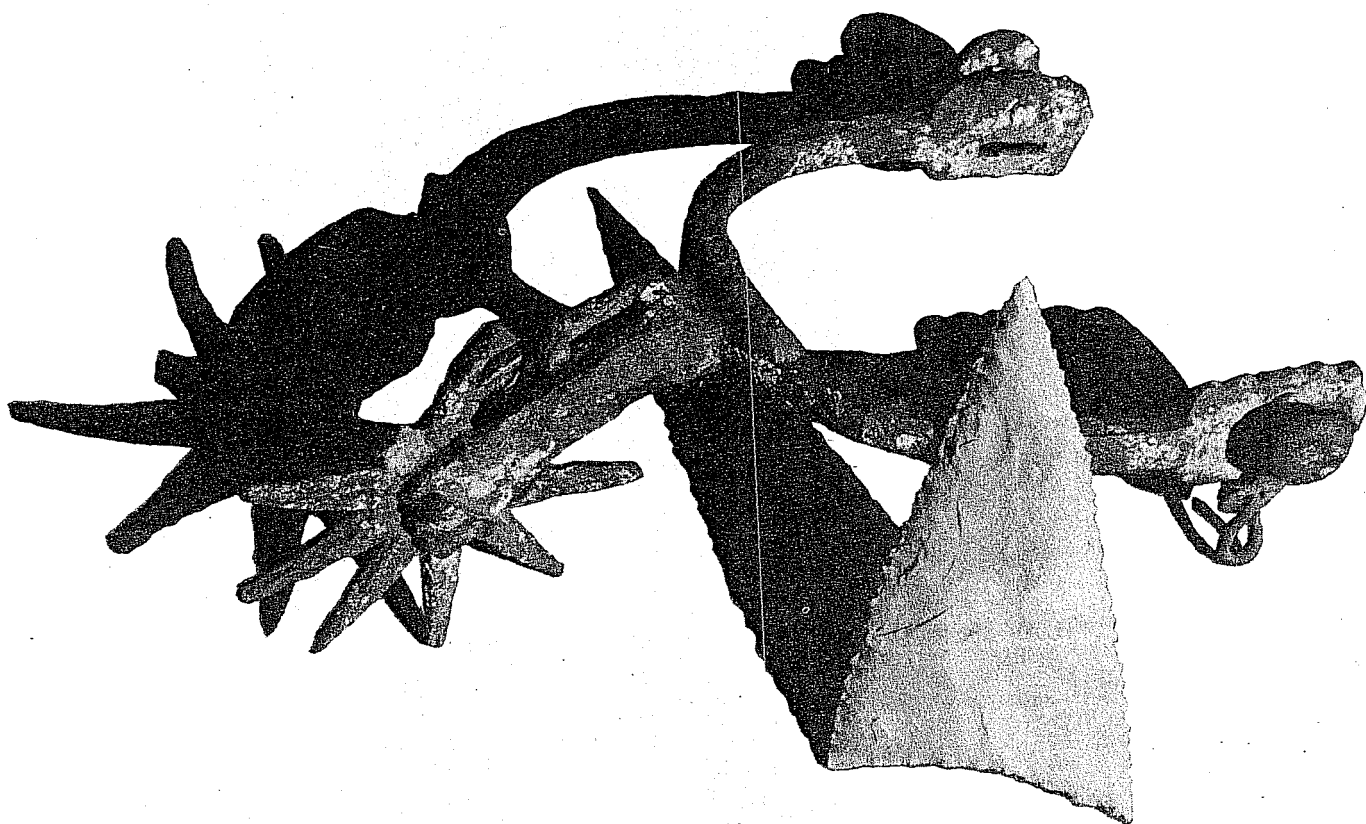


THE PREHISTORIC SITES AT CHOKE CANYON RESERVOIR, SOUTHERN TEXAS : RESULTS OF PHASE II ARCHAEOLOGICAL INVESTIGATIONS

Grant D. Hall, Thomas R. Hester, and Stephen L. Black

With Contributions By

**Frank Asaro, Elizabeth Frkuska, Richard G. Holloway
Cristi Assad Hunter, Helen Michel, Fred W. Nelson
D. Gentry Steele, and Fred Stross**



**Center for Archaeological Research
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Choke Canyon Series : Volume 10**

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FOREWORD

We have what Swanton aptly describes as a cultural sink. Archaeological exploration, which has never been systematically attempted there, may bring something to light; but nothing very notable is expected. . . .

A. L. Kroeber
**Cultural and Natural Areas of
Native North America, 1939.**

The quote with which I begin this Foreword is a description of the state of archaeological and ethnohistorical affairs in southern Texas at the end of the fourth decade of the 20th century. Such a perception endured for another 25 or 30 years and may be shared by some North American archaeologists even to the present day. However, it has now become clear that the only "cultural sink" in southern Texas was the lacunae of scientific data, not the cultural or biological failings of its native peoples. The achievements of the Choke Canyon project, initiated in 1977, in terms of archaeological, ethnohistorical and historical research, resulted from a program of long-range, systematic scientific investigations. These studies focused on a specific portion of southern Texas, along a key river drainage, and have now provided us with a greatly enhanced view of the prehistory and early history of this region.

This present volume summarizes the results of Choke Canyon archaeological research. While it emphasizes the Phase II mitigation excavations, it also draws together material from earlier field and laboratory work. With this volume, compiled almost entirely through the efforts of Grant D. Hall, we have a wealth of data from a number of sites, information on tool kits, subsistence, chronology, trade, and other key facets of the archaeological record. Furthermore, the results are meticulously detailed, providing a source of continuing information for future research in southern Texas prehistory.

In the grand scheme of world prehistory, "nothing very notable," in Kroeber's words, has yet emerged--or is likely to emerge--from the study of south Texas prehistory. There is no major architecture, and there are no contributions to be made to the study of the evolution of states and empires. Even the delineation of a regional culture history, let alone the processes of culture change, has been hard to wrest from the south Texas site deposits. This domain was marked in prehistoric, and into early historic times, by hunting and gathering lifeways that stretch back 11,000 years. The study of hunters and gatherers has been in fashion, of late, in contemporary archaeological literature; it will, perforce, always be in vogue in southern Texas. Such studies will continue to be important as we examine the mechanisms of regional resource utilization and the processes that effected culture change in response to climatic or other conditions. These are worthwhile, and "notable," endeavors and may have something to tell us, with our water shortages and other 20th-century problems, about how we might better exist in this environment that was, for so many millenia, their home.

As is the case in the progress of any science, and particularly in archaeology, cultural characterizations written 45 years ago by Kroeber or those five years ago by this author, are destined to be replaced. This is certainly true here with the vast new contributions, by Hall and his many field and laboratory associates, to the advancement of southern Texas archaeological research.

Thomas R. Hester
October 24, 1985

ABSTRACT

Reported in this volume are the results of archaeological investigations at 72 prehistoric sites located in the basin of Choke Canyon Reservoir on the Frio River in Live Oak and McMullen Counties, southern Texas. The sites investigated in this study will be affected in one way or another by a lake formed after construction of Choke Canyon Dam, a project of the United States Bureau of Reclamation (USBR). The research was sponsored by the USBR as the second and final phase of a two-stage program of archaeological investigations designed to mitigate damage or destruction of cultural resources resulting from dam construction and subsequent long-term inundation of a large area of the Frio River valley.

Methods used to study Choke Canyon's prehistoric sites during the Phase II investigation were various types of subsurface excavations, documentation of surface features and characteristics, and collection of artifacts from site surfaces.

The people who inhabited the Choke Canyon region in prehistoric times, representing an approximate span of 10,000 years, existed as mobile hunter/gatherer bands. They subsisted by tapping virtually every conceivable source of edible natural food.

A full spectrum of animals, from lowly field mice and lizards up to bison and deer, was exploited by various techniques of hunting, trapping, and catching. Large land snails and mussels were sources of meat food that Choke Canyon's prehistoric people could easily gather. Gar, drum, and turtles were taken from local creeks, sloughs, and the river, perhaps using spears, nets, or weirs. Analysis of vertebrate faunal remains, results of which are presented herein, rather conclusively demonstrates that Late Prehistoric people exploited big game species more commonly than did their Archaic period predecessors.

Floral products must also have comprised a substantial portion of the foods consumed by Choke Canyon's prehistoric inhabitants. Direct evidence of plant food utilization is nonexistent on the sites. However, the very common occurrence of sandstone manos and metates implies heavy reliance on seeds, nuts, or beans. Also, the tremendous amount of burned rock that accumulated in Archaic components at many sites, often found as very carefully constructed hearth features, suggests that baking or roasting activities were extremely common. Roots, tubers, stalks, and other edible plant parts may have been what was being prepared in these facilities.

Diagnostic artifacts recovered from prehistoric sites at Choke Canyon during the various phases of archaeological investigation clearly indicate that the general vicinity witnessed aboriginal activity from Paleo-Indian times up through the early Historic period. Evidence of Paleo-Indian people is limited to surface finds along the valley margin and on high, ancient terrace formations down in the river valley. No *in situ* subsurface Paleo-Indian components have yet been isolated at Choke Canyon. Where previously the earliest subsurface component known at Choke Canyon dated to the Middle Archaic period (ca. 3400 B.C. to 2400 B.C.), the Phase II excavations led to discovery of an Early Archaic component dating to the period from 5000 B.C.

to 4000 B.C. While recognizable Paleo-Indian, Early Archaic, and Middle Archaic components are relatively scarce, the Late Archaic and Late Prehistoric periods are amply represented in the prehistoric sites at Choke Canyon. Phase II investigations also produced the first clear indication of an aboriginal component containing evidence of contact with Anglo-Europeans in early historic times.

The bulk of cultural, paleobotanical, and vertebrate faunal data representing the prehistory of Choke Canyon indicates that floral and faunal communities and the general climatic regime remained essentially unchanged from at least 4000 B.C. up to the period in historic times when certain livestock and land management practices led to a drastic expansion of brush communities and severe erosion of formerly stable land surfaces.

KEYWORDS: Texas, archaeology, excavation, mitigation, prehistory, Archaic, and Late Prehistoric.

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INTRODUCTION

This report and three companion volumes contain the results of final archaeological field investigations at Choke Canyon Reservoir in Live Oak and McMullen Counties, southern Texas. The research program documented in these volumes was carried out under terms of Contract No. 0-07-5B-V0835 issued to the Center for Archaeological Research, The University of Texas at San Antonio (CAR-UTSA) by the U.S. Bureau of Reclamation (USBR). This investigation was required under the National Historic Preservation Act of 1966, as amended. Other relevant legal instruments include Executive Order 11593 and Public Law 93-291. The specific program of Phase II research was as stipulated in a Memorandum of Agreement dated June 5, 1980, and signed by the Chairman of the Advisory Council on Historic Preservation, the Southwest Regional Director of the USBR, and the Texas State Historic Preservation Officer. This research represents the culmination of nearly 16 years of cultural resource mitigation efforts at Choke Canyon. The archaeological surveys, site testing programs, and extensive excavations that have taken place at Choke Canyon provide a body of data that, in the future, will serve to characterize and represent sites effectively eliminated from the study universe by inundation and related impacts brought about by the creation of Choke Canyon Reservoir.

The long period of cultural resource investigation at Choke Canyon has already resulted in a substantial amount of published information. Published reports concerned primarily with the prehistoric resources at Choke Canyon include the following:

"Archeological Survey of Palmetto Bend and Choke Canyon Reservoir, Texas" (Wakefield 1968)

"Cultural Resource Survey of Choke Canyon Reservoir, Live Oak and McMullen Counties, Texas" (Lynn, Fox, and O'Malley 1977)

"Historic Indian Groups of the Choke Canyon Reservoir and Surrounding Area, Southern Texas" (Campbell and Campbell 1981)

"An Archaeological Survey of a Portion of the Choke Canyon Reservoir Area in McMullen and Live Oak Counties, Texas" (Thoms, Montgomery, and Portnoy 1981)

"The 1979 Archaeological Survey of Portions of the Choke Canyon Reservoir in Live Oak and McMullen Counties, Texas" (Roemer 1981)

"Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings" (Hall, Black, and Graves 1982)

"Archaeological Testing and Collecting at Choke Canyon Reservoir, Nueces River Project, Texas" (Weed and Shafer 1981)

"Excavations at 41 LK 67, A Prehistoric Site in the Choke Canyon Reservoir, South Texas" (Brown et al. 1982)

"Excavations at Sites 41 LK 31/32 and 41 LK 202 in the Choke Canyon Reservoir, South Texas" (Scott and Fox 1982)

Four additional reports present findings made in Phase II, the final stage of cultural resource investigations at Choke Canyon. In addition to this volume, Phase II findings are published under the following titles:

"A Study of Five Historic Cemeteries at Choke Canyon Reservoir, Live Oak and McMullen Counties, Texas" (Fox 1984)

"Archaeological Investigations at Historic Sites in the Choke Canyon Reservoir, Southern Texas" (Fox 1986)

"Archaeological Investigations at 41 LK 201, Choke Canyon Reservoir, Southern Texas" (Highley 1986)

A scope of work detailing the basic contract requirements of Phase II research is included as Appendix I to this report. This scope of work is derived from an unpublished planning document entitled "Final Recommendations for Phase II Archaeological Investigations in the Choke Canyon Reservoir, Nueces River Project, Texas" that was submitted to the USBR by the CAR-UTSA in 1979 following completion of Phase I investigations. As events transpired, the scope of work was followed closely with only one major exception. Site 41 MC 246, a prehistoric site tested early in Phase II, was recommended for extensive excavation. The site turned out to be located on land where the USBR negotiated only flowage easement instead of outright purchase. The owner of the property refused permission for further archaeological investigation of 41 MC 246, the site located on his land. In lieu of work at 41 MC 246, CAR personnel monitored the relocation of five of Choke Canyon's historic cemeteries (Fox 1984), a task that was not included in the original scope of work.

This report deals with all prehistoric site investigations conducted during Phase II with the exception of site 41 LK 201 (Highley 1986). Findings made at Choke Canyon's historic sites are reported by Fox (1986).

THE NATURAL SETTING

Choke Canyon Reservoir is located on the coastal plain of south Texas roughly midway between the southern margin of the Edwards Plateau and the Gulf of Mexico. The dam is situated about 6.4 km (four miles) west of the town of Three Rivers. This location is equidistant between the cities of San Antonio 144 km (90 miles) to the north and Corpus Christi to the southeast. The reservoir is primarily intended to meet growing urban-industrial water needs in Corpus Christi. Secondary benefits will be a decrease in the severity of floods on the Nueces River below the dam and recreation for residents of the area and region.

The Frio River rises to the northwest of Choke Canyon in the limestone hill country of central Texas. Shortly after cutting down through the hills of the Edwards Plateau, the Frio River is joined on the coastal plain by three major tributaries: the Sabinal and Leona Rivers and Hondo Creek. Fed both by springs and runoff from the Edwards Plateau, much of the water from these drainages soaks down into aquifers on the coastal plain before reaching the

Choke Canyon area. Tributaries of the Frio River, the Atascosa River and San Miguel Creek, originate on the coastal plain and serve primarily as channels for runoff. As a consequence, the Frio River flows at Choke Canyon only when there has been substantial rain locally or in the headwaters. In times of little rain, the Frio River is slow moving or still, but usually does contain water in pools along the channel (U.S. Department of the Interior 1975:B-1). In historic times, the river at Choke Canyon has been known to dry up completely during periods of severe drought.

A short distance downstream from the dam, the Frio River is joined by the Atascosa River. Slightly farther to the south, the Frio River meets the Nueces River. The town of Three Rivers is named for the confluence of these drainages. The general trend of these rivers, as for all major rivers on the Texas coastal plain, is southeasterly. As they approach Choke Canyon, however, the Nueces River and, to a lesser extent, the Frio River swing northeastward against the prevailing regional pattern. This divergence is caused by a line of low-lying hills trending northeast to southwest down the middle of the coastal plain roughly parallel to the shore of the Gulf. The hills are formed by an outcrop of resistant rocks called the Oakville-Bordas Escarpment. The Frio, Atascosa, and Nueces Rivers are forced by these resistant hills to converge into a single channel in finally breaching the barrier. From the constriction of these major river systems, the name "Choke Canyon" is derived (Lynn, Fox, and O'Malley 1977:6). At the escarpment, the Nueces River collects drainage from 17,000 square miles of southwestern Texas and then returns to the regional drainage pattern as it courses 144 km (90 miles) southeast to its mouth in Nueces Bay at Corpus Christi. An excellent illustration of the major physiographic features of south Texas is provided in Figure 1 of the THC survey report by Lynn, Fox, and O'Malley (1977:5).

Choke Canyon is located on the Rio Grande Plain, a subdivision of the West Gulf Coastal Plain physiographic province. The climate of the region is described as semiarid or subtropical, with rain averaging 23 inches a year. The area is subject to the effects of hurricanes from August through October. Rainfall rates of from 25 to 35 inches in a five-day period have been recorded in south Texas following hurricane landfalls on the coast (Grozier *et al.* 1968). Winters are short and mild; the summers are long and hot (Orton 1964:3). Winds blow from the southeast during most of the year. Short-term bursts of cold north winds mark the passage of "northers" during the winter. Temperature averages 74°F through the year with heat extremes up to 105°F being much more common than very infrequent periods when temperatures below 20°F are experienced.

The Rio Grande Plain is level to gently rolling, with the exception of scattered lines of hills formed along resistant sedimentary rock outcrops. The Oakville-Bordas Escarpment along the eastern margin of the reservoir is one good example of hill terrain in south Texas. Other relief on the plain is the result of erosion along the vast network of drainages feeding into the major river valleys.

At Choke Canyon, the Frio River has carved a broad, low-relief alluvial valley into Tertiary sediments of varying resistances. Soil developed over these Tertiary deposits and alluvium covers almost all of the reservoir basin. Bedrock outcrops in some places: along the river channel, in

gullies, and on high hills (U.S. Department of the Interior 1975:B-9). Gravels are distributed as lag pavements along the valley margins, as terrace deposits on the floodplain, and in bars along the river channel. Deep loams are the most common type of soil found in the area. Differences in the soils across the basin primarily reflect variations in content of clays, sands, and gravel. Hard, clayey loam is most common. Choke Canyon soils are generally alkaline and highly calcareous. A detailed discussion of soils in the project area is provided by Bunker (1982).

Elevational differences are modest, but definitely apparent at Choke Canyon. The highest point in the vicinity is the top of Skillet Mountain near the west end of the reservoir. The elevation there is 113 m (372 feet) above mean sea level (MSL). Directly below Skillet Mountain, the channel of the Frio River is at an elevation of 64 m (210 feet) above MSL. The elevation contrast of about 48 m (160 feet) between these two features constitutes the most drastic topographic relief anywhere in the reservoir. Downstream near the dam, the uplands rise to maximums of between 76 and 91 m (250 and 300 feet) above MSL, with the river channel below running from 36-51 m (120-170 feet) above MSL. Throughout most of the valley, the Frio River flows in a well-entrenched channel with a width of 45 m (150 feet) or less. The river has a gradient of about two to three feet per mile (*ibid.*:B-1).

In the project area, the Frio River's valley is broadest across the eastern half of the reservoir. Valley width varies from four to five miles. At the east end, the dam is footed on bedrock of the Catahoula Formation, a Miocene deposit consisting of tuff, tuffaceous sand, and sandstone interbedded with tuff, clay, and silt. Outcrops of Catahoula tuff form fairly prominent margins to the valley. Tuffaceous sedimentary rock from the outcrops was used extensively by prehistoric people for hearth construction on sites at this end of the valley. Another interesting component of the Catahoula Formation is pumice. Pieces of pumice have been found on prehistoric sites in the area, but there is no evidence that the material was used by prehistoric people.

The Oligocene Frio Formation trends across the midsection of the Choke Canyon basin. This deposit consists of dark gray green clays interbedded with shales and sand. Gypsum, occurring in a distinctive form called "satin spar," is found as seams in the Frio Formation. After being eroded out and stream rolled, satin spar gypsum cobbles assume a distinctive oblong shape. These gypsum cobbles have been found on prehistoric sites at Choke Canyon and were apparently used by the site occupants. Not as resistant to the effects of erosion as formations flanking the east and west, the Frio Formation supports gradually sloping valley margins with fewer abrupt transitions from valley to upland.

Westward from Calliham, a small community located 12.8 km (eight miles) upstream from the dam, systems of the Eocene Jackson Group crop out. Consisting of interbedded clays, ash, and sands, the group contains a unit of resistant sandstone which forms bluffs at the western end of the reservoir basin. In this half of the valley, the steepest margins, including Skillet Mountain, are along the southern side. The northern side of the valley at the western end rises more gradually away from the river. The valley narrows appreciably in passing through the Jackson Group. There is a corresponding

reduction in the width of the floodplain. In some places along the southern valley margin, there is little or no floodplain zone between river and uplands.

Sandstone of the Jackson Group was heavily utilized by the area's prehistoric inhabitants. In prehistoric sites across the western half of the basin, sandstone was used almost exclusively in construction of hearths. Sandstone was also used to make grinding slabs, manos, and a variety of abraders.

Major upland tributaries to the Frio River in the project area are San Miguel Creek, Opossum Creek, and Willow Hollow on the north side and Salt Creek on the south side. Upland drainage systems are not as extensive on the south side of the Frio River as on the north, because of the narrow divide between the Nueces and Frio River systems. Runoff waters are shared between the two. The larger tributaries such as San Miguel Creek and Opossum Creek have deeply entrenched channels and well-developed terrace systems in their lower reaches.

Landform features in the Frio River floodplain include the channel of the river, relict channels (sloughs), remnants of ancient terrace systems, and tributary drainages of varying magnitudes. The river channel is moderately sinuous. It swings into a big reverse S-curve northwest of Calliham. The early historic community of Yarbrough Bend sprang up along this stretch of the river in the 1850s. The straight courses and bends in the river channel reflect local bedrock fractures and lineations. At normal rates of flow, the river has both deep pools and shallows. Gravel and, less frequently, bedrock are exposed along the shallow stretches. Several oxbow lakes on the floodplain evidence minor changes in the channel's course. Other more obscure drainage traces suggest even older and more dramatic shifts in the channel's path through the valley. A number of sharp bends in the modern channel would eventually produce new oxbow cutoffs were the river not to be dammed. A few of the prominent sloughs contain water on a more-or-less permanent basis. Others are filled only when the river rises to flood stage or when there is locally heavy rainfall.

Remnants of older, higher terraces are apparent on the floodplain at Choke Canyon, especially in the wider section of the valley at the eastern end. Such features are of particular archaeological interest because they are old, relatively stable surfaces where the likelihood of encountering early prehistoric cultural remains is greater than on younger, more dynamic surfaces.

Major and minor drainages channelling runoff water from the uplands are responsible for much of the erosion on the floodplain and for severe erosion along the valley walls. Where the slough channels tend to be broad and U-shaped in cross section, the drainage channels are narrow and V-shaped. Gullies are much more common along the sides of drainages than they are along the sloughs, probably because the natural levees lining the sloughs effectively block runoff. In some instances, older relict channels have been pirated by upland drainage and are now serving as major arteries of floodplain runoff.

One of the foremost distinctions of the Rio Grande Plain is its vegetation. Referred to as "brush country" (Inglis 1964:1), common elements of the south Texas floral community include mesquite, acacias (blackbrush, guajillo, huisache, and catclaw), cenizo, prickly pear, and whitebrush. At Choke Canyon, 28,900 acres are covered in brush and forest; about 6500 acres are in cultivation; and 3200 acres are in native pasture (U.S. Department of the Interior 1975:A-11). Acacias, especially blackbrush and guajillo, are the prevailing upland and valley margin vegetation around Choke Canyon. Along the channels of the Frio River and San Miguel and Opossum Creeks, a narrow band of large trees grows including live oak, willow, elm, sugarberry, hackberry, ash, and pecan. Arbors of mustang grapevines form dense canopies in treetops along certain stretches of the river. On the floodplain between the river channel and valley margins, mesquite, whitebrush, huisache, prickly pear, spiny hackberry, and Texas persimmon are common. Although they may grow almost anywhere on the floodplain, all of these species tend to be locally denser and more luxuriant along the drainages and sloughs. All the cultivated land lies in the floodplain, with most of the acreage located at the eastern end of the basin where the plain is wider. Pastures occur both on the floodplain and in the uplands.

A number of the modern-day trees and plants at Choke Canyon would likely have been economically important to the area's prehistoric inhabitants. The present distribution of vegetation in and around Choke Canyon does not accurately reflect floral patterns known for the area in early historic times. Upland areas were formerly covered in grass with trees and brush growing only in localized or scattered communities if at all (Inglis 1964:44, 50). River valleys and channels of major upland drainages were apparently wooded, but it is not clear how dense and widespread this growth was. Early explorers observed the presence of oaks, other large trees, mesquite, and thorny brush in the floodplains and along drainages in southern Texas.

The available data do not yet permit a full reconstruction of plant communities existing at any given time in Choke Canyon's prehistory. However, based on the limited evidence available at present, one may speculate that many of the tree and plant species now found at Choke Canyon were in the area as much as 3000 years ago and perhaps longer. A much more critical unknown from the standpoint of prehistoric subsistence pursuits is the density in which some of the more important trees and plants may have occurred in the region. Ethnohistoric data (Campbell and Campbell 1981) demonstrate the extreme importance of prickly pear fruit to many early historic Indian groups in south Texas. Mesquite beans, acorns, hackberries, pecans, the beans of guajillo and other acacias, mustang grapes, spiny hackberry fruit, persimmons, and many kinds of grass seed are modern plant products found in substantial quantities at Choke Canyon which, assuming that they were available in sufficient amounts, would have been important considerations in planning seasonal hunting and gathering strategies. The Spanish dagger and narrow leaf yucca are two other plants now found at Choke Canyon that may have been important to prehistoric people as sources of fiber for manufacture into a variety of woven goods.

Choke Canyon is located in the Tamaulipan Biotic Province as defined by Blair (1950). White-tailed deer are the most common large game animal now in the area. Antelope were common in the uplands in early historic times prior to

brush encroachment (Inglis 1964:89). The archaeological record indicates that bison ranged into the territory during the Late Prehistoric period. Other animals commonly seen include javelina, coyote, bobcat, raccoon, opossum, skunk, jackrabbit, cottontail rabbit, badger, squirrels, rats, and mice. Birds often seen include wild turkey, hawk, quail, dove, duck, vulture, crane, and owl. Snakes, especially the Western Diamondback rattlesnake, are numerous in the area, as well as lizards and turtles (both land and water). The river, creeks, and sloughs contain a number of species such as alligator, gar, carp, drum, catfish, numerous small fish, bullfrog, and mussel. The land snail *Rabdotus* is common in the brush country and was heavily exploited by prehistoric people as a protein source. Lists of faunal remains recovered from archaeological deposits at Choke Canyon are provided in Appendix III.

ARCHAEOLOGICAL BACKGROUND

A comprehensive treatment of the archaeological background for Choke Canyon and surrounding areas of south Texas has been provided by Graves (Hall, Black, and Graves 1982:7-26) and will not be repeated here. Excellent background studies dealing with southern Texas archaeology and prehistory are also provided by Hester (1980) in *Digging Into South Texas Prehistory* and by Baskin (Mallouf, Baskin, and Killen 1977:57-88). These works should be consulted for background information related to the research reported in this volume.

In addition, the reader should be aware of a number of publications on south Texas archaeology that have appeared over the past two or three years. We will briefly review these published materials here. Although there continues to be a number of archaeological surveys of varying scales, there have been very few excavations outside the Choke Canyon area in south Texas, and most of these are limited in scope.

An exception is the major excavation project at site 41 JW 8, the Clemente and Herminia Hinojosa site, north of Alice in Jim Wells County. Excavated by the Center for Archaeological Research in 1981 (Black n.d.), the site is a major Late Prehistoric occupation of the Toyah phase or horizon. Much information was obtained on intrasite patterning, resource exploitation, and tool kits. Distinctive artifacts recovered were *Perdiz* arrow points, small end scrapers, beveled knives, and bone-tempered ceramics. This site is especially important for comparative purposes with the Late Prehistoric sites in the Choke Canyon Reservoir area (cf. Highley 1986).

The Loma Sandia site (41 LK 28; see Fig. 1, folded insert) is located approximately 8 km east of Choke Canyon Dam. Excavations were conducted at this site in 1977 and 1978 by archaeologists from the Texas Department of Highways and Public Transportation prior to its destruction as Interstate Highway 37 was built through the area. Loma Sandia yielded cultural debris evidencing activity on the site from Paleo-Indian through Late Prehistoric times. The most outstanding result of excavations was the recovery of skeletal remains of about 180 individuals along with associated grave inclusions (especially *Castroville* dart points) which suggest that this cemetery developed around 500 B.C. Analysis and interpretation of the Loma

Sandia findings, now being carried out by Anna Jean Taylor at the CAR-UTSA, should substantially alter certain conceptions of south Texas prehistory.

To the west of Choke Canyon, intensive testing was done at site 41 ZV 263 in Zavala County (Gibson n.d.). The site is located along the Nueces River and contains a sequence of occupations ranging from probable Late Paleo-Indian, through the Archaic, and into the Late Prehistoric period. **Scallorn**, **Frio**, and **Ensor** points represent early phase Late Prehistoric and Transitional Archaic occupations. The Middle Archaic is represented by **Tortugas** and **Pedernales** points, while the Early Archaic diagnostics are **Nolan** and **Early Triangular** points. The deepest diagnostic, apparently representative of Late Paleo-Indian habitations at the site, is a **Lerma** point. Gibson (n.d.) suggests that this specimen may be related to the Small Projectile Point Tradition of the Paleo-Indian era in northeastern Mexico (cf. Epstein 1980).

There have been a number of archaeological surveys throughout south Texas in the past few years. Many have consisted of small-scale survey of public properties scheduled for use as city parks, airports, etc., while others have been done as the result of federal and state environmental statutes. A sample of these studies includes Lukowski (1984), Snively (1984), and Warren (1984a, 1984b).

Larger surveys, often accompanied by evaluative testing, have also been published. In the coastal zone, there are survey data reported by Prewitt (1984) from San Patricio County. This site is located within the proposed Baker's Port development, and further investigations are planned. Other surveys in this area have been conducted by Espey, Huston and Associates, Inc., (1981) in Willacy County; Day, Laurens-Day, and Prewitt (1981) in Hidalgo and Willacy Counties; and Jurgens and Whitsett (1981) in Aransas County.

In the interior of south Texas, major survey and testing programs have been done along the Rio Grande near Laredo (McGraw 1983) and near Falcon Dam (Kotter 1980), in Duval County (McGraw, Van Note, and Jones n.d.; Day 1981), in the "sand sheet" area of Brooks County (McGraw n.d.), and in Zavala County (Kelly et al. n.d.; McGraw and Knepper n.d.). Nearer to Choke Canyon is a small survey done by Snively (1984) in Live Oak County.

Field research by avocational archaeologists, along with the documentation of private collections, has been published primarily through **La Tierra**, the journal of the Southern Texas Archaeological Association. Particularly relevant to the Choke Canyon area are published reports on collections, ranging from Paleo-Indian to Late Prehistoric in age, from McMullen County (Beasley 1982; Dusek 1983; Kelly 1983; Woerner and Highley 1983) and from the western portions of San Patricio and Nueces Counties along the Nueces River drainage (Chandler 1982a, 1983, 1984; Chandler, Knolle, and Knolle 1983). In nearby Karnes County, a recent paper by Mitchell, Chandler, and Kelly (1984) describes a burial and other materials from an important Late Archaic site. Among the diagnostics are **Marcos** points and corner tang bifaces ("knives").

Ethnohistoric research, of the type done by Campbell and Campbell (1981) at Choke Canyon, has continued for other parts of south Texas. Significant contributions include Campbell's (1984) study of the Cacaxtle Indians of

southern Texas and northeastern Mexico, as well as research into the Indians of the San Antonio Spanish Colonial missions (Campbell and Campbell 1985).

RESEARCH GOALS

The goals of Phase II investigations at Choke Canyon's prehistoric sites are in most ways consistent with problem orientations that have dictated earlier programs of research in the reservoir basin (Lynn, Fox, and O'Malley 1977; Hall, Black, and Graves 1982:26-28).

The structuring and refinement of the cultural/chronological framework is a critical need in the on-going study of south Texas prehistory. The region has lagged behind other areas of the state, especially central Texas and the Trans-Pecos area, due partly to the fact that proportionately less work has been done over the years, but also because of the character and context of the remains evidencing local prehistoric sites. Prehistoric sites at Choke Canyon containing well-stratified multiple components, sites yielding notable numbers of potential time-diagnostic artifacts (primarily chipped stone tools), and/or sites where carbon derived from prehistoric habitational activities was well preserved were heavily investigated in Phase II. Quite often, any site that had one or more of the characteristics listed above also tended to contain intact, well-integrated habitational features and, less often, vertebrate faunal materials. Thus, sites offering the best potential for elucidating the cultural/chronological scheme often produced types of data that were very useful in dealing with other research problems.

The study of subsistence systems for the prehistoric populations of southern Texas has proved to be a frustrating endeavor, but progress is nevertheless slowly being made. The remains most commonly recovered for analysis include such things as mussel shells, large land snail shells, and bones of vertebrate animals. These kinds of debris are interpreted as direct evidence of certain foods consumed by prehistoric people at the Choke Canyon sites. Indirect lines of evidence concerning subsistence habits include such items as manos and metates, presumed cooking facilities such as hearths and pits, certain plant species identifications made from carbonized remains, and variations in quantities of burned rock from site to site. Pollen and phytolith research has not been productive. Pollen is apparently not preserved in adequate quantities to permit reliable interpretation. Phytolith research has been plagued by a number of problems, not all of which are directly related to collection, analysis, and interpretation. Considering the strengths and limitations of possible avenues of research into prehistoric subsistence habits as evidenced at Choke Canyon sites, the Phase II program was, to a certain extent, weighted toward sites yielding vertebrate faunal remains. They offer the double advantage of permitting inferences concerning both human subsistence and paleoenvironment. More generally, subsistence-related data recovery occurred during Phase II investigations in the course of standard archaeological procedures of debris recovery, measured plan sketching, and soil matrix collection (especially from hearth and pit features).

Study of prehistoric human settlement systems influenced the Phase II investigations at Choke Canyon to the extent that an effort was made to

sample a wide range, geographically speaking, of the known sites in the reservoir basin. The objective here, of course, was to gather data demonstrating how people distributed themselves across the landscape through the various periods of prehistory. Time-diagnostic artifacts collected from the sites constitute the evidence most often used in determining the period of prehistoric activity represented. Less often, radiocarbon-derived dates are available to aid in such determinations. After components were identified, habitational debris representative of the site was sampled and/or noted. Intersite comparisons of general site characteristics and location, periods of cultural activity represented, and kinds of cultural debris/features deposited lead to inferences concerning settlement patterns through time.

Technological systems and tool kits are necessarily related areas of study in south Texas prehistoric archaeology. Chipped stone tools and by-products of chipped stone tool manufacture are, next to burned rock, the overwhelmingly predominate elements of debris collections from prehistoric sites at Choke Canyon, as well as everywhere else in southern Texas. Based on tools and technology, clear differences between the Archaic and Late Prehistoric periods are recognized. A continuing problem--one to which Phase II efforts were addressed--is to further refine what is known of technologies and tool kits representing subperiods, especially in the lengthy time span of the Archaic, but also including the Late Prehistoric. Such refinements and clarifications aid in building chronologies, in studying settlement systems, and in analyzing subsistence orientations.

Reconstructing the environment(s) within which prehistoric people lived continues to be a very important aspect of prehistoric research in south Texas. As discussed above concerning subsistence systems, pollen and phytolith research has not produced satisfactory results. Out of the Phase I archaeological research conducted at Choke Canyon, vertebrate faunal remains and plant species identifications made from carbonized wood did produce useful information about local paleoenvironment. This situation again suggested the desirability of concentrating Phase II efforts at sites yielding animal bone and/or carbonized plant remains, a comparatively rare occurrence at Choke Canyon. Recognition of the importance of vertebrate faunal remains and carbonized materials to studies of prehistoric human subsistence and paleoenvironmental reconstructions led to a strong emphasis on the analysis and interpretation of these types of remains which were studied by expert consultants (see Appendices II and III).

Finally, results of Phase II research in all of its aspects would be aimed at formulating as broad and complete a picture of prehistoric lifeways as possible. Through analysis and interpretation of Phase II data, it should be possible to address the questions of "when," "why," and "under what circumstances" did prehistoric human groups populate the Choke Canyon study area. To these ends, the research documented in this volume is directed.

TECHNICAL PROCEDURES

As Phase II archaeological investigations were conducted on prehistoric sites at Choke Canyon, a variety of field procedures were employed. The sites to be investigated consisted of one group recommended for extensive excavations based on findings made during Phase I investigations. Sites in a second, larger group were to be assessed in terms of their potential for further extensive excavations (see Appendix I).

EXTENSIVE EXCAVATIONS

Thirteen prehistoric sites received a level of investigative attention designated as "extensive excavation." At 11 of these sites, archaeological grid systems were established. The grids were oriented to cardinal (magnetic) directions. North-south and/or east-west baselines emanated from an arbitrarily selected point. At all sites except 41 MC 222, the point was assigned coordinates of N1000 E1000 m. At 41 MC 222, the central point was designated N100 E100 m. Baselines were set with the aid of a survey transit. The transit was centered over the central grid stake and oriented to magnetic north to set north-south lines. Magnetic declination from true north was 9° in 1968. East-west baselines were set by rotating the transit 90° off of magnetic north. Further subdivision of site areas into metric units was accomplished using the transit and measuring tapes. The basic unit of excavation was 1 m². The coordinates at the southwest corner of each unit served as unit designators. Coordinates increased to the north and east. As discussed in individual site descriptions, USBR surveyors later placed permanent site markers on each extensive excavation site and determined their exact locations expressed as Modified Texas State Plane coordinates. Archaeological grid systems were "tied in" to the USBR permanent markers as a means of recording their locations.

Due to their great size and/or heavy brush cover, two extensive excavation sites were not gridded in the same way as the 11 sites discussed above. At 41 LK 128 and 41 MC 94, excavation areas were staked out independently of one another. Each 1-m² unit was assigned a test pit number rather than metric coordinates. Test pit unit blocks were oriented to magnetic north using either the survey transit or a Brunton compass.

Vertical control was established at all extensive excavation sites by selecting a stable datum point, usually a steel spike driven into a large tree trunk, and assigning it an arbitrary elevation of 100 m. Vertical readings in excavations were then taken relative to this arbitrary datum with the aid of a survey transit and leveling rod. USBR surveyors later calculated true elevations for vertical datums at each extensive excavation site.

At 41 LK 8, a backhoe was used to dig a series of trenches across the site. Excavation areas were selected on the basis of observations made in trench profiles. At all other extensive excavation sites, Phase II unit locations were based on earlier test pit findings.

Prior to commencement of excavations in each 1-m² unit, surface elevations were taken to provide a record of localized topography before any alterations took place. Matrix was removed from units by hand excavation using shovels and trowels. At all sites units were excavated in arbitrary vertical increments of 10 cm except 41 MC 222 where 5-cm levels were excavated. Using the transit and stadia, floors were leveled on even increments of 10 cm relative to the primary datum elevation of 100 m (such as 99.40, 99.30, etc.). Each level was also given a consecutive number starting with Level 1 at the top and so forth on down to the bottom of the unit. At most of the sites, excavated matrix was dry screened through 1/4-inch mesh hardware cloth. At 41 LK 201, 41 MC 222, and 41 MC 296, some water screening was done, and matrix from selected units was washed through window screen (see individual site discussions for details). All material (except roots, modern wood fragments, animal droppings, insects, insect parts and residues, worms, and fragments of large land snails) screened from excavated matrix was collected. The collections from each level were placed in paper bags (sometimes lined with plastic bags) labeled with the following information: site number, unit coordinates, level, names of excavators and screeners, and the date of excavation.

As a general rule, the exact provenience of artifacts and other cultural debris encountered as excavations proceeded was not recorded unless there was reason to believe that the objects were constituents of definable habitation or activity features. Elements of features such as hearthstones, mussel shell, snail shell, animal bone, chipped stone tools, debitage, and soil discolorations, were left *in situ*. Such features were recorded on measured plan and profile sketches and were photographed using both color and black-and-white film. Matrix samples were collected from most features. In most cases, features were cross sectioned to establish presence or absence of subsurface structure.

Carbon encountered in fill and in features was collected in sealed aluminum foil pouches labeled with appropriate provenience information. Large chunks of carbon having potential for wood species identification purposes were wrapped in tissue paper and placed in plastic vials or other protective containers labeled with provenience data. Fragile materials recovered in excavations, such as bone and modified shell, were also wrapped in tissue and/or foil or placed in vials or boxes for added protection during transport back to the laboratory.

Column matrix samples were collected from one or more of the unit blocks excavated at extensive excavation sites and also from some of the tested sites. Columns were located on unit walls having profiles more-or-less representative of the excavation area in general. Obviously disturbed deposits were avoided. Prior to removal of the samples, the profiles were usually sketched and photographed. Exact column locations and vertical collection increments were recorded on the measured profile drawings. Each sample was taken from a block 10-cm thick, 15-cm wide, and 10-cm deep in the profile face. The vertical 10-cm increments correspond to the vertical levels excavated from units in each area. Samples were placed in plastic-lined paper bags and labeled with appropriate provenience information.

Written records of the excavations were kept in a daily journal, general site notes, level notes, feature notes, and a photographic journal. The daily journal was kept by the field director. In it were recorded a summary of each day's activities and a general discussion of findings. The most copious written records were the level notes filled out upon conclusion of each level of excavation in a 1-m² unit. In these notes, the basic observations and findings made in each level were detailed. When features were isolated in a level, the level notes were augmented by feature descriptions and measured plan drawings. In the photographic journal, the subject, exposure number, photographer, and date were recorded for each photograph taken during the course of Phase II investigations.

Upon conclusion of excavations at each site, units were completely back-filled, either by hand or mechanically.

SITE EVALUATIONS

A total of 59 prehistoric sites underwent varying degrees of Phase II investigation intended to provide: (1) data permitting assessment of each site's potential for further investigation; and (2) a sample of the prehistoric cultural remains evidencing each. Investigation of these sites began with crew members making a thorough reconnaissance of the site surface to familiarize themselves with its extent and character. Two or more shovel tests were then excavated at promising locations indicated by surface residues, topographic setting, or gully exposures. Shovel tests were generally about 50 cm², but no real effort was made to insure uniformity in test size. Matrix excavated from shovel tests was not screened. Cultural debris noted as digging occurred was collected. Observations made as shovel tests were excavated were recorded in field notes. Results of shovel tests influenced decisions concerning whether or not controlled test excavations would be conducted on a particular site.

Test pits were excavated at eight of the prehistoric sites investigated during Phase II. Unit locations were usually based on findings made in shovel tests or upon subsurface observations possible in walls of gullies. The technical procedures applied in test pits are the same as those described for extensive excavations, except that vertical readings were taken with the aid of level lines and measuring tapes.

At sites where controlled testing did not appear warranted, collections of surface artifacts were made. Depending upon circumstances encountered at each site, the surface collections might be provenienced or unprovenienced. Provenienced collections were made at sites where the distribution of artifacts and/or exposed habitational features suggested an opportunity to demonstrate patterning of prehistoric cultural activity. In making such collections, locations of individual artifacts were recorded on a plan map using an alidade, plane table, and leveling rod or measuring tape. Once located, the artifact was given a number that was recorded on the plan and on an individual collection bag. Feature locations were also plotted on the plan maps. Where the character of surface debris warranted, "dog leash" samples were collected. In this procedure, a center point of the area containing the cultural debris to be collected was determined and located on

the plan map. Using a measuring tape, the debris within an 80-cm radius of the recorded locus was then collected. When the distribution of surface debris on a site demonstrated no apparently significant patterning, unprovenienced collections were made. Except in the case of "dog leash" samples, where all debris was collected, surface collections made during Phase II investigations were restricted to potential time- and function-diagnostic artifacts.

MAPPING

During the Phase II archaeological investigations at Choke Canyon, extensive topographic mapping was unnecessary as the USBR provided excellent map coverage for the entire reservoir. Maps with a contour interval of two feet were available for all of Choke Canyon. Portions of these maps are reproduced in this report to provide "area topography" coverage for 11 of the extensive excavation sites. A second set of maps, covering only an area of roughly 5000 acres in the dam and borrow areas, was drawn with a 50-cm contour interval. On both sets of maps, presentation of modern cultural features such as roads, houses, fencelines, and utility lines was extremely detailed and accurate. On plane table and alidade maps produced during Phase II investigations, site limits, archaeological grids, test pit locations, provenienced artifacts, and other important features were "tied-in" to distinctive modern cultural features (fence and road intersections, utility poles, houses, wells, etc.) appearing on the USBR maps. By this means, the relationship between sites and local topography was recorded. In addition, USBR surveyors placed permanent monuments at a number of the extensive excavation sites. They calculated horizontal and vertical proveniences for these markers in terms of Modified Texas State Plane coordinates and feet above mean sea level, respectively. Data concerning these permanent site markers are presented in Appendix VII.

LABORATORY PROCESSING

Materials collected in the field were brought back to the CAR laboratory at The University of Texas at San Antonio on a weekly basis. Each bag of material was assigned a catalogue lot number which was initially written on the outside of the bag. Each site had a separate sequence of consecutive lot numbers, the first number assigned for the site being "Lot 1" and so on. On sites where excavations took place, the aggregate of material from each level of each unit of excavation was assigned a lot number. Whenever possible, material collections from levels were assigned lot numbers in the same sequence as they were removed from the unit. Surface-collected materials were assigned lot numbers followed by a "0." For provenienced surface artifacts, the lot number was followed in parentheses by the artifact's Plane Table Map (PTM) number.

Materials that would not be harmed by immersion were washed in tap water and then air dried. Particularly fragile items were dry cleaned by hand. Ceramic sherds were gently washed, but not brushed. Carbon sample packets were opened and the contents allowed to dry thoroughly before being resealed.

After being washed and dried, materials in each lot were sorted into analytical classes. These classes are listed on a sample Material Analysis Form presented in Appendix VI. A record form was then filled out for each lot of material. Precise counts, weights, and measurements were recorded for materials in the various analytical classes. This form was structured to accommodate transfer of data from form to computer.

After their counts and weights were recorded, tuff, sandstone, fire-fractured rock, and pebbles from general level collections were then discarded. Larger objects (primarily lithic artifacts) to undergo later special studies were labeled in ink with site, catalogue, and (if appropriate) PTM numbers. Labels were then coated with clear varnish. Many of the large ceramic sherds were also marked in this way, a procedure that hindered later analysis of the sherds. Classes composed of numerous smaller specimens, such as chert debitage, mussel shell, snail shell, and bone were enclosed in plastic bags labeled with site and lot number.

After completion of special studies, whose procedures are described in later sections of this report, much of the Phase II collection was segregated by material class (such as debitage, faunal remains, land snail, mussel shell, chert cores, etc.) and stored in pasteboard boxes. The boxes are labeled with "Choke Canyon Phase II," the type of material contained, and the numbers of the sites from which the enclosed materials were collected. Artifacts most likely to be in demand for future comparative purposes are stored in drawered cases for easy access.

All notes, plan maps, drawings, photographs, and material collections generated during Phase II archaeological investigations at Choke Canyon will be permanently housed in the facilities of the Center for Archaeological Research, The University of Texas at San Antonio. Also housed at The University of Texas at San Antonio are the notes, photographs, and material collections resulting from the archaeological survey of Choke Canyon conducted by the Texas Historical Commission (Lynn, Fox, and O'Malley 1977). A small amount of material collected at Choke Canyon during early studies carried out by the Texas Archeological Salvage Project (Wakefield 1968) and the Coastal Bend Archeological Society is housed at the Texas Archeological Research Laboratory, Balcones Research Center, The University of Texas at Austin.

THE PHASE II SITE INVESTIGATIONS

Information collected at 72 prehistoric sites investigated during the Phase II field program at Choke Canyon is presented in this section. The work at 41 LK 201 is touched on only briefly in this study. A comprehensive treatment of the findings made at this site is provided by Highley (1986).

The 72 sites discussed in this report are divided into 13 groups based primarily on their geographic proximity to one another. As in the report of Phase I research (Hall, Black, and Graves 1982), the site groups are presented in an order that proceeds generally from east to west, starting in the Choke Canyon Dam area and then extending up the Frio River valley to the western end of the reservoir basin. Beyond this, however, there is little

correspondence between the groups as defined for each different phase of investigation. For each group, individual site discussions are prefaced by a listing of sites comprising the group, the investigative procedures applied at each, and a general description of the area containing the group. Locations of sites included in this discussion, as well as other known prehistoric and historic sites at Choke Canyon, are shown in Figure 1 (folded insert).

This section deals with descriptions of the sites, discussions of investigative procedures applied, and summaries of resultant findings. The artifacts and other material remains recovered from the sites and the results of special studies performed on certain categories of material (such as radiocarbon assays, wood species identifications, faunal remains, ceramics, and lithics) are given only brief mention in this section. Detailed information on material recovery and results of special studies are provided in later sections. For some of the artifacts mentioned below--most often chipped stone specimens--group, form, and specimen numbers are provided. These numbers relate the artifacts to the organizational scheme used in the descriptive artifact section that follows. Also mentioned are data tables (Appendix VI) and special studies (Appendices II, III, and IV). In particular, the Material Analysis Records in Appendix VI are frequently referenced or summarized.

SITE GROUP 1

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
41 LK 8		41 LK 127	41 LK 121	
41 LK 201		41 LK 199	41 LK 122	
41 LK 128				

In Site Group 1 are seven prehistoric sites located on the floodplain of the Frio River immediately upstream from Choke Canyon Dam. The area containing the sites measures about 2.6 km north-south and 2.7 km east-west. The Catahoula Formation crops out immediately east of 41 LK 8. Major landform features in the area are the river channel, floodplain, a relict river channel (slough), an upland drainage, some natural levees, and a pronounced terrace remnant.

Located in the borrow area where fill material for the dam was extracted, sites 41 LK 8 and 41 LK 201 underwent dramatic changes in local appearance between Phase I and Phase II archaeological investigations. The land around these sites was denuded of vegetation. Huge borrow pits were excavated to the northeast, east, and southeast of 41 LK 201. Tremendous mounds of fill material were stockpiled east of 41 LK 8. Through all of these major modifications, USBR engineers worked in close cooperation with archaeologists to insure that clearing and borrow activities resulted in no damage to archaeological sites scheduled for Phase II investigations. Construction-

related changes in the vicinity of 41 LK 8 are illustrated in Figure 16,f of the Phase I report (Hall, Black, and Graves 1982:87), which shows the site before brush clearing occurred, and in Figure 4,a of this report, showing roughly the same view after brush was cleared and construction commenced.

Five of the sites in Group 1 are located on the north side of the Frio River. The floodplain on this side is very narrow. It gives way quickly to gravel and brush-covered upland slopes where several of the sites occur. Because it is rugged and rocky, the land containing sites 41 LK 121, 41 LK 122, 41 LK 127, and 41 LK 128 served only as cattle pasturage and was never cultivated. Between these sites and 41 LK 8, floodplain deposits deepen, probably because the area has received alluvium fed down to the valley by some major upland drainages trending in from the northwest (Fig. 1, folded insert). Immediately south and west of 41 LK 8, the floodplain supported some larger trees and dense riparian undergrowth. Site 41 LK 8 is situated on a very unusual terrace remnant forming a distinct knoll out in the floodplain. East, north, and northwest of 41 LK 8 are terraces and valley margin slopes blanketed with lag gravels. Good illustrations of the general terrain and the lag gravels are provided in Phase I reports (Hall, Black, and Graves 1982:99, Fig. 20; Brown et al. 1982:105, Fig. 3).

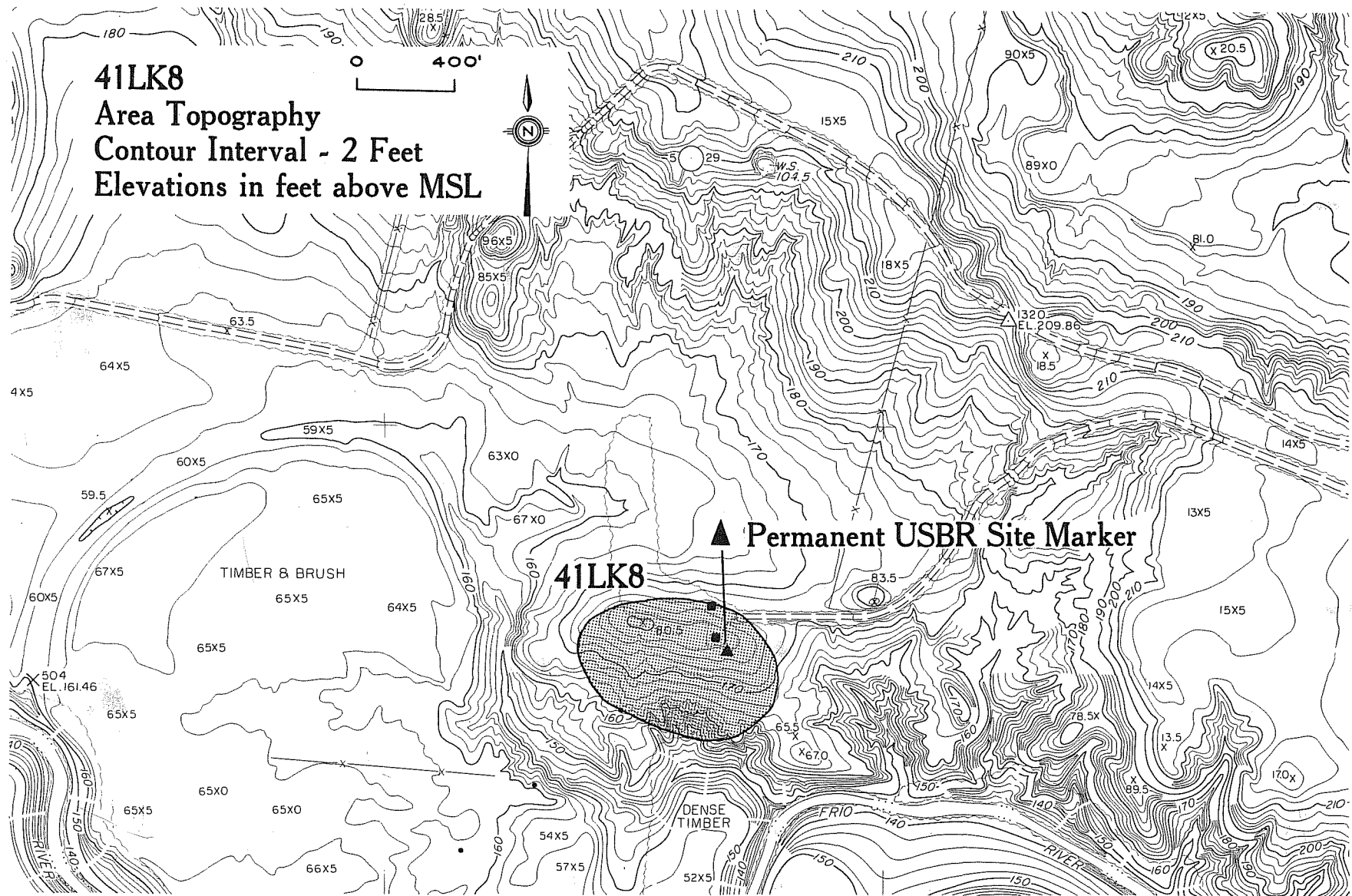
Group 1 sites 41 LK 199 and 41 LK 201 are located on the south side of the river where the floodplain is very broad and flat, and the soils are deep. Immediately west and southwest of 41 LK 201 was a cleared field that was more-or-less continuously cultivated and planted (usually with grain sorghum) during the course of Phase I and Phase II investigations. Elsewhere, there was both open pasture and dense mesquite trees or riparian forest.

There are two major relict channel systems in the area of Site Group 1. One leaves the modern river channel off the northwest end of 41 LK 201, trends southeast between 41 LK 41 and 41 LK 59, then turns northeast past 41 LK 91 and reenters the river channel. On the north side of the Frio River, there is a channel scar apparent on the floodplain southwest of 41 LK 8.

41 LK 8

Site 41 LK 8 was recorded in 1970 by members of the Coastal Bend Archeological Society (CBAS). It is an open prehistoric site situated on a terrace remnant forming a distinct knoll out on the floodplain (Fig. 2; Fig. 4,a). The terrace remnant is oblong with a length of roughly 300 m west-northwest to east-southeast. The knoll is between 150 m and 200 m in width (north-south). In recent times, a residence and outbuildings were constructed on the crest of the knoll. The foundations of these structures and much historic debris and garbage were very much in evidence as archaeological investigations occurred on the site. The crest of the knoll was clear of brush, but a number of large mesquite trees remained around the buildings to provide shade. The slopes of the knoll, except for the east end where the road entered, were heavily covered with brush and mesquite trees.

The highest part of the knoll containing 41 LK 8 is about 5 m above the level of the floodplain and as much as 12 m above the channel of the Frio River. The river currently flows through a channel a short distance southeast of



41 LK 8 (Fig. 2). A relict channel curves down from the northwest, runs along the southern edge of 41 LK 8, and meets the modern channel off the southeast end of the terrace remnant. North of 41 LK 8 there is a low area that gives way to the slope of the valley margin. The slopes are blanketed with lag gravels. East of 41 LK 8 is a heavily eroded area characterized by deep gullies.

Phase I investigation at 41 LK 8 involved excavation of four 1-m² test pits (Hall, Black, and Graves 1982:85-92). Findings made in these test pits prompted the following negative pronouncement:

Although the site had previously yielded artifacts suggesting a long span of prehistoric activity (Lynn, Fox, and O'Malley 1977:237-242), the CAR testing effort at 41 LK 8 did not yield a particularly impressive set of results. No habitational features were isolated, no recognizable time-diagnostic artifacts were recovered, preservation of prehistoric organic remains (bone and carbon, in particular) was poor, and although horizons were defined in two test pits, there was no clear-cut visible stratigraphy in the excavated deposits. The results are particularly disappointing because the terrace remnant containing the site is an unusually high topographic feature for a floodplain setting and is likely one of the older surfaces present in the Choke Canyon floodplain (Hall, Black, and Graves 1982:92).

As recommendations for Phase II research were formulated, the site's unusual characteristics overrode the test pit results. Referring to 41 LK 8 in the final recommendations, the following statement was made:

. . . its highly unusual physiographic character (that is, an obvious prominence out on the floodplain), its age as a geologic feature, and its sandy matrix are factors suggesting a strong potential for the existence of Paleo-Indian and Early Archaic components and perhaps an aboriginal cemetery. Though these conjectures were not in any way substantiated by the Phase I test excavations, the regional settlement pattern (for instance, the large Archaic cemetery, 41 LK 28, situated on a sandy hill five miles east of 41 LK 8) permits speculation to this extent. The possibility that such phenomena will be encountered at 41 LK 8 should be taken into consideration as plans for investigating the site are formulated (Center for Archaeological Research 1979:14-15).

The Phase II archaeological investigation at 41 LK 8 was conducted in July and August 1980. During nine work days, 11 crew members labored a total of 656 person hours at the site. Activities at the site were excavation of unit blocks in three areas, monitoring of backhoe trench excavations, feature and profile recording, and plan mapping.

An excavation grid was established on the surface of 41 LK 8. The baseline extended more-or-less along the crest of the knoll (Fig. 3). A nail driven into the trunk of a large mesquite tree near the center of the site served as the vertical datum. USBR surveyors later calculated an elevation of 55 m

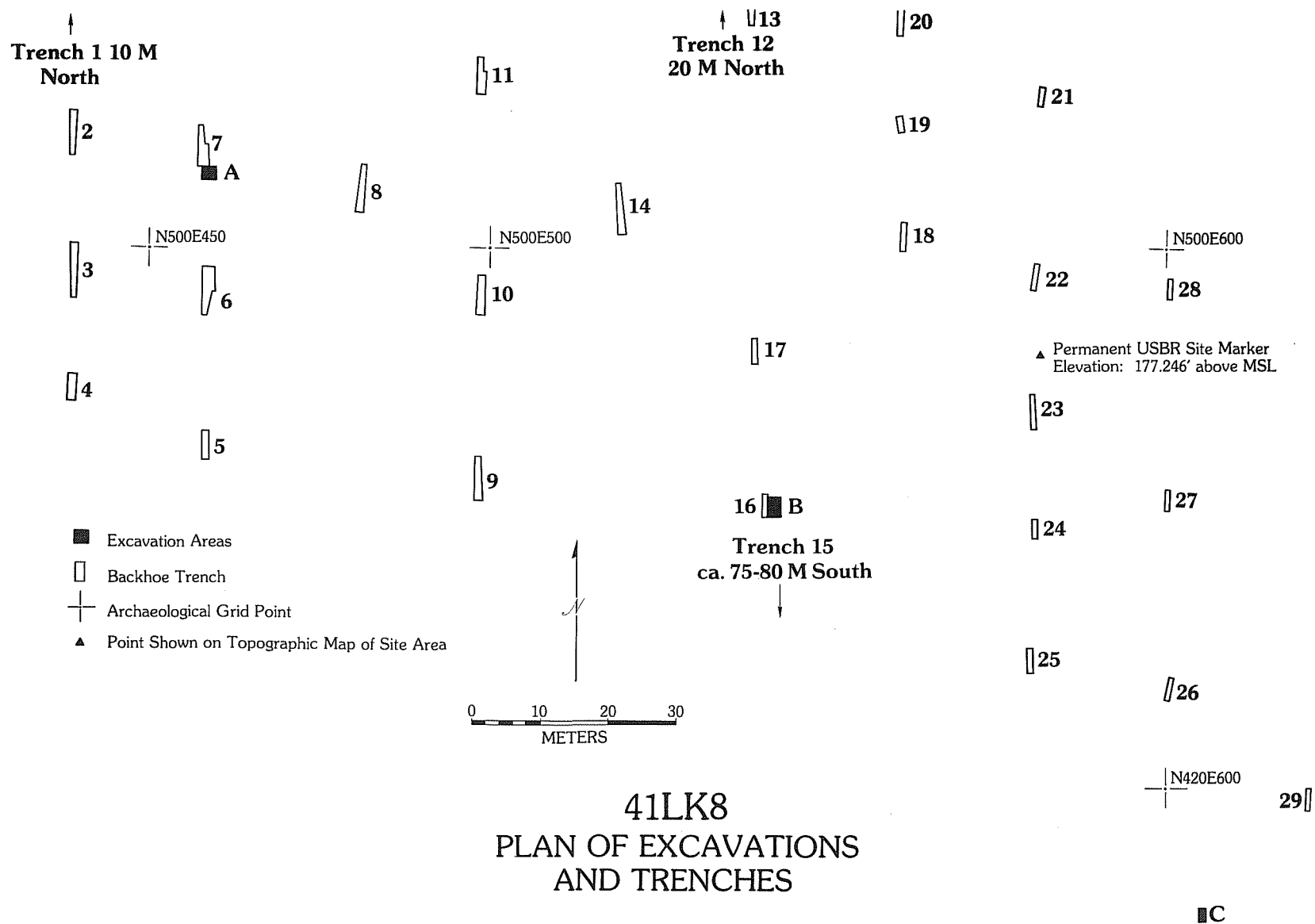


Figure 3. Plan of Excavations and Trenches at 41 LK 8.

(179.82 feet) above mean sea level (MSL) for the nail in the tree trunk. They also placed a permanent site marker at the east end of the site and determined its location, expressed in Modified Texas State Plane Coordinates. The monument location is shown in Figures 2 and 3. An elevation of 54 m (177.246 feet) above MSL was calculated for the top of this monument.

Using a backhoe, 29 short trenches were excavated across 41 LK 8. Locations of these trenches are shown in Figure 3. The purposes of the trenches were to: (1) isolate areas containing maximum subsurface concentrations of prehistoric cultural debris and/or habitational features; (2) aid in determining the full horizontal and vertical extent of prehistoric cultural remains in the site; and (3) reveal the physical structure of the knoll as evidenced in subsurface deposits.

Two of the blocks of excavation units, designated Areas A and B, were staked out at 41 LK 8 based on observations made in the backhoe trenches. Areas A and B were located by Trenches 7 and 16, respectively, where tuffaceous rock habitational features were seen in wall profiles (Fig. 3). A third block of units, Area C, was judgmentally located at the southeast end of the site to sample its deposits. Prehistoric cultural debris (chert debitage, mussel shell, tuffaceous rock, and fire-fractured rock) was found in varying amounts in all trenches excavated on the site. Generally, however, the greatest amounts of cultural debris came from trenches dug on the higher parts of the knoll. Trench data also verified that the knoll is indeed a terrace remnant. Trench 6 provided one of the deepest cuts into the site. Down to a depth of approximately 2 m, the profile of Trench 6 is much like those shown in Figures 5 and 6. From 2 to 3 cm, there was a layer of pure sand showing bedding planes. At 3 m below the surface, there was a gravel bed containing pebbles or cobbles in the 5-7 cm diameter range.

The excavation designated Area A at 41 LK 8 consisted of four 1-m² units forming a 2-m² block at the south end of Trench 7 (Fig. 3). This location is on the highest part of the knoll or terrace remnant containing the site (Fig. 4,b,c). Each of the four units in the area was excavated in arbitrary 10-cm vertical levels. The units and number of levels excavated at each are as follows: N510 E459 (17 levels), N510 E458 (20 levels), N511 E458 (17 levels), and N511 E459 (17 levels). Elevations at modern ground level ranged from 100.06 to 100.09 m.

The Area A excavations revealed a fine silty sand deposit in three visually distinguishable zones. From the ground surface to a depth of 30 cm was a zone of dark brown silty sand forming an A horizon. Between 30 cm and 110 cm below the surface was a dark brownish gray silty sand. Below 110 cm, a complicated intermixture of soil colors, all silty sands, was evidenced (Fig. 5). The intermixing appears to have been the result of pervasive bioturbation (rodents, roots, etc.) in the zone. In the lower levels, increased calcium carbonate mottling and caliche nodules were noted.

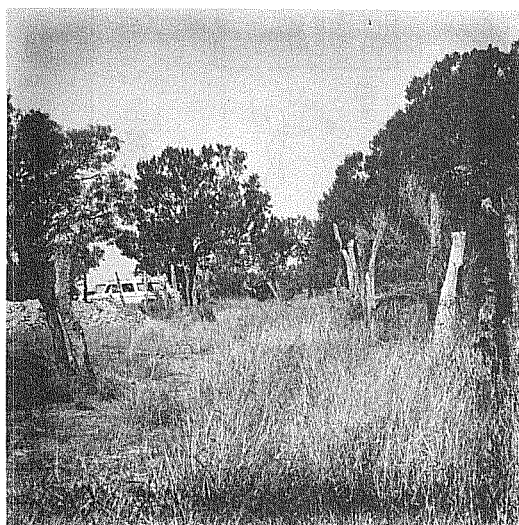
Twentieth-century artifacts such as glass fragments, wire nails, and other metal artifacts were found to a depth of 30 cm in Area A. Major classes of prehistoric cultural debris recovered from the Area A excavation are presented below. This summary includes the combined material recovery from all four units comprising Area A. The collection is divided into three

Figure 4. Phase II Investigations At 41 LK 8.

- a, view looking south to 41 LK 8 from the valley margin on the north side of the Frio River. Land in the foreground and background has been cleared for construction. Compare this scene with Figure 16,f in Hall, Black, and Graves (1982:87);
- b, view looking west at 41 LK 8 across the central prominence of the knoll to the Area A excavations;
- c, Area A excavations in progress at 41 LK 8. The view is south down the length of Trench 7. This is the highest elevation on the terrace remnant knoll containing the site;
- d, Area B at 41 LK 8 prior to excavation. Stringlines mark the units to be excavated on the east side of Trench 16;
- e, Feature 2 in Area B at 41 LK 8. View is down and to the south. Scale is 30 cm in length;
- f, the eastern and southern wall profiles of the Area B excavation at 41 LK 8. Stones comprising Feature 2 rested on the floor level shown.



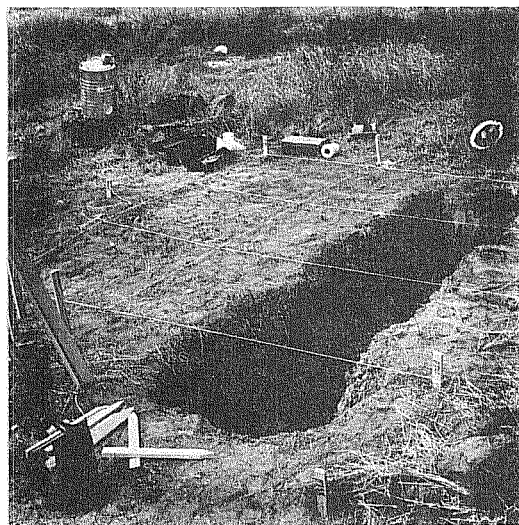
a



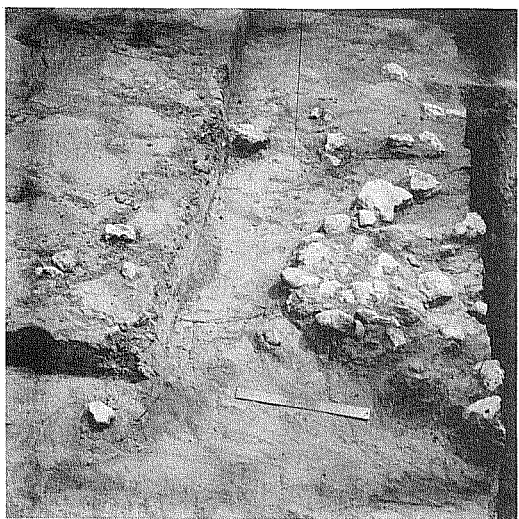
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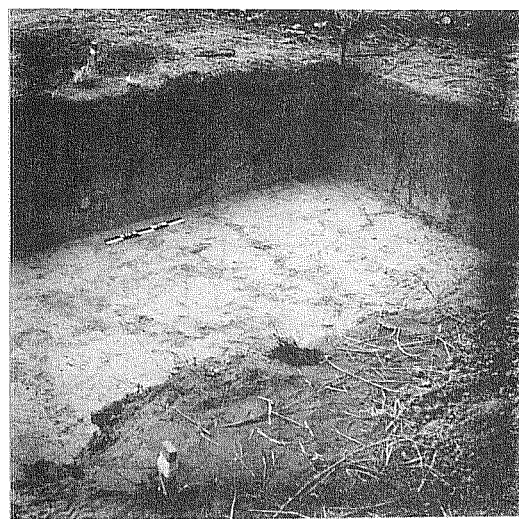
c



d



e



f

41LK8

AREA A PROFILE SKETCH OF SOUTH AND WEST WALLS

Figure 5. Profile Sketch of South and West Walls at 41 LK 8, Area A.

"horizons." The horizon divisions are based on variations in material recovery down through the deposit. In defining these horizons, the operating assumption is that all of the cultural material recovered from the 2-m-thick deposit in Area A is not the result of a single prehistoric habitation event on the site. Rather, the cultural debris represents repeated visits to the site by aboriginal groups through hundreds of years of time. However, due to the nature of the cultural activity and circumstances of the depositional environment, there are no clear-cut divisions (such as zones of sterile deposit or "living floors") apparent. Horizons are defined using both vertical provenience and perceived fluctuations in material recovery. When horizons are presented here and elsewhere in this report, the uppermost levels are referred to as "Horizon 1," the next group of levels down as "Horizon 2," and so forth. For sites where horizons are presented, the deepest horizon would presumably contain debris representing the earliest periods of cultural activity on the site. In this sense, the horizons represent a very basic application of the law of superpositioning.

In Area A, the levels are broken down into horizons as follows: Horizon 1, Levels 1-6; Horizon 2, Levels 7-11; Horizon 3, Levels 12-17 or 20. Area A combined unit recovery, by selected material classes, is as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight* (grams)	534	1160	508
Sandstone Weight (grams)	3	0	0
Fire-Fractured Rock Weight** (grams)	503	663	279
Mussel Shell Umbo Count	159	141	71
Mussel Shell Weight*** (grams)	39	50	15
Rabdotus Shell Count****	245	478	448
Bone Weight (grams)	1.4	0.8	1.4
Primary Flake Count	9	11	11
Secondary Flake Count	161	119	63
Tertiary Flake Count	344	264	135
Chip Count	674	568	279

The following notes apply to all material recovery summaries presented in this section.

*This category contains the various types of tuffaceous sedimentary rocks (sandstone, siltstone, mudstone) derived from the Catahoula Formation. "Tuffaceous sedimentary rock(s)" and "tuff" are terms used interchangeably in the text.

**Throughout this volume, the category of "Fire-Fractured Rock" represents a combination of apparently nonartifactual chert, quartzite, and petrified wood broken as a result of being burned.

***"Mussel Shell Weight" represents a combination of umbo and nonumbo shell fragments.

****"Rabdotus Shell Count" is of whole shells only.

Counts and weights for each class of material are provided on a unit and level basis in the Material Analysis Records, Appendix VI.

One habitational feature was encountered during the excavation of Area A. The feature was a small cluster of tuffaceous rock, a part of which was visible in the south end of Trench 7. Recognition of this feature in the trench prompted location of the Area A units. Designated Feature 1, this cluster of 12 tuffaceous rocks was exposed in Level 8 (99.40-99.30 elevation) of Unit N511 E458. A single layer construct, Feature 1 had an irregular outline shape. It was approximately 38 cm in length and width. Rocks comprising the feature were in the 4 to 12 cm diameter size range. No artifacts were directly associated with the feature, and it contained no carbon.

A number of artifacts were recovered from the Area A excavation. Horizon 1 yielded two chert cores (one, Group 3; one, Group 5), three thin bifaces (Group 3, Form 2, Specimen 10; Group 4, Form 1, Specimen 1; one, Group 9), and a marine shell bead (Specimen 1). From Horizon 2 came six chert cores (one, Group 1; two, Group 2; two, Group 6; one, Group 8), two thin bifaces (Group 4, Form 4, Specimen 121; one, Group 9), and one marine shell bead (Specimen 2). Horizon 3 yielded three chert cores (one, Group 1; one, Group 3; one, Group 6) and two thin bifaces (Group 2, Form 2, Specimen 12; one, Group 10).

Area B at 41 LK 8 was located in the south-central part of the site along the eastern side of Trench 16 (Fig. 3). A layer of rock observed in the east wall of Trench 16 (Fig. 6) led to the selection of this location for controlled excavation. Area B was composed of six units. Coordinates for the units and the number of levels excavated at each are as follows: N460 E541 (eight levels), N460 E542 (eight levels), N461 E541 (eight levels), N461 E542 (eight levels), N462 E541 (seven levels), and N462 E542 (eight levels). The three units on the E542 line measured a full 1 m². The three units on the E541 line were truncated by Trench 16 and were thus not complete 1-m² units (Fig. 4,d).

Excavations in Area B revealed a deposit containing a much higher clay content than did deposits in Area A. Units were excavated in arbitrary vertical levels of 10 cm. Surface elevations ranged from 97.95 to 98.05 m. From the surface to a depth of 20 cm, matrix was a gray brown silty sand containing numerous 20th-century artifacts such as glass sherds, wire, nails, bottle caps, etc. (Zone 3, Fig. 6). This upper deposit also contained much gravel and mortar related to modern construction activities in the vicinity. The next 50 cm of deposit was a dark brownish gray clayey sand (Zone 2, Fig. 6). Historic artifacts decreased substantially as quantities of prehistoric cultural debris increased. The floor of the Area B excavation was at the base of this Zone 2 deposit (Fig. 4,f). Trench 16 revealed the deposit beneath Area B to be a yellowish tan sandy clay mottled with calcium carbonate. This deepest zone also exhibited layers of caliche nodules (Zone 3, Fig. 6). Very little cultural debris was noted in Zone 3.

Prehistoric cultural debris recovered from the Area B excavation is combined into two horizons. Horizon 1 contains materials recovered from Levels 1-4, and Horizon 2 contains the materials from Levels 5-7 or 8. The six units from Area B yielded the following:

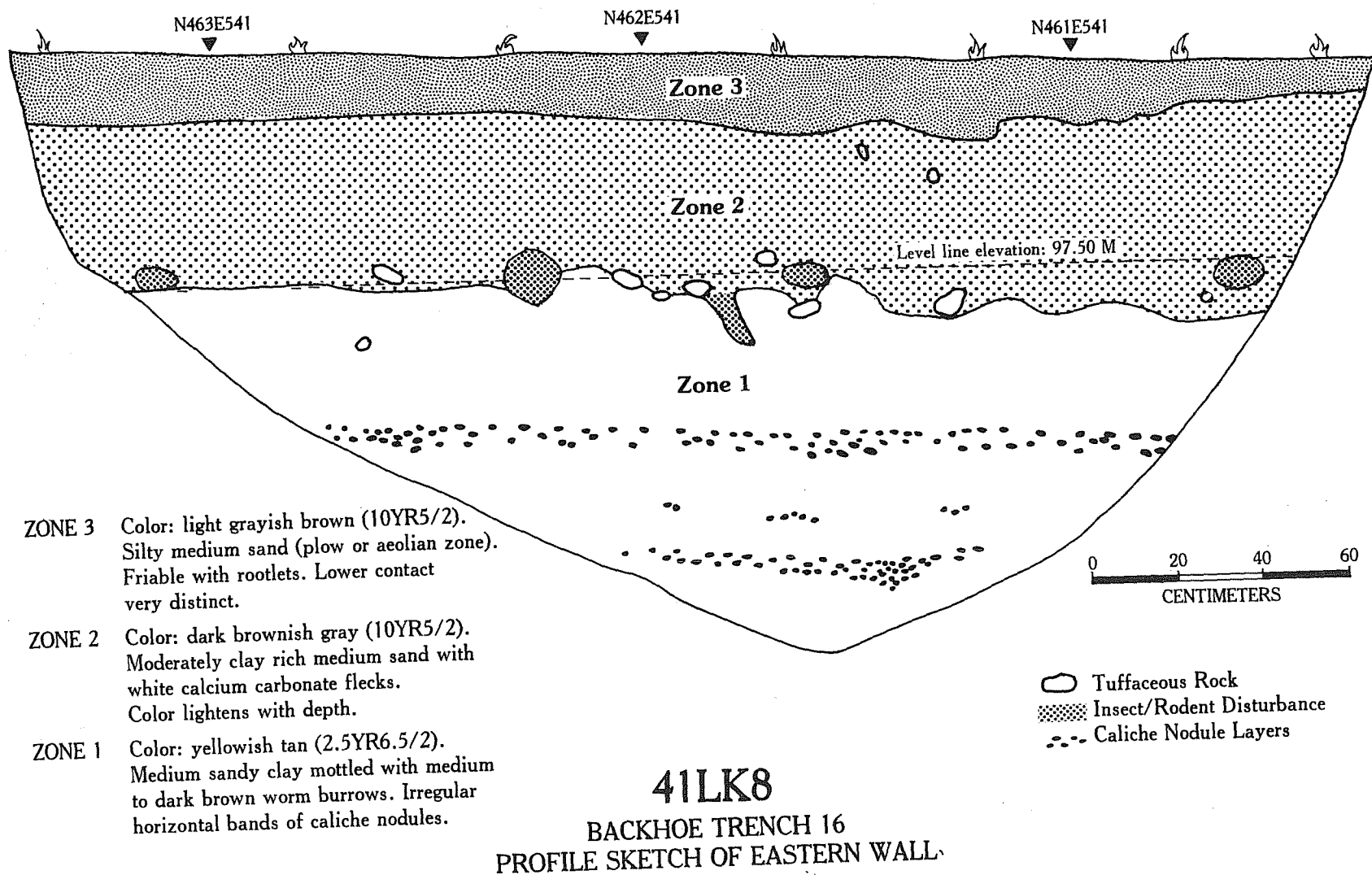


Figure 6. Profile Sketch of Eastern Wall at 41 LK 8, Backhoe Trench 16.

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	260	440
Sandstone Weight (grams)	0	14
Fire-Fractured Rock Weight (grams)	385	288
Mussel Shell Umbo Count	49	45
Mussel Shell Weight (grams)	8	11
Rabdotus Shell Count	36	203
Bone Weight (grams)	0.5	0
Primary Flake Count	18	11
Secondary Flake Count	143	57
Tertiary Flake Count	251	119
Chip Count	545	214

The layer of rock first seen in the east wall profile of Trench 16 was part of a more extensive rock cluster exposed in the Area B excavation and designated Feature 2 (Figs. 4,e; 7). Consisting predominantly of tuffaceous rock, Feature 2 was a single layer construct resting on a plane approximately 60 cm below surface (97.40 m). The central part of the feature consisted of 30+ tuffaceous rocks arranged in a subcircular cluster measuring 90 cm north-south and 60 cm east-west (this dimension truncated by excavation of Trench 16). Outward from this central cluster were more widely scattered rocks (Fig. 7). Amidst the tuff were approximately 15 mostly smaller pieces of fire-fractured rock, some chert debitage, a chert core, and a single piece of sandstone. Diameters of individual tuffaceous stones ranged from 5 to 15 cm, averaging 8 to 10 cm. Much of the debitage appeared to have been burned. Carbon was noted to occur only as infrequent flecks in the feature area.

Horizon 1 in Area B (consisting of Levels 1-4) yielded seven chert cores (two, Group 1; one, Group 2; two, Group 5; two, Group 6) and five thin bifaces (Group 1, Form 2, Specimen 1 [a **Morhiss** dart point]; one, Group 9; three, Group 10). From Horizon 2 (Levels 5-7 or 8) came three chert cores (one, Group 1; one, Group 5; one, Group 6) and one thin biface fragment (Group 10).

Area C was located at the extreme southeastern end of 41 LK 8 (Fig. 3). This location is on the flank of the knoll and thus at a considerably lower elevation than the other excavations. Short gullies cutting up into the knoll near the Area C units exposed a considerable amount of prehistoric debris, especially mussel shell and fire-fractured rock. A **Fairland** dart point (thin bifaces Group 1, Form 3, Specimen 11) was found on the surface. The Area C units were staked out on an adjacent, uneroded piece of ground.

Area C consisted of only two 1-m² units: N400 E605 (11 levels) and N401 E605 (11 levels). Surface elevations in the units ranged from 95.48 to 95.55 m. Excavations revealed a very compact dark brown clayey sand from the surface down through Level 5 (down to 50 cm). In Level 6, the deposit changed to a light gray brown sandy clay that extended down to the bottom of the units (approximately 110 cm below surface). Two horizons are defined within the Area C deposits. Horizon 1 represents Levels 1-6. Horizon 2 contains Levels 7-11. Rates of recovery for selected classes of material from Area C are as follows:

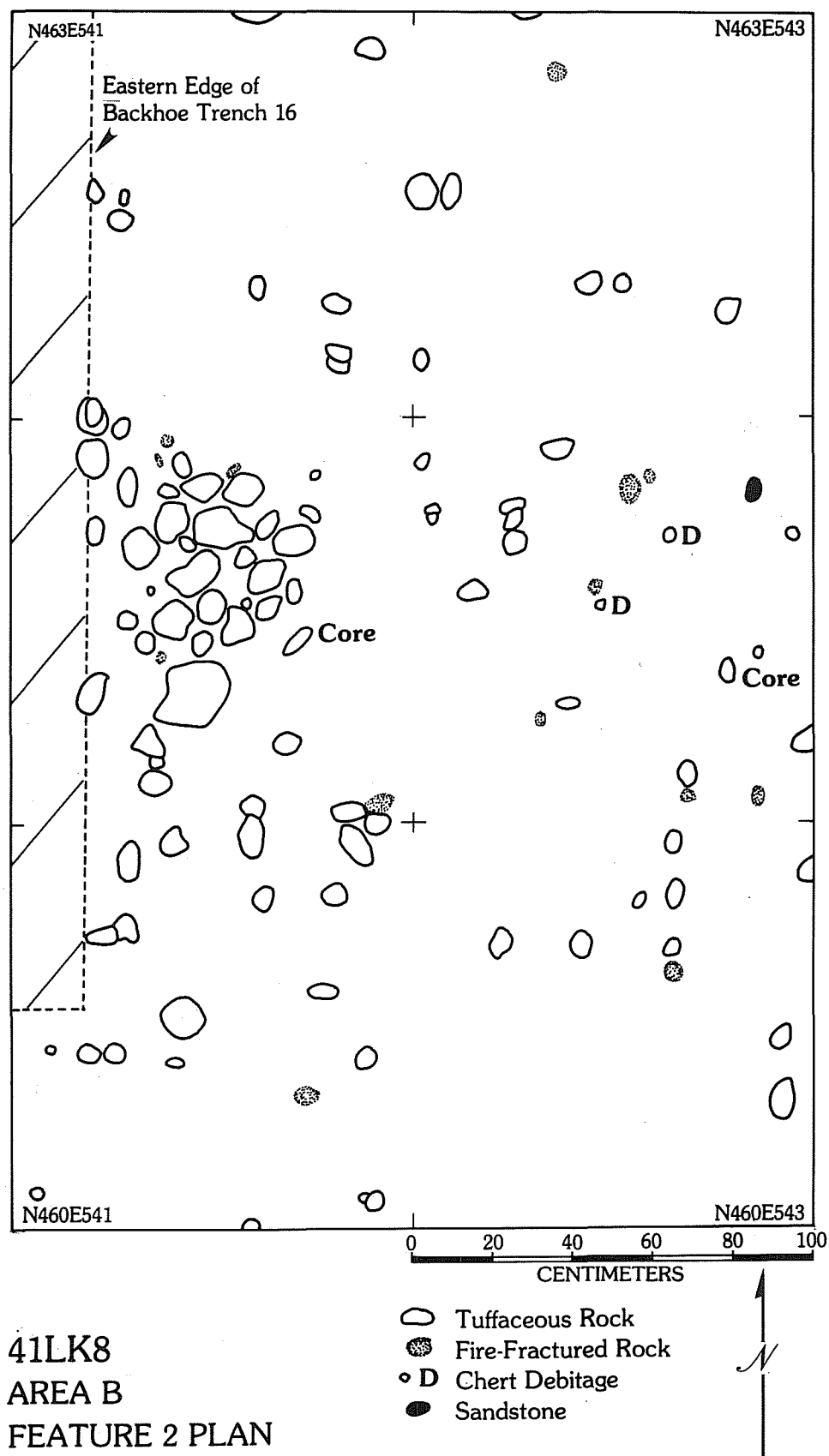


Figure 7. Feature 2 Plan at 41 LK 8, Area B.

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	92	194
Sandstone Weight (grams)	0	0
Fire-Fractured Rock Weight (grams)	146	114
Mussel Shell Umbo Count	566	130
Mussel Shell Weight (grams)	252	57
<i>Rabdotus</i> Shell Count	89	63
Bone Weight (grams)	0	0
Primary Flake Count	9	5
Secondary Flake Count	46	30
Tertiary Flake Count	77	40
Chip Count	100	85

Other artifacts recovered from Area C include a thin biface fragment from Horizon 1 (Group 9) and, from Horizon 2, one thick biface (Group 8) and a stemmed thin biface (early expanding stem Group 1, Form 3, Specimen 18).

In general, the data collected at 41 LK 8 during the Phase II investigation confirm previous assessments of the site. Results of Phase I testing demonstrated that the site's deposits offered limited potential for data gain (Hall, Black, and Graves 1982:92). The site as a relatively unique landform setting, that is, a sandy rise, led to an overriding supposition that it might contain rare Paleo-Indian or Early Archaic components and possibly an aboriginal cemetery.

Site 41 LK 8 appears to have been inhabited primarily during the Middle Archaic and Late Archaic periods. This conclusion is based on the recovery of various stemmed and unstemmed thin bifaces from the surface and subsurface of the site. Dart points such as the *Morhiss* (Group 1, Form 2, Specimen 1) from Area B, the *Fairland* (Group 1, Form 3, Specimen 11) from Area C, several triangular thin bifaces (Group 2, Form 2, Specimen 12; Group 3, Form 2, Specimen 10; Group 4, Form 1, Specimen 1; and Group 4, Form 4, Specimen 121) from Area A, and a distally beveled biface (Group 2, Form 1) are all suggestive of Middle Archaic to Late Archaic activity. Interestingly, there was no additional material recovered in Phase I or Phase II investigations to reconfirm a Late Prehistoric component evidenced by potsherds previously found on the site (Lynn, Fox, and O'Malley 1977:91). Habitation of the site, during the Late Prehistoric, must have been minimal. Likewise, in Phase II, the Paleo-Indian and Early Archaic periods are only vaguely hinted at by the recovery of a basally ground lanceolate thin biface (Group 3, Form 2, Specimen 25, *Plainview*?) and a stemmed thin biface (Group 1, Form 3, Specimen 18, early expanding stem?).

Deposits excavated in Areas A, B, and C at 41 LK 8 yielded substantial quantities of faunal remains in the form of mussel and snail shells, but almost no bone. Beyond the fact that the prehistoric inhabitants were gathering mussels and snails, there is little direct evidence upon which to base subsistence inferences at this site. It is interesting to note that no seed/nut processing tools (called grinding slabs and stones or manos and metates) have been found at 41 LK 8. This negative evidence suggests that perhaps seed or nut processing was not an important subsistence activity for the vicinity or time of year when prehistoric people lived on the site.

Data collected in controlled excavations, as trenches were dug, and in surface observations at 41 LK 8 indicate that clusters of rock exemplified by Features 1 and 2 are extremely common in the subsurface throughout the site area. This situation is reminiscent of findings made at 41 LK 67, a valley margin site located just east of 41 LK 8 (Brown et al. 1982). At 41 LK 67, the tuffaceous rock clusters were single layer constructs and occurred in surprising numbers across the site. Although 41 LK 67 was clearly occupied during Late Prehistoric times, the majority of the tuffaceous rock features were probably constructed during the Middle Archaic or Late Archaic. Carbon was present in some of the 41 LK 67 features, and they are assumed to have functioned as hearths. It is suggested that 41 LK 8 and 41 LK 67 were inhabited by prehistoric people at roughly the same time and for the same reasons; this conclusion is based on the general similarities in habitational features and other debris they left behind.

41 LK 201

This extremely important prehistoric site, 41 LK 201, was recorded in 1977 by archaeologists from Texas Tech University (Thoms, Montgomery, and Portnoy 1981). The site was subsequently tested during the course of Phase I investigations (Hall, Black, and Graves 1982:64-81). In three test units excavated at the southeastern end of 41 LK 201, prehistoric cultural remains representing Archaic and Late Prehistoric components were recovered from clearly stratified deposits extending down as much as 2 m below the surface in certain areas. In addition to being usefully stratified and deep, the 41 LK 201 deposits yielded much animal bone and a number of time-diagnostic chipped stone artifacts. Some of the most delicate and unusual prehistoric habitational features known at Choke Canyon were also revealed. Further, the features contained carbon in quantities adequate for radiocarbon assay and wood species identifications. Based on these outstanding qualities, 41 LK 201 was at the forefront among sites recommended for Phase II investigation.

Phase II excavations were conducted by the CAR field team and by members of an archaeological field school (summer 1981) from the Department of Anthropology, The University of Texas at San Antonio, under the direction of Dr. T. R. Hester. Results of the Phase II investigations at 41 LK 201 and the field school investigations are presented in Volume 11 of the Choke Canyon report series (Highley 1986). Chipped stone artifacts (except for debitage) recovered at 41 LK 201 are classified in the artifact section of this report. For artifact illustrations and all other essentials of the investigation, consult Highley (1986).

41 LK 128

Site 41 LK 128 was recorded in 1977 by surveyors from Texas Tech University (Thoms, Montgomery, and Portnoy 1981:41). The site is located on the north side of the Frio River (Fig. 1, folded insert). It trends from northwest to southeast for approximately 700 m. The northwest end is 300 m in width tapering down to about 150 m at the southeast end. Most of the prehistoric

cultural debris evidencing the site occurs on a second terrace above the Frio River (Fig. 8). The northeastern side of 41 LK 128 is bounded by the margin of the river valley, a high outcrop of the Catahoula Formation. The terrace surface containing the site slopes gently from southwest to northeast. The terrace is heavily eroded and densely covered with low brush species (blackbrush, mesquite, yucca, cacti, guajillo; Fig. 11,a). Long, deep gullies cut up into the terrace faces both above and below the main site area (Figs. 8; 9).

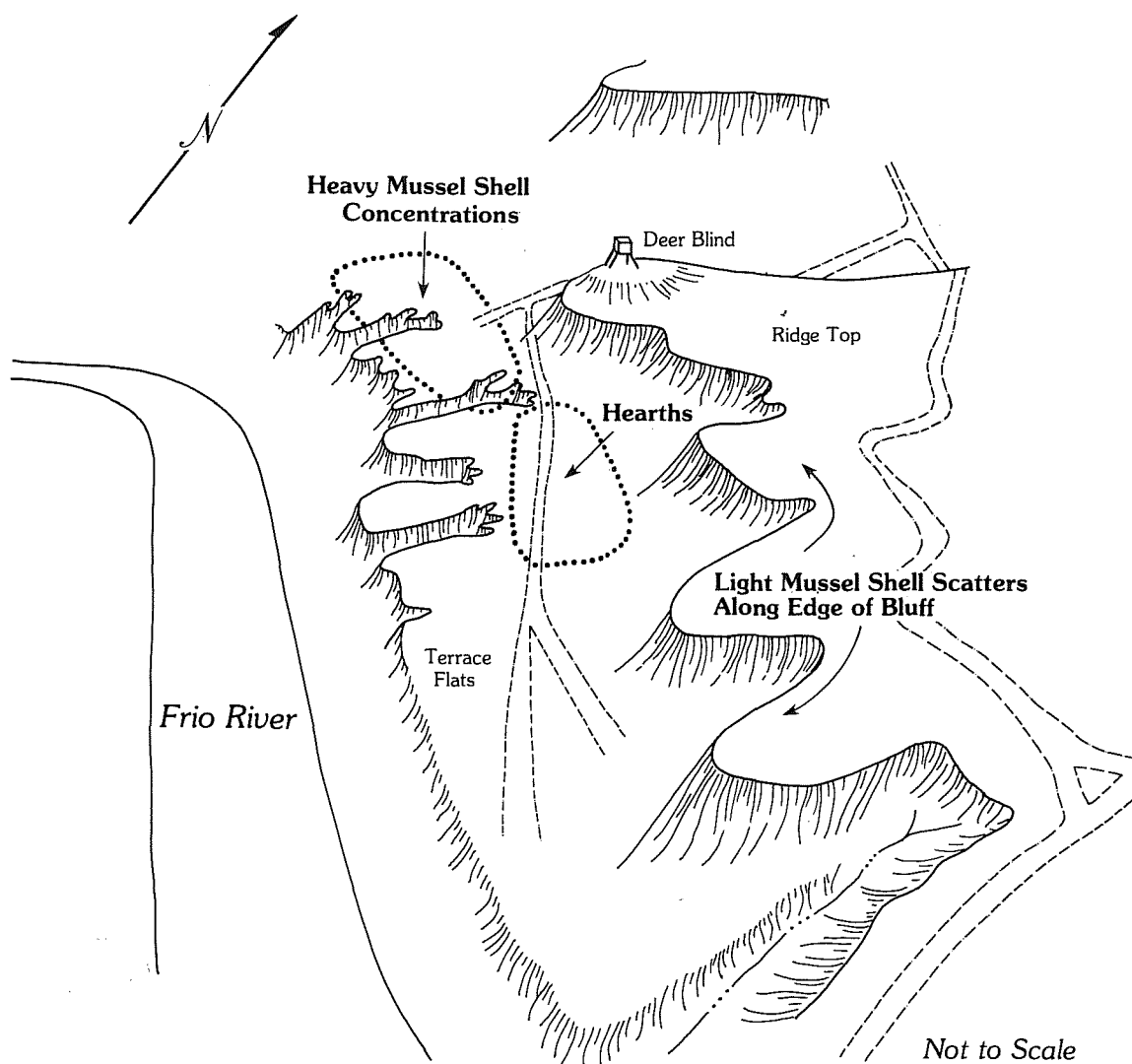
The surficial extent of 41 LK 128 is generally indicated by light scatters of mussel shell, chert debitage, and fire-fractured rock. Within the site, there are two areas where exposed habitational features and greater densities of surficial cultural debris indicate that more intensive prehistoric activity occurred here than elsewhere on the site. One of these areas is characterized by numerous exposed hearth features and the other by some quite extensive accumulations of mussel shell (Fig. 8). It was on these particular areas of concentrated remains that effort was focused during the Phase II investigation.

Phase II field activities at 41 LK 128 were excavation of fourteen 1-m² units in three separate unit blocks and mapping and documentation of 21 hearth features and three mussel shell concentrations. The CAR crew worked at the site in September and October 1981. The seven members of the crew worked a total of 650 person hours at 41 LK 128.

As 41 LK 128 had an exceptionally rugged surface and was densely covered with thorny brush, a horizontal grid system was not established on the site. Instead, blocks of units were independently laid out in each area of the site selected for excavation. These unit blocks were oriented along north-south lines as determined with a Brunton compass. Each 1-m² unit was designated a "Test Pit" and given a serial number. Vertical datums were also independently established in each excavation area. These consisted of points assigned arbitrary elevations of 100.000 m. Test pit locations and vertical datums were later recorded on a plan map (Fig. 10).

Test Pits 1-4 formed a 2-m² excavation area located to sample the character and content of one of the mussel shell concentrations exposed on the surface of 41 LK 128 (Figs. 10; 11,b). Starting elevations for the four units ranged from 99.70 to 99.73 m. In three units, two 10-cm-thick levels were excavated. In Test Pit 3, four 10-cm-thick levels were removed. Soil encountered in these units was described as a dark grayish brown silty clay loam. Rates of recovery for selected materials from Test Pits 1-4 are as follows (all levels combined):

	<u>Test</u> <u>Pit 1</u>	<u>Test</u> <u>Pit 2</u>	<u>Test</u> <u>Pit 3</u>	<u>Test</u> <u>Pit 4</u>
Tuff Weight (grams)	0.6	7	9	0
Sandstone Weight (grams)	15	61	78	57
Fire-Fractured Rock Weight (grams)	52	84	81	62
Mussel Shell Umbo Count	721	185	772	354
Mussel Shell Weight (grams)	48	50	96	43



41LK128

SCHEMATIC SKETCH OF MAJOR CULTURAL FEATURES

Figure 8. Schematic Sketch of Major Cultural Features at 41 LK 128.

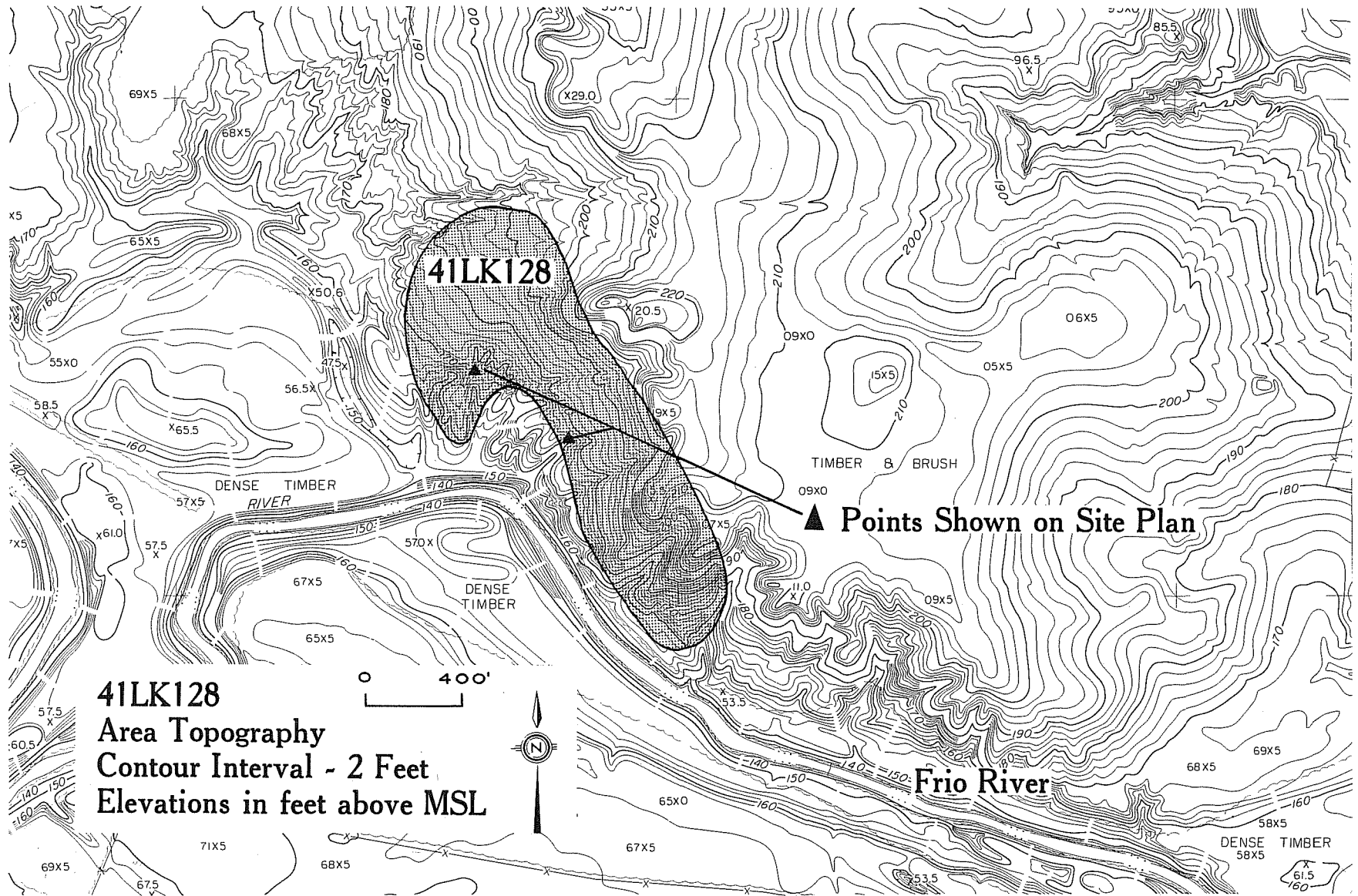


Figure 9. Topographic Map of 41 LK 128 and Surrounding Area.

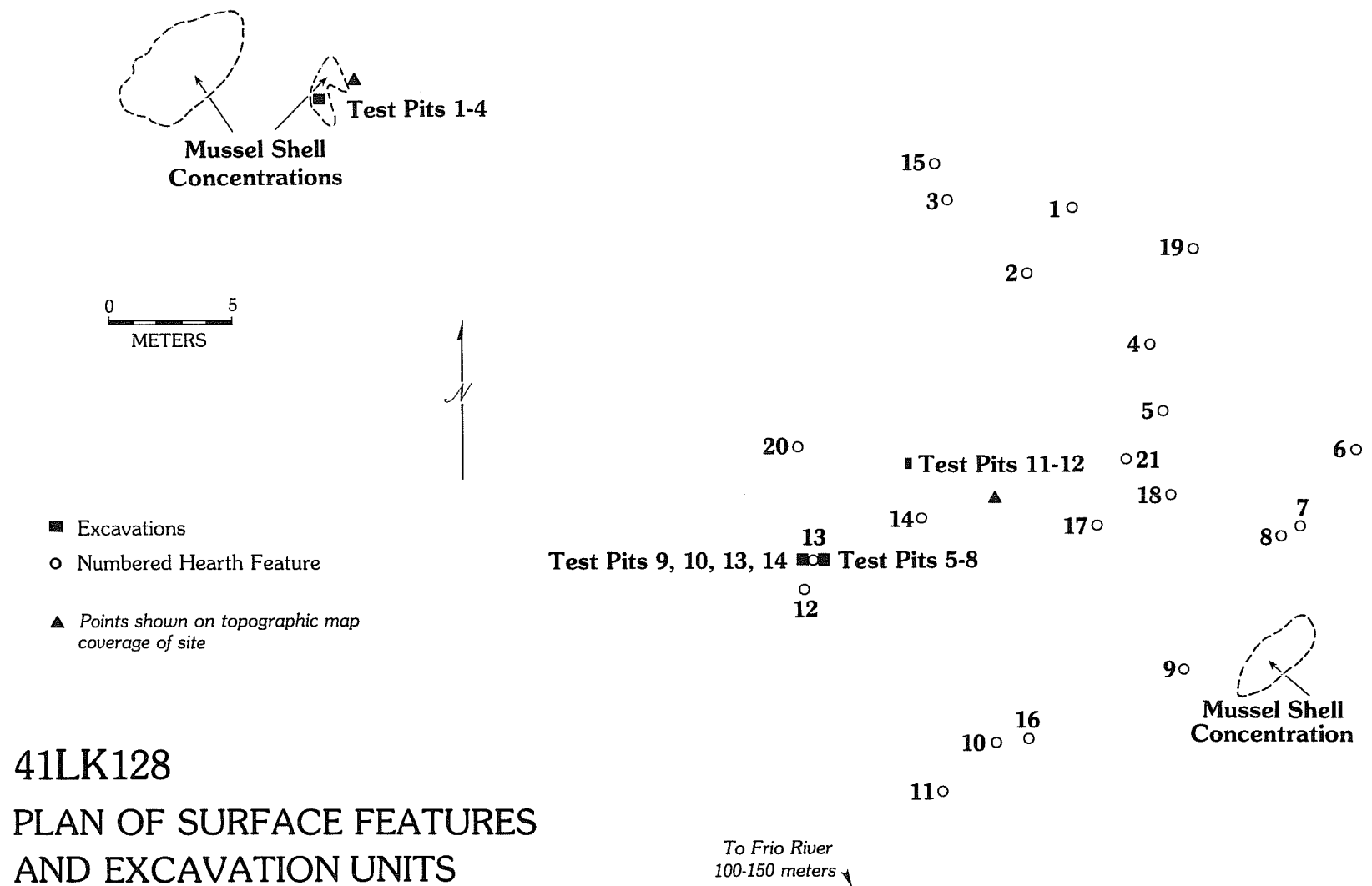


Figure 10. Plan of Surface Features and Excavation Units at 41 LK 128.

Figure 11. Phase II Investigations at 41 LK 8 and 41 LK 128.

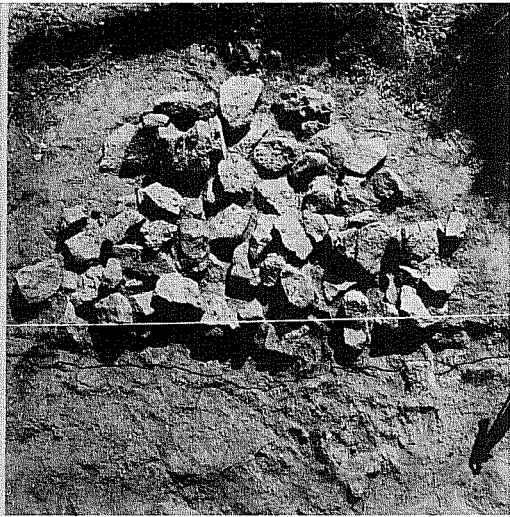
- a, view south across 41 LK 128. Cleared areas of the Frio River floodplain are visible in the background. Vegetation is predominantly mesquite trees, blackbrush, and guajillo;
- b, view looking southwest across typical scatter of mussel shell at 41 LK 128. The ground cover and degree of erosion evident in this illustration are characteristic of the site in general;
- c, Hearth 2 at 41 LK 128 after being cross sectioned;
- d, Hearth 17 at 41 LK 128 after being cross sectioned. Note the darkly stained soil beneath the rock layer;
- e, Hearth 2 at 41 LK 128;
- f, Hearth 13 at 41 LK 128 after being cross sectioned.



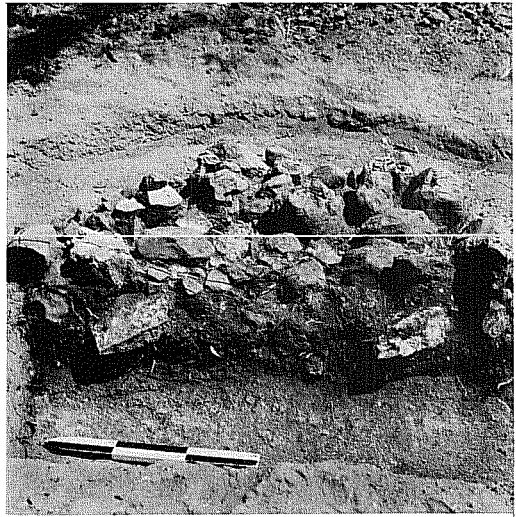
a



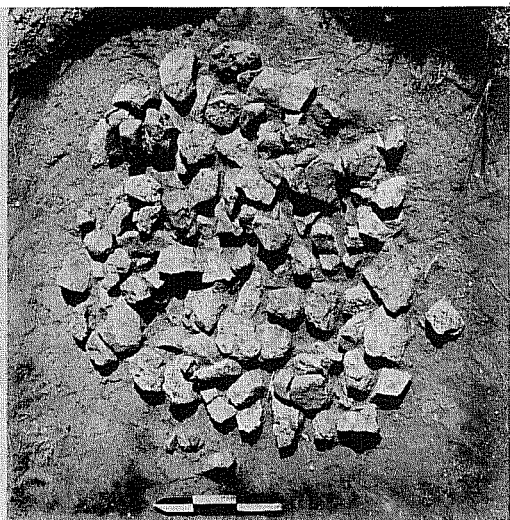
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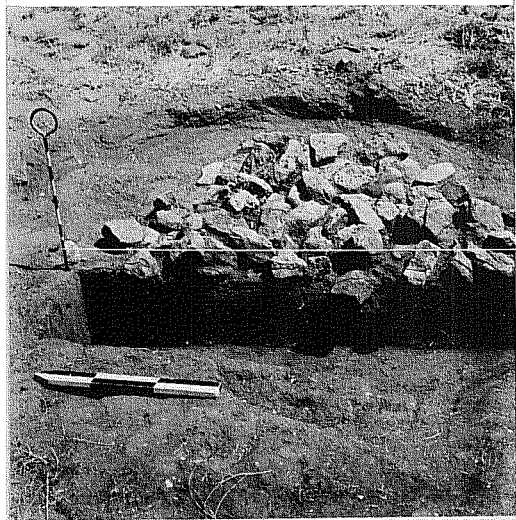
c



d



e



f

Rabdotus Shell Count	18	54	20	29
Bone Weight (grams)	0	0	0	0
Primary Flake Count	0	4	2	3
Secondary Flake Count	9	21	22	10
Tertiary Flake Count	12	18	34	13
Chip Count	12	46	43	17

Other artifacts recovered from Test Pits 1-4 include two chert cores (one, Group 5; one, Group 6), a thin biface fragment (Group 10), and one piece of satin spar gypsum.

Test Pits 5-8 and Test Pits 9, 10, 13, and 14 were located on the east and west sides of Hearth 13 (Figs. 10; 11,f; 15,a-d). Each group of four units formed a 2-m² excavation on either side of the hearth. Hearth 13 was contained within a third 2-m² block that was only partially excavated as the hearth was further exposed (Fig. 12). Levels in these units were 10-cm thick. Units were excavated to varying depths as follows: Test Pit 5, eight levels; Test Pit 6, four levels; Test Pit 7, eight levels; Test Pit 8, four levels; Test Pit 9, two levels; Test Pit 10, two levels; Test Pit 13, one level; and Test Pit 14, one level. Again, the soil matrix was a dark grayish brown silty clay loam. Starting elevations at the surface of the units ranged from 99.61 to 99.84 m. In Test Pits 5-8, rates of recovery for selected classes of debris are as follows (all levels combined):

	<u>Test</u> <u>Pit 5</u>	<u>Test</u> <u>Pit 6</u>	<u>Test</u> <u>Pit 7</u>	<u>Test</u> <u>Pit 8</u>
Tuff Weight (grams)	17	6	13	0
Sandstone Weight (grams)	145	78	302	42
Fire-Fractured Rock Weight (grams)	55	31	69	27
Mussel Shell Umbo Count	188	129	227	140
Mussel Shell Weight (grams)	95	61	123	77
Rabdotus Shell Count	1023	686	1122	578
Bone Weight (grams)	89	38	22	12
Primary Flake Count	5	11	8	8
Secondary Flake Count	64	82	116	101
Tertiary Flake Count	98	84	169	168
Chip Count	163	142	322	309

Additional artifacts found in these units include eight chert cores (three, Group 3; one, Group 4; two, Group 5; and two, Group 6), one thick biface (Group 8), 14 thin bifaces (two, Group 1, Form 4, Specimens 56 and 57 [Perdiz arrow points]; two, Group 4, Form 4, Specimens 16 and 123; one, Group 4, Form 3, Specimen 2; one, Group 9; seven, Group 10), and two trimmed flakes (Group 3, Form 1, Specimen 1 and Group 4, Form 1).

Test Pits 9, 10, 13, and 14 formed a 2-m² unit on the west side of Hearth 13 (Figs. 10; 12). These units yielded the following materials (all levels combined):

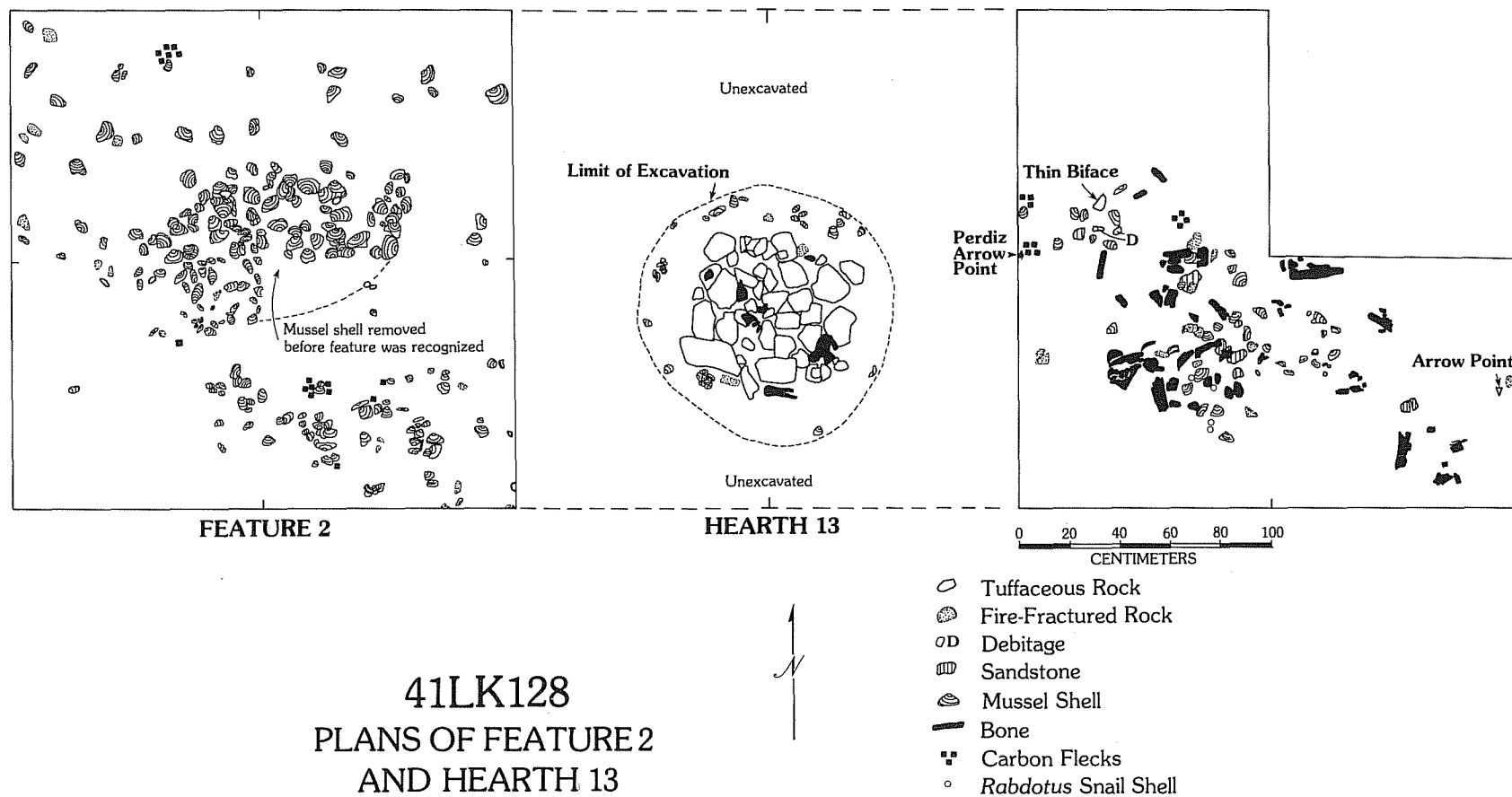


Figure 12. Plans of Feature 2 and Hearth 13 at 41 LK 128.

	<u>Test</u> <u>Pit 9</u>	<u>Test</u> <u>Pit 10</u>	<u>Test</u> <u>Pit 13</u>	<u>Test</u> <u>Pit 14</u>
Tuff Weight (grams)	1	0	0	0.5
Sandstone Weight (grams)	32	32	16	11
Fire-Fractured Rock Weight (grams)	26	36	5	8
Mussel Shell Umbo Count	97	74	52	72
Mussel Shell Weight (grams)	28	54	31	58
Rabdotus Shell Count	566	273	105	202
Bone Weight (grams)	1	1	0.3	0.1
Primary Flake Count	2	1	0	3
Secondary Flake Count	19	16	5	8
Tertiary Flake Count	23	28	14	30
Chip Count	57	48	36	42

Other artifactual materials found in the above four units include four chert cores (two, Group 3; one, Group 4; and one, Group 5), one thick biface (Group 4), and three thin bifaces (one, Group 6, Form 1; one, Group 9; and one, Group 10).

The combined excavation effort in and beside Hearth 13 at 41 LK 128 yielded data illustrated in Figure 12. The hearth is a single-layer construct, roughly circular in outline, with a diameter of approximately 60 cm. It is composed of tuffaceous rocks. The tuff totaled 52 pieces weighing 24.42 kg. Maximum size ranges for these rocks were: one at 25 cm, six at 13-15 cm, nine at 11-12 cm, eight at 8-10 cm, and 28 at 3-7 cm. Fragments of bone and mussel shell were scattered amidst and around the rock cluster. One **Perdiz** arrow point (thin bifaces Group 1, Form 4, Specimen 58) was found as Hearth 13 was exposed. Units excavated to the east of the hearth contained a relatively dense scatter of animal bone (probably deer) and mussel shell. Two **Perdiz** points came from these units. To the west of Hearth 13, excavations revealed the concentration of mussel shells and **Rabdotus** shells designated as Feature 2. Chert debitage and cores were recovered from units on both sides of the hearth, but there was more debitage of all types on the east side (Test Pits 5-8).

Unfortunately, Hearth 13 did not yield carbon in quantities sufficient for radiocarbon assay. However, the presence of three **Perdiz** arrow points in the immediate vicinity permits tentative assignment of this particular feature to the latter years of the Late Prehistoric period. Given the Late Prehistoric presence indicated by the **Perdiz** points, it is noteworthy that no prehistoric ceramic sherds were found by Hearth 13. A few sherds were found elsewhere on the site.

Roughly 5 m northeast of Hearth 13, another block of two 1-m² units was excavated (Fig. 10). Designated Test Pits 11 and 12, these units were located between Hearths 14 and 20 to sample an area where numerous Late Prehistoric artifacts were observed on the surface. Test Pit 11, with surface elevations averaging 100.90 m, was excavated in five 10-cm-thick levels. Test Pit 12, where surface elevations averaged 100.96 m, was taken down only two levels. Soil in the units was described as light grayish brown sandy clay loam. Rates of recovery for selected classes of material from Test Pits 11 and 12 are as follows (all levels combined):

	<u>Test</u> <u>Pit 11</u>	<u>Test</u> <u>Pit 12</u>
Tuff Weight (grams)	0	10
Sandstone Weight (grams)	98	29
Fire-Fractured Rock Weight (weight)	39	44
Mussel Shell Umbo Count	26	36
Mussel Shell Weight (grams)	18	18
Rabdotus Shell Count	514	248
Bone Weight (grams)	0.5	0
Primary Flake Count	3	4
Secondary Flake Count	18	13
Tertiary Flake Count	22	28
Chip Count	77	80

A chert core (Group 1) was found in Test Pit 11. Three thin biface fragments (three, Group 10) were recovered from Test Pit 12.

In addition to Hearth 13, data concerning 20 other hearth features was collected at 41 LK 128. Locations of these hearths are plotted in Figure 10. Hearths 2, 9, and 17 are described individually. Descriptive information for the remaining features is summarized in Table 1.

Hearth 2 (Figs. 11,c,e; 13)

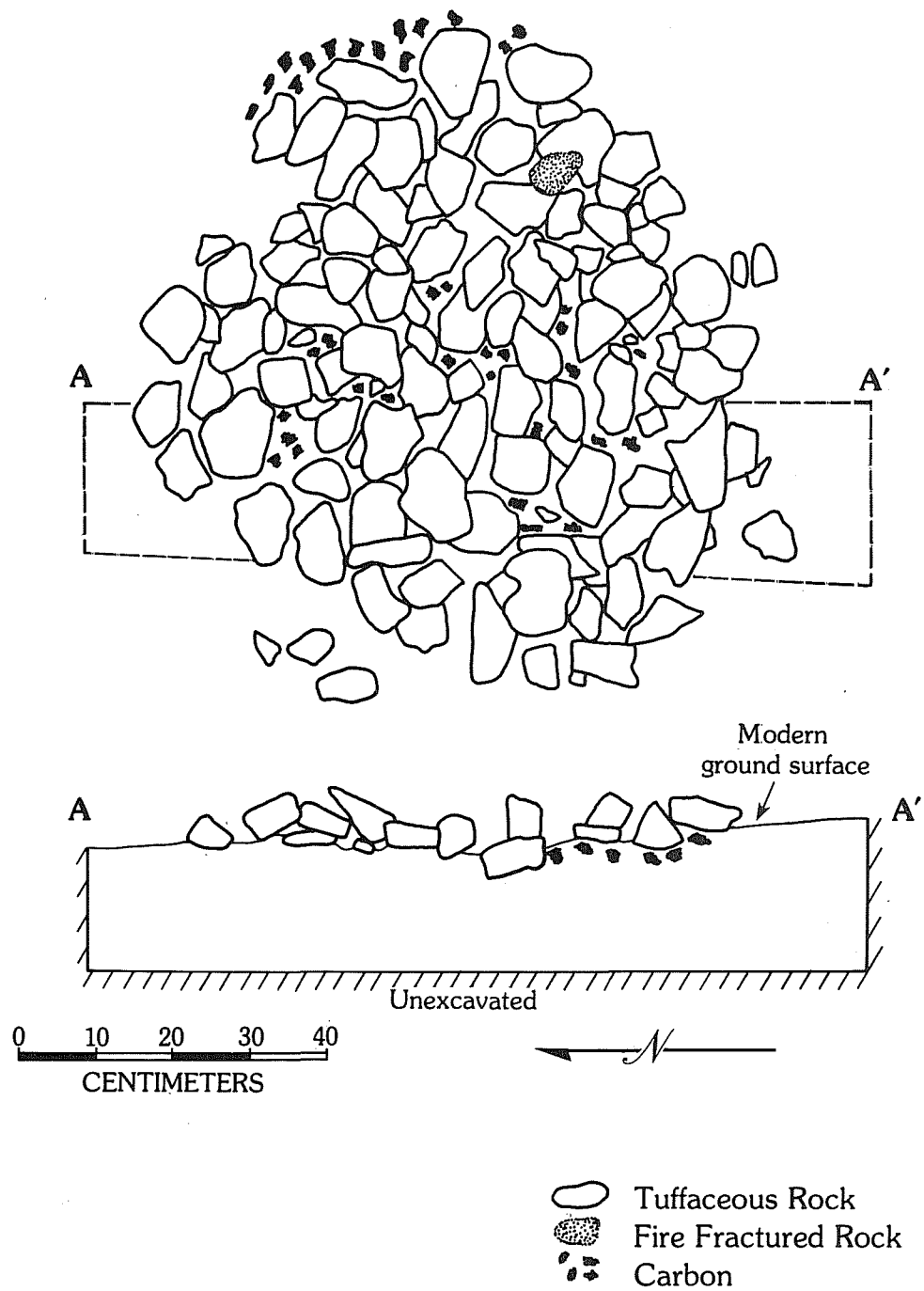
Hearth 2 is composed of tuffaceous rocks densely packed into a circular area measuring 83 cm north-south and 90 cm east-west. It was sectioned along a north-south line to reveal more about its subsurface structure. In cross section, the feature was found to consist of a single layer of rock. Substantial amounts of carbon were collected from amidst and beneath the stones. Two radiocarbon assays (TX-4671, TX-4674) yielded ages of A.D. 980 and A.D. 1180 (MASCA corrected) for Hearth 2. The species *Diospyros* (Texas persimmon?) was recognized as a wood burned to form the carbon found in this hearth (see Appendix II). After being sectioned, Hearth 2 was dismantled. Components consisted of 158 pieces of tuffaceous rock weighing 28.85 kg. Size ranges of these rocks were as follows: one at 18 cm, 10 at 13-15 cm, 32 at 10-12 cm, 50 at 8-10 cm, 24 at 6-8 cm, 16 at 5-6 cm, and 25 at 3-5 cm (maximum dimension of each rock). One piece of fire-fractured rock, weighing 0.14 kg and being 8 cm in diameter, was found in the hearth. The hearth also contained two pieces of conglomerate, both weighing 0.4 kg and with diameters of 6 and 8 cm.

Hearth 9

Hearth 9, is oblong in outline shape, and measures 110 cm north-south and 140 cm east-west. This feature was further exposed and cross sectioned. Carbon collected from within the feature was submitted for radiocarbon assay and yielded an age of A.D. 1310 (TX-4670, MASCA corrected). The section made through the feature revealed it to be a single layer of rock. Hearth 9 was composed of 156 pieces of tuffaceous rock weighing 56.2 kg and 47 pieces of

TABLE 1. SUMMARY OF HEARTH DATA AT SITE 41 LK 128

Hearth Number	Outline Shape	Dimensions		Composition		Rock Count
		North-South	East-West	Tuff	Fire-Fractured Rock	
1	Oblong	60 cm	80 cm	95%	5%	16
3	Circular	100 cm	100 cm	95%	5%	21
4	Oblong	130 cm	103 cm	30%	70%	Numerous
5	Irregular	60 cm	75 cm	10%	90%	35+
6	Circular	100 cm	110 cm	100%	-	25+
7	Oblong	70 cm	100 cm	40%	60%	35+
8	Circular	100 cm	100 cm	100%	-	12+
10	Irregular	100 cm	100 cm	100%	-	10+
11	Irregular	75 cm	75 cm	55%	45%	15+
12	Circular	40 cm	50 cm	100%	-	9+
14	Scattered	-	-	75%	25%	35+
15	Circular	100 cm	100 cm	100%	-	40
16	Oval	50 cm	50 cm	50%	50%	25+
18	Oblong	120 cm	85 cm	50%	50%	?
19	Oblong	100 cm	110 cm	100%	-	45+
20	Scattered	-	-	100%	-	10
21	Scattered	100 cm	90 cm	100%	-	8



41LK128
 HEARTH 2
 PLAN AND CROSS SECTION

Figure 13. Hearth 2 Plan and Cross Section at 41 LK 128.

fire-fractured rock weighing 6.7 kg. Ranges of maximum dimensions on these rocks were: eight at 16 cm, 118 at 9-15 cm, and 87 at 1-8 cm.

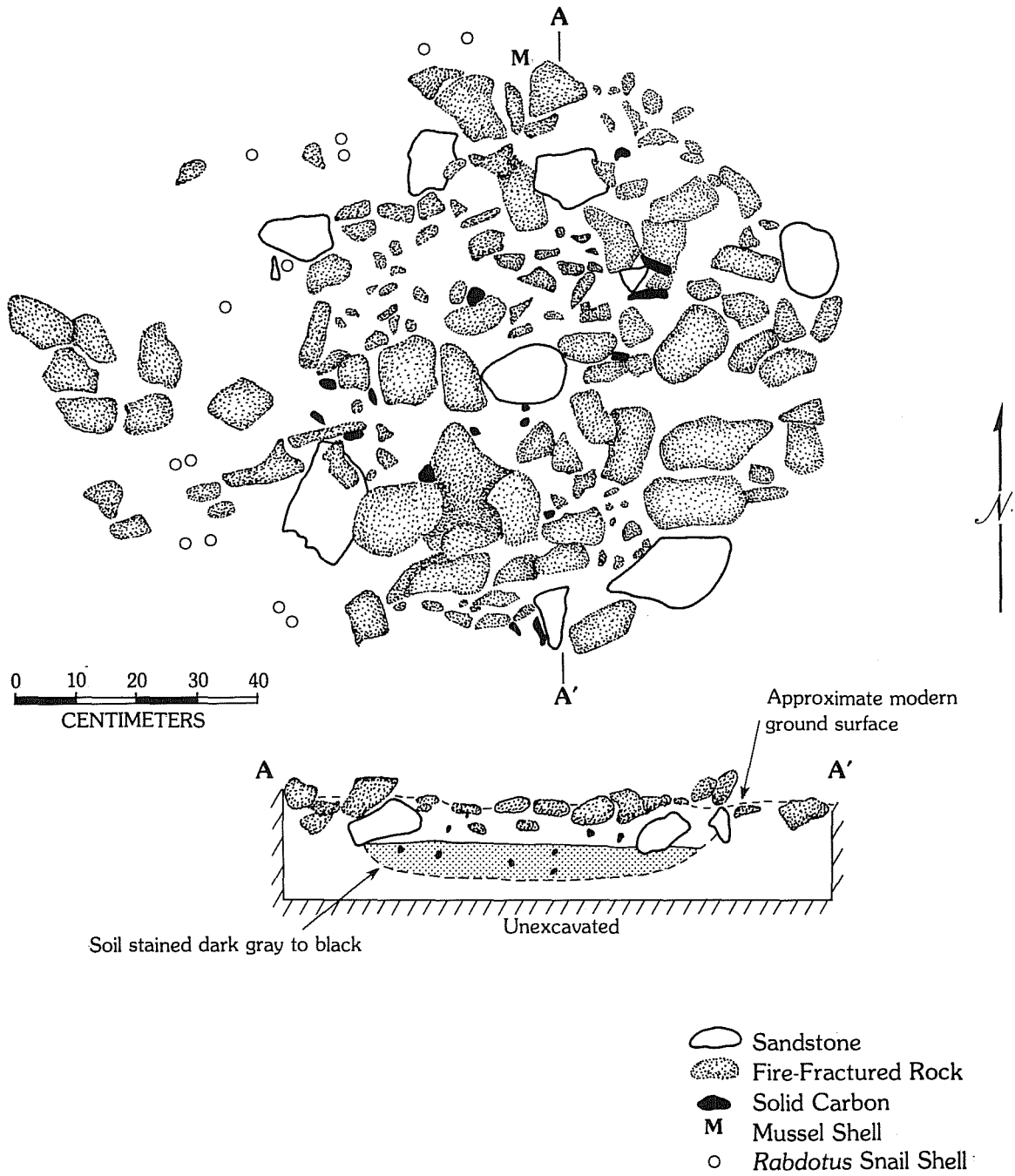
Hearth 17 (Figs. 11,d; 14)

Hearth 17 provides an example of a feature composed predominantly of fire-fractured rock. Subcircular in outline, this rock cluster measures 116 cm north-south and 130 cm east-west. It was cross sectioned along a north-south line down the middle of the cluster (Fig. 14). A very shallow basin-shaped structure was exposed in the subsurface. Radiocarbon assays of carbon samples collected from Hearth 17 yielded ages of A.D. 1180 and A.D. 1300 (TX-4675, TX-4676, MASCA corrected). *Prosopis* (mesquite?) was identified as the wood burned to form the carbon found in this feature (see Appendix II). Fragments of fire-fractured rock totaled 260 pieces weighing 42.3 kg. Counts by maximum length ranges were: nine at 11-15 cm, 43 at 8-10 cm, 46 at 5-7 cm, and 162 at 3-5 cm. The hearth also contained 42 pieces of tuff weighing 12.85 kg. Size ranges for these tuffaceous rocks were: two at 19 cm, five at 13-15 cm, 24 at 10-12 cm, five at 7-10 cm, and six at 3-6 cm.

Additional artifacts collected from the surface of 41 LK 128 are three thick bifaces (one, Group 1; one, Group 2; one, Group 9), seven thin bifaces (Group 1, Form 3, Specimen 14 [Fairland]; Group 1, Form 3, Specimen 27 [unclassified stemmed dart point]; three, Group 2, Form 1; one, Group 4, Form 1; and one, Group 8), one distally beveled biface (Group 1, Specimen 3), one uniface (Group 3, Specimen 2), one piece of modified sandstone (Group 1, Form 2), one piece of satin spar gypsum, and four sherds of aboriginal pottery.

Data collected, during the Phase II investigation at 41 LK 128, evidence habitation of the site by prehistoric people during the Late Archaic and Late Prehistoric periods. Late Archaic activity is suggested by stemmed dart points and a distally beveled biface collected from the surface of the site. Late Prehistoric activities are indicated by arrow points, sherds of pottery, and a series of radiocarbon assays. Although Late Prehistoric habitation is clearly demonstrated, the arrow points and radiocarbon dates do not permit any narrowing of the chronological focus within the period. The radiocarbon assays, yielding corrected dates ranging from A.D. 980 to A.D. 1310, suggest activity in the earlier centuries of the Late Prehistoric period while the *Perdiz* arrow points evidence a later time period in the Late Prehistoric. Unfortunately, no radiocarbon assays were possible for the one excavation where the *Perdiz* points were recovered (Hearth 13, Feature 2 vicinity). It is significant that no artifacts clearly diagnostic of the early Late Prehistoric (specifically, *Scallorn* arrow points) were recovered. If the radiocarbon results are accurate, it seems that diagnostics such as *Scallorn* points should have been found at 41 LK 128. The *Scallorn* type may be represented by certain fragmentary arrow points (thin bifaces Group 1, Form 7, Specimens 5-10), but their incomplete condition precludes definitive identification.

The four habitational features--Hearths 2, 9, 13, and 17--yielded radiocarbon assays or time-diagnostic artifacts affiliating them with the Late Prehistoric period. The Late Archaic artifacts found on the surface of



41LK128

HEARTH 17

PLAN AND CROSS SECTION

Figure 14. Hearth 17 Plan and Cross Section at 41 LK 128.

41 LK 128 were not closely associated with the hearth features. It would be unreasonable to automatically assign the remaining hearth features to the Late Prehistoric period based on such limited data. The extensive surface scatters of mussel shell, an outstanding characteristic of 41 LK 128, cannot be assigned to a particular cultural/temporal period with data currently available.

The habitation features and mussel shell deposits found at 41 LK 128 probably resulted from repeated intervals of encampment on the location through the Late Archaic and Late Prehistoric periods. Data observed or collected do not permit statements concerning the size of human groups that inhabited the site nor is there clear indication of duration of encampment. Identification of wood species burned to produce carbon found in several of the hearths clearly demonstrate that at least certain elements of the modern brush communities (*Acacia*, *Prosopis*, *Diospyros*) were present when prehistoric people were living on the site. It is possible, but difficult to imagine, that the brush cover was as thick on the site surface during periods of prehistoric habitation as at present (Fig. 11,a).

Evidence for prehistoric subsistence pursuits recovered at 41 LK 128 is mussel shell, *Rabdotus* snail shell, bones of deer and other animals, and a single grinding slab fragment. In this respect, the investigation at 41 LK 128 provides no new insights.

41 LK 121

Site 41 LK 121 is located on the north (left) side of the Frio River (Fig. 1, folded insert). It is a very small site, measuring only 75 m east-west and 50 m north-south. The modern channel of the river flows about 150 m to the southeast. An upland drainage channel, tributary to the Frio River, feeds down along the southern margin of the site. The site proper is on the first terrace above the river. Behind (north) the site, a moderately steep, gravelly slope rises and marks another, older terrace. The site surface is covered with native grasses, cacti, acacias, and mesquite trees.

Mussel shell, tuffaceous rock, and chert debitage exposed in the bank of the tributary channel evidence the character and extent of 41 LK 121. CAR activities at this site were an uncontrolled surface collection and the documentation and collection of a surficially exposed mussel shell feature. This mussel shell feature was 2 m in diameter and extended down about 20 cm into the subsurface. Artifacts collected are a thick biface (Group 6, Form 1) and a distally beveled biface (Group 1, Specimen 2). The distally beveled biface indicates that the site was occupied, at least in part, sometime during the Archaic.

41 LK 122

Site 41 LK 122 is located on the crest of an upland hill 400 m north of the Frio River (Fig. 1, folded insert). As recorded by Texas Tech surveyors, the site is subcircular in outline with a diameter of about 300 m (Thoms, Montgomery, and Portnoy 1981). A portion of the site occurs in a cultivated

field. A fringe of brush around the field includes mesquite trees, acacias, yucca, prickly pear, and grasses. Limits of the site were determined on the basis of surface scatters of chert debitage, burned rock, and mussel and snail shells.

CAR Phase II activities at 41 LK 122 were further definition of site limits, an uncontrolled surface artifact collection, and excavation of two shovel tests. Survey of the site surface revealed that prehistoric cultural debris was most densely concentrated on the surface at the highest part of the hill. This area of approximately 250 m² is located immediately north of the site's historic component, designated 41 LK 123 (Fig. 1, folded insert). In this area, relatively dense scatters of fire-fractured rock were observed, mostly in the cultivated field where surface visibility was better. Shovel tests revealed that prehistoric cultural debris is confined essentially to the surface and that controlled subsurface testing would not be productive. Apparently an ancient river terrace, the soil matrix was characterized as a tan sandy clay.

Artifacts recovered from the surface of 41 LK 122 are 18 chert cores (one, Group 1; one, Group 2; one, Group 3; five, Group 5; six, Group 6; and four, Group 9), two thick bifaces (one, Group 6, Form 1; one, Group 8), and eight thin bifaces (one, Group 1, Form 1, Specimen 3 [Bell]; Group 1, Form 3, Specimen 20 ["Early Expanding Stem"]; Group 1, Form 3, Specimen 25; Group 1, Form 3, Specimen 26; and four, Group 10). The presence of Bell and "Early Expanding Stem" dart points at 41 LK 122 indicates that the site was occupied during the Early Archaic, known components of which are very scarce at Choke Canyon. Thus, these findings are significant in that they permit definition of another focus of early human activity in the region. Although not unquestionably associated with these early diagnostic artifacts, the fire-fractured rock, mussel shell, and snail shell observed on the site surface in the same areas where the dart points were recovered may provide limited evidence of subsistence pursuits for the Early Archaic.

41 LK 127

Located on the north side of the Frio River valley and just southeast of 41 LK 128 (Fig. 1, folded insert), site 41 LK 127 was recorded by Texas Tech surveyors as being oblong in outline with dimensions of approximately 250 m northwest-southeast and 100 m north-south (Thoms, Montgomery, and Portnoy 1981). Site 41 LK 127 is positioned on the eroded, sloping face of an ancient terrace that forms the northern margin of the river valley. This same terrace runs along the northeastern boundary of 41 LK 128. The site surface is densely covered with acacias, cacti, mesquite trees, and native grasses.

During Phase II investigation of 41 LK 127, activities of the CAR crew were further survey of the site, excavation of three shovel tests, and a controlled surface collection. Careful inspection revealed that prehistoric cultural activity had apparently been most intense within a roughly circular area (about 60 m in diameter) at the southeastern end of the site. There, a round spur or projection extends out from the old, high terrace containing the site. On the southwestern slope or face of the spur, chert debitage and

fire-fractured rock were found to be most heavily concentrated on the surface. Over the remainder of the site, there is scattered chert debitage, fire-fractured rock, and mussel shell, but only in very low densities.

Three shovel tests excavated upslope on the terrace edge revealed that cultural debris extended 35 to 40 cm into the subsurface. The matrix in the tests was described as a light grayish brown sandy loam from the surface to a depth of 30 cm. This deposit contained mussel shell, *Rabdotus* snail shell, chert debitage, fire-fractured rock, tuffaceous rocks, and numerous stream-rolled pebbles. Between 30 and 55 cm below the surface, the matrix changed to a light tannish brown sandy loam. From 55 to 70 cm below the surface, the matrix color changed to yellowish tan and caliche nodules began to appear. The occurrence of gravel throughout the deposit, other signs of bioturbation, and the fact that bone and integrated features were not isolated in the subsurface were all factors indicating that controlled excavations would not be worthwhile at 41 LK 127.

A controlled collection of surface artifacts was conducted at 41 LK 127. An alidade and plane table were used to plot the locations of individual artifacts as well as the loci of six "dog leash" collection areas, each having a radius of 80 cm. The map resulting from this collection effort is on file at the CAR-UTSA.

Artifacts collected from the surface of 41 LK 127 are 21 chert cores (four, Group 2; one, Group 3; seven, Group 5; one, Group 6; one, Group 7; and seven, Group 9), nine thick bifaces (one, Group 1; one, Group 2; two, Group 5; one, Group 6, Form 1; one, Group 6, Form 2; one, Group 8; and two, Group 9), 14 thin bifaces (two, Group 2, Form 1; two, Group 2, Form 2; two, Group 4, Form 4; five, Group 9; and three, Group 10), and one distally beveled biface (Group 3, Form 1). The occurrence of chert cores and bifaces, both in relatively numerous quantities at 41 LK 127, suggest that production of chipped stone tools was a major activity. In this instance, prehistoric inhabitants were probably taking advantage of the lag gravels strewn across the face of the terrace as a source of raw material.

The predominance of unstemmed thin bifaces and the single distally beveled biface found at 41 LK 127 indicate that the site was inhabited during the Middle Archaic and/or Late Archaic periods. The presence of fire-fractured rock and a small amount of mussel shell suggest that the location was a campsite as well as a source of raw material for chipped stone tool manufacture.

41 LK 199

Site 41 LK 199 is located on the floodplain approximately 1 km south of the Frio River (Fig 1, folded insert). It is situated on the northwestern crest and flank of an ancient terrace forming a ridge that parallels the southern side of the river valley. As recorded by the Texas Tech survey crew, 41 LK 199 measures 480 m north-south and 160 m east-west. The northern end of the site was cleared of brush and in use as pastureland prior to the archaeological survey. The southern end was still covered with thick brush when the site was recorded. The site contains both prehistoric and early

historic (Anglo-European) components. The historic component, a home site, was badly damaged when brush was cleared from the northern end of the site. Prehistoric cultural activity was evidenced by a light scatter of burned tuffaceous rock, chipped stone artifacts, fire-fractured rock, and chert debitage. The distribution of these materials was used to define the limits of the site.

The Phase II investigation conducted by the CAR crew at 41 LK 199 was concerned only with the prehistoric component(s). Six shovel tests were excavated, and a controlled surface artifact collection was made. In careful survey of the site surface, the crew noted that most of the artifacts were exposed along a dirt field road running through its southern half. All of the artifacts mentioned below came from the roadway. Three shovel tests were placed at the north end of the site and three at the south end. In all cases, the very small amounts of prehistoric cultural debris noted were confined to the upper 10 to 15 cm of deposit. Results of shovel testing indicated that controlled excavations would likely not be worth the effort at 41 LK 199.

Artifacts collected from the surface of 41 LK 199 are 37 cores (one, Group 1; one, Group 2; four, Group 3; two, Group 5; nine, Group 6; one, Group 7; 19, Group 9), 12 thick bifaces (one, Group 2; one, Group 3; one, Group 4; one, Group 7, Form 1; two, Group 7, Form 3; three, Group 8; three, Group 9), 21 thin bifaces (three, Group 2, Form 2; one, Group 3, Form 2; three, Group 4, Form 4; one, Group 5; 13, Group 10), two distally beveled bifaces (one, Group 3, Form 2; one, Group 8, Form 5), and one uniface (Group 5). Outstanding among these specimens for purposes of cultural/chronological diagnosis is a Plainview fragment (thin bifaces Group 3, Form 2, Specimen 25; Fig. 78). This specimen indicates that 41 LK 199 was inhabited during the Paleo-Indian period. The remaining thin biface specimens and the distally beveled tools are generally indicative of Archaic period activity, but it is impossible to narrow the time range of prehistoric occupation any further than this.

SITE GROUP 2

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
	41 LK 133		41 LK 149	41 LK 153
	41 LK 142		41 LK 145	41 LK 136
				41 LK 150

The seven sites making up Site Group 2 are located within a series of major upland drainage channels feeding into the Frio River from the north side of the valley (Fig. 1, folded insert). The area containing the sites is located just off the north end of Choke Canyon Dam, then extending north for 2.5 km. The main channel into which at least six other lesser channels feed is called Willow Hollow. The major channels feeding down to Willow Hollow drain land

as much as 10 km to the north-northwest of the Frio River. The channels only run water when heavy rains result in runoff from the uplands. The brush cover in the vicinity of Site Group 2 is the densest to be found anywhere at Choke Canyon. The higher slopes of the drainages are covered with brush species such as blackbrush, guajillo, mesquite, prickly pear, and yucca. Down closer to the channels, whitebrush predominates along with mesquite trees and cacti. The very formidable task of conducting an archaeological survey in this vicinity was accomplished in 1977 by a crew from Texas Tech University (Thoms, Montgomery, and Portnoy 1981). All sites in Group 2, as well as a number of others in the area, were recorded by this crew.

41 LK 153

Site 41 LK 153 is a small prehistoric site located in the middle reaches of the Willow Hollow drainage system (Fig. 1, folded insert). The site is subcircular in outline with a northeast to southwest long axis of less than 30 to 50 cm and a width of 20 m. It rests on the western slope of a north-south ridge separating two of the Willow Hollow tributary drainages. The surface is covered with mesquite trees, acacias, cacti, and native grasses. In the site record, the Texas Tech surveyors noted that cobbles were exposed on the slope and suggested that 41 LK 153 might be a quarry. They also observed a light scatter of chert debitage, two thick bifaces, some chert cores, and burned rock on the surface. Site limits were established on the basis of the observed debris distribution.

During Phase II investigations, the CAR crew resurveyed 41 LK 153, making basically the same observations as were previously recorded for the site. As there was apparently no subsurface extent to the site, and no time- or function-diagnostic artifacts were found on the surface, no controlled testing or surface collecting was attempted. The site is suggested to have functioned as a quarry, but its period of usage during prehistoric times cannot be demonstrated.

41 LK 133

Located east-northeast of 41 LK 153, site 41 LK 133 is situated in the upper reaches of a short, southwesterly trending tributary drainage (Fig. 1, folded insert). The main site area is on a relatively flat terrace beside (west of) the drainage channel. This area is flanked by the main channel to the east and a pronounced gully to the west (Figs. 15,e; 16). Texas Tech surveyors estimated site dimensions to be 150 m north-south and 45 m east-west. Although portions of the site had obviously been destroyed as erosional gullies cut up either side, they estimated that perhaps 80% of the site remained intact in the flat terrace between. Subsurface prehistoric cultural debris was visible in the wall profiles of both gullies.

During Phase II investigation of 41 LK 133, activities of the CAR crew were excavation of two shovel tests and two test pits, documentation of 10 hearth features exposed on the site surface, and a provenience-controlled collection of surface artifacts. Based on observations made in two shovel tests excavated in the central site area and subsurface conditions visible in gully

walls, the southern extent of 41 LK 133 was judged to offer the best potential for productive controlled excavations. Consequently, locations for Test Pits 1 and 2 were selected in that area of the site (Fig. 16).

Test Pit 1 was placed in the south-central area of 41 LK 133. It was excavated to a depth of 90 cm below the surface (nine 10-cm-thick levels). From surface to a depth of 50 cm, the matrix was a dark grayish brown sandy loam. Below the 50 cm depth, the matrix changed in color and consistency to a tannish gray silty sand. Debris recovered from this unit is divided into two horizons, Horizon 1 containing material from Levels 1-4 and Horizon 2 containing the materials from Levels 5-9. Rates of recovery for selected classes of materials from Test Pit 1 are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	24	12
Sandstone Weight (grams)	6	0.4
Fire-Fractured Rock Weight (grams)	252	112
Mussel Shell Umbo Count	1	1
Mussel Shell Weight (grams)	1.4	0.2
Rabdotus Shell Count	265	93
Bone Weight (grams)	1.6	0
Primary Flake Count	0	1
Secondary Flake Count	2	1
Tertiary Flake Count	7	1
Chip Count	14	6

Test Pit 1 yielded no additional artifacts. A small amount of carbon was found in Level 3.

Test Pit 2 was placed about 15 m south of Test Pit 1 (Fig. 16). Seven 10-cm-thick levels of matrix were excavated from this unit. The soil matrix was described as dark grayish brown sandy loam down into Level 6. In Level 6 and below, the soil color lightened to tannish brown. Two horizons are defined in Test Pit 2. Horizon 1 contains the materials recovered from Levels 1-3. Horizon 2 contains debris from Levels 4-7. Rates of recovery for selected classes of debris representing each horizon in Test Pit 2 are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	11	3
Sandstone Weight (grams)	0.2	1.3
Fire-Fractured Rock Weight (grams)	100	69
Mussel Shell Umbo Count	7	2
Mussel Shell Weight (grams)	3.5	3
Rabdotus Shell Count	167	87
Bone Weight (grams)	0.1	0
Primary Flake Count	1	1
Secondary Flake Count	2	2
Tertiary Flake Count	2	2
Chip Count	5	6

No additional artifacts were recovered from Test Pit 2.

Figure 15. Phase II Investigations at 41 LK 128, 41 LK 133, and 41 LK 185.

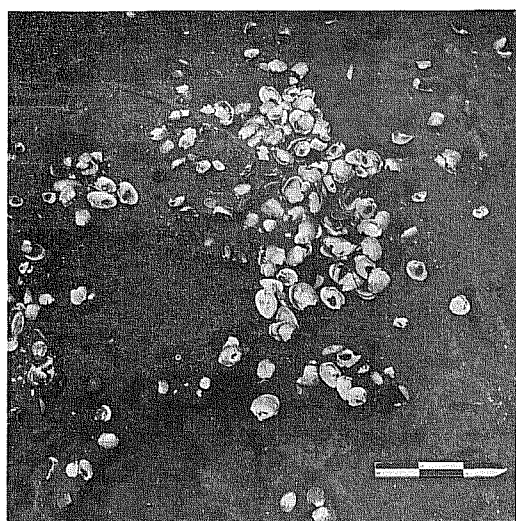
- a, Hearth 13 at 41 LK 128;
- b, plan view of bone and mussel shell concentration in Test Pit 5 (Level 2, 99.60-99.50) at 41 LK 128;
- c, overview of Feature 2 in Test Pits 9, 10, 13, and 14 at 41 LK 128;
- d, closeup of Feature 2 at 41 LK 128;
- e, view north to wall of erosional gully where prehistoric debris was exposed at 41 LK 133;
- f, view is to the north across the east end of 41 LK 185 in the vicinity of Test Pit 2.



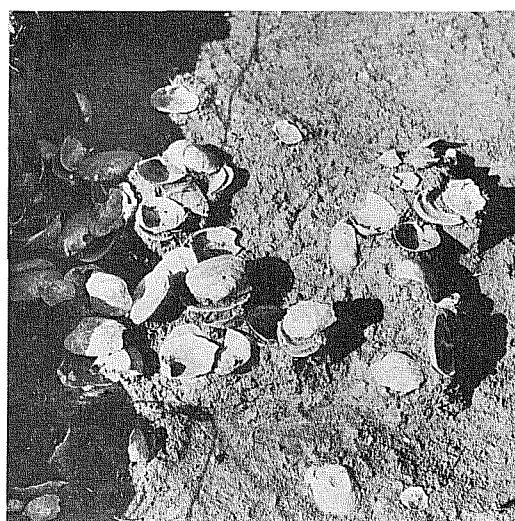
a



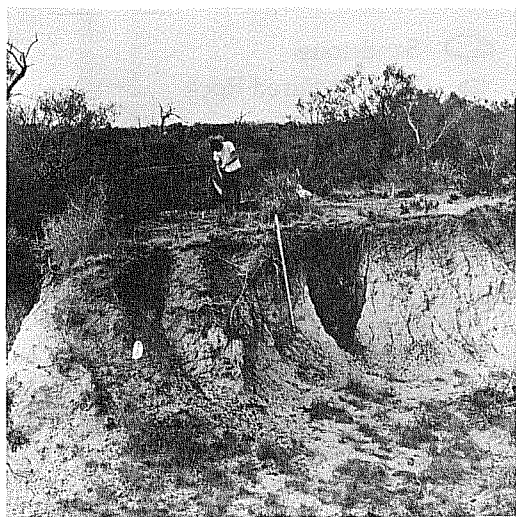
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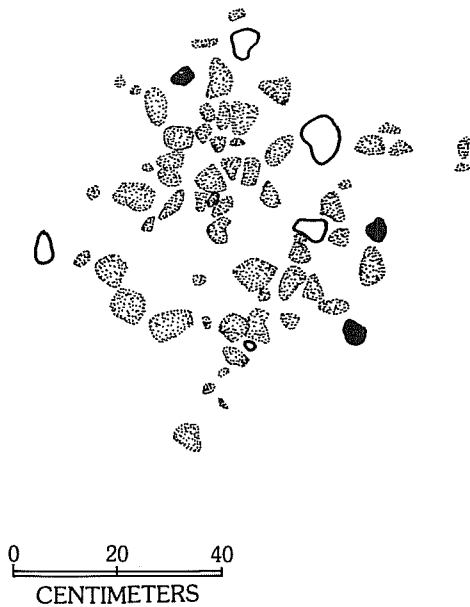


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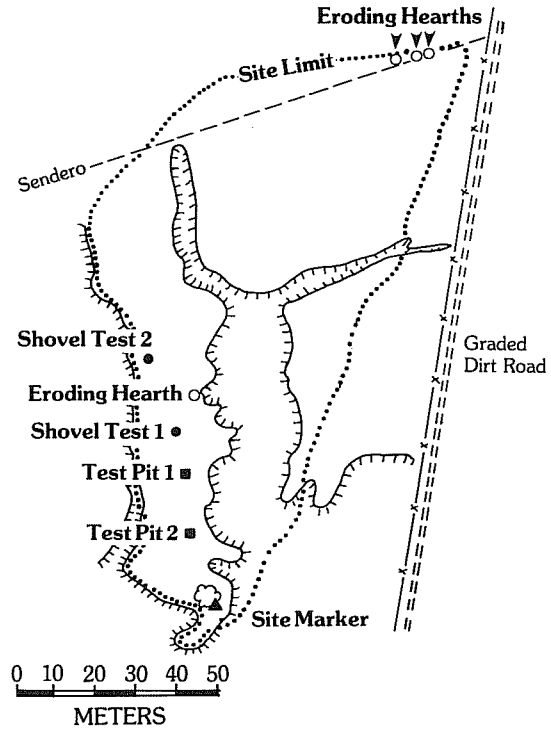


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PLAN OF HEARTH 7



SITE PLAN



PLAN OF HEARTH 2



-  Sandstone
-  Fire-Fractured Rock
-  Mussel Shell
-  Solid Carbon

41LK133

SITE AND FEATURE PLANS

Figure 16. Site and Feature Plans (Hearths 2 and 7) at 41 LK 133.

Information concerning the 10 hearth features found exposed on the surface of 41 LK 133 is summarized in Table 2. A plane table map showing the locations of the features and locations of individually mapped surface artifacts is on file at the CAR-UTSA. Plan maps of Hearths 2 and 7 are shown in Figure 16. Carbon was found in small to minute quantities in Hearths 1, 2, 5, and 7. No radiocarbon assays or wood species identifications were attempted with these specimens.

The following chipped stone artifacts were recovered from the surface of 41 LK 133. The locations of many of these specimens are plotted on a plan map filed at the CAR-UTSA. The specimens are four cores (one, Group 1; one, Group 3; one, Group 5; one, Group 9), four thick bifaces (one, Group 1; one, Group 2; one, Group 7, Form 2; one, Group 9), six thin bifaces (one, Group 2, Form 1; one, Group 3, Form 2; one, Group 4, Form 1; one, Group 4, Form 3; one, Group 4, Form 4; one, Group 10), one distally beveled biface (Group 6), one uniface (Group 3), and one trimmed flake (Group 4).

The above assemblage strongly indicates that people inhabited 41 LK 133 during the Middle Archaic and perhaps Late Archaic times. The number of hearths recognized in eroded areas on the site surface suggests that the site served as a habitation or camp. Great numbers of *Rabdotus* snail shell, a small amount of mussel shell, and minute remnants of animal bone are the only materials surviving to provide evidence of subsistence pursuits during the times when the site was occupied.

41 LK 136

Located west of 41 LK 133, site 41 LK 136 is at the southwestern end of a sloping ridge formed between two small drainages cutting down from the uplands (Fig. 1, folded insert). As recorded by the Texas Tech surveyors, 41 LK 136 measures 45 x 85 m. Brush cover consisting of mesquite trees, soapbush, spiny hackberry, agarita, yucca, and prickly pear is quite thick on the site surface.

During the Phase II investigations, the CAR crew resurveyed 41 LK 136. The original site marker could not be found. The CAR crew did relocate two of the three concentrations of chert knapping debris recorded on the site by the Texas Tech crew. These concentrations consisted of a small amount of debitage and some tested cores. No time-diagnostic chipped stone tools or other artifacts were found anywhere on the site surface. Primarily for this reason, no collection was made at 41 LK 136, and it was concluded that the site warranted no further investigation. It seems to have been a quarry area where people were testing natural cobbles that blanket the slopes in the area.

41 LK 149

Site 41 LK 149 was recorded by Texas Tech surveyors in the upper reaches of one of the major tributary drainage channels (Fig. 1, folded insert). Site dimensions were recorded as 80 x 100 m. The site rests on the west (right)

TABLE 2. SUMMARY OF HEARTH DATA AT SITE 41 LK 133

Hearth Number	Outline Shape	Dimensions		Composition		Rock Count
		North-South	East-West	Tuff	Fire-Fractured Rock	
1	Irregular	60 cm	60 cm	100%	0%	9
2	Circular	90 cm	90 cm	11%	89%	90
3	Scattered	280 cm	130 cm	80%	20%	20+
4	Scattered	60 cm	110 cm	75%	25%	20+
5	Irregular	70 cm	120 cm	83%	17%	12+
6	Irregular	60 cm	35 cm	72%	28%	11
7	Circular	80 cm	65 cm	8%	92%	50+
8	Scattered	140 cm	130 cm	100%	0%	25
9	Subcircular	35 cm	30 cm	0%	100%	6
10	Circular	40 cm	40 cm	0%	100%	10

bank of the drainage channel on a broad, relatively flat terrace surface. The site surface is covered with thick brush.

The CAR crew relocated 41 LK 149, noting a scatter of prehistoric cultural debris about 20 m in diameter. A shovel test excavated in this area revealed that controlled excavations would not be productive. The only artifact collected from 41 LK 149 was a thick biface (Group 1). No cultural and/or chronological estimates are possible with only this one artifact recovered. Careful examination of the site surface yielded no additional time- or function-diagnostic artifacts.

41 LK 150

A tiny (15 x 15 m) prehistoric site, 41 LK 150, was recorded just a short distance north of 41 LK 149 by the Texas Tech crew (Fig. 1, folded insert). Like 41 LK 136, 41 LK 150 is apparently a "quarry station" or place where some natural cobbles were tested for possible use in stone tool manufacture. The CAR crew did not relocate this site during the course of Phase II investigations.

41 LK 142

Site 41 LK 142 is evidenced in a heavily eroded area on the east bank of a stock pond formed by damming a short upland drainage channel. As recorded by the Texas Tech survey crew, 41 LK 142 has dimensions of 80 x 115 m. In less eroded areas, the site surface supports a thick stand of brush including whitebrush, mesquite, allthorn, spiny hackberry, agarita, soapbush, yucca, and prickly pear. The Texas Tech crew defined 41 LK 142 on the basis of chert debitage, fire-fractured rock, and *Rabdotus* snail shells exposed on the surface. Four hearths composed of fire-fractured rock were observed in the walls of erosional scars.

Returning to 41 LK 142 for Phase II investigation, the CAR crew carefully reexamined the site surface. Comment was again made on the severity of erosion in the site area. In gullies trending east-west through the site, much prehistoric debris was noted--fire-fractured rock, chert debitage (some pieces patinated), a small amount of mussel shell, some tuffaceous rock, and numerous *Rabdotus* snail shells.

Additional Phase II activities at 41 LK 142 included excavation of four shovel tests, a controlled test pit, and an unprovenienced collection of surface artifacts. Findings made in the shovel tests were not encouraging. There was little observed in the subsurface to warrant test pitting. Test Pit 1 was located adjacent to a gully where a cluster of flakes, many of them apparently from the same core, was found eroding out of the gully wall. Examination of the wall profile revealed *in situ* flakes 50 to 60 cm below the surface. This suggested buried, intact deposits. Test Pit 1, placed in less eroded ground to the north of the gully, was meant to sample this buried material.

Test Pit 1 was excavated to a depth of 60 cm below the surface (six 10-cm-thick levels). The soil was described as dark grayish brown clay loam down into Level 4 (30 to 40 cm). In Level 4, a light tannish brown sandy clay appeared. It contained numerous stream-rolled pebbles. Very little cultural debris was recovered from Levels 5 and 6. The debris recovery summarized below came from Levels 1-4 excavated from the unit. Rates of recovery for selected classes of debris from Test Pit 1 are as follows:

All Levels Combined

Tuff Weight (grams)	0.6
Sandstone Weight (grams)	9
Fire-Fractured Rock Weight (grams)	157
Mussel Shell Umbo Count	1
Mussel Shell Weight (grams)	3
Rabdotus Shell Count	21
Bone Weight (grams)	0
Primary Flake Count	3
Secondary Flake Count	11
Tertiary Flake Count	7
Chip Count	16

Test Pit 1 also yielded two chert cores (one, Group 1; one, Group 5) from Levels 3 and 5.

Other artifacts recovered from the surface of 41 LK 142 were two cores (two, Group 2), one thick biface (Group 1), and nine thin bifaces (one, Group 2, Form 1; one, Group 2, Form 2; one, Group 3, Form 1; one, Group 4, Form 3; three, Group 4, Form 4; two, Group 9). The large, unstemmed thin bifaces predominating in this collection indicate that 41 LK 142 was occupied by human groups during Middle Archaic and/or Late Archaic times. The test pit findings and the surface artifact scatter suggest that this particular site was not as intensively inhabited as were some of the others. Material yields from the test pit were quite low. The Phase II work at 41 LK 142 provides no new insights into Archaic lifeways at Choke Canyon.

41 LK 145

Site 41 LK 145 is located in the upper reaches of one of the major tributary channels about 5 km north of the Frio River (Fig. 1, folded insert). The site is on the right (west) bank of the drainage. Its surface is covered with brush species such as soapbush, whitebrush, spiny hackberry, mesquite, agarita, prickly pear, and some native grasses. The Texas Tech survey crew estimated site dimensions to be 10 x 60 m, with the long axis running north-south. Cutbanks about 1.5 m in height parallel each side of the drainage. Prehistoric cultural debris was observed eroding from the face of the cutbank on the west side. The debris consists of small amounts of chert cores, debitage, and fire-fractured rock. During Phase II investigations, the CAR crew reinspected the site surface and dug two shovel tests into the subsurface. Little cultural debris was recognized in these tests. The only artifact collected from the site was a chert core (Group 4). The findings suggest that 41 LK 145 functioned primarily as a source of raw material for

chipped stone tool manufacture. Numerous cobbles are exposed in the vicinity, mainly along the eroded drainage channel. The period of activity by prehistoric people is not apparent from the remains visible on the site.

SITE GROUP 3

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
	41 LK 185		41 LK 191	41 LK 239
			41 LK 162	41 LK 190
			41 LK 181	41 LK 158
			41 LK 182	41 LK 180
			41 LK 176	41 LK 241
			41 LK 174	41 LK 170
			41 LK 173	41 LK 234

The 15 prehistoric sites making up Site Group 3 are located along the southern margin of the Frio River valley from 1.0 to 7.0 km west (upstream) of the southern end of Choke Canyon Dam. The area containing the site group incorporates two major landform features. Seven of the sites are located on the slope or leading edge of the valley wall. This valley margin is formed by old, high alluvial terraces that are draped over the tuffaceous Catahoula Formation. Outcrops of the Catahoula Formation occur in the site group area, but are not nearly as prominent as on the north side of the valley. Through thousands of years the ancient terraces forming the valley wall have been eroded, and gravels, which settled out on the surface as lighter deposits, were carried away. The gravel forms a thick blanket over the crest and slopes of the valley wall. The gravelly, soil-poor slopes are thickly covered with brush, especially guajillo, blackbrush, mesquite, and prickly pear.

The other major landform feature in the Site Group 3 area is a broad expanse of the Frio River floodplain. Such areas have been referred to as "fossil" floodplains (Lynn, Fox, and O'Malley 1977:9) because they are composed of much older alluvial terrace deposits not frequently flooded by the modern river. Soils are thicker and richer down on the floodplain and support dense stands of mesquite, prickly pear, and other brush species. Also, because of the better soils and flatter terrain, there are parts of the floodplain in the Site Group 3 area that have been cleared for croplands or cattle pasturage.

Two minor upland drainage channels cut down from south to north across the site group area. Runoff is minimal as the divide between drainage basins of the Frio and Nueces Rivers is just a short distance south. A low-relief drainage channel trends from southwest to northeast across the floodplain. The concentration of sites recorded along this channel suggests that site visibility is highly dependent on where erosion has occurred down in the floodplain.

41 LK 239

Site 41 LK 239 is located on the crest and flanks of a valley margin hill overlooking the Frio River valley (Fig. 1, folded insert). The site was recorded by CAR surveyors in 1979. The surveyors defined roughly circular boundaries to the site. Prehistoric cultural debris is widely and lightly scattered over an area with a diameter of 400 to 600 m. The site surface is covered with lag gravels in a matrix of gray silt. Outcrops of Catahoula tuff also occur in the site area. The site is heavily covered with brush. Acacias, cenizo, mesquite, spiny hackberry, and native grasses are present.

CAR surveyors defined 41 LK 239 as a quarry site where prehistoric people were taking advantage of natural lag gravels as raw materials for manufacture of chipped stone tools. This assessment was based on observation of numerous chert cores and chert debitage (mostly primary and secondary flakes) on the site surface.

During Phase II investigations, the CAR crew resurveyed the surface of 41 LK 239. No time- or function-diagnostic artifacts were found. Inspection of erosional gullies cutting through the site revealed that the subsurface contained little or no prehistoric debris. Phase II findings only reconfirm the probable function of 41 LK 239 as a quarry. In the absence of time-diagnostic artifacts, it is impossible to suggest when prehistoric people were active at this location.

41 LK 190

A small site, 41 LK 190, is located a short distance down slope (west-northwest) from 41 LK 239 (Fig. 1, folded insert). The site is located at the foot of the valley wall as it meets the floodplain. A drainage channel cuts down from the upland just east of 41 LK 190. The channel has been dammed to form a stock tank. Recorded by Texas Tech surveyors, 41 LK 190 was noted to have dimensions of 41 x 60 m. The surface is heavily eroded and thickly covered with mesquite, cactus, and acacias. Site limits were defined by scatters of burned rock and chert debitage. The CAR crew returned to 41 LK 190 during the Phase II investigation. The site was reinspected, and two shovel tests were excavated. Prehistoric cultural debris in the form of chert cores and debitage, tuffaceous rock, and *Rabdotus* snail shells was observed to be scattered very lightly over the surface, especially in some cattle trails that meandered across the site. No time- or function-diagnostic artifacts were found, and the shovel tests indicated that controlled subsurface excavations would not be productive.

41 LK 191

Located at the juncture of the valley margin slope with the floodplain like 41 LK 190, site 41 LK 191 was recorded by the Texas Tech surveyors as having dimensions of 25 x 220 m (Fig. 1, folded insert). The site surface was moderately eroded and partially covered with brush such as blackbrush, mesquite, guajillo, and cactus. Modern-day slope terracing caused extensive disturbance north to south down the length of the site. The site was defined

by the distribution of burned rock, chert debitage, chipped stone tools, mussel shells, and snail shells across its surface. Artifacts observed at 41 LK 191 by the Texas Tech crew included a distally beveled biface, one "large thin biface," and one "small tear-shaped biface." These specimens suggested that the site had been occupied in Middle Archaic and/or Late Archaic times.

Returning to 41 LK 191 for Phase II investigation, the CAR crew resurveyed the site, dug five shovel tests, documented some features eroding from the site, and made an unprovenienced collection of surface artifacts. Disturbance caused by construction of a terrace across the site was again noted. Artifacts were exposed most noticeably in the area of the terrace and along a field road running through a portion of the site. Four badly eroded and scattered tuffaceous rock hearths were observed along this road. One hearth was selected for complete exposure. As found, only four pieces of tuffaceous rock were visible on the surface. Excavation in and around these rocks revealed a circular, single layer cluster of approximately 30 tuffaceous rocks. The rock cluster had a diameter of 50 cm. Individual stones averaged about 10 cm in diameter. Away from (east of) the roadbed, buried portions of the feature were as much as 35 cm below ground. About 40 **Rabdotus** snail shells were recovered from the matrix. Otherwise, no artifacts were found as the feature was cleared. No carbon was noted in this rock cluster.

The five shovel tests excavated at 41 LK 191 went down 65 to 75 cm below the surface. They revealed a matrix characterized as a dark gray silty loam down to 50 cm below the surface, a gray silty loam from 50 to 70 cm below, and a light gray silty loam below 70 cm. In all shovel tests, the matrix was described as very fine and loose, and **Rabdotus** snail shells were very common. Only small amounts of cultural debris--mostly chert debitage and tuff--were recovered. Though the shovel tests revealed that 41 LK 191 holds a limited amount of potentially useful subsurface data, the allocation of further effort at the site was not judged as important as other Phase II excavation priorities at Choke Canyon. No further investigations were attempted.

Artifacts collected from the surface of 41 LK 191 were two cores (Group 1), six thin bifaces (one, Group 2, Form 1; three, Group 9; and two, Group 10), one distally beveled tool (Group 8, Form 1), and one piece of modified sandstone (Group 1, Form 3). As time-diagnostics, these artifacts confirm human activity on the site in the Middle Archaic and/or Late Archaic periods. With respect to subsistence pursuits of the prehistoric inhabitants, two things are noteworthy. First, there is relatively little mussel shell in evidence, but there are numerous **Rabdotus** snail shells. Usually, these two types of shell occur in more equal proportions relative to one another. Second, a grinding slab fragment (modified sandstone Group 1, Form 3) was found at 41 LK 191. This artifact suggests that prehistoric people may have processed seed, nut, or bean foods while inhabiting the site. For whatever reason, evidence for such activity is uncommon in sites at the east end of the Choke Canyon study area.

41 LK 158

Site 41 LK 158 occurs on the northeast slope of a gentle hill out on the floodplain (Fig. 1, folded insert). It is about 2.5 km south of the Frio River and 0.8 km north of the valley margin. As recorded by the Texas Tech surveyors, 41 LK 158 measures 200 m northwest to southeast and is about 75 m in width. Described by the recorders as a very thin surface scatter of debitage and burned rock, the site is in a grass-covered pasture that was likely root plowed at sometime in the past. The Texas Tech crew noted that approximately 70% of the cultural debris visible on the surface was burned rock. They also found two biface fragments, one a distal piece and the other a **Tortugas** dart point.

Phase II investigation of 41 LK 158 by the CAR crew consisted of a resurvey of the site surface and excavation of a shovel test. At that time, no time- or function-diagnostic artifacts were found on the surface. No artifacts were collected. A shovel test excavated 60 cm into the subsurface revealed a light brown sandy loam containing small gravels, but no prehistoric cultural debris. No further work was done at 41 LK 158.

41 LK 162

Exposed by erosion and deflation along the bed of a dirt field road, 41 LK 162 has somewhat unusual dimensions of 5 x 125 m, its long axis is east-west along the road (Fig. 1, folded insert). The site occurs in an open pasture covered with grass. It is on the surface of an old terrace that slopes northwestward down into a shallow drainage that has been incised into the terrace. The site is evidenced by a light surface scatter of burned rock and chert debitage.

The CAR crew conducted an unprovenienced surface collection and excavated a series of 14 shovel tests during the Phase II investigation. The shovel tests were excavated to depths ranging from 30 to 60 cm. A dark brown sandy silt formed the subsurface deposit. These shovel tests revealed that the surface scatter accurately delimits the horizontal extent of cultural debris in subsurface deposits. The subsurface deposit was found to contain cultural debris in small amounts between the surface and a depth of 20 cm. Coupled with the probability that the area was root plowed, the low productivity of subsurface deposits indicated that excavation of controlled test pits would not be a worthwhile effort at 41 LK 162.

An unprovenienced collection of artifacts from the surface of 41 LK 162 yielded six chert cores (two, Group 5; four, Group 9), two thick bifaces (one, Group 7, Form 1; one, Group 7, Form 4), and five thin bifaces (one, Group 1, Form 3; one, Group 4, Form 4; three, Group 10). The stemmed thin biface (Group 1, Form 3, Specimen 36) is classified as a **Zavala** dart point. Habitation of the site during Middle Archaic and/or Late Archaic time is indicated.

41 LK 180

Site 41 LK 180 was recorded by the Texas Tech surveyors. It is situated midway up the slope marking the transition from floodplain to valley wall on the south side of the Frio River valley (Fig. 1, folded insert). The Texas Tech crew assigned dimensions of 60 x 130 m to 41 LK 180. They characterized the site as being "a moderate scatter of burned rock consisting mostly of fire-fractured rock and chipped stone materials." The surveyors also noted that 41 LK 180 yielded the first ground stone artifacts they had seen on the south side of the Frio River.

Returning to 41 LK 180, the CAR crew noted the brush cover and extensive erosion on the site surface. Mesquite, spiny hackberry, soapbush, prickly pear, and native grasses form a thick ground cover. In numerous small and large gullies cutting through the site, small amounts of prehistoric cultural debris were noted in profiles between the surface and a depth of 20 cm. Widely scattered surface debris consisting of chert debitage, tuffaceous rock, **Rabdotus** snail shells, and natural gravels and cobbles was noted. Two badly eroded and scattered tuffaceous stone hearths were seen. None of the ground stone artifacts reported by the Texas Tech crew could be relocated nor were any additional time- or function-diagnostic artifacts found. No shovel testing was done at 41 LK 180 because it was obvious from examining the walls of gullies running through the site that the subsurface contained no significant deposits of prehistoric cultural debris.

41 LK 181

Located down slope and a short distance north-northeast of 41 LK 180, 41 LK 181 was recorded by Texas Tech surveyors as having dimensions of 90 x 110 m (Fig. 1, folded insert). The site is covered with a moderately thick stand of brush including mesquite, spiny hackberry, prickly pear, and grasses. The surface is quite badly eroded with a number of small gullies running across the site. Prehistoric cultural debris observed on the surface was chert debitage, chert cores, fire-fractured rock, mussel shell fragments, **Rabdotus** snail shells, and a few chipped stone tools. Several badly scattered tuffaceous stone features were noted along and in the gullies on the site. The CAR crew collected two thin biface fragments from the site (one, Group 2, Form 2; and one, Group 4, Form 4). Ground stone fragments reported by the Texas Tech surveyors could not be relocated. Subsurface exposures revealed in the walls of gullies showed that minor amounts of debris were buried in the site, but that controlled testing would not be productive.

41 LK 182

Site 41 LK 182 is on a gentle hillside down on the floodplain and overlooks a drainage channel flowing north-south over the floodplain immediately to the west of the site (Fig. 1, folded insert). As recorded by the Texas Tech surveyors, 41 LK 182 is irregular in outline shape with dimensions of 150 x 200 m. The site was delimited on the basis of burned rock, chert debitage, mussel shell, and **Rabdotus** snail shell scattered over the surface.

Debris such as pieces of metal and sherds of crockery evidenced recent historic activity in the vicinity. The site surface is thickly covered with whitebrush, mesquite, acacias, cactus, and grasses.

During Phase II investigations, the CAR crew did an unprovenienced collection of surface artifacts and excavated four shovel tests at 41 LK 182. The shovel tests revealed a limited amount of prehistoric debris in the upper 20 cm of deposit at the north end of the site. The tests at the south end produced little or no subsurface debris. The matrix containing the site was a dark grayish brown sandy loam from the surface to a depth of 20 to 30 cm. Below, the matrix changed to a light tan sandy loam. Shovel test findings indicated that controlled excavation was not warranted.

Among the artifacts collected from the surface of 41 LK 182 by the CAR crew were three cores (one, Group 3; one, Group 6; one, Group 9), two thick bifaces (one, Group 2; one, Group 4), one thin biface (Group 10), two distally beveled tools (both Group 4), and one trimmed flake (Group 3, Form 5). The Group 4 distally beveled tools suggest that the site was inhabited during the Late Archaic.

41 LK 176

Much like 41 LK 182 in outline configuration, 41 LK 176 is located south of 41 LK 182 on the slope above (east of) the same upland drainage channel (Fig. 1, folded insert). Dimensions of 30 x 150 m were determined by the Texas Tech survey crew based on the distribution of a "wide and uniform scatter of burnt rock and chipped stone products and by-products." The site surface is covered with dense stands of whitebrush, mesquite, spiny hackberry, prickly pear, and grasses.

Phase II efforts by the CAR crew at 41 LK 176 consisted of a resurvey of the site, excavation of two shovel tests, and an unprovenienced collection of surface artifacts. A shovel test placed at the northwest end of the site was excavated to a depth of 50 cm; the entire deposit was a very dark grayish brown silty loam. Very small amounts of burned rock, debitage, and snail shells were noted. A second shovel test was located in the south-central area of the site. No cultural debris was found in this test. The single artifact collected at 41 LK 176 was a thin biface fragment (Group 9). Distally beveled tools and a sherd of aboriginal pottery found on this site by the Texas Tech surveyors indicate that it was inhabited in Middle Archaic and/or Late Archaic and Late Prehistoric times.

41 LK 185

Site 41 LK 185, evidenced by a surface scatter of chert debitage and burned rock, was located by the Texas Tech surveyors on a gentle hillside or terrace slope overlooking the channel of an intermittent upland drainage (Fig. 1, folded insert). The surveyors recognized the site as being oval in outline with dimensions of 40 x 60 m. The site surface is covered with mesquite, prickly pear, and native grasses (Fig. 15,f).

During Phase II investigations, the CAR crew excavated three shovel tests and three test pits at 41 LK 185. Locations of numerous artifacts found on the site surface were recorded on a plane table map. Shovel tests revealed that controlled test pits would likely yield useful information. Test Pits 1 and 3 were staked out near Shovel Tests 1 and 2.

Test Pit 1 was placed in the west-central area of 41 LK 185. Just north of the test pit location was a particularly heavy concentration of prehistoric cultural debris exposed in a deflated area. An apparently undeformed spot near the debris exposure was selected for the test pit. Test Pit 1 was excavated to a depth of 70 cm below the surface (seven 10-cm-thick levels). From the surface to a depth of 50 cm, the deposit was characterized as dark brown sandy clay loam. Matrix in Levels 6 and 7 was described as light brownish gray sandy loam. Debris recovered from this unit is divided into two horizon assemblages. Horizon 1 contains debris from Levels 1-3. Horizon 2 contains debris from Levels 4-7. Rates of recovery for selected classes of debris from Test Pit 1 are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	7	20
Sandstone Weight (grams)	8	3
Fire-Fractured Rock Weight (grams)	8	4
Mussel Shell Umbo Count	76	14
Mussel Shell Weight (grams)	29	8
Rabdotus Shell Count	189	77
Bone Weight (grams)	1	0
Primary Flake Count	0	0
Secondary Flake Count	6	6
Tertiary Flake Count	12	8
Chip Count	17	9

No additional artifacts were found in Test Pit 1.

Test Pit 2 was excavated to a depth of 50 cm below the surface in four vertical levels (the first was 20 cm thick). The matrix was a dark grayish brown sandy loam down to about 35 cm below the surface. At this elevation, the matrix color changed to brown sandy clay silt. In Level 4 (40 to 50 cm below surface), a yellowish brown silty clay was observed. Two concentrations of carbon, each 6 to 8 cm in diameter, were first defined at about 28 cm below the surface. The carbon concentrations were cross sectioned. Only about 3 cm thick, the carbon appears to have followed either rodent runs or root molds and, thus, was determined to be of modern origin and not related to prehistoric cultural activity on the site. The cross section also revealed that deposits were fairly recent, probably colluvial slope wash. Debris recovered from the five levels excavated in Test Pit 2 is presented as a single assemblage. No horizons were recognized. Rates of recovery for selected classes of debris from Test Pit 2 are as follows:

All Levels Combined

Tuff Weight (grams)	70
Sandstone Weight (grams)	5
Fire-Fractured Rock Weight (grams)	28
Mussel Shell Umbo Count	15
Mussel Shell Weight (grams)	3
<i>Rabdotus</i> Shell Count	45
Bone Weight (grams)	0
Primary Flake Count	1
Secondary Flake Count	14
Tertiary Flake Count	10
Chip Count	37

No additional artifacts were recovered from Test Pit 2.

Test Pit 3 at 41 LK 185 was located near the southeast end of the site, adjacent to an eroded animal trail in which some mussel shell and debitage were exposed. This unit is east of, and down slope from, Test Pit 2. Findings made in a shovel test excavated near the location selected for Test Pit 3 demonstrated the productive content of the subsurface. This unit was also excavated to a depth of 70 cm below the surface (seven 10-cm-thick levels). Down through Level 5 (50 cm below surface) the soil matrix was described as brownish gray sandy silty loam. In Level 6, the soil changed to a light yellowish tan loam with a high clay content. The debris recovered from Test Pit 3 is presented as two horizon assemblages with the same level groupings as in Test Pit 1 (see above). Recovery rates for selected classes of debris for these two horizons in Test Pit 3 are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	26	38
Sandstone Weight (grams)	0	19
Fire-Fractured Rock Weight (grams)	9	9
Mussel Shell Umbo Count	52	39
Mussel Shell Weight (grams)	11	14
<i>Rabdotus</i> Shell Count	73	112
Bone Weight (grams)	0	0
Primary Flake Count	1	1
Secondary Flake Count	4	8
Tertiary Flake Count	8	8
Chip Count	13	12

No other artifacts were recovered from Test Pit 3.

Numerous artifacts were collected from the surface of 41 LK 185. Using a plane table and alidade, locations of many of these specimens were plotted on a plan map now filed at the CAR-UTSA. The following artifacts were collected: eight cores (two, Group 1; one, Group 4; three, Group 5; one, Group 6; one, Group 9), three thick bifaces (one, Group 3; one, Group 7, Form 3; one, Group 7, Form 4), 16 thin bifaces (Group 1, Form 1, Specimen 8; Group 1, Form 3, Specimens 15 and 35; Group 1, Form 5, Specimen 21; one, Group 2, Form 1; one, Group 2, Form 2; one, Group 3, Form 1; one, Group 3,

Form 2; one, Group 4, Form 1; one, Group 4, Form 4; three, Group 9; three, Group 10), one distally beveled tool (Group 9), two pieces of modified sandstone (one, Group 2, Form 2; one, Group 3), one piece of modified quartzite, and two sherds of aboriginal pottery.

The variety of artifacts collected at 41 LK 185 indicates quite clearly that the site was inhabited during the Late Archaic and Late Prehistoric periods. Use of the site by Late Archaic peoples is evidenced by smaller stemmed dart points, one of which is typed Fairland (Group 1, Form 3, Specimen 15). A distally beveled tool (Group 9) and six forms of unstemmed thin bifaces (Groups 2, 3, and 4) are also probably related to Late Archaic inhabitants. Sherds of aboriginal pottery and a stemmed arrow point (thin bifaces Group 1, Form 5, Specimen 21) are specimens diagnostic of the Late Prehistoric. It is unfortunate that no time-diagnostic artifacts were recovered from the three controlled test excavations placed in the site. It is probably safe to assume, however, that the Late Prehistoric is represented by Horizon 1 materials, and the Late Archaic is represented by Horizon 2 materials in Test Pits 1 and 3. A comparison of horizon assemblages from these two units reveals no significant differences in material classes representing the two cultural periods.

41 LK 241

Site 41 LK 241 is a large, open prehistoric site recorded by the CAR survey crew in 1979. Located on a ridge on the southern valley margin, the site has dimensions of 600 m north-northeast to south-southwest and is about 200 m wide (Fig. 1, folded insert). The site surface is heavily covered in brush with guajillo, spiny hackberry, agarita, prickly pear, and soapbush all very common. Like much of the valley margin, the ridge upon which the site occurs is characterized by outcrops of Catahoula Formation tuff and extensive surface deposits of lag gravel. A thin mantle of gray silt is evident in some areas. Materials observed on the site by the CAR survey crew were large cortex flakes, numerous cores, 10 thick bifaces, and two distally beveled tools (Guadalupe and Clear Fork types). Also noted in the original survey was a buried cluster of tuffaceous rock exposed in a road cut along the new route of State Highway 72 around the southern margin of Choke Canyon Lake.

Reexamination of 41 LK 241 by the CAR crew during the Phase II investigation revealed that the site served primarily as a source of raw materials in the manufacture of chipped stone tools. A shovel test excavated in the north-central area of the site revealed the deposit to be a thin soil permeated with gravels and no prehistoric cultural debris. No additional artifacts were collected from this locality.

41 LK 174

Site 41 LK 174 is located down slope to the northwest of 41 LK 241 (Fig. 1, folded insert). It is on the slope of the valley margin. As recorded by Texas Tech surveyors, 41 LK 174 has an irregular outline shape with dimensions of 200 x 375 m. The surface is densely covered with prickly pear, acacias, mesquite trees, and whitebrush. Noted in the original survey were

two badly disturbed hearths, chert debitage, mussel shell, and *Rabdotus* snail shell. Distribution of these materials across the surface was used to define the site's limits.

Activities of the CAR crew at 41 LK 174 during Phase II investigations consisted of excavation of three shovel tests and an unprovenienced collection of surface artifacts. Shovel test results indicated that the site holds little or no potential for productive subsurface excavations. Artifacts collected from the surface were one thin biface fragment (Group 4, Form 4) and three pieces of modified sandstone (two, Group 2, Form 2; one, Group 3). These specimens do not permit definitive diagnosis of the period of cultural activity at 41 LK 174.

41 LK 173

Located west-northwest of 41 LK 174, 41 LK 173 is slightly farther down slope from the valley margin (Fig. 1, folded insert). This site was located and recorded by the Texas Tech survey crew. This crew defined an irregular subcircular outline shape for the site and estimated its dimensions to be 500 x 600 m. The surface is covered with brush, primarily whitebrush and prickly pear. Extensive surface deposits of lag gravel and the presence of numerous cortex flakes led to definition of 41 LK 173 as a quarry site.

Revisiting 41 LK 173 during Phase II investigations, the CAR crew concurred with the Texas Tech assessment that the site had functioned primarily as a quarry. The crew noted the gravel pavement and primary reduction flakes. No mussel shell, fire-fractured rock, or rock clusters--all considered to be signs of habitational activity--were seen. Activities on the site consisted of shovel testing and an unprovenienced collection of surface artifacts. The three shovel tests excavated in the site revealed that its deposits are extremely shallow and contain almost no prehistoric cultural debris. Artifacts collected from the surface were two cores (one, Group 1; one, Group 3), five thick bifaces (three, Group 1; one, Group 3; one, Group 7, Form 1), and one thin biface fragment (Group 4, Form 3). The cultural/chronological period(s) during which prehistoric activity occurred at 41 LK 173 is not evident from these remains.

41 LK 170

Situated on the floodplain about 2 km north of the valley margin and 1.5 km south of the Frio River, 41 LK 170 is a tiny site recorded by the Texas Tech crew (Fig. 1, folded insert). It consists of a small hearth eroding from a dirt road and a very light scatter of burned tuffaceous rock occurring over an area 20 x 40 m. The site surface supports a moderately thick stand of huisache, spiny hackberry, soapbush, mesquite, and various weeds and grasses. During Phase II field work, the CAR crew excavated two shovel tests at 41 LK 170. The subsurface yielded an insignificant amount of cultural debris, and controlled testing did not appear to be warranted. Careful examination of the site surface revealed no time- or function-diagnostic artifacts.

41 LK 234

Site 41 LK 234 is a prehistoric site located along the western side of an intermittent drainage channel out on the floodplain (Fig. 1, folded insert). Recorded by surveyors from the CAR-UTSA, this site was defined as being roughly circular in outline shape with a diameter of 60 m. The site is evidenced by a relatively heavy scatter of debitage, burned rock, and mussel and *Rabdotus* snail shells on a slight rise covered with grass, weeds, and retama. In the original survey, artifacts including an *Ensor* dart point fragment, a hammerstone, chert cores, and some other thin biface fragments were noted. Returning to the site for Phase II work, the CAR crew was unable to relocate these specimens. It is speculated that artifact collectors hit the site sometime between when it was recorded and when the Phase II investigation occurred. In five shovel tests excavated by the CAR crew, variable observations were made. One shovel test yielded evidence of substantial prehistoric cultural debris in the upper 20 cm of deposit. The other four tests showed little or no debris occurring over the remainder of the site. The site is located in a cleared pasture, and it is assumed that brush clearing and root plowing took place in the vicinity. For this reason, no controlled testing was attempted.

SITE GROUP 4

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
41 LK 14				41 LK 236
41 LK 74				

The three sites making up Group 4 are situated on the south side of the Frio River between 5 and 8 km west of Choke Canyon Dam (Fig. 1, folded insert). Two of the three sites, 41 LK 14 and 41 LK 74, rest on high, sandy terrace remnants that are relatively close to the modern Frio River, but are nevertheless considerably older than the active terrace systems immediately alongside the river. The river meanders quite extensively in its course between 41 LK 74 and 41 LK 14 (Fig. 1, folded insert). Although far apart, these two sites rest on the same terrace system at elevations of 160 feet to 180 feet above mean sea level. The leading edge of this old terrace system arcs in a southeasterly direction away from 41 LK 74, where it is immediately above the Frio River, trends as much as 1 km away from (south of) the river, then swings back to the northeast where it is again close to the river in the vicinity of 41 LK 14. The face or slope of this old terrace as it leads down to the active floodplain is heavily eroded. Two major upland drainage channels cut down from higher reaches of the floodplain to the south. Lateral erosion along these drainages has extensively altered the configuration of the terrace system.

The land encompassing Site Group 4 supports heavy stands of brush or riparian forest in some areas and elsewhere has been cleared for use as pasture or

cropland. Site 41 LK 74 occurs in a brushy area while 41 LK 14 is mostly within a cultivated field. Situated immediately alongside the modern channel of the Frio River, 41 LK 236 is partially within a cleared, grass-covered pasture. A fringe of riparian forest grows along its other side.

41 LK 14

Recorded in 1970 by members of the Coastal Bend Archeological Society (CBAS), 41 LK 14 occurs on a Pleistocene terrace remnant forming a distinct rise overlooking the channel and active floodplain of the Frio River (Figs. 1, folded insert; 17). Based on the distribution of prehistoric cultural debris on the surface, dimensions of this site are set at 200 m north-south and 180 m east-west. The river is downhill and approximately 200 m north of the site. A substantial deposit of gravel and cobbles occurs in the river channel just below the site. Much of this gravel probably originated from within the old terrace, gradually being washed out and reworked through hundreds of years. The central and western two-thirds of 41 LK 14 are located in a cultivated field that had gone into disuse at the time of Phase II investigations. On the site's northern slope and over much of its eastern end were mesquite trees, whitebrush, spiny hackberry, narrow leaf yucca, elm trees, and prickly pear (Fig. 21,a). A strip of brush was in the otherwise cleared central part of the site. At the north end of the brush strip was a large, circular water cistern that once supplied water to cattle. Shortly after Phase II work was completed, this cistern and all vegetation were removed. At the foot of the terrace below the site began the riparian forest that grew on the river's first terrace. This, too, was cleared shortly after archaeological excavations were completed.

Site 41 LK 14 was tested by surveyors from the Texas Historical Commission (THC), who excavated a 1-m² unit 80 cm down into the site (Lynn, Fox, and O'Malley 1977:143-149). Chert cores and debitage and fire-fractured rock were recovered from the test pit. No time- or function-diagnostic artifacts were found in the test pit. However, based on numerous artifacts collected by CBAS and THC surveyors from the surface of 41 LK 14, it was apparent that the site was occupied during the Paleo-Indian, Archaic, and Late Prehistoric periods (*ibid.*:149). Findings made by the THC researchers led to the following conclusion:

Considering the shallow nature of the archeological deposits, it is possible that the relatively dense concentration of cultural materials at Site 41 LK 14 represents numerous reoccupations of the site over a long time span. For this reason, in future archeological investigations it probably will be difficult to isolate occupational evidence precisely in space and time. However, data concerning site function and frequency of occupation within general cultural/chronological periods could be recovered which would be useful in intersite comparisons (Lynn, Fox, and O'Malley 1977:149).

In Phase I investigations, the CAR crew excavated four 1-m² test pits at 41 LK 14 (Hall, Black, and Graves 1982:104-110). The following observations were made:

The findings made during the CAR investigation at 41 LK 14 support the THC analysts' suggestion that the site was occupied from Paleo-Indian through Late Prehistoric times. Early activity is evidenced by the *Angostura* specimen and at least two of the distally beveled tools, including Clear Fork and Guadalupe tools. The other distally beveled tools and a wide array of thin bifaces, some stemmed and many unstemmed, appear to represent the entire time span of the Archaic. Late Prehistoric activity is demonstrated by the presence of arrow points and aboriginal pottery on the site. Testing revealed a substantial deposit of prehistoric debris in the subsurface, but few recognized time-diagnostic tools were found in controlled excavations. The vast majority came from the surface, suggesting that the deposits have undergone considerable disturbance (*ibid.*:110).

The Phase I findings also evidenced heavy usage of mussels, snails, and some fish (drum) by the prehistoric inhabitants of 41 LK 14. Plant food processing was also inferred from the relatively numerous grinding slab (metate) fragments found on the surface. Materials recovered from the test pits were divided into two horizon assemblages. The upper horizon, consisting of debris recovered from Levels 1-4 (surface to a depth of 40 cm), was suggested to represent the span from Middle Archaic to Late Prehistoric times. The lower horizon (Levels 5-7 or 9) was suggested to contain debris representing the Late Paleo-Indian and/or Early Archaic periods (Hall, Black, and Graves 1982:110). It was the potential for isolation of intact Paleo-Indian and/or Early Archaic components in the subsurface of 41 LK 14 that led to the site being recommended for Phase II investigation (Center for Archaeological Research 1979:16-17).

The Phase II archaeological investigation at 41 LK 14 was conducted in May and June 1981. During 11 work days, 10 crew members labored a total of 600 person hours at the site. Activities at the site were excavation of unit blocks in two areas, feature and profile recording, and plan mapping.

Horizontal control was established on the surface of 41 LK 14 by setting an east-west baseline running through the central area of the site. A nail driven into the trunk of a mesquite tree just north of the Area A excavation served as the vertical datum. USBR surveyors later calculated an elevation of 182.964 feet above MSL for this nail. They also placed a permanent site marker at the N1014 E1000 grid mark (Figs. 17; 18). Its exact location, expressed in Modified Texas State Plane Coordinates, was recorded.

A group of nine 1-m² units forming a 3 x 3-m² excavation pit was staked out at a location immediately northwest of the spot where Test Pit 1 was placed in Phase I investigations (Fig. 18). The pit formed by these nine units was designated Area A. This location was selected for two reasons. First, the test excavated nearby had shown that prehistoric debris was present in substantial amounts in the subsurface. Second, the general area had not been cleared of brush and cultivated as had the rest of the site. Thus, there was the opportunity for sampling deposits that had not been disturbed by root plowing and subsequent agricultural practices.

41LK14

PLAN OF EXCAVATIONS

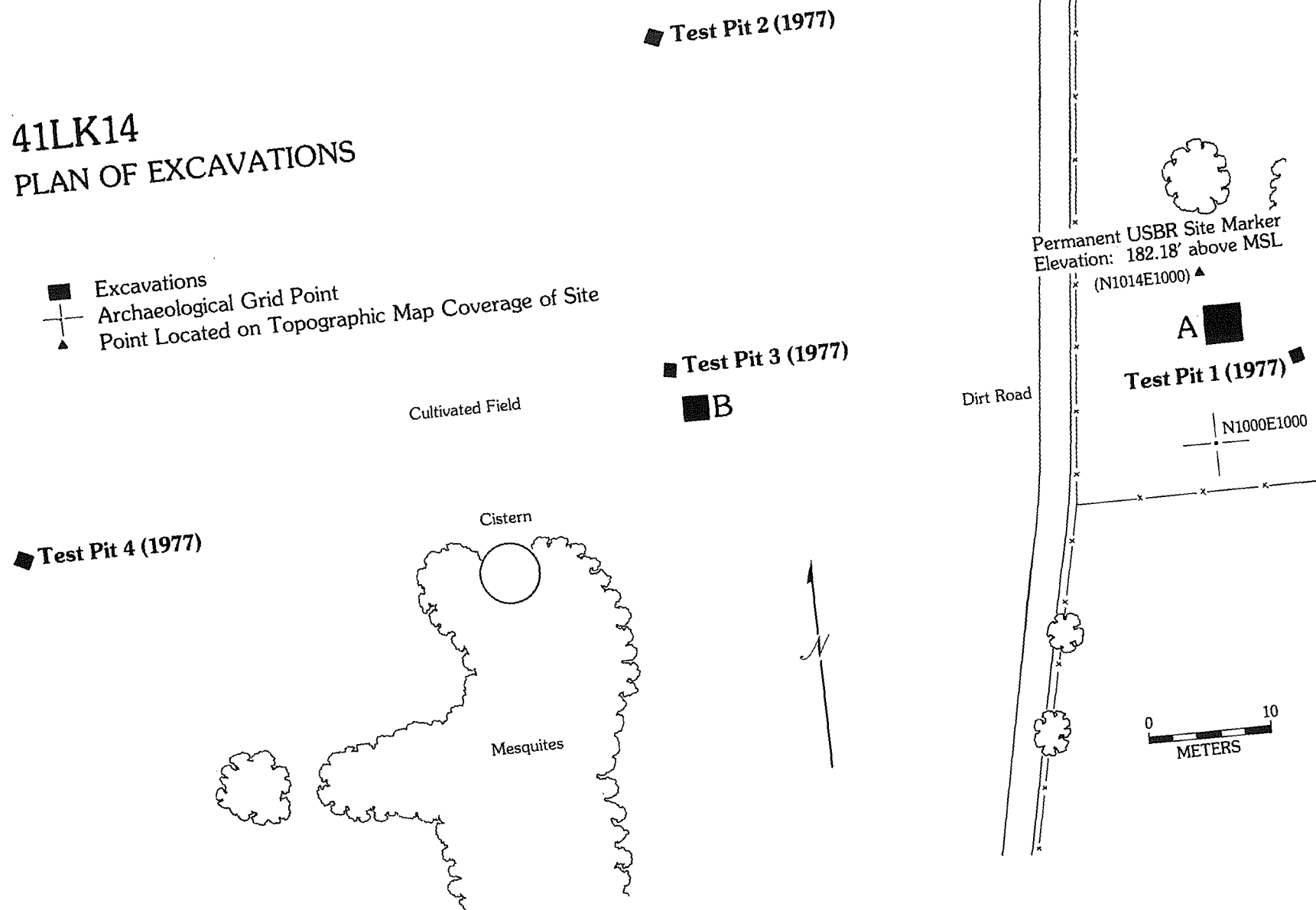


Figure 18. Plan of Excavations at 41 LK 14.

