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JESS REPORT ON CULTURAL HERITAGE SURVEY OF PROPOSED BAARDHEERE RESERVOIR

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CONTENTS

Abbreviations and Acronyms i

Preface ii

Acknowledgments iii

I. Executive Summary 1

II. Introduction 5

A. The Prehistory of Somalia: An Outline 5
B. Previous Archaeological Research in the Study Area 7
C. Results of the 1986 Reconnaissance Survey 8
D. Description of Project Area 9

III. Methods 16

A. General Survey Strategy 16
B. Southern Section 17
C. Central Section 18
D. Northern section 19
E. Data Recording 19
F. Artifact Analysis 21
G. Data Analysis 22
H. Artifact Curation 22

IV. Results 30

A. Overview 30
B. Open-Air Lithic Sites 32
C. Site Distribution in the Central Section: A Case Study 53
D. Open-Air Ceramic Sites 55
E. Cairns 64
F. Cemeteries and Graves 65
G. Caves and Rockshelters 69
H. Rock Art 72
I. Summary and Conclusions 82

V. Assessment of Results and Significance 85

VI. Recommendations 88

A. Cultural Resource Management of Riverbasins: An Overview 88
B. A Three-Phase Cultural Resource Management Program for the Baardheere Reservoir 89

References 94

Appendices

A -- Scope of Work A-1
B1 -- Site Form B1-1
B2 -- JESS Archaeological Site Assemblage Form B2-1
B3 -- Pottery Analysis Form B3-1
C -- Site Data C-1
D1 -- Lithic Assemblage Condition and Raw Material Composition D1-1
D2 -- Frequency (n) of Stone Artifact Classes by Site D2-1
D3 -- Shaped Stone Tool and Core Typology Frequency (n) of Shaped Stone Tools and Cores by Site D3-1
D4 -- Frequency (n) of Shaped Stone Tools and Cores by Techno-Stage D4-1
E -- Central Section Site Distribution Data E-1
F1 -- Frequency of Pottery Sherds by Site and Section F1-1
F2 -- Pottery Characteristics by Site and Section F2-1
F3 -- Type, Location and Pattern of Pottery Decoration F3-1

ABBREVIATIONS AND ACRONYMS

AID	U. S. Agency for International Development, Inc.
ARD	Associates in Rural Development, Inc.
ASD	Air Survey and Development, Inc.
B. P.	before present (present being 1952, when radiocarbon dating became commercially available)
ca.	circa (approximately)
GSDR	Government of the Somali Democratic Republic
H_2ODIST	distance from nearest water source
ID	
JESS	Jubba Environmental and Socioeconomic Studies
JuDAS	Jubba Development Analytical Studies
LSA	Later Stone Age
masl	meters above sea level
MNPJVD	Ministry of National Planning and Jubba Valley Development
MSA	Middle Stone Age
NLITH	number of lithics found in a density sample

PREFACE

The Jubba Environmental and Socioeconomic Studies (JESS) are a 3-year program of river-basin investigations in southern Somalia. JESS is part of a larger project, called Jubba Development Analytical Studies (JuDAS), which is a cooperative effort between the U. S. Agency for International Development (AID) and Ministry of National Plan Jubba Valley Development (MNPJVD) of the Government of the Somali Democratic Republic (GSDR). Associates in Rural Development, Inc. (ARD) was awarded a contract by AID (AFR-0134-C-00-5047-00) to provide technical assistance and project management for JESS.

ARD subcontracted with the University of Georgia to acquire the services of Steven Brandt, Thomas Gresham, Robert Benson, Nanny Carder, and James Ellison for an intensive survey of cultural heritage sites in the proposed Baardheere Reservoir on the upper Jubba River basin. The survey results are based primarily on field work carried out during September and October, 1987.

ACKNOWLEDGMENTS

Archaeology is a labor-intensive discipline which often involves complex logistics and the assistance of many people. Such was certainly the case with this project, with many people in many roles contributing to its success. We would like to thank all the field personnel, expatriate and Somali, who put in long, sometimes grueling hours. We are also very grateful for the tremendous technical, logistical, and moral support provided to us in the United States and in Mogadishu by personnel from AID, ARD, JESS, MNPJVD, the Somali Academy of Arts and Sciences, the Mennonite Mission at Hilo Mareer and the Agricultural Extension facility north of Buurdhuubo. We would in particular like to single out Robert (Gus) Tillman of ARD and Wes Fisher of AID for their invaluable assistance. Most of the data analysis and editing was performed by S. A. Brandt, while T. H. Gresham did the bulk of the report writing. Robert Benson analyzed and wrote the pottery section, Nanny Carder composed the section on the rock art, and James Ellison prepared the segment on Site Distribution in the Central Section. Melanie Brandt was responsible for the artifact illustrations, Nanny Carder drew the rock art, and Gisela Gresham produced the maps.

I. EXECUTIVE SUMMARY

This report presents the results of an intensive archaeological survey of cultural heritage sites in the proposed Baardheere Reservoir, upper Jubba River basin, southern Somalia (Figure 1). The survey, conducted over a 42-day period during September and October 1987, represents one component of the JESS project. The main objectives of the survey were to locate and describe archaeological and historical sites in the proposed reservoir basin and formulate a plan for minimizing damage and/or loss of archaeological data resulting from reservoir construction and impoundment.

The survey team consisted of co-directors Dr. Steven A. Brandt and Thomas H. Gresham, 7 additional expatriate archaeologists, and 8 Somali counterparts. Fourteen more Somalis filled various support roles in the field. The 9 expatriates also spent 10 days in Mogadishu analyzing artifacts and recording data.

In 1986, a brief archaeological reconnaissance of the 420-square-kilometer study area (Brandt 1986a) identified 3 major physiographic zones:

- a southern section, characterized by narrow gorges extending from the dam site north to just below Buurdhuubo, a distance of about 80 kilometers;
- a generally flat, open central section proposed as the main reservoir and extending some 33 linear kilometers from just south of Buurdhuubo north to Durole; and
- the northern section, 80 linear kilometers of narrow gorges and open terrain stretching from a few kilometers above Durole to Luuq.

Based upon knowledge gained from the 1986 reconnaissance, the 1987 survey personnel were divided into 3 crews. Two crews surveyed the northern and southern sections, one on each side of the river, and the third crew surveyed the Central Section. The crews in the remote southern and northern sections used camels for transport, while vehicles were used in the Central Section. All survey was conducted on foot. The authors estimate that about 90 percent of the Southern Section was examined. In the Central Section, a 5 percent systematic stratified survey coupled with a survey of all major togga (wadis) resulted in 15 percent coverage. In the Northern Section, several strategies were employed to provide an estimated 50 percent coverage.

The survey identified 686 sites, comprised of the following types.

First is open-air lithic scatters (i.e., surface scatters of stone artifacts), the most common form of site, with 394 distributed throughout the reservoir area. Most lithic scatters were classified as dating to the Middle Stone Age (MSA) (circa [ca.] 150,000 to 40-30,000 before present [B. P.]) and/or Later Stone Age (LSA) (ca. 40,000 to 5000 B. P.). Based on typological and morphological analyses of the artifacts types, 2 subdivisions of both the MSA and LSA were established.

Second is open-air ceramic scatters, with 100 sites scattered throughout the reservoir area and usually found in direct association with stone artifacts of varying ages. In most cases the lithics and ceramics are not contemporary, as most of the ceramics appear to be relatively recent in age (perhaps only the last few hundred years). However, it is possible that some sites represent LSA and/or Pastoral Neolithic encampments dating to the last 5,000 years.

The third site type is caves and rockshelters, restricted entirely to the Southern gorge section, where 23 inhabitable caves and shelters were recorded. Artifacts were observed in 5 of the caves and rock art in 9. Caves varied in width from 3 to 20 meters and several were more than 20 meters deep.

Fourth is rock art, with 10 of the 11 sites occurring in the Southern Section and one in the north. Nine of the sites are caves where monochromatic and polychromatic paintings of highly stylized patterns of dots and a few line drawings adorn the walls. The paintings are in a style unique to Somalia and possibly to all of Africa. Two sites, one in the north and the other in the south, consist of scratches and engravings on boulders. All the rock art remains undated.

The fifth site type is cairns, or rockpiles, scattered throughout the reservoir but most common in the north, where 78 percent of the 160 sites were recorded. Cairns usually occurred singly but were also found in pairs or small groups. They varied in size and quality of construction. While some may be graves, their origins and functions remain essentially unknown.

The sixth type, cemeteries, was also found throughout the reservoir but was more numerous in the Northern Section, where 64 percent of the 195 cemeteries were recorded. The vast majority are relatively recent Islamic cemeteries, but some appear to be non-Islamic.

Based on the results of this survey, it is recommended that a 3-phase program of archaeological research be implemented. This report constitutes completion of the first phase of such a

program (site location and description). The second phase should be geared primarily toward determining the significance of sites, with research divided into 2 parts. The first part, continued survey and site documentation, should include:

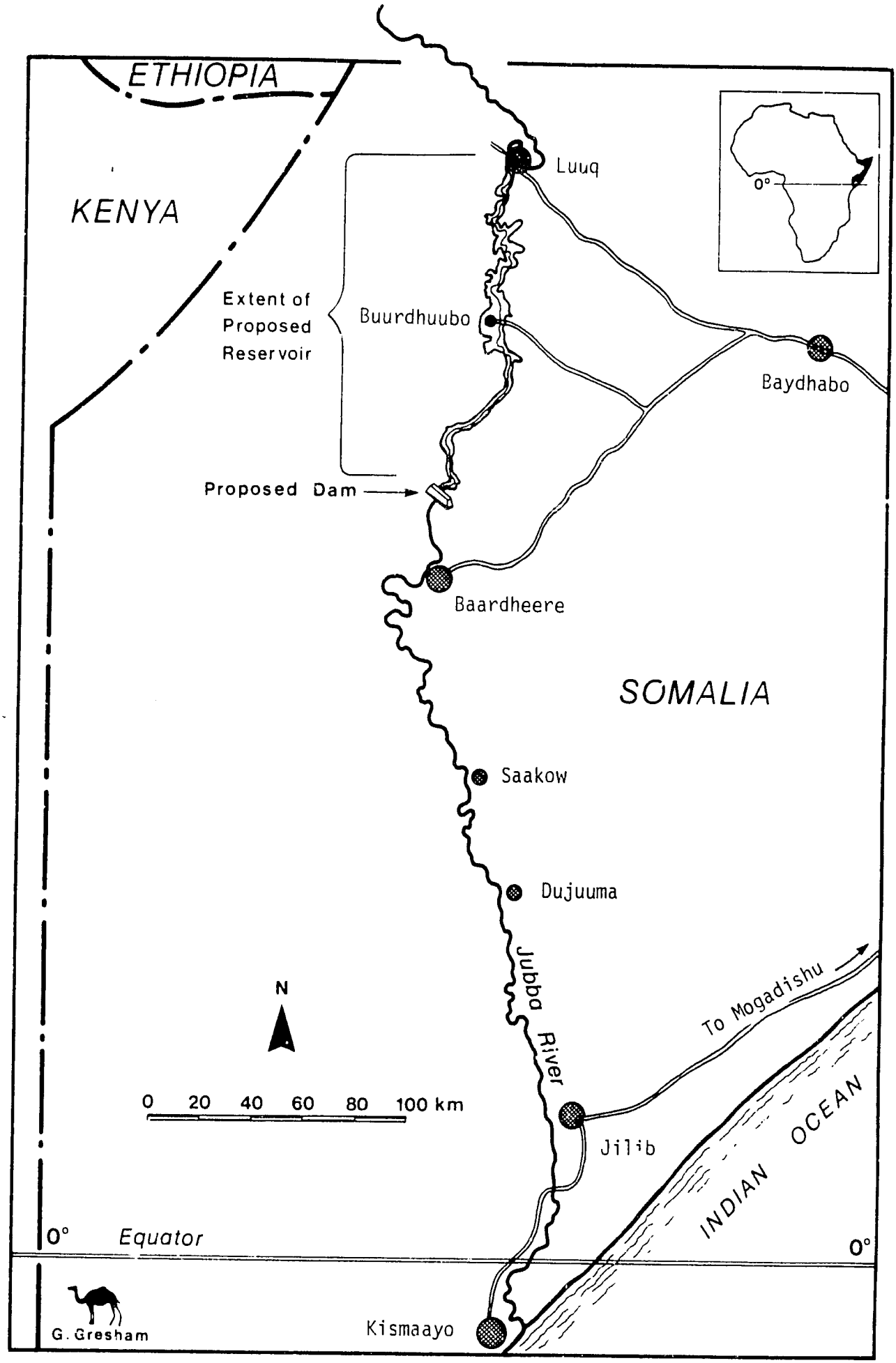
- survey for other caves and rockshelters in the Southern Section;
- brief survey of unexamined portions of the Northern Section;
- systematic collection of newly discovered sites; and
- comprehensive documentation of the rock art.

The second part of this research should include the following test excavations:

- test pits in most caves and rockshelters;
- test pits in a sample of open-air sites;
- a sample of rock cairns;
- a sample of non-Islamic graves;
- test pits in non-site, alluviated areas to test for presence of buried sites; and
- geomorphological investigations to retrieve paleoenvironmental and geomorphological data.

The third phase should involve full-scale excavations of sites found to be archaeologically significant by Phase II investigations.

Figure 1. Location of Project Area



II. INTRODUCTION

The main objectives of this archaeological survey (see Appendix A), part of JESS Phase II (data recovery), were to:

- conduct as comprehensive an archaeological survey of the proposed Baardheere Reservoir as possible given funding and time constraints;
- locate and describe archaeological sites important to an understanding of Somalia's past cultural heritage; and
- formulate a plan for minimizing loss of archaeological data resulting from construction of the dam and flooding of the reservoir.

The Phase II survey was conducted in 2 stages. The first was a brief archaeological reconnaissance from 15 to 25 September 1986, with the express purpose of developing a work plan for a second, more comprehensive round of survey (Brandt 1986a). The second stage of fieldwork, from 3 September to 17 October 1987, built on the objectives and methods of the reconnaissance. The team, which at times numbered 29 people, surveyed the proposed reservoir by foot, using either camel trains or vehicles for logistical support.

The survey resulted in the discovery of almost 700 prehistoric and/or historic sites, probably spanning the last 150,000 years of hominid occupation of the upper Jubba River Valley. This data base provides a sound foundation upon which to devise a plan for salvaging archaeological data prior to construction of the Baardheere Reservoir. Following discussion of the survey results, this report will outline a 3-phase plan of cultural resource management for the proposed Baardheere Reservoir.

A. The Prehistory of Somalia: An Outline

The Stone Age archaeological record of Sub-Saharan Africa is divided conventionally into 4 techno/cultural stages or "ages." The Early, Middle, and Later Stone Ages correspond generally to stages in the evolution of hunting and gathering. The "Neolithic," or New Stone Age, is associated with the development of food-producing systems (subsistence farming and pastoralism).

The earliest known archaeological sites in Somalia are in the northwestern part of the country, where investigators have

discovered Early Stone Age "Acheulian" stone implements (Clark 1954). The Acheulian Complex of eastern Africa ranges from ca. 1.6 million years ago to more than 125,000 years ago and is characterized by large bifacial, ovate-shaped stone tools known as handaxes and cleavers, as well as other stone implements. Acheulian tools were used for a variety of purposes related to early forms of hunting and gathering practiced by *Homo erectus* and archaic *Homo sapiens*. Surprisingly, archaeologists have not yet discovered Acheulian sites in central and southern Somalia. The reason(s) for this is unknown.

The earliest evidence for prehistoric occupation of southern Somalia dates to the MSA (>125,000 to ca. 40,000 years B. P.) when archaic forms of *Homo sapiens* and/or anatomically modern humans manufactured stone tools from pre-shaped cores known as Levallois and/or disc cores. The characteristic tools of the hunter/gatherers of the MSA (e.g., bifacial projectile points, scrapers, knives, awls, burins, and other implements) were generally smaller than Acheulian artifacts and probably hafted onto other implements, such as wooden or bone spears.

Clark (1982) maintains that the MSA of Somalia can be divided into 3 temporal stages, reflecting changes over time in:

- the frequency of certain artifact types;
- frequency in the use of prepared core techniques; and
- a reduction in the size of artifacts.

Unfortunately, most MSA sites in Somalia are unsystematically collected surface scatters, and therefore cannot provide definitive evidence for such suggested temporal divisions. Furthermore, virtually nothing is known of MSA subsistence and settlement patterns (Brandt and Gresham in press).

Current evidence suggests that by ca. 30,000 years ago MSA technology was replaced in many parts of Sub-Saharan Africa by a LSA technology based upon the production of long, narrow "blades." These blades, struck from specially prepared prismatic- and pyramidal-shaped blade cores, were shaped into a wide range of tools, including very small, purposely blunted (or "backed"), and often geometrically shaped "microliths." These and other stone tools, such as points, scrapers, burins, and awls, were fitted into bone and wooden arrows, spears, and other devices. Various bone tools and ornaments also became common, as did pottery, toward the end of this period.

Most LSA sites in southern Somalia, like the rest of the country, are surface sites. However, recent excavations in the

Buur Heybe/Hakaba region have provided new data on LSA adaptations to changing later Pleistocene and Holocene environmental conditions, as well as changes in hunter-gatherer social organization and ideology (Brandt in press).

During the early- to mid-Holocene, ca. 8,000 to 5,000 years ago, some Northeast African hunter/gatherer populations began to herd domesticated cattle, sheep, and/or goats, as well as cultivate domesticated cereals and other plants. Scholars have argued from linguistic and indirect archaeological data for introduction of pastoralism and/or horticulture into Somalia by 3,000-4,000 years ago (Brandt and Carder 1987). However, direct archaeological evidence for establishment of such food-producing "Neolithic" systems in Somalia is meager and restricted to the recent discovery of rare domesticated cattle from excavations at Buur Heybe, imprecisely dated to between 8,000-3,000 years ago (Ibid). In addition to domesticates, Eastern African Neolithic traditions are also characterized by LSA-like microlithic stone artifact assemblages and pottery.

Rock art provides another data set for understanding the development of the Pastoral Neolithic in the Horn of Africa (Carder 1988). The majority of Somali rock art is "pastoral," i.e., domestic cattle, sheep, and goats are the primary motifs. The earliest rock art in Somalia is from the north and is characterized by naturalistic portrayals of humpless cattle (*Bos taurus*). The later forms of rock art, again essentially restricted to northern Somalia, are more stylized depictions of humped cattle (*Bos indicus*) and camels. The rock art of Somalia is dominated by schematic motifs thought to denote tribal and other symbols.

B. Previous Archaeological Research in the Study Area

A literature search revealed little previous archaeological research in the upper Jubba River Valley. In 1913, the Stefanini-Paoli Geological and Zoological Expedition to Somalia explored sections of the Jubba, subsequently discovering surface stone artifact scatters from Salagle to Luuq (Puccioni 1919). Further surface scatters were discovered at Luuq by the 1935 Graziosi-Puccioni Expedition (Graziosi 1940). British military personnel reported additional Stone Age sites at Baardheere and Luuq during the Second World War (Clark 1954). However, none of these sites were systematically surveyed or excavated, and their precise locations were not recorded.

More recently, M. Mussi (1982, 1984) reported the discovery of stone cairns north of Baardheere (but outside the project area). She subsequently excavated 2 cairns but found little underneath (Mussi 1984). In 1985 Coltorti and Mussi (1987) discovered several LSA surface scatters on some hills east of

Luuq. At the site of Buur Medow 1, Mussi (1987) surface-collected all artifacts from an area of 36 square meters, in addition to excavating 5 square meters down to bedrock (ca. 20 centimeters below surface). Organic preservation was very poor. However, she did recover over 3,000 LSA chert artifacts, including endscrapers, microliths, perforators, notches, and denticulates. Mussi tentatively hypothesized that the site was occupied during the early Holocene humid phase, when LSA hunter/gatherers were making greater use of expanded riverine forest resources.

C. Results of the 1986 Reconnaissance Survey

In September 1986 S. A. Brandt (1986a) led a preliminary 10-day cultural heritage reconnaissance of the upper Jubba River Valley inundation zone (Baardheere dam site to Luuq). This study had 2 specific objectives:

- to obtain a preliminary impression of the nature, quality, and quantity of archaeological evidence in the inundation zone; and
- determine a plan of operation and logistical requirements for conducting a 2-month intensive survey in 1987.

Results of the survey were used to develop a more comprehensive Phase II survey plan for assessing historical or archaeological sites threatened by construction of the Baardheere Reservoir.

The reconnaissance involved a vehicle and foot survey of the 200-kilometer-long reservoir by 3 professional archaeologists--Steven Brandt, Thomas Gresham, and Peter Robertshaw. The team discovered over 100 sites, representing 5 classes of archaeological and historic sites:

- surface scatters of MSA and/or LSA artifacts and rare potsherds;
- stone artifacts recovered in situ from a geological trench;
- possible "pastoral camp sites" characterized by dense concentrations of pottery, bone, shell, and rare or no stone artifacts;
- rock piles/cairns; and
- modern graves, tombs, and mosques.

The most common sites were lithic surface scatters, with rock piles second.

The reconnaissance recognized 3 physiographic zones in the reservoir area--southern, central, and northern (described in detail below). The northern and southern zones were largely inaccessible by any kind of vehicle, and could only be surveyed by camel or donkey train. The extent of the proposed survey area (then estimated at 550 square kilometers), the large number of projected sites, and the limited time and personnel available led Brandt (1986:a) to propose a combination of survey methods. The planned survey procedure for the northern and southern sections would be an essentially opportunistic one, with survey crews attempting to cover as much exposed ground surface as possible within a set number of days. The vast Central Section was to be surveyed by 2 methods, 100 percent coverage of all togga and stratified random sampling of the entire area. As detailed in the following chapter, the 1987 Phase II survey was largely successful in implementing the recommended procedures of the 1986 reconnaissance.

D. Description of Project Area

The size, configuration, and accessibility of terrain within the project area played a large part in the formulation of survey strategy. The reservoir area consists of 3 major physiographic zones (Figure 2).

1. Southern Section

The Southern Section is a relatively narrow gorge (Figure 3). The proposed reservoir would average about 500 meters in width. In this section, the river meanders within a narrow floodplain bounded by the limestone walls of the gorge, forming a chain of alternating bottomlands and steep walls 2 to 4 kilometers long. The bottomland usually has a maximum width of 200 meters. Numerous drainages of various sizes feed into the Jubba River gorge. Most of these togga have formed narrow, steep, V-shaped gorges which rise abruptly in elevation near the river. A few of the larger drainages contain narrow floodplains and terraces. We have defined the Southern Section as beginning at the dam site and extending to about 4 kilometers south of Buurdhuubo (at the first major tog south of Buurdhuubo, on the western side of the river), a distance of 80 river kilometers. Based on rough transpositions of the proposed reservoir boundary from 1:100,000 topographic maps to 1:30,000 aerial photographs, we calculate that the Southern Section contains 73.8 square kilometers at estimated high pool (148 meters above sea level [masl]). If the river, considered to average 150 meters wide, is

Figure 2. Physiographic Zones in Project Area

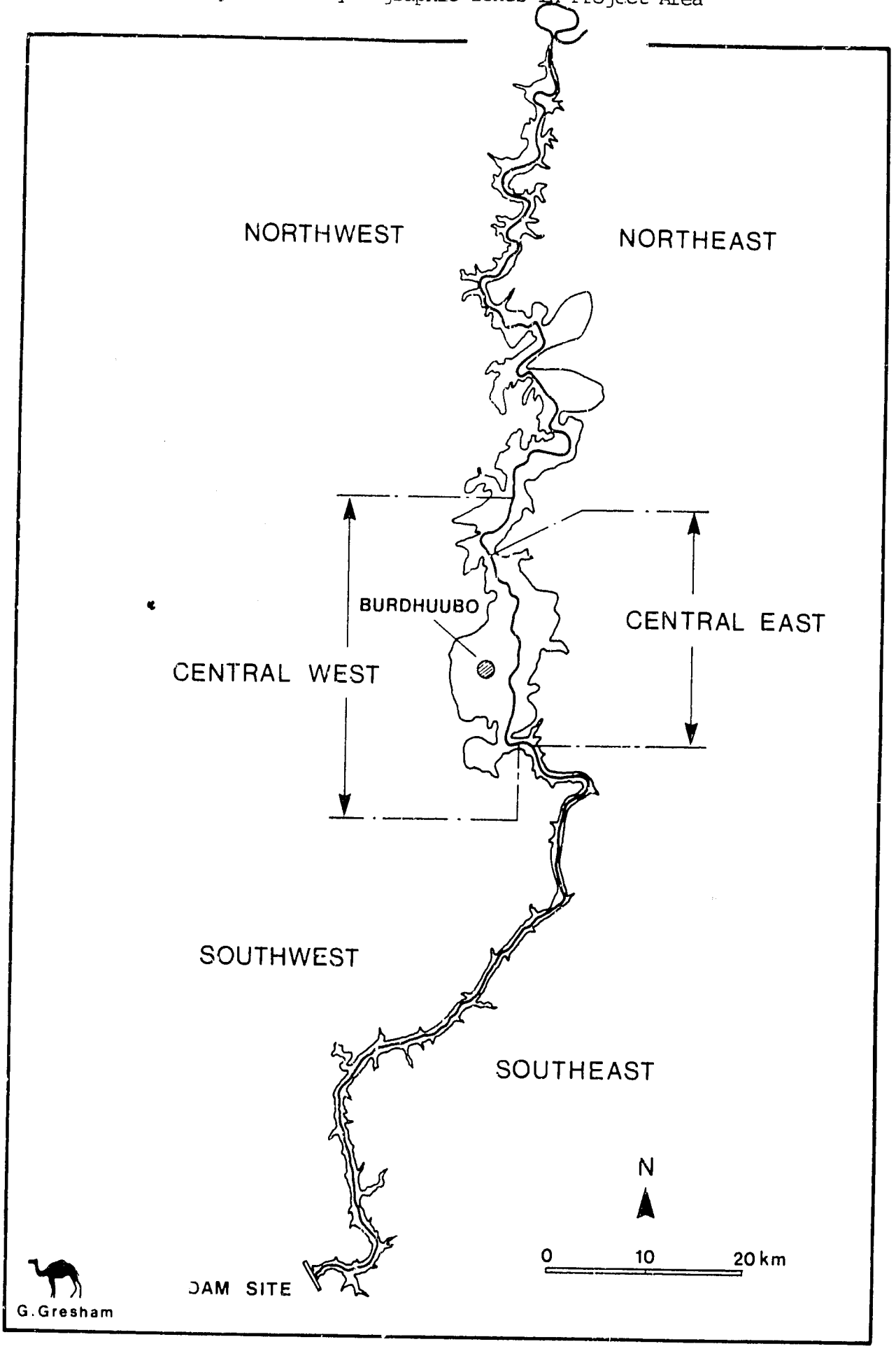


Figure 3. View of Southern Section (looking Southeast)

deducted from this figure, the Southern Section is calculated to contain 61.8 square kilometers of land area. Although no attempt was made to obtain a precise profile of the Southern Section, Figure 4 represents the survey team's best estimation of the valley profile.

In general, the valley is composed of a sharply defined first levee, a silty alluvial plain that either gently or abruptly rises, and a rocky terrace or talus slope at the foot of the limestone wall of the gorge. This description and the survey team's understanding of the geomorphology of the valley is based almost entirely on visual inspection and not on geomorphological investigations. Most archaeological sites occur on both colluvium and alluvium. This alluvium is probably ancient (Pleistocene) compared to the Holocene alluvium on the lower active floodplain and levee.

Current land use on the 2 sides of the valley differs. The east side has a higher human population density and many permanent settlements. Most of the eastern bottom lands, which are composed of recently deposited reddish silts, are at least partially under cultivation. In contrast, there are very few permanent settlements and little cultivation on the west side. The reasons for these differences in land use remain unclear but may have to do with geomorphology, hydrology, and/or access to urban centers and markets. A high water mark, presumably from the 1987 summer flood, is visible on trees in the western bottoms, perhaps suggesting one reason why the west side is underutilized.

2. Central Section

The Central Section is the widest and largest section of the proposed reservoir (Figure 5), composed of broad, flat plains dissected by 26 entrenched but shallow togga. The reservoir boundary in much of this section is not well-defined, as the proposed high water mark (148 masl) spans very gently sloping terrain. The northern terminus of the Central Section has been arbitrarily delineated at a point where surrounding uplands constrict to form a narrower valley. Using this definition, the Central Section contains 30 kilometers of river and about 168 square kilometers of land. If the river has an average width of 150 meters and is deducted from this figure, the Central Section encompasses 163.5 square kilometers of land use. About 60 percent of the terrain occurs on the west side of the river.

The Central Section has a maximum width of 20 kilometers and a relatively wide floodplain, much of which is farmed. There are 4 villages in the Central Section, the largest of which is Buurdhuubo. The recent massive influx of refugees into these villages, which together occupy approximately 12 square

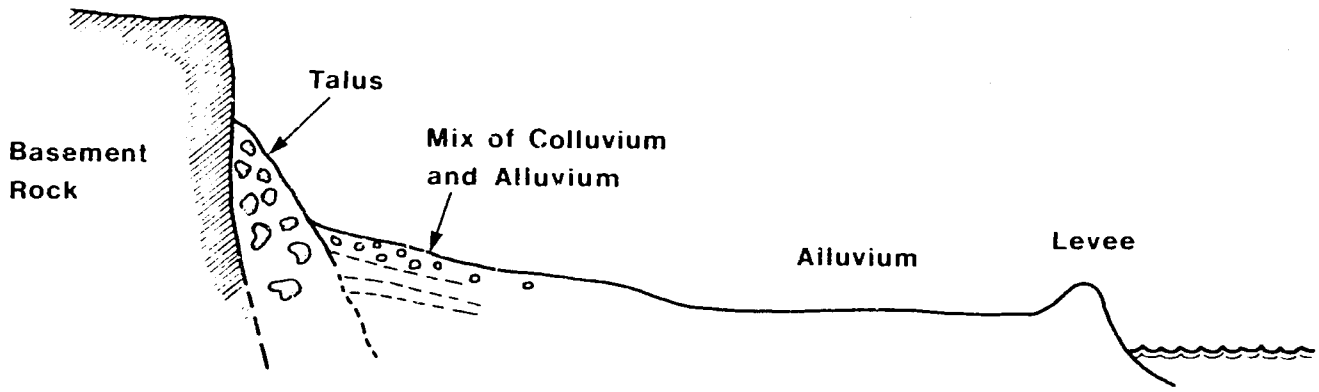


Figure 4. Sketch Profile of Southern Section

Figure 5. View of Central Section (looking east)

kilometers, has resulted in severe degradation and deforestation of the surrounding plains and hills. Whereas the Northern and Southern Sections of the river have very few tracks and are basically inaccessible by 4-wheel drive vehicles, the Central Section has an extensive network of roads as well as an auto ferry, allowing for easy access to both sides of the river.

3. Northern Section

The river valley and numerous large togga comprise the Northern Section, which is not as broad as the Central Section but wider than the Southern Section. This section encompasses a greater variety of landforms and profiles, including flat floodplains, gently sloping plains, distinct terraces, and occasional talus slopes. The proposed reservoir pool extends 5 to 6 kilometers up several of the larger togga. The northern terminus of the reservoir (and the section) is the bridge at Luuq. However, the configuration of the reservoir at this end remains unclear as the area is very flat. A one-meter difference in reservoir elevation could alter the reservoir area by tens of square kilometers. The southern terminus is arbitrarily defined as the point where surrounding uplands of the Central Section constrict to form a narrower valley. The western side of the Northern Section begins 8 river kilometers above the starting point on the east side. As we have projected the reservoir pool, the Northern Section contains 178.2 square kilometers, of which about 11.4 square kilometers is river, leaving approximately 166.8 square kilometers of land area.

III. METHODS

A. General Survey Strategy

Personnel were divided into 3 teams, as proposed in the 1986 reconnaissance report. The eastern and western teams were responsible for surveying their respective sides of the river from the dam site north to Luuq. The central team examined all togga in the flat Central Section for buried sites and conducted a transect survey. Due to the inaccessibility of the terrain, the east and west teams conducted the survey on foot, using camels as pack animals. Field personnel for each team were as follows:

West Team

Tom Gresham (Southeastern Archaeological Services), Project Supervisor
Gisela Gresham (Southeastern Archaeological Services), archaeologist
Abdisalan Muhammed Ali (JESS), counterpart
Abdulaahi Abdi Sheik, cook
Abdulqadir Abdirahman Abdi, locally hired camel driver
Hussein, locally hired camp assistant for Southern Section
Hassan Idris Ismael, locally hired camp assistant, Northern Section
Yassin Ahmed Jama, Baardheere policeman

East Team

Nanny Carder (University of Georgia), archaeologist
Curtis W. Marean (University of California), archaeologist
Abdikadir Ahmed Abdi (JESS), counterpart
Abdulkadir Sheik Mohamed ("Golden") (JESS), cook
Abdinoor Ali Muhammed, locally hired camel driver
Omar Mayow Ali, locally hired camp assistant
Noor Jamow Huedo, Baardheere policeman

Central Team

Steven Brandt (University of Georgia), Project Director,
Rob Benson (University of Georgia), archaeologist
Jim Ellison (University of Georgia), archaeologist
Wendy Rogers (University of Lancaster), archaeologist
Sandy Whitney (University of Georgia), archaeologist
Osman (JESS), counterpart, tog survey
Abdikariin Hasan Nuur (JESS), counterpart, transect survey
Hussein Hasan Nuur, locally hired cook
Abdulle Hussein Gure (JESS), driver
Abdulwahab (JESS), driver

The survey was conducted in 2 phases, the first of which was carried out from 3 to 21 September. After 2 weeks of advance preparation, including a trip to Baardheere, the survey teams departed Mogadishu on 3 September for the JESS Field House in Baardheere. At Baardheere the team members discussed survey strategy and field tested the survey forms for 2 days to help insure uniformity in survey technique and methodology. Once in the field, uniformity between the 2 teams surveying the Southern and Northern Sections was further enhanced by adherence to a similar time frame and occasional communication between the teams. The crews examining the Central Section camped together and compared their field methods daily. On 6 September, the eastern and western teams began their surveys of the Southern Section by camel caravan, while the central team drove to Buurdhuubo to begin examination of the major togga. On 22 September, the field teams drove back from Buurdhuubo to Mogadishu, and 7 days later returned to Buurdhuubo to begin the second half of field survey. This involved the survey of the Northern Section by the east and west camel teams and a transect survey of the vast open plains in the Central Section by the central team. Field research concluded on 29 September, when all 3 teams returned to Mogadishu to begin laboratory analysis of the artifacts.

On average, 15 people, divided into 3 to 5 work crews, surveyed on any given day. Approximately 210 person days were spent surveying, while approximately 120 person days were engaged in logistical matters such as assembling food and equipment and driving to the project area. The labor-intensive nature of archaeology and the inaccessibility of much of the project area contributed to the logistical complexity of the project. Nevertheless, no major obstacles arose and the field teams were able to complete their work on schedule.

B. Southern Section

The Southern Section, the narrowest and smallest of the 3 sections, was surveyed with nearly 100 percent coverage of non-alluviated portions of the main gorge. About 30 percent of the side togga were surveyed. The 3 surveyors on each team followed existing, often braided paths, which nearly always traversed ground higher than where sites were found to occur. The river levee and recently alluviated bottomlands were initially surveyed, but when it became apparent that the overlying layer of silt had been deposited during the 1987 flood, these areas were abandoned. Survey then concentrated on the generally narrow talus slopes and/or terraces that formed the high ground between bottomlands and the gorge wall. This gently sloping, rocky zone usually had sparse enough vegetation to allow a thorough searching. The southernmost side togga were surveyed, but when it was realized that the togga were generally steep-walled and

lacked terraces and sediment floors suitable for open-air sites, only a few of the larger togga were examined.

Because the limestone gorge walls of the Southern Section were susceptible to karstic activity, they were surveyed for caves and rock shelters. Unfortunately, this was difficult because thick vegetation on the talus slope obscured the view of much of the gorge walls. When potential caves were detected from the trail, the talus slope was climbed so that the surrounding section of gorge wall could be inspected. Because of the climb, the thick vegetation, and ruggedness of the talus slope/gorge wall interface, this close inspection was time consuming. Local inhabitants were also asked the locations of caves and rock shelters. However, while most were keenly aware of their environment, for some reason (perhaps translation problems) they were not always reliable in locating caves.

C. Central Section

Two survey strategies were employed in the Central Section. Since the togga were judged to be "high probability areas" during the 1986 reconnaissance survey, where buried stratified sites could be found exposed in the tog walls, the central teams surveyed intensively all 26 major togga within this broad, flat section. The tog crews were composed of 3 persons: one American and 2 Somalis. One crew member walked in the tog examining one tog wall and bed, while the other 2 would walk above the tog about 10 and 20 meters from the edge. The other side of the tog was surveyed the same way on the return to the starting point.

The second survey strategy involved a systematic sample survey using transects. Lines oriented due east-west at 150-meter intervals were penciled on aerial photographs (1:30,000) across the entire Central Section. Although original plans called for surveying a 10 percent sample of the transect lines, time limitations restricted the survey to a 5 percent transect sample of the entire Central Section. This involved surveying east-west transects 30 meters wide, spaced 600 meters apart. A 3-person crew, one American and 2 Somalis, walked each transect, 10 meters from each other. Compasses were used to maintain transect bearings. While this usually resulted in accurate plotting of sites onto the aerial photos, heavy vegetation and changing land use (from when the photograph was taken) occasionally resulted in some loss of precision. During the transect survey, 3 vehicles were used to drop off and pick up the crews.

D. Northern Section

This large, broad section was intended to be surveyed at near 100 percent coverage (except for recently alluviated areas) in a manner similar to that employed in the Southern Section. However, when the boundaries were transcribed onto the aerial photographs, the survey teams realized the section was too large to maintain the Southern Section survey strategy. Instead, survey focused on high probability areas throughout the section. Experience in the Southern Section and initial total coverage of the Northern Section allowed surveyors to identify land forms and areas where sites commonly occurred. These were principally terraces along the river and major togga and the base of the hills that bound the proposed reservoir pool. Some large areas, totaling about 50 square kilometers, were not surveyed at all. These include 2 lobes on the east side that contain broad, flat tog valleys, flat alluvial plains on both sides of the river just below Luuq, and the areas below Luuq occupied by 3 refugee villages. As with the Southern Section, most of the recently alluviated floodplains adjacent to the river were not surveyed. The northern 20 kilometers of the section exhibited high river banks that were not subject to frequent flooding and these were surveyed. Finally, some low-probability areas, i.e., broad flat expanses, were sampled by transect survey.

E. Data Recording

All surveyors used 1:30,000 aerial photographs (prepared by Air Survey and Development, Inc. [ASD], Frankfurt) with prepared site forms and daily log books to record environmental data, survey conditions, and site data. Reservoir boundaries were transcribed onto the aerial photographs by sketching the proposed reservoir elevation (148 meters) as interpolated from a set of 1:20,000 geological maps of the reservoir area (Technital S.p.a. 1977). In broad, flat areas, both the original contour mapping and the team's interpolation (between the 150- and 145-meter contour intervals) are probably subject to error that could amount to several tens of square kilometers. The configuration and extent of the reservoir at the northern terminus is particularly unclear.

The aerial photographs, with the project area delineated, were the sole means of plotting locations of archaeological sites, artifact occurrences, some land use information, environmental data, and areas surveyed. Because the most common type of site, a surface scatter of artifacts, can vary considerably in extent and density of material, defying grouping into spatially discreet sites, the following definition of an archaeological site was formulated:

- a surface scatter of at least 10 artifacts that attained a density of 5 artifacts within a 2-pace radius;

- a cave or rock shelter with any artifacts or one that, lacking evidence of artifacts, was judged as having the potential to contain artifacts (e.g., a sediment-covered floor);

- any location revealing rock art;

- graves and cemeteries; or

- rock cairns.

An artifact "occurrence" was defined as a:

- surface scatter of artifacts with a density of less than 5 artifacts within a 2-pace radius; or

- surface scatter of less than 10 artifacts regardless of the density.

A 4-page site form structured for computer coding (Appendix B1) was completed for each site with the exception of the northern part of the Northern Section, where the numerous rock cairns and cemeteries were only briefly described in notebooks (location, landform, number of graves). Most of the information on the site form was self-explanatory to the surveyors. However, some variables, such as topography (Variable 7), were discussed at length because of the difficulty in maintaining consistency in recognition of these landforms. Categories defined by Trump (1987) were used for vegetation. The sketch map on Page 1 of the form provided details of the site shape and context and aided in site relocation. The fundamental goal of artifact collection was to obtain the most information with the least amount of artifacts. Weight limits on the camel trains and limited lab analysis time dictated a limit to collection sizes. Therefore, the following artifact-collecting strategies were employed:

- total collection--on very small sites with few (ca. 30 or less) artifacts, all artifacts were collected;

- random collection--on very large and/or dense artifact scatters, only a representative sample of tools, cores, and raw material types were collected;

- most I.D. tools, sherds--on large and/or dense artifact scatters, most tools and sherds, along with a representative sample of cores, debris, and samples of raw material were collected;

- all I.D. tools, sherds--on small sites, the entire site was examined and all observed tools and sherds were collected, along with a representative sample of cores, debris, and raw material types;

- density sample--on sites with less than 100 percent collection of artifacts, 3-meter diameter circle was laid out near the center of the site, where artifact density was judged to be average. Every artifact in that circle was collected and bagged separately from the other collections (i.e., random, most I.D., or all I.D.) from the site.

The collection technique was labeled on the plastic bags in which the artifacts were placed and on the site form. The double bagging of most collections prevented any tearing and loss of artifacts during the remainder of the survey. Most sites were measured by pacing, or, in some cases, by visual estimation. Many of the cemeteries and the larger, more complex sites were sketched onto sheets of graph paper. Sites and views of the general environment were photographed with color slide film.

F. Artifact Analysis

Although preliminary analysis was begun in the field, the bulk of the artifact analysis took place over a 10-day period in Mogadishu following completion of all fieldwork. The first task undertaken was the formulation of a feasible analysis scheme and analysis form. Even with the restricted sampling scheme, there were far too many artifacts to conduct a detailed attribute analysis given the time constraints. Therefore, an abbreviated quantitative, descriptive, and typological analysis was conducted. Artifacts were quantified by count and weight for lithics and ceramics (see the artifact analysis form, Appendix B2). Descriptive attributes of the assemblage as a whole were somewhat subjective and included amount and degree of patination, degree of abrasion, type of alteration, and type of raw material. Since chert was by far the most dominant raw material, it was sorted by color, noting which color was the most frequent.

Typologically, the stone artifacts were sorted into 8 classes--shaped tools, unshaped tools, cores, flakes, angular waste, blades, Levallois flakes, and Levallois points. The shaped tools and cores were then classified by type (Appendix D3). This is essentially the typology developed by Merrick (1975) and Nelson (1973) for MSA and LSA assemblages in eastern Africa.

The ceramics were sorted into decorated body, decorated and undecorated rims, lugs and handles, and undecorated body sherds. All decorated sherds and undecorated rim sherds were then

subjected to an attribute analysis using a site pottery analysis form (Appendix B3). This included, whenever possible, the analysis of sherd decorative motifs and patterns, vessel/rim form and frequency, thickness, firing color, extent of weathering, and a subjective assessment of age. Notes were also made on other aspects of the pottery, including temper.

G. Data Analysis

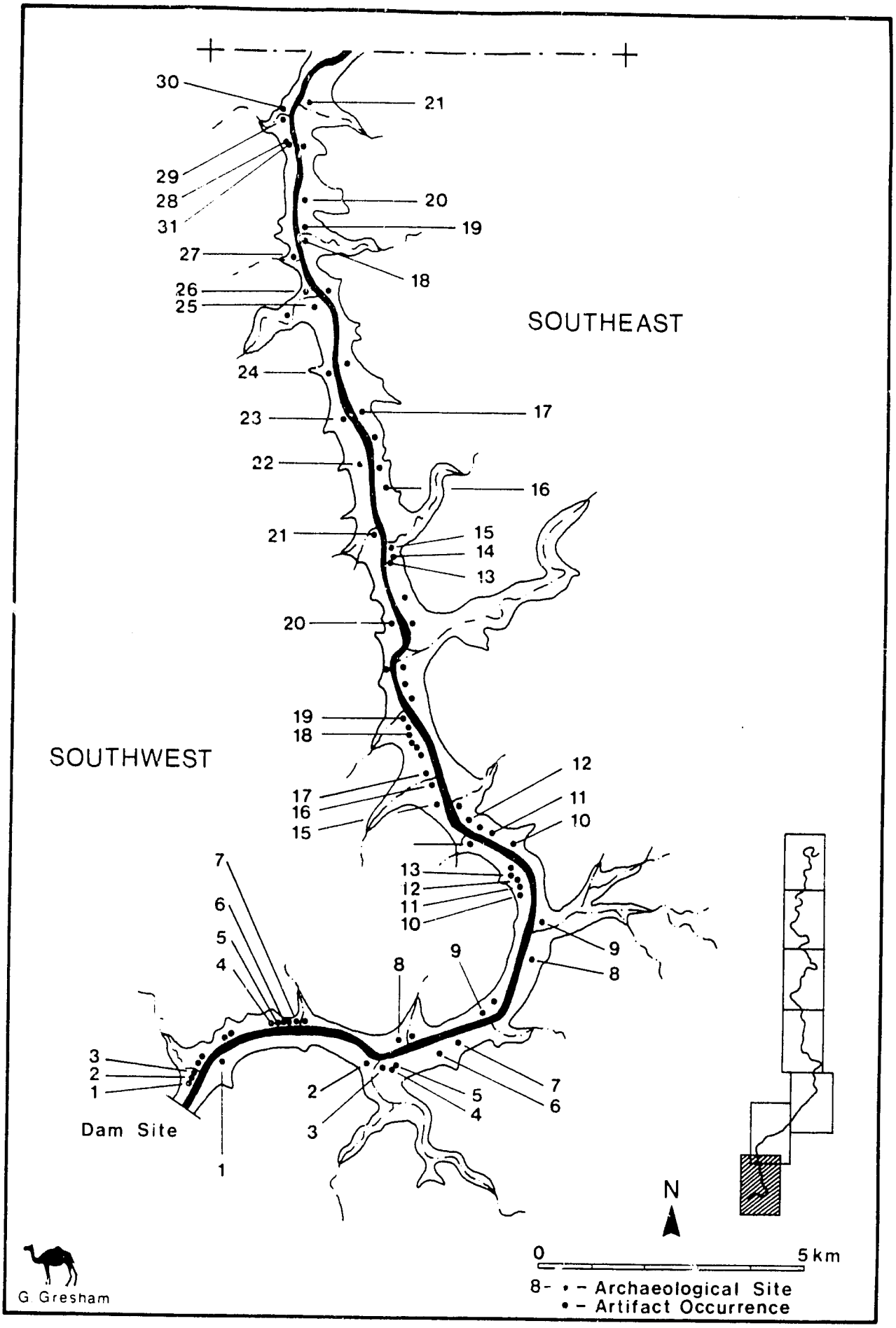
As soon as the site forms were completed, they were entered in the field and in Mogadishu on a Datavue "Spark" laptop computer, using the Reflex data base program. Following entry of all site forms, the data was printed out and scanned for data entry errors or missing information. The corrected files were saved to disk and copied onto another disk. To insure safety of the data, the forms and disks were each hand-carried by 3 different people back to the University of Georgia.

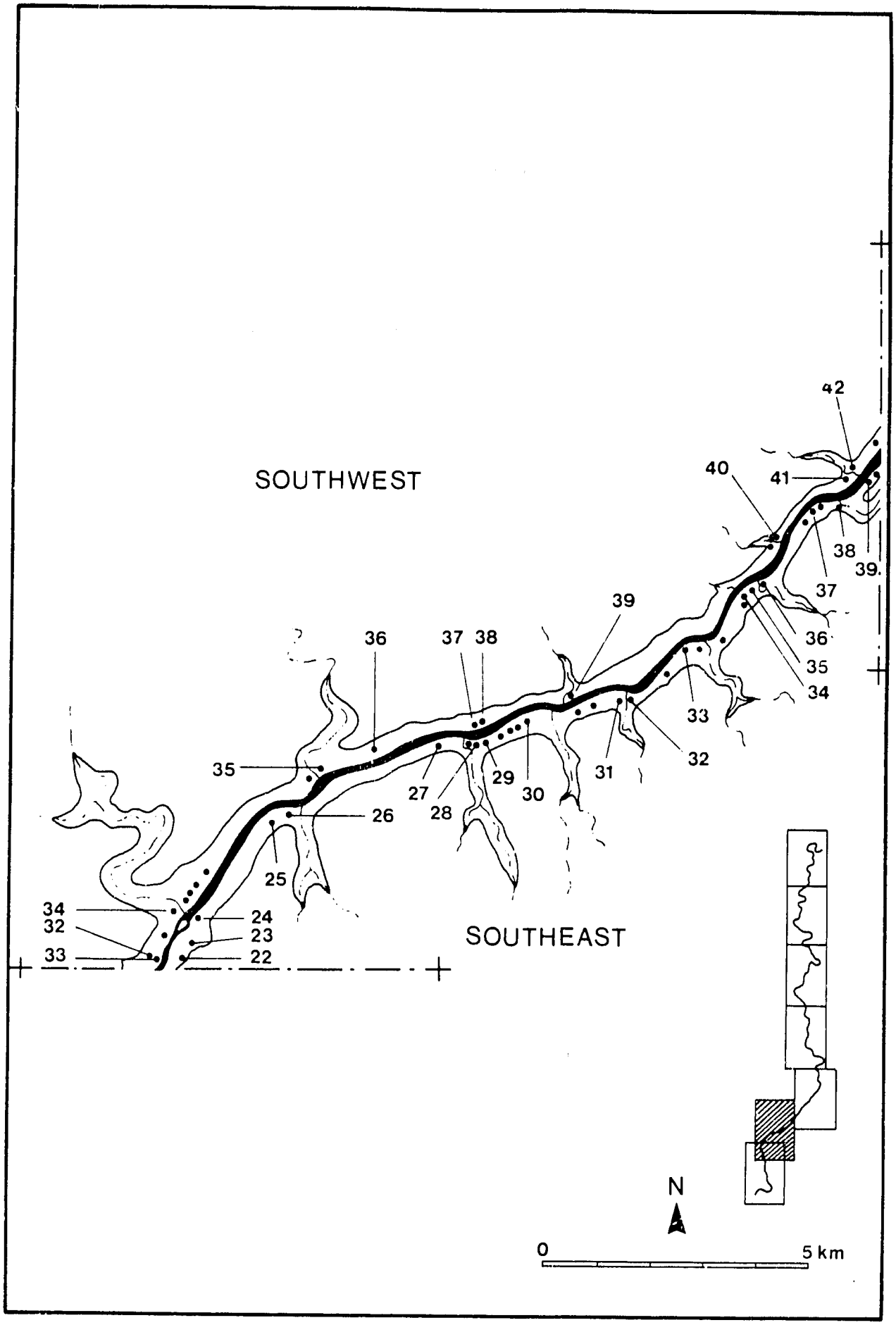
At the University of Georgia, the artifact analysis forms were entered into a Reflex file using IBM-compatible micro-computers, while the site form files were transferred from the laptop to an AT-compatible computer. Although some preliminary analyses of the site data was conducted with the laptop while in Somalia, the bulk of data analysis was undertaken at the University of Georgia.

H. Artifact Curation

The artifacts recovered by this project are presently stored at the Somali Academy of Sciences and Arts under the curatorship of Axmed Duale Jama. It is expected that eventually they will be curated permanently at the Somali National Museum.

