *Explorations in Economic History* 30, 1–30.

Lee, C.T., Puleston, C.O., Tuljapurkar, S.

2009 Population and prehistory III: food dependent demography in variable environments. *Theoretical Population Biology* 76, 179–188.

Lyman R. L.

1979 Meat from Faunal Remains: A Consideration of Techniques, *American Antiquity*, 44: 536-546.

Madrigal, T.C., Holt J. Z.

2002 White-tailed deer mean and marrow return rates and their application to eastern woodlands archaeology. *American Antiquity* 67,745-759.

Magne, Martin P. R.

1985 *Lithics and Livelihood: Stone Tool Technologies of Central and Southern Interior British Columbia.* Ottawa: National Museums of Canada, No. 133

Mandelko, Sierra A.

2006 *The Slate and Silicified Shale Industry Recovered from the Bridge River Site (EeRl4) British Columbia.* Master's thesis, Department of Anthropology, University of Montana, Missoula.

McGuire, Randall H.

1983 Breaking down Cultural Complexity: Inequality and Heterogeneity. *Advances in Archaeological Method and Theory* 6:pp. 91-142.

Mills, Barbara J.

2000 Alternative Models, Alternative Strategies: Leadership in the Perhispanic Southwest. *In* Alternative Leadership Strategies in the Prehispanic Southwest. Barbara J. Mills (Ed.) The University of Arizona Press, Tucson, pp. 3-18.

Morin, Jesse
2010 Ritual architecture in Prehistoric Complex Hunter-Gatherer Communities: A Potential Example From Keatley Creek, on the Canadian Plateau. *American Antiquity* 75(3): 599-625.

Morin, Jesse, Ryan Dickie, Takashi Sakaguchi, and Jamie Hoskins
2009 Late Prehistoric Settlement Patterns and Population Dynamics along the Mid-Fraser. *BC Studies* 160: 9-34.

Mauldin, Raymond P. and Daniel S. Amick
1989 Investigating Patterning in Debitage from Experimental Biface Core Reduction. *In* Experiments in Lithic Technology, edited by D. Amick and R. Mauldin, pp. 67-88. BAR International Series, Oxford.

McBrearty, Sally et al.
1998 Tools Underfoot: Human Trampling as an Agent of Lithic Artifact Edge Modification. *American Antiquity* 63(1):108-129.

Middleton, William D.
2000 Chemical Identification of Activity Areas. In *The Ancient Past of Keatley Creek, Volume II Socioeconomy*, edited by Brian Hayden, pp. 103-118. Archaeology Press, Burnaby, B.C.

Micozzi, Marc S.
1991 *Postmortem Changes in Human and Animal Remains: A Systematic Approach.* Charles C. Thomas Publisher, Springfield, Illinois.

Morrow, Toby A.
1997 A Chip Off the Old Block: Alternative Approaches to Debitage Analysis. *Lithic Technology* 22(1): 51-69.

Netting, Robert McC., Richard R. Wilk, and Eric J. Arnould
1984 Introduction. *In* Households: Comparative and Historical Studies of the Domestic Group, edited by Robert McC. Netting, Richard R. Wilk, and Eric J. Arnould, pp. xiii-xxxviii.

Pailes, Matthew
2016 Spatial and Temporal Variability in Hohokam Inequality. Paper presented at the 81st Annual Meeting of the Society for American Archaeology, Orlando.

Peterson, Christian and Robert Drennan
2016 Letting the Gini Out of the Bottle: Hazards of Measuring Inequality Archaeologically. Paper presented at the 81st Annual Meeting of the Society for American Archaeology, Orlando.

Pielou, E. C.,

1966 The Measurement of Diversity in Different Types of Biological Collections. *Journal of Theoretical Biology* 13, 131-144.

Pluckhahn, Thomas J.

2013 Cooperation and Competition among Late Woodland Households at Kolomoki, Georgia. *In* Cooperation and Collective Action. David M. Carballo (Ed.) University Press of Colorado, Boulder: 175-196.

Prentiss, Anna

2014 Interim *Report: Household Archaeology at Bridge River, British Columbia.* Electronic document, http://hs.umt.edu/bridgeriver/documents/BR-2013-final-report-NEH.pdf, accessed December 1, 2015.

2015 *Report of the 2014 University of Montana Investigations at the Bridge River Site (EeE14): Housepit 54 During the Bridge River 2 and 3 Periods.* Electronic document, http://www.cas.umt.edu/grants/bridgeRiver/documents/br-Housepit-54-2014-total-report-nov15.pdf, accessed December 1, 2015.

2017 *The Last House at Bridge River: The Archaeology of an Aboriginal Household in Brirish Columbia During the Fur Trade Period.* The University of Utah Press, Salt Lake City.

Prentiss, Anna Marie, Hannah S. Cail and Lisa M. Smith.

2013 At the Malthusian Ceiling: Subsistance and Inequality at Bridge River, British Columbia. *Journal of Anthropological Archaeology* 33: 34-48.

Prentiss, Anna Marie, Guy Cross, Thomas A. Foor, Mathew Hogan, Dirk Markle and David S. Clarke

2008 Evolution of a Late Prehistoric Winter Village on the Interior Plateau of British Columbia: Geophysical Investigations, Radiocarbon Dating, and Spatial Analysis of the Bridge River Site. *American Antiquity* 50 (1): 59-81.

Prentiss, Anna Marie, Thomas Foor, Kristen Barnett and Matthew Walsh

2016 Cooperation, Labor, Sharing, and Inequality in a Long-Lived Household, Bridge River Site, British Columbia. Paper presented at the 81st Annual Meeting of the Society for American Archaeology, Orlando.

Prentiss, Anna Marie, Lyons, L., Harris, L.E., Burns, M.R.P., Godin, T.M.

2007 The emergence of status inequality in intermediate scale societies: a demographic and socioeconomic history of the Keatley Creek site, British Columbia. *Journal of Anthropological Archaeology* 26, 299–327.

Prentiss, Anna and Ian Kuijt
2012 *People of the Middle Fraser Canyon: An Archaeological History*. UBC Press, Vancouver.

Prentiss, Anna Marie, Thomas A. Foor, Guy Cross, Lucille E. Harris and Michael Wanzenried
2012a The Cultural Evolution of Material Wealth-Based Inequality at Bridge River, British Columbia. *American* Antiquity 77(3): 542-564.

Prentiss, Anna Marie, Lisa Smith, Kristen Barnett, Matthew Walsh, and Eric Carlson
2012b Assessing Variability in Salmon Processing, Storage, and Consumption at the Bridge River Site, British Columbia. Paper presented at the 77th Annual Meeting of the Society for American Archaeology, Memphis.

Prentiss, William C.
1998 The Reliability and Validity of a Lithic Debitage Typology: Implications for Archaeological Interpretation. *American Antiquity* 63(4): 635-650.

2001 Reliability and Validity of a Distinctive Assemblage Typology: Integrating Flake Size and Completeness. In *Lithic Debitage: Context Form and Meaning*, edited by William Andrefsky, pp. 147-172. University of Utah Press, Salt Lake City.

Pryor, John H.
1988 The Effects of Human Trample Damage on Lithics: A Consideration of Crucial Variables. *Lithic Technology* 17(1): 45-50.

Pugh, Timothy W.
2003 A Cluster and Spatial Analysis of Ceremonial Architecture at Late Postclassic Mayapán. *Journal of Archaeological Science* 30: 941-953.

Puleston, Cedric O. and Shripad Tuljapurkar
2008 Population and prehistory II: Space-limited human populations in constant environments. Theoretical Population Biology 74(2); 147-160.

Puleston, C., Tuljapurkar, S., Winterhalder, B.
2014 The Invisible Cliff: Abrupt Imposition of Malthusian Equilibrium in a Natural Fertility, Agrarian Society. *PLoS ONE* 9(1): e87541. doi:10.1371/journal.pone.0087541.

Reininghaus, Lee Nichole
2009 *Protohistoric Signatures of Household Material Wealth: An Interhousehold Analysis of the Bridge River Site (EeRl4).* Master's thesis, Department of Anthropology, University of Montana, Missoula.

Reitz, E. J. and E. S. Wing
2008 *Zooarchaeology.* 2nd ed. Cambridge University Press, Cambridge.

Rick, John W. and Sylvia Chappell
1983 Thermal Altercation of Silica Materials in Technological and Functional Perspective. *Lithic Technology* 12(3): 69-80.

Rua, Helena
2009 Geographic Information Systems in Archaeological Analysis: A Predictive Model in the Detection of Rural Roman *Villae*. *Journal of Archaeological Science* 36: 224-235.

Sakaguchi, Takashi, Jesse Morin and Ryan Dickie
2010 Defensibility of Large Prehistoric Sites in the Mid-Fraser region on the Canadian Plateau. *Journal of Archaeological Science* 37(6): 1171-1185.

Sakek-Kooros, H.
1975 Intentional Fracturing of Bone: Description of Criteria. In *Archaeological Studies*, edited by A. T. Clason, pp. 139-150. Amsterdam: North Holland Publishing Company.

Shipman, P., G. Foster, and M. Schoeninger
1984 Burnt Bones and Teeth: An Experimental Study of Color, Morphology, Crystal Structure and Shrinkage. *Journal of Archaeological Science* 11(4)307-325.

Smith, Eric Alden, Kim Hill, Frank W. Marlowe, David Nolin, Polly Wiessner, Michael Gurven, Samuel Bowles, MoniqueBorgerhoff Mulder, Tom Hertz, and Adrian Bell
2010 Wealth transmission and inequality among hunter-gatherers. *Current Anthropology* 51(1):19–34.

Spafford, Jim
2000 Patterns in Lithic Artifact Distributions and the Social Organization of Space on Housepit Floors. In *The Ancient Past of Keatley Creek, Volume II Socioeconomy*, edited by Brian Hayden, pp. 167-178. Archaeology Press, Burnaby, B.C.

Stryd, Arnoud H.
1971 Introduction: A Speculative Framework for Plateau Prehistory. *In* Aboriginal Man and Environments on the Plateau of Northwest North America. Edited by A. H. Stryd and R. Smith, pp. 7-14. University of Calgary Archaeological Association, Calgary.

1972 Housepit Archaeology in Lillooet, British Columbia: The 1970 Field Season. *BC Studies* 14:17-46.

Stryd, Arnoud H., and J. Baker
1968 Salvage Excavation at Lillooet, British Columbia. *Syesis* 1:47- 56.

Stryd, Arnoud H., and S. Lawhead

1978 *Reports of the Lillooet Archaeological Project.* National Museum of Man, Mercury Series No. 73. National Museum of Canada, Ottawa.

Sullivan, Alan P. and Kenneth C. Rozen

1985 Debitage Analysis and Archaeological Interpretation. *American Antiquity* 50(4): 755-779.

Teit, James

1900 *The Thompson Indians of British Columbia*. Memoirs Vol. 2, No. 4, pp. 163-392. American Museum of Natural History, New York.

1906 *The Lillooet Indians*. Memoirs Vol. 2, No. 5, pp. 193-300. American Museum of Natural History, New York.

1909 *The Shuswap*. Memoirs Vol. 2, No. 7, pp. 443-813. American Museum of Natural History, New York.

1916 European Tales from the Upper Thompson Indians. *The Journal of American Folklore* 29 (113): 301-329.

Testart, A.

1982 The significance of food storage among hunter–gatherers: residence patterns, population densities, and social inequalities. *Current Anthropology* 23, 523–538.

Tringham, Ruth et al.

1974 Experimentation in the Formation of Edge Damage: A New Approach to Lithic Analysis. *Journal of Field Archaeology* 1(1/2):171-196.

Ward, Ogden Wyatt

2011 *Listen to the Bones: An Analysis of the Variation Within the Faunal Remains at the Brider River Site.* Master's thesis, Department of Anthropology, University of Montana, Missoula.

Watkins, Joe

2005 Through Wary Eyes: Indigenous Perspectives on Archaeology *Annual Review of Anthropology*, Vol. 34 pp. 429-449.

White, Tim D., Michael T. Black and Pieter A. Folkens.

2012 *Human Osteology.* 3rd ed. Academic Press, New York.

Wilk, Richard R., and Robert McC. Netting
1984 Households: Changing Forms and Functions. . *In* Households: Comparative and Historical Studies of the Domestic Group, edited by Robert McC. Netting, Richard R. Wilk, and Eric J. Arnould, pp. 1-28.

Wilk, Richard R., and William L. Rathje
1982 Household Archaeology. *American Behavioral Scientist* 25: 617-639.

Williams, Alexandra
2011 *Household Organization in the Fur Trade Era: Socioeconomic and spatial organizations of Housepit 45.* Master's thesis, Department of Anthropology, University of Montana, Missoula.

Winterhalder, Bruce, Cedric Puleston and Cody Ross
2015 Production risk, inter-annual food storage by households and population-level consequences in seasonal prehistoric agrarian societies. *The Journal of Human Palaeoecology* 20(4): 337-348.

Wood, J.W.
1998 A theory of preindustrial population dynamics: demography, economy, and well-being in Malthusian systems. *Current Anthropology* 39, 99–136.

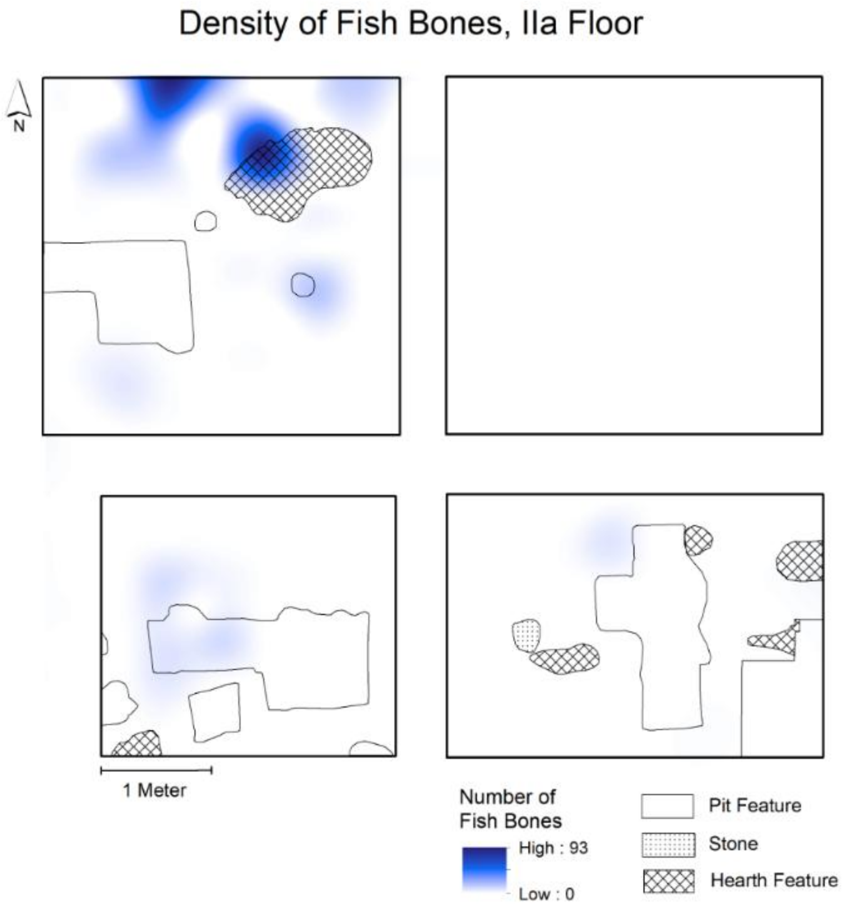


Fig. A.23a: Spline map of fish specimens from the IIa floor.

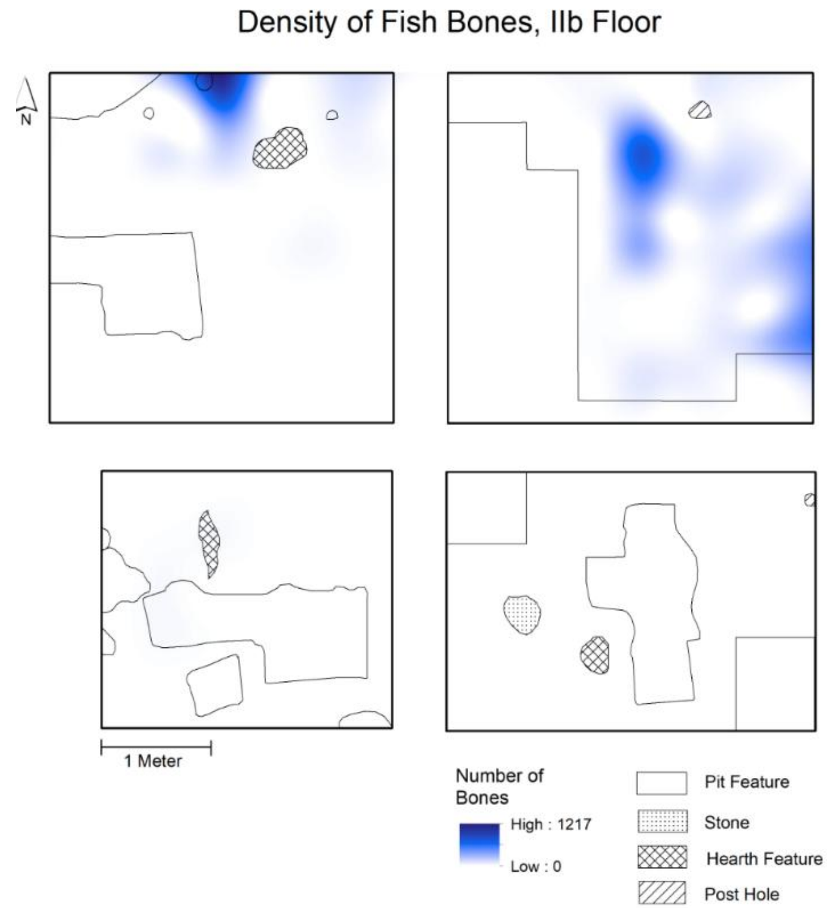


Fig. A.23b: Spline map of fish specimens from the IIb floor.

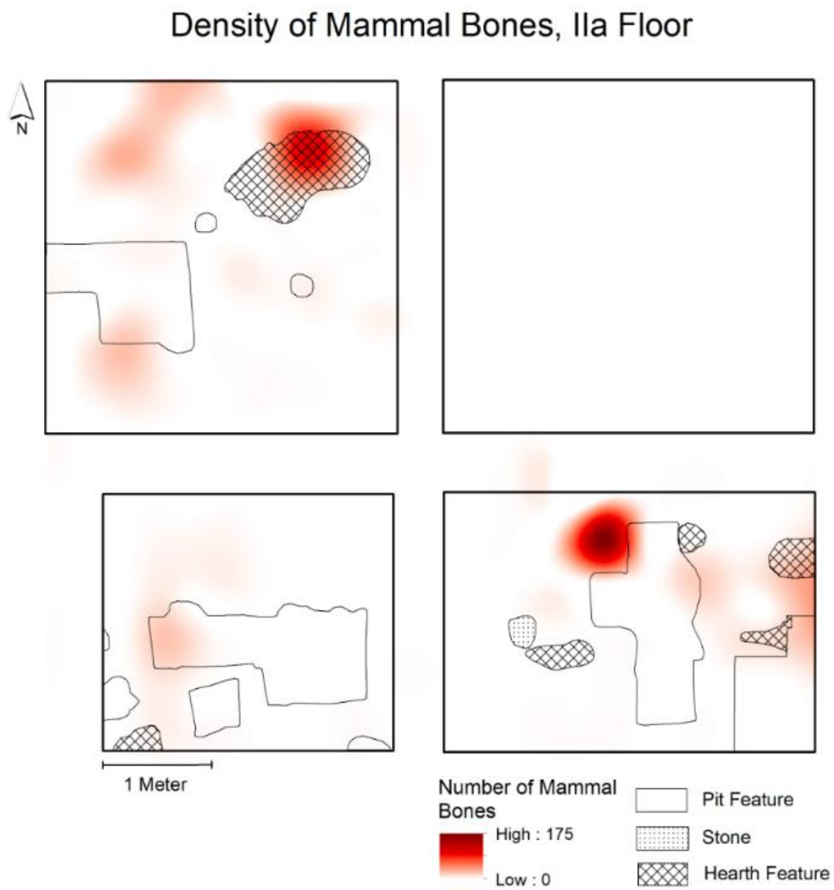


Fig. A.24a: Spline map of mammal specimens from the IIa floor.

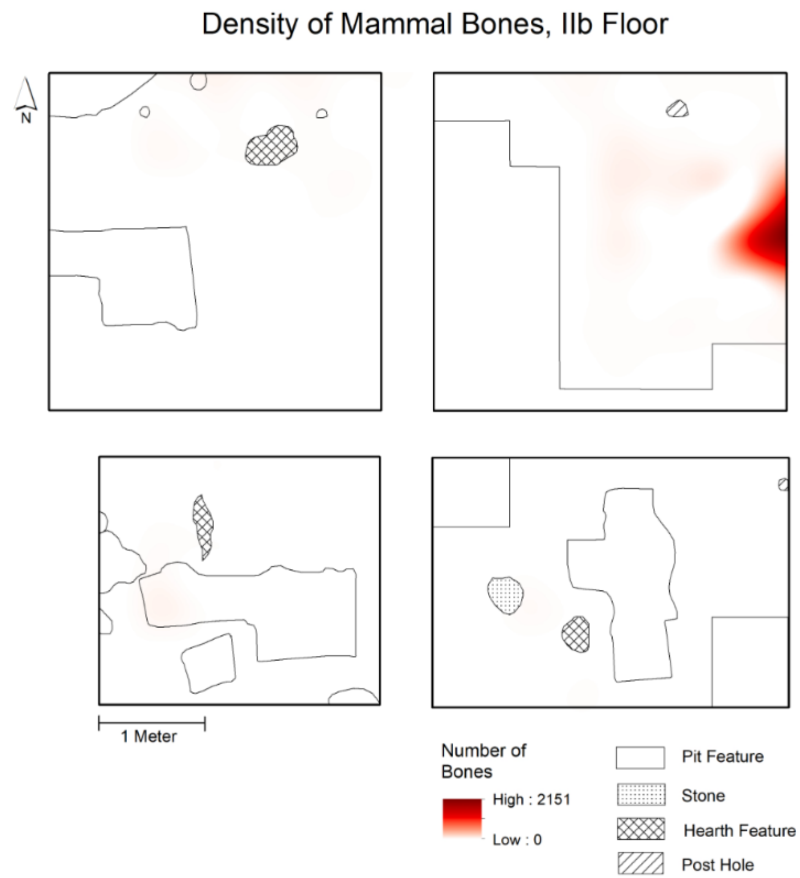


Fig. A.24b: Spline map of mammal specimens from the IIb floor.

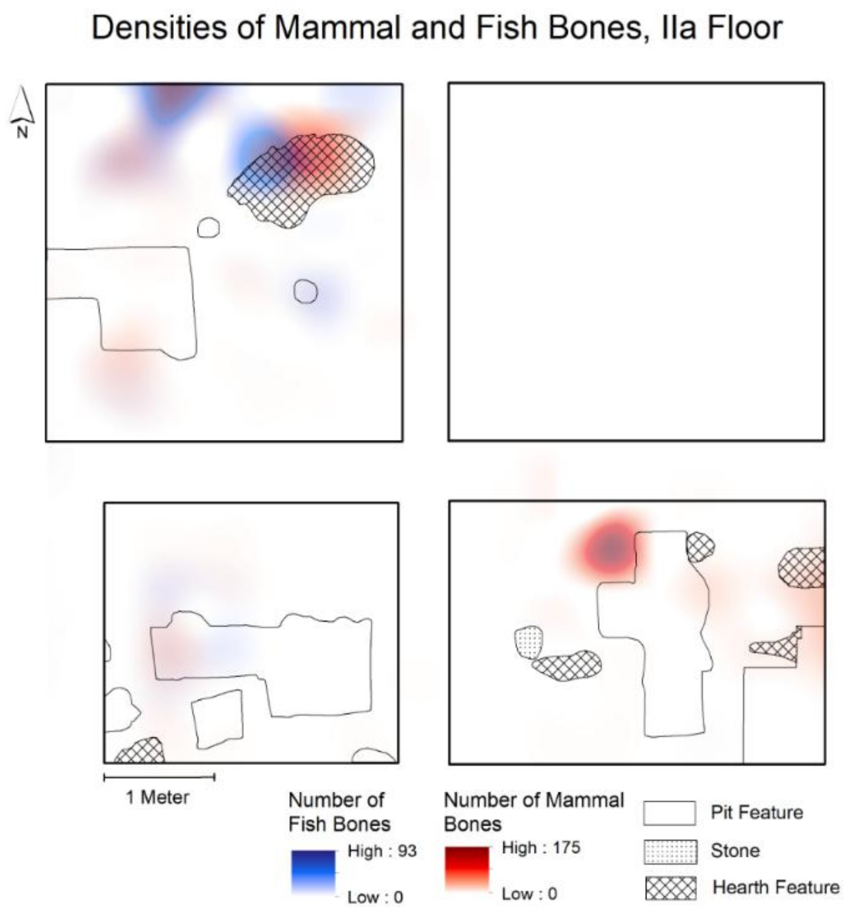


Fig. A.25a: Overlapping spline map of mammalian and fish specimens from the IIa floor.

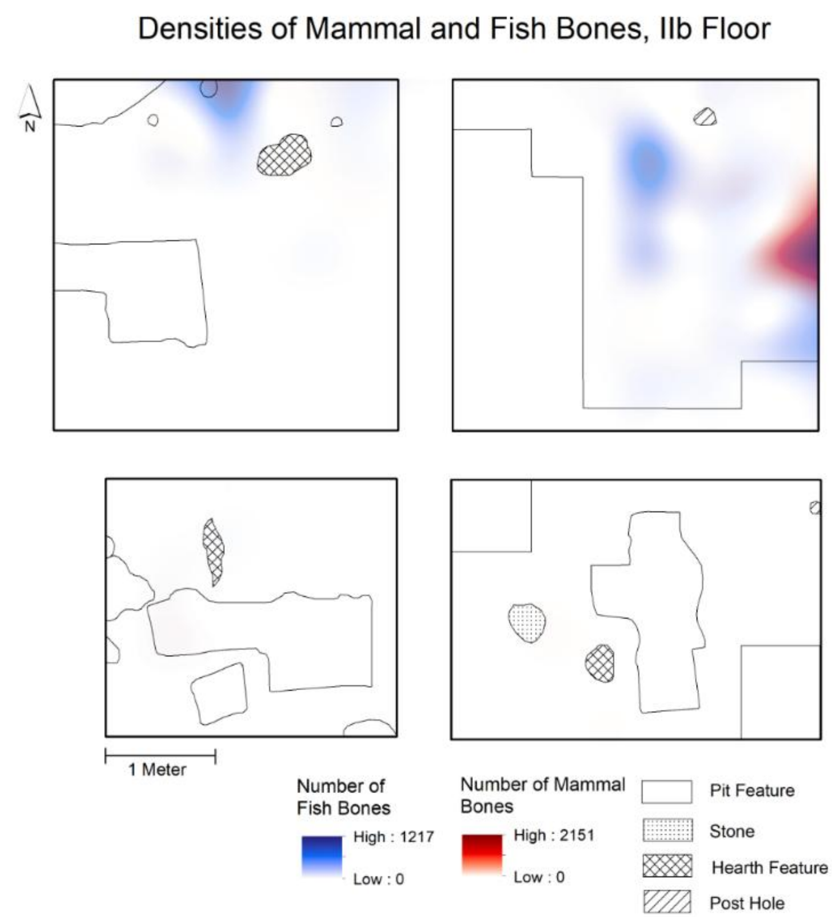


Fig. A.25b: Overlapping spline map of mammalian and fish specimens from the IIb floor.

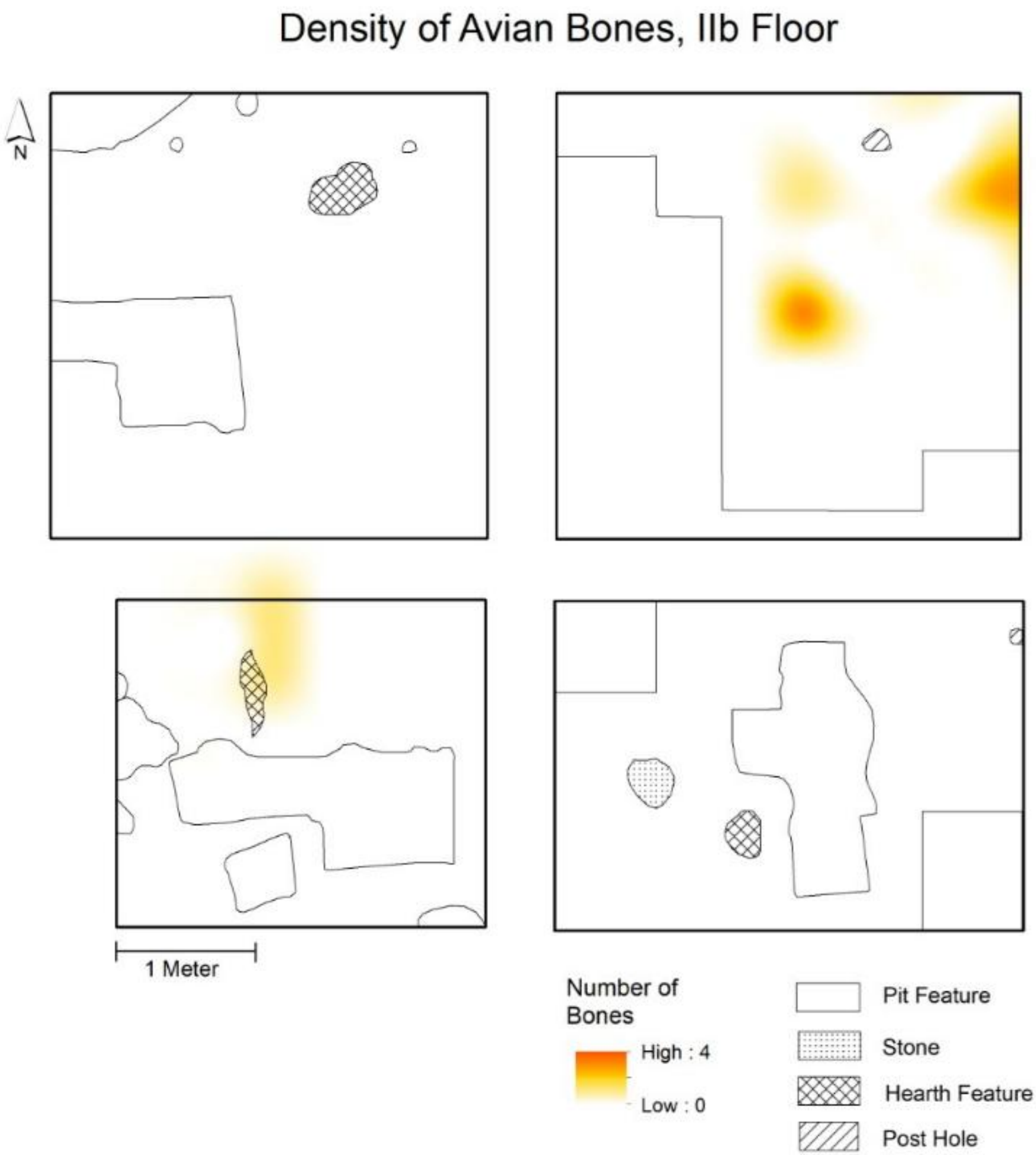


Fig. A.26: Spline map of avian specimens from the IIb floor.

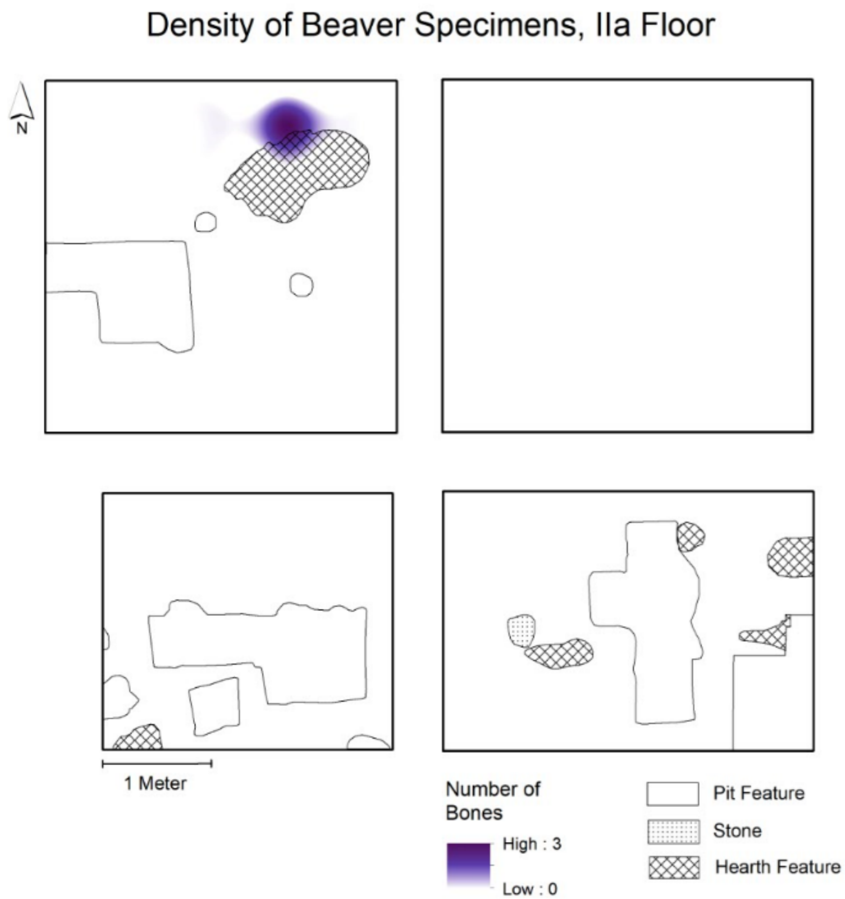


Fig. A.27a: Spline map of beaver specimens from the IIa floor.