The units comprising Area A at 41 LK 14 were excavated in arbitrary 10-cm-thick vertical levels. The nine units and the number of levels excavated at each are as follows: N1008 E1000 (11 levels), N1008 E1001 (nine levels), N1008 E1002 (nine levels), N1009 E1000 (nine levels), N1009 E1001 (nine levels), N1009 E1002 (nine levels), N1010 E1000 (11 levels), N1010 E1001 (nine levels), N1010 E1002 (nine levels). Surface elevations in these units ranged from 99.71 to 99.77 m. Debris recovered from the Area A units is presented as two horizon assemblages. Horizon 1 contains all debris from Levels 1-5 in the nine units. Horizon 2 contains debris recovered from Levels 6-9 or 11. Rates of recovery for selected classes of debris from each horizon in Area A are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	639	859
Sandstone Weight (grams)	284	62
Fire-Fractured Rock Weight (grams)	2940	2821
Mussel Shell Umbo Count	1236	499
Mussel Shell Weight (grams)	617	181
<i>Rabdotus</i> Shell Count	3873	2308
Bone Weight (grams)	0.5	0.4
Primary Flake Count	29	9
Secondary Flake Count	327	175
Tertiary Flake Count	487	374
Chip Count	720	423

Additional artifacts recovered from the Area A excavations are listed below:

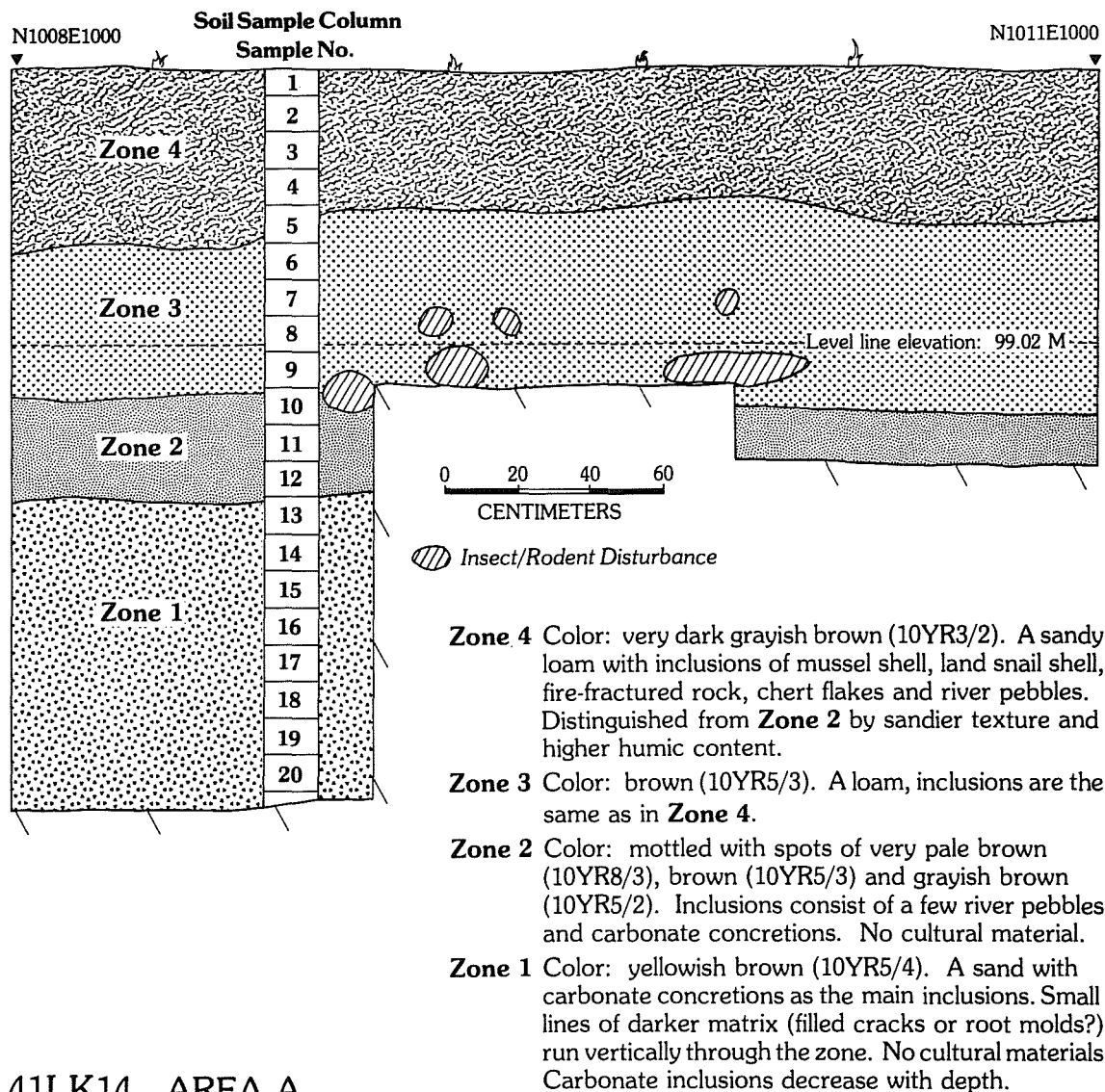
Group	Form	Specimen	Category	Horizon 1	Horizon 2
1	-	-	Cores	1	0
2	-	-	Cores	0	1
3	-	-	Cores	2	0
5	-	-	Cores	3	4
6	-	-	Cores	4	0
2	1	1	Thin Bifaces	1	0
2	2	13	Thin Bifaces	1	0
3	2	1	Thin Bifaces	0	1
4	1	2	Thin Bifaces	1	0
4	4	147	Thin Bifaces	1	0
9	-	-	Thin Bifaces	1	0
10	-	-	Thin Bifaces	4	5
-	-	2	Hammerstones	1	0
1	3	-	Modified Sandstone	0	1
2	1	-	Modified Sandstone	1	0
2	2	-	Modified Sandstone	1	0
2	3	-	Modified Sandstone	0	1
3	-	-	Modified Sandstone	0	1
-	-	-	Satin Spar Gypsum	0	1

One habitational feature was defined in the Area A excavation at 41 LK 14. Designated Feature 1, a concentration of burned rock was isolated in Level 6 (99.30-99.20) of Units N1008 E1000 and N1008 E1001. Approximately 50 stones (40 pieces of fire-fractured rock and 10 pieces of sandstone) were arranged in a roughly oval-shaped cluster with maximum dimensions of 1 m northeast to southwest and 45 cm northwest to southeast. The feature is essentially a single-layer construct with the difference in elevation between the bottom of the lowest rock and top of the highest being from 6 to 7.5 cm. The rocks averaged about 4 x 4 cm in size. Numerous very small spalls of fire-fractured rock were noted mixed in with the larger stones. Three large pieces of mussel shell and numerous smaller pieces were noted amidst the rock. *Rabdotus* snail shells, chert debitage, and pea gravels were also observed. No carbon was found in Feature 1.

Soil zonation encountered in the Area A excavation is illustrated and described in Figures 19 and 21,b. Prehistoric cultural debris was confined for the most part to Zones 3 and 4 composing the upper 90 cm of deposit on the site. Zones 1 and 2 were sterile. Also shown in Figure 19 is the location of a soil sample column. Soil samples were taken at 10-cm intervals from surface to the bottom of the excavation. These samples are curated at the CAR-UTSA and are intended to serve as a permanent record of preinundation soil character.

The Area B excavation at 41 LK 14 was composed of four 1-m² units forming a 2-m² block. Located in the central area of the site, Area B was located on the basis of findings made in Test Pit 3 immediately to the north (Fig. 18). Artifacts recovered from this test pit, as well as from the surface in the immediate vicinity, indicated that Late Prehistoric activity had been particularly intense in this part of the site. Area B was meant to sample this Late Prehistoric component as well as deeper, older components. The four units in Area B and the number of levels excavated at each are as follows: N1006 E958 (eight levels), N1006 E959 (eight levels), N1007 E958 (eight levels), N1007 E959 (eight levels). Surface elevations for the units ranged from 100.26 to 100.29 m. Debris recovered as Area B was excavated is divided into two assemblages. Horizon 1 contains debris recovered from Levels 1-4 in all four units. Horizon 2 represents the debris from Levels 5-8. Rates of recovery for selected classes of debris for Area B horizons are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	191	249
Sandstone Weight (grams)	150	248
Fire-Fractured Rock Weight (grams)	1146	1280
Mussel Shell Umbo Count	446	183
Mussel Shell Weight (grams)	351	84
<i>Rabdotus</i> Shell Count	302	637
Bone Weight (grams)	1.5	0.6
Primary Flake Count	7	12
Secondary Flake Count	185	181
Tertiary Flake Count	295	330
Chip Count	602	508



41LK14 AREA A
 PROFILE SKETCH ALONG E1000 LINE
 FROM N1008 TO N1011

Figure 19. Profile Sketch Along E1000 Line from N1008 to N1011 at 41 LK 14, Area A.

Additional artifacts recovered from the Area B excavations are listed below:

Group	Form	Specimen	Category	Horizon 1	Horizon 2
1	-	-	Cores	2	1
2	-	-	Cores	3	1
3	-	-	Cores	1	0
5	-	-	Cores	1	1
6	-	-	Cores	4	3
2	-	-	Thin Bifaces	1	0
1	4	55 Perdiz	Thin Bifaces	1	0
3	2	11	Thin Bifaces	0	1
4	4	94	Thin Bifaces	1	0
10	-	-	Thin Bifaces	2	0
-	-	1	Hammerstones	1	0
-	-	3	Marine Shell	1	0
-	-	-	Aboriginal Ceramics	21	0

No habitational features were encountered in Area B.

Soil zones recognized in the wall profiles of Area B are illustrated in Figure 20. More zones were defined in Area B than Area A, probably because Area B was located in a part of the site that had been cultivated for a number of years. Zone 6 is a plow zone, and Zone 5 may also be a product of soil cultivation. The location of a soil sample column is also shown in Figure 20. Samples collected from this column are curated at the CAR-UTSA.

Additional artifacts include 58 core fragments (core Group 9) and two cobbles (Group 10). Most of these specimens were recovered in excavations, but provenience is not provided.

The following specimens were collected from the surface of 41 LK 14. Locations of most of these specimens are plotted on a plan map filed at the CAR-UTSA.

Cores: one, Group 2; one, Group 7.

Thick Bifaces: one, Group 1; one, Group 6, Form 2.

Thin Bifaces: Group 1, Form 1, Specimen 6; Group 1, Form 3, Specimen 22; Group 1, Form 5, Specimen 1 (**Scallorn** arrow points); two, Group 2, Form 1; one, Group 2, Form 2; four, Group 4, Form 4; one, Group 5; four, Group 9; three, Group 10.

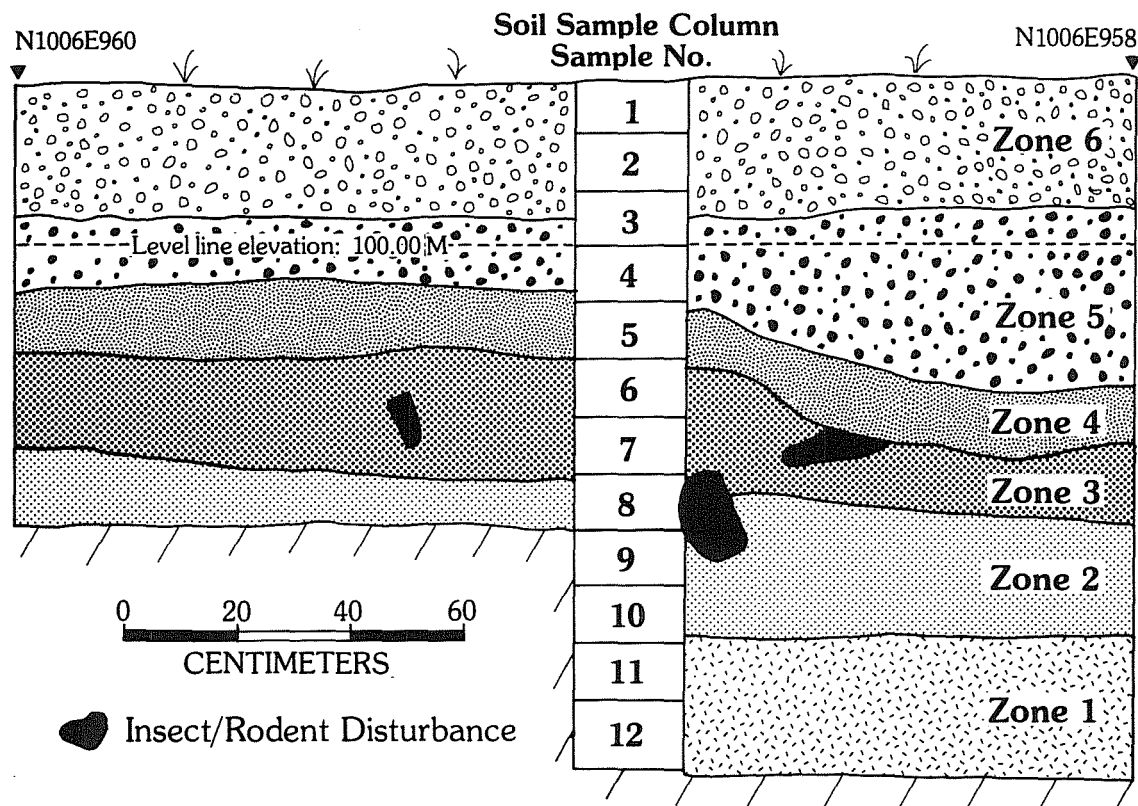
Distally Beveled Tools: one, Group 2, Form 1; one, Group 3, Form 2; one, Group 4.

Uniface: one, Group 1.

The assemblage of artifacts recovered during Phase II archaeological investigations at 41 LK 14 again demonstrates that the locality attracted human settlers through thousands of years of prehistory. The total artifact

41LK14

PROFILE SKETCH ALONG N1006 LINE FROM E958 TO E960



Zone 6 Color: very dark grayish brown (10YR3/2). A plow zone in fine sandy loam containing broken mussel shell, fire-fractured rock, pebbles, carbon flecks, and chert flakes.

Zone 5 Same as **Zone 6**, but below plow zone.

Zone 4 Color: dark grayish brown (10YR4/2). A sandy loam containing more fire-fractured rocks and less mussel and snail shell than zones above.

Zone 3 Color: dark brown (10YR4/3). A loam constituting the transition between A and B horizons. Cultural material present in disturbed areas only.

Zone 2 Color: yellowish brown (10YR5/4). A clay loam with inclusions of river pebbles and sand. No cultural material.

Zone 1 Color: mottled from white to light yellowish brown (10YR8/2-10YR6/4). A clay loam streaked with calcium carbonate. No cultural material.

Figure 20. Profile Sketch Along N1006 Line from E958 to E960 at 41 LK 14, Area B.

assemblage recovered during all phases of archaeological research at the site constitutes one of the more remarkable and outstanding single site collections known in the region. With benefit of knowledge gained through broader subsurface probing accomplished during Phase II excavations, it appears that the rich and varied assemblage of artifacts collected from the surface will be the site's major contribution to the study of regional prehistory.

The Phase II excavations at 41 LK 14 did not, as was hoped, result in definition of Paleo-Indian or Early Archaic components in the subsurface. An intact, relatively well-integrated habitational feature was found in the lower reaches of the deposit, but associated chipped stone tools do not permit a temporal assignment, other than to say it was likely constructed sometime during the lengthy Archaic period. The contrast between the numerous and varied diagnostic artifacts found on the surface of 41 LK 14 and the meager assemblage recovered from the excavations is characteristic of many sites at Choke Canyon. Because of this, attempts at dating cultural remains by comparative means are often frustrated. Further, the one feature isolated at 41 LK 14 contained no carbon that might have been used for age determination through radiocarbon assay.

Several general observations are possible based on analysis of debris recovered from the Phase II excavations at 41 LK 14. First, fire-fractured rock is by far the most common nonartifactual stone in the deposits. This clearly indicates that gravel deposits existed near the site in prehistoric times just as they now occur in the river channel below the site. Cobbles from this source were the most available form of stone for use in hearth construction. Much less common at 41 LK 14 is sandstone derived from the Jackson Group to the west, and tuffaceous siltstone (tuffaceous rock) from the Catahoula Formation to the east.

The gravel deposits near 41 LK 14 further served prehistoric inhabitants of the site as a source of raw materials for stone tool manufacture. The numbers of cores and core fragments, of thin biface fragments, and the quantities of debitage revealed in the excavations evidence the importance of tool making as an activity on the site.

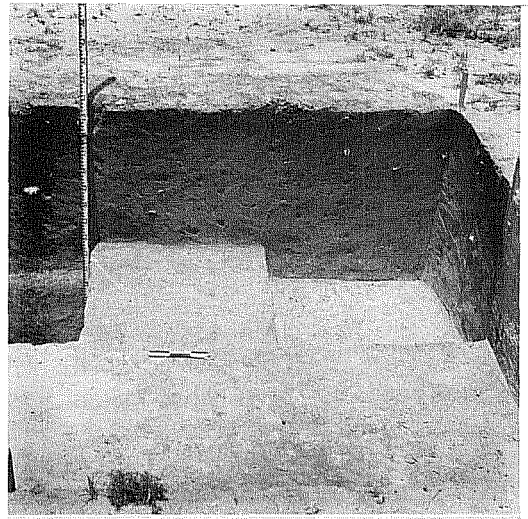
Mussell shells, *Rabdotus* snail shells, a small amount of animal bone, and sandstone grinding tools (manos and metate fragments) are believed to be remnants or indications of food items consumed by prehistoric people as they camped at 41 LK 14. In both the Area A and Area B excavations, Horizon 1 yielded more than double the number of mussel shell umbos as did Horizon 2. In Area A, *Rabdotus* snail shells were more common in Horizon 1 than Horizon 2. The opposite was true in Area B. The small quantities of animal bone found in each area demonstrate that vertebrate meat foods were being brought to the camp. The soils at 41 LK 14 are apparently not conducive to preservation of bone. It is suggested that the small amount of bone recovered is only a fraction of what may have been left by the prehistoric inhabitants. Modified sandstone artifacts in the form of a grinding slab fragment (metate) and three manos were collected on the site. These tools suggest that seeds and/or nuts may have been processed for food. Thus, the evidence for prehistoric subsistence pursuits yielded by 41 LK 14 deposits is not much different from most other sites in the area.

Figure 21. Phase II Investigations at 41 LK 14 and 41 LK 51.

- a, view looking north across 41 LK 14. The crew members are working in the 3 x 3-m pit designated Area A;
- b, the west wall of Area A, a 3 x 3-m excavation, along the E1000 line from N1008 to N1011 at 41 LK 14;
- c, a view looking west-southwest across the Area A excavations at 41 LK 51;
- d, the Area A excavations in progress at 41 LK 51, looking west;
- e, Feature 6 in Level 12 (98.70-99.60) of Unit N998 E981 at 41 LK 51;
- f, detail of carbonized wood in Level 15 (98.40-98.30) of Unit N998 E982 at 41 LK 51. Identified as either *Acacia* or *Prosopis*, a portion of this carbon was submitted for radiocarbon assay. The assays yielded ages ranging from 5130 B.C. (TX-4690) to 4450 B.C. (TX-4691).



a



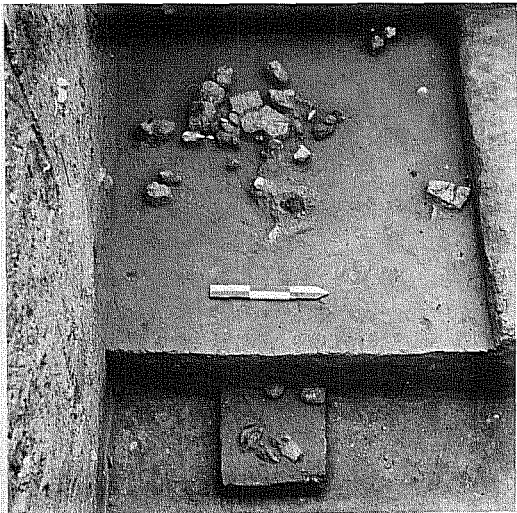
b



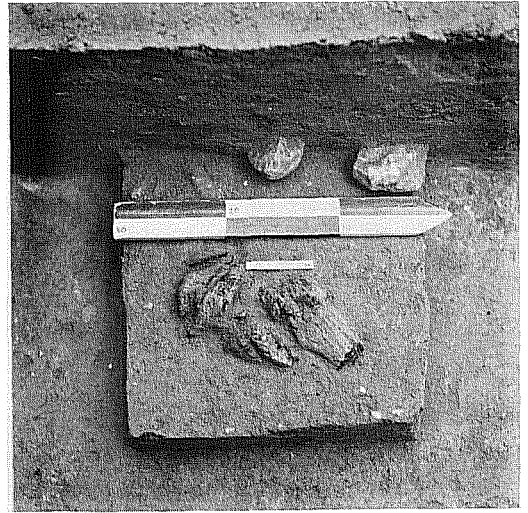
c



d



e



f

With the failure to isolate recognizable components of the Paleo-Indian or Early Archaic periods in its subsurface deposits, the major contribution resulting from the investigation at 41 LK 14 would be the artifact assemblage that demonstrates human habitation of the site through virtually the entire span of the region's prehistory. More generally, the Phase II research at 41 LK 14 has shown that old terraces of the type containing 41 LK 14 are not good locations for subsurface excavations.

41 LK 74

Like 41 LK 14, site 41 LK 74 occurs on an old terrace remnant overlooking the Frio River on its south side (Figs. 1, folded insert; 22). Recorded by archaeologists from the Texas Historical Commission, the site has dimensions of about 300 m northwest to southeast and is 150 m in width. The outline shape of 41 LK 74 is very irregular (Fig. 23). Erosion along the slope of the terrace upon which the site rests has formed two lobes which project a short distance out from the general line of the terrace system. Prehistoric cultural debris such as fire-fractured rock, debitage, and mussel shell is concentrated on the crests of these terrace lobes. Mesquite, narrow leaf yucca, Spanish dagger, persimmon, spiny hackberry, whitebrush, and guayacan are components of the moderate to dense brush cover over much of the site.

THC analysts listed 41 LK 74 as containing Pre-Archaic to Terminal Archaic components (Lynn, Fox, and O'Malley 1977:44). The CAR crew excavated four 1-m² test pits on the site during Phase I investigations. A surface artifact collection was also made (Hall, Black, and Graves 1982:144-148). The test excavations revealed that deposits bearing cultural debris extended down from 40 to 60 cm below the surface. Debris recovered consisted primarily of burned rock, mussel shell, and debitage. Diagnostic chipped stone artifacts recovered from the test pits and collected from the surface tended to verify the time span of prehistoric activity proposed for the site by the THC archaeologists. Like 41 LK 14, 41 LK 74 was selected for extensive excavation during Phase II investigations because it had the potential for yielding more information about earlier periods in the prehistoric cultural sequence.

In late May and early June of 1981, excavations were conducted at 41 LK 74 by the CAR crew and members of the Texas Archeological Society (TAS) who were participating in the TAS Summer Field School. Twenty-eight people (eight CAR crew members and 20 TAS workers) worked for 11 days at 41 LK 74, this effort resulted in an expenditure of 580 person hours on the site investigation.

An excavation grid was laid out on the surface of 41 LK 74. A nail driven into a tree trunk served as the vertical datum. USBR surveyors later calculated a true elevation of 198.133 feet above MSL for the archaeological datum nail. They also replaced a Phase I CAR site marker with a permanent marker and determined its exact location, expressed in Modified Texas State Plane Coordinates.

Phase II excavations at 41 LK 74 took place in seven areas, one of them (Area B) located in the west-central portion of the site and the others (Areas A, C, D, F, G, and H) at the site's east end (Fig. 23). Areas A and B

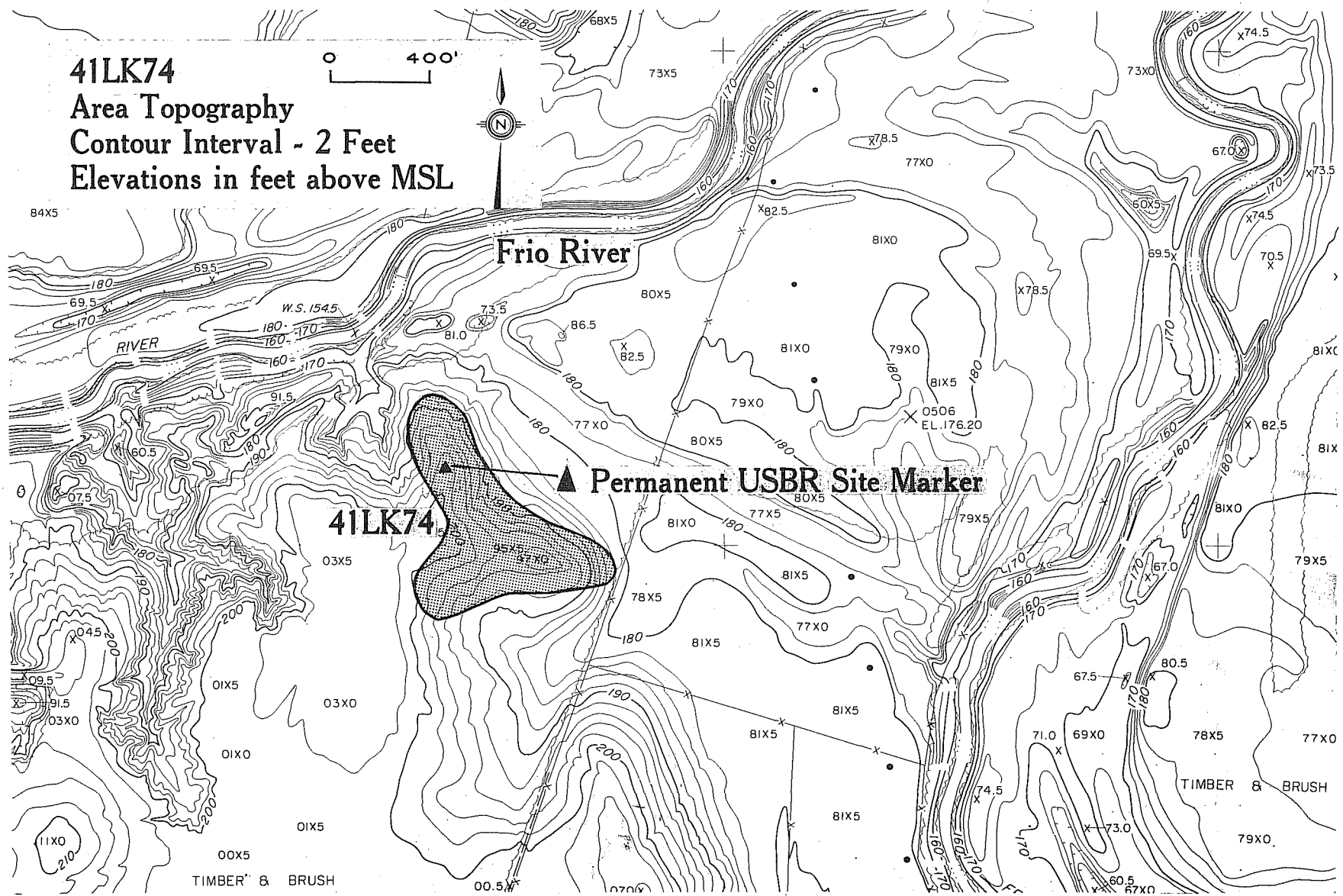


Figure 22. Topographic Map of 41 LK 74 and Surrounding Area.

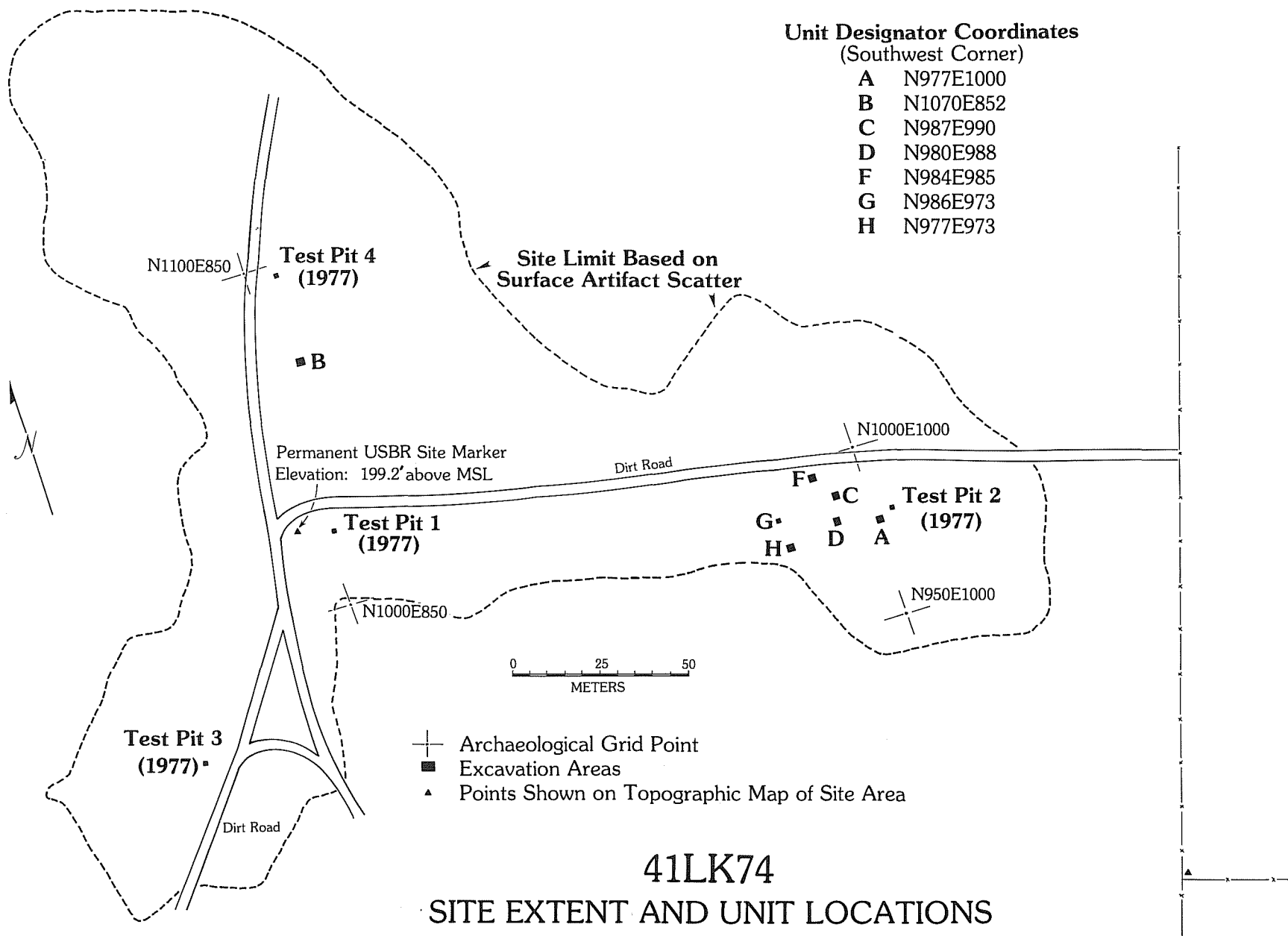


Figure 23. Site Extent and Unit Locations at 41 LK 74.

were excavated by the CAR crew. The other excavations were done by the TAS crew. Areas A and B, excavated first, were located on the basis of findings made during the Phase I testing operation. The yields from Test Pits 2 and 4 suggested that these particular locations would be good for further, more extensive excavations. Findings made in Area A prompted placement of the additional excavation areas worked at the east end of 41 LK 74 by the TAS crew. The seven areas excavated were composed of from one to four 1-m² units. The units were excavated in 10-cm-thick vertical levels.

Area B, the one Phase II excavation at the west end of 41 LK 74, consisted of the following four units: N1070 E857 (four levels), N1070 E858 (four levels), N1071 E857 (six levels), and N1071 E858 (four levels). Surface elevations for these units ranged from 100.28 m to 100.32 m. From surface down through Level 3 ($\pm$ 30 cm below surface) the soil matrix was described as grayish brown sandy silt. In Level 4, the soil matrix changed to yellowish brown clayey loam. Two horizons are defined in Area B based on variations in rates of recovery down through the deposit. Horizon 1 contains debris from Levels 1 and 2. Horizon 2 represents Levels 3-4 or 6. Rates of recovery for selected classes of debris from the two horizons defined in Area B are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	98	106
Sandstone Weight (grams)	177	109
Fire-Fractured Rock Weight (grams)	782	362
Mussel Shell Umbo Count	392	150
Mussel Shell Weight (grams)	196	112
<i>Rabdotus</i> Shell Count	381	383
Bone Weight (grams)	2.8	0.4
Primary Flake Count	6	2
Secondary Flake Count	94	44
Tertiary Flake Count	129	60
Chip Count	244	95

No habitational features were defined in the Area B excavation.

Other artifacts found in Area B are listed below:

Group	Form	Specimen	Category	Horizon 1	Horizon 2
1	-	-	Cores	1	0
5	-	-	Cores	3	1
7	2	-	Thick Bifaces	0	1
8	-	-	Thick Bifaces	1	1
4	4	12	Thin Bifaces	0	1
9	-	-	Thin Bifaces	1	0
10	-	-	Thin Bifaces	1	1
1	2	-	Modified Sandstone	0	1
-	-	-	Satin Spar Gypsum	0	1
-	-	-	Modified Mussel Shell	1	0
-	-	-	Aboriginal Ceramics	37	1

Six unit blocks--designated Areas A, C, D, F, G, and H--were excavated at the east end of 41 LK 74 (Fig. 23). Units constituting each area, as well as the number of 10-cm-thick levels excavated in each, are as follows: Area A--N977 E1000 (four levels), N977 E1001 (five levels), N978 E1000 (four levels), N978 E1001 (four levels); Area C--N987 E990 (two levels), N987 E991 (four levels), N988 E990 (two levels), N988 E981 (four levels); Area D--N980 E989 (two levels), N981 E988 (two levels), N981 E989 (one level); Area F--N994 E985 (two levels), N994 E986 (four levels), N995 E981 (one level), N995 E985 (three levels), N995 E986 (three levels); Area G--N986 E973 (one level); Area H--N977 E973 (four levels), N977 E974 (one level), N978 E973 (one level), N978 E974 (four levels). Surface elevation ranges for each area were as follows: Area A, 99.69-99.63 m; Area C, 99.45-99.36 m; Area D, 99.70-99.64 m; Area F, 99.16-99.12 m; Area G, 99.50-99.43 m; and Area H, 99.56-99.55 m. The soil matrix in all of these units was characterized as grayish brown fine sandy loam from the surface to a depth of 30 to 40 cm. Below this level, soil changed in color to grayish tan. Horizons were not defined in any of these areas. Rates of recovery for selected classes of debris recovered from each of these six areas (all units and levels combined) are as follows:

	<u>Areas</u>					
	<u>A</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>G</u>	<u>H</u>
Tuff Weight (grams)	170	129	57	67	8	122
Sandstone Weight (grams)	298	173	123	401	12	91
Fire-Fractured Rock Weight (grams)	1267	1672	793	2043	258	776
Mussel Shell Umbo Count	327	449	260	177	17	284
Mussel Shell Weight (grams)	112	184	56	61	4	25
Rabdotus Shell Count	96	121	62	187	16	122
Bone Weight (grams)	0	0	0.7	0	0	0
Primary Flake Count	12	10	6	21	0	0
Secondary Flake Count	233	101	57	83	5	25
Tertiary Flake Count	366	171	93	103	4	24
Chip Count	680	546	92	243	16	145

One habitational feature was isolated in the Area F excavation at 41 LK 74. It consisted of a scattered cluster of fire-fractured rock and sandstone. The scatter measured 2 m east-west and roughly 1.2 m north-south. Elevations on the surface, where the rocks composing the feature rested, ranged from 98.77 to 98.87 m. Approximately 70 rocks made up this loose cluster. Sixty of these rocks were fire fractured, and 10 were sandstone. They ranged in size from 3 to 10 cm (maximum dimension). The rocks occurred in a single layer. A few fragments of mussel shell were found amidst the stone. No carbon was noted.

Additional artifacts recovered from Areas A, C, D, E, G, and H are listed below:

Group	Form	Specimen	Category	Area	Count
1	-	-	Cores	A	1
-	-	-	Cores	F	1
2	-	-	Cores	C	1
5	-	-	Cores	A	2
-	-	-	Cores	C	3
-	-	-	Cores	F	2
6	-	-	Cores	A	2
3	-	-	Thick Bifaces	A	1
7	3	-	Thick Bifaces	A	1
9	-	-	Thick Bifaces	D	1
1	1	4	Thin Bifaces	C	1
2	1	6	Thin Bifaces	C	1
2	2	16	Thin Bifaces	C	1
1	3	37	Thin Bifaces	D	1
2	2	29	Thin Bifaces	D	1
4	1	10	Thin Bifaces	D	1
9	-	-	Thin Bifaces	A	3
-	-	-	Thin Bifaces	C	1
10	-	-	Thin Bifaces	D	1
-	-	-	Satin Spar Gypsum	F	2
-	-	-	Modified Mussel Shell	F	3

The artifacts collected from the surface of 41 LK 74 during the course of Phase II investigations were three thick bifaces (one, Group 6, Form 1; one, Group 7, Form 1; and one, Group 8), four thin bifaces (one, Group 2, Form 2; one, Group 3, Form 2; one, Group 9; and one, Group 10), and two distally beveled tools (one, Group 8, Form 3; one, Group 9).

Identical in terms of landform setting, 41 LK 74 and 41 LK 14 are also similar in terms of content of prehistoric cultural debris. Situated on the geologic unit known as the Frio Formation, 41 LK 74 did not offer to prehistoric inhabitants the substantial quantities of tuffaceous rock, profusely available from the Catahoula Formation to the east, or sandstone, massive outcrops of which are exposed to the west as part of Jackson Group geologic strata. What was available locally was gravel and cobble material on the surfaces of old terraces and in bars down in the river channel. The cobbles were hauled up to the main prehistoric activity areas on 41 LK 74 to build hearths and as raw material for chipped stone tool manufacture, and were left as the residues of fire-fractured rock and debitage that were recovered in large quantities during the archaeological excavations on the site. The deposits containing prehistoric cultural debris at 41 LK 74 were not quite as deep as those at 41 LK 74. Consequently, there was even less of an opportunity to recognize debris accumulations resulting from the different periods of prehistoric occupation.

The Phase II assemblage of artifacts collected at 41 LK 74 generally supports previous assessments to the effect that the site was visited off and on by human groups through the entire time span of the Archaic. No additional artifacts clearly diagnostic of the Paleo-Indian period were found. A substantial collection of sherds of aboriginal pottery came from the Area B

excavation. These sherds indicate that Late Prehistoric people were camping in that part of the site. Evidence of Late Prehistoric activity had not surfaced previously. The numerous cores, some thick bifaces, a variety of thin bifaces and biface fragments, and much debitage shows that chipped stone tool making was a somewhat more important activity at 41 LK 74 than at many sites. Here again, the easy access to cobbles on the terrace and in the river channel is the likeliest explanation for increased knapping activity.

The Phase II findings at 41 LK 74 provide no new insights into subsistence habits of the area's prehistoric residents. Mussell shell, *Rabdotus* snail shells, and a tiny collection of unidentifiable bone are probably remnants of food consumed by the prehistoric inhabitants. A single sandstone grinding implement might be interpreted as evidence of seed or nut food processing.

From the standpoint of habitational feature and activity area recognition, the findings in the excavations at 41 LK 74 were disappointing. The single hearth feature isolated in Area F was very poorly integrated and really did not provide much useful information. It is likely that prehistoric habitational debris deposited on 41 LK 74 was not buried quickly due to the location on a high, old terrace surface where soil deposition was very slow to take place. The cultural remains were probably exposed to disruptive processes such as weathering, erosion, animal movement, and, perhaps most significantly, the activities of later prehistoric inhabitants of the same area. These circumstances probably dictated against the survival of well-integrated habitational features at 41 LK 74 and also prevented the remains from becoming clearly stratified.

41 LK 236

Whereas 41 LK 14 and 41 LK 74 occur on high, old terraces above the Frio River, site 41 LK 236 is situated on a low, active terrace immediately alongside the river (Fig. 1, folded insert). Recorded in 1979 by the CAR survey team, this site has an east-west length of 700 m, but is only about 50 m in width. Most of the site is in a cleared pasture. The northern edge of the site paralleling the Frio River supports riparian vegetation in the form of elm and willow trees, briars, and mustang grape vines. The site was identified on the basis of mussel shell, fire-fractured rock, and debitage observed eroding from the terrace face leading down to the river channel. A much lighter scatter of prehistoric debris out in the pasture was used to define site limits. Sherds of aboriginal pottery seen by the survey crew evidenced a Late Prehistoric component on the site.

During Phase II investigations at 41 LK 236, the CAR crew excavated seven shovel tests at various locations down the length of the site. The shovel tests revealed that the Late Prehistoric component is buried about 30 cm below the surface. The range management practices (i.e., brush clearing and root plowing) leading to the establishment of the grass-covered pasture are assumed to have caused considerable disruption of this shallowly buried Late Prehistoric component. A second cultural horizon was defined at from 60 to 70 cm below the surface. A probable hearth feature constructed of sandstone rocks was isolated at 70 cm below the surface in Test Pit 7. Below 70 cm, to as much as 120 cm below the surface, the amount of prehistoric cultural

debris decreased rapidly. The single artifact collected from 41 LK 236 was a trimmed flake (Group 3, Form 1).

By all indications, 41 LK 236 was a site worthy of controlled excavations. Its deposits were clearly stratified into at least two cultural components, and the lower component contained an integrated habitational feature. Although the shovel tests went no deeper than 1.2 m below the surface, the landform situation of the site on an active, apparently deep first terrace of the Frio River permits speculation that it may contain older, deeper components much like those found in 41 LK 31/32, a terrace site located a short distance downstream (Scott and Fox 1982). Other priorities in the Phase II excavation program precluded additional investigations at 41 LK 236.

SITE GROUP 5

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
41 LK 51	41 LK 243			41 LK 245
41 LK 53				41 LK 247

The five sites in Group 5 are located on the northern side of the Frio River valley from 5.5 to 8.0 km west of Choke Canyon Dam (Fig. 1, folded insert). The two major sites in the group, 41 LK 51 and 41 LK 53, are located along a well-developed channel that now carries runoff from large areas of floodplain and uplands to the north and northwest of the sites. Known as Opossum Hollow, this drainage is a relict channel of either the Frio River or Opossum Creek. It runs more-or-less east to west through the site group area. The distance north from the hollow to the valley margin varies from 0.3 to 1.0 km. Over this area, a number of north-south feeder channels cut down from the valley margin and meet the hollow. Along the hollow, ground relief is not pronounced, being mainly the result of natural levee and terrace development and erosion along the hollow and feeder channels. The surface slopes gently upward from the channel to the adjacent valley margin. Bedrock in the area is the Jackson Group. It is buried beneath a thick mantle of alluvium on the floodplain, but does crop out in some places along the valley margin. The valley margin north of the site group area is characterized by dense lag gravel pavement. Sandstone, a component of the Jackson Group, also appears on the valley margin slopes. Floral patterns are quite diverse in the area. Riparian species such as elm, oak, and hackberry grow along the channel of Opossum Hollow. On the floodplain terrace surfaces north and south of the hollow, thickets of mesquite, whitebrush, spiny hackberry, and prickly pear form moderate to dense ground cover. Along the valley margin are dense stands of blackbrush and guajillo.

41 LK 51

Site 41 LK 51 is an open prehistoric site paralleling the south (right) bank of Opossum Hollow for an east-west distance of nearly 2.0 km (Figs. 1, folded insert; 24). It is estimated to be about 50 m in width. The site rests on a series of low terraces and natural levees beside the channel of Opossum Hollow. The condition of the site surface varies greatly from largely undisturbed to heavily eroded. Erosion has been more severe over the eastern half of the site. The erosion occurs mainly in a narrow band along the bank of the hollow. Long, shallow gullies and large deflated areas are common in this portion of the site. The eastern end of 41 LK 51 was partially cleared of brush at sometime in the recent past. However, whitebrush, prickly pear, and small mesquites have again grown to form a low, dense brush cover. Native brush grows in dense thickets over the western half of 41 LK 51. Mesquite, whitebrush, spiny hackberry, guayacan, prickly pear, tasajillo, and various grasses are common at this end of the site. In the western central area of the site, there is a natural levee that forms a locally higher bank along the hollow for a distance of at least 200 m east-west (Fig. 24). This area was relatively intact except for some minor gullying and deflation at its eastern end. Dense surface concentrations of fire-fractured rock, sandstone, debitage, and mussel shell characterize the eroded and deflated areas of the site.

Site 41 LK 51 was originally recorded by THC surveyors. They listed the site as containing Archaic (undifferentiated) and Late Prehistoric components (Lynn, Fox, and O'Malley 1977:44). The CAR crew excavated three 1-m² test pits and made a collection of surface artifacts during the Phase I investigation of 41 LK 51 (Hall, Black, and Graves 1982:132-135). Analysis of the Phase I data established the presence of Middle Archaic, Late Archaic, and Late Prehistoric components within the site. In Test Pit 3, excavated to a depth of 120 cm below the surface, three debris horizons were defined (*ibid.*:134-135). Based on the test pit findings, it appeared that productive, well-preserved subsurface deposits of prehistoric cultural debris were present over most of the area between Test Pits 2 and 3. Deposits in the vicinity of Test Pit 3 looked especially promising.

Phase II archaeological investigations at 41 LK 51 took place in March and June 1981. During 10 days in March, a seven member CAR crew worked in the Area A excavations for a total of 528 person hours. In June 1981, members of the Texas Archeological Society participating in the summer field school at Choke Canyon worked at 41 LK 51 for seven days. Numbering between 15 and 40 individuals, the TAS members invested over 500 person hours of effort at the site. Thus, a total of over 1000 person hours was expended in the Phase II investigation of 41 LK 51.

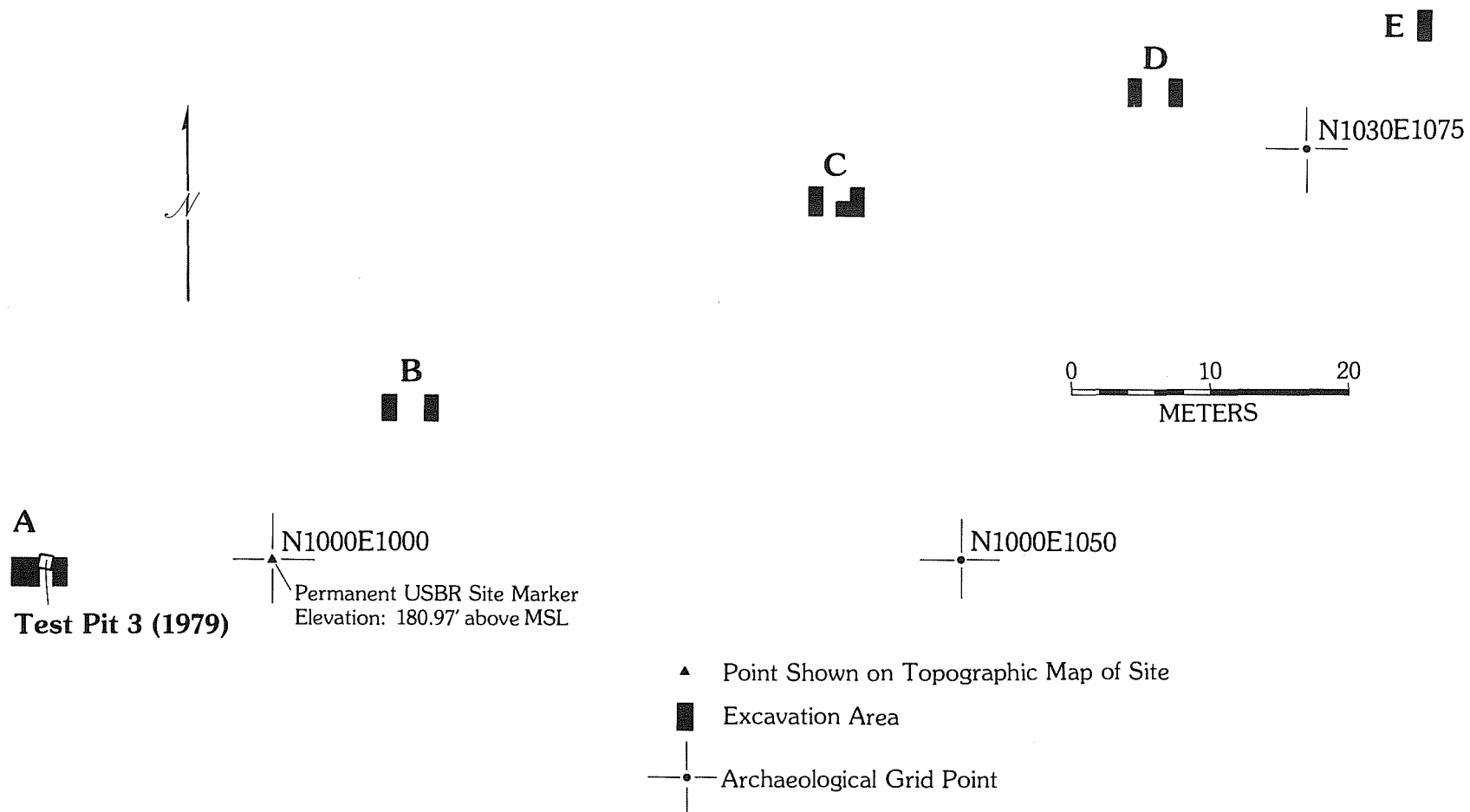
An excavation grid was set out at 41 LK 51. A steel spike driven into the trunk of a mesquite tree near the Area A excavation served as the vertical datum. USBR surveyors later calculated a true elevation of 181.756 feet above MSL for this datum. They also placed a permanent marker along the baseline for the archaeological grid system and determined its exact location expressed as Modified Texas State Plane Coordinates.

Five areas, designated Areas A to E, were excavated at 41 LK 51 (Fig. 25). Area A was placed at the same location as Test Pit 3, excavated during the Phase I investigation. This area was worked by the CAR crew. It consisted of six 1-m² units, each of which was dug in arbitrary vertical levels of 10 cm (Fig. 21,c,d). The six units and number of 10-cm-thick levels excavated in each are as follows: N998 E981 (17 levels), N998 E982 (17 levels), N998 E984 (17 levels), N999 E981 (17 levels), N999 E982 (17 levels), and N999 E984 (21 levels). Surface elevations ranged from 99.76 to 99.78 m. Four debris horizons were defined within the deposit excavated from Area A. The horizons defined and the levels each represents are Horizon 1, Levels 1-4; Horizon 2, Levels 5-9; Horizon 3, Levels 10-13; and Horizon 4, Levels 14-17 or 21. Rates of recovery for selected classes of debris from the four horizons defined in Area A at 41 LK 51 are as follows:

	<u>Horizons</u>			
	1	2	3	4
Tuff Weight (grams)	93	240	54	18
Sandstone Weight (grams)	494	809	1486	550
Fire-Fractured Rock Weight (grams)	1266	1929	1502	168
Mussel Shell Umbo Count	664	637	359	202
Mussel Shell Weight (grams)	270	181	111	66
Rabdotus Shell Count	1536	3568	2407	1812
Bone Weight (grams)	19	19	1	2
Primary Flake Count	8	12	18	8
Secondary Flake Count	164	232	310	151
Tertiary Flake Count	375	538	720	400
Chip Count	691	1003	1368	742

Other artifacts recovered from the four horizons defined in the Area A units are listed below:

Group	Form	Specimen	Category	<u>Area A</u> <u>Horizon</u>			
				1	2	3	4
1	-	-	Cores	0	1	0	0
2	-	-	Cores	2	0	1	1
3	-	-	Cores	0	3	3	0
5	-	-	Cores	1	1	1	0
6	-	-	Cores	1	0	0	1
1	-	-	Thick Bifaces	0	1	0	0
2	-	-	Thick Bifaces	0	0	1	0
7	1	-	Thick Bifaces	0	1	1	0
8	-	-	Thick Bifaces	1	0	0	0
9	-	-	Thick Bifaces	0	1	0	0
1	3	19	Thin Bifaces	0	0	0	1
1	6	1	Thin Bifaces	1	0	0	0
1	7	1	Thin Bifaces	1	0	0	0
2	1	4	Thin Bifaces	0	1	0	0
2	2	15	Thin Bifaces	0	0	0	1



41LK51 PLAN OF EXCAVATIONS

Figure 25. Plan of Excavations at 41 LK 51.

2	2	27	Thin Bifaces		0	0	1	0
3	1	1	Thin Bifaces		0	0	0	1
3	2	12	Thin Bifaces		0	0	1	0
4	1	5	Thin Bifaces		1	0	0	0
4	1	6	Thin Bifaces		0	0	0	1
4	1	7	Thin Bifaces		0	1	0	0
4	4	4	Thin Bifaces		0	0	0	1
4	4	5	Thin Bifaces		0	0	0	1
4	4	6	Thin Bifaces		0	0	0	1
4	4	96	Thin Bifaces		1	0	0	0
5	-	2	Thin Bifaces		0	1	0	0
8	-	8	Thin Bifaces		0	0	0	1
9	-	-	Thin Bifaces		2	3	1	1
10	-	-	Thin Bifaces		6	0	2	2
3	4	1	Trimmed Flake		0	0	0	1
1	3	-	Modified Sandstone		0	1	0	0
2	2	-	Modified Sandstone		0	1	1	0
2	3	-	Modified Sandstone		3	1	0	0
3	-	-	Modified Sandstone		1	0	1	0
-	-	-	Ocher		0	2	1	0
-	-	1	Modified Bone		0	1	0	0
-	-	4	Marine Shell		0	0	1	0
-	-	-	Aboriginal Ceramics		44	1	0	0

Soil characteristics and zonation observed in the Area A excavation are summarized in Figure 26. The location of a soil sample column collected from this excavation is also shown. Samples collected from the column are curated at the CAR-UTSA.

Six features were recorded during the course of excavations in Area A at 41 LK 51. Feature 1 was a concentration of burned clay and sandstone isolated in Horizon 2 (Levels 5 and 6, 99.40 to 99.20 m) in the northeast corner of Unit N999 E982. The feature has a semicircular outline shape, appearing to be perhaps a quarter or third of a circular, more extensive feature that extends beyond the limits of the unit. Dimensions of the exposed portion of the feature are 20 cm north-south and 60 cm east-west. It is composed of 12 pieces of burned clay, 18 pieces of sandstone, two fire-fractured rocks, and some debitage. Significantly, all of the clay and three of the largest pieces of sandstone were found in Level 5 (99.40 to 99.30 m). After these materials were removed, the remainder of the sandstone was found over the same area at a slightly deeper elevation (99.26 to 99.29 m). A small amount of carbon was collected. The sample was inadequate for the purpose of radiocarbon assay.

Feature 2 in Area A was first recognized in Level 3 (99.60 to 99.50 m) of Unit N998 E984. Consisting of a mass of carbonized wood, this feature was subsequently determined to be a burned stump or root. Excavation in the next level revealed portions of unburned wood in the same mass of material.

Feature 3 at 41 LK 51 was defined in Horizon 2 (Level 6, 99.30 to 99.20 m) of Unit N998 E991 in Area A. Consisting of a somewhat heavier scatter of mussel shell, sandstone, fire-fractured rock, debitage, and bone, the feature was

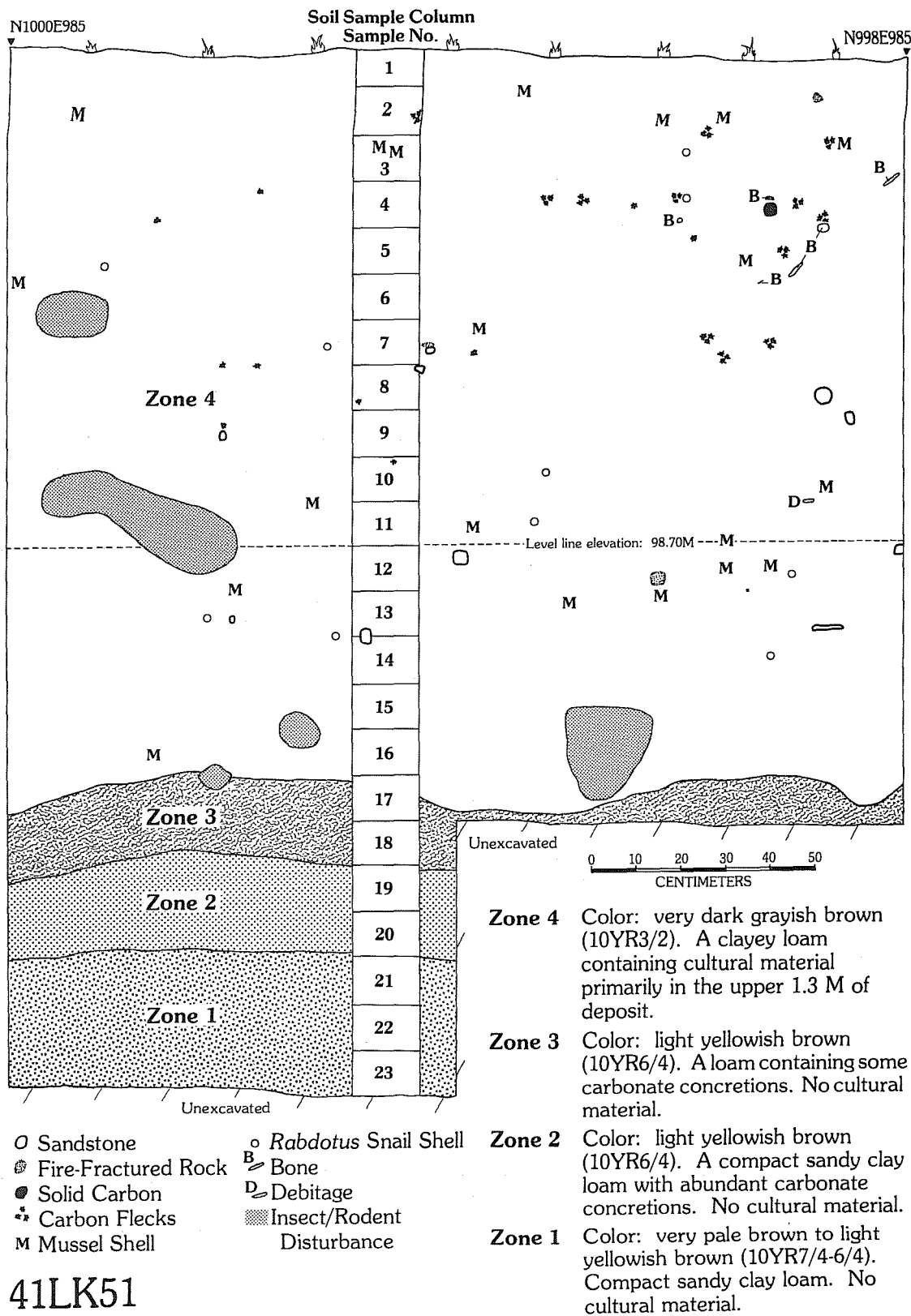


Figure 26. Profile Sketch Along E985 Line from N998 to N1000 at 41 LK 51, Area A.

found to have no integrity. It was simply a locally heavier accumulation of midden debris.

Feature 4 was a small, single layer cluster of sandstone isolated in Horizon 2 (Level 9, 98.90 to 98.80 m) of Unit N998 E982. Composed of about 12 pieces of sandstone arranged in a subcircular cluster, the feature measured 40 cm in diameter. A few pieces of chert debitage were scattered in among the sandstones. No carbon was observed.

Feature 5 consisted of a tight concentration of fire-fractured rock and looser concentrations of tuff and sandstone exposed in Level 11 (98.80 to 98.70 m) of Units N999 E981 and N999 E982 (Fig. 27). The recovery level is within Horizon 3. The main portion of the feature occurs in Unit N999 E981 where there is a dense concentration of fire-fractured rock and spalls in the northwest corner. A large biface fragment was found in this concentration. Notable amounts of burned chert debitage also occurred along with the fire-fractured rock. Scattered out in a band trending from northeast to southwest across the central part of the units was a loosely consolidated group of tuffaceous rock, sandstone, and fire-fractured rock. Mussel shells were found amidst these rocks. There was little vertical separation (± 8 cm) between all components of the feature. Mussel shell (not too much), *Rabdotus* snail shells, debitage, and more fire-fractured rock were recovered from the matrix excavated from the level. The feature was essentially a single layer construct. Only flecks of carbon were seen in and around the feature.

Feature 6 was encountered in Level 12 (98.70 to 98.60 m) of Unit N998 E981 (Figs. 21,e,f; 28). It consists of a subcircular, single layer cluster of more than 30 tuffaceous rocks, four pieces of sandstone, and eight pieces of fire-fractured rock. The feature is roughly 50 cm in diameter. The tuffaceous rock fragments appear to be part of a large piece of tuff that was originally used to build the feature. The soil around the rocks had a burned appearance, but no distinct pit was visible. Several pieces of debitage were scattered around the feature as were some mussel shell fragments, *Rabdotus* snail shells, and a few, poorly preserved bone fragments. A large chunk of carbon was found among the rocks (Fig. 28). Feature 6 occurred in Horizon 4.

Twenty centimeters below and just east of Feature 6, a mass of carbonized wood was found in Horizon 4 (Level 15, 98.40 to 98.30 m) of Unit N998 E982 in Area A (Figs. 21,e,f; 28). This carbon is apparently not a result of the same activity period that resulted in creation of Feature 6. The carbon was split into two samples and submitted to the Radiocarbon Laboratory, The University of Texas at Austin, for assay. The two samples, TX-4690 and TX-4691, yielded corrected ages 5130 to 5110 B.C. and 4450 B.C., respectively. The wood burned to form the carbon has been identified as *Acacia* or *Prosopis* (see Appendices II and VI).

Areas B, C, D, and E at 41 LK 51 were excavated in June 1981 by members of the Texas Archeological Society Summer Field School. Because the field school was seven days in length and severely hampered by unseasonable rainfall, only the upper two horizons were sampled in these four excavation areas. Area locations are shown in Figure 25.

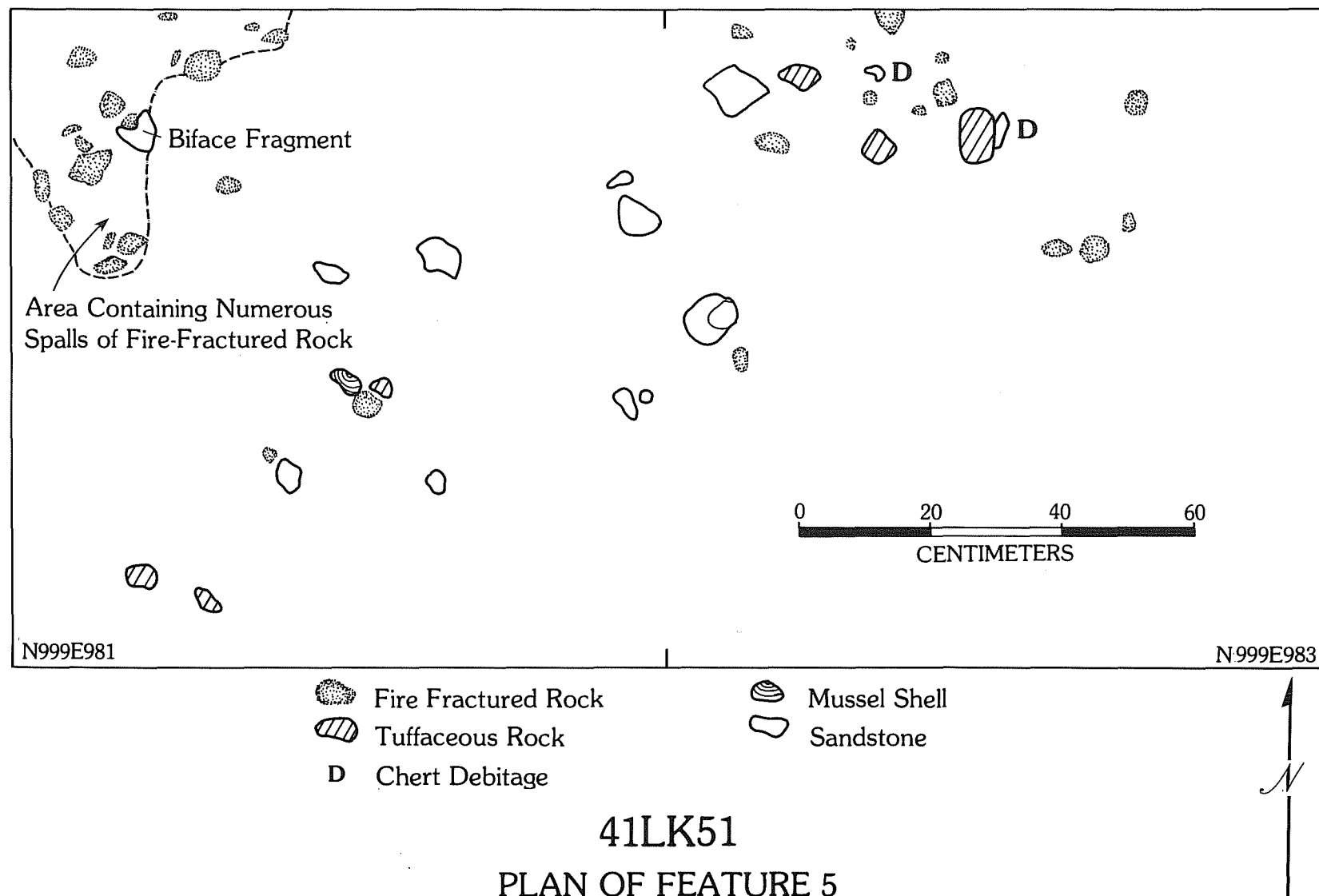
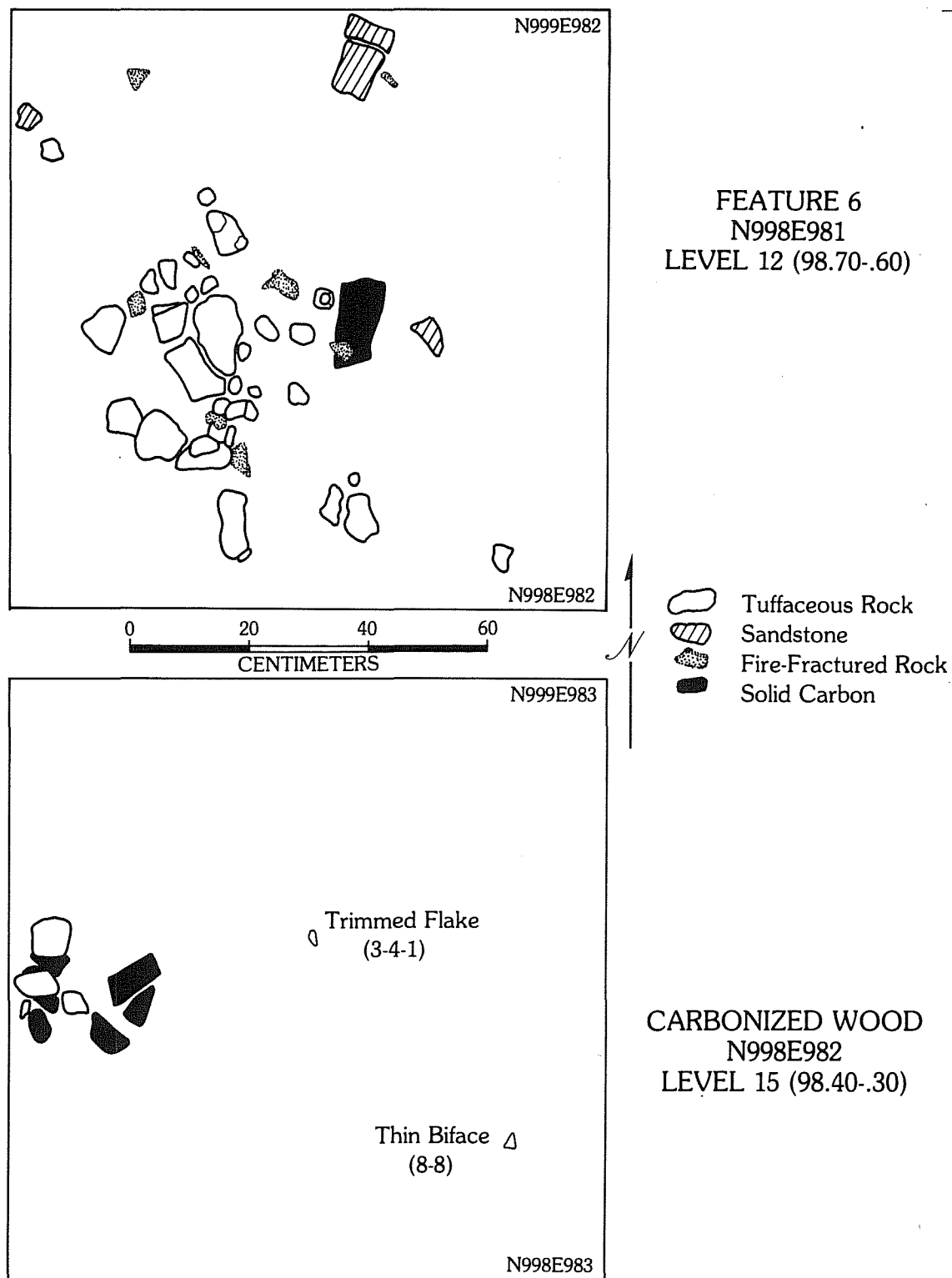


Figure 27. Plan of Feature 5 at 41 LK 51.



41LK51

FEATURE PLANS

Figure 28. Plan of Feature 6 at 41 LK 51.

Area B consisted of four 1-m² units. Unit coordinates and number of 10-cm-thick levels excavated in each unit are as follows: N1010 E1008 (one level), N1010 E1011 (11 levels), N1011 E1008 (two levels), and N1011 E1011 (eight levels). Surface elevations ranged from 99.85 to 99.91 m. Of these four units, only Unit N1010 E1011 went deep enough to provide a useful sample of Horizon 2 material. In this unit, Horizon 1 represents material from Levels 1-4 and Horizon 2, Levels 5-11. Rates of recovery for selected classes of debris from the Area B excavations are as follows:

	<u>Unit N1010 E1011</u>		<u>All Other</u>
	<u>Horizons</u>		<u>Levels</u>
	<u>1</u>	<u>2</u>	
Tuff Weight (grams)	53	176	91
Sandstone Weight (grams)	69	384	161
Fire-Fractured Rock Weight (grams)	155	376	485
Mussel Shell Umbo Count	55	35	355
Mussel Shell Weight (grams)	30	13	125
Rabdotus Shell Count	269	995	625
Bone Weight (grams)	2	3	2
Primary Flake Count	2	3	1
Secondary Flake Count	15	36	28
Tertiary Flake Count	23	57	33
Chip Count	111	174	179

Also recovered from the Area B excavation at 41 LK 51 were four cores (two, Group 2; one, Group 3; one, Group 5), six thin bifaces (Group 1, Form 7, Specimen 2; Group 5, Specimen 3; four, Group 10), a distally beveled tool (Group 3, Form 1, Specimen 2), a piece of modified sandstone (Group 1, Form 2), and two sherds of aboriginal ceramics.

Area C consisted of five 1-m² units. Unit coordinates and number of 10-cm-thick levels excavated in each unit are as follows: N1025 E1039 (four levels), N1025 E1041 (six levels), N1025 E1042 (five levels), N1026 E1039 (five levels), and N1026 E1042 (four levels). Surface elevations ranged from 99.86 to 99.89 m. No horizon separations were recognized in the Area C units. Rates of recovery for selected classes of debris from all units and levels of Area C are as follows:

	<u>Area C</u>
	<u>All Levels Combined</u>
Tuff Weight (grams)	555
Sandstone Weight (grams)	1182
Fire-Fractured Rock Weight (grams)	2882
Mussel Shell Umbo Count	553
Mussel Shell Weight (grams)	184
Rabdotus Shell Count	1919
Bone Weight (grams)	76
Primary Flake Count	12
Secondary Flake Count	151
Tertiary Flake Count	392
Chip Count	1221

Other artifacts recovered in Area C at 41 LK 51 include five cores (one, Group 1; one, Group 2; three, Group 5), two thick bifaces (one, Group 6, Form 2; one, Group 7, Form 1), 11 thin bifaces (Group 1, Form 3, Specimen 12 [Fairland]; Group 1, Form 3, Specimen 13 [Fairland]; Group 3, Form 1, Specimen 2; Group 3, Form 2, Specimen 2; Group 4, Form 1, Specimen 8; Group 4, Form 4, Specimen 7; one, Group 9; four, Group 10), one distally beveled tool (Group 3, Form 1, Specimen 1), four pieces of modified sandstone (one, Group 1, Form 3; two, Group 2, Form 3; one, Group 3), one piece of modified quartzite (Specimen 1), and one piece of satin spar gypsum. A very unusual artifact recovered from Level 1 (surface to 99.80 m) of Unit N1026 E1042 of Area C was a chunk of obsidian debitage. This artifact is discussed in more detail in Appendix V.

Four 1-m² units made up Area D at 41 LK 51. Unit coordinates and number of 10-cm-thick levels excavated in each unit are as follows: N1033 E1062 (three levels, N1033 E1065 (10 levels), N1034 E1062 (three levels), and N1034 E1065 (10 levels). Surface elevations ranged from 99.75 to 99.79 m. Units N1033 E1065 and N1034 E1065 reached depths of 100 cm below the surface, and it was possible to identify two horizons within the material recovery. For these two units, Horizon 1 contains debris recovered from Levels 1-5, and Horizon 2 contains debris from Levels 6-10. Rates of recovery for selected classes of debris from Area D are as follows:

	<u>Unit</u>		
	<u>N1033/1034 E1065</u>		
	<u>Horizons</u>		<u>All Other</u>
	<u>1</u>	<u>2</u>	<u>Levels</u>
Tuff Weight (grams)	79	95	21
Sandstone Weight (grams)	74	341	46
Fire-Fractured Rock Weight (grams)	592	1332	134
Mussel Shell Umbo Count	238	87	69
Mussel Shell Weight (grams)	55	27	31
Rabdotus Shell Count	198	437	85
Bone Weight (grams)	4	18	1
Primary Flake Count	5	2	1
Secondary Flake Count	26	102	14
Tertiary Flake Count	40	101	12
Chip Count	190	275	81

Additional artifacts recovered from the Area D excavation at 41 LK 51 are four cores (Group 5), one thick biface (Group 7, Form 1), 11 thin bifaces (Group 1, Form 2, Specimen 3 [Langtry]; Group 1, Form 3, Specimen 1 [Ensor]; Group 1, Form 4, Specimen 1 [Perdiz]; Group 1, Form 7, Specimen 3; Group 1, Form 7, Specimen 4; one, Group 9; five, Group 10), one distally beveled tool (Group 8, Form 1, Specimen 1), one piece of modified sandstone (Group 2, Form 2), and two sherds of aboriginal ceramics.

Two 1-m² units made up Area E at 41 LK 51. Four 10-cm-thick levels were excavated in Unit N1038 E1083, and five levels were excavated in Unit N1039 E1083. Surface elevations ranged from 99.65 to 99.69 m. No horizons were defined for these units. Rates of recovery for selected classes of debris for Area E are as follows:

All Levels Combined

Tuff Weight (grams)	16
Sandstone Weight (grams)	13
Fire-Fractured Rock Weight (grams)	127
Mussel Shell Umbo Count	62
Mussel Shell Weight (grams)	14
Rabdotus Shell Count	43
Bone Weight (grams)	2
Primary Flake Count	2
Secondary Flake Count	7
Tertiary Flake Count	16
Chip Count	77

One additional artifact, a thin biface (Group 3, Form 2, Specimen 13), was recovered from Area E.

The Phase II archaeological investigation at 41 LK 51 produced valuable new information concerning the prehistory of Choke Canyon. Horizon 4 defined deep in the Area A excavation has yielded the oldest radiocarbon dates yet obtained for cultural deposits in the region. The radiocarbon assays designated TX-4690 and TX-4691 gave corrected ages of 5130 to 5110 B.C. and 4450 B.C., respectively. These assays are 1000 to 1700 years older than assays from site 41 LK 31/32 (TX-2920, TX-2921), dates that previously evidenced the oldest *in situ* subsurface deposits of cultural material known for the area (Scott and Fox 1982:88). The recovery of a stemmed dart point (thin bifaces Group 1, Form 3, Specimen 19) tentatively identified as an "early expanding stem" (possibly of the **Bandy** type after Word and Douglas 1970) offers further evidence for the presence of an Early Archaic component deep in the site. Quite remarkable is the fact that carbon from the same source that yielded samples for the above radiocarbon assays has been identified as either acacia or mesquite. This evidence permits the suggestion that many components of the modern brush community at Choke Canyon were present in the area 6000 to 7000 years ago (see further discussion in Appendix II). Six other thin bifaces or biface fragments recovered from Horizon 4 in Area A are not as clearly indicative of the Early Archaic. These were identified as unstemmed triangular and leaf-shaped forms having straight, concave, and convex bases (thin bifaces Groups 2, 3, and 4). Comparing the cultural debris recovery from Horizon 4 with assemblages representing the other three horizons in Area A, there are substantially smaller amounts of fire-fractured rock and mussel shell in Horizon 4, but otherwise the collections are much the same. Likewise, the single habitational feature (Feature 6) isolated in Horizon 4 is not remarkably different from features found in higher horizons.

Horizons 2 and 3 in Area A at 41 LK 51 are assumed to contain remnants of Middle Archaic and Late Archaic cultural activities on the site. This assessment is based primarily on bracketing temporal information provided by the Early Archaic indicators in Horizon 4 and the Late Prehistoric diagnostics in Horizon 1. The chipped stone tools found in Horizons 2 and 3 do not aid appreciably in establishing cultural/chronological affiliations for the remains. Judging from the number of habitational features (Features 1, 3, 4, and 5) and the relatively greater amounts of debris

recovered, Horizons 2 and 3 represent periods during which the site was most intensively occupied.

In the remaining four Phase II excavations at 41 LK 51, only the upper two horizons were sampled with Horizon 1 receiving the most attention. Some additional sherds of aboriginal pottery, a *Perdiz* arrow point, and dart points of the *Ensor* and *Fairland* types show fairly conclusively that deposits excavated in these areas represent the Late Archaic and Late Prehistoric periods. Smaller, triangular distally beveled tools recovered from two of the areas are also suggestive of a Late Archaic component. No additional habitation features were found in Areas B to E. The obsidian chunk found in Level 1 of an Area C unit would appear to date to Late Prehistoric times based mainly on its stratigraphic context. This obsidian is of the "Escondido Ranch" type, recently traced back to a source in Idaho (see Appendix V).

The Phase II findings at 41 LK 51 do not appreciably illuminate prehistoric subsistence habits for any of the cultural/chronological periods represented by the debris collections made in the excavation areas. As usual, mussel shell, *Rabdotus* snail shells, and a small amount of mostly unidentifiable animal bone are present. As previously noted, there was substantially less mussel shell recovered from Horizon 4 in Area A than from the three horizons above. Fragments of modified sandstone probably representing manos and metates were found only in Horizons 1-3 of Area A. No such artifacts were found in Horizon 4. The absence of grinding implements and the lesser amounts of mussel shell in Horizon 4 are cited as evidence of possible dietary distinctions between the Early Archaic (Horizon 4) and later cultural periods (Horizons 1-3).

41 LK 53

On the north (left) bank of Opossum Hollow opposite the west end of 41 LK 51 is site 41 LK 53 (Fig. 1, folded insert). It contains both prehistoric and historic components. The site rests on a natural levee paralleling the hollow for an east-west distance of about 500 m. The site is about 200 m wide (north-south) as recorded by THC surveyors. The site surface is in fairly good condition, being only moderately deflated along a narrow strip beside the hollow. Brush cover on the site varies from patchy to dense. Whitebrush is very common as are mesquites, prickly pear, acacia, guayacan, and Mexican persimmon.

Phase I investigations at 41 LK 53 consisted of excavation of three 1-m² test pits and collection of surface artifacts (Hall, Black, and Graves 1982:135-139). The test pits ranged in depth from 70 cm to 1.1 m. Debris collections were divided into upper and lower horizons. Analysis of chipped stone tools found on 41 LK 53 indicated that the site was inhabited during the Middle Archaic and Late Archaic periods (*ibid.*:138). The previously unrecorded historic component at the west end of 41 LK 53 evidenced late 19th- and early 20th-century activity.

The primary Phase II investigation at 41 LK 53 was concerned only with the prehistoric components in the site. The historic component was later

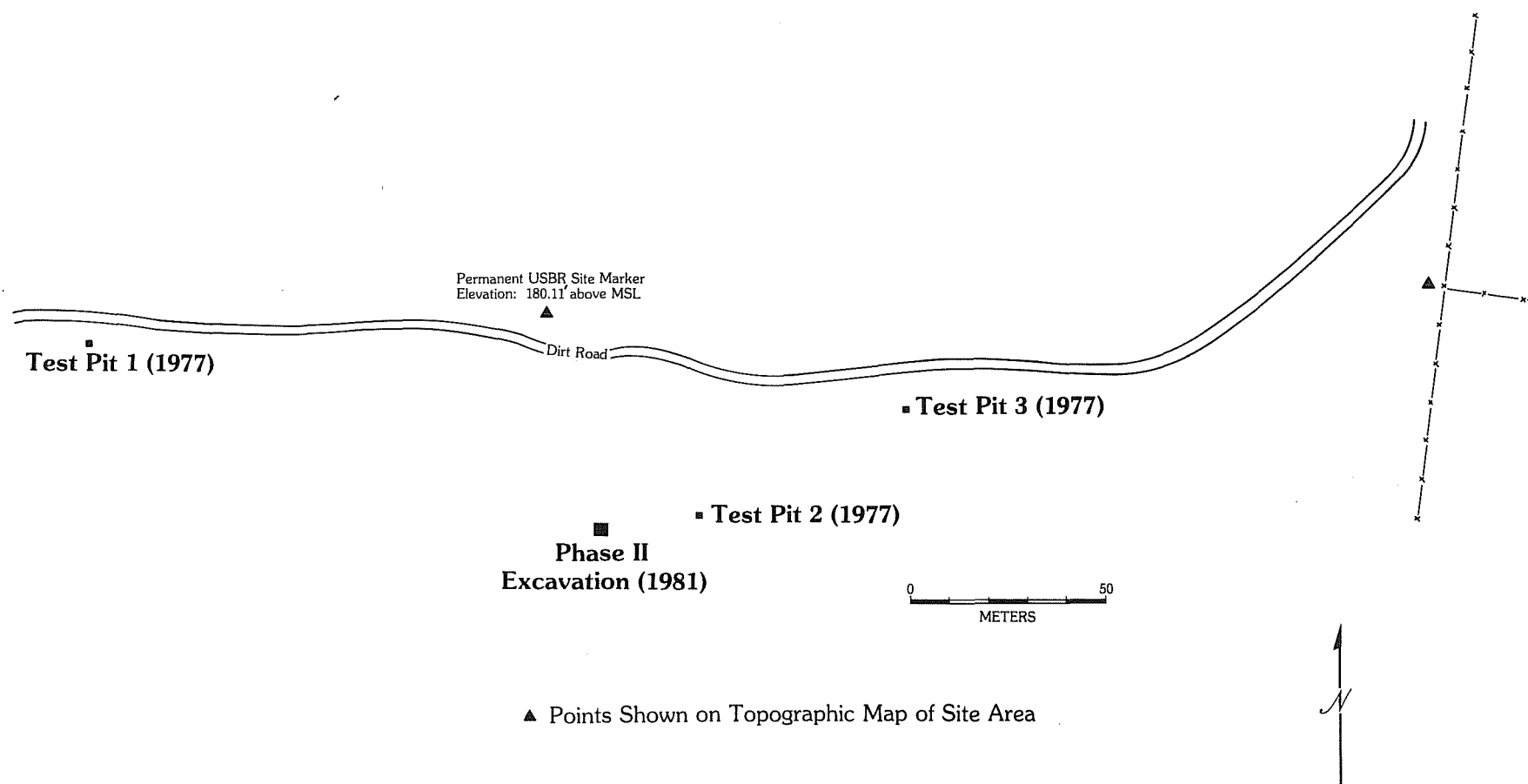
investigated by members of the Texas Archeological Society Summer Field School (Fox 1986). Phase II work was done at 41 LK 53 by a CAR crew over a 10-day period in March and April 1981. The eight persons making up this crew spent a total of 536 hours working on the site.

Horizontal control for the Phase II excavations at 41 LK 53 was established by arbitrarily setting an east-west baseline in the immediate area of excavations using a survey transit. For vertical control, a steel spike was driven into the trunk of a mesquite tree north of the excavation area. USBR surveyors later calculated a true elevation of 181.529 feet above MSL for this datum nail. They also placed a permanent marker on the site and recorded its location in terms of Modified Texas State Plane Coordinates (Figs. 24; 29).

Selection of a location for Phase II excavations at 41 LK 53 was based on findings made in the Phase I testing operation and on the site's surface condition. Test pit findings suggested that deposits in the vicinity of Test Pit 2 would yield the best results. A location approximately 25 m west of Test Pit 2 was chosen for its proximity to the test pit and because the ground surface showed no signs of disturbances such as would be caused by erosion or brush clearing. An excavation area consisting of nine 1-m² units arranged into a 3-m² block was laid out (Figs. 29; 32,a). Coordinates for the nine units and number of 10-cm-thick levels excavated in each are as follows: N1000 E1002 (11 levels), N1000 E1003 (11 levels), N1000 E1004 (17 levels), N1001 E1002 (11 levels), N1001 E1003 (11 levels), N1001 E1004 (11 levels), N1002 E1002 (11 levels), N1002 E1003 (11 levels), and N1002 E1004 (11 levels). Surface elevations for these units ranged from 99.63 to 99.66 m.

Cultural debris recovered as the 3-m² unit block was excavated at 41 LK 53 permitted definition of four horizons down through the deposit. Horizons and corresponding excavation levels are Horizon 1, Levels 1-3; Horizon 2, Levels 4-7; Horizon 3, Levels 8-11, and Horizon 4, Levels 12-17 (only in Unit N1000 E1004). Rates of recovery for selected classes of debris for these four horizons are as follows:

	<u>Horizons</u>			
	1	2	3	4
Tuff Weight (grams)	4	85	47	0
Sandstone Weight (grams)	229	978	1559	56
Fire-Fractured Rock Weight (grams)	905	2585	3676	72
Mussel Shell Umbo Count	164	390	435	4
Mussel Shell Weight (grams)	47	151	120	1
<i>Rabdotus</i> Shell Count	999	4572	3261	62
Bone Weight (grams)	0.8	2.9	1.1	0.1
Primary Flake Count	7	7	10	1
Secondary Flake Count	122	171	207	2
Tertiary Flake Count	253	356	560	14
Chip Count	476	781	1100	18



41LK53

PLAN OF EXCAVATIONS

Figure 29. Plan of Excavations at 41 LK 53.

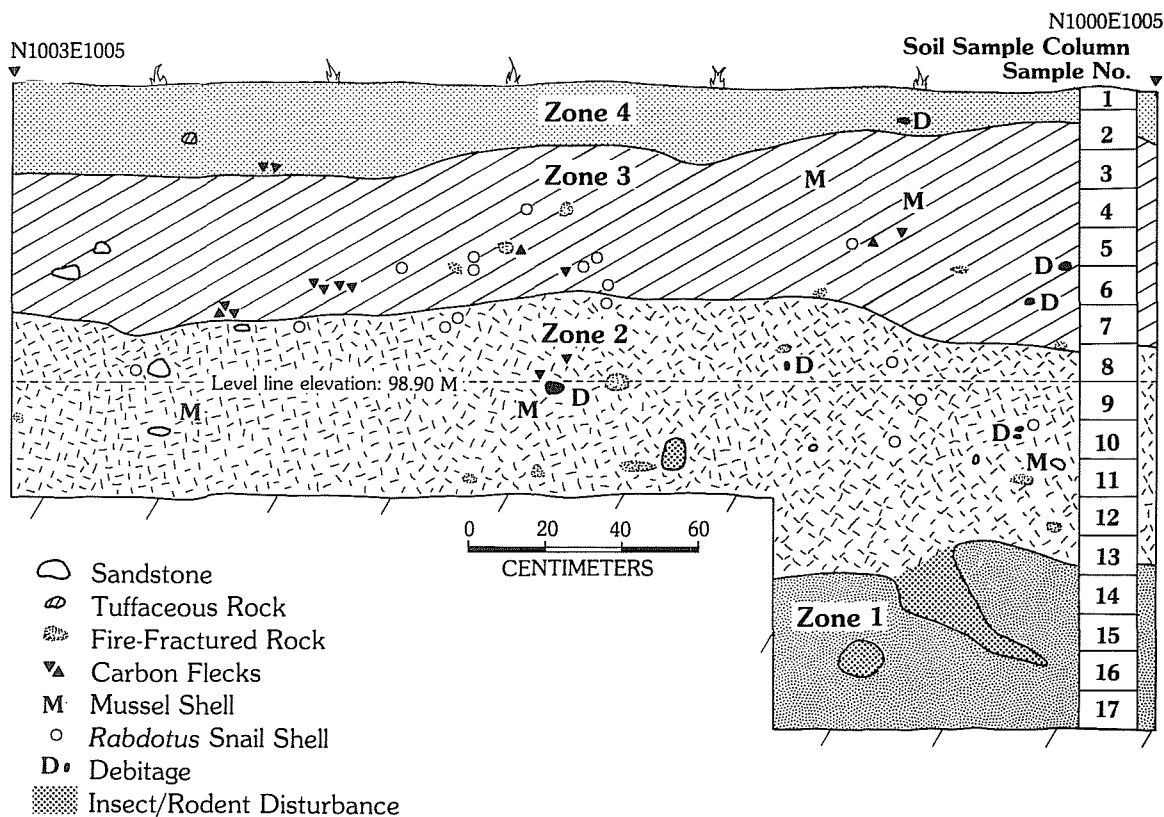
Other artifacts recovered in the Phase II excavations at 41 LK 53 are listed below.

Group	Form	Specimen	Category	Horizons			
				1	2	3	4
1	-	-	Cores	0	1	1	0
2	-	-	Cores	0	1	0	0
3	-	-	Cores	0	0	2	0
5	-	-	Cores	0	3	0	0
6	2	-	Thick Bifaces	0	0	1	0
1	1	7	Thin Bifaces	1	0	0	0
1	3	24	Thin Bifaces	1	0	0	0
1	4	2 Perdiz	Thin Bifaces	1	0	0	0
1	5	2 Scallorn	Thin Bifaces	1	0	0	0
1	5	20	Thin Bifaces	0	1	0	0
2	2	28	Thin Bifaces	0	0	1	0
3	1	3	Thin Bifaces	0	0	1	0
4	1	9	Thin Bifaces	1	0	0	0
4	3	1	Thin Bifaces	1	0	0	0
4	4	-	Thin Bifaces	1	2	3	0
9	-	-	Thin Bifaces	2	1	0	0
10	-	-	Thin Bifaces	2	4	2	0
2	1	-	Modified Sandstone	0	1	0	0
2	3	-	Modified Sandstone	1	1	1	0
3	-	-	Modified Sandstone	0	2	1	0

The zonation and certain characteristics of the soil deposits encountered in the Phase II excavation block at 41 LK 53 are illustrated in Figure 30 (also see Fig. 32,d). Also shown in this figure is the location of a soil sample column. Samples from this column are curated at the CAR-UTSA.

Two habitational features were encountered as excavations took place at 41 LK 53. Feature 1 was a rock scatter found in Level 8 (99.00 to 98.90 m) of Units N1000 E1002 and N1000 E1003. It consists of about 65 rocks distributed over an area measuring 108 cm north-south and 160 cm east-west. Roughly 50% of the material was fire-fractured rock with tuff and sandstone each comprising about 25% of the remainder. The stones were in a single layer over the feature area. Carbon flecking was observed amidst the rocks but no substantial samples were collected. Numerous *Rabdotus* snail shells, some mussel shell fragments, and debitage were collected from the soil matrix in and around the feature.

Feature 2 was another rock cluster found in Levels 10 and 11 (98.80 to 98.60 m) with portions distributed over eight of the nine units making up the excavation (Figs. 31; 32,b,c). It is composed of approximately 140 rocks, 30 to 40% of which are fire-fractured rocks, perhaps 55% sandstone, and a very small percentage of tuff rock. The feature extends 2.9 m north-south and 2.7 m east-west. The area where rock was most concentrated was along the dividing line between Units N1001 E1002 and N1001 E1003. Although its original configuration is unknown, it appears that Feature 2 has been badly disturbed. One possibility is that massive rodent activity evidenced in the



- Zone 4** Color: very dark grayish brown (10YR3/2—moist). Silty clay loam.
- Zone 3** Color: very dark grayish brown (10YR3/2—moist). Sandy clay loam.
- Zone 2** Color: brown (10YR5/3—moist). Silty clay loam.
- Zone 1** Color: very pale brown (10YR7/4—moist). Clayey sand.

41LK53

PROFILE SKETCH ALONG E1005 LINE FROM N1000 TO N1003

Figure 30. Profile Sketch Along E1005 Line from N1000 to N1003 at 41 LK 53.

feature area resulted in postdepositional redistribution of feature components. Some of the sandstone in the main concentration was orange red in color as if it had been exposed to heat. Most of the rocks were fist-sized or smaller with only six or so having dimensions in the 10 to 13 cm range. Mussel shell, snail shell, and one fish otolith were found scattered among the rocks of this feature. Carbon flecking was noted, but it seemed to occur mostly in stained areas related to rodent activity. One biface fragment (thin bifaces Group 4, Form 4, Specimen 97) was found in the feature.

In addition to the two rock scatters defined as features in the excavation at 41 LK 53, there were six smaller, poorly integrated rock groupings recorded. Unit, level, approximate size, and constitution of these small rock clusters were as follows:

Unit	Level	Size	Composition
N1000 E1003	6	60 x 80 cm	4 sandstones, 5 fire-fractured rocks
N1000 E1003	9	20 x 50 cm	3 sandstones, 3 fire-fractured rocks
N1000 E1004	12	25 x 30 cm	10 fire-fractured rocks
N1001 E1002	8	30 x 30 cm	3 sandstones, 5 fire-fractured rocks
N1002 E1002	7	30 x 40 cm	tuffaceous rock, snails, mussel shell, debitage
N1002 E1004	5	10 x 20 cm	14 sandstones

The Phase II investigation conducted at 41 LK 53 reconfirmed the presence of probably Middle Archaic and Late Archaic components in the site and added a previously undetected Late Prehistoric component. Generally speaking, the variety of artifacts recovered in Phase I investigations (especially surface collected specimens) provided a much better selection of time-diagnostic chipped stone artifacts than did the Phase II excavation. The few stemmed thin bifaces and more prevalent unstemmed thin bifaces found in the excavations are not overly useful in attempting to refine the cultural/chronological sequence for 41 LK 53.

Perhaps the most important information provided by the Phase II excavation is the evidence for repeated habitation of the site through the Archaic and into the Late Prehistoric. The two features and six smaller rock clusters evidence a series of encampments on the site through time. Concurrent with prehistoric human activity, there was gradual aggradation of deposits on the site, a likely sign that the present hollow was once a more active water course. Deposits were not accumulating rapidly enough to provide separation of prehistoric cultural debris resulting from successive habitations into discrete, definable stratigraphic units. Although apparently disrupted before burial, the rock clusters nevertheless mark living surfaces that could not have been identified solely on the basis of the other debris classes recovered.

At 41 LK 53, and at many similar Choke Canyon sites, the combination of slow surface aggradation and repeated human habitation events have caused a vertical "blurring" of habitation detritus that effectively eliminates definition of stratigraphic units any more sensitive than the horizon strata

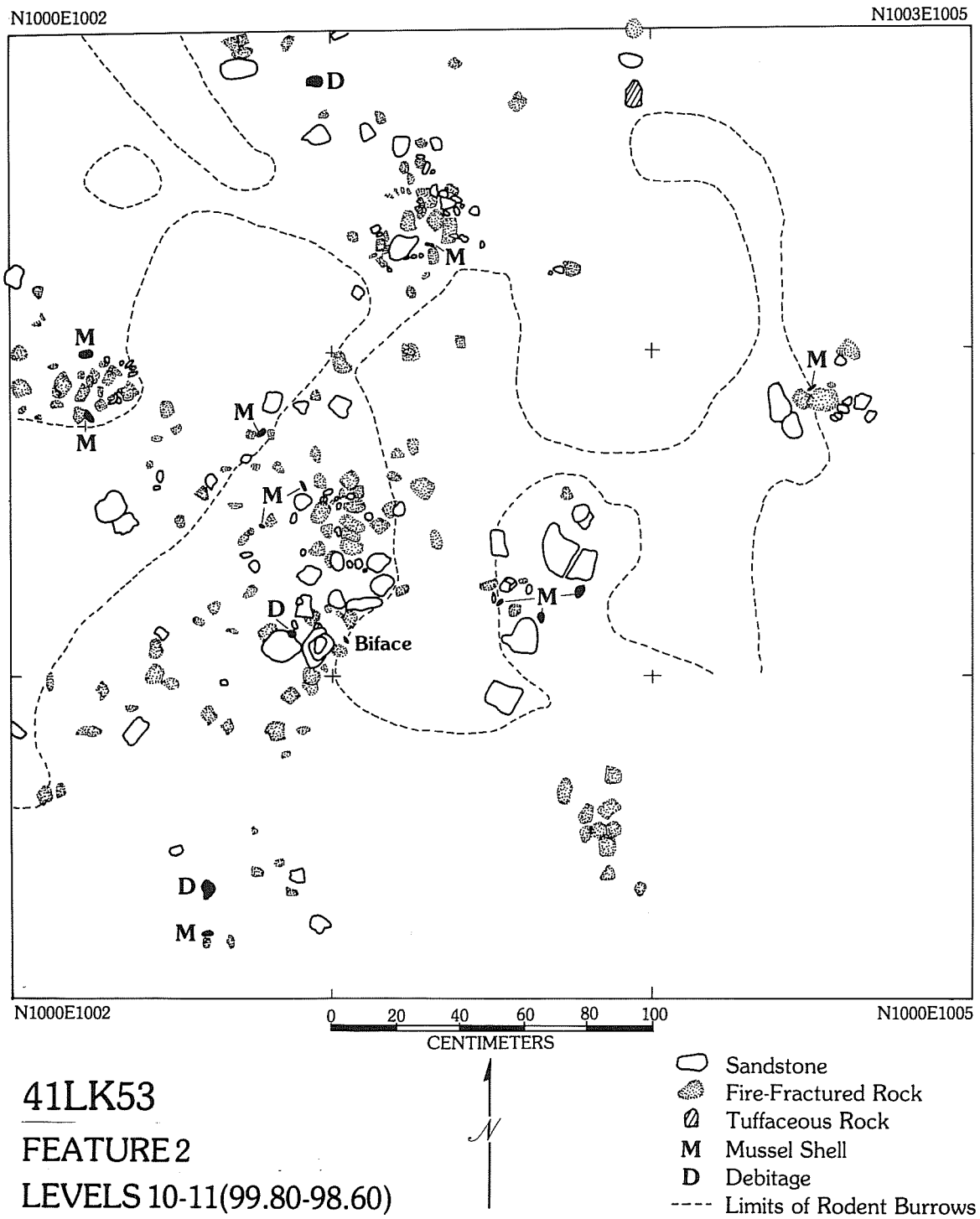


Figure 31. Plan of Feature 2 at 41 LK 53.

used for analyzing and comparing debris collections in this study. Where debitage, mussel shells, snail shells, and other small debris have undergone a vertical melding process through the centuries, the rock clusters held more firmly and survived to provide insights into the sequencing of prehistoric human activity at 41 LK 53 that might not otherwise have been available.

41 LK 243

Site 41 LK 243 was located in 1979 by the CAR survey crew. It is located at the foot of the northern Frio River valley margin (Fig. 1, folded insert). The surveyors recorded dimensions of 130 m northeast to southwest for the site. The southern end of 41 LK 243 is about 125 m north of the Opossum Hollow channel. The site surface slopes upward from southwest to northeast and then the valley margin rises quite steeply up above the site to the northeast. The surface in the site area supports a fairly dense brush cover including mesquite, soapbush, whitebrush, guajillo, spiny hackberry, cactus, and various grasses (Fig. 32,e). Some areas of the site are heavily eroded with active gullies coursing downhill through the area. Upslope on the valley wall there is a heavy pavement of lag gravels on the surface.

As 41 LK 243 was initially documented, CAR surveyors noted "semi-distinct concentrations" of mussel shell and fire-fractured rock exposed on the surface. Elsewhere the site was characterized by a heavy scatter of fire-fractured rock, chert debitage, mussel shell fragments, and snail shells. Sherds of aboriginal pottery, a distally beveled tool, several thin biface fragments, and pieces of modified sandstone were among artifacts observed at the site by CAR surveyors.

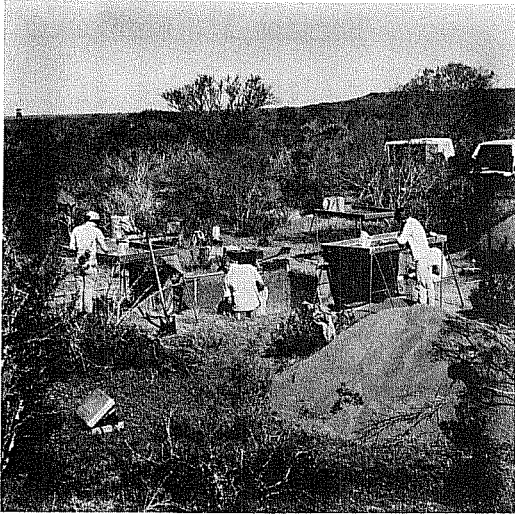
The CAR crew returned to 41 LK 243 to conduct Phase II investigations in November 1980. Looking the site over once again, comment was made on the severe gullying and sheetwash apparent over most of the site. Near the central part of the site, a layer of gravel (up to cobble size) was noted to be eroding from a gully wall about a meter below the surface. Site dimensions were adjusted slightly to 145 m east-west by 140 m north-south. The site was judged to rest on a terrace remnant so badly eroded that no part of the original floodplain remains.

Phase II activities carried out at 41 LK 243 by the CAR crew were excavation of four 1-m² test pits, four shovel tests, production of a plan map showing individual locations of 59 artifacts and a number of habitational features, mapping and collection of three mussel shell concentrations, four "dog leash" surface collections (80 cm radius), *in situ* exposure of a surface hearth, and an uncontrolled collection of surface artifacts.

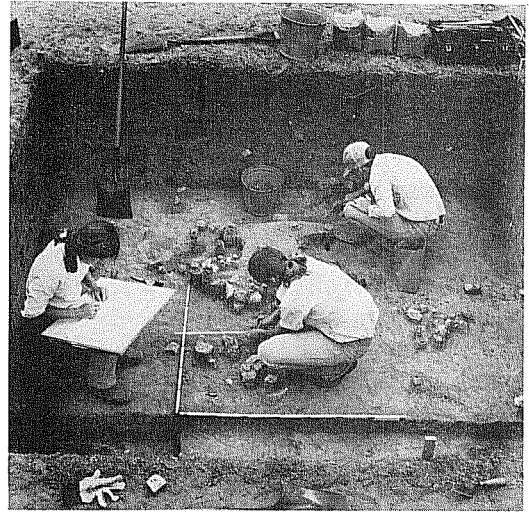
Test Pit 1 was located in the east-central area of 41 LK 243 (Fig. 33). This unit was excavated to a depth of 60 cm below the surface (six 10-cm-thick levels). Matrix excavated from the test pit was described as dark brown sandy silt from top to bottom. The debris recovered from Test Pit 1 is divided into two horizon assemblages. Horizon 1 contains debris from Levels 1-3, and Horizon 2 contains the debris from Levels 4-6. Rates of recovery for selected classes of debris recovered from the horizons in this unit are as follows:

Figure 32. Phase II Investigations at 41 LK 53 and 41 LK 243.

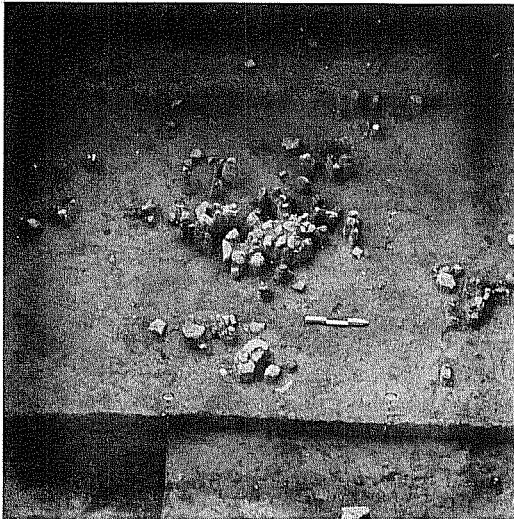
- a, view looking northwest across the Phase II excavations at 41 LK 53. Note the dense brush cover everywhere on the site and the valley margin on the horizon in the upper right corner of the picture;
- b, exposure and recording of Feature 2 underway at 41 LK 53;
- c, view looking down and west into the 3-m² pit excavated during Phase II investigations at 41 LK 53. Feature 2 in Levels 9-11 (98.90 to 98.60) is shown fully exposed. See Figure 31 for additional details;
- d, view of the east wall profile of the 3-m² pit excavated during Phase II investigations at 41 LK 53. See Figure 30 for further details;
- e, view east of testing underway at 41 LK 243. The unit is Test Pit 1 located at the site's east end. Note mussel and snail shells eroding from gully in foreground;
- f, plan view of Hearth 4 exposed at 41 LK 243.



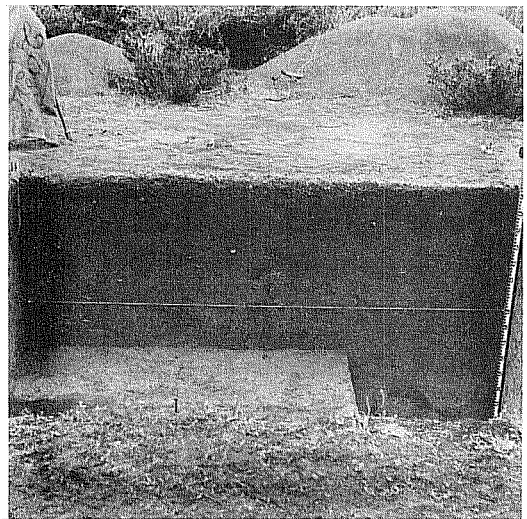
a



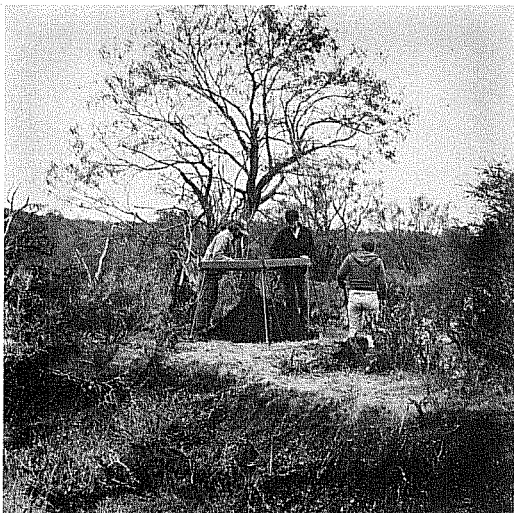
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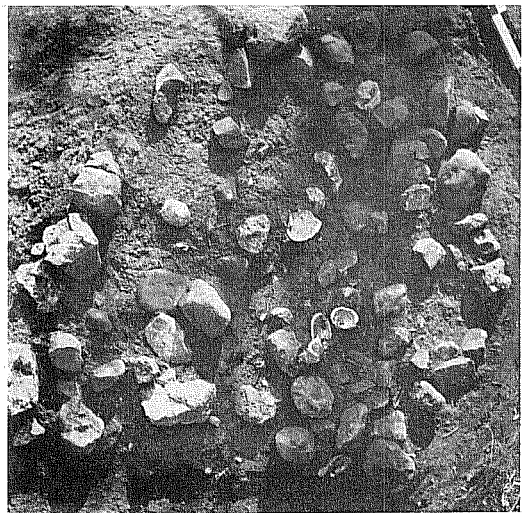
c



d



e



f

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	13	31
Sandstone Weight (grams)	14	50
Fire-Fractured Rock Weight (grams)	168	374
Mussel Shell Umbo Count	55	28
Mussel Shell Weight (grams)	18	12
Rabdotus Shell Count	93	136
Bone Weight (grams)	0	0.1
Primary Flake Count	1	0
Secondary Flake Count	13	25
Tertiary Flake Count	18	24
Chip Count	82	39

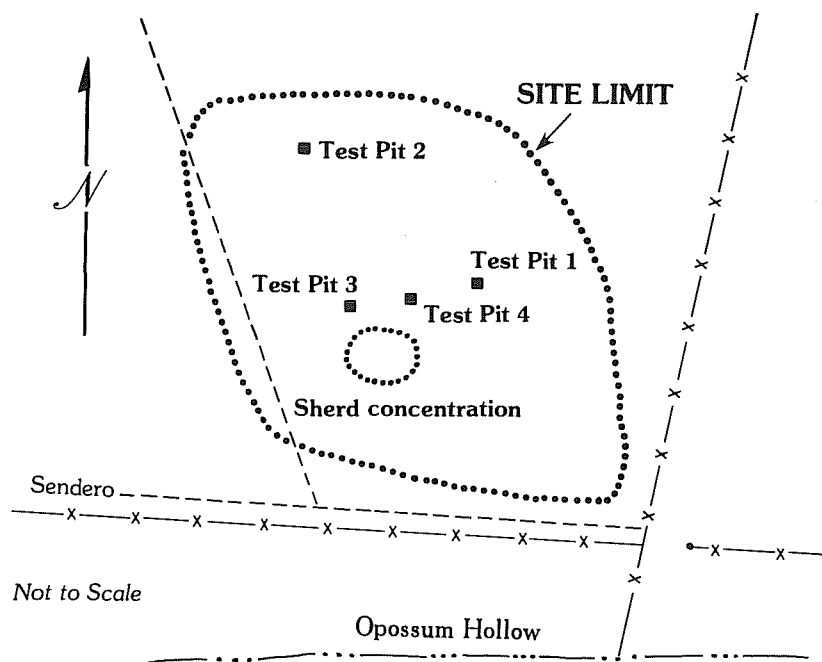
Other artifacts found in Test Pit 1 include a core (Group 1 from Level 4), two thick bifaces (Group 1 from Level 3; Group 7, Form 5 from Level 5), a thin biface fragment (Group 4, Form 4, Specimen 34 from Level 2), and a distally beveled tool (Group 8, Form 4, Specimen 1 from Level 5). Level 2 yielded a small carbon sample. In Level 4 (30 to 40 cm below surface), a loose scatter of about 20 pieces of fire-fractured rock was exposed *in situ*. It was not well integrated to warrant designation as a feature.

Test Pit 2 was located in the northwestern part of 41 LK 243 (Fig. 33). This pit was dug to a depth of 50 cm below the surface through a soil matrix described as very dark brown sandy clay loam. Amounts of material recovered from this test (all levels combined) are as follows:

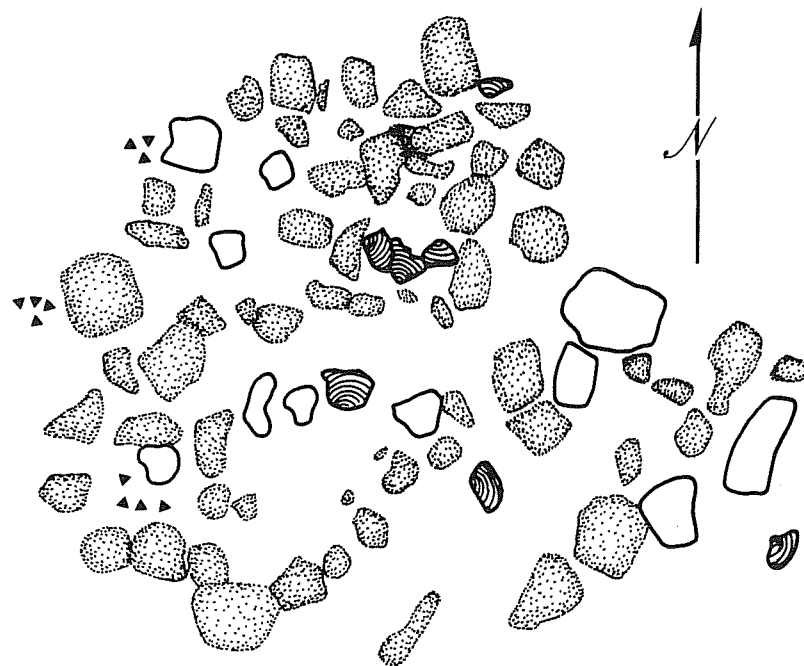
	<u>Test Pit 2</u> (All Levels)
Tuff Weight (grams)	12
Sandstone Weight (grams)	0.2
Fire-Fractured Rock Weight (grams)	61
Mussel Shell Umbo Count	21
Mussel Shell Weight (grams)	4
Rabdotus Shell Count	70
Bone Weight (grams)	0
Primary Flake Count	2
Secondary Flake Count	9
Tertiary Flake Count	17
Chip Count	18

No other artifacts were recovered from Test Pit 2 nor were any habitational features recognized.

Test Pit 3 was placed in the west-central area of 41 LK 243 (Fig. 33). It was excavated to a depth of 100 cm below the surface. Two horizons were defined. Horizon 1 represents Levels 1-5, and Horizon 2 represents Levels 6-10. Rates of debris recovery for Test Pit 3 are as follows:



SCHEMATIC PLAN OF SITE



HEARTH 4

-  Sandstone
-  Fire-Fractured Rock

-  Carbon Flecking
-  Mussel Shell

41LK243

PLANS OF SITE AND FEATURE

Figure 33. Plans of Site and Feature at 41 LK 243.

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	7	0.1
Sandstone Weight (grams)	34	58
Fire-Fractured Rock Weight (grams)	144	145
Mussel Shell Umbo Count	82	11
Mussel Shell Weight (grams)	18	21
Rabdotus Shell Count	241	167
Bone Weight (grams)	0.1	0.8
Primary Flake Count	0	3
Secondary Flake Count	35	25
Tertiary Flake Count	44	24
Chip Count	54	55

The soil matrix encountered in Test Pit 3 varied considerably. From the surface to a depth of 50 cm, the matrix was a soft, loose brown sandy loam. Below 50 cm, the matrix became a more compact dark grayish brown sandy loam with carbonate mottling. In Level 9 (80 to 90 cm below the surface), large cobbles (7 cm diameter) began to appear. These cobbles were apparently part of the same gravel layer observed in the gully nearby. No additional artifacts were found in Test Pit 3, and no habitational features were encountered.

Test Pit 4 at 41 LK 243 was located midway between Test Pits 1 and 3 at the approximate center of the site (Fig. 33). This unit was excavated to a depth of 40 cm through matrix described as dark grayish brown sandy silt containing much small gravel. No horizons were defined for the debris recovered. Rates of recovery for selected classes of debris found in Test Pit 4 are shown below. Other artifacts recovered from the unit were two cores (one, Group 5 and one, Group 6, both from Level 1).

Test Pit 4
(All Levels)

Tuff Weight (grams)	10
Sandstone Weight (grams)	77
Fire-Fractured Rock Weight (grams)	520
Mussel Shell Umbo Count	48
Mussel Shell Weight (grams)	20
Rabdotus Shell Count	301
Bone Weight (grams)	0
Primary Flake Count	0
Secondary Flake Count	14
Tertiary Flake Count	23
Chip Count	104

Habitational features found exposed on the surface of 41 LK 243 were seven apparent hearth features and three mussel shell concentrations. Locations of all of these features were plotted on a plan map of the site (on file at the CAR-UTSA). With one exception, the hearths were small, badly disrupted clusters of fire-fractured rock. They were judged to hold little information potential. One feature, designated Hearth 4, seemed to be only partially exposed and was not as disintegrated as the other six. Excavation of this

feature resulted in exposure of the hearth as shown in Figures 32,f and 33. Hearth 4 was revealed to be a single-layer cluster of approximately 60 pieces of fire-fractured rock and 11 pieces of sandstone. The feature was subcircular in outline with a maximum diameter of 90 cm. Five mussel shell valves were found amidst the rocks, and a small amount of carbon was collected. Debitage and **Rabdotus** snail shells were also recovered in small amounts from the matrix removed to expose the feature. A core (Group 3) and two grinding slab fragments (modified sandstone Group 1, Form 3; and Group 2, Form 3) were also found in the hearth. The three mussel shell concentrations mentioned above were collected after being plotted on the site map.

Seventy-five artifacts were collected from the surface of 41 LK 243. Locations of 59 of these specimens were recorded on the site plan map (on file at the CAR-UTSA). These artifacts are 16 cores (three, Group 2; three, Group 3; three, Group 5; one, Group 7; six, Group 9), 12 thick bifaces (one, Group 1; three, Group 2; one, Group 3; one, Group 6, Form 1; one, Group 6, Form 2; one, Group 7, Form 1; three, Group 8; one, Group 9), 26 thin bifaces (Group 1, Form 2, Specimen 8; Group 1, Form 3, Specimen 4 [**Ensor**]; Group 1, Form 5, Specimen 5 [**Scallorn**]; one, Group 2, Form 2; one, Group 3, Form 2; one, Group 4, Form 3; one, Group 4, Form 4; one, Group 5; one, Group 8; 10, Group 9; six, Group 10), four distally beveled tools (one, Group 3, Form 1; one, Group 3, Form 2; one, Group 4; one, Group 8, Form 2), one trimmed flake (Group 3, Form 2), eight pieces of modified sandstone (three, Group 1, Form 3; one, Group 2, Form 1; three, Group 2, Form 2; one, Group 2, Form 3), and eight sherds of aboriginal pottery.

Information recovered during Phase II investigations at 41 LK 243 clearly demonstrates prehistoric activity on the site in Late Archaic and Late Prehistoric times. The Late Archaic period is represented by diagnostics such as the **Ensor** dart point (thin bifaces Group 1, Form 3, Specimen 4) and the small triangular and subtriangular distally beveled tools (Groups 3 and 4). Other specimens, such as a large, stemmed thin biface (Group 1, Form 2, Specimen 8) and distally beveled tools (Group 8, Forms 2 and 4) may denote pre-Late Archaic human activity at 41 LK 243, but are not as clearly diagnostic as the previous specimens. The sherds of aboriginal pottery and a **Scallorn** arrow point (thin bifaces Group 1, Form 5, Specimen 5) are diagnostic of the Late Prehistoric.

The quantities of prehistoric human habitation debris and features exposed on the surface of 41 LK 243, the severe erosion actively occurring on the site surface, and the indications of colluvial deposition (i.e., numerous small, stream-rolled pebbles) seen in the test pits all suggest that the site and its remains have been considerably altered by natural destructive processes for a long period of time. Artifacts, features, and debris observed, recorded, and/or collected on the surface tell much more about the site's prehistoric inhabitants than do the test pit findings. The large quantities of debris, features, and chipped stone artifacts would also indicate that 41 LK 243 was an attractive camping locale. Opossum Hollow was probably an active stream channel carrying water on a more regular basis during certain periods of prehistory. The natural outcrops of gravel uphill from the site provided a source of raw material for stone tool manufacture. The site is also conveniently located between floodplain and upland environments, thereby making it easier for prehistoric people to exploit a more

varied range of food resources. These characteristics likely were the attractions at 41 LK 243.

41 LK 245

Located north-northwest of 41 LK 243, 41 LK 245 is in a similar setting, though slightly higher on the valley margin slope (Fig. 1, folded insert). Recorded in 1979 by the CAR survey crew, this fairly small prehistoric site has approximate dimensions of 70 m northeast to southwest and 100 m northwest to southeast. It is situated in the upper reaches of a short, steep upland drainage channel that is a minor tributary to a secondary feeder channel of Opossum Hollow. Brush cover is very dense over the surface. Mesquite, guajillo, whitebrush, and soapbush grow in profusion. The site surface has suffered moderate to heavy erosion with gullying and sheetwash being very much in evidence. The site was evidenced to the surveyors by a light scatter of debitage and three distinct scatters of fire-fractured rock, each several meters in width. A few biface fragments, a dart point (untyped), and some *Rabdotus* snail shells were noted amidst the fire-fractured rock.

After a careful search, the CAR crew failed to relocate site 41 LK 245 during Phase II investigations. Therefore, no additional information was collected for the site.

41 LK 247

Site 41 LK 247 was recorded by the CAR survey crew in 1979. It is located on the western side of a long, narrow ridge extending out from the upland southward into the Frio River valley (Fig. 1, folded insert). This upland projection constitutes the valley margin and apparently consists of eroded outcrops of Jackson Group sandstone covered with a dense pavement of lag gravels. Isolated remnants of ancient alluvial terraces also occur around the peninsula. The site occurs in the upper reaches of an east-west drainage channel cutting up the west side of the peninsula. The site surface supports moderately dense stands of guajillo, soapbush, spiny hackberry, and sparse grasses. Site dimensions were estimated by the survey as 70 m north-south and 120 m east-west. Deep gullies cut across the site and have caused extensive disturbance and destruction of prehistoric cultural remains on the site. A scatter of debitage, mussel shell, *Rabdotus* snail shell, and fire-fractured rock was used to define the site limits (Fig. 34,a).

Returning to 41 LK 247 for Phase II investigations, the CAR crew judged surface disturbance to have been so severe that only an unprovenienced collection of surface artifacts was warranted. Unfortunately, however, after careful inspection of the site area, the CAR crew failed to relocate any of the artifacts reported from the site by the 1979 survey crew. It appears that artifact collectors scoured the site subsequent to the survey and took all of the artifacts originally reported. These included an *Ensor* dart point, a *Tortugas* dart point, and several thin biface fragments. These limited materials suggest that 41 LK 247 was inhabited during the Middle Archaic and Late Archaic periods.

SITE GROUP 6

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
	41 LK 250	41 LK 252		41 LK 253

The three prehistoric sites making up Group 6 occur in the upper reaches of a major upland drainage system feeding down from the north into the Opossum Hollow drainage. The area containing the site group is 8.0 to 8.7 km northwest of Choke Canyon Dam (Fig. 1, folded insert). The sites are only a short distance east of the Live Oak-McMullen County line. A small valley formed by four major tributary drainage channels and numerous lesser drainages cuts northward for a considerable distance into the uplands. The valley margin slopes are formed of ancient alluvial terrace remnants and exposures of the Jackson Group Formation. Lag gravels form extensive pavements along the slopes. The entire area is heavily covered with brush. Erosion along the channels and on the valley margin slopes has been surveyed. The modern channel of the Frio River runs 5 km to the south of Site Group 6. The valley of Opossum Creek is about 3 km to the west across an upland area.

41 LK 250

Site 41 LK 250 is located on the western margin of the small valley formed by the several upland drainage channels down to the Frio River from the north (Fig. 1, folded insert). Recorded by the CAR survey crew in 1979, 41 LK 250 is situated on the valley margin slope in the upper reaches of a short, steep upland drainage gully that is a tributary to the bigger channels down in the valley. The site is relatively small, having dimensions of only 40 m north-south and 60 m east-west. There is heavy brush cover over the site surface, including blackbrush, spiny hackberry, persimmon, soapbush, allthorn, mesquite, and agarita. Lag gravels occur as a surface pavement uphill from the site area. The surface is heavily eroded. The site was defined and delimited on the basis of a moderate to heavy surface scatter of debitage, fire-fractured rock, and stone tool fragments observed primarily in gullies cutting through the site.

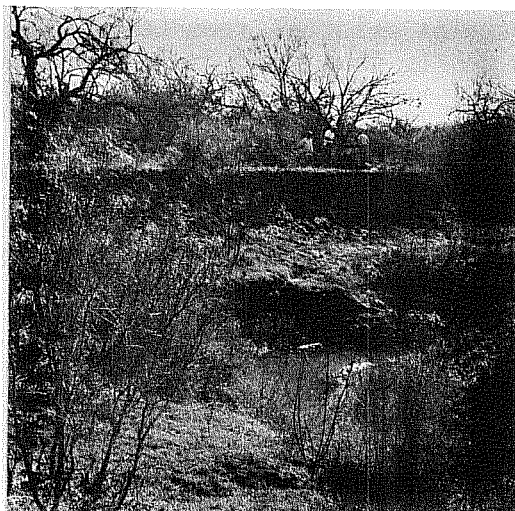
During Phase II investigations at 41 LK 250, the CAR crew excavated a 1-m² test pit, made a shovel test, and conducted a provenienced collection of surface artifacts. A large, deep gully at the north end of the site revealed in its walls a layer of fire-fractured rock and debitage at a depth of about 60 cm below the surface. Test Pit 1 was staked out in an uneroded remnant adjacent to this gully. This test pit was excavated to a depth of 110 cm below the surface (eleven 10-cm-thick levels). From the surface to a depth of 80 cm, the matrix in this unit was described as dark grayish brown clayey loam having a blocky, stiff consistency. Beneath 80 cm, the matrix was tannish brown silty loam speckled with carbonate nodules. Three debris horizons were defined for this test pit. Horizon 1 contains debris recovered from Levels 1-3, Horizon 2 contains the debris from Levels 4-8, and Horizon 3

Figure 34. Views of 41 LK 247, 41 MC 196, 41 MC 213, and 41 MC 212.

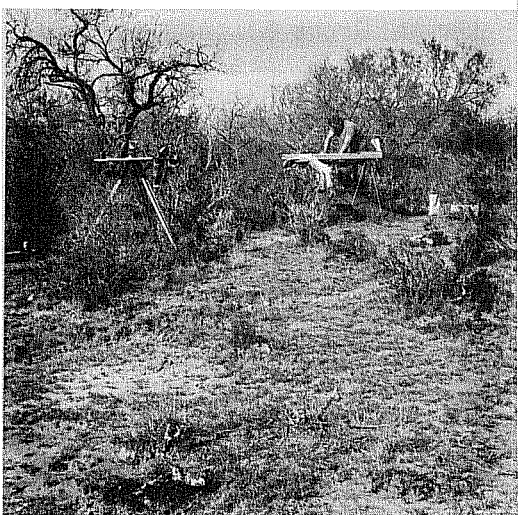
- a, view south across one area of 41 LK 247 showing fire-fractured rock, mussel shell, *Rabdotus* snail shell, and debitage exposed on the site surface by erosion. Debris exposures such as this are typical of many of the prehistoric sites at Choke Canyon;
- b, scene at 41 MC 196 looking east across drainage channel to area of Test Pit 2, where excavations are in progress;
- c, view looking north across Area C of 41 MC 196. Test Pit 3 excavation in progress;
- d, a concentration of fire-fractured rock exposed on the surface in Area E of 41 MC 196;
- e, view of 41 MC 213 looking east-southeast from hill above site area;
- f, view looking northwest across 41 MC 212 from valley margin hillside above the site.



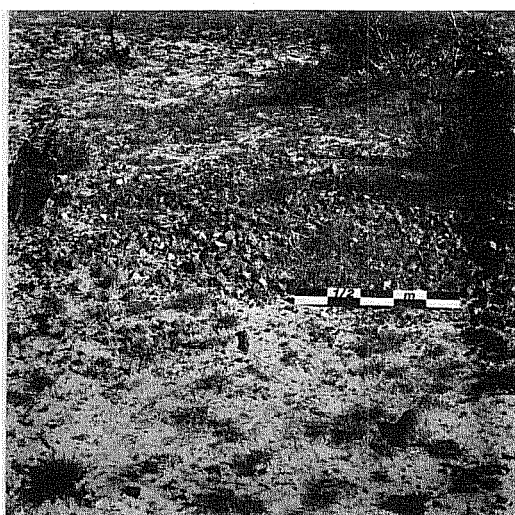
a



b



c



d



e



f

contains material from Levels 9-11. Rates of recovery for selected classes of debris from these three horizons are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight (grams)	3	178	13
Sandstone Weight (grams)	69	1019	29
Fire-Fractured Rock Weight (grams)	652	1648	518
Mussel Shell Umbo Count	2	6	7
Mussel Shell Weight (grams)	3	3	0.2
Rabdotus Shell Count	89	491	36
Bone Weight (grams)	0.1	0.1	0
Primary Flake Count	3	5	1
Secondary Flake Count	18	30	10
Tertiary Flake Count	23	31	5
Chip Count	82	86	20

The following additional artifacts, all from Horizon 2, were also recovered: seven cores (one, Group 1; three, Group 2; three, Group 5), one thick biface (Group 1), two thin bifaces (one, Group 2, Form 1; one, Group 10), one trimmed flake (Group 4), and one piece of modified sandstone (Group 1, Form 3).

The artifacts recovered from the surface of 41 LK 250 are seven cores (four, Group 3; two, Group 5; and one, Group 9), one thick biface (Group 6, Form 2), 10 thin bifaces (Group 1, Form 3, Specimen 28; two, Group 2, Form 2; one, Group 4, Form 4; three, Group 9; three, Group 10), one distally beveled tool (Group 3, Form 2), four pieces of modified sandstone (one, Group 1, Form 1; one, Group 1, Form 3; one, Group 2, Form 2; one, Group 3), and one marine shell artifact (Specimen 6). Locations of many of these specimens were plotted on a plan map of the site (on file at the CAR-UTSA).

The Phase II work at 41 LK 250 resulted in sampling an unusual habitational feature in the form of a midden of fire-fractured rock. The feature was represented by a 30 to 40 cm-thick layer of virtually solid fire-fractured rock recovered from Horizon 2 of Test Pit 1. It was also visible in the walls of gullies cutting down through the site. The full horizontal extent of this layer of rock was not determined. Clearly, however, the feature represents a substantial expenditure of energy on the part of the prehistoric people who inhabited the site.

The array of chipped stone tools found at 41 LK 250, especially items such as a stemmed thin biface (Group 1, Form 3, Specimen 28) and a distally beveled tool (Group 3, Form 2), indicate human activity on the site during the Late Archaic period. It is suggested that the midden of fire-fractured rock also dates to this period. The cores, thick bifaces, thin bifaces, and debitage recovered from the site show that local lag gravels were being utilized by prehistoric inhabitants for production of stone tools. It is noteworthy that so little mussel shell was collected from the test pit. **Rabdotus** snail shells were recovered in predictable quantities. Mano and metate fragments (modified sandstone Groups 1 and 2) were also found. Animal bone, mostly unidentifiable, occurred in very low amounts. One unusual artifact recovered

at 41 LK 250 is a tabular bead made from the columella of a marine whelk shell (Specimen 6, *Busycon* sp.).

41 LK 252

Site 41 LK 252 is located northwest of 41 LK 250 on the opposite (east) side of the drainage channel valley (Fig. 1, folded insert). It is situated on the gentle slope of the valley margin. As recorded by the CAR surveyors in 1979, 41 LK 252 is oval in outline shape with dimensions of about 100 m north-south and 250 m east-west. The site surface is moderately to heavily eroded and supports fairly thick stands of brush, including acacias, guajillo, soapbush, agarita, mesquite, and sparse grasses. Lag gravels occur as a surface pavement throughout the area. The admittedly vague limits of 41 LK 252 were defined by the survey crew on the basis of a light surface scatter of debitage and fire-fractured rock. One particularly heavy concentration of fire-fractured rock, covering an area of about 4 m², was noted on the surface. Five thick bifaces, a hammerstone, and approximately 20 cores were observed during the initial site reconnaissance.

Returning to 41 LK 252 for Phase II investigations, the CAR crew excavated three shovel tests and made a provenienced collection of surface artifacts. Shovel tests ranged in depth from 45 to 55 cm. Matrix in the upper 40 cm varied from light tannish brown clayey loam to grayish brown sandy loam. The upper 20 cm contained substantial amounts of fire-fractured rock, debitage, snail shells, and numerous stream-rolled pebbles. Beneath 40 cm, the matrix was described as yellowish white stiff clayey loam. Findings made in these shovel tests indicated that controlled excavations were not warranted at 41 LK 252.

Thirty artifacts were collected from the surface of 41 LK 252. Locations of many of these specimens were plotted on a plan map of the site (on file at the CAR-UTSA). The artifacts recovered are four cores (one, Group 1; two, Group 3; one, Group 6), 17 thick bifaces (one, Group 2; one, Group 3; four, Group 4; three, Group 6, Form 2; two, Group 7, Form 1; one, Group 7, Form 2; and three, Group 8), six thin bifaces (three, Group 4, Form 4; one, Group 5; two, Group 10), two distally beveled tools (one, Group 3, Form 1; one, Group 7, Form 2), and one uniface (Group 5). This array of specimens indicates site usage during the Middle Archaic and/or Late Archaic periods. The number of thick bifaces found indicates that chipped stone tool manufacture was one important prehistoric activity on the site.

Many of the artifacts collected at 41 LK 252 were found in and around a locally heavier concentration of fire-fractured rock exposed on the surface along the southern edge of the site. Dimensions for this fire-fractured rock feature were set at 30 x 30 m. The feature, and the array of chipped stone tools recovered from it, are remarkably similar to the findings made at 41 LK 250.

41 LK 253

Site 41 LK 253 is located far back up in the drainage valley, but is down in the floodplain rather than on the valley margin as are sites 41 LK 250 and 41 LK 252 (Fig. 1, folded insert). The site is cut through north to south by two drainage channels near the head of the valley. As recorded by CAR surveyors in 1979, 41 LK 253 has dimensions of 100 m north-south and 130 m east-west. Vegetation is moderately thick on the surface. Mesquite, soapbush, spiny hackberry, whitebrush, prickly pear, and low grasses are all present. The surface is moderately eroded in some places. Near the drainage channels, parts of the site surface have been silted over. The site limits were defined on the basis of a light to moderate scatter of fire-fractured rock and debitage across the surface. Lag gravels are distributed throughout the area.

CAR Phase II activities at 41 LK 253 were excavation of four shovel tests and a provenienced collection of surface artifacts. In the shovel tests, cultural debris was confined to the upper 20 cm of deposit. Shovel test results indicated that controlled excavations would not be worthwhile.

Twenty-three chipped stone tool specimens were collected from the surface of 41 LK 253. Locations of most of these specimens were recorded on a plan map of the site (on file at the CAR-UTSA). The artifacts were identified as two cores (one, Group 3; one, Group 5), eight thick bifaces (two, Group 1; two, Group 2; one, Group 4; one, Group 6, Form 2; two, Group 7, Form 1), 12 thin bifaces (one, Group 2, Form 1; one, Group 3, Form 1; one, Group 3, Form 2; five, Group 4, Form 4; four, Group 9), and one distally beveled tool (Group 3, Form 3). Again, these specimens indicate that prehistoric activity occurred at this site during the Late Archaic. Relatively numerous thick bifaces and thin biface fragments show that local gravels were providing raw material for chipped stone tool making, apparently one of the important activities on the site.

The three sites in Group 6, 41 LK 250, 41 LK 252, and 41 LK 253, were found to be remarkably similar in character and content. The sites share in common their physiographic setting, the presence of massive amounts of fire-fractured rock, a chipped stone tool assemblage generally diagnostic of the Late Archaic, ample evidence that stone tool manufacture was an important activity at each site, and the absence or low frequency of mussel shell and/or animal bone. The pattern emerging from this data suggests that certain locations in the transition zone from floodplain to upland became more important in the Late Archaic. Activities that resulted in the tremendous amounts of fire-fractured rock evidenced in these sites cannot currently be identified, but are undoubtedly a key to development of the sites. The small quantities of mussel shells, so common at most other prehistoric sites at Choke Canyon, suggest that the people were not heavily exploiting riverine and floodplain food resources when they lived on these sites. Although no supporting evidence is currently recognized, it seems likely that the fire-fractured rock is derived from the construction and use of rock-lined oven pits that Late Archaic people were using to prepare some kind of plant food for consumption. With the number of cores, thick bifaces, and thin biface fragments found on these three sites, it is clear that prehistoric people were putting local gravels to good use as raw material for

manufacture of chipped stone tools. Gravels are so widespread throughout the Choke Canyon region that it is unlikely the people came to these sites specifically for this reason. The knapping must surely have been of subsidiary importance to whatever the food gathering emphasis was at the time the sites were inhabited. An alternative, though less probable explanation for the accumulations of fire-fractured rock, is that they are residues from chert heat treating (annealing) operations at the sites. However, examination of chipped stone tools from the sites has not shown evidence of heat treatment. More generally, it is important to emphasize that this settlement pattern, at least in this particular area, appears to be a mode of existence for Late Archaic people. The pattern likely says something very important about conditions existing during that particular time period.

SITE GROUP 7

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
	41 MC 196	41 MC 213		41 MC 201 41 MC 209 41 MC 212

Site Group 7 is located in the upper reaches of the Opossum Creek valley 10 to 14 km northwest of Choke Canyon Dam (Fig. 1, folded insert). Opossum Creek is a major upland drainage system that feeds down to the Frio River from the northwest. The sites in Group 7 are 3 to 7 km upstream from the creek's juncture with the river. The creek valley ranges in width from 0.4 km at the northwest end of the site group area to 1.35 km at the southeast end. The creek channel is quite sinuous and, in the site group area, is fed by 10 short, steep drainage channels coming down from the uplands to the east and west. Storage tanks, pipelines, and pumps related to oil industry activity are very common. Brush cover is heavy and erosion moderate to severe. Lag gravels occur as surface pavement almost everywhere, but are especially common on the slopes leading up out of the Opossum Creek valley.

41 MC 196

Site 41 MC 196 is a very large prehistoric site recorded by the Texas Tech survey crew in 1977. It is located on the left (east) bank of Opossum Creek from 3 to 4 km upstream from the Frio River (Fig. 1, folded insert). As recorded by the Texas Tech surveyors, 41 MC 196 measures 1.3 km north-south and 0.4 km east-west. The east-west width encompasses virtually the entire floodplain from the creek channel eastward to the valley wall (Fig. 35).

In Phase II investigations, the CAR crew began by resurveying 41 MC 196. The crew defined seven areas within the site boundaries where prehistoric cultural activities appear to have been much more intense than in intervening

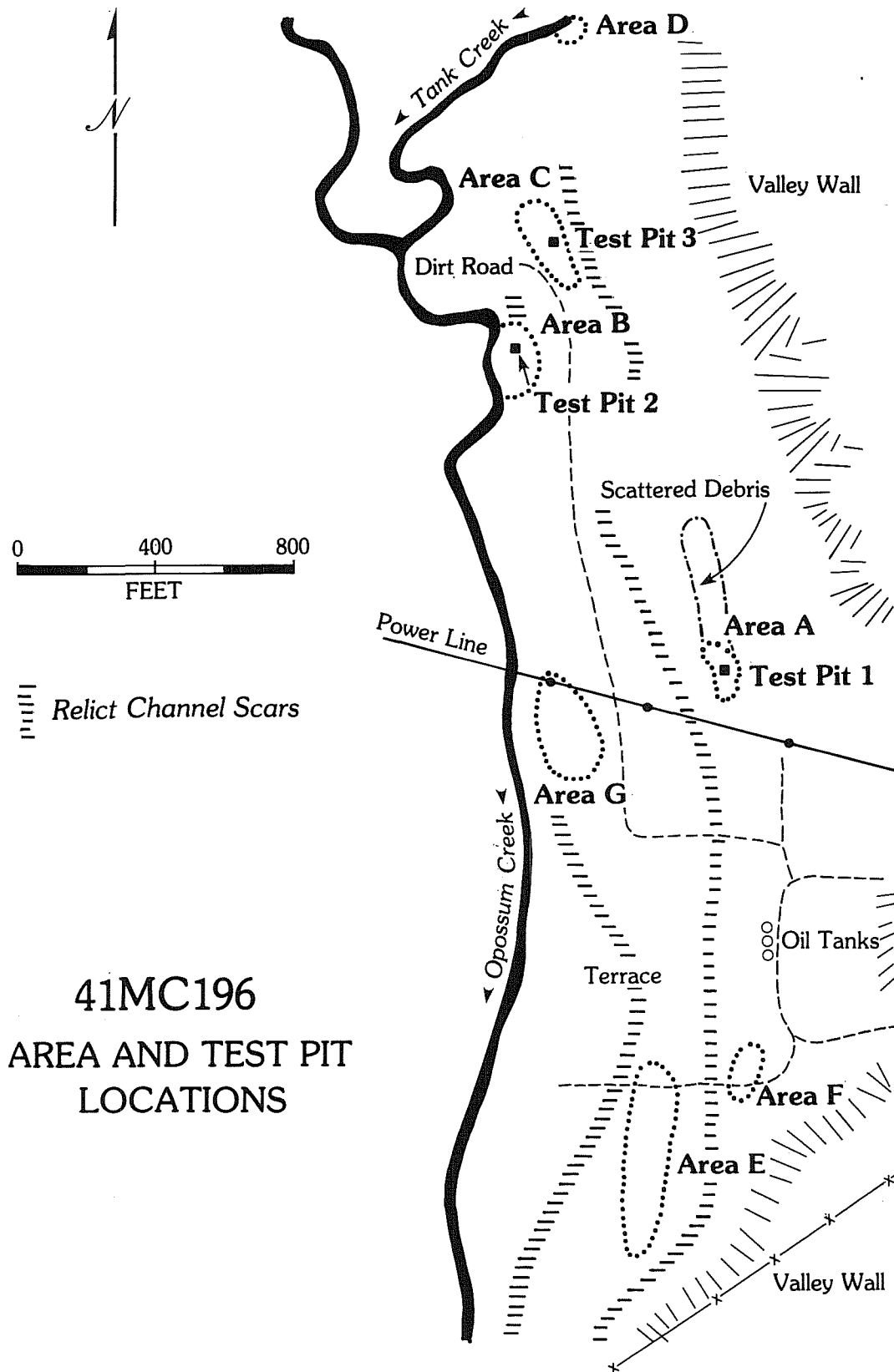


Figure 35. Area and Test Pit Locations at 41 MC 196.

zones. These locally heavier accumulations of prehistoric cultural debris were designated Areas A to G (Fig. 35). Most of the designated areas occur on locally higher ground such as terrace remnants or levees formed by the creek. By examination of topographic maps and field observations, the surveyors were able to identify relict channels paralleling the present course of Opossum Creek. Some of the more prominent channel scars are shown in Figure 35. Additional Phase II activities at 41 MC 196 included excavation of three 1-m² test pits, some shovel testing, and a provenienced collection of surface artifacts.

Located on the east side of a major north-south trending relict channel scar, Area A was unusual in that it was not situated on a topographic high as were the other areas. Dimensions of this area were estimated at 10 m x 26 m with the long axis running north-northwest to south-southeast. The area was defined on the basis of fire-fractured rock, debitage, and sandstone exposed on the surface. A large, complete metate (modified sandstone Group 1, Form 1) was found at the north end. A lighter scatter of cultural debris extends northward from the primary concentration, appearing to follow a low ridge going in that direction (Fig. 35).

Test Pit 1 was excavated in Area A at 41 MC 196. This unit went down 60 cm below the surface (six 10-cm-thick levels). Matrix was described as dark brown clayey loam from the surface down into Level 3. In Level 4, grayish white carbonate mottling began to show up and increased in each subsequent level. No horizons were defined in the debris recovered from Test Pit 1. Rates of recovery for selected classes of debris from Test Pits 1-3 (Test Pits 2 and 3 to be discussed below) are as follows:

	<u>Test Pits</u>		
	1	2	3
Tuff Weight (grams)	1	0	0
Sandstone Weight (grams)	143	9	47
Fire-Fractured Rock Weight (grams)	98	17	39
Mussel Shell Umbo Count	1	3	2
Mussel Shell Weight (grams)	0.3	0.6	4.7
Rabdotus Shell Count	246	0	72
Bone Weight (grams)	4.8	0.	1.8
Primary Flake Count	4	0	1
Secondary Flake Count	26	12	40
Tertiary Flake Count	22	13	37
Chip Count	85	11	62

Test Pit 1 also yielded three cores (one, Group 3; two, Group 5), two thin biface fragments (one, Group 9; one, Group 10), and five pieces of modified sandstone (three, Group 1, Form 3; two, Group 2, Form 1).

A small, single layer cluster of sandstone was exposed in Level 2 (10-20 cm below the surface) of Test Pit 1. Subcircular with a diameter of 60 cm, this feature was composed of about 40 pieces of sandstone and seven pieces of fire-fractured rock, all having maximum dimensions of less than 8 cm. A small amount of carbon was collected from this feature.

Area B was defined roughly 375 m northwest of Area A above a cutbank along the present channel of Opossum Creek (Figs. 34,b; 35). An ill-defined layer of prehistoric cultural debris was seen in the cutbank face from 40 to 65 cm below the surface. A relatively heavy scatter of debris also littered the talus slope below the bank. Test Pit 2 was staked out about 2 m back from the edge of the cutbank. The unit was excavated to a depth of 60 cm in six 10-cm-thick vertical levels. From the surface to a depth of 14 cm, the matrix was light grayish brown sandy loam. From 15 cm to the bottom of the unit, the soil was dark grayish brown clayey loam with carbonate speckling increasing with depth. Rates of recovery for selected classes of debris from Test Pit 2 are shown above. A piece of modified sandstone (Group 1, Form 3) was found in Level 2.

Area C has the most dense accumulation of prehistoric cultural debris found anywhere on 41 MC 196. The area occurs on a low ridge trending northeast to southwest (Fig. 35). The ridge is bounded east and west by relict channel scars. Area C was recognized and delimited on the basis of fire-fractured rock, mussel shell, bone, and debitage distributed across the surface, especially in the backdirt of numerous animal burrows.

Test Pit 3 was excavated in Area C at 41 MC 196 (Fig. 34,c). It was excavated to a depth of 50 cm below the surface; the matrix was described as dark grayish brown sandy loam. Debris recovery for all levels combined is presented above. Two cores (Group 5) were the only additional artifacts found in the test pit.

A hearth was isolated in Level 5 (40 to 50 cm below the surface) of Test Pit 3. It was composed of 47 pieces of sandstone arranged in a subcircular, single layer cluster with dimensions of 50 x 75 cm. Rocks in the center of the feature were 5 to 7 cm in diameter. Outlying stones were 3 to 4 cm in diameter. A small amount of carbon was collected from amidst the rocks.

A second hearth feature was found partially exposed on the surface of Area C. Located about 18.5 m west of Test Pit 3, this feature consisted of an oval-shaped, single layer cluster of 20 pieces of sandstone. Dimensions of the feature were 31 cm east-west by 35 cm north-south. Stones ranged in size from 4 to 5 cm. Partially exposed in the side of a large erosional gully, this feature appeared to be buried about 20 cm below the surface. Mussel shell, turtle bone, and *Rabdotus* snail shells were scattered around on the surface in the immediate area.

Area D is the northernmost concentration of cultural debris recognized at 41 MC 196 (Fig. 35). This small area was defined by the distribution of burned sandstone and debitage in two erosional gullies. Shovel test results indicated that controlled testing was not warranted in the area.

Areas E, F, and G were defined in the southern half of 41 MC 196 (Figs. 34,d; 35). Shovel tests excavated in each of these areas revealed no deposits worthy of controlled test excavations.

The artifacts collected from the surface of 41 MC 196 are three cores (one, Group 3; two, Group 5), one thick biface (Group 3), 21 thin bifaces (Group 1, Form 1, Specimen 2 [Morhiss]; Group 1, Form 2, Specimen 4 [Langtry]; Group 1,

Form 6, Specimen 3 [dart point stem]; one, Group 2, Form 1; three, Group 2, Form 2; one, Group 4, Form 1; one, Group 4, Form 3; four, Group 4, Form 4; five, Group 9; three, Group 10), seven distally beveled tools (one, Group 3, Form 1; two, Group 3, Form 3; two, Group 4; one, Group 8, Form 5; one, Group 9), two unifaces (one, Group 2, one, Group 4), one trimmed flake (Group 4), and 32 pieces of modified sandstone (two, Group 1, Form 1; 17 Group 1, Form 3; one, Group 2, Form 1; six, Group 2, Form 2; six, Group 2, Form 3). Locations of many of these specimens were recorded on a plan map of the site (on file at the CAR-UTSA).

The array of artifacts recovered from the surface of 41 MC 196 indicates that cultural debris marking the site was deposited during the Middle Archaic and/or Late Archaic period(s). The **Langtry** and **Morhiss** dart points, the unstemmed thin bifaces, and the distally beveled tools are the diagnostics upon which the estimate of period of occupation is based. Unspecified activities resulting in substantial accumulations of fire-fractured rock are again evidenced. In the case of 41 MC 196, the fire-fractured rock concentrations occur at intervals along the floodplain of Opossum Creek. Most probably, each discrete concentration (i.e., Areas A to G) represents a separate habitational event on the site. The distribution of these areas down the site graphically illustrates the concept of the "generalized resource area" offered as a settlement mode for prehistoric people at Choke Canyon (Lynn, Fox, and O'Malley 1977:172; Hall, Black, and Graves 1982:475). Like sites in Group 6 discussed above, the combination of masses of fire-fractured rock, relatively numerous seed/nut processing tools (modified sandstone specimens), and virtual absence of mussel shell again suggests a subsistence orientation focused away from riverine resources. Heavy reliance on some type of plant food is inferred.

41 MC 201

Site 41 MC 201 was recorded and extensively investigated by the Texas Tech surveyors in 1977 (Thoms, Montgomery, and Portnoy 1981:173-187). It is positioned on a slight rise formed by a natural levee along the left (east) bank of Opossum Creek (Fig. 1, folded insert). A substantial upland drainage channel trends down from the northeast and meets Opossum Creek off the southeast end of 41 MC 201. As recorded by the Texas Tech crew, the site has a northwest-southeast length of 300 m and a width of 75 to 100 m. The site surface is described as moderately eroded and covered with scattered clumps of brush. Debris evidencing the site consists of a "large relatively uniform scatter of burnt rock and chipped stone." Numerous eroded hearths were also noted on the surface. Carbon collected from one of these features (Hearth 23) yielded a radiocarbon assay indicating an age of 1140 to 1110 B.C. (TX-3020, MASCA corrected; Hall, Black, and Graves 1982:652). The Texas Tech investigation of 41 MC 201 was judged adequate, and no additional Phase II investigation was attempted.

41 MC 209

Site 41 MC 209 was recorded and extensively investigated by the Texas Tech surveyors in 1977 (Thoms, Montgomery, and Portnoy 1981:187-196). The site is

located in the upper reaches of the Opossum Creek valley (Fig. 1, folded insert) on the right (south) bank of Opossum Creek between the channel and valley margin. The site is irregular in outline shape and has an east-west length of 550 m and a width of 100 m. Its surface is severely eroded. Texas Tech surveyors estimated that at least 85% of the site had been eroded and deflated.

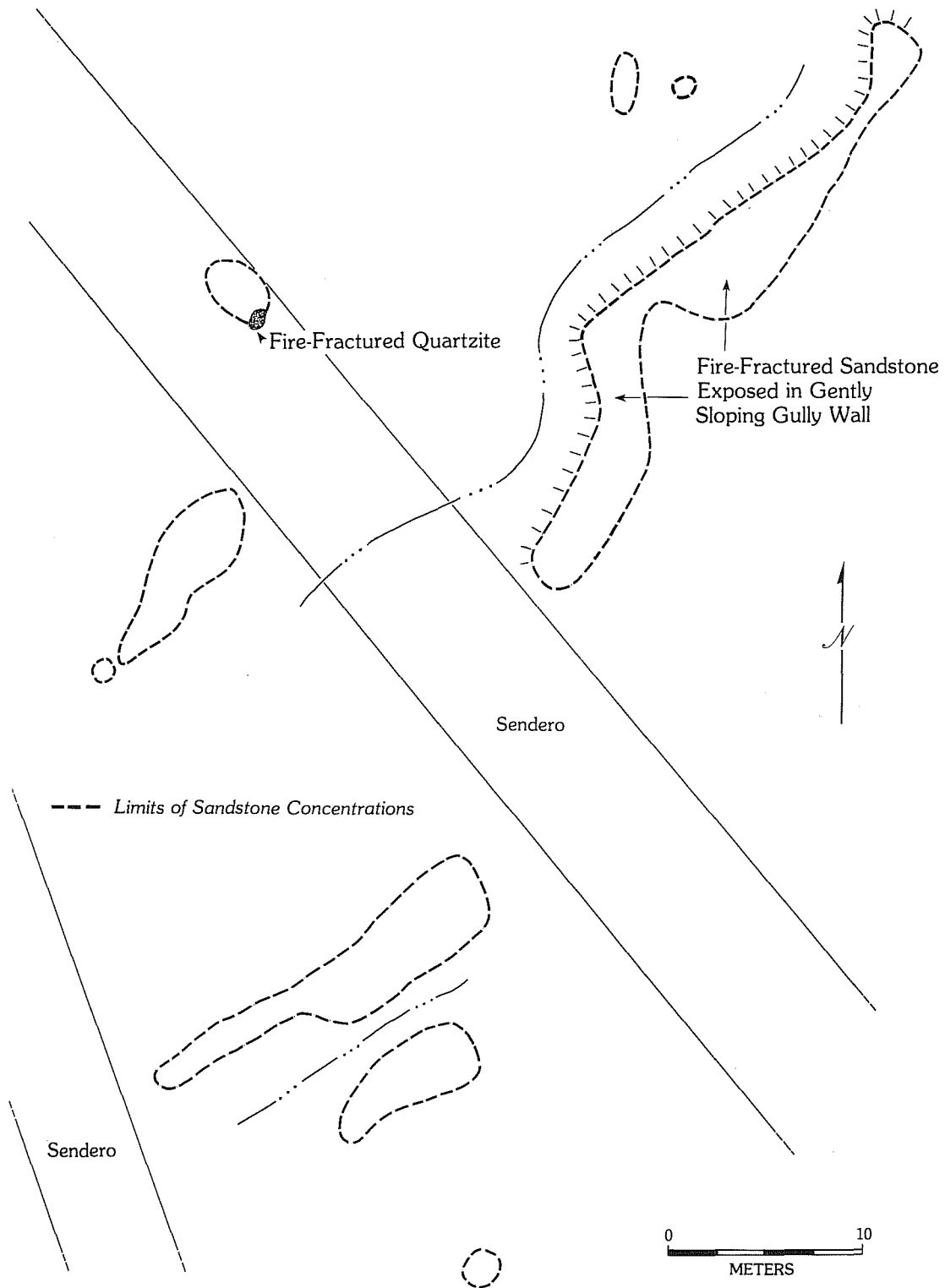
The 1977 investigation included a provenienced surface collection of numerous artifacts and documentation of a number of surface features. Given the extremely eroded condition of the site surface and the comprehensiveness of the Texas Tech research, no additional Phase II investigation was attempted at 41 MC 209.

41 MC 213

Located northwest across the Opossum Creek valley from 41 MC 209, 41 MC 213 is situated on the slope of the valley above the left (east) bank of the creek (Fig. 1, folded insert). Recorded by the Texas Tech survey crew, 41 MC 213 has a northeast-southwest length of 195 m and a width of 60 m. The site is at the foot of a prominent southwest projecting sandstone ridge that shelters it from the north (Fig. 34,e). A large southwest-trending gully system cuts through the middle of the site, reaching depths of 2 m in some places. Most of the prehistoric cultural debris evidencing the site is exposed in the sides of these gullies. Brush cover is moderate on the site. Mesquite, acacias, and grasses are present. Site 41 MC 213 is evidenced by dense, but localized scatters of fire-fractured sandstone, fire-fractured rock, and debitage. A number of *senderos* (rough roadways bulldozed through the brush) crisscross the site, contributing significantly to disruption of prehistoric cultural remains present.

Phase II activities of the CAR crew at 41 MC 213 consisted of production of a plan map showing the distribution of sandstone accumulations across the site, excavation of two shovel tests, and a provenienced collection of 57 artifacts from the surface. The plan of sandstone concentrations is shown in Figure 36. The excavation of two shovel tests into the subsurface confirmed what was apparent from conditions on the surface. The site was badly deflated and most of the prehistoric cultural debris rests on the surface or near-surface. Controlled excavations were not warranted.

The following artifacts were collected from the surface of 41 MC 213: seven thick bifaces (one, Group 1; one, Group 2; one, Group 6, Form 2; two, Group 7, Form 1; one, Group 7, Form 2; one, Group 8), 39 thin bifaces (Group 1, Form 1, Specimen 1 [*Pedernales*]; Group 1, Form 1, Specimen 11; Group 1, Form 2, Specimen 5 [*Langtry*]; Group 1, Form 3, Specimen 5 [*Ensor*]; Group 1, Form 3, Specimen 30; three, Group 2, Form 1; one, Group 2, Form 2; one, Group 3, Form 2; two, Group 4, Form 1; one, Group 4, Form 3; 10, Group 4, Form 4; one, Group 5; two, Group 6; one, Group 8; seven, Group 9; five, Group 10), eight distally beveled tools (one, Group 2, Form 1; three, Group 3, Form 2; two, Group 3, Form 3; one, Group 6; one, Group 8, Form 5), and three metates (modified sandstone Group 1, Form 1). The locations of most specimens are recorded on a plan map of the site (on file at the CAR-UTSA). The diagnostic forms among these specimens indicate that the site was



41MC213
DISTRIBUTION OF BURNED SANDSTONE
CONCENTRATIONS

Figure 36. Distribution of Burned Sandstone Concentrations at 41 MC 213.

inhabited in Middle Archaic and Late Archaic times. These periods are indicated by the **Pedernales** and **Langtry** dart points (Middle Archaic), the **Ensor** dart point (Late Archaic), and a variety of unstemmed thin bifaces and distally beveled tools (both Middle Archaic and Late Archaic).

The Middle Archaic to Late Archaic age, massive deposits of burned sandstone, presence of manos and metates, and essential absence of mussel shell place 41 MC 213 in a class with 41 MC 196, 41 MC 201, 41 MC 209, and the sites in Site Group 6, all discussed above.

41 MC 212

Site 41 MC 212 is located northwest of 41 MC 213 down on the floodplain in the upper reaches of Opossum Creek (Fig. 1, folded insert). It is bisected by the course of a tributary channel trending down to the creek from the north. Recorded by the Texas Tech surveyors, 41 MC 212 has an east-west dimension of 400 m and a north-south dimension of 100 m. The surface is moderately eroded and covered with brush (Fig. 34,f). The site is evidenced by disrupted sandstone hearths, debitage, and fire-fractured rock distributed throughout the area, especially on the south side of the drainage channel.

The CAR Phase II investigation at 41 MC 212 consisted of an unprovenienced artifact collection and excavation of two shovel tests. The shovel tests, reaching depths of 55 to 60 cm below the surface, showed the site's subsurface to hold little or no potential for productive controlled excavations.

Collection of artifacts from the surface of 41 MC 212 yielded three thick bifaces (one, Group 5; two, Group 7, Form 3), 12 thin bifaces (one, Group 1, Form 1; three, Group 2, Form 2; one, Group 3, Form 1; five, Group 4, Form 4; one, Group 9; one, Group 10), two distally beveled tools (one, Group 3, Form 1; one, Group 3, Form 2), and one piece of modified sandstone (Group 2, Form 2). Based on this array of artifacts, 41 MC 212 is suggested to have been inhabited during Middle Archaic and/or Late Archaic times.

SITE GROUP 8

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
41 MC 29			41 MC 235	41 MC 234
41 MC 55				

In Site Group 8, sites are located on both the north and south sides of the Frio River. The site group area is 12 to 14 km west (upstream) of Choke Canyon Dam and from 2 to 4 km west of the old Calliham town site. Two of the sites, 41 MC 234 and 41 MC 235, occur down in the valley of Salt Creek, an intermittent upland drainage channel tributary to the Frio River. The

channel of Salt Creek trends down northeastward from the divide between the Frio and Nueces watersheds. The channel runs west of old Calliham and then meets the Frio River north of the town. The creek valley has been mostly cleared of brush in its lower reaches. The upper (southwest) end of the creek drainage is still heavily covered with brush in most areas. Salt Creek, especially in its lower reaches southwest and west of Calliham, has exposed natural seams of satin spar gypsum, a distinctive component of the Frio Formation. Oblong, rounded cobbles of this unusual rock have been seen at a number of Choke Canyon sites. Such cobbles were also found as grave furnishings at Loma Sandia (41 LK 28), an Archaic period cemetery located just east of Choke Canyon (Fig. 1, folded insert).

The other two sites in Site Group 8, 41 MC 29 and 41 MC 55, are located down near the active floodplain of the Frio River. Both sites overlook relict channels. The relict channels are referred to as "sloughs" or "resacas." "Resaca" is the Spanish word for this type of feature (a south Texas-northern Mexico Spanish usage of the word). The slough on the east side of 41 MC 55 is a substantial feature and holds water on a year-round basis. Dense riparian vegetation grows on the Frio River floodplain in the area between 41 MC 29 and 41 MC 55. The valley margin is a relatively steep, brush- and gravel-covered slope only 500 m south of 41 MC 55. On the north side of the Frio River the valley slopes more gradually up away from 41 MC 29 to high, old alluvial terraces. The southern margin of the valley consists of exposures of sandstone belonging to the Jackson Group. This bedrock formation is partially covered by a mantle of old terrace alluvium and lag gravels.

41 MC 29

Site 41 MC 29 is located on the north side of the Frio River. It is situated on the edge of a terrace overlooking a relict channel scar in which a lake forms during periods of flooding and/or heavy local rainfall (Figs. 1, folded insert; 37). The site is on the north (left) bank of the slough. As recorded by THC surveyors, the site measures 250 m northeast-southwest and 150 m northwest-southeast. The surface is covered with a moderately thick stand of brush, interspersed with open, grass-covered clearings (Fig. 40,a). Erosion has been severe along the terrace slope forming the site's north side. Back from the terrace edge, there are localized areas of surface deflation, but substantial portions of the site remain apparently undisturbed.

In Phase I investigations at 41 MC 29, three 1-m² test pits were excavated (Hall, Black, and Graves 1982:179-184). The test pits revealed that prehistoric cultural debris was contained in the upper 60 cm of deposit on the site. Collections of cultural debris were divided into upper and lower horizons. The upper horizon contained materials from the first 30 cm of deposit. A Late Prehistoric affiliation was determined for the upper horizon based on the arrow point specimens it yielded. The lower horizon was suggested to contain a Late Archaic component based on radiocarbon assay of a carbon sample from a habitational feature recognized in the horizon. This radiocarbon assay yielded an age of 390 to 270 B.C. (TX-2873, MASCA corrected).

Phase II investigations at 41 MC 29 took place over a four day period in April 1981. During that time, nine CAR crew members spent a total of 288 person hours working on the site.

A grid system for horizontal control was set on the surface of 41 MC 29. A point on a nearby site marker placed during Phase I investigations served as the vertical datum. USBR surveyors later calculated a true elevation of 198.07 feet above MSL for this vertical datum. They then replaced the original site marker with a permanent marker and calculated its exact location in terms of Modified Texas State Plane Coordinates (Figs. 37; 38).

Nine 1-m² units were laid out to form a 3-m² excavation block for Phase II work at 41 MC 29. The excavation block was placed off the southern edge of Test Pits 1 and 3 from Phase I (Fig. 38). The unit-block was placed in hopes of retrieving a larger sample of materials indicated by the test pits, especially the Late Archaic feature isolated in the lower horizon. Unit designator coordinates and number of 10-cm-thick levels excavated in each unit are N997 E1011 (six levels), N997 E1012 (seven levels), N997 E1013 (seven levels), N998 E1011 (six levels), N998 E1012 (six levels), N998 E1013 (six levels), N999 E1011 (six levels), N999 E1012 (six levels), and N999 E1013 (six levels). Surface elevations for the above units ranged from 99.85 m to 99.93 m. The soil matrix excavated from these units was described as dark grayish brown silty clay loam from the surface down into Level 4 (30-40 cm below the surface). In Level 4, the soil became lighter brown in color. In Level 5, the soil changed to light yellowish brown silty clay loam. This soil color and consistency continued to the bottom of the excavation.

Prehistoric cultural debris recovered from the Phase II excavation block at 41 MC 29 is divided into two horizons in the same way as were materials recovered from the Phase I test pits. Horizon 1 contains debris recovered from Levels 1-3 in the nine units. Horizon 2 consists of the debris recovery from Levels 4-6 or 7. Rates of recovery for selected classes of debris are as follows for the two horizons:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0	3
Sandstone Weight (grams)	416	1573
Fire-Fractured Rock Weight (grams)	57	62
Mussel Shell Umbo Count	96	103
Mussel Shell Weight (grams)	49	64
Rabdotus Shell Count	169	972
Bone Weight (grams)	1.4	3.5
Primary Flake Count	10	5
Secondary Flake Count	72	62
Tertiary Flake Count	150	56
Chip Count	225	99

Additional artifacts found in the Phase II excavation at 41 MC 29 from Horizon 1 were four thin bifaces (two, Group 4, Form 4; two, Group 10), two pieces of modified sandstone (one, Group 1, Form 3; one, Group 2, Form 2), one piece of ocher, and a piece of modified siltstone. Horizon 2 yielded two

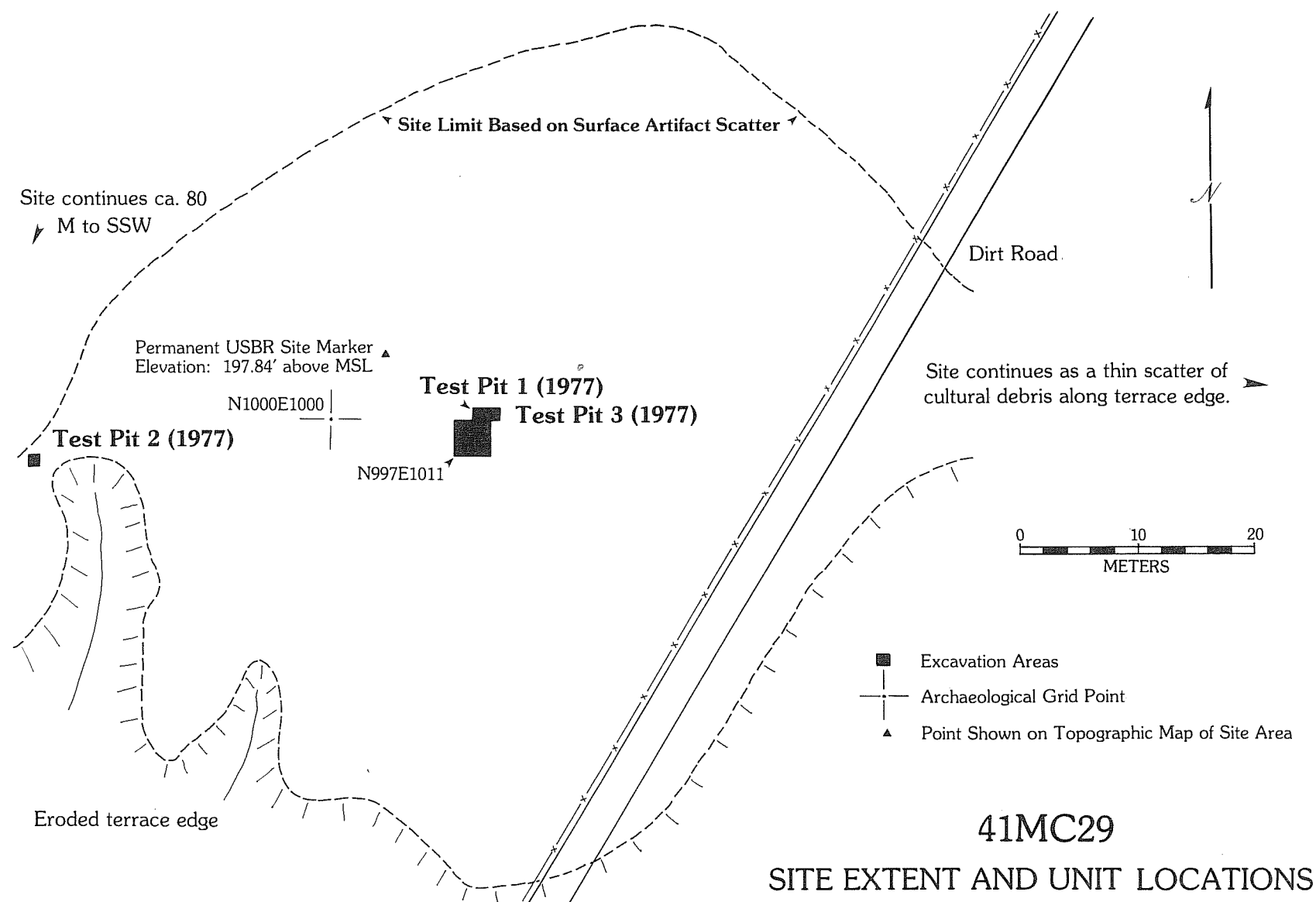


Figure 38. Plan Showing Site Extent and Unit Locations at 41 MC 29.

cores (one, Group 2; one, Group 6), one thick biface (Group 9), and four pieces of modified sandstone (one, Group 1, Form 3; one, Group 2, Form 2; one, Group 2, Form 3; one, Group 3).

Two habitational features, a rock cluster, and a filled pit, were isolated at the bottom of Horizon 2 (Figs. 39; 40,b,c). Feature 2 was a cluster of about 38 pieces of burned sandstone. The feature was scattered across two units, N998 E1013 and N999 E1013, in Level 6 (99.40 to 99.30 m). The actual range of elevations in the feature was from 99.40 to 99.34 m. The area where most of the feature components were concentrated was in Unit N998 E1013. Pieces of sandstone and a patch of carbon flecking covered a roughly circular area 40 to 50 cm in diameter (Fig. 39). Other pieces of sandstone and a small amount of carbon were widely scattered to the north and south of the main concentration. Several pieces of debitage, two or three mussel shell valves, and a piece of fire-fractured rock were also noted in and around Feature 2. The rocks occurred in a single layer.

Feature 3 was encountered about one meter south of Feature 2 in Unit N997 E1013. It was first recognized in Level 6 (at 99.76 m). The feature was traced down to a maximum depth of 99.26 m. Feature 3 consists of a subcircular pit that had a diameter of about 40 cm. Around this filled pit was an area of stained soil flecked with carbon that was somewhat more extensive than the pit outline. This stained area continued into the south and west walls of the unit. Matrix removed from the filled pit was described as very dark grayish brown silty clay loam mottled with burned clay, carbon flecks, and white ash. Also noted in the fill were burned mussel shell fragments, burned bone, and small pieces of sandstone. Other mottled, stained patches were observed to the east of the primary feature area (Fig. 39). Carbon collected from Feature 3 was submitted for radiocarbon assay in two separate samples. The assays yielded ages of 410 B.C. and 60 B.C. to A.D. 10 (TX-4688 and TX-4689, MASCA corrected). These dates bracket the age of 390 to 270 B.C. (TX-2873) yielded by the Phase I assay.

At 41 MC 29, Feature 1, recorded during Phase I investigations (Hall, Black, and Graves 1982:180, 183), and Features 2 and 3 all appear to occur on the same living surface within the site. Dates resulting from radiocarbon assay of carbon samples recovered from two of the features have provided an age range of 410 B.C. to A.D. 10. It is primarily on the basis of radiocarbon ages that the Horizon 2 remains at 41 MC 29 are assigned to the Late Archaic period. No recognized time-diagnostic artifacts were recovered from the Horizon 2 excavations. However, probable Late Archaic chipped stone tools (distally beveled tool forms) have been surface collected on the site. Horizon 2 yielded no Late Prehistoric materials.

The small filled pit (Feature 3) isolated in the Horizon 2 Late Archaic component at 41 MC 29 is not a common type of habitational feature at Choke Canyon. The presence of burned mussel shell and small animal bones, ash, burned clay, and carbon in the pit fill could indicate either that it was a cooking facility or a trash receptacle.

Findings made in Test Pits 1 and 3, during Phase I investigations, indicated that Horizon 1 materials at 41 MC 29 represent human activity during the Late Prehistoric period. The Phase II excavations yielded no additional

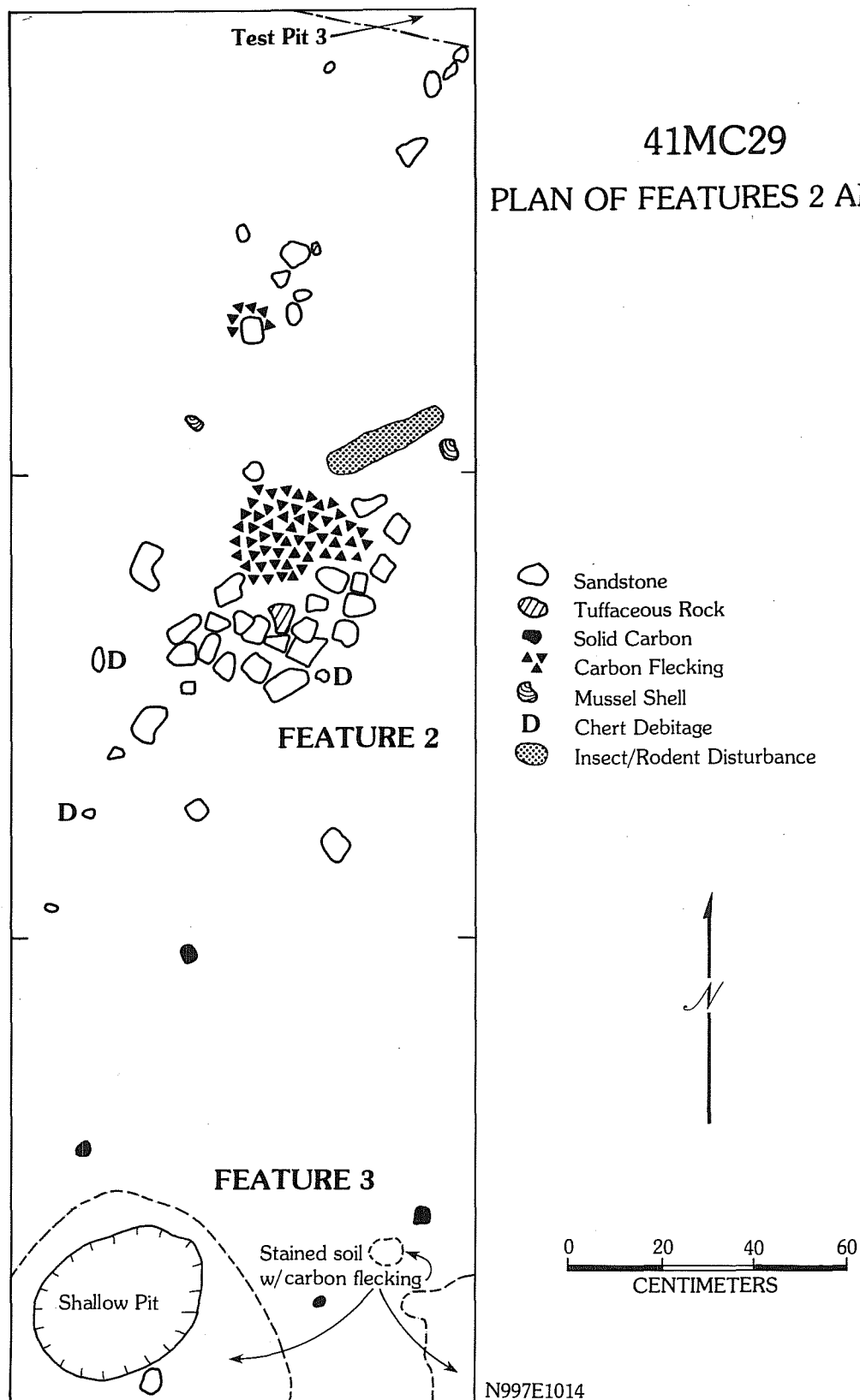


Figure 39. Plan of Features 2 and 3 at 41 MC 29.

recognized Late Prehistoric diagnostics. Nevertheless, Horizon 1 is suggested to contain remains of a Late Prehistoric component.

Artifacts collected from the surface of 41 MC 29 during Phase II were one core (Group 6) and two distally beveled tools (one, Group 3, Form 2; one, Group 9). Recovery of the Group 3, Form 2 distally beveled tool brings the total of Group 3 tools to four for the site (two, Group 3, Form 2; and one, Group 3, Form 3 were found in Phase I). All are likely derived from the Horizon 2 component, the Group 3 distally beveled tools are suggested to be fairly reliable Late Archaic diagnostics.

Results of the Phase II investigation at 41 MC 29 provide no new insights into subsistence habits for either the Late Archaic or Late Prehistoric periods. A possible contrast in diets is indicated by the fact that Horizon 2 (Late Archaic) yielded much more sandstone and *Rabdotus* snail shell than did Horizon 1 (Late Prehistoric). Both horizons contained mussel shell, animal bone, and sandstone grinding implements in roughly equal quantities.

41 MC 55

Site 41 MC 55 rests on a second terrace and levee system above the active floodplain on the south (right) bank of the Frio River (Fig. 1, folded insert). Recorded limits for the site are 600 m northwest to southeast and a width of from 100 to 150 m. The Frio River is within 75 m of the site's west end, but then bends northward and is 300 m or more north of the greater portion of 41 MC 55 (Fig. 41). Relict channel scars are, however, visible at the foot of the terrace slope, constituting the northern edge of the site. It appears as if the river flowed immediately beneath the site at sometime in the past. The site is bordered on the east by a large oxbow lake which trends north-northeast to south-southwest and is about 500 m long. Next to this lake in the northeast corner of 41 MC 55, there is a low, but distinct rise formed by a natural levee along the relict channel containing the lake. The eastern third of the site is covered with a dense growth of whitebrush and scattered large mesquite trees (Fig. 40,d). High piles of tree trunks, limbs, and other brush occur here and there at this end of the site, an indication that the surface was mechanically cleared of brush not long ago. The whitebrush has apparently reestablished itself since the clearing took place. Along the terrace slopes on the eastern and northern margins of the site grow elms, large mesquite trees, spiny hackberry, and a variety of low brush species. Along the immediate edge of the oxbow lake, especially on its eastern side, immense cottonwood trees are growing. The lake is lined with dense mustang grape canopies. The western portion of the site is in a cleared, grass-covered pasture. There are barns and corrals at the extreme western end. Mesquite and other brush grow only in a narrow fringe along the immediate edge of the terrace.

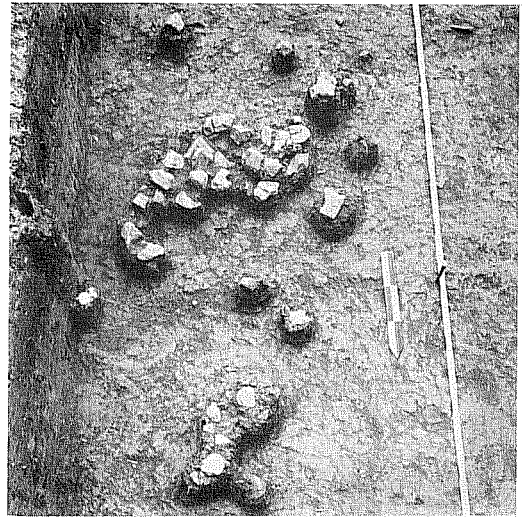
Phase I investigations at 41 MC 55 consisted of excavation of three 1-m² test pits, collection of surface artifacts, and a thorough inspection of the entire site surface. Based on the results of this initial investigation, the eastern end of the site was determined to hold the most productive subsurface deposits of prehistoric cultural debris. Test pits at this end of the site revealed both Archaic and Late Prehistoric components stratified within the

Figure 40. Views of 41 MC 29 and 41 MC 55.

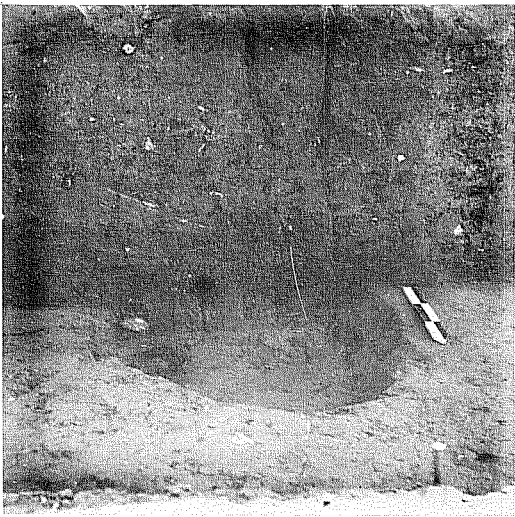
- a, view looking east across Phase II excavation area at 41 MC 29;
- b, an overview of Feature 2, a burned sandstone accumulation in Level 6 (99.40 to 99.30 m) of Units N998 E1013 and N999 E1013 at 41 MC 29;
- c, shown is Feature 3 (a filled pit) at 41 MC 29 with the fill partially removed. Unit floors (N997 E1012 and N997 E1013) are at 99.20 m elevation;
- d, view looking north across area of Phase II excavations at 41 MC 55;
- e, overview of feature debris exposed in Area D at 41 MC 55, looking south (photograph by Prince George McKenzie, Texas Archeological Society);
- f, overhead view of chert cobble and bone concentration in Area D of 41 MC 55. The unit is N1008 E1015 at an elevation of 99.30 m (photograph by Prince George McKenzie, Texas Archeological Society).



a



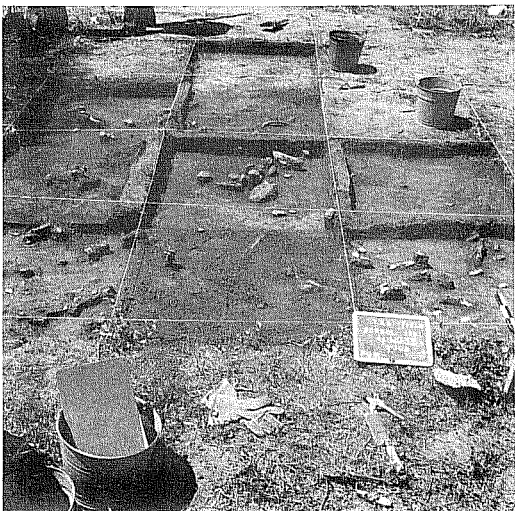
b



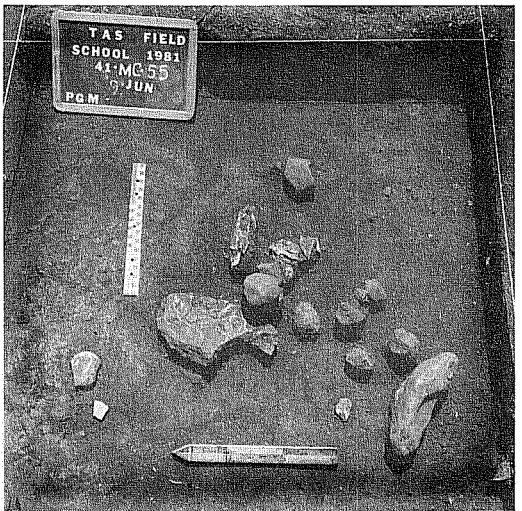
c



d



e



f

Figure 41. Topographic Map of 41 MC 55 and Surrounding Area.

upper 80 to 100 cm of deposit. In addition to being stratified, the deposits yielded relatively more animal bone than most of the other prehistoric sites tested during Phase I. The recovery of asphaltum, asphaltum-coated pottery, and marine shell artifacts in the test pits and from the surface suggested an unusual coastal relationship for the Late Prehistoric inhabitants of the site (Hall, Black, and Graves 1982:192-196).

The Phase II investigation at 41 MC 55 occurred in May and June 1981. During a four day period in May, nine members of the CAR crew spent 288 person hours excavating Areas A and B. Twenty-nine members of the Texas Archeological Society (TAS) participating in the summer field school excavated in Areas C, D, and E over a four day period in June. Field school participants expended an estimated 392 person hours of effort at 41 MC 55.

A grid providing horizontal control was established at 41 MC 55. A spike driven into the trunk of a large mesquite tree north of the N1000 E1000 stake served as the vertical datum for archaeological excavations. USBR surveyors later determined a true elevation of 199.07 feet above MSL for this vertical datum. They also replaced the N1000 E1000 stake with a permanent metal site marker. Its exact location expressed in Modified Texas State Plane Coordinates was calculated.

Test pit results and surface conditions indicated that virtually the entire area between Phase I Test Pits 1 and 3 would likely contain productive deposits of prehistoric cultural debris in the subsurface (Fig. 42). The Phase II Area A units were located farther back from (west of) the oxbow lake to aid in determining the density of subsurface prehistoric debris in that zone of the site.

Area A consisted of two 1-m² units. Coordinates for these units and number of 10-cm-thick levels excavated from each are N1017 E999 (12 levels) and N1018 E999 (eight levels). Surface elevations for these two units ranged from 99.39 to 99.40 m. From the surface down through Level 9 (98.60 to 98.50 m), soil matrix in Area A was described as medium to light grayish brown silty clay loam. In Level 10, the soil changed to very pale brown silty clay. Two horizons were defined based on debris recovery from the Area A excavation. Horizon 1 contains debris from Levels 1-3, and Horizon 2 contains the debris from Levels 4-12. Rates of recovery for selected classes of debris from these two horizons are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0	0
Sandstone Weight (grams)	33	225
Fire-Fractured Rock Weight (grams)	2	6
Mussel Shell Umbo Count	39	177
Mussel Shell Weight (grams)	27	55
Rabdotus Shell Count	37	54
Bone Weight (grams)	7	2
Primary Flake Count	0	0
Secondary Flake Count	12	25
Tertiary Flake Count	17	47
Chip Count	32	77

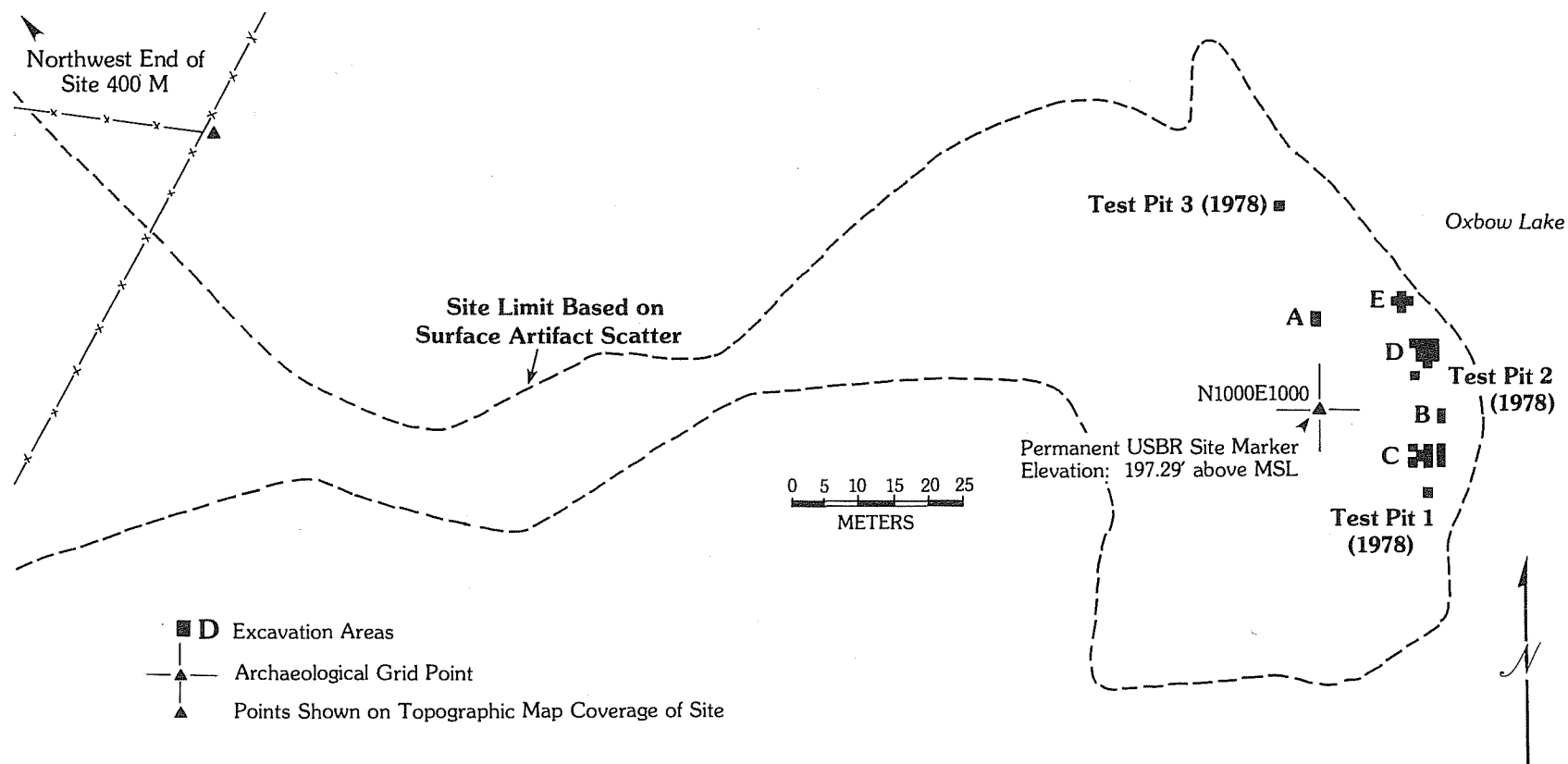


Figure 42. Plan of Site Extent and Unit Locations at 41 MC 55.

Three additional artifacts--one thick biface (Group 1), one thin biface (Group 4, Form 2, Specimen 15), and a piece of satin spar gypsum--were also recovered from Area A. The thin biface came from Horizon 1 and the other two specimens from Horizon 2.

A cluster of sandstone was found in Level 9 (98.60 to 98.50 m) of Unit N1017 E999 in Area A. Designated Feature 1, there were 15 pieces of sandstone distributed in a northeast-southwest linear pattern. A main concentration of 13 pieces of sandstone was confined to a 30- x 50-cm area in the southwest corner of the unit. Four of the pieces of sandstone continued into the south wall. There were also two pieces of fire-fractured rock with the sandstones. The feature appears to have been constructed in a single layer, but a maximum vertical difference of 12 cm was noted between the base of the highest and lowest components. Rocks in Feature 1 ranged from 4-8 cm in maximum dimension. Light carbon flecking was noted in the feature matrix, and a small sample of carbon was collected.

The Phase II excavation designated Area B at 41 MC 55 also consisted of two 1-m² units. The excavation was located roughly midway between Phase I Test Pits 1 and 2 (Fig. 42). Coordinates for the Area B units and number of 10-cm-thick levels excavated in each are N998 E1017 (six levels) and N999 E1017 (nine levels). Surface elevations ranged from 99.36 to 99.40 m. The soil excavated in Area B was described as very dark grayish brown clay loam from the surface to the base of excavations. Calcium carbonate nodules began appearing in Level 7 and increased down into Level 9. Two horizons are defined for Area B with level assignments as follows: Horizon 1, Levels 1-3; Horizon 2, Levels 4-9. These two horizons yielded the following:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0	0
Sandstone Weight (grams)	84	48
Fire-Fractured Rock Weight (grams)	3	15
Mussel Shell Umbo Count	22	16
Mussel Shell Weight (grams)	22	3
Rabdotus Shell Count	29	34
Bone Weight (grams)	50	0.5
Primary Flake Count	3	0
Secondary Flake Count	23	9
Tertiary Flake Count	35	12
Chip Count	118	25

Other artifacts recovered from Horizon 1 of Area B include two cores (Group 5), an arrow point fragment (thin bifaces Group 1, Form 7, Specimen 22), two trimmed flakes (Group 2, Specimen 2; Group 3, Form 5, Specimen 2), and five sherds of aboriginal pottery. From Horizon 2 came one core (Group 1), one thick biface (Group 6, Form 2), one piece of modified sandstone (Group 1, Form 3), and a piece of ocher.

Level 2 (99.30 to 99.20 m) in both units of Area B contained a dense Late Prehistoric midden deposit consisting of bison, deer, and bird bone, debitage, mussel shell, sandstone, and carbon. Affiliation with the Late Prehistoric period is based on the presence of potsherds and an arrow point

fragment amidst the midden debris. Results of excavations elsewhere at 41 MC 55, especially Area D (discussed below), reveal that the Area B Late Prehistoric materials are a small portion of a much more extensive living surface. A plan map showing the *in situ* distribution of the midden materials in Level 2 of Area B was drawn. Due to the limited horizontal extent of this particular excavation, the plan is not illustrated.

The Area C excavation at 41 MC 55 consisted of nine 1-m² units placed between Test Pit 1 and Area B (Fig. 42). Coordinates for the nine units and the number of 10-cm-thick levels excavated in each are N992 E1013 (one level), N992 E1015 (one level), N992 E1017 (one level), N993 E1014 (one level), N993 E1015 (one level), N993 E1017 (one level), N994 E1013 (one level), N994 E1015 (two levels), and N994 E1017 (two levels). Starting elevations for the units ranged from 99.37 to 99.43 m. The Area C units were excavated by participants in the TAS Summer Field School. Cultural debris recovered corresponds to Horizon 1 collections as defined elsewhere on the site. Rates of recovery for selected classes of debris from the combined units and levels of Areas C, D, and E (Areas D and E are discussed below) are as follows:

	<u>Area C</u>	<u>Area D</u>	<u>Area E</u>
Tuff Weight (grams)	1	0	0
Sandstone Weight (grams)	50	313	57
Fire-Fractured Rock Weight (grams)	43	51	5
Mussel Shell Umbo Count	52	62	49
Mussel Shell Weight (grams)	18	73	47
Rabdotus Shell Count	33	244	37
Bone Weight (grams)	58	185	3
Primary Flake Count	2	16	7
Secondary Flake Count	28	142	76
Tertiary Flake Count	33	296	78
Chip Count	117	989	265

Additional artifacts found in Area C are one core (Group 6), four thin bifaces (Group 1, Form 4, Specimen 72 [Perdiz]; Group 1, Form 4, Specimen 85 [Cliffton]; one, Group 6, Form 3; one, Group 10), one piece of modified sandstone (Group 1, Form 2), a piece of ocher, and 25 sherds of aboriginal pottery.

Eleven 1-m² units made up Area D at 41 MC 55. This unit-block was located northeast of Test Pit 2 (Fig. 42). Coordinates for the Area D units and the number of 10-cm-thick levels excavated in each are N1006 E1015 (two levels), N1007 E1014 (two levels), N1007 E1015 (three levels), N1007 E1016 (two levels), N1008 E1014 (three levels), N1008 E1015 (two levels), N1008 E1016 (two levels), N1009 E1013 (two levels), N1009 E1014 (one level), N1009 E1015 (two levels), and N1009 E1016 (two levels). Surface elevations in these units ranged from 99.36 to 99.45 m. Area D excavations were also carried out by members of the TAS Summer Field School. Cultural debris collected in Area D corresponds to the Horizon 1 assemblages defined elsewhere on the site. Rates of recovery for selected classes of debris from all units and levels of Area D combined are shown above.

Area D also yielded the following artifacts: 12 cores (four, Group 1; three, Group 3; two, Group 4; three, Group 5), six thin bifaces (Group 1, Form 4, Specimen 29 [Perdiz]; Group 1, Form 4, Specimen 30 [Perdiz]; Group 3, Form 1, Specimen 8; Group 4, Form 4, Specimen 130; one, Group 9; one, Group 10), one trimmed flake (Group 3, Form 3, Specimen 2), three pieces of modified sandstone (one, Group 1, Form 3; two, Group 2, Form 3), two hammerstones (Specimens 3 and 4), one piece of ocher, and 150 sherds of aboriginal pottery.

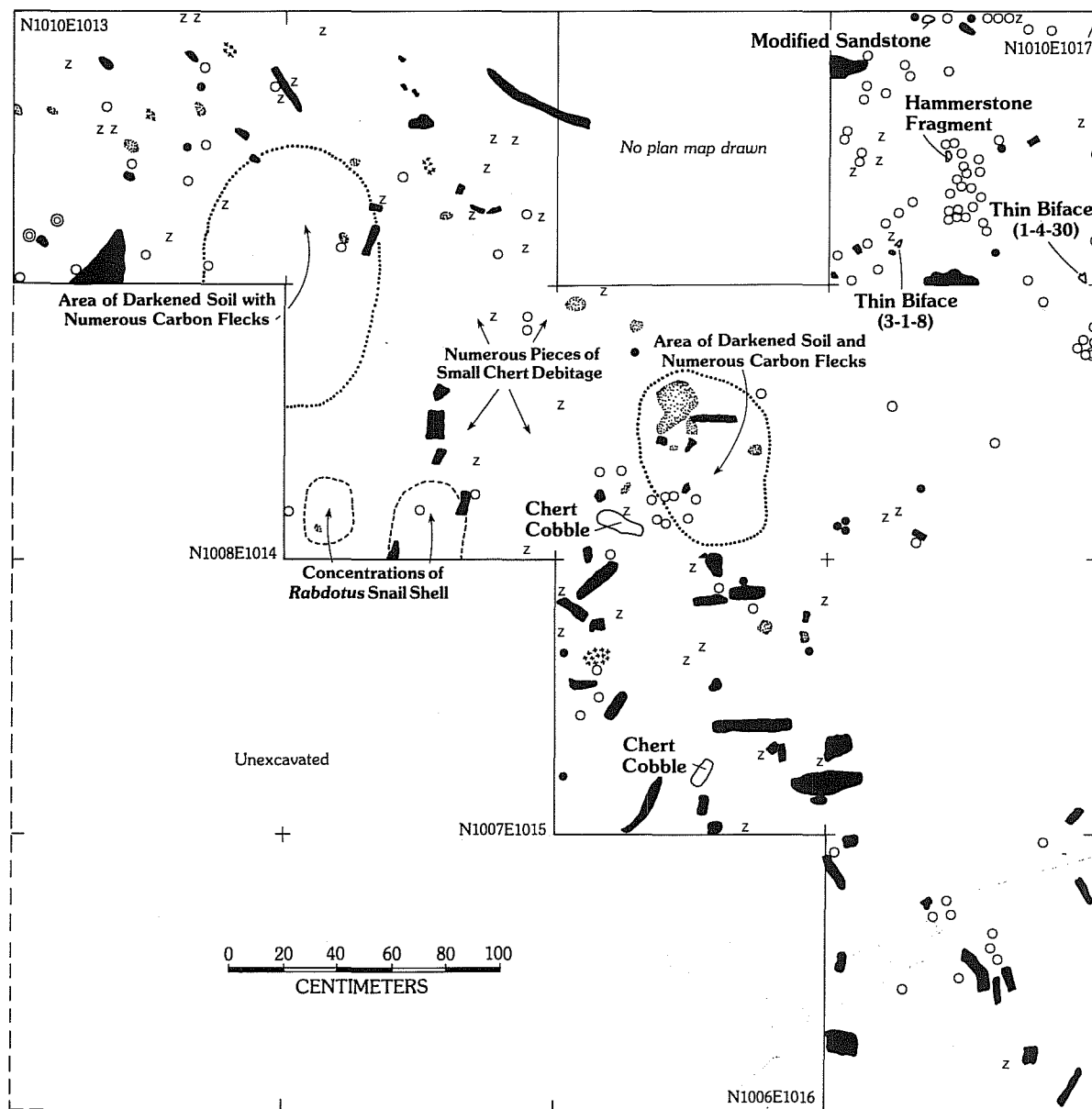
The size of the Area D excavation and the careful recording job done by TAS excavators resulted in an informative plan map of the Late Prehistoric activity surface illustrated in Figures 40,e,f and 43. Figure 43 shows the patterning of sandstone, animal bone (primarily bison), mussel shell, carbon, debitage, chipped stone tools, and potsherds encountered in the Area D units.

