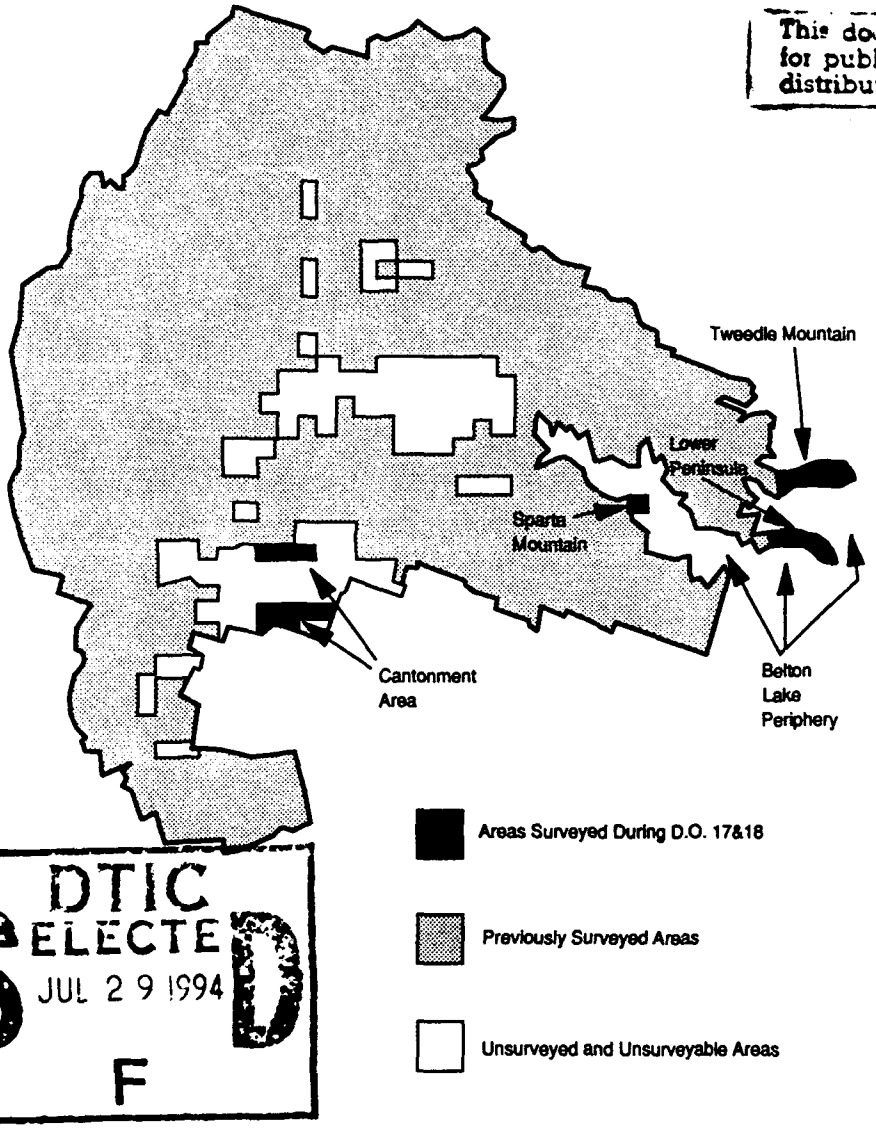
ARCHAEOLOGICAL SURVEY AT FORT HOOD, TEXAS FISCAL YEARS 1991 AND 1992 THE CANTONMENT AND BELTON LAKE PERIPHERY AREAS



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UNITED STATES ARMY FORT HOOD
ARCHAEOLOGICAL RESOURCE MANAGEMENT SERIES
RESEARCH REPORT NO. 27

1993

This report represents a survey conducted in the Cantonment and Belton Lake periphery areas at Fort Hood during Fiscal Years 1991 and 1992. The original contract report has been edited for distribution to the general public.

The cover design reflects that portion of Fort Hood surveyed during this project (dark shaded) as well as all previously surveyed areas (medium shaded).

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Archaeological Resource Management Series
Research Report No. 27

1993

ARCHAEOLOGICAL SURVEY AT FORT HOOD, TEXAS FISCAL YEARS 1991 AND 1992: CANTONMENT AND BELTON LAKE PERIPHERY AREAS

Submitted in Partial
Fulfillment of Delivery Order Numbers 17 & 18
Contract DACA-63-87-D-0155

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Archaeologists from the Archaeological Research Laboratory at Texas A&M University surveyed a total of 7.7 km² in uplands, intermediate areas, and lowlands on and adjacent to Fort Hood, including approximately 4.5 km² or 1,100 acres within the Cantonment area (Delivery Order No. 17) and 3.2 km² or 800 acres in the Belton Lake periphery area (Delivery Order No. 18). Field work was conducted on an intermittent basis from September 1991 through January 1992. Fifty prehistoric and historic archaeological sites were recorded. In the Belton Lake periphery area, prehistoric site density was 9.91 sites per square kilometer and historic site density was 1.55 per square kilometer. The prehistoric site density of 1.78 sites per km² for the Cantonment area was significantly lower than

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the areas around Belton Lake, and historic sites in the Cantonment area also had a lower density (ca. 1.1 sites per km^2).

