1979

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https://doi.org/10.21112/ita.1979.1.6
ISSN: 2475-9333
Available at: http://scholarworks.sfasu.edu/ita/vol1979/iss1/6

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Center for Archaeological Research
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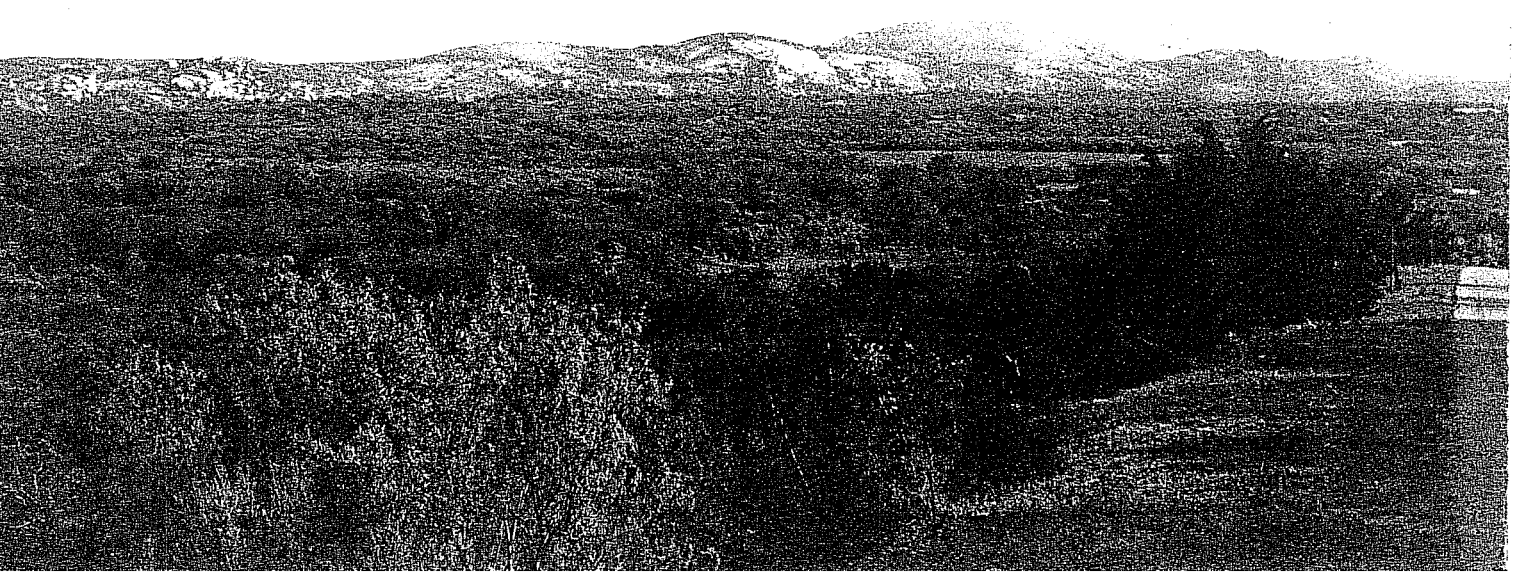

AN INTENSIVE ARCHAEOLOGICAL SURVEY OF ENCHANTED ROCK STATE NATURAL AREA, LLANO AND GILLESPIE COUNTIES, TEXAS

Cristi Assad and Daniel R. Potter

with appendices by

Daniel R. Potter, Cristi Assad and Ralph L. Robinson

Center for Archaeological Research
The University of Texas at San Antonio
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The following information is provided in accordance with General Rule of Practice and Procedure, 355.01.011C, Texas Antiquities Committee:

1. Intensive survey of Enchanted Rock State Natural Area;

2. Enchanted Rock Survey;

3. Llano and Gillespie Counties, Texas;

4. Thomas R. Hester, Principal Investigator; Cristi Assad and Daniel R. Potter, Co-Field Directors and co-authors;

5. Texas Parks and Wildlife Department;

6. Texas Historical Commission Antiquities Permit No. 199;

7. Published by the Center for Archaeological Research, The University of Texas at San Antonio, San Antonio, Texas 78285; August 1979.

ABSTRACT

During February through April 1979, the Center for Archaeological Research, The University of Texas at San Antonio, carried out an intensive archaeological survey at Enchanted Rock State Natural Area, Llano and Gillespie Counties, Texas. A summary of the 120 newly recorded sites is presented, along with more detailed information on shovel testing, auger testing and two excavated sites. Data from faunal and constant volume analyses at the excavated sites are described and tabulated. Appendices include documentation of a local collection, an artifact inventory from an earlier survey, and an analysis of phytoliths from one of the excavated sites.

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ACKNOWLEDGMENTS

As is the case in every project, a variety of people contribute numerous hours of work before the field work begins. For the last several months (beginning in January 1979), many persons have contributed their skill and experience toward the successful completion of this project.

Ronald W. Ralph, Archeologist for the Texas Parks and Wildlife Department, was invaluable in guiding the field directors in their task. He provided not only advice but also several aerial photographs of the Park produced by Texas Natural Resources Information System (TNRIS). Dr. Thomas R. Hester, Director of the Center for Archaeological Research, The University of Texas at San Antonio, served as Principal Investigator. The original proposal for archaeological inventory and evaluation of the Park was written by Hester and Daniel E. Fox. Hester also provided assistance in report preparation and coordination. Jack D. Eaton, Associate Director and Co-Principal Investigator, provided advice and guidance during the report preparation.

Tommy Asner, Vicki Houston and Mr. and Mrs. Jim Wilson were very helpful during our stay in the Enchanted Rock State Park vicinity; Mr. Wilson is the Park Superintendent, and he was invaluable in assisting our activities throughout the Park. Mr. and Mrs. Oliver Welgehausen of Llano, Texas allowed us to stay on their property; the Welgehausens also allowed us to photograph and document their artifact collection from the surrounding area.

During the course of the field work, Glen Evans and Ralph L. Robinson visited the survey area as consultants to the project. Evans provided valuable geological information. Robinson, contracted to do the phytolith analysis, was also instrumental in discussing the flora of the Park area and in providing advice for certain segments of the report.

Several Center for Archaeological Research personnel should be thanked for their assistance, ideas and information during the course of the project. Carol Graves, who coordinated the report preparation, was vital in getting the final product together. Karen West and Mary Lou Ellis of the CAR office staff endured our many requests gracefully, while Amarinthia Gretzinger had the tedious job of typing the report. Dr. Joel Gunn provided the authors with information about his survey of Gillespie County, and Lynn Highley also was very helpful in allowing the authors to use her sources and notes on Gillespie County. Grant D. Hall also allowed us to use his library. Dr. Dee Ann Story, Dr. Harry J. Shafer and Stephen L. Black assisted Daniel Potter with Appendix I on the ceramics from the Spencer collection. James E. Ivey provided fundamentals on the use of the UTSA computer system.

The field work was successfully accomplished with the dedication of the crew, Paul D. Lukowski and Maureen Cavanaugh. Lukowski was also in charge of the photography. Jane Laurens, William Day and Lois Flynn assisted with the field work for several days. Flynn also assisted us with the cataloging of lithics.

INTRODUCTION

During February through April 1979, archaeological investigations were carried out in Llano and Gillespie Counties at Enchanted Rock State Natural Area. The work was performed by the Center for Archaeological Research (CAR), The University of Texas at San Antonio, through agreement with the Texas Parks and Wildlife Department, as outlined in Contract Number IAC (78-79) 2184. Antiquities Permit Number 199 was obtained to allow the assessment of cultural resources at Enchanted Rock State Natural Area. Although the official designation of the area investigated by CAR is now Enchanted Rock State Natural Area, the area has previously been known as Enchanted Rock State Park and will be designated as such throughout this report.

The purpose of the archaeological investigations was to conduct a systematic, intensive survey and inventory of prehistoric and historic cultural resources of the 1640.5 acres within the Park boundaries. The objective of the survey was to relocate and reevaluate 98 archaeological sites that were found in the Park by Greer (1979) during a Natural Area Survey. In addition, any new archaeological resources were to be recorded and mapped. All cultural resources were evaluated for nomination to the National Register of Historic Places. A total of 120 archaeological sites and 142 "isolated finds" were located and recorded throughout the Park.

Two forms of limited subsurface testing were carried out. A mechanical earth auger was used in selected areas of the Park, primarily along stream terraces, for site delineation and evaluation without causing much disturbance to potentially buried archaeological deposits. Limited testing was also accomplished with controlled shovel tests. Shovel testing was performed at over 40% of the total number of sites found.

Shovel testing allowed field workers to evaluate the nature of subsurface cultural deposits with a minimum amount of damage to the sites. Two sites required more intensive controlled testing by use of 1-m^2 excavation units to properly evaluate their archaeological significance. Both of these sites, 41 LL 76 and 41 LL 254, are discussed in detail in several segments of this report.

Field work and report preparation were co-directed by Cristi Assad and Daniel R. Potter. Assad prepared sections on Introduction, Cultural Chronology, Previous Archaeological Work, Methodology and Testing Results; sections on Environmental Background, Historical Background, Site Descriptions, and Summary and Conclusions were prepared by Potter. The section titled Discussion of Artifact Categories was jointly authored. The members of the crew were Maureen Cavanaugh and Paul D. Lukowski. Dr. Thomas R. Hester was the Principal Investigator of the project and Jack D. Eaton served as Co-Principal Investigator.

The archaeological investigations discussed in the report provide data which are intended to be relevant to resource management at the Park, and, at the same time, useful to researchers within the archaeological profession. There is still a great deal of archaeological assessment that can be done in the Park. The authors feel that careful management of the resources within Enchanted Rock State Park will ensure the preservation of part of the archaeological record in this unique area known as the Llano Uplift.

ENVIRONMENTAL BACKGROUND

Enchanted Rock State Park can be thought of as a part of several different natural regions within central Texas. Physiographically, the Park is considered part of the Llano Basin. Various authors have labeled this zone the Llano Uplift, the LLano District or the Central Mineral Region (see Kastning 1979). These terms represent the distinctive geology, landforms and soils of the area. Enchanted Rock is also part of the Balconian Biotic Province (Blair 1950), which loosely defines the area's plant and animal life (Fig. 1).

Climate

The climatic regime for the Enchanted Rock area is one of mild temperatures and semi-arid conditions. Mean annual temperature is about 20°C (68°F), with a mean frost-free growing season of 215 to 230 days. Mean annual rainfall is ca. 27-1/2 inches (Allison, Dittmar and Hensell 1975). Roughly half of the annual precipitation (47%) occurs in May, June, September and October of the spring and fall transition months. Winter is the driest time of the year, and there is also a dry midsummer interval in July.

Precipitation in the spring through the fall months takes the form of thunderstorms, as weather disturbances move from the Gulf area into the central portion of the state. Winter precipitation takes the form of light rain or drizzle, with heavy overcast. Midwinter and midsummer temperatures are mild and stable, while spring and fall months are characterized by changeable temperatures and weather conditions (*ibid.*).

Geology

Enchanted Rock, as part of the Llano Uplift, has a complex geologic structure and history. Sedimentary, metamorphic and igneous formations all exist within the area.

Enchanted Rock and the granite hills near it are surface expressions of a much larger batholith (a body of intrusive igneous rock) which extends for roughly 3.5 miles northwest of the Park. The batholith is of middle Precambrian age and is surrounded by metamorphic Packsaddle Schist and Valley Spring Gneiss which pre-date the intrusion.

Subsequent cycles of erosion and deposition evidenced the uplifting of the general area, the deposition of Paleozoic and Mesozoic sedimentary formations, and the final emergence, through erosional processes, of Enchanted Rock and the other granite hills in the area. For a more detailed geologic description of the area, see Kastning (1979) and Barnes *et al.* (1972).

Because of the area's diverse history, the kinds of raw materials in the Park area vary greatly. Granite, of course, is ubiquitous. Other igneous or metamorphic materials also are represented in the area, but in smaller quantities. Dark gray to black schists and dark colored gneisses are most visible in the creek beds. Sandstone, ranging in texture from medium-grained to

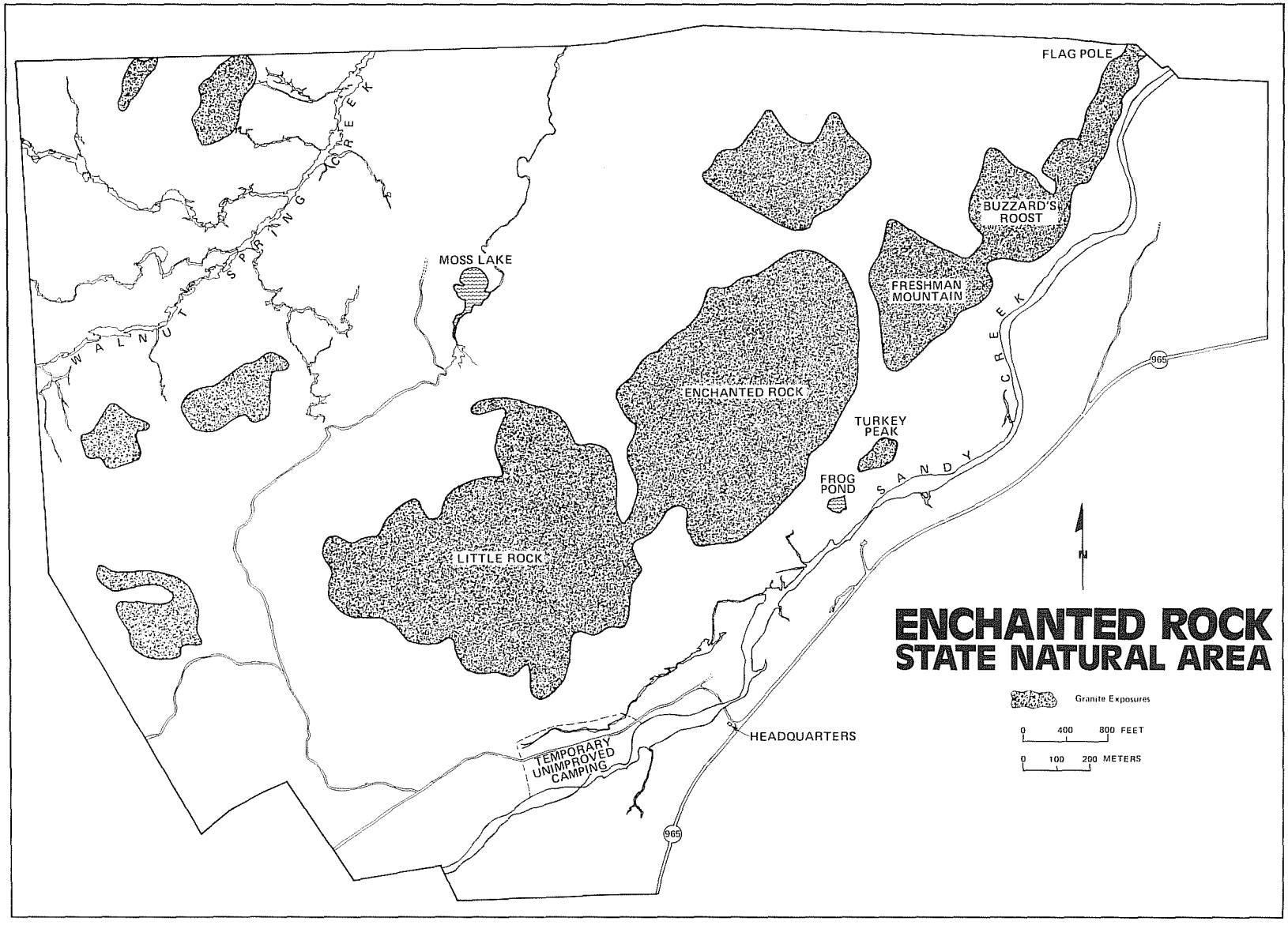


Figure 1. *Map of Enchanted Rock State Natural Area.* Shown are general landforms and drainages.

conglomerate, is also present. The metamorphic materials are attributable to the Packsaddle Schist formation, which nearly surrounds the Enchanted Rock batholith. The sedimentary materials are possibly of the Riley and/or Wilbernes formations, which are middle Cambrian in age, or of the Cretaceous Period (Kastning 1979), of which there are many formations in the area. Drift nodules of chert occur in the creek beds and alluvial soils of the Park. These are possibly remnants of the original formations which capped Enchanted Rock.

Geomorphology and Topography

At present, the Park area is topographically dominated by the granite dome called Enchanted Rock. Smaller granite structures add to the local relief of the Park, forming a rough segmented ridge located northwest of, and parallel to, the course of Sandy Creek (Fig. 1).

In addition to Enchanted Rock, this ridge includes the granite structures named Little Rock, Turkey Peak, Freshman Mountain, Buzzard's Roost and Flag Pole (see Fig. 1). In the Park area this ridge effectively divides the drainage basins of Sandy Creek in the south and Walnut Spring Creek, which runs through the northwestern corner of the Park. The range in elevations (above mean sea level) for the area runs from a minimum of ca. 1350 ft. (where Sandy Creek leaves the Park's northeastern boundary) to a maximum of 1825 ft., at the top of Enchanted Rock. This gives a total of ca. 475 ft. of relief.

Intermediate between the exposed granite hills and the low-lying creek beds are the lower pediment flats, which are located adjacent to the creek beds, and the uplands, which consist of rolling, thin-soiled areas with frequent granite outcrops, thin vegetation and uniformly active soil erosion. Even in the lower pediment zone evidence of soil erosion is prevalent, especially along the creek banks and terraces, and in any locality where man has altered the natural landscape.

Soils

That granite is the predominant kind of rock in the park is obvious with even casual inspection. Weathered granite gravel made up of orthoclase feldspar and quartz is the principal component of the stream bed gravel and the coarse, thin upland soils. The creek beds, in fact, have a distinct pink color due to the amount of decomposed orthoclase feldspar in them. Consistent with the pattern of streams in granite soils, Sandy and Walnut Spring Creeks have wide, shallow stream beds, with deep deposits of sorted gravel (Kastning 1979:26). It has been noted that these streams have rapidly aggrading beds and that earlier alluvial terrace fragments may have been buried in this process (*ibid.*; Glen Evans, personal communication).

Soil types in the area are of the Ligon-Keese-Eckart Association (Allison, Dittmar and Hensell 1975:3). These are thin upland soil series derived from

igneous or metamorphic bedrock. The Eckart series, although it is part of this association, does not occur at Enchanted Rock, being a limestone-derived soil.

The soils in the Park proper, namely the Castell, Click, Keese and Ligon series, are all primarily thin, stony soils, with frequent rock outcroppings, and are highly susceptible to water erosion. Along Sandy and Walnut Spring Creeks, deposits are in places deeper and contain much less rock detritus. Soil deposition in these localities is not completely understood and may be a result of both alluvial and colluvial action.

Flora

As part of the Balconian Biotic Province (Blair 1950), the Enchanted Rock area shares many plant species with other areas of the Edwards Plateau. The area also contains species not common in the limestone-derived soils of the Plateau. Such species as black hickory, blackjack oak and post oak are present in the Park area and are considered to be far west of their primary area of distribution (Butterwick 1979:59). The presence of these plants, along with the virtual absence of juniper in the area, gives the vegetation an appearance that is unique in the Plateau region.

Butterwick (1979:41-102) recognized four distinct plant associations in her 1976 survey. These four included the riparian association, which occupies the lower pediment flats adjacent to the major drainages; the mesquite grassland, which occurs primarily to the east and south of the Park; and the oak savanna, the best examples of which occur north of Enchanted Rock. The fourth plant association, that of Enchanted Rock itself, consists primarily of lichens, mosses, ferns and shrubs, set in a highly localized pattern.

The riparian association contains relatively thick stands of deciduous tree species such as elm, hickory, pecan, blackjack and post and live oak. The wooded areas in this association are among the densest in the Park, and the individual trees are the largest, due to increased moisture and occasionally deep soils.

The mesquite grassland association is located predominantly to the east of the Park, but several smaller pockets of this association do occur near Enchanted Rock. There is one mesquite stand near the Park entrance, on Sandy Creek. Other mesquite grassland pockets occur north of Enchanted Rock, in the Walnut Spring Creek drainage.

The oak savanna association consists of a brush/grassland with groves of mixed oaks (live oak, post oak, blackjack oak) and black hickory in more protected areas, where these species are dominant. In the thinner soils of the hilly areas grass and brush dominate, with only scattered small live oaks.

Certain species are members of every association, being distributed throughout the Park in great number. These include Mexican persimmon, prickly pear and tasajillo, and numerous short grasses. These associations are described in much more detail in Butterwick (1979).

Fauna

In a recent zoological survey of Enchanted Rock, Oliver (1979) observed 4 amphibian, 21 reptile, 66 bird and 23 mammal species. As part of the Balconian Biotic Province (Blair 1950), this area contains many animal species which have their primary distributions to the west or east of the Llano region (Blair 1950; Oliver 1979), but whose ranges overlap in this area. Oliver (*ibid.*) found that the plant associations described by Butterwick (1979) were also meaningful in terms of animal distribution. In general, he found those animals with northern and eastern "affinities" to be prevalent in the lower riparian association. Animal species with affinities to more western areas of the state were found more abundantly in the high, rocky areas of Enchanted Rock and surrounding granite hills. In the mesquite grassland and oak savanna associations, Oliver (1979) noted armadillo, white-tailed deer and black-tailed jackrabbit, as well as other species. For more detailed information on animal types and distributions in this area, see Blair (1950) and Oliver (1979).

Summary

The Enchanted Rock area includes a diversity of natural habitats. The reasons for this variety are manifold. The bedrock geology of the area reveals a complex series of sedimentary, metamorphic and igneous formations within a small area. In keeping with this diversity, soil types and vegetational distributions are "patchy": they form distinct zones of association. Finally, animal species have also been observed to be somewhat localized in distribution, depending upon habitat preference.

CULTURAL CHRONOLOGY

Enchanted Rock State Park is located in central Texas and is considered by archaeologists to fit within the cultural sequences of that area (Suhm 1960). The prehistoric chronology for central Texas, based primarily on projectile point forms, has recently been discussed in detail by Greer (1979) and in the past by several others (Suhm 1960; Suhm, Krieger and Jelks 1954; Weir 1976). A brief outline which follows Greer (1979) and applies to Enchanted Rock State Park and vicinity will be discussed in this report.

Paleo-Indian Period (ca. 12,000 to 8000 B.P.)

This period is broken into the *Clovis*, *Folsom* and *Late Paleo-Indian* periods. It is characterized by lanceolate projectile points that are associated, in part, with big game hunting. The Late Paleo-Indian projectile point styles found in the Enchanted Rock State Park area include *Plainview*, *Angostura*, *Scottsbluff*, *Agate Basin*, *Lerma* and *Meserve*. Many of these types were found by local collectors in the area (Greer 1979).

Pre-Archaic Period (8000 to 5500 B.P.)

During this time there was a change in subsistence patterns and point styles to several types of basally and corner-notched projectile point forms. Point styles from this period found in the study area include: *Gower*, *Martindale*, *Early Corner Notched*, *Uvalde* and *Early Triangular*.

Archaic Period (5500 to 700 B.P.)

This long span of time is usually divided into the following periods by projectile point groupings:

1. *Early Archaic* (5500 to 4000 B.P.) is usually characterized by the *Nolan*, *Travis* and *Bulverde* projectile point types.

2. *Middle Archaic* (4000 to 2600 B.P.) includes *Pedernales* (usually in numerous quantities) and *Bulverde* projectile point forms. In most of central Texas this time period is represented by burned rock middens; however, at Enchanted Rock State Park only one small burned rock midden was found (41 LL 311). The occurrence of burned rock middens may be lacking in the project area due to environmental considerations rather than to a different cultural preference. *Pedernales* and *Bulverde* point styles are found throughout the Park.

3. *Late Archaic* (2600 to ca. 1800 B.P.) is characterized by expanding stem, small corner-notched and side-notched projectile point forms. The types encountered in the Enchanted Rock State Park area include *Marshall*, *Marcos*, *Montell*, *Edgewood*, *Frio*, *Ensor* and *Ensor-Frio*.

4. *Transitional Archaic* (ca. 1800 to 700 B.P.) is marked by somewhat of a reduction in the size of the projectile point styles. It is still unknown if some of the projectile point forms of this period were used not only as dart points but also as arrow points (Greer 1979).

Late Prehistoric Period (ca. 700 B.P. to European contact)

This period is marked by the use of the bow and arrow. Two phases have been defined for this period (Shafer 1977). The *Austin Phase* is characterized by expanding stem arrow points such as the *Scallorn* and *Edwards* forms. The *Toyah Phase*, with the contracting stem *Perdiz* points, follows the *Austin Phase*. Unnotched triangular arrow points (*Fresno*) appear to have been utilized after the *Toyah Phase*.

The manufacture of pottery and the arrow point is diagnostic of the Late Prehistoric period. It was also during this period that Europeans began moving into central Texas. No historic Indian sites are recorded for the immediate Enchanted Rock State Park area. Indeed, they are rare in the central Texas region (Greer 1979).

PREVIOUS ARCHAEOLOGICAL WORK

This discussion will cover two aspects of the previous archaeology of the Enchanted Rock area. A brief inventory by Greer (1979) of the archaeological sites at Enchanted Rock State Park and the immediate surrounding area is provided, along with a general discussion of other archaeological sites that are found in Llano and Gillespie Counties.

1977 Survey of Enchanted Rock and Vicinity

In 1977, J. W. Greer (1979) conducted an archaeological survey of Enchanted Rock and vicinity. His survey was performed for the Natural Areas Survey of the Lyndon B. Johnson School of The University of Texas at Austin. The survey covered an area larger than that of the present Park; however, only those archaeological sites found within the Park will be discussed.

Greer (1979) found a total of 99 archaeological sites within the Park boundaries. The predominant type of site consisted of lithic scatters; however, a few larger open sites and rockshelters were found.

When the above 99 sites had been resurveyed and reevaluated during the current project, there were some alterations of the quantity, size and type of those originally found by Greer. The CAR surveyors altered 54 of the 99 site descriptions, expanding the sizes of some. The remaining 45 were not assessed as sites: 11 had been combined with other sites, and the remaining 34 were changed to Isolated Finds or were not relocated. These sites may not have been found due to site erosion or to collection of site specimens since 1977 (see Appendix II). Some of the sites described by Greer (1979) covered less than a 10 x 10 m area, or consisted of single artifacts. Table 1 briefly inventories the sites from the 1977 survey and from the present CAR survey and site reevaluation.

Archaeological Sites in Llano and Gillespie Counties

As of this writing, 350 archaeological sites in Llano County and 101 archaeological sites in Gillespie County are on file at the Texas Archeological Research Laboratory in Austin. These totals include the 66 new sites found during the current project. The 1977 survey by Greer (1979) produced a total of 248 sites in both Llano and Gillespie Counties.

Greer (1979) briefly discussed previous work carried out in these counties, including the work done by Jackson (1938) and Crawford (1965) in the Lake Buchanan area. Some published works not mentioned by Greer (1979) have been written by Ing (1970), who investigated three historic sites at Lyndon B. Johnson State Park; Denton (1976); and Gunn and Mahula (1977), whose report covers Archaic sites. Some survey work was done by Gunn (personal communication) while conducting a field school in Gillespie County for UTSA in 1978. Approximately 20 archaeological sites were found by interviewing local people and were then investigated. That work is still being analyzed.

TABLE 1. REEVALUATION OF THE 1977 GREER SURVEY

SITE NO.	TYPE OF SITE GREER 1977	CAR 1979	CHANGES TO SITE*	REMARKS
41 GL 13	small crevices		removed from inventory	no cultural remains in cave
41 GL 57	LS	LS	combined w/41 GL 58	
41 GL 58	LS		combined w/41 GL 57	new # 41 GL 57
41 GL 59	LS	LS		
41 GL 60	LS	LS		
41 GL 61	LS		removed from inventory	no cultural remains found
41 GL 62	LS	LS		
41 GL 63	LS		removed from inventory	no cultural remains found
41 GL 64	LS		removed from inventory	no cultural remains found
41 GL 65	LS	LS		
41 GL 66	base of stone fence		not found; left in inventory	historic site; see Greer 1979
41 GL 67	LS		removed from inventory	no cultural remains found at 41 GL 67 or 68
41 GL 68	LS		removed from inventory	
41 GL 69	LS	LS	combined w/41 GL 70	
41 GL 70	LS		combined w/41 GL 69	new # 41 GL 69
41 GL 71	LS	LS	combined w/41 GL 72	
41 GL 72	LS		combined w/41 GL 71	new # 41 GL 71
41 GL 73	LS	LS		
41 GL 74	LS		removed from inventory	no cultural remains found
41 GL 75	LS	LS		
41 GL 76	LS	LS		
41 GL 77	LS	LS		
41 GL 84	LS	LS		
41 GL 85	LS	LS		
41 GL 86	LS	LS		*Angostura* found in shovel test by CAR survey
41 GL 87	LS		removed from inventory	no cultural remains found
41 GL 91	historic site/ prehistoric LS			

TABLE 1. (continued)

SITE NO.	TYPE OF SITE GREER 1977	CAR 1979	CHANGES TO SITE*	REMARKS
41 GL 92	LS	LS		
41 LL 76	terrace CS	terrace CS		
41 LL 77	buried midden		removed from inventory	no cultural remains found
41 LL 201	LS	LS	combined w/41 LL 202	
41 LL 202	LS		combined w/41 LL 201	new # 41 LL 201
41 LL 203	LS	LS/CS	combined w/41 LL 204	size expanded
41 LL 204	LS		combined w/41 LL 203	new # 41 LL 203
41 LL 205	LS	LS/CS	combined w/41 LL 206	size expanded
41 LL 206	LS		combined w/41 LL 205	new # 41 LL 205
41 LL 207	eroding hearth	LS	combined w/41 LL 208	
41 LL 208	LS		combined w/41 LL 207	new # 41 LL 207
41 LL 209	LS	LS		
41 LL 210	LS	LS		size expanded
41 LL 211	LS	IF-42	changed to isolated find	only one biface found
41 LL 212	LS	LS		
41 LL 213	LS (6 x 10 m)		removed from inventory	possible IF 39, 40 and 41?
41 LL 214	LS (10 x 15 m)		removed from inventory	no cultural remains found
41 LL 215	LS (15 x 20 m)		removed from inventory	mislocated on map? (CAR's 41 LL 315?)
41 LL 216	LS (7 x 20 m)		removed from inventory	mislocated on map? (CAR's 41 LL 314?)
41 LL 217	LS (10 x 10 m)		removed from inventory	not located
41 LL 218	LS	LS		
41 LL 220	LS	LS	combined w/41 LL 222	size expanded
41 LL 221	LS	LS		
41 LL 222	LS	LS	combined w/41 LL 220	new # 41 LL 220
41 LL 225	LS		removed from inventory	no cultural remains found

TABLE 1. (continued)

SITE NO.	TYPE OF SITE GREER 1977	CAR 1979	CHANGES TO SITE*	REMARKS
41 LL 238	LS		removed from inventory	no cultural remains found
41 LL 239	LS		removed from inventory	no cultural remains found
41 LL 240	LS		removed from inventory	no cultural remains found
41 LL 241	LS	LS		
41 LL 242	LS	LS		
41 LL 243	LS	LS		
41 LL 244	LS		removed from inventory	no cultural remains found
41 LL 245	LS	LS	combined w/41 LL 246 and 247	increased in size; new # 41 LL 245
41 LL 246	LS		combined w/41 LL 245 and 247	new # 41 LL 245
41 LL 247	LS		combined w/41 LL 245 and 246	new # 41 LL 245
41 LL 248	LS	LS		
41 LL 249	isolated artifact		removed from inventory	collected by Greer
41 LL 250	LS	LS		
41 LL 251	LS	LS		
41 LL 252	LS	LS		
41 LL 253	LS	LS		
41 LL 254	LS, midden	LS, midden		
41 LL 255	LS (5 x 10 m)		removed from inventory	no cultural remains found
41 LL 256	LS	LS		
41 LL 257	LS	LS		
41 LL 258	LS	IF 138	changed to isolated find	only one dart point found
41 LL 259	LS	LS		
41 LL 260	LS	LS		
41 LL 261	LS	LS		
41 LL 262	LS	LS		
41 LL 263	LS		removed from inventory	no cultural remains found

TABLE 1. (continued)

SITE NO.	TYPE OF SITE GREER 1977	CAR 1979	CHANGES TO SITE*	REMARKS
41 LL 264	LS	LS		
41 LL 265	LS	LS		
41 LL 266	LS	LS		
41 LL 267	LS	LS		
41 LL 268	RS	RS		some sparse cultural remains found
41 LL 269	LS	IF 133	changed to isolated find	one arrow point and 2-3 flakes
41 LL 270	LS	LS		increased size
41 LL 271	LS	LS		
41 LL 272	LS	LS		
41 LL 273	caves	IF 139	changed to isolated find	1 mano on surface; shovel tests found no cultural materials
41 LL 274	LS	LS		
41 LL 275	LS		see Summary and Conclusions	no cultural remains found
41 LL 276	LS		removed from inventory	no cultural remains found
41 LL 277	LS (2 x 2 m)		removed from inventory	no cultural remains found
41 LL 278	LS		removed from inventory	no cultural remains found
41 LL 279	LS	LS		
41 LL 280	LS		removed from inventory	no cultural remains found
41 LL 281	LS	LS	combined w/41 LL 282	size increased; new # 41 LL 281
41 LL 282	LS		combined w/41 LL 281	new # 41 LL 281
41 LL 283	LS	IF 142	changed to isolated find	possible hearth in road; site collected 1977?