Area E consisted of four 1-m² units located along the edge of the slough north of Area D and east of Area A (Fig. 42). Coordinates for each unit and the number of 10-cm-thick levels excavated in each are N1014 E1011 (one level), N1015 E1010 (one level), N1015 E1012 (one level), and N1016 E1011 (one level). Surface elevations ranged from 99.32 to 99.39 m. Rates of recovery for selected classes of debris from Area E are shown above. Also recovered in Area E excavations were two cores (Group 5), two thin bifaces (Group 1, Form 4, Specimen 86 [Perdiz]; one, Group 9), a uniface (Group 5, Specimen 3), two pieces of modified sandstone (both Group 1, Form 3), a hammerstone (Specimen 5), and one sherd of aboriginal pottery.

A carbon sample collected from Levels 2 and 3 of the Area A excavations at 41 MC 55 was divided into two separate samples and submitted to the Radiocarbon Laboratory, The University of Texas at Austin, for assay. Assay of the two samples yielded radiocarbon dates of A.D. 1420 (TX-4692) and A.D. 1230 (TX-4693) (MASCA corrected). Additional carbon samples from 41 MC 55 were analyzed to determine the species of woods burned to form the carbon. *Acacia* sp./*Prosopis* sp. and unidentified hardwoods were most common in the collection of samples examined (see Appendix II).

The Phase II investigation at 41 MC 55 produced a small amount of information concerning a probable Late Archaic component within the site and, due primarily to the efforts of the Texas Archeological Society Summer Field School participants, a substantial body of data relating to a well-preserved Late Prehistoric component in the site.

Confined glimpses of a component buried 60 to 90 cm beneath the surface of 41 MC 55 were provided by excavations in Areas A and B. No recognized diagnostic artifacts of the Archaic period were found in the Phase II excavations. However, a stemmed dart point (thin bifaces Group 1, Form 3) and a small distally beveled tool (Group 3, Form 3) collected from the surface of 41 MC 55 during Phase I investigations permits the suggestion that this earlier component dates to the Late Archaic (Hall, Black, and Graves 1982:196). The small cluster of sandstone exposed in Horizon 2 of Area A demonstrates that the component contains intact habitational features. Mussel shell and *Rabdotus* snail shell are probable residues of foods consumed on the site by Late Archaic residents.



41MC55

AREA D PLAN

Figure 43. Area D Plan at 41 MC 55.

An extensive and highly productive Late Prehistoric component was evidenced in all of the excavation areas at 41 MC 55. Debris representing this component was contained in the upper 30 cm of deposit on the site, this particular vertical increment of deposit and the cultural debris it contained are referred to as Horizon 1. The actual surface upon which Late Prehistoric people were active appears to have been in Level 2, or 10 to 20 cm beneath the modern site surface.

The Late Prehistoric camp at 41 MC 55 was inhabited by people who hunted bison, possessed the bow and arrow, and had pottery vessels. Animal bone, principally bison, but including other smaller animals as well, was recovered in substantial quantities from Areas B, C, and D. One major activity evidenced on the site was the butchering of one or more bison. In Area D, the proximity of the bone to apparent hearth and chert knapping activity areas indicates that the butchering was being done in the midst of other more general habitational activities.

The array of chipped stone tools representing the Late Prehistoric component at 41 MC 55 is very typical for the region, especially at sites where bison bone also occurs. Perhaps the most diagnostic specimens are the **Perdiz** arrow points (thin bifaces Group 1, Form 4) and the beveled knives (thin bifaces Group 4, Form 2). Other triangular, unstemmed thin biface forms (Group 3, Form 1; Group 4, Form 4; and Group 6, Form 3) are also characteristic, if less distinctive, Late Prehistoric tool forms. Unifaces (Group 5, Specimen 3) and trimmed flakes (Group 2, Form 2; Group 3, Form 3; and Group 3, Form 5) are also a hallmark of Late Prehistoric components. The frequent co-occurrence of beveled knives and certain distinctive forms of unifacial and trimmed flake tools with bison bone strongly suggests that these tool forms functioned in butchering and hide preparation capacities.

Chipped stone tool manufacture is strongly evidenced by remains in the Late Prehistoric component at 41 MC 55. Numerous cores, thin bifaces, biface fragments, hammerstones, and debitage are the knapping-related tools and by-products represented in the Horizon 1 assemblage. Especially diagnostic of the Late Prehistoric period are cores in Groups 3, 4, and 5. Significantly, the two thick bifaces recovered at 41 MC 55 (Group 1; Group 6, Form 2) came from the Archaic deposits of Horizon 2. Late Prehistoric tool making was oriented toward core-flake reduction, whereas Archaic period flintknappers used a core-biface technology more commonly.

In addition to bison and other lesser vertebrates, the Late Prehistoric inhabitants of 41 MC 55 also appear to have been gathering mussels and large land snails as supplemental meat foods. Manos and metate fragments (modified sandstone Groups 1 and 2) suggest that they were also preparing seed or nut foods on the site. Close association of the above materials with potsherds indicates that pottery vessels were used extensively as an aid in food preparation (see Prehistoric Ceramics section for a more detailed discussion).

Remarkably, no additional marine shell artifacts were found in the Phase II excavations at 41 MC 55. Recovery of two pieces of marine shell from Phase I test pits and some asphaltum on potsherds, led to the suggestion that the Late Prehistoric inhabitants of the site had coastal contacts of some type

(Hall, Black, and Graves 1982:196). Although no additional marine shell was found, more asphaltum-coated pottery and a small, unstemmed thin biface (Group 3, Form 2, Specimen 8) typed tentatively as a **McGloin** point offer further support for a coastal affiliation. In this respect, the Late Prehistoric component at 41 MC 55 is quite atypical in comparison to other such components known at Choke Canyon.

Radiocarbon assay of two carbon samples from Horizon 1 deposits at 41 MC 55 yielded ambiguous results. The samples were derived from a single collection made in the Area A excavation. The resultant ages (MASCA corrected) of A.D. 1420 (TX-4692) and A.D. 1230 (TX-4693) are thus inexplicably divergent. Radiocarbon dates from other sites at Choke Canyon (41 LK 201, 41 MC 296) suggest that TX-4692 is a more accurate age for the type of remains seen at 41 MC 55. Identification of **Prosopis** sp. or **Acacia** sp. as wood burned to produce much of the carbon collected from Horizon 1 deposits suggests that the present brush community existed on or near the site in prehistoric times.

41 MC 234

Site 41 MC 234 is an open prehistoric site recorded by the CAR crew during 1979 survey operations. It is located on the left (west) bank of the Salt Creek drainage southwest of the old Calliham town site (Fig. 1, folded insert). The site's southeast end is within 50 to 75 m of the creek channel. It is oblong in outline shape with dimensions of 100 m east-west and 200 m north-south. The site surface is moderately eroded and covered with brush species such as mesquite trees, prickly pear, soapbush, spiny hackberry, yucca, and grasses. Prehistoric cultural activity is evidenced at this location by a relatively dense surface scatter of debitage, mussel shell, sandstone, fire-fractured rock, and chipped stone tools.

Activities of the CAR crew during Phase II investigations at 41 MC 234 consisted of excavation of two shovel tests and an unprovenienced collection of surface artifacts. The shovel tests revealed that the subsurface held little potential for controlled excavations. Artifacts collected at 41 MC 234 were one thick biface (Group 7, Form 4), five thin bifaces (one, Group 1, Form 6; one, Group 2, Form 1; three, Group 2, Form 2), and one uniface (Group 2). One of the thin bifaces (Group 2, Form 2, Specimen 42) exhibits fine diagonal ribbon flaking characteristic of Paleo-Indian tool traditions and, indeed, this specimen is believed to be a Paleo-Indian point fragment, possibly of the **Plainview** type. Otherwise, the 41 MC 234 artifact assemblage suggests that cultural activity occurred on the site sometime during the Archaic period.

41 MC 235

Site 41 MC 235 is also located on the left (west) side of the Salt Creek drainage. This site is about 400 m northwest of 41 MC 234 on a low, narrow ridge trending southwest to northeast (Fig. 1, folded insert). The low ridge appears to have been formed by erosion along Salt Creek and a minor tributary channel north of the site. Site 41 MC 235 is oriented with its long axis running east-northeast to west-southwest. It has a long oval outline shape

with dimensions of 50 x 200 m. Scattered vegetation on the moderately eroded surface includes mesquite trees, spiny hackberry, whitebrush, allthorn, prickly pear, other cacti, and various grasses. This site was recorded by the CAR survey crew in 1979. It was defined on the basis of a light scatter of debitage, a few cores, some fire-fractured rock, sandstone, and chipped stone tools observed on the surface. One badly disturbed sandstone concentration, probably a hearth remnant, was seen.

In Phase II, the CAR crew resurveyed 41 MC 235. Inspection of gully walls showed that prehistoric cultural debris was confined to the upper 10 to 15 cm of deposit on the site. Shovel tests were judged unnecessary. An unprovenienced surface collection yielded three thick bifaces (one, Group 3; one, Group 5; one, Group 7, Form 1) and 10 thin bifaces (one, Group 4, Form 3; five, Group 4, Form 4; four, Group 9). This array of specimens indicates that cultural activity occurred on the site sometime during the Archaic period.

SITE GROUP 9

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
		41 MC 238		41 MC 242

The two sites in Group 9 are located on the right (west) side of the Frio River between 14 and 15 km west of Choke Canyon Dam. This area is at the lower end of the huge reverse-S curve in the Frio River known as Yarbrough Bend (Fig. 1, folded insert). The sites are situated on a low second terrace above the Frio River's modern channel. Relict channel scars are apparent on the floodplain between the sites and the river. Following floods and/or periods of heavy local rainfall, the channel scars hold water to form long, narrow ponds. The sites and surrounding areas are heavily covered in brush, especially mesquite and whitebrush. To the west are cleared fields and pastures higher on the floodplain. Valley margin slopes covered with a pavement of lag gravels are located roughly 500 m west of the sites. The adjacent segment of the Frio River has the deepest water of any stretch in the Choke Canyon basin.

41 MC 238

Site 41 MC 238 is located along the edge of the second terrace above the Frio River and overlooks a meander scar (relict channel) immediately to the east (Fig. 1, folded insert). The site is elongate in outline, following the terrace edge for a northeast to southwest distance of 230 m. It is about 20 m wide. Piles of brush and scraped areas visible on the surface indicated that the site had been bulldozed not long before the Phase II investigation. Between the brush clearing and natural erosion, the site surface was heavily

disturbed. Moderate to heavy brush cover here and there on the site were guajillo, mesquite trees, weeds, and grasses.

Phase II investigations at 41 MC 238 consisted of a series of shovel tests and a provenienced collection of surface artifacts. The five shovel tests excavated at various locations on the site revealed that the subsurface contained negligible amounts of prehistoric cultural debris. One badly disrupted cluster of 12 pieces of sandstone exposed in a bulldozed area was sketched.

Thirty-nine prehistoric artifacts were collected from the surface of 41 MC 238. Locations of these artifacts were plotted on a plan map of the site (on file at the CAR-UTSA). The artifact assemblage representing this site consists of four cores (three, Group 3; one, Group 9), six thick bifaces (three, Group 1; one, Group 6, Form 2; one, Group 8; one, Group 9), 16 thin bifaces (Group 1, Form 2, Specimen 6 [Langtry]; Group 1, Form 3, Specimen 31; three, Group 2, Form 2; one, Group 3, Form 2; three, Group 4, Form 4; one, Group 8; two, Group 9; four, Group 10), five distally beveled tools (one, Group 3, Form 1; two, Group 3, Form 3; one, Group 4; one, Group 7, Form 2), and eight pieces of modified sandstone (one, Group 1, Form 1; two, Group 1, Form 3; three, Group 2, Form 2; one, Group 2, Form 3; one, Group 3).

Diagnostic forms included in the above assemblage indicate that 41 MC 238 was inhabited during the Middle Archaic and/or Late Archaic periods. The Langtry dart point (thin bifaces Group 1, Form 2, Specimen 6) is a Middle Archaic diagnostic in the Trans-Pecos area of southwest Texas. The Choke Canyon Langtry specimens are not exactly like the type as it occurs in the Trans-Pecos area. Further, the type has not yet been recovered from radiocarbon-dated deposits in southern Texas. The array of distally beveled tools found at 41 MC 238 suggests that the site was inhabited during Late Archaic times. Elsewhere at Choke Canyon, the smaller distally beveled tool forms, designated in this report as Groups 3 and 4, have been found in Late Archaic context.

Mussel shell, *Rabdotus* snail shells, and a number of grinding implements (modified sandstone Groups 1-3) provide evidence of some of the food items consumed by the site's prehistoric inhabitants.

41 MC 242

Site 41 MC 242 is located on the same terrace and about 500 m southwest of 41 MC 238 (Fig. 1, folded insert). Like 41 MC 238, 41 MC 242 was located and recorded by the CAR crew during the 1979 survey. Situated on a natural levee rise above a relict channel of the Frio River, 41 MC 242 is roughly oval in outline shape and measures 100 x 150 m. The surface is moderately eroded and densely covered with mesquite trees, whitebrush, grasses, and weeds. A dirt road following a powerline bisects the site north to south. The surveyors noted a badly eroded sandstone cluster in the road. The presence of a Perdiz arrow point and a "beveled knife" indicated to them that the site was inhabited during the Late Prehistoric period.

Phase II work at 41 MC 242 consisted of excavation of several shovel tests, documentation of the sandstone cluster exposed on the surface, and an unprovenienced collection of surface artifacts. The five shovel tests placed around the site revealed very little prehistoric debris in the subsurface. The small amount of cultural material was in the upper 20 cm of deposit. Findings made in the shovel tests indicated that controlled excavations were not warranted. The sandstone hearth feature noted by the surveyors in 1979 was relocated. Eroding from the dirt road cutting through the site, this feature was further exposed during Phase II work. It consisted of about 20 pieces of sandstone and 10 pieces of fire-fractured rock arranged in two small clusters, the centers of which were about 60 cm apart. One cluster was 20 cm in diameter, the other about 30 cm in diameter. The larger, somewhat looser cluster to the northeast contained eight pieces of sandstone and five pieces of fire-fractured rock. Also recognized in this portion of the feature were a deer bone fragment, a mussel shell, and a grinding slab (metate) fragment. Carbon flecking was noted amidst the rocks. The smaller, tighter cluster to the southwest had 12 pieces of sandstone and five pieces of fire-fractured rock. There was a substantial amount of carbon in the center of the cluster. Six or eight pieces of debitage were scattered to the west and south of this concentration.

An unprovenienced collection of surface artifacts at 41 MC 242 yielded two cores (one, Group 4; one, Group 7), one thick biface (Group 1), three thin bifaces (one, Group 4, Form 4; two, Group 9), one trimmed flake (Group 2), and two pieces of modified sandstone (one, Group 1, Form 3; one, Group 2, Form 2). The Late Prehistoric diagnostic artifacts reported by the surveyors were not relocated, suggesting that artifact collectors had scoured the site subsequent to the 1979 survey. The Phase II artifact collection contains no recognized time-diagnostic specimens.

SITE GROUP 10

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
41 MC 296		41 MC 276		41 MC 280

The three sites comprising Site Group 10 are located in the Elm Creek drainage system from 16 to 18 km west-northwest of Choke Canyon Dam. Elm Creek, an intermittent stream, and its tributaries drain a large area to the north of Yarbrough Bend on the Frio River. The main Elm Creek channel originates 8 km or more northwest of its juncture with the Frio River (Fig. 1, folded insert). As the Elm Creek channel feeds down in the Frio River valley, it assumes an easterly course for a couple of kilometers and then bends southward to meet the Frio River. The floodplain it traverses is exceptionally broad, relatively featureless, and heavily covered in brush. The local geologic formation is the Jackson Group, the most noteworthy component of which is well-cemented sandstone. Outcrops of Jackson Group sandstone form the impressive topographic rise known as Opossum Hill. This

hill, or ridge, trends north-northwest to south-southeast and separates the Elm Creek and Opossum Creek drainages. Lesser prominences formed of resistant Jackson Group sandstones occur on the north and northwest sides of the Elm Creek valley. Elm Creek supports a substantial gallery of riparian forest species, predominant among them are oak and elm trees. The floodplain between Elm Creek and the Frio River supports huge mesquite trees, Mexican persimmon, prickly pear, whitebrush, and other brush species. The main creek channel is lined with natural levees and terraces. These features, coupled with findings made in prehistoric sites along its banks, indicate that Elm Creek was once a much more substantial watercourse than currently.

41 MC 296

Site 41 MC 296 is an open aboriginal campsite situated on the right (south) bank of Elm Creek approximately 2.5 km upstream from the creek's juncture with the Frio River (Figs. 1, folded insert; 44). The site is about 500 m south of the Jackson Group sandstone outcrops forming the northern valley margin in the area (Fig. 46,a). Recorded by the CAR survey crew in August 1979, 41 MC 296 measures about 20 m north-south and 250 m east-west. The site is broadly U-shaped reflecting a similar bend in the adjacent Elm Creek channel. The site surface is in relatively good shape; eroded spots are only along the immediate edge of the creek channel (Fig. 46,b). Moderate to dense brush cover is present. Dense stands of whitebrush are in some portions. Mesquite trees, spiny hackberry, soapbush, prickly pear, allthorn, and persimmon are elsewhere. The creek margin supports oak and elm trees (Fig. 46,c).

Site 41 MC 296 was both tested and extensively excavated during the course of Phase II investigations. The CAR crew excavated three 1-m² test pits on the site in January 1981. Based on the excellent results of the testing operation, further excavations were conducted at the site in April and May 1981, by the CAR crew and in June 1981, by participants in the Texas Archeological Society Summer Field School. The combined efforts of six to nine CAR crew members over a period of 23 work days resulted in an expenditure of 1376 person hours on the investigation at 41 MC 296. Although severely hampered by rainfall during the week of the TAS Summer Field School, participants numbering from 15 to 28 nevertheless were able to work a total of 360 person hours during five days in June 1981. Over 1700 person hours of effort were thus invested in the Phase II investigation at 41 MC 296.

Locations for the three test pits initially excavated at 41 MC 296 were arbitrarily selected (Fig. 45). Test Pits 1 and 2 were located in the east-central area of the site. Test Pit 3 was placed in the west-central part of the site. Very productive deposits found in Test Pits 1 and 2 prompted location of the excavation blocks designated Areas A and B, and subsequently Areas C, D, E, and G. The excavation areas were laid out according to a grid system, the origin of which was an arbitrarily selected point south of Area A (N1010 E1000, Fig. 45). Vertical control was provided by a spike driven into the trunk of a mesquite tree located on the north side of the excavations. USBR surveyors later determined a true elevation of 214.86 feet above MSL for this vertical datum. They also placed a permanent marker on the site

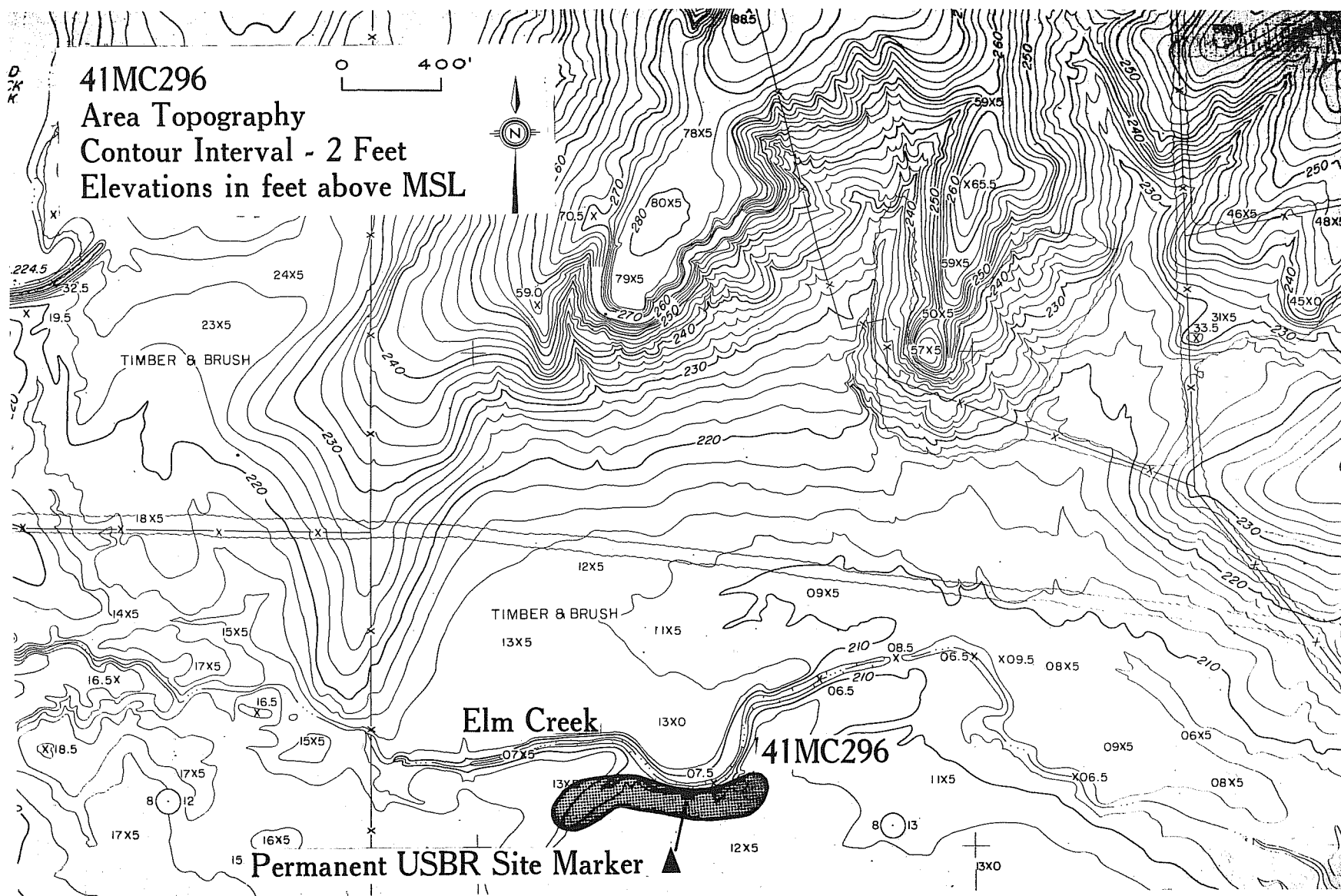
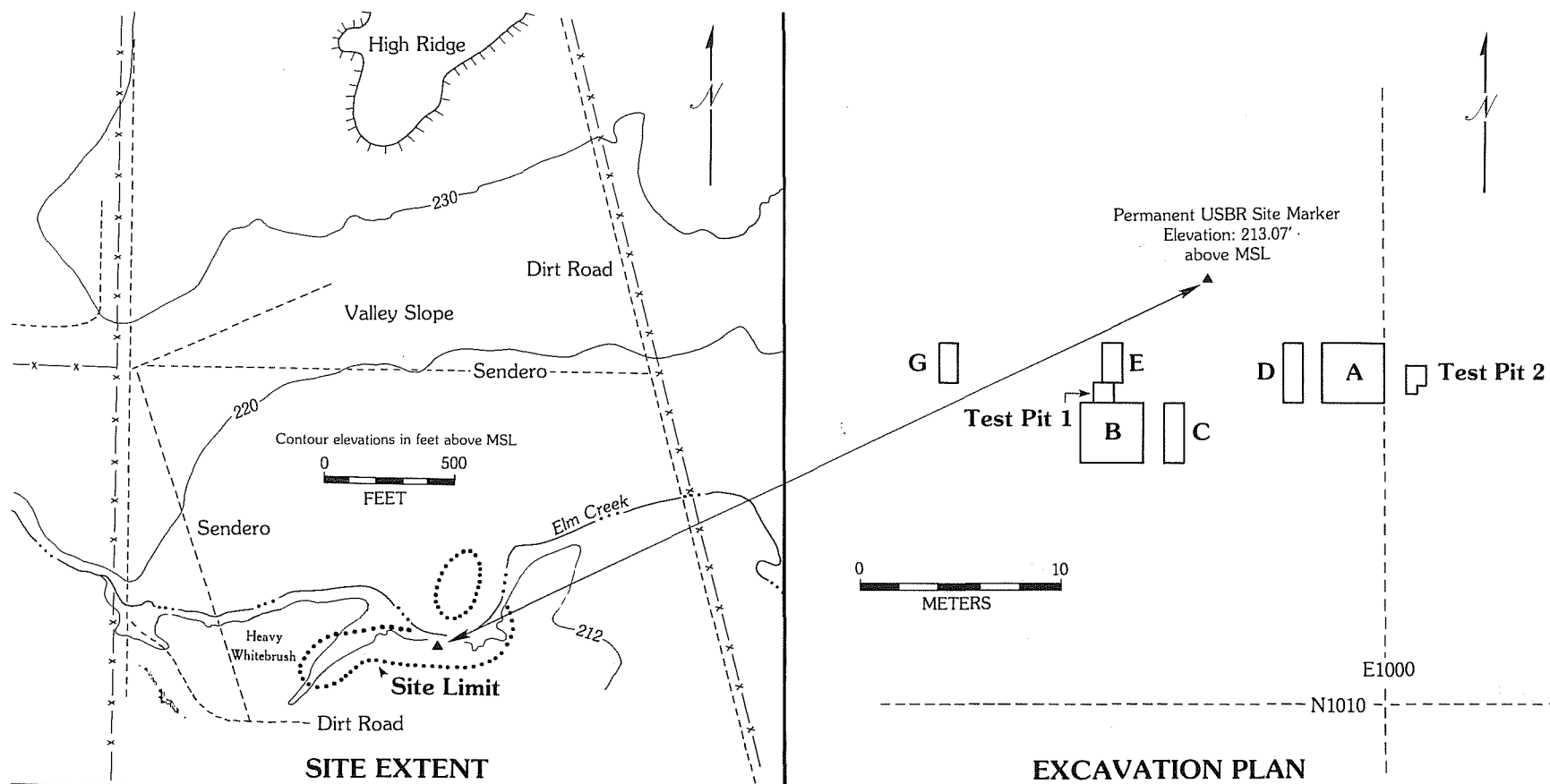


Figure 44. Topographic Map of 41 MC 296 and Surrounding Area.



▲ Points Shown on Topographic Map of Site Area

▭ Excavation Areas

41MC296

SITE EXTENT AND EXCAVATION PLAN

Figure 45. Site Extent and Excavation Plan at 41 MC 296.

(Fig. 45) and calculated its exact location in terms of Modified Texas State Plane coordinates.

Major unit blocks and test pits excavated during Phase II investigations at 41 MC 296 cluster at two locations in the east-central area of the site (Fig. 45). Reflecting their proximity to one another, Test Pit 2 and Areas A and D will be presented and discussed together. Likewise, Test Pit 1 and Areas B, C, and E will be treated together. Area G, a separate unit-block to the west, is presented by itself.

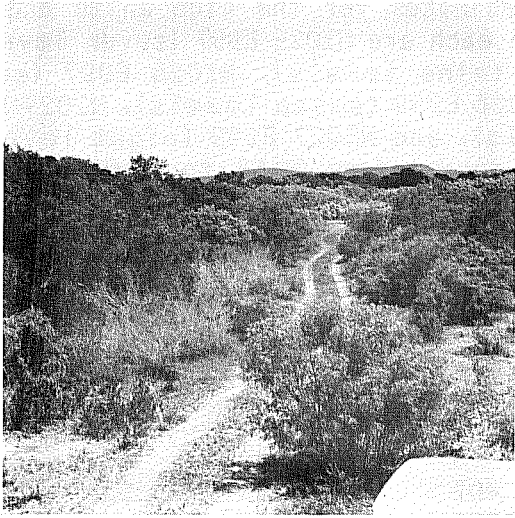
Test Pit 2 was the easternmost Phase II excavation at 41 MC 296 (Fig. 45). Excavated to a depth of 90 cm below the surface (nine 10-cm-thick levels), the unit yielded prehistoric cultural debris that has been divided into three horizon assemblages. Soil matrix from the surface to a depth of 50 cm was described as medium to dark brown silty clay loam. In Level 6 (50 to 60 cm below surface), the soil changed to grayish brown silty clay loam and in Level 9 to light brown silty clay loam. This test pit was excavated prior to placement of the 100 m arbitrary vertical datum. Surface elevations relative to the datum are therefore unavailable. Horizon divisions for the debris assemblage from Test Pit 2 are Horizon 1, Levels 1 and 2; Horizon 2, Levels 3 and 4; and Horizon 3, Levels 5-9. Rates of recovery for selected classes of debris are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight (grams)	0	0	0
Sandstone Weight (grams)	46	76	124
Fire-Fractured Rock Weight (grams)	14	7	15
Mussel Shell Umbo Count	48	26	18
Mussel Shell Weight (grams)	38	10	6
Rabdotus Shell Count	10	41	35
Bone Weight (grams)	4	3	18
Primary Flake Count	4	2	2
Secondary Flake Count	8	31	9
Tertiary Flake Count	30	40	38
Chip Count	77	116	68

Other artifacts recovered from Horizon 1 of Test Pit 2 include two thin bifaces (Group 1, Form 7, Specimen 27; one, Group 10) and a trimmed flake (Group 3, Form 1, Specimen 8). Horizon 2 yielded a thin biface fragment (Group 9) and a piece of modified sandstone (Group 1, Form 3). A most unusual find made in Horizon 3 of Test Pit 2 was a complete sandstone grinding slab (metate, modified sandstone Group 1, Form 1, Specimen 13) and a hand grinder (mano, modified sandstone Group 2, Form 1, Specimen 2). The mano was resting above the metate, the two being separated by from 1-3 cm of soil matrix (Figs. 46,e,f). Although unearthed in Level 8 (70 to 80 cm below the surface), the lowest point on the underside of the metate rested on a plane 90 cm below the surface (as measured with tape and level line from the ground surface at the unit's southwest corner). This mano and metate probably relate to the same prehistoric habitational episode that resulted in deposition of Feature 1 in Area A to be discussed in more detail below.

Figure 46. Views of 41 MC 296: Local Environment, Excavations in Progress, and Habitational Features.

- a, view east-northeast from the central area of 41 MC 296. Low line of hills visible along the horizon marks resistant outcrops of Jackson Group sandstone. The ridge is called Opossum Hill. The Elm Creek channel is to the left (north);
- b, looking north up the bank of Elm Creek to the main excavation area at 41 MC 296;
- c, view northwest of Area A and Area B excavations in progress at 41 MC 296. Note the whitebrush in the foreground and the large mesquite and oak trees in the background;
- d, view looking east across the Area A excavation to Area B at 41 MC 296;
- e, mano and metate found *in situ* in Level 8 of Test Pit 2 at 41 MC 296, looking south;
- f, overhead photograph of mano and metate in Test Pit 2 at 41 MC 296.



a



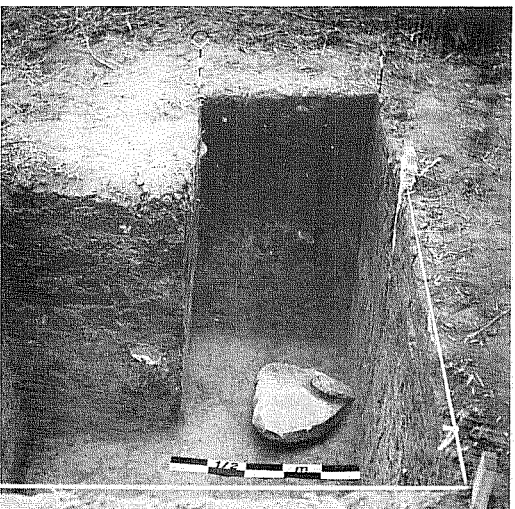
b



c



d



e



f

Area A at 41 MC 296 consisted of nine 1-m² units forming a 3-m² block just west of Test Pit 2 (Figs. 45; 46,d). Coordinates for the nine units and the number of 10-cm-thick levels excavated in each are N1025 E997 (seven levels), N1025 E998 (seven levels), N1025 E999 (nine levels), N1026 E997 (seven levels), N1026 E998 (seven levels), N1026 E999 (seven levels), N1027 E997 (seven levels), N1027 E998 (seven levels), and N1027 E999 (eight levels). Surface elevations for the Area A units ranged from 99.55 to 99.60 m. Soil characteristics in Area A were like those described for Test Pit 2 above. Three horizons were defined for Area A. Level groupings for the horizons are Horizon 1, Levels 1 and 2; Horizon 2, Levels 3 and 4; and Horizon 3, Levels 5-7 or 8. Rates of recovery for selected classes of debris from the Area A horizons are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight (grams)	0	0	0
Sandstone Weight (grams)	407	688	3281
Fire-Fractured Rock Weight (grams)	202	136	144
Mussel Shell Umbo Count	121	162	100
Mussel Shell Weight (grams)	35	49	34
Rabdotus Shell Count	135	346	472
Bone Weight (grams)	29	26	19
Primary Flake Count	22	11	6
Secondary Flake Count	311	229	184
Tertiary Flake Count	657	457	315
Chip Count	1057	712	446

Area A also yielded the following artifacts:

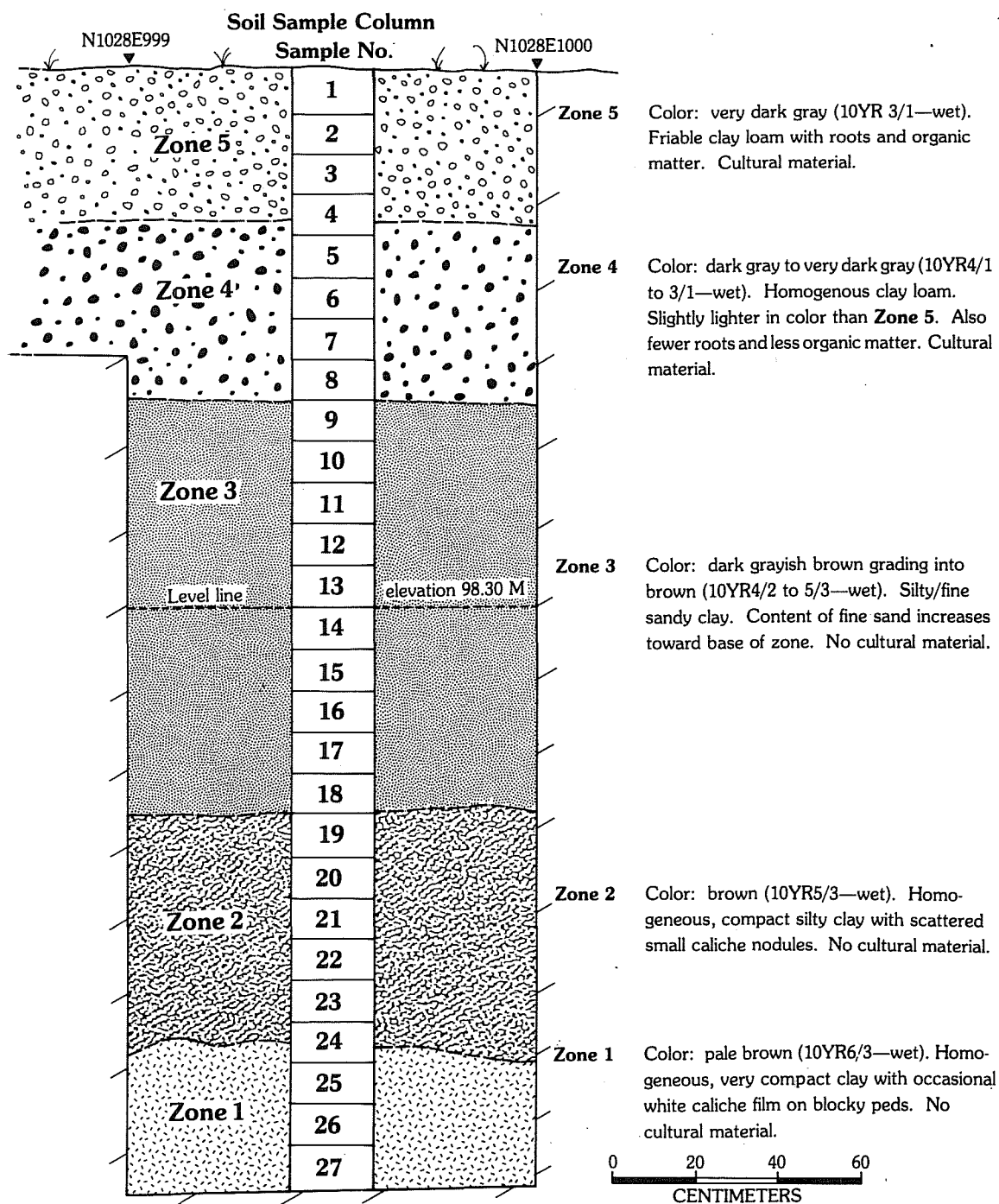
Group	Form	Specimen	Category	Horizon 1	Horizon 2	Horizon 3
1	-	-	Cores	0	0	1
2	-	-	Cores	1	0	0
3	-	-	Cores	1	0	0
4	-	-	Cores	1	0	0
5	-	-	Cores	2	2	1
2	-	-	Thick Bifaces	0	0	1
6	1	-	Thick Bifaces	0	1	0
1	3	19	Thin Bifaces Ensor	0	0	1
1	3	34	Thin Bifaces	0	1	0
1	3	38	Thin Bifaces Zavala	0	0	1
1	4	48	Thin Bifaces Perdiz	1	0	0
1	4	49	Thin Bifaces Perdiz	1	0	0
1	4	50	Thin Bifaces Perdiz	0	1	0
1	5	11	Thin Bifaces Scallorn	0	1	0
1	5	27	Thin Bifaces	0	1	0
1	5	28	Thin Bifaces	1	0	0
1	5	29	Thin Bifaces	0	1	0
1	7	44	Thin Bifaces	1	0	0
4	2	23	Thin Bifaces	0	1	0
4	3	25	Thin Bifaces	0	0	1
4	4	90	Thin Bifaces	0	1	0

4	4	91	Thin Bifaces		0	1	0
4	4	169	Thin Bifaces		1	0	0
4	4	170	Thin Bifaces		1	0	0
9	-	-	Thin Bifaces		2	0	0
10	-	-	Thin Bifaces		5	1	2
2	-	4	Trimmed Flakes		1	0	0
3	5	3	Trimmed Flakes		1	0	0
1	2	-	Modified Sandstone		0	1	0
1	3	-	Modified Sandstone		3	1	2
2	3	-	Modified Sandstone		1	0	1
3	-	-	Modified Sandstone		0	0	2
-	-	-	Satin Spar Gypsum		0	0	1
-	-	-	Ocher		1	2	3
-	-	4	Bone Bead		1	0	0
-	-	8	Marine Shell		0	0	1
-	-	-	Aboriginal Ceramics		9	4	0
-	-	-	Metal Knife Blade		1	0	0

One unit in Area A, N1027 E999, was excavated to a depth of 2.7 m (ca. 96.90 m) below the surface to test for more deeply buried cultural debris and to provide more information on the character of subsurface deposits in the site. A profile drawing of the north wall of this unit and brief descriptions of recognized soil zones are provided in Figure 47. No cultural debris was encountered beneath the Zone 4-Zone 3 contact at approximately 80 cm below the surface.

One habitational feature, an extensive accumulation of burned sandstone, was defined in the Area A excavation (Figs. 48; 50,b). Portions of Feature 1 occurred in Level 6 (99.10 to 99.00 m) in all nine units of the 3-m² area. Although most components of the feature were in Level 6, the high and low elevations on individual objects ranged from 99.11 m (Level 5) to 98.90 (Level 7). It is thus probable that the mano and metate found in Test Pit 2 were deposited during the same activity episode as resulted in the Feature 1 remains. There is a circular, though scattered, configuration to the rock cluster (more obvious in Fig. 50,b than in Fig. 48). Other debris observed amidst the sandstone pieces were chert debitage, mussel and *Rabdotus* shells, carbon, and flecks of burned clay. Much of the Horizon 3 debris listed above for Area A came from the matrix in and around Feature 1. Based on the presence of carbon, burned clay, and the fired appearance of the sandstone, it is assumed that Feature 1 functioned as a hearth. Postdepositional processes apparently caused partial disintegration and scattering of the feature components.

Area D was a 1- x 3-m pit located a meter off the west side of Area A (Fig. 45). These units were excavated by participants in the TAS Summer Field School during June 1981. Coordinates for the three Area D units and the number of 10-cm-thick levels excavated in each are N1025 E995 (six levels), N1026 E995 (six levels), and N1027 E995 (six levels). Surface elevations for the Area D units ranged from 99.57 to 99.60 m. Three horizons are defined within the assemblage of debris gathered from the Area D units. Level groupings are the same as described for Test Pit 2 and Area A above. Rates of recovery for selected classes of debris from the three horizons in Area D are as follows:



41MC296

AREA A PROFILE SKETCH

NORTH WALL OF N1027E999

Figure 47. Profile Sketch of North Wall of N1027 E999 at 41 MC 296, Area A.

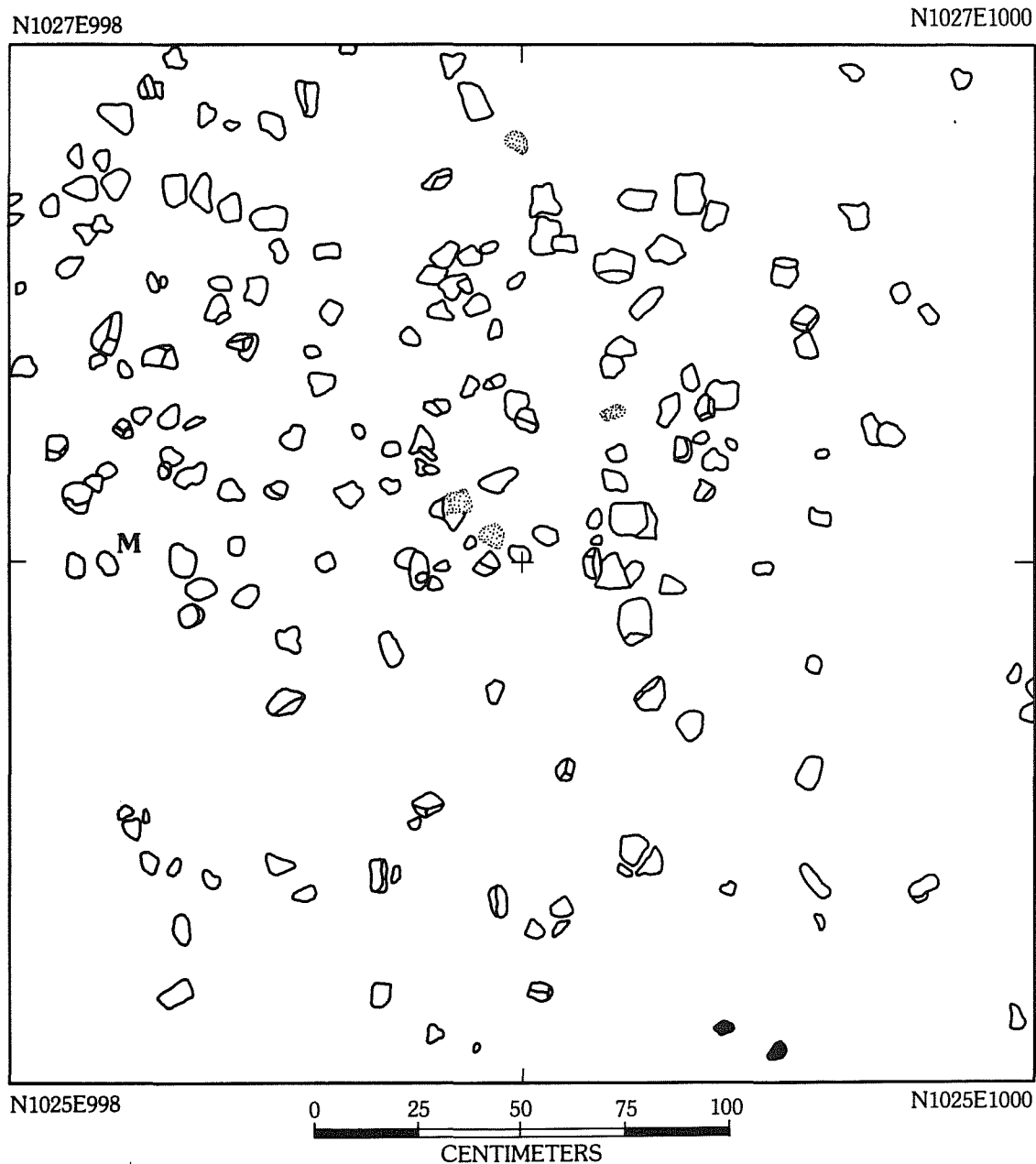
	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight (grams)	0	4	0
Sandstone Weight (grams)	34	340	641
Fire-Fractured Rock Weight (grams)	293	62	28
Mussel Shell Umbo Count	44	32	16
Mussel Shell Weight (grams)	6	20	7
Rabdotus Shell Count	27	83	107
Bone Weight (grams)	2	106	5
Primary Flake Count	6	2	3
Secondary Flake Count	36	30	44
Tertiary Flake Count	17	33	80
Chip Count	132	109	71

Additional artifacts found in Area D horizons are as follows:

Group	Form	Specimen	Category	Horizon 1	Horizon 2	Horizon 3
2	-	-	Cores	0	0	1
5	-	-	Cores	1	1	0
8	-	-	Thick Bifaces	1	0	0
1	3	39	Thin Bifaces Zavala	1	0	0
1	4	83	Thin Bifaces Perdiz	1	0	0
1	7	46	Thin Bifaces	1	0	0
4	2	24	Thin Bifaces	1	0	0
4	4	171	Thin Bifaces	1	0	0
9	-	-	Thin Bifaces	0	0	1
4	-	3	Unifaces	1	0	0
1	-	2	Trimmed Flakes	0	0	1
1	2	-	Modified Sandstone	0	0	1
1	3	-	Modified Sandstone	0	1	0
2	1	-	Modified Sandstone	0	0	1
2	3	-	Modified Sandstone	0	1	0
-	-	-	Ocher	0	0	1
-	-	9	Marine Shell	0	0	1

A second group of excavation blocks was located around Test Pit 1 at 41 MC 296 (Fig. 45). In addition to the 1-m² test pit, there are unit-blocks designated Areas B, C, and E. Selection of a location for the test pit was arbitrary. Findings made in the test prompted placement of the Area B units and, subsequently, Areas C and E.

Test Pit 1 was excavated to a depth of 140 cm below the surface (fourteen 10-cm-thick levels). Soil matrix excavated from this unit was described as dark grayish brown silty loam from the surface to a depth of 95 cm. Beneath this depth, the soil changed to very light yellowish brown or tan sandy silt laced with flecks of calcium carbonate. Three horizons are defined within the debris collection from Test Pit 1. Horizon 1 contains debris recovered from Levels 1 and 2. Horizon 2 contains debris from Levels 3 and 4.



41MC296

AREA A FEATURE 1 PLAN
LEVEL 6 (99.10-99.00)

Figure 48. Area A, Feature 1 Plan, Level 6 (99.10-99.00 m) at 41 MC 296.

Horizon 3 represents Levels 5-14. Rates of recovery for selected classes of debris from the three horizons defined in this test are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight (grams)	1	0	0
Sandstone Weight (grams)	175	265	1442
Fire-Fractured Rock Weight (grams)	25	33	48
Mussel Shell Umbo Count	25	59	34
Mussel Shell Weight (grams)	21	12	11
Rabdotus Shell Count	62	104	141
Bone Weight (grams)	23	8	8
Primary Flake Count	6	1	1
Secondary Flake Count	47	43	55
Tertiary Flake Count	78	55	82
Chip Count	114	27	139

Other artifact specimens from Test Pit 1 are as follows:

Group	Form	Specimen	Category	Horizon 1	Horizon 2	Horizon 3
7	1	-	Thick Bifaces	0	0	1
1	6	6	Thin Bifaces	1	0	0
3	2	24	Thin Bifaces	0	0	1
4	4	119	Thin Bifaces	0	0	1
4	4	165	Thin Bifaces	1	0	0
8	-	5	Thin Bifaces	0	0	1
9	-	-	Thin Bifaces	0	0	1
10	-	-	Thin Bifaces	0	0	1
1	3	-	Modified Sandstone	2	0	0
2	1	-	Modified Sandstone	0	0	1
3	-	-	Modified Sandstone	0	0	1
-	-	-	Ocher	0	1	0
-	-	-	Aboriginal Ceramics	5	0	0

The Area B excavation was laid out along the south side of Test Pit 1 (Figs. 45; 50,a). It consisted of nine 1-m² units forming a 3-m² block. Unit coordinates and number of 10-cm-thick levels excavated in each are N1022 E985 (10 levels), N1022 E986 (10 levels), N1022 E987 (nine levels), N1023 E985 (nine levels), N1023 E986 (nine levels), N1023 E987 (nine levels), N1024 E985 (nine levels), N1024 E986 (nine levels), and N1024 E987 (nine levels). Surface elevations ranged from 99.55 to 99.57 m. Soil characteristics for Area B deposits are essentially like those described for Test Pit 1 above. Three horizons were defined for debris recovered from the Area B units. Horizon 1 contains debris from Levels 1 and 2, Horizon 2 from Levels 3 and 4, and Horizon 3 from Levels 5-9 or 10. Rates of recovery for selected classes of debris are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight (grams)	0	0	0.3
Sandstone Weight (grams)	2186	2151	5745
Fire-Fractured Rock Weight (grams)	551	421	537
Mussel Shell Umbo Count	544	656	657
Mussel Shell Weight (grams)	164	205	162
Rabdotus Shell Count	805	908	1258
Bone Weight (grams)	136	60	76
Primary Flake Count	40	14	19
Secondary Flake Count	571	212	306
Tertiary Flake Count	1282	405	543
Chip Count	2985	1131	1314

Additional artifacts found in Area B excavations, by horizon, are listed below:

Group	Form	Specimen	Category	Horizon 1	Horizon 2	Horizon 3
1	-	-	Cores	0	0	2
2	-	-	Cores	3	2	1
3	-	-	Cores	1	0	0
4	-	-	Cores	0	0	1
5	-	-	Cores	0	3	3
-	-	-	Cores	0	3	4
6	-	-	Cores	6	1	7
7	-	-	Cores	0	0	2
4	-	-	Thick Bifaces	1	0	0
6	2	-	Thick Bifaces	0	1	0
7	1	-	Thick Bifaces	2	1	1
1	2	12	Thin Bifaces	1	0	0
1	2	14	Thin Bifaces	1	0	0
1	4	33-47	Thin Bifaces Perdiz	14	1	0
1	4	77-82	Thin Bifaces Perdiz	6	0	0
1	4	87	Thin Bifaces Cliffton	0	1	0
1	5	10	Thin Bifaces Scallorn	0	0	1
1	5	19	Thin Bifaces Edwards	0	1	0
1	7	28-43	Thin Bifaces	12	3	1
2	1	32	Thin Bifaces	0	0	1
4	2	21	Thin Bifaces	0	1	0
4	2	22	Thin Bifaces	1	0	0
4	4	86-89	Thin Bifaces	2	1	1
4	4	120	Thin Bifaces	0	0	1
4	4	145-146	Thin Bifaces	1	0	1
4	4	166-168	Thin Bifaces	3	0	0
8	-	6	Thin Bifaces	0	1	0
8	-	7	Thin Bifaces	1	0	0
9	-	-	Thin Bifaces	9	2	3
10	-	-	Thin Bifaces	11	5	1
3	3	13	Distally Beveled Tools	0	1	0
5	-	4	Unifaces	1	0	0
1	2	-	Modified Sandstone	0	2	0

1	3	-	Modified Sandstone		7	6	6
2	1	-	Modified Sandstone		2	2	0
2	2	-	Modified Sandstone		2	2	2
2	3	-	Modified Sandstone		0	2	5
3	-	-	Modified Sandstone		0	1	1
-	-	-	Ocher		0	1	2
-	-	1-3	Bone Beads		1	2	0
-	-	3-4	Bone Awl/Pins		0	1	1
-	-	7	Marine Shell		1	0	0
-	-	-	Aboriginal Ceramics		15	1	1

Two habitational features were documented in the Area B excavations at 41 MC 296. In Feature 2, an extensive scatter of sandstone and fire-fractured rock occurred in all nine units of Area B (Figs. 49; 50,c). Components of Feature 2 were present in Levels 5-7 (99.10 to 98.80 m). There was no intentional patterning of rocks recognized in the feature. Other debris, such as debitage, chipped stone tools, animal bone, mussel shells, snail shells, and modified sandstone, was mixed in with the rock. All of the Horizon 3 debris and artifacts listed above are related to this feature.

A second habitational feature isolated in Area B occurred in Levels 9 and 10 (98.70 to 98.50 m) of Units N1022 E985 and N1022 E986. This was a small, discrete cluster of sandstone measuring 46 cm east-west and 28 cm north-south. The feature probably extended south into unexcavated deposits. Twenty-one pieces of sandstone ranging from 4 to 8 cm in maximum dimension comprised Feature 3. The rocks were stacked. Thirteen pieces were on top in Level 9. The remaining sandstones were exposed underneath in Level 10.

Area C consisted of three 1-m² units located a meter east of Area B (Fig. 45). Forming a 1- x 3-m block, the Area C units and number of 10-cm-thick levels excavated in each are N1022 E989 (two levels), N1023 E989 (four levels), and N1024 E989 (four levels). Surface elevations for the units averaged 99.60 m. Area C was excavated by participants in the TAS Summer Field School of 1981. As the three units were not completely excavated, only Horizons 1 and 2 are represented in the area's debris collection. As elsewhere at 41 MC 296, Horizon 1 contains debris from Levels 1 and 2, and Horizon 2 contains debris from Levels 3 and 4. Rates of debris recovery for the two horizons in Area C are shown below.

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0	0
Sandstone Weight (grams)	157	373
Fire-Fractured Rock Weight (grams)	129	110
Mussel Shell Umbo Count	103	59
Mussel Shell Weight (grams)	25	27
Rabdotus Shell Count	69	159
Bone Weight (grams)	48	87
Primary Flake Count	2	5
Secondary Flake Count	30	53
Tertiary Flake Count	58	69
Chip Count	198	136

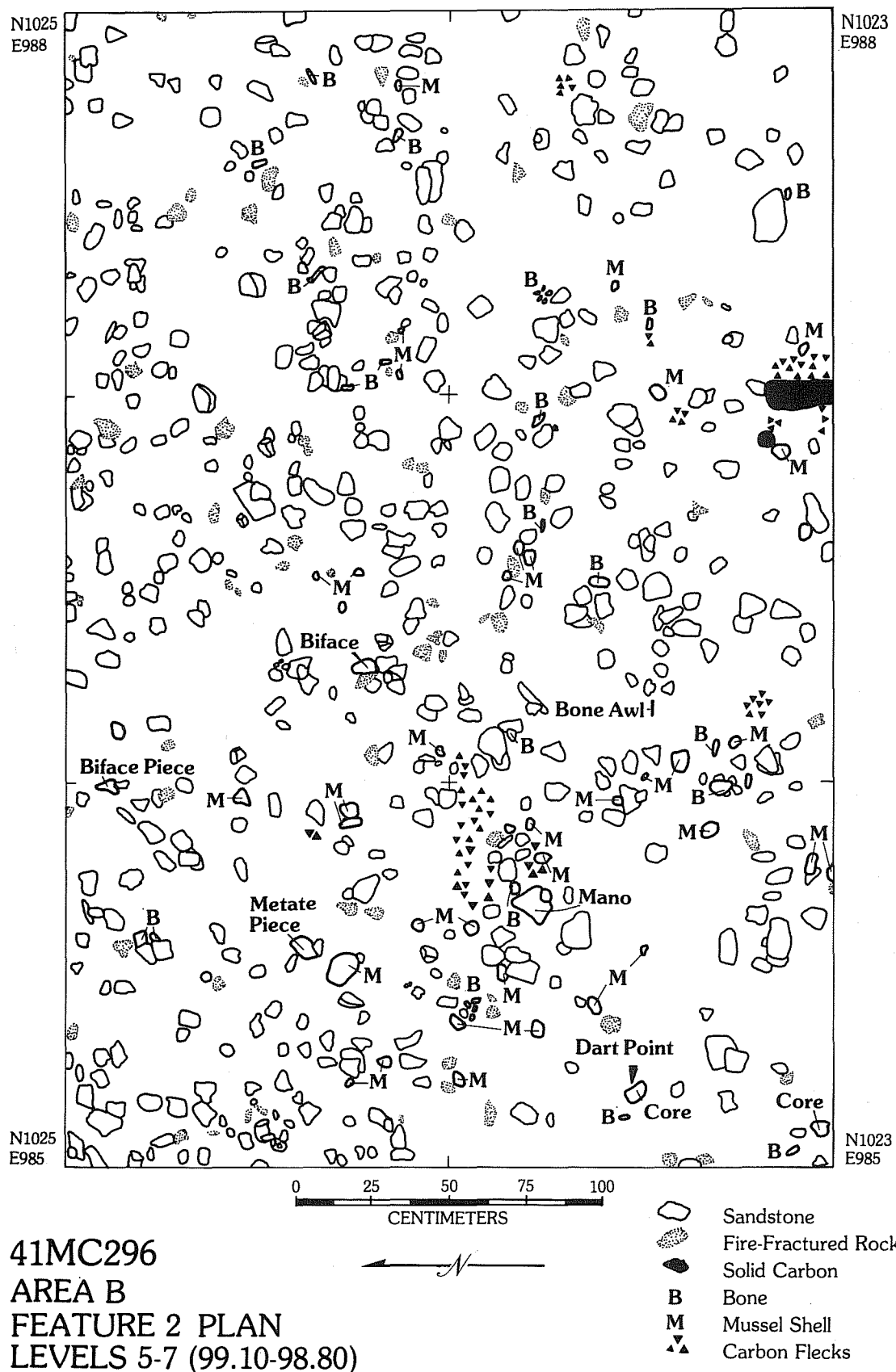


Figure 49. Area B, Feature 2 Plan, Levels 5-7 (99.10-98.80 m) at 41 MC 296.

Other artifacts recovered from Area C are as follows:

Group	Form	Specimen	Category	Horizon 1	Horizon 2
6	-	-	Cores	0	1
7	1	-	Thick Bifaces	0	1
9	1	-	Thick Bifaces	0	1
1	4	54	Thin Bifaces Perdiz	1	0
1	7	47	Thin Bifaces	0	1
3	1	11	Thin Bifaces	1	0
9	-	-	Thin Bifaces	0	1
10	-	-	Thin Bifaces	2	1
1	3	-	Modified Sandstone	3	3
2	2	-	Modified Sandstone	0	1
2	3	-	Modified Sandstone	2	1
-	-	-	Ocher	1	0
-	-	5-9	Bone Beads	0	5
-	-	-	Aboriginal Ceramics	3	0

Two 1-m² units made up Area E at 41 MC 296 (Fig. 45). Located on the north side of Test Pit 1, coordinates for the Area E units are N1026 E986 (three levels) and N1027 E986 (four levels). Surface elevations for Area E units averaged 99.60 m. The units were excavated by TAS Summer Field School workers in June 1981. The area was not completely excavated, and therefore the debris collection contains materials representing only Horizon 1 (Levels 1 and 2) and Horizon 2 (Levels 3 and 4). Rates of recovery for selected classes of debris recovered from the two horizons are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0.5	4
Sandstone Weight (grams)	163	221
Fire-Fractured Rock Weight (grams)	32	48
Mussel Shell Umbo Count	34	44
Mussel Shell Weight (grams)	11	16
Rabdotus Shell Count	35	113
Bone Weight (grams)	45	5
Primary Flake Count	7	1
Secondary Flake Count	61	20
Tertiary Flake Count	124	52
Chip Count	301	120

Additional artifacts from Area E are listed below.

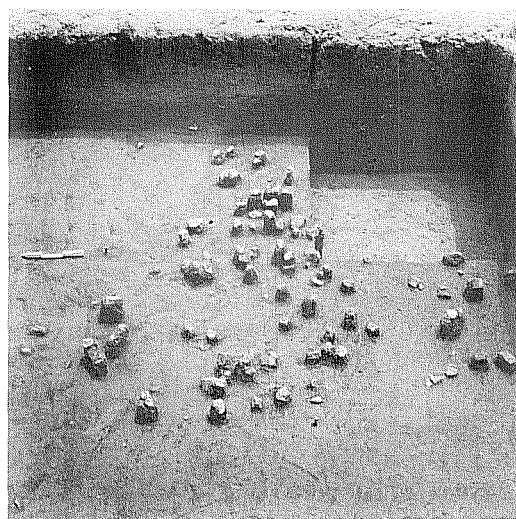
Group	Form	Specimen	Category	Horizon 1	Horizon 2
1	-	-	Cores	1	0
3	-	-	Cores	1	0
7	1	-	Thick Bifaces	1	0
9	-	-	Thick Bifaces	1	0
1	4	53	Thin Bifaces Perdiz	1	0

Figure 50. Views of 41 MC 296, 41 MC 276, and 41 MC 270.

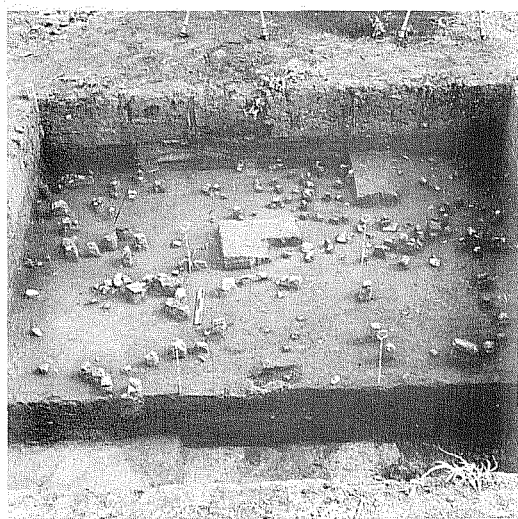
- a, view northwest of excavations in progress at 41 MC 296;
- b, portions of Feature 1 exposed in Area A at 41 MC 296;
- c, portions of Feature 2 exposed in Area B at 41 MC 296. This view shows only the feature components exposed in one level of excavation. Compare with Figure 49 showing all feature components from three levels;
- d, view looking north across Area A at 41 MC 276. Note severe deflation and pavement of prehistoric cultural debris on the site surface;
- e, a view of the Frio River looking downstream near 41 MC 270;
- f, view looking north at shovel testing in progress at 41 MC 270; note the thick grass cover and absence of brush from this cleared and improved pasture.



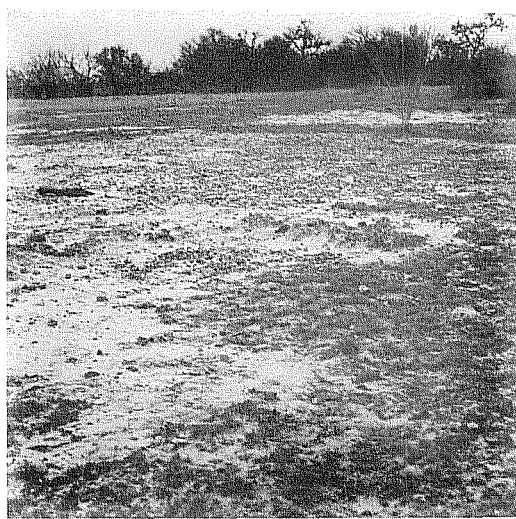
a



b



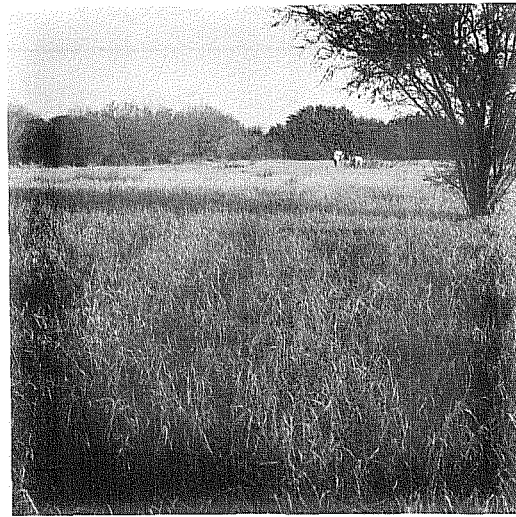
c



d



e



f

1	5	14	Thin Bifaces	Scallorn	0	1
1	7	45	Thin Bifaces		1	0
4	2	25	Thin Bifaces		1	0
4	4	92	Thin Bifaces		1	0
9	-	-	Thin Bifaces		1	0
10	-	-	Thin Bifaces		3	0
-	-	-	Aboriginal Ceramics		3	0

Area G was a block of two 1-m² units located northwest of Areas B, C, and E (Fig. 45). Unit coordinates and number of 10-cm-thick levels excavated are N1026 E978 (five levels) and N1027 E978 (six levels). Surface elevations for these units averaged 99.60 m. Excavations were conducted by participants in the TAS Summer Field School. Although three horizons are defined for the area, it should be noted that Horizon 3 is not fully represented because the excavations were not carried all the way to the bottom of the cultural deposits. Horizon/level groupings for Area G are Horizon 1, Levels 1 and 2; Horizon 2, Levels 3 and 4; and Horizon 3, Levels 5 and 6. Rates of recovery for selected classes of debris from the Area G horizons are as follows:

	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Horizon 3</u>
Tuff Weight (grams)	13	11	4
Sandstone Weight (grams)	128	243	545
Fire-Fractured Rock Weight (grams)	64	128	101
Mussel Shell Umbo Count	11	40	21
Mussel Shell Weight (grams)	3	15	12
Rabdotus Shell Count	29	104	116
Bone Weight (grams)	10	8	6
Primary Flake Count	2	4	1
Secondary Flake Count	32	34	29
Tertiary Flake Count	40	37	47
Chip Count	207	334	162

Area G also yielded the following artifacts:

Group	Form	Specimen	Category	Horizon 1	Horizon 2	Horizon 3
1	-	-	Cores	1	0	0
3	-	-	Cores	2	0	0
1	3	10	Thin Bifaces Ensor	0	0	1
1	4	51	Thin Bifaces Perdiz	1	0	0
1	4	52	Thin Bifaces Perdiz	1	0	0
1	5	12	Thin Bifaces Scallorn	0	1	0
1	5	13	Thin Bifaces Scallorn	1	0	0
2	1	33	Thin Bifaces	0	1	0
9	-	-	Thin Bifaces	2	1	1
10	-	-	Thin Bifaces	1	1	1
1	3	-	Modified Sandstone	0	1	5
2	3	-	Modified Sandstone	0	1	1
-	-	-	Aboriginal Ceramics	1	0	0

Test Pit 3 was located near the presumed western end of 41 MC 296. Only three 10-cm-thick levels were excavated. Two horizons were defined for the materials recovered. Horizon 1 contains debris from Levels 1 and 2. Horizon 2 represents debris from Level 3. Rates of recovery from these two horizons are shown below.

	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0	0
Sandstone Weight (grams)	8	4
Fire-Fractured Rock Weight (grams)	1	1
Mussel Shell Umbo Count	0	0
Mussel Shell Weight (grams)	0.4	0
Rabdotus Shell Count	0	0
Bone Weight (grams)	0.1	0
Primary Flake Count	1	0
Secondary Flake Count	9	2
Tertiary Flake Count	12	5
Chip Count	17	12

Deposits at 41 MC 296 were exceptionally productive in terms of vertebrate faunal remains and carbonized wood associated with prehistoric cultural debris in the subsurface. It is assumed that the bone and carbon are by-products of prehistoric human activity on the site. Recovery of these materials permitted identification of vertebrate and wood species and radio-carbon assay.

Site 41 MC 296 is one of three prehistoric sites excavated during Phase II investigations at Choke Canyon that yielded large collections of vertebrate faunal material. The other two sites are 41 LK 201, discussed in detail by Highley (1986), and 41 MC 222 (Skillet Mountain No. 4), to be discussed later in this report. Identification and interpretation of vertebrate faunal remains from 41 MC 296 and 41 MC 222 are the subjects of Appendix III to this report. Common names for animals identified from bones recovered at 41 MC 296 are as follows:

bird	jackrabbit
bison	lizard
canis	opossum
catfish	pack rat
cottontail rabbit	pintail duck
crappie	pronghorn
eastern mole	rattlesnake
eastern pocket gopher	salamander
freshwater drum	snake
frog	squirrel
gar	turtle
hispid cotton rat	white-tailed deer
hispid pocket mouse	wild turkey
human	

Several pertinent observations have resulted from analysis of the 41 MC 296 vertebrate collection (see Appendix III for a full discussion). Some of the

fish bones were of a size suggesting that they could not have been caught by spearing or hooking. This evidence implies that the prehistoric inhabitants of 41 MC 296 (and 41 MC 222) had some other technique for catching small fish, perhaps with traps or nets. There is "abundant evidence" to indicate that 41 MC 296 was occupied by prehistoric people during the spring and/or summer seasons. One pintail duck bone recovered from a Horizon 3 level offers scant evidence for habitation of the site in the fall/winter season sometime during the Late Archaic period. Comparison and statistical analysis of Late Archaic and Late Prehistoric vertebrate faunal remains from 41 MC 296 and 41 LK 201 demonstrate that Late Prehistoric people placed a greater emphasis on procurement of large animals, principally bison, but also deer, antelope, and peccary, than did Archaic people. Finally, the array of vertebrate fauna evidenced by the bone collection permits projection of the Tamaulipan Biotic Province back into prehistory.

Carbon was recovered from virtually all units and levels in the Phase II excavations at 41 MC 296. Identification and interpretation of wood species burned to form some of the carbon recovered from the site are presented in Appendix II. Identification of much of the carbon as being derived from *Prosopis* sp. and/or *Acacia* sp. is the most important result of this particular study. Stratigraphic context and associated radiocarbon ages for the *Prosopis* sp./*Acacia* sp. samples indicate that the species was (were) growing in the Choke Canyon vicinity in prehistoric times.

Carbon recovered from the deposits at 41 MC 296 were submitted for assay to the Radiocarbon Laboratory, The University of Texas at Austin. Assay of these samples yielded the following radiocarbon ages:

TX-Number	Horizon	Uncorrected Age	MASCA Corrected Age
TX-4677*	1	430 $\pm$ 80	A.D. 1430
TX-4678	1	330 $\pm$ 60	A.D. 1520
TX-4682*	1	450 $\pm$ 60	A.D. 1430
TX-4683*	1	290 $\pm$ 50	A.D. 1520-1610
TX-4684	1	320 $\pm$ 50	A.D. 1510-1590
TX-4685*	2	780 $\pm$ 60	A.D. 1200-1220
TX-4686*	2	750 $\pm$ 70	A.D. 1230
TX-4687*	2	1110 $\pm$ 60	A.D. 910
TX-4679**	3	2020 $\pm$ 70	A.D. 30-50
TX-4680**	3	1440 $\pm$ 80	A.D. 590
TX-4681***	3	1860 $\pm$ 60	A.D. 160
TX-4669***	3	2090 $\pm$ 60	100-10 B.C.

*These samples were composed of aggregates of carbon collected from the same vertical excavation levels within two or more contiguous 1-m² units (see Table 58 in Appendix VI for unit and level proveniences).

**TX-4679 and TX-4680 were derived from the same source, a large carbon sample collected from Feature 2 in Level 6 of the Area B excavation.

***TX-4681 and TX-4669 were derived from the same source, a large carbon sample collected from Feature 2 in Level 7 of the Area B excavation.

Resultant age ranges provided for the three horizons defined in the deposits at 41 MC 296 are Horizon 1, A.D. 1430 to A.D. 1610; Horizon 2, A.D. 910 to A.D. 1230; Horizon 3, 100 B.C. to A.D. 590.

Site 41 MC 296 ranks as one of the several most important prehistoric sites investigated during Phase II research at Choke Canyon. Outstanding characteristics of this site were (1) its multicomponent, well-stratified deposits; (2) the quantities of animal bone and carbon preserved; and (3) the number of time- and function-diagnostic artifacts recovered from each horizon in the site's deposits.

The site contains three components. The earliest, represented by Horizon 3 materials, dates to the Late Archaic period. Radiocarbon assays of samples collected from this Late Archaic component yield an age range of 100 B.C. to A.D. 590. If the latest of four radiocarbon ages for the component is dropped (TX-4680, A.D. 590), there is a span of 100 B.C. to A.D. 160. Further analysis of carbon samples from Horizon 3 indicates that *Prosopis* and/or *Acacia* were species present in the area at the time of site habitation by Late Archaic people. Wood from these species was probably being used to fuel their fires.

A summary of the major artifact categories by horizon at 41 MC 296 is shown below.

Group	Form	Type	Category	Horizon 1	Horizon 2	Horizon 3
1	-	-	Cores	1	0	3
2	-	-	Cores	5	2	2
3	-	-	Cores	5	0	0
4	-	-	Cores	1	0	1
5	-	-	Cores	3	6	5
6	-	-	Cores	6	2	7
7	-	-	Cores	0	0	2
(All Groups)	-	-	Thick Bifaces	6	5	3
1	2	-	Thin Bifaces	2	0	0
1	3	Ensor, Zavala	Thin Bifaces	1	1	3
1	4	Perdiz	Thin Bifaces	27	3	0
1	5	Scallorn, Edwards	Thin Bifaces	2	6	1
1	7	arrow point fragments	Thin Bifaces	16	4	1
2	1	-	Thin Bifaces	0	1	1
3	-	Mission?	Thin Bifaces	1	0	1
4	2	"beveled knives"	Thin Bifaces	3	2	0
4	4	-	Thin Bifaces	11	3	4
1	3	(Specimen 13)	Distally Beveled Tools	0	1	0
(All Groups)	-	-	Unifaces	2	0	0
(All Groups)	-	-	Trimmed Flakes	3	0	1

1	-	metate fragment	Modified Sandstone		17	16	16
2	-	manos	Modified Sandstone		8	11	11
3	-	grooved pieces	Modified Sandstone		0	1	4
-	-	-	Bone Beads		2	7	0
-	-	-	Marine Shell		1	0	2
-	-	sherds	Aboriginal Ceramics		32	5	1

In terms of these formal artifact categories, the Late Archaic component is distinguished from the two later components by the presence of expanding stem dart points (**Ensor** type) and by relatively massive quantities of sandstone, exemplified by Features 1 and 2 (also compare rates of recovery in horizon debris count/weight lists above). The essential absence from Horizon 3 of arrow points, both expanding and contracting stemmed; "beveled knives"; unifaces; trimmed flakes; and aboriginal ceramics is also cited as an important distinction. It is significant that all three horizons yielded roughly equal numbers of ground sandstone artifacts, here assumed to have functioned as manos and metates (now mostly fragmentary) to process seeds and nuts. The uniform distribution of these grinding tools among the horizons suggests that seed and nut foods were of equal importance to all of the people who inhabited the site through time. In terms of meat foods, the Late Archaic inhabitants of 41 MC 296 seem to have been hunting, catching, or collecting a wide spectrum of animals. **Rabdotus** snail shells occur somewhat more frequently in Horizon 3 than in the overlying horizons. Mussel shells are present in roughly equal amounts among all horizons. In terms of vertebrate fauna, most of the species identified occur in Late Archaic and Late Prehistoric components. However, no frogs, no antelope, and fewer bison are indicated in Horizon 3. The mysterious deposits of sandstone in the Late Archaic Horizon 3 levels likely hold the key to a major, but at present unidentified difference in subsistence pursuits. In this respect, the Horizon 3 component at 41 MC 296 is remarkably like the Archaic components at such sites as 41 LK 250, 41 LK 252, 41 LK 253, and 41 MC 209 where massive accumulations of sandstone or fire-fractured rock were also present.

Horizon 2 and Horizon 1 at 41 MC 296 represent early Late Prehistoric and late Late Prehistoric components, respectively. Radiocarbon assays available for the Horizon 2 materials indicate that they were deposited during a time span from A.D. 910 to A.D. 1230. **Scallorn** and **Edwards** arrow points are the primary diagnostic artifacts in the component. Major artifactual differences between Horizon 2 and Horizon 1 are that Horizon 2 yielded no unifaces or trimmed flakes and many fewer sherds of pottery than did Horizon 1. Horizon 2 also contained a distally beveled tool (Group 3, Form 3, Specimen 13).

Horizon 3, termed a late Late Prehistoric component at 41 MC 296, is radiocarbon dated to the time period from A.D. 1430 to A.D. 1610. Diagnostic artifacts of the component are **Perdiz** arrow points, "beveled knives" (thin bifaces Group 4, Form 2), certain unifaces and trimmed flakes, and relatively numerous sherds of aboriginal pottery. Two quite unusual artifacts in the Horizon 1 assemblage are a heavily corroded metal "case knife" blade and a very small, triangular arrow point suggested to represent the **Guerrero** type. These two objects suggest that the latest aboriginal occupants of 41 MC 296 had contact with Europeans. The Horizon 1 component is further distinguished

from the two earlier horizons by evidence of more intensive production of chipped stone tools. Horizon 1 generally yielded more debitage of all classes (see especially the yields for Areas A and B) as well as the most cores, thick bifaces, performs, and manufacturing failures (thin bifaces Group 1, Form 7 and Group 4, Form 4).

Although it is proposed that three distinct components exist within the deposits at 41 MC 296, there are a number of presumed component-diagnostic artifacts that were recovered from horizons other than the ones they are suggested to represent. Horizon 3, for instance, yielded a **Scallorn** arrow point, an arrow point fragment, and a sherd of aboriginal pottery. These atypical artifacts likely worked their way down into Horizon 3 from later deposits through agencies of postdepositional disturbance such as rodent/insect burrows and mechanical action of the soil. The occurrence of these Late Prehistoric diagnostics in Late Archaic context is insignificant in terms of interpreting the prehistoric cultures involved, but is meaningful in demonstrating that cultural debris is subject to postdepositional vertical movements.

The mixing of diagnostics between Horizons 1 and 2 presents more of a problem. The two stemmed dart points (thin bifaces Group 1, Form 2) found in Horizon 1 are probably artifacts collected from an Archaic period camp and reused by someone during the Late Prehistoric period. Contracting stem arrow points (thin bifaces Group 1, Form 4) are most common in Horizon 1 (27 specimens), but three specimens were also recovered in Horizon 2. Expanding stem arrow points (thin bifaces Group 1, Form 5) predominate in Horizon 2, but two specimens were also found in Horizon 1. Other categories where vertical provenience might have a bearing on interpretation of culture history include the "beveled knives" (thin bifaces Group 4, Form 2) and sherds of aboriginal ceramics. Horizon 1 yielded three beveled knives and 32 potsherds. There were two beveled knives and five potsherds in Horizon 2. Clearly there is not a distinct separation between the Horizon 1 and Horizon 2 components with respect to artifacts suggested as diagnostic of each. If, however, allowance is made for vertical migration of cultural debris as suggested by the occurrence of Late Prehistoric debris in Horizon 3, it remains possible to suggest that Horizons 1 and 2 represent culturally and temporally discrete components.

Two artifacts found in Horizon 1--the metal "case knife" blade and a small, triangular arrow point (thin bifaces Group 3, Form 1, Specimen 11)--indicate that Indians having contact with Anglo-European settlers inhabited 41 MC 296 in early historic times.

As previously discussed, the only major differences in subsistence orientations recognized between the Late Archaic and Late Prehistoric components at 41 MC 296 are that: (1) the Late Prehistoric people hunted antelope and more bison in addition to a wide variety of smaller animals; and (2) the Late Archaic people were doing something, probably related to food preparation, that resulted in deposition of great quantities of burned sandstone. A greater emphasis on procurement of antelope, bison, and white-tailed deer (common in both Late Prehistoric and Late Archaic context) is reflected in the tool assemblages for the Late Prehistoric components, especially Horizon 1. Tools such as the numerous arrow points used to kill

the animals, "beveled knives" used in butchering and skinning, and unifaces and trimmed flakes aiding in hide preparation all indicate an economy that was geared much more toward the procurement and subsequent processing of large animals. On the other hand, the Late Prehistoric remains also clearly indicate that efforts were expended on a diversity of other food sources such as seeds and nuts (inferred from grinding tools), mussels, large land snails, and a variety of smaller aquatic and terrestrial fauna. By contrast, there are fewer special function tools in the Late Archaic assemblage. Grinding implements are present to indicate seed and nut processing. Mussels and large snails were also gathered. A variety of animals, all of them smaller creatures except for deer, were hunted, trapped, or caught by hand. The enigmatic accumulations of sandstone resulting from habitation of 41 MC 296 by Late Archaic people probably holds an important unknown key to understanding their subsistence orientation.

41 MC 280

Site 41 MC 280 is located northwest of 41 MC 296 on the slopes leading up from the Elm Creek valley (Fig. 1, folded insert). Recorded by the CAR survey crew in 1979, this site has a long oval outline shape with dimensions of 500 m north-south and 200 m east-west. The southern end of 41 MC 280 is on the floodplain of Elm Creek and comes within 75 m of the present creek channel. The site then rises to the north following the slope of the valley margin. A ridge or projection of the upland sticks out (south) into the site area. The surface is densely covered with brush and is moderately to severely eroded. The survey crew defined the site on the basis of an extensive surface scatter of debitage, fire-fractured rock, sandstone, mussel shell, snail shell, and chipped stone tools. Two sandstone accumulations, probably hearth features, were observed eroding from a field road running through the site area. Late Prehistoric activity was indicated by the presence of a *Scallorn* arrow point on the surface. Cores and bifaces were also noted. The landowner reported to the survey team that the site surface had been repeatedly scoured by artifact collectors through the years. This site was not relocated during the course of Phase II investigations.

41 MC 276

In its upper reaches, the Elm Creek drainage system bifurcates. One channel heads out due north and the other, larger channel, trends off to the northwest. The open prehistoric site designated 41 MC 276 is located on the floodplain of the Elm Creek channel system that heads up to the northwest (Fig. 1, folded insert). Recorded by the CAR surveyors in 1979, 41 MC 276 is situated on the right (west) bank of the major channel running down the valley in this area. This particular channel runs along the east side of the valley. Two lesser channels occur west of the site. A long oval in outline shape, 41 MC 276 measures 150 m north-northeast to south-southwest and is 50 m wide. One portion of the site occurs in a cultivated field covered with pasture grass, weeds, cactus, and a few retama trees. The eastern half of the site paralleling the creek drainage is brush covered. Mesquite trees, soapbush, spiny hackberry, and whitebrush are present. The cleared area of the site was designated Area A and the brushy portion Area B. The surface of

Area A is badly deflated. The deflation has revealed a moderately heavy scatter of fire-fractured rock, sandstone, debitage, and chipped stone tools (Fig. 50,d). Area B is heavily gullied, and a similar array of prehistoric cultural debris is exposed.

Phase II activities at 41 MC 276 were a controlled collection of surface artifacts and excavation of four shovel tests. The shovel tests revealed that cultural debris was confined to the upper 10 cm of deposit on the site. These findings indicated that controlled test excavations would not be worthwhile.

Twenty-six artifacts were collected from the surface of 41 MC 276. Most came from Area A, but three specimens were also collected in Area B. Location of each specimen was recorded on a plan map of the site area (on file at the CAR-UTSA). The artifact assemblage recovered are three cores (one, Group 1; one, Group 5; one, Group 9), four thick bifaces (one, Group 4; one, Group 7, Form 1; one, Group 8; one, Group 9), 14 thin bifaces (Group 1, Form 1, Specimen 13; two, Group 2, Form 1; three, Group 4, Form 4; one, Group 5; one, Group 6; one, Group 8; one, Group 9; four, Group 10), two distally beveled tools (two, Group 3, Form 1), one uniface (Group 2), and one piece of modified sandstone (Group 2, Form 2). Certain specimens in this array indicate that cultural activity occurred at 41 MC 276 in Middle Archaic and/or Late Archaic times.

SITE GROUP 11

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
		41 MC 270	41 MC 266	
		41 MC 288	41 MC 282	41 MC 286
			41 MC 284	41 MC 290
			41 MC 293	41 MC 294

The nine sites comprising Group 11 occur in an area located from 17 to 21 km upstream from Choke Canyon Dam. Two of the sites are situated on upland spurs overlooking the river valley. The rest are down on the Frio River floodplain. With one exception, 41 MC 266, all of the Group 11 sites are on the south side of the river. Roughly the western half of the site group area, on both sides of the river, consists of cleared fields used for crop production or cattle pasturage. Reflecting the merging of San Miguel Creek with the Frio River, the floodplain is exceptionally broad through this area. A riparian forest grows in a gallery along the channel of the Frio River. A narrow fringe of brush parallels the outer edges of the gallery forest. In the eastern half of the site group area, the Frio River runs up against an extensive northeasterly trending upland peninsula formed of resistant outcrops of Jackson Group sandstone (Fig. 1, folded insert). The Frio River floodplain narrows down to a width of only 50 to 100 m along a stretch of 1.0 to 1.5 km on the south side of the valley. The riparian forest following the

river channel continues through this area. Outward from the river on both sides at the eastern end of the Group 11 area, the land is covered with dense stands of brush. Prehistoric sites down on the floodplain rest on levees and terraces of varying ages formed by alluvial processes of the Frio River. Relict channel scars are apparent in certain areas. Four short, steep upland drainage channels cut down across the south side of the floodplain from the uplands. At the east end of the site group area, the sandstone outcrops of the Jackson Group form a quite steep, rocky margin to the southern side of the valley. Two sites in the group, 41 MC 282 and 41 MC 284, are situated on upland spurs sticking out from the south side of the valley. San Miguel Creek, the biggest local tributary to the Frio River, joins the river just off the northern end of 41 MC 270 (Fig. 1, folded insert).

41 MC 270

Site 41 MC 270 is located on the southeast (right) bank of the Frio River very near its juncture with San Miguel Creek (Fig. 1, folded insert). The site rests on a low second terrace 100 to 150 m from the modern river channel (Fig. 50,e). Long and narrow in outline shape, the site measures 400 m north-northeast to south-southwest and is about 75 m in width. The floodplain area containing the site is from 200 to 400 m in width, the steep sandstone slopes of the valley margin are 200 to 300 m southeast and east of 41 MC 270. The site occurs partially within a cleared field planted in coastal Bermuda and partially in brush (Fig. 50,f). Mesquite, guajillo, soapbush, and low, leafy vegetation are present in the brush-covered areas. Hardwoods and dense canopies of mustang grapes grow along the river to the west. The site was evidenced to CAR surveyors by a light, but extensive surface scatter consisting of debitage, mussel shell, fire-fractured chert, burned sandstone, land snail shells, cores, and a few chipped stone tools.

Activities of the CAR crew during Phase II investigations at 41 MC 270 were a provenienced collection of surface artifacts and excavation of five shovel tests. Shovel test results indicated that further controlled excavations were not warranted. Twenty "dog leash" samples of surface artifacts were collected. Locations of the sample units were recorded on a plan map (filed at the CAR-UTSA). The following artifacts were collected: 22 cores (three, Group 2; two, Group 3; one, Group 4; five, Group 5; two, Group 6; two, Group 7; eight, Group 9), four thick bifaces (two, Group 1; one, Group 3; one, Group 7, Form 1), five thin bifaces (one, Group 4, Form 3; two, Group 4, Form 4; one, Group 9; one, Group 10), one distally beveled tool (Group 3, Form 2), one trimmed flake (Group 4), and five pieces of modified sandstone (two, Group 1, Form 3; three, Group 2, Form 2). Use of the site during the Middle Archaic and/or Late Archaic periods is indicated; this assessment is based primarily on the single distally beveled tool recovered.

41 MC 266

Site 41 MC 266 is located on the north side of the Frio River above a relict channel scar roughly 200 m north of the modern channel (Fig. 1, folded insert). As recorded by CAR surveyors during the 1979 survey, 41 MC 266 is oval in outline and measures 125 m east-west and 50 m north-south. A dirt

road bisects the site along its east-west axis. It rests on a relatively high bluff, or terrace remnant overlooking a relict Frio River channel scar downhill to the south. The face of this bluff is heavily eroded. The site surface is covered with mesquite trees, soapbush, spiny hackberry, cactus, and grasses. Prehistoric cultural debris consisting of a heavy surface scatter of fire-fractured rock, burned sandstone, debitage, mussel shell, and snail shell was used to define the site limits. This debris was exposed mainly in the roadbed and on the heavily eroded slope of the bluff (Fig. 55,a). One highly disturbed rock cluster was observed eroding from the bluff face by the surveyors. The landowner reported that the site had been collected periodically through the years. He claimed to have found sherds of aboriginal pottery on the site.

Returning to 41 MC 266 for Phase II investigations, the CAR crew excavated four shovel tests, documented some habitational features exposed on the surface, and made an unprovenienced collection of surface artifacts. Three of the shovel tests were placed in uneroded areas back away from the bluff face in the northern half of the site. Although some prehistoric cultural debris was found, the incidence was quite low. A fourth test excavated uphill from rock clusters eroding from the bluff face revealed a very productive zone extending from 20 to 65 cm below the surface. This zone was described as a "midden deposit" due to its rich consistency, and dark grayish black color. It contained much burned sandstone, two bifaces, numerous *Rabdotus* snail shells, fire-fractured rock, a few pieces of mussel shell, and numerous pieces of debitage.

Three rock clusters, or hearths, were found eroding from the lower areas of the bluff face. A sketch map showing locations of these features and the shovel tests was drawn (on file at the CAR-UTSA). Hearth 1 measured 40 cm east-west and 50 cm north-south. It was composed of about 10 pieces of sandstone (fist-sized) and 10 smaller pieces of fire-fractured rock. Debitage and small pieces of burned rock were scattered around this feature. Hearth 2 was only 2 m northeast of Hearth 1. It measured approximately 90 cm north-south and 65 cm east-west. There were 15 pieces of sandstone in a tight, central cluster of about 40 x 40 cm. There were 10 more sandstones scattered to the south and west. Hearth 3 was found 50 m northeast of Hearths 1 and 2, also at the foot of the eroding bluff slope. It was heavily disturbed by erosion. The feature covered an area measuring 65 cm north-south and 60 cm east-west. It was composed of 35 pieces of sandstone and two pieces of fire-fractured rock. A fairly dense scatter of debitage, burned sandstone, and cores occurred immediately around Hearth 3.

Only two thin bifaces (one, Group 3, Form 2; one, Group 4, Form 4) were collected at 41 MC 266. A stemmed dart point traced in the field notes and tentatively identified as a Fairland type was apparently lost or mislabeled as it does not appear in the artifact tables. Based only on specimens gathered by CAR workers, 41 MC 266 appears to have been inhabited during the Late Archaic period. If, however, the landowner's report of aboriginal potsherds is taken into consideration, a Late Prehistoric component would also be indicated. The dense accumulations of burned sandstone noted on the surface and in the subsurface are like the Late Archaic sandstone deposits at 41 MC 296 and elsewhere. This provides additional evidence of a Late Archaic component at this site.

41 MC 282

Site 41 MC 282 is situated on the north end of a spur or ridge of upland projecting out (north) into the Frio River valley (Fig. 1, folded insert). The valley margin upon which the site rests is formed of outcrops of Jackson Group sandstone. The modern channel of the Frio River is directly below 41 MC 282 at the foot of the valley margin slope. The site is subcircular to broadly oval in outline shape and measures approximately 150 x 150 m. Moderate erosion and brush cover consisting of mesquite, blackbrush, whitebrush, prickly pear, spiny hackberry, and tall grasses characterize the surface. CAR surveyors, who recorded this site in 1979, found that it contained both prehistoric and historic components. Data concerning the historic component is reported by Fox (1986). Prehistoric cultural activity was evidenced on the site by a light surface scatter of debitage, cores, and chipped stone tools.

An unprovenienced collection of surface artifacts was done by the CAR crew at 41 MC 282 during Phase II investigations. The following artifacts were collected: three cores (two, Group 6; one, Group 9), 11 thick bifaces (three, Group 2; two, Group 3; one, Group 4; four, Group 7, Form 1; one, Group 7, Form 3), five thin bifaces (four, Group 4, Form 4; one, Group 10), three distally beveled tools (one, Group 3, Form 1; one, Group 7, Form 1; one, Group 8, Form 1), one uniface (Group 3), one trimmed flake (Group 4), and one piece of modified sandstone (Group 1, Form 1). Prehistoric cultural activity on the site during the Middle Archaic and Late Archaic periods is indicated by this artifact assemblage, particularly the distally beveled tools. The relatively large number of thick bifaces recovered suggests that chipped stone tool manufacture was one important activity on the site. The presence of a sandstone metate (modified sandstone Group 1, Form 1) implies that food processing and more general habitation activities also occurred there.

41 MC 284

Located southwest of 41 MC 282, 41 MC 284 is another site located on the sandstone bluffs at the edge of the river valley (Fig. 1, folded insert). The site is oval in outline shape with dimensions of 120 m east-west and 300 m north-northeast to south-southwest. Moderately heavy stands of brush on the site surface include mesquite, blackbrush, spiny hackberry, cactus, soapbush, tasajillo, whitebrush, and grasses. Sandstone is exposed in the bluff face on the north and west sides of the site. Short upland drainage channels cut down to the river on the northeast and southwest sides of 41 MC 284. Like 41 MC 282, both prehistoric and historic components are evidenced. The Phase II investigation consisted of an unprovenienced collection of surface artifacts. Specimens recovered were two thick bifaces (one, Group 2; one, Group 6, Form 1), one thin biface (Group 4, Form 4), and one distally beveled tool (Group 8, Form 1). Prehistoric cultural activity sometime during the Archaic period is indicated.

41 MC 286

Site 41 MC 286 is located on a natural terrace levee along the right (south) bank of the modern Frio River channel (Fig. 1, folded insert). Following the trend of the levee, 41 MC 286 is long and narrow. As recorded by the CAR surveyors in 1979, it measures 225 m east-west and is about 75 m wide. An upland drainage channel meets the Frio River off the west end of the site. Mesquite, persimmon, spiny hackberry, soapbush, catclaw, whitebrush, and grasses form a light to moderate brush cover over the site. The slope forming the northern side of the site is gullied, and the main site area has deflated areas. Prehistoric cultural debris evidencing the site is exposed primarily in these areas of erosion. Cultural material observed during initial reconnaissance were fire-fractured rock, mussel shell, a sherd of aboriginal pottery, and thin bifaces including unstemmed triangular forms and a Perdiz arrow point.

During Phase II investigations, 41 MC 286 was shovel tested and a number of surface artifacts were flagged for collection. Shovel tests excavated on the site, as well as subsurface exposures in gully walls, revealed that cultural debris was confined to the upper 20 cm of deposit and held little potential for controlled excavations. Unfortunately, the surface artifacts flagged one day, and scheduled for controlled collection the following day, were apparently taken by artifact collectors in the crew's absence from the site. Sketches of some of the artifacts in the field notes show a stemmed dart point classified as a Frio type, two unstemmed triangular thin bifaces, a number of thin biface fragments, and some thick bifaces. Based on these records and data recorded in the site survey record, it appears that 41 MC 286 was inhabited during the Late Archaic and Late Prehistoric periods.

41 MC 290

Site 41 MC 290 is a small historic site located on the left (west) bank of an upland drainage channel that cuts down through the southern floodplain of the Frio River (Fig. 1, folded insert). The site is about 400 m south of the river and perhaps 100 m west of the drainage channel. The site area is covered with scattered mesquite trees and patches of whitebrush. It is evidenced by sandstone building rock strewn over a 50-m radius around a 2-m-long section of cut sandstone blocks laid in a row. This single-layer row consists of at least five blocks and may have functioned as the corner of a house foundation or a chimney base. Two ceramic artifacts, a white ironstone dinner plate base fragment, and a basal/side fragment of a white ironstone bowl were observed 15-20 m east of the *in situ* structured remnant. Several sections of heavy gauge smooth wire and a metal pan fragment were also noted in the vicinity of the structure. A sketch map of the site area was drawn (on file at the CAR-UTSA).

41 MC 288

Site 41 MC 288 occurs on an old, high floodplain terrace about 100 m south of the modern Frio River channel (Fig. 1, folded insert). It lies immediately

west of an upland drainage that comes down across the floodplain from the south. As recorded by the CAR survey crew in 1979, the site is subcircular to oval in outline shape with dimensions of 250 x 250 m. The western half of the site is in a cleared field. The eastern half is covered with mesquite trees, soapbush, acacias, and grasses. The surface is moderately to heavily eroded, the erosion is especially severe near the upland drainage channel. The surveyors defined both prehistoric and historic components at 41 MC 288. The site limits were defined on the basis of prehistoric debris scattered over the surface. Occurring in light to moderate densities on the surface are debitage, mussel shell, *Rabdotus* snail shells, fire-fractured rock, and chipped stone tools. Debris evidencing the historic component is confined to higher ground in the cleared field at the west end.

Phase II activities at 41 MC 288 were excavation of four shovel tests, collection of six "dog leash" samples of surface debris, and a controlled collection of some additional surface artifacts. This investigation was concerned only with the site's prehistoric remains. The shovel tests revealed very little cultural debris in the subsurface. The few materials that did occur were confined to the upper 20 cm of deposit. The results indicated that controlled excavations would not prove worthwhile.

In addition to the six "dog leash" samples, 19 artifacts were collected from the surface of 41 MC 288. Location of each specimen was recorded on a plan map prior to collection. The plan map showing individual artifact proveniences and "dog leash" sample locations is on file at the CAR-UTSA. Artifacts collected are four cores (one, Group 1; one, Group 2; one, Group 3; one, Group 5), four thick bifaces (one, Group 5; one, Group 6, Form 1; two, Group 7, Form 1), six thin bifaces (Group 1, Form 3, Specimen 33; two, Group 4, Form 4; two, Group 9; one, Group 10), two distally beveled tools (two, Group 8, Form 5), one trimmed flake (Group 3, Form 1), and two pieces of modified sandstone (two, Group 2, Form 2). Based on the stemmed dart point (thin bifaces Group 1, Form 3, Specimen 33) and two distally beveled tools in the collection, prehistoric cultural activity is suggested to have occurred during the Middle Archaic period at 41 MC 288.

41 MC 293

Site 41 MC 293 is located on a floodplain terrace along the south (right) bank of the Frio River (Fig. 1, folded insert). Its western side is bounded by an upland drainage channel that meets the Frio River just off the site's north end. As recorded by CAR surveyors in 1979, 41 MC 293 is oval in outline with dimensions of 150 m east-west and 200 m north-south. Most of the site occurs within a cleared field used for agriculture. The survey crew recognized both prehistoric and historic components. Sandstone building blocks thought to have once formed part of a historic structure were found in a gully off the north end of the site. This debris had apparently been bulldozed from its original location when the land was cleared.

Activities of the CAR crew at 41 MC 293 during the Phase II investigation were excavation of two shovel tests, drawing a sketch map of the site area, and making an unprovenienced collection of surface artifacts. Locations of

sandstone block scatters were shown on the sketch map (on file at the CAR-UTSA), but the investigation was mainly concerned with the prehistoric component. The two shovel tests revealed that only a small amount of cultural debris was present in the subsurface. It is assumed that agricultural practices have resulted in considerable disturbance of cultural remains on this site. Controlled testing did not appear necessary. The following artifacts were collected from the surface of 41 MC 293: two cores (one, Group 2; one, Group 5), three thick bifaces (one, Group 2; one, Group 7, Form 3; one, Group 9), five thin bifaces (one, Group 3, Form 2; two, Group 4, Form 4; two, Group 10), one piece of modified sandstone (one, Group 2, Form 2), and one sherd of aboriginal pottery. This limited array of artifacts indicates that this site was inhabited during the Late Prehistoric period.

41 MC 294

This long, narrow site is situated on a natural levee paralleling the right (south) bank of the Frio River (Fig. 1, folded insert). Its long axis running east-west, 41 MC 294 is estimated to be 900 m in length and 100 m in width. Most of the site occurs in a cultivated field. A fringe of brush grows along the northern side by the river. Soapbush, mesquite, prickly pear, and grasses are present. Near the middle of the site, a bend in the channel brings the Frio River to within 25 m. Elsewhere, the river is 100 to 250 m north. The western half of 41 MC 294 is paralleled by a relict channel, or slough, of the Frio River. This slough is 25 to 50 m down slope from the site's northern edge. A prehistoric site, 41 MC 294 was defined by the CAR surveyors on the basis of a light, but extensive surface scatter including debitage, fire-fractured rock, sandstone, mussel shell, *Rabdotus* snail shell, and chipped stone tools. Surface concentrations of prehistoric cultural debris were greatest in the bed of a field road running virtually the entire length of the site. Evidence of both Late Archaic and Late Prehistoric occupations was recognized by the surveyors.

In Phase II investigations at 41 MC 294, five shovel tests were excavated, a site sketch map was drawn, and an unprovenienced collection of surface artifacts was made. The shovel tests generally indicated that controlled excavations were not warranted for the site. The uncontrolled collection of surface artifacts resulted in accumulation of the following assemblage: three cores (two, Group 2; one, Group 3), four thick bifaces (one, Group 1; one, Group 2; one, Group 6, Form 1; one, Group 7, Form 2), 12 thin bifaces (one, Group 1, Form 7; one, Group 2, Form 2; one, Group 3, Form 2; one, Group 4, Form 2; one, Group 4, Form 3; three, Group 4, Form 4; two, Group 9; two, Group 10), one distally beveled tool (Group 8, Form 3), one trimmed flake (Group 4), two pieces of modified sandstone (one, Group 2, Form 1; one, Group 2, Form 2), and one sherd of aboriginal pottery. Certain of these specimens indicate Late Prehistoric and Archaic (undifferentiated) components are present at 41 MC 294.

SITE GROUP 12

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
41 MC 94		41 MC 275	41 MC 226	
41 MC 268				

The Site Group 12 area is located on the north side of the Frio River valley 18 to 21 km west of Choke Canyon Dam. The four sites composing this group are situated on the floodplains of the Frio River and San Miguel Creek. The coalescence of these two major drainage systems has resulted in a complex geomorphological setting. Two of the four sites are beside relict channel scars of the creek and river. The location and orientation of certain relict channels between the river and creek suggest that San Miguel Creek has changed course in its lower reaches a number of times. Much of the land in the site group area has been cleared of brush and subsequently cultivated or planted in grass for cattle pasturage. The area is especially rich in terms of gravel deposits. The gravel occurs in extensive bars in both the Frio and San Miguel channels. It also occurs as lag pavement on the slopes of older alluvial terraces, especially in the area north of 41 MC 94. The closest outcrops of sandstone are located along the northeast side of the San Miguel Creek valley where the creek has cut through the Jackson Group formation.

41 MC 94

Site 41 MC 94 is a long, narrow prehistoric site resting on a natural terrace levee paralleling the north (left) bank of the Frio River (Figs. 1, folded insert; 51). The site measures 800 m northeast-southwest and is less than 100 m wide. A relict channel scar runs along the northern edge of the site. The site is entirely within a cultivated field. Riparian species such as elm, oak, ash, and hackberry grow along the southern edge of the site, while mesquite, spiny hackberry, persimmon, prickly pear, allthorn, and huisache grow along the relict channel scar to the north (Fig. 55,b).

Originally recorded by surveyors from the Texas Historical Commission (Lynn, Fox, and O'Malley 1977), 41 MC 94 was tested by CAR workers during Phase I investigations (Hall, Black, and Graves 1982:202-203). A total of 168 artifacts was collected from the surface, and shovel tests indicated that controlled excavations on the site might yield useful results. Time-diagnostic specimens in the artifact collection indicated that the site had been occupied from Late Paleo-Indian to Late Prehistoric times. The numerous cores, thick bifaces, and thin biface fragments in the Phase I assemblage suggested that chipped stone tool manufacture had been an important activity on the site (*ibid.*).

In Phase II investigations at 41 MC 94, six 1-m² units were excavated at three different locations on the site. Due to its great length, no attempt was made to establish a site-wide horizontal grid system. Instead, the

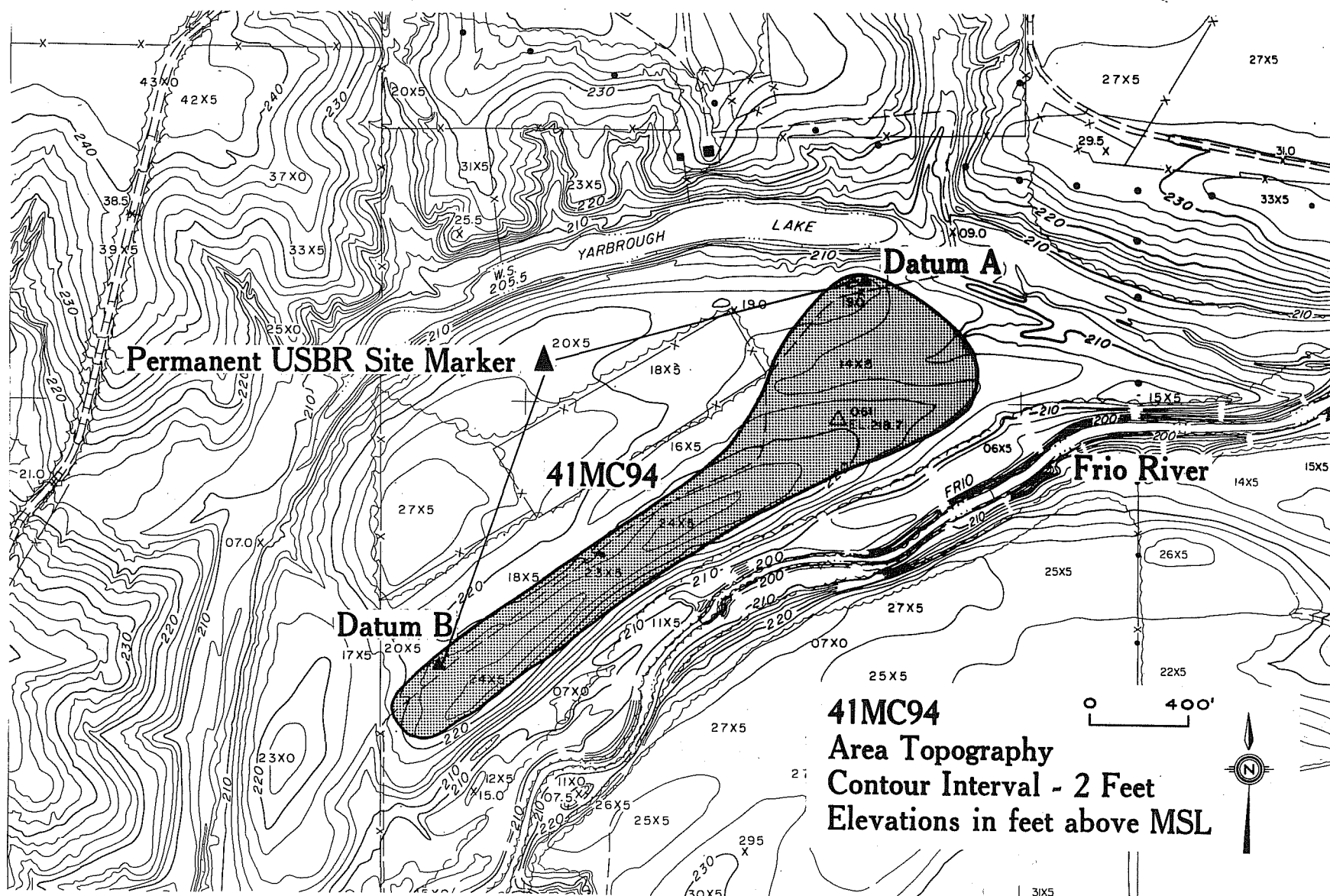


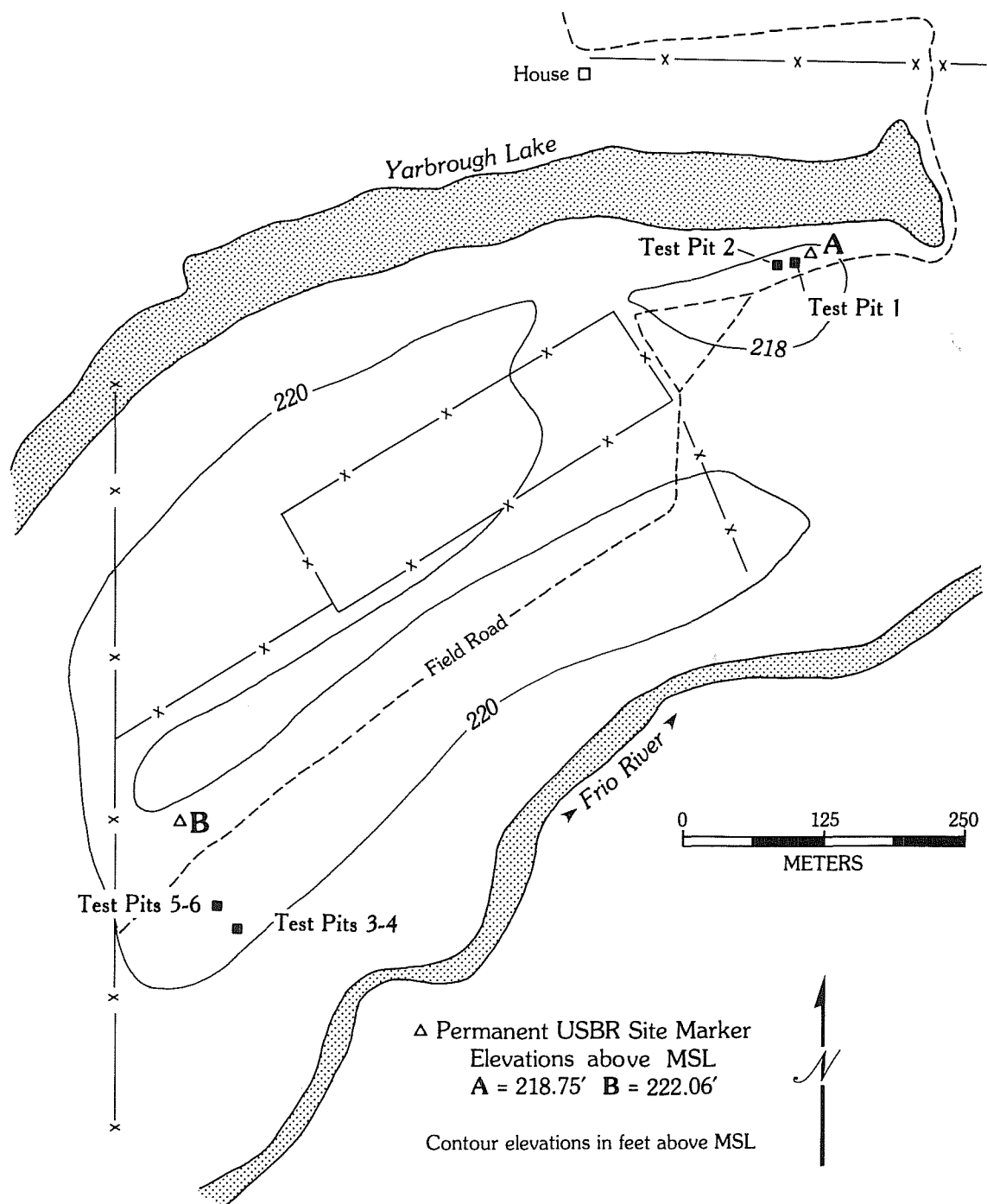
Figure 51. Topographic Map of 41 MC 94 and Surrounding Area.

excavation units were located relative to datums set at the northeast and southwest ends of the site (Figs. 51; 52). Datum A is at the northeast end, and units designated Test Pits 1 and 2 were placed nearby. Datum B is at the southwest end. Test Pits 3 and 4 and Test Pits 5 and 6 were staked out south of Datum B. Each of these two sets of units formed unit-blocks measuring 1 x 2 m. For vertical control, Datums A and B were each assigned arbitrary elevations of 100.00 m. Elevation readings in Test Pits 1 and 2 were taken relative to Datum A. Elevations taken in Test Pits 3-6 were relative to Datum B. USBR surveyors later replaced Datums A and B with permanent site markers. True elevations for the arbitrary 100.00 m marks in each area were calculated as follows: Datum A, 219.83 feet above MSL and Datum B, 221.53 feet above MSL. True elevations for the permanent markers replacing Datums A and B are shown in Figure 52. The USBR surveyors also determined exact locations for each of these datums according to Modified Texas State Plane coordinates.

Test Pits 1 and 2, located at the northeast end of 41 MC 94 near Datum A, were intended to sample subsurface deposits in an area of the site where a substantial amount of prehistoric cultural debris was on the surface. Test Pit 1 was excavated to a depth of 80 cm below the surface (eight 10-cm-thick levels) with surface elevations of 99.70 to 99.72 m. Test Pit 2 went down 90 cm below the surface and had starting elevations ranging from 99.77 to 99.79 m. Soil matrix in both units was described as dark grayish brown silty clay loam all the way down. Two horizons are defined for these units. Horizon 1 contains the debris recovered from Levels 1 to 4. Horizon 2 represents the materials found in Levels 5-8 or 9. Rates of recovery for selected classes of debris for the two horizons in Test Pits 1 and 2 are as follows:

	<u>Test Pit 1</u>	
	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0.3	0
Sandstone Weight (grams)	68	71
Fire-Fractured Rock Weight (grams)	83	312
Mussel Shell Umbo Count	11	11
Mussel Shell Weight (grams)	2	3
Rabdotus Shell Count	418	168
Bone Weight (grams)	0	0.9
Primary Flake Count	1	3
Secondary Flake Count	14	31
Tertiary Flake Count	12	52
Chip Count	28	104

	<u>Test Pit 2</u>	
	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0	0
Sandstone Weight (grams)	62	101
Fire-Fractured Rock Weight (grams)	190	324
Mussel Shell Umbo Count	63	32
Mussel Shell Weight (grams)	15	12
Rabdotus Shell Count	615	212
Bone Weight (grams)	0.1	0.1



41MC94

TEST PIT LOCATIONS

Figure 52. Test Pit Locations at 41 MC 94.

Primary Flake Count	3	2
Secondary Flake Count	30	33
Tertiary Flake Count	27	.66
Chip Count	50	90

Horizon 1 in Test Pits 1 and 2 also yielded one core (Group 4) and two thin bifaces (Group 1, Form 7, Specimen 23; one, Group 9). In Horizon 2 there were two cores (one, Group 4, one, Group 5), four thin bifaces (one, Group 4, Form 4; one, Group 9; two, Group 10), two pieces of modified sandstone (two, Group 2, Form 3), a piece of modified mussel shell (Specimen 5), and one sherd of aboriginal pottery. No habitational features were recognized in Test Pits 1 and 2.

Test Pits 3-6 were placed south of Datum B at the southwest end of 41 MC 94 (Fig. 52). It was in this area of the site that shovel tests were excavated during Phase I investigations. Test Pits 3 and 4, together forming a 1-x 2-m pit, were excavated to depths of 70 cm (seven 10-cm-thick levels) and 90 cm (nine 10-cm-thick levels), respectively. Surface elevations ranged from 99.74 to 99.85 m. The soil matrix was again described as dark grayish brown silty clay loam all the way down through the profile. Two horizons are defined for Test Pits 3 and 4. Horizon 1 consists of debris from Levels 1-4, and Horizon 2, the debris from Levels 5-7 or 9. Rates of debris recovery for Test Pits 3 and 4 are as follows:

Test Pit 3
Horizon 1 Horizon 2

Tuff Weight (grams)	0	0
Sandstone Weight (grams)	131	151
Fire-Fractured Rock Weight (grams)	75	19
Mussel Shell Umbo Count	16	11
Mussel Shell Weight (grams)	7	4
Rabdotus Shell Count	215	510
Bone Weight (grams)	0	0
Primary Flake Count	1	0
Secondary Flake Count	37	7
Tertiary Flake Count	67	8
Chip Count	103	11

Test Pit 4
Horizon 1 Horizon 2

Tuff Weight (grams)	0	0
Sandstone Weight (grams)	114	221
Fire-Fractured Rock Weight (grams)	61	27
Mussel Shell Umbo Count	17	13
Mussel Shell Weight (grams)	4	3
Rabdotus Shell Count	254	546
Bone Weight (grams)	0.1	0
Primary Flake Count	2	1
Secondary Flake Count	48	7
Tertiary Flake Count	85	12
Chip Count	128	24

Also recovered from Horizon 1 deposits in these two units were two thin bifaces (Group 1, Form 3, Specimen 29; one, Group 10), a distally beveled tool (Group 3, Form 2, Specimen 8), a piece of modified sandstone (Group 1, Form 3), and a piece of satin spar gypsum. One thin biface fragment (Group 4, Form 4) was recovered from Horizon 2.

Test Pits 5 and 6 were located in the area between Test Pits 3 and 4 and Datum B (Fig. 52). These two units also formed a 1- x 2-m pit. Test Pit 5 went to a depth of 60 cm below the surface (starting elevations ranging from 99.91 to 99.93 m). Test Pit 6 went to a depth of 80 cm (starting elevations ranging from 99.93 to 99.94 m). As elsewhere at 41 MC 94, the excavated matrix was described as grayish brown silty clay loam. Two horizons are defined for these units. Horizon 1 represents Levels 1-4. Horizon 2 represents Levels 5-6 or 8. Rates of recovery for selected classes of debris from Test Pits 5 and 6 are as follows:

	<u>Test Pit 5</u>	
	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	0	0
Sandstone Weight (grams)	62	25
Fire-Fractured Rock Weight (grams)	28	25
Mussel Shell Umbo Count	14	7
Mussel Shell Weight (grams)	6	3
Rabdotus Shell Count	117	237
Bone Weight (grams)	0	0
Primary Flake Count	0	2
Secondary Flake Count	9	7
Tertiary Flake Count	30	23
Chip Count	75	39

	<u>Test Pit 6</u>	
	<u>Horizon 1</u>	<u>Horizon 2</u>
Tuff Weight (grams)	6	0
Sandstone Weight (grams)	46	16
Fire-Fractured Rock Weight (grams)	12	6
Mussel Shell Umbo Count	9	5
Mussel Shell Weight (grams)	3	3
Rabdotus Shell Count	132	548
Bone Weight (grams)	0	0.1
Primary Flake Count	1	0
Secondary Flake Count	19	10
Tertiary Flake Count	77	24
Chip Count	53	47

Horizon 1 yielded two additional artifacts, one thin biface fragment (Group 10) and a distally beveled tool (Group 3, Form 2, Specimen 9).

Data recovered during Phase II investigations at 41 MC 94 reaffirm the presence of Late Archaic and Late Prehistoric components in the site, but provide no additional recognized evidence of Late Paleo-Indian or Early Archaic components previously suggested on the basis of Phase I findings.

Severe mixing of prehistoric cultural debris in the subsurface is suggested by the vertical provenience of certain time-diagnostic artifacts recovered from the Phase II test pits. Distally beveled tools (Group 3, Form 2, Specimens 8 and 9), both probably Middle Archaic and/or Late Archaic diagnostics, were found in Horizon 1 of Test Pits 3 and 5. Other indicators suggest that Horizon 1 should contain Late Prehistoric remains. Likewise, a sherd of aboriginal pottery was recovered from Horizon 2 (Level 9) in Test Pit 1. All other indications are that Horizon 2 represents Archaic period activity at 41 MC 94. These test pit findings, coupled with the numerous and diverse artifacts collected from the surface in Phase I, demonstrate that the prehistoric cultural remains at 41 MC 94 have been severely churned, probably as a result of agricultural practices on the land containing the site. In retrospect, the controlled surface collections made on the site in Phase I were probably the best method of studying its character.

As a result of findings made during Phase I investigations at 41 MC 94, it was concluded that chipped stone tool manufacture was a common activity on the site (Hall, Black, and Graves 1982:203). Nearby gravel deposits eroding from terrace slopes north of the site were cited as a possible attraction to the site. The Phase I surface collection contained an unusually large collection of sandstone manos and metates, indicating that seed and nut processing was an important subsistence activity in the vicinity. The Phase II test pits also yielded some information related to subsistence that is probably significant. Of particular interest is the fact that mussel shell occurred in relatively low amounts, and *Rabdotus* snail shells were recovered in unusually great numbers. Probably reflecting the proximity of gravel deposits, sandstone and fire-fractured rock occur in nearly equal amounts in the subsurface at 41 MC 94.

41 MC 268

The lower reaches of the floodplain between the Frio River and San Miguel Creek bear evidence of a complicated geomorphological history resulting from the merging of two major alluvial systems and migration of channels within their valleys. Site 41 MC 268 is located on a terrace remnant bounded to the north and west by a relict channel that connects San Miguel Creek to the Frio River (Figs. 1, folded insert; 53). A relict channel of San Miguel Creek runs along the east side of the site. The eastern edge of 41 MC 268 is now within 100 to 300 m of the modern channel of San Miguel Creek, currently flowing to the east (Fig. 55,c). Recorded by the CAR crew during the 1979 survey, 41 MC 268 is oval in outline shape with dimensions of 100 m east-west by 300 m north-south. Much of the western portion of this site occurs in a cleared, cultivated field. The site's eastern portion, paralleling the slough or relict channel scar, supports a brush cover including mesquite and retama. The site was evidenced to surveyors by a surface scatter of prehistoric cultural debris composed mainly of debitage, but also including fire-fractured rock, mussel shell, and chipped stone tools. Expanding stem dart points (one of the Ensor type), a Scallorn arrow point, and sherds of aboriginal pottery were noted on the surface by the surveyors.

Phase II investigations occurred at 41 MC 268 in August 1981. A CAR field crew of 10 persons worked seven days for a total of 560 person hours.

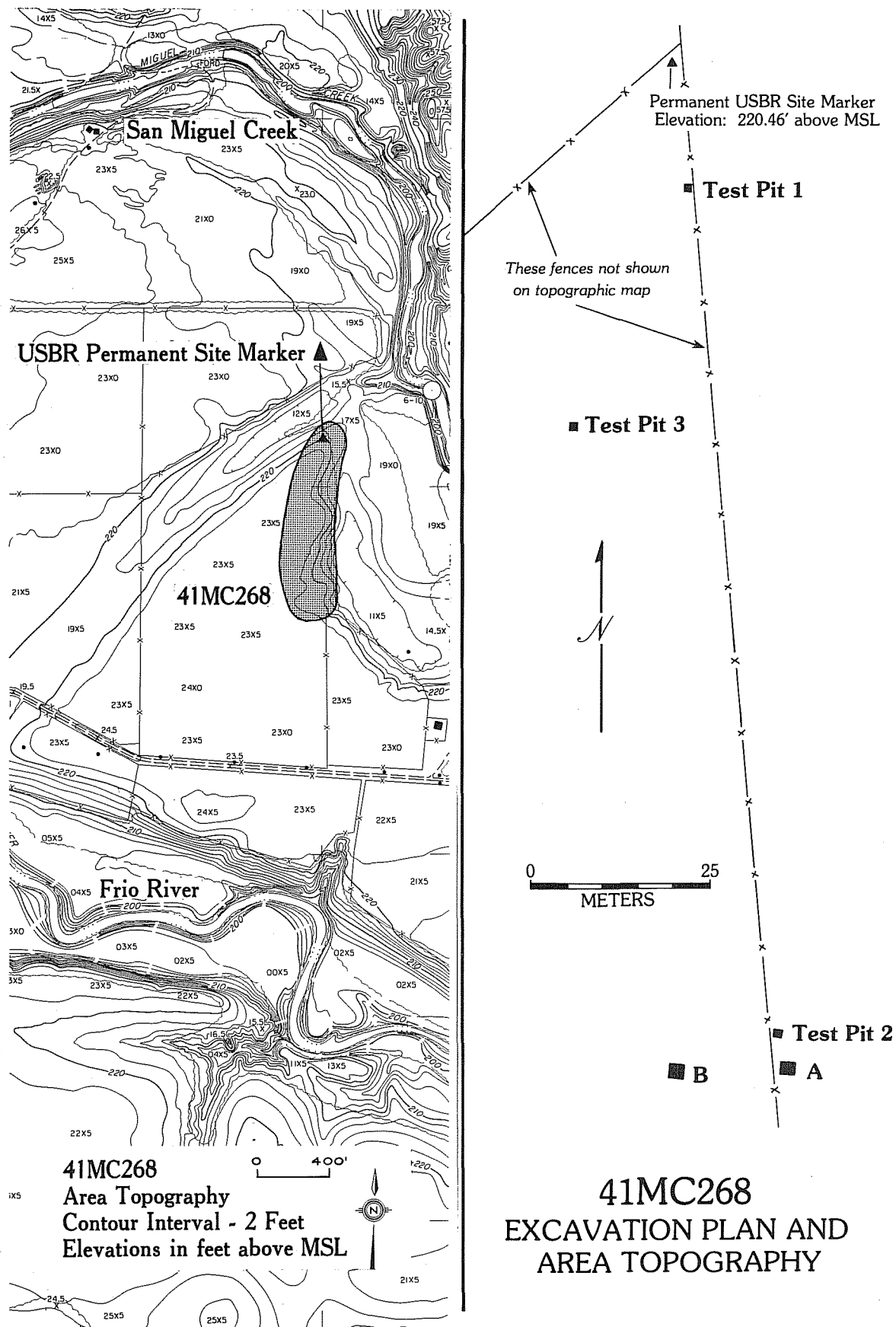


Figure 53. Local Topography and Plan of Excavations at 41 MC 268.

An excavation grid was established at 41 MC 268. A nail driven into a post along a fence line bisecting the site north to south served as the vertical datum. USBR surveyors later calculated a true elevation of 224.95 feet above MSL for this datum nail. They also placed a permanent site marker at 41 MC 268 and determined its exact location expressed in Modified Texas State Plane Coordinates (Fig. 53). A true elevation of 220.46 feet above MSL was calculated for the permanent marker.

Three 1-m² test pits and two 2-m² unit blocks were excavated at 41 MC 268. Test pit locations were judgmentally selected on the basis of surface indications. The unit blocks were positioned on the basis of test pit findings.

Test Pit 1 was placed in the cleared field along the fence line at the north end of 41 MC 268 (Fig. 53). It was excavated to a depth of 70 cm below the surface (seven 10-cm-thick levels). From the surface to a depth of 40 cm, the matrix was described as medium brown sandy loam. In Level 5, the soil changed to light grayish brown sandy clay loam. Debris recovery for Test Pits 1-3 is summarized as follows:

	<u>Test Pit 1</u>	<u>Test Pit 2</u>	<u>Test Pit 3</u>
Tuff Weight (grams)	0	0	16
Sandstone Weight (grams)	15	257	241
Fire-Fractured Rock Weight (grams)	8	251	268
Mussel Shell Umbo Count	13	62	16
Mussel Shell Weight (grams)	5	15	6
Rabdotus Shell Count	5	191	7
Bone Weight (grams)	0.2	2	4
Primary Flake Count	0	6	15
Secondary Flake Count	26	63	76
Tertiary Flake Count	28	85	156
Chip Count	52	122	181

Also found in Test Pit 1 were a thin biface fragment (Group 10) and one piece of modified sandstone (Group 1, Form 2). No habitational features were recognized in this unit.

Test Pit 2 was excavated in the south-central area of 41 MC 268 (Fig. 53). This unit reached a final depth of 80 cm below the surface (eight 10-cm-thick levels). Soil matrix throughout was described as light brown sandy silt. Rates of recovery for selected classes of debris are shown above. Also recovered from Test Pit 2 were four cores (one, Group 1; one, Group 4; two, Group 5) and a distally beveled tool (Group 3, Form 3, Specimen 10).

Feature 1, a cluster of burned sandstone, was defined in Level 8 (70-80 cm below the surface) of Test Pit 2 at 41 MC 268 (Fig. 55,e). Approximately 22 fist-sized pieces of sandstone made up the cluster. The exposed portion of this feature measured 24 x 32 cm. It appeared to continue beyond the limits of the excavation and, projecting from the exposed portion, was probably subcircular in overall outline shape. No carbon was found in or immediately around this feature.

Test Pit 3 was excavated in the north-central area of 41 MC 268 (Fig. 53). The unit was excavated to a depth of 50 cm below the surface in a matrix described as dark brown sandy loam. Rates of recovery for selected classes of debris from Test Pit 3 are shown above. Also found in Test Pit 3 were five cores (one, Group 2; one, Group 3; one, Group 4; one, Group 5; one, Group 6) and one piece of modified sandstone (Group 3). An accumulation of fire-fractured rock, isolated in Level 5 (40-50 cm below the surface) of Test Pit 3, was designated Feature 2. Consisting of about 30 pieces of fire-fractured rock, Feature 2 had dimensions of 40 cm northeast to southwest and 80 cm northwest to southeast. A small amount of carbon was collected from amidst the feature components. A small amount of mussel shell and a few lumps of fired clay were also found in the feature.

Findings made in Test Pit 2 indicated that that particular area of 41 MC 268 offered the best potential for further controlled excavations. Consequently, the two blocks of units designated Areas A and B were placed south and west, respectively, of Test Pit 2 (Fig. 53).

Area A consisted of four 1-m² units forming a 2-m² block. Coordinates for the units and number of 10-cm-thick levels excavated in each are N995 E998 (11 levels), N995 E999 (eight levels), N996 E998 (11 levels), and N996 E999 (eight levels). Surface elevations for these units ranged from 99.42 to 99.47 m. The upper 10 cm of deposit in the area was described as light grayish tan sandy loam. The remainder of the deposit was dark brown sandy loam. In two of the Area A units, N995 E998 and N996 E998, two distinct horizons of debris were perceived. In these units, Horizon 1 represents debris recovered from Levels 1-6. Horizon 2 contains the materials found in Levels 7-11. Rates of recovery for selected classes of debris in the Area A units are as follows:

	<u>Units N995 E998</u> <u>and N996 E998</u>		<u>Other Units</u> <u>All Levels</u>
	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>Combined</u>
Tuff Weight (grams)	11	0	2
Sandstone Weight (grams)	540	83	1075
Fire-Fractured Rock Weight (grams)	725	91	1352
Mussel Shell Umbo Count	29	50	73
Mussel Shell Weight (grams)	15	8	12
Rabdotus Shell Count	78	258	73
Bone Weight (grams)	3	0	1
Primary Flake Count	11	0	5
Secondary Flake Count	110	30	72
Tertiary Flake Count	143	60	97
Chip Count	277	99	143

The Horizon 1 deposits in Area A also yielded the following artifacts: five cores (one, Group 2; one, Group 3; three, Group 5), six thin bifaces (Group 1, Form 5, Specimen 9 [Scallorn]; three, Group 9; two, Group 10), and six pieces of modified sandstone (one, Group 1, Form 3; four, Group 2, Form 2; one, Group 2, Form 3). From Horizon 2 came one core (Group 7), one thin biface fragment (Group 9), and one piece of modified sandstone (Group 2, Form 1).

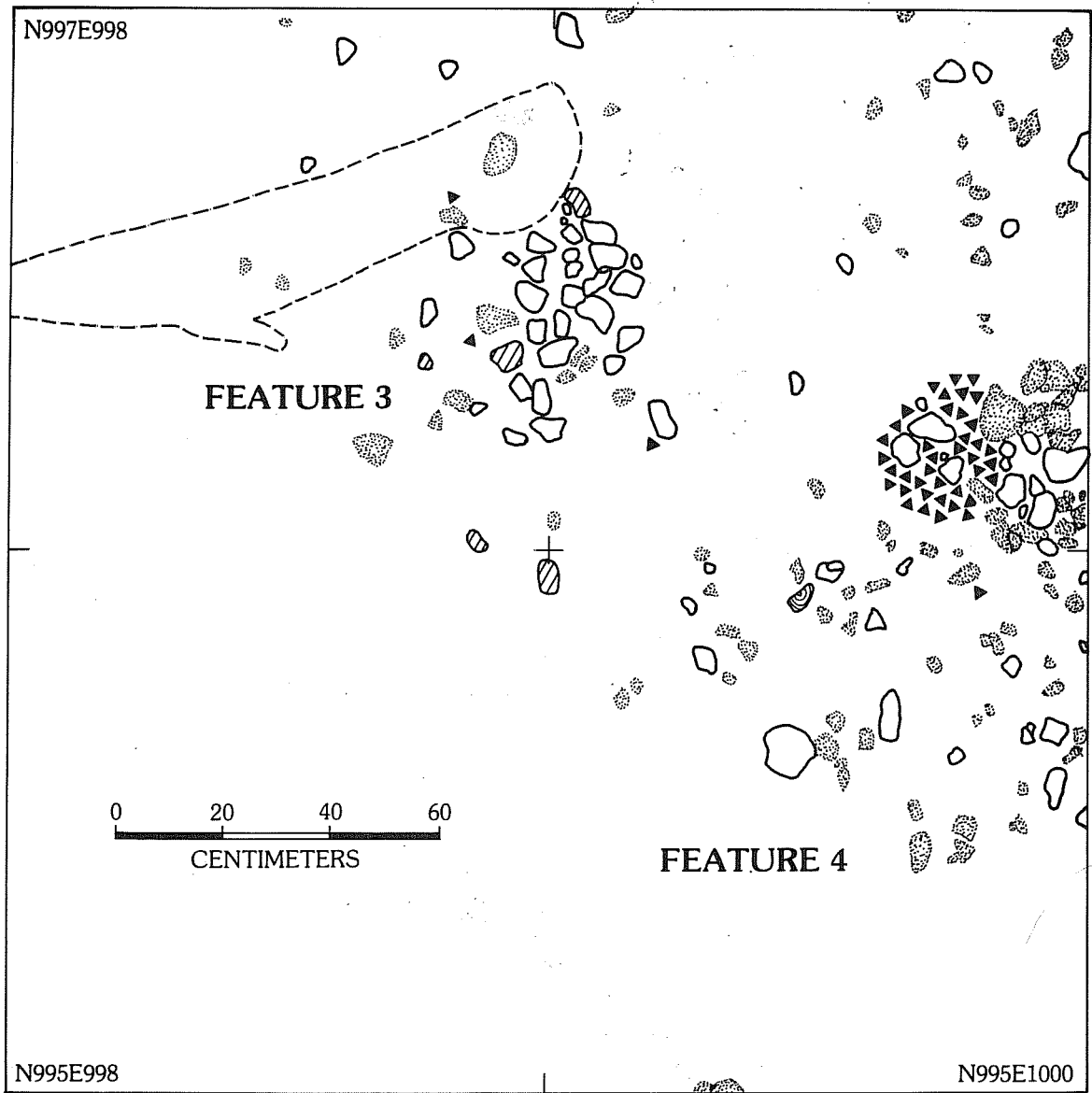
Two distinct clusters of sandstone and fire-fractured rock were exposed in Levels 5-7 (99.10 to 98.80 m) of Area A (Figs. 54; 55,d). Designated Features 3 and 4, these clusters likely represent a single prehistoric habitation event at 41 MC 268. Feature 3, more-or-less circular in outline shape, measured 45 cm north-south and 40 cm east-west. It was made up of 30 pieces of sandstone, 15 pieces of fire-fractured rock, and five pieces of tuff. Rocks ranged in size from 3 to 8 cm. A few flecks of carbon were scattered among the rocks. Small amounts of mussel shell, burned bone, and fired clay were also noted.

Located southeast of Feature 3, Feature 4 was somewhat larger (Figs. 54; 55,d). The major cluster of rocks in this feature measured 80 cm north-south and 60 cm east-west. A tight cluster of the largest rocks occurred in the central area. Roughly circular, this cluster had a diameter of about 30 cm. A concentration of carbon occurred within this central cluster. Approximately 80 pieces of fire-fractured rock and 30 pieces of sandstone made up the feature. A few pieces of mussel shell were also found in the feature. Both Feature 3 and Feature 4 were essentially single-layer constructs.

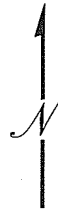
Area B was placed out in the cleared field west of Test Pit 2 and Area A (Fig. 53). The area consisted of four 1-m² units forming a 2-m² block. Coordinates for these units and the number of 10-cm-thick levels excavated in each are N994 E982 (four levels), N994 E983 (11 levels), N995 E982 (six levels), and N995 E983 (four levels). Surface elevations for the units in Area B ranged from 99.47 to 99.49 m. The soil encountered as the Area B units were excavated was described as follows: surface to a depth of 40 cm was very dark grayish brown sandy loam, 40 to 80 cm below the surface was dark grayish brown silty loam, and 80 to 110 cm below the surface was tannish brown sandy loam with carbonate flecking. For the one deepest unit in Area B, N994 E983, two horizons are defined. Horizon 1 contains debris recovered from Levels 1-6, and Horizon 2 contains the debris from Levels 7-11. The other three units yielded material that essentially corresponds to Horizon 1 as defined in N994 E983. The units yielded selected classes of debris as shown below.

	<u>Unit N994 E983</u>		<u>Other Units</u>
	<u>Horizon 1</u>	<u>Horizon 2</u>	<u>All Levels Combined</u>
Tuff Weight (grams)	0	0	2
Sandstone Weight (grams)	106	100	383
Fire-Fractured Rock Weight (grams)	63	184	258
Mussel Shell Umbo Count	48	227	73
Mussel Shell Weight (grams)	321	536	45
<i>Rabdotus</i> Shell Count	15	276	35
Bone Weight (grams)	0.4	0	2
Primary Flake Count	9	1	19
Secondary Flake Count	39	8	127
Tertiary Flake Count	53	14	139
Chip Count	113	13	285

Horizon 1 deposits in Area B also yielded the following artifacts: 10 cores (four, Group 2; two, Group 3; one, Group 4; two, Group 5; one, Group 7), two



- | | | | |
|--|-----------------|--|---------------------|
| | Sandstone | | Rodent Disturbance |
| | Tuffaceous Rock | | Fire-Fractured Rock |
| | Carbon Flecking | | Mussel Shell |



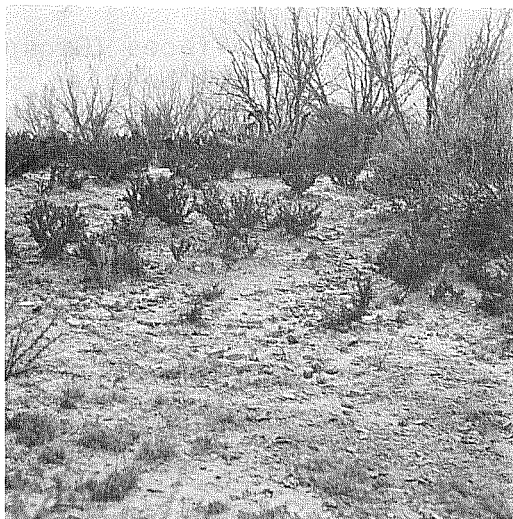
41MC268

PLAN OF FEATURES 3 AND 4

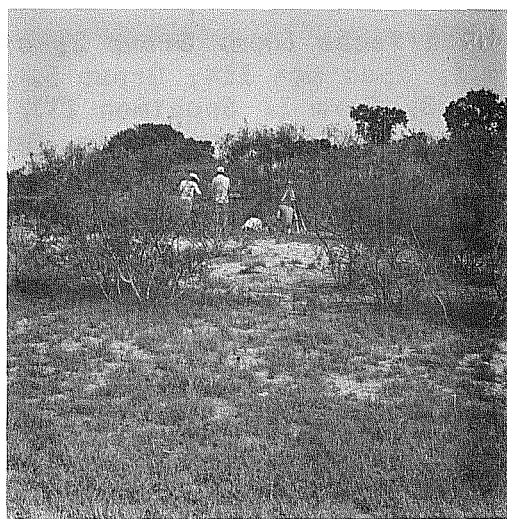
Figure 54. Plan of Features 3 and 4 at 41 MC 268.

Figure 55. Views of 41 MC 266, 41 MC 94, 41 MC 268, and 41 MC 275.

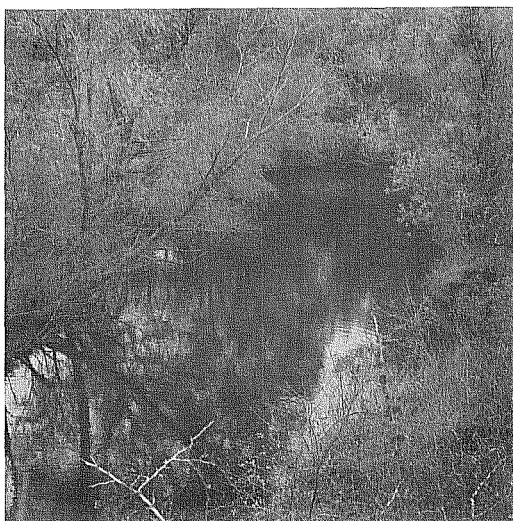
- a, view of the eroded bluff face at 41 MC 266 looking north and upslope at the site's west end;
- b, general view of excavations in progress at 41 MC 94;
- c, a view of San Miguel Creek looking southeast in the vicinity of 41 MC 268;
- d, view of Features 3 and 4 exposed in the Area A excavations at 41 MC 268;
- e, view of Feature 1 in Test Pit 2 at 41 MC 268;
- f, view of the east end of 41 MC 275 looking west-southwest.



a



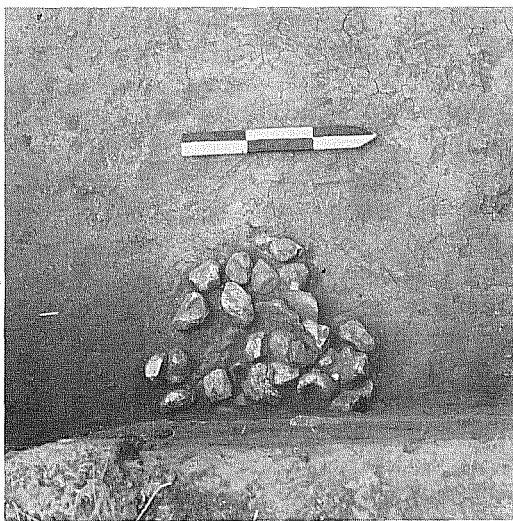
b



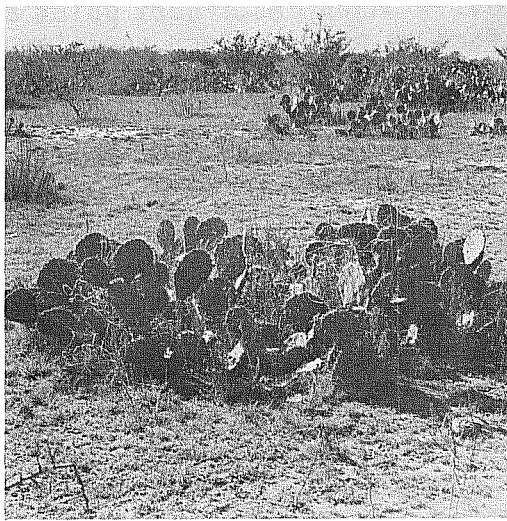
c



d



e



f

thick bifaces (one, Group 2; one, Group 4), two thin bifaces (Group 4, Form 4, Specimen 114; Group 5, Specimen 9), one distally beveled tool (Group 3, Form 1, Specimen 13), and seven pieces of modified sandstone (three, Group 1, Form 3; one, Group 2, Form 1; two, Group 2, Form 3; one, Group 3). From Horizon 2 came one distally beveled tool (Group 3, Form 3, Specimen 11).

In Unit N994 E983 of Area B, a lens of mussel shell was encountered in Level 9 (98.70 to 98.60 m). The lens was only about 2 cm thick. Two pieces of sandstone, a piece of fire-fractured rock, and some *Rabdotus* snail shells were found along with the mussel shells.

The following artifacts were collected from the surface of 41 MC 268: five cores (one, Group 1; one, Group 2; one, Group 3; two, Group 5), eight thick bifaces (one, Group 1; two, Group 2; one, Group 3; one, Group 6, Form 2; one, Group 7, Form 1; one, Group 7, Form 4; one, Group 9), 18 thin bifaces (Group 1, Form 2, Specimen 13; Group 1, Form 3, Specimen 8 [*Ensor*]; Group 1, Form 4, Specimen 31 [*Perdiz*]; Group 1, Form 5, Specimen 18 [*Edwards*]; Group 1, Form 6, Specimen 5; two, Group 3, Form 2; four, Group 4, Form 4; one, Group 7; six, Group 9), two distally beveled tools (Group 3, Form 2, Specimen 17; Group 3, Form 3, Specimen 12), two unifaces (Group 2, Specimen 4; Group 2, Specimen 6), one trimmed flake (Group 4, Specimen 7), and 24 pieces of modified sandstone (one, Group 1, Form 1; two, Group 1, Form 2; four, Group 1, Form 3; one, Group 2, Form 1; 11, Group 2, Form 2; four, Group 2, Form 3; one, Group 3). Locations of most specimens were plotted on a plan map of the site (on file at the CAR-UTSA).

The Phase II investigations at 41 MC 268 reveal that the site contains Late Archaic and Late Prehistoric components. The site's component representation, geomorphological setting, and character of habitational features are reminiscent of the situation at 41 MC 296 and a few other sites where Late Archaic and Late Prehistoric remains occur in the upper meter of deposits. Unlike 41 MC 296, the prehistoric cultural debris representing each component at 41 MC 268 appears to have been churned and otherwise disturbed, probably a result of clearing and cultivating the field containing much of the site. Recovery of an *Ensor* dart point and three distally beveled tools from the surface or near surface are cited as bits of evidence indicating that the components have been disrupted to a certain extent. These specimens are Late Archaic diagnostics and should not have occurred in the upper levels of deposit or on the surface.

Cores, thick bifaces, thin biface fragments, and debitage were recovered in quantities at 41 MC 268 suggesting that stone tool making was an important activity on the site, especially during the Late Prehistoric. The mix of *Perdiz*, *Edwards*, and *Scallorn* points in the thin biface assemblage suggests that both early and late Late Prehistoric occupations took place on the site. It is interesting to note that all five of the distally beveled tools recovered from 41 MC 268 were categorized into Group 3. The Group 3 forms had previously been suggested as possible Late Archaic diagnostics (Hall, Black, and Graves 1982:465). Unifaces and trimmed flakes in the 41 MC 268 collection are in keeping with expectations, given the presence of the arrow points. Surprisingly, no aboriginal pottery was collected during Phase II

work at 41 MC 268. This is more likely a sampling error rather than evidence of absence of pottery from the site.

The full range of grinding implements represented by modified sandstone Groups 1 and 2 in the 41 MC 268 assemblage indicates that seeds, nuts, and/or beans were important sources of food to the prehistoric inhabitants. Mussel shell and *Rabdotus* snail shells are also present as probable residues of foods consumed on the site. A small amount of animal bone survived in the deposits to evidence procurement of vertebrate meat foods. Rock clusters present in Archaic context may represent an important, but currently unidentified, subsistence activity.

41 MC 226

Site 41 MC 226 is a small prehistoric site located on the floodplain midway between the modern channels of the Frio River and San Miguel Creek (Fig. 1, folded insert). It is about 600 m from each drainage. Site 41 MC 226 was recorded in 1977 by surveyors from Texas Tech University (Thoms, Montgomery, and Portnoy 1981). The site is circular in outline shape with a diameter of 100 m. It is situated on an old, high terrace remnant forming a low, rounded hillock or rise. Relict channel scars surround the site, as evidenced on topographic map coverage for the area. A cleared field densely covered with coastal Bermuda grass contains 41 MC 226. It was evidenced to the surveyors as a surface scatter of fire-fractured rock and debitage.

Phase II investigations at 41 MC 226 consisted of excavation of two shovel tests, collection of two "dog leash" samples of surface debris, and an unprovenienenced collection of surface artifacts. The CAR crew defined an area of heavier surface debris concentration on the southwest side of the rise. The area measures approximately 40 m northeast to southwest and 10 m northwest to southeast. Shovel tests were placed near the center of the site and along its southeastern edge. Both revealed very little cultural debris in the subsurface. The profile of Shovel Test 1, excavated near the center of 41 MC 226, was described as follows:

- | | |
|--------------------------|---|
| <u>surface to 18 cm:</u> | A horizon - sandy loam, loose, moist, gray brown (10 YR 3.5/2) with organic staining, abundant chert gravel, some cultural debris (debitage and fire-fractured rock). No carbon, snails, or mussel shell noted. Fairly homogeneous. |
| <u>18 cm to 34 cm:</u> | B horizon (probable) - compact bright orange, lightly mottled with gray insect burrows derived from A horizon. Gravel is less common than above. A couple of pieces of debitage were noted. Color: 4 YR 4.5/4.5. |
| <u>34 cm to 55 cm:</u> | extremely compact yellow tan (10 YR 3.5/6.5) sandy clay-cementlike consistency. White, small (3 mm diameter) caliche nodules present below 50 cm. Mottled with brown clay. |

Though revealing interesting profiles, the shovel tests made at 41 MC 226 indicated that controlled excavations would not yield worthwhile results.

The following artifacts were collected from the surface of 41 MC 226 during Phase II investigations: three cores (one, Group 2; one, Group 3; one, Group 5), 11 thick bifaces (one, Group 2; one, Group 5; one, Group 6, Form 1; four, Group 7, Form 1; one, Group 7, Form 3; one, Group 8; two, Group 9), four thin bifaces (one, Group 2, Form 2; one, Group 3, Form 1; two, Group 10), and five distally beveled tools (one, Group 2, Form 1; two, Group 3, Form 1; one, Group 7, Form 4; one, Group 8, Form 4). Based on the presence of a possible "early triangular" thin biface (Group 3, Form 1, Specimen 10) and the unusual array of distally beveled tools, habitation of 41 MC 226 during Late Paleo-Indian or Early Archaic times is suggested.

41 MC 275

Site 41 MC 275 is located on the left (north) bank of San Miguel Creek on the floodplain between the creek channel and the valley margin slopes (Fig. 1, folded insert). As recorded by the CAR survey crew in 1979, this site measures 250 m north-south and 500 m east-west. A relict channel scar now serving as an upland drainage runs along the south side. The valley margin slopes constitute the site's northern boundary. The surface is moderately to heavily eroded. Ground cover varies from open, grass-covered stretches to heavy, low brush including acacia, prickly pear, mesquite, and whitebrush (Fig. 55,f). The site was recognized by a surface scatter consisting primarily of debitage and fire-fractured rock. The heaviest concentrations of prehistoric cultural debris on the surface were noted at the eastern end of the site, designated Area A. Three surface clusters of sandstone were noted by CAR surveyors in this area. Sherds of aboriginal pottery were also observed. The western end of 41 MC 275, designated Area B, is characterized by a lag gravel pavement showing signs of prehistoric quarry activity.

Phase II activities at 41 MC 275 consisted of excavation of two shovel tests, a provenience-controlled collection of surface artifacts, and locational recording of habitation features exposed on the site surface. Test Pit 1, located in the east-central area of the site, was excavated to a depth of 65 cm below the surface into a matrix described as brown sandy loam. A small amount of debitage and fire-fractured rock was noted down to 40 cm below the surface. Between 40 and 65 cm below the surface, there was an increase in debitage, fire-fractured rock, sandstone, and natural gravels. A piece of bone and a thin biface fragment were found at a depth of 50 cm. At 60 to 65 cm, a cluster of eight pieces of sandstone was encountered. Flecks of carbon were observed among the stones in this feature.

Shovel Test 2 was also excavated in the east-central area of 41 MC 275. It was placed in a relatively uneroded spot adjacent to a deflated, gullied area where much prehistoric cultural debris was exposed on the surface. Dark brown silty sand extended from the surface to a depth of 50 cm. From 50 to 80 cm below the surface, the soil continued to be dark brown in color, but became dry, hard, and compact. Between the surface and a depth of 20 cm, only a small amount of cultural debris was seen. The quantity of debris, including fire-fractured rock, debitage, and sandstone, increased noticeably

in deposits from 20 to 50 cm below the surface. An unstemmed thin biface (Group 2, Form 1, Specimen 28) was found at a depth of 50 cm. Below 50 cm, the amount of cultural debris again decreased.

Over 125 artifacts were collected from the surface of 41 MC 275. Locations of many of these specimens, as well as several surface features, are recorded on a plan map of the site (on file at the CAR-UTSA). The following artifact assemblage was gathered: 11 cores (one, Group 1; one, Group 2; two, Group 3; one, Group 4; two, Group 5; one, Group 7; three, Group 9), 14 thick bifaces (two, Group 1; two, Group 2; two, Group 3; three, Group 4; one, Group 6, Form 2; two, Group 7, Form 1; one, Group 7, Form 3; one, Group 9), 35 thin bifaces (Group 1, Form 1, Specimen 2 [Pedernales]; Group 1, Form 1, Specimen 12; Group 1, Form 2, Specimen 9; Group 1, Form 4, Specimen 32 [Perdiz]; Group 1, Form 5, Specimen 25; Group 1, Form 7, Specimen 25; one, Group 2, Form 2; one, Group 3, Form 2; seven, Group 4, Form 4; three, Group 6; seven, Group 9; 10, Group 10), four pieces of modified sandstone (one, Group 1, Form 2; two, Group 1, Form 3; one, Group 2, Form 2), one piece of satin spar gypsum, and 60 sherds of aboriginal pottery.

The artifact array representing 41 MC 275 is unusual in that a Middle Archaic component is indicated by large, stemmed thin bifaces, including a **Pedernales** dart point. Though it may simply be a sampling error, it is also unusual that no distally beveled tools were found on the site. In other respects, such as geomorphological setting and character of Archaic debris in the subsurface, the Archaic component at 41 MC 275 is comparable to a number of other sites in the area. The sandstone cluster found at a depth of 60 to 65 cm in Shovel Test 1 presumably represents the Archaic component and is a common feature for the period.

Activity during the Late Prehistoric period is evidenced at 41 MC 275 by both expanding stem and contracting stem arrow points and by a large collection of potsherds.

The array of cores, thick bifaces, and thin biface fragments in the 41 MC 275 collection indicate that the lag gravel deposits at the site's west end were being exploited in chipped stone tool making activities.

In summary, the findings made at 41 MC 275 are significant in that they suggest a somewhat earlier development for a particular settlement pattern that became very common in the Late Archaic and continued into the Late Prehistoric period. This pattern involved the increased utilization of site areas along the valley margins on or near floodplain/upland interfaces. Common to the Archaic components in this setting are substantial accumulations of rock that apparently formed some type of hearth. Seed and nut grinding implements (manos and metates) and evidence of more intensive chipped stone tool manufacture are also common on these sites. Location of many such sites on or near lag gravel deposits is their convenient access to raw materials needed for tool manufacture. Whatever the settlement impetus may have been, the 41 MC 275 data indicate that the pattern may have begun to develop in the Middle Archaic.

SITE GROUP 13

<u>Extensive Excavation</u>	<u>Test Pits</u>	<u>Surface Collections</u>		<u>Resurvey or Shovel Tests</u>
		<u>Provenienced</u>	<u>Unprovenienced</u>	
41 MC 222		41 MC 246 41 MC 257 41 MC 251 41 MC 260		

The Group 13 sites are located from 24 to 29 km upstream from Choke Canyon Dam. Along this stretch of the Frio River valley, the southern side is lined by relatively precipitous bluffs or cuerdas formed in outcrops of resistant Jackson Group sandstone. The highest hill on the valley margin is known as Skillet Mountain (location of 41 MC 76). It has a maximum elevation of 372 feet above MSL. Between 41 MC 222 and 41 MC 260, the easternmost and westernmost sites on the southern side of the valley, two major upland drainage channels cut down (north) to feed into the Frio River. The drainage known as Black Hill Hollow follows a course around the western flank of Skillet Mountain. Sloppy Hollow is farther west. It meets the Frio River between 41 MC 254 and 41 MC 255. A third major upland drainage, Hackberry Hollow, splits 41 MC 260 and continues northwest to meet the Frio River near 41 MC 257. Each major upland drainage has smaller tributary branches, some of which have cut quite deeply into the sandstone hills lining the valley. The bluff tops and bluff faces on the south side are densely covered with low, thorny brush. Blackbrush is extremely common, as is cenizo. Some lag gravels occur on the south side of the valley, apparently eroded from older alluvial terrace deposits draped over the flanks of the hills.

The north side of the Frio River valley in the Group 13 area slopes rather gently uphill northward from the river. The resistant Jackson Group sandstones do not appear on that side of the river. The relatively flat, deep alluvial terraces have been extensively cleared for use as pastures and cropland. Where brush still grows, the deep soils support large mesquites, whitebrush, prickly pear, persimmon, spiny hackberry, and a variety of other species.

The active Frio River floodplain is relatively narrow through the Site Group 13 vicinity. The valley is especially narrow along the southern side because the river has collided with the line of steep sandstone bluffs. The Frio River has been quite active in its migrations back and forth across the valley. This activity has left a number of relict channels that carry water at flood stage and hold water after floods recede. A gallery of riparian forest grows along the river channel. The zone between the river and valley margin supports brush species such as mesquite, prickly pear, whitebrush, and spiny hackberry. A grove of big oak trees is located just south of 41 MC 222.

41 MC 222

An important prehistoric site, 41 MC 222, was found and recorded by CAR workers in 1977 as Phase I investigations were being conducted at nearby sites (Hall, Black, and Graves 1982:238-246). At that time, the land containing these particular sites was still under private ownership. Extensive areas of the floodplain on the south side of the Frio River were being cleared of brush to facilitate the handling of cattle. The brush was being cleared with a bulldozer equipped with a 12-foot blade on the front end and a drag made of anchor chain and train rails pulled along behind (Fig. 58,d).

Inspection by the CAR crew of a newly cleared location revealed that the bulldozer had turned up large pieces of animal bone, debitage, mussel shell, sherds of aboriginal pottery, chipped tools, and tool fragments. Most of this material came out of one deep blade swath cut by the bulldozer from east to west across the area. The blade appeared to have cut down about 30 cm below the original ground surface in this swath, but it was difficult to tell where the original surface was exactly. Tree trunks, brush, and the bladed earth were pushed off into a relict channel (slough) running along the western margin of the area containing the debris exposure. In the deepest reaches of the blade cut, other large bone pieces were still partially buried in relatively undisturbed condition.

Designated as Skillet Mountain No. 4, this site was later assigned the permanent designation of 41 MC 222. It rests on a crescent-shaped natural levee. This natural levee forms a distinct rise inside a tight oxbow in a relict channel running more-or-less east-west through the area (Figs. 1, folded insert; 56). The upstream end of this channel cuts away from the Frio River just west of 41 MC 79 some 500 m west-northwest of 41 MC 222. The channel again meets the river 1300 m northwest of the site just northwest of 41 MC 78. The channel generally follows a semicircular course trending southward away from the modern channel of the Frio River and runs up against the sandstone bluffs composing the southern valley wall. Skillet Mountain, the highest of these bluffs, is 600 m southwest of 41 MC 222 (Fig. 58,a,c). A slightly lower bench in the bluffline is within 300 m of the site (Fig. 56).

Site 41 MC 222 is at the western end of an east-west trending lake having a length of about 500 m. The lake is contained in the relict channel and is fed by an abandoned oil well which now flows salty water. Upstream from the west end of the lake, the slough trends northwest for about 150 m and then makes an abrupt turn back to the southeast for about the same distance. The channel then makes a much more gradual turn back to the northwest. The natural levee rise on the south (right) side of the channel inside the oxbow trends in the same direction as does the oxbow--from southeast to northwest.

From a central prominence, the natural levee rise containing 41 MC 222 slopes down to the southeast and northwest to meet the slough channel. The main site area lies on the prominence of the rise with prehistoric cultural debris also being scattered down the southern and southeastern slopes. On the surface, cultural debris was visible over an area measuring approximately 48 m northwest to southeast and from 5 to 12 m southwest to northeast.

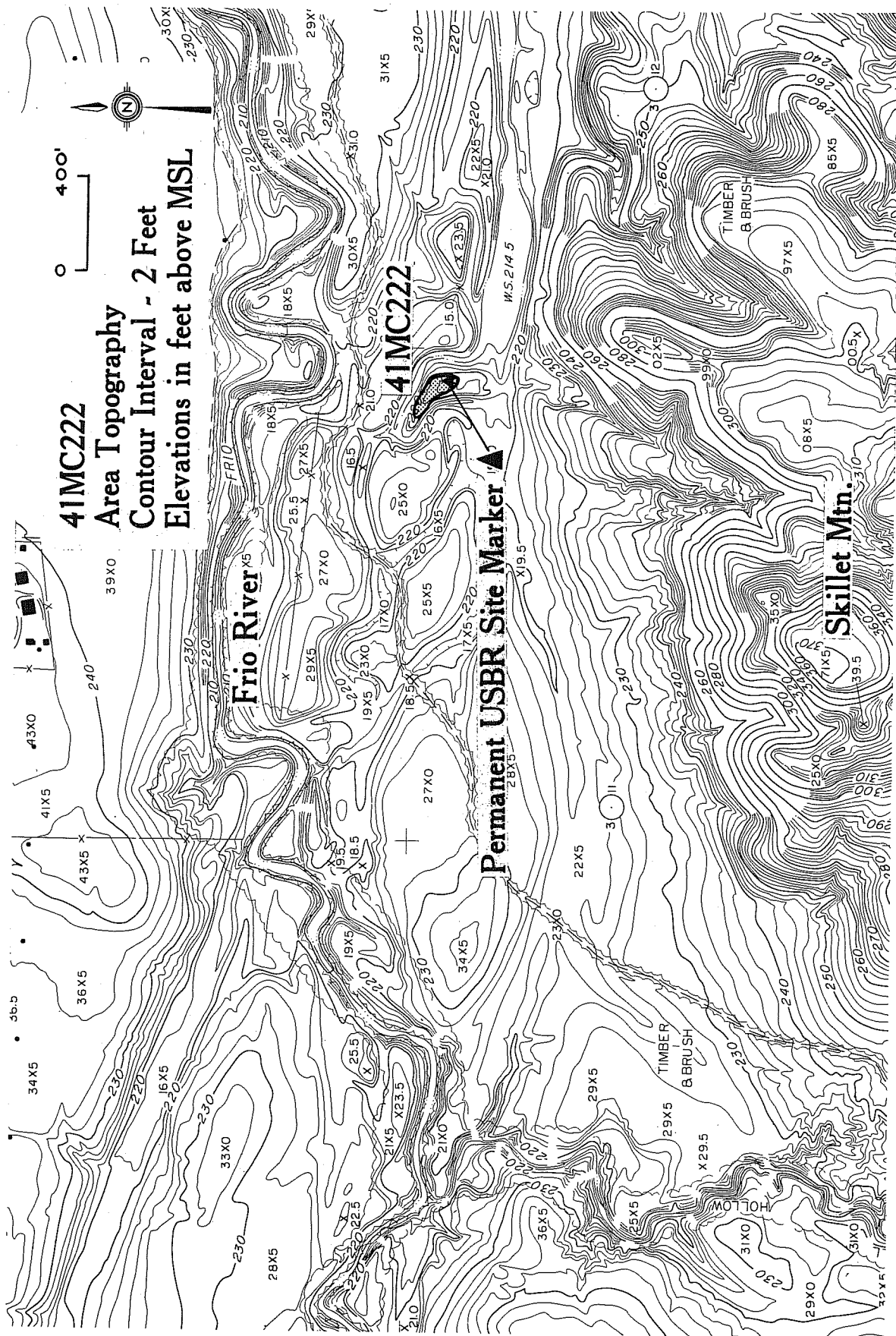


Figure 56. Topographic Map of 41 MC 222 and Surrounding Area.

Due to the brush clearing done prior to its discovery, the surface of 41 MC 222 was essentially denuded of vegetation during Phase I investigations in 1977 (Fig. 58,b,e). By 1980, when Phase II excavations occurred, the site surface was covered with grass, weeds, and allthorn bushes. Immediately south of the site area is a large grove of oak trees growing beside the slough channel. Mesquite, elm, huisache, retama, persimmon, sugar hackberry, and various grasses are on the floodplain around 41 MC 222 (Fig. 63,b).

Horizontal and vertical controls for archaeological excavations were established at 41 MC 222 during Phase I investigations. A steel spike driven into the trunk of an oak tree south of the main site area was assigned an arbitrary elevation of 100.00 m (Fig. 57). USBR surveyors later calculated a true elevation of 223.07 feet above MSL for the N100 E100 marker (top of rebar rod). The elevation on this marker relative to the 100.00 m arbitrary datum used in archaeological investigations was 98.75. The true elevation of the vertical datum spike in the trunk of the oak tree was thus 227.17 feet above MSL. The USBR surveyors also determined the exact location of the N100 E100 marker, expressed as Modified Texas State Plane coordinates.

During Phase I work at 41 MC 222, eleven 1-m² units were excavated (Figs. 57; 61). One block of seven units was staked out over the bone exposed by the bulldozer. A plan map of debris exposed as this block was excavated is shown in Figure 59 (also Fig. 58,f). Rates of recovery for certain classes of debris are illustrated in Figure 60. A second group of four units forming a 2-m² block was also excavated during Phase I work at 41 MC 222 (Figs. 57; 61). A summary of debris recovery rates for these units is provided in Figure 60.

Analysis of data recovered during the Phase I excavations at 41 MC 222 resulted in definition of an early Late Prehistoric component for the site. Two radiocarbon assays (TX-2875 and TX-2876) indicated a corrected age range of A.D. 1260 to A.D. 1290 for the period of habitation on the site. A straight stem arrow point, several unclassifiable stemmed arrow point fragments, and numerous sherds of aboriginal pottery were the main diagnostic artifacts recovered. Most of the large bone pieces collected during Phase I work at 41 MC 222 were derived from bison. Other species represented in the Phase I vertebrate faunal assemblage included rat, raccoon, jackrabbit, snake, gopher, mouse, bird, wild turkey, gar, bobcat, *Canis* sp., javelina, and deer. Other subsistence-related residues found on the site were mussel shells (*Cyrtornaias tampicoensis*, *Lampsilis* sp.), *Rabdotus* snail shells, and fragments of sandstone manos and metates.

The assessment of 41 MC 222 upon completion of Phase I analysis was as follows:

Skillet Mountain No. 4 (41 MC 222) stands out clearly as a prehistoric site of major importance among all sites studied during Phase I investigations at Choke Canyon. The site apparently contains only Late Prehistoric remains and so offers a period assemblage unadulterated by debris from earlier periods of activity. Faunal... and floral... remains are exceptionally well preserved in the deposits. The distribution of cultural debris observed in the limited excavations conducted on the site

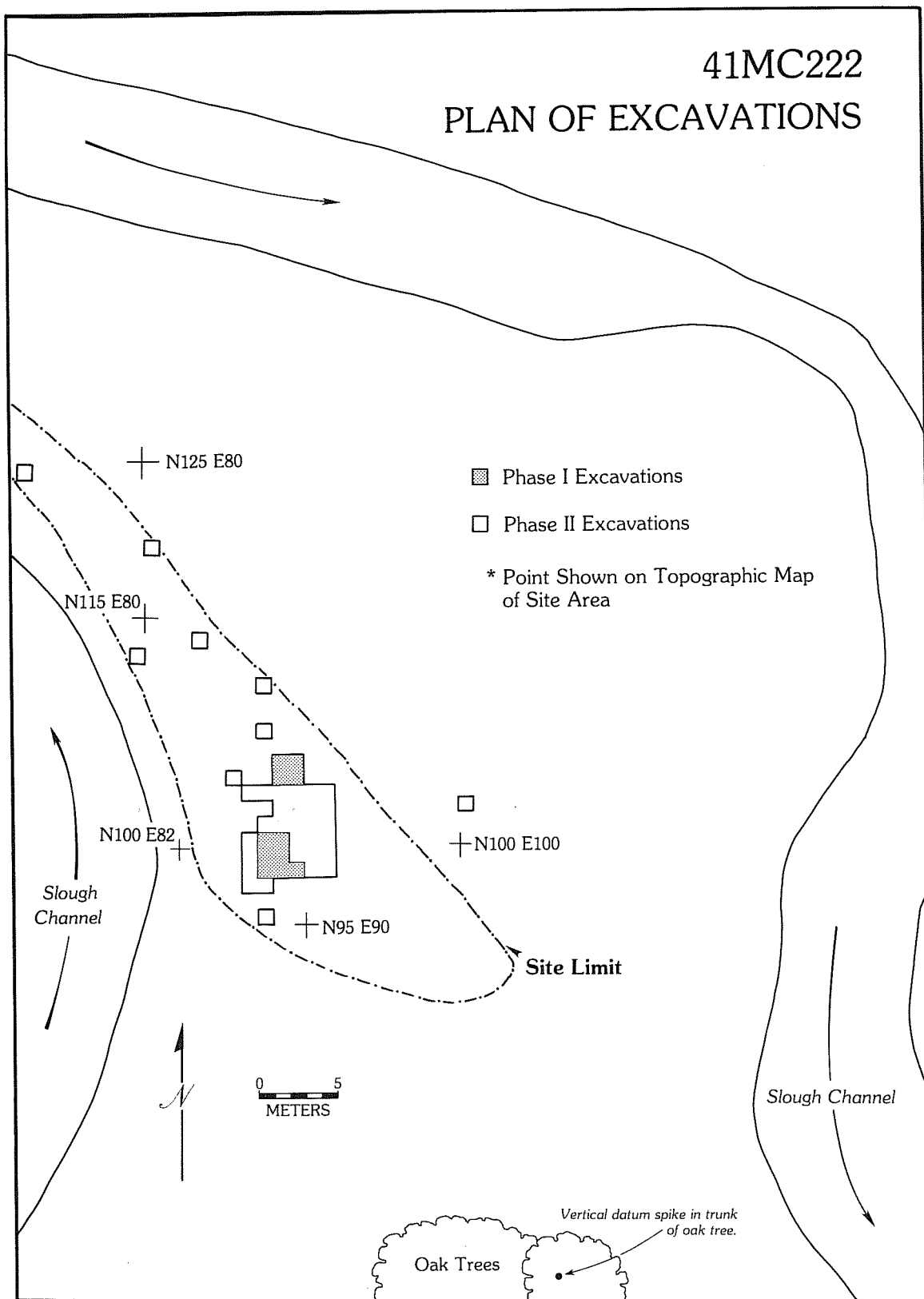


Figure 57. Site Extent and Plan of Excavations at 41 MC 222.

suggests that remains are, to a certain extent, patterned according to the prehistoric activities resulting in their generation and deposition. This site unquestionably deserves further, more intensive investigations (Hall, Black, and Graves 1982:246).

The Phase II investigation at 41 MC 222 took place in September and October 1980. Over 25 days, a crew of seven CAR workers expended a total of 1400 person hours on the site. In June 1981, participants in the Texas Archeological Society Summer Field School worked an additional 76 person hours on the site.

In Phase II, 36 additional 1-m² units were excavated at 41 MC 222. Twenty-eight of these were part of the "main excavation block," the core of which was the Phase I unit blocks (Figs. 57; 61; 63,c,d). The remaining eight 1-m² units were designated "test pits." One of these test pits was to the south of the main excavation block, another to the east, and six to the northeast (Fig. 57). The Phase II units of the main excavation block were intended to increase exposure of the prehistoric activity area recognized through Phase I investigation. The eight test pits were placed to reveal the extent and character of prehistoric cultural remains elsewhere on the site. To select locations for these test pits, the map of the site area as defined in Phase I was divided into 322 1-m² units. These map units were divided into 16 sampling strata from northwest to southeast down the length of the site. A stratified random sampling plan was then used to draw one unit from each block of 20 (the southernmost block had 22 squares) using a random numbers table.

In keeping with technical procedures applied in Phase I, the Phase II units in the main excavation block at 41 MC 222 were excavated in arbitrary 5-cm-thick vertical levels. The eight test pits were excavated in arbitrary levels of 10 cm. Insofar as possible, the cultural debris exposed in each level of each unit was left *in situ* until its provenience could be recorded on a plan map. All matrix excavated from Phase II units was water-washed through screens to promote recovery of debris. In the main excavation block, the matrix from 23 units was washed through 1/4-inch mesh hardware cloth. The following five units were designated as fine screen units: N99 E86, N99 E91, N101 E91, N103 E86, and N103 E91. Matrix excavated from these five units was first washed through 1/8-inch mesh hardware cloth to produce a coarse fraction and then through window screen (ca. 1/16-inch mesh) to produce a fine fraction.

Rates of recovery for selected classes of prehistoric cultural debris from the 36 units excavated during Phase II investigations at 41 MC 222 are summarized on page 208. Each count or weight represents recovery for all levels in a particular unit. Starting elevations on the surface of each unit are also shown. Debris distributions for units in the main excavation block are graphically represented in Figure 60. Soil matrix in the units was described as very dark gray or grayish brown, fine-grained, clay-rich sediment having a blocky structure with low sand and silt content. The soil covering the prehistoric cultural debris at 41 MC 222 is primarily alluvial material deposited when the Frio River has flooded and gone over its banks and covered substantial segments of the floodplain (Fig. 63,a).

Unit	Surface Elevation	Tuff Weight (g)	Sandstone Weight (g)	Fire-Fractured Rock Weight (g)	Mussel Shell Umbo Count	Mussel Shell Weight (g)	Rabdotus Shell Count	Bone Weight (g)	Primary Flake Count	Secondary Flake Count	Tertiary Flake Count	Chip Count
N95 E87	98.70	0.0	22.0	0.2	0	0.2	6	3.0	1	2	3	3
N97 E86	98.64-98.76	0.8	36.0	3.0	3	0.9	22	73.0	1	25	52	12
N97 E87	98.68-98.76	3.0	14.0	1.0	4	4.0	42	4.0	0	20	25	61
N98 E86	98.73-98.74	0.8	4.0	0.6	6	2.0	8	3.0	7	28	56	136
N98 E90	98.74-98.75	1.0	74.0	2.0	6	0.8	209	3.0	0	14	12	43
N98 E91	98.74-98.77	7.0	94.0	2.0	8	3.0	116	6.0	0	17	28	92
N99 E86	98.73-98.75	0.0	11.0	3.0	2	1.0	54	5.0	2	17	86	148
N99 E89	98.73-98.82	2.0	52.0	3.0	6	2.0	34	20.0	1	6	16	54
N99 E90	98.74-98.82	3.0	119.0	0.9	1	0.8	16	1.0	3	15	27	56
N99 E91	98.74-98.82	6.0	21.0	5.0	4	3.0	112	2.0	1	26	88	168
N100 E86	98.73-98.78	0.6	86.0	4.0	12	4.0	21	0.4	0	10	12	31
N100 E89	98.81-98.84	0.0	181.0	1.0	11	8.0	63	8.0	3	17	20	42
N100 E90	98.80-98.87	3.0	161.0	6.0	12	5.0	113	6.0	1	5	17	32
N100 E91	98.80-98.92	2.0	24.0	3.0	7	2.0	66	1.0	1	15	29	42
N101 E87	98.84-98.91	0.0	27.0	4.0	5	6.0	175	8.0	0	10	12	24
N101 E88	98.79-98.87	2.0	9.0	1.0	6	2.0	32	0.3	0	7	23	33
N101 E89	98.83-98.94	2.0	19.0	0.7	2	3.0	18	7.0	1	15	23	33
N101 E90	98.87-98.97	2.0	84.0	2.0	10	4.0	57	24.0	5	19	33	64
N101 E91	98.87-98.98	2.0	102.0	6.0	14	5.0	128	23.0	1	35	123	173
N102 E88	98.87-99.02	5.0	23.0	9.0	18	9.0	228	0.6	1	6	23	27
N102 E89	98.87-99.06	0.0	30.0	19.0	20	10.0	201	5.0	1	26	35	84
N102 E90	98.94-99.07	0.0	65.0	4.0	9	3.0	123	6.0	3	37	58	197
N102 E91	98.97-99.08	0.0	130.0	11.0	31	13.0	83	15.0	7	77	77	122
N102 E100	98.96-99.02	11.0	3.0	5.0	5	0.9	72	2.0	1	18	20	64
N103 E86	98.86-99.08	0.0	2.0	0.9	6	3.0	58	1.0	1	3	6	17
N103 E87	98.97-99.08	0.0	11.0	1.0	3	3.0	81	0.4	0	7	10	7
N103 E88	99.02-99.10	0.0	96.0	6.0	86	45.0	431	8.0	2	33	47	94
N103 E89	99.02-99.11	0.0	35.0	5.0	26	16.0	393	14.0	6	64	100	107
N103 E90	99.06-99.11	0.0	50.0	3.0	20	10.0	96	6.0	4	22	44	72
N103 E91	99.07-99.11	0.0	83.0	6.0	19	5.0	117	6.0	4	37	178	604
N104 E85	98.84-99.05	0.0	77.0	3.0	30	26.0	189	0.6	0	7	5	42
N107 E87	99.10	0.0	65.0	3.0	90	64.0	274	9.0	0	11	16	21
N112 E79	98.92-99.02	0.0	169.0	4.0	11	5.0	47	1.0	0	9	6	33
N113 E83	99.10-99.19	0.0	117.0	0.3	23	7.0	74	0.7	0	6	17	32
N119 E80	99.07-99.11	1.0	99.0	2.0	6	3.0	54	0.3	0	2	2	11
N125 E72	98.83-98.89	0.0	13.0	0.4	0	0.1	2	0.1	2	2	12	24

Phase II excavations at 41 MC 222 resulted in definition of seven additional prehistoric habitation features. The bone bed exposed and documented during Phase I work is designated Feature 1 (Fig. 59) and is discussed in detail in the Phase I report (Hall, Black, and Graves 1982:239-243).

Features 2, 3, 4, 5, 7, and 8 were found in Phase II excavations in the main excavation block (Figs. 61; 62; 64). Feature 6 occurred in one of the test pits (Unit N112 E79) to the north of the main excavation.

Feature 2 was defined primarily as an extensive, irregularly shaped accumulation of sandstone (Figs. 62; 63,e). Portions of the feature were located in each of four units--N102 E89, N102 E90, N103 E90, and N103 E91. The sandstone accumulation has a linear configuration trending northeast to southwest. Down its long axis, the feature measures approximately 220 cm. At its widest, it is about 63 cm. Over 100 pieces of sandstone make up the cluster. They range in size (maximum dimension) from 10 cm to 3 cm. Feature 2 is essentially a flat, single layer construct. It does, however, slope from north to south (Fig. 65), and in some cases, the sandstones are stacked one on top of the other. There was no basin or other subsurface structure noticed beneath the sandstone. Other debris scattered amidst the sandstone included debitage, mussel shell, *Rabdotus* snail shells, animal bone, carbon, and chipped stone tools. Artifacts found in the Feature 2 area are four cores (one, Group 2; one, Group 5; one, Group 6), five thin bifaces (Group 1, Form 5, Specimen 7 [*Scallorn*]; Group 1, Form 5, Specimen 8 [*Scallorn*]; one, Group 9; two, Group 10), two pieces of modified sandstone (one, Group 1, Form 1; one, Group 1, Form 2), one piece of modified bone (awl or pin?), and 59 sherds of aboriginal pottery. The pottery found near Feature 2 occurred as two large vessel sections that had been broken *in situ* into a number of sherds (Figs. 62; 64,b). Carbon samples recovered from Feature 2 were submitted for radiocarbon assay. Proveniences of the two samples submitted for assay were TX-4666, Unit N103 E91, Level 4, elevation 98.95-98.90 m and TX-4694, Unit N102 E90, Level 3, elevation 98.95-98.85 m. Both of these samples came from within soil pedestals supporting constituents of Feature 2. Ages yielded by the radiocarbon assays were:

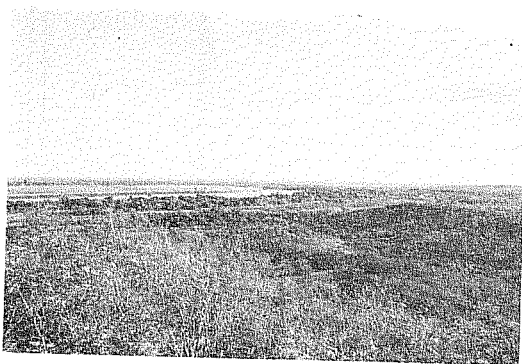
	Uncorrected Age	MASCA Corrected Age
TX-4666	360 $\pm$ 60	A.D. 1470 to 1500
TX-4694	540 $\pm$ 60	A.D. 1390

Feature 3 was a small, tight cluster of 27 pieces of sandstone encountered in Units N99 E90, N100 E90, and N100 E91 (Fig. 62). This sandstone cluster covered an oval area with dimensions of 50 cm northeast to southwest and 30 cm northwest to southeast. The elevation range represented by constituents of Feature 3 was 98.77 to 98.63 m. Rocks ranged in size (maximum dimension) from 6 to 20 cm. Function of this feature is problematical. There was no carbon or burned bone to clearly indicate that it was a hearth. It was a single layer construct and had no recognizable basin or structure beneath it.

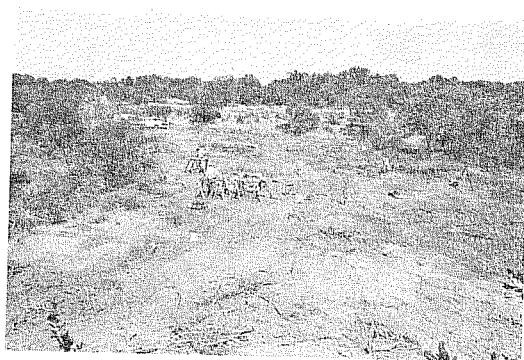
Feature 4 was a concentration of *Rabdotus* snail shells defined in Units N98 E90 and N98 E91 (Figs. 61; 62). The feature appeared to continue into adjacent unexcavated units to the south (N97 E90 and N97 E91). The exposed portion of Feature 4 was semicircular in outline with a diameter of 60 cm (east-west). The snail shell concentration was lens shape in cross section with a maximum central thickness of 7 cm. The elevation range was 98.70 to

Figure 58. Views From Phase I Investigations at 41 MC 222.

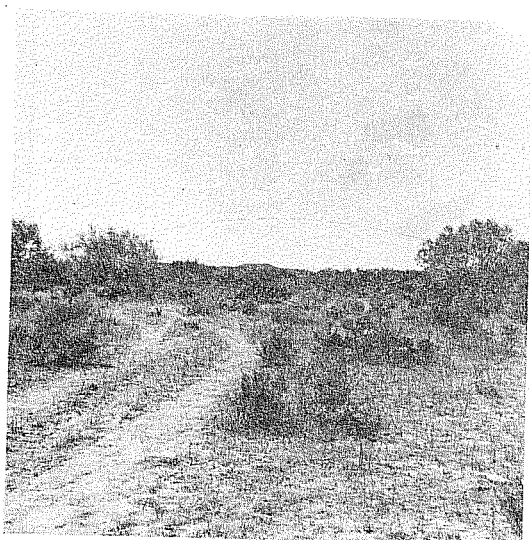
- a, view looking northeast across the Frio River valley from the "summit" of Skillet Mountain (elevation 372 feet above MSL). Note Jackson Group cuestas along southern valley margin at right. The Frio River runs through the gallery of large trees near the center of photograph. Site 41 MC 222 is located downhill to the left;
- b, overview looking north of Phase I excavations in progress at 41 MC 222. Note effects of brush clearing on site. The Frio River is located in the tall trees in the background;
- c, view looking south across 41 MC 17 to Skillet Mountain at the center of the photograph on the horizon;
- d, brush drag made of train rails and anchor chain. Pulled by a bulldozer, it was this drag that exposed 41 MC 222 as brush was being cleared on the floodplain;
- e, view looking southwest across 41 MC 222 to sandstone bluffs along south side of valley. Site lies between slough channel in foreground and large oak tree in background;
- f, bison bone exposed in Phase I excavations at 41 MC 222.



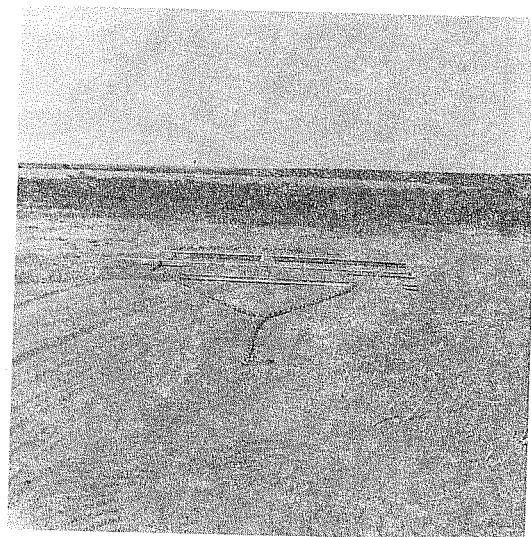
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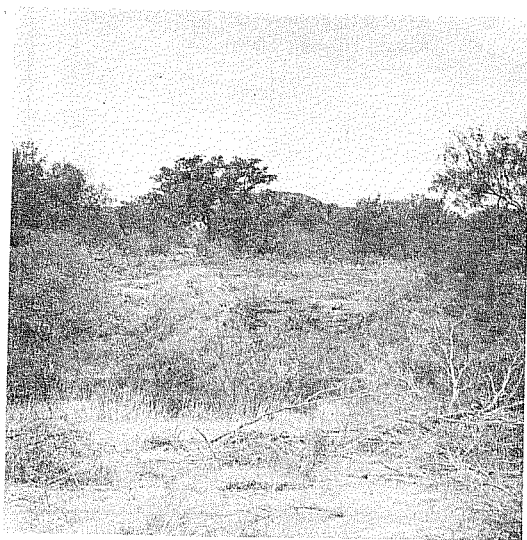
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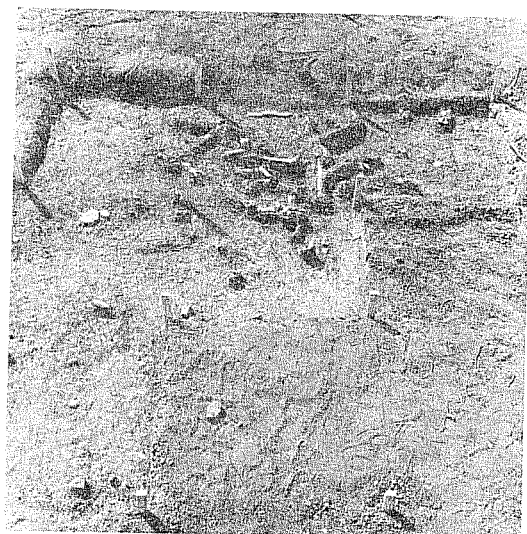
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PLAN OF BONE BED EXCAVATION DURING PHASE I INVESTIGATIONS

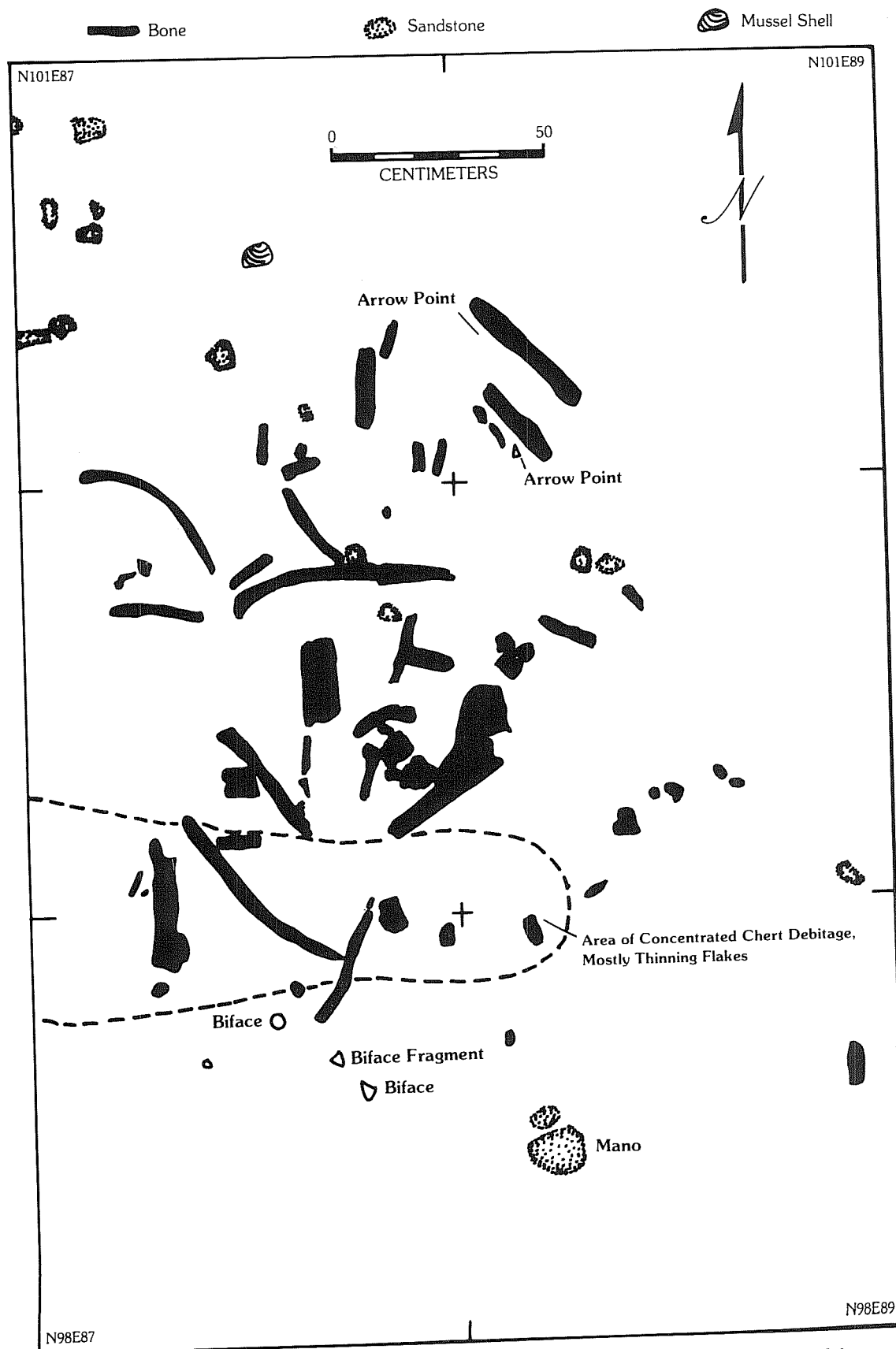


Figure 59. Plan of Bone Bed Excavation at 41 MC 222 During Phase I Investigations.

98.63 m. Found near Feature 4 were a core (Group 1) and a thin biface fragment (Group 10).

Feature 5 was a concentration of chert knapping debris (core fragments and debitage) isolated in Unit N103 E89 (Figs. 61; 62; 66,a). The feature was contained in Level 4 (98.95 to 98.90 m). Roughly oval in outline shape, it measures 30 cm east-west and 25 cm north-south. Debitage in lesser amounts extends southward about 25 cm from the main concentration. Feature thickness was 5 cm. The inventory of items composing Feature 5 was as follows: two small mussel shell fragments, one small bone fragment, 23 cortex flakes, 21 small interior thinning flakes, and two small cores. Fifteen pieces of debitage were of dark brown chert, and 13 pieces were of light tannish brown chert. Pieces of debitage ranged in size from less than 1 cm up to 7 cm in length for some of the large cortex flakes. The two cores in the feature were each about 7 cm long, 5 cm in width, and 5 cm in thickness. Outward from the primary cluster composing the feature, 24 additional cortex flakes and 17 interior thinning flakes were also noted.

Feature 6 was encountered north of the main excavation block in Unit N112 E79. The feature appeared to continue into adjacent unexcavated Units N112 E79, N112 E80, N113 E79, and N113 E80. It consisted of eight loosely clustered pieces of sandstone covering an area of 84 cm east-west by 44 cm north-south. The elevation range on highest and lowest constituents of Feature 6 was from 98.61 to 98.66 m. A carbon sample and a small bone fragment were recovered from matrix between pieces of sandstone.

Feature 7 was made up of 10 *Rabdotus* snail shells, 10 pieces of debitage, 15 bone fragments, and one piece of sandstone (Figs. 61; 64; 66,c). This feature was found in Units N97 E86 and N97 E87. The materials listed above were part of the fill in a shallow pit that had a diameter of approximately 60 cm and maximum depth of 18 to 21 cm. In addition to the material remains, the pit was evidenced by an area of very dark gray soil that stood out against the more general grayish brown soil characteristic of the site deposits. An estimated 90% of the bone in the feature was burned. Several pieces of carbon and fired clay were found in the pit fill. The presence of the burned bone, fired clay, and discolored soil in and immediately around Feature 7 clearly indicates that a fire burned at that location. Two loose clusters of debitage appear to overlap this feature (Fig. 64). Other artifacts found in the two 1-m² units containing Feature 7 were two cores (one, Group 5; one, Group 7), three pieces of modified sandstone (one, Group 2, Form 3; two, Group 2, Form 3), and eight sherds of aboriginal pottery.

Feature 8 was a concentration of *Rabdotus* snail shells located along the northern edge of Units N103 E90 and N103 E91 (Figs. 61; 62; 63,f). The feature occurred in Level 6 (98.85 to 98.80 m). The snail shell was concentrated in a semicircular area measuring 70 cm east-west and 40 cm north-south. It appeared to continue into unexcavated units along the north side of the main excavation block. It is estimated that 50 *Rabdotus* shells made up the concentration. Most of the shells were large, but there were also some small shells in the group. Also in the feature area were three mussel shells, four pieces of sandstone, some small bones, five pieces of debitage, and one piece of fire-fractured chert. Feature 8 is beneath the

41MC222 MAIN EXCAVATION BLOCK DEBRIS DISTRIBUTIONS

			963	191	
77			570	1,089	
	2	11	96	35	50 83
			23	30	65 130
		27	9	19	84 102
	86	715	42	181	161 24
	11	18	10	52	119 21
	4	70	362	107	74 94
	36	14			

Sandstone

Each number represents
recovery for a 1m² unit,
all levels combined.

			113	207	
3			75	16	
	1	1	6	5	3 6
			9	19	4 11
		4	1	0	2 6
	4	36	40	1	6 3
	3	5	59	3	1 5
	0	39	19	36	2 2
	3	1			

Fire-Fractured Rock

			89	120	
30			81	83	
	6	3	86	26	20 19
			18	20	9 31
		5	6	2	10 14
	12	8	11	11	12 7
	2	1	9	6	1 4
	6	0	0	2	6 8
	3	4			

Mussel Shell Umbos

			328	354	
189			274	474	
	58	81	431	393	96 117
			228	201	123 83
		175	32	18	57 128
	21	63	17	63	113 66
	54	6	48	34	16 112
	8	17	26	18	209 116
	22	42			

Rabdotus Snail Shells

			111	43	
0			34	46	
	1	0	8	14	6 6
			0	5	6 15
		8	0	7	24 23
	0	215	263	8	6 1
	5	403	138	20	1 2
	3	452	90	13	3 6
	73	4			

Bone

			1	0	
0			0	0	
	1	0	2	6	4 4
			1	1	3 7
		0	0	1	5 1
	0	1	0	3	1 1
	2	0	0	1	3 1
	7	4	0	0	0 0
	1	0			

Primary Flakes

			7	13	
7			24	11	
	3	7	33	64	22 37
			6	26	37 77
		10	7	15	19 35
	10	6	12	17	5 15
	17	27	13	6	15 26
	28	21	16	12	14 17
	25	20			

Secondary Flakes

			19	27	
5			39	18	
	6	10	47	100	44 178
			23	35	58 77
		12	5	23	33 123
	12	9	15	20	17 29
	86	44	23	16	27 88
	56	87	43	17	12 28
	52	25			

Tertiary Flakes

Figure 60. Main Excavation Block Debris Distributions at 41 MC 222.

northern extent of Feature 2. The two features are separated by 10 to 15 cm of deposit (Fig. 65).

Figure 65 illustrates the vertical relationship of several features and the stratigraphic position of certain time-diagnostic artifacts (arrow points) revealed during the course of Phase II excavations at 41 MC 222. The elevations of Features 2, 3, and 4 suggest that they were all formed on the same living surface. The surface apparently sloped from north to south as indicated by the slant of Feature 2's basal elevations and by lower elevations on Features 3 and 4. The occurrence of Feature 8 at depths of 10 to 15 cm below Feature 2 could be interpreted either as evidence of an earlier living surface on the site or as the remnants of a shallow pit dug from the same surface upon which Feature 2 rested.

An analysis of vertebrate faunal remains recovered during Phase II excavations at 41 MC 222 is provided in Appendix III. The following animals are represented in the bone collection: bison, deer, javelina, *Canis* sp., bobcat, alligator, rattlesnake, rabbit, rat, turtle, lizard, frog, catfish, gar, and fish. These vertebrate remains indicate that 41 MC 222 was inhabited by prehistoric groups in the spring and/or summer seasons.

Data resulting from the Phase II investigation at 41 MC 222 demonstrate that the site limits defined in Phase I on the basis of surface indications are reasonably accurate. Rates of debris recovery in the 1-m² test pits placed northwest of the main excavation block suggest that the area of most intensive cultural activity extended northwest to Unit N112 E79. The heaviest prehistoric activity thus occurred over an area measuring approximately 30 m northwest to southeast and 10 m east-west.

The time-diagnostic artifacts and radiocarbon assays recovered in Phase II reinforce the Phase I assessment of 41 MC 222 as being strictly a Late Prehistoric encampment. The principal diagnostic artifacts are the Scallorn, Edwards, and straight stem arrow points (thin bifaces Group 1, Form 4; and Group 1, Form 5), and the relatively numerous sherds of aboriginal pottery. Based on data available from other sites at Choke Canyon and elsewhere in southern Texas, these arrow point types represent the earlier years of the Late Prehistoric period. Two radiocarbon assays from Phase I (TX-2875 and TX-2876; Hall, Black, and Graves 1982:652) and two from Phase II (TX-4666 and TX-4694) have yielded corrected ages ranging from A.D. 1247 to A.D. 1500 for the episode of prehistoric cultural activity at 41 MC 222.