Prehistoric site types included lithic scatters, lithic/burned rock scatters, rockshelters, and one mussel scatter that yielded artifacts representative of the Paleo-Indian and Archaic periods, as well as undetermined time periods. Of the 40 prehistoric sites, eight do not seem likely to yield important information, but the other 32 appear to be potentially significant. Additional fieldwork is recommended to determine their eligibility for inclusion on the National Register of Historic Places. Nine of the 10 historic sites date from the turn-of-the-century to about 1950 and none of these appear eligible for inclusion on the National Register. Test excavations are recommended at one historic site — a concentration of limestone blocks — to determine whether or not it is potentially significant.

The research topics addressed herein are: (1) a comparison of the number of sites predicted by the recently revised predictive model with the number of sites recorded in the Cantonment and Belton Lake periphery areas; and (2) the nature and distribution of Late Prehistoric sites in the Fort Hood area as they pertain to a previously proposed population decrease in the central Texas area.

The predictive model developed earlier was compared to the actual distribution of sites located during the current survey projects. Since these data were not used in the creation of the model, they represent a relatively independent data set on which to evaluate the model. Comparison of the model predictions for historic sites indicates that fewer historic sites were recorded than would have been expected. Comparison of the model predictions for prehistoric sites suggests that more prehistoric sites were recorded than would have been predicted. The model is well tuned to locating lithic procurement areas, but it is unable to adequately locate rockshelters. Improvement of the elevation data in the Fort Hood GIS would provide better estimates of slope and aspect and might be expected to improve the accuracy of the predictive model.

The model does not attempt to locate significant sites only and it does not distinguish site types or chronological periods. These refinements would make the model considerably more useful as a management tool.

It seems likely that during the Late Prehistoric period there was a general increase in the intensity of occupation of bottomlands, and that much of the evidence for this more recent occupation is buried in the river's floodplain, as well as in the lowlands of the tributary basins. The data reviewed here also suggest that many Late Prehistoric components may have gone unrecognized because they are hidden in rockshelter deposits. Bioarchaeological and radiocarbon data sets from the region show an increase in the number of burials and dated occupations, respectively, from the Archaic to the Late Prehistoric periods. These trends are consistent with the concepts of long-term increase in regional population densities and hunter-gatherer land use intensification. A model for prehistoric land use at Fort Hood and surrounding environs is developed that specifies general trends and focuses on the increasing use through time of food resources with comparatively lower cost:benefit ratios.

ABSTRACT

Archaeologists from the Archaeological Research Laboratory at Texas A&M University surveyed a total of 7.7 km^2 in uplands, intermediate areas, and lowlands on and adjacent to Fort Hood, including approximately 4.5 km^2 or 1,100 acres within the Cantonment area (Delivery Order No. 17) and 3.2 km^2 or 800 acres in the Belton Lake periphery area (Delivery Order No. 18). Field work was conducted on an intermittent basis from September 1991 through January 1992. Fifty prehistoric and historic archaeological sites were recorded. In the Belton Lake periphery area, prehistoric site density was 9.91 sites per square kilometer and historic site density was 1.55 per square kilometer. The prehistoric site density of 1.78 sites per km^2 for the Cantonment area was significantly lower than the areas around Belton Lake, and historic sites in the Cantonment area also had a lower density (ca. 1.1 sites per km^2).

Prehistoric site types included lithic scatters, lithic/burned rock scatters, rockshelters, and one mussel scatter that yielded artifacts representative of the Paleo-Indian and Archaic periods, as well as undetermined time periods. Of the 40 prehistoric sites, eight do not seem likely to yield important information, but the other 32 appear to be potentially significant. Additional fieldwork is recommended to determine their eligibility for inclusion on the National Register of Historic Places. Nine of the 10 historic sites date from the turn-of-the-century to about 1950 and none of these appear eligible for inclusion on the National Register. Test excavations are recommended at one historic site — a concentration of limestone blocks — to determine whether or not it is potentially significant.

The research topics addressed herein are: (1) a comparison of the number of sites predicted by the recently revised predictive model with the number of sites recorded in the Cantonment and Belton Lake periphery areas; and (2) the nature and distribution of Late Prehistoric sites in the Fort Hood area as they pertain to a previously proposed population decrease in the central Texas area.

The predictive model developed earlier was compared to the actual distribution of sites located during the current survey projects. Since these data were not used in the creation of the model, they represent a relatively independent data set on which to evaluate the model. Comparison of the model predictions for historic sites indicates that fewer historic sites were recorded than would have been expected. Comparison of the model predictions for prehistoric sites suggests that more prehistoric sites were recorded than would have been predicted. The model is well tuned to locating lithic procurement areas, but it is unable to adequately locate rockshelters. Improvement of the elevation data in the Fort Hood GIS would provide better estimates of slope and aspect and might be expected to improve the accuracy of the predictive model.

The model does not attempt to locate significant sites only and it does not distinguish site types or chronological periods. These refinements would make the model considerably more useful as a management tool.

It seems likely that during the Late Prehistoric period there was a general increase in the intensity of occupation of bottomlands, and that much of the evidence for this more recent occupation is buried in the river's floodplain, as well as in the lowlands of the tributary basins. The data reviewed here also suggest that many Late Prehistoric components may have gone unrecognized because they are hidden in rockshelter deposits. Bioarchaeological and radiocarbon data sets from the region show an increase in the number of burials and dated occupations, respectively, from the Archaic to the Late Prehistoric periods. These trends are consistent with the concepts of long-term increase in regional population densities and hunter-gatherer land use intensification. A model for prehistoric land use at Fort Hood and surrounding environs is developed that specifies general trends and focuses on the increasing use through time of food resources with comparatively lower cost:benefit ratios.