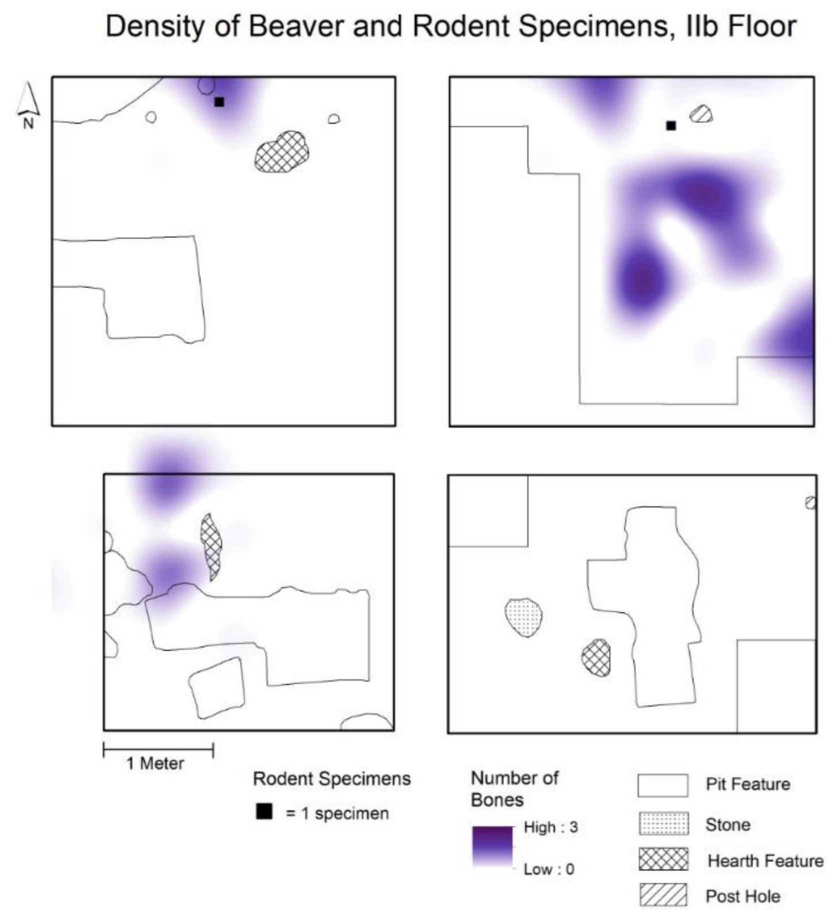


Fig. A.27b: Spline map of beaver and rodent specimens from the IIb floor.

Fig. A.28a: Spline map of canid specimens from the IIa floor.

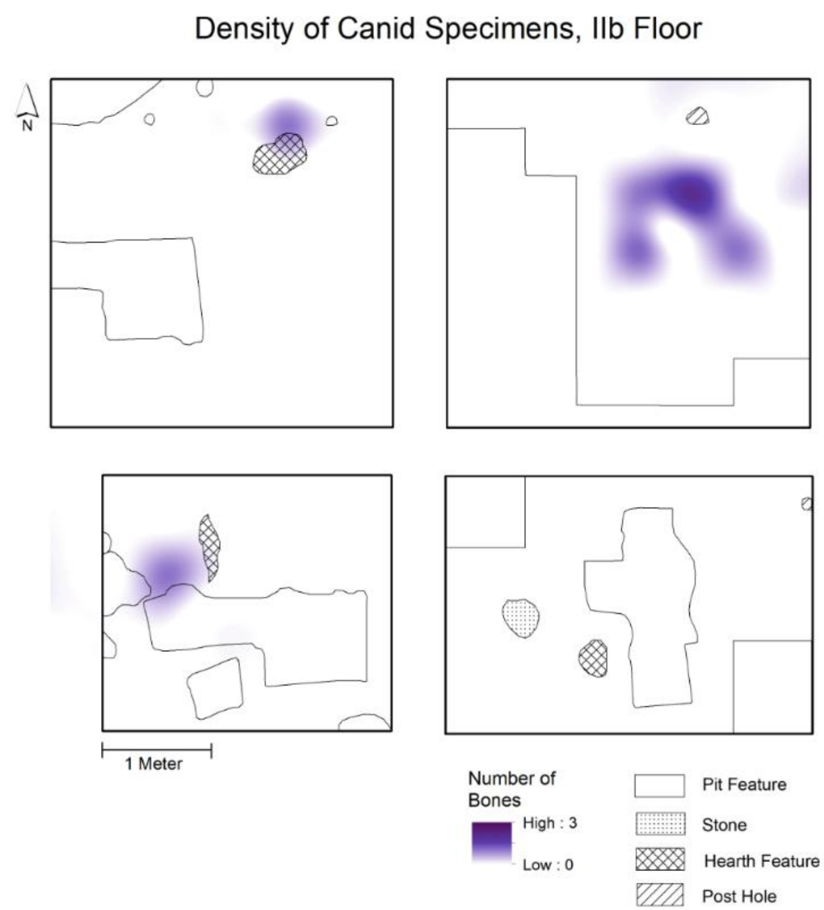
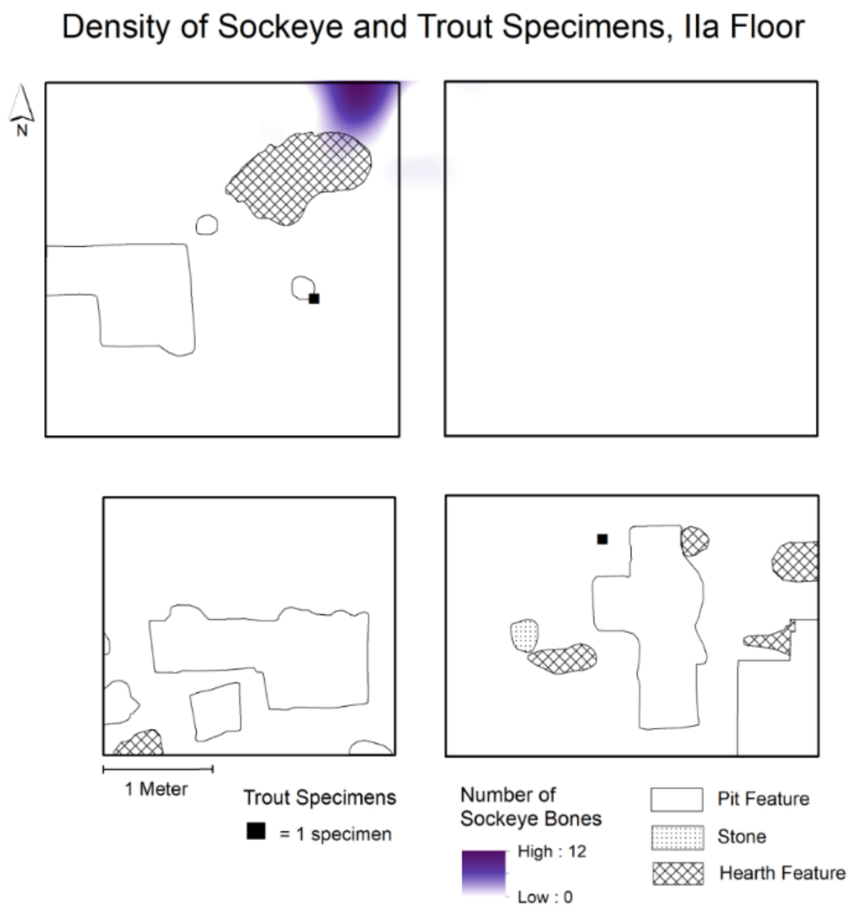


Fig. A.28b: Spline map of canid specimens from the IIb floor.



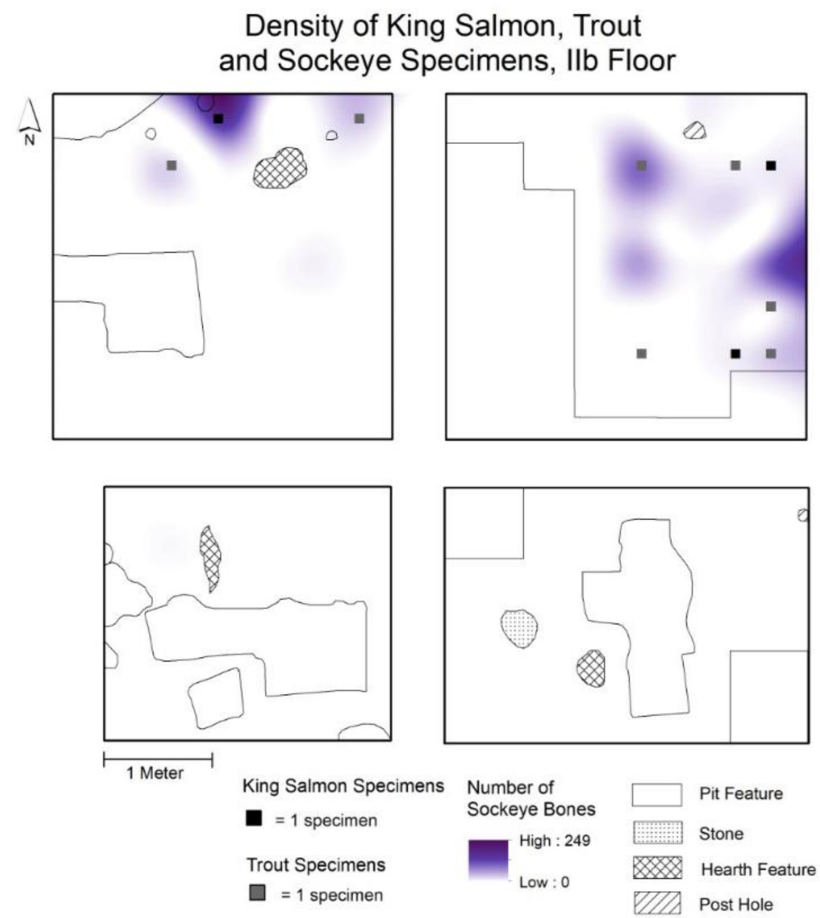
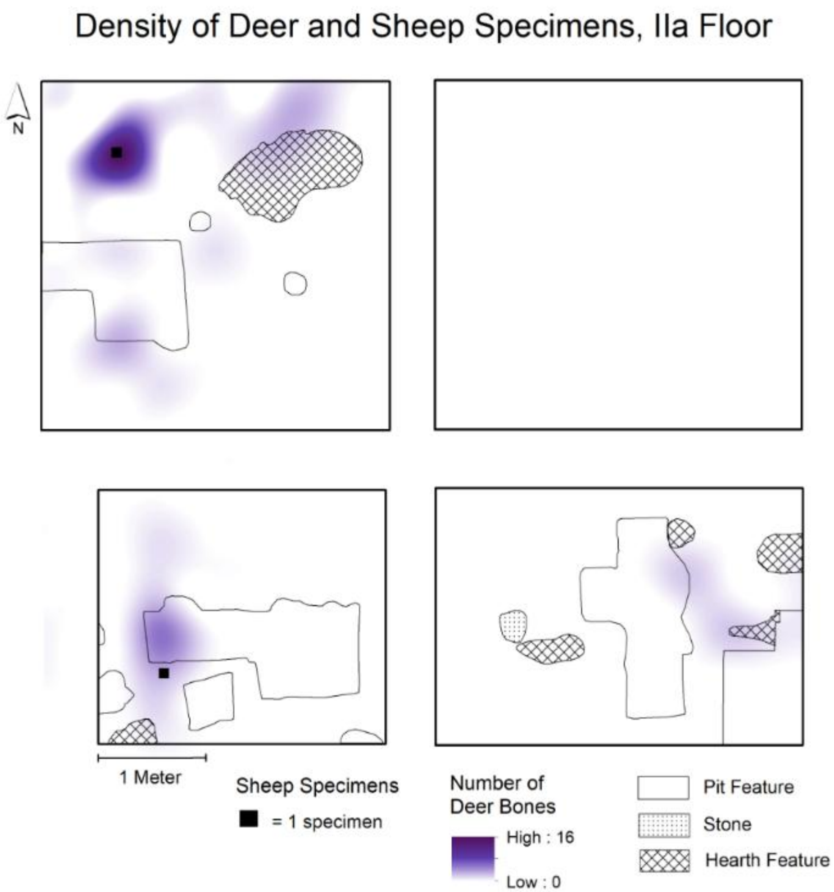


Fig. A.29a: Spline map of sockeye salmon and trout specimens from the IIa floor.

Fig. A.29b: Spline map of sockeye salmon, king salmon and trout specimens from the IIb floor.



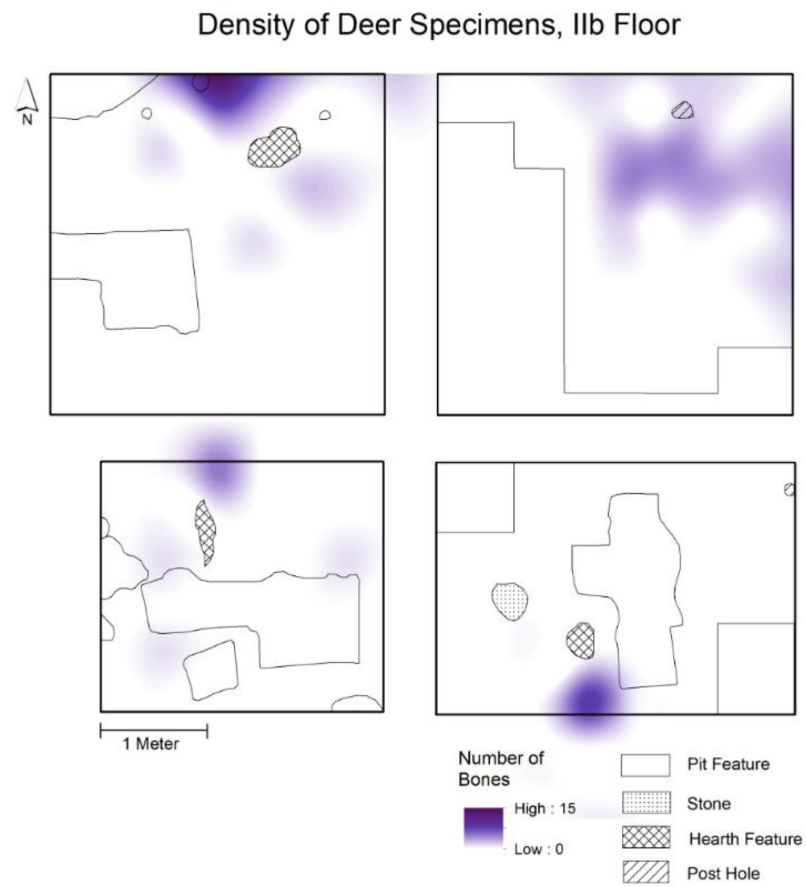


Fig. A.30a: Spline map of deer and big horned sheep specimens from the IIa floor.

Fig. A.30b: Spline map of deer specimens from the IIb floor.

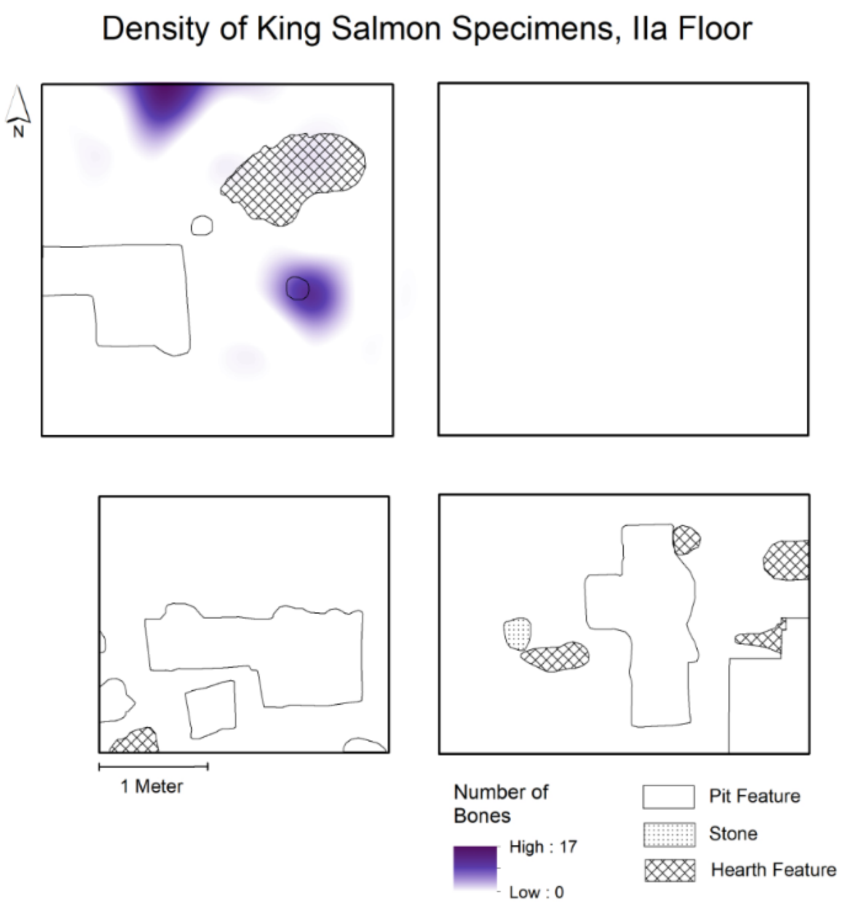


Fig. A.31: Spline map of king salmon specimens from the IIa floor.

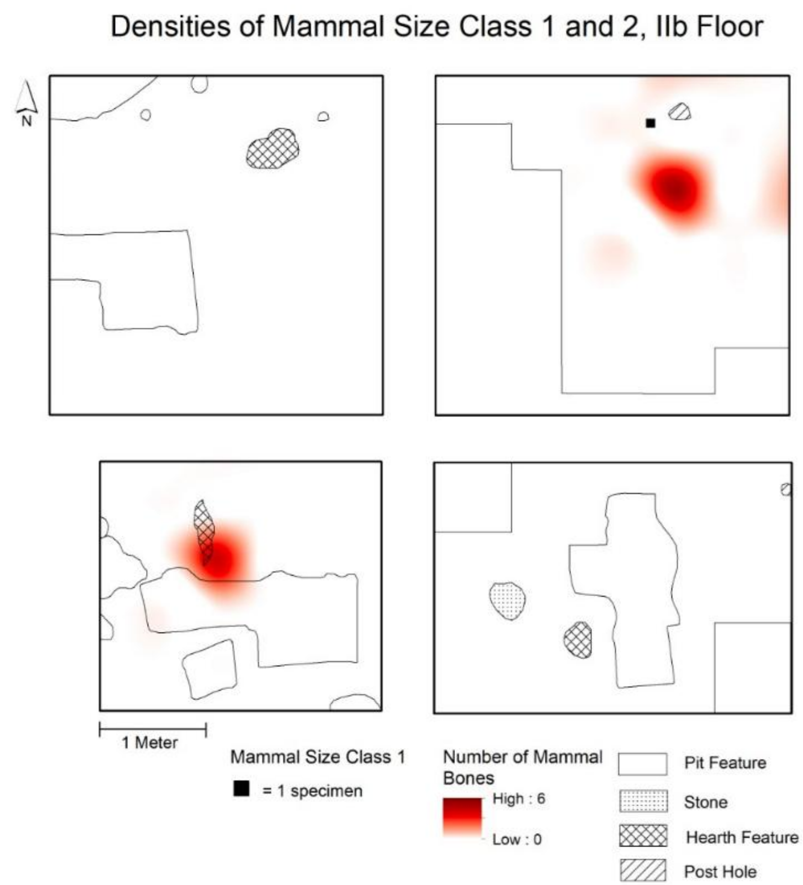


Fig. A.32: Spline map of mammal size class 1 and 2 from the IIb floor.

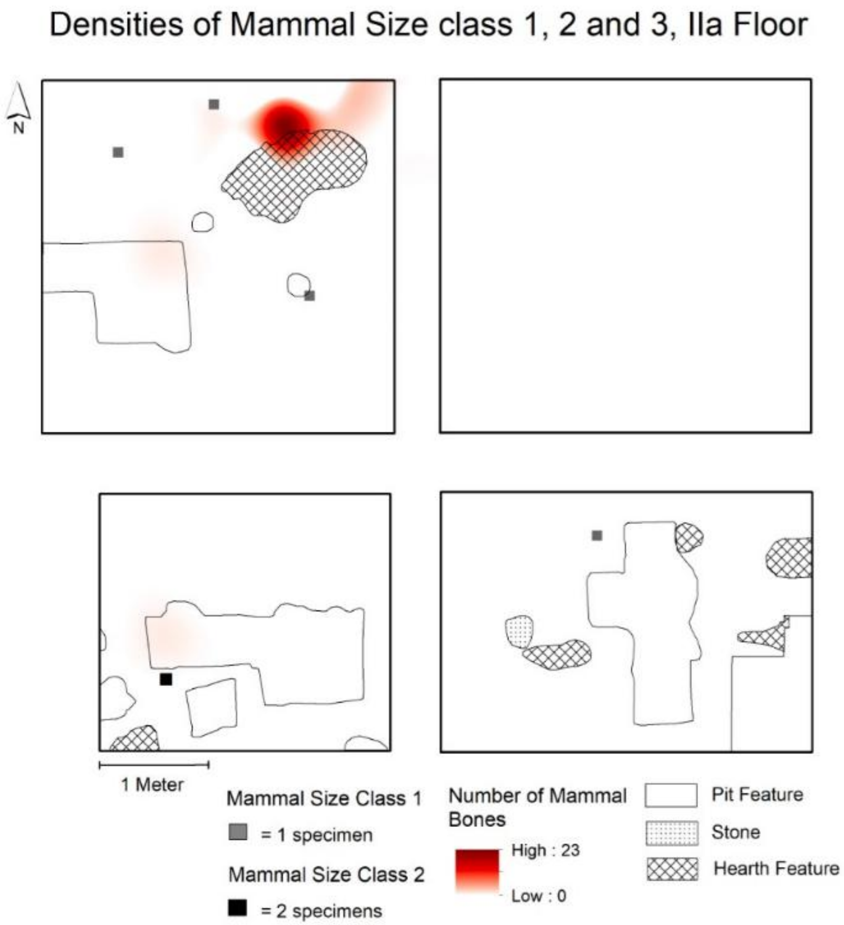


Fig. A.33a: Spline map of mammal size class 1, 2 and 3 from the IIa floor.

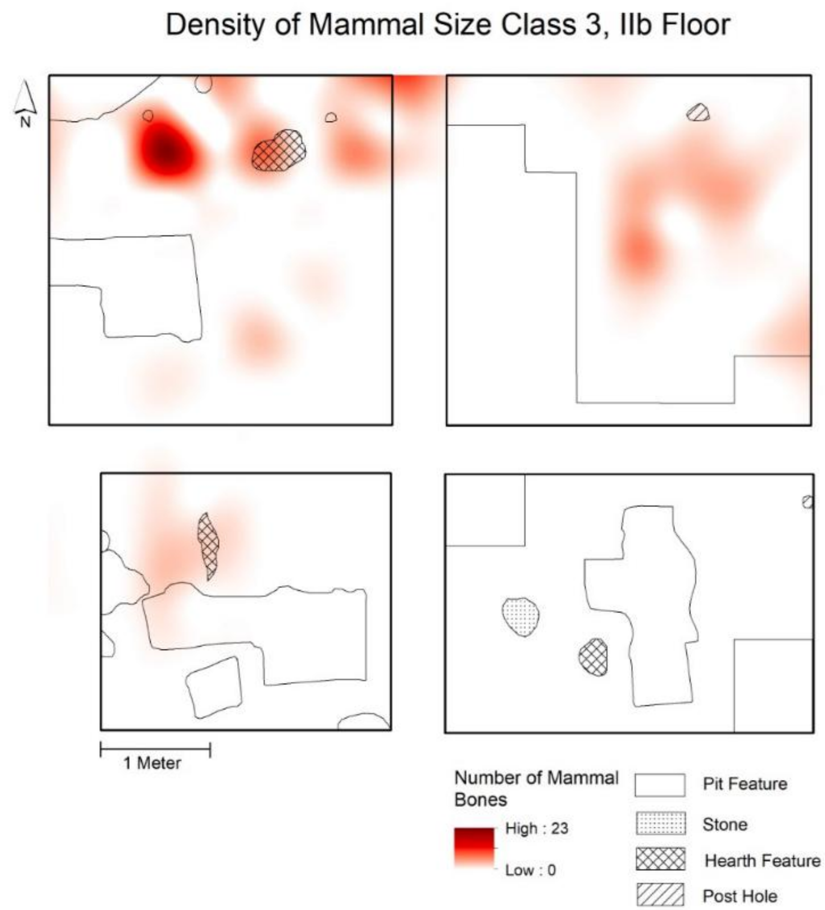


Fig. A.33b: Spline map of mammal size class 3 from the IIb floor.

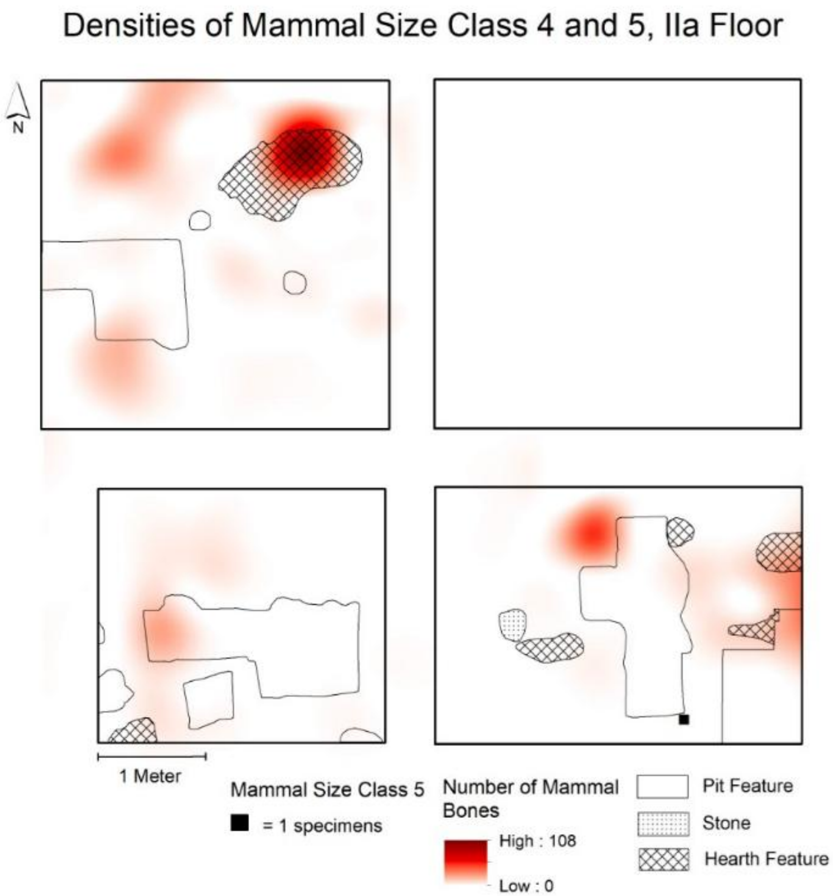


Fig. A.34a: Spline map of mammal size class 4 and 5 from the IIa floor.

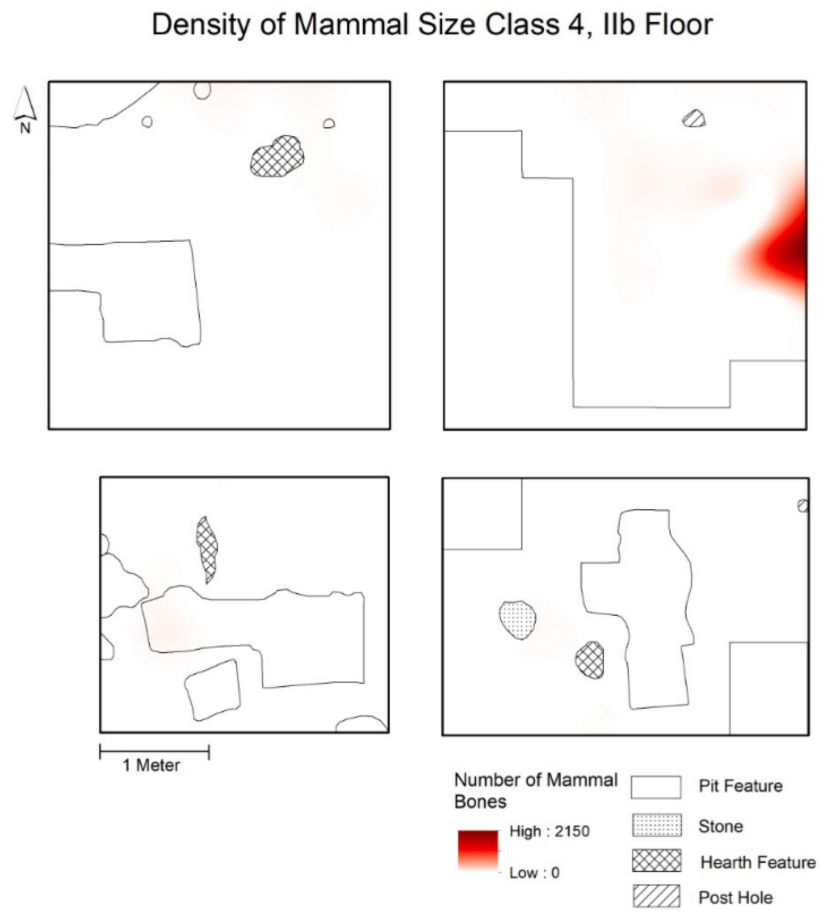


Fig. A.34b: Spline map of mammal size class 4 from the IIb floor.

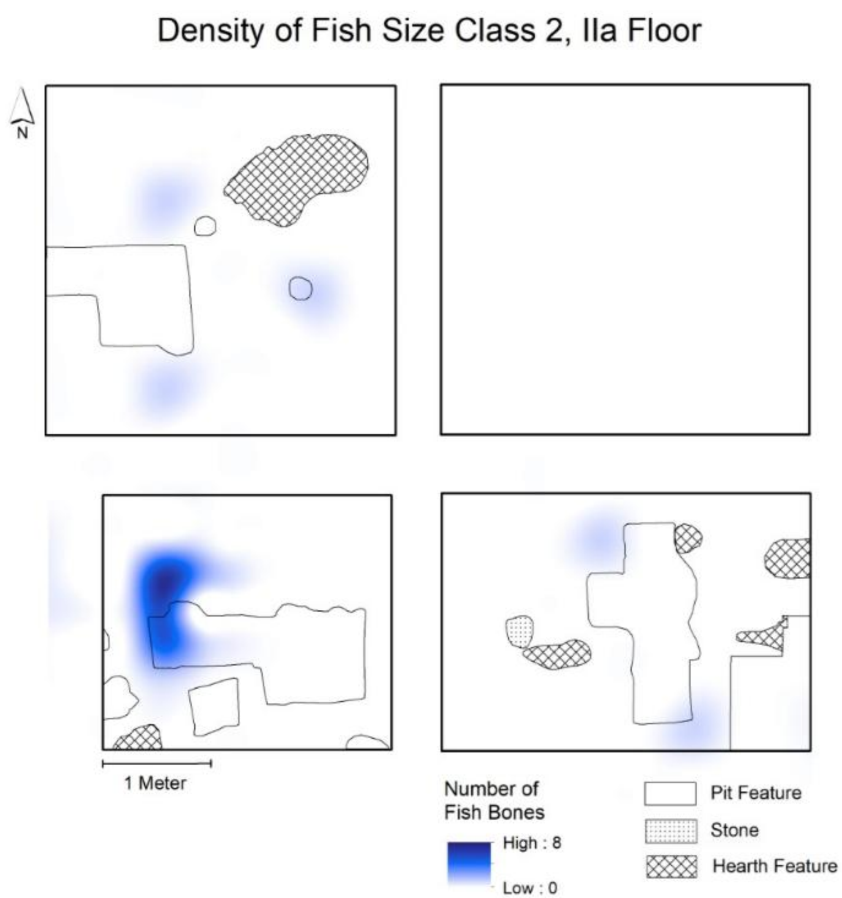


Fig. A.35a: Spline map of fish size class 2 from the IIa floor.

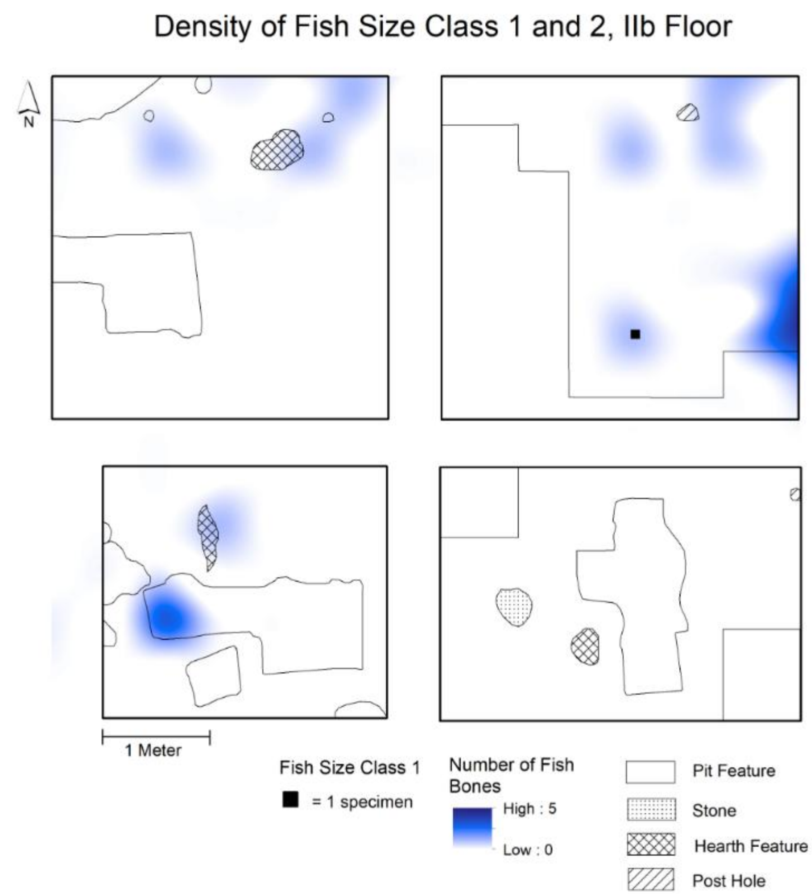


Fig. A.35b: Spline map of fish size class 1 and 2 from the IIb floor.

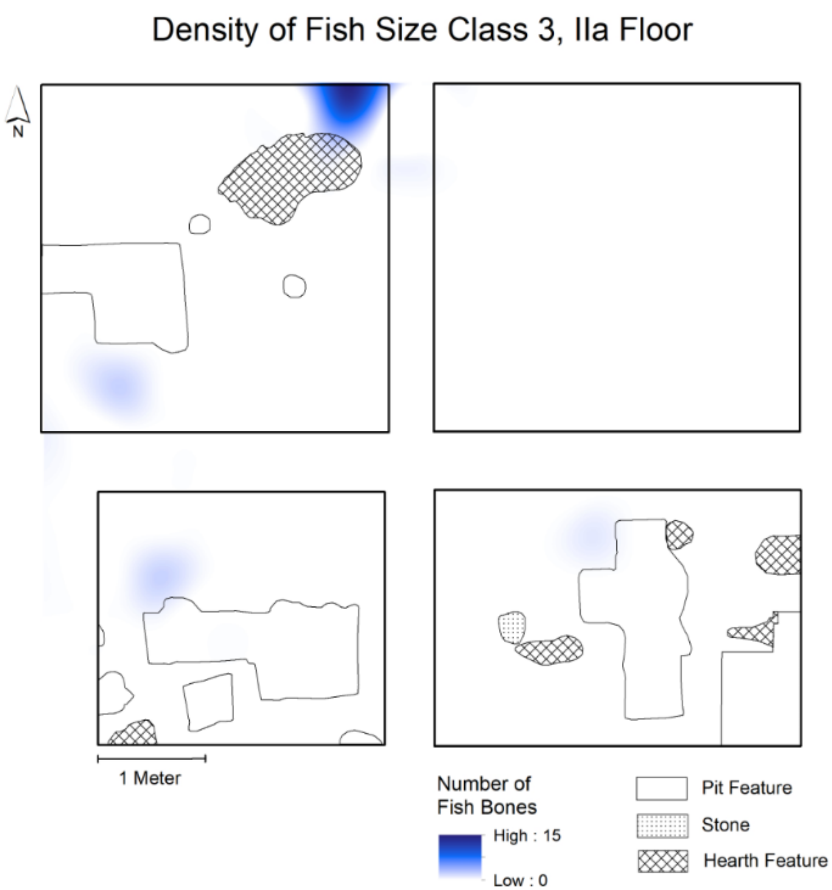


Fig. A.36a: Spline map of fish size class 3 from the IIa floor.