That 41 MC 222 was inhabited during the early years of the Late Prehistoric period is quite clearly established. The number of discrete habitational episodes represented by the remains on the site is a more difficult problem to deal with. The intact, well-integrated condition of habitational features documented within the site can be cited as evidence supporting the idea that the site was used only once for a short period of time. On the other hand, the vertical distribution of debris through up to 40 cm of deposit might be suggested to indicate intervals between habitational episodes during which accretion of the site surface occurred. It would not be unreasonable to account for vertical distributions of debris as being the result of post-depositional bioturbation and/or the effects of gravity on certain of the materials. The stratigraphic relationship of Features 2 and 8 is certainly

41MC222
FEATURE DISTRIBUTION
MAIN EXCAVATION BLOCK

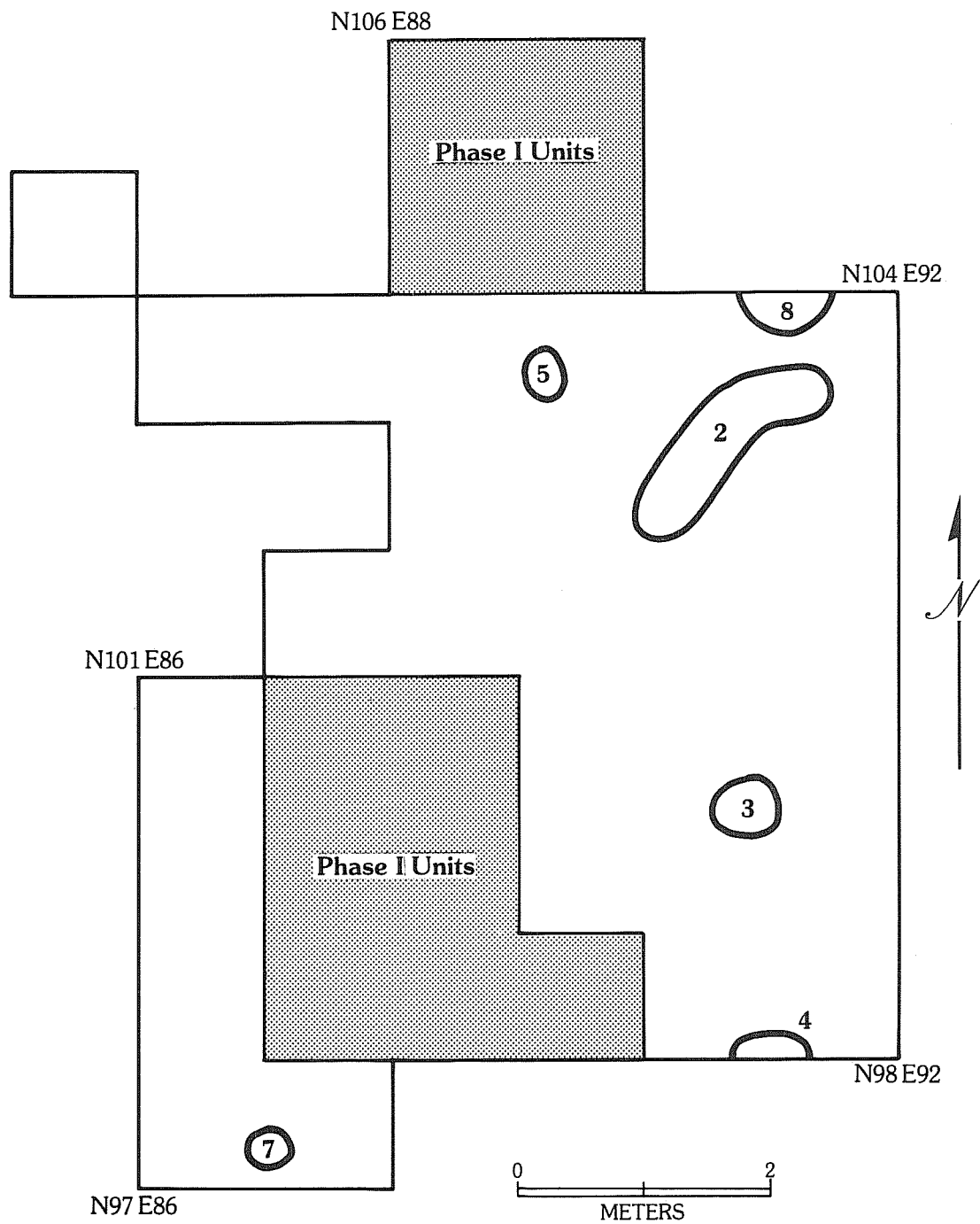


Figure 61. Main Excavation Block Feature Distributions at 41 MC 222.

suggestive of successive periods of habitation. It is significant, however, that all of the defined features except for Feature 2 seem to occur on the same living surface if certain allowances for natural slope are made. Regardless of the number of habitational episodes represented, the 41 MC 222 remains unquestionably represent a comparatively short segment in the total temporal span of Choke Canyon's prehistory. The Phase I observation that the site assemblage is important as a sort of "time capsule," unadulterated by earlier (and later) cultural debris, is still indicated and is one of the very important aspects about the site.

The array of artifactual material resulting from prehistoric cultural activity at 41 MC 222 is significant in terms of both what is present and what is absent. Generally speaking, there is not a great deal of diversity in the assemblage. There are cores, a limited selection of thin bifaces, mano and metate fragments, a single bone awl or pin, and sherds of pottery. Notably absent from the assemblage are thick bifaces, distally beveled tools, unifaces, and trimmed flakes (see summary of artifacts recovered at 41 MC 222 in Table 3).

The absence of thick bifaces and distally beveled tools supports the contention that people were not camping at 41 MC 222 during the Archaic period. In the Archaic, chipped stone tool manufacture was oriented around a core-biface reduction technique where production failures in the thick biface stage were quite frequent, the result being that thick bifaces are common elements of the archaeological record. Chipped stone tool manufacture in the Late Prehistoric period involved a core-flake reduction process that bypassed the thick biface stage. Ample evidence of chert knapping was found at 41 MC 222 in the form of cores, thin biface fragments, and debitage. Feature 5 combines all of these materials in a very explicit example of a chert knapping event that occurred on the site. Chipped stone tool manufacture was certainly an activity at the site, but the techniques utilized resulted in no thick bifaces discarded on the site. Evidence gathered elsewhere at Choke Canyon, and more generally throughout southern Texas, shows that distally beveled tools are diagnostic of the Archaic. As such, distally beveled tools would not be expected on a Late Prehistoric site.

Where the absence of thick bifaces and distally beveled tools from the Late Prehistoric assemblage at 41 MC 222 is predictable, it is noteworthy that deposits on the site yielded no unifaces or trimmed flakes. These tools are known to occur in Late Prehistoric context, most commonly in conjunction with **Perdiz** arrow points, pottery, and bison bone. As 41 MC 222 appears to be an early Late Prehistoric site, it may be suggested that specialized tools like the unifaces and trimmed flakes should be assigned to the later years of the Late Prehistoric with components defined by presence of **Perdiz** arrow points and associated materials.

The arrow points recovered during Phase II work at 41 MC 222 are the **Scallorn** and **Edwards** types, both of which are characterized by expanding stems. Also in the collection are three arrow points with straight stems (thin bifaces Group 1, Form 4, Specimens 74-76). A similar arrow point was collected from the site in Phase I (thin bifaces Group 1, Form 5, Specimen 17; Hall, Black, and Graves 1982:295). Two other untyped arrow points were also found (thin bifaces Group 1, Form 5, Specimens 22 and 23). Together, these arrow points

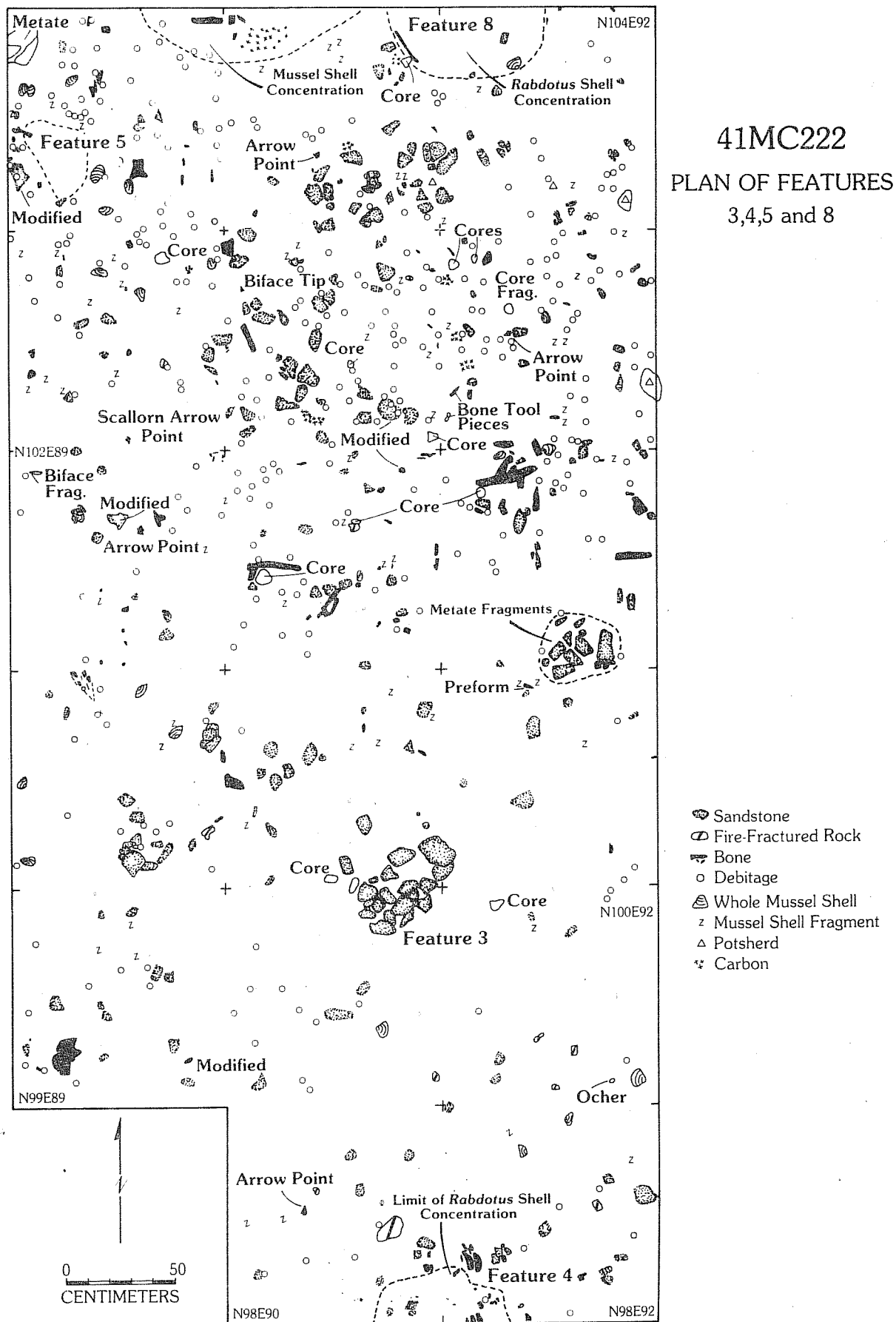


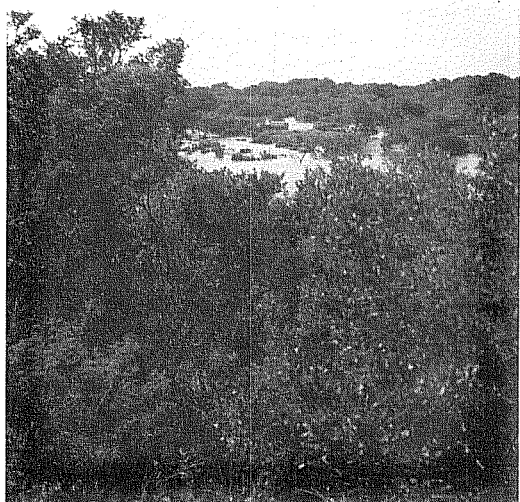
TABLE 3. ARTIFACTS RECOVERED FROM SITE 41 MC 222

Unit	Thin Bifaces										Modified Sandstone			
	Cores	Group 1 Form 3	Group 1 Form 4	Group 1 Form 5	Group 1 Form 7	Group 2	Group 3*	Group 8	Group 9	Group 10	Group 1	Group 2	Group 3	Ceramics
N95 E87	-	-	-	-	-	-	-	-	-	-	-	-	-	2
N97 E86	1	-	-	-	-	-	-	-	-	-	-	2	-	3
N97 E87	1	-	-	-	-	-	-	-	-	-	-	1	-	5
N98 E86	2	-	1	-	-	-	-	-	-	-	-	-	-	4
N98 E90	1	-	-	-	-	-	-	-	1	-	-	-	-	2
N98 E91	-	-	-	1	-	-	-	-	-	-	-	-	-	-
N99 E86	-	-	-	-	-	-	-	-	-	-	-	-	-	1
N99 E89	-	-	-	-	-	-	-	-	-	-	-	1	-	-
N99 E90	1	-	-	1	-	-	1	-	-	-	-	1	-	-
N99 E91	1	-	-	-	-	-	-	-	-	1	-	1	-	-
N100 E86	-	-	-	-	-	-	-	-	-	-	1	1	-	-
N100 E89	-	-	-	-	-	-	-	-	-	-	-	1	-	-
N100 E90	-	-	-	-	-	-	-	-	-	1	-	2	-	-
N100 E91	-	-	-	-	-	-	-	-	-	1	-	2	-	-
N101 E87	-	-	-	-	-	1	-	-	-	-	1	1	-	-
N101 E88	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N101 E89	-	1	-	-	-	-	-	-	-	-	-	-	-	-
N101 E90	2	-	-	-	-	-	-	-	-	-	1	1	-	-
N101 E91	1	-	1	-	-	-	-	-	-	-	-	-	-	-
N102 E88	-	-	-	2	-	-	-	-	-	1	1	2	-	1
N102 E89	1	-	-	1	-	-	-	-	-	1	1	1	-	-
N102 E90	-	-	-	-	-	-	-	-	-	1	1	-	-	-
N102 E91	3	-	1	-	1	-	-	-	1	1	1	2	-	5
N102 E100	1	-	-	1	-	-	-	-	1	-	-	-	-	14
N103 E86	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N103 E87	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N103 E88	2	-	-	-	-	-	-	-	-	-	-	-	-	-
N103 E89	2	-	-	-	-	-	-	-	-	-	-	-	-	-
N103 E90	1	-	-	1	-	-	-	-	-	-	1	-	-	7
N103 E91	-	-	-	-	-	-	-	-	-	-	1	-	-	5
N104 E85	1	-	-	-	-	-	-	-	-	-	-	-	-	49
N107 E87	-	-	-	-	-	-	-	-	-	-	1	1	-	-
N112 E79	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N113 E83	1	-	-	-	-	-	-	-	-	-	-	1	-	-
N119 E80	-	-	-	-	-	-	-	-	-	-	-	2	-	-
N125 E72	-	-	-	-	-	-	-	-	-	-	-	2	-	-

* A total of 39 Group 3 thin bifaces was recovered from the surface.

Figure 63. Views of 41 MC 222 During Phase II Investigations.

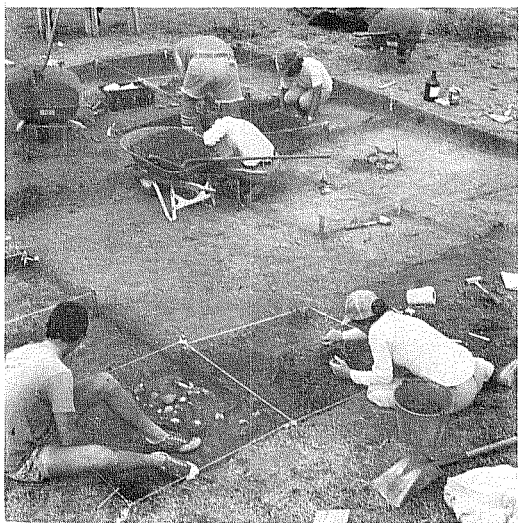
- a, view looking northwest across the Frio River valley during a major flood in June 1981. The trailer seen on the island out in the river marks the location of 41 MC 222;
- b, a view of the slough channel on the east side of 41 MC 222. The channel forms an oxbow completely circling the site;
- c, excavations in progress in the main unit block at 41 MC 222;
- d, view looking north across main excavation block at 41 MC 222 upon completion of Phase II investigations;
- e, overview of Feature 2 at 41 MC 222;
- f, overview of Feature 8 at 41 MC 222.



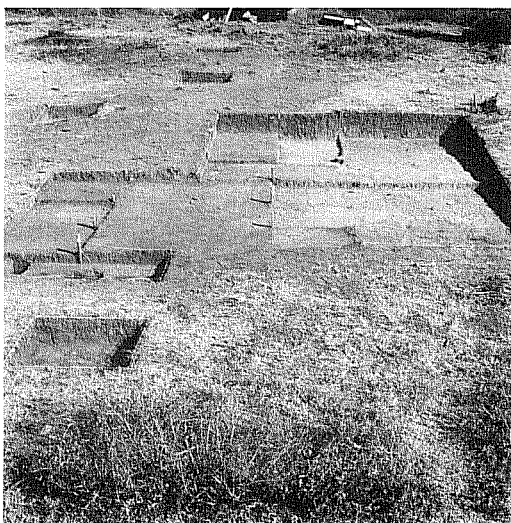
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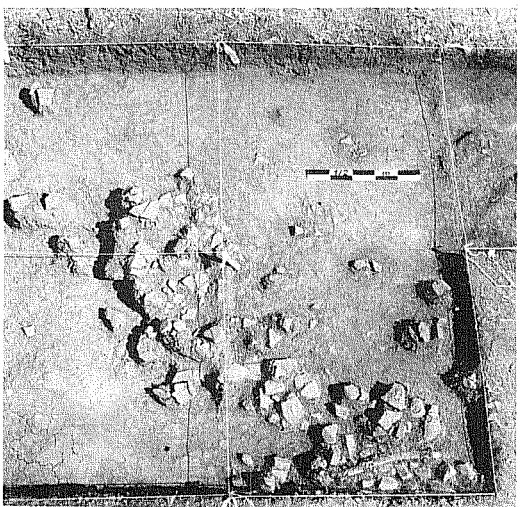
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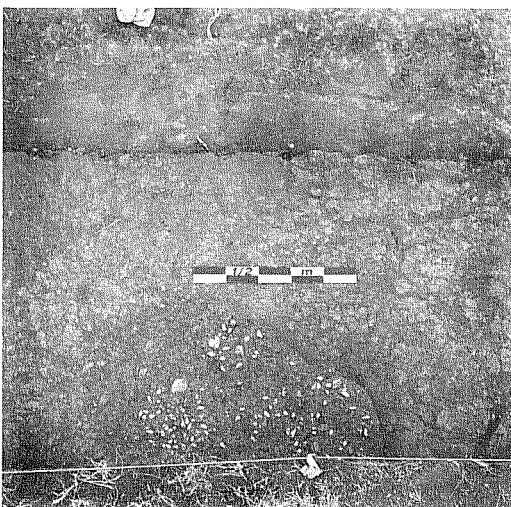
c



d



e



f

41MC222

PLAN OF FEATURE 7

-  Sandstone
-  Fire-Fractured Rock
-  Bone
-  Debitage
-  Mussel Shell Fragment
-  Whole Mussel Shell
-  Carbon Flecking

0 50
CENTIMETERS

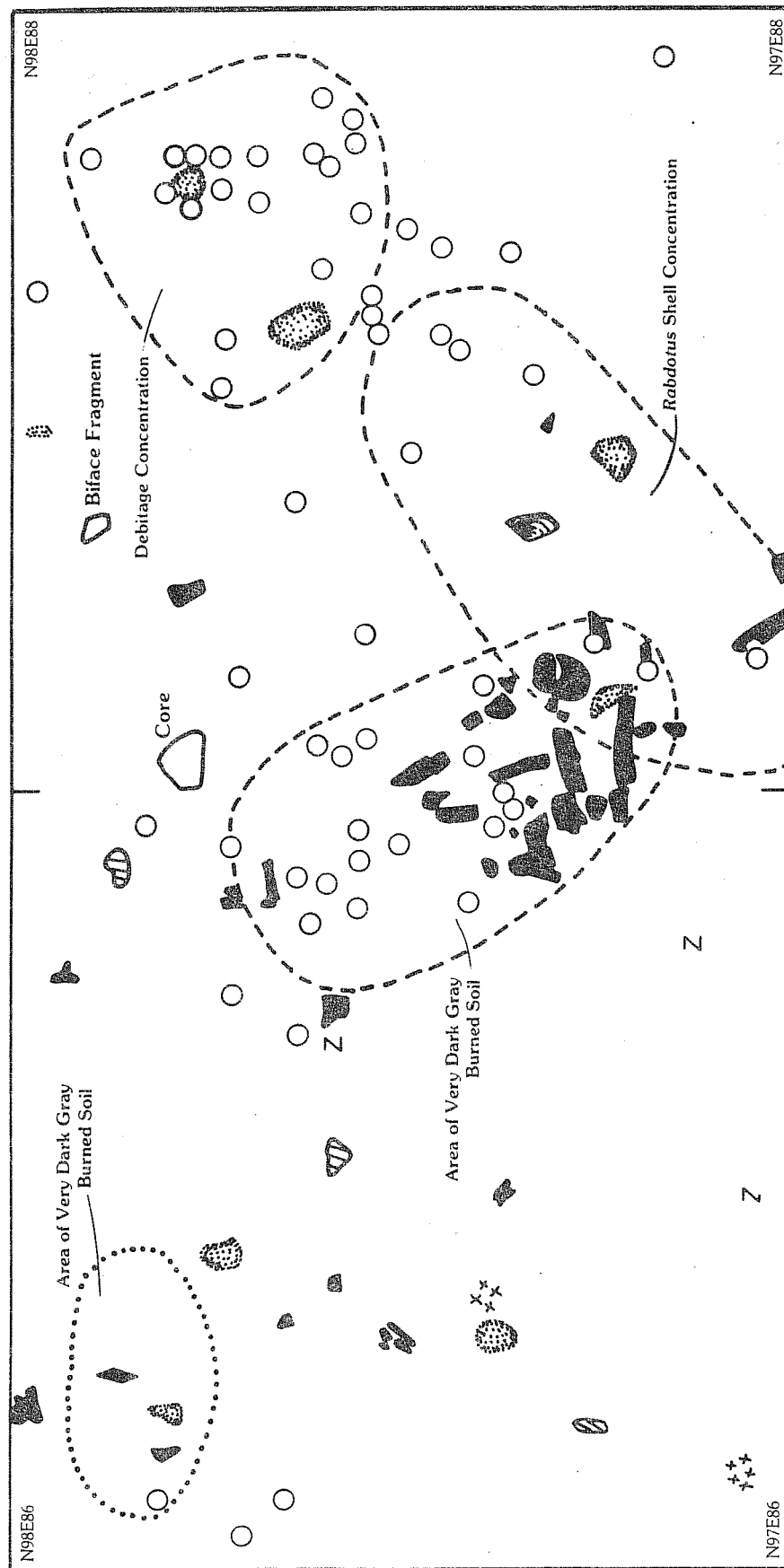
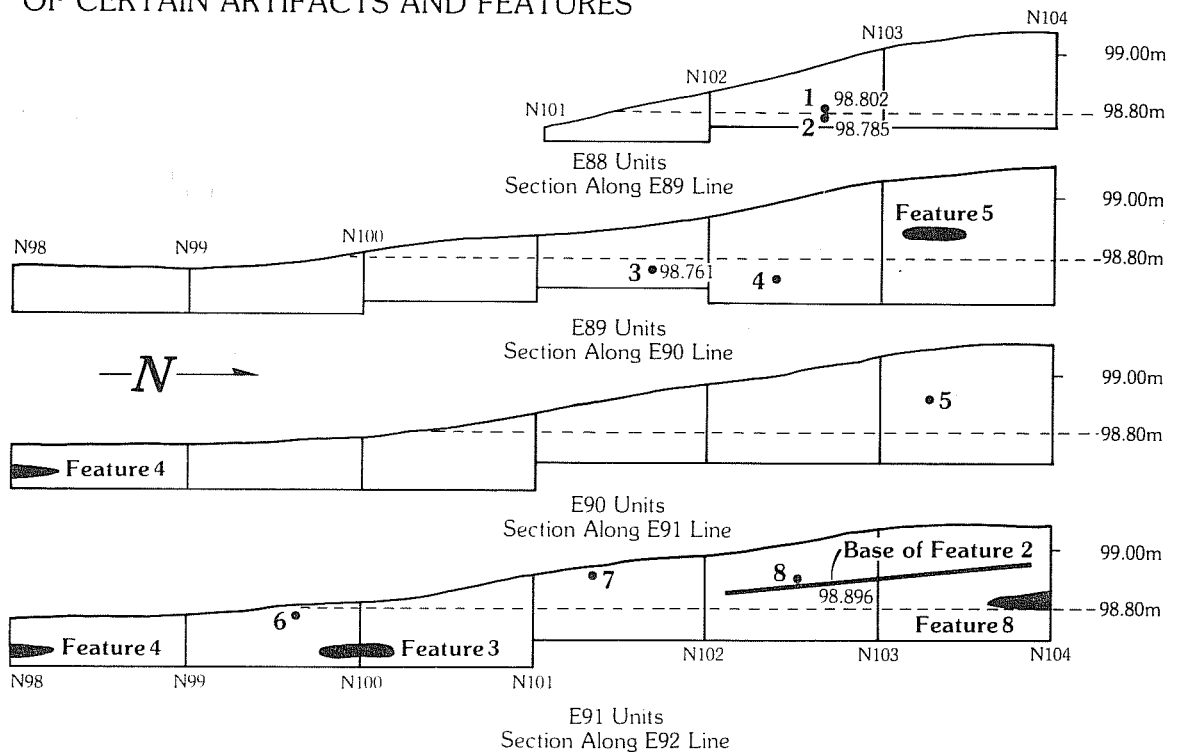


Figure 64. Plan of Feature 7 at 41 MC 222.

41MC222

MAIN EXCAVATION BLOCK

PROFILES SHOWING RELATIVE ELEVATIONS OF CERTAIN ARTIFACTS AND FEATURES



- 1 Thin Biface Group 1 Form 5 Specimen 22
- 2 Thin Biface Group 1 Form 5 Specimen 23
- 3 Thin Biface Group 1 Form 3 Specimen 6 (Ensor)
- 4 Thin Biface Group 1 Form 5 Specimen 7 (Scallorn)
- 5 Thin Biface Group 1 Form 5 Specimen 8 (Scallorn)
- 6 Thin Biface Group 1 Form 5 Specimen 24
- 7 Thin Biface Group 1 Form 4 Specimen 75 (Straight Stem)
- 8 Thin Biface Group 1 Form 4 Specimen 76 (Straight Stem)

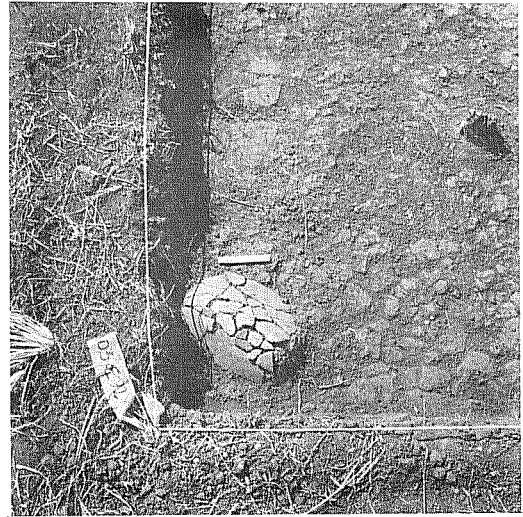
Figure 65. Profiles Along Selected Transects in Main Excavation Block at 41 MC 222.

Figure 66. Views of 41 MC 222, 41 MC 246, 41 MC 257, and 41 MC 260.

- a, overview of Feature 5 at 41 MC 222;
- b, **in situ** view of sherds forming large pottery vessel fragment in Unit N103 E91 at 41 MC 222;
- c, overview of Feature 7 at 41 MC 222;
- d, view looking east to cutbank where deeply buried prehistoric cultural debris was exposed at 41 MC 246;
- e, view looking northeast across the main site area at 41 MC 257; The channel of the Frio River is marked by the trees in the background;
- f, a concentration of sandstone on the surface in Area B of 41 MC 260.



a



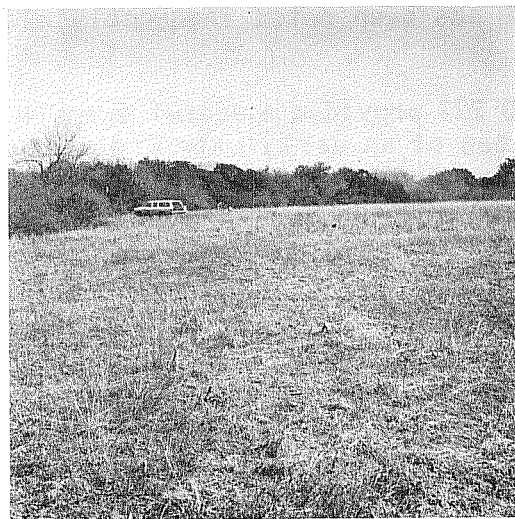
b



c



d



e



f

form a useful type collection for the early Late Prehistoric period at Choke Canyon. The single **Ensor** dart point (thin bifaces Group 1, Form 3, Specimen 6), a Late Archaic diagnostic type, was probably curated from an older site by a Late Prehistoric inhabitant of 41 MC 222. Other thin bifaces recovered from 41 MC 222 are three unstemmed triangular pieces with straight or concave bases (Group 2, Form 1, Specimen 23; Group 2, Form 2; Group 3, Form 2) and a pointed implement with a rounded proximal end (Group 8, Specimen 13). Fourteen distal and medial thin biface fragments were also found (four, Group 9; 10, Group 10).

The faunal remains, grinding implements, and habitation features discovered at 41 MC 222 provide one of the most complete records of subsistence pursuit evidence available for a prehistoric site at Choke Canyon (given the limitations of archaeological preservation characteristic of these open sites). The vertebrate species identified from bones found in the deposits, as listed above, show that the people were hunting, trapping, and catching a diversity of animals that provided them with meat foods. Shells of mussels and large land snails are abundant in the site and indicate that these creatures also contributed meat food to the diet. The numerous fragments of sandstone manos and metates (modified sandstone Groups 1 and 2) suggest that the people were processing seeds, nuts, or beans for use as food. These tools may also have aided in the crushing or splintering of bone for marrow and fat extraction. This is suggested by numerous fragments of large (i.e., bison- or deer-size) bones found in the site. The practice is also well documented in ethnographic studies of Plains Indian cultures that relied heavily on bison for their livelihood. Rock clusters such as Features 2 and 3 are suggested to have functioned in the cooking of animal meat foods and/or the processing of animal by-products, such as bones. No specific food item can be directly associated with these probable cooking facilities. Bone, mussel shell, and snail shell are scattered rather uniformly around all of the features. Bison bone does seem to cluster in the Phase I excavation area designated Feature 1 (Fig. 59) and around Feature 2 (Fig. 62). These bone scatters are suggested to represent butchering and meat roasting activity areas, respectively. Clusters of *Rabdotus* snail shell, sometimes accompanied by mussel shells, are represented by Features 4 and 8 at 41 MC 222. The co-occurrence of snail shell and mussel shell has been noted frequently elsewhere on prehistoric sites at Choke Canyon.

The body of information recovered from 41 MC 222 provides a useful example of an archaeological assemblage to be expected of an early Late Prehistoric encampment at Choke Canyon and more generally throughout southern Texas.

41 MC 246

Site 41 MC 246 is located on a floodplain terrace north of the Frio River at the far western end of Choke Canyon (Fig. 1, folded insert). It was located and recorded by the CAR survey team in 1979. The surveyors defined the site as having an irregular outline shape with dimensions of 150 m north-south and 300 m east-west. The surface is covered with mesquite trees, spiny hackberry, cactus, soapbush, guajillo, and grasses. The terrace surface consists of brown silty loam that is only moderately eroded. Just west of 41 MC 246, a relict Frio River channel bifurcates, and branches of the channel run

around either side (north and south) of the site. The branches rejoin off the east end of 41 MC 246. Erosion of the terrace containing 41 MC 246 by floodwaters running through the relict channels has left some steep, sharp faces cut into the flanks of the terrace (Fig. 66,d). The valley margin occurs a short distance north of 41 MC 246 (location of 41 MC 247 in Fig. 1, folded insert). The valley margin bears a surface pavement of lag gravel. The site was evidenced over most of its extent by only a very light scatter of debitage, a few cores and thin bifaces, and mussel and snail shells. Along the southeastern edge of the site, examination of a cutbank along the relict channel revealed prehistoric cultural debris coming out of a deeply buried horizon in the site.

Phase II activities of the CAR crew at 41 MC 246 consisted of an uncontrolled collection of surface artifacts, shovel testing, and a careful inspection of the cutbank where the survey team had noted deeply buried cultural material.

Subsequent to the 1979 survey, the face of the cutbank on the southeast side of 41 MC 246 slumped off. The fallen earth formed a veneer that masked *in situ* deposits. It was necessary to cut a clean profile back into the bank in order to properly study the deposits. Examination of this profile revealed a buried layer of prehistoric cultural debris estimated to be 4 m below the average surface elevation of the terrace and a meter above the water level in the relict channel. Three biface fragments, a core, and a number of pieces of debitage were recovered from this layer. Another profile face cleaned further to the east revealed a thin, carbon-stained stratum situated at roughly the same elevation as the layer bearing the artifacts. The stratum sloped downward (south) toward the relict channel.

Two shovel tests were excavated on the terrace surface above the cutbank at 41 MC 246. Both were within 10 to 15 m of the terrace edge. Excavated to a depth of 50 cm, virtually no cultural debris was observed in the subsurface.

The following artifacts were collected from the surface of 41 MC 246 (including the cutbank specimens): two cores (one, Group 2; one, Group 9), two thick bifaces (one, Group 7, Form 1; one, Group 7, Form 4), seven thin biface fragments (one, Group 2, Form 2; one, Group 4, Form 4; two, Group 9; three, Group 10), one distally beveled tool (Group 3, Form 2), and two unifaces (one, Group 1; one, Group 3). The distally beveled tool is a possible Late Archaic diagnostic, and the unifaces may represent Late Prehistoric activity. Generally, however, the assemblage suggests undifferentiated Archaic activity on the site.

The initial Phase II activities at 41 MC 246 were intended to aid in an assessment of the site's potential for extensive excavation. The deeply buried cultural debris seen in the cutbank, its provenience suggesting great antiquity, provided adequate grounds for recommending further excavations at the site. Approached for permission to conduct further investigations at the site on his property, the landowner refused. Therefore, no additional study of 41 MC 246 was possible.

41 MC 257

Site 41 MC 257 is also located on a floodplain terrace at the west end of Choke Canyon (Fig. 1, folded insert). This site occurs on the right (south) bank of the active channel of the Frio River. It was recorded by the CAR crew during the 1979 survey. Oval in outline shape, dimensions of 70 m north-south and 125 m east-west were defined for 41 MC 257. Most of the site is in a cleared, cultivated field. A fringe of riparian forest grows by the river channel on the north side (Fig. 66,e). It was defined on the basis of a light scatter of debitage and fairly dense scatters of mussel shell. The surveyors also noted a stemmed dart point, an unstemmed thin biface, some cores, and a thick biface on the site surface.

Phase II activities of the CAR crew at 41 MC 257 consisted of an unprovenienced surface collection and excavation of two shovel tests. The shovel test placed in the central area revealed little prehistoric cultural debris in the subsurface. A second test excavated at the site's east end showed a layer of cultural debris in the zone from 50 to 80 cm below the surface. Pieces of sandstone, *Rabdotus* snail shells, debitage, and a thin biface were recovered from this buried zone. The findings made in this shovel test indicated that 41 MC 257 warranted further testing. However, the site is located in flowage easement that remains in private ownership and which will be subjected to short term inundation only. For these reasons, no further work was attempted.

The following artifacts were collected from the surface of 41 MC 257: one thick biface (Group 9), two thin bifaces (one, Group 4, Form 4; one, Group 10), one trimmed flake (one, Group 3, Form 1), and two pieces of modified sandstone (one, Group 1, Form 1; one, Group 2, Form 2). These specimens, along with specimens documented by the surveyors, indicate that undifferentiated Archaic cultural activity occurred on the site.

41 MC 251

Site 41 MC 251 is located on the valley margin slopes north of the confluence of Salt Branch with the Frio River (Fig. 1, folded insert). As defined by the CAR surveyors in 1979, 41 MC 251 is oval in outline shape. It measures 100 m northeast-southwest and 150 m northwest-southeast. However, the full northeastward extent of the site could not be determined as it extended onto privately owned property. The site is about 100 m from the channel of Salt Branch, a rather extensive upland drainage system that feeds down to the Frio River from the northwest. The site surface supports scattered clumps of soapbush, mesquite, and whitebrush. The surface is heavily eroded, and deep gullies have formed. The site is characterized by a moderate to heavy surface scatter of debitage, concentrations of mussel shell, sandstone, snail shells, and chipped stone tools. The surveyors found a hearth feature eroding from a gully wall. It was about 50 cm below the existing ground surface.

Phase II investigations at 41 MC 251 consisted of documentation of habitation features exposed on the surface, excavation of seven shovel tests, and collection of surface artifacts. Four habitation features were

observed eroding from the walls of gullies cutting through the site. The remains evidencing these features were usually on the surface, but some were still buried by as much as 25 cm of deposit. Two rock clusters were found at the west end of 41 MC 251. One consisted of six scattered pieces of sandstone with no artifacts. The second feature at the west end was a cluster of five large pieces of fire-fractured rock. Along the southern margin of the site, a mussel shell concentration was located. The accumulation had a diameter of 40 cm and consisted of about 20 mussel shell valves and numerous fragments. In the west-central area of the site, there was a fire-fractured rock concentration with a diameter of 1 m. Mussel shell fragments, *Rabdotus* snail shells, debitage, and a distally beveled tool were noted immediately around this feature.

The shovel tests excavated at 41 MC 251, along with subsurface exposures provided by numerous gullies, demonstrate that prehistoric cultural debris was confined to the upper 25 cm of deposit. The site's shallow depth and the severity of erosion rendered 41 MC 251 unsuitable for controlled excavations.

An unprovenienced collection of artifacts from the surface of 41 MC 251 yielded the following specimens: one core (Group 4), seven thick bifaces (one, Group 2; one, Group 5; one, Group 6, Form 2; two, Group 7, Form 1; one, Group 8, one, Group 9), 16 thin bifaces (Group 1, Form 3, Specimen 32; one, Group 3, Form 2; two, Group 4, Form 1; one, Group 4, Form 3; four, Group 4, Form 4; one, Group 5; one, Group 6; two, Group 9; three, Group 10), two distally beveled tools (Group 3, Form 1; Group 3, Form 3), and one piece of modified sandstone (Group 1, Form 3). The small, stemmed dart point and distally beveled tools indicate that 41 MC 251 was inhabited during the Late Archaic period.

41 MC 260

Site 41 MC 260 is located on the floodplain near the southern side of the Frio River valley at Choke Canyon's west end (Fig. 1, folded insert). Site 41 MC 260 is cut in two by the channel of Hackberry Hollow, an upland drainage system that feeds down from areas south of the river. As recorded by the CAR surveyors in 1979, 41 MC 260 is subcircular in outline shape with dimensions of 100 m east-west and 125 m north-south. The western half of the site, located in a cultivated field, was designated Area A. The eastern half of the site was designated Area B. Brush grows in strips along the banks of Hackberry Hollow and in Area B. The brush cover consists of mesquite, soapbush, whitebrush, spiny hackberry, and grasses. Prehistoric debris evidencing this site was heavy scatters of burned sandstone, much debitage, mussel shell, and numerous chipped stone tools. Stemmed dart points, distally beveled tools, prehistoric potsherds, and a possible arrow point preform observed by the surveyors led them to suggest Archaic and Late Prehistoric components were present at this site.

During Phase II work at 41 MC 260, the CAR crew made a controlled collection of surface artifacts and excavated four shovel tests. The shovel tests excavated in Area A revealed a layer of prehistoric cultural debris extending from 25 to 45 cm beneath the site surface. The principal constituent of this

layer was burned sandstone. Snails, mussel shell, and debitage were also present.

Area B at 41 MC 260 consisted primarily of a surface scatter of sandstone measuring about 35 m north-south and 10 to 15 m east-west (Fig. 66,f). The heaviest concentration of sandstone occurs at the south end of the Area B scatter where erosion along a gully has exposed more subsurface debris. Much debitage and *Rabdotus* snail shell is also scattered amidst the sandstone. Shovel tests in Area B showed that cultural debris was essentially confined to the surface; erosion and deflation apparently removed most of the matrix that once held the material.

A provenienced collection effort at 41 MC 260 yielded the following specimens: two cores (one, Group 3; one, Group 7), two thick bifaces (two, Group 2), eight thin bifaces (Group 1, Form 2, Specimen 11; Group 1, Form 3, Specimen 7 [Ensor]; Group 1, Form 3, Specimen 17 [Fairland]; one, Group 2, Form 1; two, Group 4, Form 4; one, Group 9; one, Group 10), two distally beveled tools (two, Group 3, Form 2), and three pieces of modified sandstone (one, Group 1, Form 3; two, Group 2, Form 1). Two of the stemmed dart points (Ensor and Fairland) and the distally beveled tools clearly indicate that 41 MC 260 was inhabited during Late Archaic times. Although a Late Prehistoric component was unquestionably evidenced to the survey crew in 1979, there was no additional material clearly diagnostic of the Late Prehistoric recognized during the Phase II investigation.

At 41 MC 260, the presence of Late Archaic and Late Prehistoric components, the artifact assemblage, and the deposits of burned sandstone are characteristics similar to certain of the valley margin sites investigated on the north side of the Frio River valley. This would include such localities as 41 MC 296 in Site Group 10; 41 MC 209, 41 MC 212, and 41 MC 213 in Site Group 7; and 41 LK 250, 41 LK 252, and 41 LK 253 in Site Group 6. Site 41 MC 260 differs only slightly in that it is somewhat farther removed from the steep valley margin slopes. Nevertheless, it is within 200 m of sandstone outcrops of the Jackson Group just to the east. The tool assemblage and accumulation of sandstone indicate that the Late Archaic inhabitants of 41 MC 260 were involved in roughly the same range of activities as were the people who generated debris found at the sites listed above. Also in keeping with the pattern recognized at sites on the northern valley margin, there is subsequent Late Prehistoric habitation of the site.

ARTIFACTS

The artifacts recovered during the Phase II archaeological investigations at Choke Canyon are organized into five classes of material in the following descriptive section. The first four classes--consisting of lithics, shell, bone, and ceramics--contain aboriginal artifacts or by-products of aboriginal activity. The fifth material class--historic artifacts--contains metal, glass, ceramics, and bone which, with few exceptions, are related to Anglo-European activities on the prehistoric sites investigated during Phase II.

LITHIC ARTIFACTS

Lithic artifacts are organized and described below in a manner consistent with presentation of similar data resulting from the Phase I investigation (Hall, Black, and Graves 1982:239-387). As the basic characteristics used to divide specimens of the various lithic categories into distinct group and form classifications have not been altered from the original presentation, descriptive entries and type definitions are taken, often verbatim, from the Phase I report (*ibid.*). This is meant to insure compatibility between reports and, it is hoped, will make it somewhat easier for the reader to integrate data resulting from the two separate phases of investigation. Also for the sake of consistency, the lithic (and other prehistoric) artifacts recovered at site 41 LK 201 are included in this analysis even though they are comprehensively treated in a separate volume of this research series (Highley 1986). However, data presentations in Highley's volume does not necessarily conform to the present treatment in all respects.

The lithic artifacts are organized into 10 categories for purposes of analysis and description: cores, thick bifaces, thin bifaces, distally beveled bifaces and unifaces, unifaces, trimmed flakes, debitage, hammer-stones, ground stone, and miscellaneous artifacts and materials. The first six categories are all chipped stone artifacts and by-products of chipped stone tool manufacture. Chert, occurring as stream-rolled cobbles up to 15 cm in diameter, is found at numerous locations in the Choke Canyon area. Colors common in these local cherts include cream, gray, tan, and brown. Also used in chipped stone tool manufacture were sandstone, quartzite, petrified wood, chalcedony, jasper, and gray siliceous quartzite. All of these rocks are also easily obtained in cobble form from local gravel deposits. After chert, sandstone is the next most common lithic raw material represented in the Choke Canyon collections. Sandstone was used to make grinding slabs, manos, and grooved abraders. The Eocene Jackson Group, outcrops of which are common along the Frio River between Calliham and Tilden, yields high grade sandstone and is a likely source of raw material in making the slabs, manos, and abraders recovered from the prehistoric sites at Choke Canyon. Miscellaneous lithic artifacts and materials include gypsum, ferruginous sandstone, ocher, and hematite concretions. Except for the gypsum, which is derived from the Frio Formation in the local area, these miscellaneous rock types were likely brought in from other areas.

Unless otherwise indicated, all dimensions and weights are in centimeters and grams, respectively. An asterisk (*) placed next to a number indicates measurements or weights for incomplete specimens; an asterisk with no number indicates measurement or weight not taken.

CHIPPED STONE

Cores (789 specimens)

Cores are stream-rolled cobbles or large, thick flakes from which two or more flakes have been struck, possibly to produce flakes or to reduce the cobble or flake into a finished tool form. The cores are grouped according to the direction(s) from which flakes were struck, striking platform preparation,

striking platform morphology, size, shape, and degree of reduction. The following groupings are used:

- Group 1. Natural Platform
- Group 2. Bidirectional, Natural and Prepared Platforms
- Group 3. Multidirectional, Natural and Prepared Platforms, Single and Multiple Facets
- Group 4. Unidirectional, Prepared Platforms, Single Facet
- Group 5. Multidirectional, Natural and Prepared Platforms, Single Facet
- Group 6. Core Nuclei
- Group 7. Flat, Circular to Elliptical in Outline, Unifacially Cortex Covered
- Group 8. Tested Cobbles
- Group 9. Core Fragments
- Group 10. Unmodified Cobbles

The directional references pertain to trends of flake scars relative to one another on the cobble or flake. Where a prepared platform was used, the flakes struck to form the platform are not considered when the core is grouped according to direction of flake removals. For unidirectional cores, flakes were removed in the same direction relative to the platform such that the remaining scars parallel or overlap one another *en echelon*. On bidirectional cores, flakes were removed from opposite directions of the same platform area. The scars of multidirectional cores run in trends other than parallel or opposite one another; flakes were struck both from the same and different platforms. Natural platforms consist of the cobble's cortex. Prepared platforms occur where a single flake scar forms the striking surface. Multiple facet platforms are made when the scars of two or more removals merge to form ridges in the striking area. Direction of flake removal and platform character were used to sort cores into Groups 1-5. Size, outline, and degree of reduction were used to sort cores into Groups 6-8.

Provenience data for all core groups are provided in Tables 4 and 5.

Group 1. Natural Platform (63 specimens)

Group 1 cores are cortex-covered cobbles from which flakes have been removed using natural platforms. The cobbles are irregularly shaped, varying from round to oval to angular. The majority are flaked multidirectionally. This particular group is not subdivided according to direction of flake removals, since so few scars are present on each specimen. Flake scars tend to be confined to one end or edge. Most of the specimens within this group retain 80-95% of the cortex. Some retain as little as 50% of the cortex. The ranges of metric attributes for Group 1 are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	15.0	4.1	8.0
Width:	12.3	4.4	7.6
Thickness:	7.4	2.5	4.6
Weight:	1763.0	61.8	394.0

Examples of Group 1 cores are illustrated in Figure 67.

TABLE 4. PROVENIENCE OF CORES BY SITE

Site No.	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
41LK8	5	3	2		5	6		1	6	1
41LK14	4	6	2		9	11	1		58	2
41LK27		1	1		1				1	
41LK51	2	7	7		10	3			16	1
41LK53	3	1	2		3				5	
41LK66										
41LK69									1	
41LK74	3	1			12	2			24	2
41LK120	1	1	2		3	1	1			
41LK121										
41LK122	1	1	1		5	6			4	
41LK127		4	1		7	1	1		7	
41LK128			5	2	4	3			12	1
41LK133	1		1		1				1	
41LK142		3			1					
41LK145				1						
41LK149										
41LK162					2				4	
41LK173	1		1							
41LK174										
41LK176										
41LK181										
41LK182			1			1			1	
41LK185	2			1	3	1			1	
41LK191	2									
41LK197									1	
41LK199	1	1	4		2	9	1		19	
41LK201	17	12	8		18	13			34	
41LK236										
41LK243	1	3	4		4	1	1		6	
41LK247										
41LK250	1	3	4		5				1	
41LK252	1		2			1				
41LK253			1		1					
41MC7										
41MC10										
41MC14										
41MC15										
41MC17										
41MC29		1				2				
41MC55	6		4	2	7	1			3	
41MC67										
41MC75										
41MC79										
41MC94				2	1			1		1
41MC192										
41MC193										
41MC194										
41MC196			2		6					
41MC212										
41MC213										
41MC214										
41MC222	2	4	4	1	5	7	1		8	
41MC226		1	1		1					
41MC234										
41MC235										
41MC238			3						1	
41MC242				1			1			
41MC246		1							1	
41MC251				1						
41MC257										
41MC260			1				1			
41MC266										
41MC267										
41MC268	2	7	5	3	10	1	2		5	3
41MC270		3	2	1	5	2	2		8	
41MC275	1	1	2	1	2		1		3	
41MC276	1				1				1	
41MC282						2			1	
41MC284										
41MC288	1	1	1		1					
41MC293		1			1					
41MC294		2	1							
41MC296	4	9	6	2	15	17	2		46	

TABLE 5. PROVENIENCE OF CORES RECOVERED IN PHASE II EXCAVATIONS

SITE	UNIT	LEVEL	ELEVATION	SITE	UNIT	LEVEL	ELEVATION
CORE GROUP 1				CORE GROUP 2 (continued)			
41 LK 8	N510 E458	15	98.70-98.60	41 MC 268	Test Pit 3	4	30-40 cm
41 LK 8	N511 E458	7	98.50-98.40	41 MC 268	N994 E983	1	Surf.-99.40
41 LK 8	N461 E541	8	97.30-97.20	41 MC 268	N995 E982	2	99.40-99.30
41 LK 8	N461 E542	2	97.90-97.80	41 MC 268	N995 E983	2	99.40-99.30
41 LK 8	N462 E542	4	97.70-97.60	41 MC 268	N995 E983	2	99.40-99.30
41 LK 14	N1006 E958	5	99.90-99.80	41 MC 268	N995 E999	4	99.20-99.10
41 LK 14	N1006 E959	4	100.00-99.90	41 MC 296	N1023 E985	1	Surf.-99.40
41 LK 14	N1007 E958	4	100.00-99.90	41 MC 296	N1023 E986	1	Surf.-99.40
41 LK 14	N1008 E1000	2	99.70-99.60	41 MC 296	N1023 E987	1	Surf.-99.40
41 LK 51	N999 E981	5	99.40-99.30	41 MC 296	N1024 E985	3	99.30-99.20
41 LK 51	N1025 E1039	1	100.00-99.80	41 MC 296	N1024 E987	3	99.30-99.20
41 LK 53	N1000 E1004	7	99.10-99.00	41 MC 296	N1024 E987	5	99.10-99.00
41 LK 53	N1000 E1004	15	98.30-98.20	41 MC 296	N1026 E997	1	Surf.-99.50
41 LK 53	N1002 E1002	11	98.70-98.60	41 MC 296	N1027 E978	2	99.50-99.40
41 LK 74	N994 E986	3	98.90-98.80	41 MC 296	N1027 E995	6	99.10-99.00
41 LK 74	N997 E1001	4	99.40-99.30				
41 LK 74	N1070 E857	1	Surf.-100.20				
41 LK 133	Hearth #2	-	-	CORE GROUP 3			
41 LK 201	N490 E1043	4	98.45-98.35	41 LK 8	N510 E459	4	99.80-99.70
41 LK 201	N490 E1043	11	97.75-97.65	41 LK 8	N511 E459	13	98.90-98.80
41 LK 201	N490 E1044	13	97.55-97.45	41 LK 14	N1009 E1002	3	99.60-99.50
41 LK 201	N499 E996	5	98.95-98.85	41 LK 14	N1010 E1001	3	99.60-99.50
41 LK 201	N499 E997	14	98.05-97.95	41 LK 51	N999 E981	12	98.70-98.60
41 LK 201	N498 E996	14	98.05-97.95	41 LK 51	N999 E982	13	98.60-98.50
41 LK 201	N500 E997	16	97.85-97.75	41 LK 51	N999 E984	7	99.30-99.10
41 LK 201	N491 E1044	18	97.05-96.95	41 LK 51	N998 E982	6	99.30-99.20
41 LK 201	N506 E1008	1	99.29-99.20	41 LK 51	N998 E982	6	99.30-99.20
41 LK 201	N505 E1009	1	99.32-99.20	41 LK 51	N998 E982	13	98.60-98.50
41 LK 201	N504 E1008	2	99.20-99.10	41 LK 51	N1011 E1011	1	Surf.-99.80
41 LK 201	N504 E1014	2	99.20-99.10	41 LK 53	N1000 E1003	11	98.70-98.60
41 LK 201	N505 E1008	1	99.32-99.20	41 LK 53	N1001 E1002	11	98.70-98.60
41 LK 201	N507 E1008	2	99.20-99.10	41 LK 128	Test Pit 5	3	99.50-99.40
41 LK 201	N509 E1013	2	99.20-99.10	41 LK 128	Test Pit 6	3	99.60-99.50
41 LK 201	N509 E1013	2	99.20-99.10	41 LK 128	Test Pit 7	3	99.50-99.40
41 LK 243	Test Pit 1	4	30-40 cm	41 LK 128	Test Pit 9	1	Surf.-99.40
41 LK 250	Test Pit 1	6	50-60 cm	41 LK 128	Test Pit 9	2	99.40-99.30
41 MC 55	N1007 E1015	2	99.40-99.30	41 LK 201	N490 E1043	12	97.65-97.55
41 MC 55	N1007 E1015	2	99.40-99.30	41 LK 201	N491 E1043	10	97.85-97.75
41 MC 55	N1008 E1014	3	99.30-99.20	41 LK 201	N498 E996	2	99.25-99.15
41 MC 55	N1009 E1013	2	99.30-99.20	41 LK 201	N500 E997	2	99.25-99.15
41 MC 55	N1015 E1012	1	Surf.-99.20	41 LK 201	N500 E998	3	99.15-99.05
41 MC 55	N999 E1017	8	98.70-98.60	41 LK 201	N507 E1011	1	99.30-99.20
41 MC 222	N98 E90	1	Surf.-98.70	41 LK 201	N505 E1009	2	99.20-99.10
41 MC 222	N101 E90	4	98.80-98.75	41 LK 243	Hearth #4	-	-
41 MC 268	Test Pit 2	4	30-40 cm	41 MC 55	N1008 E1015	1	99.42-99.30
41 MC 296	N1022 E985	5	99.10-99.00	41 MC 55	N1007 E1015	2	99.40-99.30
41 MC 296	N1023 E985	5	99.10-99.00	41 MC 55	N1008 E1016	2	99.30-99.20
41 MC 296	N1027 E998	7	99.00-98.90	41 MC 55	N1014 E1011	1	Surf.-99.30
41 MC 296	N1026 E986	1	Surf.-99.50	41 MC 196	Test Pit 1	1	0-10 cm
				41 MC 222	N102 E100	5	98.60-98.50
CORE GROUP 2				41 MC 222	N102 E91	2	99.00-98.95
41 LK 8	N510 E459	9	99.30-99.20	41 MC 222	N103 E88	6	98.85-98.80
41 LK 8	N511 E458	11	99.10-99.00	41 MC 268	Test Pit 3	3	20-30 cm
41 LK 8	N460 E542	2	97.90-97.80	41 MC 268	N994 E983	2	99.40-99.30
41 LK 14	N1006 E958	2	100.20-100.10	41 MC 268	N995 E982	1	Surf.-99.40
41 LK 14	N1006 E958	3	100.10-100.00	41 MC 268	N996 E998	5	99.10-99.00
41 LK 14	N1006 E959	3	100.10-100.00	41 MC 296	N1022 E987	1	Surf.-99.40
41 LK 14	N1006 E959	5	99.90-99.80	41 MC 296	N1025 E999	1	Surf.-99.50
41 LK 14	N1008 E1001	7	99.20-99.10	41 MC 296	N1027 E978	1	Surf.-99.50
41 LK 51	N999 E984	4	99.50-99.40	41 MC 296	N1027 E978	2	99.50-99.40
41 LK 51	N998 E981	14	98.50-98.40	41 MC 296	N1027 E986	2	99.50-99.40
41 LK 51	N998 E982	4	99.50-99.40				
41 LK 51	N998 E984	10	98.90-98.80	CORE GROUP 4			
41 LK 51	N1011 E1011	8	99.20-99.10	41 LK 128	Test Pit 6	2	97.70-97.60
41 LK 51	N1011 E1011	8	99.20-99.10	41 LK 128	Test Pit 9	1	Surf.-99.40
41 LK 51	N1025 E1042	4	99.60-99.50	41 LK 185	Test Pit 3	5	40-50 cm
41 LK 53	N1000 E1003	6	99.20-99.10	41 MC 55	N1007 E1015	2	99.40-99.30
41 LK 74	N988 E991	2	99.30-99.20	41 MC 55	N1009 E1015	2	99.30-99.20
41 LK 142	Test Pit 1	3	20-30 cm	41 MC 94	Test Pit 1	7	99.10-99.00
41 LK 201	N490 E1043	11	97.75-97.65	41 MC 94	Test Pit 2	4	99.50-99.40
41 LK 201	N490 E1043	12	97.65-97.55	41 MC 222	N99 E91	4	98.65-98.60
41 LK 201	N500 E998	7	98.75-98.65	41 MC 268	Test Pit 2	3	20-30 cm
41 LK 201	N491 E1043	15	97.35-97.25	41 MC 268	Test Pit 3	3	20-30 cm
41 LK 201	N491 E1043	15	97.35-97.25	41 MC 268	N995 E982	2	99.40-99.30
41 LK 201	N491 E1044	14	97.45-97.35	41 MC 296	N1023 E985	8	98.80-98.70
41 LK 201	N497 E997	14	98.05-97.95	41 MC 296	N1026 E998	1	Surf.-99.50
41 LK 201	N498 E997	15	97.95-97.85				
41 LK 201	N498 E997	16	97.85-97.75	CORE GROUP 5			
41 LK 201	N506 E1013	2	99.20-99.10	41 LK 8	N511 E459	6	99.60-99.50
41 LK 201	N507 E1008	2	99.20-99.10	41 LK 8	N460 E452	3	97.80-97.70
41 LK 250	Test Pit 1	7	60-70 cm	41 LK 8	N461 E541	7	97.40-97.30
41 LK 250	Test Pit 1	11	100-110 cm	41 LK 8	N462 E541	1	98.05-97.90
41 LK 250	Test Pit 1	11	100-110 cm	41 LK 14	N1007 E958	4	100.00-99.90
41 MC 29	N997 E1011	5	99.50-99.40	41 LK 14	N1007 E958	7	99.70-99.60
41 MC 222	N98 E86	3	98.65-98.60	41 LK 14	N1008 E1000	6	99.30-99.20
41 MC 222	N101 E91	2	98.90-98.85				
41 MC 222	N103 E89	4	98.95-98.90				
41 MC 222	N103 E89	4	98.95-98.90				

TABLE 5. (continued)

SITE	UNIT	LEVEL	ELEVATION	SITE	UNIT	LEVEL	ELEVATION
CORE GROUP 5 (continued)				CORE GROUP 5 (continued)			
41 LK 14	N1008 E1001	2	99.70-99.60	41 MC 296	N1027 E998	6	99.10-99.00
41 LK 14	N1008 E1002	7	99.20-99.10	41 MC 296	N1027 E999	2	99.80-99.70
41 LK 14	N1008 E1002	8	99.10-99.00	41 MC 296	N1027 E999	4	99.30-99.20
41 LK 14	N1010 E1000	4	99.50-99.40	41 MC 296	N1025 E995	1	99.60-99.50
41 LK 14	N1010 E1000	6	99.30-99.20	41 MC 296	N1027 E995	4	99.30-99.20
41 LK 14	N1010 E1001	3	99.60-99.50				
41 LK 51	N999 E984	12	98.70-98.60	CORE GROUP 6			
41 LK 51	N998 E981	5	99.40-99.30	41 LK 8	N510 E458	10	99.20-99.10
41 LK 51	N998 E982	3	99.60-99.50	41 LK 8	N511 E459	7	99.50-99.40
41 LK 51	N1033 E1065	2	99.80-99.70	41 LK 8	N511 E459	12	99.00-98.90
41 LK 51	N1010 E1011	4	99.60-99.50	41 LK 8	N460 E541	7	97.40-97.30
41 LK 51	N1033 E1065	4	99.60-99.50	41 LK 8	N461 E542	2	97.90-97.80
41 LK 51	N1026 E1042	3	99.70-99.60	41 LK 8	N462 E542	1	98.04-97.90
41 LK 51	N1026 E1042	4	99.60-99.50	41 LK 14	N1006 E958	1	Surf.-100.20
41 LK 51	N1034 E1065	8	99.20-99.10	41 LK 14	N1006 E958	3	100.10-100.00
41 LK 51	N1025 E1041	5	99.50-99.40	41 LK 14	N1006 E958	5	99.90-99.80
41 LK 53	N1000 E1002	6	99.20-99.10	41 LK 14	N1006 E959	3	100.10-100.00
41 LK 53	N1002 E1002	6	99.20-99.10	41 LK 14	N1007 E958	2	100.20-100.10
41 LK 53	N1002 E1003	7	99.10-99.00	41 LK 14	N1007 E958	5	99.90-99.80
41 LK 74	N987 E990	1	Surf.-99.30	41 LK 14	N1007 E959	5	99.90-99.80
41 LK 74	N994 E986	1	99.15-99.05	41 LK 14	N1008 E1002	2	99.70-99.60
41 LK 74	N987 E991	1	Surf.-99.30	41 LK 14	N1008 E1002	4	99.50-99.40
41 LK 74	N988 E991	2	99.30-99.20	41 LK 14	N1010 E1001	4	99.50-99.40
41 LK 74	N988 E991	2	99.30-99.20	41 LK 14	N1010 E1002	4	99.50-99.40
41 LK 74	N995 E985	1	99.13-99.00	41 LK 51	N999 E982	15	98.40-98.30
41 LK 74	N974 E1000	1	99.80-99.65	41 LK 51	N999 E984	2	99.70-99.60
41 LK 74	N977 E1001	4	99.40-99.30	41 LK 51	N1033 E1065	9	99.10-99.00
41 LK 74	N1070 E857	1	Surf.-100.20	41 LK 74	N977 E1001	3	99.50-99.40
41 LK 74	N1070 E857	2	100.20-100.10	41 LK 74	N978 E1001	2	99.60-99.50
41 LK 74	N1070 E857	2	100.20-100.10	41 LK 128	Test Pit 1	1	Surf.-99.60
41 LK 74	N1071 E858	4	100.00-99.90	41 LK 128	Test Pit 7	4	99.40-99.30
41 LK 128	Test Pit 3	2	99.60-99.50	41 LK 128	Test Pit 7	5	99.30-99.20
41 LK 128	Test Pit 7	1	Surf.-99.60	41 LK 201	N490 E1043	10	97.85-97.75
41 LK 128	Test Pit 8	2	99.70-99.60	41 LK 201	N490 E1044	10	97.85-97.75
41 LK 128	Test Pit 14	1	Surf.-99.40	41 LK 201	N497 E998	7	98.75-98.65
41 LK 142	Test Pit 1	5	40-50 cm	41 LK 201	N497 E998	10	98.45-98.35
41 LK 162	Shovel Test	-	-	41 LK 201	N499 E996	2	99.25-99.15
41 LK 201	N490 E1044	5	98.35-98.25	41 LK 201	N498 E996	13	98.15-98.05
41 LK 201	N490 E1044	11	97.75-97.65	41 LK 201	N499 E998	14	98.05-97.95
41 LK 201	N498 E998	10	98.45-98.35	41 LK 201	N500 E997	13	98.15-98.05
41 LK 201	N500 E998	6	98.85-98.75	41 LK 201	N507 E1011	1	99.30-99.20
41 LK 201	N500 E998	6	98.85-98.75	41 LK 201	N507 E1012	1	99.31-99.20
41 LK 201	N498 E996	14	98.05-97.95	41 LK 201	N506 E1009	2	99.20-99.10
41 LK 201	N498 E997	16	97.85-97.75	41 LK 201	N506 E1009	2	99.20-99.10
41 LK 201	N510 E1021	8	98.85-98.80	41 LK 201	N504 E1010	1	99.31-99.20
41 LK 201	N491 E1043	18	97.05-96.95	41 LK 243	Test Pit 4	1	0-10 cm
41 LK 201	N509 E1013	2	99.20-99.10	41 MC 29	N999 E1013	6	99.40-99.30
41 LK 201	N506 E1011	1	99.30-99.20	41 MC 55	N993 E1014	1	Surf.-99.30
41 LK 201	N509 E1012	2	99.20-99.10	41 MC 222	N98 E86	2	98.70-98.65
41 LK 201	N508 E1010	3	99.00-98.90	41 MC 222	N99 E90	1	Surf.-98.75
41 LK 201	N509 E1008	2	99.10-99.00	41 MC 222	N102 E89	5	98.80-98.75
41 LK 201	N504 E1010	1	99.31-99.20	41 MC 222	N102 E91	2	99.00-98.95
41 LK 243	Test Pit 4	1	0-10 cm	41 MC 222	N102 E91	4	98.90-98.85
41 LK 250	Test Pit 1	6	50-60 cm	41 MC 222	N103 E88	5	98.90-98.85
41 LK 250	Test Pit 1	7	60-70 cm	41 MC 268	Test Pit 3	2	10-20 cm
41 LK 250	Test Pit 1	7	60-70 cm	41 MC 296	Test Pit 1	9	80-90 cm
41 MC 55	N1008 E1015	1	99.42-99.30	41 MC 296	N1022 E985	6	99.00-98.90
41 MC 55	N1008 E1015	1	99.42-99.30	41 MC 296	N1022 E986	8	98.80-98.70
41 MC 55	N1009 E1013	2	99.30-99.20	41 MC 296	N1022 E987	7	98.90-98.80
41 MC 55	N1015 E1012	1	Surf.-99.20	41 MC 296	N1023 E985	2	99.40-99.30
41 MC 55	N1015 E1012	1	Surf.-99.20	41 MC 296	N1023 E985	5	99.10-99.00
41 MC 55	N998 E1017	1	Surf.-99.30	41 MC 296	N1023 E985	7	98.90-98.80
41 MC 55	N999 E1017	1	Surf.-99.30	41 MC 296	N1023 E986	2	99.40-99.30
41 MC 94	Test Pit 2	7	99.20-99.10	41 MC 296	N1023 E987	1	Surf.-99.40
41 MC 196	Test Pit 1	1	0-10 cm	41 MC 296	N1024 E985	1	Surf.-99.40
41 MC 196	Test Pit 1	5	40-50 cm	41 MC 296	N1024 E985	2	99.40-99.30
41 MC 196	Test Pit 3	2	10-20 cm	41 MC 296	N1024 E985	8	98.80-98.70
41 MC 196	Test Pit 3	5	40-50 cm	41 MC 296	N1024 E986	2	99.40-99.30
41 MC 222	N97 E87	3	98.65-98.60	41 MC 296	N1024 E987	4	99.20-99.10
41 MC 222	N101 E90	3	98.85-98.80	41 MC 296	N1024 E987	5	99.10-99.00
41 MC 222	N103 E90	6	98.85-98.80	41 MC 296	N1023 E989	4	99.30-99.20
41 MC 222	N104 E85	3	98.85-98.80				
41 MC 222	N113 E83	1	Surf.-99.10	CORE GROUP 7			
41 MC 268	Test Pit 2	2	10-20 cm	41 MC 222	N97 E86	1	Surf.-98.60
41 MC 268	Test Pit 2	3	20-30 cm	41 MC 268	N994 E982	2	99.40-99.30
41 MC 268	Test Pit 3	2	10-20 cm	41 MC 268	N996 E999	7	98.90-98.80
41 MC 268	N994 E982	4	99.20-99.10	41 MC 296	N1022 E987	9	98.70-98.60
41 MC 268	N995 E983	2	99.40-99.30	41 MC 296	N1023 E987	6	99.00-98.90
41 MC 268	N995 E999	2	99.40-99.30				
41 MC 268	N996 E998	4	99.20-99.10	CORE GROUP 8			
41 MC 268	N996 E998	5	99.10-99.00	41 LK 8	N510 E458	8	99.40-99.30
41 MC 296	N1022 E985	3	99.30-99.20	41 MC 94	Test Pit 1	6	99.20-99.10
41 MC 296	N1022 E985	5	99.10-99.00				
41 MC 296	N1022 E987	7	98.90-98.80				
41 MC 296	N1023 E985	4	99.20-99.10				
41 MC 296	N1023 E985	7	98.90-98.80				
41 MC 296	N1023 E987	3	99.30-99.20				
41 MC 296	N1024 E986	6	99.00-98.90				
41 MC 296	N1025 E997	4	99.30-99.20				
41 MC 296	N1027 E998	2	99.50-99.40				

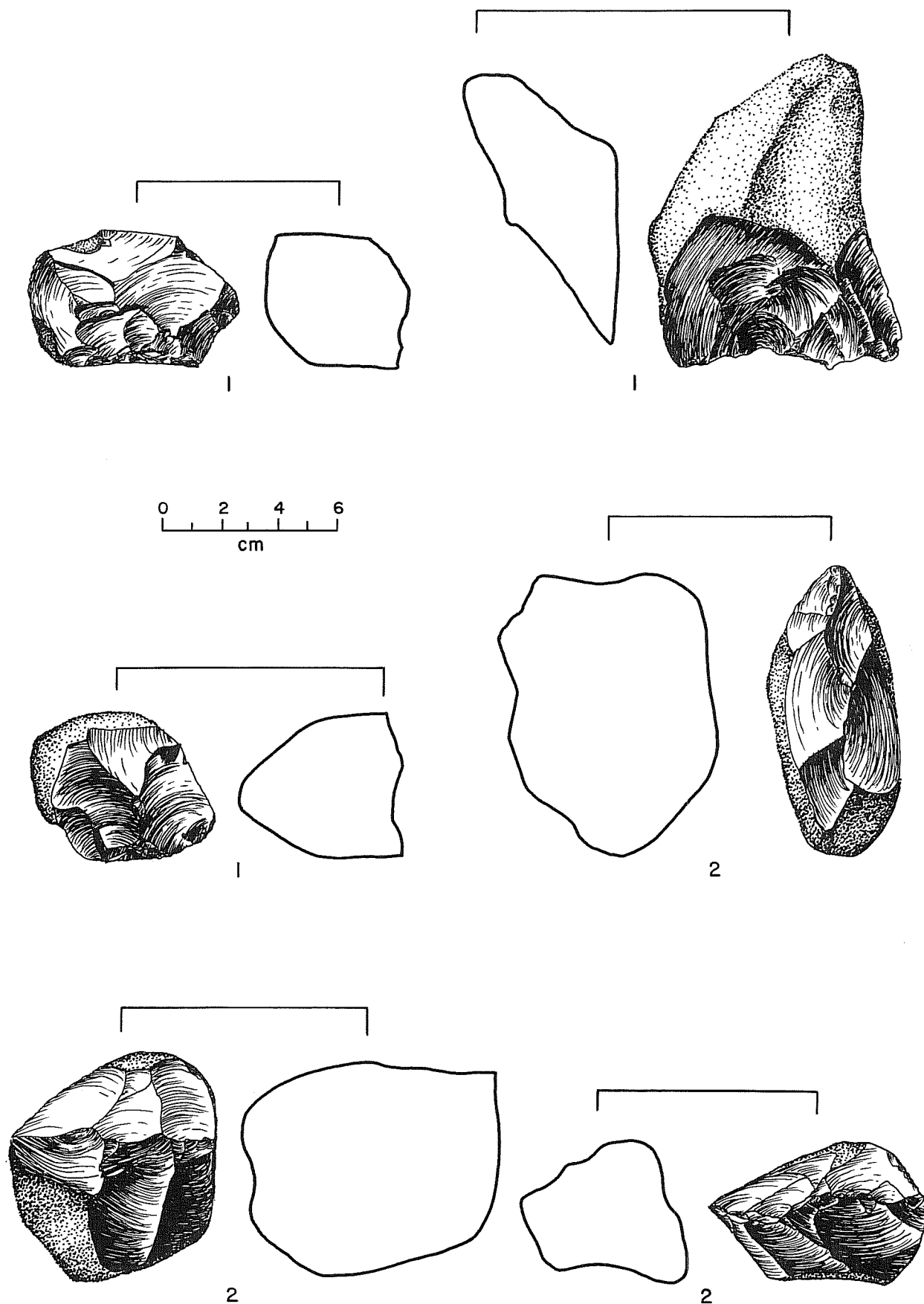


Figure 67. Cores: Groups 1 and 2. Number beneath artifact indicates core group number.

Group 1. Core--Possible Tool

One Group 1 core is shaped to suggest use as a "chopping" or "scraping" tool. This specimen is roughly subcircular in outline shape and has the following dimensions: length, 8.2 cm; width, 6.8 cm; and thickness, 2.9 cm. From one margin of the piece, comprising about one-third the circumference, flakes have been removed using natural platforms to form a relatively sharp edge. Opposite this edge, the broad, cortex-covered end forms a comfortable grip. There are no obvious signs of wear to provide additional evidence of usage as a tool. The specimen was recovered at 41 LK 173 in Shovel Test 1. The specimen is not illustrated.

Group 2. Bidirectional, Natural and Prepared Platforms (78 specimens)

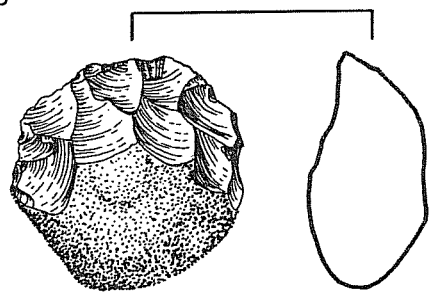
Group 2 cores are made of cobbles struck bidirectionally at one end or along one side. Flakes were removed initially using natural cortex platforms. Flake scars resulting from initial removals were then used as platforms for flake removals from the opposite direction. Specimens exhibit two to eight large flake scars. Most specimens retain 80-95% of the cortex; some retain as little as 50% of the cortex. The ranges of metric attributes for Group 2 specimens are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	11.4	4.9	8.5
Width:	8.7	3.7	6.9
Thickness:	5.9	2.6	4.4
Weight:	779.0	58.0	309.0

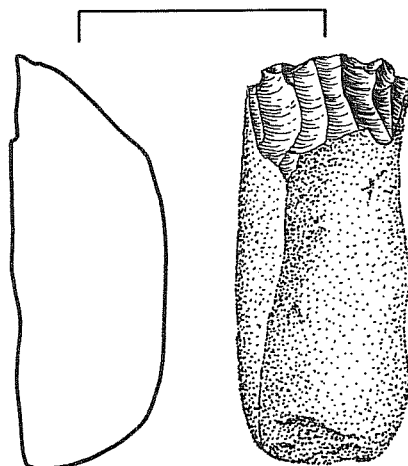
Examples of cores in Group 2 are illustrated in Figure 67.

Group 2. Cores--Possible Tools

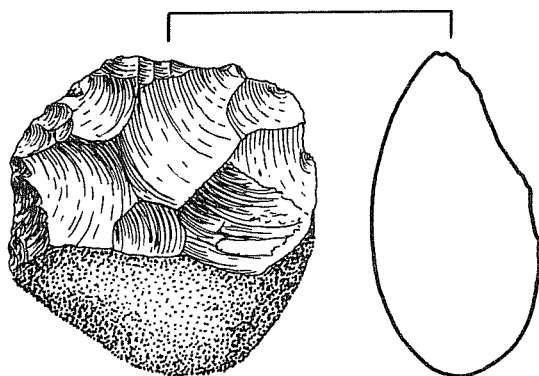
Ten of the Group 2 cores were worked into forms suggesting use as "chopping" and/or "scraping" tools. In outline shape, nine specimens are elliptical or subcircular; Specimen 4 is a narrow, elongate shape. The possible tools in Group 2 are characterized by sharp, bidirectionally knapped edges at one end and smooth, rounded cortex at the opposite end. Functional usage of these specimens as tools is inferred solely on the basis of the comfortable, convenient feel of the cortex end when held in the hand, the sharp edge at the opposite end, and the battered, crushed appearance of the flaked edges. Admittedly, these features may simply be the result of flake production or biface thinning processes completely unrelated to the intentional manufacture of a chopping or scraping tool. Specimen 4 (Fig. 68) is unusual in that its shape and the angle of its knapped end are morphologically similar to those of the **Guadalupe** tool (Distally Beveled Biface and Uniface Group 6), examples of which are described below. Specimen 7 (Fig. 71) is distinguished both by the material of which it is made--sandstone--and by three intersecting lines scratched into its face forming an asterisklike design. A surface recovery from 41 MC 268, the line pattern on Specimen 7 may have been formed as the



2-9

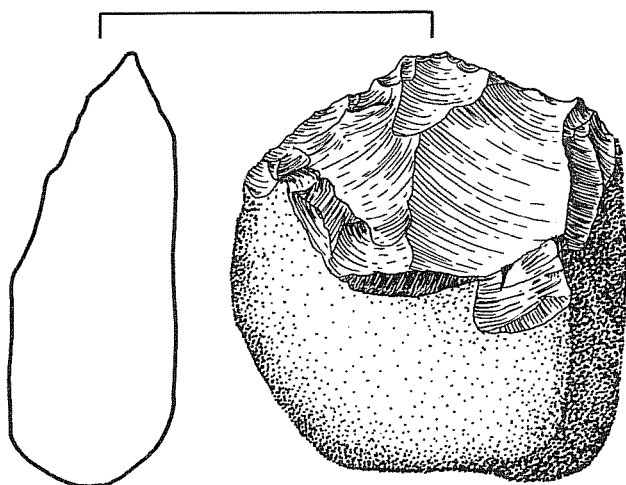


2-4



2-8

0 1 2 3 4
cm



2-5

Figure 68. Cores: Group 2--Possible Tools. Numbers beneath artifact indicate core group and specimen number, respectively.

piece was run over by farm machinery. Site provenience and metric attributes for these 10 specimens are as follows:

Specimen Number	Site	Unit	Level	Length	Width	Thickness	Figure Number
1	41 LK 51	N1011 E1011	8	8.3	6.6	5.2	-
2	41 LK 201	N490 E1043	11	12.2	9.9	3.9	-
3	41 LK 243	Surface	-	14.3	9.3	4.3	-
4	41 LK 243	Surface	-	10.8	4.1	3.9	68
5	41 MC 246	Surface	-	10.9	10.4	4.1	68
6	41 MC 268	N995 E983	2	6.6	8.1	3.3	-
7	41 MC 268	Surface	-	8.8	10.9	5.0	71
8	41 MC 293	Surface	-	8.2	8.4	4.1	68
9	41 MC 294	Surface	-	6.1	6.3	3.1	68
10	41 MC 296	Test Pit 1	7	7.1	7.3	3.7	-

Group 3. Multidirectional, Natural and Prepared Platforms, Single and Multiple Facets (81 specimens)

Group 3 cores have both natural and prepared platforms with single and multiple facets from which flakes have been removed multidirectionally. The group includes cobbles and large, thick flakes derived from cobbles. The cobble cores generally reflect the shape of the original unmodified cobble and retain up to 90% of their cortex. Many of the flakes retain no cortex. The ranges of metric attributes of Group 3 specimens are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	12.5	3.6	7.5
Width:	9.7	4.2	5.6
Thickness:	5.6	3.5	4.4
Weight:	770.0	68.0	206.0

Examples of Group 3 cores are illustrated in Figure 69.

Group 3. Cores--Possible Tools

Four Group 3 cores have shapes suggesting use as "chopping" or "scraping" tools. The specimens range from oval to subcircular in outline. The general description for the possible tools in Group 2, provided above, also applies to these specimens. Specimen 1 is made of chalcedony and constitutes the largest piece of the material recovered in the archaeological investigations at Choke Canyon. Specimen 3 exhibits a glossy or waxy sheen over its flaked faces and is mottled reddish orange and gray in color. These characteristics suggest that the core was heat treated. Generally similar in overall configuration to the Group 2 specimens illustrated in Figure 68, no Group 3 possible tool examples are illustrated. Site provenience and metric attributes for these four specimens are as follows:

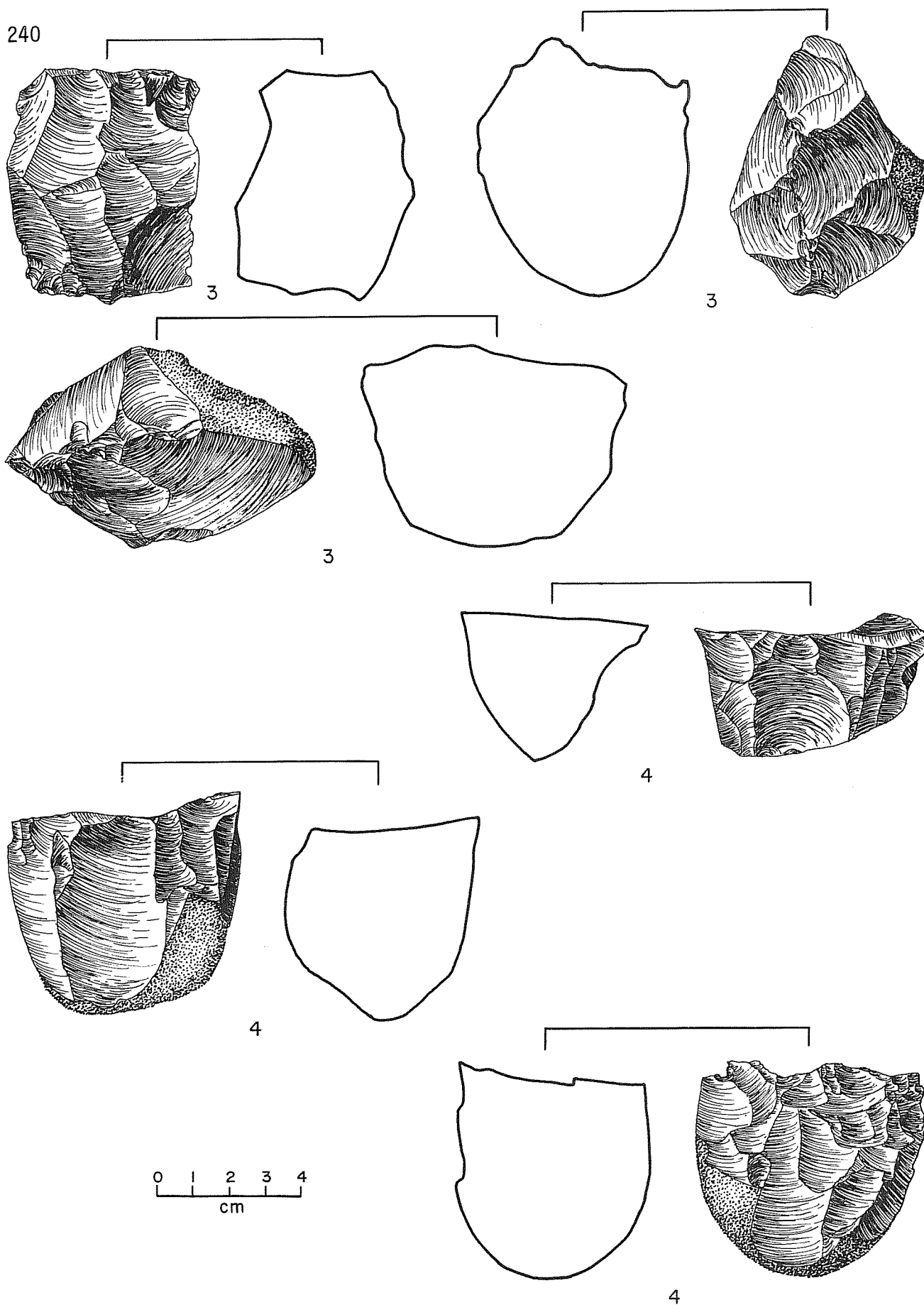


Figure 69. Cores: Groups 3 and 4. Number beneath artifact indicates core group number.

Specimen Number	Site	Unit	Level	Length	Width	Thickness
1	41 LK 199	Surface	-	11.2	9.6	4.8
2	41 MC 55	N1008 E1016	2	7.5	5.5	4.4
3	41 MC 226	Surface	-	9.9	7.9	4.3
4	41 MC 288	Surface	-	14.2	9.6	2.5

Group 4. Unidirectional, Prepared Platform, Single Facet (18 specimens)

Core Group 4 specimens are characterized by prepared, single facet platforms from which flakes have been unidirectionally removed, usually more-or-less perpendicular to the prepared platform. Platforms were prepared by splitting a cobble or by knocking a large flake from the cobble. In some cases, large flakes served as the core. Most Group 4 specimens retain 50-80% of the cortex; some retain 25% or less. The ranges of dimensions for Core Group 4 specimens are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	8.6	4.2	6.2
Width:	7.7	3.8	5.2
Thickness:	5.5	3.1	3.6
Weight:	429.0	69.0	154.0

Examples of Group 4 cores are illustrated in Figure 69.

Group 5. Multidirectional, Natural and Prepared Platforms, Single Facet (151 specimens)

Core Group 5 specimens show evidence of flakes struck multidirectionally from single facet prepared and natural platforms. Most specimens retain 25-50% of the cortex. The ranges of metric attributes for Group 5 specimens are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	10.0	4.1	7.7
Width:	8.7	4.3	5.6
Thickness:	6.1	2.3	4.5
Weight:	690.0	52.0	239.0

Examples of Group 5 cores are illustrated in Figure 70.

Group 5. Cores--Possible Tools

Three of the Group 5 cores may have functioned as tools. Specimen 1, made of petrified wood, is subtriangular in outline. Similar to the possible tools described for Core Groups 2 and 3, it has a rounded, cortex-covered broad end

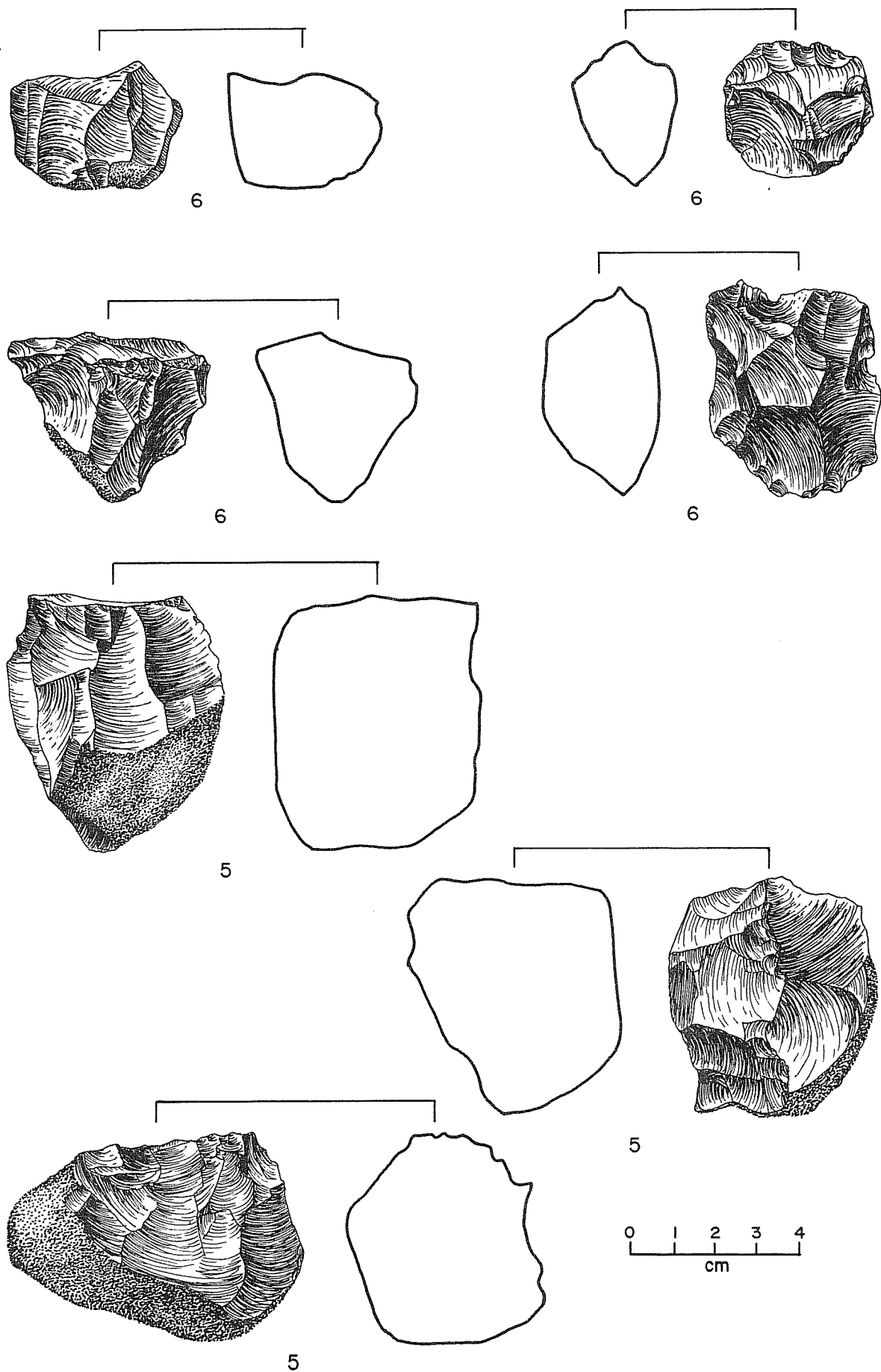


Figure 70. Cores: Groups 5 and 6. Number beneath artifact indicates core group number.

opposite a sharp edge formed by removing flakes from a prepared platform around one end and two sides (Fig. 71). Specimen 2 is similar except that the presumed working edge runs along only one side of the piece. Specimen 3 is especially remarkable in that its function as a tool is clearly evidenced by pronounced smoothing and rounding of the flaked edge. This specimen most certainly was used to perform some type of scraping task that smoothed rather than crushed the working edge. Dimensions, site provenience, and, where applicable, subsurface provenience, are as follows:

Specimen Number	Site	Unit	Level	Length	Width	Thickness
1	41 LK 8	Surface	-	10.4	8.9	3.8
2	41 LK 74	N994 E986	1	10.7	6.8	4.0
3	41 LK 201	N498 E998	10	8.0	9.1	5.3

Group 6. Core Nuclei (91 specimens)

Group 6 specimens are core nuclei or exhausted cores that have been reduced to the point where further flake removal is impossible or impractical. All are smaller than the average-sized specimens of other core groups. Shapes vary considerably from oval to subcircular to angular and irregular. Flake scars indicate use of cortex and prepared platforms with single and multiple facets. Flakes were removed multidirectionally. Platforms are commonly crushed or battered. Many specimens retain no cortex; some retain 25% or less, and a smaller number retain 50% of their cortex. The ranges of metric attributes for Group 6 specimens are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	6.5	3.5	4.7
Width:	4.2	3.2	3.7
Thickness:	3.1	2.0	2.4
Weight:	83.0	19.0	43.0

Group 7. Flat, Circular to Elliptical in Outline, Unifacially Cortex Covered (15 specimens)

Core Group 7 specimens are flat, circular to elliptical in outline, and more-or-less biconvex in cross section. On most specimens, one face is completely covered with cortex. On others, two or more flake removals from the cortex face have eliminated from 10-50% of the cortex. The other face is covered by flake scars of removals made from peripheral cortex platforms. Most of the specimens are portions of split cobbles or large flakes derived from cobbles. The ranges of metric attributes for Group 7 specimens are as follows:

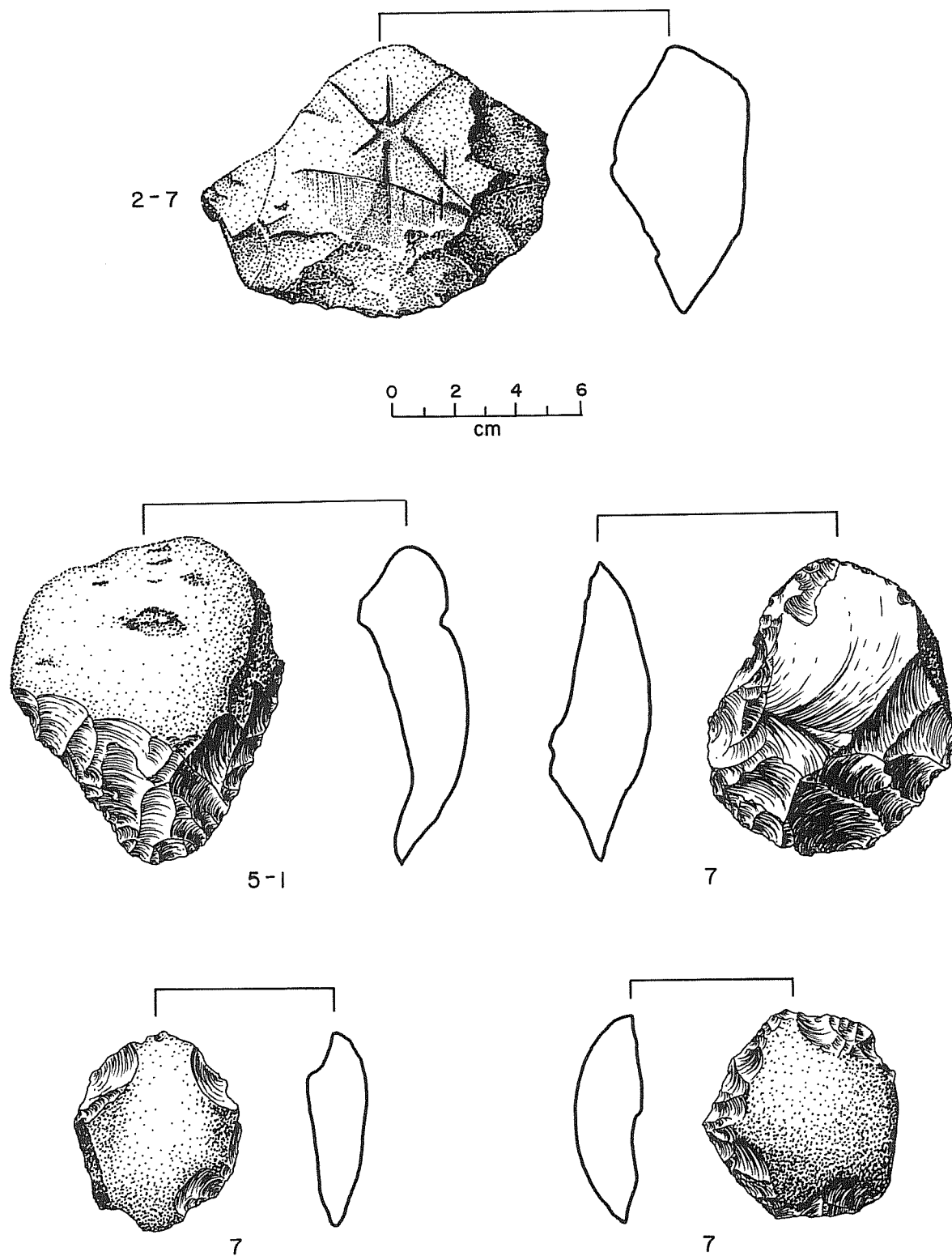


Figure 71. Cores: Groups 2 and 5--Possible Tools and Group 7. Numbers beneath artifact indicate group and specimen number, respectively.

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	9.7	4.7	6.5
Width:	8.2	4.1	5.3
Thickness:	3.9	2.0	2.3
Weight:	297.0	39.0	88.0

Examples of Group 7 cores are illustrated in Figure 71.

Group 8. Tested Cobbles (2 specimens)

Core Group 8 specimens are cortex-covered cobbles from which one to four natural platform flakes have been removed, possibly to "test" the quality of the material. The metric attributes for the two Group 8 specimens are as follows: Specimen 1--length, 10.0; width, 6.0; thickness, 5.2; weight, 463.0. Specimen 2--length, 10.1; width, 9.7; thickness, 4.1; weight, 613.0. Group 8 specimens are not illustrated.

Group 9. Core Fragments (279 specimens)

Core Group 9 specimens are unclassifiable core fragments. Most are believed to be remnants of shattered cores and trimmings resulting from platform preparation and general shaping. No metric attributes are provided, and no specimens are illustrated.

Group 10. Unmodified Cobbles (11 specimens)

Core Group 10 specimens are unmodified, cortex-covered cobbles. These specimens are not actually cores, but may have been brought to the sites with the intention of eventual reduction. Sizes range from a maximum of 12.7 x 5.0 x 3.6 cm to a minimum of 5.4 x 3.5 x 3.1 cm. No Group 10 specimens are illustrated.

Thick Bifaces (267 specimens)

The thick biface specimens are percussion-flaked bifaces which (1) measure 1.3 cm or more in thickness; (2) exhibit 10-30 flake scars, each greater than 1 cm²; and (3) do not have forms or wear patterns suggestive of their function. All are assumed to be discarded manufacturing failures; however, careful microscopic examination of edges might reveal that some were used as tools. Both cobble cores and flake cores were used in production of these specimens. Many specimens retain cortex on one or both faces, the degree of coverage on either face ranging from 80% to traces. The majority of specimens retain thick knots, or ridges, usually centrally located and surrounded by severe hinge fractures. The distinction between bifacial cores and thick bifaces, especially Groups 1-4 thick bifaces, should be clearly noted. Bifacial cores exhibit less than nine flake scars and are usually thinned more at one end than the other. Thick bifaces have 10 or more flake scars and are usually thinned more uniformly than the cores. It is

emphasized that the distinction made between cores and bifaces is arbitrary. Some of the bifacial cores may have been intended for reduction to finished bifacial tools. Likewise, artifacts grouped as thick bifaces, especially in Groups 1-4, could easily have been flake sources and not intended for reduction to finished bifacial tools. The distinction is made merely to facilitate and standardize the descriptive classifications. The thick bifaces are divided into nine morphological groupings as follows:

- Group 1. Large, Crudely Flaked Oval to Elliptical
- Group 2. Elliptical
- Group 3. Oval to Subcircular
- Group 4. Circular to Subcircular
- Group 5. Triangular
- Group 6. Fragments with Pointed Ends
 - Form 1. Elongate
 - Form 2. Triangular
- Group 7. Fragments with Rounded Ends
 - Form 1. Subcircular to Oval
 - Form 2. Large, Broad, Thin Fragments
 - Form 3. Elliptical
 - Form 4. Remnant Cortex Striking Platform
- Group 8. Odd and Miscellaneous Forms--Whole and Fragmentary
- Group 9. Lateral and Medial Fragments

Provenience data for all thick biface groups are provided in Tables 6 and 7.

Group 1. Large, Crudely Flaked Oval to Elliptical (30 specimens)

Group 1 thick bifaces are mostly oval to elliptical and represent the largest and most crudely flaked thick biface specimens. A few are irregularly shaped or subrectangular. It is apparent from these outline configurations, and from cortex remnants, that relatively flat, oval to subcircular and elliptical cobbles were selected for reduction. Flakes were struck from both natural and prepared platforms around the periphery in attempts to thin the cobbles. Edges are very sinuous. Most specimens exhibit a pronounced central ridge or knot on one or both face(s), often consisting of cortex that apparently could not be further thinned. Most are thick and biconvex in cross section. In most cases, the specimens are longer than they are wide. The amount of cortex retained ranges from 50% to traces; however, most retain 25% or less. The total number of distinct flake scars greater than 1 cm² on both faces of the Group 1 thick bifaces ranges from 10-30 scars. Metric attributes for Group 1 specimens range as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	13.2	6.7	8.6
Width:	6.2	4.2	5.7
Thickness:	4.2	2.3	3.0
Weight:	267.0	67.0	144.0

Examples of Group 1 thick bifaces are shown in Figure 72.

TABLE 6. PROVENIENCE OF THICK BIFACES BY SITE

SITE NO.	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6		GROUP 7				GROUP 8	GROUP 9
						FORM 1	FORM 2	1	2	3	4		
41LK8												1	
41LK14	1	1					1						
41LK27		2	1				1						
41LK51	1	1					1	4				1	1
41LK53							1						
41LK66													
41LK69													
41LK74			1			1		1	1	1		3	1
41LK120				2				1					
41LK121						1							
41LK122						1						1	
41LK127	1	1			2	1	1					1	2
41LK128	2	1		1								1	1
41LK133	1	1							1				1
41LK142	1												
41LK145													
41LK149	1												
41LK162								1			1		
41LK173	3		1					1					
41LK174													
41LK176													
41LK181													
41LK182		1		1									
41LK185			1							1	1		
41LK191													
41LK197			1										
41LK199		1	1	1				1		2		3	3
41LK201		1	2					3		2		5	5
41LK236													
41LK243	2	3	1			1	1	1		2		3	1
41LK247													
41LK250	1						1						
41LK252		1	1	4			3	2	1	2		3	
41LK253	2	2		1			1	2					
41MC7													
41MC10													
41MC14													
41MC15													
41MC17													
41MC29													1
41MC55	2						1						
41MC67													
41MC75													
41MC79													
41MC94													
41MC192			1		1					1			1
41MC193													
41MC194													
41MC196			1										
41MC212					1					2			
41MC213	1	1					1	2	1			1	
41MC214													
41MC222													
41MC226		1			1	1		4		1		1	2
41MC234											1		
41MC235			1		1			1					
41MC238	3						1					1	1
41MC242	1												
41MC246								1			1		
41MC251		1			1		1	2				1	1
41MC257													1
41MC260		2											
41MC266													
41MC267													
41MC268	1	3	1	1			1	1			1		1
41MC270	2		1					1					
41MC275	2	2	2	3			1	2		1			1
41MC276				1				1				1	1
41MC282		3	2	1				4		1			
41MC284		1				1							
41MC288					1	1		2					
41MC293		1								1			1
41MC294	1	1				1			1				
41MC296	1	1	1	3		1	1	7				1	2

TABLE 7. PROVENIENCE OF THICK BIFACES RECOVERED IN PHASE II EXCAVATIONS

SITE	UNIT	LEVEL	ELEVATION	SITE	UNIT	LEVEL	ELEVATION
GROUP 1				GROUP 7, FORM 1 (continued)			
41 LK 51	N998 E981	5	99.40-99.30	41 LK 201	N504 E1014	2	99.20-99.10
41 LK 128	Test Pit 11	4	100.70-100.60	41 LK 201	N506 E1011	1	99.30-99.20
41 LK 149	Shovel Test 1	-	34 cm	41 MC 296	Test Pit 1	6	50-60 cm
41 LK 243	Test Pit 1	3	20-30 cm	41 MC 296	N1023 E987	4	99.20-99.10
41 LK 250	Test Pit 1	6	50-60 cm	41 MC 296	N1024 E986	2	99.40-99.30
41 MC 55	N1017 E999	4	99.10-99.00	41 MC 296	N1024 E986	2	99.40-99.30
GROUP 2				41 MC 296	N1024 E986	8	98.80-98.70
41 LK 14	N1007 E958	1	Surf.-100.20	41 MC 296	N1026 E986	2	99.50-99.40
41 LK 51	N999 E981	11	98.80-98.70	41 MC 296	N1024 E989	4	99.30-99.20
41 LK 201	N491 E1044	10	97.85-97.75	GROUP 7, FORM 2			
41 MC 268	N994 E982	3	99.30-99.20	41 LK 74	N1070 E858	3	100.10-100.00
41 MC 296	N1025 E999	6	99.10-99.00	GROUP 7, FORM 3			
GROUP 3				41 LK 74	N978 E1000	3	99.50-99.40
41 LK 74	N977 E1000	3	99.50-99.40	41 LK 201	N499 E997	3	99.15-99.05
41 LK 201	N499 E998	12	98.25-98.15	41 LK 201	N500 E997	14	98.05-97.95
41 LK 201	N491 E1043	17	97.15-97.05	41 LK 243	Test Pit 1	5	40-50 cm
GROUP 4				GROUP 8			
41 LK 128	Test Pit 9	1	Surf.-99.40	41 LK 8	N401 E605	9	94.80-94.70
41 MC 268	N994 E982	2	99.40-99.30	41 LK 51	N999 E982	2	99.70-99.60
41 MC 296	N1024 E986	1	Surf.-99.40	41 LK 74	N1071 E858	1	Surf.-100.20
GROUP 6, FORM 1				41 LK 74	N1071 E858	3	100.10-100.00
41 MC 296	N1026 E998	4	99.30-99.20	41 LK 128	Test Pit 6	3	99.60-99.50
GROUP 6, FORM 2				41 LK 201	N498 E997	13	98.15-98.05
41 LK 51	N1026 E1042	1	Surf.-99.80	41 LK 201	N498 E996	14	98.05-97.95
41 LK 53	N1002 E1003	11	98.70-98.60	41 LK 201	N509 E1011	1	99.23-99.10
41 MC 55	N999 E1017	7	98.80-98.70	41 LK 201	N504 E1013	2	99.10-99.00
41 MC 296	N1022 E985	3	99.30-99.20	41 MC 296	N1025 E995	1	99.60-99.50
GROUP 7, FORM 1				GROUP 9			
41 LK 51	N999 E981	10	98.90-98.80	41 LK 51	N998 E984	5	99.40-99.30
41 LK 51	N999 E984	7	99.20-99.10	41 LK 74	N981 E988	2	99.60-99.50
41 LK 51	N1025 E1042	2	99.80-99.70	41 LK 201	N497 E996	4	99.05-98.95
41 LK 51	N1034 E1065	1	99.40-99.30	41 LK 201	N498 E996	3	99.15-99.05
41 LK 201	N491 E1043	2	98.65-98.55	41 LK 201	N499 E996	3	99.15-99.05
				41 LK 201	N499 E997	3	99.15-99.05
				41 LK 201	N509 E1013	2	99.20-99.10
				41 MC 29	N999 E1011	6	99.40-99.30
				41 MC 296	N1026 E986	2	99.50-99.40
				41 MC 296	N1023 E989	3	99.40-99.30

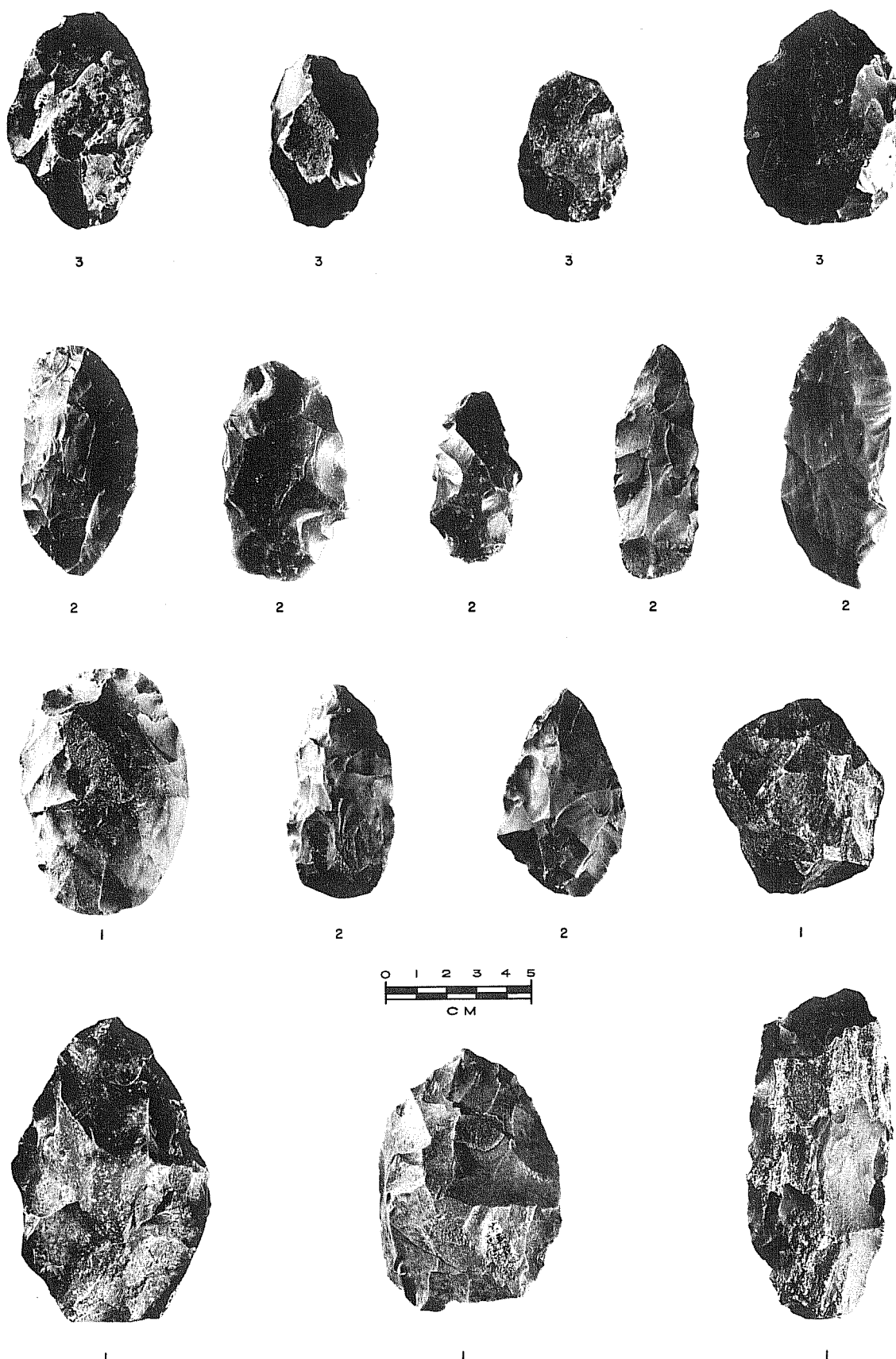


Figure 72. Thick Bifaces: Groups 1, 2, and 3. Number beneath artifact indicates group number.

Group 2. Elliptical (33 specimens)

Group 2 thick biface specimens are elliptical in greater or lesser degrees of uniformity with edges varying from moderately undulating and sinuous to fairly smooth and straight. In cross section, most are biconvex, although some are plano-convex. Group 2 specimens are uniformly smaller and flatter than Group 1 thick bifaces, but still retain the thick central ridges suggestive of thinning difficulties. Group 2 specimens are pronouncedly more elongate than oval; the lengths are consistently two times the width. Thicknesses more nearly approach widths than those of Group 1 thick bifaces. The total number of flake scars greater than 1 cm² on both faces of the Group 2 thick bifaces ranges from 10-32 scars. Metric attributes for Group 2 specimens range as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	9.3	5.8	7.4
Width:	4.4	3.1	3.8
Thickness:	2.1	1.5	1.8
Weight:	76.0	24.0	51.0

Examples of Group 2 thick bifaces are illustrated in Figure 72.

Group 3. Oval to Subcircular (20 specimens)

Group 3 thick biface specimens are oval to subcircular in outline form. Edges vary from moderately undulating and sinuous to fairly smooth and straight. Most specimens are biconvex in cross section, although there are plano-convex examples. The widths of Group 3 bifaces are more nearly equal their lengths, and the thickness of most specimens is less than half the width. Total number of flake scars greater than 1 cm² on both faces of the Group 3 thick bifaces ranges from 11-28 scars. Metric attributes for Group 3 specimens range as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	7.2	4.9	6.0
Width:	5.2	3.7	4.4
Thickness:	2.2	1.3	1.9
Weight:	86.0	24.0	54.0

Examples of Group 3 thick bifaces are illustrated in Figure 72.

Group 4. Circular to Subcircular (19 specimens)

Group 4 thick biface specimens are circular to subcircular in outline. Edges are moderately sinuous and undulating. Cross sections are mostly biconvex with a few plano-convex specimens also represented. Widths equal, or nearly equal, lengths. Thicknesses range from one-half to three-quarters of the length and width dimensions. Total number of flake scars greater than 1 cm²

on both faces ranges from 11-25 scars. The ranges of metric attributes for Group 4 thick bifaces are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	7.5	4.4	5.8
Width:	7.4	4.1	5.1
Thickness:	1.8	1.7	1.9
Weight:	111.0	37.0	57.0

Examples of Group 4 thick bifaces are illustrated in Figure 73.

Group 5. Triangular (8 specimens)

Group 5 thick biface specimens are triangular with slightly sinuous to straight edges and biconvex cross sections. Lengths approach twice the widths in most cases. Thicknesses are usually about half the widths. All specimens retain less than 25% cortex. Number of flake scars greater than 1 cm² on both faces ranges from 12-26 scars. The ranges of metric attributes for Group 5 specimens are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	7.3	4.4	6.9
Width:	4.5	3.5	4.1
Thickness:	2.4	1.6	1.7
Weight:	67.0	26.0	46.0

Examples of Group 5 thick bifaces are shown in Figure 73.

Group 6. Fragments with Pointed Ends (28 specimens)

Thick biface Group 6 specimens are fragments with pointed ends. The group is further divided into two forms--elongate and triangular--based on outline. All are probably incomplete examples of Group 2 (elliptical) and Group 5 (triangular) thick bifaces. Except that they are broken, the Group 6 specimens are otherwise similar to Group 2 and Group 5 with respect to cross section shape, degree of cortex removal, and number of flake scars. Metric attribute ranges are given below for Forms 1 and 2. Length and width ranges represent incomplete measurements due to the fragmentation of the specimens. Examples of Group 6 specimens are shown in Figure 73.

Form 1. Elongate (10 specimens)

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	9.4*	4.7*	6.3*
Width:	4.3	2.5	3.5
Thickness:	1.3	1.5	1.6
Weight:	49.0*	17.0*	40.0*

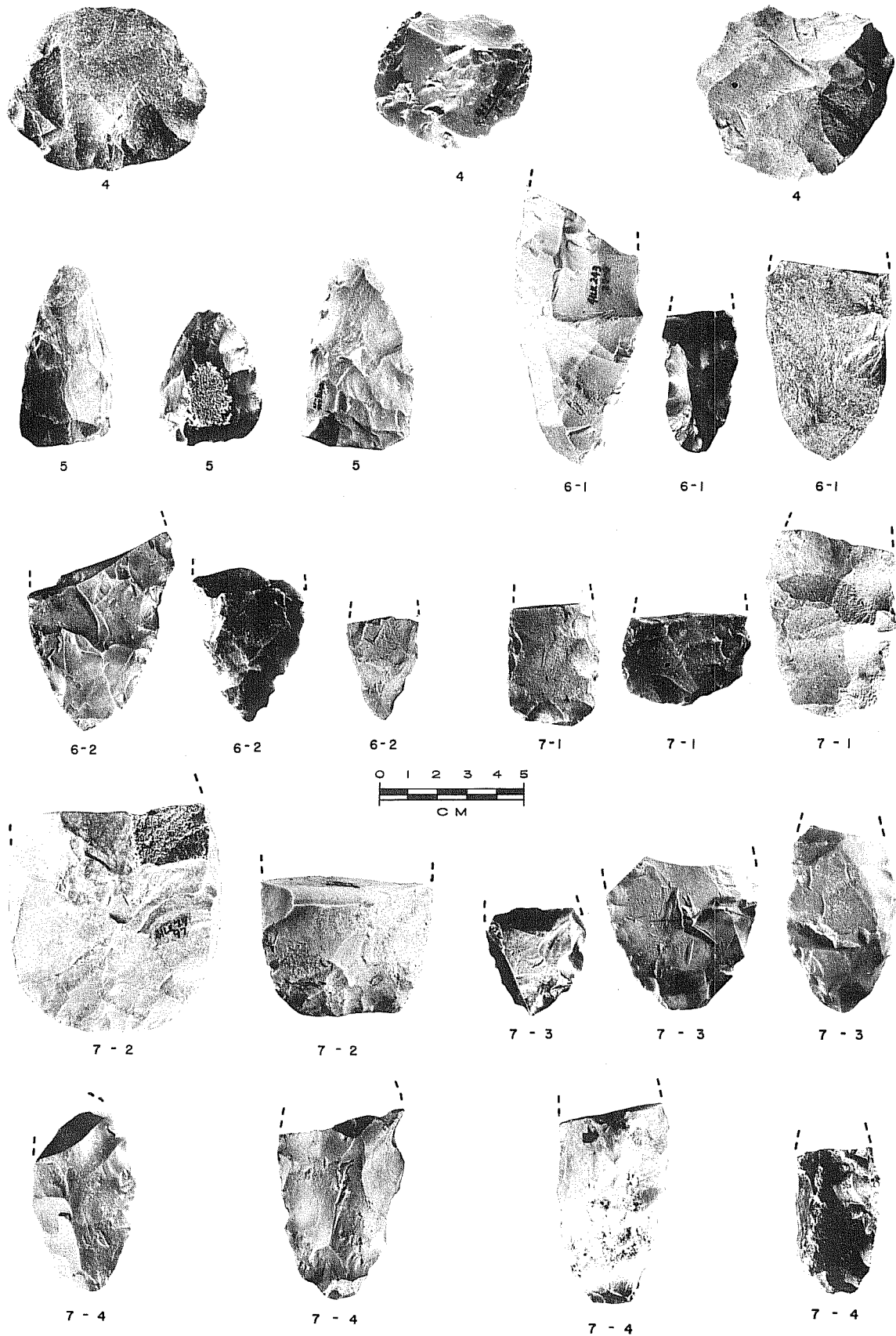


Figure 73. Thick Bifaces: Groups 4, 5, 6, and 7. Numbers beneath artifact indicate group and form number, respectively.

Form 2. Triangular (18 specimens)

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	6.2*	3.5*	5.2*
Width:	6.0	2.2	4.6
Thickness:	2.0	1.3	1.7
Weight:	71.0*	9.0*	38.0*

Group 7. Fragments with Rounded Ends (72 specimens)

Group 7 thick biface specimens are fragments with rounded ends as a common characteristic. The group is further subdivided into four forms. Form 1 specimens are broken examples of Group 2 (elliptical) and/or Group 3 (oval to subcircular) thick bifaces. Form 2 specimens are fragments of large, broad, relatively thin bifaces, not analogous to any of the previously described thick biface groups. The Form 2 specimens probably represent failures in attempts to produce large, knifelike thin bifaces (e.g., Group 4, Form 3 thin bifaces). Form 3 specimens may be fragments of Group 2 (elliptical) thick bifaces in that their broken lengths substantially exceed their widths. Form 4 specimens are unique in that a cortex striking platform is preserved on the rounded end. Cross section, degree of cortex removal, and number of flake scars of Group 7 specimens are similar to thick biface Groups 2 and 3. Metric attribute ranges are given below for Forms 1-4. Length and weight ranges represent incomplete measurements due to the fragmentation of the specimens. Examples of Group 7 thick bifaces are illustrated in Figure 73.

Form 1. Fragments of Subcircular and Oval Bifaces (45 specimens)

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	7.5*	2.7*	4.5*
Width:	4.4	4.3	4.5
Thickness:	1.9	1.4	1.6
Weight:	81.0*	15.0*	40.0*

Form 2. Large, Broad, Thin Fragments (five specimens)

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	7.5*	4.6*	5.9*
Width:	7.1	5.7	6.6
Thickness:	2.3	1.6	1.5
Weight:	151.0*	52.0*	65.0*

Form 3. Elliptical (17 specimens)

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	7.1*	3.3*	4.6*
Width:	5.0	3.6	4.1
Thickness:	1.9	1.2	1.5
Weight:	53.0*	15.0*	30.0*

Form 4. Cortex Striking Platform (five specimens)

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	7.3*	4.6*	6.2*
Width:	3.7	2.8	3.8
Thickness:	2.5	1.9	1.8
Weight:	61.0*	36.0*	46.0*

Group 8. Odd and Miscellaneous Forms--Whole and Fragmentary (28 specimens)

Group 8 thick biface specimens are whole and fragmentary with odd and miscellaneous shapes unlike any of the previously described groups. Metric attribute ranges for Group 8 specimens are as follows:

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	8.5	2.7	5.4
Width:	3.9	3.4	3.9
Thickness:	2.0	1.4	2.0
Weight:	64.0	14.0	49.0

Group 8 specimens are not illustrated.

Group 9. Lateral and Medial Fragments (29 specimens)

Group 9 thick bifaces are unclassifiable fragments, probably derived from specimens from previously described thick biface groupings. Metric attribute ranges for Group 9 specimens are given below. Length, width, and weight are incomplete measurements, due to fragmentation of the specimens.

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Length:	5.8*	2.0*	4.4*
Width:	5.2*	3.1*	3.5*
Thickness:	2.0	1.6	1.5
Weight:	89.0*	13.0*	26.0*

Group 9 specimens are not illustrated.

Thin Bifaces (1095 specimens)

Specimens classed as thin bifaces measure less than 1.3 cm thick; generally have straight, smooth edges; and show signs of being worked into their present shapes more by pressure flaking than by percussion. Only rarely is cortex retained on these specimens. Flake scars are generally much less than 1 cm² in area and coalesce to the extent that it is impossible to count them. Functional categories believed to be represented are dart points, arrow points, knives, and manufacturing failures. To avoid implying function with terminology, the thin bifaces are divided into groups and forms based on general morphological characteristics. The group divisions are based primarily on outline and size. Forms reflect more specific details such as thickness, workmanship, and manufacture. Previously established type names have been given to groups or individual artifacts when confident assignment was possible. If the group, type, or specimen is diagnostic of a time period, the age range is noted along with a reference to the source from which the reference is derived. The time ranges given for diagnostic types are derived from the better known chronologies developed for central Texas and the Trans-Pecos area. Now, however, with the radiocarbon assays resulting from two phases of investigations at Choke Canyon, as well as from investigations at a number of other south Texas sites, there is a substantial body of absolute chronological data now available for reference. Where appropriate, these are mentioned as individual artifacts and described. Site proveniences for thin bifaces are provided in Tables 8 and 9. Except for Groups 9 and 10 (not illustrated), all groups are illustrated in Figures 74-80. The thin bifaces are divided into 10 morphological groupings as follows:

- Group 1. Stemmed
 - Form 1. Large with Straight Stems
 - Form 2. Large with Contracting Stems
 - Form 3. Large with Expanding Stems
 - Form 4. Small with Contracting Stems
 - Form 5. Small with Expanding Stems
 - Form 6. Unclassifiable Fragments of Large Stemmed Bifaces
 - Form 7. Unclassifiable Fragments of Small Stemmed Bifaces
- Group 2. Unstemmed with Straight Bases
 - Form 1. Complete Triangular
 - Form 2. Proximal Fragments
- Group 3. Unstemmed with Concave Bases
 - Form 1. Complete Triangular
 - Form 2. Proximal Fragments
- Group 4. Unstemmed with Convex to Semicircular Bases
 - Form 1. Complete Triangular
 - Form 2. Steeply Beveled Blades
 - Form 3. Oval to Elliptical
 - Form 4. Fragments with Convex to Semicircular Ends
- Group 5. Unstemmed Leaf Shaped
- Group 6. Circular to Subcircular
- Group 7. Diamond Shaped
- Group 8. Bifaces with Sharp, Slender Projections
- Group 9. Fragments with Pointed Ends
- Group 10. Lateral and Medial Fragments

TABLE 8. PROVENIENCE OF THIN BIFACES BY SITE

Site Number	Group 1 Forms							Group 2 Forms		Group 3 Forms		Group 4 Forms				Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
	1	2	3	4	5	6	7	1	2	1	2	1	2	3	4						
41LK8		2	2						2		2	1			2					7	7
41LK14	1		1	1	1			3	2		2	1			6	1				5	14
41LK27									2			2								1	3
41LK51		1	5	1		1	4	1	2	2	3	4			7	2			1	9	25
41LK53	1		1	1	2			1	1	1		1		1	6					3	8
41LK66																					
41LK69																				6	4
41LK74	1		3					1	3		1	1			4						
41LK120															1						
41LK121																					4
41LK122	1		3					2	2						2					5	3
41LK127								3	1		1	1		2	6		1		1	6	13
41LK128			2	3			6	1				1		1	1						1
41LK133								1	1	1				1	3					2	
41LK142																					
41LK145																					
41LK149															1						3
41LK162			1											1							
41LK173															1						
41LK174																				1	
41LK176															1						
41LK181								1													1
41LK182																				3	3
41LK185	1		2		1			1	1	1	1	1			1					3	2
41LK191								1													
41LK197									3		1				3	1					13
41LK199																					
41LK201	2	1	1	40	3	1	11	3	1	1	1	14	11	21		1	1	1	5	41	44
41LK236																					
41LK243		1	1		1				1		1			1	2	1			1	10	6
41LK247																					
41LK250			1					1	2						1					3	4
41LK252															3	1					2
41LK253								1		1	1				5					4	
41MC7			1																		
41MC10											1										1
41MC14																					
41MC15																					
41MC17																					
41MC29															2						2
41MC55				5			1			1			3		1		1			2	2
41MC67																				2	
41MC75																					
41MC79				1		1	1					1			3					3	4
41MC94			1												1						1
41MC192																					
41MC193																					
41MC194											1										
41MC196		2				1		1	3			1		1	4					6	4
41MC212	1								3	1					5					1	1
41MC213	2	1	2					3	1		1	2		1	10	1	2		1	7	5
41MC214																					
41MC222			1	3	7		1	1	1		1								1	4	11
41MC226									1		1										2
41MC234						1		1	3												
41MC235														1	5					4	
41MC238		1	1						3		1				3				1	2	4
41MC242															1					2	
41MC246								2							1					2	3
41MC251			1								1	2		1	4	1	1			2	3
41MC257															1						1
41MC260		1	2					1							2					1	1
41MC266															1						
41MC267															1						
41MC268		1	1	1	2	1					2				5	1		1		10	3
41MC270														1						1	1
41MC275	2	1		1	1		1	1	1		1				7		3			7	10
41MC276	1							2							3	1	1		1	1	4
41MC282															4						1
41MC284															1						
41MC288			1												2					2	1
41MC293															2						2
41MC294							1		1		1		1	1	3					2	2
41MC296		2	5	30	11	1	21	3		1	1		7	1	19	2			3	26	38

For stemmed specimens, the following metric attributes are given:

Length--maximum dimension from distal tip to base.

Width--maximum dimension from blade edge to blade edge, usually occurring at the juncture of blade and stem.

Thickness--maximum dimension at thickest part of specimen, regardless of overall location.

Stem Length--the dimension from the stem base to the juncture of stem and blade.

Stem Width--widest dimension of the stem.

Neck Width--dimension of the stem at the stem/blade juncture.

Weight--in grams as determined on a triple beam balance scale.

For unstemmed specimens, only length, width, thickness, and weight attributes are given. These same attributes were presented for the Phase I collection from Choke Canyon, but definitions for each dimension were inadvertently left out of the report (Hall, Black, and Graves 1982:282).

Group 1. Stemmed (236 specimens)

Form 1. Large with Straight Stems (13 specimens)

Thin biface Group 1, Form 1 specimens are large, stemmed bifaces with more-or-less straight stems with parallel edges. Four of the specimens represent previously established dart point typological groups, **Pedernales** and **Bell**. There is considerable diversity among the remaining nine specimens. Provenience and metric data are provided in Table 9.

Specimens 1-2, 5: **Pedernales**. On Specimen 1, one blade edge is straight, the other is slightly concave. The shoulders are moderately barbed. Stem edges are straight, and the base is broadly concave. The asymmetrical shaping of the blade edges suggests use of the piece as a cutting tool. Specimen 2 consists of a proximal fragment only. The shoulders appear to be rounded rather than barbed. The base is notched by a narrow, deep (0.4 cm) concavity quite different from Specimen 1. Specimen 5 was recovered in subsurface excavations at 41 LK 201 (Highley 1986). The **Pedernales** type is a Middle Archaic diagnostic in central Texas. No specimens have been recovered from dated subsurface context at Choke Canyon.

Specimen 3: **Bell**. Specimen 3 lacks a distal tip and appears to have been retouched along the blade edges subsequent to breakage. The blade edges are crooked and roughly serrated. Both barbs, normally quite long on the **Bell** type, are broken. Stem edges and base are more-or-less straight. The base has been thinned by removal of flakes from the basal edge. The **Bell** type is an Early Archaic diagnostic in central Texas, but has not been recovered from dated subsurface context at Choke Canyon.

Specimen 4: This specimen has slightly convex blade edges and very weak shoulders. The base is broadly concave. Deposits yielding the specimen have been radiocarbon dated to between 1300 B.C. (TX-3022) and 660 B.C. (TX-4673).

TABLE 9. PROVENIENCE AND METRIC DATA FOR STEMMED THIN BIFACES

Group	Form	Specimen No.	Type	Site	Lot No.	Provenience		Length	Width	Thickness	Stem Length	Stem Width	Neck Width	Weight
						Unit	Level							
1	1	1	Pedernales	41MC213	2-42	Surface		5.1	2.6	0.6	1.6	1.7	1.8	7.0
1	1	2	Pedernales	41MC275	5-13	Surface		*	3.2	0.7	1.7	1.9	1.9	*
1	1	3	Bell	41LK122	2-2	Surface		3.3*	3.0	0.5	1.3	1.5	1.5	4.9*
1	1	4		41LK74	41	N988E991	Surf.-99.30	6.3	2.1	0.6	1.6	2.0	1.9	10.1
1	1	5	Pedernales	41LK201	404	N498E996	97.65-.55	7.1	2.2	0.9	1.5	2.2	2.1	11.9
1	1	6		41LK14	300-0	Surface		5.5*	3.1	0.9	1.7	2.1	2.1	16.5*
1	1	7		41LK53	106	N1001E1003	99.68-.60	*	*	0.5	0.8	1.1	1.0	*
1	1	8		41LK185	48-25	Surface		5.2*	2.6*	0.7	1.3	2.1	2.0	8.7*
1	1	9		41LK201	167	N490E1044	97.85-.75	8.9	2.6	0.9	2.3	2.2	2.2	18.4
1	1	10		41MC212	1-0	Surface		4.2*	2.5	0.6	1.0	1.7	1.8	7.8*
1	1	11		41MC213	2-18	Surface		5.9*	2.5	0.9	1.5	2.1	2.1	13.6*
1	1	12		41MC275	5-4	Surface		*	2.5	0.8	1.5	1.6	1.7	*
1	1	13		41MC276	1-3	Surface		5.7	2.4	1.0	1.2	2.0	1.9	12.6
1	2	1	Morhiss	41LK8	120	N460E542	97.80-.70	*	3.3	0.8	1.9	2.1	2.1	*
1	2	2	Morhiss	41MC196	27-0	Surface		6.8	2.6	0.8	1.9	2.3	2.3	15.0
1	2	3	Langtry	41LK51	325	N1034E1065	99.10-99.00	*	*	0.7	2.1	*	1.5	*
1	2	4	Langtry	41MC196	23-0	Surface		5.7	3.3	0.6	1.8	1.8	1.8	9.6
1	2	5	Langtry	41MC213	2-15	Surface		6.8	2.9*	0.5	1.5	1.5	1.5	9.1*
1	2	6	Langtry	41MC238	2-0	Surface		*	3.8*	0.6	1.8	1.9	1.9	*
1	2	7	Morhiss	41LK201	305	N500E998	98.85-.75	6.5	2.5	0.9	1.8	1.9	1.9	14.7
1	2	8		41LK243	26-37	Surface		7.0	2.3	0.8	1.4	1.9	1.9	14.0
1	2	9		41MC275	5-2	Surface		5.4	2.9	0.7	1.4	1.2	1.2	6.8
1	2	10		41LK8	198-0	Surface		3.9*	1.9	0.8	1.0	1.2	1.2	6.3*
1	2	11		41MC260	1-8	Surface		4.3*	2.1	0.7	1.1	1.3	1.3	6.1*
1	2	12		41MC296	89	N1023E987	Surf.-99.40	4.4	1.9	0.7	0.8	1.4	1.4	5.7
1	2	13		41MC268	21-18	Surface		3.2	1.9	0.5	0.6	1.2	1.2	2.9
1	2	14		41MC296	90	N1023E987	99.40-.30	3.6	1.8	0.7	1.5	1.5	1.5	4.1
1	3	1	Ensor	41LK51	301	N1034E1065	99.60-.50	3.0	1.8	0.7	1.2	1.9	1.5	4.0
1	3	2	Ensor	41LK74	42	Surface		3.6*	2.1	0.6	1.0	2.1	1.4	4.5*
1	3	3	Ensor	41LK74	112-0	Surface		*	2.2	0.6	1.0	1.9	1.5	*
1	3	4	Ensor	41LK243	26-21	Surface		*	2.2	0.7	1.1	2.2	1.5	*
1	3	5	Ensor	41MC213	2-54	Surface		3.9	2.1	0.7	0.9	1.6	1.4	5.5
1	3	6	Ensor	41MC222	163-4	N101E89	98.80-.75	*	2.1	0.7	1.2	*	1.4	*
1	3	7	Ensor	41MC260	1-15	Surface		4.1	2.0	0.9	1.4	1.9	1.6	5.8
1	3	8	Ensor	41MC288	91-60	Surface		3.8	2.0	0.5	1.0	1.9	1.7	4.7
1	3	9	Ensor	41MC296	173	N1027E997	99.20-.10	4.6	2.3	0.7	1.1	2.4	1.9	7.5
1	3	10	Ensor	41MC296	225	N1027E978	99.20-.10	3.2	2.3	0.6	1.1	2.3	1.7	4.0
1	3	11	Fairland	41LK8	199-0	Surface		*	2.4	0.6	1.1	2.5	1.7	*
1	3	12	Fairland	41LK51	282	N1026E1042	99.80-.70	4.5	2.2	0.5	1.3	2.3	1.8	5.9
1	3	13	Fairland	41LK51	311	N1026E1039	99.70-.60	4.0	2.0	0.6	1.1	2.1	1.8	4.8
1	3	14	Fairland	41LK128	46-26	Surface		4.7	2.0	0.7	1.0	*	1.5	6.2*
1	3	15	Fairland	41LK185	14-14	Surface		*	2.2*	0.8	1.2	*	1.8	*
1	3	16	Fairland	41MC7	0	Surface		4.4	1.7	0.7	1.4	1.8	1.4	5.6
1	3	17	Fairland	41MC260	3	Surface		4.5	2.0	1.6	1.2	2.0	1.6	6.5*
1	3	18	Early Exp. Stem	41LK8	189	N400E805	94.90-.80	5.0	1.9	0.7	1.3	2.0	1.4	6.5
1	3	19	Early Exp. Stem	41LK51	209	N998E981	98.40-.30	4.0	*	0.5	0.8	1.6	1.3	4.5*
1	3	20	Early Exp. Stem	41LK122	2-3	Surface		3.0*	3.0*	0.6	1.2	1.8	1.3	5.3*
1	3	21	Ensor	41LK201	184	N491E1043	97.75-.65	4.5	2.1	0.8	1.3	*	1.4	6.5*
1	3	22		41LK14	300-0	Surface		6.0*	2.3	0.9	1.9	2.3	2.0	15.5*
1	3	23		41LK51	162	N999E982	99.30-.20	6.4	2.7	0.5	1.0	*	1.5	9.5*
1	3	24		41LK53	108	N1001E1003	99.50-.40	*	*	0.6	*	2.0	1.4	*
1	3	25		41LK122	2-1	Surface		4.5*	1.9	0.6	*	*	0.8	4.0*
1	3	26		41LK122	2-4	Surface		*	1.9	0.7	1.2	*	1.0	*
1	3	27		41LK128	46-28	Surface		4.7	2.1	0.8	1.5	2.0	1.8	9.0
1	3	28		41LK250	12-5	Surface		3.0*	2.2	0.6	1.0	1.3	1.2	4.1*
1	3	29		41MC94	203	Test Pit 4	Surf.-99.70	*	*	0.5	*	2.3	*	*
1	3	30		41MC213	2-64	Surface		*	3.0	0.7	1.4	*	1.7	*
1	3	31		41MC238	1-4	Surface		5.7*	2.5	0.7	1.1	1.7	1.3	9.8*
1	3	32		41MC251	1-0	Surface		*	2.0*	0.6	0.9	1.4	1.0	*
1	3	33		41MC288	8-19	Surface		*	2.2	0.7	1.1	*	1.5	*
1	3	34		41MC296	179	N1027E998	99.30-.20	*	1.8	0.5	1.2	1.7	1.5	*
1	3	35		41LK185	16-16	Surface		*	1.5	*	1.2	1.4	1.1	*
1	3	36	Zavala	41LK162	1-0	Surface		3.7*	1.8	0.8	1.0	1.4	1.4	5.6*
1	3	37	Zavala	41LK74	56	N981E988	99.70-.80	2.9	1.6	0.6	0.9	1.2	1.1	2.9
1	3	38	Zavala	41MC296	173	N1027E997	99.20-.10	4.3	2.0	0.6	0.9	1.7	1.6	4.6*
1	3	39	Zavala	41MC296	201	N1026E995	99.60-.50	3.7	1.5	0.6	0.9	1.6	1.4	3.5
1	4	1	Perdiz	41LK51	298	N1033E1062	99.60-.50	*	*	0.2	1.0	0.6	0.6	*
1	4	2	Perdiz	41LK53	95	N1001E1002	Surf.-99.80	2.4	1.3	0.3	0.8	0.7	0.7	0.7
1	4	3	Perdiz	41LK201	222	N497E997	99.05-98.95	3.6	1.5	0.5	1.2	0.7	0.7	2.1
1	4	4	Perdiz	41LK201	239	N498E996	99.25-99.15	3.0	1.7	0.3	0.9	0.6	0.6	1.3
1	4	5	Perdiz	41LK201	240	N498E996	99.15-99.05	4.6	1.4	0.4	1.3	0.7	0.7	1.8
1	4	6	Perdiz	41LK201	247	N498E997	99.15-99.05	3.1	1.8	0.5	0.9	0.7	0.7	2.0
1	4	7	Perdiz	41LK201	247	N498E997	99.15-99.05	2.5	1.2	0.2	0.8	0.5	0.5	0.5
1	4	8	Perdiz	41LK201	247	N498E997	99.15-99.05	5.0	1.8	0.6	1.2	0.8	0.8	3.7
1	4	9	Perdiz	41LK201	270	N499E997	99.25-99.15	*	1.5	0.3	1.2	0.6	0.6	*
1	4	10	Perdiz	41LK201	271	N499E997	99.15-.05	3.1	1.5	0.3	1.2	0.7	0.7	1.0
1	4	11	Perdiz	41LK201	278	N499E998	99.15-.05	3.5	1.9	0.5	0.9	0.8	0.8	2.5
1	4	12	Perdiz	41LK201	294	N500E997	99.15-.05	3.1	1.7	0.3	0.8	0.5	0.5	1.0
1	4	13	Perdiz	41LK201	300	N500E998	99.15-.05	3.1	1.7	0.3	1.1	0.6	0.6	1.5
1	4	14	Perdiz	41LK201	300	N500E998	99.15-.05	2.5	1.6	0.3	1.0	0.7	0.7	1.0
1	4	15	Perdiz	41LK201	487-0	Surface		3.5	1.5	0.3	0.8	0.6	0.6	1.5
1	4	16	Perdiz	41LK201	654	N508E1010	99.30-.20	*	1.4	0.2	0.7	0.6	0.6	*
1	4	17	Perdiz	41LK201	657-14	N507E1010	99.30-.20	3.0	1.7	0.3	1.1	0.7	0.7	1.3

TABLE 9. (continued)

Group	Form	Specimen No.	Type	Site	Lot No.	Provenience		Length	Width	Thickness	Stem Length	Stem Width	Neck Width	Weight
						Unit	Level							
1	4	18	Perdiz	41LK201	659-45	N506E1008	99.29-.20	2.5	1.4	0.2	0.6	0.5	0.5	0.7
1	4	19	Perdiz	41LK201	696	N506E1009	99.20-.10	*	1.2	0.2	0.6	0.4	0.4	*
1	4	20	Perdiz	41LK201	699	N508E1012	99.20-.10	*	1.7	0.3	0.6	0.6	0.6	*
1	4	21	Perdiz	41LK201	700-66	N508E1013	99.20-.10	2.2	1.6	0.2	0.7	0.6	0.6	0.7
1	4	22	Perdiz	41LK201	702-111	N509E1013	99.20-.10	2.3	1.5	0.3	1.0	0.5	0.5	0.7
1	4	23	Perdiz	41LK201	707	N504E1008	99.20-.10	2.3	*	0.3	1.0	0.5	0.5	*
1	4	24	Perdiz	41LK201	707	N504E1008	99.20-.10	2.7	1.3	0.2	0.9	0.6	0.6	0.6
1	4	25	Perdiz	41LK201	720-144	N504E1012	99.20-.10	1.4	1.3	0.2	0.6	0.4	0.4	0.5
1	4	26	Perdiz	41LK201	720-145	N504E1012	99.20-.10	*	1.3	0.3	0.7	0.5	0.5	*
1	4	27	Perdiz	41LK201	722	N505E1012	99.20-.10	*	*	0.2	0.9	0.7	0.7	*
1	4	28	Perdiz	41LK201	723	N505E1013	99.20-.10	*	*	0.2	0.9	0.6	0.6	*
1	4	29	Perdiz	41MC55	78	N1007E1016	99.30-.20	*	1.6	0.3	0.7	0.7	0.7	*
1	4	30	Perdiz	41MC55	79	N1009E1016	99.30-.20	2.8	1.4	0.3	0.7	0.5	0.5	0.9
1	4	31	Perdiz	41MC268	93	Surface		*	*	0.3	1.2	0.5	0.5	*
1	4	32	Perdiz	41MC276	5-24	Surface		2.0	1.4	0.2	0.5	0.4	0.4	0.8
1	4	33	Perdiz	41MC296	41	N1022E985	Surf.-99.40	*	1.2	0.3	0.8	0.6	0.6	*
1	4	34	Perdiz	41MC296	42	N1022E985	99.40-.30	2.0*	2.0	0.3	0.8	0.6	0.6	0.9*
1	4	35	Perdiz	41MC296	43	N1022E985	99.30-.20	*	1.5	0.3	1.1	0.4	0.4	*
1	4	36	Perdiz	41MC296	51	N1022E986	Surf.-99.40	2.4	1.3	0.4	0.8	0.5	0.5	0.9
1	4	37	Perdiz	41MC296	51	N1022E986	Surf.-99.40	*	*	0.2	0.9	0.5	0.5	*
1	4	38	Perdiz	41MC296	51	N1022E986	Surf.-99.40	*	1.6	0.3	0.9	0.5	0.5	*
1	4	39	Perdiz	41MC296	51	N1022E986	Surf.-99.40	3.1	1.9	0.3	1.1	0.5	0.5	1.0
1	4	40	Perdiz	41MC296	51	N1022E986	Surf.-99.40	3.7	1.4	0.3	0.8	0.7	0.7	1.3
1	4	41	Perdiz	41MC296	51	N1022E986	Surf.-99.40	3.1	1.2	0.3	0.8	0.5	0.5	1.0
1	4	42	Perdiz	41MC296	51	N1022E986	Surf.-99.40	3.8	1.7	0.3	1.1	0.6	0.6	1.5
1	4	43	Perdiz	41MC296	61	N1022E987	Surf.-99.40	*	*	0.2	0.7	0.5	0.5	*
1	4	44	Perdiz	41MC296	62	N1022E987	99.40-.30	*	*	0.2	0.9	0.4	0.4	*
1	4	45	Perdiz	41MC296	70	N1023E985	Surf.-99.40	*	*	0.3	0.8	0.4	0.4	*
1	4	46	Perdiz	41MC296	79	N1023E986	Surf.-99.40	*	1.7	0.3	1.2	0.4	0.4	*
1	4	47	Perdiz	41MC296	98	N1024E985	Surf.-99.40	2.5	1.6	0.3	0.7	0.6	0.6	1.2
1	4	48	Perdiz	41MC296	126	N1025E997	99.50-.40	*	1.4	0.3	1.2	0.5	0.5	*
1	4	49	Perdiz	41MC296	133	N1025E998	99.50-.40	*	1.4	0.2	0.9	0.5	0.5	*
1	4	50	Perdiz	41MC296	157	N1026E998	99.40-.30	2.6*	1.6	0.4	0.8	0.6	0.6	1.3*
1	4	51	Perdiz	41MC296	198	N1026E978	99.50-.40	3.7	1.2	0.3	0.9	0.5	0.5	1.2
1	4	52	Perdiz	41MC296	206	N1025E997	Surface	3.0	2.0	0.3	1.1	0.8	0.8	2.4
1	4	53	Perdiz	41MC296	214	N1027E986	99.50-.40	2.9	1.6	0.3	0.9	0.6	0.6	1.3
1	4	54	Perdiz	41MC296	231	N1023E989	Surf.-99.50	*	1.5	0.2	0.9	0.6	0.6	*
1	4	55	Perdiz	41LK14	196	N1007E958	Surf.-100.20	*	1.4	0.3	0.6	0.6	0.5	*
1	4	56	Perdiz	41LK128	33	Test Pit 8	99.70-.60	2.8	*	0.2	1.0	0.8	0.8	*
1	4	57	Perdiz	41LK128	26	Test Pit 7	99.50-.40	*	2.1	0.3	0.9	0.6	0.6	*
1	4	58	Perdiz	41LK128	45	Hearth 13		*	*	0.2	1.1	0.5	0.6	*
1	4	59	Perdiz	41LK201	149	N490E1043	98.35-.25	*	1.7	0.3	0.8	0.8	0.8	*
1	4	60	Perdiz	41LK201	301	N500E998	99.05-98.95	*	1.4	0.2	*	0.7	0.7	*
1	4	61	Perdiz	41LK201	489-0	Surface		2.9	1.4	0.3	0.7	0.5	0.5	0.8
1	4	62	Perdiz	41LK201	652	N509E1010	99.23-.10	1.9	1.3	0.2	0.5	0.5	0.5	0.5
1	4	63	Perdiz	41LK201	669-54	N508E1012	99.31-.20	3.3*	1.3	0.2	0.7	0.6	0.6	*
1	4	64	Perdiz	41LK201	696	N506E1009	99.20-.10	2.4	1.2	0.2	0.6	0.5	0.5	0.5
1	4	65	Perdiz	41LK201	699	N508E1012	99.20-.10	2.5	1.6	0.2	0.6	0.8	0.7	0.9
1	4	66	Perdiz	41LK201	701	N509E1012	99.20-.10	1.1	0.9	0.2	0.5	0.5	0.5	0.3
1	4	67	Perdiz	41LK201	679	N504E1008	99.32-.20	*	1.4	0.2	0.8	0.7	0.7	*
1	4	68	Cliffton	41LK201	700	N508E1013	99.20-.10	*	1.8	0.5	0.5	0.8	0.8	*
1	4	69	Cliffton	41LK201	701	N509E1012	99.20-.10	*	1.5	0.3	0.5	0.6	0.6	*
1	4	70	Perdiz	41LK201	703-135	N506E1010	99.20-.10	3.5	*	0.3	0.6	0.7	0.5	1.0
1	4	71	Perdiz	41LK201	707-102	N504E1008	99.20-.10	2.8*	*	0.3	*	0.5	0.5	*
1	4	72	Perdiz	41MC55	62	N994E1015	99.30-.20	2.2	1.3	0.3	0.6	0.5	0.5	0.6
1	4	73	Perdiz	41MC79	2	Surface		2.7	*	0.3	1.0	0.6	0.6	*
1	4	74	Straight Stem	41MC222	116	N98E96	98.70-.65	2.3	1.8	0.4	0.6	*	0.6	1.2*
1	4	75	Straight Stem	41MC222	170	N101E91	Surf.-98.90	3.1	2.4	0.4	0.5	0.6	0.6	1.8
1	4	76	Straight Stem	41MC222	205-10	N102E91	98.95-.90	2.6	1.8	0.4	0.6	0.6	0.6	1.6*
1	4	77	Perdiz	41MC296	41	N1022E985	Surf.-99.40	2.2	1.9	0.2	0.9	0.6	0.6	1.0
1	4	78	Perdiz	41MC296	61	N1022E987	Surf.-99.40	*	1.5	0.4	0.5	0.6	0.6	*
1	4	79	Perdiz	41MC296	62	N1022E987	99.40-.30	2.5*	2.0	0.3	0.8	0.8	0.8	*
1	4	80	Perdiz	41MC296	70	N1023E985	Surf.-99.40	2.8	*	0.3	0.5	0.6	0.6	*
1	4	81	Perdiz	41MC296	80	N1023E986	99.40-.30	2.7*	*	0.3	0.7	0.6	0.6	*
1	4	82	Perdiz	41MC296	90	N1023E987	99.40-.30	3.7	*	0.3	0.8	0.6	0.6	*
1	4	83	Perdiz	41MC296	201	N1025E995	99.60-.50	3.6*	1.5	0.3	*	0.5	0.5	*
1	4	84	Perdiz	41LK201	278	N499E998	99.15-.05	2.5	1.6	0.4	0.5	0.6	0.6	1.5
1	4	85	Cliffton	41MC55	60	N993E1015	Surf.-99.30	2.9	2.1	0.5	0.6	0.9	0.9	*
1	4	86	Perdiz	41MC55	85	N1016E1011	Surf.-99.30	3.8	2.4	0.3	1.0	1.0	1.0	2.2
1	4	87	Cliffton	41MC296	72	N1023E985	99.30-.20	3.8	1.9	0.3	0.6	0.9	0.9	2.9
1	5	1	Scallorn	41LK14	300-0	Surface		2.5	1.4	0.4	0.9	0.9	0.5	1.0
1	5	2	Scallorn	41LK53	97	N1001E1002	99.50-.40	2.9	1.3	0.5	0.8	0.8*	0.6	1.3*
1	5	3	Scallorn	41LK201	680	N504E1009	99.32-.20	1.6*	1.3	0.2	0.4	0.8	0.5	*
1	5	4	Scallorn	41LK201	690-61	N509E1011	99.10-99.00	2.4*	1.3	0.2	0.5	0.7	0.5	0.7*
1	5	5	Scallorn	41LK243	26-53	Surface		2.0*	1.6	0.3	0.5	1.0	0.7	1.0*
1	5	6	Scallorn	41MC94	177	Surface		4.1*	1.8	0.4	0.7	1.6*	1.0	3.5*
1	5	7	Scallorn	41MC222	186	N102E89	98.75-.70	3.1	1.7	0.4	0.8	1.2	0.7	2.0
1	5	8	Scallorn	41MC222	231	N103E9C	98.95-.90	2.8	1.8	0.3	0.6	1.7	0.9	1.6
1	5	9	Scallorn	41MC268	67	N995E999	99.20-.10	2.9	1.3	0.5	0.6	1.0	0.7	1.5
1	5	10	Scallorn	41MC296	65	N1022E987	99.10-99.00	3.1*	1.7	0.5	0.6	1.2	0.7	2.2*
1	5	11	Scallorn	41MC296	135	N1025E998	99.30-99.20	2.5*	1.6	0.4	0.7	1.3	0.6	1.5*
1	5	12	Scallorn	41MC296	208	N1026E978	99.40-.30	2.6*	1.6	0.3	0.7	1.6	0.7	1.5*

TABLE 9. (continued)

Group	Form	Specimen No.	Type	Site	Lot No.	Provenience		Length	Width	Thickness	Stem Length	Stem Width	Neck Width	Weight
						Unit	Level							
1	5	13	Scallorn	41MC296	210	N1027E978	99.50-.40	2.3	1.7	0.4	0.7	1.2	0.7	1.2
1	5	14	Scallorn	41MC296	234	N1027E986	99.30-.20	3.4	1.4	0.5	0.8	1.2	0.6	1.5
1	5	15	Edwards	41LK201	721-170	N504E1013	99.10-99.00	3.0*	1.4*	0.5	1.2	1.4	0.5	*
1	5	16	Edwards	41MC222	132	N99E90	Surf.-98.75	3.7	1.7*	0.5	0.7	*	0.8	2.3*
1	5	17	Edwards	41MC222	198	N102E100	98.80-.70	2.6	1.9	0.4	0.6	1.4	0.8	1.4
1	5	18	Edwards	41MC268	21-26	Surface		*	2.5	0.4	0.9	*	0.7	*
1	5	19	Edwards	41MC296	109	N1024E986	99.30-.20	2.5	1.4*	0.4	0.7	1.5	0.7	1.3
1	5	20		41LK53	99	N1001E1002	99.30-.20	2.5*	1.4	0.6	0.8	1.3	0.8	1.6*
1	5	21		41LK185	18-18	Surface		3.4*	1.6	0.4	0.9	1.4	0.6	1.5
1	5	22		41MC222	179-8	N102E88	98.85-.80	2.1*	1.7	0.5	0.9	1.3	0.8	*
1	5	23		41MC222	179-19	N102E88	98.85-.80	3.7	1.7	0.6	0.6	0.8	0.8	2.3
1	5	24	Stem Only	41MC222	136	N99E91	Surf.-98.75	*	*	0.3	*	1.8	*	*
1	5	25	Stem Only	41MC275	2-0	Surface		*	*	0.4	*	1.8	0.7	*
1	5	26	Stem Only	41MC296	2	Test Pit 1	10-20 cm.	*	*	0.2	0.7	*	0.5	*
1	5	27	Stem Only	41MC296	135	N1025E998	99.30-.20	*	*	0.3	*	1.4*	*	*
1	5	28	Stem Only	41MC296	140	N1025E999	99.50-.40	*	*	0.4	*	*	*	*
1	5	29	Stem Only	41MC296	178	N1027E998	99.40-.30	*	*	0.3	*	1.7	*	*
1	5	30	Stem Only	41MC296	191	Surface		*	*	0.4	*	1.4	*	*
1	6	1	Untyped	41LK51	160	N999E982	99.50-.40	6.5*	1.7	0.8	*	*	1.3	8.7*
1	6	2	Dart Point	41LK201	727-167	N505E1011	99.31-.20	*	3.4*	0.6	2.0	2.4*	1.9	*
1	6	3	Fragments	41MC196	27-0	Surface		7.7*	2.0	1.0	*	*	1.5	14.4*
1	6	4		41MC234	1-0	Surface		2.8*	1.7	0.5	*	*	1.0	2.8*
1	6	5		41MC268	21-8	Surface		*	2.4	0.6	*	*	*	*
1	6	6		41MC296	2	Test Pit 1	10-20 cm.	*	*	0.6	0.4	1.9	*	*
1	7	1	Untyped	41LK51	141	N999E981	99.70-.60	2.5*	1.9*	0.4	*	*	0.6	*
1	7	2	Arrow Point	41LK51	272	N1010E1008	Surf.-99.80	*	1.4	0.3	0.5	0.8	0.8	*
1	7	3	Fragments	41LK51	287	N1033E1062	99.70-.60	2.5*	1.7	0.3	*	*	0.5	1.2*
1	7	4		41LK51	300	N1033E1065	99.50-.40	2.6*	1.8	0.5	*	*	0.6	2.1*
1	7	5		41LK128	22	Test Pit 6	99.60-.50	3.1*	2.4	0.3	*	*	*	1.8*
1	7	6		41LK128	23	Test Pit 6	99.50-.40	2.7*	2.1	0.2	*	*	0.6	1.1*
1	7	7		41LK128	33	Test Pit 8	99.70-.60	2.2*	1.6	0.2	*	*	0.7	0.9*
1	7	8		41LK128	47-0	Hearth 18		*	1.7	0.3	*	*	0.6	*
1	7	9		41LK128	61	Test Pit 10	Level 2	4.3*	1.6	0.4	*	*	0.5	2.2*
1	7	10		41LK128	64	Test Pit 16	Level 1	2.3*	*	0.2	*	*	*	*
1	7	11		41LK201	221	N497E997	99.15-.05	*	1.8	0.4	*	*	*	*
1	7	12		41LK201	230	N497E998	99.15-.05	*	1.5*	0.3	*	*	*	*
1	7	13		41LK201	248	N498E997	99.05-98.95	*	1.6	0.4	*	*	0.8	*
1	7	14		41LK201	272	N499E997	99.05-98.95	2.8*	2.1	0.2	*	*	0.8	1.6*
1	7	15		41LK201	653	N509E1011	99.23-.10	0.9*	1.2	0.2	*	*	0.4	*
1	7	16		41LK201	689-82	N509E1010	99.10-99.00	2.9*	1.3*	0.2	*	*	0.5	0.6*
1	7	17		41LK201	698	N507E1009	99.20-.10	*	1.5	0.2	*	*	*	*
1	7	18		41LK201	719-159	N508E1008	99.10-99.00	*	1.7	0.3	*	*	*	*
1	7	19		41LK201	719-161	N508E1008	99.10-99.00	*	1.4*	0.2	*	*	0.5	*
1	7	20		41LK201	720-143	N504E1012	99.20-.10	2.0*	1.5	0.2	*	*	*	*
1	7	21		41LK201	723	N505E1013	99.20-.10	2.7*	*	0.3	*	*	*	*
1	7	22		41MC55	94	N999E1017	Surf.-99.30	2.2*	1.3	0.3	*	*	*	*
1	7	23		41MC94	187	Test Pit 2	Surf.-99.70	2.9*	*	0.5	*	*	*	*
1	7	24		41MC222	208	N102E91	98.80-.75	*	1.4	0.4	*	*	*	*
1	7	25		41MC275	5-27	Surface		1.8*	1.5	0.2	*	*	*	*
1	7	26		41MC294	3-0	Surface		2.5*	1.5	0.3	*	*	*	*
1	7	27		41MC296	16	Test Pit 2	10-20cm.	2.1*	1.5	0.3	*	*	0.5	*
1	7	28		41MC296	41	N1022E985	Surf.-99.40	*	*	0.2	*	0.7	0.7	*
1	7	29		41MC296	61	N1022E987	Surf.-99.40	*	1.4	0.3	*	*	*	*
1	7	30		41MC296	61	N1022E987	Surf.-99.40	3.0*	1.6	0.3	*	*	0.6	*
1	7	31		41MC296	61	N1022E987	Surf.-99.40	*	1.0	0.2	*	*	0.4	*
1	7	32		41MC296	72	N1023E985	99.30-.20	2.2*	1.5*	0.3	*	*	*	*
1	7	33		41MC296	72	N1023E985	99.30-.20	2.3*	*	0.2	1.0	0.9	0.9	*
1	7	34		41MC296	74	N1023E985	99.10-99.00	2.2*	1.8	0.4	*	*	*	*
1	7	35		41MC296	79	N1023E986	Surf.-99.40	2.3*	*	0.3	*	*	0.5	*
1	7	36		41MC296	79	N1023E986	Surf.-99.40	2.4*	1.1	0.3	*	*	0.4	*
1	7	37		41MC296	79	N1023E986	Surf.-99.40	2.3*	1.5	0.3	*	*	0.6	*
1	7	38		41MC296	91	N1023E987	99.30-.20	1.8*	1.2*	0.3	*	*	*	*
1	7	39		41MC296	98	N1024E985	Surf.-99.40	2.4*	1.6	0.3	*	*	0.5	*
1	7	40		41MC296	98	N1024E985	Surf.-99.40	1.8*	1.2	0.2	*	*	0.7	*
1	7	41		41MC296	99	N1024E985	99.40-.30	3.3*	1.9	0.4	*	*	*	*
1	7	42		41MC296	108	N1024E986	99.40-.30	*	*	0.2	*	*	0.7	*
1	7	43		41MC296	116	N1024E987	Surf.-99.40	*	1.8*	0.3	*	*	0.5	*
1	7	44		41MC296	133	N1025E998	99.50-.40	3.0*	2.4	0.3	*	*	*	*
1	7	45		41MC296	214	N1027E986	99.50-.40	1.5*	0.9	0.2	*	*	0.5	*
1	7	46		41MC296	217	N1026E995	99.50-.40	*	1.4	0.2	*	*	*	*
1	7	47		41MC296	227	N1024E989	99.40-.30	*	*	0.3	1.2	1.2	1.2	*

Specimen 6: Specimen 6 lacks a distal tip and a portion of the base. The blade edges are convex, and the shoulders are moderately pronounced. The basal morphology is obscure due to breakage. The distal end seems to have been reworked.

Specimen 7: The distal tip, one barb, and lateral edge are missing from Specimen 7. The surviving barb is pronounced, and the basal edge is straight. The specimen is made of chalcedony.

Specimen 8: Burning has caused extensive potlidding on this specimen, and its color has been altered to a purplish gray. Blade edges are irregular. The shoulders are weak. Basal edge morphology cannot be determined.

Specimen 9: The blade edges of Specimen 9 are slightly concave and alternately beveled. This configuration suggests use of the piece as a hafted cutting tool. Shoulder morphology is asymmetrical. One shoulder is moderately pronounced while the other is very weak. The base is straight. The piece has been burned, resulting in two large potlids on one face. Specimen 9 was recovered in excavations at 41 LK 201. Deposits yielding the piece have been radiocarbon dated to 480 B.C. (TX-4665).

Specimen 10: The distal end on Specimen 10 was apparently shattered by impact and then reworked. Blade edges are irregularly convex. The stem is asymmetrical with a straight base.

Specimen 11: The distal tip is missing from Specimen 11. It is similar to Specimens 4 and 5 above except that the base is not as pronouncedly concave. Blade edges are straight. The shoulders are weak.

Specimen 12: The distal half of Specimen 12 is missing. Shoulders are moderately pronounced, but not barbed. The base is notched by a shallow concavity.

Specimen 13: Blade edges are slightly convex. Shoulders are weak. The stem is short with a convex base.

Form 2. Large with Contracting Stems (14 specimens)

Seven of these dart points fall into the previously established types of **Morhiss** and **Langtry**. The remaining specimens do not conform to any currently established types.

Specimens 1-2, 7: **Morhiss**. Specimen 1 lacks its distal half. Specimen 2 has straight blade edges with alternate beveling. Specimen 7 was recovered from deposits at 41 LK 201 (see Highley 1986 for descriptive information). Shoulders are lightly to moderately pronounced, but not barbed. Stem edges are straight with boldly convex bases imparting a bulbous appearance to the stems. Radiocarbon assays from deposits yielding **Morhiss** points in Goliad County place the type in the time period of 1250-500 B.C. (D. E. Fox 1979a:62).

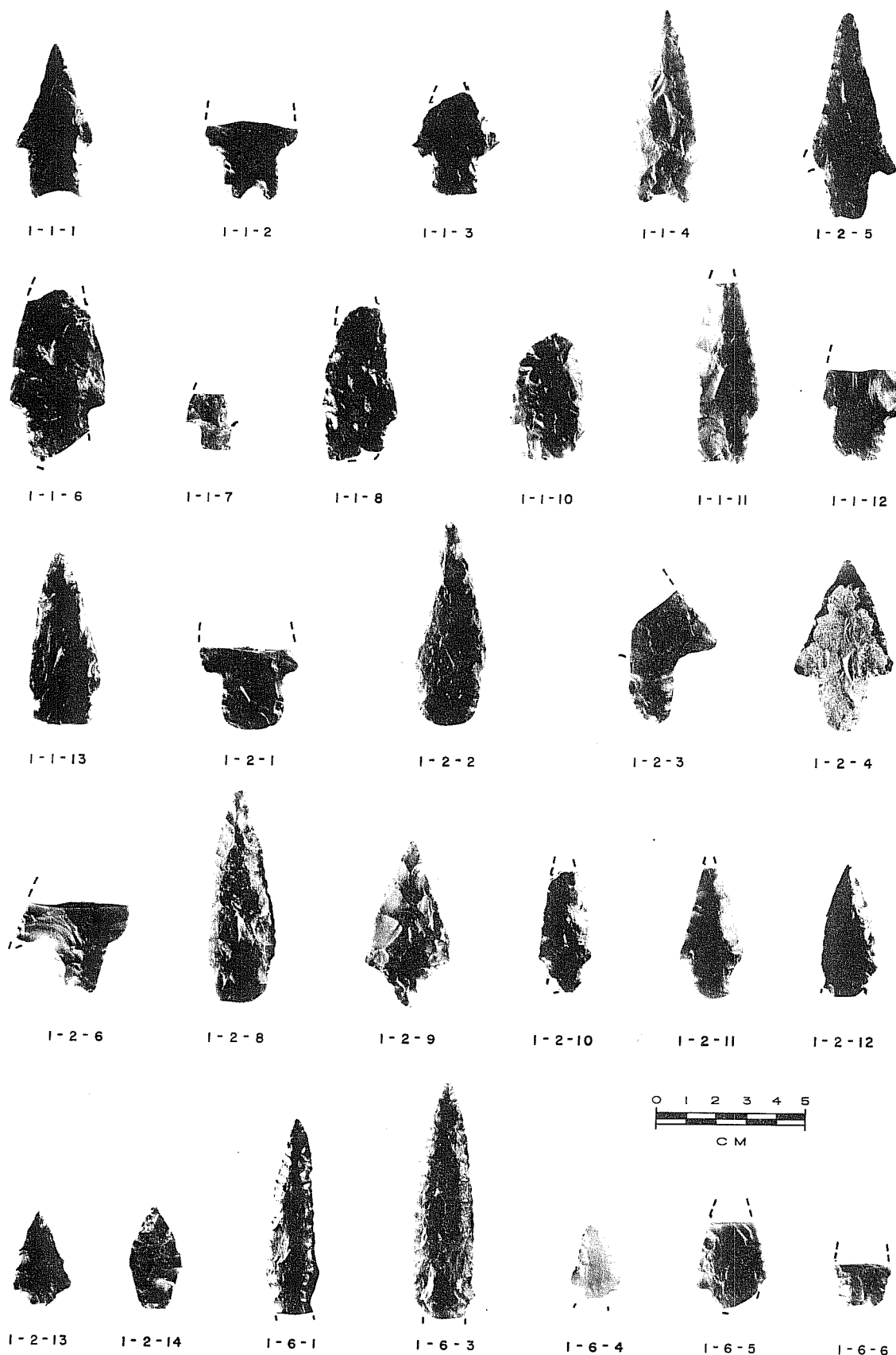


Figure 74. Thin Bifaces: Group 1, Forms 1, 2, and 6. Numbers beneath artifact indicate group, form, and specimen number, respectively.

Specimens 3-6: Langtry. Typed **Langtry**, the specimens from Choke Canyon are not exactly like the **Langtry** points from the Trans-Pecos region in Texas. It is probably better to refer to the Choke Canyon specimens as southwest Texas variants of the classic **Langtry** form. Blade edges are straight to slightly concave. Shoulders are very strong. Wide stems contract slightly to rounded bases. Specimen 3 was recovered from subsurface deposits at 41 LK 51, but no associated radiocarbon samples were found. Specimen 4 is heavily patinated over its entire surface with the exception of the blade edges. The piece was apparently picked up and reused a considerable time after it was first dropped.

Specimen 8: Blade edges are slightly convex, and the shoulders are very weak. Stem edges contract slightly to a rounded base.

Specimen 9: This unusual biface has straight blade edges; weak, rounded shoulders; and a sharply tapering stem.

Specimens 10-14: The smallest specimens in the Form 2 grouping, these pieces all have straight to slightly convex blade edges with short stems and rounded bases. Shoulders are moderate to weak.

Form 3. Large with Expanding Stems (39 specimens)

Seventeen of the Form 3 dart points are categorized as **Ensor** and **Fairland**. Four specimens are referred to as "Early Expanding Stem." The remaining 18 specimens do not clearly fit any currently recognized typological groupings.

Specimens 1-10, 21: Ensor. Blades are triangular with straight to slightly convex blade edges. Shoulders are strong, sometimes with slight barbs. Stems are short and expand strongly to straight or slightly convex bases. All specimens are side notched. Specimens 1, 3, and 4 are made of chalcedony. The rest are made of fine-grained chert. Specimen 21 was from 41 LK 201 (see Highley 1986 for descriptive information). The **Ensor** type is diagnostic of the Late or Terminal Archaic period in central Texas and the Trans-Pecos. Specimens 9 and 10, recovered in subsurface excavations at 41 MC 296, came from deposits radiocarbon dated between 100 B.C. (TX-4669) and A.D. 590 (TX-4680). Previously, excavations at 41 LK 67 yielded **Ensor** points from a Late Archaic component dating between 1590 B.C. and 660 B.C. (Brown et al. 1982:97). Based on the central Texas chronology, the time range established at 41 LK 67 would be too early for **Ensor**. The range of Phase II dates presented above is more in line with the dating of **Ensor** in central Texas.

Specimens 11-17: Fairland. Blades are triangular. Blade edges are straight to slightly convex. Shoulders are moderately strong, but more rounded than barbed. Stems flare strongly to concave bases.

Specimens 18-20: "Early Expanding Stem." These three specimens are not assignable to any formally established types, but their overall shape places them within the morphological range of "Early Expanding Stem" points, which represent Early Archaic components at a number of sites in central and southern Texas. Specimen 18 has moderately convex blade edges, weak

shoulders, and a strongly flared stem with concave base. It is somewhat like the **Fairland** type, but is more gracile and finely flaked. Specimen 18 was found 80 cm below the surface at 41 LK 8. There are no radiocarbon dates for the zone yielding this point. Specimen 19 has concave blade edges that form a sharp, slender distal tip. Although they are missing, the piece apparently had pronounced barbs. The stem is short and has a basal notch. The general outline and fine workmanship shown in this specimen are characteristic of the **Bandy** type reported from Baker Cave by Word and Douglas (1970). Specimen 19 was recovered at 41 LK 51 in deposits radiocarbon dated to the period from 5130 B.C. (TX-4690) to 4450 B.C. (TX-4691). Specimen 20 has convex blade edges, strong barbs, a straight base, and lacks a distal end. The specimen is heavily patinated.

Specimen 22: This unusual stemmed biface has straight to slightly convex blade edges, very weak shoulders, and a rounded or lobate stem. No similar specimens are known from Choke Canyon. The blade is slightly beveled on alternate sides.

Specimen 23: Long, thin, and finely worked, this specimen has slightly convex blade edges with small barbs and a short stem. Basal configuration cannot be determined due to breakage. The "waxy" appearance of this specimen suggests that the material of which it is made was heat treated. This point may be a large **Ensor** form typical of central Texas and Trans-Pecos Late Archaic assemblages.

Specimen 24: A stem fragment only, this specimen flares at the base. The base is slightly concave.

Specimen 25: This piece has straight blade edges, small barbs, and a small stem. It apparently lay on the surface long enough to become lightly patinated and was then retrieved at some later date. This retrieval is evidenced by retouch along the blade edges which has removed some of the patination on the surface.

Specimen 26: Lacking its distal half, Specimen 26 has broad side notches forming weak shoulders and a narrow stem with straight base.

Specimen 27: This piece has convex, crudely asymmetrical blade edges, shallow side notches, and a straight base. One face retains cortex over most of its surface.

Specimen 28: Made of translucent white chalcedony, Specimen 28 has straight blade edges, small barbs, and a short stem with straight base.

Specimen 29: This specimen consists only of a strongly flared stem fragment with a broadly concave base. It is similar to the base on **Fairland** dart points.

Specimen 30: This specimen consists of a proximal half only. Blade edges appear to have been convex. Broad, shallow side notches form weak shoulders and a short stem with convex base.

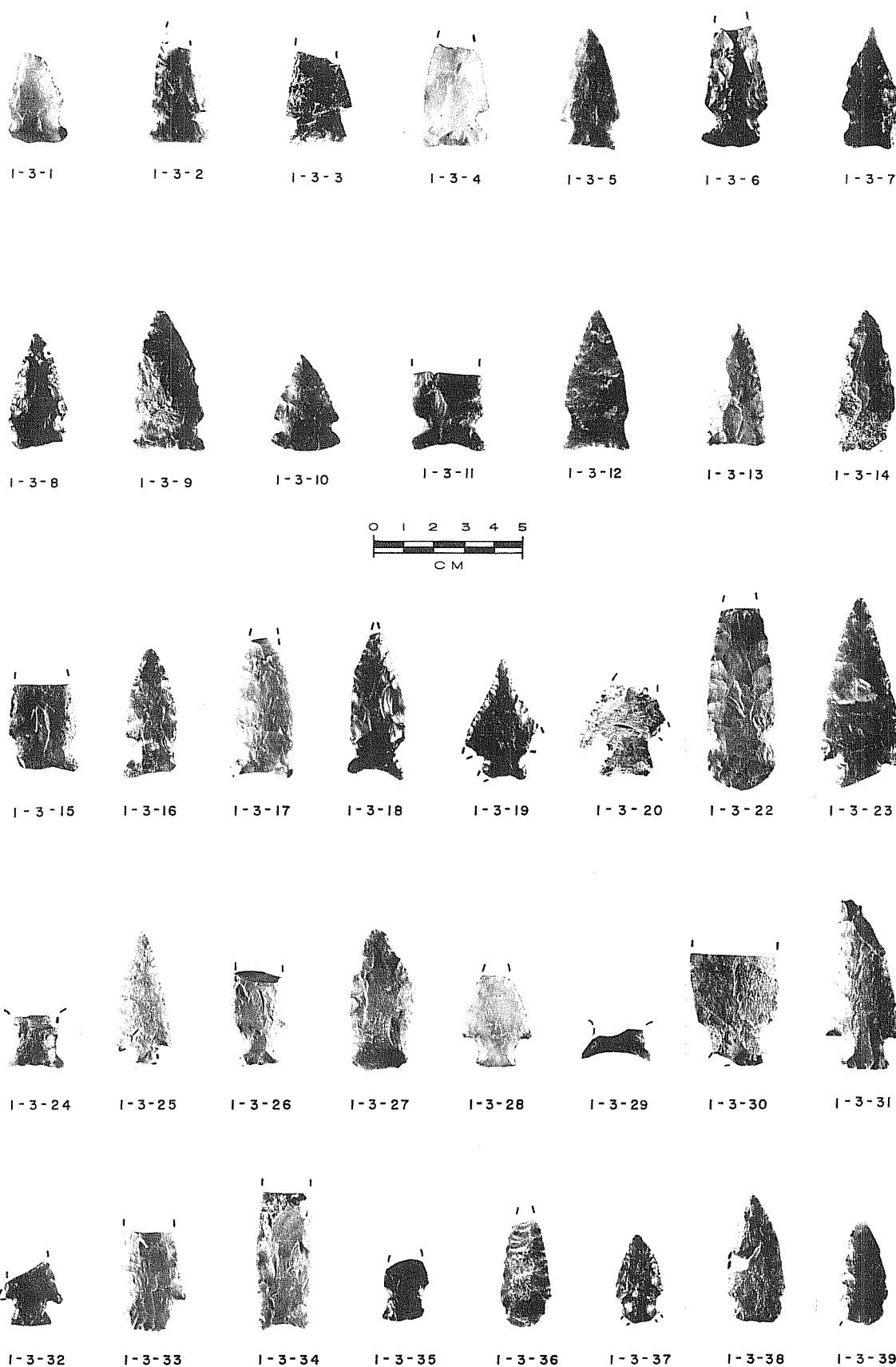


Figure 75. Thin Bifaces: Group 1, Form 3. Numbers beneath artifact indicate group, form, and specimen number, respectively.

Specimen 31: Specimen 31 has straight blade edges. The distal tip seems to have been removed by impact fracture. Small barbs give way to a short stem with a straight base.

Specimen 32: The distal half is missing. Moderate barbs are formed by corner notching. The base is slightly convex.

Specimen 33: Specimen 33 lacks the distal half. It has straight blade edges, small barbs, and an asymmetrical stem with a straight base.

Specimen 34: This specimen lacks its distal end. Blade edges are slightly convex. The stem is formed by very broad, shallow side notches. The stem flares slightly and has a concave base. This piece was recovered at 41 MC 296 in deposits radiocarbon dated to the period between 100 B.C. (TX-4669) and A.D. 590 (TX-4680).

Specimen 35: This piece lacks its distal end. Shallow side notches form weak shoulders and a short stem with a convex base.

Specimens 36-39: **Zavala**. These diminutive stemmed points have been informally typed **Zavala** by Hester and Hill (1975) as a result of their investigations in southwest Texas. The points have slightly convex blade edges with small side notches. The stems are distinguished by striking platforms preserved at the base. The bases are asymmetrically convex. Specimen 39 is made of chalcedony. Specimens 38 and 39 were recovered in excavations at 41 MC 296. Deposits yielding these specimens have been radiocarbon dated to the period from A.D. 910 (TX-4687) to A.D. 1520 (TX-4678). A Late Prehistoric affiliation for this type is consistent with findings made by Hester and Hill (*ibid.*).

Form 4. Small with Straight or Contracting Stems (87 specimens)

Eighty of the specimens in this form grouping are typed **Perdiz**. There are four examples of the **Cliffton** type (Specimens 68, 69, 85, and 87). The **Cliffton** type is simply a preform of **Perdiz**. There are three specimens with straight stems (Specimens 74, 75, and 76). All of these straight stemmed specimens were found along with expanding stemmed **Edwards** arrow points at 41 MC 222 in deposits previously radiocarbon dated to the period from A.D. 1260 to 1290 (Hall, Black, and Graves 1982:652).

The **Perdiz** points display considerable variation in blade morphology. Blade edges may be convex, straight, or concave. All are moderately to strongly barbed. Stems usually contract to a point, but may also be rounded at the base. The specimens show a relatively great range of overall lengths, widths, and stem lengths. The greatest difference in length (3.9 cm) is between Specimen 8 (5 cm) and Specimen 66 (1.1 cm). The widest piece is Specimen 86 (2.4 cm). Specimen 46 has the longest stem (1.6 cm).

By virtue of their atypical blade configurations, two of the **Perdiz** specimens (Specimens 17 and 52) are suggested to have been used as hafted end scrapers. The distal ends of these two pieces are rounded rather than pointed.

Form 5. Small with Expanding Stems (30 specimens)

Specimens 1-14: **Scallorn**. Blades are triangular. Blade edges are straight to slightly convex. Blade edges of Specimens 1 and 2 are serrated. Shoulders are strongly barbed. Side- and corner-notching forms expanding stems with straight, concave, or convex bases. Basal width is variable, but usually slightly less than the width at the shoulders. Specimen 5 is made of translucent white chalcedony. The rest are of chert.

Specimens 15-19: **Edwards**. Blades are triangular with straight to slightly convex edges. The blades of Specimen 18 are heavily serrated. Shoulders are strongly barbed. The specimens are deeply corner notched. The stems flare downward to the same width as the shoulders. The bases are pronouncedly concave. The type is described by Sollberger (1978:14).

Specimen 20: Blade is triangular. Blade edges are slightly convex. Stem is formed by broad, U-shaped side notches. Stem flares to shoulder width and has a straight base.

Specimen 21: Blade is triangular with deeply serrated edges. U-shaped side notches form an expanding stem with a straight base. The piece is made of brownish white opaque chalcedony.

Specimen 22: Blade is triangular (distal end gone) with straight edges. Broad, U-shaped side notches form an expanding stem with a convex base. This specimen is made of frosted white, translucent chalcedony. It was recovered from deposits at 41 MC 222 radiocarbon dated between A.D. 1290 and 1300 (Hall, Black, and Graves 1982:652).

Specimen 23: Blade is triangular in outline with slightly concave edges. The shoulders are moderately pronounced, but not barbed. The stem expands very slightly to a convex base. The specimen was apparently burned, turning it a grayish white color with some crazing evident on the surface. It was recovered from the same provenience at 41 MC 222 as Specimen 22 above. It is very similar in general form to the straight stemmed specimens (Group 1, Form 4, Specimens 74-76) described above.

Specimens 24-30: Consisting of stem fragments only, all of these specimens likely represent the **Scallorn** type, but positive identification is not possible.

Form 6. Unclassifiable Fragments of Large Stemmed Bifaces (6 specimens)

Specimen 1: A long, slender piece, this specimen has asymmetrical blade edges, one slightly concave and the other slightly convex. The piece appears to have been resharpened along the edges forming a relatively steep bevel on both faces and sides. The longitudinal midsection is unusually thick in relation to the width. Very weak shoulders give way to what appears to have been a mildly expanding stem. The specimen is made of fine-grained petrified wood.

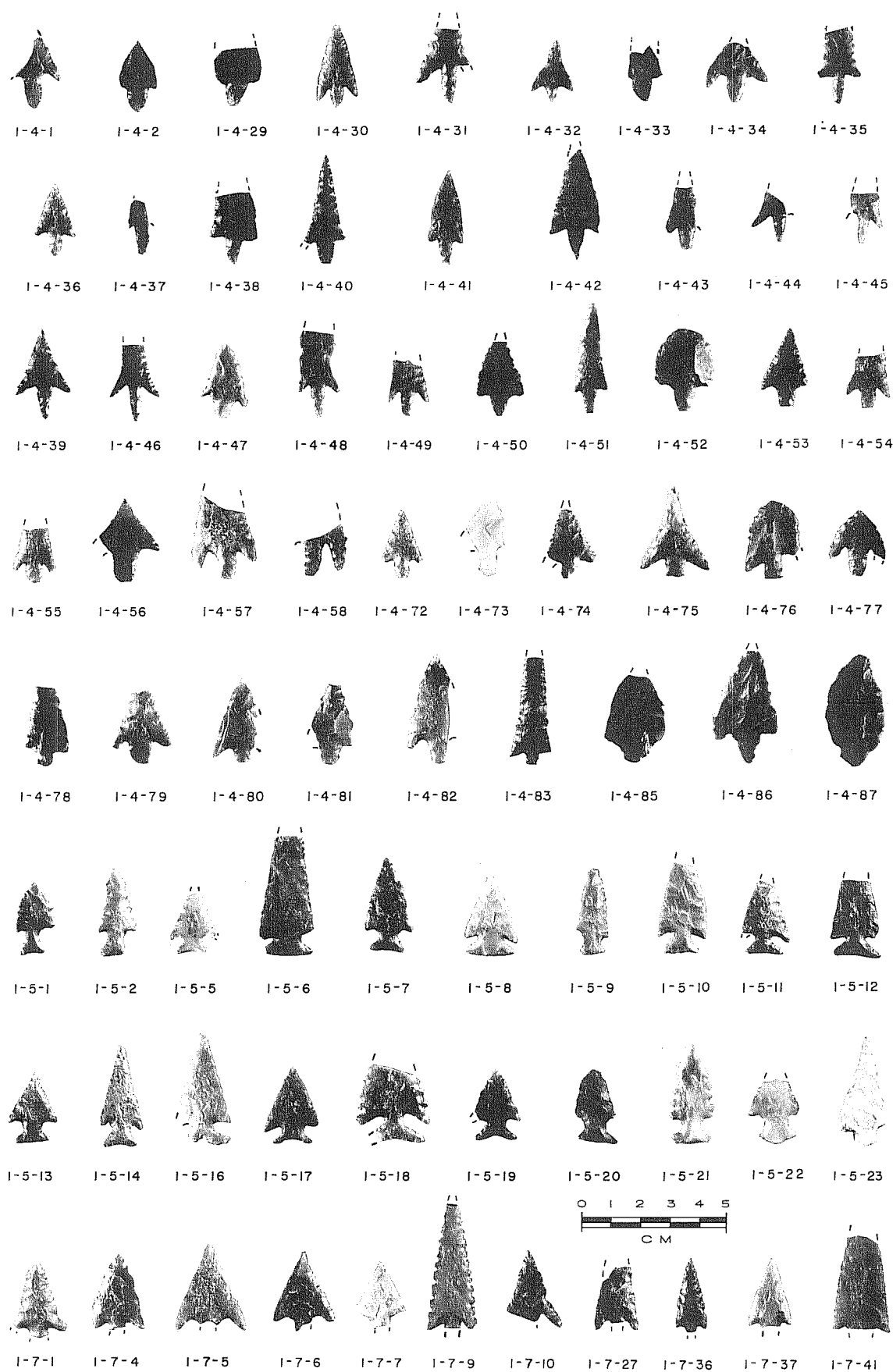


Figure 76. Thin Bifaces: Group 1, Forms 4, 5, and 7. Numbers beneath artifact indicate group, form, and specimen number, respectively.

Specimen 2: This unusual piece is very irregular in outline shape. There is the appearance of a disproportionately large stem at one end formed by shallow notches worked in from two opposing sides. A hafted knife or scraper is suggested. The piece was recovered from Late Prehistoric context at 41 LK 201 (see Highley 1986).

Specimen 3: The blade of this specimen is long and slender with slightly convex edges. The shoulders are very weak. Only small vestiges of the stem remain. The piece was burned, resulting in potlid fractures on one face.

Specimen 4: The blade is triangular with slightly concave blade edges, apparently a result of resharpening. The distal tip is thick and blunt. The shoulders appear to have been moderately barbed. The stem was formed by basal notching and is straight. The piece is made of tan, opaque chalcedony.

Specimen 5: Consisting of a midsection and portion of stem only, this specimen apparently had a triangular blade with straight edges. Shoulders are weakly barbed.

Specimen 6: This specimen consists of a stem only. The stem contracts slightly to a concave base.

Form 7. Unclassifiable Fragments of Small Stemmed Bifaces (47 specimens)

Thin biface Group 1, Form 7 specimens are small distal, medial, and proximal fragments, all believed to be pieces of arrow points. Most are well within the general range of characteristics described for the **Perdiz**, **Scallorn**, and **Edwards** types presented above. Provenience and metric data for these specimens are shown in Table 9.

Group 2. Unstemmed with Straight Bases (77 specimens)

Form 1. Complete Triangular (33 specimens)

Group 2, Form 1 specimens are more-or-less triangular in outline. Blade edges may be slightly convex, straight, or slightly concave. Specimens 1, 3, 10, and 18 are classic examples of the **Tortugas** type. The **Tortugas** form is characterized by steep, alternately beveled blade edges, by carefully thinned basal portions, and by a prominent thickening in the midsection and toward the distal tip. Phase II work at Choke Canyon has unfortunately not provided any additional control over the temporal occurrence of **Tortugas**. Specimens 5 and 16 are distinguished by their fine flaking and thinness. They are suggested to be examples of the "Early Triangular" form diagnostic of the Early Archaic in central Texas. Specimen 5 has one concave blade edge, apparently formed as the piece was resharpened. It may have functioned as a cutting tool. Found at 41 LK 53, Specimen 5 is heavily patinated. From 41 LK 197, Specimen 16 is moderately patinated on one face. Specimen 23 has a small notch started near the base on one blade. Recovered at 41 MC 222, this thin, well-flaked piece is likely an arrow point preform. Specimen 33 exhibits steep alternate blade beveling, but is smaller, thinner, and generally better worked than is typical of the **Tortugas** type discussed above.

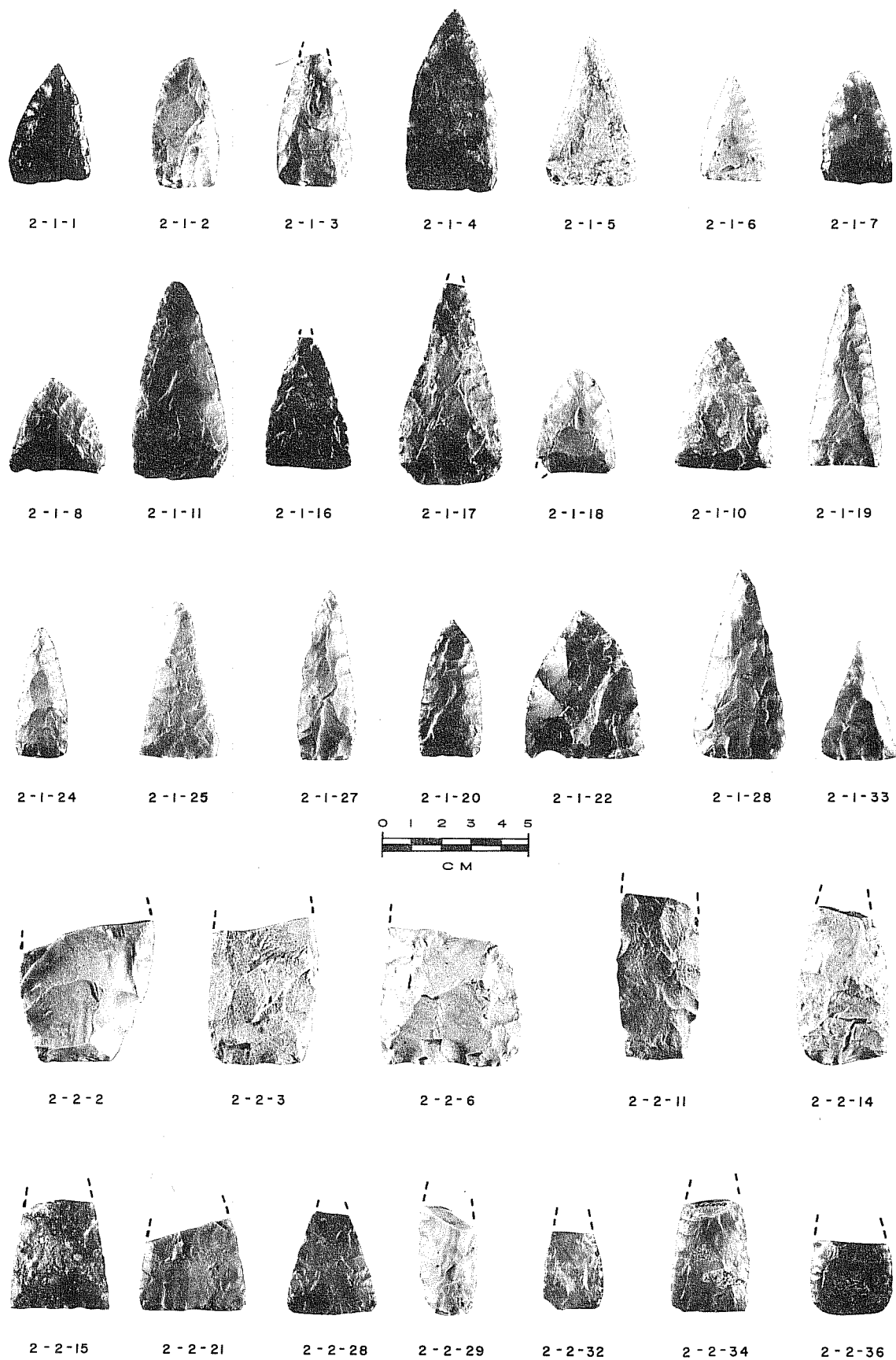


Figure 77. Thin Bifaces: Group 2, Forms 1 and 2. Numbers beneath artifact indicate group, form, and specimen number, respectively.

Specimen 33 was recovered from probable Late Prehistoric context at 41 MC 296 in deposits radiocarbon dated between A.D. 910 and A.D. 1230. Specimen 1 is made of petrified wood. All others are chert. Provenience and metric data for the Group 2, Form 1 specimens are shown in Table 10.

Form 2. Proximal Fragments (44 specimens)

Specimens 1-7: Specimens 1-7 are broader and thicker than other Form 2 specimens. Remnant blade edges are convex. Flaking is rough. They are similar to the Group 5 thick biface specimens described above and are likely manufacturing failures.

Specimens 8-11: Generally longer relative to their width in comparison to others in this form grouping, Specimens 8-11 are also suggested to be manufacturing failures rather than completed tools.

Specimens 12-44: Remnant blade edges on these specimens are straight or convex. Basal corners range from sharp and angular to slightly rounded. Bases are more-or-less straight. Although not complete, the original outline shape of most of these specimens appears to have been triangular, much like the Group 2, Form 1 thin biface specimens described above. Thin and well flaked, it is difficult to tell whether these specimens were broken in manufacture or by use. Specimens 14, 16, 43, and 44 are heavily patinated. Specimen 32 is made of clear chalcedony. The rest are of fine-grained chert. Specimen 42 is distinguished by fine, diagonal ribbon flaking on both faces and by basal blade edge grinding. The edge grinding extends from the basal corners upward 1.8 cm along the blade edges. The specimen is definitely a Paleo-Indian form, but a type designation is not offered.

Site provenience, subsurface provenience, metric data, and specimen numbers by site are shown for the Group 2, Form 2 specimens in Tables 11-13.

Group 3. Unstemmed with Concave Bases (39 specimens)

Form 1. Complete Triangular (11 specimens)

Group 3, Form 1 specimens are all triangular in outline with concave bases. Eight specimens have convex blade edges, and three (Specimens 8, 10, and 11) have straight blade edges. Provenience and metric attribute data for Group 3, Form 1 thin biface specimens are given in Table 14. Five specimens are further described below.

Specimen 1: Apparently made from a large flake, this piece retains the curve of the flake. It was recovered from deposits at 41 LK 51 radiocarbon dated to the period from 5130 B.C. (TX-4690) to 4450 B.C. (TX-4691).

Specimen 3: Long and relatively narrow, Specimen 3 is made of fine-grained petrified wood. A cortex-covered striking platform is retained at the distal tip. This piece was recovered from undifferentiated Archaic deposits at 41 LK 53.

TABLE 10. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 2, FORM 1

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight
1	41 LK 14	290	N1010 E1002	3	99.60-99.50	3.9	2.7	0.8	8.5
2	41 LK 14	298-0	Surface	-	-	4.3	2.4	0.9	9.4
3	41 LK 14	300-0	Surface	-	-	4.3	2.5	0.9	11.6
4	41 LK 51	200	N998 E981	6	99.30-99.20	5.9	3.0	0.8	16.3
5	41 LK 53	161-0	Surface	-	-	4.9	3.0	0.5	7.4
6	41 LK 74	51	N987 E990	2	99.30-99.20	3.5	2.1	0.6	4.7
7	41 LK 127	10-9	Surface	-	-	3.7	2.4	0.6	6.8
8	41 LK 127	10-18	Surface	-	-	3.1	3.2	0.7	6.8
9	41 LK 128	46-2	Surface	-	-	5.3*	3.5	0.8	14.7*
10	41 LK 128	46-11	Surface	-	-	4.3	3.2	0.8	11.0
11	41 LK 128	46-33	Surface	-	-	6.5	3.1	0.8	18.3
12	41 LK 133	17-11	Surface	-	-	6.2	3.1	1.0	21.6
13	41 LK 142	19-5	Surface	-	-	3.7	2.6	0.7	7.0
14	41 LK 185	53-30	Surface	-	-	5.2	2.5	0.7	10.1
15	41 LK 191	1-4	Surface	-	-	5.3	3.2	1.3	18.6
16	41 LK 197	1-0	Surface	-	-	4.4	2.9	0.5	5.6
17	41 LK 250	6	Test Pit 1	6	50-60 cm	6.6	3.4	1.0	19.8
18	41 LK 253	1-10	Surface	-	-	3.4	2.6	0.8	7.3
19	41 MC 196	21-20	Surface	-	-	6.0	2.4	0.9	12.5
20	41 MC 213	2-16	Surface	-	-	4.5	2.1	0.7	8.0
21	41 MC 213	2-52	Surface	-	-	4.2	2.5	0.6	5.5
22	41 MC 213	2-67	Surface	-	-	4.9	4.0	0.9	16.6
23	41 MC 222	154-2	N100 E91	1	Surf.-98.80	5.0	2.0	0.4	3.4
24	41 MC 234	1-0	Surface	-	-	4.4	1.7	0.8	5.9
25	41 MC 246	3	Surface	-	-	5.2	2.6	0.6	5.9
26	41 MC 246	48	Surface	-	-	4.4*	2.7	0.7	9.8*
27	41 MC 260	1-6	Surface	-	-	5.6	2.0	0.9	8.8
28	41 MC 275	7	Shovel Test 2	-	-	6.2	3.1	1.0	17.3
29	41 MC 276	1-27	Surface	-	-	4.3	3.1	0.7	9.0
30	41 MC 276	1-30	Surface	-	-	4.4*	2.3	0.8	8.7
31	41 MC 296	25-27	Surface	-	-	5.9	3.0	0.9	18.5
32	41 MC 296	75	N1023 E985	6	99.00-98.90	3.8	2.2	0.6	5.4
33	41 MC 296	209	N1026 E978	4	99.30-99.20	4.0	2.5	0.6	4.3

TABLE 11. METRIC DATA FOR CERTAIN UNSTEMMED THIN BIFACES

Group	Form	Specimen number	Length Range			Width Range			Thickness Range			Weight Range		
			Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
2	2	1-7	4.7*	3.0*	4.1*	4.7	3.5	4.2	1.2	0.9	1.1	29.6*	14.0*	22.3*
		8-11	8.0*	4.5*	5.7*	3.5	2.6	3.1	1.1	0.8	1.0	32.7*	13.2*	20.1*
		12-44	6.3*	1.4*	3.4*	3.9	1.8	2.8	1.1	0.4	0.8	18.3*	2.9*	8.5*
3	2	1-9	7.6*	4.4*	5.4*	4.1	2.5	3.5	1.3	0.7	1.1	27.2*	12.9*	21.9*
		10-24	4.7*	1.8*	3.2*	3.2	2.3	2.8	1.0	0.4	0.7	13.4*	3.1*	7.4*
		25-28	4.9*	2.0*	3.3*	2.7	1.8	2.2	0.8	0.5	0.7	7.8*	2.8*	5.5*
4	4	1-92	4.8*	1.5*	3.3*	4.6	2.2	3.6	1.3	0.5	0.9	22.8*	3.3*	11.8*
		93-120	5.8*	3.3*	4.5*	3.7	2.1	2.8	1.3	0.6	0.9	26.7*	6.6*	13.8*
		121-146	7.7*	2.6*	4.2*	6.7	3.8	5.2	1.3	0.6	1.0	57.6*	8.9*	25.9*
		147-171	4.4*	0.9*	2.3*	2.9	1.2	2.1	0.8	0.2	0.5	5.2*	0.4*	2.7*

Specimen 5: This specimen was manufactured from fine-grained petrified wood.

Specimen 8: Typed as a **McGloin** arrow point (Corbin 1974:41), this small specimen was made from a thin flake. The base is worked into a pronounced V-shaped notch. Specimen 8 was found in Late Prehistoric context at 41 MC 55. Deposits yielding the piece have been radiocarbon dated between A.D. 1230 and A.D. 1420.

Specimen 11: This specimen is tentatively suggested to be a **Guerrero** arrow point (D. E. Fox 1979b). It was found in near surface deposits at 41 MC 296. These same deposits also yielded substantial amounts of presumed Late Prehistoric material, including **Perdiz** arrow points and pottery. A hand-forged iron knife blade recovered in close proximity to Specimen 11 lends credence to the presence of a historic aboriginal component at 41 MC 296 as would be indicated by the **Guerrero** type.

Form 2. Proximal Fragments (28 specimens)

Specimens 1-9: These nine specimens are the largest in this particular form grouping. Consisting of proximal fragments, most have convex remnant blade edges with concave bases. The thickness and rough flaking exhibited by most specimens suggest that they were preforms broken in the biface thinning process. The shape, thinness, and context of Specimen 6 suggest that it is probably a variety of "beveled knife" (see Group 4, Form 2 thin bifaces--described below), an artifact type diagnostic of the Late Prehistoric. However, this specimen has a concave base rather than the convex or semi-circular base more typical of the "beveled knives" found in southern Texas.

Specimens 10-24: Specimens 10-24 are generally thinner and better worked than Specimens 1-9 described above. With two or three exceptions, they appear to have been in finished form and may have been broken either in the final stages of manufacture or in use. Specimen 22 is heavily patinated.

