Buller and Heaphy:

A social interpretation of two Archaic West Coast Settlements

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Note on Appendixes

The work in thesis is based on two years of a four year excavation programme as explained in the preface. An appendix was not included in this thesis because work on the data is still in progress for the forthcoming Buller monograph and will be available in full at a later stage. Any questions about the data or appendix can be referred to Richard Walter.

Abstract

This thesis investigates the material culture assemblage and spatial patterning of two Archaic sites on the West Coast of the South Island - Buller River Mouth (K29/8) and Heaphy River Mouth (L26/1). Two key themes are explored in this thesis. The first theme argues that New Zealand archaeology can benefit from ideas and discussions from social anthropology. The second theme investigates the concept of space in both archaeology and social anthropology, and uses this as a medium to explore how links can be made between the two sub-disciplines.

The analysis of material culture showed that Buller and Heaphy are both artefactualy representative of the Archaic Phase of New Zealand prehistory. Both have a large and varied artefact assemblage containing adzes, flakes, blades, hammer stones, minnow lures, drill points and other artefact types.

The intra-site spatial analysis demonstrated areas of concentrated fire features, cooking areas, pavement areas, possible domestic buildings, stone working activity areas, adze caches, areas of oven rake out, specialized stone material manufacturing floors. With three exceptions, both Buller and Heaphy share features and activity areas that were common with each other.

This thesis argues that New Zealand archaeology can benefit by using ideas from social anthropology, and demonstrates how this can be done by interpreting the artefactual and spatial results in light of some ideas from social anthropology. The interpretation focused on three key ideas: 1) The social construction of space, 2) Ian Hodder's concept of *Domus, Agrios and Foris* and 3) Lévi-Strauss notions of *sociétés à maison* or *house societies*. The resulting discussion illustrates how a rich series of overlaying contextual interpretations can be an effective approach to understanding and interpreting New Zealand archaeology.

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Completing this thesis was one of the hardest things I've ever done. I wouldn't have done it without the support and help of those around me.

I would like to thank my supervisors Richard Walter and Tim Thomas. Richard introduced me to West Coast archaeology, involved me on several fieldtrips there, and provided me with stimulating discussions about West Coast and New Zealand prehistory. Tim Thomas came on board later in the project and provided significant guidance with the anthropological and theoretical discussions in this thesis. I would also like to thank Chris Jacomb for all his support and assistant throughout the project and his role as co-director of the West Coast Excavations.

Over the years, many people have supported and assisted the West Coast fieldwork which resulted in the accumulation of data used in this thesis. They include archaeology fieldschool students, West Coast residents, staff from the Department of Conservation and NZ Historic Places Trust and members of Te Runanga o Kati Waewae, and Te Runanga o Ngati Apa.

I would like to thank Helen leach, Jenny Kahn and Angela Scott who provided stimulating discussions and ideas about various components or themes within this thesis.

I am grateful to my colleagues and friends in the Anthropology Department, who, without their assistance, support and companionship, I would not be where I am today. A special thanks to Amy and Raelene who shared an office with me and provided friendship through the ups and downs of this thesis.

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Preface

The Tai Poutini Project

The following research was conducted as part of the Tai Poutini Project. This is an archaeological research project which focuses on the prehistory of the West Coast of the South Island, New Zealand. The project is run by Southern Pacific Archaeological Research (SPAR), a research group from the University of Otago.

The Tai Poutini Project was developed by Chris Jacomb and Richard Walter, the directors of SPAR. Their research objectives are to investigate coastal sites on the West Coast, and to investigate implications of the West Coast research on models of early adaptation, regional comparisons, and culture change in New Zealand prehistory.

As part of this project, excavations were carried out at two archaic sites, Buller River Mouth (K29/8) and Heaphy River Mouth (L26/1), and at a slightly later site in Karamea. The first of these excavations started in 2003, and research is ongoing. To date, the Tai Poutini Project has undertaken five excavations at Buller River Mouth (a test pit excavation, and four fieldschool excavations), and one excavation at each of Heaphy River Mouth and Karamea. This thesis will focus mainly on the spatial analysis and material culture from the 2004 excavations at Buller River Mouth and Heaphy River Mouth.

This research would not have gone ahead without the assistance and support of Te Runanga o Kati Waewae, and Te Runanga o Ngati Apa.

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Introduction

A distinguished Pacific archaeologist has more than once remarked to me that New Zealand archaeologists don't see the wider picture and are only too interested in New Zealand. (Prickett 2004:397)

Buller River Mouth (K29/8) and Heaphy River Mouth (L26/1) are two early prehistoric sites on the West Coast of the South Island. This thesis presents a study of the material culture assemblage and spatial patterning of these two sites, using data collected during excavations in 2004 and 2005.

The primary aim of this thesis is to document the material culture of Buller and Heaphy by describing and analyzing the excavated artefact assemblage and then to discuss this within a broader theoretical framework. There are two theoretical ideas raised in this thesis. The first theme argues that New Zealand archaeology can benefit by drawing on ideas and discussions from social anthropology. The second theme investigates the concept of space in both archaeology and social anthropology, and it is through this medium that I will focus my discussions.

In order to link anthropological discussions about space with empirical archaeological data from New Zealand prehistory, a three step approach was adopted. The first stage is to present a material culture analysis from Buller and Heaphy. The second stage is to provide an intra-site spatial analysis of the two sites, incorporating the results of the material culture. Thirdly, the empirical archaeological data presented in the first and second stage will be discussed in relation to the spatial theories from social anthropology.

The West Coast: Buller and Heaphy

The West Coast of the South Island was once described by Atholl Anderson as an "archaeological *terra incognita*" (Anderson 1982:131). Thirty years on, it still remains relatively untouched by archaeologists. Although there are several reported archaeological sites on the West Coast, only a handful have been excavated with published results. These sites include Jackson's Bay (Hooker

1986:33-37), Bruce Bay (Jones, Hooker and Anderson 1997; Allingham and Symon 1999), Buller River Mouth (Orchiston 1974), Heaphy River Mouth (Wilkes and Scarlet 1967) and Karamea (Walter, Jacomb and Muth 2004). Another key site on the West Coast is Fox River Mouth, a Classic phase site which was excavated by Graeme Mason, but not yet published (Anderson 1982:107).

Buller River Mouth and Heaphy River Mouth are both are located on the northern West Coast of the South Island (Figure 1.1), and both were initially excavated in the 1960s. Buller was first excavated by Wayne Orchiston (Orchiston 1971, 1974), and Heaphy was initially excavated by Ron Scarlett and Owen Wilkes (Wilkes and Scarlet 1967; Scarlett 1967). In 2004, Buller and Heaphy were excavated again, as part of the Tai Poutini Archaeological Research Program directed by Chris Jacomb and Richard Walter from the University of Otago. The more recent excavations were undertaken as a result of threat. Buller was under potential threat from agricultural development and Heaphy was under direct threat from steady river erosion. Further information about the environment and archaeology of the South Island's West coast is presented in Chapter 3.

Figure 1.1: Map of New Zealand showing the location of Buller River Mouth and Heaphy River Mouth

The material culture from Buller and Heaphy is characteristic of the Archaic Phase of New Zealand prehistory (Golson 1959; Jacomb, Walter and Tucker 2004:13; Walter, Muth and Jacomb 2004:10). Artefacts include flaked greenstone adzes, argillite adzes of several Duff types (Duff 1977), minnow lure shanks, chert blades, abraders, spall tools, anvil and flakes from a New Zealand-wide variety of sources. The acidity of the soil on the West Coast has resulted in poor preservation of bone and shell, resulting in only the stone artefacts remaining. A more in-depth discussion of the material culture from Buller and Heaphy is presented in Chapter 4.

New Zealand archaeology and social anthropology

Nigel Prickett (2004) has previously argued that New Zealand archaeology is strongly influenced by the sciences, but not adequately influenced by ideas from the humanities and social sciences. Consequently, the human focus is in danger of being lost from New Zealand prehistory altogether. In order to avoid this, we need to draw in ideas from the humanities based disciplines such as anthropology, sociology, human geography, history, politics and economics (Prickett 2004). Similarly, Walter (Walter 2004) argued that New Zealand archaeology is largely removed from discussions in Pacific archaeology despite having an important prehistoric connection with the Pacific. This thesis sets out to explore ways in which New Zealand archaeology can better situate itself within the wider contexts of Pacific archaeology and within anthropology.

This thesis argues that New Zealand archaeology can benefit from both the sciences and the humanities. This thesis explores how we can bring ideas from the humanities based disciplines such as anthropology, sociology, human geography and history into our discussions of New Zealand archaeology.

The concept of space

Cynthia Robin notes that "The use of space is something that defines and is defined by every aspect of human life. It is influenced by the social, political, economic, ritual and private lives" (Robin and Rothschild 2002:159). Space is the main theme that was selected for this study because it is something that is widely studied by both social anthropologists and archaeologists and it is involved with every aspect of human life. Parker-Pearson and Richards (1994:xi) note that archaeologists have a tendency to treat social space with such contrived objectivity that it reduces the study of structures to a descriptive and definitional level.

Indeed, it is difficult to make social interpretations when all you have to go on are a row of post holes and fire features. Archaeologists are cautious of applying symbolic and ritualistic interpretations when very little else is known about

these sites. This thesis proposes that we can make social interpretations of archaeological sites by drawing in knowledge of social space from other disciplinary perspectives.

The concept of space in anthropology and archaeology is such a vast topic that it can become very broad and ungrounded. Consequently, this thesis will focus on three key ideas: 1) The social construction of space, 2) Ian Hodder's concept of *Domus, Agrios and Foris* and 3) Lévi-Strauss notion's of *sociétés à maison* or *house societies*. These three themes were chosen for their potential applicability to New Zealand archaeology

The social construction of space is the main theme explored in this thesis. Rapoport (1969:9) has proposed that houses are part of society's non verbal communication system. That is, use of space and the physical objects within this space can be a way of communicating rank, power and other aspects of social identity (Blanton 1994:7). For the modern Maori, the physical construction of the Maori meeting house portrays symbolic representations and varieties of social structure. Chapter Two will explore how we can incorporate worldviews of the modern and historic Maori to help us understand how space may have been used in prehistory.

The household cluster is the most basic social and spatial unit of any community (Flannery 1976, Taomia 2001:140). Because it is the most basic social and spatial unit, it is an ideal discussion topic for this thesis. Chapter Two elaborates more on the spatial and social aspects of houses and households from both an archaeological and social anthropological perspective. This thesis develops on Walter's (2004) discussion of the Lévi-Strauss's *Société à Maisons*, or *house societies* as a theoretical tool for bridging New Zealand archaeology with social anthropology.

Thesis Structure

Chapter Two: Theoretical Perspectives

This chapter is a critical discussion of recent approaches to understanding space from both social anthropologists and archaeologists. It introduces some interpretive frameworks from the wider anthropological and pacific literature. It then focuses the discussion on the New Zealand context, and how space has been previously investigated by New Zealand archaeologists and social anthropologists.

Chapter Three: West Coast Archaeology

This chapter provides the background to the environment and climate on the West Coast followed by a discussion of prehistoric human adaptation to thesis environment. It discusses the history of the archaeology of the West Coast with particular emphasis on the two key sites being investigated in this thesis – Buller and Heaphy.

Chapter Four: Material Culture and Methods

In order to link anthropological discussions about space with empirical archaeological data from New Zealand Prehistory, a three step approach was adopted. The first stage is to present a material culture analysis from Buller and Heaphy. Therefore, this chapter is a comprehensive analysis of the 2004 and 2005 excavated artefact assemblages at Buller and Heaphy.

Chapter 5: Material Culture and intra-site spatial analysis

Following on from Chapter 4, this chapter is second part of a three step approach. Chapter 5 is a spatial analysis of Buller and Heaphy. It builds on the lithics results from Chapter 4 and analyzes them in the context of intra-site spatial archaeology.

Chapter 6: Discussion and Conclusions

Chapter 6 is the last stage of a three step approach to linking New Zealand archaeology with anthropological discussions. It builds on the empirical

archaeological results of chapters 4 and 5 and discusses these in light of the theories discussed in Chapter 2. Here, we examine ways in which anthropological discussions about space can benefit New Zealand archaeology.

Two

Theoretical perspectives

Variability is not only the key to understanding the past, but also what makes studying the past of such interest. It is time New Zealand archaeologists adopted the theoretical tools to do the job. (Holdaway 2004:27)

Introduction

This chapter is a discussion of space. It explores the way in which archaeologists and anthropologists have explored space, and illustrates how we can draw some of these ideas from social anthropology into the discussions of spatial analysis in New Zealand archaeology. This chapter begins with a literature review of how social anthropologists and archaeologists have approached the concept of space. It is not intended to be an exhausting literature review, but will focuses on three themes: 1) the social construction of space, 2) Ian Hodder's conception of *Domus, Agrios and Foris* and 3) Lévi-Strauss notion *of sociétés à maison* or *house societies*. The second section of this chapter talks about the spatial and social contexts of houses. It begins with definitions of house and households, followed by a discussion of Maori houses. The third section of this chapter is a critical discussion of spatial analysis in New Zealand and Pacific archaeology. The forth and final section of this chapter explores of the ideological dimensions of spatial organisation and its relationship to New Zealand archaeology.

The social construction of space

This is not the first study to combine archaeology with social anthropological approaches to space. Albeit, along with Nigel Prickett's MA thesis (Prickett 1974), it is one of the few studies which apply these to the New Zealand context. Several studies have linked the concept of space from an anthropological and archaeological perspective. To review them all here is unnecessary, but seminal examples include the following.

Grön, Englelstad and Lindblom's (1991) edited volume *Social space: Human Spatial Behavior in Dwellings and Settlements* combines approaches to spatial organisation

from archaeology, social anthropology and social psychology. In their discussions of how humans structure the space around them, they argue that the way in which people organize their rooms, dwellings, villages, cities and landscape are influenced greatly by traditional cultural patterns. Susan Kent's (1993) edited volume *Domestic Architecture and the Use of Space* is an integrated approach to the study of space, linking ideas from archaeology, architecture, ethnography, geography and psychology. The main relevance to this study is that Kent's edited volume demonstrates, in many ways how archeologists can use the data and theories from other disciplines without compromising the data or simplifying theoretical orientation.

Michel Parker Pearson and Colin Richards (1994a) edited book *Architecture and Order: Approaches to Social Space* is another review of interdisciplinary perspectives to interpreting space. They propose that while archaeologists have obsessively recorded architecture and physical features in great detail, there has been something lacking in archaeological interpretations of architecture and social space. Parker-Pearson and Richard's main argument is that uses of human space are socially constructed and not just determined by environment or function. This argument is a key focus for the current thesis which explores more social approaches to interpreting New Zealand archaeology.

Fox's edited volume *Inside Austronesian Houses: Perspectives on Domestic Designs for Living* investigates spatial organisation in houses from a broad geographical distribution from Borneo to New Zealand. It is interesting to note that Austronesian houses have recurring patterns of symbolic similarity despite the vast cultural, social and geographical barriers. For it's relevance to New Zealand, this is an indication that the symbolic and ritualistic observations observed in ethno-historic records may have a long time depth which spans the period starting before the arrival of the first settlers.

All of the above studies propose that the motivation behind spatial organisation extends to more than just functional and environmental reasons. Cultural, symbolic and ritualistic reasons for spatial organisation along with the interweaving of kinship, structure and rank are major contributors behind spatial organisation (Waterson 1993:228).

Ian Hodder's notion of *Domus, Agrios and Foris*

In Hodder's (1990) interpretation of the Near East Natufian period (11,0000-9000 BC) the house was seen as the centre, a symbolic focus that domesticated people, and kept separate to the wild, the dangerous, the unsocial (Parker Pearson and Richards 1994b:65:). Hodder (1990) has proposed three spatial representations encompassing this worldview:

Domus - the place and practice of nature, control, symbolic elaboration and power relations focusing on the house

Agrios – field, outside and wild

Foris – the doorway with the outside

The domus was seen as a representation of society in several ways. For example, death was domesticated by burying the dead under the floorboards, wild animals and plants were brought into the domain of the house to be tamed. Collectivistic group values were stressed over individualistic values (Hodder 1990).

In a more recent article, Hodder and Cessford (2004) readdressed the notion of the *domus, agrios* and *foris* using socialization within the house as their centre point. They argue that people were socialized into social roles and rules through repetitive daily practices and routines and secondly though the development of social memories in which these practices were embedded. They draw heavily on Pierre Bourdieu's(1977) theory of *Habitus* in their discussions. *Habitus* refers to the practices, involved in productive, consumptive social and ritual spheres of life – a set of social codes. As part of this, Bourdieu notes that daily routines within the house such as eating, sitting and sleeping are part of the mechanism through which people are socialized into particular roles. For example, Hodder and Cessford (2004: 22) have observed that obsidian caches at Çatalhöyük are found near hearths and ovens and pottery is never found in graves. Here, Hodder and Cessford (2004:22) are referring to an observed spatial pattern that can be used to infer social practice. They tested their proposal by looking at patterns of activities areas, bone and lithic distribution in the house floors. They were looking for evidence of social practices in the form of discard-producing activities in house floors and concluded that social

memories helped create the repetition of daily practices (Hodder and Cessford 2004:36).

House societies

Lévi-Strauss notion of *sociétés à maison* or *house societies* refers to the idea that the house can be seen as a form of social institution similar to the notion of kinship. That is, the house is a social grouping which persists through time, and maintains continuity, holding onto a mixed or movable property through the transmission of names, titles, prerogatives and other aspects which are important to one's existence and identity. The theory of *house societies* proposes that houses can be interpreted as a parallel to units of kinship. That is, the house is not just a physical structure, but it constitutes the group of people who claim membership within it. *House societies* as a theoretical tool has been used by many Pacific archaeologists (e.g. Kirch and Green 2001; Fox 1993; Anderson 2001; Walter 2004; Chiu 2005; Kirch 1996). In the current thesis, *house societies* can be used as an interpretative framework in which to build the theoretical relationship between New Zealand archaeology and social anthropology. As a theoretical tool, *house societies* has already been applied to the New Zealand context by Walter (2004) in his discussion of the connection between New Zealand and Polynesia.

House – the domestic space

Leading on from the topic of house societies, this next section is a discussion of houses and households. This thesis focuses on the house because it is the most basic unit of social structure, and easily comparable for both archaeologists and anthropologists. While the house is the main unit of analysis here, this thesis also takes into account other spatial constructs where relevant, such as the location of postholes and features, context of a house within a kainga or community, and inter-regional comparisons.

Definitions of house

It appears that most anthropological definitions of a "house" are not restricted to a description of purely architectural form and function. Such definitions also incorporate the social and economic constructs of a house. In effect, anthropologists are not defining houses per se, instead they are defining the social constructs within these houses – they are defining households.

The household cluster is the most basic social and spatial unit of any community (Flannery 1976; Taomia, 2001:140). It is considered a fundamental unit in any community for various purposes, including social, economic, and political organisation. The relationships between individuals in a household, the size and organisation of structure within a household and its connections and economic relationships with the wider community can further enhance our understanding of society (Laslett 1969:199).

Households are generally defined as a domestic unit of people who share a common shelter, facilities such as kitchen/stove, house holding activities and decision making (Blanton 1994:5; Shah 1974:123-128; Lowie, 1947:66). In most house societies, the household group consists of people residing together who have a kinship based relationship (Blanton 1994:5). However this is not the case for every single household. Such examples include student flats, nursing hostels, Buddhist monasteries, and 19th century gold miner's huts. In these contexts, the residences don't necessarily share a common kinship. Instead they share common interests such as stages in life and daily practices. The notion of common facilities as a core component in defining a household is still used today by social historians to define households in modern society. For example, for their census definitions, New Zealand Statistics defines a household as:

> A household is either one person who usually resides alone, or two or more people who *usually reside together and share facilities* (such as eating facilities, cooking facilities, bathroom and toilet facilities, and a living area), in a private dwelling (Statistics New Zealand 2006, my emphasis).

What is noted here is that Statistics New Zealand identify "shared facilities" as one of the key components for the definition of a household. What was crucial to New Zealand Statistics was that it wasn't the number of *structures* that defined the household (i.e., each tent, shed or building was not considered a household), it was the shared common facilities such as cooking facilities, bathroom and living areas that defined a household.

In addition to sharing common shelters and cooking facilities, a third criterion for defining a household is the sharing of economic resources. Such resources include the orientation of tasks and activities within a residential unit (Netting, Wilk and Arnould 1984:xxvi), and financial resources. For some authors, the economic resources are a crucial factor. Engels for example, refers to the nuclear family as the "economic unit of society" (Engles 1972:138). However, other scholars do not regard it as a crucial part of their household definition (e.g. Blanton 1994:5). In many non western cultures, the household consists of members of the extended family, living together and sharing economic resources such as income, division of labour, tasks and childcare. In the context of student flats, and historic gold miners, sharing accommodation and dividing the costs of living is more economically viable than living separately. Extending beyond the immediate needs within the household, intermarriage with people outside the household is a form of exchange that can be economically beneficial (e.g. Engles 1972:138; Ng 1993).

The context of households is a focus in archaeology that has increased in interest in the last three decades. David Clarke was one of the first to introduce the concept of household into archaeological discussions as part of the settlement pattern analysis framework (Clarke 1977; Kahn 2005). Similarly, Wilks and Rathje's (1982) edited book *Archaeology of the Household: Building a Prehistory of Domestic Life* was one of the first significant scholarly works on the theoretical advancement of household archaeology. They noted that households are an important unit for studying adaptation in archaeology, and they defined households as "the most common social component of subsistence, the smallest and most abundant activity group" (Wilk and Rathje 1982: 618). Their definition was more archaeologically directed than the previous sociological/historical definition mentioned earlier in this chapter with economic interaction being a main focus. In addition, Wilkes and Rathje included the following three aspects of household:

> (1) *social*: the demographic unit, including the number and relationships of the members, (2) *material*: the dwelling, activity areas, and possessions, and (3) *behavioral*: the activities it performs (Wilk and Rathje 1982:617).

In contrast to archaeological *households*, the archaeological *house* is more difficult to define. As Yvonne Marshall (1990:73) has pointed out in the New Zealand context, it is difficult to give a definition of prehistoric Maori houses. Few prehistoric houses in New Zealand have been fully excavated or published. At the most basic level, archeological definitions of prehistoric Maori houses are mainly based on the evidence of post holes, patterns of post holes, and areas of cultural horizons which might be interpreted as house floors. The archaeology is often restricted to small excavation areas, which are often not large enough to determine the whole or even a large fraction of a structure (Jacomb 2005). Larger excavation areas are more beneficial for determining spatial patterns such as house floors and post hole patterning for structures (e.g. Holdaway and Gibb 2006). While excavating large areas is an ideal approach for identifying structures, most excavations are restricted by limited resources such as labour and time and money. Because there are few archaeological samples of houses in New Zealand, much of our archaeological understanding of domestic space in New Zealand has been aided by ethno-historical texts (e.g. Beaglehole 1955: 248; Cumberland 1949:413-415; Best 1927:211-222).

Social Structure in New Zealand

In order to understand space, one also needs to have an understanding of social structure (Taomia, 2000). By the end of early 19th century, Maori social structure seamed to be made up of four levels consisting of the *whaanau* (extended family), the *hapuu* (subtribe), the *iwi* (tribe) and the *waka* (confederation of tribes) (van Meijl 1995; Metge 1976:127; Sutton 1990b:668-9). There are regional variations for social structure. Each of these levels was associated with a certain type of Maori leader: *kaumaatua* (elder), *rangatira* (chief), junior and senior *ariki* (paramount chief) (van Meijl 1995:304).

Firth (1929)described the basic unit of Maori society as a kinship based structure based on the *whanau*, or extended family who resided in undefended villages or hamlets called *kainga*, located in close proximity to a tribal or sub-tribal stronghold (*pa*). Spatial organisation of the *kainga* was divided into separate sections for sleeping, cooking and storing food (Firth 1929:92,213). The distribution of economic resources such as food and land was largely managed at the level of the *whanau.* The

smaller units of *whanau* may help us understand New Zealand prehistory in the context of the house society.

Firth's model of social organisation was based on ethnographic observations of 19th century Maori. This model should be applied with caution because it is possible that these distinctions in Maori social organisation may not have existed in early prehistory (van Meijl 1995). Firth's model is based on historical documents, ethnographic observations and oral tradition and probably only represents some northern communities between about mid 18th and early 19th century. However, because social organisation is one of few things that is not well detected archaeologically, we need to draw information from ethno-historical sources.

Maori structures

There has been a wealth of ethnohistoric information on house types, building structures and associated concepts used by the proto-historic and historic Maori. These have been reviewed by other archaeologists in greater depth (e.g. Phillipps 1952; Prickett 1974; Prickett 1982b, 1987; Prickett 1979; Groube 1965). This section presents a brief overview of the Maori use of space and the terms for various types of structures. These ethno-historical descriptions can provide physical information to archaeologists as a possible analogy or hypothesis for prehistoric households. It has been argued that we need to take into consideration the great time depth between ethnographic observations of the proto-historic Maori, and any possible interpretations of house structures from the Archaic period (Groube 1964:6). Especially since the influence of Europeans to Maori culture and society resulted in such a rapid rate of culture change to the extent that any 19th century observation of settlement patterns may not necessarily be reflective of prehistoric society (Groube 1964:6; Prickett 1982b:128). Although it is cautioned that we should not rely too heavily on ethno-historical records of symbolism to directly represent Pacific and New Zealand prehistory in any great detail, it is still possible to make some generalised inferences about how symbolic and social factors can influence the way in which prehistoric people organise space. These ethnographic observations were considered here because the proto-historic Maori are the descendants of the earliest inhabitants. The way in which they use space may provide us with better understanding of how their ancestors used space. Fox (1993) argues that parallels and

generalized patterns of the social use of domestic space can be observed across most Austronesian cultures. One such example is that most Austronesian houses have a "ritual attractor" which is part of the structure of the house – a post, beam, platform, altar, enclosure etc. It is usually present during the construction of the house and is acknowledged during rituals (Fox 1993:1). The fact that Austronesian houses have some evidence of symbolic similarity in architecture despite the vast cultural, social and geographical barriers is an indication that the symbolic and ritualistic observations observed in ethno-historic records may have a long time depth.

Kainga

Kainga is a Maori term that signifies "home" or "residence" (Cumberland 1949:413; Green 1990:23). More generally, it refers to undefended or unfortified hamlets and villages, which are made up of the *hapu* or sub tribe. Evidence for the presence of the kainga dates back to the earliest New Zealand settlements (Davidson 1984:166). An example of a kainga is presented in

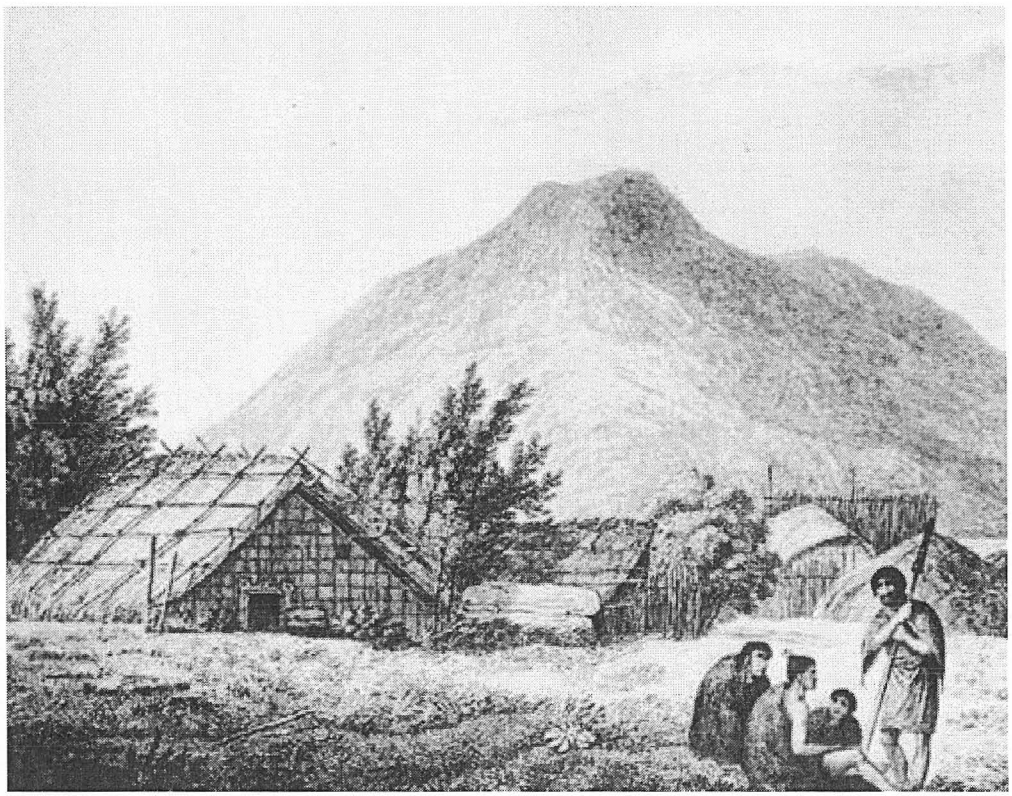


Figure 2. 1 Kainga as seen by Captain Cook on Motuara Island, Queen Charlotte Sound (c.f. Phillipps 1952:25)

Pa

The term *pa* refers to "a fortified settlement", and is derived from a verb meaning "to obstruct" or "to block up (Cumberland 1949:413). The *pa* emerged later in Maori prehistory, around 1500 AD (Schmidt 1996) as part of changing social dynamics associated with the increasing intertribal competition and changes in social, economic and political organisation in later prehistory. A wide variety of previous site types became fortified from this period onwards, including settlements, storage sites and refuges. There are several types of *pa*, classified according to their structure. These include the terraced *pa*, ridge top *pa*, ditch and bank *pa*, fortified warehouses, and the gunfighter *pa*. An example of a *pa* from the Northland site of Pouerua is presented in Figure 2.2.

Figure 2. 2 Photograph of a Pouerua, an example of a pa (c.f. Sutton, Furey and Marshall 2003:15)

Marae in Polynesia

In Western Polynesia, the *marae* (or *malae* in Samoa) is an open assembly space attached to a ritual house (*fale*). The Polynesian outliers also use the term *marae* to refer to the open spaces adjacent a ritual structure. In East Polynesia, the ritual architecture is more complex and architecturally diverse. At the boundaries of East Polynesia, ritual structures consist of the *marae*, a meeting house in New Zealand, the *ahu,* megalithic temples of Rapa Nui and the stone platform and terraced *heiau* of Hawai'i. In Central East Polynesian *marae* are also quite variable, but most contain a paved court and a raised platform. In summary, throughout Polynesia, the ritual

architecture consists of three main features; an open space usually referred to as *malae* or *marae*, adjacent to a ritual god house called *fale* and posts or upright stones (*pou*). Central East Polynesia contains a fourth feature, a raised platform or altar (*ahu*) (Kirch and Green 2001:249-254). Of particular interest is that the *marae* of Western Polynesia and the Polynesian outliers refer to an open space attached to a communal or ritual building which is the same as New Zealand *marae*. The *marae* in East Polynesia, still contain a ritualistic aspect, but they vary diversely in architectural form and structure. New Zealand *marae* is closer in definition to the *marae* of West Polynesia.

Marae in New Zealand

In New Zealand, the term *marae* generally refers to the community building complex associated with a Maori meeting house. More specifically the term *marae* refers to the open grassy space immediately in front of the group's ancestral meeting house (Robb 1992:8). This open court yard is used for sacred and secular activities, and often meetings and gatherings are held in the open space (Davidson 1984:162; Neich 1993:92).The concept of the *marae* as an open meeting ground is evident in both Western Polynesia and Eastern Polynesia indicating a long time depth, and was probably introduced by the earliest settlers (Davidson 1984:162).

Upon entering a marae, there are three designated social areas, the *maraeatea*, the *kuaha* and the *wharenui*. The *maraeatea* is open space area outside of the meeting house. The *kuaha* is the outer threshold or entrance gate in front of the marae. For strangers to enter through the *kuaha* without an invitation is considered impolite. In the context of marae terminology, *whare nui* is referred to as the interior space of the main meeting house, or ancestral dwelling of the *marae* (Robb 1992:13). These three aspects are physical representations denoting social structure within the marae – the public area, the threshold and the private area (Robb 1992:13).

Whare nui

The *Whare nui* (meeting-house) is the largest of the village structures in the settlement which also functions as the community meeting house. It is usually located at one end of the marae complex opposite the main gateway entrance. Because of the various functions that occur within the *whare nui*, it has also been referred to as *whare*

runanga (council house), *wahare whakaira* (carved house), *whare tupuna* (ancestral house) and *whare manuhiri* (guest house) (Firth 1926:30). The *whare nui* is built using communal labour and efforts of builders, and spiritual experts (Cumberland 1949:4165-416). It has elaborately decorated paneled interiors, decorated walls, carved jambs and lintel and barges, ornamented bargeboards and supporting posts. Also located within the *marae* complex, and in close vicinity to the *whare nui* are the dwellings of the tribal elders and tohunga (Cumberland 1949:416).

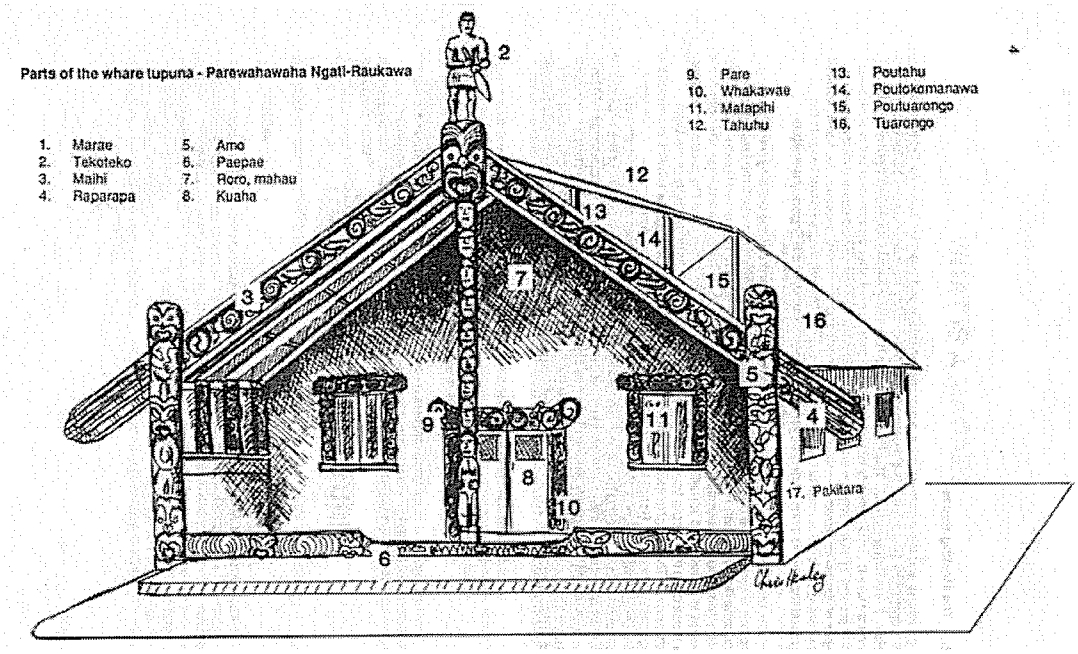


Figure 2. 3 Illustration of a wharenui (c.f. Richardson 1988:4)

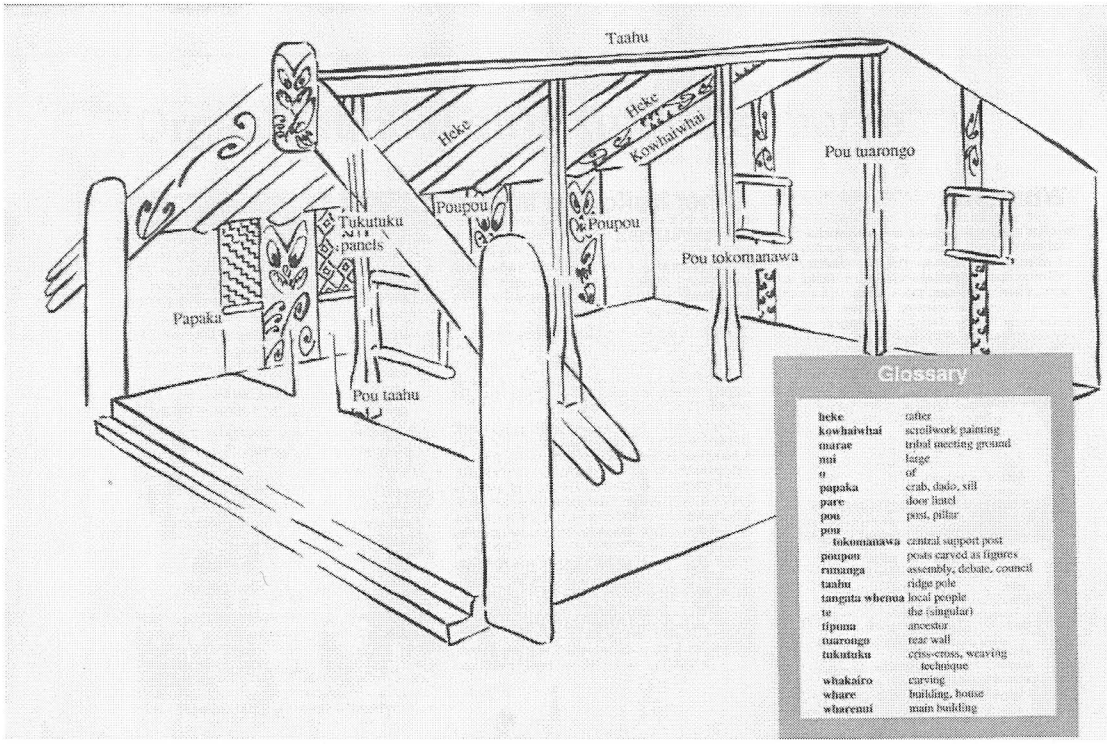


Figure 2. 4 Structural layout of a marae building (from Robb 1992:17).

Wharepuni

The *wharepuni* is the most common type of Maori structure, and refers to the dwelling house or the sleeping quarters. *Whare* refers to house, and *puni* implies "blocked" or "plugged up" (Firth 1926:30) It is a rectangular hut approximately 3m x 3.6m, with the interior earth floor dug below the ground surface. During the proto-historic period, the structure was built of poles or worked timbers, lined with reeds and tree ferns, and had a gabled veranda in the front. There was no chimney or roof hole for smoke ventilation. The sleeping quarters were small, and ventilated by a small door and a window in the front veranda. The small door is located in the centre of the façade and a window was nearly always located to the right of the door. The veranda functioned as a shelter for daytime activities during periods of bad weather (Cumberland 1949:15). Occasionally the *whare puni* was separated from other structures by low fences or other marks which differentiate the genealogical groupings within the settlement. It has been argued that the type and style of hearth contained within proto-historic maori house can determine what type of house structure surrounded the hearth (see Anderson 1986:100), however the sample sizes for known *wharepuni* with recorded hearths is too small to make any clear distinctions. An example of a wharepuni from Hokianga is presented in Figure 2.5.

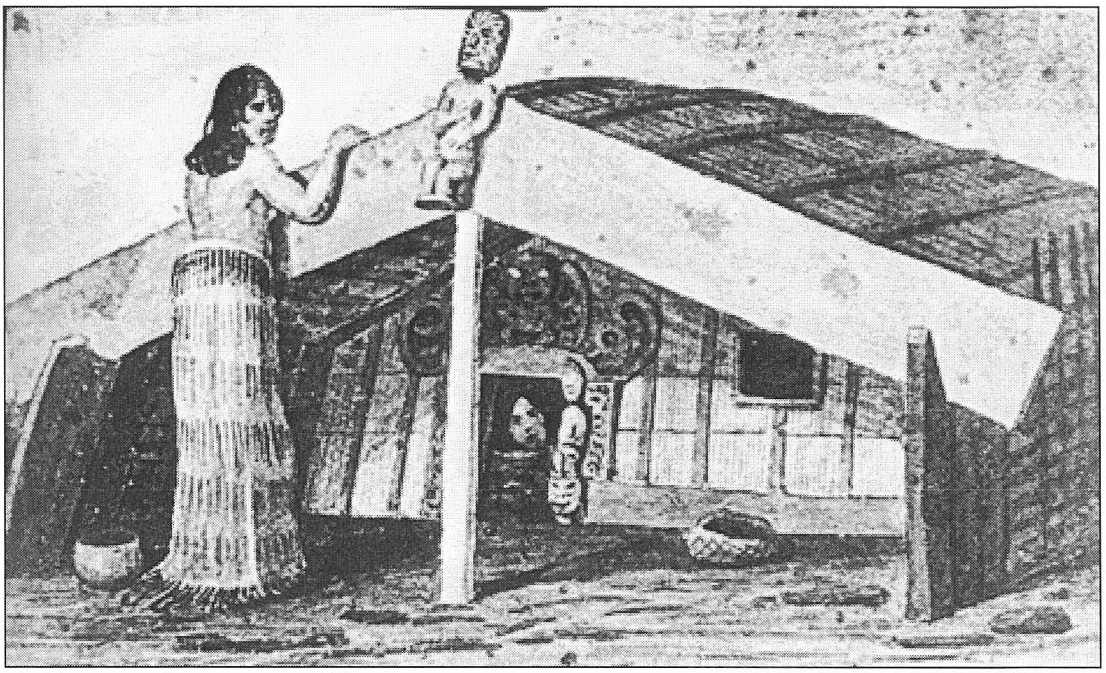


Figure 2. 5 Illustration of wharepuni ("The Residence of a New Zealand Chief", Watercolour, Augustus Earl, 1827).