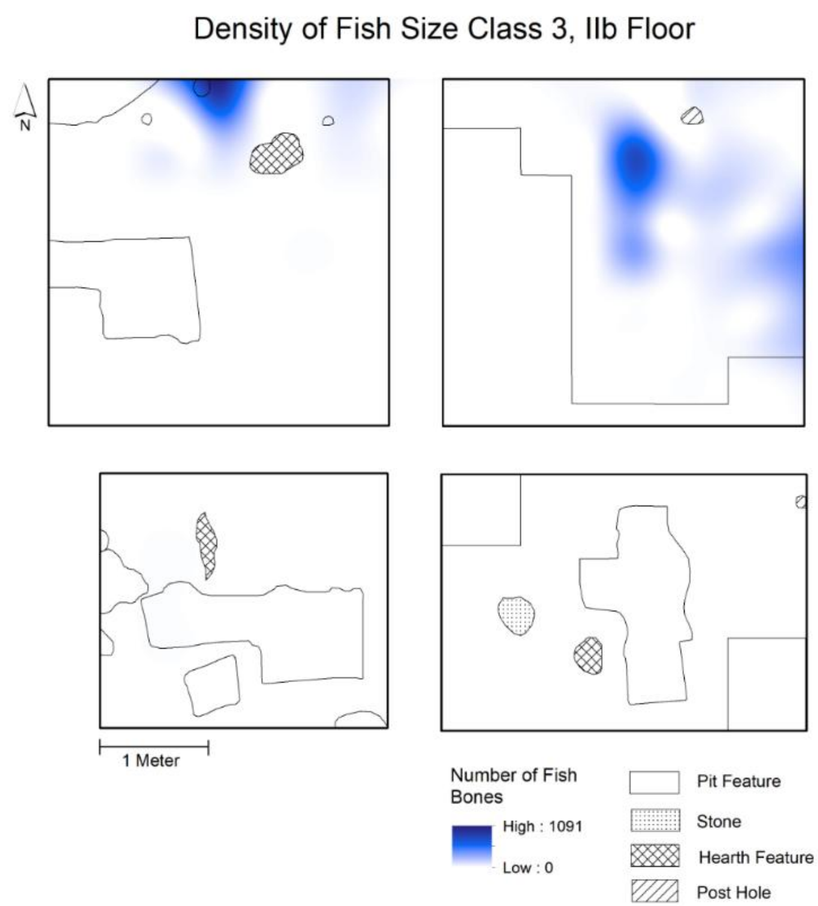


Fig. A.36b: Spline map of fish size class 3 from the IIb floor.

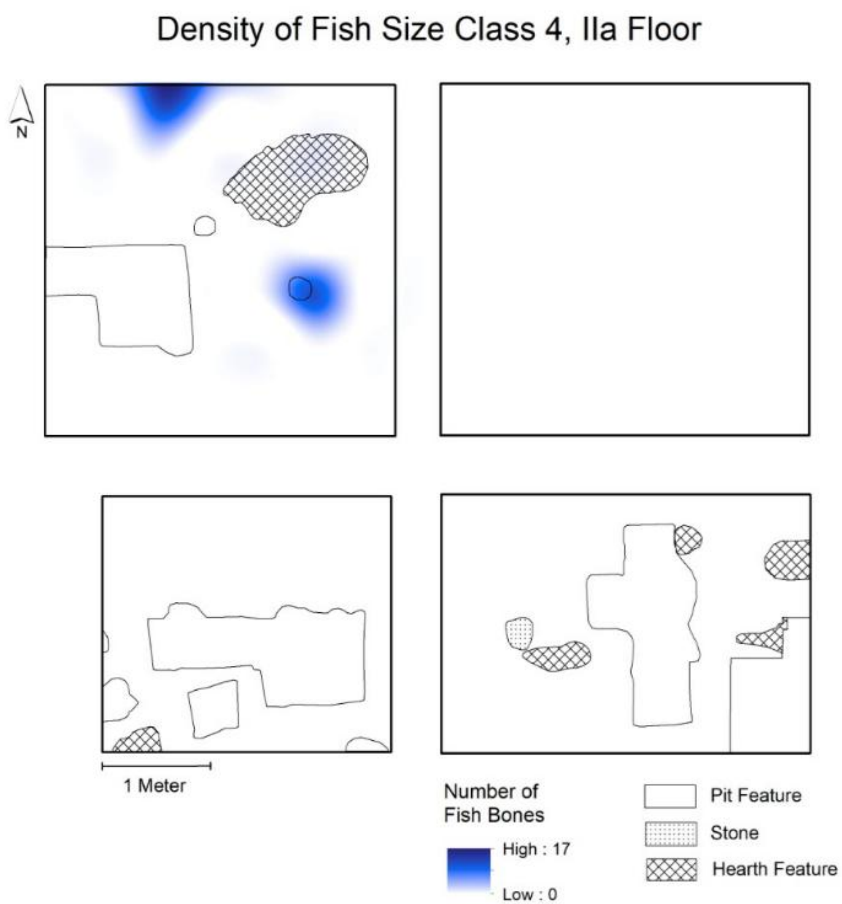


Fig. A.37a: Spline map of fish size class 4 from the IIa floor.

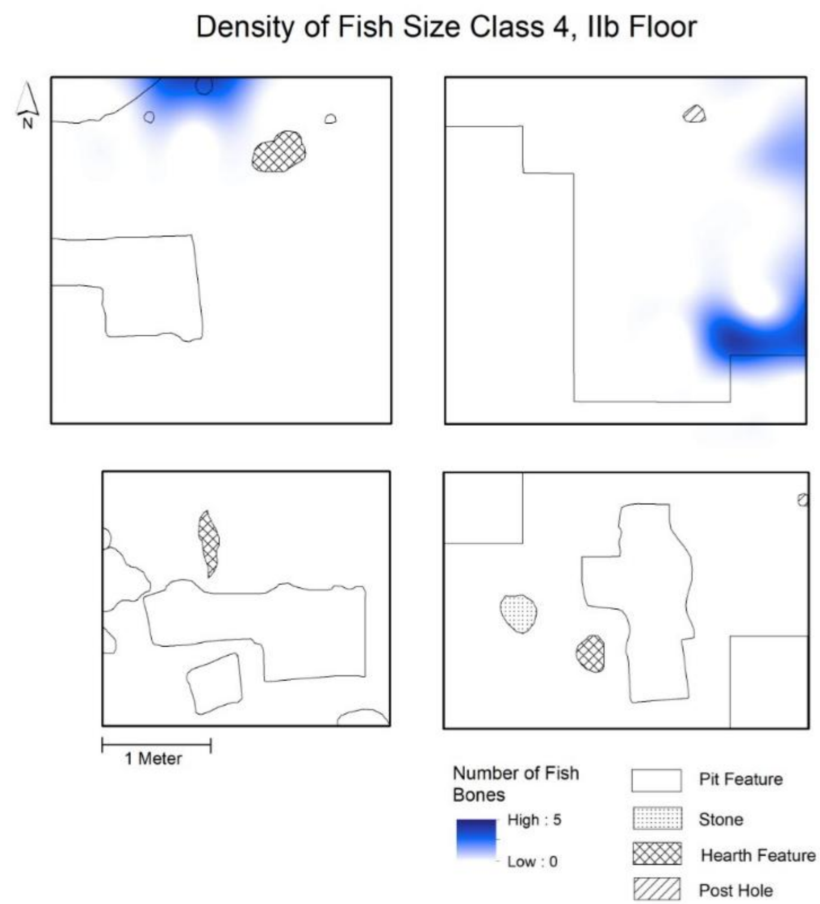


Fig. A.37b: Spline map of fish size class 4 from the IIb floor.

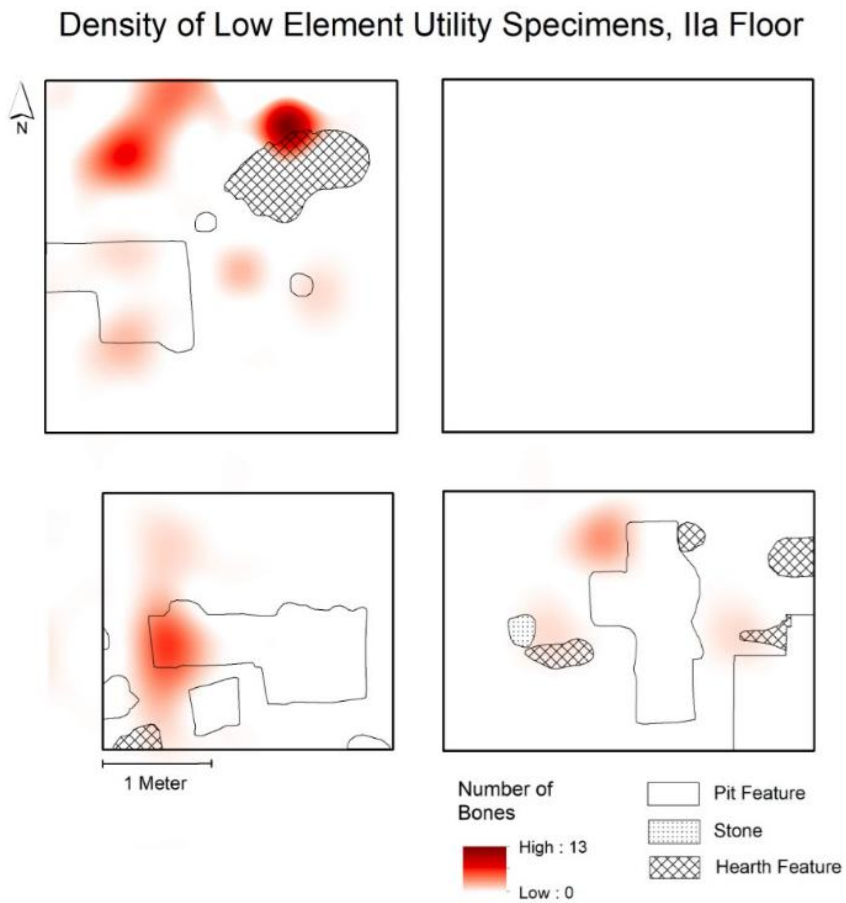


Fig. A.38a: Spline map of low element utility specimens from the IIa floor.

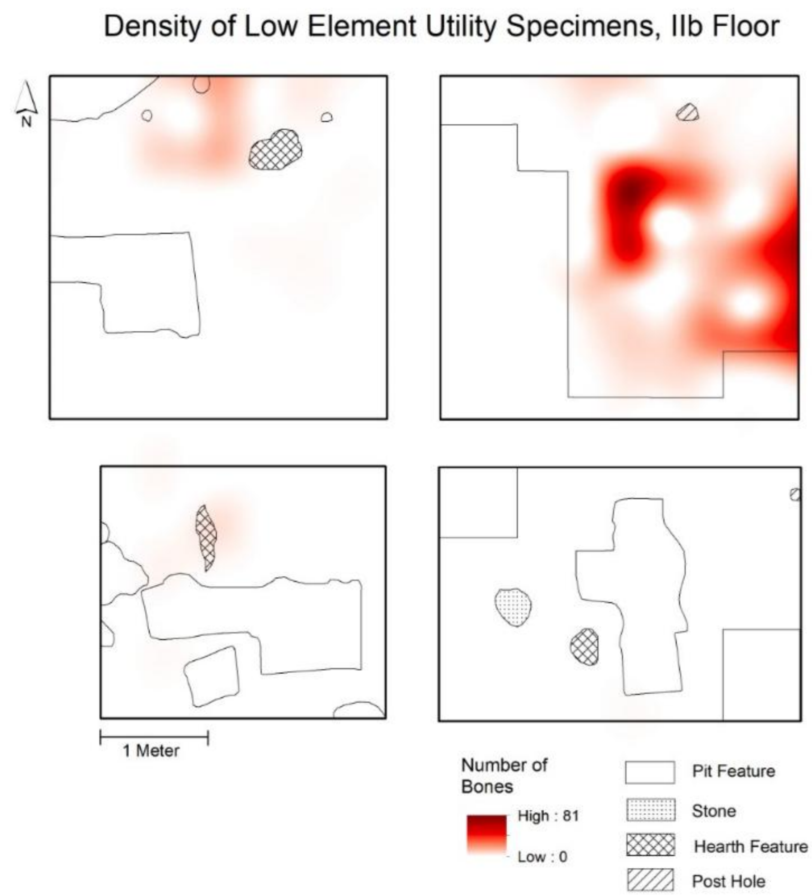


Fig. A.38b: Spline map of low element utility specimens from the IIb floor.

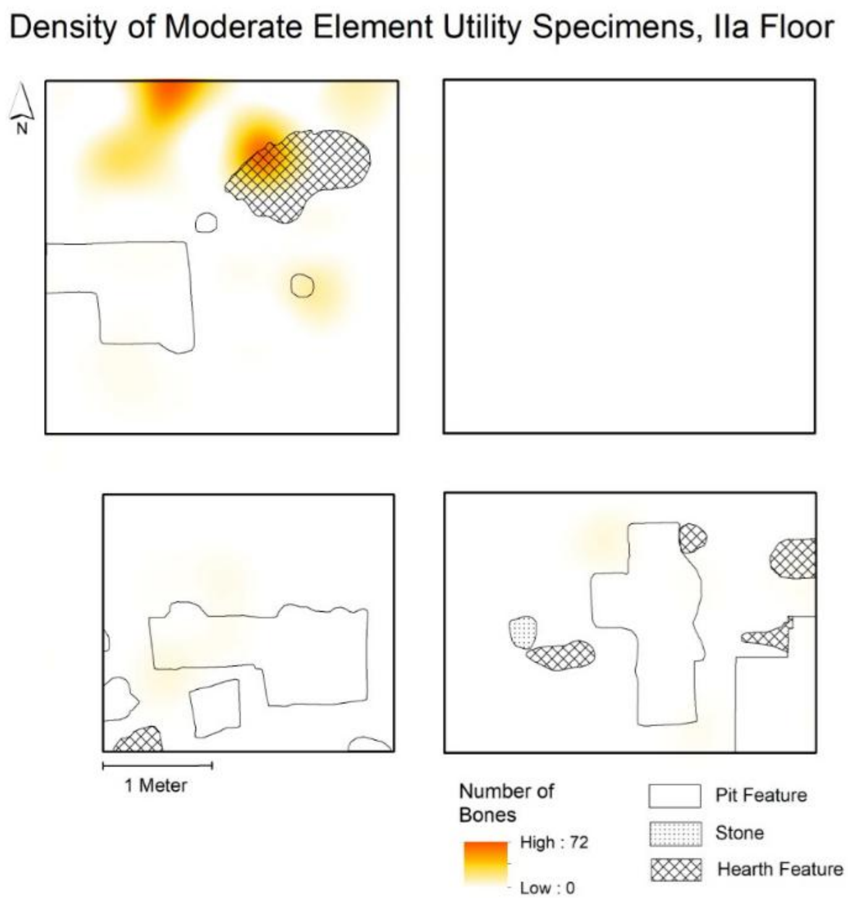


Fig. A.39a: Spline map of moderate element utility specimens from the IIa floor.

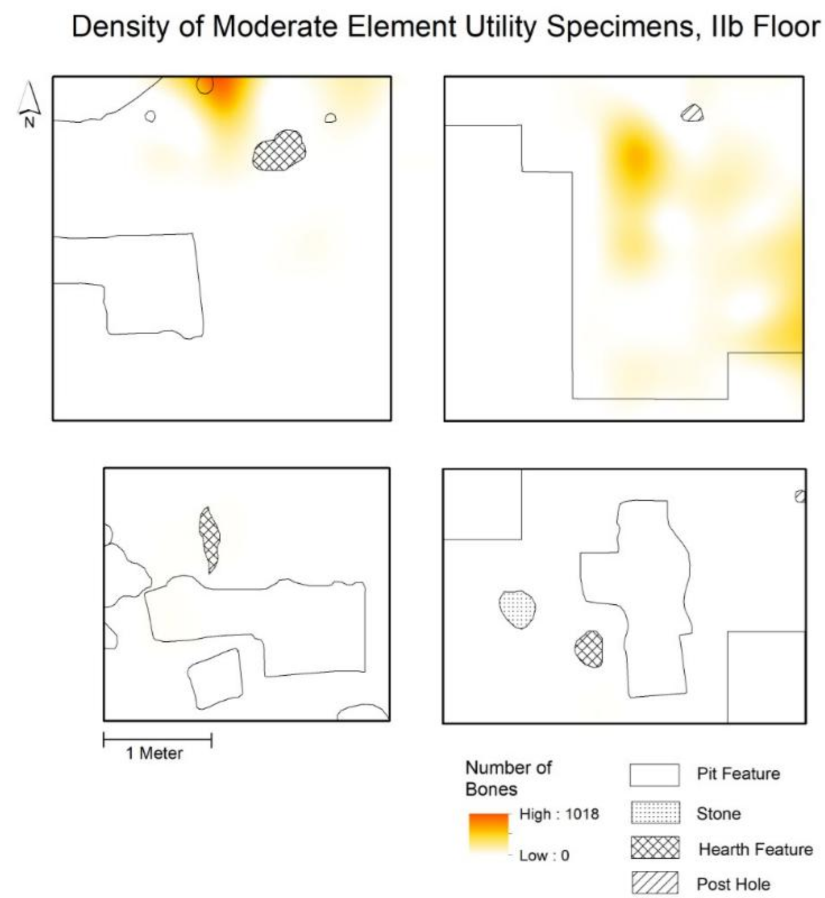


Fig. A.39b: Spline map of moderate element utility specimens from the IIb floor.

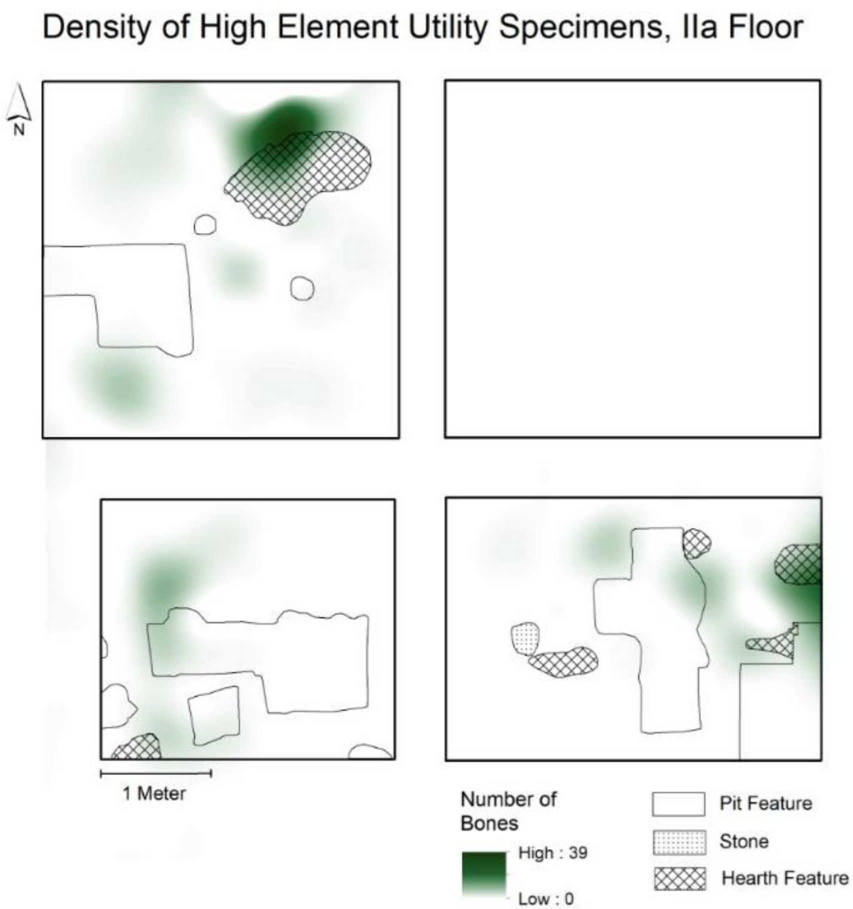


Fig. A.40a: Spline map of high element utility specimens from the IIa floor.

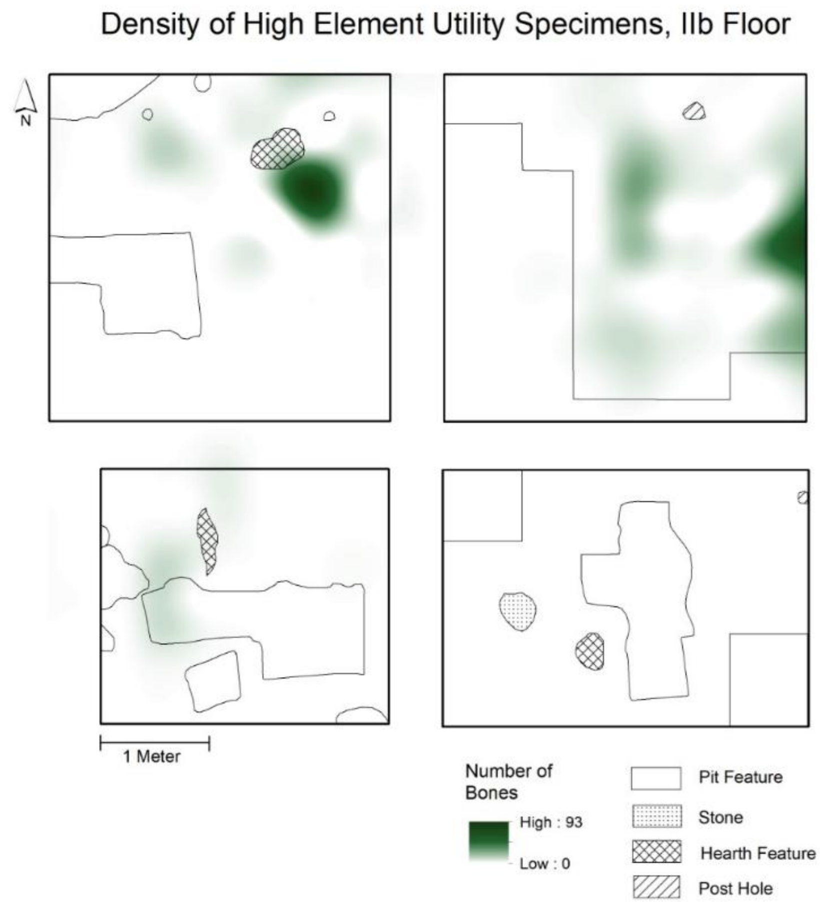


Fig. A.40b: Spline map of high element utility specimens from the IIb floor.

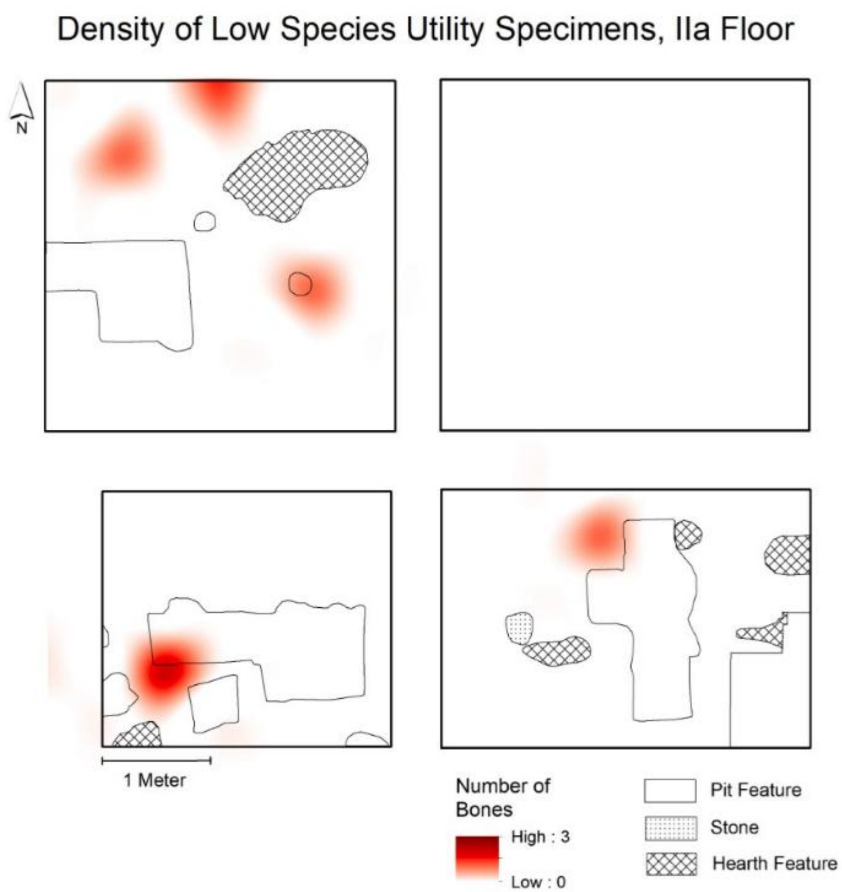


Fig. A.41a: Spline map of low species utility specimens from the IIa floor.

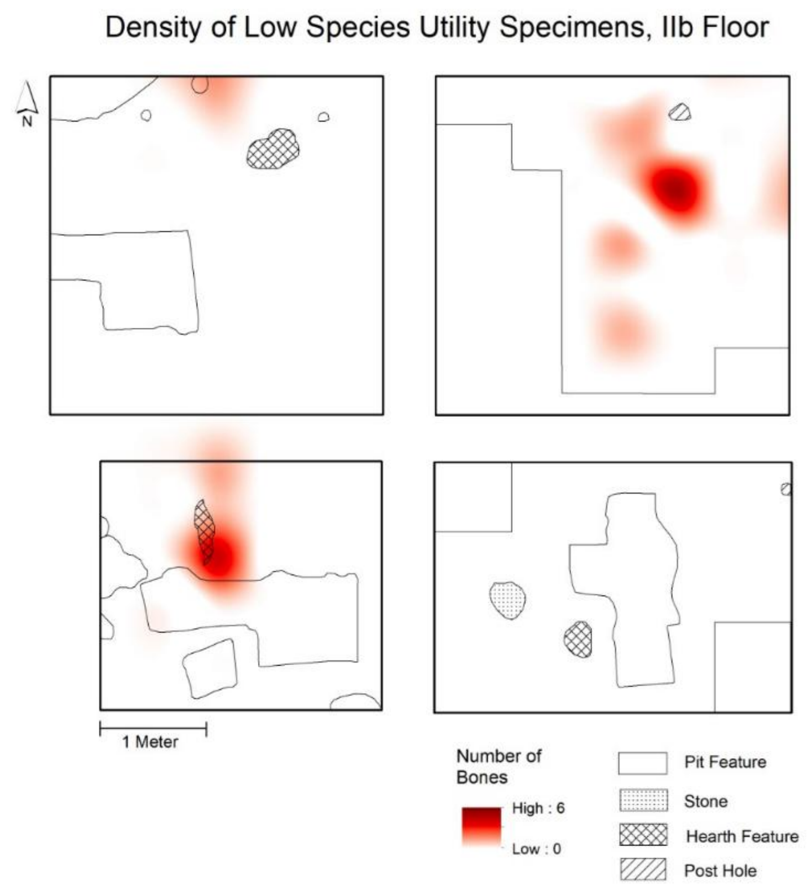


Fig. A.41b: Spline map of low species utility specimens from the IIb floor.

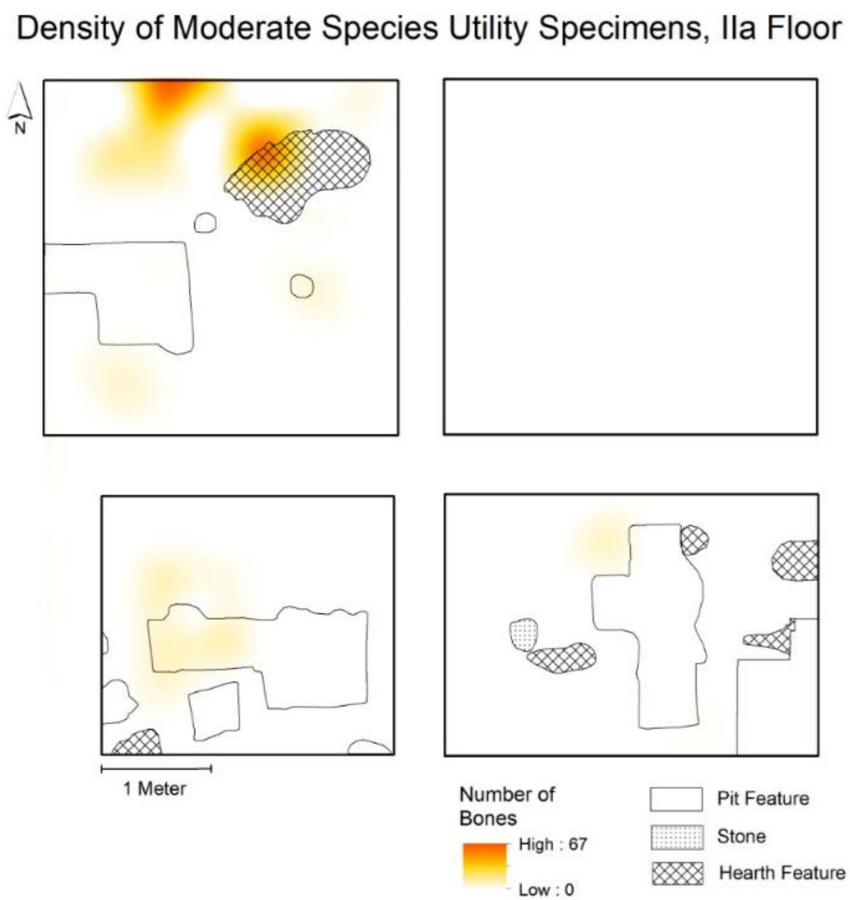


Fig. A.42a: Spline map of moderate species utility specimens from the IIa floor.

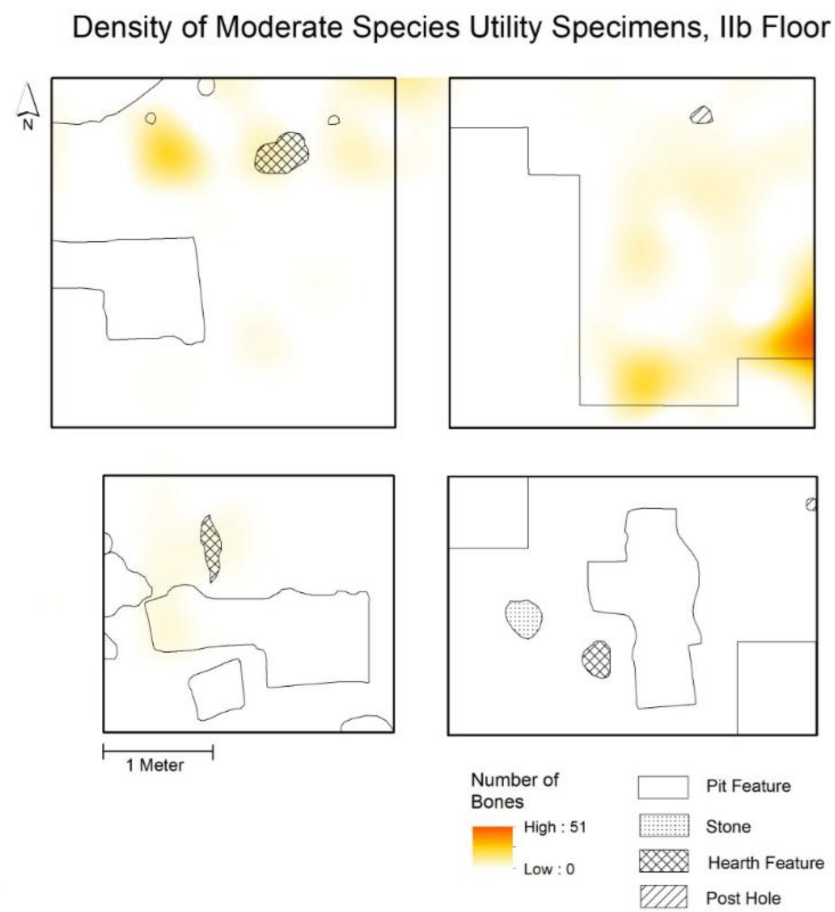


Fig. A.42b: Spline map of moderate species utility specimens from the IIb floor.

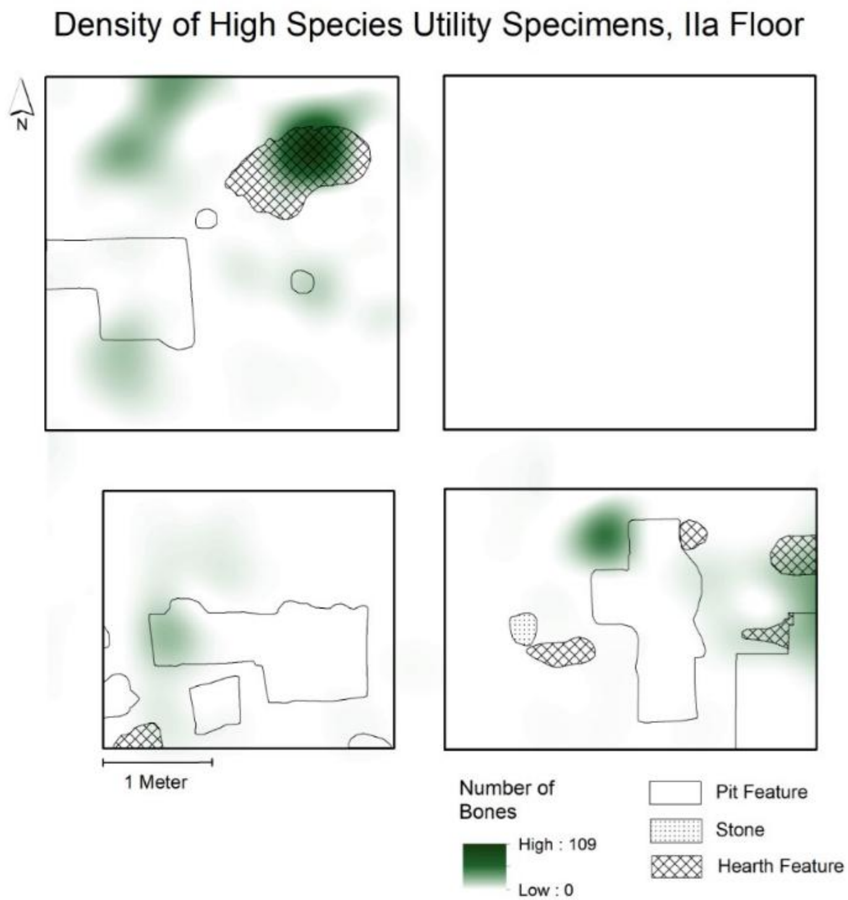


Fig. A.43a: Spline map of high species utility specimens from the IIa floor.