MANAGEMENT SUMMARY

Archaeological surveys were conducted on an intermittent basis from September 1991 through January 1992 (fiscal years 1991 and 1992) for the U.S. Army at Fort Hood, Texas by personnel from the Archaeological Research Laboratory, Texas A&M University. The surveyed area totals 7.7 km^2 (1,900 acres), with 4.5 km^2 (1,100 acres) being in the Cantonment area (Delivery Order No. 17) and 3.2 km^2 (800 acres) in the Belton Lake periphery area (Delivery Order No. 18). The goals of the surveys were to identify all cultural properties in the survey areas that could be identified through surface examination and to make preliminary recommendations as to their National Register eligibility status. Fifty sites were recorded, 37 of which were in the Belton Lake periphery area (32 prehistoric and 5 historic) and 13 of which were in the Cantonment area (8 prehistoric and 5 historic).

Four of the prehistoric sites in the Cantonment area do not appear to be significant in terms of criteria established for the National Register, and the other four are recommended for additional investigations to adequately assess their potential significance. Backhoe trench excavations are recommended at two lithic scatters and one lithic/burned rock scatter, and shovel tests are recommended for one lithic scatter where dense grass cover obscures the surface. None of the historic sites appear to be eligible for inclusion on the National Register.

Four lithic scatter sites in the Belton Lake periphery area are assessed as not likely to yield important information, and hence they are not recommended for inclusion on the National Register of Historic Places. Systematic surface collections and/or subsurface excavations are recommended at 13 sites to gather additional information needed to adequately assess their eligibility to the National Register: one lithic scatter/rockshelter, two rockshelters, three lithic scatters, and seven lithic/burned rock scatters. Standard documentation should be completed at 14 other prehistoric sites that were discovered but not fully recorded due to time limitations resulting from the greater than anticipated number of sites and inclement weather: one mussel shell scatter, two lithic/burned rock scatters, three lithic scatters, and eight rockshelters. Four of the five historic sites were assessed in the field as not likely to be eligible for inclusion on the National Register. Test excavations are recommended at one site — a concentration of limestone blocks — to determine whether or not it is potentially significant.

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Alston V. Thoms	Co-PI/ Project Director

Although we — the editors and contributors — wish to acknowledge the contributions made by the people and organizations noted here, as well as others who inadvertently remain unnamed, we accept the responsibility for our contributions, including any errors of fact or oversight that they may contain.

INTRODUCTION

Alston V. Thoms

This report presents the results of two intensive archaeological surveys totalling approximately 7.7 km^2 (ca. 1,900 acres) in and adjacent to Fort Hood, Bell, and Coryell counties, Texas. The survey of the Cantonment area and adjacent parts of Fort Hood (Bell and Coryell counties) encompassed 4.5 km^2 or about 1,100 acres, and the Belton Lake periphery area, in and adjacent to Fort Hood (Bell County), covered 3.2 km^2 or about 800 acres (Figure 1). Survey work and related investigations were undertaken by personnel from the Archaeological Research Laboratory (ARL) at Texas A&M University. This is the 25th research report in the Archaeological Resource Management Series that documents results from the continuing Fort Hood cultural resource management program initiated in 1978. Among the primary objectives of the Fort Hood archaeological management program are "to progressively survey areas, and to derive therefrom a computerized predictive model which could be used to forecast the locations of archaeological sites on other areas of the 339 square mile reservation" (Jackson 1991a:1).

Work conducted for the present survey projects is designed to be in accordance with and in partial fulfillment of Fort Hood's general cultural resource management obligations under the National Historic Preservation Act of 1966 (PL 89-665), the National Environmental Policy Act of 1969 (PL 91-190), the Archeological and Historical Preservation Act of 1974 (PL 93-29), and Executive Order 11593 of 1970. More specifically, the investigations are intended to be consistent with the Programmatic Agreement among the U.S. Army, the Advisory Council on Historic Preservation, and the State Historic Preservation Officer of Texas (Jackson 1991a, 1991b).

During the surveys reported herein, 50 sites were recorded; 37 were located in the Belton Lake periphery area (32 prehistoric and 5 historic) and 13 were recorded in the Cantonment area (8 prehistoric and 5 historic). A single historic site and 32 prehistoric sites could not be assessed adequately for National Register eligibility on the basis of survey data alone, and recommendations were made for subsurface testing to gather information needed to assess these sites. The other 17 sites (8 prehistoric and 9 historic sites) do not appear to have potential significance in terms of National Register criteria. Descriptions of each site and site specific recommendations for management purposes are presented in the report.

In addition to the surveys and related analyses, an important goal of the present report is "to provide for the further testing of the revised predictive model, developed under Delivery Order No. 10, against the data gathered from a relatively urbanized and developed area of the reservation" (Jackson 1991a:1), as well as from the comparatively undisturbed areas along the Belton Lake periphery. Delivery Order No. 10 was intended to replicate Fort Hood's "CERL" predictive model and then "test the effectiveness of the model in predicting the number, kind, and location of sites in those areas which have been surveyed by the Contractor subsequent to the model's development" (Jackson 1990a:1). As such, the present report is designed, in part, as a further assessment of the revised predictive model presented in the report entitled *Archaeological Survey at Fort Hood, Texas, Fiscal Year 1990: The Northeastern Perimeter Area* (Carlson et al. 1993).