Figure 6. Location of Archaeological Sites

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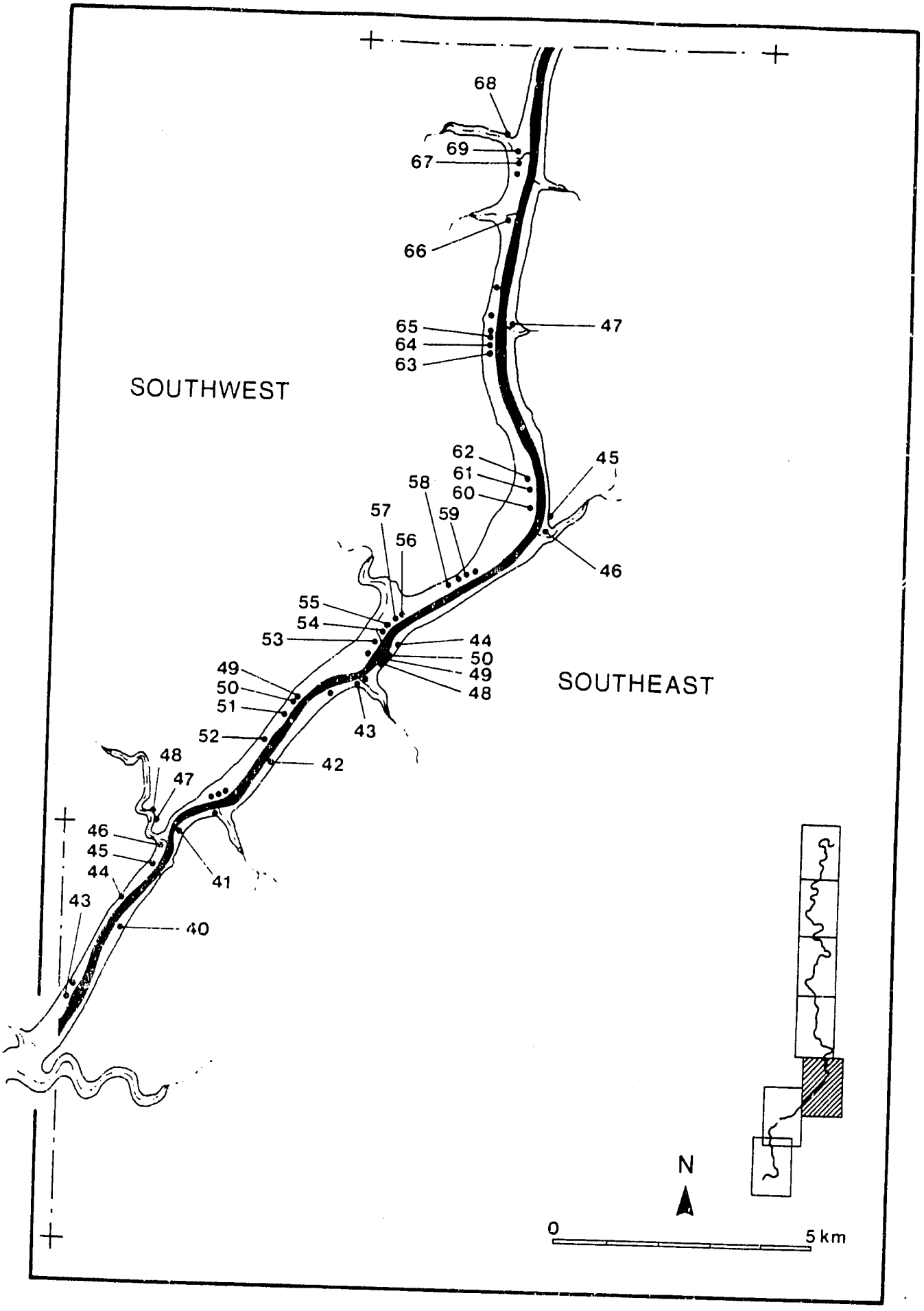
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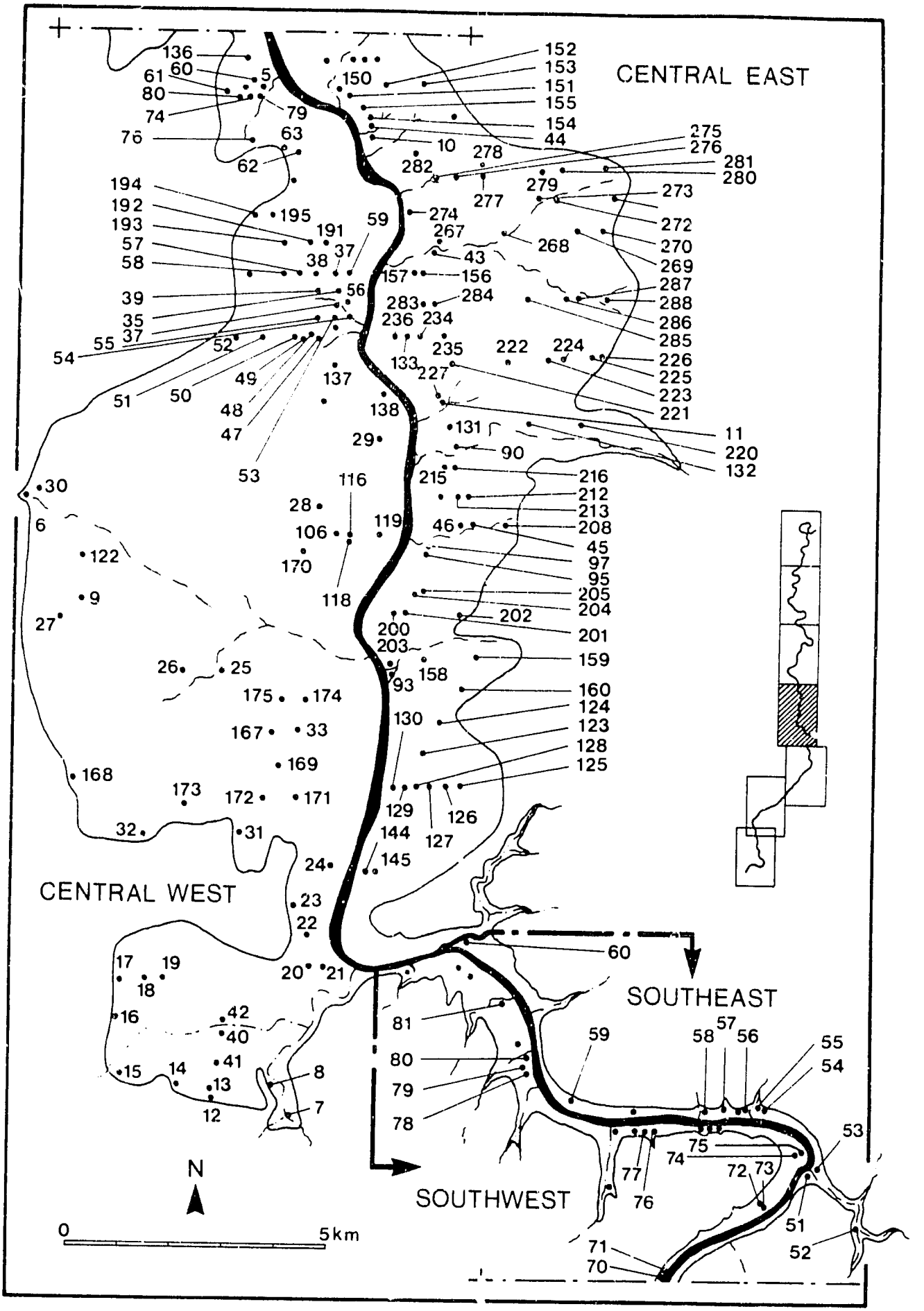
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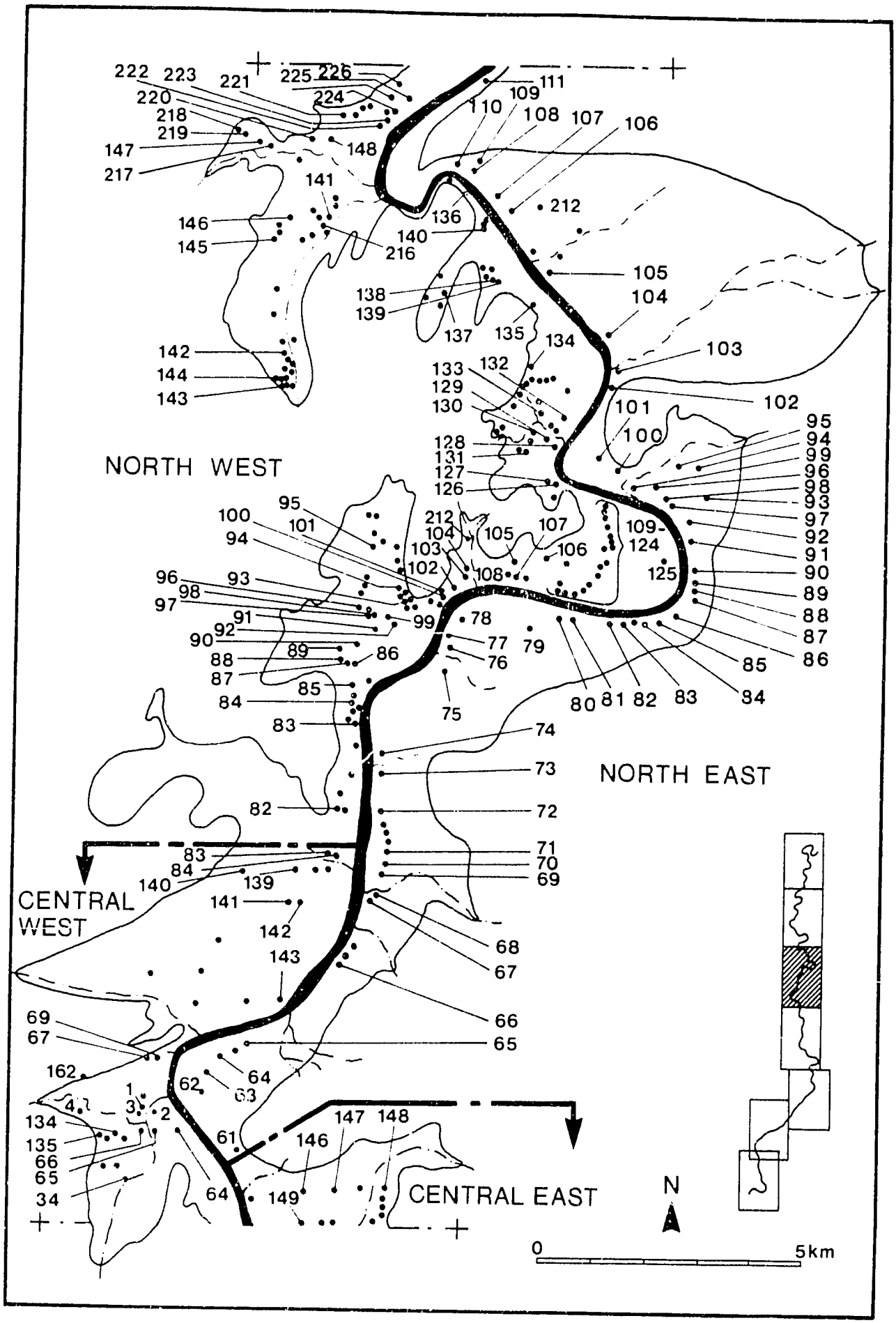
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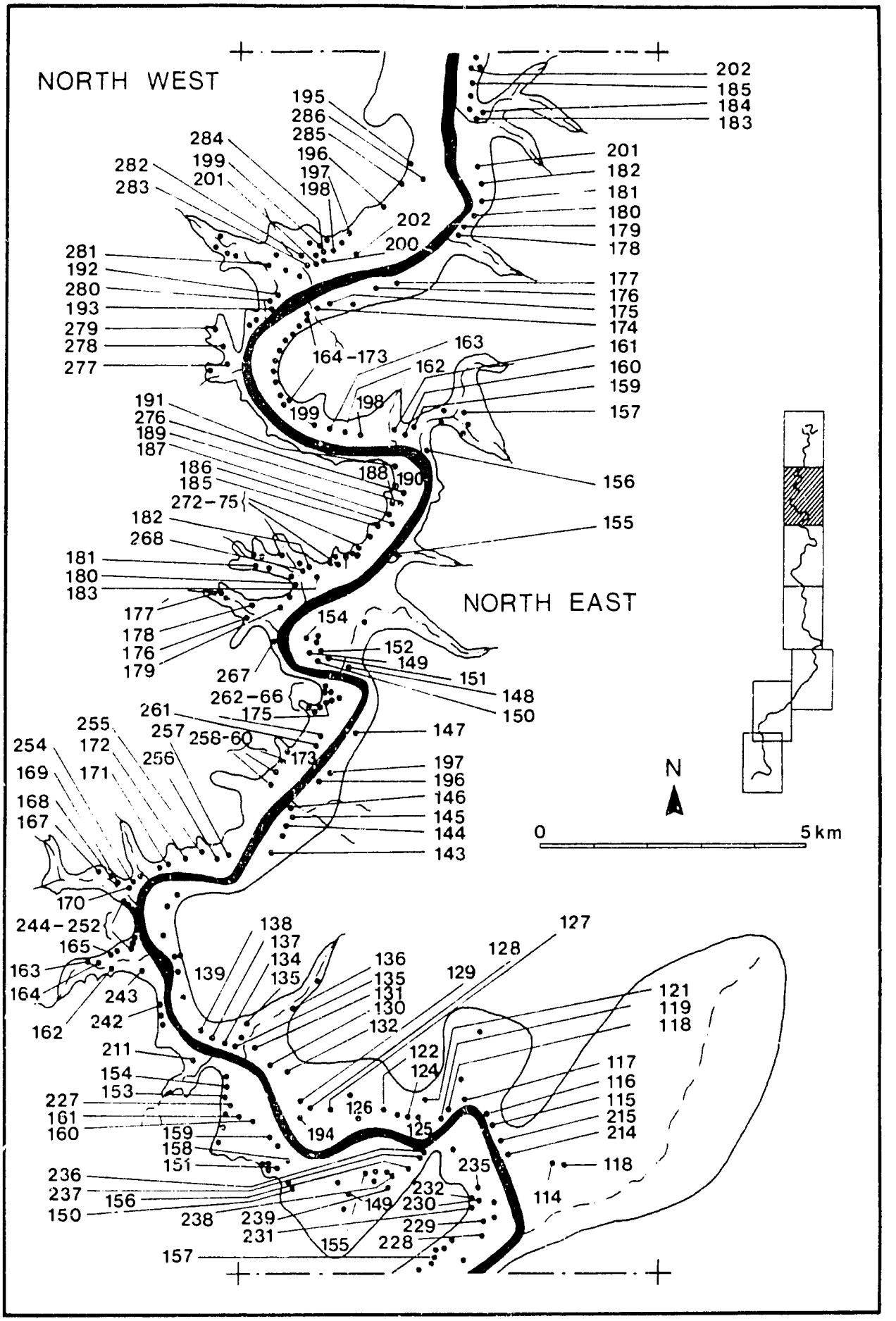
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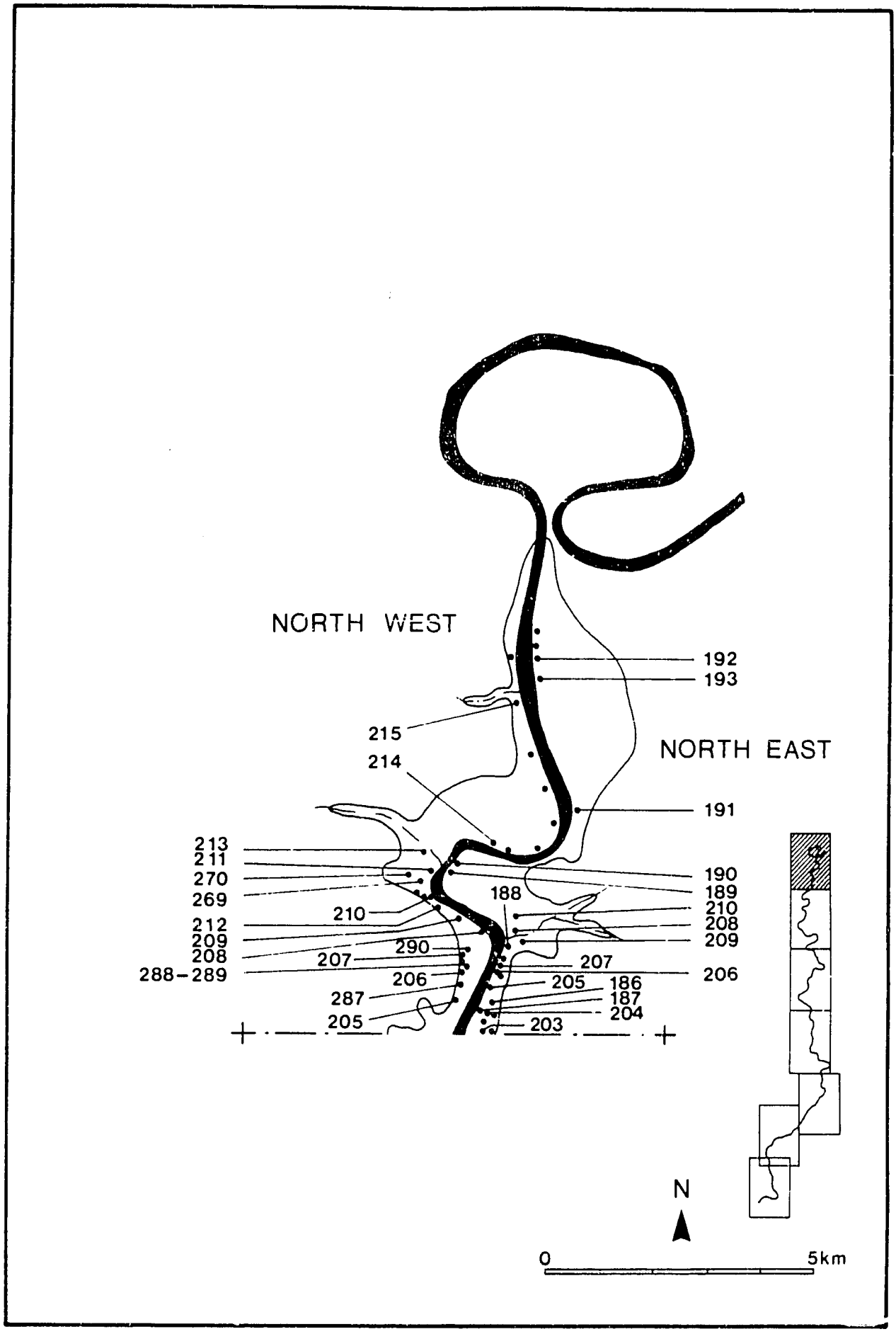
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IV. RESULTS

A. Overview

The Phase II survey recorded 686 archaeological sites, including the 2 sites discovered during the 1986 reconnaissance survey (Figure 6; Appendix C). Since most of the Central Section was only 5 percent sampled, and portions of the Northern Section were not surveyed, the total number of sites in the reservoir area is undoubtedly much higher.

The sites can be divided into 6 classes, each of which is described below. Table 1 presents the distribution of the sites by class and survey section.

Table 1. Distribution of Sites by Class and Survey Section*

	SW	SE	CW	CE	NW	NE	Total
Total Sites	81	60	98	83	209	155	686
Open-air lithic	45	31	87	59	99	73	394
(with no ceramics)	32	23	76	50	90	51	322
Open-air ceramic	13	8	15	19	19	26	100
(with no lithics)	0	0	4	10	10	4	18
Caves and Rock-shelters	15	8	0	0	0	0	23
Rock Art	3	7	0	0	0	1	11
Cairns	12	11	7	6	48	78	162
Cemeteries	25	21	12	12	66	59	195

*Many sites are composed of more than one class.

Site frequency is more meaningful when the site totals for each section are adjusted for the amount of area surveyed. Using estimates of 90 percent coverage for the Southern Section, 15 percent for the Central Section, and 50 percent for the Northern Section, the number of sites per 100 square kilometers can be computed as shown in Table 2.

Table 2. Sites per 100 km2 by Class and Survey Section

	Southern Section	Central Section	Northern Section
Area surveyed	55.6 km2	24.5 km2	83.3 km2
Open-air lithic	135	600	206
(with no ceramics)	97	518	169
Open-air ceramic	38	135	49
(with no lithics)	0	53	37
Caves and Rock-shelters	41	0	0
Rock Art	18	0	1
Cairns	38	53	151
Cemeteries	83	98	152
Total Sites	254	739	437

These data show a greater density of sites (particularly open-air artifact scatters) in the Central Section than in the Northern or Southern Sections. However, artifact occurrences were far more numerous in the Southern and Northern Sections, as shown below:

Number of Artifact Occurrences

Southwest	54
Southeast	38
Central West	16
Central East	6
Northwest	158
Northeast	37

If these artifact occurrences are added to the site totals, the differences moderate considerably, although site density still remains highest in the Central Section. The sum of sites and occurrences totals 388 per 100 square kilometers in the Southern Section, 837 per 100 square kilometers in the Central Section, and 758 per 100 square kilometers in the Northern Section. We initially hypothesized that the greater site density of the Central Section may not be an accurate indicator of relative intensity of land use, since Central Section sites appeared subjectively to be small with few artifacts. However,

as will be shown later, the size of artifact scatters in the Central Section is comparable or even larger than sites in the Northern or Southern Section.

Artifact frequencies are more difficult to compare due to different collection techniques employed. However, sites in the Central Section do appear to have fewer artifacts than those in the Northern and Southern Sections. Of the Central Section's surface artifact scatters, 55 (34 percent) were of such low density that they could be 100 percent collected. In sharp contrast, only 2 sites (0.6 percent) in the Northern and Southern Sections were completely collected. Thus, compared to the other sections, the Central Section has a much greater density of sites, some of which are large, but on average they contain fewer artifacts.

Caves, rock shelters, and rock art sites are almost entirely limited to the Southern Section. This is due largely to the geological nature of the landscape, as the Southern Section is composed of limestone gorge walls which are conducive to karstic activity. For reasons as yet unknown, the relative frequency of rock cairns increases substantially from south to north while the relative frequency of cemeteries increases only slightly.

The Phase II survey collected 12,798 stone artifacts and pottery sherds. The total sample of artifacts was sorted into technological and typological classes. Although the vast majority of stone artifacts was composed of lithic debris, the analysts did identify 1,437 shaped stone tools and 1,756 cores.

B. Open-Air Lithic Sites

As is the case with most regional surveys where the majority of sites date to the Stone Age, open-air lithic scatters are the most common class of site, occurring in every section of the reservoir. Occasionally ceramics, rock cairns, and cemeteries occur with the lithic scatters. However, it is likely that many, if not most, of the these site classes are not contemporary with the lithic scatters.

1. Stone Ages and Techno-Stages

Most of the 394 open-air lithic sites can be classified into 2 broad, technologically defined, and temporally delimited cultural stages, Middle Stone Age (MSA) and Later Stone Age (LSA). Technological criteria include the technique used to reduce a block of raw material to a tool and the type of tool produced. Using these and other subjective criteria, each was further subdivided into 3 techno-stages. As shown in Table 3, one, 2, or 3 techno-stages could be represented at a single site.

Table 3. Number of Open-Air Lithic Sites by Techo-Stage and Section

	SW	SE	CW	CE	NW	NE	ALL	%
Big MSA	1	2	2	3	10	6	24	6.1
Little MSA	3	5	10	3	34	9	64	16.2
Undif. MSA	4	1	14	16	20	14	69	17.5
Blade LSA	5	3	5	3	4	1	21	5.3
Micro LSA	1	3	6	3	1	4	18	4.6
Undif. LSA	2	2	10	3	1	0	18	4.6
Undif. Lithic	5	2	10	10	8	9	44	11.2
Big MSA/Little LSA	0	0	0	0	1	0	1	0.3
Big MSA/Blade LSA	0	0	1	1	0	2	4	1.0
Big MSA/Micro LSA	0	1	1	0	1	0	3	0.8
Big MSA/Undif. LSA	1	0	0	0	0	1	2	0.5
Little MSA/Blade LSA	6	0	11	5	5	8	35	8.9
Little MSA/Micro LSA	0	1	3	2	2	11	19	4.8
Little MSA/Undif. LSA	6	5	5	3	4	3	26	6.6
Undif. MSA/Blade LSA	3	0	4	0	4	0	11	2.8
Undif. MSA/Micro LSA	1	2	0	3	0	1	7	1.8
Undif. MSA/Undif. LSA	2	3	3	2	3	2	15	3.8
Blade LSA/Micro LSA	4	0	0	1	1	0	6	1.5
Big MSA/Blade LSA/ Micro LSA	3	0	0	0	0	0	3	0.8
Little MSA/Blade LSA/ Micro LSA	1	2	0	0	0	1	4	1.0
ALL	48	32	85	99	99	72	394	100

Big MSA

Big MSA techno-stage is characterized by the greater size of cores and tools and by a high percentage of tools (Table 4). The survey teams first recognized such large MSA assemblages while surveying the Northern Section. Several sites in the Central and Southern Sections were later identified during laboratory analysis of the artifacts as containing Big MSA assemblages.

Table 4. Comparison of Key MSA Techno-Stage Attributes

	Big MSA	Little MSA	Undifferentiated MSA
Total No. of Sites	24	64	69
Average Site Size (m2)	4,692	12,350	8,605
Tools			
Total	99	153	213
Per Site	4.13	2.39	3.09
Per 1,000m2 of Site Area	0.88	0.19	0.36
Levallois Cores			
Total	51	246	151
Per Site	2.13	3.84	2.19
Per 1,000m2	0.45	0.31	0.25
As % of Cores	58	72	56
Avg. Weight of Artifact	17.6 g	6.7 g	6.3 g

Twenty-four (6.1 percent) open-air lithic sites are represented solely by Big MSA assemblages. They also occur in conjunction with other techno-stages at 13 sites. Big MSA sites are most common in the Northern Section, occurring in 21 (12.3 percent) of the open-air lithic sites. In contrast, only 8 open-air lithic sites in the Southern Section (10 percent) and 8 sites (5.6 percent) in the Central Section encompass Big MSA assemblages (Table 5). At present, it is unclear what, if any, correlation this techno-stage may have with such variables as time, site function, or availability of raw material.

Table 5. Distribution of Sites with MSA Assemblages

	Southern Section		Central Section		Northern Section	
	n	%*	n	%*	n	%*
Big MSA	8	10	8	6	21	12
Little MSA	29	36	42	29	78	46
Undif. MSA	16	20	42	29	44	26
All MSA	53	66	92	64	142	83

*percent of open-air lithic sites in Section.

Little MSA

The relatively small size of artifacts (particularly cores), the high percentage of Levallois cores, and a low number of tools are characteristic features of the Little MSA techno-stage (Table 4). This techno-stage was recognized in the field, but only formally defined during analysis. The tool-per-site count equals half that of Big MSA. Furthermore, when the greater size of Little MSA sites is taken into account, the tool count (per standard unit of size) is less than one quarter that for Big MSA. The absolute number of Levallois cores is much higher in Little MSA sites than Big MSA sites. The per site number of Little MSA artifacts is nearly twice that of Big MSA. However, the number of artifacts by standard unit of area is less in Little MSA than Big MSA sites (Table 4). Unfortunately, variable collecting strategies diminish the reliability of artifact counts as a reliable characteristic of the techno-stages. The most reliable variable appears to be size as reflected in the average artifact weight. As Table 4 reveals, there is a major difference in number of tools and weight of artifacts between Big MSA and Little MSA sites.

Little MSA is the only techno-stage represented in 64 (16 percent) of the open-air lithic sites. It occurs in conjunction with other techno-stages in 85 sites. Thus, Little MSA occurs in 38 percent of all open-air lithic sites within the reservoir area. This techno-stage is most common in the Northern Section where it occurs in 78 (46 percent) of the sites. Little MSA occurs in 29 (36 percent) sites in the Southern Section, and 42 (29 percent) sites in the Central Section.

Undifferentiated MSA

Many of the sites in the reservoir area contained Levallois cores and other tools which did not exhibit Big MSA or Little MSA characteristics, but fell somewhere in the middle (Table 4). Such assemblages were classed as Undifferentiated MSA. Undifferentiated MSA is the only techno-stage present at 69 sites. It occurs in conjunction with other techno-stages in 102 sites. This stage occurs in 16 (20 percent) sites in the Southern Section, 42 (29 percent) sites in the Central Section, and 44 (26 percent) sites in the Northern Section.

Backed blades, geometric microliths, and small blade cores are the characteristic artifacts of the LSA. Two subsets of the LSA can be distinguished based on the relative size of the backed blades. Assemblages containing microliths less than 1.0 centimeters in width are classed as "Micro LSA," while those with microlith 1.0 centimeters or greater in width are termed "Blade LSA." Undifferentiated LSA includes those assemblages containing only blade cores or other nondistinctive LSA artifacts.

LSA sites occur with the greatest frequency in the Southern Section, where 70 percent of the open-air lithic sites contain one or more of the LSA techno-stages (Table 6). The relative frequency of LSA sites decreases significantly in the Central and Northern Sections.

Table 6. Distribution of Sites with LSA Assemblages

	Southern Section		Central Section		Northern Section	
	n	%*	n	%*	n	%*
Blade LSA	27	34	29	20	24	14
Micro LSA	19	24	19	13	22	13
Undif. LSA	21	26		18	14	8
All LSA	56	70	73	51	46	27*

*percent of open-air lithic sites in Section.

2. Artifact Assemblage Composition and Condition

Appendix D1 presents a complete listing, by site, of assemblage condition and raw material composition. Appendix D2 divides the artifacts into specific classes, and Appendix D3 provides a list of tool and core types for each site. Appendix D4 presents counts of tools and cores by techno-stages. Table 7 displays the 80 specific-shaped stone tool and core types condensed into 25 broader typological categories for sites identified to one specific techno-stage component. The artifacts listed in Table 7 constitute 59 percent of tools and cores recovered from all sites and provide a summary statement of the core and tool types associated with each techno-stage.

The survey teams found relatively few bifacial, unifacial, parti-bifacial, and distally retouched points in the reservoir area (Figure 7). Points comprise 3 percent of the shaped stone tools and are limited exclusively to MSA sites. They are most numerous in Big MSA assemblages and least numerous at Undifferentiated MSA sites.

Side scrapers (Figure 7) are the most common category of shaped tool, accounting for 24 percent of the total sample. Side scrapers comprise between 26 and 40 percent of the tools from MSA sites and 7 to 13 percent of shaped tools at LSA sites. Big MSA assemblages contain a much higher percentage of side scrapers compared to Little MSA or Undifferentiated MSA assemblages.

End scrapers (Figure 8) occur in both MSA and LSA assemblages but are more frequent in the LSA, especially the Blade LSA, where they comprise 13 percent of all tools. Few patterns are readily apparent in the frequency of other scraper types (Figures 7 and 8). However, transverse and circular scrapers are found in higher frequencies at MSA sites, whereas steep scrapers are more common in LSA assemblages.

Burins (Figure 9) are present in higher frequencies at LSA sites, although none are associated with Blade LSA sites. "Perforators," a category which includes both becs and perforators (Figure 9), are the second most common shaped tool, comprising 12 percent of all shaped tools from the reservoir. They are particularly abundant at Undifferentiated LSA sites, where they constitute 30 percent of all tools, more than twice the percentage of any other tool type. "Platformed gravers" (Figure 9), a new tool type first identified during this survey, are found in both MSA and LSA assemblages.

Although a few rare backed blades are present in MSA assemblages, the vast majority of microliths (Figure 10) are restricted to LSA sites, where they form more than 30 percent of all shaped tools. Geometric microliths (crescents, triangles,

TABLE 7. TOOLS AND CORE CATGORIES BY TECHNO-STAGE*
*using sites with only one techno-stage component

Tools	Big MSA		Little MSA		Undiff. MSA		Blade LSA		Micro LSA		Undiff. LSA		Undiff.		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	N
Points	10	4	6	4	7	3							3	2	26
Side Scrapers	40	40	39	26	70	28	9	13	10	15	11	13	25	20	204
End Scrapers	5	5	6	4	22	9	9	13	5	7	6	7	9	7	62
End & Side Scrapers	3	3	6	4	12	5			2	3	1	1	5	4	29
Transverse Scrap.	3	3	10	7	12	5			1	1	4	5	6	5	36
Inverse Scrap.			6	4	4	2	1	1			1	1	1	1	13
Circular Scrap.	2	2	13	8	13	5	1	1	1	1	4	5	5	4	39
Steep Scrap.	1	1	6	4	20	8	4	6	6	9	4	5	15	12	56
Scraper Frags.	2	2	6	4	6	3	3	5			1	1	7	6	25
Burins	1	1	5	4	1	0.4			8	12	4	5	2	2	21
Perforators	6	6	17	11	30	12	4	6	4	6	25	30	15	12	101
Backed Blades	2	2	10	7	9	4	23	34	21	31	7	9	6	5	78
Truncated Blades			1	1					2	3					3
Cresents							7	10	2	3	2	2			11
Outil esquille			2	1	2	1	3	5	2	3	3	4	2		14
Composite tool	6	8	11	7	19	8	3	5			4	5	18	2	63
Platformed graver	1	1			3	1			1	1	1	1	1	14	7
Misc. Frags.	17	17	7	5	12	6	1	1	2	3	3	4	6	1	48
TOTAL	101	-	151	-	245	-	68	-	67	-	82	-	127	5	841
Cores															
Blade	9	10	25	7	29	11	41	46	31	63	17	27	17	23	169
Flake	11	13	31	9	50	18	10	11	8	16	20	32	30	40	160
Multiple plat.	7	8	19	6	23	8	16	18	5	10	13	21	8	11	91
Bipolar			2	1											2
Levallois	51	58	246	72	151	56	8	9	4	8	10	13	5	7	475
Discoid	1	1	6	2	4	1	1	1					4	5	16
Frags.	9	10	13	4	15	6	13	15	1	2	3	3	10	14	64
TOTAL	88	-	342	-	272	-	89	-	49	-	63	-	74	-	977

Renderings of Lithic Specimens Collected in Survey Area

FIGURE 7. Points and Scrapers.

A. bifacial point (NW 150)
B. bifacial point (NW 111)
C. bifacial point (NW 153)
D. bifacial point (SW 29)
E. unifacial Levallois point (SW 7)
F. side scraper (NW 112)
G. side scraper (NE 104)
H. convergent scraper (NW 141)
I. convergent scraper (CW 79)

FIGURE 8. Scrapers.

A. end and side scraper (CW 30)
B. end and side scraper (CW 114)
C. end and side scraper (CW 6)
D. denticulate scraper (SW 53)
E. side scraper with burin (SW 54)
F. side scraper with multiple burin (SW 67)
G. double side scraper and perforator (CE 101)
H. transverse scraper (NE 114)
I. circular scraper (NW 111)
J. end scraper (NE 118)
K. end scraper (NE 181)

FIGURE 9. Gravers, Perforators and Burins.

A. platformed graver (CW 114)
B. platformed graver (CW 175)
C. perforator (SW 4)
D. perforator (NW 143)
E. burin on double backed blade (SW 45)
F. burin (CW 104)
G. burin (NE 90)

FIGURE 10. Backed Blades, Microliths and Unshaped Tools.

A. large crescent (CE 149)
B. crescent (CE 149)
C. crescent (SW 19)
D. triangle (NE 143)
E. triangle (NW 125)
F. curved backed blade (NE 120)
G. curved backed blade (NE 131)
H. curved backed blade (NW 125)
I. straight backed blade (SW 69)
J. straight backed blade (SW 53)
K. straight backed blade (NW 125)
L. double straight backed blade (NW 125)
M. partially backed blade (NW 125)
N. unshaped tool (NW 125)
O. unshaped tool (NW 125)

FIGURE 11. Levallois/Discoidal Cores and Flakes.

A. Levallois core (NW 140)
B. Levallois core (CW 8)
C. Levallois core (NW 160)
D. Discoidal core (NE 129)
E. Levallois core (NE 141)
F. Levallois flake (NW 201)
G. Levallois point (NE 175)

FIGURE 12. Cores and Blades.

A. multiple platform core (SE 51)
B. double platform core (NW 125)
C. opposed platform blade core (NW 125)
D. pyramidal blade core (NW 195)
E. single platform blade core (NE 114)
F. opposed platform blade core (NW 128)
G-I. blades (NW 125)

Figure 7. Points and Scrapers

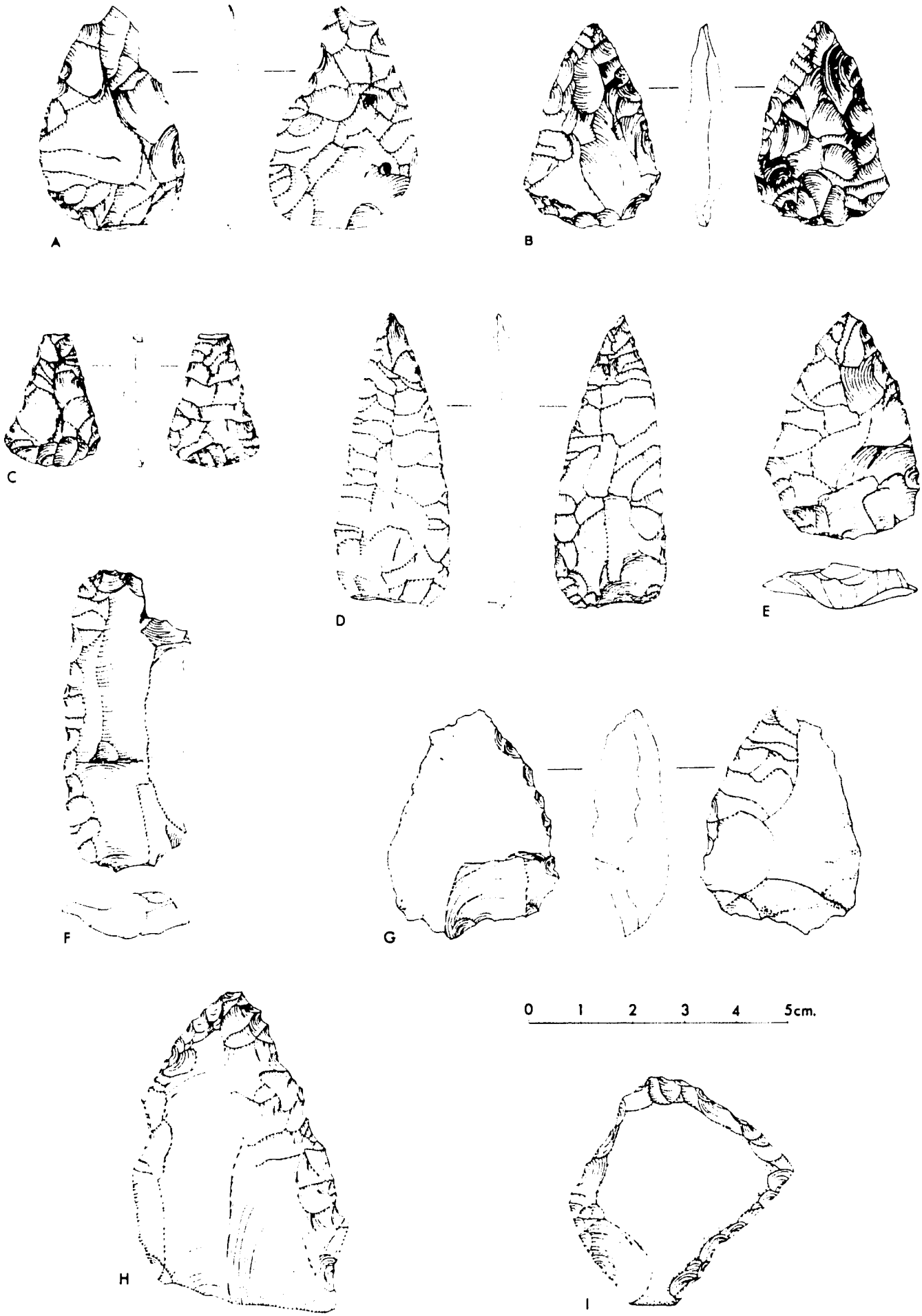


Figure 8. Scrapers

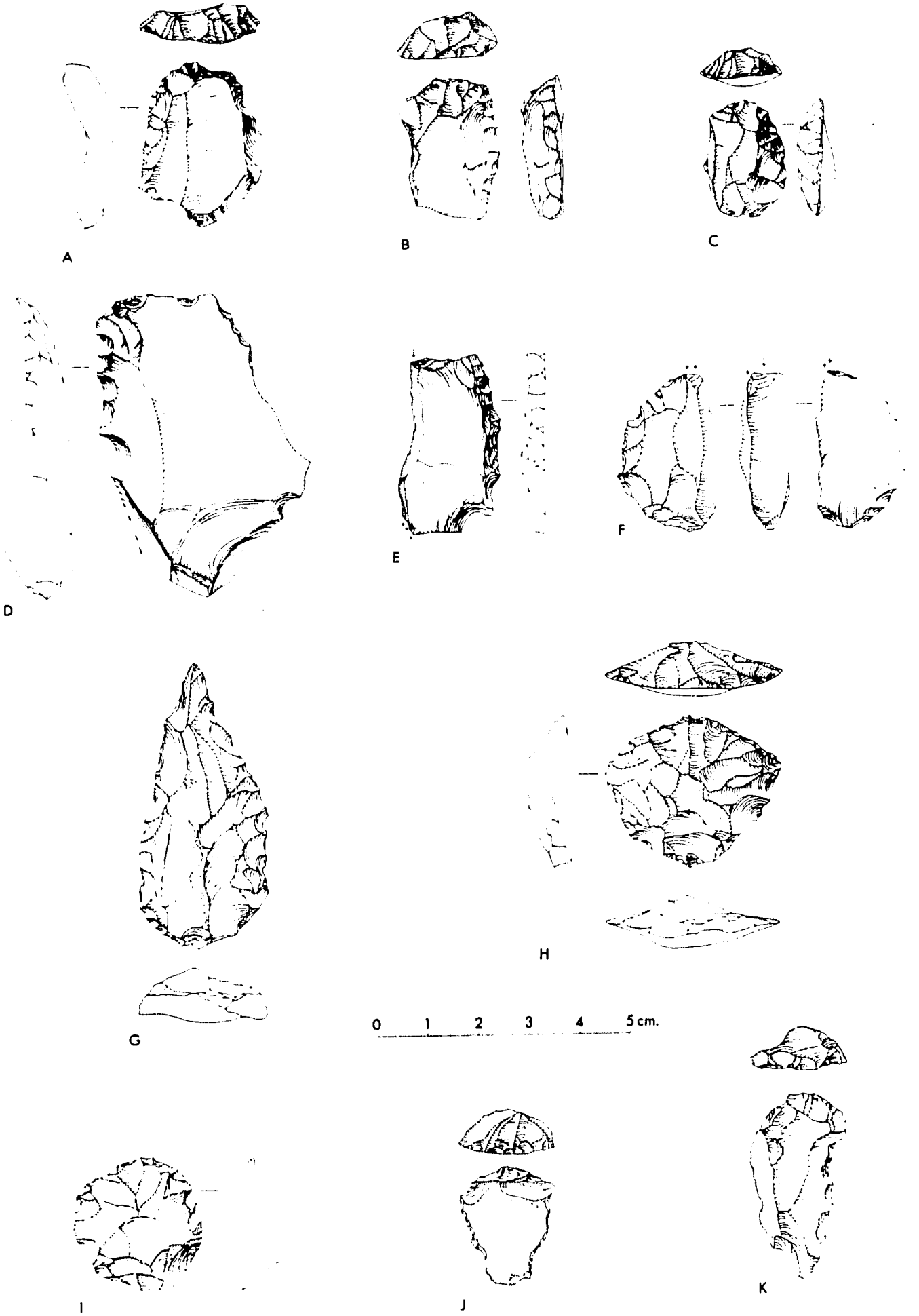


Figure 9. Gravers, Perforators and Burins

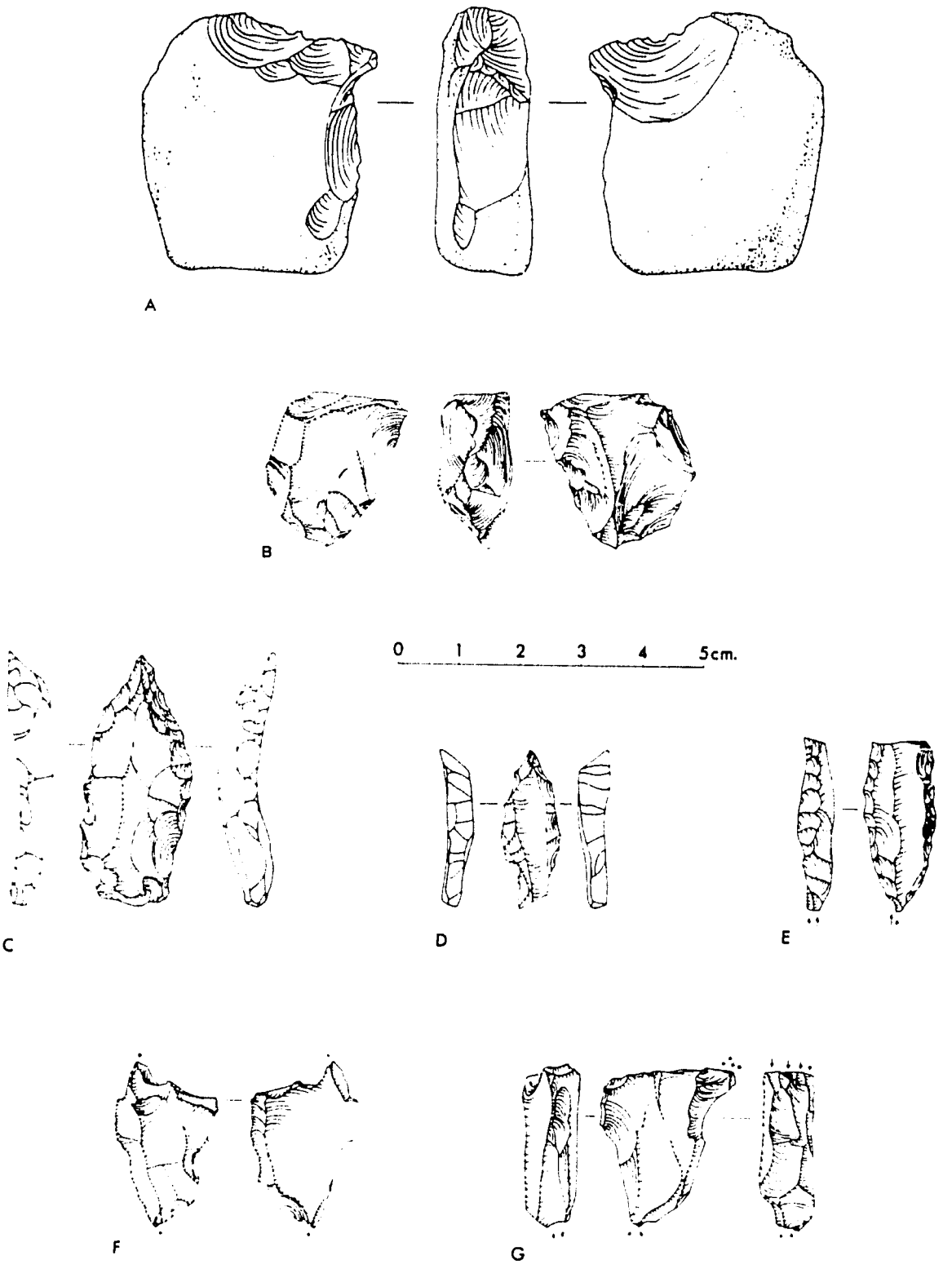


Figure 10. Backed Blades, Microliths and Unshaped Tools

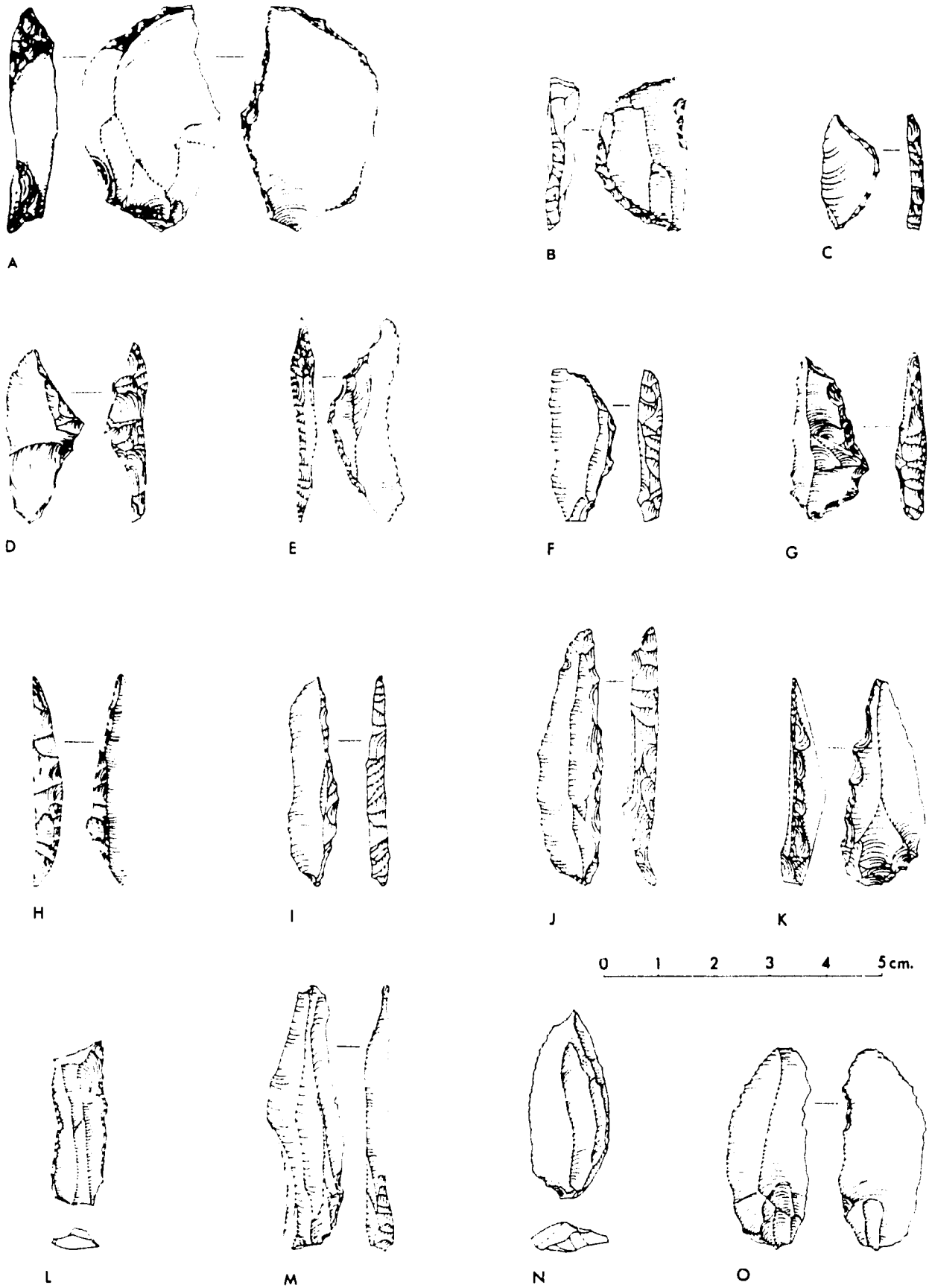


Figure 11. Levallois/Discoidal Cores and Flakes

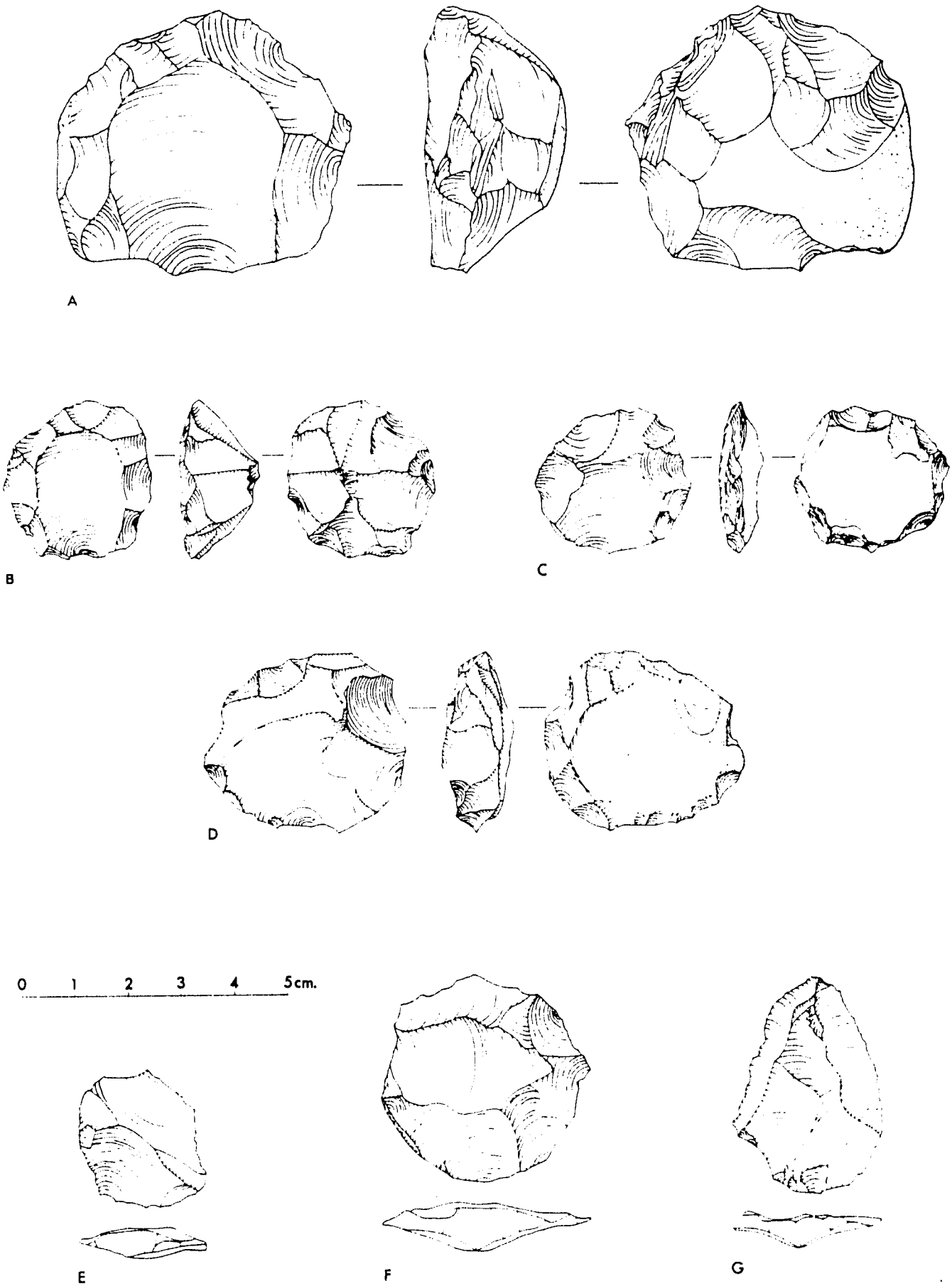
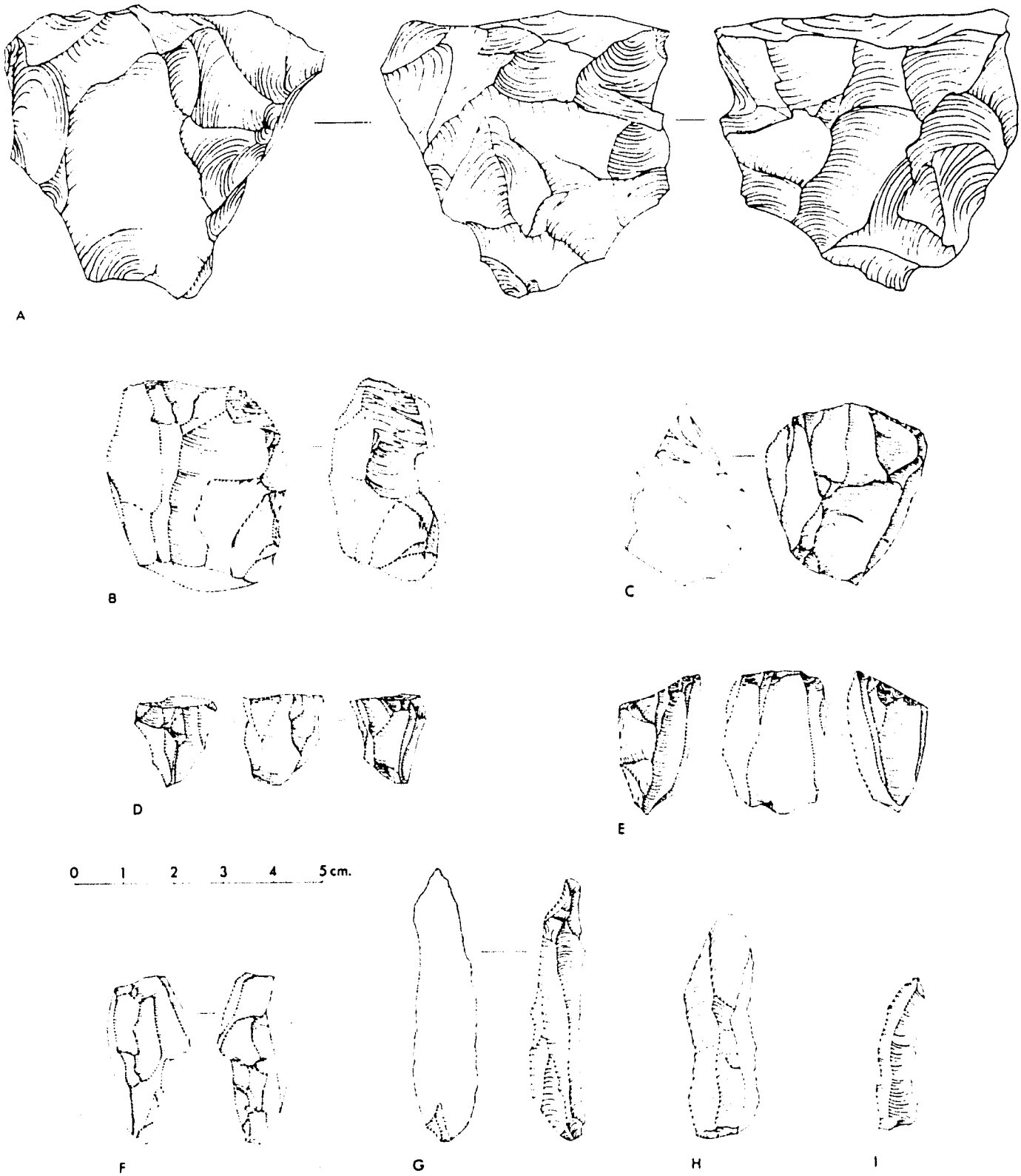


Figure 12. Cores and Blades



and trapezes) are found exclusively at LSA sites, but in small frequencies. Outils esquilles occur in MSA and LSA assemblages, but are more frequent in the latter. Composite tools, on the other hand, are more common at MSA sites. Figure 10 also illustrates 2 unshaped tools (modified and "utilized" artifacts), a category recovered from most sites.