Whare porotaka

Whare porotaka are round houses that are mainly associated, but not restricted to the South Island (Davidson 1984: 159). They are referred to by Te Rangi Hiroa (1950) as "makeshift structures of little importance" because of their flimsy characteristics and temporary functions. Prickett (1974:47) commented that despite their flimsy structure, they are of considerable value to the Maori because they can be built quite quickly without any of the associated rituals or ceremonies that some of the larger buildings require. It was also preferred for casual habitation because it did not require the spatial or social considerations of tapu that would normally be associated with more formal building structures (Prickett 1974:47). One of the concerns about the Maori round houses is that because of their temporary structure, they may not be so evident in the archaeological record. Post holes associated with round houses are not evident in any regular pattern, resulting in a problematic identification of round houses in the archaeological record (Anderson 1986:100).

Figure 2. 6 Illustration of a round house, at Waikanae pa, Wellington (c.f. Phillipps 1952:66)

Storage structures

The Maori had several types of food stores, and several different names for them (see Phillipps 1952 for a more thorough review). In addition to storing food, these storage structures also housed weapons and tools, fishing gear and canoe paddles (Davidson 1984:161). The three main types of Maori food stores consist of the *whata,* the *pataka,* and storage pits. The *pataka* is a platform, without walls or a roof supported on one post. The *whata,* is similar to the *pataka* in that it is raised on high wooden posts, however, instead of a platform, the *pataka* is enclosed with walls and a roof, and occasionally the entrance would be elegantly decorated. They were often positioned away from the houses with a fence around them to avoid the ritual taboo of walking under food (Anderson 2006:124). Certain types of food such as kumara were also housed in storage pits in the ground (Davidson 1984:121-129).

Figure 2. 7 Illustrated example of pataka (c.f. Phillipps 1952)

Cooking sheds

Within the settlement enclosure, there were also communal cooking sheds, which were simple structures surrounding the cooking ovens and steaming pits (Cumberland 1949:416). In some modern marae complexes, the cooking area may be attached to or very close to the main meeting house. Although it may not be physically separated, the concept of it's separation is still always held. The concept of *tapu* and *noa* are strongly enforced when it comes too food. Food is *noa*, and the Maori meeting house is sacred and when possible, the two are always separated (Richardson 1988:6). The ideological dimensions of spatial organisation are explored in more detail in a later

section of this chapter. This later section will also include a more detailed discussion of *tapu* and *noa*.

Symbolism of the Maori meeting house

The Maori meeting house is often named after a famous ancestor from the mythological homeland of Hawaiki (Salmond 1975:39). The physical structure of the Maori meeting house represents the physical body of this ancestor, a summary of which is shown in Table 2. 1.

Table 2. 1 Ancestral representations of the meeting house structure (c.f.van Meijl 1993:202).

Maori term	**House feature**	**Ancestral representation**
Koruru	Junction of the eaves	face
Roro	Porch	brain
Maihi	Arms	barge-boards
Raparapa	Extension of the barge-boards	fingers
Mataaho	Front window	eye
Poho	Interior of meeting house	chest
Taahuhu	Ridge-pole	spine, the main line of descent from the apex of the tribes genealogy
Heke	Rafters	Ribs, represents junior descent lines from the senior line
Poupou	Interior panels	Depicts more recent ancestors

Maori symbolism also applies to the direction in which the house lies, with the length of the house lying north/south to prevent the spirits of the dead flying across the ridge pole as they fly north towards Te Reinga (Tregear 1904:281; Jacomb 2005:97).

Summary

This section began with the definitions of house and households as they relate to the themes in this thesis. Definitions of "house" were discussed from both an anthropological and archaeological perspective. Social structure is one of the key elements for understanding social space, and was discussed briefly here in the context of New Zealand Maori. Following this, the terms for Maori structures and architecture were described using both ethno-historical and archaeological evidence. *Marae* was defined in both the Polynesian and New Zealand contexts. The next section of this chapter was a discussion of spatial archaeology in New Zealand and the Pacific. This

is followed by the final section of this chapter which explores the ideological dimensions of spatial organisation.

Spatial Archaeology in New Zealand & the Pacific

Spatial Archaeology in New Zealand

In New Zealand, spatial analysis has mainly been studied under the umbrella of settlement pattern analysis (Phillips and Campbell 2004:85). Settlement pattern archaeology was initially introduced by Roger Green (1967a; Green 1967b; Green, and Leach, 1970), a student of Gordon Willey who first proposed settlement pattern archaeology in his work on the Viru Valley, Peru (Willey 1953). Some of the key components of settlement pattern analysis include looking at spatial patterns within cultures rather than between cultures, the notion that settlements were part of a system, sites as a whole became a focus of study and that the environment was a significant contributor towards settlement distribution and human behaviour (Phillips and Campbell 2004:86) Other major contributors towards settlement pattern archaeology in New Zealand include Groube (1965b), Trigger (1967) and Davidson (1970; 1978).

The archaeology of house floors in New Zealand

While settlement pattern archaeology has played a major role in the evolution of New Zealand archaeology, there are some aspects of spatial analysis in New Zealand archaeology that have not received as much recognition. These include intra-site spatial analysis, house floors and activity areas.

There have been only a handful of archaeological studies of house floors in New Zealand. These include Anderson's study of simple round huts (Anderson 1986), a structure in fourteenth century Wairau Bar (Anderson 1989), Nigel Prickett's study of the Moikau house in Palliser bay (Prickett, 1979 #1163), Chris Jacomb's (2005) study of a 14th century house from Rakaia River mouth, and Leach et al's (2000) study of Mokotukutuku house in Palliser Bay, and the house sites at Pouerua (Marshall 1990; Damm and Sutton 1990; Sutton 1990a). Janet Davidson (1984:151-163) provides a

good review of prehistoric houses and settlement space from both the Archaic and Classic Periods from throughout New Zealand.

Evidence of archaic houses

Large scale excavations at the Rakaia River Mouth located just south of Banks Peninsular uncovered the post holes of a substantial building, found in close vicinity to a possible cooking shelter and oven, fire scoops, early artefacts and evidence of a fenced enclosure (Jacomb 2005:91). One of the key themes that Jacomb emphasized in his paper is that sites of "early" New Zealand prehistory actually should look to the Pacific for models and analogies, and he uses the Rakaia house floor as a case study to demonstrate this. The Rakaia house floor constitutes a row of large post holes the size of telegraph poles (250-350 mm) down the centre of the house, with rows of smaller post holes running parallel either side of the large post holes, and a row of smaller post holes along side with oven features within. This is typical of a basic Polynesian household containing sleeping quarters and a covered cooking area outside (e.g Taomia 2001).

Anderson (2006) has proposed some alternative interpretations for the Rakaia house floor. He proposes that the large post holes are evidence of *whata* with the smaller post holes immediate around them were the post holes for fences surrounding the *whata* (see Anderson 1996:124) for an illustration of his alternative interpretation.

Anderson (2006:124) noted that identifying house structures from the Archaic period is rather difficult, because we don't yet have a clear understanding of what house floors in early New Zealand are supposed to look like. Based on some of the earlier archaeological observations, Haast (1872:96) proposed that houses from the moa-hunter period were set on raised floors, and Teviotdale (1932) proposed that moa-hunter houses were set in circular or rectangular depressions. Currently, the most accepted evidence for Archaic house floors are post holes set in regular patterns (Anderson 1989:124). However, for proto-historic Maori houses, there has been ethnographic evidence that the layout and spacing of post holes are not always symmetrical (Prickett 1982b:129), and evidence that the front of the Maori house is sometimes slightly wider than the back (Best 1924:562; Sutton 1991:546; Jacomb

2005:97). Because of the known asymmetrical layout of house structure, it would be difficult to make any interpretations of archaic house floors based on post holes alone.

Jacomb (2006:127) proposes that houses from contemporary East Polynesian Archaic sites would be the best analogy for understanding what early Archaic houses looked like, rather than the ethno-historical New Zealand examples of houses of which Anderson (2006:124) used. The East Polynesian Archaic houses contain widely spaced posts with no internal hearth. The *wharenui* of the ethno-historic accounts contain internal hearths, and Anderson argues that "Archaic houses often had a stone-built hearth" (Anderson 1989:123), although he doesn't give any known examples of Archaic houses with internal hearths to support this. Jacomb also notes that there is no evidence for similar styles of wharepuni houses found in eastern Polynesia (Jacomb 2005:97). Davidson (1984:153) noted that very little is known of early East Polynesian houses and that although rectangular houses are common in East Polynesia, but they are different to Maori houses in that they don't have a porch at one end.

The Wairau Bar house structure (Anderson 1989)is important because it is the only evidence of a rectangular building in New Zealand which also has a direct association with moa consumption, a key indicator that rectangular houses were evident from the earliest settlement of New Zealand.

The Moikau house was excavated as part of the Palliser Bay research project, and was used as a case study for Nigel Pricket's early prehistoric analysis. At the time of excavation, it was thought to be one of the earliest house floors excavated in New Zealand, and consequently, Prickett argued that there has been relatively little change in the style of house design over several centers. He uses this evidence to explain the preservation of patterns of social behavior and symbolism (Prickett 1979).

Spatial Archaeology in the Pacific

In the Pacific, spatial archaeology has followed similar trends as New Zealand archaeology. Much of it is associated with studies of settlement landscapes, first introduced by Roger Green in the 1960s (e.g. Green 1967a). Many of the household and spatial studies in the Pacific are often connected to interpretations of social

organisation in prehistory (e.g. McCoy 1973; Jennings 1979; Taomia 2001; Kahn 2006; Weisler 1985; Sand 1996; Kahn 2005). One of the things that has been noted by many of the authors (e.g. Sand 1996:293) is that is that it is quite difficult to relate archaeological spatial interpretations to prehistoric society as it has been described by the ethnographers.

In their study of Kewala, Molokai in Hawaii, Weisler and Kirch (1986) proposed a holistic approach to linking settlement space and social structure by overlapping several interconnected paradigms. Wiesler and Kirch (1986) suggested that there are several other alternative paradigms that can be incorporated. They investigated settlement space through the perspective of several paradigms including: 1) environmental, 2) social, 3) economic and political and 4) semiotic (Weisler and Kirch 1986:151). The present study is similar to Weisler and Kirch (1986) in that several contextual associations were incorporated into the analysis in order to gain a rounded understanding of the structure of space at Buller and Heaphy.

Jenny Kahn (2006) also made a connection between prehistoric East Polynesian buildings and social status. Kahn used wood charcoal to identify types of wood used to make prehistoric house posts from the Opunohu Valley in Mo'orea. She then investigated the economic, symbolic and ritual status of these types of woods from ethno-historical contexts, and used this information to make interpretations of status differentiation of building structures in prehistoric Tahitian society. Kahn's work was significant, because it took the context of investigating archaeological posts to a whole new level. It has been shown in previous studies that Polynesian post holes features do not occur randomly when it comes to size (e.g. Kahn, 2005: 330-331; Sutton, 1990:188-191; Taomia, 2001:147). This led Kahn (2006:321) to argue that East Polynesian house posts were more than just functional architectural features, and to further hypothesize that there were cultural reasons for the choices of wood used to make prehistoric Tahitian house posts. Her results indicated that wood from the breadfruit tree was used in high status and specialized houses, but not used for the lower status sleeping house. The breadfruit tree is both a sacred and economically important tree. This type of wood is sacred, highly esteemed and also used to make other ritual objects (Kahn and Coil 2006:338). Historical observations from Missionary texts and Tahitian lexicons note the ritualized "planting of the house

posts" (Kahn and Coil 2006:339). Kahn's recent article didn't clearly address the functioning hardness and strength of various types of wood used for house building. Perhaps larger building structures (such as those belonging to high status people, or large meeting houses) may require a different type of wood strength and hardness to that of smaller building structures such as the smaller and more common sleeping house. Perhaps there are functional purposes for choices in wood used to build larger structures which is not emphasized very well in Kahn's study.

The social construction of space for Maori

The final section of this chapter summaries the previously discussed themes by relating them to the context of social and symbolic space in New Zealand archaeology.

Nigel Prickett has proposed that the structure and style of Maori houses have a long time depth, reflecting a conservation of behavioral patterns and social change (Prickett 1974). If this was the case in prehistory, it is probably not the case for contemporary and historic Maori. The physical use of Maori domestic space has changed dramatically since European colonization, but how much change has occurred in terms of symbolic and social space is still uncertain. van Meijl (1993:201) argues that contemporary, and historic Maori houses consist of large extended families, adopted children and spouses, making extensive use of fictive kinship in terms of both alliance and adoption. Prior to World War II, meeting houses were organized by sub tribe (*hapu*). However, after World War II, meeting houses were more commonly built by large families or *whanau*. This trend started on the East Coast of the North Island and spread to other areas of New Zealand. It is possible that this more restricted change in the use of meeting houses symbolizes and reinforces the unity of groups associated with the meeting houses. It is an indication of the way in which Maori society has altered it's environment and structures as a response to culture change (van Meijl 1993:201) over a short period of time.

Similarly, Sissons (1998) noted two phases in the historic tradition of the Maori meeting house since European colonization. Firstly there was the asetheticisation phase in the late nineteenth century and then the standardization and tribalisation

during the 1930s and 1940s. Sissons (1998) argues that social forces such as increasing national identity, tourism and ethnology were the driving forces towards these stylistic changes of the Maori meeting house (Sissons 1998:36). Both van Meijl and Sissons argues that rapid change has occurred in the architecture of the Maori meeting house and that this rapid change in architecture is a reflection of social and cultural forces. If this is the case in historic and contemporary New Zealand, it is possible that rapid architecture change may have occurred in prehistory as a result of dramatic cultural changes.

Social structure of round houses

It has been proposed by Prickett (1974: 48) that the *whare porotaka* has a lesser degree of association with human behaviour because the *whare porotaka* do not require the spatial or social requirements of *tapu* that would normally be associated with more formal building structures. Atholl Anderson compares the symbolism of the *whare porotaka* to that of King Arthur's Round table (Anderson 1986:107). That is, a round table is one which has no "head" and no "sides". Unlike the rectangular table where the person sitting at the head is given a privileged position, everyone seated at the round table is treated as equals. Consequently, the round houses of the Maori are thought to be similar in that there is a lesser degree of formality and hierarchy involved in both the social and spatial structure (Anderson 1986:107; Prickett 1974:48). The fact that round huts are more common in the South Island may be a reflection of the degree of social structure, hierarchy and spatial ritual present in the South Island.

Nigel Prickett's argument for conservatism in social behaviour and symbolism

Nigel Prickett (1982b) made an argument that the *wharepuni* as a structural form has a long conserved history in New Zealand, and argues that conservation of house form is related to social behaviour and symbolism, and therefore historical evidence can be used in the interpretation of the earlier prehistoric dwellings. Les Groube (1964, 1965) cautions against relying too heavily on historical sources because upon European arrival, Maori culture changed so rapidly that any observation of historic Maori houses might provide little insight into the prehistoric period. Prickett develops quite heavily on Lewis Morgan's (Morgan 1965) idea of relating the house form to social behaviour. Pricket applies Hall's notion of proxemis (1963; Hall 1966, 1969) to

explain some aspects of house forms. He noted that "House forms tend to be conservative because of the relation of the physical organisation of space to culturally prescribed social and psychological constraints. House plans can be interpreted as complex behavioural maps" (Prickett 1982b:112).

Tapu and Noa

Tapu and *noa* are symbolic dual concepts referring to sacred and profane respectively. *Tapu* refers to a religious or superstitious restriction where somebody or something is sacred or set apart. *Noa* refers to a state whereby something or someone is not in a tapu state. They are applicable to every facet of Maori life including social interactions, marae spatial structure, social hierarchy (van Meijl 1993:203) and food. Food is considered *noa* and kept separately to *tapu* items. In relation to housing, the symbolic applications of *tapu* and *noa* have been applied to spatial contexts by van Meijl (1993)and Pricket (Prickett 1982a). Prickett argues that the concepts of *tapu* and *noa* can help archaeologists understand prehistoric spatial construction. The relative location of oven and cooking areas, and sleeping areas and activities areas can be interpreted using the Maori concepts of sacred and profane.

Chapter Summary

This chapter is a discussion of space. It began with a review of the way in which anthropologists and archaeologists have discussed concept space. It then narrows down to a discussion of houses and households, the house in Maori society, and the house in as it is approached by anthropologists and archaeologists in the context of New Zealand prehistory. This is then followed by a discussion of spatial archaeology in the Pacific. Finally this chapter provided a review of the social construction of Maori space. The ideas presented in this chapter will be applied to the interpretations of the results which will help us understand New Zealand prehistory from a more social perspective. The following chapter presents an environmental, adaptive and archaeological review of the West Coast.

Three

West Coast Archaeology

The West Coast is all but an archaeological *terra incognita*
(Anderson 1982:103)

This Chapter provides the environmental and cultural setting of the West Coast followed by an archaeological history of the region and site descriptions of Buller and Heaphy.

West Coast Iwi

Although the West Coast is often described as a 'region', it is similar in length to the stretch of coast between Wellington and Auckland and contains enormous variations in geography, climate, temperature, topology and soils (Hooker 1986:11). At the time of European exploration on the West Coast, a number of cultural boundaries and tribal influences were noted for different areas of the West Coast. For example, the central region of the West Coast was influenced by Poutini Ngai Tahu (Leach 1969:63). The northern part of the West Coast was influenced by the Nelson tribe of Ngati Tumatakokiri (Leach 1969:63), and the southern area of the West Coast was influenced by Ngati Mamoe (Hooker 1986:11).

Today, Te Runaka o Kati Waewae of Ngai Tahu is the main runanga for the Buller District and their boundary extends from the north of the Hokitika River to Kahuraki and inland to the Main Divide (1996 2001). Ngati Apa also have connections with area surrounding the Kawatiri (Buller) river. They arrived in the Buller area in 1829, following a raid by Ngati Rarua (Ngai Tahu Land Report: 1990).

The West Coast Environment

The West Coast of the South Island of New Zealand stretches 600 km from Maharani Point in the North to Jackson's Bay in the South (Figure 2.1). The West Coast is well known for its wild rocky beaches, rugged coast line and forested hills which rise towards the snow covered mountains of the Southern Alps (Williams, Niven and

Turner 2000). The conditions of the West Coast were difficult for human habitation, to the extent that early European explorers reported remote forested country with few resources for human settlement (Anonymous 1959). Typical of rainforest environments, the climate on the West Coast is humid and mild. The West Coast of the South Island shares similar climatic conditions to the North Island, in that they are similar in temperature, frost, number of rain days and sunshine hours, and relatively little wind (Anonymous 1959:38). However, climate is not the only influence affecting vegetation and agriculture on the West Coast. One of the reasons why the South Island's West Coast is not heavily developed for modern agriculture, compared to the North Island's West Coast is because of the poor soils which limit agriculture and market gardening (Anonymous 1959:38). These factors probably had an affect on the potential for agriculture and human settlement in prehistory.

Implications for Polynesian settlement

Much of the information about Maori adaptation to the West Coast environment has been gathered from protohistoric records of the early European explorers including Charles Brunner and Charles Heaphy. Helen Leach's ethnohistoric synthesis of protohistoric subsistence on the West Coast can be cautionary applied to this context in order to understand prehistoric adaptation to the West Coast environment. However, they are applied with caution here because these records were made during the protohistoric period, and this thesis is about the Archaic sites of Buller and Heaphy.

When the early European explores first explored the West Coast and recorded their observations of the Maori, they noted that most of the Maori food sources was temporal, and largely restricted to forest and river availabilities and strongly influenced by seasonal food availability (Hooker 1986:1). Seasonal winter settlements were found near the green stone sources such as at Hokitika. These winter settlements contained permanent building structures, which were used by the West Coast Maori used as a base for the winter, and then occupied temporary summer camps located over a wide area, closer to eel and kakapo sources. During the observations of the early European explorers, it was noted that the West Coast Maori inhabitants were busy with food gathering and food preservation during the summer (Leach 1968:72).

They spent their winter months occupied with the greenstone industry, making artefacts for trade and local use. The preserved food stores accumulated during the summer months supported the energy concentration for the greenstone industry during the winter (Leach 1968:72).

Despite having a suitable micro-environment for gardening with sheltered areas and frost free conditions, the West Coast had limited gardening opportunities, as a result of the high rainfall and poor soil conditions (Leach 1969:62). With adequate rainfall, a forest can regenerate itself relatively quickly, and forest clearing on the West Coast would have required frequent burnings to keep the ground clear for horticulture (McGlone 1983). The frequent burnings might have required more human energy than worthwhile, which suggests another reason why the protohistoric Maori of the West Coast continued with seasonal foraging for their subsistence rather than moving towards an agricultural subsistence like their North Island, and east coast, South Island counterparts.

Archaeology of the West Coast

Very little archaeological research has been carried out on the West Coast. The most intensive period of work was in the 1960s and early 1970s with a few scattered excavations occurring irregularly since then (Anderson 1982:103). To date, there have been three major synthesizes, or reviews of archaeology on the West Coast. These include Helen Leach's (1969) ethnohistoric review of subsistence on the West Coast, Atholl Anderson's (1982) regional perspective, and the most recent one, Ray Hooker's(1986) published archaeological review of the South Westland Maori. The most recent of these reviews was written over twenty years ago.

In 2003 Chris Jacomb and Richard Walter from the University of Otago began the Tai Poutini Archaeological Research Project. This is a large scale regional project with excavations held at Buller River Mouth, Heaphy River Mouth and the Karamea Midden site. This thesis is part of the larger Tai Poutini Archaeological research project and utilises data from the 2004 and 2005 excavations at Buller and Heaphy.

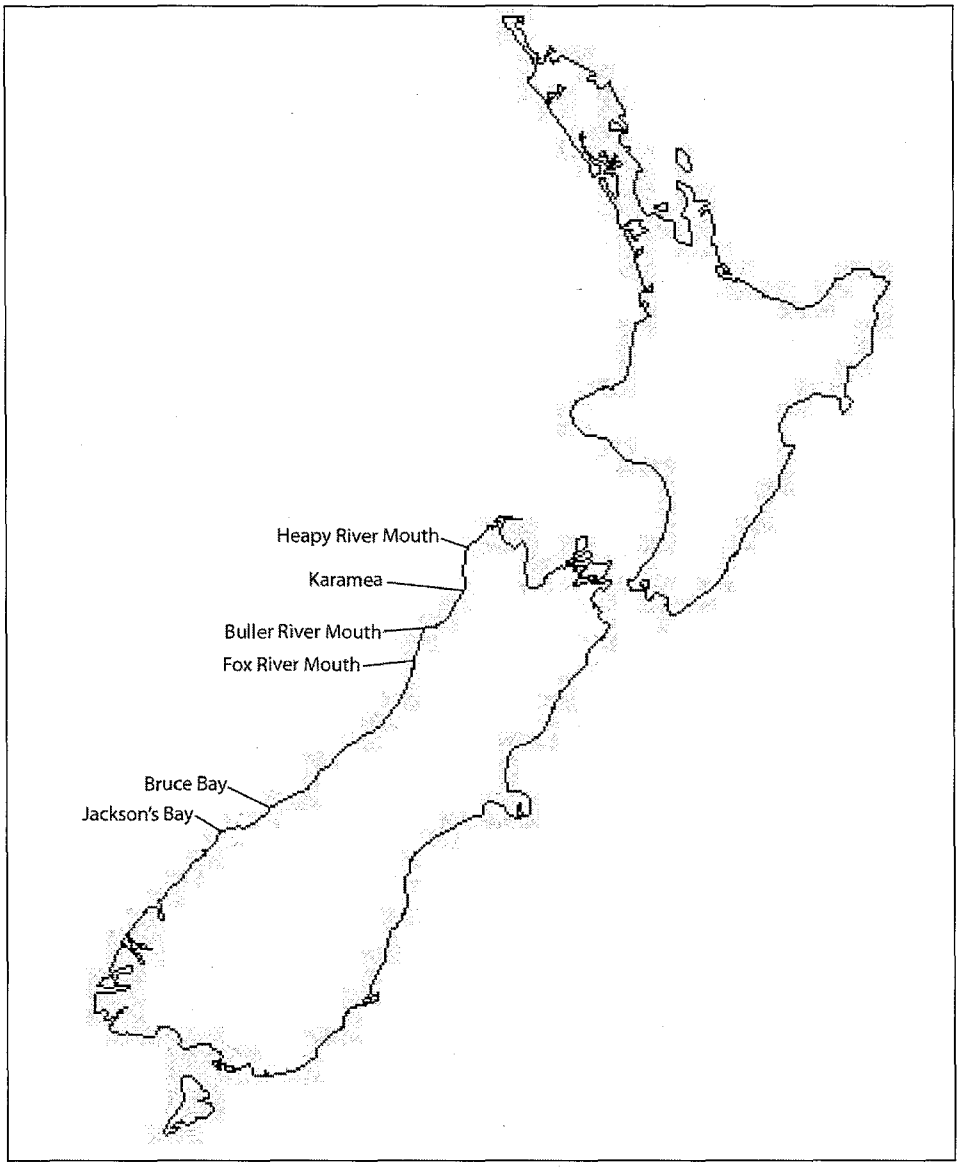


Figure 3.1: Location of archaeological sites discussed in the text

It is acknowledged that there are several other sites along the West Coast where prehistoric Maori artefacts have been found (see Hooker 1986 & Anderson 1986), however very few of these sites have been thoroughly excavated and researched. The five West Coast sites where a substantial amount of excavation and research as been carried out include Jackson's Bay (E37/4) Bruce Bay (G36/8) Buller River Mouth (K29/8), and Heaphy River Mouth (L26/1) and the Karamea Midden site (L27/44). The locations for these sites are shown in Figure 3.1. Jackson's Bay, Serendipity Cave, Bruce Bay are located in the southern part of the West Coast region, and their artefactual and historical records indicate Classic and Proto-historical

sites. Buller and Heaphy are the two main sites investigated in this thesis, and they are described in detail in the following paragraphs.

Buller River Mouth (K29/8)

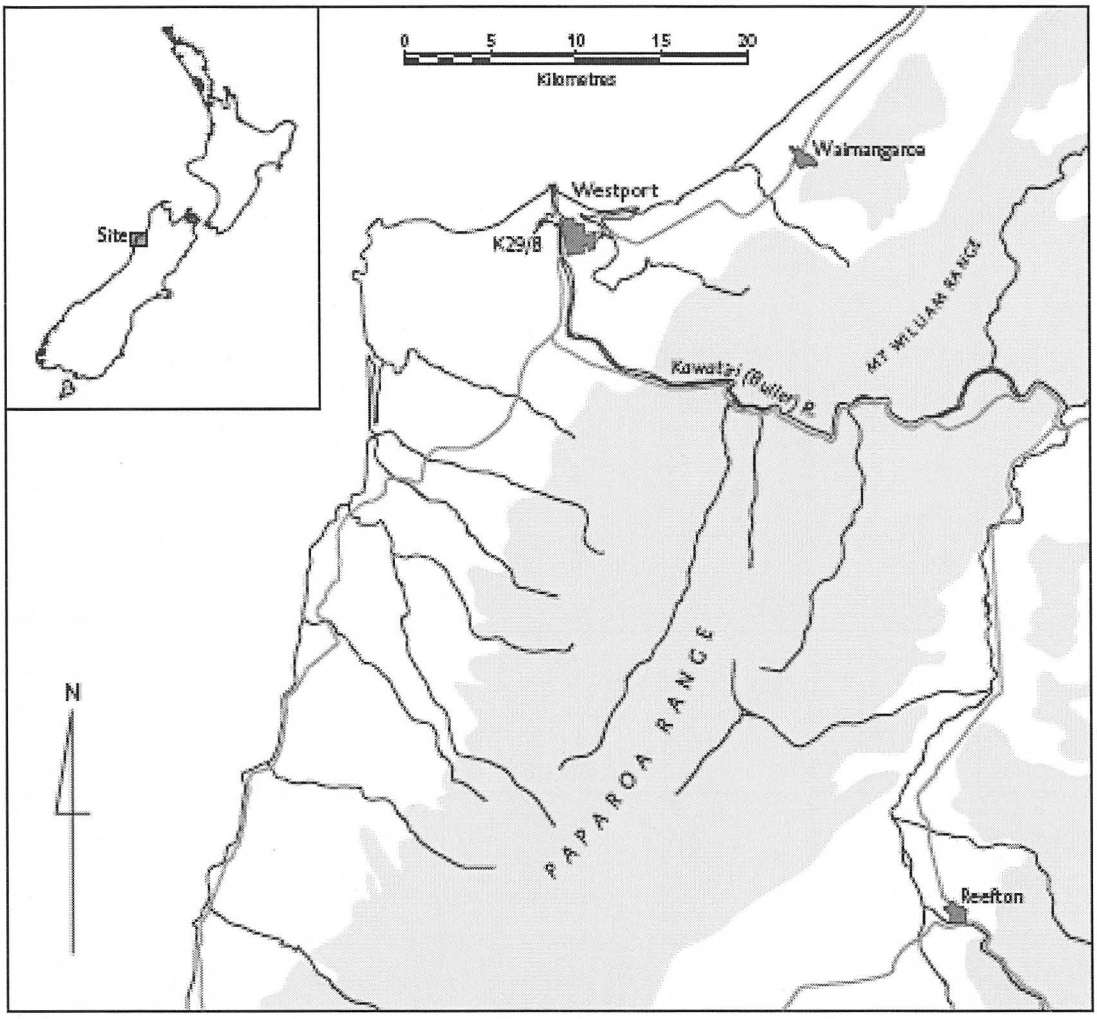


Figure 3.2. West Coast of the South Island showing location of the Buller River site (K29/8) (c.f. Jacomb, Walter and Tucker 2004: 119).

Buller River Mouth is located on the South Bank of the Buller River, across the bridge from Westport, and about 1km from the current coast as shown in Figure 3.2. It is an archaic Maori site, which has been radiocarbon dated to early 14th century (Jacomb *et al.* 2004:133). The site of was first discovered in the 1920s when the immediate area was cleared and ploughed, exposing numerous artefacts. Owen Wilkes first recorded the site in 1965, describing several ovens, depressions and an archaic artefact assemblage. In 1969 Wayne Orchiston, undertook the initial excavations at the site. Although Orchiston's findings were never published, the 1969

excavation was summarised in Orchiston's 1974 thesis. In 2003, the site was brought to the attention of the New Zealand Historic Places Trust because the owner of the land was planning to develop the soil by digging down to the iron pan, and flipping it to improve the pasture. In February 2004, Chris Jacomb and Richard Walter undertook an excavation at Buller to record and access the site prior to it's proposed demolition.

At Buller, few faunal remains were uncovered, largely due to the acidic soil conditions. Despite this, the site was rich in artefacts and features. Numerous stone flakes were found, in a variety of imported stone materials which included argillite, obsidian, chert and silcrete. In one area, stone flakes were found in association with adze performs indicating an adze manufacturing floor. In another area, four minnow lures in different stages of production were uncovered, suggesting the location of a minnow lure production site (Jacomb *et al.* 2004).

Because the site was under threat from development, (Jacomb *et al.* 2004) the excavators also used a hydraulic excavator to excavate part of the site. The digger was used to skim off the turf down to the top of the cultural layer and standard hand excavation methods were then used. Although this method of large scale excavation was not usual for research archaeology, it proved to be a valuable exercise, because it opened up large areas, allowing a good opportunity for the study for large scale spatial patterning, an opportunity which does not normally arise in South Island sites. The machine excavated trenches showed areas of rich charcoal stained soils containing a high proportion of artefacts located throughout the machine trenches especially along MT4. These areas of dark soil are thought to be house floors and activity areas. Between these patches of dark cultural soil, there was no evidence of visible organic components or soil modification associated with human activity, and these areas contained only a scattering of artefacts. The machine trenches also gave evidence of cooking or hearth features and a fire rake out. Due to time constraints in the field, only one of the fire rake outs was studied in greater detail, and was found to contain heavily eroded mussel, shell and seal bone as well as two femurs of the moa species *Anomalopteryx didiformis*. In one of the well defined house floors, three greenstone adzes and a minnow lure shank were uncovered. In another area of the same trench, a stone working floor with an anvil and several flakes of Pahautane flint, or 'Heaphyite'

was discovered. Pahautane flint is a dark yellow – dark brown type of flint, sourced to Limestone creek, just north of Punakaiki. It is also thought to be sourced somewhere close to the Heaphy River, hence the name Heaphyite by Wilkes and Scarlett (1967:205). In April 2004, the author, and colleagues took a helicopter expedition to the coastal areas just north of the Heaphy River Mouth but were unsuccessful at finding any sources of Heaphyite.

Further excavations at the Buller River Mouth were carried again in 2005, 2007 and 2008 as part of the Otago Archaeology Fieldschool. In 2005, an adze cache was excavated containing four polished green stone adzes and a piece of worked red argillite. In 2007, a geophysical survey was undertaken by Hans Dieter-Bader from Geometria, using a fluxgate gradiometer. The results of the geophysical survey provided an approximate definition of the boundaries of the site and evidence of possible features such fire features, post holes and 'empty' areas showing no geomagnetic anomalies (Dieter-Bader 2007). The Fluxgate gradiometer survey at Buller was tested with sampled test pitting, with results showing reasonable confidence that certain types of magnetic anomaly can be associated with certain types of human activity (Shaw, Jacomb and Walter 2008).

Heaphy River Mouth (L26/1)

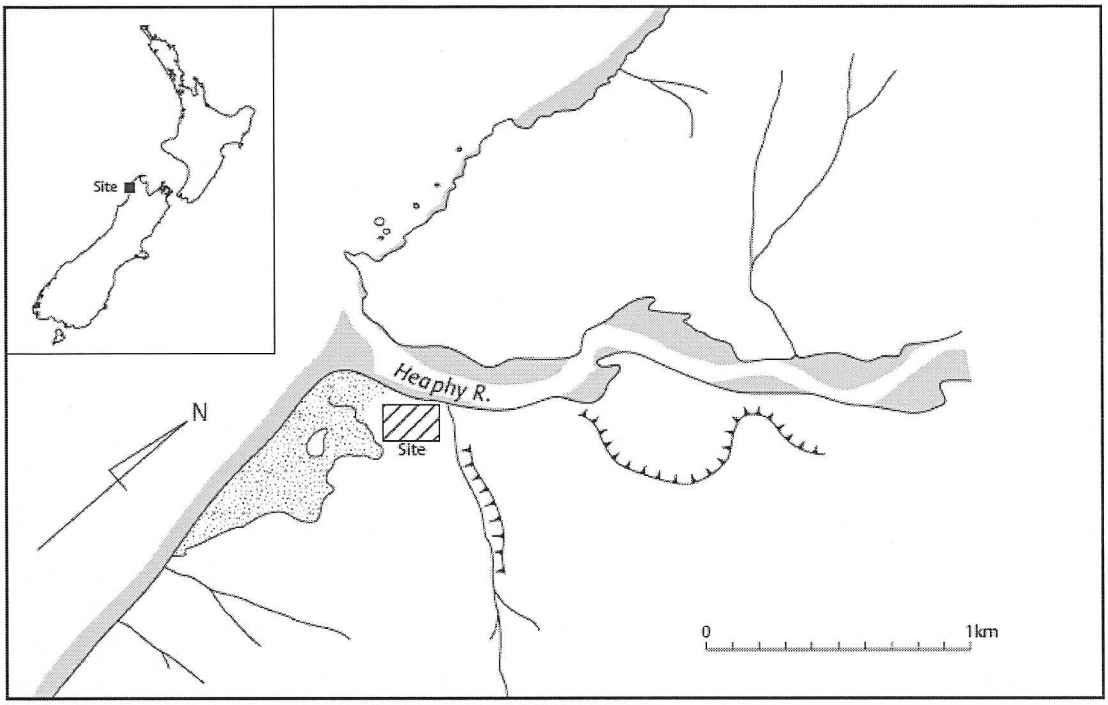


Figure 3.3. Map of the South Island, showing the location of the Heaphy River Mouth Site (c.f. Walter, Muth and Jacomb 2004: 1)

Heaphy River Mouth is another archaic site the West Coast. As shown in Figure 3.3, the site is located on the south bank of the Heaphy River, 500 m inland from the sea, in front of the southernmost hut on the Heaphy track. Over the years, many artefacts have been recovered from the Heaphy River Mouth site and these are now held in private collections and at the Karamea and Canterbury Museums. In the 1960s Owen Wilkes and Ron Scarlet discovered a large hogback (Duff Type 4A) adze from an exposed layer in the river bank, which also contained moa bones. This discovery was followed by a series of excavations between 1961 and 1963, which uncovered possible stone pavements, a flaking floor, fire features, post holes, moa bones, and several artefacts associated with the archaic phase, which included adzes, minnow lure shanks, a fish hook and a whale tooth necklace. They also uncovered moa bones of the species *Anomalopteryx didiformis*. Radiocarbon dating suggests the site was occupied around the 14th century (Walter *et al.* 2004). In 1985, an archaeological inspection at the site by Jones and Hooker (1985) noted that there was some erosion, but that it was not severe enough to warrant excavation. In 2003, the Department of Conservation noted further erosion at the site, and a report by McFadgen and Goff

(McFadgen and Goff 2003:16) recommended a research driven archaeological excavation at the site before any further erosion damage occurs. In response to this, Chris Jacomb and Richard Walter, in partnership with the DOC lead a salvage excavation at the Heaphy River Mouth in April 2004. They uncovered a large flake assemblage of both local stone and imported stone. The latter included obsidian, argillite, quartz, chert, nephrite and hydrogrossular garnet. Several adzes of various stages of production were uncovered from the excavation, including the preform of a side hafted adze (Duff type 5). A nearly complete argillite hogback adze (Duff type 4A) was found in close association with a grindstone and a hammer stone. The excavation uncovered fire features, post holes, and production areas were identified in all of the three open units. A bone fragment of New Zealand Fur seal (Arctocephalus fosteri) was one of the few pieces of faunal remains, along with mussel periostracum. The limited faunal remains uncovered at Heaphy is thought to be a result of the acidity of the soil as at Buller.

Summary

This chapter is an overview of the archaeology of the South Island's West Coast. I have incorporated environmental and climate factors, cultural settings and possible prehistoric habitation. In addition, this chapter has provided site descriptions and archaeological history of Buller and Heaphy. In the next chapter I will provide the lithics analysis.

Four

Material Culture

Only through a continuing evolution of the conceptual framework within which we work can we ever hope to throw light on New Zealand prehistory (Green, King and Shawcross 1963:11).

One of the key objectives of this thesis is to link anthropological discussions about social space with empirical archaeological data from New Zealand prehistory. In order to do this, a three step approach has been applied. The first step is an analysis of the material culture from Buller and Heaphy. The second step builds on the material culture analysis, and discusses these results in relation to intra-site spatial distribution. The third step will discuss the results of the intra-site spatial analysis with reference to the social concepts of space that were discussed in Chapter 2.

The current chapter presents the first stage of this three step approach – an analysis of the material culture assemblage. In this chapter, I begin with a discussion of studies that have connected lithics with spatial analysis in New Zealand and the Pacific. This is followed by an artefactual analysis from Buller and Heaphy. The material culture analysis is presented in three sections: flakes, adzes and other artefacts.

Lithics and spatial analysis

The range of lithics found at a site and how they are spatially distributed can provide an important contribution towards understanding spatial and social relationships. There are two main types of spatial analysis in archaeology – inter-site and intra-site.

Inter-site analysis refers to the distribution of artefact type and stone material types throughout a region or geographical area. Large scale distribution studies represent the bulk of research on spatial distribution in New Zealand, usually in the form of settlement pattern analysis (Phillips and Campbell 2004; Anderson 1980; Groube 1964, 1965; Green 1984, 1967). In relation to spatial distribution and lithics, this thesis does not attempt to review large scale spatial interaction in New Zealand as comprehensive reviews have already been presented by Sheppard (2004:148) and

Turner (2000). While it is acknowledged that inter-site spatial analysis is an important contribution to understanding prehistoric social interaction, this thesis will focus predominantly on the intra-site spatial analysis.

Intra-site spatial analysis has been investigated in much detail in other parts of the archaeological world (e.g. Flannery 1976; Flannery and Marcus 2005; Rick 1976), in Australia (e.g. Fanning and Holdaway 2004; Holdaway 1998) and in the Pacific (e.g. Walter and Anderson 2002; Walter 1998; Felgate 2003:421-447). However, in New Zealand, studies of intra-site spatial analysis are still limited. Such studies are more common in historical archaeology than in prehistoric archaeology (e.g. Harris 2005; Campbell and Furey 2007). There has been a handful of archaeological studies of house floors (e.g. Anderson 1986, 1989; Prickett 1979; Jacomb 2005; Leach, Davidson and Wallace 2000; Marshall 1990; Sutton 1990; Davidson 1984:151-163). These studies have been reviewed in Chapter 2. Studies of activity areas within a site have been reported at Hawksburn (Carty 1981), at Long Beach (Leach and Hamel 1981, and at Kakanui {Wilson, 1999 #1497).

Amanda Wilson's (1999) MA thesis presented a within-site spatial analysis of the lithics assemblage from Cat's Eye Point at Kākanui. A flake based lithics analysis was combined with an intra-site spatial analysis to determine if intra-site activity areas could be inferred. Wilson's methodology involved analysing flakes from two different sieve sizes (6.4 mm and 3.2 mm) in order to infer assemblage diversity. Micro-debitage analysis has an important role in the study of the spatial layout of the site. This approach stemmed out of Butler's (1988) argument that the use of different sieve sizes in Lapita site excavations are not consistent, which creates problems of comparison for methodologies and results. In her results, Wilson noted that the main difference between the two sieve sizes was the presence of different rock types and that there was a larger volume of flakes for the 6.4 mm sieve. It was concluded that no technological information was gained from investigating smaller flakes.

