UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

An archaeological investigation of Mahula Hill: a thirteenth century settlement in the southern Kruger National Park.

BY

LUPFUNO PROMISE LAMULA

Submitted in fulfilment of the requirements for the degree of

Master of Arts

in the

FACULTY OF HUMANITIES

at the

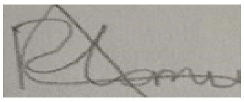
UNIVERSITY OF PRETORIA

SUPERVISOR: Doctor Alexander Antonites

Date:31/08/2024

Declaration

I, Lupfuno Promise Lamula, declare that this dissertation is my own original work. Where secondary material was used, this has been properly acknowledged and referenced in accordance with university requirements. This work has not been submitted before, in whole or in part, for any other degree or examination.

Signature: 

Date:31/08/2024

Acknowledgements

I would like to acknowledge the following people without whom this dissertation would not have been possible.

To Dr Alexander Antonites for the guidance, patience, and advice, thank you.

To Dr Annie R Antonites for the expertise in fauna, advice, encouragement, and the utilisation of the Ditsong reference collection thank you.

To Bianca Steyn for the expertise in botany analysis, thank you.

To Michelle Mouton for the expertise in shell disc bead analysis and the willingness to share her knowledge, thank you.

To Christine Smith for lending your iPad to assist with ceramic drawing thank you

To Anton Pelser for sharing the excavated material and project reports on Mahula Hill

Financial Assistance

This research was funded by the Department of Sports Arts and Culture.

Thus, any opinion, findings and conclusions or recommendations expressed in this dissertation are those of the author and therefore Department of Sports Arts and Culture do not accept any liability thereto.

Abstract

This study revisits the Early Iron Age (EIA) communities in the southern Kruger National Park, building upon Andre Meyer's 1980s survey that identified 17 Skukuza (SK) sites but missed Mahula Hill. Discovered and excavated by Anton Pelser between 2016 and 2019, Mahula Hill's strategic location along trade routes linking to the Mozambique coastline makes it a key site for understanding regional interactions. This research focuses on the material culture from Mahula Hill, as well as from the SK 4, SK 9, and SK 11 sites. Key artefacts, including glass beads, ceramics, shell disc beads, bone tools, stone tools, and metal objects, were analysed to establish a chronological framework and to examine site-level activities, consumption patterns, and regional linkages. Faunal and botanical analyses further reveal the dietary practices of these communities. The findings contribute to a broader understanding of the Early Iron Age landscape of the southern Kruger National Park, offering new insights into the social and economic networks that shaped the region. The findings include three samples that provided uncalibrated dates of 590±50, 760±60, and 720±60, which, after calibration, correspond to AD 1294-1425, AD 1161-1389, and AD 1215-1397, as well as uncalibrated date of 703±25, calibrated to AD 1270-1384. These dates have assisted in establishing a chronological framework for Mahula Hill allowing for the further development of this study. Additionally,28 glass beads, ranging in diameter from 2mm to 4.5mm, with the most common being tube-shaped (42%), classified into six shapes, reflecting reheating processes with dominant colours of citron and green, futher providing a chronological context for the site. Pertaining consumption patterns the Mahula Hill assemblage includes a variety of taxa, open grassland grazers like zebra, forest dwellers like impala, and riverine species like fish and serrated hinged turtle. Large mammals like giraffe and smallest mammal like crab are also present. The zebra is the most common species, at 6.5%. Additionally seeds were analyzed, revealing taxa such as Sclerocarya Birrea endocarp's fragment, Sclerocarya Birrea operculum, and amorphous material of a Sclerocarya Birrea nut. All bones tools showed sustained forceful impact, indicating macrofracture. Diagnostic impact fractures included crushing, bending, and hunting fractures. There are 4140 stone artefacts identified, 99% quartz, and 0.1% polishing stones, excluding lower grinders.

Key words: Kruger National Park, Archaeology, Early Iron Age, Ceramics, Glass beads, Lifeways

TABLE OF CONTENTS

Chapter 1: Introduction 1

1.1. Research objectives. 4

1.1.1.Problem Statement 5

1.2. Dissertation structure 5

Chapter 2: Research area 6

2.1. Climate, ecology, and fauna 7

2.2. Geology of the southern Kruger National Park 8

2.3. Site background 9

2.4. Summary 12

Chapter 3: Research Background 13

3.1. Introduction 13

3.2. Southern Kruger National Park 13

3.3. Ceramics as an integral part of Iron Age communities 18

3.4. Early Iron Age in the southern Kruger National Park 20

3.4.1. The Sabie complex. 20

3.4.2. Mutlumuvi complex 20

3.4.3.Skukuza complex 21

3.4.4.Relevent ceramic traditions for this project 22

3.4.4.1. Urewe tradition 23

3.4.4.1.1. Silver leaves 23

3.4.4.1.2. Mzonjani 23

3.4.4.2. Kalundu tradition 26

3.5. Human presence in the Kruger National Park 28

3.6.Animal use in the Kruger National Park 35

3.7. Summary 36

Chapter 4: Methods 37

4.1. Introduction 37

4.2. Mahula Hill excavation methods 37

4.3. Radiocarbon Dating 40

4.4. Ceramics 41

4.4.1. Vessel shapes 42

4.4.2. Decoration placement 43

4.4.3. Decorative motifs 43

4.4.4. Rim types 43

4.4.5. Orifice diameter 44

4.5. Beads 45

4.5.1. Glass beads 45

4.5.1.1. Method of manufacture and end treatment 45

4.5.1.2. Shape and size. 46

4.5.1.3. Diaphaneity and colour 46

4.5.2. Shell beads 47

4.5.2.1. Raw material 48

4.5.2.2. Shell disc bead morphology 49

4.5.2.3. Shell disc bead dimensions 49

4.6. Fauna remains 50

4.6.1. Unidentifiable and identifiable specimens 51

4.6.2. Recording system 51

4.6.3. Taxonomic identification 52

4.6.4. Skeletal element recording 54

4.6.5. Ageing 54

4.6.6. Quantification 55

4.6.7. Taphonomic factors 55

4.6.7.1 Burning 56

4.6.7.2. Butchery 56

4.6.7.3. Animal Gnawing 57

4.6.7.4. Weathering 58

4.6.7.5. Breakage and fragmentation 59

4.6.7.6. Ash 59

4.7. Metal/Iron objects. 60

4.7.1. Slag 60

4.8. Seeds 61

4.9. Bone tools 62

4.9.1. Macrofracture 62

4.9.2. Diagnostic Impact Fracture 63

4.9.3. Use-trace process. 64

4.10. Stone artefacts 65

4.11. Summary 66

Chapter 5: Results 67

5.1. Introduction 67

5.2. Radiocarbon Dating 67

5.3. Ceramics 69

5.3.1. Ceramic material from Mahula Hill 69

5.3.1.1. Vessel types 70

5.3.1.2. Vessel shapes 70

5.3.1.3.Decoration placement 71

5.3.1.4 Decorative motifs 71

5.3.1.5.Rim types 73

5.3.2. Ceramic material from SK4, SK9, SK11 74

5.3.2.1 Vessel types 75

5.3.2.2.Vessel shapes 70

5.3.2.3.Decoration placement 71

5.3.2.4.Decorative motifs 71

5.3.2.5.Rim types 80

5.4. Beads 81

5.4.1. Mahula Hill glass beads 81

5.4.1.1. Glass bead description Mahula Hill 83

Brownish red 83

Citron 83

Blue 83

Green 84

5.4.2. Skukuza 4 (SK 4) glass beads 85

5.4.2.1. Glass bead description Skukuza 4 (SK4) 87

Red on white 87

White 87

Blue 87

5.4.2. Disc beads. 88

5.4.2.1. Raw material identification 88

5.4.2.2. Shell disc bead size distribution patterns 89

5.4.2.3. Disc bead thickness and perforation. 90

5.4.2.4. Heated disc bead description 91

5.4.2.5. Disc bead edge description. 93

5.5. Fauna 95

5.5.1. Assemblage composition 95

5.5.1.1. Species presence 98

5.5.1.2. Wild Taxa 100

5.5.1.3. Small mammals and non-mammals 102

Small mammals 102

Non mammals 102

5.5.1.4. Exceptionally large mammals 102

5.5.1.5. Fish and freshwater mollusk. 103

5.5.1.6. Birds 103

5.5.1.7. Wild Bovids, Equids and Suids 104

5.5.2. Taphonomy 104

5.5.2.1. Weathering 105

5.5.2.2. Gnawing: rodent and carnivore 105

5.5.2.3. Butchery 106

5.5.2.4. Burning 106
5.6. Metal/Iron objects 107
5.6.1. SK4 107
5.6.2. Slag 107
5.7. Seeds 108
5.8.Bone tools 109
5.9. Stone artefacts 110
5.10. Summary 111

Chapter 6: Discussion and Conclusion 112

6.1. Chronology for Mahula Hill 112
6.2. Regional interactions and site articulation 112
6.2.1.Disc bead production. 112
6.2.2. Other site economic activities 114
6.2.2.1.Smithing activities 114
6.2.2.2.Stone artefact usage 115
6.2.2.3.Bone tools use and production. 115
6.3.3.Long distance trade routes 116
6.3.4.Regional interactions through ceramics 116
6.3. Consumption patterns at Mahula Hill 119
6.3.1.Patterns of animal use 119
6.3.1.1.Burning 119
6.3.1.2.Butchery 120
6.3.2.Hunting targets and species diversity 121
6.3.2.1.Other identified species 125
6.3.3.Acquisition strategies and kill off patterns. 126

6.3.3.1.Other sources of subsistenance 127

6.4.Summary 127

Conclusion and future directions 128

References 130

List of Figures

Figure 2-1: Map of South Africa and the location of Kruger National Park 6

Figure 2-2: The general location of Mahula Hill site and Skukuza 9

Figure 2-3: Mahula Hill stone walled terraces and small enclosures 10

Figure 2-4: Mahula Hill excavation blocks 11

Figure 2-5: Excavation layout of Skukuza 4 12

Figure 3-1 The spread of Bantu communities in the southern African interior adapted from (Huffman 2007:336). 22

Figure 4-1: Excavation layout of Mahula Hill Block 2 38

Figure 4-2: Mahula Hill Block 2 excavation depth 39

Figure 4-3: Mahula Hill Block 2 profiles 40

Figure 4-4: Different shades of burning recorded. 48

Figure 4-5: Chemical use-trace due to environmental and depositional factors 64

Figure 4-6: Fixed lower grinding stone 65

Figure 5-1: Radiocarbon dates from Mahula Hill. Results were calibrated using the southern Hemisphere calibration curve (Reimer *et.,al* 2020) and plotted with the OxCal v4.3.2 (Bronk Ramsey 2021) 68

Figure 5-2: Decoration placement from Mahula Hill 71

Figure *5-3:* Common neck decoration placement on SK4, SK9 and SK11 76

Figure 5-4 Diameter distribution patterns across both sites 89

Figure 5-5 Weathering patterns on skeletal material at Mahula Hill 104

Figure 5-6 Gnawing marks on skeletal material. 105

Figure 5-7 Sclerocarya birrea endocarp 108

Figure 5-8 Length distribution of bone tools and their use/function 109

List of tables

Table 4-1. Bovid size classes (after Brain 1974) and species represented in the study area. 52

Table 5-1 Radiocarbon dates from Mahula Hill. Results were calibrated using the southern Hemisphere calibration curve (Reimer et.,al 2020) and plotted in OXcal v4.3.2 (Bronk Ramsey 2017) 68

Table 5-2 Ceramic Material from Mahula Hill 69

Table 5-3 Mahula Hill assemblage vessel shapes 70

Table 5-4 Decoration motifs for Mahula Hill assemblage 72

Table 5-5 Mahula Hill assemblage rim types 73

Table 5-6 Ceramic material from SK4, SK9 and SK11 74

Table 5-7 SK4, SK9 and SK11 assemblage vessel shape 75

Table 5-8 Decoration motifs from SK4, SK9 and SK 11 78

Table 5-9 SK4, SK9 and SK11 assemblage rim types 80

Table 5-10 Diameter size distribution at Mahula Hill 81

Table 5-11 Shape distribution at Mahula Hill 81

Table 5-12 Glass bead colour distribution at Mahula Hill 82

Table 5-13 Shape distribution at SK4 85

Table 5-14 Diameter size distribution at SK4 85

Table 5-15 Diameter size distribution at SK4 86

Table 5-16 Total of analysed bead material from Mahula Hill and SK4 88

Table 5-17 Disc bead heated colours of SK4 91

Table 5-18 Disc bead heated colours of Mahula Hill 92

Table 5-19 Disc bead edge categories of Mahula Hill 93

Table 5-20 Disc bead edge categories of SK4 94

Table 5-21 Total faunal assemblage from Block 2 Square 9 Mahula Hill 96

Table 5-22 List of identified species. 98

Table 5-23 Description of taxa grouping adapted from (Brain 1975) 100

Table 5-24 NISP grouped into taxa (refer to table 4-1 for taxa abbreviations) 101

Table 5-25 Slag pieces from Mahula Hill (all block 2) and SK4. 107

Table 5-26 Stone artefacts from Mahula Hill 110

Chapter 1: Introduction

The thirteenth century in South Africa marks a time of growing social complexity in southern Africa, with notable examples like Mapungubwe and Mapela Hill in northern South Africa and southern Zimbabwe. This period is also defined by the expansion of trade and interaction networks throughout the region (Huffman 2007, 2015). As a result, most archaeological research from this time has understandably concentrated on these communities, often overlooking those located further south.

Mahula Hill a large thirteenth century settlement in the southern Lowveld of Mpumalanga in the Kruger National Park. The site was recently discovered and excavated by Pelser (2016, 2018 ,2019) uncovering large scale stone settlement which is uncommon for the region during its period. The research will also include comparisons with the nearby sites SK 4, SK 9, and SK 11 to answer research objectives on regional interactions.

The southern Lowveld (the low-lying regions east of the Drakensberg escarpment and west of the Lebombo mountains in northeast South Africa) has been regarded as being sparsely populated and liminal to major social developments as witnessed elsewhere in southern African history (Meyer 1986). The Skukuza complex of sites was identified by Andre (Meyer 1986), identifying seventeen sites within this complex.

However, only a few have been studied in detail such as Skukuza 17. (Jordaan 2016) studied SK 17 and TSH 1 focusing on creating a ceramic sequence for the sites through stylistic analysis of its ceramic assemblage as well as incorporating technological ceramic analysis X-ray fluorescence (XRF). Thus, adding to our understanding of Early Iron Age Communities by additionally, analysing stone artefacts, shell beads and faunal material.

The analysis of material finds from Mahula Hill, SK 4, SK 9, and SK 11 provide a chronological and archaeological context for the southern greater region of the Kruger National Park. Despite being a large site, Mahula Hill had not been identified in previous surveys of the Kruger National Park (e.g Meyer 1986). Pelser identified and excavated the site in 2016, 2017, 2018 and 2019. Radiocarbon dates indicate that the first occupation of the site was in the Early Iron Age. However, the material culture suggests further multiple occupations going into more recent times.

This means that Mahula Hill occupied a prominent position in regional history since elsewhere during this period is one which sees major changes in southern African society. The most significant of these is the move to increasingly complex social organisations and a rapid increase of long distance of trade between the ports on the Indian Ocean and communities in the southern African interior. Prior to the excavations of Mahula Hill, the southern Lowveld was seen as isolated from these regional processes. However, the finds of trade beads, and marine shells suggest that this region was far more involved than previously thought.

In addition, the prominent stone architecture (typically associated with socially complex communities), also suggests a degree of social differentiation within the community and of regional political prominence. Few sites with these features from the early mid second millennium have been identified, and to date, none from the southern Lowveld. Therefore, it may be some of the earliest stone walled sites in the Lowveld region. Mahula can therefore, potentially make a significant contribution to the archaeology of southern South Africa.

1.1. Research objectives.

The southern region of the Kruger National Park is surrounded by rivers with the Sabie River north of the sites and the Mozambique border to the east. The area south of the Sabie had been under studied over the years, until surveys conducted by Andrie Meyer (1986) indicated a need for further research. The surveys conducted earlier within the southern region of the Kruger National Park could not identify Mahula Hill regardless of its size and stone structure.

1.To establish a temporal framework for Mahula Hill.

An initial step in establishing archaeological context for Mahula Hill is to establish a temporal framework for the site. This temporal framework of the occupation at the site will be conducted through radiocarbon dating, ceramic and glass bead analysis.

2.To reconstruct regional interactions.

To reconstruct regional linkages and interactions of material culture to other sites in the region, a comparative analysis of material culture was conducted. The analysis will focus on regional linkages through ceramic similarities. The comparative analysis of ceramics will investigate ceramic design and style at Mahula Hill and how it compares to regional assemblages.

3.To establish basic parameters of past lifeways.

This aim will focus on consumption habits and patterns especially pertaining to animal and plant resources at Mahula Hill. To establish the basic parameters of past lifeways and consumption patterns, the study will look at the economic activities at the site through diet (faunal and botanical remains), trade items (e.g. Glass beads) and craft production (metal production) .

1.2. Problem Statement

Despite being a large site, Mahula Hill was not identified in previous surveys of the Kruger National Park (e. g Meyer 1984,). Pelser identified and excavated the site in 2016, 2017, 2018 and 2019. Preliminary ceramic analysis suggested that the site dates between 12th and 15th century AD. These dates need to be confirmed by radiometric methods, however. Preliminary analysis of the glass beads suggests that this date range is likely constrained to the thirteenth century. This means that Mahula hill occupies a very important position in regional history since the period is one which sees major changes in southern African society. Thus, it is important to fill this gap, as this area is mostly excluded from main archaeological discussions. Additionally, the increasingly complex social organisations and a rapid increase of long distance of trade between the ports on the Indian Ocean and communities in the southern African interior also prompts the need for research in this region.

Prior to the excavations of Mahula hill, the southern Lowveld was largely seen as isolated from most regional processes. However, the finds of trade beads, and marine shells suggest that this region was likely far more involved than previously thought. In addition, the prominent stone architecture typically associated with more socially complex communities, also suggests a degree of social differentiation within the community and regional prominence which must be investigated. Not many sites with these features from the early mid second millennium have been identified with these features, and none from the southern Lowveld. Therefore, it may be some of the earliest stone walled sites in the wider region. Mahula can therefore, potentially make a significant contribution to the archaeology of southern South Africa.

1.3. Dissertation structure

Chapter 2 defines the research area of Kruger National Park environment, geological features and ecology of diverse plants and animals. This chapter also expands on the history of excavations in the southern KNP.Chapter 3 provides a review of relevant literature on the Kruger National Park and Iron Age archaeology. This chapter highlights the history of occupation within the southern region of the park, focusing on the chronological sequence of the known sites within the park as well as exploring animal use within settled communities.Chapter 4 presents the methods used to answer the above-mentioned research objectives. It is structured to firstly present the excavation methods from Mahula Hill as well as other methods used in analysing fauna, glass beads, ceramics, metal objects , seeds and bone tools.Chapter 5 presents the detailed results of material culture analyses from Mahula Hill, Skukuza 4, Skukuza 9, and Skukuza 11. The material consisted of metal/iron, seeds, bone tools, stone tools, fauna, beads, ceramics starting with radiocarbon dates.The results from this study have shed light into the social economy of craft production, traded goods, and hunting and or sawing tools. Chapter 6, draws on the information presented in the previous chapters to provide meaning to the activities that took place on each site, giving concluding remarks and research output.Highlighting the chronological sequencing of occupations conducted by radiocarbon dating and glass beads. Furthermore, reconstructing site articulation, regional linkages and interactions through ceramics and glass beads. Lastly providing a basic understanding of lifeways focussing on consumption habits.

Chapter 2: Research area

The sites included in this study were identified and excavated as part of different projects. The Skukuza 4, Skukuza 9 and Skukuza 11 sites were first identified during a survey of the Kruger National Park (KNP) by Andre Meyer (1989) and test pit excavations was done at SK4 . However, during the KNP survey Mahula Hill had not been identified . Anton Pelser later excavated and mapped Mahula Hill in three seasons between 2016 and 2019. The area that this research takes place is in the South African Lowveld region the low-lying landscape west of Drakensburg escarpment and Lebombo Mountains to the east (Figure 2-1). This area is geographically bounded in north-east by the highveld escarpment to the southeast, separating the inland highveld plateau from the lowveld and the Soutpansberg mountains to the north and the Lebombo Mountains to the east.

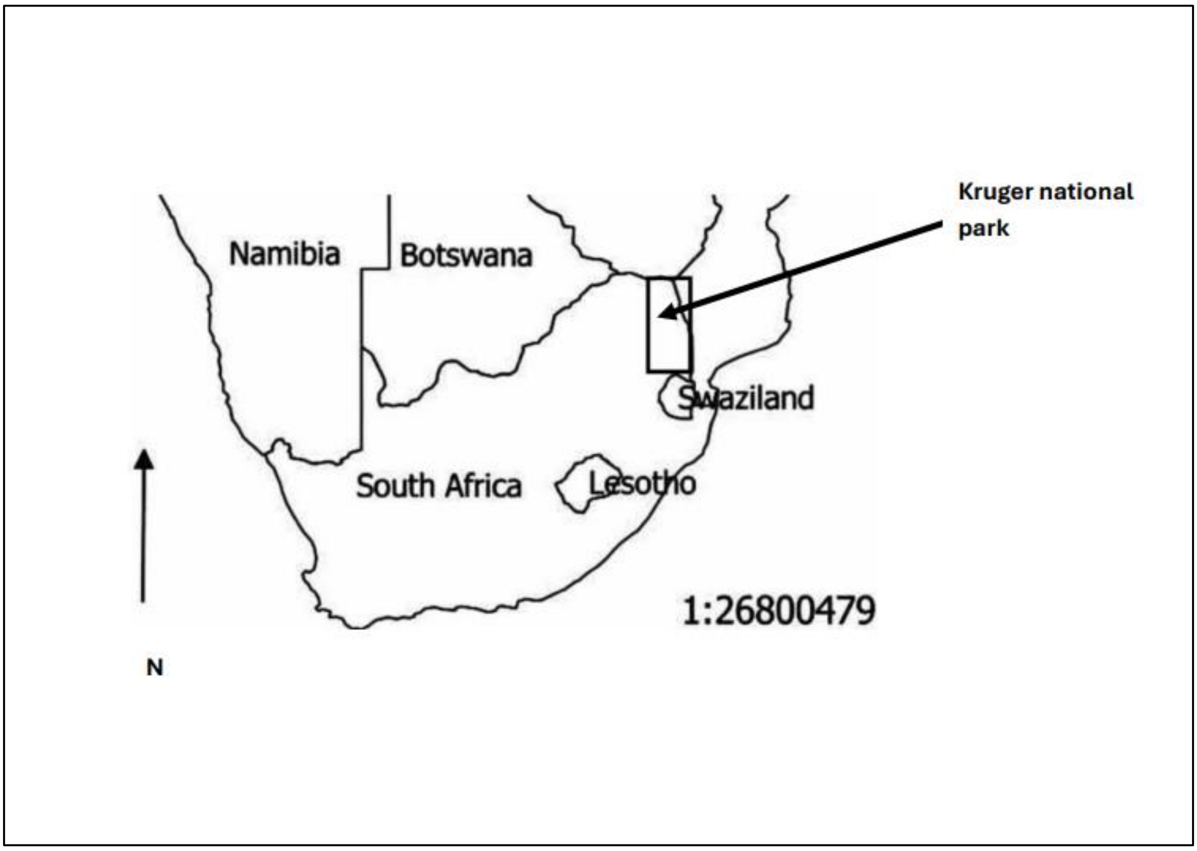


Figure 2-1: Map of South Africa and the location of Kruger National Park

2.1. Climate, ecology, and fauna

The Lowveld undulates and decreases in terrain elevation from 2100 m in the west to ca.450 m in the east (Wessels et al 2010). Rains occur in summer from October to May with a strong rainfall gradient from the Drakensburg mountains in the west 1200 mm to 500 mm in the east (Wessels et al 2010:20; Shackleton & Scholes 2011:187). The southern Lowveld has arid, semi-arid and mesic regions which are mostly covered by savanna woodland with a subtropical climate and hot rainy summers.

Central lowveld span approximately 11 000 km and is mostly covered by savanna woodland with a height mean canopy of 5-7 m (Wessels et al 2010). The ecology of the southern Kruger National Park ranges from arid and semi-arid areas within the region thus, influencing the fauna of the area. The arid region has a mean canopy of 5-6. m with a vegetation dominated by *Acacia nigrescens*, the significant biomass contributors to the 6-7 m canopy in the semi-arid region is dominated by *Combretaceae* species and the mesic region on Pretoriuskop southern KNP has more broadleaved species dominated by the *Pterocarpus angolensis* (Shackleton & Scholes 2011).Thus, the southern region of the Kruger National Park has a high diversity of plant and animals.

The vegetation in the semi-arid region of southern Kruger National Park (KNP) is sparse, with a biomass of 34 kg/ha, and is primarily home to giraffes, zebras, blue wildebeests, impalas, and waterbucks (Shackleton & Scholes 2011). The abundance of wildlife in this area likely attracted communities to settle there (Plug 1982). Additionally, the availability of wood for fuel and the protection offered by the savanna canopy may have made this southern region an ideal environment for some inhabitants. The rich resources in the area have supported a long history of occupation, which will be the focus of this study to better understand the diet and chronological sequence of these communities.

2.2. Geology of the southern KNP

The geology of the southern Lowveld includes granite hills and gneiss characterized by nutrient poor soils and undulating terrain (Shutte 1986:15; Venter 1986:126-127; Wessels et al 2011:20; Shackleton & Scholes 2011:185; Moffet 2017:42). Characterized by granite hills, outcrops, and large boulder, such as Shirimantanga and Renosterkoppies, Mahula Hill is located on a large granite outcrop at 368m above sea level (Pelser 2018). These granite hills provided shelters close to watering places and game paths.

There is a strong correlation between geology and soil properties in plants (Venter 1986; Shutte 1986; Shackleton & Scholes 2011). Hence, the grazing and environment of the southern Kruger National Park is unsuitable for domestic stock and the soils are poor (Plug 1984). The southern Kruger National Park is also characterised by soils on granitoid basement rock (Venter 1986) which are believed to be poor soils for agriculture.

2.3. Site background

Andre Meyer (1989) conducted surveys of the park with the aim of identifying and documenting all sites ranging in size and age. This survey identified several sites including SK4, SK9 and SK11, however, the survey did not identify Mahula Hill which is located within the same area (Figure 2-2).

Figure 2-2: The general location of Mahula Hill site and Skukuza (Google earth)

Mahula Hill is geographically located in an area characterized by granite hills,with Skukuza sites located 15km north. Mahula Hill is situated halfway between the Mahlambamadvebe and Mahula rivers and their floodplain. The site contains substantial stone-walled terracing and enclosures with living & working spaces created by enclosing walls and natural rocky ridges and contours, the site has at least eighteen stone-walled terraces consisting of low sections of 0.50m in height (Figure 2-3). The natural topography of the hill was utilized in the construction, the stone-walled terraces is typical dry stone, with a double row of large stones in-filled with smaller stones.

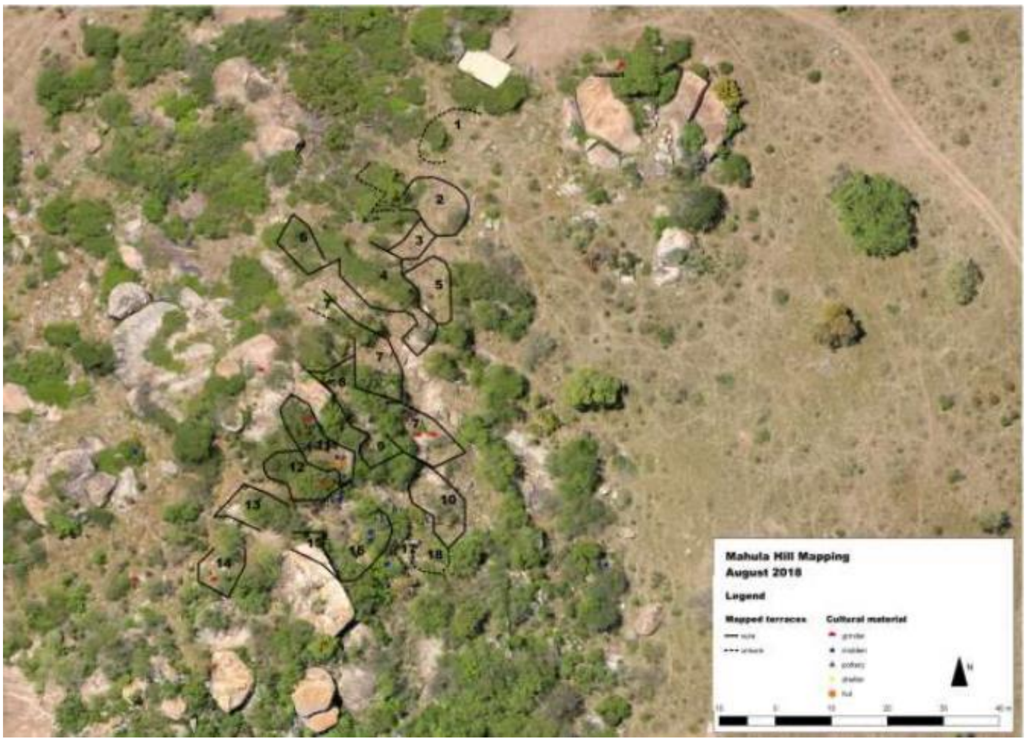


Figure 2-3: Mahula Hill stone walled terraces and small enclosures (Pelser 2017)

The presence of pottery and a grinding stone underneath one of the large boulders discovered by a ranger at the site in January 2016 led to formal in excavations in 2017. The formal excavations were in Blocks 1 and 2 (Figure 2-4) with several squares in each block. These sections of the site contained a fair amount of broken pottery fragments, a lower and upper grinder, burnt bone and tortoise shell pieces and ashy deposit on the site thus, they were excavated.Pelser's (2017) excavation on block 1 was close to a small rock overhang on one of the stone-packed terraces containing a rich ashy deposit and Block 2 was on another terrace where a hut would have been located.

