Field and Technical Report

THE MATJES RIVER ROCK SHELTER: A DESCRIPTION OF THE SKELETAL ASSEMBLAGE

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INTRODUCTION

From 9000 to 2000 BP, Holocene hunter and gatherer groups utilized and, perhaps, inhabited the Matjes River Rock Shelter in the Eastern Cape and left an indelible impact on the landscape with regard to their waste deposits (e.g. shell and ash middens) and artefacts (Sealy 2006). Due to its immense time depth, this site has been shown to be important in understanding the lifestyles and habits of early Holocene foragers in South Africa (e.g. Sealy & Pfeiffer 2000; Stock & Pfeiffer 2001, 2004; Clayton *et al.* 2006; Sealy 2006; Stock 2006; Pfeiffer & Sealy 2006; Pfeiffer 2007), but the manner in which it was initially excavated and the artefacts (including human remains) described and accessioned has been criticized (Singer 1961; Rightmire 1978; Döckel 1998). While some of the skeletons have archaeological provenance, a large number of the remains were commingled after excavation and stored by skeletal element (e.g. femur with femur), or with each other. To this date, the total number of skeletons removed from the site is unknown, approximations on the size of the collection ranges between 40 to 120 individuals (Rightmire 1978; Sealy 2006).

The Matjes River Rock Shelter was excavated in the 1920s by Dreyer (1933), and again, in the 1950s by Hoffman and Meiring; the latter excavation lasted more than 30 years in which more than 2000 tons of soil, 30 000 artefacts, and an unknown number of human remains were removed (Meiring 1937; Hoffman 1958; Louw 1960). Five stratigraphic layers were recorded from these excavations, each of which had been assigned an alphabetic letter (A, B, C, D, E) in sequence from youngest to oldest (e.g. Sealy *et al.* 2006; Louw 1960). Few artefacts were found in either layer A or E and they cannot be associated with a distinct assemblage; two skeletons, described as coming from the uppermost layer of the site, have been radiocarbon dated to approximately 2200 BP. After this period, it has been suggested that the site was abandoned or scantily occupied (Sealy 2006).

Layers B, C and D, have properties that uniquely define them within the Holocene landscape of southern Africa. For instance, Layer B, due to the abundance of mussel shells found, is often referred to as the 'Mytilus' layer. Six skeletons from this level have been radiocarbon dated to between 3600 and 2200 BP (Sealy *et al.* 2006). Layer C, also known as the 'Wilton' layer, contained a greater variety of microliths and artefacts such as ostrich egg-shell and ochre than the previous layer, indicating a different culture and period of occupation (Sealy *et al.* 2006). Radiocarbon dates for nine Wilton skeletons are available and ranged between 5000 and 7400 BP (Sealy *et al.* 2006). The oldest layer, D, contained reworked scrapers and bone tools considered to be similar to the Albany assemblage; at least three skeletons are associated with this layer, one of which was radiocarbon dated to 9688 BP ± 36 (Pta-OxA-V-2064-56) (Sealy *et al.* 2006).

These skeletal remains form the largest conglomeration of material for the Later Stone Age in South Africa, and thus have, regardless of earlier excavation methods or commingling, considerable intrinsic value. Information about the collection can be accessed in the 'Catalogue of Holocene Skeletons in South Africa,' in which Morris (1992) described the history, general contents, and provenance of 120 National Museum of Bloemfontein (NMB) catalogue numbers associated with the Matjes River excavations. This catalogue, various publications and Hoffman's (1953, 1955, 1956) field notes, are means by which information on these remains can be accessed. The purpose of this paper is to further describe the collection with regard to its content, minimum number of individuals assigned to each identification tag, their general preservation, age, and sex. Furthermore, all skeletal elements were counted, tabulated and an estimate of the possible number of individuals removed from the site was calculated.

MATERIALS AND METHODS

The skeletons are housed at the Florisbad Quaternary Research Station of the National Museum of Bloemfontein, and have been stored in both cardboard and wooden boxes. All skeletal remains associated with the collection were analysed. Many of these skeletons have multiple identification numbers, which may include that from the original excavation (i.e. MR S4 SK 3) and/or the National Museum of Bloemfontein (NMB 1442) (Morris 1992).

Four standard gross morphological techniques were used to distinguish multiple individuals found in a box and with the same identification tag (e.g. NMB 1241). These methods included visual pair matching, articulation, process of elimination and visual appearance (Snow 1948; Ubelaker 2002; Byrd & Adams 2003). With any of these techniques, if a strong reason for exclusion could not be found, then the skeletal elements were considered to belong to one individual.