Specimens 25-28: All of these specimens are apparently Paleo-Indian tool types. Specimen 25, probably a **Plainview** point, was broken by impact and

TABLE 12. SPECIMEN NUMBERS BY SITE--CERTAIN UNSTEMMED THIN BIFACES

SPECIMEN NUMBER	SITE NUMBER	SPECIMEN NUMBER	SITE NUMBER	SPECIMEN NUMBER	SITE NUMBER	SPECIMEN NUMBER	SITE NUMBER
<u>GROUP 2, FORM 2</u>		<u>GROUP 3, FORM 2</u> continued		<u>GROUP 4, FORM 4</u> continued		<u>GROUP 4, FORM 4</u> continued	
1	41 LK 27	16	41 MC 238	47	41 MC 196	110	41 MC 242
2	41 LK 127	17	41 MC 222	48	41 MC 212	111	41 MC 251
3	41 LK 128	18	41 MC 251	49	41 MC 212	112	41 MC 266
4	41 MC 196	19	41 MC 268	50	41 MC 212	113	41 MC 268
5	41 MC 234	20	41 MC 268	51	41 MC 213	114	41 MC 268
6	41 MC 238	21	41 MC 275	52	41 MC 213	115	41 MC 268
7	41 MC 238	22	41 MC 293	53	41 MC 213	116	41 MC 270
8	41 LK 199	23	41 MC 294	54	41 MC 213	117	41 MC 282
9	41 LK 201	24	41 MC 296	55	41 MC 213	118	41 MC 288
10	41 MC 212	25	41 LK 8	56	41 MC 213	119	41 MC 296
11	41 MC 218	26	41 LK 199	57	41 MC 213	120	41 MC 296
12	41 LK 8	27	41 MC 10	58	41 MC 213	121	41 LK 8
13	41 LK 14	28	41 MC 194	59	41 MC 235	122	41 LK 14
14	41 LK 27			60	41 MC 235	123	41 LK 128
15	41 LK 51			61	41 MC 235	124	41 LK 174
16	41 LK 74	<u>GROUP 4, FORM 4</u>		62	41 MC 235	125	41 LK 185
17	41 LK 127			63	41 MC 238	126	41 LK 201
18	41 LK 181	1	41 LK 14	64	41 MC 238	127	41 LK 201
19	41 LK 201	2	41 LK 14	65	41 MC 246	128	41 LK 201
20	41 LK 250	3	41 LK 51	66	41 MC 251	129	41 LK 243
21	41 LK 250	4	41 LK 51	67	41 MC 251	130	41 MC 55
22	41 MC 196	5	41 LK 51	68	41 MC 251	131	41 MC 94
23	41 MC 212	6	41 LK 51	69	41 MC 257	132	41 MC 212
24	41 MC 275	7	41 LK 51	70	41 MC 260	133	41 MC 213
25	41 LK 8	8	41 LK 51	71	41 MC 268	134	41 MC 251
26	41 LK 14	9	41 LK 53	72	41 MC 268	135	41 MC 260
27	41 LK 51	10	41 LK 53	73	41 MC 275	136	41 MC 267
28	41 LK 53	11	41 LK 53	74	41 MC 275	137	41 MC 270
29	41 LK 74	12	41 LK 74	75	41 MC 275	138	41 MC 275
30	41 LK 74	13	41 LK 120	76	41 MC 275	139	41 MC 275
31	41 LK 142	14	41 LK 127	77	41 MC 276	140	41 MC 276
32	41 LK 185	15	41 LK 128	78	41 MC 282	141	41 MC 276
33	41 LK 199	16	41 LK 128	79	41 MC 282	142	41 MC 282
34	41 LK 199	17	41 LK 128	80	41 MC 284	143	41 MC 293
35	41 LK 201	18	41 LK 128	81	41 MC 288	144	41 MC 294
36	41 LK 243	19	41 LK 133	82	41 MC 293	145	41 MC 296
37	41 MC 212	20	41 LK 142	83	41 MC 294	146	41 MC 296
38	41 MC 196	21	41 LK 142	84	41 MC 294	147	41 LK 14
39	41 MC 222	22	41 LK 199	85	41 MC 296	148	41 LK 53
40	41 MC 226	23	41 LK 199	86	41 MC 296	149	41 LK 53
41	41 MC 234	24	41 LK 199	87	41 MC 296	150	41 LK 74
42	41 MC 234	25	41 LK 201	88	41 MC 296	151	41 LK 74
43	41 MC 238	26	41 LK 201	89	41 MC 296	152	41 LK 128
44	41 MC 294	27	41 LK 201	90	41 MC 296	153	41 LK 201
		28	41 LK 201	91	41 MC 296	154	41 LK 201
		29	41 LK 201	92	41 MC 296	155	41 LK 201
		30	41 LK 201	93	41 LK 8	156	41 LK 201
		31	41 LK 201	94	41 LK 14	157	41 LK 201
		32	41 LK 201	95	41 LK 14	158	41 LK 201
		33	41 LK 201	96	41 LK 51	159	41 LK 201
		34	41 LK 243	97	41 LK 53	160	41 LK 253
		35	41 LK 250	98	41 LK 74	161	41 MC 29
		36	41 LK 252	99	41 LK 127	162	41 MC 212
		37	41 LK 252	100	41 LK 142	163	41 MC 238
		38	41 LK 253	101	41 LK 162	164	41 MC 275
		39	41 LK 253	102	41 LK 181	165	41 MC 296
		40	41 LK 253	103	41 LK 201	166	41 MC 296
		41	41 LK 253	104	41 LK 201	167	41 MC 296
		42	41 MC 94	105	41 LK 252	168	41 MC 296
		43	41 MC 94	106	41 MC 29	169	41 MC 296
		44	41 MC 192	107	41 MC 196	170	41 MC 296
		45	41 MC 196	108	41 MC 213	171	41 MC 296
		46	41 MC 196	109	41 MC 235		
<u>GROUP 3, FORM 2</u>							
1	41 LK 14						
2	41 LK 51						
3	41 LK 74						
4	41 LK 128						
5	41 LK 185						
6	41 LK 201						
7	41 LK 253						
8	41 MC 213						
9	41 MC 266						
10	41 LK 8						
11	41 LK 14						
12	41 LK 51						
13	41 LK 51						
14	41 LK 133						
15	41 LK 243						

TABLE 13. PROVENIENCE OF CERTAIN UNSTEMMED THIN BIFACES RECOVERED IN EXCAVATIONS

SPECIMEN	LOT	SITE	UNIT	LEVEL	ELEVATION	SPECIMEN	LOT	SITE	UNIT	LEVEL	ELEVATION
GROUP 2, FORM 2											
9	696-93	41 LK 201	N506 E1009	2	99.20-99.10	42	185	41 MC 94	Test Pit 1	8	99.00-98.90
12	77	41 LK 8	N510 E458	16	98.60-98.50	43	207	41 MC 94	Test Pit 4	5	99.40-99.30
13	243	41 LK 14	N1009 E1000	3	99.60-99.50	86	52	41 MC 296	N1022 E986	2	99.40-99.30
15	187	41 LK 51	N999 E984	14	98.50-98.40	87	75	41 MC 296	N1023 E985	6	99.00-98.90
16	33	41 LK 74	N987 E990	1	Surf.-99.30	88	92	41 MC 296	N1023 E987	4	99.20-99.10
19	271	41 LK 201	N499 E997	3	99.15-99.05	89	116	41 MC 296	N1024 E987	1	Surf.-99.40
27	150	41 LK 51	N999 E981	11	98.80-98.70	90	134	41 MC 296	N1025 E998	3	99.40-99.30
28	85	41 LK 53	N1000 E1004	8	99.00-98.90	91	142	41 MC 296	N1025 E999	4	99.30-99.20
29	70	41 LK 74	N981 E989	1	99.70-99.60	92	196	41 MC 296	N1026 E986	1	Surf.-99.50
35	154	41 LK 201	N490 E1043	10	97.85-97.75	94	191	41 LK 14	N1006 E959	4	100.00-99.90
GROUP 3, FORM 2											
1	287	41 LK 14	N1010 E1001	9	99.00-98.90	96	115	41 LK 51	N998 E981	3	99.60-99.50
2	310	41 LK 51	N1025 E1041	4	99.60-99.50	97	115	41 LK 53	N1001 E1003	10	98.80-98.70
6	724	41 LK 201	N504 E1010	1	99.31-99.20	98	51	41 LK 74	N987 E990	2	99.30-99.20
9	2	41 MC 266	Shovel Test 1	-	20-65 cm	103	220	41 LK 201	N497 E997	2	99.25-99.15
10	95	41 LK 8	N511 E459	2	100.00-99.90	104	457	41 LK 201	N510 E1020	2	99.15-99.10
11	202	41 LK 14	N1007 E958	7	99.70-99.60	106	36	41 MC 29	N997 E1011	1	99.90-99.80
12	186	41 LK 51	N999 E984	13	98.60-98.50	112	2	41 MC 266	Shovel Test 1	-	20-65 cm
13	286	41 LK 51	N1039 E1083	4	99.40-99.30	114	50	41 MC 268	N995 E983	2	99.40-99.30
24	5	41 MC 296	Test Pit 1	5	40-50 cm	119	7	41 MC 296	Test Pit 1	7	60-70 cm
GROUP 4, FORM 4											
4	153	41 LK 51	N999 E981	14	98.50-98.40	120	111	41 MC 296	N1024 E986	5	99.10-99.00
5	156	41 LK 51	N999 E981	17	98.20-98.10	121	53	41 LK 8	N510 E459	7	99.50-99.40
6	225	41 LK 51	N998 E982	14	98.50-98.40	123	33	41 LK 128	Test Pit 8	2	99.70-99.60
7	296	41 LK 51	N1025 E1041	1	Surf.-99.80	130	72	41 MC 55	N1008 E1014	3	99.30-99.20
9	109	41 LK 53	N1001 E1003	4	99.40-99.30	145	89	41 MC 296	N1023 E987	1	Surf.-99.40
10	117	41 LK 53	N1001 E1003	9	98.90-98.80	146	111	41 MC 296	N1024 E986	5	99.10-99.00
11	126	41 LK 53	N1001 E1004	10	98.80-98.70	147	280	41 LK 14	N1010 E1001	2	99.70-99.60
12	93	41 LK 74	N1070 E857	3	100.10-100.00	148	99	41 LK 53	N1001 E1002	5	99.30-99.20
16	14	41 LK 128	Test Pit 5	3	99.50-99.40	149	128	41 LK 53	N1002 E1002	1	99.68-99.60
25	199	41 LK 201	N491 E1044	11	97.75-97.65	150	89	41 LK 74	N978 E1001	3	99.50-99.40
26	213	41 LK 201	N497 E996	3	99.15-99.05	153	247	41 LK 201	N498 E997	3	99.15-99.05
27	263	41 LK 201	N499 E996	2	99.25-99.15	154	270	41 LK 201	N499 E997	3	99.15-99.05
28	458	41 LK 201	N510 E1020	3	99.10-99.05	155	270	41 LK 201	N499 E997	2	99.25-99.15
30	699	41 LK 201	N508 E1012	2	99.20-99.10	156	700	41 LK 201	N508 E1013	2	99.20-99.10
31	706	41 LK 201	N507 E1011	2	99.20-99.10	157	707	41 LK 201	N504 E1008	2	99.20-99.10
32	724	41 LK 201	N504 E1010	1	99.31-99.20	158	702	41 LK 201	N509 E1013	2	99.20-99.10
33	733	41 LK 201	N504 E1014	2	99.20-99.10	159	716	41 LK 201	N509 E1009	2	99.10-99.00
34	2	41 LK 243	Test Pit 1	2	10-20 cm	161	87	41 MC 29	N999 E1013	2	99.80-99.70
						165	2	41 MC 296	Test Pit 1	2	10-20 cm
						166	71	41 MC 296	N1023 E985	2	99.40-99.30
						167	79	41 MC 296	N1023 E986	1	Surf.-99.40
						168	89	41 MC 296	N1023 E987	1	Surf.-99.40
						169	125	41 MC 296	N1025 E997	1	Surf.-99.50
						170	163	41 MC 296	N1026 E999	2	99.50-99.40
						171	217	41 MC 296	N1026 E995	2	99.50-99.40

GROUP 4, FORM 4 (continued)

TABLE 14. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 3, FORM 1

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 51	288	N998 E982	17	98.20-98.10	5.9	3.2	0.7	16.2	78
2	41 LK 51	328	N1025 E1042	4	99.60-99.50	5.9	3.2	0.7	14.9	78
3	41 LK 53	76	N1000 E1003	10	98.80-98.70	10.2	2.8	0.9	27.7	78
4	41 LK 142	19-2	Surface	-	-	6.4	2.9	0.9	14.3	78
5	41 LK 185	37	Shovel Test 1	-	0-10 cm	5.0	2.2	0.8	7.7	78
6	41 LK 201	417	N500 E996	19	97.55-97.45	4.8	2.3	0.6	7.9	-
7	41 LK 253	1-9	Surface	-	-	5.2*	3.9	0.9	18.4	78
8	41 MC 55	79	N1009 E1016	2	99.30-99.20	2.4	1.6	0.2	0.7	-
9	41 MC 212	1-0	Surface	-	-	4.3	2.7	0.9	12.4	-
10	41 MC 226	4-0	Surface	-	-	3.9	3.2	0.6	4.9	-
11	41 MC 296	212	N1024 E989	2	99.50-99.40	2.1	1.0	0.2	0.4	-

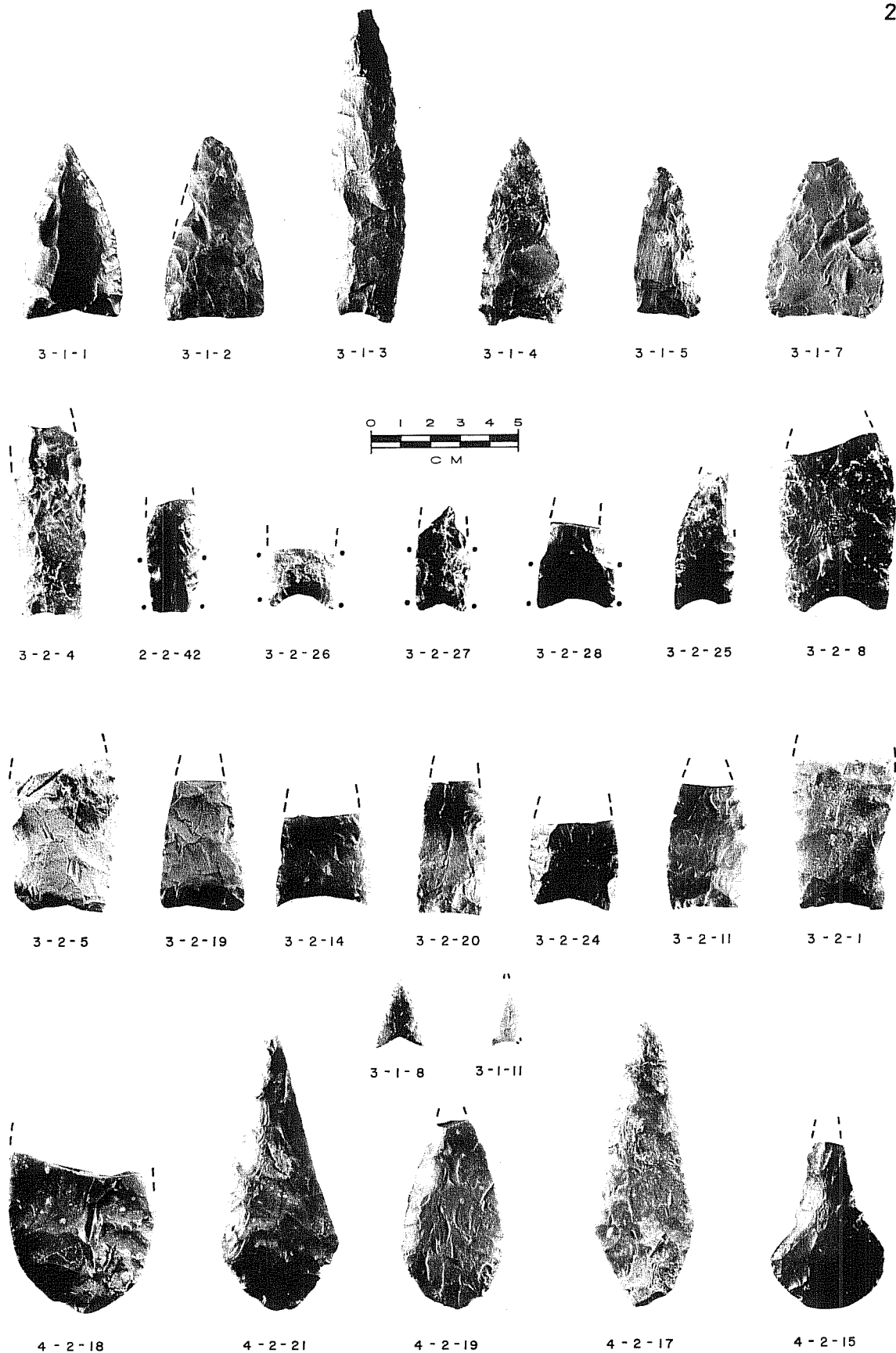


Figure 78. Thin Bifaces: Group 3, Forms 1 and 2 and Group 4, Form 2. Numbers beneath artifact indicate group, form, and specimen number, respectively.

reworked along both edges of the break. Remnant blade edges are straight and have been very lightly ground from the base upward 2.2 cm. The piece is heavily patinated, including the surfaces of the impact break. The impact fractures terminated where the grinding ends. Specimen 26 is the basal portion of a **Golondrina** point. Remnant blade edges (1.8-2.0 cm in length) are heavily ground. The base is deeply concave, and the basal corners flare out slightly. The basal concavity is also lightly ground. Specimen 27, another **Plainview** fragment, exhibits heavy blade edge grinding from the base upward 2.1 cm on each side. The base is concave. This piece was apparently broken by impact fracture. The break was subsequently reworked to an irregular, asymmetrical point. It is heavily patinated. Specimen 28 is a reworked **Golondrina** point. Remnant blade edges measuring approximately 1.5 cm on each side give way to a beveled blade remainder that has been tapered by retouch. The base is broadly concave. It is not ground. The basal corners flare slightly.

All Group 3, Form 2 specimens are made of chert. Site provenience, sub-surface provenience, metric data, and specimen numbers by site are shown for the Group 3, Form 2 artifacts in Tables 11-13.

Group 4. Unstemmed with Convex to Semicircular Bases (241 specimens)

Form 1. Complete Triangular (20 specimens)

Specimens in this form grouping have convex or straight blade edges. In most cases, blade/base intersections are rounded. Specimens 3, 4, 19, and 20 have more angular basal corners. Configurations of various specimens in this group conform with descriptions given for **Refugio**, **Abasolo**, and **Catán** dart points (Suhm and Jelks 1962:165, 175, 241). Specimens 3 and 6 have pronouncedly beveled blades. Specimens 9, 11, and 14 are probably arrow point preforms. Specimens 10, 12, and 17 are atypically thick and roughly flaked. They are likely preform manufacturing failures. Specimen 16 is made of white chalcedony laced with gold. All others are of chert. Specimen 3 is moderately patinated. Provenience and metric data for the Group 4, Form 1 specimens are shown in Table 15.

Form 2. Steeply Beveled Blades (25 specimens)

Thin biface Group 4, Form 2 category arbitrarily includes complete and fragmentary specimens of an artifact form so distinctive that even broken examples may be recognized as belonging to this form. In the past, this artifact has been referred to under the function-specific name of "beveled knife" (Sollberger 1971). More recently, the term "quadrilateral two-beveled bifaces" has been applied to a distinctive form of the artifact type commonly found in southern Texas (Brown et al. 1982:55-63). Brown (*ibid.*) provides a comprehensive discussion of the various manifestations of the type, its geographic distribution, use-wear indications, and possible functions. The Phase II research at Choke Canyon resulted in a substantial increase in the number of these specimens available for study. A number of radiocarbon assays on datable materials from deposits yielding the "beveled knives" provides better control over the temporal occurrence of the type.

TABLE 15. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 4, FORM 1

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 8	79	N511 E458	2	100.00-99.90	2.5	3.1	0.6	5.5	-
2	41 LK 14	291	N1010 E1002	4	99.50-99.40	3.8	2.1	0.6	6.0	79
3	41 LK 27	44-0	Surface	-	-	2.7	2.3	0.7	4.4	79
4	41 LK 27	44-0	Surface	-	-	3.8*	2.5	0.6	6.6*	79
5	41 LK 51	142	N999 E981	3	99.60-99.50	4.1*	2.0	0.8	7.7*	-
6	41 LK 51	188	N999 E984	15	98.40-98.30	4.0*	2.8	0.7	10.7*	-
7	41 LK 51	203	N998 E981	9	99.00-98.90	3.5	2.4	0.7	6.0	-
8	41 LK 51	312	N1026 E1042	3	99.70-99.60	5.1	2.8	0.8	12.8	-
9	41 LK 53	80	N1000 E1004	3	99.50-99.40	3.8	1.3	0.6	2.6	-
10	41 LK 74	56	N981 E988	1	99.70-99.60	5.5	2.6	1.6	20.0	-
11	41 LK 128	48-0	Surface	-	-	3.1	2.1	0.5	3.3	-
12	41 LK 133	17-9	Surface	-	-	6.7	2.9	0.7	15.2	-
13	41 LK 185	7-7	Surface	-	-	4.8	2.1	1.0	8.0	-
14	41 LK 201	301	N500 E998	4	99.05-98.95	5.3	1.9	0.5	5.4	-
15	41 MC 94	227-0	Surface	-	-	4.8	3.3	0.7	12.4	79
16	41 MC 196	22-0	Surface	-	-	4.4	2.7	0.6	7.7	79
17	41 MC 213	2-23	Surface	-	-	5.9	4.0	1.1	26.5	79
18	41 MC 213	2-62	Surface	-	-	3.9	2.4	0.6	6.5	-
19	41 MC 251	1-0	Surface	-	-	2.9*	2.4	0.9	10.7	79
20	41 MC 251	1-0	Surface	-	-	5.1	2.1	0.8	9.0	79

The Phase II collection of "beveled knives" contains 10 complete specimens, 14 proximal fragments, and one distal fragment. Blade outlines on complete specimens range from convex to concave to recurved, depending upon the degree to which each has been altered by retouch. In eight cases, blade retouch has been so extensive that distinct shoulders have developed where the blade meets the basal portion. In most cases, the specimens are widest at the shoulders and contract or round out to semicircular bases. On all specimens retaining blade portions, the beveling was done along the left-hand edge of each face. This form of artifact is diagnostic of the Late Prehistoric and is often found along with **Perdiz** arrow points and aboriginal pottery.

In this assemblage of beveled knives, Specimen 6 offers the best complete example of a relatively unmodified knife. Although beveling has commenced, the blade edges are still convex, and there are no shoulders near the base. Edge angles are low. Specimens 3, 16, 18, and 22, all proximal fragments, give an impression of the finished or near-finished width of the beveled knives before they start to be beveled and narrowed by retouch. Specimen 2 is an exceptionally narrow and thin example. Specimen 11 is made of fine-grained petrified wood. Specimen 15 is the most heavily retouched of the group. Specimen 9 appears to have been broken and then reworked into an end scraper at the distal end. Provenience and metric data for the Group 4, Form 2 specimens are shown in Table 16.

Form 3. Oval to Elliptical (25 specimens)

Specimens in Group 4, Form 3 vary considerably in size and degree of thinning. Most are probably dart point and/or arrow point preforms discarded due to manufacturing failure. Specimens 1-3, 7-10, 13, 14, 16-18, and 22 are probably arrow point preforms, judging from their size, thinness, and context of recovery. Specimens 4-6, 12, 15, 19-21, and 23 are all relatively large and roughly flaked. Specimens 5 and 24 are heavily patinated. All are made of fine-grained chert. Provenience and metric data for the Group 4, Form 3 bifaces are shown in Table 17.

Form 4. Fragments with Convex to Semicircular Ends (171 specimens)

Sharing convex to semicircular ends as a common characteristic, this category of thin bifaces contains examples of workmanship ranging from thin and well finished to thick and crudely flaked. Many are probably fragments of artifacts similar to the complete Group 4 specimens described above, broken either in the process of manufacture or in use. Another possibility, especially for surface-collected specimens, is that breakage occurred post-depositionally through exposure to weather and large animals (hoof damage). Although morphologically most similar to specimens in the other Group 4 categories, these Form 4 fragments could theoretically be preforms of any of the thin bifaces described herein.

Group 4, Form 4 bifaces are further subdivided into four categories based on size, outline configuration, and thickness. Specimens 1-92 represent the most common size of biface fragments in the group. They average 3.3 cm in length, 3.6 cm in width, 0.9 cm in thickness, and 11.8 g in weight.

TABLE 16. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 4, FORM 2

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 201	653	N509 E1011	1	99.15	6.5*	3.3	0.9	14.0*	-
2	41 LK 201	247	N498 E997	3	99.15-99.05	8.2	2.0	0.5	5.8	-
3	41 LK 201	491-0	Surface	-	-	4.7*	4.7	0.7	*	-
4	41 LK 201	673	N507 E1013	1	99.31-99.20	5.1*	3.7	0.9	*	-
5	41 LK 201	694	N507 E1013	2	99.20-99.10	5.9*	3.3	0.9	*	-
6	41 LK 201	651	N508 E1011	1	99.23-99.10	8.9	3.6	0.7	26.7	-
7	41 LK 201	656	N507 E1011	1	99.30-99.20	4.4*	3.6	0.7	*	-
8	41 LK 201	680	N504 E1009	1	99.32-99.20	7.2	3.6	0.6	15.9	-
9	41 LK 201	689	N509 E1010	2	99.10-99.00	5.7	4.2	0.8	18.6	-
10	41 LK 201	696	N506 E1009	2	99.20-99.10	4.1*	4.9	0.7	*	-
11	41 LK 201	699	N508 E1012	2	99.20-99.10	8.5	4.4	0.8	25.3	-
12	41 LK 201	701	N509 E1012	2	99.20-99.10	9.3	2.7	0.7	18.7	-
13	41 LK 201	706	N507 E1011	2	99.20-99.10	2.5*	4.8	0.6	*	-
14	41 LK 201	729	N508 E1007	1	99.20-99.10	8.5	4.0	0.8	22.6	-
15	41 MC 55	106	N1017 E999	4	99.10-99.00	5.5*	3.8	0.9	15.1*	78
16	41 MC 55	123	Surface	-	-	5.7*	4.4	0.6	*	-
17	41 MC 55	124-0	Surface	-	-	9.8	3.3	0.6	22.8	78
18	41 MC 294	4	Surface	-	-	4.9*	4.9	0.6	*	78
19	41 MC 296	25-11	Surface	-	-	6.3*	3.5	0.7	19.4*	78
20	41 MC 296	25-15	Surface	-	-	3.2*	4.6	0.6	*	-
21	41 MC 296	44	N1022 E985	4	99.20-99.10	9.7	3.9	0.8	26.9	78
22	41 MC 296	71	N1023 E985	2	99.40-99.30	3.9*	5.4	0.5	*	-
23	41 MC 296	150	N1026 E997	3	99.40-99.30	8.4	3.9	0.7	24.0	-
24	41 MC 296	201	N1025 E995	1	99.60-99.50	9.1	3.9	0.8	22.7	-
25	41 MC 296	213	N1026 E986	2	99.50-99.40	4.7*	3.4	0.7	*	-

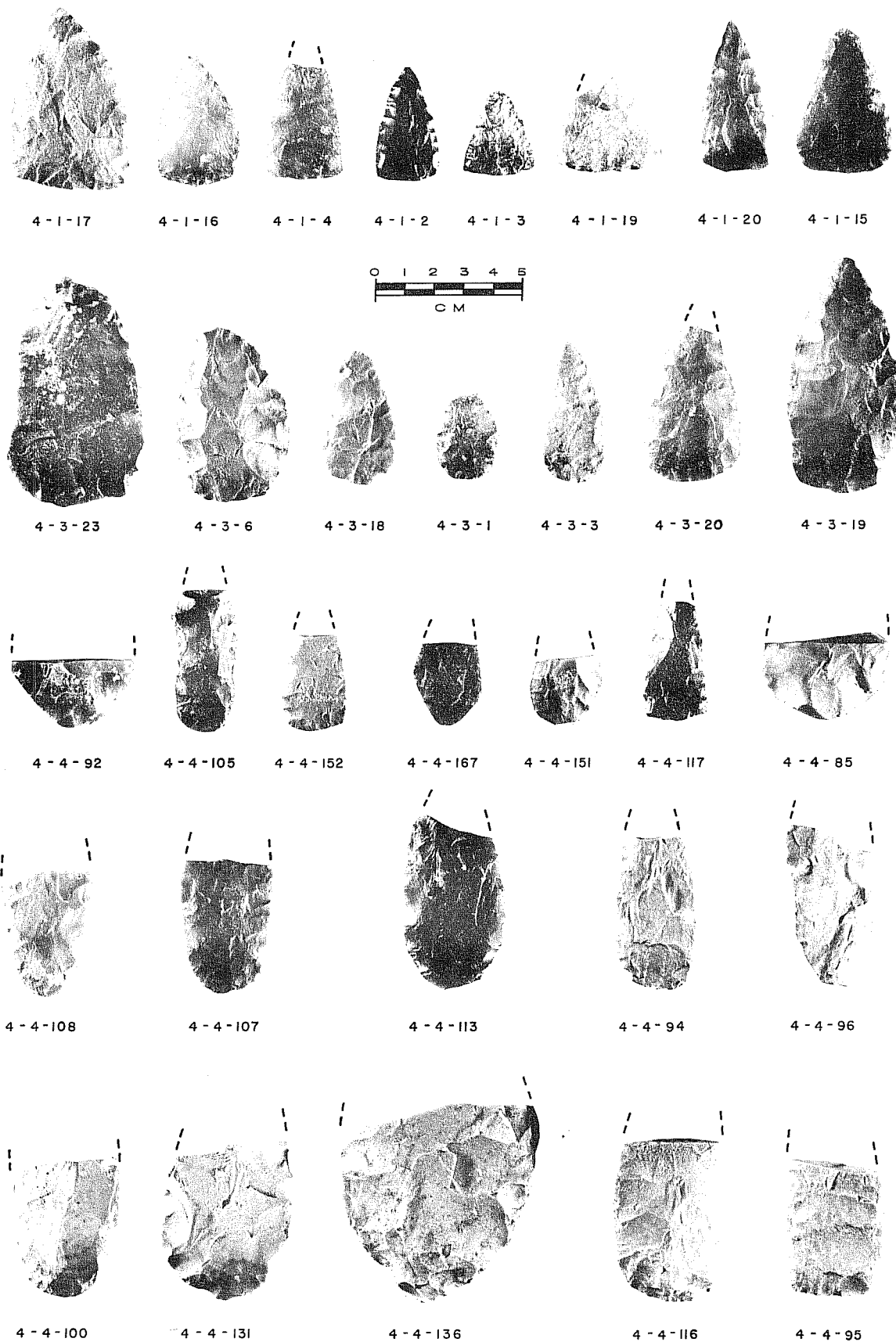


Figure 79. Thin Bifaces: Group 4, Forms 1, 3, and 4. Numbers beneath artifact indicate group, form, and specimen number, respectively.

TABLE 17. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 4, FORM 3

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 53	108	N1001 E1003	3	99.50-99.40	2.8	2.1	0.6	2.9	79
2	41 LK 128	26	Test Pit 7	3	99.50-99.40	4.5	3.0	0.6	8.8	-
3	41 LK 128	46-29	Surface	-	-	4.7	2.1	0.4	4.3	79
4	41 LK 133	17-13	Surface	-	-	6.3	3.1	1.2	18.1	-
5	41 LK 142	20-0	Surface	-	-	5.4	3.3	0.9	15.8	-
6	41 LK 173	1-1	Surface	-	-	5.7	3.9	1.3	29.3	79
7	41 LK 201	239	N498 E996	2	99.25-99.15	4.6	2.1	0.4	5.1	-
8	41 LK 201	240	N498 E996	3	99.15-99.05	5.7	2.1	0.6	7.0	-
9	41 LK 201	264	N499 E996	3	99.15-99.05	3.7	1.9	0.5	3.6	-
10	41 LK 201	266	N499 E996	5	98.95-98.85	2.8	2.2	0.5	3.3	-
11	41 LK 201	271	N499 E997	3	99.15-99.05	5.5	3.5	0.5	11.8	-
12	41 LK 201	491-0	Surface	-	-	6.1	3.5	0.7	16.9	-
13	41 LK 201	659	N506 E1008	1	99.29-99.20	2.2	1.4	0.5	1.5	-
14	41 LK 201	692	N506 E1013	2	99.20-99.10	3.2	2.2	0.4	3.7	-
15	41 LK 201	700	N508 E1013	2	99.20-99.10	5.6	2.8	0.7	14.3	-
16	41 LK 201	721	N504 E1013	2	99.10-99.00	2.8	1.6	0.5	1.7	-
17	41 LK 201	734	N505 E1014	2	99.20-99.10	2.5	1.9	0.4	1.8	-
18	41 LK 243	26-12	Surface	-	-	4.5	2.6	0.6	5.9	79
19	41 MC 196	20-2	Surface	-	-	8.0	3.6	1.1	33.2	79
20	41 MC 213	2-6	Surface	-	-	5.2	3.1	1.0	17.0	79
21	41 MC 235	1-0	Surface	-	-	6.3	3.7	1.1	30.3	-
22	41 MC 251	1-0	Surface	-	-	4.9	2.9	0.4	5.9	-
23	41 MC 270	21-1	Surface	-	-	7.7	4.6	1.0	40.0	79
24	41 MC 294	4-0	Surface	-	-	4.7*	3.1	0.7	12.7*	-
25	41 MC 296	152	N1026 E997	5	99.20-99.10	5.0	3.0	0.7	11.1	-

Specimens 93-120 are generally longer relative to width than the other Form 4 specimens. Specimens 121-146 are fragments of exceptionally large thin bifaces, most of which are likely manufacturing failures in the preform stage. Specimens 147-171 are probably all arrow point preforms based on their small size, thinness, and context of recovery.

Site provenience, subsurface provenience, metric data, and specimen numbers by site are shown for the Group 4, Form 4 specimens in Tables 11-13.

Group 5. Unstemmed Leaf Shaped (12 specimens)

Group 5 specimens are long and slender with a point at one end. They are semicircular, convex or slightly pointed at the other end. Most reach their maximum width at the midsection. Specimen 4 is made of frosted white chalcedony. The rest are fine-grained chert. Provenience and metric data for the Group 5 thin bifaces are shown in Table 18.

Group 6. Circular to Subcircular (10 specimens)

Group 6 specimens are roughly circular in outline, vary considerably in thickness, and are crudely flaked. Specimens 5 and 8 retain cortex on one face. Specimen 6 is heavily patinated. Provenience and metric data for the Group 6 specimens are shown in Table 19.

Group 7. Diamond Shaped (two specimens)

Group 7 specimens are widest at the midsection and taper to points at either end. Provenience and metric data are shown in Table 20.

Group 8. Bifaces with Sharp Slender Projections (15 specimens)

Having a variety of outline forms, Group 8 specimens have slender, needlelike points and probably functioned as drills or perforators. Specimens 1-7 were made on large, thin flakes. Specimens 1-5 have exceptionally long, finely worked "bits." Specimens 6 and 7 are the same, but the "bits" are missing. The basal or proximal portion of each of these is the original, relatively unmodified flake surface. This type of artifact is diagnostic of Late Prehistoric assemblages containing Perdiz arrow points and pottery. Specimens 8-15 are much larger, thicker, and more roughly flaked than Specimens 1-7. Projections worked on these pieces are sharp, but generally shorter and broader. Cultural period affiliation is not as clear for Specimens 8-15 as for Specimens 1-7. However, most are probably Archaic in age. Provenience and metric data for the Group 8 specimens are shown in Table 21.

TABLE 18. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 5

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 14	300-0	Surface	-	-	4.0	2.0	0.7	5.8	80
2	41 LK 51	200	N998 E981	6	99.30-99.20	4.5	3.0	1.2	16.6	-
3	41 LK 51	261	N1010 E1011	1	Surf.-99.80	2.8*	2.0	0.9	5.3*	80
4	41 LK 199	12-0	Surface	-	-	4.3	1.8	0.6	5.2	80
5	41 LK 243	26-40	Surface	-	-	5.3	2.0	0.7	8.1	80
6	41 LK 252	1-15	Surface	-	-	6.5	2.1	0.9	13.4	80
7	41 MC 213	2-51	Surface	-	-	5.8	2.0	0.8	11.9	80
8	41 MC 251	1-0	Surface	-	-	7.6	3.7	1.4	29.6	80
9	41 MC 268	30	N994 E982	3	99.30-99.20	3.6	1.5	0.8	4.9	80
10	41 MC 276	1-6	Surface	-	-	4.6	1.8	0.8	8.0	80
11	41 MC 296	25-2	Surface	-	-	6.4	2.6	0.8	15.9	80
12	41 MC 296	205	N1023 E997	3	-	4.6	2.2	0.6	6.8	80

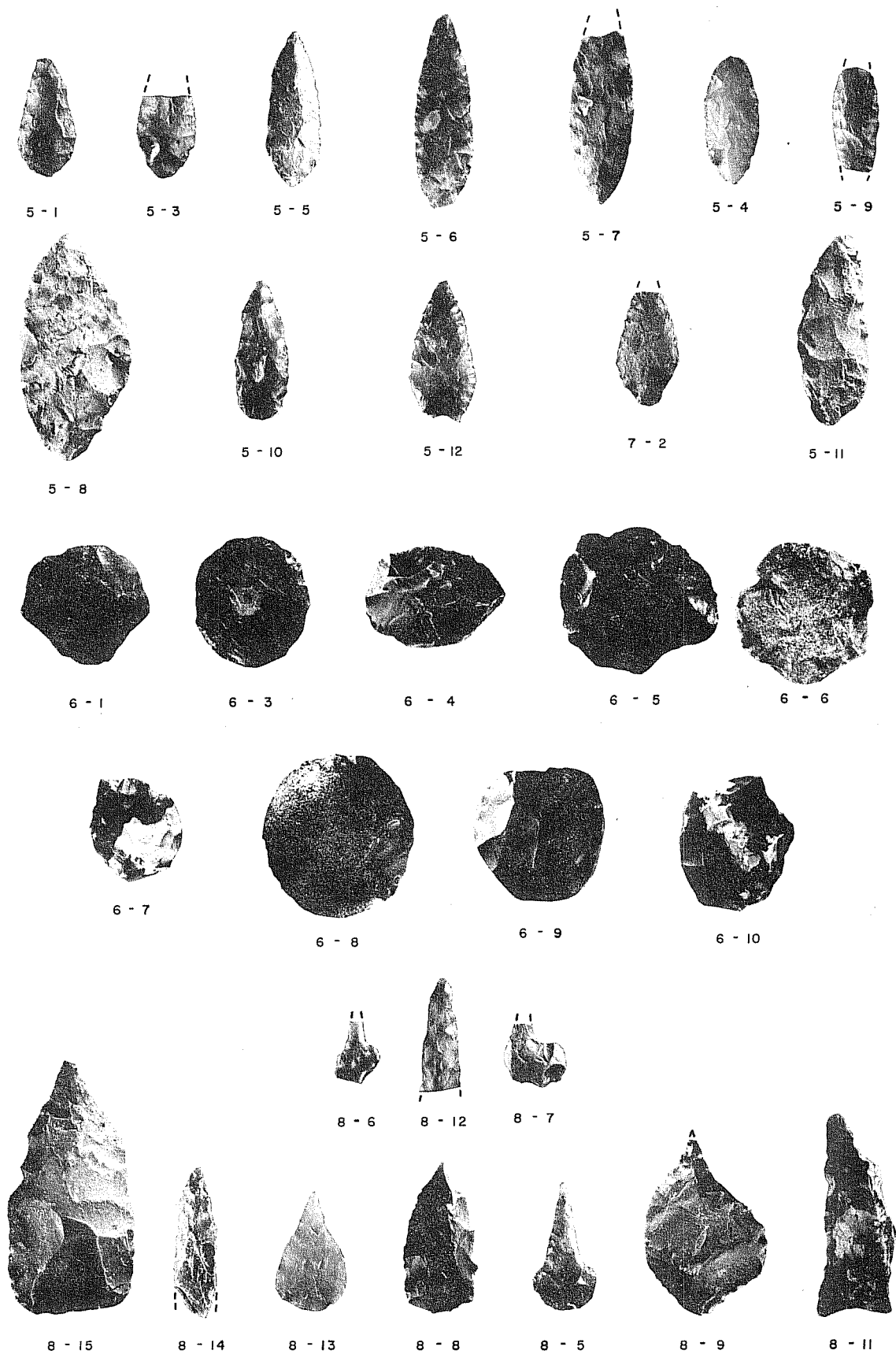


Figure 80. Thin Bifaces: Groups 5, 6, 7, and 8. Numbers beneath artifact indicate group and form number, respectively.

TABLE 19. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 6

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 128	37	Test Pit 10	1	Surf.-99.50	4.2	4.0	1.1	11.7	80
2	41 LK 201	489-0	Surface	-	-	7.0	6.8	1.0	63.9	-
3	41 MC 55	60	N993 E1015	1	Surf.-99.30	4.4	3.9	0.8	17.3	80
4	41 MC 213	2-68	Surface	-	-	4.8	3.7	1.2	19.5	80
5	41 MC 213	2-21	Surface	-	-	5.2	4.7	1.3	40.1	80
6	41 MC 251	1-0	Surface	-	-	4.4	4.7	1.2	24.3	80
7	41 MC 275	5-41	Surface	-	-	3.8	3.0	1.1	9.8	80
8	41 MC 275	5-42	Surface	-	-	5.4	5.0	1.6	52.9	80
9	41 MC 275	5-40	Surface	-	-	4.5	4.2	1.2	31.7	80
10	41 MC 276	1-22	Surface	-	-	4.5	3.9	1.3	24.9	80

TABLE 20. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 7

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 201	659	N506 E1008	1	99.29-99.20	2.7	0.9	0.4	0.9	-
2	41 MC 268	41-59	Surface	-	-	3.8*	2.2	0.8	7.3*	80

TABLE 21. PROVENIENCE AND METRIC DATA FOR THIN BIFACES GROUP 8

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Figure Number
1	41 LK 201	660	N506 E1009	1	99.29-99.20	3.5	1.6	0.3	0.8	-
2	41 LK 201	683	N508 E1008	1	99.17-99.10	5.0	2.6	0.5	3.4	-
3	41 LK 201	696	N506 E1009	2	99.20-99.10	5.0*	2.2	0.6	4.1*	-
4	41 LK 201	697	N507 E1008	2	99.20-99.10	5.9	1.8	0.5	4.5	-
5	41 MC 296	6	Test Pit 1	6	50-60 cm	4.3	2.1	0.4	3.0	80
6	41 MC 296	64	N1022 E987	4	99.20-99.10	2.1*	1.6	0.4	0.8*	80
7	41 MC 296	89	N1023 E987	1	Surf.-99.40	2.2*	2.1	0.6	2.5*	80
8	41 LK 51	226	N998 E982	15	98.40-98.30	5.1	2.5	1.4	16.4	80
9	41 LK 128	46-23	Surface	-	-	5.8	4.2	0.9	17.3	80
10	41 LK 201	278	N499 E998	3	99.15-99.05	6.8	3.4	0.9	17.8	-
11	41 LK 243	26-42	Surface	-	-	6.4	2.3	2.1	28.8	80
12	41 MC 213	2-61	Surface	-	-	3.7*	1.3	0.8	*	80
13	41 MC 222	133-2	N99 E90	2	98.75-98.70	3.9	2.4	0.6	4.5	80
14	41 MC 238	2-0	Surface	-	-	5.0*	2.1	1.3	*	80
15	41 MC 276	1-28	Surface	-	-	8.4	4.0	2.2	61.8	80

Group 9. Fragments with Pointed Ends (196 specimens)

Group 9 specimens are thin biface fragments with pointed ends. Workmanship varies from relatively thick and crudely flaked to thin and finely flaked. Depending upon whether breakage occurred during manufacture or use, these specimens could be fragments of preforms or of finished tools. Especially in the case of surface-collected specimens, breakage may also have occurred postdepositionally through exposure to weather and large animals (hoof damage). The specimens are grouped by width: 4-5 cm, 14 specimens; 3-3.9 cm, 47 specimens; 2-2.9 cm, 64 specimens; 1-1.9 cm, 41 specimens; and less than 1 cm, 30 specimens. Probable arrow point fragments among the Group 9 pieces were found at 10 sites as follows: 41 LK 51, one; 41 LK 53, one; 41 LK 128, three; 41 LK 201, 23; 41 LK 243, two; 41 MC 55, one; 41 MC 94, two; 41 MC 196, one; 41 MC 222, four; and 41 MC 296, 16. One piece each of gray siliceous quartzite, dark red quartzite, and chalcedony was present in Group 9. All others were made of fine-grained chert. Provenience information for Group 9 specimens is provided in Table 22.

Group 10. Lateral and Medial Fragments (267 specimens)

Group 10 specimens are unclassifiable lateral and medial fragments of thin bifaces. The fragments may be derived from finished tools broken during use or from preforms broken during manufacture. Some breakage may also be the result of postdepositional mechanical action (weather, animal tramping, farm/ranch machinery). The specimens are grouped by width: greater than 4 cm, 17 specimens; 3-3.9 cm, 36 specimens; 2-2.9 cm, 83 specimens; 1-1.9 cm, 97 specimens; and less than 1 cm, 34 specimens. Probable arrow point fragments were found at seven sites as follows: 41 LK 128, three; 41 LK 182, one; 41 LK 201, 25; 41 MC 29, two; 41 MC 55, two; 41 MC 222, one; and 41 MC 296, 13. One piece is chalcedony. The rest are chert. Provenience information for Group 10 specimens is provided in Table 22.

Distally Beveled Bifaces and Unifaces

Distally beveled bifaces and unifaces are chipped stone tools often referred to as "gouges." In the report of Phase I investigations at Choke Canyon (Hall, Black, and Graves 1982:318), specimens such as these were also referred to as "distally beveled bifaces and unifaces" to avoid the functional implications of the name "gouge." The specimens share distal ends that are beveled and/or concave. Bifacial and unifacial specimens are included in this category with thicknesses ranging above and below the arbitrary thickness standard of 1.3 cm used to distinguish between thick and thin bifaces above. The distinctive beveled end is considered to be the single most important descriptive attribute. The extent of facial chipping (unifacial vs. bifacial) and artifact thickness are of secondary importance as classificatory criteria. Outline, bit morphology, and thickness are the principal attributes used to define the various groups described below. Discussions of type names, geographic distributions, chronological considerations, and possible functions for distally beveled bifaces and unifaces are provided in Hall, Black, and Graves (1982:338-348). The specimens are grouped into the following categories for descriptive purposes:

TABLE 22. PROVENIENCE DATA FOR THIN BIFACES GROUPS 9 AND 10

SITE	UNIT	LEVEL	ELEVATION	SITE	UNIT	LEVEL	ELEVATION
GROUP 9				GROUP 10 (continued)			
41 LK 8	N511 E458	4	98.80-98.70	41 MC 222	N98 E86	3	98.65-98.60
41 LK 8	N511 E459	9	99.30-99.20	41 MC 222	N102 E90	3	98.90-98.85
41 LK 8	N462 E542	2	97.90-97.80	41 MC 222	N102 E91	4	98.90-98.85
41 LK 8	N400 E605	5	95.20-95.10	41 MC 222	N110 E87	3	99.10-99.00
41 LK 14	N1009 E1000	2	99.70-99.60	41 MC 268	N995 E998	6	99.00-98.90
41 LK 51	N999 E981	8	99.10-99.00	41 MC 268	N995 E999	8	99.80-99.70
41 LK 51	N999 E981	11	98.80-98.70	41 MC 268	N996 E998	3	99.30-99.20
41 LK 51	N998 E981	14	98.50-98.40	41 MC 268	N996 E999	3	99.30-99.20
41 LK 51	N998 E982	2	99.70-99.60	41 MC 275	Shovel Test 1	-	50 cm
41 LK 51	N998 E982	5	99.40-99.30	41 MC 296	Test Pit 1	6	50-60 cm
41 LK 51	N998 E982	8	99.10-99.00	41 MC 296	Test Pit 2	3	20-30 cm
41 LK 51	N998 E984	3	99.60-99.50	41 MC 296	N1022 E985	1	Surf.-99.40
41 LK 51	N1026 E1042	2	99.80-99.70	41 MC 296	N1022 E985	8	98.80-98.70
41 LK 51	N1034 E1065	9	99.10-99.00	41 MC 296	N1022 E986	1	Surf.-99.40
41 LK 53	N1000 E1002	2	99.60-99.50	41 MC 296	N1022 E986	1	Surf.-99.40
41 LK 53	N1000 E1003	4	99.40-99.30	41 MC 296	N1022 E987	2	99.40-99.30
41 LK 53	N1001 E1002	3	99.50-99.40	41 MC 296	N1022 E987	3	99.30-99.20
41 LK 74	N987 E991	1	Surf.-99.30	41 MC 296	N1022 E987	4	99.20-99.10
41 LK 74	N974 E1000	1	99.80-99.65	41 MC 296	N1022 E987	9	98.70-98.60
41 LK 74	N977 E1000	1	Surf.-99.60	41 MC 296	N1023 E986	1	Surf.-99.40
41 LK 74	N978 E1000	4	99.40-99.30	41 MC 296	N1023 E986	2	99.40-99.30
41 LK 74	N1071 E858	1	Surf.-100.20	41 MC 296	N1023 E987	1	Surf.-99.40
41 LK 128	Test Pit 6	2	99.70-99.60	41 MC 296	N1024 E986	1	Surf.-99.40
41 LK 128	Test Pit 14	1	Surf.-99.40	41 MC 296	N1024 E986	7	98.90-98.80
41 LK 201	N490 E1044	2	98.65-98.55	41 MC 296	N1024 E987	2	99.40-99.30
41 LK 201	N490 E1044	12	97.65-97.55	41 MC 296	N1025 E998	1	Surf.-99.50
41 LK 201	N497 E996	3	99.15-99.05	41 MC 296	N1026 E997	1	Surf.-99.50
41 LK 201	N498 E997	3	99.15-99.05	41 MC 296	Shovel Test 3	-	-
41 LK 201	N498 E998	3	99.15-99.05	41 MC 296	N1026 E978	1	Surf.-99.50
41 LK 201	N498 E998	3	99.15-99.05	41 MC 296	N1026 E978	2	99.50-99.40
41 LK 201	N499 E996	3	99.15-99.05	41 MC 296	N1026 E978	4	99.30-99.20
41 LK 201	N499 E997	3	99.15-99.05	41 MC 296	N1027 E986	2	99.50-99.40
41 LK 201	N499 E997	3	99.15-99.05	41 MC 296	N1027 E995	5	99.20-99.10
41 LK 201	N499 E998	3	99.15-99.05	41 MC 296	N1027 E978	6	99.10-99.00
41 LK 201	N497 E996	11	98.35-98.25	41 MC 296	N1023 E989	3	99.40-99.30
41 LK 201	N498 E998	13	98.15-98.05				
41 LK 201	N500 E996	11	98.35-98.25				
41 LK 201	N497 E997	18	97.65-97.55				
41 LK 201	N510 E1020	6	98.95-98.90				
41 LK 201	N510 E1021	2	99.15-99.10				
41 LK 201	N508 E1010	1	99.23-99.10	41 LK 8	N460 E542	2	97.90-97.80
41 LK 201	N507 E1009	1	99.29-99.20	41 LK 8	N460 E542	3	97.80-97.70
41 LK 201	N507 E1009	1	99.29-99.20	41 LK 8	N460 E542	6	97.50-97.40
41 LK 201	N507 E1009	1	99.29-99.20	41 LK 8	N461 E542	4	97.70-97.60
41 LK 201	N504 E1012	1	99.28-99.20	41 LK 8	N510 E459	17	98.50-98.40
41 LK 201	N507 E1012	1	99.31-99.20	41 LK 14	N1006 E958	3	100.10-100.00
41 LK 201	N509 E1014	0	99.29	41 LK 14	N1006 E958	3	100.00-100.00
41 LK 201	N504 E1008	1	99.32-99.20	41 LK 14	N1008 E1000	1	Surf.-99.70
41 LK 201	N505 E1009	1	99.32-99.20	41 LK 14	N1009 E1001	7	99.20-99.10
41 LK 201	N505 E1009	1	99.32-99.20	41 LK 14	N1009 E1001	7	99.20-99.10
41 LK 201	N509 E1008	1	99.17-99.10	41 LK 14	N1009 E1002	4	99.50-99.40
41 LK 201	N507 E1008	2	99.20-99.10	41 LK 14	N1009 E1002	5	99.40-99.30
41 LK 201	N508 E1012	2	99.20-99.10	41 LK 14	N1009 E1002	7	99.20-99.10
41 LK 201	N508 E1013	2	99.20-99.10	41 LK 14	N1010 E1000	7	99.20-99.10
41 LK 201	N508 E1013	2	99.20-99.10	41 LK 14	N1010 E1001	6	99.30-99.20
41 LK 201	N508 E1013	2	99.20-99.10	41 LK 14	N1010 E1002	5	99.40-99.30
41 LK 201	N509 E1008	2	99.10-99.00	41 LK 51	N999 E982	3	99.60-99.50
41 LK 201	N505 E1012	2	99.20-99.10	41 LK 51	N999 E982	4	99.50-99.40
41 LK 201	N505 E1013	2	99.20-99.10	41 LK 51	N999 E982	13	98.60-98.50
41 LK 201	N505 E1010	1	99.31-99.20	41 LK 51	N999 E984	15	98.40-98.30
41 LK 201	N508 E1007	1	99.20-99.10	41 LK 51	N998 E981	2	99.70-99.60
41 LK 201	N508 E1007	1	99.20-99.10	41 LK 51	N998 E981	3	99.60-99.50
41 LK 201	N505 E1011	2	99.20-99.10	41 LK 51	N998 E981	3	99.60-99.50
41 LK 243	Test Pit 4	1	0-10 cm	41 LK 51	N998 E981	11	98.80-98.70
41 MC 55	N1007 E1016	2	99.30-99.20	41 LK 51	N998 E982	3	99.60-99.50
41 MC 55	N1015 E1012	1	Surf.-99.20	41 LK 51	N998 E984	16	98.30-98.20
41 MC 94	Test Pit 1	9	98.90-98.80	41 LK 51	N1025 E1042	1	Surf.-99.80
41 MC 94	Test Pit 2	1	Surf.-99.70	41 LK 51	N1026 E1042	1	Surf.-99.80
41 MC 94	Test Pit 4	3	99.60-99.50	41 LK 51	N1033 E1065	1	Surf.-99.80
41 MC 196	Test Pit 1	1	0-10 cm	41 LK 51	N1010 E1011	2	99.80-99.70

TABLE 22. (continued)

SITE	UNIT	LEVEL	ELEVATION	SITE	UNIT	LEVEL	ELEVATION
GROUP 10 (continued)				GROUP 10 (continued)			
41 LK 51	N1026 E1039	2	99.80-99.70	41 LK 201	N507 E1008	2	99.20-99.10
41 LK 51	N1033 E1062	3	99.60-99.50	41 LK 201	N508 E1012	2	99.20-99.10
41 LK 51	N1010 E1011	7	99.30-99.20	41 LK 201	N509 E1012	2	99.20-99.10
41 LK 51	N1025 E1041	2	99.80-99.70	41 LK 201	N505 E1013	2	99.20-99.10
41 LK 51	N1010 E1011	8	99.20-99.10	41 LK 201	N509 E1017	1	99.08-99.00
41 LK 51	N1034 E1065	8	99.20-99.10	41 LK 201	N509 E1007	1	99.08-99.00
41 LK 51	N1034 E1065	8	99.20-99.10	41 LK 201	N509 E1007	1	99.08-99.00
41 LK 51	N1010 E1011	9	99.10-99.00	41 LK 243	Test Pit 3	4	30-40 cm
41 LK 51	N1033 E1065	10	99.00-98.90	41 LK 250	Test Pit 1	4	30-40 cm
41 LK 53	N1000 E1003	10	98.80-98.70	41 LK 252	Shovel Test 2	-	15-20 cm
41 LK 53	N1000 E1003	10	98.80-98.70	41 MC 29	N998 E1011	1	99.89-99.80
41 LK 53	N1000 E1004	5	99.30-99.20	41 MC 29	N998 E1011	1	99.89-99.80
41 LK 53	N1000 E1004	5	99.30-99.20	41 MC 55	N992 E1013	1	Surf. -99.40
41 LK 53	N1001 E1002	3	99.50-99.40	41 MC 55	N1009 E1015	1	-
41 LK 53	N1001 E1003	6	99.20-99.10	41 MC 94	Test Pit 1	7	99.10-99.00
41 LK 53	N1001 E1004	7	99.10-99.00	41 MC 94	Test Pit 1	9	98.90-98.80
41 LK 53	N1002 E1002	3	99.50-99.40	41 MC 94	Test Pit 3	2	99.70-99.60
41 LK 74	N981 E988	2	99.60-99.50	41 MC 94	Test Pit 6	1	Surf. -99.80
41 LK 74	N1070 E858	2	100.20-100.10	41 MC 196	Test Pit 1	1	0-10 cm
41 LK 74	N1071 E858	3	100.10-100.00	41 MC 222	N98 E90	1	Surf. -98.70
41 LK 128	Test Pit 3	1	Surf. -99.60	41 MC 222	N99 E91	4	98.65-98.60
41 LK 128	Test Pit 5	1	Surf. -99.60	41 MC 222	N100 E89	3	98.75-98.70
41 LK 128	Test Pit 5	1	Surf. -99.60	41 MC 222	N100 E90	5	98.65-98.60
41 LK 128	Test Pit 5	2	99.60-99.50	41 MC 222	N101 E89	2	98.80-98.75
41 LK 128	Test Pit 5	4	99.40-99.30	41 MC 222	N101 E91	2	98.90-98.85
41 LK 128	Test Pit 7	3	99.50-99.40	41 MC 222	N102 E88	4	98.85-98.80
41 LK 128	Test Pit 7	5	99.30-99.20	41 MC 222	N102 E89	5	98.80-98.75
41 LK 128	Test Pit 8	2	99.70-99.60	41 MC 222	N102 E90	5	98.80-98.75
41 LK 128	Test Pit 9	1	Surf. -99.40	41 MC 222	N102 E100	2	98.90-98.80
41 LK 128	Test Pit 12	1	Surf. -100.90	41 MC 257	Shovel Test 2	-	50-80 cm
41 LK 128	Test Pit 12	1	Surf. -100.90	41 MC 268	Test Pit 1	2	10-20 cm
41 LK 128	Test Pit 12	2	100.90-100.80	41 MC 268	N996 E998	1	Surf. -99.40
41 LK 185	Test Pit 2	1	0-20 cm	41 MC 268	N996 E999	2	99.40-99.30
41 LK 201	N497 E996	3	99.15-99.05	41 MC 296	Test Pit 1	5	40-50 cm
41 LK 201	N498 E997	3	99.15-99.05	41 MC 296	Test Pit 2	2	10-20 cm
41 LK 201	N498 E997	4	99.05-98.95	41 MC 296	N1022 E985	1	Surf. -99.40
41 LK 201	N498 E998	2	99.25-99.15	41 MC 296	N1022 E986	1	Surf. -99.40
41 LK 201	N499 E997	2	99.25-99.15	41 MC 296	N1022 E986	1	Surf. -99.40
41 LK 201	N499 E997	3	99.15-99.05	41 MC 296	N1022 E987	1	Surf. -99.40
41 LK 201	N499 E997	4	99.05-98.95	41 MC 296	N1023 E985	3	99.30-99.20
41 LK 201	N499 E997	4	99.05-98.95	41 MC 296	N1023 E985	3	99.30-99.20
41 LK 201	N500 E997	2	99.25-99.15	41 MC 296	N1023 E985	3	99.30-99.20
41 LK 201	N500 E997	3	99.15-99.05	41 MC 296	N1023 E985	6	99.00-98.90
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1023 E986	3	99.30-99.20
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1023 E987	1	Surf. -99.40
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1024 E985	1	Surf. -99.40
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1024 E985	1	Surf. -99.40
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1024 E985	1	Surf. -99.40
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1024 E985	1	Surf. -99.40
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1024 E986	1	Surf. -99.40
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1024 E986	1	Surf. -99.40
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1024 E986	3	99.30-99.20
41 LK 201	N500 E998	3	99.15-99.05	41 MC 296	N1025 E998	1	Surf. -99.50
41 LK 201	N498 E997	11	98.35-98.25	41 MC 296	N1025 E998	1	Surf. -99.50
41 LK 201	N499 E997	11	98.35-98.25	41 MC 296	N1025 E998	2	99.50-99.40
41 LK 201	N500 E996	11	98.35-98.25	41 MC 296	N1025 E998	3	99.40-99.30
41 LK 203	N500 E996	15	97.95-97.85	41 MC 296	N1026 E997	1	Surf. -99.50
41 LK 201	N497 E998	18	97.65-97.55	41 MC 296	N1027 E997	1	Surf. -99.50
41 LK 201	N500 E997	19	97.55-97.45	41 MC 296	N1027 E998	6	99.10-99.00
41 LK 201	N499 E997	18	97.65-97.55	41 MC 296	N1027 E998	6	99.10-99.00
41 LK 201	N510 E1020	6	98.95-98.90	41 MC 296	N1026 E986	1	Surf. -99.50
41 LK 201	N507 E1011	1	99.30-99.20	41 MC 296	N1026 E978	2	99.50-99.40
41 LK 201	N504 E1012	1	99.28-99.20	41 MC 296	N1026 E978	3	99.40-99.30
41 LK 201	N507 E1013	1	99.31-99.20	41 MC 296	N1026 E978	5	99.20-99.10
41 LK 201	N508 E1012	1	99.29-99.20	41 MC 296	N1026 E986	2	99.50-99.40
41 LK 201	N505 E1009	1	99.32-99.20	41 MC 296	N1027 E986	2	99.50-99.40
41 LK 201	N506 E1013	2	99.20-99.10	41 MC 296	N1022 E989	2	99.50-99.40
41 LK 201	N507 E1012	2	99.20-99.10	41 MC 296	N1023 E989	1	Surf. -99.50
41 LK 201	N507 E1013	2	99.20-99.10	41 MC 296	N1023 E989	3	99.40-99.30

- Group 1. Large Triangular to Subtriangular (Clear Fork gouge Type 1, after Ray 1941)
- Group 2. Large, Elongate, Rectangular to Subrectangular (Clear Fork gouge Type 3, after Ray 1941)
 - Form 1. Long
 - Form 2. Short
- Group 3. Short, Broad, Triangular to Subrectangular
 - Form 1. Triangular, Proximal End Pointed
 - Form 2. Triangular, Proximal End Rounded
 - Form 3. Rectangular to Subrectangular (Nueces scrapers after Hester, White, and White 1969)
- Group 4. Small Triangular to Subtriangular
- Group 5. Small, Narrow Distal Fragments
- Group 6. Long, Narrow, Elliptical (Guadalupe adzes, after Campbell 1976)
- Group 7. Various Forms with Broad, Rounded, Low-Angle Bevels
 - Form 1. Elongate, Elliptical to Subrectangular
 - Form 2. Short, Broad, Subrectangular to Oval
 - Form 3. Subtriangular
 - Form 4. Distal Fragments
- Group 8. Miscellaneous Forms
 - Form 1. Triangular to Subtriangular with Steep Bevels
 - Form 2. Steeply Beveled Sides
 - Form 3. Offset Bevels
 - Form 4. Broad, Flat, Triangular
 - Form 5. Odd Shapes
- Group 9. Distal Fragments

Site provenience for distally beveled bifaces and unifaces is provided in Table 23. Individual specimen number provenience and metric attributes are presented following the description of each group.

Group 1. Large Triangular to Subtriangular (Clear Fork gouge Type 1, after Ray 1941) (four specimens)

Group 1 specimens are triangular to subtriangular in outline and have the bevel at the broad end. All are bifacially worked and biconvex in lateral cross section. On the ventral face, that is, the face opposite the bevel, there is a ridge running the length of each piece. The ridges impart a more convex appearance to the ventral faces in comparison to the dorsal surface. Lateral edges are straight to slightly convex. Proximal ends are rounded. Specimen 2 retains a cortex striking platform at its proximal end and is made of gray siliceous quartzite. Specimen 3 is made of petrified wood. Provenience and metric data for these four specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 27	44-0	Surface	-	-	6.8	3.6	2.0	57.8	56°	-
2	41 LK 121	1-0	Surface	-	-	6.5	3.9	1.8	53.6	59°	81
3	41 LK 128	1-0	Surface	-	-	5.7	3.5	1.6	40.3	62°	-
4	41 MC 192	1-0	Surface	-	-	6.8	3.5	1.6	42.9	66°	81

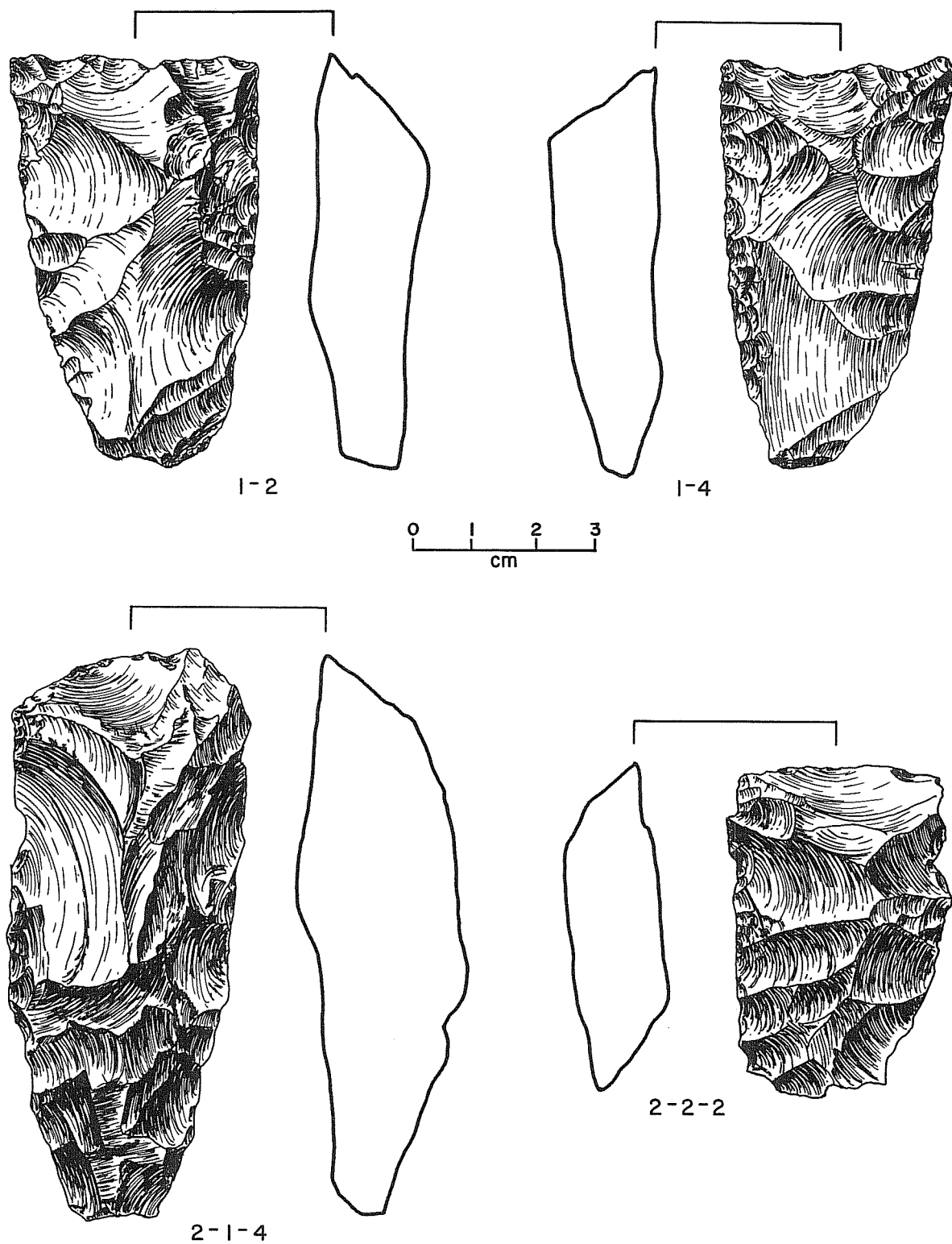


Figure 81. Distally Beveled Bifaces and Unifaces: Group 1 and Group 2, Forms 1 and 2. Two numbers beneath an artifact indicate group and specimen number; three numbers indicate group, form, and specimen number, respectively.

Group 2. Large, Elongate, Rectangular to Subrectangular (Clear Fork gouge Type 3, after Ray 1941) (six specimens)

Group 2 specimens are rectangular to subrectangular in outline, and all are bifacially worked. Bit (bevel) edges are convex. The bevels do not have the cusped or "scooped out" configuration characteristic of Group 1. Group 2 specimens are generally narrower in relation to length than are other distally beveled specimens, with the exceptions of Groups 5 and 6. Group 2 is further divided into two forms based on length. Form 2 specimens are about half as long as those in Form 1. Since all specimens in the group are so similar except for the length, it is suggested that the Form 2 pieces are simply worn-down and resharpened examples of Form 1.

Form 1. Long (four specimens)

Specimens 2 and 4 are biconvex in lateral cross section. Specimens 1 and 3 are more nearly plano-convex with the flat surface on the dorsal face, that is, on the same side as the bevel. All specimens have pronounced ridges running down the length of the ventral face. On Specimen 4, both faces have this longitudinal ridge, and a diamond-shaped lateral cross section is formed. Specimen 2 is moderately patinated on one face. Provenience and metric data for Group 2, Form 1 are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 8	196-0	Surface	-	-	7.9	4.2	1.8	70.3	60°	-
2	41 LK 14	300-0	Surface	-	-	8.9	4.2	2.0	75.0	69°	-
3	41 MC 213	2-46	Surface	-	-	7.4	3.3	1.6	41.6	62°	-
4	41 MC 226	4-0	Surface	-	-	9.1	3.8	2.6	92.5	52°	81

Form 2. Short (two specimens)

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 69	88-0	Surface	-	-	5.7	3.5	1.9	38.0	48°	-
2	41 MC 192	1-0	Surface	-	-	5.4	3.6	1.5	34.9	54°	81

Group 3. Short, Broad, Triangular to Subrectangular (48 specimens)

Group 3 specimens are generally distinguished from Group 1 by their smaller size and more variable outline, but there is nevertheless some overlap between Groups 1 and 3, especially with respect to Forms 1 and 2 described below. Group 3 specimens are as wide as those in Group 1, but are shorter, thinner, and more finely flaked. The width of Group 3 specimens approaches, and in some cases exceeds, the length. The group is further subdivided into three forms based on outline shape. Two of the forms are basically triangular in outline, one composed of specimens with pointed proximal ends and the other of specimens with slightly rounded proximal ends. The third form contains specimens with rectangular to subrectangular outlines.

Form 1. Triangular, Proximal End Pointed (16 specimens)

Specimens 2, 5, 7, and 12 are unifacially worked. Specimens 2, 9, and 13 have concave bit edges; Specimen 12 has a convex, slightly offset bit edge; and the rest have straight bit edges. Specimens 2, 7, 10, and 14 are asymmetrically pyramidal in configuration. The apex of the pyramid is on the dorsal side of each specimen and is off center toward the bevel edge. Three distinct facets are formed on the dorsal surface by the intersection of the bevel with a pronounced ridge running back to the proximal end. These pyramid-shaped specimens are generally thicker than the others in the group. Specimens 5, 7, 10, and 15 retain small patches of cortex on their dorsal faces. Specimens 12 and 14 are made of gray siliceous quartzite; all other specimens are chert. Provenience and metric data for the Group 3, Form 1 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 51	282	N1026 E1042	2	99.80-99.70	4.4	4.1	1.3	22.2	74°	82
2	41 LK 51	315	Surface	8	99.20-99.10	4.6	4.3	1.5	22.7	66°	-
3	41 LK 127	10-10	Surface	-	-	5.1	4.0	1.5	29.9	58°	-
4	41 LK 243	27-0	Surface	-	-	5.5	4.4	1.3	29.9	66°	-
5	41 LK 252	1-2	Surface	-	-	5.1	4.5*	1.1	29.8	73°	-
6	41 MC 75	34-0	Surface	-	-	3.7*	4.8	1.2	24.4	68°	-
7	41 MC 196	23-0	Surface	-	-	5.1	3.6	1.5	27.4	60°	-
8	41 MC 212	1-0	Surface	-	-	3.6	3.1	0.9	11.4	60°	-
9	41 MC 226	4-0	Surface	-	-	4.8	4.1	1.2	23.5	61°	82
10	41 MC 226	7-0	Surface	-	-	4.0	4.5	1.6	23.8	64°	-
11	41 MC 238	2-0	Surface	-	-	3.7	4.3	1.6	21.1	56°	-
12	41 MC 251	1-0	Surface	-	-	5.4	4.5	1.3	27.9	64°	-
13	41 MC 268	49	N995 E983	1	Surf.-99.40	3.5	3.6	1.1	14.3	69°	-
14	41 MC 276	1-15	Surface	-	-	4.4	3.3	1.5	19.2	68°	-
15	41 MC 276	1-17	Surface	-	-	5.1	3.8	1.6	27.7	49°	-
16	41 MC 282	1-0	Surface	-	-	3.3	3.0	0.9	10.4	58°	-

Form 2. Triangular, Proximal End Rounded (18 specimens)

Specimens 9, 15, 16, and 17 are unifacially worked. Specimens 6 and 7 have "scooped out" bits, but the bit edges are straight. Specimens 9, 10, 11, 15, 16, and 17 have the dorsal pyramid configuration described for Group 3, Form 1 above. Specimen 14 is made of petrified wood. Specimen 15 is gray siliceous quartzite. All others are chert. Specimen 5 retains a small patch of cortex on the ventral face. Provenience and metric data for the Group 3, Form 2 specimens are as follows:

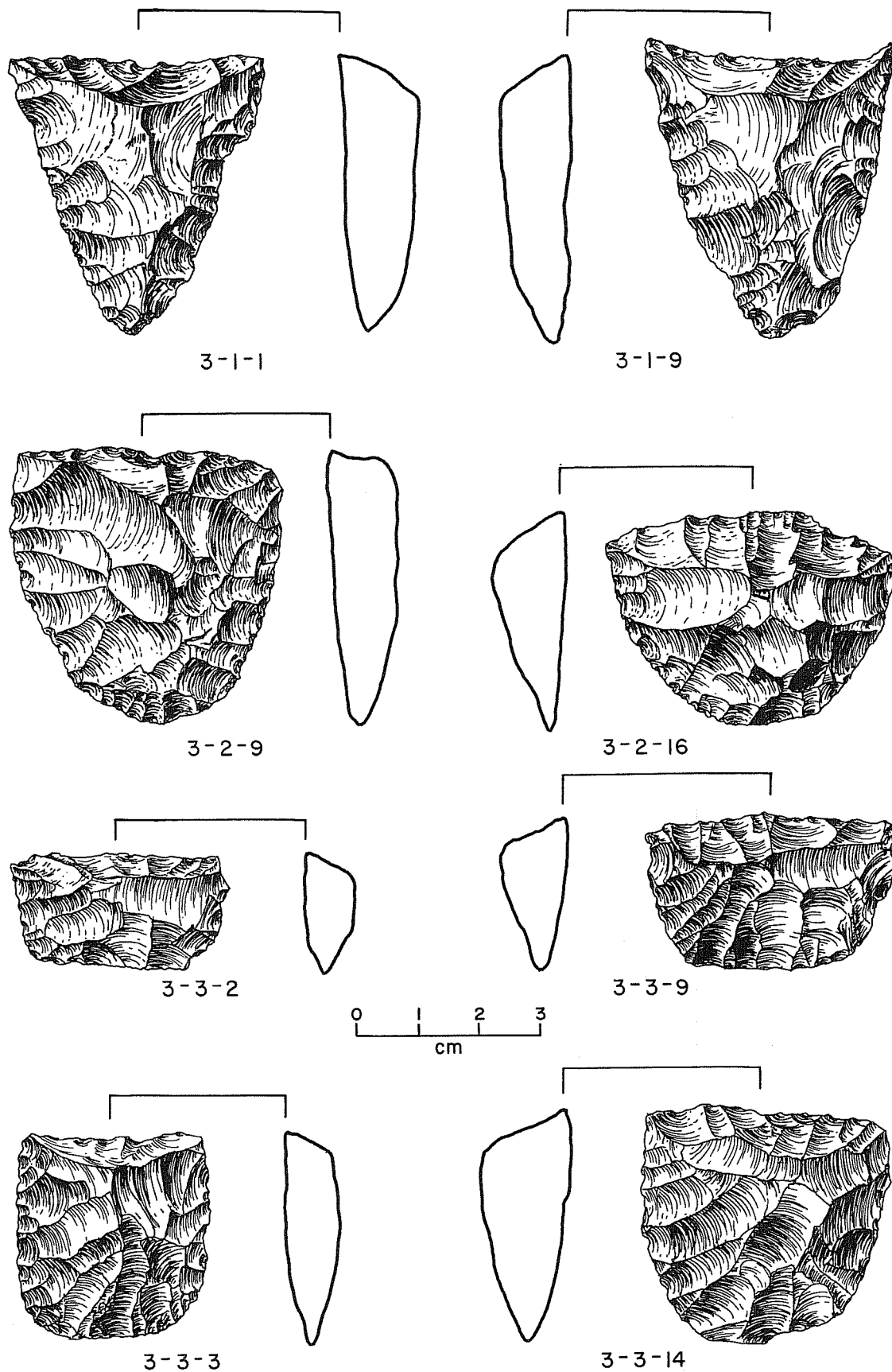


Figure 82. Distally Beveled Bifaces and Unifaces: Group 3, Forms 1, 2, and 3. Numbers beneath artifact indicate group, form, and specimen number, respectively.

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 14	300-0	Surface	-	-	4.9	4.2	1.5	28.6	73°	-
2	41 LK 199	2-0	Surface	-	-	3.4	4.3	1.1	17.4	63°	-
3	41 LK 201	371	N500 E998	13	98.15-98.05	3.7	4.8	1.0	19.4	61°	-
4	41 LK 243	27-0	Surface	-	-	5.0	4.1	1.3	27.5	53°	-
5	41 LK 250	12-15	Surface	-	-	4.3	4.4	1.4	26.9	81°	-
6	41 MC 7	1-0	Surface	-	-	5.3	4.7	1.3	34.4	54°	-
7	41 MC 29	92-0	Surface	-	-	4.9	5.0	1.5	38.7	53°	-
8	41 MC 94	198	Test Pit 3	3	99.60-99.50	3.4	3.9	1.3	15.2	55°	-
9	41 MC 94	212	Test Pit 5	1	Surf. -99.80	4.4	4.4	1.3	27.2	79°	82
10	41 MC 212	1-0	Surface	-	-	4.0	4.0	1.5	25.0	72°	-
11	41 MC 213	2-27	Surface	-	-	3.9	3.3	1.3	20.0	48°	-
12	41 MC 213	2-56	Surface	-	-	3.5	3.5	1.0	11.4	64°	-
13	41 MC 213	2-57	Surface	-	-	3.6	5.1	1.3	23.6	52°	-
14	41 LK 243	26-14	Surface	-	-	4.8*	4.8	1.1	29.1	39°	-
15	41 MC 260	3	Shovel Test 2	-	-	3.5	3.7	1.3	17.2	54°	-
16	41 MC 260	1-11	Surface	-	-	3.6	4.8	1.2	17.7	55°	82
17	41 MC 268	91-57	Surface	-	-	3.8	4.5	1.2	21.2	53°	-
18	41 MC 270	21-3	Surface	-	-	4.0	3.4	1.0	15.8	65°	-

Form 3. Rectangular to Subrectangular (Nueces scraper after Hester, White, and White 1969) (14 specimens)

Specimen 9 is unifacially worked. Specimens 4, 12, and 13 retain patches of cortex. Cortex covers approximately 50% of the dorsal face of Specimen 12. On Specimen 13, the cortex occurs at the proximal end, apparently a remnant striking platform. Specimen 9 is heavily patinated on the bit and at the proximal end on the ventral face. Specimen 11 appears to have been the proximal portion of an unstemmed thin biface (concave base) that was reworked into a distally beveled biface. Provenience and metric data for the Group 3, Form 3 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 201	184	N491 E1043	11	97.75-97.65	2.8	3.2	0.9	8.8	73°	-
2	41 LK 253	1-25	Surface	-	-	1.8	3.6	0.8	5.7	67°	82
3	41 MC 196	20-4	Surface	-	-	3.3	3.2	1.0	12.8	67°	82
4	41 MC 196	21-42	Surface	-	-	4.1	3.8	1.3	22.7	53°	-
5	41 MC 213	2-58	Surface	-	-	2.0	3.8	1.0	8.3	70°	-
6	41 MC 213	2-63	Surface	-	-	2.8	4.8	1.3	16.8	46°	-
7	41 MC 238	1-2	Surface	-	-	3.6	4.6	1.1	25.7	48°	-
8	41 MC 238	1-3	Surface	-	-	4.0	4.9	1.5	28.6	64°	-

9	41 MC 251	1-0	Surface	-	-	2.5	4.1	1.0	11.9	55°	82
10	41 MC 268	8	Test Pit 2	1	0-10 cm	3.1	3.0	0.8	8.3	61°	-
11	41 MC 268	37	N994 E983	6	99.00-98.90	3.9	3.2	1.0	14.9	55°	-
12	41 MC 268	1-40	Surface	-	-	3.1	5.6	1.6	31.9	58°	-
13	41 MC 296	82	N1023 E986	4	99.20-99.10	1.7	3.1	0.9	4.5	68°	-
14	41 MC 296	244-0	Surface	-	-	3.9	4.1	1.6	28.1	68°	82

Group 4. Small Triangular to Subtriangular (nine specimens)

Much like the Group 1 specimens in their overall configuration, Group 4 specimens are distinguished by their diminutive size, straight to convex bit edges, thinness, and fine flaking. Specimens 1 and 4 have pronouncedly convex bit edges. Specimen 7 is, in essence, unifacially worked. Specimen 3 is made of petrified wood; the others are of chert. Provenience and metric data for Group 4 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 14	297-0	Surface	-	-	4.4	2.6	0.9	10.6	58°	-
2	41 LK 182	1-0	Surface	-	-	4.0	3.2	0.8	12.7	57°	83
3	41 LK 182	1-0	Surface	-	-	4.7	3.2	1.1	15.1	52°	-
4	41 LK 201	323	N497 E997	13	98.15-98.05	6.6	3.7	1.2	37.2	61°	-
5	41 LK 201	331	N498 E997	11	98.35-98.25	4.4	3.7	1.1	17.2	75°	-
6	41 LK 243	26-39	Surface	-	-	5.3	3.8	0.8	15.5	63°	83
7	41 MC 196	27-0	Surface	-	-	5.1	3.7	1.2	23.5	50°	-
8	41 MC 196	21-38	Surface	-	-	4.8*	3.1	1.0	18.2	82°	-
9	41 MC 238	1-28	Surface	-	-	4.4	3.2	0.9	11.8	52°	-

Group 5. Small, Narrow Distal Fragments (three specimens, from Phase I investigations)

No examples of this distinctive distally beveled tool type were recovered during Phase II investigations at Choke Canyon. The three specimens shown in this report have been previously described (Hall, Black, and Graves 1982:330), but inadvertently were not illustrated. The three Group 5 specimens are the narrowest of the distally beveled tools. They are rectangular, having a chisellike appearance. All are bifacially worked. Perhaps significantly, each is broken into lengths ranging from 3.3 to 4.1 cm, and they are much the same size in their other dimensions. Cross sections are biconvex. The beveled ends of Specimens 1 and 3 are "scooped out" very shallowly and form a bit somewhat like those of the Group 2 specimens. The bevel on Specimen 2 is more angular, the bit edge slightly convex. The most distinctive feature of the Group 5 specimens is that they are so slender relative to their length. All three are made of chert. A possible Late Paleo-Indian or Early Archaic affiliation has been suggested for Group 5 based on findings made at 41 MC 57 (ibid.:189-190). Provenience and metric data for the Group 5 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 52	1-17	Surface	-	-	3.6*	2.4	0.9	10.3*	52°	83
2	41 MC 57	14(1)	Surface	-	-	3.3*	2.8	0.9	11.2*	57°	83
3	41 MC 94	20(20)	Surface	-	-	4.2*	2.5	1.1	12.5*	61°	83

Group 6. Long, Narrow, Elliptical (Guadalupe adzes) (two specimens)

Group 6 specimens are the largest of the distally beveled bifaces and unifaces. They have previously been referred to as **Guadalupe** adzes (Calhoun 1965; Campbell 1976). The specimens are long, narrow, and bifacially worked. Transverse cross sections are thickly plano-convex or trianguloid. The convex faces have pronounced medial ridges running the length of each specimen. A roughly prismatic or "keeled" appearance is imparted by the medial ridge. Beyond these observations, the two specimens recovered in Phase II investigations are somewhat different from the Phase I examples. Unlike the Phase I specimens, these pieces have the bevel on the same side as the medial ridge. On Specimen 2, this variance may be explained by a major flaw which has eliminated the medial ridge. No such explanation is apparent in the case of Specimen 1. Provenience and metric data for the Group 6 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 133	17-10	Surface	-	-	10.8	3.9	3.2	116.8	49°	84
2	41 MC 213	2-3	Surface	-	-	10.8	4.3	2.6	130.2	64°	84

A detailed discussion of the **Guadalupe** tool is provided by Black and McGraw (1985) in their report of findings at the Panther Springs Creek site (41 BX 228) in northern Bexar County.

Group 7. Various Forms with Broad, Rounded, Low-Angle Bevels (six specimens)

Group 7 specimens share a distal end morphology considerably different from those previously described. The distal ends on these specimens might best be described as "shovel-shaped." The edge of the beveled end is pronouncedly convex or rounded, whereas other distally beveled bifaces and unifaces have straight to only slightly convex bevel edges. None of the Group 7 specimens have the more angular or cusped corners marking the intersection of the bevel edge with the lateral edges typical of previously described groups. The angle of beveling is generally so low that there is not a distinct bevel face on the specimens. In general, the Group 7 specimens are very thick and/or crudely flaked. It is possible that Group 7 contains preform examples of specimens in the groups described above. Provenience and metric data for the Group 7 specimens are as follows:

Form Number	Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	1	41 LK 201	271	N499 E997	3	99.15-99.05	5.8	4.0	1.7	43.1	52°	-
1	2	41 MC 282	1-0	Surface	-	-	4.9*	4.0	1.6	39.6*	65°	83
2	1	41 LK 252	1-28	Surface	-	-	4.5*	5.1	1.4	39.9*	39°	83
2	2	41 MC 238	2-0	Surface	-	-	5.9	5.1	1.2	46.8*	74°	-
3	1	41 LK 120	1-0	Surface	-	-	9.4	3.5	1.8	51.6	41°	85
4	1	41 MC 226	4-0	Surface	-	-	*	3.8	1.2	*	42°	-

Form 1. Elongate, Elliptical to Subrectangular (two specimens)

Specimen 1 appears to have been burned based on its reddish brown color and craze lines visible on the surface. It is very roughly flaked and retains cortex on the convex face. Specimen 2 consists of a distal portion only. It is relatively well flaked, and the distal end is distinctly formed into the characteristic "shovel shape."

Form 2. Short, Broad, Subrectangular to Oval (two specimens)

Form 2 specimens vary from subrectangular to subtriangular in outline. Specimen 1 is a distal fragment only, while Specimen 2 is complete. Both are comparatively thin. Specimen 1 exhibits very distinctly the "shovel-shaped" distal end.

Form 3. Subtriangular (one specimen)

The Group 7, Form 3 specimen is very unusual looking; it is well flaked with the exception of a cortex-covered knot remaining near the proximal or pointed end. The convex face of the distal, rounded end was thinned by driving off four or five long, narrow flakes from the bit edge back toward the proximal end. Use-wear or perhaps intentional dulling is very apparent on the distal edge.

Form 4. Distal Fragment (one specimen)

The Group 7, Form 4 specimen is a distal end fragment with the distinctive "shovel-shaped" bit morphology.

Group 8. Miscellaneous Forms (14 specimens)

The five form categories in Group 8 are essentially distinct from one another, sharing only the distal end beveling as a common trait.

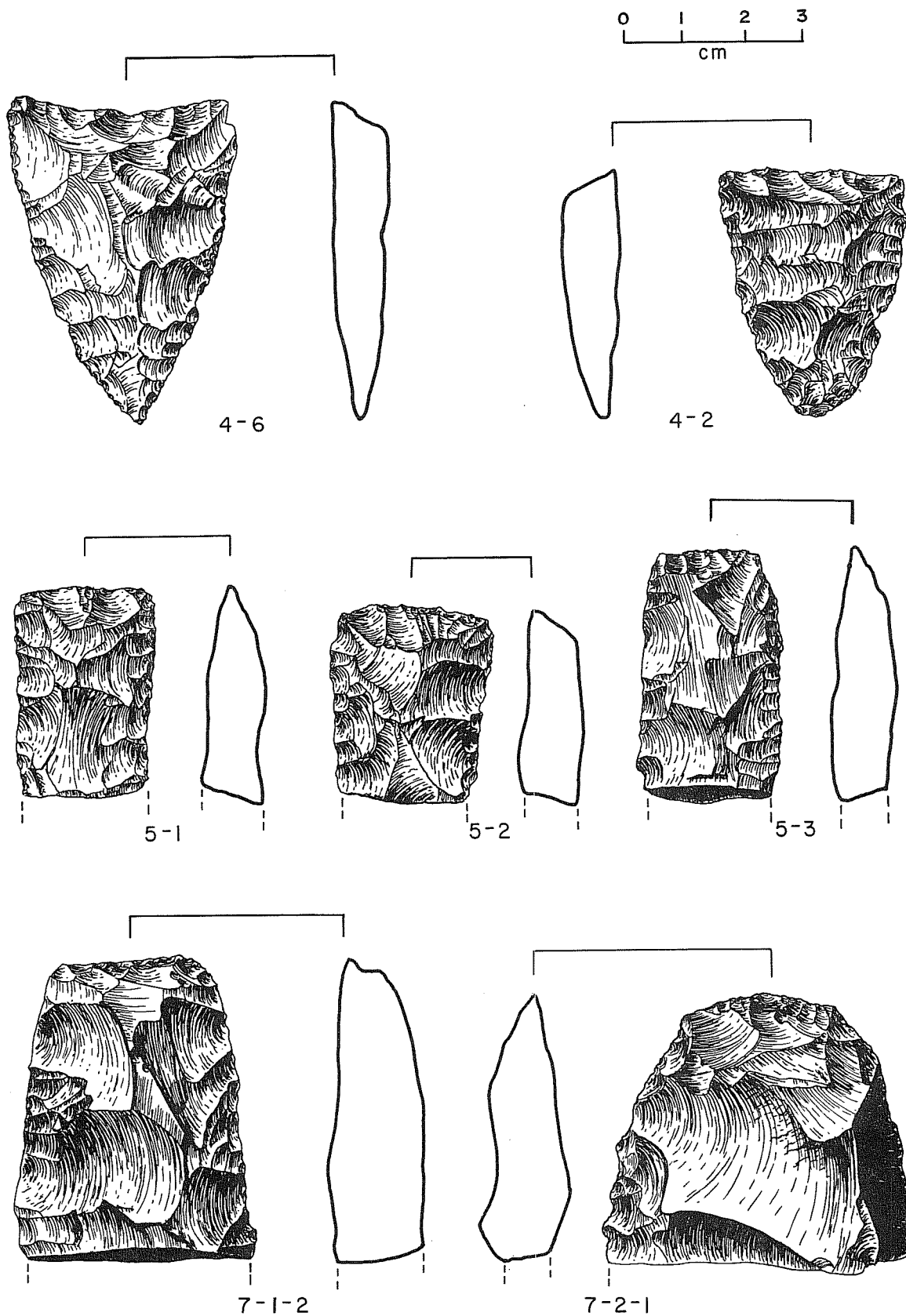


Figure 83. Distally Beveled Bifaces and Unifaces: Group 4, Group 5, and Group 7, Forms 1 and 2. Two numbers beneath an artifact indicate group and specimen number; three numbers indicate group, form, and specimen number, respectively.

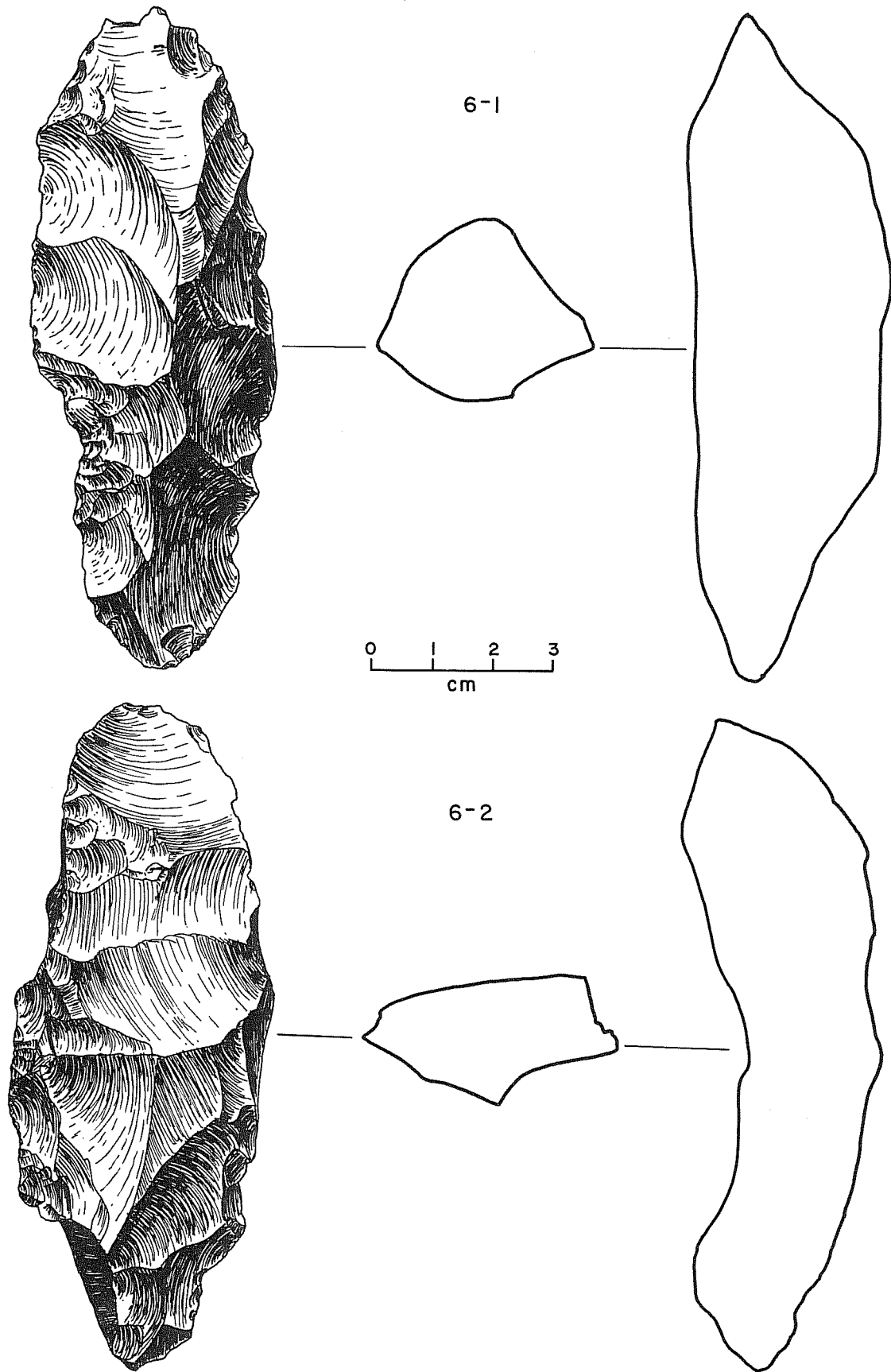


Figure 84. Distally Beveled Bifaces and Unifaces: Group 6. Numbers indicate group and specimen number.

Form 1. Triangular to Subtriangular with Steep Bevels (four specimens)

Group 8, Form 1 specimens are more-or-less triangular in outline. In contrast to the Group 1 and Group 4 triangular specimens, these pieces are abnormally thick and have very steep bevels. The thickness of the pieces, coupled with the steepness of the bevels and sides, imparts an asymmetric pyramidal configuration to the specimens.

Form 2. Steeply Beveled Sides (one specimen)

The Group 8, Form 2 specimen is irregularly triangular in outline. It is distinguished by steep dorsal sides which, in conjunction with the beveled bit, impart an asymmetrically pyramidal configuration to the dorsal face.

Form 3. Offset Bevels (two specimens)

Group 8, Form 3 specimens are distinguished by offset bevels. They are subtriangular in outline. Both are, in essence, unifacially worked. Specimen 1 is offset to the left, Specimen 2 to the right. Both retain some cortex on one face. Specimen 2 is moderately patinated.

Form 4. Broad, Flat, Triangular (two specimens)

Triangular in outline, Group 8, Form 4 specimens are unusually broad at the beveled end. They are also comparatively flat and have low-angle bits. Both are bifacially worked.

Form 5. Odd Shapes (five specimens)

Group 8, Form 5 specimens are characterized by eccentricities of outline, thickness, and dorsal face morphology. Specimen 1 is a distal fragment with an extremely steep bevel. It is quite wide and thick. Specimen 2 is subcircular in outline and has a very irregular bit. The proximal end comes to a rounded point. Specimens 3, 4, and 5 are elongate subrectangular in outline with poorly formed distal bits. Specimen 5 is made of petrified palmwood.

Provenience and metric data for the Group 8 specimens are as follows:

Form Number	Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	1	41 LK 51	298	N1033 E1062	3	99.60-99.50	6.4	3.1	1.6	27.5	53°	-
1	2	41 LK 191	1-8	Surface	-	-	4.2	3.4	1.9	25.6	62°	-
1	3	41 MC 282	1-0	Surface	-	-	4.2	4.2	2.1	35.6	76°	85
1	4	41 MC 284	1	Surface	-	-	6.5	3.9	2.2	49.2	58°	-
2	1	41 LK 243	26-4	Surface	-	-	6.2	4.0	2.0	36.3	55°	85
3	1	41 LK 74	110-0	Surface	-	-	5.2	4.1	1.1	25.8	49°	85
3	2	41 MC 294	4-0	Surface	-	-	6.6	4.1	1.5	45.4	45°	-

4	1	41 LK 243	5	Test Pit 1	5	40-50 cm	6.0	4.3	1.4	32.6	40°	85
4	2	41 MC 226	4-0	Surface	-	-	5.4	3.7	1.1	22.1	58°	-
5	1	41 LK 199	19-0	Surface	-	-	2.6*	5.6	2.0	37.2	86°	85
5	2	41 MC 196	20-19	Surface	-	-	5.4	4.7	1.2	33.6	59°	-
5	3	41 MC 213	2-61	Surface	-	-	5.6	3.9	1.5	38.6	50°	-
5	4	41 MC 288	8-15	Surface	-	-	5.7	3.6	1.6	40.8	67°	-
5	5	41 MC 288	8-17	Surface	-	-	5.8	4.4	1.8	57.4	48°	-

Group 9. Distal Fragments (seven specimens)

Group 9 specimens are distal (beveled end) fragments retaining too little of the proximal section for inclusion in the above groups and forms. Most, if not all, probably do belong in previously described categories, primarily Groups 2, 3, and 4. Provenience and metric data for the Group 9 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 74	112-0	Surface	-	-	3.6*	2.9*	0.9	*	57°	-
2	41 LK 185	45-22	Surface	-	-	*	3.6	1.0	*	61°	-
3	41 LK 201	227	N497 E997	10	98.45-98.35	*	3.9	1.7	*	74°	-
4	41 LK 201	402	N498 E996	16	97.85-97.75	*	*	0.8	*	63°	-
5	41 MC 29	92-0	Surface	-	-	*	3.9	1.6	*	78°	-
6	41 MC 94	213	Test Pit 5	2	99.80-99.70	*	3.3*	1.0	*	63°	-
7	41 MC 196	20-15	Surface	-	-	*	4.3	1.5	*	63°	-

Unifaces (20 specimens)

A uniface is a flake or flake fragment exhibiting flake scars over most or all of one face. The opposite face is the unmodified ventral side of the original flake. A uniface is distinguished from a trimmed flake in that additional chipping has served to modify the overall shape of the piece so that it no longer resembles the original flake in outline form, as does the trimmed flake specimen. Often, but not always, the unifacial shaping has obliterated the flake's striking platform, bulb of percussion, and ventral termination features.

The following five descriptive groups contain artifacts suggested to have served as "scrapers," "gouges," "adzes," or "knives." However, these specimens have not been examined for use-wear. The above function-specific terminology is strictly subjective. Some may be preforms of chipped stone tools intended for the uses suggested, or for other uses altogether.

The distinction between unifaces described in the distally beveled bifaces and unifaces section and unifaces described below is somewhat arbitrary in a

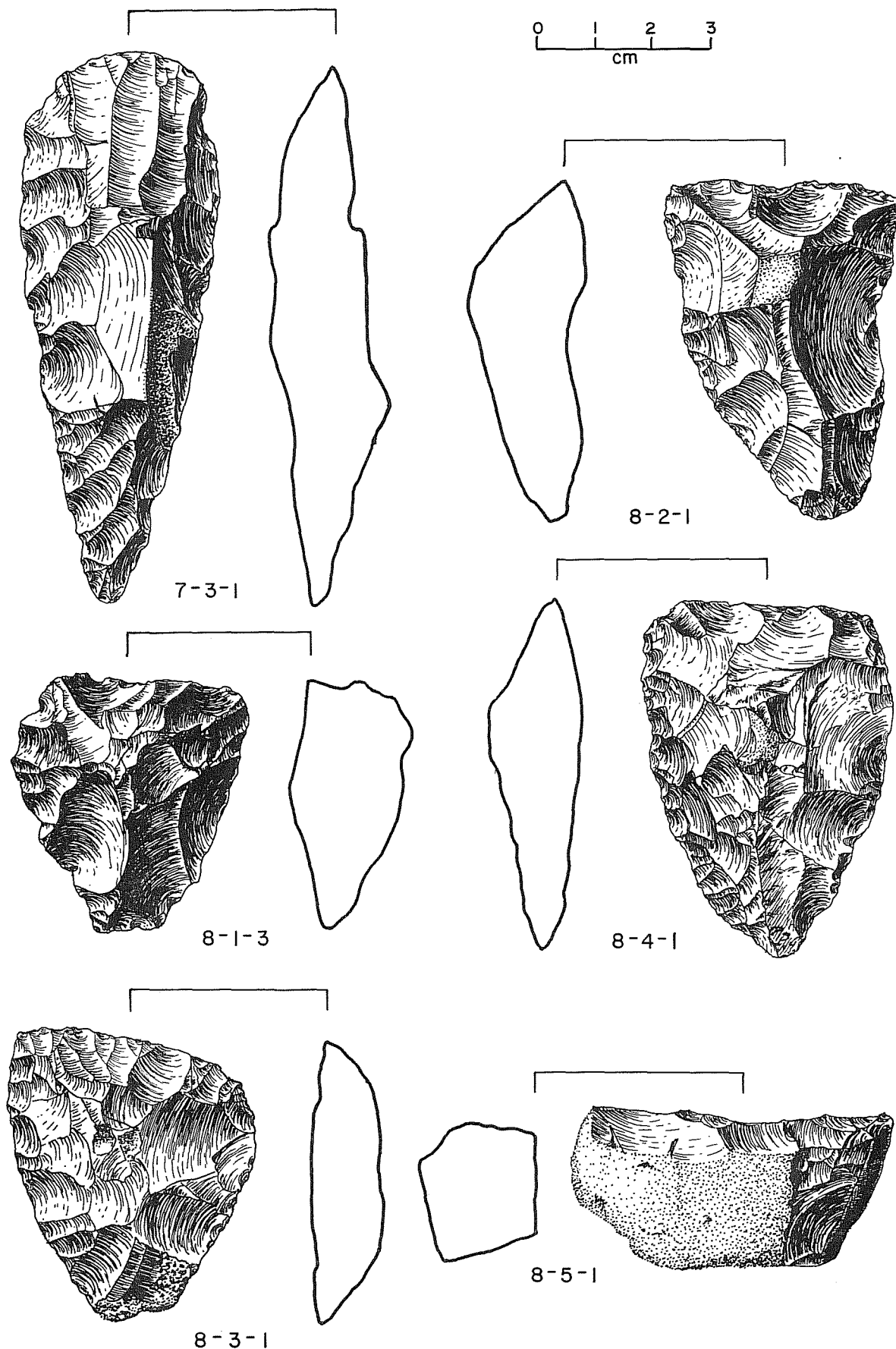


Figure 85. Distally Beveled Bifaces and Unifaces: Group 7, Form 3 and Group 8, Forms 1, 2, 3, 4, and 5. Numbers beneath artifact indicate group, form, and specimen number, respectively.

number of cases, especially in the Group 3 unifaces category. It is probable that some or all of the specimens included in this category were manufactured to serve in the same capacity as were the distally beveled tools. These flakes, however, do not assume such distinctive forms, either in outline or distal bevel morphology, as do the distally beveled specimens.

The unifaces are divided into the following categories based primarily on shape:

- Group 1. Large Elliptical
- Group 2. Subcircular to Oval
- Group 3. Triangular to Subtriangular
- Group 4. Truncated or Fragmentary with Rounded Ends
- Group 5. Irregular Shapes

Site provenience for the unifaces is provided in Table 24.

Group 1. Large Elliptical (two specimens)

Group 1 specimens are elliptical in outline and plano-convex in cross section. The convex, chipped faces are pronouncedly humped. A patch of cortex remains on the highest area of the convex face of Specimen 2. Provenience and metric data for these two specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 14	299-0	Surface	-	-	6.4	4.6	1.7	61.6	57°	86
2	41 MC 246	2-0	Surface	-	-	6.9	5.1	2.0	70.4	47°	86

Group 2. Subcircular to Oval (six specimens)

Group 2 specimens are subcircular to oval in outline, plano-convex in cross section, and uniformly smaller than Group 1 specimens. The convex faces of Specimens 4 and 5 are pronouncedly humped. Specimens 4, 5, and 6 retain patches of cortex on the convex, chipped face. Provenience and metric data for the Group 2 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 201	491-0	Surface	-	-	4.3	4.5	1.2	22.7	80°	-
2	41 MC 196	21-35	Surface	-	-	4.8	4.3	1.8	38.9	44°	86
3	41 MC 234	1-0	Surface	-	-	4.1	3.8	1.7	27.5	57°	86
4	41 MC 268	92	Surface	-	-	4.4	4.6	2.1	45.0	56°	-
5	41 MC 276	1-23	Surface	-	-	4.5	4.9	2.3	61.6	77°	86
6	41 MC 268	21-10	Surface	-	-	5.7	5.7	1.7	63.2	64°	86

Group 3. Triangular to Subtriangular (five specimens)

Group 3 unifaces are triangular to subtriangular in outline and plano-convex in cross section. They are beveled at the broad end and perhaps should be grouped with the distally beveled forms. However, these specimens do not exhibit as distinctive a form either in outline or bevel morphology as do the distally beveled artifacts. Flaking is generally rougher, and specimens are thicker relative to their length than the distally beveled specimens. Except for Specimen 5, the Group 3 unifaces retain patches of cortex on the convex, chipped face. Specimens 3, 4, and 5 are asymmetrically pyramidal in configuration, and the convex faces have pronounced humps. Provenience and metric data for the Group 3 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 128	59-0	Surface	-	-	4.9	3.8	1.3	27.2	67°	-
2	41 LK 133	17-16	Surface	-	-	5.8	5.4	1.9	67.1	54°	86
3	41 MC 29	92-0	Surface	-	-	4.8	4.8	1.9	46.2	66°	86
4	41 MC 246	1-0	Surface	-	-	3.7	5.0	1.9	38.0	75°	-
5	41 MC 282	1-0	Surface	-	-	4.6	4.2	1.4	29.7	49°	86

Group 4. Truncated or Fragmentary with Rounded Ends (three specimens)

Group 4 unifaces vary considerably in outline, from irregularly subcircular to subrectangular. All are plano-convex in cross section. These specimens all have a "stubby" appearance, and one end is worked to a rounded form. Provenience and metric data for the Group 4 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 MC 29	92-0	Surface	-	-	3.2*	3.1	1.5	14.4	52°	86
2	41 MC 196	20-7	Surface	-	-	3.0*	5.3	1.4	24.8	52°	86
3	41 MC 296	201	N1025 E995	1	99.60-99.50	2.2*	3.3	0.8	8.0	43°	86

Group 5. Irregular Shapes (four specimens)

Specimen 1 is square in outline shape. A patch of cortex remains at one end. At the corners of the other end are two graverlike beaks that appear to have been intentionally worked onto the specimen. It is heavily patinated.

Specimen 2 is long and narrow, but thick in cross section. Steep sides and a medial ridge of cortex impart a prismatic configuration to the piece. The edges are quite sinuous.

Specimen 3 is subtriangular in outline and appears to be a uniface fragment.

Specimen 4 is subcircular in outline and appears to have been broken at either end. The intact lateral edges, both slightly rounded, are retouched.

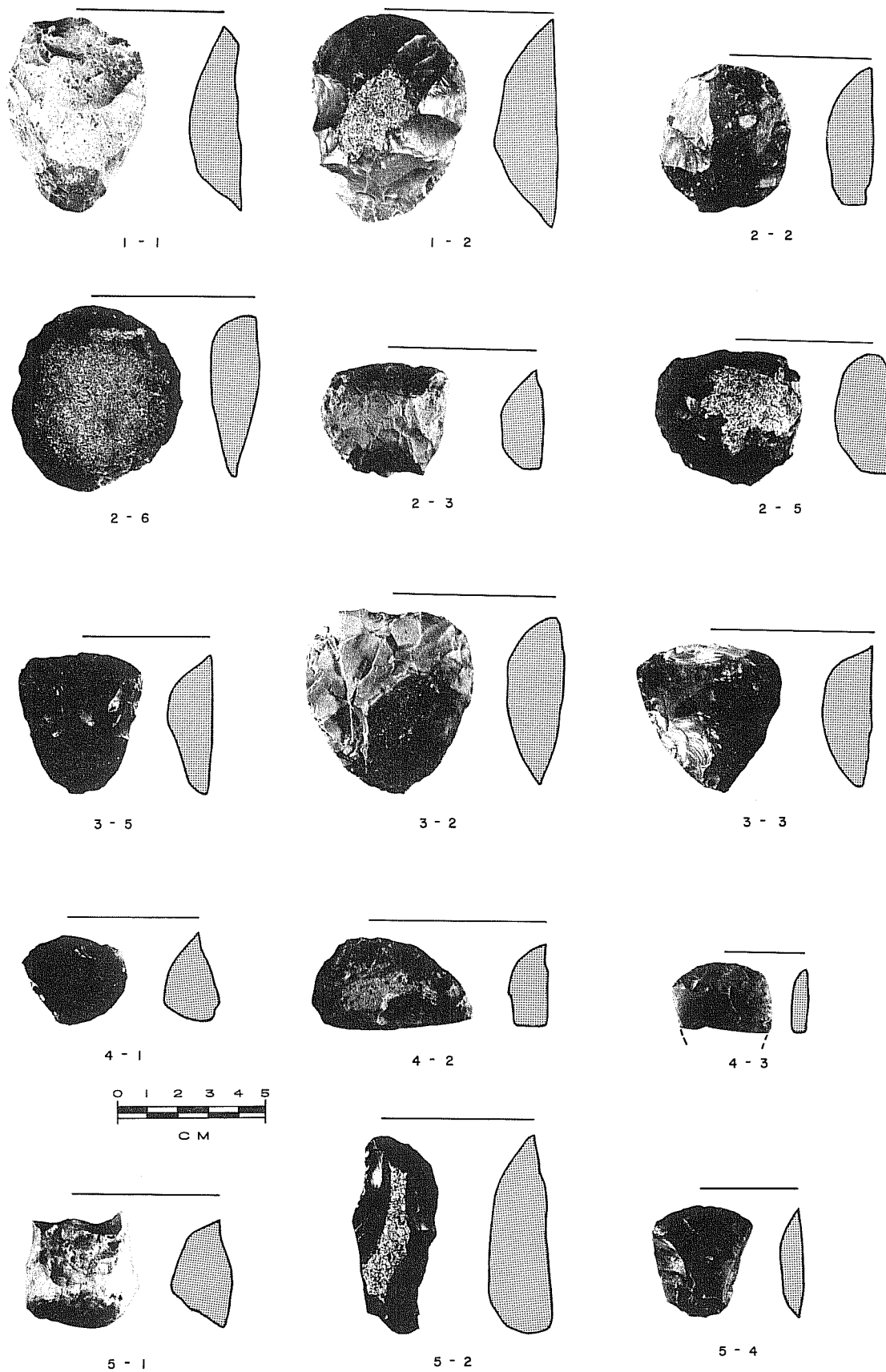


Figure 86. Unifaces: Groups 1, 2, 3, 4, and 5. Numbers beneath artifact indicate group and form number, respectively.

Provenience and metric data for the Group 5 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 199	23-0	Surface	-	-	3.9	3.7	2.1	30.9	72°	86
2	41 LK 252	1-18	Surface	-	-	6.6	2.8	2.0	36.5	62°	86
3	41 MC 55	80	N1015 E1010	1	Surf.-99.30	4.2*	3.3	1.2	*	50°	-
4	41 MC 296	99	N1024 E985	2	99.40-99.30	3.1*	3.7	0.9	*	52°	86

Trimmed Flakes (37 specimens)

Trimmed flakes are flakes or flake fragments exhibiting retouch to the extent that a working edge is formed. The flaking on these specimens has not substantially altered the original shape of the flake or flake fragment upon which the tool has been made. Like the unifaces, trimmed flakes are suggested to have served in the functional capacities of "end scrapers," "side scrapers," and "knives." Trimmed flakes are divided into four groups, based primarily on outline shape and thickness:

- Group 1. Circular to Subcircular
- Group 2. Large, Oval to Elliptical
- Group 3. Thin Blade Flakes and Flake Fragments
 - Form 1. Rectangular
 - Form 2. Triangular
 - Form 3. Convergent
 - Form 4. Divergent
 - Form 5. Distal Fragments
- Group 4. Miscellaneous Thick Flakes and Flake Fragments

Provenience for trimmed flakes is provided in Table 25.

Group 1. Circular to Subcircular (two specimens)

Group 1 trimmed flake specimens are circular to subcircular in outline and plano-convex in cross section. On Specimen 1, roughly one-third of the convex face is covered with cortex. Specimen 2 retains cortex over 90% of one face. Both retain obvious striking platforms and bulbs of percussion on the unchipped face. About one-half of the circumference of Specimen 1 is retouched. The working edge of Specimen 2 composes one-third of its circumference. Metric attributes and provenience for Group 1 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 201	663-2	N504 E1012	1	99.28-99.20	4.8	4.4	0.9	16.5	44°	-
2	41 MC 296	235	N1025 E995	6	99.10-99.00	4.4	3.8	1.3	22.7	58°	87

TABLE 24. SITE PROVENIENCE
FOR UNIFACES

Site Number	Group 1	Group 2	Group 3	Group 4	Group 5
41LK8					
41LK14	1				
41LK27					
41LK51					
41LK53					
41LK66					
41LK69					
41LK74					
41LK120					
41LK121					
41LK122					
41LK127					
41LK128			1		
41LK133			1		
41LK142					
41LK145					
41LK149					
41LK162					
41LK173					
41LK174					
41LK176					
41LK181					
41LK182					
41LK185					
41LK191					
41LK197					
41LK199					1
41LK201		1			
41LK236					
41LK243					
41LK247					
41LK250					
41LK252					1
41LK253					
41MC7					
41MC10					
41MC14					
41MC15					
41MC17					
41MC29			1	1	
41MC55					1
41MC67					
41MC75					
41MC79					
41MC94					
41MC192					
41MC193					
41MC194					
41MC196		1		1	
41MC212					
41MC213					
41MC214					
41MC222					
41MC226					
41MC234		1			
41MC235					
41MC238					
41MC242					
41MC246	1		1		
41MC251					
41MC257					
41MC260					
41MC266					
41MC267					
41MC268		2			
41MC270					
41MC275					
41MC276		1			
41MC282			1		
41MC284					
41MC288					
41MC293					
41MC294					
41MC296				1	1

TABLE 25. SITE PROVENIENCE FOR
TRIMMED FLAKES

Site Number	Group 1	Group 2	Group 3					Group 4
			Form 1	Form 2	Form 3	Form 4	Form 5	
41LK8								
41LK14								
41LK27		1						
41LK51						1		
41LK53								
41LK66								
41LK69								
41LK74								
41LK120								
41LK121								
41LK122								
41LK127								
41LK128			1	1				1
41LK133								1
41LK142								
41LK145								
41LK149								
41LK162								
41LK173								
41LK174								
41LK176								
41LK181								
41LK182							1	
41LK185								
41LK191								
41LK197								
41LK199								
41LK201	1		3	3	1	1		1
41LK236			1					
41LK243				1				
41LK247								
41LK250								1
41LK252								
41LK253								
41MC7								
41MC10								
41MC14								
41MC15								
41MC17								
41MC29								
41MC55		1			1		1	
41MC67								
41MC75								1
41MC79								
41MC94								
41MC192								
41MC193								
41MC194								
41MC196								1
41MC212								
41MC213								
41MC214								
41MC222								
41MC226								
41MC234								
41MC235								
41MC238								
41MC242		1						
41MC246								
41MC251								
41MC257			1					
41MC260								
41MC266								
41MC267								
41MC268								1
41MC270								1
41MC275								
41MC276								
41MC282								1
41MC284								
41MC288			1					
41MC293								
41MC294								1
41MC296	1	1	2				1	

Group 2. Large, Oval to Elliptical (four specimens)

Group 2 specimens are the largest of the trimmed flakes. The pieces are elongate and oval to elliptical in outline. Specimen 1 retains a cortex striking platform and bulb of percussion along one edge. There is a narrow band of cortex retained around roughly one-quarter the circumference of the piece. The cortex may have served as a "backing," permitting the artifact to be held comfortably in the hand while being used. This cortex band is opposite and slightly offset from the apparent working edge. Specimen 2 retains a platform and bulb of percussion at one end. The dorsal face is 90% covered with cortex. At the distal end, five flakes removed from the dorsal face form the apparent working surface of the tool. Like Specimen 1, Specimen 3 retains a cortex band around almost half its circumference. This cortex seems to have been left intentionally to form a "backing" opposite the working edge. The beveled working edge of Specimen 3 exhibits a somewhat steeper angle than do most of the other trimmed flakes. Specimen 4 has a cortex rim extending around the proximal end (striking platform) and halfway down each side. The configuration of all Group 2 specimens suggests that they were designed to be pulled toward the user, perhaps as scraping tools. Metric attributes and provenience for Group 2 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 27	44-0	Surface	-	-	8.8	5.3	2.2	85.4	51°	87
2	41 MC 55	88	N998 E1017	2	99.30-99.20	9.6	4.7	1.7	84.3	51°	-
3	41 MC 242	4-0	Surface	-	-	6.8	4.5	1.0	33.1	60°	-
4	41 MC 296	133	N1025 E998	2	99.50-99.40	6.9	4.4	1.7	54.4	48°	87

Group 3. Thin Blade Flakes and Flake Fragments (21 specimens)

Form 1. Rectangular (nine specimens)

Group 3, Form 1 specimens are long flakes that were apparently struck from prepared cores as evidenced by long, parallel flake scars and ridges running the length of the dorsal faces. The ridges impart a prismatic configuration to the flakes. Form 1 specimens are more-or-less rectangular in outline and prismatic in cross section, the plano surface being the ventral face of the flake. Striking platforms are retained at one end of each specimen, this end tending to be slightly narrower than the other end. Cortex patches remain on the striking platforms of three specimens and on the dorsal (convex) face of a fourth. Four specimens have been trimmed at the distal end only. Three are trimmed at the distal end and along one edge. Two are trimmed at the distal end and along both edges. Trimmed flakes of this type are elsewhere referred to as "side scrapers" and "end scrapers" and are often found in Late Prehistoric context. A Late Prehistoric affiliation is strongly indicated for these Choke Canyon specimens also. Provenience and metric attributes for Group 3, Form 1 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 128	33	Test Pit 8	2	99.70-99.60	6.4	4.8	1.0	44.4	49°	87
2	41 LK 201	660-19	N506 E1009	1	99.29-99.20	5.0	3.0	0.5	7.3	44°	-
3	41 LK 201	700-79	N508 E1013	2	99.20-99.10	5.0	2.2	0.6	8.7	52°	-
4	41 LK 201	730-190	N509 E1007	1	99.08-99.00	4.8	2.1	0.9	7.6	51°	-
5	41 LK 236	1-0	Surface	-	-	6.0	2.5	0.9	14.8	80°	87
6	41 MC 257	1-0	Surface	-	-	3.0	1.7	0.3	1.9	51°	-
7	41 MC 288	8-3	Surface	-	-	6.5	3.0	1.3	25.5	39°	87
8	41 MC 296	16	Test Pit 2	2	10-20 cm	3.6	2.2	0.5	4.1	75°	-
9	41 MC 296	243-0	Surface	-	-	5.7	1.9	0.7	7.8	34°	-

Form 2. Triangular (five specimens)

Form 2 specimens are much like Form 1 specimens except that the outline shape is triangular to subtriangular. Trimming has occurred primarily on the rounded distal ends. Specimens 2 and 5 evidence minor lateral trimming. Specimen 1 retains cortex on the striking platform and over about 25% of the dorsal surface. Artifacts like Specimen 1 are often referred to as "keel-backed scrapers." All of the flakes out of which these Form 2 specimens are made have a pronounced curvature that gives a peculiar angle to the working edge. Provenience and metric attributes for the Group 3, Form 2 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 128	1-0	Surface	-	-	6.1	4.4	1.9	43.9	52°	87
2	41 LK 201	655-13	N506 E1011	1	99.30-99.20	5.8	3.7	0.9	19.1	71°	-
3	41 LK 201	720-150	N504 E1012	2	99.20-99.10	6.0	3.4	1.4	19.1	87°	-
4	41 LK 201	730-188	N509 E1007	1	99.08-99.00	6.0	3.5	1.6	22.0	59°	-
5	41 LK 243	28-0	Surface	-	-	4.5	2.1	0.9	6.2	42°	87

Form 3. Convergent (two specimens)

Group 3, Form 3 specimens are triangular to subtriangular in outline, but unlike the Form 2 specimens, they are broadest at the platform (proximal) end and taper to a narrow, rounded end. Both specimens are plano-convex in cross section and retain cortex at the broad platform end. The configuration of the distal ends is similar to specimens in the Form 1 and Form 2 groupings. Each specimen is trimmed only at the narrow, rounded end. Provenience and metric data for the Group 3, Form 3 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 201	654	N506 E1010	1	99.30-99.20	4.2	3.7	1.9	23.2	71°	-
2	41 MC 55	67	N1007 E1015	2	99.40-99.30	5.9	4.9	1.5	32.0	54°	87

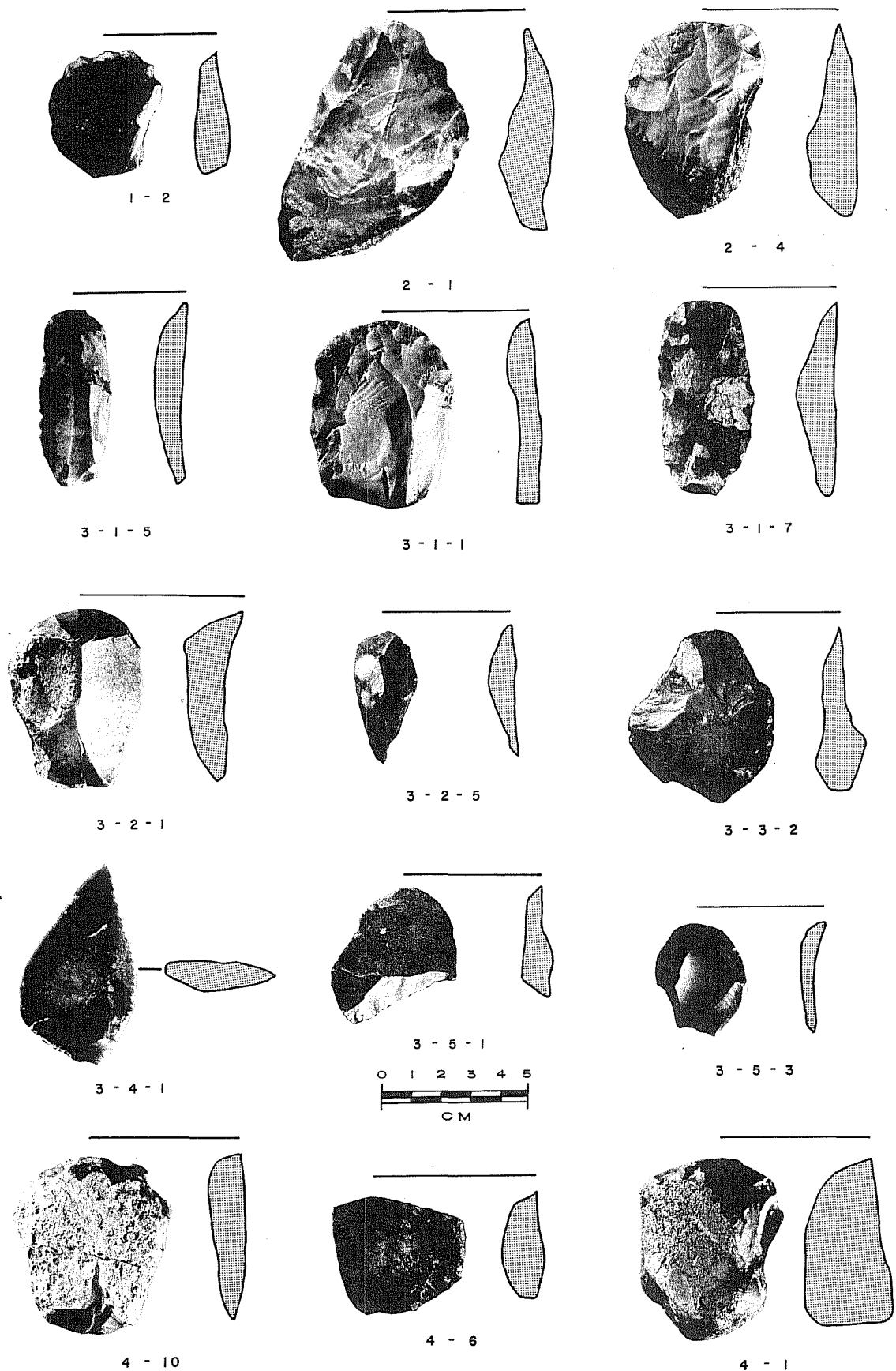


Figure 87. Trimmed Flakes: Groups 1, 2, 3 (Forms 1, 2, 3, 4, and 5), and 4. Two numbers beneath an artifact indicate group and specimen number; three numbers indicate group, form, and specimen number, respectively.

Form 4. Divergent (two specimens)

Group 3, Form 4 trimmed flake specimens are irregularly shaped, but the lateral edges generally diverge from the striking platform. Specimen 1 is distinguished by a 6.8-cm-long edge bearing small, but pronounced serrations. It has the appearance of a saw blade. Specimen 2 is trimmed distally in the fashion of Forms 1, 2, and 3. Provenience and metric data for Group 3, Form 4 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 51	226	N998 E982	15	98.40-98.30	6.9	3.9	1.0	23.5	35°	87
2	41 LK 201	491-0	Surface	-	-	5.7	4.3	0.9	20.0	77°	-

Form 5. Distal Fragments (three specimens)

Group 3, Form 5 trimmed flakes are very similar in appearance to the distal ends of other specimens in Group 3, especially Forms 1, 2, and 3. They are probably fragments of such complete forms. Provenience and metric data for Group 3, Form 5 specimens are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 182	1-0	Surface	-	-	5.0*	4.2	1.0	*	74°	87
2	41 MC 55	87	N998 E1017	1	Surf.-99.30	2.4*	2.4	0.5	*	54°	-
3	41 MC 296	149	N1026 E997	2	99.50-99.40	4.0*	3.1	0.5	*	48**	87

Group 4. Miscellaneous Thick Flakes and Flake Fragments (10 specimens)

Specimen 1 is made on a small, split cobble and has cortex remaining over most of the dorsal surface. Trimming was done unifacially at the distal end to form a beveled working edge similar in configuration to those of Group 3, Forms 1, 2, and 3. The trimming was done on the cortex side, thus removing perhaps 25% of the cortex from that face. The cortex provides a comfortable "backing" opposite the working end.

Specimen 2 retains a pronounced bulb of percussion at the proximal end. It diverges broadly to a unifacially trimmed working edge at the distal end.

Specimen 3 is an irregularly shaped flake. The trimmed edge is lateral to the bulb of percussion. The edge opposite the trimmed side retains cortex to form a comfortable "backing."

Specimen 4 is heavily burned and irregular in outline shape. The trimmed edge is opposite the bulb of percussion.

Specimen 5 is subtriangular in outline shape and is similar in general configuration to Group 3, Form 2 distally beveled bifaces and unifaces. However, it does not exhibit the intentional shaping characteristic of that particular group of artifacts.

Specimen 6 is a thick flake that retains cortex over most of the dorsal face. The bulb of percussion is at the proximal end. The lateral edges are squared and expand slightly to the working edge opposite the bulb. Unifacial trimming on the cortex face forms the working edge.

Specimen 7 is subtriangular in outline shape and is trimmed on both lateral edges expanding away from the bulb of percussion at the proximal end. The distal end is untrimmed.

Specimen 8 is made on a thick cortex flake; the trimmed edge is opposite and slightly offset from the bulb of percussion at the proximal end.

Specimen 9 is very irregular in outline shape. This piece has a trimmed edge apparently worked over the flake's bulb of percussion. Opposite the working edge, there is a narrow band of cortex forming a backing.

Specimen 10 has a rounded broad end that tapers to the opposite end which is more squared. Each end is trimmed on the dorsal face with the intervening area retaining a cortex cover.

The provenience and metric data for Group 4 trimmed flakes are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 128	22	Test Pit 6	3	99.60-99.50	5.7	4.7	3.0	102.0	66°	87
2	41 LK 133	17-14	Surface	-	-	3.2	5.1	1.4	24.4	46°	-
3	41 LK 201	720-146	N504 E1012	2	99.20-99.10	3.8	3.9	1.1	17.4	46°	-
4	41 LK 250	7	Test Pit 1	7	60-70 cm	3.3	4.3	1.1	16.5	42°	-
5	41 MC 75	34-0	Surface	-	-	3.8	4.0	1.5	21.6	62°	-
6	41 MC 196	26-0	Surface	-	-	3.9	4.5	1.4	27.4	61°	87
7	41 MC 268	21-9	Surface	-	-	5.3	4.9	1.6	38.7	70°	-
8	41 MC 270	22-0	Surface	-	-	4.4	5.4	1.7	44.1	50°	-
9	41 MC 282	1-0	Surface	-	-	4.2	6.5	1.0	30.1	41°	-
10	41 MC 294	4-0	Surface	-	-	6.0	5.4	1.4	45.0	62°	87

Obsidian Core Fragment

A small piece of obsidian bearing flake scars on both faces was recovered from Level 1 (surface to 99.81 m) of Unit N1026 E1042 at 41 LK 51. Subcircular in outline shape; metric attributes for this piece are: length, 3.1 cm; width, 2.4 cm; thickness, 0.9 cm; and weight, 4.9 g. Results of trace element analysis and comments on the origin of this obsidian are provided in Appendix V.

Debitage

A total of 62,153 pieces of lithic debitage was recovered from 18 prehistoric sites excavated during the Phase II investigation at Choke Canyon. Debitage

totals by site are presented in Table 26. This total does not include debitage recovered from 41 LK 201. The 41 LK 201 collection is reported by Highley (1986).

All debitage recovered from Phase II controlled excavations was sorted by catalog lot (usually representing all debitage found in a 5-cm or 10-cm vertical level excavated in a 1-m² unit) into the following categories: primary flakes, secondary flakes, tertiary flakes, chips, and chunks. A total and percentage for each category were recorded and are presented in Table 27. Pieces in each category were then classified according to flake platform characteristics (for flakes) and degree of cortex removal (for chips and chunks). Subtotals for these divisions were recorded within each category. The number of modified or trimmed pieces within each division was recorded. A detailed presentation of the debitage data is in Appendix VI to this report.

TABLE 26. DEBITAGE TOTALS BY SITE

<u>Site</u>	<u>Total Pieces</u>		<u>Site</u>	<u>Total Pieces</u>
41 LK 8	4599		41 LK 243	663
41 LK 14	4680		41 LK 250	317
41 LK 51	10,346		41 MC 29	683
41 LK 53	4503		41 MC 55	2521
41 LK 74	3868		41 MC 94	1503
41 LK 128	2734		41 MC 196	321
41 LK 133	55		41 MC 222	4980
41 LK 142	39		41 MC 268	2729
41 LK 185	189		41 MC 296	17,423

Note: See Table 56 in Appendix VI for the site by site breakdown of debitage into the 53 analytical/descriptive units.

The following definitions of the debitage categories were adapted from studies by Crabtree (1972), Shafer (1969) and Mallouf (1976).

A primary flake retains cortex over its entire external or dorsal surface and is the result of the initial testing and/or removal of cortex from a cobble core. A primary flake may have a striking platform devoid of cortex.

A secondary flake retains 1-99% cortex on its external or dorsal surface as a result of having been struck from a core partially free of cortex.

A tertiary flake, including its striking platform, is devoid of cortex.

TABLE 27. TOTAL AND PERCENTAGE OF DEBITAGE RECOVERED DURING PHASE II EXCAVATIONS

SITE	<u>PRIMARY FLAKES</u>		<u>SECONDARY FLAKES</u>		<u>TERTIARY FLAKES</u>		<u>CHIPS</u>		<u>CHUNKS</u>	
	COUNT	PERCENTAGE	COUNT	PERCENTAGE	COUNT	PERCENTAGE	COUNT	PERCENTAGE	COUNT	PERCENTAGE
41 LK 8	74	1.60	619	13.46	1230	26.75	2465	53.60	211	4.59
41 LK 14	57	1.22	868	18.55	1486	31.75	2253	48.14	16	0.34
41 LK 51	74	0.72	1236	11.95	2707	26.16	6112	59.08	217	2.09
41 LK 53	25	0.55	502	11.15	1183	26.27	2600	57.74	193	4.29
41 LK 74	59	1.53	657	16.98	985	25.46	2106	54.45	61	1.58
41 LK 128	55	2.01	510	18.65	751	27.47	1414	51.72	4	0.15
41 LK 133	3	5.45	7	12.73	12	21.82	31	56.36	2	3.64
41 LK 142	3	7.69	11	28.21	7	17.95	16	41.03	2	5.12
41 LK 185	3	1.59	38	20.11	46	24.34	88	46.56	14	7.40
41 LK 243	6	0.91	121	18.25	150	22.62	352	53.09	34	5.13
41 LK 250	9	2.84	58	18.29	59	18.61	188	59.31	3	0.95
41 MC 29	15	2.20	134	19.62	206	30.16	324	47.44	4	0.58
41 MC 55	28	1.11	315	12.50	518	20.54	1623	64.38	37	1.47
41 MC 94	16	1.06	252	16.77	483	32.14	752	50.03	0	0
41 MC 196	5	1.56	78	24.30	72	22.43	158	49.22	8	2.49
41 MC 222	62	1.24	679	13.63	1331	26.73	2809	56.41	99	1.99
41 MC 268	66	2.42	551	20.19	775	28.40	1285	47.08	52	1.91
41 MC 296	162	0.93	2386	13.69	4556	26.15	9985	57.31	334	1.92

A cortex platform flake possesses a platform of unmodified, weathered cortex.

A single facet platform flake possesses a platform consisting of a single removal scar (facet) produced by previous knapping.

A multiple facet platform flake possesses a platform consisting of two or more facets produced by previous knapping. It has been subdivided into small (<1 cm) and large (>1 cm) according to the width of combined facets.

Lipped flakes "have multifaceted, lenticular-shaped striking platforms and a characteristic lip or ridge which is at right angles to the axis of removal on the ventral side. The striking platforms are bifacially prepared and multifaceted. The dorsal side of the flake is multifaceted and rarely exhibits cortex. Lipped flakes are characteristically thin and arched" (Shafer 1969:4).

A chip is a portion of a flake which has no platform because of breakage, crushing, or shattering. The chips are subdivided into primary, secondary, and tertiary according to the amount of cortex remaining on the external surface.

A chunk is a fragment showing no striking platform and no force rings (bulbs of percussion) emanating from the direction of applied force. Thickness approaches maximum length and width. It is too small to be a core and too large and massive to qualify as a chip. Chunks are subdivided into primary, secondary, and tertiary according to the amount of cortex remaining on the external surface.

A modified flake or chip may have been used as a tool. Such use is evidenced by minute nicking, battering, or polish along the edge(s) of the flake or chip.

A trimmed flake or chip exhibits intentional edge preparation through removal of a uniform series of tiny flakes along an edge. It is distinguished from modified flakes and chips in that human alteration of the piece is unquestionable (Mallouf 1976).

For primary flakes, the "Other Platform Types" division was intended to include lipped and multiple facet platform flakes, both of which were very minor elements of the primary flake collection.

Among secondary and tertiary flakes, lipping was a characteristic given precedence over platform faceting. Lipped flakes had either single facet or multiple facet platforms, but were always counted as lipped flakes.

Modified flakes were recognized through unenhanced eye inspection of the debitage as it was being sorted. No microscopic inspection was attempted. It is therefore likely that some modified flakes were not seen and that some believed to be modified actually were not.

HAMMERSTONES (six specimens)

Six cobbles or cobble fragments having the appearance of hammerstones were recovered. The hammerstone function for these objects is suggested on the basis of their overall configuration and the presence of battering on one or both of their ends. Provenience and metric data for the hammerstones are as follows:

Specimen Number	Site	Lot	Unit	Level	Elevation	Length	Width	Thickness	Weight	Bevel Angle	Figure Number
1	41 LK 14	201	N1007 E958	6	-	7.6	3.7	2.9	94.9	-	92,i
2	41 LK 14	242	N1009 E1000	2	-	2.7*	4.4	2.4	41.4*	-	-
3	41 MC 55	65	N1008 E1015	1	-	6.6	6.8	3.5	213.8	-	-
4	41 MC 55	79	N1009 E1016	2	-	2.3*	4.9	3.0	48.8*	-	-
5	41 MC 55	83	N1014 E1011	1	-	7.0	5.2	4.6	240.0	-	92,g
6	41 MC 296	25-19	Surface	-	-	5.6	4.1	3.0	94.9	-	92,h

Except for Specimen 3, a chert cobble, all of these specimens are made of fine-to medium-grained quartzite. Specimens 1, 2, and 6 are grayish red to purple to red in color. Specimen 4 is a brown quartzite. Specimens 2 and 4 are fragmentary.

MODIFIED SANDSTONE (391 specimens)

The sandstone artifacts are divided into the following categories for descriptive purposes:

- Group 1. Smoothed Slabs and Slab Fragments with Flat and/or Concave Faces
 - Form 1. Large
 - Form 2. Medium
 - Form 3. Small
- Group 2. Subcircular to Angular Pieces with Flat and/or Convex Faces
 - Form 1. Wedge-Shaped Cross Section
 - Form 2. Lenticular Cross Section
 - Form 3. Fragments
- Group 3. Grooved Pieces

Specimens from each group (although not all forms) are illustrated in Figures 88-91. Site provenience is provided in Table 28, and provenience of sub-surface specimens is shown in Table 29.

Group 1. Smoothed Slabs and Slab Fragments with Flat and/or Concave Faces
(158 specimens)

Group 1 modified sandstone is divided into three forms based on maximum length. Five essentially complete grinding slabs and numerous angular fragments are included which, by virtue of one or more smoothed faces, are thought to be portions of slabs similar to the complete specimens. Smoothed

TABLE 28. PROVENIENCE OF MODIFIED SANDSTONE BY SITE

Site No.	Group 1			Group 2			Group 3
	Form 1	Form 2	Form 3	Form 1	Form 2	Form 3	
41LK8							
41LK14			1	1	1	1	1
41LK27							
41LK51		1	2		3	6	3
41LK53				1		3	3
41LK66							
41LK69							
41LK74		1					
41LK120				2	1		
41LK121							
41LK122							
41LK127							
41LK128		1					
41LK133							
41LK142							
41LK145							
41LK149							
41LK162							
41LK173							
41LK174					2		1
41LK176							
41LK181							
41LK182							
41LK185					1		1
41LK191			2				
41LK197							
41LK199							
41LK201		4	24	5	2	5	7
41LK236							
41LK243			4	1	3	2	
41LK247							
41LK250	1		2		1		1
41LK252							
41LK253							
41MC7							
41MC10							
41MC14							
41MC15							
41MC17							
41MC29			2		2	1	1
41MC55		1	4			2	
41MC67							
41MC75							
41MC79							
41MC94		1	1	1		2	
41MC192							
41MC193							
41MC194							
41MC196	2		21	3	6	6	
41MC212					1		
41MC213	3						
41MC214							
41MC222	2	5	10		9	20	4
41MC226							
41MC234							
41MC235							
41MC238	1		2		3	1	1
41MC242			1		1		
41MC246							
41MC251			1				
41MC257	1				1		
41MC260			1	2			1
41MC266							
41MC267							
41MC268	1	3	8	3	15	7	3
41MC270			2		3		
41MC275		1	2		1		
41MC276					1		
41MC282	1						
41MC284							
41MC288					2		
41MC293					1		
41MC294				1	1		
41MC296	5	5	58	7	10	16	6

TABLE 29. PROVENIENCE OF MODIFIED SANDSTONE RECOVERED IN EXCAVATIONS

SITE	UNIT	LEVEL	ELEVATION	SITE	UNIT	LEVEL	ELEVATION
<u>GROUP 1, FORM 1</u>				<u>GROUP 1, FORM 3 (continued)</u>			
41 MC 222	N101 E91	3	98.85-98.80	41 MC 222	N102 E88	3	98.90-98.85
41 MC 222	N103 E90	5	98.90-98.85	41 MC 222	N102 E91	5	98.85-98.80
41 MC 296	Test Pit 2	8	70-80 cm	41 MC 222	N104 E85	1	Surf. -98.90
<u>GROUP 1, FORM 2</u>				41 MC 222	N113 E83	4	98.90-98.80
41 LK 51	N1010 E1011	8	99.20-99.10	41 MC 268	N995 E982	2	99.40-99.30
41 LK 74	N1071 E857	3	100.10-100.00	41 MC 268	N995 E982	3	99.30-99.20
41 LK 201	N499 E997	3	99.15-99.05	41 MC 268	N995 E982	3	99.30-99.20
41 LK 201	N498 E997	11	98.35-98.25	41 MC 268	N995 E998	3	99.30-99.20
41 LK 201	N504 E1012	2	99.20-99.10	41 MC 296	Test Pit 1	1	0-10 cm
41 LK 201	N506 E1011	2	99.20-99.10	41 MC 296	Test Pit 1	2	10-20 cm
41 MC 55	N994 E1017	2	99.30-99.20	41 MC 296	Test Pit 2	4	30-40 cm
41 MC 222	N102 E90	6	98.75-98.70	41 MC 296	Test Pit 2	8	70-80 cm
41 MC 222	N103 E89	8	98.75-98.70	41 MC 296	N1022 E985	6	99.00-98.90
41 MC 268	Test Pit 1	5	40-50 cm	41 MC 296	N1022 E987	2	99.40-99.30
41 MC 296	N1023 E987	4	99.20-99.10	41 MC 296	N1022 E987	3	99.30-99.20
41 MC 296	N1024 E985	4	99.20-99.10	41 MC 296	N1022 E987	4	99.20-99.10
41 MC 296	N1025 E999	3	99.40-99.30	41 MC 296	N1022 E987	5	99.10-99.00
41 MC 296	N1027 E995	6	99.10-99.00	41 MC 296	N1022 E987	8	98.80-98.70
<u>GROUP 1, FORM 3</u>				41 MC 296	N1023 E985	1	Surf. -99.40
41 LK 14	N1010 E1002	9	99.00-98.90	41 MC 296	N1023 E985	7	98.90-98.80
41 LK 51	N998 E981	7	99.20-99.10	41 MC 296	N1023 E986	3	99.30-99.20
41 LK 51	N1025 E1041	6	99.40-99.30	41 MC 296	N1024 E985	1	Surf. -99.40
41 LK 201	N491 E1042	2	98.65-98.55	41 MC 296	N1024 E985	2	99.40-99.30
41 LK 201	N497 E998	3	99.15-99.05	41 MC 296	N1024 E985	4	99.20-99.10
41 LK 201	N499 E996	3	99.15-99.05	41 MC 296	N1024 E985	4	99.20-99.10
41 LK 201	N499 E997	5	98.95-98.85	41 MC 196	N1024 E985	4	99.20-99.10
41 LK 201	N500 E996	1	Surf. -99.25	41 MC 296	N1024 E985	5	99.10-99.00
41 LK 201	N497 E996	1	98.45-98.35	41 MC 296	N1024 E986	1	Surf. -99.40
41 LK 201	N497 E997	13	98.15-98.05	41 MC 296	N1024 E986	1	Surf. -99.40
41 LK 201	N498 E996	13	98.15-98.05	41 MC 296	N1024 E986	7	98.90-98.80
41 LK 201	N498 E996	13	98.15-98.05	41 MC 296	N1025 E997	3	99.40-99.30
41 LK 201	N498 E996	14	98.05-97.95	41 MC 296	N1026 E998	2	99.40-99.30
41 LK 201	N499 E996	15	97.95-97.85	41 MC 296	N1027 E997	1	Surf. -99.50
41 LK 201	N500 E996	15	97.95-97.85	41 MC 296	N1027 E997	1	Surf. -99.50
41 LK 201	N500 E996	15	97.95-97.85	41 MC 296	N1027 E998	5	99.20-99.10
41 LK 201	N499 E997	15	97.95-97.85	41 MC 296	N1025 E995	4	99.30-99.20
41 LK 201	N499 E997	15	97.95-97.85	41 MC 296	N1027 E978	4	99.30-99.20
41 LK 201	N504 E1013	1	99.28-99.20	41 MC 296	N1022 E989	2	99.50-99.40
41 LK 201	N506 E1010	2	99.20-99.10	41 MC 296	N1022 E989	2	99.50-99.40
41 LK 201	N504 E1011	1	99.33-99.20	41 MC 296	N1026 E978	6	99.10-99.00
41 LK 201	N508 E1007	1	99.20-99.10	41 MC 296	N1026 E978	6	99.10-99.00
41 LK 201	N509 E1007	1	99.08-99.00	41 MC 296	N1025 E995	5	99.20-99.10
41 LK 243	Hearth #4			41 MC 296	N1027 E978	6	99.10-99.00
41 LK 250	Test Pit 1	7	60-70 cm	41 MC 296	N1027 E978	6	99.10-99.00
41 MC 29	N998 E1011	1	99.90-98.80	41 MC 296	N1023 E989	2	99.50-99.40
41 MC 29	N998 E1012	6	99.40-99.30	41 MC 296	N1023 E989	2	99.50-99.40
41 MC 55	N1008 E1015	1	99.42-99.30	41 MC 296	N1023 E989	2	99.50-99.40
41 MC 55	N1014 E1011	1	Surf. -99.30	41 MC 296	N1024 E989	4	99.30-99.20
41 MC 55	N1016 E1011	1	Surf. -99.30	41 MC 296	N1024 E989	4	99.30-99.20
41 MC 55	N998 E1017	4	99.10-99.00	41 MC 296	N1024 E989	4	99.30-99.20
41 MC 94	Test Pit 2	3	99.60-99.50	<u>GROUP 2, FORM 1</u>			
41 MC 196	Test Pit 1	1	0-10 cm	41 LK 14	N1009 E1002	3	99.60-99.50
41 MC 196	Test Pit 1	1	0-10 cm	41 LK 53	N1002 E1002	5	99.30-99.20
41 MC 196	Test Pit 1	2	10-20 cm	41 LK 201	N498 E997	10	98.45-98.35
41 MC 196	Test Pit 1	2	10-20 cm	41 LK 201	N490 E1043	13	97.55-97.45
41 MC 196	Test Pit 1	2	10-20 cm	41 LK 201	N499 E997	10	98.45-98.35
41 MC 196	Test Pit 1	3	20-30 cm	41 LK 201	N510 E1020	6	98.95-98.90
41 MC 222	N100 E86	2	98.70-98.65	41 LK 201	N510 E1021	3	99.10-99.05
41 MC 222	N100 E91	5	98.65-98.60	41 MC 196	Test Pit 1	1	0-10 cm
41 MC 222	N101 E91	2	98.90-98.85	41 MC 196	Test Pit 1	2	10-20 cm

TABLE 29. (continued)

SITE	UNIT	LEVEL	ELEVATION	SITE	UNIT	LEVEL	ELEVATION
GROUP 2, FORM 1 (continued)				GROUP 2, FORM 3 (continued)			
41 MC 268	N995 E982	4	99.20-99.10	41 MC 222	N97 E86	4	98.50-98.45
41 MC 268	N995 E998	9	98.70-98.60	41 MC 222	N99 E89	3	98.70-98.65
41 MC 296	Test Pit 1	5	40-50 cm	41 MC 222	N99 E90	4	98.65-98.60
41 MC 296	Test Pit 2	8	70-80 cm	41 MC 222	N99 E91	4	98.65-98.60
41 MC 296	N1022 E986	2	99.40-99.30	41 MC 222	N100 E89	3	98.75-87.70
41 MC 296	N1024 E985	4	99.20-99.10	41 MC 222	N100 E89	3	98.75-98.70
41 MC 296	N1024 E987	2	99.40-99.30	41 MC 222	N100 E90	1	Surf. -98.80
41 MC 296	N1024 E987	3	99.30-99.20	41 MC 222	N100 E90	3	98.75-98.70
41 MC 296	N1025 E995	5	99.20-99.10	41 MC 222	N101 E91	2	98.90-98.85
GROUP 2, FORM 2				41 MC 222	N102 E88	2	98.95-98.85
41 LK 14	N1009 E1002	3	99.60-99.50	41 MC 222	N102 E91	2	99.00-98.95
41 LK 51	N998 E984	6	99.30-99.20	41 MC 222	N102 E91	3	98.95-98.90
41 LK 51	N998 E984	11	98.80-98.70	41 MC 222	N104 E85	3	98.85-98.80
41 LK 51	N1034 E1065	9	99.10-99.00	41 MC 222	N112 E79	4	98.70-98.60
41 LK 201	N491 E1044	10	97.85-97.75	41 MC 222	N113 E83	3	99.00-98.90
41 LK 201	N500 E996	5	98.95-98.85	41 MC 222	N113 E83	3	99.00-98.90
41 MC 29	N998 E1013	6	99.40-99.30	41 MC 222	N119 E80	1	Surf. -99.00
41 MC 29	N999 E1013	2	99.80-99.70	41 MC 222	N119 E80	1	Surf. -99.00
41 MC 222	N97 E87	4	98.60-98.55	41 MC 268	N994 E982	3	99.30-99.20
41 MC 222	N100 E86	2	98.70-98.65 ⁴⁰	41 MC 268	N995 E982	3	99.30-99.20
41 MC 222	N100 E91	2	98.80-98.75	41 MC 268	N995 E999	6	99.00-98.90
41 MC 222	N101 E89	2	98.80-98.75	41 MC 296	N1022 E986	3	99.30-99.20
41 MC 222	N101 E91	3	98.85-98.80	41 MC 296	N1022 E986	6	99.00-98.90
41 MC 222	N110 E87	3	99.10-99.00	41 MC 296	N1022 E987	3	99.30-99.20
41 MC 268	N995 E998	3	99.30-99.20	41 MC 296	N1022 E987	9	98.70-98.60
41 MC 268	N995 E999	5	99.10-99.00	41 MC 296	N1023 E985	5	99.10-99.00
41 MC 268	N996 E998	2	99.40-99.30	41 MC 296	N1023 E985	5	99.10-99.00
41 MC 268	N996 E998	3	99.30-99.20	41 MC 296	N1024 E985	7	98.90-98.80
41 MC 296	N1022 E987	6	99.00-98.90	41 MC 296	N1027 E998	5	99.20-99.10
41 MC 296	N1023 E985	3	99.30-99.20	41 MC 296	N1027 E999	1	Surf. -99.50
41 MC 296	N1023 E985	5	99.10-99.00	41 MC 296	N1024 E989	2	99.50-99.40
41 MC 296	N1024 E986	1	Surf. -99.40	41 MC 296	N1027 E978	3	99.40-99.30
41 MC 296	N1024 E986	4	99.20-99.10	41 MC 296	N1026 E995	4	99.30-99.20
41 MC 296	N1024 E987	1	Surf. -99.40	41 MC 296	N1027 E978	6	99.10-99.00
41 MC 296	N1025 E998	3	99.40-99.30	41 MC 296	N1023 E989	2	99.50-99.40
41 MC 296	N1024 E989	3	99.40-99.30	41 MC 296	N1023 E989	3	99.40-99.30
GROUP 2, FORM 3				GROUP 3			
41 LK 14	N1008 E1002	9	99.00-98.90	41 LK 14	N1009 E1002	7	99.20-99.10
41 LK 51	N999 E982	3	99.60-99.50	41 LK 51	N999 E982	2	99.70-99.60
41 LK 51	N999 E984	2	99.70-99.60	41 LK 51	N998 E981	11	98.80-98.70
41 LK 51	N999 E984	4	99.50-99.40	41 LK 51	N1025 E1041	3	99.70-99.60
41 LK 51	N998 E981	7	99.20-99.10	41 LK 53	N1002 E1002	5	99.30-99.20
41 LK 51	N1026 E1039	1	Surface	41 LK 53	N1002 E1003	5	99.30-99.20
41 LK 51	N1025 E1042	4	99.60-99.50	41 LK 53	N1002 E1004	8	99.00-98.90
41 LK 53	N1001 E1003	2	99.60-99.50	41 LK 201	N492 E1042	3	98.55-98.45
41 LK 53	N1001 E1003	8	99.00-98.90	41 LK 201	N497 E998	6	98.85-98.75
41 LK 53	N1002 E1002	5	99.30-99.20	41 LK 201	N499 E997	5	98.95-98.85
41 LK 201	N491 E1044	5	98.35-98.25	41 LK 201	N491 E1043	13	97.55-97.45
41 LK 201	N500 E996	5	98.95-98.85	41 LK 201	N508 E1013	2	99.20-99.10
41 LK 201	N497 E997	13	98.15-98.05	41 LK 201	N509 E1013	2	99.20-99.10
41 LK 201	N498 E996	14	98.05-97.95	41 LK 201	N509 E1008	2	99.10-99.00
41 LK 201	N506 E1010	2	99.20-99.10	41 MC 29	N997 E1012	6	99.40-99.30
41 LK 243	Hearth #4			41 MC 222	N98 E91	2	98.70-98.65
41 MC 29	N999 E1011	4	99.60-99.50	41 MC 222	N119 E80	1	Surf. -99.00
41 MC 55	N1007 E1015	2	99.40-99.30	41 MC 268	Test Pit 3	3	20-30 cm
41 MC 55	N1009 E1013	2	99.30-99.20	41 MC 268	N995 E982	3	99.30-99.20
41 MC 94	Test Pit 1	7	99.10-99.00	41 MC 296	Test Pit 1	6	50-60 cm
41 MC 94	Test Pit 1	8	99.00-98.90	41 MC 296	N1023 E985	5	99.10-99.00
41 MC 222	N97 E86	3	98.55-98.50	41 MC 296	N1023 E987	4	99.20-99.10
				41 MC 296	N1026 E998	7	99.00-98.90
				41 MC 296	N1027 E998	5	99.20-99.10

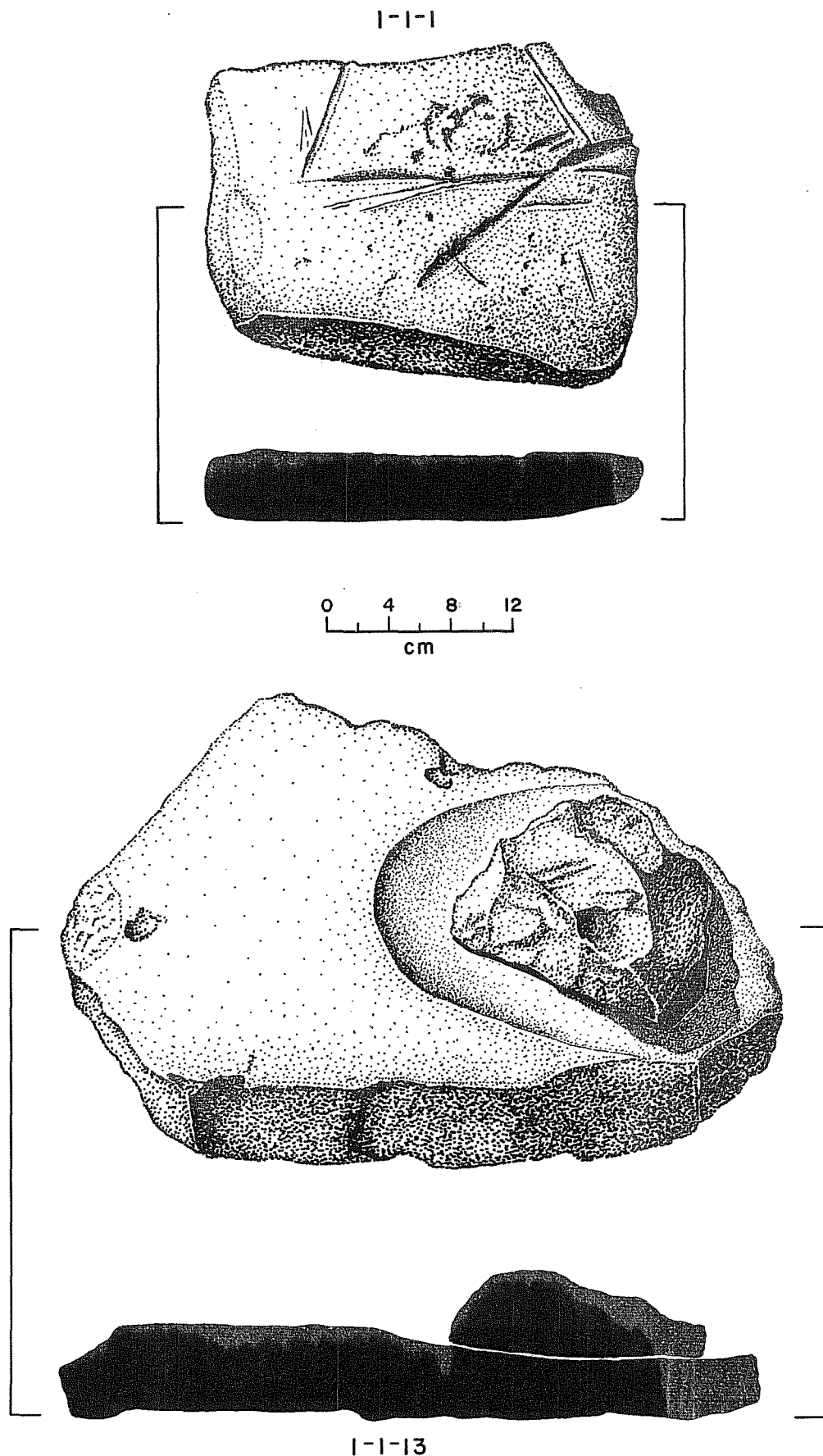


Figure 88. Modified Sandstone: Group 1, Form 1, Specimens 1 and 13. Numbers beneath artifact indicate group, form, and specimen number, respectively.

faces of all specimens in Group 1 are either flat or shallowly concave. On the complete slabs, these smoothed surfaces are obviously grinding facets, usually assuming a long, oval shape. Smoothing and distinctive curvatures on the fragmentary specimens suggest that they were once part of whole grinding slabs. The assumed function of these slabs was to grind, pulp, or otherwise process vegetal products such as seeds, nuts, and fruit into edible form. The slabs likely served in other capacities as well. Fragments of broken slabs were also used as manos (Group 2) and abraders (Group 3).

Form 1. Large (17 specimens)

Group 1, Form 1 modified sandstone specimens range in maximum length from 15 to 54 cm, in width from 15-33 cm, and in thickness from 3.1-10.5 cm. Individual descriptions of some of the complete and near complete slabs follow.

Specimen 1 is a complete slab, approximately 30 cm long, 21 cm wide, and 5.5 cm thick (Fig. 88). The specimen was surface collected at 41 LK 250. One face exhibits a relatively flat grinding facet, roughly rectangular in outline, that measures 14 x 19 cm. On the opposite face are four striations that probably served as abrading grooves for sharpening some type of implement. Two of the grooves measure from 4 to 6 cm in length, are about 1.5 cm wide, and 0.5 cm deep. The other two grooves are from 8 to 10 cm in length, about 1 cm wide, and 0.5 cm deep.

Specimen 2, a complete sandstone slab, was surface collected at 41 MC 196 (Fig. 89). It is approximately 54 cm long, 29 cm wide, and 7.5 cm thick. There is an oblong grinding facet on one face that measures 14 x 29 cm. The face opposite the grinding facet is apparently unmodified.

Specimen 13 a large, but incomplete slab (Fig. 88), was found in controlled excavations at 41 MC 296, in Level 8 (70-80 cm) of Test Pit 2. Group 2, Form 1, Specimen 22, a wedge-shaped sandstone abrader, was found in position on top of this slab. Associated artifacts and radiocarbon assays indicate that the slab and related mano were deposited during a Late Archaic occupation of the site. Radiocarbon dates from the stratum yielding Specimen 13 range from 100 B.C. (TX-4669) to A.D. 590 (TX-4680). Specimen 13 is approximately 46 cm in length, 20 cm in width, and 5.5 cm thick. There is an oblong grinding facet on one face that measures 18 x 26 cm. The opposite face does not seem to be modified.

Specimen 17 was surface collected at 41 MC 296, and is unusual in that it has two oblong facets on one face and is ground to a smooth, very flat surface on the opposite face (Fig. 89). This slab is 50.5 cm in length, 28 cm in width, and 6.5 cm thick. The oblong grinding facets measure 17-22 cm in length and are 12-16 cm in width. The shallow facets are 1.0-2.0 cm deep.

Form 2. Medium (23 specimens)

Group 1, Form 2 modified sandstone specimens are 9-14 cm long and 1.5-1.7 cm thick. Outlines are irregular and angular. One, and sometimes two, face(s)

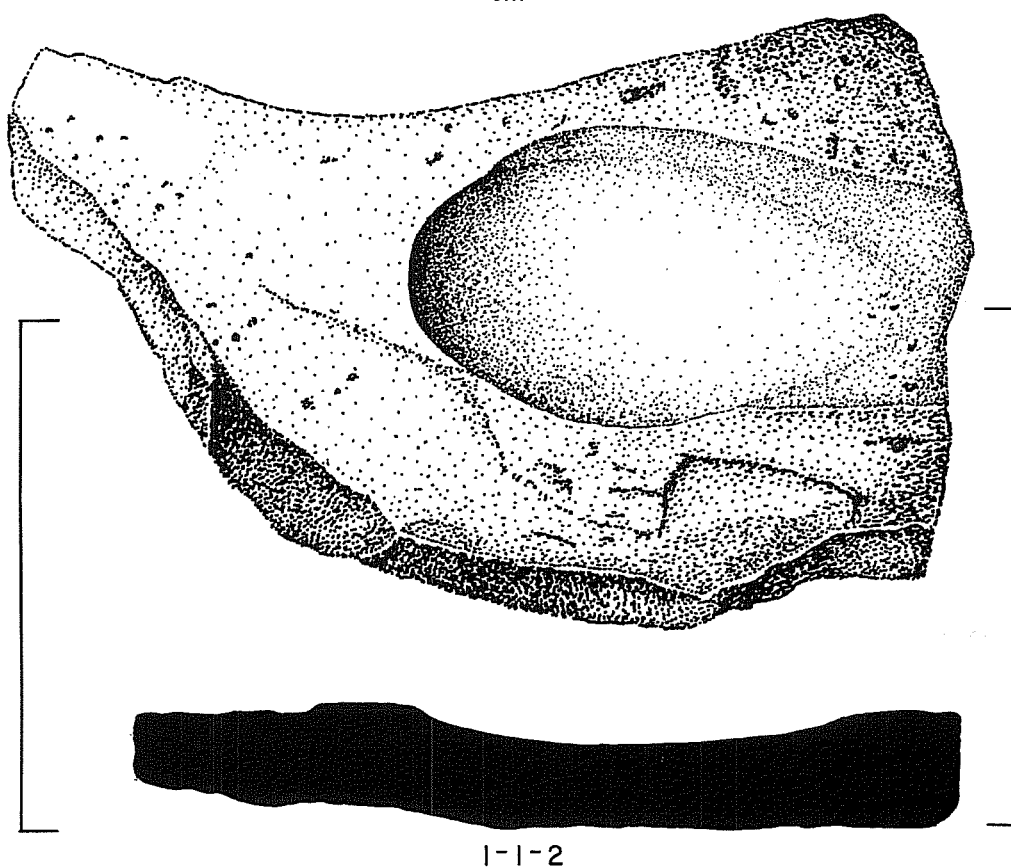
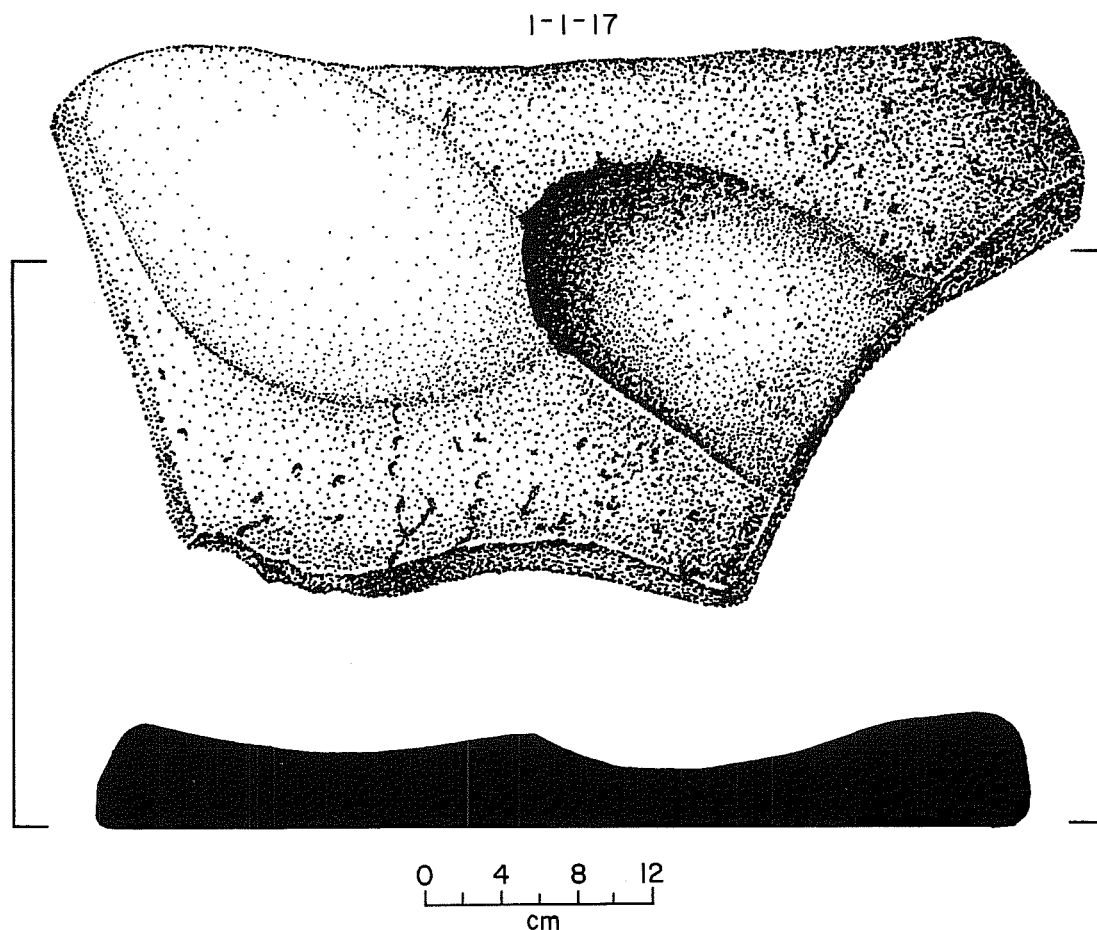


Figure 89. Modified Sandstone: Group 1, Form 1, Specimens 2 and 17. Numbers beneath artifact indicate group, form, and specimen number, respectively.

of each piece has (have) been smoothed to either a flat or slightly concave shape. Complete grinding facets are not evidenced. Most Form 2 specimens appear to be fragments of larger slabs with grinding facets and basins similar to those of Form 1. Form 2 specimens are not illustrated.

Form 3. Small (118 specimens)

Group 1, Form 2 modified sandstone specimens are small fragments of smoothed slabs with both flat and basined facets on one or both faces. Length and width dimensions are 3-8 cm, and the range for thickness dimensions are from 1.0-4.0 cm. Form 3 specimens are not illustrated.

Group 2. Subcircular to Angular Pieces with Flat and/or Convex Faces (170 specimens)

Sandstone pieces in Group 2 are subcircular to angular in outline. Lengths range from 3.3-17.0 cm, widths are 2-13 cm, and thicknesses are 2.2-5.3 cm. Smooth faces on these pieces are either flat or slightly convex. Smoothing laps up onto the edges of many pieces, and the edges often appear to be intentionally rounded and shaped. Because of their size and the morphology of their faces and edges, Group 2 specimens are believed to be "manos," the sandstone piece held in the hand when food products were ground on slabs. Group 2 is divided into three forms based on cross section shape or degree of completeness.

Form 1. Wedge-Shaped Cross Section (27 specimens)

Outlines of the Group 2, Form 1 specimens vary from subcircular to triangular to rectangular. All are wedge shaped in cross section. Most are smoothed only on one face. Seven of the pieces exhibit smoothing on both faces. Lateral breakage noted among Group 2, Form 1 specimens recovered during Phase I investigations at Choke Canyon (Hall, Black, and Graves 1982:380) occurs on only two specimens. Specimen 22 was found on top of a grinding slab (Group 1, Form 1, Specimen 13; Fig. 88) at 41 MC 296. The range of dimensions for complete specimens is as follows:

	<u>Maximum</u>	<u>Minimum</u>
Length:	14.3	9.0
Width:	13.0	6.7
Thickness:	4.0	2.6

Form 2. Lenticular Cross Section (71 specimens)

Most Group 2, Form 2 modified sandstone specimens are subcircular to oval in outline, but there are also pieces with rectangular and irregular outlines (Figs. 90 and 91). Most Form 2 pieces are plano-convex in cross section; some are biconvex or rectangular in cross section. Faces are flat or convex,

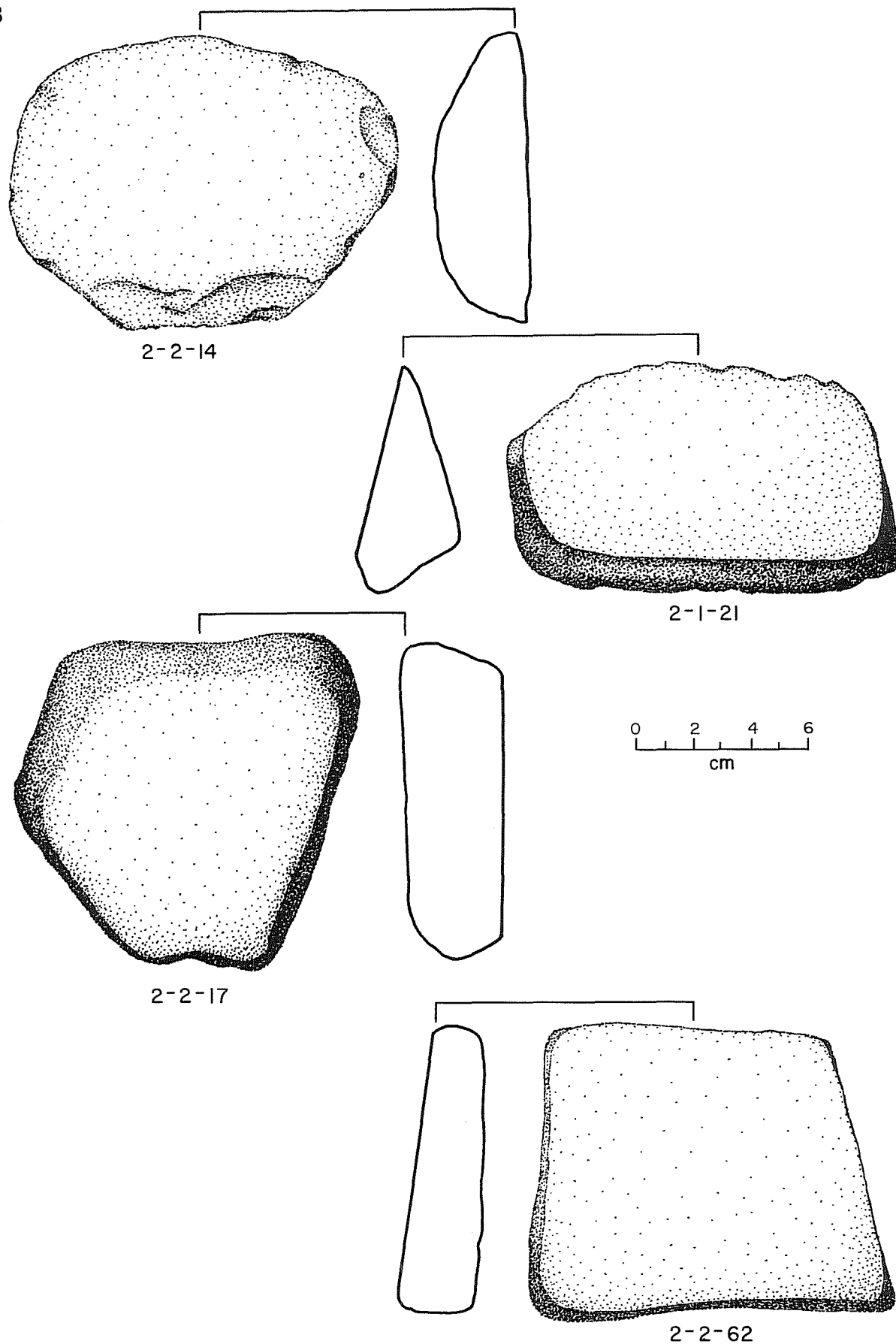


Figure 90. **Modified Sandstone: Group 2, Forms 1 and 2.** Numbers beneath artifact indicate group, form, and specimen number, respectively.

edges rounded and/or smoothed. The range of dimensions for complete specimens is as follows:

	<u>Maximum</u>	<u>Minimum</u>
Length:	17.0	8.3
Width:	12.0	6.8
Thickness:	5.3	2.4

Form 3. Fragments (72 specimens)

Group 2, Form 3 modified sandstone specimens bear one or more of the characteristics described for Forms 1 and 2 above. However, they are too fragmentary to permit definite assignment to either Forms 1 or 2. The range of dimensions for Form 3 is as follows:

	<u>Maximum</u>	<u>Minimum</u>
Length:	8.0	3.3
Width:	5.9	2.0
Thickness:	2.7	2.2

Group 3. Grooved Pieces (33 specimens)

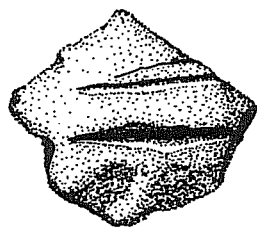
Group 3 modified sandstone specimens are angular fragments with from one to five V-shaped or U-shaped grooves worked into their faces. Lengths are 3.3-14.0 cm, widths are 2.1-10.0 cm, and thicknesses are 1.0-4.5 cm. In outline, most are irregularly angular. The assemblage has been broken down according to the number of grooves on each piece.

<u>Number of Grooves</u>	<u>Specimen Count</u>
1	19
2	5
3	4
4	2
5	3

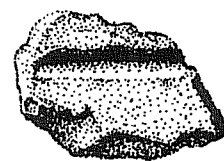
The grooves vary from 2.5-7.0 cm in length, 0.2-1.3 cm in width, and 0.1-0.5 cm in depth. On the specimens with more than one groove, the grooves are often parallel, but, in some cases, crisscross or are independent of one another at different angles. Two specimens, one from 41 LK 51 and the other from 41 MC 268, had broad (3.9 to 4.3 cm), shallow (0.4 to 0.6 cm) grooves quite different from the rest of the Group 3 specimens (see Fig. 91).

MODIFIED QUARTZITE (five specimens)

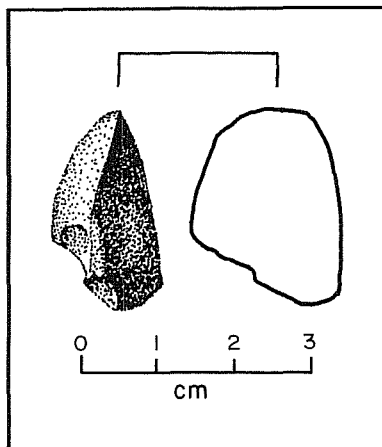
All fragmentary, these five pieces of quartzite probably represent broken manos. Material color ranges from pink to gray. Specimens 2 and 3 exhibit end battering suggesting re-use as hammerstones. Specimen 1 was recovered in



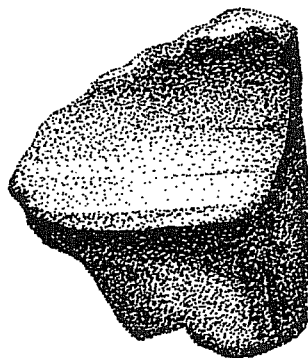
3-30



3-24

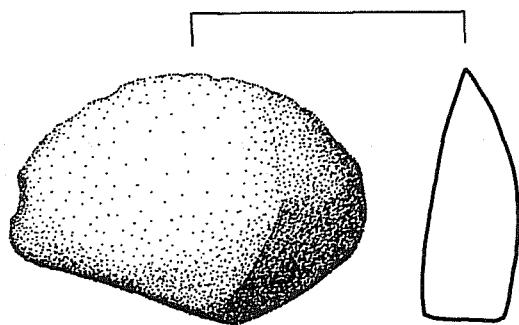
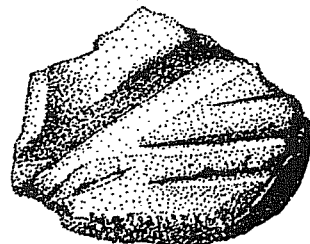


3-27

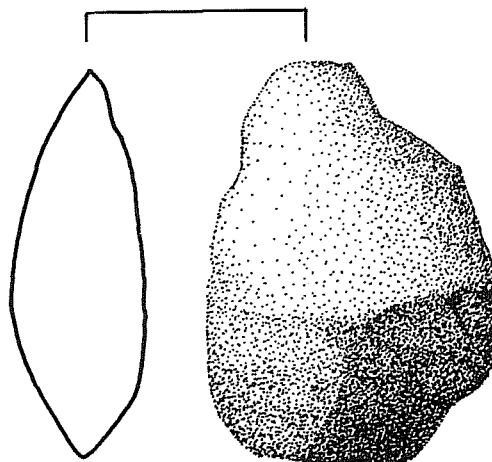


0 2 4 6
cm

3-9



2-1-11



2-1-4

Figure 91. **Modified Sandstone: Group 2, Form 1 and Group 3, and Modified Siltstone.** Two numbers beneath artifact indicate group and specimen number; three numbers indicate group, form, and specimen number, respectively.

Level 6 (99.40-99.30) of Unit N1025 E1041 at 41 LK 51. The other specimens were surface collected. Site provenience and metric attributes for the modified quartzite specimens are as follows:

Specimen Number	Site	Length	Width	Thickness	Figure Number
1	41 LK 51	4.9*	3.6*	3.7	-
2	41 LK 69	4.9*	3.1*	3.6	-
3	41 LK 120	10.2*	6.4*	3.4	92,j
4	41 LK 185	8.8*	7.2*	4.8	92,k
5	41 LK 201	5.0*	4.4*	2.3	-

MISCELLANEOUS LITHIC ARTIFACTS AND MATERIALS

Satin Spar Gypsum (14 specimens)

Satin spar gypsum specimens are stream-rolled cobbles, 4-10 cm long, 1-3.4 cm wide, and 0.5-2.5 cm thick. Most have rounded ends. The ends are smoothed, sometimes slightly battered. Whether these alterations are intentional or natural cannot be determined. Gypsum of the satin spar variety is derived from the Frio Formation which runs through the midsection of the Choke Canyon project area. Occurrence of gypsum specimens on prehistoric sites suggests that the aboriginal inhabitants had some use for the mineral, but what that use may have been is currently unknown. Gypsum cobbles were found as grave inclusions at 41 LK 28, an Archaic cemetery site located a short distance east of Choke Canyon. Provenience data for the satin spar gypsum specimens are as follows:

Site	Lot	Unit	Level	Elevation
41 LK 14	231	N1008 E1001	9	99.00-98.90
41 LK 51	328	N1025 E1042	4	99.60-99.50
41 LK 74	53	N994 E986	2	99.00-98.90
41 LK 74	61	N995 E985	1	99.13-99.00
41 LK 74	93	N1070 E857	3	100.10-100.00
41 LK 128	4	Test Pit 2	1	Surface-99.60
41 LK 128	49-0	Surface	-	-
41 LK 191	2-0	Surface	-	-
41 LK 191	2-0	Surface	-	-
41 LK 201	502	N491 E1044	20	96.85-96.75
41 MC 55	112	N1017 E999	10	98.50-98.40
41 MC 94	198	Test Pit 3	3	99.60-99.50
41 MC 275	2-0	Surface	-	-
41 MC 296	175	N1027 E997	7	99.00-98.90

Examples of satin spar gypsum are illustrated in Figure 92,d-f.

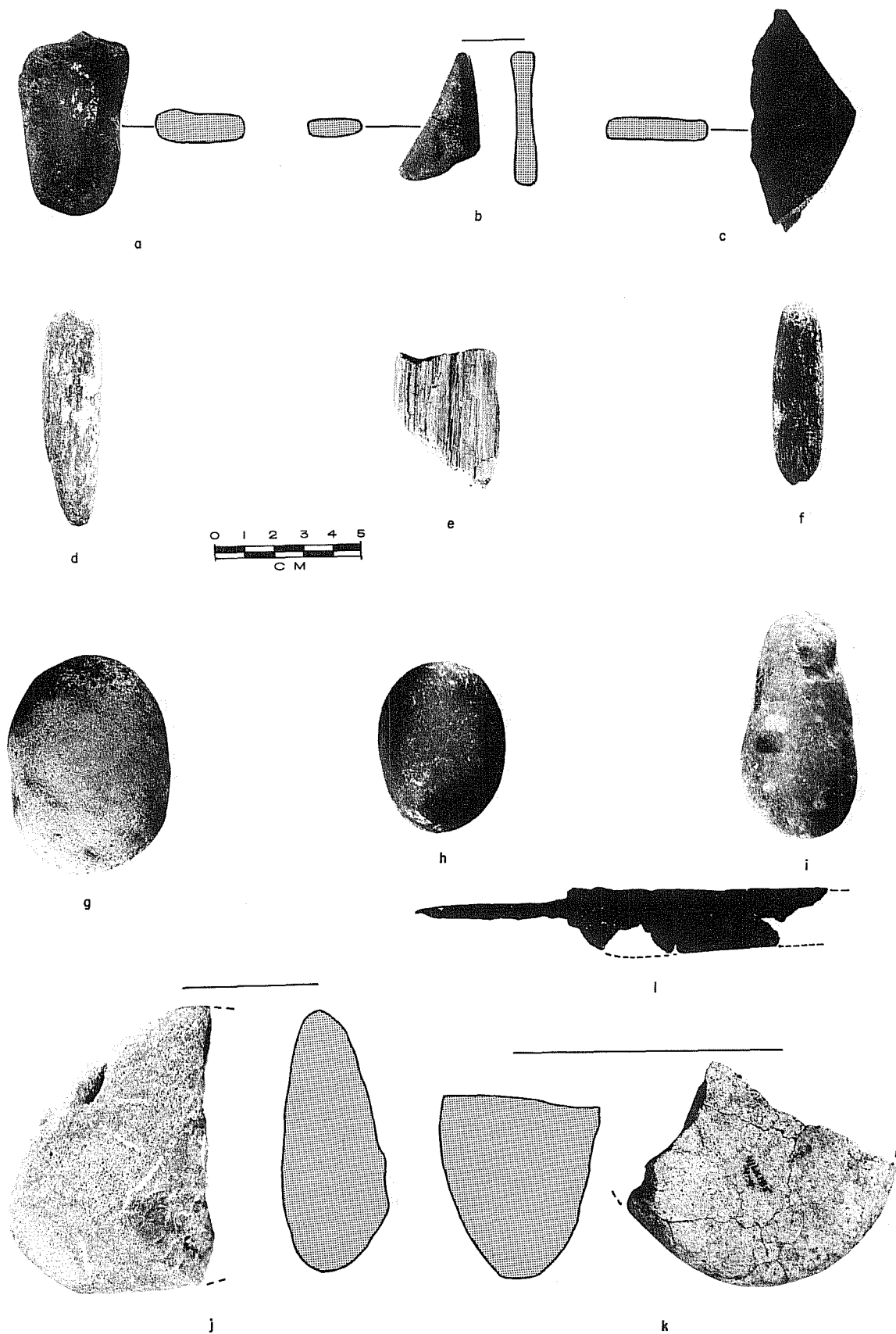


Figure 92. Artifacts of Ferruginous Sandstone, Gypsum, Hammerstones, Metal Knife Blade, and Modified Quartzite. a-c, ferruginous sandstone; d-f, gypsum; g-i, hammerstones; j,k, modified quartzite; l, metal knife blade.

Ferruginous Sandstone (three specimens)

Specimen 1 was surface collected at 41 LK 185. It is orange tan in color and roughly triangular in outline. The specimen measures 4.8 cm in length, 2.0 cm in width, and 1.2 cm in thickness. It appears to have been ground into shape on both faces and the three edges. The grinding has formed concave facets on the faces. Grinding has resulted in a very smooth surface on this fine-grained, well-cemented material.

Specimen 2 was recovered in Level 6 (99.00-98.90) of Unit N995 E982 at 41 MC 268. It is a fine-grained piece of black or dark gray ferruginous sandstone that has been ground flat and very smooth on one face. The opposite face is unmodified. This fragmentary specimen measures 7.5 cm in length, 3.5 cm in width, and is 0.8 cm thick.

Specimen 3 was found in Level 2 (99.50-99.40) of Unit N1025 E999 at 41 MC 296. It is a fine-grained, yellow buff ferruginous sandstone. Fragmentary, this piece is subrectangular in outline shape. One face is flat and smoothed, the other unmodified. Dimensions for this specimen are: length, 6.2 cm; width, 3.8 cm; and thickness, 1.3 cm.

These three specimens are illustrated in Figure 92,a-c.

Hematite Concretions (three specimens)

Three hematite concretions were recovered during Phase II investigations, two at 41 MC 268 and one at 41 MC 296. There are no obvious signs of human alteration of any of the specimens.

Ocher*

Small bits and pieces of ocher were recovered at four of the prehistoric sites excavated during the Phase II investigations at Choke Canyon. Provenience and quantity data for the ocher specimens are as follows:

Site	Lot	Unit	Level	Color	Count	Weight
41 LK 51	144	N999 E981	5	Buff	1	0.3
41 LK 51	233	N998 E984	5	Yellow	1	1.3
41 LK 51	240	N998 E984	12	Red	1	0.3
41 MC 29	64	N998 E1012	3	Red	4	5.6
41 MC 55	59	N992 E1015	1	Orange	1	0.1
41 MC 55	81	N1008 E1016	2	Yellow	1	1.3
41 MC 55	98	N999 E1017	5	Buff	1	0.2
41 MC 296	4	Test Pit 1	4	Red	1	0.4
41 MC 296	64	N1022 E987	4	Red	3	0.3
41 MC 296	104	N1024 E985	7	Yellow	1	0.2

* Ocher from 41 LK 201 are not included in this report (see Highley 1986).

41 MC 296	120	N1024 E987	5	Red	1	0.9
41 MC 296	141	N1025 E999	3	Red	1	0.2
41 MC 296	150	N1026 E997	3	Red	1	0.3
41 MC 296	169	N1027 E997	1	Red	1	1.1
41 MC 296	173	N1027 E997	5	Red	1	2.4
41 MC 296	174	N1027 E997	6	Buff	1	6.9
41 MC 296	181	N1027 E998	6	Red	1	0.2
41 MC 296	212	N1024 E989	2	Buff	2	0.7
41 MC 296	222	N1027 E995	6	Red	1	0.7

Modified Siltstone (one specimen)

This unusual beveled piece of buff yellow siltstone was recovered from Level 2 (98.80-98.70) of Unit N998 E1012 at 41 MC 29. The piece measures 2.9 x 2.2 x 1.4 cm. The angle of the bevel is approximately 42°. The specimen appears to be fragmentary, as if broken off of a longer artifact. The specimen is illustrated in Figure 91.

BONE ARTIFACTS (13 specimens)

Thirteen artifacts of modified bone (nine bead specimens and four awl or pin fragments) were recovered from Choke Canyon's prehistoric sites during the Phase II investigations. This total does not include a number of bone artifacts recovered at 41 LK 201 and described in a separate volume of the research series (Highley 1986). With two exceptions, the beads appear to have been manufactured from bird bones. Lacking articular ends, species of bird from which the bones are derived cannot be identified. The largest bead (Specimen 2) is made from the bone of a deer-sized animal. The smallest bead (Specimen 1) is a fish or snake vertebra of unidentified species. Provenience and metric data for bone beads are as follows:

Specimen Number	Site	Lot	Unit	Level	Length	Width	Thickness	Figure Number
1	41 MC 296	71	N1023 E985	2	0.6	0.6	0.3	-
2	41 MC 296	82	N1023 E986	4	4.0*	1.4	0.8*	93,b
3	41 MC 296	91	N1023 E987	3	2.1*	0.7	0.7	-
4	41 MC 296	163	N1026 E999	2	2.9*	0.3	0.3	93,a
5	41 MC 296	227	N1024 E989	3	3.5	0.6	0.6	93,a
6	41 MC 296	237	N1024 E989	4	2.2*	0.6	0.4	93,a
7	41 MC 296	237	N1024 E989	4	3.3	0.6	0.4	-
8	41 MC 296	237	N1024 E989	4	1.9*	0.5	0.5	-
9	41 MC 296	238	N1023 E989	3	3.1*	0.5	0.5	93,a

No species identifications were possible for the awl or pin fragments. Specimen 1 is a flat, rectangular, highly smoothed and polished medial fragment. Specimen 2 is flat and worked to a very sharp point. Specimen 3 is rounded, polished, and worked to a sharp point. Specimen 4 is a flat medial fragment. Provenience and metric data for awl/pin fragments are as follows:

Specimen Number	Site	Lot	Unit	Level	Length	Width	Thickness	Figure Number
1	41 LK 51	182	N999 E984	9	1.7*	0.7	0.2	92,c
2	41 MC 222	229	N103 E90	2	3.9*	0.5	0.2	92,f
3	41 MC 296	84	N1023 E986	5	3.1*	0.7	0.6	92,e
4	41 MC 296	91	N1023 E987	3	2.1*	0.6	0.3	92,d

MARINE SHELL ARTIFACTS (nine specimens)

Nine marine shell artifacts were recovered from prehistoric sites during the Phase II investigations. This total does not include specimens found at 41 LK 201 (see Highley 1986). Provenience and metric data are as follows:

Specimen Number	Site	Lot	Unit	Level	Length	Width	Thickness	Figure Number
1	41 LK 8	66	N510 E458	5	1.2	0.7	0.5	93,j
2	41 LK 8	101	N511 E459	8	1.2	0.7	0.6	93,j
3	41 LK 14	190	N1006 E959	3	2.6*	1.7*	0.3	93,q
4	41 LK 51	224	N998 E982	13	1.2	0.7	0.5	93,j
5	41 LK 51	246	Surface	-	7.3*	3.2*	0.3	93,r
6	41 LK 250	12-1	Surface	-	3.2	1.1	1.1	93,i
7	41 MC 296	62	N1022 E987	2	2.1	0.7	0.7	93,g
8	41 MC 296	173	N1027 E997	5	2.7*	1.7*	0.3	93,n
9	41 MC 296	230	N1025 E995	5	1.1	1.0	0.4	93,h

Specimens 1, 2, and 4 are beads made from whole shells of the common Atlantic marginella (*Prunum [leptegouana] apicina*). These small gastropod shells were modified for suspension by abrading a hole through the body whorl near the aperture. This would allow a string to be passed through the abraded hole and out the aperture. These shells are common on the Texas coast, especially from Port Aransas south (Andrews 1981:61).

Specimens 3 and 5 are fragments of the giant Atlantic cockle (*Laevicardium [Dinocardium] robustum*). The specimens show no obvious signs of modification. This is a very common species along the Texas coast (Andrews 1981:110-111).

Specimens 6 and 9 are tubular beads made from conch or whelk shell columellas (*Busycon* sp.). Specimen 9 is a small, thin disk bead with a perforation diameter of 0.4 cm. Specimen 6 is longer (3.2 cm) with a perforation diameter of 0.4 cm. Specimen 6 is biconically drilled. Its exterior surface is very smooth and well shaped.

Specimen 7 is made from a whole plicate horn shell (*Cerithidea [Cerithideopsis] pliculosa*). The small gastropod shell is perforated through the outer whorl near the aperture to form a hole suitable for suspension. The species is common along the Texas coast (Andrews 1981:21-22).

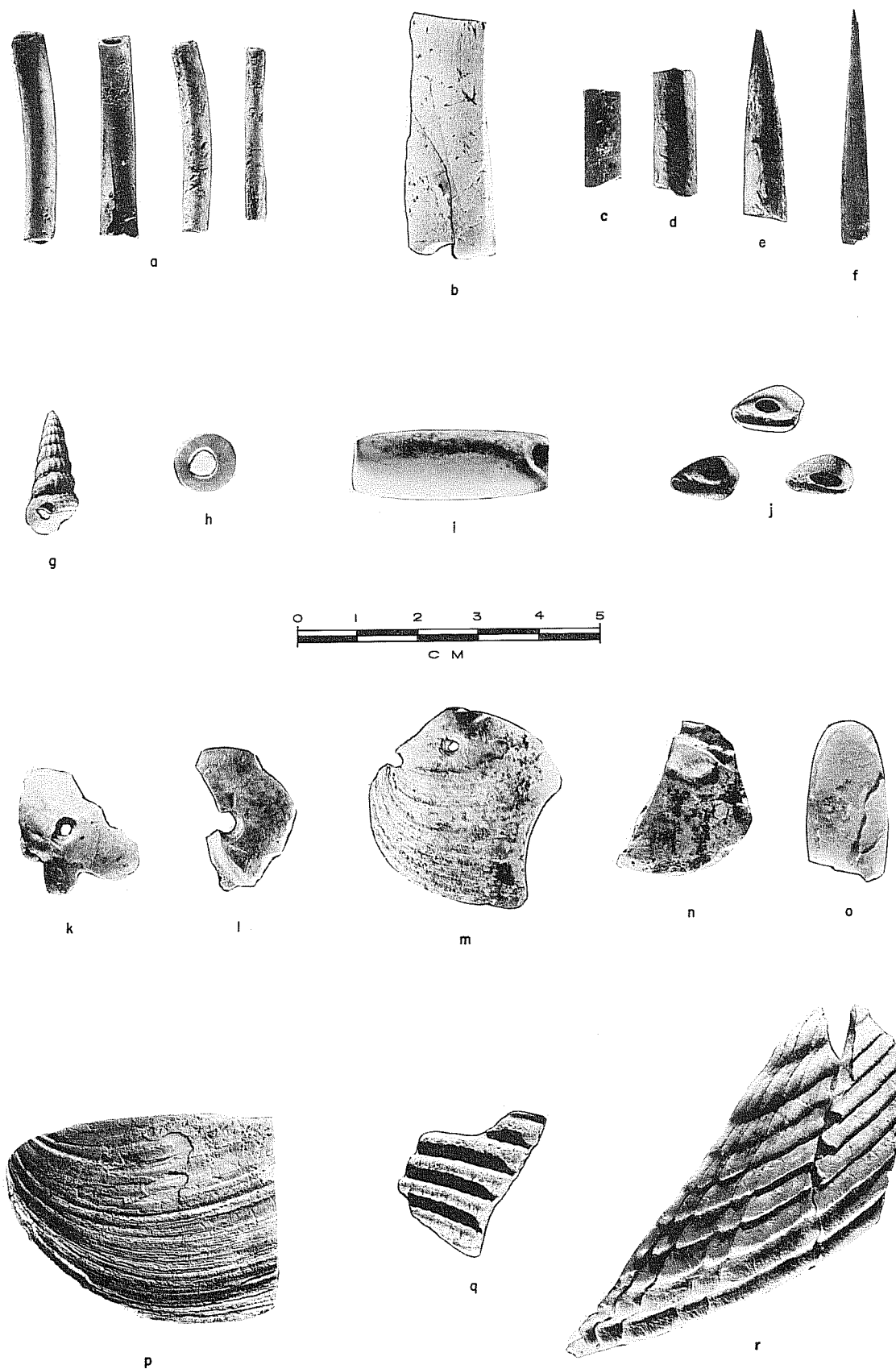


Figure 93. Bone Artifacts, Marine Shell Artifacts, and Modified Mussel Shells. a,b, bone beads; c-f, awl/pin fragments; g-j,n,q,r, marine shell artifacts; k-m,o,p, mussel shells.

Specimen 8 is made from an unidentifiable bivalve shell fragment.

MODIFIED MUSSEL SHELL (five specimens)

Five specimens of cut, shaped, or perforated mussel shell were recovered in the Phase II investigations. Provenience and metric data are as follows:

Specimen Number	Site	Lot	Unit	Level	Length	Width	Thickness	Figure Number
1	41 LK 74	71	N994 E986	3	3.2*	3.1	0.2	93,m
2	41 LK 74	73	N995 E985	3	4.5	3.5	0.5	93,p
3	41 LK 74	73	N995 E985	3	2.3*	1.7*	0.5	93,k
4	41 LK 74	100	N1071 E857	2	2.6*	1.3	0.3	93,o
5	41 LK 94	191	Test Pit 2	5	2.3*	1.7*	0.3	93,l

Specimen 1 is a fragmentary valve that has been conically perforated near the umbo. The perforation is 0.1 cm in diameter.

Specimen 2 is an angular fragment of a large, thick valve that was intentionally cut or snapped along two edges. One of the cut edges seems to have been slightly smoothed.

Specimen 3 is another valve fragment that exhibits a conical perforation near the umbo.

Specimen 4 is a long, oval piece that has been shaped and smoothed into its present form. One end has been broken.

Specimen 5 is a relatively flat, conically perforated fragment.

PREHISTORIC CERAMICS (Stephen L. Black)

A total of 574 aboriginal ceramic fragments was recovered from 13 sites during the Phase II investigations at Choke Canyon. This total does not include the 36 sherds recovered from the Phase II investigations or the 1476 sherds recovered from the UTSA Summer Field School at 41 LK 201 (Highley 1986). The analysis of these artifacts was directed toward two goals: (1) a description of the ceramics and comparison with the Phase I ceramics; and (2) an interpretive summary of an aboriginal ceramic tradition in the Choke Canyon Reservoir area and surrounding region. The author conducted a detailed analysis of the Phase I ceramics (Black 1982). The Phase II ceramics were examined using a similar though simplified analytical approach. The ceramic background, terminology, and coding value sections of this report are repeated almost verbatim from the 1982 report. Minor revisions reflect additional data and a rethinking of certain aspects of the analysis. The Phase II site group descriptions follow a format similar to that used in Phase I. The concluding section presents a revised interpretive summary of the south Texas bone-tempered ceramic tradition.