Leach (1984) reconstructed flakes and debris from Oturehua in the Ida Valley using a three dimensional jigsaw methodology. Following this, Leach then examined the spatial distribution of the debris in order to observe the spatial pattern of where the "fly-off" debris was landing. The jigsaw exercise produced eleven assembled cores,

and the spatial distribution of the components that made up these assembled cores revealed that the spread of the discarded material was approximately 1 m on either side of the distribution centre. Many of the flakes fell to one side of the centre. Leach proposed that this is probable evidence of right-handedness, based on the assumption that the prehistoric flakers were facing the sun when flaking.

Leach and Leach's investigations of the Riverton Adze quarry set out to investigate a specialist camp, a site category that is not well understood in New Zealand archaeology. Flakes were separated into three different classes: A) Primary flakes: flakes with a high proportion of cortex with minimal reduction damage, B) secondary flakes: flakes with edge damage reduction scars and C) broken flakes which had the area of edge reduction damage missing (Leach and Leach 1980:118). Their spatial analysis comprised of three excavation Areas which were further divided into squares. Instead of a distribution map, they presented a table showing the frequency of each flake Class in each Area and Square. The results showed that primary flakes were dominant in one Area, while secondary flakes were more dominant in another Area. What they inferred from this is that different phases of lithic reduction probably occurred in different parts of the site (Leach and Leach 1980:118).

Considerations of intra-site spatial analysis

Wilson (1999:24) points out that one of the problems with research on intra-site spatial analysis is that it is difficult to determine the extent to which cultural beliefs have influenced the use of space within a site. Some of these ideas are discussed in more depth in Chapters 2 and 6. The formal cleanup of remains during prehistory can also complicate the interpretation. At Buller, there are examples of oven rake out areas – a secondary removal of material within a site during prehistory. Another issue with intra-site spatial analysis is that it is difficult to determine the boundaries of an archaeological site, and these artificial boundaries might not always encompass the distribution of materials from a site (Wilson 1999:24).

As mentioned earlier, this chapter is an analysis of the lithic assemblages from Buller and Heaphy. Flakes and adzes were chosen as key items because they were the most numerous artefact types found at Buller and Heaphy, which made them suitable for spatial analysis than some of the less common artefact types. The final section of this

chapter will look briefly at some of the other artefact types such as drill points, hammer stones, grinding stones and blades. These items provide important information relating to activity areas and site function, which is relevant to understanding the use intra-site spatial analysis.

Flake analysis

Stone flakes were chosen for analysis in this study because flakes are one of the few artefact types in which comprehensive spatial analysis can be performed. Flake studies are still rare in the New Zealand context, but they are beneficial for understanding spatial analysis because flakes are available in large quantities which can reduce the chances of statistical errors resulting from the low frequencies of less common artefact types. Another benefit is that they can be analysed at many different levels, including in their form, function and manufacturing technique. As a by-product of tool manufacture and maintenance, flakes are often deposited close to the spatial area where they were created, and can provide information for activity area research (Ahler 1989: 86). Flakes of certain stone types were also used as cutting implements. This is evidenced in the signs of usewear, retouching and microflaking on the edges of the flakes. Some types of stone material are used for flake tools only, and are rarely found the context of stone tool manufacture. These include material such as chert, silcrete and obsidian which were used for various functions including working of flax, wood and bone, and hair cutting (Turner 2005). On the other hand, adzes made of argillite, basalt, nephrite, and greywacke are made from raw material with physical properties that can withstand high impact forces for cutting hard surfaces or digging. It is expected that flakes of these materials are more likely to be by products rather than stone tools.

Flake studies in New Zealand

Stone flakes in New Zealand have received very little attention compared to other stone artefact types, despite being one of the most readily available and most common artefacts found on sites (Leach 1969a:30). This lack of interest is noted by several authors, and one of the proposed reasons is that there is a lack of standards and uniformity for describing flake assemblages in order to make them comparable (Jones 1984a; Turner 2005). However, a handful of papers exist on flakes from New Zealand sites.

Shawcross (1964) provided the first systematic, qualitative approach to flake assemblages using obsidian pieces from Kauri point. He classified the flakes according to technique of manufacture, form and function, a methodology that was adopted from European lithics studies, and he noted that the typological categories used for lithics in Europe is not applicable to the New Zealand context. In addition to this, Shawcross noted that there were technological difference between the Southern flake assemblage and those from elsewhere in New Zealand, and he interpreted this to mean that there was no ancestry associated with the southern flake industry. From this interpretation, he proposed the notion of convergent evolution in New Zealand as an explanation for the observed variation.

Another early analysis of New Zealand flakes is that of B.F. Leach (1969a). Leach presented the idea that cultural similarity is not necessarily proportional to formal similarity (1969a:1). Leach used quantitative and statistical methods to determine cultural similarities. The investigation of similarities or differences between artefact assemblages is an important approach to understanding inter-site spatial differences in New Zealand prehistory. However, the density of mathematical theory renders Leach's methods unusable to many archaeologists.

Jones (1984a) further added to flake discussions with his study of the variations of technological differences of flake assemblages from stone tool manufacturing sites. Jones performed a quantitative analysis of the variations of flaking techniques that can be related to stone tool manufacture and converted this evidence to measured parameters that can be used for comparisons. For example, morphological and technological differences such as platform angles are measurable parameters that can provide information about whether flakes are a by-product of different adze shapes.

By adopting a within site approach, Jones attempted to eliminate cultural performance or stylistic affinity as the cause of variation. This enabled him to focus on technology as the cause of variation. Jones's (1984a) paper is of particular interest to this thesis because it was the first to analyse a selection of flakes from the Heaphy River Mouth. It is also of interest because it proposed the concept of "within site" variability as another dimension to compare flake assemblages across different spatial scales.

Turner (2005) provided the most recent contribution to flake analysis in New Zealand archaeology with a discussion of usewear in flake assemblages from several regions around New Zealand. Studies of usewear in flakes and other stone tools are popular, but methods used to determine usewear are still widely debated. This paper largely focused on the function of stone flakes, using experimental archaeology. The variables that were tested for include various surfaces for different periods of time and various functions such as cutting, sawing, scraping and peeling. Turner noted that the stone material from which flakes were made are closely associated with the function and conservatory use of the resulting flake. Local materials were more common and have a large variation of uses while exotic materials like obsidian are used in a more conservative manner, and for fewer functions.

West Coast Flakes

This analysis incorporates all the available stone flakes and debitage from the 2004 excavations at the Buller River Mouth, and Heaphy river mouth. Flakes which were not included in this analysis include flakes which were set aside for residue analysis, or flakes which did not have adequate provenance data from the field. In total, the 2004 excavations uncovered an assemblage of 2693 flake and debitage pieces from Buller and 1212 pieces from Heaphy. Throughout the results chapter, sample sizes of flakes will differ depending on the different variables used for each analysis.

Method

Stone artefacts from the 2004 Buller and Heaphy excavations were initially sorted into artefact type and material type as described below. All flakes were weighed and measured for length, width and thickness. All the debitage pieces were weighed only.

Flake Terminology

For this study, flakes and debitage has been grouped into three different artefact types: Unmodified flake, flake tool, and debitage. The definitions of each class are presented below. The differentiation of flake types is relevant to this thesis because it provides a description of how flakes and debitage was used within an archaeological site. Flake tools can be thought of as functional stone tools whereas unmodified flakes are likely to be by products of stone tool manufacture. The different activity types associated

with these two items can provide ideas about activity areas and use of space within a site.

Unmodified Flake

Unmodified flake is defined as piece of stone, which was intentionally removed from a stone core. In this context, an unmodified flake is identified by the presence of both a bulb of percussion and a striking platform as illustrated in Figure 4.1. An unmodified flake contains no evidence of further use, either in the form of edge modification or use wear.

Flake tool

Flake tool utilises the same description as an unmodified flake but they also contain evidence of edge modification. This is identified through macroscopic evidence of usewear on the edges, or scars of micro-flaking and retouch as illustrated in Figure 4.1. Usewear is defined as evidence of edge modification which has occurred as a result of functional use. Micro-flaking and retouch are defined as deliberate shaping of the flake to improve its function as a tool as evidenced through negative flake scars from micro-flaking.

Debitage

Also thought of as waste products, debitage is defined as small pieces of stone which do not contain either a bulb of percussion or a striking platform, and do not fit the morphological criteria for any of the other artefact categories.

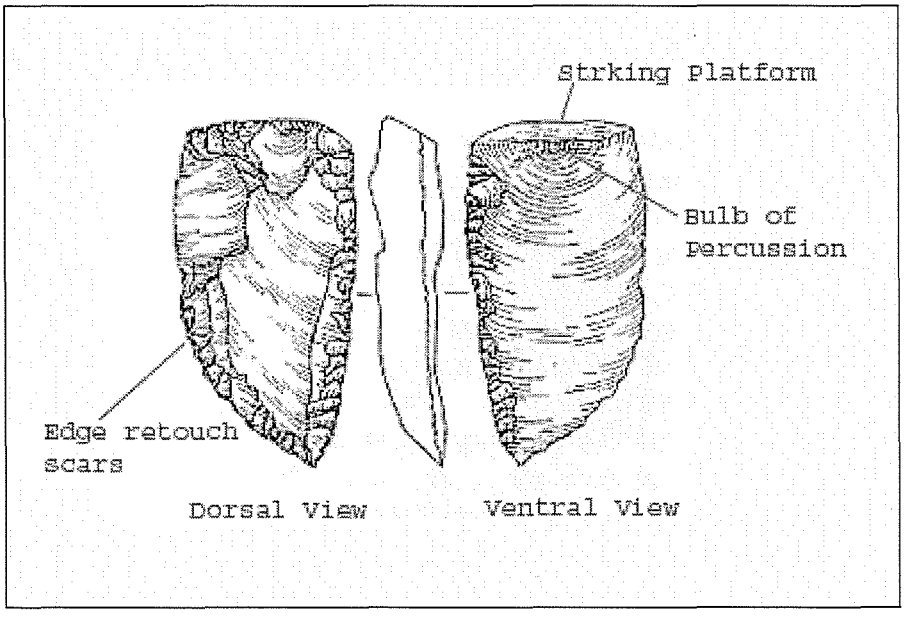


Figure 4. 1. Flake Terminology (from Andrefsky (1988:167)

Flake measurements

Flake size can provide useful information about stone tool manufacturing techniques and stages of production processes. Smaller flakes are associated with microflaking, while large flakes can be associated with the earlier stages of adze production. Larger flakes are also more likely to be used as flake tools. The spatial distribution of different size flakes can provide more information about activity areas within an archaeological site.

Weight

Weight is one of the most common measurements of flake size, because it is reliable and comparable across assemblages. Weight measurements were not as time consuming as measurements for other size variables, and there is often a close correlation with length and width (Mauldin and Amick 1989:77). Weight was measured using the Sartorius BP 3100s Laboratory Scales set to 0.001g accuracy.

Other authors of NZ flake analysis have eliminated flakes less than 1.0 grams from their analysis as these were seen to be too small for accurate quantification (Leach 1969b; Jones 1984a). In the present study, flakes smaller than 1.0 grams were included in the analysis. The author believes that eliminating a particular flake size would skew the statistical results for size. Smaller flakes can provide information about the process of flaking, such as whether certain types of stone tools were microflaked, or whether certain stone types were flaked to a finer degree than other stone types.

Length, width and thickness

Measurements for maximum length, width, and thickness are beneficial for flake analysis studies because they provide other measures for comparisons with assemblages which do not have weight measurements (Andrewsky 1998:97). Flakes were measured using a set of Mitutoyo Digimatic Callipers, Series 5600 to the nearest 0.01 mm. Length was measured as the maximum length taken at right angles to the striking platform as shown in Figure 4.2. Width was measured at the most distant edges from each other with the calipers parallel to the striking platform as shown in Figure 4.3. Thickness was measured at its maximum point as illustrated in Figure 4.3. These measurement techniques were selected from Andrewsky (1988) because it is a

proposed standardized method for stone tool measurements which can be comparable with other assemblages.

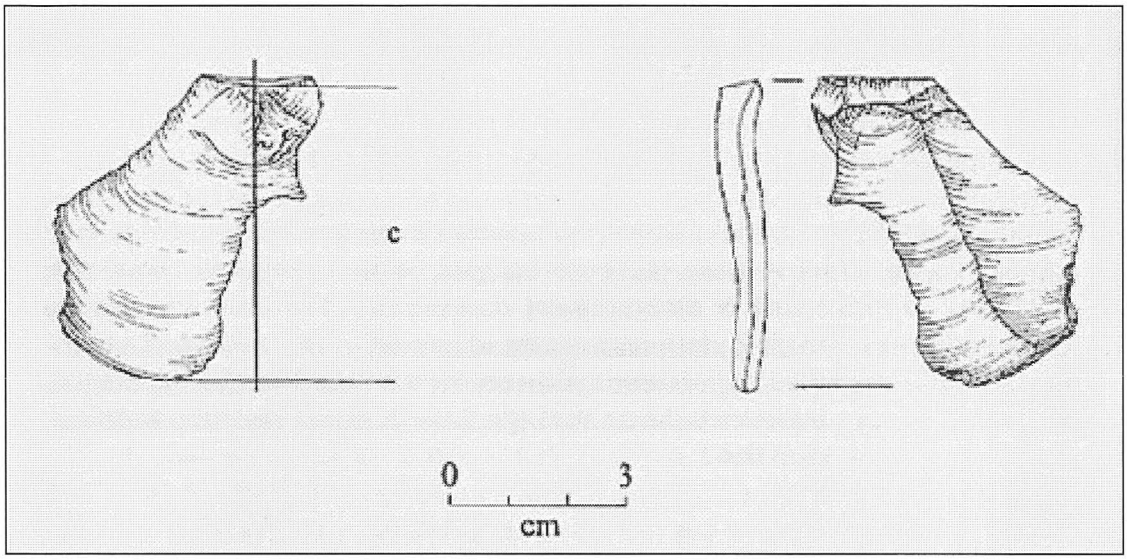


Figure 4. 2. Measurement of maximum length (From Andrewsky 1998:98)

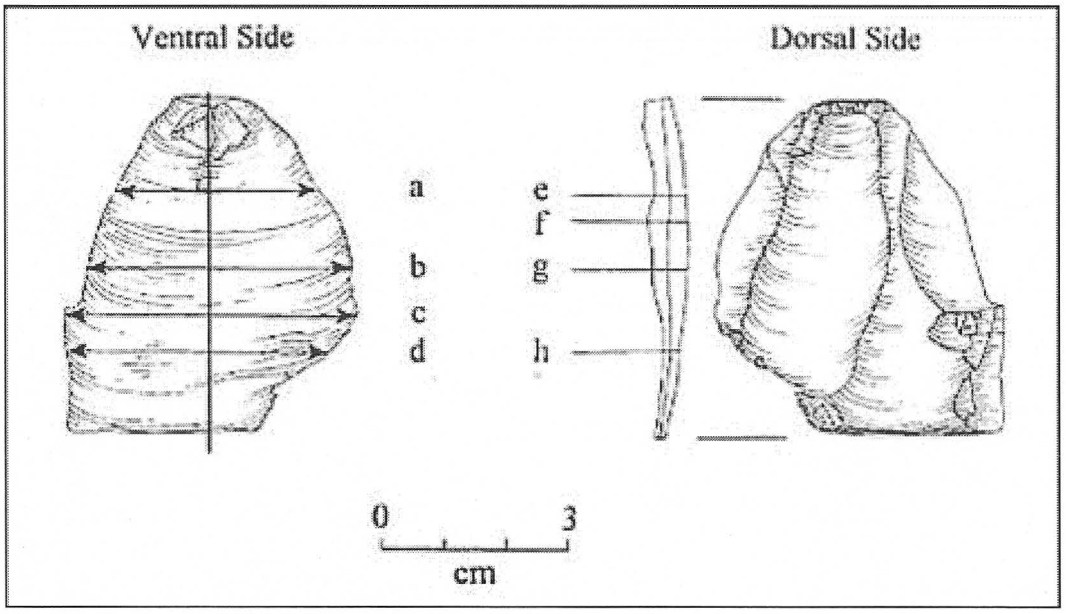


Figure 4. 3. Measurement of maximum width and thickness (from Andrefsky 1998:99)

Presence of Cortex

Cortex is the macroscopically observable rind or outer surface of the stone material (Ahler 1989:90). As the stone tool production progresses, the amount of surface cortex is also reduced. The presence or absence of cortex also provides information about whether a stone type was taken to a site in it's raw form, or whether it was worked to some degree prior to being carried to the site (Dibble, Schurmans, Iovita

and McLaughlin 2005). The presence of cortex was recorded as part of this flake analysis.

Polish/Grinding

The methods of polishing and grinding provide a smoother surface for adzes, minnow lures and other artefact types. Grinding is also used to resharpen the cutting edges of adzes. Polish and grinding on flakes is evidence that the flake was a by product of adze reworking and stone tool recycling. The presence or absence of polish and grinding on flakes was recorded accordingly.

Retouch and Usewear

Usewear is where edge modification has occurred as a result of functional use on the edge. This is shown macroscopically by the evidence of jaggared edges, or worn cutting edge. Micro-flaking and retouch are a result of deliberate shaping of the flake, designed to improve it's function as a tool. Macroscopically, this is shown the negative microflake scars on the edge. The presence of one of both of these variables determined if flakes were classified into flake tools. These two variables were recorded concurrently because it is often too difficult determine whether a flake edge was retouched or worn from use. Retouch and usewear was only recorded if it was macroscopically observable, effectively eliminating ambiguity.

Raw Material

Material Type

A variety of material types were found at Buller and Heaphy. Raw material was incorporated into this analysis because it is an important variable of lithic studies. Different stone types have different geographical and chemical characteristics which can influence the physical and functional characteristics of the stone tools. When these different material types are observed spatially, it can provide information about different uses of space use within a site. Material type was identified through hand specimen identification of the raw material in consultation with reference samples from the Otago Archaeology Laboratories. A description of the most common raw material types is provided below.

Argillite

Argillite is a fine grained rock, metasomatised rock, commonly used to make adzes. There are several sources around the Nelson/Marlborough area, Taranaki, and Southland. It is likely that of the argillite found at Buller and Heaphy came from the Nelson Marlborough area, as this source is close to the archaeological sites. On the West Coast, argillite is the most prevalent raw material for adzes, and chisels. Argillite flakes were also found with evidence of polish and hammer dressing, indicating that the polished argillite tools were reused or reworked on the West Coast. Some of the argillite flakes also contained cortex and argillite preforms were found, indicating that argillite adzes were taken to the site it's very early stages of tool production, and manufactured at the sites.

Basalt

Several sources are found along the southern half of the east coast of the South Island, and through the Northern portion of the North Island. Very little basalt was actually found at Buller and Heaphy (K. Prickett, pers. com), however, this was compensated for by the relatively large amount of argillite.

Chert

Chert is a fine grained form of microcrystalline quart with high silica content and ranges in texture, colour and grain size. The term chert is often used interchangeably with flint, although there has been some disagreement over whether they should be separated into different categories (Luedtke 1992:92). It is commonly used in prehistoric tools because its hardness and even grain size provide for ideal flaking and tool making characteristics. A variety of colours including yellow, brown, light grey were found at Buller and Heaphy. It is sourced to the Upper North Island (Jacomb, Walter and Tucker 2004:12), and north Otago (Smith, Campbell and Bristow 1996:85).

Chalcedony

Similar to the physical and chemical matrix of chert, chalcedony is also a mineral made of microcrystalline quart, with a slightly higher water content which makes it more translucent than chert (Kooyman 2000:29).

Greywacke

Greywacke is a form of sandstone which contains 15% silt, or finer grain types in the matrix. Greywacke has a high feldspar content, and come in a variety of different shades of grey (Kooyman 2000:35). Because of the hardness of the rock, greywacke is difficult to flake, but it is used quite commonly in the northern part of the North Island, where the Motutapu greywacke, sourced to Motutapu Island in the Hauraki Gulf, is a well known stone used in adze manufacture. However, the greywacke adzes found at Buller and Heaphy are thought to have come from local sources. This local greywacke is coarser than the Motutapu greywacke, is a lighter grey in shade, and of poorer quality (Turner, pers. comm.)

Pahuatane Flint

Also known colloquially as Heaphyite, Pahuatane flint is a dark yellow – dark brown type of chert, sourced near Punakaiki on the West Coast. It was first termed 'Heaphyite' by Wilkes and Scarlett (1967), because it was the dominating material type found in excavations at Heaphy. Wilkes and Scarlett (1967) proposed that Pahuatane flint might be sourced along the coast to the north of Heaphy River Mouth. Being a local stone, it is the most common raw material found at Buller and Heaphy.

Hydrogrossular garnet

Used as a hammer stone for working stone tools, pieces of Hydrogrossular garnet were found at Buller, and also in close proximity to a nearly complete hog back adze at Heaphy. It is sourced from Nelson, South Westland, Kaikoura and Southland (Jacomb *et al.* 2004:12). Hydrogrossular garnet is a hard stone and able to withstand great impacts. These are features which make it beneficial as a stone working tool. The proportion of Hydrogrossular garnet found at Buller and Heaphy is relatively small when compared to other stone types and unlike the other stone types, there appears to be no uniform shape or form to the artefact.

Nephrite

Also known as greenstone or pounamu, nephrite is sourced to the West Coast of New Zealand (Beck 1981; Beck and Mason 2002). Nephrite ranges in colour from a dark green to a milky white. The milky white nephrite is a common phenomenon in Archaic sites, and it was initially thought that the milky white colour was preferred by the archaic Maori for stone tools. Nephrite flakes are found in early sites, but the

method of sawing nephrite was developed by the Classic period (Davidson 1984:94). Nephrite adzes, chisels and several flakes were found at both Buller and Heaphy.

Obsidian

Obsidian is a black, fine grained volcanic glass found in a majority of prehistoric sites. It is only sourced in the North Island, at several locations including Taupo and Mayor Island. Despite the great distanced from source, obsidian was one of the major material types found the West coast flake assemblages. Obsidian pieces with either a green or grey translucency were uncovered at Buller and Heaphy. Over 27 sources of New Zealand Obsidian has been noted (Sheppard 2004:152), and these sources can be grouped into four different regions (Leach and de Souza 1979:39).

Quartzite

Two main types of quartz were represented in the West Coast assemblages. A clear and colourless type, more commonly known as rock crystal, and a milky white quartz. Although quartzite is difficult to work, and does not flake very well, worked cores and flakes were found at Buller and Heaphy, it is unclear what function quartz had as a stone tool in prehistoric New Zealand. Known sources have been identified in the Nelson/Marlborough area.

Sandstone

Classified as a sedimentary rock, the main characteristic of sandstone is that most of the particles coarse and grainy, measuring approximately between 1/16 mm and 2 min diameter - the size of sand (Kooyman 1985:34). Sandstone is commonly used in prehistory as an abrader or stone grinding tool.

Silcrete

Silcrete is a fine grained stone, also known as flint or orthoquartzite (Smith, Campbell and Bristow 1996:83). Although silcrete is common on the east Coast of the South Island, it is not as prevalent in the West Coast sites, possibly because Pahuatane flint was used as a local substitute. It is thought to be sourced from Central Otago and Canterbury (Jacomb *et al.* 2004:12).

West Coast Flake Results

In total, there were 2693 flakes and pieces of debitage from Buller and 1215 from Heaphy. A summary of the flake types and their material type is presented in Tables 4.1 and 4.2. From the Buller 2004 excavation, there were1887 flakes in total (flake tools and unmodified flakes combined), and 826 pieces of debitage. From the Heaphy 2004 excavation, there were 812 total flakes (flake tools and unmodified flakes combined), and 403 pieces of debitage. The two most common material types from both sites were heaphyite and argillite.

Table 4. 1 Summary of flakes from Buller

Material	Debitage		Flake tool		Unmodified flake		Total	
	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Argillite	165	371.59	49	813.96	548	3450.76	762	4636.31
Basalt	3	2.11			11	126.863	14	128.973
Bowenite	1	1.35					1	1.35
Chalcedony	1	1.51	1	15.02	2	9.11	4	25.64
Chert	56	31.069	9	99.59	43	79.98	108	210.639
Granite	2	4.01					2	4.01
Greywacke	8	107.56			4	74.921	12	182.481
Heaphyite	264	465.153	133	2867.4	657	2768.581	1054	6101.134
Mica Schist	4	7.54					4	7.54
Nephrite	30	103.54			33	133.982	63	237.522
Obsidian	61	104.549	85	717.541	99	315.217	245	1137.307
Porcellanite	3	9.66	3	8.28	2	7.82	8	25.76
Quartz	199	2079.082	13	405.28	145	1307.23	357	3791.592
Sandstone	14	66.44					14	66.44
Schist	4	43.08					4	43.08
Silcrete	11	23.03	3	28.09	27	344.45	41	395.57
Total	826	3421.27	296	4955.164	1571	8618.916	2693	16995.35

Table 4. 2 Summary of flakes from Heaphy

Material	Debitage		Flake tool		Unmodified flake		Total	
	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Argillite	132	51.2	16	67.04	368	834.67	516	952.91
Basalt	2	2.35			2	10.87	4	13.22
Chalcedony					1	0.46	1	0.46
Chert	56	75.28	4	22.72	32	33.37	92	131.37
Greywacke	1	0.87					1	0.87
Heaphyite	88	186.94	47	647.99	196	689.87	331	1524.80
Mica Schist	2	45.07					2	45.07
Nephrite	37	37.88			36	118.788	73	156.66
Obsidian	33	61.31	27	260.04	43	51.93	103	373.28
Porcellanite	1	0.17	2	6.99	1	0.13	4	7.29
Quartz	47	294.86	2	61.28	31	72.68	80	428.82
Sandstone	3	39.67					3	39.67
Schist	1	4.37					1	4.37
Silcrete			4	34.12			4	34.12
Total	403	799.97	102	1100.18	710	1812.77	1215	3712.92

Flake size

The mean weights for each artefact and material type is shown in Figures 4.3 and 4.4. It was expected that flake tools would be larger than the unmodified flakes and debitage, and the results have shown that this was the case. Debitage had the smallest mean weight followed by unmodified flakes. For Buller, flakes of greywacke and basalt were the heaviest, while flakes of chert and porcellanite were the smallest

flakes. At Heaphy, the heaviest flakes were quartz and heaphyite, while chalcedony and chert flakes were the smallest.

Table 4. 3 Average weight of debitage, flake tools and unmodified flakes at Buller

Material	Debitage	Flake tool	Unmodified flake	Total
	mean weight (g)			
Argillite	2.34	16.61	6.24	6.09
Basalt	1.06		10.57	9.21
Bowenite	1.35			1.35
Chalcedony	1.51	15.02	4.56	6.41
Chert	0.56	11.07	1.82	1.95
Granite	2.01			2.01
Greywacke	13.45		18.73	15.21
Heaphyite	1.81	21.56	4.17	5.79
Mica Schist	1.89			1.89
Nephrite	3.45		4.06	3.77
Obsidian	1.83	8.44	3.06	4.64
Porcellanite	3.22	2.76	3.91	3.22
Quartz	10.45	31.18	9.02	10.62
Sandstone	4.75			4.75
Schist	10.77			10.77
Silcrete	2.56	9.36	11.88	9.65
Total	4.25	16.74	5.42	6.31

Table 4. 4 Average weight of debitage, flake tools and unmodified flakes at Heaphy

Material	**Debitage**	**Flake tool**	**Unmodified flake**	**Total**
	mean weight (g)			
Argillite	0.39	4.19	2.27	1.85
Basalt	1.18		5.44	3.31
Chalcedony			0.46	0.46
Chert	1.34	5.68	1.04	1.43
Greywacke	0.87			0.87
Heaphyite	2.12	13.79	3.52	4.61
Mica Schist	22.54			22.54
Nephrite	1.02		3.30	2.15
Obsidian	1.86	9.63	1.21	3.62
Porcellanite	0.17	3.50	0.13	1.82
Quartz	6.27	30.64	2.34	5.36
Sandstone	13.22			13.22
Schist	4.37			4.37
Silcrete		8.53		8.53
Total	1.99	10.79	2.55	3.06

Flakes with cortex, polish, hammer dressing, or usewear

Tables 4.5, 4.6 and 4.7 show the percentage of flakes from each site that contain these variables. At both Buller and Heaphy, flakes with cortex constitute approximately 10% of the flakes. Flakes with polish constitute 4.4 % of the flakes at Buller, but 15% of the flakes at Heaphy. Flakes with polish are most likely to have been produced through the process of recycling an adze or other polished item. The higher frequency of polished flakes at Heaphy indicates more conservative use of the stone and recycling. Flakes with hammer dressing constitute 2.01% at Buller and 5.17% at Heaphy. Again, Heaphy has a higher proportion of flakes from the adze recycling process. Flakes with either usewear or retouch constitute 15.63% at Buller and 12.32% at Heaphy.

Table 4. 5 Number and percentages of flakes at Buller with cortex, polish, hammer dressing and retouch

	Present		Not present		Total flakes
	count	percentage	count	percentage	
Cortex	206	10.92	1681	89.08	1887
Polish	83	4.40	1804	95.60	1887
Hammer Dressing	38	2.01	1849	97.99	1887
Retouch/Useware	295	15.63	1592	84.37	1887

Table 4. 6. Number and percentages of flakes at Heaphy with cortex, polish, hammer dressing and retouch

	Present		Not present		Total flakes
	no.	percentage	no.	percentage	
Cortex	85	10.47	727	89.53	812
Polish	128	15.76	684	84.24	812
Hammer Dressing	42	5.17	770	94.83	812
Retouch	100	12.32	712	87.68	812

Table 4. 7 Mean weight (g) of flakes containing cortext, polish, hammer dressing, retouch and usewear

	Buller		Heaphy	
	mean weight (g)			
Presence of feature: yes/no	Yes	No	Yes	No
Cortex	15.02	6.24	11.31	2.68
Polish	7.64	7.18	2.58	3.78
Hammer Dressing	9.33	7.15	4.53	3.54
Retouch/Usewear	16.58	5.46	10.98	2.55

As shown in Table 4. 7, flakes with cortex are heavier than flakes without cortex. This result is expected because flakes with cortex are part of the first stage of the reduction process, and flakes get smaller further into the reduction process. The other expected result is that flakes with retouch/usewear are larger than flakes with no retouch/usewear, which is expected.

Flakes: Summary

In total, 2693 combined flakes and debitage from Buller and 1215 from Heaphy were analyzed. Argillite and heaphyite were the most common material types for flakes found at these two sites. Flake tools were larger than unmodified flakes and debitage. The presence of cortex, polish, hammer dressing, usewear/retouch were recorded, and their percentages are presented here.

Adzes

New Zealand Adze Studies

An adze is defined as a cutting tool used for working wood. It is similar to an axe, except that it is set at right angles to the haft, similar to the way a hoe is hafted. In New Zealand prehistoric adzes are made from stone, but varieties of shell adzes are known in the Pacific. Unlike the New Zealand flake assemblages, adzes are one of the most well researched areas of New Zealand prehistory, with several papers written on various aspects of their manufacture (Jones 1984b; Leach and Leach 1980; Turner 1992; Turner and Bonica 1994), function (Best 1977; Turner 2000), technology (Nelson 1991; Best 1977), quarry studies (Jones 1984b; Walls 1974; Leach 1990), trade and exchange (Davidson 1981).

The study of Polynesian adzes originated in the mid 1880s, comprising mainly of descriptive reports (e.g. Smith 1892; Rutland 1894, 1896). Some of the main contributors through this period include Elsdon Best, H.D. Skinner and Roger Duff. In 1912, Elsdon Best was one of the first to move beyond a descriptive analysis of adzes to incorporate manufacturing techniques as part of a cultural historical relationship for adzes (Cleghorn 1984:405). In 1921, H.D. Skinner further influenced the culture historical relationship and used formal adze types to define prehistoric culture areas within different regions of New Zealand. Skinner also developed the first New Zealand adze typology (Skinner 1943). Roger Duff introduced discussions of culture

change and regionalism to New Zealand prehistory using the "age area geographical distribution". More recent adze studies saw a movement away from purely descriptive and classificatory analysis to include technical, behavioural, quarry studies and distribution analysis. These include contributions by Simon Best, Helen Leach and Marianne Turner. Simon Best's (Best 1977) thesis studied the function of adzes and it's relation to form. Helen Leach's quarry studies (1978, 1981) investigated technology through the manufacturing process rather than through complete adzes. Marianne Tuner's thesis, studied function and adze distribution (Turner 2000). This thesis does not attempt to review all adze's studies in NZ, as this has been done elsewhere (e.g. Furey 2004; Turner 2000).

West Coast Adzes

This section analyses the prehistoric adzes and chisels from the 2004 excavations at Buller and Heaphy. In addition to the assemblage collected from the 2004 excavations, I have also incorporated the Heaphy assemblage excavated in the 1960s by Wilkes and Scarlet, loaned from the Canterbury Museum. A selection of adzes from the 1960s excavations were previously discussed and published by Scarlett (1967). However, this publication was a purely descriptive study, and limited because it only included complete, and finished adzes, thus eliminating adze portions, fragments and preforms. Also, Scarlett provided only a minimum range of descriptive variables. In order to make these variables consistent with the rest of the assemblages, all of the adzes mentioned in Scarlett (1967)were analysed again in the present analysis, using the criteria outlined in this section.

Adze study methods

The variables selected for this adze analysis is very similar to the methods outlined by Smith and H. Leach (1996) in their study of adzes at Shag River Mouth. They provide a good selection of variables for a descriptive, technological, functional, comparative and classificatory of adzes. Although several variables were measured and recorded by the author, to discuss there results in detail and interpret them all here is beyond the size limit of this thesis. Consequently results of only some of the variables will be discussed in the results section. Measures that are not discussed here will be incorporated into future studies associated with the larger Tai Poutini Archaeology Research Programme. Observations were recorded onto specially designed recording

forms and later entered into a spreadsheet on Microsoft Excel for analysis. Statistical tests were performed in Minitab.

Adze typology

The adze typology utilized in this analysis is the standard typology used by several scholars and outlined by Turner (2000:60) below. In a typical New Zealand adze, the poll is the most dorsal part of the adze, usually hafted onto a wooden handle. The butt is at the back of the adze, immediately below the poll. The chin is the area where the butt and bevel meet. The blade is the area from the chin down to the cutting edge, and the cutting edge is the surface which is hit against the target. The front of the adze is so named because, with the exception of hog back adzes, it usually faces the holder when it is hit into its target. The tang is the sloping area on the front, dorsal part of the adze, immediately below poll. These features are illustrated in Figure 4.4.

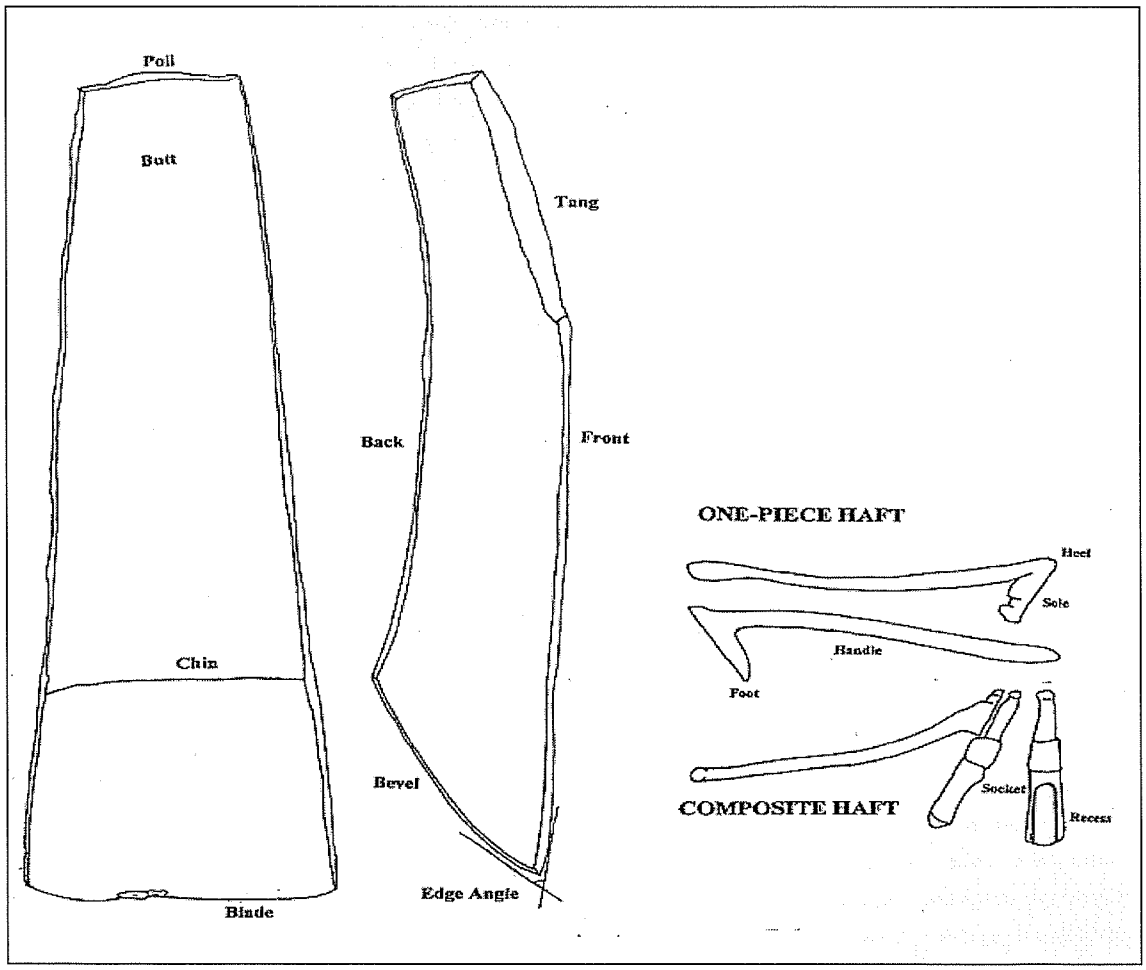


Figure 4. 4. Terminology of adze features (from Turner 2000:60)

Nearest Duff Classification

The Duff and Skinner classifications are the two main classifications for New Zealand adzes with Duff (Duff 1956) being more widely used classification out of the two. The Duff classification was included in this analysis because it is a useful descriptive tool. However, the Duff classification did not accommodate preforms or portions of adzes. Consequently, an analysis of cross sections was more appropriate as a comparative tool.

Cross Section

Analysis of cross sections is beneficial because it's a variation which can also incorporate preforms and portions of adzes. However one of the downfalls of using this is that the variables are not as descriptive as the Duff or Skinner classifications unless other variables are taken into consideration including whether they are tanged, have narrow blades, or whether they are fully polished.

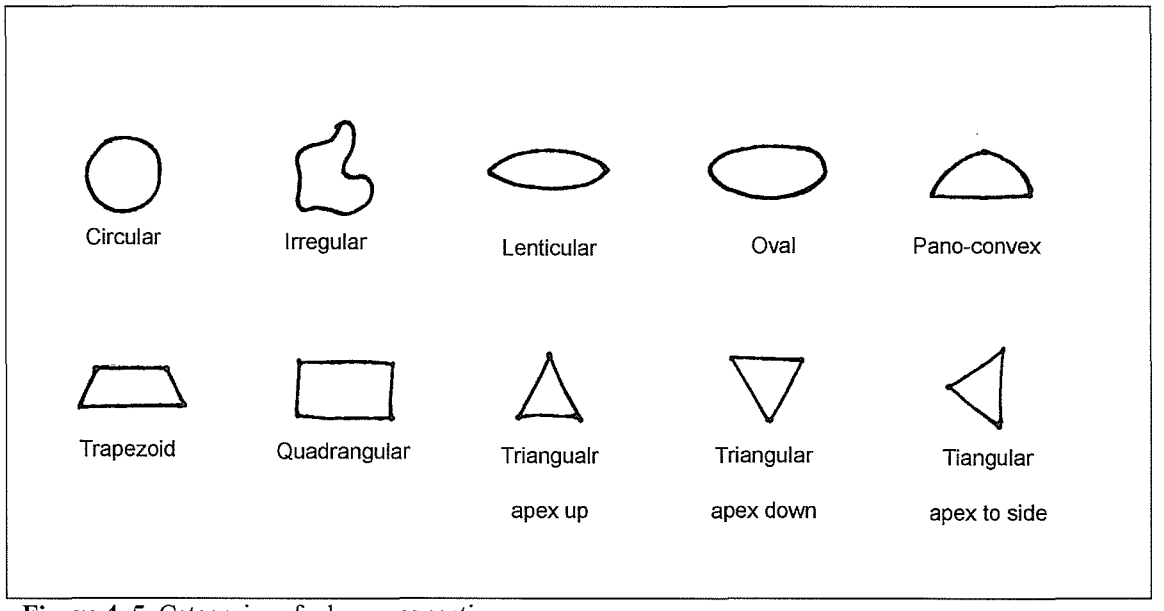


Figure 4. 5. Categories of adze cross sections

Raw Material

As with the flake analysis, this variable involves hand specimen identification of the raw material from which each adze was made.

State

State refers to the condition of the adze when it was discarded. The variables here include blank, preform, primary, refurbished, recycled, reworked, or broken/discarded. *Blanks* are pieces of raw material of suitable size dimensions and

quality for the intended manufacture a desired artefact (Crabtree 1972). *Preforms* are blanks which have undergone further modifications, but are still unfinished. *Primary* adzes are originally finished adzes, *refurbished* adzes refer to adzes that have been altered after use, such as through grinding or flaking of the blade to sharpen it. *Recycled* adzes are adzes which have been reworked into a new form. Some of the preforms from the West Coast assemblages have evidence of grinding or hammer dressing on one or more sides, indicating that it was a preform made from a previous adze. *Broken/discarded* adzes refer to broken portions with no signs of reworking. With the exception of blanks, all of these adze stages follow the method proposed by Smith and Leach (1996:104). Some of the variables proposed by Leach and Smith (1996: 104) such as *Fatu* and *Mutilated* were not included in the present analysis because it was difficult to determine these states based on the methods described. Although this classification proved to be useful for the present analysis, one of the difficulties of this classification is that some adzes fall into more than one category. For example, an adze can be a primary adze and be broken/discarded as well. A recycled adze can also be the preform of a newer adze which was abandoned.

