Faunal remains from MNR 74, a Mapungubwe period settlement in the Limpopo Valley

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This research presents an interpretation of the faunal remains from MNR 74, a small 13th century AD settlement located in the Limpopo Valley, east of Musina in South Africa. Archaeological excavations undertaken in 2013 yielded material that connects the site to the larger socio-political interaction sphere of the Mapungubwe polity (*c.* AD 1220–1290). The widespread impact of the development of social complexity in the Limpopo Valley is best understood through a regional approach. However, only a limited number of archaeozoological reports from Mapungubwe period settlements are available. The data from MNR 74 provide a valuable addition to our understanding of regional faunal use patterns. Here, subsistence strategies focused on herding (cattle and sheep/goats), while wild animals were intermittently hunted, trapped and collected. The presence of a possible black rat (*Rattus rattus*), together with traded glass beads, confirm that the people at MNR 74 participated in broader Indian Ocean trade networks.

Keywords: Archaeozoology, Middle Iron Age, Farming Communities, Limpopo Valley, Mapungubwe.

INTRODUCTION

MNR 74 is a Middle Iron Age (*c*. AD 900–1300) settlement located in the Maremani Nature Reserve, 20 km east of Musina in the Limpopo province of South Africa (Fig. 1). Radiocarbon dates from the site securely date its occupation to the 13th century AD and material culture, such as ceramics and beads, suggest clear links to communities in the Shashe-Limpopo confluence area. Interaction with the confluence area is significant, since it is here that southern Africa's first class-based society developed, at the settlement known as Mapungubwe. Here, exotic trade items came to symbolize political power and social status (Huffman, 2000, 2009).

During the 13th century, Mapungubwe was the centre of a diverse network of trade and commerce that connected the African interior with markets as far away as Europe, the Middle East, as well as South and southeast Asia. The Mapungubwe ruling elite amassed large amounts of glass beads and metal objects, with restricted access to the rest of society. To date, most of the research from this area and period has focused on larger, regionally important sites in the confluence area (e.g., Fouché, 1937; Gardner, 1963; Meyer, 1998; Huffman, 2009). As a result, basic aspects of daily life at smaller sites – where much of the population lived – remain poorly understood. Located approximately 110 km from Mapungubwe, MNR 74 therefore provides an opportunity to study smaller communities living in the hinterland of Mapungubwe.

This paper will focus on one particular aspect of daily life at MNR 74 – the interaction between people and animals. Much research has been done to understand aspects of animal management and use in the Limpopo Valley during the Mapungubwe (AD 1250–1300) and preceding Transitional K2 (AD 1200–1250) and K2/Leokwe periods (AD 1000–1200) (e.g., Voigt and Plug, 1981; Plug and Voigt, 1985; Plug, 2000; Hutten, 2005; Smith, 2005; Fatherley, 2009; Brunton *et al*., 2013; Raath, 2014). Voigt's (1983) study of the K2 and Mapungubwe faunal assemblages remains the authoritative reference on this topic. At a regional level, however, only a limited number of archaeozoological reports are available for the Mapungubwe period (e.g., Van Ewyk, 1987; De Wet-Bronner, 1995; Manyanga *et al*., 2000; Plug, 2000; Manyanga, 2007; Badenhorst *et al*., 2011). Since the development of social complexity had a regional impact (e.g., Huffman, 2009), a better understanding of faunal use at smaller, contemporary settlements is needed. As a result, the data from MNR 74 provide an important addition to our understanding of regional patterns of human–animal relations in northern South Africa during the 13th century.

SITE BACKGROUND

MNR 74 (22°28′23.70″S, 30°18′22.00″E) is located on a low northeast–southwest running dolerite ridge. The archaeological deposits are distributed around a boulder outcrop that forms part of the ridge. The extent of the archaeological deposit was fairly limited, covering a width of roughly 30 m. In

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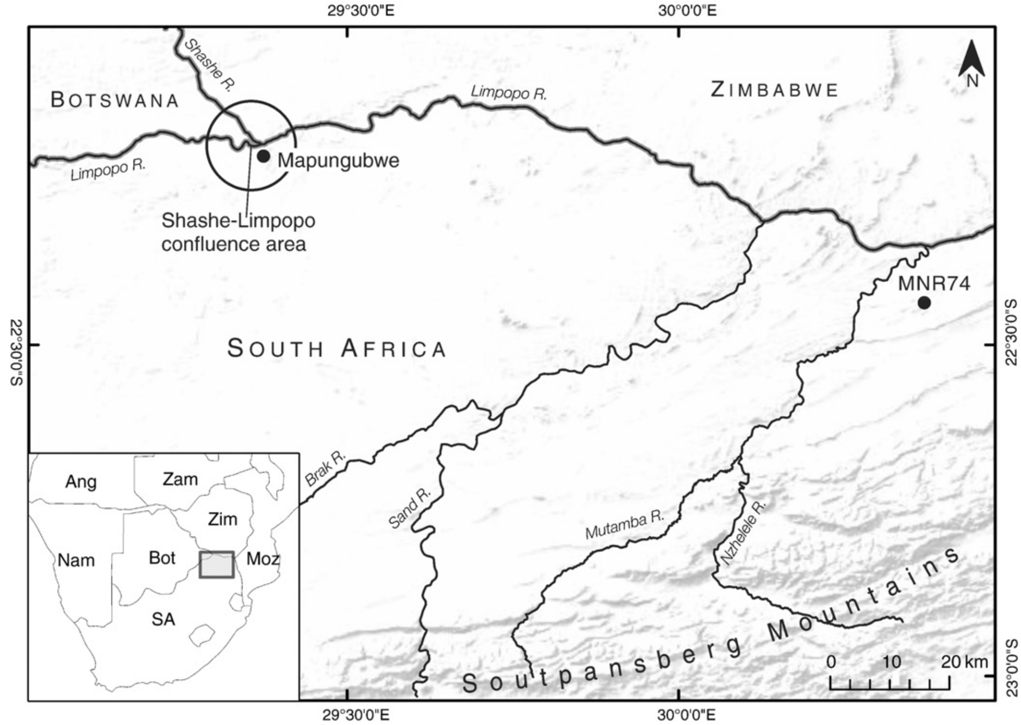

Fig. 1
Regional map indicating MNR 74 and its relation to the Shashe-Limpopo confluence area.

2013, members of the Department of Anthropology and Archaeology from the University of Pretoria excavated the site. These excavations included five 2 m x 2 m units, as well as three 1 m × 1 m test trenches (Fig. 2).