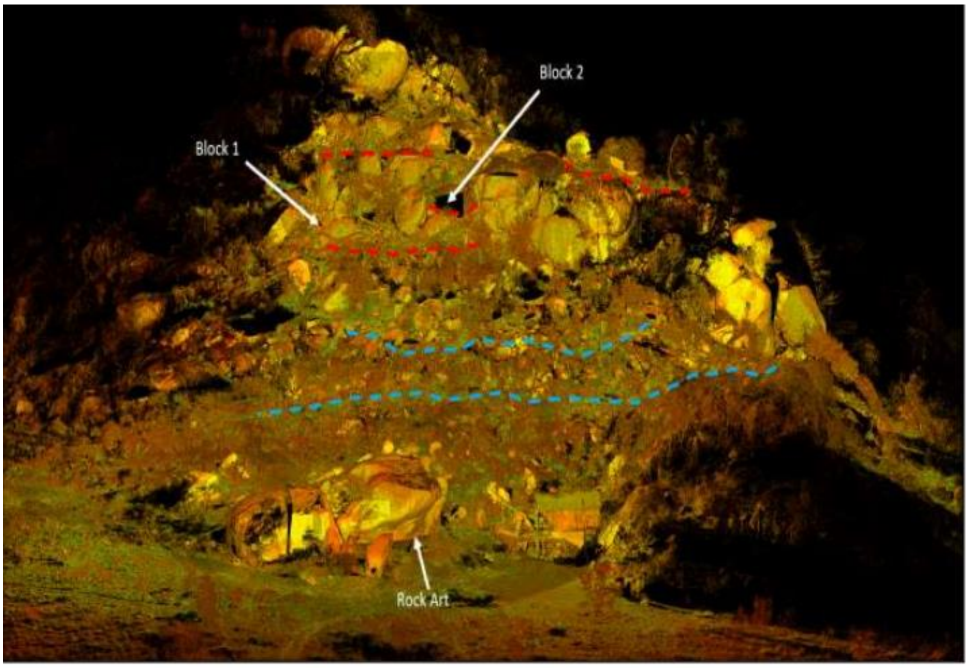


Figure 2-4: Mahula Hill excavation blocks (Pelser 2017)

Sk 4 was excavated in 1988 and surface collections were made of Sk 9 and Sk 11 surface. During surveys (Meyer 1986) other sites were identified however, the focus of this study will be on SK 4, SK 9 and SK11 since these are in proximity of Mahula Hill.

Sk 4 is geographically located in an area characterized by granite hills, outcrops, and large boulders. This natural topography of the site enabled the enclosures to be used for living and working spaces. Several test pit excavations of one meter on four sides were dug (Figure 2-5) ceramics, slag, ostrich eggshell, glass beads, metal, bone tools were excavated. The excavations were dug in block C 7, block E5, block F5, and block G5.

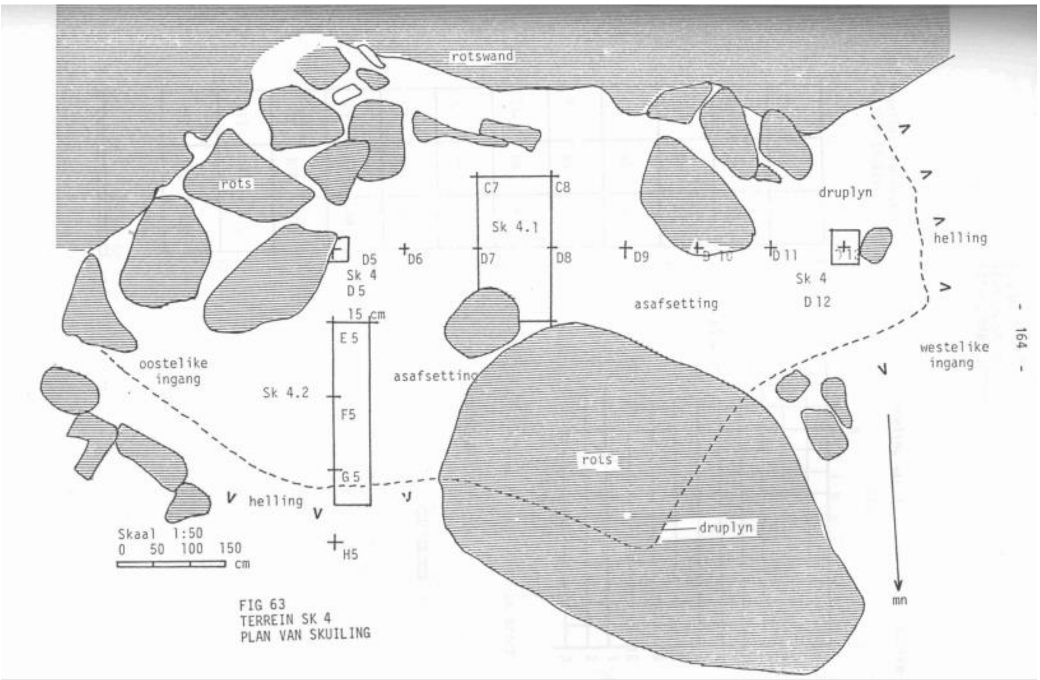


Figure 2-5: Excavation layout of Skukuza 4 (Meyer 1986)

2.4. Summary

The Kruger National Park environment has played host to several communities. The lowveld region within KNP is home to a unique geological features and wide variety of diverse plant and animals. This diversity spreads into the archaeology however, not much research has been conducted within this region thus, below l present a research background into the area.

Chapter 3: Research Background

3.1. Introduction

This chapter presents Iron Age research in the Kruger National Park to explore research questions that guide this study. The history of occupation within the southern region of the park is also reviewed highlighting the pros and cons of occupying the region and the abundance of the resources that pulled people into the region. Further focusing on the chronological sequence of the known sites within the park and exploring animal use within sedentary communities.

The Iron Age is a period in human history characterized by the widespread use of iron tools, agriculture, and weapons. This period is divided into three periods the Early Iron Age (AD 200-900), the Middle Iron Age (AD 900-1300) and late Iron Age (AD 1300-1840) (Huffman 2007). The beginning of the Early Iron Age, which will be the focus of this project, may vary according to region however, it marks the widespread use of iron transition from stone tool with regions having varying levels of iron use. Early Iron Age saw the rise of trade and settlements, as iron tools and weapons became more common, communities grew ushering in a period of development of trade networks with iron being the most important trade good. This period also saw the development of distinct artistic ceramic styles and jewellery. Cultural identities were strongly influenced by these developments especially in regions like the Lowveld.

3.2. Southern Kruger National Park

Research on the eastern Lowveld, especially in Kruger National Park, is limited, with most studies focusing on late farming communities (Meyer 1986, Plug 1988) and heritage sites like Thulamela in the northern part of the park (Meskell 2007, 2009). Most research has also concentrated on stone-walled complexes. However, the excavation of the Makahane ruins in the northern part of the park (Elloff & De Vaal 1965) sparked further interest in the area's archaeology, leading to ethnological studies at Masorini (Meyer 1986:178). These studies included a comprehensive survey of the southern Letaba bank (Meyer 1986; Verhoef 1986), confirming the area's long-term occupation. This work contributed to doctoral theses by

Andrie Meyer (1986), Ina Plug (1988), and a master's dissertation by Gerhard Jordaan (2016).

Andrie Meyer (1986) PhD focused on identifying and creating a cultural historical sequence of farming communities within the southern Kruger National Park. The survey south of Letaba identified 313 Early Iron Age sites with 35% (N=110) are associated with specific farming communities through ceramic markers (Meyer 1986). Excavations were conducted at 11 of the identified sites (Meyer 1986).

Within the Kruger National Park survey (Meyer 1986) identified seven Early Iron Age ceramic traditions on eleven excavated sites, with *Pafuri* 8 and *Shilowa* 4 having Early and Late Iron Age components, and Letaba 7 having two early and one Late Iron Age component, representing single occupations. Early Iron Age settlements were typically situated on high riverbanks, above the flood zone. Sandy banks were especially favoured, as the area's agricultural potential was limited. These settlements were small, often covering less than 2 hectares, due to the lack of stable farming practices (Meyer 1986).

The excavations revealed that one of the 11 sites examined was not used for a single, continuous occupation. Instead, it had multiple short-term occupations, each lasting no more than a decade (Meyer 1986; Plug 1989). This conclusion was based on the size and depth of the ash heaps at the sites, as well as the shallow layers of material culture found (Meyer 1986; Plug 1989). It was believed that the region was marginal during prehistoric times, affected by diseases like nagana, foot-and-mouth, and horse sickness, which limited the herding of domesticated animals. This theory was supported by the absence of cattle remains at the sites (Meyer 1986). Earlier research suggested that the presence of farming communities in this area was influenced by socio-political factors, population growth, and tensions in more favourable regions, which caused people to move to less fertile areas (Meyer 1984:217).

However, this study proposes that the presence of farming communities within the southern region of the Kruger National Park was not due to the dispersal of people to unfavourable regions rather, it was a strategic positioning of people who engaged in trade. Their presence may also be due to migration and diffusion of people within the southern region as attested by ethnological accounts of how ethnic groups formed and diffused with others within the region. The presence of animal diseases may have restricted herding of domesticated animals however, this should not be used to qualify the southern region as insignificant and unfavourable for sedentary settlements.

The stance that the lack of cattle substantiates the marginality of the southern region is derived from the well documented importance of herding within Bantu communities (Huffman 2001). Animal domestication has long been used as a barometer for wealth, class, and social complexity in Iron Age communities (Voigt 1986). Furthermore, the use of domesticates in the diet and social aspects such as marriage rites (Kuper 2016, Preston-Whyte 2024) further solidifies the importance of cattle, sheep and goats in the developed ideology and the classification of Iron Age communities that was employed by Andrie Meyer (1984, 1986).

This study focuses on repositioning the ideology of domestication within Iron Age communities in the context of southern Kruger National Park. Within the southern region new ideology must be pragmatic in studying the area without centring domestication as one of the foundations for the development of complex societies. It is crucial to consider the environment in the southern region from an angle of resource abundance and great importance, to be open to new interpretations of the area. Thus, what will be considered within these new interpretations of social complexity within the region is the scale and size of the site as well as the occupation period instead of mainly considering domestication .

The reconnaissance of the southern bank of the Letaba valley (Meyer 1986) was unable to identify Mahula Hill that is located within the same area. Mahula Hill is a large-scale occupation (Pelser 2018) that can be used in understanding social complexity within the region. The inability to identify this site during Meyer's survey was due to thick vegetation. Furthermore, the reconnaissance results were not properly propagated, and they were too broad without specific focus on a site to fully understand the nuances of each community. The lack of proper propagation of results was also due to the excavated material not being analysed in totality causing gaps in our understanding of the southern region in the Kruger National Park. This gap led to a research project undertaken by a master's student on Early Iron Age Communities analysing ceramics from Tshokwane 1 (TSH 1) and (SK17) Skukuza 17 (Jordaan 2016).

The formulation of culture historical sequences of the farming communities in the southern Kruger National Park was intended to serve as a foundation for further research in the area. Thus, Gehard Jordaan (2016) dissertation focused on two Early Iron Age Communities in the southern region of Kruger National Park TSH1 and SK 17 which were excavated by Meyer (1986). The focus was on the reanalysis of the material collected by Andrie Meyer (1984) as well as providing new radiocarbon dates to support the chronological sequence of TSH1 and SK 17 ceramic assemblage (Jordaan 2016). Furthermore, the focus was on understanding the finer nuances of the communities by analysing stone artefacts, shell beads and fauna material formulating a deeper understanding of the once inhabited sites (Jordaan 2016).

In the attempt of understanding the finer nuances of site economy that were not covered by Andrie Meyer (1986). The use of desktop study was employed in the identification of the sites to locate the sites on the ground to assess their potential relevance. Furthermore, excavations took place at TSH 1 and SK 17 to supplement the study material. The excavated material was combined with the material excavated from Andrie Meyer's research. The ceramic analysis method focused on larger ceramics with more diagnostic attributes creating a typology that was linked to relevant published ceramic typologies in addition XRF was conducted on the ceramics to understand clay sourcing.

The inferences drawn from this study is that ceramics found at TSH1 formed part of late Mzonjani ceramic assemblage and that the site was likely occupied for a single period (Jordaan 2016). Furthermore, TSH1 compositional analysis of fabric and XRF indicate that the clay used for ceramic material were locally sourced (Jordaan 2016). However, other material that infer onto site economy indicate that production of shell beads in TSH 1 occurred elsewhere (Jordaan 2016:154) this is a great indicator of trade. Furthermore, TSH1 provided evidence of the presence of cattle (Jordaan 2016:154) however, earlier collections contained no cattle remains (Plug 1988).

The drawn inferences on SK17 are that the site consisted of multiple occupations indicated by the presence of ceramic assemblages from the Kalundu tradition (Msuluzi, Ndondondwane and Ntshekane) and the Urewe tradition (Mzonjani) however, the lack of stratigraphic information and depth horizons posed a problem (Jordaan 2016). The lack of shell beads from SK17 suggested that the size of the community was smaller, or shell beads were not recovered due to excavation methods employed (Jordaan 2016:238). However, it is possible that the absence of shell beads was due to beads being passed down generations or the short occupation period did not allow for the establishment of shell bead production.

The clarification of the ceramic sequence for SK 17 and TSH1 has laid a solid foundation for more conclusive formulations of ceramic sequences in the southern region of Kruger National Park. In Jordaan's 2016 study on the ceramic sequences of SK 17 and TSH1, significant challenges arose due to the lack of stratigraphic knowledge and depth horizons, which made it difficult to interpret the ceramic data. The re-analysis of the existing archaeological material, along with additional excavation and survey work, is crucial for addressing the research questions posed by Gerhard Jordaan (2016). This re-analysis is valuable because it allows for the use of improved analytical techniques and the opportunity to challenge outdated interpretations and information.

The role of ceramics within the interpretation of Early Iron Age Communities is very significant as typological studies have used in creating a relative dating sequence in the identification and spread of Bantu culture in southern Africa (Huffman 2007). In addition, their socio-political structures and way of life can be understood through morphological and technological aspects of ceramic vessels (Huffman 2007;Lindahl & Pikirayi 2010). Furthermore, temporal issues such as settlement establishment, their growth and their subsequent abandonment can all be revealed through ceramic studies (Fowler &Greenfield 2009:345). Thus, ceramic studies continuously provide crucial means to understand the spread of Early Iron Age Communities as well as their settlement history and the socio-political organisation of communities.

3.3. Ceramics as an integral part of Iron Age communities

Early Iron Age communities culture sequence was created through the combination of radiocarbon dating and ceramic assemblages (Inskeep 1971, Van der Merwe & Huffman 1979; Maggs 1993) application enables the establishment of regional chronology of cultural units (Maggs 1980 1984; Huffman 2007). This approach had been challenged (Hall 1980 1987) leading to two approaches the British and North American which play a significant role in understanding Early Iron Age communities.

The British culture model approach borrowed from Gordon Childe's constructs of culture. Within this approach cultural material is viewed based on certain cultural material such as (ceramics andornaments) re-occurring together. These re-occurring cultural traits are grouped together, however, through seriation and stratigraphy they are distinguished into different cultural groups. Thus, archaeological translation into the past is done by collecting archaeological objects, dividing them into groups called archaeological cultures (Childe et.,al 1940).

However, in contrast to the British approach Thomas Huffman (1980 1970 1971) introduced ceramic traditions which is well established in North America (Hall 1983 1984). This approach presents the idea of ceramic traditions as archaeological cultures defined by ceramic styles enabling the trace of ceramic attributes through successive generations based on stylistic attributes (Huffman 1980 1970 2007). In addition, making it possible to identify objects and determine group identity through identified objects (Huffman 2007:111). This approach emphases that style becomes a maker of group identity.

Ceramic decorations are intricate and important as they infer a great deal of information about social identity or individual identity (Huffman 2007). In addition, ceramic decorations carry messages about social organisation as well as daily life for example inferring on a woman's marriage status or an individual's social hierarchy (Blacking 1969; Huffman 2007). Therefore, to understand intricate ceramic decorations archaeologists tend to draw from ethnographic studies (Huffman 1979:123) to create correlations between ethnographic cultures and archaeological material (Huffman 1980:121) this point will be further discussed below.

The material culture that can be used to infer community identity are only ceramics. They meet the three criteria's that can be used in identifying archaeological entities (1) the display of stylistic variable (2) variables consisting of multiple alternatives that are unlikely to occur in various groups by chance (3) objects must occur commonly (Huffman 1980:124). Additionally, there are three variables that are used in determining ceramic styles namely vessel profile, decoration layout and motif type (Huffman 2007). Thus, this multidimensional method offers an empirical way to measure cultural identity through ceramic traditions/ assemblage (Huffman 1980 2007). The use of this multidimensional method has been used to equate ceramic stylistic attributes to group identity (Evers 1988; Whitelaw 1994 1996 2012). Furthermore, this method has been applied across studies on farming communities in southern African communities (Huffman 1980 1989; Loubser 1993; Whitelaw 1994 1996).

This multidimensional method, however, has faced criticism that it is focused on equating ceramic vessel to group identity and the way ethnographic sources are applied (Hall 1983) stated that the direct link of present and past groups within the multidimensional method is problematic. Furthermore, it created a representation of the past as static and lacking internal agency (Hall 1984). Also, other studies indicate that group identity is not fixed in time and space thus, it can be fluid and changing (Ashley 2010; Pikirayi & Lindahl 2013). Regardless of the multidimensional method's limitation stylistic studies do remain prevalent and are successful in defining and describing ceramic assemblages in southern African (Pikirayi 1999; Whitelaw 2012).

3.4. Early Iron Age in the southern Kruger National Park

A substantial amount of Early Iron Age sites was identified by Andrie Meyer (1984 1986) as mentioned above. The ceramic material from these sites were divided into nine traditions suggesting the movement of different groups into the southern region of the Kruger National Park (Meyer 1986). The Early Iron Age communities moved into the region around AD 200 and AD 400 (Meyer 1986). Ceramic traditions that are relevant to this study out of the nine identified will be addressed below , as the rest would not be relevant to the study.

3.4.1. The Sabie Complex

In relation to the Mutlumuvi complex, the Sabie complex also relates to the Lydenburg tradition as well as Ndondondwane in the Tugela basin KwaZulu-Natal (Maggs 1980). The Sabie complex has been identified in the southern Kruger National Park in SK17 (Meyer 1986:225). (Jordaan 2016) concluded that based on similarities to Lydenburg sites and Ndondondwane sites , SK17 belongs to this industry stretching across KwaZulu-Natal to Mpumalanga. Additionally, SK11, SK4 and SK9 may belong also within this complex, this will further be discussed below.

3.4.2. Mutlumuvi Complex

Archaeological sites within this complex mostly occur close to streams and rivers. They are characterised by ash heaps and the concentration of bone and ceramic sherds (Meyer 1986:22). The site associated with this complex within this study is Mahula Hill. Ceramics within this complex have characteristics of everted rims, with thick horizontal incised lines on the neck as well as triangular decoration (Meyer 1986). This complex dates between AD AD350 and AD600, it is closely related to the Broederstroom industry, sites relating to Lydenburg, Mzonjani and Enkwazini sites and the Matola sites in Mozambique (Maggs 1980; Mason 1981; Evers 1982). The ceramic distinction and interpretation adopted by Meyer (1986) was controversial and not adopted by other archaeologists at the time. As they often lumped the Kruger National Park Early Iron Age sites into either Western stream or Eastern stream (Ever 1988). Thus, opposing the developing position of multiple migrations into the already existing streams presented (Meyer 1986). These multiple migrations distinguish sites within the Kruger National Park from elsewhere.

3.4.3. Skukuza Complex

The Skukuza complex is a great example human migration and cultural diffusion that can be noted on ceramic assemblages within the study region. The ceramic assemblage has both Kalundu and Urewe tradition, which is very common for sites that are multi-occupational. Situated along the northern banks of the Sabie river falling in the same landscape with Tshokwane 1 . It was initially believed to be a single occupation (Meyer 1986) however, Jordaan (2016:286) re-analysed the ceramics, and it indicated that the site is multi-occupation.

The ceramic assemblage of Skukuza were likened to the Lydenburg Heads site (Meyer 1986:270) as well as Ndondondwane in KwaZulu-Natal (Evers 1982; Maggs 1984; Whitelaw 1996). In addition, others believed it belonged to the Garonga facie (Huffman 2007:131). Garonga is the third facie of the Kwale branch dating between AD750-AD900 (Huffman 2007). The site has both Urewe eastern stream tradition and the Kalundu western stream . The multiple occupation on the site indicates the presence of Mzonjani ceramics, followed by communities that produced Msuluzi and Ndondondwane (Jordaan 2016:287).

Stylistic attributes that are characteristic to Urewe tradition such as punctate with oblique incised lines on the rims of vessels combined with the Kalundu tradition S shaped and/or recurved jar vessels are found in the SK17 assemblage (Jordaan 2016:286). Additionally, rims that have well defined points of inflexion that are characteristic to Urewe tradition as well as decorations on the lower parts of rims or on necks are also included in the SK 17 assemblage (Jordaan 2016:287). The SK17 ceramic complex is a very important assemblage in this study especially when studying other Skukuza sites.

3.4.4. Relevant ceramic traditions for this project

The project will focus on Urewe tradition especially the Kwale stream as well as the Kalundu tradition (Figure 3-1). Thomas Huffman's stance on the spread of ceramic assemblage in the Iron Age period will be used as it has been proven to be the most accurate in understanding the Iron Age period in southern Africa. With the aim of answering questions stated in Chapter 1, below a clear understanding of ceramic traditions is presented focusing on the stylistic attributes of the Urewe (Kwale stream) and the Kalundu traditions.

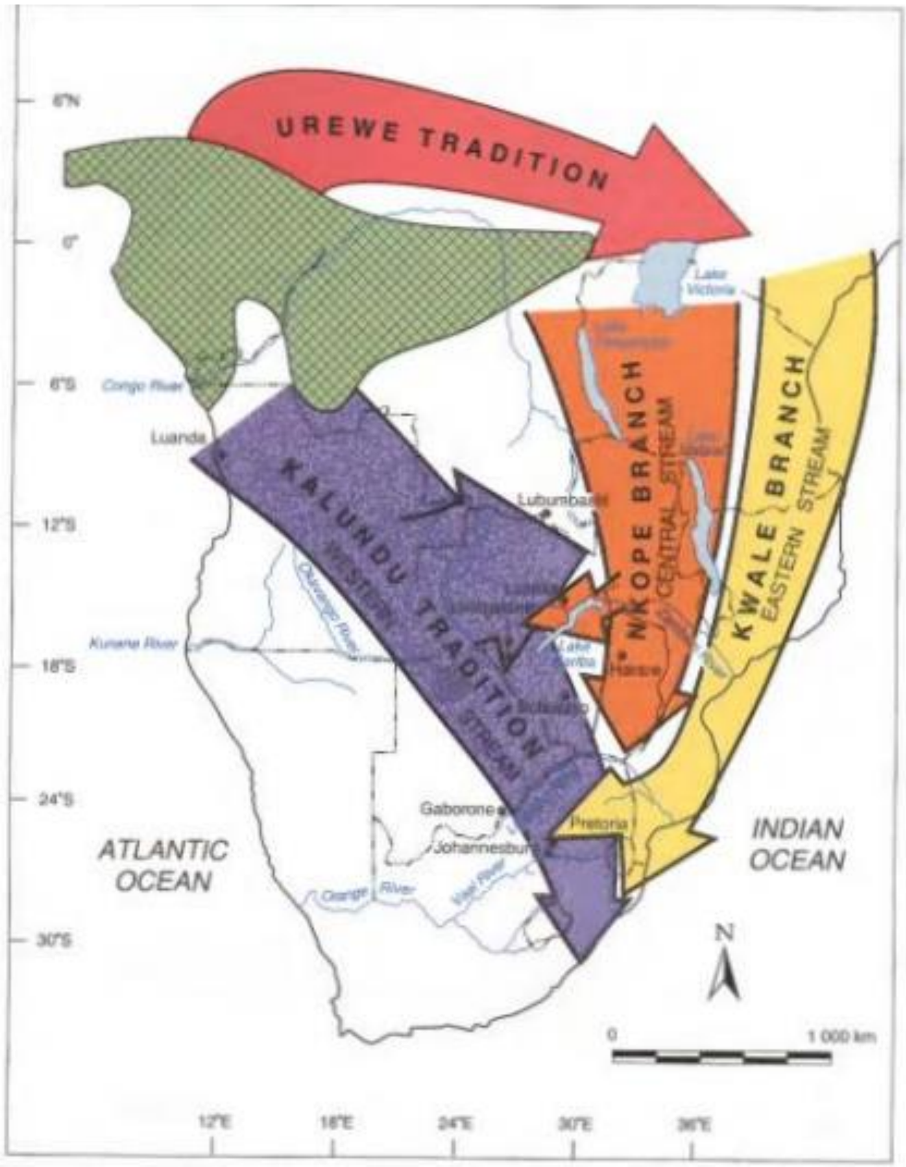


Figure 3-1 The spread of Bantu communities in the southern African interior adapted from (Huffman 2007:336).

3.4.4.1. Urewe

In the Urewe tradition, the focus will be on the Early Iron Age movement of the Kwale eastern stream, as the central stream Nkope branch is not relevant to this project. The Kwale branch is divided into three different facies Silver leaves, Mzonjani and Garonga (Huffman 2007: 123). The focus within these facies will be focused on Silver Leaves and Mzonjani as they are the most relevant facies for this project.

3.4.4.1.3. Silver Leaves

The Silver leaves ceramics are characterised by jars with bevelled rims and/or straight necked jars (Klapwijk 1974). Their decorative motifs show either one or two bevels with a lower border of broad line incisions or dentate stamp impressions, that are located on the neck/ shoulders of the pots (Klapwijk 1974:19; Huffman 2007:125). The emergence of Early Iron Age in southern Africa is marked by the appearance of Silver leaves facies including Matola (Huffman 2007:123). The first identification of Silver leaves was in Mozambique at Matola and University Campus near Maputo (Cruz e Silva 1976; Sinclair 2010). In addition, Silver leaves facie was also identified in Swaziland (Dart & Beaumont 1969) and Bhuwa in Zimbabwe (Huffman 1978). Furthermore, Silver leaves facie within South Africa was identified at the Drakensburg foothills near Tzaneen and in the Kruger National Park at Mahlangeni (Ma38) (Meyer 1986).

3.4.4.1.2. Mzonjani

Another facie of the Kwale branch is Mzonjani dating between AD450-AD750 (Huffman 2007). Additionally, this facie has a design layout and profile shapes like Silver leaves however, lacking bevels and flutes (Mitchell 2002). Mzonjani ceramics are characterised by straight everted rims with well-defined points of inflexion placed mostly along the entire rim of the vessel as well as oblique incised lines with or without punctuates (Maggs 1980). Furthermore, they are characterised by discontinuous spaced motifs that consist of triangular shapes or parallelogram (Hall 1980). This facie plays an integral role within this study thus, the sites within the Lowveld region that have this ceramic type are briefly discussed.

The first identification of the Mzonjani facie was in KwaZulu-Natal Mzonjani site was excavated by Tim Maggs (1970 1980) as part of a rescue excavation (Maggs 1980). Upon analysis the ceramic retrieved dated to the Early Iron Age and it was first of its kind south of the Tugela river (Maggs 1980:71). Additionally, Enkwazini a similar site was also identified to have a similar assemblage although it had considerably smaller sample than Maggs (1980) sample Hall (1980) it was placed within the Mzonjani facie.

The ceramics from these two sites were first classified to Matola and Plaston as they have similar characteristics (Cruz e Silva 1976; Klapwijk & Huffman 1996; Evers 1977; Maggs 1980:92). However, with more Early Iron Age sites being excavated along the Mngeni valley (Whitelaw 1993; Whitelaw & Moon 1996) it became clear that Silver leaves Mzonjani and Matola can be placed under the Urewe tradition (Huffman 2007:123). The major difference between these facies is the absence of bevelling and the complex decorative motifs in Mzonjani assemblage (Huffman 2007: 123-127).

Another site that consists of the Mzonjani facie is in the South African interior in the Derdepoort region located north of Pretoria close to Broederstroom (Nienaber et *al.*, 1997). This Early Iron Age site within the Makapan valley was excavated, revealing a multiple occupational settlement, with the first occupation dating to AD400-AD500 attributed to the Mzonjani facie (Moore 1999). Furthermore, other occupations on the site are dated to AD 800-AD 900 followed by another occupation around AD1400 and the last occupation around AD 1900 (Moore 1999).

Located on the foothills of Magaliesburg mountains in the Northwest province the site Broederstroom also consists of Mzonjani facies (Mason 1981). This site also became a crucial example in the discussion of socio-political organisation of Early Iron Age (Huffman 1991). Like Derdepoort, Broederstroom also had multiple occupational settlements (Mason 1981).

In the Lowveld on the Mpumalanga escarpment another site with the Mzonjani facie was identified that is also relevant to this study. The Lydenburg Heads site was first identified by von Bezing (1962). Further research was done on the terracotta heads and other archaeological material collected providing a radiocarbon date of AD 500 (von Bezing & Inskeep 1966; Inskeep 1966; Evers 1982:16; Evers 1977). The ceramics within this site were originally found to be like the Msuluzi facies (Evers 1982). This view was later repositioned to similarity to the Matola facie (Evers 1982:30). Upon re-examination the ceramic assemblage indicated multiple occupations first during AD 700 by the Urewe tradition Mzonjani as well as AD 900 -AD 1100 by the Kalundu tradition (Whitelaw 1996:75). Thus, the ceramic assemblage within this site plays a crucial role in understanding agropastoral communities (Whitelaw 1996).

Lastly another site identified within this region that has similar ceramic to Mzonjani is Plaston (Evers 1977:178; Huffman 2007:127). Furthermore, a salt production settlement Baleni in the northeastern Lowveld has Mzonjani ceramics however, the assemblage was limited to jar shaped vessels (Antonites 2005 2013). The assemblage was characterised with decorations consisting of horizontal punctuates on the rim and spaced motifs on the body (Antonites 2013:110). The Baleni decorations are less complex compared to the previous mentioned assemblage within the Mzonjani facie. Labalelo close to Burgersfort is another Mzonjani site with a small ceramic assemblage however, it was placed in the Mzonjani facie (Huffman &Schoeman 2011:163). Further discussion is provided below on another ceramic tradition Kalundu that occurs within the region.