Each possible individual found in a box was assigned a unique case number (i.e. 03.01), and the contents were counted, described, measured, and photographed. The case numbers were written on notebook paper, placed in a plastic bag with the remains to which they had been assigned, and then returned to their respective box (i.e. NMB 1264). Any additional information, such as notes on sampling for radiocarbon dating or isotope analysis was photographed and kept with the skeletal element(s) in which it was found. The known archaeological context of a box, or of a skeleton, such as radiocarbon dates, was also recorded.

Standard anthropological techniques were used to determine sex and estimate age of each possible individual. For adults, sex was determined from the cranium and pelvis (e.g. Scheuer 2002). In instances where these bones were fragmented or not present, the methodology of Sealy and Pfeiffer (2000) was used in which a 'probable' sex was assigned based on the general appearance of the bone and femoral head diameters (femoral

head diameters <34 mm = probable female).

Development of the cranial fontanelle, base of the occipital bone, vertebral column, deciduous and permanent dentition, and secondary ossification centres were employed as methods to estimate age of infants and juveniles (e.g. Scheuer & Black 2000; Scheuer 2002). For adults (older than 18 years), the closure of the cranial sutures, dental wear, morphological changes to the pubic symphysis and general degenerative changes of the joints were used (e.g. Krogman & İşcan 1986; Brooks & Suchey 1990). On account of the various errors involved in estimating age at death in adult remains that are fragmented, none of the skeletons were assigned an age range of less than 10 years, most often 20-year categories were used. In cases of ambiguity, a person was usually considered an adult or plus 30 or 40 years.

To estimate the number of people excavated from the Matjes River Rock Shelter, all the skeletal elements present, irrespective of whether they belonged to a known or suspected individual, were recorded on a standard inventory form for commingled remains (Brickley & McKinley 2004). Traditional morphological landmarks, such as the glabella, were not used to determine the minimum number of individuals (MNI); rather, the completeness of the skeletal element was used to calculate this (see further explanation below). While this method is not conventional, it is standardized and repeatable, and takes into account all skeletal elements, not only those that are morphologically unique.

Excluding ribs, vertebrae, hands and feet, all bones were scored on their completeness such as less than 25%, 25–50%, 50–75%, or more than 75% complete. Long bones were divided into five unique sections: 1) proximal epiphyses, 2) 1/3 proximal, 3) 1/3 midshaft, 4) 1/3 distal, and 5) distal epiphysis. For example, if a single left femur was present, then all five sections on the left side were scored; on the other hand, if only the midshaft of the bone was available, then it would be scored as a 3. With infants and juveniles who had a complete bone shaft but unfused epiphyses, the proximal and distal epiphyses were not recorded on the data form (unless they were present) but the bone was considered complete, which implies that no additional segments could be added. Ribs were classified as either right or left. Vertebrae were sorted, wherever possible, into type (cervical, thoracic and lumbar) and number. Type (carpal, metacarpal, phalanges) and location (1st metacarpal) were used to record hands and feet.

To avoid counting the fragments of the same element twice, the following criteria were set: for the cranial bones, a unique individual was counted when more than 50% of the bone element was present, and for the postcranials, at least two-thirds (66%) of the bone had to have been observed. If the completeness of the element was less than these arbitrary cut off points, it was excluded from the count. Immature and mature remains were not separated. Data were recorded using Microsoft Excel™ (version 2003).

In any archaeological sample, the recovery of skeletal remains can be affected by factors that include burial practices, preservation of the remains, excavation methods and treatment of the collection. Because of this possibility, the most likely number of individuals (MLNI) was also used (Adams & Konigsberg 2004). MLNI calculations are a modified version of the Lincoln Index (LI; and also known as the Peterson Index), which were created with the premise that the whole population, from which the sample was derived, cannot be studied. Because of this premise, the Lincoln Index is known to provide an accurate estimation of the original population from samples, especially when taphonomic bias has, or may have, occurred. Using a modified version of the LI, Adams & Konigsberg (2004) created the MLNI and extended the formula to include multiple elements, such that it is possible to estimate the size of a population using more than one bone.

The formulae for the MLNI also give a highest density region percentage (HDR%) and recovery probability. Since a population (*N*) follows a discrete distribution, it is not possible to give customary confidence intervals for the data; rather, Adams & Konigsberg (2004) described how the highest density region (HDR%), which is analogous to a confidence interval, could be used. The HDR% indicates the range of values for *N* of which the probability of recovery of this number of individuals is larger than an arbitrary baseline value (e.g. 95%, 99%). Recovery probability refers to the probability that a particular skeletal element was found during the excavation and is thus a useful approach in describing the completeness of a sample.