In general, deposits consisted of a single layer of undifferentiated material, which suggests a single short-lived occupation. Fine, light grey ashy soil in the central area of the settlement indicated the presence of a small stock pen and was partially excavated in unit N100/E98. At the base of several boulders at the northern edge of the site, excavations uncovered artefact-rich deposits, suggesting that this area served as a midden (excavated as units N115/E93.5 and N115/E97). The only other architectural feature visible on the surface was a single circular stone grain bin base. Two remaining units (N105/E98 and N97/E100) did not uncover any definable features and mostly contained low density, undifferentiated deposits related to the settlement's occupation.

Two radiocarbon samples from unit N115/E97 were submitted for dating. The uncalibrated samples date to 729 BP ± 31 (D-AMS 4205) and 837 BP ± 35 (D-AMS 4206). Since both samples were from the same context the dates were combined using Oxcal v4.2 (Bronk Ramsey, 2009) and calibrated with the southern hemisphere calibration curve (Hogg *et al*., 2013). The calibrated 1-sigma range of the combined date is AD 1226–1300, which firmly establishes the occupation of MNR 74 as contemporaneous with the flourishing of Mapungubwe.

Excavated material was screened using a 5-mm mesh. In addition, a 10-litre flotation sample was taken for each locus to account for any loss of small artefacts and ecofacts through the screening process. The flotation samples were processed and sorted at the University of Pretoria archaeology laboratory. All faunal material recovered from screening as well as a sample of the heavy fraction flotation material were included in the analysis.

METHODOLOGY

All taxonomic identifications were confirmed using the comparative skeletal collection at Ditsong National Museum of Natural History in Pretoria. Where necessary, Prummel and Frisch (1986) and Zeder and Lapham (2010) supplemented visual comparisons to distinguish between sheep (*Ovis aries*) and goat (*Capra hircus*) postcranial skeletal remains, which are often difficult to separate. Bovid remains that lacked diagnostic features were assigned to size group, following Brain (1974).

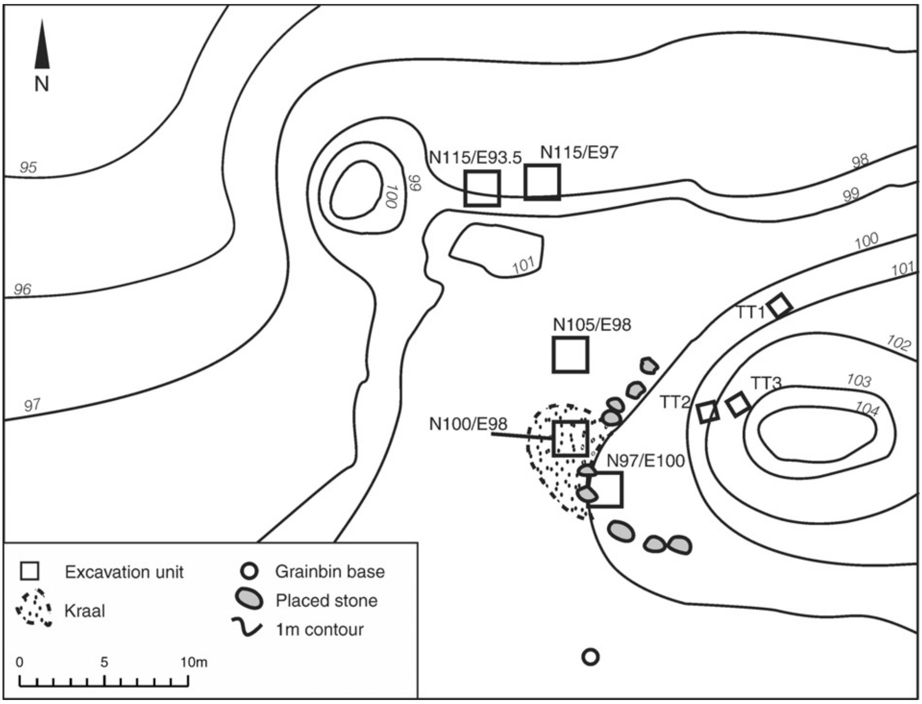

Fig. 2

Map of MNR 74 with excavated areas and site features ('TT' refers to test trench).

Indeterminate mammal, reptile and bird remains were assigned to class level and relative size group where possible. Small mammals include animals similar in size and smaller than springhares (*Pedetes capensis*) and hares (*Lepus* sp.). Medium birds refer to chicken (*Gallus gallus*) or guineafowl (Numididae) sized birds. Small reptiles include animals similar in size to, for example, skinks (Scincidae) and lacertids (Lacertidae).

Complete and semi-complete tooth rows of domesticates were aged using Voigt's (1983) categories. Juvenile and subadult postcranial material of both domesticated and wild taxa was identified based on size, surface porosity and the presence of unfused and partially fused elements. Where relevant, specific portions of particular skeletal elements were recorded according to 'zones' provided by Dobney and Rielly (1988) and Serjeantson (2009: 412–418). All quantifications are based on Number of Identified Specimens (NISP) (see Lyman, 2008: 21–82). For Tables 1–4, mandibles and maxillae that contain teeth were counted as a single unit (i.e., NISP = 1). However, for the purposes of quantifying bovid and equid skeletal elements in Table 5, the different components are presented individually. For example, a maxilla with two teeth would be represented under 'teeth' (NISP = 2) and 'skull' (NISP = 1). In addition, where limb bone articular ends had at least half of the adjoining shaft zone still attached, both end and shaft were counted as being present. The skeletal element NISP presented in Table 5 thus differs from those presented in the other tables.

The general condition of the bone assemblage was assessed based on the presence and extent of surface weathering and fresh breaks (the latter inflicted during excavation and screening). All specimens were examined for evidence of human and natural modification, including butchery and animal gnawing (Fisher, 1995). Burnt bones were described based on changes in surface colour, ranging from brown and black (carbonized) to blue, grey and white (calcined) (see Nicholson, 1993).

Measurements of complete and semi-complete skeletal elements follow Von den Driesch (1976) and Peters (1986) and are provided in Appendix 1. Comparative data for this time period are poorly published, and discussion of the osteometrics is beyond the scope of this paper. Instead, we include our data here for consideration in future regional studies.

SAMPLE COMPOSITION AND CONDITION

The excavations yielded 4161 bones and teeth of which 870 (21%) were identifiable to species, genus, family or class level (Table 1). The number of identifi-

Table 1
Total faunal assemblage from MNR 74 based on Number of Identified Specimens (NISP). TT = combined test trenches.