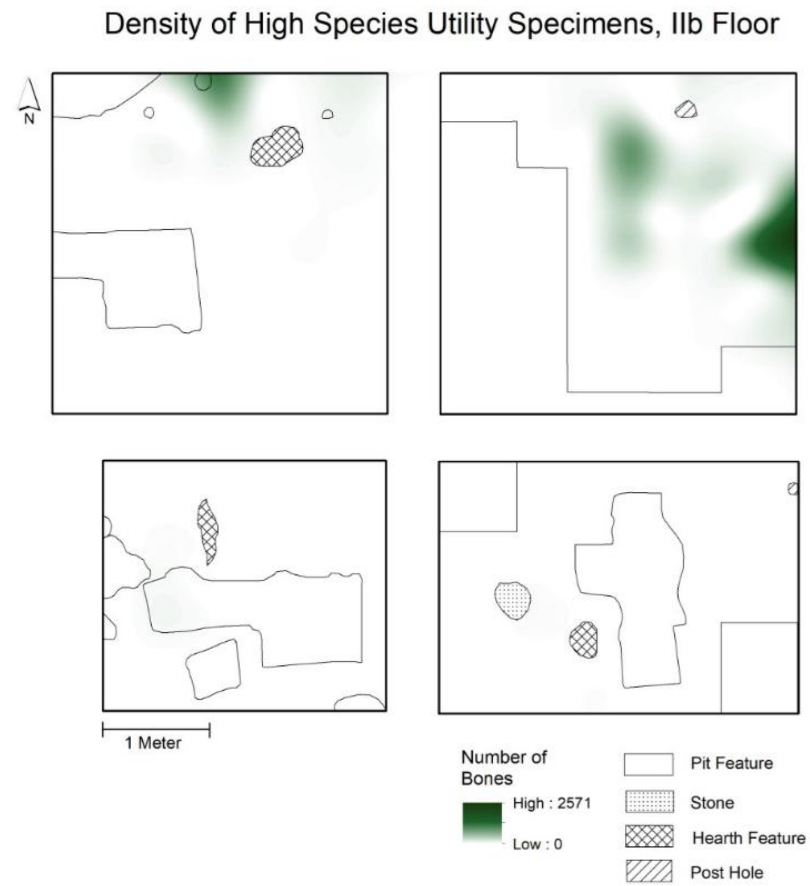


Fig. A.43b: Spline map of high species utility specimens from the IIb floor.

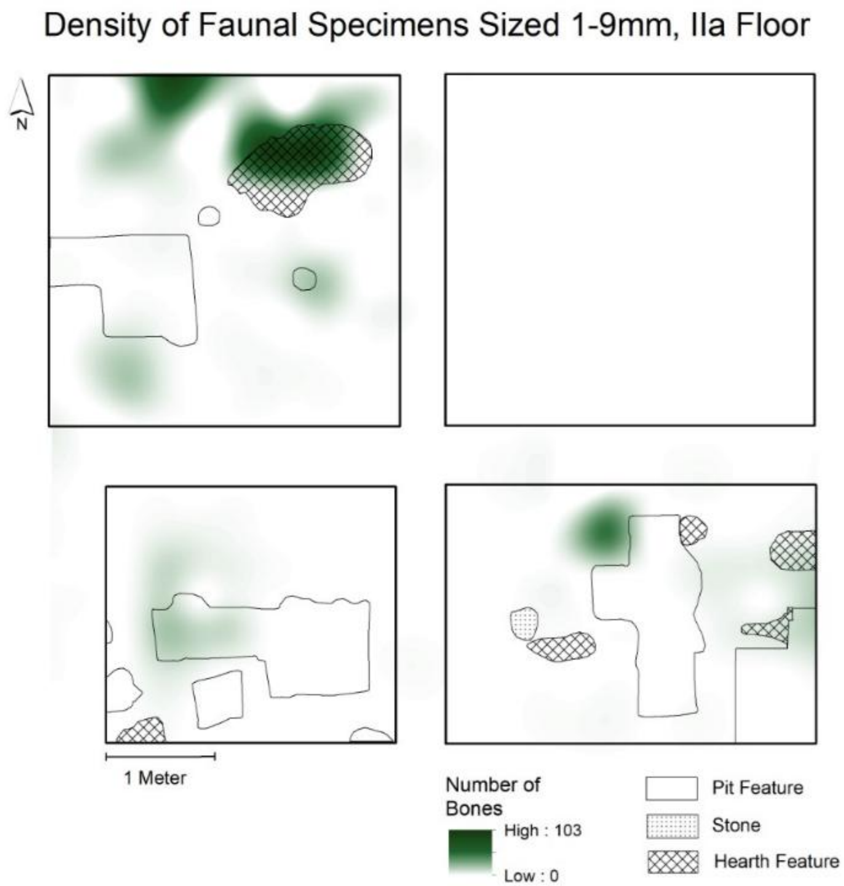


Fig. A.44a: Spline map of specimens of the size grade 1-9mm from the IIa floor.

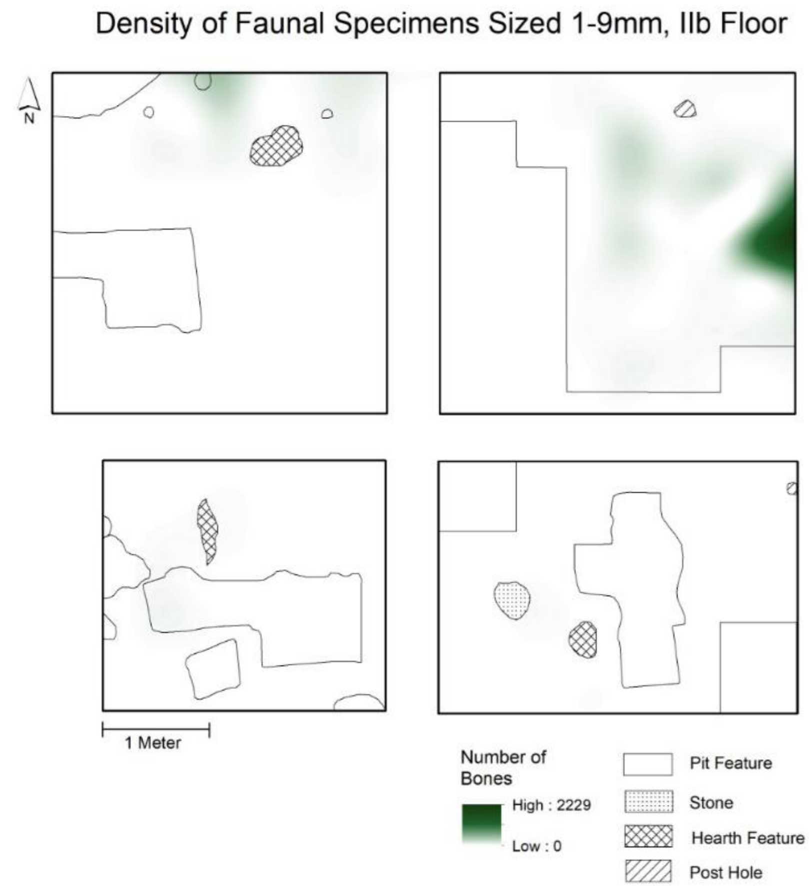


Fig. A.44b: Spline map of specimens of the size grade 1-9mm from the IIb floor.

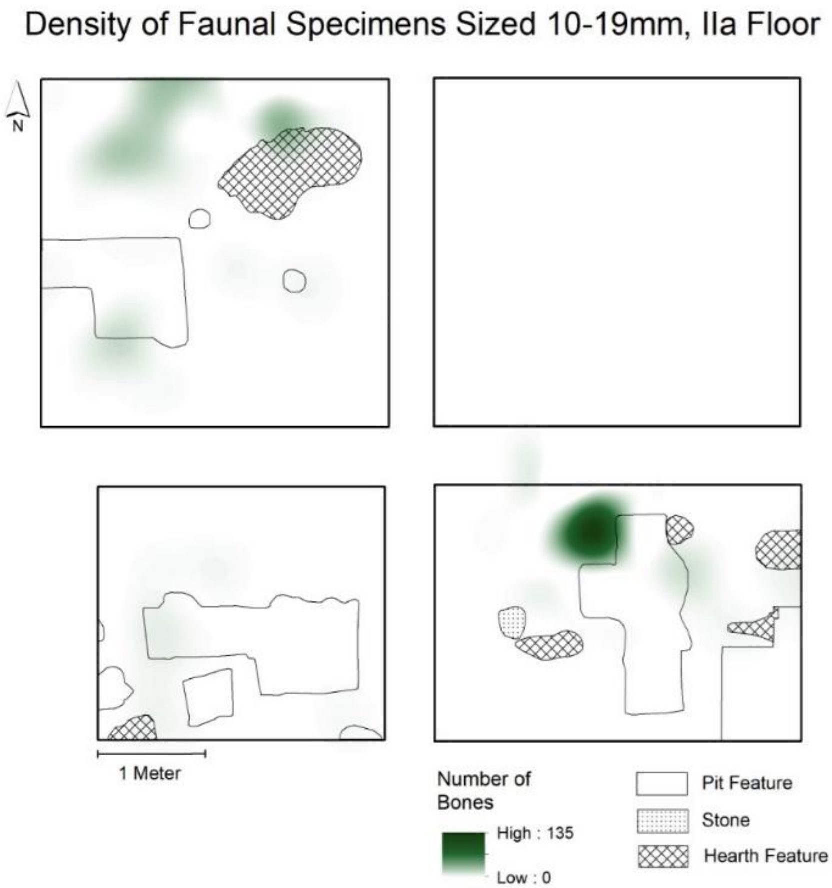


Fig. A.45a: Spline map of specimens of the size grade 10-19mm from the IIa floor.

Fig. A.45b: Spline map of specimens of the size grade 10-19mm from the IIb floor.

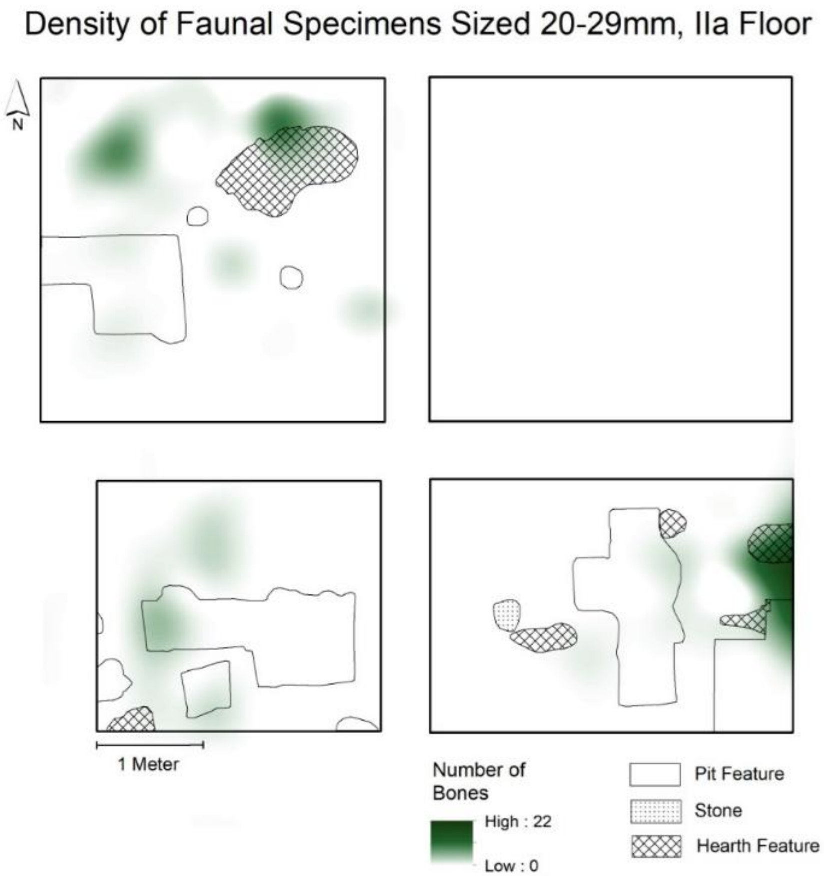


Fig. A.46a: Spline map of specimens of the size grade 20-29mm from the IIa floor.

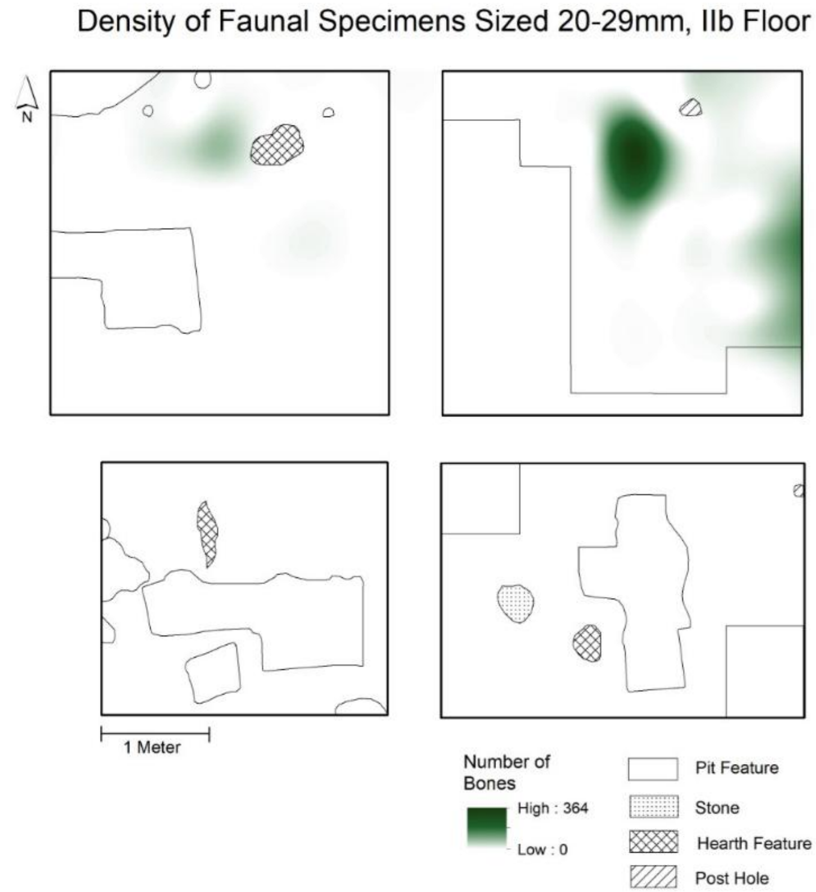


Fig. A.46b: Spline map of specimens of the size grade 20-29mm from the IIb floor.

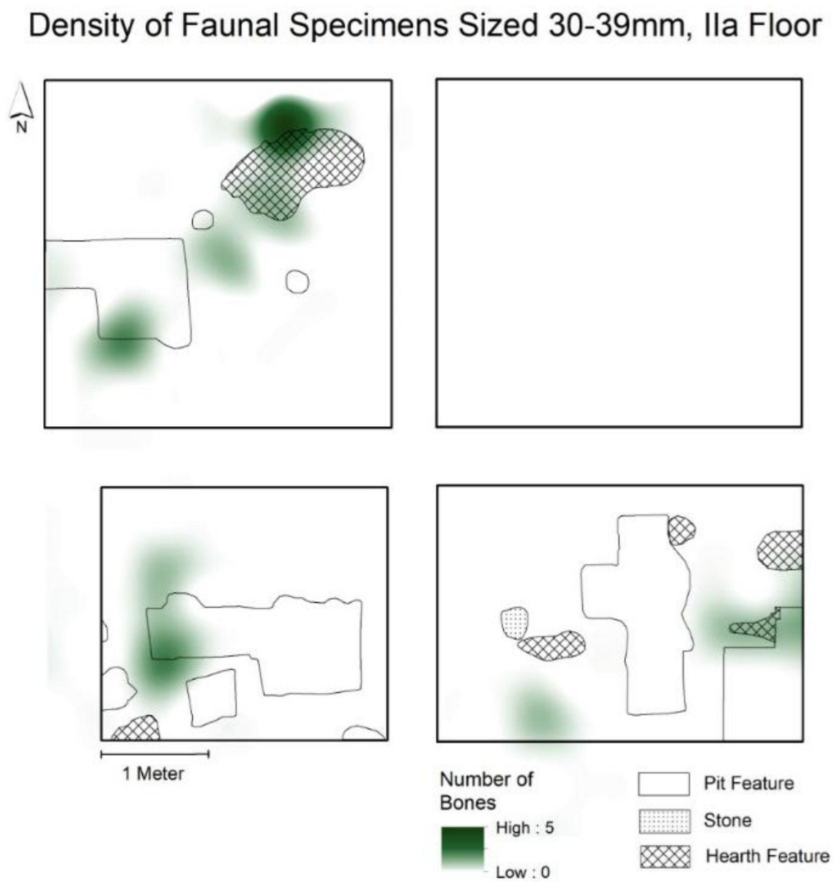


Fig. A.47a: Spline map of specimens of the size grade 30-39mm from the IIa floor.

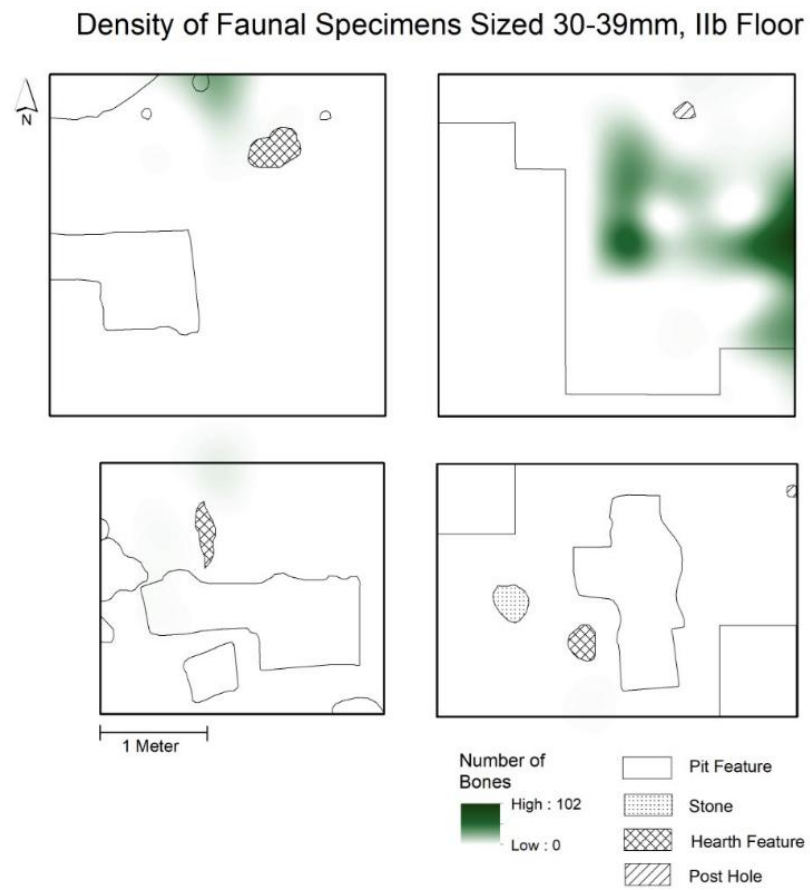


Fig. A.47b: Spline map of specimens of the size grade 30-39mm from the IIb floor.

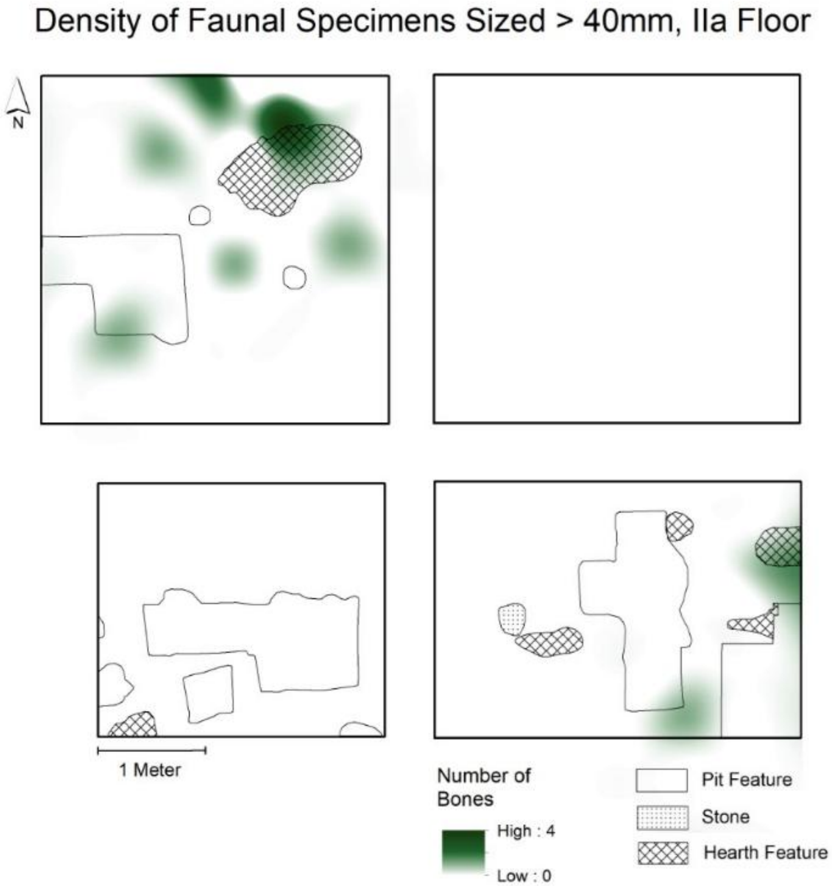


Fig. A.48a: Spline map of specimens of the size grade > 40 mm from the IIa floor.

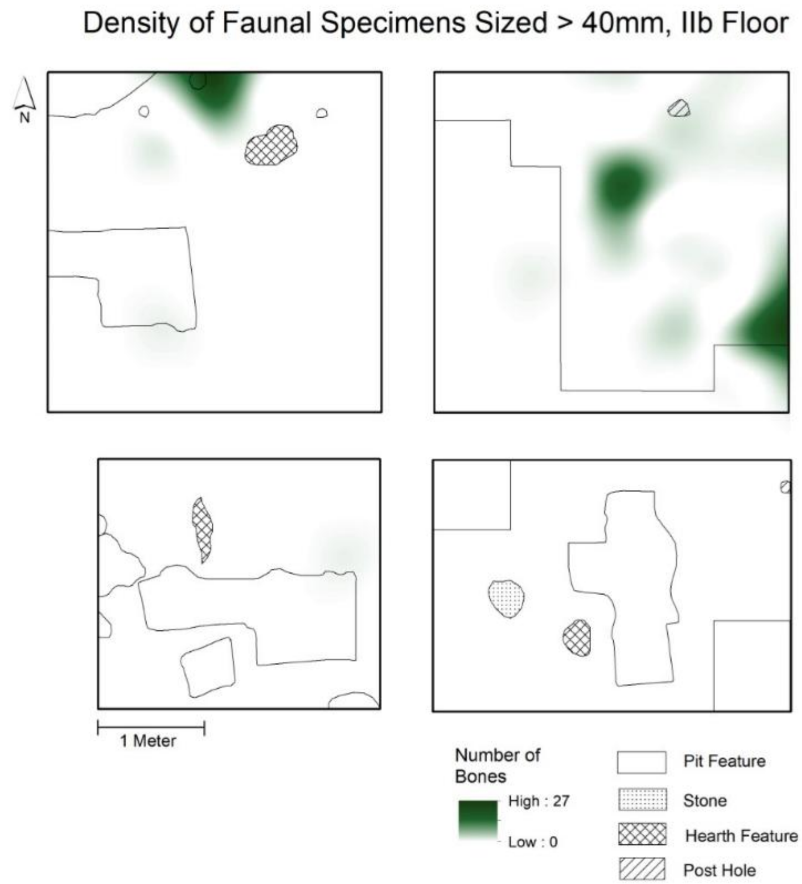


Fig. A.48b: Spline map of specimens of the size grade > 40 mm from the IIb floor.

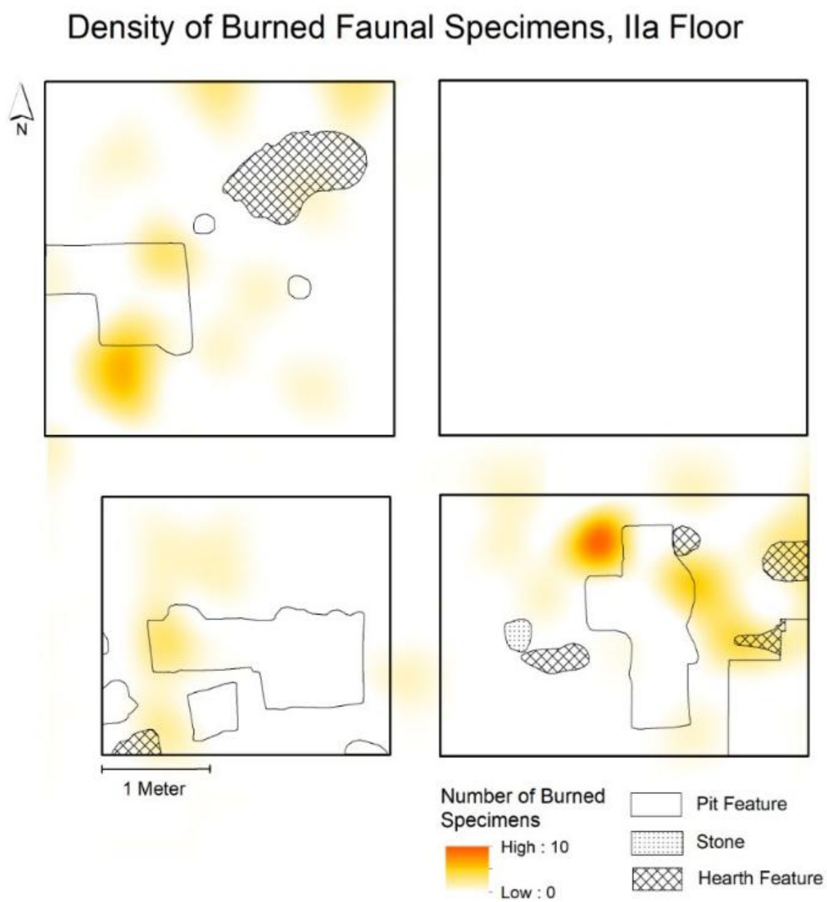


Fig. A.49a: Spline map of burned faunal specimens from the IIa floor.

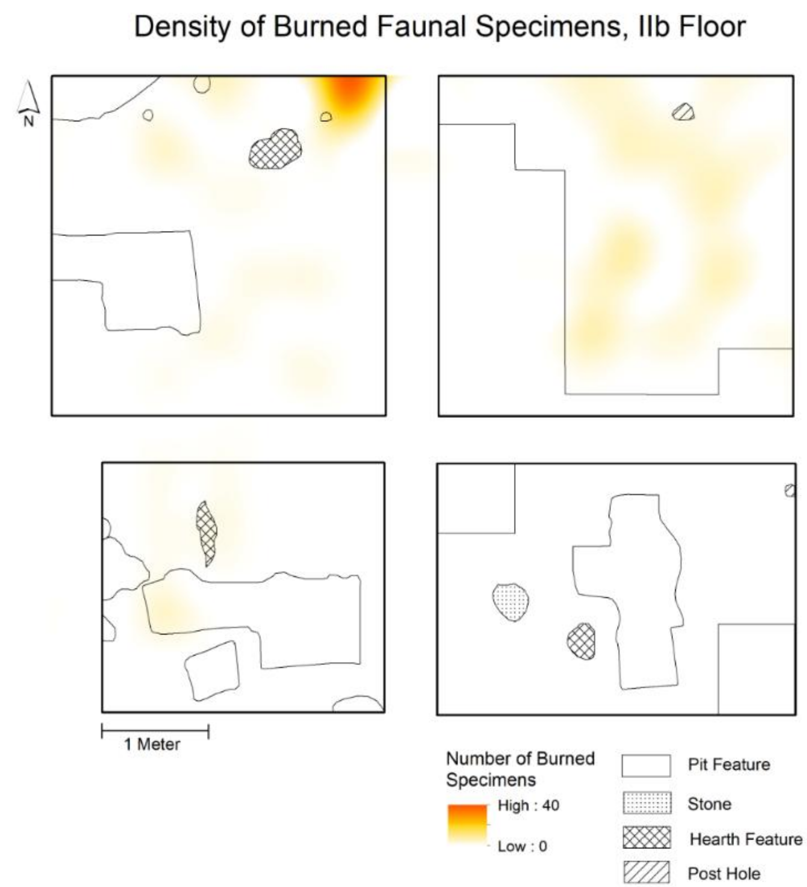


Fig. A.49b: Spline map of burned faunal specimens from the IIb floor.

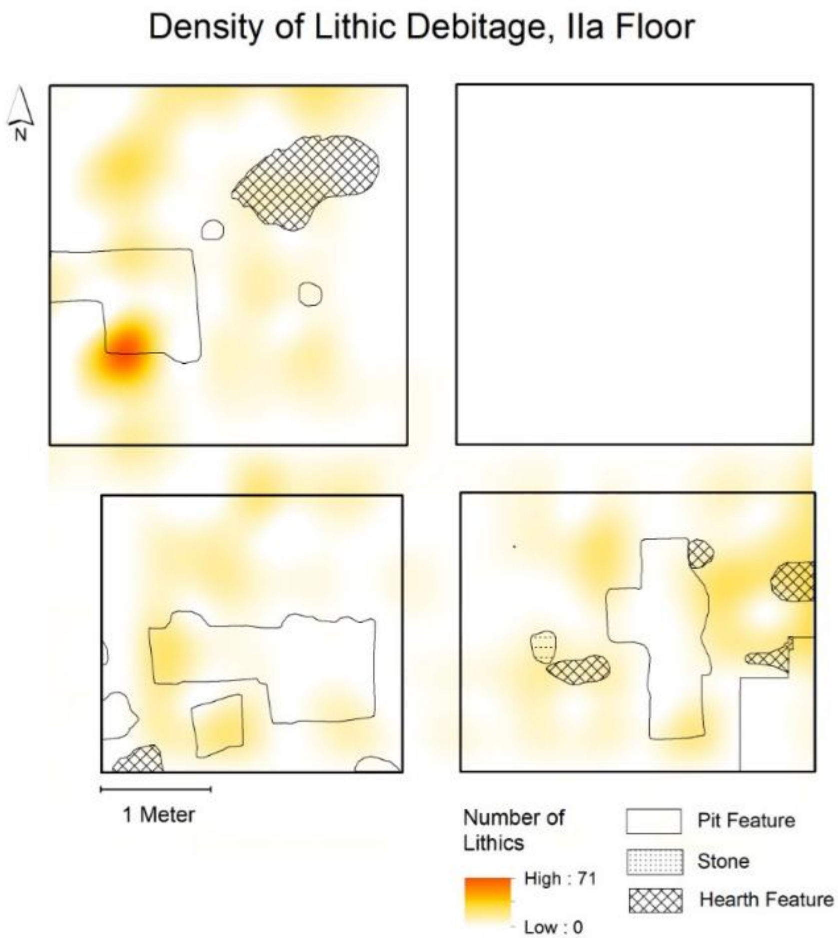


Fig. B.50a: Spline map of lithic debitage from the IIa floor.

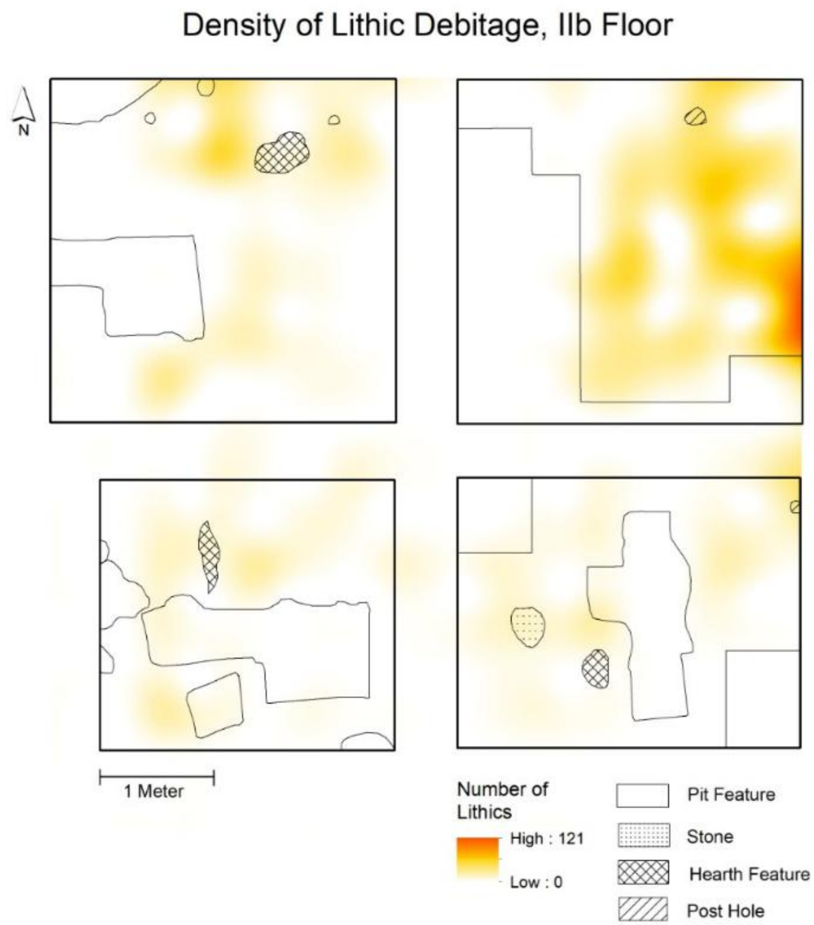


Fig. B.50b: Spline map of lithic debitage from the IIb floor.