Note: There are only 98 sites listed because two field site numbers were later combined and given one final number (41 GL 91) by Greer.

LS=Lithic Scatter; CS=Campsite; IF=Isolated Find; RS=Rockshelter

*Changes in size not noted except when drastic.

HISTORICAL BACKGROUND

The history of the Llano Basin began with the first European travelers who came through the area. Alvar Nuñez Cabeza de Vaca probably encountered the area in the early 1530s. He described hills that ". . . seemed as if they swept down from the direction of the North Sea," and saw rock which appeared to him to be iron slag (Weddle 1979:2).

This was the only known contact Europeans had with the Central Mineral Region until 1723, by which time the cause of European interaction with the region had changed. In that year, Captain Valdes of Presidio de San Antonio de Bejar led a punitive action against the Apaches which passed through the area. Other military campaigns against the Apaches occurred in 1732, 1739 and 1745, and possibly used part of a trail system leading through the area.

In the 1750s the area was being explored for other reasons. The inhabitants of San Antonio looked to the area as a possible location for new missions, which might quiet the Apaches where military expeditions had not. During the exploration of this period, Europeans first discovered the economic potential of the Llano region. In 1756 Bernardo Miranda found what he thought to be a rich silver mine south of Enchanted Rock on Sandy Creek. He was so impressed with the area that Miranda wrote, "The mines that are throughout the Cerro del Almagre and all its slopes are so abundant that I guarantee to give a mine to each one of all the inhabitants in this Province of Texas . . ." (Miranda Journal in Patten 1970; from Weddle 1979:3). Europeans for the next two to three decades were caught between the desire to exploit the expected wealth of the region on one hand, and a fear of the region's Indian inhabitants on the other.

The Spaniards could not resolve the Indian problem by the time the Mexican War for Independence was won in 1821, and the problem passed into other hands. The Spanish rumors and tales of gold and silver in the Llano region, however, have continued down to the present.

The English, Anglo-Texans and Germans were drawn to the area with ideas of developing mines and settlements, even though the region was by this time in the hands of the Comanches. Fredericksburg, 19 miles south of Enchanted Rock, was established in 1846, with the permission of the Comanches. The heterogeneous nature of the Comanches at this time is interesting to note. In an early meeting with the Indians, it was observed that:

> Whites and Indians intermingled in a motley crowd, diverse among themselves with Mexican muleteers, American surveyors and peasant Germans; a warrior whose Anglo-Saxon features indicated that he was a white captive Indianized, and the little Mexican boy whom he treated as his slave; a twelve year old Indian boy, speaking fluent English, who had been taken captive by the whites in the council house fight at San Antonio, then restored to his own people (Weddle 1979:9).

By the outbreak of the Civil War, craft-merchant trade and ranching had become the basis of the economy of the area. During this period, the first limestone homes were being built in Gillespie County, many of which presently attract

tourists from Texas and beyond. Shortly after this period Indian contacts became rare.

Ranching has continued to be a base of the region's economy to the present day, and the area's geological wealth is exploited in granite quarrying. Although tales of gold and rare metals have long fascinated residents and visitors alike, the Llano region has never produced a profitable rare metal concern.

"Enchanted Rock"

Although the name Enchanted Rock is at least 140 years old, there is no reliable historic source that explains how the landmark fit into the beliefs of the aboriginal inhabitants of the area. That it was known and used as a landmark and meeting place by historic Indians is certain, as described in Weddle (1979:6). Some of the earliest accounts by Europeans indicate that Indians were not only in the area, but were actively engaged in maintaining preferred habitats by burning off large areas in order to permit fresh plant growth (*ibid.*:3,8).

However the Indians viewed Enchanted Rock, there is evidence that quartz crystals, which are abundant in some areas of the Park, were possibly given special significance by the Comanches (Weddle 1979:6). For more information on the history of Enchanted Rock country, see Weddle (1979), from which this brief description has been drawn.

METHODOLOGY

Survey Methods

A systematic intensive archaeological survey and a preliminary site evaluation were carried out over the 1640.5 acres of Enchanted Rock State Park. Approximately 90% of the Park was intensively surveyed and 10% was surveyed sparingly (Fig. 2). The intensively surveyed portion consisted of nongranite exposures and included all creeks and side drainages, open spaces between drainages, and hills and ridges. The granite exposures, including Enchanted Rock, were briefly checked, primarily for rockshelters and caves.

A four-person field team conducted the majority of the site survey by walking transects. As the team walked in a parallel line along a transect, one member collected flagging from the previous transect, and the person on the opposite end of the line placed new flagging tape to mark the next transect when a transect boundary was reached. The surveyors would then extend the line along the boundary and return in a new transect toward the direction from which they had started. These transects were arbitrarily set up to extend between man-made and natural boundaries such as fence lines, creek beds and roads. Transects were roughly 100 m wide. Each surveyor covered a ca. 25 m wide area of the 100 m wide transect.

When any flakes or artifacts were found, the crew would search the area for other materials. The surrounding area of a site would be searched to determine visible boundaries. Most artifacts were flagged, sketched and photographed. Specific characteristics of each specimen were noted with each drawing. A sketch map with the approximate location of the artifacts was made for most sites. The artifacts sketched included all types of bifaces, unifaces, retouched flakes and any ground stone. Each site was plotted on an aerial photograph. The maps in this report are based upon the aerial photographs. Two types of field survey forms were used for each site. One was provided by the Texas Parks and Wildlife Department and is their standard form, and the other was the standard Center for Archaeological Research (CAR) site survey form. A separate photographic log was kept for each roll of film. Artifacts were not collected during the surface survey.

Isolated artifacts or flakes were designated as "Isolated Find(s)." Isolated Finds were usually sketched and photographed. All were plotted on aerial photographs.

The scale of the aerial photographs used for plotting sites and Isolated Finds was 1.3 cm to 100 m (1 inch = 660 feet). These photographs were provided by the Texas Parks and Wildlife Department.

Excavation Methods

Three methods of subsurface excavation were utilized in order to provide various data on site density, cultural affiliation, depth and boundaries. These types of excavation included excavation units, smaller "shovel tests" and auger testing.

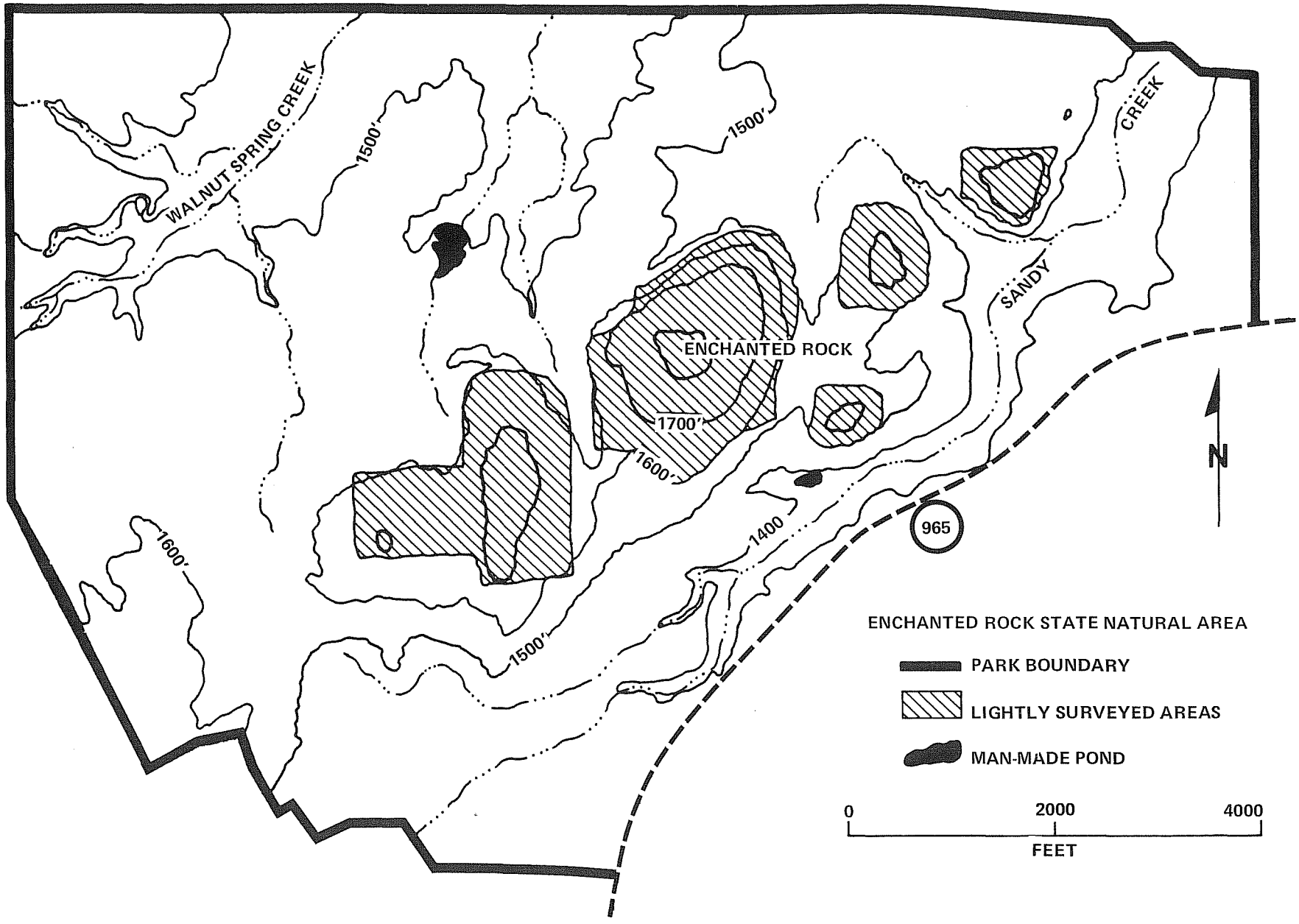


Figure 2. *Limits of Survey Area, Enchanted Rock State Natural Area.* Approximately 90% of the Park was intensively surveyed. Granite outcrops, shown as "lightly surveyed areas," received minimal inspection.

Excavation units were 1-m^2 and were employed at two sites, 41 LL 254 and 41 LL 76. Each was dug in arbitrary 10-cm levels and screened through 1/4-inch mesh screen. A constant volume sample (15 X 15 X 10 cm) was taken from the northeast corner of the excavation units for each level. A standard CAR Unit Level Record was completed for each level. Most levels had accompanying maps. A transit was used to maintain vertical control of excavated levels, provenienced artifacts and features at two sites. A site map was produced to show the excavation units and their relationship to the sites as a whole. The primary function of the excavation units was to provide additional information about certain sites to aid in the evaluation of their archaeological significance. All materials were collected from excavation.

The majority of testing was performed by shovel tests (ST). These small tests were circular 30 X 30 cm holes which were dug in arbitrary 15-cm levels and screened through 1/4-inch mesh screens. A standard CAR Unit Level Record was used per shovel test, including specific information for each level excavated. Each shovel test was plotted on aerial photographs (Fig. 5; see Testing Results section). All materials were collected.

The final form of subsurface testing was performed with the use of a gasoline-powered auger. Auger testing (AT) was conducted primarily where buried cultural deposits were partially located. Notes were taken on the soil changes for each auger test, along with total depth and materials recovered. All auger tests were plotted on aerial photographs and the materials were collected (Fig. 5; see Testing Results section).

Mapping Techniques

Two sites, 41 LL 254 and 41 LL 76, were mapped concurrently with excavation. An arbitrary datum was established at each mapped site, and the information was recorded by using a transit and a stadia rod. The maps were drafted in the laboratory from notes taken in the field and provide topographic data, relationship of all subsurface tests (excavation units and shovel tests) and some surface artifact relationships. One of these maps is shown in Fig. 7.

Laboratory Methods

All collected materials were washed, sorted and catalogued prior to analysis. The predominant items recovered were chert; however, there were some animal bone and ground stone from the excavation units and a few of the shovel tests. Some of the ground stone specimens were not washed, pending their use in specialized studies (phytolith, etc.), and the condition of the animal bone was checked prior to immersion in water.

The sites were plotted on 7.5 USGS (United States Geological Survey) quadrangle maps and also transferred from the smaller aerial photographs to a larger map (1 inch = 400 feet) of the entire Park. A computer-coded site survey form was developed which included items such as topographic data, distance to water source, cultural affiliation based on projectile points and an inventory of artifacts. It was planned that this data would

provide the basis for a statistical factor analysis of prehistoric settlement patterns in the Enchanted Rock area. Unfortunately, limitations of time during the analysis did not permit this information to be keypunched and analyzed.

Limited classification was performed on the lithics from the surface survey. The artifacts were sorted into chipped stone and ground stone categories. The chipped stone was divided into the following categories: projectile points, thin bifaces, thick bifaces, cores, core-choppers, choppers, retouched/utilized flakes, unifaces, perforator-drills, tested cobbles and hammerstones. The ground stone categories included manos, pitted manos, other pitted ground stone, bedrock metates and miscellaneous ground stone for all unidentified specimens. The lithic classification is presented in this generalized manner because the laboratory analysis for these specimens had to be taken solely from the field sketches and photographs.

Special analyses were performed on the faunal remains of each level, limited constant volume samples, and, from one site, selected phytolith samples. The faunal analysis is intended to provide a brief account of the types of animals recovered. The material was sorted into burned and unburned identifiable bone, burned and unburned unidentifiable bone, and worked bone. These items were then weighed, counted and inventoried (see Tables 7,8,9,12,14,15). Phytolith samples were selected from excavated levels of site 41 LL 254. This material was analyzed by Ralph L. Robinson, and the results are presented in Appendix III.

Thirteen constant volume samples were processed from two sites (41 LL 76 and 41 LL 254). The procedure follows that of Gerstle, Kelly and Assad (1978), with some minor changes. A fine screen separation was substituted for the flotation segment. The procedure was as follows:

1. A sample measuring 6.5 X 11.5 X 15.5 cm was selected for each 10-cm level.

2. Each sample was washed over a 1/4-inch mesh screen which was set over a fine screen geologic sieve (USA Standard Testing Sieve No. 35). The sieve has an opening of 0.0197 inches (500 micrometers).

3. When dried, the fine screen and coarse (1/4-inch) materials were sorted for lithics, bone snails and seeds. The samples were first sorted by using a three-power, lighted magnifier. The sorted specimens were further identified by using a microscope.

Constant volume samples are tabulated in Tables 10, 11, 16 and 17.

DISCUSSION OF ARTIFACT CATEGORIES

Numerous artifacts were located and recorded during the survey of Enchanted Rock. These artifacts, made of chipped or ground stone, undoubtedly were used for a great variety of tasks within prehistoric cultural systems.

The "no-recovery" methodology required on this survey precluded several types of detailed analyses usually done in the laboratory. It was impossible, of course, to conduct any type of microwear study designed to provide information on tool function. Petrographic research with raw materials was also impossible, and we do not feel that observations made as to raw material type during the course of survey work are definitive enough to allow meaningful comments on the kinds and distributions of such materials.

In this section, we have admittedly mixed both functional and descriptive classifications in dealing with the stone tools. Functional categories represent our best judgment based on hasty field analysis and should be considered tentative.

Cores

Cores are defined here as cobbles of siliceous stone with at least three flakes removed from either prepared or natural platforms. Cores do not exhibit use wear such as crushing or rounding, etc. This artifact type is common throughout the Park area and is a by-product of chipped stone tool manufacture.

Core-Choppers

Core-choppers cannot be distinguished from cores in terms of artifact shape, flake removal patterns, etc. They differ from cores in that, on one or more edges, core-choppers exhibit edge wear such as battering, rounding or crushing, indicating possible use as chopping tools.

Choppers

These tools caused some confusion initially, as they are similar, although not identical, to cores and core-choppers. These tools were usually made on tabular chert stream-cobbles, which had been modified by bifacial retouch along one or more margins. At least one edge of these artifacts was left with unaltered cortex, possibly for the purpose of holding the tool. The retouched margins sometimes exhibit heavy edge damage, thought to be caused by tool use.

Tested Cobbles

Tested cobbles were observed in many areas of the Park. They are defined as chert cobbles exhibiting the removal of one or two flakes. This class of items is thought to be a by-product of chert resource procurement and selection.

Retouched and Utilized Flakes

For the purposes of this survey, these two classes are combined. Retouched and utilized flake tools were commonly observed in the Park area, primarily on medium- to large-sized debitage flakes. The term "retouch" implies purposeful modification of an edge in preparation for a task. "Utilization" implies the use of an unmodified edge in a task.

Formally, retouch consists of a contiguous series of percussion or pressure flakes along a flake edge. Utilization consists of a series of smaller flakes along an edge, which are often non-contiguous. Flakes removed in this process are usually not as wide or as long as retouch flakes.

Unifaces

Numerically, unifaces made up only a small portion of the observed artifact inventory. Again, this is a formal category and probably includes tools of various functions. Unifaces can be described as being made on moderate to large flakes, which have received modification only on one face of the tool.

Perforators/Drills

This tool class was not represented by many specimens. Even so, a great deal of variability was exhibited. The tools were made on flakes with unifacial retouch, and on thin bifaces. The distinctive characteristic of this tool is a narrow tapering bit which usually exhibits fine flaking. This tool type is thought to have been used for perforating soft materials, such as hide or plant matter.

Gravers

This category was again poorly represented numerically. Gravers are generally defined as implements for incising or cutting hard materials, such as wood, bone and shell. Formally, we recognized gravers made on unifacially retouched flakes and small bifaces. The bit end of this tool type is usually a short, narrow, finely flaked beak.

Hammerstones

Formally, hammerstones are defined here as cobbles exhibiting battering or impact wear upon one or more surfaces. Considering the number of chipped stone tools, debitage and cores observed on the survey, it is surprising to have seen so few hammerstones. It is also surprising that the primary raw material for hammerstones was chert, instead of the abundant igneous and metamorphic materials which the Park area has to offer. A possible reason for the rejection of igneous materials lies in the "fresh" nature of these materials. Granite debris in the Park tends to occur in large, angular cobbles, which would have to be substantially reduced and modified in order to produce manageable tools. Granite which has weathered into smaller pieces is in a

weakened condition because of the dissolution of the component minerals biotite and hornblende, and might well be unsuitable for use as hammerstones. Another point to be considered is the fact that many chert cores we observed had unusual amounts of battered edges and faces, indicating the possibility that these tools were also hammerstones. Quartzite was also used for hammerstones, but this raw material is distributed sparsely in comparison to granite and chert.

Metates (Fig. 3,a)

Metates and metate fragments are common in the Park area and were predominantly composed of fine or conglomerate sandstones. These artifacts were rarely made of granite. Metates are associated with vegetal processing and usually take the form of large stone slabs with smooth, dished grinding surfaces on one or both faces.

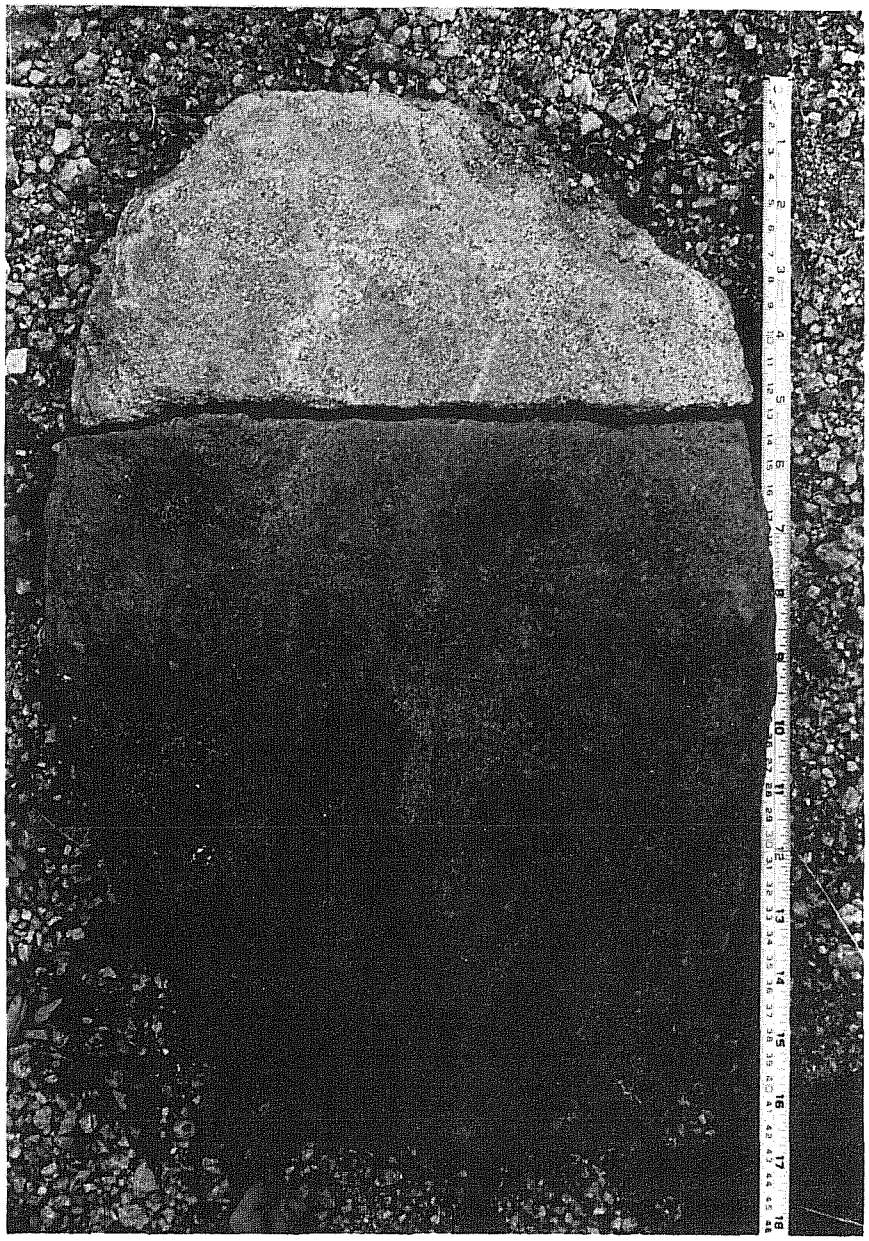
Bedrock Metates (Fig. 3,b)

This artifact class is made up of concave grinding surfaces worked into granite bedrock exposures at several sites along Sandy Creek. These facilities are also thought to be associated with plant processing. They occur in circular to ovoid smoothed surfaces with an average dimension of ca. 26 X 21 cm. From the edge of the ground surface to the center, these features varied in depth from 0.5 cm to 5 cm, averaging about 1.5 cm. They occur exclusively on low granite outcrops, and all are associated with recognized sites. These facilities have been observed at Oblate Shelter in Bell County, where they were probably associated with the Middle Archaic component (Johnson, Suhm and Tunnell 1962:109). A. T. Jackson (1938:15) observed very similar features at sites on the eastern margin of Llano County occurring on low outcrops of granite. Weir (1976:43,44) describes this feature as a trait of the Central Texas Archaic, being more common in western sections of the area.

Manos and Pitted Manos

These artifacts are associated with metates in the processing of vegetal foods. They are usually hand-sized cobbles of fused or unfused sandstone or, rarely, granite. Specimens encountered during the survey were usually naturally shaped, although pecked or ground edges were not uncommon. Both unifacial and bifacial specimens were observed.

Pitted manos were also numerous in the Park area. These tools were of the same general size, shape and raw material as manos, but they included small, roughly textured pits on one or both grinding surfaces. These are generally termed "nutting stones" in the eastern woodlands, including east and central Texas. As the term implies, these tools are thought to be used in cracking nut hulls. Another possible function for these tools is that of an anvil stone in lithic tool production. It has also been suggested that these tools were used as anvils in bipolar flaking, but no evidence of such technology has been recognized in the area.



a

b

Figure 3. *Ground Stone Artifacts.* a, large sandstone metate from site 41 GL 73; b, series of bedrock metates at site 41 LL 254.

Thin Bifaces

This class of artifacts is defined as bifacially chipped specimens having a thickness of one centimeter or less. Subsumed in this category are bifaces of triangular, ovoid or lanceolate form, of varying size. Well-developed cutting edges and generally fine flaking give these artifacts the appearance of finished tools. Projectile points are considered as part of this category; recovery of these artifacts is noted in the Site Descriptions section of this report.

The formal category of thin bifaces probably includes tools used in many different kinds of tasks. Included in these functions would be such activities as cutting, piercing, whittling, sawing and undoubtedly others. Both plant and animal matter could be processed with these tools.

Thick Bifaces

These tools are defined as bifacially chipped implements which have a thickness of over one centimeter. This very numerous class of tools has potentially as many different functions as thin bifaces. In addition, this category probably includes tool preforms, "quarry blanks" and other implements which were broken or discarded before completion. This artifact class is characteristically crudely flaked, usually by hard-hammer technique, and has a poorly developed shape and edge.

SITE DESCRIPTIONS

The following descriptions are brief summaries of site characteristics and of CAR-UTSA survey team activities carried out on a site-by-site basis. Data supplied in these descriptions are taken from field records, excavation notes and the field journal, which are on file at the Center for Archaeological Research and at the Texas Parks and Wildlife Department.

The following format is used in site description. Location of the site is given in general terms, to aid in finding the site on the Park map (see Fig. 4). Dimensions of the site are supplied in meters. The Environment of the site is given, listing the plant association (see the section entitled Environmental Background) within which the site is located. A Site Description lists the kinds of artifacts observed, the density of the cultural material and the chronological placement of the site (e.g., "Middle Archaic"). A final section, Comments, explains CAR-UTSA activities at each site and includes comments and recommendations for site preservation. Sites located in Gillespie County are described first, followed by sites found in Llano County.

Following the site descriptions is Table 2, which lists Isolated Finds from Enchanted Rock State Park. The Isolated Finds are located on the Park map in Fig. 4.

41 GL 57

Location: The site is located on and around a low ridge segment in the lower pediment area northwest of Sandy Creek, at an elevation of 1405 to 1425 ft. The Park headquarters and parking lot are directly across Sandy Creek from this location. The Park road bisects this site.

Dimensions: 97 X 110 meters.

Environment: 41 GL 57 is within both the oak savanna and the mesquite grassland associations. Short grass is dominant over most of the site. Soil is thin and gravelly on the rise but trends to a deeper deposit toward Sandy Creek to the south.

Site Description: The site is characterized by a light to moderate density lithic scatter on and around the rise, including ground stone artifacts, cores, a chopper and a large tested cobble. Disturbance caused by road improvement activities occurring after our investigations revealed three Archaic projectile points, a *Nolan*, an *Ensor* and a *Frio*, as well as burned rock and chert debitage. This suggests possible Early and Late Archaic cultural affiliations.

Depth of cultural deposits on the rise is a maximum of 30 cm. In the areas of the site off the rise, cultural deposits may be somewhat deeper.

Comments: CAR surveyors visited this site several times. An initial walkover was completed, and subsequent shovel and auger testing was accomplished at a later date. The site was disturbed by road grading and fencing activities

after our investigations. The Park road will continue to be a major factor in the destruction of a part of this site. Continued monitoring of the site is recommended. Possible alternative solutions to this problem might include erosion control in the immediate area of the Park road, or localized mitigation or testing. It should be noted that 41 GL 57 is a combination of two sites located on Greer's (1979:131-132) earlier survey of the area, 41 GL 57 and 41 GL 58.

41 GL 59

Location: This site is located in the lower pediment flats between a northern branch of Sandy Creek and Little Rock, at an elevation of 1410 ft. It is within the south-central area of the Park.

Dimensions: Not determined.

Environment: The site is within the oak savanna association, with scattered clumps of live oak and Mexican persimmon. Grass cover was short but fairly thick. The soil in this area is a medium brown sandy loam, which grades into an orange brown gravel-rich stratum at ca. 60 cm.

Site Description: The site consists of a very sparse scatter of lithic debitage. No finished artifacts were observed. Boundaries of the site are poorly understood, and accurate estimates of site area are not possible at present. Shovel testing revealed a diffuse cultural deposit of ca. 60 cm in depth. Cultural affiliations cannot be inferred for the site at this time.

Comments: In the initial CAR-UTSA survey of this area of the Park, this site was not recognized due to the very sparse amount of cultural material. Greer (1979) had recorded a site in this area, however, and it was decided to subsurface test in order to insure that a site was not being overlooked. The presence of the thin subsurface cultural deposit was enough to warrant site status until further work can be done in this area. The general area around this site sustains a fairly thick grass cover and seems well protected from erosional damage and vandalism. No recommendations for further work are offered at this time.

41 GL 60

Location: The site is located on lower pediment soils at the southeastern base of Little Rock, at an elevation of ca. 1440 ft.

Dimensions: 36 X 53 meters.

Environment: 41 GL 60 is located in the oak savanna association. Soil is a medium gray brown loam which grades to a gravelly yellow brown at ca. 45 cm. A dark gray brown stratum occurs from 15 to 30 cm and is probably due to cultural activity.

This page has been redacted because it contains restricted information.

Site Description: The site is characterized by a moderate surface debris scatter in which one ground stone fragment, a uniface and a biface midsection were observed. Shovel testing revealed a dense cultural deposit to 45 cm below surface. Previous work by Greer (1979) and Ron Ralph (personal communication) has indicated that 41 GL 60 is a multicomponent site spanning the Late Prehistoric, Archaic and possibly Late Paleo-Indian periods.

Comments: This site is subject to disturbance by collectors, and by some sheet erosion. A 1-m^2 pit had been dug into the site and is partially backfilled. The excavator of this pit is unknown at present. Because of the site's potential time depth and preservation, it is strongly recommended for nomination to the National Register of Historic Places.

41 GL 62

Location: The site is located on a granite bench on the southern exposure of Little Rock, at an elevation of 1460 to 1480 ft.

Dimensions: 18 X 24 meters.

Environment: Soil development is localized, and vegetation grows in protected areas in the form of cacti, grasses and persimmon. The area has affinities to both the oak savanna and the granite rock associations.

Site Description: 41 GL 62 had a very light scattering of chert debris and tools, and ground stone fragments. The distribution of materials in the site was spotty and diffuse, making site boundary definition difficult. Tools observed included a retouched flake, a core-chopper and ground stone fragments. Because of its hillside location, erosion is active, and site preservation is poor. No cultural affiliations could be assigned to this site in our survey. Greer (*ibid.*), however, reports that dart point fragments were observed at this site.

Comments: The CAR-UTSA survey located and described the site based upon surface indications. No subsurface testing was done. A small pothole(?) was found on this site, excavator unknown. No recommendations are offered for the site at this time.

41 GL 65

Location: The site is located at the southern base of Little Rock, in the south-central area of the Park. The site sits on a low, colluvial hillock which is heavily eroded by rain and runoff from the granite slope immediately above it.

Dimensions: 12 X 22 meters.

Environment: Vegetation is of the oak savanna association, with a thin cover of short grasses.