	N115/E93.5	N115/E97	N105/E98	N100/E98	N97/E100	TT	Total
Bovid & equid (teeth)	23	17			12		52
Bovid & equid (other)	67	71			53		191
Other taxa	6	10			5	5	26
Shell (molluscs)	205	250	1	40	72	33	601
Total identified	301	348	1	40	142	38	870
Skull fragments	87	89	1		37		214
Enamel fragments	106	109			42	6	263
Vertebrate fragments	14	5			7		26
Rib fragments	130	66			59	3	258
Bone flakes	346	185			108	2	641
Miscellaneous fragments	575	870	2	5	422	15	1889
Total unidentified	1258	1324	3	5	675	26	3291
Total sample	1559	1672	4	45	817	64	4161
Mass identified (g)	765	928.5	0.5	21	1186	27	2928
Mass unidentified (g)	961	1054	5	2	582	13	2617
Total mass (g)	1726	1982.5	5.5	23	1768	40	5545

able taxa is somewhat inflated by large quantities of terrestrial snail shell fragments (Table 2); when these are excluded from the sample, the proportion of identifiable taxa drops to 7% (NISP = 303). Most of the faunal material was concentrated in units N115/E93.5, N115/E97 and N97/E100 (Fig. 2). Domesticated animal remains are abundant throughout the deposit, with lower occurrences of wild taxa such as plains zebra, small mammals, rodents, reptiles and birds (Table 2). Faunal material represented in the heavy fraction flotation sample included mainly terrestrial snail shells as well as unidentified bone flakes and miscellaneous fragments. This suggests that the identifiable taxa recovered through screening are representative of the total excavated sample.

Bone fragmentation, surface weathering and animal gnawing impacted the condition of the sample to various degrees. Substantial pre- and post-depositional bone fragmentation resulted in the low identification rate, which is also evident in the higher proportion of unidentifiable bone flakes and miscellaneous fragments (Table 1). The level of fragmentation seems to have been consistent across those units with high NISP counts. Exposure to the elements, which causes the bone surface to crack, flake and erode, affected 21% of the sample (Table 3). However, the extent of this surface weathering was such that it did not notably impact taxonomic and taphonomic identification.

On the other hand, certain post-depositional processes had a more severe influence on the assemblage. Carnivores destroyed several diagnostic articular ends of bovid limb bones, which meant that these bones could only be identified to size class (Tables 2, 3). The removal of these sections also influenced the frequency with which certain elements could be identified. A layer of hardened ashy deposit partially or completely covered almost a quarter of identifiable bones. The ash obscured potential taphonomic evidence but could not be entirely removed without damaging the bone surface. These specimens occurred throughout all units, except Test Trench 3 and the natural bedrock contexts.

Domesticates: taxa, ageing and dental pathology

Domesticates represent 42% (NISP = 128) of the identified taxa (calculated excluding terrestrial snail shells). This number increases to 74% (NISP = 223) when indeterminate medium and large bovid remains, most of which probably originate from domesticates, are added. Sheep/goat NISP outnumber that of cattle at MNR 74. The difficulty in distinguishing between sheep (*Ovis aries*) and goats (*Capra hircus*) (e.g., Zeder and Lapham, 2010), especially when fragmented, resulted in the majority of small livestock bones being classed as sheep/goat. Only 19 sheep and two goat specimens were positively identified in the MNR 74 assemblage (Table 2). Those remains that have been identified as 'medium bovid' may well be sheep/goat; however, at least one of these is from a wild animal.

Fifteen sheep/goat specimens could be assigned to age class (Table 4). Older animals are slightly more common; however, the sample is small and the uneven time span of the different age categories (see Plug and Badenhorst, 2006) might influence this pattern. In addition, certain of the MNR 74 specimens did not clearly fall into a specific age

Table 2
Identified taxa from MNR 74 expressed as Number of Identified Specimens (NISP). TT = combined test trenches.

	N115/ E93.5	N115/ E97	N105/ E98	N100/ E98	N97/ E100	TT	Total
Canidae (fox, dog & jackal)					1		1
Herpestidae (mongoose)		2					2
Carnivore, medium	1						1
Equus quagga (plains zebra)	1				4		5
cf. Equus quagga (possibly plains zebra)					1		1
Bos taurus (cattle)	25	10			8		43
cf. Bos taurus (possibly cattle)	2	2			2		6
Capra hircus (goat)	2						2
Ovis aries (sheep)	1	2			4		7
cf. Ovis aries (possibly sheep)	4	3			5		12
Ovis/Capra (sheep/goat)	13	23			18		54
cf. Ovis/Capra (possibly sheep/goat)	2	1			1		4
Sylvicapra grimmia (common duiker)					1		1
cf. Sylvicapra grimmia (possibly common duiker)		1					1
cf. Raphicerus sharpei (possibly Sharpe's grysbok)		1					1
Bov I (small bovid)	3	4			2		9
cf. Bov I (possibly small bovid)					1		1
Bov II (medium bovid), wild	1						1
Bov II (medium bovid), indeterminate	26	23			12		61
Bov III (large bovid), indeterminate	10	18			6		34
Pedetes capensis (springhare)	3	1			2	1	7
cf. Rattus rattus (possibly black rat)	1						1
Rodent, large						2	2
Lepus saxatilis (scrub hare)					1		1
Lepus sp. (hare)		1					1
Mammal, small		1					1
cf. Numididae (guineafowl)		1					1
Gallus/Numididae (chicken/guineafowl)	1						1
Bird, medium		1			1		2
cf. Bird		1					1
cf. Lizard		2					2
Reptile, small						1	1
Frog/Toad						1	1
Achatina sp. (giant African land snail)	116	152	1	2	50	17	338
Terrestrial snail, small	86	68		38	21	16	229
Unionidae (freshwater mussel)	3	30			1		34
Total	301	348	1	40	142	38	870

group and exhibited tooth development and wear stages characteristic of successive categories. As such, the dental ageing data should be considered in broad terms only. An unfused sheep/goat distal metacarpal and possible sheep proximal femur, which fuse around 13–24 and 30–36 months, respectively (Marshall, 1990: 879), could be from the Class III/IV and Class V animals represented in the dental sample. Two probable sheep pelvis specimens were identified as female but these could not be related to specific ages.

Pathological markers were present on four sheep/goat specimens (Fig. 3). A right adult mandible fragment had a missing premolar (P2) alveolus. The animal was aged between 30–60 months (Age Class V). This phenomenon might be explained by

Table 3
Total Number of Identified Specimens (NISP) affected by taphonomic agents.