Not surprisingly, Levallois cores (Figure 11) constitute the highest frequency of core types at MSA sites. This is especially true of Little MSA sites, where they comprise 72 percent of all cores. Discoidal cores (Figure 11) occur in low numbers and are restricted almost entirely to MSA assemblages. Blade cores (Figure 12) also occur in low frequencies at some MSA sites (7 to 11 percent) but constitute the dominant core type at LSA sites.

Table 8 summarizes the physical condition of assemblages by techno-stage. The bulk of artifact abrasion probably results from trampling by domestic stock. However, on the whole, most assemblages, especially those recovered in the Southern Section, are not heavily abraded and have probably not been subjected to redeposition or other disturbances. Only 7 to 13 percent of the MSA assemblages and 4 to 5 percent of LSA assemblages were judged to be heavily abraded.

MSA assemblages are more heavily patinated than LSA sites, possibly indicating that they have been exposed on the surface for greater lengths of time, producing a thicker, heavier patina.

Chert is the predominant raw material throughout the reservoir, accounting for almost 94 percent of all lithics (Table 9). Raw material use is very consistent, with the greatest variation occurring in the Southeastern section, where quartz is a relatively high 9.1 percent of all stone artifacts. Other materials include basalt, limestone, and siltstone. Although it was noted in the field and in the laboratory that chert came in many colors and several textures, the latter 2 variables occur as gradients, making chert difficult to differentiate. The 4 color categories utilized in the analysis, and presented in Table 8, are very generalized and thus not very informative.

The vast majority of chert utilized in the reservoir area was derived from rounded pebbles and cobbles. Several pebble/cobble beds that were extensively utilized as raw material sources were noted in the Northern Section. These beds, which are several hundred meters long, contain chert and quartz cobbles, both of which were utilized. Two chert sources, in and adjacent to a large tog in the southern part of the Central Section, were also noted.

Table 8. Condition and Dominant Chert Type of Assemblages by Techno-Stage

	Big MSA (n=28)	Little MSA (n=73)	Undif. MSA (n=70)	Blade MSA (n=26)	Micro LSA (n=26)	Undif. LSA (n=20)	Undif. LSA (n=21)
Abrasion							
None	0	0	0	4	0	0	0
Light	50	48	36	70	65	35	50
Medium	43	45	51	23	15	60	38
Heavy	7	7	13	4	4	5	12
Amount Patination							
0-25%	43	42	29	31	59	6	33
26-50%	18	22	25	42	32	31	33
51-75%	18	26	31	19	4	31	12
76-100%	21	10	14	8	4	31	16
Degree Patination							
Light	54	40	27	62	68	26	42
Moderate	31	45	52	34	32	63	40
Heavy	15	15	21	4	0	11	17
Dominant Chert Type							
Undiff.	75	54	69	79	75	56	62
Light	12	45	28	21	25	44	36
Finebrown	12	1					2
Brown			3				

Table 9. Raw Material Use By Section

	Chert		Quartz		Other		Total	
	n	%	n	%	n	%	n	%
SW	2002	93.1	113	5.3	36	1.6	2151	100
SE	1193	88.0	124	9.1	39	2.9	1356	100
CW	2650	94.9	126	4.5	16	0.6	2792	100
CE	1623	94.9	81	4.7	6	0.4	1710	100
NW	1548	94.7	78	4.8	9	0.5	1635	100
NE	1320	95.5	58	4.2	4	0.3	1382	100
TOTAL	10,336	93.7	580	5.3	110	1.0	11,026	

3. Spatial Variability

In addition to observing variability in the artifact composition of assemblages, there was considerable variability in factors related to the spatial distribution of sites at the micro- to macro-regional scale, e.g., site size, artifact density, soil type and color, landforms, distance to water, etc. In this section, the spatial variability of open-air lithic sites will be described in brief. Then an examination of 2 of these factors (artifact density and distance to nearest water source) will illustrate ways in which the survey data can provide more detailed future analyses.

Open-air lithic sites were distributed over all landform types surveyed (Table 10). The geomorphology of the river valley is not well-known and it is not known what some of the landforms, such as "terraces," "hillslopes," and "foot of hills," represent geologically. Hillslopes were identified as talus slopes composed of boulders with some soil. Foot of hills represented the intersection of the talus slope with a terrace or other alluvial formation, and were composed of soil with some rock. Terraces were level to gently sloping formations composed, at least in the southern sections, of alluvial sediments.

Throughout the Southern Section, sites occur most frequently where the rocky scree of the talus slope ends and alluvial/colluvial soils begin (Figure 13). The preponderance of sites on these landforms could be a result of other site locations having been scoured away or buried by alluvial forces. Another aspect

FIGURE 13. Typical Open-Air Lithic Site

of site location in the Southern Section, particularly evident on the western side, is that sites tend to occur adjacent to and most often on the south side of togga.

In the Central Section, 131 sites (90 percent of all sites) are located on the flat plains. While most of these sites occur within 2 kilometers of the river, some are located as far as 7.5 kilometers away, at the very edge of the project area. In the Southern Section, the vast majority of open-air lithic sites occur on hill slopes and foot of hills. On the western side, the sites sometimes extend onto or are entirely confined to "terraces" that adjoin the hill slopes.

Table 10. Distribution of Open-Air Lithic Sites by Landform

Landform (code*)	SW	SE	CW	CE	NW	NE	TOTAL	%
Hill Top (1)		1	1	1	2	2	7	1.8
Hill Slope (2)	28	20	9	2	25	26	110	27.9
Foot of Hill (3)	10	9	1		17	3	40	10.2
Terrace (7 or 9)	7		1		44	26	78	19.8
Plains (4)			75	56	10	15	156	39.6
Bottoms (8)		1				1	2	0.5
Levee (5 or 6)					1		1	0.2
Total	45	31	87	59	99	73	394	100.0

*last digit of value coded for "Topography" in Appendix B1

The greatest variability in site location and associated landform is in the Northern Section (Table 10). The number of sites on terraces, bottoms, and levees increases substantially in this section, and with only one exception all sites immediately adjacent to the river occur in the Northern Section. In the broad tog valleys of the north sites occur up to 5 kilometers from the river.

The size of open-air lithic sites varies tremendously in all sections and with all techno-stages (Tables 11 and 12). Sites situated on the western side of the Southern Section average 3.7 times larger than those on the eastern side. A similar ratio is

observed in the Central Section, where western sites are 4.7 times larger than those in the east. However, in the Northern Section, eastern sites averaged nearly twice the size of sites on the western side. Furthermore, the hypothesis that sites in the relatively narrow, constricted Southern Section should be smaller than those in the expansive Central and Northern Sections is apparently not supported by the data (Table 11).

Table 11. Size of Open-Air Lithic Sites by Section

	SW	SE	CW	CE	NW	NE	Total
N	48	32	85	58	99	72	394
Min.	12	6	1	1	1	100	1
Max.	128,000	9,000	180,000	44,800	134,400	100,000	180,000
Mean	4,631	1,262	16,175	3,414	3,758	6,123	5,909
S.D.	16,047	1,748	29,561	8,906	12,383	16,211	16,995

The average size of all MSA sites is very similar to that of all LSA sites (Table 12). Although mean site size differs greatly between the subdivisions of the MSA and LSA, the reason(s) for these differences is not readily apparent. While mean size of MSA and LSA sites is similar, the maximum site size varies considerably, with the largest MSA site being about 3 times the size of the largest LSA site (134,400 square meters vs. 44,800 square meters). The largest site encountered is a multi-component site in the west Central Section that is 180,000 square meters (18 hectares).

Table 12. Size of Open-Air Lithic Sites by Techo-Stage

	All MSA	All LSA	Big MSA	Little MSA	Blade LSA	Micro LSA
N	262	63	24	64	21	18
Min.	1	12	4	4	16	48
Max.	134,400	44,800	27,000	134,400	44,800	22,500
Mean	7,565	7,468	4,692	12,350	10,217	5,562
S.D.	16,096	10,441	5,946	23,804	11,863	5,817

C. Site Distribution in the Central Section: A Case Study

The following study is a linear regression analysis of site spatial patterning in the Central Section. Various authors (e.g., Ambrose 1984; Brandt in press; Dyson-Hudson and Smith 1978) have hypothesized that Stone Age settlement patterns were governed largely by the predictability and density of natural resources such as water, wild edible plants, and animals. In this pilot study, site location and occupation density (the latter of which is measured by artifact density) is examined in relation to distance to water, in this case either the Jubba River or a tog.

The archaeological survey of the broad, flat Central Section, which is dissected by 26 major togga, produced 280 sites, using a systematic and stratified sampling scheme. Of these, 87 are Stone Age sites for which a standardized density sample was taken. The density sample, a 3-meter diameter circle from which surveyors collected all artifacts, allows cross-site comparison of artifact density. For purposes of this pilot study, artifact density was assumed to reflect the intensity and duration of occupation, although other factors are undoubtedly also involved. The distance of a site from the nearest water source (H_2ODIST) is the independent variable, while the number of lithics found in a density sample (NLITH) is the dependent variable (Appendix E, Table 1).

The mean distance of sites to water is 389 meters, while the median distance is 250 meters (Appendix E, Table 2). The Kurtosis index for the distribution of H_2ODIST is 2.85, indicating a leptokurtic (or peaked) curve caused by an excessively large number of cases clustered about the mean. H_2ODIST has a Skewness index of 1.81, which is positively skewed (i.e., to the right). This indicates that most distances are less than 389 meters, and that outlying values are affecting the mean. The unevenness of the distribution is also reflected in the exceptionally large coefficient of variation.

The density samples also vary dramatically, with a mean number of lithic artifacts of 13.7, and a median of 10. The 1,191 lithics from all density samples produce a highly leptokurtic curve, with a Kurtosis index of 32.3. A Skewness index of 4.78 exists, again describing a positively skewed distribution with outliers exerting a pull of the mean above the median. A high coefficient of variation exists for NLITH as well.

NLITH and H_2ODIST were subjected to a simple linear regression using the Statistical Analysis System (SAS) microcomputer program and the complete data set of 87 sites. The authors hoped the results would confirm any existing relationship

between the variables, and indicate the statistical strength of the relationship. The estimate of the relationship is:

lithics=15,016+(-0.0034)*(the distance to water)+Ei R2=0.015
1.8936 0.0029

Results indicate that the level of explanation with this estimate is very low (Appendix E, Table 3). Only 1.5 percent of the variation in artifact density can be explained by variation in the distance of sites from the nearest water source. A "t test" of the parameters of the estimated relationship rejects a null hypothesis of a good estimate and shows distance to water to be a poor predictor of site density (Beta does not differ significantly from zero). To check the regression analysis we examined the residuals (differences of actual lithic numbers with those predicted with the estimation). The residuals were mapped at their respective sites to check for a spatial autocorrelation (systematic error by space). Virtually none exists. However, there are twice as many overestimations as underestimations for numbers of lithics. This means that the underestimations (greater numbers of lithics) are exerting a greater pull per site on the regression line (i.e., there are a few very large positive residuals). We see the beginnings of this in examining the measures of central tendency above.

Appendix E, Figure 1 shows the linear relationship predicted in the linear model. A Durbin-Watson test shows no autocorrelation of the residuals with respect to water distance in this model. However, a look at the actual values plotted shows an absence of linearity, or for that matter, any relationship (Appendix E, Figure 2). Thus, to summarize the regression procedure, occupation density does not appear functionally dependent on distance to water.

The negative results of the regression analysis may be explained by a variety of phenomena. First, it is conceivable that the uncharacteristic outlying values of NLITH are obstructing a possible linearity. However, when the one value of 0 lithics and the one value of 115 (more than twice the next largest value) are removed, only 0.6 percent of the variance in site density can be attributed to distance to water. If a non-linear relationship was present, a logarithmic transformation of the data should be considered. Yet an examination of the plotted data shows no signs of this. Therefore, the overwhelming unanimity of the quantitative tests is that no simple relationship exists.

Since the sites used in this study date typologically to the MSA and LSA, and may therefore span more than 100,000 years of time, it is possible that:

- all prehistoric water sources may simply not be observable today; or, conversely,

- present-day water sources were prehistorically not present; or

- the ecosystems may have changed dramatically over time.

Gasse et al. (1980) and Van Campo et al. (1982) note that late Quaternary paleoenvironments of the Horn have fluctuated markedly, with periods of aridity followed by phases of increased humidity. This could have affected markedly when and where Stone Age peoples camped near fluvial regimes.

Furthermore, specific site ages are lacking, since only about 10 percent of the Central Section has been surveyed. Thus, the sample may be inadequate for making sound inferences about spatial relationships. Finally, we have examined only one independent variable, the distance to water. Most likely there is a complex combination of variables working together to influence prehistoric settlement patterns along the upper Jubba River basin. Distance to water source may have been relatively unimportant to the prehistoric inhabitants of the upper Jubba Valley.

In conclusion, the simple linear regression performed here has failed to confirm an hypothesized relationship between artifact density and site distance from water. Nevertheless, this initial pilot study of the Central Section does demonstrate how data generated by the archaeological survey can be explored further in an attempt to gain a better understanding of prehistoric human settlement strategies in the upper Jubba River basin. Additional studies and interpretations of the spatial distribution of open-air lithic sites, as well as other types of sites in the basin, must await detailed analyses of other key variables.

D. Open-Air Ceramic Sites

The archaeological survey also resulted in the discovery of 1,772 sherds from 100 open-air sites (Table 13). The frequency of ceramic-bearing sites increases from south to north, with the lowest number of sites in the Southeast Section (9) and the highest in the Northeast (43). Twenty sites are represented exclusively by pottery scatters, while the remaining sites also contain either MSA (at 31 sites), MSA and LSA (20), LSA (13), or undefined (16) lithic components. In addition to lithics, 25 pottery sites are associated with stone cairns and/or Islamic graves.

Table 13. Distribution and Makeup of Pottery Sites by Section

	SW	SE	CW	CE	NW	NE	TOTAL
# Sites	16	9	15	17	20	23	100
# Potsherds	87	41	484	555	232	373	1772
Avg. sherds/site	5.4	4.6	32.3	32.6	11.6	16.2	
Total weight	307	202	1691	-	1329	1793	
Avg. wt/sherd	3.5	4.9	3.5	-	5.7	4.8	
Sherd Type (N)							
Decorated body	44	26	175	264	108	165	782
Decorated rim	9	5	44	45	33	46	182
Plain rim/handle	1	1	11	13	6	4	36
Plain body	33	9	254	233	76	156	761
Imported	-	-	-	-	9	2	11
# Sites with Other Components							
MSA	6	3	4	3	6	9	31
MSA/LSA	3	4	2	5	2	4	20
LSA	3	1	2	3	2	2	13
Unspecified	4	1	1	4	2	4	16
Pottery only	-	-	5	3	8	4	20
Cairns/graves	7	2	1	1	4	10	25

While the Northern Section has the most ceramic sites, Central sites have the most potsherds, accounting for 57 percent of all sherds recovered (Appendix F1). However, the Central sherds are the smallest by weight, averaging less than 4 grams per sherd. The majority of the pottery is decorated body sherds (44 percent), followed closely by plain body sherds (43 percent). Decorated and plain rim sherds account for 12 percent of the sample, while imported non-earthenware (and probably modern) ceramics form less than one percent of the sample and are restricted to the Northern Section.

The age of the Jubba pottery has been difficult to establish, due to the lack of a prehistoric pottery chronology for Somalia. Recent excavations at Gogoshiis Qabe rockshelter, Buur Heybe (Brandt 1986b in press) have yielded the only systematically analyzed prehistoric pottery from Somalia. However, the Gogoshiis Qabe sample, which is dated equivocally to between ca. 8,000 and 3,000 B. P., is still undergoing analysis. The fact that over half of the pottery sites include MSA artifacts implies that either:

- these sites were re-occupied by pottery-using peoples tens (if not hundreds) of thousands of years after the MSA artifacts were deposited; or, more likely,

- post-depositional physical processes have resulted in the mixing of artifacts.

Several pottery variables such as firing color, number and types of partially reconstructible vessel forms, evidence of pitting or sooting, and other morphological data are presented in Appendix F2. Most sherds show little evidence of weathering, suggesting they have not been exposed on the surface for any great length of time. A study of decorative motifs and associated techniques of manufacture (Appendices B3 and F3) reveals the most common body motifs to be incised parallel vertical lines ("Halbad Jooge" [Ahmed 1986]), incised horizontal lines ("Xariijin"), and horizontal strips of modeled clay ("Kasiir"). These, as well as other Jubba pottery motifs, are identical to motifs used to decorate pottery manufactured today in the inter-riverine and coastal areas of southern Somalia (Ahmed 1986). The few partially reconstructible vessels from the Jubba sample also reveal forms similar to those made by contemporary potters (Ahmed 1986), i.e., "cooking jars" with globular bodies, short necks and rounded bases; "incense burners" with wide mouths, straight walls and flat bases; "braziers" with wide mouths, thick straight walls, and interior "brackets;" and "coffee pots," characterized by globular bodies, collared necks, round bases, and exterior handles.

A sample of Jubba pottery was also examined critically by the local potters of Buur Heybe. They recognized 6 geographically distinct patterns or "wares."

"Hawal Dheeri" ware (Figure 14:1,2,5,6), manufactured at the village of Hawal Dheeri, Buur Heybe (ca. 210 kilometers northeast of Baardheere), is characterized by one or more of the following motifs:

- Halbad Jiife (slanted parallel incised lines) with Maroog motif (combed impressions) between the Halbad Jiife incised lines;

- Dhuun (stamped hollow circles) placed laterally across the vessel (occasionally with a punctated mark in the center of the circle) and Halbad Jiffe and/or Halbad Jooge (vertically parallel incised lines) connected to but not extending into the circles; and

- Durdur-Xariig (slanted and parallel combed impressions) found directly beneath the lip of the rim and/or at the junction of the rim and body.

"Bardaale" ware, manufactured at Bardaale village, Buur Heybe (ca. 205 kilometers northeast of Baardheere) is characterized by one or more Xariijin (laterally incised lines) placed beneath the lip of the rim up to the junction of the rim and body. Halbad Jiife and/or Halbad Jooge are placed directly underneath and are usually connected to these incised lines. Where the Halbad Jiife or Halbad Jooge incised lines end, Kasiir begins. Bardaale pottery is very similar to Hawal Dheeri pottery, with the main difference being the color and texture of the clay.

"Buur Dinsor" ware (Figure 15:5,8), from the granite hill of the same name (ca. 80 kilometers northeast of Baardheere), is recognized by Dhuun being placed directly beneath the lip of the rim. Parallel incised lines are placed laterally around the body, with Halbad Jiife incised alternately between the laterally incised lines. The color and texture of the clay are also distinctive.

"Buur Xakaba" pottery (Figure 15:6,7), from the granite hill of the same name (ca. 170 kilometers northeast of Baardheere), is recognized by the distinctive color and texture of the clay and by pinched or modeled clay placed directly beneath the rim with a combed impression running through the modeling.

"Baydhaabo" ware (Figure 15:1-4), from the limestone plateau ca. 160 kilometers northeast of Baardheere, includes decorative motifs similar to Hawal Dheeri ware. Dhuun is also used and a

Photographs of Pottery Specimens Collected in Survey Area

FIGURE 14 Pottery

"Hawal Dheeri" Ware: 1,6 (CE282); 2,5 (NE130)
"Jelib/Jemame" Ware: 3,4 (CW138)

FIGURE 15 Pottery

"Baydhaabo" Ware: 1 (NE71); 2-4 (CE149)
"Buur Dinsor" Ware: 5,8 (CE44)
"Buur Xakaba" Ware: 6,7 (NE168)

FIGURE 16 Pottery

"Jelib Jemaame" Ware (NE189) except center row right (CW138)

FIGURE 17 Pottery

"Jelib/Jemaame" Ware (CW28)

Figure 14.

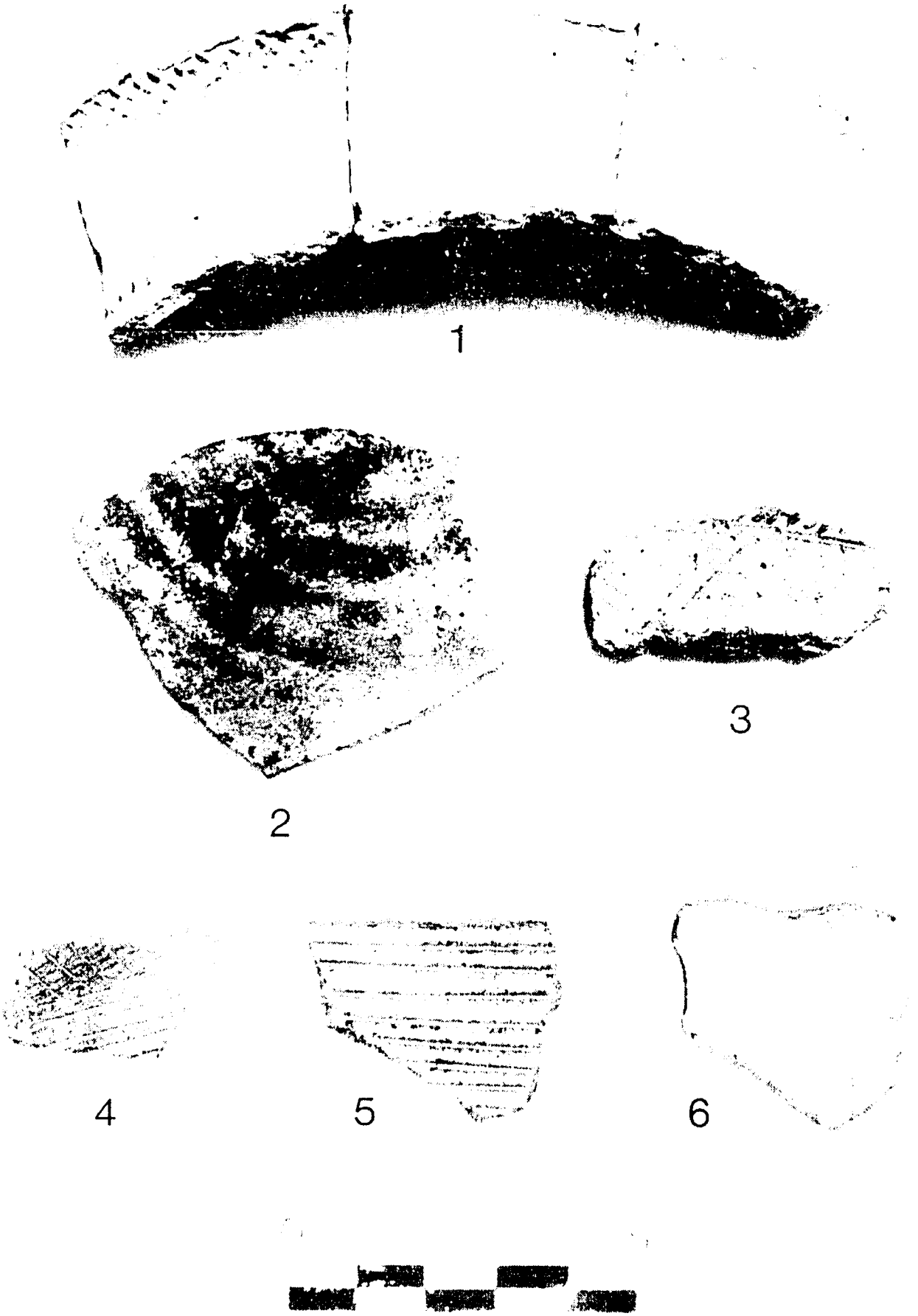


Figure 15.

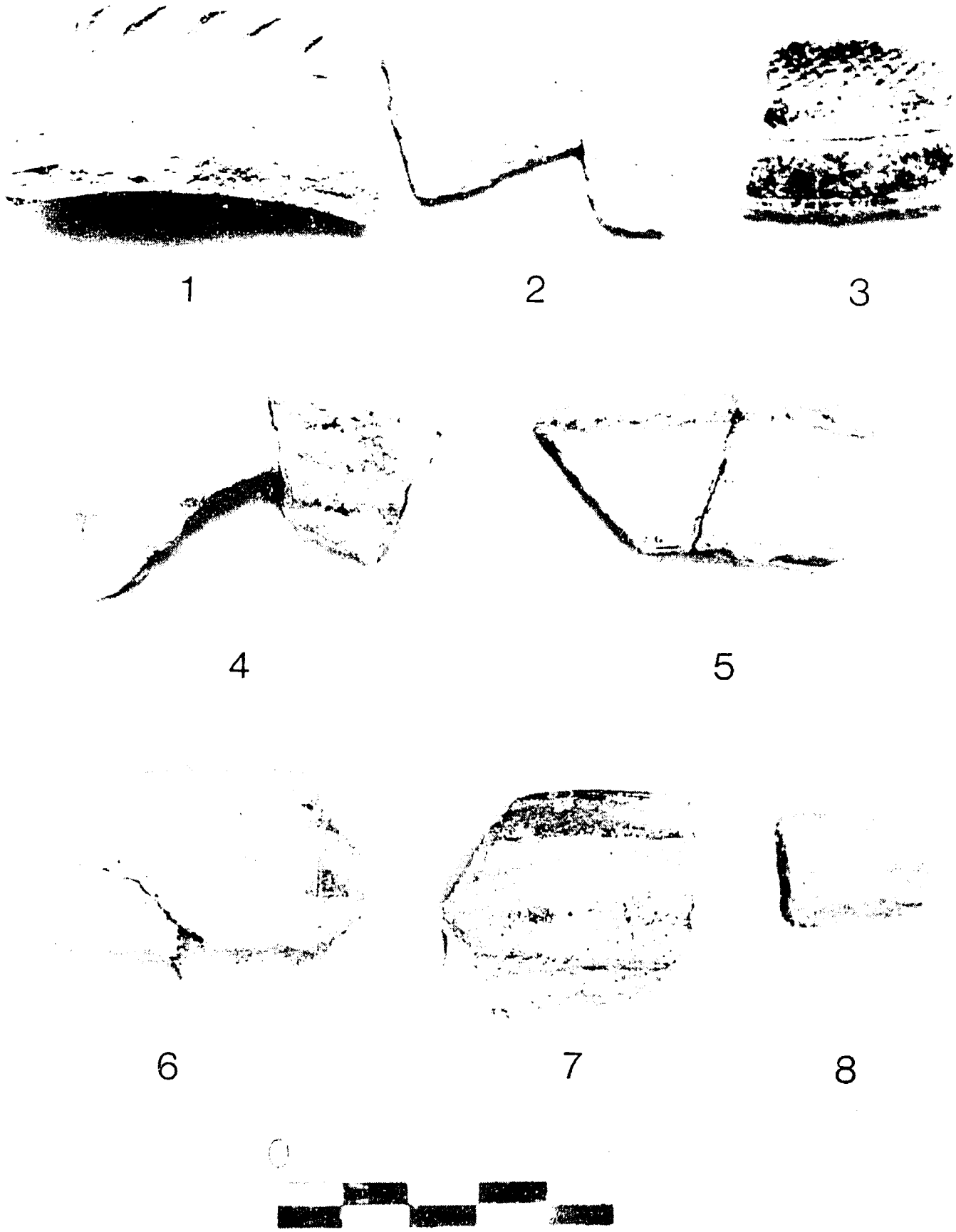


Figure 16.

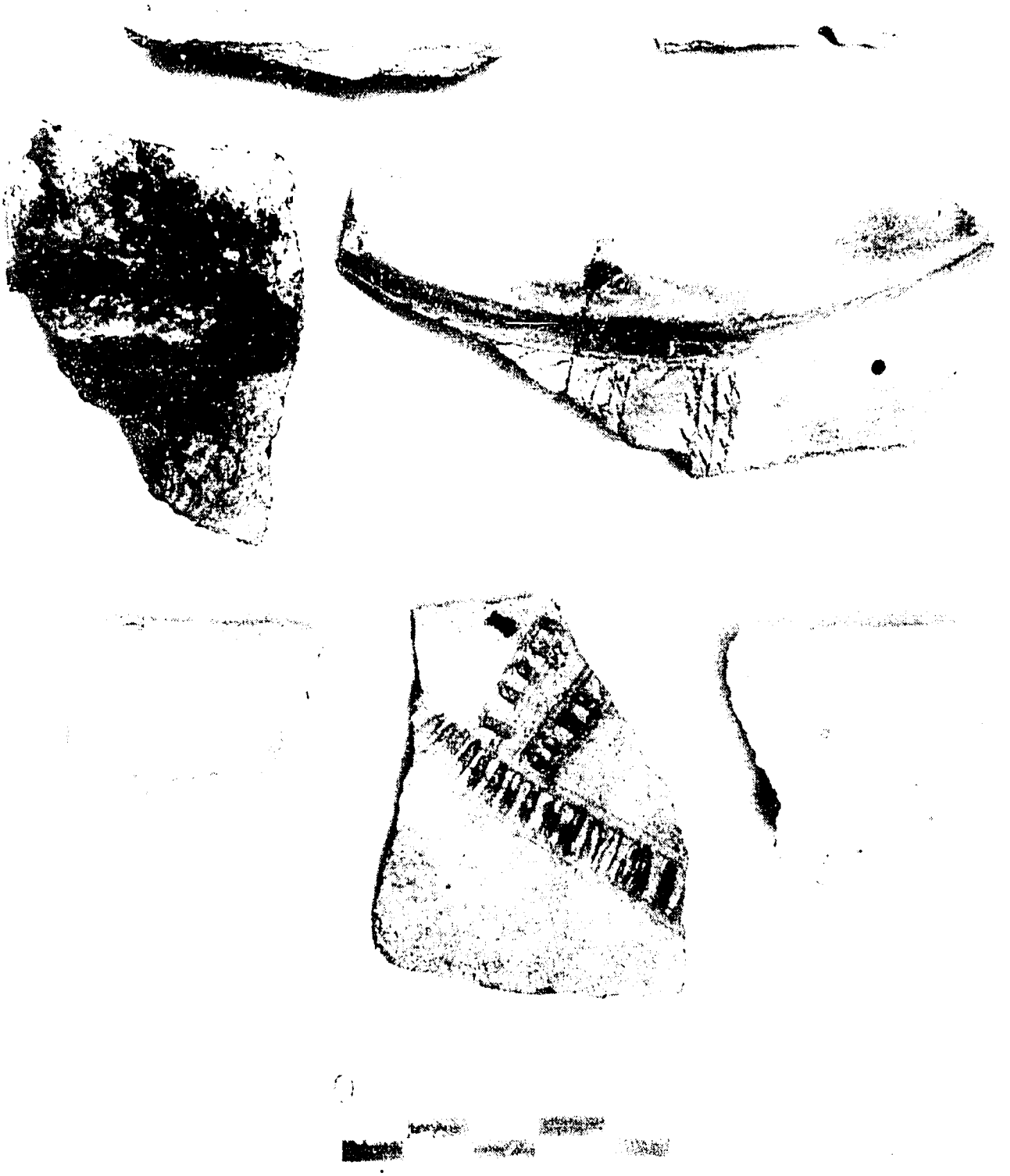
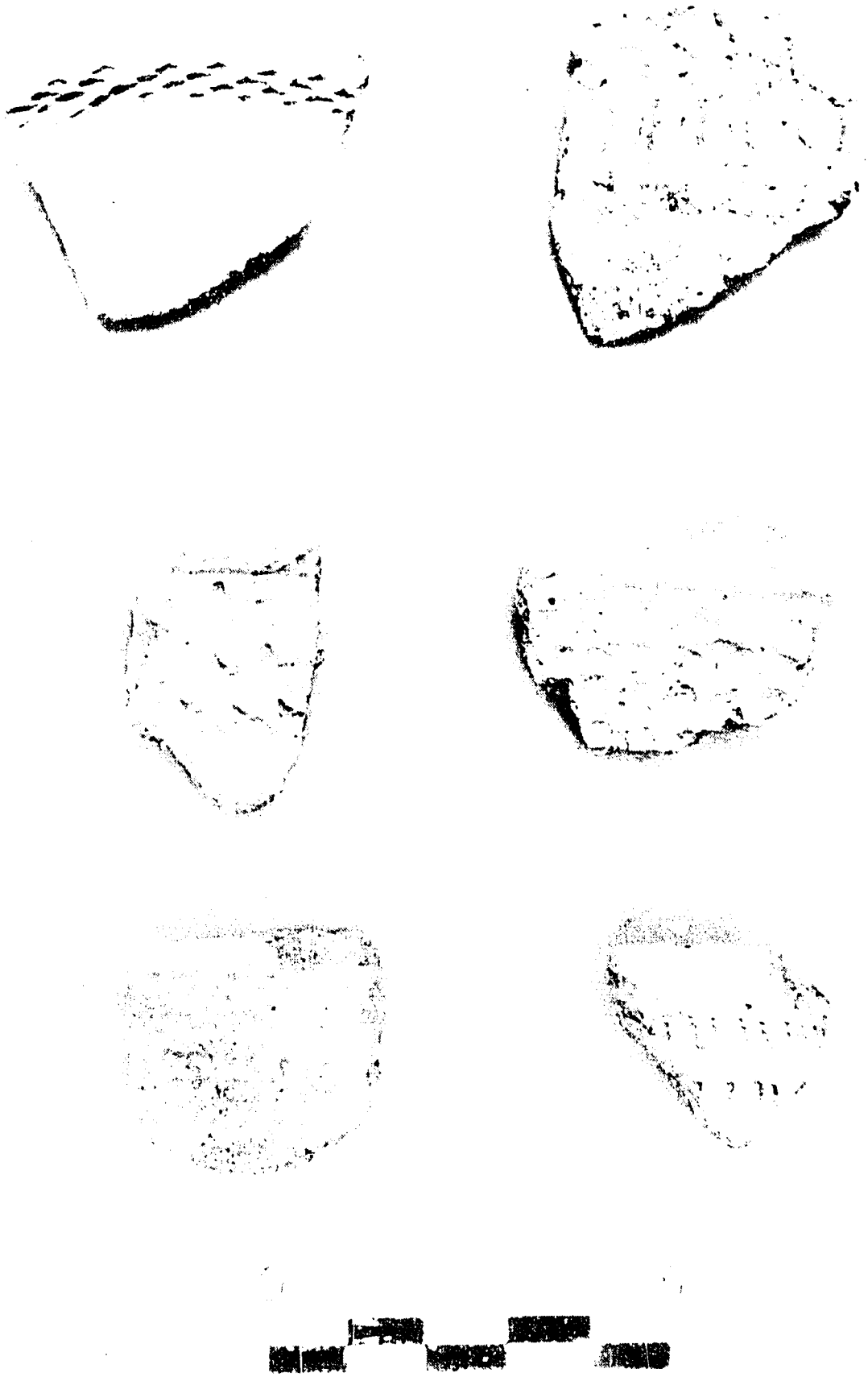


Figure 17.



punctation is made in the center of the stamped circles. Halbad Jooge does not terminate at the circles like Hawal Dheeri pottery, but instead the incised lines extend into the circles. Xariijin is also incised laterally through the middle of Dhuun. The color and texture of the clay also differentiates this ware from the others.

"Jelib/Jemame" pottery (Figure 14:3,4; Figures 16-17), named after the towns ca. 220 kilometers south of Baardheere, is significantly different from any of the other wares. The clay is much coarser, the pottery much thicker and the sherds consistently different in color (buff/brown rather than black or red). The motifs are also very different. Vertically combed (rather than slanted) Durdur-Xariig is combined with laterally incised lines to produce a unique motif. Durdur-Xariig is usually combed on modeled clay. Maroog is also used but not in any regular or predictable fashion.

Each of the above wares is distributed throughout the entire length of the study area with the exception of "Buur Xakaba," which is apparently restricted to the northern sections (Appendix F3). Such a distribution suggest · that pottery is being brought into the Jubba Basin from sources more than 200 kilometers to the south and northeast, implying sizeable (?pastoral) trading networks and/or settlement patterns.

In summary, most of the Jubba pottery appears to be of recent (if not modern) age. Nevertheless, it is possible that at least some of the sites encompassing LSA lithics and/or pottery represent relatively undisturbed later LSA, Neolithic, or Iron Age/Early Islamic occupations.

E. Cairns

Rock piles, or cairns, occur throughout the reservoir. Because of a high degree of variability in size and shape and their similarity to some Islamic graves, cairns created classification problems. The majority of the cairns are isolated, circular, or (less frequently) oblong piles of rock. Almost all the cairns are located at the base of a hill or talus slope. Cairn diameters range from 1.5 to 8.0 meters, whereas height varies from 0.5 to approximately 1.5 meters. Occasionally cairns occur in cemeteries with linear graves. The authors assume these cairns are associated in some way with the rite of passage, and could very well be graves of a specific type or age.

Of the 121 cairn sites not associated with cemeteries, 98 (81 percent) occur in the Northern Section. Over 83 percent of the cairn sites (n=101) are isolated, single cairns, the function(s) and ages of which remain unknown. Twelve sites

consist of 2 cairns, 5 consist of 3 cairns, and 2 sites consist of 4 cairns. A tentative classification of cairns follows.

First, small rounded cairns are the most common type of cairn in the survey area. These cairns are composed of locally procured, angular rock and average 3 meters in diameter and less than one meter in height.

Second, large rounded cairns, except for size, are virtually identical to the small rounded cairn. They average 7 meters in diameter and slightly more than 1 meter in height (Figure 18).

Third, platformed cairns are circular rock and earth platforms approximately 14 meters in diameter and 0.3 meters in height with a second cairn, averaging 10 meters in diameter and 1.5 meters in height, resting on top of the base platform. There are 3 occurrences of these more regularly constructed large cairns in the Northern Section.

Fourth, irregular cairns are irregularly shaped, linear cairns occurring singly and in groups in the Northern Section. These cairns are probably graves, as they occur with modern, Islamic graves and/or are arranged like a cemetery. Irregular cairns are generally more level and lower to the ground than the rounded cairns and are most often composed of large blocks of tabular mudstone. The stones are usually somewhat dispersed, and could indicate a greater antiquity than Islamic graves.

Cairns are highly visible features. The authors believe most of those in the Northern and Southern Sections were recorded. However, as the number of cairn sites increased in the Northern Section, site documentation became extremely time consuming and cairn sites were recorded by simply noting the location, number of cairns, and associated landforms in the field notebooks.

F. Cemeteries and Graves

Cemeteries (including some isolated graves) are the second most common class of site, occurring throughout the reservoir area. Cemeteries in the Northern Section are more numerous, larger in dimension and contain more graves (Table 14). Those located near the refugee camps in the Central and Northern Sections are obviously modern and were not recorded.

Table 14. Cemetery Sites by Number of Graves and Section*

No. of Graves	SW	SE	CW	CE	NW	NE	Total
	1	2	3	2	4	3	17
2 - 5	17	8	3	3	32	13	76
6 - 10	4	3	3	2	15	7	34
11 - 20	1	7			5	8	21
21 - 50	1		2	1	4	9	17
> 50				2	3		5
Total	25	21	10	10	61	43	170

*Cemetery sites where graves were counted.

The vast majority of cemeteries are clearly Islamic. Both the Somali crew members and local inhabitants had no difficulty in identifying cemeteries as Islamic, but determining their age was another matter. Informants would occasionally identify Islamic cemeteries as "old," but could not really explain why. The authors were usually unable to determine even an approximate age. Most of the Islamic cemeteries consist of a series of east/west oriented graves, usually occurring within a protective brush or rock fence (Figure 19). On average, the graves are constructed from gravels and measure 3 meters in length and 0.5 meters in height. In the larger cemeteries, 2 to 6 fenced compartments separate family or clan burials. In the Southern Section, people would carve tribal marks into logs or scratch them onto rock surfaces forming the walls of the cemetery. In rare cases, grave goods, such as a milk container, are associated with a grave.

Throughout the survey area, the majority of cemeteries occur on terraces or elevated bases of hills. In the Southern Section, only 4 of the 46 cemeteries occur in the bottom lands, while in the Northern Section only 11 of 124 occur in bottomlands. Cemetery maintenance by the local populations varies considerably. This may be related to the age of the cemetery. The vast majority of the cemeteries in the Southern Section have fences, while many in the Northern Section do not.

Some graves within cemeteries are morphologically different from recent Islamic graves and therefore could be pre-Islamic,

Figure 18. Large Rounded Cairn

Figure 19. Islamic Cemetery

non-Islamic, or early-Islamic. These graves are constructed from a tabular stone (most often mudstone) and consist of a low mound or veneer of stone in an oblong shape (Figure 20). The stones are often somewhat dispersed. These oblong graves are never fenced and occur singly or in groups of up to 34 graves.

G. Caves and Rockshelters

A total of 23 caves and rockshelters were recorded as sites, although not all exhibited evidence of human use. Caves and shelters occur in the main gorge wall and in the walls of the togga, usually at the interface between the talus slope and gorge wall. Caves and rockshelters that contained sediments or which were judged by the surveyors as potentially inhabitable were considered sites, as were those displaying rock art, regardless of whether they contained sediments or artifacts. Although a precise count was not kept, at least 40 caves and shelters with sloping rock floors were examined and rejected as sites. The 23 caves and rockshelters can be broken down as follows:

No rock art or artifacts	11
Lithics only	3
Rock art only	7
Rock art and lithics	1
Rock art and ceramics	1

The caves and rock shelters vary in floor size from 3 by 4 meters to 7 by 20 meters. Two of the caves have several chambers and one (SW 48) extends about 20 meters into the gorge wall. Numerous bats, combined with the potential of discovering large carnivores, limited exploration of some of the caves. Most of the rockshelters are shallow and appear to have thin sediments, although several were as large as 20 meters wide (Figure 21).

Of the 4 caves and shelters with stone artifacts, 2 (SW 47 and SE 51) yielded Levallois flakes indicative of MSA occupation. The rockshelter with ceramics and rock art also had some fiber mats, indicating that the shelter is still in use. Site SE 51, a large rock shelter with rock art, had the greatest number of artifacts (43). These appear to be all MSA and are eroding out of a large talus slope in front of the shelter, suggesting the shelter may contain sub-surface archaeological deposits.

Figure 20. "Old Islamic" Cemetery

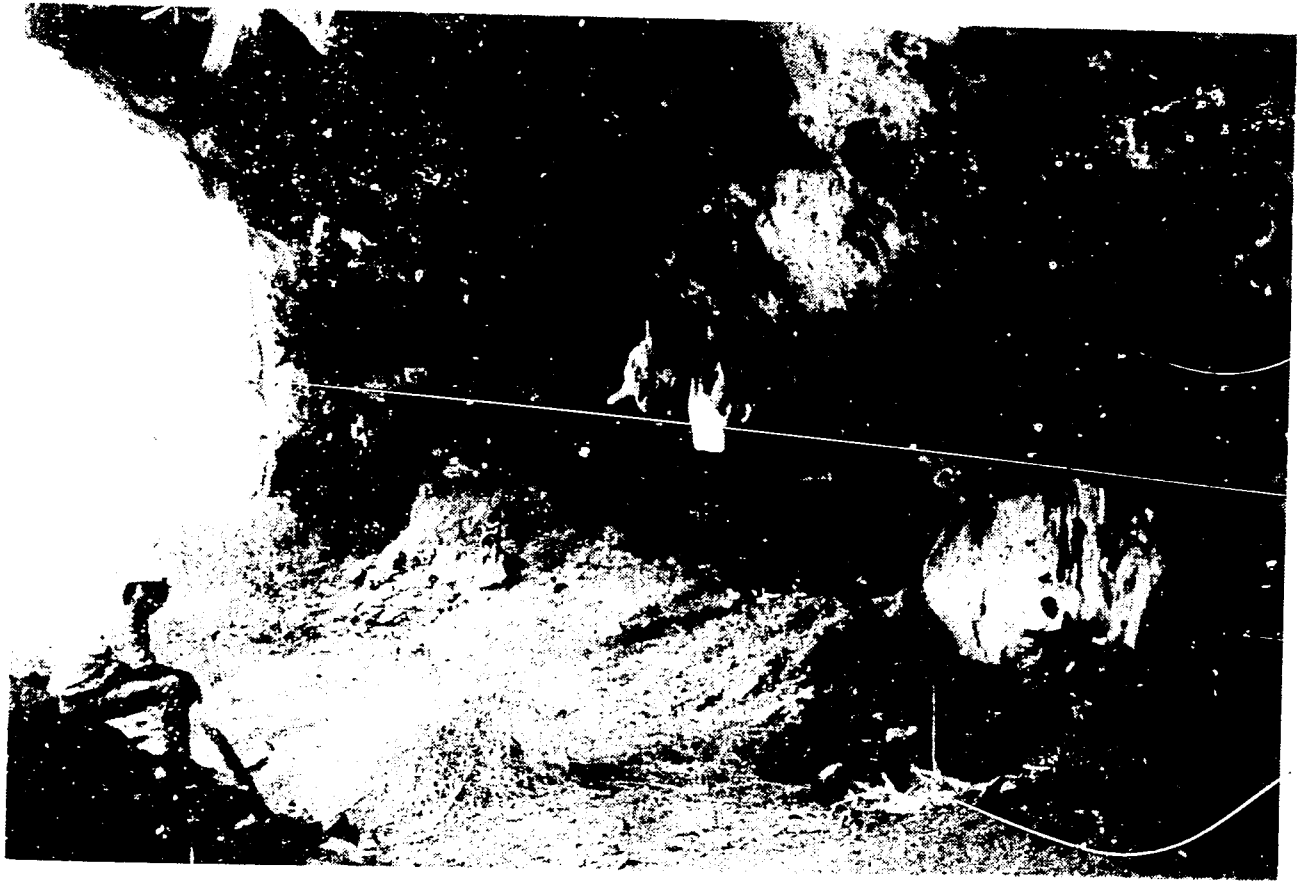


Figure 21. Large Cave

H. Rock Art

There is a total of 11 rock art sites in the survey area. Ten sites are in the limestone gorge of the Southern Section (6 in the Southeast and 4 in the Southwest) and one site is situated in the Northern Section (Northeast). Nine of the sites are painted caves/rock shelters, while 2 sites (SE 39 and NE 133) consist of scratchings and engravings on boulders.