CERAMIC BACKGROUND

The archaeology of the interior portion of southern Texas was largely unknown and uninvestigated until the last 20 years (Hall, Black, and Graves 1982). Prior to the late 1960s, the presence of ceramics at prehistoric sites in southern Texas was undocumented (cf. Suhm, Krieger, and Jelks 1954:142). Hester (1968) and Hester and Hill (1969, 1971) published the first articles calling attention to the presence of ceramics in southern Texas. Since 1971, a relatively large number of archaeological investigations have been undertaken in south Texas resulting in a tremendous increase in the number of reported and recorded sites, many of which contain Late Prehistoric ceramic-bearing components.

The initial study of south Texas aboriginal ceramics contained a descriptive ceramic classification based on a study of "large ceramic samples" from three sites in Dimmit County (Hester and Hill 1971). Hester and Hill defined seven descriptive groups and stated that ". . . sherds from southern Texas sites can usually be sorted into one or more of them." The importance of Hester and Hill's initial study is three-fold: (1) it called attention to the presence of ceramics at a number of southern Texas sites that were "remarkably similar" in appearance; (2) the paper discussed the distribution of the known ceramic-bearing sites, acknowledging the limited sample of sites; and (3) the paper summarized the known ceramics from areas adjacent to south Texas as possible antecedents of the south Texas bone-tempered ceramic tradition. Hester and Hill (*ibid.*) reviewed the known ceramic types such as **Leon Plain** (central Texas), the **Rockport** wares (central coastal Texas), and the **Goliad** wares (mission Indian ceramics from the south-central coastal plains). They also discussed the miscellaneous reports of unnamed bone-tempered pottery noted at many coastal sites and a few sites in the Trans-Pecos area. Hester and Hill (1971:199-200) suggested that "it seems most probable that the bone-tempered pottery of southern Texas was introduced by the Late Prehistoric peoples from central Texas (i.e., the Toyah Focus described by Jelks 1962)."

A number of small scale descriptions of ceramics from specific sites or areas of southern Texas have been published in the last decade. These studies have been limited to relatively brief descriptions of varying degrees of detail. The most detailed of these studies (Hester and Parker 1970) divided several hundred bone-tempered sherds from the Berclair site in Goliad County into 10 groups based primarily on exterior surface color. In addition, they described several **Rockport** ware sherds; some sherds with various incised, punctated, and brushed finishes; some asphaltum-decorated sherds; and a partially restorable bone-tempered jar. Hester and Parker (*ibid.*) used a consistent format for describing each group. Other ceramic descriptions from south Texas are much less detailed and offer little interpretive information (Creel et al. 1979, Live Oak County; Hester et al. 1977, Jim Wells County; Lynn, Fox, and O'Malley 1977, Live Oak and McMullen Counties). Hester (1980) provides a brief, updated summary of south Texas ceramics.

The limitations of the ceramic descriptions from south Texas have also been noted for many of the plainwares described in Texas. Dulaney (1977:201) discusses the problem of "blurred distinctions" in Texas plainwares. He points out that this problem has most often been overcome, or perhaps

ignored, by the use of "non-typological" approaches utilized by Story (1968), Hester and Parker (1970), Hester (1972), Fawcett (1976), Lynn, Fox, and O'Malley (1977), and Dulaney (1977). "Non-typological" descriptions are based on qualitative attributes determined by macroscopic and microscopic sherd examination. These attributes are used to define a number of categories of attribute groups. Once established, these groups can then be utilized for intersite and intrasite comparison. A major limitation with "non-typological" studies is that the categories are, as Dulaney (*ibid.*:201) points out, "devoid of areal, temporal and spatial implications." That is to say, the sherds are sorted simply on the basis of appearance without regard to when or where a vessel was produced. In short, while "non-typological" studies have enabled some comparative studies, they serve only to describe the range or the variations of physical appearance. They tell us nothing (with the exception such as Story 1968) about where the ceramics were produced, about how they were produced, about when they were produced, or why they were produced. The categories based on subjective appraisal cannot be quantitatively demonstrated.

South Texas ceramics have not been subjected to the types of analysis which have long been utilized in other areas and are often considered basic (cf. Shepard 1976). These include petrographic examination, refiring tests, and a variety of recently developed or recently applied techniques termed "scientific analysis" by Peacock (1970). The value of such studies is not simply that it can be done--but rather that much more can be learned from the ceramics than is currently known. Among the techniques which have been successfully applied to ceramics are Differential Thermal Analysis (DTA), Atomic Absorption Spectrography (AAS), emission spectrography, X-ray diffraction, neutron activation, and X-ray fluorescence. These methods, properly applied, can identify clay minerals, mineral inclusions, and minor and trace elements in the sherds, thus, providing clues to manufacturing localities and techniques.

Summarizing the available background information on south Texas ceramics, bone-tempered pottery is known to occur across much of south Texas. Bone-tempered pottery is associated with Late Prehistoric occupations and dates after A.D. 1200 at over 100 sites in south Texas according to Hester (1980:124). At many sites only a few sherds have been found, although sites yielding hundreds of sherds have been reported from several areas. South Texas bone-tempered pottery is usually undecorated, but incising, punctates, brushing, and asphaltum decoration have occasionally been reported. Vessel forms are restricted to simple functional forms (e.g., ollas, jars, and bowls). The method of manufacture is coil construction and presumably open firing at relatively low temperatures. The south Texas bone-tempered pottery tradition is believed to be linked to a similar central Texas tradition commonly referred to as **Leon Plain** (Hester and Hill 1971). Bone-tempered pottery also occurs in east Texas in the Caddoan area as well as adjacent areas of Louisiana and Arkansas. It is possible that bone-tempered pottery making was introduced to south Texas from the east rather than from central Texas.

Along the south Texas Gulf coast, sandy paste ceramics known as **Rockport wares** (Campbell 1962) are common. **Rockport** sherds have been found at several inland sites such as the Berclair site (Hester and Parker 1970) and are

usually cited as examples of coastal contact. Trade wares from distant regions have occasionally been found in south Texas. Huastecan ceramics have been found in extreme south Texas (MacNeish 1958). Mogollon ceramics have been found in Dimmit County (Hester and Hill 1969). Southwestern ceramics have been found in Bexar County (Orchard and Campbell 1959). These finds, although rare, clearly indicate some trade or indirect contact with cultures producing more sophisticated ceramics during the Late Prehistoric period.

PHASE I CERAMIC ANALYSIS

The Phase I ceramic analysis involved the examination of 576 ceramic fragments from 16 sites in the Choke Canyon Reservoir (Black 1982). The author began the Phase I ceramic analysis as a novice ceramist with an idealistic attitude toward solving the deficiencies in previous ceramic studies. A detailed research design was outlined that emphasized a quantitative analysis. During the analysis the reality of working with small eroded plainware sherds caused the author to realize how unrealistic his initial research plans had been. The quantitative analysis was scraped in favor of a qualitative or "non-typological" descriptive analysis. All of the Phase I ceramics were examined macroscopically and microscopically and sorted into "site groups."

Ideally, each site group would consist of sherds from a single vessel. Unfortunately, this is only possible if the ceramics are very well preserved. Most site ceramic collections evidence variable preservation. The tiny eroded sherds could rarely be sorted into discrete vessel groups. Hence, the site groups sometimes consisted of the sherds of a single vessel but more often consisted of sherds from several vessels with similar pastes and surface finishes. From one to seven site groups were defined for each of the Phase I sites containing ceramics. The ceramic collections from the sites with larger ceramic samples evidenced most of the variability noted for the entire collection.

The careful examination of the entire Phase I sample revealed considerable ceramic variation within relatively narrow limits. Virtually the entire sample consisted of bone-tempered ceramics (574 out of 576 fragments had bone temper). The ceramic fragments were attributed to locally produced pottery. Although no vessels were reconstructed, the vessel fragments indicated that only simple functional vessel forms were present. These forms included ollas and bowls as well as occasional jars and pipe bowls. Considerable variation was noted in the paste content. Fine-grained pastes usually had more bone than did the sandy pastes. Sand was assumed to be an unintentional paste inclusion present in the natural clay sources in the area. Variation in sand grain size and morphology was attributed to differing clay sources. Although the ceramics were not linked to specific clay source localities, most pastes were believed to represent alluvial clay sources.

Except for the pipe bowls, all vessel forms appear to have been made using coil construction techniques. The pipe bowls may have been made by the "pinch-pot" technique. The Phase I ceramics were all fired at relatively low temperatures. Fire clouds were common as was considerable variation in the degree of oxidation, the result of poorly controlled firing conditions. Most

sherds have thick carbon streaks as the result of the firing conditions (low temperatures and short duration).

Consistent patterns of surface finishing were observed. Most vessels had smooth, even exterior surfaces that had been burnished (polished). Most bowls also had smoothed and burnished interior surfaces. Ollas, probably the most numerous vessel form, had uneven poorly smoothed interior surfaces that were usually brushed while the clay was still wet. Surface finishes were often destroyed by postdepositional weathering and chemical corrosion or concealed by lichen or calcareous coatings. Fine-grained pastes formed harder more durable burnished surfaces than did sandy pastes. A few sherds had sliplike thin coatings of fine-grained clay. Most of these were believed to have been the result of surface floating and burnishing. One sherd had a definite applied slip composed of a fine clay that distinctly contrasted in color and texture from that of the paste matrix.

One surprising aspect of the Phase I ceramic analysis was the recognition of decoration on an estimated 18% of the vessels represented by the sherd sample. The major form of decoration was fugitive red filming. Fugitive red film is a thin ephemeral layer of red mineral pigment that was applied to the burnished exterior and interior (rare) surfaces of bowl forms. The pigment is an iron oxide mineral, probably earthy hematite (red ocher). Fugitive red filming had not been previously recognized in prehistoric contexts in south Texas, although the technique was known from mission Indian assemblages.

One Phase I sherd evidenced a second form of decoration, asphaltum banding. Asphaltum is more commonly associated with edge mending. A number of sites had sherds with traces of asphaltum along the sherd edges. Asphaltum was apparently used as a mending glue or waterproofing agent to repair cracked vessels. A simple chemical test, the "Lewis Method," was used to distinguish between asphaltum and other black coatings such as carbon sooting and other unidentified organic residues.

CERAMIC TERMINOLOGY

Ceramic analysis requires the understanding and use of a number of specialized terms and concepts which have been borrowed from other fields and used with specific meanings. One problem is that ceramic terminology has not been standardized; two researchers may use a single term to represent two different concepts (see Shepard 1976:365-368 for an excellent discussion of this problem). In an effort to clarify the meanings of many of the terms repeatedly used in this analysis the following definitions are provided. More detailed discussions of many of these terms or concepts can be found in Shepard (*ibid.*).

Burnishing

The use of a hard tool such as a smooth pebble or a worn sherd to compact and polish a vessel surface. Burnishing is done when a vessel is in a leather-hard state of drying. A fine clay and water solution may be used during the burnishing.

The fine clay may be the same clay in the paste or a different clay which is referred to as a burnishing slip. A

burnished surface is smooth to the touch and has a luster or gloss. Functionally, a burnished surface strengthens the vessel and decreases the permeability (holds water longer).

Core

The layer of unoxidized carbon usually visible in the cross section of a freshly broken sherd, also called the carbon streak. The core is often in the central portion of the cross section appearing as a noticeably darker color than the surface or near surface areas of the paste. The core may cover part or almost all of a cross section. Figure 94 shows the variations of core thicknesses common at Choke Canyon. Cores are usually centered but may be closer to the exterior or interior of a vessel wall. A zoned core is one with distinct zonation in color.

Floating

The use of water or a paste slurry to bring the finer clay particles to the surface of a vessel. A floated surface has a thin layer of fine clay which often masks the temper particles just under the surface. This process is analogous to the final step of finishing concrete. A vessel surface is floated after the vessel has been formed, shaped, and smoothed just before it is set aside to dry.

Fire Cloud

An unoxidized patch or cloud on a vessel surface caused during firing. The fire cloud results from lack of oxygen and can be caused by direct contact of fuel against the vessel. Fire-clouded surfaces have gray splotches or mottling on them. Fire clouding can be difficult to distinguish from soot on small sherds.

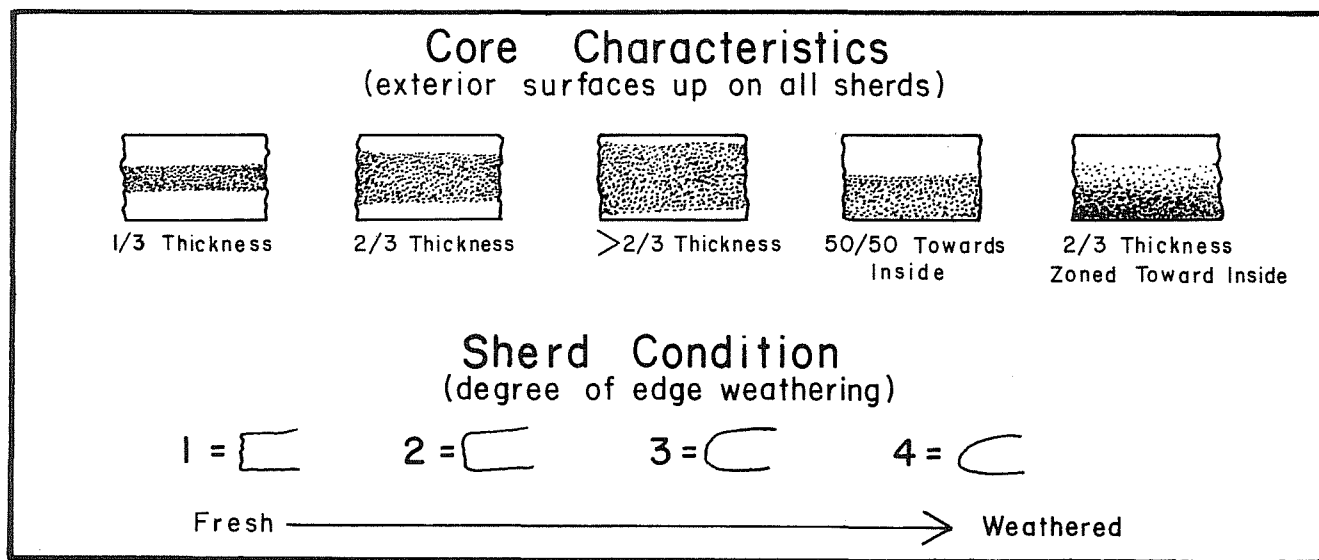


Figure 94. Core Characteristics and Sherd Condition of Prehistoric Ceramics.

- Oxidation To combine with oxygen. The carbonaceous matter in a ceramic paste needs oxygen in order to burn. An oxidized vessel has absorbed the maximum amount of oxygen possible and contains no unburned carbonaceous material. Iron compounds oxidize as well, and are very important in determining colors. Well-oxidized vessels will have light clear colors such as red, tan, and orange.
- Paste The mixture of clay and temper used to form a vessel. A paste may include a variety of constituents such as sand, clay, and silt. A compact paste has few visible pores. A porous paste has many visible pores. These terms are subjective as porosity is difficult to measure (Arnold 1975). A homogeneous paste is one in which the constituents are evenly distributed as opposed to a poorly mixed paste. In a convoluted paste, the constituents are aligned in folded irregular patterns. A patchy paste is one with distinct patches of untempered clay. The term fine-grained paste herein refers to the texture of the matrix to which the bone temper has been added. Since virtually all the Nueces River project ceramics were bone tempered, bone was not considered in paste texture. See Shepard (1976:117-121) for an excellent discussion of paste texture.
- Paste Inclusion A nonclay constituent of a paste. A nonplastic inclusion is one that retains its structure when fired (e.g., bone or sand). A natural inclusion is one naturally present in the clay. Intentionally added inclusions are called temper.
- Rim The lip or top edge of a vessel. A rim may be direct, tapered, tapered from the exterior (Fig. 95,b), tapered from the interior, thickened, or beveled.
- Slip A thin layer of fine clay particles applied to a vessel surface. Floating produces a self-slipped effect. A true slip is made from a different clay than used in the paste. A burnishing slip is a clay layer applied while polishing a surface.
- Smoothing The use of fingers or tools to make a vessel surface even. A well-smoothed surface has very even contours. A poorly smoothed surface has uneven, irregular contours.
- Sooting Application of a thin layer of carbonaceous material on a vessel surface. Sooting can be intentional during firing or a by-product of cooking over an open fire. Sooting results in a black color which can be easily confused with fire clouding or asphaltum.
- Wet Brushing Use of a brushlike tool (possibly a frayed stick) to smooth the surface of a wet, freshly made vessel. This technique was frequently applied to the interior surfaces of Nueces River

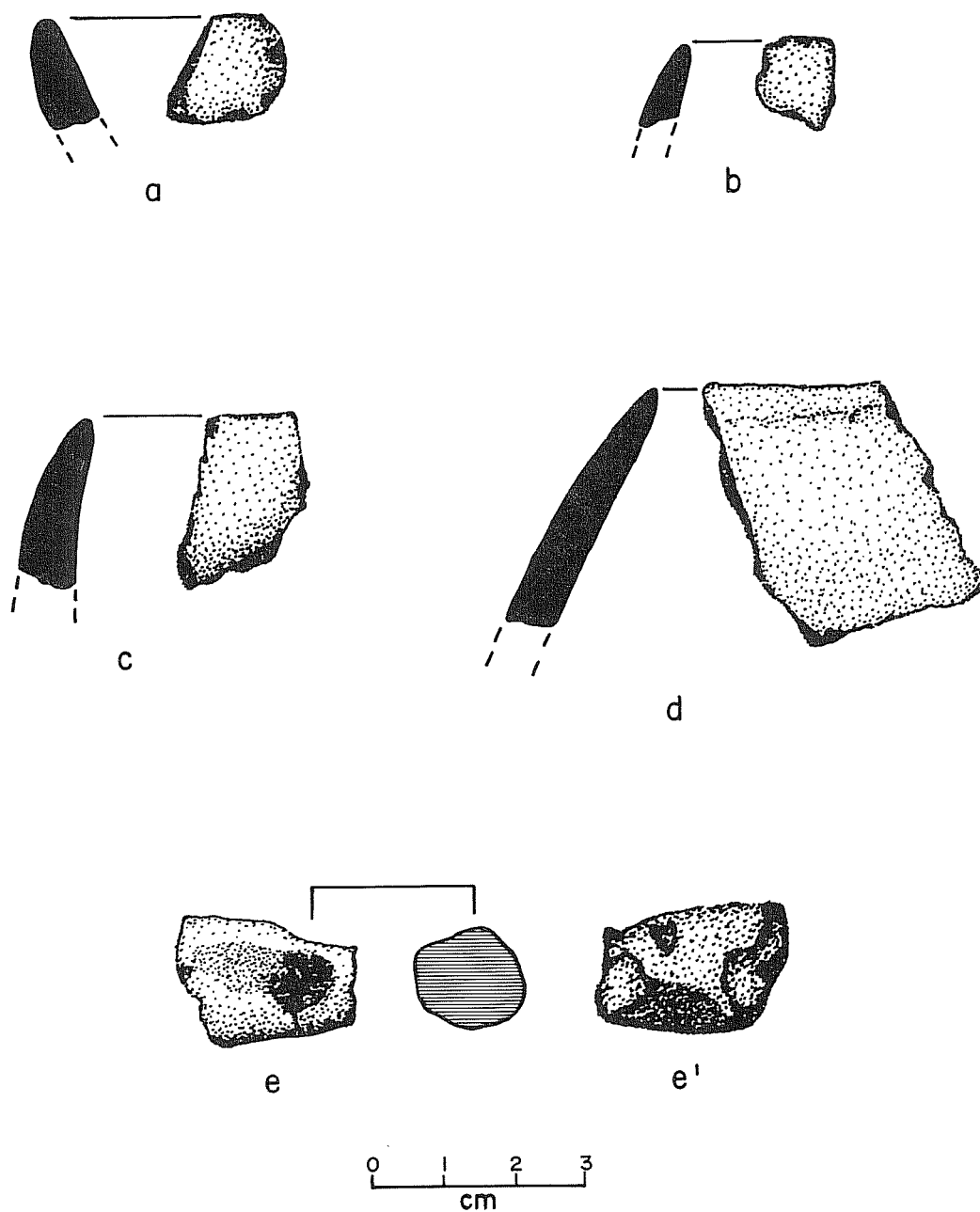


Figure 95. **Rim Sherds and Figurine Fragment.** a, rim sherd, Group 3, 41 LK 51; b, rim sherd tapered from the exterior, Group 1, 41 LK 74; c, inverted rim bowl, Group 1, 41 LK 185; d, closed rim (inverted) large bowl, Group 10, 41 MC 55; e-e', figurine fragment, Group 17, 41 MC 55.

vessels leaving a characteristic surface finish. The brush marks are usually parallel, but can be irregular.

ATTRIBUTE CODING VALUES

Numeric attribute coding was used during the Phase I analysis to simplify and standardize the descriptive process. The attribute coding values presented here are the same values used in Phase I except for the paste inclusion density values. During Phase I, five coding values ranging from very sparse (1) to very profuse (5) were used to estimate the density of each paste inclusion. Herein, as defined below, only three values are used. The simplification of the attribute coding speeds up the analysis and eliminates some inconsistency caused by narrowly defined limits. The attribute definitions and values presented below are applicable to bone-tempered ceramics from most areas of southern Texas.

Nonplastic Paste Inclusion Quantities or Density

The Choke Canyon ceramics were quite varied in the density of nonplastic paste inclusions. This attribute was felt to be significant in distinguishing between paste or vessel groups. The density or relative frequency of paste inclusions in ceramics is a difficult attribute to quantify. The problems are analogous to those faced by sedimentologists and mineralogists trying to quantify particle or mineral composition frequencies. Most of the accurate methods are prohibitively time consuming and require special equipment. An alternative method which is less accurate, but much quicker is a visual comparison chart. Several methods of constructing visual comparison charts have been used, including the checkerboard method employed by Bennett (1974:105) and a more sophisticated method using irregular angular fragments (Terry and Chilingar 1955). The latter method is more realistic and contains both black fragments on a white background and white fragments on a black background. The comparison charts Terry and Chilingar illustrated were actually developed by a Russian sedimentologist, M. S. Shvetsov, and have been reproduced in readily accessible publications such as the American Geological Institute (A.G.I.) Sheets (No. 6).

There are several problems inherent in estimating paste inclusion density which should be emphasized. Griffiths and Rosenfeld (1954) have clearly demonstrated that operator error is a significant concern in comparing this type of data. Different operators will estimate values differently and may consistently overestimate or underestimate. To verify the accuracy of the paste inclusion quantity estimate, it would be necessary to measure an operator's estimates against known values. This was not done with the Nueces River project ceramics. A further problem is that many sherd cross sections have a variety of color inclusions against a variety of background colors. Sand appears to be much harder to estimate than bone, perhaps because sand is often translucent or highly reflective. The paste inclusion quantity values should be regarded as relative estimates. Below are the percentage density ranges and Nueces River project values used to code this attribute. To reduce error, comparatively broad categories were selected.

NUECES RIVER PROJECT CODING VALUES

PHASE I

PHASE II

1	very sparse.....1	sparse
2	sparse.....1	sparse
3	moderate.....2	moderate
4	profuse.....3	profuse
5	very profuse.....3	profuse

Particle Shape or Degree of Roundness

Considerable variation in sand grain shape was observed in the Choke Canyon ceramic collection. Sedimentologists have long been concerned with measuring sedimentary particle shape or rather sphericity or roundness. In general, given particles of similar hardness and mineralogy (quartz grains, for example) the greater the degree of roundness, the longer the distance the particle has been transported. The actual factors, which determine particle shape, are more complex (A.G.I. Data Sheet 7); however, the size and degree of roundness in sand grains can indicate general depositional modes. A visual comparison chart (A.G.I. Data Sheet 7) was used to estimate particle shape or sphericity. Table 30 shows the correlation of terms with the Nueces River project shape values.

Particle Sizes

Particle size of nonplastic paste inclusions such as sand, bone, and hematite was determined by use of a micrometer installed in one of the 10X eyepieces in the Olympus variable power binocular microscope. The micrometer was calibrated for 30X. All measurements were taken at this magnification. Wentworth's size classification system (Shepard 1976:118) was used for a particle size scale as shown in Table 31. The most visible particles observed in the ceramic cross sections ranged from very fine to very coarse and were coded numerically for convenience.

TABLE 30. ROUNDNESS OF SEDIMENTARY PARTICLES

Descriptive Term	Shape Values
Very Angular	-
Angular	1
Subangular	2
Subrounded	3
Rounded	4
Well Rounded	5

TABLE 31. WENTWORTH'S SIZE CLASSIFICATION

Descriptive Term	Diameter Limits	Size Classes
Pebble	64-4 mm	-
Granular	4-2 mm	-
Very Coarse	2-1 mm	5
Coarse	1-0.5 mm	4
Medium	0.5-0.25 mm	3
Fine	0.25-0.125 mm	2
Very Fine	0.125-0.062 mm	1
Silt	0.062-0.0039 mm	-

PHASE II METHODOLOGY

The experience gained during the Phase I ceramic analysis enabled the author to simplify the analysis and reduce the amount of time necessary to examine the sample. To begin with, it was recognized that the examination of very small eroded sherds provides very little analytical data. In fact, small poorly preserved sherds can only provide data on the paste characteristics. The Phase I examination provided an adequate expectation of paste characteristics. The decision was made to examine only the sherds with comparatively well-preserved surfaces. This effectively eliminated most of the smaller sherds. In addition, in cases where the ceramic sample from a site contained many sherds that appeared identical (i.e., from the same vessel), only two or three of the best preserved sherds from an identical group were chosen for analysis. Using these criteria, each site collection was examined macroscopically, and a "select" sample was chosen. Thus, 77 sherds were selected for analysis from the total sample size of 574.

The select sample contained examples of all of the macroscopically distinctive sherd groups. All rim sherds, decorated sherds, and appendages were examined. The intent was to examine a sample of all vessels represented by the collection without examining each sherd. In cases where the author was uncertain whether all vessel groups from a site were sampled or where the visible variation was suspected to represent differential preservation or firing conditions of a single vessel, additional sherds were examined, just to be sure. It should be emphasized that this sampling procedure may not be advisable for inexperienced analysts who are examining assemblages from unstudied areas.

Each sherd from the select sample was examined using a routine procedure. Although the sherds had been washed during the laboratory processing some still had encrusted soil, lichen, or calcareous coatings. An ultrasonic cleaner was used to clean these sherds. A dilute solution of warm water and detergent specifically designed for ultrasonic cleaners adequately removed the encrusted material from most sherds after about 15 minutes of ultrasonic vibration. Ultrasonic cleaning may not remove all foreign coatings and may

have an adverse effect on fugitive red filming, however, it is far superior to hand washing.

Each sherd was first examined macroscopically. A light rubbing with a soft rag was used to enhance the surface luster of burnished sherds. Burnishing and wet brushing were best seen macroscopically by holding the sherd at oblique angles to a bright incandescent light source. Burnishing or surface polish is easily weathered especially on sandy paste ceramics. After a brief macroscopic examination, each sherd was examined with a variable power binocular microscope. Both surfaces of a sherd were examined for details not seen macroscopically such as traces of fugitive red film or asphaltum. The best results were obtained by first using low power (7X) to scan and then "zooming up" to higher powers (30-80X) to look more closely at areas of interest.

After the sherd surfaces had been examined, each sherd was broken to obtain a fresh paste exposure. Slip-joint pliers with padded grips were used to break the sherds that could not be snapped by hand. The act of breaking the sherds provided information about the paste composition that was invariably confirmed by microscopic examination. Fine-grained compact pastes with bone temper were usually much harder to break than porous sandy paste sherds. In addition, sandy paste sherds usually crumbled while sherds with fine-grained pastes broke cleanly. Large inclusions such as small pebbles or chunks of hematite, usually caused the sherd to break at the inclusion.

The fresh breaks were then examined microscopically; first under low power for overall inclusion density and paste characteristics and then under higher power for detail and particle size. The particle sizes and paste texture were always evaluated at 30X. A consistent setting allowed easy comparison of sherds and simplified use of the micrometer. A micrometer was installed in the left eyepiece. Eyepiece micrometers must be calibrated for each power setting. At 30X, fine silt particles (less than 0.0156 mm) are not visible, while coarse silt particles (0.031-0.0625 mm) are distinguishable. Sand grains are easily visible at 30X. With practice, one can determine particle sizes reasonably accurately at a quick glance without reference to the micrometer. It is usually only necessary to determine the predominate particle size range. Bone particle size was not determined during Phase II as the Phase I analysis had revealed that bone temper invariably consists of a wide range of particle sizes. Occasional sherds had uniform bone particle size as is noted in the site group descriptions. Magnification up to 80X was used to examine unusual paste constituents.

A simple coding system was used to record information for each sherd. In addition to the attribute coding values already described, the vessel fragment and surface finishes were coded. The exact codes used are unimportant; a value was assigned for each attribute variation that was recorded. For example, the exterior surface finish was recorded as 1 (unburnished), 2 (lightly burnished), or 3 (highly burnished); most sherds could be placed in one of these categories. A similar approach could be used with any ceramic assemblage using values appropriate to the problems under consideration. Using this system most sherds could be described with single digit codes for nine attributes: exterior finish, decoration, interior finish, vessel thickness, vessel fragment, paste matrix, bone, sand, and other

inclusions. In addition, any significant variation not described by the attributes was noted. Thus, the major differences noted within the select sample were recorded on a few sheets of paper and could be easily compared. These sheets provided information used in the group descriptions.

After the select sherds had been examined and coded, the select sample sherds from each site were reexamined and placed into site groups. The select sherd sample from sites that had been previously analyzed during Phase I were compared to the Phase I site group examples from the Nueces River Project Comparative Ceramic Collection. Some Phase II sherds could be assigned to the Phase I site groups. In the remaining cases, additional site groups were established for each distinctive sherd group within the ceramic collection from each Phase II site. As was the case in Phase I, some sites had discrete groups that could be attributed to single vessels. At other sites, poor preservation or large heterogeneous ceramic collections made it difficult to distinguish individual vessel groups.

After the select sample had been sorted, the remaining sherds from each site were macroscopically compared to the newly established site groups. The total sample size for each group was estimated. At some sites, such as 41 MC 296, the groups were distinctive enough so that the estimated sample sizes are very accurate. At other sites, such as 41 MC 55, the site groups were so numerous and similar that many tiny eroded sherds could not be associated with the defined groups.

Below, the site groups for each site are described using a slightly revised format from Phase I. Phase I site groups for each revisited site are briefly discussed. More complete site group descriptions are only repeated for Phase I site groups that were recognized in the Phase II collection.

SITE GROUP DESCRIPTIONS

41 LK 14

Total number of sherds: 7, Phase I; 21, Phase II.

Phase II

select sample size: 6.

Phase II provenience: Controlled subsurface.

General discussion: Two groups of burnished bone-tempered ceramics were defined from the Phase I collection. More samples of both groups were recovered during Phase II. Revised descriptions of these groups are presented. A third group was defined from Phase II sherds. The remaining four sherds are tiny and very weathered. Additional vessels may be represented by these eroded sherds.

41 LK 14 Group 1 (thick-walled, flat-bottomed burnished bowl)

Estimated sample size: 5, Phase I; 8, Phase II (2 select sample).

Vessel fragments: Body.

Sherd thickness: 0.6-0.9 cm.

Sherd condition: 1-3; varies.

Exterior surface: Smooth, floated, and burnished, temper-free surface; light brown to gray (clouded).

Interior surface: Partially smoothed and burnished; reddish light brown.

Paste matrix: Coarse silty paste; slightly porous.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 2.
Sand: quantity = 1; size = 2-3; shape = 2-4.
Other: occasional quartzite and hematite.

Estimated number of vessels: 1.

Comments: Based on sherd morphology, Group 1 appears to represent a medium-sized bowl. The bowl had a flat bottom, fairly thick walls, and a very well-finished exterior.

41 LK 14 Group 2 (thin-walled, burnished)

Estimated sample size: 2, Phase I; 5, Phase II (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5 cm.

Sherd condition: 3; weathered.

Exterior surface: Smoothed, floated, and highly burnished.

Interior surface: Smoothed; poorly preserved.

Paste matrix: Very fine, homogeneous paste.

Core: 2/3 thickness; offset toward interior.

Paste inclusions: Bone: quantity = 3.

Estimated number of
vessels: 1.

41 LK 14 Group 3 (sandy paste, poorly preserved)

Estimated sample size: 4; (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.7 cm.

Sherd condition: 3; weathered.

Exterior surface: Poorly preserved; red brown.

Interior surface: Poorly preserved; red brown.

Paste matrix: Sandy, porous paste.

Core: 1/3 thickness; oxidized by exposure(?).

Paste inclusions: Bone: quantity = 2.
Sand: quantity = 3; size = 2-4; shape = 2-3.
Other: hematite pebble.

Estimated number of
vessels: 1.

Comments: Poorly preserved group.

41 LK 51

Total number of sherds: 51, Phase I; 41, Phase II.

Phase II
select sample size: 12.

Phase II provenience: Controlled subsurface.

General discussion: Two groups were defined from Phase I surface collections. The Phase II sherds do not fit the Phase I groups. Three additional groups are defined. Most Phase II sherds belong to Group 3. From the total site ceramic collection six groups are defined. Most groups have sandy pastes. A minimum of eight vessels contributed sherds to the 41 LK 51 collection.

41 LK 51 Groups 1 and 2

See Phase I report (Black 1982:417-419) for descriptions of Groups 1 and 2.

41 LK 51 Group 3 (coarse sandy paste, thick-walled bowl)

Estimated sample size: 31 (6 select sample).

Vessel fragments: Body and a rim sherd (Fig. 95,a).

Sherd thickness: 0.6-0.9 cm.

Sherd condition: 1-3; varies.

Exterior surface: Smooth, even, and lightly burnished; brown.

Interior surface: Wet brushed, even; brown with fire clouds.

Paste matrix: Coarse, porous sandy paste; many inclusions.

Core: Variable.

Paste inclusions: Bone: quantity = 2.
 Sand: quantity = 3; size = 3-5; shape = 2-4.
 Other: occasional hematite chunk.

Estimated number of vessels: 1.

Comments: This group probably represents a large bowl with thick walls and a tapered rim.

41 LK 51 Group 4 (sparsely tempered, burnished)

Estimated sample size: 3 (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.7 cm.

Sherd condition: 2.

Exterior surface: Well-finished burnished surface; light tan.

Interior surface: Uneven, wet brushed; gray tan.

Paste matrix: Coarse silty and fine sandy paste; sparsely tempered.

Core: 2/3 thickness; light gray.

Paste inclusions: Bone: quantity = 1.
 Sand: quantity = 2; size = 1-2; shape = 2-4.
 Other: occasional hematite chunk.

Estimated number of
 vessels: 1.

41 LK 51 Group 5 (miscellaneous thin-walled, bone-tempered)

Estimated sample size: 7 (4 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5-0.6 cm.

Sherd condition: 2.

Exterior surface: Even, smooth, and burnished; well finished; tan to red tan.

Interior surface: Uneven, poorly smoothed; some wet brushed; some clouded; gray to tan.

Paste matrix: Fine to coarse silty paste; profuse temper.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 3.
 Sand: quantity = 1; size and shape vary.
 Other: occasional hematite chunk.

Estimated number of
 vessels: 2-4.

Comments: Catch-all group of sherds from several vessels with similar pastes and surfaces.

41 LK 74

Total number of sherds: 33, Phase II.

Phase II
 select sample size: 9.

Provenience: Controlled subsurface.

General discussion: The ceramics from 41 LK 74 are very well preserved. Two distinctive vessel groups are defined.

41 LK 74 Group 1 (thin-walled, bone-tempered olla)

Estimated sample size: 28 (7 select sample).

Vessel fragments: One rim sherd, many body sherds, and several sherds from a constricted neck vessel (olla).

Sherd thickness: 0.4-0.6 cm.

Sherd condition: 2.

Exterior surface: Smooth and lightly burnished; flesh colored with fire cloud near bottom of vessel.

Interior surface: Uneven, poorly smoothed.

Paste matrix: Very fine, compact paste; sparsely tempered.

Core: $>2/3$ thickness.

Paste inclusions: Bone: quantity = 1.

Estimated number of vessels: 1.

Comments: This group represents a relatively small olla with a thin tapered rim (Fig. 95,b), a constricted neck, and a flaring globular body.

41 LK 74 Group 2 (sandy paste with sparse bone)

Estimated sample size: 5 (2 select sample).

Vessel fragments: Body.

Sherd thickness: 0.6 cm.

Sherd condition: 1.

Exterior surface: Smooth, even, and lightly burnished; some burnishing marks visible; brown with fire clouds.

Interior surface: Rough texture; wet brushed; unusual bright red color.

Paste matrix: Very homogeneous, porous sandy paste.

Core: $2/3$ thickness.

Paste inclusions: Bone: quantity = 1 (very sparse).
 Sand: quantity = 2; size = 2-3; shape = 1-2.
 Other: occasional hematite fragment.

Estimated number of
vessels:

1.

Comments:

This group has an unusual paste and interior surface. The homogeneous angular sand suggests an upland clay source. This is a unique group in the Nueces River project collection and may be from outside the local area.

41 LK 128

Total number of sherds: 5, Phase II.

Phase II

select sample size: 3.

Provenience: 3, controlled surface; 2, controlled subsurface.

General discussion: All the sherds from 41 LK 128 are from a single vessel.

41 LK 128 Group 1 (fugitive red and asphaltum decorated)

Estimated sample size: 5 (3 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5-0.7 cm.

Sherd condition: 1-2; some lichen.

Exterior surface: Even, smooth, floated, and burnished; fugitive red film and asphaltum decoration; tan with red and black.

Interior surface: Smooth, slightly uneven; gray tan.

Paste matrix: Very fine, compact, durable paste; well fired.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 2; finely crushed.

Estimated number of
vessels:

1.

Comments:

This group represents a single vessel, probably a well-made bowl. The bowl originally had a strikingly decorated exterior with a bright red background and jet black designs.

41 LK 185

Total number of sherds: 2, Phase II.

Phase II

select sample size: 1.

Provenience: Controlled surface.

General discussion: One sherd is a well-preserved rim sherd, while the other is a poorly preserved body sherd. The pastes are similar, although the surfaces look different. Only one group is defined.

41 LK 185 Group 1 (inverted rim bowl)

Estimated sample size: 2 (1 select sample).

Vessel fragments: One body and one rim sherd.

Sherd thickness: 0.3-0.7 cm.

Sherd condition: 1 and 3.

Exterior surface: Smooth but uneven; lightly burnished around rim; red tan.

Interior surface: Smooth but slightly uneven; cloudy tan to gray.

Paste matrix: Coarse silty paste with very fine sand.

Core: 2/3 thickness; zoned toward inside.

Paste inclusions: Bone: quantity = 2.
Sand: quantity = 2.
Other: hematite patches (soft hematite) common.

Estimated number of vessels: 1.

Comments: The rim sherd (Fig. 95,c) suggests a strongly inverted bowl form (tapered rim with a closed opening).

41 LK 243

Total number of sherds: 8, Phase II.

Phase II

select sample size: 3.

Provenience: Controlled surface.

General discussion: Three distinct groups are defined. All groups have sandy porous pastes. The clay sources are obviously different as the colors are very distinct between groups.

41 LK 243 Group 1 (sandy paste with bone temper)

Estimated sample size: 5 (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5 cm.

Sherd condition: 2-3.

Exterior surface: Smooth, even, and lightly burnished; flesh tan with light gray streak.

Interior surface: Wet brushed; light tan.

Paste matrix: Sandy, porous paste.

Core: 1/3 thickness.

Paste inclusions: Bone: quantity = 2.
Sand: quantity = 3; size = 2-4; shape = 2.

Estimated number of vessels: 1.

41 LK 243 Group 2 (weathered, sandy paste)

Estimated sample size: 2 (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.8 cm.

Sherd condition: 3.

Exterior surface: Even with a rough texture; gray tan.

Interior surface: Even with a rough texture; fire clouded.

Paste matrix: Sandy, porous paste.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 2.
 Sand: quantity = 3; size (most 1-2, occasional 5);
 shape = 2.

Estimated number of vessels: 1.

Comments: Unusual surface finish. The edges are not too badly weathered, but the surfaces are as rough as sand-paper.

41 LK 243 Group 3 (red brown, sandy paste)

Estimated sample size: 1 (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.7 cm.

Sherd condition: 3; lichen.

Exterior surface: Smoothed and probably burnished; dark red brown.

Interior surface: Smoothed and probably burnished; brown.

Paste matrix: Sandy, porous paste.

Core: 2/3 thickness.

Paste inclusions: Bone: quantity = 2.
 Sand: quantity = 3; size = 1-4; shape = 2-3.
 Other: small hematite particles.

Estimated number of vessels: 1.

41 MC 55

Total number of sherds: 16, Phase I; 197, Phase II.

Phase II
 select sample size: 21.

Provenience: 16, surface; 181, controlled subsurface.

General discussion: Seven bone-tempered groups were defined during Phase I. Two of these were decorated; one with an asphaltum band and one with fugitive red. The large Phase II ceramic sample represents at least 10 additional vessel groups. Despite careful

comparison, no examples of the Phase I groups were found among the Phase II ceramics.

The 10 vessel groups defined from the Phase II sample are three sandy paste groups, two asphaltum decorated groups, and five bone-tempered groups with coarse silt or fine pastes. Several unusual pastes are present including a clay-tempered paste, a hematite/silt paste, and a paste dominated by rounded coarse sand. One sandy paste ceramic appendage is believed to be a figurine fragment.

The most striking aspect of the total 41 MC 55 ceramic collection is the diversity. At least 18 separate ceramic objects (17 vessels and the figurine) contributed ceramic fragments to the collection. Many of the Phase II sherds are small weathered fragments. Based on the diversity observed in the select sample, it is probable that additional vessels may be represented by the unexamined Phase II sherds. Because of the poor condition of many Phase II ceramic fragments not selected for analysis and the difficulty of distinguishing between groups lacking good surface preservation, no attempt was made to estimate the sample size of each group.

Several trends were noted in the 41 MC 55 ceramic collection. Most vessel groups had fine to coarse silty pastes; sandy pastes were less common (5 out of 17). Asphaltum decoration occurs on sherds from three groups.

41 MC 55 Groups 1-7

See Phase I report (Black 1982:431-434) for descriptions of Groups 1-7.

41 MC 55 Group 8 (asphaltum decorated, bone-tempered)

Estimated sample size: ? (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.6 cm.

Sherd condition: 2.

Exterior surface: Smooth, slightly uneven; possibly burnished; with asphaltum band at least 0.5 cm wide; gray tan with black.

Interior surface: Smooth; gray (clouded).
 Paste matrix: Coarse silty paste.
 Core: >2/3 thickness; offset toward interior.
 Paste inclusions: Bone: quantity = 3.
 Estimated number of vessels: 1.

41 MC 55 Group 9 (burnished, bone and clay tempered olla)

Estimated sample size: At least several dozen; (7 select sample).
 Vessel fragments: Several neck sherds and many body sherds.
 Sherd thickness: 0.4-0.5 cm.
 Sherd condition: 2-3; generally well preserved.
 Exterior surface: Well finished; smooth, even, and burnished; buff with clouding.
 Interior surface: Unusual; uneven, irregular lumpy surface; bone and clay chunks protrude; looks like pulverized clay added to interior surface during construction; buff to buff pink with dark fire clouds.
 Paste matrix: Fine matrix with profuse bone and untempered clay chunks.
 Core: >2/3 thickness.
 Paste inclusions: Bone: quantity = 3.
 Other: untempered clay chunks: quantity = 2; size = 4-5.
 Estimated number of vessels: 1.
 Comments: Unusual group. All sherds appear to represent a single olla. The untempered clay is an unusual paste inclusion. The clay chunks are finer in texture and different in oxidized color than the paste matrix. This suggests that the clay chunks represent added temper. Very fine clay chunks without sand suggest an upland clay source. The clay was probably collected in a solidified form and pulverized. Some sherds are much better finished on the interior; these probably represent neck sherds.

41 MC 55 Group 10 (bone-tempered, inverted rim bowl)

Estimated sample size: ? (3 select sample).

Vessel fragments: Body and rim.

Sherd thickness: 0.6-0.7 cm.

Sherd condition: 2.

Exterior surface: Smooth, even, and burnished; fire cloud around rim; flesh to gray.

Interior surface: Smooth and even; light wet brush marks; gray to tan.

Paste matrix: Coarse silty paste.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 3.

Estimated number of vessels: 1.

Comments: Rim sherds (Fig. 95,d) suggest that the vessel was a large bowl form with a closed (inverted) rim.

41 MC 55 Group 11 (bone-tempered, burnished with sooted interior)

Estimated sample size: ? (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5 cm.

Sherd condition: 3.

Exterior surface: Smooth, even, and burnished; fire clouded; gray.

Interior surface: Poorly smoothed; partially burnished; heavily sooted; black.

Paste matrix: Fine with profuse temper.

Core: >2/3 zoned toward interior.

Paste inclusions: Bone: quantity = 3.

Estimated number of vessels: 1.

41 MC 55 Group 12 (sparsely tempered with uneven walls)

Estimated sample size: ? (3 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5-0.9 cm.

Sherd condition: 2.

Exterior surface: Smooth and well finished but uneven; burnished; tan.

Interior surface: Uneven; wet brushed; clouded; gray.

Paste matrix: Coarse silt with very fine sand; sparsely tempered.

Core: >2/3 thickness; offset toward interior.

Paste inclusions: Bone: quantity = 1.
Sand: quantity = 2; size = 1-2; shape = 1-2.

Estimated number of vessels: 1.

Comments: This vessel had a very uneven wall thickness with variable curvature. The poorly finished, oxidized interior suggests an olla form.

41 MC 55 Group 13 (bone-tempered with asphaltum decoration)

Estimated sample size: ? (2 select sample).

Vessel fragments: Body.

Sherd thickness: 0.6 cm.

Sherd condition: 2-3; variable.

Exterior surface: Smooth, even, and burnished; asphaltum band at least 0.7 cm wide; gray to tan with black.

Interior surface: Even with protruding sand and large bone chunks.

Paste matrix: Coarse silt.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 2.
Sand: quantity = 1; size = 4-5; shape = 4-5.
Other: occasional hematite.

Estimated number of
vessels: 1.

41 MC 55 Group 14 (burnished with hematite/silt paste)

Estimated sample size: ? (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5 cm.

Sherd condition: 2.

Exterior surface: Smooth, even, and partially burnished; burnish marks prominent; gray brown with red.

Interior surface: Wet brushed and streaked with occasional burnish marks; gray brown with red.

Paste matrix: Coarse silt with abundant hematite.

Core: 2/3 thickness offset toward exterior.

Paste inclusions: Bone: quantity = 3.
Sand: quantity = 1; size = 4-5; shape = 2-3.
Other: hematite throughout paste; finely pulverized to coarse chunks.

Estimated number of
vessels: 1.

Comments: Unusual paste. The paste has so much hematite that the unevenly burnished surfaces look like fugitive red film ware.

41 MC 55 Group 15 (coarse sandy paste, burnished)

Estimated sample size: ? (1 select sample).

Vessel fragments: Neck.

Sherd thickness: 0.5-0.8 cm.

Sherd condition: 2.

Exterior surface: Smooth, even, and burnished; gray brown.

Interior surface: Smooth and burnished; red brown.

Paste matrix: Coarse sandy.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 1.
Sand: quantity = 3; size = 3-5; shape = 3-5.

Estimated number of vessels: 1.

Comments: Unusual coarse sandy paste with rounded clear sand grains. The paste had enough fine clay to allow floated and well-finished surfaces. The sherd has a double curvature that suggests it represents a neck sherd from an olla.

41 MC 55 Group 16 (fine sandy paste with thick walls)

Estimated sample size: ? (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.8-1.2 cm.

Sherd condition: 3.

Exterior surface: Smooth and even; weathered; light tan.

Interior surface: Uneven and wet brushed; light tan.

Paste matrix: Fine sandy paste with profuse temper.

Core: 1/3 thickness; light gray; probably sun bleached.

Paste inclusions: Bone: quantity = 3.
Sand: quantity = 3; size = 1-3; shape = 1-2.

Estimated number of vessels: 1.

41 MC 55 Group 17 (figurine fragment)

A small fragment of a modeled figurine was recovered (Fig. 95,e,e'). The object measures 2.8 x 1.9 x 1.4 cm. It has a flattened cylindrical shape with an oval cross section. The thick end of the object has been broken. The opposite end is more rounded but could also be broken. The surface of the fragment has been smoothed but not burnished. Several indentations, a short groove, and several shaped depressions are apparent. When the object is viewed from certain directions the modifications look vaguely like zoomorphic features (head, eyes, and snout?). The object appears to be a section of a figurine.

Surface: Smooth with modifications; fire clouded; brown with black.

Paste matrix: Sandy paste with no visible bone.

Paste inclusions: Sand: quantity = 3; size = 1-3; shape = 2-4.

Comments: Very unusual ceramic object.

41 MC 222

Total number of sherds: 47, Phase I; 159+, Phase II.

Phase II
select sample size: 4.

Provenience: Controlled subsurface.

General discussion: The Phase II ceramic collection represents the same vessel groups as those defined from the Phase I collection. This is the only revisited site that did not produce new groups. The fact that only four groups have been defined after extensive collection and excavation suggests that only a limited number of vessels were discarded and/or broken at the site. In comparison with other excavated site ceramic assemblages, such as 41 LK 41 (Phase I), 41 LK 201 (Phases I and II), and 41 MC 55 (Phases I and II), the 41 MC 222 ceramic collection suggests a limited occupation by ceramic using peoples.

Most of the Phase II sherds are from Group 3. Several sherd concentrations were uncovered. Two large sections of the vessel were restored. Unfortunately, both are body sections from a large olla, hence they provide comparatively little data on vessel form. The Phase I group descriptions for Groups 1, 2, and 4 remain unchanged and are only briefly summarized below. A revised description is provided for Group 3.

Six Phase II sherds fit Group 1 as defined from Phase I. Group 1 is made up of two subgroups, 1A and 1B. Both are from a thin-walled, profusely bone-tempered bowl. Group 1B sherds had traces of fugitive red on the interior as well as some purple and gray stains that may represent some sort of organic or mineral pigment design. Both subgroups are quite likely from a single vessel. The paste has a silty matrix with frequent inclusions such as hematite, caliche(?), untempered clay, and sandstone as well as bone and some sand. The paste was poorly

mixed, the large inclusions created weak spots along which the vessel broke. The exterior surface was variably finished from poorly smoothed to partially burnished with some fire clouding. The interior was similar and had faint wet brush marks.

Three Phase II sherds are from Group 2 as defined from Phase I. Group 2 represents a thick-walled sandy paste vessel very different from Group 1. The paste has a porous sandy texture with a coating of very fine silty dust over most sand particles. The exterior surface is smoothed and was probably burnished although, as with most sandy paste vessels, the surface is eroded. The interior is smoothed. Fire clouds are common on the exterior and rare on the interior. The unclouded surfaces are reddish light brown. The vessel was quite large and may have been an olla, although no form diagnostic sherds were recovered.

None of the Phase II sherds fit Group 4. Group 4 contained two fired clay lumps that may be accidentally fired, as they are obviously not from a vessel.

41 MC 222 Group 3 (bone-tempered olla) Revised Description

Estimated sample size: 4, Phase I; 150+, Phase II (3 select sample).

Vessel fragments: Body and basal.

Sherd thickness: 0.5-0.7 cm.

Sherd condition: 1-3.

Exterior surface: Smoothed, floated, and lightly burnished; the contours are more even than the interior but undulate; gray with fire clouding.

Interior surface: Wet brushed; irregular with some smoothed patches; gray with fire clouds.

Paste matrix: Variable (poorly mixed), coarse silt/fine sandy with occasional inclusions in addition to bone and sand.

Core: Varies.

Paste inclusions: Bone: quantity = 3.
Sand: quantity = 1-2; size = 1-2; shape = 1-2.
Other: occasional hematite and clay chunks.

Estimated number of
vessels:

1.

Comments:

Group 3 was originally described as a miscellaneous group due to the variability observed among four sherds. The large Phase II collection includes several large reconstructed sections which show that the vessel has variable surface finish and many fire clouds. The paste also varies. The reconstructed sections represent the wall and base of a large olla. The vessel had a diameter of at least 30 cm and had a slightly flattened base. The variability evidenced illustrates why it is often difficult to associate small numbers of variably preserved sherds with discrete vessel groups.

41 MC 275

Total number of sherds: 65, Phase II.

Phase II

select sample size: 4.

Provenience:

Controlled surface; sherds were found in a single cluster.

General discussion:

The sherd cluster represents a single vessel. Group 1 is a thick-walled sandy paste vessel similar to many other vessels represented by the Choke Canyon ceramic collection.

41 MC 275 Group 1 (thick-walled with sandy paste)

Estimated sample size: 65 (4 select sample).

Vessel fragments:

Body.

Sherd thickness:

0.8-0.9 cm.

Sherd condition:

3-4.

Exterior surface:

Smooth, even, very fine burnished surface; light brown with fire clouds.

Interior surface:

Uneven, rough textured; red brown.

Paste matrix:

Fine sand with sparse bone temper.

Core:

Varies.

Paste inclusions: Bone: quantity = 1.
 Sand: quantity = 3; size = 1-3 with occasional 5;
 shape = 2.

Estimated number of
 vessels: 1.

Comments: All sherds are from a single fairly large vessel, possibly an olla. The large collection illustrates the variable preservation problem. Only a very few of the sherds have a preserved exterior surface showing that the vessel had a thin, floated, very fine burnished finish. Most sherds have the eroded exterior that is typical of most sandy paste sherds from Choke Canyon.

41 MC 293

Total number of sherds: 1, Phase II.

Phase II
 select sample size: 1.

Provenience: Surface.

General discussion: A single undistinctive sherd.

41 MC 293 Group 1 (coarse silt/fine sandy paste)

Vessel fragment: Body.

Sherd thickness: 0.7 cm.

Sherd condition: 2.

Exterior surface: Even, smooth, and burnished; gray with fire clouds.

Interior surface: Uneven, partially smoothed; tan to gray tan.

Paste matrix: Coarse silt and very fine sand.

Core: >2/3 offset toward exterior.

Paste inclusions: Bone: quantity = 2.
 Sand: quantity = 3; size = 1; shape = 2.

Estimated number of
 vessels: 1.

Comments: This sherd is probably from an olla.

41 MC 294

Total number of sherds: 1, Phase II.

Phase II
select sample size: 1.

Provenience: Surface.

General discussion: A single, poorly preserved sherd.

41 MC 294 Group 1 (eroded, sandy paste)

Vessel fragment: Body.

Sherd thickness: 0.8 cm.

Sherd condition: 4.

Exterior surface: Eroded; smoothed and probably burnished; red brown.

Interior surface: Same as exterior except gray (clouded).

Paste matrix: Sandy, porous.

Core: 2/3 offset toward interior.

Paste inclusions: Bone: quantity = 2.
Sand: quantity = 3; size = 3-5; shape = 3-5.

Estimated number of
vessels: 1.

41 MC 296

Total number of sherds: 41, Phase II.

Phase II
select sample size: 11.

Provenience: Controlled subsurface.

General discussion: The 41 sherds recovered from 41 MC 296 constitute a very unusual ceramic assemblage for the Choke Canyon area. The occurrence of six fragments believed to be figurines is particularly unique. Single examples of ceramic figurine fragments were also recovered from 41 MC 55 (this volume) and 41 LK 67 (Chandler 1978, 1982b). The appendage fragments from 41 MC 296 represent four different objects. Unfortunately, none of the objects are complete

enough to allow reconstruction of the completed form.

Another interesting aspect of the collection is the occurrence of grog temper and a unique mineral temper, hematite and chalk(?). The presence of so many unusual ceramic attributes in such a small collection combined with the absence of common attributes such as fugitive red filming and asphaltum suggests that the group responsible for the collection was different from the groups that produced most of the ceramics at Choke Canyon. The basic ceramic technology is still bone-tempered plainwares, however, many differences are present. The unusual nature of the collection may be explained by the suggestion that 41 MC 296 had a historic Indian component (see site discussion of 41 MC 296 in this volume).

41 MC 296 Group 1 (grog tempered)

Estimated sample size: 16 (2 select sample).

Vessel fragments: Body.

Sherd thickness: 0.6-0.7 cm.

Sherd condition: 2.

Exterior surface: Slightly uneven, poorly smoothed, partially burnished; tan.

Interior surface: Uneven and rough textured; tan.

Paste matrix: Coarse silt/sand with grog and sparse bone.

Core: Varies.

Paste inclusions: Bone: quantity = 1.
 Sand: quantity = 2; size = 2-3; shape = 2-3.
 Other: one whole juvenile land snail (*Mesodon* sp?).
 Large grog (crushed sherd) chunks occur in variable quantities. Some sherd breaks do not show grog. Grog is sandy and does appear to have bone temper.

Estimated number of vessels: 1.

Comments: Grog temper is unique in the Choke Canyon ceramic collection.

41 MC 296 Group 2 (bone and hematite temper)

Estimated sample size: 1 (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.5 cm.

Sherd condition: 2.

Exterior surface: Smooth, even burnished with traces of hematite; brown with red.

Interior surface: Smooth with visible smoothing marks; gray (clouded).

Paste matrix: Sandy with hematite and bone.

Core: >2/3 offset toward interior.

Paste inclusions: Bone: quantity = 1-2.
 Sand: quantity = 3; size = 2-4; shape = 2-3.
 Other: fine hematite particles throughout paste, one snail fragment.

Estimated number of vessels: 1.

Comments: The exterior seems to have traces of fugitive red filming. However, with the amount of hematite in the paste, the apparent filming may simply have been formed by polishing a surface with protruding hematite particles.

41 MC 296 Group 3 (thick-walled with silty paste)

Estimated sample size: 7 (3 select sample).

Vessel fragments: Body.

Sherd thickness: 0.8-0.9 cm.

Sherd condition: 2.

Exterior surface: Smooth, even, and burnished; tan.

Interior surface: Uneven and burnished; gray (clouded).

Paste matrix: Coarse silt with little sand.

Core: >2/3 offset toward interior.

Paste inclusions: Bone: quantity = 2.
Other: one snail fragment.

Estimated number of vessels: 1.

Comments: The burnishing on both surfaces suggests a bowl form.

41 MC 296 Group 4 (hematite and chalk tempered)

Estimated sample size: 11 (1 select sample).

Vessel fragments: Body.

Sherd thickness: 0.8-0.9 cm.

Sherd condition: 2.

Exterior surface: Smooth, even, and burnished; gray with sooting.

Interior surface: Slightly uneven and burnished; gray tan with black.

Paste matrix: Coarse silt with pulverized hematite and chalk(?); gray tan.

Core: >2/3 thickness.

Paste inclusions: Bone: quantity = 3.
Sand: very little.
Other: hematite and chalk; quantity = 1-2; size = 1-3.

Estimated number of vessels: 1.

Comments: Unique paste. The apparent chalk particles are bright white with very fine structure (no visible lamination or cell structure). The composition is unknown but is not shell or bone. It appears to be some type of mineral, perhaps chalk. Pulverized chalk and hematite occur throughout the paste.

Appendages: Six fragments of ceramic appendages were recovered from 41 MC 296. These fragments are very different from any others found except as noted above. Due to the unusual nature of these artifacts they were not broken to examine the paste. They are described in four groups believed to represent four separate objects.

41 MC 296 Group 5 (incised appendage with green mineral stain)

Sample: 2 fragments, Lot 163; 1 fragment, Lot 185.

Dimensions: Largest fragment measures 3.0 x 1.2 x 1.0 cm.

Surface: Smooth with many narrow incised lines; gray tan with pink tinge and green discoloration near tip of largest fragment.

Paste matrix: Based on surface, very fine sand with occasional coarse well-rounded grains.

Core: Thick, dark core.

Comments:

The largest fragment is shaped roughly like a cornucopia (Fig. 96,f,f'). The thick end is broken. The curving thin end forms a comparatively sharp point. A turquoise green stain is present on the first 2-3 mm of the tip. This substance appears to be a mineral pigment, possibly a copper mineral. The stain could have resulted from contact with copper or brass. This stain was carefully examined microscopically. It appears to be embedded in the pores of the surface and does not appear to be recently added or of some modern material (plastic, etc.).

A few millimeters further from the tip and extending to the break are a series of roughly parallel zigzag lines. These lines are very tiny (ca. 0.01 mm) and must have been executed with a very fine device, such as a cactus spine, while the clay was wet. The lines are 1-4 mm apart and form a consistent pattern that varies only in spacing and angle of zigzag. Some adjacent lines are parallel, others zig while opposite lines zag.

One of the smaller fragments was recovered with the larger fragment but does not fit. It has a series of parallel-incised lines, but they do not zigzag (Fig. 96,e). The third fragment has a rounded end that shows fire clouding. The opposite end is broken and has traces of three incised lines (Fig 96,b,b'). The paste is identical to other fragments except several tiny hematite fragments were observed. The broken edge seems to curve as if the fragment was protruding from a larger mass at an angle.

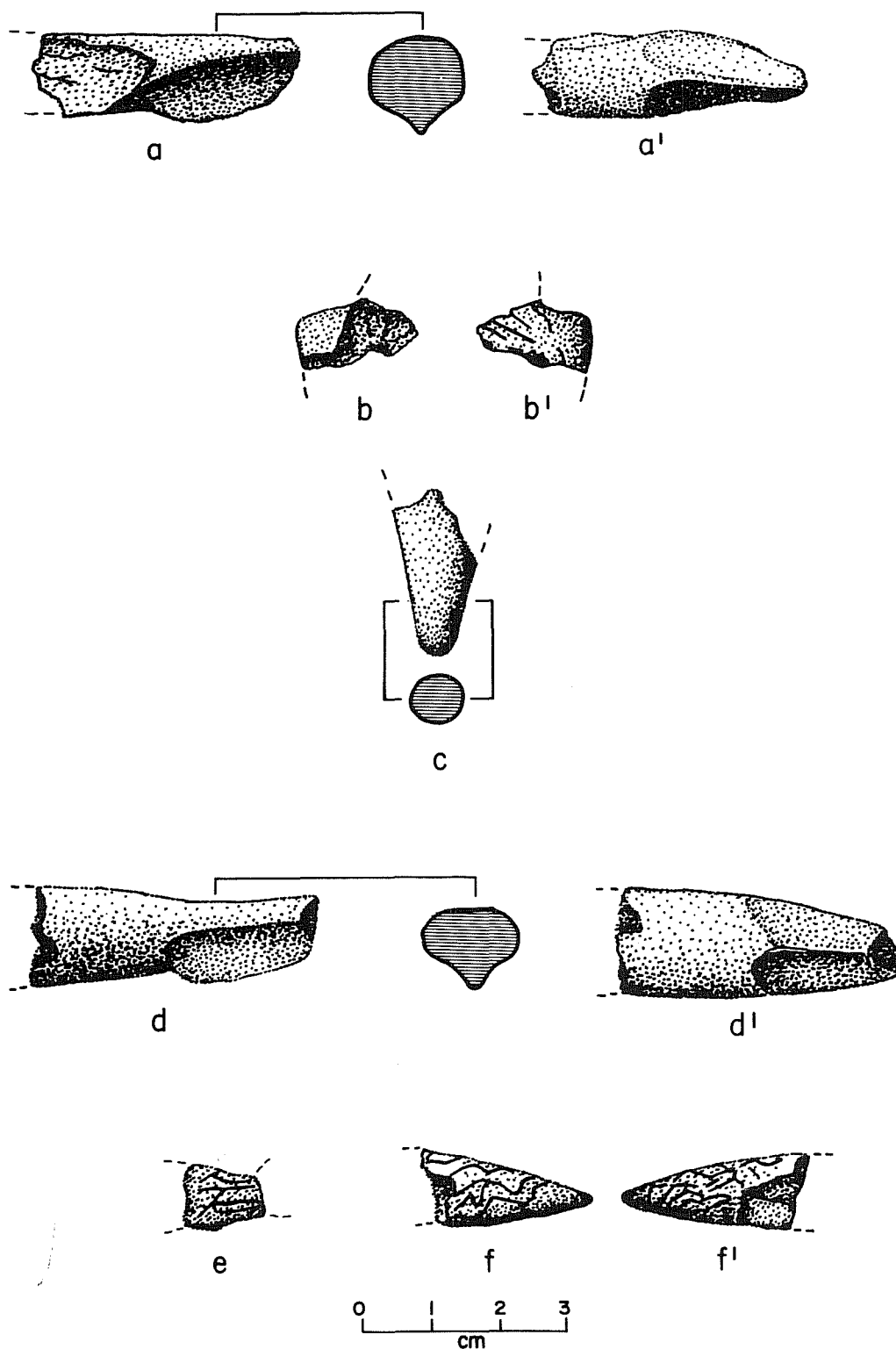


Figure 96. Figurine Fragments from 41 MC 296. a, a', Group 6, 41 MC 296, Lot 139; b, b', Group 5, 41 MC 296, Lot 185; c, Group 7, 41 MC 296, Lot 184; d, d', Group 8, 41 MC 296, Lot 141; e, Group 5, 41 MC 296, Lot 163; f, f', Group 5, 41 MC 296, Lot 163.

41 MC 296 Group 6 (pinched appendage with rounded end)

Sample: 1 fragment, Lot 139.

Dimensions: 4.0 x 1.6 x 1.2 cm.

Surface: Smooth but uneven; light tan with fire cloud.

Paste matrix: Based on surface, very fine sand with occasional coarse-rounded grains.

Core: Thick core with cracking in center of core.

Description: Cylindrical form with a pinched and rounded end (Fig. 96,a,a'). The thick end is broken. The smaller end is rounded and is wedge shaped due to pinch on one edge. Similar to Group 6 specimen and could be from same artifact (probably not).

41 MC 296 Group 7 (pinched appendage with blunt end)

Sample: 1 fragment, Lot 184.

Dimensions: 4.3 x 1.7 x 1.5 cm.

Surface: Smooth and carefully shaped; tan to gray; some dark gray stains which were not removed in ultrasonic cleaner; could be organic residue.

Paste matrix: Based on surface, very fine sand with occasional hematite particle.

Core: Thick core with cracking in center of core and some hollow voids (plant fragment casts?).

Description: Cylindrical form with a pinched and truncated blunt end (Fig. 96,c). The thick end is broken. The smaller end is rounded and is wedge shaped due to pinch on one edge. Similar to Group 5 specimen and could be from same artifact (probably not).

41 MC 296 Group 8 (blunt-pointed appendage)

Sample: 1 fragment, Lot 141.

Dimensions: 2.4 x 1.2 x 1.0 cm.

Surface: Smooth; gray (clouded).

Paste matrix: Based on surface, very fine sand.

- Core: Thick dark core with some hollow voids (plant fragment casts?).
- Description: Different form from other appendages with a blunt pointed end (Fig. 96,d,d'). The thick end is broken. The smaller end is rounded and blunt and less smooth than other surface.

ABORIGINAL CERAMICS--SUMMARY AND INTERPRETATIONS

The remainder of this section will offer an interpretative summary of the aboriginal ceramics of the Choke Canyon Reservoir area. This summary is based on all of the prehistoric ceramics recovered by the CAR-UTSA in the reservoir area including the Phase I collection (Black 1982), the Phase II collection, and the 41 LK 201 collection (Phase II and UTSA Summer Field School; Highley 1986). The total number of ceramic fragments recovered from all of these investigations is 2346.

Table 32 lists all the ceramic site groups that have been defined by the CAR-UTSA projects at Choke Canyon. The table summarizes some of the major ceramic attributes. A careful examination of Table 32 reveals several inconsistencies between the ceramic total presented above and some of the individual site group descriptions from Phase I (Black 1982). These inconsistencies are due to the fact that not all of the Phase II ceramics were placed in site groups (tiny eroded sherds at several sites were disregarded) and also due to new information. For example, 41 MC 222 Group 3 was originally estimated to represent two vessels (Black 1982:439). The Phase II collection showed that Group 2 actually represented a single vessel with considerable variation, hence Table 32 gives a vessel count of one for the group. Thus, Table 32 gives the final interpretation of a few key attributes on all aboriginal ceramics recovered to date by the CAR-UTSA during the Choke Canyon Reservoir project (some ceramics were recovered by the THC survey; Lynn, Fox, and O'Malley 1977).

The various percentages of attribute variation that are given in the following section are based on Table 32. A minimum of 115 ceramic objects (vessels, pipe bowls, and figurines) are represented by the total collection. Note this does not include the miscellaneous fired clay lumps that were recovered from several sites (41 LK 41 and 41 MC 222). Each percentage given is based on the proportion of the number of vessels that have a given attribute. For example, 76% of the vessels represented by the collection have burnished surfaces (88 out of 115).

Choke Canyon Ceramic Technology

The prehistoric ceramics recovered from the Choke Canyon Reservoir area during Phases I and II of the Nueces River project offer a look at technological aspects of pottery making along the lower Frio River drainage during the Late Prehistoric period. These observations are applicable to much of south and possibly central Texas. Viewed as a group, the ceramic collection

exemplifies the widespread bone-tempered pottery tradition defined by Hester and Hill (1971). Crushed bone in varying amounts was added to almost every vessel represented by the collection. The majority of the sherds represent vessels made by coil construction techniques. With the exception of a few figurine fragments, the sherds represent a limited range of functional forms such as ollas, bowls, jars, bottles, and pipe bowls. Surface treatment techniques were varied; but, in general, exterior surfaces were well smoothed and burnished while the interior surfaces were predictably less smooth, and usually brushed. Thus, in general terms, the ceramics are very similar. However, when one considers the specific combinations of attributes, the homogeneous picture gives way to a view of considerable variation within relatively restricted limits. The variety of combinations of paste, paste inclusions, surface finish, and firing conditions strongly suggests a widespread regional ceramic tradition in which bone temper seems to be the only mandatory ingredient in an otherwise flexible recipe. Specific aspects of the pottery making tradition merit individual discussion.

Paste Composition and Inclusions

Microscopic examination of fresh sherd breaks (cross sections) revealed considerable variation in paste characteristics. Paste in the collection ranges from highly compact homogeneous mixtures which were well fired (light clear colors) to very friable porous heterogeneous mixtures which were incompletely fired, resulting in thick dark cores and dark, cloudy surface colors. This range in paste characteristics can be attributed to different clay sources, amounts of added temper, degrees of paste constituent admixture, and firing conditions.

Paste inclusions can be divided into unintentional or natural inclusions and intentionally added inclusions or temper. Unintentional inclusions are those nonplastic (and a few plastic) paste constituents which naturally occur in the clay (e.g., sand) or those accidentally mixed into the paste (e.g., fragments of crushing tools). The intentional inclusions are bone, grog, untempered clay (in chunk form), hematite, and in a few cases, possibly sand. Each paste inclusion observed in the Choke Canyon ceramics will be discussed.

Bone

Crushed bone was added to all ceramic fragments with only a few exceptions. The amount of bone ranges from very sparse to very profuse. Particle size ranges from minute, very fine particles to granular particles measuring up to 4 or 5 mm in diameter. Bone comes in a variety of colors and shapes, a fact that has probably caused inexperienced archaeologists to misidentify bone. Bone may be black, gray, blue, brown, and white with many variations in hue. All of these colors may appear within a single sherd cross section.

Bone also comes in a myriad of shapes. Some fragments are long, layered splinters, and some are amorphous chunks. Thin layers of bone and tiny holes are the most common bone structures visible. The thin parallel layers are known as "circumferential lamellar bone" which forms in the cortex of long bone. The tiny holes are osteoclasts which are filled in during the growth

TABLE 32. CHOKE CANYON ABORIGINAL CERAMICS--SITE GROUP SUMMARY

Key Explanations to Attribute Codes

EX. SUR.	Exterior Surface Finish 1 = Burnished 2 = Unburnished (smoothed only) 3 = Other	BONE	Amount of Bone Temper 1 = Very Sparse to Sparse 2 = Moderate 3 = Profuse to Very Profuse 4 = None
IN. SUR.	Interior Surface Finish 1 = Wet Brushed 2 = Smoothed 3 = Burnished 4 = Other/Unknown 5 = Variable	INCLUSIONS	Other Inclusions/Temper 1 = No Sand 2 = Clay Chunks 3 = Hematite 4 = Grog 5 = Chalk and Hematite 6 = Bimodal Sand Size Distribution 7 = Wood/Fiber
DECOR	Decoration and Edge Mending 1 = Fugative Red Film 2 = Asphaltum Edge Mending 3 = Asphaltum Design 4 = 1 and 3 5 = Incising	FORM	Vessel Form 1 = Unknown 2 = Olla 3 = Olla? 4 = Bowl 5 = Bowl? 6 = Jar 7 = Pipe Bowl 8 = Pipe Bowl? 9 = Appendage (Figurine) 10 = Bottle
PASTE	Paste Matrix Texture 1 = Very Fine to Fine Silt/Clay 2 = Coarse Silt 3 = Fine Sand 4 = Coarse Sand 5 = Varies		

VESSEL Count of minimum number of vessels represented by group.

SITE GROUP	PHASE	COUNT	EX. SUR.	IN. SUR.	DECOR	PASTE	BONE	INCLUSIONS	FORM	# VESSELS
41 LK 14 Group 1	I+II	13	1	3	-	2	2	-	5	1
41 LK 14 Group 2	I+II	7	1	-	-	1	3	-	1	1
41 LK 14 Group 3	II	4	3	4	-	3	2	-	1	1
41 LK 15 Group 1	I	2	1	2	-	3	1	6	1	1
41 LK 15 Group 2	I	16	1	4	1	3	1	-	4	1
41 LK 41 Group 1A	I	40	1	5	-	1	3	-	1	2
41 LK 41 Group 1B	I	2	1	5	2	1	3	-	1	1
41 LK 41 Group 1C	I	13	1	5	-	1	3	1	4	2
41 LK 41 Group 1D	I	3	1	5	-	1	3	-	1	1
41 LK 41 Group 1E	I	6	3	5	-	1	3	-	1	1
41 LK 41 Group 2A	I	20	1	5	-	5	3	-	1	4
41 LK 41 Group 2B	I	1	1	5	-	5	3	-	1	1
41 LK 41 Group 2C	I	1	1	5	-	3	3	2	1	1
41 LK 41 Group 3A	I	6	1	1	-	3	2	-	1	1
41 LK 41 Group 3B	I	3	1	1	-	3	2	-	1	1
41 LK 41 Group 3C	I	8	1	1	-	3	2	-	1	1
41 LK 41 Group 4	I	8	2	2	-	3	1	-	1	1
41 LK 41 Group 5	I	9	1	2	-	3	1	-	1	3
41 LK 41 Group 6A	I	1	2	-	-	3	4	2	3	1
41 LK 41 Group 6B	I	2	1	-	-	3	4	-	1	0
41 LK 41 Group 6C	I	1	-	-	-	3	1	-	1	0
41 LK 41 Group 6D	I	1	-	-	-	3	1	-	1	0
41 LK 41 Group 6E	I	1	-	-	-	3	4	-	1	0
41 LK 51 Group 1	I	11	1	1	1	3	2	-	1	1
41 LK 51 Group 2A	I	25	1	2	1	3	1	3	1	1
41 LK 51 Group 2B	I	1	3	1	-	3	2	-	1	1
41 LK 51 Group 2C	I	14	1	3	-	3	2	-	4	1
41 LK 51 Group 3	II	31	1	1	-	4	2	-	5	1
41 LK 51 Group 4	II	3	1	1	-	3	1	-	1	1
41 LK 51 Group 5	II	7	1	1	-	1	3	-	1	2
41 LK 67 Group 1	I	146	1	3	-	2	3	3	1	2
41 LK 67 Group 2	I	70	1	1	2	3	2	-	2	1
41 LK 67 Group 3	I	10	1	2	-	1	3	-	1	1
41 LK 67 Group 4	I	10	1	3	-	3	1	-	5	1
41 LK 67 Group 5	I	2	1	4	-	2	2	-	1	1
41 LK 74 Group 1	II	28	1	4	-	1	1	1	2	1
41 LK 74 Group 2	II	5	1	1	-	3	1	-	1	1
41 LK 128 Group 1	II	5	1	2	4	1	2	1	5	1

TABLE 32. (continued)

SITE GROUP	PHASE	COUNT	EX. SUR.	IN. SUR.	DECOR	PASTE	BONE	INCLUSIONS	FORM	# VESSELS
41 LK 185 Group 1	II	2	1	2	-	2	2	-	4	1
41 LK 201 Group 1A	I	7	3	1	-	1	3	1	10	2
41 LK 201 Group 1B	I	2	3	1	-	1	3	-	4	1
41 LK 201 Group 2	I+II+FS	217	1	2	1	2	3	-	1	1
41 LK 201 Group 3A	I+II	15	1	1	-	3	2	-	5	1
41 LK 201 Group 3B	I+II	4	1	1	2	3	2	-	1	1
41 LK 201 Group 3C	I	6	3	1	-	3	2	-	1	1
41 LK 201 Group 3D	I	2	1	1	-	3	2	-	1	1
41 LK 201 Group 3E	I	2	1	4	-	3	2	-	5	1
41 LK 201 Group 4	I	2	1	3	1	3	1	-	1	1
41 LK 201 Group 5	I	1	1	1	-	3	2	-	1	1
41 LK 201 Group 6	I	1	1	4	-	3	4	-	8	1
41 LK 201 Group 7	I	2	1	1	-	2	3	2	7	1
41 LK 201 Group 8	II+FS	30	1	5	1	3	3	-	3	1
41 LK 201 Group 9	FS	502	1	1	-	2	3	-	2	1
41 LK 201 Group 10	FS	269	1	2	-	2	3	-	10	1
41 LK 201 Group 11	FS	41	2	1	-	3	3	-	2	1
41 LK 201 Group 12	FS	53	1	4	-	3	3	-	2	1
41 LK 201 Group 13	FS	25	1	2	1	1	3	3	2	1
41 LK 201 Group 14	FS	80	1	3	-	1	3	-	3	1
41 LK 201 Group 15	FS	6	1	2	-	3	1	-	7	1
41 LK 201 Group 16	FS	5	1	4	-	2	2	-	7	1
41 LK 201 Group 17	FS	33	1	4	-	1	2	7	8	1
41 LK 201 Group 18	FS	5	1	2	-	3	1	-	1	1
41 LK 201 Group 19	FS	100	1	1	-	1	3	-	2	1
41 LK 243 Group 1	II	5	1	1	-	3	2	-	1	1
41 LK 243 Group 2	II	2	2	4	-	3	2	-	1	1
41 LK 243 Group 3	II	1	1	3	-	3	2	3	1	1
41 MC 15 Group 1	I	1	2	2	-	2	2	-	1	1
41 MC 15 Group 2	I	1	3	4	-	3	1	-	1	1
41 MC 17 Group 1	I	1	1	3	-	3	2	-	2	1
41 MC 19 Group 1	I	1	2	2	-	3	3	-	1	1
41 MC 41 Group 1	I	1	2	1	-	3	1	-	3	1
41 MC 55 Group 1	I	4	1	1	-	2	2	-	1	1
41 MC 55 Group 2	I	3	1	1	1	1	1	-	1	1
41 MC 55 Group 3	I	1	2	4	-	2	1	-	1	1
41 MC 55 Group 4	I	3	1	1	-	2	3	-	1	2
41 MC 55 Group 5	I	1	1	2	-	3	2	-	1	1
41 MC 55 Group 6	I	2	1	4	3	3	2	-	1	1
41 MC 55 Group 7	I	2	1	1	-	4	1	-	1	1
41 MC 55 Group 8	II	1	1	2	3	2	3	-	1	1
41 MC 55 Group 9	II	24	1	4	-	1	3	2	2	1
41 MC 55 Group 10	II	3	1	1	-	2	3	-	4	1
41 MC 55 Group 11	II	1	1	3	-	1	3	-	1	1
41 MC 55 Group 12	II	3	1	1	-	2	1	-	3	1
41 MC 55 Group 13	II	2	1	4	3	2	2	-	1	1
41 MC 55 Group 14	II	1	1	1	-	2	3	3	1	1
41 MC 55 Group 15	II	1	1	3	-	4	1	-	3	1
41 MC 55 Group 16	II	1	2	1	-	3	3	-	1	1
41 MC 55 Group 17	II	1	2	-	-	2	4	-	9	1
41 MC 64 Group 1	I	1	1	2	-	3	2	-	1	1
41 MC 84 Group 1	I	11	2	2	-	3	1	-	1	1
41 MC 84 Group 2	I	1	3	1	-	2	2	-	1	1
41 MC 84 Group 3	I	1	1	4	-	2	2	-	1	1
41 MC 94 Group 1	I	2	1	4	-	3	1	-	1	2
41 MC 222 Group 1	I+II	34	2	1	1	2	3	3	4	1
41 MC 222 Group 2	I+II	16	2	2	-	4	1	3	3	1
41 MC 222 Group 3	I+II	154	1	1	-	2	3	-	2	1
41 MC 222 Group 4	I	2	-	-	-	3	4	-	1	0
41 MC 223 Group 1	I	1	2	4	-	3	3	-	3	1
41 MC 275 Group 1	II	65	1	4	-	3	1	-	3	1
41 MC 293 Group 1	II	1	1	2	-	3	2	-	3	1
41 MC 294 Group 1	II	1	1	3	-	4	2	-	1	1
41 MC 296 Group 1	II	16	1	4	-	2	1	4	1	1
41 MC 296 Group 2	II	1	1	2	-	3	1	3	1	1
41 MC 296 Group 3	II	7	1	3	-	2	2	-	5	1
41 MC 296 Group 4	II	11	1	3	-	2	3	5	1	1
41 MC 296 Group 5	II	3	2	-	5	3	4	-	9	1
41 MC 296 Group 6	II	1	2	-	-	3	4	-	9	1
41 MC 296 Group 7	II	1	2	-	-	3	4	-	9	1
41 MC 296 Group 8	II	1	2	-	-	3	4	-	9	1

process, except for a tiny hole in the center of concentric layers of bone known as osteoblasts (Ubelaker 1978:64). The whole structure--the tiny hole and surrounding osteoblasts is known as an osteon. In addition to these shapes, spongy cell-like structures are sometimes visible which appear to be cancellous bone tissue fragments. The faunal species utilized as bone temper are unknown, but most of the bone appears to be from large mammals such as deer or bison. This statement is based on intuition rather than any real scientific basis.

In attempting to reproduce bone-tempered pottery, it was discovered that weathered bone crushed more easily than fresh bone; however, it also disintegrates into a useless powder. The answer to the problem is to burn the fresh or partially weathered bone over an open fire for a few minutes. The burned bone crushes easily into the shapes and sizes observed in sherd cross sections.

If the bone is being burned and fire blackened to facilitate crushing, then why does the exposed bone appear white or unburned? The color of the bone is a result of oxidation. The more oxygen each particle receives during firing, the whiter the bone appears. Blackened (carbon-rich) bone will reoxidize during firing as long as sufficient oxygen penetrates the vessel. In general, the exposed bone on the vessel surface is always white, while bone within the paste may or may not be, depending upon localized oxidation conditions.

Sand

Siliceous detrital particles composed principally of quartz were observed in most site groups as a paste inclusion in varying amounts. Most of the sand can be attributed to natural inclusions present in the clay which were used to form the paste. The composition of the sand also varied in grain size and particle shape (degree of roundness). These attributes varied markedly between certain site groups and were often useful in distinguishing between sherds from similar vessels.

A good example of the variation in sand morphology is the 41 MC 55 ceramic collection. Certain site groups at 41 MC 55, such as Group 15, had very coarse sand grains that were very well rounded while others, such as Group 16, had fine to very fine angular to subangular sand grains. It can be inferred that Group 16 represents an upland clay source (angular and unabraded grains), while Group 15 represents an alluvial source (rounded and abraded grains). The presence of a large amount of comparatively well-sorted, stream-rolled sand in Group 15 may alternatively be interpreted as intentionally added sand collected from a sand bar. This illustrates the problem of trying to determine whether sand has been intentionally added or is a natural inclusion.

Future researchers could attempt to solve this problem by comparing the sand grain morphology observed in locally made ceramics with clay samples collected from the study area in question. It is suggested that such an approach may offer the best method of determining source areas short of sophisticated trace element studies.

Hematite

Iron oxide particles herein referred to as hematite were a common paste inclusion. These particles are usually recognizable by their bright red to rusty red appearance. Hematite typically occurred as rounded to well-rounded, medium to granular (up to 6 mm) particles. Differences in hardness, color, and particle shape probably reflect different compositions of iron oxide minerals such as hematite, goethite, limonite, and magnetite. In most site groups, hematite particles occurred only occasionally, although some groups, such as Group 1A at 41 MC 222, contained numerous particles which were large enough to weaken the vessel walls.

Most hematite particles are considered natural inclusions as they are known to occur in some local clay sources such as the clay from the oxbow adjacent to 41 LK 201. In a few cases, such as Groups 2 and 4 at 41 MC 296, finely pulverized hematite is present in comparatively large amounts and probably represents purposefully added temper.

Clay

Irregular to rounded patches or chunks (up to 7 mm) which appear to be untempered clay were observed in some sherds. These clay patches are usually lighter in color than the surrounding paste and are finer in texture because they do not contain bone particles. These clay inclusions were most common in upland clays (little sand or angular sand). It is suggested that the clay patches represent incompletely pulverized clay which was collected dry from an upland source. Some of the lighter colored patches may actually be a caliche.

Group 9 at 41 MC 55 has very large quantities of clay chunks both in the paste and added to sections of the vessel surface. This is interpreted as an intentional temper. Most occurrences of untempered clay chunks probably represent incidental inclusions.

Resin Bubbles

Clusters of tiny amber to orange bubbles were observed in many sherd cross sections. The composition of these resin bubbles is unknown. Resin bubbles seem to fill void or large pores in bone-tempered pottery. Resin bubbles possibly formed during firing by molten residue (which may be derived from animal bone) that flows and fills adjacent open spaces. Occasionally, similar material occurs as spongy accumulations. No resin bubbles were ever observed on sherd surfaces or anywhere except obvious voids. The bubbles themselves are tiny round spheres less than 1 mm in diameter. The resin bubble clusters are shaped to fit the available space and may be 5 mm or more.

Quartzite and Sandstone

Occasionally, chunks up to 6 mm were observed which appeared to be quartzite and sandstone fragments. These are possibly fragments of quartzite and sandstone grinding implements used to crush the bone and/or the clay.

Shell

Occasionally, land snail fragments were observed in the sherd cross sections. These appear as thin, bright white fragments. Examination under high magnification reveals a laminated cross section that is typical of shell. Several small whole juvenile land snails were observed (*Mesodon* sp?). Land snail fragments are obviously an unintentional inclusion.

Grog

One sherd out of over 2000 from the Choke Canyon area had grog temper. Grog is crushed ceramic material (sherds). These appear as angular or rectangular chunks that are often oxidized within the otherwise unoxidized core. The single example came from 41 MC 296 (Group 1) which has an unusual assemblage in many respects. Grog tempering is a common trait in east Texas and eastern North America.

Surface Finish Techniques and Surface Coatings

A variety of surface finish techniques were observed within the ceramic collection. A consistent pattern of even, smooth, and burnished exterior surfaces was noted (76% of the vessels). Sherd surfaces were frequently destroyed by postdepositional weathering, calcareous coatings, and lichen. Decoration was surprisingly common (at least 15% of the vessels). Decorative techniques include fugitive red filming, asphaltum banding, and in one case, incising. Vessel surface colors were often concealed or marred by fire clouding or sooting. A few vessels seem to have had an exterior slip.

Burnishing

Most exterior surfaces and interior bowl surfaces were first smoothed and floated and then burnished. The degree of burnishing ranged from very slight patchy burnishing with a very low luster to extensive well-developed burnishing which left a high glossy surface. Burnishing frequently was accomplished in parallel strokes as evidenced by the tool marks.

Slipping

A few sherds have coatings of fine-grained clay on the exterior surface. These coatings are distinct in color from the paste. In the Phase I analysis, the coatings were termed burnishing slips; however, this may be erroneous. Burnishing (polishing) compacts the surface and may form a fine

layer of lustrous clay that appears distinct from the paste, thus resembling a slipped surface (Shepard 1976:192). No Phase II sherds have a true slip; however, one sherd from 41 LK 41 (Group 2B) in Phase I had a brown contrasting color exterior coating that appeared to be a true slip. This slip may have functioned to improve surface appearance, to decrease permeability, or both (*ibid.*:191).

Wet Brushing

Wet brushing was evidenced on about a third of the vessels in the collection (32%). This technique involves the use of some type of organic brush (frayed stick?) while the vessel surface is still wet. Wet brushing leaves a series of tiny (sometimes microscopic) ridges and furrows on the vessel surface. Parallel and irregular patterns of wet brushing were sometimes observed. With the exception of one or two vessels, wet brushing was always confined to the interior surface. It is suggested that the technique was used on restricted neck vessels such as ollas to smooth the vessel surface.

The brushing commonly present on the interior vessel surfaces in the Choke Canyon area is rarely as pronounced as the brushed wares produced by agricultural groups in the southwest and in eastern North America. The purpose of the brushing in southern Texas appears to have been to smooth the interior surface rather than to provide a decorative or functional texture.

Fugitive Red Filming

Traces of a thin film of red mineral pigment were observed on approximately 9% of the vessels in the collection. Most examples appear to be from bowl forms, although a fugitive red decorated olla recovered from 41 LK 201 (Highley 1986) has been partially restored. Fugitive red occurs on the burnished exterior surfaces and occasionally on the interior surface. Fugitive red also occurs along the rim of bowl forms (Phase I, 41 LK 15 Group 2) and in combination with asphaltum. One site group, Group 1 from 41 LK 128, had traces of asphaltum over a fugitive red filmed surface. The vessel must have originally had quite a striking appearance.

Fugitive red film is extremely ephemeral; it is easily washed or rubbed off surfaces and usually remains only as traces. Most traces are only recognizable under careful microscopic examination. The composition of the red mineral is unknown, but appears to be an iron oxide such as earthy hematite (also called red ocher). Intact patches are bright red and have a metallic luster. Some examples of fugitive red film were a darker maroon color. Interestingly, one of the properties of hematite is that the red streak turns dark when heated (Hurlbut and Klein 1977:269). It is suggested that the dark maroon color indicates a fugitive red filmed vessel was used for cooking (exposed to heat). Given the ephemeral nature of fugitive red film, one suspects that a large percentage of the ceramics were filmed originally, and the substance has weathered away or was not observed during examination. Similar decoration has been described on **Goose Creek red-filmed** pottery along the upper Texas Gulf coast (Aten 1967) and on **Goliad red-on-buff** at Mission Espiritu Santo (Mounger 1959).

Asphaltum

Asphaltum, or natural tar, was present on many site groups and used as an edge mending glue or as a decorative coating. Evidence of edge mending was observed on the exterior surface and along one or more edges of several sherds. Other sherds had asphaltum bands or dots on the exterior surfaces that were not connected with an edge. These are interpreted as decorative coatings, although no clear designs could be reconstructed. As mentioned, asphaltum and fugitive red film were combined on a vessel from 41 LK 128.

A serious problem arose during the early stages of the Phase I analysis when distinction between asphaltum and heavy black sooting became impossible. Story (1968:17-19) encountered this same problem with ceramics from the Ingleside Cove site and was unable to solve it. Dr. Donald R. Lewis, Director of the newly formed Center for Archaeological Research Chemical Laboratory, came up with an easy, inexpensive, and rapid method (referred to as the "Lewis Method") for positively identifying asphaltum. The "Lewis Method" involves a three-step process outlined below (courtesy of D. R. Lewis).

Test for Asphalt-Bitumen

1. Place small flake of material in one cup of a white porcelain spot plate.
2. Place one drop of isopentane (2-methyl Butane) on sample. Stir gently with fine clean point. If liquid turns yellow or brown, the sample is probably from heavy crude oil. If liquid stays clear, allow to evaporate completely and go to Step 3.
3. Place one drop of Toluene on sample. Stir gently with fine clean point. If liquid turns yellow or brown, the sample probably contains asphaltic material. If liquid stays clear, the sample is probably coal, charcoal, soot, graphite, or pyrobitumen.

Using the "Lewis Method," it was determined that many of the black coats on sherd surfaces were not asphaltum. The site groups identified in the text as having asphaltum were positively identified using the "Lewis Method."

Asphaltum presumably was obtained along the Texas Gulf coast where it is commonly found along the beaches. The beach asphaltum is derived from offshore oil or tar seeps (D. R. Lewis, personal communication). The presence of asphaltum on the ceramics probably indicates coastal contact either direct or indirect through trade, although surface tar seeps are known in the Uvalde area (G. L. Hammon, Department of Earth Science, The University of Texas at San Antonio, personal communication).

Foreign Coatings

Several sherds with a dried black coat or film on one or more surfaces were found. The material is not asphaltum. The nature of this material is

unknown; it may be postdepositional or an organic waterproofing agent such as mesquite sap. It also may be heavy carbon sooting, but it seems to have been a liquid at one time.

Burned Organic Residue

Two sherds found during Phase I at 41 LK 201 (Group 2E) had a layer of dark, cracked organic material on the interior surface. During the UTSA Field School at 41 LK 201, 267 more sherds of the vessel were found (redefined as Group 10). The vessel form is unique in the area, a long-necked bottle. The organic residue is several millimeters in thickness and appears to be burned. It occurs only in the neck region of the vessel. The composition of the residue is unknown, but it may be a burned liquid residue that was preserved through carbonization (see Highley 1986).

Postdepositional Effects

A variety of postdepositional conditions have adversely affected the ceramics: calcareous coating, lichen, sun bleaching, weathering, and chemical corrosion. These effects are difficult to detect and often mask the original surface treatment techniques so effectively that one is left wondering what the original vessel surface was like.

Calcareous Coating

A light gray or white coating was observed on many sherds. The coating covers all surfaces including old broken edges. This coating is apparently a calcareous (calcium carbonate) stain derived from alkaline soils. The calcareous coating is postdepositional and frequently masks surface characteristics.

Lichen

Tiny black patches which appear to be lichen were seen on some sherds (particularly surface-collected sherds). Similar coats were often observed on lithic artifacts. Lichen are postdepositional and, like calcareous coatings, tend to obscure surface characteristics.

Weathering

Most sherds, especially surface-collected sherds, were adversely affected to varying degrees by the ravages of time. The combined effects of sun, rain, freezing, plowing, and animal and plant activity will eventually break down even the most resistant ceramics. The edges of the sherds go first. A fresh break weathers to a rounded edge as the condition attribute (Fig. 94) illustrates. A number of sherds were lighter in color on exposed edges than in the center of a fresh break. These sherds may have been sun bleached or oxidized by exposure to the bright Texas sun for hundreds of years.

Eventually, this process may entirely oxidize the sherd leaving no carbon core.

Chemical Corrosion

In some groups, particularly Group 1 at 41 LK 67 (Phase I), all exposed bone appears to be eaten away or chemically dissolved. This process is not understood and may be attributed to soil chemistry or to biological action (see discussion of Group 1 at 41 LK 67 for further details and speculation; Brown et al. 1982:34-35).

Vessel Function

The Nueces River project ceramics, while highly fragmented, offer some indications of vessel form and function. The only reconstructable vessels were recovered from 41 LK 201 (Highley 1986). The 41 LK 201 collection and some diagnostic rim and neck sherds from other sites suggest that vessel form was limited to perhaps five forms: ollas, bowls, bottles, jars, and pipe bowls. In addition, fragments of ceramic appendages have been recovered that are believed to represent figurines. Ollas appear to be the dominate vessel form followed by bowls. Jars, bottles, and pipe bowls are indicated by smaller numbers of sherds.

Ollas are the largest form represented by the collection and the most numerous. Approximately 41% of the vessels that could be assigned a tentative vessel form were ollas. An olla is a globular vessel with a constricted neck and an outward flaring rim. Handles or lugs were sometimes attached to ollas. It is suggested that the olla form functioned as a water container. This function is suggested by the vessel form and the fact that none of the suspected olla sherds show sooting as would be expected if used for cooking. The constricted neck served to minimize water spillage during transportation. The handles provided a better grip for handling a wet, slippery water container. Decoration seems to be rare on olla forms, although one decorated olla has been partially restored from 41 LK 201.

The second most numerous form type is the bowl form; approximately 31% of the vessels that could be assigned a tentative form were bowls. Bowl forms show considerable variation in size and shape. Small rim sherds suggest at least three bowl forms: closed or inverted rim bowls, open rim bowls, and flaring rim bowls. Fugitive red filming usually occurs on bowl forms. Bowls are suggested to have functioned as cooking or serving containers. Heavily sooted exterior surfaces on several suspected bowl forms suggest a cooking function.

Jar and bottle forms are uncommon. The best evidence of these is a partially restored bottle and a large rim sherd from an apparent cylindrical jar. Both of these were recovered from 41 LK 201. The bottle obviously served as a liquid container. The jar may have served as a storage container.

Several fragmentary examples of ceramic pipe bowls were recovered. The function of these is readily apparent. A wooden or bone pipe stem was

probably used in connection with the pipe bowl. The ceramic pipe bowls are similar in form and size to stone pipe bowls recovered from Archaic and Late Prehistoric contexts (Black n.d.). A number of stone pipe bowls were recovered from the Loma Sandia site (41 LK 28) in Archaic burial contexts. One of these was found with a bone stem still in place (Hester 1980: Fig. 5.16).

The above ceramic forms obviously represent utilitarian functions: water storage, food processing, and smoking. The ceramic figurine fragments from 41 LK 67, 41 MC 55, and 41 MC 296 may represent objects with ritual significance. It is interesting to note that the possible nonutilitarian objects, the figurines, are also the only ceramic form that was not bone tempered. This may suggest that the figurines were not the product of the local tradition and may have been introduced from an outside area (the lower coast?).

The above discussion is presented as a tentative assessment of vessel function. The reconstruction of several vessels from 41 LK 201 will provide a more tangible picture of complete vessels (Highley 1986).

Ceramic Chronology

Radiocarbon assays were determined from five sites at Choke Canyon that may be associated with occupational components containing ceramic material. The associated dates are presented below. More complete radiocarbon assay data can be found in Table 36 in Hall, Black, and Graves (1982:652) and in Appendix VI in this volume.

The radiocarbon assay range for a ceramic-using occupation at Choke Canyon falls very closely to earlier estimates given in south Texas, after A.D. 1200 (Hester and Hill 1971; Hester 1980). It is significant that in the Choke Canyon area, ceramics occur in association with both contracting stem arrow points (*Perdiz*) and expanding stem arrow points (*Edwards* and *Scallorn*). However, ceramics were associated with *Perdiz* types more often than with the expanding stem arrow points. Based on the radiocarbon assays, ceramics appear to have been introduced into the area by A.D. 1200 and were in use for at least 400 years.

An attempt was made to distinguish ceramic attributes that could be linked to temporal change. Some differences do occur between the earlier dated sites such as 41 MC 55 and 41 MC 222 and the later dated sites such as 41 MC 296 and 41 LK 201. However, these differences are not striking, and the dates somewhat overlap. Also, the sites with the later dates were also sites that were repeatedly reoccupied by ceramic-using peoples, while 41 MC 222 appears to result from a short-term occupation. It may be significant that thick-walled sandy paste vessels occur at 41 MC 55 and 41 MC 222 but do not occur at 41 MC 296 and 41 LK 201. Alternatively, this may reflect the available clay source rather than a temporal change in ceramic technology.

Below, each site with radiocarbon assays associated with ceramic material is briefly discussed. All radiocarbon dates given below are the MASCA calibration estimates (Ralph, Michael, and Han 1973).

41 LK 128

Four radiocarbon assays ranging from A.D. 1180-1310 may date the ceramic occupation at 41 LK 128. Unfortunately, only a small ceramic sample was obtained from the site, hence association with the four dates is rather tentative.

41 LK 201

Two radiocarbon assays date the ceramic-using occupation at 41 LK 201. TX-4667 and TX-4668 range between A.D. 1470 and A.D. 1590. These assays suggest that the extensive ceramic assemblage from the site dates comparatively late in the Late Prehistoric era. The site ceramic assemblage can be characterized as diverse in form (ollas, bowls, jar(s), bottle(s), and pipe bowls), paste composition (sandy and silty pastes), and surface finish (burnished, fugitive red filmed, asphaltum, etc.). The only major ceramic type (as in attribute combination) that appears to be missing from the 41 LK 201 collection is the thick-walled sandy paste vessels recovered from many sites.

41 MC 55

Two radiocarbon assays, TX-4692 and TX-4693, date the occupation that contains ceramics at 41 MC 55. These assays range in date from A.D. 1230 to A.D. 1420. Thus, the ceramics from 41 MC 55 seem to be earlier in time than the 41 LK 201 collection. The 41 MC 55 collection is dominated by silty paste vessels but is also characterized by considerable diversity in most attributes. Unlike the 41 LK 201 collection, several thick-walled sandy paste vessels were present in the 41 MC 55 collection.

41 MC 222

Site 41 MC 222 appears to be a single component site. The four assays determined from wood charcoal from 41 MC 222 (one date on mussel shell is obviously too old), TX-2875, TX-2876, TX-4666, and TX-4694, range between A.D. 1260 and A.D. 1500. Because three out of the four dates are before A.D. 1400 it is suspected that the 41 MC 222 ceramic collection, like that from 41 MC 55, dates earlier than the 41 LK 201 assemblage. The problem in comparing the assemblages is that the 41 MC 222 collection only represents three vessels, probably resulting from a single occupational episode, while the other two sites are multicomponent sites with large numbers of ceramic vessels. Nonetheless, it is interesting to note that the 41 MC 222 collection like the 41 MC 55 collection contains a thick-walled, sandy paste ceramic vessel (probably an olla). The three vessels from the site are not as well made as most of the vessels from 41 LK 201 or 41 MC 55.

41 MC 296

Seven radiocarbon assays date the ceramic occupation at site 41 MC 296 (TX-4677, TX-4678, TX-4682, TX-4683, TX-4684, TX-4685, and TX-4686). The dates

range between A.D. 1200 and A.D. 1610. The four assays from Levels 1 and 2, where most of the ceramics were recovered, date after A.D. 1430. This combined with a tentative indication of a historic Indian occupation (see site discussion of 41 MC 296 in this volume) at 41 MC 296 places the ceramic assemblage relatively late in the ceramic-using era. As noted, the 41 MC 296 collection has a number of unusual aspects such as grog tempering, hematite and chalk(?) tempering, and the four figurine fragments. No thick-walled sandy paste vessels are represented, although several thick-walled silty paste vessels were documented.

THE BONE-TEMPERED CERAMIC TRADITION OF SOUTH AND CENTRAL TEXAS

The analysis of the Choke Canyon ceramic collection offers a detailed look at many aspects of the bone-tempered pottery tradition of southern Texas defined by Hester and Hill (1971). This tradition represents the widespread practice of making bone-tempered utilitarian ceramics during the Late Prehistoric era, ca. A.D. 1200 to historic contact (A.D. 1530-1700).

Vessel forms are limited to comparatively simple functional forms such as ollas, bowls, bottles, jars, and pipe bowls. The only exception to this is provided by the sandy paste figurines that may be derived from the coastal region. All ceramic forms were made using coil construction techniques except for the figurines, and some of the pipe bowls were made by the pinch pot method.

Crushed animal bone was added to almost every vessel in approximate inverse proportion to the amount of sand occurring naturally in the clay. Clay sources appear to have varied widely as evidenced by the paste color, paste texture, sand grain morphology, and minor inclusions.

The exterior surfaces of all vessels were smoothed and usually burnished. Decoration occurs in the area more frequently than had previously been recognized. Approximately 15% of the vessels had definite evidence of fugitive red filming or asphaltum. The percentage of decorated vessels is probably higher due to the ephemeral nature of the fugitive red filming, the major form of decoration. Asphaltum was used as a mending glue to repair cracked vessels and as a decorative paint. Incising occurs on at least one figurine and may have been present on several other vessels. Several of the figurines also have shaped surfaces. Other forms of decoration such as punctating and brushing have been documented at other southern Texas sites (Hester and Parker 1970).

The origins of the south Texas ceramic tradition have been tentatively linked to central Texas by previous researchers (Hester and Hill 1971:199-200). **Leon Plain** is the type name applied to most central Texas bone-tempered pottery (Suhm, Krieger, and Jelks 1954). Hester and Hill (1971:198-199) suggest that "**Leon Plain** has never been fully studied and seems to be an amalgamation of various plain ceramics found in Late Prehistoric central Texas." One unpublished study (Heartfield 1966) of **Leon Plain** documents considerable variation in central Texas ceramics, but concludes that **Leon Plain** should be considered a viable provisional type based on attribute consistency and geographic isolation. In the same paper, Heartfield suggests

that the origin of **Leon Plain** lies to the east in the fringe area between central Texas and the Caddoan area (east Texas).

Leon Plain and the bone-tempered pottery from southern Texas cannot be clearly separated in form, appearance, or spatial distribution. It is argued here that the differences one notices between a ceramic collection from a central Texas Late Prehistoric site and a southern Texas Late Prehistoric site are probably more due to an individual's technique, clay source variation, and fortuitous firing conditions rather than technology or tradition. The differences between the ceramic collections from different sites in the Choke Canyon area are similar in scope to the differences between central Texas and southern Texas ceramic assemblages. It is suggested here that **Leon Plain** and the south Texas bone-tempered ceramic tradition are virtually indistinguishable and should be considered a single tradition.

Most studies have suggested that the ceramic tradition in central Texas and southern Texas dates after A.D. 1200 (Jelks 1962:88; Hester 1980:124). The radiocarbon assays from the Choke Canyon area certainly support this dating. Recent excavations at the Panther Springs Creek site in Bexar County (south-central Texas) suggest that pottery may have been introduced in the region several hundred years earlier (Black and McGraw 1985). At the Panther Springs Creek site, a poorly made bone-tempered cylindrical jar was found in association with a charcoal feature radiocarbon dated to A.D. 980 $\pm$ 60 (TX-3856, MASCA calibrated). This ceramic vessel was also associated with expanding stem arrow points (**Scallorn** and possibly **Edwards**). The occurrence of rather crudely made bone-tempered ceramics in south-central Texas several hundred years before the widespread occurrence of thinner, better made ceramics across much of central and southern Texas is significant.

Bone-tempered pottery appears to have been introduced into the region by A.D. 1000. The most likely source for the tradition is from the agricultural groups to the east who made bone-tempered ceramics as early as A.D. 500. Story (1981:146) notes that there were two early ceramic traditions in east Texas, a sandy paste and a grog and bone-tempered tradition.

It is argued that the bone-tempered ceramic tradition that is evidenced at many Late Prehistoric sites over much of south and central Texas survived until early historic times. Clark (1978:76-77) has observed that bone-tempered ceramics very similar to **Leon Plain** have been found at many Spanish sites including Mission San José, Mission San Antonio de Valero, Presidio San Luis de Amarillas, Mission Santa Cruz de San Saba, Mission Concepción, Mission Espíritu Santo, Mission Rosario, and Mission San Juan. These Spanish Colonial missions dealt mostly with Indian groups from southern and central Texas. It is suggested that bone-tempered ceramics were not found at the Lipan Apache mission, San Lorenzo de la Santa Cruz (Tunnell and Newcomb 1969). Mounger (1959:179-181) defined three variants of bone-tempered ceramics at Mission Espíritu Santo--**Goliad Plain**, **Goliad red-on-buff**, and **Goliad black-on-buff**. A comparison was made of the ceramics from Mission Espíritu Santo to the **Rockport** wares of the central Texas Gulf coast and to **Leon Plain** of central Texas. She found that, while the mission ceramic decoration was more similar to the **Rockport** wares, the color, porosity, and tempering were most similar to **Leon Plain**. Mounger (*ibid.*:181) apparently

decided that **Goliad** wares were distinctive from **Leon Plain** solely on the basis of decoration: "No **Leon Plain** has even been reported in red or black, it may be concluded, **Goliad** ware is a local product and represents the ceramic tradition of the Arana." The recognition of fugitive red filming and asphaltum painting on Late Prehistoric bone-tempered ceramics challenges the validity of the **Goliad** types.

In conclusion, it is argued that a single ceramic tradition is represented by the Late Prehistoric and mission period (early Historic) bone-tempered pottery in south and central Texas. Between A.D. 1000 and A.D. 1500, the tradition of making bone-tempered utilitarian ceramics was adopted by many inland hunting and gathering groups living in south and central Texas. Spanish expansion from the south and Apache and later Comanche expansion and raiding from the north and northwest, rapidly decimated and displaced the native groups in the region during the 17th and 18th centuries (Campbell and Campbell 1981:64). The surviving remnants, while sheltered in the Spanish missions, maintained their tradition of making bone-tempered pottery for a few decades longer. The bone-tempered ceramic tradition would include the following previously defined types: **Leon Plain**, "Doss Red Ware" (Kelley 1947), **Goliad Plain**, **Goliad red-on-buff**, and **Goliad black-on-buff**, as well as the untyped bone-tempered ceramics from south Texas and the Spanish missions. Considerable differences do occur within the bone-tempered tradition of south and central Texas. Most differences may be more a product of clay source variation, sample size, sample preservation, and individual style rather than distinct cultural practices. It is suggested that the above type names are no longer valid in view of the regional nature of the tradition. These names should be discarded in favor of simple descriptive labels until adequate distributional and descriptive data are available to define culturally meaningful types.

METAL KNIFE BLADE (Grant D. Hall)

A badly corroded, fragmented metal knife blade was recovered from Level 2 (99.80 to 99.70 m) of Unit N1027 E999 at 41 MC 296. The blade fragment measures 13.8 cm in length and has a maximum width of 2.1 cm. The shank is 5.1 cm in length and tapers down to a twisted end. This type of knife is called a "case knife." It was popular in the Indian trade during the 18th century. The specimen is illustrated in Figure 92,1.

CONCLUSIONS

The research reported in this volume represents the culmination of a series of archaeological investigations at Choke Canyon that began 18 years ago with a limited pilot survey conducted by Wakefield (1968). The first large-scale survey efforts occurred in 1974 and 1976 under the auspices of the Texas Historical Commission. This field work was done in two phases during a three-year period because of changes in governmental jurisdiction over the project. Due partly to funding problems related to these changes and partly to the refusal of landowners to permit archaeological surveys on their property, the THC investigators were able to survey only about 22,000 acres of the total 38,000 acres to become the basin of Choke Canyon Reservoir.

Recommendations for further field research, including test excavations and more survey, were published in 1977 (Lynn, Fox, and O'Malley 1977). These recommendations provided the framework for the CAR-UTSA Phase I investigations which began in July 1977. Two additional surveys, one conducted in 1977 and the other in 1979, finally completed the archaeological survey effort at Choke Canyon. Recommendations for Phase II work, formulated by the CAR staff on the basis of Phase I findings, had to include provisions for testing certain of the sites recorded in the final surveys.

Thus, due to scheduling problems of one kind or another, the sets of recommendations premising both major phases of field work at Choke Canyon were based on incomplete data collections. For Phase I, THC analysts lacked control over the full universe of detectable sites as they made their recommendations. In Phase II, provision had to be made for preliminary testing of a number of recently recorded sites to determine their eligibility for more intensive study (see Appendix I). The staggered fashion in which the archaeological data base was brought under control at Choke Canyon was a definite hindrance, making recommendations somewhat tentative at times when decisiveness would have been preferable.

ESTABLISHING SITE SIGNIFICANCE

Formulation of recommendations for Phase II archaeological investigations at Choke Canyon required development of a set of guidelines for establishing the relative significance of sites in the reservoir basin. These guidelines would aid in decisions as to which sites should receive additional investigative attention, how field time should be allocated, and what types of investigative procedures should be applied. In designing these guidelines, we defined "significance" as the potential a site has for yielding data pertinent to the major research problems currently recognized in south Texas prehistory. By this definition, all prehistoric sites have some degree of significance. However, the actual information yield from a site is totally dependent on state-of-the-art techniques of recovery and analysis. For us, the most significant sites were those that yielded the greatest variety of debris evidencing prehistoric human activity. In practice, this placed a premium on sites where animal bone and carbonized plant remains were preserved, in addition to the chipped stone, burned rock, mussel shell, and snail shell that occurred on virtually every Choke Canyon site. Sites where cultural debris was stratified into two or more distinct zones were given special consideration because of their potential to yield information pertinent to cultural/chronological problems. Presence of intact, well-integrated habitational features was another factor adding to a site's significance. The perceived scarcity (or apparent absence) of definable components of Paleo-Indian and Early Archaic activity led us to pay special attention to localities where there was even the merest suggestion that such components might be found intact. According to this scheme, the most significant of the sites at Choke Canyon would be those that evidenced all of the characteristics just described.

THE CONDUCT OF PHASE II INVESTIGATIONS

The Phase II Scope of Work (Appendix I) made provision for the investigation of 67 prehistoric sites at Choke Canyon. Thirteen of these sites were to receive a level of attention termed "intensive excavation." As Phase II field work commenced, only five of these intensive excavation sites were known. The balance of eight sites would be selected from the 62 sites tested during the course of Phase II field investigations. This necessary, but very arbitrary procedure had the unfortunate consequence of bringing on some difficult choices among the sites that were evaluated through the testing program. In discussions of excavation results presented in the preceding section of this report, there are several of the tested sites that obviously warranted further attention. These sites became victims of the value judgments that had to be made in dealing with a project on the scale of Choke Canyon. Their exclusion from additional investigation was not so much a comment on each site's individual worth, but on the collective significance of all sites studied in Phase II. It was our opinion that available field time could be more beneficially expended elsewhere. Some recommendations for ways in which such decisions can be more judiciously made in the future will be discussed below.

A CULTURAL/CHRONOLOGICAL SUMMARY OF CHOKE CANYON PREHISTORY

THE PALEO-INDIAN PERIOD

The combined efforts of archaeologists at Choke Canyon over the past 15 years have resulted in recovery or documentation of recognized Paleo-Indian period chipped stone artifacts from only 12 of the many prehistoric sites investigated. Sites, diagnostic forms recovered from each, and landform settings are shown below.

Site	Artifact Types	Landform Setting
41 LK 8	Plainview, Scottsbluff	ancient floodplain terrace remnant
41 LK 14	Angostura (?)	ancient floodplain terrace remnant
41 LK 199	Golondrina	ancient floodplain terrace remnant
41 LK 204	Scottsbluff	upland valley margin
41 MC 7	Plainview or Angostura (?)	ancient floodplain terrace remnant
41 MC 10	Plainview (several)	ancient floodplain terrace remnant
41 MC 14	Plainview	ancient floodplain terrace remnant
41 MC 84	proximal fragment with edge grinding	valley margin slopes
41 MC 172	Plainview or Angostura (?)	ancient floodplain terrace remnant
41 MC 194	Golondrina	upland valley margin
41 MC 214	Angostura	valley margin slopes
41 MC 234	medial thin biface fragment with ribbon flaking, edge grinding	ancient floodplain terrace remnant

Also confirmed are surface finds, made by local residents, of a **Folsom** point in the vicinity of 41 MC 7 and 41 MC 10 and a **Clovis** point on Opossum Hill southwest of Opossum Creek (west of 41 MC 89).

Hester (1980:98-102) suggests the following ages for the Paleo-Indian diagnostics mentioned above:

Clovis	9200 B.C.
Folsom	8800 B.C. to 8500 B.C.
Plainview	8200 B.C.
Golondrina	7000 B.C.
Scottsbluff	6500 B.C.
Angostura	6000 B.C.

Thus far, all recognized Paleo-Indian diagnostics known from Choke Canyon have been found on site surfaces. No Paleo-Indian components have been defined in excavations. At virtually all locations where Paleo-Indian artifacts have been recovered there is also evidence of human activity post-dating the Paleo-Indian period. It has therefore not been possible to expand our knowledge of the Paleo-Indian tool kit or subsistence habits as might otherwise be done through analysis of artifacts and other cultural residues present on sites where reliable diagnostics have occurred.

Review of the landform settings containing sites that have yielded Paleo-Indian diagnostics are revealing, yet very likely deceptive. The settlement pattern was apparently oriented to the crests of high, old terrace remnants down on the floodplain of the Frio River and its major tributaries, such as San Miguel Creek and Salt Branch (south side of valley), and to the slopes and upland edge of the valley margin. It should be clearly emphasized here that the sampling universe is restricted to the Choke Canyon Reservoir basin. The data do not allow speculations of prehistoric settlement in upland areas away from the river valley.

Although Paleo-Indian components have not yet been isolated in subsurface deposits at Choke Canyon, the bulk of regional data suggests that such buried components should exist here and there in the basin. Factors that may be dictating against discovery of buried Paleo-Indian components include: (1) the relatively small numbers of Paleo-Indian people that inhabited the region; (2) the shorter duration of their activity (3000 years for the Paleo-Indian period compared to 8000 years for the Archaic and Late Prehistoric); and (3) the tendency, especially over the past 5000 or 6000 years, for the major drainages to be filling with alluvial and colluvial deposits. These factors combined likely influence heavily the modern perception of Paleo-Indian settlement at Choke Canyon. A smaller number of Paleo-Indian people operating in a region over a shorter period of time would be expected to have generated proportionately less habitational debris at fewer sites than did succeeding Archaic period populations. If Paleo-Indian base camps were located on the banks of the river and its tributaries as they existed 10,000 years ago, the residues evidencing their encampments have probably been deeply buried as the valleys subsequently began to fill through processes of alluvial and colluvial deposition.

The rare buried Paleo-Indian components that have come to light elsewhere on the coastal plain of southern Texas (Hester 1980) provide hope for the discovery of similar remains in the Choke Canyon region. Until such components are isolated and thoroughly investigated, it will be impossible to do much more than recognize that Paleo-Indian people were active in the area as indicated by the occurrence of lanceolate biface types such as **Plainview**, **Golondrina**, **Angostura**, and **Scottsbluff**. These types are elsewhere clearly affiliated with Paleo-Indian cultural patterns and must surely indicate expressions of the same or similar traditions at Choke Canyon.

THE PALEO-INDIAN TO EARLY ARCHAIC TRANSITION: THE CLEAR FORK QUESTION

The discussion of the Paleo-Indian period at Choke Canyon presented above is arbitrarily exclusive, but technically correct, in limiting definition of Paleo-Indian components to those sites yielding lanceolate point types that are well established as period diagnostics. The **Clear Fork "gouge"** (after Ray 1941) tool form is herein categorized as distally beveled tools, Group 1 and Group 2 (especially Form 1). The presence of large numbers of these artifacts, and the variability they exhibit, present a special problem in terms of their value as a temporally diagnostic item. For example, bifacial forms of **Clear Fork**, usually elongate and parallel-sided, are known to occur in Paleo-Indian contexts in northeastern Mexico, the lower Pecos River area, and in south-central Texas (Epstein 1969; Hester 1980:137-138). Furthermore, a large unifacial variant occurs in Early Archaic sites in south-central Texas (Hester and Kohnitz 1975; Black and McGraw 1985). Finally, throughout much of southern Texas, smaller unifacial and bifacial **Clear Fork** implements occur entirely in Archaic contexts (Hester, Gilbow, and Albee 1973). Clearly, the use of the term **Clear Fork** can only refer to a loose morphological group of artifacts from both Paleo-Indian and Archaic times. Much additional research is needed to sort the various forms, if possible, into meaningful temporal types (cf. Turner and Hester 1985:205).

Listed below are sites at Choke Canyon where **Clear Fork** gouges--of all forms--have been recovered:

41 LK 8*	41 LK 67	41 LK 203	41 MC 84*
41 LK 14*	41 LK 69	41 LK 204*	41 MC 94
41 LK 27	41 LK 87	41 MC 19	41 MC 177
41 LK 31/32	41 LK 93	41 MC 33	41 MC 192
41 LK 52	41 LK 121	41 MC 54	41 MC 213
41 LK 64	41 LK 128	41 MC 78	41 MC 226

Asterisks (*) following site numbers indicate locations where Paleo-Indian diagnostics were also found. This listing would seem to indicate that **Clear Fork** tools are not commonly associated with Paleo-Indian components at Choke Canyon. More probably, these artifacts are an indicator of Middle Archaic activity. As with sites yielding sound Paleo-Indian diagnostics, the sites where "classic" **Clear Fork** tools are found tend to be located on older terrace remnants in the river and creek valleys and along the valley margins.

There are indications that it may someday be possible to improve the diagnostic capabilities of **Clear Fork** tools on the basis of minor

morphological variations. Such a clarification will depend on location and investigation of sites containing the appropriate components as identified by diagnostic tool forms more reliable than the **Clear Fork** as currently defined.

THE EARLY ARCHAIC PERIOD

Early Archaic Diagnostics: The Guadalupe Tool and Others

A growing body of data has shown that the tool type known as the **Guadalupe** "adze," or "gouge," treated for descriptive purposes as Group 6 of distally beveled tools in this report, is a very reliable Early Archaic diagnostic form, specifically for the time period from 6000 B.C. to 3500 B.C. in central Texas (Hester and Kohnitz 1975; Hester 1980; Black and McGraw 1985). The following sites at Choke Canyon have yielded **Guadalupe** tools. All are surface finds.

41 LK 8*	41 LK 65	41 MC 52	41 MC 174
41 LK 14*	41 LK 69+	41 MC 60	41 MC 189
41 LK 15	41 LK 74	41 MC 94+	41 MC 213+
41 LK 17	41 LK 133	41 MC 165	

Asterisks (*) in the list above indicate sites where Paleo-Indian diagnostics were also recovered. Crosses (+) show sites where **Clear Fork** specimens were found.

There are few additional Early Archaic diagnostic tool forms clearly recognized at Choke Canyon. Thin biface specimens tentatively advanced as Early Archaic types include stemmed dart points such as **Bell** (41 LK 52, 41 LK 122) and the generic "Early Expanding Stem" dart points (41 LK 8, 41 LK 51, and 41 LK 122). The specimen recovered from radiocarbon-dated deposits at 41 LK 51 is very similar to the **Bandy** type, an Early Archaic dart point common in the Trans-Pecos region (Word and Douglas 1970; Turner and Hester 1985). Another generic form, the "Early Triangular," is an unstemmed thin biface whose delicate workmanship makes it stand out in some assemblages in the Trans-Pecos and in central Texas (Hester 1980). Possible "Early Triangular" specimens have been recovered from sites 41 LK 53 (Group 2, Form 1, Specimen 5, thin bifaces) and 41 LK 197 (Group 2, Form 1, Specimen 16, thin bifaces) at Choke Canyon. The problem with the use of triangular thin biface forms as diagnostics in south Texas is that, unlike central Texas, the triangular form becomes extremely common in Middle Archaic and Late Archaic times (the best example is the **Tortugas** type). As a result, the "Early Triangular" form does not have the background of predominately stemmed dart points to make it stand out as distinctively as it does in central Texas (Hall, Black, and Graves 1982:463).

Buried Early Archaic Components

Evidence recovered from 41 LK 31/32 (Scott and Fox 1982) and observations made at three other sites investigated during the course of Phase I pre-historic research at Choke Canyon led to the statement that "low terraces along the Frio River, its relict channels, and its larger tributaries became

major zones of intensive aboriginal settlement after 3500 B.C. (Hall, Black, and Graves 1982:464). Findings made at 41 LK 51 during Phase II excavations reveal an even earlier buried component along Opossum Hollow.

At 41 LK 31/32, evidence was found of prehistoric cultural debris buried over two meters beneath the modern ground surface on a terrace beside the modern Frio River. In subsequent controlled excavations, a number of habitational features were exposed and recorded. Carbon in amounts adequate for radio-carbon assay were collected from three of the features. Assays of these samples yielded two absolute dates ranging from 3380 B.C. to 3350 B.C. on the early horizon in the site and an age range of 2360 B.C. to 2340 B.C. for a living surface which occurred a meter above the early horizon, a location roughly midway through the deposit (all dates MASCA corrected). These dates indicate that 41 LK 31/32 contained Early Archaic and Middle Archaic components in its lower reaches.

The Early Archaic component at 41 LK 31/32 was manifest by a very distinct living surface across which clusters of habitational debris were distributed. These debris clusters were composed predominately of mussel shell and *Rabdotus* snail shell. Sandstone, chert cores, debitage, carbon, and soil discolorations were also present (Scott and Fox 1982:31). Three proximal thin biface fragments, each broad and finely worked with a concave base, were recovered from this Early Archaic component. Bone was very infrequent, but turtle and drum fish were identified among vertebrate faunal remains recovered.

Phase II excavations at 41 LK 51 produced evidence of another Early Archaic component buried approximately 1.5 m below the modern ground surface beside the channel of Opossum Hollow. The horizon was sampled in only six 1-m² units. One habitational feature (Feature 6)--a cluster of tuff, sandstone, and fire-fractured rock--was isolated. Mussel shell, *Rabdotus* shell, and a small amount of bone were found around the feature. A number of thin biface specimens came out of this horizon. One of these specimens is a stemmed dart point (Group 1, Form 3, Specimen 19, thin bifaces), tentatively identified as the **Bandy** type. Also recovered were six unstemmed thin bifaces with straight (Group 2, Form 2, Specimen 15), concave (Group 3, Form 1, Specimen 1), or convex bases (Group 4, Form 1, Specimen 6; Group 4, Form 4, three specimens). A very large carbon sample gathered from a location 20 cm beneath Feature 6 yielded a radiocarbon age range of 5130 B.C. to 4450 B.C. (TX-4690 and TX-4691, both MASCA corrected). As this carbon was slightly deeper than, and distinctly separate from Feature 6, it is possible that the feature would date to a somewhat younger time. The wood burned to form this carbon has been identified as either *Prosopis* or *Acacia*. This is an extremely significant determination in that it demonstrates the local presence 6500 to 7000 years ago of a species that is a major element of modern brush communities in the region.

Though limited in their extent of investigation, the Early Archaic components identified at 41 LK 31/32 and 41 LK 51 are very important for several reasons. First, the simple fact that they have been found and identified is a major advance. In the future, investigators will know that such early components are to be expected and will have an idea of where they ought to be found. Further, since buried Early Archaic components are present and

identifiable at Choke Canyon it becomes all the more likely that buried Paleo-Indian components are also preserved and will someday be found.

The buried Early Archaic components at Choke Canyon have not been generous in providing distinctive chipped stone tool forms useful as diagnostics for the period. The unstemmed thin biface fragments from 41 LK 31/32, distinguished by their fine workmanship and broad, concave bases, will likely prove useful as local Early Archaic diagnostics. Likewise, the stemmed thin biface from 41 LK 51 suggested to be of the **Bandy** type, is a distinctive form and should make a good diagnostic. More generally, these few specimens are very important in that they are suggestive of a broad cultural/chronological pattern that occurs across south Texas, the Trans-Pecos (the **Bandy** type; Word and Douglas 1970), and central Texas (unstemmed thin bifaces with broad, concave bases; Weir 1976). It is speculated that future, more extensive investigations of buried Early Archaic components in southern Texas will reveal even stronger parallels to Trans-Pecos and central Texas Early Archaic diagnostic assemblages. The limited probes of Early Archaic components at Choke Canyon have thus far not yielded any specimens of large, unifacial **Clear Fork** or **Guadalupe** tools, given the very small areas actually excavated, this is likely to be a sampling error.

Again limited by the extremely small sample, it is not possible to comment at any great length on the subsistence habits of Choke Canyon's Early Archaic peoples. As is so frequently the case in local prehistoric context, it is mussel shell, *Rabdotus* snail shell, a few shreds of animal bone, and perhaps some sandstone grinding implements, that may be cited as direct or indirect signs of what Early Archaic people were eating. In this respect, it can only be said that Early Archaic subsistence residues are not remarkably different from assemblages representing later periods. In comparing the Early Archaic and Middle Archaic habitational features defined at 41 LK 31/32, it is striking that the most carefully constructed and well-integrated rock clusters (suggested to be hearths intended for roasting or baking some type of food) occur in Middle Archaic context. Data from other sites, such as 41 LK 67 and 41 LK 201, support this apparent pattern (Brown et al. 1982; Highley 1986). The fact that well-constructed roasting/baking facilities are not yet definitely recognized in Early Archaic context at Choke Canyon may reflect a sampling bias. However, should this perceived pattern hold up in future research, a significant difference in subsistence orientation may be indicated.

THE MIDDLE ARCHAIC AND LATE ARCHAIC PERIODS

In this study, the terminus of the Early Archaic period and the starting date for the Middle Archaic period are arbitrarily set at 2500 B.C. This tentative determination is based partly on the approximate temporal juncture of these two periods in central Texas and the Trans-Pecos and partly on the radiocarbon date of 2360 B.C. to 2340 B.C. provided by a presumed Middle Archaic component at 41 LK 31/32 (Scott and Fox 1982). Later radiocarbon ages for the Middle Archaic have also been obtained at 41 LK 67 (Brown et al. 1982), 41 LK 201 (Highley 1986), and at 41 MC 201 (Thoms, Montgomery, and Portnoy 1981). These later dates suggest a terminus of 400 B.C. for the Middle Archaic (see discussion in Appendix VI).

Investigation of buried Middle Archaic components at 41 LK 31/32, 41 LK 67, and 41 LK 201 permit, in a limited way, characterization of the habitation residues representing the period. As mentioned above in the discussion of the Early Archaic, the Middle Archaic components contain very substantial, well-integrated rock cluster features suggested to have functioned as roasting or baking hearths. Distally beveled tools ("gouges") appear in radiocarbon-dated context for the first time, with specimens categorized into Groups 3 and 4 as being especially common. Stemmed dart points occur infrequently, and most specimens that have been found do not meet the criteria for established dart point typologies. Unstemmed thin bifaces are much more common, but equally difficult to classify.

Three stemmed dart point types found at Choke Canyon--**Pedernales**, **Morhiss**, and **Langtry**--are demonstrated Middle Archaic diagnostics in central Texas (**Pedernales**), in the Trans-Pecos area (**Langtry**), and on the Texas coastal plain northeast of Choke Canyon (**Morhiss**). Sites yielding these types at Choke Canyon are as follows:

<u>Pedernales</u>	<u>Morhiss</u>	<u>Langtry</u>	
41 LK 10	41 LK 8	41 LK 51	41 MC 57
41 LK 31/32	41 LK 14	41 LK 69	41 MC 163
41 LK 51	41 LK 31/32	41 LK 75	41 MC 196
41 LK 201	41 LK 201	41 LK 250	41 MC 213
41 MC 201	41 MC 196	41 MC 14	41 MC 238
41 MC 209		41 MC 30	41 MC 285
41 MC 213		41 MC 43	
41 MC 275			

Most of these specimens were surface finds.

If recognition of Middle Archaic components at Choke Canyon was limited to those localities yielding the specimens listed above, there would appear to have been very little human activity in the area during the period. However, based on the limited findings at 41 LK 31/32, 41 LK 67, and 41 LK 201, it appears likely that many of the unstemmed thin bifaces (thin bifaces Groups 2, 3, 4, [except Forms 2 and 3], and 5) and many of the distally beveled tools (especially Groups 3 and 4) are representative of the Middle Archaic period.

Distally Beveled Tools of the Middle and Late Archaic Periods

The diminutive "gouge" tools classified into distally beveled tools Groups 3 and 4 appear to be strongly affiliated with the Middle Archaic period and, to a lesser extent, with the Late Archaic. Phase I findings at Choke Canyon contribute much of the data permitting this association (Hall, Black, and Graves 1982:340-346). Unfortunately, uncertainty about where Early Archaic, Middle Archaic, and Late Archaic temporal boundaries should be drawn led to assignment of a number of distally beveled tools to the Early Archaic and Late Archaic periods (Hall, Black, and Graves 1982:345, Fig. 79). In truth, the radiocarbon age span of 2360 B.C. to 660 B.C. for the few dated Phase I specimens more accurately indicates Middle Archaic affiliation. Additional specimens (Groups 3 and 4) recovered during Phase II excavations at 41 LK 201

provide more support for assignment of the forms to the Middle Archaic period. Less conclusive stratigraphic occurrences of these small distally beveled tools suggest more limited usage on into the Late Archaic.

Distally beveled tools categorized into Group 3 (Forms 1-3) and Group 4 were recovered from 59 prehistoric sites at Choke Canyon (Phase I and Phase II research combined). Eleven (19%) of these 59 sites also yielded one or more of the **Pedernales, Morhiss, or Langtry** Middle Archaic diagnostics discussed above. Probable Late Archaic diagnostics (to be discussed below) were found on 13 (22%) of the 59 sites where Group 3 and Group 4 distally beveled tools were recovered. Sites where these particular tools were found are as follows (from site provenience tables in this report and Hall, Black, and Graves 1982):

41 LK 10*	41 LK 94	41 MC 18	41 MC 174
41 LK 13	41 LK 127	41 MC 19	41 MC 196*
41 LK 14*	41 LK 182	41 MC 22	41 MC 212
41 LK 15+	41 LK 199	41 MC 25	41 MC 213*+
41 LK 17	41 LK 201+	41 MC 28	41 MC 226
41 LK 27	41 LK 205+	41 MC 29	41 MC 238*
41 LK 31/32*	41 LK 206	41 MC 41	41 MC 246
41 LK 51*+	41 LK 243	41 MC 50	41 MC 251
41 LK 53	41 LK 250*	41 MC 52	41 MC 260+
41 LK 67+	41 LK 252	41 MC 55	41 MC 268+
41 LK 69*	41 LK 253	41 MC 64	41 MC 270
41 LK 74+	41 MC 11	41 MC 75	41 MC 276
41 LK 75*	41 MC 13	41 MC 84+	41 MC 282
41 LK 85	41 MC 14*	41 MC 94+	41 MC 296+
41 LK 91	41 MC 15+	41 MC 95	

Asterisks (*) indicate sites where Middle Archaic dart points were recovered. Crosses (+) designate sites yielding Late Archaic dart points (see below).

Recognized Late Archaic Diagnostics

A survey of all reports dealing with Choke Canyon's prehistoric sites, including the present study, yields a list of 44 sites from which stemmed dart points diagnostic of the Late Archaic period have been recovered. The point types are **Ensor, Frio, Ellis, Marcos, and Fairland**. Sites where these point types were found are listed below.

41 LK 8	41 LK 185	41 MC 43	41 MC 250
41 LK 15	41 LK 201	41 MC 57	41 MC 257
41 LK 51	41 LK 205	41 MC 84	41 MC 259
41 LK 64	41 LK 234	41 MC 85	41 MC 260
41 LK 67	41 LK 243	41 MC 94	41 MC 266
41 LK 70	41 LK 247	41 MC 163	41 MC 268
41 LK 74	41 LK 251	41 MC 171	41 MC 275
41 LK 87	41 LK 252	41 MC 184	41 MC 280
41 LK 128	41 MC 7	41 MC 213	41 MC 288
41 LK 159	41 MC 15	41 MC 247	41 MC 294
41 LK 181	41 MC 17	41 MC 248	41 MC 296

The Late Archaic period at Choke Canyon is suggested to span the time period from 400 B.C. to A.D. 900.

The Middle and Late Archaic: Aspects of Settlement and Subsistence

By combining the sites at Choke Canyon that have yielded recognized Middle Archaic and Late Archaic stemmed dart point forms and the sites yielding distally beveled tools in Groups 3 and 4, a total of 99 sites is achieved. This comparatively vast number of sites suggests a period of intense human activity in the river valley for the periods represented. Sites in this group occur in virtually every physiographic setting found in the area. As previously discussed, the Middle Archaic component at 41 LK 31/32 was radiocarbon dated at 2340 B.C. This is the earliest dated component designated Middle Archaic. Other radiocarbon dates for apparent Middle Archaic components range from 1800 B.C. to 800 B.C., and there is a notable clustering of dates in the 800 B.C. to A.D. 200 range (see Appendix VI). The latter end of this cluster--from 400 B.C. to A.D. 200--would, of course, carry over into the Late Archaic period as it is being defined in this study.

It is in this period of apparently intensive Middle Archaic activity that another distinctive phenomenon is manifested. The well-made roasting/baking hearths found at 41 LK 31/32, 41 LK 67, and 41 LK 201 have already been discussed. Here, attention is called to 14 sites (41 LK 17, 41 LK 69, 41 LK 207, 41 LK 250, 41 LK 252, 41 LK 253, 41 MC 196, 41 MC 201, 41 MC 209, 41 MC 213, 41 MC 220, 41 MC 260, 41 MC 266, 41 MC 296) where particularly massive quantities of burned rock--sandstone, tuff, or chert--have been noted and/or sampled.

These sites, too, apparently date to the later years of the Middle Archaic and to the Late Archaic. Where they have been exposed on the surface--such as at 41 LK 69, 41 LK 207, and 41 MC 266--the concentrations of burned rock assume subcircular or oval outline patterns with dimensions on the order of 10 m x 20 m. Even larger surface exposures of burned rock occur at sites such as 41 MC 209 (Thoms, Montgomery, and Portnoy 1981) and 41 MC 220 (Hall, Black, and Graves 1982). Where accumulations have been encountered in excavations, for example at 41 LK 17 and 41 LK 250, layers of virtually solid burned rock up to 40 cm thick have been documented. There is a tendency for sites bearing the burned rock deposits to be located either along valley margins or on the floodplains of tributary channels in their upper reaches, away from the river valley. However, to demonstrate that the rock masses are not confined to the higher reaches of the valley, site 41 LK 17 is located down on the floodplain beside a relict channel of the Frio River. It is stretching the inference very thin, but it is nevertheless interesting to note the modern-day proximity of groves of oak trees to sites such as 41 MC 209, 41 MC 220, and 41 MC 296. Some have attributed the development of "burned rock middens" in central Texas to the processing of acorns for human consumption during the Archaic (Weir 1976; Darrel Creel, personal communication).

The later years of the Middle Archaic period and the Late Archaic period may thus be characterized as times when numerous sites were periodically occupied in all parts of the Choke Canyon basin. The primary tool kit, as lithic

evidence of it has survived in the archaeological record, consisted of small distally beveled tools (for multipurpose woodworking and/or plant product harvesting tasks?), unstemmed thin bifaces that could have been used as knives or dart points, modified and trimmed chert flakes, and a limited number of stemmed thin bifaces that, again, might have served either as cutting tools or dart points. Grinding stones (manos and metates) are very common. Hearths, formed of substantial, well-integrated clusters of rock, and masses of burned rock stand out as a major distinction for bracketing cultural periods and are interpreted as residues of a major subsistence interest, probably the cooking of roots or plant stalks. Mussel shell and *Rabdotus* snail shell are usually present and are believed to show that the flesh of mussels and snails was often eaten. Analysis of vertebrate faunal remains from 41 LK 201 (Steele 1986) and 41 MC 296 (Appendix III) provides an idea of the kinds of animals that Archaic people were hunting, trapping, or catching. Comparison of Archaic and Late Prehistoric faunal assemblages from Phase I investigations led to the following speculation:

. . . it appears that Archaic people were concentrating on the capture of smaller animals such as rodents, rabbits, snakes, lizards, fish, and turtles. Deer were also hunted. During Late Prehistoric times, a much broader and diversified hunting effort seems to have been underway. In addition to the smaller animals, Late Prehistoric people relied heavily upon procurement of larger animals such as bison, antelope, deer, and javelina (Hall, Black, and Graves 1982:471).

With benefit of more extensive collections and careful identifications in Phase II, similar differences in Archaic and Late Prehistoric faunal remains have been clearly demonstrated (see Appendix III). Wood species identifications made from carbon recovered from Middle Archaic components at 41 LK 51 and 41 LK 201--specifically of *Prosopis* and *Acacia*--demonstrate that major elements of the modern brush community were present in the region in prehistoric times. As producers of nutritious beans, the *Prosopis* and *Acacia* species may have provided a significant food contribution to the diets of prehistoric people. However, after finding that such species existed in Middle Archaic and Late Archaic times and recovering coeval sandstone grinding tools (presumed seed/nut/bean processing equipment), there is at present no hard data that links mesquite or acacia beans (or grass seeds, for that matter) to the manos and metates. Thus, the evidence permits only the suggestion that grinding implements indicate seed/nut/bean processing. The carbon identifications show what may have been available for processing.

THE LATE PREHISTORIC PERIOD

Being the latest period in Choke Canyon's prehistoric cultural sequence, the Late Prehistoric offers some dramatic research advantages over its local predecessors. Debris representing the period is highly visible. If not exposed on the surface, Late Prehistoric debris is seldom buried by more than 40 cm of deposit--usually less. Due probably to the fact that chemical agencies and soil processes have not had as long a time to break them down, bone and charcoal are recovered much more frequently from Late Prehistoric components at Choke Canyon than they are from Archaic contexts. Finally, the

most important characteristic of the Late Prehistoric components is that they normally yield a profusion of time diagnostics in the form of arrow points, potsherds, and certain other artifact types. Based on radiocarbon assays and differences in arrow point types, the period can be divided into two segments. Components bearing only **Scallorn** and/or **Edwards** arrow points tentatively date from A.D. 900 to A.D. 1400. Components yielding only **Perdiz** arrow points appear to date from A.D. 1400 to A.D. 1650 (see discussion of radiocarbon dates in Appendix VI).

Combined archaeological efforts at Choke Canyon over the past 15 years have resulted in definition of Late Prehistoric components at 61 sites. Arrow points of the **Scallorn**, **Edwards**, and **Perdiz** types and prehistoric aboriginal pottery were the diagnostics used to identify the components. The sites are listed below according to the diagnostic(s) found at each.

<u>Pottery only</u>		<u>Scallorn only</u>	<u>Scallorn-pottery</u>
41 LK 8	41 MC 14	41 LK 49	41 LK 243
41 LK 15	41 MC 17	41 LK 86	41 MC 17
41 LK 74	41 MC 41	41 LK 246	41 MC 84
41 LK 85	41 MC 64	41 MC 24	41 MC 94
41 LK 92	41 MC 194	41 MC 28	41 MC 165
41 LK 176	41 MC 260	41 MC 74	41 MC 222
41 LK 185	41 MC 266	41 MC 83	41 MC 298
41 LK 236	41 MC 283	41 MC 95	
41 MC 9	41 MC 293	41 MC 264	
		41 MC 280	
<u>Scallorn-pottery-Perdiz</u>		<u>Perdiz-Scallorn</u>	<u>Perdiz only</u>
41 LK 14		41 LK 53	41 LK 18
41 LK 41			41 LK 55
41 LK 201*			41 LK 64
41 MC 268			41 LK 181
41 MC 296			41 MC 65
			41 MC 79
			41 MC 183
			41 MC 242
			41 MC 297
			41 LK 51
			41 LK 67
			41 LK 94
			41 LK 128
			41 MC 19
			41 MC 43
			41 MC 55
			41 MC 223
			41 MC 275
			41 MC 286
			41 MC 294

Plotting the distribution of sites that produced Late Prehistoric diagnostics at Choke Canyon, a settlement pattern distinctly different from that of the Archaic is seen. Late Prehistoric camps are most often situated along the channels of major drainages, either of the Frio River or its principal local tributaries, and on natural levees beside relict channels of these same drainages. Preference for proximity to a water source is clearly indicated.

*Here, the **Scallorn** group includes **Scallorn**-like expanding stem arrow points.

A few Late Prehistoric sites occur along the valley margins, but they are not nearly so common as Archaic components in the same setting.

Two sites excavated during Phase II investigations, 41 MC 222 and 41 MC 55, serve well as examples of the temporally discrete subperiods recognized for the Late Prehistoric at Choke Canyon. Site 41 MC 222 (Skillet Mountain No. 4) yielded an assemblage containing arrow points of the **Scallorn** and **Edwards** types. There are also examples of a currently untyped arrow point form having a straight stem. Several unstemmed thin bifaces, mano and metate fragments, a bone pin or awl, and sherds of pottery round out the assemblage for 41 MC 222. This collection is typical of the early phase of the Late Prehistoric period at Choke Canyon in the range of A.D. 900 to A.D. 1400. It corresponds, at least in part, to the Austin phase of central Texas.

The Late Prehistoric component at 41 MC 55 yielded **Perdiz** arrow points; a tiny, unstemmed arrow point (**McGloin** type?); "beveled knives"; unifaces; trimmed flakes; and sherds of pottery. Site 41 LK 201 (Highley 1986) has a similar assemblage, and though some **Scallorn** points occur with **Perdiz** points and ceramics at 41 MC 296, it is also felt to be a good example of this late phase Late Prehistoric at Choke Canyon. Although there is an overlap of radiocarbon dates from the Late Prehistoric sites, the assays from 41 MC 55, 41 MC 296, and 41 LK 201 tend to cluster later than 41 MC 222 and other early phase Late Prehistoric components. Such late phase materials have been referred to the Toyah horizon by Black (n.d.), based on excavations at site 41 JW 8.

THE ARCHAIC AND LATE PREHISTORIC PERIODS: COMPARISONS

Substantial changes in material culture, apparent subsistence pursuits, and settlement patterns all serve to distinguish the roughly 800 years of the Late Prehistoric period in south Texas from the previous 7000 years of Archaic lifeways. For the Archaic period, the appearance is that changes occurred slowly and were simply modifications on the same basic theme. The dart point, distally beveled tool ("gouge"), grinding implements, and chert flakes of no customary shape are the main classes of tools that survive to represent the Archaic.

With the appearance of the first Late Prehistoric occupations of the area around A.D. 900, the hallmarks of the Archaic tool kit--the dart point and gouge--disappear completely from the material culture inventory. They are replaced by the arrow point and a series of unifacially worked side- and end scrapers. Pottery comes into use. The Late Prehistoric people confine their activities much more to the banks of the river and major streams than did their predecessors. In particular, the Late Archaic period saw human activity resulting in accumulation of cultural debris at diverse locations throughout the Frio River valley and beyond.

Differences in perceived subsistence habits between the Archaic and Late Prehistoric are indicated by respective collections of vertebrate faunal remains and cooking facilities preserved in various components of each period. Generally speaking, the Archaic at Choke Canyon is represented by substantial features composed of stone and presumed to have functioned as

cooking facilities. Rock clusters do certainly occur as habitational features in Late Prehistoric context, but they do not tend to be as massive or well integrated as those found in Archaic contexts. As shall be discussed in more detail below, the amount of rock concentrated in Archaic components as habitational features points to a heavy reliance on plant products for food.

Other archaeologically visible indicators of plant food utilization--grinding implements--are equally common in both the Archaic and Late Prehistoric periods. Probably used in the preparation of seeds, nuts, and/or beans, the grinding implements suggest that such foods were important to human subsistence throughout the prehistory of the Choke Canyon area.

With the apparent de-emphasis on use of certain kinds of plant foods in the Late Prehistoric came an increase in the quantity and variety of meat foods contributing to the diet (see discussion above and in Appendix III). Shells of large land snails and of mussels, often combined in the same habitational features, evidence the continuing importance of these fauna for meat food through the entire span of the Archaic and Late Prehistoric periods.

The very clear differences between Archaic and Late Prehistoric adaptations recognized on the basis of findings made at Choke Canyon necessitate consideration of a basic problem in the study of south Texas prehistory. Were the changes in material culture, subsistence pursuits, and settlement patterns characteristic of the south Texas Late Prehistoric impressed on an indigenous population, that is, people descended from the Archaic groups who inhabited the region? Or, do these changes indicate an influx of people from other regions? We offer no solution to this problem other than to call attention to the obvious differences revealed by the research at Choke Canyon. Future investigations should focus on the time period between A.D. 200 and A.D. 800, a 600-year span that is significantly underrepresented in the Choke Canyon radiocarbon analysis (see Appendix VI) and which serves as the temporal breach between solid Late Archaic and Late Prehistoric components. If it is to be argued that population replacement occurred, one obvious question that needs to be addressed is: what happened to the region's indigenous people? The period between A.D. 200 and A.D. 800 is the time when the transition would have taken place. Prehistoric cultural components dating to this time should contain data that would help clarify this issue.

Regardless of the eventual resolution to the questions raised above, the Late Prehistoric data already in hand, especially evidence for technological innovations such as the bow and arrow and pottery and the apparent shifts in subsistence orientation, give us the impression that quite profound changes occurred in the Late Prehistoric--changes unprecedented in the 7000 years of Archaic period cultural activity in the region.

HISTORIC PERIOD ABORIGINAL OCCUPATIONS

Although Campbell and Campbell (1981) have detailed what is known of Historic era aboriginal populations in the Choke Canyon region, we have found only a few recognizable traces of their presence. At 41 LK 31/32, a metal arrow

point of a form that can be linked to 19th-century Indian groups (probably middle to late 19th century) was reported by Fox (Scott and Fox 1982). The occurrence of an earlier Historic period aboriginal occupation is likely at 41 MC 296. A corroded metal knife blade was found and is similar to those we have seen in collections from the Spanish Colonial missions in Texas and northeastern Mexico. In the same context was a lanceolate arrow point of the Guerrero type also found in the missions (Hester 1977; Fox 1979b; Hester 1980). Site 41 MC 296 also has cultural materials from the late phase Late Prehistoric. Indeed, such late materials may represent early Historic occupations elsewhere at Choke Canyon, but cannot be clearly distinguished without the presence of Spanish Colonial period diagnostics.

SUGGESTIONS FOR FUTURE RESEARCH

In archaeological studies of reservoir basins and other large tracts of land to be affected by whatever type of destructive modification, the prevalent attitude over the past 15 or 20 years has been that sampling of sites and the materials they contain should be broad and all-inclusive. Ideally, each kind of material manifestation resulting from past aboriginal activity would be identified and probed as necessary in an attempt to demonstrate what people were doing to generate that particular set of remains. In large part, this attitude came about as a response to WPA and River Basin Survey salvage operations that concentrated efforts on large, highly productive sites and ignored smaller, special activity loci. Greater emphasis on settlement pattern studies and recognition of the systemic aspects of culture have also acted to promote the broad spectrum approach to site investigations.

As a result of our experience at Choke Canyon, it may be suggested that the time has come for the pendulum to swing back to a more moderate position between the extremes. We would not argue that broad spectrum site investigation is bad in and of itself. The problem arises within the framework of a sponsored program where funds are generous, but nevertheless limited, and the objective is mitigation of damages to a massive cultural resource base spread over a large geographic area.

It is our opinion that sites holding the greatest potential for elucidating human lifeways of the Paleo-Indian, Early Archaic, and Middle Archaic periods at Choke Canyon (and generally throughout south Texas) are in deep, stratified deposits occurring as terraces beside the major drainages in the reservoir basin. Some good examples of such sites excavated during Phase I and Phase II investigations at Choke Canyon are 41 LK 31/32 (Scott and Fox 1982), 41 LK 201 (Highley 1986; Hall, Black, and Graves 1982), and 41 LK 51 (this volume). The major advantage recognized for these sites is that their stratification permits definition of discrete components, something impossible at the majority of sites where these early periods of activity are represented. Also, alluvial deposition over these terraces has tended to stabilize and protect habitational features much more satisfactorily than at most other locations in the valley (e.g., Pleistocene terraces, valley margin, and upland edge). A particularly vivid example of a fragile prehistoric feature preserved in such an environment is Feature 16 at 41 LK 31/32 (Scott and Fox 1982:43-44), consisting of some chert cores, debitage, a hammerstone, and some mussel shell. The integrity and definition

of this cluster of remains is such that it requires no stretch of imagination to return to the scene the person who flaked the chert and satisfied an appetite with a meal of mussels. Thus, the process of terrace alluviation at Choke Canyon has provided resolution of human behavioral episodes not only down to the component level, but to an individual event in prehistory.

Beyond providing discrete units of cultural debris offering the potential for study of behavior and activity patterning, there is a tendency for the deep, stratified terrace sites to yield more vertebrate faunal material and carbon. The scarcity of these materials within prehistoric sites at Choke Canyon automatically places a premium on localities where they are preserved in relatively substantial amounts. Carbon recovered from habitational features provides samples for radiocarbon assay and for wood species identifications. When successful results are obtained from these types of analysis, cultural components can be dated, and elements of prehistoric floral communities are identified. Recognition of plant species aids in paleoenvironmental reconstruction and may also indicate plant products that were available as potential food sources to prehistoric people. Vertebrate faunal remains provide evidence of the meat foods that people were consuming and are also useful in paleoenvironmental reconstructions. Due to (1) the uniform absence of perishable materials in south Texas prehistoric sites; (2) the scarcity of pollen in these same sites; and (3) the infancy of regional phytolith (plant opal) research, studies of carbonized plant remains and faunal material currently constitute the main avenues of research into paleoenvironment and prehistoric human subsistence.

It is in consideration of the factors and conditions outlined above that we suggest the major thrust of future field research in the study of south Texas prehistory be directed at sites where it is possible to recognize discrete components (the finer the time/stratigraphic resolution the better) and which contain well-integrated habitational features, carbonized plant remains, and vertebrate faunal materials. We would contend that much more will ultimately be learned about prehistoric lifeways in south Texas through the intensive study of a few sites with these characteristics than by attempting to equitably distribute effort over the full spectrum of sites existing within a given study area. In the concluding chapter of the recently published **Prehistoric Hunter-Gatherers - The Emergence of Cultural Complexity**, Brown and Price (1985:440-441) have said:

Improvements in the chronologies of prehistoric hunter-gatherer adaptations and refinements in the definition of major variables are essential to measure more accurately changes in natural productivity, technology, population, mobility, and the like. Only with greater resolution in time and definition will information on the precise relations between these variables become clear.

VISIBILITY AND ACCESSING THE BURIED REMAINS

A related problem in the study of south Texas prehistory involves factors that result in older components receiving proportionately less attention than younger components. Late Prehistoric components on prehistoric sites at Choke Canyon are typically highly visible and easily recognizable. The

cultural debris evidencing Late Prehistoric activity occurs within the upper 40 cm of deposit on most sites. Arrow points and ceramics are clearly diagnostic of a time period post-dating A.D. 900. Perhaps because they have been subjected to shorter periods of exposure to mechanical and chemical action of soils, bone and carbon tend to be preserved more often in Late Prehistoric components at Choke Canyon. Late Prehistoric sites are thus shallow, well represented by cultural/temporal diagnostics, and tend to yield more bone and carbon than earlier components.

Archaic components in sites at Choke Canyon are typically very difficult to assign to more specific temporal units within the 7000-year span of the period in south Texas prehistory. This critical problem was recognized and addressed in concluding statements on the Phase I research at Choke Canyon (Hall, Black, and Graves 1982:473-475). Refinement of the Archaic chronological sequence is hampered now by the same factors recognized then: there are at present too few diagnostic artifacts. This problem becomes especially acute on sites--constituting a decided majority at Choke Canyon--where there is little or no recognizable stratigraphic separation between debris representing the presumed major periods of cultural activity. Such sites are often located on older, higher land surfaces where deposition has been slow or nonexistent. These same locations are frequently the ones that have suffered most from overgrazing and resultant degrading erosion in historic times.

The great need for a much more finely tuned Archaic period chronological framework in south Texas again accentuates the value of concentrating efforts on deep, stratified sites. Attempts at analyzing debris recovered from nonstratified or poorly stratified Archaic sites at Choke Canyon has not added substantially to our knowledge of lifeways for the period.

Where an active depositional environment provides much-needed stratigraphic separation between sets of debris representing periodic encampments on a site, it also buries components, making them progressively more difficult to reach and investigate. The difficulty in reaching the deepest horizons or components on stratified terrace sites at Choke Canyon, such as 41 LK 31/32 and 41 LK 51, has dictated against the kind of thorough investigation we believe will be necessary in the future.

At Choke Canyon, the most extensive contiguous horizontal excavations were conducted at 41 LK 67 (Brown et al. 1982). Controlled excavations occurred in two unit blocks measuring 10 x 12 m and 8 x 8 m. Between the two blocks of controlled excavations, over an area of approximately 38 x 74 m, a bulldozer was used to expose habitational features. This gross excavation technique, utilized on a site soon to be completely destroyed by dam construction, provided an opportunity to map feature distributions over a large area. Other relatively extensive controlled excavations occurred at 41 LK 31/32 (Scott and Fox 1982), 41 LK 201 (Highley 1986), 41 MC 55, and 41 MC 222. Of these, only the excavations at 41 LK 31/32 and 41 LK 201 entailed investigation of deep deposits containing Middle Archaic components. At the other sites, the components explored were very shallowly buried and, with the exception of 41 LK 67, represent only Late Prehistoric activity.

One of the major reasons for conducting the horizontally more extensive excavations on the sites mentioned above was to gather data evidencing the patterning of human activities within the sites. We had hoped that by studying the activity patterns we might ultimately infer more about the behavior of the people who generated the debris. In retrospect, there are three problems recognized, two of which relate directly to the Choke Canyon investigation and a third which will be a major consideration in the conduct of future research.

First, the "extensive" excavations at Choke Canyon turned out to be not extensive enough. Remains of fascinating and very significant single, or individual activity events were recorded, but plots evidencing what might be termed community patterning were possible only at 41 LK 67, and this was but marginally accomplished due to the largest area being explored by stripping deposits with heavy machinery. If patterns of community activity are the objective, future excavations will need to be more extensive than those conducted at 41 LK 67.

A second problem involves the kinds of materials that are preserved in sites as evidence of prehistoric cultural activity. Stated very simply, the more varied the types of remains preserved in a site, the greater the interpretive potential. Less can be said about a site where cultural activity is evidenced predominately by burned rock, mussel shell, chert debitage, and a few chipped stone tools than about a site where, in addition to the above materials, carbon and animal bone are also preserved. At Choke Canyon, the "poor" site characterized above is well exemplified by sites 41 LK 67 and 41 LK 31/32, while data-"wealthy" sites are those such as 41 MC 296, 41 LK 201, and 41 LK 51. As 41 LK 67 and 41 LK 31/32 were located in the immediate area of Choke Canyon Dam and would be destroyed in the early stages of construction, they were the first to be extensively excavated. The decision to devote relatively great amounts of investigative effort to these two sites was based on site evaluation data available as Phase I field work was still underway in 1977. The excavations at both sites yielded useful and significant information. With benefit of hindsight, however, we believe that more would have been learned about Choke Canyon prehistory had the available time and resources for field work been allocated differently. Specifically, more excavation time should have been devoted to sites where vertebrate faunal remains and carbonized plant materials are preserved. As discussed above, these sites would also preferably be "pure," single component sites or well-stratified multicomponent sites.

The third problem is an outgrowth of the first two. If, as we suggest, excavations need to be much more extensive and would preferably occur in deeply stratified sites, what are the implications in terms of budgeting field time for a research program on the scale of Phase II investigations at Choke Canyon?

A good example of community patterning inferred from excavations is provided in the report of recent work at the Loeve-Fox site in Williamson County (Prewitt 1982:207). At Loeve-Fox, the Twin Sisters component (Late Archaic) in the site was heavily investigated. This component, buried about 1 m below the modern ground surface, was explored in three blocks of contiguous controlled excavation units. The largest unit block measured 8 x 16 m. Two

smaller unit blocks brought the area of controlled excavations in the Twin Sisters component to a total of 154 m², an area somewhat smaller than the 184 m² excavated at 41 LK 67. As at 41 LK 67, some additional distributional data concerning the Loeve-Fox Twin Sisters component was obtained through machinery excavation. It must be emphasized that the community patterning proposed for the Twin Sisters component at Loeve-Fox is hypothetical. Prewitt (personal communication, August 19, 1985) estimates that additional excavations on the order of three to five times the horizontal extent of the existing blocks would be necessary to test the community pattern model he has proposed.

Prewitt (personal communication) estimates that the field investigation of the Twin Sisters component at Loeve-Fox consumed roughly three-quarters (6660 person hours) of the total time expended in excavations at the site (8880 person hours). The investigation at 41 LK 67 required 4100 person hours to complete. Though a slightly smaller area of the Twin Sisters component was explored in comparison to the Archaic component revealed at 41 LK 67, the Loeve-Fox target zone was buried by about 1 m of deposit while the 41 LK 67 remains were buried by less than 40 cm of deposit. If we accept Prewitt's most conservative estimate of additional effort required to reveal community patterning in the Twin Sisters component at Loeve-Fox, we arrive at a labor investment of 19,980 person hours (about 2500 person days). This would be the labor commitment necessary to adequately investigate one component buried to a depth of one meter. For a stratified terrace site such as 41 LK 31/32 at Choke Canyon, having at least three distinct cultural components and a total depth of more than 3 m, the figures above indicate that an effort totaling about 60,000 person hours (7500 person days) of field time would be needed to adequately study the three components.

The bottom line, then, is that investigations of the type proposed require a formidable investment. If such investigations in an area like Choke Canyon are to be carried out within the framework of existing federal guidelines, some fundamental changes in expectations for, and conduct of, field research will have to be made.

In future projects involving large land areas, we suggest that the program of research be structured in two stages. In the first stage, the objective would be to locate and evaluate all detectable sites in the project area. This objective should be accomplished by the most economical and efficient means possible. Rather than relying on costly and time-consuming controlled test excavations to evaluate sites, methods such as backhoe testing (McGuff and Fawcett 1978), shovel testing, augering, and examination of opportunistic exposures (walls of arroyos, borrow pits, river banks, etc.) should be applied. The information obtained should then be used to rank the sites according to their potential for elucidating area prehistory. At Choke Canyon, sites with high potential would have characteristics such as: (1) clear stratigraphy; (2) intact, well-integrated habitational features; and (3) good preservation of vertebrate faunal material and carbonized plant remains. The criteria for establishing the research potential of sites in other project areas may vary from these at Choke Canyon, but the important thing is that they be drawn from the body of data expeditiously obtained in the first stage of investigations. It is critical that all definable sites be surveyed and evaluated before intensive, focused excavations begin. The

piecemeal way in which the Choke Canyon project area was surveyed, tested, and excavated was a great hindrance to an organized program of evaluation. Important sites should be recognized in the initial stage of investigation, not in the final stage. No major excavations should occur until the site universe has been determined and appropriate means of calculating potential and relative significance are worked out.

In the second stage of overall project investigation, a highly select and limited group of sites or components within sites should be subjected to extensive excavation. By way of defining what an extensive excavation would entail, the projected estimate of 2500 person days needed to adequately explore the Twin Sisters component at the Loeve-Fox site is given as an example. In a research program such as Choke Canyon, the total field effort possible will be set by federally dictated funding levels. Invariably, the resources remaining as the second stage of field research commences will not be adequate to support an "ideal" program of data recovery. Insofar as possible, the inclination to reduce the level of effort committed to extensive excavations in individual sites or components in favor of less extensive investigations at more sites should be suppressed. The experience gained during the Phase I and Phase II investigations at Choke Canyon indicates that the kinds of information obtained in limited excavations at many sites can be recovered in extensive excavations at a few carefully selected sites, but the reverse is not true. It has not proved possible to forge a cultural mosaic of data gathered from numerous sites into a satisfactory, unified picture of lifeways at any given period in prehistory.

Future progress in interpretation of prehistoric lifeways in southern Texas will be heavily dependent on the extent to which methods can be developed for identifying the floral food products exploited by the region's aboriginal inhabitants. One need only briefly review findings made in the dry rock-shelters of the Trans-Pecos (Williams-Dean 1978; Stock 1983), 160 to 200 miles northwest of Choke Canyon, or in the caves of Tamaulipas slightly farther to the south in Mexico (MacNeish 1958) to obtain a strong impression of the important contribution that a variety of plant foods made to the prehistoric human diet. The limited ethnohistoric accounts available for south Texas also demonstrate this extensive reliance on plant foods (Campbell and Campbell 1981). Some advances have been made through identification of carbonized botanical remains, but recognition of species in this way so far only permits gross speculations about the composition of prehistoric floral communities and on the possible contributions of this flora to human diet. Phytolith research offers great promise, especially in light of the demonstrated scarcity of pollen in the open prehistoric campsites typical of south Texas. This type of research, however, continues to be a complex and highly technical process. Much additional effort will be required to realize its full potential.

Beyond carbon and phytoliths, the chemical and/or elemental "fingerprinting" of plant food residues may represent another productive avenue of future research. With this type of research, we would suppose that each kind of plant food might have an individual chemical or elemental constitution that would leave traces in the deposits of archaeological sites.

With both the existing carbon and phytolith research tools, as well as the proposed "fingerprinting" program, there are two overarching problems to be dealt with. First, no effort has yet been made to identify all of the potentially edible foods provided by the plant communities of southern Texas, especially those plants whose presence we can now demonstrate archaeologically. In this area, two things must be done. A complete list of products yielded by the modern floral communities must be developed, and the fitness (and seasonal availability) of each product for human consumption determined. Nutritional values should also be calculated (Everitt and Alaniz 1981). Second, systematic means of sampling for vestiges of these remains within prehistoric sites, via whichever technique discussed above, must be developed. The potential of carbonized remains is only now beginning to be fully realized with application of flotation recovery techniques in southern Texas (Black and McGraw 1985; Black n.d.). Where such material is preserved, flotation permits the recovery of minute carbonized plant parts (seeds, epidermis, etc.) that would normally be lost or destroyed as matrix is passed through even the smallest of screen meshes. We would suggest that the archaeological feature commonly identified as the "hearth" (i.e., any locus where burning and/or food preparation is inferred by presence of carbon, burned rock, fired clay, or presumed food remnants such as animal bone, mussel shells, and snail shells) is the likeliest place for collection of large matrix samples. Hearth features are recommended for intensive scrutiny primarily because they are usually immediately detectable to the field archaeologist. The ethnographic literature indicates that hearths are often the final "loci of concentration" in the process of plant food collection and preparation leading finally to consumption. The potential for sample bias created by concentrating on hearth features must be recognized and counterbalanced by sampling nonhearth matrices to the extent that reasonable doubts are eliminated. However, this strategy should not become so diffuse as to impair study of what we believe to be the truly important focus of analytical effort--the hearth and its related materials and matrices.

SPECIFIC PROBLEMS FOR FUTURE RESEARCH

Beyond our general recommendation that much more extensive excavations be carried out on individual sites and components, there are certain problems which we feel will require special attention and which should be the focus of research effort in coming years.

As is made clear in the cultural/chronological summary presented above, we really know very little about the Paleo-Indian, Early Archaic, and Middle Archaic periods in southern Texas. The time period from 2000 B.C. back into prehistory is represented by only five radiocarbon dates at Choke Canyon and by very limited recovery of data from *in situ*, definable components. More data is needed on all fronts--dating, diagnostic artifacts, subsistence pursuits, settlement patterns, and paleoenvironment. We must continue to seek out components of these early periods, excavate them extensively, and build a body of information suitable for comparison to the better-known Late Archaic and Late Prehistoric periods. There is simply not enough known about early cultures to do a reasonable job of comparing and contrasting them to later cultures in the region. As discussed in detail above, the best components of these periods are deeply buried in river terraces. Their very

inaccessability is the reason we know so little about them. Findings made at Choke Canyon have verified the existence of early components. In the future, specific steps should be taken to guarantee that these deep, hard-to-get-at early components receive at least as much attention as do the later components.

The later years of the Middle Archaic period and the Late Archaic period in southern Texas witnessed cultural developments that were apparently much more similar than previously suspected to trends in the prehistory of adjacent regions such as central Texas, the central coastal plain, and the Trans-Pecos area. Specifically at Choke Canyon, there is a marked increase in the number of sites representing the time period from 1500 B.C. up to A.D. 200. The amount of burned rock generated by people who were occupying these sites increased dramatically, which is believed to signify a heavier reliance on some type of plant food. A very short distance east of the Choke Canyon Dam, we know of the Loma Sandia cemetery where 280 people were buried around 500 B.C. (A. J. Taylor, personal communication). All of the signs point to a population increase in the Choke Canyon vicinity with correspondingly greater demands on local food resources and possibly the development of exclusive territories. As elsewhere in Texas, the conditions leading to the apparent population increase need to be studied. We need to analyze matrices in the south Texas "burned rock middens" in hopes of determining what people were doing to result in accumulation of so much burned rock. If it is true that burned rock middens in the Trans-Pecos region resulted from cooking sotol, lechuguilla, and similar plants, and from acorn processing in central Texas, then similar functions may be hypothesized for the south Texas burned rock accumulations. For south Texas prehistory, the specifics of this particular adaptation are important. From an interregional standpoint, the significant realization is that the people at Choke Canyon were apparently responding to a set of conditions or circumstances that were also influencing their contemporaries in adjacent regions.

Relative to the specific question about the origin of burned rock masses and more generally to prehistoric subsistence pursuits in the region, there is a desperate need for development of techniques that will permit us to identify plant foods being exploited at any given period in the past. As discussed above, the findings reported from dry caves in the Trans-Pecos and what we know from hunter-gatherer ethnographic studies very clearly demonstrate the important role that plant foods played in the survival of the prehistoric inhabitants of south Texas. We may reasonably assume that the availability of various kinds of plant food was a significant factor influencing settlement patterns, especially during the Archaic. Preservation is so poor in south Texas sites that success in recognition of plant food utilization is going to depend on development of some very sophisticated techniques. Phytolith research will hopefully continue and prove fruitful. Beyond this, we can only hope that ways of "fingerprinting" plants through chemical or elemental analysis will provide us with a helpful tool. This is a very complicated, but highly critical area of investigation badly in need of further research and development.

As we are able to see some similar interregional trends developing for the Middle Archaic and Late Archaic periods, so, too, do we see parallels between Choke Canyon and adjacent areas for the time period from A.D. 200 to

A.D. 800. We have only one radiocarbon date at Choke Canyon for this period. This fact is unusual given the substantial number of radiocarbon assays representing the bracketing periods between 1500 B.C. and A.D. 200 at the early end and A.D. 900 and A.D. 1600 at the later end. The period from A.D. 200 to A.D. 800 represents the time when the transition from Archaic to Late Prehistoric adaptations occurred. Answers to the questions about what caused the changes distinguishing Archaic from Late Prehistoric lifeways must lie in cultural components dating to this 600-year span. With respect to this problem, the key questions would seem to be:

(1) What conditions or circumstances (climate, population, etc.) may be related to the changes?

(2) How were the distinctive technological innovations of the Late Prehistoric introduced to southern Texas?

(3) Were the changes wrought on indigenous people, or did new populations move into the region?

(4) If there was an influx of new populations into south Texas, what became of the indigenous peoples? We feel that the differences between Archaic and Late Prehistoric adaptations are so significant as to warrant study of this critical period of transition as a research unit in and of itself.

The Late Prehistoric period at Choke Canyon is the best known and most extensively studied of the prehistoric cultural units dealt with in this investigation. The reasons for our better understanding of this period are simple: Late Prehistoric components at Choke Canyon are shallowly buried, are prodigiously represented by time-diagnostic artifacts, and tend to exhibit the best preservation of all sites in terms of faunal material and carbonized plant remains. In future research, the shallow depth of Late Prehistoric components should be used to good advantage in conducting horizontally extensive, contiguous excavations aimed at demonstrating community patterning. Within the Late Prehistoric, it is now possible to recognize two subperiods generally corresponding to the Austin and Toyah phases of central Texas. An important goal of future research in south Texas will be to demonstrate the significant changes in material culture that distinguish components of these two subperiods of the Late Prehistoric. Though the meat foods exploited by these people seem to be well represented in our faunal lists, we again know very little about the contribution of plant foods to the Late Prehistoric diet. The comments made above concerning the need for means of detecting plant foods used in the Archaic apply also for the Late Prehistoric.

Finally, the Phase II findings at Choke Canyon indicate to us that it will be possible to find and recognize campsites that were occupied by aborigines who were in contact with Europeans in the early Historic period. Artifacts recovered from aboriginal components at 41 MC 55 and 41 MC 296 indicate that aborigines in contact with Anglo-European settlers were camping on some of the Choke Canyon sites. The small amount of data in hand does not permit any substantial suggestion as to the nature of integration between cultures,

except to the extent that the foreigners were supplying metal knives and arrow points to the aboriginal populace.

NATIONAL REGISTER SITES

Nine sites located around the margin of Choke Canyon Lake are recommended for nomination to the National Register of Historic Places. Eight of these are prehistoric sites as follows:

41 LK 250	41 MC 57
41 LK 253	41 MC 84
41 MC 7	41 MC 220
41 MC 10	41 MC 275

The ninth site--41 MC 282--is a historic site (see Fox 1986 for further details).

Of the eight prehistoric sites listed above, findings made at 41 MC 7, 41 MC 10, 41 MC 57, 41 MC 84, and 41 MC 220 are discussed in the report of Phase I investigations at Choke Canyon (Hall, Black, and Graves 1982). Information concerning the remaining three sites is presented in this volume. These sites would certainly not qualify as the most significant of the prehistoric resources identified in the Choke Canyon project area. Most of the best sites known in the area will be inundated by the lake. It is our opinion that no practical ends will be served by placing these flooded sites on the National Register. The primary impact to these sites will be related to their submergence. Beyond this, the fact that the sites are under water will reduce their exposure to certain other destructive impacts.

The eight prehistoric sites we are recommending for the National Register will be at or above the shoreline of Choke Canyon Lake. At these locations, they will be subject to impact from vandalism and any lakeshore modifications that may occur in the future. By placing these sites on the Register, we see a means of providing an additional measure of protection that might not otherwise be afforded these localities.

The sites listed represent only a small percentage of all prehistoric sites situated on the shore of the lake. We have singled out these particular sites because we feel that each holds a particular potential for elucidating problems we have defined for future research. The following sites contain relatively massive accumulations of burned rock: 41 LK 250, 41 LK 253, 41 MC 220, and 41 MC 275. These sites--especially 41 MC 220--would be good places to gather data concerning the Middle Archaic and Late Archaic activities that resulted in generation of so much burned rock. The neighboring sites, 41 MC 7 and 41 MC 10, have yielded a number of Paleo-Indian diagnostics. Of all known sites at Choke Canyon, they offer the best opportunity for definition of a Paleo-Indian component in the area. Likewise, sites 41 MC 57 and 41 MC 84 are locations where Early Archaic components may be preserved. Site 41 MC 57 in particular offers potential for a buried Early Archaic component.

Given their location along the banks of Choke Canyon Lake, the eight sites will likely be subjected to wave wash and/or other destructive erosional processes during the lifetime of the reservoir. We would encourage the USBR to facilitate excavations at these sites in the future, perhaps in the form of institutional field schools or other such programs. We predict that with the filling of the lake and subsequent fluctuations in floodpool level, significant prehistoric cultural remains will wash out of many sites in the reservoir basin. We again urge the USBR to consider making provisions for a Cultural Resource Manager at Choke Canyon.

REFERENCES CITED

Andrews, J. M.

- 1981 **Shells and Shores of Texas.** University of Texas Press, Austin and London.

Arnold, J. B. III

- 1975 Porosity and Refiring Tests on Ceramics from the George C. Davis Site, Texas. **Bulletin of the Texas Archeological Society** 46:231-241.

Aten, L. E.

- 1967 Excavations at the Jamison Site (41 LB 2), Liberty County, Texas. **Houston Archeological Society, Report 1.**

Beasley, T. S.

- 1982 Paleo-Indian Artifacts from a Site in McMullen County, Texas. **La Tierra** 9(3):34-38.

Bennett, M. A.

- 1974 Basic Ceramic Analysis. San Juan Valley Archaeological Project. **Eastern New Mexico University, Contributions in Anthropology, Technical Series** (6)1.

Black, S. L.

- 1982 Prehistoric Ceramic Artifacts. In **Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings**, by G. D. Hall, S. L. Black, and C. Graves:390-453. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series** 5.
- n.d. The Clemente and Herminia Hinojosa Site, 41 JW 8: A Toyah Horizon Campsite in Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Special Report** 18 (in preparation).

Black, S. L. and A. J. McGraw

- 1985 The Panther Springs Creek Site: Cultural Change and Continuity in the Upper Salado Creek Drainage, South-Central Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 100.**

Blair, W. F.

- 1950 The Biotic Provinces of Texas. **The Texas Journal of Science** 2(1):93-117.

Brown, J. A. and T. D. Price

- 1985 Complex Hunter-Gatherers: Retrospect and Prospect. In **Prehistoric Hunter-Gatherers - The Emergence of Cultural Complexity**, edited by T. D. Price and J. A. Brown. Academic Press, Orlando.

Brown, K. M., D. R. Potter, G. D. Hall, and S. L. Black

- 1982 Excavations at 41 LK 67, A Prehistoric Site in the Choke Canyon Reservoir, South Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 7.**

Bunker, R. C.

- 1982 The Geomorphic Framework of Human Occupation in the Frio River Valley, Choke Canyon Dam Reservoir Area, Live Oak and McMullen Counties, Texas. Appendix II in **Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings:498-517. Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 5.**

Calhoun, C. A.

- 1965 Archeology of the Coastal Bend. Paper given at a meeting sponsored by the Houston Archeological Society, 1965.

Campbell, T. N.

- 1962 Origins of Pottery Types from the Coastal Bend Region of Texas. **Bulletin of the Texas Archeological Society** 36:331-336.
- 1976 Archaeological Investigations at the Morhiss Site, Victoria County, Texas, 1932-1940. Transcribed from a recording of a talk presented at the annual meeting of the Texas Archeological Society, Victoria, Texas, November 3, 1962. In **An Archaeological Survey of Coletto Creek, Victoria and Goliad Counties, Texas**, by A. A. Fox and T. R. Hester:81-85. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 18.**

Campbell (continued)

- 1984 The Cacaxtle Indians of Northeastern Mexico and Southern Texas. **La Tierra** 11(1):4-20.

Campbell, T. N. and T. J. Campbell

- 1981 Historic Indian Groups of the Choke Canyon Reservoir and Surrounding Area, Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 1.**
- 1985 Indian Groups Associated with Spanish Missions of the San Antonio Missions National Historical Park. **Center for Archaeological Research, The University of Texas at San Antonio, Special Report 16.**

Center for Archaeological Research

- 1979 Final Recommendations for Phase II Archaeological Investigations in the Choke Canyon Reservoir, Nueces River Project, Texas. Unpublished document, on file at the Center for Archaeological Research, The University of Texas at San Antonio.

Chandler, C. K.

- 1978 Two Clay Figurines from the Central Coastal Region of Texas. **Bulletin of the Texas Archeological Society** 49:341-348.
- 1982a Paleo-Indian Projectile Points from San Patricio County, Texas, Texas Coastal Bend. **La Tierra** 9(3):26-33.
- 1982b Descriptions of Soapstone Pipe Ceramic Figurine. Appendix III in Excavations at 41 LK 67, A Prehistoric Site in the Choke Canyon Reservoir, South Texas, by K. M. Brown, D. R. Potter, G. D. Hall, and S. L. Black:169-176. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 7.**
- 1983 Notes on Some Bell Points from San Patricio County, Texas. **La Tierra** 10(3):7-10.
- 1984 Lithic Resources in the Texas Coastal Bend. **La Tierra** 11(1):26-27.

Chandler, C. K., F. Knolle, and M. M. Knolle

- 1983 Paleo-Indian Projectile Points from Jim Wells and Nueces Counties, Texas. **La Tierra** 10(2):23-27.

Clark, J. W.

- 1978 Mission San José y San Miguel de Aguayo, Archeological Investigations. **Texas Historical Commission, Office of the State Archeologist, Report 29.**

Corbin, J. E.

- 1974 A Model for Cultural Succession for the Coastal Bend Area of Texas. **Bulletin of the Texas Archeological Society 45:29-54.**

Crabtree, D. E.

- 1972 An Introduction to Flintworking. **Occasional Papers of the Museum, Idaho State University 28.** Pocatello, Idaho.

Creel, D., A. J. McGraw, F. Valdez, Jr., and T. C. Kelly

- 1979 Excavations at 41 LK 106, A Prehistoric Occupation Site in Live Oak County, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 62.**

Day, D. W.

- 1981 An Assessment of Archeological Sites 41 WY 71 and 41 WY 72, Willacy County, Texas. **Prewitt and Associates, Inc., Reports of Investigations 17.** Austin.

Day, D. W., J. Laurens-Day, and E. R. Prewitt

- 1981 Cultural Resources Survey and Assessment in Portions of Hidalgo and Willacy Counties, Texas. **Prewitt and Associates, Inc., Reports of Investigations 15.** Austin.

Dulaney, A. R.

- 1977 Ceramics from the Fayette River Project. In Archeological Investigations of the Fayette Power Project, Fayette County, Texas, by D. W. Skelton:198-209. **Texas Archeological Survey, The University of Texas at Austin, Research Report 60.**

Dusek, C.

- 1983 Cut Mussel Valve from 41 MC 320, The Nichols I Site, McMullen County, Texas. **La Tierra 10(3):45-46.**

Epstein, J. F.

- 1969 The San Isidro Site: An Early Man Campsite in Nuevo Leon, Mexico. **Department of Anthropology, The University of Texas at Austin, Anthropology Series 7.**

Epstein (continued)

- 1980 Some Reflections on the Nature of the Northeast Mexico Lithic Tradition and the Problem of Its Origin. In Papers on the Prehistory of Northeastern Mexico and Adjacent Texas, edited by J. F. Epstein, T. R. Hester, and C. Graves:81-92. **Center for Archaeological Research, The University of Texas at San Antonio, Special Report 9.**

Espey, Huston and Associates, Inc.

- 1981 **Proposed Deepwater Channel and Multipurpose Terminal Construction and Operation Near Brownsville, Texas. Cultural Resources Technical Report. Espey, Huston and Associates, Inc., Austin.**

Everitt, J. H. and M. A. Alaniz

- 1981 Nutrient Content of Cactus and Woody Plant Fruits Eaten By Birds and Mammals in South Texas. **The Southwestern Naturalist 26(3):301-305.**

Fawcett, W. B., Jr.

- 1976 The Artifacts and Artifact Typology. Appendix I in Prehistoric Archeological Investigations at Palmetto Bend Reservoir: Phase I, Jackson County, Texas, by P. R. McGuff:184-215. **Texas Archeological Survey, The University of Texas at Austin, Research Report 58. Palmetto Bend Reservoir Series 3.**

Fox, A. A.

- 1984 A Study of Five Historic Cemeteries at Choke Canyon Reservoir, Live Oak and McMullen Counties, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 9.**
- 1986 Archaeological Investigations at Historic Sites in the Choke Canyon Reservoir, Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 12.**

Fox, D. E.

- 1979a Archaeological Investigations of Two Prehistoric Sites on the Coleta Creek Drainage, Goliad County, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 69.**
- 1979b The Lithic Artifacts of Indians at the Spanish Colonial Missions, San Antonio, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Special Report 8.**

Gibson, E. C.

- n.d. Archaeological Investigations in Zavala and Dimmit Counties, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 110** (in preparation).

Griffiths, J. C. and M. A. Rosenfeld

- 1954 Operator Variation in Experimental Research. **Journal of Sedimentary Petrology** 62(1):74-91.

Grozier, R. U., D. C. Hahl, A. E. Hulme, and E. E. Schroeder

- 1968 Floods From Hurricane Beulah in South Texas and Northeastern Mexico, September-October 1967. **Texas Water Development Board, Report 83.** Austin.

Hall, G. D., S. L. Black, and C. Graves

- 1982 Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 5.**

Heartfield, L.

- 1966 An Analysis of Leon Plain Typology. Unpublished manuscript on file at the Center for Archaeological Research, The University of Texas at San Antonio.

Hester, T. R.

- 1968 Notes on Some Pottery-Bearing Sites in Southern Texas. **The Bull-Roader, University of Texas Anthropological Society Newsletter** 3(2):9-11.
- 1972 The Surface Archaeology of Three Sites in Duval County, Texas. **Bulletin, Lower Plains Archeological Society** 2:45-71.
- 1977 The Lithic Technology of Mission Indians in Texas and Northeastern Mexico. **Lithic Technology** 6(1-2):9-12.
- 1980 **Digging Into South Texas Prehistory.** Corona Publishing Company, San Antonio, Texas.

Hester, T. R., F. A. Bass, Jr., A. A. Fox, E. S. Harris, and T. C. Kelly

- 1977 Archaeological Research at the Hinojosa Site (41 JW 8), Jim Wells County, Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 42.**

Hester, T. R., D. Gilbow, and A. D. Albee

- 1973 A Functional Analysis of "Clear Fork" Artifacts from the Rio Grande Plain, Texas. **American Antiquity** 38(1):90-96.

Hester, T. R. and T. C. Hill, Jr.

- 1969 Mogollan Ceramics from Southern Texas. **The Artifact** 7(3):11-15.
- 1971 An Initial Study of a Prehistoric Ceramic Tradition in Southern Texas. **Plains Anthropologist** 16(53):195-203.
- 1975 Some Aspects of Late Prehistoric and Protohistoric Archaeology in Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Special Report** 1.

Hester, T. R. and H. Kohnitz

- 1975 Chronological Placement of Guadalupe Tools. **La Tierra** 2(2):22-25.

Hester, T. R. and R. C. Parker

- 1970 The Berclair Site: A Late Prehistoric Component in Goliad County, Southern Texas. **Bulletin of the Texas Archeological Society** 41:1-24.

Hester, T. R., L. O. White, and J. White

- 1969 Archeological Materials from the Oulline Site (41 LS 3) and Other Sites in La Salle County, Southwest Texas. **The Texas Journal of Science** 21(2):131-166.

Highley, C. L.

- 1986 Archaeological Investigations at 41 LK 201, Choke Canyon Reservoir, Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series** 11.

Hurlbut, C. S., Jr. and C. Klein

- 1977 **Manual of Mineralogy (after James D. Dana)**. 19th edition. John Wiley & Sons, New York.

Inglis, J. M.

- 1964 A History of Vegetation on the Rio Grande Plain. **Texas Parks and Wildlife Department, Bulletin** 45. Austin.

Jelks, E. B.

- 1962 The Kyle Site, A Stratified Central Texas Aspect Site in Hill County, Texas. **Department of Anthropology, The University of Texas at Austin, Archaeology Series 5.**

Jurgens, C. J. and W. H. Whitsett

- 1981 Cultural Resources Inventory and Assessment of Proposed Wastewater Facilities, Aransas County Conservation and Reclamation District, Aransas County, Texas. Mimeographed report, Texas Department of Water Resources, Austin.

Kelley, J. C.

- 1947 The Lehmann Rock Shelter: A Stratified Site of the Toyah, Uvalde, and Round Rock Foci. **Bulletin of the Texas Archeological Society** 18:115-128.

Kelly, T. C.

- 1983 The Brom Cooper Paleo-Indian Collection from McMullen County, Texas. **La Tierra** 10(3):17-39.

Kelly, T. C., P. Green, S. Bento, and I. W. Cox

- n.d. The Chacon Creek Project: Archaeological Investigations in Maverick and Zavala Counties, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 112** (in preparation).

Kotter, S. M.

- 1980 Archeological Assessments at Site 41 ZP 73, Falcon State Recreation Area, Zapata County, Texas. **Prewitt and Associates, Inc., Reports of Investigations 9.** Austin.

Lukowski, P.

- 1984 An Archaeological Survey of a Proposed Well Pad in the Vicinity of Lake Corpus Christi, San Patricio County, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 134.**

Lynn, W. M., D. E. Fox, and N. O'Malley

- 1977 Cultural Resources Survey of Choke Canyon Reservoir, Live Oak and McMullen Counties, Texas. **Office of the State Archeologist, Texas Historical Commission, Archeological Survey Report 20.**

MacNeish, R. S.

- 1958 Preliminary Archaeological Investigations in the Sierra de Tamaulipas, Mexico. **Transactions, American Philosophical Society** 48(6).

Mallouf, R. J.

- 1976 Archeological Investigations at Proposed Big Pine Lake, 1974-1975, Lamar and Red River Counties, Texas. **Texas Historical Commission, Archeological Survey Report** 18.

Mallouf, R., B. Baskin, and K. Killen

- 1977 A Predictive Assessment of Cultural Resources in Hidalgo and Willacy Counties, Texas. **Texas Historical Commission, Archeological Survey Report** 23.

McGraw, A. J.

- 1983 Arroyo de los Muertos and Other Prehistoric Terrace Sites Along the Rio Grande, Laredo, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report** 106.
- n.d. Archaeology in the South Texas Sand Sheet: A Study of Chevron Properties in Brooks County. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report** 129 (in preparation).

McGraw, A. J. and D. Knepper

- n.d. The East Chacon Project: 11,000 Years of Prehistory Along the Upper Nueces River, Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report** 125 (in preparation).

McGraw, A. J., B. Van Note, and C. Jones

- n.d. Archaeology of the Brasada: A Cultural Resources Assessment of the Chevron Resources Company Properties in Northeastern Duval County, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report** 113 (in preparation).

McGuff, P. R. and W. B. Fawcett, Jr.

- 1978 Phase II: Palmetto Bend Archeological Investigations, Re-Evaluative Survey and Testing. **Texas Archeological Survey, The University of Texas at Austin, Research Report** 67, **Palmetto Bend Reservoir Series** 4.

Mitchell, J. L., C. K. Chandler, and T. C. Kelly

- 1984 The Rudy Haiduk Site (41 KA 23): A Late Archaic Burial in Karnes County, Texas. **La Tierra** 11(2):12-39.

Mounger, M. A.

- 1959 Mission Espíritu Santo of Coastal Texas: An Example of Historic Site Archeology. Unpublished Masters thesis, University of Texas at Austin.

Orchard C. D. and T. N. Campbell

- 1959 Southwestern Pottery from Sites in the Vicinity of San Antonio. **Texas Archeology** 4(2):7-8.

Orton, R. B.

- 1964 **The Climate of Texas and Adjacent Gulf Waters.** U. S. Department of Commerce, Washington, D. C.

Peacock, D. P. S.

- 1970 The Scientific Analysis of Ancient Ceramics: A Review. **World Archaeology** 1(3):375-389.

Prewitt, E. R.

- 1982 Archeological Investigations at the Loeve-Fox, Loeve and Tombstone Bluff Sites in the Granger Lake District of Central Texas. In Archeological Investigations at the San Gabriel Reservoir Districts, Central Texas. **Institute of Applied Sciences, North Texas State University** 4. Denton.

Prewitt, E. R., editor

- 1984 Archeological and Historical Investigations in the Proposed Baker's Port Project and Vicinity, Southern Live Oak Peninsula, San Patricio County, Texas. **Prewitt and Associates, Inc., Reports of Investigations** 25. Austin.

Ralph, E. K., H. N. Michael, and M. C. Han

- 1973 Radiocarbon Dates and Reality. **MASCA Newsletter** 9(1):1-20.

Ray, C. N.

- 1941 Various Types of Clear Fork Gouges. **Bulletin of the Texas Archeological and Paleontological Society** 13:152-162.

Roemer, E., Jr.

- 1981 The 1979 Archaeological Survey of Portions of the Choke Canyon Reservoir in Live Oak and McMullen Counties, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 4.**

Scott, R. F. IV and D. E. Fox

- 1982 Excavations at Sites 41 LK 31/32 and 41 LK 202 in the Choke Canyon Reservoir, South Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 8.**

Shafer, H. J.

- 1969 Archeological Investigations in the Robert Lee Reservoir Basin, West Central Texas. **Texas Archeological Salvage Project, The University of Texas at Austin, Papers 17.**

Shepard, A. O.

- 1976 Ceramics for the Archaeologist. **Carnegie Institute of Washington, Publication 609.**

Snively, R.

- 1984 An Archaeological Survey of the Probst and McGriff Leases in Live Oak County, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report 139.**

Sollberger, J. B.

- 1971 A Technological Study of Beveled Knives. **Plains Anthropologist 16(53):209-218.**
- 1978 A New Type of Arrow Point With Speculations as to Its Origin. **La Tierra 5(4):13-20.**

Steele, D. G.

- 1986 Analysis of Vertebrate Faunal Remains from 41 LK 201, Live Oak County, Texas. Appendix V in Archaeological Investigations at 41 LK 201, Choke Canyon Reservoir, Southern Texas, by C. L. Highley. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 11.**

Stock, J. A.

- 1983 The Prehistoric Diet of Hinds Cave (41 VV 456), Val Verde County, Texas: The Coprolite Evidence. Master's thesis, Department of Anthropology, Texas A&M University, College Station.

Story, D. A.

- 1968 Archeological Investigations at Two Central Texas Gulf Coast Sites. **Texas Historical Commission, State Building Commission, Report 13.**
- 1981 An Overview of Archaeology of East Texas. **Plains Anthropologist** 26(92):139-156.

Suhm, D. A. and E. B. Jelks

- 1962 Handbook of Texas Archeology: Type Descriptions. **Texas Archeological Society, Special Publication 1** and **Texas Memorial Museum, Bulletin 4.** Austin.

Suhm, D. A., A. D. Krieger, and E. B. Jelks

- 1954 An Introductory Handbook of Texas Archeology. **Bulletin of the Texas Archeological Society** 25.

Terry, R. D. and G. V. Chilingar

- 1955 Summary of "Concerning Some Additional Aids in Studying Sedimentary Formations," by M. S. Shuetsov:229-234. **Journal of Sedimentary Petrology** (25)3.

Thoms, A. V., J. L. Montgomery, and A. W. Portnoy

- 1981 An Archaeological Survey of a Portion of the Choke Canyon Reservoir Area in McMullen and Live Oak Counties, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 3.**

Tunnell, C. D. and W. W. Newcomb, Jr.

- 1969 A Lipan Apache Mission, San Lorenzo de la Santa Cruz, 1762-1771. **Texas Memorial Museum, Bulletin 14.** Austin.

Turner, E. S. and T. R. Hester

- 1985 **A Field Guide to Stone Artifacts of Texas Indians.** Texas Monthly Press, Austin.

Ubelaker, D. H.

- 1978 **Human Skeletal Remains.** Aldine Publishing Co., Chicago.

U. S. Department of the Interior

- 1975 Final Environmental Impact Statement, Nueces River Project, Choke Canyon Dam and Reservoir Site, Texas. Bureau of Reclamation, Southwest Region, Amarillo.

Wakefield, W. W.

- 1968 Archeological Survey of Palmetto Bend and Choke Canyon Reservoir, Texas. **Texas Archeological Salvage Project, The University of Texas at Austin, Survey Report 5.**

Warren, J. E.

- 1984a **A Cultural Resources Inventory Around the Perimeter of Salt Lake, Aransas County, Texas.** Privately printed, Report 106. George West, Texas.
- 1984b **A Cultural Resources Reconnaissance of the City of Alice Sanitary Landfill, Jim Wells County, Texas.** Privately printed, Report 112. George West, Texas.

Weed, C. and H. J. Shafer

- 1981 Archaeological Testing and Collecting at Choke Canyon Reservoir, Nueces River Project, Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 6.**

Weir, F. A.

- 1976 The Central Texas Archaic. Ph.D. dissertation. Department of Anthropology, Washington State University, Pullman.

Williams-Dean, G. J.

- 1978 Ethnobotany and Cultural Ecology of Prehistoric Man in Southwest Texas. Ph.D. dissertation, Department of Botany, Texas A&M University, College Station.

Woerner, M. C. and L. Highley

- 1983 The Bromley F. Cooper Collection of Pre-Archaic and Archaic Dart Points from McMullen County. **La Tierra 10(1):3-28.**

Word, J. H. and C. L. Douglas

- 1970 Excavations at Baker Cave, Val Verde County, Texas. **Bulletin of the Texas Memorial Museum 16.**

APPENDIX I.

SCOPE OF WORK

CULTURAL RESOURCE MANAGEMENT PLAN AND PHASE II INVESTIGATIONS CHOKE CANYON RESERVOIR, NUECES RIVER PROJECT, TEXAS SOLICITATION NO. 5B-V0835

The work to be performed under this contract has been formulated with the intention of completing the documentation of the significance of Choke Canyon cultural resources and assuring that irreplaceable resources are not destroyed by direct impacts of reservoir construction. The data retrieval program does not pretend to be, nor should it be, the basis for the ideal pure research endeavor in archeology which might be undertaken given unlimited funding and time. The data retrieval, analysis, and reporting aspects of work to be accomplished under this contract (Phase II Investigations) will constitute the initial implementation stages of a long-term Management Plan designed to preserve and protect the significant cultural resources of the Choke Canyon Archeological District. The Management Plan will consist of (1) the specifications of work to be performed under this contract and (2) the long-term management recommendations formulated by the contractor (see below) as they may be modified by the WPRS after further consultation with the Advisory Council and the SHPO.

The Phase I program identified the significance of the Choke Canyon cultural resources by defining a set of scientific research objectives upon which those resources have a bearing. The Phase II Investigations will be designed to assure that the potential contribution of the resources to the accomplishment of those objectives is not impaired.

The Phase II Investigations will consist of a program of field investigations including the intensive testing and evaluation of 62 sites and further extensive excavation of 22 sites (the scope of these investigations and the rationale behind the selection of sites for investigation is defined below). Due to time restrictions, field seasons cannot be restricted to summers only. The investigations will include the analysis of data generated and the preparation and submittal to the Government of a Final Investigative Report (or set of reports) which will document the research performed and present its findings.

The realization of the scientific objectives of the investigations and the formulation of a comprehensive long-term Cultural Resource Management Plan well in advance of the completion of construction (i.e., by the end of calendar year 1981) will require the continuous evaluation of data generated by investigations performed under this contract and the evaluation of the results of research performed under previously awarded contracts (all Phase I Final Investigative Reports are scheduled for completion by January 1980). Meticulous organization and highly competent staffing at all levels will be fundamental to the success of the program.

A. The Phase II Investigations

1. Intensive Testing (an estimated 4,100 person-hours of field work)--Sixty-two sites will be intensively tested in accordance with procedures defined for intensive testing under the Phase I contract and UTSA Recommendations Report. These sites comprise two groups, Site Group A (30 of the 113 sites located by Texas Tech in the Phase I survey) and Site Group B (32 sites which require intensive testing from among those located in the survey completed by UTSA in 1979). Level of effort is defined in terms of total person/hours based on prior experience with similar investigations in the project area. The actual time spent and extent of investigation at a given site will depend on conditions encountered in the field. UTSA recommendations in terms of person/hours per site for Site Groups A and B are shown below:

Site Group A: (Cultural Resources Institute temporary field numbers are shown in parentheses following each permanent site number.)

Recommended for evaluative effort totaling 125 person/hours per site (3 sites): 41 LK 128 (11), 41 LK 176 (81), 41 MC 201 (45).

Recommended for evaluative effort totaling 75 person/hours per site (17 sites): 41 LK 121 (4), 41 LK 127 (10), 41 LK 133 (16), 41 LK 142 (25), 41 LK 145 (28), 41 LK 149 (32), 41 LK 170 (75), 41 LK 174 (79), 41 LK 181(86), 41 LK 182 (87), 41 LK 190 (95), 41 LK 199 (106), 41 MC 196 (40), 41 MC 209 (53), 41 MC 212 (56), 41 MC 213 (57), 41 MC 226 (110).

Recommended for evaluative effort totaling 25 person/hours per site (10 sites): 41 LK 122 (5), 41 LK 136 (19), 41 LK 150 (33), 41 LK 153 (36), 41 LK 158 (63), 41 LK 162 (67), 41 LK 173 (78), 41 LK 180 (85), 41 LK 185 (90), 41 LK 191 (96).

Site Group B:

Recommended for evaluative effort totaling 125 person/hours per site (3 sites): 41 MC 260, 41 MC 276, 41 MC 296.

Recommended for evaluative effort totaling 75 person/hours per site (20 sites): 41 LK 234, 41 LK 236, 41 LK 241, 41 LK 243, 41 LK 247, 41 LK 250, 41 LK 252, 41 LK 253, 41 MC 234, 41 MC 238, 41 MC 242, 41 MC 251, 41 MC 266, 41 MC 268, 41 MC 275, 41 MC 280, 41 MC 282, 41 MC 286, 41 MC 293, 41 MC 294.

Recommended for evaluative effort totaling 25 person/hours per site (9 sites): 41 LK 239, 41 LK 245, 41 MC 235, 41 MC 246, 41 MC 257, 41 MC 270, 41 MC 284, 41 MC 288, 41 MC 290.