The most likely number of individuals (MLNI), the recovery probability, and the highest density region (HDR %) were calculated using a Microsoft Excel™ (version 2003) spreadsheet (Adams & Konigsberg 2004: 143). For single variable analysis, the MNI counts for six bones (mandible, humerus, radius, ulna, femur, tibia and fibula) were used. Four of these (mandible, humerus, femur and tibia), were used in the multiple variable analysis.

RESULTS

A summary of information pertaining to the skeletons associated with the Matjes River Rock Shelter collection is presented in Table 1. This table can be used by researchers when using the NMB or other MR identification tags, to obtain information on: the case number, archaeological layer, condition of the remains, a radiocarbon date, and the MNI in the box as well as their estimated age (adult, juvenile, infant or unknown), and sex (male, female, or unknown).

For example, the first skeleton is MSK 2. These remains had been radiocarbon dated to the upper (or youngest) stratigraphic layer at the Matjes River Rock Shelter. As shown in the table, the skeletal remains are complete (C) such that cranial and postcranial remains are present, but fragmentary (F). Within the box marked MSK 2, researchers can expect to find one adult (1A), who is female (F). Furthermore, skeletal remains associated with MSK 2 (case 129) were also found in box NMB 1281. In this box, case 68.02 refers to a sacrum labelled MSK 2, and 68.03 contains a proximal right humerus that might belong to MSK 2. These remains, while they may belong to each other, were not moved from their original locations, but were identified as being associated with each other in the table.

Of the 172 boxes that make up the Matjes River Collection, 76 house a single individual, while more than one person is represented in the other 96. Among the boxes associated with Layer B (n = 26), 11 contain more than one person. The last three boxes in this section are designated as 'B/C'. This is because they have radiocarbon dates, which according to Morris (1992) may be incorrect.

Fifty-seven boxes represent the Wilton layer, of which 45 contain one person, while only 12 are commingled. An additional 10 are presumed to belong to this layer, but no additional reference, other than their identification tag which says "Wilton Grave 1" or "Wilton Upper strata", is available. For this reason, a '?C' was used to distinguish them.

Layer D contains three individuals, although additional skeletal remains were found. For example, NMB 1311 contains four individuals, including MR 2. According to Keith (1933), MR 2 is the 'oldest' (regarding period, not skeletal age) baby to have been excavated from the site. From his description, it is possible to match the skeletal remains associated with case

TABLE 1. *Description of the MR collection including the NMB catalogue number, contents, archaeological layer, MNI, estimated age and sex.*