Portion

Refers to the portion of the adze when it was discarded, whether it was a complete adze, butt portion, mid section, blade portion or fragment.

Reworking/Recycling

Adzes were recorded according to whether they were reworked or recycled. Smith and H. Leach (1996)identified reworking and recycling as separate categories. That is, a reworked adze is when the edge of the adze was resharpen via flaking, and a recycled adze is when the whole of the original adze was made into a new artefact. This analysis also attempted to follow Smith and H. Leach with regards to classifying adzes into reworked or recycled. However, trying to identify an artefact that might have been made from a previous, recycled adze can sometimes be difficult when all traces of the original tool has been destroyed (Odell 1996:59).

Weight

The weight of an adze is a good descriptive variable (Gero 1989:93). Among other things, it is a useful measurement for comparing size with other adzes from within and between assemblages. It is also helpful for interpreting the function of the adze, and

henceforth, interpreting the human activities that were occurring at a prehistoric site. Weight was measured using the Sartorius BP 3100s Laboratory Scales set to ± 0.001g.

Length, width and thickness

The reason for measuring length, width and thickness is because they are good variables for comparison with other assemblages. These measures can provide information about the possible function, design and manufacture of the adze. In addition, length can be an important indicator to the life stages of the adze, and how often it has been resharpened or reworked by measuring the proportion of the blade section to the butt. The width of an adze can provide further descriptive, functional and technological information about the adze, as the adze proportion is a significant variable in the function of an adze. Whether the adze was wide or narrow, or whether it tapers down from wide shoulders to a narrow cutting edge can provide insight about the function of the adze. Maximum length, width and thickness were measured using a set of Mitutoyo Digimatic Callipers, Series 5600 to the nearest 0.01 mm.

Adze results

In total, adzes from the Buller 2004 excavation consisted of 71 from the West area and six from the east area. There were 18 adzes from the Heaphy 2004 excavation. Adzes from the West Coast area comprised of four types of stone material: argillite, basalt, nephrite and a light grey, slightly grainy material which could not be identified by the author. It is very similar in texture, colour and grain size to greywacke, and has been described by Marianne Turner (pers. comm.) as low grade adze making material, possibly an opportunist local material.

Table 4. 8 Number of adzes from Buller and Heaphy and their material types

	Assemblage			
	Buller West Area	Buller East Area	Heaphy	Total
Material	Number of Adzes			
Argillite	51	3	16	70
Basalt	3	1		4
Nephrite	9	1	2	12
Unknown material	8	1		9
Total	71	6	18	95

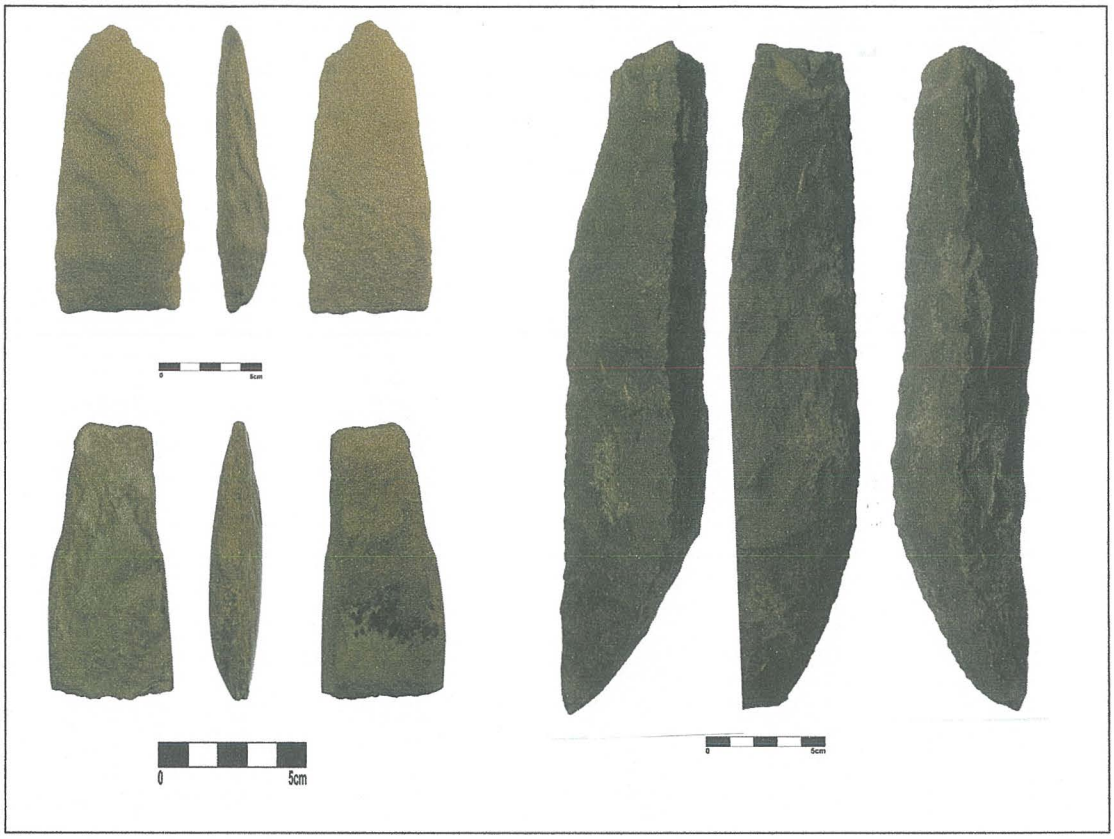


Figure 4. 6. A sample of adzes from Buller and Heaphy. Top left: greywacke adze from Buller, Surface Find 1. Bottom left, nephrite adze from Buller, MT4-21-14. Right: argillite hogback adze from Heaphy, E-R39-2-ii-6-1.

Material type

Figure 4.7 is a graph showing the percentages of material types of adzes found at each site. The data presented here is the same as that for Table 4. 1, except that the numbers have been converted into percentages so that comparisons can be made across the sites. Argillite was the most common adze material followed by nephrite.

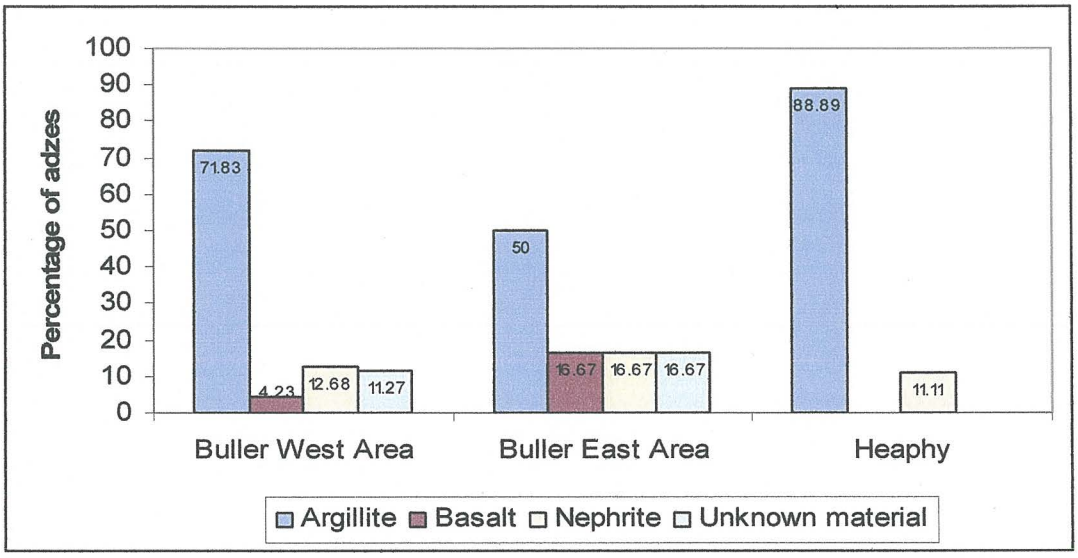


Figure 4. 7. Percentage of material type of adzes found at each site

Adze Size

West Coast adzes were measured for their weight, length, width, and thickness in order to record the size of the adze. Only complete adzes were used in this summary, because broken and fragmented adzes would give a disproportionate indication of overall adze size. There were 30 complete adzes from the West Coast, which comprised of 22 from Buller's West Area, one from the East Area and seven complete adzes from Heaphy. Table 4.9 summaries the size of these complete adzes in terms of their average size and weight.

Table 4. 9 Number of complete adzes and their average weight and length

		Assemblage			
Material	**Data**	**Buller West Area**	**Buller East Area**	**Heaphy**	**Total**
Argillite	Number of adzes	12	1	7	20
	Mean weight(g)	68.99	30.60	198.35	112.35
	Mean length(mm)	73.72	64.39	109.49	85.77
Nephrite	Number of adzes	7			7
	Mean weight(g)	28.13			28.13
	Mean length(mm)	83.09			83.09
Unknown	Number of adzes	3			3
	Average of weight(g)	114.54			114.54
	Average of length(mm)	90.64			90.64
Total	Total adzes	22	1	7	30
	Total mean weight (g)	62.20	30.60	198.35	92.92
	Total mean length (mm)	79.01	64.39	109.49	85.63

Thirty complete adzes is a small sample, and therefore, the mean sizes for these adzes can be skewed. For example, there was only one complete adze from the Buller East Area, which is not an adequate representation. There were seven adzes from Heaphy, and one of those adzes was a large argillite hogback adze weighing over 1kg, and measuring 273 mm in length. This large argillite adze would have skewed the average size of adzes from Heaphy.

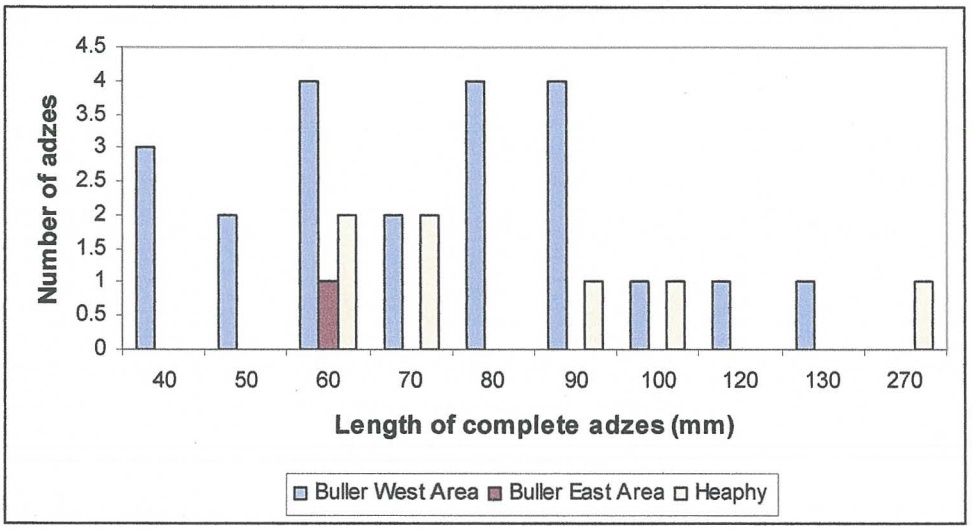


Figure 4. 8 Length of complete West Coast Adzes

Figure 4. 8 shows the size distribution of length of complete adzes in the west coast. Most of the West Coast Adzes fall between the 40-90 mm length. The largest adze was from this analysis was the previously mentioned hogback adze from Heaphy. The smallest was a 44.5 mm argillite adze from the Buller West Area. Of important consideration here is that the 2004 assemblages yielded a small sample of only 30 complete adzes which may not be representative of adze size. For Heaphy, there is an additional 74 adzes from the Canterbury Museum collections, and for Buller, there are additional adzes from the 2005, 2007 and 2008 field school excavations. One recommendation for future research is to incorporate the adzes from these additional assemblages which will increase the sample of completed adzes.

Adze state

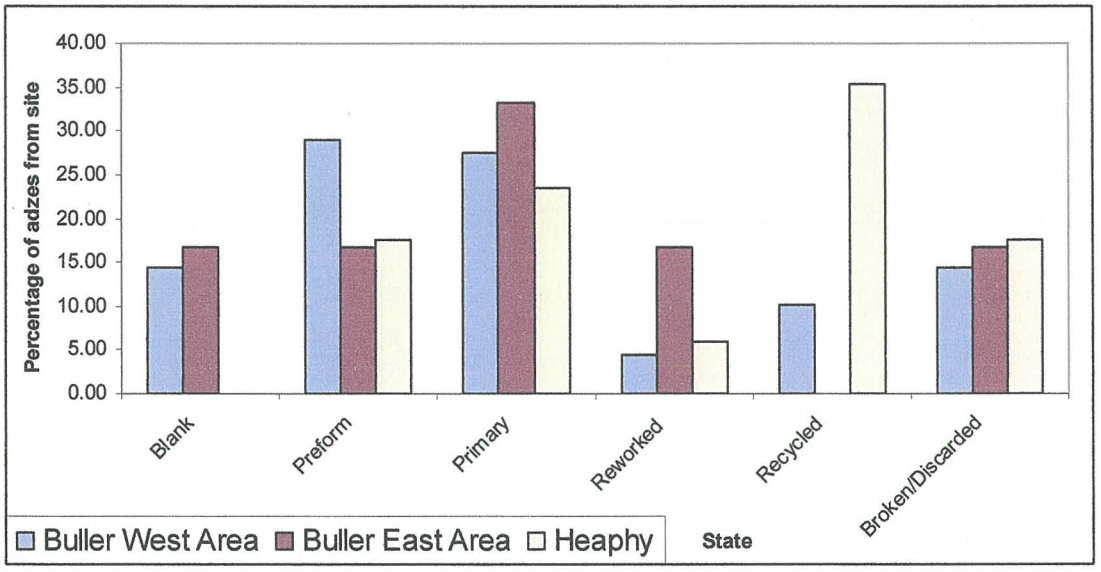


Figure 4. 9 Adze states from Buller and Heaphy

For Buller, the most common adze states were blanks, preform and primary adzes. This indicates that most the adzes at Buller were brought during the early stages of the adze's life and worked into final tool shape at the site. For Heaphy the most common adze state were recycled adzes followed by preform and primary adzes. It appears that adze use at Heaphy was more conservative than adze use at Buller. This evidence is also supported by the flake evidence where flakes with hammer dressing and polish were more common at Heaphy than Buller.

Adze cross section

Adze cross section was analysed here as a measure of adze form instead of the Duff or Skinner classifications because many of the West Coast adzes were either preforms or adze portions, and consequently did not fit into the Duff or Skinner classifications.

Table 4. 10 Cross sections of adzes at Buller and Heaphy

	Assemblage			
Cross Section	Buller West Area	Buller East Area	Heaphy	Total
Circular	4		1	5
Irregular	7		2	9
Lenticular	1			1
Oval	1			1
Plano-convex	2	1		3
Quadrangular	24	1	8	33
Quadrangular, Untanged	13			13
Trapezoid	3	1	1	5
Triangular	10	1	1	12
Triangular, Apex Down	1		1	2
Triangular, Apex to side			1	1
Triangular, Apex Up	1		2	3
Indeterminate	4	2	1	7
Total	71	6	18	95

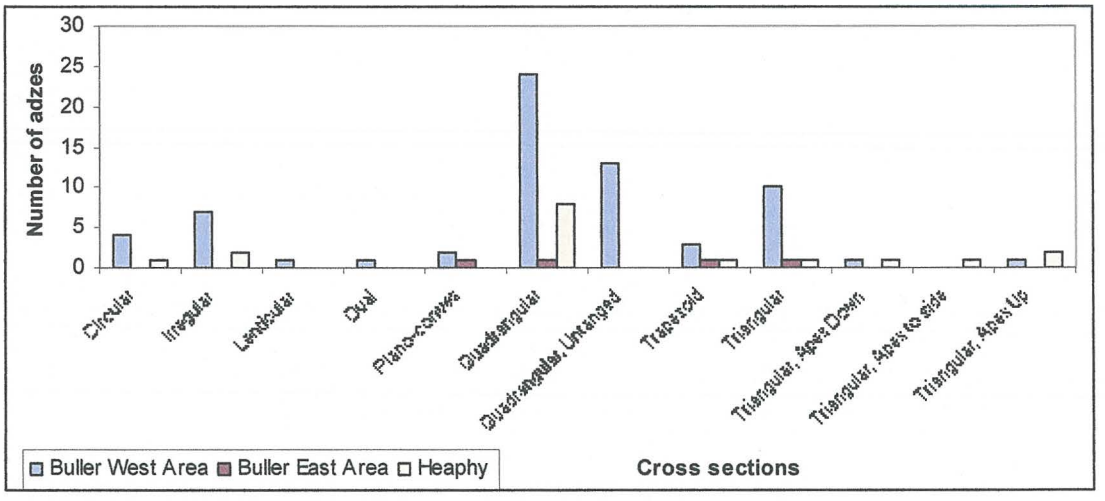


Figure 4. 10 Cross sections of adzes at Buller and Heaphy

The number of adzes for each cross section is also presented in Figure 4. 10. For both Buller and Heaphy, quadrangular adzes were the most common adze cross section followed by triangular adzes. From Buller there were 4 circular and one oval adze. These circular adzes are possibly chisels, used for a slightly different function to normal adzes. However it is difficult to determine function from cross sections. From Heaphy, there is one triangular adze with it's apex to the side, and is thought to be one of the few side hafted adzes found on the West Coast.

Adze summary

The 2004 excavations at Buller and Heaphy uncovered 71 from the Buller West Area, six from the Buller East Area, and 18 adzes from the Heaphy. Adzes from these two sites area comprised of four types of stone material: argillite, basalt, nephrite and a light grey, slightly grainy material. Argillite was the most common adze material, followed by nephrite. Thirty complete adzes were used in an analysis of size, but this sample is too small to be representative of the Buller and Heaphy assemblages. Based on the states of the adzes, it is possible that the Heaphy assemblage displays more conservative stone tool use than Buller. This evidence is supported by the high proportion of flakes with polish or hammer dressing found at Heaphy and a higher frequency of adze recycling. Quadrangular adzes were the most common adze type followed by triangular adzes.

Other Artefacts

The range and variety of artefacts at an archaeological site has often been used to interpret the function of the site. In addition to the flakes and adzes found on the West Coast, the lithic assemblage also contained drill points, hammer stones, files, blades, minnow lures, spall tools, cores and a small number of unidentified stone tools. The minnow lures and spall tools will not be discussed here, because they have been analysed in detail by Findlater (2004; 2005), and Williams (2005; 2006) respectively. This section presents a brief descriptive analysis of other artefacts found at Buller and Heaphy.

Blades

Following Crabtree (Crabtree 1972:42), a blade is defined as a large flake, where the length is at least twice as long as the width. In addition to the bulb of percussion, and the striking platform, blades also contained the presence of an aris, a longitudinal ridge on the dorsal surface (Smith, Campbell and Bristow, 1996:77) Blades that were fractured or were not clearly distinguishable were not included in this analysis. Following the procedure outlined earlier for the flake and adze assemblages, the maximum length, width and thickness was measured for all blades, along with evidence of usewear or retouch was recorded.

Figure 4. 11 A sample of heaphyite blades from the West Coast.

Table 4. 11 Summary of West Coast Blades

Assemblage	Reference Number	Material	Weight(g)	Length(mm)
Buller, West Area	MT4-140-11	Heaphyite	55.1	82.00
Buller, West Area	MT5-25-3	Heaphyite	24.33	55.4
Buller, West Area	MT1-26-1	Heaphyite	40.48	81.12
Buller, West Area	MT1-1-i-1	Heaphyite	60.23	91.12
Buller, West Area	MT5-20-1	Heaphyite	27.72	89.1
Buller, West Area	MT4-410-8	Heaphyite	23.12	69.26
Buller, West Area	MT2-29-1	Heaphyite	104.01	87.48
Buller, East Area	E-K11-2-i-17-1	Heaphyite	51.82	83.56
Buller, East Area	E-AD44-2-i-12-1	Heaphyite	48.81	47.14
Heaphy	A-F26-2-i-3-1	Heaphyite	72.44	88.47
Heaphy	C-G38-2-iii-3-2	Heaphyite	42.73	66.31

In total, there were only 11 blades uncovered during the 2004 excavations at Buller and Heaphy. Seven were from the Buller West Area, two from the Buller East Area and two from Heaphy. As shown in Table 4.1 all blades were made of heaphyite and ranged in size from 47.14 mm in length to 91.12 cm in length. The relatively low number of blades at these two West Coast sites probably indicates that blades are a regional artefact.

Drill points

Following the morphological criteria outlined by Smith, Campbell and Bristow (Smith *et al.* 1996:9), Drill points are defined as pieces of stone, which have a triangular cross section, sides that are reworked and shaped to a tapered point, and evidence of retouching on at least two sides. Maximum length, width, and thickness were measured for all drill points using the procedure outlined earlier for the flake and adze assemblages.

Figure 4. 12 A sample of drill points from the West Coast

Table 4. 12 Summary of West Coast drill points

Assemblage	Reference Number	Material	Weight	Length
Buller, West Area	MT4-456-6	Argillite	6.11	53.4
Buller, West Area	MT4-445-11	Argillite	1.98	26.46
Buller, West Area	MT4-440-13	Argillite	2.08	23.15
Buller, West Area	MT4-443-33	Argillite	6.22	29.55
Buller, West Area	MT4-446-28	Argillite	18.56	64.86
Buller, West Area	MT4-115-1	Argillite	8.66	44.9
Buller, West Area	MT5-48-1	Argillite	5.98	38.47
Buller, West Area	MT4-446-53	Argillite	8.61	34.23
Buller, West Area	MT4-423-7	Heaphyite	2.74	20.82
Buller, West Area	MT4-447-17	Heaphyite	1.62	19.04
Buller, West Area	MT4-15-3	Heaphyite	11.06	41.88
Buller, West Area	MT1-14-2	Heaphyite	23.21	44.29
Buller, West Area	MT4-443-20	Quartz	5.12	36.24
Buller, West Area	MT4-446-3	Obsidian	30.11	58.07
Buller, West Area	MT4-350-30	Chalcedony	12.25	39.62
Buller, West Area	MT4-357-2	Chert	7.97	31.49
Buller, East Area	E-AD32-2-i-5-2	Heaphyite	11.72	42.63
Heaphy	C-F38--1-i-3-i	Heaphyite	12.63	46.09

In total, 18 drill points were found at the 2004 excavations of Buller and Heaphy. At Buller, 16 were from the West Area, one from the East Area, and 1 drill point was found at Heaphy. The low number of drill points found in the East Area and Heaphy are more likely to be a reflection of the relatively small amount of excavated square metres opened up rather than the lack of manufacturing tools at these site. The Canterbury Museum assemblage contained at least two drill points from Heaphy, and later excavations at Buller uncovered even more drill points in the East Area. Most of the drill points at Buller were made of argillite, with heaphyite being the second most common drill point material.

Hammer stones

Hammer stones are one of the poorly represented stone manufacturing tools in the New Zealand archaeological literature, despite their functional importance in the manufacturing of other stone tools. A hammer stone is a cobble of hard stone material such as hydrogrossular garnet, limestone or quartzite. It is a stone manufacturing tool used to strike flakes off a core or stone tool. Buller and Heaphy yielded a small sample of hammer stones. This is also the case in other sites (e.g. McGovern-Wilson, Allingham, Bristow and Smith 1996: 168-173; Wilson 1999; Trotter 1979).

Two hammer stones were uncovered at the 2004 excavation of Heaphy. One was made of argillite and the other was made of hydrogrossular garnet. Three hammer stones were found at the Buller 2004 excavation, and they were all made of hydrogrossular garnet. Their weights and lengths are presented in Table 4. 13.

Table 4. 13 Summary of hammer stones found at Buller and Heaphy

Assemblage	Identification	Material type	Weight (g)	Length (mm)
Heaphy	A-D27-2-i	Argillite	288.74	74.48
Heaphy	R39-2-ii	Hydrogrossular Garnet	792.25	99.34
Buller West Area	MT4-47-1	Hydrogrossular Garnet	35.58	68.78
Buller West Area	MT4-61-1	Hydrogrossular Garnet	61.94	76.68
Buller West Area	MT5-50-i	Hydrogrossular Garnet	178.29	97.32

Stone grinding tools

In this analysis, stone grinding tools incorporates abraders, files, hoanaga. Stone grinding tools are manufacturing tools used for various functions which include manufacturing of fish hooks, shaping lithic tools, and polishing. They are usually made of a relatively coarse stone material like sandstone or shist.

Table 4. 14 Summary of stone grinding tools found at Buller and Heaphy

	Material type		
Assemblage	**Sandstone**	**Shist**	**Total**
Buller East Area	2		2
Buller West Area	7	2	9
Heaphy	3	1	4
Total	12	3	15

A summary of the stone grinding tools is presented in Table 4. 14. From the 2004 excavations, 11 stone grinding tools were found at Buller – two from the East Area and nine from the West area. Four grinding stones were uncovered at Heaphy. Most of these grinding stone tools were made of sandstone, and about a fifth of them were made of shist. The weights and lengths of the stone grinding tools are presented in Table 4. 15, and they range in weight from 7.53g to 127.33g.

Table 4. 15 Stone grinding tools at Buller and Heaphy

Assemblage	Identification	Material type	Weight (g)	Length (mm)
Buller West Area	MT4-347-1	Sandstone	7.53	38.11
Buller West Area	MT4-415-5	Sandstone	8.97	46.42
Buller West Area	MT4-416-2	Sandstone	44.44	52.02
Buller West Area	MT4-370-3	Sandstone	52.12	79.71
Buller West Area	MT4-352-18	Sandstone	5.96	30.36
Buller West Area	MT5-415-6	Sandstone	8.37	44.05
Buller West Area	MT4-415-2	Sandstone	4.17	46.29
Buller West Area	MT4-26-1	Shist	41.66	77.31
Buller West Area	MT6-28-1	Shist	71.56	86.31
Buller East Area	E-AB47-2-i	Sandstone	56.07	39.64
Buller East Area	E-AB47-2-i	Sandstone	36.08	43.93
Heaphy	C-D38-2-iii	Sandstone	127.33	114.56
Heaphy	A-H26-2-ii	Sandstone	54.01	76.72
Heaphy	A-H27-2-ii	Sandstone	31.19	46.28

Cores

Cores are defined as a lump of stone marked with negative flake scares, which do not fit into any of the any other artefact categories investigated in this thesis. In this context, a core refers to a *non-tool* artefact with negative flake scares. Cores may be discarded after the required flakes have been removed, or they may be intended to be shaped further into a core tool such as an adze or chisel. In the present core analysis, we are only analysing the cores that have been discarded prior to the process of being shaped into a tool. This is because stone tools made from cores (such as adzes and chisels), are discussed separately in this thesis.

The analysis of cores is a significant contribution to lithic analysis, because they provide information about technological and manufacturing techniques, along with information about stone sourcing networks. When combined with spatial data, the study of cores can provide some useful information about stone working at a site. However, to provide a comprehensive study of cores in this thesis would have made this thesis too big. It is proposed that future studies of lithics from Buller and Heaphy provide a more substantial analysis of cores. Presented here is some basic, preliminary data of cores uncovered during the 2004 excavations at Buller and Heaphy.

Table 4. 16 Number of cores at Buller and Heaphy

	Buller East Area		Buller West Area		Heaphy		Total
Material	Count	Percentage	Count	Percentage	Count	Percentage	Total
Argillite	2	8.70	27	18.12	3	8.33	32
Basalt			2	1.34			2
Chert			2	1.34			2
Greywacke			1	0.67			1
Heaphyite	15	65.22	43	28.86	19	52.78	77
Nephrite			1	0.67			1
Obsidian	3	13.04	29	19.46	7	19.44	39
Porcellanite			2	1.34			2
Quartz			35	23.49	7	19.44	42
Sandstone			1	0.67			1
Schist			2	1.34			2
Silcrete			1	0.67			1
Unknown	3	13.04	3	2.01			6
Total	23	100	149	100	36	100	208

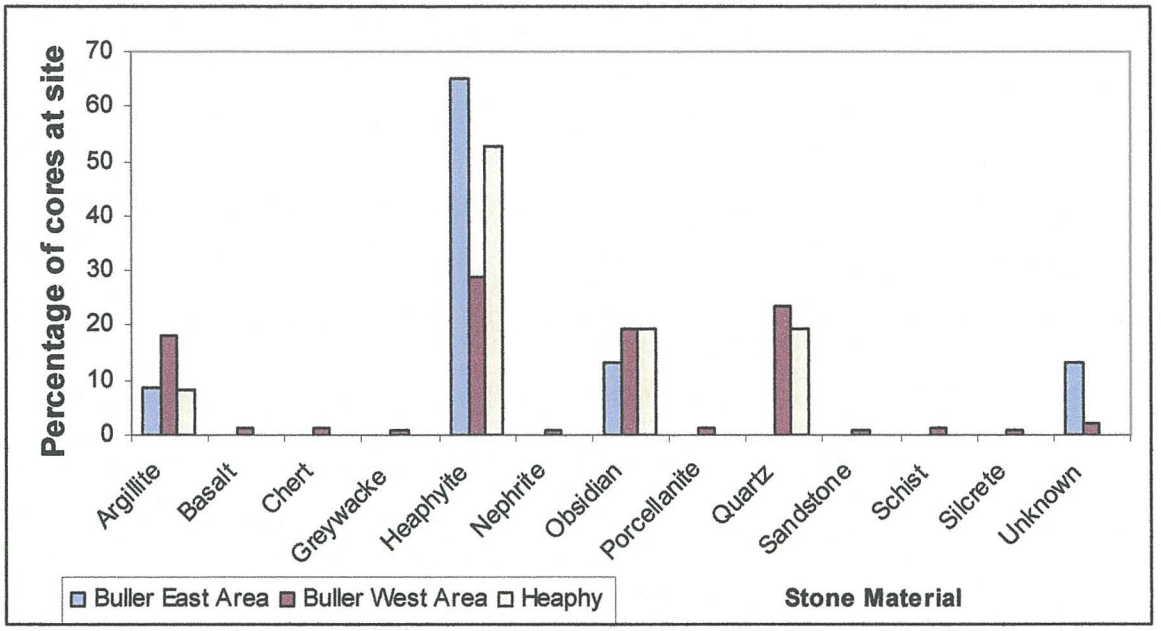


Figure 4. 13 Percentages of cores in each material type at Buller and Heaphy

There were 208 cores uncovered during the 2004 excavations at Buller and Heaphy. From Buller, 149 were from the West Area, 23 were from the east area and 36 cores were from Buller. The numbers of cores and their material types are summarised in Table 4. 16. Cores were represented in a number of stone materials which is shown in Figure 4. 13. Because there were such large difference in the amount of square metres excavated between the assemblages, this reflected large difference in assemblage size. In order to compare the proportion of cores in different materials, the numbers were converted into percentages per site. At Buller and Heaphy, Heaphyite was the most common core material followed by obsidian and argillite. Interestingly, there was also a large proportion of quartz cores found at these two sites.

Other artefacts: summary

The stone tools discussed in this analysis were: blades, drill points, hammer stones, stone grinding tools and cores. They were analysed here because the spatial distribution of these stone tools, especially the stone manufacturing tools will provide some information about the activity areas within the site.

Buller 2005 Assemblage

Most of this chapter has focused on the analysis of material culture from the 2004 excavations at Buller and Heaphy. Up to this point, the material culture analysis has been done by the author. In addition to the 2004 material culture assemblage, the following chapter also incorporates the data from the 2005 excavations at Buller. The Buller 2005 material culture assemblage was not analysed by the author as part of this thesis. The reason for incorporating the Buller 2005 data here is because the hand excavated units from 2004 only provided 23m², and the author needed spatial data from a larger excavated area.

The 2005 excavation was held as part of the Otago Archaeology Field School in February-March 2005. The author was involved in the 2005 excavation as a field demonstrator and research assistant. Following the three week field school excavation, all the material was brought back to the Otago Archaeology Lab and processed by the 2005 ANTH 405 fieldschool students. All the material was washed, a primary analysis was undertaken to distinguish artefacts into material type and artefact type and the items were weighed. The methodology employed was the same as for the 2004 lab method. Data from the primary sorting was entered into an excel spread sheet, and it is this data that the author will incorporate into the spatial analysis. The Buller 2005 excavation uncovered 48m². These squares are located in the East Area, in the vicinity of the hand excavated 2004 units (see Figure 4. 14). The preliminary results of the material culture analysis are presented in the following section.

Some of the considerations of using the Buller 2005 data include the fact that only the preliminary data is available from Buller 2005. Therefore, things like the flakes and adzes have not been analysed to the same detail as the 2004 material. Also, several people have been involved in the primary sort of the 2005 data, so inter-observer differences need to be taken into consideration.

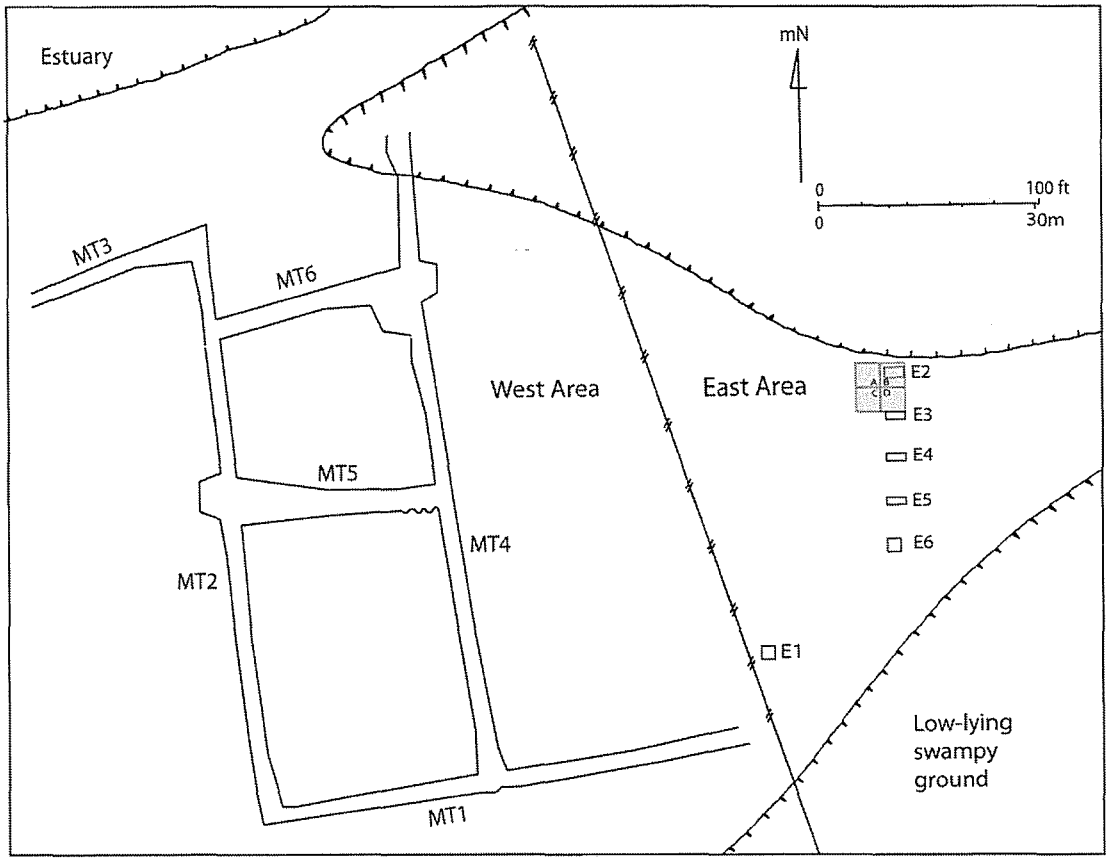


Figure 4. 14 Map showing 2004 and 2005 excavation units at Buller. East and West areas are separated by a paddock fence. In the East Area, squares E1-E6 are the 2004 hand excavated units. In the West Area, MT1-MT6 represent machine excavated trenches. The shaded squares labelled A,B,C, D in the East are 2005 excavation areas (from Jacomb *et al.* 2004:4:4).

Buller 2005 results

Flakes

As shown in Table 4.17, over 3000 flakes were uncovered during the Buller 2005 excavation. The trends are similar to the 2004 flakes data, in that the most common flakes were made of heaphyite followed by argillite and then obsidian.

Table 4. 17 Summary of flakes and debitage from Buller 2005 excavation

Raw Material	Artefact Type							
	Flake tool		Unmodified Flake		Debitage		Total	
	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Argillite	77	742.52	1101	1768.52	158	498.57	1336	3009.61
Basalt	1	4.39	2	1.77	1	1.44	4	7.6
Chert	2	12.27	27	71.31	13	13.91	42	97.49
Greywacke			6	46.85	8	47.81	14	94.66
Heaphyite	53	1442.87	986	3638.28	287	689.3	1326	5770.45
Mica					1	0.16	1	0.16
Nephrite	8	18.07	9	21.73	68	299.76	85	339.56
Obsidian	28	495.98	117	202.44	76	87.72	221	786.14
Quartz	2	4.5	42	213.29	61	159.38	105	377.17
Sandstone	1	8.02	14	31.98	17	35.13	32	75.13
Schist					2	3.23	2	3.23
Silcrete			4	19.41	6	7.9	10	27.31
Slate					2	4.52	2	4.52
Bowenite					1	0.24	1	0.24
Total	172	2728.62	2308	6015.58	701	1849.07	3181	10593.27

Adzes

Nine adzes were uncovered during the Buller 2005 excavation. Four of these were completed nephrite adzes found in an adze cache, and the other five adzes were preforms found in other areas of the site. In addition to the four nephrite adzes, there was a stone tool made of red argillite also found in the adze cache. It is in the form of a curved, hook like shape, and is possibly an ulu.

Table 4. 18 Summary of adzes from Buller 2005 excavation

Raw Material	Artefact Type							
	Adze		Adze Preform		Stone tool		Total	
	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Argillite			3	84.63			3	84.63
Nephrite	4	338.16					4	338.16
Red Argillite					1	29.76	1	29.76
Unknown			2	256.87			2	256.87
Total	4	338.16	5	341.5	1	29.76	10	709.42

Table 4. 19 Buller East, combined adzes from Buller 2004 and 2005

Raw Material	Artefact Type	n.	Total
Argillite	Adze	1	
	Adze Fragment	50	
	Adze Preform	3	
Argillite Total			54
Basalt	Adze Fragment	0	
	Adze Preform	1	
Basalt Total			1
Nephrite	Nephrite Adze	4	
	Nephrite Adze Fragment	5	
Nephrite Total			9
Unknown	Unknown Material Adze	0	
	Unknown Material Adze Fragment	1	
	Unknown Material Adze Preform	3	
Unknown Material Total		4	4
Grand Total			68

The combined adzes from the 2004 and 2005 excavations are shown in Figure 4.1. When the adzes, adze fragments and adze preforms are combined from the 2004 and 2005 excavations in the East Area, there is a total of 68 items.

Other artefacts

The Buller 2005 excavations uncovered twenty blades, five drill points, 15 stone grinding tools, 66 cores and three hammer stones of unknown material was found. The frequencies of each artefact type, and the raw material that each artefact is made of is shown in Table 4. 20 .

Table 4. 20 Number of blades, drill points, stone grinding tools, hammer stones and cores from the Buller 2005 excavation

Raw Material	Artefact Type					
	Blade	Drill Point	Stone grinding tool	Hammer stone	Core	Total
Argillite	4	3			27	34
Chert					2	2
Granite			1			1
Greywacke			1			1
Heaphyite	14	1			27	42
Obsidian	2				4	6
Quartz					2	2
Sandstone			6			6
Schist			1			1
Schist			2			2
Silcrete					1	1
Unknown		1	4	3	3	11
Total	20	5	15	3	66	109

Buller 2005 assemblage summary

The Buller 2005 excavation was incorporated into this study because 23m² of hand excavated material was uncovered in the 2004 excavations. Adding the 2005 data was beneficial because it incorporates a larger area for spatial analysis and a bigger lithics assemblage.

Recommendations and future studies for Material culture

Buller and Heaphy are two sites that contain a rich collection of artefacts. The potential for further lithics studies in this area is wide and broad. This thesis mainly focuses on the spatial and social interpretations of the artefactual assemblage. Because of the scope of this study, it was not feasible to go into to much detail expect for aspects of material culture that are related to the present discussion. Several other variables were recorded during the process of data collection process, but they are not reported here because they were not relevant to the present discussion. Such variables include, for the flakes, the presence of hammer dressing, polish and cortex, and which material types these variables were most frequent in. For the adzes, other variables were recorded, including manufacturing technique, portion, presence and form of reworking, presence of haft polish and additional other observations. It is expected that future research reports will present some of the findings of the material culture in more detail.

Chapter 4: Summary

This chapter began with a literature review of studies that have connected lithics and spatial analysis in New Zealand and the Pacific. This was followed by a comprehensive lithics analysis from the 2004 excavations Buller and Heaphy. The lithics data was presented here in three sections: flakes, adzes and other artefacts. In addition to the assemblages from the 2004 excavations at Buller and Heaphy, the last part of this chapter presented a summary of the material culture from the 2005 Buller excavations. This assemblage was not analysed by the author, but was incorporated here because it will be used in the spatial analysis data in the next chapter.

The material culture analysis in this chapter is the first phase of the three step approach. In the following chapter, Chapter 5, I continue into the second phase the spatial analysis of Buller and Heaphy.

Five

Spatial Analysis

Studied in their proper context, as part of the site, region and time to which they belonged, they can reveal much about human technological achievements, knowledge and use of raw materials, ingenuity and changing fashions (Davidson 1984:61).