	NISP	Burnt	Butchered	Gnawed (carnivore)	Gnawed (rodent)	Weathered
Bovid & equid (teeth)	52	2				44
Bovid & equid (other)	191	19	38	76	13	127
Other taxa	26		4	2		7
Shell (molluscs)	601	1				
Total identified	870	22	42	78	13	178
Skull fragments	214	7	5	8		52
Enamel fragments	263	7		1		50
Vertebrate fragments	26	3	2	4		10
Rib fragments	258	16	10	11	4	64
Bone flakes	641	54	18	29	13	131
Miscellaneous fragments	1889	81	8	28	12	376
Total unidentified	3291	168	43	81	29	683
Total sample	4161	190 (5%)	85 (2%)	159 (4%)	42 (1%)	861 (21%)

either genetic predisposition (Baker and Brothwell, 1980: 137–141) or the effects of intense alveolar inflammation (Bartosiewicz, 2013: 172–182). Three sheep/goat maxillary teeth had caries on their occlusal surfaces: a left premolar (P2), a heavily worn left premolar (P2/P3) and a left molar (M3). Caries forms through 'continuous damage to teeth by plaque-forming bacteria' (Bartosiewicz, 2013: 172).

Forty-three cattle (*Bos taurus*) and six probable cattle specimens were identified, the majority of which came from unit N115/E93.5 (Table 2). Only seven cattle dental specimens could be assigned to age class (Table 4), and these range from older juveniles to mature adults. No animals younger than Age Class III (15 months) were present in the dental sample. However, an unfused first phalanx from N115/E93.5, which should fuse sometime between 7–18 months (Marshall, 1990: 878), suggests that younger animals may also have been killed. The low number of such young cattle could either relate to small sample size or reflect infrequent slaughter of these animals.

Table 4
Sheep/goat and cattle age classes represented as Number of Identified Specimens (NISP).

Age class	Age (months)	NISP
Sheep/goat		
Class I	<3	1
Class II	3–10	1
Class II/III	3–16	2
Class III	10–16	0
Class III/IV	10–30	3
Class IV	16–30	2
Class V	30–60	5
Class VI	>60	1
Cattle		
Class I	<6	0
Class II	6–15	0
Class III	15–18	2
Class IV	18–24	1
Class V	24–30	0
Class VI	30–42	1
Class VII	>42	2
Class VII/VIII	>42	1
Class VIII	Mature	0
Class IX	Aged	0

Wild animals: taxa and ageing

Excluding terrestrial snail shell fragments, wild taxa represent 26% (NISP = 80) of the identified sample (Table 2). These include four adult carnivore specimens: two mongoose (Herpestidae), one canid (jackal-sized) and one medium-sized indeterminate carnivore. The remains of the indeterminate mongoose specimen may well be that of the slender mongoose (*Galerella sanguinea*), based on size and the occurrence of these species in the bushveld region of the far northern parts of the Limpopo province (Skinner and Chimimba, 2005: 445–448).

Some of the larger animals exploited were plains zebra (*Equus quagga*), common duiker (*Sylvicapra grimmia*) and possibly Sharpe's grysbok (*cf. Raphicerus sharpei*), whose current distribution falls well within the MNR 74 catchment area (Skinner and Chimimba, 2005: 544, 674, 702). These animals have also been identified at other MIA settlements in the region (e.g., Van Ewyk, 1987: 73; Manyanga *et al*., 2000; Plug, 2000; Hutten, 2005: 137). It is possible that the indeterminate small bovid remains are also common duiker and Sharpe's grysbok. Although smaller bovids such as steenbok (*Raphicerus campestris*) and klipspringer (*Oreotragus oreotragus*) were not positively identified, these

Fig. 3

Sheep/goat dental pathologies. **1:** Caries on upper P2; **2:** caries on upper P2/P3; **3–4:** mandible with missing P2 alveolus.

animals were also present in the area (e.g., Van Ewyk, 1987: 73; Plug, 2000; Hutten, 2005: 137; *cf*. Skinner and Chimimba, 2005: 699, 710). At least one of the small bovids was immature when it died. Five of the six plains zebra bones are from the same context (N97/E100) and probably represent a single adult individual. It is unknown whether the plains zebra tooth from unit N115/E93.5 was part of this animal.

Smaller mammalian remains included a single springhare (*Pedetes capensis*) bone recovered from the shallow Test Trench 3. Scrub hare (*Lepus saxatilis*) was positively identified in unit N97/E100; the other hare specimen from unit N115/E97 could only be identified to genus level (*Lepus* sp.). A possible black rat (*cf*. *Rattus rattus*) specimen came from unit N115/E93.5 and two large indeterminate rodents from Test Trench 3. The latter two bones are probably from the same animal and their relatively 'fresh' appearance suggest that they are intrusive.

All of the bird bones came from the units located in the midden area at the northern edge of the site. The possible guineafowl (Numididae), guineafowl/chicken and medium-sized bird (Table 2) could in fact all be from the same individual. Guineafowl and chicken (*Gallus gallus*) are difficult to distinguish in the absence of complete skeletal elements (see MacDonald, 1992). They also frequently co-occur at farming community settlements in the region (e.g., Plug, 2000). The possible bird specimen from unit

Table 5
Bovid and plains zebra skeletal elements represented at MNR 74 (NISP).

Skeletal portion	Bov I	Sheep/Goat	Bov II	Cattle	Bov III	Zebra	Total	%
Skull		7	4	6	2		19	7
Mandible	2	8	6	4	3		23	8.5
Teeth		39	1	22	2	1	65	24
Atlas/Axis		1		1			2	1
Scapula	1	7	6	1			15	6
Humerus proximal			3				3	1
Humerus shaft	2	1	1		4		8	3
Humerus distal		3					3	1
Radius proximal		4	1				5	2
Radius shaft	3	1	5				9	3
Radius distal					2		2	1
Ulna shaft			2				2	1
Pelvis		8	4	3	1	2	18	7
Femur proximal		2	2		1		5	2
Femur shaft			4				4	1
Femur distal	1		1				2	1
Patella				1		1	2	1
Tibia shaft	1		3		3		7	2.5
Tibia distal		2	3				5	2
Metacarpal proximal		3	2	1	2		8	3
Metacarpal shaft	1	1	2				4	1
Metatarsal proximal	1	2	3	1			7	2.5
Metatarsal shaft			4				4	1
Metapodial proximal					1	1	2	1
Metapodial shaft			2		4		6	2
Metapodial distal			2	2	4		8	3
Carpal				1			1	0.5
Tarsal	1	3	1	3	3	1	12	4
Phalanx 1		3		4	2		9	3
Phalanx 2		1	2	4	1		8	3
Phalanx 3			1	1			2	1
Total	13	96	65	55	35	6	270	100

N115/E97 was identified based on an incomplete limb bone shaft fragment and the size range could not be established.