3.4.4.2. Kalundu

The Kalundu tradition is a western stream that has two sub-branches namely Benfica and Happy Rest however, the focus will be on Happy Rest Early Iron Age stream (Huffman 2007). Within the Happy Rest facie, the focus will be on Doornkop formally known as Lydenburg (Huffman 2007) and Ndondondwane as they are the most relevant to this study. It had been concluded that ceramic entities in the region southeast of South Africa are from Silver leaves and Mzonjani (Maggs 1984). However, further inspection indicated that, these ceramic entities were a later version of Kalundu tradition (Huffman 2007). The earliest Kalundu facie is Happy Rest dating between AD500 -AD750 (Huffman 2007). This facie consists of ceramics with thickened rims, ladder stamping and multiple bands of mixed techniques (Huffman 2007:221). Sites with this facie are found in the eastern Botswana and the northern South Africa (Huffman 1989).

This is a later Kalundu facie from a later period that is also relevant to this study. Doornkop dates to AD750 and AD1000, it was previously known as the Lydenburg facie (Huffman 2007:275-276). Its characteristic makers are herringbone motifs on the necks of vessels (Huffman 2007:277). It had been suggested that Mzonjani precedes Doornkop this is due to the interaction between Happy Rest and Mzonjani communities leading to the creation of Doornkop like Lydenburg (Whitelaw 1996; Huffman & Schoeman 2011). The exemplary migration and diffusion of communities within this facie is important to note as it will be expanded on with a focus of ethnography in the next section below.

Ndondondwane dates between AD750-AD950, it is mostly found in KwaZulu-Natal, also occurring at Lydenburg Head sites inland (Huffman 2007; Whitelaw 1996). The decorative motif consists of cross hatched incised lines and herringbone motifs with spaced discontinuous motifs in the form of a ladder on the body of the vessel (Maggs 1984:80). Furthermore, the decorations also included punctuates used on their own or in combination with incised continuous motifs (Maggs 1984). The decoration placement was often placed on the lower necks of vessels additionally, there are no everted jars with a well-defined point of inflexion which are popular within Mzonjani assemblages (Huffman 2007). The introduction of new ideas within communities produces ceramics that may have elements of other facies combined with decorations from other ceramic traditions, this is indicative of human interaction and diffusion of cultures which will be discussed in the next section.

As highlighted above, the present and past study approaches in Iron Age communities within southern Africa it is important to note that little research had been conducted in the southern region of Kruger National Park. In the following section human presence in the Kruger National Park is presented in the form of ethnographic accounts of communities that migrated in and out of the Kruger National Park. The ethnographic accounts are very crucial in this study as they will assist in the analogy and interpretation of ceramics.

3.5. Human presence in the Kruger National Park

Despite prevalent tsetse fly and malaria, the lowveld has a rich record of human occupation during the late Iron Age period (Meyer 1986). The history of occupation in the Lowveld region is characterised by considerable migration, interaction and the fission and fusion of social and political identities (Moffet 2016). The earliest migration into the Lowveld can be dated to the Stone Age period by hominids and the same rock shelters were occupied by San people. The indicative evidence of these multiple habitation of the area are their stone tools and rock paintings and etchings (English 1983; Eloff *et al* 1983; Pelser 2018).

These political identities changed by the end of the Late Stone Age and the beginning of the Iron Age where the Bantu also occupied the same rock shelters. This influx of communities was further characterized by a drastic increase of settlements in the Lowveld which became a marginal area where the overlapping ethnic groups represent the Sotho from the west, Nguni from the south, the Tsonga from the east and the Venda from the north would occupy (Meyer 1984). The influx of communities into the Lowveld was inferred by the abundance of resources and easy accessibility to trade routes. The terrain also provided good shelter against the elements contributing to the comfort level and permanent settlements.

The Maluleke is classified together with the Baloyi however, the Maluleke lived in the area between the Olifants river and the Limpopo River (Junod 1927). The Maluleke of Mhinga lived there until around 1968 still living in the Pafuri area between the Limpopo and Levubu rivers (Meyer 1986).

The Changana are the descendants of Sochangana and his followers as well as refugee groups that were sent by the Kruger National Park before the war of Sochangana and his successors (Meyer 1986) excluding the Maluleke. Their history can be traced back to the devastating defeat led by the Ndwandwe of Sochangana in 1820 against Shaka when Sochangana fled with a section of the Ndwandwe northwards where he had to subjugate the Tsonga tribes (Hartman 1978). Out of fear of possible Zulu attacks Tsonga speakers became known as Machangana During these wars Tsonga groups fled into Limpopo between 1838 and 1840 and they inhabited areas in the eastern lowveld (Meyer 1986).Another fighting group was the Nkuna who after wandering settled at Pabeni north of Pretoriuskop were they fended off the baPai in the surrounding Pabeni and Sabie river, shortly after conquering the territory the area was declared a national park (Hartman 1978).After the death of Sochangana in 1858, a bloody battle of succession followed consequently, many Tsonga groups once again fled the

Limpopo region and joined earlier fled groups (Meyer 1986) a large group of the Changana fled to the eastern Lowveld.

According to (Eloff & De Vaal 1965), Venda folklore mentions that the vhaLembethu were already resident in northern Limpopo during the arrival of the Venda in the area. The vhaLembethu were already living in the eastern part of present-day Venda by 1700 where they were involved in military clashes with the Venda (Stayt 1968) The stone building at Makahane at the confluence of the Mutale and Luvuvhu river relates to the vhaLembethu chief Makahane who settled there during the late-eighteenth or early-nineteenth century (Eloff & De Vaal 1965). In the northern part of the Kruger National Park east of the Madzaringwe spruit is the Makahane ruins situated on a high ridge next to Luvuvhu river forty-eight kilometres from Punda Maria occupied by the vhaLembethu who were one of the network ethnic groups in the northern Transvaal and Zimbabwe associated with the building of stone structures (Eloff & De Vaal 1965).

The Venda existed before the end of the seventeenth century in the northern Limpopo, were they established themselves as rulers over tribes that were already present in the area, namely the vhaNgona, the vhaMbedzi, thevhaTwamamba and the vhaLembethu (Eloff & De Vaal 1965). TshiVenda has linguistic correspondences with the Karanga languages (Stayt 1968), the Venda entered the Soutpansberg area in two groups, namely vhaTavhatsindi and later the vhaKhwinde. The descendants, vhaTavhatsinde, Netshiendeulu, currently still live at their original place of residence in Mphephu's residential area. The vhaKhwinde subdued the vhaTavhatsinde after their arrival and later the ruling group formed under the leadership of Thoho-ya-Ndou (Stayt 1968). Stayt (1968) further describes the baLemba as the craftsmen among the Venda and mention traditions of metalworking tools and techniques as well as mining activities that played a key role in the culture history of the Venda.

The maPulana are described as one of the Eastern Sotho ethnic groups (Van Warmelo 1935). Their dialect is also spoken among the baKutswe and baPai (Ziervogel 1954). Their folklore suggests that they came from Motshiteng lived in Barberton, then moved via Phageng Crocodile Gate to Sakwaneng their head was nearby Pretorius (Mybugh 1949) They operated a prosperous grain farm later they were harassed by the Swazis, the group broke up and they moved to east of Graskop.

The nature of the natural environment and historical events had far-reaching consequences for these tribes. The baPhalaborwa are who originally came from the north came and stayed near Bosbokrand they moved to the Phalaborwa area where they during the eighteenth and nineteenth century were an influential clan and economically largely dependent on the metalworking technology (Moffet 2017). Due to changed trading conditions and the poor farming potential of the residential area, impoverished the tribe members left the residential area (Meyer 1986).

The eastern ethnic groups, namely the baPai, baKutswe and maPulana came from different points of origin arrived in Swaziland and the Crocodile Gate territory. From here they were during the nineteenth century by the arriving Swazi drifted northwards and for a time a flourishing arable economy operated in the Nskazi and Pretoriuskop area (Meyer 1986).The Ngomane were originally Sothos from the eastern Limpopo, moved to the Lowveld area in the vicinity of the Crocodile River and the Komati River , were they adopted the way of life of the neighbouring Tsonga and Swazi tribes and lost their Sotho identity (Meyer 1986).

The Nhlanganu were originally a Nguni group that during the eighteenth century moved north to the Lebombo area near Komatipoort, were they merged and are currently the western branch of the southern Tsonga known (Meyer 1986). In addition, during the nineteenth century they in the area between the Crocodile River and Olifants River on either side distributed from the Lebombo mountain range. However, due to periodic tribal wars they moved around as impoverished refugee groups at this time and consequently, established economy could not develop (Meyer 1986).

The Maluleke are part of the Nwalungu group of the Tsonga of Mozambique, they appeared scattered throughout historical times on either side of the Lebombo Mountains in the area between the Olifants River and the Limpopo River (Meyer 1986). Their eastern and northern neighbors were the Hlengwe-Tsonga. There is little information available about the ethnic and cultural history of the Maluleke. The Changana-Tsonga best partly from the Ndwandwe followers of Sochangana who was defeated by Shaka in northern Natal and Tsonga famous people who later joined him and his successors in Natal. As result of the subsequent tribal wars in which the Changana in south like Mozambique was involved, numerous Tsonga groups moved to the eastern Limpopo Lowveld. One of these groups was the Nkuna who the conquered territory at Pabeni as tribal territory in battles with the eastern Sotho tribes. These ethnic groups also from part of the people who once lived within the studied area of KNP. Thus, the reminents of their cultural material might still be present.

Ethnographic accounts indicate that there were no ethnic people living in the Kruger National Park after the reproclamation of the Sabie reserve in 1902 (Punt 2012: 90; Carruthers & Pienaar 2012:446; Stevenson-Hamilton 2012:113). They were systematically resettled in surrounding areas this included people from Thulamela who later consolidated into the Venda ethnic group (Meskell 2007; Kusel 1992) the ethnic groups also included the present-day Nguni, Sotho, and Tsonga. In previous centuries they occupied the entire Lowveld from the accounts of journeys between 1725-1838 they also had economies focused on forging copper, iron, gold melting in Thulamela (Kusel 1992) and they also traded with proceeds of hunting (Grody 2017) especially ivory (Punt 2012).

The trading was on a limited scale due to an impeding factor of a plague of two diseases malaria from Anopheles mosquito and nagana from the tsetse fly. This impeding factor varied at various times because of climatic cycles, for example in 1725 there were no tsetse fly in the southern part of the Kruger National Park (Punt 2012). However, the distribution range of the tsetse fly had expanded in the 19th century hence, when Louis Trichardt trekked through the lowveld from 1836-1838 he encountered tsetse fly (Punt 2012). Therefore, the southern Kruger was densely populated at different periods of time.

There is little information on the ethnic communities that were resettled outside the Kruger National Park prior the resettlement. Thus, the ethnohistorical information of the ethnic inhabitants that came in contact in the Kruger National Park belonging to the branches of the southeast Bantu will be briefly reviewed. This will aid in understanding the multiple occupations and trade at different time periods within the southern region of the Kruger National Park.

The Ba-Phalaborwa are one of the Sotho ethnic groups on the outer edge of the Sotho area (Van Warmelo 1935). On accounts of gens tradition, the Ba-Phalaborwa under chief Malatsi came from the north and joined the Mapula Neng settling near Bosbokrand (Meyer 1986). They later went to the present Phalaborwa area, originally, they were a small tribe with some skilled metal miners (Du Toit 1968) mining the ores of the Phalaborwa igneous complex producing surplus metalwork products for hunting and trading purposes (Moffet 2017).

The baKutswe according to their traditions, originally came from the area around Rustenburg, from the ranks of the Kwena they are one of the Eastern Sotho tribes (Van Warmelo 1935).They moved eastwards under chief Tlou to northern Swaziland where they were driven northwards by the Swazi who were attacking from the south (Ziervogel 1954).They lived in the vicinity of the Kutswe River west of the Kruger National Park moving around a lot and settling for short periods at places known as Mogogong near Pretoriuskop, Senwapitsi which is a pan between Pretoriuskop and Skukuza, Phabeng and Mokomeng near the Sabie River (Meyer 1986). The baKutswe were strong and influential as their chiefs were known as good rainmakers and they participated in several military conflicts, against the incoming Nhlanganu of Bondzeni (Meyer 1986). However, over time they intermarried with the Nhlanganu and to a lesser extent with the Swazi and baPai (Ziervogel 1954).

The baPai are part of the Eastern Sotho ethnic groups mentions they originally came from the area of the Tugela River in Natal (Van Warmelo 1935; Ziervogel 1954). Here they were harassed by other tribes and consequently moved north. The baPai are also called the vaMbayi and according to tradition received the name while they were living in or near Swaziland at a head called Mbayi (Van Warmelo 1935). After being attacked by the Swazi, they moved further north during the first half of the nineteenth century they settled in the vicinity of Crocodilepoort and the Lumati River (Meyer 1986). They further moved to the confluence of the umLambongwane (Cape) and liThaka (Southern Cape) rivers where they, fled before the attacking Swazi and found themselves at the Sabie River by 1882 (Ziervogel 1954). Their language differed from the baKutswe in many respects however, it was also influenced by that of the Nguni and Tsonga - specifically Swazi and Nhlanganu. The baPai ethnic group freely intermarried with the Swazi and to a lesser extent with Nhlanganu, baKutswe and maPulana (Ziervogel 1954).

The Ngomane are classified as Changana-Tsonga (Van Warmelo 1935). During the eighteenth-century independent Sotho group was in the vicinity of Lugogodo in the Nsikaziva under chief, Ngomane, living by the Lomati river (Myburgh 1949). It was during this period that De Cuyper in 1725 ventured into the area from Delagoa Bay (Punt 1976). Upon their arrival in the around the Crocodile and Komati rivers the Ngomane had the Nhlanganu and evicted baPai who lived in the area (Myburgh 1949) after this they moved to Middleburg (Meyer 1986). The group later divided into various tribes, including the Ngomane of Hoyi, of Sistophowa and of Lugedlane (Meyer 1986). The Ngomane of Hoyi ca 1850 lived in the area between Skukuza on the Sabie River and Mnondozi river in the north and the Crocodile River in the south (Meyer 1986). This ethnic group are resident near Komatipoort (Myburgh 1949). They are primarily agriculturists with a material cultural possession classified as Changana and Swazi.

The Ngomane of Lugedlane broke away from the mother group around 1800 until1840 they were in the south of the Kruger National Park after which they moved to Mozambique (Meyer 1986). However, by the middle of the nineteenth century they moved to the Crocodile River, they are currently Tsonga and Swazi speaking (Myburgh 1949). The Ngomane of Sistophowa had already broken away from the mother group however, their subsequent history is unknown until the second half of the nineteenth century during which they settled in the area south of Komatipoort on the Mozambican border have (Myburgh 1949). The tribe is currently mainly Swazi, and their material cultural possessions show Swazi and Changana characteristics.

The Nhlanganu have conflicting beliefs and ambiguities about their origin, suggestively by 1675 they moved northward from Zulu and settled at Marakweni on the foothills of the Lebombo mountains in Mozambique (Hartman 1978). They occupied the area of the Lebombo Mountains between the Nkomati River in the south and occupied the Olifants river in the north (Junod 1927) they were classified as the western subgroup of the southern Tsonga speakers. During their establishment on the Lebombo mountains, the Nhlanganu divided into the Mnisi and Khoza (Hartman 1978).

The ethnographic cultures identified on various levels can be classified broadly according to their socio-political backgrounds. Thus, being able to identify groups and set them apart by behavioural patterns that are not limited to socio political affiliations will assist in ceramic interpretations (Huffman 1979:124). Additionally, even though ethnic groups have similar attributes they evolve in ways that make them unique from one another and yet develop special forms of some objects and customs that would set them apart from the next. To identify such difference within similar communities is through the study of discrete patterns in material culture (Huffman 1980). Therefore, material culture that can infer on the uniqueness of ethnic groups are ceramics which will be studied in conjunction to ethnographic accounts to infer on archaeological entities.

3.6. Animal use in the Kruger National Park

Animal use amongst Early Iron Age people of the Kruger National Park primarily focused on hunting larger, gregarious animals such as impala, blue wildebeest, buffalo, and zebra for animal protein (Plug 1989). However non gregarious or animals that move in smaller groups animals like eland, kudu, waterbuck, bushbuck, reedbuck, eland, nyala, and small buck were underrepresented in archaeological samples (Plug 1989). Thus, communal hunting and hunting drives were more popular (Plug 1989) the inhabitants of the lowveld used corrals or large pits for hunting.

Plug (1989) found that faunal samples were well-preserved with little weathering, this was due to alkaline soils on sites like Shl4a, Le6, and Le7 were suitable for bone preservation, while acid soils like Tshl and Skl7 only allowed preservation in ash-containing middens and pits. The study identified a variety of species, with mammalian species listed based on bovids, over 90% of unidentified Bovid I, II, III, and IV animals were grouped together as indeterminate bovids, with over 90% from wild (Plug 1989). In addition, trade goods such as glass beads and marine shells were less pursued in the northern part of the Kruger National Park therefore it is important to note if the sites in the southern part of the had similar patterns (Plug 1989).

In addition (Grody 2016) examined the treatment of wild species in the faunal assemblages of Le6 and Le7, two during Early Iron Age settlements in the central Kruger National Park. (Grody 2016) combined morphological and taphonomic analyses to explore, frameworks of intensification and potential specialization in hunting, and processing large wild mammals. The study revealed a new use strategy and site type for this period and region, which was occupation for intensive procurement and processing that might be driven by long distance trade (Grody 2016). This entailed a community group traveling to these sites to hunt and acquire wild animal products. This pattern is similar to those observed at salt production sites (Antonites 2014) and smelting sites (Moffet 2017; Chirikure 2006, 2015).

Kruger National Park's fauna analysis of sites in the central and northern regions revealed that the majority of meat, over 97%, was obtained through hunting, with only 2% coming from domestic stock (Plug 1982:230). However, these subsistence patterns vary further south.

3.7. Summary

This dissertation seeks to establish subsistence patterns, focussing on how many animals where acquired, where they were acquired in terms of distributional range and how they were disposed on the site. Furthermore, contrasting the Mahula Hill fauna assemblage and the distributional range of animals within the region. As previous research shows that Iron Age sites within Kruger National Park animal consumption played a crucial role. This is shown through animals contributing 97% of the meat supply (Plug 1984:230; Meyer 1984:219).

Chapter 4: Methods

4.1. Introduction

This chapter is structured to present the excavation methods from Mahula Hill and radiocarbon dating. Furthermore, the methods used for material analysis, including fauna, glass beads, disc beads, ceramics, metal objects, seeds, bone tools, and stone tools will be discussed below.

Legacy datasets and digitization

This section discusses historical materialism, a methodology that studies existing objects or specimens in museums and university departments. It addresses questions through the analysis and synthesis of previously excavated materials, including specialist material analyses like zooarchaeological (Grody 2016). Re-analysis or re-assessment of existing datasets from collections to answer research questions or complement excavation and survey are increasingly being used by researchers. This is beneficial due to changing research questions and improved analytical techniques for example Jordaan (2016) employed new and improved analytical techniques in the study of Skukuza 17. Technological advances allow for the digitization, merger, and comparison of large datasets, particularly relevant in studies of complex societies in southern Africa. Collections-based research builds on original research and published data, not simply dismissing or replacing it.

‘

Collections-based research involves the use of 'legacy data', which includes non-digital archaeological data such as books, maps, and excavation reports and material. However, legacy data often relies on the previous recorders' assessments and classifications, which required extensive reorganization. This collections-based research required dealing with large quantities of obscure legacy data, especially when working on collections pre-dating the digital age from Andre Meyer’s excavation. Thus, it required careful evaluation and further investment beyond the project's research objectives. Due to the size of the collection and lack of digitization during excavation, preparing them for analysis, digitization and object processing was necessary.

Digitization involved converting all hardcopy excavation records and related materials analyses into a digital format, a necessary step since none of the data was initially available in such a format. Throughout the research, handwritten and typed records were transformed into Excel spreadsheets, and original tags and boxes were changed thus, enabling better storage and cataloguing. As part of the dissertation, various paper records were digitized to include accession lists, faunal catalogues, and photo logs, with efforts made to link new data to specific objects within the accession list. This ongoing process aims to create a comprehensive and effective database.

The collections underwent significant rehabilitation before analysis, requiring sorting, cleaning, marking, and re-bagging of objects. A major issue arose from inconsistency in initial sorting and processing, particularly with ceramics from SK 9, SK 11 and SK4, which were organized into diagnostic and non-diagnostic categories, whereas ceramics from Mahula Hill were not cleaned or sorted. Consequently, diagnostic ceramics had to be cleaned for accurate identification. Similarly, faunal materials from Mahula Hill were sorted and labelled. The sorting, cleaning, and labelling of bones from Square 2 Mahula Hill were completed, but the extensive nature of the ceramic and faunal assemblages rendered data preparation more time-consuming than anticipated. However, it is hoped that remaining materials especially fauna from Mahula Hill will be processed in a subsequent research phase.

The original packing materials, primarily consisting of deteriorating brown paper bags and elastic rubber bands, led to the loss of contextual information for certain unmarked objects. To address this, I replaced the brown paper bags with resealable plastic bags. Long-term storage of bone fragments has compromised the integrity of assemblages due to improper packaging and labelling. Many bones were bagged incorrectly, leading to lost provenience and legible catalogue information, complicating the tracking and identification of specimens.

Bones were grouped by catalogue numbers to prevent damage. Similarly, small finds, fragile objects often stored in glass bottles, faced issues with breakage and loss of provenience due to inadequate padding. To address this, the contents of the broken bottles were sorted and repackaged by material type to enhance accessibility. Although this approach has improved organization, further refinement is necessary for long-term preservation and access.

4.2. Mahula excavation methods

The excavation at Mahula Hill was conducted by Anton Pelser starting from 2016, 2017, 2018 and 2019. This was prompted by a park ranger's knowledge of pottery and a grinding stone underneath one of the large boulders at Mahula Hill site which necessitated an assessment in January 2016 followed by excavations. My role was mainly focused on analysising the material from the excavation and the lack of published information and archaeological context about Mahula Hill led to this project emerging. The first season of archaeological excavations was undertaken for 2 weeks in August 2017. The fieldwork focused on several formal excavations of features on the site and mapping of the site. In addition, scanning the stone-walled site and the rock art at Mahula Hill. For the second season undertaken in August 2018 the focus was on archival research, site mapping and surveying. The third season of fieldwork was done in 2019.

The excavation was conducted on Block 1 and Block 2 which are located on a terrace situated on top of Mahula Hill. They are parallel to one another (Figure 2-6 page 24) they were excavated to obtain detailed information on material deposits. In 2017 the Block 1 excavations were measured out in 1m x 1m squares (17 squares in total). Block 2 consists of (8 squares in total) of 1m x 1m squares (Figure 4-1) and was also excavated in 2017. In 2018 the focus was on mapping the sites terrace walls. However, in 2019 the focus was entirely on Block 2 area where a hut was found, they excavated area was 3m x3m.

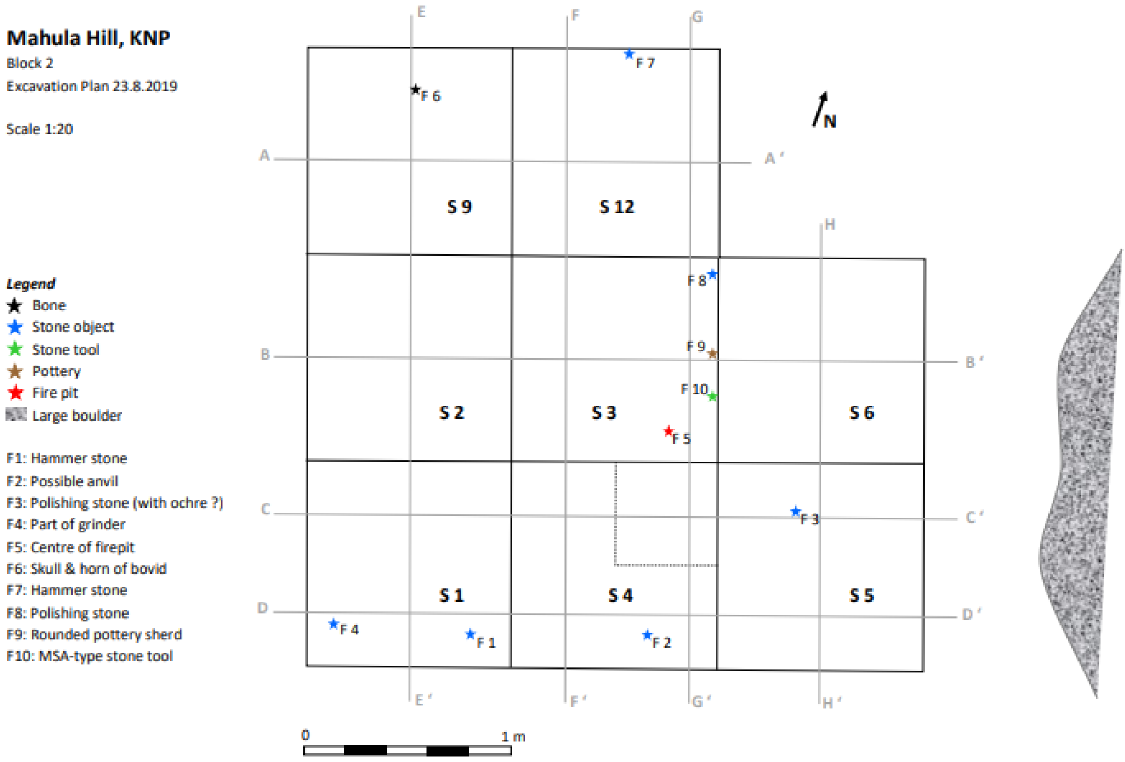


Figure 4-1: Excavation layout of Mahula Hill Block 2

Excavation layers within Block 2 were distinguished by layer A that had square 9 and square 12 cutting into layer B that consist of square 2, square 3 and square 6 (Figure 4-2) has the excavation layers and depth of each square. The excavation profile of Block 2 hut area (Figure 4-3) also indicates the different layers from the surface dark brown to the ashy layer, soft and loose soil and the rock bottom dark brown soil. The east profile indicates animal burrowing and/or soil erosion in square 4 as layer 2 was ashy, soft and loose soil is located and there is a burrow in layer 4 that is compacted ash layer that probably formed due to water draining in through layer 2.

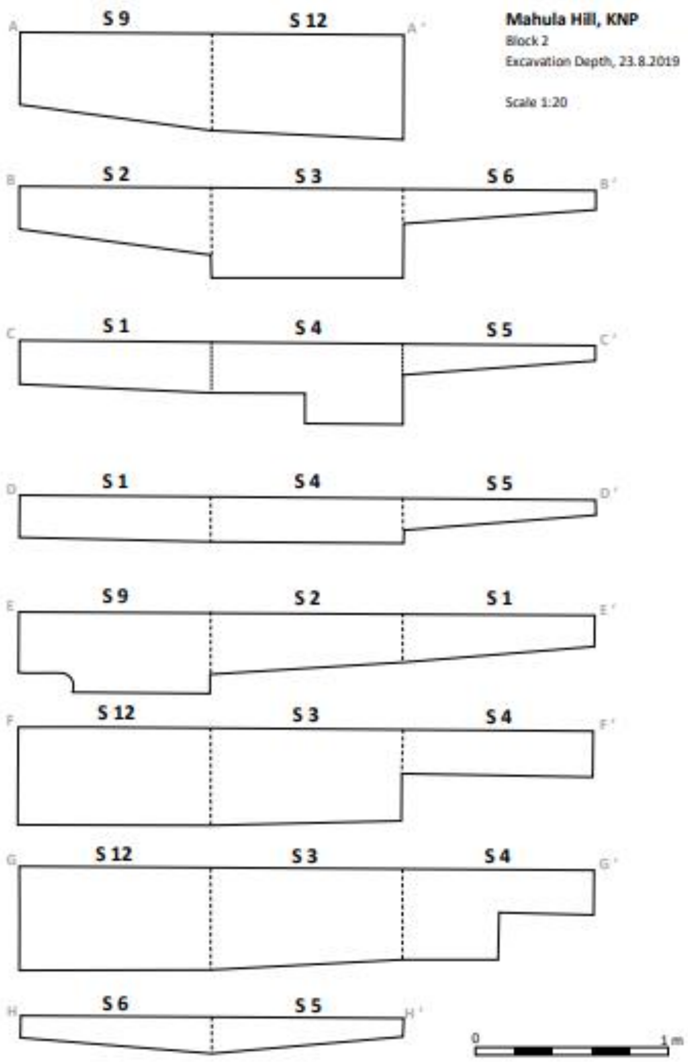


Figure 4-2: Mahula Hill Block 2 excavation depth

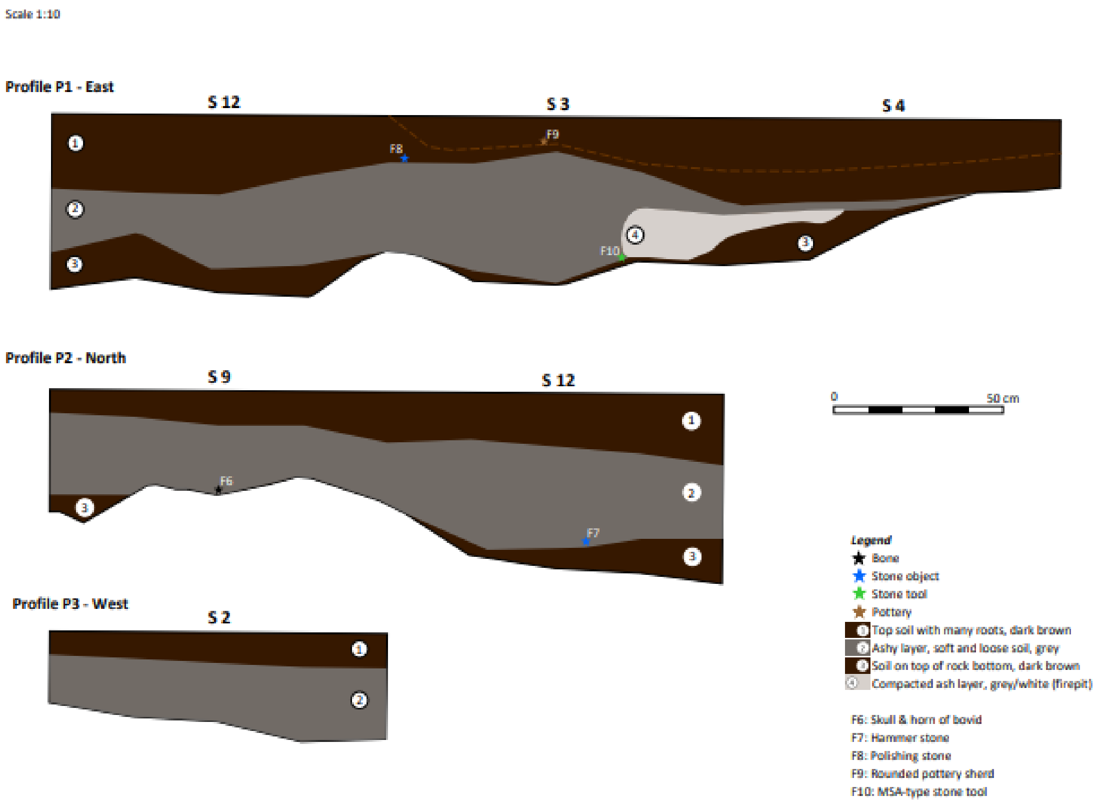


Figure 4-3: Mahula Hill Block 2 profiles

4.3. Radiocarbon Dating

Charcoal samples from Block 2 Square 2 Mahula Hill were sent for radiocarbon dating to provide accurate date ranges. The uncalibrated dates were calibrated on OxCal v.4.3.2 (Bronk Ramsey 2017) using the southern hemisphere curve (Reimer et al. 2020). Both the uncalibrated dates and the calibrated date ranges are included.