NMB accession	Contents[1]	Case	L	C/I	W/F	C14	MNI [AJIN][2]	Sex[3]	Ref[4]
MSK 2	C and PC	129.00	A	C	F	*	1A	F	1, 4
NMB 1281	MSK 2	068.02-03	A	C	W		2A	UU	1, 4
MRA1	MR skel 1	123.01-.02	A	I	F	*	2AJ	UU	1
NMB 1241	C and PC	024.01 -.08	B	I	W		6A	?F?MUUUM	1, 2
NMB 1241	A	024.03	B	I	W	*	1A	F	1
NMB 1241	B	024.04	B	I	W	*	1A	F	1, 2
NMB 1242		025.00	B	I	W	*	1A	?F	1, 2
NMB 1247		28.01 & 30.00	B	I	F		1A	?F	2
NMB 1248		031.01-0.2	B	I	F		2J	UU	2
NMB 1249		032.00	B	I	F		1A	M	2
NMB 1250		033.01-.03	B	I	F		3AJJ	UUU	2
NMB 1251		035.01-35.08	B	I	F		8A	?F7U	2
NMB 1252		034.01-.02	B	I	F		2?AJ	UU	2
NMB 1266	MRA X 11	051.00	B	C	F		1I	U	2
NMB 1267		052.00	B	I	F		1N	U	2
NMB 1268		053.01-.02	B	I	F		2JN	UU	2
NMB 1269		055.01-.06	B	I	F		5A1J	?MUUUUU	2
NMB 1270		056.01-.02	B	I	F		2A	?M?M	2
NMB 1271		057.01-.03	B	I	F	*57.02	2A1J	U?FU	1
NMB 1272		058.00	B/C	I	F	*	1A	?M	10
NMB 1273	MRB 3	059.00	B	I	W	*	1A	M	1, 2, 9
MSK 3		134.00	B	I	F		1A	U	4
MSK 4		126.00	B	I	F		1A	U	1, 4
MSK 5		131.00	B	C	F		1A	U	1, 4
MSK 6 SV-2/10		159.00	B	I	F		1I	U	4
NMB 1440	S4 SK 1	103.00	B	I	F	*	1A	F	1, 2
NMB 1441	S4 SK 2	096.00	B/C	I	F	*	1A	?F	2, 10
NMB 1442	S4 SK 3	099.01-.03	B/C	I	F	*	2/3A	UU/U	2, 10
NMB 1443	S4 SK 4	097.01-.03	B/C	I	F	*	2A2I	?F?FUU	2, 10
NMB 1254	MRA X2	038.00	C	C	F		1J	U	2
NMB1259	MRA X	043.00	C	C	W		1J	U	2
NMB 1264	W3 (48.01)	048.01-.03	C	I	F		3A	MUU	2, 8
NMB 1265	W7	049.00/50	C	I	F		1A	?M	2, 8
NMB 1268	MRSK	054.01-.02	C	I	F		2JA	UM	2
WSK 2	MRSK	162.01	C	I	F		1A	M	4
WSK 2	PC	162.02	C	I	F		1A	?F	4
NMB 1274	MRB 2	060.00	C	I	F	*	1A	F	1, 4
NMB 1275	MRB 1	061.01-.02	C	I	F	*61.01	2A	MU	1, 4
NMB 1276		062.00	C	I	F		1J	U	2
NMB 1277	W9	063.00	C	I	W		1A	F	2
NMB 1278	Not W5	064.00	?C	I	F		1A	?M	2
NMB 1279	W5	065.00	C	I	W		1A	M	2, 8
NMB 1280	W6	067.00	C	I	F		1A	?M	2, 8
NMB 1281	W4	068.01	C	I	F	*	1A	M	1, 2, 8
NMB 1282	W8	069.00	C	I	F		1A	?F	2, 8
NMB 1283	W1 (70.01)	070.01-.02	C	I	F		2AN	MU	2 ,8
NMB 1284		071.00	C	I	F		1N	U	2
NMB1285	W4 (72.01)	072.01-.02	C	I	F		2A	? MM	2
NMB 1286		073.01-.03	C	I	F		2/3A	?M?MU	2
NMB 1287		074.01-.03	C	I	F		3JAA	UUU	2
NMB 1288		075.01-.07	C	I	F		7A	7U	2
NMB 1290		076.00	C	I	F		1J	U	2
NMB 1291		077.01-.02	C	I	F		2A?J	UU	2
NMB 1293	MR 6	078.00	C	I	F		1A	?F	2
NMB 1294	MR 9	079.00	C	I	F		1A	?F	2
NMB 1295	MR 8	080.00	C	I	F		1A	?F	2
NMB 1296		081.00	C	I	F		1A	?M	2
NMB 1298	MR 7	066.00	C	I	F		1A	?M	2
NMB 1299		082.01-.03	C	I	F		3AAJ	U?MU	2
NMB 1300		083.00	C	I	F		1A	?F	2
NMB 1301		084.00	C	I	F		1J	U	2
NMB 1305/07	MR4 (119.02)	119.01-.03	C	I	F		3AJN	UUU	2, 6
NMB 1337	?NMB1303 (86.5)	092.00	C	I	F		1A	M	2
NMB 1376		094.00	C	I	F		1A	F	2
NMB 1434	1I.T.K.I/S.1	169.01-02	C	I	F		2JA	UU	5

Continued on p. 64

TABLE 1 (*continued*)