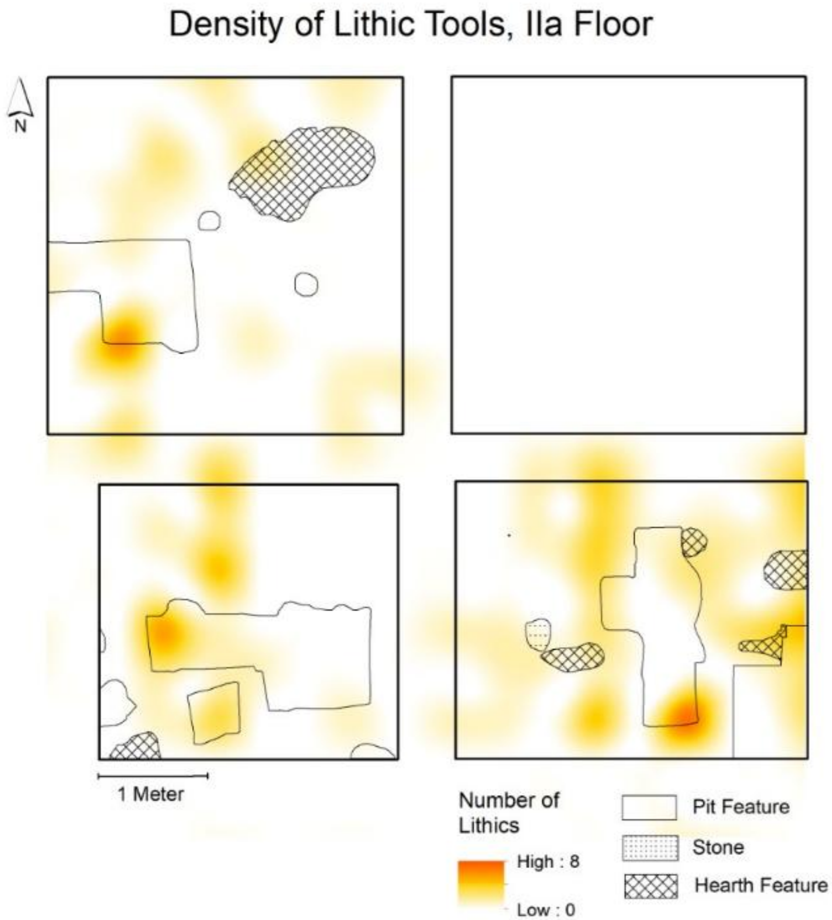


Fig. B.51a: Spline map of lithic tools from the IIa floor.

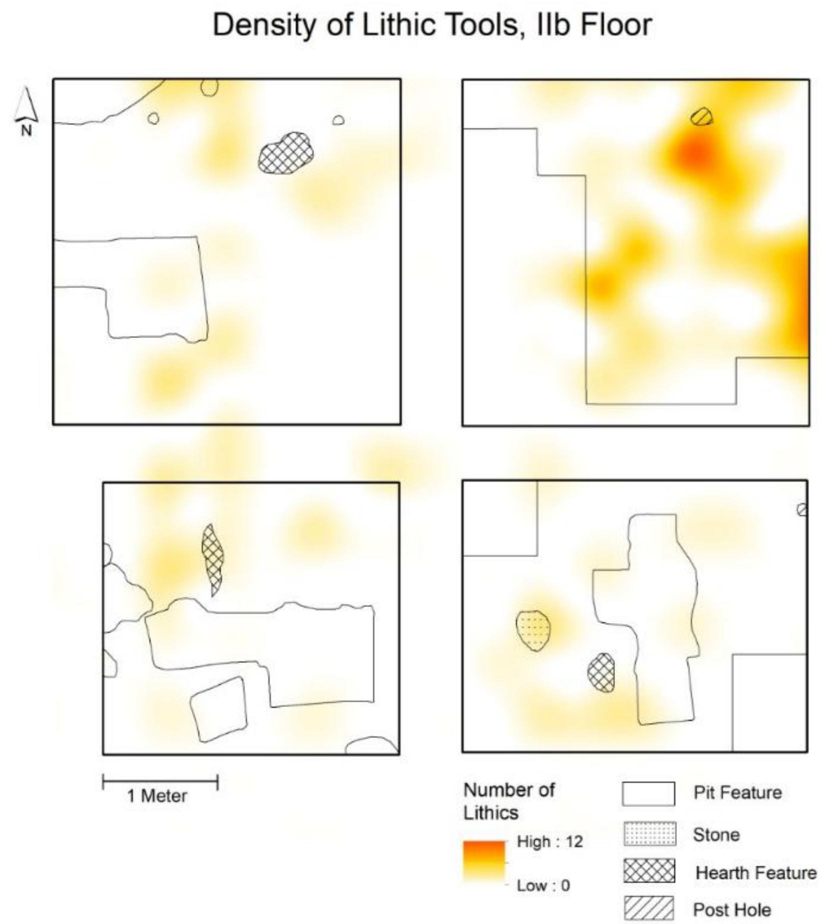


Fig. B.51b: Spline map of lithic tools from the IIb floor.

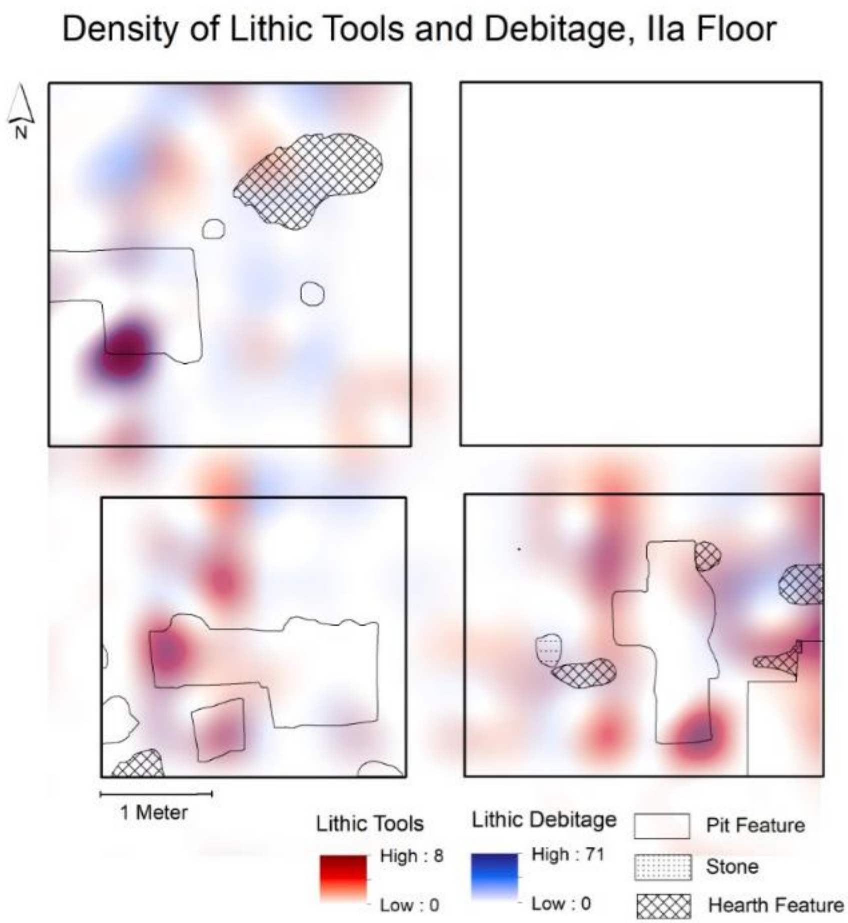


Fig. B.52a: Spline map of lithic tools and debitage from the IIa floor.

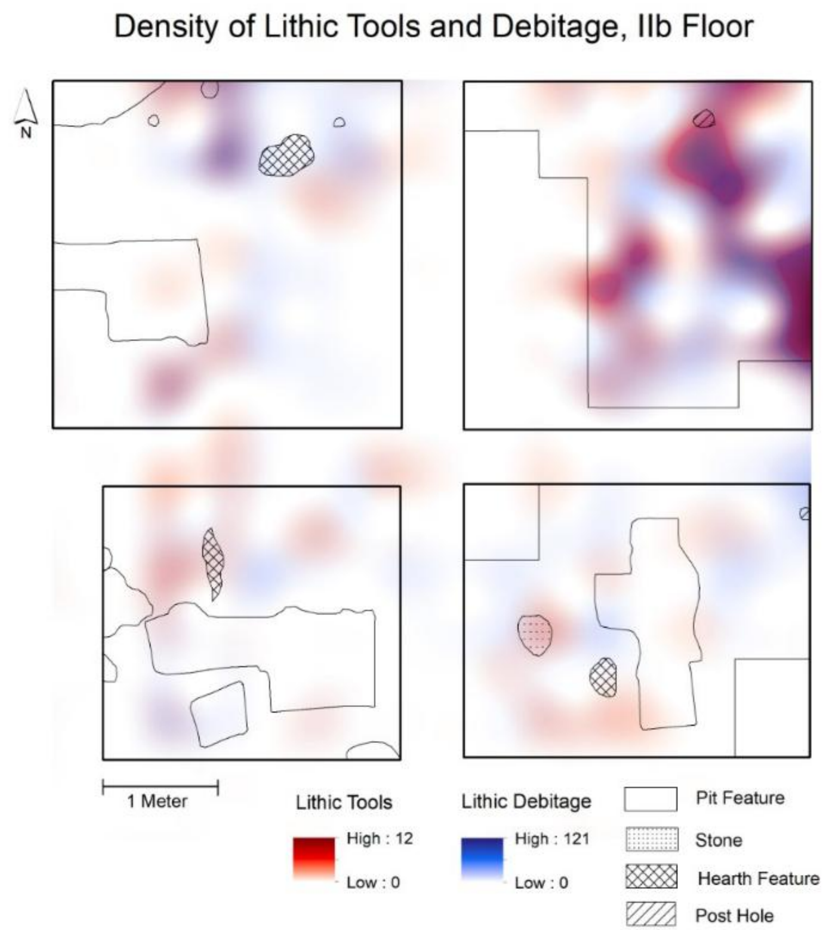


Fig. B.52b: Spline map of lithic tools and debitage from the IIb floor.

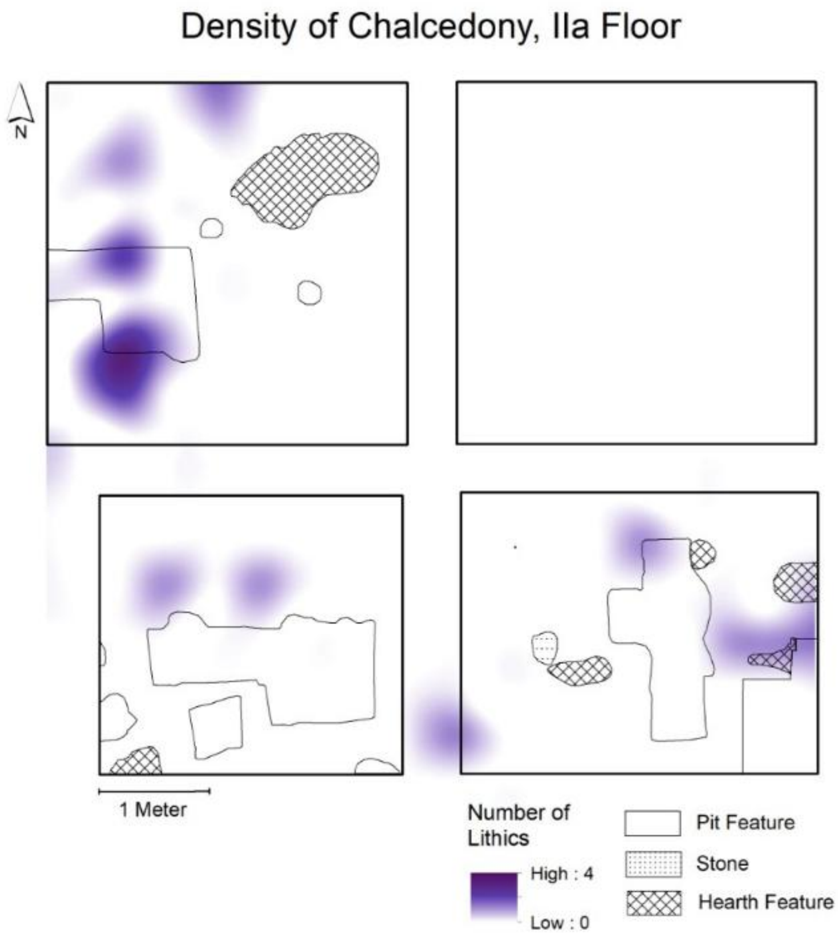


Fig. B.53a: Spline map of chalcedony specimens from the IIa floor.

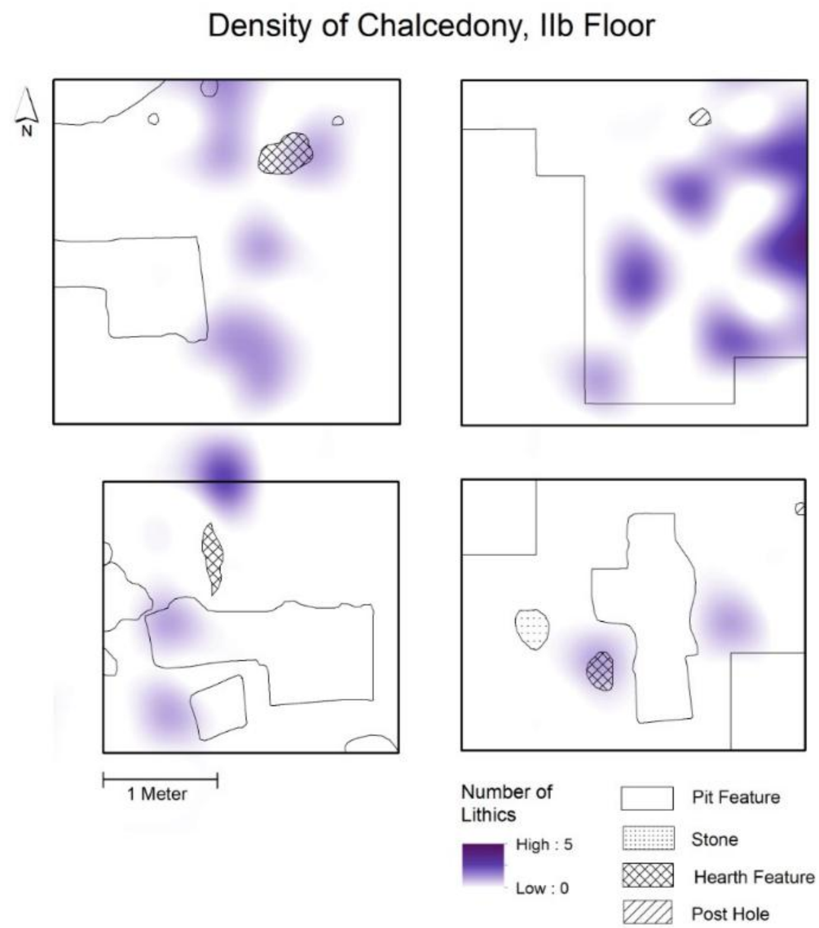


Fig. B.53b: Spline map of chalcedony specimens from the IIb floor.

Fig. B.54a: Spline map of chert and jasper specimens from the IIa floor.

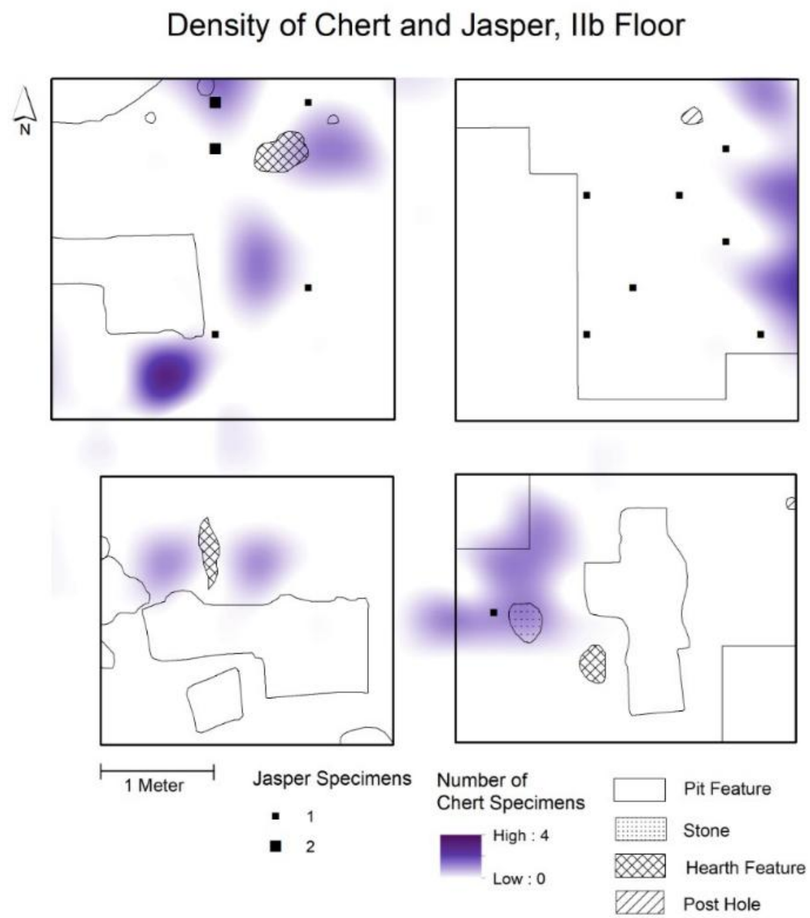


Fig. B.54b: Spline map of chert and jasper specimens from the IIb floor.

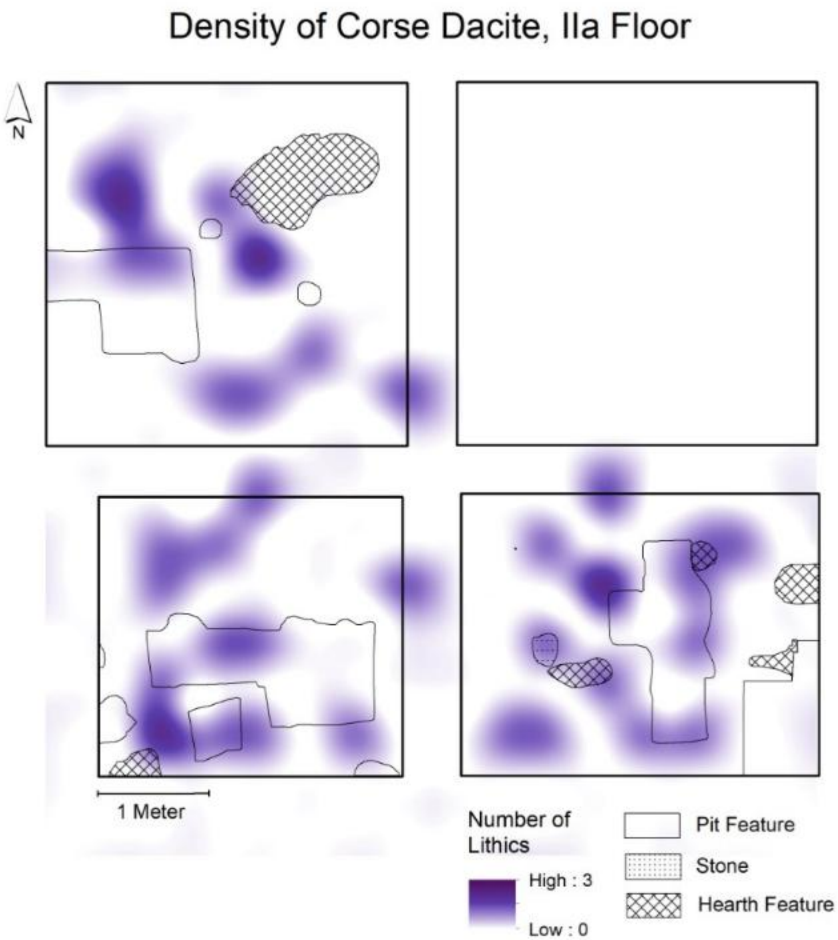


Fig. B.55a: Spline map of coarse dacite specimens from the IIa floor.

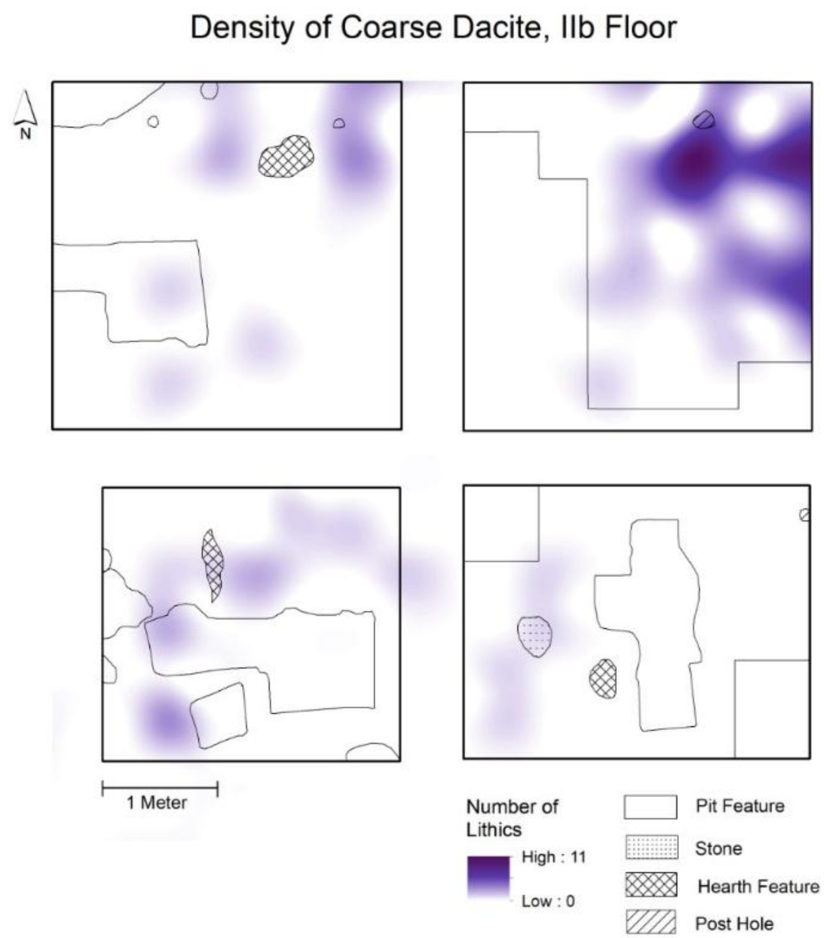


Fig. B.55b: Spline map of coarse dacite specimens from the IIb floor.

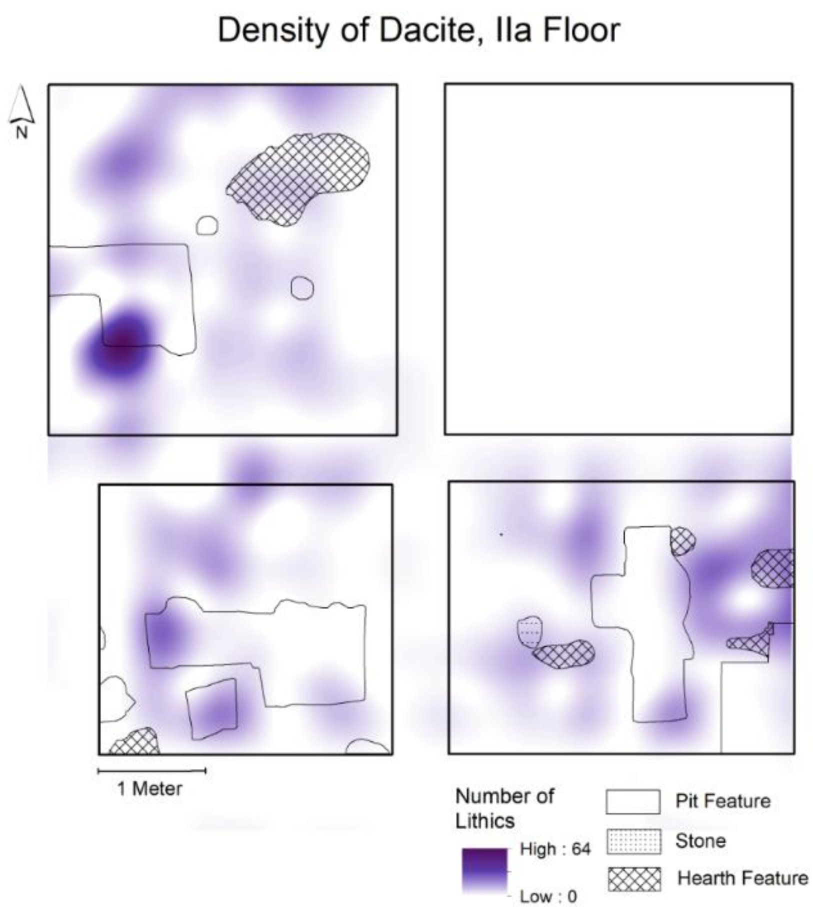


Fig. B.56a: Spline map of dacite specimens from the IIa floor.

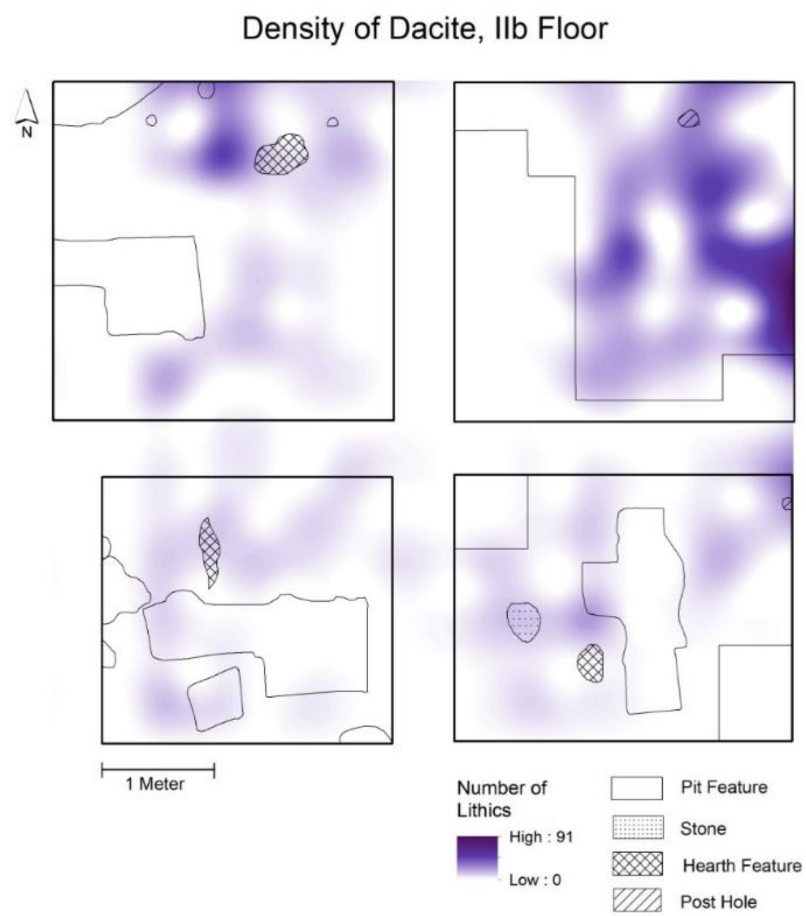


Fig. B.56b: Spline map of dacite specimens from the IIb floor.

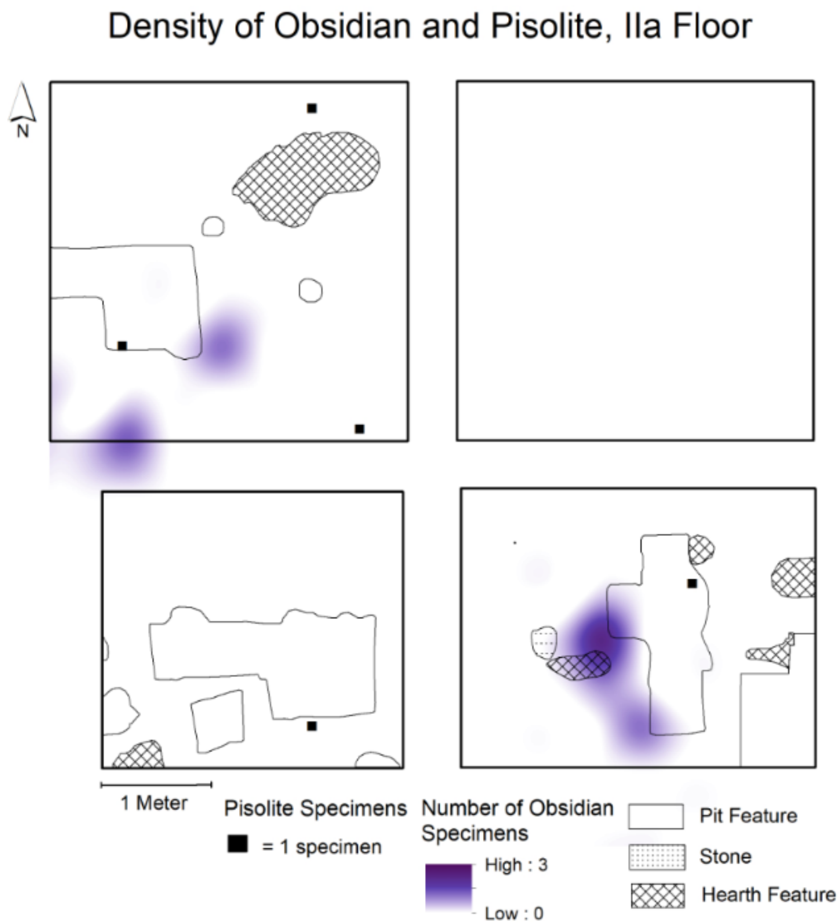


Fig. B.57a: Spline map of obsidian and pisolite specimens from the IIa floor.

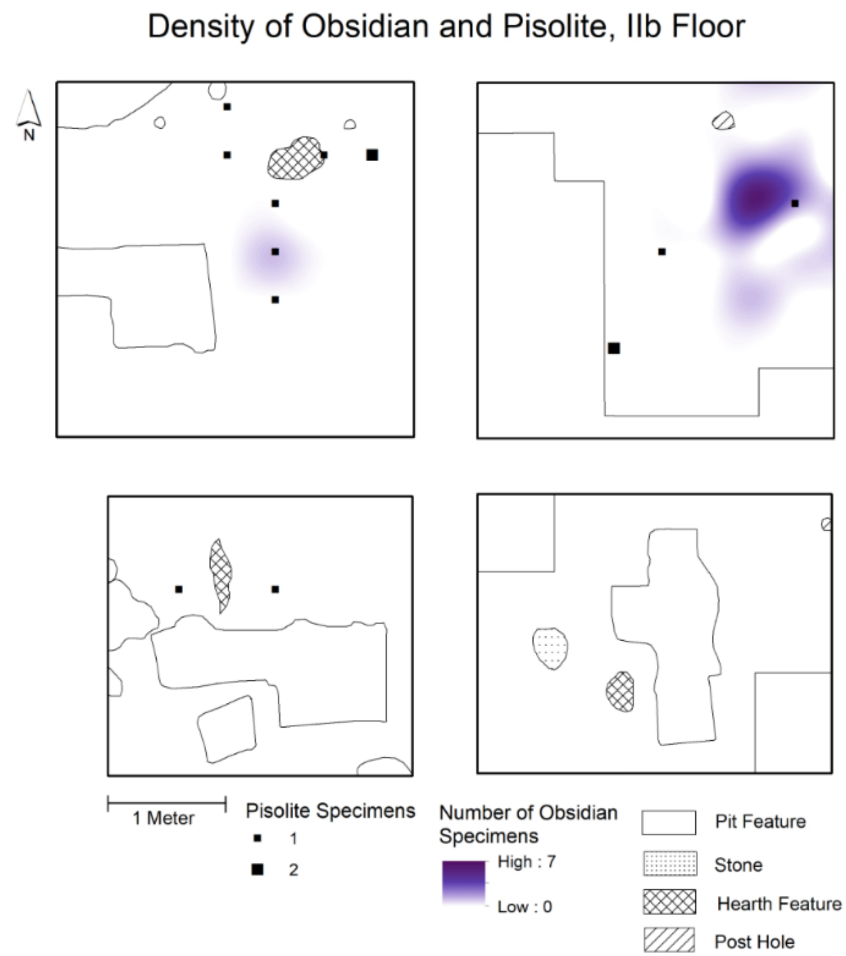


Fig. B.57b: Spline map of obsidian and pisolite specimens from the IIb floor.

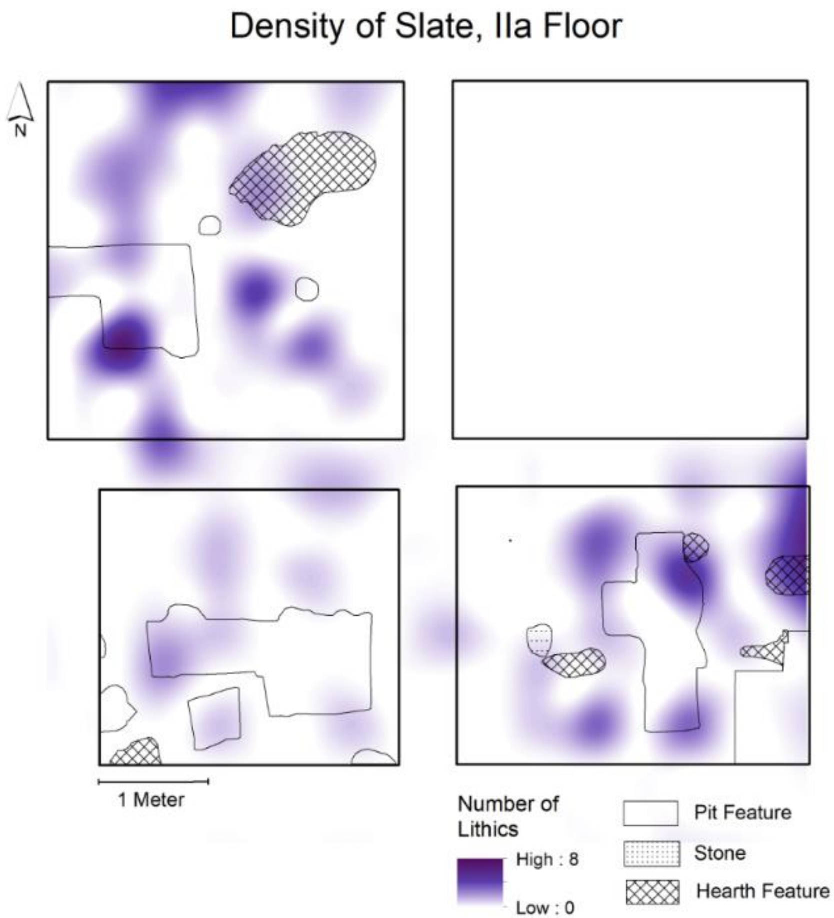


Fig. B.58a: Spline map of slate specimens from the IIa floor.