2. Extensive Excavation--The decision to open substantial areas of contiguous squares at any given site (extensive excavation) will be based on the application of the following criteria as stated in the UTSA Recommendations Report:

Achieving representation of the occupation of the different geological formations and land forms of the reservoir area, of the range of postulated functional site types, and of the range of cultural stages present. Additional consideration will be given to anticipated productivity of cultural residues, the presence of stratigraphy, site condition, presence of intact occupational features, site specific preservation factors, potential for yielding information on the pre-mid Archaic time period, presence of unusual artifactual remains, factors promoting or impeding data retrieval, and the anticipated impact of project construction to the site.

Site Group C: Twelve sites of those which have already been tested have been determined to meet the above criteria so completely that their extensive excavation is known to be required for Phase II Investigation. These sites (designated Site Group C) consist of the following:

Historic Sites (7)

Site	Estimated person/hours required for (field) investigation
41 LK 66	75
41 MC 15	100
41 MC 17	100
41 MC 192	175
41 MC 193	150
41 MC 194	50
41 MC 214	200
Total	850

Prehistoric Sites (5)

Site	Estimated person/hours required for (field) investigation
41 LK 8	200
41 LK 14	150
41 LK 201	170 + 2 days backhoe time
41 MC 29	150 + 1/2 day backhoe time
41 MC 222	180
Total	850

Site Group D: The remaining 10 sites (Group D sites) whose extensive excavation will complete Phase II field investigations will be selected according to the above criteria from a "pool" of 95 sites. As a number of the criteria are oriented toward achieving representation of different categories of sites, the characteristics of the 15 sites (Group C

and 41 LK 31/32, 41 LK 67, and 41 LK 202) at which extensive excavation has been completed, or is known to be required for Phase II, will heavily influence the selection of the remaining 10 (Group D) sites.

The "pool" from which the Group D sites are ultimately to be selected consists of:

a. Ten sites which have already been evaluated and which UTSA has advanced for additional consideration: 41 LK 52, 41 LK 53, 41 LK 74, 41 MC 13, 41 MC 15, 41 MC 39, 41 MC 55, 41 MC 56, 41 MC 84, and 41 MC 94.

b. Seventeen sites at which testing and evaluation procedures will be completed during 1979 under the Phase I contract: 41 LK 51, 41 LK 73, 41 LK 85, 41 LK 86, 41 LK 87, 41 LK 88, 41 LK 92, 41 LK 93, 41 LK 94, 41 LK 97, 41 MC 18, 41 MC 83, 41 MC 90, 41 MC 91, 41 MC 92, 41 MC 93, and 41 MC 171.

c. Six sites advanced as significant from among 19 evaluated by the Texas A&M Anthropology Research Laboratory crew: 41 LK 56, 41 MC 60, 41 MC 186, 41 MC 187, and 41 MC 188.

d. The 30 Group A sites (see above).

e. The 32 Group B sites (see above).

It is estimated that up to 1,500 person/hours and 1.5 days of backhoe time will be required to complete field investigations at the Group D sites.

In order to assure thorough organization and efficient comprehensive reporting of progress, a detailed and specific research framework for field work, analysis, and report preparation shall be specified by offerors. This framework shall consist of the definition of decision-making processes to be followed for (1) decisions related to the extent of testing and/or extensive excavations at specific sites (field decisions), (2) decisions on which sites to investigate (definition of research priorities), and (3) decisions on recommended preservation procedures (long-term management plan components).

B. Field Decisions

Previous Choke Canyon cultural resource investigation contracts have defined levels of effort to be performed at specific sites. The extent and depth of a site and the density of artifact deposits is often not fully realized until investigations are well underway. It has been suggested that future contracts specify that the number of person-hours expended at a particular site be determined by the Principal Investigator in the field (to reflect actual practice). This suggestion is incorporated; it will be the responsibility of the Principal Investigator to determine when each site has been adequately tested and/or excavated (the final approval of the "adequacy" of investigations still rests with the Contracting Officer). Thus the Principal Investigator will be responsible for "budgeting" the overall scope of work (defined above) between sites. The means by which these field

decisions will be reached must be clearly defined in the proposals of offerors.

A decision-making matrix approach (see attachment B) is suggested as appropriate. The approach to reaching field decisions, defined by the offeror, shall clearly define an objective and systematic framework for reaching those decisions. The advance definition of the approach to reaching field decisions should allow the contractor, without extensive narrative description, to document the rationale behind field decisions, the general nature of deposits encountered during investigation, and progress in investigation. The approach to be defined shall also clearly commit the contractor to field techniques of the same or better quality as those employed during Phase I and the previously completed mitigative excavation programs. A policy statement by the offeror should be sufficient and include details of excavation strategy such as: use of arbitrary vs. natural excavation units, mechanical equipment, screening, treatment of features, sample collection, and recording standards and procedures.

C. Definition of Research Priorities

Research priorities relate primarily to the application of the criteria defined above to the selection of Group D sites for extensive excavation and to timing of all investigative efforts to insure program success. Staffing, adequate to provide for continuous analysis of data generated by field work and its evaluation along with the results of previously awarded contracts, will be necessary.

The work will be organized in a fashion which will allow the formulation of yearly progress reports. These reports will document work performed, outline upcoming field work, suggest such changes in investigation strategy as new information and experience dictate, and assess progress toward program objectives. Such documentation is not only required as a matter of Federal procurement policy, but the WPRS will also require such documentation as the basis of periodic consultation with the SHPO and Advisory Council on progress of the program toward realizing research objectives. An additional determinant of the need to organize Phase II Investigations to allow comprehensive documentation of both work progress, and evaluation of progress toward achieving research objectives is related to the extent possibility that Phase II Investigations may discover resources of such scope and significance that their responsible investigation cannot be accomplished within the scope of work of the contract. Should substantial investigations be required beyond the scope of Phase II, congressional authorization to allocate additional funds will be required.

It is possible that cultural resources not previously discovered will be found. If so, required documentation should be completed as soon as possible so as to prevent costly construction delays or the destruction of important cultural resources by the construction contractor.

The framework presented below is suggested for the organization of work to be performed under the Cultural Resource Management Plan, Phase II Investigations contract. Offerors' proposals will comment upon the

framework: reasoned criticism and alternative suggestions are encouraged. Offerors' proposals will expand upon the framework, presenting the specifics of task assignment and staffing required to accomplish the work.

D. Proposed Organizational Framework

1. Initial period of advance planning and orientation.
2. First field season:
 - a. testing and evaluation of the 30 sites identified during the Texas Tech field work (Group A sites),
 - b. initiation of work at those of the 12 sites definitely scheduled for extensive excavation (Group C sites) at which more than one field season of work is anticipated or at which early construction impacts are possible, and
 - c. ongoing laboratory analysis and processing of data.
3. Interim
 - a. evaluation of the results of previous contracts,
 - b. ongoing analysis of data generated by field work and its evaluation,
 - c. preparation of yearly progress report (report to be submitted at least 60 calendar days before the planned date for the initiation of the next field season), and
 - d. consultation period (with WPRS and SHPO).
4. Second field season:
 - a. testing and evaluation of the 30 sites identified by UTSA in 1979 survey (Group B sites),
 - b. completion of work at the 12 Group C sites,
 - c. initiation of work at Group D sites which can be designated at that time as constituting components of the sample of 10 from the 95 site pool, and
 - d. ongoing laboratory analysis and processing of data.
5. Interim
 - a. evaluation of the results of previous contracts,
 - b. ongoing analysis of data generated by field work and its evaluation,

c. preparation of yearly progress report (as in 3.c. above) and presentation of the proposed long-term Cultural Resource Management Plan (to be submitted 90 calendar days prior to initiation of next field season), and

d. consultation (with WPRS and SHPO).

6. Third and final field season:

a. completion of all excavation field investigation,

b. completion of all preservation activities, and

c. ongoing laboratory analysis and processing of data.

7. Wrap-up:

a. submittal of yearly Progress Report within 3 weeks of final field season,

b. completion of the analysis of all data generated by the field work, and

c. prepare and submit final investigative report(s) within 52 months after date of award of contract.

E. Cultural Resource Management Plan Components

The contract and the recommendations resulting from Phase II Investigations will form a comprehensive Cultural Resource Management Plan for the Choke Canyon Archeological District. Accordingly, the nature and structure of those investigations will be influenced throughout by concerns for long-term *in situ* data preservation.

Many aspects of field work will be wholly or partially determined by the kind of project impacts anticipated. Such matters as detailed site mapping, placement of permanent datum points, the specifics of site excavation strategy, and the decision to backfill are aspects of field investigation strategy which could be considered as related to long-term data presentation.

Decisions on which sites to investigate (definition of research priorities) will also depend on balancing the need to collect data to evaluate site significance and the need to preserve the data base intact *in situ* wherever possible. Ninety calendar days prior to the initiation of the final field season, the contractor will furnish a draft of a detailed long-term Cultural Resource Management Plan (to take the form of the major portion of a Yearly Progress Report). Most of the initial phases of this plan will have already been accomplished through the recovery of important information in previous field seasons. The final season will complete the initial phase of the plan by completing those data recovery and preservation-related activities defined as the contractor's responsibility. The long-term

Cultural Resource Management Plan will recommend long-term and major structural programs to the Government, which it will be the Government's responsibility to put into operation.

Offerors will define in their initial proposals the nature of preservation-related activities to be performed by the contractor. The National Inundation Study, previously completed Choke Canyon investigations, the State Historic Preservation Officer, and other appropriate sources should be consulted. Such activities might include detailed mapping and/or placement of permanent datum markers, backfilling, application of soil cement, or other techniques to preserve unexcavated portions of sites.

Long-range programs or major structural activities which the contractor might recommend, but for which the Government and not the contractor would be responsible for implementing, might include: structural stabilization of portions of the future lakeshore and the development of a program to foster public awareness of the importance and fragility of the Choke Canyon cultural resources (possibly including the development of some sites as *in situ* displays).

The activities to be performed by the contractor shall be defined in offeror's proposals and the recommendations to the Government in the final yearly Progress Report.

APPENDIX II.

MACROBOTANICAL ANALYSIS OF PHASE II MATERIALS FROM THE CHOKE CANYON RESERVOIR AREA, TEXAS

Richard G. Holloway

INTRODUCTION

Pollen and plant macrofossil evidence of past vegetational assemblages from the region of south-central Texas are generally lacking, and the existing data base is in dire need of expansion. At least in part, this may be due to factors directly related to the environment of preservation or the type of site being investigated. The results presented here are a continuation of the recovery and analysis of botanical remains from the Choke Canyon area and as such are an important addition to our understanding of past vegetational assemblages.

Charcoal remains were recovered from five archaeological sites excavated in the Choke Canyon Reservoir area: 41 LK 51, 41 LK 128, 41 LK 201, 41 MC 55, and 41 MC 296. Preliminary data from site 41 LK 201 have previously been reported by Dering (1982), whereas the remaining four sites represent new data points.

These sites are located in both Live Oak and McMullen Counties in the Tamaulipan Biotic Province (Blair 1950, 1952). The modern vegetation in this region forms something of a mosaic pattern. A southeast facing escarpment near Tilden is dominated by *Acacia* sp., which supports almost a shrubland type of vegetation. Beneath the escarpment at lower elevations, mesquite (*Prosopis* sp.) dominates. Along river courses are located riparian communities including ash (*Fraxinus* sp.), willow (*Salix* sp.), elm (*Ulmus* sp.), hackberry (*Celtis* sp.), and some oak (*Quercus* sp.).

METHODS AND MATERIALS

The samples recovered during the excavations were generally small and fragmentary. The largest specimens from each level were examined and identified to the lowest possible taxonomic category. Clear transverse surfaces were examined by the snap method (Leney and Casteel 1975). In almost all cases the individual specimens of charcoal were too small to allow either tangential or longitudinal sections to be made in addition to the transverse section. Thus, all identifications are based on transverse sections.

RESULTS AND DISCUSSION

The results of this study are provided in Tables 33-37. This form of data presentation is somewhat easier to interpret than site by site descriptions of what was identified. The data are arranged by site, by horizontal provenience, and depth provenience.

TABLE 33. RESULTS OF CHARCOAL ANALYSIS FROM 41 LK 51

Provenience	Level	Depth	Identification	Comments
N998 E981	6	99.30-99.20	too small to identify	fragmentary
N998 E981	12	98.70-98.60	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N998 E984			Fabaceae	
N998 E984	3*	99.60-99.50	hardwood	badly fragmented
N998 E984	4*	99.50-99.40	cf. <i>Carya</i> sp.	
N998 E984	4*	99.50-99.40	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N998 E984	4*	99.50-99.40	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	large pieces
N998 E982	13	98.60-98.50	hardwood	very fragmentary
N998 E982	15	98.40-98.30	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	branch nodes or knobs
N998 E982	15	99.40-99.30	cf. <i>Acacia</i> sp.	
N999 E981	3	99.60-99.50	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N999 E981	17	98.20-98.10	Salicaceae	
N999 E982	5	99.40-99.30	hardwood	very fragmentary
N999 E982	5	99.30-99.20	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N999 E981	13	98.60-98.50	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N998 E981	12	98.70-98.60	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N998 E992	15	98.40-98.30	hardwood	highly fragmented, no clear surface
N1010 E1011	4	99.60-99.50	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1010 E1011	7	99.30-99.20	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1010 E1014	7		Salicaceae	either <i>Salix</i> sp. or <i>Populus</i> sp.

*Feature 2

TABLE 34. RESULTS OF CHARCOAL ANALYSIS FROM 41 LK 128

Provenience	Level	Depth	Identification	Comments
Hearth 2		bottom	cf. <i>Diospyros</i> sp.	
Hearth 12			cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Hearth 13				too fragmentary to identify
Hearth 13			cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	fragmentary
Hearth 17			cf. <i>Prosopis</i> sp.	fragmentary
Test Pit 5	2	99.60-99.50	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	fragmentary
Test Pit 5	3	99.50-99.40	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 5	5	99.30-99.20	hardwood	
Test Pit 5	6	99.20-99.10	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 5	7	99.10-99.00	hardwood	
Test Pit 6	2	99.70-99.60	cf. <i>Prosopis</i> sp.	
Test Pit 6	2	99.60-99.50	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 7	1	Surface-99.60	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 7	2	99.60-99.50	hardwood	fragmentary
Test Pit 7	2	99.60-99.50	bone	charred
Test Pit 7	3	99.50-99.40	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 7	4	99.40-99.30	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 7	6	99.20-99.10	hardwood	
Test Pit 8	1	Surface-99.70	bone	charred
Test Pit 8	2	99.70-99.60	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 8	3	99.60-99.50	cf. <i>Acacia</i> sp.	
Test Pit 8	4	99.50-99.40	hardwood	
Test Pit 9	1	Surface-99.40	<i>Carya</i> sp.	
Test Pit 9	1	Surface-99.40		too fragmentary to identify
Test Pit 9	2	99.40-99.30	<i>Salix</i> sp.	
Test Pit 10	2	99.50-99.40	bone	charred
Test Pit 12	1	Surface-100.90		too fragmentary to identify
Test Pit 12	2	100.90-100.80	hardwood	
Test Pit 13	1	Surface-99.40	hardwood	
Test Pit 14	1	Surface-99.40	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 16	1	Surface-99.60		too fragmentary to identify

TABLE 35. RESULTS OF CHARCOAL ANALYSIS FROM 41 LK 201

Provenience	Level	Depth	Identification	Comments
AREA A				
Feature 5				
N490 E1043	12	97.65-97.55	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N491 E1043	12	97.65-97.55	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Feature 2				
N490 E1043/ N491 E1043	16-18	97.25-96.92	cf. <i>Prosopis</i> sp.	10 samples - fragmentary
AREA B				
N497 E997	11	98.35-98.25		too fragmentary to identify
N497 E996	15	97.95-97.85	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	very fragmentary
N498 E997	15	98.95-98.85	cf. <i>Prosopis</i> sp.	
Feature 7				
N498 E997	15	97.95-97.85	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	hearth sample

TABLE 36. RESULTS OF CHARCOAL ANALYSIS FROM 41 MC 55

Provenience	Level	Depth	Identification	Comments
N993 E1015	1	Surface-99.30	bone	charred
N994 E1013	1	Surface-99.30	Acacia sp./Prosopis sp.	
N994 E1015	2	99.30-99.20	cf. Diospyros sp.	
N1008 E1014	2	99.40-99.30	shell, cf. Acacia sp./Prosopis sp.	
N1008 E1015	1	99.40-99.30	Acacia sp./Prosopis sp.	
N1009 E1014	1	Surface-99.30	Acacia sp./Prosopis sp.	
N1009 E1013	1	Surface-99.30	no specimen recovered	
N1009 E1015	2	99.30-99.20	cf. Acacia sp./Prosopis sp.	
N1008 E1014	3	99.30-99.20	hardwood	very fragmentary
N1008 E1015	2	99.30-99.20	hardwood	
N1007 E1015	3	99.30-99.20	Acacia sp./Prosopis sp.	very fragmentary
N1009 E1013	2	99.30-99.20	cf. Prosopis sp.	many small fragments
N1007 E1016	2	99.30-99.20	hardwood	distorted by heat
N1009 E1016	2	99.30-99.20	cf. Prosopis sp.	many small fragments
N1008 E1016	2	99.30-99.20	hardwood	
N1015 E1012	1	Surface-99.20	cf. Acacia sp./Prosopis sp.	
N1007 E1014	2	99.40-99.30		too fragmentary to identify
N998 E1017	2	99.30-99.20	Acacia sp./Prosopis sp.	
N999 E1017	2	99.30-99.20	cf. Acacia sp./Prosopis sp.	knotty portion
N999 E1017	4	99.10-99.00	cf. Acacia sp./Prosopis sp.	fragmentary
N1017 E999	1	Surface-99.30		too fragmentary to identify
N1017 E999	9	98.60-98.50		charcoal embedded in soil
				too fragmentary to identify
N1018 E999	1	Surface-99.30		too fragmentary to identify
N1018 E999	2	99.30-99.20	cf. Acacia sp./Prosopis sp.	
N1018 E999	3	99.20-99.10	Acacia sp./Prosopis sp.	
N1018 E999	4	99.10-99.00	hardwood	
N1018 E999	8	98.70-98.60	cf. Acacia sp./Prosopis sp.	

TABLE 37. RESULTS OF CHARCOAL ANALYSIS FROM 41 MC 296

Provenience	Level	Depth	Identification	Comments
Lot 256			cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp. hardwood	no clear sections
Test Pit 1	1	0-10 cm	cf. Fabaceae	very small
Test Pit 1	1			too fragmentary to identify
Test Pit 1	2	10-20 cm	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	Lot 28
Test Pit 1	3	20-30 cm	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	Lot 29
Test Pit 1	4			too fragmentary to identify
Test Pit 1	4	30-40 cm		too fragmentary to identify
Test Pit 1	5	40-50 cm	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 1	6	Lot 35	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	heat fractured
Test Pit 1	7	60-70 cm	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 1	8	70-80 cm		too fragmentary to identify
Test Pit 1	9		cf. Fabaceae	very fragmentary
Test Pit 2	2	10-20 cm	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 2	3	20-30 cm	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	Lot 33
Test Pit 2	3			too fragmentary to identify
Test Pit 2	4	30-40 cm	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	Lot 34
Test Pit 2	4		Fabaceae	
Test Pit 2	5			too fragmentary to identify
Test Pit 2	5	40-50 cm	cf. <i>Acacia</i> sp./ <i>Prosopis</i> sp.	Lot 37
Test Pit 2	6	50-60 cm	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
Test Pit 2	8	70-80 cm	Fabaceae	
Test Pit 2	9	80-90 cm		too fragmentary to identify
N1022 E985	2	99.40-99.30	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1022 E985	5	99.10-99.00	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1022 E985	6	99.00-98.90	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1022 E985	7	98.90-98.80	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1022 E985	8	98.80-98.70	hardwood	traumatic fracturing
N1022 E985	9	98.70-98.60	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1022 E986	2	99.40-99.30	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1022 E986	5	99.10-99.00		too fragmentary to identify
N1022 E986	6	99.00-98.80	cf. <i>Prosopis</i> sp.	
N1022 E986	6		cf. Fabaceae	
N1022 E986	7	98.90-98.80	cf. Fabaceae	
N1022 E986	8	98.80-98.70		too fragmentary to identify

Table 37. (continued)

Provenience	Level	Depth	Identification	Comments
N1022 E986	9	98.70-98.60	cf. Fabaceae	
N1022 E987	5	99.10-99.00	Carya sp., bone	charred
N1022 E987	6	99.00-98.90	Fabaceae	
N1022 E987	7	98.90-98.80		too fragmentary to identify
N1022 E987	8	98.80-98.70	cf. Acacia sp.	traumatic vessels
N1022 E987	9	98.70-98.60		too fragmentary to identify
N1022 E989	1	Surface-99.50	Acacia sp./ Prosopis sp.	
N1023 E985	3	99.30-99.20	Acacia sp./ Prosopis sp.	
N1023 E985	5	99.10-99.00	Acacia sp./ Prosopis sp.	Feature 2
N1023 E985	5		cf. Acacia sp./ Prosopis sp., shell	very fragmentary
N1023 E985	6	99.00-98.90	Acacia sp./ Prosopis sp.	fragmentary
N1023 E985	7	98.90-98.80	Fabaceae	
N1023 E985	8	98.80-98.70		traumatic vessels, too fragmentary to identify
N1023 E986	1	Surface-99.40	Fabaceae	
N1023 E986	5*	99.10-99.00	Acacia sp./ Prosopis sp.	
N1023 E986	6	99.00-98.90	Acacia sp./ Prosopis sp.	
N1023 E986	8	98.80-98.70	Acacia sp./ Prosopis sp.	
N1023 E986	9	98.70-98.60		too fragmentary to identify
N1023 E986-7	6*	99.00-98.00	Acacia sp./ Prosopis sp.	
N1023 E986-7	7	98.90-98.80	Acacia sp./ Prosopis sp.	
N1023 E987	2	99.40-99.30	Fabaceae	
N1023 E987	5	99.10-99.00	Acacia sp./ Prosopis sp.	
N1023 E987	6	99.00-98.90	Acacia sp./ Prosopis sp.	
N1023 E987	9	98.70-98.60		too fragmentary to identify
N1024 E985	2	99.40-99.30	Fabaceae	
N1024 E985	5	99.10-99.00		too fragmentary to identify
N1024 E985	6	99.00-98.90	Acacia sp./ Prosopis sp.	
N1024 E985	7	98.90-98.80	Fabaceae	
N1024 E985	8	98.80-98.70	cf. Carya sp.	
N1024 E985	9	98.70-98.60		no specimen found
N1024 E986	2	99.40-99.30	Acacia sp./ Prosopis sp.	
N1024 E986	5	99.10-99.00		no clear surface

Table 37. (continued)

Provenience	Level	Depth	Identification	Comments
N1024 E986	6	99.00-98.90		no clear surface, traumatic vessels
N1024 E986	7	98.90-98.80	cf. <i>Prosopis</i> sp.	
N1024 E986	9	98.70-98.60		too fragmentary to identify
N1024 E987	2	99.40-99.30	<i>Carya</i> sp., cf. Salicaceae	
N1024 E987	5	99.10-99.00		too fragmentary to identify
N1024 E987	6	99.00-98.90		traumatic vessels
N1024 E987	7	98.90-98.80	Fabaceae	
N1024 E987	8	98.80-98.70		too fragmentary to identify
N1025 E997	1	Surface-99.50	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1025 E997	4	99.30-99.20	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1025 E997	5	99.20-99.10	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1025 E997	6	99.10-99.00	hardwood	very fragmentary
N1025 E997	7	99.00-98.90		too fragmentary to identify
N1025 E998	1	Surface-99.50		too fragmentary to identify
N1025 E998	2	99.50-99.40	<i>Carya</i> sp., Salicaceae, <i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1025 E998	3	99.40-99.30	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1025 E998	4	99.30-99.20	cf. <i>Prosopis</i> sp.	
N1025 E998	5	99.20-99.10	cf. <i>Prosopis</i> sp.	
N1025 E998	6	99.10-99.00		too fragmentary to identify
N1025 E998	7	99.00-98.90		too fragmentary to identify
N1025 E999	1	Surface-99.50	hardwood	too small and fragmentary
N1025 E999	2	99.50-99.40	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1025 E999	4	99.30-99.20	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	stone, wood fragments
N1025 E999	5	99.20-99.10	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1025 E999	6	99.10-99.00		too small to identify
N1025 E999	7	99.00-98.90		too fragmentary to identify
N1025 E999	8	98.90-98.80	Fabaceae	
N1026 E978	2	99.50-99.40		too fragmentary to identify
N1026 E978	4	99.30-99.20	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	
N1026 E978	6	99.10-99.00		too fragmentary to identify
N1026 E995	3	99.40-99.30	<i>Carya</i> sp.	
N1026 E995	4	99.30-99.20	cf. <i>Prosopis</i> sp.	
N1026 E995	7	99.00-98.90	<i>Acacia</i> sp./ <i>Prosopis</i> sp.	

Table 37. (continued)

Provenience	Level	Depth	Identification	Comments
N1026 E998				too fragmentary to identify
N1026 E998	3	99.40-99.30	Acacia sp./Prosopis sp.	
N1026 E998	4	99.30-99.20		too fragmentary to identify
N1026 E998	5	99.20-99.10	Acacia sp./Prosopis sp.	
N1026 E998	6	99.10-99.00	Acacia sp./Prosopis sp.	
N1026 E998	7	99.00-98.90		too fragmentary to identify
N1026 E999	5	99.20-99.10	Acacia sp./Prosopis sp.	
N1026 E999	6	99.10-99.00	Acacia sp./Prosopis sp.	
N1027 E978	2	99.50-99.40	Acacia sp./Prosopis sp.	
N1027 E978	3	99.40-99.30		too brittle to identify too fragmentary to identify
N1027 E978	5	99.20-99.10	cf. Carya sp.	
N1027 E978	6	99.10-99.00	Salicaceae, Acacia sp./Prosopis sp.	
N1027 E986	3	99.40-99.30		too fragmentary to identify
N1027 E986	4	99.30-99.20		too fragmentary to identify
N1027 E997	2	99.50-99.40	cf. Prosopis sp.	
			Acacia sp./Prosopis sp.	
N1027 E997	5	99.20-99.10	Acacia sp./Prosopis sp.	
N1027 E997	6	99.10-99.00		too fragmentary to identify
N1027 E998	1	99.60-99.50	Juniperus sp.	
N1027 E998	3	99.40-99.30	cf. Prosopis sp.	
N1027 E998	4	99.30-99.20	cf. Prosopis sp.	
N1027 E998	5	99.20-99.10		too fragmentary to identify
N1027 E998	6	99.10-99.00	hardwood	
N1027 E998	7	99.00-98.90	Acacia sp./Prosopis sp.	
N1027 E999	Soil Column North Wall	99.13	Acacia sp./Prosopis sp.	
N1027 E999	1	Surface-99.5		too fragmentary to identify
N1027 E999	4	99.30-99.20	Acacia sp./Prosopis sp.	
N1027 E999	5	99.20-99.10	Fabaceae	
N1027 E999	6	99.10-99.00	Acacia sp./Prosopis sp.	
N1027 E999	6			too fragmentary to identify
N1027 E999	7	99.00-98.90		no clean break

*Feature 2

Radiocarbon analyses of these sites are quite wide ranging. Site 41 LK 51 dated between 5860 ± 80 and 6360 ± 90 years B.P. However, these dates were recovered from Level 15. The upper levels of the site quite possibly are not contemporaneous, but at present are undated. The deeper levels (Levels 12-17) from site 41 LK 201 were dated between 2450 ± 60 and 3090 ± 80 years B.P. While these deeper level excavations provide older materials, the dates are still more recent than those from site 41 LK 51. Site 41 MC 296, from which the greatest amount of macrobotanical material was recovered, dated between 2090 ± 60 years B.P. and A.D. 1430-1610. Site 41 LK 128 dated between A.D. 980-1310 and site 41 MC 55 between A.D. 1330-1420.

Most of the charcoal recovered from these sites (Tables 32-37) was identified as belonging to either *Acacia* or *Prosopis*. Both genera are members of the Fabaceae family, both inhabit the same ecological habitats, and both are present in the region today. Lack of adequate comparative materials which would reveal the extent of species variation in wood anatomy precluded the positive identification beyond this very general level. In a few cases, the specimens were noted as comparing very favorably (cf.) to one genus or the other.

The materials recovered from site 41 LK 51 dated older than any other materials recovered from the Choke Canyon region. Yet the charcoal analysis reveals similar, if not identical, taxa available for selection as fuel sources as were present in the more recent sites. This strongly argues for a stable environment which may have persisted in this region for 6000 years.

Data recovered from these botanical remains suggest that a minimum of two habitats were consistently exploited for fuel. A primary source was probably restricted to more upland and drier sites which may have provided the bulk of the *Acacia* sp./*Prosopis* sp. woods. These species are semiarid in requirements, and their dominance in the fossil record suggests their proximity and perhaps, somewhat easier acquisition.

A secondary plant community likewise exploited, but with less frequency, would be the riparian communities located along the watercourses. These communities provided the occasional specimens of hickory (*Carya* sp.), Salicaceae (most likely *Salix* sp. [willow]), and persimmon (*Diospyros* sp.). The low numbers of these woods in comparison to the *Acacia* sp./*Prosopis* sp. also suggest that they were not heavily exploited.

There is no readily discernible pattern to the distribution of the riparian taxa throughout the date ranges assigned. They appear almost randomly distributed throughout the levels. Thus, they provide no evidence to support a hypothesis based on shifting climates. Neither do they support an interpretation of decreasing availability through utilization as suggested by Minnis (1981) for the Mimbres occupation in southwestern New Mexico. The pattern emerges that for possibly the past 6000 years this region was occupied by a mosaic of both semiarid shrubs and riparian elements.

Dering (1982) reported similar results from his previous study of the Choke Canyon area. The main differences between his study and the current investigations is his identification of ash (*Fraxinus* sp.) and hackberry (*Celtis* sp.) charcoal. This should not invalidate any of the possible

interpretations herein presented as both ash (*Fraxinus* sp.) and hackberry (*Celtis* sp.) are typical components of the riparian community.

Dering (1982) identified both *Acacia* sp. and *Prosopis* sp. charcoal from sites 41 LK 31/32 which had been dated between 4360-4340 years B.P. Thus, Dering's (1982) 4300-year record compares quite favorably with the 6000-year record of these taxa from the local area.

Bryant (1977a) and Bryant and Riskind (1980) have attempted to summarize the available pollen data from the Chihuahuan Desert region of south Texas and northern Mexico. In both studies, they concluded that the region had been relatively stable during the past 3000 years. Bryant (1977a) reported evidence of increasing trends to aridity in levels dated post-7000 B.P. from deposits recovered from the Amistad Reservoir area. He also noted a very short-lived mesic period dated around 2800 B.P. This mesic interval was not identifiable in the charcoal record from the Choke Canyon region. Bryant and Riskind (1980) did note a more mesic pollen assemblage from a single sample recovered from Cueva de la Zona de Derrumbes, northern Mexico. However, this may be a local phenomenon as it was present in only a single sample.

Steele (1986) has recently analyzed the faunal remains recovered from site 41 LK 201. He notes the mixture of both eastern and southern elements and interprets these as perhaps representing mixtures of components of both the Tamaulipan and Eastern Woodland Biotic Provinces. Steele's (1986) data are comparable with the present botanical evidence in that they are indicative of a mosaic pattern of biological communities. The available evidence (pollen, faunal, and charcoal) all suggest a relatively stable environment characterized by increasing aridity. From the available radiocarbon dates, this community distribution has been present in the region for 6000 years.

Gunn et al. (1982) have recently proposed an alternative model of climate change for the region of south Texas. Utilizing current climatic records and subjecting these data to factor analysis, Gunn et al. (1982) have proposed a series of alternating periods of wet and dry which may have been operating to control Holocene climate and vegetation.

Additionally, Gunn et al. (1982) cite phytolith evidence (Robinson 1979, 1982) which purports to substantiate their model. The phytolith data is then compared with previously published sequences of cultural and geological data.

Both Gunn et al. (1982) and Robinson (1982) rely heavily on the identification of a definable Hypsithermal interval. The radiocarbon dates recovered from 41 LK 51 place these strata within the classic Hypsithermal period. However, the charcoal assemblages reported herein show no change in composition of taxa which would suggest changes of the magnitude associated with the Hypsithermal as originally defined by Deevey and Flint (1957). Steele's (1986) faunal data likewise fail to suggest the presence of this climatic interval. Furthermore, pollen analysis of a number of sites located throughout Texas (Bryant 1969, 1977b; Potzger and Tharp 1954; Graham and Helmsch 1960) fails to support the identification of this interval. Based on the combined evidence of the charcoal, fauna, and pollen, a re-evaluation of Gunn et al.'s (1982) model is indicated.

The data presented in this report has an immediate bearing on several questions related directly on the biogeography of certain taxa. Dering (1982) reported the single occurrence of *Juniperus* sp. charcoal and, based on supporting evidence by Adams (1977), has suggested the presence of relict stands of *Juniperus ashei* in the region of Choke Canyon. While Dering (1982) may be correct in his interpretation, the results of my analysis have not supported the presence of *Juniperus* sp. at 2200 B.P. A single specimen of *Juniperus* sp. charcoal was recovered from Level 1 at site 41 MC 296, but this level was dated between A.D. 1400-1600, about 1500 years too recent to compare with Dering's (1982) estimate.

A second major biogeographical problem concerns the migration of mesquite (*Prosopis* sp.) into the area. Johnston (1963) has proposed this migration occurred historically as a result of overgrazing by cattle. Due to lack of corresponding data, I can only propose a tentative identification of *Prosopis* sp. from this region. Some of the specimens identified did compare quite favorably to the characteristics of the genus *Prosopis* and, thus, it is quite possible that this taxon has a much longer history in this region than has previously been proposed. Dering (1982) likewise proposed the presence of *Prosopis* sp. in this region for the past 2000 years. Based on data recovered during the present investigation, *Prosopis* sp. may have been present in this region for a much longer period of time than previously suspected.

CONCLUSIONS

The macrobotanical evidence recovered from these sites suggests a long-term stable environment. The stability of this region is somewhat longer than previously suggested, by about 2000 years, extending back approximately 6000 years B.P. The vegetational assemblages appear to have formed something of a mosaic configuration in the landscape composed primarily of a xeric plant community dominated by leguminous woody species. Interspersed with this plant community were more mesic and presumably smaller stands dominated by riparian taxa.

Unfortunately, lack of precision has precluded any positive statement concerning the migration of *Prosopis* into this region. It would not be unexpected, however, for this taxon to have been a common component of the vegetation. Perhaps, palynological data, if forthcoming, can elucidate the problem. The results of the present study cannot substantiate the proposed range extension of *Juniperus* sp. into the Choke Canyon region as earlier suggested by Dering (1982).

REFERENCES CITED

Adams, R. P.

- 1977 Chemosystematics--Analysis of Populations Differentiation and Variability of Ancestral and Recent Populations of *Juniperus ashei*. **Annals of the Missouri Botanical Garden** 64:184-209.

Blair, W. F.

- 1950 The Biotic Provinces of Texas. **The Texas Journal of Science** 2:93-117.
- 1952 Mammals of the Tamaulipan Biotic Province in Texas. **The Texas Journal of Science** 4:230-250.

Bryant, V. M., Jr.

- 1969 Late Fullglacial and Postglacial Pollen Analysis of Texas Sediments. Ph.D. dissertation, The University of Texas at Austin.
- 1977a Late Quaternary Pollen Records From the East-Central Periphery of the Chihuahuan Desert. In Transactions of the Symposium on the Biological Resources of the Chihuahuan Desert Region United States and Mexico, edited by R. H. Wauer and D. H. Riskind. **U.S. Department of the Interior, National Park Service Transactions and Proceedings, Series 3.**
- 1977b A 16,000 Year Pollen Record of Vegetational Change in Central Texas. **Palynology** 1:143-156.

Bryant, V. M., Jr. and D. H. Riskind

- 1980 The Paleoenvironmental Record for Northeastern Mexico: A Review of the Pollen Evidence. In Papers on the Prehistory of Northeastern Mexico and Adjacent Texas, edited by J. F. Epstein, T. R. Hester, and C. Graves. **Center for Archaeological Research, The University of Texas at San Antonio, Special Report** 9:7-31.

Dering, P.

- 1982 Analysis of Carbonized Botanical Remains From the Choke Canyon Reservoir Area. In Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings, by G. D. Hall, S. L. Black, and C. Graves. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series** 5:518-530.

Deevey, E. S. and R. F. Flint

- 1957 Postglacial Hypsithermal Interval. **Science** 125:182-184.

Graham, A. and C. Heimsch

- 1960 Pollen Studies of Some Texas Peat Deposits. **Ecology** 41:785-790.

Gunn, J., T. R. Hester, R. Jones, R. L. Robinson, and R. A. Mahula

- 1982 Climatic Change in Southern Texas. In Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings, by G. D. Hall, S. L. Black, and C. Graves. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series** 5:578-596.

Johnston, M. C.

- 1963 Past and Present Grasslands of Southern Texas and Northeastern Mexico. **Ecology** 44:456-466.

Leney, L. and R. Casteel

- 1975 Simplified Procedure for Examining Charcoal Specimens for Identification. **Journal of Archaeological Science** 2:153-159.

Minnis, P. E.

- 1981 Economic and Organizational Responses to Food Stress by Non-Stratified Societies: An Example From Prehistoric New Mexico. Ph.D. dissertation, University of Michigan.

Potzger, J. E. and B. C. Tharp

- 1954 Pollen Study of Two Bogs in Texas. **Ecology** 35:462-466.

Robinson, R. L.

- 1979 Biosilica and Climatic Change at 41 GD 21 and 41 GD 21A. In Archaeological Investigations of Two Prehistoric Sites on the Coleto Creek Drainage, Goliad County, Texas, by D. E. Fox:102-113. **Center for Archaeological Research, The University of Texas at San Antonio, Archaeological Survey Report** 69.
- 1982 Biosilica Analysis of Three Prehistoric Archaeological Sites in the Choke Canyon Reservoir, Live Oak County, Texas: Preliminary Summary of Climatic Implications. In Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings, by G. D. Hall, S. L. Black, and C. Graves. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series** 5:597-610.

Steele, D. G.

- 1986 Analysis of Vertebrate Faunal Remains From 41 LK 201, Live Oak County, Texas. Appendix V in Archaeological Investigations at 41 LK 201, Choke Canyon Reservoir, Southern Texas, by C. L. Highley. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 11.**

Tharp, B. C.

- 1939 The Vegetation of Texas. **Texas Academy of Science Publications in Natural History, Non-Technical Series 1.**

APPENDIX III.

ANALYSIS OF VERTEBRATE FAUNAL REMAINS FROM 41 MC 222 AND 41 MC 296,
McMULLEN COUNTY, TEXAS

D. Gentry Steele and Cristi Assad Hunter

The present report, part of the continuing study of the faunal remains recovered from the basin of Choke Canyon Reservoir in south Texas, analyzes the bony remains of vertebrates recovered from 41 MC 222 (Table 38) and 41 MC 296 (Table 39). Additional reports on the faunal remains recovered from the basin include an examination of the unionids recovered during the first phase of the archaeological excavation (Murray 1982), a study of the remains of vertebrates recovered from 41 LK 201 (Steele 1986), and the analysis of the value of fine screening for vertebrate remains in south Texas (DeMarcey and Steele 1986).

Prior to interpreting human behavior based upon the analysis of the faunal remains recovered from 41 LK 201, Steele (1986) examined the nature of the bone assemblage itself. Since the conclusions reached based on that assemblage are pertinent to the examination of the two assemblages considered here it is worth summarizing those points. When researchers examine the lithic or ceramic assemblages recovered from a site it is generally safe to assume that humans were the predominant, if not the only agent, which created the artifacts. It is usually safe to also assume that the lithic and ceramic artifacts have not been differentially destroyed or removed from the site. If they have, there is usually clear-cut evidence of another agent, such as water transportation, which has affected the assemblage. When we examine the bone assemblage, however, such assumptions are not as safe to make. A variety of authors (Steele 1986; Binford 1981; Brain 1981; Shipman 1981; Behrensmeyer and Hill 1980; Hester 1975a, 1980; Hester et al. 1975) have pointed out that humans may not have been the only contributors to the bone assemblage at a site. Nonhuman predators co-occupying the site with the humans or occupying the site at different times could have contributed to the assemblage. Also, animals inhabiting the site after the human occupation, could have died and their bones been incorporated into the assemblage.

Just as humans may not have been the only agents creating the bone assemblage, it is also clear that not all of the animals utilized by humans will be represented in the bone assemblage at the site. Very large animals such as bison may have been killed and butchered away from the site and only the flesh returned to the site, thus no bones would have accrued in the habitation site to mark the event. Similarly, other animals large or small could have been killed, processed, and consumed away from the site. Again, the result would be that no bones would have been added to the assemblage at the site. Even the bony remains which are carried back to the site are subject to being deleted from the site prior to the excavation. Scavengers (canids most commonly in North America) could have destroyed some of the bones, or differential preservation could have removed the smaller and more fragile remains. Humans themselves could have destroyed some of the bones as they modified them into tools, or ground them for meal or pottery temper. In south Texas, awls, pressure flaking tools, billets, beads, and needles made from bone have been recovered (Hester 1980), and one of the main pottery

TABLE 38. LIST OF THE VERTEBRATE TAXA RECOVERED FROM 41 MC 222

Levels	Late Prehistoric				Late Archaic				
	1	2	3	4	5	6	7	8	9
CLASS INDETERMINATE	X	X	X	X	X	X	X	X	X
CLASS OSTEICHTHYES									
Order Indeterminate	X	-	X	-	-	X	-	-	-
ORDER LEPISOSTEIFORMES									
Lepisostidae									
Lepisosteus	X	X	X	-	-	X	X	X	-
ORDER CYPRINIFORMES									
Ictaluridae									
Genus Indeterminate	X	-	X	-	-	-	-	-	-
CLASS AMPHIBIA									
ORDER ANURA									
Family Indeterminate	-	-	X	-	-	-	-	-	-
CLASS REPTILIA									
ORDER CROCODYLIA									
Alligatoridae									
Alligator	X	-	-	-	-	-	-	-	-
ORDER SQUAMATA									
SUBORDER LACERTILIA									
Iguanidae									
Genus Indeterminate	-	-	X	-	-	-	-	-	-
SUBORDER SERPENTES									
Family Indeterminate	-	-	X	-	-	-	-	-	-
Crotalidae									
Crotalus	-	X	-	-	-	X	-	-	-
ORDER TESTUDINES									
Family Indeterminate	X	X	X	X	X	-	X	-	-
Emydidae									
Chrysemys	-	-	X	X	X	-	-	-	-
Terrapene	-	X	X	X	-	-	-	-	-
CLASS MAMMALIA									
ORDER ARTIODACTYLA									
Family Indeterminate	X	-	X	-	-	-	-	-	-
Bovidae									
Bison	X	X	X	X	X	-	-	-	-
Cervidae									
Odocoileus	-	X	X	X	X	X	X	-	-
Tayassuidae									
Dicotyles	X	-	X	X	-	-	-	-	-
ORDER CARNIVORA									
Canidae									
Canis	-	-	-	-	X	-	X	-	-
Felidae									
Felis	-	-	X	-	X	-	-	-	-
ORDER LAGOMORPHA									
Leporidae									
Lepus	X	X	X	X	X	X	X	-	-
Sylvilagus	X	X	X	X	X	X	X	-	-
ORDER RODENTIA									
Muridae									
Neotoma	-	X	X	-	-	X	-	-	-
Sigmodon	X	X	X	-	-	-	-	-	-
Sciuridae									
Genus Indeterminate	-	-	-	-	-	X	-	-	-
Sciurus	-	-	-	X	-	-	-	-	-
Spermophilus	-	-	X	X	-	-	-	-	-

X = presence of the taxon within the assemblage from the level indicated.
 - = absence of the taxon within the assemblage from the level indicated.

Note: Common names for the taxa are provided in the Description of Taxa section of the text.

TABLE 39. LIST OF THE VERTEBRATE TAXA RECOVERED FROM 41 MC 296

Levels	Perdiz A.D. 1200-1700		Scallorn A.D. 800-1200			Late Archaic					
	1	2	3	4	5	6	7	8	9	10	11
CLASS INDETERMINATE	X	X	X	X	X	X	X	X	X	X	X
CLASS OSTEICHTHYES											
ORDER INDETERMINATE	X	X	X	-	-	-	X	X	X	-	-
ORDER LEPISOSTEIFORMES											
Lepisostidae											
Lepisosteus	X	X	X	X	X	X	X	X	-	-	-
ORDER CYPRINIFORMES											
Ictaluridae											
Genus Indeterminate	X	X	X	X	X	X	X	X	X	-	-
ORDER PERCIFORMES											
Centrarchidae											
Pomoxis	-	-	X	-	-	-	-	-	-	-	-
Sciaenidae											
Aplodinotus	-	X	-	X	-	-	-	X	-	-	-
CLASS AVES											
ORDER INDETERMINATE	X	X	X	X	X	X	X	X	-	-	-
ORDER ANSERIFORMES											
Anatidae											
Anas	-	-	-	-	-	-	-	X	-	-	-
ORDER GALLIFORMES											
Meleagridae	-	X	X	X	-	X	X	-	-	-	-
Meleagris											
CLASS AMPHIBIA											
ORDER ANURA											
Family Indeterminate	-	X	X	X	X	X	X	-	-	-	-
Ranidae											
Rana	X	X	X	-	-	-	-	-	-	-	-
CLASS REPTILIA											
ORDER SQUAMATA											
SUBORDER LACERTILIA											
Iguanidae											
Genus Indeterminate	-	X	X	-	X	X	X	-	-	-	-
Sceloporus	-	X	X	X	-	-	-	-	X	-	-
SUBORDER SERPENTES											
Family Indeterminate	X	X	X	X	X	X	X	X	X	-	-
Crotalidae											
Crotalus	X	X	X	X	X	X	X	X	X	-	-
ORDER TESTUDINES											
Family Indeterminate	X	X	X	X	X	X	X	X	X	-	X
Emydidae											
Chrysemys	X	X	X	X	X	X	X	X	-	X	-
Terrapene	-	X	X	-	-	X	-	X	-	-	-
Kinosternidae											
Kinosternon	-	-	-	-	-	X	-	-	-	-	-
Trionychidae											
Trionyx	-	-	X	X	-	-	-	-	-	-	-

TABLE 39. (continued)

Levels	Perdiz A.D. 1200-1700		Scallorn A.D. 800-1200			Late Archaic					
	1	2	3	4	5	6	7	8	9	10	11
CLASS MAMMALIA											
ORDER MARSUPIALIA											
Didelphidae											
Didelphis	-	-	-	-	-	-	X	-	-	-	-
ORDER ARTIODACTYLA											
Family Indeterminate	X	X	X	X	-	X	X	X	-	-	-
Antilocapridae											
Antilocapra	X	X	X	-	-	-	-	-	-	-	-
Bovidae											
Bison	X	X	X	X	-	-	-	X	-	-	X
Cervidae											
Odocoileus	X	X	X	X	X	X	X	X	X	-	-
ORDER CARNIVORA											
Canidae											
Canis	X	X	X	X	-	-	-	X	-	-	-
ORDER INSECTIVORA											
Talpidae											
Scalopus	-	-	-	X	X	-	-	-	-	-	-
ORDER LAGOMORPHA											
Leporidae											
Lepus	X	X	X	X	X	X	X	X	X	X	X
Sylvilagus	X	X	X	X	X	X	X	X	X	X	X
ORDER PRIMATES											
Hominidae											
Homo	-	-	-	-	X	X	-	-	-	-	-
ORDER RODENTIA											
Geomyidae											
Geomys	-	X	X	-	-	X	-	-	-	-	-
Heteromyidae											
Perognathus	-	-	X	-	-	-	-	-	-	-	-
Muridae											
Neotoma	X	X	X	X	X	X	X	X	X	-	-
Sigmodon	X	X	X	X	X	X	X	-	X	-	-
Sciuridae											
Genus Indeterminate	X	-	X	-	-	X	-	-	-	-	-
Spermophilus	X	X	-	-	-	-	X	-	-	-	-

X = presence of the taxon within the assemblage from the level indicated.

- = absence of the taxon within the assemblage from the level indicated.

Note: Common names for the taxa are provided in the Description of Taxa section of the text.

traditions in the area consists of sherds tempered with bone (Hester and Hill 1971; Hester 1980). Finally, recovery techniques could preferentially recover the larger bones, thus deleting small bones from the sample which was studied. Recognizing these factors, which structure the bone assemblage, does not lessen the significance of the assemblage, but it does establish the parameters for interpretations based upon the assemblage.

Another factor which must be taken into account is the size of the assemblage itself. Grayson (1984), who has most closely examined the relationship between sample size and the structure of the sample, has noted two particularly interesting phenomena. The first is that smaller bone assemblages will have fewer taxa because the rarer species are less likely to be represented. Second, in smaller assemblages each taxa will be represented by fewer bones. What creates this effect is that as the sample size increases there is a greater chance of recovering additional bones of the individuals represented.

Because of these characteristics of bone assemblages, larger assemblages from human habitation sites may give the illusion that the inhabitants were sampling a more diverse fauna, or that they were bringing more complete carcasses of the game back to camp. This problem can be particularly troublesome when comparing samples of different ages at a site. The older assemblages are generally fewer in number and smaller in size, therefore, they commonly have fewer taxa. This may give the illusion that Paleo-Indians utilized fewer species than Archaic humans, and in some cases that Archaic hunters harvested fewer taxa than Late Prehistoric hunters. Sample size is usually not a problem at dry cave sites where good preservation and uniformly large samples have indicated a diverse diet for central and south Texas hunters and gatherers over a very long period of time (Hester 1978; Lord 1984). However, sample size must be taken into account when examining the fauna from open air stratified sites such as 41 LK 201 and 41 MC 296.

Given the history and development of the bone assemblages then, the following interpretations are presented with caution.

DIETARY PATTERNS

One is immediately struck by the diversity of the faunal assemblages recovered from 41 MC 222 and 41 MC 296. Twenty-three taxa including 16 genera of vertebrates were recovered from 41 MC 222, and 35 taxa including 26 genera were recovered from 41 MC 296. From both sites fish, amphibians, reptiles, birds, and mammals have been recovered. In these respects, the assemblages compare quite favorably with the faunal assemblages recovered from 41 LK 201 (41 taxa including 32 genera). The differences in the number of taxa between the sites is probably a reflection of the size of the samples, since the ranking of the sites by number of taxa is the same as the ranking of the sites by the number of bones recovered from each site. On the basis of the diversity of the fauna from these three sites, it appears that the human inhabitants of the Choke Canyon basin were quite opportunistic hunters, catching and consuming all major classes of vertebrates.

This diversity of faunal remains recovered from habitation sites in south Texas has been noted by Hester (1975b, 1980), Hester and Hill (1972, 1975), and Steele (1986). While it is known that factors can add bones to the assemblage at a site, the authors feel confident that virtually all taxa found at 41 MC 222 and 41 MC 296 probably represented food refuse, and probably that of humans. All taxa were represented by incomplete skeletons and fragmented bone exhibiting spiral fractures, conditions indicative of food refuse. The assumption that the refuse probably represented the refuse of humans is that they are the one identified occupant of the site.

When we compare the classes, mammalian remains represent the largest portion of the assemblage; more bones of mammals were present, and more taxa of mammals were identified. Certainly, some of this disparity is a reflection of differential preservation, recovery, and identification. The smaller vertebrates, mostly small amphibians, reptiles, and fish, have smaller and more friable bones so they rarely preserve as well as the denser and larger bones of the mammals. Similarly, the bones of these smaller vertebrates commonly slip through the 1/4-inch mesh screen used to recover most of the faunal remains. Even though a portion of the matrix was fine screened and analyzed at 41 MC 222 and 41 MC 296, a technique recommended by Hester (1980) and DeMarcay and Steele (1986) for south Texas sites, it was impractical to fine screen all matrix. Consequently, the smaller assemblage recovered by fine screening had fewer taxa represented.

Mammalian remains are also more easily identified. Variances between taxa in mammalian teeth and articular ends of long bones make taxa within this class easier to identify. In spite of these caveats, the disparity in numbers of recovered remains between the classes leads the authors to the tentative conclusion that consistently more mammals were harvested than members of the other classes. There is probably a good reason for this greater reliance on mammals by humans. For humans, mammals are probably easier to hunt than some of the classes, such as birds. Mammalian habitats are more accessible to humans than the habitats of other classes, such as fishes. Mammals are also more likely to be active during all seasons than some classes, such as amphibians and reptiles.

There is an additional consideration supporting the view that mammals are of greater sustenance value. Simply because more species of mammals are larger than species of the other classes, they would have provided a larger portion of the usable meat consumed by the humans. This is particularly important when we consider the artiodactyls, the remains of which are found in all three sites and from virtually all layers. The only species of the other classes of vertebrates which is of comparable size is the alligator, and only a single dermal scute has been recovered from 41 MC 222. Given these lines of evidence, the conclusion that mammals were of greater value as a food resource than the other classes is supportable.

The foregoing conclusion does not diminish the significance of species of the other classes at particular times of the year or during particularly critical times. The amphibians, reptiles, and fishes must surely have taken on increasing significance to the humans during the spring and summer when these species became more available and more easily hunted. Amphibians and reptiles, such as turtles, become more active in the spring and can be more

easily collected then along the banks of streams and ponds. Fish, particularly spring spawning freshwater drum and crappie, also become more easily harvested in the spring, and these two species were recovered from 41 MC 296, while the freshwater drum was recovered from 41 LK 201. It should be noted also that other species of fish appear to have been taken at all three sites but these remains could not be identified to genera because they were too fragmentary or comparable remains were not in the reference collections.

Birds occur infrequently at 41 MC 296 and not at all in the bone assemblage from 41 MC 222. On the basis of this negative evidence, this class does not appear to have been particularly significant in the dietary regime of the human inhabitants. One should note, however, that like the amphibians birds will be underrepresented in most faunal assemblages simply because of the fragile nature of the skeletal elements.

When we examine the mammalian portion of the faunal assemblage it is clear that artiodactyls, rodents, and lagomorphs were the most consistently utilized mammals during the entire period of occupation of both sites. Within the sample of artiodactyl remains, deer represents the most frequent genus, with bison occurring far less frequently in both sites. Pronghorn remains were recovered only from 41 MC 296, and collared peccary remains were recovered only from 41 MC 222. Bones of leporids were represented in both sites and at all levels. At both sites a large variety of leporid, either the jackrabbit or swamp rabbit, and a smaller variety, either the desert cottontail rabbit or eastern cottontail rabbit, were present in the bone assemblage. The most commonly recovered rodent remains were those of the pack rat and the cotton rat. The relative high frequency of pack rats and cotton rats in south Texas sites has also been noted by Hester and Hill (1972), Hester (1975b), and Steele (1986).

Utilizing counts of identified elements (NISP) of the artiodactyls, rodents, and lagomorphs, we get a reasonably accurate assessment of their relative numbers to one another, if not the actual numbers of animals taken or consumed. Tables 40-42 list the number of identified elements for the artiodactyls, rodents, and lagomorphs; and Figures 97-99 illustrate the relative frequencies of the three orders at 41 MC 222, 41 MC 296, and 41 LK 201. At 41 MC 222, artiodactyls and lagomorphs are the most frequently recovered taxa, but there appears to be no other consistent trend recognizable. At 41 MC 296, however, rodents and lagomorphs are the most frequently recovered taxa. There also appears to be a long-term trend recognizable; as the remains of artiodactyls decrease in frequency through time at the site, the number of rodent and lagomorph bones increases through Level 6, and then decreases. This inverse relationship between the frequency of the artiodactyls versus the rodents and lagomorphs was noted in the examination of faunal remains from 41 LK 201 by Steele (1986), who suggested that it reflected a human dietary shift between Late Prehistoric and Late Archaic times.

To test this hypothesis all Late Prehistoric faunal elements (Levels 1-4) were pooled and compared to all Late Archaic elements of each taxon (Levels 5-11). Table 43 presents the 2-way tables for the chi-square test for sites 41 MC 296 and 41 LK 201, while Figures 100 and 101 illustrate the

TABLE 40. LISTING OF THE NUMBER OF IDENTIFIED ELEMENTS (NISP) RECOVERED FROM EACH 10-CM LEVEL OF 41 MC 222 FOR THE ARTIODACTYLS, LAGOMORPHS, AND RODENTS

Levels	1	2	3	4
M ³ Excavated	13.0	11.0	5.4	2.4
Artiodactyla	34	15	25	1
Indeterminate	-	1	-	1
Bison	27	5	1	-
Antilocapra	-	-	-	-
Odocoileus	4	5	24	1
Dicotyles	3	4	-	-
Rodentia	11	11	2	2
Indeterminate	-	9	2	2
Neotoma	4	1	-	-
Sigmodon	7	1	-	-
Lagomorpha	45	60	51	4
Lepus	24	30	24	2
Sylvilagus	21	30	27	2

Note: The number of elements listed for the artiodactyls, rodents, and lagomorphs includes all elements identified for all of the taxa in that order. In addition to the listing for these three orders, the table includes the number of identified elements for the most commonly recovered genera within each of these orders. The original squares for 41 MC 222 were excavated in 5-cm levels, we have converted the data to 10-cm levels so the data will be comparable with the unit-levels from 41 MC 296 and 41 LK 201. Consequently, Level 1 of this chart includes the combined bone assemblage from the 5-cm Levels 1 and 2 in the original excavation, and so forth.

TABLE 41. LISTING OF THE NUMBER OF IDENTIFIED ELEMENTS (NISP) RECOVERED FROM EACH 10-CM LEVEL OF 41 MC 296 FOR THE ARTIODACTYLS, LAGOMORPHS, AND RODENTS

Levels	1	2	3	4	5	6	7	8	9	10	11
M ³ Excavated	10.0	9.6	9.6	9.6	8.0	8.0	6.8	4.0	4.0	1.6	0.8
Artiodactyla	35	29	29	14	6	16	5	4	2	-	1
Indeterminate	22	10	17	3	1	3	1	1	-	-	-
Bison	2	2	3	2	-	-	-	1	-	-	1
Antilocapra	1	1	1	-	-	-	-	-	-	-	-
Odocoileus	10	16	8	9	4	13	4	2	2	-	-
Dicotyles	-	-	-	-	1	-	-	-	-	-	-
Rodentia	30	45	44	32	41	62	37	16	7	-	-
Indeterminate	10	7	14	15	14	3	11	12	-	-	-
Neotoma	19	26	27	12	12	43	7	4	4	-	-
Sigmodon	1	12	3	5	15	16	19	-	3	-	-
Lagomorpha	47	71	95	72	100	58	42	20	10	2	3
Lepus	17	31	46	38	42	32	16	7	6	1	1
Sylvilagus	30	40	49	34	58	26	26	13	4	1	2

Note: The number of elements listed for the artiodactyls, rodents, and lagomorphs includes all elements identified for all of the taxa for that order. In addition to the listing for these three orders, the table includes the number of identified elements for the most commonly recovered genera within each of these orders.

TABLE 42. LISTING OF THE NUMBER OF IDENTIFIED ELEMENTS (NISP) RECOVERED FROM EACH 10-CM LEVEL OF 41 LK 201 FOR THE ARTIODACTYLS, LAGOMORPHS, AND RODENTS

Levels	1	2	3	4	5	6	7	8	9	10	11	12	13
M ³ Excavated	26.4	23.2	12.0	8.0	8.0	8.0	8.0	8.0	6.4	6.4	6.4	6.4	6.4
Artiodactyla	64	89	36	5	3	1	5	9	4	2	-	-	-
Indeterminate	12	4	22	-	1	-	2	-	-	2	-	-	-
Bison	12	2	1	-	-	-	-	-	-	-	-	-	-
Antilocapra	4	9	-	-	-	-	-	-	-	-	-	-	-
Odocoileus	35	73	13	4	2	1	3	9	4	-	-	-	-
Dicotyles	1	1	-	1	-	-	-	-	-	-	-	-	-
Rodentia	36	27	7	5	2	-	-	1	-	1	4	2	3
Indeterminate	-	-	3	-	-	-	-	1	-	-	3	1	3
Neotoma	29	27	4	4	-	-	-	-	-	1	1	1	-
Sigmodon	7	-	-	-	-	-	-	-	-	-	-	-	-
Lagomorpha	37	46	10	8	3	5	3	1	1	14	12	8	8
Lepus	5	3	4	5	1	3	-	-	-	6	6	-	3
Sylvilagus	32	43	6	3	2	2	3	1	1	3	6	8	5
Levels (continued)	14	15	16	17	18	19	20	21	22	23	24	25	
M ³ Excavated	6.4	6.4	6.4	6.4	6.4	2.8	1.6	1.2	1.2	1.2	1.2	1.2	
Artiodactyla	-	4	3	-	-	-	-	-	-	-	-	-	
Indeterminate	-	-	1	-	-	-	-	-	-	-	-	-	
Bison	-	-	1	-	-	-	-	-	-	-	-	-	
Antilocapra	-	-	-	-	-	-	-	-	-	-	-	-	
Odocoileus	-	4	1	-	-	-	-	-	-	-	-	-	
Dicotyles	-	-	-	-	-	-	-	-	-	-	-	-	
Rodentia	-	-	-	-	-	-	-	-	-	-	-	-	
Neotoma	-	-	-	-	-	-	-	-	-	-	-	-	
Sigmodon	-	-	-	-	-	-	-	-	-	-	-	-	
Lagomorpha	2	-	1	-	4	-	-	-	-	-	-	-	
Lepus	1	-	1	-	-	-	-	-	-	-	-	-	
Sylvilagus	1	-	-	-	4	-	-	-	-	-	-	-	

Note: The number of elements listed for the artiodactyls, rodents, and lagomorphs includes all elements identified for all of the taxa for that order. In addition to the listing for these orders, the table includes the number of identified elements for the most commonly recovered genera within each of these orders. Data is from Steele (1986).

41 MC 222
BONE DENSITY BY LEVEL

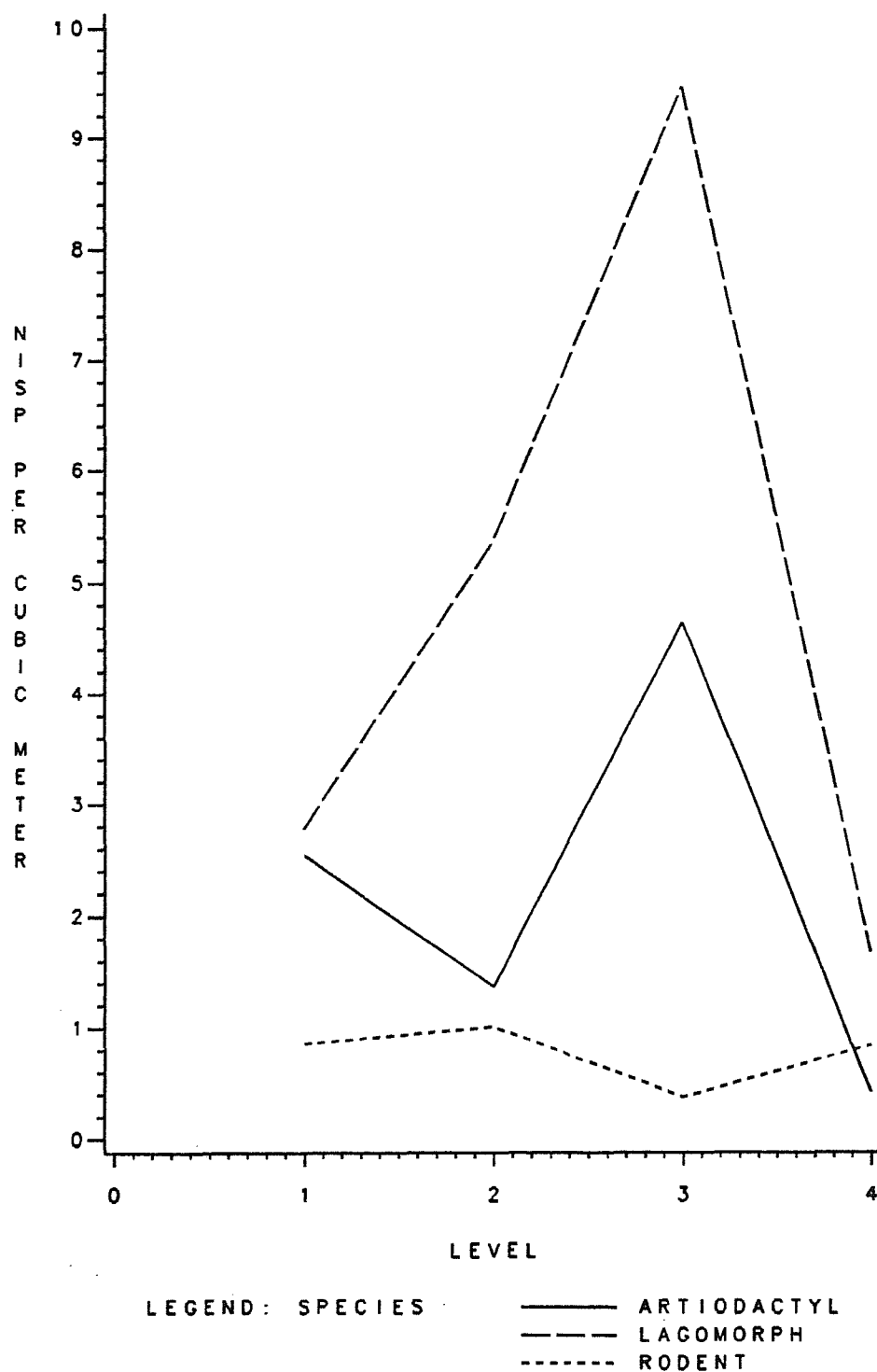


Figure 97. Distribution of the Number of Identified Elements per Cubic Meter (NISP) for the Artiodactyls, Lagomorphs, and Rodents Recovered from 41 MC 222. The number of identified elements and cubic meters excavated for each level are presented in Table 40. Levels are 10 cm in depth.

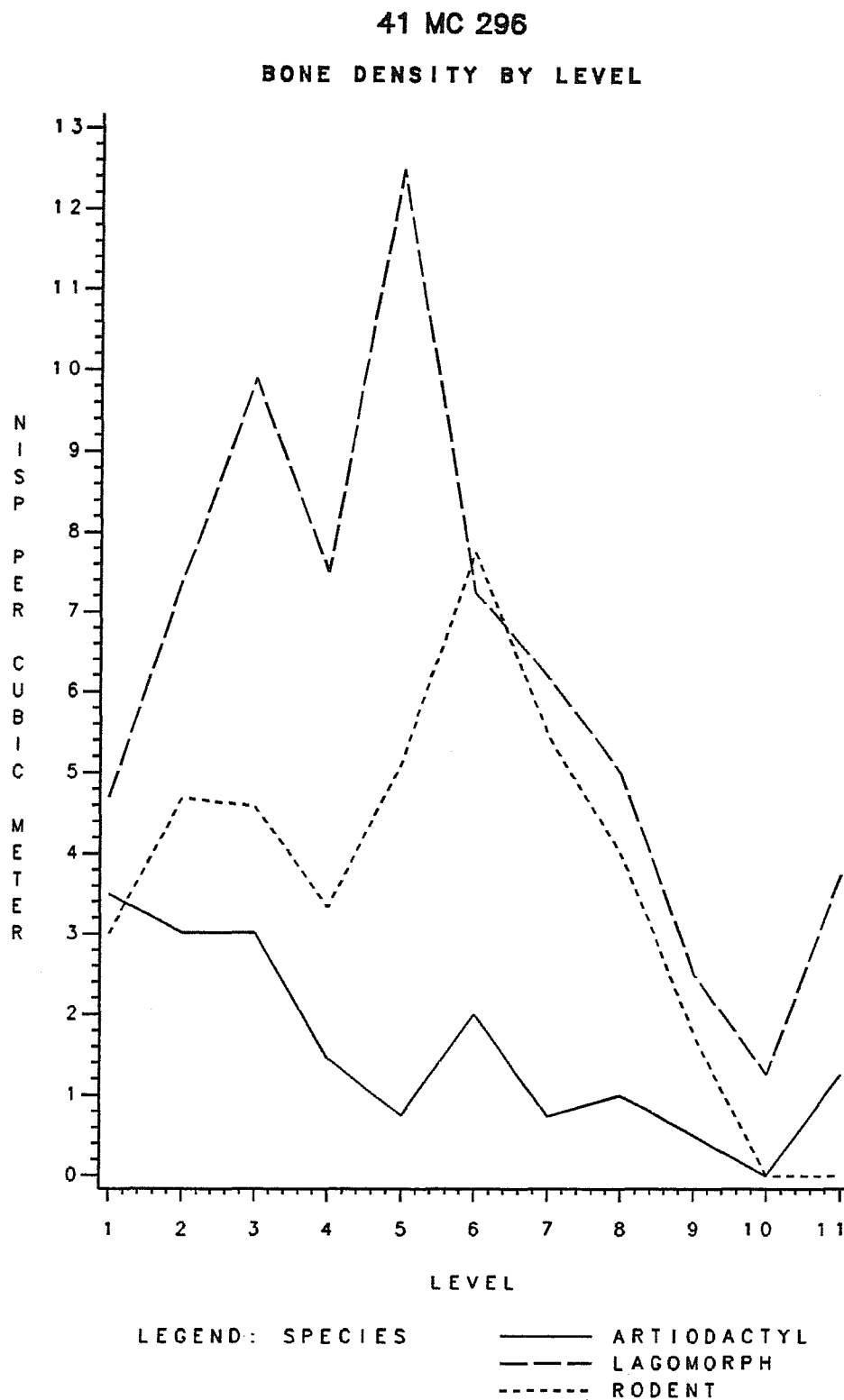


Figure 98. Distribution of the Number of Identified Elements per Cubic Meter (NISP) for the Artiodactyls, Lagomorphs, and Rodents Recovered from 41 MC 296. The number of identified elements and cubic meters excavated for each level are presented in Table 41.

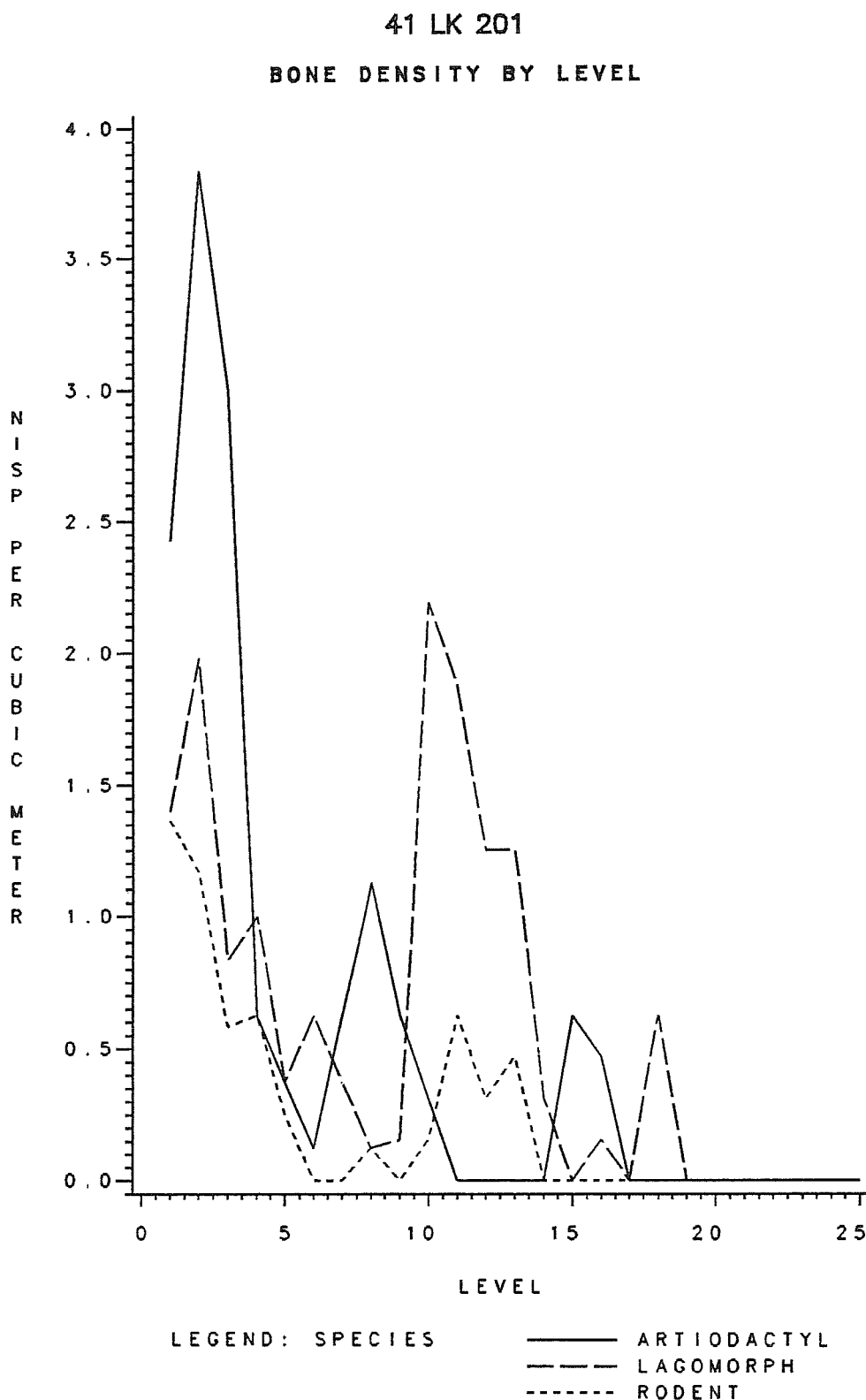


Figure 99. Distribution of the Number of Identified Elements per Cubic Meter (NISP) for the Artiodactyls, Lagomorphs, and Rodents from 41 LK 201. The number of identified elements and cubic meters excavated for each level are presented in Table 42.

TABLE 43. TWO-WAY TABLES OF BONE FREQUENCIES FOR THE ARTIODACTYLS, RODENTS, AND LAGOMORPHS RECOVERED FROM 41 MC 296 AND 41 LK 201

SITE 41 MC 296

	<u>Artiodactyls</u>	<u>Rodents</u>	<u>Lagomorphs</u>
Late Prehistoric			
Bone frequency	113	192	385
Expected frequency	99.8	222.2	368.0
Row percent	16.38	27.83	55.80
Column percent	80.14	61.15	74.04
Late Archaic			
Bone frequency	28	122	135
Expected frequency	41.2	91.8	152.0
Row percent	9.82	42.81	47.37
Column percent	19.86	38.85	25.96

Statistics for 2-way tables:

Chi-square = 22.730, Degrees of Freedom = 2, Probability = 0.0001

SITE 41 LK 201

	<u>Artiodactyls</u>	<u>Rodents</u>	<u>Lagomorphs</u>
Late Prehistoric			
Bone frequency	194	75	101
Expected frequency	176.4	69.0	124.6
Row percent	52.43	20.27	27.30
Column percent	86.22	35.23	63.52
Late Archaic			
Bone frequency	31	13	58
Expected frequency	48.6	19.0	34.4
Row percent	30.39	12.75	56.86
Column percent	13.78	14.77	36.48

Statistics for 2-way tables:

Chi-square = 31.325, Degrees of Freedom = 2, Probability = 0.0001

Note: The table for each site lists the observed frequency, the expected frequency, the row percent, and the column percent. The chi-square figure, degrees of freedom, and probability of significance is listed at the bottom of each table.

41 MC 296

PERCENTAGE OF ELEMENTS BY PERIOD

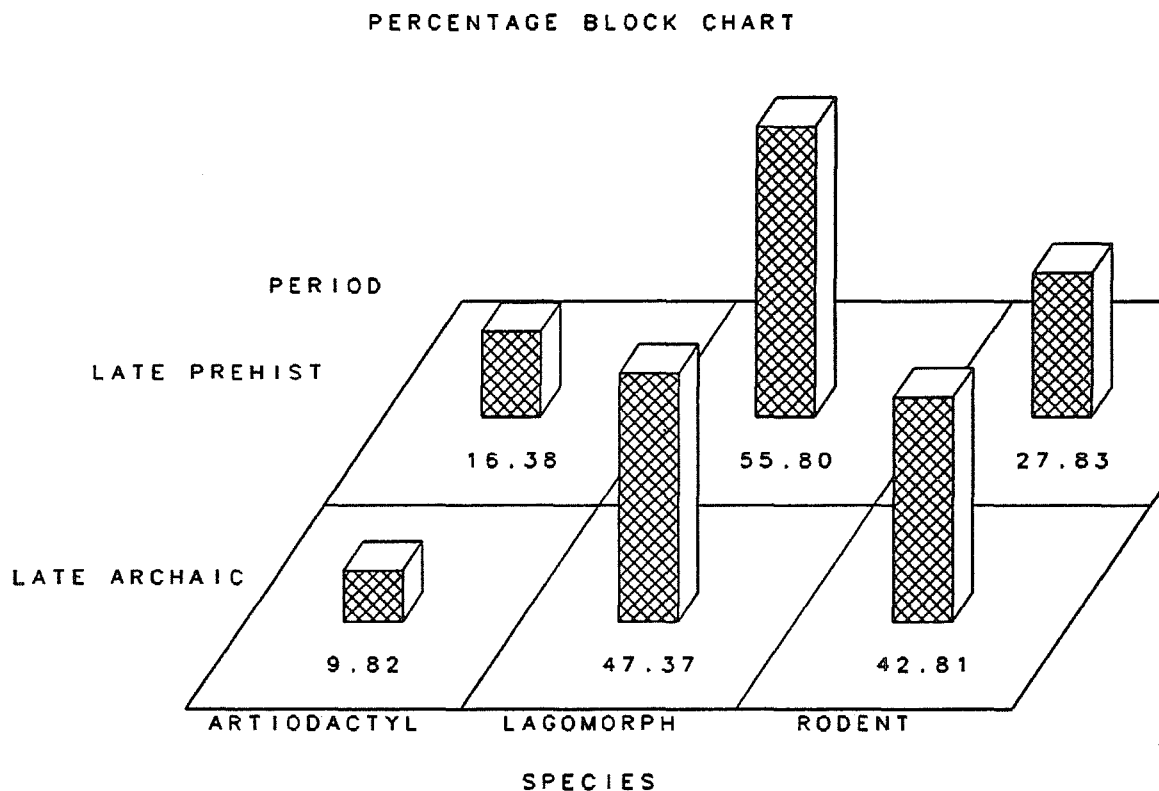


Figure 100. Block Chart Illustrating the Relative Percentages During the Late Prehistoric and Late Archaic of the Artiodactyls, Lagomorphs, and Rodents Recovered from 41 LK 296.

41 LK 201

PERCENTAGE OF ELEMENTS BY PERIOD

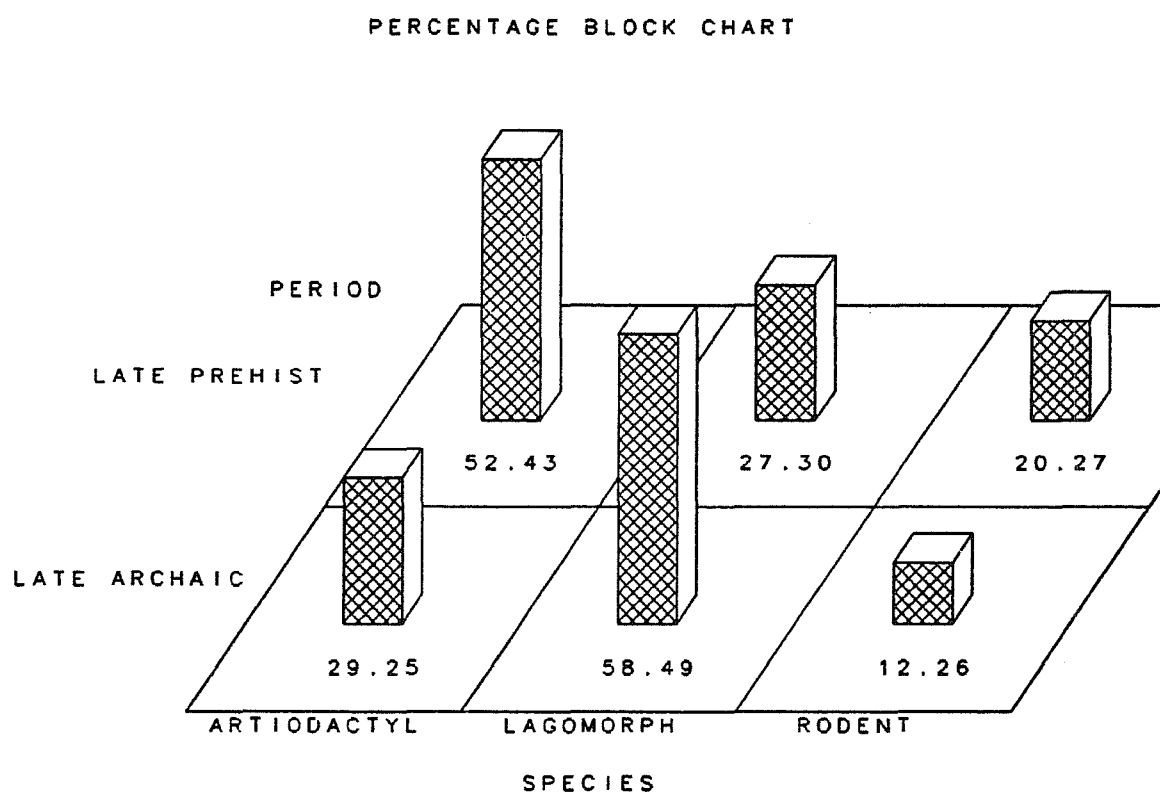


Figure 101. Block Chart Illustrating the Relative Percentages During the Late Prehistoric and Late Archaic of the Artiodactyls, Lagomorphs, and Rodents Recovered from 41 LK 201.

relative frequencies of the artiodactyls, rodents, and lagomorphs during the Late Prehistoric and Late Archaic times at 41 MC 296 and 41 LK 201. Examining 41 MC 296, first we see that artiodactyls account for 16.38% of the total of these three taxa during the Late Prehistoric, but only 9.82% during the Late Archaic. This drop is also seen at 41 LK 201 where the artiodactyls account for 52.43% of the faunal remains during the Late Prehistoric, but only 29.25% of this sample during the Late Archaic. For both of these sites, the differences in the frequencies of the three taxa (artiodactyls, rodents, and lagomorphs) between Late Prehistoric and Late Archaic times is highly significant (0.0001 probability). On the basis of this evidence then, we feel that a human dietary shift did indeed occur in the Choke Canyon basin between Late Archaic and Late Prehistoric times.

Now that such a dietary shift has been documented, a second related question can be raised. What prompted such a dietary shift? Is this a reflection of humans having increased artiodactyls, particularly bison, to hunt? Or, is it a reflection of increased efficiency of hunting, with the bow and arrow a constantly available resource? Certainly, one of the causes for the increased frequency of artiodactyl remains in the Late Prehistoric is the greater number of recovered bison elements during this time. Unfortunately, what prompted this increase in bison in particular, and artiodactyls in general, cannot be determined from the analysis of the faunal remains (see the discussion of bison in the description of taxa section).

Also, when we compare the artiodactyls, rodents, and lagomorphs during Late Prehistoric and Late Archaic times at the two sites there appears to have been spatially different foraging patterns for these taxa. At 41 MC 296 during the Late Archaic times, rodents and lagomorphs were both harvested in approximately equal proportions, 42.81% and 47.37%, respectively. During Late Prehistoric times, however, as artiodactyls became increasingly important lagomorphs also increased in frequency, but rodents dropped to approximately half their previous frequency. Different frequencies for these taxa are observable at 41 LK 201. Here, during the Late Archaic, artiodactyls account for 29.25% of these three taxa, but by Late Prehistoric times artiodactyls represented 52.43% of the sample. For the small mammals a different pattern emerges. During the Late Archaic, the lagomorphs accounted for 58.49% of the sample, and rodents accounted for 12.26%. During Late Prehistoric times at 41 LK 201, lagomorphs decreased in frequency and rodents increased in frequency, the opposite of the pattern seen at 41 MC 296.

When we examine the NISP counts for the genera of rodents and lagomorphs we see that both *Sylvilagus* and *Lepus* increase in frequency during the Late Prehistoric at 41 MC 296, and both *Neotoma* and *Sigmodon* decrease in frequency (see Table 41). At 41 LK 201 both genera of lagomorphs decrease in frequency, but it is only *Neotoma* among the rodents which increases dramatically, particularly in Levels 1 and 2 (Table 42). Interpretations of adaptive strategies based on these bone counts can only be tentative, but it appears that at 41 MC 296 a variety of habitats were equally utilized during the Late Archaic times for hunting the small mammals, and while small mammals decreased in importance during the Late Prehistoric times, no change in hunting patterns can be discerned. At 41 LK 201 though, it appears that the greater numbers of *Neotoma* taken during Late Prehistoric times may indicate a

greater utilization of the more arid shrub and grasslands at this time compared to the Late Archaic.

The above discussion has concentrated on identifying which species were most commonly hunted, and this provides one line of evidence as to which species were most important in the human diet. It is also possible to ask which species provided the most meat irrespective of how many animals were consumed, and which species provided the most consistently available meat. If we consider meat weight alone, then the artiodactyls in general and the deer in particular appear to have provided the most meat consumed at the site. Deer, however, may not have provided the most consistently available meat resource. Campbell and Campbell (1981:17-18) stated that the Mariame Indians of south Texas acquired deer only occasionally. If this were true for the inhabitants of 41 MC 222 and 41 MC 296 as well, then a more consistently available meat resource such as the lagomorphs and rodents, even if they represented smaller portions, would have been more important from a dietary viewpoint. A variety of authors have suggested this, including Hester (1975b, 1980), Hester and Hill (1975), Steele (1986), and Steele and Mokry (n.d.).

SEASONAL UTILIZATION OF SITES

Because of the well-known nomadic nature of hunters and gatherers one wonders if any of the examined sites within Choke Canyon basin were occupied only during specific seasons, or if the sites served as bases during more than one season. For 41 LK 201, there was substantial evidence for the site being occupied during the spring and early summer, and some slight evidence (a moderately worn deciduous premolar of a deer and an antler fragment which may have been in velvet at the time of the deer's death) indicated that the site was occupied during the late summer or fall as well. For 41 MC 222 and 41 MC 296, there is also abundant evidence for spring and/or summer occupation. The amphibians and reptiles are most active in the spring and summer and would in all probability have been collected then. Similarly, the crappie and freshwater drum (Levels 2, 4, and 8) suggest a late winter or early spring occupation of the site. A fall and/or winter occupation of 41 MC 296 (Level 9) is indicated by the presence of a left ulna of a duck (cf. pintail). Ducks, including the pintail, are migratory birds arriving in south Texas during the fall and leaving the area for their breeding grounds in the spring. During their time of Texas residency, they can be found along the streams and in the ponds throughout the area.

In summary then, it appears that the three sites examined all document spring and/or summer occupation. Additionally, sites 41 LK 201 and 41 MC 296 document occupation later in the year as well. While these bits of information indicate that these sites were at least occupied at these times, there are many questions left unanswered or at least inadequately answered. For instance, were 41 LK 201 and 41 MC 296 occupied throughout the year, or were they occupied intermittently at different times of the year? While the evidence is decidedly weak, the minimal remains of fall waterfowl and the virtual lack of evidence of deer killed while in antler suggest that the occupation of these sites in the latter part of the year was less common or less intense.

ENVIRONMENTAL RECONSTRUCTION

Reconstruction of environments around sites in Choke Canyon basin involve two different but related questions. The first concerns what kinds of habitats were available for the people to exploit. The second concerns what the general environmental conditions around the site were like.

Table 44,a lists animals which have reasonably specific habitat preferences and the types of habitats which they prefer. A review of the table illustrates that humans from both sites were hunting animals in all three habitats (grassland, riparian forest, and aquatic), just as the humans did who occupied 41 LK 201 (Steele 1986). In this respect, it is apparent that all three sites served as satisfactory bases from which the inhabitants could forage a mosaic of habitats.

Reconstructing the general environment of the site is a more complex issue. Today, fauna characteristic of the southern, western plains, and eastern parts of the northern hemisphere reside in Texas south of the Balcones Escarpment and east of the Nueces River. Recognizing the uniqueness of this biological diversity, Blair (1950, 1952) identified the region as the Tamaulipan Biotic Province. More recently, Steele (1986) addressed the question of the antiquity of the faunal diversity within the region. The presence of the southern fauna could be documented in Late Prehistoric times with *Baïomys*, *Liomys*, and *Dicotyles*, and in Late Archaic times with *Liomys* and *Dicotyles*. The eastern fauna was represented in the region during Late Prehistoric times by *Sylvilagus audubonii* and *Ondatra*, and during Late Archaic times by *S. audubonii* and *Microtus*. The plains fauna was represented in Late Prehistoric times by *Taxidea*, *Antilocapra*, and *Bison*, and in the Late Archaic by *Bison* alone. On the basis of this evidence, Steele concluded that the Tamaulipan Biotic Province (at least the faunal component) could be traced back to Late Archaic times, but that indeed the fauna was even more diverse than it is today. This antiquity suggests that impact upon the region by European culture was not the major force creating the Tamaulipan Biotic Province. The greater diversity of the faunal assemblage, Steele felt, indicated that milder summers and winters may have existed during these times than exist today.

Table 44,b summarizes the information for interpreting past environmental conditions at 41 MC 222 and 41 MC 296. As at 41 LK 201 fauna from all three regions are present, thus the Tamaulipan Biotic Province can be traced back into Late Prehistoric times at these sites. This supports the antiquity of the fauna to this point in time as had been proposed on the basis of the fauna from 41 LK 201. Unfortunately, the biotic province cannot be traced into Late Archaic times. The assemblage from 41 MC 222 contains only Late Prehistoric remains, and the Late Archaic assemblage from 41 MC 296 is too meager to determine the nature of the biotic province of the locality.

DESCRIPTION OF TAXA

Presented below is the description by taxon of the faunal remains recovered from 41 MC 222 and 41 MC 296. Following the documentation of the provenience and nature of the faunal remains recovered from each site are the notes about

TABLE 44. HABITATS AND FAUNAL AFFINITIES FROM 41 MC 222 AND 41 MC 296

a, HABITATS

Grassland/ Scrubland	41 MC 222	41 MC 296	Forest Forest/Edge	41 MC 222	41 MC 296	Aquatic	41 MC 222	41 MC 296
Antilocapra	-	x	Odocoileus	x	x	Testudinae	x	x
Bison	x	x	Didelphis	-	x	Alligator	x	-
Dicotyles	x	-				Osteichthyes	x	x
Spermophilus	x	x				Anas	-	x
Sigmodon	x	x				Anura	x	x
Neotoma	x	x						

b, FAUNA AFFINITIES

Plains Mammals			Mexican/ Southwestern Mammals			Eastern Mammals		
Antilocapra	-	x	Dicotyles	x	-	Scalopus	-	x
Bison	x	x				cf. S.		
						aquaticus	x	x

x = presence of the species for each site.

- = absence of the species for each site.

Note: Habitats: The three major kinds of habitats interpreted as present surrounding the site are listed. Below the habitat is a listing of the species associated with that habitat.

Fauna Affinities: Listing of taxa recovered from 41 MC 222 and 41 MC 296 which are associated with a specific biotic community are listed below the name of the community.

the species which are pertinent for interpreting human behavior or environmental reconstruction. Classification of the fishes follows Blair *et al.* (1968). Classification of the amphibians and reptiles follows Conant (1975). Classification of the birds follows Robbins, Brunn, and Zim (1966). Classification of the mammals follows Davis (1974), Hall (1981), Schmidly (1977, 1983), and Steele (1986). Where these authors differ we have followed Steele (1986). Tables 47 and 48, proveniences by lot number, are presented following the description of taxa.

PHYLUM CHORDATA

SUBPHYLUM VERTEBRATA class indeterminate (vertebrates)

Referred Material: From all levels and squares of both 41 MC 222 and 41 MC 296. Material consists of the fragments of unidentifiable bone.

Remarks: Material in this category includes bone from a wide variety of species, but the bulk of the material consists of fragmented long bone material from large mammals. Like the unidentified material from 41 LK 201, much of this material was broken while fresh, burned and scarred by humans during processing and consumption, and by nonhumans as the bone was gnawed upon. This large bone accumulation is typical of localities which have served as human habitation sites.

CLASS OSTEICHTHYES

ORDER indeterminate (bony fishes)

Referred Material from 41 MC 222: N101 E91, Lot 170; N102 E90, Lot 190; N103 E91, Lot 247. Material consists of vertebrae from Levels 1, 3, and 6.

Referred Material from 41 MC 296: Test Pit 1, Lots 2,4; N1022 E987, Lots 61, 62, 63, 64, 65, 67, 69; N1023 E985, Lot 78; N1023 E986, Lot 87; N1023 E989, Lot 238; N1024 E986, Lot 107; N1026 E997, Lot 154; N1027 E986, Lot 214. Material consists of vertebrae and one dorsal spine from Levels 1, 2, 3, 7, 8, and 9.

Remarks: The fish remains, mostly specimens of vertebral centra, can be classified as fish, but more specific classifications cannot be made. It is apparent, however, that a variety of sizes of fish were harvested, including some specimens too small to have been taken by spear or hook.

ORDER LEPISOSTEIFORMES

FAMILY LEPISOSTIDAE

Lepisosteus

SPECIES indeterminate (gar)

Referred Material from 41 MC 222: N99 E91, Lots 136, 137; N102 E88, Lots 179, 180; N102 E90, Lot 190; N102 E100, Lot 197; N103 E88, Lot 217; N103 E89, Lot 226; N103 E91, Lot 247. Material consists of scales and cranial fragments recovered from Levels 1-3, 6, 7, and 8.

Referred Material from 41 MC 296: Test Pit 1, Lots 1, 2, 3, 4; N1022 E985, Lot 47; N1022 E986, Lots 51, 52; N1022 E987, Lots 61, 62, 63, 64, 65, 67, 68; N1023 E985, Lots 70, 72, 75; N1023 E986, Lots 79, 80, 81, 87, 113, 114; N1023 E987, Lots 89, 92; N1023 E989, Lots 233, 238; N1024 E985, Lots 98, 99, 100, 102; N1024 E986, Lots 107, 109; N1024 E989, Lot 212; N1026 E986, Lots 213, 228; N1027 E986, Lot 214. Material consists of scales and cranial fragments recovered from Levels 1-8.

Remarks: While the family of gars is monogeneric, there are three species of gar within the state of Texas. Distinguishing these on the basis of the fragmentary remains recovered was not possible.

ORDER CYPRINIFORMES

FAMILY ICTALURIDAE

GENUS indeterminate (catfish)

Referred Material from 41 MC 222: N101 E91, Lot 170; N102 E90, Lot 190. Material consists of vertebrae from Levels 1 and 3.

Referred Material from 41 MC 296: Test Pit 1, Lots 2, 4; N1022 E987, Lots 61, 62, 63, 64, 65, 66, 67, 69; N1023 E985, Lot 78; N1023 E986, Lot 87; N1023 E987, Lots 94, 95; N1023 E989, Lot 238; N1024 E985, Lot 103; N1023 E986, Lot 113; N1026 E986, Lot 228; N1026 E997, Lot 154. Material consists of vertebrae from Levels 1-9.

Remarks: There are six genera and 24 species of catfish found in the southern half of the United States, and distinguishing which of these were represented by the fragmentary remains was not possible.

ORDER PERCIFORMES

FAMILY CENTRARCHIDAE

cf. *Pomoxis* (crappie)

Referred Material from 41 MC 296: N1022 E987, Lot 63. Material consists of an otolith from Level 3.

Remarks: The family Centrarchidae, the sunfishes, is a large family, and one abundantly represented in Texas. The otolith recovered from the site has been tentatively identified as crappie which is one of the larger species. Crappie spawn in the shallow waters of streams during the spring in south Texas today where they can be relatively easily harvested. If the identification of the otolith is correct, then this specimen may indicate that 41 MC 296 was at least occupied in the spring.

FAMILY SCIAENIDAE

Aplodinotus grunniens (freshwater drum fish)

Referred Material from 41 MC 296: N1022 E987, Lot 68; N1024 E986, Lot 110; N1026 E999, Lot 163. Material consists of a maxillary fragment and two dorsal spines recovered from Levels 2, 4, and 8.

Remarks: Like crappie, freshwater drum spawn in the shallower waters of the streams in the spring where they can most easily be harvested, so these specimens too may suggest that 41 MC 296 was occupied in the spring.

CLASS AVES

ORDER indeterminate (birds)

Referred Material from 41 MC 296: N1022 E985, Lot 43; N1022 E987, Lots 64, 65, 66, 67, 68; N1023 E985, Lot 74; N1023 E987, Lot 89; N1023 E987, Lot 73; N1024 E986, Lot 108; N1024 E989, Lot 227. Material consists of long bone fragments from Levels 1-8.

Remarks: These remains consist of bird bones unassignable to family. Based upon size several species are represented in the faunal assemblage.

ORDER ANSERIFORMES

FAMILY ANATIDAE

Anas cf. A. acuta (pintail duck)

Referred Material from 41 MC 296: Test Pit 1, Lot 8. Material consists of a left ulna from Level 8.

Remarks: The surface feeding ducks comprising this genus are winter migrants to the state, so recovery of this material within the faunal assemblage from 41 MC 296 is a strong indication that the site was occupied sometime between early fall and early spring. The pintail duck more commonly winters along the coastal margin near the bays, but they may also be found inland.

ORDER GALLIFORMES

FAMILY MELEAGRIDAE

Meleagris gallapavo (wild turkey)

Referred Material from 41 MC 296: Test Pit 1, Lot 4; N1023 E985, Lot 73; N1023 E989, Lot 238; N1024 E985, Lot 104; N1024 E986, Lots 110, 112; N1024, E989, Lot 212. Material consists of a left humerus, a left metacarpus, a right femur, two metatarsals, a tibia, and a spur. Material was recovered from Levels 2, 3, 4, 6, and 7.

Remarks: Positive identification of turkey remains can usually be made because of the large size of the bird and because the family is monotypic.

CLASS AMPHIBIA

ORDER ANURA

FAMILY indeterminate (frogs and toads)

Referred Material from 41 MC 222: N107 E87, Lot 259. Material consists of a long bone from Level 3.

Referred Material from 41 MC 296: N1022 E987, Lots 65, 66, 67; N1026 E997, Lot 151; N1027 E998, Lot 177; N1023 E989, Lot 238; N1024 E986, Lot 109. Material consists of long bone fragments from Levels 2, 3, 4, 5, 6, 7.

Remarks: Remains of frogs and toads, while seasonally abundant and relatively easy to harvest, rarely are recovered in faunal assemblages because of the small and fragile nature of the

skeletal elements. Like the fish remains, these amphibian remains suggest an occupation of the two sites during the spring, summer, or early fall portion of the year.

FAMILY RANIDAE

Rana

SPECIES indeterminate (frogs)

Referred Material from 41 MC 296: N1022 E989, Lot 226; N1023 E989, Lot 238; N1024 E986, Lot 109; N1026 E997, Lot 149. Material consists of long bone elements from Levels 1, 2, and 3.

Remarks: While most of this material could not be identified to species, three long bones from Level 1 (N1022 E989, Lot 226) and one vertebra from Level 2 (N1026 E997, Lot 149) appear to be within the size range of **Rana catesbiana**.

CLASS REPTILIA

ORDER CROCODYLIA

FAMILY ALLIGATORIDAE

Alligator mississippiensis (American alligator)

Referred Material from 41 MC 222: N125 E72, Lot 291. Material consists of a single dermal scute from Level 1.

Remarks: Alligators are present today in the Nueces River drainage so their presence at the site is not unexpected. It is interesting to note that only the scutes were recovered, and this was all that was identified as alligator from 41 LK 201. The presence of scutes alone could be nothing more than a sampling bias since far more dermal scutes would be available for recovery than cranial and postcranial skeletal material. On the other hand, if the pattern of finding only scutes continues at other sites, it may reflect a preferential use of alligator skins.

ORDER SQUAMATA

SUBORDER LACERTILIA

FAMILY IGUANIDAE

GENUS indeterminate (lizards)

Referred Material from 41 MC 222: N99 E91, Lot 138. Material consists of a small vertebral centrum and a long bone fragment from Level 3.

Referred Material from 41 MC 296: N1022 E987, Lots 62, 63, 65, 66, 67; N1023 E989, Lot 233. Material consists of small vertebral centra and long bone fragments from Levels 2, 3, 5, 6, and 7.

Remarks: Little can be inferred from these limited remains other than that the human inhabitants, and probably their domesticated dogs if they were present at the site, were harvesting the reptile fauna available to them as well as the mammalian fauna.

Sceloporus

SPECIES indeterminate (spiny lizards)

Referred Material from 41 MC 296: N1022 E987, Lots 62, 63, 64, 69. Material consists of mandible and vertebral fragments from Levels 2, 3, 4, and 9.

Remarks: **Sceloporus** is a common genus of lizard found throughout the southwest. Of the 10 species listed for this genus by Conant (1975), six are found in the general vicinity of the site.

SUBORDER SERPENTES

FAMILY indeterminate (snakes)

Referred Material from 41 MC 222: N98 E86, Lot 117. Material consists of a vertebral centrum from Level 3.

Referred Material from 41 MC 296: N1022 E985, Lot 45; N1022 E986, Lots 51, 52, 54, 55; N1022 E987, Lots 61, 62, 63, 64, 65, 66, 67, 68, 69; N1023 E985, Lot 74; N1023 E986, Lots 80, 82, 84, 85, 87; N1024 E985, Lots 98, 99, 105; N1024 E986, Lot 112; N1026 E986, Lot 213; N1026 E998, Lot 155; N1027 E999, Lot 185. Material consists of isolated vertebrae recovered from Levels 1-9.

Remarks: Although only the genus *Crotalus* has been identified at this taxonomic level, the range of size in the vertebrae included in the assemblage of unidentified snake remains clearly indicates that a variety of these reptiles were being harvested.

FAMILY CROTALIDAE

Crotalus

SPECIES indeterminate (rattlesnakes)

Referred Material from 41 MC 222: N102 E91, Lot 204; N103 E91, Lot 247. Material consists of vertebral elements from Levels 2 and 6.

Referred Material from 41 MC 296: Test Pit 1, Lot 6; Test Pit 2, Lot 21; N1022 E987, Lots 65, 69; N1023 E985, Lots 70, 71, 72, 76; N1023 E986, Lot 86; N1023 E987, Lots 89, 90; N1023 E989, Lots 231, 233, 238, 242; N1024 E985, Lots 100, 102; N1024 E986, Lot 114; N1024 E989, Lots 195, 212, 237; N1026 E978, Lot 197; N1026 E998, Lot 156; N1026 E999, Lots 162, 163; N1027 E997, Lot 170. Material consists of vertebrae recovered from Levels 1-9.

Remarks: Like amphibians, the snakes are more active in the spring, summer, and early fall portions of the year, so the presence of remains of snakes in the faunal assemblages of both sites indicates that they were occupied during this time period.

ORDER TESTUDINES

FAMILY indeterminate (turtles)

Referred Material from 41 MC 222: N99 E90, Lot 133; N102 E90, Lot 190; N102 E91, Lots 206, 207; N103 E89, Lots 221, 225; N103 E90, Lot 228; N103 E91, Lot 243; N107 E87, Lot 259; N113 E83, Lot 277. Material consists of scute fragments from Levels 1-5 and 7.

Referred Material from 41 MC 296: Test Pit 1, Lots 2, 3, 5, 6, 7; Test Pit 2, Lots 16, 17, 18, 20, 41; N1022 E985, Lots 41, 42, 44, 45, 48; N1022 E986, Lots 52, 53, 54, 55, 56, 57, 59; N1022 E987, Lots 63, 65, 67, 68, 69; N1023 E985, Lots 70, 71, 74, 76, 78; N1023 E986, Lots 82, 84, 86, 88; N1023 E987, Lots 90, 91, 92, 93, 94, 96, 97; N1023 E989, Lots 231, 233, 242; N1024 E985, Lots 98, 99, 100, 101, 102, 103, 104, 105; N1024 E986, Lots 102, 109, 111, 112, 113; N1024 E989, Lots 212, 237; N1026 E978, Lots 197, 209, 211, 229; N1026 E986, Lot 228; N1026 E995, Lots 218, 241; N1026 E997, Lots 150, 151, 153, 154; N1026 E998,

Lots 156, 157, 158, 159, 161; N1026 E999, Lots 162, 163, 164, 167; N1027 E978, Lots 215, 224, 232; N1027 E986, Lot 234; N1027 E995, Lot 222; N1027 E997, Lots 171, 173, 174; N1027 E998, Lots 177, 179; N1027 E998, Lots 180, 181; N1027 E999, Lots 185, 187, 188, 189. Material consists of scute fragments from Levels 1-9 and 11.

Remarks: Turtle shell fragments are scattered throughout both sites, and in all layers. It is difficult to evaluate the importance of turtles in human diets based upon an examination of the frequency of shell remains for two reasons. The first reason is that fragmented shells result in a high number of identifiable elements per individual, thus in raw bone counts turtles are overrepresented. It is also difficult to assess the dietary importance of turtle because the shells were used for tools and ornaments. Like the other cold-blooded vertebrates, turtles are usually most active in the spring, summer, and early fall and would therefore more likely be harvested during this time.

FAMILY EMYDIDAE

Chrysemys

SPECIES indeterminate (water turtle)

Referred Material from 41 MC 222: N102 E90, Lot 190; N102 E91, Lot 206; N103 E90, Lot 233; N103 E91, Lot 246. Material consists of scutes from Levels 3-5.

Referred Material from 41 MC 296: Test Pit 1, Lot 5; Test Pit 2, Lots 21, 24; N1022 E985, Lots 42, 43; N1022 E986, Lots 51, 58; N1022 E987, Lots 61, 62, 64, 66, 67; N1023 E985, Lots 72, 73, 74, 75, 77; N1023 E986, Lots 79, 80, 81, 85; N1023 E987, Lot 89; N1023 E989, Lot 238; N1024 E985, Lots 99, 102; N1024 E986, Lots 107, 110; N1026 E986, Lots 213, 236; N1026 E997, Lot 152; N1026 E998, Lots 156, 160; N1027 E978, Lot 225; N1027 E986, Lots 199, 214, 223. Material consists of carapace and plastron fragments from Levels 1-8 and 10.

Remarks: There are two species of *Chrysemys* which occur within the state today, both species are aquatic in their habitat preference. It is interesting to note that more elements were identifiable to this taxon from 41 MC 296 than either 41 MC 222 or 41 LK 201. This may suggest that 41 MC 296 was located nearer slow moving or stagnant water which is the preferred habitat for *Chrysemys*.

Terrapene

SPECIES indeterminate (box turtles)

Referred Material from 41 MC 222: N98 E90, Lot 119; N99 E86, Lot 127; N101 E90, Lot 168. Material consists of carapace and plastron shell fragments from Levels 2, 3, and 4.

Referred Material from 41 MC 296: N1023 E985, Lots 71, 75, 77; N1027 E999, Lot 185. Material consists of shell and postcranial skeletal fragments from Levels 2, 3, 6, and 8.

Remarks: There are two species of box turtles in Texas, **Terrapene ornata** and **T. carolina**. Both of these species are terrestrial, but **T. carolina** is more commonly found in wooded terrain while **T. ornata** is a resident of the more arid prairies. Today, only **T. ornata** is found in the vicinity of the sites. Identification to species was not possible for the recovered fragmentary remains.

FAMILY KINOSTERNIDAE

Kinosternon

SPECIES indeterminate (mud turtle)

Referred Material from 41 MC 296: N1024 E986, Lot 112. Material consists of one femur fragment from Level 6.

Remarks: There are two species of **Kinosternon** resident in Texas today, **K. flavescens** and **K. subrubrum**. Identification to species was not possible for the recovered remains.

FAMILY TRIONYCHIDAE

Trionyx cf. T. spiniferus (spiny softshell turtle)

Referred Material from 41 MC 296: Test Pit 1, Lot 4; N1022 E985, Lot 43. Material consists of shell fragments from Levels 3 and 4.

Remarks: Shell material of the spiny softshell turtle is readily identifiable so the meager amount of material recovered from these two sites probably indicates that this species of turtle was not harvested as abundantly at these sites as the species was at 41 LK 201.

CLASS MAMMALIA

ORDER MARSUPIALIA

FAMILY DIDELPHIDAE

Didelphis cf. D. virginiana (Virginia opossum)

Referred Material from 41 MC 296: N1026 E997, Lot 154. Material consists of a left mandible from Level 7.

Remarks: The limited number of remains representing arboreal species was noted in the 41 LK 201 faunal assemblage, and it was suggested that this reflected underharvesting of these species by the human occupants of the site (Steele 1986). The suggested reason for this underrepresentation was ineffective hunting techniques for these species or not hunting when these species were active. The underrepresentation of nocturnal, arboreal, and fossorial species also is a pattern seen at 41 MC 222 and 41 MC 296 as well. The consistency in the pattern among the three sites seems to support the hypothesis.

ORDER ARTIODACTYLA

FAMILY indeterminate (cloven-hooved ungulates)

Referred Material from 41 MC 222: N97 E86, Lot 104; N101 E89, Lot 162; N101 E90, Lot 167. Material consists of long bone fragments from Levels 1 and 3.

Referred Material from 41 MC 296: Test Pit 1, Lots 1, 2, 4; Test Pit 2, Lot 20; N1022 E985, Lots 41, 42; N1022 E986, Lots 51, 56, 57; N1022 E987, Lots 61, 63, 68; N1022 E989, Lot 226; N1023 E985, Lot 71; N1023 E986, Lot 81; N1023 E987, Lot 89; N1024 E985, Lots 99, 102, 103; N1024 E986, Lot 107; N1026 E986, Lot 213; N1027 E986, Lot 214. Material consists of long bone fragments from Levels 1-4, 6, 7, and 8.

Remarks: The unidentified artiodactyl remains indicate the degree of marrow processing practiced by the human inhabitants at the two sites. Most of the fragments represent greatly reduced long bone elements which were broken while the bones were green. This pattern of breakage has been associated with carnivore bone reduction performed by nonhuman carnivores, but the bone in this case is commonly scarred with gnaw marks. The bone from 41 MC 222 and 41 MC 296 showed little evidence of gnaw marks, which further supports the contention that the bone reducers were human.

FAMILY ANTILOCAPRIDAE

Antilocapra americana (pronghorn)

Referred Material from 41 MC 296: Test Pit 1, Lot 1; N1023 E985, Lot 72; N1026 E986, Lot 213. Material consists of two upper molars and a left metatarsal fragment from Levels 1-3.

Remarks: The pronghorn, although not found in the region today, was a part of the local fauna within historic times and has been recorded in faunal assemblages from 41 LK 201. This species is associated with grassland habitat.

FAMILY BOVIDAE

Bison bison (bison)

Referred Material from 41 MC 222: N97 E86, Lot 104; N97 E86-87, Lot 114; N99 E89, Lot 130; N100 E89, Lot 142; N100 E90, Lot 148; N101 E89, Lots 162, 163; N104 E89, Lots 182, 183; N103 E89, Lot 221; N103 E90, Lot 233; N125 E72, Lot 290. Material consists of a left scaphoid, a left trapezoid, distal phalanges, sesmoids, unidentified carpal fragments, a medial phalanx, unidentified long bone fragments, a proximal femur fragment, a right humerus fragment, two mandibular incisors, and one unidentified tooth fragment from Levels 1, 2, 3, 4, and 5.

Referred Material from 41 MC 296: Test Pit 1, Lot 2; Test Pit 2, Lots 16, 40; N1022 E987, Lot 63; N1023 E985, Lot 70; N1023 E986, Lots 79, 87; N1023 E989, Lots 238, 242; N1024 E989, Lots 195, 212, 227, 237; N1027 E986, Lots 199, 223. Material consists of fragments of phalanges, metapodials, vertebra centra, long bone shaft fragments, and isolated teeth from Levels 1-4, 8, and 11.

Remarks: The bison remains appear in all levels associated with Late Prehistoric times at both sites, but appear less frequently in the Late Archaic levels at 41 MC 296. This pattern mirrors the temporal distribution of bison remains at 41 LK 201 and appears to be a reflection of relative abundance in the sample. Two alternative explanations have been proposed to explain this pattern of abundance and scarcity of bison remains. Dillehay (1974) proposed that there were three periods during which bison were present on the southern plains and two periods during which they were scarce or absent. He felt that this pattern was a reflection of changing climatic conditions in the southern plains. On the basis of a more detailed review of the evidence in north-central Texas, Lynott (1979) felt that the evidence in his study area could not be used to support Dillehay's hypothesis. Rather, Lynott felt that the evidence only suggested that the bison, which were

generally scarce, were relatively more abundant from A.D. 1200 to 1600. The data from 41 LK 201, 41 MC 222, and 41 MC 296 substantiate the relative scarcity of bison in the Late Archaic and the relatively greater abundance in the Late Prehistoric time periods. Dibble (1968:73) also noted the relative scarcity of bison remains during the Late Archaic in central Texas and suggested that the bison probably represented a relative minor part of the biomass in central Texas, and also was of minor significance in the dietary regimen of the hunters and gatherers of the region. Dibble's conclusions seem to be valid for south Texas as well. What the data does not do is contradict Dillehay's model or provide sufficient data to confirm Dillehay's model.

FAMILY CERVIDAE

Odocoileus virginianus (white-tailed deer)

Referred Material from 41 MC 222: N99 E86, Lot 126; N99 E89, Lot 131; N99 E90, Lot 133; N100 E91, Lot 155; N101 E89, Lot 163; N101 E90, Lot 167; N101 E91, Lot 172; N103 E88, Lot 215; N103 E89, Lots 223, 224, 225; N103 E91, Lot 245; N107 E87, Lot 259. Material consists of a right and a left astragali, a left calcaneus, distal and medial phalanges, sesmoid elements, a right tibia fragment, a left metatarsal fragment, a fragment of the basicranium, and an antler tyne collected from Levels 2, 3, 4, 5, 6, and 7.

Referred Material from 41 MC 296: Test Pit 1, Lots 2, 3, 6; Test Pit 2, Lots 18, 19, 20, 21; N1022 E985, Lots 42, 47, 49; N1022 E986, Lots 51, 52, 59; N1022 E987, Lots 63, 64, 66; N1022 E989, Lot 194; N1023 E985, Lots 70, 74; N1023 E986, Lots 80, 85; N1023 E987, Lots 93, 96; N1023 E989, Lots 223, 238, 242; N1024 E985, Lots 98, 99, 101, 104, 105; N1024 E986, Lots 107, 112; N1024 E989, Lot 237; N1026 E978, Lots 209, 229; N1026 E985, Lot 213; N1026 E995, Lot 217; N1027 E978, Lots 223, 224; N1027 E986, Lot 214; N1027 E999, Lot 184. Material consists of dental, cranial, and postcranial skeletal fragments from Levels 1-9.

Remarks: While the referred material could be assigned to the genus on the basis of structural features, identification of the material to *O. virginianus* is presumed since the other species of deer within the state, the mule deer, is restricted today to the Big Bend and High Plains regions of the state.

The remains of the white-tailed deer are the most abundant of any of the larger sized mammals. It is also apparent that whole carcasses of the animals were consistently returned to the site since a wide range of skeletal elements have been recovered in the faunal assemblage. These two lines of evidence support the common contention that deer were one of

the most important faunal resources for human inhabitants in south Texas.

Most of the deer remains are from adult deer, but one specimen (41 MC 296, N1024 E989, Lot 212, Level 2) is a femur fragment with an unfused epiphysis, a condition found in subadult deer. The element, however, was from a deer older than a fawn so no statement can be made as to the season when the animal was taken.

Two specimens (41 MC 222, N99 E90, Lot 13 and 41 MC 296, N1023 E989, Lot 242) were modified antler tynes which document the use of antler remains as tools at these sites.

FAMILY TAYASSUIDAE

Dicotyles tajacu (collared peccary)

Referred Material from 41 MC 222: N100 E90, Lot 148; N101 E89, Lot 162; N101 E90, Lot 167; N102 E90, Lot 192. Material consists of a left third metacarpal, a carpal element, a distal phalange, a distal fragment of a metapodial, and a distal metapodial epiphysis from Levels 1, 3, and 4.

Remarks: The recognition that the collared peccary was endemic in south Texas during the Late Prehistoric and possibly the Late Archaic is a relatively recent discovery. To date, material representing this species has been recovered from 41 MC 222, 41 LK 201 (Steele 1986), 41 NU 102 (Steele and Mokry n.d.), 41 NU 103 (Steele and Mokry n.d.), and 41 KL 13 (Herman Smith, personal communication 1983). While the remains from no one site are frequent enough to suggest that the peccary was a major component of the diet of the peoples, the fact that the peccary has been recovered from five sites does indicate that the species was common enough in the region to have been hunted.

ORDER CARNIVORA

FAMILY CANIDAE

Canis

SPECIES indeterminate (coyotes, dogs, and wolves)

Referred Material from 41 MC 222: N103 E88, Lot 215; N103 E89, Lots 223, 225; N103 E91, Lot 250. Material consists of a tarsal element, one distal phalange, and one medial phalange from Levels 5 and 7.

Referred Material from 41 MC 296: Test Pit 1, Lots 4, 8; N1022 E985, Lot 41; N1022 E986, Lots 51, 54; N1022 E987, Lots 63, 68; N1027 E986, Lot 214. Material consists of fragments of distal phalanges, metapodials, and a right second lower molar from Levels 1-4 and 8.

Remarks: Distinguishing the species of *Canis* on the basis of bony remains is extremely difficult. The material recovered from both 41 MC 222 and 41 MC 296 fall within the size range of the coyote as well as medium to large size domesticated dogs.

FAMILY FELIDAE

Felis cf. *F. rufus* (bobcat)

Referred Material from 41 MC 222: N102 E90, Lot 191; N103 E88, Lot 215. Material consists of one proximal metacarpal and one distal metapodial from Levels 3 and 5.

Remarks: These remains have been tentatively referred to as bobcat because of the similarity in size and structure. The species is present throughout Texas today and has been reported from the region during late Pleistocene times (Lundelius 1972) and from Late Archaic levels of the Holocene (Steele 1986).

ORDER INSECTIVORA

FAMILY TALPIDAE

Scalopus cf. *S. aquaticus* (eastern mole)

Referred Material from 41 MC 296: N1023 E985, Lot 74; N1026 E997, Lot 151. Material consists of a right mandibular fragment and a right humerus from Levels 4 and 5.

Remarks: The eastern mole prefers loose, well-drained soils because of their burrowing habitats. For south Texas these conditions are usually found near waterways or in wooded patches.

ORDER LAGOMORPHA

FAMILY LEPORIDAE

cf. *Lepus californicus* (jackrabbit)

Referred Material from 41 MC 222: N98 E91, Lot 123; N99 E86, Lot 127; N99 E89, Lot 131; N99 E90, Lot 133; N99 E91,

Lots 136, 138; N100 E86, Lots 140, 141; N100 E89, Lots 143, 144, 145; N100 E90, Lots 147, 148; N100 E91, Lots 154, 155; N101 E88, Lots 159, 160; N101 E90, Lots 166, 167, 168; N101 E91, Lots 172, 173; N102 E89, Lots 183, 184, 186; N102 E90, Lot 190; N102 E91, Lots 206, 207; N102 E100, Lot 197; N103 E88, Lots 215, 216, 217; N103 E89, Lot 223; N103 E90, Lots 231, 232, 233, 235; N103 E91, Lots 245, 246; N107 E87, Lot 259; N110 E87, Lots 264, 266. Material consists of cranial, dental, and postcranial remains from Levels 1-7.

Referred Material from 41 MC 296: Test Pit 1, Lots 1, 2, 3, 5, 6, 7, 8; Test Pit 2, Lots 17, 18, 19, 20, 21, 22, 40; N1022 E985, Lots 41, 43, 44, 45, 47, 50; N1022 E986, Lots 51, 52, 54, 55, 56, 57, 59; N1022 E987, Lots 61, 62, 63, 64, 65, 66, 67, 69; N1023 E985, Lots 70, 71, 73, 74, 76; N1023 E986, Lots 79, 80, 82, 85, 87; N1023 E987, Lots 91, 92, 93, 94, 95, 97; N1023 E989, Lots 233, 238, 242; N1024 E985, Lots 98, 99, 100, 101, 102, 103, 104, 105; N1024 E986, Lots 108, 109, 110, 111, 112, 113, 114; N1024 E989, Lot 237; N1026 E978, Lots 198, 208, 211; N1026 E985, Lots 213, 228, 236; N1026 E995, Lots 217, 218, 239; N1026 E997, Lots 148, 150, 151, 152, 153; N1024 E998, Lots 157, 158, 159; N1026 E999, Lots 163, 164, 165, 166, 167; N1026 E978, Lots 215, 224, 225; N1027 E986, Lots 214, 223; N1027 E995, Lots 219, 221, 222; N1027 E997, Lots 170, 173, 174, 175; N1027 E998, Lots 177, 178, 180, 181; N1027 E999, Lots 185, 186, 187, 188. Material consists of fragments of dental, cranial, and postcranial skeletal elements recovered from Levels 1-11.

Remarks: Hulbert (1979) has noted the difficulty in distinguishing between *Lepus* and the largest species of *Sylvilagus*, *S. aquaticus*. For this reason the identification of these remains as *Lepus* is tentative. Where tentative identifications for *S. aquaticus* were made, they were included in that genus sample. While there are six species of jackrabbits recognized by Hall (1981), only the black-tailed jackrabbit is found within the state today, and the remains recovered from both sites compare favorably in size with this species. This species is predominately an inhabitant of the prairie and scrublands, and its probable presence in the two sites indicates that these habitats were present in the region during prehistoric times as well.

Sylvilagus

SPECIES indeterminate (cottontail rabbits)

Referred Material from 41 MC 222: N98 E90, Lot 118; N98 E91, Lots 121, 124; N99 E86, Lot 126; N99 E89, Lot 129; N99 E91, Lot 137; N101 E89, Lot 164; N101 E90, Lots 167, 168, 169; N101 E91, Lots 171, 172, 173, 174; N102 E89, Lots 182, 183, 184; N102 E90, Lots 188, 190, 192, 193, 194; N102 E91,

Lots 206, 207; N102 E100, Lot 196; N103 E88, Lots 216, 217; N103 E89, Lots 220, 224; N103 E90, Lots 233, 234, 235; N103 E91, Lots 241, 243, 245, 246, 247, 248; N104 E85, Lot 255; N107 E87, Lot 259; N110 E87, Lots 261, 264, 266; N112 E79, Lot 269; N119 E80, Lot 283. Material consists of cranial, dental, and postcranial remains from Levels 1-7.

Referred Material from 41 MC 296: Test Pit 1, Lots 3, 4, 5, 6, 8, 10; Test Pit 2, Lots 17, 18, 19, 21, 40; N1022 E985, Lots 41, 42, 43, 44, 45; N1022 E986, Lots 51, 53, 54, 55, 56, 57; N1022 E987, Lots 61, 62, 66, 67, 68, 69; N1022 E989, Lots 63, 64, 65; N1023 E985, Lots 70, 71, 72, 73, 74, 75, 76, 77, 78; N1023 E986, Lots 79, 80, 81, 82, 84, 85, 86; N1023 E987, Lots 91, 92, 93; N1023 E989, Lots 231, 233, 238, 242; N1024 E985, Lots 98, 100, 101, 102, 103, 104, 105; N1024 E986, Lots 108, 109, 110, 111, 114; N1024 E989, Lots 212, 227, 237; N1026 E978, Lots 197, 198, 208, 211, 229; N1026 E985, Lots 213, 228; N1026 E995, Lots 217, 241; N1026 E997, Lots 149, 150, 151, 152, 153, 154; N1026 E998, Lots 156, 157, 158, 159, 160; N1026 E999, Lots 163, 164, 165, 166, 167; N1027 E978, Lots 210, 215, 224, 225, 232; N1027 E995, Lot 221; N1027 E986, Lots 223, 224; N1027 E997, Lots 171, 173, 174, 175; N1027 E998, Lots 178, 179, 182; N1027 E999, Lots 183, 185, 186, 187, 188. Material consists of dental, cranial, and postcranial skeletal elements from Levels 1-11.

Remarks: Steele (1986) reviewed the taxonomy of the cottontail rabbits, and we follow that report. For most of the material, identification was not made to species because of the fragmentary nature of the material.

Adding to the difficulty of dealing with highly cominuted material is the fact that the four species of leporids found within the state today grade in size from the small desert cottontail rabbit to the large California jackrabbit. Not only do they grade in size, the size range of each species overlaps with the next largest species. Hulbert (1979) noting these similarities in size felt that subjective identification of leporids to species was unreliable; therefore, he developed discriminant functions utilizing measurements of the cranium and mandible to distinguish the species. Unfortunately, the material recovered from Choke Canyon basin sites was too cominuted, so the necessary measurements to utilize Hulbert's discriminant functions could not be made. In spite of these difficulties we felt, as did Steele (1986), that some of the material could be assigned to specific species.

While the ranges of each species overlaps, the means are not overlapping, and the smaller specimens of each species are outside the range of the larger specimens of the species closest in size. To illustrate this, Table 45

TABLE 45. COMPARATIVE MEASUREMENTS FOR LAGOMORPHS INDIGENOUS TO TEXAS

	LDL	S.D.	RANGE	LTL	S.D.	RANGE	MD	S.D.	RANGE
L. californicus	21.1	1.29	18.6-25.2	17.9	0.92	16.1-20.5	13.2	1.05	10.8-16.3
S. aquaticus	18.2	0.97	16.9-20.7	17.7	0.68	16.5-18.9	11.7	0.74	10.6-13.6
S. floridanus	14.3	1.12	12.0-17.1	13.6	0.70	11.8-15.8	8.8	0.60	7.2-10.6
S. audubonii	13.3	0.83	11.7-14.9	12.4	0.56	11.4-14.0	9.3	0.64	8.1-11.0

	<u>Total Length Range</u>	<u>Hind Foot Length Range</u>
L. californicus	465 - 630	112 - 145
S. aquaticus	530 - 540	105 - 110
S. floridanus	375 - 463	87 - 104
S. audubonii	350 - 420	75 - 100

LDL = lower diastema length of the mandible from the incisors to the anterior premolar (from Hulbert 1979).

S.D.= standard deviation.

LTL = lower tooth row length of the premolar and molars (from Hulbert 1979).

MD = mandible depth.

Total length = head and body length; minimum and maximum given (from Hall 1981).

Hind foot length = length of hind foot; minimum and maximum given (from Hall 1981).

provides measurements of total length and hind foot length after Hall (1981), and lower diastema length, mandible depth, and lower tooth row length after Hulbert (1979). On this basis, the smallest of the *Sylvilagus* specimens were assigned to *S. audubonii* and the largest of the small specimens tentatively assigned to *S. floridanus*. Similarly, the largest of the large leporids were tentatively assigned to *Lepus*, while the smaller specimens of the large leporids were tentatively assigned to *S. aquaticus*.

To test at least a portion of these subjective assessments a discriminant function developed by Assad and Carlson (n.d.) to distinguish *S. floridanus* and *S. audubonii* was utilized to assign six of the small leporid mandibles to either of these species. Table 46 presents the discriminant function formula, the sectioning point, the percent accuracy, and the measurements of the six mandibles from 41 LK 201 and 41 MC 296. All six specimens were assigned to *S. audubonii* with a high probability of accuracy.

In summary then, minimally two species of leporids can be recognized in the faunal assemblages. The largest leporid, assigned to *Lepus*, falls outside the range of the small species of *Sylvilagus*. The other leporid species which can be confidently recognized is *Sylvilagus audubonii*, recovered from 41 LK 201 and 41 MC 296. In addition to these two species, *S. floridanus* and *S. aquaticus* may have also been present. *S. floridanus* was tentatively identified at 41 LK 201 and 41 MC 296. *S. aquaticus* was identified at 41 MC 222 and 41 MC 296. These last two identifications were based upon subjective evaluations alone, however, and need further substantiation.

Today, *Lepus californicus*, *S. audubonii*, and *S. floridanus* occur within the Choke Canyon basin (Hall 1981). *Sylvilagus aquaticus*, an eastern species, occurs as far west as the Colorado and San Antonio Rivers, approximately 70 miles east of the sites. Interpreting this material conservatively, it appears that at least as many species of leporids were present in the basins in the past as there are today. There is also the possibility that *S. aquaticus* may also have been present in the area as well. If this is a correct identification, it would represent evidence for a greater westward distribution of this species than it currently has. Hulbert (1979) reexamined leporid remains from Friesenhahn Cave in Bexar County and Kincaid Shelter in Uvalde County, and felt that *S. aquaticus* was represented in the bone assemblages from both of these sites. The Friesenhahn Cave sample is late Pleistocene in age and is associated with a more mesic fauna than is present in Bexar County today. The Kincaid Shelter

TABLE 46. THE DISCRIMINANT FUNCTION, SECTION POINT FOR DISTINGUISHING *SYLVILAGUS AUDUBONII* AND *S. FLORIDANUS*

Discriminant function: $4.8414 \text{ (LTL)} - 3.9091 \text{ (MD)} - 27.474$

Section point: Negative score = *Sylvilagus audubonii*
 Positive score = *S. floridanus*

Percent accuracy on study sample: 88%

SITE 41 LK 201

<u>Unit, Lot, Level</u>	<u>LTL</u>	<u>MD</u>	<u>Discriminant Function Score</u>	<u>Probable Accuracy</u>
N505 E1011, Lot 727, Level 1	13.4	10.4	-3.254	0.96
N509 E1012, Lot 701, Level 2	11.4	8.0	-3.555	0.97
N509 E1010, Lot 652, Level 1	11.5	8.9	-6.589	1.00
N506 E1013, Lot 692, Level 2	11.3	10.5	-13.812	1.00

SITE 41 MC 296

N1024 E985, Lot 104, Level 7	11.7	10.9	-13.439	1.00
N1026 E997, Lot 154, Level 7	13.6	10.6	-3.0674	0.96

LTL = lower tooth row length.

MD = mandibular depth taken beneath the talonid of the third premolar.

Note: The discriminant function, section point for distinguishing *Sylvilagus audubonii* and *S. floridanus*, the percent accuracy of the function in distinguishing the study sample, and the probability of a correct assessment is presented. Following the function are the locations, measurements, and discriminant function scores for the six unknown mandibles tested. All six specimens were assigned to *S. audubonii* on the basis of their negative functions scores.

material assigned to *S. aquaticus* lacked provenience. If the assessment of the material from Choke Canyon basin is correct then, it provides evidence for a greater range for the species during the Holocene.

ORDER PRIMATES

FAMILY HOMINIDAE

Homo sapiens (humans)

Referred Material from 41 MC 296: Test Pit 1, Lot 5; N1026 E995, Lot 240. Material consists of a right clavicle and an isolated premolar of indeterminate number and size. Material was recovered from Levels 5 and 6.

Remarks: Isolated fragments of human remains not uncommonly turn up in North American habitation sites (Collins, Hester, and Weir 1969; Hester 1969; Steele 1975). In Late Prehistoric sites in south Texas these remains are commonly modified (Collins, Hester, and Weir 1969; Hester 1969). The remains recovered from 41 MC 296, however, evidence no modifications, nor is there any evidence as to how they came to be a part of the bone assemblage at the site.

ORDER RODENTIA

FAMILY GEOMYIDAE

Geomys

SPECIES indeterminate (eastern pocket gopher)

Referred Material from 41 MC 296: N1022 E987, Lot 66; N1023 E989, Lots 233, 238. Material consists of fragments of a maxillary incisor, a right humerus, and a left femur from Levels 2, 3, and 6.

Remarks: The genera of gophers found in Texas can be distinguished from one another by the structure of the labial surface of the maxillary incisors, *Geomys* being marked by two lines parallel to the length of the tooth (Davis 1974). Therefore, the incisor recovered can be positively assigned to genus. The humerus and femur on the other hand are only tentatively identified to genus. Of the three species of *Geomys* occurring in Texas, *G. arenarius*, *G. busarius*, and *G. personatus*, only the last two are found near the locality of the site today. *G. arenarius* is restricted to the mountainous area of far west Texas and is unlikely to have ever existed in south Texas.

FAMILY HETEROMYIDAE

Perognathus cf. **P. hispidus** (hispid pocket mouse)

Referred Material from 41 MC 296: N1023 E985, Lot 72. Material consists of a maxillary fragment from Level 3.

Remarks: Hall (1981) lists two species of pocket mice as occurring in the area of the site today, **P. hispidus** and **P. flavus** (Davis identifies **P. flavus** as **P. merriami**). Of these two species, **P. hispidus** is more similar in size to the material recovered from 41 MC 296. The only other comparable sized pocket mouse is **P. pencillatus**, and it is known only from the Trans-Pecos region. Both **P. hispidus** and **P. flavus** are listed by Davis (1974) as preferring friable soil with sparse vegetation cover.

FAMILY MURIDAE

Neotoma

SPECIES indeterminate (pack rat)

Referred Material from 41 MC 222: N102 E90, Lot 190; N102 E90, Lot 204; N103 E88, Lot 212; N103 E91, Lots 241, 242, 247. Material consists of two right mandibles, a right upper first molar, a left second lower molar, an unidentified molar fragment, and a right tibia from Levels 2, 3, and 6.

Referred Material from 41 MC 296: Test Pit 2, Lots 16, 21; N1022 E985, Lot 42; N1022 E987, Lots 61, 62, 63, 64, 65, 66, 67, 68, 69; N1023 E985, Lots 70, 74, 75, 77; N1023 E986, Lots 79, 85; N1023 E987, Lot 94; N1023 E989, Lots 233, 238, 242; N1024 E985, Lots 98, 100, 103; N1024 E989, Lots 212, 227, 237; N1026 E978, Lot 208; N1026 E995, Lot 240; N1026 E997, Lots 149, 150, 151, 152, 153, 154; N1026 E998, Lot 158; N1026 E999, Lots 163, 165; N1027 E986, Lots 223, 224; N1027 E997, Lot 170; N1027 E998, Lots 177, 179; N1027 E999, Lots 185, 186. Material consists of dental, cranial, and postcranial skeletal elements from Levels 1-9.

Remarks: The four species of pack rat currently found in the state today are **N. albigula**, **N. mexicana**, **N. micropus**, and **N. floridanus** (Davis 1974; Hall 1981).

Sigmodon cf. **S. hispidus** (hispid cotton rat)

Referred Material from 41 MC 222: N98 E90, Lot 118; N103 E89, Lot 220; N103 E90, Lot 228; N103 E91, Lot 241. Material

consists of a right mandible, one right first upper molar, one ulna, and one right humerus from Levels 1-3.

Referred Material from 41 MC 296: Test Pit 1, Lots 1, 4; N1022 E985, Lots 42, 43; N1022 E986, Lot 54; N1022 E987, Lots 61, 62, 63, 64, 65, 66, 67, 69; N1023 E985, Lots 71, 75; N1023 E987, Lots 94, 95; N1023 E989, Lots 233, 242; N1024 E985, Lots 99, 104; N1024 E986, Lots 110, 111. Material consists of dental and postcranial skeletal elements from Levels 1-7 and 9.

Remarks: Of the two species of cotton rats found within the state today *S. ochrognathus* is restricted to the higher elevations of the Chisos Mountains while *S. hispidus* is found throughout the state (Davis 1974). *S. hispidus* prefers heavily grassed habitat.

FAMILY SCIURIDAE

GENUS indeterminate (squirrels)

Referred Materials from 41 MC 222: N103 E91, Lot 252. Material consists of a right distal fragment of a humerus from Level 6.

Referred Material from 41 MC 296: N1022 E985, Lots 41, 43; N1022 E986, Lot 56. Material consists of a left calcaneus and the distal end of a right humerus from Levels 1, 3, and 6.

Remarks: Material assigned to this taxon could not be classified to genus. One comment which can be made concerns the relative paucity of recovered material assigned to this family considering how relatively abundant they are in both grassland and wooded habitats. It is possible, however, that the fossorial or arboreal niches they occupy made them difficult game to capture.

Sciurus

SPECIES indeterminate (tree squirrels)

Referred Material from 41 MC 222: N101 E91, Lot 173. Material consists of one right calcaneus from Level 4.

Remarks: Species of this genus are generally restricted to the riparian forest and oak mott in south Texas and are a good indication of the Indians harvesting food within this environment.

Spermophilus

SPECIES indeterminate (ground squirrels)

Referred Material from 41 MC 222: N101 E91, Lot 173; N102 E89, Lot 183; N102 E90, Lot 190. Material consists of two distal fragments of the tibia and a right calcaneus from Levels 3 and 4.

Referred Material from 41 MC 296: N1022 E987, Lot 67; N1023 E987, Lot 89; N1026 E998, Lot 156. Material consists of a maxillary fragment containing molars and premolars of a subadult from Level 7, a nearly complete skeleton from Level 1, and a left edentulous mandible from Level 2.

Remarks: While the fragmented remains indicate that this genus served as food for the human inhabitants or their dogs, one nearly complete specimen recovered from Level 1 may well represent the intrusive remains of a ground squirrel which occupied the area of the site and died there when the locality was not occupied by humans.

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TABLE 47. PROVENIENCE BY LOT NUMBER FOR SITE 41 MC 222

LOT	UNIT	LEVEL	ELEVATION	LOT	UNIT	LEVEL	ELEVATION
101	N95 E87	1	Surface-98.60	157	N100 E91	4	98.70-98.65
102	N95 E87	2	98.60-98.50	158	N100 E91	5	98.65-98.60
103	N95 E87	3	98.50-98.40	159	N101 E88	1	Surface-98.80
104	N97 E86	1	Surface-98.60	160	N101 E88	2	98.80-98.75
105	N97 E86	2	98.60-98.55	161	N101 E88	3	98.75-98.70
106	N97 E86	3	98.55-98.50	162	N101 E89	1	Surface-98.80
107	N97 E86	4	98.50-98.45	163	N101 E89	2	98.80-98.75
108	N97 E86	5	98.45-98.40	164	N101 E89	3	98.75-98.70
109	N97 E87	1	Surface-98.70	165	N101 E90	1	Surface-98.90
110	N97 E87	2	98.70-98.65	166	N101 E90	2	98.90-98.85
111	N97 E87	3	98.65-98.60	167	N101 E90	3	98.85-98.80
112	N97 E87	4	98.60-98.55	168	N101 E90	4	98.80-98.75
113	N97 E87	5	98.55-98.50	169	N101 E90	5	98.75-98.70
114	*	*	*	170	N101 E91	1	Surface-98.90
115	N98 E86	1	Surface-98.70	171	N101 E91	2	98.90-98.85
116	N98 E86	2	98.70-98.65	172	N101 E91	3	98.85-98.80
117	N98 E86	3	98.65-98.60	173	N101 E91	4	98.80-98.75
118	N98 E90	1	Surface-98.70	174	N101 E91	5	98.75-98.70
119	N98 E90	2	98.70-98.65	175	N102 E88	1	Surface-98.95
120	N98 E90	3	98.65-98.60	176	N102 E88	2	98.95-98.90
121	N98 E91	1	Surface-98.70	177	N102 E88	3	98.90-98.85
122	N98 E91	2	98.70-98.65	178	*	*	*
123	N98 E91	3	98.65-98.60	179	N102 E88	4	98.85-98.80
124	*	*	*	180	N102 E88	5	98.80-98.75
125	N99 E86	1	Surface-98.70	181	N102 E89	1	Surface-98.95
126	N99 E86	2	98.70-98.65	182	N102 E89	2	98.95-98.90
127	N99 E86	3	98.65-98.60	183	N102 E89	3	98.90-98.85
128	N99 E89	1	Surface-98.75	184	N102 E89	4	98.85-98.80
129	N99 E89	2	98.75-98.70	185	N102 E89	5	98.80-98.75
130	N99 E89	3	98.70-98.65	186	N102 E89	6	98.75-98.70
131	N99 E89	4	98.65-98.60	187	N102 E89	7	98.70-98.65
132	N99 E90	1	Surface-98.75	188	N102 E90	1	Surface-98.95
133	N99 E90	2	98.75-98.70	189	N102 E90	2	98.95-98.90
134	N99 E90	3	98.70-98.65	190	N102 E90	3	98.90-98.85
135	N99 E90	4	98.65-98.60	191	*	*	*
136	N99 E91	1	Surface-98.75	192	N102 E90	4	98.85-98.80
137	N99 E91	2	98.75-98.70	193	N102 E90	5	98.80-98.75
138	N99 E91	3	98.70-98.65	194	N102 E90	6	98.75-98.70
139	N99 E91	4	98.65-98.60	195	*	*	*
140	N100 E86	1	Surface-98.70	196	N102 E100	1	Surface-98.90
141	N100 E86	2	98.70-98.65	197	N102 E100	2	98.90-98.80
142	N100 E89	1	Surface-98.80	198	N102 E100	3	98.80-98.70
143	N100 E89	2	98.80-98.75	199	N102 E100	4	98.70-98.60
144	N100 E89	3	98.75-98.70	200	N102 E100	5	98.60-98.50
145	N100 E89	4	98.70-98.65	201	N102 E100	6	98.50-98.40
146	N100 E89	5	98.65-98.60	202	N102 E100	7	98.40-98.30
147	N100 E90	1	Surface-98.80	203	N102 E91	1	Surface-99.00
148	N100 E90	2	98.80-98.75	204	N102 E91	2	99.00-98.95
149	N100 E90	3	98.75-98.70	205	N102 E91	3	98.95-98.90
150	N100 E90	4	98.70-98.65	206	N102 E91	4	98.90-98.85
151	*	*	*	207	N102 E91	5	98.85-98.80
152	N100 E90	5	98.65-98.60	208	N102 E91	6	98.80-98.75
153	*	*	*	209	N102 E91	7	98.75-98.70
154	N100 E91	1	Surface-98.80	210	*	*	*
155	N100 E91	2	98.80-98.75	211	N103 E88	1	Surface-99.05
156	N100 E91	3	98.75-98.70	212	N103 E88	2	99.05-99.00

TABLE 47. (continued)

LOT	UNIT	LEVEL	ELEVATION	LOT	UNIT	LEVEL	ELEVATION
213	N103 E88	3	99.00-98.95	269	N112 E79	1	Surface-98.90
214	N103 E88	4	98.95-98.90	270	N112 E79	2	98.90-98.80
215	N103 E88	5	98.90-98.85	271	N112 E79	3	98.80-98.70
216	N103 E88	6	98.85-98.80	272	N112 E79	4	98.70-98.60
217	N103 E88	7	98.80-98.75	273	N112 E79	5	98.60-98.50
218	N103 E89	1	Surface-99.05	274	N113 E83	1	Surface-99.10
219	N103 E89	2	99.05-99.00	275	N113 E83	2	99.10-99.00
220	N103 E89	3	99.00-98.95	276	N113 E83	3	99.00-98.90
221	N103 E89	4	98.95-98.90	277	N113 E83	4	98.90-98.80
222	*	*	*	278	N113 E83	5	98.80-98.70
223	N103 E89	5	98.90-98.85	279	N113 E83	6	98.70-98.60
224	N103 E89	6	98.85-98.80	280	N119 E80	1	Surface-99.00
225	N103 E89	7	98.80-98.75	281	N119 E80	2	99.00-98.90
226	N103 E89	8	98.75-98.70	282	N119 E80	3	98.90-98.80
227	N103 E89	9	98.70-98.65	283	N119 E80	4	98.80-98.70
228	N103 E90	1	Surface-99.05	284	N119 E80	5	98.70-98.60
229	N103 E90	2	99.05-99.00	285	N119 E80	6	98.60-98.50
230	N103 E90	3	99.00-98.95	286	N119 E80	7	98.50-98.40
231	N103 E90	4	98.95-98.90	287	N125 E72	1	Surface-98.80
232	*	*	*	288	N125 E72	2	98.80-98.70
233	N103 E90	5	98.90-98.85	289	N125 E72	3	98.70-98.60
234	*	*	*	357	N101 E87	1	Surface-98.85
235	N103 E90	6	98.85-98.80	358	N101 E87	2	98.85-98.80
236	N103 E90	7	98.80-98.75	359	N101 E87	3	98.80-98.75
237	N103 E90	8	98.75-98.70	360	N101 E87	4	98.75-98.70
238	*	*	*	361	N103 E86	1	Surface-99.00
239	*	*	*	362	N103 E86	2	99.00-98.95
240	N103 E91	1	Surface-99.05	363	N103 E86	3	98.85-98.90
241	N103 E91	2	99.05-99.00	364	N103 E86	4	98.90-98.80
242	N103 E91	3	99.00-98.95	365	N103 E87	1	Surface-99.00
243	N103 E91	4	98.95-98.90	366	N103 E87	2	99.00-98.95
244	*	*	*	367	N103 E87	3	98.95-98.90
245	N103 E91	5	98.90-98.85	368	N103 E87	4	98.90-98.85
246	*	*	*	*Special Notes - Lot/Provenience			
247	N103 E91	6	98.85-98.80				
248	N103 E91	7	98.80-98.75				
249	N103 E91	8	98.75-98.70				
250	*	*	*				
251	*	*	*				
252	*	*	*				
253	N104 E85	1	Surface-98.90				
254	N104 E85	2	98.90-98.85				
255	N104 E85	3	98.85-98.80				
256	N104 E85	4	98.80-98.75				
257	N107 E87	1	Surface-99.10				
258	N107 E87	2	99.10-99.00				
259	N107 E87	3	99.00-98.90				
260	N107 E87	4	98.90-98.80				
261	N110 E87	1	Surface-99.20				
262	N110 E87	2	99.20-99.10				
263	N110 E87	3	99.10-99.00				
264	N110 E87	4	99.00-98.90				
265	N110 E87	5	98.90-98.80				
266	N110 E87	6	98.80-98.70				
267	N110 E87	7	98.70-98.60				
268	N110 E87	8	98.60-98.50				
				Lot	Unit	Elevation	Description
				114	N97 E86-87	98.59-98.499	Feature 7
				124	N98 E91	98.697-98.625	Feature 4
				151	N100 E90	98.70-98.65	Fill from Feature 3 pedestal
				153	N100 E90	98.65-98.60	Fill from Feature 3 pedestal
				191	N102 E90	98.90-98.85	From Feature 2 pedestal
				222	N103 E89	98.95-98.90	Feature 5
				232	N103 E90	98.95-98.90	Feature 2 pedestal
				234	N103 E90	98.90-98.85	Feature 2 pedestal
				238	N103 E90	98.90-98.85	Feature 2
				239	N103 E90	98.90-98.85	Feature 2
				244	N103 E91	98.95-98.90	Feature 2 pedestal
				246	N103 E91	98.90-98.85	Feature 2 pedestal
				250	N103 E91	98.90-98.85	Feature 2 pedestal
				251	N103 E91	98.90-98.85	Feature 2
				252	N103 E90-91	98.85-98.80	Feature 8

TABLE 48. PROVENIENCE BY LOT NUMBER FOR SITE 41 MC 296

LOT	UNIT	LEVEL	ELEVATION	LOT	UNIT	LEVEL	ELEVATION
1	Test Pit 1	1	0-10 cm	77	N1023 E985	8	98.80-98.70
2	Test Pit 1	2	10-20 cm	78	N1023 E985	9	98.70-98.60
3	Test Pit 1	3	20-30 cm	79	N1023 E986	1	Surface-99.40
4	Test Pit 1	4	30-40 cm	80	N1023 E986	2	99.40-99.30
5	Test Pit 1	5	40-50 cm	81	N1023 E986	3	99.30-99.20
6	Test Pit 1	6	50-60 cm	82	N1023 E986	4	99.20-99.10
7	Test Pit 1	7	60-70 cm	83	*	*	*
8	Test Pit 1	8	70-80 cm	84	N1023 E986	5	99.10-99.00
9	Test Pit 1	9	80-90 cm	85	N1023 E986	6	99.00-98.90
10	Test Pit 1	10	90-100 cm	86	N1023 E986	7	98.90-98.80
11	Test Pit 1	11	100-110 cm	87	N1023 E986	8	98.80-98.70
12	Test Pit 1	12	110-120 cm	88	N1023 E986	9	98.70-98.60
13	Test Pit 1	13	120-130 cm	89	N1023 E987	1	Surface-99.40
14	Test Pit 1	14	130-140 cm	90	N1023 E987	2	99.40-99.30
15	Test Pit 2	1	0-10 cm	91	N1023 E987	3	99.30-99.20
16	Test Pit 2	2	10-20 cm	92	N1023 E987	4	99.20-99.10
17	Test Pit 2	3	20-30 cm	93	N1023 E987	5	99.10-99.00
18	Test Pit 2	4	30-40 cm	94	N1023 E987	6	99.00-98.90
19	Test Pit 2	5	40-50 cm	95	N1023 E987	7	98.90-98.80
20	Test Pit 2	6	50-60 cm	96	N1023 E987	8	98.80-98.70
21	Test Pit 2	7	60-70 cm	97	N1023 E987	9	98.70-98.60
22	Test Pit 2	8	70-80 cm	98	N1024 E985	1	Surface-99.40
23	Test Pit 2	9	80-90 cm	99	N1024 E985	2	99.40-99.30
24	*	*	*	100	N1024 E985	3	99.30-99.20
41	N1022 E985	1	Surface-99.40	101	N1024 E985	4	99.20-99.10
42	N1022 E985	2	99.40-99.30	102	N1024 E985	5	99.10-99.00
43	N1022 E985	3	99.30-99.20	103	N1024 E985	6	99.00-98.90
44	N1022 E985	4	99.20-99.10	104	N1024 E985	7	98.90-98.80
45	N1022 E985	5	99.10-99.00	105	N1024 E985	8	98.80-98.70
46	N1022 E985	6	99.00-98.90	106	N1024 E985	9	98.70-98.60
47	N1022 E985	7	98.90-98.80	107	N1024 E986	1	Surface-99.40
48	N1022 E985	8	98.80-98.70	108	N1024 E986	2	99.40-99.30
49	N1022 E985	9	98.70-98.60	109	N1024 E986	3	99.30-99.20
50	N1022 E985	10	98.60-98.50	110	N1024 E986	4	99.20-99.10
51	N1022 E986	1	Surface-99.40	111	N1024 E986	5	99.10-99.00
52	N1022 E986	2	99.40-99.30	112	N1024 E986	6	99.00-98.90
53	N1022 E986	3	99.30-99.20	113	N1024 E986	7	98.90-98.80
54	N1022 E986	4	99.20-99.10	114	N1024 E986	8	98.80-98.70
55	N1022 E986	5	99.10-99.00	115	N1024 E986	9	98.70-98.60
56	N1022 E986	6	99.00-98.90	116	N1024 E987	1	Surface-99.40
57	N1022 E986	7	98.90-98.80	117	N1024 E987	2	99.40-99.30
58	N1022 E986	8	98.80-98.70	118	N1024 E987	3	99.30-99.20
59	N1022 E986	9	98.70-98.60	119	N1024 E987	4	99.20-99.10
60	N1022 E986	10	98.60-98.50	120	N1024 E987	5	99.10-99.00
61	N1022 E987	1	Surface-99.40	121	N1024 E987	6	99.00-98.90
62	N1022 E987	2	99.40-99.30	122	N1024 E987	7	98.90-98.80
63	N1022 E987	3	99.30-99.20	123	N1024 E987	8	98.80-98.70
64	N1022 E987	4	99.20-99.10	124	N1024 E987	9	98.70-98.60
65	N1022 E987	5	99.10-99.00	125	N1025 E997	1	Surface-99.50
66	N1022 E987	6	99.00-98.90	126	N1025 E997	2	99.50-99.40
67	N1022 E987	7	98.90-98.80	127	N1025 E997	3	99.40-99.30
68	N1022 E987	8	98.80-98.70	128	N1025 E997	4	99.30-99.20
69	N1022 E987	9	98.70-98.60	129	N1025 E997	5	99.20-99.10
70	N1023 E985	1	Surface-99.40	130	N1025 E997	6	99.10-99.00
71	N1023 E985	2	99.40-99.30	131	N1025 E997	7	99.00-98.90
72	N1023 E985	3	99.30-99.20	132	N1025 E998	1	Surface-99.50
73	N1023 E985	4	99.20-99.10	133	N1025 E998	2	99.50-99.40
74	N1023 E985	5	99.10-99.00	134	N1025 E998	3	99.40-99.30
75	N1023 E985	6	99.00-98.90	135	N1025 E998	4	99.30-99.20
76	N1023 E985	7	98.90-98.80	136	N1025 E998	5	99.20-99.10

TABLE 48. (continued)

LOT	UNIT	LEVEL	ELEVATION	LOT	UNIT	LEVEL	ELEVATION
137	N1025 E998	6	99.10-99.00	197	N1026 E978	1	Surface-99.50
138	N1025 E998	7	99.00-98.90	198	N1026 E978	2	99.50-99.40
139	N1025 E999	1	Surface-99.50	199	N1027 E986	1	Surface-99.50
140	N1025 E999	2	99.50-99.40	200	N1027 E978	1	Surface-99.50
141	N1025 E999	3	99.40-99.30	201	*	*	*
142	N1025 E999	4	99.30-99.20	202	N1025 E995	2	99.50-99.40
143	N1025 E999	5	99.20-99.10	203	N1025 E995	3	99.40-99.30
144	N1025 E999	6	99.10-99.00	204	N1027 E995	2	99.50-99.40
145	N1025 E999	7	99.00-98.90	205	*	*	*
146	N1025 E999	8	98.90-98.80	206	*	*	*
147	N1025 E999	9	98.80-98.70	207	N1027 E995	3	99.40-99.30
148	N1026 E997	1	Surface-99.50	208	N1026 E978	3	99.40-99.30
149	N1026 E997	2	99.50-99.40	209	N1026 E978	4	99.30-99.20
150	N1026 E997	3	99.40-99.30	210	N1027 E978	2	99.50-99.40
151	N1026 E997	4	99.30-99.20	211	N1026 E978	5	99.20-99.10
152	N1026 E997	5	99.20-99.10	212	N1024 E989	2	99.50-99.40
153	N1026 E997	6	99.10-99.00	213	N1026 E986	2	99.50-99.40
154	N1026 E997	7	99.00-98.90	214	N1027 E986	2	99.50-99.40
155	N1026 E998	1	Surface-99.50	215	N1027 E978	3	99.40-99.30
156	N1026 E998	2	99.40-99.30	216	N1025 E995	4	99.30-99.20
157	N1026 E998	3	99.40-99.30	217	N1026 E995	2	99.50-99.40
158	N1026 E998	4	99.30-99.20	218	N1026 E995	3	99.40-99.30
159	N1026 E998	5	99.20-99.10	219	N1027 E995	4	99.30-99.20
160	N1026 E998	6	99.10-99.00	220	N1026 E995	4	99.30-99.20
161	N1026 E998	7	99.00-98.90	221	N1027 E995	5	99.20-99.10
162	N1026 E999	1	99.60-99.50	222	N1027 E995	6	99.10-99.00
163	N1026 E999	2	99.50-99.40	223	N1027 E986	3	99.40-99.30
164	N1026 E999	3	99.40-99.30	224	N1027 E978	4	99.30-99.20
165	N1026 E999	4	99.30-99.20	225	N1027 E978	5	99.20-99.10
166	N1026 E999	5	99.20-99.10	226	N1022 E989	2	99.50-99.40
167	N1026 E999	6	99.10-99.00	227	N1024 E989	3	99.40-99.30
168	N1026 E999	7	99.00-98.90	228	N1026 E986	3	99.40-99.30
169	N1027 E997	1	Surface-99.50	229	N1026 E978	6	99.10-99.00
170	N1027 E997	2	99.50-99.40	230	N1025 E995	5	99.20-99.10
171	N1027 E997	3	99.40-99.30	231	N1023 E989	1	Surface-99.50
172	N1027 E997	4	99.30-99.20	232	N1027 E978	6	99.10-99.00
173	N1027 E997	5	99.20-99.10	233	N1023 E989	2	99.50-99.40
174	N1027 E997	6	99.10-99.00	234	N1027 E986	4	99.30-99.20
175	N1027 E997	7	99.00-98.90	235	N1025 E995	6	99.10-99.00
176	N1027 E998	1	99.60-99.50	236	N1026 E986	4	99.30-99.20
177	N1027 E998	2	99.50-99.40	237	N1024 E989	4	99.30-99.20
178	N1027 E998	3	99.40-99.30	238	N1023 E989	3	99.40-99.30
179	N1027 E998	4	99.30-99.20	239	N1026 E995	5	99.20-99.10
180	N1027 E998	5	99.20-99.10	240	N1026 E995	6	99.10-99.00
181	N1027 E998	6	99.10-99.00	241	N1026 E995	7	99.00-98.90
182	N1027 E998	7	99.00-98.90	242	N1023 E989	4	99.30-99.20
183	N1027 E999	1	Surface-99.50	245	N1027 E999	6	99.10-99.00
184	N1027 E999	2	99.80-99.70	*Special Notes - Lot/Provenience			
185	N1027 E999	3	99.40-99.30				
186	N1027 E999	4	99.30-99.20				
187	N1027 E999	5	99.20-99.10				
188	N1027 E999	6	99.10-99.00				
189	N1027 E999	7	99.00-98.90				
190	N1027 E999	8	98.90-98.80				
191	Test Pit 3	1	Surface-10 cm				
192	Test Pit 3	2	10-20 cm				
193	Test Pit 3	3	20-30 cm				
194	N1022 E989	1	Surface-99.50				
195	N1024 E989	1	99.60-99.50				
196	N1026 E986	1	Surface-99.50				

*Special Notes - Lot/Provenience

Lot	Unit	Elevation	Description
24	Test Pit 2	70-80 cm	50 cm ² extension
40	Test Pit 2		50 cm ² extension
83	Lot number not used		
201	N1025/1028		
	E995/996	99.60-99.50	
205	N1023 E997	25 cm	recovered from unit wall
206	N1025/1028		
	E997/1000	11 cm	

REFERENCES CITED

Assad, C. and D. L. Carlson

- n.d. **Osteological Identification of the Eastern and Desert Cottontail.** Manuscript on file, Department of Anthropology, Texas A&M University, College Station.

Behrensmeyer, A. K. and A. P. Hill

- 1980 **Fossils in the Making: Vertebrate Taphonomy and Paleocology.** The University of Chicago Press, Chicago.

Binford, L. R.

- 1981 **Bones: Ancient Men and Modern Myths.** Academic Press, New York.

Blair, W. F.

- 1950 **The Biotic Provinces of Texas. The Texas Journal of Science** 2:93-117.
- 1952 **Mammals of the Tamaulipan Biotic Province in Texas. The Texas Journal of Science** 4:230-250.

Blair, W. F., A. P. Blair, P. Brodkorb, F. R. Cagle, and G. A. Moore

- 1968 **Vertebrates of the United States.** McGraw-Hill Book Company, Inc., New York.

Brain, C. K.

- 1981 **The Hunters or the Hunted? An Introduction to African Cave Taphonomy.** The University of Chicago Press, Chicago.

Campbell, T. N. and T. J. Campbell

- 1981 **Historic Indian Groups of Choke Canyon Reservoir and Surrounding Area, Southern Texas. Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 1.**

Collins, M. B., T. R. Hester, and F. Weir

- 1969 **Two Prehistoric Cemetery Sites in the Lower Rio Grande Valley of Texas. Part 1: The Floyd Morris Site (41 CF 2) a Prehistoric Cemetery Site in Cameron County, Texas. Bulletin of the Texas Archeological Society** 40:119-146.

Conant, R.

- 1975 **A Field Guide to Reptiles and Amphibians of Eastern and Central North America.** Houghton Mifflin Company, Boston.

Davis, W. B.

- 1974 **Mammals of Texas.** Texas Parks and Wildlife Department, Bulletin 41, Austin, Texas.

DeMarcay, G. B. and D. G. Steele

- 1986 The Value of Fine Screening on Inland Based Hunter-Gatherer Habitation Sites. Appendix VI in Archaeological Investigations at 41 LK 201, Choke Canyon Reservoir, Southern Texas, by C. L. Highley. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 11.**

Dibble, D. S.

- 1968 Part I: Archeology. In Bonfire Shelter: A Stratified Bison Kill Site, Val Verde County, Texas, by D. S. Dibble and D. Lorrain. **Texas Memorial Museum, Miscellaneous Papers 1,** Austin.

Dillehay, T. D.

- 1974 Late Quaternary Bison Population Changes on the Southern Plains. **Plains Anthropologist 19(65):180-196.**

Grayson, D. K.

- 1984 **Quantitative Zooarchaeology: Topics in the Analysis of Archaeological Faunas.** Academic Press, New York.

Hall, E. R.

- 1981 **The Mammals of North America.** John Wiley and Sons, New York.

Hester, T. R.

- 1969 Human Bone Artifacts from Southern Texas. **American Antiquity 34(3):326-328.**
- 1975a The Natural Introduction of Mollusca in Archaeological Sites: An Example from Southern Texas. **Journal of Field Archaeology 2:273-274.**
- 1975b Late Prehistoric Cultural Patterns Along the Lower Rio Grande of Texas. **Bulletin of the Texas Archeological Society 46:107-125.**

Hester (continued)

- 1978 Prehistoric Subsistence and Settlement Systems on the Rio Grande Plain, Southern Texas. In Background to the Archaeology of Chaparrrosa Ranch, Southern Texas, by T. R. Hester:37-39. Center for Archaeological Research, The University of Texas at San Antonio, Special Report 6(1).
- 1980 Digging Into South Texas Prehistory: A Guide for Amateur Archaeologists. Corona Publishing Company, San Antonio, Texas.

Hester, T. R. and T. C. Hill, Jr.

- 1971 An Initial Study of a Prehistoric Ceramic Tradition in Southern Texas. *Plains Anthropologist* 16(52):195-203.
- 1972 Prehistoric Occupation at the Holdsworth and Stewart Sites on the Rio Grande Plain of Texas. *Bulletin of the Texas Archeological Society* 43:33-75.
- 1975 Some Aspects of Late Prehistoric and Protohistoric Archaeology in Southern Texas. Center for Archaeological Research, The University of Texas at San Antonio, Special Report 1.

Hester, T. R., T. C. Hill, Jr., D. Gifford, and S. Holbrook

- 1975 Archaeological Salvage at Site 41 ZV 152, Rio Grande Plain of Texas. *The Texas Journal of Science* 26(1-2):223-228.

Hulbert, R. C., Jr.

- 1979 Linear Discriminant Analysis and Variability of Pleistocene and Holocene Leporidae of Texas. Unpublished Master's thesis, University of Texas at Austin.

Lord, K. J.

- 1984 The Zooarcheology of Hinds Cave, Val Verde County, Texas. Department of Anthropology, Texas A&M University, College Station.

Lundelius, E. L., Jr.

- 1972 Fossil Vertebrates from the Late Pleistocene Ingleside Fauna, San Patricio County, Texas. *Bureau of Economic Geology, The University of Texas at Austin, Reports of Investigations* 77:1-74.

Lynott, M. J.

- 1979 Prehistoric Bison Populations of North Central Texas. *Bulletin of the Texas Archeological Society* 50:89-102.

Murray, H. D.

- 1982 **An Analysis of Unionoids (Freshwater Mussels) Recovered in Phase I Archaeological Investigations at Choke Canyon Reservoir. In Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings, by G. D. Hall, S. L. Black, and C. Graves:541-555. Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 5.**

Robbins, C. S., B. Brunn, and H. S. Zim

- 1966 **A Guide to Field Identification Birds of North America. Golden Press, New York.**

Schmidly, D. J.

- 1977 **The Mammals of Trans-Pecos Texas. Texas A&M University Press, College Station, Texas.**
- 1983 **Texas Mammals East of the Balcones Fault Zone. Texas A&M University Press, College Station, Texas.**

Shipman, P.

- 1981 **Life History of a Fossil. Harvard University Press, Cambridge, Massachusetts.**

Steele, D. G.

- 1975 **Analysis of a Human Tooth. Appendix in A Prehistoric Athapaska Campsite in Northwestern Alberta, by A. K. Bryan and G. Conaty:88. The Western Canadian Journal of Anthropology 5.**
- 1986 **Analysis of Vertebrate Faunal Remains From 41 LK 201, Live Oak County, Texas. Appendix V in Archaeological Investigations at 41 LK 201, Choke Canyon Reservoir, Southern Texas, by C. L. Highley. Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 11.**

Steele, D. G. and E. R. Mokry

- n.d. **Archeological Investigations of Seven Prehistoric Sites Along Oso Creek, Nueces County, Texas. Bulletin of the Texas Archeological Society. In press.**

APPENDIX IV.

COMPUTER DOCUMENTATION: THE PHASE II PRIMER

Elizabeth G. Frkuska

Appendix VI in "Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings" (Hall, Black, and Graves 1982) describes the development of the NRP project computer based data retrieval system. The section includes word definitions, specific information on file structures, data quality control, management programs, and storage or retrieval parameters. The purpose of this guide is to act as a supplement to be utilized in conjunction with that of Phase I. The Phase II guide will explain the data structure, system programs, and storage or retrieval procedures.

DATA QUALITY CONTROL

During the course of the Phase I computer study we were able to determine changes that would be advantageous for the Phase II study, although the basic 80 column card image remained the same as Phase I (see Gunn, Frkuska, and Mahula 1982:556, NRP System Data File--File Structure section). As a result the data collection forms have been slightly amended (Fig. 102). These changes aided in quality control. Data quality control remained high during Phase II since a consistent few performed the analysis and recording tasks. Lynn Highley supervised all laboratory analysis. Biasing should be minimal. I supervised all data entry and verification procedures. Darrel Baker aided in the data entry and verification process.

SYSTEMS PROGRAMS

Phase II continued to utilize the main system programs written by Dr. Joel Gunn for Phase I. I have augmented these programs with specific Phase II FORTRAN programs. These programs are available upon request to the CAR-UTSA. In addition to these programs I continued to utilize SPSS standard statistical programs for numerical tallies.

After the data had been keypunched and verified it was indexed (see Gunn, Frkuska, and Mahula 1982:572). After these steps are accomplished the data file is ready to be used with the main system program, NRP FORTRAN. The system program requires a parameters file which contains all requested data from a given site. For example, it might be necessary to examine whether bone occurred with bifaces, grinding stone, or manos at a given area at site 41 LK 201. We will call this Study1. Study1 information is requested through the parameters file Study1 Param (Fig. 103). Once the data file is extracted it can be used alone as a table for a report by utilizing a heading routine Study1 FORTRAN (Fig. 104) or as a data set for a SPSS program Study1 SPSS (Fig. 105). Just from the extraction of four variables several questions can be answered. For example, are proximal fragments of bifaces more commonly found with bone fragments or do bifaces of any kind occur with

F O R M A T	Q 3	CARD NO.	F O R M A T	Q 4	CARD NO.
1. I2	_____	UNIQUE NO.	5. I2	_____	LEVEL
2. I9	_____	N COORDINATE	6. I6	_____	TOP ELEVATION
3. I5	_____	E COORDINATE	7. I6	_____	BOTTOM ELEVATION
4. I5	_____		8. I3	_____	UNIT SIZE

1. I2	_____	Card No.	23. I7	_____	MARINE SHELL
2. I9	_____	Unique No.	23. I7	_____	Count
		<u>ROCK</u>			<u>ABORIGINAL CERAMICS</u>
3. I7	_____	Tuff Count	24. I7	_____	Count
4. I7	_____	Tuff Weight			<u>BIFACES</u>
5. I7	_____	Pebble Count	25. I7	_____	Whole Count
6. I7	_____	Pebble Weight	26. I7	_____	Proximal Count
7. I7	_____	Sandstone Count	27. I7	_____	Medial Count
8. I7	_____	Sandstone Weight	28. I7	_____	Distal Count
9. I7	_____	Fire Fractured Ct.	29. I7	_____	Lateral Count
10. I7	_____	Fire Fractured Wt.	30. I7	_____	Misc. Fragment Count
11. I7	_____	Cobble Count			<u>UNIFACES</u>
12. I7	_____	Misc. Rock Count	31. I7	_____	Count
		<u>MUSSEL SHELL</u>			<u>HAMMERSTONES</u>
13. I7	_____	Umbo Count	32. I7	_____	Count
14. I7	_____	Shell/Umbo Wt.			<u>GROUND STONE</u>
		<u>SNAILS</u>	33. I7	_____	Grooved Abrader
15. I7	_____	Aquatic Count	34. I7	_____	Grinding Slab Fragments
16. I7	_____	Rabdotus Ct.	35. I7	_____	Mano
17. I7	_____	Polygyra Ct.	36. I7	_____	Gypsum Rods
18. I7	_____	Helicina Ct.			<u>CORES</u>
19. I7	_____	Praticolella Ct.	37. I7	_____	Count
20. I7	_____	Succinea Ct.			<u>CHARCOAL</u>
		<u>BONE</u>	38. I7	_____	1=present; 2=absent
21. I7	_____	Fragment Ct.			
22. I7	_____	Total Weight			

Figure 102. Material Analysis Form, Choke Canyon Project, Phase II.

<u>FLAKES</u>					
39. I7	0 3 7	Primary Total	65. I7	0 6 3	Tertiary Total
40. I7	0 3 8	Primary Corticate Plat.	66. I7	0 6 4	Tertiary Single Facet
41. I7	0 3 9	Primary Corticate Plat. Modified	67. I7	0 6 5	Tertiary Single Facet Modified
42. I7	0 4 0	Primary Corticate Plat. Trimmed	68. I7	0 6 6	Tertiary Single Facet Trimmed
43. I7	0 4 1	Primary Single Facet	69. I7	0 6 7	Tertiary Small Multifacet
44. I7	0 4 2	Primary Single Facet Modified	70. I7	0 6 8	Tertiary Small Multifacet Modified
45. I7	0 4 3	Primary Single Facet Trimmed	71. I7	0 6 9	Tertiary Small Multifacet Trimmed
46. I7	0 4 4	Primary-Other	72. I7	0 7 0	Tertiary Large Multifacet
47. I7	0 4 5	Primary-Other Modified	73. I7	0 7 1	Tertiary Large Multifacet Modified
48. I7	0 4 6	Primary-Other Trimmed	74. I7	0 7 2	Tertiary Large Multifacet Trimmed
49. I7	0 4 7	Secondary Total	75. I7	0 7 3	Tertiary Lipped
50. I7	0 4 8	Secondary Corticate Plat.	76. I7	0 7 4	Tertiary Lipped Modified
51. I7	0 4 9	Secondary Corticate Platform Modified	77. I7	0 7 5	Tertiary Lipped Trimmed
52. I7	0 5 0	Secondary Corticate Plat. Trimmed	<u>CHIPS</u>		
53. I7	0 5 1	Secondary Single Facet	78. I7	0 7 6	Chip Total
54. I7	0 5 2	Secondary Single Facet Modified	79. I7	0 7 7	Chip Corticate
55. I7	0 5 3	Secondary Single Facet Trimmed	80. I7	0 7 8	Corticate Modified
56. I7	0 5 4	Secondary Small Multifacet	81. I7	0 7 9	Chip Corticate Trimmed
57. I7	0 5 5	Secondary Small Multifacet Modified	82. I7	0 8 0	Chip Partially Corticate
58. I7	0 5 6	Secondary Small Multifacet Trimmed	83. I7	0 8 1	Chip Partially Corticate Modified
59. I7	0 5 7	Secondary Large Multifacet	84. I7	0 8 2	Chip Partially Corticate Trimmed
60. I7	0 5 8	Secondary Large Multifacet Modified	85. I7	0 8 3	Chip Decorticate
61. I7	0 5 9	Secondary Large Multifacet Trimmed	86. I7	0 8 4	Chip Decorticate Modified
62. I7	0 6 0	Secondary Lipped	87. I7	0 8 5	Chip Decorticate Trimmed
63. I7	0 6 1	Secondary Lipped Modified	<u>CHUNKS</u>		
64. I7	0 6 2	Secondary Lipped Trimmed	88. I7	0 8 6	Chunks Total
			89. I7	0 8 7	Corticate
			90. I7	0 8 8	Partially Corticate
			91. I7	0 8 9	Decorticate

Figure 102. (continued)

FILE: STUDY1 PARAM A U T S A SAN ANTONIO TX 78285 UTSA4341

```

1
2
3112(I2,A2,I3,I3,2I5,I2,2I6,A3,I1,A2,38X,I2)
4223(I2,A2,I3,I3,I1,9(I3,I4)4X,I2)

(1X,A2,I3,2I5,I2,11I4)
3 ANALYSIS UNIT=SITE=1,UNIT=2,LEVEL=3,ZONE=4
3 2 COUNTY/STATE
3 3 SITE
3 5 NORTH
3 6 EAST
3 7 0 SUBSTRATUM (ARBITRARY LEVEL)
4 20 BONE WEIGHT
4 23 BIFACE COMPLETE
4 24 BIFACE PROXIMAL
4 25 BIFACE MEDIAL
4 26 BIFACE DISTAL
4 27 BIFACE LATERAL
4 28 BIFACE MISC. FRAG
4 32 GRINDING/SLAB FRAGS
4 33 MANO
9999

```

Figure 103. An Example of a Parameters File Used in Conjunction with NRP's Main System Program to Generate Data Sets.

DISTRIBUTION STUDY

A=BONE
 B=BIFACE
 C=GRINDING SLAB
 D=MANO

SITE	NORTH	EAST	LEV	A	B	C	D
LK201	490	1042	1	0	0	0	0
LK201	490	1042	2	2	0	0	0
LK201	490	1042	3	2	0	0	0
LK201	490	1043	1	1	0	0	0
LK201	490	1043	2	1	0	0	0
LK201	490	1043	3	4	0	0	0
LK201	490	1043	4	7	0	0	0
LK201	490	1043	5	16	1	0	0
LK201	490	1043	6	4	0	0	0
LK201	490	1043	7	1	0	0	0
LK201	490	1043	8	6	0	0	0
LK201	490	1043	9	2	0	0	0
LK201	490	1043	10	4	2	0	0
LK201	490	1043	11	17	0	0	0
LK201	490	1043	12	35	0	0	0
LK201	490	1043	13	12	0	0	0
LK201	490	1043	14	2	0	0	0
LK201	490	1043	15	3	0	0	0
LK201	490	1043	16	3	0	0	0
LK201	490	1043	17	3	0	0	0
LK201	490	1043	18	5	0	0	0
LK201	490	1043	19	4	0	0	0
LK201	490	1044	1	10	0	0	0
LK201	490	1044	2	1	0	0	0
LK201	490	1044	3	1	0	0	0
LK201	490	1044	4	1	0	0	0
LK201	490	1044	5	1	0	0	0
LK201	490	1044	6	10	0	0	0
LK201	490	1044	7	10	0	0	0
LK201	490	1044	8	2	0	0	0
LK201	490	1044	9	1	0	0	0
LK201	490	1044	10	2	1	0	0
LK201	490	1044	11	1	0	0	0
LK201	490	1044	12	1	1	0	0
LK201	490	1044	13	0	0	0	0
LK201	490	1044	14	1	0	0	0
LK201	490	1044	15	1	0	0	0
LK201	490	1044	16	1	0	0	0
LK201	490	1044	17	0	0	0	0
LK201	490	1044	18	1	0	0	0
LK201	490	1044	19	0	0	0	0
LK201	491	1042	1	1	0	0	0
LK201	491	1042	2	12	0	1	0
LK201	491	1042	3	126	0	0	0
LK201	491	1043	1	0	0	0	0

Figure 104. An Example of a Table That Can be Generated Utilizing the NRP Data Based Computer System.

```

FILE:  STUDY1      SPSS      A      U T S A      SAN ANTONIO TX 78285      UTSA4341

VARIABLE LIST      DSIT,SITE,NORTH,EAST,STRAT,TUFF,SAND,FIRE,UMBO,MUSS,RAB,
                   BONE,MAR,ABORC,BIF1,BIF2,BIF3,BIF4,BIF5,BIF6,GRAB,GRSL,
                   MANO,GYRO,CORES,PRIM,SEC,TERT

INPUT MEDIUM      CARD
INPUT FORMAT      FIXED (1X,A2,F3.0,2F5.0,F2.0,11F4.0/18X,12F4.0)
N OF CASES        332
COMPUTE           BIFACE=BIF1+BIF2+BIF3+BIF4+BIF5+BIF6
READ INPUT DATA
LK201 490 1042 1    0    0    1    2    2    10    0    0    0    0    0
LK201 490 1042 1    0    0    0    0    0    0    0    0    0    0    0    0
LK201 490 1042 2    5    0    1    3    18   87    2    0    0    0    0    0
LK201 490 1042 2    0    0    0    0    0    0    0    0    0    0    2    2
LK201 490 1042 3    0    0    3    3    21   78    2    0    1    0    0    0
LK201 490 1042 3    0    0    0    0    0    0    0    0    0    0    2    3
LK201 490 1043 1    0    0    2    0    3    1    1    0    0    0    0    0
LK201 490 1043 1    0    0    0    0    0    0    0    0    0    0    1    0
LK201 490 1043 2    18   0    1    2    17   34    1    0    0    0    0    0
LK201 490 1043 2    0    0    0    0    0    0    0    0    0    0    1    2
LK201 490 1043 3    17    1   23    8   43  285    4    0    0    0    0    0
LK201 490 1043 3    0    0    0    0    0    0    0    0    0    2    1    5
LK201 490 1043 4    33   83   74    9   76    0    7    0    0    0    0    0
LK201 490 1043 4    0    0    0    0    0    0    0    0    1    0    5    1
LK201 490 1043 5    43    0    1    4   39    1   16    0    0    0    0    1
LK201 490 1043 5    0    0    0    0    0    0    0    0    0    0    1    5
LK201 490 1043 6    14    0   39    5   41    0    4    0    0    0    0    0
LK201 490 1043 6    0    0    0    0    0    0    0    0    0    0    1    2
LK201 490 1043 7    29    0    1    4   39    0    1    0    0    0    0    0
LK201 490 1043 7    7    0    0    0    0    0    0    0    0    0    1    2
LK201 490 1043 8    0    0    2    2    9    0    6    0    0    0    0    0
LK201 490 1043 8    0    0    0    0    0    0    0    0    0    0    0    4
LK201 490 1043 9    27    0    4    4   30   13    2    0    0    0    0    0
LK201 490 1043 9    0    0    0    0    0    0    0    0    0    0    1    1
LK201 490 104310   12    0   17    2    9   15    4    0    0    0    1    0
LK201 490 104310    0    1    0    0    0    0    0    0    1    0    2   10
LK201 490 104311    0    0   12   29  151   18   17    0    0    0    0    0
LK201 490 104311    0    0    0    0    0    0    0    0    2    5   10    5
LK201 490 104312   379   0  108   17   58   29   35    0    0    0    0    0
LK201 490 104312    0    0    0    0    0    0    0    0    2    4   15    0
LK201 490 104313    64    0   46    6    7   20   12    0    0    0    0    0
LK201 490 104313    0    0    0    0    0    0    0    0    0    0    3    4
LK201 490 104314    45    0    5    0    5   10    2    0    0    0    0    0
LK201 490 104314    0    0    0    0    0    0    0    0    0    0    2    4
LK201 490 104315   161    0  109    3    6   29    3    0    0    0    0    0
LK201 490 104315    0    0    0    0    0    0    0    0    0    0    1   11
LK201 490 104316    25   58   72    4   32    8    3    0    0    0    0    0
LK201 490 104316    0    0    0    0    0    0    0    0    0    0    0    2
LK201 490 104317    31   20  110    1   13    2    3    0    0    0    0    0
LK201 490 104317    0    0    0    0    0    0    0    0    0    0    0    1
LK201 490 104318   491   18   55    3    9    8    5    0    0    0    0    0
LK201 490 104318    0    0    0    0    0    0    0    0    0    1    0    1
LK201 490 104319   292    4    1    2   11   25    4    1    0    0    0    0
LK201 490 104319    0    0    0    0    0    0    0    0    0    0    3    4

WRITE CASES      (1X,A2,F5.0,2F7.0,F4.0,F6.0,F9.0,2F6.0) DSIT,
                  SITE,NORTH,EAST,STRAT,BONE,BIFACE,GRSL,MANO
FINISH

```

Figure 105. Data Set for a SPSS Program Study1 SPSS.

grinding slabs or manos? From this kind of analysis hypotheses can be drawn about the material culture of the site dwellers.

Since NRP Phase II contains large quantities of data that could be studied in the future, all data sets have been stored on magnetic tapes. The character set is EPCIDIC, and the density is 1600 bpi. A guide to NRP Phase II systems operations is available upon request from the CAR-UTSA. This guide includes all data sets, programs, and tape drive operation procedures.

REFERENCES CITED

Hall, G. D., S. L. Black, and C. Graves

- 1982 Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 5.**

Gunn, J., E. G. Frkuska, and R. Mahula

- 1982 Computer Documentation: A Guide to the Collection, Storage, and Retrieval of the Phase I Data. Appendix VI in Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings, by G. D. Hall, S. L. Black, and C. Graves:556-577. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 5.**

APPENDIX V.

TRACE ELEMENT AND GEOLOGIC SOURCES STUDIES OF AN
OBSIDIAN ARTIFACT FROM SITE 41 LK 51,
LIVE OAK COUNTY, TEXAS

Thomas R. Hester, Frank Asaro, Helen Michel,
Fred Stross, and Fred W. Nelson

INTRODUCTION

We describe here the results of trace element analysis, using the techniques of nuclear chemistry, of an obsidian artifact excavated at a prehistoric site in southern Texas. This site, 41 LK 51, was studied as a part of Phase II archaeological investigations in the Choke Canyon Reservoir basin. The analyses are important not only for Choke Canyon, but also address a larger issue in obsidian trace element research in Texas.

The senior author has been engaged for about a dozen years in tracing the geologic origins of obsidian artifacts found at prehistoric Texas sites. The initial studies were done in the early 1970s in collaboration with Robert N. Jack; over the past decade, the project has involved Asaro, Michel, and Stross, scientists at the Lawrence Berkeley Laboratory (LBL), University of California, Berkeley (Hester, Asaro, and Stross 1980:12-13).

Obsidian, a volcanic glass does not occur in geologic outcrops in Texas. Leo Byerley (personal communication to Hester, October 1983) has observed "fist-size" obsidian nodules at Mule Ear Peak in the Big Bend National Park. However, the materials reported there and at some other localities in the Big Bend area do not appear to be of artifact-quality obsidian. Rather, we have to look to major obsidian sources outside of Texas, principally those known to have been exploited in ancient times, in Mexico, New Mexico, and Arizona, and as far away as Obsidian Cliff in Yellowstone Park, Wyoming (cf. Hester et al. 1975; Hester, Asaro, and Stross 1980, 1982; Hester et al. 1980; Hester et al. ms.; Mitchell et al. 1980).

OBSIDIAN SOURCE ANALYSES

We have now analyzed more than 100 Texas obsidian artifacts. For some, we have been able to identify specific geologic sources (e.g., in New Mexico, Mexico, and Wyoming). A number of specimens, however, fall into groups with chemical characterizations for which we have no currently recognized geologic source. Among these groups, as we will discuss later, was one known as "Escondido Ranch."

The obsidian artifact from 41 LK 51 is a subcircular specimen with bifacial flake scars; it may be a core fragment or a reworked biface. It is 3.1 cm long, 2.4 cm wide, and 0.9 cm thick; weight is 4.9 g. Based on the stratigraphic context at the site (Level 1, Unit N1026 E1042), this excavated specimen is Late Prehistoric in age (ca. A.D. 1000-1600). It was initially submitted to the LBL for X-ray fluorescence (XRF) analysis, by using a nondestructive procedure. It was labeled as "TEX 22" in the laboratory.

When the trace element analysis was obtained, the specimen was found to fall with the Escondido Ranch group of Texas obsidians. The Escondido Ranch group was first recognized in 1972 by R. N. Jack, after his analysis of a number of Texas obsidian artifacts found at various sites in the state. Since the geologic source of this group was not known, Jack assigned it the "Escondido Ranch" name, after a ranch in Dimmit County, Texas, where an obsidian artifact of this composition was initially discovered. Since that time, other Texas obsidian artifacts analyzed at the LBL were also found to match chemically the Escondido Ranch type. The Barium (Ba) content of this type, ~1500 parts-per-million (ppm), is distinctive because it is unusually high, but none of the source samples from the southwestern United States or Mexico previously measured at LBL conformed to the observed chemical profile.

However, a recent report on analyses of western obsidians (Nelson 1984) contained XRF data on source obsidian from Malad, Idaho, and the chemical abundances seemed close to those of the Escondido Ranch type. Samples of this source rock were generously made available by Fred W. Nelson for a collaborative study, by neutron activation measurements, with Hester and the LBL group.

High precision neutron activation analyses (NAA) were made at LBL on two Malad source obsidian samples and on the artifact from 41 LK 51 (TEX-22). These results are shown in Table 49. It is seen that the agreement is usually consistent with the measurement errors. Exceptions are the Na abundance which is slightly different (3.2%) for the two Malad source samples and the Sm abundance, which is 0.9% different for the two source samples.

The source sample MALAD-1 and artifact TEX-22, however, agree as closely as can be expected from the measurement errors. The average difference for the abundances of the 15 elements is only 1.5%, which shows conclusively the artifact has a provenience of Malad, Idaho. Deviations of individual Na abundances of up to 10% have been occasionally detected in obsidian groups which were otherwise chemically homogeneous (Table 50). The Sm variation of 0.9% in the source samples may be related to the Na variations, although normally deviations of less than 2% are not considered significant in provenience determinations.

Table 51 shows less precise nondestructive XRF measurements made on TEX-22, seven other artifacts from southern, south-central, and north-central Texas, and the two source samples from Malad, Idaho. Although the agreement is considerably poorer than for the NAA measurements, it is as good as is expected from this type of measurement, and it is likely that the other artifacts as well as TEX-22 also have the same origin as the source samples. The XRF results obtained by R. N. Jack, which have been correlated by procedures used at LBL, are also shown on Table 51 and are seen to match within the limits of the correlation.

DISTRIBUTION AND DATING OF MALAD MATERIALS

While Tables 51 and 52 show the results of analyses of several Texas specimens of Escondido Ranch type and compare these with analysis of source samples from Malad, in southeastern Idaho, we should point out that there are

TABLE 49. ABUNDANCES OF ELEMENTS BY NEUTRON ACTIVATION ANALYSIS IN PARTS PER MILLION (except where otherwise indicated)

	Al	Ba	Ce	Co	Cs	Dy	Eu
MALAD-1	6.35 ± .14	1487 ± 24	64.16 ± .32	.51 ± .05	2.455 ± .064	4.91 ± .14	.606 ± .011
MALAD-2	6.50 ± .07	1512 ± 25	64.70 ± .32	.42 ± .05	2.497 ± .065	5.02 ± .14	
TEX-22	6.47 ± .08	1498 ± 24	64.13 ± .32	.50 ± .05	2.346 ± .064	5.15 ± .15	.609 ± .010
	Fe%	K%	La	Lu	Mn	Na%	Rb
MALAD-1	.711 ± .011	4.04 ± .27	31.55 ± .57	.482 ± .023	205.4 ± 2.5	2.77 ± .02	137.9 ± 6.2
MALAD-2	.709 ± .011	4.05 ± .27	32.49 ± .52	.468 ± .023	208.1 ± 2.6	2.86 ± .02	130.6 ± 6.0
TEX-22	.703 ± .011	3.92 ± .27	32.10 ± .52	.477 ± .023	206.1 ± 2.6	2.77 ± .02	135.0 ± 6.1
	Sc	Sb	Sm	Ta	Th	U	Yb
MALAD-1	1.939 ± .013	.19 ± .04	4.717 ± .013	1.161 ± .008	21.96 ± .11	5.28 ± .04	3.379 ± .061
MALAD-2	1.960 ± .013	.14 ± .04	4.760 ± .013	1.165 ± .008	22.21 ± .11	5.32 ± .04	3.432 ± .062
TEX-22	1.971 ± .013	.11 ± .03	4.700 ± .013	1.158 ± .007	21.98 ± .11	5.30 ± .04	3.405 ± .061

TABLE 50. SEPARATION OF SOURCE HETEROGENEITY FROM PROCEDURAL ERRORS (SAMPLES TEX-22, MALAD-1 AND 2)

Element	RMSD(%)	Estimated Counting Error(%)*	Residual Error(%)
Values based on run 2161 only			
Na	1.78	.64 ± .32	
Sm	.65	.28 ± .14	
Ta	.30	.69 ± .35	
Sc	.83	.66 ± .33	
Th	.63	.50 ± .25	
U	.35	.81 ± .40	
Values based on run 2170 only			
Na	1.31 ± .65	.69	1.11 ± .65
Sm	1.83 ± .92	.34	1.80 ± .92
Ta	1.25 ± .63	.60	1.10 ± .63
Sc	.91 ± .46	.65	.64 ± .46
TH	1.35 ± .68	.46	1.27 ± .68
U	2.26 ± 1.13	.91	2.07 ± 1.13

*Estimate of one standard deviation of error arising from gamma ray counting statistics.

Comments: The first column is the root mean square deviation (RMSD), calculated as a percentage, of the average value of the abundances of the array of elements measured. If there are no errors introduced in the measuring technique and the source is chemically homogeneous, the RMSD of the abundances for a given element in n number of samples will be equal to the counting error (c.e.) with an uncertainty of equal to: $c.e. / \sqrt{2(n-1)}$. If the RMSD is much larger than the counting error, the uncertainty in the RMSD is approximately: $RMSD \sqrt{2(n-1)}$. Since the uncertainty in the error decreases with the number of samples, it is relatively large in our case, where only three samples are being analyzed. After the uncertainties in counting gamma rays are removed from the RMSD, the remaining uncertainties are shown in the third column as Residual Error. The RMSDs for run 2161 indicate the source is homogeneous, at the 1% level, except possibly for the Na value. In the second run (2170), the residual error in most elements is larger than 1%. We believe that this error is probably due to procedural problems in the reactor irradiation. Samples are rotated periodically (about every hour) during the full power irradiation to provide all samples with the same flux and energy distribution of neutrons. It is likely that this periodic rotation for run 2161 was fortuitously adequate for the desired precision and accuracy, while that for run 2170 was not. A continuous rotation of the samples eliminates this problem.

Our conclusion is that the Malad source, as represented by the samples available, is homogeneous at the 1% level.

TABLE 51. XRF RESULTS ON ESCONDIDO RANCH TYPE ARTIFACTS AND MALAD, IDAHO, SOURCE SAMPLES

Designation	Ba* (ppm)	Zr* (ppm)	Rb/Zr	Sr/Zr
LBL	Escondido Ranch Type Artifacts			
TEX-1	1490	105	1.223 ± .062	.791 ± .030
TEX-13	1570	97	1.233 ± .059	.754 ± .028
TEX-19	1690	106	1.264 ± .097	.722 ± .054
TEX-22	1550	101	1.231 ± .045	.759 ± .026
TEX-23	1450	101	1.255 ± .022	.755 ± .022
HORN-2	1660	105	1.188 ± .054	.742 ± .031
HAM-8	1570	104	1.267 ± .055	.712 ± .032
HAM-9	1540	106	1.180 ± .052	.693 ± .030
HAM-10	1680	106	1.261 ± .057	.708 ± .032
HAM-11	1530	113	1.253 ± .058	.740 ± .033
HAM-12	1510	126	1.150 ± .055	.762 ± .033
RN Jack**				
Spec #2		114	1.20	.69
41 BL 104		102	1.23	.66
Sanderson, Tex		96	1.30	.72
LBL	Malad, Idaho Source			
MALA-1	1510	104	1.249 ± .057	.705 ± .039
MALA-1	1520	99	1.318 ± .062	.724 ± .034

*The absolute values of the abundances are only approximate and contain errors due to the variable sample shapes.

**Dr. Jack's data, obtained in counts per second, were intercalibrated and converted to absolute units by a procedure described in a letter (Asaro et al. to Hester) dated, January 4, 1979.

TABLE 52. CONCORDANCE OF ANALYZED ARTIFACTS OF ESCONDIDO RANCH TYPE FROM TEXAS AND SOURCE SAMPLES ANALYZED FROM MALAD, IDAHO

LBL Designation	Date of Letter	Designation	Sample Run Number XRF	NAA
TEX-1	07-19-77	Medina River Site	8069-H	
TEX-13	12-07-77	Hi-6, Aquilla Lake	-Q	
TEX-19	09-11-78	41 BX 300/001274/311	8085-F	
TEX-22	07-23-81	41 LK 51; Choke Canyon Project	8118-9	2151-G 2161-W 2170-W
TEX-23	10-15-81	Keystone Ranch, Real County	8122-D	
HORN-2		D21-21	8132-H	
HAM-8		Ham Creek Site, Sfce Quad IV	-L	
HAM-9		Ham Creek IV 1J/20-6N	-M	
HAM-10		Ham Creek II 10/7-15	-N	
HAM-11		Ham Creek I 1K/10-9	-O	
HAM-12		Ham Creek IV 5J9	-P	
MALA-1	12-20-83	Malad, Oneida County Idaho, SOURCE	8136-E	2151-E 2161-J 2170-J
MALA-2			8136-F	2151-F 2161-V 2170-V

a number of other specimens of Escondido/Malad type from Texas, earlier analyzed by R. N. Jack. We will briefly review the distribution and context of these 27 analyzed Escondido/Malad obsidian artifacts.

The artifacts are widely dispersed from southern Texas, to south-central Texas and then to the north-central part of the state (Fig. 106). One specimen probably linked to this type has been found in western Texas (Fig. 106, see number 13 on the map). With this one exception, the other Escondido/Malad artifacts seem to be distributed along the periphery of the Edwards Plateau. Some lie on the edge of the Plateau (e.g., 41 BX 300; Medina River site), others are just within the southern and eastern portions of the Plateau (e.g., Real County site; San Saba and Llano Counties sites; Travis County site), and others on the coastal plain (Escondido Ranch; 41 LK 51), or the prairies east and south of the Plateau (Ham Creek site; Aquilla Lake site). It will be interesting to learn, upon analysis of further specimens, whether this clustering in a north-south "corridor," in terms of distribution, will continue. If so, it should suggest to archaeologists something about the exchange systems which led to the spread of these obsidian artifacts.

In terms of context, some of the specimens are surface finds from multi-component sites and cannot be dated in terms of cultural associations (Table 53). Several are from Late Prehistoric deposits (41 LK 51; San Saba County specimens; 41 ME 29--see Addendum), or are of Late Prehistoric artifact type (e.g., Medina River site), others are from Late to Transitional Archaic or Late Prehistoric associations (e.g., Ham Creek site; 41 HI 34--see Addendum), and from Late to Transitional Archaic deposits (Horn Rockshelter; Evoe Terrace [41 BL 104]). However, as a glance at Table 53 will indicate, most of the specimens tend to be late in the Texas sequence, from Late/Transitional Archaic to Late Prehistoric times (i.e., from ca. A.D. 250 to A.D. 1700). Many of the Texas obsidian artifacts from other geologic sources that we have analyzed are surface finds and cannot be dated. We are thus fortunate to have all but five of the Escondido/Malad obsidian specimens with reasonably secure chronological contexts.

Most of the artifacts from this group are gray-tinted obsidian, sometimes varying to a "clear gray" color. Most are flakes, two are unifacially chipped tools (scrapers), and six others are bifaces. Of the latter, there is a side-notched projectile point from the Medina River site; it is the size of an arrow point and no doubt dates to the Late Prehistoric period. Other arrow points come from 41 SS 2, 41 TE 98, and Escondido Ranch (see Table 53). The corelike morphology of the specimen from 41 LK 51 suggests that some Escondido/Malad obsidian might have appeared in the Texas area as cores or nodules. The shaping of such items would lead, of course, to multiple flakes and flakes with "biface thinning" attributes, of the sort found in site 41 SS 2 in San Saba County.

POSSIBLE TRADE NETWORKS FOR MALAD DISTRIBUTION

The most challenging question that results from this analysis focuses on how Malad obsidian was transported from its source, some 1250 miles from 41 LK 51, into various areas of Texas. We have a clue that it might have

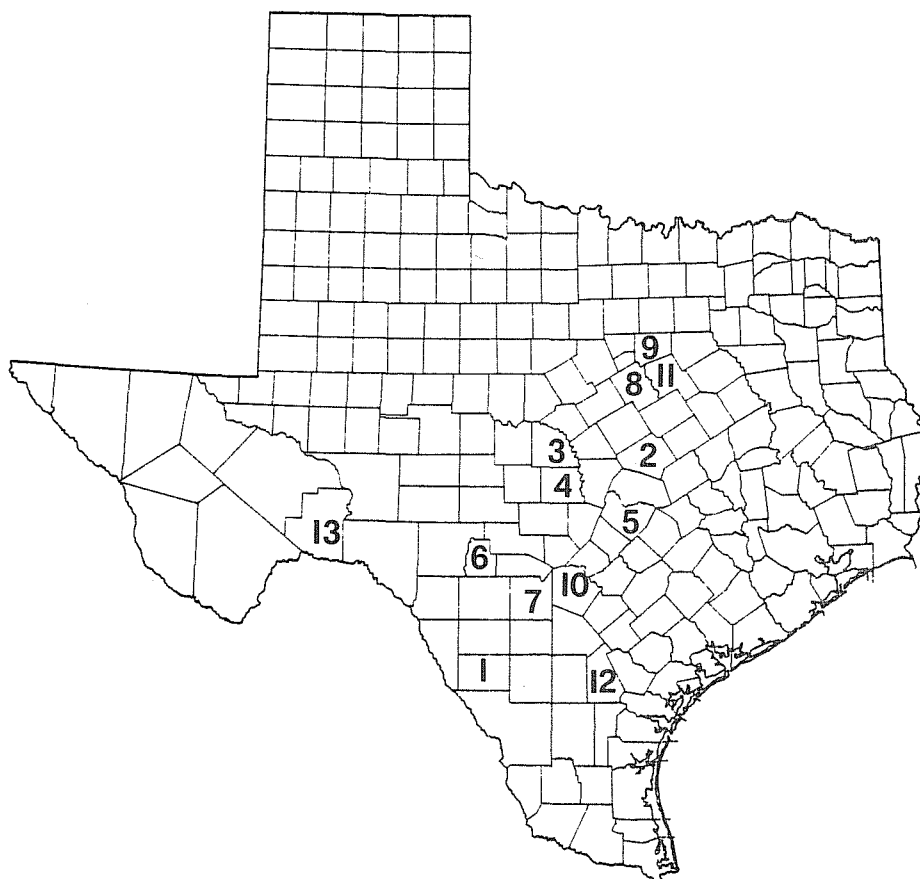


Figure 106. Location of Sites with Escondido/Malad Obsidian in Texas. Each site represents a locality at which one or more pieces of obsidian representing the Escondido Ranch group, now linked to a source in Malad, Idaho, was found. Numbers may be correlated by referring to Table 53.