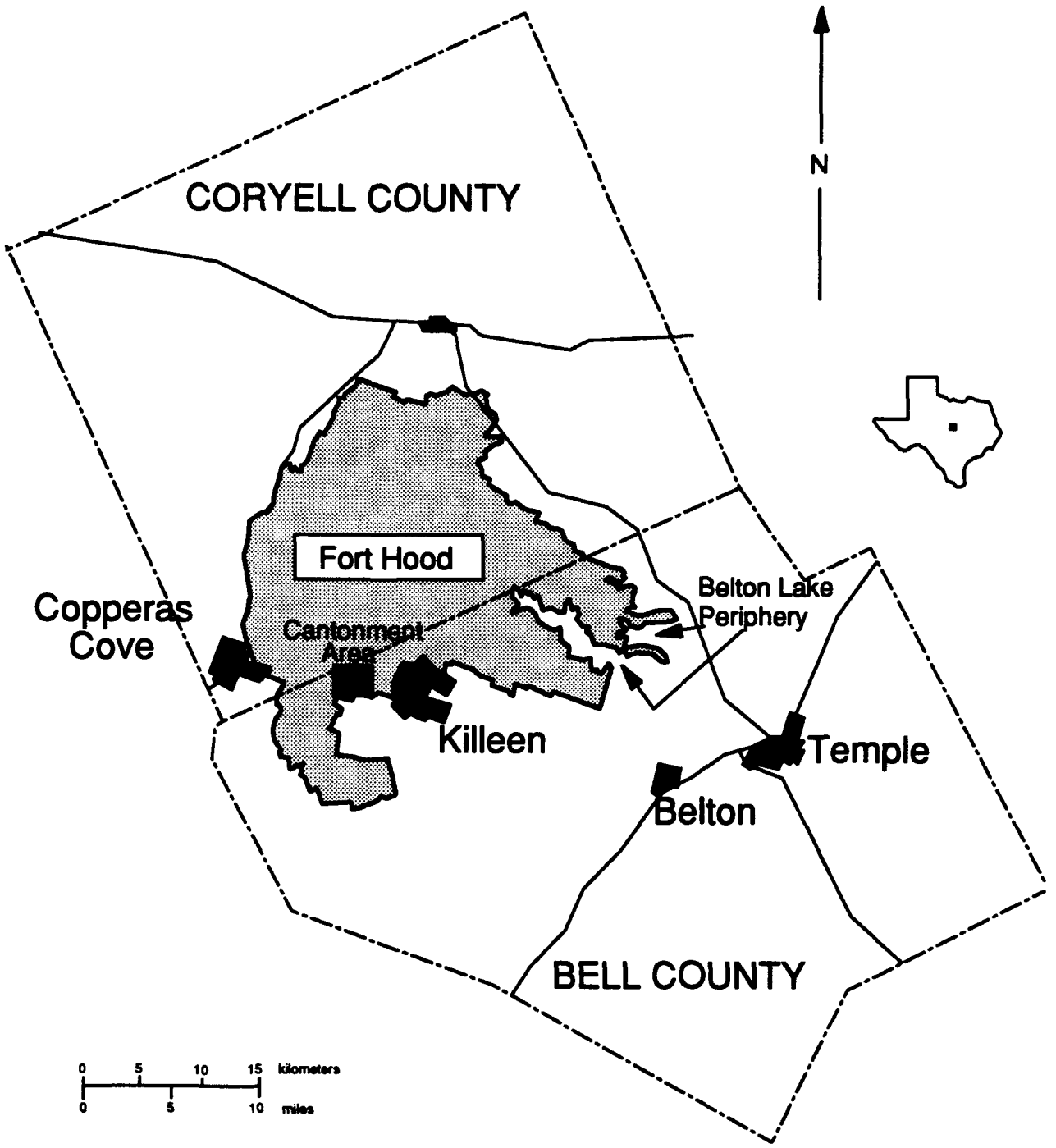


Figure 1. Location of Fort Hood in Bell and Coryell Counties, Texas.

THE SCOPES OF WORK

The scopes of work for the two survey projects are generally similar in requirements, but differ in detail. As stated in their respective delivery orders — No. 17 for the Cantonment area and No. 18 for the Belton Lake periphery area — both projects have two major components: an on-the-ground survey and an assessment of the predictive model.