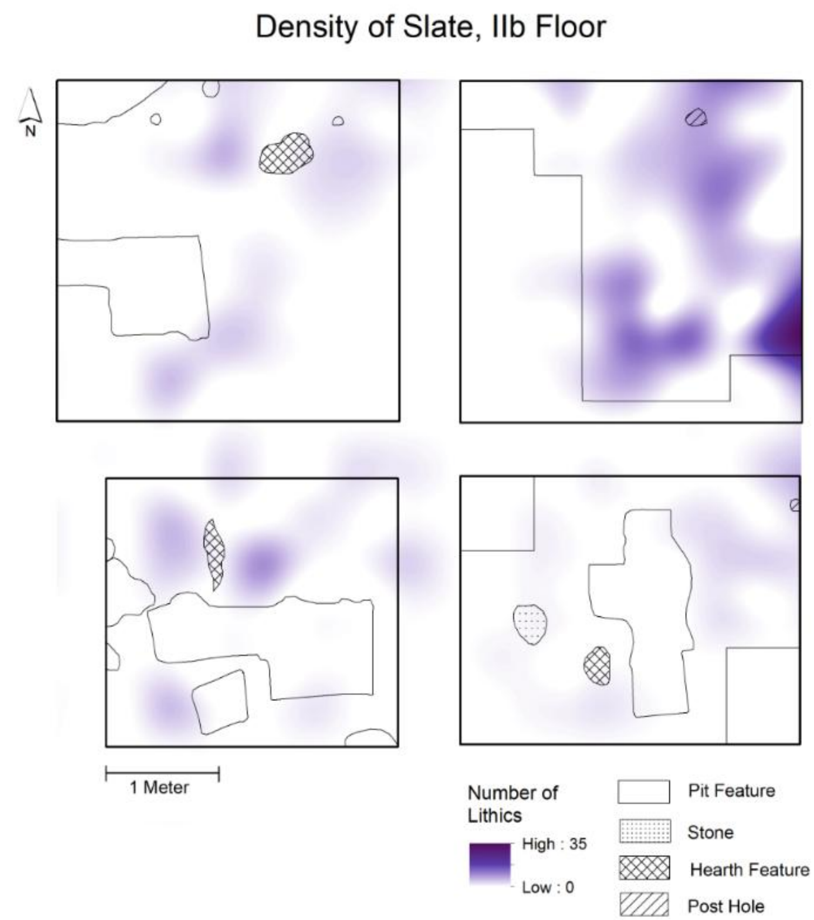


Fig. B.58b: Spline map of slate specimens from the IIb floor.

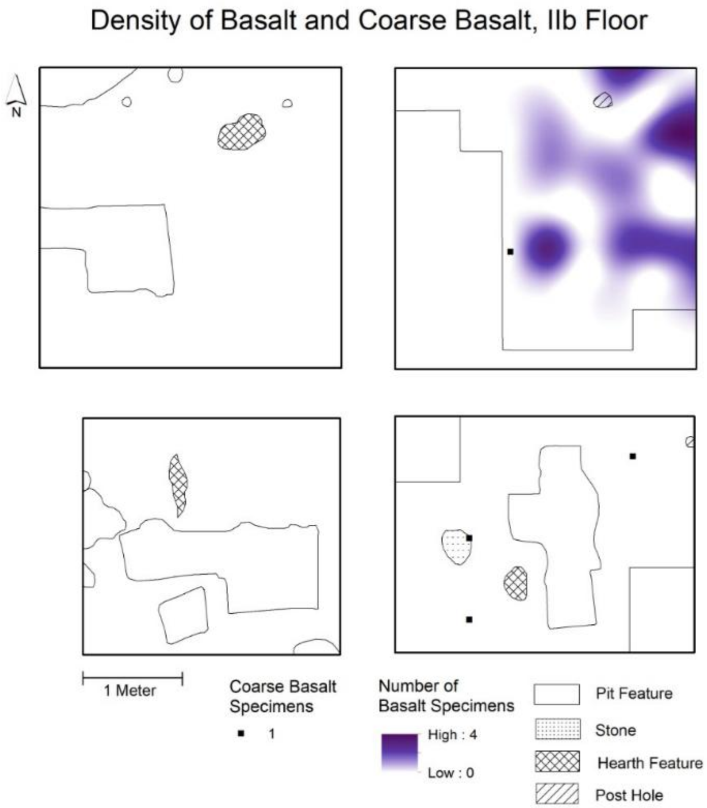


Fig. B.59: Spline map of basalt and coarse basalt specimens from the IIb floor.

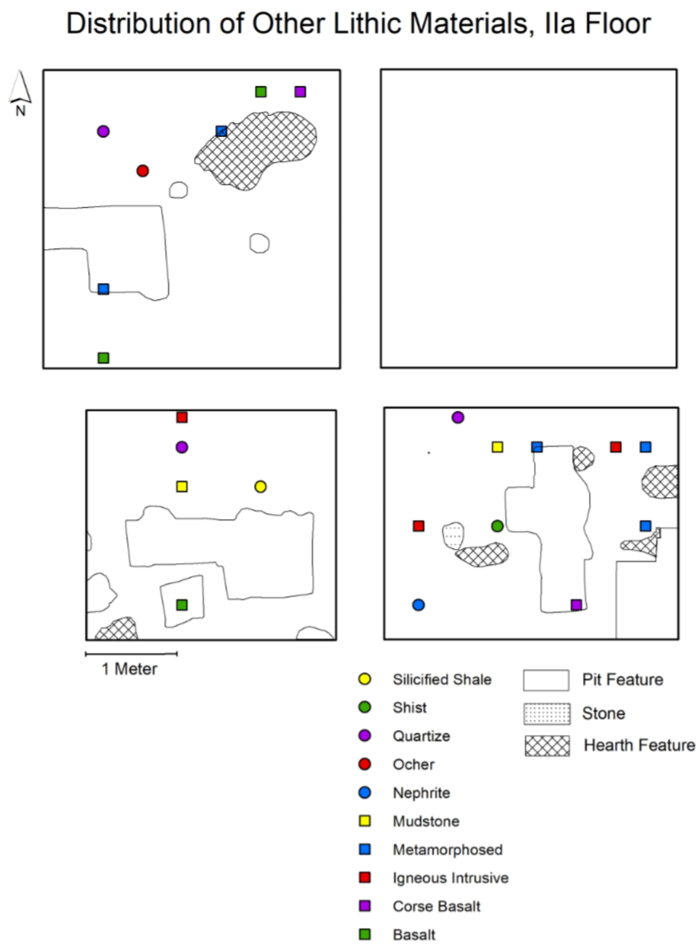
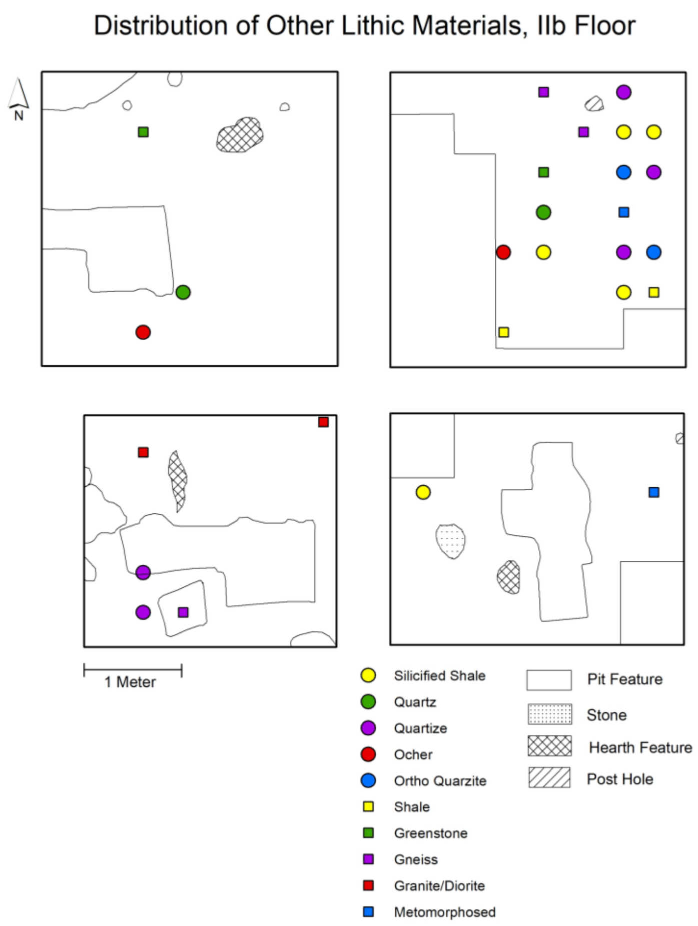


Fig. B.60a: Spline map of other lithic materials from the IIa floor.



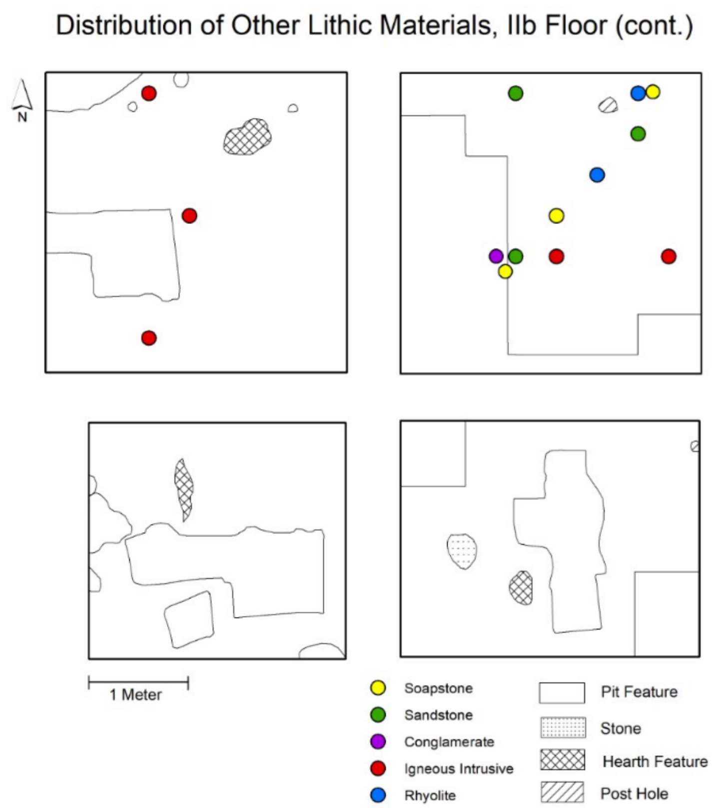


Fig. B.60b: Spline map of other lithic materials from the IIb floor.

Fig. B.60c: Spline map of other lithic materials from the IIb floor (continued).

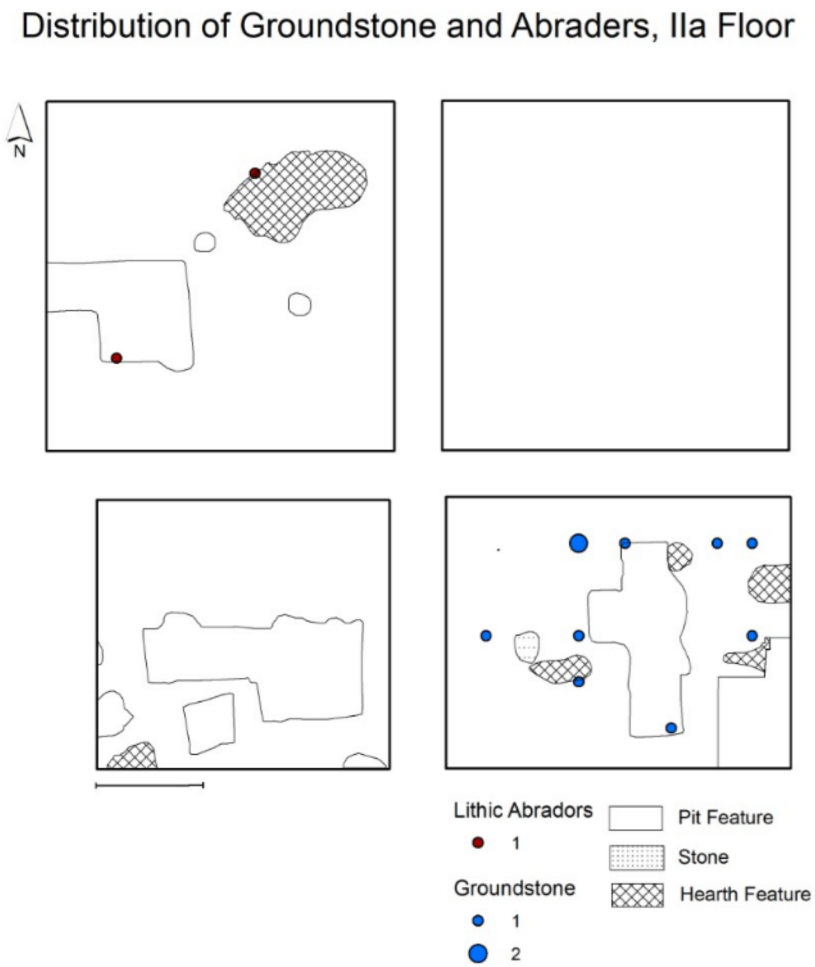


Fig. B.61a: Map of the distribution of lithic groundstone and abraders from the IIa floor.

Fig. B.61b: Map of the distribution of lithic groundstone and abraders from the IIb floor.

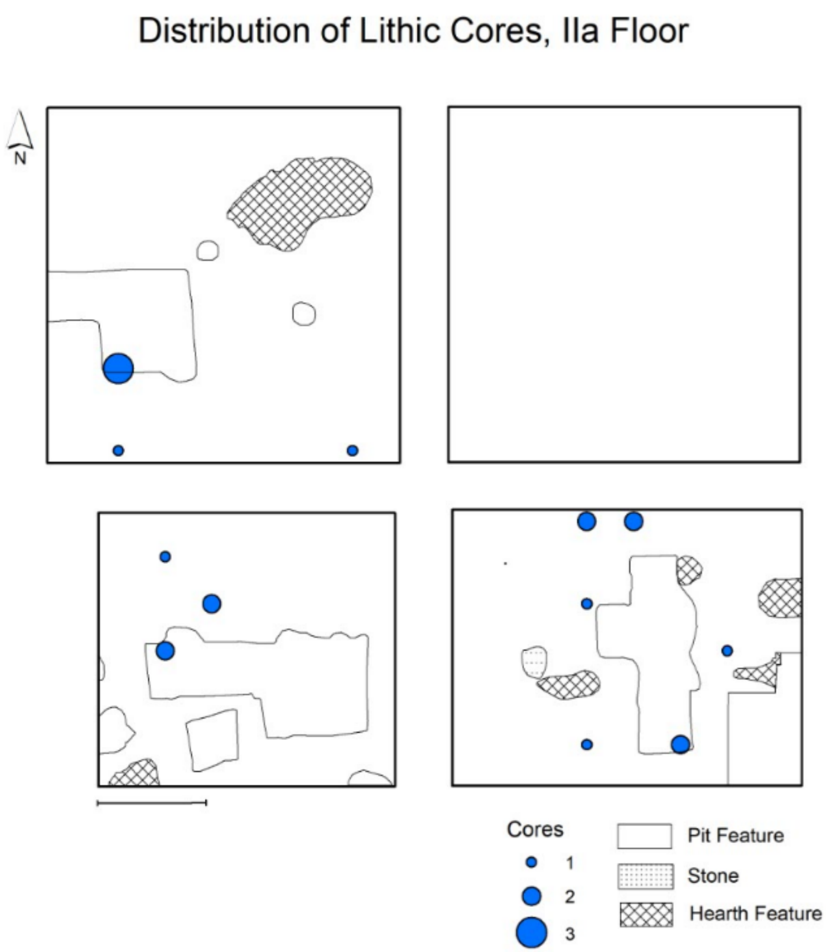


Fig. B.62a: Map of the distribution of lithic cores from the IIa floor.

Fig. B.62b: Map of the distribution of lithic cores from the IIb floor.

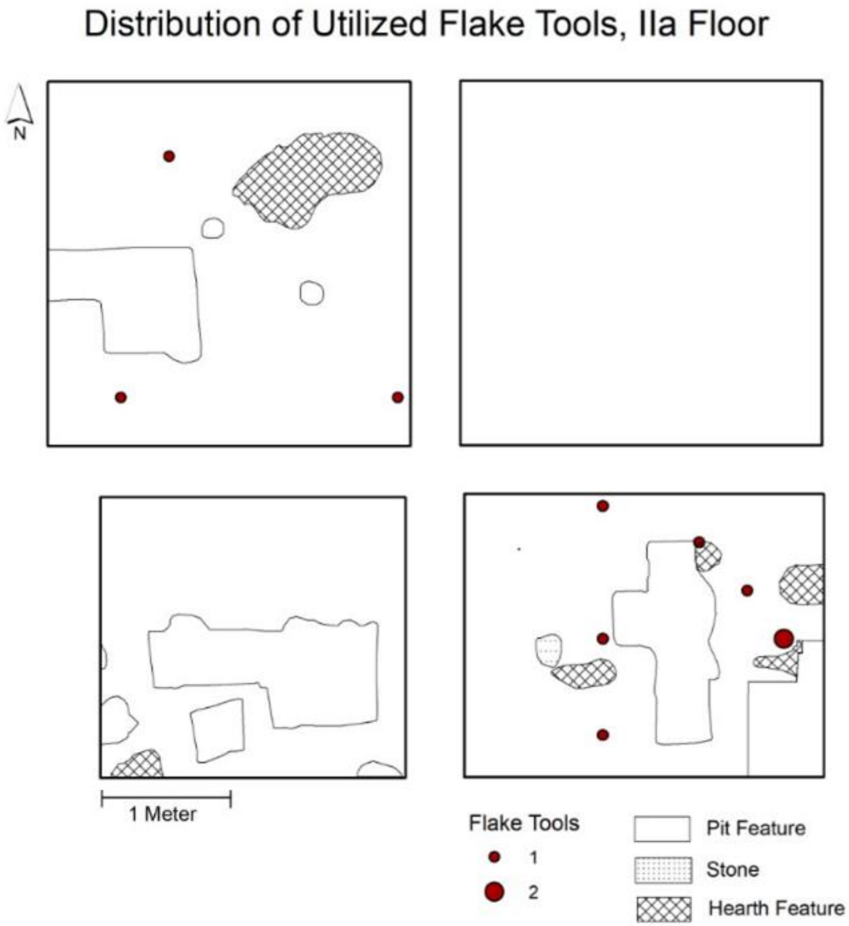


Fig. B.63a: Map of the distribution of utilized flakes from the IIa floor.

Fig. B.63b: Map of the distribution of utilized flakes from the IIb floor.

Fig. B.64a: Map of the distribution of hide processing tools from the IIa floor.

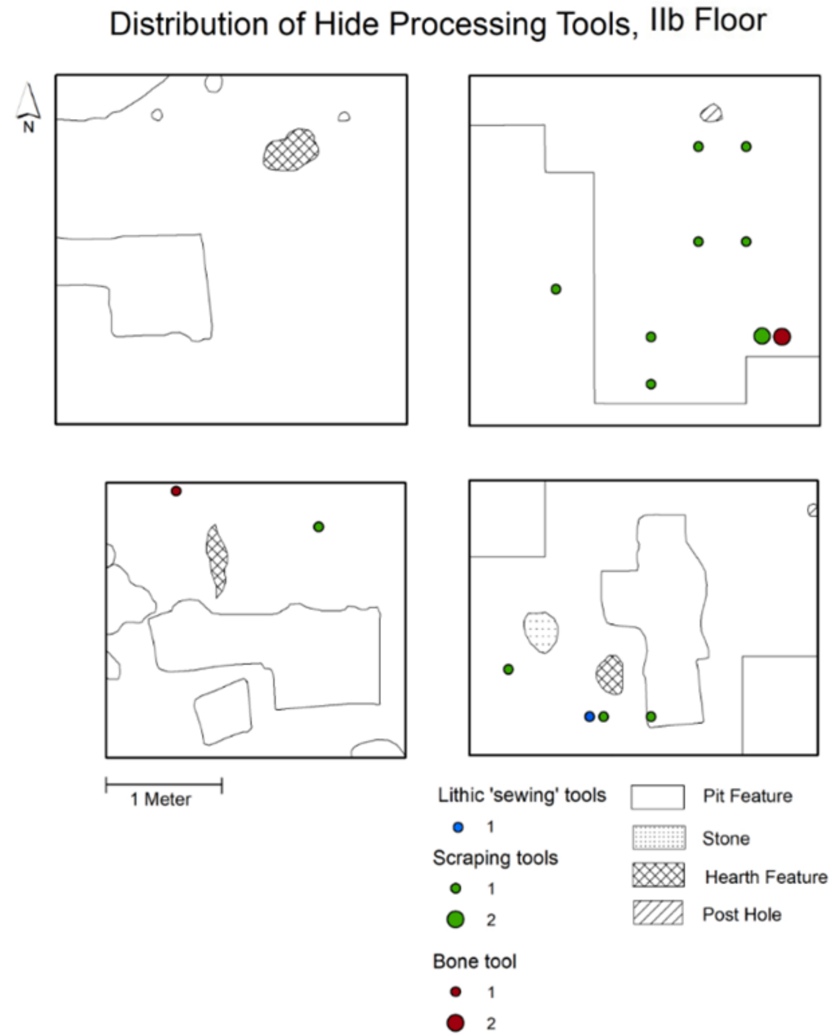


Fig. B.64b: Map of the distribution of hide processing tools from the IIb floor.

Fig. B.65a: Map of the distribution of animal (meat) processing tools from the IIa floor.

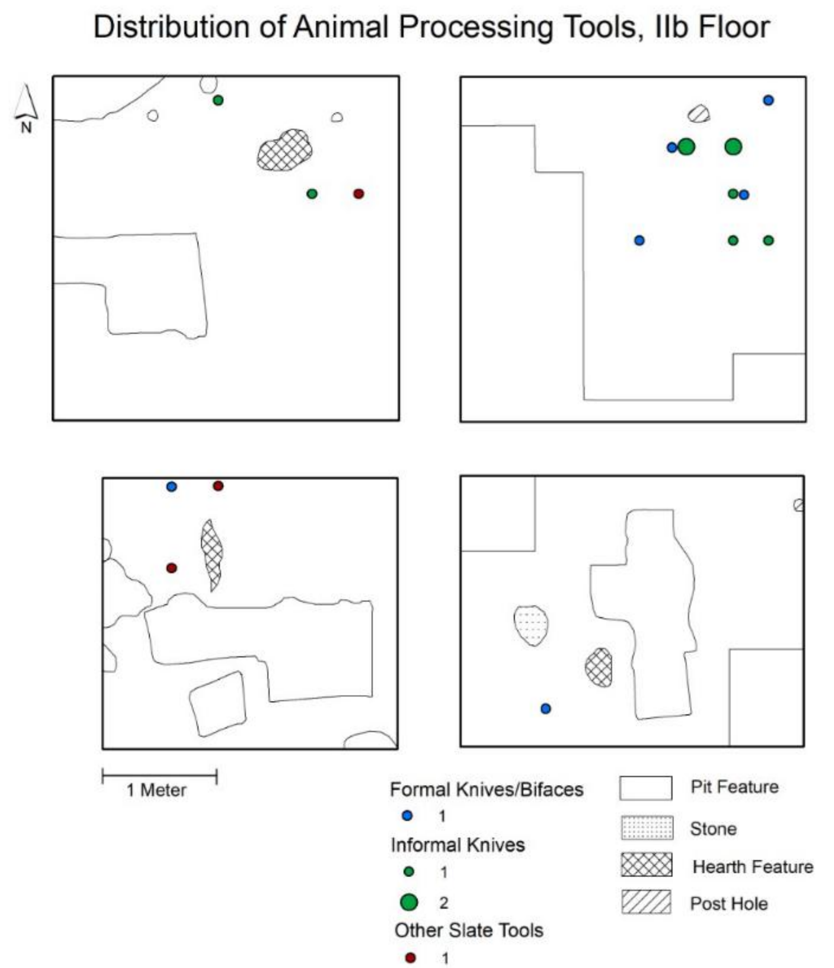


Fig. B.65b: Map of the distribution of animal (meat) processing tools from the IIb floor.

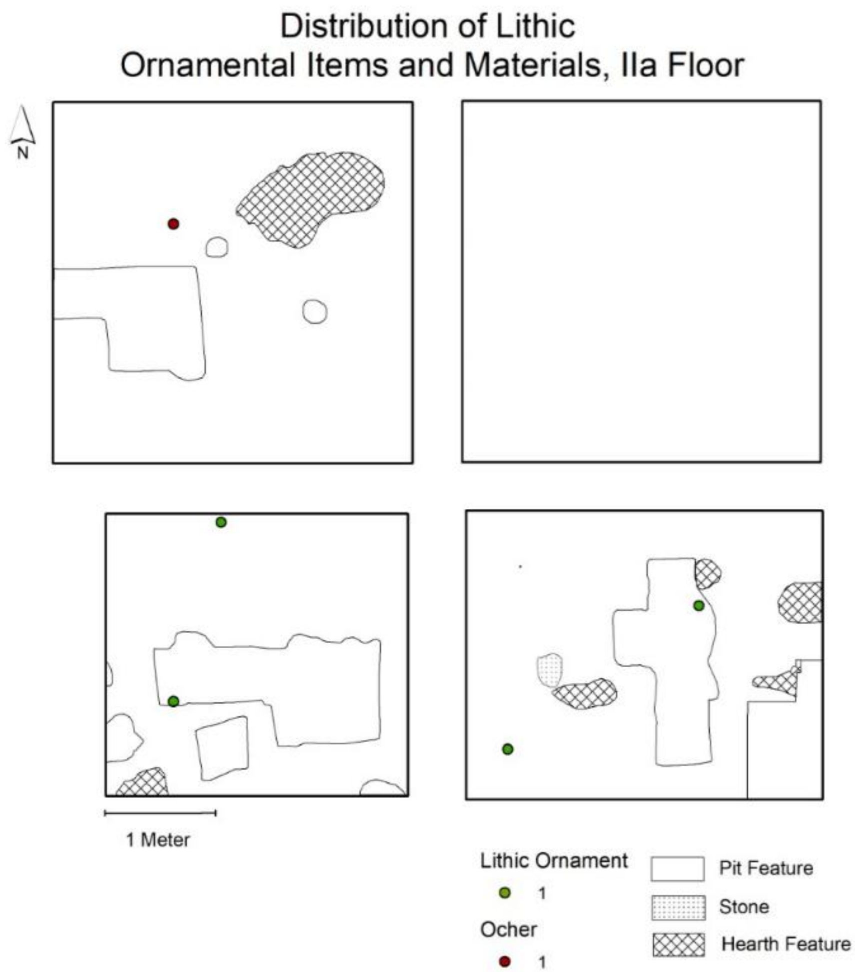


Fig. B.66a: Map of the distribution of ornamental lithic items and materials from the IIa floor.

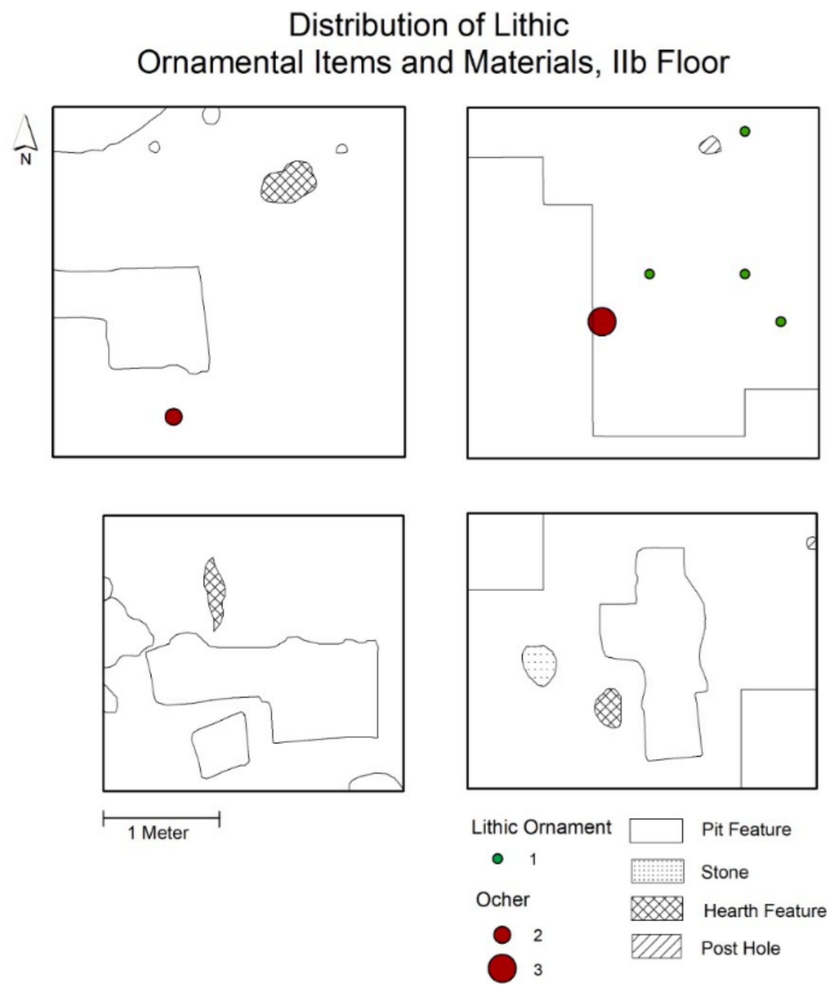


Fig. B.66b: Map of the distribution of ornamental lithic items and materials from the IIb floor.

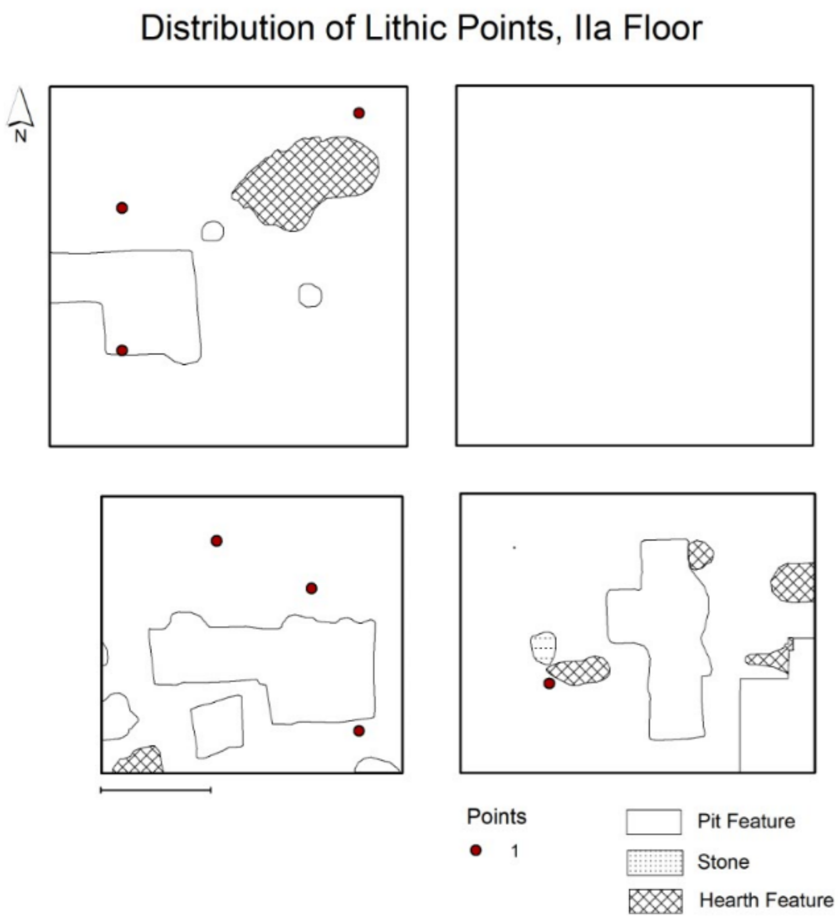


Fig. B.67a: Map of the distribution of lithic projectile points from the IIa floor.

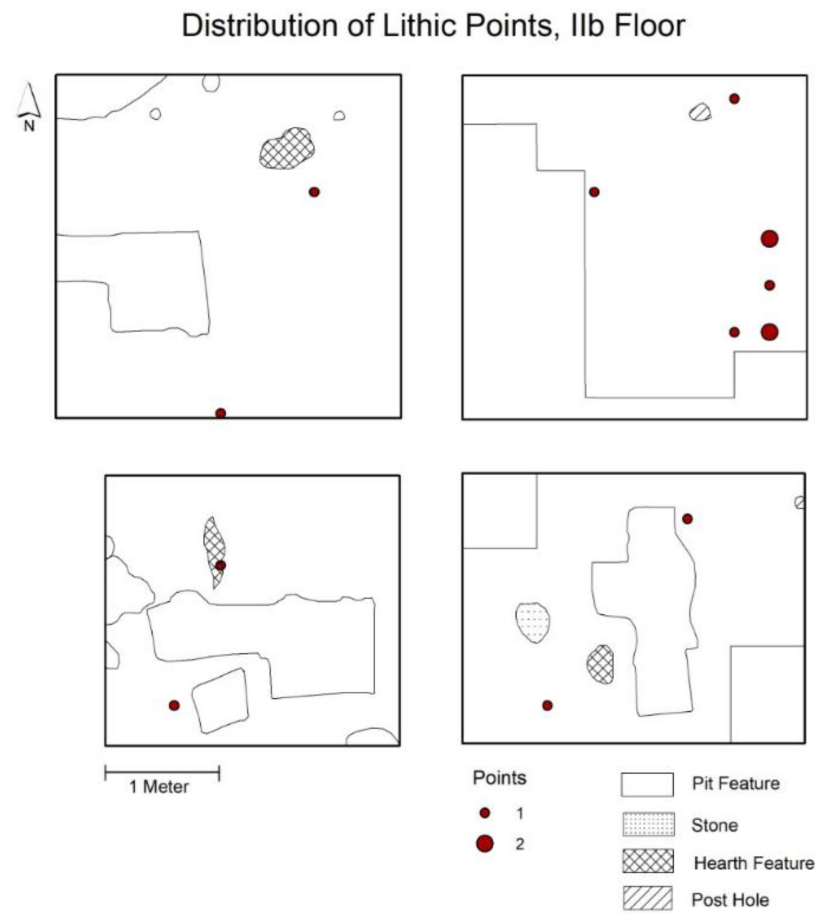


Fig. B.67b: Map of the distribution of lithic projectile points from the IIb floor.