NMB accession	Contents[1]	Case	L	C/I	W/F	C14	MNI [AJIN][2]	Sex[3]	Ref[4]
NMB 1436	2.1.SK1	168.00	C	I	F		1A	?M	2
NMB 1437		095.01-.05/.07	?C	I	F		5A1J	UU?F?M?MU	1
NMB 1437	SIS KX	095.06	C	I	F	*	1A	M	11
NMB1438	Wilton 2.1 SK 2	161.00	C	I	F		1A	?F	2
NMB 1444	S3S KB MRC (S3.25)	098.00	C	I	W		1I	U	2
NMB 1448		102.01-.10	C	I	F/W	*102.04	10A	U?M?F?MU?FUUUFU	1
NMB 1450	"Proto-Bushman"	104.00	?C/D	I	F		1A	?M	2
NMB 1451		105.00	C	C	W		1A	M	2
NMB 1595/6/7		110.01	C	I	F	*	1A	?M	1
MR 4		118.00	C	I	F		1A	?M	6
WSK 1	WSK 1 (120.02)	120.01-.02	C	I	F		2II	U	4
SSI (C)	375 (164.01)	164.01-.03	C	I	F		2AN	FUU	5
SSI (PC)	(115.01&.02)	115.01-115.03	C	I	W		3AI	FUU	5
SS2/WSK 2	SS2 C (III)	138.00	C	I	F		1A	F	5
SS2	SS2 PC (III)	121.00	C	I	F	*	1A	F	1, 5
WSK 3		132.00	C	I	F		1A	?M	4
WSK3		133.00	C	I	F		1A	U	4
SS3 (C)	Site III	139.00	C	I	F		1A	M	5
SS3 (PC)	SS3(124.01)	124.01-.03	C	I	F	*	3AAI	MUU	1,5
SS4		144.00	C	I	W		1A	F	5
SS5	?S5	145.00	C	I	F		1I	U	?5
SS1 - 4		141.00	?C	I	F		1A	?M	NR
WG 1 SS 1-4	SS 1-4	143.00	?C	I	W		1A	?M	NR
WG 1		130.01-.11(A-I)	?C	I	F		7A3J1I	7U	NR
G1; SSII-IV	Ind. ABCD	146.01-.04	C	I	F	*AB	4AAJJ	UM?MU	1
G2, SS II-IV		122.00	?C	I	F		1N	U	NR
G4, SS II - IV		127.01-07	?C	I	F		6A1J	3U2?M1?F	NR
Unmarked/SN4		151.01-.08	C	I	F	*151.06	2A5J1N	M?F6U	1
S 5-7-8/10	C.1933	136.00	C	I	F		1I	U	4
SV-2/13		135.00	?C	I	F		IJ	U	NR
WU strata II:	A & B	154.01-.02	?C	I	F		2J	UU	NR
Kindergraf	Box 382	170.00	?C	I	F		1J	U	NR
S4 26′ Baba & S4/26′/3′6" van Wand		172.00	?C	I	F		1I	U	NR
SV 2/10	Skeleton S5 Proto	160.00	?C/D	I	F		1J	U	NR
NMB 1302	MRD (85.04-.06)	085.01-06	D	I	F		3AAI	UUU	2
NMB 1342/1373	MRD or MR1	093.01-.02	D	I	W	*	1A	U	1
NMB 1310	MR X (90.04)	090.01-.05	D	I	W		5A	U?FU?F?M	2, 6
NMB 1311	MR 2 (91.04)	091.01-.04	D	I	F		4AAJI	UUUU	2, 9
WG 1	?Child found with SS1	142.00	NP	I	W		1A	U	NR
?Unmarked: G4 SII - IV		149.01-.02	NP	I	F		2A	FU	NR
?SS3		155.01-.05	NP	I	F		2A1J2N	5U	NR
?SS1		125.01-.02	NP	I	F		2AJ	UU	NR
?SI: Grave II		128.01-.03	NP	I	F		2JA	UUU	NR
?M/MRC		140.01-.02	NP	I	F		2JA	UU	NR
Wilton "Upper",	?MR	147.01-.02	NP	I	F		2A	FU	NR
1st S3	S3 SK (Box 375)	163.01	NP	I	F		2A	UU	NR
MR 105		007.00	NP	I	F		1J	U	NR
SK No. 4		116.00	NP	C	F		1J	U	NR
SK No. 5		117.00	NP	I	F		1A	M	NR
OKT 58	Box 381	165.00	NP	I	F		1J	U	NR
MR P6		001.00	NP	I	F		1J	U	2
NMB 6		002.00	NP	I	F		1N	U	2
NMB 7	Vertebrae	03.01-.10	NP	I	W		10A	10U	2
NMB 8	Max, Mand	04.1-4.09	NP	I	F		8A1J	4U3?F1M	2
NMB 10	Box 211 (2/2, C with PC 1/2)	005.00	NP	I	W		1A	U	2
NMB 9	Box 211	006.00	NP	I	W		1A	U	2
Box 211 (1/2)		008.00	NP	I	W		1A	M	2
Box 211 (1/2)		009.00	NP	I	W		1A	U	2
Box 211 (2/2)		011.01-.02	NP	I	F		2I	UU	2
Box 211 (2/2)		012.00	NP	I	F		1J	U	2
NMB 1231	H/F (n = 234)	013.00	NP	I	W		20A3J	23U	2