Three small to medium-sized reptile skeletal elements were identified, two of which could be from a lizard (Table 2). It could not be established whether the lizard bones were a recent intrusion or formed part of the original archaeological deposit. On the other hand, the small reptile maxilla and frog/toad humerus from Test Trench 3 were noticeably 'fresh' in appearance.

Shells were very common and include fragments of the giant African land snail (*Achatina* sp.), small indeterminate terrestrial snails and, less frequently, freshwater mussel (Unionidae). Many of the small terrestrial snails were complete and are most likely juvenile *Achatina* sp. specimens. The large number of juvenile specimens suggests that these molluscs are intrusive (*cf*. Plug, 1990). The edges of one freshwater mussel shell from N115/E97 showed signs of modification. The shells of *Achatina* sp. and ostrich eggs were also shaped into beads. These beads form part of another study and are only mentioned here to provide a complete record of the animal resources exploited at the site.

Skeletal element representation

The NISP for bovids and plains zebra skeletal elements are shown in Table 5. For the bovids, skull, teeth and mandibles dominate, followed by phalanges, metapodials (shafts and ends), and scapulae. Pelvis fragments, mostly from the acetabulum, ilium and/or pubis sections, were also well represented. The majority of MNR 74 cattle identifications are based on teeth and phalanges, with smaller numbers of carpal/tarsal and pelvis fragments. Limb bone shafts and ends are noticeably absent. The ranges of sheep/goat and indeterminate medium-sized bovid skeletal elements are more representative. All six of the plains zebra specimens were from fairly dense skeletal elements, which probably accounts for their survival.

Butchery marks and burning

Butchery marks associated with carcass skinning and processing were very rare (Table 3), but were noted on several different taxa. Seventeen large-sized bovid and four plains zebra specimens displayed butchery marks. For the larger bovids, these include the mandibular ramus, limb bone articular ends (e.g., metapodials) and shafts (e.g., humerus, metapodials), non-articular surface of a naviculo-cuboid, area around the distal tuberosity and articulation of a calcaneum, shaft and articular ends of first and second phalanges, as well as the pelvic acetabulum and adjoining pubic and ilium sections. Plains zebra remains showed such evidence on a pelvic ischial spine and ilium shaft (probably opposite sides), as well as the medial halves of an astragalus distal articulation and distal metapodial shaft.

Butchery marks on 18 medium-sized bovid specimens were mostly visible on the following skeletal elements: areas adjoining and on articular surfaces of limb bones (e.g., distal humerus, proximal radius), limb bone shafts (e.g., humerus, ulna, tibia, metatarsal), scapula glenoid and blade, first phalanx distal shaft, pelvic ilium shaft (both juvenile sheep/goat and wild bovid), section of pubis adjoining acetabulum and acetabulum, as well as sections of the mandible below the tooth row and on the ramus. Cut marks were found on the lower half of a sheep/goat orbital bone and also on a few more undiagnostic skull, vertebra and rib fragments (probably bovids).

Processing marks on smaller animals were also noted. The medium-sized bird femur had multiple chop marks on the medial portion of the proximal shaft. The guineafowl/chicken tibiotarsus had multiple cut marks on the distal shaft and a deeper chop mark on the distal medial articular end. Multiple cut marks were also present on the shaft of a hare metapodial and indeterminate small mammal limb bone.

The incidence of burning was very low across the assemblage (Table 3), but seemed to be slightly more prevalent in units N115/E93.5 and N115/N97, where most of the refuse was deposited. Bones displayed the usual range and extent of heat exposure seen in archaeological faunal assemblages from the region (e.g., Voigt, 1983: 83–86; Hutten, 2005: 235).

DISCUSSION AND CONCLUSION

The MNR 74 faunal composition correlates to other Mapungubwe period settlements in the Limpopo Valley (e.g., Plug, 2000; Manyanga, 2007: 110–114; Badenhorst *et al*., 2011). Livestock remains are more abundant than those of wild animals and indicate a heavier reliance on these animals for meat and other products (e.g., sinews, skins and marrow). Small stock remains also tend to outnumber those of cattle at MNR 74. This pattern becomes more evident if we assume that the majority of medium and large-sized bovid remains from MNR 74 are most likely from livestock. Sheep remains are more common than those of goats; however, given the small sample size, and related issues with quantification (Lyman, 2008), it is unlikely that their numbers reflect the actual sheep/goat ratio. At best, their identification merely indicates that both species were herded at the site.

At MNR 74, livestock tooth wear (and epiphyseal fusion, to a lesser extent), possibly suggests that younger animals were generally left to reach sexual maturity before slaughter, enabling herd growth and higher meat and milk yields (see Dahl and Hjort, 1976). Prime-aged animals were sometimes consumed, while in other cases older cattle and sheep/goats, past their reproductive age, were slaughtered. It is possible that the differential slaughtering of male and female animals underlies this pattern (e.g., Dahl and Hjort, 1976); however, in the absence of positive sex identifications this cannot be confirmed. The dental and epiphyseal fusion data suggest that it was fairly uncommon for sheep/goats to be killed before they reached 12 months, thus leaving most animals to mature and gain some weight before they were considered fit for slaughter.

A small number of sheep/goats showed signs of periodontal disease, including the absence of a premolar alveolus and the presence of caries. The loss of an alveolus can occur when food particles are lodged between the teeth. Over time, the constant abrasion damages the bone and the periodontal membrane becomes detached. The grip of the tooth root loosens, resulting in the loss of the tooth and eventual remodelling of the alveolus (Rabkin, 1946: 513; *cf.* Bartosiewicz, 2013: 172–182). Alveolar support seems to deteriorate over time, which put the more mature animal from MNR 74 at a higher risk of such disease (Rabkin, 1946: 513). The interplay between several factors may be responsible for tooth decay that causes caries. These factors include genetics, presence of cariogenic microorganisms, diet, tooth developmental defects and abnormal mastication (which would naturally remove plaque) (Baker and Brothwell, 1980: 145).