Many of the painted limestone rockshelters could not have been found without the help of local informants, as vegetation was usually very dense with no obvious paths leading to the shelters. A site form was filled out and artifacts collected if present. The paintings were then sketched, color coded, and photographed. Measurements were taken of some of the larger motifs. Back in camp more detailed sketches were made from the field notes.

Southeast

SE 39

This site, situated 45.3 kilometers north of the proposed dam, consists of a large boulder at the edge of the main camel path. On the south side of the boulder are a series of highly schematic scratchings which appear to be of recent origin. Also present are 2 schematic engravings which may be older.

Sites 48, 49, and 50 are rock art sites located within a one-kilometer stretch about 55 kilometers north of the proposed dam and 30 kilometers south of Buurdhuubo. Each of the 3 rock shelters lies along the escarpment face in dense vegetation only 50 meters from the river's edge. There are no discernable paths to these shelters and no evidence of present day use. The shelters were formed when large boulders separated from the escarpment face and shifted downslope. Detachment of the boulders left smooth rock faces for painting. Each painted shelter had a stone floor with no visible trace of artifacts present.

SE 48

This rock shelter is located 55.5 kilometers from the dam. It lies about 50 meters from the river's eastern bank, facing southwest. The shelter measures 10 meters in length, 4 meters in depth, and approximately 3 meters in height. Over 20 paintings are displayed irregularly along the back wall. This irregularity is due, in part, to the wall's undulating surface. Preservation is excellent overall, although some figures are now indiscernible. This appears to be due to a variation in pigment base rather than a significant difference in the age of the

paintings. The majority of the figures are geometrical compositions of dots and circles (Figure 22) and most are polychromatic motifs in red, orange, black, and white. Of the geometrical motifs, one highly complex, rosette-like figure measures 35 x 35 centimeters. The rosette is composed of hundreds of open red dots, red dots, black lines, and red circles. Thick streaks of a fatty white pigment have been superimposed on top of the figure. Other motifs in the shelter range in size from 2 by 3 centimeters to 30 by 40 centimeters. These include crude animal-like figures and highly schematic designs.

SE 49

Located 55.6 kilometers from the proposed dam site, this site, like SE 48, faces the southwest 50 meters from the river's edge. The shelter measures 10 meters in length, 2 meters in depth, and 3 meters in height. A detached boulder inhibits ready access to the paintings. Approximately 15 paintings are displayed along the escarpment detachment face. Most are clustered on the northern wall just below a 1.5 meter overhang. Preservation in most cases is excellent. The majority of the figures are geometrical motifs of red, white, and orange dots with solid red lines. Also included are snake-like designs (Figures 23 and 24). Particularly striking are 2 undulating compositions in red, orange, and white. The larger of the 2 measures almost 50 centimeters in length (Figure 24).

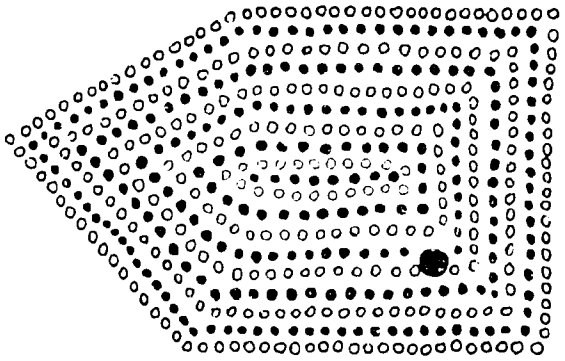
SE 50

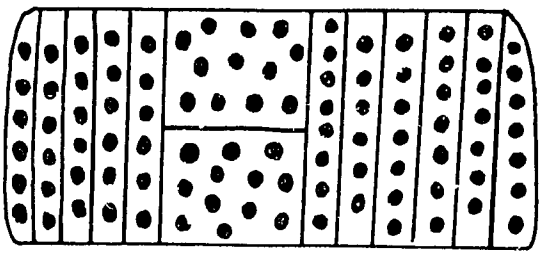
This rock shelter is located 55.62 kilometers from the proposed dam. The shelter faces southwest and measures 10 meters in length and 3 meters in depth. Site 50 is still in an active formation stage with layers of limestone peeling off the concave detachment surface. It appears that the entire back wall contained paintings, but strip weathering of the surface has removed all but a few traces of the art work. Informants claimed that local inhabitants attribute the paintings to supernatural causes and have taken an active role in expediting the natural weathering process.

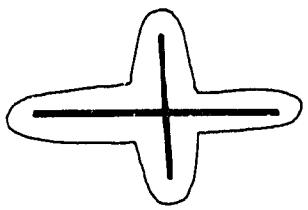
SE 44 ("QARIIB")

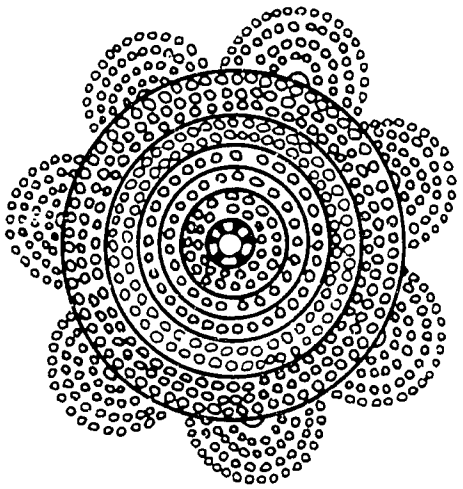
SE 44 is situated 56.25 kilometers north of the dam at the base of a vertical ridge. The shelter opens to the southwest and is approximately 150 meters from the eastern bank of the river. It measures 10 meters in length, 5 meters in width, and 4 meters in height. The shelter floor contains a thin veneer of sediment, which spills into the shelter mouth. No artifacts were found. Today, local inhabitants use the shelter to store sleeping mats and honey-collecting equipment.

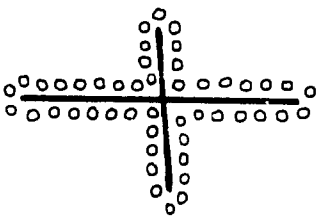
Figure 22. Sketches of Rock Art in Rock Shelter SE 48 (not to Scale)

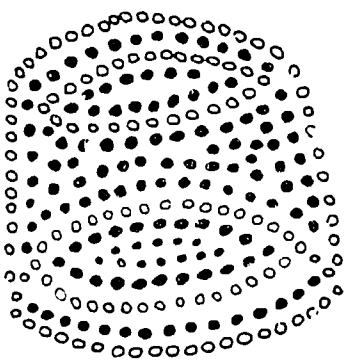


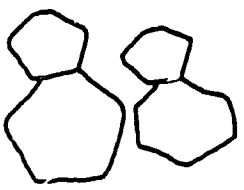


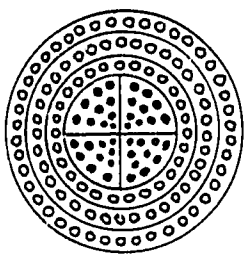












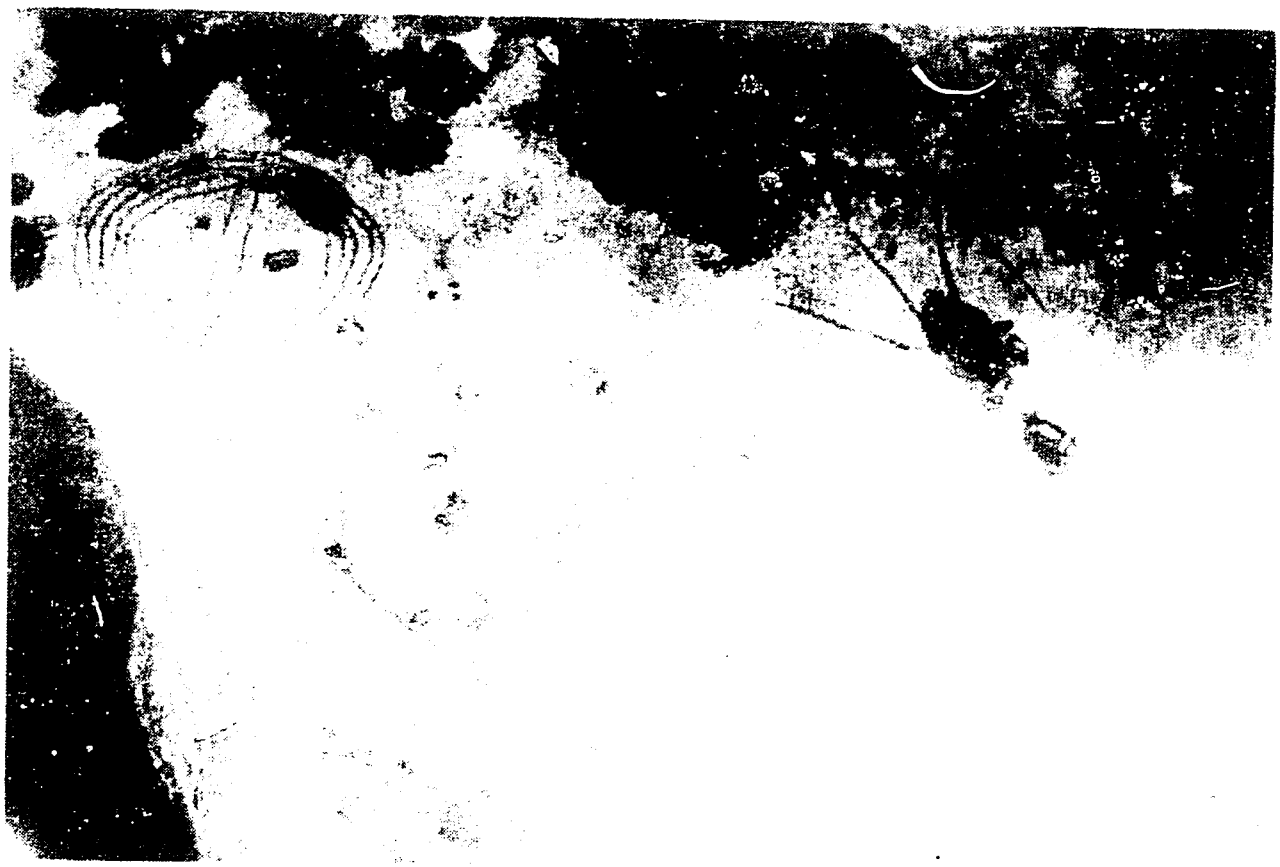
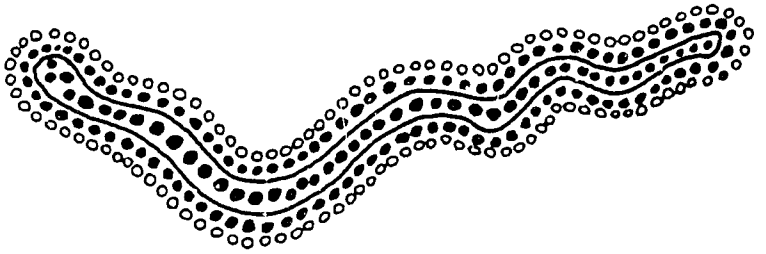
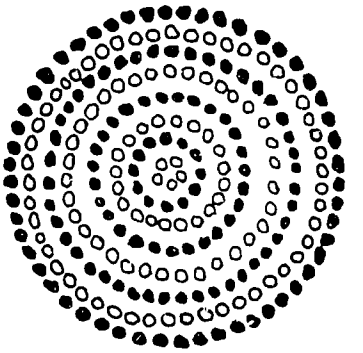
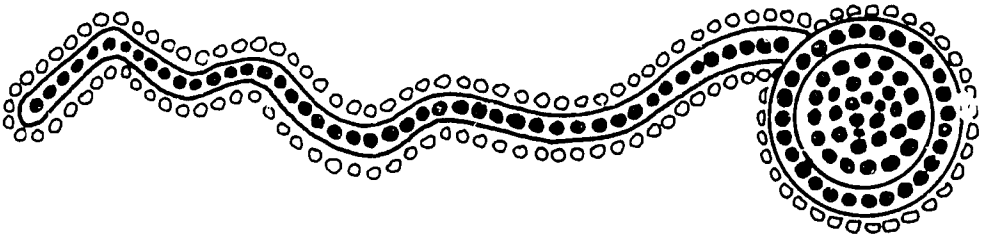


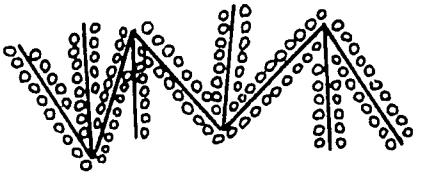
Figure 23. Rock Art in Rock Shelter

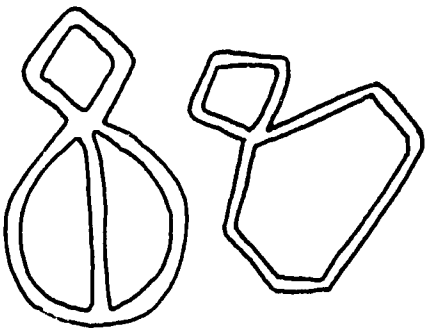
Figure 24. Sketches of Rock Art in Rock Shelter SE 49 (not to scale)

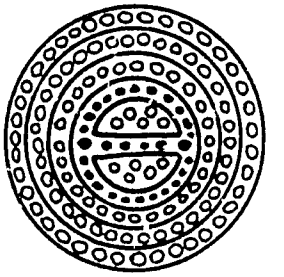












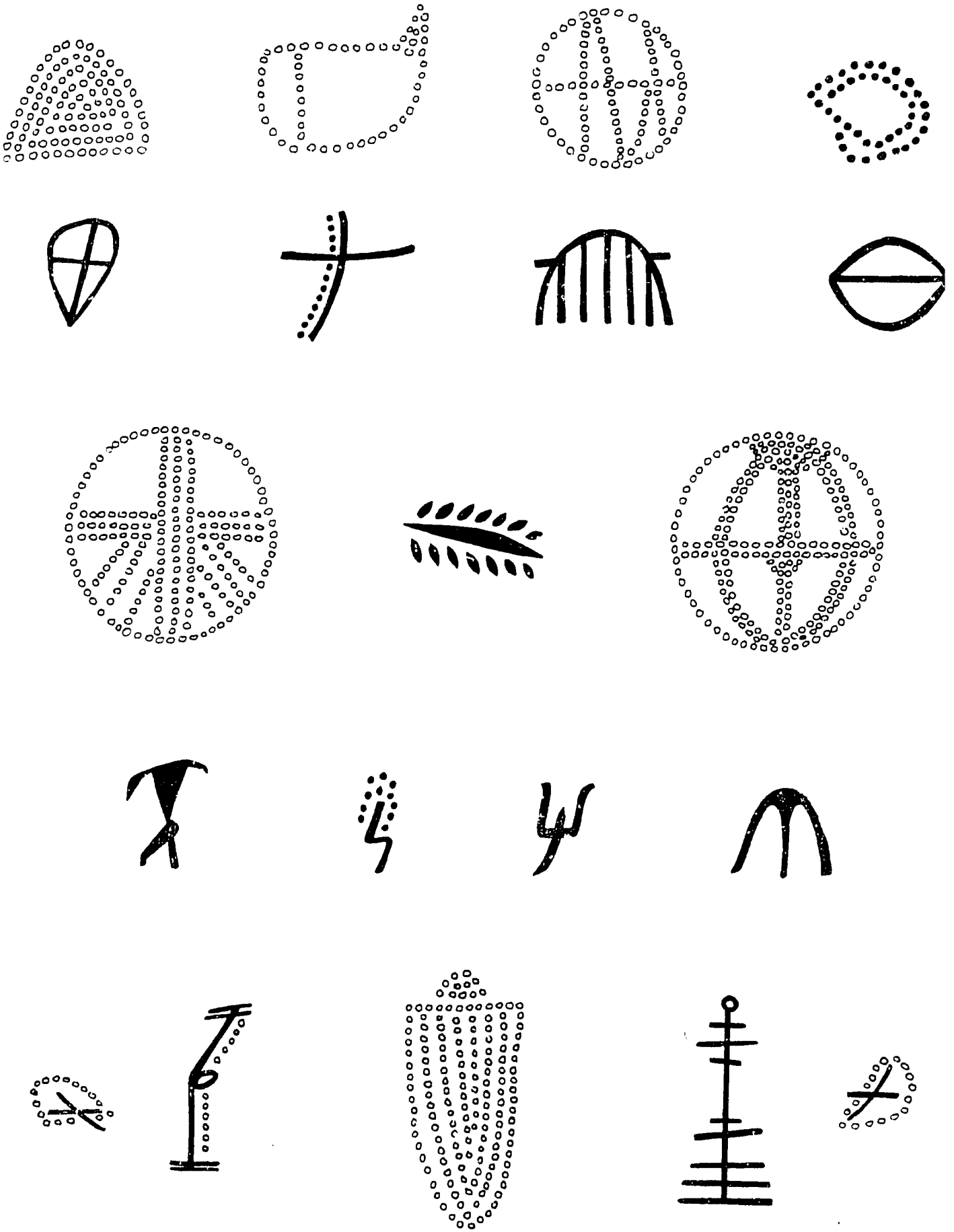
The nearly 100 paintings displayed on the back wall can be divided into 3 main panels, corresponding to the natural topography of the rock face. Panel 1, at the far northern end of the shelter, is composed of about 20 paintings, all executed in reds. The figures include motifs formed by linear arrangements of dots, circular compositions of dots, and schematic figures, including modern day tribal symbols (Figure 25). One interesting figure is a plant-like motif measuring 20 by 10 centimeters. Panel 2 consists of approximately 50 monochromatic red paintings and a single black motif. Again, the paintings include intricate compositions of dots and schematic motifs. No single motif from Panel 1 is repeated in Panel 2. The largest figure in Panel 2 is a globe-like arrangement of crisscrossing dots measuring 22 by 25 centimeters. The third panel lies at the extreme southern end of the shelter and contains over 40 individual figures. The paintings are monochromatic and include red, orange, and black figures. Linear and circular arrangements of dots, as well as schematic motifs, are common. One motif, a cross enclosed within a box, is repeated frequently. Local informants claim this is a modern tribal symbol of local populations. A red figure composed of a linear pattern of dots is painted on the southern entrance to the shelter. The figure measures 34 by 10 centimeters and resembles an ear of maize.

SE 45

This rock shelter is located 60.0 kilometers from the proposed dam site, about 200 meters from the river's edge up a steep, lightly vegetated slope. It is clearly visible from the main path, in an open area at a bend in the river. Several paths make the shelter readily accessible. Today, local villagers use the shelter as a storage facility for mats. The shelter is large and relatively deep, measuring 10 meters in length, 5 meters in depth, and 5 meters in height. It affords a panoramic view of the river and opposite bank, and is striking for its coolness and its absence of bats and other carnivores.

Approximately 20 paintings are displayed intermittently along the back wall. The paintings are all monochromatic figures in reds and black (Figure 26), with the majority occurring just south of the center. Preservation is good to poor. Most motifs are schematic figures, including wavy and crossed lines. The largest of these figures measures 35 by 34 centimeters. Several smaller, indeterminate animal-like figures are also displayed. The figures in this shelter are interesting for their dissimilarity to the figures in the shelters just one kilometer south.

Figure 25. Sketches of Rock Art in Rock Shelter SE 44 (not to scale)



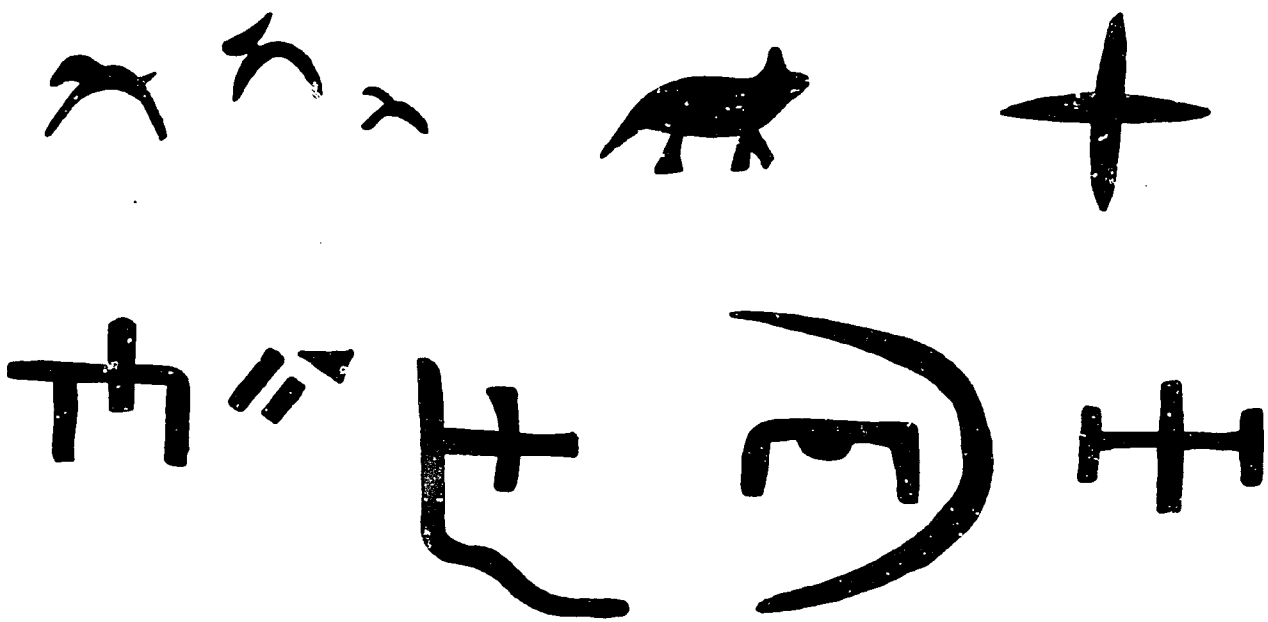


Figure 26. Sketches of Rock Art in Rock Shelter SE 45 (not to scale)

SE 51

Located 73.05 kilometers from the dam, this shelter lies 100 meters south of a large gypsumous spring named "Ceel Barre" and is clearly visible from the path. The shelter is situated 100 meters from the eastern bank of the river and is readily accessible from the north, but a sheer rock face and dense vegetation make access from the south extremely difficult. The shelter measures 7 meters in depth, 15 meters in length, and 5 meters in height. A deposit of sediment extends onto a talus slope. A small amount of MSA and LSA material was collected from the talus deposit. Today the shelter is used for storage.

The rock art is confined to 2 panels, reflective of the cave topography. Preservation is good to poor. Panel 1 is located at the extreme western side of the shelter and consists of approximately 15 monochromatic figures in red. Only one figure is black. Motifs from Panel 1 include irregular arrangements of dots, the largest measuring 43 by 21 centimeters. Crosses and simple streaks of pigment are also displayed.

Along the center back wall of the shelter are a few indeterminate smudges of pigment. Here preservation is extremely poor. At the far eastern end of the shelter, a dozen paintings are displayed. All figures are black except for one red design. The motifs include linear and irregular arrangements of dots, simple lines, and crosses. The largest figure from Panel 2 measures 41 centimeters in length.

Southwest

SW 55

This shelter is located 55.8 kilometers from the proposed dam, 80 meters north of a tog, and 35 meters from the western bank of the river. The cave measures 7 meters in length, 8 meters in depth, and approximately 2.5 meters in height. The floor of the cave contains a deposit of sediment. Pottery was collected inside the cave and on the talus slope. A recently abandoned hearth was located just outside the cave's entrance. Today, local inhabitants use the cave for storing fiber mats.

This site contains 9 monochromatic figures in red. Preservation is very good overall. The figures are confined to the exposed rock face of the cave entrance and just inside the ceiling close to the entrance. Most of the figures are irregular arrangements of dots and lines, or dots enclosed in circles. The largest motif, a "house-like" design of interwoven lines and dots, measures 30.5 centimeters in height. A 20-centimeter cross enclosed in a box, a local tribal motif branded on domestic animals in the valley, is included among the painted figures.

SW 57

This cave is located 56.1 kilometers north of the dam site, 40 meters from the river's edge and 20 meters south of site 56. It measures 7 meters in length and 6 meters in depth. The stone floor of the shelter is littered with rockfall.

Less than 10 figures are displayed on the south wall of the cave. Preservation is good to excellent. The majority of the designs are monochromatic figures of red or black. Only one polychromatic figure is portrayed and consists of red, black, and white pigments. The designs include arrangements of dots enclosed in boxes and highly schematic motifs. These schematic designs are similar to those found on the eastern side of the river (Sites 45, 46).

SW 56

This shelter lies 40 meters from the river's edge, approximately 15 to 20 meters above the floodplain, and is 56.2 kilometers from the dam. It measures 7 meters in length and 3 meters in depth, with a stone floor.

Several clusters of paintings are displayed along the back wall of this shelter. Most of the paintings are polychromatic figures of red, black, and white. Preservation is very good overall but weathering of portions of the wall has rendered some figures indiscernible. Highly regular, geometric compositions of lines and dots are common, as are schematic motifs. One particularly striking design is a double "zigzag" of lines and dots painted in black, white, and red.

Northeast

NE 133

Site 133 occurs alongside the major footpath leading to Luuq. It consists of 3 flat, engraved stones placed end on end. The stones display schematic scratchings, one a local tribal motif, and are obviously of recent origin. A local informant indicated the scratchings were associated with a purposeful arrangement of pebbles and were made as part of a healing ritual for a sick camel.

In summary, the rock art of the Jubba Valley displays significant stylistic differences from other rock art of the Horn. The patterned arrangement of dots and lines to form both highly regular and irregular motifs is a novel use of design elements, not only in the Horn, but in all of African rock art. However, while stylistically unique, tribal symbols in the Jubba rock art bear a functional similarity to other rock art sites in

the Horn. The display of tribal motifs is apparently a common component of southern Somalia rock art sites (Carder 1988).

At this stage of analysis, there is little one can say about the age, function, or cultural affinities of Jubba rock art. Like most of the world's rock art, there are no reliable means for dating the Jubba paintings. Preservation alone tells us very little. Many of the rock paintings in southern African shelters appear as crisp and fine in detail today as they did 10,000 to 20,000 years ago. Stylistic criteria remain the most common means of dating rock art. This method necessitates a systematic collection and consistency in documentation of rock art sites, but is not possible in the Horn at present, due to weaknesses in the database.

I. Summary and Conclusions

The absence of sites dating to the Early Stone Age (ca. 2.3 million years ago to 200,000 B. P.) is not surprising given the complete lack of Oldowan or Acheulian sites elsewhere in southern and central Somalia. However, it still remains a mystery why this is the case. Further archaeological as well as geomorphological and paleoenvironmental research in the Jubba Valley, and elsewhere in southern Somalia, should provide information contributing to a resolution of this puzzle.

The MSA open-air sites represent the earliest evidence of human occupation in the Upper Jubba River basin. Not enough is known of MSA regional variability in Somalia to indicate how the Jubba MSA compares temporally, stylistically, functionally, or culturally to other MSA assemblages, such as those from the Buur Heybe region or the Mudugh (Clark 1954). The Jubba MSA could date anywhere between ca. 150,000-200,000 to 30,000-40,000 years ago. The division of the Jubba MSA into "Big" and "Little," if found through excavations of stratified and datable sites to be viable, could represent temporal stages similar to those Clark (1982) has recognized for the MSA of the Horn. However, they could also reflect differences in artifact and site function, or represent differential access to raw material sources.

LSA sites, although not as common as MSA occupations, are well-represented in all sections of the basin. Subdivision of the Jubba LSA into Blade LSA and Micro LSA, as well as the possible association of ceramics, suggests a temporal span of about 30,000-40,000 years to 5,000 years B. P. (or later) for LSA hunter/gatherer occupation of the upper Jubba basin. Whether these divisions, like the MSA, represent temporal and/or functional differences, or if they are valid taxonomic entities at all, can only be determined through excavations and chronometric dating of suitable sites.

The LSA of southern Somalia is somewhat better described and dated than the MSA. Nevertheless, the data base on LSA regional variability is still meager (Brandt 1986b). The LSA assemblage from Buur Medow east of Luuq, hypothesized by Mussi (1987) to be of early Holocene age, resembles Micro LSA assemblages from the Northern sections of the reservoir in many respects. This is hardly surprising given the close proximity of Buur Medow to the Jubba River. What is surprising is the apparent lack of Eibian components along the Jubba. The Eibian is a late/terminal Pleistocene industry known from sites east of the Jubba and characterized by distinctive pressure-flaked bifacial and unifacial tools (Brandt 1986b; Brandt and Gresham in press). The absence of the Eibian from the upper Jubba River basin, if substantiated by further research, has various implications for understanding hunter/gatherer adaptations in southern Somalia during the late Pleistocene/early Holocene (Brandt in press; Brandt and Peters in prep.).

While it seems likely that Neolithic pastoral and/or horticultural groups periodically occupied the upper sections of the river basin sometime after 5,000 years ago, specific archaeological evidence for this is lacking. Ceramic-bearing Micro-LSA assemblages could represent the material remains of such groups, but the absence of a well-defined and dated pottery sequence for Somalia, the fact that LSA hunter-gatherers also made and used pottery, the virtual absence of any organic remains from sites, including carbonized cereal grains or domesticated plants and bones of domesticated animals, make the identification of Neolithic habitations in the river basin difficult. Once again, recognition of the presence of prehistoric populations engaged in food production must await archaeological excavation. The same holds true for evidence of Iron Age occupation in the Valley.

Pastoral or horticultural occupation of the basin during early Islamic times may be represented by the "old" graves, cemeteries, and cairns as well as some of the pottery scatters distributed throughout the survey area. However, until a sample of these sites are excavated, this remains conjecture.

Judging from the few regional archaeological surveys undertaken in Sub-Saharan Africa (Bower 1986) so far, the discovery of 686 sites within a 420-square-kilometer survey area indicates relatively intensive prehistoric utilization of the upper Jubba River basin over time. These sites exhibit considerable variability in size, location, and artifact density. However, we are reluctant at this initial stage to draw any conclusions pertaining to demography, site functions, changing patterns of land use, and other aspects of prehistoric socio-territorial organization in the upper Jubba Valley.

This initial phase of archaeological research in the Jubba Valley has raised the following issues:

- whether prehistoric populations used the Jubba Valley as a refuge during more arid times; or
- did they abandon the river valley during exceptionally humid and/or arid periods;
- was the Jubba River basin a corridor for seasonal movements of hunter/gatherers and/or pastoralists from the Indian Ocean coast to the foothills of the southern Ethiopian highlands;
- who was responsible for painting the rock art and what purpose(s) did the rock art serve;
- who constructed the cairns and why;
- did populations establish horticulture along the small alluvial pockets of the Southern Section hundreds if not thousands of years ago, and, if so, why?

However, the authors are reluctant to address these and other issues at this time due to:

- an inadequate understanding of past geological, geomorphological, hydrological, and climatic conditions in the Jubba Valley;
- the absence of excavated sites and chronometrically dated culture-stratigraphic sequences from which to tie in our surface finds;
- the absence of faunal and floral remains for reconstructing subsistence strategies;
- incomplete knowledge of the range and detail of rock art; and
- artifact samples too scanty to gauge site activities and functions.

The following chapters suggest ways in which these issues can be addressed through the establishment of a program of additional archaeological research.

V. ASSESSMENT OF RESULTS AND SIGNIFICANCE

Once archaeological sites have been located within proposed construction zones, their significance needs to be evaluated and the impacts of the proposed projects assessed. It is not the intent at this time to fully assess the significance of the cultural resources discovered by the Phase II survey. Proper assessment requires subsurface testing, recommended for future phases of work (see the next chapter). However, the survey has provided enough data to make some general statements of significance and evaluate the significance of a few specific sites. Some assessment of the impacts to sites can also be tentatively formulated, but full assessment must wait until final project designs (e.g., the precise reservoir boundary) are known and mapped.

Several sets of criteria can be used to judge the significance of prehistoric cultural resources. According to U.S. National Register of Historic Places criteria (which seem applicable to Somalia), a significant site:

- is associated with persons or events that made a major contribution to the history of the country or region;
- embodies distinctive characteristics of a particular type, period, or method of construction; or
- may be likely to yield information important in prehistory or history.

The first criterion is geared primarily to historic period sites. Since the historic period (when written records were kept) for the interior of Somalia is relatively recent, this criterion may apply to only a few sites. Historic research of the reservoir area will be necessary before it can be applied. At this time we are not aware of any sites in the reservoir that are associated with significant persons or events other than the tombs of recently deceased sheiks in the Central Section, one or more of which may fall within this criterion.

The second criterion is primarily geared to architectural remains, although it is rightfully used to recognize and protect some prehistoric, non-architectural sites. This criterion is sometimes applied to a group of sites of a particular type, with the result that one is considered significant in that it represents the group as a whole. None of the standing structures encountered during this survey were recorded as sites. The houses, tombs, mosques, pens, and other structures encountered are ubiquitous throughout Somalia and do not seem to be significant.

The third criterion is the most widely used and applies mainly to archaeological sites. Its broad scope, covering sites with the potential to yield important archaeological and historical information, needs to be more precisely defined to become a useful guide. Almost any archaeological site can be reasonably argued to contain some important information. However, often the information can be gained from initial survey. It becomes necessary to identify those sites that are likely to contribute substantially to the survey data. These are sites that contain relatively intact, subsurface cultural deposits. Such deposits have the potential of yielding archaeological materials (such as artifacts, botanical remains, faunal remains, and features) in primary context (i.e., as they were left by the inhabitants of the sites), thus allowing detailed analysis of past lifeways. Intact subsurface cultural deposits are rare and archaeologically significant.

Applying the above criteria (in particular the last) to the survey data, the significance of the various classes of sites can be judged as follows.

First, open-air artifact scatters are the largest and most diverse class of site. These sites occur on talus slopes, terraces, and open plains. While this class of site will need subsurface testing to determine the presence of subsurface deposits, it is the authors' estimation that the majority will not have intact deposits, will not be able to yield additional important information, and thus are not significant to the degree that further work would be warranted. This opinion is based on fortuitous glimpses of the subsurface (in warthog holes, maize storage pits, and small ravines) that suggest most surface scatters are either deflated and lying on culturally sterile subsoil or in a mixed context resulting from erosion on a talus slope. It should be stressed that this needs to be verified through archaeological testing.

One open-air site on a low terrace, NW 125, had artifacts eroding out of small gullies in a way strongly suggesting the site contained intact subsurface deposits. This site also contained a great density of artifacts that constitute an assemblage unlike any other found in the reservoir. For these reasons, the site is likely to be significant. Another site, SE 58, had an artifact-bearing stratum visible in a maize pit about 1.0 meter below surface. This site also may be significant.

Second, the rock art styles are unique to Somalia and possibly to Africa, and therefore all the painted caves and rockshelters are clearly significant.

Third, caves and rockshelters are often significant because they have the potential to yield stratified cultural deposits in

relatively undisturbed contexts. Some of the caves and rockshelters recorded by this survey lacked floors with sediments. Others had sediments but no artifacts, while others had sediments and artifacts. The significance of these sites generally corresponds to depth, extent, and integrity of the sediments they contain. While the presence of artifacts provides proof of past human use, adding to the significance of the site, the absence of artifacts on the surface does not necessarily denote lack of human occupation, since cultural deposits could be buried below surface. Therefore, all of the caves and rockshelters found to contain sediments are potentially significant.

Rock cairns form an enigmatic class of sites common throughout the reservoir area. Their cultural affiliation and function remain unknown, making it difficult to assess their significance. While many appear as simple piles of rock, some are carefully constructed and are composed of a circular base and a rounded mound of stones. As a class, they seem to be significant, but their potential for yielding information may vary. Similar rock piles in North America seldom contain artifacts and the few cairns excavated in Eastern Africa have often yielded few artifacts or other information. However, a few cairns have yielded burials and/or artifacts.

Numerous cemeteries, most of which are clearly Islamic, are scattered throughout the reservoir. Islamic cemeteries are a difficult class of site to evaluate for significance. Since the Judeo-Christian/Western attitude towards death is different than the Islamic/Somali attitude, local criteria should guide the decisions on which, if any, of the Islamic cemeteries are significant. In regard to the specific issue of inundation of Islamic graves and cemeteries, local informants told us that no special measures (such as removal and reburial) need or even should be undertaken. It was not clarified whether this attitude would prevail in the case of a "famous" person, such as a great sheik. The authors were hesitant to discuss the possible inundation of the valley with residents who were not aware of such plans and thus this issue was not fully explored.

VI. RECOMMENDATIONS

The Phase II survey has demonstrated clearly that the proposed Baardheere Reservoir encompasses a vast array of prehistoric through historic sites, constituting a large, diverse, and potentially valuable data base. This report has attempted to highlight the types of analyses that can be derived from this data base and the authors are confident this data base will be used for additional analyses. While all of the sites are of some value, some sites are of particular significance, having the potential to yield substantially more information than was gathered from the survey. Some of these significant sites can be recognized now (e.g., rock art sites and some caves and rockshelters), but the significance of most sites remains unknown. Recommendations for further work are outlined below.

A. Cultural Resource Management of Riverbasins: An Overview

Archaeological surveys of river basins have played a significant role in the reconstruction of North American prehistory (Willey and Sabloff 1980). Pioneering archaeological work in the United States focused on the major river valleys of the Midwest and Southeast, and river valleys in the eastern United States are still principle attractions because they often contain high site densities, large, intensively occupied sites, large, monumental edifices (i.e., temple mounds), and buried, stratified sites.

For reasons that are not entirely clear, there has not been such a clear archaeological focus on African river basin surveys (Bower 1986). The archaeological potential of river valleys in Africa cannot be assessed adequately because little survey and evaluation have taken place. The reasons for this are complex and not entirely clear, but it is reasonable to assume that African river basins should be as archaeologically rich as other well-studied river basins in the world.

Building on antiquities laws established in the early part of this century, recent U. S. federal legislation has resulted in laws to identify and protect significant cultural resources on federal property, or that might be impacted by federally funded or licensed construction projects. Statutes established in the 1960's and 1970's provide an infrastructure and mechanism for carrying out the mandate to protect threatened significant cultural resources. This system, which typically involves private or institutional archaeologists working with state and federal review agencies, is now well-established and, despite some flaws, seems to be working reasonably well. In the United States, archaeological investigations of areas where construction

and development threaten cultural resources typically have 3 principal objectives:

- identify cultural resources in the project area;
- evaluate the significance of those resources; and
- retrieve important information from the significant resources.

These objectives are usually addressed in 3 corresponding phases of research:

During the survey phase, all (or a representative sample of) archaeological and historical sites are located, briefly described, and sometimes evaluated. This phase usually involves limited or no excavation. If the project area is only sampled, predictive models of site location are formulated.

During the second, or testing, phase, sites are revisited and test excavations (typically one to 4 square meters) are placed in promising sites to determine their integrity and research potential. In the case of a large number of sites, a stratified sample of sites are selected for testing.

The third phase is data recovery, during which information is retrieved from those sites determined by testing to be significant. This usually involves large-scale excavations at a few sites, but can include smaller-scale excavations as well.

This multi-phase approach to cultural resource management is generally applied to areas of direct (primary) impact. For reservoirs this includes the high-pool impoundment zone, the construction zone around the dam, borrow pits and staging areas near the dam, and main transmission line corridors. Areas of secondary impact, which are often more poorly defined, sometimes also receive archaeological attention. Secondary impacts include roads built to the project area and construction and development prompted by the project.

B. A Three-Phase Cultural Resource Management Program for the Baardheere Reservoir

Except for the celebrated case of the High Aswan Dam in Egypt and a few less publicized projects, there have been few reservoir projects in Africa associated with archaeological salvage work. Furthermore, comprehensive culture-resource management programs have not yet been established in most African countries, including Somalia. With little continental precedent and no salvage-oriented infrastructure in Somalia, it is strongly recommended that the United States' 3-phase model of cultural

resource management, mentioned above, be applied to the Baardheere Reservoir. The bulk of the recommendations relate specifically to the main area of direct impact, the impoundment zone. However, recommendations for the cultural resource assessment of other areas of direct impact (i.e., the construction zone around the dam, borrow pits, staging areas near the dam, and main transmission line corridors) should also be worked into the Baardheere Reservoir culture-resource management program. Phases I and II, detailed below, can be undertaken during the same field season(s).

1. Continued Survey and Site Documentation

Although the project described in this report adequately surveyed the majority of the proposed reservoir, certain areas still require additional and/or more intensive examination.

First, because of their potential significance, a more intensive survey for additional caves and rockshelters in the southern limestone gorge is required. The Phase II survey was unable to devote the amount of time necessary to thoroughly explore the densely vegetated walls of the main gorge, particularly the area about 20 kilometers south of Buurdhuubo where the bulk of the rock art sites is located. Undoubtedly some caves remain to be discovered in this area. Furthermore, all major togga within the impoundment zone which dissect the limestone escarpment need to be surveyed (not all were).

Second, several expanses of land in the Northern Section require initial or additional inspection, including 2 large lobes of land on the eastern side, the horseshoe bend containing site NW 125, and the alluvial plains just south of Luuq, if indeed they are in the impoundment zone.

Third, we have no idea how site density and site types in the proposed reservoir basin compare with areas immediately adjacent to the reservoir basin. For this reason, a survey of non-riverine areas is necessary. Twelve 1.0-kilometer-long, 100-meters-wide transects (2 in each section), extending from the rim of the river valley, should be surveyed.

Fourth, lack of time permitted only the recovery of small artifact samples from most of the larger and/or more artifact-rich sites. While our density samples are valuable in redressing the bias towards tools and larger artifacts in our general site collections, sample size is far too small to accurately characterize site assemblages. Consequently, to obtain more adequate representations of site assemblages, we recommend making total collections of 100-square-meter units at about 20 sites representative of varying types and techno-stages. At some sites

with noticeable intra-site variability, several 100-square-meter collections may be required.

Fifth, comprehensive documentation of rock art sites is highly recommended. Anthropologists are just beginning to explore the potential of rock art for contributing to our knowledge of human adaptation and behavior. For this reason, and the ephemeral nature of the artifact itself, complete documentation of the Jubba rock art is critical. To insure this, future work must include thorough tracing of the individual motifs with color coding of the pigments. Additionally, the rock art and the shelters must be photographed comprehensively in color, black and white, and infra-red film. Descriptions should include an attribute analysis of the individual motifs, and mapping of the art and the shelter. Samples of the pigments should be collected for chemical analysis and possible radiometric dating. Finally, the possibility of removing some of the panels for permanent display in the Somali National Museum needs to be considered.

2. Site and Non-Site Testing

Caves/Rockshelters

The discovery of caves with evidence of MSA/LSA occupation in a context that suggests stratified deposits is exciting because there are relatively few such sites in eastern Africa in general and southern Somalia in particular. A minimum of 1 square-meter excavation unit will be placed in each of the sediment-bearing caves to determine the presence and extent of subsurface artifact-bearing deposits.

Open-Air Sites

This most frequent type of site (n=421) will require the greatest amount of testing, including excavation of one or 2 square-meter test pits at a number of sites. Sites chosen to be tested should be representative of the range of open-air sites. The 6 sites judged by the surveyors to most likely be significant (SE58, CW74, NW125, NE187, NE188, and NE189) will be tested with 3 to 6 test units placed on each site, and 12 of the 53 sites judged by the surveyors to be possibly significant will be tested with 2 to 6 test units each. This would include 6 of 26 sites in the Northern Section, 2 of the 9 in the Central Section and 4 of the 18 in the Southern Section.

The test excavations should provide an indication of the presence, depth, density, and context of culture (artifact)-bearing deposits. On some sites, several one-by-2-meter units will be placed in a line to provide a stratigraphic profile of the entire site. Cultural deposits were exposed to a depth of ca. 1.0 meter below surface at one site (SE 58), and it is anticipated that cultural material could be this deep or even deeper at other sites. In most cases units will be excavated no deeper than 2.0 meters, for the sake of safety and expediency. It is expected that cultural material will be only at the ground surface on some sites, thus requiring only shallow test units.

Rock Cairns

Although there is considerable variability among the cairns, they can be grouped into 4 types--small mounded, large mounded, irregularly shaped, and large platformed. At least one of each type should be tested by first recording it thoroughly, then excavating it by sectioning (halving). Soil samples should be taken at the base and subsurface of the cairns. Careful inspection for burials and artifacts will be required.

Cemeteries

While the majority of cemeteries appears to be of recent Islamic style, many are morphologically different and could be of pre-Islamic or early Islamic age. Excavating graves, even very old ones not related to modern populations, can be upsetting to local inhabitants. However, graves and skeletal remains often provide very important archaeological data. If local Somalis give us permission, as past experience indicates they will, the excavation of at least 2 non-Islamic-type graves is recommended to determine the state of bone preservation and age/culture affiliation.

Non-Site Areas

Large tracts of recently alluviated bottomlands were not surveyed because artifacts were unlikely to occur on the surface. Six of these non-site locations should be tested. In conjunction with the proposed geomorphological investigations (see below), a sample of alluvial formations should be test excavated. A 2-by-2-meter excavation unit should be step excavated to a depth of 2 meters to test for deeply buried deposits.

Geomorphological and Paleoenvironmental Research

There is a wealth of landform and paleoenvironmental information which will be lost forever if geological investigations are not conducted in the proposed reservoir prior to flooding. Therefore, it is imperative that geomorphological research be incorporated into future phases of research. Such research would include the study of stratified fluvial and alluvial deposits as well as cave speleothem deposits (e.g., stalactites). The speleothems can provide radiometric dates and give a history of climatic and vegetational change in the Jubba Valley. To our knowledge, the Southern Section caves are the only known sites in southern Somalia which have the potential of providing such information.

3. Data Recovery

This last phase will involve large and small-scale excavations of those sites determined by test excavations to be of greatest significance.

REFERENCES

Ahmed, H. S. 1986. An Ethnoarchaeological Study of Pottery Technology in Berdaale Village, Somalia. Master's thesis, University of Georgia.

Ambrose, S. H. 1984. Holocene Environments and Human Adaptations in the Central Rift Valley, Kenya. Ph.D. dissertation, University of California.

Bower, J. 1986. "A Survey of Surveys: Aspects of Surface Archaeology in Sub-Saharan Africa." African Archaeological Review 4: 21-40.

Brandt, S. A. 1986a. JESS Interim Report on Cultural Heritage Sites in Proposed Baardheere Reservoir Area. JESS Report No. 8. Burlington: Associates in Rural Development.

Brandt, S. A. 1986b. "The Upper Pleistocene and Early Holocene Prehistory of the Horn of Africa." African Archaeological Review 4: 41-82.

Brandt, S. A. in press. "Early Holocene Mortuary Practices and Hunter-Gatherer Adaptations in Southern Somalia." World Archaeology.

Brandt, S. A. and N. Carder. 1987. "Pastoral Rock Art in the Horn of Africa: Making Sense of Udder Chaos." World Archaeology 19: 194-213.

Brandt, S. A. and T. H. Gresham. in press. "The Stone Age of Somalia." L'Anthropologie.

Carder, N. 1988. Modeling the Evolution of Pastoral Rock Art in the Horn of Africa. Master's thesis, University of Georgia.

Clark, J. D. 1954. The Prehistoric Cultures of the Horn of Africa. Cambridge: Cambridge University Press.

Clark, J. D. 1982. "The Cultures of the Middle Palaeolithic/Middle Stone Age." In The Cambridge History of Africa vol.1. Ed. J. D. Clark. Cambridge: Cambridge University Press, pp.248-341.

Coltorti, M. and M. Mussi. 1987. "Late Stone Age Hunter-Gatherers of the Jubba Valley, Southern Somalia." Nyame Akuma 28: 32-33.

Dyson-Hudson, R. and E. A. Smith. 1978. "Human Territoriality: an Ecological Reassessment." American Anthropologist 80: 21-41.

Gasse, F., R. Rognon, and F. A. Street. 1980. "Quaternary History of the Afar and Ethiopian Rift Lakes." In The Sahara and the Nile. Eds. M. A. J. Williams and H. Faure. Rotterdam: A. A. Balkema.

Graziosi, P. 1940. L'Eta della pietra in Somalia. Firenze: Centro di Studi Coloniali.

Merrick, H. V. 1975. Changes in Later Pleistocene Lithic Industries in Eastern Africa. Ph.D. dissertation, University of California, Berkeley.

Mussi, M. 1982. "Archaeological Survey in Southern Somalia." Nyame Akuma 20: 45.

Mussi, M. 1984. "Excavations in Southern Somalia." Nyame Akuma 24/25: 18.

Mussi, M. 1987. "Preliminary Report on Buur Medow 1, A LSA Site in the Middle Jubba Valley (Southern Somalia)." Nyame Akuma 28: 33-37.

Nelson, C. M. 1973. A Comparative Analysis of Twenty-Nine Later Stone Age Occurrences in East Africa. Ph.D. dissertation, University of California, Berkeley.

Puccioni, N. 1919. "Studi sui materiali antropologici ed etnografici raccolti dalla missione Stefanini - Paoli nella Somalia Italiana meridionale." Archivio per l'Antropologia ed l'Ethnologia 49.

Technital Spa. 1977. Baardheere Flood Detention Reservoir Photogeological Maps (1:20,000). Rome.

Trump, E. 1987. JESS Interim Report on Aerial Photography Interpretation. JESS Report No. 13. Burlington: Associates in Rural Development, Inc.

Van Campo, E., J. C. Duplessy, and M. Rossignol-Strick. 1982. "Climatic Conditions Deduced from a 150-kyr Oxygen Isotope-Pollen Record from the Arabian Sea." Nature 296: 56-59.

Willey, G. R. and J. A. Sabloff. 1980. A History of American Archaeology. Second Edition. San Francisco: W. H. Freeman and Co.

APPENDIX A

Scope of Work--Phase II--Cultural Heritage

Proposed Candidates: Dr. Stephen Brandt
Dr. Tom Gresham

1. The contractor will conduct an eight week consultancy in Somalia beginning on or about June 1987 for Associates in Rural Development, Inc. (ARD) as a part of the Jubba Environmental and Socioeconomic Studies (JESS).