Continued on p. 65

TABLE 1 (*continued*)

NMB accession	Contents[1]	Case	L	C/I	W/F	C14	MNI [AJIN][2]	Sex[3]	Ref[4]
NMB 1231	Femur	014.00	NP	I	W		1I	U	2
NMB 1232	Patellae	015.01-.06	NP	I	W		1A	U	2
NMB 1233	Wrists & Ankles	016.00	NP	I	W		19A2J	21U	2
NMB 1234	Sacra	017.01-.09	NP	I	W		9A	4M2F3U	2
NMB 1235	Vertebrae	019.01-.05	NP	I	W		5A	UUUUU	2
NMB 1235	Tibiae	20.01-.05	NP	I	W		5A	UUUUU	2
NMB 1236	Mandible	018.01-.07	NP	I	W		7A	3U?M?F?F?F	2
NMB 1238	Femora	021.01-.13	NP	I	W		8A5N	4?M4?F5U	2
NMB 1239	Scapulae	022.01-.06	NP	I	W		6AN	UUUUUU	2
NMB 1240	Pelves	023.01-.08	NP	I	W		8A	M?MFFU?MFM	2
NMB1243	Crania	026.01-.03	NP	I	F		3A	?M?M?M	2
NMB 1244	Mandible	027.00	NP	I	W		1J	U	2
NMB1245	Cranial frags	028.02-.04	NP	I	F		4N	UUUU	2
NMB1246	Cranial frags	029.00	NP	I	F		1J	U	2
NMB 1251	Radius, Ulna, Femur	036.00	NP	I	F		1A	U	2
NMB1253	Cranium	037.00	NP	C	W		1J	U	2
NMB 1255	Cranium	039.00	NP	I	F		1I	U	2
NMB1256	Cranial frags	040.00	NP	I	F		1?A	U	2
NMB1256	Cranial frags	041.00	NP	I	F		1N	U	2
NMB 1258	MRA X 1, 7 My La.	042.00	NP	I	W		1J	U	2
NMB 1260		044.00	NP	I	F		1J	U	2
NMB 1260		045.00	NP	I	F		1J	U	2
C.2131	In box NMB 1260 [44]	156.01-.06	NP	I	F		4J1I1A	UUUUU	NR
NMB 1261		046.01-.05	NP	I	F		2J3I	UUUUU	2
NMB1263		047.00	NP	I	F		1J	U	2
NMB 1303	Cranial frags	86.01-.06	NP	I	F		6N	UUUUUU	2
NMB 1304	Cranials and foot	087.01-.02	NP	I	F		2AJ	UU	2
NMB 1306	Cranial frags	088.01-.04	NP	I	F		4N	UUUU	2
NMB 1308	Vertebrae and pelvis	089.01-.03	NP	I	F		2A1J	UUU	2
NMB 1445		100.00	NP	I	F		1A	?F	2
NMB 1446	S5 PreBush	101.01-.02	NP	I	F		2A	FU	2
NMB 1585	Fibulae	106.01-.13	NP	I	F		12A1J	13U	2
NMB 1586, NMB 1587, NMB 1588		107.01-107.49	NP	I	F/W		48A	48U	2
NMB 1589	Clavicles	109.01	NP	I	F		16A	16U	2
NMB 1595/6/7	Femora, Humeri, Scap	110.02-110.07	NP	I	F		6AI	?MFMUFU	
NMB 1599	Vertebrae	108.01-108.05	NP	I	W		5A	UUUUU	2
NMB 1600	Pelves	111.01-.03	NP	I	W		3A	UM?F	2
NMB 1601	Foot bones	112.01-.04	NP	I	F		4A	UUUU	2
NMB 1602	Cranial frags	113.01-.03	NP	I	F		3AN	U?MU	2
NMB 1603	Cranial frags	114.01-.02	NP	I	F		2JN	UU	2
5 V 0-12/12	Cranial frags	137.00	NP	I	F		1A	M	NR
Unmarked	Cranial frags	148.01-.05	NP	I	F		2A3N	U?MUFU	NR
Unmarked	C and PC	150.01-.05	NP	I	F		2I1J1N	UUUU	NR
Unlisted MR	Cranial frags	153.00	NP	I	F		1J	U	NR
No no, No context	Cranial frags	157.00	NP	I	F		1?J	U	NR
Matjes River	Cranial frags	158.01-.02	NP	I	F		2A	UU	NR
S 592	Box 381	166.00	NP	C	F		1I	U	NR
?MR S1-S4	No number, S1, S3, S4 and S5 were assigned with the number C.1246								
		167.00	NP	I	F		1N	U	NR
No no.? MR	Box 382	171.00	NP	I	F		1A	U	NR