Baker and Brothwell (1980: 136; *cf.* Bartosiewicz, 2013: 171–182) suggest that poor oral health could be due to factors such as 'poor grazing land [especially from overgrazing], insufficient nutrients during growth and varying amounts of abrasive materials in foodstuffs'. The possibility of overgrazing in the Limpopo Valley, and its potential effects, has been suggested (e.g., Plug and Voigt, 1985: 230; Plug, 2000). However, the small sample from MNR 74 should ideally be read in a wider regional context regarding spatiotemporal trends in animal health – a topic beyond the scope of this project.

Wild animals of various sizes were hunted, trapped and perhaps even scavenged. Effort levels in acquiring additional animal resources seem to have been low, especially compared to other Mapungubwe period sites, such as Skutwater (Van Ewyk, 1987: 70–74). The types of wild animals present at MNR 74 (e.g., duiker, grysbok, mongoose, springhare and hare) suggest that trapping or snaring was the preferred procurement strategy. Freshwater mussels were probably collected from nearby rivers, such as the Nzhelele, while watering livestock or collecting water for household use. At least one of these mussel shells was utilized as a tool, possibly as a scraper or ceramic burnisher (see Voigt, 1983: 120). Fish remains occasionally occur at contemporaneous settlements (e.g., Plug, 2000), but are absent from the MNR 74 assemblage.

Some of the specimens, such as the possible juvenile *Achatina* sp., frog/toad and small reptile, were later intrusions and did not contribute to the inhabitants' diet. The presence of other taxa is more ambiguous. For example, adult *Achatina* sp. and carnivore remains can both enter the archaeological record for various reasons. *Achatina* sp. are often self-introduced, yet their shells were also used as tools and to make beads during the MIA. Their role as a food source is also possible (e.g., Gardner, 1963: 93–168; Plug, 1990; Badenhorst *et al.*, 2011). Carnivores could have been killed for their meat, or for their skins (to trade) and other body parts (used in ritual) (see Raath, 2014: 188–191).

Although the sample of butchered specimens was too small to produce a meaningful pattern, certain steps in the processing of animal carcasses are evident. The leg portions of birds such as guineafowl or chicken seem to have been cut into smaller pieces along the joints, prior to cooking. Bovid and plains zebra carcasses were also reduced at the joints (e.g., between the femoral head and the pelvic acetabulum) and in some cases, the meat was filleted prior to cooking (as seen in cuts made through thick meat-bearing sections such as a proximal tibia shaft and scapula blade). A metatarsal mid-shaft and phalanx display typical evidence of skin removal (i.e., shallow cut marks on low meat-yielding bones). It is possible that the cut mark on the sheep/goat eye socket was made in an effort to remove the eye, either before or after cooking. Differences in skeletal size, bone thickness and muscle mass meant that larger bovids were subject to more severe butchery. This is particularly evident in the differences between butchery marks on the mandibular ramus of medium- *versus* large-sized bovids. Butchery marks tend to be similarly located, but were clearly executed more forcefully when separating the mandible from the skull.

Cattle skeletal elements produced a 'head-and-feet' dominated pattern (see Marean *et al.*, 2004). Various factors can account for this pattern, which include higher identification rates of cranial and lower limb/foot elements, compared to other skeletal parts. In particular, teeth and phalanges tend to be less affected by density mediated attrition processes, but also occur more frequently in the bovid skeleton than other elements. In addition, the difficulty in identifying mid-shaft limb bone fragments to species level and the exclusion of 'unidentified' rib and vertebrate categories through specific analytical methods used (Marean *et al.*, 2004; Badenhorst and Plug, 2011; *cf.* Lyman, 2008: 214–263), complicate the interpretation of this pattern. A more detailed analysis of the variability in bovid and equid skeletal density and its effect on the formation of the MNR 74 assemblage is required before any further conclusions can be drawn.

Following butchery, cooking and secondary use, the MNR 74 faunal remains were tossed downslope, away from the living space (see Fig. 2). The low incidence of surface weathering shows that the bones were covered with deposit fairly rapidly. However, they continued to be accessible to carnivores, such as dogs, either at the time of occupation, or post-occupation.

In addition to information on foodways and site formation processes, one of the animal species identified, namely the black or house rat, serves as a proxy for regional interaction and trade. The black rat occurs in southern Africa from the late first millennium AD onwards (e.g., Voigt and Von den Driesch, 1984; Plug, 2000; Hutten, 2005: 137, 244). These rats originate from the Indian subcontinent and spread across the Indian Ocean through maritime trade networks (Boivin *et al*., 2013). Their presence at archaeological sites of the interior is evidence of interaction with coastal communities. It is, therefore, not surprising that their earliest occurrence coincides with the expansion of inter-regional trade in southern Africa. Whether black rats were considered a food source remains unknown, but like the small number of glass beads from MNR 74, their presence is a clear indication that even small, peripheral sites were part of a much larger network of interaction.

Archaeologists still have a limited understanding of how people at smaller Mapungubwe period settlements interacted with the animals around them – whether their livestock or the wild animals they encountered. Thus, the archaeozoological results from MNR 74, a small settlement in the Mapungubwe hinterland, will add valuable information to the available regional dataset for this important time period in southern African prehistory.

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REFERENCES

BADENHORST, S. and PLUG, I., 2011. Unidentified specimens in zooarchaeology. *Palaeontologia africana* **46:** 89–92.

BADENHORST, S., PLUG, I. and BOSHOFF, W., 2011. Faunal remains from test excavations at Middle and Late Iron Age sites in the Limpopo Valley, South Africa. *Annals of the Ditsong National Museum of Natural History* **1:** 23–31.

BAKER, J. and BROTHWELL, D., 1980. *Animal diseases in archaeology.* Academic Press, London.

BARTOSIEWICZ, L., 2013. *Shuffling nags, lame ducks*: *the archaeology of animal disease*. Oxbow Books, Oxford.

BOIVIN, N., CROWTHER, A., HELM, R. and FULLER, D. Q., 2013. East Africa and Madagascar in the Indian Ocean World. *Journal of World Prehistory* **26:** 213–281.

BRAIN, C. K., 1974. Some suggested procedures in the analysis of bone accumulations from southern African Quaternary sites. *Annals of the Transvaal Museum* **29:** 1–8.

BRONK RAMSEY, C., 2009. Bayesian analysis of radiocarbon dates. *Radiocarbon* **51:** 337–360.

BRUNTON, S., BADENHORST, S. and SCHOEMAN, M. H., 2013. Ritual fauna from Ratho Kroonkop: a second millennium AD rain control site in the Shashe-Limpopo confluence area of South Africa. *Azania* **48:** 111–132.

DAHL, G. and HJORT, A., 1976. *Having herds*: *pastoral herd growth and household economy.* Department of Social Anthropology, University of Stockholm, Stockholm.