The primary aim of this thesis is to investigate the material culture and the organisation of space at Buller and Heaphy. This chapter is the second part of a three step approach to link data from New Zealand archaeology with social discussions about space. The previous chapter has provided an artefactual analysis from Buller and Heaphy, and the present chapter will take the artefact results and analyze them in the context of intra-site spatial organisation. The following chapter (Chapter 6) will interpret the material culture and spatial data from Buller and Heaphy. It will then discuss that information in the context of some of the ideas presented in Chapter 2. In relation to this thesis, spatial archaeology can best be defined by Clark (2007:9):

> Spatial analysis deals with human activity at every scale, from the traces and artefacts left by them or the physical infrastructure that accommodated them, to the environments that impinged upon the interaction between all these aspects (Clarke 1977:9).

One of the important aspects of this definition is that it links the concept of space with every aspect of human activity. It indicates how space is important to our understanding of human cultures and human activities. Spatial archaeology has been discussed in earlier chapters, especially in relation to social space, (Chapter 2), and in relation to lithics (Chapter 4). This chapter does not provide any further review of spatial archaeology. Instead, it will present the spatial results of the archaeology data from Buller and Heaphy. This chapter will discuss the spatial analysis in a site by site basis. Firstly, I will discuss the spatial results of Heaphy, followed by Buller. Because the excavation methods varied between the East and West areas of Buller (consequently affecting the spatial results), I have discussed the East Area and West Area of Buller in separate sections. This chapter is split into three sections: 1. Heaphy,

2. Buller East and 3. Buller West. Within each of these sections, the spatial results are presented and discussed in the following subsections:

1. Features
2. Formal artefact types
3. Flake tools
4. Cores
5. Unmodified flakes and debitage.

Non flake and flake debitage

In the previous chapter, I provided a flake analysis in which I differentiated between flake tools, unmodified flakes and debitage. The West Coast sites were rich in lithic material, and the different types of flakes and debitage was one of the important aspects of investigating the material culture at Buller and Heaphy. For the purposes of the material culture analysis, it was important to separate the flakes and debitage into these three separate categories in order to understand and analyze the lithics more thoroughly.

However, for the spatial analysis, a different set of variables were needed in order to understand the spatial distribution of features and artefacts. For the spatial analysis, three key aspects of spatial distribution were investigated: 1) Features, 2) Formal tool types, 3) By-products of manufacture. Firstly, features were investigated in their own context as an individual layer of spatial information.

Secondly, the distribution of formal artefact types were overlaid onto the features and investigated both in their own context, and how they are associated with the spatial patterning of the features and other artefacts. There were two aspects to the formal tools distribution. The first aspect includes all the formal tools discussed in Chapter 4 – adzes, adze fragments, adze portions, blades, drill points, hammer stones, stone grinding tools and minnow lures. The second part defines all the "Flake tools" as formal tools. That is, flake tools are flakes that have edge wear and retouch. Effectively, they have been used functionally as a tool. In this context, they are differentiated from unmodified flakes and debitage which are the by-product of stone tool manufacture.

Thirdly I investigate the spatial distribution of by-products of stone tool production. These include cores, unmodified flakes and debitage. In this context, cores are defined as a stone with negative flake scars which has been discarded prior to the process of being shaped into a tool. Unmodified flakes and debitage were categorised together as by-products of stone tool manufacture, and presented here as one category.

Features

Features are defined as non portable evidence of human activity. Some examples include pits, house floors, fire hearths, building foundations, trenches, etc. For the 2004 excavations at Buller and Heaphy, the two key types of features uncovered were fire features and post holes.

A fire feature is the evidence of a burning event. They are typically circular in shape and characterized by ash, charcoal and fire cracked rocks. In this thesis, fire features are given a generic description because it was difficult to ascertain their function – whether they were cooking ovens or hearths for heating and warmth. At Heaphy during the 1960s excavation, Wilkes and Scarlet (1967) defined three different types of hollow: oven hollow, hollow with stone lining and hollow with overhanging lip. The first two refer to different oven types while the later is oven-like in shape but is filled with a substratum yellow rather than charcoal (Wilkes and Scarlet 1967:193).

For the 2004 excavations at Heaphy, I have presented the fire features in a similar context to that of Wilkes and Scarlet. Only the first two types of oven hollows were uncovered during the 2004 excavations. They are illustrated in the maps as oven hollows and hollows with stone lining. For the Buller 2004 excavations, I used the same features key as for Heaphy. At Buller, there were several oven hollows, some with fire cracked rocks, but nothing that resembled a hollow with clear stone lining.

A post hole is described as a hole cut into the earth or rock which at one time held an upright post. The timber posts themselves rarely survive in the archaeological context, but they do leave a negative impression in the soil where they once stood. When alignments of postholes of similar shape, texture, and depth are observed in an excavation, interpretations can be made about the possibility of structures that once

stood at the site. A cluster of several post holes in the same location of varying sizes may be indicative of several structures that may have stood at that same location over a period of time. At Buller and Heaphy, several post holes were uncovered of various size and shape. Later in this chapter, the patterning and spatial distribution of these post holes will be presented.

Spatial Analysis at Heaphy

The 2004 excavations at Heaphy uncovered 40m². These areas were chosen according to their relation to the previous 1960s excavations and the threat to erosion. The directors of the 2004 excavation were able to identify the location of the 1960s excavations based on test squares excavated around Area C. Three Areas were excavated and named Area A, C and E. They were three of six plotted areas for planed potential excavation – the other three Areas were not opened during the 2004 season. These Areas are shown in Figure 5. 1. Within each Area are 1 x 1 metre squares marked with their appropriate grid co-ordinates.

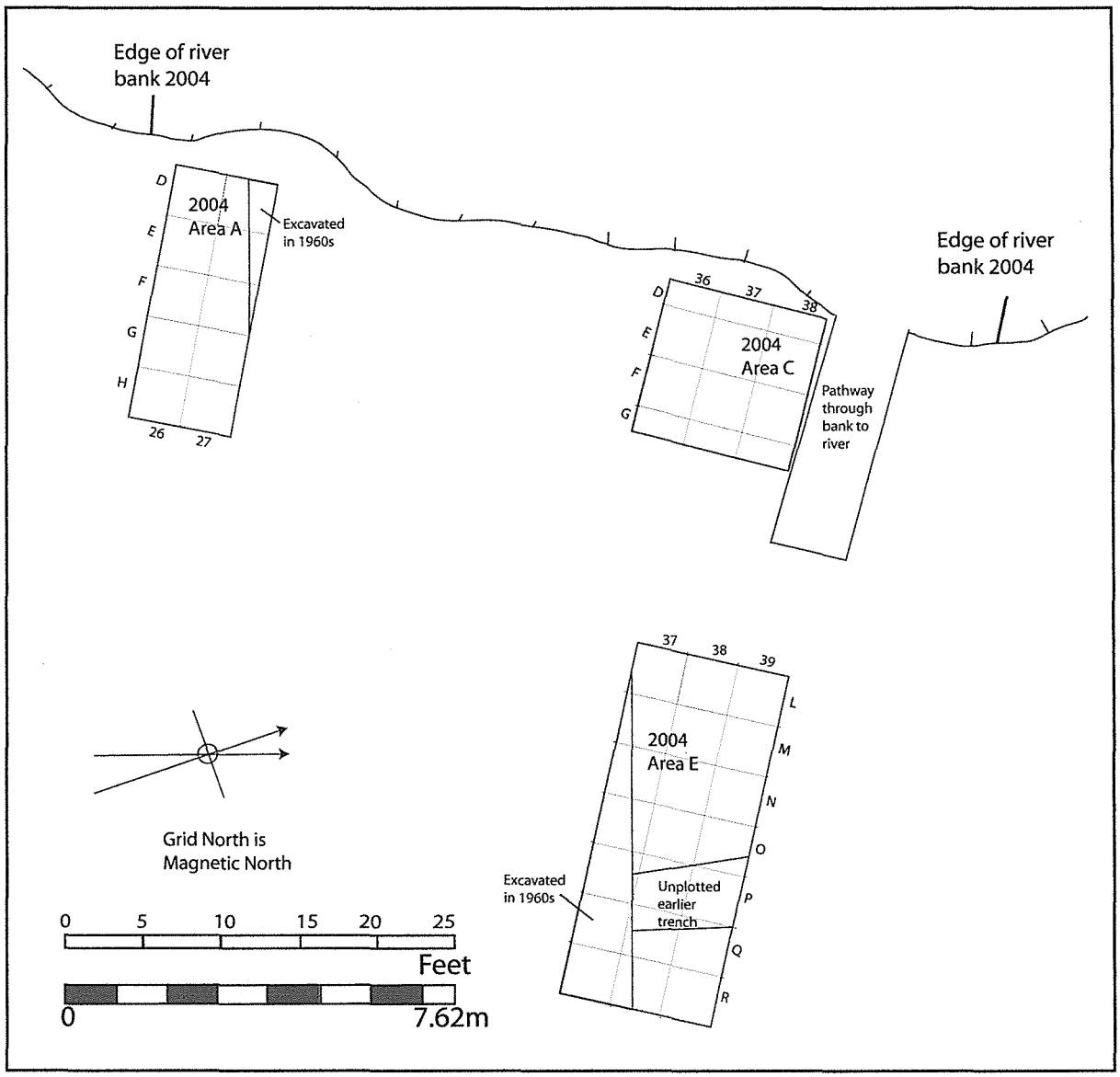


Figure 5. 1 Plan of 2004 excavation units at Heaphy and their relationship to the eroding river bank

Figure 5.1 shows the plan drawn by Wilkes and Scarlett in the 1960s overlaid with the three areas that were excavated in 2004.

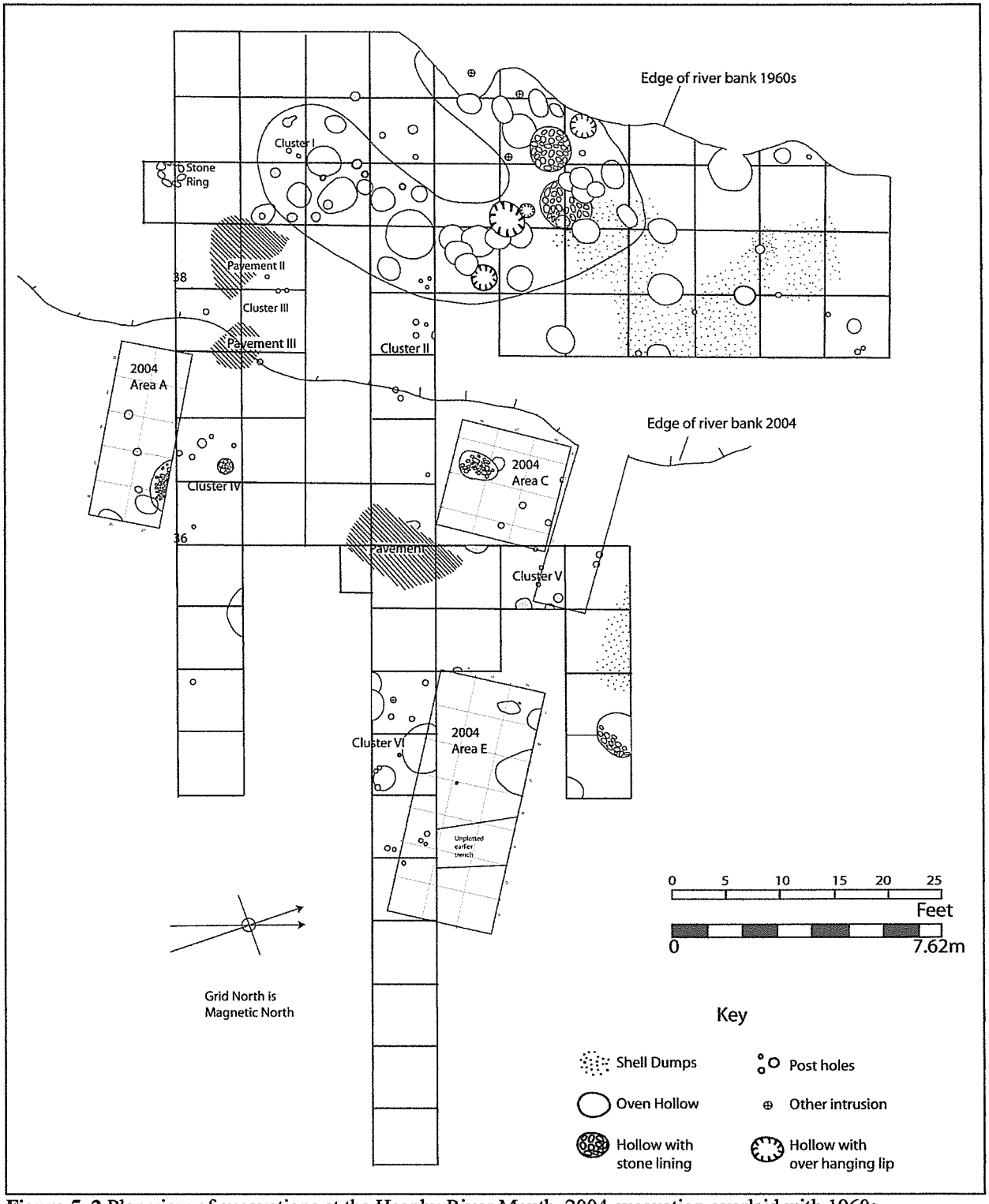


Figure 5. 2 Plan view of excavations at the Heaphy River Mouth, 2004 excavation overlaid with 1960s excavation ns. Areas A, C and E are 2004 excavations (c.f. Wilkes and Scarlett 1967:187).

Features

For the 1960s excavations, Wilkes and Scarlett (1967) describe a concentration of oven hollows in the northern part of the site, which has now eroded away. They also noted clusters of post holes described according to their location, size and fill

material. There were also three intrusions that appear to be post holes, but they contain possible wedging stones for posts or to act as "pointers" for the relocation of caches. In addition, they also found stone features, including a ring of stones in the northwest corner of the excavation and three separate areas thought to be stone pavements (Wilkes and Scarlett 1967:195).

The features of the 2004 excavation are also shown in Figure 5. 2. A large amount of the site has been lost to erosion since the 1960s excavations. The concentration of fire features was evident in northern part of the site (now washed away), but this pattern does not continue into the southern part of the site. The 2004 excavation was smaller in size than the 1960s excavations, and thus the amount of spatial data produced was comparatively small. In Area A, there is a stone lined oven and three post holes. Area C uncovered another stone lined oven and three post holes. In area E, there are three areas where the soil was different in texture and colour to that of the occupation layer. It is uncertain whether these different coloured areas are similar to the hollows found by Wilkes and Scarlett in the 1960s.

The posthole patterns are not really clear enough to provide any detailed information about possible structures at the site. They do appear to be in clusters rather than in geometric lines. In addition, they appear to be in close proximity with the oven features. The fact that post holes were present, and are in close association with other features is a clear indication that there were structures of some description in this area. For this site, I was not able to determine any readily predictable building structures, but this is a common problem in many archaeological sites

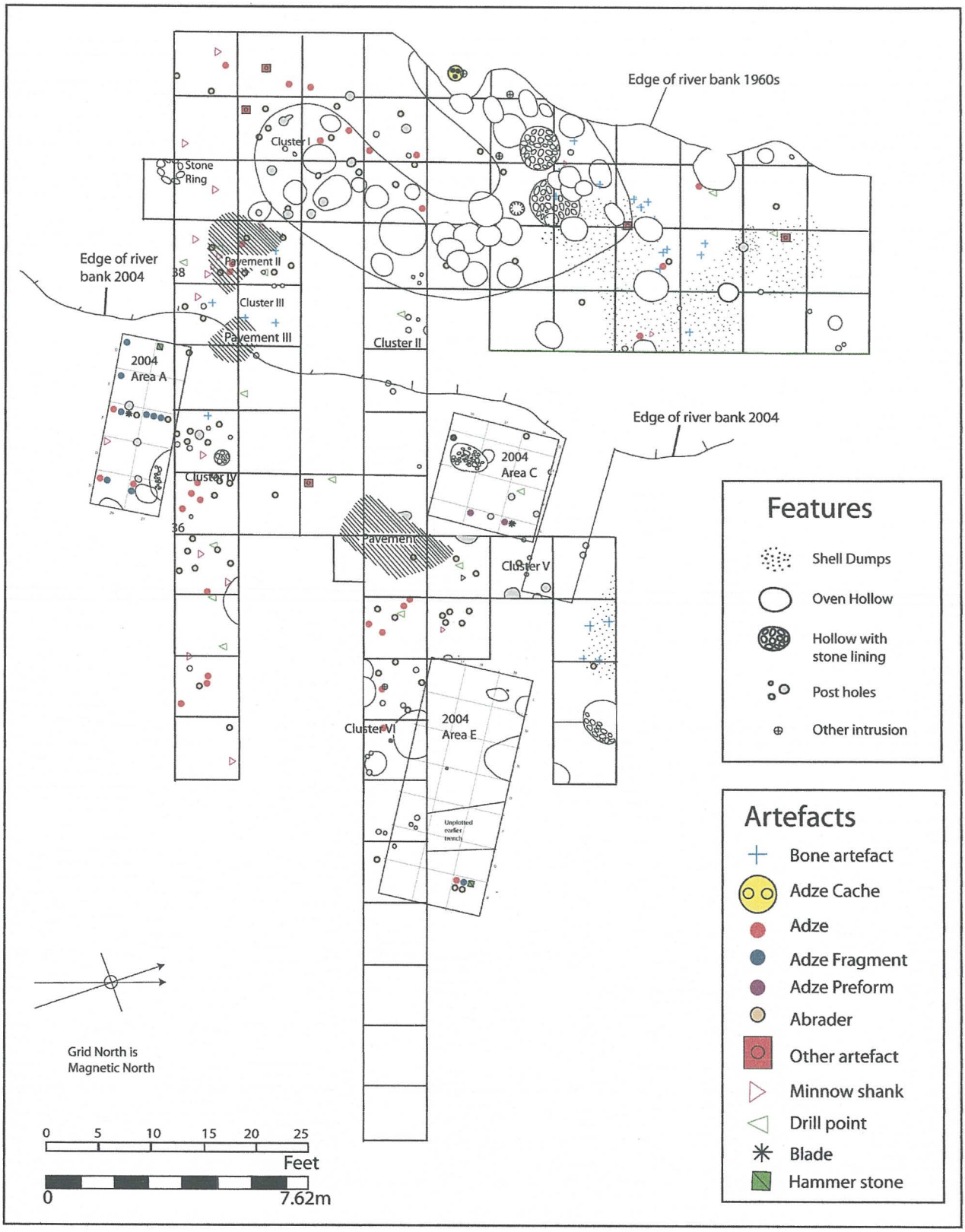


Figure 5. 3 Distribution of formal tools at Heaphy

The formal tools from the 2004 excavation are plotted according to which 1x1 metre square they were found in. Their distribution is shown in Figure 5. 3. The symbols used in this plan are the same as the symbols used in Wilkes and Scarlett (1967: Figure 4). In addition, I have added some other artefact types such as adze fragments, adze preforms, blades and hammer stones. Colour was added to the symbols for easier observation.

There are several bone artefacts in the northern part of the site. Two bone artefacts were also located in the southern part of the site during the 1960s, but none were uncovered during the 2004 excavations.

Complete adzes, shown as red dots were found throughout the site. Wilkes and Scarlett didn't differentiate whether their adzes were complete, preform or portions of adzes, so it is difficult to determine what kind of adzes they are. There is a clustering of adze fragments found in Area A. This is also an area where high concentrations of argillite flakes were found. An adze cache was found in the northern part of the site during the 1960s.

With regards to stone working tools, stone grinding tools, also known as abraders were found abundantly scattered throughout the site and drill points were also similarly scattered throughout. Only one hammer stone was recorded in Area E.

Minnow lure shanks were mainly concentrated in the eastern part of the site. No blades were recorded for the 1960s excavations and two blades were found in the 2004 excavation. They both appear to be in close proximity to oven features, possible evidence that some form of meat or food processing was happening in these areas.

Overall, there are two areas that appear to show a high concentration of formal artefacts. Square R39 in Area E uncovered a nearly complete reverse triangular (Duff Type 4A, or "hogback") adze, a hammer stone, an adze fragment and two grinding stones. Area A also contained a high concentration of formal artefact types.

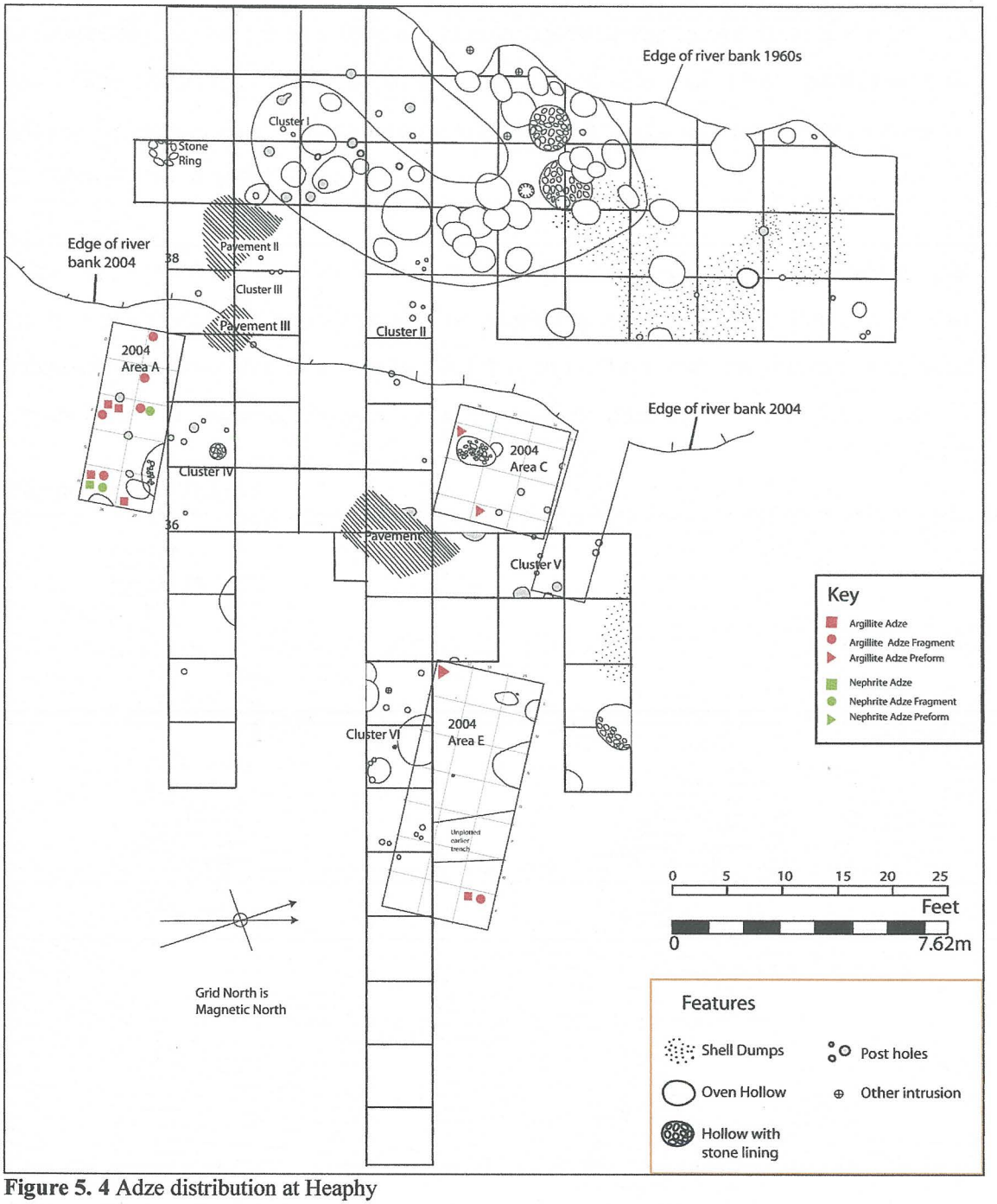


Figure 5. 4 Adze distribution at Heaphy

Adzes at Heaphy comprised two stone material types – argillite and nephrite. In Figure 4.5, the argillite adzes are shown in red, and the nephrite adzes are shown in green. Full, competed adzes are shown as squares, adze fragments are shown as circles and adze preforms are shown as triangles.

Area A appears to be a location of concentrated adzes. There are several argillite adze and adze fragments in this area. In the 2004 excavation, nephrite adzes and fragments

were only found in Area A. Since nephrite adzes are comparatively rare at Heaphy, it is interesting to observe that they are mainly concentrated in one area of the site. In the 1960s excavations there appears to be some clusters of adzes, particularly in Cluster IV (to the East of Area A) and another cluster of adzes northwest of Area E, between Area E and the pavement.

Three adze preforms were uncovered at Heaphy. They were all argillite adzes, and there doesn't seam to be any particular patterning associated with them. It is also interesting to note that other tools used for production such as abraders and drill points were also scattered throughout the site with no observable spatial patterning.

Flake tools at Heaphy

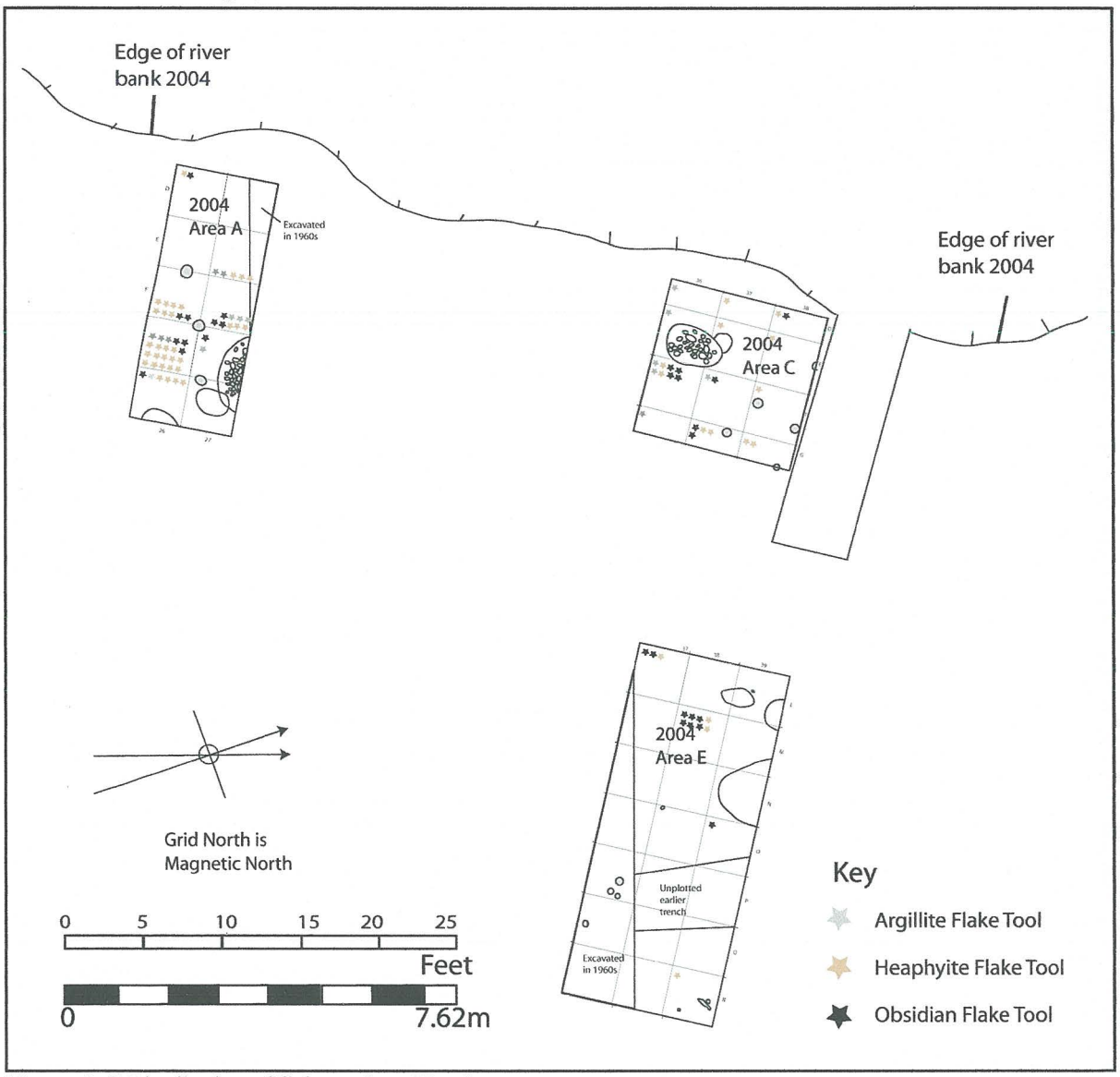


Figure 5. 5 Distribution of flake tools at Heaphy

Figure 5.5 shows the distribution of the 2004 excavated flake tools. There are concentrations of obsidian and heaphyite tools in various parts of the site. In the lower half of Area A, there is a heavy concentration of heaphyite flake tools. In square G26 alone, there are 14 flake tools, and the surrounding squares also have a high number of flake tools. This area of high concentration surrounds a stone lined oven, so perhaps there is some association between the use of flake tools for food manufacture and the oven. Heaphyite as a stone material type is used for similar functions as silcrete or chert. Some potential functions include cutting of faunal and plant material, and possibly food preparation. However, as shown earlier, there is a high number of formal artefact tools in this Area. This location appears to be a result of overlapping activity areas, where stone tool production was occurring in addition to activities associated with possible food production.

Flake tools are were found in Area C, although not in such high concentrations. There was one square, Area F36 where there were eight flake tools of various material types. Half of the flake tools in this square were obsidian. This square was located south of another stone lined oven, so there may be some association between the high concentration of flake tools and the stone lined oven. The fact that the high concentration of flakes were located south of the oven is interesting. This pattern is not seen in Area A where the flake tools surround the oven. This may be associated with a possible veranda or wall to shelter people during food production.

Compared to the other Areas, few flake tools were found in Area E. One notable exception was in square M38 where eight flake tools were found – six of these were obsidian. This high concentration of obsidian flake tools in one area is interesting. Within this vicinity, there is also a high proportion of obsidian flakes and debitage (shown in a later map). While I suggested earlier that the flake tools in Area A and C may have been associated with food production because of their association with oven features, it is possible that the flake tools in Area E are not associated with food production. This interpretation is based on the high percentage of obsidian flake tools, and they are comparatively farther away from an oven feature than the other two Areas.

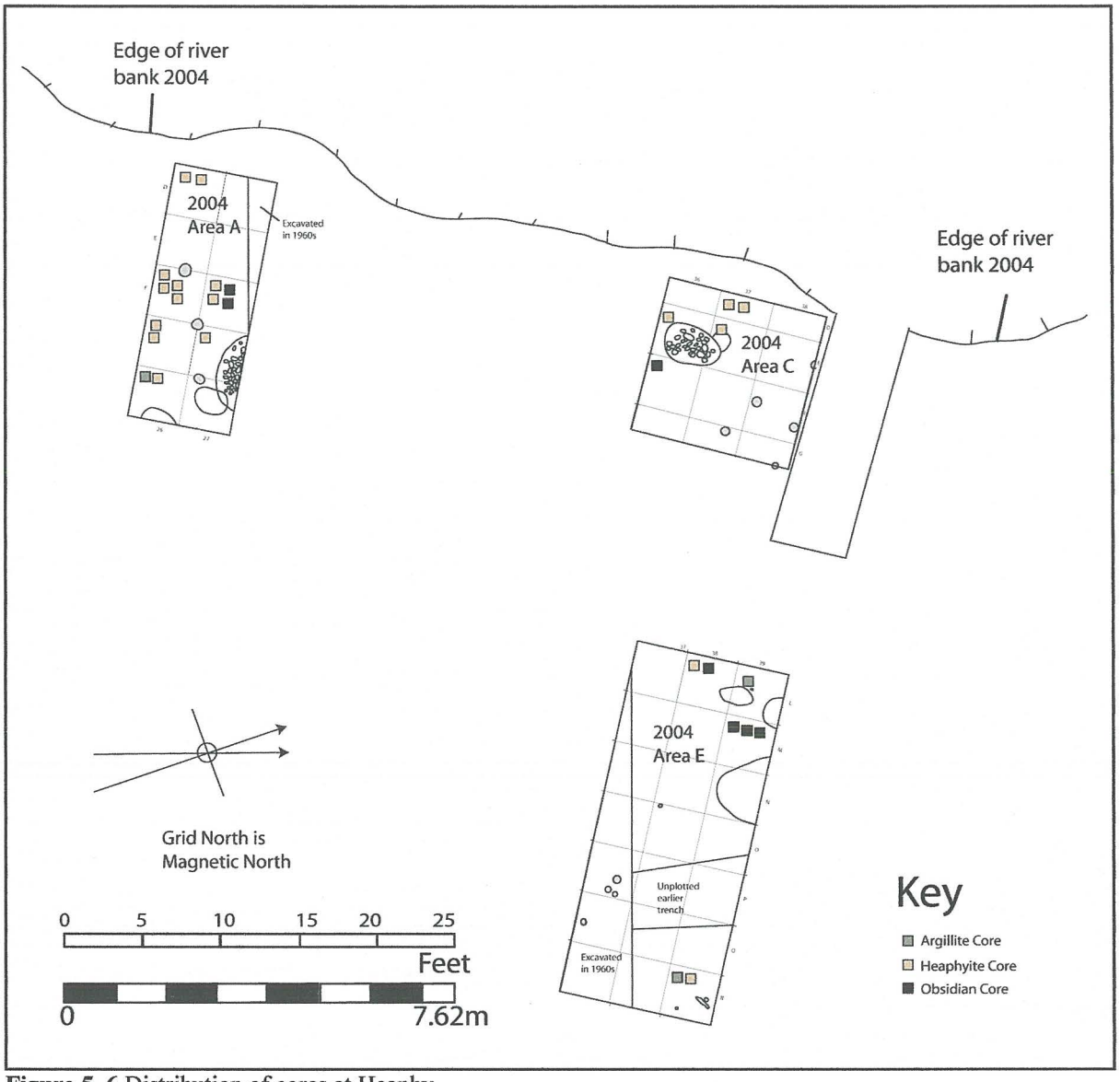


Figure 5. 6 Distribution of cores at Heaphy.

Stone cores at Heaphy appear to be concentrated in specific squares. In area A, there were several heaphyite core tools, mainly concentrated in the middle of the Area. In Area C, cores were mainly concentrated in the north-west part of the Area. In Area E, square M29 uncovered three obsidian cores. I have previously mentioned that the neighbouring square, M38 contained a high concentration of obsidian flake tools. Later, I will show that there was a high concentration of obsidian debitage and unmodified flakes in the vicinity. There appears to be some sort of activity associated with obsidian working in this location.

Flakes and Debitage at Heaphy

The following figure shows five plans of the 2004 excavation at Heaphy. Each of these plans shows the distribution of unmodified flakes and flake tools combined. The first plan shows the distribution of argillite, heaphyite, nephrite and obsidian all combined together. The subsequent plans show the distribution of each of these four material types individually.

The percentages presented here are the percentages for each individual map. For example, the map showing the argillite distribution shows the results of all the argillite unmodified flakes and debitage combined, divided into how many pieces were located in each square, and then a percentage of pieces per square was calculated from the total of the argillite pieces. These maps are based on count of items rather than weight.

Most of the unmodified flakes and debitage are located in Area A. This is the case for all material types. Area A was also rich in other artefact types including the formal tool types mentioned earlier. Area C had a medium percentage of unmodified flakes and debitage, and Area E had the lowest percentage.

Area A is a distinctive area of highly concentrated flake working. A high concentration of obsidian is observed in the northern part of Area E. This location also contained a high percentage of obsidian flake tools and obsidian cores. It is possible that this location once held some activity associated with the use of obsidian, but I am uncertain what it is. This is surprising because Area E contains very few artefacts in general.

Outside of the obsidian observation in the northern part of Area E, this Area had relatively few flakes and very few artefacts in general. It is possible that this low artefact count is because some of the squares have previously been fully or partially excavated in the 1960s, and thus, any excavation in 2004 would result in finding few artefact types. However, Area A also overlaps with the 1960s excavation, where a small corner in the north-east part of Area was previously excavated – but this area still uncovered a relatively high number of artefacts. Despite the previously excavated squares in Area E, there was still a large part of Area E which haven't been excavated, and these squares still uncovered only a small amount of artefacts.

Heaphy Summary

The Heaphy site is rich in information pertaining to the spatial organisation of activities. In this section, I have overlaid information from the 1960s excavations with the 2004 excavations. There are concentrations of fire features and post holes, and Area A appears to be a distinctive location for flake working. The distribution of formal tools are plotted from both the 1960s and 2004 excavations, and there are some noticeable patterns in their distribution. There is a high concentration of formal tools in Area A and in the south east corner of Area E. Area A has a clustering of adze fragments and a high concentration of argillite and nephrite flakes. It is possible that much of the adze reworking and recycling was occurring here.

Spatial Analysis of Buller

As discussed in Chapter 3, there have been several excavations at the Buller River Mouth Site. The first of the excavations were held in 1969 by Wayne Orchiston who summarised the results in his Phd thesis (Orchiston 1974) where he noted two cooking areas and a large amount of shell midden. Richard Walter and Chris Jacomb further directed five excavations at Buller in 2003, 2004, 2005, 2007 and 2008. The analyses of these last two excavations are still in process, but some preliminary spatial data from the 2004 and 2005 excavations is available and will be used in this chapter.

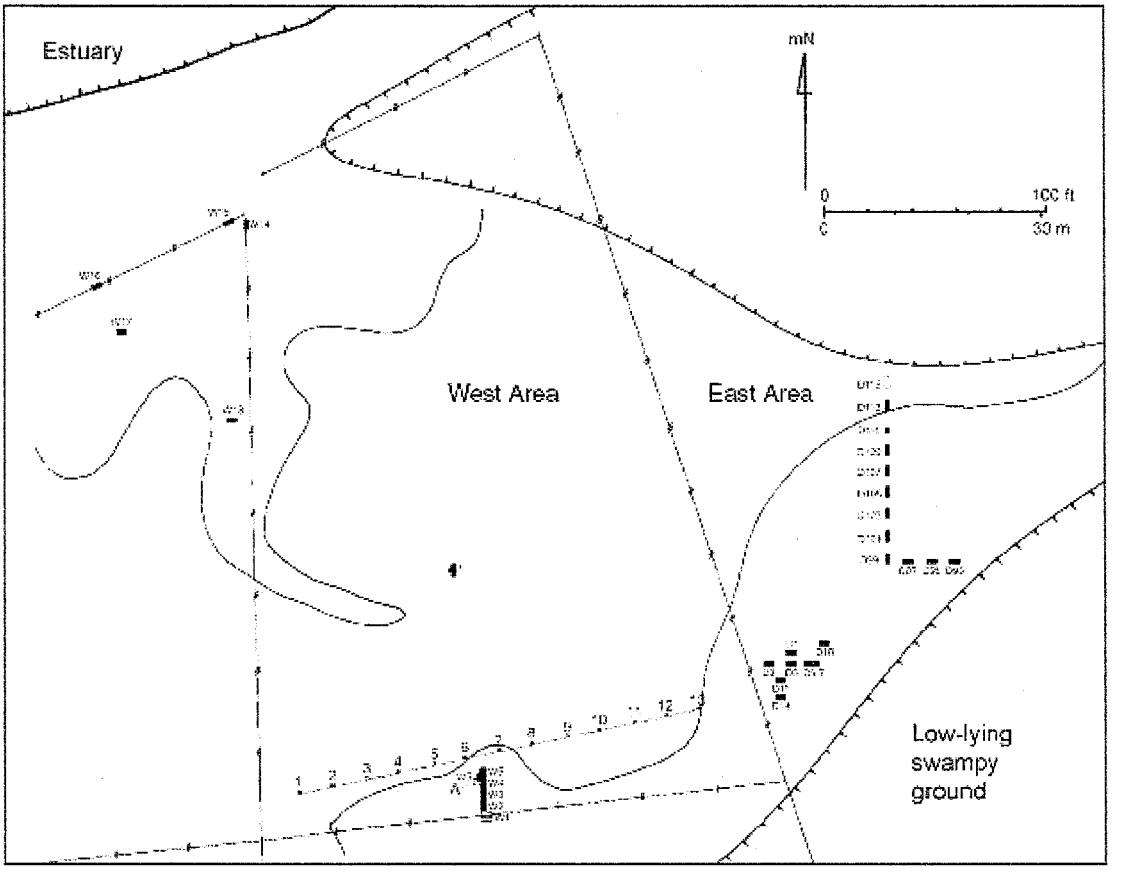


Figure 5. 8 Site map showing Walter and Jacomb's 2003 excavations and Orchiston's 1969 excavation (from Jacomb, Walter and Tucker 2004:4)

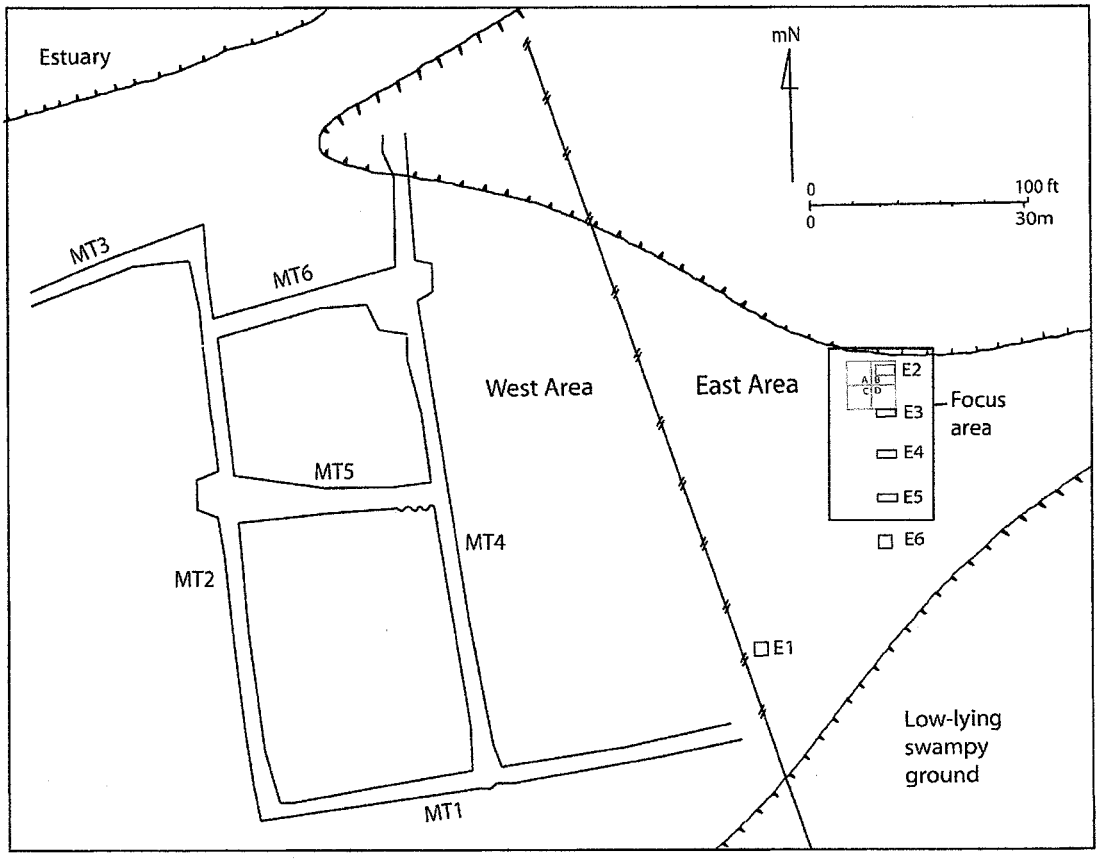


Figure 5. 9 Site plan showing the 2004 and 2005 excavation. E1-E6 refer to the hand excavation units in the East Area, and MT1-MT5 refer to the Machine Trenches in the West Area. The inserted box indicates the focus area for the present study (from Jacomb *et al.* 2004:4:4).