2. The general focus of this consultancy will be to conduct a reconnaissance archaeological survey of the proposed inundation zone and environs of the Baardheere Dam.

3. Prior to departure for Somalia, the consultant will receive written or telephone briefings from the ARD project manager. JESS will make preliminary inquiries concerning the consultant's logistical needs, such as locate brokers in Baardheere for camel and donkey caravans. However, the consultant will have to make final arrangements after arriving in Somalia.

4. Upon arrival in Somalia, the consultant will hold briefing meetings with the USAID project manager or designate, the JESS team leader or designate and the JESS anthropologist to discuss the consultant's scope of work. At these meetings, a means for progress reporting during this consultancy will be defined.

5. The consultant will take responsibility for conducting an archaeological reconnaissance between the dam site and the upper end of the proposed reservoir at Luuq.

6. In the course of this survey, the consultant will locate, map and describe cultural heritage sites important to understanding prehistory of this region. Map scales will correspond to scales presently in use by the JESS team.

7. The consultant will map and describe settlement and land-use patterns over time in the upper Jubba Valley based on findings of the survey. A fundamental objective is to discern temporal changes in human mobility and settlement patterns.

8. Based on survey results, the consultant will formulate recommendations for a cultural heritage salvage for the inundation area which might be implemented by the Government of the Somali Democratic Republic prior to closure of the Baardheere Dam.

9. All artifacts collected in the course of the survey will be handled and stored in strict accordance to Somali law. It is the responsibility of the consultant to ensure strict adherence with the law.

10. A word-processed draft report for this consultancy will be delivered to the JESS team leader at least one full day prior to departure from Somalia. This report will be written in a format which meets guidelines which the consultant will receive from the JESS team leader. This report will constitute a basis for a final briefing with the USAID project manager, the JESS team leader and project personnel from the Ministry of Jubba Valley Development (MJVD). Revisions to a final report should be completed within two weeks after receiving comments from JESS and ARD.

11. At the discretion of the JESS team leader, the consultant may be required to present a one hour training seminar at the MJVD on a topic related to this consultancy.

97

APPENDIX B1: SITE FORM

JUBBA Environmental and Socioeconomic Studies Project

Archaeological Site Survey Form

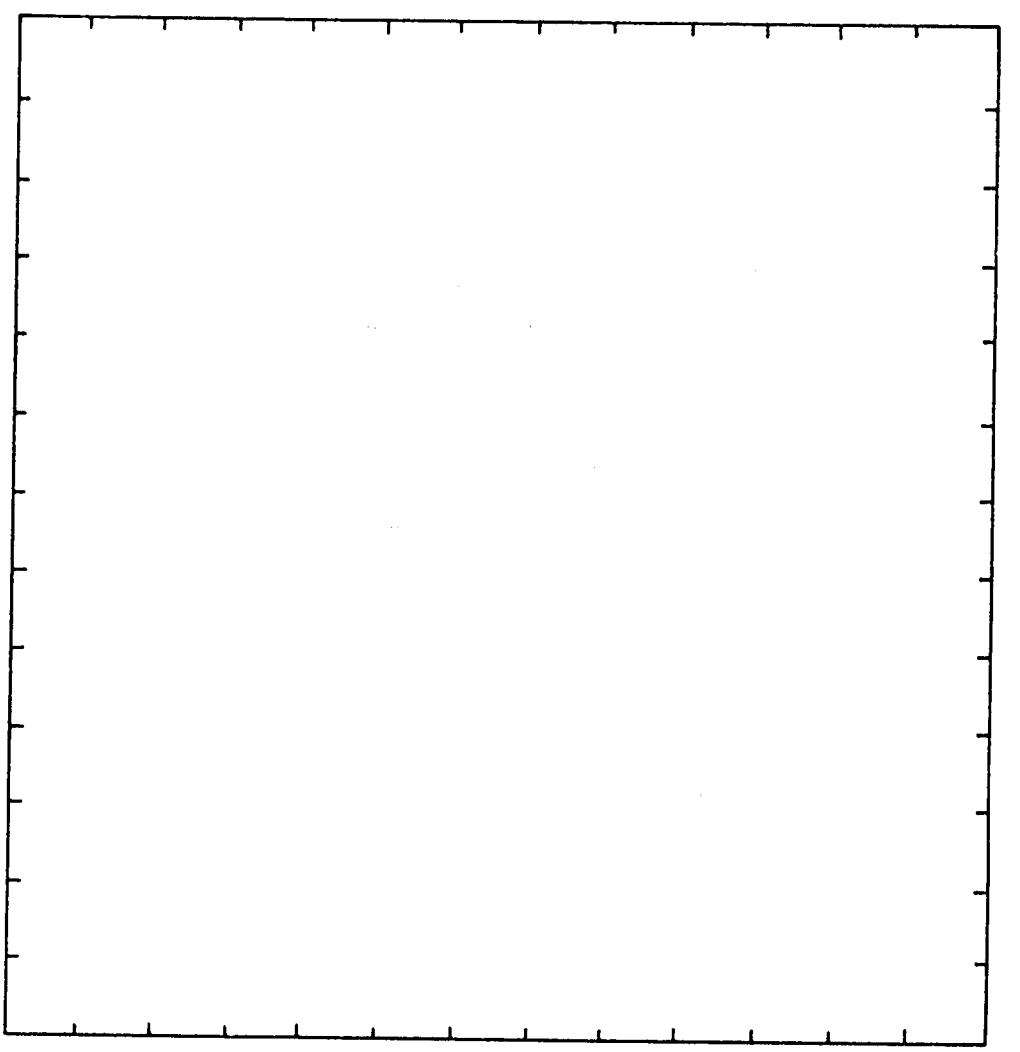
Date: Time: Surveyors:

Location: 1. SW 2. SE 3. CW 4. CE 5. NW 6. NE

GENERAL SITE LOCATION

1. Site #:
2. Air photo #:
3. Topo#:
4. Tug #:
5. Transect #:
6. Distance from Dam:

Profile:



Scale:

98

GENERAL SITE ENVIRONMENT

7. Topography:

0. extends from ... to ...
1. hill top
2. hill slope
3. foot of hill
4. plain
5. 1st levee
6. 2nd levee
7. first terrace
8. undiff. bottoms
9. second terrace

8. Location of Artifacts

1. surface
2. ravine
3. stream bed
4. river bed
5. road cut
6. path
7. disturbance

9. Vegetation

1. bush-land
2. bushed grassland
3. bush-land thicket
4. forest
5. grassland
6. sand dunes
7. woodland
8. wooded grassland
9. cleared/deforested
10. burned area

10. Height above River

1. 0-1 m
2. 1-3 m
3. 3-5 m
4. greater than 5 m

11. Soil Type/Texture

1. clay/silt
2. sand
3. gravel/rocky
4. loam
5. duracrust

12. Soil Color

1. white/pale
2. light brown
3. reddish
4. dark brown
5. dark grey/black

13. Known Depth of Cultural Deposits

5. surface
6. shallow (0-2 cm)
7. medium (2-100 cm)
8. deep (over 1 m)
9. likely extends beyond known depth
10. surface known, possible depth

14. Soil Erosion

1. deflation
2. bisected by tug
3. ravine

15a. Closest Water Source/Type

1. river
2. permanent stream
3. seasonal stream
4. spring/seep
5. spring/pool
6. artificial well
7. artificial pond
8. natural pond
9. swamp
10. seasonally flooded low-lying area
11. bedrock catchment

15b. Maximum Width of Nearest Water

_____

16. Distance to Nearest Water

_____

17. Special/Natural/Resources

1. quarriable quartz
2. quarriable chert
3. other lithics
4. pottery clay
5. hematite/magnetite

18. Evidence of Animal Use

1. burrows
2. animal bones/lair
3. animal dung

99

19. Modern Land Use

0. [nearby-within view]
1. [abandoned]
2. unknown
3. homestead (max 3)
4. village
5. pastoral camp
6. rain-fed cultivation
7. irrigated cultivation
8. flood crops - riverbank
9. flood crops - depression
10. storage
11. pottery making
12. pottery storage
13. undifferentiated cultivation

20. Land Modification

1. unknown
2. plowed
3. levees
4. roads
5. terraces

21. Predominant Crops

1. sorghum
2. sesame
3. maize
4. fruit trees
5. other

GENERAL SITE INFORMATION

22. Type of Archaeological Site

1. rock shelter
2. cave
3. open air site - lithic
4. open air site - ceramic
5. stone cairn
6. grave/tomb
7. shrine
8. mosque
9. monument
10. building
11. homestead
12. village
13. structural feature
14. rock art
15. iron slag

23. Site length (m) _____

24. Site Width (m) _____

25. Age/Cultural Affiliation

1. LSA
2. MSA
3. ESA
4. Iron Age
5. Islamic
6. Colonial
7. modern
8. unknown lithic
9. unknown ceramic
10. unknown

26. Associated Features

1. storage pit
2. hearth
3. fire pit
4. earthen mound
5. stone cairn
6. stone scatter

27. Characterization of Assemblage

1. chert artifacts
2. quartz artifacts
3. other flaked stone artifact
4. pottery
5. grinding stones
6. metal/glass
7. no artifacts - features only
8. modern-plastics, fiber
9. fire-cracked rock

28. Recognized Tools

1. hand axe
2. bifacial points
3. unifacial points
4. microliths
5. side scrapers
6. end scrapers
7. burin
8. bec/perforator
9. Levallois points/flakes
10. unshaped tools

29. Overall Lithic Density

1. none
2. trace
3. light
4. moderate
5. heavy

100

30. % of Quartz Lithics _____

31. % of Chert Lithics _____

32. % of Other Lithics _____

33. Estimated Lithic Artifacts

1. less than 10
2. 10-50
3. 51-100
4. 101-500
5. 501-1,000
6. over 1,000

34. Sherd Density

1. none
2. trace
3. light
4. moderate
5. heavy

35. Estimated # of Potsherds

1. less than 10
2. 10-50
3. 51-100
4. 101-500
5. 501-1,000
6. over 1,000

36. # of Grind Stones/Frags

1. less than 5
2. 6-10
3. 11-25
4. 26-50
5. over 50

37. # of Rock Cairns _____

38. Shape of Cairns

1. all round
2. all linear
3. some of both

39. Average Length of Linear Cairns:

_____

40. Average Height of Linear Cairns:

_____

41. Average Diameter of Round Cairns:

_____

42. Average Height of Round Cairns:

_____

43. Organic Preservation

1. bone
2. shell
3. charcoal
4. ash
5. vegetal remains

44. Sampling Technique

1. random collection
2. 100% collection
3. density collection (3 m dia.)
4. all I.D tools, sherds collected
5. most I.D. tools, sherds collected
6. no collection

45. Other Samples Taken

1. raw materials
2. organic
3. C-14

46. Attached Map or Form?

1. map
2. form
3. rock art sketches

47. Significance

1. none
2. little
3. medium
4. high

Notes:

_____

_____

_____

_____

APPENDIX B2:JESS ARCHAEOLOGICAL SITE ASSEMBLAGE FORM

FORM#___**ANALYST**___**DATE**_____**SITE#**_____ **LOCATION**_____ **>1 FORM PER SITE**_____

SAMPLING: 1.random 2.100% 3.density 4. All ID 5. Most ID

LITHICS: total#_____ total wt._____ DENSITY: total#_____ total wt._____

ABRASION: 1. none 2.light 3. moderate 4. heavy

ALTERATION: 1. varnished 2. heat fractured 3. color altered

AMOUNT PATINATION(%): 1.<25% 2. 25-50% 3. 50-75% 4. 75-100%

DEGREE PATINATION: 1. light 2. moderate 3. heavy

RAW MATERIAL(#): Chert_____ Quartz/Quartzite_____ Sand/Siltstone_____

Basalt_____ Limestone_____ Other_____

DOMINANT CHERT: 1. undiff. 2. blue/grey/brown/white 3. fine-grained brown

4. other browns 5. multi-colored pebbles

ARTIFACT CLASS(#): shaped tools_____ unshaped tools_____ cores_____

angular waste_____ flakes_____ blades_____ Lev. flakes_____ Lev. points-

SHAPED TOOL TYPOLOGY:

Code	#	Code	#	Code	#	Code	#	Code	#

CORE TYPOLOGY:

Code	#	Code	#	Code	#	Code	#	Code	#

CERAMIC SUMMARY: total wt.____ total #_____

(#) plain body_____ plain rim_____ dec. body_____ dec. rim_____ non-Somali_____

NEW AGE/STAGE: 1.big MSA 2.little MSA 3.undiff MSA 4.blade LSA 5.micro LSA

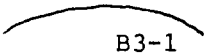
6.undiff LSA 7.modern 8.undiff. lithic 9.undiff. ceramic

APPENDIX B3

JESS Survey 1987-Pottery Analysis Form

Site No. ____ Date: ____ Recorder: ____

	Dec.	Undec.	Total
No.Rim	____	____	____
No.Rim/Body	____	____	____
No.Body	____	____	____
No.Lug/Body	____	____	____
No.Hand/Body	____	____	____

Surface Decoration		Body	Rim	Lip	Handle
1 Halbad Jiife					
Incised Combed 2.Halbad Jooge		11 ____	12 ____	13 ____	14 ____ 18 ____
Incised Combed 3.Jiiddo/Incised		21 ____ 25 ____	22 ____ 26 ____	23 ____ 27 ____	24 ____ 28 ____
4.Baaley/Incised		31 ____	32 ____	33 ____	34 ____
5.Baaley-Beenad/Incised		41 ____	42 ____	43 ____	44 ____
6.Maroog/Combed		51 ____	52 ____	53 ____	54 ____
7 Fraante/Incised		61 ____	62 ____	63 ____	64 ____
8.Saamow Sagaar/Incised		71 ____	72 ____	73 ____	74 ____
9 Dhargaas/Incised		81 ____	82 ____	83 ____	84 ____
10.Xariijin 1/Incised		91 ____	92 ____	93 ____	94 ____
11 Xariijin 2/Incised		101 ____	102 ____	103 ____	104 ____
		111 ____	112 ____	113 ____	114 ____

12.Kasiir/Modeling

13.Sursur/Fing/nail Imp. 121 ---- 122 ----123---- 124 ----

))))))

14.Kasdi-Dibi/Incised 131 ---- 132 ----133---- 134 ----

15.Firinje/Incised 141 ---- 142 ----143---- 144 ----

16.Dhuun/Stamping 151 ---- 152 ----153---- 154 ----

0 0 0 0

17.Andaano/Combing 161 ---- 162 ----163---- 164 ----

18.Rocker Stamping 171 ---- 172 ----173---- 174 ----

19.Falladdh/Incised 181 ---- 182 ----183---- 184 ----

>>> or —> —>

20.Il/Stamping 191 ---- 192 ----193---- 194 ----

21.Durdur-Xariig 201 ---- 202 ----203---- 204 ----

Combing
~~Stamping~~
22.Tobacco/Pinch 211 ---- 212 ----213---- 214 ----

23.Honey Comb/Stamping 221 ---- 222 ----223---- 224 ----

24.Borehole/Drilling 231 ---- 232 ----233---- 234 ----

241 ---- 242 ----243---- 244 ----

Rim Thickness: _____ Avge.: ____
Body Thickness: _____ Avge.: ___
Overall Color: _____
Weathered: _____
App Age: _____
Rim Type: _____
Rim Diameter: _____

Comments: _____

_____

APPENDIX C: SITE DATA

This appendix presents the entries for 26 variables for the 686 recorded sites. The abbreviated variable headings used are explained below. The numbers in parentheses refer to variable numbers on the site form (Appendix B1). The values for the nominal variables are also listed in Appendix B1.

L= Location
Site= Site Number (1)
Sitet= Site Type (22)
Sig= Significance (47)
Sit= Depth of Cultural Deposits (13)
Len= Site Length (23)
Wid= Site Width (24)
Sitesi- Site Size (length x width computed)
Art= Location of Artifacts (8)
T= Tog Number (4) [applies only to Central Section]
Tra= Transect Number (5) [applies only to Central Section]
Dista= Distance from Dam (6) [applies only to Southern and Northern Sections]
Topograp= Topography (7) [values of landforms are listed from the river to the site; the last value is the landform on which the site is situated; if a site extends to two landforms a "0" is coded between those landform values]
Ve= Vegetation (9)
Ht= Height above River (10)
So= Soil Type/Texture (11)
H2OS= Closest Water Source/Type (15a)
H2OD= Distance to Nearest Water (16)
Modern= Modern Land Use (19)
Cro= Predominant Crops (21)
Fe= Associated Features (26)
#C= Number of Rock Cairns (37)
C= Shape of Cairns (38)
Li= Average Length of Linear Cairns (39)
Lin= Average Height of Linear Cairns (40)
Ro= Average Diameter of Round Cairns (41)
Rou= Average Height of Round Cairns (42)

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
1	1	3	1	5	15	15	225	1			0.3	5703	1
1	2	3	1	5	50	15	750	1			0.4	57302	1
1	3	36	3	10	80	70	5600	126			0.6	57	1
1	4	3	2	5	65	50	3250	1			2.4	570302	1
1	5	3	1	5	55	25	1375	1			2.5	570302	1
1	6	3	1	5	20	10	200	1			2.6	5732	1
1	7	3	2	5	180	130	23400	12			2.9	570302	1
1	8	3	1	5	375	150	56250	1			5	570302	1
1	9	6	1	5	15	10	150	1			6.7	5832	1
1	10	6	1	5	20	18	360	1			9.3	583	1
1	11	3	1	5	25	10	250	12			9.4	5832	1
1	12	5	1	5	5	5	25	1			9.6	583	1
1	13	5	1	5	4	4	16	1			9.7	5832	1
1	14	3	2	5	30	15	450	1			11	5703	1
1	15	3	1	5	40	15	600	1			11.9	53832	1
1	16	345	2	5	80	70	5600	1			12.3	57	1
1	17	346	3	510	200	90	18000	1			12.5	58703	1
1	18	3	1	5	30	25	750	1			13.4	5832	1
1	19	3	3	10	90	35	3150	12			13.7	57	1
1	20	3	1	5	30	15	450	1			15.5	5832	1
1	21	35	1	5	30	20	600	12			17.3	58302	1
1	22	5	1	5	25	10	250	1			18.7	5832	1
1	23	35	2	5	60	40	2400	12			19.6	5870302	1
1	24	3	3	10	200	35	7000	12			20.5	5870302	1
1	25	346	2	5	400	320	128000	12			21.7	58703	1
1	26	3	3	5	100	70	7000	12			22.1	587	1
1	27	3	2	5	80	15	1200	1			23	58703	1
1	28	36	2	5	250	30	7500	1			25.2	5870302	1
1	29	3	2	5	160	60	9600	12			25.5	568703	1
1	30	2	2		4	4	16				25.6	11	1
1	31	6	1	5	12	9	108	1			25.2	58	5
1	32	3	3	5	20	10	200	1			27.5	5832	1
1	33	6	1	5	10	7	70	1			27.5	583	5
1	34	3	3	5	500	80	40000	12			28.5	5870302	1
1	35	6	1	5	11	8	88	1			32.3	587	1
1	36	5	1	5	6	6	36	1			33.4	5832	1
1	37	6	1	5	8	7	56	1			35.5	583	1
1	38	5	1	5	4	4	16	1			35.8	583	1
1	39	36	1	5	30	30	900	1			37.4	587	1
1	40	6	1	5	18	16	288	1			42.8	587	1
1	41	34	2	5	100	60	6000	12			44.5	5870302	1
1	42	346	1	5	40	45	1800	1			44.7	58703	1
1	43	6	1	5	16	12	192	1			45.9	7	1
1	44	2	1		4	4	16				48.2	11	
1	45	36	1	5	100	40	4000	12			49	58302	1
1	46	34	1	5	75	20	1500	12			49.4	5870302	1
1	47	1	4	10	20	4	80	1			49.5	11	1
1	48	2	3		30	3	90				49.5	11	1
1	49	1	3		6	4	24				53.6	11	1
1	50	1	3		6	2	12				53.5	11	1
1	51	1	2		8	3	24				53.2	11	1
1	52	1	3	10	8	3	24	1			52.5	11	1
1	53	3	2	5	250	40	10000	12			55.5	5870302	1
1	54	3	3	5	70	25	1750	12			55.6	5302	1
1	55	214	4	10	7	8	56	1			55.8	11	1
1	56	114	4		7	3	21	5			56.2	11	1

101

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
1	1	4	13	3	1	40									
1	2	4	13	2	1	70									
1	3	4	2	2	3	5	5		5	8	2	3	0.8		
1	4	4	23	2	3	15	15								
1	5	4	23	2	13	15									
1	6	4	23	2	1	30									
1	7	4	23	2	3	10	15								
1	8	4	23	2	3	1	15			12	3	4	0.5	7	1
1	9	4	1	3	1	100	150			1	1	6	1		
1	10	4	1	3	1	200	50			3	2	3	0.3		
1	11	4	3	2	1	200									
1	12	4	23	2	1	150				1	1			5	0.6
1	13	4	3	2	3	2				1	1			4	1
1	14	4	23	2	13	10									
1	15	4	23	2	1	60									
1	16	4	23	2	3	15	15			1	1			4	1
1	17	4	2	2	3	20	15			4	2	4	0.4		
1	18	4	23	2	1	150									
1	19	4	23	2	13	20	15								
1	20	4	3	2	3	45									
1	21	4	23	2	1	30				2	2	4	0.3		
1	22	4	23	2	1	200	3			2	1			4	0.8
1	23	4	23	2	1	15				1	1			4	0.8
1	24	4	23	2	3	20									
1	25	4	1	2	24	20	45			11	2	4	0.4		
1	26	4	23	2	24	25	15								
1	27	4	23	2	1	30	390								
1	28	4	23	2	1	120				4	4	2	0.6		
1	29	4	23	2	3	20	4								
1	30	4		3	3	10									
1	31	4	1	3	1	30	30	1		3	2	4	0.4		
1	32	4	23	2	1	150									
1	33	4	1	3	1	100				2	2	4	0.3		
1	34	4	23	2	3	30	5								
1	35	4	1	2	1	35				4	2	4	0.4		
1	36	4	23	2	1	120				1	1			6	0.6
1	37	4	1	2	1	125				1	2	5	0.6		
1	38	4	23	2	1	100				1	1			4	1
1	39	4	1	2	1	40				7	3	4	0.3		
1	40	4	1	2	1	60	50			7	2	5	0.3		
1	41	4	23	2	3	20									
1	42	4	23	2	3	20	15			2	2	4	0.2		
1	43	4	1	2	1	75	390	13		3	2	4	0.4		
1	44	4			1	70									
1	45	4	1	2	1	120	30			2	2	5	0.4		
1	46	4	23	2	3	25	15								
1	47	4		5	3	5									
1	48	4			3	10									
1	49	4		3	1	30									
1	50	4		3	1	30									
1	51	4		3	1	45	15		2						
1	52	4		3	1	40	1510		2						
1	53	4	23	2	3	20	3								
1	54	4	23	2	1	20									
1	55	4		3	1	35	15		2						
1	56	4		3	1	40									

108

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
1	57	214	4		7	6	42				56.1	11	1
1	58	2	1		6	2	12				57.3	11	1
1	59	6	1	5	9	7	63	1			57.7	583	1
1	60	5	1	5	4	4	16	1			59.8	5832	1
1	61	3	1	5	60	20	1200	1			60.2	5832	1
1	62	3	2	5	60	20	1200	12			60.4	5832	1
1	63	34	3	5	330	20	6600	1			63.2	5703	1
1	64	346	2	5	40	30	1200	1			63.3	570302	1
1	65	34	1	5	30	30	900	1			63.5	5703	1
1	66	5	1	5	8	8	64				65.7	5832	1
1	67	34	1	5	100	25	2500	12			66.7	58302	1
1	68	2	2	5	20	7	140	12			66.9	11	
1	69	36	1	5	90	25	2250	12			67	5870302	1
1	70	1	2		8	2	16				67.8	11	
1	71	2	1		4	3	12				67.9	11	1
1	72	56	1	5	14	7	98	1			71.7	586832	1
1	73	6	1	5	16	14	224	1			71.8	586	1
1	74	6	1	5	14	10	140	1			73.1	5832	1
1	75	6	1	5	5	5	25	1			73.1	586	1
1	76	34	1	5	70	25	1750	12			76.3	5832	1
1	77	56	1	5	10	8	80	1			76.5	5832	1
1	78	3	1	5	25	20	500	12			79.4	58302	1
1	79	346	1	5	40	20	800	1			79.5	58703	1
1	80	346	3	10	60	50	3000	12			79.7	5687	1
1	81	3	1	5	25	20	500	12			81	58687	1
2	1	3	1	5	7	5	35	1			0.9	5832	1
2	2	346	2	59	80	35	2800	1			4.05	583	1
2	3	3	1	5	35	30	1050	16			4.35	583	1
2	4	3	3	59	300	30	9000	16			4.5	58	1
2	5	6	1	5	20	10	200	1			4.8	58	1
2	6	3	2	5	70	15	1050	1			5.4	5832	1
2	7	3	2	5	80	12	960	1			6	583	1
2	8	3	1	5	15	15	225	1			7.8	5832	1
2	9	36	3	510	20	25	500	16			9	583	1
2	10	3	1	5	60	25	1500	16			10.35	2	1
2	11	5	1	5	5	5	25	1			10.95	2	1
2	12	3	1	5	60	15	900	1			11.55	5832	1
2	13	3	2	5	70	15	1050	1			16.5	5832	1
2	14	[illegible]	1	5	50	20	1000	1			16.8	5832	1
2	15	3[illegible]	1	5	30	25	750	167			16.95	5832	1
2	16	3	1	5	50	20	1000	1			18	5832	1
2	17	3	1	5	20	15	300	1			19.5	5832	1
2	18	3	1	5	25	20	500	1			22.8	5832	1
2	19	36	1	5	35	30	1050	17			22.9	5832	1
2	20	34	3	5	85	65	5525	1			24	583	1
2	21	3	1	5	45	30	1350	1			25.65	58632	1
2	22	1	3		20	6	120	1			27.3	58683211	1
2	23	2	4	9	25	3	75	1			27.75	58683211	1
2	24	6	1	5	5	5	25	1			28.2	58	9
2	25	6	1	5	25	15	375	1			30.9	583	1
2	26	6	1	5	10	20	200	1			31.35	5832	1
2	27	3	1	5	60	30	1800	1			34.5	5832	1
2	28	6	1	5	20	20	400	1			35.4	583	1
2	29	3	1	5	30	20	600	1			35.7	583	1
2	30	6	1	5	20	20	400	1			36.3	5832	19
2	31	34	3	5	85	70	5950	1			38.4	5832	1

1011

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
1	57	4		3	1	40									
1	58	4		3	1	100									
1	59	4	1	2	1	75	40			3	2	4	0.4		
1	60	4	2	2	1	120				1	1			4	0.5
1	61	4	23	2	1	90									
1	62	4	23	2	1	90									
1	63	3	23	2	1	15	15								
1	64	4	123	2	1	10				5	2	4	0.2		
1	65	3	23	2	3	10									
1	66	4	23	2	1	35				1	1			8	1.5
1	67	4	23	2	3	30									
1	68	4	13	3	3	5									
1	69	4	23	2	3	30				8	2	3	0.3		
1	70	4			1	70									
1	71	4		2	1	60									
1	72	4	2	2	1	100				2	1			7	0.7
1	73	4	1	3	1	70				2	2	4	0.3		
1	74	4	1	3	1	150				2	2	6	0.4		
1	75	3	2	2	1	60	14			2	1	4	0.6		
1	76	4	23	2	3	20									
1	77	4	23	2	3	10				2	3	4	0.4	8	0.7
1	78	4	23	2	13	30									
1	79	4	23	2	1	100				3	3	6	0.3		
1	80	4	12	2	13	30	50			32	2	4	0.4		
1	81	4	23	2	3	25									
2	1	4	3	2	1	45	510								
2	2	4	2	2	1	100	510			2	2	2	0.5		
2	3	4	1	2	3	20									
2	4	4	1	2	3	150	510								
2	5	4	1	2	3	180			6	11	2	3	0.3		
2	6	4	1	2	1	200	30	12							
2	7	4	1	2	3	100	30								
2	8	4	1	2	1	100	30								
2	9	4	1	2	13	100				11	2	3	0.5		
2	10	4	1	2	13	50									
2	11	4	1	2	13	100	50			1	1			5	0.5
2	12	3	1	2	1	75	3090								
2	13	3	13	2	1	80	13090	13							
2	14	3	13	2	1	100									
2	15	3	1	2	1	75	30	13		11	2	3	0.5		
2	16	3	13	2	1	75	4090	3							
2	17	4	13	2	1	100									
2	18	3	13	2	3	10									
2	19	4	1	2	3	20			6	2	2	3	0.4		
2	20	3	13	2	1	150	405								
2	21	3	13	2	3	10	3060	3							
2	22	4	1	3	3	20	8090	23	2						
2	23	4	1	3	3	10	60								
2	24	3	1	3	1	50	8090	3		1	2	3	0.4		
2	25	4	1	2	1	100				11	2	3	0.4		
2	26	4	1	2	3	100				2	2	3	0.3		
2	27	4	13	2	1	150									
2	28	4	1	2	1	75			4	6	2	3	0.5		
2	29	4	1	2	3	10									
2	30	4	13	2	1	120	30			8	2	3	0.5		
2	31	3	1	2	3	5	3								

110

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
2	32	34	1	5	35	40	1400	1			38.55	5832	1
2	33	5	1	5	4	4	16	1			40.05	5832	1
2	34	6	1	5	7	10	70	1			41.7	5832	1
2	35	3456	3	5	90	40	3600	1			41.85	5832	1
2	36	3	2	5	50	40	2000	1			42	583	1
2	37	56	1	5	35	20	700	1			43.65	583	19
2	38	34	3	59	75	30	2250	1			44.4	583	1
2	39	14	3	5	2	3	6	15			45.3	2	3
2	40	6	1	5	15	8	120	1			48	5832	39
2	41	6	1	5	5	5	25	1			50.7	58	1
2	42	6	1	4	8	5	40	1			52.5	5832	39
2	43	3	1	5	120	30	3600	1			54.75	5832	1
2	44	114	4	5	10	5	50	1			56.25	583211	3
2	45	114	4	5	40	15	600	1			60	583211	3
2	46	34	3	5	70	30	2100	1			59.75	5832	1
2	47	5	1	5	40	20	800	1			63.9	5832	19
2	48	114	4		10	4	40	1			55.5	83211	3
2	49	114	4		20	2	40	1			55.6	83211	3
2	50	114	4		10	3	30	1			55.62	83211	3
2	51	1314	4	5	30	45	1350	1			73.05	83211	1
2	52	356	3	5	150	40	6000	1			73.06	5843	1
2	53	13	2	5	40	40	1600	1			73.4	3211	1
2	54	6	1	5	10	5	50	1			75.3	5832	1
2	55	56	1	5	60	60	3600	1			75.5	5832	1
2	56	5	1	5	7	8	56	1			75.7	583	1
2	57	56	1	5	18	18	324	1			76.1	5832	1
2	58	34	4	58	50	50	2500	17			76.5	5832	1
2	59	567	1	5	40	50	2000	1			78.9	583	1
2	60	5	1	5	5	5	25	1			82.95	5832	1
3	1	3	1	5	34	20	680	1	G			4	2
3	2	3	1	5	6	4	24	1	G			4	2
3	3	35	1	10	60	16	960	1	G			4	2
3	4	3	1	5	16	11	176	1	G			4	2
3	5	3	1	5	65	40	2600	1	F			4	2
3	6	3	2	10	425	135	57375	1	C			4	2
3	7	3	1	5	190	80	15200	1	A			4	2
3	8	3	1	5	45	40	1800	1	A			4	2
3	9	5	1	5	7	6	42	12	C			4	2
3	12	35	1	5	200	80	16000	1		6		4	2
3	13	3	1	5	500	150	75000	1		8		4	2
3	14	3	1	5	350	100	35000	1		8		4	2
3	15	3	1	10	300	100	30000	12		10		4	2
3	16	5	1	5	3	2	6	1		18		4	2
3	17	3	1	5	140	100	14000	1		22		2	2
3	18	3	1	5	100	30	3000	1		22		4	2
3	19	3	1	5	150	80	12000	1		22		4	2
3	20	3	1	5	100	60	6000	1		22		2	2
3	21	3	1	5	80	60	4800	1		22		2	2
3	22	3	1	5	130	80	10400	1		26		1	2
3	23	3	1	5	130	90	11700	1		30		4	2
3	24	6	1	7	50	30	1500	1		34		9	2
3	25	6	1	5	30	20	600	1		60		4	2
3	26	4	1	5	9	5	45	1		60		4	2
3	27	356	1	10	500	300	150000	1		68		12	2
3	28	34	2	5	620	190	117800	1		80		4	2
3	29	3	1	5	210	210	44100	1		88		2	2

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
2	32	4	13	2	3	10									
2	33	4	13	2	1	200				1	1			4	0.4
2	34	4	13	2	1	150				3	2	3	0.4		
2	35	4	1	2	3	20				3	3	3	0.5	4	0.5
2	36	4	1	2	3	100									
2	37	4	1	2	1	150				14	3	3	0.5	3	0.5
2	38	3	1	2	3	10	130								
2	39	4	13	2	1	50									
2	40	4	13	2	1	100	3080	13		5	2	3	0.3		
2	41	3	2	3	1	30				1	2	3	0.4		
2	42	4	13	4	1	200	30			1	2	4	0.6		
2	43	4	13	2	2	15	30								
2	44	4			1	150	10								
2	45	4			1	200	809010	13							
2	46	3	13	2	3	20	380	31							
2	47	3	13	2	3	5	4890	1		14	2	4	0.5		
2	48	4			1	50									
2	49	4			1	50									
2	50	4			1	50									
2	51	34	13	4	1235	100	10		2						
2	52	4	13	2	2	10			5	2	3	3	0.7	3	0.7
2	53	4	13	3	2	50									
2	54	4	13	32	3	50	6090	1		4	2	3	0.4		
2	55	4	13	32	3	100	6090	13		11	3	3	0.5	3	0.5
2	56	3	13	2	3	100			2	3	1			4	1
2	57	4	13	2	3	60	50		4	8	3	3	0.5		
2	58	4	13	2	3	100	50								
2	59	34	13	2	13	150				11	3	3	0.6		
2	60	4	13	2	13	150				1	1			5	1
3	1		1	1	3	25									
3	2	3	1	1	3	14									
3	3	4	1	1	3	0	13			1	1			3	0.4
3	4	4	1	3	3	0									
3	5	3	1	1	3	0									
3	6	4	1	3	3	0									
3	7	4	13	1	3	0									
3	8	4	13	1	3	100									
3	9	4	1	3	3	35				1	1			7	0.5
3	12		13	3	3	150				1	1			9	0.8
3	13		1	3	3	60	15								
3	14		13	1	2	750									
3	15		13	3	3	350									
3	16	1	1	3	3	60				1	1			3	0.4
3	17	1	13	3	3	100									
3	18	1	1	2	3	40									
3	19	1	13	3	3	200									
3	20	4	3	2	1	600									
3	21	1	3	2	1	400									
3	22	4	3	1	1	400									
3	23	1	13	1	1	700									
3	24	3	1	1	1	700	4080	3		25	2	3	0.6		
3	25	1	1	3	3	900				6	2	3			
3	26	1	1	3	3	1000	51								
3	27		13	1	3	150	5				3			4	0.4
3	28		1	2	1	1500									
3	29		13	1	1	900	40								

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
3	30	3	2	5	3	3	8	1		84		4	2
3	31	356	1	5	600	300	180000	1		40		2	2
3	32	3	1	5	280	130	36400	1		40		4	2
3	33	3	1	5	290	150	43500	1		52		4	2
3	34	4	1	5	3	3	9	1	G			4	2
3	35	3	1	10	45	40	1800	1	E			4	2
3	36	3	3	10	120	75	9000	12	E			4	2
3	37	4	1	5	8	5	40	1	E			4	2
3	38	34	1	5	45	30	1350	12	E			4	2
3	39	3	1	5	85	35	2975	12	E			4	2
3	40	3	3	9	55	40	2200	12	A			4	2
3	41	3	2	5	400	20	8000	12	A			4	2
3	42	3	3	10	400	200	80000	12	A			4	2
3	47	3	1	5	45	30	1350	1		102		4	2
3	48	3	1	5	90	80	7200	1		102		4	2
3	49	3	1	5	100	55	5500	1		102		4	2
3	50	3	1	5	40	30	1200	1		102		4	2
3	51	3	1	5	35	25	875	1		102		4	2
3	52	3	1	5	60	25	1500	1		102		4	2
3	53	3	1	5	45	15	675	1		104		4	2
3	54	3	1	5	55	25	1375	1		104		4	2
3	55	34	1	5	60	30	1800	1		104		4	2
3	56	3	1	5	60	50	3000	1		106		4	2
3	57	34	1	5	20	5	100	1		110		4	2
3	58	3	1	5	170	75	12750	1		110		4	2
3	59	34	2	5	160	140	22400	1		110		609	2
3	60	3	1	5	75	40	3000	1		134		4	2
3	61	3	1	5	40	55	2200	1		134		4	2
3	62	34	1	5	25	15	375	1		126		4	2
3	63	36	1	5	130	90	11700	1		126		4	2
3	64	3	2	5	150	100	15000	1		154		4	2
3	65	3	1	10	220	80	17600	1		154		402	2
3	66	3	1	5	175	150	26250	1		154		4	2
3	67	3	1	5	2	1	1	1	H			4	2
3	69	3	1	5	20	19	380	1	H			4	2
3	74	3	4	8	4	1	2	8	F			4	2
3	76	3	1	5	8	5	40	1	F			4	2
3	79	3	3	5	76	55	4180	1	F			4	2
3	80	6	3	6	28	16	448	1	F			4	2
3	83	3	1	5	2	2	4	2	J			4	2
3	83	3	1	5	2	2	4	2	J			4	2
3	84	3	1	5	8	5	40	1	J			4	2
3	106	3	1	5	3	2	6	6		76		4	2
3	115	3	1	5	8	6	48	1		76		4	2
3	116	3	1	5	5	5	25	1		76		4	2
3	119	3	2	9	1	1	1	7		76		4	9
3	122	34	1	5	6	2	12	1		76		4	2
3	134	3	1	10	160	75	12000	1		154		4	2
3	135	3	1	5	200	175	35000	1		154		4	2
3	136	3	1	5	55	15	825	1		138		4	2
3	137	36	3	5	350	100	35000	1		98		4	2
3	138	4	2	10	75	35	2625	1		94		5	2
3	139	3	1	5	120	110	13200	1		186		4	2
3	140	356	1	5	250	175	43750	1		186		4	2
3	141	3	1	5	110	80	8800	1		182		4	2
3	142	34	1	5	110	70	7700	1		182		4	2

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
3	30		1	3	3	1									
3	31		13	1	1	2000				8	3	5	0.4		
3	32		1	3	3	150									
3	33		13	1	1	1000									
3	34	1	1	3	3	25	50								
3	35	1	1	23	3	5	50								
3	36	2	1	2	3	25	50								
3	37	1	1	3	3	30	50								
3	38	1	1	3	3	3	40								
3	39	1	1	3	3	5	40								
3	40	1	1	3	3	5									
3	41	2	12	23	3	5									
3	42	2	13	23	3	15									
3	47	1	13	3	3	300	40								
3	48	1	1	3	3	350	40								
3	49	1	1	3	3	350	40								
3	50	1	1	3	3	400	40								
3	51	1	13	3											
3	52	1	3	3											
3	53	2	13	1	1	300	40								
3	54	2	3	2	1	250	304070								
3	55	1	1	3	3	400	40								
3	56	2	3	2	1	300	5070								
3	57	1	1	3	3	100	40								
3	58	1	1	3	3	400	40								
3	59	2	3	2	1	250	4070								
3	60	1	3	2	3	100	50								
3	61	1	3	3	3	400	40								
3	62	1	1	2	1	800	4070								
3	63	2	13	3	3	500	40		4	1	2				
3	64	1	23	23	1	350	50								
3	65	2	23	2	3	300	50								
3	66	1	13	3	3	5									
3	67		3	3	3	9									
3	69		3	3	3	60									
3	74		3	2	3	0									
3	76		1	3	3	45									
3	79		3	2	3	10									
3	80		3	2	3	50	14			4	2	4	0.7		
3	83		1	3	3	10									
3	83		1	3	2	10									
3	84		1	2	3	10									
3	106		2	3	1	600									
3	115		1	2	1	900									
3	116		1	2	1	400									
3	119		1	4	1	400	7	2							
3	122	1	2	3	3	100									
3	134	1	1	2	3	45									
3	135	1	3	2	3	50									
3	136	1	3	2	1	700	170								
3	137	1	13	23	3	300	4								
3	138	1	2	2	1	10	3070								
3	139	1	1	3	3	360									
3	140	1	3	3	3	400	40			2	3	3	0.3	3	2
3	141	1	12	3	1	550	40								
3	142	1	12	2	1	400	40								

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
3	143	3	3	5	300	100	30000	1		170		60903	2
3	167	3	1	5	85	45	3825	1		52		4	2
3	168	3	1	5	100	50	5000	1		48		4	2
3	169	36	1	5	150	100	15000	1		48		2	2
3	170	34	1	5	150	120	18000	1		72		4	2
3	171	36	1	5	240	200	48000	1		44		4	2
3	172	3	1	5	260	256	66560	1		44		12	2
3	173	3	1	5	250	180	45000	1		44		4	2
3	174	3	1	5	100	80	8000	1		56		4	2
3	175	34	1	10	140	55	7700	1		56		4	2
3	191	6	1	5	33	51	1683	1		114		4	2
3	192	34	1	5	130	195	25350	1		114		4	2
3	193	6	1	5	100	50	5000	1		114		4	2
3	194	3	1	5	80	100	8000	1		114		4	2
3	195	3	1	5	100	220	22000	1		114		4	2
4	10	34	3	5	150	75	11250	1	R			4	2
4	11	3	2	5	207	136	28152	1	V			4	2
4	43	4	1	5	6	3	18	1	U			4	2
4	44	346	3	10	350	100	35000	1	R			4	2
4	45	3	1	5	65	45	2925	12	X			4	2
4	46	3	1	5	60	45	2700	1	X			4	2
4	90	3	1	5	3	2	6	2	W			4	2
4	93	3	1	5	2	2	4	1	Y			4	2
4	95	3	1	5	8	6	48	1	X			4	1
4	97	3	1	5	2	2	4	1	X			4	2
4	123	34	1	5	11	6	66	1		76		2	2
4	124	3	1	5	9	7	63	1		52		1	1
4	125	6	1	5	15	4	60	1		44		4	1
4	126	5	1	5	5	4	20	1		44		4	1
4	127	56	1	5	20	5	100	1		44		4	2
4	128	3	1	5	6	3	18	1		44		4	1
4	129	5		5	3	3	9	1		44		4	2
4	130	6	1	5	3	1	3	1		44		4	1
4	131	3	1	5	125	35	4375	1		90		4	2
4	132	3	1	5	7	4	28	1		90		4	1
4	133	3	1	5	42	35	1470	1		102		4	2
4	144	3	1	5	30	15	450	1		34		2	3
4	145	4	1	5	15	10	150	1		34		1	2
4	146	3	1	5	90	60	5400	1		146		4	2
4	147	3	3	5	200	75	15000	1		146		4	2
4	148	36	2	5	175	110	19250	1		146		4	2
4	149	34	2	5	120	65	7800	1		142		4	2
4	150	3	1	5	280	160	44800	1		134		4	2
4	151	3	1	5	130	95	12350	1		134		4	2
4	152	3	1	5	65	55	3575	1		134		4	2
4	153	4	1	5	3	2	6	1		134		4	2
4	154	3	1	5	115	65	7475	1		130		4	2
4	155	3	1	5	70	45	3150	1		130		4	2
4	156	3	1	5	120	65	7800	1		110		4	2
4	157	3	1	5	65	40	2600	1		110		4	2
4	158	34	1	5	4	3	12	1		60		4	2
4	159	6	1	5	3	3	8	1		60		2	2
4	160	34	1	5	10	7	70	1		56		4	2
4	200	567	1	35	52	40	2080	1		64		4	2
4	201	34	1	5	20	17	340	1		64		4	2
4	202	6	1	5	57	47	2679	1		64		3	2

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
3	143	3	3	2	1	85	470								
3	167		13	1	1	1400									
3	168		1	3	3	1									
3	169		13	1	1	2000				1	2	3	0.4		
3	170		1	1	1	1000									
3	171		13	1	3	70				7	2	3	0.5		
3	172		13	1	1	1750									
3	173		1	1	3	70	50								
3	174		1	1	1	1500	45								
3	175		1	3	1	2000	6	1							
3	191		1	3	3	100				27	2	2	0.7		
3	192		13	2	3	800			6						
3	193	1	1	3	3	20				3	2	2	0.4		
3	194		3	4	3	80									
3	195	1	3	4	3	150									
4	10		1	2	3	0	46	5							
4	11		1	1	3	0			5	1	1	7			
4	43	2	1	23	3	30	50								
4	44	2	13	13	3	10	50			25	2	3			
4	45	1	13	3	3	10									
4	46	1	1	3	3	10									
4	90		3	3	3	9									
4	93		3	3	3	20									
4	95		3	2	3	15	50								
4	97		3	3	3	5	50								
4	123		3	2	1	500	40								
4	124		3	3	1	1000									
4	125		1	3	1	1800				5	2	3	0.4		
4	126		2	2	1	500				1	1			3	0.5
4	127		2	2	1	400				10	3	4	0.4		
4	128		2	2	1	300									
4	129		2	2	1	300				1	1			3	0.2
4	130		2	2	1	300				1	2	3	0.3		
4	131		3	2	3	50									
4	132		3	3	3	40									
4	133		1	3	1	500									
4	144	3	3	2	1	350	70								
4	145	1	1	2	1	450	15								
4	146	1	13	3	1	700	50								
4	147	1	1	3	3	400									
4	148	1	3	2	3	300				3	2	3	0.5		
4	149	1	1	3	3	400									
4	150	1	13	23	3	300									
4	151	1	13	23	3	350									
4	152	1	3	2	3	700									
4	153	1	1	3	3	900									
4	154	1	1	3	3	30									
4	155	1	1	3	3	150									
4	156	1	3	3	3	250									
4	157	1	3	2	1	850	5								
4	158	1	1	23	3	20	15		6						
4	159	2	3	2	3	20	15			1	2	3	0.5		
4	160	1	13	3	3	400			6						
4	200	1	13	2	3	500									
4	201	1	2	2	3	525									
4	202	2	2	2	3	600									

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
4	203	6	1	5	119	53	6307	1		60		4	2
4	204	6	1	5	2	1	2	1		68		4	2
4	205	5	1	5	3	3	6	1		68		4	2
4	208	6	1	5	5	4	20	1		76		4	2
4	212	3	1	5	4	3	12	1		80		4	2
4	213	6	1	5	7	5	35	1		80		4	2
4	214	3	1	5	57	50	2850	1		80		4	2
4	215	3	1	5	26	18	468	1		86		4	2
4	216	3	1	5	18	14	252	1		84		4	2
4	220	34	1	5	12	11	132	1		88		4	2
4	221	4	1	5	11	10	110	1		98		4	2
4	222	3	1	5	17	11	187	1		98		4	3
4	223	4	1	5	2	1	2	1		98		4	3
4	224	3	1	5	11	9	99	1		98		4	2
4	225	3	1	5	12	6	72	1		98		4	2
4	226	3	1	5	13	13	169	1		98		4	2
4	227	3	1	5	20	15	300	1		96		4	2
4	234	4	1	5	2	2	4	1		102		4	1
4	235	3	1	5	13	9	117	1		102		4	1
4	236	4	1	5	7	6	42	1		102		4	1
4	267	34	1	5	8	5	40	1		114		4	2
4	268	3	1	5	9	5	45	1		114		4	2
4	269	3	1	5	7	5	35	1		114		4	2
4	270	3	1	5	9	6	54	1		114		4	2
4	271	3	1	5	5	3	15	1		118		4	2
4	272	3	1	5	11	6	66	1		118		4	2
4	273	3	1	5	84	25	2100	1		118		4	2
4	274	3	1	5	4	5	20	1		118		4	2
4	275	3	1	5	6	5	30	1		122		4	2
4	276	3	1	5	6	4	24	1		122		4	2
4	277	4	1	5	5	3	15	1		122		4	2
4	278	4	1	5	1	1	1	1		122		4	2
4	279	3	1	5	93	300	27900	1		122		4	2
4	280	3	1	5	99	200	19800	1		122		4	2
4	281	3	1	5	14	9	126	1		122		4	2
4	282	4	1	5	17	11	187	1		126		4	2
4	283	3	1	5	9	7	63	1		106		4	2
4	284	3	1	5	17	11	187	1		106		4	2
4	285	3	1	5	9	6	54	1		106		4	2
4	286	3	1	5	7	5	35	1		106		4	2
4	287	5	1	5	3	2	6	1		106		4	2
4	288	3	1	5	8	6	48	1		106		4	2
5	82	5	1	5	20	15	300	1			115	5832	1
5	83	3	2	5	25	15	375	1			116.6	587	1
5	84	3	2	5	70	25	1750	1			117	58703	1
5	85	5	1	5	8	8	64	1			117.3	24	1
5	86	3	1	5	45	40	1800	1			117.5	24	1
5	87	6	1	5	12	8	96	1			117.5	582	1
5	88	3	1	5	40	40	1600	1			117.5	24	1
5	89	3	1	5	40	25	1000	1			117.6	4	1
5	90	3	1	5	70	30	2100	1			117.8	4	1
5	91	3	2	5	15	15	225	1			118.3	543	1
5	92	6	1	5	45	30	1350	1			118.4	543	1
5	93	3	1	5	20	20	400	1			119.4	4	1
5	94	3	3	5	25	10	250	1			119.4	3	1
5	95	3	2	5	60	30	1800	1			119.5	4	1

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
4	203	1	2	2	1	150			6	9	2				
4	204	1	2	2	3	80				1	2	2	0.4		
4	205	1	2	3	3	100				1	1			3	0.4
4	208	1	1	2	3	150				1	2	5	0.4		
4	212	1	1	2	3	600									
4	213	1	1	2	3	600	30			2	2	5			
4	214	1	3	3	1	600									
4	215	1	3	3	3	100									
4	216	1	3	3	3	100									
4	220	1	2	2	3	30									
4	221	1	2	3	3	600									
4	222	1	2	3	3	525									
4	223	1	2	3	3	400	5		3						
4	224	1	3	2	3	600									
4	225	1	2	3	3	600									
4	226	1	1	2	3	600									
4	227	1	3	2	3	200	30								
4	234		1	3	1	500									
4	235		1	3	1	200									
4	236		1	3	1	100									
4	267	1	1	2	3	50									
4	268	1	1	3	3	25									
4	269	1	2	3	3	900									
4	270	1	1	3	3	900									
4	271	1	1	3	3	150									
4	272	1	1	3	3	30									
4	273	1	1	3	3	20									
4	274	1	2	2	1	40									
4	275	1	1	3	3	10									
4	276	1	1	3	3	20									
4	277	1	1	3	3	150									
4	278	1	1	3	3	160									
4	279	1	1	3	3	150									
4	280	1	1	3	3	10									
4	281	1	1	3	3	5									
4	282	1	1	2	3	80									
4	283	1	2	2	1	900									
4	284	1	1	3	1	950									
4	285	1	1	3	3	500									
4	286	1	2	3	3	300									
4	287	1	2	3	3	100				1	1			3	0.5
4	288	1	1	3	3	40									
5	82	4	3	2	1	400				1	1			20	1.5
5	83	3	5	2	1	80									
5	84	4	3	2	1	110									
5	85	4	3	2	1	250				1	1			8	1.5
5	86	4	3	2	2	90									
5	87	4	3	2	3	80				52	3	3	0.2		
5	88	4	3	2	3	60									
5	89	4	3	2	3	50									
5	90	4	3	2	3	550									
5	91	4	3	3	1	700	50								
5	92	4	2	3	1	800				45	2	4	0.3		
5	93	4	3	2	3	85	30								
5	94	4	23	2	3	120									
5	95	4	3	2	3	120									