Site Description: The site is represented by a sparse lithic scatter which includes a metate fragment, a *Fresno* point, one biface fragment and two core fragments. One small bone was recovered from the surface but is probably of recent origin. The site is badly disturbed by erosion. Chronological affiliation is defined as Late Prehistoric. Cultural deposit extends ca. 30 cm below surface.

Comments: Natural erosion and probable collecting activities have already done a great deal of damage to this site. No recommendations are made at this time.

41 GL 69

Location: 41 GL 69 is located on a gentle, southeast-exposed slope south of Little Rock and northwest of Sandy Creek, at an elevation of 1430 to 1440 ft. The present temporary campground is just east of the site.

Dimensions: 61 X 65 meters.

Environment: The site is within the oak savanna plant association; soil is thin and gravelly.

Site Description: The site is composed of a moderate lithic scatter which includes thin and thick bifaces, manos, choppers and a utilized flake. Debris was concentrated in two areas, one in an eroded road cut on the northern edge of the site, and one in a heavily eroded area on the eastern margin of the site. The site has a depth of ca. 30 cm. No chronological assignment can be given at present.

Comments: CAR-UTSA activities included shovel and auger testing as well as surface survey. Although we observed no signs of disturbance other than that already mentioned, Greer (1979:145) noted potholes in part of the site. The site is a combination of two of Greer's sites, 41 GL 69 and 41 GL 70.

Two factors will continue to affect the preservation of this site. One is the Park road which was previously mentioned as cutting through the northern corner of the site. Another problem is the sheet erosion which has denuded a segment of the area. Erosion control along the Park road is recommended.

41 GL 71

Location: This is a large site located on the same gentle south-exposed slope as 41 GL 69, in the central-southern area of the Park. The site is located north of Sandy Creek, at 1420 to 1460 ft. elevation. The Park road cuts through the northern edge of the site.

Dimensions: 124 X 207 meters.

Environment: The site is part of the oak savanna association. Live oak dominates the vegetation. Soil is thin and stony.

Site Description: Cultural material is concentrated in two areas of the site. One area is in the Park road, where two small hearths are present. The second is on the southern edge of the site, where erosional gullying has exposed burned rock, chipping debris and tools. Artifacts observed at the site included a core, ground stone tools, two unclassified dart points, a thin biface and a core-chopper. The site contains both Archaic and Late Prehistoric artifacts (Greer 1979:133,145). Depth of deposit ranges to 45 cm on the southern edge of the site.

Comments: The Park road is a factor in the continuing disturbance of this site. Localized mitigation along the road or erosion control work are two alternative solutions to this situation. This site includes two sites as defined by the earlier Natural Area survey, 41 GL 71 and 41 GL 72 (*ibid.*).

41 GL 73

Location: This site is located on a low knoll north of the Park road, southwest of Little Rock.

Dimensions: 58 X 111 meters.

Environment: Soil is thin and gravelly, with scattered rock outcrops in the area. The site is within the oak savanna plant association.

Site Description: Chipping debris, one core, two ground stone fragments and a broken biface were observed here, along with a moderate density flake scatter. No chronological assignment can be made on this site at present.

Comments: CAR-UTSA activities included a single shovel test as well as a walk-over. It should be noted that this site included several piles of flakes on the surface indicating an intensive collecting practice. Many sites with similar flake aggregations were noted within the Park. These flakes are presumably the work of a single collector. Monitoring of this site is recommended.

41 GL 75

Location: This site is situated on a small hillock within the lower pediment flats north of Sandy Creek and southwest of Little Rock, at an elevation of 1440 ft.

Dimensions: 38 X 41 meters.

Environment: The site is within the riparian association. The soil is a sandy loam.

Site Description: A light density scatter of debitage covered the site. No finished artifacts were observed.

Comments: Shovel testing revealed a shallow deposit of ca. 15 cm. The site is partially destroyed by an erosional gully. No recommendations for further work are offered at this time.

41 GL 76

Location: The site is situated on a gentle, south-exposed slope, southwest of Little Rock in the lower pediment zone.

Dimensions: 27 X 34 meters.

Environment: The site is located within the riparian association, with thin grass cover and scattered live oak and persimmon.

Site Description: The site is composed of a light lithic scatter; no artifacts were observed.

Comments: Two shovel tests revealed sparse cultural materials to 15 cm below surface. No recommendations are made.

41 GL 77

Location: The site is exposed in the Park road, just east of the western boundary fence. Elevation is ca. 1450 ft. The site is between Sandy Creek and the granite ridge to the north.

Dimensions: 61 X 8 meters.

Environment: The site is located in an area with elements of both the riparian and oak savanna associations. The soil is a gravelly sandy loam.

Site Description: The site consists of burned rock, chipping debris and a single *Frio* dart point, eroding out in the Park road. Chronological placement for this site is Late Archaic.

Comments: Shovel testing revealed sparse cultural materials to 45 cm. As with other sites in this area of the Park, the Park road is a major cause of erosion and disturbance. Erosion control or localized testing and mitigation are possible alternatives to be considered.

41 GL 84

Location: 41 GL 84 is an upland site exposed in the Park road which leads to the north of Enchanted Rock, at an elevation of 1570 to 1580 ft. The site is southwest of Little Rock.

Dimensions: 57 X 7 meters.

Environment: The site is within the oak savanna association. Grasses predominate in this area. Soil is thin, and stony granite outcrops are common.

Site Description: The site consists of a light lithic scatter exposed in the Park road. Only one artifact, a thick biface fragment, was observed.

Comments: The site is thought to be disturbed from its primary context, due to erosion and road use. No recommendation for further work is made.

41 GL 85

Location: The site straddles the western boundary fence in the upland zone, at an elevation of 1580 ft. The major portion of this site is outside of the Park boundary, to the southwest of Little Rock.

Dimensions: 25 X 30 meters.

Environment: The site is within the oak savanna association. Soil is a gravel-sand-loam mixture, within an area of numerous granite outcrops. A spring or seep is nearby.

Site Description: Artifacts observed at this site included an unclassified dart point and a bifacial mano. Chert flakes were very sparse. Chronological placement of the site is Archaic.

Comments: This site is bisected by an old, unused, ranch road which runs generally in an east-west direction. The site location is on a fairly steep upland slope, with intermittent granite outcrops and protected areas with thick plant growth. No further work is recommended.

41 GL 86

Location: 41 GL 86 is near, and possibly on both sides of, the western Park boundary fence. The site is located in uplands, west southwest of Little Rock, at an elevation of 1630 ft.

Dimensions: Uncertain.

Environment: The site is in the oak savanna association. Grasses predominate. Soils here are thin, reddish and very gravelly.

Site Description: There is a very sparse scattering of flakes in localized erosional areas. No finished artifacts were observed on the site's surface. Cultural deposit is a maximum of 30 cm deep.

Comments: This site was not defined as such until shovel testing had revealed an *Angostura* point at 25 cm below the surface. Site boundaries are uncertain due to sporadic distribution of debris. Chronological assignment is tentatively Late Paleo-Indian.

41 GL 91

Location: The site is located on the margin between the lower pediment and upland zones, at an elevation of 1420 ft. The site is south of Sandy Creek, in the southern tip of the Park.

Dimensions: 57 X 34 meters.

Environment: The site is part of both the riparian and mesquite grassland associations.

Site Description: The site has two known components. One is a ranch house and outbuilding complex, part of which may date to the 1880s (Greer 1979:132). The second component is a prehistoric lithic scatter, which includes two mano fragments, two cores, a uniface and a large granite metate, along with a sparse scatter of flakes. No chronological assignment can be made for this component.

Comments: The construction and use of the ranch house complex (it is being used presently as a storage and work area for the Park staff) has affected the prehistoric component to the extent that most of it has been destroyed. Soils at this and neighboring site 41 GL 92 are so stony and compact that the auger bit snapped after repeated attempts to test for subsurface deposits in this area.

41 GL 92

Location: The site is located on a large, low hill on the south side of Sandy Creek, within the southern tip of the Park. Elevation of the site runs from 1420 to 1460 ft.

Dimensions: 207 X 212 meters.

Environment: The site lies in a border area between oak savanna, riparian and mesquite grassland associations. The site area is dominated by short grasses, with a few scattered clumps of live oak. Soil is thin, extremely stony and compact.

Site Description: A dense scatter of lithic debris was noted at this large site. Artifacts observed here included thick and thin bifaces, cores, metates, manos and pitted manos, a uniface, retouched flakes and several bedrock metates. Greer (1979:132) notes that a possible tipi ring is located on this site, but it was not observed in our work here. Chronological assignment is Archaic, and possibly also Late Prehistoric.

Comments: Flake and artifact aggregations were noted at this site and are thought to be the result of individual collectors. The fact that projectile points were not observed by the crew also indicates a substantial amount of collection, considering the profusion of other artifact types. It is also important to note the high proportion of ground stone tools at 41 GL 92, which made up over a third of the observed tool inventory. Because of its size and artifactual content, this site was placed on the National Register of Historic Places by Greer. CAR-UTSA activities included a surface walkover and five subsurface shovel tests; shovel and auger testing revealed a cultural deposit to ca. 30 cm below surface. Erosional damage at this site is at present a serious problem. Mitigation, testing and erosion control work should be considered as alternative solutions.

41 GL 94

Location: 41 GL 94 is located on the lower pediment flats south of Sandy Creek, within the southern tip of the park. Elevation is 1440 ft.

Dimensions: 24 X 20 meters.

Environment: The site is in the oak savanna association. Short and midstem grasses dominate. Soil here is a dark gravelly loam.

Site Description: Cultural remains are sparse. A few chert flakes, one biface midsection, a chert core and two unifaces made up the site inventory.

Comments: Shovel testing revealed a thin cultural deposit to 30 cm. The site is well protected from erosion and appears undisturbed. No recommendations for further work are made.

41 GL 95

Location: Located on a low hilltop just northwest of Rt. 965, at 1445 to 1460 ft. elevation, the site is within the southern tip of the Park.

Dimensions: 22 X 11 meters.

Environment: The site is part of the oak savanna and mesquite grassland associations. The site area is dominated by brush and some small live oak. Soil is a brown gravelly sandy loam.

Site Description: The site inventory consisted of two thin bifaces, two bifaces of unidentified type and four flakes.

Comments: The site is exposed in an old, unused, dirt road which parallels Rt. 965. No recommendations for further work are made at this time.

41 GL 96

Location: 41 GL 96 is situated on a lower pediment margin north of Sandy Creek, just east of the western boundary fence. The Park road is to the north of the site.

Dimensions: 34 X 40 meters.

Environment: The site is located on the border between riparian and oak savanna associations. Soil is a brown sand-gravel-loam mixture which grades into a dense clay at 25 to 30 cm below surface.

Site Description: Three thick bifaces, two thin bifaces, a core and one retouched flake were observed at the site, along with a light density scatter of flakes. No chronological assignment can be made for this site.

Comments: Shovel testing revealed a deposit of ca. 60 cm (maximum). Most material was in the upper 30 cm. The site surface is well covered with grass, and erosion is slight. No recommendations for further work are made at this time.

41 GL 97

Location: Situated at the southwestern base of Little Rock, at an elevation of 1440 to 1460 ft., the site is in the south-central area of the Park. A small runoff channel runs by the site.

Dimensions: 42 X 57 meters.

Environment: The site is in the oak savanna association. Due to the increased moisture of Little Rock's runoff, a thick stand of live oak, post oak and blackjack oak dominates.

Site Description: The site is characterized by a light to moderate surface scatter, with most flakes occurring in rodent disturbances. Two *Pedernales* dart points were found in these disturbances. In addition to these artifacts, a burned core, dart point tip and bifacial mano fragment were observed. Chronological assignment is Middle Archaic.

Comments: Six shovel tests revealed moderate to dense cultural remains to ca. 60 cm below surface. This site is recommended for nomination to the National Register of Historic Places because of its well-preserved nature. No evidence of collection, vandalism or extreme erosion was seen in the area.

41 GL 98

Location: 41 GL 98 is a small boulder shelter on the southwest exposure of Little Rock, near the base, within the south-central area of the Park. Elevation is ca. 1470 ft.

Dimensions: 2 X 3 meters.

Environment: The site is part of the granite rock outcrop and oak savanna associations. Soil is localized in protected areas and is very gravelly.

Site Description: Cultural material at this site consisted of one *Fresno* arrow point fragment and a flake. Chronological assignment is Late Prehistoric.

Comments: No testing was done at this site; no recommendations for further work are made.

41 GL 99

Location: Situated on a soil-capped hilltop in uplands to the west of Little Rock, at an elevation of 1620 to 1640 ft., the site is not far from the western boundary fence.

Dimensions: 15 X 15 meters.

Environment: Oak savanna, grass and brush dominate. The soil is thin and stony; granite outcrops are frequent.

Site Description: A very sparse lithic scatter of 10 to 12 flakes and two thick bifaces was noted.

Comments: Sheet erosion is present. The site is not otherwise disturbed. No recommendations for further work are made.

41 GL 100

Location: 41 GL 100 is situated in the uplands southwest of Little Rock, at an elevation of 1600 ft.

Dimensions: 16 X 14 meters.

Environment: The site is within the oak savanna association, with scattered groves of live oak. Short grass dominates. The soil is a thin, brown sandy loam with gravel.

Site Description: Cultural material includes a sparse scatter of flakes, two thin bifaces, one utilized flake, one ground stone fragment, two cores and a chopper. Chronological period is unknown.

Comments: The site was not tested. The area is relatively undisturbed by erosion and collecting. No recommendations for further work are made at this time.

41 GL 101

Location: Located in the uplands to the southwest of Little Rock, on the southeast exposed slope, the site is just east of 41 GL 100. Elevation is ca. 1590 ft.

Dimensions: 12 X 24 meters.

Environment: The site is within the oak savanna, with scattered clumps of live oak and brush. Short grass dominates the area. The soil is thin and gravelly loam.

Site Description: The site was characterized by a thin scatter of debitage, with three cores and two thick bifaces. No chronological assignment was possible.

Comments: A high tension power line runs between this site and neighboring 41 GL 100. It is possible that these are two parts of a single site disturbed by power line construction. No recommendations for further work are made.

41 LL 76

Location: Positioned on a northern terrace remnant of Sandy Creek, where a small northern branch meets Sandy Creek, the site is a short distance north of the present Park picnic area. Elevation is 1400 ft.

Dimensions: 85 X 69 meters.

Environment: The site is within the riparian plant association, with a thick stand of oak, elm and some mesquite. Soil here is deep, fine, clayey silt. Granite-derived gravel is relatively rare in this soil.

Site Description: Cultural material is very sparse on the surface. Most cultural materials are completely buried. One granite metate fragment, a mano, a *Frio* dart point and a thick biface were recorded in numerous walks across the site. Chronological assignment is Late Prehistoric to Late Archaic, and probably earlier.

Comments: Materials from this site are covered in other sections of this report (see Appendix I and section on Testing Results). Greer (1979:127,131) also discusses this site, assigning it to the Late Prehistoric to Middle Archaic periods. The site has been nominated to the National Register of Historic Places by Greer. Isolated finds of projectile points in the area of the site indicate the possibility of Early Archaic and Late Paleo-Indian components as well.

41 LL 201

Location: The site is on an eastern terrace of Walnut Spring Creek, near the northern boundary fence, at an elevation of 1460 to 1480 ft., and within the northwest section of the Park.

Dimensions: 258 X 74 meters.

Environment: The site has characteristics of both the riparian and oak savanna associations. Soil is a brown loam which grades into a clay zone at varying depths across the site.

Site Description: The site is best described as a sparse scatter of flakes with two areas of concentration. These two concentrations were noted by Greer (1979) and given separate site designations, 41 LL 201 and 41 LL 202. At area 1 (41 LL 201), a thick biface was observed. At area 2 (41 LL 202), a trimmed flake, a thin biface fragment and a large chopper were observed.

Comments: Shovel testing at this site revealed only a very light cultural deposit to 15 cm. No further work is recommended for the site.

41 LL 203

Location: On a lower pediment flat west of Walnut Spring Creek, just south of the northern boundary fence, the site is at an elevation of 1480 to 1500 ft.

Dimensions: 78 X 187 meters.

Environment: The association is predominantly oak savanna, but some mesquite occurs in the area. Because of increased moisture due to runoff from a nearby granite exposure, blackjack and post oaks are dominant. Ground cover is thin, and sheet and gully erosion is severe. Soil is a gravelly coarse loam.

Site Description: There is a light to dense lithic scatter associated with hearths. Artifacts observed include 10 thin bifaces and/or biface fragments (some are probably dart point fragments), two metate fragments, three cores,

two core-choppers and a uniface. Cultural material is concentrated toward the western end of the site. Chronological assignment is Archaic.

Comments: The site is a combination of two earlier Natural Area Survey (NAS) sites, 41 LL 203 and 41 LL 204 (Greer 1979:135,136). This site is in an area of particularly severe erosion, where some of the largest erosional features in the Park crosscut the site. The presence of intact hearths indicates that portions of the site are *in situ*, but these sections are in danger of destruction. The site in addition shows evidence of being heavily collected (also noted in Greer, *ibid.*). The site is recommended for nomination to the National Register of Historic Places.

41 LL 205

Location: 41 LL 205 is situated on a lower pediment flat west of Walnut Spring Creek, south of 41 LL 203 and the northern boundary fence, at 1480 to 1500 ft. elevation.

Dimensions: 148 X 131 meters.

Environment: The site associations are oak savanna and mesquite grassland. Grass cover is generally thick. Soils are gravelly and coarse in oak savanna areas, fine and compact in mesquite.

Site Description: Two dart points were observed, a *Montell* and an *Ensor-Frio* point, the latter being associated with an eroded hearth. Also found were a pitted mano, three thick and two thin bifaces, three cores, a uniface and two choppers.

Comments: The site may be associated with 41 LL 203. Testing revealed a buried concentration of cultural material on the northwestern portion of the site. Erosion is not as marked on this site as on 41 LL 203. The site is recommended for nomination to the National Register of Historic Places.

41 LL 207

Location: Located west-northwest of Moss Lake Dam, between two side-drainages of Walnut Spring Creek, the site is at an elevation of 1490 to 1500 ft.

Dimensions: 52 X 47 meters.

Environment: The site is within the oak savanna association, with thin grass cover away from drainages. Soil is a coarse gravel loam.

Site Description: A light lithic scatter, concentrated in eroded areas and associated with hearths, was noted. Artifacts include one thin and one thick biface, one mano, a chopper and a core. At least two hearths were observed, both in eroded areas.

Comments: Auger testing revealed no subsurface remains on this site. The site is a combination of two earlier-defined NAS sites, 41 LL 207 and 41 LL 208 (Greer 1979:134).

41 LL 209

Location: The site is located on the southern edge of Moss Lake, at an elevation of 1510 ft.

Dimensions: 108 X 88 meters.

Environment: The site has elements of both mesquite grassland and oak savanna. Short grass cover is dominant.

Site Description: The site consists of a sparse lithic scatter, most of which is exposed in eroded sections on the southern margin. Artifacts observed include one dart point base (*Pedernales*?), a core fragment, a chopper and one unclassified dart point fragment. Chronological assignment is the Middle Archaic period.

Comments: No recommendations for further work are made at this time. Two shovel tests revealed little to no cultural deposit.

41 LL 210

Location: A large site located southwest of Moss Lake and north of Little Rock, partially exposed by the Park road, at an elevation of ca. 1520 ft.

Dimensions: 292 X 81 meters.

Environment: The site is in the oak savanna association, with post oak, blackjack oak and black hickory dominant.

Site Description: The site consists of a large, diffuse scatter of flakes and tools, including a broken triangular dart point, six thin bifaces or biface fragments, one dart point preform (?), an unclassified triangular dart point and two unifaces. Chronological assignment for the prehistoric component is Archaic.

Comments: Thirteen shovel tests revealed only light cultural materials to 30 cm. Also present on this site are a cement slab and a cattle pen. No recommendations for further work are made.

41 LL 212

Location: Located on the west bank of the north fork of Walnut Spring Creek, at ca. 1480 ft. elevation, the site is in the northwest corner of the Park.

Dimensions: 19 X 34 meters.

Environment: The site has elements of the riparian and mesquite grassland plant associations. Mesquite and post oaks dominate. The soil is a gravel loam.

Site Description: The site is a linear, moderate density scatter associated with at least two hearths. Artifacts include four ground stone tool fragments, a quartz flake, chert cores, two thick and one thin biface.

Comments: The drainage has destroyed an unknown proportion of this site.

41 LL 218

Location: The site is located on the south bank of Walnut Spring Creek, just east of the western Park boundary fence; elevation is ca. 1500 to 1515 ft.

Dimensions: 30 X 15 meters.

Environment: The site lies within the oak savanna plant association; short grass is dominant in this area. Soil is a gravel loam.

Site Description: The site is exposed in an erosional gully and surrounding area. Along with a moderate scatter of flakes, five ground stone tools (one with striations on one side), a thick biface, three thin bifaces and a single quartz flake were observed.

Comments: Erosion has damaged an unknown amount of this site. Monitoring of the site condition is recommended.

41 LL 220

Location: Located south of Walnut Spring Creek near the western boundary fence, the elevation is ca. 1520 to 1540 ft.

Dimensions: 100 X 80 meters.

Environment: The site lies within the oak savanna plant association. The soil is thin and gravelly.

Site Description: The site revealed a light to moderate lithic scatter with one *Pedernales* dart point, three thin biface fragments, a metate fragment and a core. Burned rock, possibly an *in situ* hearth, was found on the eastern edge of the site. Chronological assignment is Middle Archaic.

Comments: The site is disturbed by runoff from a nearby granite outcrop, and by an old ranch road (now a seldom-used Park road). No further work is recommended at this time.

41 LL 221

Location: The site is located on the southwest side of Walnut Spring Creek, east of 41 LL 218 and the Park boundary fence, in the northwestern corner of the Park. Elevation is 1505 to 1520 ft.

Dimensions: 80 X 40 meters.

Environment: The site lies within the oak savanna plant association, with grasses dominating in the area. The soil is a gravelly loam. There are frequent bedrock outcroppings along this slope.

Site Description: Surface survey revealed a large, incomplete *Pedernales* point, a *Frio* dart point, a core, two core-choppers and one thin biface. The site has a moderate density flake scatter, which is concentrated on its northern side, nearest Walnut Spring Creek.

Comments: The west exposed slope is undergoing some erosion, but generally the surface is undisturbed. No recommendations for further work are made.

41 LL 241

Location: The site is located on a small soil-capped granite outcropping in the lower pediment area northwest of Sandy Creek, with an elevation of 1380 to 1390 ft. The site is in the northeastern area of the Park.

Dimensions: 46 X 51 meters.

Environment: The site is within the riparian association. Grass is the dominant plant on the site. The site is surrounded by a thick stand of live oak, persimmon and elm, which is typical of the riparian zone. Soil is thin and stony. Off the knoll, deposits are deeper, with less gravel.

Site Description: The site revealed a light to moderate lithic scatter on the knoll, including a fragment of unclassified ground stone, three thick bifaces, two cores and a tested cobble. No chronological assignment can be made.

Comments: There is a light amount of subsurface material north of the knoll in the lower pediment area. The knoll area is eroded quite heavily and may have been collected.

41 LL 242

Location: Situated in a large, low "saddle" between Buzzard's Roost and Flag Pole, the site is at an elevation of 1480 to 1490 ft. The site is located in the northeastern extremity of the Park, northwest of Sandy Creek.

Dimensions: 58 X 58 meters.

Environment: Vegetation is localized to protected areas and includes stunted live oak, brush and cacti. Generally, it is on a border between the oak savanna and granite rock outcrop associations. Soil is thin and rocky.

Site Description: Materials were scattered across the site but were most concentrated in areas of severe erosion. Artifacts observed included two hematite chunks, four cores, one thin and one thick biface, one unclassified dart point fragment, a *Scallorn* arrow point and one chopper. Chronological assignment is Archaic to Late Prehistoric.

Comments: The site is badly disturbed by erosion. No recommendations for further work are made.

41 LL 243

Location: The site is located within the same large, low saddle as 41 LL 242, at an elevation of 1450 to 1475 ft.

Dimensions: 63 X 69 meters.

Environment: The environment of this site is the same as that of 41 LL 242.

Site Description: In the area of this site, artifacts and debris were again most plentiful in areas of heavy erosion. Artifacts observed included a ground stone fragment, one *Tortugas* dart point, a chopper, three thin bifaces, a tested cobble, seven cores and a uniface. Chronological assignment is Archaic.

Comments: This site and neighboring 41 LL 242 are possibly related. No recommendations for further work are made.

41 LL 245

Location: The site is situated northeast of Freshman Mountain, at the upper end of a large pass which lies between Freshman Mountain and Buzzard's Roost. Elevation is 1410 to 1440 ft.

Dimensions: 75 X 68 meters.

Environment: The site lies within the oak savanna plant association, with short grasses dominating. The soil is a gravelly loam.

Site Description: The site inventory includes a light scatter of lithic debris and tools. Artifacts observed included three choppers, four cores, five ground stone fragments, a thin and a thick biface and one tested cobble. Although no features were visible, there was a scatter of burned rock at the site.

Comments: This site is a combination of three NAS sites, 41 LL 245-247. Erosion is severe in places, and an old ranch road has contributed to the disturbance of the site. No recommendations are made for additional work at this site.

41 LL 248

Location: The site is located on an upland hilltop north of Enchanted Rock, at an elevation of ca. 1520 ft. A large granite exposure borders the site to the south.

Dimensions: 131 X 57 meters.

Environment: The site is situated within the oak savanna plant association, with short grasses and brush dominant in the area. The soil is a gravel loam mixture.

Site Description: The site revealed a moderate density lithic scatter, including three unclassified ground stone fragments, an unclassified dart point, a *Lange* dart point, a chopper, three thick bifaces, a thin biface fragment and three cores. Chronological assignment of the site is Archaic.

Comments: The site is somewhat eroded. No recommendations for further work are made for this site.

41 LL 250

Location: The site is located on a small soil-capped rise due north of Enchanted Rock, at an elevation of 1480 to 1500 ft.

Dimensions: 86 X 91 meters.

Environment: The site lies within the oak savanna plant association, with both grass and brush dominating. The soil at this site is the ubiquitous gravel-sand-loam mixture. The site is bordered on the south, east and west by a large granite exposure.

Site Description: Site survey revealed a moderate to dense lithic scatter, which included two dart points (a *Meserve* and a *Lange*), an unclassified dart point fragment, two core fragments, five thick and two thin bifaces and two unclassified ground stone fragments. Most of the above-mentioned material was found in a concentration on the eastern side of the site. Chronological assignment is possibly Late Paleo-Indian, probably Archaic.

Comments: The site is severely eroded, but it remains potentially important. Monitoring of the site and erosion control or mitigation should be considered.

41 LL 251

Location: The site is situated in a low area northeast of Enchanted Rock, east of a small flowing spring channel. Site elevation is 1440 to 1450 ft.

Dimensions: 30 X 47 meters.

Environment: The site is within the oak savanna plant association. In the area of the site, an oak hickory forest is present.

Site Description: The site is characterized by an extremely light lithic scatter, including a core and one thin biface fragment, probably the distal section of a dart point. The site is tentatively assigned to the Archaic period.

Comments: The site appears to be in a low and well-protected position. No recommendations for additional work are made for this site.

41 LL 252

Location: The site is located on a small ridge extending northeast from Freshman Mountain, at an elevation of 1420 to 1450 ft.

Dimensions: 75 X 55 meters.

Environment: The site lies within the oak savanna plant association. The immediate area of the site, however, is almost completely denuded of vegetation by erosion. Soil here is extremely stony through deflation.

Site Description: The site is a disturbed lithic scatter situated primarily on an exposed gravelly surface. A hearth and associated grinding stone (metate fragment?) and a thin triangular biface were observed weathering out of a small patch of topsoil. Other artifacts at the site included a small unclassified dart point, two cores and a thin biface midsection. Chronological placement is Archaic.

Comments: This site is heavily eroded and probably requires mitigation of the small remaining *in situ* portions.

41 LL 253

Location: The site is located on a slight, wooded knoll at the foot of the pass between Freshman Mountain and Buzzard's Roost. Sandy Creek is to the southeast of the site. Elevation is 1370 to 1400 ft.

Dimensions: 85 X 68 meters.

Environment: The site is between the riparian and oak savanna associations. A fairly thick stand of live oak occupies the site. Soil is a stony loam over granite bedrock.

Site Description: This site has a large amount of cultural material, including bedrock metates, two *Pedernales* dart points, an unclassified dart point fragment, four biface fragments, seven cores, eight core-choppers, two choppers, five unclassified ground stone fragments, two metate fragments, three hammerstones, two tested cobbles and a graver. Chronological assignment is Early Archaic to Late Prehistoric (Greer 1979:133).

Comments: The diversity of the tool inventory at 41 LL 253 suggests that this site was occupied for longer periods of time than most others in the Park (for a discussion of tool diversity and length of occupation, see Yellen 1977:107). Because of the easily visible profusion of cultural material, the site has been subject to surface collection and uncontrolled excavation. Erosional damage is severe in a large part of the site, and a seldom-used Park road also cuts through part of the site. Erosion control work, site monitoring, testing, and partial or complete excavation of the site are alternative approaches which should be considered. 41 LL 253 has been nominated to the National Register of Historic Places (Greer 1979:133).

41 LL 254

Location: The site is situated on a low ridge northwest of Sandy Creek and immediately southeast of site 41 LL 253. The site is located at the foot of a wide pass between Freshman Mountain and Buzzard's Roost, at an elevation of ca. 1380 ft.

Dimensions: 61 X 36 meters.

Environment: The site is within the riparian association and consists primarily of live oak, post oak and elm, with thick short grass cover.

Site Description: 41 LL 254 is primarily a buried site, with very sparse amounts of cultural material on the surface, limited primarily to the Park road cutting across the site, or to the rodent disturbances on the eastern side of the site. Tools observed on the site surface included numerous bedrock metates, a *Montell* dart point base, a chopper, a bifacial mano and a thin biface. Chronological placement for this site is Early Archaic to Late Prehistoric.

Comments: Shovel tests and a 1-m^2 excavation unit revealed a cultural deposit of ca. 1.5 m at this site. The results of this testing are described in detail in the Testing Results section of this report. The site is likely a part of 41 LL 253, which lies immediately to the north of this site. 41 LL 254 is recommended to the National Register of Historic Places.

41 LL 256

Location: The site is located southeast of Sandy Creek in the area of Freshman Mountain and Turkey Peak, at an elevation of 1410 ft.

Dimensions: 20 X 30 meters.

Environment: The site is within the oak savanna association and is dominated by thick short grass cover.

Site Description: The site is characterized by a light to moderate lithic scatter, including a triangular biface with graver(?) tip, a thin biface fragment and a retouched flake. No chronological assignment can be made at this time.

Comments: No recommendations for further work on this site are made at this time.

41 LL 257

Location: The site is situated on an eroded hillside north of Sandy Creek and southeast of Turkey Peak.

Dimensions: 66 X 15 meters.

Environment: The site lies within the oak savanna association. Short grass dominates in the area of the site. Soil is a stony loam, with frequent granite outcrops.

Site Description: The site consists of a very sparse flake scatter, with one mano and a metate fragment.

Comments: The surface is heavily eroded in places, and it seems likely that all material observed by the survey crew was out of its original context. No recommendations for further work are made.

41 LL 259

Location: The site is located on the north side of Sandy Creek, east-southeast of Frog Pond, at an elevation of 1380 to 1400 ft.

Dimensions: 34 X 31 meters.

Environment: The site lies within the oak savanna plant association, with the soil being deep and gravelly.

Site Description: The site revealed a sparse scatter of flakes. No finished artifacts were observed.

Comments: The cultural material is exposed in large erosional cuts created by overflow from Frog Pond. The site is completely buried, except where erosional cuts have disturbed it. The site should be monitored.

41 LL 260

Location: The site is situated on the north bank of Sandy Creek, south of Frog Pond.

Dimensions: 12 X 12 meters.

Environment: The site lies within the oak savanna association, with deep gravelly soil.

Site Description: A very sparse lithic scatter defines the site area. No artifacts were observed.

Comments: Auger tests in this area showed little or no subsurface cultural material. No recommendations for further work are made.

41 LL 261

Location: Situated on the southeast side of Sandy Creek, across from Frog Pond, the site is at an elevation of 1400 to 1410 ft.

Dimensions: 8 X 25 meters.