Figure 5. 8 shows a plan of the Buller site with Orchiston's excavation units along with the Jacomb and Walter's 2003 test squares. Figure 5. 9 shows the 2004 and 2005 excavations. In the West Area are the machine excavated trenches. In the East Area are the smaller squares excavated by hand. On the plan there is a rectangular area which was the main East Area focus in this thesis.

Method

In order to meet specific research and teaching aims, the 2004 excavation used two different approaches for excavating the West Area and the East Area. At the time, the site was considered to be potentially under threat from development and a large excavation area was opened in order to assess the significance of the site. In the West Area, a digger was employed to skim the turf off the trenches to just above the top of the cultural layer. This was closely monitored and halted if the digger's blades exposed any cultural material. Six machine trenches were excavated and labelled MT1-MT6 as shown in Figure 4. The spoil heaps of these machine trenches were sorted through, and any artefacts found in the spoil heaps were recorded to within 2.5

m of its original location within the trench. Items that were found in situ within the trench were recorded using tape and campus method to the nearest datum point. Some parts of Machine Trench 4 (MT4) showed areas of occupation horizons. These areas were of particular interest and were excavated in a more detailed manner using standard hand excavation methods.

For the spatial analysis I have selected a small part of the East Area for the main focus of my spatial analysis study. The reason for this selection is because most of the excavated units in this focus area are close together and provide a large data set for a spatial analysis study. From the 2004 excavations, hand excavated units E1 and E6 will be discussed briefly in the text, but were not included in this spatial analysis. The spatial and lithics data from these two squares was relatively minimal compared to the other squares, and they were quite a distance from the focus area. The spatial data from the West Area was gathered using different methods to those employed in the East Area so only some locations of the West Area will be incorporated into this study.

Buller East Area

This section discusses the spatial distribution of the East Area. This area was hand excavated in 2004 and 2005 by students attending the University of Otago, Anthropology Department Fieldschool (Paper ANTH 405).

Features

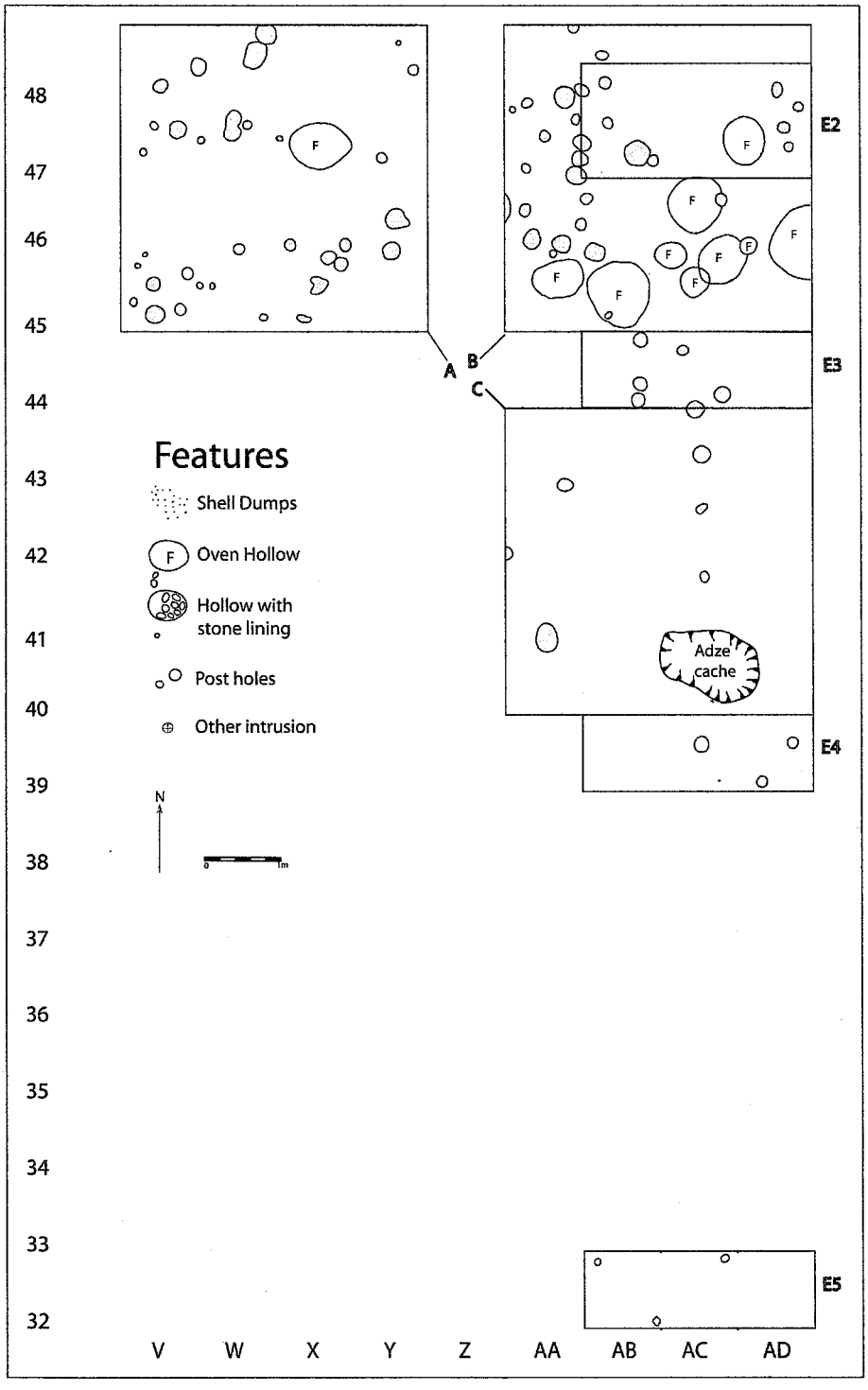


Figure 5. 10 Features in the Buller East Area

The features for the East Area are shown in Figure 5.10. Although the excavated area was small, there was still a high concentration of features. Area C uncovered an adze cache and a north-south line of post holes. Area B contained a rich concentration of fire features which overlapped each other and some post hole clusters. There is another possible north-south line of postholes in Area B. In Area A contained one fire feature and a high concentration of post holes of various sizes. There was also a concentration of smaller post holes in the north west corner of Area A which could be stake holes.

From the observations of the features it is very likely that there are some building structures in this area. I am uncertain how the stake holes correlate to the possible buildings, but they may have been a lean too, or a small structure for drying food. Fires were mainly kept outside of the house because of the smoke, so the fire features might indicate which side of the post holes is the external side.

It is interesting that the adze cache is located in the north-south line of post holes in Area C & E5. It is possible that the adze cache may have been underneath a wall, possibly for more security. A more likely possibility is that the southern most post hole in this line (located in E4) is not associated with the building structure at all.

The fire features in Area B are numerous and overlap each other throughout the spits. In addition there is a cluster of post holes in Area B. It is possible that this cluster represents a series of structures which were built in the same area over a period of time – similar to the idea that the overlapping fire in this area would have been lit at different times over a period of time.

Formal tools

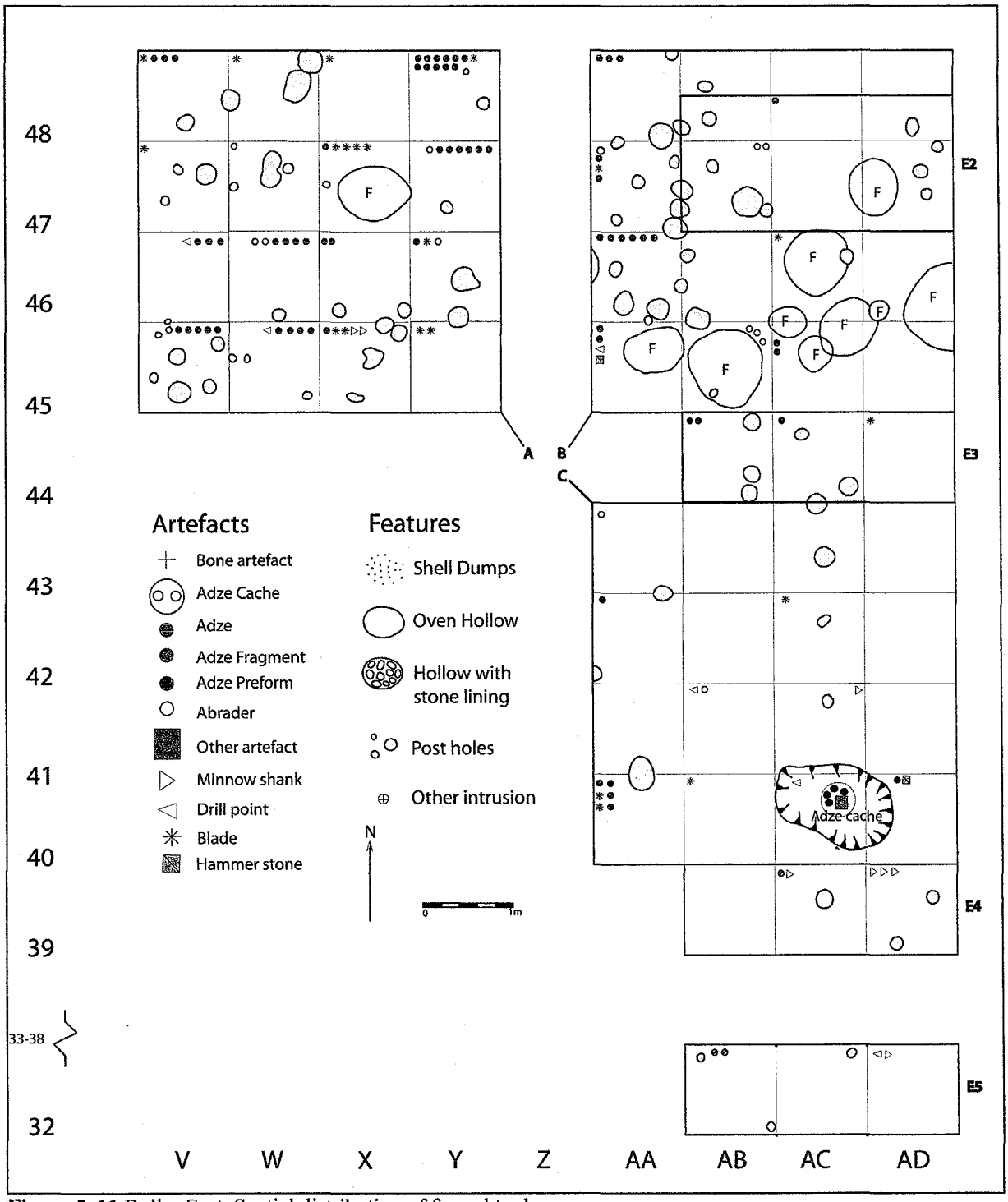


Figure 5. 11 Buller East, Spatial distribution of formal tools

The spatial distribution of formal tools is shown in Figure 5.11. There is an adze cache in the south east part of Area C. The adze cache contained four Duff Type 2 nephrite adzes and a half crescent shaped stone tool made of red argillite.

Adze fragments were quite abundant in Area A and the eastern part of Area B. This area is a possible stone working and adze recycling area. In area B there was an

abundance of oven features. Except for the eastern part of Area B, there were very few formal tools scattered amongst the oven features.

Most of Area C is barren of features and formal artefacts except for the southern part of the Area, where there was the adze cache, and in the south-east corner where a one metre unit, square AA40 uncovered two adzes, one preform, one adze fragment and two blades.

In Area A, unit X48, there was a fire feature and a concentration of four heaphyite blades. Because blades are mainly associated with the processing moa and other forms of meat, it is possible that this location may have something to do with cooking and food production. However this context is interesting because it doesn't quite fit the patterning of the other features and formal artefacts at the site. It is a stand alone fire feature as apposed to being contained within a cluster of fire features. Within a two metre radius, it is surrounded by clusters of post holes and adze fragments. Perhaps it is an internal fire feature, situated inside a building structure.

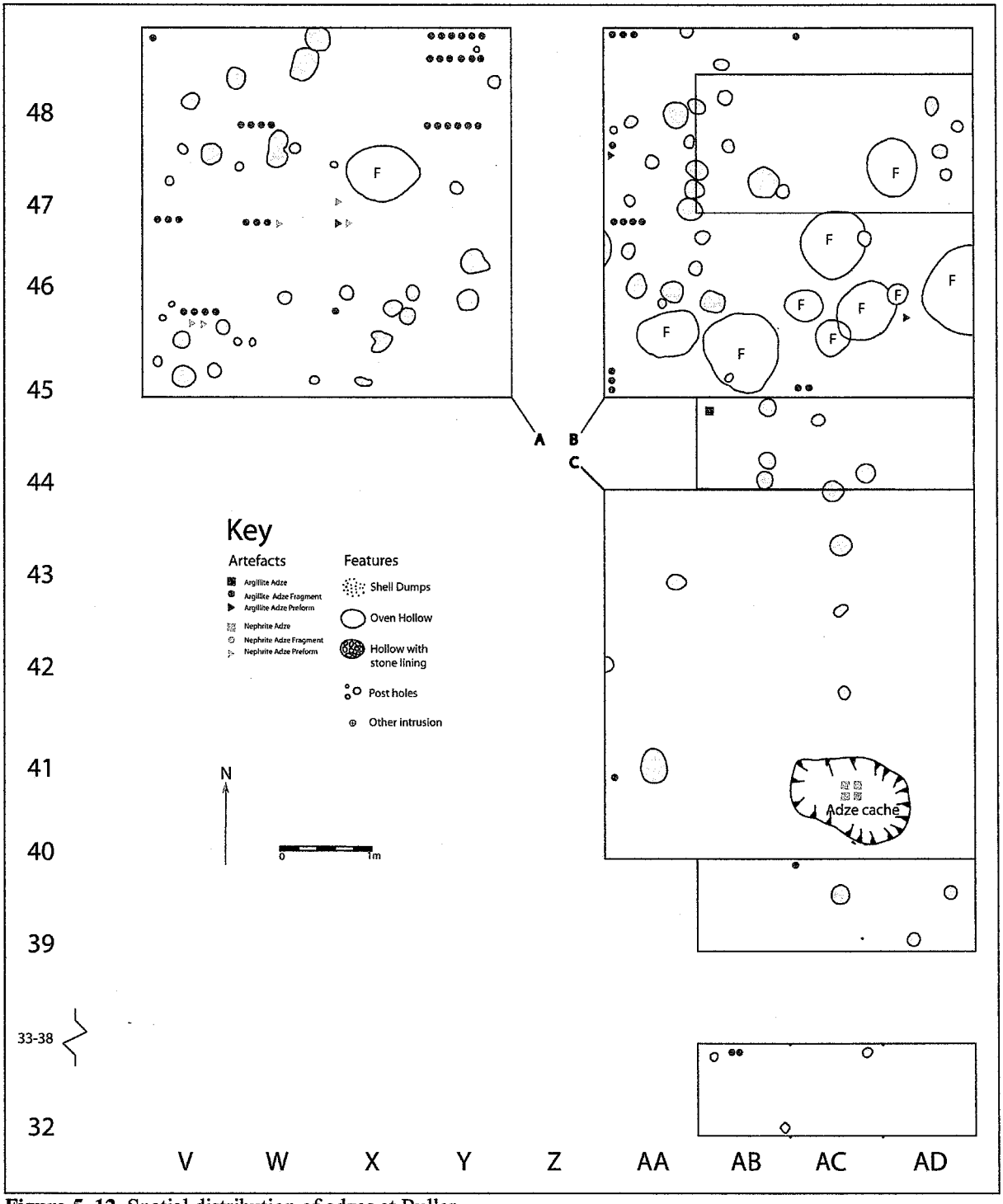


Figure 5. 12 Spatial distribution of adzes at Buller

Only five whole and complete adzes were found in the Buller East Area. They comprised the four nephrite adzes in the adze cache, and one argillite adze in square AB44.

There was a large number of adze portions and fragments. These adzes fragments varied in size but all these fragments were more substantial than an adze flake, and they comprised of various blade, butt and mid section portions. This high number of adze fragments is a possible indication that stone tools were being reused and recycled at the site. Concentration of these adze fragments are found in V45, V46, W56, W47, Y47, Y48, AA45, AA46 and AA48. In particular the north-east corner of Area A contained a significantly high amount of argillite adze fragments. There is also a high concentration of argillite flakes and debitage in this area, indicating a possible adze working and reworking area.

Adze preforms were less common, and were found mainly in Area A. They are less frequent than adze fragments which might indicate that adze production from raw stone materials was less common than adze production from recycled stone material.

Flake tools

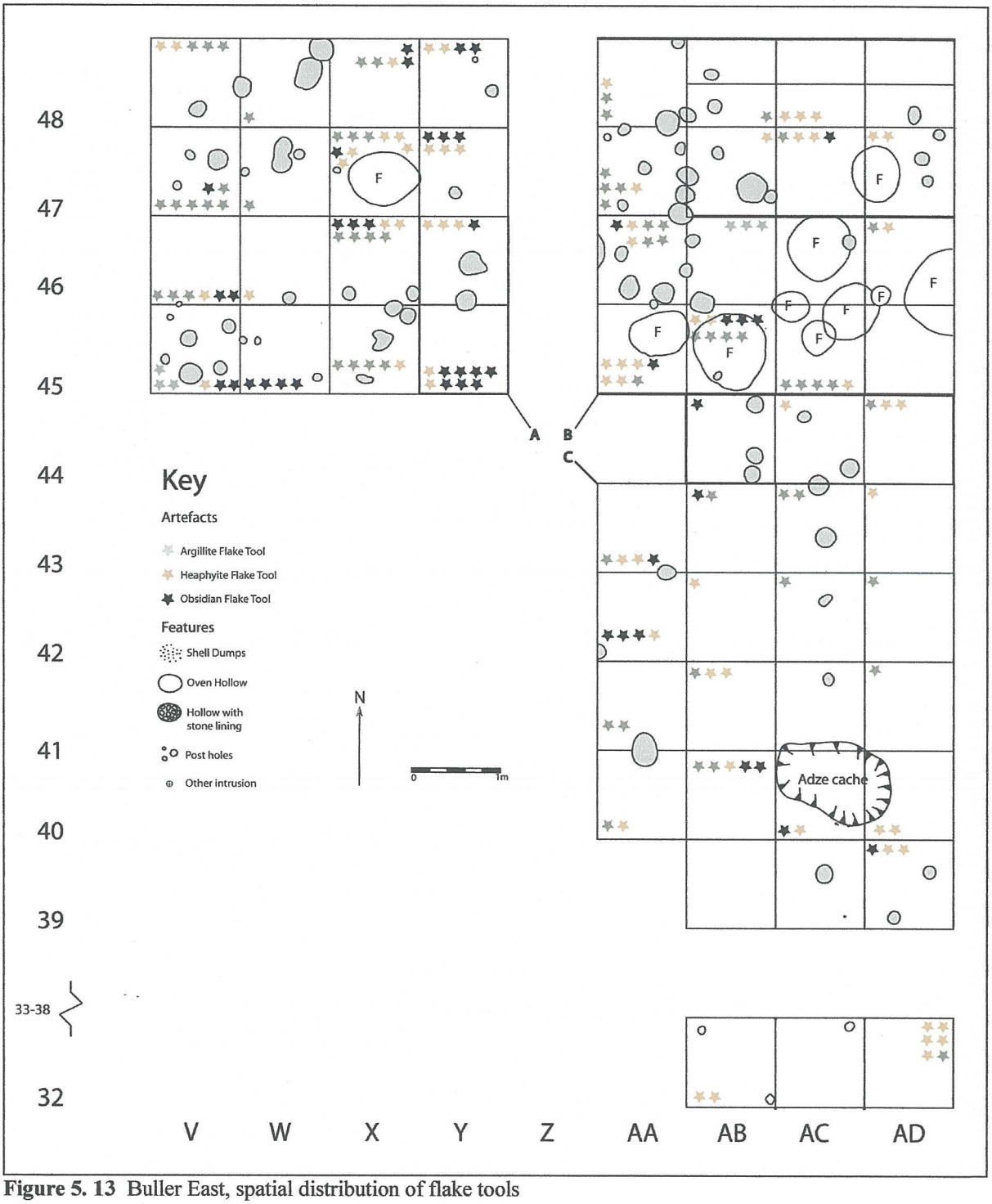


Figure 5. 13 Buller East, spatial distribution of flake tools

A large number of flake tools was uncovered in the East Area. Argillite flake tools were mainly located in the eastern part of Area A, and around the post hole clusters in the eastern part of Area E. Obsidian flake tools were located in the southern part of Area A, in the north-east corner of Area A and around a fire feature in Area B. Heaphyite flake tools are concentrated in AD32, AA45 and the eastern part of Area A.

Stone cores at Buller

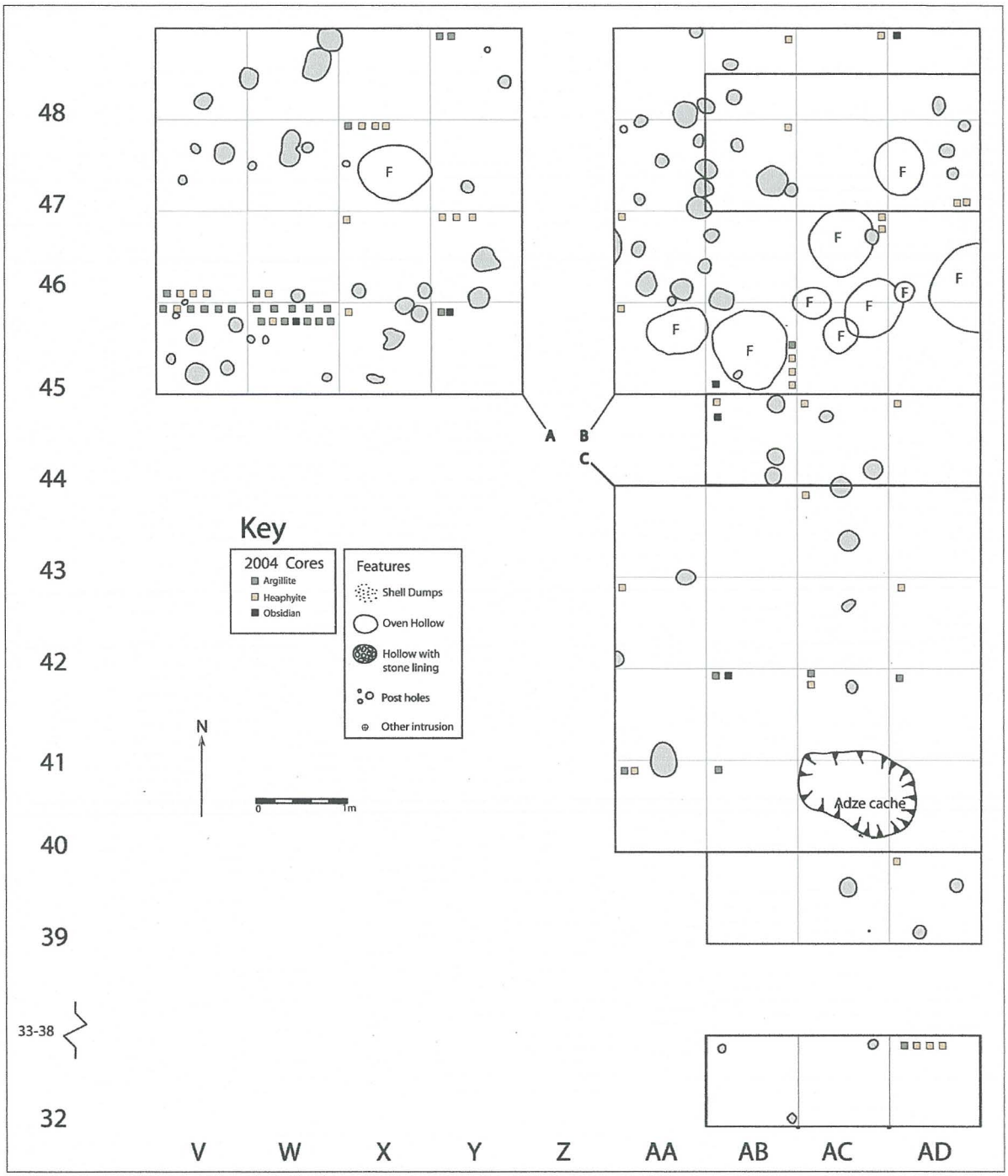
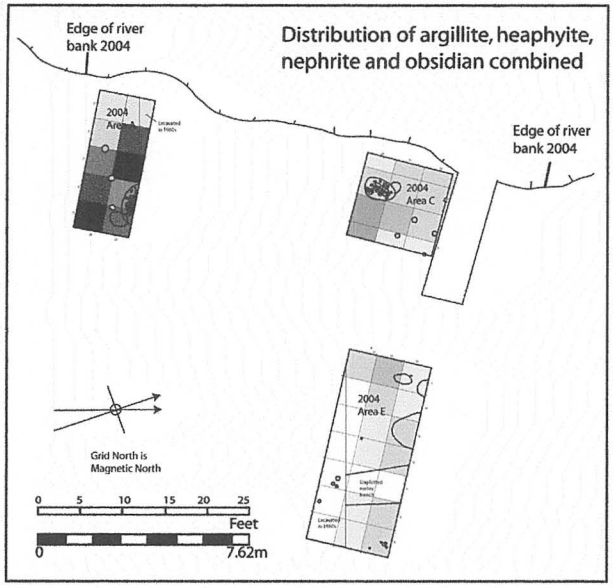
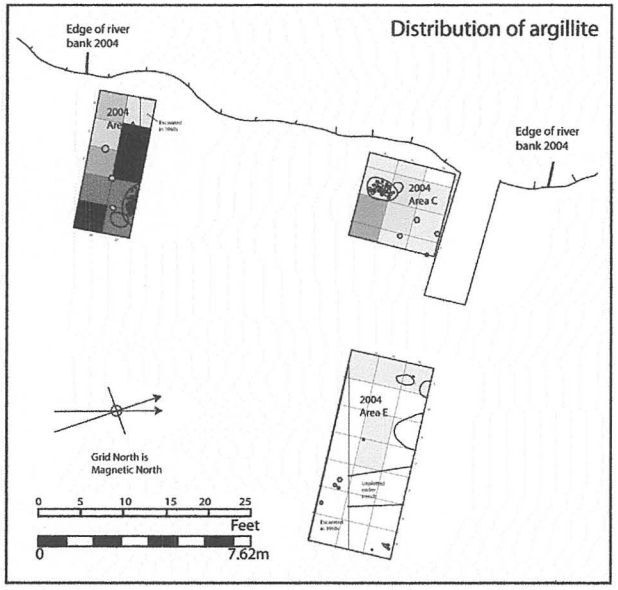
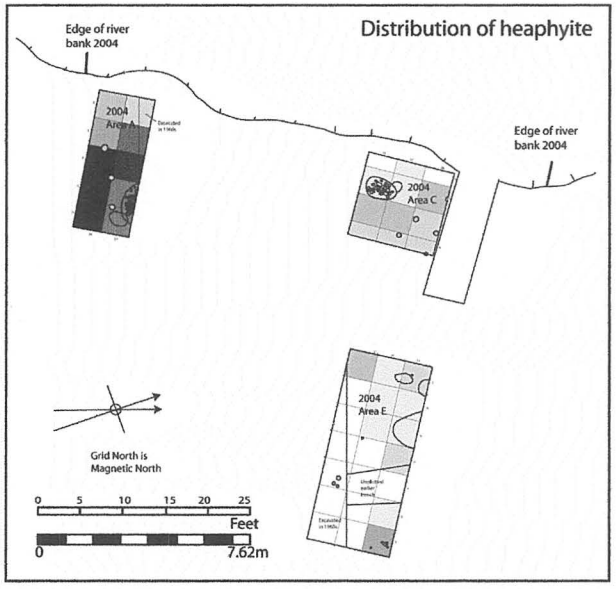


Figure 5. 14 Buller East, distribution of cores

Stone cores were mainly concentrated in the lower part of Area A. There was also a concentration of cores in AD32 and AB 45. Most of the cores are located in one part of Area A. This location also contained a post hole where a large obsidian core was found at the bottom. It is possible that this location may have been used as a storage area for storing raw materials such as cores.





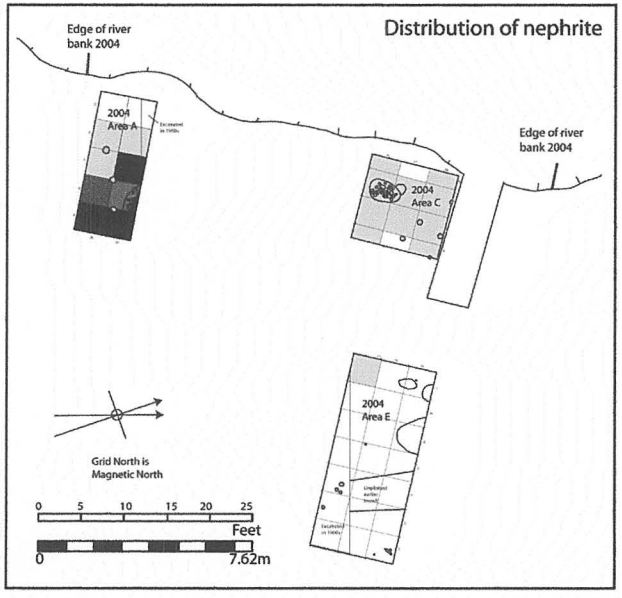


Key

- Shell Dumps
- Oven Hollow
- Hollow with stone lining
- Post holes
- Other intrusion

Artefact Distribution

- Zero
- 0-0.99%
- 1-1.99%
- 2-2.99%
- 3-3.99%
- 4-4.99%
- 5-5.99%
- 6-6.99%
- 7-7.99%
- 8-8.99%
- More than 10%



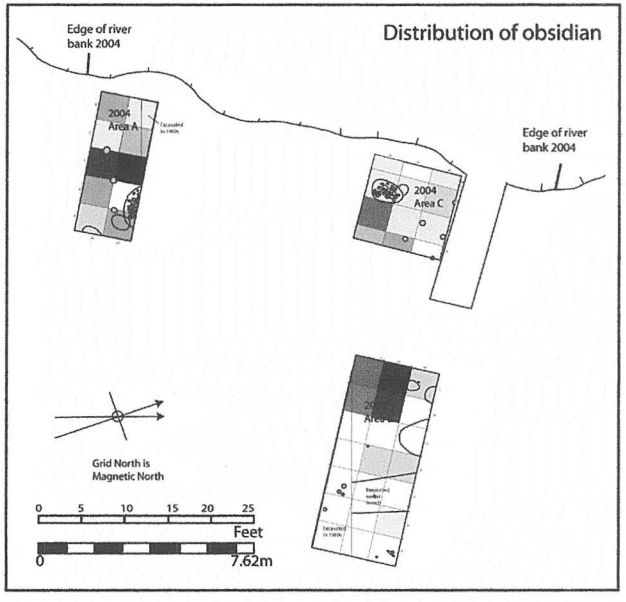
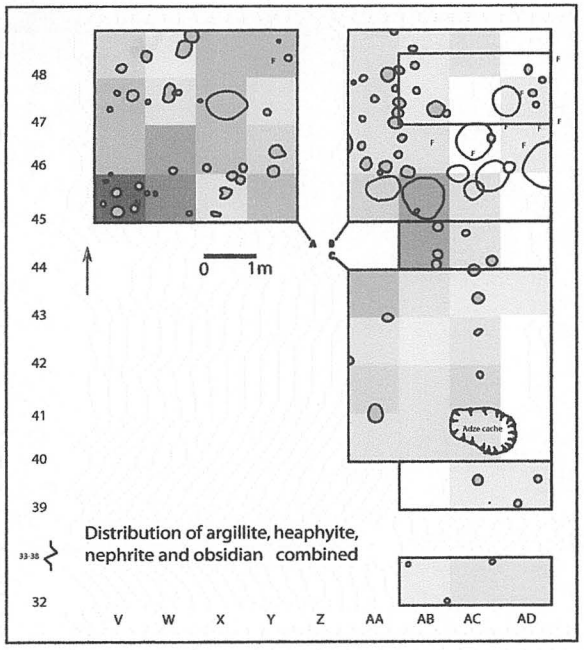
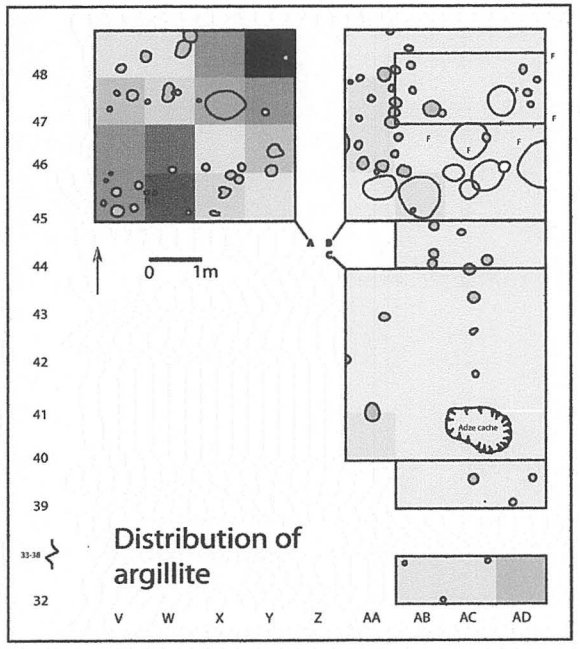
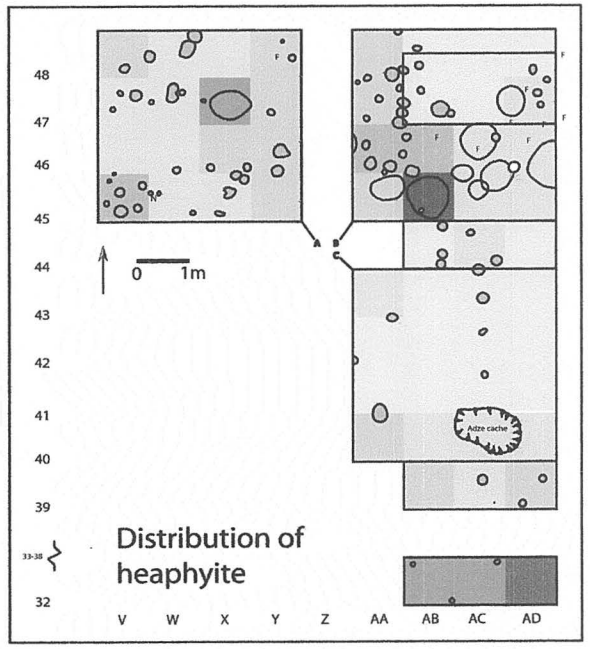


Figure 5.7. Spatial distribution of unmodified flakes and debitage. Shading represents percentage of flakes and debitage within each map







Key

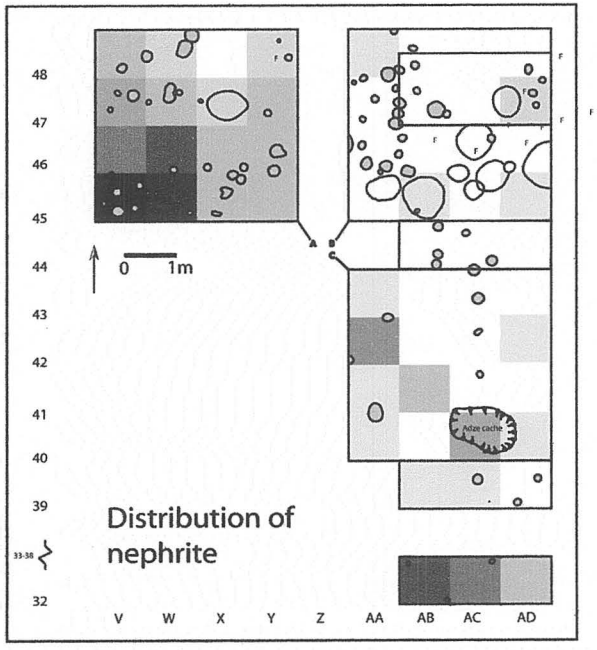
Shading

Percentage

- 0.00%
- 0-0.99%
- 1-1.99%
- 2-2.99%
- 3-3.99%
- 4-4.99%
- 5-5.99%
- 6-6.99%
- 7-7.99%
- 8-8.99%
- 9-9.99%
- 10% +

Features

- Shell Dumps
- F — Oven Hollow
- Hollow with stone lining
- Post holes
- ⊕ Other intrusion



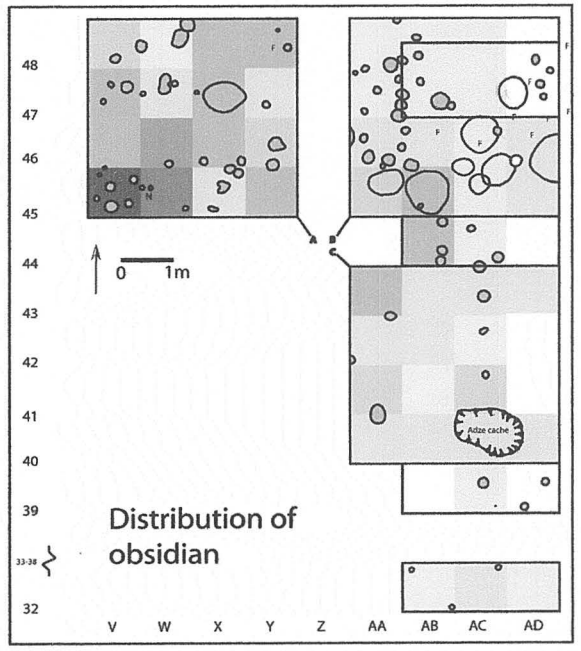


Figure 5.15. Spatial distribution of unmodified flakes and debitage. Shading represents percentage of flakes and debitage within each map

The general patterning shows a gradual decrease in flakes and debitage (for all material types) moving from east to west. The eastern part of Area A had a comparably high concentration of flakes and debitage, while the western parts of Areas B and D contained relatively few flakes and debitage.

Argillite was mostly concentrated in square Y48 and in the south-east corner of Area A. This area also contained high concentrations of argillite adze fragments and argillite flake tools. This may have been a possible location for an argillite manufacturing area.

Heaphyite was concentrated in the southern part of the plan in squares AB32, AC32 and AD32. In the northern part of the plan, there are concentrations of heaphyite in AB4 and X47. What is most interesting about these two later sites is that they both contained fire features. There may be some sort of functional association between heaphyite flaking and the fire features. Perhaps the heaphyite flakes were related to some form of food processing activity next to the fire features. Another possibility is that heaphyite flaking was undertaken close to hearths for warmth. Heaphyite is the most abundant material type on the site, it is possible that people may have tended to sit close to hearths when they were working the heaphyite.

Nephrite flakes and debitage was highly concentrated in some areas and absent in other areas. There is a comparatively small number of nephrite debitage in total, and this small number may have skewed the spatial results. Nephrite debitage was mainly concentrated in the south-west corner of Area A and in square AB32. It is proposed that these areas might be nephrite working locations. The eastern part of the plan contained very few pieces of nephrite debitage.

Unmodified obsidian flakes and debitage appeared to be quite evenly distributed throughout the East Area. There is a slight concentration of obsidian in unit V45, but no significant densities stand out. The obsidian distribution follows the general distribution, where flakes and debitage frequencies were higher in the eastern part of the plan, and fewer in the western part of the plan.