DE WET-BRONNER, E., 1995. The faunal remains from four Late Iron Age sites in the Soutpansberg region: Part II: Tshitheme and Dzata. *Southern African Field Archaeology* **4:** 18–29.

DOBNEY, K. and RIELLY, K. 1988. A method for recording archaeological animal bones: the use of diagnostic zones. *Circaea* **5**(2): 79–96.

FATHERLEY, K. 2009. Sociopolitical status of Leokwe people in the Shashe-Limpopo Basin during the Middle Iron Age through faunal analysis. M.Sc. thesis, University of the Witwatersrand, Johannesburg.

FISHER, J. W., 1995. Bone surface modification in zooarchaeology. *Journal of Archaeological Method and Theory* **2**(1): 7–68.

FOUCHÉ, L., 1937. *Mapungubwe.* Vol. I. Cambridge University Press, Cambridge.

GARDNER, G. A., 1963. *Mapungubwe.* Vol. II. Van Schaik, Pretoria.

HOGG A. G., HUA, Q., BLACKWELL, P. G., NIU, M., BUCK, C. E., GUILDERSON, T. P., HEATON, T. J., PALMER, J. G., REIMER, P. J., REIMER, R. W., TURNEY, C. S. M. and ZIMMERMAN, S. R. H., 2013. Shcal13 southern hemisphere calibration, 0–50,000 years cal BP. *Radiocarbon* **55:**1889–1903.

HUFFMAN, T. N., 2000. Mapungubwe and the origins of the Zimbabwe Culture. *South African Archaeological Society Goodwin Series* **8:** 14–29.

HUFFMAN, T. N., 2009. Mapungubwe and Great Zimbabwe: the origin and spread of social complexity in southern Africa. *Journal of Anthropological Archaeology* **28:** 37–54.

HUTTEN, L., 2005. K2 revisited: an archaeozoological study of an Iron Age site in the Northern Province, South Africa. M.Sc. thesis, University of Pretoria, Pretoria.

LYMAN, R. L., 2008. *Quantitative paleozoology.* Cambridge University Press, Cambridge.

MACDONALD, K. C., 1992. The domestic chicken (*Gallus gallus*) in sub-Saharan Africa: a background to its introduction and its osteological differentiation from indigenous fowls (Numidinae and *Francolinus* sp.). *Journal of Archaeological Science* **19:** 303–318.

MANYANGA, M., 2007. *Resilient landscapes*: *socio-environmental dynamics in the Shashi-Limpopo Basin, southern Zimbabwe* c. *AD 800 to the present.* Studies in Global Archaeology No. **11**. Department of Archaeology and Ancient History, Uppsala.

MANYANGA, M., PIKIRAYI, I. and NDORO, W., 2000. Coping with dryland environments: preliminary results from Mapungubwe and Zimbabwe phase sites in the Mateke Hills, south-eastern Zimbabwe. *South African Archaeological Society Goodwin* Series **8:** 69–77.

MAREAN, C. W., DOMÍNGUEZ-RODRIGO, M. and PICKERING, T. R., 2004. Skeletal element equifinality in zooarchaeology begins with method: the evolution and status of the "shaft critique". *Journal of Taphonomy* **2**(2): 69–98.

MARSHALL, F., 1990. Origins of specialized pastoral production in East Africa. *American Anthropologist* **92:** 873–894.

MEYER, A., 1998. *The archaeological sites of Greefswald: stratigraphy and chronology of the sites and a history of investigations.* University of Pretoria, Pretoria.

NICHOLSON, R.A., 1993. A morphological investigation of burnt animal bone and an evaluation of its utility in archaeology. *Journal of Archaeological Science* **20:** 411–428.

PETERS, J., 1986. Bijdrage tot de archeozoölogie van Soedan en Egypte. Ph.D. thesis, State University of Ghent, Ghent.

PLUG, I., 1990. Terrestrial molluscs and archaeological stratigraphy: a cautionary tale. *South African Journal of Science* **86:** 204–205.

PLUG, I., 2000. Overview of Iron Age fauna from the Limpopo Valley. *South African Archaeological Society Goodwin Series* **8:** 117–126.

PLUG, I. and BADENHORST, S., 2006. Notes on the fauna from three Late Iron Age mega-sites, Boitsemagano, Molokwane and Mabjanamatshwana, North West Province, South Africa. *South African Archaeological Bulletin* **61:** 57–67.

PLUG, I. and VOIGT, E. A., 1985. Archaeozoological studies of Iron Age communities in southern Africa. *Advances in World Archaeology* **4:** 189–238.

PRUMMEL, W. and FRISCH, H. J., 1986. A guide for the distinction of species, sex and body side in bones of sheep and goat. *Journal of Archaeological Science* **13:** 567–577.

RAATH, A., 2014. An archaeological investigation of Zhizo/Leokwe foodways at Schroda and Pont Drift, Limpopo Valley, South Africa. Ph.D. thesis, Yale University, New Haven.

RABKIN, S., 1946. Comparative alveolar pathology in sheep and goats. *Journal of Dental Research* **25:** 513–520.

SERJEANTSON, D., 2009. *Birds*. Cambridge University Press, Cambridge.

SKINNER, J. D. and CHIMIMBA, C. T., 2005. *The mammals of the southern African subregion.* Cambridge University Press, Cambridge.

SMITH, J. M., 2005. Climate change and agropastoral sustainability in the Shashe/ Limpopo River basin from AD 900. Ph.D. thesis, University of the Witwatersrand, Johannesburg.

VAN EWYK, J. F., 1987. The prehistory of an Iron Age Site on Skutwater. M.A. thesis, University of Pretoria, Pretoria.

VOIGT, E. A., 1983. *Mapungubwe: an archaeozoological interpretation of an Iron Age community.* Transvaal Museum Monograph No. **1**. Transvaal Museum, Pretoria.

VOIGT, E. A. and PLUG I., 1981. *Early Iron Age herders of the Limpopo Valley.* Report to the Human Sciences Research Council, Transvaal Museum, Pretoria.

VOIGT, E. A. and VON DEN DRIESCH, A., 1984. Preliminary report on the faunal assemblage from Ndondondwane, Natal. *Annals of the Natal Museum* **26:** 95–104.

VON DEN DRIESCH, A., 1976. *A guide to the measurement of animal bones from archaeological sites*. Peabody Museum Bulletin No. **1**, Cambridge University, Cambridge.

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:** 2887–2905.