4.4. Ceramics

The material found during excavations at Mahula Hill is supplemented by excavated ceramic material from SK4, SK9 and SK11 which increased the overall size of the total assemblage for determining site chronology. The added sites of SK4, SK9 and SK11 are there to supplement the ceramic material from Mahula Hill. As these sites have a more established archaeological context within the southern KNP region. They also do not have a very broad research history thus, adding them in this project may broaden their archaeological context. Additionally, their addition a regional interaction with Mahula Hill is hoped to be established.. Three stylistic attributes were analysed decorative motif, vessel shape and decorative placement (c.f. Huffman 2007:111). This typology was created to address the research objective of this project to chronologically determine the sites date.

All ceramics sherds were cleaned, with water and brushes. Thereafter, they were sorted into three groups. Group A were sherds smaller than 2 cm in size. Group B included sherds larger than 2 cm however, lacking the diagnostic attributes of shape decoration and decoration placement. All the sherds where it was possible to determine all diagnostic attributes were placed in Group C. Refitting was done wherever possible. All ceramics were layered out and coded with a site name, block number and square number (e.g MAH/BL1/SQ1).

All the sherds were counted and weighed. Analysis done on the decorated pieces were identified based on decoration type whether it has continuous motifs that cover the entire vessel or discontious motifs that covered only a certain part of the vessel. Another variable considered was the location of motifs. Analysis of Group A and B sherds was not further done due to their size being less than 2 cm and them being undiagnostic. The focus of this analysis was mostly on Group C that had multiple attributes present.

4.4.1. Vessel shapes

These vessel shapes categorised between bowls and jars further creating a typology that allows the identification of discernible patterns. The vessel shapes were categorised into the different bowl types of namely open bowls, carinated bowls, in-turned bowls or sub-carinated and jar types of namely straight necked jars, everted jars, slightly everted jars (Hall 1980; Maggs 1980; Huffman 2007).

4.4.2. Decoration placement

The position of decoration was recorded as per profile portions of the pot. These profiles include the vessel lip, top part of the rim, the neck of the vessel, the shoulder and upper body of the vessel.

4.4.3. Decorative techniques

Multiple decorating techniques identified and recorded. These include incisions, this is where the surface of the vessel slashed or incised with a tool whilst the surface is wet furthermore, punctate, which may occur when the clay punctured wet and leave small circular holes on the pottery (Orton et al 1993). The last decorative technique identified was stamping, these occur when clay stamped usually with an iron bangle creating an intricate design.

.4.4.4. Rim types

The rim type of the ceramic assemblage was also recorded on all sites. The rims were categorised as either tapered, rounded, flattened, or thickened. The analysis of the rim types mostly focused on ceramics that had a portion of a rim and neck or a part of the rim.

4.4.5. Orifice diameter

To determine the size of the ceramic pot, the orifice diameter was recorded. This was done on using the curve of rim sherds fitted to a standard vessel diameter chart .

4.5. Beads

Glass beads were analysed based on the morphological analysis developed by (Wood 2000,2005) who identified bead sequences based on the physical characteristics of beads.

4.5.1. Glass Beads

Studies by Wood (2000, 2005, 2009, 2010, 2011) and Robertshaw *et al* (2003, 2006, 2010) developed a bead series based on morphological and chemical properties for southern Africa. The glass bead classification and methodology for this study followed the methods outlined by (Wood 2011) for southern African glass beads. The glass bead analysis focused on method of manufacture, end treatment, roundness factor, colour, size, shape, and diaphaneity.

4.5.1.1. Method of manufacture and end treatment

Glass beads were grouped according to their method of manufacture distinguishing between wound, drawn and moulded beads. Wound beads were made through furnace winding which often display swirl marks from the winding process (Wood 2011:69). The technique of drawn beads was made by creating a hollow in a gather of glass either through perforation or blowing a bubble (Wood 2011). This bead assemblage did not contain any moulded beads.

4.5.1.2. Shape and size

Bead's shape may inform the study on the method of manufacture, as the shape results from the ratio between its diameter and length and the degree to which it is reheated (Wood 2011). Bead length, width and diameter of the perforation were recorded in millimetres with a digital calliper. The drawn and wound beads included tubes, cylinders and oblates, the wound beads further included spheres, ellipsoids, barrels and bicones (Wood 2011).

4.5.1.3. Diaphaneity and colour

The glass bead assemblage in the study was classified based on manufacture, shape, size, and end treatment. A microscope and a Munsell colour chart (1976) were used and translated to colour names of the ISCC NBS Colour System. Bead diaphaneity focuses on the translucency of glass bead light reflection that would strongly transmit through light in conjunction with a microscope magnification (Wood 2011). The glass bead diaphaneity categories were based on (Wood 2011).

4.5.2. Shell Beads

Ostrich eggshell and land snail (Achatinidae) beads were recovered from all sites. The raw material of each bead was determined by visual inspection under a microscope. Furthermore, the perforation recorded whether it was a complete perforation that extends all around the bead or was an incomplete perforation that had started but does not extend to the entirety of the bead (Mouton 2021).

The identification of raw materials was done through a stereo microscope and a comparison with modern reference samples of shell types following Mouton (2021). The bead assemblage was split into (a) finished beads which were distinguished by roundness and perforation, (b)beads in progress distinguished by triangular, square, and irregular edges with central perforation and (c) potential blanks which distinguished by the lack of middle perforation but with have triangular, square, and irregular edges.

4.5.2.1. Raw materials

Ostrich eggshell

The identification of ostrich (*Struthio camelus*) eggshell can be done based on the distinction between its characteristic smooth and glossy outer surface and its inner mammillary layer (Mouton 2021). However, the identification of ostrich eggshell exposed to heat drastically changes, as the outer glossy, smooth finish completely delaminates, leaving a rough and broken surface. The different shades of burning were recorded, namely brown, grey, black, and white. Burnt ostrich eggshell beads are distinguishable from other shell beads because the inner and outer layers burn differently (Figure 4-4).

Figure 4-4: Different shades of burning recorded

Achatinidae

These shells belong to the family of giant African land snails. They are distinguishable from ostrich eggshell by the several types of foliated layers (periostracum, prismatic and nacreous layers) of the shell (Mouton 2021:58). The periostracum layer covers the outer surface of the shell and gives the shell its colour and pattern. These shell beads were identified with the use of microscope magnification. This level of magnification exposed the shell's characteristic foliated nacre layer, especially visible in the bead profile.

4.5.2.2. Shell disc bead morphology

The characteristics relating to shell bead morphology were recorded as part of the analysis. These characteristics include perforation, edge, and the general bead shape. The drill shape was noted for raw material that showed signs of being in progress. The drill shape was recorded as conical, biconical or cylindrical. The beads' angularity was described and record as well-rounded, rounded, angular and very angular. The edges of the bead can yield information on the extent to which the bead was ground for smoothness.

4.5.2.3. Shell disc bead dimensions

The disc bead dimensions were measured with a digital calliper in millimetres to two decimal places. The recorded dimensions include bead diameter, perforation diameter, and bead thickness.

4.6. Faunal remains.

The faunal analysis will provide information on the range of animals that formed part of the meat diet at Mahula Hill. At multiple sites in the Kruger National Park, it was shown that herding was of minor importance in the economy and diet, with wild animal contributing the bulk of meat requirements (Plug 1984:230; Grody 2016). The faunal analysis will determine if this was also the case at Mahula Hill. In addition, the study of skeletal parts can yield information on site function and use age, carcass transportation, trade, long distance meat acquisition and general meat provisioning (Plug 2011:89).

The faunal material from Mahula Hill discussed here was analysed with assistance from Dr Annie Antonites at the Ditsong National Museum of Natural History (DNMNH) in Pretoria. Only a sample of the excavated material from Mahula Hill was analysed, namely those from Square 2, Block 9. Nikita Robertson (2021) and Annie Antonites analysed the remainder of the fauna from the other blocks independently. The material was cleaned prior to analysis by removing excess soil to expose the bone surface of each fragment and any taphonomic traces. The analysis followed standard archaeozoological methods used within the region (e.g., Grody 2016; Hutten 2005; Plug 2011; Raath 2014).

4.6.1. Unidentifiable and identifiable specimens

Faunal assemblages consist of fragmented specimens due to complex interactions that transform complete or near complete elements into fragments over time (Plug 2011:89). The first step in the faunal analysis was to separate 'unidentifiable' from 'identifiable' specimens, Identifiable bones are those specimens that can be identified to species, genus, or family level. All identifications were based on the extensive comparative skeletal collections of the Archaeozoology and Large Mammals section at DNMNH. Split bone shafts, skull fragments, enamel fragments, indistinguishable vertebra and rib fragments and specimens that could not be identified to species, genus, or family level, were considered unidentifiable.

4.6.2. Recording System

All identifiable specimens were labelled with a unique identification number, which comprised of the site code followed by a sequential number (e.g., MAH/201, MAH/202). In the case of broken pieces and conjoined specimens, such as a fused radius and ulna and teeth embedded in a mandible, these were given the same identification number, with slash numbers indicting different teeth, for example. Tortoise/terrapin shell fragments, freshwater mussel and land snail shell specimens were grouped under a single identification number with a slash added (e.g., MAH 201/01, MAH/201/02).

All the information was added in a MS database. Data categories included provenience, taxon, size class, skeletal element, side, and age. Taphonomic aspects recorded include burning, butchery, animal gnawing and weathering. Additional information on ash coverage, fresh breaks and measurability were also recorded.

4.6.3. Taxonomic Identification

Taxonomic identifications were made using the DNMNH comparative skeletal collections in conjunction with published morphological guides namely sheep/goat (Zeder & Lapham 2010) and cattle/buffalo (Peters 1988). Given the morphological similarity within the Bovid family in southern Africa (Brain 1974) not all specimens could be identified to species or genus level. These specimens were instead identified following (Brian 1974) classification of bovid size classes (Table 4-1). However, most bird, fish, tortoise, and shell not grouped under Bovid size category (Table 4-1).

Table 4-1. Bovid size classes (after Brain 1974) and species represented in the study area.

BOVID SIZE CLASS	INCLUSIVE SPECIES
BOV I	Blue duiker (*Philantomba monticola*)
(SMALL BOVIDS)	Red duiker (*Cephalophus natalensis*)
0-23KG/ 0-501BS	Common duiker (*Sylvicapra grimmia*)
	Damara dik-dik (*Madoqua damarensis*)
	Oribi (*Ourebia ourebi*)
	Steenbok (*Raphicerus campestris*)
	Sharpe's grysbok (*Raphicerus sharpei*)
	Klipspringer (*Oreotragus oreotragus*)
BOV II	Bushbuck (*Tragelaphus scriptus*)
(MEDIUM BOVIDS)	Bontebok/Blesbok (*Damaliscus pygargus*)
23-84KG / 50-1851BS	Southern reedbuck (*Redunca arundinum*)
	Mountain reedbuck (*Redunca fulvorufula*)
	Puku (*Kobus vardonii*)
	Grey rhebok (*Pelea capreolus*)
	Springbok (*Antidorcas marsupialis*)
	Lechwe (*Kobus leche*)
	Impala (*Aepyceros melampus*)
BOV III	Greater kudu (*Tragelaphus strepsiceros*)
(LARGE BOVIDS)	Nyala (*Tragelaphus angasii*)
84 -296KG / 185-6501BS	Sitatunga (*Tragelaphus spekii*)
	Black wildebeest (*Connochaetes gnou*)

	Blue wildebeest (*Connochaetes taurinus*) Lichtenstein's hartebeest (*Alcelaphus lichtensteinii*) Red hartebeest (*Alcelaphus buselaphus*) Tsessebe (*Damaliscus lunatus*) Roan (*Hippotragus equinus*) Sable (*Hippotragus niger*) Gemsbok (*Oryx gazelle*) Waterbuck (*Kobus ellipsiprymnus*)
BOV IV **(VERY LARGE BOVIDS)** **>296KG / >650LBS**	Buffalo (*Syncerus caffer*) Eland (*Tragelaphus oryx*)

4.6.4. Skeletal Element Recording (Diagnostic Zones)

This study used (Dobney and Rielly 1988) method to record the portion of a skeletal element that was present. The method relies on the premise that whole bones can be divided into readily identifiable morphological zones. This method can be used in conjunction with other methods (e.g, Grody 2016:49). However, this method was used in its entirety for its flexibility in enabling accurate recording of bone fragmentation (Dobney & Rielly 1988) These diagnostic zones are a series of two-dimensional drawings with a standard anatomical view, with each zone represented by a numerical code and a precise anatomical description (Dobney & Rielly 1988:81).Small mammal, reptile and amphibian specimens as well as mollusk shells were recorded as either ‘complete’ or ‘incomplete’.

4.6.5. Ageing

The ageing of animal remains can address both environmental conditions and social choices (Reitz & Wing 2008; Gifford-Gonzalez 2018). Large numbers of a certain aged animal may indicate specific environmental conditions or season. For, example, if the assemblage has a larger number of juveniles, it may suggest a drought period or another natural occurrence that may have hampered animal growth (Plug 1988). However, young animals may also have been used for sacrifice or other ritual purposes (Wilson 1999). The ageing of specimens from the Mahula Hill faunal assemblage focused on tooth growth and wear patterns (Voigt 1983) as well as epiphyseal fusion (cf. Grody 2016; Badenhorst &Kimambo 2020; Antonites, *et al.*, 2016). Age based on bone fusion was described as adults, sub-adults, or juveniles. Where the aging of an individual was unclear, it was assigned as ‘adult/sub-adult.’

4.6.6. Quantification

With multiple debates around archaeozoology there has not been ideal methods set for the practice (Grody 2016). Their two methods of quantification that will use NISP and or Minimum Number of individuals MNI (Gifford-Gonzalez 2018:186). This study will use Number of Identified Specimens (NISP) as the main quantification method due to its simplicity in calculation NISP, values may provide a better representative of relative skeletal elements than other quantification methods (Gifford-Gonzalez 2018:187).

4.6.7. Taphonomic factors

Taphonomy refers to the changes that influence a deposit, in its strictest interpretation it applies only to the processes resulting in burial and what happens subsequently (Reitz &Wing 2008:118). For archaeological context, this term must be expanded to include the human element and processes preceding discard and burial at the same time, including steps involved in archaeological faunal recovery (Reitz & Wing 2008:123). These circumstances of deposition or agencies that modified them before deposition were recorded on an Excel spread sheet. For this study, these categories were evidence of burning butchery marks, animal gnaw marks, breakage, and ash coverage. These taphonomic factors are crucial in reconstructing human-animal relationships, and past environments and evaluating observed patterns in faunal data (Marin Arroyo *et al* 2012)

4.6.7.1. Burning

Burning traces on a faunal assemblage can inform on past cooking and disposal habits (Huffman 1993, 2012, 2014:107; Grody 2016:62).The burning of bones can also result from natural events, such as veld fires, or from ritual activities (Schoeman 2006; Huffman 2009; Whitelaw 2013; Grody 2016).The severity of burning assist in determining the main cause for thermal alteration as it can be meant to combat pollution or for ritual purposes. In this fauna assemblage, l recorded two levels of information a.) the severity of burning; 0-no burning, 1-possible burning, 2-light burning [brown < 50 %], 3-medium burning [50 % + black], 4-heavy burning [>50 % white/grey/blue]; and b.) the extent of burning (complete or partial).

4.6.7.2. Butchery

Butchery marks may occur during cooking or preservation, meat processing and distribution (Grody 2016). In addition, these butchery marks may also assist in reconstructing the dismemberment patterns used for carcass transportation (Lyman 1987, Plug 2004). For the purposes of this study, two levels of butchery information were recorded; a.) the type of butchery marks (single/multiple cut/chop marks); and b.) the location of the butchery mark following Dobney and Rielly (1988) using the zones to indicate where the butchery marks are.

In terms of this faunal assemblage a 'chop mark' relates to titular chopping or splitting action and cut marks stems from the aim to slice through meat or to remove it from bone (Plug 1988:57; Seetah 2006:125-129, Grody 2016:62).Understanding butchery patterns can be done by comparing the total frequencies for each diagnostic zone with the type of damage (Dobney and Rielly 1988).

4.6.7.3. Animal Gnawing

A comparison can be drawn between evidence of animal gnawing and bone surface weathering. As their presence can indicate the disposal rate and habits of communities (Orton 2012; Steele *et al.*,2012). Gnaw marks can also shed light on the socio-cultural treatment of skeletal parts (Brown & Emery 2008) that might be considered important for either ritual use or household use. Gnawing by carnivores has the potential to cause destruction and fragmentation and is important when considering taphonomy patterns intrinsic factors (Grody 2016: 63; Haynes 1980). Furthermore, the presence of these damage patterns suggests carnivore activity (Haynes 1980) especially on skeletal parts that have a lot of meat left on the bone such as antlers and tibiae. A high presence of heavy gnawing can indicate the presence of domestic dogs (Grody 2016) or wild carnivores and rodents that can easily gain access to middens for example porcupines (Dart 1958:715-716; Plug 2004). This study, recorded carnivore, and rodent gnawing following Grody (2016) noting the type of animal (carnivore/rodent) and severity 0-no gnawing, 1-gnawing, 2-light to medium gnawing [does not obscure bone surface], 3- heavy gnawing [obscures bone surface], 4-portions destroyed.

4.6.7.4. Weathering

Although weathering can be seen as indirect evidence of human action, it can also exhibit distinctive characteristics that can be related to time of death and local conditions of temperature, humidity, and soil chemistry (Behrensmeyer 1978). Weathering involves, but is not limited to, the effects of both open air and underground water mechanisms on bone such as sun bleaching, soil chemistry or underground water (Reitz &Wing 2008; Gifford-Gonzalez 2018). The severity of weathering present on skeletal remains may indicate how long the bones were exposed on midden, for example, and how long it took to be covered by more refuse or soil (Behrensmeyer 1978; Bickart 1984; Behrensmeyer 2003; Andrews & Armour-Chelu 1998).

Weathering can be associated with structural density of the bone (Andrews & Armour-Chelu 1998). Furthermore, the difference in weathering of various taxa may inform on the socio-cultural treatment of skeletal parts or specific animal groups (Brown &Emery 2008). In addition, weathered surfaces can affect the ability to identify more taphonomic features such as butchery marks. Bone surface weathering was recorded on two levels; a.) the type of weathering (erosion, fine line fractures, flacking, root etching and large cracks); and b.) the extent of weathering (0-none, 1-light weathering, 2-medium weathering, 3- high weathering).

4.6.7.5. Breakage and Fragmentation

Breakage and fragmentation are recurring features of archaeological faunal material excavations, transportation, storage, and cleaning can all influence the preservation of the material. Breakage can impact multiple aspects of the analysis especially taxonomical identification (Durocher *et al*., 2022). In addition, breakage, and fragmentation result from pre- or post-depositional taphonomy processes that may be caused by natural or anthropogenic actions, butchering, and hammering of bones, trampling, climatic effects, and biological agents such as carnivores (Durocher *et al.*, 2022:9; Marean 1990:681; Todd & Rapson 1988:321-323; Plug &Roodt 1990:50). Breakage and fragmentation may also result from bone marrow extraction (Outram 2000) and, bone tool manufacture (Bradfield 2015:9, Bradfield & Antonites 2018). This study only recorded the presence of fresh breaks as an indicator of the state of preservation following excavation.

4.6.7.6. Ash

Ash middens hold a wealth of information about Early Iron Age communities (Boeyens & Plug 2011; Collet & Swan 1979) hence, they are often the focus of excavation. However, hardened ash can also obscure the bone surface which limits taphonomic observations such as butchery and gnaw marks. The occurrence of ash on a faunal assemblage can reflect disposal habits, time, and socio-cultural treatment of bones (Brown & Emery 2008; Orton 2012). Ash coverage that obscured substantial portions of a specimen were noted as present/absent.

4.7. Metal/Iron objects

The categories of metal analysis include corroded metal items and slag which was analysed based morphological differences. These could have been produced with a slag pit furnace or a natural draught furnace (Chirikure 2005). These items were numbered, weighed, labelled, and stored in a separate plastic bag to avoid subsequent damage through mutual contact. Some of the iron objects were severely corroded, but the slag was well preserved. There was no attempt made to remove the corrosion or to stabilise the objects chemically. Iron objects were classified according to Miller (1992) scheme where classes are based on geometric shape defined below. The use of Optical Microscopy, X-ray Florescence and Scanning Electron Microscopy (SEM) are used in understanding material remains such as slag, fumace wall/linings and metal objects. However, these methods will not be employed in this study.

4.7.1. Slag

Slag pieces were collected from Mahula Hill and SK4.Slag pieces were recorded based on weight and count. Chemical analysis did not form part of the analysis.

4.8. Seeds

The seeds came from excavations by Pelser (2018) at Mahula Hill, no seeds were recovered at the other sites in this study. Over the course of excavations seeds were hand collected from the squares and each bagged within their respective layers. A total of 14 samples were collected. All the samples collected were analysed with a focus on domestic contexts thus, ignoring surface collections which may have an elevated risk of contamination. Archaeobotanical material may become part of the site through direct use age in cooking or as a by-product (Steyn and Antonites 2019).

The seeds recovered, were analysed by Bianca Steyn (University of Pretoria). The analysis focused on seed identification to species and genus, which may yield information about the source of these seed and their use within domestic spaces. The methodology followed is outlined in (Steyn and Antonites 2019). The seeds were examined under a Nikon microscope of up to 0,65-4,5X magnification range, most notable taxa were identified using key characteristics of seed morphology and compared to known reference samples.

4.9. Bone tools

The role played by animals was beyond sustenance as it extended to animal-derived raw material used in bone tool manufacture. The analysis focused on use-traces explained by Bradfield (2015) as the combination of micro and macroscopic features which may develop onto both objects that may come across one another during use or manufacture (Fischer *et al.*, 1984; Lombard & Pargeter 2008) also (Bradfield 2011; 2012; 2015). The analysis of these micro and macroscopic traces assists in identifying activities at archaeological sites which no other evidence remains for example, leather production (Bradfield 2015). In addition, they further provide evidence of production activities such as the manufacture of disc beads which infer on function and primary economic activities within an archaeological site.

4.9.1. Macrofracture

The study will make use of the macrofracture analysis to identify bone tools that have undergone some impact. This method is easy to use and initially does not require an expert, as it is based on the principles of fracture mechanics which states that fractures will develop onto brittle solid tools when used in a specific manner (Fischer 1984; Bradfield 2015:5). This method is commonly used in stone tool examination (e.g., Lombard & Pargeter 2008) however, it has shown its usefulness when applied to bone tools (Bradfield 2011, 2012; Bradfield & Lombard 2011). Macrofracture analysis mostly identify longitudinal impact on bone tools rather than hunting impact making it difficult to interpret the possible hunting function and other economic production activities of individual pieces therefore, use-trace processes will also be used.

4.9.2. Diagnostic Impact Fracture

The use of 'diagnostic impact fracture' (DIF) identifies evidence for impact use in the form of fracture types that are unlikely to have originated in any other way than through forceful longitudinal collisions (Fischer et al. 1984; Cotterell & Kamminga 1987; Bradfield & Lombard 2011). Identifiable DIFs are bending fractures, which are spin-off fractures resulting from pressure perpendicular to the dorsal and ventral sides resulting in small spin-off fractures on only one broad side thus, they are considered diagnostic for impact use, irrespective of the dimensions of the fractures (Fischer et al. 1984; Bradfield & Lombard 2011).

Additionally, another fracture type associated with impact use usually occur along either one of the lateral edges which resembles the effect of lateral macrofracture, in which they were documented on archaeological tools interpreted as hunting weapons (Lombard et al. 2004). Another fracture type recorded may have resulted from impact-use or because of trampling or accidental breakage on bone tools, bending fractures, are sometimes recorded on replicated hunting weapons (e.g., Fischer et al. 1984). Crushing fracture although not diagnostic, was also recorded, this was identified by multiple, small, uneven overlapping step-like fractures that commonly occur on the tip or butt of a stone, bone or horn tool used during hunting (e.g., Lombard et al. 2004). These macrofracture were recorded as well as further examination of fractures under microscope of up to 4.5X magnification, most notable use-wear traces were identified (see. LeMoine 1994).

4.9.3. Use-trace processes

Use-traces develop through four processes abrasive, fatigue, adhesive and chemical which may occur due to manufacture, use and environmental factors (LeMoine 1994). During the manufacturing of bone tools abrasive traces occur from the prolonged frictional contact, whilst in use micro-cracks occur in the structural strain through contact which manifest fatigue use-trace, the frictional contact between two surfaces result in adhesive use-trace ,lastly chemical use-trace (Figure 4-5) is the physical alteration of a tool surface due to environmental and depositional factors, acidic substances or organic enzymes and contact with skin (Johnson 1985; LeMoine 1994; Fisher 1995;Bradfield 2015). The use-wear processes recorded focused on the chemical use trace process on bone tools recovered from SK4.

Figure 4-5: Chemical use-trace due to environmental and depositional factors

The bone tools were individually numbered, bagged separately, the analysis of each bone tool recorded any impact on the bone and further categorised the bone tool to identifiable use-wear processes. The bone tools were examined under a Nikon microscope of up to 0,65-4,5X magnification range.

4.10. Stone artefacts

The numerous lower grindstones are a prominent feature of the site. Most were permanently made on large stream-rounded dolerite cobbles (Figure 4-6), of which there are many (Pelser 2018). The recovered stone artefacts were categorized into quartz, upper grinders (Zurro *et., al* 2005) hammer stone (Byrne *et., al 2006*), polishing stone (Geib & Callahan 1988) and stone tools (Lombard 2005) furthermore, they were counted and weighed.

Figure 4-6: Fixed lower grinding stone (Pelser 2016)

4.11. Summary

The different methods that were applied to this project were discussed as well as the process followed. These methods include fauna analysis that highlight the impact of people on fauna's pre-depositional and post-depositional impacts. Additionally presenting methods followed in analysing beads and ceramics to reconstruct chronological context for the sites. In the next chapters the results of the collected data from SK4, SK9, SK11 and Mahula Hill will be presented. The data from each site will be presented within the following chapter starting with the radiocarbon dates.

Chapter 5: Results

5.1. Introduction

The methods outlined in the previous chapter enabled the examination of archaeological material from SK4, SK9, SK11 and Mahula Hill. The material consisted of metal/iron, seeds, bone tools, stone tools, fauna, beads, ceramics starting with radiocarbon dates.

5.2. Radiocarbon Dating

Three charcoal samples were taken from Block 2 Square 2 indicated as a hearth feature. This produced three uncalibrated dates of 590+_50 (IT-C-4667) and 760+_60 (IT-C-4669) and 720+_60 (IT-C-4663) were returned. Upon calibration they provided a 1-sigma range of AD 1294-1425 (IT-C-4667) ; AD 1161-1389 (IT-C- 4669) and AD 1215-1397 (IT-C-4663). Another charcoal sample was taken from Block 2 Square 4 (D-AMS 052195) returned an uncalibrated date of 703+_ 25 which was calibrated to AD 1270-1384. One charcoal sample from Block 1 Square 2D (D-AMS 052196) returned date uncalibrated dates of 985+_27 which was calibrated to AD 994-1157. This date is substantially earlier than the other radiocarbon dates and could indicate that possibility of containimation or an old wood date. Alternatively it could point an earlier occupation on the site, these points will further be discussed in Chapter 6 below.