Buller East Summary

The East Area at Buller was fairly rich in features and artefacts. There were some observable patterns in the spatial distribution of features. Area A contained several post holes of various size and shape, a high concentration of artefacts and one fire feature. Area B contained a concentration of overlapping oven features and a cluster of post holes of various shape and sizes. The oven features indicate this may have been a potential fire feature. Area C contained an adze cache with four nephrite adzes and a half crescent shaped artefact made from red argillite, and a possible line of post holes.

There were also some distinctive concentrations of particular artefacts in various locations. In the north-east part of Area A, there was a concentration of argillite adze fragments, flake tools and debitage. This is a possible location for an argillite working area. Minnow lures of various stages of manufacture were found in square AD44. Concentrations of adze fragments were found in Area A, and the eastern part of Area B. These concentrations were found in amongst high concentrations of post holes. Stone working artefacts such as drill points and abraders were found juxtaposed with food preparation artefacts such as blades and flake tools indicating that parts of the site had dual activity areas. The south-east part of Area A had a high concentration of cores – a possible storage area for raw materials.

The by-products of stone tool manufacture were represented by the unmodified flakes and debitage. In the Buller East area, there was a general area showing high concentrations of flakes and debitage in the eastern part of the plan, gradually reducing to a small count of in the western part of the plan. High concentrations of heaphyite flakes were found close to oven features. Nephrite flakes were mainly concentrated in the south-east corner of Area A, and obsidian flakes were mainly located in Area A.

Buller West Area

In 2004, the West Area at Buller was excavated using a hydraulic excavator. This method was used because the site was under threat from farming development, and we wanted to make an assessment of the archaeological site before it was destroyed. Since then, the result of the machine trench excavations showed that the site was quite significant, and the site was recommended for preservation.

Figure 5. 16 Aerial photograph of the 2004 Buller excavation showing the machine trenches in the West Area and the hand excavated units in the East area.

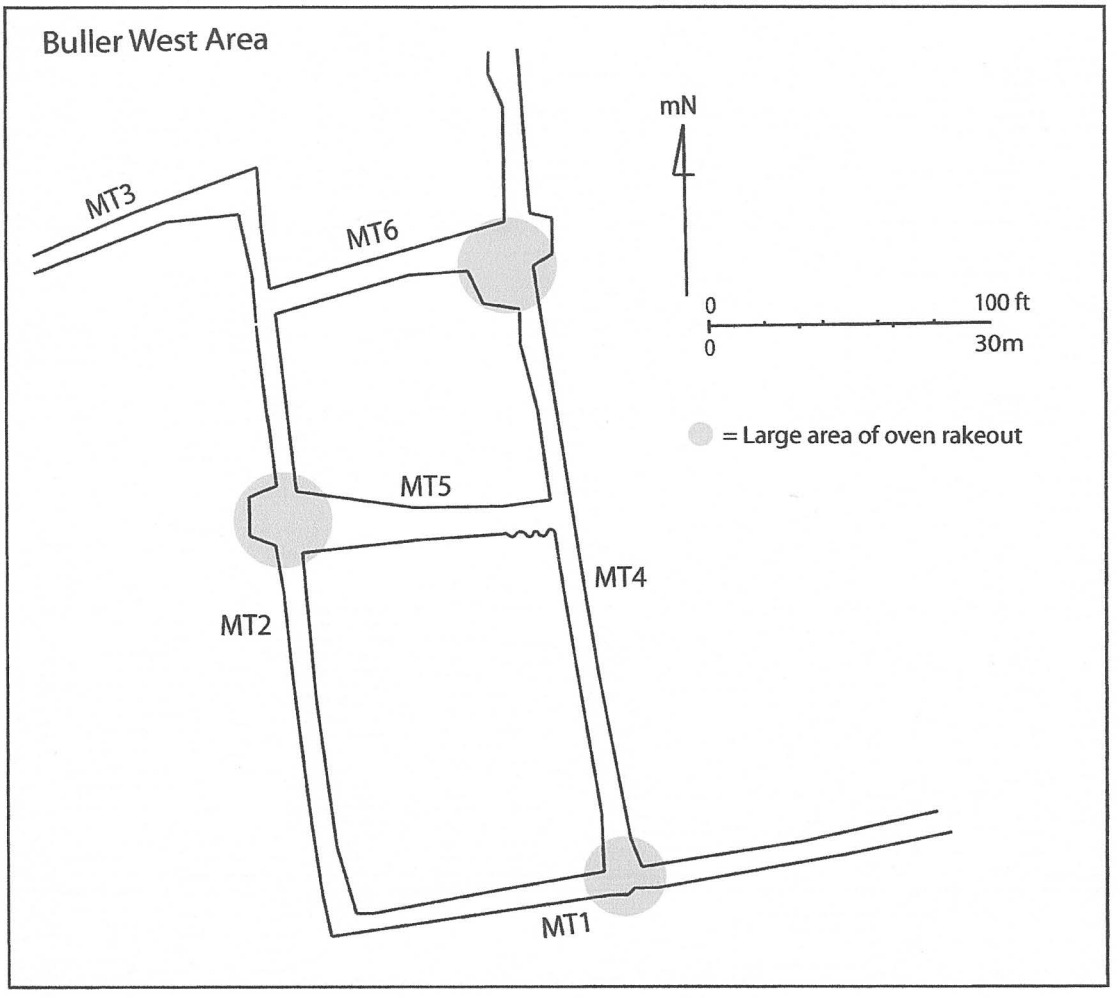


Figure 5. 17 Machine trenches in the West Area of Buller, showing patches of dark, charcoal stained oven rake-out area in grey.

Figure 5. 16 is an aerial photograph showing areas of the hydraulic excavated trenches in the West Area. A map of the machine trenches is shown in Figure 5. 17. Large patches of dark, charcoal stained soil were observable at the intersections of MT4 with MT1, MT2 with MT5 , MT4 with MT6. When these patches of dark, charcoal stained soil were uncovered, the surrounding area was widened slightly to expose the patches further. Because there were no distinctive hearth or oven features within in these areas, it is thought that these patches are areas of oven rake-out.

The 2004 excavation at Buller was only two weeks long, and there was a small team of people. Due to time constraints during fieldwork, only one of these patches was studied in detail – the one at the intersection of MT1 and MT4. A 10 metre by 25 cm trench was excavated through this intersection (See Figure 5. 20). The time constraints also meant that the spatial distribution of artefact and features in the West Area were not studied to a great amount of detail. For MT1, MT2, MT3, MT5 and

MT6, artefacts were picked out of the machine's spoil heap and recorded to the nearest 5 x 5 metre unit. Any artefacts that were lying in-situ within the trench were collected and it's location recorded by tape and compass. Most of the artefacts from the West Area were not plotted on a map, however their trench location has been recorded and shown in Table 5. 1.

Table 5. 1 Distribution of formal artefacts in West Area

Artefact Type	**Provenance**					
Artefact Type	MT1	MT2	MT4	MT5	MT6	Total
Adze			15	3	1	19
Adze Fragment	2	2	23	6	3	35
Adze Preform		2	11		3	16
Blade	2		3	2		7
Drill Point	1		14	1		16
Hammer stone			2	1		3
Minnow Lure			9	3		12
Stone grinding tool			7	1	1	9
Total	5	4	84	17	8	117

MT3 is not in this table because no artefacts were found in this trench. Although MT2 and MT4 were the longest trenches, MT2 had comparatively fewer artefacts than the other trenches. Adze fragments were found in most of the trenches. Full, complete adzes were found in MT4, MT5 and MT6. Blades were found in MT1, MT4 and MT5 indicating a possible association with food production in these areas. Minnow lures are only located in two trenches – MT5 and MT6.

Drill points were found in MT1, MT4 and MT5, and stone grinding tools were located in MT4, MT5 and MT6. One suggestion of this observation is that perhaps stone and bone manufacturing activities were localised to specific areas. However, we know from previous observations of the East Area that stone tool manufacturing tools such as drill points and abraders were randomly scattered throughout the site. It is likely that this is the case here too. Drill points are small when compared to other formal artefact types, and their small sample size may be a result of the excavation methods employed in the West Area.

Machine Trench Four

MT4 was one of the longest trenches at Buller. The different excavation methods applied to MT4 was one of the reasons why there were a higher number of artefacts recovered from this trench than the other trenches. The following maps display the features and artefactual data found in MT4.

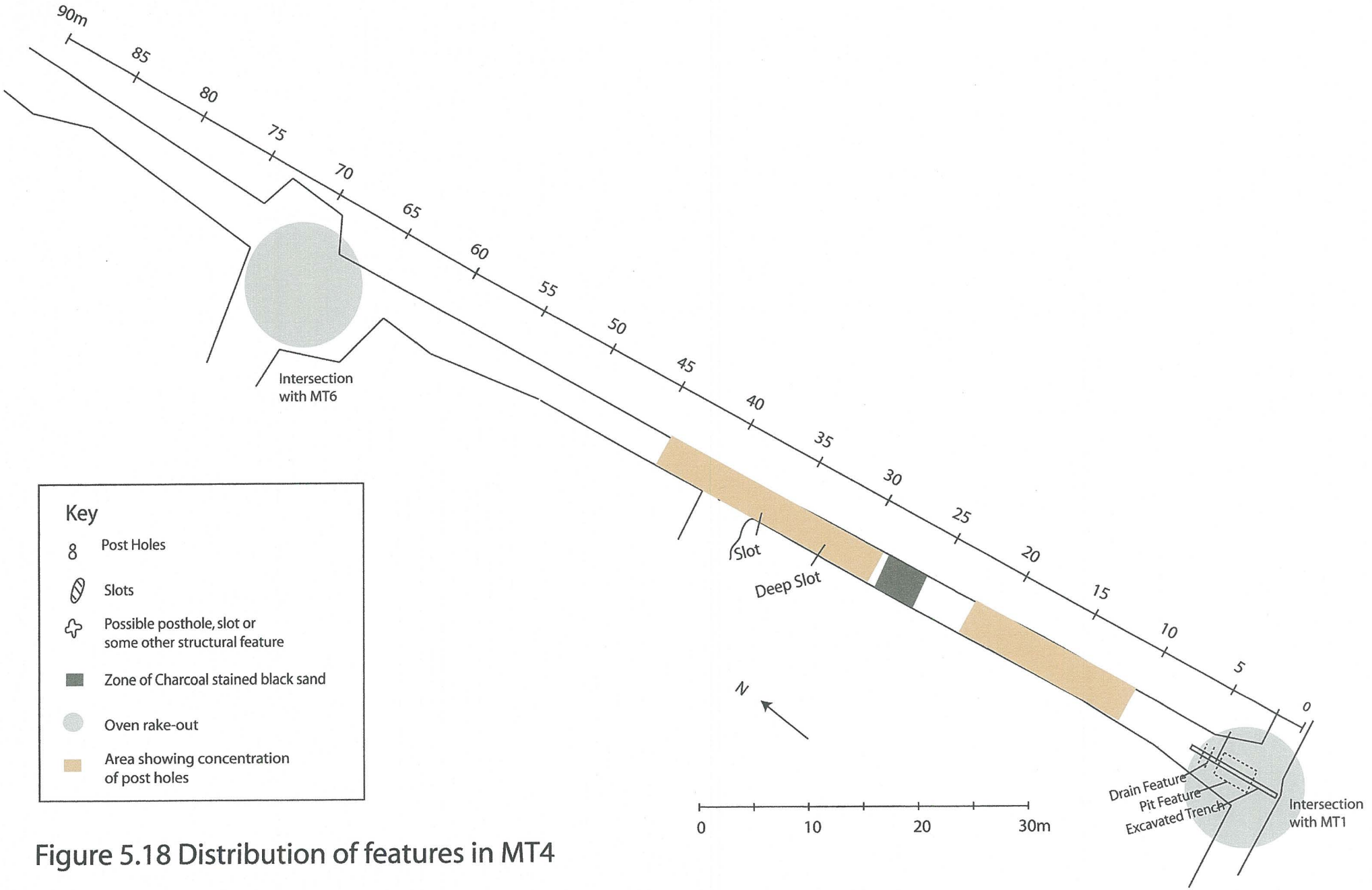


Figure 5.18 Distribution of features in MT4

Features

Features were concentrated in the middle and southern half of the trench. They are displayed in Figure 5. 20 and comprised of fire rake out, post holes, oven features, and slots. Within the trench, there was one patch of charcoal stained soil, and a clear fire feature which was excavated by hand, and will be described in more depth below. Concentrations of post holes were found at 30-45 m north. Because the width of the trench was only 1.5-1.8 m wide, it was difficult to determine any geometric patterning of these post holes. The high number of post holes in this area does indicate that there was at least one structure at that location. Immediately south of this posthole cluster is a patch of dark grey charcoal stained soil. This patch was not investigated in any great depth, but it is possible that it is associated with fire, whether it be an oven, or a rake out. It is likely to have existed next to, but outside the suggested structures. There is another area of post holes at 10-20 m north along the trench, and this is possibly another structure of some description.

A 10 m trench was excavated through the rake-out feature at the intersection of MT1 and MT4. This 10 m trench uncovered a shallow ditch feature and a drain feature, shown in Figure 5. 20. It is possible that these features are a result of the modern day farming practices on the site rather than a residue of prehistoric occupation.

Of particular interest is the fact that there are no recorded features north of 45 m along the trench except for the oven rake-out area at the intersection of MT4 and MT6. This lack of features indicates an open area. The northern most part of the trench lead into a cobble bank, which further lead into a swampy area north of the site. It is possible that no building structures were deliberately built close to the cobble bank. The oven rake-out feature at the intersection of MT4 and MT6 would have come from ovens near by which may not have been shown in the narrow 1.5-1.8 m trench. Further excavations in the area around this intersection may uncover any expected oven features.

The area located 22-26 m north was hand excavated and the features uncovered in this area were described in detail. This hand excavated area is shown in Figure 5. 19. In this area, we found an oven feature of charcoal grey black soil located next to a feature of

stock-piled rocks. Within the charcoal grey black soil, was a circle of brown soil, and within this brown soil nestled an anvil. Within one metre of the anvil were several heaphyite flakes of variable sizes, some of them had cortex. This is interpreted as a definite area of heaphyite stone working, although there is some uncertainly regarding the function of the stock-piled rocks feature. The rocks are river cobbles similar to those found on the boulder bank located between the site itself and a swampy area to the north. It is possible that the stock-piled rocks may have been piled there with the intention of them being used in the fire feature. In which case, it is possible that this fire may have been used for food production as well as for heaphyite flake manufacture.

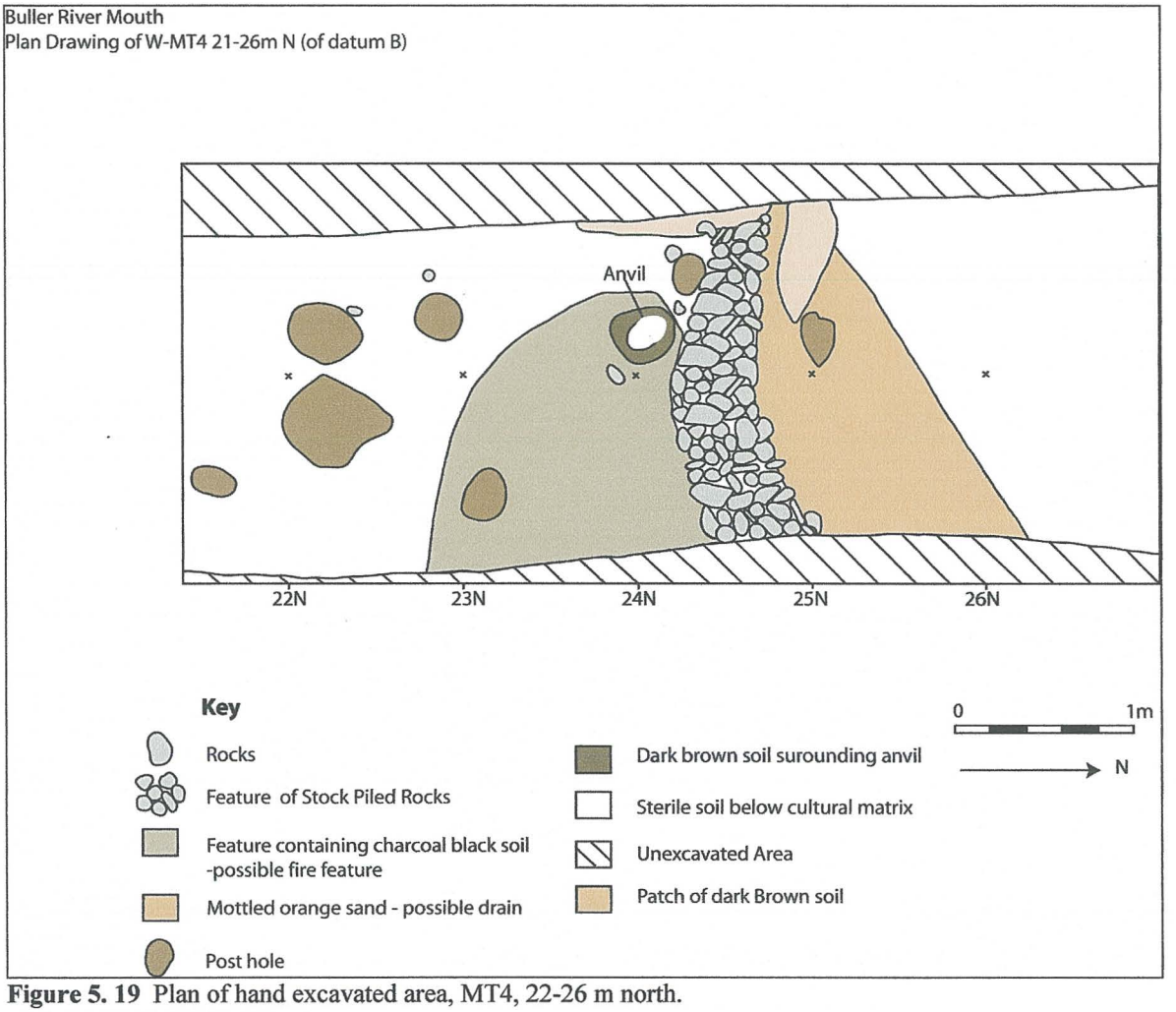


Figure 5. 19 Plan of hand excavated area, MT4, 22-26 m north.

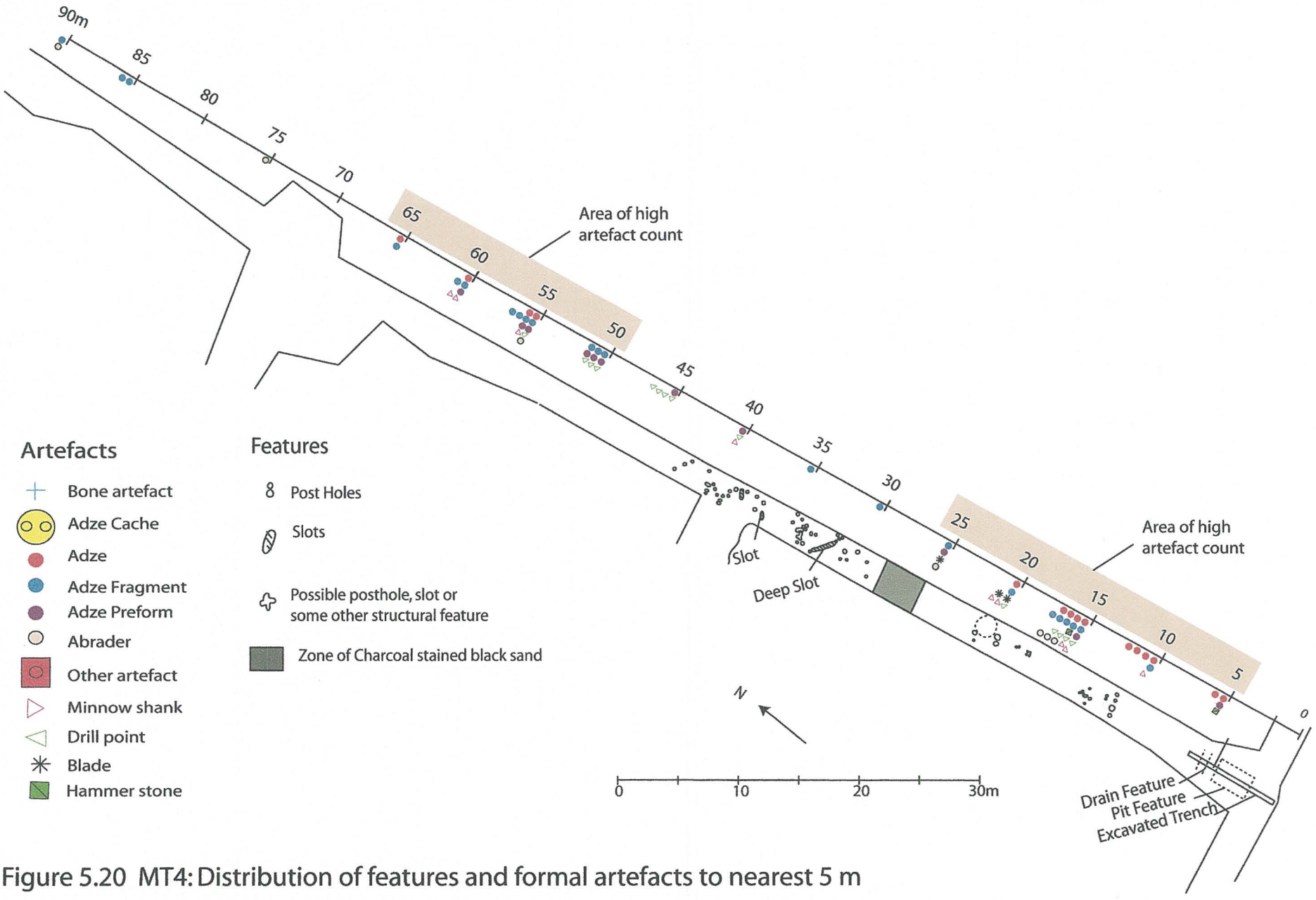


Figure 5.20 MT4: Distribution of features and formal artefacts to nearest 5 m

Formal tools

Adzes, adze fragments and adze preforms were mainly concentrated in two general areas. These areas were located 5-25 m north and 50-65 m north. A small number of adze artefacts existed outside of these two areas, but these two areas are where the main concentration of adzes, fragments and preforms were located. Several full and complete adzes were found 5-15 m north along the trench, and 15 m north was the location of a concentration of several adze fragments. There was another concentration of adze fragments at 50-60 m north, and this location also contained several adzes and adze preforms. There is a concentration of drill points located 40-50m north. This is close to several adze preforms, and it is possible that this was some sort of stone working area. Few artefacts were found at the extreme northern end of the trench, but three adze fragments and an abrader were uncovered here.

Of particular interest is that there were no features in the northern part of the trench, except for the previously mentioned oven rake out at the intersection of MT2 and MT4. Despite the area not having any features, this area was heavily concentrated in artefacts – especially adze fragments, adze preforms and drill points. This was possibly an outdoor stone-tool manufacturing area.

Around the 30-45 m square, there is a high concentration of posthole features, indicating the possible presence of a building. This area contains comparatively few artefacts. At 5-25 m north, several artefacts were found juxtaposed with post holes and other features including a fire feature, an anvil and a cobble stock pile feature. It is possible that the post holes here represented a structure which may have been associated with stone tools. This area contained a comparatively high number of full and complete adzes, and several nephrite adzes came from this area. This structure may have been associated with the storage of stone tools.

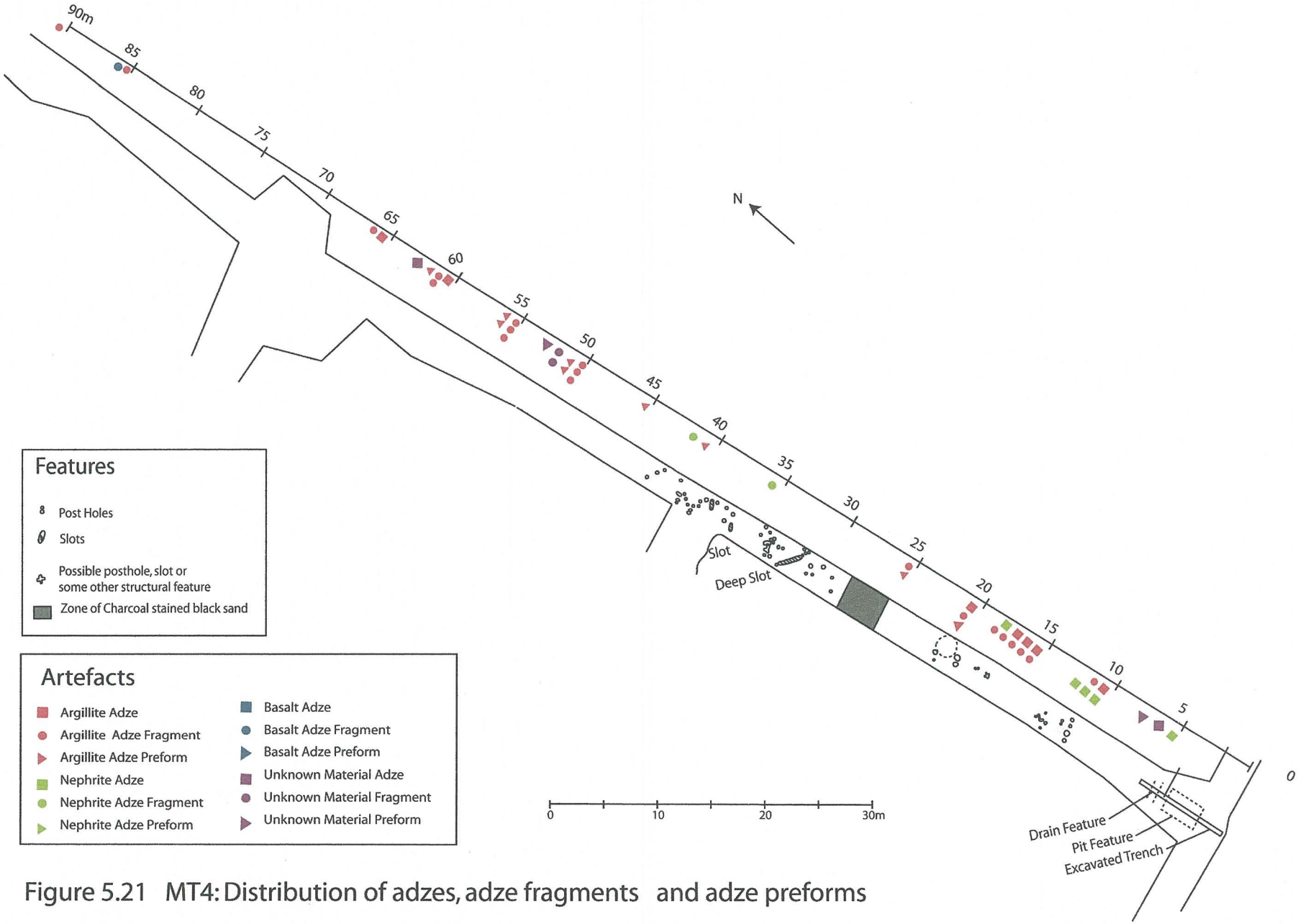


Figure 5.21 MT4: Distribution of adzes, adze fragments and adze preforms

Adzes

Only two adze material types were uncovered in MT4 – argillite and nephrite. A concentration of five full and complete nephrite adzes were found at 5-15 m north along the trench. Outside of the adze cache in the East Area, these constitute the highest concentration of full and complete nephrite adzes at the site. It is possible that this may have been another adze cache which was disturbed by the hydraulic excavator. The nephrite adzes found in this area are slightly different to those found in the East Area Adze cache. Both collections of adzes comprised Duff Type 2 nephrite adzes. However, the ones found in the West Area concentration in MT4 were shorter and thicker than those found in the East Area adze cache. In addition, there was another full and compete nephrite adze found at 55 m north, and a couple of nephrite adze fragments found at 35-45 m north.

Argillite adzes were concentrated in the area 10-25 m north, which uncovered five full and complete argillite adzes with several adze fragments and some preforms. Another concentration of full and complete argillite adzes were found at 50-60 m north. Six argillite adzes were uncovered here along with the previously motioned full and complete nephrite adze. This may have been the location for another adze cache or storage area disturbed by the hydraulic excavator. Several argillite adze preforms were located between 40 m north and 65 m north. It was argued earlier that this area may have been the location of stone tool manufacturing. Two full and complete adzes were found at 85 m and 90 m north. This northern part of the trench was mainly a cobble bank and it is quite unusual for any artefacts to have been found in this location.

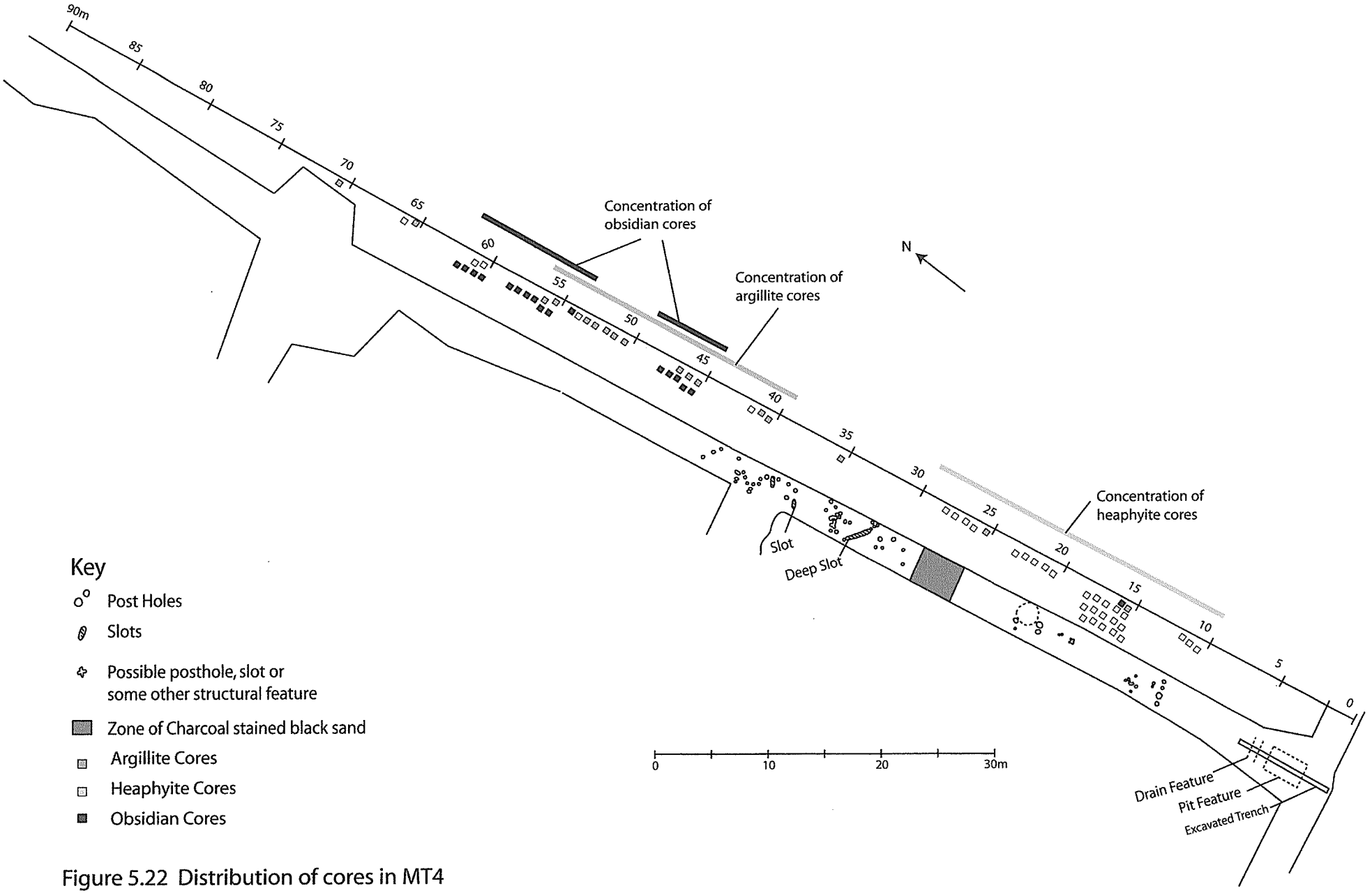


Figure 5.22 Distribution of cores in MT4

Cores

There are some distinctive spatial patterns in the distribution of stone cores at MT4 as shown in Figure 5. 22. In the stretch of trench between 10 m and 30 m north, there is a concentration of heaphyite cores with only three non-heaphyite cores in this area. This is also interesting because it has been shown previously in this chapter that this area contains an anvil and a high percentage of heaphyite flakes, some of which have cortex. It is argued here that this particular stretch of MT4 is a heaphyite manufacturing area. It has been shown earlier in this chapter that there is a high concentration of full and complete adzes in this area, and one possible interpretation of this is that it is an artefactual storage area. Heaphyite is the most common material type at Buller and Heaphy, both in weight and in frequency. It is possible that this location may have been some sort of storage area where heaphyite cores were stored until needed.

There are also concentrations of obsidian and argillite cores. Two concentrations of obsidian cores are found, one at 45 m north, and the second one at 55-65 m north. The concentration of obsidian cores is very similar to the situation at Heaphy, where there is a distinctive area of obsidian cores, flake tools and debitage.

The stretch of MT4 at 40-55 m north was an area of argillite cores. They were concentrated in this area and overlapped at places with the obsidian cores. In relation to other artefact types, this area also has a high concentration of argillite adze fragments and adze preforms. It is possible that the argillite cores in this area may have been created with the intension of being worked into an adze at a later stage.

The cores in MT4 are quite interesting in relation to spatial distribution because they show quite clear distinctions between stone material types. In the Buller East Area, cores were also mainly concentrated in one area, although the spatial distinction between stone material types was not so clear.

Flake tools, unmodified flakes and debitage

In the West Area, flake tools, unmodified flakes and debitage have not been studied to a such a high detail as that at Heaphy or in the East Area. This is because of the differing excavation methods employed in the West Area which made comparison difficult. We could not compare MT4 with the other machine trenches, because MT4 was more thoroughly investigated. Similarly, investigating the flake distribution within MT4 was quite problematic because some areas were hand excavated and other areas were hydraulically excavated. This section provides a brief discussion about the spatial distribution of flake tools, unmodified flakes and debitage in the Buller West Area.

Table 5. 2 Distribution of flake tools at in MT4

Artefact Type	Argillite		Heaphyite		Obsidian		Total	
Location	no.	%	no.	%	no.	%	no.	%
0-5 m N			1	0.75	1	1.18	2	0.75
5-10 m N	2	4.08	2	1.50	1	1.18	5	1.87
10-15 m N			3	2.26	3	3.53	6	2.25
15-20 m N	7	14.29	34	25.56	10	11.76	51	19.10
20-25 m N	1	2.04	9	6.77		0.00	10	3.75
25-30m N			5	3.76	2	2.35	7	2.62
30-35 m N	3	6.12	1	0.75	1	1.18	5	1.87
35-40m N	2	4.08	2	1.50		0.00	4	1.50
40-45 m N	1	2.04	3	2.26	1	1.18	5	1.87
45-50m N	7	14.29	2	1.50	8	9.41	17	6.37
50-55 m N	9	18.37	4	3.01	1	1.18	14	5.24
55-60m N	7	14.29	5	3.76	14	16.47	26	9.74
60-65 m N	2	4.08	1	0.75	17	20.00	20	7.49
65-70m N	1	2.04	1	0.75	3	3.53	5	1.87
75-80m N			3	2.26	1	1.18	4	1.50
80-85 m N			1	0.75		0.00	1	0.37
85-90m N					1	1.18	1	0.37
Total	49	100	133	100	85	100	267	100

Two hundred and sixty seven flake tools were uncovered in MT4. Heaphyite was the most common stone material for flake tools comprising 50% of the flake tools in MT4, 32% of the flake tools were obsidian and 18% were argillite. There were two major concentrations of flake tools in MT4. The first concentration in the stretch of trench at 15-25 m north which contained 23% of the flake tools in this trench. The second concentration of flake tools is 45-65 m north, which contained 29% of the total flake tools. The spatial distribution of flake tools in MT4 is similar to that of other artefact types in that they were located in areas of high artefact concentration.

Table 5. 3 Distribution of unmodified flakes and debitage in MT4

Material type	Argillite		Heaphyite		Nephrite		Obsidian		Total	
Location	no.	%	no.	%	no.	%	no.	%	no.	%
0-5 m N	1	0.22	6	1.88					7	0.79
5-10 m N	6	1.34	14	4.39					20	2.26
10-15 m N	18	4.02	20	6.27			2	2.41	40	4.51
15-20 m N	52	11.61	127	39.81	9	25	8	9.64	196	22.12
20-25 m N	18	4.02	51	15.99	4	11.1	3	3.61	76	8.58
25-30m E			1	0.31					1	0.11
25-30m N	3	0.67	5	1.57	1	2.78	2	2.41	11	1.24
30-35 m N	19	4.24	3	0.94	1	2.78	2	2.41	25	2.82
35-40m N	9	2.01	2	0.63			2	2.41	13	1.47
40-45 m N	10	2.23	2	0.63			1	1.20	13	1.47
45-50m N	27	6.03	6	1.88	9	25	12	14.46	54	6.09
50-55 m N	105	23.44	29	9.09	2	5.56	8	9.64	144	16.25
55-60m N	121	27.01	27	8.46	5	13.89	19	22.89	172	19.41
60-65 m N	51	11.38	21	6.58	3	8.33	19	22.89	94	10.61
65-70m N	5	1.12	1	0.31	2	5.56	1	1.20	9	1.02
75-80m N	2	0.45	2	0.63			1	1.20	5	0.56
80-85 m N			2	0.63					2	0.23
90-95 m N	1	0.22					3	3.61	4	0.45
Total	448	100	319	100	36	100	83	100	886	100

There were 886 unmodified flakes and debitage in MT4. Argillite was the most common of this artefact type in MT4, comprising 51%, followed by Heaphyite at 36%, obsidian at 9.3% and nephrite had 4%. Argillite was the most common stone material in this category, which was expected considering the amount of adze working and reworking was uncovered at Buller. Heaphyite and obsidian both contain characteristics which rendered them suitable for flake tool – a reason for why they were more common as flake tools rather than as flakes and debitage. There was only a small amount of obsidian in MT4, but this may be a result of the field collection methods.

The spatial distribution of unmodified flakes and debitage appear to be quite closely associated with the location of other artefact types. As with the other artefact types, unmodified flakes and debitage were concentrated in two key areas in MT4. The first concentration is 10-20 m north, and the second concentration is 45 to 65 m north.

Chapter Summary

This chapter set out to investigate the intra-site spatial distributions at Buller and Heaphy. It is the second part of a three step approach to link data from New Zealand archaeology with social discussions about space. At both Buller and Heaphy, there are concentrations of features, particularly fire features and post holes. The distribution of different artefact types and their variable stone material types showed that the location of artefact types and stone material can be associated with activity areas. This chapter has presented the results of the spatial analysis data with only a minimum amount of interpretation. A more thorough interpretation of the artefact types and their spatial distribution will now be presented in the following chapter.

Six

Discussion and Conclusions

...it is time we looked also to the humanities and social sciences for ideas and collaboration. Political, economic, technological and social history, human geography, economics, sociology and anthropology all have much to offer (Prickett 2004:384).

This thesis set out to describe and analyse the excavated artefactual assemblage from Buller and Heaphy, and to discuss these within a broader theoretical framework. Two themes were explored in this thesis – 1) the concept of space and 2) how New Zealand archaeology can benefit from ideas and discussions found in social anthropology.

The first section of this Chapter provides a discussion of the artefactual assemblage from Buller and Heaphy. The second section will interpret the intra-site spatial analysis of these two sites. The third section will demonstrate some ways in which New Zealand archaeology can benefit from ideas drawn from social anthropology. This is done by interpreting the aforementioned material culture and spatial results in light of some of the ideas discussed in Chapter 2.

Interpretation of Material culture

As shown in the results of Chapter 4, Buller and Heaphy both have a large and varied material culture assemblage. There are adzes of varying cross sections, sizes, form and material types. The artefactual assemblage at Buller and Heaphy is representative of the Archaic Phase of New Zealand prehistory. The Archaic phase is a term coined by Jack Golson in 1959 which refers to the earliest phase of New Zealand The Archaic phase is part of Jack Golson's notion of the 'New Zealand East Polynesian Culture", a theory proposing New Zealand prehistory was divided into two developmental phases – Archaic and Classic. Artefacts that are characteristic of Archaic material culture are described in Table 6.1.

Table 6. 1: Characteristics of Archaic material culture based on Golson 1959 (adapted from Tucker 2003: 49)

Artefact Type/Feature	Comments
Adzes	A wide variety of Duff adze types, especially 1A, 2A, and 4A
Fishing Gear	One-piece fish hooks, composite hooks, minnow lures, barracuda points and harpoons
Ornaments	Necklaces of reel units, imitation whale teeth, tubes, beads, shark/porpoise teeth and chevroned amulets made variously from stone, bone , shell and teeth.
Other bone tools	Awls, needles, tattooing chisels, bird spears and cloak pins
Flake tools	Standardised flakes and slate knives
Food processors	Stone pounders
Moa eggs	Perforated
Pit features	Interpreted as kumara storage pits
Weapons	Whale bone patu

As discussed in Chapter 4, there were 14 varieties of adze cross sections found at Buller and nine cross section varieties found at Heaphy. The only fishing gear found at Buller and Heaphy were stone minnow lures. No obvious ornaments were uncovered, and no bone tools were preserved in the acidic soil. Flake tools and blades were uncovered in the West Coast sites, but no perforated moa eggs or obvious weapons. No kumara storage pits were found. In total only three of the nine artefact types identified by Golson as being characteristic of the Archaic were actually found at Buller and Heaphy. However, we do know from C14 dates (Jacomb, Walter and Tucker 2004; Scarlett 1967; Wilkes and Scarlet 1967)that Buller and Heaphy are dated to the 14th century, which puts them in the time frame for early New Zealand prehistory.