Appendix 1. Osteometric data for skeletal elements from MNR 74. See Von den Driesch (1976) and Peters (1986) for abbreviations. (±) denotes an approximate measurement, influenced by eroded bone surface or ambiguity in exact point of measurement.

Catalogue No.	Species	Skeletal part	Measurement	mm	Notes
MNR74/B178	*Bos taurus*	Patella	GB	±42.07	
MNR74/B036	*cf. Bos taurus*	Intermediate carpal	GD	46.49	
MNR74/B036	*cf. Bos taurus*	Intermediate carpal	GH	28.88	
MNR74/B075	*Bos taurus*	Calcaneum	Dd	44.95	
MNR74/B075	*Bos taurus*	Calcaneum	GB	±37.28	
MNR74/B006	*Bos taurus*	Phalanx 1	Bp	24.30	
MNR74/B010	*Bos taurus*	Phalanx 2	SD	18.56	
MNR74/B045	*Bos taurus*	Phalanx 2	SD	18.89	
MNR74/B045	*Bos taurus*	Phalanx 2	GL	34.77	
MNR74/B045	*Bos taurus*	Phalanx 2	Dp	24.78	
MNR74/B045	*Bos taurus*	Phalanx 2	Bp	23.80	
MNR74/B234	*Bos taurus*	Phalanx 2	SD	19.57	
MNR74/B234	*Bos taurus*	Phalanx 2	GL	33.85	
MNR74/B234	*Bos taurus*	Phalanx 2	Dp	29.39	
MNR74/B234	*Bos taurus*	Phalanx 2	Bp	25.10	
MNR74/B234	*Bos taurus*	Phalanx 2	Bd	20.58	
MNR74/B002	*Bos taurus*	Phalanx 3	MBS	17.05	
MNR74/B002	*Bos taurus*	Phalanx 3	HP	±34.60	
MNR74/B002	*Bos taurus*	Phalanx 3	BFp	18.38	
MNR74/B001	*Ovis aries*	Scapula	SLC	16.18	

Continued on p. 38

Appendix 1 (continued)

Catalogue No.	Species	Skeletal part	Measurement	mm	Notes
MNR74/B128	*Ovis aries*	Scapula	SLC	21.33	
MNR74/B128	*Ovis aries*	Scapula	BG	±22.60	
MNR74/B128	*Ovis aries*	Scapula	LG	29.70	
MNR74/B128	*Ovis aries*	Scapula	GLp	34.10	
MNR74/B176	*Ovis aries*	Humerus	BT	29.87	
MNR74/B176	*Ovis aries*	Humerus	Dmd	27.15	
MNR74/B227	*cf. Ovis aries*	Humerus	BT	28.49	
MNR74/B335	*cf. Ovis aries*	Humerus	Bd	±25.00	
MNR74/B201	*Ovis aries*	Radius	BFd	25.18	
MNR74/B201	*Ovis aries*	Radius	GL	±172.90	
MNR74/B201	*Ovis aries*	Radius	Bd	±28.25	
MNR74/B201	*Ovis aries*	Radius	BFp	29.40	
MNR74/B201	*Ovis aries*	Radius	Dp	±16.22	
MNR74/B072	*cf. Ovis aries*	Pelvis	LA	±28.45	Female
MNR74/B222	*cf. Ovis aries*	Tibia	Bd	20.20	
MNR74/B222	*cf. Ovis aries*	Tibia	Dd	15.37	
MNR74/B204	*Ovis aries*	Astragalus	GLl	28.75	
MNR74/B204	*Ovis aries*	Astragalus	GLm	27.91	
MNR74/B204	*Ovis aries*	Astragalus	Bd	18.62	
MNR74/B204	*Ovis aries*	Astragalus	Dl	16.35	
MNR74/B260	*Ovis aries*	Calcaneum	Dd	24.33	
MNR74/B260	*Ovis aries*	Calcaneum	GL	60.10	
MNR74/B260	*Ovis aries*	Calcaneum	GB	22.03	
MNR74/B260	*Ovis aries*	Calcaneum	Bp	14.16	
MNR74/B064	*Ovis/Capra*	Skull	24	35.75	
MNR74/B241	*Ovis/Capra*	Mandible	12	±58.68	
MNR74/B241	*Ovis/Capra*	Mandible	13	52.52	
MNR74/B255	*Ovis/Capra*	Mandible	8	46.45	
MNR74/B223	*Ovis/Capra*	Axis	BFcr	45.42	
MNR74/B223	*Ovis/Capra*	Axis	SVB	24.96	
MNR74/B026	*Ovis/Capra*	Scapula	SLC	19.30	
MNR74/B026	*Ovis/Capra*	Scapula	BG	±20.70	
MNR74/B086	*Ovis/Capra*	Scapula	LG	±21.73	
MNR74/B097	*Ovis/Capra*	Scapula	SLC	14.91	
MNR74/B173/2	*Ovis/Capra*	Femur	DC	±21.45	Subadult
MNR74/B134	*Ovis/Capra*	Tibia	Bd	±26.44	
MNR74/B134	*Ovis/Capra*	Tibia	Dd	21.00	
MNR74/B175	*Ovis/Capra*	Astragalus	GLl	28.12	Subadult
MNR74/B175	*Ovis/Capra*	Astragalus	GLm	27.13	Subadult
MNR74/B175	*Ovis/Capra*	Astragalus	Bd	19.25	Subadult
MNR74/B175	*Ovis/Capra*	Astragalus	Dl	15.85	Subadult
MNR74/B054	*Ovis/Capra*	Phalanx 1	SD	8.65	
MNR74/B054	*Ovis/Capra*	Phalanx 1	Bd	9.67	
MNR74/B145	*Ovis/Capra*	Phalanx 1	SD	7.52	
MNR74/B071	*Equus quagga*	Pelvis	SB	±20.00	
MNR74/B060	*Equus quagga*	Patella	GL	67.40	
MNR74/B061	*Equus quagga*	Astragalus	GH	59.72	
MNR74/B061	*Equus quagga*	Astragalus	LmT	59.68	
MNR74/B061	*Equus quagga*	Astragalus	GB	59.25	
MNR74/B061	*Equus quagga*	Astragalus	BFd	50.40	
MNR74/B160	*cf.* Numididae	Tarsometatarsus	SD	±8.15	
MNR74/B053	*Gallus*/Numididae	Tibiotarsus	Dd	11.25	
MNR74/B053	*Gallus*/Numididae	Tibiotarsus	Bd	10.11	
MNR74/B053	*Gallus*/Numididae	Tibiotarsus	SC	5.88	