[1]C = cranial, PC = postcranial.
[2]A = adult, J = juvenile, I = infant, N = unknown.
[3]M/F = male/female, ?M/?F = possible male/female, U = not determined.
[4]Sources for information.
1 = Sealy *et al.* 2006.
2 = Morris 1992.
3 = Pfeiffer & Sealy 2006.
4 = Hoffman 1953 (unpublished field notes).
5 = Hoffman 1956 (unpublished field notes).
6 = Keith 1934.
7 = Louw 1963.
8 = Meiring 1937.
9 = Dreyer, 1933
10 = Protsch & Oberholzer 1975.
11 = Sealy & Pfeiffer 2000.
NR = not referenced.

91.04 to MR 2, but not the other three skeletons, which are represented by two adults and one infant. Similarly, NMB 1302, contains at least four individuals, only one of which has been labeled MRD (also known as MR-1, NMB 1342 and 1373).

The last 83 boxes belong to the Matjes River Rock Shelter excavations, but they do not have archaeological provenance. The majority of this material has been sorted into skeletal element, considered to be unmarked MR, and assumed to belong to the assemblage. There are two boxes in which the skeletal material cannot be associated with the identification tag to which it had been assigned.

The first is SS3. According to Hoffman (1953), SS3 had been removed from Site III, Wilton level, and was a fairly complete skeleton (cranial and postcranial). The skeleton, which best fits Hoffman's description, can be found in two boxes marked SS3 (case 138: cranium, and 124.01 postcranials). Another box marked SS3 (case 155.01-.05) contains the remains of two adults, two juveniles and one person of unknown age/sex. Clearly, this set of skeletal elements cannot be attributed to Hoffman's original SS3. Likewise, SS1, described in Hoffman (1956), was excavated from Site I, Wilton layer, and contained a young adult female and an infant. These remains were found in two boxes marked SS1 (case 164.01 cranium, and case 115.01 postcranials and 115.02 infant). Another SS1 box (case 125.01-.02) contains the remains of an adult male (125.01) as well as ribs and metacarpals of a juvenile (125.02).

To address the potential size of this skeletal sample, the skeletal elements were counted as if they all came from one level, even though they are clearly associated with multiple periods. An inventory, or total count, of skeletal elements and their general completeness is shown in Tables 2 to 4. These tables provide the raw data for the determination of MNI; when right and left bones, which are more than 50% complete, are counted, the largest element was the right parietal ($n = 79$).

In Table 5, left and right bones, paired bone counts, the MNI (Max L, R), MLNI, the recovery probability (r) and standard error (s.e.) for the mandible, humerus, radius, ulna, femur, tibia and fibula are presented. These results are based on a single element being used to estimate the size of the sample. As can be seen, sample size varies substantially between skeletal elements for both estimation methods, with MNI ranging from 38 to 72 and MLNI from 57 to 93. Because of this variation, it would not be accurate to establish the size of this assemblage from a single bone, or a single unique element (e.g. proximal humerus). These results are to be expected, since it is known that not all skeletons were found complete (Hoffman 1953, 1955, 1956).

Four elements (mandible, humerus, femur and tibia) were combined and applied to the modified LI for multiple variables (Adams & Koningsberg 2004). The results yielded an overall MLNI of 88 with a range of 86 to 103 and a recovery probability of 0.6352 at an HDR% of 99.9 (Table 5). This means that the collection contains at least 88 people but probably not more than 103. Furthermore, a count of between 86 and 103 individuals would have sufficed to supply 99.9% of the skeletal elements currently present in the Matjes River collection.

TABLE 2. *An inventory of mature and immature cranial elements in the MR collection: bone type and completeness.*

Unpaired	25%		50%		75%		100%	
Frontal	8		17		2		53	
Occipital	3		29		2		45	
Sphenoid	1		0		0		7	
Vomer	0		0		0		8	
Ethmoid	0		0		0		8	
Hyoid	0		0		0		3	
Cricoid	0		0		0		0	
Thyroid	0		0		0		2	
Teeth							869	
Paired	Left	Right	Left	Right	Left	Right	Left	Right
Parietal	5	4	11	13	0	0	66	66
Temporal	16	18	7	9	0		0	38
Zygomatic	0	0	0	0	0	0	9	13
Nasal	2	2	0	1	0	0	26	26
Lacrimal	0	0	0	0	0	0	10	9
Palatine	0	1	1	1	0	0	28	30
Orbit	0	1	4	3	0	0	29	26
Maxilla	7	3	6	5	1	0	37	46
Mandible	5	7	11	14	0	4	61	43