Environment: Mesquite grassland, with some scattered oaks, comprises this site. Soil at the site is a stony loam. Granite outcrops are scattered in this area.

Site Description: The site consists of a sparse lithic scatter. One thin biface fragment and a tested cobble were observed.

Comments: No recommendations for additional work are made for this site.

41 LL 262

Location: Situated between the Park supervisor's house and Park headquarters, the site is on the southeast side of Sandy Creek.

Dimensions: 61 X 71 meters.

Environment: The site lies within the riparian and mesquite grassland associations. Soil here is fairly deep and gravelly.

Site Description: The site is a moderate density scatter, including a uniface, three thin biface fragments, two thick bifaces and two unclassified bifaces.

Comments: Auger testing revealed a light density subsurface cultural deposit. The surface of this site is badly disturbed by vehicular traffic and by the old (Moss) campground facilities. The area has also been recently disked and planted with grass. No recommendations are made for further work.

41 LL 264

Location: The site is located on a low soil ridge in the lower pediment area southwest of Frog Pond, on the northwest side of Sandy Creek. Elevation of the site is 1420 to 1430 ft.

Dimensions: 28 X 27 meters.

Environment: The site lies within the oak savanna association. Grass dominates on this ridge. The soil is gravelly and fairly deep.

Site Description: The site consists of a moderate lithic scatter, including one core and a thin biface midsection.

Comments: A Park trail cuts across this site on its way to Enchanted Rock, and flakes are abundant within it. Some erosion is associated with the path, but not enough to damage the site seriously. Sheet erosion was noticed all along this ridge, but is not marked in any one location. Monitoring of the site is recommended.

41 LL 265

Location: The site is north of the Spencer site and the Park headquarters on the northwest terrace of Sandy Creek. Elevation is ca. 1400 ft.

Dimensions: 10 X 12 meters.

Environment: The site lies within the riparian association. Thick grass cover with oak and mesquite predominates in the area. Soil is deep, with less than a normal amount of gravel.

Site Description: The site was defined by a number of rodent disturbances which had dark soil and occasional flakes.

Comments: This may be another buried site similar to 41 LL 254 and 41 LL 76. Monitoring of the site is recommended.

41 LL 266

Location: The site is on a lower pediment rise at the southeastern base of Little Rock. Elevation is 1420 to 1430 ft.

Dimensions: 34 X 64 meters.

Environment: The site is within the oak savanna association. Soil is a stony loam.

Site Description: A light lithic scatter, including a thin biface and a unifacially trimmed flake, comprises this site.

Comments: Shovel testing revealed buried cultural remains at the site. Thick grass cover in most areas of the site has controlled erosion. Modern campfires represent the only recent disturbance on the site.

41 LL 267

Location: The site is located on a sloping, soil-covered granite bench at the southeastern base of Little Rock. Elevation is 1490 to 1500 ft.

Dimensions: 34 X 28 meters.

Environment: This area has plants of both the oak savanna and granite outcrop associations. Soil is a dark, stony loam.

Site Description: The site consisted of a light to moderate scatter of flakes, and the artifacts included a *Scallorn* arrow point and two metate fragments. Chronological assignment is Late Prehistoric.

Comments: This site is thought to be related to 41 LL 268, a small boulder shelter immediately upslope from 41 LL 267. No recommendations are made for additional work at this site.

41 LL 268

Location: The site is situated on a sloping, soil-covered granite bench at the southeastern base of Little Rock. Elevation is 1490 to 1500 ft.

Dimensions: 10 X 10 meters.

Environment: This site area has plants of both the oak savanna and granite outcrop associations. The soil is a dark, stony loam.

Site Description: A very sparse lithic scatter, including two flakes, a metate and mano fragment, and a smoothed, small granite boulder which may have been a grinding surface, was present.

Comments: There is recent trash and broken glass in the shelter as well as the above-mentioned prehistoric materials.

41 LL 270

Location: 41 LL 270 is situated on the pediment ridge at the northern base of Enchanted Rock.

Dimensions: 117 X 69 meters.

Environment: The site is within the oak savanna association. Short grass is dominant in this area. The soil is a gravel-loam mixture.

Site Description: Surface cultural material was seen to occur in two concentrations, or areas. Area A contained a small (possibly *Ellis*) dart point, a chopper, four thin biface fragments, a core and two large bifacial granite metates. Area B included an unclassified dart point fragment, a thick biface fragment and a core fragment.

These two areas were linked by a diffuse, sparse scatter of flakes. Chronological placement of this site is Archaic.

Comments: Shovel testing at 41 LL 270 revealed little to no subsurface cultural material. The number of granite metates at this and neighboring site 41 LL 272 is unusual.

41 LL 271

Location: The site is located on the slightly sloping to flat pediment northwest of Enchanted Rock. Site elevation is 1510 to 1530 ft.

Dimensions: 61 X 156 meters.

Environment: The site lies within the oak savanna association, with short grass dominating.

Site Description: The site is characterized by a light to moderate lithic scatter which includes one thick biface fragment, a core chopper, three thin biface fragments and a dart point fragment (possibly *Gary*). Chronological placement is Archaic.

Comments: The site is relatively undisturbed except for occasional rodent disturbances. Shovel testing revealed a fairly deep (45 cm) but sparse subsurface deposit. No recommendations for further work are made for this site.

41 LL 272

Location: The site is situated in a wooded talus slope immediately northwest of Enchanted Rock, at 1540 to 1580 ft. elevation.

Dimensions: 61 X 70 meters.

Environment: The site lies within the oak savanna association. Post, blackjack and live oak are dominant.

Site Description: The site consists of a light density lithic scatter with an unusual density of ground stone tools. Six large metates were observed, four of which were granite; the remaining two were sandstone. One mano was observed, as well as a pitted ground stone fragment. Other artifacts at the site included a core and an unclassified dart point. Chronological placement of the site is Archaic.

Comments: Shovel testing revealed no recognizable subsurface component.

41 LL 274

Location: Located on a steep talus slope at the northwestern base of Enchanted Rock, the site is 1510 to 1570 ft. in elevation.

Dimensions: 64 X 109 meters.

Environment: The site is within the oak savanna plant association. The area is dominated by oaks and hickory. Soil here is coarse and shallow.

Site Description: The site consists of a light to moderate lithic scatter, including a chert hammerstone, a core, three manos, an unclassified ground stone fragment, two pitted manos and one very large metate made on a small granite boulder.

Comments: This site follows the pattern set by other sites in the area (41 LL 270, 41 LL 272) in that it has a high proportion of ground stone in its artifact assemblage. Shovel testing revealed little to no subsurface deposit.

41 LL 279

Location: The site is situated on the upper pediment hilltop west of Enchanted Rock and Little Rock, in rolling uplands at an elevation of 1580 to 1600 ft.

Dimensions: 27 X 45 meters.

Environment: The site lies within the oak savanna association. Grass and persimmon brush dominate. Soils are thin and gravelly.

Site Description: The site revealed a very sparse lithic scatter, including a thin, burned biface fragment.

Comments: The ridge on which this site occurs is heavily eroded. Auger testing revealed very little subsurface cultural material.

41 LL 281

Location: The site is located in a soil depression and pediment slope associated with a large granite outcrop west of Little Rock, not far from the western Park boundary fence. Elevation ranges from 1610 to 1640 ft.

Dimensions: 61 X 84 meters.

Environment: The site lies within the oak savanna association. In this area, scrub live oak and brush dominate. Soil is thin and rocky, with many granite outcrops.

Site Description: The site consists of a moderate to dense lithic scatter exposed primarily in badly eroded areas. Artifacts observed include an *Ensor* point, a perforator, two thin biface fragments, two thick biface fragments, an incomplete dart point (possibly *Nolan*?), a core and two choppers. Chronological placement is Late Archaic, and possibly earlier.

Comments: This is potentially an important site which is badly damaged by erosion. Surface materials are highly visible in this eroded state, making the site susceptible to collection. Erosion control or further archaeological work should be considered. This site is a combination of NAS sites 41 LL 281 and 41 LL 282.

41 LL 293

Location: The site is located between Sandy Creek and Route 965, north of the current Park residence. Elevation is 1410 ft.

Dimensions: 17 X 22 meters.

Environment: The site vegetation is part of both the riparian and mesquite grassland associations. Soil is fairly deep and gravelly.

Site Description: A light density lithic scatter, including a biface fragment, comprises this site.

Comments: The site has been disturbed to an unknown degree by road and structure building, as well as erosion. No recommendations for further work are made.

41 LL 294

Location: The site is located on an eroded terrace(?) fragment on the southeast side of Sandy Creek, across the stream from Turkey Peak and Frog Pond, at an elevation of 1380 to 1400 ft.

Dimensions: 24 X 12 meters.

Environment: The site is within the riparian association, with thick short grass and scattered oaks. Soil is a sandy loam with some gravel.

Site Description: The site consists of a light to moderate lithic scatter, with a retouched flake uniface, a core and one crude biface.

Comments: Some erosion has taken place, but the site is generally well protected. No recommendations for additional work are made at this time.

41 LL 295

Location: The site is situated between Sandy Creek and Route 965, due west of Turkey Peak.

Dimensions: 29 X 12 meters.

Environment: The site is between the oak savanna and mesquite grassland. Soil is thin and rocky.

Site Description: Eight flakes were observed on this site.

Comments: No recommendations are made for further work.

41 LL 296

Location: The site is located between Sandy Creek and Route 965, on the eastern side of the Park. Elevation of the site is ca. 1420 ft.

Dimensions: 27 X 24 meters.

Environment: The site is between the oak savanna and mesquite grassland associations. Site area is thinly soiled with frequent rock outcrops.

Site Description: There is a sparse scatter of materials, including two manos and a uniface. No chronological assignment can be made for the site at this time.

Comments: No recommendations are made for this site.

41 LL 297

Location: The site is situated on the southeastern terrace of Sandy Creek, in the area of Freshman Mountain. Elevation of the site is ca. 1830 ft.

Dimensions: 24 X 46 meters.

Environment: The site is within the riparian association. Thick, short grass cover is dominant. Soil is deep and stony.

Site Description: The site revealed a light density scatter of flakes and artifacts including a thick and a thin biface fragment, two mano fragments and several cores. No chronological assessment can be made at present.

Comments: Shovel and auger testing revealed a light density subsurface deposit to 75 cm.

41 LL 298

Location: The site is situated east of Sandy Creek, in the northeast corner of the Park. Elevation is ca. 1380 ft.

Dimensions: 14 X 17 meters.

Environment: The site is located within the riparian association; mesquite and oak dominate. Soil is gravel loam.

Site Description: A light density flake scatter with two thin bifaces (one burned) is present. No chronological assignment can be made at this time.

Comments: The site has been disturbed by a Park road and by construction and removal of a small building or deer blind.

41 LL 299

Location: The site is on a lower pediment east of Sandy Creek, in the northeastern corner of the Park. Elevation is 1360 to 1370 ft.

Dimensions: 83 X 64 meters.

Environment: The site is within the riparian association. Scattered oaks and thick grass cover typify this area. Soil is thin and stony.

Site Description: The site is a moderate to dense lithic scatter, with a variety of artifacts. These include a bifacial drill fragment, a thin biface fragment, two unclassified ground stone artifacts, a hammerstone and five cores. No chronological assessment can be made for this site.

Comments: The site is subject to some sheet erosion but generally is in a fairly good state of preservation. No recommendations are made at this time. This site is possibly related to 41 LL 300, which borders this site to the south.

41 LL 300

Location: The site is located immediately south of 41 LL 299, in the northeastern section of the Park, at an elevation of 1360 ft.

Dimensions: 14 X 18 meters.

Environment: The site is within the riparian association and is identical in environment to 41 LL 299 (see above).

Site Description: The site consists of a sparse scatter of flakes and a single quartzite metate fragment. No chronological assignment is made for this site.

Comments: This site is perhaps related to the occupation at 41 LL 299. No recommendations are made at this time. No testing was done at this site.

41 LL 301

Location: The site is located on a southern terrace of Sandy Creek, in the area of Flag Pole, in the northeastern section of the Park.

Dimensions: 16 X 14 meters.

Environment: The site is within the riparian association. Live oak, mesquite, and short, thick grass cover dominate.

Site Description: The site consists of several flakes, a *Bos* long bone fragment and a tested cobble. Chronological affiliation is unknown.

Comments: No recommendations for further work are made at this time. Auger testing was done at this site and revealed no subsurface deposit.

41 LL 302

Location: The site is located in the uplands west-northwest of Little Rock, at an elevation of 1590 ft.

Dimensions: 5 X 24 meters.

Environment: The site lies within the oak savanna association. There is sparse grass cover. Scattered trees and brush and deflated, gravelly surfaces typify this area.

Site Description: A compact, moderate flake scatter with two thin biface fragments is present. The scatter runs on the southwestern side of a large boulder which possibly was used for shelter. No chronological placement is made for the site at this time.

Comments: No testing was done here by the CAR-UTSA crew. No recommendations are offered at this time.

41 LL 304

Location: The site is in a flat wooded area due north of Little Rock, at an elevation of 1515 to 1540 ft.

Dimensions: 197 X 111 meters.

Environment: The site is within the oak savanna plant association; blackjack oak, post oak and black hickory are dominant in this area.

Site Description: The site consists of a large area with scattered concentrations of lithic debris and artifacts. The artifacts included a stemmed retouched-flake arrow point, two finely flaked small thin bifaces, a bifacial ground stone fragment, a uniface and two thick bifaces.

Comments: The site gives an impression of having numerous small horizontally limited components within it. Detailed mapping of the site might help in evaluating this impression. CAR-UTSA shovel testing revealed very little in the way of subsurface cultural materials. No further recommendations are made.

41 LL 305

Location: The site is situated on a high granite ridge which extends north from Little Rock, at an elevation of 1605 ft.

Dimensions: 33 X 95 meters.

Environment: Plants are primarily those of the granite rock association: grass, ferns and mosses. Some persimmon occurs as well.

Site Description: The site consists of a moderate lithic scatter, including an unclassified biface fragment, five thin biface fragments, a core, a thick biface fragment and a ground stone fragment. No chronological assignment can be made at present.

Comments: The site is unusual in its highly elevated position, one of the highest in the Park. The location commands a wide view to the north. No testing was done at this site.

41 LL 306

Location: The site runs parallel to the western Park boundary fence, to the west of a large, low granite exposure.

Dimensions: 72 X 14 meters.

Environment: Oak savanna, brush and grass dominate. Soil is a gravel loam, with scattered low, flat granite outcrops.

Site Description: The site is large and has two areas of artifact concentration: area 1, on the southeastern end, and area 2, which occupies the northern half of the site. Area 1 is a heavily eroded locality with a ground stone fragment (unclassified), three unclassified biface fragments and a retouched flake. Area 2 yielded a long thin biface, a thick biface, five unclassified bifaces, a chopper and a possible *Pedernales* dart point. The site is chronologically defined as Middle Archaic.

Comments: Parts of the site are undergoing surface erosion, particularly near erosional gullies and slopes. No recommendations for further work are made. This site was not tested.

41 LL 307

Location: Associated with a small granite "dome" on the western margin of the Park, the site lies between two "arms" of the dome, at an elevation of 1570 to 1580 ft.

Dimensions: 38 X 83 meters.

Environment: Within the oak savanna association, the site is densely wooded with black hickory, post oak and blackjack oak. The area lacks any grass cover. Soil is a black organic loam which grades into a lighter, gravelly loam.

Site Description: The site is characterized by a light scatter of surface materials, including two core-choppers, one core, a mano fragment, a metate fragment and an unclassified ground stone fragment. Flakes were only sparsely scattered across the site.

Comments: Shovel tests revealed very little subsurface cultural material. The site is eroding somewhat due to runoff from the adjacent granite dome but is generally well protected. No recommendations are offered.

41 LL 308

Location: The site is immediately north of a small granite dome on the western side of the Park, at an elevation of 1570 to 1590 ft.

Dimensions: 112 X 112 meters.

Environment: Located within the oak savanna association, live oak, persimmon and fairly thick grass cover dominate.

Site Description: Materials observed at the site include the following dart points: one *Nolan*, one *Marcos*, one possible *La Jita* point, one possible *Ellis* point and one unclassified dart point. Additional artifacts included a drill fragment (made on a triangular biface), two thin and two thick bifaces and a chopper. Chronological placement of this site is Early-Middle-Late Archaic.

Comments: Shovel testing revealed cultural debris to 30 cm. A *Pedernales* point was recovered from one shovel test. The site does not appear to have been collected. No recommendations are made.

41 LL 309

Location: In the upland, west central area of the Park, at an elevation of ca. 1580 ft., the site is on a moderate southeastern slope.

Dimensions: 33 X 18 meters.

Environment: The site lies within the oak savanna association. In this area short grass dominates. Soil is a gravelly sand loam, with frequent low granite exposures.

Site Description: A moderate scatter of debris, artifacts (including four thin bifaces and a burned, fragmented, unclassified dart point) and a possible hearth are present. Chronological assignment is Archaic.

Comments: Erosion is active at this site, especially on the northern edge, in the vicinity of the possible hearth. The site was not tested.

41 LL 310

Location: The site is located on a small ridge in the upland zone, in the western margin of the Park, at an elevation of 1560 ft.

Dimensions: 52 X 25 meters.

Environment: The site is within the oak savanna association with live oak and thin, short grass cover. Soil is a sand-gravel-loam mixture.

Site Description: The site is characterized by a light lithic scatter, including two thin biface fragments and one core fragment.

Comments: No recommendations are made at this time. The site was not tested.

41 LL 311

Location: The site is in a low area between two small granite outcrops on the western side of the Park.

Dimensions: 85 X 92 meters.

Environment: The site is within the oak savanna association. In this protected area, oaks and hickory dominate. Soil here is a gravelly loam.

Site Description: A dense scatter of cultural material was observed at this site, as well as a small buried midden of black soil and burned rock. Numerous artifacts were noted, including a possible *Nolan* arrow point, two *Fresno* arrow points, two *Pedernales* dart points, a single *Nolan* dart point and one unclassified dart point. Also recorded were six thin and three thick bifaces, two cores and a trimmed flake (scraper?). Four large granite metates were observed on the eastern margin of the site. Chronological placement for this site is Early Archaic through Late Prehistoric.

Comments: The diversity and amount of tools and debris at this site suggest a more intensive habitation than in most other sites in the Park. The small burned rock midden is the only one which was encountered on the survey. Shovel testing revealed copious amounts of black soil, burned rock and lithic debitage in the midden area, and a depth of deposit of about 75 cm. The midden had a diameter of about three m and was roughly circular in shape. Other areas of the site showed similar deep cultural deposit, with lighter soil color and much less burned rock. This site is recommended for nomination to the National Register of Historic Places.

41 LL 312

Location: The site is located on the northwest bank of Walnut Spring Creek, just south of the northern Park boundary fence. Elevation is 1460 to 1470 ft.

Dimensions: 20 X 27 meters.

Environment: The site lies within the riparian association, with a thick stand of mesquite and live oak. There is a thick, short grass cover; soil is a sandy loam.

Site Description: A very light density lithic scatter, including a thin biface fragment and a perforator (made on a unifacially retouched flake), was present.

Comments: CAR-UTSA shovel testing revealed a light density cultural deposit to a depth of 30 cm. No recommendations for further work are made.

41 LL 313

Location: The site is situated on top of an uplands hill, in the northwest corner of the Park.

Dimensions: 13 X 16 meters.

Environment: Within the oak savanna association, brush dominates in this area. Soil is a thin gravelly loam. Several large granite exposures are nearby.

Site Description: A very sparse, small lithic scatter, with a single *Montell* dart point, a thick biface and a bifacially pitted mano, was present. Chronological placement is Late Archaic.

Comments: No testing was done at this site by the field crew. No recommendations are offered at this time.

41 LL 314

Location: The site is situated slightly north of a tributary drainage to Walnut Spring Creek, in the northwestern corner of the Park. Elevation is 1500 to 1510 ft.

Dimensions: 19 X 13 meters.

Environment: The site lies within the oak savanna association. Live oak and brush are separated by large areas of short grass and exposed granite. Soil is a gravel loam.

Site Description: The site is a small, light density lithic scatter. Artifacts observed included a small core remnant and a ground stone fragment.

Comments: No testing was done at this site by the field crew. No recommendations are made.

41 LL 315

Location: The site is located on the north bank of a tributary drainage to Walnut Spring Creek, in the northwest corner of the Park.

Dimensions: 34 X 28 meters.

Environment: The site lies within the oak savanna association. Scattered stands of live oak and brush are spaced by large expanses of short grass and granite outcrops.

Site Description: The site is a moderate lithic scatter, including a mano and metate, an unclassified dart point fragment, a small hammerstone and two thin biface fragments. Chronological placement is Archaic.

Comments: No recommendations are made. No testing was done by the field crew.

41 LL 316

Location: The site is situated on the northwest bank of Walnut Spring Creek, near the northern Park boundary fence. Elevation is 1460 to 1480 ft.

Dimensions: 129 X 41 meters.

Environment: The site lies within the riparian association. Post oak and persimmon dominate.

Site Description: The site consists of a light density lithic scatter which conforms to the shape of the creek bank. Cultural material observed includes three tested cobbles, two small cores, a unifacial scraper, a mano, a metate, an unclassified ground stone fragment and a thin biface fragment. Chronological assignment is Early or Pre-Archaic.

Comments: Two shovel tests revealed a thin cultural stratum at 15 to 20 cm, including a possible hearth and a *Gower* dart point (the two were not associated).

41 LL 317

Location: Situated at the junction of a small tributary drainage and Walnut Spring Creek, at an elevation of ca. 1480 ft., the site is in the northwest corner of the Park.

Dimensions: 14 X 46 meters.

Environment: Located in an oak savanna association, the area consists of stands of live oak spaced by open areas of short grass.

Site Description: The site consists of a light surface scatter of debris and artifacts. Artifacts recorded included a possible *Gower* dart point, a thin biface fragment, two trimmed or retouched flakes and one possible hearth. Chronological assessment of this site is Early or Pre-Archaic.

Comments: No testing was done at this site. Erosion is fairly heavy. Monitoring the progress of this erosion is recommended.

41 LL 318

Location: The site is located on the southern bank of a tributary drainage to Walnut Spring Creek, in the northwest corner of the Park. Elevation is 1490 ft.

Dimensions: 12 X 16 meters.

Environment: Lying within the oak savanna association, live oak and post oak dominate this area. Soil here is a gravel loam.

Site Description: The site consists of a light density lithic scatter, including an unclassified ground stone fragment, two thick biface fragments and a retouched flake. Chronological estimation of this site is not possible at present.

Comments: No testing was done at this site. No recommendations are offered at this time.

41 LL 319

Location: The site is situated on the north bank of a small side drainage to Walnut Spring Creek, within the northwest corner of the Park. Elevation is 1490 to 1500 ft.

Dimensions: 12 X 16 meters.

Environment: The area has elements of the oak savanna and mesquite grassland associations. Soil is a gravel loam.

Site Description: The site is a compact, moderate density scatter, including one *Bulverde* dart point and a bifacial mano fragment. Associated with the scatter are three hearths, eroding out on the surface. Chronological placement of the site is Archaic.

Comments: No testing was done at this site. It is recommended that the site be monitored for further erosional damage.

41 LL 320

Location: The site is situated on the north terrace of Walnut Spring Creek, in the northwest corner of the Park. Elevation is ca. 1510 ft.

Dimensions: 13 X 18 meters.

Environment: Lying within the riparian association, live oak, black hickory and persimmon dominate the site area.

Site Description: The site is defined as a light lithic scatter on what may be a fossil terrace of Walnut Spring Creek. Artifacts associated with this scatter included an unclassified dart point, a thin biface fragment and a retouched flake. Chronological assignment is Archaic.

Comments: No recommendations are offered at this time. No testing was done at this site.

41 LL 321

Location: The site is on the north bank of Walnut Spring Creek, near the western Park boundary. Elevation is ca. 1500 ft.

Dimensions: 68 X 14 meters.

Environment: The site is located within the riparian association. Oak and persimmon dominate.

Site Description: The site consists of a linear scatter of debris and artifacts along the creek bank. Artifacts observed include a *Fresno* arrow point, a small core, two thin and two thick bifaces and a retouched flake graver. Chronological assignment is Late Prehistoric.

Comments: No recommendations for the site are offered at present. The site was not tested.

41 LL 322

Location: The site is located on a soil-capped granite exposure south of Walnut Spring Creek, in the northwest corner of the Park.

Dimensions: 24 X 35 meters.

Environment: The site lies within the oak savanna association. Soil is a shallow gravel loam.

Site Description: The site consists of small scattered concentrations of lithic debris and artifacts. Artifacts recorded at this site include a thin biface fragment and retouched flake. Chronological assignment for the site cannot be made at this time.

Comments: A small flake concentration was noted on the western margin of the site, exposed on bedrock. If this scatter is not of recent origin, it would indicate that the site is undergoing extreme erosion. No recommendations for further work are offered at this time. The site was not tested.

41 LL 323

Location: The site is positioned on a small granite hill west of Enchanted Rock, at an elevation of 1580 ft.

Dimensions: 62 X 75 meters.

Environment: The site is within the oak savanna association, with small live oak, grass and yucca. Soil is a gravelly loam.

Site Description: The site consists of a sparse lithic scatter, including a *Pedernales* point, a dart point fragment (possible *Nolan* type), two cores, an unclassified ground stone fragment and a thick biface. Chronological placement is Middle and, possibly, Early Archaic.

Comments: Erosion associated with this site is severe, and the context of the observed artifacts is uncertain. No recommendations are offered. The site was not tested.

41 LL 324

Location: The site is located on a small granite hill west of Little Rock, at an elevation of 1590 ft.

Dimensions: 14 X 22 meters.

Environment: The site is part of the oak savanna association. Plants are localized, mostly small live oak and yucca. Soils are thin and gravelly; granite exposures are large and frequent.

Site Description: The site is comprised of a small scatter of flakes and two core-choppers. No chronological assessment can be given at this time.

Comments: No recommendations are made at this time. No testing was done at this site.

41 LL 325

Location: The site is located in an erosional gully which runs northwest into Walnut Spring Creek, in the northwest section of the Park. Elevation is ca. 1510 ft.

Dimensions: 39 X 40 meters.

Environment: The site is in the oak savanna association. Post oak are dominant in this area.

Site Description: This site is composed of a sparse flake scatter, with the following associated artifacts: a thick biface fragment, a mano and a metate fragment. No chronological assignment can be made at this time.

Comments: No testing was done at this site. There are no recommendations for further work.

41 LL 326

Location: The site is situated on the east bank of an erosional drainage leading north to Walnut Spring Creek.

Dimensions: 23 X 16 meters.

Environment: The site is within the oak savanna association. Post oak and blackjack oak are dominant in this area.

Site Description: The site is composed of a compact, sparse lithic scatter, including a possible *Angostura* dart point base and two cores. The dart point exhibits fine flaking and lightly ground basal edges. Chronological estimate is tentatively Late Paleo-Indian.

Comments: This site may be associated with site 41 LL 327, just to the north on the same erosional feature. Due to the possible great antiquity of this site, continued monitoring is recommended.

41 LL 327

Location: The site is located on the east bank of a large erosional gully running north to Walnut Spring Creek. Elevation is 1500 ft.

Dimensions: 16 X 34 meters.

Environment: The site is within the oak savanna plant association. Oaks and hickory are dominant. Soil is a gravelly loam.

Site Description: The site consists of a sparse lithic scatter, including a single thin biface fragment and an unclassified ground stone fragment.

Comments: This site may be associated with 41 LL 326, which is just south of this site. No recommendations are offered. This site was not tested.

41 LL 328

Location: The site is situated on the southeast bank of Walnut Spring Creek, at the confluence of a very large erosional drainage and the creek. Elevation is 1480 ft.

Dimensions: 34 X 42 meters.

Environment: The site is within the riparian association. Oak and hickory dominate the vegetation.

Site Description: The site consists of a light density lithic scatter, visible primarily in the eroded creek bank. A very small unclassified dart(?) point was observed, as well as a *Bos*-sized rib fragment. One small hearth was found associated with this scatter, eroding out of the cut bank at ca. 17 cm. Chronological placement is tentatively Late Archaic.

Comments: Two shovel tests produced extremely sparse cultural remains. No recommendations are offered at this time.

41 LL 329

Location: The site is located on the southeastern bank of Walnut Spring Creek, in the northwestern section of the Park. Elevation is ca. 1480 ft.

Dimensions: 146 X 45 meters.

Environment: The site is within the riparian association. Dominant plants are oak, persimmon and grasses. Soil is a sandy, gravel loam.

Site Description: The site consists of scattered concentrations of lithic debris and artifacts. These concentrations may represent horizontal components, or differences in erosion, and concomitant exposure of cultural materials. Artifacts recorded include four thin biface fragments, a *Fresno* arrow point and a core. Chronological assignment is Late Prehistoric.

Comments: No recommendations are made. Shovel testing revealed very sparse subsurface materials.

41 LL 330

Location: The site is southeast of Walnut Spring Creek, in the northwest section of the Park, roughly placed at the juncture of the lower pediment flats and the uplands. Elevation is ca. 1480 ft.

Dimensions: 73 X 70 meters.

Environment: The site is within the riparian association. The dominant plants are live oak and grasses. Soil is a gravel loam.

Site Description: The site consists of a moderate to dense scatter of debitage and artifacts. Artifacts recorded include two unclassified dart points, an *Edwards* arrow point, a *Nolan* dart point and one *Pedernales* dart point. Also noted were three bifacial manos, a core-chopper, and one thin and three thick biface fragments. A fragment of a hematite cobble was also noted. Chronological assignment is Early Archaic to Late Prehistoric.

Comments: Large areas of the site are badly eroded, and there is a strong possibility that much of this material is disturbed from an *in situ* context farther upslope. This site may be related to 41 LL 331, upslope and south of this site.

41 LL 331

Location: The site is on a sloping upper pediment south of Walnut Spring Creek, near site 41 LL 330.

Dimensions: 53 X 31 meters.

Environment: The site is in the oak savanna association. Soil is a gravel loam.

Site Description: A sparse lithic scatter, with two thin bifaces, a uniface fragment and a small core, is present.

Comments: No recommendations for further work are made. No testing was done at this site. The site is possibly related to 41 LL 330.

41 LL 332

Location: The site is located on the west bank of a southern tributary drainage to Walnut Spring Creek. The site is in the north central area of the Park, at an elevation of 1450 to 1470 ft.

Dimensions: 109 X 36 meters.

Environment: The site is in the oak savanna association. Oaks dominate this area. Soils are stony but deep in places.

Site Description: The site consists of a light to moderate density lithic scatter in eroded areas along the drainage cut bank. Artifacts recorded include two chopper-cores, a retouched flake graver, a small, thin triangular biface fragment (dart point or drill?) and a thin biface tip. Chronological assignment is Archaic.

Comments: Shovel and auger testing revealed a buried component at the western edge of the site, where augering produced an *Ensor*-like point. Cultural material ranged from a depth of 30 cm at the eastern margin of the site to 85 cm on the western end.

41 LL 333

Location: The site is located on the east bank of a large tributary drainage leading north to Walnut Spring Creek, at an elevation of 1450 ft.

Dimensions: 60 X 38 meters.

Environment: The site lies within the oak savanna association. Oaks are dominant. Soil is a gravel loam.

Site Description: The site is a light to moderate lithic scatter, including a dart point base (*Pedernales* or *Gower*?), an unclassified ground stone fragment, two thin biface fragments, one thick biface fragment and three cores. Chronological assignment is Archaic.

Comments: No recommendations are offered at present.

41 LL 334

Location: The site is located within the north-central area of the Park, on the west bank of a large tributary drainage leading north to Walnut Spring Creek.

Dimensions: 10 X 16 meters.

Environment: Lying within the oak savanna association, the site area is within a relatively heavily wooded area. Soil is a gravel loam.

Site Description: The site is composed of a few flakes and two hearths eroding out of the drainage cut bank.

Comments: A shovel test near the hearths revealed a light density cultural deposit to ca. 30 cm below surface. No recommendations are offered at this time.

41 LL 335

Location: The site is located between two branching drainages which lead north to Walnut Spring Creek. Elevation is ca. 1460 to 1470 ft.

Dimensions: 25 X 52 meters.

Environment: The site is within the oak savanna association. Dominant plant types are oaks and short grass. Soil is a gravelly loam.