Delivery Order No. 17: The Cantonment Area Survey

Tasks to be performed during the Cantonment Area project are as follows, quoted from Jackson (1991a:1-3):

> **Introduction:** The Fort Hood archeological resource management program has been ongoing since 1978. During that time an effort was made to progressively survey areas, and to derive therefrom a computerized predictive model which could be used to forecast the locations of archeological sites in other areas of the 339 square mile reservation. The first attempt at the development of such a model was undertaken by CERL, using the GRASS Geographic Information System. The relative success of this effort has never been fully tested. Since the model was developed, a much larger area of the Fort has been surveyed. This delivery order is thus intended to further test the revised predictive model developed under Delivery Order No. 10, against the data gathered from a relatively urbanized and developed area of the reservation. This project is to be conducted under the same research design as Delivery Order No. 10.
>
> **General Work Requirements:** The field survey portion of this work order will be carried out in accordance with the latest edition of the Fort Hood Standard Operating Procedure (Briuer and Thomas 1986). Because the units to be surveyed are only partial grid squares bordering U.S. Highway and the Army family housing areas, the Contractor may use a smaller field crew (3 persons) for greater efficiency.
>
> **Site Distribution Prediction for Unsurveyed Areas:** Using the revised model developed under Delivery Order No. 10, the Contractor shall generate a predictive map of locations in the unsurveyed areas specified below that possibly contain historic and/or prehistoric archeological sites. A finer discrimination between functional sites types and/or time periods may be made at the discretion of the Contractor. As a minimum requirement, historic and prehistoric sites will be separately predicted. The results of the field survey shall be used as a test of the model independent of the test specified in Delivery Order No. 10.
>
> **Field Survey:** The Contractor, following specifications set forth in the Fort Hood Archeology Program Standard Procedures (Briuer and Thomas 1986) and the Fort Hood Laboratory Standard Operation Procedure (LSOP) (Jackson 1984), as well as the modifications to those procedures described in this work order, shall survey portions of 9 individual grid squares totalling approximately 1100 acres. The individual quads are listed below. Only those portions of the quads that have not been heavily impacted by the construction of the Highway and housing are to be examined.

Quad	Comments	Portion for Survey
1. 16/42	Omit area south of Watercrest Rd.	66%
2. 16/43	Omit U.S. 190 and area north of railway	66%
3. 17/42	Omit housing area	66%
4. 17/43	Omit 190 cloverleaf construction area	30%
5. 18/43	Omit housing area	60%
6. 19/43	Omit housing area	30%
7. 16/46	Omit Cantonment area	40%
8. 17/46	Omit Cantonment area	40%
9. 18/46	Omit Cantonment area	40%

Site Recording: The Contractor shall record up to 6 historic and prehistoric sites under this Delivery Order. If the number of sites actually encountered in the survey area exceeds the total estimate of 6 sites, the Contractor will notify the COR, and a modification of the Delivery Order will be negotiated to cover the additional site recordings. Because much of the area to be surveyed lies in the Nolan Creek floodplain, a larger number of prehistoric sites is anticipated.

Because this survey will follow the Geomorphology study envisioned in Delivery Order No. 8, it is anticipated that some buried sites may be identified in these areas. Field crews should thus incorporate data derived from excavated test trenches in these areas with observed surface characteristics as well.

Shovel Testing: Shallow shovel testing shall be conducted as a part of normal site recording and does not constitute a task separate from site recording. Such tests may be conducted at the discretion of the contractor, so long as they not extend site recording times significantly. Where extensive, or deep, excavations would be required to evaluate the extent and depth of a site, it is appropriate to note this in the record, and defer such work to the evaluation phase.

Two-Phase Flexible Survey: As with other recent surveys, the Contractor is authorized to separate the quadrat sweeping and site recording phases of the field work in such a manner as to promote optimal manpower utilization. To achieve this, the size of the field crew may be reduced to three persons, as specified above.

Analysis: The Contractor shall undertake the necessary analysis of the collected data to make a meaningful comparison between the site locations, types, and frequencies predicted by the revised predictive model and the data collected in the survey. The research questions in Delivery Order No. 10 will be addressed, but the specific question of the effectiveness of the predictive technique in small sample areas such as this should be added. The analysis will also address directly the National Register eligibility of any sites found that might be impacted by the construction of the proposed 195 units of new family housing to be constructed in the southern area, or sites located in the three northern quadrats that may be impacted by construction of warehouse facilities [Jackson 1991a:1-3].

Delivery Order No. 18: The Belton Lake Periphery

Tasks to be performed during the Belton Lake Periphery project are as follows, quoted from Jackson (1991b:1-3):

Introduction: The Fort Hood archeological resource management program has been an ongoing effort since 1978. During the twelve year period, over 95% of the non-cantonment land outside the live-fire area has been surveyed. The land to be surveyed under this delivery order while under operational control of Fort Hood is owned by the U.S. Army Corps of Engineers, and is part of the Belton Lake periphery.

General Work Requirements: The field survey portion of this work order will be carried out in accordance with the latest edition of the Fort Hood Standard Operating Procedure (Briuer and Thomas 1986). Because the units to be surveyed are partial grid squares along the perimeter, the Contractor may use a smaller field crew (3 persons) for greater efficiency.

Site Distribution Prediction for Unsurveyed Areas: Using the revised model developed under Delivery Order No. 10, the Contractor shall generate a predictive map of the locations as yet in unsurveyed areas specified below that are most likely to be the location of historic or prehistoric archeological sites. A finer discrimination between functional site types and/or time periods may be made at the discretion of the Contractor. As a minimum requirement, historic and prehistoric sites will be separately predicted. The results of the field survey shall be used as a test of the model independent of the test specified in Delivery Order No. 10.