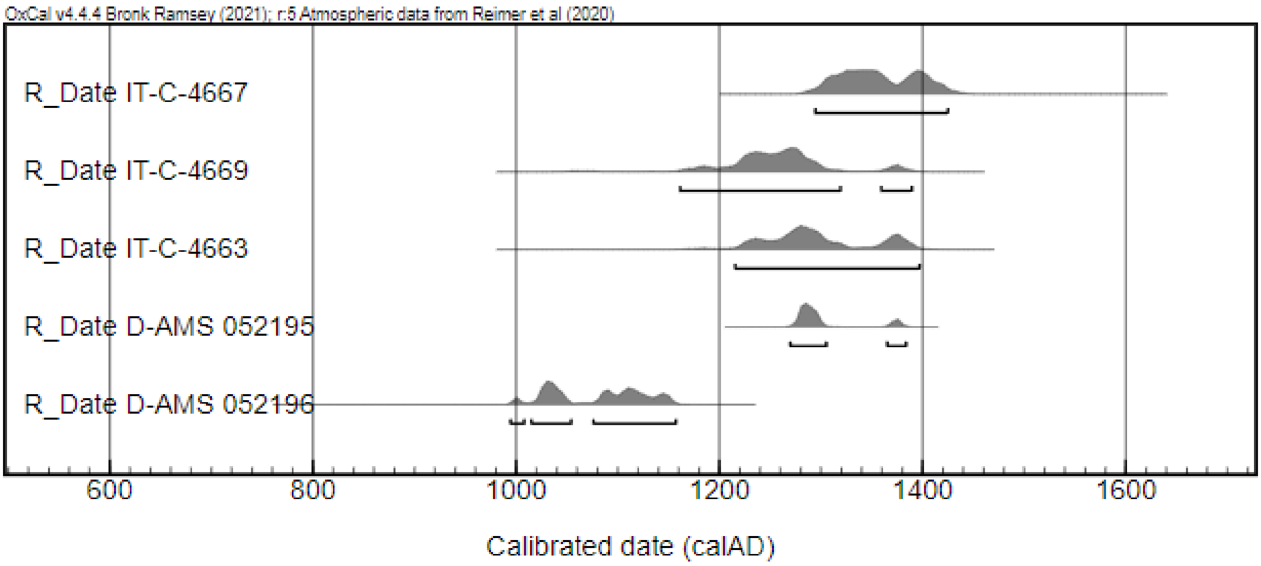


Figure 5-1 Radiocarbon dates from Mahula Hill. Results were calibrated using the southern Hemisphere calibration curve (Reimer et.,al 2020) and plotted with the OxCal v4.3.2 (Bronk Ramsey 2021)

Table 5-1 Radiocarbon dates from Mahula Hill. Results were calibrated using the southern Hemisphere calibration curve (Reimer et.,al 2020) and plotted in OXcal v4.3.2 (Bronk Ramsey 2017)

LABORATORY NUMBER	UNCALIBRATED AGE BP	1-SIGMA RANGE (cal.AD)
R-Date IT-C-4667	590+-50	1294-1425
R-Date IT-C-4669	760+-60	1161-1389
R-Date IT-C-4663	720+-60	1215-1397
R-Date D-AMS 052195	703+-25	1270-1384
R-Date D-AMS 052196	985+-27	994-1157

5.3. Ceramics

The ceramic analysis focused on four sites SK4, SK9, SK11 and Mahula Hill with the aim of providing evidence of regional interaction.. The necessary attributes in identifying the archaeological date for these sites are addressed below. This involves the analysis of vessel shapes found, orifice diameter, rim types, decorative motifs, and decoration placement.

5.3.1. Ceramic material from Mahula Hill

The total of (n=1061) ceramic sherds from the 2016 and 2017 excavations weighing 10640 kg were analysed (Table 5-2). Of these sherds (n=320) were non diagnostic and smaller than 2cm thus, they were not included for further analysis, this was the first category. The second category had (n=741) of sherds larger than 2 cm without any diagnostic attributes. The last category had (n=129) sherds with diagnostic attributes which became the focus of this analysis. Most of these sherds (n=50%) showed some decoration whilst the other (n=50%) did not have any decorative motifs. Within group C it was possible to identify majority of the diagnostic attribute’s vessel shape, decoration placement and motif. However, sherds that were without the above-mentioned attributes rim diameter and rim type were recorded.

Table 5-2 Ceramic Material from Mahula Hill

Sherd size	**N**	**%**	**Weight (kg)**	**Decorated N**	**Decorated %**	**Undecorated N**	**Undecorated %**
Smaller than 2cm	320	30	3192	0	0	320	100
Larger than 2cm	741	69	6172	0	0	741	100
Vessels with complete attributes	129	12	1276	129	12	0	0

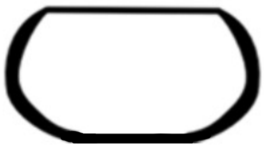
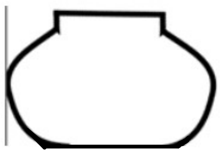
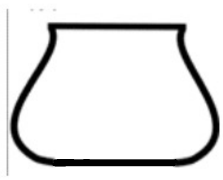
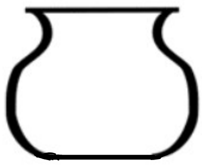
5.3.1.1. Vessel types

The three attributes for vessel types are shape, decoration motif and decoration placement (Huffman 1980). The identification of ceramic vessel type will be based on these three attributes which will be the criteria for the typological model within Mahula Hill assemblage.

5.3.1.2.Vessel shapes

The assemblage had 35% sherds without attributes that can assist in identifying vessel shapes. However, the 57% sherds within this assemblage were identified to vessel shapes straight necked jar 5%, slightly recurved jar 11%, sub-carinated bowl 22%, well defined recurved/ S-shaped jar 1% (Table 5-3).

Table 5-3 Mahula Hill assemblage vessel shapes

Sub-carinated bowl	Straight necked jar	Slightly recurved jar	S-shaped jar
			

5.3.1.3. Decoration placement

Vessel decorations were mostly confined to the rims, shoulder, and neck, (Figure 5-2) these decorations comprised of 9% of the assemblage. There is a great absence of visible decorations on the lower body of the vessel which correlates to the high fragmentation of the assemblage. The91% of the assemblage had vessel decoration visible however, they are either too small to accurately identify decoration placement or too ambiguous in shape to clearly identify decoration placement. The neck decorations comprised of 6%, shoulder decoration placement 5% and rim decoration placement of the total collection.

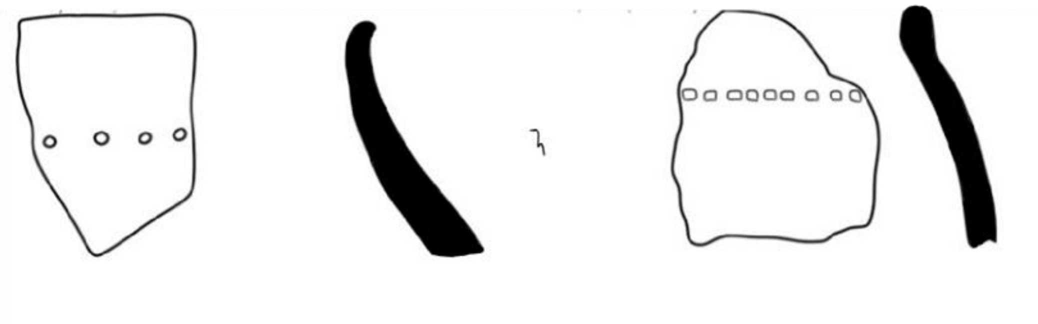
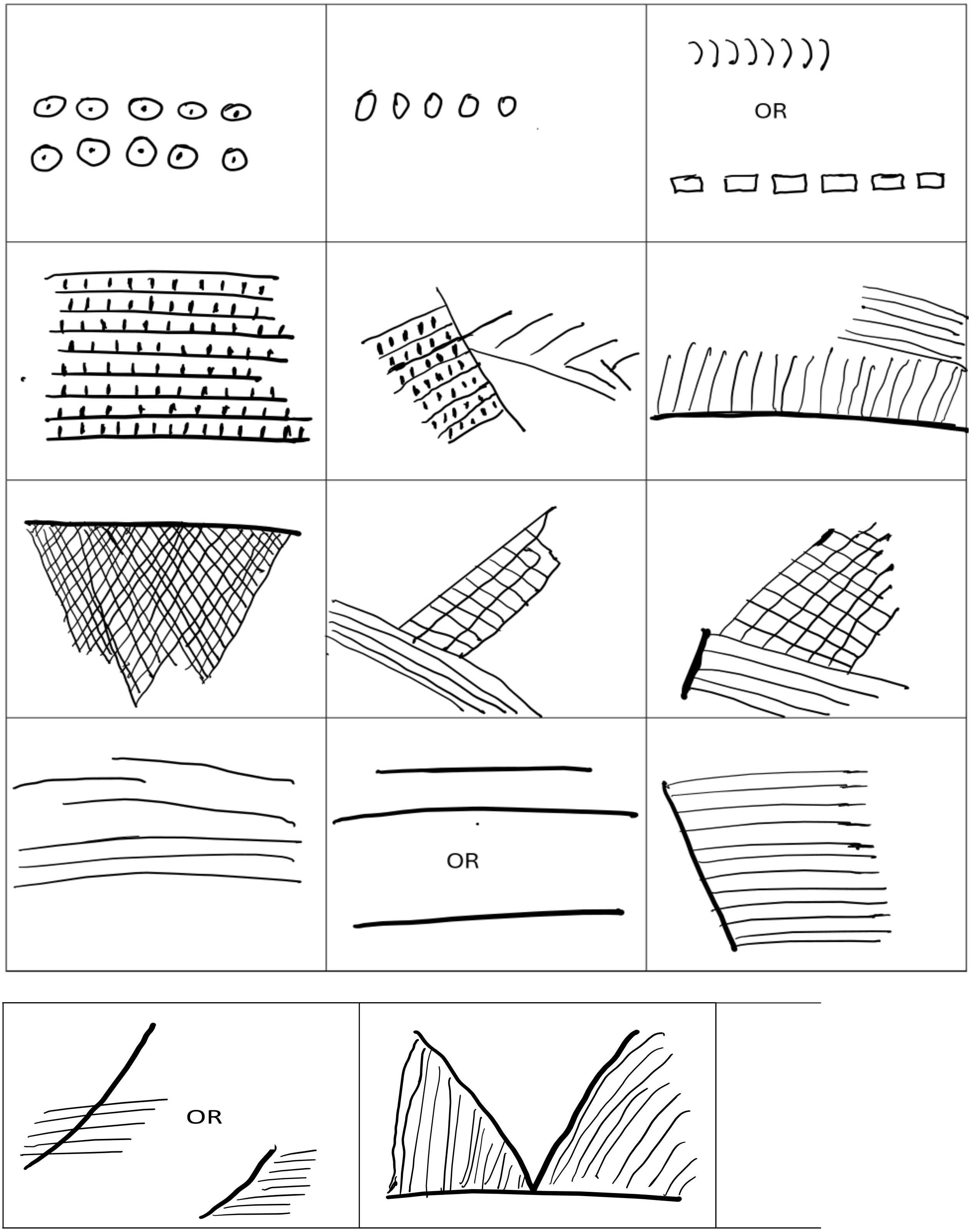


Figure 5-2 Neck decoration placement from Mahula Hill

5.3.1.4. Decorative motifs

Decorative motifs were only identified on the group C sherds with 50% of the assemblage without any decoration. The remaining sherds 50% had decorations, 9% of the of the total assemblage of decorated sherds had deep punctate. Additionally, other identified design motifs are a combination of vertical line design and deep punctate, red ochre and black burnishing, multiple bands of punctate, single line band of punctate, oblique incised lines with horizontal lines or without lines, triangular incised lines with horizontal incised lines, alternating oblique and horizontal lines, bead impression or stamping and lastly cross hatched incised lines. The assemblage shows the predominance of deep punctate 9% of the total assemblage, vertical incised lines and horizontally incised lines 9% of the total assemblage.

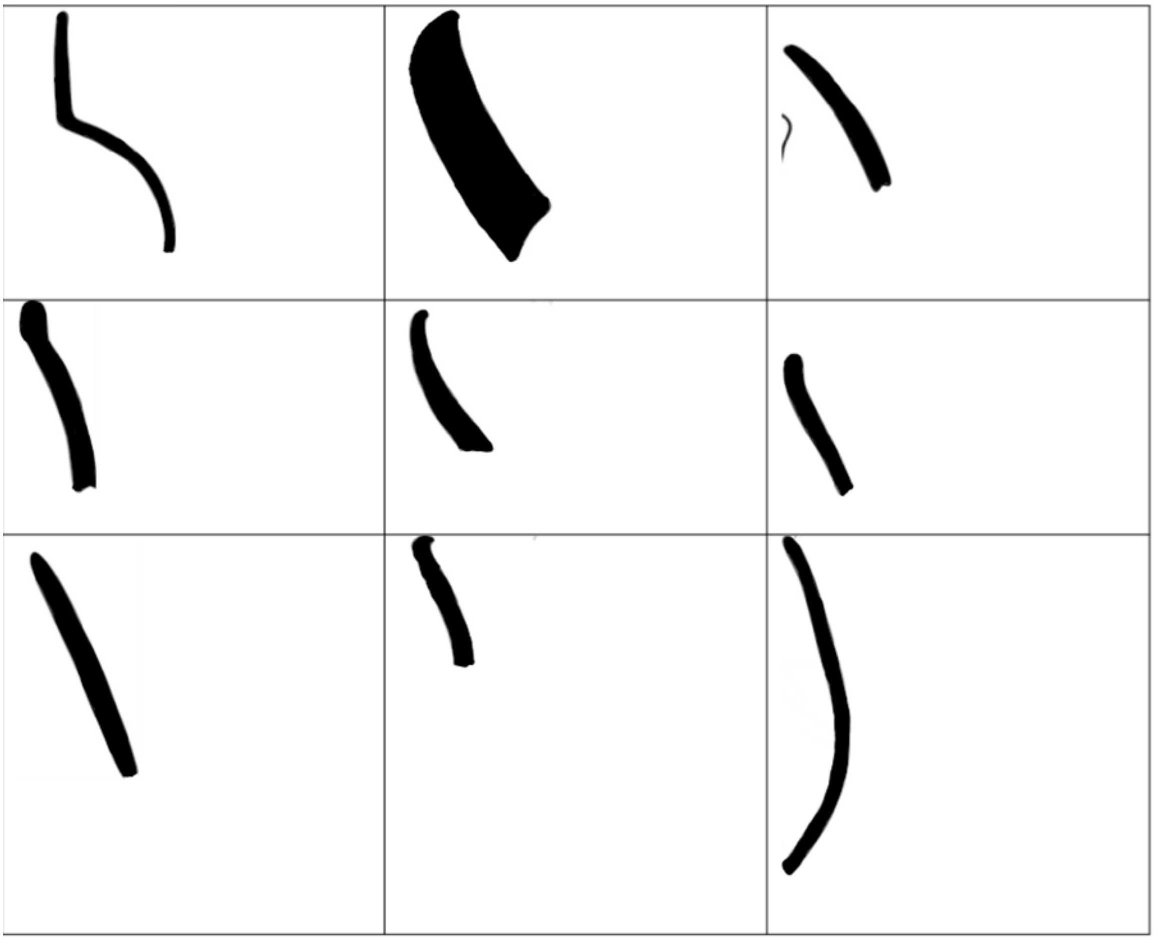
Table 5-4 Decoration motifs for Mahula Hill assemblage



5.3.1.5. Rim types

This assemblage has identified four rim types rounded, thickened, and flattened (Table 5-5).The assemblage had 37% sherds with a rim portion, not all of these had a clear rim portion 9% of the assemblage. The remaining sherds 53% had no rim portion however other diagnostic attributes has been recorded. The assemblage had a dominance of sherds that had their rim and shoulder portion.

Table 5-5 Mahula Hill assemblage rim types



5.3.2. Ceramic material from SK4, SK9 and SK11

The total of (n=1472) ceramic sherds were recovered weighing 15kg (Table 5-5). Group A less than 2cm (n=296) with the largest amount coming from SK11 (N=150) followed by SK9 (n=120) and SK4 (n=26). This is followed by the classification of group B that has sherds bigger than 2cm however, without any diagnostic traits (n=1024) Sk 9 had notably (n=595) more sherds within this group, followed by SK11 (n=387) and Sk4 with (n=42) sherds. The last group of classification is group C which will be the focus that includes sherds that are diagnostic as described in the chapter above SK9 had more diagnostic pieces (n=80) sherds followed by SK4 (n=46) and SK11 (n=26). This group included sherds that may had one or two diagnostic attributes.

Table 5-6 Ceramic material from SK4, SK9 and SK11

Sherd size	N	%	Weight (kg)	Decorated N	Decorated %	Undecorated N	Undecorated %
Smaller than 2cm	296	20	3	0	0	296	20
Larger than 2cm	1024	69	10	0	0	1024	69
Vessels with complete attributes	152	10	2	152	100	0	0

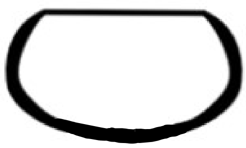
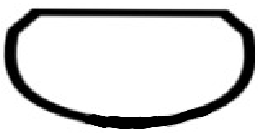
5.3.2.1. Vessel types

The three attributes for vessel types are shape, decoration motif and decoration placement (Huffman 1980). The identification of ceramic vessel type will be based on these three attributes.

5.3.2.2. Vessel shapes

Three different vessel shapes were identified, Sk11 had vessel bowl shape with a recurved lip (Table 5-9), other identified bowls are from SK4 which include a sub-carinated and carinated vessel shape (Table 5-7). These are the only two vessel shapes identified from the SK4 and Sk11, SK9 have limited vessel shape diagnostic pieces thus, no vessel shapes could be identified. These bowls were identified in the assemblage from SK 17 an Early Iron Age site south of the Kruger national Park (Jordaan 2016:62).

Table 5-7 SK4, SK9 and SK11 assemblage vessel shape

Sub-carinated bowl	Carinated bowl
	

5.3.2.3. Decoration placement

Identified decoration placement are mostly confined to the neck and rim of vessel (Figure 5-3). The decoration placement identified from SK4 assemblage had a predominance of neck decoration placement 37 % and rim decoration placement. The rest of the assemblage were too small to identify decoration placement 63 % thus, only decorative motif was recorded below. Additionally, decoration placement identified on SK11 were only on neck placement 12% the assemblage had a dominance of small pieces of ceramics. Lastly the assemblage from SK9 also had a great presence of neck decoration placement 10 % with only 1% rim placement 89% were too small to identify decoration placement.

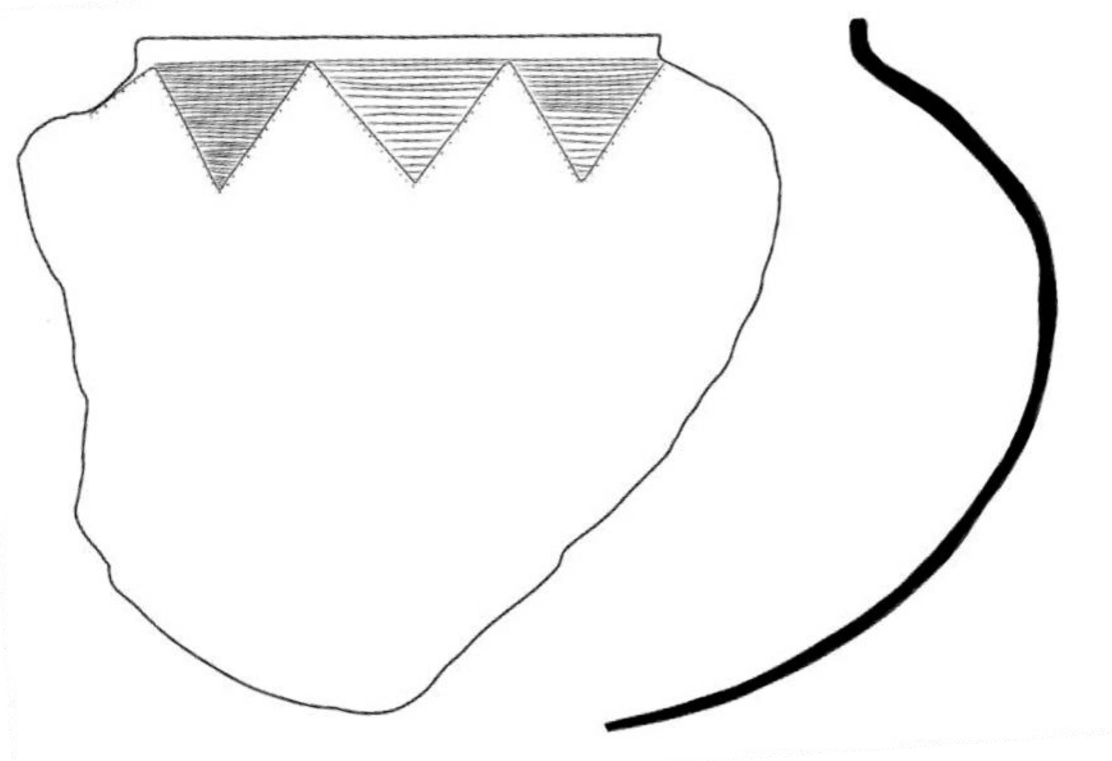
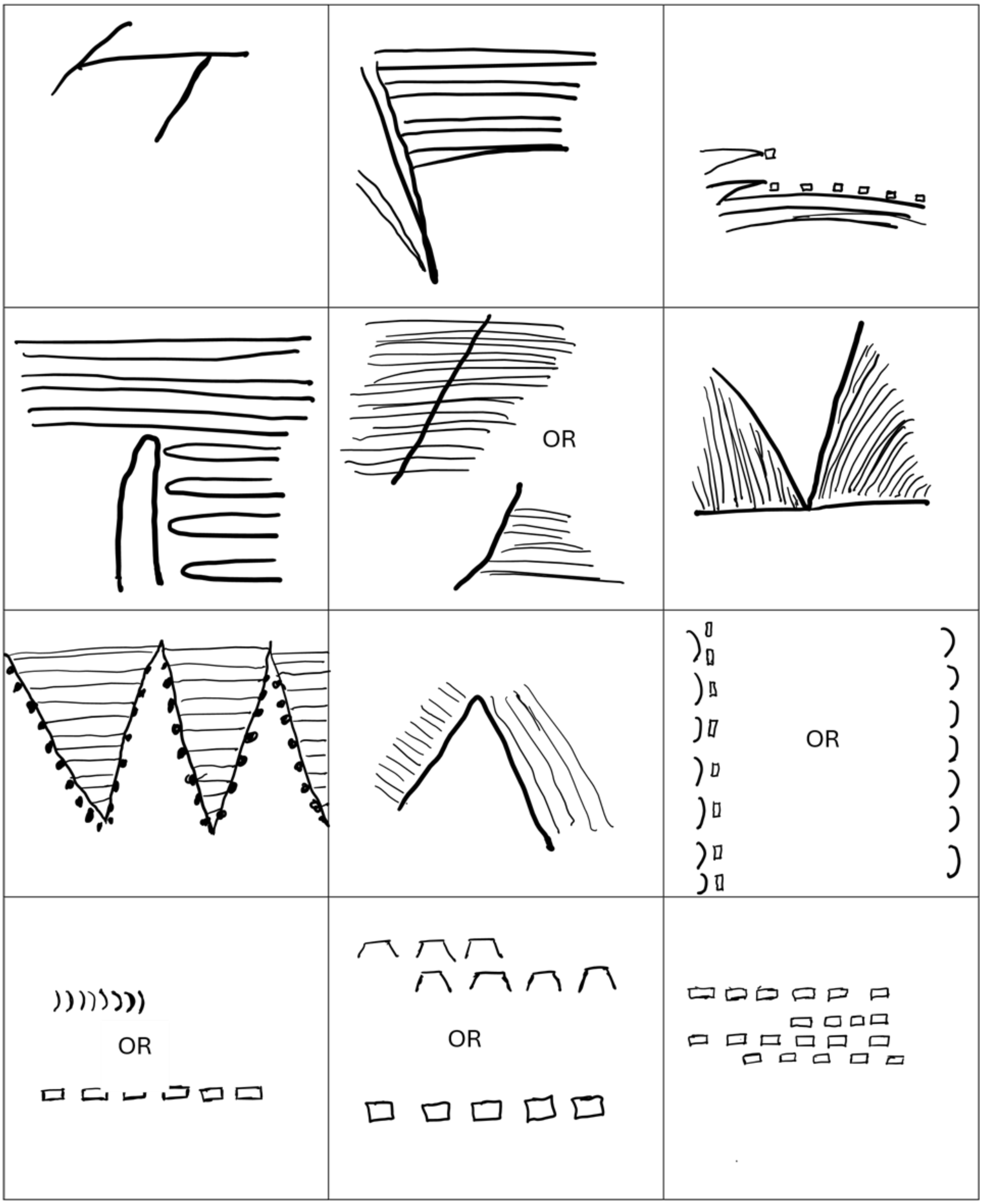


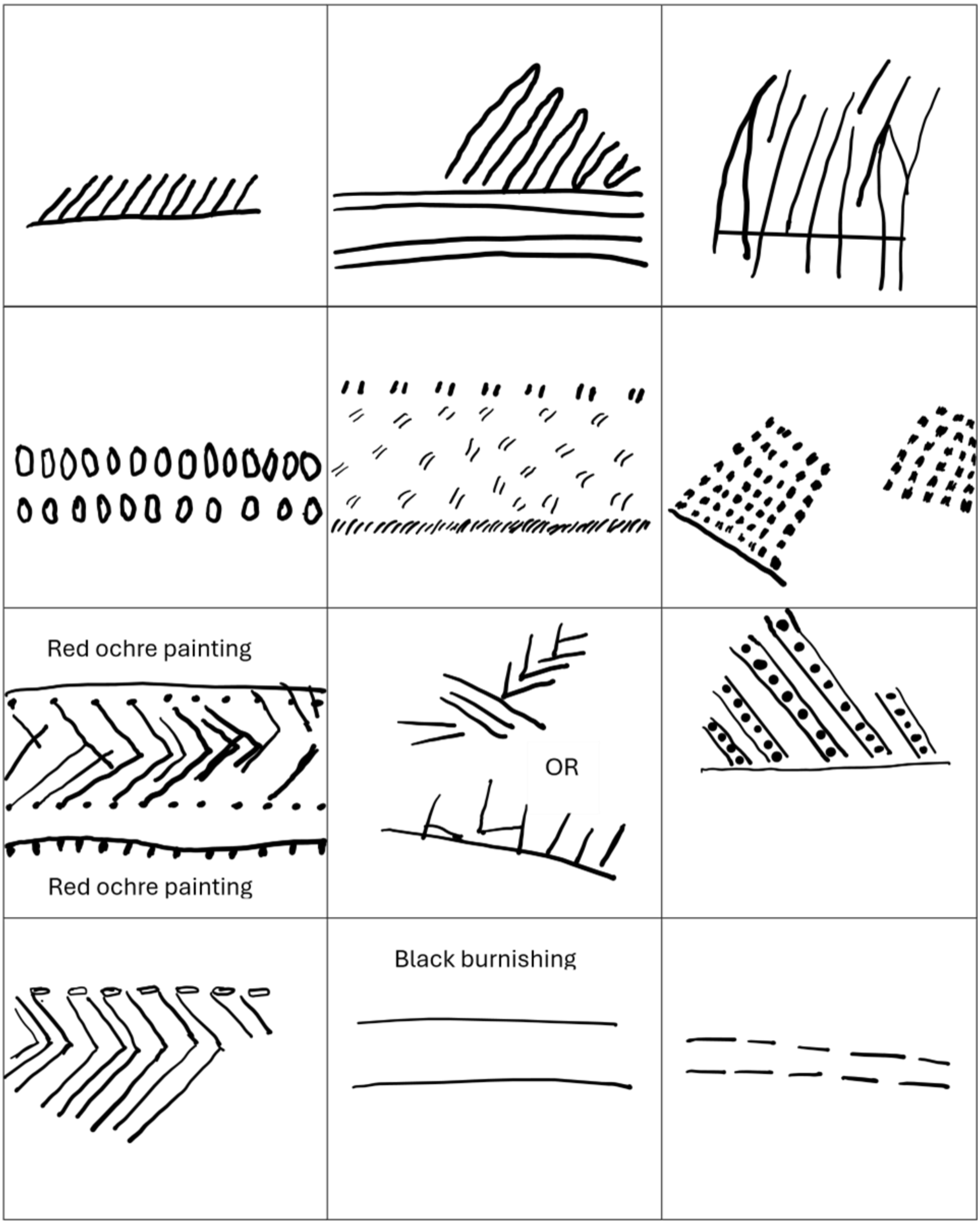
Figure 5-3 Common neck decoration placement on SK4, SK9 and SK11

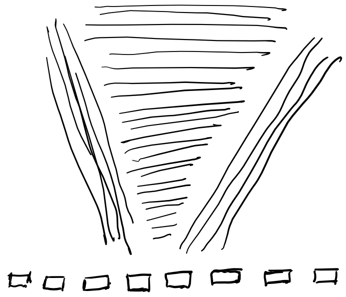
5.3.2.4. Decorative motifs

Decorative motifs identified (Table 5-8) were herringbone with red ochre paint, herringbone without red ochre paint, black barnishing, triangles on the neck bordered with slashes and or punctates. Other motifs presented include horizontally incised lines coupled with vertical lines and punctates, stamping and deep incised lines. Some of these motifs are similar to Klingbeil and Ndondondwane assemblage which will be discussed in Chapter 6.

Table 5-8 Decoration motifs from SK4, SK9 and SK 11




Red ochre painting
Red ochre painting
OR
Black burnishing

5.3.2.5.Rim types

The assemblage had a small number of sherds with rim portions that have clear rim identifiable attributes. The identified rims from the SK4, SK9 and SK 11 sites are rounded (n=6), thickened (n=3) and flattened (n=3) (Table 5-9).

Table 5-9 SK4, SK9 and SK11 assemblage rim types

5.4. Beads

5.4.1. Mahula Hill glass beads

In total (n=28) glass beads were found at the site split between Block 1 and Block 2.Their diameter distribution ranges from 2mm-4.5mm (Table 5-10) with 50 % (n=14) ranging between 2.5 mm and 3.5mm, beads ranging between 3.5mm-4.5mm account for 2% (n=7).

Table 5-10 Diameter size distribution at Mahula Hill

Size Designation	**N**	**%**
Minute (>2.5 mm)	4	14
Small (2.5 -3.5 mm)	14	50
Medium (3.5-4.5 mm)	8	29
Large (> 4.5)	2	7

Beads shapes (Table 5-11) were categorised into six different shapes .The most common bead shape is tube 42 %(n=12) with the least being sphere 4%(n=1) and Bicone 4%(n=1).