Site Description: The site consisted of a sparse, diffuse scatter of flakes, one thin triangular biface fragment and a possible retouched flake graver. No chronological assignment is possible at present.

Comments: Shovel testing revealed a light density cultural deposit to 10 cm below surface. No recommendations are given at this time.

41 LL 336

Location: The site is situated on the east bank of the feeder stream running into Moss Pond, north of Little Rock. Elevation is ca. 1510 ft.

Dimensions: 73 X 29 meters.

Environment: Lying within the oak savanna association, live oak and short grass are dominant. Soil is a gravel loam.

Site Description: The site consists of a very sparse lithic scatter, with two thin biface fragments and a small core. No chronological assignment can be made for the site at present.

Comments: One shovel test revealed a single flake in 45 cm of excavation. No recommendations are offered at this time.

41 LL 337

Location: The site is located in and around a small drainage channel east-northeast of Moss Lake. Elevation is 1480 to 1490 ft.

Dimensions: 64 X 22 meters.

Environment: The site is in the oak savanna association. Oaks and short grasses are dominant.

Site Description: The site was observed as a linear scatter of light density, including two unclassified dart points, two thin bifaces and an unclassified ground stone fragment. Chronological placement is Archaic.

Comments: No recommendations are offered at this time. Auger testing at this site produced very sparse subsurface cultural material.

41 LL 338

Location: The site is located on the east bank of a small tributary drainage leading north to Walnut Spring Creek. Elevation is ca. 1480 ft.

Dimensions: 33 X 34 meters.

Environment: The site is in the oak savanna association. Dominant plant types are live oak and short grasses. Soil is a gravel loam.

Site Description: The site consists of a light to moderate density lithic scatter exposed in eroded areas near the drainage cut bank. Artifacts recorded include an *Edgewood* dart point, a unifacial mano fragment and five thin bifaces and biface fragments. Chronological assignment is Late Archaic.

Comments: No recommendations are offered at this time. No testing was done at this site.

41 LL 339

Location: The site is positioned due north of Enchanted Rock in the rolling uplands of the north-central area of the Park. Elevation is ca. 1500 ft.

Dimensions: 23 X 38 meters.

Environment: The site is within the oak savanna association. Scattered oaks and short grasses typify this area. Soil is a gravel loam.

Site Description: The site consists of a very sparse, small lithic scatter which includes a *Darl* or *Yarbrough* dart point, one thin and one thick biface, a tested cobble and a retouched flake. Chronological assignment is Late Archaic.

Comments: No testing was done at this site. No recommendations are made.

41 LL 340

Location: The site is situated on a soil-capped granite ridge north of Enchanted Rock, at an elevation of 1440 to 1460 ft.

Dimensions: 99 X 83 meters.

Environment: The site is in the oak savanna association, dominated by live oak and short grass. Soil is a stony loam.

Site Description: The site consists of these poorly defined concentrations of flakes and artifacts, designated A, B and C in the field. Cultural material density is sparse in all three areas. The artifact inventory for the three areas is as follows:

Area A: Two choppers, one thick biface, a retouched flake.

Area B: One *Yarbrough*(?) dart point, one bifacial mano, one thick biface.

Area C: One chopper, one hammerstone, one thick and one thin biface and a core.

Chronological assignment for Area B is tentatively Late Archaic.

Comments: Because of the sparse, diffuse nature of these areas, it is difficult to assess the relationship between them. Due to their proximity, it was decided to combine the three areas into a single site. No testing was done here, and no recommendations are offered.

41 LL 341

Location: The site is situated on a southeast exposed slope north of Enchanted Rock, at an elevation of ca. 1420 to 1430 ft.

Dimensions: 73 X 33 meters.

Environment: The site lies within the oak savanna association. Dominant plants are live oak, yucca and short grasses. Soil is a rocky loam.

Site Description: The site consists of a light scatter of burned rock and flakes, with the following artifacts: a metate fragment, a mano fragment, two unclassified ground stone fragments, two thin bifaces and a small core. No chronological placement can be given at this time. A possible hearth was found associated with this site.

Comments: The site is undergoing severe erosion. A seldom-used portion of the Park road crosses the site. No recommendations are made. The site was not tested.

41 LL 342

Location: The site is situated on the northern bank of a small gully due north of Buzzard's Roost. Elevation is ca. 1440 ft.

Dimensions: 45 X 42 meters.

Environment: The site is in the oak savanna association. Oaks and black hickory are dominant. Soil is a gravelly loam.

Site Description: The site consists of a light to moderate lithic scatter, including a sandstone abrader, a bifacial mano fragment, three thin biface fragments and an unclassified dart point fragment. Chronological placement of the site is Archaic.

Comments: The site is well protected from erosion by a covering of forest litter. No recommendations are made.

41 LL 343

Location: The site is on a soil-covered slope at the northwestern base of Buzzard's Roost, at an elevation of ca. 1460 ft.

Dimensions: 63 X 69 meters.

Environment: The site lies within the oak savanna association. Dominant plants are prickly pear and persimmon. Soil is a thin, rocky loam.

Site Description: The site is a light density scatter of lithics, including three choppers, a tested cobble, one core, a thin biface fragment and three retouched flakes. No chronological assignment can be made for the site at present.

Comments: No recommendations are offered at this time.

41 LL 344

Location: The site is located west of Sandy Creek and northeast of Turkey Peak, at an elevation of 1380 to 1400 ft.

Dimensions: 172 X 50 meters.

Environment: The site is within the riparian association, with a thick stand of live oak and persimmon. Soil is a gravelly loam.

Site Description: The site consists of a sparse lithic scatter with numerous tested cobbles, two core-choppers, one mano fragment and a thick biface.

Comments: The numerous tested cobbles are inferred to be the result of lithic raw material selection. One possible function of the site is that of a quarry. Auger testing revealed a sparse subsurface cultural deposit.

41 LL 345

Location: The site is located on a flat-topped high ridge which extends northeast from Turkey Peak, at an elevation of 1490 to 1500 ft.

Dimensions: 80 X 73 meters.

Environment: The site lies within the oak savanna association; persimmon, brush and grasses dominate. Soil is a thin rocky loam.

Site Description: The site consists of a very sparse lithic scatter, including a single core, a quartz crystal and a pitted mano. No chronological estimate can be given at present.

Comments: The site was not tested. No recommendations are offered at this time.

41 LL 346

Location: This is a linear site at the eastern base of Buzzard's Roost. Elevation is ca. 1400 ft.

Dimensions: 74 X 23 meters.

Environment: The plants in the area are of both the riparian and oak savanna associations. Oak and persimmon dominate. Soil is a gravel loam.

Site Description: The site consists of a linear scatter of artifacts and debris conforming to the eastern base of Turkey Peak. Much of this material could be washed in from primary contexts upslope on Turkey Peak, but inspection of the slope revealed no visible lithic scatters or sites to support this possibility. Artifacts recorded here include a *Pedernales* and a possible *Fairland* dart point, a cobble hammerstone, two choppers, two cores, unclassified ground stone, three thin and one thick biface and at least two bedrock metates. Chronological placement of this site is Middle to Late Archaic.

Comments: Two shovel tests revealed a light density cultural deposit to ca. 45 cm below the surface. No recommendations are offered at present.

41 LL 347

Location: The site is situated on a flat lower pediment southeast of Buzzard's Roost, northwest of Sandy Creek. Elevation is ca. 1360 to 1370 ft.

Dimensions: 21 X 25 meters.

Environment: The site lies within the riparian association. The site area is heavily wooded. Soil is a sandy loam.

Site Description: The site is primarily buried, with occasional flakes or artifacts visible in small animal disturbances. A small, expanding-stemmed arrow point was recorded here, as well as a thin biface fragment and a single core. Chronological assignment is Late Prehistoric.

Comments: A single shovel test at this site revealed a sparse but deep cultural deposit (to 75 cm). The site is well protected from erosion and collection. No recommendations are offered at this time.

41 LL 348

Location: The site is situated on a forested lower pediment area southeast of Buzzard's Roost, northwest of Sandy Creek. Elevation is ca. 1380 ft.

Dimensions: 8 X 7 meters.

Environment: The site lies in the riparian association. The site area is forested by hickory, oak and buckeye. Soil is a deep gravelly loam.

Site Description: Part of the site is exposed in a small eroded area near two large boulders. A major portion of the site is buried deeply by colluvium. Only one artifact, a thick biface, was recorded at the site. No chronological assignment can be given at this time.

Comments: A shovel test at this site revealed profuse cultural debris to a depth of 85 cm below surface. An association between this site and nearby site 41 LL 254 is suspected, but cannot be demonstrated at this time. The site is recommended for nomination to the National Register of Historic Places.

41 LL 349

Location: The site is situated on a low "shoulder" of Enchanted Rock, north of the Spencer site (41 LL 76) and the current Park headquarters. Elevation is 1460 to 1480 ft.

Dimensions: 27 X 33 meters.

Environment: The site is part of the granite rock association, with thin soil and localized brush and grass cover. Granite boulders and outcrops are common.

Site Description: The site consists of a moderate lithic scatter, including a *Fresno* arrow point, a core-chopper, a thin biface fragment and a retouched flake. Chronological placement is Late Prehistoric.

Comments: The site is severely eroded and probably has also been collected; it is bisected by a main trail to the summit of Enchanted Rock. Monitoring of this site is recommended. Mitigation of this site should be considered.

41 LL 350

Location: The site is very near site 41 LL 349, on a small "shoulder" of Enchanted Rock.

Dimensions: 36 X 39 meters.

Environment: The site is part of the granite rock association, with thin soil and localized brush and grass cover. Granite boulders and outcrops are common.

Site Description: The site consists of a light lithic scatter, including a thin biface fragment and a mano fragment. No chronological assessment is possible at present.

Comments: This site is heavily eroded and probably collected (a hiking trail passes through the site). No recommendations are made at present.

41 LL 351

Location: The site is situated on an upper pediment on the southeastern slope of Freshman Mountain, at an elevation of 1430 to 1470 ft.

Dimensions: 34 X 61 meters.

Environment: The site lies within the oak savanna association, with small oaks and grass dominant. Soil here is thin gravel loam.

Site Description: The site consists of a light to moderate lithic scatter. No artifacts were observed at this site.

Comments: No testing was done at this site. No recommendations are offered at this time.

TABLE 2. ISOLATED FINDS FROM ENCHANTED ROCK STATE PARK

ISOLATED FINDS (IF) #	SPECIMEN(S)	COMMENTS
1.	1 uniface	
2.	1 core and 1 uniface	
3.	1 uniface; 1 ground stone frag. and 1 core frag.	
4.	2 thick bifaces	associated with a few flakes
5.	1 ground stone frag. (bifacial)	
6.	1 thick biface frag.	
7.	1 biface frag.	
8.	1 *Nolan* dart point	
9.	1 *Marshall* dart point; 2 bifaces; 1 core	all specimens probably redeposited
10.	1 biface	
11.	1 metate frag.	
12.	1 thick biface	
13.	1 thick biface	
14.	1 retouched flake	associated with less than 10 flakes
15.	1 core-chopper	associated with a few flakes
16.	1 thick biface frag.	
17.	1 metate frag.	17, 18 all close together and associated with a few flakes
18.	1 miscellaneous ground stone frag.	
19.	1 bifacially retouched flake	
20.	1 uniface	
21.	1 mano	
22.	1 biface	associated with a few flakes
23.	1 retouched flake	
24.	1 uniface frag.	
25.	1 core frag.	
26.	1 ground stone frag.	
27.	1 uniface	
28.	1 metate frag.	
29.	1 *Perdiz* arrow point	
30.	1 biface frag.	
31.	1 biface frag.	
32.	1 core	
33.	1 *Ensor* dart point	
34.	1 bifacial core	possibly a core-chopper
35.	1 thick biface	
36.	1 *Marcos* (?) dart point	
37.	1 thick biface	
38.	1 core-chopper	

TABLE 2. (continued)

ISOLATED FINDS (IF) #	SPECIMEN(S)	COMMENTS
39.	1 thin biface	
40.	1 bifacial core frag.	
41.	1 possible hearth	eroding out of stream bank
42.	1 thin biface	
43.	1 grooved and pitted ground stone	
44.	1 pitted stone (bifacially)	
45.	1 small projectile point (*Edgewood*?)	45, 46 close together
46.	1 chopper	with a few flakes
47.	1 thick biface	
48.	1 chopper	
49-52.		all specimens made into 41 LL 323
53.	1 retouched flake	associated with a few other flakes
54.	1 thick biface (core?)	54, 55, 56, 57 - all
55.	1 thick biface	specimens within several
56.	1 core	meters of each other in
57.	1 core frag.	an eroded area
58.	1 thin biface frag.	
59.	1 thin biface (possible drill)	associated with a few flakes
60-62.		part of 41 LL 323
63.	1 core	63, 64 located close
64.	1 biface (core?)	together
65.	1 core	
66.	1 chopper and 1 retouched flake	
67.	1 thin biface frag.	associated with a few flakes
68.	1 thin biface frag.	
69.	1 biface frag.	
70.	1 core/hammerstone	70, 71 located close to-
71.	1 biface frag.	gether with ca. 10 flakes
72.	1 retouched flake (unifacial)	
73.	1 core	
74.	1 biface and 1 core frag.	associated with 2 flakes
75.	1 biface	
76.	1 core/tested cobble	
77.	1 core	

TABLE 2. (continued)

ISOLATED FINDS (IF) #	SPECIMEN(S)	COMMENTS
78.	1 *Frio*? dart point	
79.	1 uniface	
80.	1 thin biface frag.	
81.	1 *Frio*? dart point	
82.	1 thin biface	associated with 4-5 flakes
83.	1 biface	
84.	1 chopper	
85.	1 mano frag.	
86.	1 chopper	
87.	1 retouched flake	associated with 6 flakes
88.	1 mano frag. and 1 miscellaneous ground stone frag.	associated with 2 flakes
89.	1 thin biface	
90.	1 *Nolan* dart point	associated with 3 flakes
91.	1 thick biface	
92.	1 mano frag.	
93.	1 mano frag.	
94.	1 biface frag.	
95.	1 metate frag.	
96.	1 thin biface	
97.	1 thin biface	
98.	1 thin biface	
99.	1 core-chopper	
100.	1 thick biface	
101.	1 retouched flake	
102.	1 core/tested cobble	
103.	1 core frag.	
104.	1 thin biface frag.	104, 105 associated with 5-6 flakes
105.	1 retouched flake	
106.	1 *Ensor* dart point	106, 107 associated with a few flakes
107.	1 thin biface	
108.	1 mano	
109.	1 ground stone frag.	
110.	1 mano	
111.	1 tested cobble	associated with a few flakes
112.	1 unclassified dart point	badly burned specimen
113.	flake scatter	ca. 10 flakes associated with IF-112
114.	1 tested cobble	
115.	1 *Pedernales* dart point	115, 116 associated with 4-5 flakes
116.	1 small biface	

TABLE 2. (continued)

ISOLATED FINDS (IF) #	SPECIMEN(S)	COMMENTS
117.	1 unclassified dart point	
118.	1 core frag.	
119.	1 hematite chunk	has possible ground surface
120.	1 ground stone frag.	
121.	1 core	
122.	1 core	
123.	1 tested cobble	
124.	1 core	
125.	1 thick biface	125, 126 close together and associated with 5 flakes
126.	1 thick biface frag.	
127.	1 retouched flake	
128.	1 retouched flake	128, 129, 130 located close together
129.	1 core	
130.	1 thin biface	
131.	1 thick biface frag.	
132.	1 ground stone frag.	
133.	1 *Fresno*? arrow point	formerly 41 LL 269
134.	1 thin biface frag.	
135.	1 unclassified dart point	
136.	1 *Pedernales* dart point	
137.	1 unclassified dart point	
138.	1 *Marshall*? dart point	formerly 41 LL 258
139.	1 biface frag.; 1 mano	formerly 41 LL 273
140.	1 thin biface (dart point?)	
141.	flake scatter	ca. 10 flakes in dirt road
142.	1 biface; 1 possible hearth	associated with a few flakes; formerly 41 LL 283

TESTING RESULTS

In order to further evaluate the sites encountered during the surface survey, three forms of subsurface excavation were utilized: 1-m^2 excavation units, small shovel tests and auger testing. A 1-m^2 excavation unit was placed in each of two terrace sites along Sandy Creek; several sites were tested by the smaller shovel tests; and over 200 auger test holes were extended along Sandy Creek and along a small portion of the Walnut Spring Creek drainage.

Shovel Tests

The shovel tests (ST) were excavated in the same manner as a larger unit would be excavated. The diameter of each was 30 cm. Arbitrary 15-m levels were dug at all sites except 41 LL 76, where 10-m levels were used. No shovel tests were deeper than 85 cm. All soil was screened through 1/4-inch mesh screen; excavation information was recorded and any artifacts found in place were provenienced (Fig. 5).

The sites that were shovel tested were usually located near other sites that warranted some type of subsurface test. By testing sites that were located close together, the investigators were able to efficiently gather information about specific sites, along with sites of possibly less importance but in close proximity to a particular site(s) of interest. This method of testing clusters of sites enabled many more sites to be tested than some other process would have allowed.

Of the 120 sites found during the survey, a total of 53 (44%) sites received at least one shovel test. In order to illustrate the intensity of this testing, Table 3 provides a breakdown of the number of shovel tests placed in tested sites, indicating that a total of 133 shovel tests was placed in the 53 sites.

TABLE 3. QUANTITY OF SHOVEL TESTS IN TESTED SITES

No. of Shovel Tests:	1	2	3	4	5	6	7	13
No. of Sites Tested:	20	15	7	5	2	2	1	1
% of Tested Sites:	38	28	13	9	4	4	2	2

The information provided by the shovel testing was two-fold. It gave the investigators an understanding of the depth of cultural material in the sites, and the few artifacts found provided specific chronological information for

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some of the sites. Table 4 inventories the cultural material recovered from the shovel tests. Four sites shovel-tested had chronologically diagnostic artifacts. These artifacts included: an *Angostura* dart point (Fig. 6,h); a *Gower* dart point (Fig. 6,g); a *Pedernales* dart point (Fig. 6,f); a *Marcos* dart point (Fig. 6,d); and a *Perdiz* dart point (Fig. 6,a).

Auger Tests

The use of a mechanical earth auger in selected portions of the Park enabled the investigators to further delineate and evaluate archaeological deposits. A primary segment of the Park that was tested by auger was along the terraces and flats of Sandy Creek. A small upland area was tested along with a limited amount of the Walnut Spring Creek drainage area (Fig. 5). A total of 217 auger test holes was dug; of those, 102 tests contained one chert flake or more. All materials were screened through 1/4-inch mesh screen. The depth range of the auger tests was between 10 cm and 80 cm, with an average of 55 cm depth. The types of soils encountered ranged from hard, dry clay to wet, sticky clay; and from dry, gravelly loam to moist and usually gravelly loam. A total of eight whole and fragmented artifacts was found by auger testing. One, a thick biface fragment (Fig. 6,e), was from a test on a terrace of Sandy Creek; another biface, possibly a point preform (Fig. 6,b), was from an auger test at 41 GL 92, also along Sandy Creek. An unclassified dart point (Fig. 6,c) was found at 41 LL 332 along Walnut Spring Creek drainage. The proveniences of these artifacts and all other recovered materials from the auger tests are provided in Table 5.

The locations of auger tests are illustrated in Fig. 5. The specific auger test numbers are not provided on the map but are given in Table 5. All pertinent locational data for the auger testing is on file at the Center for Archaeological Research, The University of Texas at San Antonio, and at the Texas Parks and Wildlife Department.

Excavation Units

Sites 41 LL 76 and 41 LL 254 were tested additionally by digging one excavation unit at each site. Both sites had been shovel tested, and it was decided that, in order to further evaluate their archaeological significance, more detailed examination was necessary. The excavation units were 1 m^2 and were dug in arbitrary 10-cm levels. All materials were screened through 1/4-inch mesh screen. Artifacts and features were recorded; some of these were photographed in place. All materials were collected.

A contour map was prepared for each site with the use of a transit and stadia rod. All shovel tests and excavation units were located on the map, along with any obvious surface disturbances.

Soil samples (constant volume) were taken from the northeast corner of each level of the excavation units. These samples provided the soil for a constant

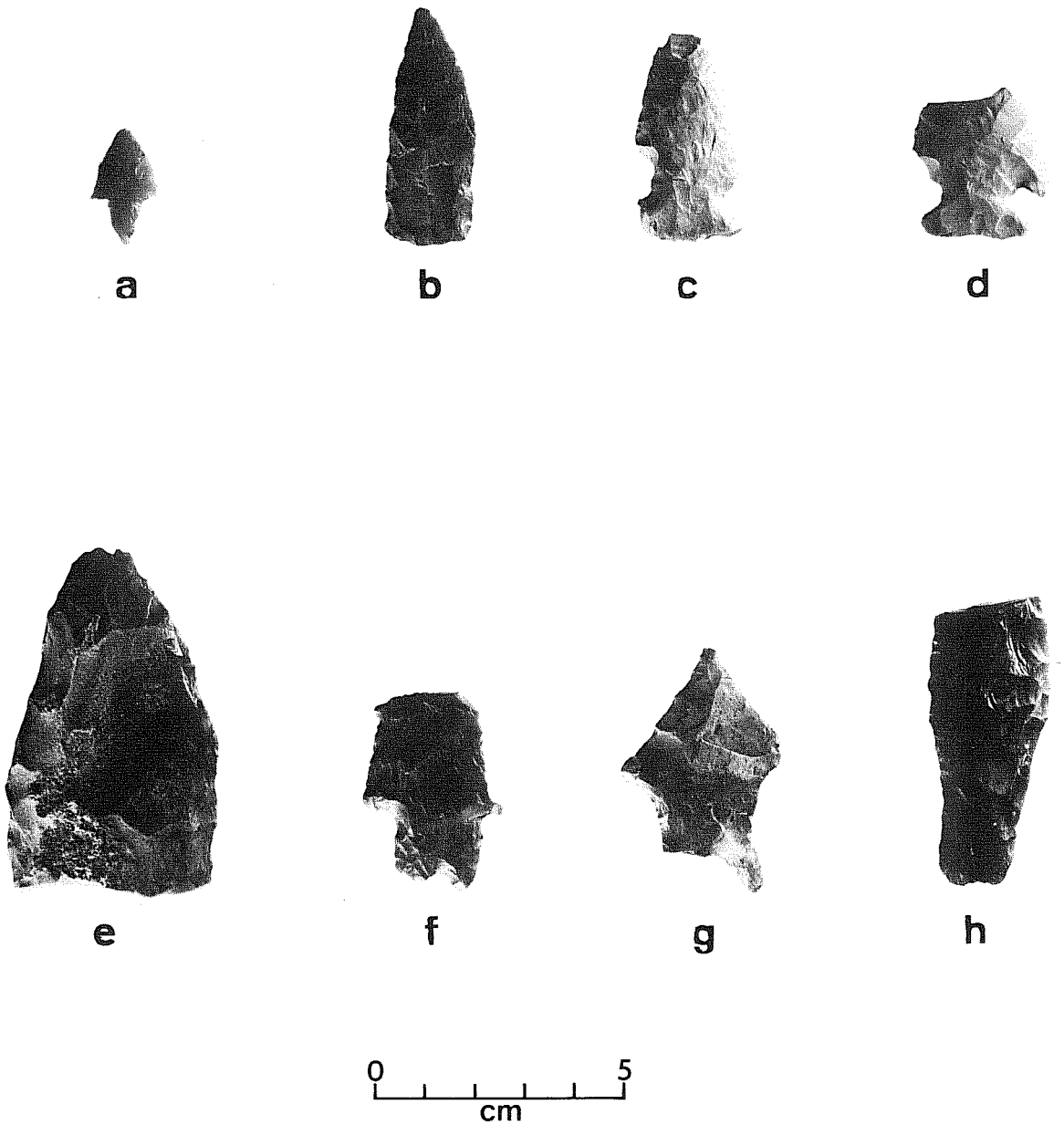

Figure 6. *Lithic Artifacts from Shovel and Auger Tests*. a, *Perdiz*; b, preform; c, unclassified dart point; d, *Marcos*; e, thick biface fragment; f, *Pedernales*; g, *Gower*; h, *Angostura*.

TABLE 4. SUBSURFACE LITHICS RECOVERED FROM SHOVEL-TESTED SITES

Site/STs*	Quantity of Items Recorded: Debitage Count	Artifacts	Primary Vertical Distribution	Total Depth of Test (Termination)
41 GL 57				
ST-1	7	1 retouched flake	0-15 cm	40 cm (bedrock)
ST-2	10		0-30 cm	30 cm (clay & gravel)
41 GL 59				
ST-1	26		0-60 cm	60 cm (water table)
41 GL 60				
ST-1	57		0-45 cm	60 cm (gravel)
41 GL 65				
ST-1	4		0-30 cm	60 cm (bedrock/gravel)
ST-2	4		0-15 cm	60 cm (bedrock/gravel)
ST-3	0		--	60 cm (bedrock/gravel)
ST-4	0		--	60 cm (bedrock/gravel)
ST-5	4	1 ground stone frag.	0-45 cm	60 cm (bedrock/gravel)
ST-6	1		0-15 cm	60 cm (bedrock/gravel)
41 GL 69				
ST-1	2		15-30 cm	45 cm (sterile)
41 GL 71				
ST-1	15	1 retouched flake	0-60 cm	75 cm (bedrock)
ST-2	20	1 utilized flake 1 retouched flake	0-45 cm	60 cm (sterile)
ST-3	37		0-40 cm	45 cm (clay/gravel)
ST-4	30	1 utilized flake	0-75 cm	80 cm (probably sterile)
ST-5	8		0-15 cm	40 cm (bedrock)
41 GL 73				
ST-1	50		0-30 cm	35 cm (bedrock)
41 GL 74				
ST-1	0		--	30 cm (sterile)

*All shovel tests were 30 cm in diameter.

TABLE 4. (continued)

Site/STs	Quantity of Items Recorded: Debitage Count	Artifacts	Primary Vertical Distribution	Total Depth of Test (Termination)
41 GL 75				
ST-1	9		0-15 cm	30 cm (bedrock)
ST-2	31		0-30 cm	45 cm (sterile)
ST-3	3		30-60 cm	75 cm (sterile)
41 GL 76				
ST-1	4		0-15 cm	32 cm (sterile)
ST-2	0		--	17 cm (bedrock)
41 GL 77				
ST-1	8		0-60 cm	75 cm (sterile)
41 GL 78				
ST-1	2	2 retouched flakes 1 biface tip 1 *Angostura* dart point (at 25 cm)	0-30 cm	42 cm (bedrock)
41 GL 87				
ST-1	0		--	30 cm (sterile)
ST-2	0		--	45 cm (sterile)
ST-3	0		--	30 cm (sterile)
41 GL 92				
ST-1	25	1 utilized flake 1 biface tip	0-15 cm	24 cm (bedrock)
ST-2	8		0-15 cm	30 cm (sterile)
ST-3	3		0-15 cm	30 cm (bedrock)
41 GL 94				
ST-1	4		0-15 cm	40 cm (bedrock)
41 GL 96				
ST-1	20	1 ground stone frag.	0-15 cm	30 cm (sterile)
ST-2	1		15-30 cm	43 cm (bedrock)
ST-3	12	1 utilized flake	0-45 cm	60 cm (sterile)
41 GL 97				
ST-1	109	1 utilized flake 1 retouched flake	0-72 cm	72 cm (bottom not reached)
ST-2	57		0-45 cm	60 cm (sterile)
ST-3	11		0-45 cm	60 cm (sterile)
ST-4	82	1 biface fragment	0-60 cm	75 cm (sterile)
ST-5	59		0-30 cm	50 cm (bedrock)
ST-6	22		0-30 cm	60 cm (sterile)

TABLE 4. (continued)

Site/STs	Quantity of Items Recorded: Debitage Count	Artifacts	Primary Vertical Distribution	Total Depth of Test (Termination)
41 LL 76				
ST-1	31	1 biface tip 1 *Perdiz* arrow point	0-10 cm	10 cm (bottom not reached)
ST-2	21		0-20 cm	50 cm (sterile)
ST-3	24		0-10 cm	10 cm (bottom not reached)
ST-4	1		10-20 cm	20 cm (bottom not reached)
ST-5	4		10-20 cm	50 cm (sterile)
ST-6	7	1 retouched flake	0-30 cm	40 cm (sterile)
ST-7	21	1 biface fragment	0-20 cm	40 cm (sterile)
41 LL 201				
ST-1	2		0-15 cm	30 cm (sterile)
ST-2	21	1 retouched flake	0-30 cm	45 cm (sterile)
ST-3	4		0-45 cm	45 cm (bottom not reached)
41 LL 203				
ST-1	10		0-45 cm	60 cm (sterile)
ST-2	6		30-45 cm	60 cm (sterile)
ST-3	2		0-30 cm	30 cm (sterile)
ST-4	3		0-30 cm	45 cm (sterile)
ST-5	1		30-45 cm	45 cm (bottom not reached)
41 LL 205				
ST-1	59		0-30 cm	45 cm (sterile)
ST-2	5		0-15 cm	45 cm (sterile)
ST-3	0		--	45 cm (Sterile)
ST-4	1		0-15 cm	30 cm (sterile)
41 LL 209				
ST-1	2		0-15 cm	45 cm (sterile)
ST-2	0		--	45 cm (sterile)

TABLE 4. (continued)

Site/STs	Quantity of Items Recorded: Debitage Count	Artifacts	Primary Vertical Distribution	Total Depth of Test (Termination)
41 LL 210				
**ST-1	2		15-30 cm	45 cm (sterile)
ST 3	8	1 retouched flake	0-45 cm	60 cm (sterile)
ST-4	6		0-15 cm	60 cm (sterile)
ST-5	1		30-45 cm	45 cm (bottom not reached)
ST-6	18		0-45 cm	60 cm (sterile)
ST-7	5		0-30 cm	45 cm (sterile)
ST-8	1	1 retouched flake	0-15 cm	30 cm (sterile)
ST-9	6	1 biface fragment	0-15 cm	45 cm (sterile)
ST-10	10	1 biface fragment	0-45 cm	45 cm (bottom not reached)
**ST-11	4		0-30 cm	45 cm (sterile)
**ST-13	2		15-30 cm	45 cm (sterile)
**ST-15	6		0-30 cm	45 cm (sterile)
ST-17	1		0-15 cm	35 cm (sterile)
41 LL 241				
ST-1	2		0-17 cm	17 cm (bedrock)
ST-2	5		0-60 cm	75 cm (sterile)
41 LL 253				
ST-1	51		0-50 cm	50 cm (bottom not reached)
41 LL 254				
ST-1	206	1 biface fragment	0-85 cm	85 cm (bottom not reached)
ST-2	26		0-75 cm	75 cm (bottom not reached)
41 LL 256				
ST-1	14		0-15 cm	26 cm (bedrock)
41 LL 264				
ST-1	16		0-30 cm	30 cm (gravel)

**Not all test numbers assigned were excavated.

TABLE 4. (continued)

Site/STs	Quantity of Items Recorded: Debitage Count	Artifacts	Primary Vertical Distribution	Total Depth of Test (Termination)
41 LL 266				
ST-1	50		0-45 cm	60 cm (sterile)
41 LL 267				
ST-1	23	2 biface fragments	0-30 cm	44 cm (bedrock)
41 LL 270				
ST-1	0		--	30 cm (sterile)
ST-2	2		15-45 cm	60 cm (sterile)
41 LL 271				
ST-1	14		0-45 cm	45 cm (bottom not reached)
ST-2	19		0-45 cm	45 cm (bottom not reached)
41 LL 272				
ST-1	4		0-15 cm	45 cm (sterile)
41 LL 273				
ST-1	0		--	73 cm (sterile)
ST-2	0		--	38 cm (sterile)
41 LL 274				
ST-1	0		--	24 cm (sterile)
ST-2	0		--	28 cm (sterile)
ST-3	1		0-15 cm	45 cm (sterile)
41 LL 297				
ST-1	19		0-75 cm	75 cm (bottom not reached)
ST-2	14		0-85 cm	86 cm (bottom not reached)
41 LL 299				
ST-1	0		--	30 cm (sterile)
ST-2	4		0-14 cm	14 cm (bedrock)
41 LL 303				
ST-1	0		--	30 cm (sterile)