16

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
5	96	6	1	5	50	45	2250	1			119	4	1
5	97	5	1	1	8	8	64	1			119	4	1
5	98	36	2	5	70	25	1750	1			119	302	1
5	99	3	1	5	700	50	35000	12			119	302	1
5	100	3	2	5	90	40	3600	1			119.5	7	1
5	101	3	1	5	25	25	625	1			119.5	7302	1
5	102	36	1	5	140	40	5600	1			119.8	7	1
5	103	6	1	1	20	12	240	1			120.1	587	1
5	104	6	1	5	10	9	90	1			120.2	8	1
5	105	5	1	5	7	7	49	1			120.9	3	1
5	106	3	1	5	80	40	3200	1			121.5	1	1
5	107	6	1	1	25	25	625	1			121.3	587	1
5	108	6	1	5	10	10	100	1			121.1	587	1
5	109	3	3	5	40	30	1200	1			121.8	587	1
5	110	34	2	5	35	25	875	1			121.7	587	1
5	111	3	3	5	90	50	4500	12			121.9	587	1
5	112	3	2	5	50	40	2000	1			122.1	587	1
5	113	3	1	5	80	40	3200	1			122.3	58789	1
5	114	3	1	5	20	20	400	1			122.4	58789	1
5	115	3	1	5	90	80	7200	1			122.6	58789	1
5	116	3	1	5	50	40	2000	1			122.5	58789	1
5	117	3	1	5	30	20	600	1			122.5	58789	1
5	118	3	1	5	10	10	100	1			124.8	58789	1
5	119	3	1	5	20	20	400	1			124.8	58789	1
5	120	3	1	5	40	30	1200	1			125	58789	1
5	121	3	1	5	30	30	900	1			125.2	58789	1
5	122	3	1	5	40	40	1600	1			127	58789	1
5	123	3	1	5	50	20	1000	1			127	58789	1
5	124	6	1	5	6	5	30	1			127	5873	1
5	125	34	4	10	500	40	20000	12			124.9	587	1
5	126	5	1	5	7	7	49	1			128	14	1
5	127	56	1	5	15	10	150	1			128.2	587	1
5	128	3	1	5	20	10	200	1			128.5	587	1
5	129	6	1	5	45	20	900	1			128.6	7	1
5	130	3	1	5	20	20	400	1			128.4	7	1
5	131	4	1	5	3	3	9	1			128.4	4	1
5	132	346	1	5	400	70	28000	1			129	587	1
5	133	6	1	5	10	8	80	1			128.7	7	1
5	134	5	1	5	10	10	100	1			131.4	5832	1
5	135	5	1	5	5	5	25	1			132.1	32	1
5	136	6	1	5	8	6	48	1			134.6	5832	1
5	137	3	1	5	25	25	625	1			133.2	2	1
5	138	6	1	5	11	14	154	1			133	587	1
5	139	6	1	5	10	10	100	1			132.8	587	1
5	140	6	1	5			0	1			133.8	583	1
5	141	3	3	5	100	40	4000	12			137	7	1
5	142	3	1	5	30	30	900	1			137	14	1
5	143	3	1	5	25	20	500	1			137	3	1
5	144	3	1	5	80	60	4800	12			137	3	1
5	145	3	1	5	180	150	27000	1			137	302	1
5	146	3	2	5	130	100	13000	12			137	4	1
5	147	3	1	5	1	1	0	1			137.5	1	1
5	148	3	1	5	50	30	1500	1			137.6	4	1
5	149	3	1	5	60	30	1800	1			147	4	1
5	150	3	2	10	250	40	10000	12			147.5	3	1
5	151	3	1	5	50	30	1500	1			147.7	7	1

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
5	96	4	2	2	1	1000				30	2	4	0.2		
5	97	4	3	2	1	1000				1	1			8	1
5	98	4	23	2	1	1000				6	2	4	0.2		
5	99	4	23	2	1	800									
5	100	4	23	2	1	150									
5	101	4	3	2	1	250									
5	102	4	23	2	1	130				7	2	4	0.3		
5	103	4	5	1	1	300				4	2	3	0.4		
5	104	4	1	2	3	75				4	2	4	0.1		
5	105	4	3	2	1	400				1	1			7	1
5	106	4	23	3	3	30									
5	107	4	23	2	1	150				10	2	4	0.3		
5	108	4	23	2	1	150				4	2	4	0.1		
5	109	4	5	2	1	200									
5	110	4	5	2	1	200									
5	111	4	5	3	1	150									
5	112	4	5	2	1	150									
5	113	4	5	2	1	400									
5	114	4	5	2	1	300									
5	115	4	5	2	1	500									
5	116	4	5	2	1	350									
5	117	4	5	2	1	360									
5	118	4	5	2	1	1000									
5	119	4	5	2	1	1000									
5	120	4	5	2	1	950									
5	121	4	5	2	1	850									
5	122	4	5	2	1	550									
5	123	4	23	2	1	260									
5	124	4	23	2	1	180				1	2	4	0.5		
5	125	4	12	3	1	300									
5	126	4	3	3	1	200				1	1			7	1
5	127	4	5	1	1	250				2	3	3	0.3		
5	128	4	5	2	1	80									
5	129	4	5	2	3	25				10	2	4	0.2		
5	130	4	5	12	3	50									
5	131	4	2	2	1	500	150								
5	132	4	5	23	1	200	4			8	2	4	0.3		
5	133	4	5	2	3	50				6	2	4	0.3		
5	134	4	3	2	1	900				1	1			10	0.2
5	135	4	3	2	1	900				3	1			5	1
5	136	4	3	2	1	50				1	2	4	0.2		
5	137	4	23	4	3	100									
5	138	4	23	2	1	700				8	3	4	0.2	4	0.2
5	139	4	2	2	1	650				5	2	4	0.3		
5	140	4	1	3	1	100					2	4	0.3		
5	141	4	2	1	3	80									
5	142	4	13	3	3	80									
5	143	4	23	3	3	250									
5	144	4	13	3	3	300									
5	145	4	23	3	3	700									
5	146	4	23	3	3	80									
5	147	4	23	2	3	100									
5	148	4	2	2	3	300	30								
5	149	4	23	2	3	20									
5	150	4	2	3	1	500									
5	151	4	23	2	1	400									

120

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
5	152	3	1	5	60	30	1800	12			147.8	7	1
5	153	3	1	5	160	50	8000	12			149.7	302	1
5	154	34	1	5	50	50	2500	12			149.7	302	1
5	155	3	2	5	140	30	4200	1			146	587	1
5	156	4	1	5	30	30	900	1			145.2	583	2
5	157	3	2	5	20	15	300	12			139.8	2	1
5	158	3	1	5	30	20	600	1			147.6	587	1
5	159	3	1	5	75	25	1875	1			148	7	1
5	160	36	1	5	130	50	6500	1			148.4	7	1
5	161	3	1	5	30	20	600	1			148.6	7	1
5	162	3	1	5	30	10	300	1			152.5	7	1
5	163	3	1	5	40	20	800	1			152.7	7	1
5	164	3	2	5	50	30	1500	12			152.7	70302	1
5	165	3	1	5	25	15	375	1			152.7	703	1
5	166	35	2	5	180	50	9000	12			152.7	70302	1
5	167	3	2	5	350	100	35000	12			153.5	70302	1
5	168	5	1	5	13	11	143	1			153.5	3	1
5	169	5	1	5	10	8	80	1			153.5	3	1
5	170	36	1	5	70	40	2800	1			153.5	587	1
5	171	3	1	5	60	30	1800	1			154.2	58703	1
5	172	3	1	5	300	50	15000	1			154.5	58703	1
5	173	3	1	5	175	60	10500	1			158	703	1
5	174	3	1	5	5	5	25	1			158.5	587	1
5	175	3	1	5	25	25	625	1			160.4	5832	1
5	176	3	1	5	35	30	1050	1			161.9	703	1
5	177	3	1	5	200	40	8000	1			161.9	7	1
5	178	3	1	5	280	100	28000	12			162	70302	1
5	179	346	2	5	450	110	49500	1			162.2	5870302	1
5	180	3	1	5	260	60	15600	12			162.5	70302	1
5	181	3	1	5	20	20	400	1			162.5	7	1
5	182	3	1	5	20	20	400	12			162.8	302	1
5	183	3	2	5	560	240	134400	12			162.9	5870302	1
5	184	5	1	5	17	17	289	1			163.8	3	1
5	185	3	1	5	25	15	375	1			164.7	302	1
5	186	3	1	5	200	60	12000	1			164.8	587	1
5	187	3	2	5	180	50	9000	1			165	58302	1
5	188	3	2	5	30	30	900	1			165.2	3	1
5	189	3	1	5	25	10	250	1			165.3	3	1
5	190	36	1	5	350	60	21000	1			165.9	58302	1
5	191	3	3	5	50	25	1250	12			166.9	58703	1
5	192	3	1	5	110	30	3300	1			171.8	587	1
5	193	4	1	5	50	20	1000	1			171.6	5	6
5	194	36	2	5	70	60	4200	1			172.3	587	1
5	195	3	1	5	330	150	49500	12			176.8	43	1
5	196	34	1	5	60	60	3600	12			174.5	43	1
5	197	34	2	5	120	100	12000	1			173.3	43	1
5	198	3	2	5	325	200	65000	1			173	7	1
5	199	3	1	5	130	50	6500	12			172.7	302	1
5	200	36	2	5	220	80	17600	1			172.6	587	1
5	201	3	1	5	25	20	500	1			172.8	587	1
5	202	3	1	5	70	25	1750	1			173.4	586	1
5	203	4	3	6	45	10	450	1			178.4	5	9
5	204	4	1	6	20	10	200	1			178.3	5	9
5	205	3	1	5	325	15	4875	12			177.5	58302	1
5	206	35	1	5	150	25	3750	12			180	58302	1
5	207	3	2	5	15	15	225	1			180.4	5832	1

L	SITE	HT	SOI	SOI	H20S	H20D	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
5	152	4	23	2	1	250									
5	153	4	23	2	1	700				10	2	4	0.3		
5	154	4	23	2	1	400									
5	155	4	5	2	1	600									
5	156	4	23	2	1	300									
5	157	4	3	2	1	600									
5	158	4	5	2	1	40									
5	159	4	5	2	1	100									
5	160	4	5	2	1	300				4	2	3	0.2		
5	161	4	5	2	1	500	30								
5	162	4	23	3	3	20									
5	163	4	235	3	3	2									
5	164	4	235	3	3	50									
5	165	4	5	2	3	50									
5	166	4	235	2	3	30				1	1			6	0.6
5	167	4	235	2	3	40									
5	168	4	3	2	3	40				1	1			9	1.5
5	169	4	3	2	3	50				1	1			10	1.5
5	170	4	235	2	1	80				15	2	4	0.1		
5	171	4	23	2	1	80									
5	172	4	23	2	1	200	5								
5	173	4	23	2	1	400									
5	174	4	5	2	1	150									
5	175	4	23	2	1	400									
5	176	4	23	2	3	30									
5	177	4	3	2	3	5									
5	178	4	5	2	3	30									
5	179	4	235	2	1	50				3	2	4	0.3		
5	180	4	23	2	3	30									
5	181	4	3	5	3	40									
5	182	4	3	2	3	200									
5	183	4	235	2	1	40	3								
5	184	4	23	2	1	300				1	1			17	1.7
5	185	4	23	2	1	350									
5	186	4	5	2	1	60									
5	187	4	3	2	1	350									
5	188	4	23	2	1	400									
5	189	4	2	2	1	250									
5	190	4	3	2	1	500				10	2	4	0.2		
5	191	4	23	2	1	80									
5	192	4	5	2	3	5									
5	193	2	2	2	1	2			2						
5	194	4	5	1	1	80				10	2	4			
5	195	4	23	12	1	70									
5	196	4	23	2	1	600									
5	197	4	23	2	1	800									
5	198	4	2	3	1	400									
5	199	4	23	2	1	500									
5	200	4	5	1	1	80				2	2	4	0.2		
5	201	4	5	2	1	300									
5	202	4	2	1	1	400									
5	203	2	12	3	1	55	7	3	36						
5	204	2	1	2	1	10	7	3	36						
5	205	4	3	2	1	200									
5	206	4	3	2	1	250									
5	207	4	3	2	1	500	40								

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
5	208	4	1	6	55	35	1925	1			180.8	5	1
5	209	4	1	6	125	20	2500	1			181.6	5	5
5	210	46	1	5	60	10	600	1			182.2	5	9
5	211	34	2	5	80	15	1200	1			182.5	7	9
5	212	3	1	5	30	20	600	1			182	58302	1
5	213	46	1	6	70	30	2100	12			182.7	8	1
5	214	4	1	6	70	10	700	1			183.8	5	1
5	215	34	1	5	110	40	4400	12			188.1	57	1
5	216	5	1				0	1			136.8	4	
5	217	5	1	5			0	1			137.2	2	
5	218	6	1	5			0	1			137.4	4	
5	219	6	1	5			0	1			137.4	4	
5	220	5	1	5			0	1			137.5	2	
5	221	5	1	5			0	1			137.8	2	
5	222	6	1	5			0	1			137.8	7	
5	223	6	1	5			0	1			138	7	
5	224	6	1	5			0	1			138.1	7	
5	225	6	1	5			0	1			138.6	7	
5	226	5	1	5			0	1			138.5	2	
5	227	6	1	5			0	1			148.8	7	
5	228	6	1	5			0	1			140.8	7	
5	229	6	1	5			0	1			141.1	7	
5	230	5	1	5			0	1			142.2	4	
5	231	6	1	5			0	1			142.2	3	
5	232	6	1	5			0	1			142.4	4	
5	233	6	1	5			0	1			142.3	4	
5	234	6	1	5			0	1			142.3	4	
5	235	6	1	5			0	1			142.5	4	
5	236	5	1	5			0	1			145.1	2	
5	237	5	1	5			0	1			145.2	2	
5	238	6	1	5			0	1			145.4	7	
5	239	6	1	5			0	1			145.4	7	
5	240	6	1	5			0	1			139.9	8	
5	241	6	1	5			0	1			150.4	7	
5	242	5	1	5			0	1			151.5	3	
5	243	5	1	5			0	1			152.3	2	
5	244	5	1	5			0	1			152.5	3	
5	245	5	1	5			0	1			152.6	2	
5	246	5	1	5			0	1			152.6	2	
5	247	5	1	5			0	1			152.7	2	
5	248	5	1	5			0	1			152.9	3	
5	249	5	1	5			0	1			153.2	4	
5	250	5	1	5			0	1			153.3	2	
5	251	5	1	5			0	1			153.4	2	
5	252	5	1	5			0	1			153.5	3	
5	253	5	1	5			0	1			153.6	3	
5	254	5	1	5			0	1			153.6	2	
5	255	5	1	5			0	1			154.7	2	
5	256	6	1	5			0	1			155.2	7	
5	257	5	1	5			0	1			155.8	2	
5	258	6	1	5			0	1			157.2	7	
5	259	5	1	5			0	1			157.4	2	
5	260	5	1	5			0	1			157.7	2	
5	261	6	1	5			0	1			158.4	7	
5	262	6	1	5			0	1			158.9	3	
5	263	6	1	5			0	1			160.2	4	

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RC	ROU
5	208	4	2	1	1	5			23						
5	209	2	2	1	1	2			26						
5	210	3	2	1	1	2			3	8	2	3			
5	211	3	23	1	1	2	40								
5	212	4	3	2	1	200									
5	213	3	1	3	3	5	40			100	2	3	0.3		
5	214	2	2	2	1	2	7	3	2						
5	215	4	235	2	1	50									
5	216									1	1				
5	217									1	1				
5	218									5	2				
5	219									5					
5	220									1	1				
5	221									1	1				
5	222									4	2				
5	223									4	2				
5	224									4	2				
5	225									8	2				
5	226									1	1				
5	227									25	2				
5	228									2	2				
5	229									15	2				
5	230									3	2				
5	231									5	2				
5	232									5	2				
5	233									7	2				
5	234									5	2				
5	235									5	2				
5	236									1	1				
5	237									1	1				
5	238									30	2				
5	239									2	2				
5	240									5	2				
5	241									10	2				
5	242									1	1				
5	243									1	1				
5	244									1	1				
5	245									1	1				
5	246									1	1				
5	247									1	1				
5	248									1	1				
5	249									1	1				
5	250									1	1				
5	251									1	1				
5	252									1	1				
5	253									1	1				
5	254									1	1				
5	255									1	1				
5	256										2				
5	257									1	1				
5	258										2				
5	259									1	1				
5	260									1	1				
5	261									5	2				
5	262									4	2				
5	263									5	2				

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
5	264	6	1	5			0	1			160.2	4	
5	265	6	1	5			0	1			160.4	4	
5	266	5	1	5			0	1			160.5	3	
5	267	5	1	5			0	1			161.6	2	
5	268	6	1	5			0	1			162.7	3	
5	269	6	1	5			0	1			182.3	4	
5	270	6	1	5			0	1			182.4	4	
5	271	6	1	5			0	1			163.2	7	
5	272	6	1	5			0	1			163.4	7	
5	273	6	1	5			0	1			163.6	3	
5	274	6	1	5			0	1			163.7	8	
5	275	6	1	5			0	1			164	3	
5	276	6	1	5			0	1			165.6	7	
5	277	5	1	5			0	1			170.5	2	
5	278	5	1	5			0	1			170.7	7	
5	279	6	1	5			0	1			170.9	3	
5	280	6	1	5			0	1			171.7	3	
5	281	5	1	5			0	1			171.9	4	
5	282	6	1	5			0	1			172.5	7	
5	283	6	1	5			0	1			172.5	7	
5	284	5	1	5			0	1			172.8	4	
5	285	6	1	5			0	1			176.6	3	
5	286	6	1	5			0	1			176.6	4	
5	287	5	1	5			0	1			179.8	3	
5	288	5	1	5			0	1			180.2	3	
5	289	5	1	5			0	1			180.2	3	
5	290	5	1	5			0	1			180.4	3	
6	61	5	1	5	3	4	12	1			106.3	58683	1
6	62	345	3	5	200	50	10000	1			107.8	586832	1
6	63	6	1	5	20	8	160	1			108.3	58684	1
6	64	5	1	5	6	6	36	1			109.1	5868432	1
6	65	3	2	5	280	30	8400	1			109.6	586843	1
6	66	36	3	5	60	50	3000	1			112.3	5832	1
6	67	3	2	5	20	5	100	1			114.1	5832	1
6	68	3	2	5	200	45	9000	1			114.4	5832	1
6	69	5	1	5	8	8	64	1			114.8	58432	1
6	70	3	1	5	40	20	800	1			115.2	586832	1
6	71	346	2	5	55	35	1925	1			115.3	586832	1
6	72	5	1	5	7	7	49	1			115.9	58432	1
6	73	3	2	5	40	40	1600	1			117.0	58321	1
6	74	6	1	5	12	7	84	1			117.1	584321	1
6	75	3	2	5	300	275	82500	1			119.5	5832	1
6	76	35	2	5	25	15	375	1			120.0	58321	1
6	77	35	3	5	70	70	4900	1			120.3	5832	1
6	78	5	3	5	12	1[illegible]	144	1			120.7	584	1
6	79	3	2	5	50	50	2500	1			121.9	583214	1
6	80	3	1	5	25	15	375	1			122.4	5832	1
6	81	5	1	5	5	4	20	1			123.0	5843	1
6	82	3	2	5	80	40	3200	1			123.6	5832	1
6	83	35	2	5	30	30	900	1			123.9	5832	1
6	84	6	1	5	30	15	450	1			124.2	587	1
6	85	56	1	5	25	20	500	1			124.5	58321	1
6	86	56	1	5	20	15	300	1			124.9	587	16
6	87	6	3	5	2	1	2	1			125.4	587	1
6	88	34	3	5	6	6	36	1			126.3	587	1
6	89	3	2	5	100	50	5000	1			126.5	587	1

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
5	264									10	2				
5	265									5	2				
5	266									1	1				
5	267									1	1				
5	268									3	2				
5	269									20	2				
5	270									5	2				
5	271									5	2				
5	272									5	2				
5	273									5	2				
5	274									3	2				
5	275									5	2				
5	276									20	2				
5	277									1	1				
5	278									1	1				
5	279									12	2				
5	280									7	2				
5	281									1	1				
5	282									3	2				
5	283									1	2				
5	284									1	1				
5	285										2				
5	286										2				
5	287									1	1				
5	288									1	1				
5	289									1	1				
5	290									1	1				
6	61	4	13	2	3	100	70	1		1	1			4	0.2
6	62	3	13	23	3	100	70			1	1			4	0.5
6	63	4	1	2	1	250				4	2	3	0.4		
6	64	4	13	3	3	150				1	1			6	2
6	65	3	13	32	1	175	30								
6	66	4	13	2	3	175	15030			12	2	3	0.6		
6	67	3	13	32	1	100									
6	68	3	13	2	1	75									
6	69	4	13	2	3	10				1	1			6	1
6	70	3	13	32	3	50	30600	3							
6	71	4	13	32	1	300			4	1	2	3	0.4		
6	72	4	13	2	1	50				1	1			7	1.5
6	73	4	13	32	3	5									
6	74	4	13	2	3	5				4	2	3	0.4		
6	75	4	31	32	3	20									
6	76	4	13	23	3	20				1	1			6	1.2
6	77	4	13	23	1	150				2	1			7	1
6	78	3	2	23	1	100	50		6	1	1			8	1
6	79	4	13	32	1	700									
6	80	3	13	2	1	150									
6	81	3	13	23	1	150				1	1			5	0.8
6	82	3	31	2	1	75									
6	83	3	2	4	1	75	3090	1		2	1			5	0.8
6	84	4	5	2	1	200				11	2	3	0.3		
6	85	4	5	2	1	100			6	8	3	3	0.5	3	0.7
6	86	4	12	12	13	150			6	15	3	3	0.3	3	0.5
6	87	4	12	2	3	2				1	2	2	0.3		
6	88	3	5	2	1	50									
6	89	3	5	2	3	75									

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
6	90	346	1	5	80	40	3200	1			127	587	1
6	91	5	1	5	30	8	240	1			127.6	58	1
6	92	5	2	5	4	4	16	1			127.8	5832	1
6	93	3	1	5	400	175	70000	1			127.8	58732	1
6	94	5	2	5	6	4	24	1			128.2	587321	1
6	95	3	1	5	30	15	450	1			128.5	58732	1
6	96	356	1	5	160	100	16000	1			128.8	58732	1
6	97	5	1	5	3	3	9	1			128.2	87	1
6	98	5	2	5	3	2	5	1			128.5	58	9
6	99	3	1	5	100	60	6000	1			129.3	587	1
6	100	6	2	5	15	20	300	1			129.9	587	1
6	101	35	3	5	250	400	100000	1			130	5832	1
6	102	3	2	5	50	50	2500	1			131.5	7	1
6	103	5	1	5	40	30	1200	1			132.1	83	1
6	104	3	1	5	225	100	22500	1			133	587	1
6	105	36	1	5	100	75	7500	1			134.5	587	1
6	106	345	1	5	50	50	2500	1			135.7	587	1
6	107	35	3	5	180	70	12600	1			136.2	587	1
6	108	36	3	5	70	16	1120	1			136.8	5832	1
6	109	5	1	5	4	4	16	1			136.8	832	1
6	110	356	2	5	110	70	7700	1			137.1	832	1
6	111	6	1	5	15	15	225	1			142.5	83	1
6	112	5	1	5	20	15	300	1			143.5	5832	1
6	113	56	1	5	40	30	1200	1			143.6	5832	1
6	114	35	1	5	40	25	1000	1			143.7	5832	1
6	115	5	1	5	12	8	96	1			144.5	832	1
6	116	5	1	5	6	6	36	1			144.9	82	1
6	117	3	1	5	20	15	300	1			145.3	7	1
6	118	3	2	5	35	20	700	1			145.6	7	1
6	119	5	1	5	10	10	100	1			145.9	5832	1
6	120	35	2	5	50	50	2500	1			145.3	587	1
6	121	56	1	5	30	15	450	1			146.5	58732	1
6	122	5	1	5	2	2	2	1			147.7	58732	1
6	123	6	1	5	15	5	75	1			147.4	5874	1
6	124	34	1	5	20	20	400	1			147.3	5874	1
6	125	35	2	5	60	35	2100	1			147.2	5874	1
6	126	34	3	5	100	50	5000	1			148.4	584	1
6	127	356	1	5	400	200	80000	1			148.9	584	1
6	128	5	1	5	3	3	6	1			149.5	584	1
6	129	34	2	5	50	50	2500	1			149.8	584	1
6	130	3456	3	5	100	100	10000	1			151	584	1
6	131	34	1	5	150	150	22500	1			151.3	584	1
6	132	56	1	5	15	10	150	1			150.9	584	1
6	133	14	1	5	1	1	1	1			151.6	584	1
6	134	56	1	5	40	20	800	1			151.7	584	1
6	135	34	2	5	80	60	4800	1			151.9	584	1
6	136	356	3	5	150	80	12000	1			151.9	584	1
6	137	56	1	5	20	20	400	1			152.2	584	1
6	138	5	1	5	3	3	6	1			152.4	5832	1
6	139	3	2	5	20	20	400	1			153.7	5874	1
6	140	56	1	5	90	30	2700	1			154.3	583	1
6	141	35	1	5	200	75	15000	1			155.1	5832	1
6	142	35	2	5	80	20	1600	1			157.3	58432	1
6	143	34	3	5	130	60	7800	1			159.7	5874	1
6	144	356	2	5	200	75	15000	1			160	5874	1
6	145	345	2	5	200	150	30000	1			160.3	5874	1

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
6	90	4	5	2	1	50			6	2	3	3	0.3	3	0.3
6	91	3	1	3	3	0				2	1			4	0.8
6	92	4	13	23	3	50				1	1			4	0.6
6	93	4	13	23	3	5									
6	94	4	13	1	3	250				2	1			3	0.5
6	95	4	13	2	3	75									
6	96	4	13	2	1	60				4	3	3	0.3	5	0.7
6	97	34	5	2	1	20				1	1			3	0.7
6	98	3	24	34	1	30	90	1		1	1			2	0.7
6	99	4	13	12	3	50	15								
6	100	4	123	2	3	600	5			41	2	3	0.5		
6	101	4	13	2	1	500	5			1	1			4	1
6	102	4	12	12	1	2	5								
6	103	3	13	2	3	75				4	1			5	2
6	104	4	13	2	3	15	150								
6	105	4	13	2	13	100	15			1	2	3	0.5		
6	106	4	13	2	3	10	150			2	1			3	0.7
6	107	4	13	2	3	20				1	1			4	0.7
6	108	3	2	1	1	250	30			6	2	3	0.3		
6	109	4	13	2	1	250	30			1	1			4	1
6	110	4	13	2	1	200	30			4	3	3	0.3	4	0.7
6	111	3	13	2	1	20	30			7	2	3	0.3		
6	112	4	1	3	3	500			6	7					
6	113	4	1	3	3	450			6	6	3	3	0.3	3	0.6
6	114	3	1	2	3	450			6	2	1			3	0.3
6	115	3	13	2	1	50				3	1			2	0.2
6	116	4	13	2	1	30				1	1			6	1.5
6	117	3	1	12	1	40									
6	118	4	1	12	1	60									
6	119	4	1	12	1	150	70	1		34	2	3	0.3		
6	120	4	1	2	1	200				1	1			3	0.7
6	121	4	13	23	1	300	15		46	5	3	3	0.7		
6	122	4	13	2	1	200				1	1			2	0.2
6	123	4	12	12	1	200				6	2	3	0.3		
6	124	4	123	12	1	150									
6	125	4	13	2	1	150				1	1			2	0.5
6	126	3	12	2	3	75									
6	127	3	1	23	3	200	30		6	60	3	3	0.4		
6	128	4	1	2	1	400	50			1	1			3	0.2
6	129	3	12	2	1	500									
6	130	4	12	23	1	400			6	40	3	3	0.5	4	0.5
6	131	3	1	2	3	10									
6	132	4	13	23	1	400				2	1			4	1
6	133	4	13	12	3	100			6						
6	134	3	1	4	1	200	70	35		15	2	2	0.3		
6	135	3	13	2	3	150	3070	135							
6	136	4	12	12	3	180			6	60	3	3	0.5		
6	137	4	13	2	1	200	70	35	6	4	3	3	0.5		
6	138	4	13	2	1	150	70	35		1	1			3	0.9
6	139	3	123	2	1	200	30								
6	140	3	12	4	1	60				60	2	3	0.4		
6	141	4	13	3	3	150	150			1	1			2	0.7
6	142	3	13	2	1	200				1	1			2	0.5
6	143	3	5	2	1	250									
6	144	4	5	2	3	200			6	12	3	3	0.4		
6	145	3	5	2	3	150	150			1	1			2	0.6

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
6	146	3	1	5	70	40	2800	1			160.4	587	1
6	147	56	1	5	25	20	500	1			162	5874	1
6	148	56	1	5	35	25	875	1			163.3	5874	1
6	149	5	1	5	2	2	4	1			164.8	5874	1
6	150	34	2	5	100	100	10000	1			164.5	5874	1
6	151	56	1	5	25	10	250	1			164.2	5874	1
6	152	356	2	5	280	180	50400	1			164.5	587	1
6	153	5	1	5	4	4	14	1			164.8	58732	1
6	154	3	3	5	50	30	1500	1			165	5832	1
6	155	356	1	5	60	50	3000	1			167.5	583	1
6	156	5	1	5	5	5	25	1			169.3	5832	1
6	157	5	1	5	2	2	4	1			169.3		1
6	158	6	1	5	20	20	400	1			169.3		1
6	159	5	1	5	5	5	25	1			169.5	5832	1
6	160	356	1	5	120	50	6000	1			169.6	587	1
6	161	56	1	5	25	15	375	1			169	58	1
6	162	5	1	5	7	7	49	1			170.8	587	1
6	163	56	1	5	35	10	350	1			171.3	587	1
6	164	356	1	5	25	20	500	1			172.3	587	1
6	165	3456	3	5	100	50	5000	1			172.3	587	1
6	166	5	1	5	25	15	375	1			172.9	583	1
6	167	34567	2	5	100	60	6000	1			173.2	587	1
6	168	346	3	5	110	60	6600	1			173.5	587	1
6	169	345	2	5	120	60	7200	1			174.1	587	1
6	170	36	2	5	200	120	24000	1			174.4	5832	1
6	171	5	1	5	5	5	25	1			174.7	5832	1
6	172	346	1	5	100	40	4000	1			174.9	5832	1
6	173	5	1	5	3	3	9	1			175	583	1
6	174	3	3	5	100	30	3000	1			175.2	5832	1
6	175	35	2	5	150	80	12000	1			175.3	5832	1
6	176	3	3	5	400	50	20000	1			176.5	5832	1
6	177	5	1	5	4	4	16	1			177.0	5832	1
6	178	6	1	5	10	10	100	1			178.3	58	1
6	179	3	3	5	215	70	15050	1			178.6	587	1
6	180	35	2	5	400	250	100000	1			178.8	587	1
6	181	3	2	5	150	60	9000	1			178.9	587	1
6	182	6	1	5	20	20	400	1			179.2	583	1
6	183	34	1	5	100	50	5000	1			181	587	1
6	184	3	1	5	120	60	7200	1			181	58743	1
6	185	5	1	5	5	5	25	1			181.5	5832	1
6	186	13	1	5	400	40	16000	1			183.0	5832	1
6	187	4	4	5	70	40	2800	1			183.0	58	9
6	188	3	4	5	50	50	2500	1			184	8	1
6	189	4	4	53	110	50	5500	1			185.8	58	9
6	190	4	3	53	15	15	225	1			186.1	8	9
6	191	34	3	5	120	75	9000	1			189.1	587	16
6	192	34	3	5	30	10	300	1			192.4	507	2
6	193	4	2	5	20	10	200	1			192.1	507	9
6	194	6	1	5			0	1			149.5	4	
6	195	6	1	5			0	1			157	2	
6	196	6	1	5			0	1			161.4	8	
6	197	6	1	5			0	1			161.5	8	
6	198	6	1	5			0	1			170.5	7	
6	199	6	1	5			0	1			171.8	7	
6	200	6	1	5			0	1			171.8	7	
6	201	6	1	5			0	1			179.5	3	

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
6	146	3	13	2	3	10									
6	147	3	13	2	3	10				4	3			3	0.9
6	148	4	13	2	1	50				15	3	3	0.5		
6	149	4	12	2	1	300				1	1			2	0.3
6	150	4	5	2	3	100									
6	151	4	5	2	3	4				12	3	3	0.3	2	0.5
6	152	3	5	2	13	250				50	3	3	0.3	3	0.5
6	153	4	13	23	1	250	150			2	1			4	1
6	154	4	13	23	1	200									
6	155	3	13	2	13	25				4	3	3	0.3		
6	156	4	13	2	1	30	90	1		1	1			5	1.8
6	157	4	13	23	3	1000				1	1			2	0.3
6	158	4	1	23	3	2				3	2	3	0.5		
6	159	4	13	2	3	150				1	1			5	2
6	160	4	13	2	3	200	150		6	30	3	3	0.4	4	1
6	161	3	4	3	3	50				4	3	3	0.3	3	0.5
6	162	4	13	12	1	150				1	1			7	0.5
6	163	4	12	12	1	200				7	3	2	0.3		
6	164	4	5	1	1	100	90			12	3	3	0.3		
6	165	4	13	12	1	170				30	3	3	0.3		
6	166	4	1	2	1	250				4	3	2	0.3	4	0.5
6	167	4	1	12	1	200	90	1	6	30	2	3	0.4	3	0.5
6	168	4	1	12	1	200	90	1	6	30	2	3	0.3		
6	169	4	13	23	1	250	3070	13		3	1			2	0.5
6	170	4	123	123	1	200	3070	1		40	2	3	0.4		
6	171	3	13	23	1	175	3070	13		1	1			5	1
6	172	3	13	2	3	175	30			4	2	3	0.5		
6	173	3	123	23	3	15				1	1			3	0.6
6	174	4	123	23	3	10									
6	175	4	13	32	3	10	70	13		1	1			3	0.8
6	176	4	13	3	3	1									
6	177	4	13	2	3	150	70	1		1	1			4	1.5
6	178	3	12	23	13	50	50			8	2	2	0.2		
6	179	4	1	23	3	20									
6	180	4	15	23	3	30	70	13		2	1			2	0.5
6	181	4	5	23	1	3	4570	13							
6	182	4	1	2	1	300	70			40	2	3	0.6		
6	183	4	5	1	3	30	4			1	1			7	2.5
6	184	4	13	23	3	3	40								
6	185	4	13	23	1	100	70	13		1	1			5	1
6	186	4	13	23	1	100	70	13							
6	187	3	12	4	1	50	7	135							
6	188	3	12	4	1	2	70								
6	189	3	12	24	1	3	4070	3							
6	190	3	12	24	1	25	7	135							
6	191	3	12	1	13	5	40								
6	192	3	2	2	1	10	70	1							
6	193	3	2	1	1	20	4070								
6	194										2				
6	195										2				
6	196										2				
6	197										2				
6	198										2				
6	199										2				
6	200										2				
6	201										2				

L	SITE	SITET	SIG	SIT	LEN	WID	SITESI	ART	T	TRA	DISTA	TOPOGRAP	VE
6	202	5	1				0	1			181.8	2	
6	203	5	1	5			0	1			182	2	
6	204	5	1	5			0	1			182.4	2	
6	205	6	1	5			0	1			182.9	2	
6	206	5	1	5			0	1			183.2	2	
6	207	6	1	5			0	1			183.2	2	
6	208	5	1	5			0	1			183.9	4	
6	209	5	1	5			0	1			183.9	4	
6	210	6	1	5			0	1			185.8	4	
6	211	6	1	5			0	1			126.3	8	
6	212	6	1	5			0	1			135.7	4	
6	213	6	1	5			0	1			137.7	4	
6	214	6	1	5			0	1			144.1	8	
6	215	6	1	5			0	1			144.4	8	

L	SITE	HT	SOI	SOI	H2OS	H2OD	MODERN	CRO	FE	# C	C	LI	LIN	RO	ROU
6	202									1	1				
6	203									1	1				
6	204									1	1				
6	205										2				
6	206									2	1				
6	207										2				
6	208									1	1				
6	209									1	1				
6	210										2				
6	211										2				
6	212										2				
6	213										2				
6	214										2				
6	215										2				

APPENDIX D1: LITHIC ASSEMBLAGE CONDITION AND RAW MATERIAL COMPOSITION

Key to Headings:

SITE#= Site Number
ST= Techno-stage
AVGWT= Average weight per artifact (grams)
AB= Degree of Abrasion
ALT= Degree of Alteration
PA= Amount of Patination
DPA= Degree of Patination
DC= Dominant Chert Type

BAS= Basalt
CHER= Chert
LIM= Limestone
OTH= Other
QUA= Quartz
SLT= Siltstone
ALL= Total Lithic Artifacts

Key to coding values is presented in Appendix B2.

LITHIC RAW MATERIAL-SOUTHWEST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	OTH	QUA	SLT	ALL
1	2	7.4	2	2	3	2	1		12	1		1	1	15
2	4	3.1	2	3	3	2	1		19					19
3	26	4.7	2	2	1	1	2		35	1		2	1	39
4	3	4.5	2	2	2	2	1		51			1	1	53
5	6	2.7	2		2	1	2		33			6		39
6	8	7.2	2	2	2	1	1		12					12
7	36	1.8	2	3	1	2	2		67	1		4		72
8	26	1.4	2	1	2	3	2		56			4		60
11	45	2.1	2	1	1	1	1		15			3		18
14	26	2.6	3	23	2	2	2		33			3		36
15	6	3.7	2	23	3	2	1		18			2		20
16	26	2.4	2	1	1	1	1		25			6		31
17	2	2.0	2	2	3	1	1		25	1				26
18	34	5.7	2	2	4	2	1		18					18
19	5	2.3	2	1	2	2	2		38			4		42
20	16	4.2	3	13	1	3	2		20					20
21	8	4.3	2	1	2	1	1		23			1		24
23	26	4.1	2	1	3	1	1		72					72
24	145	3.5	2	1	2	1	2		99		1	1		101
25	26	2.4	2	13	3	2	1		120		1	3	2	126
26	45	1.9	3	1	2	1	2	1	140			3		144
27	8	1.9	2	12	2	1			27					27
28	3	1.3	2	1	3	2	1		25					25
29	24	2.5	3	3	1	3	2		95	1			1	97
32	38	2.9	2	1	1	1	2		26			1		27
34	24	2.8	2	12	3	2	2		74					74
38	4	2.0	2		4	1			1					1
39	3	4.4	2		3	1	2		9					9
41	29	1.7	2	2	3	2	1		56	1		4		61
42	4	3.5	2	1	2	1	1		37	1		1		39
45	45	2.9	2	12	3	2	1		60		1	3		64
46	24	1.8	2	1	1	1	1		26			1		27
47	8	7.2	2	2	3	2			11					11
52	4	3.7	2		1	1	1	1	2					3
53	24	1.8	2	23	3	2	2		59			5	1	65
54	1	3.8	2	1	2	1	1		96			11	2	109
61	4	3.4	2	1	1	1	1		26			5		31
62	45	3.8	2	1	1	1	1		75			8	1	84
63	34	2.8	2	1	1	1	2		37		1	2	3	43
64	145	4.2	2	1	1	1	2		48		1	2	1	52
65	24	4.1	2	1	2	1	1		29			3	1	33
67	36	2.8	2	12	2	1	2		25		1	1		27
68	8	9.0	2	1	1	1	1		3			1	2	6
69	34	3.4	2	1	2	2	2		63			8		71
76	245	3.3	2	1	2	2	1		45			8		53
79	24	5.8	2	1	2	1			14					14
80	145	4.1	2	13	1	1	1		59			1	3	63
81	35	4.0	2	1	1	1	1		43			4	1	48
ALL	1	5.2	2	1	1	1	1	2	2002	7	6	113	21	2151

LITHIC RAW MATERIAL-SOUTHEAST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	OTH	QUA	SLT	ALL
1	35	3.8	3	1	1	1	1		26			1		27
2	5	8.5	2	1	1	1	1		17			4		21
3	2	2.7	2	13	1	2	2		49		1	6	2	58
4	4	1.6	3	1	1	1	1		39			7	5	51
6	26	1.1	2		2	1	1		62			5		67
7	2	2.5	3	1	1	1	1		49			4		53
8	5	1.8	3	13	1	1	1		28			1		29
9	5	2.1	2	13	1	1	1		39		1	9	7	56
10	26	1.0	3	1	1	1	1		20			3		23
12	8	4.7	3	1	4	3	2		18			2		20
13	4	2.0	2	1	3	1	1		50			7		57
14	36	2.4	3	13	3	1	1		18	1				19
15	25	3.4	2	1	1	1	1		37			8		45
16	2	2.8	4	3	1	1	1		13		1	1		15
17	6	3.8	3	13	3	2	2		24			1		25
18	6	2.8	2	3	2	1	1		26			2		28
19	2	1.5	2	1	1	1	1		27			7		34
20	15	2.1	2	1	2	1	1		57	2	2	5		66
21	36	2.7	3	1	1	1	1		32			3		35
27	4	2.0	2	123	2	1	2		27		1	1		29
29	26	3.6	2	1	1	1	1		51			3		54
31	2	2.2	3	3	1	1	1		35		1	3		39
32	245	2.4	2	1	2	2	2		34			2		36
34	36	2.8	3	1	1	1	1		36	1		5		42
36	26	2.5	2	1	1	1	1		36	1	2	5	1	45
38	245	2.6	3	12	1	2	1		53			2		55
43	3	5.8	3	12	1	1	1		49			4	1	54
46	26	3.2	2	1	2	1	1		67			7		74
51	1	3.9	2	2	1	1	1	5	37					42
52	35	2.7	2	3	1	1	1		63		1	15	3	82
53	8	3.6	4				1		7					7
58	1	1.8	2	1	1	1	3		67			1		68
ALL		6.4	2	1	1	1	1	5	1193	5	10	124	19	1356

LITHIC RAW MATERIAL-CENTRAL WEST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	OTH	QUA	SLT	ALL
1	3	6.9	3	1	1	1	4		23					23
2	8	5.6	4	1	2	1	1		11					11
3	1	7.3	3	1	1	1	2		44	1				45
4	6	3.3	3		4	2	2		19					19
5	14	6.1	2	1	3	2	4		89					89
6	3	5.6	4	1	4	3	2		195			3		198
7	24	6.8	4		4	3	2		76					76
8	15	11.6	2		1	2	2		55					55
12	3	8.9	4		4	3	1		47					47
13	2	7.8	2		2	2	2		76				1	77
14	3	4.4	3		4	3	1	1	13					14
15	3	10.0	3	23	3	3	1		61			1		62
17	8	5.0	3	3	2	2	2	1	15					16
18	24	4.1	4		3	3	1		17					17
19	5	3.9	3		2	2	1		21					21
20	26	5.0	3		4	3	1		27			1		28
21	8	3.6	3		1	2	2		33	1				34
22	24	4.5	3	3	4	2	1		37			1	1	39
23	2	3.7	3		2		2		27			2		29
27	8	6.5	2	13	3	2	1	1	37					38
28	8	4.8	3		1	1	1		9	1		1		11
29	36	3.8	3	2	1	2	2		90			4		94
30	24	7.2	3	2	1	2	2		42	2		1		45
31	3	5.3	2	13	3	3	1		39			3	1	43
32	3	10.5	4	13	2	2	1		21		1	1	1	24
33	26	4.8	3	23	2	2	2		42					42
35	3	3.2	3	1	3	2	1		38			1		39
36	36	6.0	2	2	1	1	1		43			7		50
38	24	3.1	2	1	1	1	1		15			2		17
39	34	8.0	2	3	2	1	1		12			1		13
40	5	5.6	2		4	2	1		12					12
41	36	6.1	3	1	3	2	1		33			3		36
42	24	6.2	2		2	2	2		30			4		34
47	26	6.3	3		4	2	1		10			1		11
48	6	6.5	2	3	2	1	1		12			5		17
49	24	5.1	3		1	1	1		13			2		15
50	5	1.9	2		1	2	2		12			4		16
51	2	2.6	3	3	2	1	1		10			2		12
52	2	4.7	2		2	2	2		8			8		16
53	6	7.2	2		2	2			13			1		14
54	2	3.4	2		2	1	1		32			3		35
56	4	3.8	2		1	1	1		14			5		19
58	4	3.1	3		2	1	1		13			3		16
59	4	1.9	2	1	2	1	1		15			3		18
60	2	3.1	2		3	2	1		11					11
61	6	3.8	3		4	2	2		17			1		18
62	6	3.2	3	3	4	2	1		5					5
63	4	5.1	2		2	1	1		26			5		31

LITHIC RAW MATERIAL-CENTRAL WEST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	OTH	QUA	SLT	ALL
64	34	5.6	2	1	1	2	1		35			4		39
65	2	5.4	2	12	3	13	1		29			1		30
66	24	4.0	3	1	2	1	1		20			5		25
67	3	8.5	3		4	3	1		10					10
69	3	5.5	4		4	3	1		30					30
74	8	8.2	3		2	2	1		10					10
76	2	3.6	3	1	1	3	2		17					17
79	1	141.6	3		3	13	1		7					7
83	2	4.3	2		3	2	1		8			2		10
84	25	3.5	2	1	3	2	1		23			3		26
115	5	3.8	3	2	1	1	1		32			1		33
116	24	2.5	2	12	2	2	1		34			1		35
119	3	4.7	2	1	2	2	1		6					6
122	8	4.3	3		3	3	1		16					16
134	5	2.3	2		1	1	1		16			3		19
135	3	4.8	3		2	2	2		21			2		23
136	26	2.5	2	1	3	1	1		11			2		13
137	6	4.1	2	1	3	3	1		30			6		36
139	34	3.0	2	3	2	1	1		18			2		20
140	6	2.7	2		2	1	2		15			4		19
141	5	1.4	2		2	2	1		24					24
142	25	2.8	2		1	1	1		10			2		12
143	34	3.3	2	1	1	3	1		16			2		18
167	3	3.0	3		2	2	1		23					23
168	8	13.8	4	2	4	3	1		21			2		23
169	24	4.5	3		2	2	1		33			3		36
170	4	2.7	2	12	2	2	1		54					54
171	2	3.1	3		1	1	2		48				1	49
172	24	6.4	3	123	4	3	1		44	1		2		47
173	8	2.5	3	3	2	2	2		21					21
174	38	2.4	3	13	3	3	1		40					40
175	6	2.3	2		1	1	1		32	1				33
192	6	2.8	3	2	2	2	2		163					163
194	26	3.8	3	2	4	3	2		55					55
195	3	4.1	3	2	4	3	2		118					118
ALL	1	6.2	2	1	1	1	1	3	2650	7	1	126	5	2792

LITHIC RAW MATERIAL-CENTRAL EAST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	QUA	SLT	ALL
10	35	3.1	2	2	2	1	1		67	1			68
11	3	4.0	3	23	1	2	1		93		1		94
44	35	6.6	3		2	1	1		40		5	1	46
45	26	8.6	2	3	2	1	1		12				12
46	8	3.2	2	1	3	2	1		10		1		11
90	3	10.1	2		2	2	2		13				13
93	3	4.2	3	1	4	13	2		9				9
95	14	4.4	2	13	3	2	1		38				38
97	1	8.4	3	1	2	2	2		15				15
123	5	3.0	3		2	1	2		26	1	1		28
124	25	3.7	3	13	3	2	1		14		2		16
128	26	4.0	2		2	2	2		18		2		20
131	3	8.6	4	123	4	3	2		189	1	6		196
132	35	15.1	3		1	2	1		10				10
133	26	1.9	3	23	1	1	1		123		5		128
146	24	1.8	2	1	2	1	1		16		4		20
147	4	1.8	2		2	1	1		16		4		20
148	3	3.9	3		1	1	1		10		4		14
149	45	2.8	2	1	1	2	1		14		6		20
150	4	1.9	2	2	2	2	1		38		5		43
151	5	6.5	2	1	1	1	1	1	20		7		28
152	3	6.0	2		1	1	1		19		5		24
153	89	1.0	3		4	1	1		1				1
154	5	2.8	2		1	1	1		30		3		33
155	25	5.4	2		1	1	1		17		1		18
156	24	3.1	3	3	2	2	1		29		1		30
157	2	3.2	2	1	3	1	1		18				18
158	6	1.0	3				1		1				1
160	3	6.4	3		3	2	1		9				9
201	24	2.4	3	1	2	2	2		45		1		46
212	6	7.3	3	12	3	2	1		12				12
214	8	2.6	3		2	2	2		114				114
215	1	15.5	3	1	4	2	1		34				34
216	36	7.2	3	1	2	3	1		22				22
220	8	6.2	2	1	2	2	2		36				36
221	8	3.0	3	1	4	1	1		1				1
222	8	3.1	3		1	2	1		13		2		15
225	3	3.5	3		1	1	2		21				21
226	46	14.3	3	1	1	1	1		57		2	1	60
227	3	5.2	3	1	3	3	1		44				44
235	36	3.6	3	12	3	3	1		19		2		21
267	1	24.5	2		1	1	2		11				11
268	3	4.8	3	23	1	1	1		12		2		14
269	24	4.4	3	23	1		1		12				12
270	6	9.1	3		3	2	1		16		1		17
271	8	14.9	3	2	1	2	2		14				14
272	3	7.5	3	23	1	2	1		13				13
273	8	6.5	4	2	4	3	1		15				15

LITHIC RAW MATERIAL-CENTRAL EAST SITES

								RAW MATERIAL					
SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	BAS	CHER	LIM	QUA	SLT	ALL
274	8	5.9	2		1	2	2		10				10
275	3	4.8	2		1	1	1		13		1		14
276	3	6.5	3		2	1	1		12		1		13
279	38	8.0	3	2	3	2	1		31		1		32
280	8	6.7	4	2	3		1		38				38
281	24	9.2	3	1	3	1	2		17		1		18
283	2	3.4	2	1	1	1	1		16				16
284	3	3.8	3	3	3	2	1		26		1		27
285	8	5.8	3		1	1	2		11		1		12
286	3	5.0	3	1	2	1	1		13		1		14
288	2	4.0	3		1		2		10		1		11
ALL	1	5.8	2	1	1	1	1	1	1623	3	81	2	1710