Field Survey: The Contractor, following specifications set forth in the Fort Hood Archeology Program Standard Procedures (Briuer and Thomas 1986) and the Fort Hood Laboratory Standard Operation Procedure (LSOP) (Jackson 1984), as well as the modifications to those procedures described in this work order, shall survey portions of 9 individual grid squares or about 800 acres. The individual quads are listed below. Figure 1 presents a map of the areas to be surveyed.

Quad	Comments	Portion for Survey
1. 36/47	Southwest corner	20%
2. 43/46	Land sector	40%
3. 43/48	Land sector	20%
4. 43/49	Land sector	30%
5. 44/46	Land sector	30%
6. 44/48	Land sector	15%
7. 44/49	Land sector	80%
8. 45/48	Land sector	15%
9. 45/49	Land sector	80%

Site Recording: The Contractor shall record up to 30 historic and prehistoric sites under this Delivery Order. If the number of sites actually encountered in the survey area exceeds the total estimate of 30 sites, the Contractor will notify the COR, and a modification of the Delivery Order will be negotiated to cover the additional site recordings. Because much of the area be surveyed lies in the steeply sloped areas near the shore of Belton Lake, a larger number of prehistoric rock shelter sites is anticipated.

Shovel Testing: The excavation of shallow (30 cm or less) shovel tests, as an aid to the determination of site boundaries, is authorized when surface indications are not deemed sufficient. These may be conducted as part of normal site recording, and do not constitute a task separate from site recording. Such tests may be conducted at the discretion of the

contractor, as long as they do not extend site recording times significantly. Extensive or deep excavations necessary to evaluate the extent and depth of such sites would be noted for the record, and deferred to the evaluation phase.

Two-Phase Flexible Survey: As with other recent surveys, the Contractor is authorized to separate the quadrat sweeping and site recording phases of the field work utilizing optimal manpower. This may entail reducing the size of the field crew to three persons in the case of fragmentary quadrats.

Analysis: The Contractor shall undertake the necessary analysis of the collected data to make a meaningful comparison between the site locations, types, and frequencies predicted by the revised predictive model and the data collected in the survey. As a minimum, the following questions will be addressed in the analysis; the Contractor is encouraged to expand on these to address issues of wider interest such as the application of the model to other areas of Central Texas.

a. Is the model useful in predicting the locations of prehistoric rockshelter sites?

b. Does the survey data from this survey indicate any greater frequency of occupied sites on north-facing slopes versus south-facing slopes?

c. Do other factors such as depth of the available overhangs seem to influence selection of shelters for occupation to a greater degree that the direction of exposure [Jackson 1991b:1-3]?

Research Questions for Predictive Model Component of Delivery Order Nos. 17 and 18

One of the goals of the present project is to assess the revised predictive model developed under Delivery Order No. 10. As part of that project's scope of work, the locations, types and frequencies of the 77 sites recorded in the 26 km^2 (6,425 ac) survey area were compared with predictions generated from the revised predictive model. Survey data from the Cantonment and Belton Lake periphery areas are also useful in assessing the revised predictive model. Specifically, the scopes of work for the present projects should address the following questions (Jackson 1990a:5-6):

a. What percent of the land surveyed could have been left unexamined if a 10% shortfall in recorded sites had been acceptable? 20% shortfall?

b. If only those locations predicted by the model to have a high (.75 or greater probability) had been subjected to pedestrian survey, what percent of the recorded sites would have been missed?

c. How do these results compare with those predictions generated by the original CERL predictive model?

d. What would have been the minimum data sample required to attain predictive accuracy sufficient to make the model an effective management tool?

e. Are the predicted site locations along the Cowhouse Creek in the artillery impact area considered to be as accurate as those in the test sample along the Leon River? Is further survey in these highly restricted access areas recommended?

f. Are historic sites the primary problem as far as the predictive locations? Do they require a different predictive model [Jackson 1990:5-6]?

Changes in the Scopes of Work for Delivery Order Nos. 17 and 18

The discovery of more than twice as many sites as expected — six anticipated, 13 recorded — in the Cantonment area and vicinity necessitated changes in the scope of work. Because additional funding was not available to cover the costs of fully documenting the seven unanticipated sites, a decision was made to "borrow" task time and funds from an upcoming survey project along the periphery of Belton Lake (Thoms 1993). While this action enabled completion of the Cantonment area survey, the net result was a significant reduction in the scope of field work for the Belton Lake periphery survey where "extra" sites were also discovered, with 30 being anticipated and 37 actually recorded. Moreover, unusually heavy rains and high lake levels resulted in slower survey rates, and prevented the complete documentation of several of the sites (Carlson 1992:3). For all of the recorded sites, however, locational data are available and can be used effectively for the predictive modeling component of the project.

LOCATION OF THE SURVEY AREAS

Archaeological surveys were undertaken in nine survey quadrats (100 ha, 1 km^2, 247 ac) to identify potentially significant sites at proposed construction zones in and adjacent to the Cantonment area at Fort Hood. The survey areas cover approximately 1,100 acres, all of which are in the uplands of southwestern Coryell County and eastern Bell County. Portions of three quadrats (1 km^2, ca. 247 acres) were surveyed in and adjacent to the northern part of the Cantonment area where several warehouses are planned (Figure 2). Within the southern part of the Cantonment area, portions of six quadrats along minor watercourses were surveyed where almost 200 family housing units are planned (Figure 2).