TABLE 4. (continued)

Site/STs	Quantity of Items Recorded: Debitage Count	Artifacts	Primary Vertical Distribution	Total Depth of Test (Termination)
41 LL 304				
**ST-1	0		--	45 cm (sterile)
**ST-3	2		0-30 cm	45 cm (sterile)
**ST-5	3		0-15 cm	45 cm (sterile)
ST-7	5		0-30 cm	45 cm (sterile)
41 LL 307				
ST-1	1		0-15 cm	30 cm (sterile)
ST-2	0		--	30 cm (sterile)
41 LL 308				
ST-1	1	1 *Pedernales* dart point	15-30 cm	45 cm (sterile)
ST-2	7	1 *Marcos* dart point (surface)	0-30 cm	45 cm (sterile)
ST-3	0		--	45 cm (sterile)
ST-4	0		--	30 cm (sterile)
41 LL 311				
ST-1	30	1 utilized flake	0-60 cm	75 cm (sterile)
ST-2	7		0-30 cm	45 cm (sterile)
ST-3	124	1 mano fragment	0-75 cm	75 cm (bottom not reached)
ST-4	47		0-15 cm	33 cm (sterile)
41 LL 312				
ST-1	13		0-30 cm	45 cm (sterile)
41 LL 316				
ST-1	6	1 ground stone frag.	0-45 cm	60 cm (sterile)
ST-2	2	1 biface fragment 1 *Gower* dart point (retouched)	0-15 cm	40 cm (sterile)

**Not all numbers assigned were excavated.

TABLE 4. (continued)

Site/STs	Quantity of Items Recorded: Debitage Count	Artifacts	Primary Vertical Distribution	Total Depth of Test (Termination)
41 LL 328				
ST-1	4	1 retouched flake	0-30 cm	60 cm (sterile)
ST-2	1	1 utilized flake	0-30 cm	45 cm (sterile)
41 LL 329				
ST-1	0		--	45 cm (sterile)
ST-2	0		--	45 cm (sterile)
ST-3	4		0-60 cm	60 cm (bottom not reached)
ST-4	6		15-30 cm	45 cm (sterile)
41 LL 332				
ST-1	22		0-30 cm	45 cm (sterile)
ST-2	17		30-85 cm	85 cm (bottom not reached)
41 LL 334				
ST-1	2		15-30 cm	45 cm (sterile)
41 LL 335				
ST-1	3	1 biface fragment	0-15 cm	30 cm (sterile)
41 LL 336				
ST-1	1		15-30 cm	45 cm (sterile)
41 LL 346				
ST-1	7	1 utilized flake 1 biface fragment	0-31 cm	31 cm (bedrock)
ST-2	8		0-45 cm	60 cm (sterile)
41 LL 347				
ST-1	19	2 utilized flakes	0-60 cm	75 cm (sterile)
ST-2	21		0-75 cm	75 cm (bottom not reached)
ST-3	8		15-45 cm	60 cm (sterile)
41 LL 348				
ST-1	216	2 biface fragments 1 utilized flake	30-75 cm	85 cm (bottom not reached)

TABLE 5. SUBSURFACE LITHICS RECOVERED FROM AUGER TESTS

AT	Total Depth (cm)	Site Association	Debitage Count	Artifacts
AT-10	66		3	
14	28	41 LL 300	1	
15	40		1	
16	40		1	
21	43		2	
22	55		2	
25	51		3	
26	44	Near 41 LL 292	3	
27	52	41 LL 297	3	
28	59		5	
30	56		3	
31	57		1	
32	56		3	
33	54		1	
38	75		3	
48	60		2	
50	70	41 LL 293	3	
51	56			1 utilized flake
52	56		5	
53	65		3	
56	50		1	1 thick biface fragment
57	60		1	
58	70		4	
60	72		4	2 biface fragments
61	61		1	
67	78		2	
70	76	41 LL 262	8	
71	65	41 LL 262	2	

TABLE 5. (continued)

AT	Total Depth (cm)	Site Association	Debitage Count	Artifacts
AT-75	51		1	
76	35	41 GL 92	3	1 biface fragment
77	35	41 GL 92	10	1 biface fragment
79	68		2	
81	46	41 GL 75	10	
82	67		1	
87	67	41 GL 69	11	
88	71	41 GL 69	2	
89	66	41 GL 69	4	
91	61	41 GL 71	4	
92	72	41 GL 71	2	
93	55		3	
94	60	41 GL 71	12	
96	70	Assoc. w/ 41 GL 71?	7	1 biface fragment
100	80		1	
101	63		2	
102	51		1	
103	56		2	
107	63		2	
109	44	41 GL 57	3	
110	15	41 GL 57	3	
111	22		2	
114	66		1	
117	59	Near 41 GL 60	1	
120	73		1	
121	43		1	
122	62		2	
123	67		5	
124	75	41 LL 266	10	
125	69	Assoc. w/ 41 GL 60 or 41 LL 266?	7	

TABLE 5. (continued)

AT	Total Depth (cm)	Site Association	Debitage Count	Artifacts
AT-126	63	41 GL 60	2	
127	56	Near 41 GL 60	2	
128	47		2	
129	65		5	
131	66		6	
132	75	Buried cult. dep.?	16	
133	74		3	
135	62	Buried cult. dep.?	9	
136	10		1	
137	70		2	
138	65	Assoc. w/ 41 GL 265?	8	
139	64	41 LL 264	2	
143	54		2	
144	72		1	
147	71		1	
156	39		1	
157	53	41 LL 344	3	
158	58	41 LL 344	1	
160	33		1	
169	45	41 LL 279	1	
170	57	41 LL 210	3	
174	60	41 LL 210	3	1 biface fragment
183	60	41 LL 332	2	
185	60	41 LL 332	1	
187	80	41 LL 332	1	1 unidentified dart point
191	23	Near 41 LL 335	1	
193	43		2	
195	50		1	
196	48		1	
197	56	Assoc. w/ 41 LL 337?	7	

TABLE 5. (continued)

AT	Total Depth (cm)	Site Association	Debitage Count	Artifacts
AT-198	60	Assoc. w/ 41 LL 334?	5	
199	51	Near 41 LL 334	2	
200	56	Assoc. w/ 41 LL 334?	7	
201	71		1	
205	48		1	
206	46	Assoc. w/ 41 LL 337?	7	
207	43	41 LL 337	2	
211	52		3	
214	58		3	
216	32		1	
217	56	41 LL 207	1	

volume analysis (CVS) during the laboratory analysis phase of the project. A column of phytolith samples was taken from a wall of the units at 41 LL 76 and 41 LL 254. Appendix III, by Ralph L. Robinson, reports the results of this analysis from site 41 LL 254. Phytoliths from 41 LL 76 have not been analyzed. All faunal remains for each site were analyzed also. A brief tabulation and inventory is provided for each site.

41 LL 76, THE SPENCER SITE

This site is discussed by Greer (1979), in which he reported that 41 LL 76 has been dug by at least four people at different occasions through the years. The collection described by Greer (*ibid.*), which is probably the largest from the site, was excavated by Bob Spencer of Fredericksburg, Texas.

41 LL 76 is primarily a Late Prehistoric midden overlying a Pleistocene terrace (Glen Evans, personal communication). There is some scanty Archaic association, but it is tenuous. The materials which were recovered by Spencer (Greer 1979) include numerous arrow points, some dart points (not *in situ*), unifaces, bifaces and chipping debitage. Numerous and unusual sherds of pottery were found also, representing several vessels. The pottery is described in Greer (1979) and is also described and illustrated in Appendix I. A large quantity of faunal remains had also been recovered by Spencer; these included bison (*Bison bison*), white-tailed deer (*Odocoileus* cf. *virginianus*) and coyote (*Canis* cf. *latrans*). Smaller species were probably either overlooked or disregarded. All of the above materials came from the upper 20 cm of deposit (*ibid.*).

Excavation Unit 1

Seven shovel tests were placed in site 41 LL 76 prior to the excavation unit (see Fig. 7; Table 4). The location for Unit 1 was designed to produce a maximum amount of information. It was set up next to ST-1 since that small test had produced a *Perdiz* arrow point (see Fig. 6,a), lithic debris and animal bone. This appeared to be a relatively undisturbed location.

The soil in the first 25 to 30 cm of Unit 1 was a dark brown silty loam. It slowly graded into a brown clay from ca. 25 to 55 cm, then graded into a tan brown sandy loam which increased in pebble content towards the bottom. The final depth was 100 cm below ground surface.

The majority of the cultural material was found within the first 30 cm. Table 6 lists all of the materials recovered and observed from Unit 1. From 30 cm to 100 cm the only cultural materials found were flakes (less than 10 per level), a few bits of animal bone and land snail shells. The artifacts and other materials recovered within the first 30 cm include: one oval biface and two small biface fragments; one sandstone mano fragment; numerous flakes and animal bone; and some scattered burned rock and charcoal bits. No features were found. Fig. 8 provides the percentage of primary, secondary and interior flakes from the total count of flakes in the unit. A breakdown of the percentage of the distribution of the flakes in Unit 1 is given in Fig. 9. Nearly 90% of the chipping debris was composed of interior flakes, indicating that virtually all initial lithic reduction was done elsewhere.

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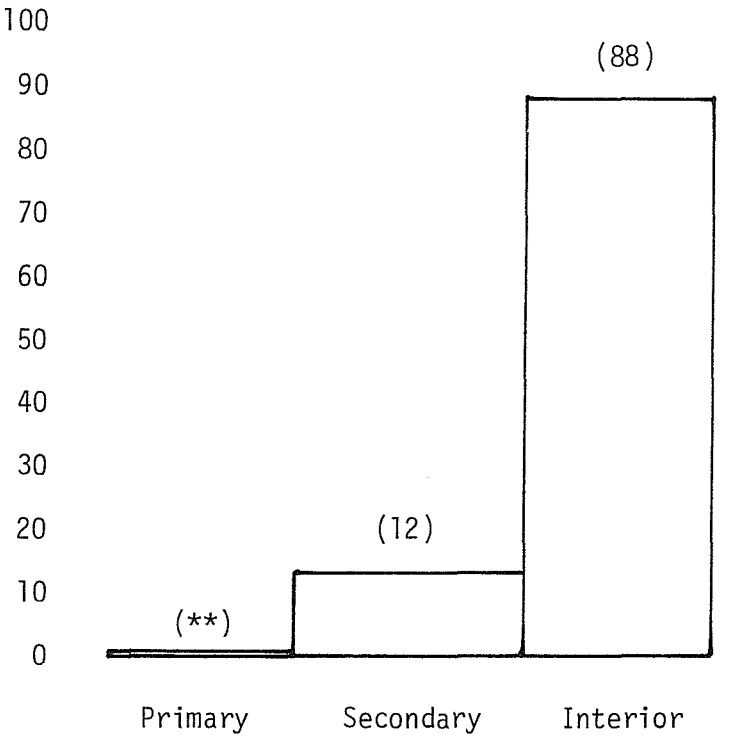


Figure 8. *Percentage of Primary, Secondary and Interior Flakes from Unit 1, 41 LL 76.** The total percentage of flakes is in parentheses.

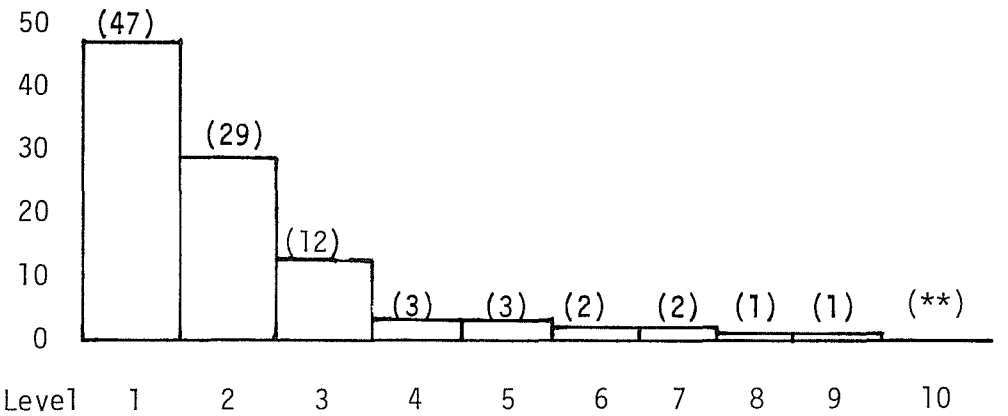


Figure 9. *Percentage of Flakes per Level from Unit 1, 41 LL 76.** The total percentage of flakes is in parentheses.

*All percentages have been rounded off to the nearest whole number.
**Less than 0.5%.

TABLE 6. VERTICAL DISTRIBUTION OF MATERIALS FROM UNIT 1, 41 LL 76

	Level (Depth cm)										
	1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	Total
Bifaces/fragments	1	1	1								3
Debitage*											
Primary		1									1
Secondary	17	7	5		1	1	1	1			33
Interior	106	70	28	9	7	5	4	2	3	1	235
Utilized/retouched flake	1										1
Ground stone (mano fragment)			1								1
Animal bone fragments**	122	24		1		1					148
Land snail shells						1	4		5		10
Burned rock (scattered)	present	present	present								
Stream pebbles								present	present	present	
Scattered charcoal	present	present									

*Presented in more detail in Figs. 8 and 9.
**Presented in more detail in Table 7.

Faunal Analysis

Four levels from the excavation unit at 41 LL 76 contained animal bone (Levels 1, 2, 4 and 6). Level 1 (0-10 cm) contained over 85% of the bone recovered; the identifiable remains in that level include deer, bison, cottontail rabbit and snake (probably rattlesnake). The second level contained one bison bone and one small mammal fragment plus some unidentifiable fragments. Table 7 inventories the identifiable species and bone elements. Table 8 presents data on quantity and bone weight, which is divided into categories of unburned identifiable bone, burned identifiable bone, unburned and burned "deer-sized" bone, and unburned and burned unidentifiable bone. The bone was counted and weighed in order to determine whether or not there would be a quantitative difference between a given count total and weight.

The results showed a significant difference between these two methods of measuring the amount of animal bone present in an archaeologial site. The differences between counting and/or weighing the animal bone are also considerable in the faunal study at 41 LL 254.

The sample of bone from Unit 1 is too small to adequately determine much about quantities of animals killed, amounts of meat consumed, or even any processing of the bone (such as tool making, marrow extraction, etc.). Only 22% (by count) of the bone was burned in the first level (0-10 cm), while 46% of the bone from Level 2 (10-20 cm) was burned (Table 9). Much of the bone had spiral breakage, indicating that it was fresh (or green) when broken (Bonnichsen 1973) rather than being broken after being exposed to the elements.

Constant Volume Analysis (CVS)

Samples from five levels at 41 LL 76 were prepared for microanalysis. The procedure for the CVS processing is discussed in the section on Methodology. Each CVS sample has two parts: material that was recovered from a 1/4-inch mesh screen (coarse) and material from roughly a 1/50-inch screen (fine).

As in the regular excavation, the majority of the cultural material was found in the upper 30 cm of deposit. Numerous amounts of small flakes and animal bone were recovered, especially from the 0-10 cm level. Several seeds were found in the 0-10 cm level also, but they are probably from the recent plants. The only other seeds found were some hackberry seeds from below 60 cm where cultural associations are sketchy. All items recovered from this CVS sorting are listed in Table 10. The only "coarse screen" materials were from 0-10 cm. All cultural materials were less than 50 cm deep, but some hackberry seeds and several small species of land snail shells were found to 90 cm deep. The seeds and snail shells are probably associated with the Pleistocene terrace deposition rather than any human activities. The weights of the sorted specimens and the residue of the sample are presented in Table 11. Only in the 0-10 cm level did the sorted items constitute over 2% of the sample, and in most cases it was less than 0.5%. Nevertheless, even though the size of the identifiable sample was small, valuable information can still be derived that would not have been obtainable under usual excavation practices. Time for further analysis of the sorted materials was not available, but there are very small identifiable animal bone and land snail shell elements in the samples.

TABLE 7. FAUNAL INVENTORY FROM EXCAVATION UNITS AT 41 LL 76 AND 41 LL 254

Site/Unit	Level	Animal	Remarks
41 LL 76/Unit 1	1 (0-10 cm)	Deer (*Odocoileus* sp.)	2 teeth in mandible
		Deer (*Odocoileus* sp.)	1 metacarpal
		Deer (?)	3 deer-sized fragments
		Bison (*Bison bison*)	2 phalanx fragments
		Cottontail (*Sylvilagus* sp.)	1 calcaneum--burned
		Cottontail (*Sylvilagus* sp.)	1 mandible fragment--juvenile
		Snake (cf. *Crotalus*)	1 vertebrae
	2 (10-20 cm)	Bison (*Bison bison*)	1 hoof fragment
		Small mammal	1 unidentified fragment
41 LL 254/Unit 1	2 (10-20 cm)	Turtle	1 carapace fragment
		Mammal	1 owl (?)--burned
	4 (30-40 cm)	Bison (*Bison bison*)	1 epiphysis
		Turtle (cf. *Chrysemys*)	1 carapace fragment
	6 (50-60 cm)	Possible deer	1 tooth fragment
	7 (60-70 cm)	Deer (*Odocoileus* sp.)	2 metacarpal fragments
		Possible deer	1 unidentified fragment
	8 (70-80 cm)	Deer (*Odocoileus* sp.)	1 phalanx
		Possible deer	1 badly burned fragment
		Deer (*Odocoileus* sp.)	3 teeth fragments
		Cottontail rabbit (cf. *Sylvilagus*)	1 astragalus fragment--burned
		Snake (cf. *Crotalus*)	1 vertebrae
		Turtle	4 carapace fragments (2 burned)
	9 (80-90 cm)	Deer (*Odocoileus* sp.)	1 tooth fragment
		Deer (*Odocoileus* sp.)	1 sesamoid
		Possible deer	1 rib fragment
		Possible deer	2 unidentified fragments (1 burned)
		Deer (*Odocoileus* sp.)	1 tooth fragment
		Jackrabbit (*Lepus californicus*)	1 metatarsal fragment
		Jackrabbit (*Lepus californicus*)	1 humerus fragment
		Possible jackrabbit	1 unidentified fragment (burned)
		Turtle	3 burned carapace fragments

TABLE 7. (continued)

Site/Unit	Level	Animal	Remarks
41 LL 254/Unit 1 (continued)	10 (90-100 cm)	Med-large mammal	1 tooth fragment
		Deer (*Odocoileus* sp.)	2 metapodial fragments
		Deer (*Odocoileus* sp.)	1 phalanx fragment
		Rodent	1 incisor fragment
		Cottontail (*Sylvilagus* cf. *floridavus*)	1 mandible fragment--burned
		Cottontail (*Sylvilagus* cf. *floridavus*)	1 humerus fragment--burned
		Jackrabbit (*Lepus californicus*)	1 metacarpal fragment--burned
		Large frog	1 urostyle fragment
		Turtle	10 carapace fragments (7 burned)
	11 (100-120 cm)	Possible deer	4 shaft fragments (2 burned)
		Possible deer	1 rib fragment
		Possible deer	1 unidentified fragment--burned
		Turtle	11 carapace fragments--burned
	12 (110-120 cm)	Deer (*Odocoileus* sp.)	1 tooth fragment
		Possible deer	1 long bone fragment--burned
		Possible deer	1 sesamoidon carpal--burned
		Turtle	2 carapace fragments (2 burned)
	14 (130-140 cm)	Deer (*Odocoileus* sp.)	1 tooth fragment
	15 (140-150 cm)	Med-sized mammal	1 rib (?) fragment--burned
		Turtle	1 carapace fragment--burned

TABLE 8. QUANTITATIVE DATA FOR THE FAUNAL REMAINS FROM UNIT 1, 41 LL 76*

Level/Depth	Identifiable Bone		Deer-Sized Bone		Unidentified Bone		TOTAL
	Unburned	Burned	Unburned	Burned	Unburned	Burned	
1 (0-10 cm)	10	1	24	9	67	19	130
	(18.17)	(.27)	(41.64)	(10.10)	(12.86)	(3.91)	(86.95)
2 (10-20 cm)	2		1	4	10	7	24
	(5.94)		(1.31)	(2.15)	(1.94)	(2.16)	(13.50)
4 (30-40 cm)				1			1
				(.59)			(.59)
6 (50-60 cm)						1	1
						(.20)	(.20)
							156
							(101.24)

*Numbers without parentheses represent bone count; numbers within parentheses represent bone weight.

TABLE 9. PERCENTAGES OF BURNED AND UNBURNED BONE FROM UNIT 1, 41 LL 76*

Level/ Depth	Count of Unburned/Burned Bone %	Weight of Unburned/Burned Bone %	Difference in %	Percentage of Total Bone in each Level† Count (Weight)	Difference in %
1 (0-10 cm)	78/22	84/16	6	83 (86)	3
2 (10-20 cm)	54/46	68/32	14	15 (13)	2
4 (30-40 cm)	0/100	0/100	-	1 (1)	
6 (50-60 cm)	0/100	0/100	--	1 (**)	1

*All percentages rounded off to the nearest whole number.
**Less than 0.5%.
†Computed from data in "Total" column, Table 8.

TABLE 10. CONSTANT VOLUME SAMPLE MATERIAL FROM UNIT 1, 41 LL 76

Level/Depth	Flakes		Animal Bone		Seeds (Fine Screen)	Land Snail Shells (Fine Screen)
	Coarse	Fine	Coarse	Fine		
1 (0-10 cm)	4	110	3	51	1 *Chenopodium** 5 other types (19 seeds)	3 fragments
3 (20-30 cm)		10		4		
5 (40-50 cm)		6				
7 (60-70 cm)					11 hackberry fragments	over 5 species (26 snails)
9 (80-90 cm)					2 hackberry fragments	3 species (13 snails)
TOTAL	4	126	3	55	33	42

*Personal communication, Ralph Robinson.

TABLE 11. WEIGHTS OF CONSTANT VOLUME SAMPLES FROM UNIT 1, 41 LL 76

Level(Depth)	Coarse Screen		Fine Screen		Percentage Of Sorted Items/Residue* (Coarse and Fine Combined)
	Sorted Items	Residue	Sorted Items	Residue	
1 (0-10 cm)	.32 g	7.32 g	.58 g	40.95 g	2/98
3 (20-30 cm)	---	3.60 g	.09 g	37.56 g	**/100
5 (40-50 cm)	---	1.46 g	.11 g	53.85 g	**/100
7 (60-70 cm)	---	9.49 g	.40 g	31.98 g	1/99
9 (80-90 cm)	---	66.10 g	.03 g	126.51 g	**/100

*Rounded off to the nearest whole number.
**Less than 0.5%.

41 LL 254

This site is located on a second terrace of Sandy Creek. 41 LL 253 is nearby, if not actually the same site (see Fig. 4). The two sites are physically separated only by a small drainage, but they are quite different in character. 41 LL 253 has been badly eroded and disturbed, leaving many artifacts exposed on its surface, while 41 LL 254 is protected from erosion by a thick grass cover with few lithics exposed. It has been disturbed somewhat by rodent activities, however.

Excavation Unit 1

One of the two shovel tests dug at 41 LL 254 contained much more material than was recovered at any other tested site. This shovel test was excavated to 85 cm, with the amount of materials increasing in quantity as the depth increased. An excavation unit was necessary to allow proper evaluation of this site, which from surface observation showed little cultural evidence.

The excavation unit, Unit 1, was set up near the location of the very productive shovel test. It was on the top of the terrace mound, towards the southwest end of the site. A large granite exposure is nearby, and there are some bedrock metates ground into various spots in the granite. A contour map of the site was produced and is on file at the Center for Archaeological Research.

The soil of Unit 1 was a dark brown silty loam, with gravels from surface to ca. 65 cm, then grading into a slightly lighter brown, becoming more of a clayey loam to ca. 105 cm deep. From roughly 105 cm to the bottom of the unit at 150 cm, the soil becomes a silty to sandy loam and continues to lighten to a brown with an orange cast to it. There is no rodent or tree root disturbance throughout.

All the materials recovered are tabulated and presented in Table 12. The types of lithic artifacts indicate that the site is predominantly a Middle and Early Archaic site with a probable Late Prehistoric component, and possibly a Late Archaic component in the upper levels. Few diagnostic artifacts were recognizable until a depth of roughly 80 cm below the ground surface was reached. The chronologically diagnostic chipped stone artifacts include: three *Bulverde* dart points, with one at 83.5 cm (Fig. 10,e), one at 90-100 cm (Fig. 10,g), and one at 135.5 cm (Fig. 10,f); and three *Nolan* dart points, one at 108 cm (Fig. 10,h), one at 110-120 cm (Fig. 10,i), and one at 120-130 cm (Fig. 10,j). A very large and finely made biface came from 119.5-123 cm (Fig. 10,k). Its dimensions are 16 X 5 X 0.6 cm, and it is of a tan to pink mottled chert. A possible arrow point preform came from 25 cm below the surface (Fig. 10,d); two unclassified dart points were found at 80-90 cm (Fig. 10,b,c); and one was found at 94 cm (Fig. 10,a). The other types of chipped stone and organic materials from the unit included: whole or broken, badly burned biface fragments; utilized and retouched flakes; primary, secondary and interior flakes (many of which were burned); ground stone fragments; and unburned and burned animal bone.

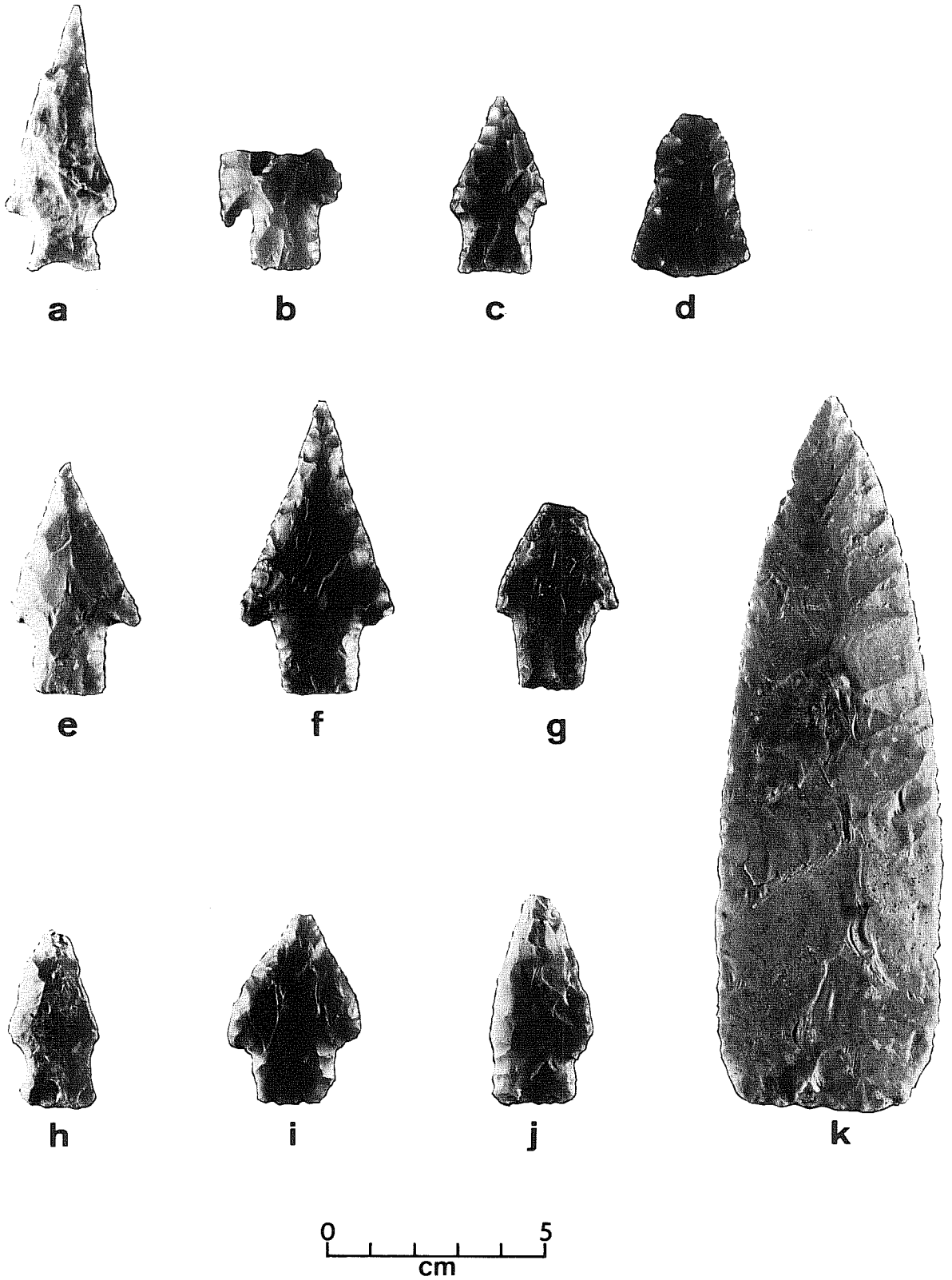


Figure 10. *Lithic Artifacts from Site 41 LL 254.* a,b,c, unclassified dart points; d, possible arrow point preform; e,f,g, *Bulverde*; h,i,j, *Nolan*; k, large biface.

TABLE 12. DISTRIBUTION OF MATERIALS FROM UNIT 1, 41 LL 254

Level cm	1 (0-10)	2 (10-20)	3 (20-30)	4 (30-40)	5 (40-50)	6 (50-60)	7 (60-70)	8 (70-80)	9 (80-90)	10 (90-100)	11 (100-110)	12 (110-120)	13 (120-130)	14 (130-140)	15 (140-150)	Total
Diagnostic Projectile Points									1□	1□	1△	2△ 1□	1△	1□		8
Unidentified Proj. Pts./Frags.	1	3			1			4	2	3	1					15
Bifaces/Frags.	3	1	2†	1	2	1	5	12	11	7	7	1	4+			57
*Debitage Primary Flakes	2	8		7	1†	5	7	10	10	18	12	8		1		89
Secondary Flakes	64	82†	65†	66	56†	40	50	106	79	116†	139	56	39	17	6	981
Interior Flakes	368	668†	596†	533	569†	331	529	1304	1782	1831†	1680	765	379	189	97	11,621
Utilized/Retouched Flakes	3	6	1	2	4	2	1	2	6	1	1		1	1		31
Hammerstones									1							1
Core(s)			2					1								3
Ground Stone Mano/Frags.		1	1†	1						1†						4
Metate/Frags.										1†						1
Misc. Gr. St.			3†											1		4
**Animal Bone Frags.		3	4	8	16†	14	27	62	98	133	128	14	37	10	2	556
Land Snail Shells	5												5	2		12
Burned Rock (Scattered)	Present	Present	Present	Present		Present			Present	Present		Present				
***Burned Rock (Feature)		Feat 1	Feat 2		Feat 3					Feat 4						
Misc. Rock	5		8	2		4	6	33	18	33	7	5	3	5	1	130
Scattered Charcoal		Present	Present					Present	Present			Present	Present			

*Presented in Detail in Figs. 11, 12
**Presented in Detail in Tables 7, 14, 15
***Items from Features Presented in Detail in Table 13
†Contains Material from Feature 1, 2, 3 or 4
+One specimen is 16X5X0.6 cm in Size(see Fig. 10,K)
□Bulverde
△Nolan

Four burned rock features (concentrations) were encountered. Feature #1, at 10-18 cm, was roughly 30 X 30 cm (NS/EW) and somewhat circular in size. A total of eight rocks was counted as part of the feature, but other scattered burned rock was probably associated. Feature #2, at 19-26 cm, was 60 X 55 cm (NS/EW) and irregular in shape. Roughly 31 rocks were included in the concentration, including two mano fragments. Several other scattered burned rocks were in the level. Feature #3, at 36-46 cm, was irregular in outline (60 X 55 cm NS/EW) and composed of 28 rocks. A biface medial fragment was found nearby. Very little scattered burned rock was found near this feature. Feature #4, at 82.5-100 cm, was the last burned rock concentration found. It was linear (55 X 30 cm NS/EW) and located in the southeast corner of the unit. The rock concentration was composed of roughly 15 rocks, including a granite metate fragment and a sandstone mano fragment. A *Bulverde* dart point and an unclassified dart point came out of this level also. Once a burned rock concentration was encountered, it was isolated and carefully exposed. A soil sample was taken out of each feature, and the remaining soil was screened separately. There was no significant difference in the materials which came out of the burned rock concentrations, and only one had any animal bone in it. The feature materials are presented in Table 13.

