3. METHODS

3.1 EXCAVATION

The microfaunal remains from the Sibudu Cave deposit were collected during excavations between 1998 and 2004 by dry sieving. The units were excavated by hand, using small trowels and brushes. Only the micromammal remains were extracted from the faunal collection and have been used in this study. In total, 2,690 micromammal specimens have been catalogued from the MSA levels to date. Between 1998 and 2002, a 2 mm mesh size was used to screen excavated materials, resulting in tiny skeletal parts (teeth, metapodials, vertebrae) from smaller species (insectivores and small rodents) potentially slipping through the mesh. Reappraisal of excavation methods, with the intent of recovering a higher percentage of microfaunal remains, has resulted in the use of a 1 mm mesh size in 2003 and 2004. Due to the presence of other organic material in the assemblage, wet sieving was not considered as this method would damage these materials. Specimens recovered were dry brushed and bagged according to date of excavation, unit, unit quadrant and layer. This meticulous approach has facilitated an accurate database of spatial patterning of distribution.

Excavations in late 2004 recovered numerous micromammal remains. These were cursorily examined and the cranial material was extracted and included in this study. Six cranial specimens from the deeper layers were added in this analysis, however, they are not represented in the statistical totals as the postcranial elements were not counted. The catalogue numbers of these specimens are SMF 1853, SMF 1854, SMF 1857, SMF 1859 and SMF 1860. These specimens are the only specimens recovered from Grey Sand II, Light Brown Grey and Light Brown Grey II, all of which are deep post Howiesons Poort levels, dating to approximately 60 kyr.

3.2 HANDLING

In the laboratory, skeletal parts were identified where possible using a modern comparative collection from Jacovec Cavern at Sterkfontein collected and catalogued by Annie van de Venter. Each bag, representing one unit quadrant layer, was
examined for identifiable specimens, elements were separated and placed within a
category: skull elements (mandibles, maxillae and isolated teeth), and the main
postcranial elements: long bones (humerus, radius, and ulna for forelimbs, femur and
tibia for hind limbs). Each identifiable skeletal element was counted, bagged
separately, and given a catalogue number. The remaining non-identifiable material
was counted, bagged together, and given a separate catalogue number. Each bag was
labelled with SMF (Sibudu Microfauna) level, unit, quadrant, and catalogue number.
An example of this would be: SMF: Level: SPCA, Unit: B, Quadrant: 5d, Catalogue
#: 1319.

A total of 2700 specimens was sampled and the entire micromammal catalogue was
entered into a Microsoft Excel spreadsheet (Appendix A). The categories for the non-
diagnostic elements include: Level, Square, Quadrant, Catalogue Number, Number of
Specimens, Cranial/Postcranial, Element, Complete/Partial, and Comments.
Additional categories for diagnostic cranial elements in the catalogue include: Order,
Genus, Species, Side, Upper/Lower, and Dental Formula (representing which teeth
were present).

Results showed significant differences in frequencies between certain stratigraphic
layers. Higher frequencies of specimens in certain layers over others, indicate that the
specimen frequencies from the majority of layers in this collection are statistically
negligible in comparison to those from layer Bu (Buff). As a result of these findings
an in depth study of the specimens from layer Bu will be made. The species diversity
from the remaining layers will then be individually compared so as to provide an idea
of species variation between layers and through time. A single specimen from a
modern owl pellet found near the cave was examined in order to provide an idea of
the modern occurrence of micromammal species in the area.

3.3 SPECIES IDENTIFICATION

The cranial elements from the micromammal collection were separated from the
postcranial material for this analysis. Species are identified by cranial elements,
specifically, dental morphology. While postcranial elements were examined for
minimum number of individuals, these elements can only be identified to their Genus, which is not specific enough for environmental reconstructions.

During species identification, it was determined that more than one individual was sometimes present within a single catalogued bag. This necessitated an additional subdivision within the original catalogue numbering system (Appendix B). The cranial elements, such as mandibles and isolated teeth were given sub-catalogue letters (a, b, c, etc.) to their original catalogue number when more than one individual or species was identified with the same catalogue number. This allows for separate analyses of each layer, based upon species diversity and number of species present.

The Sibudu dental material was compared to the extensive extant micromammal collection at the Transvaal Museum. The archaeological specimens were identified to genus level using De Graaff (1981), and the likely extant candidates within each genus were extracted from the comparative collection and used in the analysis. Rodent tooth patterns from the archaeological specimens were then examined under a (50x) microscope and compared to each extant genus, and species identifications were made based on the same criteria as those used by Avery (1986). The nomenclature of each species was based on a revised systematic checklist of the extant mammals of the southern African sub-region provided by Bronner et al. (2004). Consequently the parameters of variety within a species over geographical regions, time and between sexes have not yet been firmly established and therefore misidentifications are possible because of the absence of such information.

3.4 MINIMUM NUMBER OF INDIVIDUALS

The Minimum Number of Individuals (MNI) was determined using two different methods. The first method was based on the most numerous postcranial element. Complete specimens were separated from other undiagnostic postcranial material counted and used in this analysis. The remains were sorted manually, based on the methods used by Laudet et al. (2002). Where possible individual postcranial specimens were sided ie: left or right femur, using the comparative collection from Jacovec Cavern at Sterkfontein and the collection of small mammals from the Transvaal Museum.
In this study the analysis was based on species identified from cranial elements, therefore I felt that it was necessary to create a second method for estimating MNIs to provide cranial and species counts within the assemblage. This cranial MNI was based on the most numerous cranial element. Isolated mandibles and teeth were sided using Avery (1986), De Graaff (1981) and the comparative material from the Transvaal Museum collection of small mammals. Two MNIs were then calculated from the best representative of the cranial and post cranial elements in the sample. Results were then tabulated and comparisons were then made between stratigraphic layers as determined above.

3.5 HABITAT PROFILE

A habitat profile for each species was drawn up using De Graaff (1981), Meester et al. (1986), Rautenbach (1982), Skinner and Smithers (1990) and Mills and Hes (1997). These profiles were based on species identified within each layer. They were divided into order, genus, species, modern distribution, habitat, diet, habits and possible predators. These profiles were combined to associate vegetation types, landscape and biome data for each species. The percentages of specimens per stratigraphic layer were calculated in order to compare layers. Percentage representation, based on cranial material, allows species diversity and presence per layer to be compared, and an environmental profile for each layer to be drawn. All percentage calculations were calculated to the first decimal place.

The spatial distribution of micromammal bone in each unit of the deposit was investigated. The spatial patterning of bone distribution (if any) was then calculated and percentages compared to try and determine if there were any patterns that might indicate possible raptor roosting sites.

3.6 TAPHONOMY

A preliminary taphonomic investigation was conducted in order to try and determine possible collecting agents that may have contributed to the assemblage. This taphonomic investigation followed the methods and principles as used by Andrews
(1990). Incisors and postcranial elements were used in this analysis. Specimens were investigated through a microscope at 50x magnification for any signs of modifications. Results were then compared to the Scanning Electron Microscope micrographs found in Andrews (1990) and divided according to the categories proposed by Andrews. It should be noted that a more intensive taphonomic study is necessary, but was not considered here due to the limited scope of this project.