Portions of nine quadrats were also surveyed in the Belton Lake periphery area (Figure 2), encompassing about 800 acres. Eight of the quadrats were in the Tweedle Mountain area and in a similarly-linear, plateau-ridge top area to the south, also extending into Belton Lake. One quadrat in the Sparta Mountain area is in hillock/slope terrain adjacent to the lake.

ORGANIZATION OF THE REPORT

The next two chapters in this report provide contextual information on the environmental and cultural settings in the Fort Hood area. These are followed by chapters on the research strategy, survey methods and results. Subsequent chapters provide research results pertaining to changes in land-use patterns and assessment of the revised predictive model. The final chapter includes recommendations and conclusions. Several appendices provide specific project results, including site and artifact descriptions.

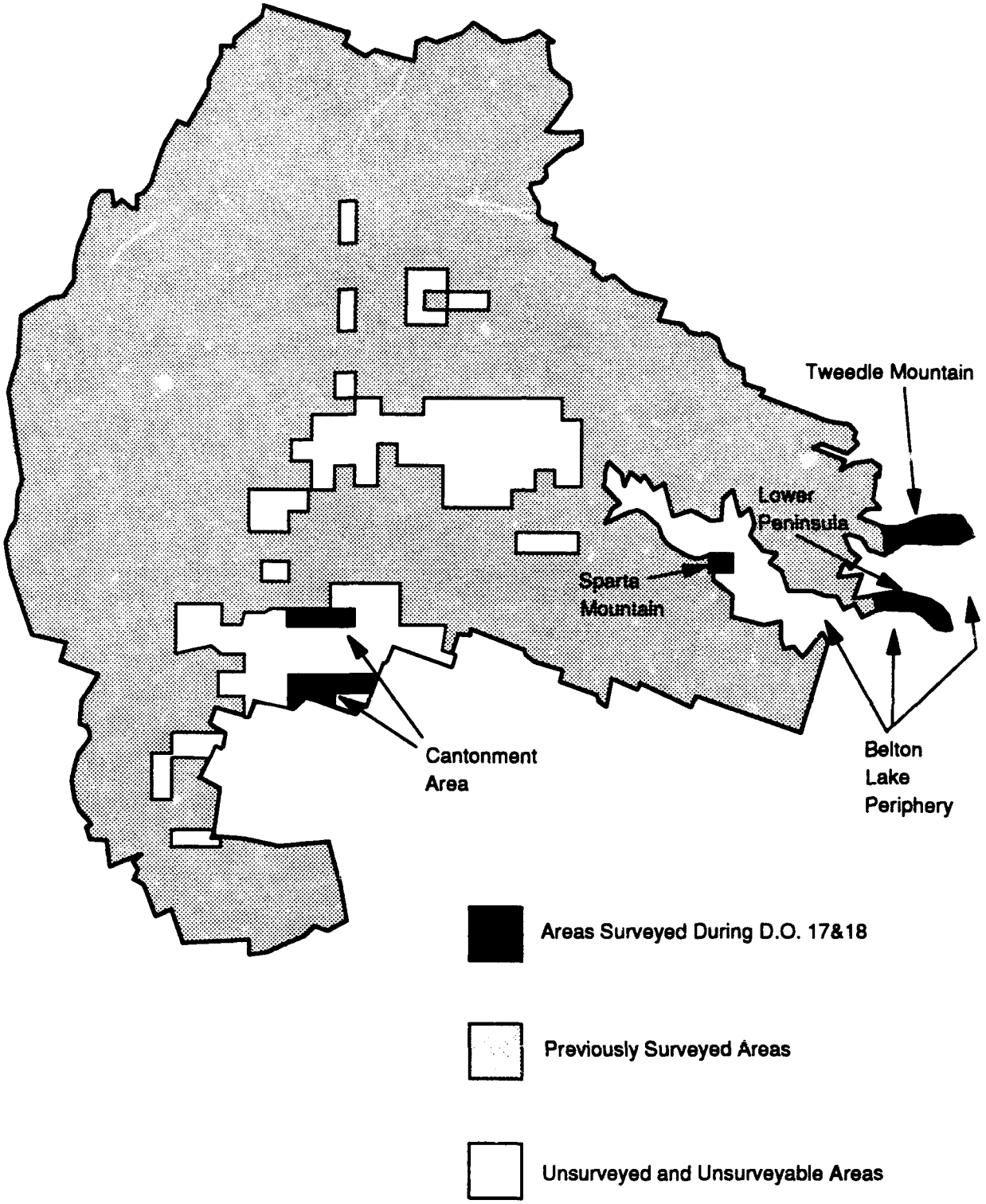


Figure 2. Map of the Cantonment and Belton Lake periphery areas showing the locations of the 18 survey quadrats.

RESEARCH STRATEGIES

Alston V. Thoms and David L. Carlson

The Fort Hood archaeological surveys, testing projects, and related studies undertaken by the Archaeological Research Laboratory (e.g., Carlson 1993; Ensor 1991; Nordt 1992) are a continuation of investigations undertaken in central Texas and surrounding environs during the last 30 years by archaeologists and related specialists who were or are now affiliated with Texas A&M University (e.g., Shafer 1971; Sorrow et al. 1967). Over the years, much of the focus has been in the Brazos River basin. Previous archaeological studies in the regions around Fort Hood include surveys and testing work conducted in anticipation of construction of Belton and Stillhouse lakes (Shafer et al. 1964; Sorrow et al. 1967), survey and testing for Granger and Northfork lakes (Moore 1977; Moore et al. 1978), survey work in the South Bend area of the Brazos River valley (Saunders et al. 1992), and survey and testing along the Brazos River valley slopes in the Post Oak Savannah area (Thoms 1993). Collectively, these and other archaeological projects at Texas A&M University provide a reliable foundation for the development of regionally specific, long-term land-use models for different parts of the Brazos River basin and the inner Gulf Coastal Plain, including the Fort Hood area.