The predominant material from Unit 1 consisted of chipping debris--flakes and chips. Over 11,000 flakes and chips came from the unit, and, of those, over 90% were interior flakes. Figure 11 presents the breakdown of primary, secondary and interior flakes, and Figure 12 presents the distribution of all flakes throughout the unit.

There was a marked concentration of burned and unburned lithic materials and animal bone between 80-110 cm (Levels 9, 10 and 11). Feature #4 was within the zone, along with one *Nolan* point, two *Bulverde* points and three unclassified dart points. The frequencies of the amounts of burned and unburned flakes and animal bone are presented in Figure 13.

A totally sterile zone was never reached in Unit 1. It was evident that the amount of cultural materials was drastically dropping off, however, and the excavation was stopped due to lack of time.

Faunal Remains

Hundreds of small animal bones were recovered from Unit 1 at 41 LL 254. The size of the majority of the bone was less than 2-3 cm, and it was very fragmentary. Over 50% of the bone from most levels had signs of obvious burning (white to black coloration, chalky texture, etc.), and probably much more was burned than was discernible. The burned condition of the bone probably accounts for the good preservation.

The analysis of the faunal remains was limited. The different species of animal remains found include: bison, white-tailed deer, cottontail rabbit, jackrabbit, rodent, turtle, snake and frog. Some very small fish bones were found in the CVSs from the 80-90 cm and 100-110 cm samples. The identifiable animal species and bone elements are provided in Table 7.

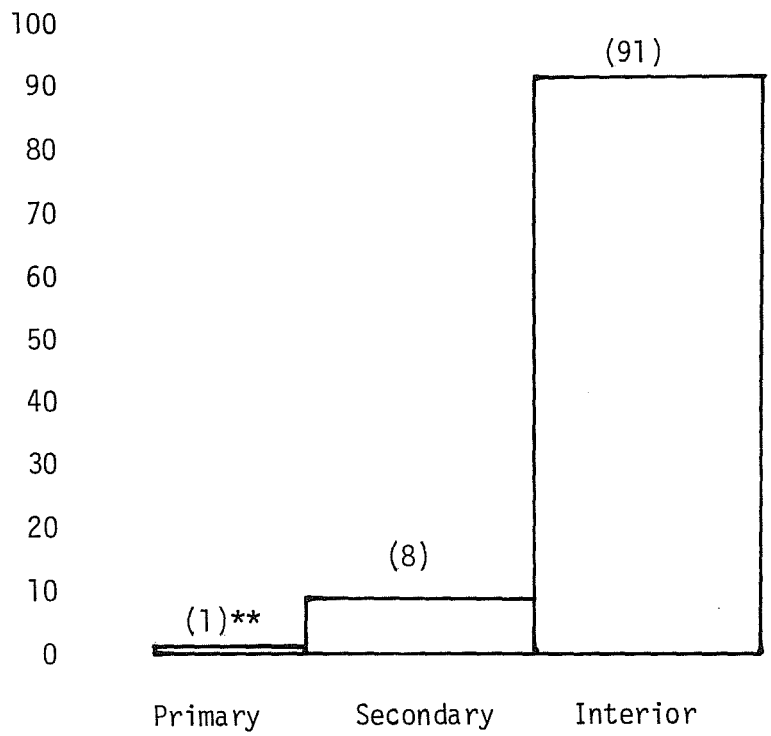
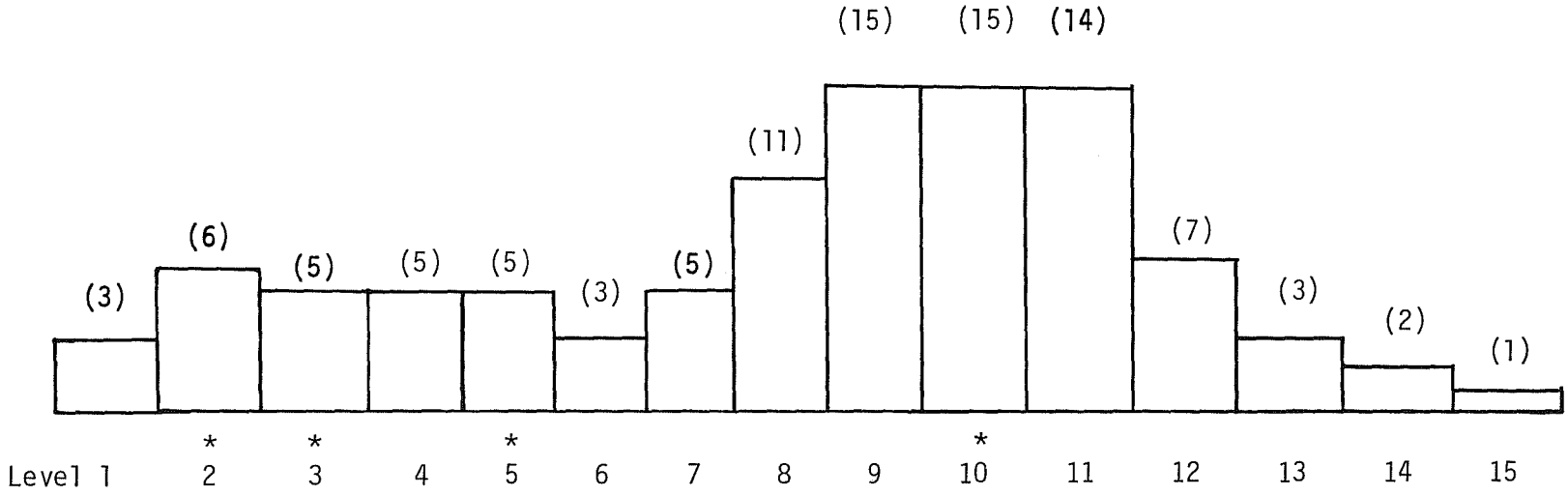


Figure 11. *Percentage of Primary, Secondary and Interior Flakes from Unit 1, 41 LL 254.** The total percentages of flakes are in parentheses.

*All percentages have been rounded off to the nearest whole number.
**Less than 0.5%.



*Feature in level.

Figure 12. *Percentage of Flakes per Level from Unit 1, 41 LL 254.* The percentages of flakes are in parentheses and are rounded off to the nearest whole number.

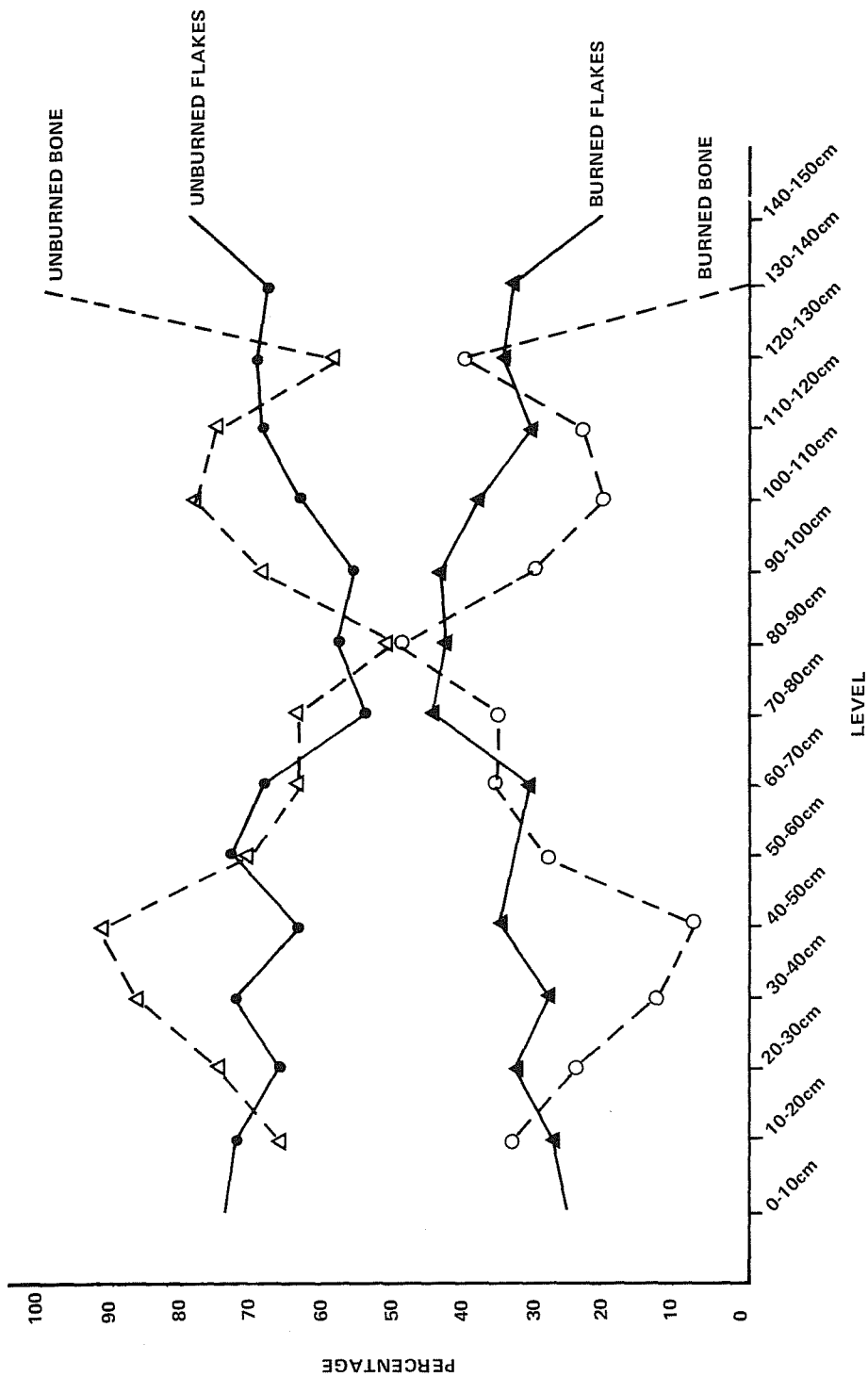


Figure 13. *Frequencies of Amounts of Burned and Unburned Flakes and Animal Bones, 41 LL 254.*

TABLE 13. FEATURE MATERIALS FROM UNIT 1, 41 LL 254

	Biface(s)/ Fragments	Mano/ Fragments	Metate/ Fragments	Ground Stone Misc. Fragments	Flakes Primary	Flakes Secondary UB/B*	Flakes Interior UB/B	Burned Rock in Feature	Animal Bone
Feature #1 (Level 2) 10-20 cm							12/7	8	
Feature #2 (Level 3) 20-30 cm	1	1		3		10/0	52/27	31	
Feature #3 (Level 5) 40-50 cm					1	5/4	63/45	28	6
Feature #4 (Level 10) 90-100 cm		1	1			6/0	15/19	15	
TOTAL	1	2	1	3	1	21/4	142/98	82	6

*UB/B = Unburned/Burned.

As at 41 LL 76, the faunal remains were counted and weighed. Table 14 provides a breakdown of identifiable bone, deer-sized bone and unidentifiable bone. All three categories were divided between unburned and burned specimens. Only one level, the 0-10 cm level, had no faunal remains in it. Much of the animal bone was concentrated between the 80-100 cm zone in the unit, much the same as the quantity of lithic debris, diagnostic artifacts and high proportion of burned and unburned flakes and animal bone (see Fig. 13). Table 15 provides the percentages of counted bone as opposed to weighed bone and the percentage differences in these measuring methods.

Constant Volume Sample (CVS)

A constant volume analysis was performed on samples from eight levels of Unit 1. Although the analysis is general and can only provide a brief inventory of what was found, it is important because it indicates the numerous amounts of small lithic debris, animal bone and seeds that could not have been found by conventional methods of recovery.

The quantity of materials which came out of the small sample is impressive: over 2,000 small flakes and chips, almost 900 animal bone fragments (with 41 further identifiable), and some seeds and land snail shells. Categories and quantities of the recovered items are provided in Table 16.

All of the sorted CVS specimens and remaining residue were compared (see Table 17), as was done for 41 LL 76. There is a marked difference in the percentage of sorted materials as opposed to residue at this site as compared to 41 LL 76, where there was never more than 2% sorted material in any one sample. At 41 LL 254, 6% of a sample consisted of sorted material in one level and 5% in another. Both of these samples correspond with a highly concentrated zone of cultural material that has already been discussed.

TABLE 14. QUANTITATIVE DATA FOR THE FAUNAL REMAINS FROM UNIT 1, 41 LL 254*

	Identifiable Bone		Deer-Sized Bone		Unidentifiable Bone		
	Unburned	Burned	Unburned	Burned	Unburned	Burned	TOTAL
Level 2 (10-20 cm)	1 (.26)					2 (.41)	3 (.67)
Level 3 (20-30 cm)					3 (.33)	1 (.21)	4 (.54)
Level 4 (30-40 cm)		1 (.41)	1 (2.72)			6 (2.40)	8 (5.53)
Level 5 (40-50 cm)					1 (.16)	11 (12.01)	12 (12.17)
Level 6** (50-60 cm)		1 (.08)			4 (1.66)	9 (1.46)	14 (3.20)
Level 7 (60-70 cm)	2 (.88)		1 (1.16)		15 (2.41)	10 (1.59)	28 (6.04)
Level 8 (70-80 cm)	7 (1.91)	4 (1.53)			16 (3.20)	37 (9.83)	64 (16.47)
Level 9 (80-90 cm)	4 (2.07)	6 (1.52)	1 (1.57)	1 (1.96)	43 (1.51)	42 (14.64)	97 (23.27)
Level 10 (90-100 cm)	7 (4.09)	11 (2.07)			31 (8.13)	72 (24.27)	121 (38.56)
Level 11 (100-110 cm)	1 (.42)	12 (2.43)	2 (4.01)	2 (3.18)	23 (4.05)	85 (18.49)	125 (32.58)
Level 12 (110-120 cm)		5 (1.38)			8 (1.06)	21 (3.61)	34 (6.05)
Level 13 (120-130 cm)	4 (4.24)	5 (.96)			16 (1.85)	9 (1.12)	34 (8.17)
Level 14 (130-140 cm)		1 (.10)				10 (1.71)	11 (1.81)
Level 15 (140-150 cm)		2 (.32)					2 (.32)
							557 (155.38)

*Numbers without parentheses represent counts; numbers within parentheses represent weights.

**Includes Feature #3 faunal material.

TABLE 15. PERCENTAGES OF BURNED AND UNBURNED BONE FROM UNIT 1, 41 LL 254*

	% Count of Bone Unburned/Burned	% Weight of Bone Unburned/Burned	Difference Between Count & Weight %	Percentage of Total Bone in each Level† Count (Weight)		Difference Between Total %
Level 2 (10-20 cm)	33/67	39/61	6	1	(1)	
Level 3 (20-30 cm)	75/25	61/39	14	1	(**)	Less than 1%
Level 4 (30-40 cm)	13/87	49/51	36	2	(4)	2
Level 5 (40-50 cm)	8/92	7/93	1	2	(2)	
Level 6 (50-60 cm)	29/71	52/48	23	3	(2)	1
Level 7 (60-70 cm)	64/36	74/26	10	5	(4)	1
Level 8 (70-80 cm)	36/64	31/69	5	11	(11)	
Level 9 (80-90 cm)	49/51	22/78	27	17	(16)	1
Level 10 (90-100 cm)	31/69	32/68	1	22	(27)	5
Level 11 (100-110 cm)	21/79	26/74	5	22	(22)	
Level 12 (110-120 cm)	24/76	18/82	6	6	(4)	2
Level 13 (120-130 cm)	59/41	75/25	16	6	(6)	
Level 14 (130-140 cm)	0/100	0/100		2	(1)	1
Level 15 (140-150 cm)	0/100	0/100		**	(**)	

*All percentages rounded off to the nearest whole number.
**Less than 0.5%.
†Computed from data in "Total" column, Table 14.

TABLE 16. CONSTANT VOLUME SAMPLE MATERIAL FROM UNIT 1, 41 LL 254

Level	Flakes		Identifiable Animal Bone (Fine Screen)	Animal Bone Fragments		Seeds (Fine Screen)	Land Snail Shells (Fine Screen)
	Coarse	Fine		Coarse	Fine		
1 (0-10 cm)	6	149	--	--	9	3 types (9 seeds)	10 fragments
3 (20-30 cm)	8	182	--	--	4	--	--
5 (40-50 cm)	6	98	1 deer tooth fragment	1	15	3 types (4 seeds)	--
7 (60-70 cm)	15	168	1 deer tooth fragment	--	53	--	--
9 (80-90 cm)	45	684	27 (small mammal, snake, fish or bird)	6	422	--	--
11 (100-110 cm)	15	516	12 (small mammal, snake or other reptile)	--	306	1 (hackberry)	6 fragments
13 (120-130 cm)	1	110	--		21	--	--
15 (140-150 cm)	1	21	--		10	--	--
TOTAL	97	1,928	41	7	840	14	16

TABLE 17. WEIGHTS OF CONSTANT VOLUME SAMPLES FROM UNIT 1, 41 LL 254

Level(Depth)	Coarse Screen		Fine Screen		Percentage Of Sorted Items/Residue* (Coarse and Fine Combined)
	Sorted Items	Residue	Sorted Items	Residue	
1 (0-10 cm)	2.23 g	121.33 g	1.05 g	332.80 g	1/99
3 (20-30 cm)	2.72 g	176.32 g	1.18 g	557.50 g	1/99
5 (40-50 cm)	.71 g	190.69 g	.82 g	474.20 g	**/100
7 (60-70 cm)	2.89 g	274.10 g	1.31 g	521.00 g	1/99
9 (80-90 cm)	10.78 g	89.00 g	4.56 g	158.09 g	6/94
11 (100-110 cm)	5.59 g	32.90 g	3.21 g	130.42 g	5/95
13 (120-130 cm)	.75 g	10.52 g	.45 g	76.22 g	1/99
15 (140-150 cm)	.68 g	14.66 g	.07 g	50.50 g	1/99

*Rounded off to the nearest whole number.
**Less than 0.5%

SUMMARY AND CONCLUSIONS

In attempting to interpret the archaeological data recovered during the Enchanted Rock State Park survey, many local factors which affect the archaeological record and its visibility demand consideration. Erosion has undoubtedly acted as a "limiting factor" in this area, selectively destroying or damaging sites by distorting the context of cultural materials. On the other hand, soil deposition, especially in the lower pediment areas along the creeks, is decreasing the visibility of archaeological sites in certain areas of the Park. For this reason, it is recommended that the 120 sites now recognized within the Park be monitored on a continuing basis, to observe and, if necessary, to react to changing conditions caused by the above-mentioned factors.

Despite the disrupting conditions, a pattern is visible when considering the characteristics and distribution of sites within the Park. This pattern can be observed when considering the relative elevation of various sites. In general, sites which have the largest and most diverse artifact inventories are in areas of relatively low elevation, near Sandy or Walnut Spring Creeks. Sites which are located away from these major water courses tend to have smaller, less diverse artifactual remains. This pattern can probably be explained by both cultural and environmental factors; while it is possible or even probable that many of the upland sites are representative of specialized procurement activities, it is also possible that they have undergone more severe erosion, and therefore have fewer material remains.

Fifty-one sites, or 42.5% of the total site inventory, included chronologically diagnostic artifacts which provided relative estimates of their period of occupation. Of these 51 sites, the Middle Archaic period was the best represented (35%), followed by Late Prehistoric sites (25%), Late Archaic (20%), Early Archaic (12%) and Late Paleo-Indian (8%).

The scarcity of datable sites is a serious problem in the understanding of prehistoric settlement patterns in the Park. To overcome this problem, it is suggested that more private collections from the Park area be documented, with an emphasis on provenience of collected artifacts. Although several collections have been documented, others reported to have come from area sites have not been accessible (Greer 1979). This study method has the advantage of being relatively fast and inexpensive as compared to the amount of information potentially recoverable.

Based upon our archaeological survey of the Park area, six sites are recommended for nomination to the National Register of Historic Places. These sites are 41 GL 60, 41 LL 203, 41 LL 205, 41 LL 254, 41 LL 311 and 41 LL 348. Five sites were placed on the National Register by Greer (1979), including 41 LL 76, 41 LL 253, 41 GL 73, 41 GL 92 and 41 LL 275. Site 41 LL 275 remains in the site inventory, even though no cultural material was observed there during our field inspection of the site. Due to its historic significance, it was placed on the National Register. The site is also a national landmark (*ibid.*:146).

It is hoped that this report has accomplished three goals: (1) an inventory of the cultural resources of Enchanted Rock State Park has been supplied, and recommendations for the preservation and maintenance of the archaeological

record have been offered; (2) data has been presented which should be of use to the archaeological community as a whole; and (3) some possible areas of future research have been suggested.

Appendix I

SPENCER COLLECTION, 41 LL 76

Daniel R. Potter

INTRODUCTION

Lithic and ceramic artifacts from the Bob Spencer collection have previously been described by Greer (1979:150,155-160). Late in the analysis phase of the current project, Greer sent materials from the Spencer collection to UTSA for study. A brief discussion of this collection is presented.

All of the materials were excavated from the Spencer site (41 LL 76) by Bob Spencer of Fredericksburg. The ceramic artifacts came from the upper 20 cm of deposits and were associated with *Perdiz, Edwards, Scallorn, Lott* and "*Hayes*-like" points (Greer 1979:158). Dart points are also thought to have come from 41 LL 76, but this is a tenuous association which has not been substantiated by CAR-UTSA investigations at the site.

The pottery collection from the Spencer site is the only ceramic material known to have come from Enchanted Rock State Park. It is certainly one of the larger ceramic inventories from the general region, with 87 sherds from vessels having exterior decoration, and the remaining 169 sherds subsumed under the *Leon Plain* type.

CERAMICS

The ceramics in the collection are represented by 256 sherds displaying considerable variation in style, material and manufacture. At least 10 vessels are represented in the collection and are described in some detail by Greer (*ibid.*:155-157). Most of these vessels can be assigned to the *Leon Plain* type. They have plain, usually burnished, exteriors and characteristic bone tempering. Other vessels represented in the collection show stylistic and/or technological traits which are not thought to be included in the *Leon Plain* type. These are the specimens upon which this description will focus.

Because of the granitic nature of the soil, streams and, presumably, clay sources within the area, it was expected that locally made pottery would be easily detectable by microscopic examination of inclusions within the ceramic material. Studies using a binocular microscope with low magnification (up to 50X) revealed that most of the sherds, with the notable exception of two brushed sherds, were tempered primarily with bone, a trait of central Texas wares. The brushed sherds were grog tempered. Microscopic examination also revealed granitic minerals, including hornblende, mica, vermiculite (?), feldspar and quartz, in all sherds *except* the brushed ware. When considering the design elements of these sherds, it is important to keep in mind this strong evidence for local manufacture.

Fig. 14 illustrates the range of decorated wares from the Spencer site. All sherds except those shown in Fig. 14,c-e are thought to show strong stylistic similarities to Frankston and Titus Foci ceramic designs, more typical of

east Texas ceramic inventories. These types are thought to be *Maydelle Incised*, (Fig. 14,f), *Bullard Brushed* (Fig. 14,g) and an unnamed type (Fig. 14,h), also probably associated with the Titus Focus (Jelks and Tunnell 1959:Plate 14,i). The remaining decorated sherds (Fig. 14,a,b), exhibiting linear patterns of small punctates, are in some ways more similar to coastal ceramic designs (Dee Ann Story, personal communication).

While these identifications are certainly subject to debate, it cannot be denied that this stylistic variability occurring on locally manufactured wares has important implications concerning interregional contact, and perhaps individual group mobility during the *Toyah* phase.

It is hoped that further study of this and other ceramic collections from the Spencer site will add to our present knowledge of ceramic traditions within central Texas.

NONCERAMIC ARTIFACTS FROM THE BOB SPENCER COLLECTION

A complete inventory of the Spencer collection is given in Greer (1979). The following items were received from Greer during the present study:

1	smooth quartz cobble
16	retouched/utilized flakes
2	burins
8	end scrapers
10	unifaces or uniface fragments
1	thick biface
2	flake arrow points
1	flake biface

Also included in this collection are a number of flakes, burned rocks and a soil sample.

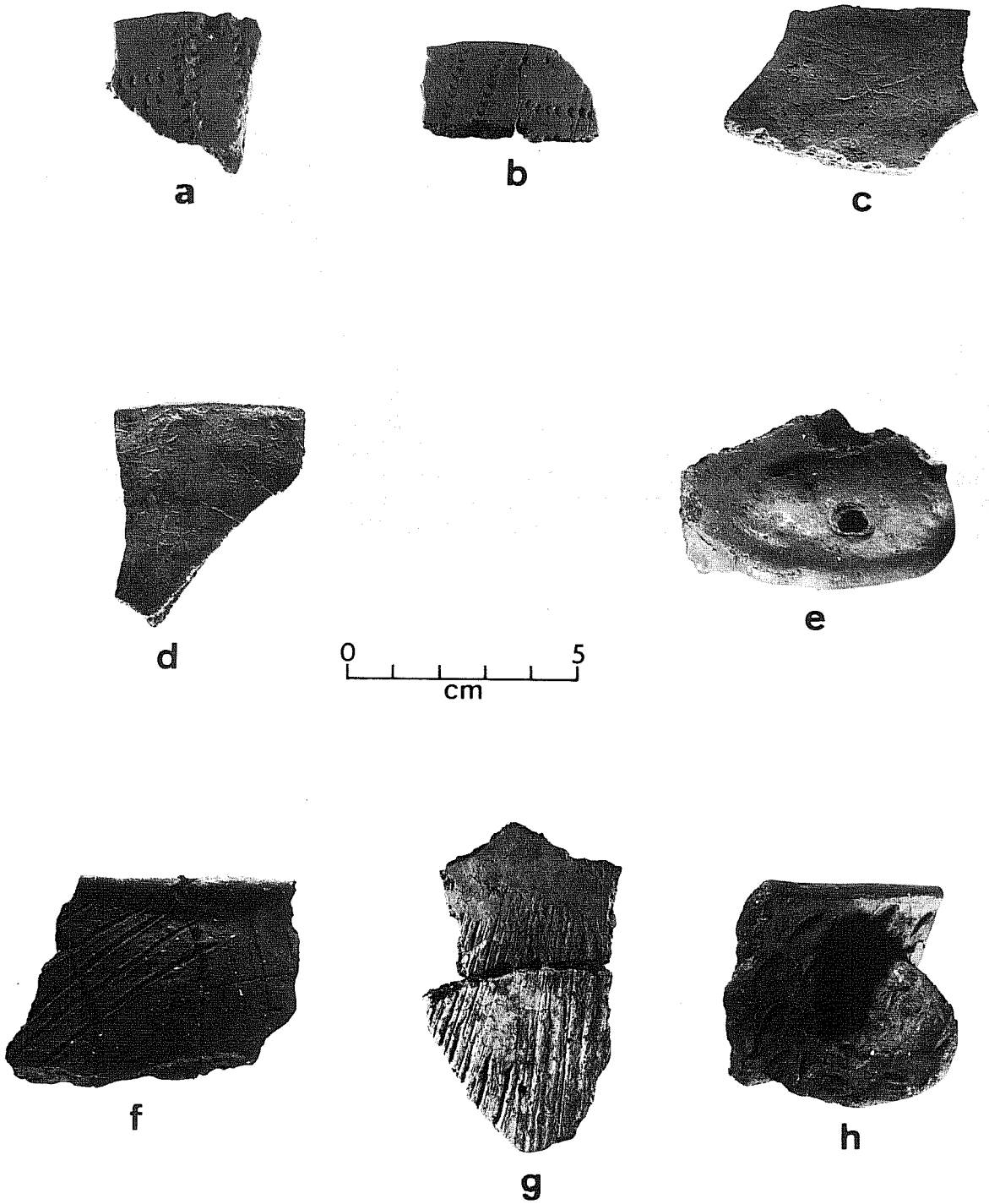


Figure 14. *Ceramics from the Spencer Collection, 41 LL 76.* a,b, decorated sherds with linear patterns of small punctuates; c-e, *Leon Plain*; f, *Maydelle Incised*; g, *Bullard Brushed*; h, unclassified sherd.

APPENDIX II

ARTIFACT INVENTORY, 1977 SURVEY

Cristi Assad

As reported in Greer's (1979) "Enchanted Rock: A Natural Area Survey," a number of lithic artifacts were collected by the 1977 survey team. The artifacts were sent to the Center for Archaeological Research by Mr. John Greer, Archeological Services, Laramie, Wyoming. An inventory of the artifacts that were found within Enchanted Rock State Park is provided in Table 18. The majority of the artifacts collected from the Park in 1977 are typical of the types found during the field work of the current project.

As noted in Table 1, several sites listed and collected during the 1977 survey of Enchanted Rock State Park were not relocated by the surveyors in 1979. There are several reasons for this discrepancy. Surface erosion is very active throughout the Park and undoubtedly has affected many archaeological sites. Some of the sites listed by Greer (1979) were isolated artifacts or scattered lithics in a very small area; these specimens may have been collected in 1977 or may have been affected by erosion. It is also possible that a few sites were mislocated when placed on the project map in 1977.

TABLE 18. INVENTORY OF SURFACE ARTIFACTS COLLECTED DURING 1977 NATURAL AREA SURVEY AT ENCHANTED ROCK STATE PARK

SITE #	ITEM	SITE RELOCATED 1979 SURVEY	REMARKS
41 GL 60	2 biface frags (1 dart pt. ?) 2 utilized flakes	yes	
41 GL 62	1 *Desmuke* (?) dart point 1 worked chert cobble frag.	yes	
41 GL 64	1 large uniface	no	no cultural remains found in 1979
41 GL 74	1 core (or blank)	no	site eroded away?
41 GL 75	1 chopper	yes	
41 GL 86	1 biface frag.	yes	
41 GL 87	1 *Pedernales* dart point 1 *Frio* dart point 1 burned dart point frag.	no	nothing found at site during 1979 survey--all artifacts collected in 1977?
41 GL 92	1 *Travis* dart point 1 dart point 1 biface 1 hammerstone	yes	
41 LL 203	1 burin spall	yes	41 LL 203 and 204 combined to 41 LL 203
41 LL 204	1 biface frag.	yes	
41 LL 209	1 biface frag.	yes	
41 LL 215	1 *Elam* (?) dart point 1 *Pedernales* dart point 2 biface frags.	no(?)	possibly CAR's 41 LL 315?
41 LL 216	1 retouched flake	no	possibly CAR's 41 LL 314?
41 LL 220	1 biface 2 thin biface frags.	yes	combined with 41 LL 222
41 LL 225	1 uniface	no	no cultural remains found in 1979

TABLE 18. (continued)

SITE #	ITEM	SITE RELOCATED 1979 SURVEY	REMARKS
41 LL 249	1 uniface	no	isolated specimen
41 LL 252	1 *Martindale* dart point	yes	
41 LL 278	1 biface	no	no cultural remains found in 1979
41 LL 283	1 badly burned biface	no	changed to Isolated Find (IF-142)

APPENDIX III

BIOSILICA ANALYSIS: PALEOENVIRONMENTAL RECONSTRUCTION OF 41 LL 254

Ralph L. Robinson

INTRODUCTION

There are virtually no data on the prehistoric vegetation of many areas of Texas because the subtropical climate quickly destroys even the durable pollen grains which have served to reveal past climate and its changes in many other areas of the world. This study takes an alternative approach. Many plants deposit opaline silica within their cells while they are living, and these microscopic bits of silica or, more specifically, opal phytoliths, are very resistant to chemical destruction. Fortunately, not only plants, but also freshwater sponges and some microscopic, one-celled aquatic plants and animals have skeletons of silica. All of these are preserved to one degree or another, even in the alkaline and acid soils of Texas. After several years of research and experimentation, an effective method for recovering the various biosilica (or more specifically, biogenic opaline microfossils) from the soil has been developed, and, through various literary sources and the author's collection of present-day plants, the identification of many specimens to the family, genus or, even in some cases, species has been possible.