LITHIC RAW MATERIAL-NORTHWEST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	QUA	SLT	ALL
83	36	2.4	3	12	1	1	1		22		1		23
84	2	6.6	3		3	2	2		21		1		22
86	3	8.5	2		3	2	1		10				10
88	2	7.2	3	2	4	3	2		16		2		18
89	26	5.3	3		1	2	2		21		1		22
90	2	5.8	3		2	2	2		19		5		24
91	8	3.8	3		1	1	1		7		2		9
93	4	2.6	2		1	2	2		9		5		14
94	26	7.4	2	1	3	2	1		13		4		17
95	5	4.8	2	23	2	1			31		1		32
98	24	7.7	4	2	3	3	2		23				23
99	3	10.9	2	3	2	2	2		15				15
100	6	8.3	3	12	3	2			23				23
101	3	7.6	3	2	3	3			20		1		21
102	3	7.2	3	2	3	2	1		28		1		29
106	3	7.4	2		2	1			12		1		13
109	3	14.9	2		1	1	2		10				10
110	3	7.3	3	2	3	2			7				7
111	15	7.4	2	13	2	2	1		32			1	33
112	1	9.1	2	13	1	2	1		17				17
115	1	9.3	2		1	1			14		1		15
118	2	8.0	2	3	4	3	1		2				2
123	26	3.3	2		2	1	2		3				3
125	4	7.2	1	13	1	1	1		116		2	2	120
128	4	2.6	3	13	1	1	1		36				36
130	1	9.5	2		1	1	1		12				12
132	4	5.4	2	1	2	2	1		18		1	1	20
137	3	5.4	2		1	1	2		11		1		12
141	1	16.6	2	3	3	2	1		46		1	2	49
142	8	5.4	4		4	3	2		12		1		13
143	34	3.9	2	13	2	2	1		24		1		25
144	45	5.0	2	3	3	2	1		18		1		19
145	1	8.6	2		4	3	2		7		1		8
146	1	9.8	4	1	3	3	1		20		1		21
148	36	7.0	2	1	1	1	1		9				9
149	34	5.9	3		3	2			18				18
150	1	8.9	3	3	2	2	1		37		1	1	39
151	3	10.2	3		1	2	1		20		1		21
153	3	7.7	2	13	2	2	1		28		1		29
154	24	5.1	2		3	3			27		3		30
155	26	7.1	2		2	1	1		16				16
157	34	6.9	3	3	3	2	1		9				9
158	8	4.7	2	1	1	2	2		6				6
159	25	4.0		12	1	1	1		15		1		16
160	2	5.6	3		1	2	2		25		2		27
161	2	8.3	3		1		2		6				6
162	24	6.4	2		1	1			8				8
163	34	12.5	3		1		1		17				17

LITHIC RAW MATERIAL-NORTHWEST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	QUA	SLT	ALL
164	2	11.5	3		1	2	2		11				11
165	2	8.7	3	1	1	1	2		21		2		23
166	12	10.4	3	1	1	1	2		22		1		23
167	2	10.6	2		1	1	2		27		3		30
170	8	10.2	3	1	2	1	1		5				5
171	2	9.4	3		4	3	2		7		1		8
172	2	6.4	3		1	2	2		9				9
173	2	14.0	3		1	1	2		11		1	1	13
174	2	5.6	2	1	1	1	2		12				12
175	2	13.6	3		1		2		7		1		8
176	2	13.3	2		1	2	2		7		1		8
177	24	19.2	3		1	3	0		25		1		26
178	2	14.0	2		1	3	1		22		2	1	25
179	2	8.5	2	1	1	2	1		24		1		25
180	2	13.1	3		1	1	2		17				17
181	2	10.0	2		1	1	1		5				5
182	2	8.5	3		1		2		11				11
183	2	9.4	2	3	1	3	2		34		4		38
185	2	8.5	3		1	2	2		12		1		13
186	2	8.3	3	12	1	2	2		19				19
187	2	12.6	3		2	1	1		16		1		17
188	3	25.2	4		1	3	2		12				12
189	2	11.8	3	3	2	1	1		9				9
190	2	15.8	4		3	2	1		15				15
191	2	22.5	2	2	3	2	1		24		2		26
192	8	8.1	3	12	1	2	1		7				7
193	8	15.0	2		4	1	2		1				1
194	2	6.5	2	3	2	2	1		18		4		22
195	2	10.3	3	13	3	2	1		27				27
196	24	5.8	2	1	3	2			19				19
197	2	10.1	2	1	3	2	2		13				13
198	2	6.2	3	123	3	2			32		2		34
199	3	7.6	3	123	3	2	1		13				13
200	25	6.4	2	1	2	1			22		3		25
201	3	6.0	3	23	3	2	1		9				9
202	8	3.0	2		1	1			7				7
205	2	6.6	2	1	4	2	2		21				21
206	1	7.2	3	12	4	2			11				11
207	1	11.8	3	1	4	2	1		11				11
210	1	12.0	2	1	4	1	3		1				1
211	8	4.2	2		1	1	3		8		2		10
212	3	11.9	2		2	1	2		7				7
215	2	12.0	4	2	4	3			1				1
ALL	1	8.6	1	1	1	1	0		1548		78	9	1635

LITHIC RAW MATERIAL-NORTHEAST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	QUA	SLT	ALL
61	8	4.0	3	1	1	1	1		38	1	1		40
64	8	3.4	3		2	3	2		10				10
66	24	4.1	2	1	3	2	1		16				16
67	3	3.1	2	1	3	2	1		13		1		14
68	3	3.9	2	13	3	2	1		21		1		22
70	3	4.6	3	1	2	1	4		13		1		14
71	3	7.0	4		3	2	1		13		1		14
73	26	3.2	2	1	1	1	1		8		3		11
75	16	7.6	3	1	2	1	1		10				10
76	1	14.8	2	1	1	1	1		4				4
77	1	4.6	2	1	1	1	3		13				13
79	25	0.4	2	1	2	2	1		28		2		30
80	14	4.3	2	1	2	1	3		12				12
82	1	3.5	3	1	3	3			35		1		36
83	26	3.1	3	1	1	1	1		11				11
88	8	2.3	2	1	1	1	1		4				4
89	5	2.2	2	1	2	1	1		32		9		41
90	5	1.8	2	13	1	1	1		23		1		24
93	35	3.9	2	3	2	2	1		36		3		39
95	2	5.9	4		3	2	1	1	15				16
96	25	2.5	2	3	2	1	1		42				42
99	8	2.4	2		2	2	1		15		1		16
101	3	3.3	3	1	2	2	1		16		2		18
102	24	4.1	2	1	1	1	1		24		1		25
104	4	4.5	2	13	1	1	1		20		1		21
105	26	3.3	2		2	2	1		21		1		22
106	25	3.2	2	1	1	1	1		10		1		11
107	8	5.4	2		1	1	1		16				16
110	1	5.1	3	13	3	2	1		17		1		18
112	2	2.9	3		2	1	1		11		1		12
114	25	8.3	4		3	3	1		22			1	23
118	8	5.2	2	1	1	1	1		6				6
120	24	2.9	2		1	1	1		17				17
124	2	2.6	2	3	2	1	1		8				8
125	3	4.5	2	123	3	2	1		15				15
126	3	3.8	2	2	1	2	1		21		1		22
127	2	3.4	3	1	3	2	1		21		2		23
129	2	2.6	2	3	1	1	1		20		4		24
130	89	1.6	2	1	1	1	1		4		1		5
131	5	3.9	2		1	1	1		17		1		18
135	5	2.8	2		1	1	1		21		2		23
136	3	5.4	2	1	1	2	1		32				32
139	245	2.8	2	1	2	1	1		16		3		19
141	24	7.8	2	1	1	1	1		14		1		15
142	25	4.4	2	12	1	2	1		16				16
143	25	3.0	2		1	1	1		25		3		28
144	25	4.3	2	13	2	2	1		8				8
145	25	5.9	2		1	1	1		28		3		31

LITHIC RAW MATERIAL-NORTHEAST SITES

SITE #	ST	AVGWT	AB	ALT	PA	DPA	DC	RAW MATERIAL BAS	CHER	LIM	QUA	SLT	ALL
146	2	3.8	2	1	1	1	1		5				5
150	25	3.8	2	1	2	2	1		21				21
152	25	3.7	2	13	2	2	1		35		1		36
154	24	3.9	3	1	4	3	2		21				21
155	2	6.3	2		2	1	2		7				7
160	3	5.8	3	3	2	2	2		26				26
164	8	4.8	2		2	3	1		12				12
165	1	9.4	3		4	3	1		9				9
167	3	9.4	3	1	2	2	1		16				16
168	2	3.3	2	13	2	2	1		8				8
169	2	6.9	2	1	2	3	1		12		2		14
170	14	8.9	2	1	2	3	2		33		1		34
172	24	5.0	2	1	2		1		13				13
174	24	4.4	3		2	3	1		21				21
175	1	5.1	3	13	2	1	1		17				17
176	36	6.7	2		2	13	4		39				39
179	25	3.7	2	13	2	2	1		50				50
180	24	4.9	3		2	2	2		28				28
181	3	5.8	3	13	2	2	1		18				18
183	3	8.5	2		1	2	1		21				21
184	3	11.1	4	2	4	3	1	1	18				19
188	36	5.0	2	1	3	2	1		21				21
191	3	3.0	3		1	2	1		8				8
192	8	2.7	2				1		3				3
ALL	1	4.6	2	1	1	1	1	2	1320	1	58	1	1382

APPENDIX D2: FREQUENCY (n) OF STONE ARTIFACT CLASSES BY SITE

Key to headings:

SITE#= Site Number
SAMP= Sampling Technique
ST= Techno-stage
ANG= Angular Waste
BLA= Blades
COR= Cores
Flak= Flakes
LEVF= Levallois Flakes
LEVP= Levallois Points
SHA= Shaped Tools
UNSH= Unshaped Tools
All= Total Lithic Count

Key to coding values is presented in Appendix B2.

STONE ARTIFACT CLASSES-SOUTHWEST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
1	1	2	4	2	4	5					15
2	3	4	4		3	6			2	4	19
3	3	26	1	3	9	21	3		2		39
4	3	3	3	3	7	26	5		4	5	53
5	3	6	7	2	8	15	1		3	3	39
6	1	8	1	1	3	5	1			1	12
7	1	36	8	1	16	35	2		5	6	72
8	1	26	3	9	10	26	1		7	4	60
11	3	45	3	5	3	6	1				18
14	3	26	3	2	8	10	6		2	5	36
15	3	6	1		6	11			2		20
16	3	26	1	3	11	6	3		4	3	31
17	1	2	5	1	7	5			1	7	26
18	1	34	2		2	11	1			2	18
19	1	5	8	6	3	11			8	6	42
20	3	16	3	3	1	8	3		1	1	20
21	3	8	3		4	9	1		4	3	24
23	1	26	5	10	11	30	7		4	5	72
24	1	145	20	10	15	31	7		14	4	101
25	1	26	18	8	16	51	7		15	11	126
26	1	45	35	15	10	71			10	3	144
27	1	8	8		2	11			4	2	27
28	1	3	5		3	5	7		1	4	25
29	1	24	18	1	4	46	13		2	13	97
32	1	38	9		3	14				1	27
34	1	24	3	15	10	33	2		7	4	74
38	1	4							1		1
39	1	3		1	1	1	1		3	2	9
41	1	29	5	2	8	14	15		4	13	61
42	1	4	8	2	11	6			4	8	39
45	3	45	9	6	13	14	1		11	10	64
46	1	24	3	3	5	10			2	4	27
47	5	8				8	2		1		11
52	2	4		2		1					3
53	1	24	10	2	13	29	1		6	4	65
54	1	1	13	18	25	19	9		14	11	109
61	3	4	6	3	8	7			3	4	31
62	1	45	9	9	16	36	1		11	2	84
63	3	34	11	1	5	16	1		6	3	43
64	1	145	7	13	9	7	2		8	6	52
65	1	24	7	4	6	3	2			11	33
67	1	36	6	2	4	8	2		5		27
68	2	8	2		1	2				1	6
69	1	34	12	10	13	24			6	6	71
76	1	245	12	4	9	16	3		1	8	53
79	1	24	1		4	3			2	4	14
80	1	145	4	7	9	22	7		13	1	63
81	1	35	8	5	10	3			10	12	48
ALL			313	194	349	757	118		213	207	2151

STONE ARTIFACT CLASSES-SOUTHEAST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
1	2	35	4		6	12	2			3	27
2	5	5	4	3	5	5			3	1	21
3	3	2	12	3	7	24	1		6	5	58
4	3	4	14	3	8	11	1		5	9	51
6	3	26	23		8	25	1		6	4	67
7	3	2	8	3	11	20	2		7	2	53
8	3	5	5	1	4	11			3	5	29
9	3	5	18	2	6	28			1	1	56
10	3	26	4		3	7	1		2	6	23
12	3	8	2		9	4	1		2	2	20
13	3	4	30		15				9	3	57
14	3	36	2	2	7	6				2	19
15	3	25	13	2	6	8	3		6	7	45
16	3	2	3	2	5		1		2	2	15
17	3	6	8	1	5	5			3	3	25
18	3	6	5		5	11			4	3	28
19	3	2	5		8	19			1	1	34
20	3	15	16	6	11	25	3		3	2	66
21	3	36	6	3	8	12			2	4	35
27	3	4	7	5		7			5	5	29
29	3	26	10	3	14	21	1		4	1	54
31	3	2	3		8	9			11	8	39
32	3	245	1	3	8	12	5		2	5	36
34	3	36	8	4	7	7	1		10	5	42
36	3	26	11	1	4	17	3		7	2	45
38	3	245	19	2	7	10	4		6	7	55
43	3	3	13	1	11	16	1		10	2	54
46	3	26	12	3	15	19	1		14	10	74
51	3	1	4		3	29	1		2	3	42
52	3	35	22	2	7	23			19	9	82
53	5	8	2		1	1			2	1	7
58	3	1	11	3	1	35	14		3	1	68
ALL			305	58	223	439	47		160	124	1356

STONE ARTIFACT CLASSES-CENTRAL WEST SITES

SITE #	SAMP	ST	ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
						CLASS					
1	1	3	1	2	2	12			5	1	23
2	2	8	4		2	2			2	1	11
3	5	1		5	4	20	13			3	45
4	2	6	3		2	11			1	2	19
5	5	14	9	6	3	43	10		13	5	89
6	5	3	18	17	29	92	5		20	19	198
7	5	24	3	3	19	25	9		7	8	76
8	5	15			13	29	7		3	3	55
12	5	3	1	2	7	21	5		8	3	47
13	5	2	3	4	11	32	4		11	12	77
14	5	3	3	2		4	3		1	1	14
15	5	3	7	1	15	14	2		22	1	62
17	5	8				6			4	5	16
18	5	24		2	2	10	2		1		17
19	5	5			4	13			3	1	21
20	5	26	6	1	6	10	2		3		28
21	5	8	7		5	15			7		34
22	5	24	4	1	4	15	4		7	4	39
23	5	2	4			11	5		4	5	29
27	5	8	4		7	14			7	6	38
28	5	8	1		1	4			3	2	11
29	5	36	18	2	14	35	3		9	13	94
30	5	24	2	8	11	13			8	3	45
31	5	3	1	5	6	15	1		7	8	43
32	5	3			4	11	2		3	4	24
33	5	26	2	4	7	7	3		9	10	42
35	5	3	2		2	25	5		1	4	39
36	1	36	2	3	4	34	3		4		50
38	1	24	5	1	2	2	1		3	3	17
39	1	34		1	5	3				4	13
40	1	5		3	1	6			1	1	12
41	1	36	1	1	6	16	4		6	2	36
42	1	24	10	1	8	4	2		9		34
47	1	26	1		3	4	1		2		11
48	1	6	1	4	3	7			2		17
49	1	24		5	2	6	1			1	15
50	1	5				12			4		16
51	1	2		1	2	4			3	2	12
52	1	2	1		3	10			2		16
53	1	6		3		6			5		14
54	1	2	1	6	2	16	1		6	3	35
56	1	4	2	2	3	9			2	1	19
58	5	4		4	2	5			4	1	16
59	1	4	2	5		3			5	3	18
60	1	2		3	2	3	2			1	11
61	1	6		4	1	6			4	3	18
62	1	6				1			1	3	5
63	1	4	2	4	6	4			6	9	31

STONE ARTIFACT CLASSES-CENTRAL WEST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
64	1	34		5	8	10	7		4	5	39
65	1	2	8		5	8			3	6	30
66	1	24		3	4	11	2		4	1	25
67	2	3			1	2	3		3	1	10
69	2	3	8	1	2	16	2		1		30
74	2	8				6			2		10
76	2	2	1	1	1	7	3		3	1	17
79	1	1			5				2		7
83	2	2	3		1	2			1	3	10
84	2	25	2	2	3	15	2			2	26
115	2	5	4		3	20	1		3	2	33
116	2	24	3	3	6	18	2		2	1	35
119	2	3	1		3	2					6
122	2	8	1		1	12			2		16
134	1	5	1	5	2	8	3				19
135	1	3	2	3		11			5	2	23
136	1	26		1		5	2		1	4	13
137	1	6	1	7	2	14			10	2	36
139	1	34		5	2	5			6	2	20
140	1	6	2	4		4			5	4	19
141	1	5		12	1	7			3	1	24
142	1	25		3	1	6			2		12
143	1	34		3	1	4	3		6	1	18
167	5	3	2	1	2	12	3		3		23
168	5	8	7	1	5	7			3		23
169	5	24	3	3	6	14	2		7	1	36
170	5	4	5	7	3	29			2	8	54
171	5	2	8		6	29	1		4	1	49
172	1	24	2	3	7	20	4		9	2	47
173	5	8	3		2	13			1	2	21
174	5	38			2	33			5		40
175	5	6	4		2	20			7		33
192	5	6	7	16	14	72	5		33	16	163
194	5	26	3		9	35	1		6	1	55
195	5	3	30	1	16	55	1		10	5	118
ALL			242	207	361	1204	147		396	235	2792

STONE ARTIFACT CLASSES-CENTRAL EAST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
10	5	35	3	4	5	47	4		4	1	68
11	5	3	6	5	5	49	15		6	8	94
44	1	35	2	7	13	17	1		4	2	46
45	1	26		1	6	1	1		3		12
46	1	8			1	4			1	5	11
90	2	3	1		6	1	3			2	13
93	2	3	1		1	1	2			4	9
95	2	14		2	3	20	9		4		38
97	2	1			2	3	7		3		15
123	2	5	9		2	10			4	3	28
124	2	25	2		2	3	2		4	3	16
128	2	26	2	1	3	10	1		3		20
131	1	3	37	1	14	118	4		16	6	196
132	2	35			2	4	3			1	10
133	2	26	6	1	8	87	9		8	9	128
146	1	24		4		6	1		8	1	20
147	1	4	1	5	4	5			4	1	20
148	1	3			3	3	1		6	1	14
149	1	45		9	2	3			4	2	20
150	1	4	6	7	4	8			5	13	43
151	1	5	1			13			5	9	28
152	1	3	2	1	5	10	1		4	1	24
153	2	89				1					1
154	1	5		7	4	16			5	1	33
155	1	25		4	3	7			4		18
156	1	24		6	5	12			4	3	30
157	1	2	2		3	2	1		4	6	18
158	2	6				1					1
160	2	3	4			1	2		1	1	9
201	2	24	6	2	8	16	1		8	5	46
212	2	6	4		2	2			1	3	12
214	2	8	32		5	50	3		23	1	114
215	1	1	1		5	3	9		11	5	34
216	3	36	2			11	3		6		22
220	2	8	6		7	10	3		6	4	36
221	2	8				1					1
222	2	8	5		1	4			4	1	15
225	2	3			1	13	4		2	1	21
226	2	46	13	2	3	24			11	7	60
227	2	3	8	1	1	22	4		7	1	44
235	2	36	2		2	13	2		2		21
267	2	1	1		4	4			1	1	11
268	2	3	5	1		6			1	1	14
269	2	24			2	6	1		2	1	12
270	2	6	1		8	7			1		17
271	2	8	7		1	3				3	14
272	2	3	9		1	2			1		13
273	3	8	12							3	15

STONE ARTIFACT CLASSES-CENTRAL EAST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
274	2	8			1	5			3	1	10
275	2	3			1	9	2		2		14
276	2	3	1	1	2	6	1		2		13
279	1	38	9		3	15	3		1	1	32
280	1	8	37							1	38
281	2	24	3	1	6	3	2		2	1	18
283	2	2	1		1	11	2		1		16
284	2	3			5	17	2		3		27
285	2	8	3		1	7			1		12
286	2	3	1		1	7	3		1	1	14
288	2	2	1	1	1	5	2		1		11
ALL			255	74	179	745	114		218	125	1710

150

STONE ARTIFACT CLASSES-NORTHWEST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
83	5	36	4		1	11	2		1	4	23
84	1	2	2		3	7	1		7	2	22
86	4	3	1		2	2			4	1	10
88	1	2	6		1	3	6		2		18
89	5	26	2	4	6	8			2		22
90	1	2	2		5	3			7	7	24
91	1	8	2	1	2	2			2		9
93	1	4	4			4			1	5	14
94	5	26	1		6	6	2		1	1	17
95	5	5	5	1	5	16			3	2	32
98	1	24	5	2	6	5	3		1	1	23
99	1	3			6	3	1		5		15
100	1	6		1	7	9	1		4	1	23
101	1	3	6		6	1	5		2	1	21
102	1	3	1	4	7	5	2		6	4	29
106	1	3	1		2	6	2			2	13
109	5	3			4	2	1		3		10
110	1	3			3	3			1		7
111	5	15		8	8	3	4		10		33
112	1	1		3	5	3	3		3		17
115	1	1	1		4				6	4	15
118	1	2							2		2
123	1	26							2	1	3
125	1	4	3	63	16	21			9	8	120
128	1	4	10	1	4	13	1		1	6	36
130	1	1	1	1	1	7	1			1	12
132	1	4	2	2	1	4			1	10	20
137	1	3			1	7	2		1	1	12
141	1	1	4	4	10	13	5		11	2	49
142	1	8	2		1	6			4		13
143	1	34		8	2	6	3		6		25
144	1	45	1	10	1	2			5		19
145	1	1	3		1		2		1	1	8
146	1	1			4	4	6		6	1	21
148	1	36			1	5				3	9
149	5	34	3	2	2	3	4			4	18
150	1	1	1	1	10	7	5		9	6	39
151	5	3	1		9	3	4		3	1	21
153	1	3		5	10	5	1		6	2	29
154	1	24	2	4	9	7	5		2	1	30
155	1	26		1	5	4			5	1	16
157	1	34	1		1	4	3				9
158	1	8	1			2			2	1	6
159	1	25			3	5	2		3	3	16
160	1	2		2	9	6	1		6	3	27
161	1	2			2	2			2		6
162	1	24	2		3	1	1			1	8
163	1	34		1	9	2	3			2	17

STONE ARTIFACT CLASSES-NORTHWEST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
164	1	2	1		5	2	1		1	1	11
165	1	2	1	2	10	6	1		2	1	23
166	1	12	1		17	2	3				23
167	1	2	2		13	2	5		4	4	30
170	1	8		1	1	1			1	1	5
171	5	2			6					2	8
172	1	2			4	1	2		2		9
173	1	2			10	1			2		13
174	5	2	1	1	2	6	1			1	12
175	1	2			4		4				8
176	1	2			5	1	1		1		8
177	1	24	1		20		4		1		26
178	1	2	1	2	15	4			1	2	25
179	1	2		1	14	6	2			2	25
180	1	2			12	4	1				17
181	1	2	2		2				1		5
182	1	2	5		3	3					11
183	1	2		2	10	10	5		6	5	38
185	1	2	2		6		3		1	1	13
186	1	2	1		10	7			1		19
187	1	2	2	2	7	4	2				17
188	1	3	1		7	3	1				12
189	1	2			5	1			2	1	9
190	1	2			9		4	1		1	15
191	1	2		2	15	4	4		1		26
192	1	8	1		2	1			3		7
193	1	8			1						1
194	1	2			9	7			3	3	22
195	1	2			10	6	8		1	2	27
196	1	24	1	1	6	1	4		4	2	19
197	1	2	1		9	1			2		13
198	1	2		2	15	8			5	4	34
199	1	3			5	4	2		2		13
200	1	25	1	6	9	8				1	25
201	1	3	1		1	4	1		2		9
202	1	8	2	2			1		1	1	7
205	1	2		1	5	6	4		3	2	21
206	1	1	2				3		4	2	11
207	5	1			1	3	3		3	1	11
210	5	1							1		1
211	1	8		1		5			2	2	10
212	5	3			2	1	3		1		7
215	1	2			1						1
ALL			110	155	492	364	155	1	222	136	1635

152

STONE ARTIFACT CLASSES-NORTHEAST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
61	5	8	9		2	10			10	9	40
64	5	8	4			1			4	1	10
66	5	24	1		3	6	2		4		16
67	5	3		2	1	6	4		1		14
68	5	3			2	8	3		5	4	22
70	5	3	2	2	1	4	4		1		14
71	5	3	1		2	3	1		5	2	14
73	5	26			3		2		3	3	11
75	5	16		1		1	4		3	1	10
76	5	1				1			1	2	4
77	5	1		1		4	4		1	3	13
79	5	25		6	4	10	2		6	2	30
80	5	14		3		3	2		2	2	12
82	5	1				14	11		8	3	36
83	5	26	3		1	1	2		1	3	11
88	5	8	1			3					4
89	5	5	2	8	1	13			5	12	41
90	5	5			3	11			5	5	24
93	5	35	2	5	3	18	3		6	2	39
95	5	2		1	1	6	1		2	5	16
96	5	25		12	4	17	2		3	4	42
99	5	8	1	4	1	4	2		1	3	16
101	5	3	1	2	4	3	3		1	4	18
102	5	24		4	2	2	4		7	6	25
104	5	4	8	5		8					21
105	5	26		3		8			9	2	22
106	5	25		4	2	2	2		1		11
107	5	8	1	2	1	5	1		4	2	16
110	5	1		3		6	7		1	1	18
112	5	2		1		6			4	1	12
114	5	25		1	5	7	8		2		23
118	5	8		1	1	3			1		6
120	5	24	1	4	3	3			3	3	17
124	5	2	3	1	2		1		1		8
125	5	3	2	1	2	4			1	5	15
126	5	3	2		4	10			5	1	22
127	5	2		2	2	7	4		3	5	23
129	5	2		1	4	8	5		2	4	24
130	5	89				5					5
131	5	5		1	1	12			2	2	18
135	5	5	1	2	2	10	1		3	4	23
136	5	3	1	4	2	3	12	1	5	4	32
139	5	245	1	4	4	4	4			2	19
141	5	24		2	4	1	2		1	5	15
142	5	25		1		9	3		2	1	16
143	5	25			5	9	3		5	6	28
144	5	25		5	2		1				8
145	5	25		5	5	6	12		2	1	31

STONE ARTIFACT CLASSES-NORTHEAST SITES

SITE #	SAMP	ST	CLASS ANG	BLA	COR	FLAK	LEVF	LEVP	SHA	UNSH	ALL
146	5	2			2	2				1	5
150	5	25	1		5	4			9	2	21
152	5	25		5	2	13	6		8	2	36
154	5	24		5		3	6		4	3	21
155	5	2			1	5	1				7
160	5	3		2	6	5	5		6	2	26
164	5	8	1	1	2	5			2	1	12
165	5	1			1	3	3		2		9
167	5	3		1	3	4	4		2	2	16
168	5	2			2	3			1	2	8
169	5	2			2	5	2		1	4	14
170	5	14		8	4	3	12		6	1	34
172	5	24			4	5			3	1	13
174	5	24		4		4	7		1	5	21
175	5	1			1	7	5	1	2	1	17
176	5	36	1	1	1	16	8		9	3	39
179	5	25	1	10	6	5	2		17	9	50
180	5	24	2	5	2	3	6		4	6	28
181	5	3				12	2		2	2	18
183	5	3		1	6	7	3		3	1	21
184	5	3	1	1	8	5	1		1	2	19
187	5	5									
188	5	36		3	2	6	6		3	1	21
189	5	5									
190	5	5									
191	5	2		1	2	2	1			2	8
192	5	8			1	2					3
193	5	5									
ALL			54	152	152	414	202	2	228	178	1382

APPENDIX D3: SHAPED STONE TOOL AND CORE TYPOLOGY
FREQUENCY (n) OF SHAPED STONE TOOLS AND CORES BY SITE

SHAPED TOOLS

1. Unifacial point
2. Parti-bifacial point
3. Bifacial point
4. Distally retouched point

5. Single side scraper
6. Double side scraper

7. Convergent scraper

8. Denticulate scraper-single edge
9. Denticulate scraper-double edge

10. Notched scraper-single edge
11. Notched scraper-double edge
12. Notched and denticulate scraper

13. End scraper-single edge

14. End scraper-double edge

15. End and single side scraper
16. End and double side scraper
17. Double end and side scraper

18. Transverse scraper

19. Inverse scraper

20. Circular and semi-circular scraper

21. Core scraper

22. Steep scraper

23. Nosed scraper

24. Scraper Frags.

25. Angle Burin
26. Dihedral Burin
27. Transverse Burin
28. Multiple burin
29. Burin on a backed piece
30. Core Burin

31. Bec
32. Perforator

33. Straight-backed blade-single
34. Straight-backed blade-double
35. Curved backed blade-single
36. Curved backed blade-double

37. Obliquely truncated blade
38. Orthoganally truncated blade
39. Double oblique truncation
40. Double orthogonal truncation
41. Oblique and orthogonal truncation
42. Misc. truncated blade

43. Biface or biface fragment
44. Parti-biface or fragment
45. Uniface or fragment

46. Outils esquilles

47. Crescents
48. Triangles
49. Trapezes

50. Composite tool
51. Gravers
52. Fragment

CORES

75 Flake, Single platform-normal
76 Flake, Single platform-angle
77 Flake, Single platform-pyramidal
78 Flake, Double platform-opposed, same plane
79 Flake, Double platform-right angles, same plane
80 Flake, Double platform-different planes
81 Flake, Double platform-opposed, alternate sides
82 Flake, Cores on flakes-single platform
83 Flake, Cores on flakes-double platform

84. Bipolar core

85. Irregular, Multiple platform

86. Biconical core

87. Levallois core
88. Levallois core on a flake
89. Levallois blade core
90. Convergent (Lev. points)
91. Convergent Nubian I
92. Discoid (flat)
93. Discoid (high backed)
94. Nubian Core II

95 Blade, Single platform-normal
96 Blade, Single platform-angle
97 Blade, Single platform-pyramidal
98 Blade, Double platform-opposed, same plane
99 Blade, Double platform-right angles, same plane
100 Blade, Double platform-different planes
101 Blade, Double platform-opposed, alternate sides
102 Blade, Cores on flakes-single platform
103 Blade, Cores on flakes-double platform

104 Core Frag.

156

SHAPED STONE TOOLS-SOUTHWEST SITES

SITE #	TYPE 1	2	3	5	6	7	8	10	11	12	13	14	15	18	19	20	21	22	23	24	25	26	28	29	30	31	32	33	34	35	37	38	43	44	45	46	47	48	50	ALL
2																																								2
3																	1			1																				2
4				1										1																										2
5						1										1				1							1								1					4
7	1										1			1								1								1										3
8					1	1															1					1														5
14											1					1				2	1														2					7
15					1	1																																		2
16				1				1																																2
17																																	1			1				4
19					1																														1					1
20													1															3		2					1			1		8
21														1																										1
23						1	1						1														1			1									1	4
24	1			2		1								2		1	1		1	1			1																	4
25									2		4	1		1			2				1									1		1		1	1					14
26			1	1																							1			1					2					15
27			1													1												1	1	3				1					2	10
28						1																					1							1						4
29			1																																					1
34	2	1				1					1																	1												2
38																														1					1					7
39								1			1		1															1												1
41															1		1																							3
42				2																																			1	4
45								1					1			1				1				1				1									1			4
46											1																	3		2							1			11
47																		1										1												2
53							1										1																							1
54	2			1		1					2					2				1			1					1		2									1	6
61																		1		1														1	2				1	14
62								1													1		1					4		4										3
63																				1								2		1	1									11
64											1		1					1										1											1	6
67				2							1														1			1							3					8
69					1			1								2												1											1	5
76	1																											2												6
79				1																																				1
80				1		2			1					1		2			1									1												2
81							2									1		1	1	1								2		1					1		1			13
ALL	7	1	3	12	6	10	4	5	3		13	1	5	7	1	12	6	4	3	10	4	1	3	1	1	1	4	25	1	20	1	2	1	5	15	1	3	1	10	213

CORES-SOUTHWEST SITES

	TYPE 75	76	77	78	79	80	81	82	83	85	86	87	88	92	93	95	96	97	98	99	100	101	102	103	104	ALL
S 1										1		1									1				1	4
I 2																1			1						1	3
T 3	1			2								3				1		1	1							9
E 4				1								4				1									1	7
# 5	2					1				1		2				2										8
6												1				1									1	3
7	4			4		1				1		1				2			1						2	16
8				2						3		4									1					10
11				1												1			1							3
14			1							1		2	1											1	2	8
15	1		1							1		1				1									1	6
16	1					1	1					3		2		3										11
17				1		1				1		3				1										7
18				1										1												2
19	1					1																			1	3
20	1																									1
21										1						3										4
23				1				1		1		7				1										11
24	1									2		4		1	1	2			2						2	15
25	1			2								9				2					1				1	16
26				1							1			1		4		1			1	1				10
27																									2	2
28	1											2														3
29				1									1			1					1					4
32										1		1											1			3
34				1				2		3		3				1										10
39												1														1
41			1							1		1							1		1				3	8
42	2			1		2				1						1									4	11
45	2				1	4						3						1							2	13
46			1									3									1					5
53			1				1			2		5				3			1							13
54	3	1		2		1				3		10				1			1		2				1	25
61	2			1			1			1				1								1			1	8
62	4			3	2			1		1						1									4	16
63												3					1		1							5
64	2								1	2						2			1						1	9
65										1				1		3						1				6
67															1	3										4
68																1										1
69	3			2						1		4	1	1		1										13
76	1			1			1			2		2				1									1	9
79	2									1		1														4
80			1								1					4		1		1	1					9
81	3			2				1				1													3	10
ALL	38	1	6	30	3	12	4	5	1	33	2	85	3	8	2	49	1	4	11	1	10	3	1	1	35	349

SHAPED STONE TOOLS-SOUTHEAST SITES

SITE	TYPE 2	3	5	6	7	8	10	11	13	15	16	18	19	20	22	23	24	25	26	31	32	33	34	35	40	44	45	46	47	49	50	ALL
1																																
2															1																	3
3							1			1		1		1	1										1			1				6
4										1														1								5
6			1		1	1			1						1						1			2			2					6
7			1			1			1								2															7
8																		1			1			2								3
9									1															1								1
10				1																						1						2
12			1				1																									2
13							1						1	1			1							1					2	2		9
14																																
15									1								1					3							1			6
16										2																						2
17															1						1		1									3
18									1				1				1				1											4
19						1																										1
20				1																				2								3
21									1											1												2
27			2				1		1															1								5
29													1		1									1			1					4
31	2	2	1							1				3	1							1										11
32												1			1																	2
34			3						1	2				1							1					1	1					10
36									1					1	2							1					2					7
38							1			1	1	1	1											1								6
43			1	1						1			2	2	1	1															1	10
46			4	1	1		1						1		1					1		2		1			1					14
51			1														1															2
52			2	1			2	3		3			2	1					1		1	1		1							1	19
53							1							1																		2
58			1			1																		1								3
ALL	2	2	18	5	2	4	9	3	9	12	1	3	9	11	11	1	6	1	1	2	6	8	1	15	1	2	7	1	3	2	2	160

CORES-SOUTHEAST SITES

	TYPE 73	75	78	80	81	82	84	85	87	88	89	90	92	93	95	98	100	101	102	103	104	ALL
SITE 1		1		1				1				1			2							6
2		5																				5
3		1							2		1			1	2							7
4	1	1						5							1							8
6								5	3													8
7		3						1	4						3							11
8		3	1																			4
9			2		1			1							1	1						6
10								1	1												1	3
12		2	1					1	2				2	1								9
13		3			1			6	5													15
14			1					1		2					2		1					7
15		1						3	1						1							6
16									5													5
17		1	1					2									1					5
18								3							2							5
19							2		5									1				8
20		2	1						3	1					2	1	1					11
21								2	5						1							8
29		1						1	7						3		1	1				14
31		1			1				5				1									8
32		1						3	1				2		1							8
34				1					4						1		1					7
36								2	1									1				4
38								2	3	1										1		7
43								2	5						1	2			1			11
46		7		2	1				4	1												15
51									2							1						3
52		3	1						1	1				1								7
53						1																1
58									1													1
ALL	1	36	8	4	4	1	2	42	70	6	1	1	5	3	23	5	5	3	1	1	1	223

160

SHAPED STONE TOOLS-CENTRAL WEST SITES

SITE	TYPE 1	2	4	5	6	7	8	9	10	11	13	15	16	18	19	20	21	22	23	24	25	26	30	31	32	33	35	43	44	45	46	47	50	52	ALL
1				1										1						1				1									1		5
2				1																													1		2
3																																			
4																									1										1
5				1					1					1					3			1		3	3										13
6		1		4	1				1		1		1		1	2				2				1			3	1		1					20
7						1			1		1														4										7
8							1												1						1										3
12				2					1					1					1					1											8
13				2		1								1	1			2		3				1				1					1		11
14							1																												1
15				2	1	2					2	1				2			4					4			1	1					2		22
17						1												1	1								1								4
18																											1								1
19				1						1		1																							3
20																	1	1							1										3
21				1															2	1				1									2		7
22				1			1																1			2	1						1		7
23									2											1				1											4
26																																			
27																		3						1	1								2		7
28				1																					1					1					3
29				1												1			1					1	1		1	1					2		9
30															1				1						1	3	1						1		8
31						1	2					1				1			1														1		3
32				1										1																1					9
33				2				1	1												1			3			1								1
34																																			4
35																										1									1
36				1							1										1				1										4
37																																			
38																		1			1					1									3
39																																			
40							1																												1
41				2														1		1				1		1									6
42	1									1		1			1	1									3	1									9
47											1																	1							2
48				1										1																					2
49																																			
50				1		1																					1				1				4
51																		1							1		1								3
52				1																	1														2
53											1			1	1									1									1		5
54				1			1									1					1	1					1								6
56																											1		1						2
57																																			
58																			1												2		1		4
59									1												1			1	1							1			5
60																																			
61												1				1		1									1								4
62																											1								1
63											1																1				1	1	2		6
64				1											1												1				1				4
65							1																												
66									1															1									1		3
67				1																					1	2									4
69																		1						1											3
73																									1										1
74		1												1																					
76				2														1																	2
79						2																													3
83											1																								2
84																																			1
115																					1				1	1									3
116																1								1											2
119																																			
122																									1								1		2
134																																			
135					2	1																		1										1	5
136																																	1		1
137				2												1								2	1		1		1		1	1			10
138																																			
139				1		1			1		1					1										1									6
140																					1			1									3		5
141				1															1							1									3
142																											2								2
143					1										1		1							1	1								1		6
167				1																					1						1				3
168													1													1		1							3
169																			1						4						1		1		7
170											1								1																2
171				1																							2				1				4
172		1									2								2						4										9
173																								1											1
174																2		1		1				1											5
175				1	1															1					1						1	1		1	7
192				1		1					5			2		1		2			2			17			1				1				33
194											1			1												1	2		1						6
195				3				1								1		2							2									1	10
ALL	1	2	1	43	6	12	8	1	11	2	19	5	1	12	7	16	2	18	21	11	10	2	1	48	30	16	26	6	3	3	11	4	26	3	396

161

CORES-CENTRAL WEST SITES

SITE #	TYPE 75	76	77	78	80	81	82	85	86	87	88	92	93	95	98	99	100	101	102	103	104	ALL
1	1														1							2
2														1							1	2
3										2											2	4
4								1													1	2
5	1							1									1					3
6	4			2				8		7		2									6	29
7	1					1		2		5				2							8	19
8	1			1						9			1	1								13
12										5					1		1					7
13								3		4			1	1							2	11
15	2							1		9				2			1					15
18								1													1	2
19	1									2				1								4
20								1		2									1		2	6
21										1				1			3					5
22	3							1														4
27	5							2														7
28														1								1
29	3				1			1		5				2							2	14
30	2		1					2		2				2			1	1				11
31										4							1				1	6
32								1		1				2								4
33	1									3				2			1					7
35										1	1											2
36					1			1						2								4
38										1											1	2
39								2										1	2			5
40				1																		1
41	1				1			2		1				1								6
42								5		1	1			1								8
47	1			1				1														3
48														3								3
49																	1				1	2
51										1											1	2
52								1		1					1							3
54				1										1								2
56	2																				1	3
58	1													1								2
60										1				1								2
61								1														1
63				1	1			1		1											2	6
64		1		2				2		1					1		1					8
65	2				1			2														5
66							1	2											1			4
67														1								1
69										1				1								2
76																					1	1
79								1	1	2								1				5
83										1												1
84	2				1																	3
115	1							1							1							3
116	1			1				3												1		6
119	1									2												3
122														1								1
134				1						1												2
137								1						1								2
139										1				1								2
141				1																		1
142										1												1
143	1																					1
167										1				1								2
168														2	1	1	1					5
169								1		2							1		1	1		6
170	2																				1	3
171										4				1			1					6
172	2									3	1			1								7
173																					2	2
174								1													1	2
175	1													1								2
192	2			4	1			1		2				4								14
194				2				3		2					1						1	9
195	2							2		6				3			2	1				16
ALL	47	1	1	18	7	1	1	59	1	99	3	2	2	46	7	1	16	4	5	2	38	361

SHAPED STONE TOOLS-CENTRAL EAST SITES

SITE	TYPE 1	3	5	6	7	8	10	13	15	16	18	19	20	22	23	24	25	26	27	31	32	33	35	43	44	45	46	47	48	50	51	52	ALL
10			1														1						1					1					4
11			1		1	1					2						1																6
43																																	
44	1																			1			1	1									4
45						1															1	1											3
46																	1																1
90																																	
93																																	
95			1														1			1					1								4
97			2	1																													3
123								1						1	1							1											4
124					1					1	1												1										4
128																				1							1			1			3
131			3	1					1						2					2	2			1						4			16
132																																	
133						1					1		1			1					1				1	1	1						8
145																																	
146			1										1								3	2	1										8
147																				1		2	1										4
148		1	1																		2	1								1			6
149																					1	1						2					4
150																	1			1		3											5
151															1					1			2								1		5
152			1																			1		1								1	4
153																																	
154																			1			2							1			1	5
155						1																	3										4
156													1		2							1											4
157																				2	1						1						4
158																																	
160			1																														1
201				1								1	2								2		1							1			6
212																							1										1
214	1		2	1	2		1		1		1			1	1			1		2	2		2	2			1			1		1	23
215	1						1				1				2					3				1						2			11
216			3								1				1						1												6
220									1				1			2											1			1			6
221																																	
222										1																				3			4
223																																	
225																				2													2
226									1			2	1		2						2	1						1		1			11
227			2	1											1					1							1			1			7
235											1										1												2
236																																	
267			1																														1
268														1																			1
269								1														1											2
270													1																				1
271																																	
272																									1								1
273																																	
274			1						1																					1			3
275					1										1																		2
276			1	1																													2
278																																	
279										1																							1
280																																	
281															1						1												2
282																																	
283																				1													1
284						1							1							1													3
285							1																										1
286					1																												1
288											1																						1
ALL	1	3	22	6	6	5	3	2	5	3	9	3	9	3	15	3	5	1	1	20	20	17	14	6	3	1	6	4	1	17	1	3	218

163

CORES-CENTRAL EAST SITES

SITE #	TYPE 75	78	80	81	82	85	87	88	92	93	95	96	98	99	100	101	102	103	104	ALL
10	2					2				1										5
11	1						2	1			1									5
44	3	1					6				3									13
45						1	2			1	1				1					6
46																			1	1
90	3						2		1											6
93																			1	1
95	1		1				1													3
97							1	1												2
123						1					1									2
124							1				1									2
128						1					1						1			3
131						2	6				4				2					14
132		1					1													2
133	1	1				1	2				3									8
147		1				1		1											1	4
148							1				1				1					3
149	1										1									2
150	2					1													1	4
152	1					1	1						1	1						5
154	1	1				1	1													4
155			1				1						1							3
156		2			1	1	1													5
157							2	1												3
201	1			1	1	1	2				1								1	8
212																			2	2
214		1					1				1	1			1					5
215					1	1	2								1					5
220	2																		5	7
222		1																		1
225						1														1
226	1					1													1	3
227											1									1
235							1				1									2
267							1												3	4
269								1										1		2
270	2					3						1				1	1			8
271											1									1
272							1													1
274											1									1
275							1													1
276							1						1							2
279						1				1	1									3
281					2	3											1			6
283															1					1
284	1						1				1		1		1					5
285											1									1
286							1													1
288							1													1
ALL	23	9	2	1	5	24	44	5	1	3	26	2	4	1	8	1	3	1	16	179

SHAPED STONE TOOLS-NORTHWEST SITES

SITE	TYPE 1	2	3	4	5	6	7	9	10	12	13	15	16	17	18	19	20	21	22	23	25	26	27	28	31	32	33	34	35	36	37	38	43	44	45	47	50	52	ALL
83																																							1
84																	1																						7
86									1			2			1			1							3	1											1		4
88					1													1																					2
89																																							2
90					1		1				1	1					1										1												7
91					1						1													1	1							1							2
93																																							1
94					1																						1												1
95																																							3
98																											1		2										1
99			1												1			1																1					5
100					1																													1	1				9
101												1																						1	2				2
102					1		1				1			1	1											1											1		6
106																																							
109			1								1				1																								3
110															1																								1
111			1		2		1										1	1									3						1						10
112					1	1																																	3
115				1		2	1																		1										1			1	6
118																	2																				1		2
123																	1																						2
125																		1									4		4							1			9
128											1																												1
130																																							
131																																							
132																					1																		1
137																	1																						1
141	2			1	1		1	1						1																									11
142				1				1										1														3		1					4
143																							1			1	2		2				1						6
144							1									1												1	2							1			5
145																																							1
146	1	1		1	1														1						1														6
148																																							
149																																							
150		2		1	1	1																																	9
151												1																		1			1	2					3
153		3		1	1																											1				1			6
154																	1									1													2
155				1							1						1										1				1								5
156																																							
157																																							
158															1				1																				2
159				1																							2												3
160					1						2				1																	1				1			6
161				1											1																								2
162																																							
163																																							
164									1						1																					1			1
165															1			1																					2
167				1											1																	1							4
170											1																												1
172					1																												1						2
173												1				1																							2
174																																							
176																1																							1
177						1																																	1
178																																				1			1
179																																							
180																																							
181																																							
182																									1														1
183				3					1																														6
185				1											1	1																							1
186																					1																		1
187																																							
188																																							
189																																							
191																																							2
192				1																												1							1
193																2																							3
194																																							
195								1										1			1															1			3
196																					1					1	1	1											1
197															1																					1			4
198				1		2																				1		1											2
199				1												1																							5
200																																							2
201				1											1																								
202														1																									2
203																																							1
204																																							
205																1								1															3
206								1				1							1															1					4
207				1																					1											1		3
208																																							
209																																							
210																																							1
211				2																																1			2
212																								1															1
213																																							
214																																							
215																																							
ALL	3	9	1	29	9	9	1	6	1	9	6	1	2	11	6	14	7	3	1	1	3	1	1	8	6	17	2	12	1	1	1	9	6	8	2	12	3	222	

CORES-NORTHWEST SITES

SITE #	TYPE 72	75	77	78	79	80	81	82	85	87	88	89	92	93	95	96	98	99	100	102	103	104	ALL	
83										1													1	
84	1									2													3	
86		1								1													2	
88															1								1	
89				2						4													6	
90										4												1	5	
91										1							1						2	
94				1						4					1								6	
95		3							1								1						5	
98		1								4					1								6	
99		1								4					1								6	
100										5					2								7	
101										5	1												6	
102									1	4		1			1								7	7
106				1						1													2	
109										3					1								4	
110				1																		2	3	
111		1					1			5							1						8	
112										4												1	5	
115										2			1									1	4	
125		8		2				1							2						1	2	16	
128			1	2													1						4	
130											1												1	
132				1																			1	
137										1													1	
141										7					3								10	
142																						1	1	
143										1					1								2	
144									1														1	
145										1													1	
146										4													4	
148										1													1	
149										1									1				2	
150		1							1	7					1								10	
151										9													9	
153										9				1									10	
154								1		6												2	9	
155		1								4													5	
157																				1			1	
159									1	2													3	
160										9													9	
161										1					1								2	
162		1								2													3	
163									1	8													9	
164										5													5	
165										8					1							1	10	
166						1				13	2		1										17	
167										12													13	
170									1														1	
171									1	5													6	
172										4													4	
173										7					2					1			10	
174										1												1	2	
175										3								1					4	
176							1			4													5	
177		1							1	12	1				4				1				20	
178									1	12					1							1	15	
179		1								13													14	
180										12													12	
181										2													2	
182									1	2													3	
183									1	9													10	
185							1			5													6	
186				1						8						1							10	
187		2							1	4													7	
188										5					2								7	
189													1	1								3	5	
190										7	2												9	
191				1						11			1		2								15	
192															2								2	
193									1														1	
194										3	2								2		1	1	9	
195		1							1	8													10	
196		1							1	3	1												6	
197		1		1						5					1				1				9	
198					1				2	12													15	
199		2			1					2													5	
200		1		2			1			5													9	
201										1													1	
205										5													5	
207										1													1	
212										2													2	
215										1													1	
ALL	1	28	1	15	2	1	4	2	18	340	10	1	4	2	31	1	4	1	5	2	2	17	492	

166

SHAPED STONE TOOLS-NORTHEAST SITES

	TYPE	1	5	6	7	8	10	11	13	15	16	18	19	20	21	22	23	24	25	26	28	29	31	32	33	35	36	41	43	44	45	46	47	48	50	51	ALL
S	61			1					1							1	1	3																	3		10
I	64		2						1																										1		4
T	66								1									2																	1		4
E	67																																		1		1
0	68				1		1			1																				1					1		5
	70		1																																		1
	71		1						2							1																			1		5
	73																1			1				1													3
	75		1			1																			1												3
	76		1																																		1
	77		1																																		1
	79		1				1		1	1						1								1													6
	80		1											1																							2
	82		3			1	2																												2		8
	83																																		1		1
	86																																				
	87		1							1						1			1					1													5
	90																			1	1	1			1		1										5
	93								2	1			1				1									1											6
	95				1									1																							2
	96																1								1									1			3
	99																									1											1
	101							1																													1
	102						2	1									1											1				1	1				7
	105		2		2		1	2															1		1												9
	106																														1						1
	107		1			1																		1					1								4
	110					1																															1
	112			1		1								1																					1		4
	114										1	1																									2
	118															1																					1
	120																							1		2											3
	124																						1														1
	125								1																												1
	126		1		1							1											1	1													5
	127								1			1												1													3
	129	1												1																							2
	130																																				
	131		1																							1											2
	135											1		1												1											3
	136											1											1		2				1								5
	139																																				
	141																																		1		1
	142																								1							1					2
	143						1		1																1								1	1			5
	144																																				
	145											1												1													2
	146																																				
	150		1	2					1			1	1					1								1								1			9
	152		1		1	1								2		1	1									1											8
	154			1			1		1				1																								4
	155																																				
	160			1	1											1	1	1																	1		6
	164																						1												1		2
	165											1																		1							2
	167																													1					1		2
	168											1																									1
	169																																		1		1
	170								2	1		1													1				1								6
	172				1									1												1											3
	174									1																											1
	175				2																																2
	176	1	1				1			1								3					1		1												9
	179						1		1	1			1				1								4		1								3	1	16
	180								1	1				1											1												4
	181		1						1																												2
	183					1	1					1																									3
	184		1																																		1
	187																																				
	188		1	1						1																											3
	189																																				
	190																																				
	191																																				
	192																																				
	193																																				
	ALL	2	24	7	10	7	12	4	18	10	1	11	4	9		7	9	10	1	2	1	1	6	8	17	9	2	1	3	3	1	2	2	3	20	1	228

CORES-NORTHEAST SITES

	TYPE	75	76	77	78	80	81	82	85	87	88	93	95	98	101	102	104	ALL
S	61																2	2
I	66				1		1										1	3
T	67													1				1
E	68			1						1								2
#	70									1								1
	71									2								2
	73									3								3
	79	1			1					2								4
	83								1									1
	89	1																1
	90	1					1							1				3
	93	1								1					1			3
	95									1								1
	96	1							1	2								4
	99	1																1
	101				1					1							2	4
	102							1		1								2
	106	1											1					2
	107	1																1
	114			1						4								5
	118				1													1
	120							2	1									3
	124									2								2
	125								1	1								2
	126									3							1	4
	127									1				1				2
	129								1	3								4
	131	1																1
	135	2																2
	136									2								2
	139	1	1						1		1							4
	141								1	1			1				1	4
	143	2			1		1			1								5
	144								1	1								2
	145									5								5
	146				1					1								2
	150	1								3	1							5
	152									2								2
	155									1								1
	160				1				1	2			1			1		6
	164	1											1					2
	165									1								1
	167									2	1							3
	168									1							1	2
	169									2								2
	170				1					2		1						4
	172									3							1	4
	175									1								1
	176	1																1
	179	2				1				2			1					6
	180									2								2
	183					1				5								6
	184									7			1					8
	188													2				2
	191									2								2
	192												1					1
	ALL	19	1	2	8	2	3	3	9	78	3	1	7	5	1	1	9	152

APPENDIX D4: FREQUENCY (n) OF SHAPED STONE TOOLS AND CORES BY TECHNO-STAGE

Table 3 in the text provides the Techno-Stage coding values.