Table 5-11 Shape distribution at Mahula Hill

Bead Shape	**N**	**%**
Bicone	1	4
Barrel	4	14
Cylinder	7	25
Oblate	3	11
Sphere	1	4
Tube	12	42

The bead shape directly correlates to bead length distribution as it infers on the changes of reheated shapes. It was noted that there is a high percentage of beads with a range of 2.5mmin length.These were mostly unheated beads which are mostly cylinders as depicted on (Table 5-11) above were .

The beads included in the assemblage had a very wide range of colour (n=4) identified in total (Table 5-12). The dominant colour is citron 50% (n=14) and green 29% (n=8). These colours are further discussed below. These multiple colours will aid in identifying a date range.

Table 5-12 Glass bead colour distribution at Mahula Hill

Colour	N	%
Brownish red	4	14
Citron	14	50
Green	8	29
Blue	2	7

5.4.1.1. Glass bead description Mahula Hill

Brownish red

Four beads within this category include barn red (10.0R 3/8), dark brown (2.5Y2/2) and red feather (2.5R314). The beads have reheated ends opaque and manufactured by drawing. The beads are often referred to as Indian reds, they are either tubes or cylinders (Wood 2015:184). The frequently identified shape within the Mahula Hill assemblage is a tube . These beads had been made for at least two thousand years in India and they first appeared in South Africa in the 10th century (Wood 2005). These are difficult to date (Wood 2015) however, similar beads were identified in uMgungundlovu a royal capital in Zululand dating to the 18th century they were also in the bead assemblage of Shikumba in the Kruger National Park (Saitowitz 1990).

Citron

This category has 14 citron (10.0Y7/5) beads with a diameter of 2mm-4.5mm and a width ranging from 2mm-5mm. These beads are drawn and a cylinder shape and with an untreated end treatment. Their diaphaneity varies from opaque-translucent to translucent.

Blue

This category consists of two blue beads which includes deep teal blue (10.0BG3/6) and medium blue (5.0B4/6). Their size in length is 4mm and width at 1mm. These beads are all reheated with a diaphaneity varying from opaque-translucent to translucent and shaped into a tube or oblate.

Green

This category has a total of eight beads it was firstly focused on colour, which included teal green (5.0BG3/6); dusty aqua green (7.5BG6/3), light jade green (10.0G6/6) and surf green (5.0G6/6). This was done because under ISCC-NBS colour chart they all fall under the main colour green.

All the beads in this category are drawn and reheated, they are also on R4 of roundness factor which implies that they were worked down. This is evident, as another bead is also light jade green (10.0G6/6) was identified however, it has a roundness factor of R0, it is cylinder, untreated and translucent. The beads in this category have different shapes from oblate, barrel, sphere, and barrel. Another, cylinder shape identified has a roundness factor of R4 which entails that it was heavily reworked in comparison to the other identified cylinder bead that has R0 for roundness factor. The diaphaneity varies from translucent, opaque-translucent, and opaque. The diameter of this category ranges between 2.5mm-4.5mm, their length ranges within 2mm-4mm and the width ranging within 1mm-3mm.

5.4.2. Sk4 glass beads.

The total glass beads within SK4 assemblage are (n=20). This assemblage is dominated by oblate bead shapes 50% (n=10) and cylinder-shaped beads 40% (n=8) (Table 5-13). Both bead shapes are prominently long, in length hence, a high volume of beads within a range of 2.5 mm-3.5 mm length.

Table 5-13 Shape distribution at SK4

Bead Shape	N	%
Barrel	1	5
Cylinder	8	40
Oblate	10	50
Tube	1	5

The diameter distribution pattern of this assemblage has a noticeably wide range from 1mm-4.5 mm like the Mahula Hill diameter distribution pattern. This is suggestive of small sized beads throughout the assemblage which will be useful in dating the site further discussion below. The bead size distribution has a high number of small bead sizes 50% (n=14) falling within the range of 2.5mm-3.5mm with the lowest bead size being 4.5mm with 7% (n=2) (Table 5-14).

Table 5-14 Diameter size distribution at SK4

Size Designation	N	%
Minute (>2.5 mm)	4	14
Small (2.5 -3.5 mm)	14	50
Medium (3.5-4.5 mm)	8	29
Large (> 4.5)	2	7

There are five identified main colours, and (n=2) colours were more dominant, the identified colours are briefly classified (Table 5-15) and discussed below . The colour distribution is dominant of white 45% (n=9) and blue 20% (n=20), these have a diameter of less than 2mm.

Table 5-15 Glass bead colour distribution at SK4

Colour	**N**	**%**
Red on White	3	15
White	9	45
Blue	4	20
Green	2	10
Black	2	10

The length distribution of SK4 beads suggest that most of the beads where small, as the length ranges from 2.5mm-3.5mm. The total beads arepopulated within the (n=55%) that has a length size of 2mm, this is followed by (n=30%) of the total beads with 1mm length size and (n=15%) of the bead's length size is 3mm.

5.4.2.1. Glass bead description SK4

Red on White

These beads (n=3) are also known as white hearts which are red and a white core (2.5R3/10). Shape within the SK4 assemblage is oblate with a diaphaneity that is opaque-translucent. All these beads are reheated, and their roundness factor ranges from R2 to R3. Their diameter range is between 3mm-4mm, the length is between 2mm-3mm, and the width is within 1mm-2mm therefore, these beads are small to medium size.

White

This category consists of (n=9) drawn opaque pure white (N9) beads as well as pink (5.0R9/2) where identified within this assemblage. The size of the white bead’s ranges from 2mm-3mm in diameter, length ranging within 1mm-2mm and a width of 1mm.The shell pink size range from 1mm-3mm in diameter, the length of 1mm-2mm and a width of 1mm. These beads are small and often termed seed beads they arrived in South Africa in the early 19th century (Wood 2008:186). The shape of these beads may vary from cylinder to oblate.

Blue

This category has (n=4) includes sky blue (7.5B6/6), cerulean blue (7.5B4/8), wedge wood blue (10.0B 4/10), bright teal blue (7.5BG3/8). The width size ranges between 1mm, with a diameter range of 3mm and a length range of 2mm-3mm. The shape of these beads varies from oblate to cylinder with a diaphaneity of opaque and translucent-opaque. Furthermore, all the beads were reheated with a roundness factor of R4. The other sites did not yield any glass beads thus they are not included.

5.4.2. Disc beads.

The methods discussed in the previous Chapter 4 enabled the examination of shell disc beads, bone beads and unknown bead material. Revealing several unique taphonomic characteristics such as burning, perforation and worked edges for a rounder smoother edge. As well as identifying the type of material used in bead production and further identifying the type of shell used (Mouton 2021). The (Table 5-16) summaries the analysed beads per site and per material identified.

Table 5-16 Total of analysed bead material from Mahula Hill and SK4

Bead material	**Mahula**	**SK4**
ACH	2	8
BONE	3	1
OES	16	73
UKN	4	0
Total	**25**	**81**

Table acronyms: Achatina (ACH), Ostrich eggshell (OES), Unknown (UKN)

5.4.2.1. Raw material identification

The identified shell types are ostrich eggshell (OES) and giant African land snail (Achatina). There is an observable distribution pattern of ostrich eggshell and Achatina beads between Mahula and SK4. As depicted by (Table 5-16) that 89% (n=73) of the SK4 assemblage is ostrich eggshell disc beads 10% (n=8) of the assemblage is Achatina and the other 1 % is bone beads. While 63 % (n=15) of the Mahula assemblage is ostrich eggshell, 13 % (n=4) of the assemblage is bone bead, 8 % (n=2) Achatina and 17 % (n=4) of unknown material.

The total of Mahula Hill and SK4 assemblages, SK4 had more disc beads 76% (n=81) with 68% (n=73) ostrich eggshell beads and 7% (n=8) of Achatina. Whilst Mahula Hill has 15% (n=16) ostrich eggshell disc beads 1% (n=2) Achatina and a total assemblage of 17% (n=25). Mahula Hill is the only site with unknown (UKN) bead material at 17 % and a higher percentage of bone beads at 13%.

5.4.2.2. Shell disc bead size distribution patterns

Diameter

Diameter trend at Mahula Hill (Figure 5-4) indicates the dominance of a range from 5mm-9mm on both shell material in comparison to SK4, where there is a broader diameter range from 3mm-9mm and 76% of all OES are within 5-7 mm range which is a significant pattern. The ostrich eggshell beads from Mahula Hill are concentrated within a diameter range of 5mm-9mm, with 47% of the beads falling between 7mm-8mm and 27% having a range of 8mm-9mm and the remaining beads falls below 7mm. The major difference noted is the achatina from Mahula Hill in comparison to the ostrich eggshell beads is that the total beads fall within 5mm-6mm.

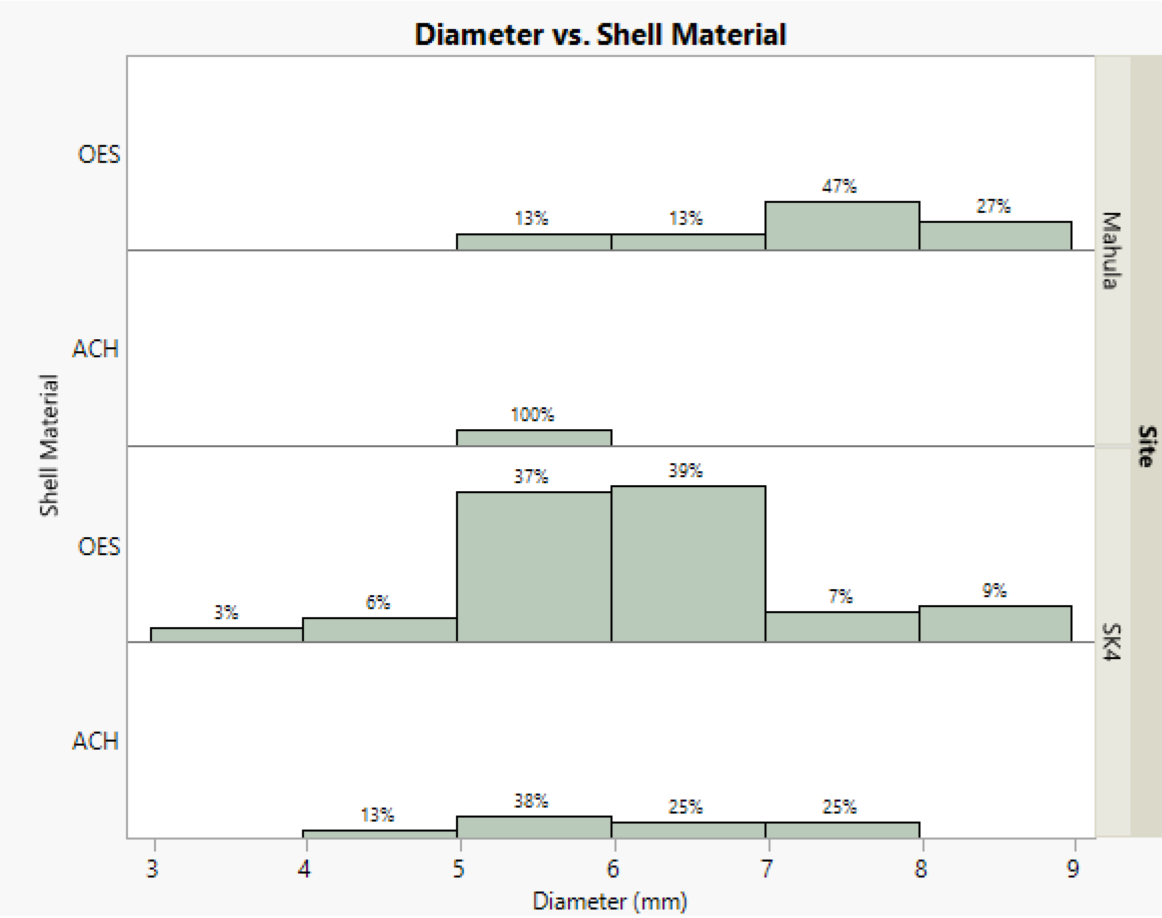


Figure 5-4 Diameter distribution and shell patterns across Mahula Hill and SK4

However, the achatina beads from SK4 in comparison were more spread out with a diameter ranging (Figure 5-4) from 4mm-8mm, with a high concentration between 5mm-6mm by 38% followed a low 13% of the beads within a diameter range of 4mm-5mm and the remaining 50% is spread out within 6mm-8mm diameter range. In addition, the ostrich eggshell from SK4 has a broad range in comparison to Mahula with a diameter of 3mm-9mm, the beads are highly concentrated within 5mm-7mm whereas Mahula Hill has a high concentration. This big range of difference might be due to having a bigger sample thus, getting more outliers.

5.4.2.3. Disc bead thickness and perforation.

There is a broad measurement variation between the sites with regards to shell material thickness after production. Mahula Hill achatina beads (n=2) were within 2 mm thickness in comparison to SK4. They have more variability ranging from 0,4 mm to 1 mm. Although the combined achatina shell from SK4 was more worked, as they were below 1mm thickness whilst Mahula Hill had a small number of achatina beads however, they were less worked on. This observation highlights the difference manufacturing methods employed within these sites.

The major difference noted in the manufacturing methods of achatina shell between the sites can be noted with ostrich eggshell beads. The thickness range of ostrich eggshell in Mahula Hill starts from 1mm-2mm, with the bulk of the beads falling within 1mm (n=9) and the rest falling under 2mm (n=7). In contrast to Sk4 the beads thickness also ranges within 1mm-2mm, with the bulk of the beads falling within 2mm (n=47) and the rest falling within 1mm (n=23).

5.4.2.4. Heated disc bead description

The SK4 beads were all exposed to heat, dominated by variations of black, brown, and grey (Table 5-17). The heavily burnt beads of black 24% (n=19) and grey 21% (n=17) might be because of depositional factors of hot ash being thrown onto disposed beads or the material was too thin and easily burnt during manufacturing.

Table 5-17 Disc bead heated colours of SK4

Colour	No.	%
Grey	17	21
Brown	27	33
Black	19	24
White	17	21
Total	**80**	**100**

The Mahula Hill disc beads were all exposed to heat, dominated by variations of black, brown, and grey (Table 5-18). A fair number of beads showed signs extreme heat exposure 8% (n=2). This extreme exposure could be because of depositional factors of hot ash being thrown onto them. The mildly burnt beads of brown 46% (n=6) and grey 42% (n=10) might have occurred during manufacturing.

Table 5-18 Disc bead heated colours of Mahula Hill

Colour	**No.**	**%**
Grey	10	42
Brown	6	46
Black	2	8
White	0	0
Total	**18**	**100**

5.4.2.5. Disc bead edge description.

The disc bead edges were categorised into well rounded, rounded, angular and very angular table below, however beads with shapes that could not be categorised where put under unknown category (Table 5-19). The noted pattern within these beads categorise is that 54% (n=13) of the disc beads are well rounded suggesting that extensive attention was paid unto them during craft production.

Table 5-19 Disc bead edge categories of Mahula Hill

Category	No	%
Unknown	0	0
Well rounded (WR)	13	54
Rounded (R	7	29
Angular (A)	3	13
Very angular	1	4
Total	**24**	**100**

All the achatina beads are well rounded as well as most of the ostrich eggshell. The other disc bead edge categories are spread-out in the ostrich eggshell material this might be because of the abundance of the material. Hence, the beads can be shaped into different edges at Mahula Hill. Disc bead edge for achatina disc beads is 11% (n=2) of well-rounded edges, with a 50% (n=9) ostrich eggshell well rounded beads and 27% (n=27) round bead edge. There were less angular 6% (n=1) and very angular 6% (n=1) disc bead edge.

SK4 disc bead edges were categorised into well rounded, rounded, angular and very angular (Table 5-20) however beads with shapes that could not be categorised where put under unknown category. The noted pattern within these beads categorise is that 68% (n=55) of the disc beads are well rounded suggesting that extensive attention was paid unto them during craft production, .

Table 5-20 Disc bead edge categories of SK4

Category	No	%
Unknown	2	2
Well rounded (WR)	55	68
Rounded (R	15	18
Angular (A)	6	7
Very angular	4	5
Total	**80**	**100**

5.5. Fauna

The presence of distinct species within this fauna assemblage is key in exploring the past substance patterns through wildlife. Furthermore, it is keystone in understanding wild taxa in the southern Kruger National Park, making comparisons with the northern Kruger National Park (Plug 1988). The presence and identification of these species may also infer about decisions made on the selection of certain species may have depended on environmental conditions.

5.5.1. Assemblage composition

The total fauna samples for Mahula Hill block 2 square nine are presented (Table 5-21). The site sample had a dwindling number of identifiable bones of 13% leaving an extremely high proportion of non-identifiable bones of 87%. The high non identifiable rate may be due to elevated level of fragmentation. This includes bone flakes and short fragment.

Table 5-21 Total faunal assemblage from Block 2 Square 9 Mahula Hill

Skeletal Part	Counted no.	NISP	Mass (g)
Identified	**370**		**1513G**
Pelvis	6	2	
Tibia	17	7	
Ulna	3	2	
Phalange	12	0	
Carpal	6	4	
Sesamoid	2	0	
Scapula	3	3	
Phalanx	2	0	
Vertebrae	22	0	
Radius	7	4	
Humerus	9	6	
cf. Humerus	1	0	
Acromion	1	1	
Rib	43	0	
cf. Rib	1	0	
Spine	3	0	
Carpometacarpus	1	1	
Coracoid	1	1	
cf. Sheldonia (shell)	9	9	
Mollusk (shell)	12	1	
Achatinidae (shell)	85	0	
Tarsal	4	2	
Claw	3	0	
Bovid (teeth)	8	4	
Mammal (teeth)	4	0	
Femur	3	2	
Dermal Plate	1	0	
Long Bone	1	1	
Humerus Head	9	6	

Phalanges	12	0	
Distal Femur	1	1	
Metapodial	5	2	
cf. Metapodial	1	0	
Astralagus	1	0	
Metacarpal	1	1	
Skull	15	7	
Other Unknown	10	0	
Unidentified	**2382**		**5085G**
Skull fragments	72	0	
Enamel fragments	95	0	
Bone flakes	643	0	
Miscellaneous fragments	476	0	
TOTAL	**2752**	**67**	**5238 G**

5.5.1.1. Species presence

There is a diverse variety of taxa within this assemblage. These are species from the open grassland grazers (zebra, warthog, blue wildebeest, and reedbuck) forest dwellers (impala, sable, common duiker, bush pig, hare) species from the riverine (fish, freshwater muscle, serrated hinged turtle). The assemblage also included large mammal (giraffe) to the smallest (crab, cf. Sheldonian, rodent, bird). The discussion of the broader species availability will be continued below, the use of common names for specie (Table 5-22) will be applied throughout. All species classified as cf. (e.g *c. f* Sable) will be combined with the confirmed counterparts. (Table 5-22) indicate patterns, the predominance of often grassland grazers (zebra) at 6.5%. This high specie presence is expected as it dwells in open grassland, easily accessible for hunting.

Table 5-22 List of identified species.

Taxon (common name)	**NISP**	**%**
Connochaetes taurinus (Blue Wildebeest)	3	0.8
Equus quagga (Zebra)	24	6.5
Martes zibellina (cf. Sable)	1	0.3
Aepyceros melampus (Impala)	2	0.5
Sylvicapra grimmia (Common Duiker)	1	0.3
Crocuta (cf. Spotted Hyena)	1	0.3
cf. Redunca (Reedbuck)	1	0.3
Giraffa camelopardalis (Giraffe)	1	0.3
Phacochoerus (Warthog)	6	1.6
Testudinidae (Tortoise)	61	16
Vertebrata subphylum (Fish)	9	2
Gallus domesticus (Chicken)	1	0.3

Aves (Bird)	2	0.5
Pelusios sinuatus (Serrated Hinged Turtle)	1	0.3
Lepus timidus (Hare)	1	0.3
Brachyura (Crab)	2	0.5
Rodentia (Rodent)	3	0.8
Siluriformes (Catfish)	1	0.3
Unionidae (Freshwater Mollusks)	13	3.5
Achatina (Giant African Snail)	52	14.1
cf. *Sheldonia* (Montane tail-wager snail)	10	2.7
Potamochoerus larvatus (Bushpig)	1	0.3

5.5.1. 2. Wild Taxa

The taxa will be grouped by type and size which can infer on the procurement strategies such as hunting, snaring/gathering, and fishing. The taxa can also be used to infer on specific questions on the impact of prey size and how it influenced hunting target choices. The size of the prey can also infer on environmental conditions. This study broadly follows (Raath 2014:180-181) in grouping wild species (Table 5-23) .Species with secondary use regardless of them being self-introduced such as snails where included.

Table 5-23 Description of taxa grouping adapted from (Brain 1975)

Group name	*Abbreviation*	*Species included*
Very Large mammal	VLM	giraffe, rhino, and hippo
Wild bovids, equids and suids	WBES	All wild bovid, equid and suid species and genus level specimens as well as Bov I and Bov II, III and IV
Carnivores	Carn	All carnivores
Small snared/gathered animals	S/G	This includes porcupines, hare large, tortoise and reptiles
Birds	B	All bird remains
Freshwater mollusk	M	All freshwater bivalve remains
Fish	F	All fish remains
Excluded	A	All achatina and rodents

Table 5-24 NISP grouped into taxa (refer to table 4-1 for taxa abbreviations)

Group name	*NISP grouping*	*Total*
VLM	15	
WBES	81	
CARN	1	
S/G	77	
B	3	
M	23	
F	11	

Broadly following (Brain 1975) grouping the identified species (Table 5-24) indicates the description of the type of species. However, all species such as rodent and achatina snails were excluded as they have a debateable dietary contribution.

5.5.1.3. Small mammals and non-mammals

Small mammals

There is an extremely high NISP (n=26) of small mammals within the assemblage. Within this group a hare (n=1) was the only identified species within the assemblage. The remaining skeletal material were only identified as small mammals based on their size. The skeletal material had a high number of ribs (n=18), vertebrae (n=3) and tibia (n=1). It is safe to assume that these belonged to a single animal. In comparison to other taxa such as birds, fish and freshwater mollusk, the small mammals are also contributing to a small part of the diet. Regardless of the possibly self-introduced rodents they also formed part of the NISP for small mammals.

Non-mammals

The confirmed non-mammals within this assemblage are crab claw (n=3), serrated hinged turtle (n=1), tortoise (n=68), reptile (n=2), achatina (n=85) and sheldonia (n=10). These animals were either gathered or snared at opportunistic and occasional days. The achatina also known as the large land snails may have been also acquired as food or for bead making. It is difficult to quantify the achatina shells due to its propensity to inflate the sample fragmentation.

5.5.1.4. Exceptionally large mammals

The exceptionally large mammals identified are more regularly present on the site's region. Giraffe skeletal remains were most populous (16 total NISP). Although fewer than WBES their sizes would contribute an exceptionally substantial portion of meat as giraffe's weigh 700-1400 kg (Skinner and Chimimba 2005). The MNI for the exceptionally large mammals is (n=1) because there is a high number of vertebrae (n=6), rib (n=6), first phalanx (n=2), right ulna (n=1), right pelvis (n=1) and a femur.

5.5.1.5. Fish and freshwater mollusk

Freshwater mollusks were also present and consistent with the skeletal material. These are extremely popular in Iron Age sites (Plug 1989). There were (n=13) pieces of freshwater mollusk identified however, these are difficult to quantify as well as (n=11) pieces of fish.

The presence of these species suggests the use of the local riverine resources as minimal effort food gathering.

5.5.1.6. Birds

The identified bird remains are low (n=2) and a chicken (n=1) was also included in the bird category in (Table 5-22). The identified bird skeletal parts are (n=1) right pelvis and (n=1) right coracoid. Therefore, the MNI for the bird remains is (n=1) as each skeletal part is representative of the side however, different bone. The dwindling number of birds remains suggestive to the possibility where the community did not direct their resources to animals that produced less meat which can also be witnessed with total number of fish and freshwater mollusk.

5.5.1.7. Wild Bovids, Equids and Suids

The grouped taxa of wild bovids, equids and suids as the largest and well represented assemblage will be presented below under its different major taxon types. There were few suids (n=6) identified within the assemblage. The number has been inflated by teeth (n=4) these spread across smaller size molars thus, they can be calculated as part of one animal. Additionally, a warthog right mandible was also identified hence the molars can be accounted for as part of the warthog. Another, suid identified within the assemblage is a bushpig left metacarpal (n=1). Like the bird, fish, and freshwater mollusk assemblage they are all representing a low percentage of the total species identified, this might be because of the low amount of meat they produce. Plains zebras are the most prevalent species within this taxon contributing 6.5 % of the total NISP. Blue wildebeest follows this 0.8% and Impala 0.3% (Table 5-22).

5.5.2. Taphonomy

These results explore what happened to animals after procurement. Additionally, exploring how they were captured, why they were captured and how they were used. This section is focused on recordable human and environmental activity on skeletal material such as weathering impact, post depositional fragmentation and post excavation breakage, burning, butchery, carnivore, and rodent gnawing.

5.5.2.1. Weathering

This section focuses on the entire assemblage assessing weathering trends. Weathering is common and its severity marks damage and jeopardies bone surface structure and any marks. Weathering features were recorded as 0-no weathering; 1-light weathering; 2-medium weathering;3-high weathering (Figure 5-5). The assemblage has, 67% (n=249) of the skeletal material that did not indicate weathering damage, the skeletal material mostly had 24% (n=87) of light weathering; skeletal material 7% (n=27) had medium weathering and material with high weathering 2% (n=7).

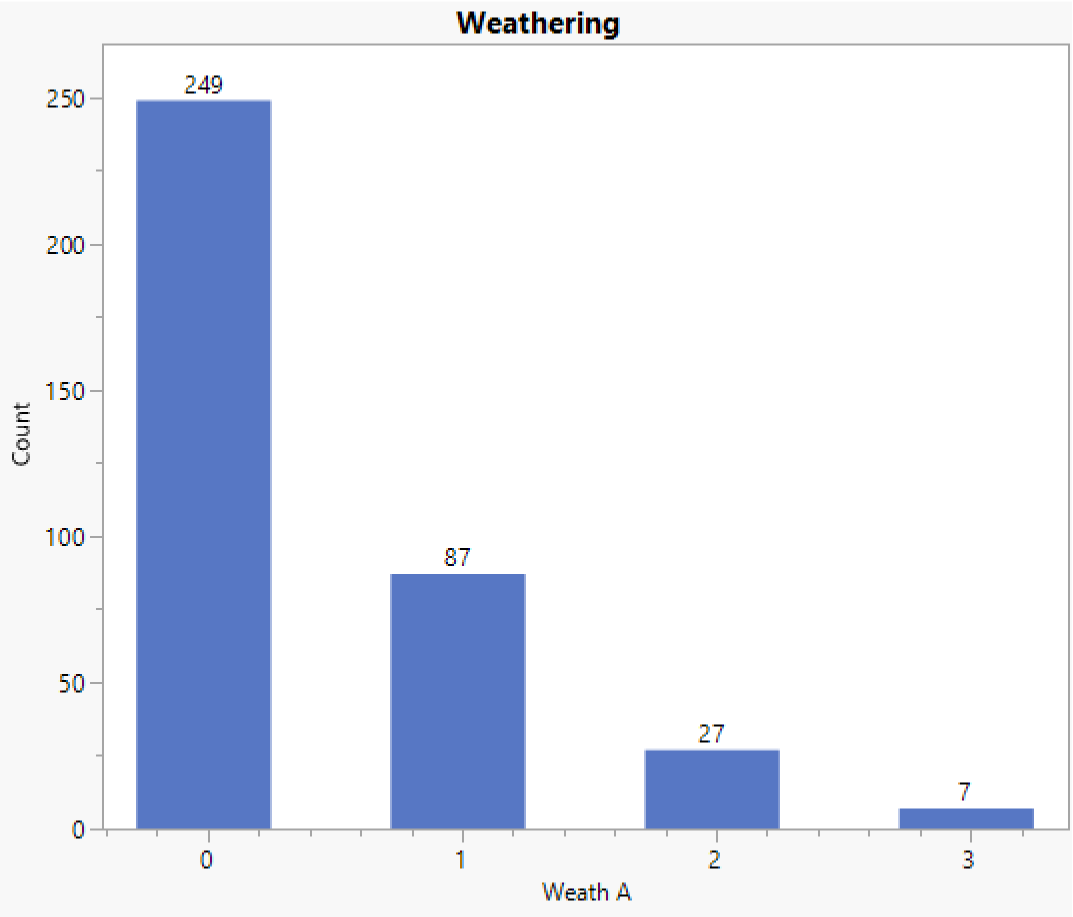


Figure 5-5 Weathering patterns on skeletal material at Mahula Hill

5.5.2.2. Gnawing: rodent and carnivore

Butchery traces, gnaw marks significantly play a huge role in fauna preservation. Rodent activity on the site was scarce and carnivore gnawing had a greater effect on the assemblage (Figure 5-6). There were four levels of severity recorded for both rodent and carnivore gnawing 0-no gnawing; 1-gnawing; 2-light to medium; 3-heavy gnawing; 4-portions destroyed. A high number of skeletal materials 81% (n=298) had no gnawing marks. Carnivore gnawing of the skeletal material was 7% (n=26) from the assemblage. Medium carnivore gnawing on the skeletal assemblage was also high 10% (n=37). Heavy gnawing mostly occurred on level three 1% (n=5) and level four 1% (n=3). It is evident that carnivore gnawing is more prevalent than rodent gnawing (Figure 5-6).