During the course of these studies, biosilica has been separated from the sediments of 14 archaeological sites in north, south, central and west Texas. However, the sites 41 GD 21 and 41 GD 21A were the first be fully and systematically analyzed (Robinson 1979a). This analysis of 41 LL 254 is based upon the extensive research undertaken at sites 41 GD 21 and 41 GD 21A. The highly detailed data and more extensive discussions resulting from these studies are being published separately (Robinson 1979b).

All of the samples from Texas sites contained biogenic opaline microfossils, sometimes in great abundance. Careful comparison of the plants and animals represented indicates that the climate of Texas has been quite variable over the last 14,000 years. The plant community indicates that sometimes it was dry, while at other times the climate was wet. It is even possible to tell the density of the vegetation and vegetational biomass, a very important factor in understanding erosional conditions and the types of animals that might have lived in the area.

Five soil samples were analyzed from 41 LL 254: Sample 1 from Level 15, Sample 2 from Level 13, Sample 3 from Level 10, Sample 4 from Level 6 and Sample 5 from Level 4.

SEPARATION TECHNIQUES

Many methods have been developed by various researchers to separate opaline microfossils from soil. In fact, phytoliths have been known for 175 years and studied by many different individuals in various parts of the world. After experimenting with several of these methods, the author has found that a modified version of Rovner's (1971) technique seems at the same time most practical and least likely to damage the biosilica. All of the methods, including the one used, are extremely time-consuming.

The details of the separation technique are explained in detail in another publication (Robinson 1979b). Briefly, the separation technique requires seven steps, each of which involves bathing the five-gram soil sample in acids to remove unwanted materials and immersing it in heavy liquids to float the silica particles. Each step is strictly controlled in order to avoid contamination. After the biosilica are separated and dried, they are mounted on a slide and examined under a microscope, where the various shapes and sizes of particles are identified, measured, counted and recorded.

CLASSIFICATION

As with the separation technique, the process of classification is lengthy and complex (Robinson 1979b). All of the soil samples from 41 LL 254 contained biogenic opaline microfossils. These were classified into the categories outlined in Table 19. Basically, they were divided into two groups, plant and animal, and these were subdivided into one-celled varieties such as algae, one-celled plants, and vascular plants, larger multicelled plants such as trees, etc. Each of these categories was then further refined until the final level contained a list of the opaline microfossils with which the author is actually familiar and can confidently identify. In addition to the author's own comparative collection (Table 20), comparisons were made to photomicrographs and drawings of over 300 species from 102 separate publications.

Phytoliths were most abundant in all of the samples processed, and, of these, grass phytoliths were the most frequent. Fortunately, grasses are quite sensitive to climatic change. During wetter climates, tall grass (Panicoid type phytoliths) prairies are characteristic of eastern Texas, and they were also closely associated with the climax forest vegetation of east Texas before being destroyed by agricultural activity (Gould 1968). Familiar species such as Big Bluestem are typical of this group. Short grasses (Chloridoid type phytoliths) are found in western and central Texas at present and are associated with drier climates. Buffalo grass and grama are familiar varieties. Though occasionally found in central Texas today, cool humid grasses (Festucoid type phytoliths) were not represented in the soil samples from 41 LL 254. These grasses typically dominate in the northern plains now, so they are representative of cool humid climate. There is no reason to believe, therefore, that cool humid conditions have been important during the time period represented by the samples analyzed in this project.

Phytoliths from tree leaves were also observed in the samples, though in varying numbers and much less frequently than grasses. Opaline silica

TABLE 19. MORPHOLOGICAL CLASSIFICATION OF BIOGENIC OPALINE MICROFOSSILS FROM 41 GD 21, 41 GD 21A and 41 LL 254†

I. Phytogenic Opaline Microfossils (Plant)
  A. Unicellular (algae)
    1. Bacillariophyta (Diatoms), Frustles
      a. *Coscinodiscus* sp.**
      b. Unknown**
    2. Chrysophyceae, Cysts
      a. Type 1
      b. Type 2
  B. Multicellular Vascular Plants
    1. Silicified Cells of Grasses (Opal Phytoliths)
      a. Origin in Epidermal Tissues
        (1) Idoblast (short cell)
          (a) Panicoid Type (tall grass)**
          (b) Chloridoid Type (short grass)**
          (c) Festucoid Type
        (2) Long Cell
          (a) Elongate Type 1 (*Bouteloua* sp.)**
          (b) Unknown**
        (3) Trichomes (hairs)**
        (4) Stomata
      b. Origin in Inner Tissues
        (1) Bulliform Cells**
        (2) Tracheids
        (3) Sclerenchyma Fiber
      c. Tissue Fragments
        (1) Chloridoid
        (2) Unknown**
    2. Silicified Cells of Trees and Palm (Opal Phytoliths)
      a. Origin in Epidermal Tissues
        (1) Trichome (hair) bases
          (a) Type 1

†41 GD 21 and 41 GD 21A are described in detail in Robinson 1979b.
**Types observed at 41 LL 254.

TABLE 19. (continued)

- (A) Type 1A
- (B) Type 1B
- (b) Type 2
- (c) Type 3 Unknowns

(2) Trichomes (hairs)

- (a) Type 1
  - (A) Type 1A
  - (B) Type 1B
- (b) Type 2
- (c) Type 3
  - (A) Type 3A
  - (B) Type 3B
- (d) Type 4 Unknowns**

(3) Cells

- (a) Type 1
- (b) Type 2
- (c) Type 3
- (d) Type 4 Unknowns

(4) Stomata

b. Origin in Inner Tissues

(1) Mesophyll

- (a) Cells
- (b) Idoblasts
  - (A) Type 1
    - (aa) Type 1A
    - (bb) Type 1B
  - (B) Type 2
  - (C) Type 3**

(2) Tracheids

c. Tissue Fragments

(1) Type 1

(2) Type 2 (*Quercus* sp.)**

(3) Type 3

(4) Type 4 Unknowns**

**Types observed at 41 LL 254.

TABLE 19. (continued)

II. Zoogenic Opaline Microfossils (Animal)
  A. Unicellular (protozoan)
    1. Silicoflagellidae (Skeleton)
    2. Radiolarians
  B. Multicellular, Spongillidae (Freshwater Sponges), spicules
    1. Megascleres (Skeletal Elements)
      a. Spinose Slender Amphioxea (hollow with sharp points)
      b. Smooth
        (1) Robust Amphioxea**
        (2) Slender Amphioxea**
    2. Microscleres (Dermal Spicules)
    3. Gemmoscleres (Gemmule Spicules)
      a. Birotulate (wheel-like ends) - smooth robust shaft
        (1) Rotules equal
        (2) Rotules unequal
      b. Birotulate - spinose slender shaft

**Types observed at 41 LL 254.

TABLE 20. PLANTS PROCESSED FOR COMPARATIVE COLLECTION OF OPAL PHYTOLITHS

Scientific Name	Common Name
EQUISTEACEAE	
Equisetum sp.	Scouring-rush
PINACEAE	
Pinus taeda L.	Loblolly Pine
CUPRESSACEEAE	
Juniperus ashei Buchh.	Mexican Juniper
Juniperus virginiana L.	Eastern Red Cedar
GRAMINEAE	
Arundinaria gigantea (Walt.) Muhl.	Giant Cane
Phragmites auatrailis (Eav.) Trin. ex Stued.	Common Reed
Stipa leucotricha Trin. and Rupr.	Texas Wintergrass
Elymus canadensis L.	Wild-rye
Panicum virgatum L.	Switchgrass
Schizachyrium scoparium (Michx.) Nash	Little Bluestem
Andropogon gerardii Vitman	Big Bluestem
Andropogon virginicus L.	Broomsedge Bluestem
Sorghastrum nutans L. Nash	Indiangrass
Muhlenbergia sp.	Muhly
Bouteloua rigidiseta (Strud.) Hitche.	Texas Grama
Bouteloua sp.	Grama
CYPERACEAE	
Cladium jamaicense Crantz.	Saw-grass
PALMAE	
Sabal minor (Jacq.) Pers.	Dwarf Palmetto Palm
LILIACEAE	
Yucca treculeana Carr	Spanish Dagger
Yucca rupicola Scheele	Twisted-leaf Yucca
Dasylirion texanun Scheele	Sotol

TABLE 20. (continued)

Scientific Name	Common Name
FAGACEAE	
Fagus grandifolia Ehrh.	Beechnut Tree
Castanea alnifolia Nutt.	Downy Chinquapin
Quercus fusiformis Small	Live Oak
Quercus Shumardii Buckl.	Southern Red Oak
ULMACEAE	
Celtis pallida Torr.	Desert Hackberry
Celtis reticulata Torr.	Netleaf Hackberry
Ulmus crassifolia Nutt.	Cedar Elm
BERBERIDACEAE	
Berberis trifoliolata Moric.	Agarito
ROSACEAE	
Crataegus viburnifolia Sarg.	Hawthorn
Rubus sp.	Dewberry
LEGUMINOSAE	
Prosopis glandulosa Torr.	Mesquite
ANACARDIACEAE	
Rhus copallina L.	Shining Sumac
ACERACEAE	
Acer saccharum Marsh.	Sugar Maple
TILIACEAE	
Tilia americana L.	American Basswood
CACTACEAE	
Opuntia lindheimeri Engelm.	Texas Prickly Pear
EBENACEAE	
Diospyros texana Scheele.	Texas Persimmon
BORAGINACEAE	
Ehretia Anacua (Teran and Berl.) I.M. Johnst.	Anacua

accumulates in the cells of tree leaves and in and around the bases of hairs on leaves. These were the most frequent and most useful evidence of trees.

Opaline microfossils from animals as well as plants were observed. The spicules (or skeletons) of freshwater sponges were identified, although the absence of gemmoscleres prevented classification. Sponges grow locally in the streams and could have been carried to the site by human activity or, more likely, by flooding or wind.

All of these tiny particles of once-living plants and animals have something to say about the environment at the time they were deposited, hundreds or thousands of years ago. While it would be dangerous to draw conclusions from any one of them, taken from a larger perspective, they can present a fairly reliable and reasonable picture of climatic change. Some of the criteria used are as follows. The algae (diatoms) found in these samples live in ponds and streams and reflect a well-watered environment. When tall grasses predominate in the collection of phytoliths, it is thought that the environment is "wet," since tall grasses have definite limits on the amount of dry weather they can stand. On the other hand, short grasses are very tolerant of arid conditions, so when they are more frequent than tall grasses, the environment is assumed to be "dry." Increased frequencies of tree phytoliths are taken to be an indication of yet damper climate. Sponges live in shallow water and vary in their preference of habitats, as some prefer alkaline waters while others prefer acid waters. Therefore, it is possible to determine the condition of the streams near the site and other aspects of the environment.

INTERPRETATIONS

The following discussion of the course of environmental change is based on information summarized in Table 21, Figs. 15, 16 and 17. The sequence is presented from the lowest and oldest sample to the highest and youngest.

Due to the problems with the separation of the biosilica from the granitic sediment of 41 LL 254, the actual sample analyzed may be too small to be statistically valid. The abundance of micaceous flakes of the same specific gravity as the biosilica prevented mounting and analysis of more than 5% of the total sample (see Table 21). However, the data derived from these samples do provide some insight into the paleoenvironment of 41 LL 254.

Sample 1

Sample 1 was collected from Level 15 at a depth of 145 cm, the lowest level sampled at 41 LL 254. No diagnostic cultural material was associated with this sample. Sample 1 is the sample with the highest percentage of the Panicoid type phytolith observed and the lowest frequency of phytoliths. These grass phytoliths were not classified below the taxonomic level of tribe. Tissue fragments of the leaves of deciduous trees were also present. One fragment is very similar to the comparative samples of the leaves of *Quercus* sp. (oak). One fragment of charred plant epidermal tissue was observed but was not identified.

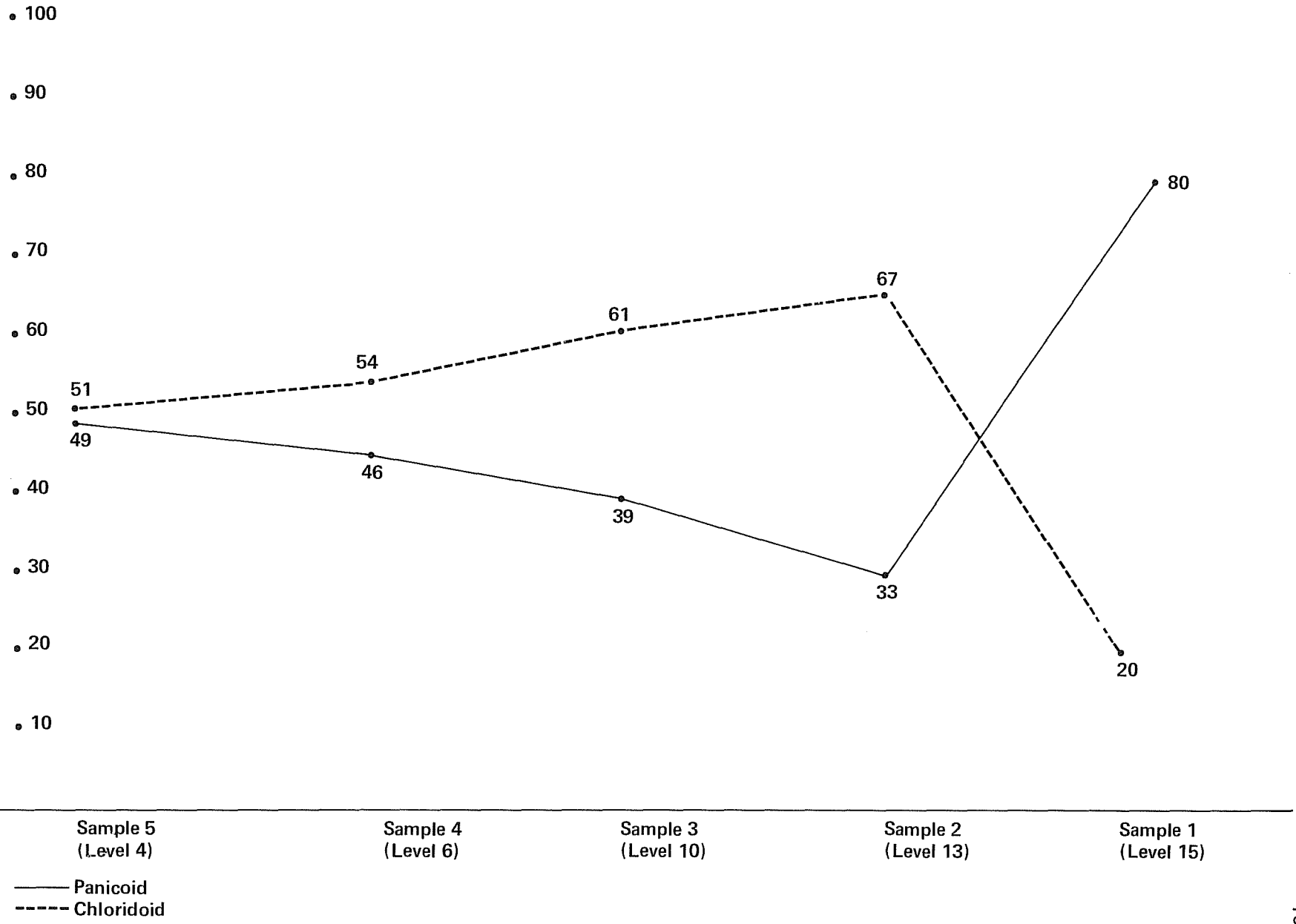


Figure 15. *Percentage of Panicoid and Chloridoid Type Phytoliths, 41 LL 254.*

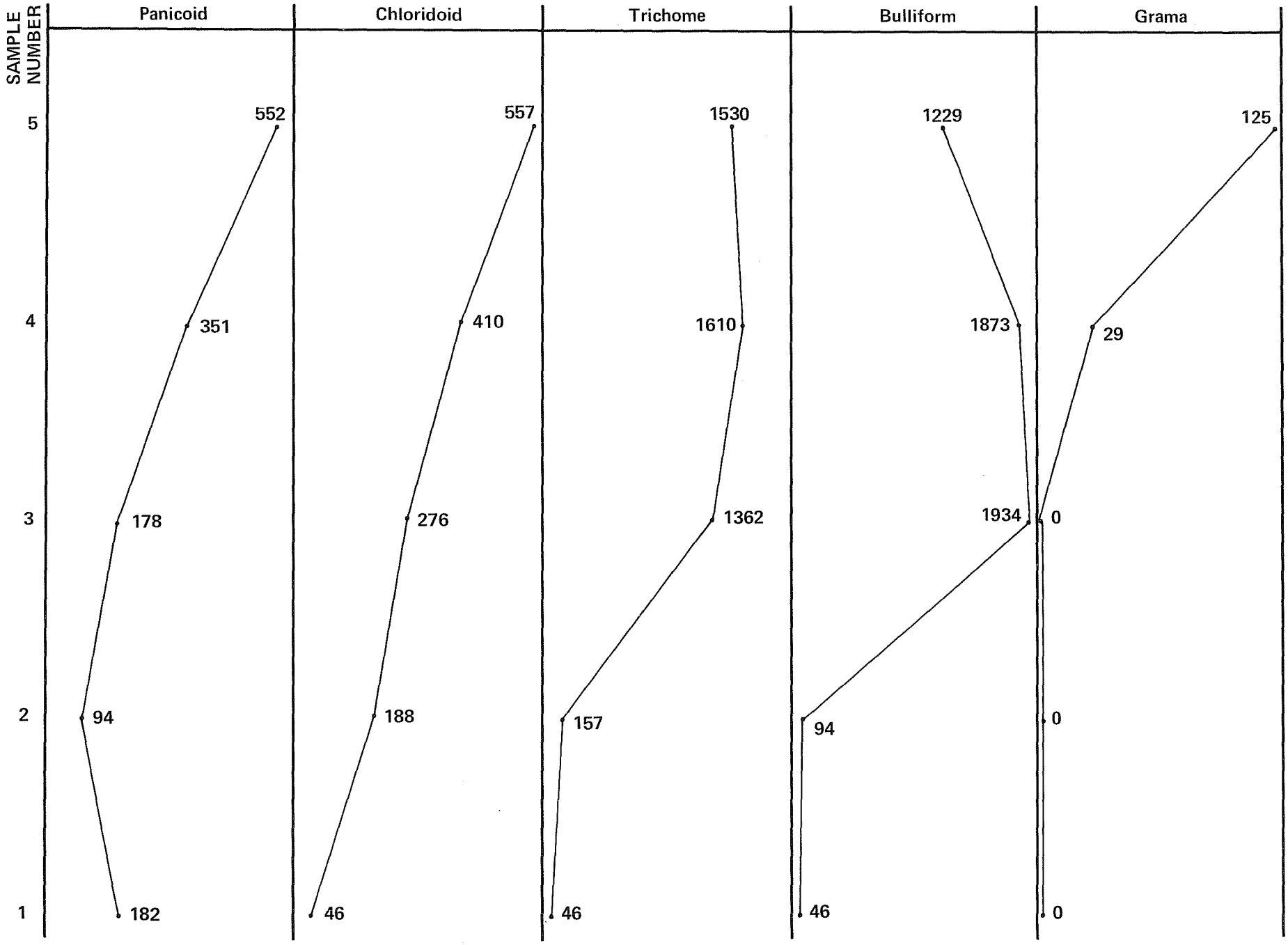


Figure 16. *Frequency of Occurrence of Biosilica, 41 LL 254.* Extrapolated counts computed in Table 21 are used in plotting the distribution of biosilica.

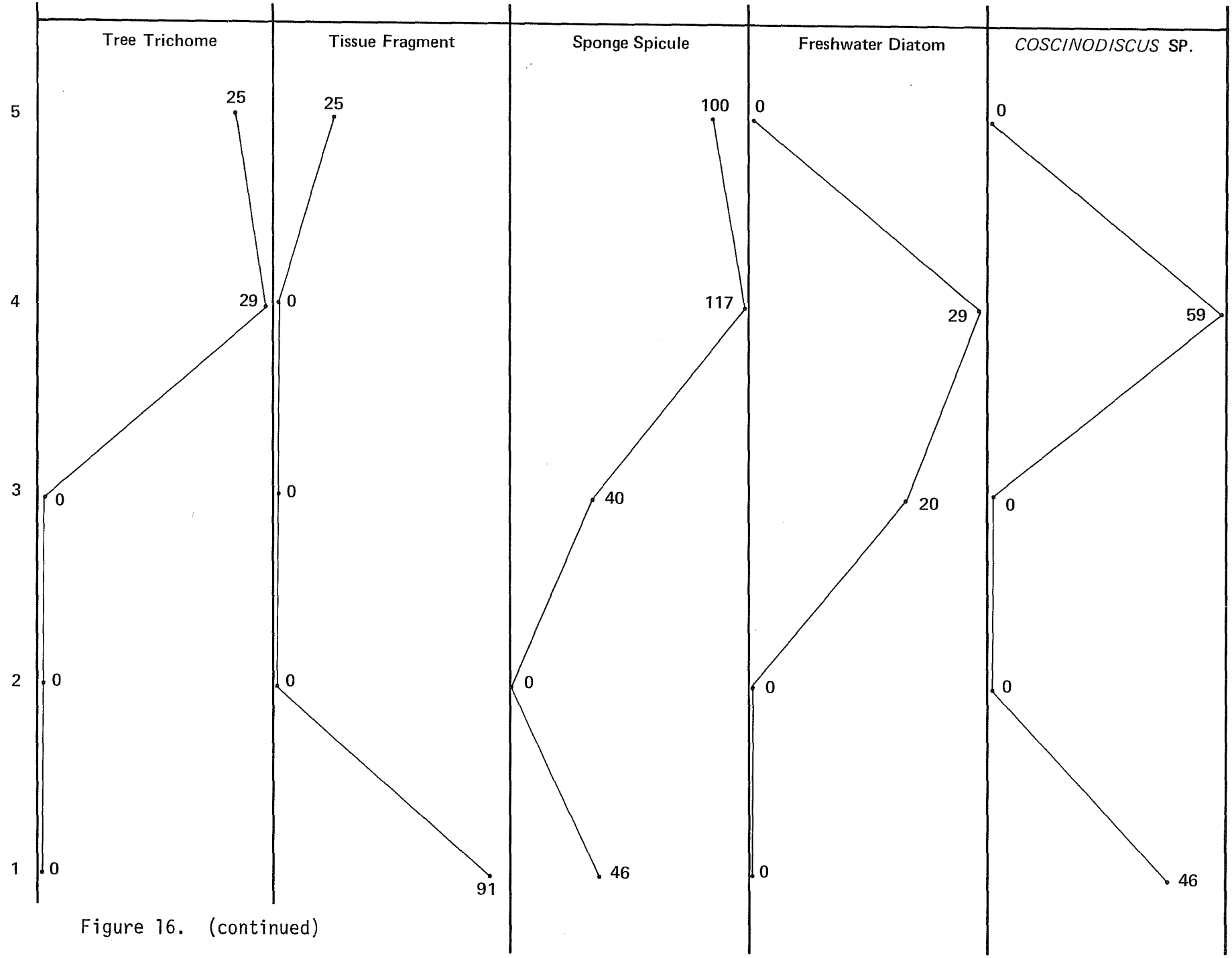


Figure 16. (continued)

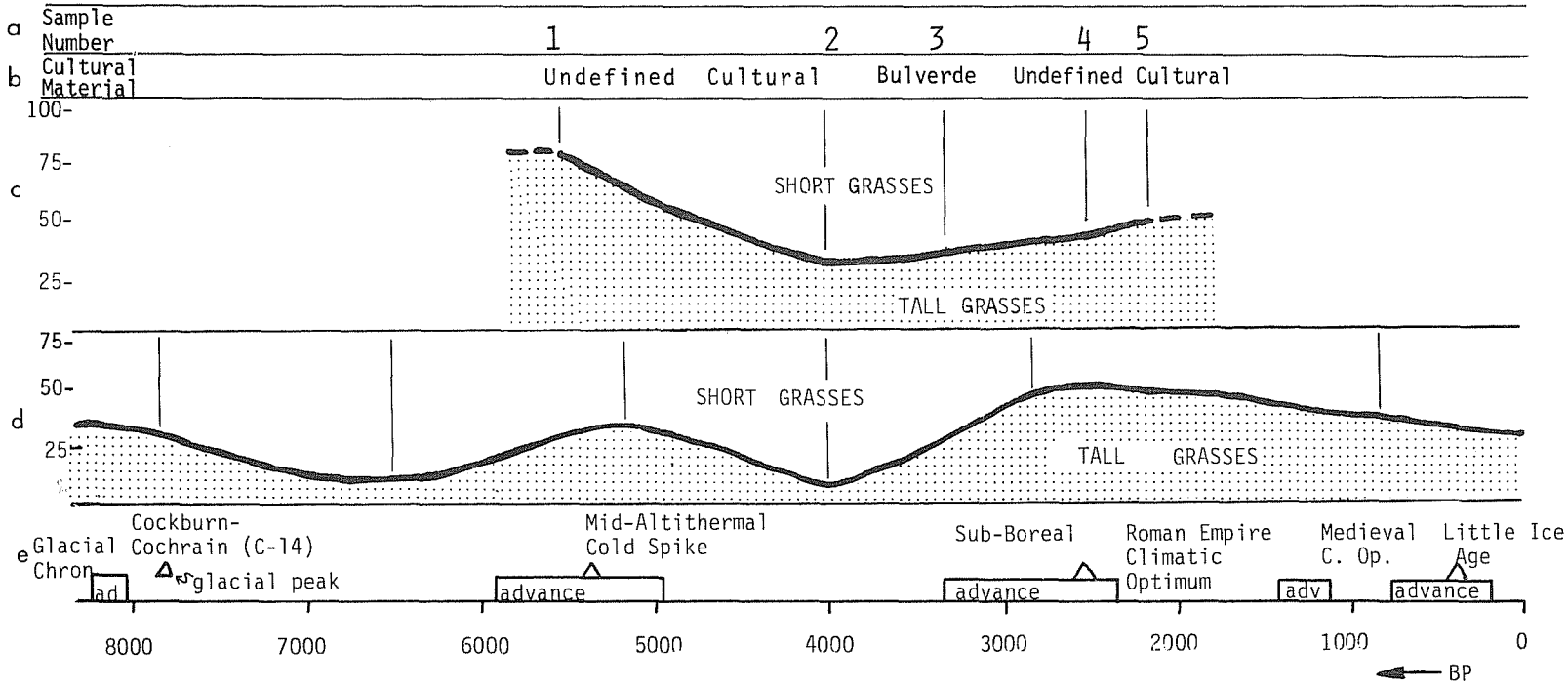
TABLE 21. BIOSILICA FROM 41 LL 254

Sample Number	% M	% S	Panicoid			Chloridoid			Trichome		Bulliform	
			A	E	%	A	E	%	A	E	A	E
5	11.96	33.33	22	552	49	23	557	51	61	1530	49	1229
4	10.25	33.33	12	351	46	14	410	54	55	1610	64	1873
3	15.20	33.33	9	178	39	14	276	61	69	1362	98	1934
2	9.56	33.33	3	94	33	6	188	67	5	157	3	94
1	6.58	33.33	4	182	80	1	46	20	1	46	1	46

% M = Percent of sample mounted
% S = Percent of slide scanned
A = Actual count
E = Extrapolated count = (Actual count ÷ % of slide scanned) ÷ % of sample mounted
* = Fragments

TABLE 21. (continued)

Grama		Tree Trichome		Tissue Fragment		Sponge Spicules*		Freshwater Diatom*		*Coscino-discus* sp.*	
A	E	A	E	A	E	A	E	A	E	A	E
5	125	1	25	1	25	4	100	0	0	0	0
1	29	1	29	0	0	4	117	1	29	2	59
0	0	0	0	0	0	2	40	1	20	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	2	91	1	46	0	0	1	46



* Adapted from Prewitt and Valastro (n.d.)
** Hester (personal communication)
a. Sample numbers, 41 LL 254
b. Cultural material associated with levels
c. Alternating proportions of tall and short grasses, 41 LL 254
d. Alternating proportions of tall and short grasses, 41 GD 21 (Robinson 1979a)
e. Glacial chronology amplified from Denton and Karlen (1973)
f. Central Texas cultural sequence
g. South Texas cultural sequence

Figure 17. *Biosilica Analysis, 41 LL 254.*

Freshwater sponge spicules and fragments of *Coscinodiscus* sp., a marine diatom, were observed. Their presence indicates alluvial and/or aeolian depositional sources of sediments at 41 LL 254.

All the above data imply a mesic environment and a very low vegetational biomass. This mesic interval may correspond to the brief mesic period which occurred on the central Texas coastal plain approximately 5500 B.P. or, less likely, the mesic interval which occurred at approximately 8000 B.P. (Robinson 1979b). The carbonates present in this sample will be discussed in the interpretations of Sample 2.

Sample 2

Sample 2 from Level 13 came from a depth of 125 cm. This sample contained the highest percentage of Chloridoid type phytoliths of any sample analyzed and in very low frequency. The reduced number of trichomes and bulliform cells of this sample may be due to species differences. No phytoliths from the leaves of trees were observed.

This was the only sample in which sponge spicules were not observed. Diatoms were also absent from this sample. These data imply a xeric environment with the possibility of erosion and low vegetational biomass. The carbonates in Sample 1 may be a result of the accumulation of a *Bca* horizon during the time period represented by Sample 2, which may correspond to a dry period which occurred approximately 4000 B.P. or, less possibly, the very xeric period at approximately 7000 B.P. (Robinson 1979b).

It is also possible that differential preservation or the small sample size may be responsible for the low biosilica frequencies of Samples 1 and 2.

Sample 3

Sample 3 from Level 10 was collected from the center of the *Bulverde* occupation zone at a depth of 95 cm (see p. 7 of this report for discussion of chronology). Sample 3 contained a large number of phytoliths from tall and short grasses. No phytoliths were classified below the taxonomic level of tribe. These grass phytoliths were unusual in that most were dark brown to black, indicating a high carbon content. The carbon content may be an indication that grasses were being utilized in the cooking of foods in conjunction with the burned rocks which were present in this level. Phytoliths from Level 10 could serve as an uncontaminated source of carbon for radiocarbon dating of the *Bulverde* occupation of 41 LL 254. The exact age of the level is not known. Phytoliths from the leaves of trees were not observed, but sponge spicules and freshwater diatoms were present.

This sample contained the highest percentage of organics of any sample analyzed. The above data suggest that the environment was mesic, possibly corresponding to the 3000 B.P. mesic interval detected at 41 GD 21 and 41 GD 21A on the central Texas coastal plain (Robinson 1979a).

Sample 4

Sample 4 was collected from Level 6 at a depth of 55 cm. The phytoliths of grasses were the most abundant of any sample analyzed, as were the trichomes of deciduous leaves. Two types of freshwater sponge spicules and one type of freshwater diatom were also observed. *Bouteloua* sp. (grama) was present. The above combination of data indicate a mesic environment, probably not earlier than 3000 B.P. or later than 2200 B.P.

Alluvial and/or aeolian deposition during this time period is suggested by the high frequency of *Coscinodiscus* sp. fragments which occur in sediments derived from Cretaceous limestones. Freshwater sponge spicules were present in the highest frequency of any sample analyzed. This sample also contained many highly eroded phytoliths, as well as those with virtually no pitting. These may be the product of differential preservation or transportation of older phytoliths to the site.

Sample 5

The uppermost sample analyzed was from a depth of 35 cm, from Level 4. Phytoliths of the Panicoid and Chloridoid types were abundant in this sample. *Bouteloua* sp. (grama) was present. Several Panicoid type phytoliths similar to *Andropogon* sp. (bluestem) were also observed, as were tissue fragments of grasses. The trichomes of deciduous tree leaves and phytoliths identical to those from the fall leaves of *Quercus* sp. (oak) were present. Sponge spicules were observed in this sample. Sample 5 seems to be from a mesic environment, perhaps the mesic interval as discussed in the interpretations of Sample 4.

CONCLUSIONS

The data derived from biosilica analysis of five samples of sediment from 41 LL 254, although tentative, imply a mesic period with the occurrence of a xeric interval during the time period represented by Sample 2 from Level 13. The grasses have been abundant in the project area for a long period of time. Evidence of alluvial and/or aeolian deposition of sediments was found. Pollen was not observed in any sample, while phytoliths and other biogenic opaline microfossils were present in large numbers.

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