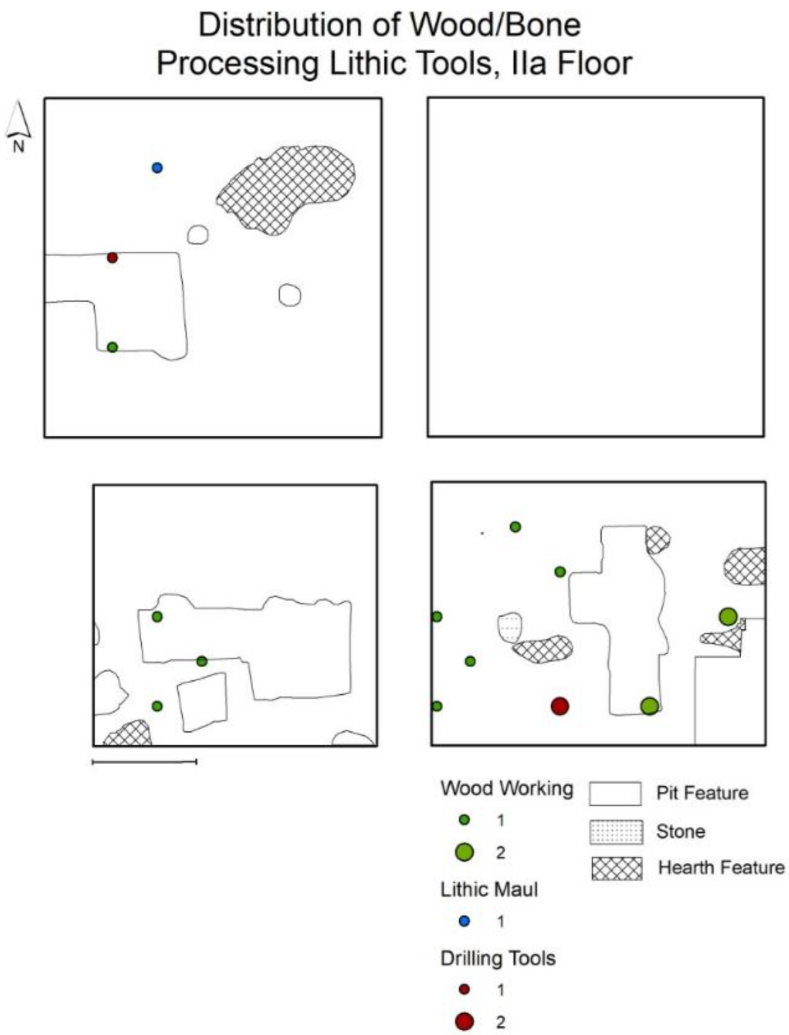


Fig. B.68a: Map of the distribution of lithic wood/bone processing tools from the IIa floor.

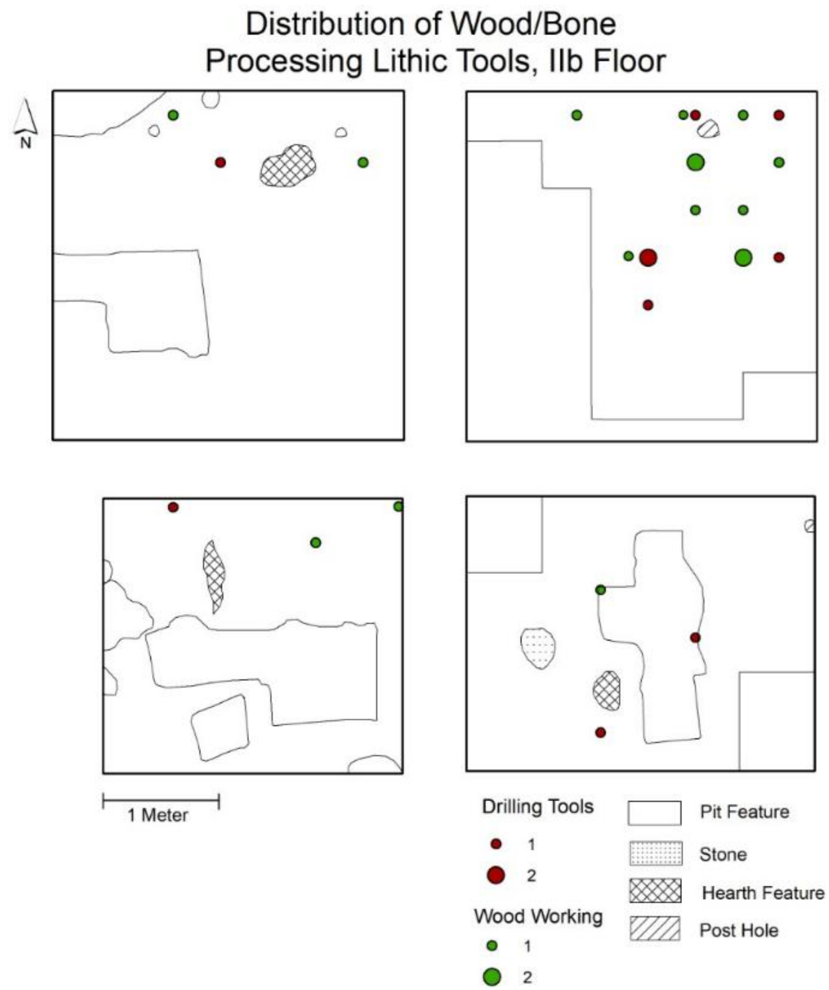


Fig. B.68b: Map of the distribution of lithic wood/bone processing tools from the IIb floor.

Fig. B.69: Map of the distribution of lithic flint knapping tools from the IIb floor.

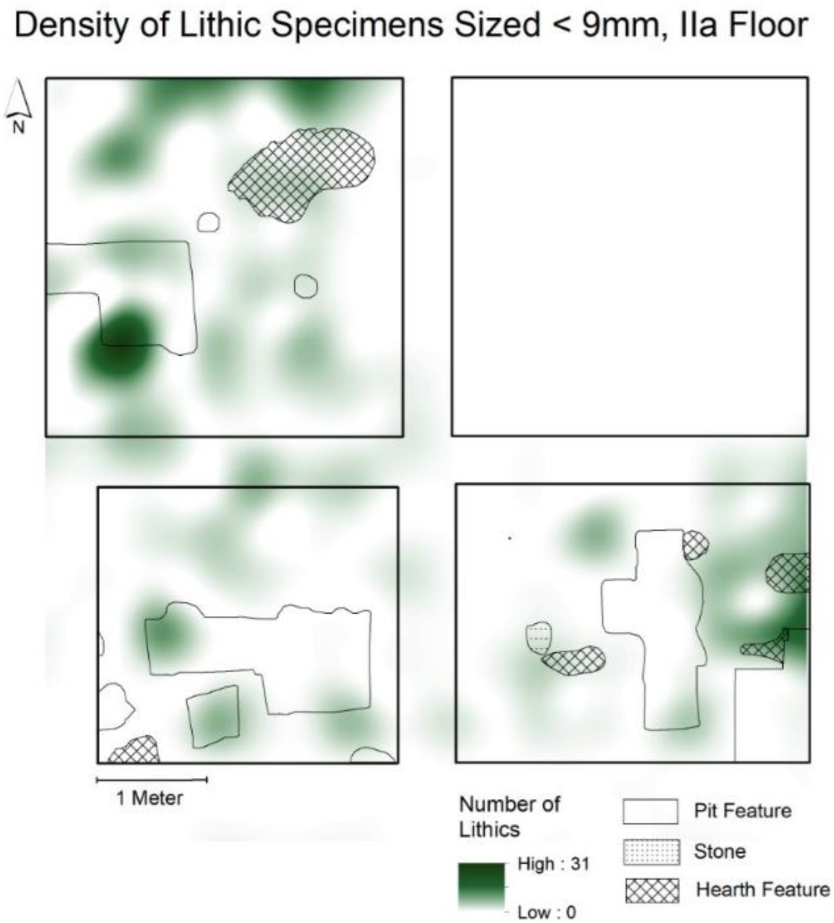


Fig. B.70a: Map of the distribution of lithic specimens of the size grade < 9 mm from the IIa floor.

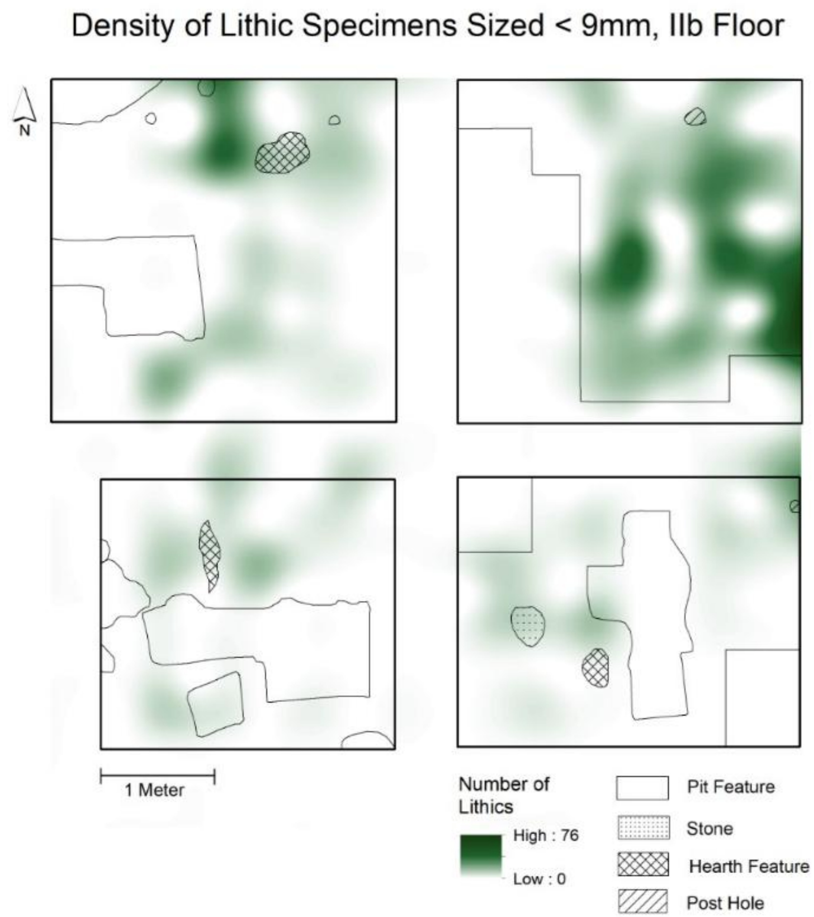


Fig. B.70b: Map of the distribution of lithic specimens of the size grade < 9 mm from the IIb floor.

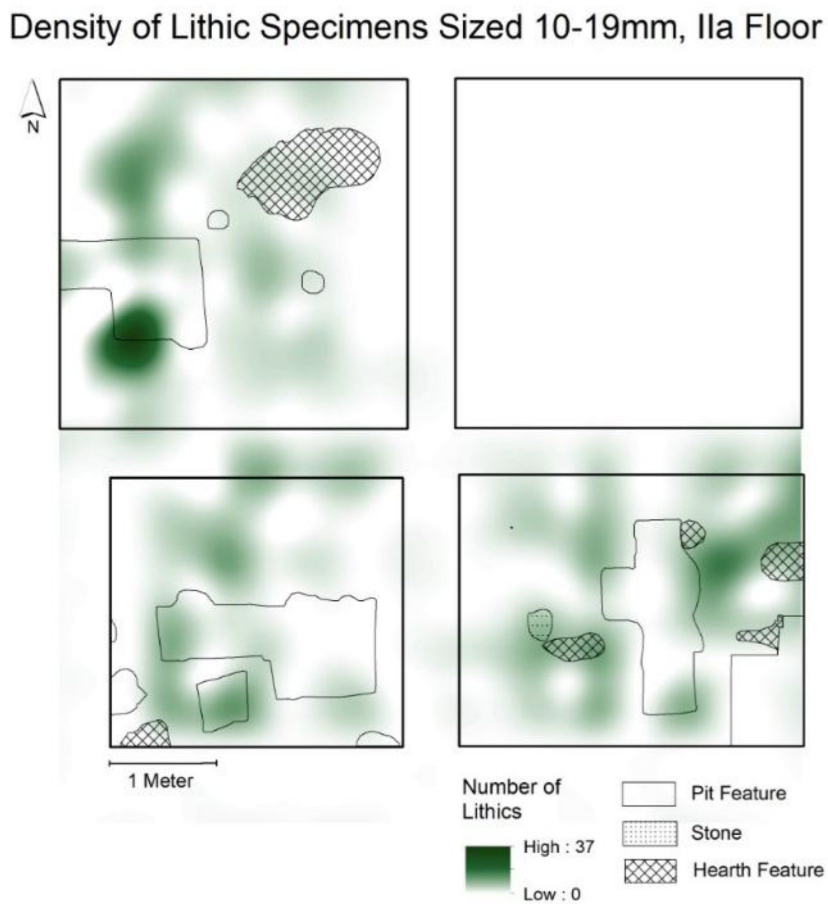


Fig. B.71a: Map of the distribution of lithic specimens of the size grade 10-19mm from the IIa floor.

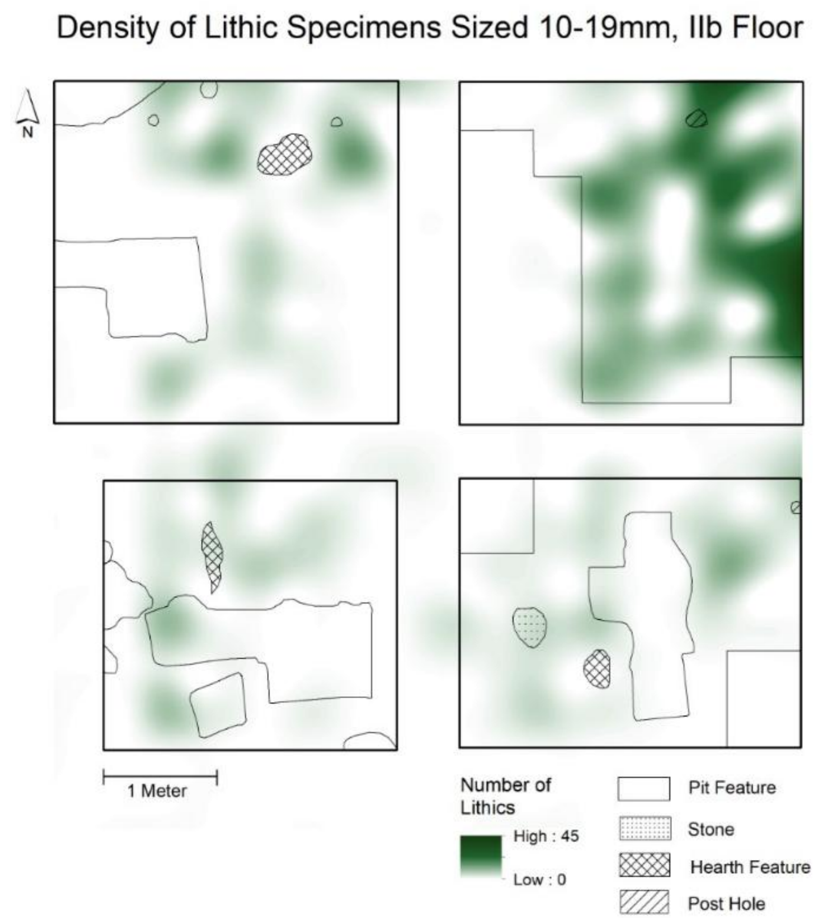


Fig. B.71b: Map of the distribution of lithic specimens of the size grade 10-19mm from the IIb floor.

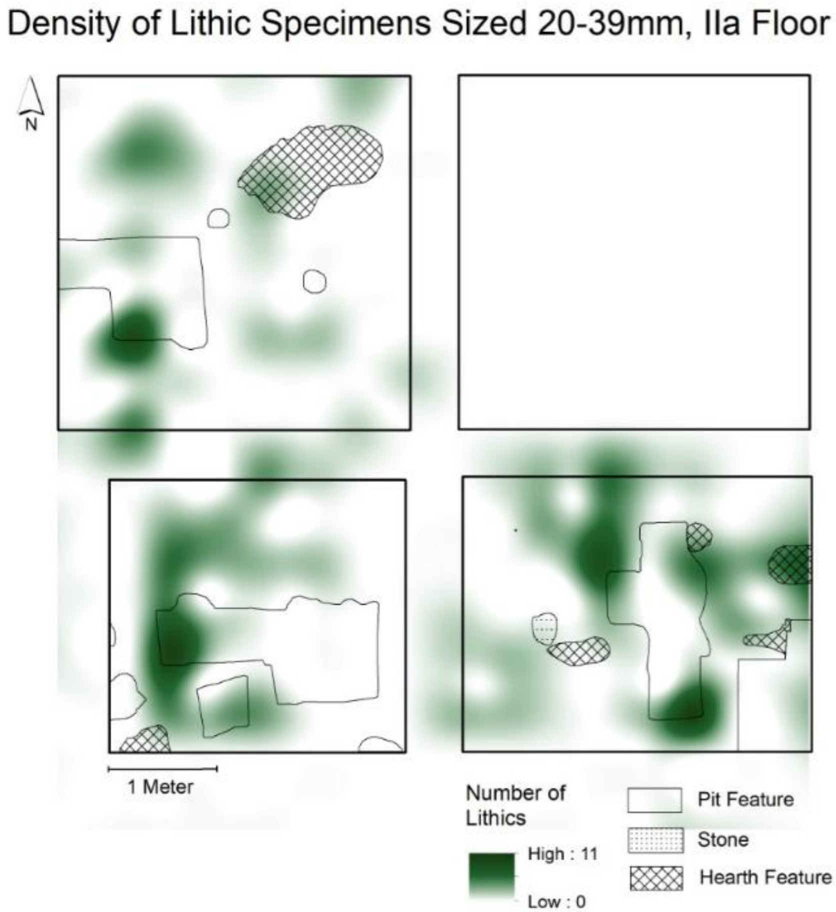


Fig. B.72a: Map of the distribution of lithic specimens of the size grade 20-39mm from the IIa floor.

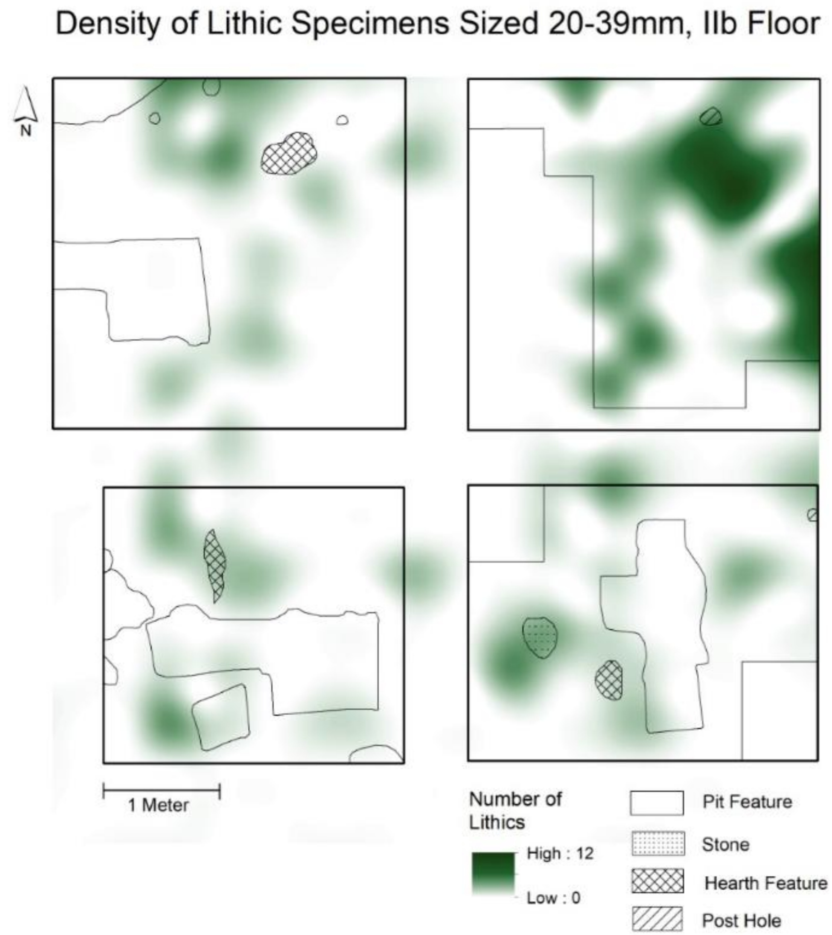


Fig. B.72b: Map of the distribution of lithic specimens of the size grade 20-39mm from the IIb floor.

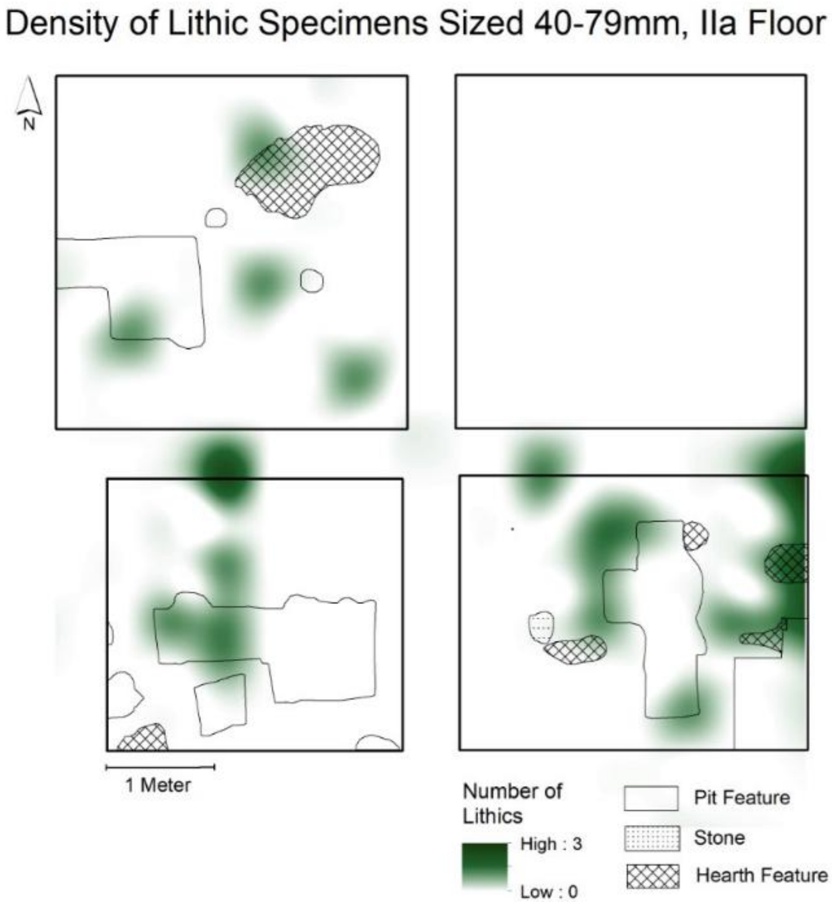


Fig. B.73a: Map of the distribution of lithic specimens of the size grade 40-79 mm from the IIa floor.

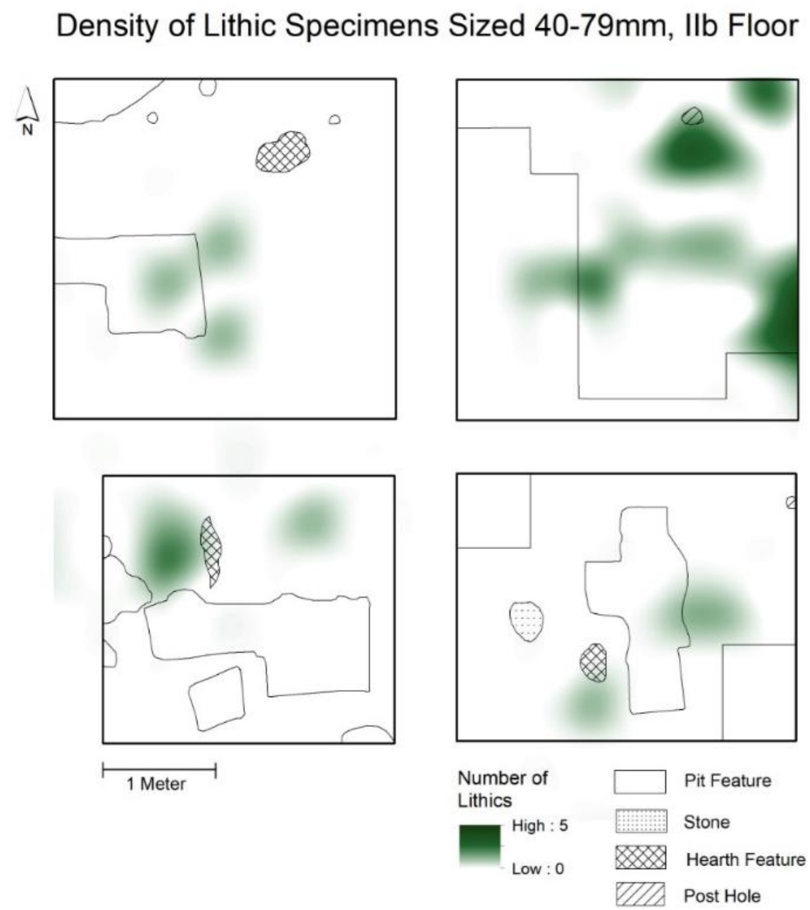
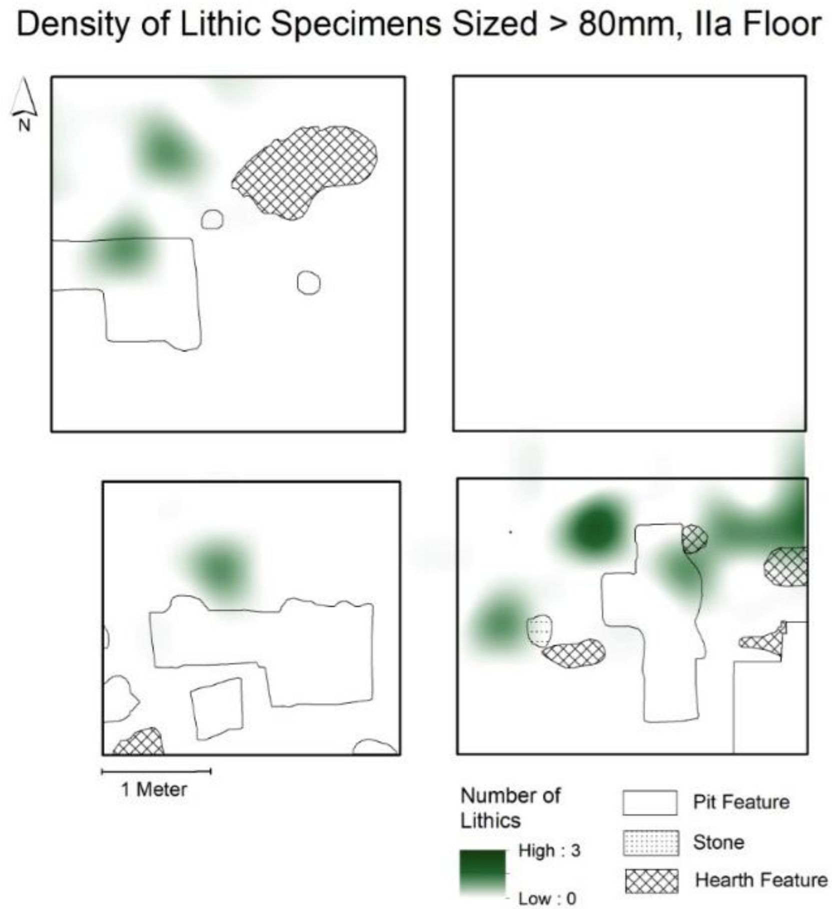


Fig. B.73b: Map of the distribution of lithic specimens of the size grade 40-79 mm from the IIb floor.



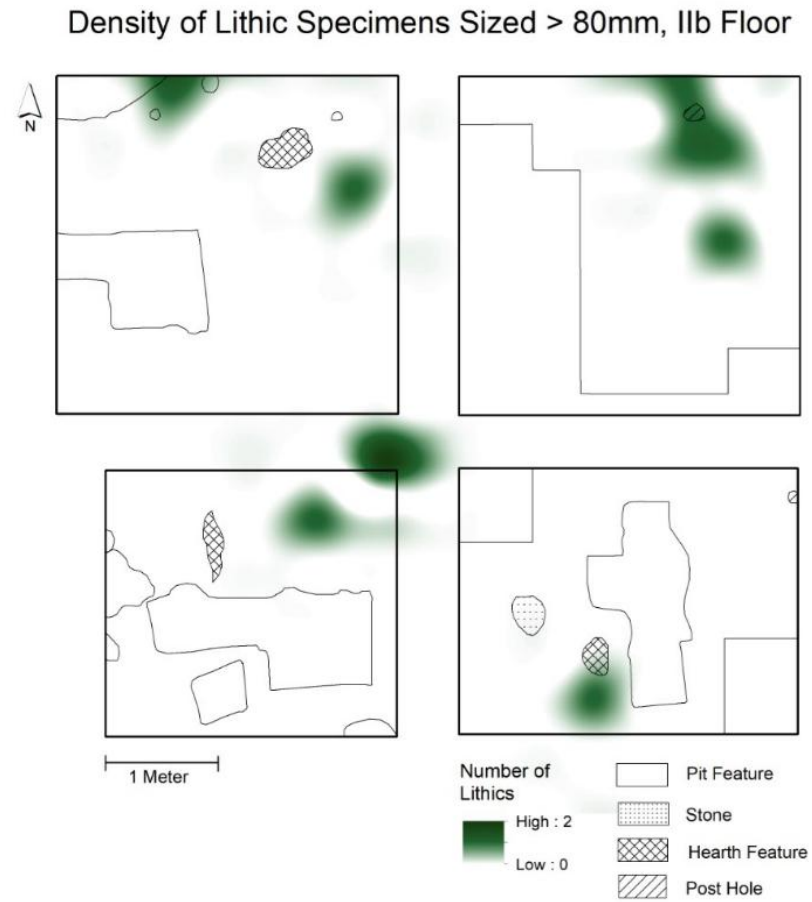


Fig. B.74a: Map of the distribution of lithic specimens of the size grade > 80 mm from the IIa floor.

Fig. B.74b: Map of the distribution of lithic specimens of the size grade > 80 mm from the IIb floor.

Fig. B.75a: Map of the distribution of thermally altered lithics from the IIa floor.

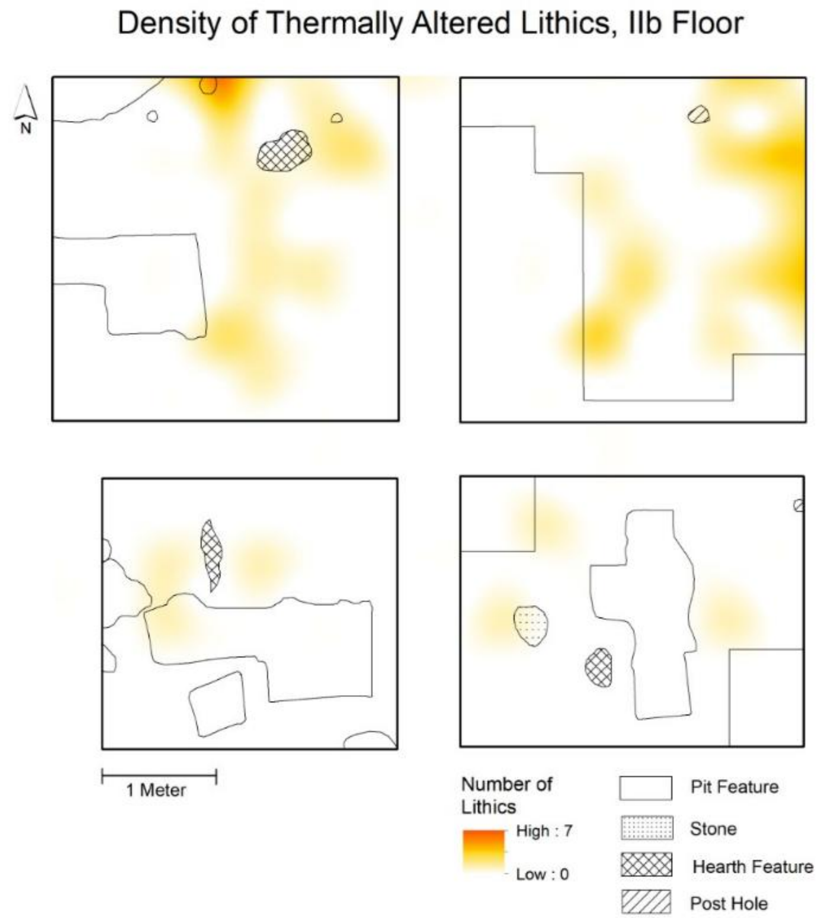


Fig. B.75b: Map of the distribution of thermally altered lithics from the IIb floor.

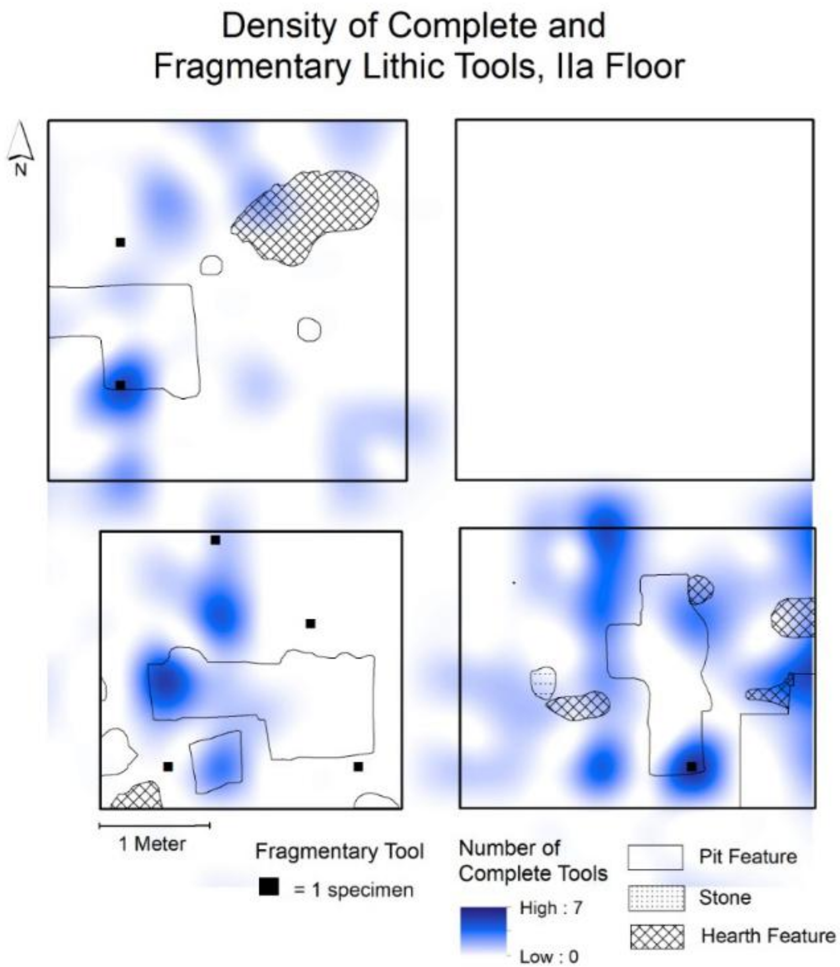


Fig. B.76a: Map of the distribution of fragmentary and complete lithic tools from the IIa floor.