TABLE 53. PROVENIENCE AND CONTEXT OF ESCONDIDO/MALAD OBSIDIAN ARTIFACTS FROM TEXAS SITES

Figure 106	Designation	Provenience	Context/Date	Description
1	Escondido Ranch	Escondido Ranch, Dimmit County	surface	stemmed point
2	41 BL 104	Evoe Terrace site, Bell County	Late Archaic (Zone 4)	flake
3	41 SS 2 (8 specimens)	Fall Creek site, San Saba County	Late Prehistoric in most cases	1 arrow point fragment; 2 unifaces; 5 flakes
4	41 LL 4	Buchanan Reservoir, Llano County	Late Prehistoric	flake
5	41 TV 133 (4 specimens)	Trammel Rockshelter, Travis County	excavated; date?	flakes
6	Keystone Patch (LBL TEX-23)	Near Leahey, Real County	surface	flake
7	Medina River* (LBL TEX-1)	Judson site; Medina County	buried; context? (Late Prehistoric)	side-notched arrow point
8	41 BQ 46 (LBL HORN-2)	Horn Shelter No. 2, Bosque County	Late Archaic	flake
9	Ham Creek site (LBL TEX-8-12) (5 specimens)	Johnson County	Late Prehistoric to Transitional Archaic	1 biface fragment 5 flakes
10	41 BX 300 (LBL TEX-19)	Bexar County	Late Prehistoric	flake
11	X41 HI 130 (LBL TEX-13)	"Hi-6"; Aquilla Lake	surface	biface
12	41 LK 51 (LBL TEX-22)	Choke Canyon, Live Oak County	Late Prehistoric	core?
13	41 TE 98**	Rockshelter, Terrell County	Late Prehistoric	stemmed arrow point

*erroneously attributed to site 41 BX 229 in earlier descriptions.

**probably Escondido/Malad; erroneously linked to Guadalupe Victoria, Mexico, in earlier studies.

involved some sort of trade network with origins in the Idaho and Wyoming area, in that at 41 SS 2 and at 41 TV 133, obsidians of both Malad and Obsidian Cliff, Wyoming, sources are found together.

Little is currently known about the importance in ancient times of Malad obsidian. Nelson (1984:56) notes its presence in the Sevier, Late Sevier, and Shoshone periods (ca. A.D. 600 to historic times) at sites in northern Utah. However, it is clear that Obsidian Cliff (Yellowstone Park, Wyoming) was a major source from Paleo-Indian times (some fluted points of this material have been found), through the Archaic and Woodland, and into the Late Prehistoric and even Historic periods (Griffin, Gordus, and Wright 1969). The use of Obsidian Cliff obsidian is best documented, in terms of long-distance exchange or transport, at Hopewell sites in the Middle West (*ibid.*). Such sites date somewhat earlier than many Texas specimens we have discussed in that most Hopewell sites are thought to date between 200 B.C. and A.D. 500. The exchange systems that carried Obsidian Cliff material, grizzly bear teeth, and other items from the Western Rockies into the Hopewell sites of the Middle West have not been, to our knowledge, described in any definitive form. Wright (1974) presents a detailed review of exchange networks as they may have operated within Hopewell sites after obsidian and other exotics had reached their region.

As to the Escondido/Malad specimens from Texas, a great distance from the Malad, Idaho, source, currently we cannot offer any detailed scenario as to what trade or exchange mechanisms were involved. Spielmann (1983) has provided a lengthy review of trade systems involving the Pueblo peoples of the Southwest and peoples on the Southern Plains. Trade or exchange on the Southern Plains around A.D. 1450 "was part of a larger system of hunter-gatherer/horticultural interaction which encompassed populations from central Kansas to western Oklahoma" (*ibid.*:257). She also notes (Spielmann 1983:269) the role of wide-ranging itinerant Indian traders in historic times on the Plains.

We suspect that such exchange systems existed in earlier times and perhaps interacted with another exchange system (or systems) that moved Obsidian Cliff and Malad obsidian either into the Southwest or the Southern Plains, and through exchange systems operating to the south, into Texas. One area of speculation is that peoples of the Sevier-Fremont and Shoshone periods in Utah, where sites with Malad obsidian have been found (Nelson 1984), could have included such obsidian in their interactions with Pueblo peoples to the south. Some Malad material might then have moved through the Puebloan-Southern Plains exchange system posited by Spielmann (1983). This would bring Malad obsidian into close proximity with the northernmost distribution of this obsidian type in Texas.

However, Nelson has analyzed obsidian from these areas--Utah, the Puebloan area, and New Mexico--and sees no evidence for Malad obsidian reaching Oklahoma and Texas via this route.

Timothy Baugh (personal communication) is of the opinion that the Malad obsidian is representative of a north-south trade network through the Plains, perhaps originally associated with the Obsidian Cliff network into the Hopewell area. He believes that this network may have ceased around

A.D. 1450 when a greater emphasis was placed on a Southern Plains/Southwest network. He and Nelson have documented Malad obsidian at five west Oklahoma sites with dates that clearly overlap with the Texas Malad specimens (see Table 54). The dating and the north-south "trajectory" indicated by the Oklahoma-Texas materials certainly lend credence to Baugh's suggestion of a Plains trade network.

In closing, we wish to restate the importance of the 41 LK 51 obsidian artifact. Through the NAA analysis of this specimen and the fortunate timing of Nelson's definition of the Malad source, we are now able to link a number of Texas obsidian artifacts, previously known as the Escondido Ranch type and of unknown source, to a known geologic outcrop near Malad, southeastern Idaho. We believe that the definition of this link will have significant consequences in the future study of prehistoric exchange systems in Texas, Oklahoma, and adjacent areas.

ADDENDUM

Since the completion of this manuscript, the Lawrence Berkeley Laboratory (LBL) has analyzed, by X-ray fluorescence, two additional obsidian artifacts from Texas, and has found that they are also derived from the Malad source. One specimen is a corner-notched arrow point (LBL 8142) found at site 41 ME 29 (Medina County; see Fig. 106 from area of 7) during controlled excavations by archaeologists of the Texas Department of Highways and Public Transportation. It is datable to Late Prehistoric times based both on stratigraphic context and morphology of the specimen.

The second obsidian artifact is a biface thinning flake (LBL 8141-0) found in the fill of a prehistoric burial pit at site 41 HI 34 (Hill County; see Fig. 106 from area of 11). Although the stratigraphic placement is not certain, the excavator (C. K. Chandler) believes that a Late Archaic-to-Late Prehistoric date is very likely.

Detailed data on both of these artifacts of Malad source will be published in the near future.

TABLE 54. OBSIDIAN OF THE MALAD SOURCE FROM OKLAHOMA ARCHAEOLOGICAL SITES*

Sample Number	Site	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	NnO %	Fe ₂ O ₃ %	TiO ₂ %	Ba ppm	Na ₂ O %	Chronological Evaluation
1104	34 WO 43	123.7	75.0		110.5		.031	1.06	.074	1574.8	3.46	Late Prehistoric (A.D. 1350-1400)
1167	34 RM 72	97.4	60.8	38.2	90.5	29.8	.034	1.15	.070	1559.3	3.85	Late Prehistoric (A.D. 1350-1400)
1169	34 RM 72	121.0	73.2	20.4	89.9	14.0	.033	1.06	.071	1552.2	3.70	Late Prehistoric (A.D. 1350-1400)
1406	34 BK 2	123.8	74.0	35.6	120.8	24.6	.030	1.02	.084	1573.1	3.58	Protohistoric (A.D. 1450-1650)
1616	34 GV 22	121.0	55.9	60.3	130.7	39.4	.031	1.08	.077	1571.2	3.60	Late Prehistoric or Early Plains Village (A.D. 1100-1450)

*Data reported here are courtesy of Fred W. Nelson. They were originally presented in a paper by Nelson and Timothy G. Baugh at the Society for American Archaeology meetings, April 1984, in Portland, Oregon.

REFERENCES CITED

Griffin, J. B., A. A. Gordus, and G. A. Wright

- 1969 Identification of the Sources of Hopewellian Obsidian in the Middle West. **American Antiquity** 34(1):1-14.

Hester, T. R., F. Asaro, and F. Stross

- 1980 Source Analysis of Obsidian Artifacts in Texas: New Results. **Newsletter, Houston Archaeological Society** 68:12-16.

- 1982 Results of Some Recent Studies by the Texas Obsidian Project. **Journal, Houston Archaeological Society** 73:8-10.

Hester, T. R., F. Asaro, F. Stross, and S. A. Skinner

- ms. Trace Element Analysis of Obsidian Artifacts from North Central Texas. Manuscript submitted to Archaeology Research Program, Southern Methodist University. 7 pp.

Hester, T. R., J. W. House, R. N. Jack, and F. H. Stross

- 1975 X-Ray Fluorescence of Obsidian Artifacts from the Rio Grande Plain, Southern Texas. **The Texas Journal of Science** 26(1-2):286-289.

Hester, T. R., J. L. Mitchell, F. Asaro, and F. Stross

- 1980 Further Notes on Obsidian Artifacts from Dimmit County, Southern Texas. **La Tierra** 7(3):30-33.

Mitchell, J. L., T. R. Hester, F. Asaro, and F. Stross

- 1980 Notes on Trace Element Analysis of Obsidian from Hutchinson and Roberts Counties in the Texas Panhandle. **Bulletin of the Texas Archeological Society** 51:301-308.

Nelson, F. W.

- 1984 X-Ray Fluorescence Analysis of Some Western North American Obsidians. In *Obsidian Studies in the Great Basin*, edited by R. E. Hughes:27-62. **Contributions of the University of California Archaeological Research Facility** 45. Berkeley.

Spielmann, K. A.

- 1983 Late Prehistoric Exchange Between the Southwest and Southern Plains. **Plains Anthropologist** 28(102):257-272

Wright, G. A.

- 1974 **Archaeology and Trade**. An Addison-Wesley Module in Anthropology 49.

APPENDIX VI.

GENERAL DATA TABLES

MATERIAL ANALYSIS RECORDS

KEY TO COLUMN ENTRIES FOR TABLE 55.

SITE -	Site number.
NORTH/EAST -	Grid coordinates for southwest corner of excavation unit.
TP -	Test pit number.
LEV -	Vertical level in excavation unit starting with surface level (1) and proceeding downward. Most levels are 10-cm thick. Some 5-cm thick levels were excavated at 41 MC 222.
A	Tuff weight, in grams
B	Sandstone weight, in grams
C	Fire-fractured rock weight, in grams
D	Mussel shell umbo count
E	Mussel shell weight (umbos and fragments), in grams
F	Rabdotus count
G	Bone weight, in grams
H	Primary flakes, total count
I	Primary flakes, modified, total count
J	Secondary flakes, total count
K	Secondary flakes, modified, total count
L	Tertiary flakes, total count
M	Tertiary flakes, modified, total count

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
LK 8	5 10	4 58	5	265	0	19 4	17	38	11	0	0	0	0	8	0	19
LK 8	10	4 58	6	335	0	24 9	8	27	12	0	0	0	0	0	0	22
LK 8	10	4 58	7	420	0	61 0	6	56	18	0	0	0	0	0	0	24
LK 8	10	4 58	8	1049	0	24 7	9	77	0	0	0	0	0	1 19	0	19
LK 8	10	4 58	9	197	0	21 5	6	22	1 33	0	0	0	0	0	0	22
LK 8	10	4 58	10	593	0	50 0	2	33	0	0	0	0	0	0	0	23
LK 8	10	4 58	11	477	0	28 6	2	33	0	0	0	0	0	0	0	11
LK 8	10	4 58	12	952	0	15 7	1	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	13	121	0	11 2	1	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	14	256	0	14 1	1	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	15	167	0	5 0	1	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	16	24	0	3 4	0	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	17	36	0	3 8	0	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	18	49	0	5 5	1	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	19	63	0	1 5	1	33	0	0	0	0	0	0	0	10
LK 8	10	4 58	20	32	0	2 0	1	33	0	0	0	0	0	0	0	10
LK 8	11	4 58	1	9	0	18 3	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	2	33	0	24 7	4	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	3	114	0	17 1	4	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	4	372	0	19 7	5	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	5	458	0	23 6	5	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	6	152	0	17 2	5	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	7	103	0	5 4	5	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	8	122	0	4 1	5	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	9	325	0	27 2	7	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	10	126	0	3 9	7	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	11	325	0	3 9	7	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	12	109	0	3 3	7	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	13	50	0	3 3	7	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	14	106	0	3 3	7	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	15	124	0	1 5	9	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	16	49	0	1 5	9	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	17	13	0	10 3	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	18	145	6	20 1	4	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	19	344	0	24 0	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	20	170	0	29 2	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	1	89	0	27 2	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	2	589	0	3 8	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	3	627	0	4 6	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	4	460	0	3 6	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	5	203	0	6 6	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	6	118	0	1 6	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	7	231	0	1 5	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	8	141	0	12 4	6	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	9	78	0	8 9	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	10	74	0	4 4	0	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	11	12	0	5 8	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	12	7	0	4 1	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	13	16	0	12 2	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	14	0	0	13 5	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	15	0	0	13 6	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	16	0	0	27 8	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	17	0	0	16 5	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	18	0	0	12 8	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	19	0	0	2 2	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	20	0	0	3 2	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	1	62	0	9 9	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	2	0	0	12 5	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	3	72	0	16 0	4	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	4	115	0	11 3	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	5	107	0	8 5	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	6	0	0	4 1	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	7	0	0	2 5	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	8	0	0	5 1	3	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	9	81	0	50	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	10	170	0	55	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	11	81	0	67 4	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	12	81	0	75 7	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	13	453	0	78 1	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	14	402	0	209 4	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	15	158	0	60 5	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	16	118	0	32 0	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	17	0	0	4 5	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	18	40	0	55	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	19	94	0	62 0	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	20	119	0	81 1	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	1	396	0	64 5	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	2	349	0	174 0	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	3	753	0	101 3	1	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	4	58	0	33 3	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	5	0	0	1 5	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	6	15	0	16 0	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	7	179	0	72 9	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	8	121	0	60 4	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	9	83	0	76 9	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	10	193	0	38 1	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	11	496	0	2 5	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	12	529	0	89 4	2	33	0	0	0	0	0	0	0	11
LK 8	11	4 58	13	171	0	33 8	2	33	0	0	0	0	0	0	0	11

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
LK 14	1008	1000	9	0	28	32	5	14	13	0	0	0	0	1	0	5
LK 14	1009	1000	10	0	6	21	1	0	2	0	0	0	0	0	0	0
LK 14	1008	1000	11	0	18	8	0	2	2	0	0	0	0	0	0	0
LK 14	1008	1001	2	66	84	23	4	26	2	0	0	0	0	0	0	0
LK 14	1008	1001	3	124	63	30	7	19	13	0	0	0	0	1	0	0
LK 14	1008	1001	4	0	44	2	0	10	2	0	0	0	0	0	0	0
LK 14	1008	1001	5	235	0	84	6	12	46	1	0	0	0	0	0	0
LK 14	1008	1001	6	675	127	139	9	22	65	0	0	0	0	0	0	0
LK 14	1008	1001	7	601	7	129	0	10	45	95	0	0	0	0	0	0
LK 14	1008	1001	8	80	67	168	13	33	32	0	0	0	0	0	0	0
LK 14	1008	1001	9	26	0	20	4	3	15	0	0	0	0	0	0	0
LK 14	1008	1002	1	0	0	47	0	9	0	0	0	0	0	0	0	0
LK 14	1008	1002	2	76	20	485	31	26	116	1	0	0	0	0	0	0
LK 14	1009	1002	3	98	34	782	56	42	205	0	0	0	0	0	0	0
LK 14	1008	1002	4	165	60	455	33	15	157	0	0	0	0	0	0	0
LK 14	1008	1002	5	141	0	64	3	81	123	0	0	0	0	0	0	0
LK 14	1008	1002	6	365	0	188	9	44	84	0	0	0	0	0	0	0
LK 14	1008	1002	7	1091	0	117	0	59	117	0	0	0	0	0	0	0
LK 14	1008	1002	8	29	12	209	9	42	37	0	0	0	0	0	0	0
LK 14	1008	1002	9	45	0	110	4	14	27	0	0	0	0	0	0	0
LK 14	1009	1000	1	9	18	426	27	78	2	0	0	0	0	0	0	0
LK 14	1009	1000	2	302	31	115	67	340	154	0	0	0	0	0	0	0
LK 14	1009	1000	3	379	54	643	17	116	78	0	0	0	0	0	0	0
LK 14	1009	1000	4	182	32	600	23	131	77	0	0	0	0	0	0	0
LK 14	1009	1000	5	123	16	836	17	80	91	0	0	0	0	0	0	0
LK 14	1009	1000	6	349	120	810	17	80	91	0	0	0	0	0	0	0
LK 14	1009	1000	7	207	0	700	20	72	95	0	0	0	0	0	0	0
LK 14	1009	1000	8	47	0	172	2	28	35	0	0	0	0	0	0	0
LK 14	1009	1000	9	5	33	158	13	39	13	0	0	0	0	0	0	0
LK 14	1009	1001	1	7	2	335	13	3	1	0	0	0	0	0	0	0
LK 14	1009	1001	2	153	85	922	46	318	89	0	0	0	0	0	0	0
LK 14	1009	1001	3	99	120	346	28	146	163	0	0	0	0	0	0	0
LK 14	1009	1001	4	157	9	521	20	104	103	0	0	0	0	0	0	0
LK 14	1009	1001	5	184	5	389	17	71	70	0	0	0	0	0	0	0
LK 14	1009	1001	6	213	13	2019	39	74	125	0	0	0	0	0	0	0
LK 14	1009	1001	7	285	0	617	16	51	126	0	0	0	0	0	0	0
LK 14	1009	1001	8	39	1	298	11	45	36	0	0	0	0	0	0	0
LK 14	1009	1001	9	34	0	168	6	13	25	0	0	0	0	0	0	0
LK 14	1009	1002	1	6	0	175	5	16	2	0	0	0	0	0	0	0
LK 14	1009	1002	2	192	81	798	59	358	111	0	0	0	0	0	0	0
LK 14	1009	1002	3	151	49	721	36	243	176	0	0	0	0	0	0	0
LK 14	1009	1002	4	9	237	680	13	65	135	0	0	0	0	0	0	0
LK 14	1009	1002	5	157	3	1027	18	104	112	0	0	0	0	0	0	0
LK 14	1009	1002	6	532	28	1216	23	82	103	0	0	0	0	0	0	0
LK 14	1009	1002	7	729	35	1404	19	78	76	0	0	0	0	0	0	0
LK 14	1009	1002	8	61	0	272	19	57	38	0	0	0	0	0	0	0
LK 14	1009	1002	9	5	0	94	10	34	34	0	0	0	0	0	0	0
LK 14	1010	1000	1	23	5	454	32	98	24	0	0	0	0	0	0	0
LK 14	1010	1000	2	234	97	1256	54	348	160	0	0	0	0	0	0	0
LK 14	1010	1000	3	7	22	251	13	57	31	0	0	0	0	0	0	0
LK 14	1010	1000	4	145	34	732	34	122	86	0	0	0	0	0	0	0
LK 14	1010	1000	5	244	0	576	13	52	63	0	0	0	0	0	0	0
LK 14	1010	1000	6	445	0	1185	18	76	96	0	0	0	0	0	0	0
LK 14	1010	1000	7	319	5	813	20	60	97	0	0	0	0	0	0	0
LK 14	1010	1000	8	0	4	87	20	30	25	0	0	0	0	0	0	0
LK 14	1010	1000	9	3	0	94	7	26	6	0	0	0	0	0	0	0
LK 14	1010	1000	10	0	0	5	2	6	1	0	0	0	0	0	0	0
LK 14	1010	1000	11	0	0	3	1	1	5	0	0	0	0	0	0	0
LK 14	1010	1001	1	4	1	260	8	20	0	0	0	0	0	0	0	0
LK 14	1010	1001	2	254	132	1239	61	0	146	0	0	0	0	0	0	0
LK 14	1010	1001	3	47	41	680	34	245	140	0	0	0	0	0	0	0
LK 14	1010	1001	4	163	10	596	36	133	104	0	0	0	0	0	0	0
LK 14	1010	1001	5	67	31	628	19	63	69	0	0	0	0	0	0	0
LK 14	1010	1001	6	482	10	1660	25	82	109	0	0	0	0	0	0	0
LK 14	1010	1001	7	431	56	1598	16	86	116	0	0	0	0	0	0	0
LK 14	1010	1001	8	346	5	592	13	58	49	0	0	0	0	0	0	0
LK 14	1010	1001	9	187	0	183	7	37	44	0	0	0	0	0	0	0
LK 14	1010	1002	1	135	0	278	8	15	0	0	0	0	0	0	0	0
LK 14	1010	1002	2	820	136	1726	86	312	86	0	0	0	0	0	0	0
LK 14	1010	1002	3	330	21	842	32	207	73	0	0	0	0	0	0	0
LK 14	1010	1002	4	69	65	774	17	22	0	0	0	0	0	0	0	0
LK 14	1010	1002	5	232	6	898	35	121	100	0	0	0	0	0	0	0
LK 14	1010	1002	6	348	196	66	21	80	87	0	0	0	0	0	0	0
LK 14	1010	1002	7	195	0	1262	21	90	80	0	0	0	0	0	0	0
LK 14	1010	1002	8	175	0	316	9	46	77	0	0	0	0	0	0	0
LK 14	1010	1002	9	45	2	407	7	29	25	0	0	0	0	0	0	0
LK 51	999	981	1	0	22	592	24	63	14	0	0	0	0	15	0	22
LK 51	999	981	2	334	19	1037	47	190	48	0	0	0	0	4	0	26
LK 51	999	981	3	391	34	546	33	143	91	0	0	0	0	3	0	33
LK 51	999	981	4	0	31	237	18	68	65	0	0	0	0	5	0	33
LK 51	999	981	5	0	60	807	27	91	73	0	0	0	0	1	0	36
LK 51	999	981	6	528	31	905	30	124	0	0	0	0	0	2	0	36
LK 51	999	981	7	0	6	88	39	54	172	0	0	0	0	22	0	46
LK 51	999	981	8	327	23	786	13	39	140	0	0	0	0	10	0	20
LK 51	999	981	9	429	13	949	12	34	150	0	0	0	0	6	0	29
LK 51	999	981	10	0	26	790	12	86	140	0	0	0	0	12	0	30
LK 51	999	981	11	0	71	1877	11	41	117	0	0	0	0	14	0	33
LK 51	999	981	12	229	50	597	10	18	76	0	0	0	0	15	0	62
LK 51	999	981	13	119	16	388	17	20	0	0	0	0	0	27	0	43

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
LK 51	999	981	14	173	228	178	11	25	87	0	0	0	0	17	0	24
LK 51	999	981	15	0	1213	300	7	7	0	0	0	0	0	11	1	20
LK 51	999	981	16	0	75	67	6	27	99	0	0	0	0	9	0	30
LK 51	999	981	17	0	92	1	1	4	27	0	0	0	0	6	0	12
LK 51	999	982	1	0	1233	357	11	31	12	0	0	0	0	3	0	12
LK 51	999	982	2	0	359	790	30	180	55	0	0	0	0	19	0	18
LK 51	999	982	3	0	178	787	30	138	118	0	0	0	0	7	0	22
LK 51	999	982	4	0	25	291	7	36	31	0	0	0	0	4	0	5
LK 51	999	982	5	157	397	909	17	104	86	0	0	0	0	11	0	26
LK 51	999	982	6	0	589	587	17	62	65	0	0	0	0	7	0	23
LK 51	999	982	7	0	68	639	7	57	20	0	0	0	0	4	0	22
LK 51	999	982	8	327	196	650	5	14	0	0	0	0	0	2	0	19
LK 51	999	982	9	167	346	733	15	30	164	0	0	0	0	2	0	29
LK 51	999	982	10	0	379	446	20	107	158	0	0	0	0	9	0	30
LK 51	999	982	11	94	677	446	14	33	33	0	0	0	0	1	0	49
LK 51	999	982	12	0	444	487	14	33	33	0	0	0	0	2	0	41
LK 51	999	982	13	0	469	555	12	30	30	0	0	0	0	7	0	19
LK 51	999	982	14	0	213	101	17	91	1	0	0	0	0	7	0	18
LK 51	999	982	15	0	625	74	11	14	82	0	0	0	0	2	0	14
LK 51	999	982	16	0	235	79	3	3	49	0	0	0	0	2	0	11
LK 51	999	982	17	8	8	36	4	4	40	0	0	0	0	4	0	13
LK 51	999	984	205	0	118	355	9	54	23	19	0	0	0	4	0	10
LK 51	999	984	2	0	254	771	51	172	85	11	0	0	0	7	0	17
LK 51	999	984	3	0	160	65	24	120	105	3	0	0	0	5	0	17
LK 51	999	984	4	0	78	228	21	142	120	6	0	0	0	9	0	12
LK 51	999	984	5	0	71	227	33	142	65	7	0	0	0	2	0	1
LK 51	999	984	6	0	300	455	26	78	53	3	0	0	0	4	0	4
LK 51	999	984	7	463	61	440	18	52	144	1	0	0	0	7	0	16
LK 51	999	984	8	0	147	462	12	44	140	0	0	0	0	7	0	24
LK 51	999	984	9	0	446	373	9	51	118	0	0	0	0	19	0	33
LK 51	999	984	10	0	468	856	19	80	105	0	0	0	0	17	0	38
LK 51	999	984	11	0	426	13	13	45	103	1	0	0	0	17	0	33
LK 51	999	984	12	0	81	267	16	33	111	0	0	0	0	24	0	23
LK 51	999	984	13	0	71	14	14	21	106	0	0	0	0	9	0	16
LK 51	999	984	14	0	63	12	9	28	65	0	0	0	0	3	0	38
LK 51	999	984	15	0	149	5	5	1	42	0	0	0	0	2	0	1
LK 51	999	984	16	0	0	0	2	9	20	0	0	0	0	0	0	0
LK 51	999	984	17	0	0	0	1	9	13	0	0	0	0	0	0	0
LK 51	999	984	18	0	0	0	0	0	10	0	0	0	0	0	0	0
LK 51	999	984	19	0	0	0	0	58	5	0	0	0	0	0	0	0
LK 51	999	984	20	0	0	0	4	1	2	0	0	0	0	0	0	0
LK 51	999	984	21	0	0	0	0	0	1	0	0	0	0	0	0	0
LK 51	998	981	2	0	68	38	34	0	11	1	0	0	0	14	0	14
LK 51	998	981	3	0	111	33	46	19	33	1	0	0	0	4	0	21
LK 51	998	981	4	0	654	13	21	102	71	3	0	0	0	5	0	18
LK 51	998	981	5	0	332	88	37	132	46	0	0	0	0	7	0	3
LK 51	998	981	6	0	111	23	46	70	33	0	0	0	0	4	0	22
LK 51	998	981	7	0	205	68	43	123	39	0	0	0	0	10	0	22
LK 51	998	981	8	0	185	11	22	63	100	0	0	0	0	7	0	18
LK 51	998	981	9	0	129	33	9	9	128	0	0	0	0	8	0	19
LK 51	998	981	10	0	81	66	11	29	119	0	0	0	0	0	0	14
LK 51	998	981	11	0	608	22	15	24	138	0	0	0	0	1	0	26
LK 51	998	981	12	0	654	68	18	0	103	0	0	0	0	15	0	43
LK 51	998	981	13	2	385	199	13	25	90	3	0	0	0	23	0	52
LK 51	998	981	14	0	351	36	15	36	68	1	0	0	0	8	0	15
LK 51	998	981	15	0	755	165	22	45	105	0	0	0	0	13	0	20
LK 51	998	981	16	0	218	80	8	17	72	3	0	0	0	15	0	21
LK 51	998	981	17	0	20	31	8	55	62	1	0	0	0	6	0	22
LK 51	998	982	1	0	97	14	0	4	29	0	0	0	0	0	0	4
LK 51	998	982	2	0	57	33	19	12	12	0	0	0	0	4	0	21
LK 51	998	982	3	0	23	44	30	55	60	0	0	0	0	3	0	30
LK 51	998	982	4	0	168	22	30	178	81	0	0	0	0	3	0	24
LK 51	998	982	5	0	222	87	10	71	50	0	0	0	0	7	0	8
LK 51	998	982	6	0	133	88	45	199	72	2	0	0	0	2	0	6
LK 51	998	982	7	0	122	22	14	64	11	4	0	0	0	12	0	7
LK 51	998	982	8	0	195	66	14	0	176	1	0	0	0	8	0	18
LK 51	998	982	9	0	146	607	11	33	272	1	0	0	0	6	0	15
LK 51	998	982	10	0	881	781	11	28	184	0	0	0	0	7	0	16
LK 51	998	982	11	0	198	343	6	39	145	0	0	0	0	4	0	11
LK 51	998	982	12	0	373	785	18	71	80	1	0	0	0	16	0	43
LK 51	998	982	13	0	137	480	16	29	82	0	0	0	0	3	0	23
LK 51	998	982	14	0	197	27	11	27	99	0	0	0	0	3	0	24
LK 51	998	982	15	0	290	40	12	29	189	0	0	0	0	10	0	17
LK 51	998	982	16	0	333	43	1	46	23	0	0	0	0	7	0	21
LK 51	998	982	17	0	297	77	9	22	97	0	0	0	0	4	0	15
LK 51	998	984	1	0	26	33	18	15	52	0	0	0	0	3	0	6
LK 51	998	984	2	0	115	22	34	46	11	1	0	0	0	4	0	4
LK 51	998	984	3	0	259	88	34	129	96	2	0	0	0	9	0	8
LK 51	998	984	4	0	117	66	35	136	192	0	0	0	0	5	0	8
LK 51	998	984	5	0	228	66	26	122	106	1	0	0	0	4	0	13
LK 51	998	984	6	0	53	22	45	22	57	71	0	0	0	1	0	3
LK 51	998	984	7	0	118	74	20	69	69	25	0	0	0	5	0	10
LK 51	998	984	8	0	72	65	9	0	147	8	0	0	0	6	0	10
LK 51	998	984	9	0	481	77	18	44	199	2	0	0	0	7	0	20
LK 51	998	984	10	0	858	46	11	44	179	1	0	0	0	13	0	2
LK 51	998	984	11	0	670	44	11	33	125	1	0	0	0	0	0	15
LK 51	998	984	12	14	197	581	38	13	98	0	0	0	0	0	0	0
LK 51	998	984	13	88	726	14	14	45	124	0	0	0	0	2	0	0
LK 51	998	984	14	0	197	168	12	45	103	1	0	0	0	5	0	16

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
LR 1	998	984	15	0	75	8	10	36	72	1	0	1	0	7	0	18
LR 1	998	984	16	0	5	7	4	15	50	0	0	2	0	5	0	18
LR 1	998	984	17	0	1	6	3	10	31	1	0	0	0	5	0	7
LR 1	1010	1008	11	159	329	42	12	47	17	6	0	0	0	5	0	6
LR 1	1010	1011	11	62	42	30	8	29	9	1	0	0	0	5	0	10
LR 1	1010	1011	11	182	333	288	2	77	51	2	0	0	0	1	0	20
LR 1	1010	1011	11	46	90	33	10	81	30	0	0	0	0	1	0	5
LR 1	1010	1011	11	78	97	36	4	65	162	0	0	0	0	0	0	5
LR 1	1010	1011	11	112	4	192	1	12	120	1	0	0	0	0	0	4
LR 1	1010	1011	11	64	0	44	2	8	26	0	0	0	0	0	0	1
LR 1	1010	1011	11	367	462	550	3	18	95	0	0	0	0	1	0	10
LR 1	1010	1011	11	537	163	966	6	18	78	12	0	0	0	0	0	10
LR 1	1010	1011	11	0	44	778	1	15	117	5	0	0	0	0	0	8
LR 1	1010	1011	11	277	552	350	11	33	307	2	0	0	0	0	0	15
LR 1	1010	1011	11	398	922	799	11	300	252	12	0	0	0	0	0	9
LR 1	1011	1008	11	14	170	449	200	133	13	0	0	0	0	0	0	9
LR 1	1011	1008	11	19	97	922	74	30	66	0	0	0	0	0	0	2
LR 1	1011	1011	11	14	208	366	9	24	7	0	0	0	0	0	0	1
LR 1	1011	1011	11	85	133	103	27	167	101	0	0	0	0	0	0	1
LR 1	1011	1011	11	0	47	103	22	18	25	0	0	0	0	0	0	0
LR 1	1011	1011	11	214	17	61	1	10	70	0	0	0	0	0	0	1
LR 1	1011	1011	11	45	25	208	10	82	57	2	0	0	0	0	0	2
LR 1	1011	1011	11	300	299	750	3	19	108	0	0	0	0	0	0	1
LR 1	1011	1011	11	222	582	1151	7	99	91	0	0	0	0	0	0	8
LR 1	1025	1039	11	253	735	2350	5	125	90	15	0	0	0	1	0	2
LR 1	1025	1039	11	200	866	907	25	110	119	11	0	0	0	0	0	10
LR 1	1025	1039	11	1472	382	1527	43	100	109	338	0	0	0	0	0	20
LR 1	1025	1039	11	251	329	1004	19	92	75	4	0	0	0	0	0	7
LR 1	1025	1041	11	239	478	1588	24	71	39	5	0	0	0	0	0	1
LR 1	1025	1041	11	0	790	1042	20	78	79	1	0	0	0	0	0	5
LR 1	1025	1041	11	45	365	673	20	52	56	1	0	0	0	0	0	9
LR 1	1025	1041	11	194	134	1690	15	128	104	9	0	0	0	0	0	0
LR 1	1025	1041	11	0	125	1405	27	112	138	5	0	2	0	1	0	14
LR 1	1025	1041	11	0	55	913	18	19	70	13	0	0	0	0	0	6
LR 1	1025	1042	11	539	487	2245	10	51	15	7	0	0	0	0	0	17
LR 1	1025	1042	11	194	488	1141	42	125	121	15	0	0	0	0	0	12
LR 1	1025	1042	11	239	488	1097	42	111	111	3	0	0	0	0	0	12
LR 1	1025	1042	11	213	488	1073	20	64	107	26	0	0	0	1	0	28
LR 1	1025	1042	11	0	339	1636	35	45	62	1	0	0	0	0	0	5
LR 1	1025	1039	11	204	267	1632	35	78	69	1	0	0	0	2	0	5
LR 1	1026	1039	11	300	344	878	10	65	94	18	0	0	0	0	0	3
LR 1	1026	1039	11	0	82	1030	29	91	37	31	0	0	0	0	0	18
LR 1	1026	1039	11	210	602	1234	1	89	78	19	0	0	0	0	0	13
LR 1	1026	1039	11	0	48	217	1	7	21	4	0	0	0	0	0	2
LR 1	1026	1042	11	300	264	2079	32	97	35	1	0	0	0	0	0	28
LR 1	1026	1042	11	234	475	1303	17	96	131	19	0	0	0	0	0	12
LR 1	1026	1042	11	151	328	670	8	3	64	34	0	0	0	0	0	4
LR 1	1026	1042	11	307	205	720	13	38	95	17	0	0	0	1	0	26
LR 1	1026	1062	11	0	0	54	0	12	0	0	0	0	0	0	0	0
LR 1	1033	1062	11	138	41	343	4	161	43	9	0	0	0	0	0	7
LR 1	1033	1062	11	8	246	418	8	17	3	0	0	0	0	0	0	1
LR 1	1033	1065	11	48	0	0	12	61	0	2	0	0	0	0	0	12
LR 1	1033	1065	11	128	44	671	18	70	29	0	0	0	0	0	0	6
LR 1	1033	1065	11	16	840	308	10	55	26	12	0	0	0	0	0	1
LR 1	1033	1065	11	118	119	308	9	64	23	4	0	0	0	0	0	1
LR 1	1033	1065	11	25	42	482	6	23	22	8	0	0	0	0	0	0
LR 1	1033	1065	11	0	0	88	6	37	16	5	0	0	0	1	0	10
LR 1	1033	1065	11	180	101	782	11	32	79	4	0	0	0	0	0	14
LR 1	1033	1065	11	278	478	1836	12	27	44	30	0	0	0	0	0	13
LR 1	1033	1065	11	118	327	1598	7	44	44	1	0	0	0	0	0	2
LR 1	1033	1065	11	0	470	2232	30	54	75	0	0	0	0	0	0	26
LR 1	1034	1062	11	0	20	150	5	11	3	1	0	0	0	0	0	0
LR 1	1034	1062	11	0	60	0	10	63	11	0	0	0	0	0	0	1
LR 1	1034	1065	11	61	899	370	8	67	23	1	0	0	0	0	0	1
LR 1	1034	1065	11	0	56	566	6	16	4	0	0	0	0	0	0	6
LR 1	1034	1065	11	95	424	633	13	69	13	9	0	0	0	0	0	0
LR 1	1034	1065	11	18	121	999	16	56	34	10	0	0	0	0	0	1
LR 1	1034	1065	11	214	168	556	16	58	28	4	0	0	0	0	0	3
LR 1	1034	1065	11	132	688	222	19	88	38	0	0	0	0	0	0	3
LR 1	1034	1065	11	0	632	333	2	15	12	1	0	0	0	0	0	3
LR 1	1034	1065	11	79	222	789	9	27	22	31	0	0	0	0	0	1
LR 1	1034	1065	11	0	22	190	7	40	48	29	0	0	0	0	0	1
LR 1	1034	1065	11	1	49	161	2	10	54	10	0	0	0	2	0	1
LR 1	1034	1065	11	140	244	164	2	17	65	16	0	0	0	1	0	4
LR 1	1038	1083	11	2	17	128	25	4	0	0	0	0	0	0	0	0
LR 1	1038	1083	11	40	19	77	2	14	0	0	0	0	0	0	0	2
LR 1	1038	1083	11	0	19	189	2	18	1	0	0	0	0	0	0	0
LR 1	1038	1083	11	10	10	50	3	2	4	0	0	0	0	0	0	0
LR 1	1039	1083	11	10	19	144	0	3	0	1	0	0	0	0	0	2
LR 1	1039	1083	11	28	0	301	11	36	15	13	0	0	0	0	0	8
LR 1	1039	1083	11	12	42	295	13	53	17	1	0	0	0	0	0	0
LR 1	1039	1083	11	0	0	47	4	33	2	0	0	0	0	0	0	1
LR 1	1039	1083	11	59	0	38	2	5	4	0	0	0	0	0	0	1
LR 1	1000	1002	11	0	1	183	3	5	0	0	0	0	0	0	0	1
LR 1	1000	1002	11	0	209	210	7	41	15	0	0	0	0	0	0	6
LR 1	1000	1002	11	0	62	140	10	37	66	1	0	0	0	1	0	2
LR 1	1000	1002	11	0	88	394	12	55	92	0	0	0	0	1	0	2
LR 1	1000	1002	11	0	75	745	16	85	102	1	0	0	0	1	0	8
LR 1	1000	1002	11	0	317	869	14	60	108	1	0	0	0	1	0	2

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
LK 53	1000	1002	7	0	133	960	18	38	179	1	0	0	0	2	0	13
LK 53	1000	1002	8	41	855	1803	17	45	115	1	0	0	0	4	0	18
LK 53	1000	1002	9	0	1400	706	17	31	74	0	0	0	0	5	0	14
LK 53	1000	1002	10	30	1399	708	4	27	91	0	0	0	0	4	0	34
LK 53	1000	1002	11	0	415	294	6	28	81	0	0	0	0	7	0	8
LK 53	1000	1003	1	0	366	213	2	4	1	1	0	0	0	4	0	7
LK 53	1000	1003	2	0	122	295	8	11	41	0	0	0	0	6	0	2
LK 53	1000	1003	3	0	466	584	8	42	82	1	0	0	0	6	0	38
LK 53	1000	1003	4	0	211	586	16	59	105	0	0	0	0	0	0	3
LK 53	1000	1003	5	0	142	455	16	51	140	0	0	0	0	0	0	16
LK 53	1000	1003	6	392	620	693	11	80	156	0	0	0	0	0	0	14
LK 53	1000	1003	7	0	222	880	16	53	185	0	0	0	0	0	0	11
LK 53	1000	1003	8	99	222	1410	10	29	147	0	0	0	0	0	0	11
LK 53	1000	1003	9	0	336	1078	13	29	79	0	0	0	0	1	0	7
LK 53	1000	1003	1	0	332	180	13	34	77	0	0	0	0	1	0	19
LK 53	1000	1003	11	0	455	300	13	32	97	0	0	0	0	5	0	17
LK 53	1000	1004	1	16	0	112	1	0	3	0	0	0	0	0	0	6
LK 53	1000	1004	2	0	4	240	9	0	45	0	0	0	0	0	0	9
LK 53	1000	1004	3	0	103	48	24	41	124	0	0	0	0	8	0	0
LK 53	1000	1004	4	0	300	390	12	58	82	0	0	0	0	4	0	7
LK 53	1000	1004	5	0	332	989	11	58	339	0	0	0	0	0	0	1
LK 53	1000	1004	6	0	254	703	9	20	175	0	0	0	0	0	0	5
LK 53	1000	1004	7	0	255	1233	7	8	107	0	0	0	0	0	0	1
LK 53	1000	1004	8	0	295	1496	3	21	123	0	0	0	0	0	0	2
LK 53	1000	1004	9	0	147	1214	3	26	96	0	0	0	0	0	0	1
LK 53	1000	1004	10	0	244	1030	3	26	38	0	0	0	0	0	0	2
LK 53	1000	1004	11	65	833	465	16	30	74	0	0	0	0	1	0	7
LK 53	1000	1004	12	0	55	1098	11	19	51	0	0	0	0	0	0	2
LK 53	1000	1004	13	0	45	405	11	5	22	0	0	0	0	2	0	9
LK 53	1000	1004	14	0	99	150	1	2	16	0	0	0	0	0	0	0
LK 53	1000	1004	15	0	1	106	1	1	13	0	0	0	0	0	0	3
LK 53	1000	1004	16	0	93	46	1	1	9	0	0	0	0	0	0	0
LK 53	1000	1004	17	0	0	10	1	1	2	0	0	0	0	0	0	3
LK 53	1001	1002	1	0	110	110	1	5	2	0	0	0	0	0	0	0
LK 53	1001	1002	2	0	13	450	8	30	27	0	0	0	0	1	0	1
LK 53	1001	1002	3	0	13	677	7	28	70	0	0	0	0	0	0	1
LK 53	1001	1002	4	225	499	379	7	46	75	0	0	0	0	0	0	1
LK 53	1001	1002	5	0	10	893	16	66	99	0	0	0	0	1	0	2
LK 53	1001	1002	6	0	38	900	14	74	131	0	0	0	0	0	0	15
LK 53	1001	1002	7	0	34	902	0	0	148	0	0	0	0	0	0	0
LK 53	1001	1002	8	69	354	989	13	33	129	0	0	0	0	0	0	14
LK 53	1001	1002	9	0	179	551	21	39	129	0	0	0	0	0	0	12
LK 53	1001	1002	10	0	173	258	13	45	111	0	0	0	0	0	0	17
LK 53	1001	1002	11	0	499	160	8	22	54	0	0	0	0	0	0	26
LK 53	1001	1003	1	0	266	128	3	6	4	0	0	0	0	0	0	2
LK 53	1001	1003	2	0	103	499	2	6	36	0	0	0	0	1	0	17
LK 53	1001	1003	3	0	65	175	10	2	75	0	0	0	0	0	0	9
LK 53	1001	1003	4	0	22	412	11	96	96	0	0	0	0	0	0	1
LK 53	1001	1003	5	0	333	422	17	33	121	0	0	0	0	0	0	8
LK 53	1001	1003	6	0	333	823	13	38	142	0	0	0	0	0	0	1
LK 53	1001	1003	7	130	32	756	14	39	109	0	0	0	0	0	0	5
LK 53	1001	1003	8	0	55	719	6	27	73	0	0	0	0	0	0	14
LK 53	1001	1003	9	0	16	485	12	30	78	0	0	0	0	0	0	21
LK 53	1001	1003	10	0	309	1692	17	33	94	0	0	0	0	0	0	0
LK 53	1001	1003	11	0	400	164	10	14	82	0	0	0	0	0	0	22
LK 53	1001	1004	1	16	288	192	6	6	5	0	0	0	0	0	0	3
LK 53	1001	1004	2	12	600	132	5	17	38	0	0	0	0	0	0	1
LK 53	1001	1004	3	0	172	565	11	26	106	0	0	0	0	0	0	10
LK 53	1001	1004	4	37	178	500	17	26	109	0	0	0	0	0	0	8
LK 53	1001	1004	5	0	10	769	13	25	144	0	0	0	0	0	0	1
LK 53	1001	1004	6	0	155	1207	6	25	141	0	0	0	0	0	0	1
LK 53	1001	1004	7	0	122	748	3	16	178	0	0	0	0	0	0	1
LK 53	1001	1004	8	166	222	1167	15	33	124	0	0	0	0	0	0	1
LK 53	1001	1004	9	0	195	508	19	49	73	0	0	0	0	0	0	27
LK 53	1001	1004	10	0	427	542	17	61	60	0	0	0	0	1	0	12
LK 53	1001	1004	11	0	105	153	8	33	106	0	0	0	0	0	0	8
LK 53	1002	1002	1	0	133	210	5	7	13	0	0	0	0	0	0	5
LK 53	1002	1002	2	0	26	381	13	27	43	0	0	0	0	0	0	10
LK 53	1002	1002	3	0	26	388	14	27	48	0	0	0	0	0	0	10
LK 53	1002	1002	4	0	85	481	15	46	78	0	0	0	0	0	0	8
LK 53	1002	1002	5	0	381	92	11	29	101	0	0	0	0	0	0	10
MC 99	998	1013	1	0	98	5	2	0	0	0	0	0	0	0	0	10
MC 99	998	1013	2	0	171	18	7	20	3	0	0	0	0	0	0	10
MC 99	998	1013	3	0	109	20	6	48	3	0	0	0	0	0	0	4
MC 99	998	1013	4	0	424	6	5	36	28	0	0	0	0	0	0	5
MC 99	998	1013	5	0	264	17	11	16	10	0	0	0	0	0	0	19
MC 99	999	1011	1	0	130	28	5	13	15	0	0	0	0	0	0	4
MC 99	999	1011	2	0	130	5	11	10	7	0	0	0	0	0	0	13
MC 99	999	1011	3	0	95	0	5	10	9	0	0	0	0	0	0	2
MC 99	999	1011	4	0	234	0	12	71	3	0	0	0	0	0	0	0
MC 99	999	1011	5	25	177	16	1	24	14	0	0	0	0	0	0	1
MC 99	999	1012	1	0	10	17	1	13	0	0	0	0	0	0	0	0
MC 99	999	1012	2	0	344	3	7	35	12	0	0	0	0	0	0	1
MC 99	999	1012	3	0	894	63	4	12	1	0	0	0	0	0	0	6
MC 99	999	1012	4	0	270	13	1	10	13	0	0	0	0	0	0	0
MC 99	999	1012	5	0	26	8	0	5	21	0	0	0	0	0	0	1

[illegible]

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
MC2222	98	90	1	8	207	1	1	1	13	18	0	0	0	4	0	1
MC2222	98	90	2	5	444	4	2	1	80	11	0	0	0	5	0	5
MC2222	98	90	3	10	899	17	3	6	116	3	0	0	0	5	0	6
MC2222	98	91	1	12	205	2	2	8	7	6	0	0	0	5	0	5
MC2222	98	91	2	24	430	3	4	14	64	4	0	0	0	4	0	1
MC2222	98	91	3	34	301	11	4	45	21	10	0	0	0	4	0	1
MC2222	99	86	1	0	99	9	0	3	18	13	0	0	0	6	0	2
MC2222	99	86	2	1	11	16	0	3	21	15	0	0	0	6	0	3
MC2222	99	86	3	0	0	0	0	5	15	17	0	0	0	5	0	1
MC2222	99	89	1	3	22	0	0	1	6	1	0	0	0	1	0	1
MC2222	99	89	2	3	22	0	0	5	7	2	0	0	0	1	0	3
MC2222	99	89	3	10	206	2	1	13	19	18	0	0	0	1	0	4
MC2222	99	89	4	8	184	2	0	1	0	7	0	0	0	2	0	8
MC2222	99	90	1	0	112	2	0	0	0	0	0	0	0	0	0	8
MC2222	99	90	2	5	525	1	0	0	0	0	0	0	0	0	0	8
MC2222	99	90	3	12	334	1	0	1	0	0	0	0	0	0	0	10
MC2222	99	91	1	14	141	2	1	6	5	8	0	0	0	0	0	1
MC2222	99	91	2	10	105	18	1	4	40	10	0	0	0	8	0	2
MC2222	99	91	3	23	103	17	1	4	19	7	0	0	0	4	0	4
MC2222	99	91	4	20	1	4	1	1	50	2	0	0	0	3	0	1
MC2222	99	91	5	10	2	8	1	1	3	1	0	0	0	1	0	1
MC2222	100	86	1	6	114	13	9	33	16	0	0	0	0	9	0	10
MC2222	100	86	2	2	741	30	3	6	5	4	0	0	0	1	0	2
MC2222	100	89	1	0	65	1	1	18	21	5	0	0	0	4	0	5
MC2222	100	89	2	3	281	3	0	4	12	2	0	0	0	8	0	8
MC2222	100	89	3	8	464	66	9	27	143	1	0	0	0	0	0	1
LK2222	100	100	1	0	420	80	16	33	103	0	0	0	0	0	0	2
LK2222	100	100	2	10	308	79	5	30	109	0	0	0	0	0	0	0
LK2222	100	100	3	11	187	83	3	21	0	0	0	0	0	0	0	0
LK2222	100	100	4	1	22	21	5	4	2	0	0	0	0	0	0	0
LK2222	100	100	5	1	118	48	8	21	47	0	0	0	0	0	0	0
LK2222	100	100	6	3	145	71	8	14	64	0	0	0	0	0	0	1
LK2222	100	100	7	4	210	41	9	30	101	1	0	0	0	0	0	4
LK2222	100	100	8	5	483	82	8	28	99	1	0	0	0	0	0	5
LK2222	100	100	9	6	195	81	1	22	121	0	0	0	0	0	0	8
LK2222	100	100	10	7	218	79	5	9	96	1	0	0	0	0	0	8
LK2222	100	100	11	8	243	77	11	32	117	0	0	0	0	0	0	4
LK2222	100	100	12	9	192	73	21	81	56	0	0	0	0	0	0	1
LK2222	100	100	13	0	133	67	15	52	107	0	0	0	0	0	0	3
LK2222	100	100	14	1	130	12	12	24	87	0	0	0	0	0	0	3
LK2222	100	100	15	1	24	26	0	5	4	0	0	0	0	0	0	1
LK2222	100	100	16	2	91	42	8	27	23	0	0	0	0	0	0	1
LK2222	100	100	17	3	71	28	6	24	64	0	0	0	0	0	0	1
LK2222	100	100	18	4	177	28	4	23	94	1	0	0	0	0	0	5
LK2222	100	100	19	5	1064	99	11	36	177	0	0	0	0	0	0	5
LK2222	100	100	20	6	76	97	7	41	146	0	0	0	0	0	0	7
LK2222	100	100	21	7	405	65	3	10	152	0	0	0	0	0	0	7
LK2222	100	100	22	8	198	10	17	39	91	0	0	0	0	0	0	3
LK2222	100	100	23	9	442	59	11	31	98	0	0	0	0	0	0	5
LK2222	100	100	24	0	213	39	10	26	98	0	0	0	0	0	0	2
LK2222	100	100	25	1	156	55	10	21	24	0	0	0	0	0	0	0
LK2222	100	100	26	1	110	91	22	34	7	0	0	0	0	0	0	1
LK2222	100	100	27	2	106	1	29	58	14	0	0	0	0	0	0	2
LK2222	100	100	28	3	6	75	7	30	11	0	0	0	0	0	0	3
LK2222	100	100	29	4	29	41	9	0	14	0	0	0	0	0	0	3
LK2222	100	100	30	5	179	121	4	15	6	0	0	0	0	0	0	1
LK2222	100	100	31	6	832	336	42	143	9	0	0	0	0	0	0	2
LK2222	100	100	32	7	137	279	49	136	17	0	0	0	0	0	0	1
LK2222	100	100	33	8	98	13	10	45	6	0	0	0	0	0	0	1
LK2222	100	100	34	9	16	50	5	10	0	0	0	0	0	0	0	1
LK2222	100	100	35	0	98	32	20	52	7	0	0	0	0	0	0	5
LK2222	100	100	36	1	290	81	25	64	7	0	0	0	0	0	0	2
LK2222	100	100	37	2	87	85	13	61	13	0	0	0	0	0	0	1
LK2222	100	100	38	3	36	138	7	46	0	0	0	0	0	0	0	2
LK2222	100	100	39	4	94	134	7	22	12	0	0	0	0	0	0	3
LK2222	100	100	40	5	115	90	17	18	28	0	0	0	0	0	0	1
LK2222	100	100	41	6	273	313	17	43	26	0	0	0	0	0	0	5
LK2222	100	100	42	7	430	50	18	10	17	0	0	0	0	0	0	2
LK2222	100	100	43	8	37	45	2	18	7	0	0	0	0	0	0	0
LK2222	100	100	44	9	7	65	6	6	0	0	0	0	0	0	0	2
LK2222	100	100	45	0	352	161	33	152	2	0	0	0	0	0	0	5
LK2222	100	100	46	1	371	116	26	146	14	0	0	0	0	0	0	3
LK2222	100	100	47	2	19	24	5	0	4	0	0	0	0	0	0	1
LK2222	100	100	48	3	0	0	0	1	0	0	0	0	0	0	0	1
LK2222	100	100	49	4	45	194	28	77	0	0	0	0	0	0	0	4
LK2222	100	100	50	5	262	94	43	128	0	0	0	0	0	0	0	3
LK2222	100	100	51	6	106	336	55	33	0	0	0	0	0	0	0	9
LK2222	100	100	52	7	384	165	15	99	15	0	0	0	0	0	0	6
LK2222	100	100	53	8	141	77	5	59	5	0	0	0	0	0	0	1
LK2222	100	100	54	9	182	167	5	106	0	0	0	0	0	0	0	1
LK2222	100	100	55	0	258	216	80	184	25	0	0	0	0	0	0	2
LK2222	100	100	56	1	266	166	56	109	9	0	0	0	0	0	0	2
LK2222	100	100	57	2	76	257	17	35	16	0	0	0	0	0	0	4
LK2222	100	100	58	3	82	325	1	258	13	0	0	0	0	0	0	3
LK2222	100	100	59	4	0	138	1	0	11	0	0	0	0	0	0	5
LK2222	100	100	60	5	401	95	23	4	12	0	0	0	0	0	0	2
LK2222	100	100	61	6	142	114	5	155	23	0	0	0	0	0	0	2
LK2222	100	100	62	7	0	100	10	3	3	0	0	0	0	0	0	1
LK2222	100	100	63	8	0	8	0	4	0	0	0	0	0	0	0	1
LK2222	100	100	64	9	0	19	0	185	2	0	0	0	0	0	0	1
LK2222	100	100	65	0	71	234	14	221	26	0	0	0	0	0	0	6

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
IK 74	988	991	1	100	156	170	25	245	1	0	0	1	0	11	0	24
LK 74	988	991	2	144	170	189	84	244	24	0	0	0	0	19	0	23
LK 74	988	991	3	16	26	73	24	86	3	0	0	0	0	15	0	12
LK 74	988	991	4	0	0	89	0	7	2	0	0	0	0	0	0	1
LK 74	994	985	1	0	21	181	19	89	17	0	0	0	0	8	0	19
LK 74	994	985	2	139	271	149	88	75	18	0	0	0	0	8	0	4
LK 74	994	985	1	220	98	143	11	28	8	0	0	10	0	8	0	4
LK 74	994	985	2	7	100	75	21	20	20	0	0	0	0	1	0	7
LK 74	994	985	3	32	23	59	8	23	14	0	0	0	0	1	0	5
LK 74	994	985	4	0	0	59	11	7	5	0	0	0	0	1	0	0
LK 74	995	985	1	10	15	182	14	48	18	0	0	0	0	14	0	3
LK 74	995	985	2	30	241	190	11	55	25	0	0	2	0	8	0	2
LK 74	995	985	3	0	317	919	25	61	25	0	0	2	0	10	0	8
LK 74	995	985	4	220	536	244	11	50	23	0	0	1	0	5	0	2
LK 74	995	986	2	0	145	115	23	71	21	0	0	0	0	2	0	3
LK 74	997	1000	1	0	169	22	15	49	15	0	0	0	0	14	0	3
LK 74	1001	1004	1	16	188	772	18	37	2	0	0	0	0	1	0	3
LK 74	1070	857	1	51	28	192	66	6	5	0	0	0	0	7	0	1
LK 74	1070	857	2	80	145	796	28	168	16	0	0	0	0	7	0	1
LK 74	1070	857	3	72	393	909	23	286	46	0	0	0	0	6	0	1
LK 74	1070	857	4	94	367	548	4	224	22	0	0	0	0	6	0	1
LK 74	1070	858	1	71	17	159	49	46	57	0	0	0	0	9	0	1
LK 74	1070	858	2	31	191	942	55	400	25	0	0	0	0	2	0	7
LK 74	1070	858	3	0	263	282	10	287	61	0	0	0	0	7	0	8
LK 74	1070	858	4	0	199	678	10	173	40	0	0	0	0	2	0	1
LK 74	1071	857	1	0	84	179	55	57	24	0	0	0	0	13	0	1
LK 74	1071	857	2	106	434	730	45	190	21	0	0	0	0	17	0	1
LK 74	1071	857	3	766	74	143	54	311	39	0	0	0	0	7	0	6
LK 74	1071	857	4	3	198	293	12	176	51	0	0	0	0	4	0	0
LK 74	1071	857	5	25	80	109	66	14	6	0	0	0	0	0	0	0
LK 74	1071	857	6	0	0	2	0	3	7	0	0	0	0	0	0	0
LK 74	1071	858	1	61	151	75	0	4	9	0	0	0	0	1	0	1
LK 74	1071	858	2	55	114	132	0	314	94	0	0	0	0	1	0	0
LK 74	1071	858	3	26	0	90	0	257	107	0	0	0	0	8	0	1
LK 74	1071	858	4	0	13	60	0	124	68	0	0	0	0	0	0	0
MC 29	997	1011	1	0	150	8	2	4	0	0	0	0	0	0	0	0
MC 29	997	1011	2	0	115	8	1	7	3	0	0	0	0	0	0	0
MC 29	997	1011	3	0	49	20	4	34	14	0	0	0	0	0	0	0
MC 29	997	1011	4	0	88	95	3	9	69	0	0	0	0	0	0	0
MC 29	997	1011	5	0	35	0	1	7	51	0	0	0	0	0	0	0
MC 29	997	1011	6	0	88	4	3	9	0	0	0	0	0	0	0	0
MC 29	997	1012	1	0	102	10	3	35	2	0	0	0	0	0	0	0
MC 29	997	1012	2	0	63	46	4	20	24	0	0	0	0	0	0	0
MC 29	997	1012	3	0	31	126	5	13	43	0	0	0	0	0	0	0
MC 29	997	1012	4	0	69	1	8	39	75	0	0	0	0	0	0	0
MC 29	997	1012	5	0	60	1	1	29	39	0	0	0	0	0	0	0
MC 29	997	1012	6	0	0	1	1	3	52	0	0	0	0	0	0	0
MC 29	997	1013	1	0	37	12	4	8	1	0	0	0	0	0	0	0
MC 29	997	1013	2	0	28	4	5	13	10	0	0	0	0	0	0	0
MC 29	997	1013	3	0	86	8	5	11	29	0	0	0	0	0	0	0
MC 29	997	1013	4	0	16	0	6	36	38	0	0	0	0	0	0	0
MC 29	997	1013	5	0	14	0	6	10	66	0	0	0	0	0	0	0
MC 29	997	1013	6	0	17	0	6	33	0	0	0	0	0	0	0	0
MC 29	998	1011	1	0	3	22	0	4	0	0	0	0	0	0	0	0
MC 29	998	1011	2	0	67	34	2	11	5	0	0	0	0	0	0	0
MC 29	998	1011	3	0	100	10	1	11	14	0	0	0	0	0	0	0
MC 29	998	1011	4	0	134	6	2	22	26	0	0	0	0	0	0	0
MC 29	998	1011	5	0	208	91	4	19	52	0	0	0	0	0	0	0
MC 29	998	1012	1	0	13	44	2	6	0	0	0	0	0	0	0	0
MC 29	998	1012	2	0	31	75	6	72	12	0	0	0	0	0	0	0
MC 29	998	1012	3	0	19	11	7	18	36	0	0	0	0	0	0	0
MC 29	998	1012	4	0	136	9	2	30	23	0	0	0	0	0	0	0
MC 29	998	1012	5	0	97	1	2	16	5	0	0	0	0	0	0	0
MC 29	998	1012	6	0	30	2	10	4	12	0	0	0	0	0	0	0
MC 29	998	1012	7	0	45	6	1	5	38	0	0	0	0	0	0	0
MC 29	998	1012	8	0	19	0	0	1	7	0	0	0	0	0	0	0
MC 29	998	1012	9	0	12	0	0	0	20	0	0	0	0	0	0	0
MC 29	998	1012	10	0	5	0	0	0	25	0	0	0	0	0	0	0
MC 29	998	1012	11	0	1	0	0	0	7	0	0	0	0	0	0	0
MC 29	998	1012	12	0	1	0	0	0	13	0	0	0	0	0	0	0
MC 29	998	1012	13	0	6	0	0	0	11	0	0	0	0	0	0	0
MC 29	998	1012	14	0	22	0	0	0	16	0	0	0	0	0	0	0
MC 29	998	1012	15	0	43	0	0	0	10	0	0	0	0	0	0	0
MC 29	998	1012	16	0	14	0	0	0	4	0	0	0	0	0	0	0
MC 29	998	1012	17	0	8	0	0	0	2	0	0	0	0	0	0	0
MC 29	998	1012	18	0	26	0	0	0	29	0	0	0	0	0	0	0
MC 29	998	1012	19	0	44	0	0	0	20	0	0	0	0	0	0	0
MC 29	998	1012	20	0	1	0	0	0	8	0	0	0	0	0	0	0
MC 29	998	1012	21	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	22	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	23	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	24	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	25	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	26	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	27	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	28	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	29	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	30	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	31	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	32	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	33	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	34	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	35	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	36	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	37	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	38	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	39	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	40	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	41	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	42	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	43	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	44	0	1	0	0	0	1	0	0	0	0	0	0	0
MC 29	998	1012	45	0	1	0	0	0	1	0	0	0				

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
MC222	112	79	5	0	5	1	1	11	3	0	0	0	0	0	0	0
MC222	113	83	1	0	4	0	0	3	7	1	0	0	0	0	0	0
MC222	113	83	2	0	173	1	0	26	27	2	0	0	0	0	0	0
MC222	113	83	3	0	383	0	7	11	19	1	0	0	0	0	0	0
MC222	113	83	4	0	204	1	10	20	17	2	0	0	0	0	0	0
MC222	113	83	5	0	358	1	5	7	3	1	0	0	0	0	0	0
MC222	113	83	6	0	48	0	0	9	16	0	0	0	0	0	0	0
MC222	119	80	1	0	650	0	0	1	12	0	0	0	0	0	0	0
MC222	119	80	2	0	340	0	4	24	3	0	0	0	0	0	0	0
MC222	119	80	3	0	0	21	1	1	3	1	0	0	0	0	0	0
MC222	119	80	4	0	1	0	0	0	10	1	0	0	0	0	0	0
MC222	119	80	5	0	0	0	0	0	3	0	0	0	0	0	0	0
MC222	119	80	6	1	0	0	0	0	4	1	0	0	0	0	0	0
MC222	119	80	7	0	0	0	0	0	0	0	0	0	0	0	0	0
MC222	125	72	1	0	131	4	0	0	1	1	0	0	0	0	0	0
MC222	125	72	2	0	1	0	0	0	0	0	0	0	0	0	0	0
MC222	125	72	3	0	0	0	0	0	0	0	0	0	0	0	0	0
MC222	101	87	1	0	128	2	1	5	8	1	0	0	0	0	0	0
MC222	101	87	2	0	103	10	4	33	66	28	0	0	0	0	0	0
MC222	101	87	3	0	39	2	0	19	67	16	0	0	0	0	0	0
MC222	101	87	4	0	0	26	0	1	14	30	0	0	0	0	0	0
MC222	103	86	1	0	1	1	0	1	2	0	0	0	0	0	0	0
MC222	103	86	2	0	1	1	0	1	6	1	0	0	0	0	0	0
MC222	103	86	3	0	7	3	6	27	19	2	0	0	0	0	0	0
MC222	103	86	4	0	11	4	0	3	31	11	0	0	0	0	0	0
MC222	103	87	1	0	70	4	0	1	4	1	0	0	0	0	0	0
MC222	103	87	2	0	33	0	0	1	3	0	0	0	0	0	0	0
MC222	103	87	3	0	6	2	2	10	14	0	0	0	0	0	0	0
MC222	103	87	4	0	0	7	1	14	60	1	0	0	0	0	0	0
MC222	994	9	1	0	11	13	1	9	1	1	0	0	0	0	0	0
MC222	994	9	2	0	210	95	0	10	0	0	0	0	0	0	0	0
MC222	994	9	3	0	455	161	12	87	0	0	0	0	0	0	0	0
MC222	994	9	4	16	192	203	1	6	0	0	0	0	0	0	0	0
MC222	994	9	5	0	81	146	2	10	0	0	0	0	0	0	0	0
MC222	994	9	6	0	38	82	3	6	0	0	0	0	0	0	0	0
MC222	994	9	7	0	682	97	34	23	1	0	0	0	0	0	0	0
MC222	994	9	8	0	232	204	6	43	7	0	0	0	0	0	0	0
MC222	994	9	9	0	2	30	0	1	5	0	0	0	0	0	0	0
MC222	994	9	10	0	155	1207	0	4	2	0	0	0	0	0	0	0
MC222	994	9	11	0	10	176	11	8	78	0	0	0	0	0	0	0
MC222	994	9	12	0	224	239	10	339	125	0	0	0	0	0	0	0
MC222	994	9	13	10	552	168	10	174	255	0	0	0	0	0	0	0
MC222	994	9	14	11	539	154	3	11	0	0	0	0	0	0	0	0
MC222	994	9	15	11	533	110	0	6	0	0	0	0	0	0	0	0
MC222	994	9	16	0	216	318	10	16	0	0	0	0	0	0	0	0
MC222	994	9	17	0	1345	115	11	101	0	0	0	0	0	0	0	0
MC222	994	9	18	0	201	102	2	20	0	0	0	0	0	0	0	0
MC222	994	9	19	0	44	171	1	5	2	0	0	0	0	0	0	0
MC222	994	9	20	0	162	221	0	2	0	0	0	0	0	0	0	0
MC222	994	9	21	0	51	90	0	5	0	0	0	0	0	0	0	0
MC222	994	9	22	0	66	230	10	2	0	0	0	0	0	0	0	0
MC222	994	9	23	0	458	332	22	121	0	0	0	0	0	0	0	0
MC222	994	9	24	0	259	291	2	23	15	0	0	0	0	0	0	0
MC222	994	9	25	0	1	12	0	3	0	0	0	0	0	0	0	0
MC222	994	9	26	0	284	445	0	17	16	0	0	0	0	0	0	0
MC222	994	9	27	11	782	445	3	32	14	0	0	0	0	0	0	0
MC222	994	9	28	0	319	764	3	14	14	0	0	0	0	0	0	0
MC222	994	9	29	0	497	569	0	1	2	0	0	0	0	0	0	0
MC222	994	9	30	0	361	708	0	2	1	0	0	0	0	0	0	0
MC222	994	9	31	0	200	248	1	8	18	0	0	0	0	0	0	0
MC222	994	9	32	0	7	79	4	5	49	0	0	0	0	0	0	0
MC222	994	9	33	0	113	140	11	14	30	0	0	0	0	0	0	0
MC222	994	9	34	0	64	20	4	22	19	0	0	0	0	0	0	0
MC222	994	9	35	0	2	1	2	7	5	0	0	0	0	0	0	0
MC222	994	9	36	0	126	109	2	2	1	0	0	0	0	0	0	0
MC222	994	9	37	0	211	264	8	8	0	0	0	0	0	0	0	0
MC222	994	9	38	0	784	306	10	11	0	0	0	0	0	0	0	0
MC222	994	9	39	0	1082	587	3	8	0	0	0	0	0	0	0	0
MC222	994	9	40	0	1310	3317	0	0	0	0	0	0	0	0	0	0
MC222	994	9	41	0	1132	1316	0	2	0	0	0	0	0	0	0	0
MC222	994	9	42	0	49	295	0	0	0	0	0	0	0	0	0	0
MC222	994	9	43	0	51	0	0	0	10	0	0	0	0	0	0	0
MC222	994	9	44	0	35	144	2	4	0	0	0	0	0	0	0	0
MC222	994	9	45	0	262	421	2	12	2	0	0	0	0	0	0	0
MC222	994	9	46	0	290	533	5	0	8	0	0	0	0	0	0	0
MC222	994	9	47	0	141	222	1	54	21	0	0	0	0	0	0	0
MC222	994	9	48	0	468	292	0	3	4	0	0	0	0	0	0	0
MC222	994	9	49	0	100	19	4	10	21	0	0	0	0	0	0	0
MC222	994	9	50	0	20	54	15	3	44	0	0	0	0	0	0	0
MC222	994	9	51	0	180	47	4	6	7	0	0	0	0	0	0	0
MC222	994	9	52	0	52	14	4	2	0	0	0	0	0	0	0	0
MC222	994	9	53	0	172	121	2	1	0	0	0	0	0	0	0	0
MC222	994	9	54	0	997	451	11	25	4	0	0	0	0	0	0	0
MC222	994	9	55	0	1602	286	28	48	8	0	0	0	0	0	0	0
MC222	994	9	56	21	1769	3017	2	9	4	0	0	0	0	0	0	0
MC222	994	9	57	0	80	204	0	1	8	0	0	0	0	0	0	0
MC222	994	9	58	0	23	31	0	0	7	0	0	0	0	0	0	0

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
HC2966	996	999	8	0	1333	11	0	0	16	0	0	0	0	3	0	3
HC2966	1022	985	0	0	1373	355	204	98	27	93	0	0	0	35	0	43
HC2966	1022	985	2	0	1507	2334	304	79	57	76	0	0	0	8	0	53
HC2966	1022	985	2	0	1866	218	102	57	47	47	0	0	0	8	0	53
HC2966	1022	985	4	0	1066	242	26	78	41	23	0	0	0	16	0	18
HC2966	1022	985	5	0	1306	140	20	35	37	8	0	0	0	18	0	20
HC2966	1022	985	5	0	1751	102	8	26	45	11	0	0	0	18	0	21
HC2966	1022	985	7	0	1864	107	10	23	8	16	0	0	0	10	0	29
HC2966	1022	985	8	0	762	34	3	15	13	7	0	0	0	11	0	6
HC2966	1022	985	9	0	834	18	17	17	4	4	0	0	0	11	0	4
HC2966	1022	985	10	0	845	8	11	7	1	1	0	0	0	11	0	4
HC2966	1022	986	11	0	660	375	23	50	2	25	0	0	0	116	0	19
HC2966	1022	986	22	0	1357	251	36	78	41	33	0	0	0	30	0	35
HC2966	1022	986	33	0	1317	123	45	127	39	33	0	0	0	7	0	10
HC2966	1022	986	44	0	861	262	26	109	38	17	0	0	0	8	0	6
HC2966	1022	986	55	0	1254	150	44	97	47	24	0	0	0	1	0	1
HC2966	1022	986	66	0	1264	254	16	39	28	17	0	0	0	1	0	1
HC2966	1022	986	77	0	1134	176	25	71	23	13	0	0	0	5	0	5
HC2966	1022	986	88	0	967	85	16	32	9	6	0	0	0	5	0	7
HC2966	1022	986	99	0	1223	25	6	8	10	7	0	0	0	4	0	4
HC2966	1022	986	10	0	630	20	3	4	3	1	0	0	0	2	0	10
HC2966	1022	987	11	0	1173	341	27	47	152	77	0	0	0	4	0	33
HC2966	1022	987	22	0	839	217	30	99	129	77	0	0	0	4	0	10
HC2966	1022	987	33	0	919	232	44	170	57	75	0	0	0	10	0	36
HC2966	1022	987	44	0	695	111	43	98	58	48	0	0	0	10	0	7
HC2966	1022	987	55	0	1259	134	24	51	45	38	0	0	0	12	0	33
HC2966	1022	987	66	0	1588	107	11	20	30	19	0	0	0	4	0	11
HC2966	1022	987	77	0	784	56	14	33	20	8	0	0	0	4	0	14
HC2966	1022	987	88	0	1136	34	21	28	49	14	0	0	0	4	0	8
HC2966	1022	987	99	0	984	21	21	20	10	8	0	0	0	4	0	5
HC2966	1022	989	1	0	41	102	0	4	4	0	0	0	0	4	0	6
HC2966	1022	989	2	0	544	153	5	30	15	53	0	0	0	1	0	4
HC2966	1023	985	11	0	791	278	23	26	69	69	0	0	0	33	0	41
HC2966	1023	985	22	0	871	372	35	69	33	63	0	0	0	33	0	70
HC2966	1023	985	33	0	1158	491	37	90	73	50	0	0	0	50	0	75
HC2966	1023	985	44	0	1479	358	49	176	70	52	0	0	0	9	0	38
HC2966	1023	985	55	0	1879	102	48	145	81	58	0	0	0	1	0	22
HC2966	1023	985	66	0	1311	466	26	102	73	56	0	0	0	1	0	1
HC2966	1023	985	77	0	1020	191	22	68	47	36	0	0	0	1	0	22
HC2966	1023	985	88	0	1140	142	12	29	25	12	0	0	0	3	0	8
HC2966	1023	985	99	0	628	62	8	11	13	7	0	0	0	3	0	8
HC2966	1023	986	1	0	1834	365	22	49	20	14	0	0	0	5	0	127
HC2966	1023	986	2	0	1294	454	20	101	77	41	0	0	0	5	0	41
HC2966	1023	986	3	0	1135	154	28	68	32	24	0	0	0	1	0	8
HC2966	1023	986	4	0	1469	178	21	215	66	27	0	0	0	1	0	32
HC2966	1023	986	5	0	598	148	10	56	29	19	0	0	0	1	0	28
HC2966	1023	986	6	0	1520	185	25	69	39	24	0	0	0	1	0	13
HC2966	1023	986	7	0	2642	36	24	64	47	13	0	0	0	3	0	13
HC2966	1023	986	8	0	880	56	13	32	18	20	0	0	0	4	0	15
HC2966	1023	986	9	0	195	51	7	31	3	3	0	0	0	2	0	12
HC2966	1023	987	10	0	875	202	31	64	26	54	0	0	0	20	0	54
HC2966	1023	987	11	0	976	220	28	113	40	14	0	0	0	8	0	11
HC2966	1023	987	22	0	732	311	23	79	42	23	0	0	0	1	0	20
HC2966	1023	987	33	0	1535	150	25	96	41	47	0	0	0	5	0	18
HC2966	1023	987	44	0	2033	224	22	30	55	25	0	0	0	4	0	9
HC2966	1023	987	55	0	1628	76	9	16	45	13	0	0	0	1	0	17
HC2966	1023	987	66	0	1914	268	14	20	21	9	0	0	0	7	0	13
HC2966	1023	987	77	0	1176	93	15	55	5	20	0	0	0	5	0	7
HC2966	1023	987	88	0	428	7	3	6	10	5	0	0	0	5	0	12
HC2966	1023	989	1	0	67	53	3	9	2	10	0	0	0	5	0	4
HC2966	1023	989	2	0	460	253	80	90	22	172	0	0	0	5	0	23
HC2966	1023	989	3	0	780	262	9	55	55	30	0	0	0	9	0	23
HC2966	1023	989	4	0	1628	312	19	47	45	151	0	0	0	10	0	23
HC2966	1024	985	1	0	1447	313	34	91	29	70	0	0	0	3	0	4
HC2966	1024	985	2	0	994	268	39	114	71	0	0	0	0	2	0	2
HC2966	1024	985	3	0	0	182	35	85	58	29	0	0	0	1	0	2
HC2966	1024	985	4	0	1167	157	41	69	48	26	0	0	0	9	0	2
HC2966	1024	985	5	0	1559	220	27	94	57	41	0	0	0	1	0	2
HC2966	1024	985	6	0	1734	153	9	35	29	20	0	0	0	1	0	2
HC2966	1024	985	7	0	1953	206	9	28	29	16	0	0	0	0	0	0
HC2966	1024	985	8	0	879	34	10	23	17	21	0	0	0	0	0	0
HC2966	1024	985	9	0	310	36	16	27	11	4	0	0	0	1	0	1
HC2966	1024	986	10	0	1606	205	19	67	38	63	0	0	0	3	0	58
HC2966	1024	986	21	0	1920	337	46	104	71	21	0	0	0	16	0	19
HC2966	1024	986	32	0	787	320	42	127	60	25	0	0	0	19	0	23
HC2966	1024	986	43	0	1283	161	26	50	37	25	0	0	0	10	0	33
HC2966	1024	986	54	0	1336	257	41	48	39	25	0	0	0	1	0	36
HC2966	1024	986	65	0	2104	204	16	44	34	20	0	0	0	3	0	20
HC2966	1024	986	76	0	1666	264	9	22	26	5	0	0	0	2	0	0
HC2966	1024	986	87	0	546	19	4	3	5	3	0	0	0	6	0	12
HC2966	1024	986	98	0	272	53	24	3	11	8	0	0	0	2	0	6
HC2966	1024	987	1	0	1214	498	23	161	31	41	0	0	0	10	0	24
HC2966	1024	987	2	0	1127	226	33	161	67	41	0	0	0	11	0	28
HC2966	1024	987	3	0	2232	377	46	231	49	39	0	0	0	11	0	8
HC2966	1024	987	4	0	1781	179	24	76	32	26	0	0	0	11	0	2
HC2966	1024	987	5	0	1210	156	10	20	46	25	0	0	0	1	0	33
HC2966	1024	987	6	0	2256	175	3	13	44	17	0	0	0	28	0	0
HC2966	1024	987	7	0	2393	83	1	4	19	4	0	0	0	2	0	12
HC2966	1024	987	8	0	137	26	1	1	2	0	0	0	0	1	0	5
HC2966	1024	987	9	0	499	23	0	1	6	10	0	0	0	3	0	5
HC2966	1024	989	1	317	101	35	0	2	5	29	0	0	0	0	0	4

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
MC2996	1024	989	2	0	353	695	15	118	21	220	0	0	0	7	0	17
MC2996	1024	989	3	0	702	267	14	69	24	147	0	0	0	20	0	25
MC2996	1024	989	4	0	638	259	17	82	35	144	0	0	0	15	0	19
MC2996	1025	995	3	3	58	270	3	20	13	7	0	0	0	6	0	15
MC2996	1025	995	4	0	1016	456	5	20	18	1014	0	0	0	6	0	1
MC2996	1025	995	5	0	574	474	5	12	10	26	0	0	0	7	0	3
MC2996	1025	995	6	0	506	74	5	24	20	18	0	0	0	4	0	18
MC2996	1025	995	7	0	1049	83	3	7	11	66	0	0	0	6	0	12
MC2996	1025	997	1	0	164	91	2	7	12	8	0	0	0	15	0	32
MC2996	1025	997	2	0	319	85	16	33	12	22	0	0	0	11	0	46
MC2996	1025	997	3	0	887	116	18	46	29	37	0	0	0	16	0	24
MC2996	1025	997	4	0	637	106	11	23	15	9	0	0	0	12	0	11
MC2996	1025	997	5	0	534	36	3	0	24	13	0	0	0	7	0	11
MC2996	1025	997	6	0	1776	46	4	1	22	11	0	0	0	12	0	13
MC2996	1025	997	7	0	1109	98	0	1	12	3	0	0	0	14	0	12
MC2996	1025	998	1	0	64	60	9	16	3	5	0	0	0	17	0	38
MC2996	1025	998	2	0	281	236	14	33	15	41	0	0	0	37	0	59
MC2996	1025	998	3	0	276	83	9	46	26	14	0	0	0	12	0	27
MC2996	1025	998	4	0	358	81	15	51	30	14	0	0	0	9	0	18
MC2996	1025	998	5	0	1638	54	6	19	34	7	0	0	0	6	0	12
MC2996	1025	998	6	0	1970	49	6	17	38	8	0	0	0	1	0	9
MC2996	1025	998	7	0	1114	27	0	12	22	2	0	0	0	17	0	107
MC2996	1025	999	1	0	117	76	1	14	18	2	0	0	0	34	0	89
MC2996	1025	999	2	0	81	123	8	31	21	42	0	0	0	28	0	100
MC2996	1025	999	3	0	189	101	14	31	70	39	0	0	0	13	0	28
MC2996	1025	999	4	0	274	30	14	16	15	27	0	0	0	5	0	3
MC2996	1025	999	5	0	739	12	5	5	16	7	0	0	0	0	0	0
MC2996	1025	999	6	0	1711	36	3	2	21	16	0	0	0	0	0	0
MC2996	1025	999	7	0	1135	10	1	1	11	7	0	0	0	0	0	0
MC2996	1025	999	8	0	735	42	1	1	6	4	0	0	0	0	0	5
MC2996	1025	999	9	0	51	1	0	0	0	0	0	0	0	3	0	1
MC2996	1026	978	1	12	11	314	0	6	2	12	0	0	0	0	0	11
MC2996	1026	978	2	14	1503	174	6	5	2	24	0	0	0	7	0	0
MC2996	1026	978	3	77	548	402	5	5	49	24	0	0	0	18	0	1
MC2996	1026	978	4	32	236	734	1	51	16	33	0	0	0	15	0	13
MC2996	1026	978	5	0	755	519	7	35	28	18	0	0	0	1	0	19
MC2996	1026	986	1	0	100	40	10	2	20	22	0	0	0	1	0	10
MC2996	1026	986	2	0	685	114	9	42	2	80	0	0	0	34	0	74
MC2996	1026	986	3	35	639	211	12	72	68	19	0	0	0	3	0	20
MC2996	1026	995	4	0	280	24	6	18	13	13	0	0	0	30	0	0
MC2996	1026	995	5	40	186	51	5	35	9	6	0	0	0	4	0	9
MC2996	1026	995	6	0	417	33	5	36	12	6	0	0	0	7	0	4
MC2996	1026	995	7	0	264	34	4	0	11	2	0	0	0	8	0	11
MC2996	1026	995	8	0	1325	39	0	7	28	4	0	0	0	10	0	14
MC2996	1026	995	9	0	245	40	0	0	0	2	0	0	0	10	0	29
MC2996	1026	997	1	0	558	150	14	6	10	10	0	0	0	12	0	27
MC2996	1026	997	2	0	367	50	7	36	14	3	0	0	0	11	0	27
MC2996	1026	997	3	0	670	76	8	34	21	5	0	0	0	15	0	24
MC2996	1026	997	4	0	346	34	5	32	20	0	0	0	0	10	0	15
MC2996	1026	997	5	0	1514	74	11	56	25	13	0	0	0	13	0	21
MC2996	1026	997	6	0	1026	34	7	38	17	17	0	0	0	3	0	12
MC2996	1026	998	1	0	53	54	7	14	5	5	0	0	0	9	0	26
MC2996	1026	998	2	0	233	149	10	12	12	15	0	0	0	17	0	41
MC2996	1026	998	3	0	278	42	11	14	20	19	0	0	0	21	0	46
MC2996	1026	998	4	0	290	55	7	15	17	13	0	0	0	12	0	24
MC2996	1026	998	5	0	435	36	3	12	18	7	0	0	0	9	0	10
MC2996	1026	998	6	0	3032	38	6	21	29	11	0	0	0	13	0	20
MC2996	1026	998	7	0	1759	49	1	5	3	2	0	0	0	11	0	29
MC2996	1026	999	1	0	96	73	3	7	3	4	0	0	0	11	0	29
MC2996	1026	999	2	0	377	52	16	22	17	5	0	0	0	29	0	3
MC2996	1026	999	3	0	295	45	10	52	9	14	0	0	0	11	0	24
MC2996	1026	999	4	0	361	39	8	33	12	11	0	0	0	14	0	18
MC2996	1026	999	5	0	673	48	10	41	18	6	0	0	0	9	0	15
MC2996	1026	999	6	0	2297	132	3	11	30	9	0	0	0	6	0	17
MC2996	1026	999	7	0	523	27	0	0	7	2	0	0	0	0	0	7
MC2996	1027	978	1	9	324	24	0	1	0	7	0	0	0	4	0	3
MC2996	1027	978	2	11	553	21	0	11	10	65	0	0	0	18	0	22
MC2996	1027	978	3	0	485	276	8	12	17	20	0	0	0	10	0	26
MC2996	1027	978	4	0	650	69	14	13	28	23	0	0	0	0	0	15
MC2996	1027	978	5	0	997	74	13	33	11	8	0	0	0	2	0	10
MC2996	1027	978	6	0	1890	200	5	18	46	8	0	0	0	3	0	16
MC2996	1027	986	1	5	1302	120	3	17	16	12	0	0	0	4	0	12
MC2996	1027	986	2	0	345	0	0	3	0	7	0	0	0	5	0	13
MC2996	1027	986	3	2	504	170	15	60	13	138	0	0	0	22	0	28
MC2996	1027	986	4	0	504	122	18	48	25	22	0	0	0	6	0	14
MC2996	1027	986	5	0	1069	151	14	39	20	12	0	0	0	12	0	18
MC2996	1027	995	1	0	0	202	5	18	1	0	0	0	0	0	0	2
MC2996	1027	995	2	0	288	35	10	78	15	4	0	0	0	3	0	7
MC2996	1027	995	3	0	915	30	3	18	19	4	0	0	0	6	0	9
MC2996	1027	995	4	0	2098	15	3	18	22	8	0	0	0	9	0	10
MC2996	1027	995	5	0	1163	25	2	15	15	7	0	0	0	14	0	16
MC2996	1027	997	1	0	103	25	2	5	0	5	0	0	0	1	0	23
MC2996	1027	997	2	0	358	119	3	9	12	14	0	0	0	13	0	12
MC2996	1027	997	3	0	384	206	5	14	6	6	0	0	0	12	0	10
MC2996	1027	997	4	0	358	20	4	14	14	6	0	0	0	10	0	11
MC2996	1027	997	5	0	801	25	2	7	15	8	0	0	0	11	0	13
MC2996	1027	997	6	0	165	50	4	8	27	10	0	0	0	8	0	16
MC2996	1027	997	7	0	1001	75	0	2	11	5	0	0	0	5	0	11
MC2996	1027	998	1	0	161	42	1	0	1	2	0	0	0	11	0	18
MC2996	1027	998	2	0	324	391	5	31	6	14	0	3	0	11	0	30

TABLE 55. (continued)

SITE	NORTH	EAST	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
MC296	1027	998	3	0	82	128	3	11	13	9	0	3	0	4	0	12
MC296	1027	998	4	0	443	64	10	9	10	9	0	0	0	9	0	13
MC296	1027	998	5	0	771	45	4	8	16	7	0	0	0	0	0	16
MC296	1027	998	6	0	1231	42	3	4	24	7	0	0	0	10	0	28
MC296	1027	998	7	0	1437	131	0	2	2	1	0	0	0	5	0	8
MC296	1027	999	1	0	153	67	7	22	2	2	0	0	0	1	0	19
MC296	1027	999	2	0	378	187	7	27	7	1	0	0	0	3	0	35
MC296	1027	999	3	0	353	58	9	29	7	20	0	0	0	6	0	19
MC296	1027	999	4	0	380	41	8	19	12	11	0	0	0	8	0	21
MC296	1027	999	5	0	489	47	7	26	10	6	0	0	0	1	0	9
MC296	1027	999	6	0	875	42	6	24	14	5	0	0	0	10	0	14
MC296	1027	999	7	0	1306	33	0	1	8	1	0	0	0	4	0	7
MC296	1027	999	8	0	620	70	0	0	4	0	0	0	0	5	0	1

SITE	TP	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
LK128	1	1	6	145	197	111	378	9	0	0	0	0	7	0	5
LK128	1	2	0	0	324	610	1103	9	0	0	0	0	3	0	7
LK128	2	1	0	275	357	98	250	23	0	0	0	0	0	0	4
LK128	2	2	68	334	482	87	253	31	0	0	0	0	13	0	14
LK128	3	1	0	337	423	437	874	4	0	0	0	0	2	0	14
LK128	3	2	88	435	310	302	1017	14	0	0	0	0	12	0	14
LK128	3	3	0	5	56	20	66	2	0	0	0	0	5	0	7
LK128	3	4	0	7	17	13	0	0	0	0	0	0	4	0	9
LK128	4	1	0	187	206	74	175	12	0	0	0	0	0	0	6
LK128	4	2	0	381	409	280	259	17	0	0	0	0	10	0	8
LK128	5	1	0	136	64	24	130	108	25	0	0	0	21	0	39
LK128	5	2	0	407	62	53	300	329	657	0	0	0	25	0	32
LK128	5	3	166	287	307	77	422	278	119	0	0	0	28	0	13
LK128	5	4	0	384	77	24	0	258	72	0	0	0	6	0	4
LK128	5	5	0	134	0	1	13	15	6	0	0	0	1	0	0
LK128	5	6	0	56	34	5	34	18	4	0	0	0	3	0	0
LK128	5	7	0	40	4	3	18	11	4	0	0	0	0	0	1
LK128	5	8	0	7	0	1	30	6	1	0	0	0	0	0	0
LK128	6	1	0	74	18	3	9	6	0	0	0	0	5	0	7
LK128	6	2	8	43	67	19	74	155	33	0	0	0	3	0	40
LK128	6	3	0	347	75	60	388	352	271	4	0	0	5	0	24
LK128	6	4	51	319	148	47	143	173	74	0	0	0	13	0	13
LK128	6	5	0	469	99	70	430	219	23	0	0	0	5	0	73
LK128	7	1	36	147	136	74	447	344	111	0	0	0	2	0	43
LK128	7	2	0	413	92	54	317	161	35	0	0	0	9	0	22
LK128	7	3	138	748	138	19	0	167	8	0	0	0	8	0	14
LK128	7	4	360	1542	153	6	14	84	42	0	0	0	4	0	11
LK128	7	5	0	1100	39	4	13	118	4	0	0	0	4	0	5
LK128	7	6	0	338	5	0	2	23	0	0	0	0	0	0	0
LK128	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0
LK128	8	1	0	28	86	9	47	27	1	0	0	0	6	0	3
LK128	8	2	0	98	100	61	398	72	7	0	0	0	6	0	105
LK128	8	3	0	94	47	41	212	192	29	0	0	0	3	0	22
LK128	8	4	0	203	37	29	112	159	19	0	0	0	4	0	9
LK128	9	1	11	286	221	274	3135	375	12	0	0	0	17	0	20
LK128	9	2	0	165	118	48	269	103	7	0	0	0	13	0	17
LK128	9	3	0	79	71	6	48	39	0	0	0	0	8	0	8
LK128	9	4	0	160	125	13	86	143	1	0	0	0	4	0	8
LK128	9	5	0	232	152	3	21	113	0	0	0	0	3	0	3
LK128	9	6	0	261	14	3	28	95	4	0	0	0	2	0	2
LK128	9	7	0	245	30	1	1	124	0	0	0	0	1	0	1
LK128	9	8	0	206	340	26	142	124	0	0	0	0	10	1	24
LK128	9	9	101	88	95	10	41	124	0	0	0	0	2	0	0
LK128	9	10	0	38	40	23	143	191	4	0	0	0	4	0	3
LK128	10	1	0	151	237	26	273	170	1	0	0	0	5	0	17
LK128	10	2	0	159	51	52	308	105	3	0	0	0	5	0	14
LK128	10	3	0	112	78	72	576	202	3	0	0	0	8	0	30
LK128	10	4	0	114	40	43	264	89	4	0	0	0	6	0	10
LK128	11	1	33	6	868	0	8	99	1	0	0	0	1	0	1
LK128	11	2	14	7	568	1	5	77	15	0	0	0	1	0	4
LK128	11	3	100	0	425	0	1	49	0	0	0	0	0	0	0
LK128	11	4	96	49	655	0	0	40	0	0	0	0	0	0	2
LK128	11	5	2	1	510	0	0	25	0	0	0	0	0	0	0
LK128	11	6	26	3	279	0	0	16	0	0	0	0	0	0	0
LK128	11	7	90	0	240	0	0	28	0	0	0	0	0	0	0
LK128	11	8	0	0	94	0	0	17	0	0	0	0	0	0	0
LK128	11	9	0	0	1	0	0	7	0	0	0	0	1	0	0
LK128	11	10	0	0	0	0	0	0	0	0	0	0	0	0	0
LK128	12	1	86	0	606	4	31	92	1	0	0	0	2	0	0
LK128	12	2	28	0	228	3	0	45	0	0	0	0	0	0	1
LK128	12	3	0	0	168	0	4	30	0	0	0	0	0	0	0
LK128	12	4	29	0	416	1	1	25	0	0	0	0	1	0	1
LK128	12	5	0	13	101	1	1	34	0	0	0	0	1	0	0
LK128	12	6	0	0	112	0	0	16	0	0	0	0	0	0	0
LK128	12	7	0	0	59	0	0	12	0	0	0	0	0	0	0
LK128	12	8	0	0	3	0	0	5	0	0	0	0	0	0	0
LK128	12	9	0	0	0	1	0	2	0	0	0	0	1	0	0
LK128	12	10	0	0	488	0	0	4	0	0	0	0	2	0	0
LK128	13	1	0	0	746	0	0	5	0	0	0	0	1	0	0
LK128	13	2	0	92	240	0	0	3	0	0	0	0	7	0	0
LK128	13	3	0	2	8	0	0	2	0	0	0	0	0	0	0
LK185	1	1	46	77	59	35	114	49	0	0	0	0	0	0	5
LK185	1	2	9	5	17	32	117	79	10	0	0	0	0	0	4
LK185	1	3	19	2	3	9	61	61	1	0	0	0	3	0	4

TABLE 55. (continued)

SITE	TP	LEV	A	B	C	D	E	F	G	H	I	J	K	L	M
LK185	1	4	40	15	12	7	46	34	0	0	0	0	1	0	2
LK185	1	5	14	7	28	5	36	25	0	0	0	0	3	0	3
LK185	1	5	139	8	2	5	22	9	0	0	0	0	2	0	2
LK185	1	5	139	11	0	0	0	9	0	0	0	0	0	0	1
LK185	1	5	419	30	165	9	15	29	0	0	1	0	1	0	1
LK185	1	5	276	14	109	1	17	16	0	0	0	0	3	0	1
LK185	1	5	6	3	3	0	0	0	0	0	0	0	0	0	0
LK185	1	5	78	1	46	0	11	4	0	0	0	0	0	0	0
LK185	1	5	126	0	31	1	34	16	0	0	0	0	2	0	0
LK185	1	5	53	5	16	30	62	53	0	0	1	0	1	0	3
LK185	1	5	217	190	16	23	69	49	0	0	0	0	3	0	3
LK185	1	5	159	7	75	10	23	48	0	0	1	0	4	0	1
LK185	1	5	0	0	0	5	22	12	0	0	0	0	1	0	1
LK185	1	5	0	0	0	1	4	3	0	0	0	0	0	0	0
LK185	1	5	2	19	50	19	46	18	0	0	1	0	5	0	9
LK185	1	5	44	44	58	21	75	47	0	0	0	0	4	0	5
LK185	1	5	45	76	59	15	62	28	0	0	0	0	4	0	5
LK185	1	5	306	0	205	21	95	37	0	0	0	0	10	0	8
LK185	1	5	0	4	148	21	24	82	0	0	0	0	10	0	1
LK185	1	5	0	59	203	1	0	17	0	0	0	0	0	0	0
LK185	1	5	0	0	27	0	0	19	0	0	0	0	0	0	0
LK185	1	5	0	0	121	3	1	30	0	0	0	0	0	0	0
LK185	1	5	119	2	419	7	16	14	0	0	0	0	6	0	8
LK185	1	5	0	0	38	6	12	6	0	0	1	0	3	0	1
LK185	1	5	0	0	0	5	5	1	0	0	0	0	0	0	0
LK185	1	5	0	0	54	1	14	15	0	0	0	0	1	0	3
LK185	1	5	10	4	101	2	60	28	0	0	0	0	1	0	7
LK185	1	5	0	10	491	3	50	118	0	0	0	0	1	0	1
LK185	1	5	53	102	480	3	20	50	0	0	0	0	18	0	2
LK185	1	5	0	19	312	2	5	30	0	0	0	0	7	0	4
LK185	1	5	0	30	224	2	5	21	0	0	0	0	2	0	2
LK185	1	5	0	33	189	4	6	38	0	0	0	0	1	0	1
LK185	1	5	0	4	922	4	6	76	0	0	0	0	0	0	0
LK185	1	5	0	42	81	1	2	15	0	0	0	0	1	0	1
LK185	1	5	10	61	34	0	0	17	2	0	2	0	4	0	0
LK185	1	5	0	51	128	20	69	31	0	0	0	0	1	0	7
LK185	1	5	75	129	138	19	69	74	0	0	0	0	1	0	6
LK185	1	5	28	74	118	1	44	71	0	0	0	0	5	0	6
LK185	1	5	0	51	134	3	17	125	0	0	0	0	1	0	5
LK185	1	5	19	27	308	0	9	24	0	0	1	0	1	0	1
LK185	1	5	10	143	148	0	19	18	0	0	0	0	1	0	5
LK185	1	5	0	280	195	0	3	47	0	0	0	0	3	0	2
LK185	1	5	0	66	374	1	2	81	0	0	0	0	0	0	1
LK185	1	5	0	32	412	1	2	24	0	0	0	0	7	0	1
LK185	1	5	0	66	0	1	1	99	0	0	0	0	8	0	1
LK185	1	5	0	93	99	1	10	201	0	0	0	0	8	0	1
LK185	1	5	0	98	76	0	1	86	0	0	0	0	8	0	4
LK185	1	5	1776	4	159	0	1	15	0	0	0	0	4	0	2
LK185	1	5	131	35	159	0	1	11	0	0	0	0	5	0	2
LK185	1	5	0	210	298	0	1	11	0	0	0	0	1	0	1
LK185	1	5	0	44	589	6	0	10	0	0	0	0	0	0	0
MC	94	1	0	143	191	4	7	49	0	0	1	0	11	0	3
MC	94	1	0	91	169	5	5	101	0	0	0	0	0	0	0
MC	94	1	0	203	148	4	4	173	0	0	0	0	1	0	0
MC	94	1	0	240	419	1	4	95	0	0	0	0	2	0	9
MC	94	1	0	278	451	1	5	69	0	0	2	0	4	0	9
MC	94	1	0	248	730	2	7	58	0	0	0	0	10	0	1
MC	94	1	0	152	1143	2	10	32	6	0	1	0	8	0	1
MC	94	1	0	36	799	1	5	9	2	0	0	0	9	0	1
MC	94	1	0	59	494	1	9	49	0	0	2	0	11	0	4
MC	94	1	0	29	252	2	6	6	0	0	0	0	1	0	6
MC	94	1	0	293	648	2	5	64	0	0	0	0	10	0	1
MC	94	1	0	334	508	3	81	2	0	0	0	0	9	0	7
MC	94	1	0	374	511	3	45	292	1	0	0	0	7	0	7
MC	94	1	0	462	1257	1	35	44	0	0	0	0	13	0	2
MC	94	1	0	154	1270	1	26	44	0	0	0	0	10	0	2
MC	94	1	0	17	153	4	8	7	0	0	0	0	0	0	0
MC	94	1	0	0	47	0	2	1	0	0	0	0	0	0	0
MC	94	1	0	326	131	5	14	8	0	0	0	0	10	0	1
MC	94	1	0	481	277	2	25	36	0	0	1	0	7	0	2
MC	94	1	0	376	260	2	28	89	0	0	0	0	15	0	2
MC	94	1	0	122	79	3	0	82	0	0	0	0	5	0	7
MC	94	1	0	624	25	3	2	156	0	0	0	0	1	0	0
MC	94	1	0	721	79	5	16	173	0	0	0	0	3	0	4
MC	94	1	0	165	88	5	24	181	0	0	0	0	3	0	4
MC	94	1	0	380	250	1	21	15	1	0	0	0	1	0	1
MC	94	1	0	73	76	1	1	22	0	0	0	0	1	0	1
MC	94	1	0	59	281	1	6	121	0	0	0	0	0	0	0
MC	94	1	0	87	0	1	3	96	0	0	0	0	0	0	0
MC	94	1	0	547	88	1	3	118	0	0	0	0	0	0	0
MC	94	1	0	524	118	3	16	133	0	0	1	0	1	0	4
MC	94	1	0	371	31	5	5	212	0	0	0	0	5	0	1
MC	94	1	0	222	28	2	80	3	0	0	0	0	0	0	0
MC	94	1	0	46	0	1	1	0	0	0	0	0	0	0	0
MC	94	1	0	79	25	2	2	5	0	0	0	0	4	0	1
MC	94	1	0	178	147	0	10	16	0	0	0	0	0	0	0
MC	94	1	0	23	3	5	19	44	0	0	0	0	0	0	0
MC	94	1	0	28	139	5	24	85	0	0	0	0	0	0	0
MC	94	1	0	76	0	5	22	0	0	0	0	0	4	0	1

DEBITAGE TABLE

In Table 56, the debitage recovered from prehistoric sites excavated during the Phase II investigation is broken down into the 53 units used in the debitage analysis. Each debitage category is represented in the table by a code number. Code numbers and corresponding debitage categories are presented below:

CODE		CODE	
37	Primary Flakes - Total	64	Single Facet Platform
38	Cortex Platform	65	Modified
39	Modified	66	Trimmed
40	Trimmed	67	Small Multiple Facet Platform
41	Single Facet Platform	68	Modified
42	Modified	69	Trimmed
43	Trimmed	70	Large Multiple Facet Platform
44	Other Platform Types	71	Modified
45	Modified	72	Trimmed
46	Trimmed	73	Lipped
47	Secondary Flakes - Total	74	Modified
48	Cortex Platform	75	Trimmed
49	Modified	76	Chips - Total
50	Trimmed	77	Cortex
51	Single Facet Platform	78	Modified
52	Modified	79	Trimmed
53	Trimmed	80	Partial Cortex
54	Small Multiple Facet Platform	81	Modified
55	Modified	82	Trimmed
56	Trimmed	83	No Cortex
57	Large Multiple Facet Platform	84	Modified
58	Modified	85	Trimmed
59	Trimmed	86	Chunks - Total
60	Lipped	87	Cortex
61	Modified	88	Partial Cortex
62	Trimmed	89	No Cortex
63	Tertiary Flakes - Total		

It is important to note that the code numbers listed above are different from those used in the analysis of debitage recovered during the Phase I investigations (Hall, Black, and Graves 1982:620). However, the debitage categories and their ordering are exactly the same.

Headings for Table 56 provide: (1) Site Number, (2) Excavation Area, Unit, or Test Pit (TP), and (3) either "Horizon" assignments or the term "ALL." The "Excavation Area" heading indicates that debitage collections from a number of contiguous units have been combined to yield the totals presented. In most cases, "Unit" and "Test Pit" represent 1-m² excavations. Horizon assignments are indicated by the column headings "1st," "2nd," "3rd," "4th," etc. Horizons consist of one or more vertical excavation levels (5-cm or 10-cm thick in most cases) yielding markedly greater amounts of cultural residues than levels immediately above or below. They have been defined based on the vertical distribution of materials as shown in the Material Analysis

TABLE 56. DEBITAGE ANALYSIS FOR PHASE II INVESTIGATIONS

CODE	41 LK 8								41 LK 14	
	Area A			Area B		Area C		SITE TOTAL	Area A	
	1st	2nd	3rd	1st	2nd	1st	2nd		1st	2nd
37	9	11	11	18	11	9	5	74	29	9
38	3	3	4	10	3	2	2	27	11	6
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	1
41	5	5	5	5	8	5	3	36	18	4
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	1	3	2	19	0	2	0	27	2	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	161	119	63	143	57	46	30	619	327	175
48	56	41	27	55	28	13	17	237	80	53
49	10	0	0	1	1	0	0	12	6	3
50	12	0	0	0	3	0	0	15	3	0
51	26	10	4	21	4	6	3	74	73	37
52	10	1	0	1	0	0	0	12	4	2
53	5	10	0	1	2	0	0	18	0	1
54	11	21	3	8	3	6	6	58	5	2
55	0	6	0	0	0	0	0	6	0	0
56	0	6	0	0	0	0	0	6	0	0
57	5	15	1	8	2	2	1	34	1	0
58	0	0	11	0	0	0	0	11	0	0
59	0	0	6	0	0	0	0	6	0	0
60	66	48	33	66	19	19	3	254	155	83
61	0	1	6	0	0	0	0	7	1	1
62	6	0	0	2	0	0	0	8	1	0
63	344	264	135	251	119	77	40	1230	487	374

TABLE 56. (continued)

CODE	41 LK 8								41 LK 14	
	Area A			Area B		Area C		SITE TOTAL	Area A	
	1st	2nd	3rd	1st	2nd	1st	2nd		1st	2nd
64	28	23	10	25	19	7	5	117	59	35
65	8	0	0	0	0	0	0	8	3	2
66	6	1	0	0	0	0	0	7	1	1
67	100	76	24	69	29	35	13	346	12	2
68	0	6	0	0	0	0	0	6	1	0
69	0	6	0	0	0	0	0	6	0	0
70	22	26	7	8	7	1	1	72	0	0
71	0	6	0	0	0	0	0	6	0	0
72	0	10	0	0	0	0	0	10	0	0
73	202	154	100	164	64	34	21	739	407	369
74	0	1	6	0	1	0	1	9	7	4
75	0	0	6	1	0	0	0	7	1	2
76	674	568	279	545	214	100	85	2465	720	423
77	14	17	16	17	11	9	3	87	22	13
78	3	0	0	0	19	0	0	22	0	0
79	6	0	0	0	0	0	0	6	1	0
80	140	101	47	124	52	9	32	505	179	125
81	6	1	0	0	1	0	0	8	2	1
82	10	0	0	0	3	0	0	13	0	2
83	533	459	237	404	159	82	66	1940	573	332
84	1	7	0	3	0	1	0	12	12	1
85	2	12	0	2	14	0	0	30	4	5
86	42	83	26	21	20	14	5	211	1	1
87	6	13	3	4	0	1	0	27	0	1
88	9	27	10	5	9	2	3	65	1	0
89	27	49	23	12	14	11	3	139	0	0

TABLE 56. (continued)

CODE	41 LK 14			41 LK 51						
	Area B		SITE TOTAL	Area A				Area B		A11
	1st	2nd		1st	2nd	3rd	4th	1st	2nd	
37	7	12	57	93	240	54	18	2	3	1
38	1	4	22	4	1	7	2	0	3	1
39	0	0	0	0	0	0	0	0	0	0
40	0	0	1	1	0	0	0	0	0	0
41	5	6	33	4	11	7	5	2	0	0
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	1	2	5	0	0	2	1	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	185	181	868	164	232	310	151	14	36	28
48	43	47	223	53	92	110	65	5	17	14
49	0	1	10	0	1	0	0	0	0	0
50	2	0	5	0	1	0	0	0	0	0
51	46	40	196	40	50	56	33	3	4	4
52	0	3	9	0	0	0	0	1	0	0
53	0	2	3	0	0	0	0	0	0	0
54	9	4	20	11	22	23	18	2	8	7
55	1	0	1	0	0	0	0	0	1	0
56	0	0	0	1	0	0	0	0	1	0
57	2	0	3	8	10	12	4	3	5	1
58	0	0	0	0	1	0	1	0	0	1
59	0	0	0	0	0	0	0	0	0	0
60	93	90	421	50	57	110	31	2	2	2
61	0	0	2	0	0	0	0	0	0	0
62	0	0	1	0	0	0	1	0	0	0
63	295	330	1486	375	538	720	400	23	57	33

TABLE 56. (continued)

SITE CODE	41 LK 14			41 LK 51						
	Area B		SITE TOTAL	Area A				Area B		A11
	1st	2nd		1st	2nd	3rd	4th	1st	2nd	
64	45	35	174	81	115	140	57	3	7	0
65	4	1	10	1	1	2	0	0	0	0
66	0	0	2	1	0	0	0	0	0	0
67	10	3	27	60	152	184	128	13	39	26
68	0	0	1	0	1	0	0	0	1	0
69	1	0	1	0	0	0	0	0	0	0
70	0	2	2	8	18	14	13	3	6	1
71	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0
73	284	292	1352	224	271	440	201	4	5	6
74	0	0	11	1	0	1	0	0	0	0
75	0	1	4	0	0	1	0	0	0	0
76	602	508	2253	691	1003	1368	742	111	174	179
77	9	11	55	21	24	35	20	2	7	6
78	0	0	0	0	0	0	0	0	0	0
79	1	0	2	0	0	0	0	0	0	0
80	140	127	571	152	216	319	179	50	42	64
81	1	1	5	0	1	0	0	0	0	0
82	2	0	4	0	1	0	0	0	1	0
83	452	369	1726	497	795	1043	543	60	125	109
84	0	1	14	2	4	4	0	0	0	0
85	5	2	16	0	3	1	0	0	0	0
86	0	0	2	15	40	35	16	6	10	5
87	0	0	1	1	11	2	8	2	4	0
88	0	0	1	6	13	9	3	3	2	2
89	0	0	0	8	16	24	5	1	4	3

TABLE 56. (continued)

41 LK 51							41 LK 53			
CODE	Area C	Area D		All	Area E	SITE TOTAL	1st	2nd	3rd	4th
	1st	2nd								
37	12	5	2	1	2	433	7	7	10	1
38	7	2	2	0	1	30	1	3	3	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	1	0	0	0	0
41	5	3	0	1	1	39	5	4	8	1
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	3	1	0	1	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	151	26	102	14	7	1235	122	171	207	2
48	76	10	34	8	2	486	31	82	92	-
49	0	0	0	0	0	1	0	2	1	0
50	0	0	0	0	0	1	0	0	0	0
51	31	5	24	3	1	254	31	39	36	0
52	0	0	1	0	0	2	0	1	1	0
53	0	0	0	0	0	0	1	0	0	0
54	26	7	5	1	2	132	20	21	22	0
55	0	0	1	0	0	2	2	0	1	0
56	0	1	0	0	0	3	6	0	1	0
57	21	3	1	1	1	70	12	6	9	1
58	1	0	0	1	0	5	10	0	0	0
59	0	0	0	0	0	0	0	10	0	0
60	26	1	38	1	1	321	34	36	41	1
61	0	0	0	0	0	0	1	10	0	0
62	0	0	0	0	0	1	0	0	0	0
63	392	40	101	12	16	2707	253	356	560	14

TABLE 56. (continued)

CODE	41 LK 51						41 LK 53			
	Area C	Area D		All	Area E	SITE TOTAL	1st	2nd	3rd	4th
		1st	2nd							
64	27	8	18	1	2	459	45	54	88	0
65	1	0	0	0	0	5	1	1	10	0
66	1	0	1	0	0	3	0	0	6	0
67	203	23	26	4	12	870	86	152	220	0
68	0	0	1	0	0	3	10	0	1	0
69	5	0	0	0	0	5	0	0	1	0
70	20	3	6	1	1	94	3	17	22	0
71	2	0	0	0	0	2	0	10	0	0
72	0	0	0	0	0	0	0	10	0	0
73	151	4	72	6	1	1385	132	164	258	14
74	1	0	1	0	0	4	1	2	11	0
75	2	0	1	0	0	4	0	1	10	0
76	1221	190	275	81	77	6112	476	781	1100	18
77	29	8	6	4	5	167	7	25	38	1
78	0	0	0	0	0	0	3	0	0	0
79	0	0	0	0	0	0	6	0	0	0
80	320	56	68	29	16	1511	125	173	239	1
81	2	0	1	0	0	4	0	10	1	0
82	1	0	1	0	0	4	0	6	0	0
83	862	126	199	46	56	4461	350	584	894	16
84	4	0	2	2	0	18	0	7	4	0
85	5	0	2	1	0	12	0	0	8	0
86	62	6	10	3	9	217	34	84	75	0
87	14	1	4	1	1	49	8	19	20	0
88	16	1	5	0	3	63	13	19	28	0
89	32	4	1	2	5	105	13	46	48	0

TABLE 56. (continued)

41 LK 53		41 LK 74								
CODE	SITE TOTAL	Area A	Area B		Area C	Area D	Area F	Area G	Area H	SITE TOTAL
			1st	2nd						
37	25	12	6	2	10	6	21	0	0	57
38	7	3	2	0	3	1	11	0	0	20
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	18	6	3	2	14	4	4	0	0	33
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	6	6
44	2	3	1	0	2	1	1	0	6	14
45	0	0	0	0	0	0	0	0	6	6
46	0	0	0	0	0	0	0	0	0	0
47	502	233	94	44	101	57	83	5	25	642
48	205	41	23	7	39	13	28	2	15	168
49	3	1	1	0	0	0	1	0	0	3
50	0	2	1	1	0	0	0	0	0	4
51	106	33	18	12	21	13	22	0	4	123
52	2	1	0	0	6	0	1	0	0	8
53	1	1	0	0	0	0	8	0	0	9
54	63	4	2	1	15	0	2	2	6	32
55	3	0	0	0	0	0	0	0	0	0
56	7	0	0	0	0	0	0	0	0	0
57	28	5	4	1	14	0	1	1	0	26
58	10	0	0	0	6	0	0	0	0	6
59	10	0	0	0	0	0	0	0	0	0
60	112	150	47	24	34	31	29	0	3	318
61	11	3	2	0	0	0	6	0	0	11
62	0	2	1	1	0	0	6	0	0	10
63	1183	366	129	60	171	93	103	4	24	950

TABLE 56. (continued)

41 LK 53		41 LK 74								
CODE	SITE TOTAL	Area A	Area B		Area C	Area D	Area F	Area G	Area H	SITE TOTAL
			1st	2nd						
64	187	26	19	7	15	6	17	0	3	93
65	12	0	1	0	0	7	0	0	0	8
66	6	0	0	0	0	6	0	0	0	6
67	458	4	3	0	75	10	23	4	18	137
68	11	0	0	0	0	0	6	0	0	6
69	1	0	0	0	0	0	0	1	0	1
70	42	2	1	0	8	10	5	0	1	27
71	10	0	0	0	0	0	6	0	0	6
72	10	0	0	0	0	0	3	0	0	3
73	568	334	105	53	75	87	68	0	2	724
74	14	3	4	0	0	0	0	0	0	7
75	11	9	0	0	0	1	0	0	0	10
76	2375	680	244	95	546	92	243	16	145	2061
77	71	23	5	2	17	3	8	0	1	59
78	3	6	0	0	0	0	0	0	0	6
79	6	10	0	0	0	0	0	0	0	10
80	538	195	76	30	157	38	71	5	36	608
81	11	11	1	1	0	0	1	0	0	14
82	6	8	2	1	0	0	1	0	0	12
83	1844	467	163	63	372	105	164	11	108	1453
84	11	12	2	0	2	1	1	1	0	19
85	8	11	2	0	1	1	1	0	1	17
86	193	6	0	0	30	0	10	2	13	61
87	47	3	0	0	8	0	2	0	3	16
88	60	15	0	0	10	0	5	1	2	33
89	107	10	0	0	12	0	3	1	8	34

TABLE 56. (continued)

41 LK 128

CODE	TP 1	TP 2	TP 3	TP 4	TP 5	TP 6	TP 7	TP 8	TP 9	TP 10
37	0	4	2	3	5	11	8	8	2	1
38	0	2	0	1	0	3	1	5	2	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	1	0	0	0	0
41	0	2	2	2	4	4	7	5	0	0
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	1	1	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	9	21	22	10	64	82	116	101	19	16
48	2	6	6	4	13	22	18	18	6	6
49	0	0	1	0	0	0	2	0	0	0
50	0	0	0	0	0	1	1	1	0	0
51	2	6	5	7	27	17	32	16	4	1
52	1	1	0	0	0	1	2	1	0	1
53	0	0	0	0	0	0	0	0	0	0
54	0	0	1	2	1	2	3	2	0	0
55	0	0	0	0	0	0	0	1	0	0
56	0	0	0	0	0	1	0	0	0	0
57	0	0	0	0	0	1	1	1	0	1
58	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0
60	5	9	10	4	23	40	63	70	15	8
61	0	0	0	1	0	0	0	0	0	0
62	0	0	1	0	0	0	1	1	0	0
63	12	18	34	13	98	84	169	168	23	28

TABLE 56. (continued)

41 LK 128

CODE	TP 1	TP 2	TP 3	TP 4	TP 5	TP 6	TP 7	TP 8	TP 9	TP 10
64	2	5	3	3	9	9	15	16	0	0
65	0	0	0	0	0	0	0	1	0	0
66	0	0	0	0	0	1	0	1	0	0
67	0	0	0	0	1	3	1	2	0	0
68	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	1	1	0	1
71	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0
73	10	13	31	10	79	72	152	149	23	27
74	0	1	2	0	2	0	1	1	0	0
75	0	0	0	0	1	0	0	1	0	0
76	12	46	43	17	163	142	322	309	57	48
77	1	4	3	2	6	6	13	24	2	1
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
80	4	5	12	7	45	43	102	70	13	9
81	0	0	0	0	0	1	1	0	0	0
82	0	0	0	0	0	1	1	1	0	0
83	7	37	28	8	112	93	107	115	42	38
84	1	0	0	0	1	0	0	1	0	0
85	0	0	0	0	1	2	0	2	0	0
86	0	0	0	0	1	0	1	2	0	0
87	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	1	2	0	0
89	0	0	0	0	1	0	0	0	0	0

TABLE 56. (continued)

CODE	41 LK 128						41 LK 133			41 LK 142
	TP 11	TP 12	TP 13	TP 14	TP 16	SITE TOTAL	1st	2nd	SITE TOTAL	SITE TOTAL
37	3	4	0	3	1	55	1	2	3	3
38	10	10	0	2	0	36	1	1	2	1
39	6	0	0	0	0	6	0	0	0	0
40	6	0	0	0	0	7	0	0	0	0
41	9	2	0	1	1	39	0	0	0	1
42	6	0	0	0	0	6	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	2	0	1	1	1
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	18	13	5	8	6	510	4	3	7	11
48	4	3	1	3	2	114	2	2	4	6
49	0	0	0	0	0	3	0	0	0	0
50	0	0	0	0	0	3	0	0	0	0
51	3	4	2	1	1	128	1	1	2	2
52	0	1	0	0	0	8	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0
54	1	0	0	0	0	12	1	0	1	0
55	0	0	0	0	0	1	0	0	0	0
56	0	0	0	0	0	1	0	0	0	0
57	1	1	0	1	0	7	0	0	0	1
58	0	1	0	0	0	1	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0
60	9	5	2	3	3	269	0	0	0	2
61	0	0	0	0	0	1	0	0	0	0
62	0	0	6	0	0	9	0	0	0	0
63	22	28	14	30	10	751	9	3	12	7

TABLE 56. (continued)

41 LK 128							41 LK 133			41 LK 142
CODE	TP 11	TP 12	TP 13	TP 14	TP 16	SITE TOTAL	1st	2nd	SITE TOTAL	SITE TOTAL
64	2	5	0	2	6	77	2	0	2	2
65	0	0	0	0	0	1	0	0	0	0
66	0	0	0	0	0	2	0	0	0	0
67	2	0	0	0	0	9	3	0	3	2
68	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0
70	0	0	1	0	0	4	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0
73	18	23	13	18	10	648	4	4	8	3
74	0	0	0	0	0	7	0	0	0	0
75	0	0	0	0	0	2	0	0	0	0
76	77	80	36	42	20	1414	19	12	31	16
77	5	4	1	0	0	72	1	0	1	1
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
80	22	25	3	16	5	381	6	3	9	9
81	1	0	0	0	0	3	0	0	0	0
82	0	0	0	0	0	3	0	0	0	0
83	50	51	32	26	15	761	12	10	22	6
84	0	0	0	0	0	3	0	0	0	0
85	0	0	0	0	0	5	0	0	0	0
86	0	0	0	0	0	4	1	1	2	2
87	0	0	0	0	0	0	0	1	1	1
88	0	0	0	0	0	3	0	0	0	1
89	0	0	0	0	0	1	1	0	1	0

TABLE 56. (continued)

CODE	41 LK 185						41 LK 243			
	TP1 1st	2nd	TP2 A11	TP3 1st	2nd	SITE TOTAL	TP1 1st	2nd	TP2 A11	TP3 1st
37	0	0	1	1	1	3	1	0	2	0
38	0	0	0	0	1	1	1	0	1	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	0	0	1	1	0	2	0	0	1	0
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	6	6	14	4	8	38	13	25	9	35
48	1	1	3	1	4	10	9	9	4	11
49	0	0	0	0	0	0	0	0	0	1
50	0	0	0	0	0	0	0	1	0	0
51	3	3	8	1	3	18	1	6	1	6
52	0	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0
54	1	2	2	2	1	8	1	0	0	0
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	0	0	1	0	0	1	2	0	0	0
58	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0
60	1	0	0	0	0	1	0	10	4	16
61	0	0	0	0	0	0	0	1	0	1
62	0	0	0	0	0	0	0	1	0	1
63	12	8	10	8	8	46	18	24	17	44

TABLE 56. (continued)

CODE	41 LK 185						41 LK 243			
	TP1 1st	2nd	TP2 All	TP3 1st	2nd	SITE TOTAL	TP1 1st	2nd	TP2 All	TP3 1st
64	1	2	6	2	0	11	0	8	2	3
65	0	0	0	0	0	0	0	0	0	0
66	0	0	1	0	0	1	0	0	0	0
67	7	4	8	5	6	30	14	2	0	0
68	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0
70	2	0	3	1	1	7	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0
73	2	2	6	0	1	11	4	14	15	41
74	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	2	1	0
76	17	9	37	13	12	88	82	39	18	54
77	0	0	0	0	0	0	3	1	1	1
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
80	9	5	11	6	1	32	20	14	7	8
81	0	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0
83	8	4	26	7	11	56	59	24	10	45
84	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	1	1	0
86	4	2	0	5	3	14	15	0	0	0
87	0	0	0	1	0	1	2	0	0	0
88	3	1	0	3	2	9	4	0	0	0
89	1	1	0	1	1	4	9	0	0	0

TABLE 56. (continued)

CODE	41 LK 243			41 LK 250				41 MC 29		
	TP3 2nd	TP4 A11	SITE TOTAL	TP1 1st	2nd	3rd	SITE TOTAL	1st	2nd	SITE TOTAL
37	3	0	6	3	5	1	9	10	5	15
38	2	0	4	0	4	1	5	4	4	8
39	0	0	0	0	0	0	0	0	3	3
40	0	0	0	0	0	0	0	0	3	3
41	1	0	2	3	1	0	4	5	4	9
42	0	0	0	0	0	0	0	3	0	3
43	0	0	0	0	0	0	0	3	0	3
44	0	0	0	0	0	0	0	7	0	7
45	0	0	0	0	0	0	0	0	3	3
46	0	0	0	0	0	0	0	0	6	6
47	25	14	121	18	30	10	58	72	62	134
48	12	7	52	10	6	7	23	9	20	29
49	0	0	1	0	0	0	0	0	0	0
50	0	0	1	0	0	0	0	0	0	0
51	4	3	21	2	13	2	17	12	20	32
52	0	0	0	0	0	0	0	1	4	5
53	0	0	0	0	0	0	0	0	6	6
54	2	4	7	3	0	0	3	1	6	7
55	0	0	0	0	0	0	0	0	3	3
56	0	0	0	0	0	0	0	6	0	6
57	0	0	2	1	2	0	3	6	0	6
58	0	0	0	0	0	0	0	6	0	6
59	0	0	0	0	0	0	0	0	3	3
60	7	1	38	2	9	1	12	63	29	92
61	0	0	2	0	0	0	0	0	3	3
62	0	0	2	0	0	0	0	6	0	6
63	24	23	150	23	31	5	59	150	56	206

TABLE 56. (continued)

Day 11/25/97 10:00 AM

CODE	41 LK 243			41 LK 250				41 MC 29		
	TP3 2nd	TP4 A11	SITE TOTAL	TP1 1st	2nd	3rd	SITE TOTAL	1st	2nd	SITE TOTAL
64	3	3	19	6	7	2	15	13	9	22
65	0	0	0	0	0	0	0	1	3	4
66	0	0	0	0	1	0	1	0	3	3
67	0	15	31	11	12	0	23	2	4	6
68	0	0	0	0	1	0	1	6	0	6
69	0	0	0	0	0	0	0	6	0	6
70	0	0	0	0	1	0	1	4	0	4
71	0	0	0	0	0	0	0	0	6	6
72	0	0	0	0	0	0	0	0	6	6
73	21	5	100	2	11	3	16	138	54	192
74	0	0	0	0	1	1	2	4	0	4
75	0	0	3	0	0	0	0	6	0	6
76	55	104	352	82	86	20	188	225	99	324
77	5	11	22	8	11	1	20	4	3	7
78	0	0	0	0	0	0	0	0	3	3
79	0	0	0	0	0	0	0	0	6	6
80	18	28	95	37	30	4	71	65	40	105
81	0	0	0	0	0	0	0	3	1	4
82	0	0	0	0	0	0	0	6	0	6
83	32	65	235	33	45	15	93	129	55	184
84	0	0	0	0	0	0	0	1	4	5
85	0	0	2	0	0	0	0	3	6	9
86	2	17	34	2	0	1	3	4	0	4
87	2	3	7	1	0	0	1	6	0	6
88	0	8	12	1	0	1	2	4	0	4
89	0	6	15	0	0	0	0	0	3	3
TOTAL	22	247	62	2	12	1	25	21	61	72

TABLE 56. (continued)

41 MC 55									41 MC 94	
CODE	Area A		Area B		Area C	Area D	Area E	SITE	TP1	2nd
	1st	2nd	1st	2nd	A11	A11	A11	TOTAL		
37	0	0	3	0	2	16	7	28	1	3
38	0	0	1	0	0	7	4	12	1	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	0	0	2	0	1	5	3	11	0	2
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	1	4	0	5	0	1
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	12	25	23	9	28	142	76	315	14	31
48	3	9	5	3	17	39	15	91	6	4
49	0	0	0	0	1	0	1	2	0	0
50	0	0	0	0	1	0	0	1	0	0
51	3	9	11	2	2	50	22	99	6	5
52	0	0	0	0	0	0	0	0	0	0
53	0	0	1	0	0	3	0	4	0	0
54	0	0	3	2	4	60	17	86	0	0
55	0	0	0	0	0	3	0	3	0	0
56	0	0	1	0	6	1	0	8	0	0
57	0	0	2	0	4	11	2	19	0	0
58	0	0	0	0	3	0	0	3	0	0
59	0	0	0	0	10	1	0	11	0	0
60	6	7	2	2	7	19	20	63	2	22
61	0	0	0	0	3	0	0	3	0	0
62	0	0	0	0	10	0	1	11	0	0
63	17	47	35	12	33	296	78	518	12	52

TABLE 56. (continued)

CODE	41 MC 55								41 MC 94	
	Area A		Area B		Area C	Area D	Area E	SITE	TP1	2nd
	1st	2nd	1st	2nd	A11	A11	A11	TOTAL	1st	
64	5	5	5	3	9	29	4	60	2	5
65	0	0	0	1	0	15	0	16	0	0
66	0	0	0	0	0	5	0	5	0	0
67	6	9	13	1	13	188	45	275	0	1
68	0	0	1	0	0	11	3	15	0	0
69	0	0	0	0	1	7	1	9	0	0
70	0	1	1	0	2	18	2	24	0	0
71	0	0	0	0	0	10	0	10	0	0
72	0	0	0	0	0	10	0	10	0	0
73	6	32	16	8	3	92	27	184	10	46
74	0	0	0	1	0	10	1	12	0	0
75	0	0	0	0	0	3	0	3	0	0
76	32	77	118	25	117	989	265	1623	28	104
77	2	8	8	2	8	65	13	106	2	4
78	0	0	0	0	0	10	0	10	0	0
79	0	0	0	0	0	10	0	10	0	0
80	8	19	39	4	63	263	80	476	8	18
81	0	0	1	0	0	3	0	4	1	0
82	0	0	0	0	0	1	0	1	0	0
83	21	50	71	19	43	676	188	1068	18	82
84	0	0	1	1	0	3	22	27	0	1
85	1	0	0	0	0	2	11	14	0	0
86	2	1	4	0	3	26	1	37	0	0
87	1	0	3	0	0	7	0	11	0	0
88	1	1	11	0	2	7	0	22	0	0
89	0	0	13	0	1	9	1	24	0	0

TABLE 56. (continued)

41 MC 94 (continued)										
CODE	TP2 1st	2nd	TP3 1st	2nd	TP4 1st	2nd	TP5 1st	2nd	TP6 1st	2nd
37	3	2	1	0	2	1	0	2	1	0
38	1	0	0	0	1	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	2	2	1	0	1	0	0	2	1	0
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	1	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	30	33	37	7	48	7	9	7	19	10
48	7	7	5	2	12	3	1	0	3	0
49	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
51	8	4	2	1	3	1	1	3	2	2
52	1	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	1	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	0	1	0	0	0	0	1	0	0	0
58	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0
60	12	21	30	4	32	3	6	4	14	8
61	1	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	1
63	27	66	67	8	85	12	30	23	77	24

TABLE 56. (continued)

41 MC 94 (continued)

[illegible]

TABLE 56. (continued)

CODE	41 MC 94	41 MC 196				41 MC 222				
	SITE TOTAL	TP1 A11	TP2 A11	TP3 A11	SITE TOTAL	N95 E87	N97 E86	N97 E87	N98 E86	N98 E90
37	16	4	0	1	5	1	1	0	7	0
38	3	2	0	0	2	0	1	0	2	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	11	2	0	0	2	1	0	0	5	0
42	0	0	0	0	0	1	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	2	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	252	26	12	40	78	2	25	20	28	14
48	50	15	4	3	22	0	7	7	8	4
49	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	1	2	0	0	0
51	38	5	4	19	28	1	8	4	6	4
52	1	0	0	1	1	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0
54	1	2	1	0	3	0	0	7	11	4
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	2	3	1	1	5	0	0	2	2	2
58	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0
60	158	1	2	17	20	1	10	0	1	0
61	1	0	0	0	0	0	0	0	0	0
62	1	0	0	1	1	0	0	0	0	0
63	483	22	13	37	72	3	52	25	56	12

TABLE 56. (continued)

CODE	41 MC 94	41 MC 196				41 MC 222				
	SITE TOTAL	TP1 A11	TP2 A11	TP3 A11	SITE TOTAL	N95 E87	N97 E86	N97 E87	N98 E86	N98 E90
64	23	8	10	14	32	0	3	7	3	3
65	0	0	1	0	1	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0
67	2	2	1	3	6	0	6	33	46	8
68	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0
70	0	6	2	0	8	0	2	4	5	1
71	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0
73	457	6	1	20	27	3	41	4	2	0
74	0	0	0	0	0	0	0	0	0	0
75	1	0	0	0	0	0	0	0	0	0
76	752	85	11	62	158	3	12	61	136	43
77	29	2	0	0	2	0	3	2	3	0
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
80	185	27	3	12	42	0	12	22	46	11
81	2	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0
83	688	55	8	50	113	3	34	37	87	32
84	2	1	0	0	1	0	1	0	0	0
85	2	0	0	0	0	0	0	0	0	0
86	0	8	0	0	8	0	0	0	10	3
87	0	2	0	0	2	0	0	0	6	0
88	0	3	0	0	3	0	0	0	4	2
89	0	3	0	0	3	0	0	0	0	1

TABLE 56. (continued)

41 MC 222 (continued)

CODE	N98 E91	N99 E86	N99 E89	N99 E90	N99 E91	N100 E86	N100 E89	N100 E90	N100 E91	N101 E87
37	0	2	1	3	1	0	3	1	1	0
38	0	1	0	0	1	0	1	0	1	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	0	1	1	3	0	0	2	0	0	0
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	1	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	17	17	6	15	26	10	17	5	15	10
48	5	8	2	4	4	0	2	2	4	0
49	0	0	0	0	0	0	0	0	0	5
50	0	0	0	0	1	0	0	0	0	0
51	4	3	2	2	1	2	7	3	1	2
52	0	0	0	3	0	0	0	0	0	0
53	0	0	0	0	1	1	0	0	0	2
54	3	1	2	5	3	0	5	0	0	0
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	4	0	0	1	0	0	2	0	0	0
58	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0
60	1	5	0	0	10	8	1	9	10	9
61	0	0	0	0	9	0	0	1	0	0
62	0	0	0	0	0	0	0	1	0	0
63	28	86	16	27	88	12	20	17	29	12

TABLE 56. (continued)

41 MC 222 (continued)										
CODE	N98 E91	N99 E86	N99 E89	N99 E90	N99 E91	N100 E86	N100 E89	N100 E90	N100 E91	N101 E87
64	6	4	3	3	3	0	4	3	0	1
65	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0
67	0	5	10	20	1	0	15	0	2	0
68	18	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0
70	0	0	1	3	1	0	0	1	0	0
71	1	0	0	0	0	0	0	1	0	0
72	0	0	0	0	0	0	0	0	0	0
73	2	77	2	1	83	12	1	13	27	10
74	0	0	0	0	1	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0
76	92	148	54	56	168	31	42	32	42	24
77	2	2	1	2	4	2	3	2	1	3
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
80	25	25	17	19	30	3	15	5	11	5
81	0	0	0	0	0	0	0	2	0	0
82	0	0	0	0	0	0	0	0	0	0
83	65	121	36	30	134	26	24	25	30	16
84	0	1	0	0	1	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0
86	8	3	2	10	10	1	12	1	0	0
87	0	0	0	2	0	1	3	0	0	0
88	3	0	1	5	4	0	3	0	0	0
89	5	3	1	3	6	0	6	1	0	0

TABLE 56. (continued)

41 MC 222 (continued)										
CODE	N101 E88	N101 E89	N101 E90	N101 E91	N102 E88	N102 E89	N102 E90	N102 E91	N102 E100	N103 E86
37	0	1	5	1	1	1	3	7	1	1
38	0	0	2	0	1	0	0	4	1	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	1	0	0	0	0	0
41	0	0	2	1	0	1	3	3	0	1
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	1	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	7	15	19	35	6	26	37	77	18	3
48	0	2	4	10	9	8	12	12	10	2
49	0	0	0	0	0	0	0	0	0	0
50	0	0	0	1	0	0	0	0	0	0
51	2	4	9	7	3	8	16	17	5	0
52	0	0	0	1	0	0	0	1	0	0
53	0	0	0	0	0	0	0	1	0	0
54	0	0	5	0	1	0	5	3	3	0
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	0	2	1	2	0	1	2	3	0	0
58	0	0	0	0	0	0	0	1	0	0
59	0	0	0	0	0	0	0	0	0	0
60	7	7	0	16	9	9	2	42	0	1
61	1	0	0	1	0	0	0	0	0	0
62	0	0	0	0	0	0	0	1	0	0
63	5	23	33	123	23	35	58	77	20	6

TABLE 56. (continued)

41 MC 222 (continued)										
CODE	N101 E88	N101 E89	N101 E90	N101 E91	N102 E88	N102 E89	N102 E90	N102 E91	N102 E100	N103 E86
64	0	1	10	5	5	8	12	9	6	1
65	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0
67	0	0	20	2	0	5	40	2	9	0
68	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0
70	0	0	1	0	0	0	3	2	3	0
71	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	1	0
73	5	22	2	116	18	22	3	64	2	6
74	0	0	0	1	0	0	0	0	0	0
75	0	0	0	0	0	0	0	1	0	0
76	14	33	64	173	27	84	197	122	64	17
77	0	0	1	4	0	0	6	7	0	0
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
80	4	7	24	33	6	30	35	32	15	3
81	0	0	0	0	0	0	0	1	0	0
82	0	0	0	0	0	0	0	0	0	0
83	10	26	39	128	21	52	156	76	49	9
84	0	0	0	0	0	2	0	0	0	0
85	0	1	0	0	0	0	0	1	0	0
86	0	0	12	1	0	0	7	0	1	0
87	0	0	4	0	0	0	3	0	0	0
88	0	0	5	0	0	0	2	0	1	0
89	0	0	3	1	0	0	2	0	0	0

TABLE 56. (continued)

41 MC 222 (continued)

CODE	N103 E87	N103 E88	N103 E89	N103 E90	N103 E91	N104 E85	N107 E87	N112 E79	N113 E83	N119 E80
37	0	2	6	4	4	0	0	0	0	0
38	0	0	2	0	2	0	0	0	0	0
39	0	0	7	0	0	0	0	0	0	0
40	0	0	2	0	0	0	0	0	0	0
41	0	2	4	4	2	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	1	0	0	0	0	0	0	0
47	7	33	64	22	37	7	11	9	6	2
48	1	10	14	7	17	2	3	3	2	1
49	0	0	38	0	0	0	0	0	0	0
50	0	0	10	0	0	0	0	0	0	0
51	1	13	15	3	10	3	3	1	2	0
52	0	0	0	1	0	0	0	0	0	0
53	0	0	3	0	0	0	0	0	0	0
54	0	17	3	0	1	0	0	0	2	1
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	0	3	1	0	0	0	2	1	0	0
58	0	0	0	0	0	0	0	0	0	0
59	0	0	1	0	0	0	0	0	0	0
60	5	3	31	11	7	2	3	4	0	0
61	0	0	0	0	0	0	0	0	0	0
62	1	0	22	0	0	0	0	0	0	0
63	10	47	100	44	178	5	16	6	17	2

TABLE 56. (continued)

41 MC 222 (continued)										
CODE	N103 E87	N103 E88	N103 E89	N103 E90	N103 E91	N104 E85	N107 E87	N112 E79	N113 E83	N119 E80
64	2	10	14	13	45	3	1	2	2	1
65	0	0	40	0	0	0	0	0	0	0
66	0	0	3	0	0	0	0	0	0	0
67	0	31	5	11	44	0	1	0	11	1
68	0	0	0	0	0	0	0	0	0	0
69	0	0	1	0	0	0	0	0	0	0
70	0	2	4	3	5	1	1	0	2	0
71	0	0	0	0	0	1	0	0	0	0
72	0	0	0	1	0	0	0	0	0	0
73	8	4	77	16	83	0	13	4	2	0
74	0	0	0	0	1	0	0	0	0	0
75	0	0	37	0	0	0	0	0	0	0
76	7	94	107	72	604	42	21	33	32	11
77	0	6	3	0	7	0	0	0	1	0
78	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0
80	3	26	27	25	85	16	4	11	12	5
81	0	0	0	1	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0
83	4	61	77	45	509	24	17	22	19	6
84	0	0	0	1	3	0	0	0	0	0
85	0	0	2	0	0	0	0	1	0	0
86	0	7	1	0	3	0	0	0	4	3
87	0	0	1	0	0	0	0	0	1	1
88	0	1	0	0	2	0	0	0	1	1
89	0	5	0	0	3	0	0	0	2	1

TABLE 56. (continued)

CODE	41 MC 222		41 MC 268							
	N125 E72	SITE TOTAL	Area A			Area B			TP1 A11	TP2 A11
			1st	2nd	A11	1st	2nd	A11		
37	2	62	11	0	5	9	1	19	0	6
38	1	20	4	0	2	1	6	5	0	1
39	0	7	0	0	0	0	6	0	0	0
40	0	1	0	0	0	0	3	0	0	0
41	1	37	5	0	3	4	4	13	0	4
42	0	1	0	0	0	0	3	0	0	0
43	0	0	0	0	0	0	0	6	0	0
44	0	2	2	0	0	1	0	11	0	1
45	0	0	0	0	0	0	0	6	0	0
46	0	1	0	0	0	0	0	6	0	0
47	2	679	110	30	72	39	8	127	26	63
48	0	186	32	7	27	8	0	29	9	18
49	0	43	1	0	1	0	0	7	0	0
50	0	15	2	0	0	0	0	10	0	0
51	1	173	31	7	23	9	3	29	11	18
52	0	6	1	0	3	0	0	6	1	1
53	0	8	6	0	1	1	0	0	0	0
54	1	83	11	0	4	1	0	2	0	0
55	0	0	10	0	0	0	0	0	0	0
56	0	0	10	0	0	0	0	0	0	0
57	0	31	7	1	1	0	0	1	0	0
58	0	1	6	0	0	0	0	0	0	0
59	0	1	0	3	0	0	0	0	0	0
60	0	224	44	21	25	21	5	69	7	28
61	0	12	0	6	0	0	0	1	0	0
62	0	25	1	6	0	0	0	0	0	0
63	4	1331	143	60	97	53	14	139	28	85

TABLE 56. (continued)

CODE	41 MC 222		41 MC 268							
	N125 E72	SITE TOTAL	Area A			Area B			TP1 A11	TP2 A11
			1st	2nd	A11	1st	2nd	A11		
64	1	194	15	10	18	8	1	13	7	21
65	0	40	0	0	6	0	0	0	0	0
66	0	3	0	1	6	0	0	0	0	0
67	2	330	0	1	10	0	0	3	0	2
68	0	18	0	0	6	0	0	0	0	0
69	0	1	0	0	3	0	0	0	0	0
70	0	45	4	0	4	0	0	2	0	0
71	0	3	0	0	6	0	0	0	0	0
72	0	2	6	0	0	0	0	0	0	0
73	1	746	134	43	80	45	13	121	21	62
74	0	3	13	0	2	0	0	0	0	0
75	0	38	11	0	0	0	0	1	0	0
76	6	2809	277	99	143	113	13	285	52	122
77	0	75	20	3	6	9	0	15	1	5
78	0	0	0	3	0	0	0	0	0	0
79	0	0	0	3	0	0	0	0	0	0
80	3	652	65	36	43	40	4	92	14	32
81	0	4	0	6	0	1	0	0	0	0
82	0	0	1	3	0	0	0	0	0	0
83	3	2053	189	66	100	63	9	178	37	85
84	0	9	2	0	4	0	0	0	1	3
85	0	5	2	0	6	0	0	0	0	0
86	0	99	0	0	6	0	1	2	0	0
87	0	22	0	0	6	0	1	1	0	0
88	0	35	0	0	6	0	0	1	0	0
89	0	43	0	0	3	0	0	0	0	0

TABLE 56. (continued)

CODE	41 MC 268		41 MC 296							
	TP3 A11	SITE TOTAL	1st	Area A 2nd	3rd	1st	Area B 2nd	3rd	Area C 1st	2nd
37	15	66	22	11	6	40	14	19	2	5
38	8	27	5	4	2	15	4	7	0	3
39	0	6	0	0	0	0	0	0	0	0
40	0	3	0	0	0	0	0	0	0	0
41	5	38	15	4	4	20	8	9	2	2
42	0	3	0	0	0	0	0	0	0	0
43	0	6	0	0	0	0	0	0	0	0
44	2	17	2	3	0	5	2	3	0	0
45	0	6	0	0	0	0	0	0	0	0
46	0	6	0	0	0	0	0	0	0	0
47	76	551	311	229	184	571	212	306	30	53
48	26	156	50	42	32	162	62	125	9	11
49	0	9	3	0	2	4	0	7	0	1
50	0	12	0	1	1	3	1	6	0	1
51	19	150	43	43	31	144	50	71	8	19
52	0	12	0	1	5	19	5	2	0	0
53	0	8	1	0	2	3	12	3	0	0
54	15	33	6	3	2	75	35	20	6	4
55	0	10	0	2	0	0	0	6	0	0
56	0	10	0	0	0	1	0	10	0	0
57	13	23	3	2	3	21	10	31	4	0
58	0	6	0	0	0	0	1	10	0	0
59	0	3	0	0	1	0	0	6	0	0
60	3	223	209	139	112	205	70	110	3	19
61	0	7	2	0	0	21	1	1	0	0
62	0	7	1	0	0	19	1	1	0	0
63	156	775	657	457	315	1282	405	543	58	69

TABLE 56. (continued)

CODE	41 MC 268		41 MC 296							
	TP3 A11	SITE TOTAL	1st	Area A 2nd	3rd	1st	Area B 2nd	3rd	Area C 1st	2nd
64	21	114	61	38	30	115	46	63	7	7
65	0	6	4	0	1	1	1	16	0	0
66	0	7	1	1	0	2	0	10	0	0
67	98	114	3	1	2	357	105	195	25	2
68	0	6	0	0	0	8	0	11	1	0
69	0	3	0	0	0	5	3	11	0	0
70	18	28	4	2	1	34	7	22	1	1
71	0	6	0	1	0	16	0	0	0	0
72	0	6	0	0	0	0	15	2	0	0
73	19	538	625	416	283	827	254	344	25	59
74	0	15	8	2	1	5	2	16	0	1
75	0	12	11	2	2	2	0	10	1	1
76	181	1285	1057	712	446	2985	1131	1314	198	136
77	23	82	27	12	11	109	34	78	8	4
78	0	3	0	0	0	0	0	6	0	0
79	0	3	0	0	0	0	0	0	0	0
80	254	580	256	134	94	754	238	354	43	32
81	0	7	0	0	0	2	11	3	0	0
82	0	4	0	1	0	5	11	2	0	0
83	329	1056	1011	625	332	3256	883	984	147	100
84	0	10	4	2	3	10	4	11	0	0
85	0	8	8	4	0	20	5	19	0	1
86	43	52	2	2	2	97	37	91	8	3
87	9	17	0	1	0	17	10	32	1	0
88	12	19	0	1	2	22	12	28	4	1
89	22	25	2	0	0	73	15	35	3	2

TABLE 56. (continued)

41 MC 296 (continued)								
CODE	Area D			Area E		Area G		
	1st	2nd	3rd	1st	2nd	1st	2nd	3rd
37	6	2	3	7	1	2	4	1
38	2	2	0	2	0	0	1	1
39	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
41	3	0	3	4	1	2	1	0
42	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0
44	1	0	0	1	0	0	2	0
45	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0
47	36	30	44	61	20	32	34	29
48	8	8	12	15	6	7	15	10
49	0	0	1	1	0	0	0	0
50	0	0	0	1	1	0	0	0
51	8	8	6	9	5	16	7	6
52	0	1	1	0	1	0	0	0
53	0	1	0	0	0	0	0	0
54	1	2	1	6	2	13	14	4
55	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0
57	0	5	0	4	0	4	5	1
58	0	0	0	0	0	0	0	0
59	0	0	0	1	0	0	0	0
60	19	6	25	27	7	0	0	7
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	17	33	80	124	52	40	37	47

TABLE 56. (continued)

41 MC 296 (continued)								
CODE	Area D			Area E		Area G		
	1st	2nd	3rd	1st	2nd	1st	2nd	3rd
64	34	5	6	7	3	9	11	8
65	0	0	1	1	0	0	0	0
66	0	0	0	0	0	0	1	0
67	11	14	0	34	26	25	59	22
68	0	0	0	0	0	2	2	0
69	1	0	0	2	0	1	0	0
70	2	2	1	2	0	2	5	3
71	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0
73	34	12	73	81	23	4	5	21
74	1	0	0	0	1	0	0	0
75	1	0	2	0	0	0	1	0
76	132	109	71	301	120	207	334	162
77	10	3	1	8	5	7	14	8
78	0	0	1	0	0	0	0	0
79	0	0	0	0	0	0	0	0
80	35	41	23	70	32	77	128	61
81	0	0	0	1	0	0	0	0
82	0	0	0	0	0	0	1	0
83	87	65	47	223	83	119	192	93
84	2	0	1	2	0	1	0	0
85	2	0	1	1	2	0	1	1
86	3	16	0	6	3	18	25	13
87	0	4	0	3	0	4	4	3
88	1	5	0	1	1	5	12	5
89	2	7	0	2	2	9	9	5

TABLE 56. (continued)

41 MC 296 (continued)									
CODE	TP1 1st	2nd	3rd	TP2 1st	2nd	3rd	TP3 1st	2nd	SITE TOTAL
37	6	1	1	4	2	2	1	0	162
38	4	0	0	2	0	1	0	0	55
39	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
41	2	1	0	2	2	1	1	0	87
42	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0
44	0	0	1	0	0	0	0	0	20
45	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0
47	47	43	55	8	31	9	9	2	2386
48	14	22	29	2	8	5	0	0	654
49	0	0	0	0	0	0	0	0	19
50	0	0	0	0	0	0	0	0	15
51	18	12	14	1	15	3	1	0	538
52	1	0	0	0	0	0	0	0	36
53	0	0	0	0	0	0	0	0	22
54	2	0	1	2	0	0	1	0	200
55	0	0	0	0	0	0	0	0	8
56	0	0	0	0	0	0	0	0	11
57	3	2	3	0	4	1	1	0	105
58	0	0	0	0	0	0	0	0	11
59	0	0	0	0	0	0	0	0	8
60	10	7	18	3	4	0	6	2	1008
61	0	0	0	0	0	0	0	0	25
62	0	0	1	0	0	0	0	0	23
63	78	55	82	30	40	38	12	5	4556

TABLE 56. (continued)

41 MC 296 (continued)									
CODE	TP1 1st	2nd	3rd	TP2 1st	2nd	3rd	TP3 1st	2nd	SITE TOTAL
64	29	22	40	8	11	10	0	0	570
65	0	0	1	1	0	0	0	0	27
66	0	0	0	0	0	0	0	0	15
67	11	13	19	4	8	6	0	0	942
68	0	0	0	0	0	0	0	0	24
69	0	0	0	0	0	0	0	0	23
70	5	5	13	2	9	3	0	0	127
71	1	0	0	0	0	0	0	0	18
72	0	0	0	0	0	0	0	0	17
73	31	14	62	16	12	19	12	5	3257
74	0	0	0	0	0	0	0	0	37
75	0	0	0	0	0	0	0	0	33
76	114	27	139	77	116	68	17	12	9985
77	5	4	6	2	7	3	0	0	366
78	1	0	0	0	0	0	0	0	8
79	0	0	0	0	0	0	0	0	0
80	32	26	52	21	31	24	2	2	2562
81	0	1	1	0	0	0	0	0	19
82	0	1	0	0	0	0	1	0	22
83	125	86	142	51	78	45	15	10	8799
84	1	3	0	3	0	0	1	0	48
85	1	1	0	0	0	0	0	0	67
86	0	0	2	0	4	2	0	0	334
87	0	0	0	0	0	0	0	0	79
88	0	0	1	0	1	1	0	0	103
89	0	2	1	0	3	1	0	0	173

Records, Table 55. The Horizon assemblages are suggested to reflect more realistically the successive periods of cultural activity resulting in accumulation of debitage at each site. The column heading "ALL" signals the combination of debitage from all levels of a unit or area. This is done when no horizons are definable, or when the deposit is believed to represent a limited time period or single cultural event. In certain cases, presentation of both horizons (i.e., 1st, 2nd, etc.) and "ALL" totals beneath a particular excavation are discernible in some of the unit collections, but not in others. Table 57 shows area, unit, and level groupings and horizon combinations for each site.

RADIOCARBON ASSAYS

Thirty carbon samples recovered from seven prehistoric sites excavated during the course of the Phase II investigation at Choke Canyon were submitted for assay to the Radiocarbon Laboratory, The University of Texas at Austin. Assay results are shown, along with provenience information and MASCA corrections, in Table 58. For three of the sites, 41 LK 201, 41 MC 29, and 41 MC 222, the results of additional radiocarbon assays have been previously published (Hall, Black, and Graves 1982:652).

Fourteen of the carbon samples submitted for assay were paired, that is, the amount of carbon collected in seven cases was adequate for division into two samples. The paired samples are as follows:

TX-Number	Site	MASCA Corrected B.P. Age
1. TX-4690	41 LK 51	7060-7080
TX-4691	41 LK 51	6400
2. TX-4674	41 LK 128	970
TX-4671	41 LK 128	770
3. TX-4675	41 LK 128	770
TX-4676	41 LK 128	650
4. TX-4688	41 MC 29	2360
TX-4689	41 MC 29	1940-2010
5. TX-4692	41 MC 55	530
TX-4693	41 MC 55	720
6. TX-4679	41 MC 296	1900-1920
TX-4680	41 MC 296	1360
7. TX-4681	41 MC 296	1790
TX-4669	41 MC 296	1960-2050

The differences in ages yielded by the paired assays range from a minimum of 120 years (Pair No. 3) to a maximum of 660 years (Pair No. 1). The average

TABLE 57. AREA, UNIT, AND LEVEL GROUPINGS AND HORIZON COMBINATIONS FOR EACH SITE

Site	Area	Units	Total Levels	Horizon/Level Combinations				
				1st	2nd	3rd	4th	ALL
41 LK 8	A	N510 E459	17	1-6	7-11	12-17	-	-
41 LK 8	A	N510 E458	20	1-6	7-11	12-20	-	-
41 LK 8	A	N511 E458	17	1-6	7-11	12-17	-	-
41 LK 8	A	N511 E459	17	1-6	7-11	12-17	-	-
41 LK 8	B	N460 E541	8	1-4	5-8	-	-	-
41 LK 8	B	N460 E542	8	1-4	5-8	-	-	-
41 LK 8	B	N461 E541	8	1-4	5-8	-	-	-
41 LK 8	B	N461 E542	8	1-4	5-8	-	-	-
41 LK 8	B	N462 E541	7	1-4	5-7	-	-	-
41 LK 8	B	N462 E542	8	1-4	5-8	-	-	-
41 LK 8	C	N400 E605	11	1-6	7-11	-	-	-
41 LK 8	C	N401 E605	11	1-6	7-11	-	-	-
41 LK 14	A	N1008 E1000	11	1-5	6-11	-	-	-
41 LK 14	A	N1008 E1001	9	1-5	6-9	-	-	-
41 LK 14	A	N1008 E1002	9	1-5	6-9	-	-	-
41 LK 14	A	N1009 E1000	9	1-5	6-9	-	-	-
41 LK 14	A	N1009 E1001	9	1-5	6-9	-	-	-
41 LK 14	A	N1009 E1002	9	1-5	6-9	-	-	-
41 LK 14	A	N1010 E1000	11	1-5	6-11	-	-	-
41 LK 14	A	N1010 E1001	9	1-5	6-9	-	-	-
41 LK 14	A	N1010 E1002	9	1-5	6-9	-	-	-
41 LK 14	B	N1006 E958	8	1-4	5-8	-	-	-
41 LK 14	B	N1006 E959	8	1-4	5-8	-	-	-
41 LK 14	B	N1007 E958	8	1-4	5-8	-	-	-
41 LK 14	B	N1007 E959	8	1-4	5-8	-	-	-
41 LK 51	A	N998 E981	17	1-4	5-9	10-13	14-17	-
41 LK 51	A	N998 E982	17	1-4	5-9	10-13	14-17	-
41 LK 51	A	N998 E984	17	1-4	5-9	10-13	14-17	-
41 LK 51	A	N999 E981	17	1-4	5-9	10-13	14-17	-
41 LK 51	A	N999 E982	17	1-4	5-9	10-13	14-17	-
41 LK 51	A	N999 E984	21	1-4	5-9	10-13	14-21	-
41 LK 51	B	N1010 E1008	1	-	-	-	-	1
41 LK 51	B	N1010 E1011	11	1-4	5-11	-	-	-
41 LK 51	B	N1011 E1008	2	-	-	-	-	1-2
41 LK 51	B	N1011 E1011	8	-	-	-	-	1-8
41 LK 51	C	N1025 E1039	4	-	-	-	-	1-4
41 LK 51	C	N1025 E1041	6	-	-	-	-	1-6
41 LK 51	C	N1025 E1042	5	-	-	-	-	1-5
41 LK 51	C	N1026 E1039	5	-	-	-	-	1-5
41 LK 51	C	N1026 E1042	4	-	-	-	-	1-4
41 LK 51	D	N1033 E1062	3	-	-	-	-	1-3
41 LK 51	D	N1033 E1065	10	1-5	6-10	-	-	-
41 LK 51	D	N1034 E1062	3	-	-	-	-	1-3
41 LK 51	D	N1034 E1065	10	1-5	6-10	-	-	-
41 LK 51	E	N1038 E1083	4	-	-	-	-	1-4

TABLE 57. (continued)

Site	Area	Units	Total Levels	Horizon/Level Combinations					ALL
				1st	2nd	3rd	4th		
41 LK 128	-	Test Pit 14	1	-	-	-	-	1	
41 LK 128	-	Test Pit 16	1	-	-	-	-	1	
41 LK 133	-	Test Pit 1	9	1-4	5-9	-	-	-	
41 LK 133	-	Test Pit 2	7	1-3	4-7	-	-	-	
41 LK 142	-	Test Pit 1	6	-	-	-	-	1-6	
41 LK 185	-	Test Pit 1	7	1-3	4-7	-	-	-	
41 LK 185	-	Test Pit 2	4	-	-	-	-	1-4	
41 LK 185	-	Test Pit 3	7	1-3	4-7	-	-	-	
41 LK 243	-	Test Pit 1	6	1-3	4-6	-	-	-	
41 LK 243	-	Test Pit 2	5	-	-	-	-	1-5	
41 LK 250	-	Test Pit 1	11	1-3	4-8	9-11	-	-	
41 MC 29	-	N997 E1011	6	1-3	4-6	-	-	-	
41 MC 29	-	N997 E1012	7	1-3	4-7	-	-	-	
41 MC 29	-	N997 E1013	7	1-3	4-7	-	-	-	
41 MC 29	-	N998 E1011	6	1-3	4-6	-	-	-	
41 MC 29	-	N998 E1012	6	1-3	4-6	-	-	-	
41 MC 29	-	N998 E1013	6	1-3	4-6	-	-	-	
41 MC 29	-	N999 E1011	6	1-3	4-6	-	-	-	
41 MC 29	-	N999 E1012	6	1-3	4-6	-	-	-	
41 MC 29	-	N999 E1013	6	1-3	4-6	-	-	-	
41 MC 55	A	N1017 E999	12	1-3	4-12	-	-	-	
41 MC 55	A	N1018 E999	8	1-3	4-8	-	-	-	
41 MC 55	B	N998 E1017	6	1-3	4-6	-	-	-	
41 MC 55	B	N999 E1017	9	1-3	4-9	-	-	-	
41 MC 55	C	N992 E1013	1	-	-	-	-	-	
41 MC 55	C	N992 E1015	1	-	-	-	-	1	
41 MC 55	C	N992 E1017	1	-	-	-	-	1	
41 MC 55	C	N993 E1014	1	-	-	-	-	1	
41 MC 55	C	N993 E1015	1	-	-	-	-	1	
41 MC 55	C	N993 E1017	1	-	-	-	-	1	
41 MC 55	C	N994 E1013	1	-	-	-	-	1	
41 MC 55	C	N994 E1015	2	-	-	-	-	1-2	
41 MC 55	C	N994 E1017	2	-	-	-	-	1-2	
41 MC 55	D	N1006 E1015	2	-	-	-	-	1-2	
41 MC 55	D	N1007 E1014	2	-	-	-	-	1-2	
41 MC 55	D	N1007 E1015	3	-	-	-	-	1-3	
41 MC 55	D	N1007 E1016	2	-	-	-	-	1-2	
41 MC 55	D	N1008 E1014	3	-	-	-	-	1-3	
41 MC 55	D	N1008 E1015	2	-	-	-	-	1-2	
41 MC 55	D	N1008 E1016	2	-	-	-	-	1-2	
41 MC 55	D	N1009 E1013	2	-	-	-	-	1-2	
41 MC 55	D	N1009 E1014	1	-	-	-	-	1	
41 MC 55	D	N1009 E1015	2	-	-	-	-	1-2	
41 MC 55	D	N1009 E1016	2	-	-	-	-	1-2	
41 MC 55	E	N1014 E1011	1	-	-	-	-	1	
41 MC 55	E	N1015 E1010	1	-	-	-	-	1	
41 MC 55	E	N1015 E1012	1	-	-	-	-	1	
41 MC 55	E	N1016 E1011	1	-	-	-	-	1	

TABLE 57. (continued)

Site	Area	Units	Total Levels	Horizon/Level Combinations					ALL
				1st	2nd	3rd	4th		
41 LK 51	E	N1039 E1083	5	-	-	-	-	1-5	
41 LK 53	-	N1000 E1002	11	1-3	4-7	8-11	-	-	
41 LK 53	-	N1000 E1003	11	1-3	4-7	8-11	-	-	
41 LK 53	-	N1000 E1004	17	1-3	4-7	8-11	12-17	-	
41 LK 53	-	N1001 E1002	11	1-3	4-7	8-11	-	-	
41 LK 53	-	N1001 E1003	11	1-3	4-7	8-11	-	-	
41 LK 53	-	N1001 E1004	11	1-3	4-7	8-11	-	-	
41 LK 53	-	N1002 E1002	11	1-3	4-7	8-11	-	-	
41 LK 53	-	N1002 E1003	11	1-3	4-7	8-11	-	-	
41 LK 53	-	N1002 E1004	11	1-3	4-7	8-11	-	-	
41 LK 74	A	N977 E1000	4	-	-	-	-	1-4	
41 LK 74	A	N977 E1001	5	-	-	-	-	1-5	
41 LK 74	A	N978 E1000	4	-	-	-	-	1-4	
41 LK 74	A	N978 E1001	4	-	-	-	-	1-4	
41 LK 74	B	N1070 E857	4	1-2	3-4	-	-	-	
41 LK 74	B	N1070 E858	4	1-2	3-4	-	-	-	
41 LK 74	B	N1071 E857	6	1-2	3-6	-	-	-	
41 LK 74	B	N1071 E858	4	1-2	3-6	-	-	-	
41 LK 74	C	N987 E990	2	-	-	-	-	1-2	
41 LK 74	C	N987 E991	4	-	-	-	-	1-4	
41 LK 74	C	N988 E990	2	-	-	-	-	1-2	
41 LK 74	C	N988 E991	4	-	-	-	-	1-4	
41 LK 74	D	N980 E989	2	-	-	-	-	1-2	
41 LK 74	D	N981 E988	2	-	-	-	-	1-2	
41 LK 74	D	N981 E989	1	-	-	-	-	1	
41 LK 74	F	N994 E985	2	-	-	-	-	1-2	
41 LK 74	F	N994 E986	4	-	-	-	-	1-4	
41 LK 74	F	N995 E981	1	-	-	-	-	1	
41 LK 74	F	N995 E985	3	-	-	-	-	1-3	
41 LK 74	F	N995 E986	3	-	-	-	-	1-3	
41 LK 74	G	N986 E973	1	-	-	-	-	1	
41 LK 74	H	N977 E973	4	-	-	-	-	1-4	
41 LK 74	H	N977 E974	1	-	-	-	-	1	
41 LK 74	H	N978 E973	1	-	-	-	-	1	
41 LK 74	H	N978 E974	4	-	-	-	-	1-4	
41 LK 128	-	Test Pit 1	2	-	-	-	-	1-2	
41 LK 128	-	Test Pit 2	2	-	-	-	-	1-2	
41 LK 128	-	Test Pit 3	4	-	-	-	-	1-4	
41 LK 128	-	Test Pit 4	2	-	-	-	-	1-2	
41 LK 128	-	Test Pit 5	8	-	-	-	-	1-8	
41 LK 128	-	Test Pit 6	4	-	-	-	-	1-4	
41 LK 128	-	Test Pit 7	8	-	-	-	-	1-8	
41 LK 128	-	Test Pit 8	4	-	-	-	-	1-4	
41 LK 128	-	Test Pit 9	2	-	-	-	-	1-2	
41 LK 128	-	Test Pit 10	2	-	-	-	-	1-2	
41 LK 128	-	Test Pit 11	5	-	-	-	-	1-5	
41 LK 128	-	Test Pit 12	2	-	-	-	-	1-2	
41 LK 128	-	Test Pit 13	1	-	-	-	-	1	

TABLE 57. (continued)

Site	Area	Units	Total Levels	Horizon/Level Combinations				
				1st	2nd	3rd	4th	ALL
41 MC 94	-	Test Pit 1	8	1-4	5-8	-	-	-
41 MC 94	-	Test Pit 2	9	1-4	5-9	-	-	-
41 MC 94	-	Test Pit 3	7	1-4	5-7	-	-	-
41 MC 94	-	Test Pit 4	9	1-4	5-9	-	-	-
41 MC 94	-	Test Pit 5	6	1-4	5-6	-	-	-
41 MC 94	-	Test Pit 6	8	1-4	5-8	-	-	-
41 MC 196	-	Test Pit 1	6	-	-	-	-	1-6
41 MC 196	-	Test Pit 2	6	-	-	-	-	1-6
41 MC 196	-	Test Pit 3	5	-	-	-	-	1-5
41 MC 222	-	N95 E87	3	-	-	-	-	1-3
41 MC 222	-	N97 E86	3	-	-	-	-	1-3
41 MC 222	-	N97 E87	5	-	-	-	-	1-5
41 MC 222	-	N98 E86	3	-	-	-	-	1-3
41 MC 222	-	N98 E90	3	-	-	-	-	1-3
41 MC 222	-	N98 E91	3	-	-	-	-	1-3
41 MC 222	-	N99 E86	3	-	-	-	-	1-3
41 MC 222	-	N99 E89	4	-	-	-	-	1-4
41 MC 222	-	N99 E90	4	-	-	-	-	1-4
41 MC 222	-	N99 E91	4	-	-	-	-	1-4
41 MC 222	-	N100 E86	2	-	-	-	-	1-2
41 MC 222	-	N100 E89	5	-	-	-	-	1-5
41 MC 222	-	N100 E90	5	-	-	-	-	1-5
41 MC 222	-	N100 E91	5	-	-	-	-	1-5
41 MC 222	-	N101 E87	-	-	-	-	-	-
41 MC 222	-	N101 E88	3	-	-	-	-	1-3
41 MC 222	-	N101 E89	3	-	-	-	-	1-3
41 MC 222	-	N101 E90	5	-	-	-	-	1-5
41 MC 222	-	N101 E91	5	-	-	-	-	1-5
41 MC 222	-	N102 E88	5	-	-	-	-	1-5
41 MC 222	-	N102 E89	7	-	-	-	-	1-7
41 MC 222	-	N102 E90	6	-	-	-	-	1-6
41 MC 222	-	N102 E91	7	-	-	-	-	1-7
41 MC 222	-	N102 E100	7	-	-	-	-	1-7
41 MC 222	-	N103 E86	4	-	-	-	-	1-4
41 MC 222	-	N103 E87	4	-	-	-	-	1-4
41 MC 222	-	N103 E88	7	-	-	-	-	1-7
41 MC 222	-	N103 E89	9	-	-	-	-	1-9
41 MC 222	-	N103 E90	8	-	-	-	-	1-8
41 MC 222	-	N103 E91	8	-	-	-	-	1-8
41 MC 222	-	N104 E85	4	-	-	-	-	1-4
41 MC 222	-	N107 E87	4	-	-	-	-	1-4
41 MC 222	-	N112 E79	5	-	-	-	-	1-5
41 MC 222	-	N113 E83	6	-	-	-	-	1-6
41 MC 222	-	N119 E80	7	-	-	-	-	1-7
41 MC 222	-	N125 E72	3	-	-	-	-	1-3
41 MC 268	A	N995 E998	11	1-6	7-11	-	-	-
41 MC 268	A	N995 E999	8	-	-	-	-	1-8
41 MC 268	A	N996 E998	11	1-6	7-11	-	-	-

TABLE 57. (continued)

Site			Area	Units	Total Levels	Horizon/Level Combinations				ALL
						1st	2nd	3rd	4th	
41 MC 268	A	N996 E999		8	-	-	-	-	1-8	
41 MC 268	B	N994 E982		4	-	-	-	-	1-4	
41 MC 268	B	N994 E983		11	1-6	7-11	-	-	-	
41 MC 268	B	N995 E982		6	-	-	-	-	1-6	
41 MC 268	B	N995 E983		4	-	-	-	-	1-4	
41 MC 268	B	Test Pit 1		7	-	-	-	-	1-7	
41 MC 268	B	Test Pit 2		8	-	-	-	-	1-8	
41 MC 268	B	Test Pit 3		5	-	-	-	-	1-5	
41 MC 296	A	N1025 E997		7	1-2	3-4	5-7	-	-	
41 MC 296	A	N1025 E998		7	1-2	3-4	5-7	-	-	
41 MC 296	A	N1025 E999		9	1-2	3-4	5-9	-	-	
41 MC 296	A	N1026 E997		7	1-2	3-4	5-7	-	-	
41 MC 296	A	N1026 E998		7	1-2	3-4	5-7	-	-	
41 MC 296	A	N1026 E999		7	1-2	3-4	5-7	-	-	
41 MC 296	A	N1027 E997		7	1-2	3-4	5-7	-	-	
41 MC 296	A	N1027 E998		7	1-2	3-4	5-7	-	-	
41 MC 296	A	N1027 E999		8	1-2	3-4	5-8	-	-	
41 MC 296	B	N1022 E985		10	1-2	3-4	5-10	-	-	
41 MC 296	B	N1022 E986		10	1-2	3-4	5-10	-	-	
41 MC 296	B	N1022 E987		9	1-2	3-4	5-9	-	-	
41 MC 296	B	N1023 E985		9	1-2	3-4	5-9	-	-	
41 MC 296	B	N1023 E986		9	1-2	3-4	5-9	-	-	
41 MC 296	B	N1023 E987		9	1-2	3-4	5-9	-	-	
41 MC 296	B	N1024 E985		9	1-2	3-4	5-9	-	-	
41 MC 296	B	N1024 E986		9	1-2	3-4	5-9	-	-	
41 MC 296	B	N1024 E987		9	1-2	3-4	5-9	-	-	
41 MC 296	C	N1022 E989		2	1-2	-	-	-	-	
41 MC 296	C	N1023 E989		4	1-2	3-4	-	-	-	
41 MC 296	C	N1024 E989		4	1-2	3-4	-	-	-	
41 MC 296	D	N1025 E995		6	1-2	3-4	5-6	-	-	
41 MC 296	D	N1026 E995		6	1-2	3-4	5-6	-	-	
41 MC 296	D	N1027 E995		6	1-2	3-4	5-6	-	-	
41 MC 296	E	N1026 E986		3	1-2	3	-	-	-	
41 MC 296	E	N1027 E986		4	1-2	3-4	-	-	-	
41 MC 296	G	N1026 E978		5	1-2	3-4	5	-	-	
41 MC 296	G	N1027 E978		6	1-2	3-4	5-6	-	-	
41 MC 296	-	Test Pit 1		14	1-2	3-4	5-14	-	-	
41 MC 296	-	Test Pit 2		9	1-2	3-4	5-9	-	-	
41 MC 296	-	Test Pit 3		3	1-2	3	-	-	-	

TABLE 58. RADIOCARBON ASSAYS FOR PHASE II INVESTIGATIONS

TX Number	Site	Lot(s)	Unit(s)	Level	Elevation	Horizon	Uncorrected Age	MASCA B.P.	MASCA B.C./A.D.
TX-4691	41 LK 51	248	N998 E982	15	98.40-98.30	4	5860 $\pm$ 80	6400	4450 B.C.
TX-4690	41 LK 51	248	N998 E982	15	98.40-98.30	4	6360 $\pm$ 90	7060-7080	5130-5110 B.C.
TX-4674	41 LK 128	56	Hearth 2	-	Surface	-	1030 $\pm$ 70	970	A.D. 980
TX-4671	41 LK 128	56	Hearth 2	-	Surface	-	830 $\pm$ 50	770	A.D. 1180
TX-4670	41 LK 128	57	Hearth 9	-	Surface	-	660 $\pm$ 50	640	A.D. 1310
TX-4675	41 LK 128	58	Hearth 17	-	Surface	-	830 $\pm$ 60	770	A.D. 1180
TX-4676	41 LK 128	58	Hearth 17	-	Surface	-	670 $\pm$ 60	650	A.D. 1300
TX-4665	41 LK 201	521	N491 E1043	12	97.65-97.55	3	2450 $\pm$ 60	2430	480 B.C.
TX-4667	41 LK 201	Various	N497-499-500 E997-998	3	99.15-99.05	1	360 $\pm$ 50	450-480	A.D. 1470-1500
TX-4673	41 LK 201	53	N500 E996	17	97.75-97.65	4	2520 $\pm$ 70	2610-2670	720-660 B.C.
TX-4672	41 LK 201	539,545	N500 E996-997	16	97.85-97.75	4	2710 $\pm$ 60	2770-2790	840-820 B.C.
TX-4668	41 LK 201	694,700	N507-508 E1013	2	99.20-99.10	1	320 $\pm$ 60	360-440	A.D. 1510-1590
TX-4688	41 MC 29	55	N997 E1013	7	99.30-99.20	2	2320 $\pm$ 70	2360	410 B.C.
TX-4689	41 MC 29	55	N997 E1013	7	99.30-99.20	2	2060 $\pm$ 80	1940-2010	60 B.C.-A.D. 10
TX-4692	41 MC 55	104,105	N1017 E999	2-3	99.30-99.10	1	460 $\pm$ 60	530	A.D. 1420
TX-4693	41 MC 55	104,105	N1017 E999	2-3	99.30-99.10	1	760 $\pm$ 80	720	A.D. 1230
TX-4666	41 MC 222	339	N103 E91	4	98.95-98.90	-	360 $\pm$ 60	450-480	A.D. 1470-1500
TX-4694	41 MC 222	312,341	N102 E90	3	98.90-98.85	-	540 $\pm$ 60	560	A.D. 1390
TX-4677	41 MC 296	Various	N1023-1024 E985-987	1	Surf.-99.40	1	430 $\pm$ 80	520	A.D. 1430
TX-4678	41 MC 296	98	N1024 E985	1	Surf.-99.40	1	330 $\pm$ 60	430	A.D. 1520
TX-4682	41 MC 296	Various	N1022-1023 E985-987-989	2	99.40-99.30	1	450 $\pm$ 60	520	A.D. 1430
TX-4683	41 MC 296	Various	N1025-1027 E997-999	2	99.50-99.40	1	290 $\pm$ 50	340-430	A.D. 1520-1610
TX-4684	41 MC 296	254	N1024 E989	2	99.50-99.40	1	320 $\pm$ 50	360-440	A.D. 1510-1590
TX-4685	41 MC 296	Various	N1022-1024 E985-987	3	99.30-99.20	2	780 $\pm$ 60	730-750	A.D. 1200-1220
TX-4686	41 MC 296	Various	N1025-1027 E997-999	3	99.40-99.30	2	750 $\pm$ 70	720	A.D. 1230
TX-4687	41 MC 296	Various	N1022-1024 E985-987	4	99.20-99.10	2	1110 $\pm$ 60	1040	A.D. 910
TX-4679	41 MC 296	252	N1023 E986-987	6	99.00-98.90	3	2020 $\pm$ 70	1900-1920	A.D. 30-50
TX-4680	41 MC 296	252	N1023 E986-987	6	99.00-98.90	3	1440 $\pm$ 80	1360	A.D. 590
TX-4681	41 MC 296	256	N1023 E986-987	7	98.90-98.80	3	1860 $\pm$ 60	1790	A.D. 160
TX-4669	41 MC 296	256	N1023 E986-987	7	98.90-98.80	3	2090 $\pm$ 60	1960-2050	100-10 B.C.

difference in age for all seven paired samples is 318 years. No explanation is offered for the variances shown between assays in the paired samples. The samples were large and relatively free of impurities (rootlets, soil, etc.). The average standard deviation for the 14 assays (reflecting latitude for experimental error) is 69 years. The comparatively low standard deviation for the individual assays reflect an acceptable degree of reliability for the samples at the radiocarbon laboratory.

RADIOCARBON DATA SUMMARY

The Nueces River project is responsible for the largest sample of radiocarbon assays yet assembled from any area of south Texas. In fact, the total number of assays obtained during the project probably exceeds the total number of assays currently available from all other archaeological contexts in south Texas. A total of 47 assays has been determined from samples collected in the Choke Canyon Reservoir area during the project. This total includes four assays of burned mussel shell and 43 assays of wood charcoal. Full provenience data and MASCA calibrations for all 47 dates are presented in Table 36 in Hall, Black, and Graves 1982 and in Table 58 in this volume. The purpose of this discussion is to summarize the radiocarbon data and to provide a calibrated presentation using the most recent radiocarbon calibration (Klein et al. 1982).

It should be noted that the 47 radiocarbon samples that were processed from the Choke Canyon Reservoir work were all from comparatively well-controlled contexts. That is, all of the samples were from contexts that were felt to be related to specific cultural components. Most of the samples were collected from sites that were extensively tested or excavated. Thus, the resulting assays can be related in most cases to specific cultural assemblages. Numerous other charcoal samples collected from less secure contexts were not processed precisely because of their questionable associations.

Table 59 lists 42 assays obtained from wood charcoal, which are felt to be the most reliable basis for dating. The four mussel shell assays did not have a consistent relationship to the matching wood charcoal assays. One wood charcoal assay from 41 LK 67, TX-2911, had a one sigma error estimate of 830 years, indicating an inadequate amount of carbon; hence, this sample was not used. The remaining 42 assays were calibrated by reference to the calibration tables in Klein et al. (1982:124-144), arranged from earliest to latest beginning date and plotted in Figure 107.

In the last decade a number of radiocarbon correction curves or tables (calibrations) have been constructed and published following the recognition that the radiocarbon content of atmospheric carbon dioxide has varied through time. These calibrations have been accomplished by comparing the radiocarbon assays of a series of tree ring samples that were accurately dated by dendrochronology. Earlier calibrations such as those by Ralph, Michael, and Han (1973), Damon et al. (1974), and Clark (1975) are based on various subsamples of the total number of tree ring dates which have been radiocarbon dated. These calibrations are generally in agreement on the major variations of atmospheric radiocarbon but differ on the minor variations. In addition,

TABLE 59. RADIOCARBON DATES FROM PHASE II EXCAVATIONS AT CHOKE CANYON RESERVOIR

ID Number(#)	TX Number(#)	Site	Assay
1	2920	41 LK 31/32	4710 $\pm$ 80
2	2921	41 LK 31/32	4690 $\pm$ 80
3	2922	41 LK 31/32	3970 $\pm$ 160
4	2909	41 LK 67	2600 $\pm$ 70
5	2910	41 LK 67	2530 $\pm$ 70
6	3021	41 LK 67	3300 $\pm$ 60
7	3607	41 LK 88	1080 $\pm$ 60
8	3022	41 LK 201	3090 $\pm$ 80
9	2873	41 MC 29	2240 $\pm$ 50
10	3020	41 MC 201	2950 $\pm$ 70
11	2875	41 MC 222	700 $\pm$ 150
12	2876	41 MC 222	710 $\pm$ 50
13	4691	41 LK 51	5860 $\pm$ 80
14	4690	41 LK 51	6360 $\pm$ 90
15	4674	41 LK 128	1030 $\pm$ 70
16	4671	41 LK 128	830 $\pm$ 50
17	4670	41 LK 128	660 $\pm$ 50
18	4675	41 LK 128	830 $\pm$ 60
19	4676	41 LK 128	670 $\pm$ 60
20	4665	41 LK 201	2450 $\pm$ 60
21	4667	41 LK 201	360 $\pm$ 50
22	4673	41 LK 201	2520 $\pm$ 70
23	4672	41 LK 201	2710 $\pm$ 60
24	4668	41 LK 201	320 $\pm$ 60
25	4688	41 MC 29	2320 $\pm$ 70
26	4689	41 MC 29	2060 $\pm$ 80
27	4692	41 MC 55	460 $\pm$ 60
28	4693	41 MC 55	760 $\pm$ 80
29	4666	41 MC 222	360 $\pm$ 60
30	4694	41 MC 222	540 $\pm$ 60
31	4677	41 MC 296	430 $\pm$ 80
32	4678	41 MC 296	330 $\pm$ 60
33	4682	41 MC 296	450 $\pm$ 60
34	4683	41 MC 296	290 $\pm$ 50
35	4684	41 MC 296	320 $\pm$ 50
36	4685	41 MC 296	780 $\pm$ 60
37	4686	41 MC 296	750 $\pm$ 70
38	4687	41 MC 296	1110 $\pm$ 60
39	4679	41 MC 296	2020 $\pm$ 70
40	4680	41 MC 296	1440 $\pm$ 80
41	4681	41 MC 296	1860 $\pm$ 60
42	4669	41 MC 296	2090 $\pm$ 60

*See Table 36 in Hall, Black, and Graves (1982) for full provenience and corrected dates for assays 1-12. See Table 58 in this report for full provenience and corrected dates for assays 13-42. The ID Number is used in Figures 107 and 108 to identify each assay.

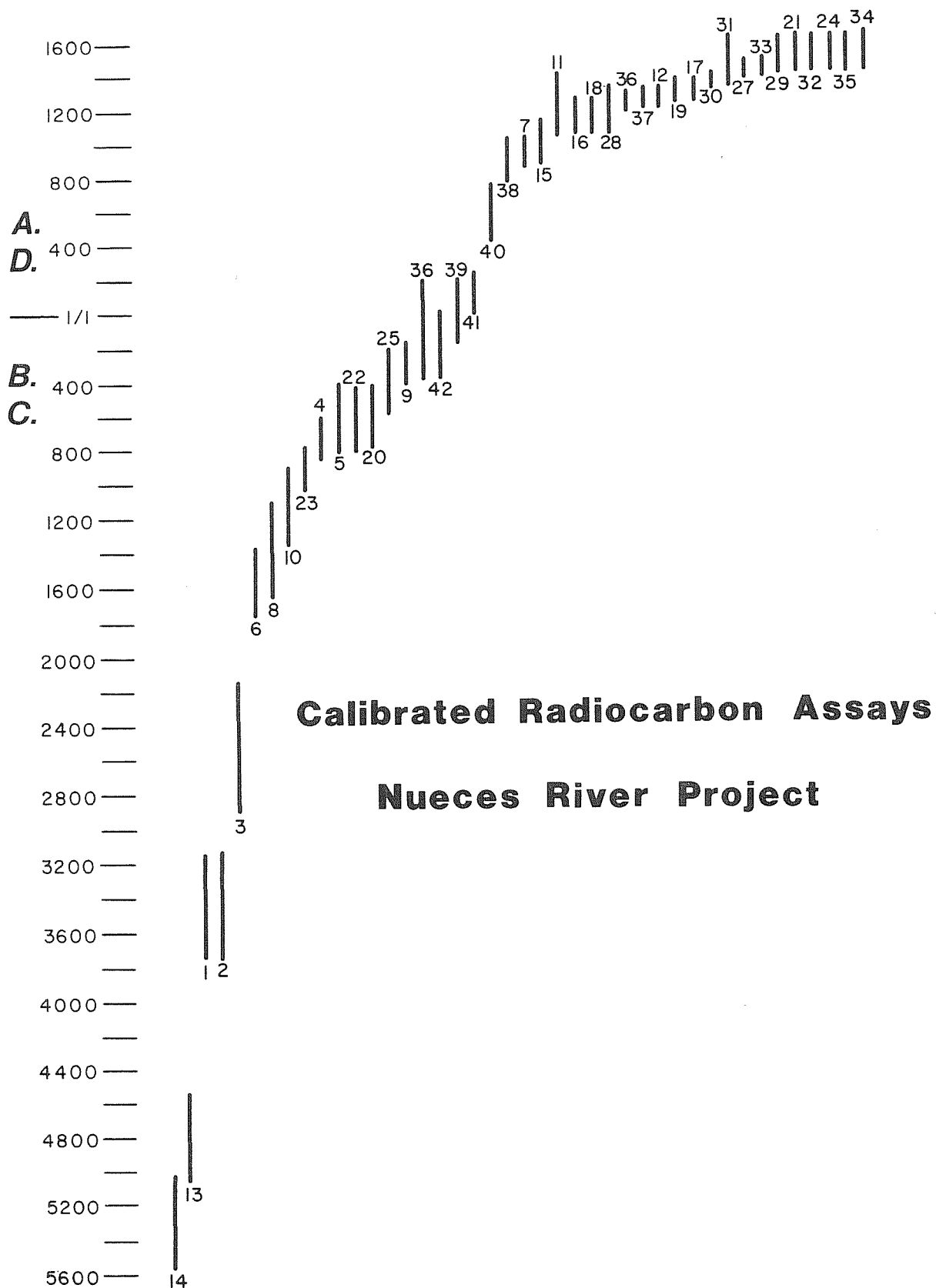


Figure 107. Calibrated Radiocarbon Assays, Nueces River Project.

the calibrations are expressed in different formats, with some being much more difficult to use than others. The new calibration is the result of a major workshop held by radiocarbon scientists from all over the world in 1979 in Tucson (Michael and Klein 1979). This calibration is based on the combined data of a number of major radiocarbon laboratories and is, thus, more accurate than the earlier calibrations based on subsets of the total sample. In addition, the Klein et al. (1982) calibration is presented in an unambiguous format.

One of the most important aspects of the Klein et al. (1982) calibration is that it is set up to yield two sigma assay ranges. By international agreement, all radiocarbon laboratories report their assays by reference to the 1950 radiocarbon present (years B.P.) with a one sigma error estimate. For example, assay 18 in Table 59, TX-4675 (41 LK 128), was reported as 830 ± 60 years B.P. The one sigma error estimate of 60 years means that, statistically, two out of three assays of this particular sample would yield a midpoint between 770 and 890 B.P. To put this another way, actual age of the sample only has a statistical chance of 66% of falling within the reported assay range or radiocarbon age. The Klein et al. (1982) calibration tables yield two sigma assay ranges. This means that the black bars shown in Figure 107 indicate the date range within which the actual date has a 95% statistical chance of occurring. It is important to realize that radiocarbon dating is a statistical method of estimating the actual date that yields an estimated **range** rather than a **fixed date**.

Figure 107 shows a time span of some 7200 years within which the 42 calibrated radiocarbon assays from the Choke Canyon Reservoir range. As noted elsewhere in this report, this does not cover the full range of occupation in the area as we lack samples from the earliest occupations. Within the time span in which we do have radiocarbon assays, one can observe a very sparse sample of dates prior to 2000 B.C. From about 1700 B.C. forward in time, we have increasingly larger numbers of dates that form an almost unbroken sequence of overlapping assays. The patterning of these dates may say something about the prehistoric occupation in the area, although it is clearly recognized that sampling and preservation problems are a factor in the scarcity of early dates.

Two sites, 41 LK 51 and 41 LK 31/32 provide all of the assays that date before 2000 B.C. These few assays do not form much of a basis for discussion. Beginning around 1700 B.C., the assays are much more numerous and represent larger numbers of sites. Five apparent breaks in the assay continuum can be defined. It should be emphasized that these are only apparent breaks which may not represent cultural realities but rather the result of sampling gaps. The first break occurs at 800 B.C. Four dates from 41 LK 67, 41 LK 201 (two dates), and 41 MC 201 range between 1700 and 800 B.C. A second cluster of four dates occurs between 800 and 400 B.C. Two of these assays are from 41 LK 67 and 41 LK 201. A second break at about 400 B.C. is partially obscured by the overlap of a paired set of assays from 41 MC 29, as will be discussed later. Between 400 B.C. and A.D. 200, five assays occur, including two assays from 41 MC 29 (not including the aberrant assay, #25) and three assays from 41 MC 296.

Perhaps the most interesting break in the radiocarbon assay distribution occurs between A.D. 200 and A.D. 800. Only one assay falls within this period, #40, from 41 MC 296. Given the fact that three assays from comparable contexts at 41 MC 296, including a matching sample, #39, from the same cultural feature, all date to before A.D. 200, assay #40 is considered aberrant. The absence of assays for this 600-year (or more) period is considered highly significant in view of the substantial number of assays earlier and later in time. Elsewhere in this report, this break is interpreted as a break in settlement in the area.

Beginning at around A.D. 800, the radiocarbon assays form an unbroken span of some 800 years. A minor break or rather a 'thin point' in the sequence comes at about A.D. 1350. This would appear to be correlated with the change from expanding stem arrow point (Austin horizon) to contracting stem arrow point (Toyah horizon) occupations (Black n.d.).

Paired Samples

As mentioned earlier, seven pairs of assays were submitted for radiocarbon dating. All of these pairs were from archaeologically secure contexts. In each case the pairs were judged to be archaeologically identical, that is to say they were from the same specific contexts. Each pair was pulled from the same field collection bag (aluminum pouches). All of the pairs were of chunk wood charcoal and were large enough to yield assays with comparatively low, one sigma error ranges. It should be noted that these samples were not identical from a radiocarbon scientist's perspective, as they were not split after combined sample pretreatment (Sam Valastro, personal communication). However, these samples were identical from an archaeologist's perspective. As has been stated, the seven pairs had an average uncorrected midpoint difference in age of 318 years. In order to further examine the differences in the radiocarbon evaluations of these seven pairs the calibrated ranges (Klein et al. 1982) were plotted in Figure 108.

As Figure 108 indicates, the results of the paired assays were inconsistent. Two of the pairs overlapped strongly, three pairs overlapped slightly, and two pairs did not overlap. It should be remembered that these are two sigma assay ranges, hence a second assay from a given sample should have a 95% chance of occurring within the range of the first assay. Moreover, since we can expect the radiocarbon assays to be normally distributed within the probability range (two sigma range) then most of the dates should cluster near the center (midpoint) rather than on the edge of the distribution. Thus the paired assays are rather disappointingly inconsistent; only two pairs comfortably overlap. We are unable to explain this lack of consistency.

CONCLUDING COMMENTS ON RADIOCARBON DATING IN SOUTH TEXAS

The Nueces River Project has contributed significantly to the refinement of regional and local chronology in south Texas, however, it is apparent that many temporal gaps and questions remain. The chronology remains poorly defined for almost all periods of prehistory in southern Texas. Even for the best dated and presumably the briefest cultural period, the Late Prehistoric,

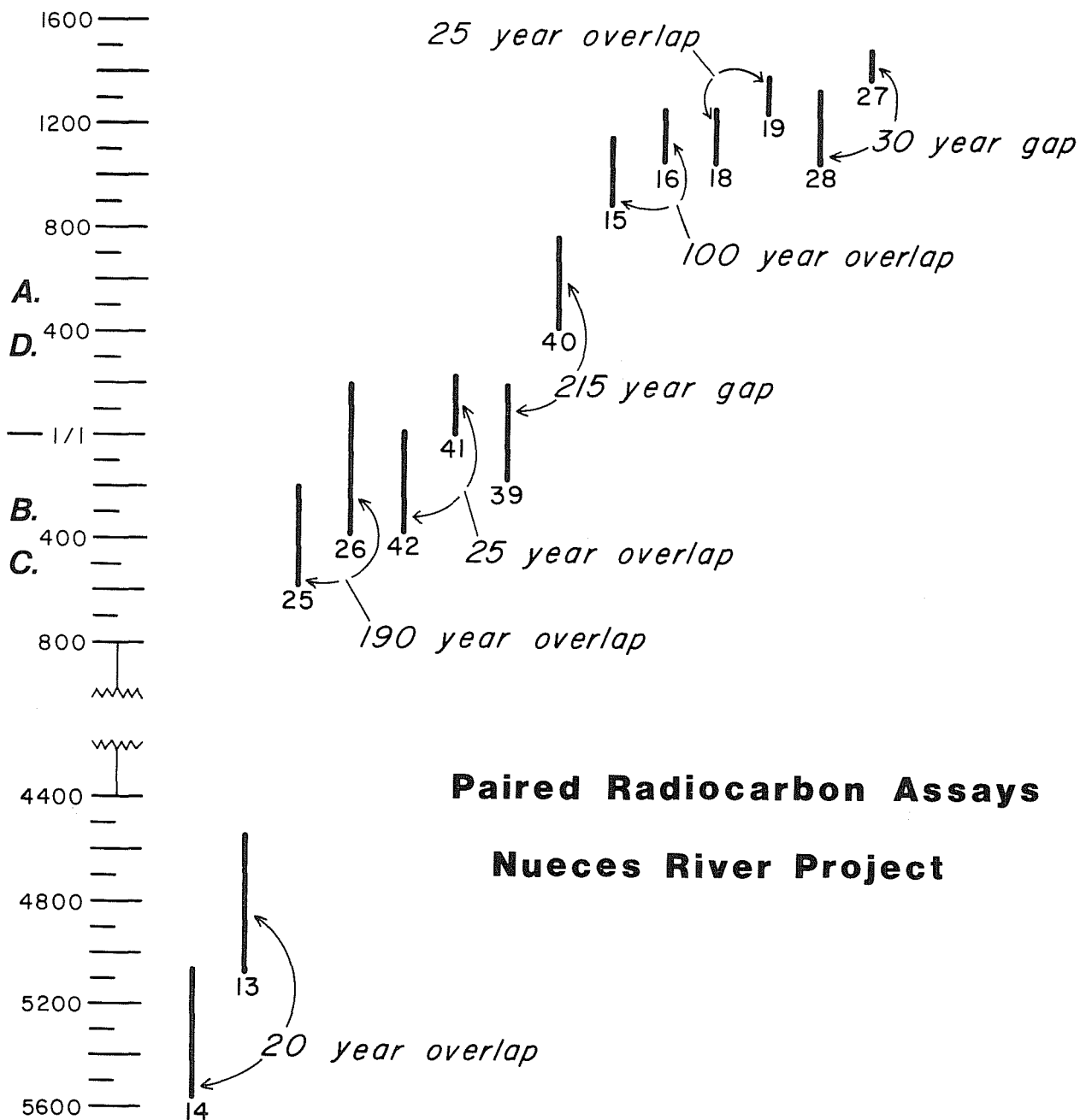


Figure 108. **Calibrated Radiocarbon Assay Pairs.** Dates are arranged in chronological order; note site numbers at top of vertical bars. Vertical bars reflect 2-sigma deviation possible for each date. The dates shown here are calibrated following the "Workshop on Calibrating the Radiocarbon Time Scale" (Klein et al. 1982).

we still are in need of a series of assays from stratigraphically discrete components (cf. Black n.d.). For all other periods, the need is even greater. Thus, archaeological projects should continue to emphasize the recovery of datable material. However, the results presented here suggest that a change in radiocarbon dating strategy is necessary to effectively refine the prehistoric chronology.

Up until now, the attitude often taken toward radiocarbon sampling has been that one tries to collect charcoal whenever possible and to obtain assays whenever funding is available. Effectively, this has meant that numerous assays have been run on samples from questionable contexts. The main questionable aspect of these contexts is that given very limited sondage testing (a common source of radiocarbon samples in south Texas), one cannot understand the full context of the sample. Thus, while an assay may help date a given level at a given site only an adequate sample of the cultural component being dated will place the assay in meaningful cultural context. The rationale that has been used to justify this approach is that we know so little about the absolute dating of south Texas prehistory that any assay could potentially be of use. This rationale is no longer viable given the limitations inherent in radiocarbon dating.

The Nueces River Project's paired sampling and multiple sampling from discrete contexts and components as well as recent work at the Hinojosa site, 41 JW 8 (Black n.d.), underscore the limitations of radiocarbon dating. The repeated failure of multiple dates from a single feature or component to closely agree (i.e., overlap within the first sigma) raise the question of what is an adequate sample of radiocarbon assays. In fact at sites in south Texas that have had multiple dates from archaeologically discrete contexts, the Choke Canyon sites discussed above and 41 JW 8, many of the dates do not strongly overlap. This implies that single dates cannot be expected to accurately reflect the actual date of a given component or feature. Thus, archaeologists should exercise extreme caution in relying on small numbers of radiocarbon dates. It cannot be emphasized enough that radiocarbon dating is a statistical method that yields statistical estimates of actual dates rather than actual dates itself.

It is recommended that archaeologists seek to recover and process as many samples from discrete components as is possible. This will not be possible without intensive excavation strategies aimed at uncovering large areas of well-preserved site components. The alternative, small numbers of samples from limited testing, will not yield a radiocarbon data base which can be effectively evaluated. Thus, it is recommended that the focus for dating archaeological remains in southern Texas be shifted from processing a few samples wherever possible to concentrating on the small percentage of sites which can provide adequate numbers of samples from discrete contexts.

It is argued that a single assay or even two or three assays from a given site component, no matter how unquestionable the context, cannot be assumed to yield a confident chronological appraisal. Small numbers of radiocarbon assays from well-defined cultural contexts will add to the regional and local data base. However, the statistical results yielded by radiocarbon dating must be viewed within the context of the most extensive sample of dates that can be assembled from a given component or cultural construct. Story and

Valastro's (1977) work at the Davis site in east Texas show the necessity for large numbers of samples to accurately date site components. Thus, while the Nueces River Project's radiocarbon data can be regarded as a major contribution to the ongoing effort to refine the chronology of southern Texas prehistory, much more dating remains to be done.

REFERENCES CITED

Black, S. L.

- n.d. The Clemente and Herminia Hinojosa Site, 41 JW 8: A Toyah Horizon Campsite in Southern Texas. **Center for Archaeological Research, The University of Texas at San Antonio, Special Report 18** (in preparation).

Clark, R. M.

- 1975 A Calibration Curve for Radiocarbon Dates. **Antiquity** 49:251-266.

Damon, P. E., C. W. Fergusson, A. Long, and E. I. Wallick

- 1974 Dendochronologic Calibration of the Radiocarbon Time Scale. **American Antiquity** 39(2):350-366.

Hall, G. D., S. L. Black, and C. Graves

- 1982 Archaeological Investigations at Choke Canyon Reservoir, South Texas: The Phase I Findings. **Center for Archaeological Research, The University of Texas at San Antonio, Choke Canyon Series 5**.

Klein, J., J. C. Lerman, P. E. Damon, and E. K. Ralph

- 1982 Calibration of Radiocarbon Dates. **Radiocarbon** 24:103-150.

Michael, H. N. and J. Klein

- 1979 An International Calibration for Radiocarbon Dates. **MASCA Journal** 1(2):56-57.

Ralph, E. K., H. N. Michael, and M. C. Han

- 1973 Radiocarbon Dates and Reality. **MASCA Newsletter** 9(1):1-20.

Story, D. A. and S. Valastro, Jr.

- 1977 Radiocarbon Dating and the George C. Davis Site, Texas. **Journal of Field Archaeology** 4(1977):63-89.

APPENDIX VII.

PERMANENT SITE MARKER INFORMATION

Upon completion of Phase II archaeological investigations at Choke Canyon, USBR surveyors placed permanent markers at 16 prehistoric sites and eight historic sites. The exact location of each marker was determined and recorded as Modified Texas State Plane coordinates. Elevation in feet above mean sea level (MSL) was also determined for each marker. Monument elevations and coordinates are as follows:

Prehistoric Sites	Monument Elevation (feet above MSL)	Monument Coordinates	
		North	East
41 LK 8	177.246	241,087.07	2,239,416.93
41 LK 14	182.18	237,518.52	2,225,522.71
41 LK 48/41 MC 30	203.90	241,364.31	2,213,015.60
41 LK 51	180.97	245,183.37	2,217,867.40
41 LK 53	180.11	245,692.93	2,217,117.88
41 LK 74	199.20	240,312.58	2,216,871.01
41 LK 128	174.782	242,977.05	2,232,174.07
41 LK 201	169.72	236,859.11	2,234,520.80
41 MC 13	235.27	235,293.11	2,201,698.55
41 MC 29	197.84	238,032.36	2,198,746.01
41 MC 55	197.29	235,026.21	2,198,103.42
41 MC 84	237.83	246,539.08	2,170,311.86
41 MC 94 Datum A	218.75	246,492.85	2,173,361.46
41 MC 94 Datum B	222.06	244,935.55	2,171,679.33
41 MC 222	222.98	233,849.82	2,163,831.58
41 MC 268	220.46	248,253.93	2,180,010.95
41 MC 296	213.07	258,211.97	2,188,837.91
41 LK 66	170.416	238,327.66	2,243,029.42
41 MC 15	232.55	240,810.06	2,170,690.15
41 MC 17	236.62	237,893.37	2,168,982.50
41 MC 192	248.90	233,748.40	2,159,452.70
41 MC 194	260.00	234,078.09	2,158,178.21
41 MC 214	232.66	259,620.14	2,203,655.95
41 MC 282	250.70	244,942.32	2,185,445.85