TABLE 3. *An inventory of mature and immature shoulder girdles and pelves in the MR collection: bone type and completeness.*

Unpaired	<25%		25–50%		50–75%		>75%	
Sternum	11		0		2		5	
Sacrum	6		5		3		23	
Coccyx	0		0		1		0	
Paired	Left	Right	Left	Right	Left	Right	Left	Right
Clavicle	5	6	1	1	2	1	23	26
Scapula	9	16	6	8	4	2	13	20
Patella	0	0	0	0	0	0	13	11
Ilium	8	11	3	3	3	2	21	`8
Ischium	4	8	1	3	5	6	13	10
Pubis	3	2	0	1	1	0	17	10

DISCUSSION AND CONCLUSION

Without a doubt, the Matjes River Rock Shelter is an important collection for archaeologists and anthropologists in studying the behaviour and lifestyle of early Holocene inhabitants in southern Africa. While the raw data used for calculating an MNI and MLNI in this study reflect an opinion based on experience in sorting commingled skeletons from a single time period and not multiple time periods, as is the case with this collection, it does provide an approximation as to the

TABLE 4. *An inventory of mature and immature long bones in the MR collection: bone type and completeness.*

Bone	Prox		P1/3		M1/3		D1/3		Dist	
	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Humerus	38	36	50	51	48	47	59	55	47	42
Radius	31	29	39	36	38	32	43	36	35	26
Ulna	33	32	45	40	34	29	34	34	29	26
Femur	30	29	40	39	29	37	35	47	29	35
Tibia	29	24	45	36	40	31	43	37	27	31
Fibula	23	19	34	34	35	36	39	46	31	37

TABLE 5. *MNI and MLNI for the MR collection.*

Element	Left	Right	Pairs	Max (L, R)	MLNI[1]	*r*	S.E.	% HDR
Mandible	72	61	48	72	86,91,100	0.7218	0.0439	95. 9
Humerus	55	53	31	55	83,93,112	0.5741	0.0568	95. 3
Radius	40	39	22	40	61,70, 89	0.5570	0.0671	95. 5
Ulna	39	39	20	39	64 ,75,97	0.5128	0.0690	95. 2
Femur	40	44	24	44	64,72,90	0.5714	0.0645	95. 1
Tibia	44	34	25	44	54,59,71	0.6410	0.0633	95. 9
Fibula	38	38	25	38	52,57,68	0.6578	0.0630	95. 9
Overall[2]	211	192	128	72	85, 88, 103	0.6352	0.0280	99.9

[1]Central number in triplet is MLNI, while first and last numbers give highest-density region (HDR).
[2]Using the mandible, humerus, femur and tibia.
S.E. = standard error.
r = correlation coefficient.
HDR = highest density region.

number of people who may have been *removed* from the site; but these results cannot be used to make inferences as to the number of people associated with the different archaeological assemblages. An estimation of 86 to 103 people compares well with previous researchers who suggested that the collection was larger than 80 individuals (Hausman 1980; Sealy 2006, Pfeiffer, unpublished notes). Owing to the fact that many skeletons were found incomplete, or without archaeological context, and considering the large time depth, it will not be possible to associate skeletal elements with each other.

A description of the Matjes River Collection has been provided that summarized the minimum number of people with the same NMB identification number, their age, sex, and probable archaeological layer. When using the summary table to find skeletons associated with a particular layer or identification tag, four key points are necessary to remember. First, if a radiocarbon-dated skeleton is in a box with other individuals, the additional person(s) might not belong to the same cultural period. Second, the MNI is a value provided for each box, it cannot be added up to describe the possible number of individuals in a layer as the remains were not sorted layer by layer, but box by box. Third, as pointed out above, the identification tag on at least two of the boxes do not represent the actual content of the box (e.g. ?SS1, ?SS3). Lastly, only 120 of the 172 Matjes River boxes have been assigned a National Museum of Bloemfontein catalogue number.

A photographic catalogue of the skeletal remains is available either on DVD from the Department of Anatomy at the University of Pretoria or at the following web address: www.mapungubwe.co.za/matjes. This digital catalogue corresponds with the descriptive table (Table 1) in this study. The material presented will be useful for collection administrators, researchers using the collection, and for the long-term preservation of the remains.

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