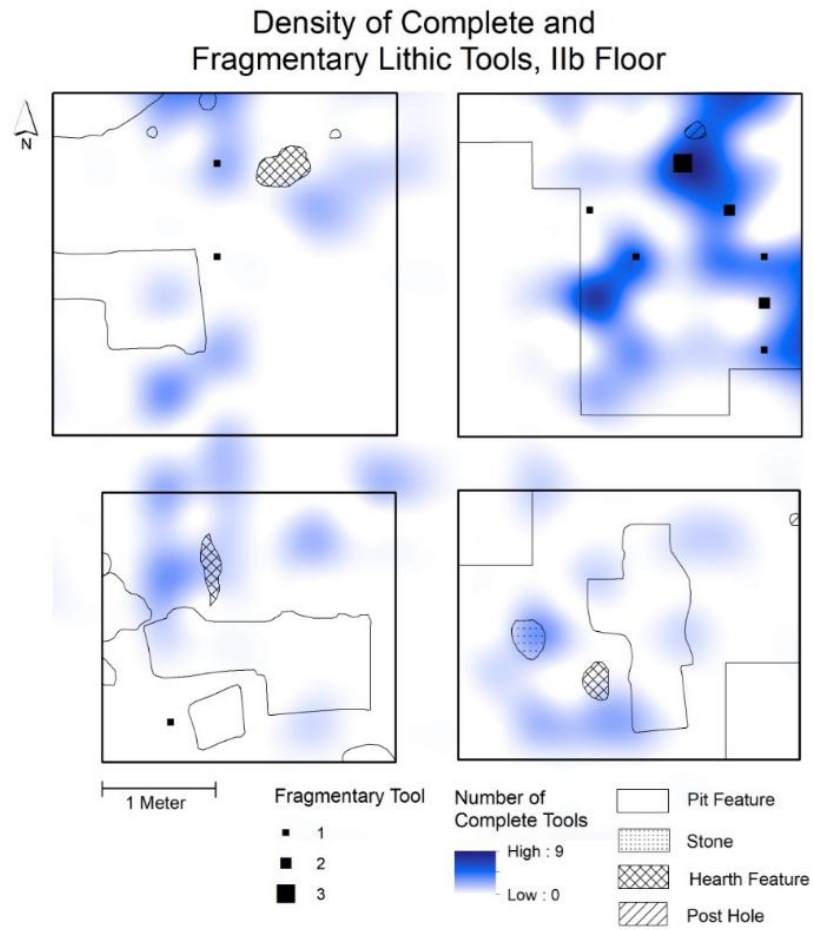


Fig. B.76b: Map of the distribution of fragmentary and complete lithic tools from the IIb floor.

Appendix C

Table C.11.a: Table displays the NISP and %NISP of faunal classes from the IIa assemblage.

Scientific Class	Block	NISP (Count)	% of Class Assemblage	% of Total Assemblage
Osteichthyes	Block A	33	11.30%	3.47%
	Block B	9	3.08%	0.95%
	Block C	250	85.62%	26.26%
	Block D	0	0%	0%
	Total	292	100%	30.67%
Mammalia	Block A	62	9.44%	6.51%
	Block B	242	36.83%	25.42%
	Block C	353	53.73%	37.08%
	Block D	0	0%	0%
	Total	657	100%	69.01%
Aves	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	0	100%	0%
Indeterminate	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	3	100%	0.31%
	Block D	0	0%	0%
	Total	3	100%	0.31%
Total Fauna	Block A	95	9.98%	9.98%
	Block B	255	26.79%	26.79%
	Block C	606	63.66%	63.66%
	Block D	0	0%	0%
	Total	952	100%	100%

Table C.11b: Table displays the NISP and %NISP of faunal classes from the IIb assemblage.

Scientific Class	Block	NISP (Count)	% of Class Assemblage	% of Total Assemblage
Osteichthyes	Block A	78	1.77%	1.21%
	Block B	1	0.02%	0.02%
	Block C	1226	27.78%	19.05%
	Block D	3108	70.43%	48.30%
	Total	4413	68.58%	68.58%
Mammalia	Block A	103	5.25%	1.60%
	Block B	53	2.70%	0.82%
	Block C	205	10.45%	3.19%
	Block D	1601	81.60%	24.88%
	Total	1962	100%	30.49%
Aves	Block A	2	25%	0.03%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	6	75%	0.09%
	Total	8	100%	0.12%
Indeterminate	Block A	1	1.92%	0.02%
	Block B	0	0%	0%
	Block C	1	1.92%	0.02%
	Block D	50	96.15%	0.78%
	Total	52	100%	0.81%
Total Fauna	Block A	183	2.84%	2.84%
	Block B	54	0.84%	0.84%
	Block C	1431	22.24%	22.24%
	Block D	4716	73.29%	73.29%
	Total	6435	100%	100%

Table C.12.a: Table displays fauna species assemblages from the IIa floor.

Genus/Species	Block	NISP (Count)	% of Species Assemblage	% of Total Assemblage
King Salmon	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	24	100%	2.52%
	Block D	0	0%	0%
	Total	24	100%	2.52%
Sockeye Salmon	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	9	100%	0.95%
	Block D	0	0%	0%
	Total	9	100%	0.95%
Trout	Block A	0	0%	0%
	Block B	1	50%	0.11%
	Block C	1	50%	0.11%
	Block D	0	0%	0%
	Total	2	100%	0.21%
Deer	Block A	11	22.92%	1.16%
	Block B	5	10.42%	0.53%
	Block C	32	66.67%	3.36%
	Block D	0	0%	0%
	Total	48	100%	5.04%
Big Horn Sheep	Block A	1	50%	0.11%
	Block B	0	0%	0%
	Block C	1	50%	0.11%
	Block D	0	0%	0%
	Total	2	100%	0.21%
Canis	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	6	100%	0.63%
	Block D	0	0%	0%
	Total	6	100%	0.63%
Beaver	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	3	100%	0.32%
	Block D	0	0%	0%
	Total	3	100%	0.32%
Species Assemblage	Total	94	-	9.87%

Table C.12b: Table displays fauna species assemblages from the IIb floor.

Genus/Species	Block	NISP (Count)	% of Species Assemblage	% of Total Assemblage
King Salmon	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	1	25%	0.02%
	Block D	3	75%	0.05%
	Total	4	100%	0.06%
Sockeye Salmon	Block A	4	0.63%	0.06%
	Block B	0	0%	0%
	Block C	231	36.15%	3.59%
	Block D	404	63.22%	6.28%
	Total	639	100%	9.93%
Trout	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	2	25%	0.03%
	Block D	6	75%	0.09%
	Total	8	100%	0.12%
Deer	Block A	7	11.11%	0.11%
	Block B	9	14.29%	0.14%
	Block C	20	31.75%	0.31%
	Block D	27	42.86%	0.42%
	Total	63	100%	0.98%
Canis	Block A	1	14.29%	0.02%
	Block B	1	14.29%	0.02%
	Block C	0	0%	0%
	Block D	5	71.43%	0.08%
	Total	7	100%	0.11%
Beaver	Block A	2	15.38%	0.03%
	Block B	0	0%	0%
	Block C	1	7.69%	0.02%
	Block D	10	76.92%	0.16%
	Total	13	100%	0.20%
Mouse-Sized Rodents	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	1	33.33%	0.02%
	Block D	2	66.67%	0.03%
	Total	3	100%	0.05%
Ptarmigan	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	2	100%	0.03%
	Total	2	100%	0.03%
Species Assemblage	Total	739	-	11.48%

Table C.13.a: Table displays faunal size class assemblages from the IIa floor.

Faunal Size Class	Block	NISP (Count)	% of Size Class Assemblage	% of Total Assemblage
Mammal Size Class 1	Block A	0	0%	0%
	Block B	1	25%	0.11%
	Block C	3	75%	0.32%
	Block D	0	0%	0%
	Total	4	100%	0.42%
Mammal Size Class 2	Block A	2	100%	0.21%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	2	100%	0.21%
Mammal Size Class 3	Block A	1	3.23%	0.11%
	Block B	0	0%	0%
	Block C	30	96.77%	3.15%
	Block D	0	0%	0%
	Total	31	100%	3.26%
Mammal Size Class 4	Block A	57	12.47%	5.99%
	Block B	102	22.32%	10.71%
	Block C	298	65.21%	31.30%
	Block D	0	0%	0%
	Total	457	100%	48.00%
Mammal Size Class 5	Block A	0	0%	0%
	Block B	1	100%	0.11%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	1	100%	0.11%
Fish Size Class 2	Block A	14	73.68%	1.47%
	Block B	2	10.53%	0.21%
	Block C	3	15.79%	0.32%
	Block D	0	0%	0%
	Total	19	100%	2.00%
Fish Size Class 3	Block A	2	12.50%	0.21%
	Block B	1	6.25%	0.11%
	Block C	13	81.25%	1.37%
	Block D	0	0%	0%
	Total	16	100%	1.68%
Fish Size Class 4	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	24	100%	2.52%
	Block D	0	0%	0%
	Total	24	100%	2.52%
Size Class Assemblage	Total	554	-	58.19%

Table C.13b: Table displays faunal size class assemblages from the IIb floor.

Faunal Size Class	Block	NISP (Count)	% of Size Class Assemblage	% of Total Assemblage
Mammal Size Class 1	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	1	100%	0.02%
	Total	1	100%	0.02%
Mammal Size Class 2	Block A	4	44.44%	0.06%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	5	55.56%	0.08%
	Total	9	100%	0.14%
Mammal Size Class 3	Block A	10	10.99%	0.16%
	Block B	0	0%	0%
	Block C	52	57.14%	0.81%
	Block D	29	31.87%	0.45%
	Total	91	100%	1.41%
Mammal Size Class 4	Block A	85	5.05%	1.32%
	Block B	41	2.43%	0.64%
	Block C	144	8.55%	2.24%
	Block D	1402	83.25%	21.79%
	Total	1684	100%	26.17%
Fish Size Class 1	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	1	100%	0.02%
	Total	1	100%	0.02%
Fish Size Class 2	Block A	4	28.57%	0.06%
	Block B	0	0%	0%
	Block C	3	21.43%	0.05%
	Block D	7	0.50%	0.11%
	Total	14	100%	0.22%
Fish Size Class 3	Block A	28	0.77%	0.44%
	Block B	1	0.03%	0.02%
	Block C	1015	28.04%	15.77%
	Block D	2576	71.16%	40.03%
	Total	3620	100%	56.25%
Fish Size Class 4	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	4	25%	0.06%
	Block D	8	75%	0.12%
	Total	12	100%	0.19%
Avian Size Class 1	Block A	2	50%	0.03%

	Block B	0	0%	0%
	Block C	2	50%	0.03%
	Block D	0	0%	0%
	Total	4	100%	0.06%
Avian Size Class 2	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	2	100%	0.03%
	Total	2	100%	0.03%
Avian Size Class 3	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	1	100%	0.02%
	Total	1	100%	0.02%
Size Class Assemblage	Total	5439	-	84.52%

Table C.14.a: Table displays faunal element utility assemblages from the IIa floor.

Element Utility	Block	NISP (Count)	% of Utility Assemblage	% of Total Assemblage
Low	Block A	12	24.49%	1.26%
	Block B	5	10.20%	1.12%
	Block C	32	65.31%	3.36%
	Block D	0	0%	0%
	Total	49	100%	5.15%
Moderate	Block A	12	5.15%	1.26%
	Block B	9	3.86%	0.95%
	Block C	212	90.99%	22.27%
	Block D	0	0%	0%
	Total	233	100%	24.47%
High	Block A	24	14.72%	2.52%
	Block B	31	19.02%	3.26%
	Block C	108	66.26%	11.34%
	Block D	0	0%	0%
	Total	163	100%	17.12%
Total Utility Assemblage	Block A	48	10.79%	5.04%
	Block B	45	10.11%	4.73%
	Block C	352	79.10%	36.97%
	Block D	0	0%	0%
	Total	445	100%	46.74%

Table C.14b: Table displays faunal element utility assemblages from the IIb floor.

Element Utility	**Block**	**NISP (Count)**	**% of Utility Assemblage**	**% of Total Assemblage**
Low	Block A	10	2.47%	0.16%
	Block B	1	0.25%	0.02%
	Block C	42	10.37%	0.65%
	Block D	352	86.91%	5.47%
	Total	405	100%	6.29%
Moderate	Block A	51	1.42%	0.79%
	Block B	9	0.25%	0.14%
	Block C	1026	28.52%	15.94%
	Block D	2512	69.82%	39.04%
	Total	3598	100%	55.91%
High	Block A	30	9.55%	0.47%
	Block B	0	0%	0%
	Block C	116	36.94%	1.80%
	Block D	168	53.50%	2.61%
	Total	314	100%	4.88%
Total Utility Assemblage	Block A	91	2.11%	1.41%
	Block B	10	0.23%	0.16%
	Block C	1184	27.43%	18.40%
	Block D	3085	71.46%	47.94%
	Total	4317	100%	67.09%

Table C.15.a: Table displays faunal species utility assemblages from the IIa floor.

Species Utility	Block	NISP (Count)	% of Utility Assemblage	% of Total Assemblage
Low	Block A	2	33.33%	0.21%
	Block B	1	16.67%	0.11%
	Block C	3	50.00%	0.32%
	Block D	0	0%	0%
	Total	6	0.82%	0.63%
Moderate	Block A	34	14.72%	3.57%
	Block B	8	3.46%	0.84%
	Block C	189	81.82%	19.85%
	Block D	0	0%	0%
	Total	231	31.64%	24.26%
High	Block A	57	11.56%	5.99%
	Block B	103	20.89%	10.82%
	Block C	333	6.69%	34.98%
	Block D	0	0%	0%
	Total	493	67.53%	51.79%
Total Utility Assemblage	Block A	93	12.74%	9.77%
	Block B	112	15.34%	11.76%
	Block C	525	71.92%	55.15%
	Block D	0	0%	0%
	Total	730	100%	76.68%

Table C.15b: Table displays faunal species utility assemblages from the IIb floor.

Species Utility	Block	NISP (Count)	% of Utility Assemblage	% of Total Assemblage
Low	Block A	6	37.50%	0.09%
	Block B	1	6.25%	0.02%
	Block C	9	56.25%	0.14%
	Block D	0	0%	0%
	Total	16	0.29%	0.25%
Moderate	Block A	14	7.65%	0.22%
	Block B	0	0%	0%
	Block C	54	29.51%	0.84%
	Block D	115	62.84%	1.79%
	Total	183	3.31%	2.84%
High	Block A	113	2.12%	1.76%
	Block B	54	1.01%	0.84%
	Block C	1163	21.83%	18.07%
	Block D	3998	75.04%	62.13%
	Total	5328	96.40%	82.80%
Total Utility Assemblage	Block A	133	2.41%	2.07%
	Block B	55	1.00%	0.85%
	Block C	1226	22.18%	19.05%
	Block D	4113	74.42%	63.92%
	Total	5527	100%	85.89%

Table C.16.a: Table displays the faunal size grade assemblages from the IIa floor.

Size of Faunal Material	Block	NISP (Count)	% of Size Class Assemblage	% of Total Assemblage
0-9mm	Block A	56	10.28%	5.88%
	Block B	79	14.50%	8.30%
	Block C	410	75.23%	43.07%
	Block D	0	0%	0%
	Total	545	100%	57.25%
10-19mm	Block A	21	6.91%	2.21%
	Block B	148	48.68%	15.55%
	Block C	135	44.41%	14.18%
	Block D	0	0%	0%
	Total	304	100%	31.93%
20-29mm	Block A	14	20.59%	1.47%
	Block B	19	27.94%	2.00%
	Block C	35	51.47%	3.68%
	Block D	0	0%	0%
	Total	68	100%	7.14%
30-39mm	Block A	4	19.05%	0.42%
	Block B	3	14.29%	0.32%
	Block C	14	66.67%	1.47%
	Block D	0	0%	0%
	Total	21	100%	2.21%
>40mm	Block A	0	0%	0%
	Block B	2	14.29%	0.21%
	Block C	12	85.71%	1.26%
	Block D	0	0%	0%
	Total	14	100%	1.47%
Size of Fuana Assemblage	Total	952	-	100%

Table C.16b: Table displays the faunal size grade assemblages from the IIb floor.

Size of Faunal Material	Block	NISP (Count)	% of Size Class Assemblage	% of Total Assemblage
0-9mm	Block A	132	39.90%	2.05%
	Block B	49	1.48%	0.76%
	Block C	617	18.65%	9.59%
	Block D	2510	75.88%	39.01%
	Total	3308	100%	51.41%
10-19mm	Block A	41	2.64%	0.64%
	Block B	3	0.19%	0.05%
	Block C	384	24.74%	5.97%
	Block D	1124	72.42%	17.47%
	Total	1552	100%	24.12%
20-29mm	Block A	3	0.32%	0.05%
	Block B	1	0.12%	0.02%
	Block C	117	12.45%	1.82%
	Block D	819	87.13%	12.73%
	Total	940	100%	14.61%
30-39mm	Block A	7	2.41%	0.11%
	Block B	1	0.34%	0.02%
	Block C	24	8.25%	0.37%
	Block D	259	89.00%	4.02%
	Total	291	100%	4.52%
>40mm	Block A	1	1.49%	0.02%
	Block B	0	0%	0%
	Block C	20	29.85%	0.31%
	Block D	46	68.66%	0.71%
	Total	67	100%	1.04%
Size of Fuana Assemblage	Total	6158	-	95.70%

Table C.16: Table displays the burned faunal assemblages from the IIa and IIb floors.

Fauna	Block	NISP (Count)	% of Thermal Assemblage	% of Total Assemblage
IIa	A	11	17.74%	1.16%
	B	28	45.16%	2.94%
	C	23	37.10%	2.42%
	D	0	0%	0%
	All	63	100%	6.62%
IIb	A	11	8.53%	0.17%
	B	0	0%	0%
	C	49	37.98%	0.76%
	D	69	53.49%	1.07%
	All	129	100%	2.00%

Appendix D

Table D.18.a: Table displays the lithic debitage and lithic tool assemblages from the IIa floor.

Lithic Category	Block	NISP (Count)	% of Lithic Category	% of Total Assemblage
Lithic Tool	Block A	25	26.32%	2.98%
	Block B	48	50.53%	5.71%
	Block C	22	23.16%	2.62%
	Block D	0	0%	0%
	Total	95	100%	11.31%
Lithic Debitage	Block A	177	23.76%	21.07%
	Block B	256	34.36%	30.48%
	Block C	312	42.42%	37.14%
	Block D	0	0%	0%
	Total	745	100%	88.69%
Total Lithic	Block A	202	24.05%	24.05%
	Block B	304	36.19%	36.19%
	Block C	334	39.76%	39.76%
	Block D	0	0%	0%
	Total	840	100%	100%

Table D.18b: Table displays the lithic debitage and lithic tool assemblages from the IIb floor.

Lithic Category	Block	NISP (Count)	% of Lithic Category	% of Total Assemblage
Lithic Tool	Block A	16	12.40%	1.03%
	Block B	15	11.63%	0.97%
	Block C	20	15.50%	1.29%
	Block D	75	58.14%	4.83%
	Total	129	100%	8.31%
Lithic Debitage	Block A	165	11.59%	10.62%
	Block B	184	12.92%	11.85%
	Block C	310	21.77%	19.96%
	Block D	765	53.72%	49.26%
	Total	1424	100%	91.69%
Total Lithic	Block A	181	11.65%	11.65%
	Block B	199	12.81%	12.81%
	Block C	330	21.25%	21.25%
	Block D	840	54.09%	54.09%
	Total	1553	100%	100%

Table D.19.a: Table displays the lithic raw material assemblages from the IIa floor.

Lithic Material Type	Block	NISP (Count)	% of Species Assemblage	% of Total Assemblage
Basalt	Block A	1	20%	0.12%
	Block B	2	40%	0.24%
	Block C	2	40%	0.24%
	Block D	0	0%	0%
	Total	5	100%	0.90%
Chalcedony	Block A	2	12.50%	0.24%
	Block B	4	25%	0.48%
	Block C	10	62.50%	1.19%
	Block D	0	0%	0%
	Total	16	100%	1.90%
Chert	Block A	5	35.71%	0.90%
	Block B	4	28.57%	0.48%
	Block C	5	35.71%	0.90%
	Block D	0	0%	0%
	Total	14	100%	1.67%
Coarse Basalt	Block A	0	0%	0%
	Block B	2	66.67%	0.24%
	Block C	1	33.33%	0.12%
	Block D	0	0%	0%
	Total	3	100%	0.36%
Coarse Dacite	Block A	13	33.33%	1.55%
	Block B	14	35.90%	1.67%
	Block C	12	30.77%	1.43%
	Block D	0	0%	0%
	Total	39	100%	4.64%
Dacite	Block A	160	24.73%	19.05%
	Block B	230	35.55%	27.38%
	Block C	257	39.72%	30.60%
	Block D	0	0%	0%
	Total	647	100%	77.02%
Igneous Intrusive	Block A	1	33.33%	0.12%
	Block B	2	66.67%	0.24%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	3	100%	0.36%
Jasper	Block A	3	33.33%	0.36%
	Block B	4	44.44%	0.48%
	Block C	2	22.22%	0.24%
	Block D	0	0%	0%
	Total	9	100%	1.07%

Metamorphosed	Block A	0	0%	0%
	Block B	3	60%	0.36%
	Block C	2	40%	0.24%
	Block D	0	0%	0%
	Total	5	100%	0.90%
Mudstone	Block A	1	33.33%	0.12%
	Block B	2	66.67%	0.24%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	3	100%	0.36%
Nephrite	Block A	0	0%	0%
	Block B	1	100%	0.12%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	1	100%	0.12%
Obsidian	Block A	0	0%	0%
	Block B	4	66.67%	0.48%
	Block C	2	33.33%	0.24%
	Block D	0	0%	0%
	Total	6	100%	0.71%
Ocher	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	1	100%	0.12%
	Block D	0	0%	0%
	Total	1	100%	0.12%
Pisolite	Block A	1	20%	0.12%
	Block B	1	20%	0.12%
	Block C	3	60%	0.36%
	Block D	0	0%	0%
	Total	5	100%	0.90%
Quartize	Block A	1	33.33%	0.12%
	Block B	1	33.33%	0.12%
	Block C	1	33.33%	0.12%
	Block D	0	0%	0%
	Total	3	100%	0.36%
Shist	Block A	0	0%	0%
	Block B	1	100%	0.12%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	1	100%	0.12%
Silicified Shale	Block A	1	100%	0.12%
	Block B	0	0%	0%

	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	1	100%	0.12%
Slate	Block A	13	16.67%	1.55%
	Block B	29	37.18%	3.45%
	Block C	36	46.15%	4.29%
	Block D	0	0%	0%
	Total	78	100%	9.29%
Material Assemblage	Total	840	-	100%

Table D.19b: Table displays the lithic raw material assemblages from the IIb floor.

Lithic Material Type	Block	NISP (Count)	% of Species Assemblage	% of Total Assemblage
Basalt	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	17	100%	1.09%
	Total	17	100%	1.09%
Chalcedony	Block A	4	14.81%	0.26%
	Block B	2	7.40%	0.13%
	Block C	7	25.93%	0.45%
	Block D	14	51.85%	0.90%
	Total	27	100%	1.76%
Chert	Block A	2	10.53%	0.13%
	Block B	6	31.58%	0.39%
	Block C	8	42.11%	0.52%
	Block D	3	15.79%	0.19%
	Total	19	100%	1.24%
Coarse Basalt	Block A	0	0%	0%
	Block B	3	75%	0.19%
	Block C	0	0%	0%
	Block D	1	25%	0.06%
	Total	4	100%	0.26%
Coarse Dacite	Block A	13	16.05%	0.83%
	Block B	4	4.94%	0.26%
	Block C	12	14.81%	0.77%
	Block D	52	64.20%	3.35%
	Total	81	100%	5.28%
Conglomerate	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%

	Block D	1	100%	0.06%
	Total	1	100%	0.06%
Dacite	Block A	119	11.12%	7.66%
	Block B	158	14.77%	10.17%
	Block C	242	22.62%	15.58%
	Block D	551	51.50%	35.48%
	Total	1070	100%	69.80%
Gniess	Block A	1	25%	0.06%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	3	75%	0.19%
	Total	4	100%	0.26%
Granite/Diorite	Block A	2	40%	0.13%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	3	60%	0.19%
	Total	5	100%	0.32%
Igneous Intrusive	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	3	60%	0.19%
	Block D	2	40%	0.13%
	Total	5	100%	0.32%
Jasper	Block A	0	0%	0%
	Block B	1	6.67%	0.06%
	Block C	7	45.56%	0.45%
	Block D	7	45.56%	0.45%
	Total	15	100%	0.98%
Metamorphosed	Block A	0	0%	0%
	Block B	1	20%	0.06%
	Block C	0	0%	0%
	Block D	4	80%	0.26%
	Total	5	100%	0.32%
Greenstone	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	1	50%	0.06%
	Block D	1	50%	0.06%
	Total	2	100%	0.13%
Obsidian	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	1	8.33%	0.06%
	Block D	11	91.67%	0.71%
	Total	12	100%	0.78%

Ocher	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	2	40%	0.13%
	Block D	3	60%	0.19%
	Total	5	100%	0.32%
Ortho-Quartzite	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	2	100%	0.13%
	Total	2	100%	0.13%
Pisolite	Block A	2	14.29%	0.13%
	Block B	0	0%	0%
	Block C	8	57.14%	0.52%
	Block D	4	28.57%	0.26%
	Total	14	100%	0.91%
Quartize	Block A	2	25%	0.13%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	6	75%	0.39%
	Total	8	100%	0.52%
Quartz	Block A	0	0%	0%
	Block B	1	50%	0.06%
	Block C	1	50%	0.06%
	Block D	0	0%	0%
	Total	2	100%	0.13%
Rhyolite	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	2	100%	0.13%
	Total	2	100%	0.13%
Sandstone	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	3	100%	0.19%
	Total	3	100%	0.19%
Shale	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	2	100%	0.13%
	Total	2	100%	0.13%
Silicified Shale	Block A	0	0%	0%
	Block B	1	20%	0.06%

	Block C	0	0%	0%
	Block D	4	80%	0.26%
	Total	5	100%	0.32%
Slate	Block A	36	15.06%	2.32%
	Block B	23	9.62%	1.48%
	Block C	39	16.32%	2.51%
	Block D	141	59.00%	9.08%
	Total	239	100%	15.59%
Soapstone	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	3	100%	0.19%
	Total	3	100%	0.19%
Material Assemblage	Total	1552	-	99.94%

Table D.20.a: Table displays the lithic tool assemblages from the IIa floor.

Tool Type	Block	NISP (Count)	% of Tool Assemblage	% of Total Assemblage
Abrador	Block A	0	0%	0%
	Block B	10	100%	1.19%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	10	100%	1.19%
Core	Block A	5	26.32%	0.60%
	Block B	9	47.37%	1%
	Block C	5	26.32%	0.60%
	Block D	0	0%	0%
	Total	19	100%	2.26%
Drilling	Block A	0	0%	0%
	Block B	2	66.67%	0.24%
	Block C	1	33.33%	0.12%
	Block D	0	0%	0%
	Total	3	100%	0.36%
Flake Tool	Block A	0	0%	0%
	Block B	7	70.00%	0.83%
	Block C	3	30.00%	0.36%
	Block D	0	0%	0%
	Total	10	100%	1.19%
Groundstone	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	2	100%	0.24%
	Block D	0	0%	0%
	Total	2	100%	0.24%
Hide Processing	Block A	4	36.36%	0.48%
	Block B	3	27.27%	0.36%
	Block C	4	36.36%	0.48%
	Block D	0	0%	0%
	Total	11	100%	1.31%
Informal Knife	Block A	0	0%	0%
	Block B	2	100%	0.24%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	2	100%	0.24%
Biface/Formal Knife	Block A	5	62.50%	0.60%
	Block B	3	37.50%	0.36%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	8	100%	0.42%

Ornamental	Block A	2	50.00%	0.24%
	Block B	2	50.00%	0.24%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	4	100%	0.48%
Other Slate	Block A	2	66.67%	0.24%
	Block B	0	0%	0%
	Block C	1	33.33%	0.12%
	Block D	0	0%	0%
	Total	3	100%	0.36%
Points	Block A	3	42.86%	0.36%
	Block B	1	14.29%	0.12%
	Block C	3	42.86%	0.36%
	Block D	0	0%	0%
	Total	7	100%	0.83%
Pounding	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	1	100%	0.12%
	Block D	0	0%	0%
	Total	1	100%	0.12%
Sewing	Block A	0	0%	0%
	Block B	2	100%	0.24%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	2	100%	0.24%
Wood	Block A	3	23.08%	0.36%
	Block B	9	69.23%	1.07%
	Block C	1	7.69%	0.12%
	Block D	0	0%	0%
	Total	13	100%	1.55%
Tool Assemblage	Total	95	-	11.31%

Table D.20b: Table displays the lithic tool assemblages from the IIb floor.

Tool Type	Block	NISP (Count)	% of Tool Assemblage	% of Total Assemblage
Abrador	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	2	50%	0.13%
	Block D	2	50%	0.13%
	Total	4	100%	0.26%
Core	Block A	2	9.09%	0.13%
	Block B	4	18.18%	0.26%
	Block C	6	27.27%	0.39%
	Block D	10	45.45%	0.64%
	Total	22	100%	1.42%
Drilling	Block A	1	10%	0.06%
	Block B	2	20%	0.13%
	Block C	1	10%	0.06%
	Block D	6	60%	0.39%
	Total	10	100%	0.64%
Flake Tool	Block A	1	10%	0.06%
	Block B	2	20%	0.13%
	Block C	1	10%	0.06%
	Block D	6	60%	0.39%
	Total	10	100%	0.64%
Groundstone	Block A	1	25%	0.06%
	Block B	1	25%	0.06%
	Block C	1	25%	0.06%
	Block D	1	25%	0.06%
	Total	4	100%	0.26%
Hide Processing	Block A	1	7.69%	0.06%
	Block B	3	23.08%	0.19%
	Block C	0	0%	0%
	Block D	9	69.23%	0.58%
	Total	13	100%	0.84%
Informal Knife	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	2	25%	0.13%
	Block D	6	75%	0.39%
	Total	8	100%	0.52%
Biface/Formal Knife	Block A	1	16.67%	0.06%
	Block B	1	16.67%	0.06%
	Block C	0	0%	0%
	Block D	4	66.67%	0.26%
	Total	6	100%	0.39%

Ornamental	Block A	0	0%	0%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	4	100%	0.26%
	Total	4	100%	0.26%
Other Slate	Block A	2	66.67%	0.13%
	Block B	0	0%	0%
	Block C	1	33.33%	0.06%
	Block D	0	0%	0%
	Total	3	100%	0.19%
Points	Block A	2	14.29%	0.13%
	Block B	2	14.29%	0.13%
	Block C	2	14.29%	0.13%
	Block D	8	57.14%	0.52%
	Total	14	100%	0.90%
Knapping	Block A	2	100%	0.13%
	Block B	0	0%	0%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	2	100%	0.13%
Sewing	Block A	0	0%	0%
	Block B	1	100%	0.06%
	Block C	0	0%	0%
	Block D	0	0%	0%
	Total	1	100%	0.06%
Wood	Block A	2	33.33%	0.13%
	Block B	2	6.25%	0.13%
	Block C	1	33.33%	0.06%
	Block D	11	68.75%	0.71%
	Total	16	100%	1.03%
Tool Assemblage	Total	117	-	8.31%

Table D.21.a: Table displays the lithic size grade assemblages from the IIa floor.

Size of Lithic Material	Block	NISP (Count)	% of Size Assemblage	% of Total Assemblage
> 9 mm	Block A	51	19.84%	6.07%
	Block B	64	24.90%	7.62%
	Block C	142	55.26%	16.90%
	Block D	0	0%	0%
	Total	257	100%	30.60%
10-19 mm	Block A	97	24.62%	11.55%
	Block B	151	38.32%	17.98%
	Block C	146	37.06%	17.38%
	Block D	0	0%	0%
	Total	394	100%	46.90%
20-39 mm	Block A	47	30.32%	5.60%
	Block B	70	45.16%	8.33%
	Block C	38	24.52%	4.50%
	Block D	0	0%	0%
	Total	155	100%	18.45%
40-79 mm	Block A	6	30%	0.71%
	Block B	10	50%	1.19%
	Block C	4	20%	0.48%
	Block D	0	0%	0%
	Total	20	100%	2.38%
> 80 mm	Block A	1	11.11%	0.12%
	Block B	6	66.67%	0.71%
	Block C	2	22.22%	0.24%
	Block D	0	0%	0%
	Total	9	100%	1.07%
Size of Lithic Assemblage	Total	835	-	99.40%

Table D.21b: Table displays the lithic size grade assemblages from the IIb floor.

Size of Lithic Material	Block	NISP (Count)	% of Size Assemblage	% of Total Assemblage
> 9 mm	Block A	93	10.89%	5.99%
	Block B	92	10.77%	5.92%
	Block C	215	25.18%	13.84%
	Block D	454	53.16%	29.23%
	Total	854	100%	54.99%
10-19 mm	Block A	58	11.60%	3.73%
	Block B	76	15.20%	4.89%
	Block C	82	16.40%	5.28%
	Block D	284	56.80%	18.29%
	Total	500	100%	32.20%
20-39 mm	Block A	21	13.46%	1.35%
	Block B	28	17.95%	1.80%
	Block C	26	16.67%	1.67%
	Block D	81	51.92%	5.22%
	Total	156	100%	10.05%
40-79 mm	Block A	4	15.38%	0.26%
	Block B	3	11.54%	0.19%
	Block C	3	11.54%	0.19%
	Block D	16	61.54%	1.03%
	Total	26	100%	1.67%
> 80 mm	Block A	3	30%	0.19%
	Block B	1	10%	0.06%
	Block C	2	20%	0.13%
	Block D	4	40%	0.26%
	Total	10	100%	0.64%
Size of Lithic Assemblage	Total	1546	-	99.55%

Table D.22: Table displays thermally altered lithis assemblages from the IIa and IIb floors.

Lithic	Block	NISP (Count)	% of Thermal Assemblage	% of Total Assemblage
IIa	A	4	21.05%	0.42%
	B	6	31.58%	0.63%
	C	9	47.37%	0.95%
	D	0	0%	0%
	All	19	100%	2.00%
IIb	A	3	6.98%	0.05%
	B	3	6.98%	0.05%
	C	17	39.53%	0.26%
	D	20	46.51%	0.31%
	All	43	100%	2.77%

Table D.23.a: Table displays the lithic fragmentary and complete tools from the IIa floor.

Tools	Block	NISP (Count)	% of Complete/Fragmented Tool Assemblage	% of Tool Assemblage
Complete Tools	Block A	20	23.26%	21.05%
	Block B	46	53.49%	48.42%
	Block C	20	23.26%	21.05%
	Block D	0	0%	0%
	Total	86	100%	90.53%
Fragmented Tools	Block A	4	57.14%	4.21%
	Block B	1	14.29%	1.05%
	Block C	2	28.57%	2.11%
	Block D	0	0%	0%
	Total	7	100%	7.37%

Table D.23b: Table displays the lithic fragmentary and complete tools from the IIb floor.

Tools	Block	NISP (Count)	% of Complete/Fragmented Tool Assemblage	% of Tool Assemblage
Complete Tools	Block A	15	13.16%	11.63%
	Block B	15	13.16%	11.63%
	Block C	18	15.79%	13.95%
	Block D	66	58%	51.16%
	Total	114	100%	88.37%
Fragmented Tools	Block A	1	7.14%	0.78%
	Block B	0	0%	0%
	Block C	2	14.29%	1.55%
	Block D	11	78.57%	8.53%
	Total	14	100%	10.85%