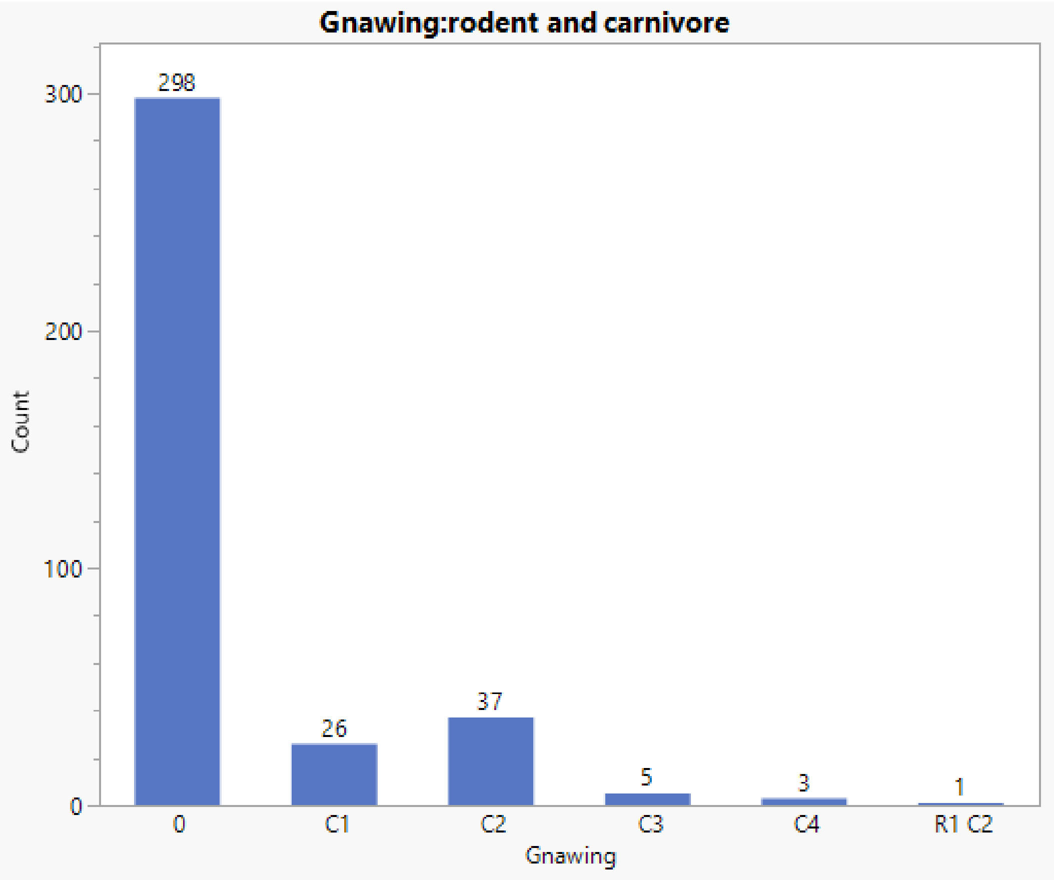


Figure 5-6 Gnawing marks on skeletal material.

5.5.2.3. Butchery

The butchery patterns left may reconstruct cut and chop marks used for meat processing, distribution and transporting (Lyman 1987; Plug 2004) as well as cooking and preservation method (Gifford-Gonzalez 1993). The analysis recorded the zone according to the bone's original anatomical position into which the mark occurred and the description of the mark (Dobney & Rielly 1998). Therefore, 86% (n=317) of the analysed fauna had no traceable butchery marks leaving a total of 14% of skeletal material with butchery marks. Furthermore, focusing on skeletal material with butchery marks 5% had multiple cuts another 5% had multiple chop marks, 2% had single chop mark and the other 2% had single cut marks.

5.5.2.4. Burning

Burning within this assemblage was recorded as Burn A- the level of burning from 0-4 as different levels of burning on top of and Burn B-recording whether the bone was completely burnt or incompletely burnt below. The assemblage had a sparse number of unburnt bones 36% (n=135) in comparison to 64% (n=235) burnt bones. The burnt bones were either completely burnt or incompletely burnt. The difference of completely burnt and incompletely burnt and how it reflects on society will be discussed in the following Chapter 6.

5.6. Metal/Iron objects

5.6.1.SK4

A total of fourteen metal items were recovered. These include one iron arrowhead and thirteen pieces of corroded iron of indetermined form.

5.6.2. Slag

Mahula Hill and Sk 4

A total of fourteen pieces of slag weighing a total of sixty-seven gram were found (Table 5-26). All the slag found was recovered from Block 2. The slag was visually differentiated into categories based on morphological considerations (Miller & Killick 2004; Chirikure & Rehren 2004) One fragment of slag was found weighing eleven grams from SK4.

Table 5-26 Slag pieces from Mahula Hill (all block 2) and SK4.

Site	***Square***	***N***	***Weight (g)***
MAH	3	2	11
MAH	12	3	10
MAH	9	1	6
MAH	4	5	20
MAH	1	2	11
MAH	1	1	9
SK 4	2	1	11
Average		2	8

5.7. Seeds

For analysis twelve samples were analysed from the material collected. Only excavated seeds were analysed. The identified taxa are *Sclerocarya Birrea* endocarp's fragment (n=4), *Sclerocarya Birrea* (n=1), *Sclerocarya Birrea* operculum (n=4), and amorphous material of a *Sclerocarya Birrea* nut (n=1). Their unburnt nature as depicted below (Figure 5-7) suggests that they were introduced into the site at a later stage.

Figure 5-7 Sclerocarya birrea endocarp

5.8. Bone tools

All analysed bones tools (n=30) had sustained forceful impact which was concluded to be a sign of macrofracture. Further, analyses into diagnostic impact fracture also revealed that all the analysed bone tools revealed evidence of forceful impact use. Within the diagnostic impact fracture, spin off fractures were not identified in any of the tools analysed. However, the identified diagnostic impact fractures include crushing fractures (n=18), bending fracture (n=5) and hunting fracture (n=7).

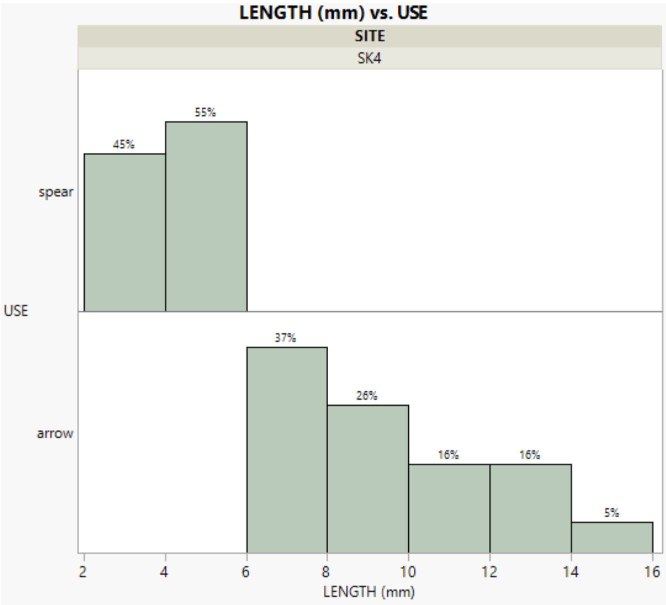


Figure 5-8 Length distribution of bone tools and their use/function

Chemical use trace alteration on bone tools as defined in Chapter 4 above was identified on (n=6) of the bone tools. The use of these bone tools was differentiated between a spear (n=11) and arrows (n=19). The length of these bone tools ranges from 2mm-16mm (Figure 5-8). However, the arrows length ranges from 6mm-16mm and all spears range between 2mm-6mm. The difference between arrows and spears (see Bradfield and Lombard 2011:68)

5.9. Stone artefacts

Mahula Hill

The assemblage had 4140 stone artefacts. The analysis indicated that these included 99% (n=4091) of quartz and 0.1% (n=5) were polishing stones. This assemblage did not include lower grinders (Table 5-25).

Table 5-25 Stone artefacts from Mahula Hill

STONE ARTEFACTS	COUNT	%	WEIGHT (GRAM)
QUARTZ	4091	99	2000
UPPER GRINDER	3	0.07	800
HAMMER STONE	1	0.02	60
POLISHING STONE	5	0.1	300
STONE TOOLS	40	0.96	100

Upper grinder

Upper grinders are characterised with round or oval and a smooth flattened bottom that is used for grinding. (Zurro *et., al 2005*) demonstrated the potential uses of grinding stones providing reference patterns for functional purposes confirming use-wear traits observed during cereal processing. This description of upper grinders was used in categorising them on (Table 5-25) following a description of weight, shape and count, upper grinders constituted 0,07% (n=3) of the total assemblage.

Hammer stones.

Hammer stones often have percussion smears that are concentrated near the edge with extension striations. (Byrne *et., al 2006*) states that some hammers were used to retouch flakes, resulting in morphologically characteristic smears, which can be used in identifying hammer stones as these smears remained visible after use. The assemblage has 0.02% (n=1) hammer stones.

Polishing stones

The analysis approach of this artefact is through technological use-trace and ethnographic accounts defined elsewhere. Polishing stones are usually smaller in size in comparison to upper grinders and hammers, they also are exceptionally smooth and flat on one side of their body. The size, shape of oval or round and use-wear traces was used in identifying and categorizing polishing stones within this assemblage. The assemblage has 0.1% (n=5) polishing stones. The inferences about this artifact's activities were made using (Geib & Callahan 1988) as polishing stones are not limited to floor polishing but they were also used for pottery polishing.

Stone tools

Stone tools vary in size, length, and weight thus they are used for various activities. However, they all have common characteristics that can be used in identifying they such as a bulb of percussion (Lombard 2005). This identification feature is caused by stone tools often breaking either by accident during excavation or animal trampling, during knapping or because of use-age. Identifying these fracture types assist in establishing the hunting function of hafted tools, with diagnostic impact fractures resulting from forceful longitudinal collisions with other objects. The four diagnostic impact fracture types used in identifying stone tools from other stone artefacts are bending fractures, spin-off fractures, and bilateral spin-off fractures (Zurro *et., al* 2005). Thus, following this description the assemblage has 0.96% (n=40) identified however, there was no further analysis conducted. Additionally, the size and shape were also considered during the identification process as they can also display diagnostic fractures. These stone artefacts are essential in reconstructing production processes and social life, analysing forms, social organization, productivity, and economic activities within a society's production cycle.

5.10. Summary

The yielded results from this study has been shared above shedding light into the social economy of craft production, traded goods, and hunting and or sawing tools. In the next chapter the discussion of these results will be presented, starting with setting out the chronological date and context of Mahula Hill.

CHAPTER 6: Discussion

This chapter synthesizes the data from chapter 5. Highlighting the chronological sequencing of occupations conducted by radiocarbon dating and glass beads. Furthermore, reconstructing site articulation, regional linkages and interactions through ceramics and glass beads. Lastly providing a basic understanding of lifeways focussing on consumption habits. To conclude the major findings of the research are highlighted and their contribution to the broader understanding of KNP southern region. Furthermore, highlighting future research avenues on Mahula Hill.

6.1. Chronology for Mahula Hill

One of the major objectives of this study was to establish the chronological occupation at Mahula Hill. In a combination of radiocarbon dates and already existing glass bead sequences. The first dates of Mahula Hill identified by radiocarbon dating from Block 1 dated to AD994-AD1157 AD. This may have been one of the first Bantu occupations on the site. Glass beads from Block 1 were all drawn and included dusty aqua green and white, which were identified in the uMgungundlovu bead assemblage that dates to the 1800s. Their presence do suggest the introduction of another Bantu group in the area as this date coincides with the historic *Difeqane* wars.

6.2.Regional interactions and site articulation

6.2.1.Disc bead production.

Dating back to the Late Iron Age Ostrich eggshell and Achatina (giant land snail) have always been present in the archaeological record and still are present. Disc beads are often used for personal adornment and or sewn onto clothing. However, the presence of shell blanks left during production on site level are often accounted for as fragments of shell remains in faunal collections. Thus, the focus of analysing disc beads was to note changes in the use of raw materials, manufacturing techniques, shell blanks left after production across the sites.

Of all four sites studied only two sites have the presence of disc beads. The largest sample of disc beads was recovered from SK4 in total (n=80), disc beads recorded nearly in every context. This massive collection of disc beads had few Achatina beads (n=8) and one bone bead, the preference of ostrich eggshell material might be due to its ability of not easily breaking down during production. Less than half of the disc beads (n=35) were found in the context C.7, C.10 and C.12 (Figure 2-7), that is centre of the settlement and the remaining beads (n=45) were spread on the outer areas of the settlement on context D.10, D.7, G.4, G.7, E.4, E.7 and E.3. The high number of beads from the centre of the settlement is suggestive of communal bead production and or difference in social class. This is further evidenced by a low number of very angular beads (n=1) in comparison to other context layers. Context C.7,C.10 and C.12 have a high number of well-rounded disc beads (n=27) followed by rounded beads (n=7) and lastly angular beads (n=5).

Additionally fragments of shell material in the process of bead making and potential disc blanks were only recorded at SK4. The availability of these fragments provide evidence of their manufacturing at SK4. There is higher number of shell blanks on context D.7 and D.10 (n=9) in comparison to context C.7, C.10 and C.12 that has a total of (n=4), other contexts do not have shell blanks. The four stages of disc bead production have been identified throughout the SK4 assemblage, the stages of complete and semi-completed disc bead production were mostly found at the centre of the settlement.

Mahula Hill has the second collection of shell disc beads, comprising of (n=17) disc beads, (n=3) bone beads and unknown (n=4) material. The highest concentration of disc beads came from Block 2 terrace (n=18), the collection has a high number of well-rounded beads (n=11), round beads (n=6) and one angular bead. This is in line with the daily domestic living context where they were excavated. Interestingly there is no evidence of bead production in the form of shell blanks at Mahula Hill. The analysed disc beads mostly have well rounded edges with a uniform thickness that falls within 2mm range. The lowest concentration of disk beads came from Block 1 overhang, however all the recovered and analysed beads are well rounded and there is no evidence of bead production within this context as well. Thus, the lack of disc bead production may suggest that they may been some localised trade with other sites or disc bead production may have occurred on other designated areas on the site which may need further investigation and excavation.

6.2.2. Other site economic activities

6.2.2.1.Smithing activities

The consumption of non-utilitarian metal objects is commonly closely controlled within Iron Age communities (Calabrese 2000).Thus metallurgy can be linked to elite status as well as social stratification. The Kruger National Park has deposits of iron thus, making the production of these metals a widespread industry in the region. This is evident by the presence of metal and slag at SK4 and Mahula Hill. Iron was used to make items of personal adornment such as bangles, anklets, and pendants. Additionally, the use of iron was employed in making weapons such as arrowheads. The items related to the process of metallurgy such as slag are indicative of some form of smithing taking place at the sites. Additional items relating to iron smelting that can be found at the sites include furnace remnants. However, due to the indestructability of slag, it is the most abundant remnant of metallurgical process and the most common archaeological evidence of metal working at on sites and it will be discussed alongside specific sites were identified.

Iron objects were classified according to Ducan Miller's arbitrary scheme where classes are based on geometric shapes. Arrowhead-flat, tanged point with round shaft. The arrowhead found from SK4 is flat tanged point with a round shaft weighing 213 gram and 26 cm in length. The potential use of the arrowhead may have been for ritual purpose, security and or food acquisition through hunting. The corroded iron pieces were only found in SK4 are obliterated and no further information could be retrieved. The ferrosilicate waste product is indicative of metal production from the site. Slag has been identified from both sites SK4 and Mahula Hill.

The fourteen pieces of slag from Mahula Hill were differentiated based on morphological considerations. The (n=12) slags of the (n=14) from Mahula Hill were furnace slags which solidified in the furnace during smelting, they have ruminants of charcoal inclusions and porous shape (Moffet 2017). Additionally, the (n=2) were identified as flow slag -which are well rounded with clearly defined flow structure. The slag material from SK4 was also a flow slag and only one slag was identified. The iron objects recovered from both Mahula Hill and SK4 are merely indicative of iron smelting and other functional uses of iron objects for example arrow heads for hunting.

6.2.2.2.Stone artefact usage

The use of stone artefacts is widely known during the early human habitation and development of complex technologies in the Stone Age period (Lombard 2005 2012). With the introduction of iron tools and weapons during the Iron Age, it led to a significant shift in the use of stone artefacts. As prevalent as iron tools had become in the Iron Age, stone tools continued to be used for specific purposes. For example, grinding stones, querns and pounders which are essential in processing grains thus, becoming increasingly crucial during food production.

The stone artefacts analysed are from Mahula Hill. The stone artefacts have an absence of movable lower grinders. This is due to the presence of fixed lower grinders on flat granite surface. These are commonly used in communal spaces thus, eliminating any movable household lower grinders. Additionally, these stone artefacts were recovered from a terrace space Block 2. Based on ethnographic accounts grinding stones are commonly used in food processing and preparation methods. Additionally, the polishing stone within the assemblage was used within a domestic floor polishing.

6.2.2.3.Bone tools use and production.

Bone tool production during the Iron Age in Southern Africa reflects the adaptation and innovation that occurred alongside the introduction and widespread use of iron technology. The Iron Age in Southern Africa, spanning approximately from 500 CE to 1800 CE, saw the use of bone tools in various ways, complementing iron tools and fulfilling specific roles. These roles may differ depending on the type of bone tools produced as they range from knives and scrapers used in processing meat, awls and needles which are essential in making clothing items, harpoons and points which are used in hunting large game, and adzes and hammers used in woodworking.

The bone tools analysed are from SK4.The bone tools include awls and needles; this is further evidenced by eggshell beads presence that are abundant on the site. However, this is not the case on other sites as there are no bone tools recovered. The analysis focused on assessing macrofracture impact on bone tools that may have developed during different uses. Thus, revealing that microfractures frequently occur on bone tools whilst in use as well as during production.

6.3.3.Long distance trade routes

The presence of glass beads at SK4 and Mahula Hill enable us to speak about the site's participation in the larger trade network. Wood (2012) states that previous excavation methods make it difficult to have precise regional comparisons, as the smaller glass beads are difficult to see and recover on sieve meshes. However, with the recovered glass beads we can confirm that these communities had access to exotic trade goods within the region. Access to these exotic goods should not be used as a direct correlation in assigning status within these settlements, as it has been proven in Mutamba that glass beads should no longer be associated primarily with elitism (Antonites 2014). It is safe to draw conclusion on the presence of local trade of exotic goods, as glass beads from uMgungundlovu have been identified within the SK4 assemblage. However, to have a much fuller understanding of these sites' participation in the trade of exotic goods more data needs to be generated as the region remains elusive.

6.3.4.Regional interactions through ceramics

To reconstruct regional linkages and interactions of material culture to other sites in the region, a comparative analysis of material culture was conducted. The analysis focused on regional linkages through ceramic similarities. The data obtained from the ceramics indicate that there may have been a Mzonjani occupation as well as Ndondodwane occupations. The presence of multiple facies and the merging and blending of ceramic styles is not uncommon (Loubser 1991).

The ceramic assemblage of Skukuza Complex has been likened to that of the Lydenburg Heads site and Ndondondwane in KZN (Evers 1982, Whitelaw 1996, Meyer 1986). The Skukuza Complex is a testament of human migration and cultural diffusion (see Chapter 3). This Complex has a mix of both Kalundu and Urewe tradition (Huffman 2007).

The data assemblage from SK4, SK9 and SK11 sites indicate bowl shapes which are sub-carinated and carinated, that were also identified in other Skukuza sites (Meyer 1986). These carinated bowls have also been identified and are very popular within the Ndondondwane sites (Maggs 1984). Additionally, their presence within the assemblage is indicative of food preparation/serving as they are still commonly used for such.

There were only two positions that were used for decoration placement. These two areas are the neck and rim of the pot. These positions for decoration placement on the rim was also found in the Mzonjani ceramic assemblage. Meyer (1986) does mention that decoration placement within Skukuza Complex is found on the rims of vessels as well as other parts of the vessel. Other decoration placement that are common are decorations on the lower part/upper neck that is like Ndondondwane assemblages (Maggs 1984). However, these decorations like Ndondondwane were not identified in these assemblages due to the small number of ceramics excavated.

The decoration placement in relation to the type of decoration identified within this assemblage include continuous motifs, discontinuous motifs, cross hatched/horizontal motifs, and triangular motifs. Additionally, decorations also included oblique incised lines with or without punctates which are commonly seen on the Mzonjani assemblages (Huffman 2007:129). Whereas the cross-hatching motifs are like Ndondondwane assemblages (Huffman 2007, Maggs 1984). Other decoration placement and motif of triangles on the neck bordered with slashes and punctates on the shoulder are common in the Klingbeil facies as well as Mahula Hill assemblage. Lastly decorations with horizontal lines with or without punctates found within this assemblage are also like Mzonjani and Ndondondwane.

Mahula Hill assemblage has a dominance of cross hatching decorations that are like the Skukuza Complex. The vertical/horizontal lines with or without punctates identified at Mahula Hill were also identified at Silver Leaves (Huffman 2007:129). However, the Silver Leaves decoration where a spaced motif appearing on the shoulder and punctates on the rim. The Mahula Hill punctates are a combination of vertical/horizontal deep punctates, multiple bands of punctates or a single line band of punctate which is like the SK4, SK9 and SK11. The similarity in decoration motifs is suggestive of regional interaction at some point and time.

The major difference between Mahula Hill and Skukuza site lies on the decoration placement. Mahula Hill decoration placement is confined to the rims, shoulder, and neck whereas the analysed Skukuza sites have their decoration placement on the rim and neck. Other decorations identified at Mahula Hill include red ochre and black burnishing, bead impression and stamping, these designs were not identified within the Skukuza sites. Another major difference between these sites is that Mahula Hill has the sub-carinated bowl identified at SK4, SK9 and SK11 it also has the straight neck jar, slightly recurved jar and the S-shaped jar which are also common at Ndondondwane.

The interaction between SK4, SK9,SK11 and Mahula Hill is visible through shared motifs, motif placement as well as bowl shapes. This interaction may have occurred through intermarriages, trade and/or shared knowledge during migration and diffusion.

The similarities of these assemblages to other ceramic facies such as Ndondondwane, Klingbeil and Mzonjani is a sign of multiple occupations over a period on the same site thus, yielding ceramic decorations from different facies. This is not uncommon within this region as SK17, is also a multi-occupational site (Jordaan 2016).

6.3. Consumption patterns at Mahula Hill

Another objective for this study was to establish basic lifeway parameters focusing on consumption habits and patterns especially pertaining to animal and plant resources. This also brings into context foodways (Simoons 1991; Goody 1982; Raath 2014) in relation to procurement, preparation, and disposal of food.

6.3.1.Patterns of animal use

6.3.1.1.Burning

Similarly compared to other taphonomy factors recording human interference onto fauna remains. Burning in the assemblage may stem directly from human actions during cooking (Gifford-Gonzalez 1989) however, the disposal practices of the community resulted in highly burnt and charred bones. The burning may have been incidental or for hygiene purposes (Lyman 1994) or for fuelling. Kent (1993) suggests that charring on bones is unusual during food preparation therefore, suggesting that charring is highly because of depositional and other factors and unlikely cooking.

Additionally, completely burnt bones were recorded at a higher level than incompletely burnt bones (see Chapter 5). The level of burning was recorded to track the temperature and severity of damage, brown and black bones were burnt at low temperature whilst grey and white denoted elevated temperature. The burning reflected on the Mahula Hill assemblage may have occurred due to disposal practices where bone is occasionally thrown into the fire or pit and covered with hot ashes. The is supported by the fact that the excavated layers at the bottom had more charred and black burnt bones than the layers on top. Within the identified species burning is more common throughout the assemblage aside from the shell species. The burning severity is mostly at level 2 which is mostly light brown. The uniform burning level is suggesting that most of the fauna assemblage was disposed the same manner.

6.3.1.2.Butchery

Apart from burning as a disposal method. Butchery traceable marks on skeletal material are often left through dismembering meat using stone and metal tools (Seetah 2006). The butchery patterns left may reconstruct cut and chop marks used for meat processing, distribution and transporting (Lyman 1987; Plug 2004) as well as cooking and preservation method (Gifford-Gonzalez 1993).

The assemblage revealed that there was less butchery as 86% (n=317) of the fauna had no traceable butchery marks. It is common for fauna assemblages to have a high number of butchery chop marks (Grody 2016). These chop marks and cut marks would be related to carcass transportation from hunting camps to the main settlement. In relation to Mahula Hill it seems to be the opposite. This may indicate that hunting took place near the settlement. This is further supported by the identified species within the assemblage that were identified in the same area where Mahula Hill is located.

Focusing on skeletal material with butchery marks totalling 14% of the assemblage. These may have occurred during food preparation as 5% of the assemblage had multiple cuts which often occur during food preparation. The other 5% of the assemblage had multiple chop marks which often occur during dismembering these may have occurred at the site or during carcass transportation. Lastly 2% of the fauna had multiple chop marks and the other 2 % had single cut marks. These types of cuts often occur during preparation. Thus, it is safe to conclude that animal acquisition occurred within the site's proximity as less time was used in dismembering animals as indicated by the 5% multiple chop marks and 2% single chop marks of the total assemblage. These butchery marks are influenced by the type of animal being acquire and where it was acquired as discussed below.

6.3.2.Hunting targets and species diversity

Mahula Hill has a very broad and diverse specie presence that was targeted for hunting. The game species represent both large and small mammals, suggesting that the community were well skilled hunters that may have engaged in hunting drives which were popular in the region (Stevenson-Hamilton 2012; Von Wielligh 1928; Plug 1991; Grody 2016).The absence of domestic animals such as cattle, sheep and goats suggests that the area was not free of tsetse infestation at the time of occupation. Based on historical evidence the lowveld was immensely infested with tsetse fly during the 19th century and the first half of the 18th century (Stevenson-Hamilton 2012). However, the region was free of tsetse fly during the 18th century (Punt 1975). In addition, the absence of cattle, sheep and goat may also be due to the abundance and relative ease access to animal protein thus, domesticating animals was unnecessary. The species found at Mahula Hill many of these species still occur in the Kruger National Park in the present day with a few exceptions that changed their distribution within the park. The following animals have been found within the Mahula Hill region.

Equus burchelli (plains zebra)

The plains zebra present distribution occurs in reserved areas. These animals are savanna species living in open areas, woodland, and grassland where water is available (Skinner and Chimimba 2005) plains zebra distribution range within the Kruger National Park have a definite habitat choice with daily movements to areas with better grazing and water sources. This specie moves in groups hence, the hunting may have been easier. This is indicated by the high NISP(Table 3), the plains zebra has a high dominance within the fauna assemblage. This dominance may have been due to accessibility of this specie within the Mahula Hill region.

Crocuta Crocuta (spotted hyaena)

There are six subspecies of hyaena (Skinner and Chimimba 2005) the spotted hyaena is distinguished by the rounded ears, spotting on the body and a short coat. They are widely distributed throughout Africa and within South Africa they occur in Limpopo, Mpumalanga, and Northwest thus, their distribution range within the Kruger National Park is wide. These are savanna species, open woodland and often associated with human habitations (Skinner and Chimimba 2005:373). Their habitat attests to why they were acquired as a source of protein however they were not acquired as often.

Connochaetes taurinus (Blue wildebeest)

They are associated with savanna woodland and water sources are essential to their habitat requirements for this specie. Their woodland habitat is often dominated by *acacia nigrescens* which is quite common within Mahula Hill region. Their long-distance seasonal movements to seek better grazing ensured that they were not exploited for meat hence, their low NISP compared to plains zebra. This specie is gregarious, (Skinner and Chimimba 2005) moving in herds of 20 to 30 or more thus hunting them may have been easier compared to species that move in smaller herds.

Hippotragus niger (sable)

They are a savanna woodland specie with a wide distribution throughout the Kruger National Park. They are highly dependent on close water sources and sufficient perennial grass, typically occurring in herds of 10 to 30. They were identified within Skukuza 4 assemblage thus, they still laying within the past distribution pattern (Plug 1989:113).

Potamochoerus larvatus (bushpig)

This specie is associated throughout its distributional range with thick cover, forests, heavy cover of tall grass or reed beds. This specie only occurs where these conditions pertain along with dense cover and water. Bushpig distributional range within the Kruger National Park is wider as they were found in Letaba 6 and 7 (Plug 1989). This specie within the assemblage was not common in comparison to warthog.

Phacochoerus africanus (warthog)

This specie was originally referred to as Phacochoerus aethiopicus however, it had long been extinct in southern Africa but occurs further north in Kenya and Somalia (Randi et al 2002) however, all southern African forms are referred to as Phacochoerus africanus. Their distribution range throughout Mpumalanga and Limpopo covering the entire Kruger National Park. This specie is commonly associated with open woodland, shorter grassland, flood plains and open areas close to water sources, these animals avoid thick heavy cover forests (Bigourdan 1948; Smither 1971). Its natural habitat being within the same region with Mahula Hill explains the high NISP (Table 3) in comparison to Potamochoerus larvatus (bushpig), the animal was easily accessible and available in the region.

Aepyceros melampus (impala)

With large congregations of 50 to 100 animals classed as intermediate mixed feeder, their habitat is mostly grassland regions coupled with acacia trees. The habit of this specie makes it to be the most preferred and acquired in this study it was the least hunted animal. This is suggestive of preferred taste of the community.

Redunca arundinum (southern reedbuck)

There are two types of reedbuck specie that have been identified the Redunca arundinum (southern reedbuck) and Redunca fulvorufula (mountain reedbuck). The southern reedbuck is identified within this assemblage, they are associated with habitats that have tall grass or reed beds and a good water supply. They occur singly or in pairs never in a gregarious manner thus, making slightly difficult to catch.

Giraffa camelopardalis (giraffe)

There are two subspecies identified based on coat marking however, they do not have any skeletal difference (Singer and Bone 1960). Their distribution is wide throughout Africa. However, in the context of the Kruger National Park their habitat varies from dry savanna to scrub or woodland. These browsing animals have a heightened level of vigilance thus, constituting to few of them being successfully hunted. There are few identified giraffes in this assemblage this might be due to the high quantity of meat ranging from 1090kg to 1360kg.

Sylvicapra grimmia (common duiker)

They have a wide distribution range with six listed subspecies. This species avoids open grassland and hides in forests that have acacia woodland which are quite common in the south of the Kruger National Park. This specie has a home range of twenty-one hectare throughout the year thus, making them more accessible throughout the year.

6.3.2.1.Other identified species

Other identified species used for subsistence at Mahula Hill include freshwater mollusk, fish and rodents. The freshwater mollusk are indigenous to the Mahula Hill region however, there has not been research done on their distributional range within the park. Their low presence within this assemblage suggests that they make have been acquired to supplement the community's diet. Other identified species include but not limited to catfish which is common within Kruger National Park assemblage (Plug and Skelton 1991). The fauna assemblage from Mahula Hill simply reflect a presence of catfish and not its relative abundance or preference within the community's diet. Thus, it is safe to conclude that fish and freshwater mollusks are not one of the major diet's composites.