The lithic analysis has shown that there is a wide variety of material types and artefact types from Buller and Heaphy. This analysis focused mainly on the flakes and adzes, but other artefacts were also discussed. While the artefacts themselves provide considerable information about prehistoric life, especially with regards to tool use, function, technology, what I am most interested in is how these artefacts can be interpreted in relation to their spatial distribution and their social relevance. This section was more of a summary of the results of the material culture at Buller and Heaphy rather than an interpretation. The following sections of this chapter will

present the actual interpretation of the artefact assemblage in light of both the spatial analysis and the theoretical discussion mentioned earlier in this chapter.

Interpretation of Spatial use at Buller and Heaphy

Very little is known about the intra-site spatial patterning of the New Zealand Archaic (Jacomb, Tucker and Walter 2004). In an attempt to address this issue, one of the aims of the Tai Poutini Archaeology Project was to investigate on intra-site spatial analysis. Following Walter (1998: 89), three levels of interpretation were used in this study of spatial analysis at Buller and Heaphy. Walter (1998:89) developed this three step process of spatial analysis based on excavations at Anai'o a 14th century village in the southern Cook Islands.

Level one consists of features and artefacts and their position in space. In archaeological terms, these are thought to be the smallest culturally meaningful excavation units in spatial analysis consisting of all items on a site associated with past human behaviour. These include artefacts, features and faunal remains (Walter 1998:89).

Level 2 is the first analytical unit made up of lower order elements. As with the site of Anai'o, there are two main categories. The first category consists of groups of features whose distribution patterns indicate that they may be related to the same building unit. The second category is the activity areas comprising spatially discrete clusters of artefacts or faunal material (Walter 1998:89).

Level 3 is the activity zone, representing the highest order analytical unit used at Anai'o. An activity zone consists of a group of one or more structures and associated activity areas. The distribution of activity areas reflects the manner in which individuals and larger groups on the site organised their activities in relation to one another. There are both implicit and explicit rules underlying these patterns of organisation and understanding these is the ultimate goal of spatial archaeology (Walter 1998:89).

Structures

As proposed by Walter (1998:90) structures are defined by patterns or clusters of various features such as post holes, stone alignments and stone paving's and laid surfaces of sand or kirikiri (Walter 1998:89). At Anai'o Walter identified six structures which varied in size, density of midden, floor type, the presence and position cooking/burning features and presence of absence of manufacturing activities (Walter 1998:89-90). These structures were identified by the clear distinction between internal and external space as reflected in the contrast between flooring materials within and surrounding the structures. In some structures, this was also obvious in the presence of a definite border region or ditch (Walter 1998:90). In addition, all the structures discussed by Walter are all rectangular structures, consistent with ethnographic and archaeological descriptions of building structures in the Southern Cooks (see Walter 1998:90).

However, at Buller and Heaphy, the clear distinctions mentioned above were not so evident. Although there were post holes and areas or patches of contrasting changes in soil colour and texture, it was difficult to make any implicit interpretations about whether these lenses or patches of soil changes reflected an internal or external part of the building. In this context, the definition of structures is very loosely defined as "the patterns or clusters of various features including, but not restricted to: post holes, stone alignments and stone paving" (Walter 1989:90).

Structures at Heaphy

At Heaphy, structures were identified in the 1960s excavations in the form of oven clusters and pavements. Wilkes and Scarlett (1967) identified four structures three pavements, a ring of stones and an area of highly concentrated ovens (see Figure 6.1). The pavement areas at Heaphy are of irregular shape.

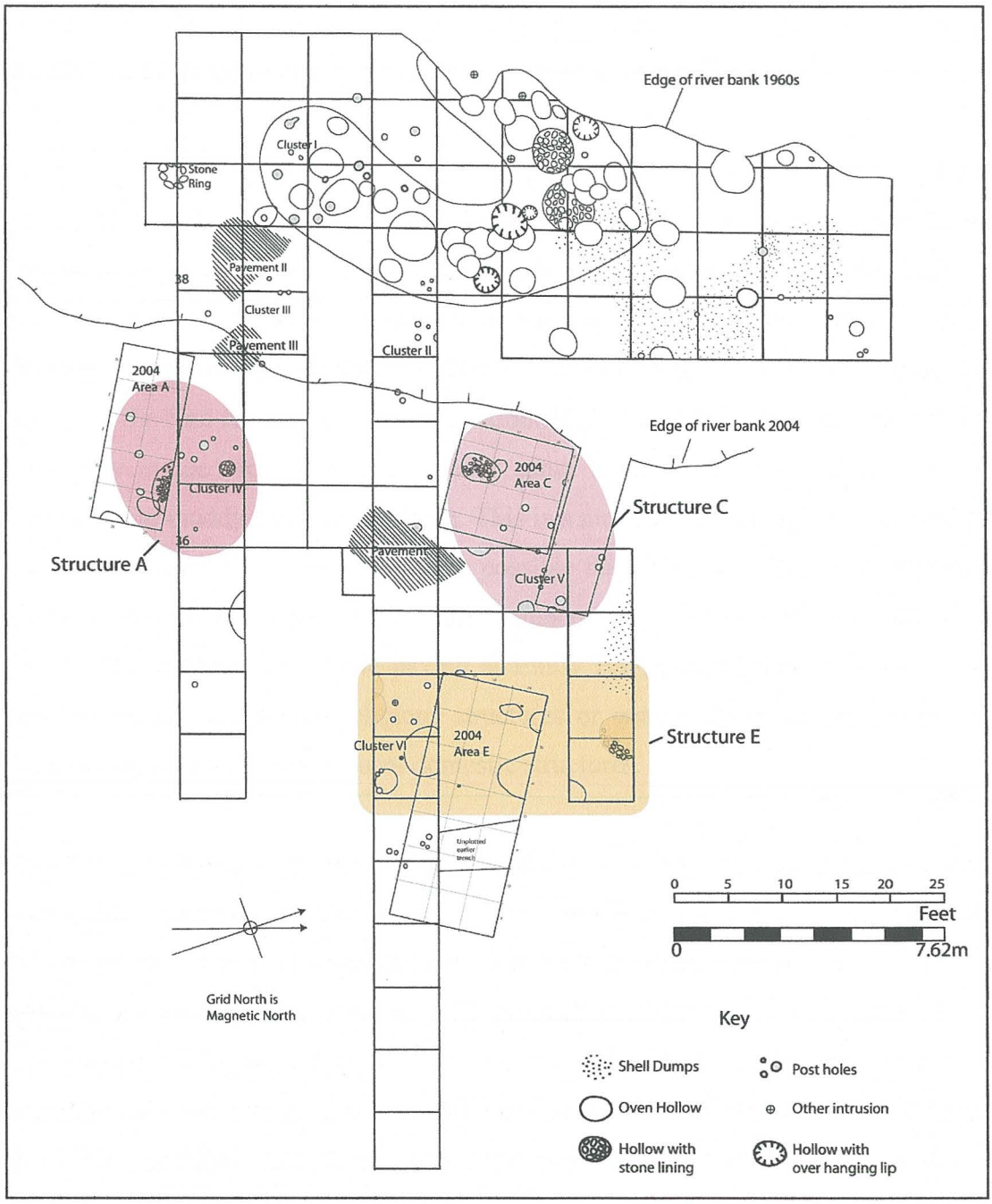


Figure 6. 1. Structures identified in the 2004 excavation at Heaphy. The pink shaded areas show a clustering of post holes and an oven. The orange shaded area shows another potential concentration of ovens, similar to the one found in the northern part of the site

Figure 6.1 shows the structures identified at the 2004 excavations at Heaphy. The pink shaded areas in Area A and C show two possible structures. These structures comprise a cluster of post holes in close proximity (within a 5 m radius) to an oven. It is difficult to determine the perimeters of a rectangular structure at Heaphy based on the changes in soil colour and texture, but the presence of postholes is indicative that a structure once stood there. In prehistoric East Polynesian settlements, rectangular houses with posthole arrangements and exterior ovens are expected (Anderson and

Green 2001:2001). It is possible that these posthole structures represent a domestic structure with an associated external oven, perhaps a *wharepuni.*

In addition to the presence of an oven feature, these structures also have a nearby pavement. For Structure A, the pavement is to the north west. For Structure C, the pavement is to the north east. It is possible that these pavement areas may be associated with the structures in some way, perhaps representing the veranda or point of entry into a building. During the 2004 excavation, there was a significant amount of rain in the first few days of the excavation. With a team of archaeologists walking repeatedly in the vicinity of the outdoor camp kitchen area, the soil in this area became quite muddy and bogged down. This is a modern day example of the need for pavement areas at the Heaphy site. It is possible that these pavement areas represent areas of frequent foot traffic such as the entrance to a building. Anderson and Green (2001:44) also uncovered stone paving at Emily Bay, Norfolk Island. They argued that the paving represented religious structures or *marae*, while the post holes and their associated pattering represent domestic structures.

Structure E as indicated by the orange shaded area shows another potential structure – a concentration of ovens similar to that found in the northern part of the site in the 1960s. Within an area of approximately 9 m by 4 m, there were nine ovens. This is possibly another cooking area or food production area. In the north-east of this structure are some shell dumps. It is uncertain why there would be two areas of concentrated ovens within the same site with a possible row of structures in between them. One possible explanation is that the oven features were used consecutively. That is, perhaps the ovens in one part of the site may have been used first. After the area become too overwhelmed with charcoal stained soil and neighbouring shell dumps, they may have moved the ovens and food production to another area of the site.

Structures at Buller

East Area - Structure

At Buller, there are five tentative structures in the East Area which are shown in Figure 6.2 and described in Table 6. 2.

Table 6. 2. Description of identified structures in the East Area

Structure	Map colour	Description/Interpretation
Structure 1	Pink	Pink shading in Area B- a clustering of fire features, similar to the fire feature clusters mentioned previously for Heaphy
Structures 2 and 3	Green	North-south lines of post holes. Structure 3 also has am adze cache within this line of post holes.
Structure 4	Blue	Postholes in a circular pattern. This could possibly be the structure of a round house or whare porotaka
Structure 5	Yellow	Pattern of post holes in a possible rectangular pattern with a fire feature within it. This could possibly be a whare puni.
Structure 6	Purple	Two lines of post holes, possibly at right angles to each other

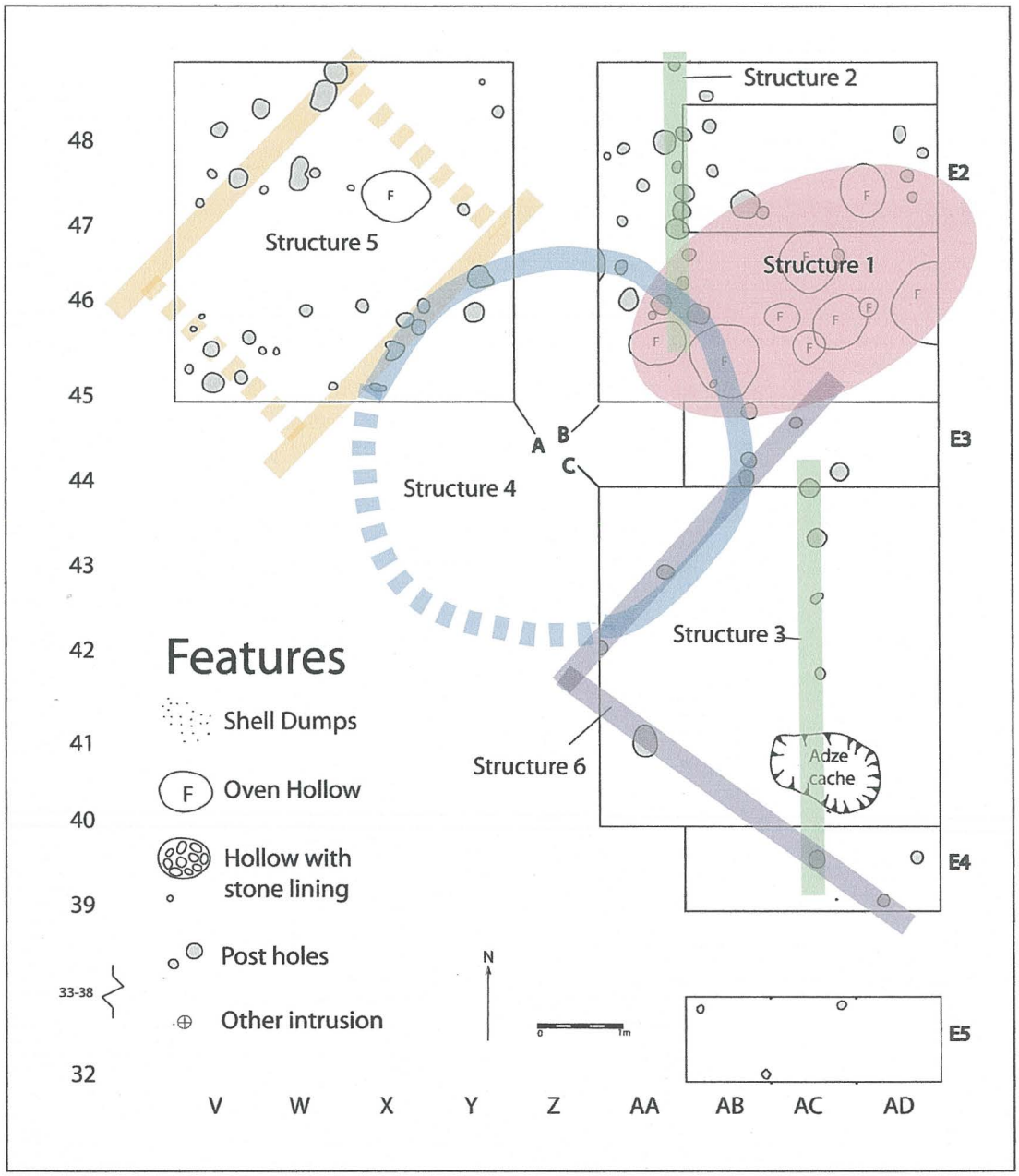


Figure 6. 2. Tentative structures in the Buller East Area

West Area - Structures

In the West Area, MT4 is the only area where we have adequate data for analysis. The identified structures in MT4 are numbered north to south and shown in Figure 6.3. A description of the structures is presented in Table 6. 3.

Table 6. 3. Description of identified structures in the East Area

Structure	Map colour	Description/Interpretation
Structures 1 and 6	Light Grey	Areas of concentrated charcoal stained soil, interpreted to be possible oven rake out
Structures 2 and 3	Yellow	Concentrations of post holes indicating a potential structure. In addition, Structure 3 also has an oven, and a heaphyite manufacturing floor
Structure 4	Dark Grey	Zone of charcoal stained black sand. This could be interpreted as some form of living area.
Structure 5	Light brown	Area of highly concentrated post holes and slot features indicating some sort of structure.

MT4 has two areas of artefact concentration which are thought to be manufacturing areas. The first manufacturing area is in the southern part of the MT4, approximately 10-25 m north. The high concentration of heaphyite cores and flake in this area indicate a possible heaphyite manufacturing area. The second manufacturing area located 40-65 m north, contains concentrations of argillite and obsidian cores. Structure 5, shaded in light brown in Figure 6.3 is an area of high concentrated post holes and slot features located between the two manufacturing areas. Interestingly, there are very few artefacts in this area, and very few cores. Structure 5 is probably a building structure of some description in between the two stone tool manufacturing areas.

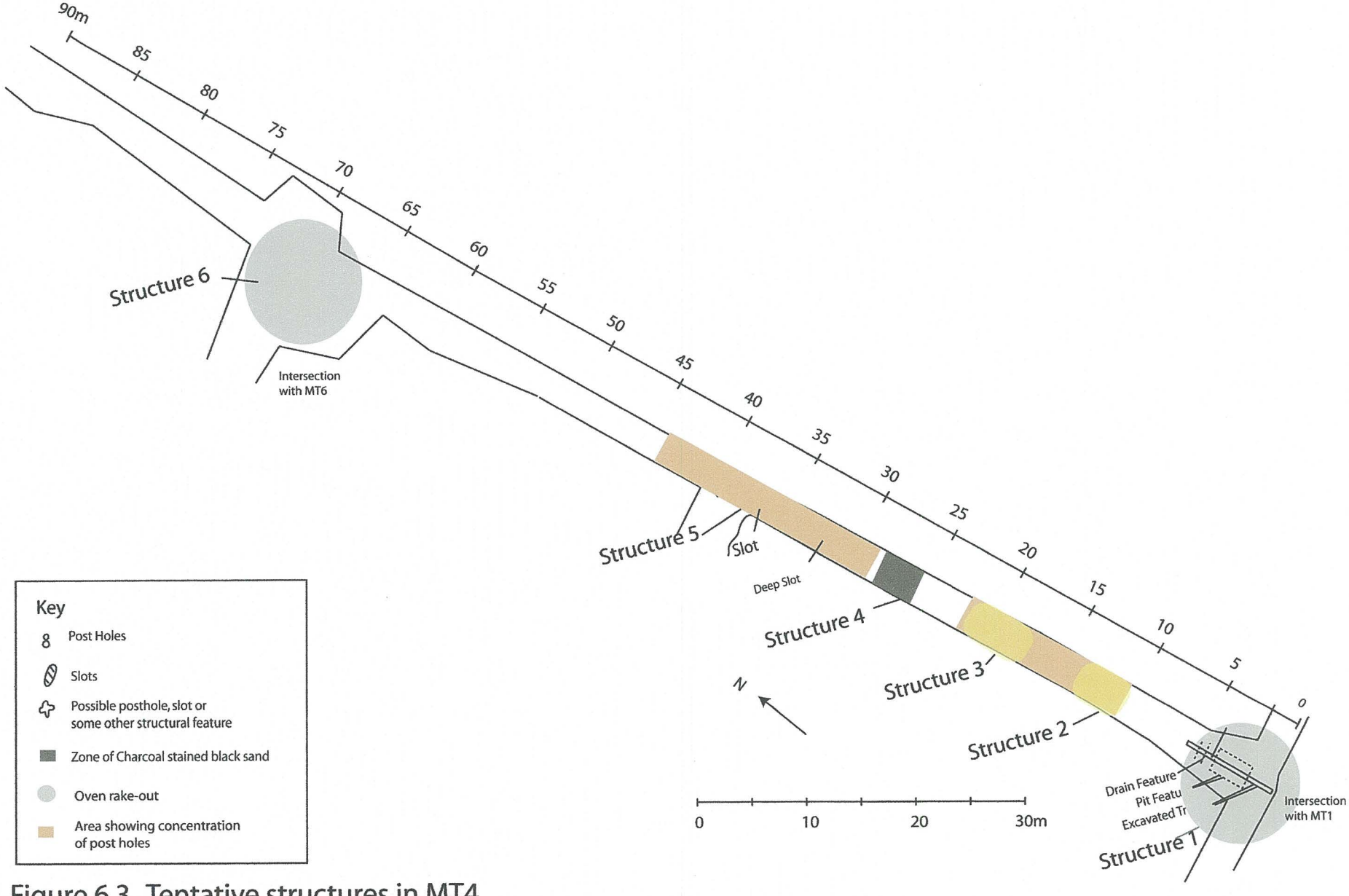


Figure 6.3. Tentative structures in MT4

Analysing Activity Areas

This section builds on the previous discussions in this chapter by combining the lithics analysis, the spatial analysis and the interpretations of structures. In this section, activity areas are discussed in two contexts. Firstly, this section discusses Activity Zones at Heaphy and Buller as per the three part spatial interpretation technique put forward by Walter (1009:89). As mentioned previously, Level 3 is the activity zone, representing the highest order analytical unit used at Anai'o.

Secondly, this thesis draws on Jenny Kahn's (2005) thesis for a model to link imperial archaeological data with the abstract and theoretical social interpretations relating to house societies and social organisation. Kahn's work was particularly relevant to this study because she also investigated lithic assemblages and spatial data, and discussed these in light of household and community organisation in the Society Islands.

Kahn (2005) argues that the diversity of a lithic assemblage is a reflection of the way in which prehistoric stone tool production is organised. This is an indicator of the various activity carried out within a site. Kahn investigated inter and intra household variation to understand social and productive roles of households. Drawing on the some of the analytical techniques used by Kahn, I will discuss the activity zones at Buller and Heaphy within a more detailed interpretive framework. Kahn grouped morphological classes of lithics into general diagnostic categories as outlined in Table 6.4. From these, she was able to make interpretations about the organisation of stone tool production, various activities occurring within a site and the social, economical, and political structures associated with these activities.

Table 6. 4. Modelling Adze Production and Consumption in Reference to General Morphological Classes. c.f. Kahn 2005:349)

Lithic Reduction or Use Activity	Expected Tool Classes
Production	• Worked prismatic basalt or waterworn cobbles • Adze blank (early stage production) • Adze preform (early to middle stage production)
Consumption and/or Reworking	• Adze, adze fragment, reworked adze • Polished adze debitage (includes polished flakes, flake fragments and shatter)
Waste-By-Products of Production and Consumption	• Complete flakes, flake fragments, shatter • Retouched flakes, utilised flakes, utilized prismatic basalt cores
Tools Used in Adze manufacture and Final Polishing	• Fabricators (hammer stones • Abraders (polishing stones, grinding stones)

Activity Zones at Heaphy

Following the previous discussion of structures three types of activity zones have been identified at Heaphy: cooking areas, building structures and stone working activity areas.

Cooking areas

In Figure 6.1, two cooking areas were identified. The first cooking area is in the northern part of the site, which was excavated in the 1960s. The second cooking and heating area is identified as Structure E in figure 6.1, where there are nine oven hollows, one of which is a stone lined oven. In the north-west corner of Structure E are four post holes. These post holes are relatively smaller than other post holes at the site, more comparable with the size of stake holes. It is possible that these stake holes are associated with some sort of structure associated with drying of food, an interpretation which would place these small post holes in an appropriate context of the oven stones.

Building structures

Structures A and E are areas of tightly clustered post holes with an associated stone line oven feature. It is proposed that these are domestic structures associated with household organisation and activities. Interestingly, when overlaid with the lithics

data, Structure A is an area of highly concentrated artefacts, a possible stone manufacturing area, while Structure C appears to have limited stone working activity.

Activity Areas

At Heaphy, stone working activity areas are evident in several parts of the site, and have been described in Chapter 5. Three stone working activity areas are particularly noteworthy. The first is in the middle of Area A where several adze fragments were located along with two abraders and a high concentration of flakes and debitage. There was a high concentration of artefacts in the general vicinity in general, and it is proposed that this is a stone working area. The second area is the bottom left hand corner of Area E where an argillite hog back (Duff Type 4A) adze was found in close proximity to a hammer stone and a grinding stone. The third activity area is the northern part of Area E where there is a high concentration of obsidian artefacts.

Interpretation of Activity Areas

At Heaphy, there appears to be a pattern in the spatial distribution of the various types of adzes as observed in Figure 5.4. Complete adzes and adze portions, are usually found together. They appear to be clustered in the middle and southern parts of Area A and the south-eastern corner of Area E. In the 2004 excavations at Heaphy, it was rare not to find a complete adze within a one metre radius of an adze portion.

Adze preforms on the other hand, are located a distance away from the other adze types. Two argillite adze preforms were located in the southern part of Area C, and third is located in the northern part of Area E. When compared with the map of argillite unmodified flakes and debitage (Figure 5.7), these two locations show relatively minimal concentrations of argillite waste productions. Earlier in this chapter, I discussed activity zones at Heaphy, and highlighted three areas of stone tool production which did not include the areas where the adze preforms were found. It is interesting that three argillite adze preforms were found in locations containing relatively low number of argillite flakes and debitage. Perhaps these locations were storage areas for new adze blanks and preforms rather than stone working areas.

Previously, I also proposed, on the basis of the relatively higher number of recycled adzes, that adze use at Heaphy was more conservative than at Buller. The fact that

three adze preforms were found in potential storage areas is further evidence of the conservative adze use at Heaphy.

It has already been discussed that flake tools have a functional role, and are not merely by-products of stone tool production. Therefore, the location of flake tools are a possible indication of where flakes were used rather than where they were produced. In Areas A and C, concentrations of flake tools were found clustered around oven features (Figure 5.5). Interestingly, both of these areas were nominated as possible building structures. It is uncertain what these structures were used for, but the presence of post holes and fire feature indicate some sort of domestic structure. The close proximity of these stone tools to the oven features indicates that they may have been associated with food production.

In the northern part of Area E, there is a high concentration of obsidian flake tools. This correlates with the high number of unmodified obsidian flakes, debitage and cores in this area. As mentioned previously, Anderson and Green (2001:27) found a pavement at Emily Bay, Norfolk Island which they interpret to be a religious structure or *marae*. One of the key reasons for their interpretation was the presence of 24 obsidian artefacts scattered above the pavement. At Heaphy, there is some uncertainly regarding the concentration of obsidian artefacts in this particular area. Like Anderson and Green's (2001) interpretation, it may have something to do with some form of religious activity. Another possibility is the functional reason for the obsidian concentration. Perhaps it is a storage area. The presence of four obsidian cores at this location may support the argument for functional storage area, however, there is also a high concentration of flake tools, unmodified flakes and debitage in this area too – so it appears that obsidian tools may have been both produced and used in this area.

Activity Zones at Buller

Cooking areas

In the East Area, the main observable kitchen zone is the cluster of ovens in Area B indicating a possible kitchen zone. The soils in this area are charcoal stained, there is a high concentration of fires features, oven stones and ash. The high number of ovens features in this area indicate that it may have been used over a long period of the site's

use. Post holes in the vicinity indicate that structures may have been associated with the kitchen zone.

Building structures

In MT4, Structure 5 is probably a building structure as indicated by the presence of post holes. It is possibly a domestic structure of the *whare puni* type. It is located between the two stone manufacturing areas, and contains very few artefacts.

The East Area contains some tentative structures illustrated in Figure 6.2. The green shaded area indicates two rows of north-south post holes. The blue circle in the centre of the image is a possible round structure. There are also two possible structures with right angle alignments. One is represented by the yellow structure in Area A and the other is represented by the purple structure in Area

Activity Areas

In, MT4 there are two areas of artefact concentration which are possible stone tool manufacturing areas, one of which contains a heaphyite working floor. In the East Area, there was no distinctive stone tool manufacturing area. Area A had a relatively higher number of unmodified flakes and debitage than the other Areas, and adze preforms were scattered throughout the East Area with no clear, distinctive patterning. There is however, concentrations of argillite adze fragments in the northern-east part of Area A, and a concentration of nephrite adze preforms in the southern part of Area A, indicating a possible area of stone working.

Common arrangements of space between Buller and Heaphy

Table 6. 5. Common arrangements of space between Buller and Heaphy

Spatial Arrangements	Heaphy	Buller
Area of highly concentrated fire features	✓	✓
Cooking Areas	✓	✓
Pavement Areas	✓	✗
Possible domestic buildings (based on post hole patterning)	✓	✓
Stone working activity areas	✓	✓
Areas of concentrated obsidian artefacts	✓	✗
Adze cache	✓ (uncovered in 1960s excavation)	✓
Areas of oven rake out	✗	✓
Specialised stone type manufacturing floors (e.g. heaphyite, obsidian, argillite activity areas)	✓	✓
East and West division of features: East = ovens West = stone tools	✓	✓

Table 6.5 shows ten spatial features and activity areas that were present at either Buller or Heaphy. Except for three exceptions, both sites had features and activity areas that were common with each other. Heaphy had some pavement areas and an area of concentrated obsidian Artifacts which were not observed at Buller. Buller had an area of oven rake out which was not observed at Heaphy. Despite these differences, the two sites were similar in many other spatial aspects. Interestingly, there was an observable East – West division of features. At both sites, ovens were mainly concentrated in the East and stone tools were located in the West.

Theoretical interpretations

One of the key themes of this thesis was to link imperial New Zealand archaeological data with wider anthropological discussions. This section demonstrates some ideas for how this can be done by linking the results of the material culture and spatial analysis with some of the theoretical discussions from Chapter 2.

The social construction of space

Wilks and Rathje's (1982) proposed that households are an important unit for studying adaptation in archaeology. They defined households as "the most common social component of subsistence, the smallest and most abundant activity group" (Wilk and Rathje 1982: 618). Their idea of households is described by three aspects: 1) *social*: 2) *material*: and 3) *behavioral* (Wilk and Rathje 1982:617). These three concepts can help us understanding spatial organisation.

A multi paradigm approach

One of the key arguments in Chapter 2 is that space is socially constructed. A multi paradigm approach is an effective way to investigate this. The multi disciplinary approach to studying structural space was discussed briefly in Chapter 2 (eg: Grön 1991; Kent; 1993; Parker Pearson 1994; Fox 1993; Kirch and Green 2001). The common trend in all of the above studies is that space is not just determined purely by environmental or functional reasons. Cultural, social, symbolic and ritualistic reasons for spatial organization along with the interweaving of kinship, structure and rank are major contributors behind spatial organization (Waterson 1993:228).

In their study of Kawela, Molokai in Hawaii, Weisler and Kirch (1986) proposed an approach to understanding the structure settlement space which overlaid several interconnected paradigms to obtain a holistic view. They noted that previous studies of Polynesian settlement patterns mainly focussed on two aspects – the ecological or environmental determinants of settlement, and the social or community patterns – as reflected in settlement layout. Wiesler and Kirch (1986) suggested that there are several other alternative paradigms that can be incorporated. They investigated settlement space through the perspective of several paradigms including: 1) environmental, 2) social, 3) economic and political and 4) semiotic (Weisler and Kirch 1986:151).

The present study is similar to Weisler and Kirch (1986) in that several contextual associations were incorporated into the analysis in order to gain a rounded understanding of the structure of space at Buller and Heaphy. In this thesis, I will explore three of the paradigms used by Weisler and Kirch: the environmental, social and semiotic.

Environment

Invariably, the surrounding environment and climate of a prehistoric site will influence the spatial patterns of the inhabitants. Stone pavements were observed at Heaphy, a possible adaptation to the high rain fall and damp grounds surrounding the building structures. Hearths and fire places were present at Buller and Heaphy, some located away from the main cooking areas. These were possibly used for lighting and warmth and for drying. There was minimum evidence of artefacts and activities in the spaces between huts, indicating that most of their activities were undertaken close to the shelter of building structures.

Like modern day horticulture, the acidic soil may have discouraged prehistoric horticulture. The high rainfall resulting in any cleared parts of the forest growing back too rapidly to be effective for horticulture. Consequently the subsistence lifestyle on the West Coast was mainly restricted to hunting and fishing rather than horticulture. These subsistence patterns may influence the spatial organisation in the sites with regards to how and where food was preserved and stored on the site.

In Chapter 2 I discussed *whare porotaka*, round houses that are mainly found the South Island and have a flimsy structure. Prickett (1974:47) has proposed that *whare porotaka* are preferred for casual habitation because they can be built quite quickly without any of the associated rituals or ceremonies that some of the larger buildings require, and also because they do not require the spatial or social considerations of *tapu* that would normally be associated with more formal building structures (Prickett 1974:47). *Whare porotaka* are difficult to identify because their post holes are not in any regular pattern (Anderson 1986:100). Their temporary and flimsy structure means that they may not be so evident in the archaeological record.

It is possible that round houses may have existed at Buller and Heaphy. It was difficult to determine the boundaries of structures at these sites, possibly because they were flimsy and temporary to begin with. The blue structure in Figure 6.2 indicates a possible *Whare porotaka* at Buller. The climate and environment on the West Coast indicates a seasonal hunting and gathering existence rather than a horticulturalist existence which supports the idea of temporary structures. The fact that there was more than one cooking area at Heaphy indicates that they may have had different cooking areas over different stays.

However, we also know that Buller and Heaphy were more than just seasonal hunting camps. Evidence of stone tool manufacture and the presence of storage features for adze catches and obsidian support the idea of permanent settlement. It is possible that Buller and Heaphy may have been permanent settlements where population increased and declined according to the hunting and food gathering seasons. Permanent or long term inhabitants may have lived in permanent resident structures (hence the evidence for the two lines of post holes at Buller), and during certain times of the year, the population may have increased in accordance with the hunting and gathering in which case *whare porotaka* may have been erected for these seasonal inhabitants. This is one example of how the environment may have influenced the way in which a site as laid out.

Social

Basic principles of spatial patterning can be a reflection of social structure and social organisation. In Kawela all residential complexes in the study area share common attributes such as the presence of a primary residential feature surrounded by a number of smaller ancillary features. There are also notable separations of certain activities such as food preparation, craft activities, and social ranking of individual households.

As discussed in chapter 2, Maori social structure is made up of four levels: *whaanau* (extended family), *hapuu* (subtribe), the *iwi* (tribe) and *waka* (confederation of tribes) (van Meijl 1995). Based on ethnohistorical evidence, Firth (1929)described the basic unit of Maori society as a kinship based structure of the *whanau*, or extended family who resided in undefended villages (*kainga)* located in close proximity to a tribal or

sub-tribal stronghold (*pa*). Spatial organisation of the *kainga* was divided into separate sections for sleeping, cooking and food storage (Firth 1929:92,213). The distribution of economic resources such as food and land was largely managed at the level of the *whanau.*

At Buller and Heaphy we observed separate areas for sleeping, cooking and food storage. If the ethnohistorical evidence is applicable to the Archaic phase, we can assume that Buller and Heaphy were two undefended *kainga* where daily activities and economic resources were managed at the level of the *whanau.* As *whanau* is the basic and smallest unit of social organisation this may help us understand New Zealand prehistory in the context of the house society, which will be discussed in further later in this chapter.

Symbolic and ritualistic

At Buller and Heaphy, there were some observable distinctions between the different activities reflecting symbolic and ritualistic aspects within a site. Following Lawerence (1981), Weisler and Kirch identified dichotomous distinctions in Polynesian Ethnohistory:

East - west
Sacred - profane
Male - female

At Buller and Heaphy, there is a tentative East-West distinction. At both sites, fire features (indicating cooking and food producing areas) were located in East and stone tool manufacturing were located in the West. At Heaphy, obsidian artefacts are concentrated in one area, and at Buller there was a post hole with a large obsidian core at the bottom, a possible indication of obsidian storage or conservative practices. The presence of obsidian has previously been interpreted in a ritual context (e.g. Anderson and Green 2001), however this is probably not the case for the West Coast Archaic. At Buller, the post hole with a large obsidian core was found separate from the cooking areas. However, at Heaphy, the high concentration of obsidian artefacts overlaps with the proposed cooking area. One possibility is that this is not a cooking area at all, but the high concentrations of fires in this area were for another purpose. In

interpretation of the house as the centre, a symbolic focus where people were kept separate from the outside and the unknown. Hodder proposed that people were socialized into social roles and rules through repetitive daily practices and routines and through social memories in which these practices were embedded. The practice of moving through the threshold between the public area and the private area is one that is usually done upon invitation from a member of the Marae and often involves a welcoming ritual. This is an example of the social roles and rules are embedded with the physical spatial structure of the Marae.

It can be argued that inferences of the Maori marae is not applicable in this context because the marae structure discussed here is associated with late prehistory and contact periods, whereas Buller and Heaphy are Archaic phase sites. However, in his analysis of the Moikau House in Palliser Bay, Nigel Prickett argues that there has been relatively little change in the style of house design over several centuries. This was used to explain the preservation of social behaviour and symbolism (Prickett 1979). In addition the definition of West Polynesian Marae is similar to the Marae of the Polynesian outliers, including New Zealand. This indicates a long depth for New Zealand Marae, and was probably introduced by the earliest settlers (Kahn: 2006:441, Davidson 1984:162). The aim of this thesis is to explore ways in which social anthropology can influence and benefit New Zealand archaeology. The use of ethnographic interpretations is one way of doing so.

Ian Hodder's notion of *Domus, Agrious* and *Foris* along with Bourdieu's theory of *Habitus* can be applied to the context of New Zealand prehistory. It is argued that the house is a centre point in which people are socialized into social roles and rules through repetitive daily practices and routines and through social memories in which these practices were embedded. In the context of Buller and Heaphy, possible structures have been identified earlier in this chapter, and spatial patterning can be used to infer social practices. For example, cooking and food preparation areas were observed at both sites, and these areas were usually separate from post holes, indicating that building structures were kept separate from cooking areas. This in turn emphases the learned social rules of keeping *tapu* and *noa* separate. Artefact manufacture areas were identified in addition to areas of artefact use and artefact

storage. These are distinctive functional areas reflecting the social rules and daily practices involved with using these items and their specific functions.

Levi Strauss's house society and the Archaic phase in New Zealand

Levi'Strauss's *sociétés à maison* has been recommended as a tool for linking archaeological observations such as material culture or subsistence with abstract concepts of social and political organisation Walter (2004:134). *Sociétés à maison, or* house societies refers to the idea that the house can be interpreted as an analogy for kinship. That is, the house can be seen as a social grouping which persists through time, and maintains continuity, holding onto a mixed or movable property through the transmission of names, titles, prerogatives and other aspects which are important to one's existence and identity. Levi Strauss intended the house to be an addition to the classificatory terminology of social structure (Gillespie 2000:31). While family, lineage, clan and tribe can be arranged in a linear scheme based on size, complexity and exclusivity, the house exists at all these levels, encompassing the entire range of variability (Gillespie 2000 :31).

Walter (2004) initially introduced Levi-Strauss's *house societies* in relation to New Zealand Archaic as a theoretical tool to make connections between New Zealand Archaic and the East Polynesian Archaic. Walter (2004:135) proposed that these activity zones, when placed in close association with dwelling structures and cooking shelters can define household clusters – the most basic spatial unit of a house-based kin group. The way in which artefacts, work floors and food preparation is patterned is closely associated with the organisation of domestic production and household labour (Walter 2004:135). Walter noted that at several East Polynesian sites, household units are cluttered and lie within a single contiguous living surface, indicating a village type settlement. The space between houses is open space used by members of the community for traffic and inter-household interactions (Walter 1993:74).

It has been suggested earlier in this chapter that the social structure of Buller and Heaphy is probably a kinship based structure of the *whanau*, or extended family who resided in undefended villages (*kainga)*. As *whanau* is the basic unit of social

organisation this may help us understand New Zealand prehistory within the context of the *sociétés à maison.* At Buller and Heaphy, building structures are not so clearly defined, but from what spatial information we have, we can make inferences about social structure and social organisation. Structures were identified by post hole patterning, even if the parameters of the structures were not observable. Cooking and food preparation areas were observed. Artefact manufacturing zones were defined by areas of worked fragmented adzes in association with shell or stone debitage and flakes in close association with formed artefacts in various stages of production. At Buller and Heaphy, the activity zones in association with dwelling structures and cooking shelters indicate possible household clusters.

Walter (1992:74) noted that the space between houses is open space used by members of the community for traffic and inter-household interactions. Activities occurring in these "between" spaces can be organised or carried out at an individual, household or community level. At Heaphy, these "between" spaces were not easily observable, but at Buller, especially in MT4, there was evidence of these "between spaces – open areas indicated by the absence of post holes. Walter proposed at in a Polynesian village, the social rules defining memberships and member's rights are based around principals of lineage or descent (Walter 2004:136). This is also the case in other Austronesian settlements (See van Meijl 1993). At Buller and Heaphy, there was no clear evidence of social hierarchy observed in the spatial data. Nor were we able to make inferences about gender specifications in relation to the spatial data.

Recommendations for future research

Buller and Heaphy are two sites that contain a rich collection of artefacts. The potential for further lithics studies in this area is wide and broad. This thesis has focused on lithics and its association to space and social anthropology. Therefore, it was not feasible to go into to much detail in the material culture analysis outside of this focus. Several other variables were recorded during the process of data collecting in this research project, but not reported here because they were not relevant to the spatial analysis discussion. Such variables include, for the flakes, the presence of hammer dressing, polish and cortex, and which material types these variables were most frequent in. For the adzes, other variables were recorded, including manufacturing technique, portion, presence and form of reworking, presence of haft

polish and additional other observations. It is expected that future research will present some of the findings of the material culture in more detail.

Intra-site spatial analysis is also a broad topic, which is still not commonly investigated in New Zealand prehistory. One recommendation would be to do a comparative spatial analysis with other sites. In this thesis I compared the spatial analysis of Buller and Heaphy – two archaic sites on the West Coast of the South Island, but future research might extend to comparing the intra-site spatial analysis with inland and central South Island and with North Island sites to see if there are any common spatial patterning's that occur on a regional base. In addition, this thesis has compared two Archaic sites, but it would be interesting to see how Archaic sites compare with the later Classic phase sites in their intra-site spatial analysis. Finally, Buller and Heaphy are thought to be two kainga type settlements. It would be interesting to compare intra-site spatial analysis with other types of sites such as temporary camp sites and pa sites.

In this thesis I have argued New Zealand archaeology can benefit from influences in social anthropology. I have used discussions of space as a medium to link the two sub-diciplines. This thesis focused on intrasite spatial analysis and house as a focal point. However, there are other avenues to link social anthropology and archaeology. Some ideas for future research include investigating settlements and communities, studying architecture, and utilising ethnographic data and oral traditions to better inform archaeology.

Conclusions

This thesis originally set out to explore ways in which New Zealand archaeology can be better linked to social anthropology. In the process of doing so, I analysed two rich artefactual assemblages and explored intra-site spatial analysis from two key sites on the West Coast of the South Island.

I have examined the suitability and effectiveness of anthropological discussions within the context of New Zealand archaeology. In this thesis, I demonstrate that spatial organisation is not just motivated by functional and environmental reasons. Other factors such as cultural, symbolic and ritualistic, kinship, structure and rank are major contributors behind spatial organisation. A rich series of contextual interpretations which overlay each other is needed in order to better understand and interpret in New Zealand archaeology.

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