SOUTHWEST SHAPED TOOLS AND CORES BY TECHNO-STAGE AND TYPE

TYPE	TECHNO-STAGE 1	2	3	4	5	6	8	14	15	16	24	26	34	36	45	58	145	ALL
1	3										1		2	1				7
2													1					1
3						1	1								1			3
5	3		1				2	1			1	1		2	1			12
6		1			1	1	1					1	1					6
7	2		1			1		2				3	1					10
8							2				1	1						4
10			1		1							1	1		1			5
11									1			2						3
13	1		1				3				1	5	1	1				13
14												1						1
15			1			1	1			1				1				5
18	2						1	1				2		1				7
19		1																1
20	2		2				1	2			1	1	2		1			12
21	1		1	1							1	2						6
22				1	1		2										1	4
23	1		1					1										3
24	1		1	2	1		1					2	1		1			10
25					1							2		1				4
26												1						1
28	1				1							1						3
29															1			1
30			1															1
31					1													1
32			1				2					1						4
33			1	2	4		1	2			3		3	1	7		1	25
34															1			1
35	1			1	3		1		1		1	2	2		8			20
37													1					1
38	1				1													2
43												1						1
44	2				1		1								1			5
45	3	1			1				1			6					3	15
46												1						1
47				1					1						1			3
48					1													1
50	1	1					4				1			1	2			10
75	3		3	3	3	2	5			1		4	3	3	5	1	2	38
76							1											1
77		1				1		1			2	1						6
78	1	1	2	1	2	1	3				1	8	4	3	3			30
79						1									2			3
80	1	1		2	1	1						2		1	3			12
81				1							1	1				1		4
82			1									2	1		1			5
83			1															1
85	5	2	2	2	1	2	5				4	8	1	1				33
86								1							1			2
87	15	4	10			1	2				8	32	8	2	3			85
88											1	1	1					3
92	0			1							1	2	2		1			8
93	1													1				2
95	3	[illegible]	[illegible]	[illegible]	1	2	11	4			4	8	2	6	2	1	1	49
96													1					1
97								1				1			2			4
98	[illegible]		[illegible]	1		1					1	1		1				11
99								1										1
100	2	2				1		1			1	2			1			10
101							2								1			3
102							1											1
103												1						1
104	3	5	4	3	2		14				1	1		1	1			35
ALL	63	21	41	23	28	17	67	18	4	2	36	112	39	28	52	3	8	562

SOUTHEAST SHAPED TOOLS AND CORES BY TECHNO-STAGE AND TYPE

TYPE	TECHNO-STAGE 1	2	3	4	5	6	8	15	25	26	35	36	245	ALL
2		2												2
3		2												2
5	2	2	1	2			1			1		9		18
6			2							1	1	1		5
7										1		1		2
8	1	1	1									1		4
10		1	1	1			3			1		2		9
11												3		3
13		1			1	1	3					3		9
15	1	3	2				1					5		12
16			1											1
18		1	1										1	3
19			3				3					3		9
20		4	2				2					3		11
22		2			1	1	3		1	1		2		11
23			1											1
24	1	2					2		1					6
25					1									1
26												1		1
31			1									1		2
32					2	1	1					2		6
33		2			1				3	1		1		8
34						1								1
35		2	3	3	1		3	1		1	1			15
40					1									1
44			1									1		2
45	2									2		3		7
46					1									1
47				1			1		1					3
49				1			1							2
50							1					1		2
73	1													1
75		4		2	11	1	5	1	2	5	1	4		36
78					4	1	1				1	1		8
80												4		4
81		1			1		1					1		4
82							1							1
84		2												2
85		2	2	5	1	6	9		2	1		7	5	42
87	3	20	14			1	13	2	2	5	1	8	1	70
88			1					1				4		6
89		1												1
90					1									1
92		1					2						2	5
13		1					1					1		3
95		2	1	1	2	3	3	2	2	3		4		23
98	1		1				2	1						5
100						1		1		1		2		5
101		2								1				3
102							1							1
103													1	1
104										1				1
ALL	12	61	39	16	29	19	64	9	14	26	5	79	10	383

171

CENTRAL WEST SHAPED TOOLS AND CORES BY TECHNO-STAGE AND TYPE

TYPE	TECHNO-STAGE 1	2	3	4	5	6	8	14	24	25	26	34	36	38	ALL
1									1						1
2			1						1						2
4							1								1
5		7	15		3	5	3	1	1		2	2	4		43
6			4			1						1			6
7	2	1	4		1	1	1		1			1			12
8		2	2		1				2						7
9											1				1
10		2	3	1				1	2		1	1			11
11					1				1						2
13		1	3	2		6			3		2	1	1		19
15			2		1	1			1						5
16			1												1
18		1	3			4	2	1			1				12
19		1	1			1			2			2			7
20		1	6			3			2			1	1	2	16
21											1	1			2
22		4	3			3	4		1		1		1	1	18
23			6	2	1		3	3	5				1		21
24		4	3			1	1						1	1	11
25		1		1	2	3			1		1		1		10
26		1						1							2
30									1						1
31		3	9	1		21	3	3	1		3	1	2	1	48
32		1	4	1	1	3	3	3	18		1	1	2		38
33			1		2		1		9		1	1	1		16
35		4	4	2	1	4	1		3	2	3	1	1		26
43			3				1				1		1		6
44				1		1					1				3
45			2				1								3
46		1	1	3	1	3			1			1			11
47				2		2									4
50		1	5	3		4	6		3		1	1	2		26
52			2			1									3
75		2	10	5	2	3	5	1	10	2	2	1	4		47
76												1			1
77									1						1
78			2	1	4	4			2		3	2			18
80		1		2		1				1			3		8
81									1						1
82									1						1
85	1	6	12	1	1	4	2	1	17		5	4	4	1	59
86	1														1
87	4	14	37	1	3	2	1		21	1	7	2	6		99
88			1						2						3
92			2												2
93		1							1						2
95		3	10	1	2	9	6		7		2	1	5		46
98		1	2		1		1				1	1			7
99							1								1
100		1	5				4	1	3		1	1			16
101	1		1						1			1			4
102									2		1	2			5
103									2						2
104	2	3	7	4		1	3		12		3		2	1	38
ALL	11	68	177	34	28	92	54	16	143	6	46	32	43	7	757

CENTRAL EAST SHAPED TOOLS AND CORES BY TECHNO-STAGE AND TYPE

TYPE	TECHNO-STAGE 1	2	3	4	5	6	8	14	24	25	26	35	36	38	45	46	ALL
1												1					1
3	1		1				1										3
5	3		10				3	0	1			1	3				22
6	1		3				1		1								6
7			3				2			1							6
8			2							1	2						5
10	1						2										3
13					1				1								2
15			1				3									1	5
16							1			1				1			3
18	1	1	2				1			1	1		2				9
19									1							2	3
20			1			1	1		4		1					1	9
22			1		1		1										3
23	2		4		2		1		3				1			2	15
24							2				1						3
25			1	1			1	1				1					5
26							1										1
27					1												1
31	3	3	6	2	1		2	1			1	1					20
32		1	4				2		6		2		2		1	2	20
33			2	5	3				4		1				1	1	17
35				1	2	1	2		2	4		2					14
43	1		2				2					1					6
44			1					1			1						3
45											1						1
46		1	1				2				2						6
47												1			2	1	4
48					1												1
50	2		6				6		1		1					1	17
51					1												1
52			1		1		1										3
75			6	2	1	2	1	1	7		1	6			1	1	23
78				1	1		2		2		1	2					9
80								1		0							2
81									1								1
82	1								4								5
85	1		4	2	2	3			5		3	2		1		1	24
87	4	3	17		1		1	1	3	2	4	7	1				44
88	1	1	1	1					1								5
92			1														1
93											1	1		1			3
95			9		1		4		1	1	4	3	1	1	1		26
96						1	1										2
98			3							1							4
99			1														1
100	1	1	4				1				1						8
101						1											1
102						1			1		1						3
103									1								1
104	3		1	2		4	4		1							1	16
ALL	26	11	99	17	20	14	52	7	45	13	30	29	10	4	6	14	397

NORTHWEST SHAPED TOOLS AND CORES BY TECHNO-STAGE AND TYPE

TYPE	TECHNO-STAGE 1	2	3	4	5	6	8	12	15	24	25	26	34	36	45	ALL
2	3															3
3	3		5						1							9
4	1															1
5	5	10	3			1	4		2		1	2		1		29
6	6	2	1													9
7	3	3	1						1	1						9
9	1															1
10	2	2	1				1									6
12		1														1
13		3	2	1			1					1		1		9
15		2	4													6
16	1															1
17	1		1													2
18	1	5	4				2									12
19		4	1												1	6
20		5	1				2		1	1		3		1		14
21		2	2	1			1		1							7
22	1	1					1									3
23	1															1
25				1												1
26		2								1						3
27													1			1
28		1														1
31	2	5	1													8
32	1	2	1							1			1			6
33		1		5	1				3	1	2	2	2			17
34										1					1	2
35		1		4	2					1			2		2	12
36	1															1
37												1				1
38		1														1
43	3	3	2						1							9
44	1	1	1			1	1			1						6
45	5	1	1			2										9
47												1			1	2
50	3	7	2													12
52	1															1
72		1														1
75	1	7	2	8	3				1	4	1	1				28
77				1												1
78		3	2	5							2	3				15
79		1	2													3
80								1								1
81		2							1		1					4
82				1						1						2
85	1	8	1		1		2			2	1		1		1	18
87	26	185	48			5		13	5	27	7	13	10	3		342
88	1	4	1					2		2						10
89			1													1
92	1	2						1								4
93		1	1													2
95	4	9	5	2		2	2			5		1	2			32
96		1														1
98				1	1				1					1		4
99		1														1
100		3								1			1			5
102		1											1			2
103		1		1												2
104	2	5	2	2						2						13
ALL	82	300	99	33	8	11	17	17	18	52	15	28	21	7	6	714

NORTHEAST SHAPED TOOLS AND CORES BY TECHNO-STAGE AND TYPE

TYPE \ TECHNO-STAGE	1	2	3	4	5	8	14	16	24	25	26	35	36	245	ALL
1		1											1		2
5	5		4	1	2	3	1	1		3	2		2		24
6		1	1			1			1	2			1		7
7	2	1	3						1	1	2				10
8	2	1	1			1		1		1					7
10	2		2						3	3	1		1		12
11			1						1		2				4
13		1	4	2		2	2		2	3		2			18
15			1		1		1		2	2		1	2		10
16										1					1
18	1	2	3		1		1			3					11
19									1	2		1			4
20		3			1		1		2	2					9
22			2		1	2				2					7
23			1	1		1			1	3	1	1			9
24			1			5				1			3		10
25					1										1
26					1						1				2
28					1										1
29					1										1
31		1	2			1					1		1		6
32		1	1		1	1			1	2	1				8
33			2		1		1	1	1	9	1		1		17
35					2	1			3	2		1			9
36					1					1					2
41									1						1
43			1			1	1								3
44	1		2												3
45										1					1
46									1	1					2
47									1	1					2
48										3					3
50	2	2	5			6			1	3	1				20
51										1					1
75				1	5	3				7		1	1	1	19
76														1	1
77			1							1					2
78		1	2			1	1		1	2					8
80			1							1					2
81					1				1	1					3
82									3						3
85		1	2						2	2	1			1	9
87	2	12	29	1			2		7	21	3	1			78
88			1							1				1	3
93							1								1
95			2			2			1	2					7
98		1	1		1								2		5
101												1			1
102			1												1
104		1	3			2			3						9
ALL	17	30	80	6	22	33	12	3	41	91	17	9	15	4	380

APPENDIX E: CENTRAL SECTION SITE DISTRIBUTION DATA

TABLE 1:CENTRAL SECTION SITE DATA (VARIABLES USED IN ANALYSIS ARE UNDERLINED)

SITE	SITENAME	STLENGTH	STWIDTH	H2ODIST	MLU	NLITH	WTLITH
1	CE010	150	75	0	20	11	15
2	CE011	207	136	0	10	36	110
3	CE044	350	100	10	20	10	33
4	CE045	65	45	10	10	4	9
5	CE046	60	45	10	10	1	15
6	CE131	125	35	50	10	13	122
7	CE146	90	60	700	20	10	23
8	CE147	200	75	400	10	21	25
9	CE148	175	110	300	10	18	38
10	CE149	120	65	400	10	23	67
11	CE150	280	160	300	10	14	21
12	CE151	130	95	350	10	17	41
13	CE154	115	65	30	10	17	51
14	CE155	70	45	0	10	12	80
15	CE156	120	65	250	10	13	39
16	CE157	65	40	850	20	13	41
17	CW002	6	4	14	10	11	64
18	CW003	60	16	0	10	25	75
19	CW004	16	11	0	10	9	25
20	CW005	65	40	0	10	34	127
21	CW006	425	135	0	10	22	37
22	CW007	190	80	0	10	14	93
23	CW008	45	40	100	10	9	130
24	CW012	200	80	150	10	4	25

SITE	AREA	AVEWTLTH	DIST	STATE	PRED	RESID
1	11250	1.3636	near	fresh	15.0162	-4.016
2	28152	3.0556	near	dstrbd	15.0162	20.984
3	35000	3.3000	near	fresh	14.9822	-4.982
4	2925	2.2500	near	dstrbd	14.9822	-10.982
5	2700	15.0000	near	dstrbd	14.9822	-13.982
6	4375	9.3846	near	dstrbd	14.8459	-1.846
7	5400	2.3000	far	fresh	12.6313	-2.631
8	15000	1.1905	far	dstrbd	13.6534	7.347
9	19250	2.1111	far	dstrbd	13.9941	4.006
10	7800	2.9130	far	dstrbd	13.6534	9.347
11	44800	1.5000	far	dstrbd	13.9941	0.006
12	12350	2.4118	far	dstrbd	13.8237	3.176
13	7475	3.0000	near	dstrbd	14.9140	2.086
14	3150	6.6667	near	dstrbd	15.0162	-3.016
15	7800	3.0000	near	dstrbd	14.1645	-1.164
16	2600	3.1538	far	fresh	12.1202	0.880
17	24	5.8182	near	dstrbd	14.9685	-3.969
18	960	3.0000	near	dstrbd	15.0162	9.984
19	176	2.7778	near	dstrbd	15.0162	-6.016
20	2600	3.7353	near	dstrbd	15.0162	18.984
21	57375	1.6818	near	dstrbd	15.0162	6.984
22	15200	6.6429	near	dstrbd	15.0162	-1.016
23	1800	14.4444	near	dstrbd	14.6755	-5.676
24	16000	6.2500	near	dstrbd	14.5052	-10.505

TABLE 1 (cont'd)

SITE	SITENAME	STLENGTH	STWIDTH	H2ODIST	MLU	NLITH	WTLITH
25	CW013	500	150	60	20	22	88
26	CW014	350	100	750	10	2	14
27	CW015	300	100	350	10	6	17
28	CW017	140	100	100	10	10	27
29	CW018	100	30	40	10	12	49
30	CW019	150	80	200	10	7	35
31	CW020	100	60	600	10	10	54
32	CW021	80	60	600	10	9	45
33	CW022	130	80	400	10	7	45
34	CW023	130	90	700	10	9	33
35	CW027	500	300	150	20	14	37
36	CW028	620	190	1500	10	1	9
37	CW029	210	210	900	20	6	17
38	CW030	280	175	0	10	19	82
39	CW031	600	300	2000	10	11	47
40	CW032	280	130	150	10	7	14
41	CW033	250	150	1000	20	12	21
42	CW035	45	40	5	20	8	10
43	CW036	120	75	25	20	32	98
44	CW038	45	30	15	20	6	5
45	CW039	85	35	5	20	5	18
46	CW040	55	40	5	10	2	15
47	CW041	400	70	5	10	4	22
48	CW042	400	200	15	10	29	86

SITE	AREA	AVEWTLTH	DIST	STATE	PRED	RESID
25	75000	4.0000	near	fresh	14.8118	7.188
26	35000	7.0000	far	dstrbd	12.4609	-10.461
27	30000	2.8333	far	dstrbd	13.8237	-7.824
28	14000	2.7000	near	dstrbd	14.6755	-4.676
29	3000	4.0833	near	dstrbd	14.8799	-2.880
30	12000	[illegible].0000	near	dstrbd	14.3348	-7.335
31	6000	5.4000	far	dstrbd	12.9720	-2.972
32	4800	5.0000	far	dstrbd	12.9720	-3.972
33	10400	6.4286	far	dstrbd	13.6534	-6.653
34	11700	3.6667	far	dstrbd	12.6313	-3.631
35	150000	2.6429	near	fresh	14.5052	-0.505
36	117800	9.0000	far	dstrbd	9.9056	-8.906
37	44100	2.8333	far	fresh	11.9498	-5.950
38	49000	4.3158	near	dstrbd	15.0162	3.984
39	180000	4.2727	far	dstrbd	8.2020	2.798
40	36400	2.0000	near	dstrbd	14.5052	-7.505
41	37500	1.7500	far	fresh	11.6091	0.391
42	1800	1.2500	near	fresh	14.9992	-6.999
43	9000	3.0625	near	fresh	14.9311	17.069
44	1350	0.8333	near	fresh	14.9651	-8.965
45	2975	3.6000	near	fresh	14.9992	-9.999
46	2200	7.5000	near	dstrbd	14.9992	-12.999
47	28000	5.5000	near	dstrbd	14.9992	-10.999
48	80000	2.9655	near	dstrbd	14.9651	14.035

TABLE 1 (cont'd)

SITE	SITENAME	STLENGTH	STWIDTH	H2ODIST	MLU	NLITH	WTLITH
49	CW047	45	30	300	20	9	49
50	CW048	90	80	350	20	7	32
51	CW049	100	55	350	20	8	23
52	CW050	40	30	400	20	7	40
53	CW053	45	15	300	20	6	23
54	CW054	55	25	250	20	16	49
55	CW056	60	50	300	20	9	25
56	CW058	170	75	400	20	4	15
57	CW059	160	140	250	20	7	20
58	CW060	75	40	100	20	8	19
59	CW061	55	40	400	20	7	14
60	CW062	25	15	800	20	0	0
61	CW063	130	90	500	20	13	24
62	CW064	150	100	350	20	40	66
63	CW065	220	80	300	20	10	39
64	CW066	175	150	5	10	12	38
65	CW069	20	19	60	10	1	8
66	CW079	76	55	10	10	115	489
67	CW134	160	75	45	10	13	40
68	CW135	200	175	50	10	31	53
69	CW136	55	35	700	20	11	19
70	CW137	350	100	300	20	29	87
71	CW139	120	110	300	10	8	11
72	CW140	250	175	400	20	14	30

SITE	AREA	AVEWTLTH	DIST	STATE	PRED	RESID
49	1350	5.4444	far	fresh	13.9941	-4.994
50	7200	4.5714	far	fresh	13.8237	-6.824
51	5500	2.8750	far	fresh	13.8237	-5.824
52	1200	5.7143	far	fresh	13.6534	6.653
53	675	3.8333	far	fresh	13.9941	-7.994
54	1375	3.0625	near	fresh	14.1645	1.836
55	3000	2.7778	far	fresh	13.9941	-4.994
56	12750	3.7500	far	fresh	13.6534	-9.653
57	22400	2.8571	near	fresh	14.1645	-7.164
58	3000	2.3750	near	fresh	14.6755	-6.676
59	2200	2.0000	far	fresh	13.6534	-6.653
60	375	.	far	fresh	12.2906	-12.291
61	11700	1.8462	far	fresh	13.3127	-0.313
62	15000	1.6500	far	fresh	13.8237	26.176
63	17600	3.9000	far	fresh	13.9941	-3.994
64	26250	3.1667	near	dstrbd	14.9992	-2.999
65	380	8.0000	near	dstrbd	14.8118	-13.812
66	4180	4.2522	near	dstrbd	14.9822	100.018
67	12000	3.0769	near	dstrbd	14.8629	-1.863
68	35000	1.7097	near	dstrbd	14.8459	16.154
69	1925	1.7273	far	fresh	12.6313	-1.631
70	35000	3.0000	far	fresh	13.9941	15.006
71	13200	1.3750	far	dstrbd	13.9941	-5.994
72	43750	2.1429	far	fresh	13.6534	0.347

TABLE 1 (cont'd)

SITE	SITENAME	STLENGTH	STWIDTH	H2ODIST	MLU	NLITH	WTLITH
73	CW141	110	80	550	20	23	35
74	CW142	110	70	400	20	19	52
75	CW143	300	100	85	20	13	54
76	CW167	85	45	1400	10	8	25
77	CW168	100	50	0	10	8	137
78	CW169	150	100	2000	10	12	22
79	CW170	150	120	1000	10	14	44
80	CW171	240	200	70	10	5	11
81	CW172	260	250	1700	10	10	38
82	CW173	250	180	70	20	7	9
83	CW174	100	80	1500	20	6	22
84	CW175	140	55	2000	20	8	9
85	CW192	195	130	800	10	21	44
86	CW194	100	80	80	10	7	12
87	CW195	220	100	1500	10	34	122

SITE	AREA	AVEWTLTH	DIST	STATE	PRED	RESID
73	8800	1.5217	far	fresh	13.1423	9.858
74	7700	2.7368	far	fresh	13.6534	5.347
75	30000	4.1538	near	fresh	14.7266	-1.727
76	3825	3.1250	far	dstrbd	10.2463	-2.246
77	5000	17.1250	near	dstrbd	15.0162	-7.016
78	15000	1.8333	far	dstrbd	8.2020	3.798
79	18000	3.1429	far	dstrbd	11.6091	2.391
80	48000	2.2000	near	dstrbd	14.7777	-9.778
81	65000	3.8000	far	dstrbd	9.2242	0.776
82	45000	1.2857	near	fresh	14.7777	-7.778
83	8000	3.6667	far	fresh	9.9056	-3.906
84	7700	1.1250	far	fresh	8.2020	-0.202
85	25350	2.0952	far	dstrbd	12.2906	8.709
86	8000	1.7143	near	dstrbd	14.7437	-7.744
87	22000	3.5882	far	dstrbd	9.9056	24.094

TABLE 2: STATISTICAL RESULTS

Variable=NLITH

Moments

N	87	Sum Wgts	87
Mean	13.68966	Sum	1191
Std Dev	13.92948	Variance	194.0305
Skewness	4.781033	Kurtosis	32.33461
USS	32991	CSS	16686.62
CV	101.7519	Std Mean	1.493397
T:Mean=0	9.166787	Prob>|T|	0.0001
Sgn Rank	1870.5	Prob>|S|	0.0001
Num ^= 0	86		

Quantiles(Def=5)

100% Max	115	99%	115
75% Q3	16	95%	34
50% Med	10	90%	29
25% Q1	7	10%	4
0% Min	0	5%	2
		1%	0
Range	115		
Q3-Q1	9		
Mode	7		

Extremes

Lowest	Highest
0	34
1	34
1	36
1	40
2	115

Variable=H2ODIST

Moments

N	87	Sum Wgts	87
Mean	389.3563	Sum	33874
Std Dev	500.0917	Variance	250091.7
Skewness	1.815505	Kurtosis	2.855303
USS	34696946	CSS	21507890
CV	128.4406	Std Mean	53.61546
T:Mean=0	7.262016	Prob>|T|	0.0001
Sgn Rank	1501.5	Prob>|S|	0.0001
Num ^= 0	77		

Quantiles(Def=5)

100% Max	2000	99%	2000
75% Q3	500	95%	1500
50% Med	250	90%	1000
25% Q1	15	10%	0
0% Min	0	5%	0
		1%	0
Range	2000		
Q3-Q1	485		
Mode	0		

Extremes

Lowest	Highest
0	1500
0	1700
0	2000
0	2000
0	2000

130

TABLE 3: GENERAL LINEAR MODELS PROCEDURE

Dependent Variable: NLITH

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	249.66965349	249.66965349	1.29	0.2590
Error	85	16436.9510362	193.37589454		
Corrected Total	86	16686.6206897			

R-Square	C.V.	Root MSE	NLITH Mean
0.014962	101.58011	13.905966	13.68965517

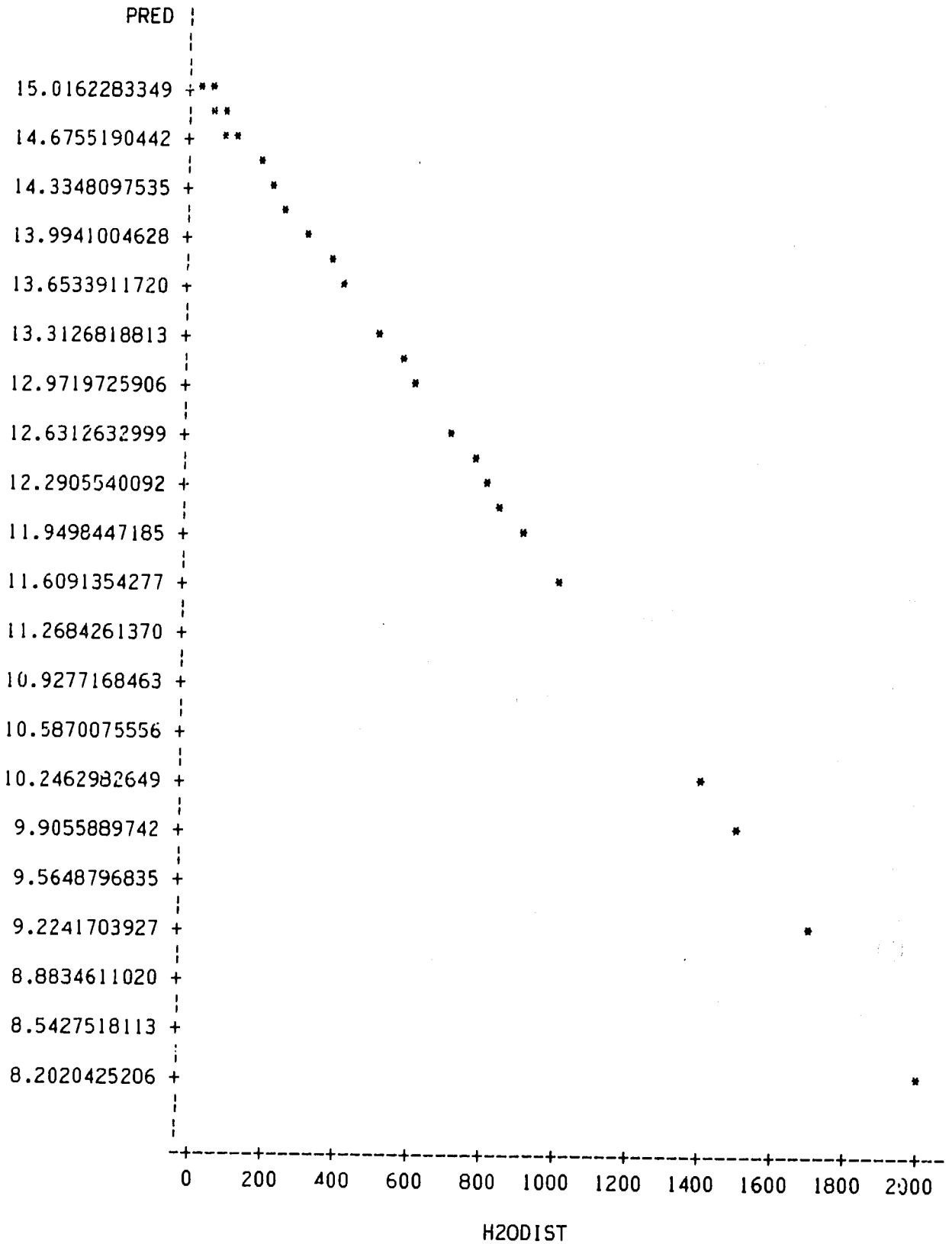
Source	DF	Type I SS	Mean Square	F Value	Pr > F
H2ODIST	1	249.669653	249.669653	1.29	0.2590

Source	DF	Type III SS	Mean Square	F Value	Pr > F
H2ODIST	1	249.669653	249.669653	1.29	0.2590

Parameter	Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT	15.01622833	7.93	0.0001	1.8936000823
H2ODIST	-0.00340709	-1.14	0.2590	0.0029984877

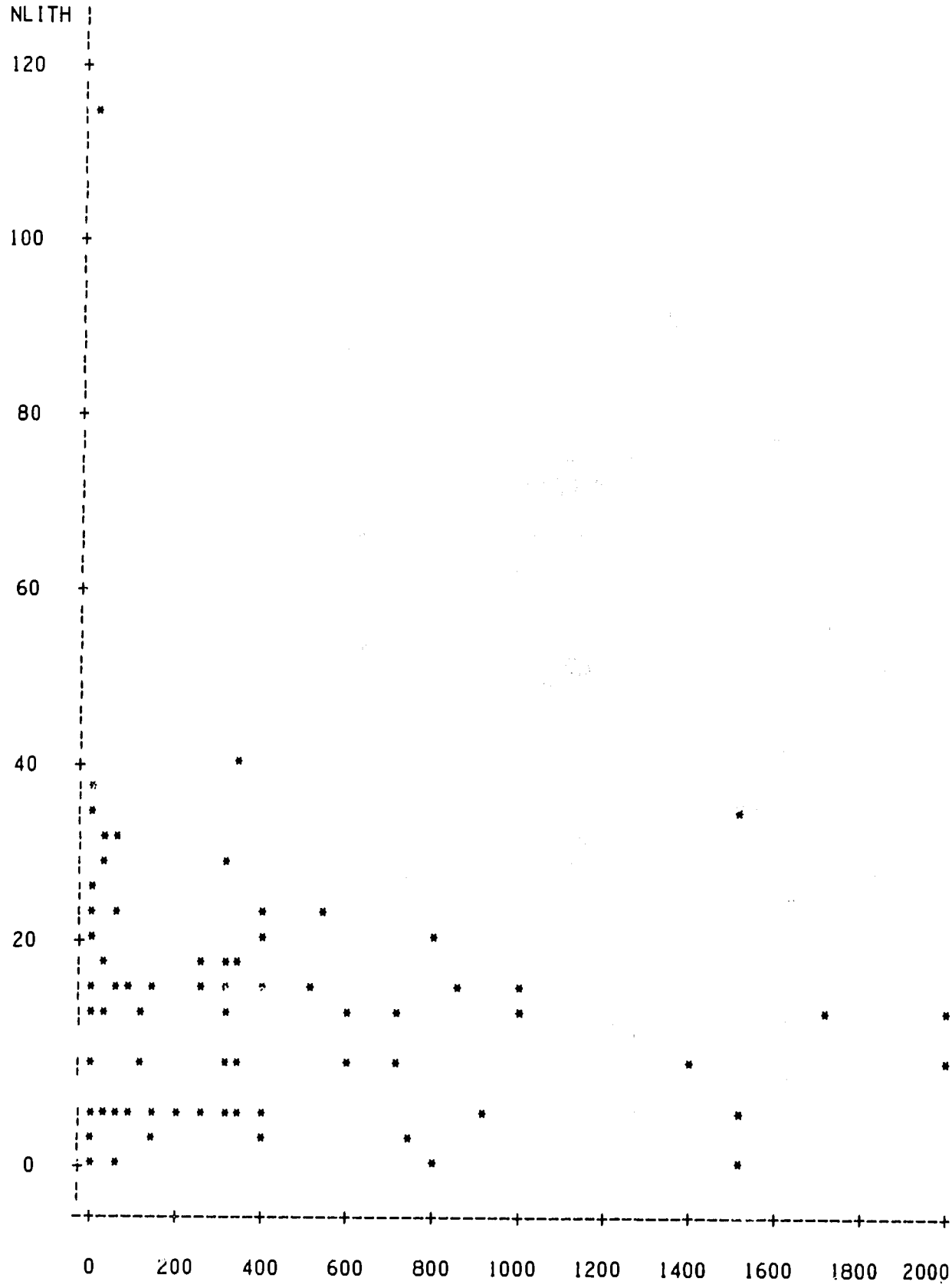
Sum of Residuals	-0.00000000
Sum of Squared Residuals	16436.95103617
Sum of Squared Residuals - Error SS	-0.00000000
First Order Autocorrelation	-0.09303831
Durbin-Watson D	2.14977606

FIGURE 1:PLOT OF PRED*H2ODIST



NOTE: 62 obs hidden

FIGURE 2: PLOT OF NLITH*H2ODIST



NOTE: 19 obs hidden

APPENDIX F1: FREQUENCY OF POTTERY SHERDS BY SITE AND SECTION

Key to headings:

SI= Site Number
ST= Techno-Stage
DECB= Decorated Body Sherds
DECR= Decorated Rim Sherds
NONS= Imported Non-Earthenware
PLRM= Plain Rim Sherds
PLNB= Plain Body Sherds
WT= Weight of All Sherds

SOUTHWEST SITES

SI	ST	DECB	DECR	PLRM	PLNB	ALL	WT
16	26	12			10	22	31
17	2	1	1			2	11
25	2	3			2	5	17
29	6	6				6	33
41	2	2	1		5	8	44
42	4				2	2	3
46	8				1	1	3
53	4		1			1	19
63	3		1			1	5
64	3	1				1	2
65	8	16		1	7	24	75
67	8	1	2		1	4	24
76	8				1	1	4
79	24		1		1	2	6
80	14	2	2		1	5	26
81	3				2	2	4
ALL		44	9	1	33	87	

SOUTHEAST SITES

SI	ST	DECB	DECR	PLRM	PLNB	ALL	WT
2	5	2				2	7
20	15	1			1	2	1
31	2	6	2	1	3	12	55
32	25	3			3	6	8
34	36	2	1		1	4	11
38	3	3	1			4	2
46	26	1	1			2	7
53	8	6				6	101
58	1	2			1	3	10
ALL		26	5	1	9	41	

CENTRAL WEST SITES

SI	ST	DECB	DECR	PLRM	PLNB	ALL	WT
15	3		1			1	10
26	9	3	1		25	29	74
27	9	6	2			8	20
28	8	29	20		3	52	479
34	9	22	2	5	37	66	94
37	9	25	1	2	9	37	82
38	24	8		2	14	24	37
52	2			1	1	2	4
54	2	30	1		90	121	363
57	9	15			51	66	109
59	4	13	3	1	18	35	134
62	6	5	1			6	30
74	3	3			6	9	61
138	9	16	11			27	186
142	25		1			1	8
ALL		175	44	11	254	484	

CENTRAL EAST SITES

SI	ST	DECB	DECR	PLRM	PLNB	ALL	WT
10	35	26	1	2	26	55	215
43	9	15			10	25	46
44	35	5	8	4	5	22	157
123	5				6	6	16
132	35	12				12	
145	9	18	6		7	31	
149	45	34	5		1	40	139
153	8	21			31	52	79
158	6	5	1		26	32	58
160	3	3	6		6	15	186
220	8	3	6	7	1	17	103
221	8	15			41	56	95
223	8	13	1		11	25	234
227	3	13				13	
236	36	23	3		35	61	
278	3	19	2		9	30	
282	24	39	6		18	63	269
ALL		264	45	13	233	555	

NORTHWEST SITES

SI	ST	DECB	DECR	NONS	PLRM	PLNB	ALL	WT
88	2	21			3		24	106
110	3	20				5	25	94
125	4		1			4	5	27
131	9	6				1	7	17
132	4	12	1			9	22	82
154	24	1			1	4	6	32
156	9	5	4	2		7	18	103
179	2	4	4		2	4	14	105
193	8	4	1			4	9	78
196	24	3	1			1	5	34
197	2	1					1	2
203	9	9	10	3		3	25	157
204	9	5	2			5	12	86
208	9	1	1			5	7	27
209	9	1	2			10	13	130
210	1	4		3		3	10	22
211	8					3	3	7
213	9	7	4			1	12	79
214	9	3				5	8	62
215	2	1	2	1		2	6	79
ALL		108	33	9	6	76	232	

NORTHEAST SITES

SI	ST	DECB	DECR	NONS	PLRM	PLNB	ALL	WT
61	8	1	1				2	37
71	3	1	2				3	49
88	8	19			2	18	39	87
90	5	1	1				2	7
106	25	6	2			2	10	38
124	2		1				1	8
126	3	2	1			30	33	195
129	2		1				1	9
130	8	68	4			56	128	342
135	5			1			1	1
143	25	1	2			3	6	25
145	25	2	1				3	23
165	1	1					1	28
168	2	15	5			1	21	106
169	2			1		8	9	66
179	25	1					1	5
183	3		2		1	4	7	57
187	9	14	11			15	40	220
189	9	3	10			11	24	331
190	9	5				2	7	37
191	3					3	3	18
192	8	17	2		1	2	22	70
193	5	8				1	9	34
ALL		165	46	2	4	156	373	

APPENDIX F2: POTTERY CHARACTERISTICS BY SITE AND SECTION

Key to Headings:

SI= Site Number
WEA= Weathering: 1-little
2-Moderate
3. Heavy

COL= Firing Color:
1-Buff/Brown-Grey/Black-Red
2-Red-Buff/Brown-Red
3-Buff/Brown-Buff/Brown-Buff/Brown
4-Red-Grey/Black-Red
5-Grey/Black-Buff/Brown-Grey/Black
6-Buff/Brown-Buff/Brown-Red
7-Buff/Brown-Grey/Black-Grey/Black
8-Grey/Black-Grey/Black-Grey/Black
9-Grey/Black-Grey/Black-Buff/Brown
10-Buff/Brown-Buff/Brown-Grey/Black
11-Grey/Black-Buff/Brown-Buff/Brown
12-Red-Buff/Brown-Grey/Black
13-Grey/Black-Grey/Black-Red
14-Buff/Brown-Grey/Black-Buff/Brown
15-Red-Red-Red
16-Red-Buff/Brown-Buff/Brown

PIT= Evidence of Pitting: 1-Yes
SOO= Evidenc of Sooting: 1-Yes
#VE= Minimum Number of Partially Reconstructable Vessels
VET= Vessel Form:
1-Cooking pots
2-Incense burners
3-Braziers
4-Coffee pots

RMT= Most Common Rim Type:
1-Straight walled/outcurved lip
2-Straight walled/incurved lip
3-Converging walls/rounded lip
4-Straight walled/rounded lip
5-Incurvate/rounded lip
5-Baydhaba
6-Converging walls/outcurved lip

MRD= Minimum Rim Diameter
MXR= Maximum Rim Diameter
ARD= Average Rim Diameter
MRT= Minimum Rim Thickness
MXT= Maximum Rim Thickness
ART= Average Rim Thickness
MBT= Minimum Body Thickness
MXT= Maximum Body Thickness
ARB= Average Body Thickness

SOUTHWEST SITES

SI	WEA	COL	PIT	SOO	#VE	VET	RMT	MRD	MXR	ARD	MRT	MXT	ART	MBT	MXD	ABT
16	2	5			1									4.7	5.2	5.0
17	2	2			1		1	7.5	7.5	7.5	7	7	7	8.6	8.7	8.7
25	2	3			2									6	6.3	6.2
41	2	5			1		2				13	13	13	7	8.4	7.7
63	2	6			1		4	5	5	5	8.9	8.9	8.9	7	7	7
64	2	6			1									6.5	6.5	6.5
65	1	7			4		1	6.5	6.5	6.5	6	6.3	6.2	4.4	6.6	5.5
67	3	2			2		3	11	11	11	8.2	11	9.4	7.4	7.4	7.4
79	2	9			1		4				5.4	5.4	5.4	7.4	7.4	7.4
ALL								5	11	7.4	5.4	13	8.2	4.4	8.7	5.9

SOUTHEAST SITES

SI	AGE	WEA	COL	PIT	SOO	#VE	VET	RMT	MRD	MXR	ARD	MRT	MXT	ART	MBT	MXB	ABT
31	1	1	1			6		1	6.5	9.5	7.8	7.4	12	8.9	5.1	8.9	6.9
32	1	2	9			1									6.4	6.4	6.4
38	1	1	4			2									4.8	6.1	5.6
53	3	3	3			1	3					13	13	13	6.1	15	8.5
58	1	1	4			1									7.5	7.6	7.6
ALL									6.5	9.5	7.8	7.4	13	9.7	4.8	15	7.3

CENTRAL WEST SITES

SI	WEA	COL	PIT	SOO	#VE	VET	RMT	MRD	MXR	ARD	MRT	MXT	ART	MBT	MXB	ABT
15	1	4			1									5.2	5.2	5.2
28	3	3					1				7.4	20	13	4.6	11	6.8
34	2	11				1	1	8.5	9	8.8	8.2	9.4	8.8	2.4	8	4.6
37	1	3			3		1	8.5	8.5	8.5	7.1	7.1	7.1	6	6.9	6.3
38	1	3			3		1	9	10	9.5	7.2	7.5	7.4	3.7	7.2	4.8
54	3	3	1				5							3.3	7.1	4.5
57	2	3												3.7	5.7	4.6
59	2	6		1			1	7.5	11	8.7	9.3	20	14	4	8.5	6.1
62	1	3			1		1				6.7	6.7	6.7	5.5	5.5	5.5
138	2	4			1		1	5.4	7.5	6.4	6.8	16	11	4.9	7.8	6.3
142	1	13			1		1	7	7	7	8	8	8			
ALL								5.4	11	8.0	6.7	20	12	2.4	11	5.4

CENTRAL EAST SITES

SI	WEA	COL	PIT	SOO	#VE	VET	RMT	MRD	MXR	ARD	MRT	MXT	ART	MBT	MXB	ABT
10	2	5		1		3					4.4	4.4	4.4	3.1	7.3	4.8
43	1	8			1									3.2	4.7	4.0
44	2	4			4	1	1	8.5	9.5	9	6	11	7.6	4.2	7.3	5.1
123	2	8			1									5.4	5.4	5.4
132	1	3			1									4.6	5.6	5.1
145	1	9			4	2	1	4.5	5	4.7	8.1	12	10	4.3	8.6	5.6
149	1	3		1	2	1	1	7	7	7	7.5	7.7	7.6	2.9	6.8	4.5
153	2	10			2									3	4.5	3.8
158	1	3			5		1	6.8	6.8	6.8	7.4	7.4	7.4	3.4	6.9	5.1
160	1	14		1	1	1	1	5.5	5.5	5.5	7.1	7.1	7.1	6	7	6.6
220	2	5			3		1	5.5	8	7	7.4	0.6	7.8			
223	1	8		1	1	1	1	6.8	6.8	6.8	11	11	11	6.5	6.5	6.5
227	1	5	1	1	1									4.8	7.1	5.9
275	2	10	1				1	7	7	7	5.5	7.5	6.5	3.7	6.5	5.4
278	2	8		1	1									4.1	5.3	4.6
282	1	14			2	1	1	7.5	7.5	7.5	6.1	7.9	7	3.1	5.1	3.9
ALL								4.5	9.5	7.3	4.4	12	7.8	1.2	9.7	4.8

189

NORTHWEST SITES

SI	WEA	COL	PIT	SOO	#VE	VET	RMT	MRD	MXR	ARD	MRT	MXT	ART	MBT	MXB	ABT
88	1	13			3		1	6	8	7	6.1	7.2	6.7	3.1	7.7	4.7
110	1	13			1									2.9	5	3.9
131	2	5			3									4.1	5.6	4.9
132	1	4		1	2		4				6.3	6.3	6.3	4.1	6.5	5.0
146	3	1			2		4				11	12	12	8.4	8.4	8.4
154	2	2			3		4	5	6.8	5.9	8.7	10	9.4	6.8	8.5	7.7
156	1	4					1	5.8	6.5	6.1	8.2	15	12	4.5	8.6	6.9
179	2	1					1	6	9.8	7.9	8.6	11	9.9	5.7	8.5	7.3
193	2	1			4		1	5	5	5	11	11	11	4.4	7.5	6.0
203	2	14	1				1	6	11	7.8	5.6	18	13	5.6	8.5	7
204	2	9			5		2	4.5	5.8	5.2	10	11	10	4.4	8.4	6.7
208	1	13			1									3.9	3.9	3.9
209	2	3			3		1	6.5	6.5	6.5	11	11	11	6.3	7.1	6.7
210	1	3			2									5.9	8.3	7.1
213	1	8			2		1	6	6.4	6.3	6.7	7.4	7.0	3.3	4.5	3.6
215	2	4			2		1				12	12	12	6	7.7	6.9
ALL								4.5	11	6.6	5.6	18	11	2.9	8.6	5.5

NORTHEAST SITES

SI	WEA	COL	PIT	SOO	#VE	VET	RMT	MRD	MXR	ARD	MRT	MXT	ART	MBT	MXB	ABT
61	2	16			2	3								13	18	15
71	1	13			2		1				6.5	7.3	6.9	6.1	7.2	7.2
106	3	6					3				7.4	15	11	5.1	7.3	5.9
126	2	13			2		4	6	6	6	11	11	11	7.5	9.8	8.7
129	1	2			1		1				5.5	5.5	5.5	6.2	6.2	6.2
130	1	3	1		2		3	6.8	10	8.6	6.8	16	13	3.7	16	0.7
143	1	3			2		1				5.3	6	5.8	4	7.4	5.4
145	1	13			2		1				8.8	8.8	8.8			
165	2	8			1									8.3	8.3	8.3
168	1	2					1	5	7.5	6.1	7.5	14	10	4.7	6.4	5.5
179	1	14			1									5.1	5.1	5.1
183	3	11			3		4	9.4	10	9.7	8.9	17	12	5.3	6	5.7
187	1	7				4	1	5	8	6.6	4.3	11	8.5	3	9.6	6.6
189	2	3	1		4	2	1	3.4	7.4	5.9	6	17	11	5.3	14	8.0
190	2	1					4							4.4	7.7	5.8
192	1	3					4				9.3	10	9.8	4.2	8.5	5.8
ALL								3.4	10	6.7	4.3	17	10	3	18	7.3

APPENDIX F3: TYPE, LOCATION AND PATTERN OF POTTERY DECORATION

Key to coding values is presented in Appendix B3 Except for "Pattern" (Ware) which is as follows:

1- Hawal Dheeri
2- Bardaale
3- Buur Dinsor
4- Buur Xakaba
5- Baydhaabo
6- Jelib/Jemame

Examples: 21= Incised Halbad Jooge motif on the body
102= Incised Xariijin motif on the rim
223= Stamped Honey Comb motif on the lip

SOUTHWEST SITES

TYPE, LOCATION, AND PATTERN OF DECORATION

		21	61	101	102	103	121	122	141	161	201	211	212	ALL	PATTERN
S	16			8										8	
I	17				2									2	
T	25	1				3								4	
E	41			2								1		3	
	63		1											1	
	64											1		1	
	65	5		10	1			1						17	1,2
	67		1										1	2	
	79									1	1			2	5
	ALL	6	2	20	3	3		1		1	1	2	1	40	

SOUTHEAST SITES

TYPE, LOCATION, AND PATTERN OF DECORATION

		11	21	61	62	69	89	101	102	112	121	211	215	ALL	PATTERN
S	31		2					2	2					6	3
I	32	1						1						2	
T	38	1	2	1										4	
E	53				1	1	1	1		2	4	4	1	15	6
	58		2											2	1
	ALL	2	6	1	1	1	1	4	2	2	4	4	1	29	

192

CENTRAL WEST SITES

TYPE, LOCATION, AND PATTERN OF DECORATION

		11	12	15	16	21	22	25	32	51	52	61	62	63	101	102	121	122	141	151	161	171	172	201	211	212	213	215	221	231	241	ALL	PATTERN
S	15					1									1						1				1							4	
I	28	2	2		1	4	3	1	1			4	3		13	15	5	1	2			1	4		5	12	1			1		81	
T	34					19									4		2							3	4							32	5
E	37	2	1							2	1				2	1					1											10	
	38					2	2								6	1					1				4							16	1
	54					1									29	1			5							2						38	6
	57					12									2		6				1											21	1
	59	5				1	1	2				2	1		9	1	4				1	1			1			1				30	2
	62	1												1	1	1											1					5	
	138	9		2	2	6						1			21	3	7			6					2				1		2	62	
	142															1																1	
	ALL	19	3	2	3	46	6	3	1	2	1	7	4	1	88	24	24	1	7	6	5	2	4	3	17	14	2	1	1	1	2	300	

CENTRAL EAST SITES

TYPE, LOCATION, AND PATTERN OF DECORATION

		11	21	61	62	101	102	121	122	151	161	162	211	212	216	222	ALL	PATTERN
S	10	1	4			15		7			4		7		1		39	1,6
I	43		12			2		12					1				27	2
T	44	1	1		1	4	1	1				5	2				16	3
E	123							1									1	
	132							3									3	
	145	5	4			7		2			1		2			1	22	2
	149	4	21			12		4					7				48	5
	153		12	2				3			1						18	2
	158	1	2			1		4					1				9	
	160		5				2										7	2
	220				2		7							5			14	2
	223					1											1	2
	227	2	9			5		1									17	2
	278	9				5		1									15	2
	282		28			1		5		3	5		6	6			54	1
	ALL	23	98	2	3	53	10	44		3	11	5	26	11	1	1	291	

NORTHEAST SITES

TYPE, LOCATION, AND PATTERN OF DECORATION

		11	12	15	16	18	21	22	25	61	62	63	101	102	103	104	112	113	121	122	131	141	142	161	162	171	172	173	201	211	212	213	214	219	221	241	ALL	PATTERN
S	61						1						1																									
I	71				1								2	1										1						1								4
T	106	2					4				1		3	1						1						1				1	1							8
E	126	1								1			2									1																12
	129	1											1																									4
	130	15		9			76			8		4	25	1					28			1		15		1			6	1								2
	143	1					4				2		1	2					1					2														190	1,2
	145												1																		1							14	1
	165																		1																			1
	168			2			4	1					11	1			1		2			1		1		2					1							1
	179																							1														28
	183	1											1																									1
	187	2	2	1			7						8	3	1				2		1			1	1	2	1			2	1	1						2
	189	1		5	1		8		1	1			12		1			1	4	3			1	1		2		1		1	1	1	1	1		1		36
	190	2		3			6			1			7						1																		49	3,6
	192	2		3		1			1	2			15			1			12					1						1								20
	ALL	28	2	23	2	1	110	1	2	13	3	4	90	9	2	1	1	1	51	4	1	3	1	23	1	8	1	1	6	8	5	2	1	1	1	1	412	

NORTHWEST SITES

TYPE, LOCATION, AND PATTERN OF DECORATION

		11	12	15	21	25	26	61	101	102	121	122	141	161	163	171	211	212	ALL	PATTERN
S	88				10						9			3					22	1
I	110				13				5		2								20	1
T	131					1			4		1			1					7	
E	132	4			3			1	3	1	1	1		2					16	
	154	1			1				2		1						1		6	
	156								2	3	1						3		9	
	179			1		1	1		4	2						1			10	
	193	1			2	1			3		2								9	4
	203	3				1		1	9		3		1	1	1		1		21	5
	204	1	1						1	1	2								6	
	208				1														1	
	209							1	1	1								1	4	
	210	2							2										4	
	213	2							5	2				2			4	2	17	
	215				1														1	
	ALL	14	1	1	31	4	1	3	41	10	22	1	1	9	1	1	9	3	153	