The identified hare within this assemblage can only be a red hare, even though the analysis did not conclude on the type of hare. The red hare mostly occurs in the Kruger National Park however, its present distribution range is mostly in the northern part of the park (Plug 1989). Its current distribution range within the Kruger National Park suggests an intense environmental shift.

Snails also added to the protein intake, the achatina snail was not only acquired for consumption purposes but also for disc bead making. In addition, the sheldonia snail was also included in their diet. The snaring of these specie may have taken place in marshes, or they may have introduced themselves into the site. Another specie that may have introduced itself into the site are Rodentia. Remains of small rodents were also identified in the deposits of Le6 (Plug 1989; Grody 2016) this specie lives along riverbanks and marshes. In summary smaller species identified, supplemented the diet of Mahula Hill community and they were not the main source of protein intake.

6.3.3.Acquisition strategies and kill off patterns.

The species list suggests that the people who inhabited Mahula Hill used a variety of strategies to obtain animal protein. The animals were acquired using a variety of methods fishing, herding, hunting, trapping, snaring, and collecting. Animal acquisition strategy of the Mahula Hill people included snaring, gathering, fishing, and hunting mammals. This range of animal acquisition exploited several different habitats. However, there is a high focus and effort centred around the acquisition of wild bovids such as zebra, wildebeest, sable, Impala, common duiker, and reedbuck. The acquisition of these animals normally involves the spot and stalk, these animals are usually in a grassland, woodland habitat in open terrain or traveling to or away from water sources. These animals may have not presented much difficulty in acquiring them as reflected by (Table 3) indicating the dominance of these wild bovids. In addition, large mammals found in this assemblage were few. The acquisition strategy may have been dictated by environmental conditions that the community mostly procured. There is a variety of small species that were also acquired as an addition to the animal protein. Their acquisition was snaring, fishing, and trapping these were small animals mostly found in marshes, water sources or rock shelters.

Animal use amongst Early Iron Age people of the Kruger National Park primarily focused on hunting larger, gregarious animals such as impala, blue wildebeest, buffalo, and zebra for animal protein (Plug 1989). However non gregarious or animals that move in smaller groups animals like eland, kudu, waterbuck, bushbuck, reedbuck, eland, nyala, and small buck were underrepresented in archaeological samples (Plug 1989). Thus, communal hunting and hunting drives were more popular (Plug 1989) the inhabitants of the lowveld used corrals or large pits for hunting. High protein foods were abundant at Mahula Hill, with herding and hunting being the main activities. Furthermore, the gathering of ostrich eggs, giant land snails, freshwater mollusk and tortoises seem to have been regularly done. Ostrich eggshell and land snails were used for secondary purpose of bead production whilst freshwater mollusks were not extensively collected due to their brittle shells. The presence of land snails could also be due to animals in archaeological deposits burrowing into soft soil during the dry season, causing natural deaths during estimation displacing smaller objects in the process.

6.3.3.1.Other sources of subsistenance

Seeds

Sclerocarya Birrea was the only taxa was identified at Mahula Hill which was identified to specie and genus level (Steyn and Antonites 2019:8). This taxon belongs to the *Anarcardiaceae* family the identified taxa is wild. The presence of *Sclerocarya Birrea* can be attributed to the common occurrence of the species in the region and its high fruit bearing capabilities. Therefore, wild taxa utilisation by the community such as *Sclerocarya Birrea* commonly known as marula was used to supplement their nutritional needs. The utilisation of this wild taxa further indicates opportunistic usage when they were in season.

6.4.Summary

These four sites have produced ample evidence of an active participation in the local economy even though they are located along prosperous trade routes. Each of these sites has contributed to the larger economy in their own way. Exotic trade goods such as glass beads identified at different sites attest to the wider distribution of these items within this region. Thus, these sites were not only involved in local trade but also long-distance trade.

Conclusion and future directions

These sites have provided data points on the southern part of the Kruger National Park contributing to the understanding of the broader region. Focusing on a regional level SK4, SK9 and SK11 are located within a proximity and have shown a combined higher number of trade goods such as glass beads as well as small finds such as disc beads. This can be interpreted as they were involved in local trade of exotic goods and or they were heavily involved with trade linking them to the Mozambique coast as the area afforded them enough agency to acquire exotic goods. Evidence from these sites indicated that they had produced goods for the larger network as well as individual needs, especially shell disc beads as one site had them.

In relation to Mahula Hill, it appears to be having more exotic goods in comparison to locally produced shell disc beads. This could be due to its proximity to trade routes thus, having agency to acquire more exotic goods than producing disc beads in large quantity to trade locally. Trade goods such as glass beads and marine shells were less pursued in the northern Kruger National Park (Plug 1989). However, the pattern differs in the south as these trade goods are pursued and spread out through the region especially glass beads. This might be due to the proximity to coastal area and the location of the site along the trade route.

Mahula Hill appears to be focused on hunting , this may have been done for subsistenance to support a more permanent population or for trading purposes as evidenced by a larger quantity of exotic goods. The study in the northern Kruger National Park identified a variety of species, with mammalian species listed based on bovids, over 90% of unidentified Bovid I, II, III, and IV animals were grouped together as indeterminate bovids, with over 90% from wild (Plug 1989). These findings are not like the southern Kruger National Park irrespective of the differences in landscape. The fauna assemblage at Mahula Hill consisted of only wild animals acquired for subsistenance which is very different from other sites in the Kruger National Park.

With these datasets there was an attempt to provide an understanding of each site as its own centre and yet connected to others within the region. This allowed for the interpretation not to follow known binaries of commoner and elite status symbols especially with sites that have an abundance of exotic goods and involved with trade. With the unique position of these sites in the southern Kruger National Park they all had ample opportunity to be involved in long distance trade independently thus, the focus of this investigation took a more decentralized and less hierarchical approach in understanding them. Future archaeological investigations will not only focus on more extensive excavations, but also on completing the mapping of Mahula Hill.

References

Adams, J.L.1998. Ground stone artifacts. *Archaeological investigations of early village sites in the middle Santa Cruz Valley: Analysis and synthesis. Anthropological Papers* (19):357-422.

Andrews, P. and Armour-Chelu, M.1998. Taphonomic observations on a surface bone assemblage in a temperate environment. *Bulletin de la Société géologique de France 169*(3):433-442.

Antonites, A.R., Uys, S. and Antonites, A. 2016. Faunal remains from MNR 74, a Mapungubwe period settlement in the Limpopo Valley. *Annals of the Ditsong National Museum of Natural History 6*(07):26-38.

Antonites, A.2013. Archaeological salt production at the Baleni spring, northeastern South Africa. *South African Archaeological Bulletin 68*(198):105-118.

Ashley, C.Z. 2010. Towards a socialised archaeology of ceramics in Great Lakes Africa. *African Archaeological Review 27*.135-163.

Badenhorst, S. and Kimambo, J.S., 2020. The frequency of butchery marks on goat (Capra hircus) remains from pastoral Khoekhoe villages at Gobabeb, Namibia. *Indago* (*36):*1–12.

Bradfield, J., 2015. Pointed bone tool technology in southern Africa: results of use-trace analyses. *Southern African Humanities*,*27*(1):pp.1-27.

Bradfield, J. and Lombard, M., 2011. A macrofracture study of bone points used in experimental hunting with reference to the South African Middle Stone Age. *South African Archaeological Bulletin*,*66*(193):67-76.

Bradfield, J. and Antonites, A.R.2018. Bone hoes from the Middle Iron Age, Limpopo Province, South Africa. Quaternary International 472:126-134.

Beach, D., Bourdillon, M.F.C., Denbow, J., Hall, M., Lane, P., Pikirayi, I., Pwiti, G. and Huffman, T.N., 1997. Snakes and crocodiles: Power and symbolism in ancient Zimbabwe The South African Archaeological Bulletin 52 (166):125-143

Bigourdan, J., 1948.*Le phacochère et les suidés dans l'Ouest africain*.

Byrne, L., Ollé, A. and Vergès, J.M.2006. Under the hammer: residues resulting from production and microwear on experimental stone tools. Archaeometry 48(4):549-564.

Boeyens, J.C.A. and Plug, I. 2011.A chief is like an ash-heap on which is gathered all the refuse': the faunal remains from the central court midden at Kaditshwene. Annals of the Ditsong National Museum of Natural History 1(1):1-22.

Brown, L.A., and Emery, K.F. 2008. Negotiations with the animate forest: hunting shrines in the Guatemalan Highlands. Journal of Archaeological Method and Theory 15(4):300-337.

Behrensmeyer, A.K., Stayton, C.T. and Chapman, R.E.2003. Taphonomy and ecology of modern avifaunal remains from Amboseli Park, Kenya. Paleobiology 29(1):52-70.

Behrensmeyer, A.K., 1978.Taphonomic and ecologic information from bone weathering. Paleobiology 4(2):150-162.

Bickart, K.J.1984. A field experiment in avian taphonomy. Journal of Vertebrate Pale ontology 4(4):525-535.

Blacking, J., 1969. Songs, dances, mimes, and symbolism of Venda girls' initiation schools: Part 4: The great Domba song. *African Studies*,*28*(4):215-266.

Calabrese, J.A., 2000. Metals, ideology, and power: the manufacture and control of materialised ideology in the area of the Limpopo-Shashe confluence, c. AD 900 to 1300. *Goodwin Series*.100-111.

Chatterton, J.F., Collett, D.P. and Swan, J.T.1979. A late Iron Age village site in the Letaba District, northeast Transvaal. *Goodwin Series* (3):109-119.

Childe, V.G., Wolf, A., Pledge, H.T., Perazich, G., Field, P.M. and Bernal, J.D., 1940. Man makes himself. *Science and Society*, *4*(4).

Chirikure, S., Hall, S. and Rehren, T., 2015. When ceramic sociology meets material science: sociological and technological aspects of crucibles and pottery from Mapungubwe, southern Africa. *Journal of Anthropological Archaeology 40*:23-32.

Chirikure, S., 2005. *Iron production in Iron Age Zimbabwe: stagnation or innovation?* University of London, University College London (United Kingdom).

Chirikure, S., 2006. New light on Njanja iron working: towards a systematic encounter between ethnohistory and archaeometallurgy. *South African Archaeological Bulletin*,*61*(184):142-151.

Cotterell, B. and Kamminga, J., 1987. The formation of flakes. *American antiquity*,*52*(4):675-708.

Dart, R.A.1958. Bone tools and porcupine gnawing. American Anthropologist 60(4):715-724.

Dart, R.A. and Beaumont, P., 1969. Evidence of iron ore mining in Southern Africa in the Middle Stone Age. *Current Anthropology*,*10*(1):127-128.

Dobney, K. and Rielly, K., 1988. A method for recording archaeological animal bones: the use of diagnostic zones. *Circaea*,*5*(2):pp.79-96.

Durocher, M., Grouard, S., Nicolas, V., Maestri, R. and Evin, A. 2022. Defining Fragmentation Patterns of Archaeological Bone Remains without Typologies: A Landmark-Based Approach on Rodent Mandibula. *Quaternary 5*(1):14.

Eloff, M.A. and De Vaal, D.L., 1965. Makahane.*Koedoe*,*8*(1):68-74.

Evers, T.M., 1977. Recent progress in studies of the Early Iron Age in the eastern Transvaal, South Africa. *South African Journal of Science*,*73*(3):78.

Evers, T.M., 1982. Two Later Iron Age sites on Mabete, Hans Merensky Nature Reserve, Letaba District, NE Transvaal. *The South African Archaeological Bulletin*, pp.63-67.

Evers, T.M., Voigt, E.A. and de Villiers, H., 1982. Excavations at the Lydenburg heads site, eastern Transvaal, South Africa. *The South African Archaeological Bulletin*, pp.16-33.

Evers, T.M., Huffman, T.N. and Wandibba, S., 1988. On why pots are decorated the way they are. *Current Anthropology*, *29*(5), pp.739-741.

Fowler, K.D. and Greenfield, H.J., 2009. Unravelling settlement history at Ndondondwane, South Africa: a micro-chronological analysis. *Southern African Humanities*, *21*(1), pp.345-393.

Geib, P.R. and Callahan, M.M.1988. Clay residue on polishing stones. Kiva 53(4):357-362.

Gertenbach, W.D.1983. Landscapes of the Kruger national park. *Koedoe 26*(1):9-121.

Gifford-Gonzalez, D., 1989. Ethnographic analogues for interpreting modified bones: some cases from East Africa. *Bone modification*, pp.179-246.

Gifford-Gonzalez, D. and Hudson, J., 1993. From Bones to Behavior: Ethnoarchaeological and Experimental Contributions to the Interpretation of Faunal Remains. *Gaps in the zooarchaeological analyses of butchery: is gender an issue?*

Grody, E.2016.A critical zooarchaeological examination of animal use and processing at the Early Iron Age sites Le6 and Le7 in the Kruger National Park. Unpublished Doctoral dissertation. University of Pretoria.

Haynes, G. 1980. Evidence of carnivore gnawing on Pleistocene and Recent mammalian bones. Paleobiology 6(3):341-351.

Huffman, T.N., 1970. The Early Iron Age and the spread of the Bantu. *The South African Archaeological Bulletin*, *25*(97):3-21.

Huffman, T.N., 1979. Test excavations at NaBa and Lanlory, northern Mashonaland.*Goodwin Series*, (3):14-46.

Huffman, T.N.1980. Ceramics, classification, and Iron Age entities. African studies 39(2):123-174.

Huffman, T.N.1989. Ceramics, settlements, and late Iron Age migrations. *African archaeological review 7*(1):155-182.

Huffman, T.N.1998. Presidential address: the antiquity of lobola. The South African Archaeological Bulletin no of pub:57-62.

Huffman, T.N.2000. Mapungubwe and the origins of the Zimbabwe culture. *Goodwin Series*.no of pub:14-29.

Huffman, T.N.2007.*Handbook to the Iron Age*. University of KwaZulu-Natal Press.

Huffman, T.N.2009. A cultural proxy for drought: ritual burning in the Iron Age of southern Africa. *Journal of Archaeological Science 36*(4):991-1005.

Huffman, T.N. and Schoeman, M.H., 2011. Labalelo: Early iron age pits near Burgersfort, South Africa. *South African Archaeological Bulletin*,*66*(194):161-166.

Huffman, T.N. 2014.Salvage excavations on Greefswald: Leokwe commoners and K2 cattle. Southern African Humanities 26(1):101-128.

Huffman, T.N. 2015. Mapela, Mapungubwe and the origins of states in southern Africa. The South African Archaeological Bulletin 70: 15-27

Inskeep, R.R., 1971. The future of rock art studies in southern Africa. *Rock Paintings of Southern Africa*, (2):101.

Inskeep, R.R. and Hendey, Q.B., 1966. An interesting association of bones from the Elandsfontein fossil site. In *Actes du Ve Congres Panafricain de Préhistoire et de l'Etude du Quaternaire. Museo Arqueologico, Tenerife* pp. 109-124.

Jordaan, G., 2016. *An archaeological study of two Early Iron Age sites in the southern Kruger National Park, South Africa* Masters dissertation, University of Pretoria.

Junod, H.A., 1927. The life of a South African tribe: vol. 2.

Kuper, A.1982. Wives for cattle: bride wealth and marriage in southern Africa. London: Routledge and Kegan Paul.

Kusel, M.M., 1992. A preliminary report on settlement layout and gold melting at Thula Mela, a Late Iron Age site in the Kruger National Park. *Koedoe 35*(1):55-64.

Klapwijk, M. and Huffman, T.N., 1996. South African Archaeological Society. *The South African Archaeological Bulletin 51*(164):84-93.

Klapwijk, M., 1974. A preliminary report on pottery from the north-eastern Transvaal, South Africa.*The South African Archaeological Bulletin*, pp.19-23.

Keretetse, M.T. 2009.*Water and available nitrogen as co-determinants of a mesic savanna in Kruger National Park, South Africa* master's thesis, University of Cape Town.

LeMoine, G.M., 1994. Use wear on bone and antler tools from the Mackenzie Delta, Northwest Territories. *American Antiquity 59*(2):316-334.

Lippert, B.L., 2019. *An investigation of the material culture from five middle iron age sites in the Limpopo valley* Doctoral dissertation, University of Pretoria.

Lindahl, A. and Pikirayi, I., 2010. Ceramics and change: an overview of pottery production techniques in northern South Africa and eastern Zimbabwe during the first and second millennium AD. *Archaeological and Anthropological Sciences*,*2*, pp.133-149.

Lombard, M., Parsons, I. and Van der Ryst, M.M., 2004. Middle Stone Age lithic point experimentation for macro-fracture and residue analyses: the process and preliminary results with reference to Sibudu Cave points: Sibudu Cave. *South African Journal of Science 100*(3): 159-166.

Lombard, M. 2005. A method for identifying Stone Age hunting tools. The South African Archaeological Bulletin, pp.115-120.

Lombard, M. and Pargeter, J., 2008. Hunting with Howiesons Poort segments: pilot experimental study and the functional interpretation of archaeological tools. *Journal of Archaeological Science 35*(9):2523-2531.

Lombard, M., 2012. Thinking through the middle stone age of sub-Saharan africa.*Quaternary International 270*:140-155.

Loubser, J.H.N., 1991. The ethnoarchaeology of Venda-speakers in southern Africa: chapter 4: the excavation of central Cattle Pattern settlements. *Navorsinge van die Nasionale Museum: Researches of the National Museum*,*7*(7):193-269.

Loubser, J.H., 1993. Ndondondwane: the significance of features and finds from a ninth-century site on the lower Thukela River, Natal. *Southern African Humanities*, *5*(10), pp.109-151.

Lyman, R.L., 1987. Archaeofaunas and butchery studies: a taphonomic perspective. *Advances in archaeological method and theory*, pp.249-337.

Lyman, R.L., 1994. Quantitative units and terminology in zooarchaeology. *American Antiquity*, *59*(1), pp.36-71.

Marean, C.W., 1990. *Late Quaternary paleoenvironments and faunal exploitation in East Africa*. University of California, Berkeley.

Mason, R.J., 1981. Early Iron Age settlement at Broederstroom 24/73, Transvaal, South Africa. *South African Journal of Science 77*(9):401-416.

Meyer, A. 1984. A profile of the Iron Age in the Kruger National Park, South Africa. In M. Hall, G. Avery, D.M. Avery, M.L Wilson & A.J.B Humphreys (Eds), Frontiers: Southern African Archaeology Today. 215-227. Oxford: Centre Mead.

Meyer, A., 1986.*'N Kultuurhistoriese interpretasie van die ystertydperk in die Nasionale Krugerwildtuin*. University of Pretoria South Africa.

Miller, D., 1992. Iron Age metal working at the Tsodilo Hills, northwestern Botswana.

Mouton, M., 2021.*The manufacture, use, and significance of shell disc beads from the 9th to 13th century CE in northern South Africa* Masters dissertation, University of Pretoria.

Maggs, T. 1980. The Iron Age sequence south of the Vaal and Pongola Rivers: some historical implications. *The Journal of African History 21*(1):1-15.b

Maggs, T. 1984. Ndondodwane: a preliminary report on an Early Iron Age site on the lower Tugela River. Annals of the Natal Museum 26(1):71-93.

Marín-Arroyo, A.B., Madgwick, R., Brugal, J.P. and Moreno-García, M. 2012. New perspectives on taphonomy. International journal of Osteoarchaeology 22(5):505-508.

Marean, C.W. 1991. Measuring the post-depositional destruction of bone in archaeological assemblages. Journal of archaeological Science 18(6):677-694.

Meskell, L., 2007. Archaeologies of identity. In *The archaeology of identities* pp. 37-57. Routledge.

Meskell, L., 2009. The nature of culture in Kruger National Park. *Cosmopolitan archaeologies*, pp.89-112.

Moffett, A.J. 2017. 'Phalaborwa where the hammer is heard': crafting together the political economy of Iron Age communities in southern Africa, AD 900-1900.

Moore, J.D., 1999. Archaeology in the forgotten peninsula: Prehistoric settlement and subsistence strategies in northern Baja California. *Journal of California and Great Basin Anthropology*, pp.17-44.

Mitchell, P., 2024.*The archaeology of southern Africa*. Cambridge University Press.

Myburgh, A.C., 1949. *The tribes of Barberton district* (No. 25). Pretoria: Government Printer.

Nienaber, WC, Prinsloo, HP & Pistorius, J.C.C., 1997. Derdepoort:'n vroeë Ystertydperkterrein noord van die Magaliesberg. *South African Journal of Ethnology*, *20*(1): 15-22.

Outram, A.K. 2001. An innovative approach to identifying bone marrow and grease exploitation: why the "indeterminate" fragments should not be ignored. Journal of archaeological science 28(4):401-41

Orton, D.C. 2012. Taphonomy and interpretation: An analytical framework for social zooarchaeology. International Journal of Osteoarchaeology 22(3):320-337.

Orton, C., 1993. How many pots make five?—An historical review of pottery quantification.*Archaeometry*,*35*(2):169-184.

Pikirayi, I., 1999. Taking Southern African ceramic studies into the twenty-first century: A Zimbabwean perspective. *African Archaeological Review 16*:185-189.

Punt, W.H.J.1975 *Die eerste Europeane in die Nasionale Krugerwildtuin, The first Europeans in the Kruger National Park*. Pretoria: Raad van Kuratore vir Nasionale Parke van die Republiek van Suid-Afrika.

Pelser, A.J.2018.A Report on the Results of a 1st Field Season of Archaeological Excavations as a Late Iron Age Stone-Walled Settlement Site Called Mahula Hill, in the Kruger National Park. Unpublished Report APELSER ARCHAEOLOGICAL CONSULTING cc APAC018/07. For: South African National Parks. April 2018

Plug, I., 1989. Aspects of life in the Kruger national park during the early Iron Age. *Goodwin Series*, pp.62-68.

Plug, I., 1982. Bone tools and shell, bone, and ostrich eggshell beads from Bushman Rock Shelter (BRS), Eastern Transvaal. *The South African Archaeological Bulletin*, pp.57-62.

Plug, I. and Roodt, F. 1990. The faunal remains from recent excavations at uMgungundlovu. *The South African Archaeological Bulletin*, pp.47-52.

Plug, I. and Skelton, P., 1991. Fish and other faunal remains from a Late Iron Age site on the Letaba River, Kruger National Park. *Koedoe 34*(1): pp.1-6.

Plug, I. 2000. Overview of Iron Age fauna from the Limpopo valley. *Goodwin Series*, pp.117-126.

Plug, I. 2004. Resource exploitation: animal use during the Middle Stone Age at Sibudu cave, KwaZulu-Natal: Sibudu cave. South African Journal of Science 100(3):151-158.

Pienaar, U. de V. 2012. A cameo from the past: the prehistory and early history of the Kruger national park. 1st edition. Pretoria: Protea Book House Protea history.

Raath, A., 2014.*An archaeological investigation of Zhizo/Leokwe foodways at Schroda and Pont Drift, Limpopo Valley, South Africa*. Yale University.

Randi, E., Lucchini, V. and Aman, R., 2002. Evidence of two genetically deeply divergent species of warthog, Phacochoerus africanus and P. aethiopicus Artiodactyla: Suiformes in East Africa. *Mammalian Biology 67*(2):91-96.

Ramsey, C.B., 2017. Methods for summarizing radiocarbon datasets. *Radiocarbon*, *59* (6): 1809 - 1833.

Reitz, E.J. and Wing, E.S., 2008. Zooarchaeology. New York: Cambridge University Press.

Schutte, I.C. 1986. The general geology of the Kruger National Park. *Koedoe 29*(1):13-37.

Stayt, H.A., 1968. The Vhavenda. *London: Frank Cass*.

Smithers, R.H.N., 1971. *The mammals of Botswana*. University of Pretoria South Africa.

Simmons, A.H., 1991. One flew over the hippo's nest: extinct Pleistocene fauna, early man, and conservative archaeology on Cyprus. *Perspectives on the past: theoretical biases in Mediterranean hunter–gatherer research. University of Pennsylvania Press, Philadelphia*, pp.282-304.

Stiner, M.C., Kuhn, S.L., Weiner, S. and Bar-Yosef, O. 1995. Differential burning, recrystallization, and fragmentation of archaeological bone. Journal of archaeological science 22 (2):223-237.

Skinner, J.D. and Chimimba, C.T., 2005.*The mammals of the southern African sub-region*. Cambridge University Press.

Schoeman, M.H. 2006. Imagining rain-places: rain-control and changing ritual landscapes in the Shashe-Limpopo Confluence Area, South Africa. *South African Archaeological Bulletin 61*(184):152-165.

Seetah, K. and Maltby, M., 2006. Integrating Zooarchaeology.

Seetah, K. and Pluskowski, A., 2006. The Animal Bones from the 2004 Excavations at Stari Bar, Montenegro. *Archaeology of an abandoned town: the 2005 project in Stari Bar. The archaeological project in Stari Bar 2:*1000-1015.

Sinclair, P.J., 2010. Towards an archaeology of the future: the urban mind, energy regimes and long-term settlement system dynamics on the Zimbabwe Plateau. *The urban mind: Cultural and environmental dynamics*, pp.591-616.

Shackleton, C.M. and Scholes, R.J. 2011. Above ground woody community attributes, biomass, and carbon stocks along a rainfall gradient in the savannas of the central lowveld, South Africa. South African Journal of Botany 77(1):184-192.

Stevenson-Hamilton, J., 2012. *South African Eden*. Penguin Random House South Africa.

Steele, T.E., Mackay, A., Orton, J. and Schwortz, S. 2012. Varsche Rivier 003, a new Middle Stone Age site in southern Namaqualand, South Africa. South African Archaeological Bulletin 67(195):108-119.

Steyn, B. and Antonites, A., 2019. Plant use in southern Africa's Middle Iron Age: the archaeobotany of Mutamba. *Azania: Archaeological Research in Africa 54*(3):.350-368.

Todd, L.C., and Rapson, D.J. 1988. Long bone fragmentation and interpretation of faunal assemblages: approaches to comparative analysis. Journal of Archaeological Science 15(3):307-325.

Van Warmelo, N.J., 1935. *A preliminary survey of the Bantu tribes of South Africa*. Pretoria: Government Printer.

Von Wielligh, G.R., 1928. Die Afrikaner en lees. *Die Huisgenoot 13*(345):47.

Von Bezing, K.L. and Inskeep, R.R., 1966. Modelled terracotta heads from Lydenburg, South Africa. *Man, 1*(1) :102-102.

Voigt, E.A., 1983. Mapungubwe: an archaeological interpretation of an iron age community Appendix III. *Transvaal Museum Monographs*, *1*(1).

Venter, F.J. 1986. Soil patterns associated with the major geological units of the Kruger National Park. Koedoe 29(1):125-138.

Verhoef, J., 1986. Notes on archaeology and prehistoric mining in the Kruger National Park. *Koedoe 29*(1):149-156.

Wood, M. 2000. Making connections: Relationships between inter-national trade and glass beads from the Shashe-Limpopo area. *South African Archaeological Society Goodwin Series* 8 :78-90 13

Wood, M., 2009. The glass beads from Hlamba Mlonga, Zimbabwe: classification, context, and interpretation. *Journal of African Archaeology*,*7*(2):219-238.

Wood, M. 2011. Interconnections: Glass beads and trade in southern and eastern Africa and the Indian Ocean- 7th to 16th centuries AD. *Studies in Global Archaeology* 17 :18-49

Wood, M., 2012.*Interconnections: Glass beads and trade in southern and eastern Africa and the Indian Ocean-7th to 16th centuries AD* (Doctoral dissertation, Department of Archaeology and Ancient History).

Whitelaw, G., 1994. Towards an early Iron Age worldview: some ideas from KwaZulu-Natal. *Azania: Archaeological Research in Africa*,*29*(1):37-50.

Whitelaw, Gavin* & Moon, M., 1996. The ceramics and distribution of pioneer agriculturists in KwaZulu-Natal. *Southern African Humanities 8* (12):53-79.

Whitelaw, G., 1996. Lydenburg revisited: another look at the Mpumalanga Early Iron Age sequence. *The South African Archaeological Bulletin*, pp.75-83.

Whitelaw, G., 2012. Anthropology and history in the southern African Iron Age. *African Studies 71*(1):127-144.

Whitelaw, G.2013. Pollution concepts and marriage for the southern African Iron Age. Cambridge Archaeological Journal 23(2):203-225.

Whitelaw, G., and van Rensburg, S.J., 2020. Lake Sibaya and the beginning of the Iron Age in Kwazulu-Natal. *The Digging Stick 37*(2):1-4.

Wilson, B.1999. Displayed or concealed? Cross cultural evidence for symbolic and ritual activity depositing Iron Age animal bones. Oxford Journal of Archaeology 18(3):297-305.

Wessels, K.J., Mathieu, R., Erasmus, B.F.N., Asner, G.P., Smit, I.P.J., Van Aardt, J.A.N., Main, R., Fisher, J., Marais, W., Kennedy-Bowdoin, T., and Knapp, D.E.2011. Impact of communal land use and conservation on woody vegetation structure in the Lowveld savannas of South Africa. Forest Ecology and Management 261(1):19-29.

Wessels, M., 2010.*Bushman letters: interpreting| Xam narrative*. NYU Press.

Ziervogel, D., 1954.*The Eastern Sotho: A Tribal, Historical, and Linguistic Survey (with Ethnographic Notes) of the Pai, Kutswe, and Pulana Bantu Tribes in the Pilgrim's Rest District of the Transvaal Province, Union of South Africa*. JL van Schaik.

Zeder, M.A. and Lapham, H.A., 2010. Assessing the reliability of criteria used to identify postcranial bones in sheep, Ovis, and goats, Capra. *Journal of Archaeological Science 37*(11):2887-2905.

Zurro, D., Risch, R. and Clemente-Conte, I.2005. Analysis of an archaeological grinding tool: what to do with archaeological artefacts. *Lithic toolkits in ethnoarchaeological contexts*, pp.57-64.