The legally mandated inventory, assessment, and protection of potentially significant cultural resources within the Fort Hood military reservation can be accomplished effectively and efficiently within a research strategy that focuses on past land-use systems. Using this approach, the degree of significance manifested by a given cultural resource is determined, in large measure, by its potential to contribute reliable data that are relevant to settlement and subsistence patterns and changes, related technologies, and chronology. The following discussion draws heavily from Thoms' (1985, 1991) previous comments regarding the utility of a land-use research framework for cultural resources management programs.

Since all sites are not likely to be significant, and because the property of significance is not necessarily either spatially or temporally constant, individual assessments must consider the resource potential to contribute information useful in the elucidation of identified research topics, problems, and data gaps. The land-use approach mandates consideration of all kinds of cultural resources as potentially significant, while focusing on the potential contributions of cultural resources to specific research topics. Importantly, this approach discourages the *a priori* dismissal of certain sites (e.g., "ephemeral sites," "temporary camps," "limited activity loci," "farmstead ruins," "low-density artifact scatters") that are sometimes assumed to be insignificant (cf. Binford 1981; Talmage and Chesler 1977).

RESEARCH TOPICS

As stated in the scope of work (see "Introduction"), the basic research objective for the present project is to make meaningful comparisons between site locations, types, and frequencies that, on one hand, were predicted by the revised predictive model (Carlson et al. 1993), and on the other hand, were recorded in the cantonment area during the present survey. The first of the following subsections discusses the research strategies and rationale for testing the revised predictive model with the new survey data. Discussions in the second subsection focus on the strategy for developing the land-use research topic by assessing patterns in the data that show a marked decrease in the frequency of sites and artifacts attributed to the Late Prehistoric period.

Predictive Modelling: Quantifying and Qualifying Site Location

Predictive modelling is an area of archaeological research that has received increased attention since 1970 (Kohler 1988; Kohler and Parker 1986; Kvamme 1988b; Kvamme and Kohler 1988). Thoms (1988) summarizes the results of 22 different projects to illustrate the variety of approaches which have been taken. The principal drawback to the earliest studies was the difficulty in obtaining data to describe each site location (Kvamme 1988a). Generally, these data were obtained during the survey and efforts were made, at least in the southwest (Gumerman 1971), to systematize site recording so that surveys from several nearby areas could be analyzed together. Sample sizes are often quite small and the first efforts did little more than to develop generalizations about site locations from survey data.

The main barrier to more sophisticated studies was the difficulty in documenting the overall characteristics of the area being surveyed. It is of little interest to know that all sites are within 500 m of water if fewer sites in the survey area are more than 500 m from water. By the 1980s, researchers such as Kvamme (1985) and Parker (1985) were making direct comparisons between site locations and the overall region in which the sites were found. For small areas, the region could be gridded off and the characteristics of each grid could be determined from maps. For larger areas, randomly selected places which did not contain sites could be chosen and used as a control (non-sites). The development of Geographic Information Systems (GIS) allows either or both approaches to be used on large areas.

The extraordinary archaeological data base preserved at Fort Hood affords an opportunity to study past human behavior, and it is especially well-suited for studying long-term changes in land-use systems. Because sites at Fort Hood are largely not subject to immediate, complete destruction, site preservation continues to be an important option. Over the next several generations, areas such as Fort Hood will preserve much information about the past and will become a kind of archaeological archive.

Fort Hood is larger and has more sites than other areas used for any previous predictive models. Prehistoric site densities are high on the post since the raw material for tool production, chert, is abundantly available. In addition, most of the post has high surface visibility and an upland setting which is erosional rather than depositional in its character. Fort Hood is not unique; much of central Texas has these characteristics. High site densities in this area are a reflection of site visibility, not population density.

The predictive model developed earlier (Carlson et al. 1993) can be compared to the actual distribution of sites located during the current survey projects. Since these data were not used in the creation of the model, they represent an relatively independent data set on which to evaluate the model. This evaluation may clarify where the model is successful and where it needs further adjustment. Currently, the model does not attempt to locate only significant sites and does not distinguish site types or chronological periods. These refinements would make the model considerably more useful as a management tool.

Land-use: Fort Hood Data in a Central Texas Context

Archaeology in the eastern section of the Edwards Plateau, the southern part of the Blackland Prairie, and the adjacent areas of the Gulf Coast Plains is now fairly well known. The existing data base comes mainly from federally mandated cultural resource studies, including the Fort Hood archaeological projects, conducted during the last 10 to 15 years. Results of these and earlier studies demonstrate that hunter-gatherers occupied the regions encompassing the present-day Fort Hood military reservation throughout most of the last 11,500 years (Black 1989; Carlson et al. 1993; Hester 1989).

Within the last two decades, archaeologists have refined old cultural chronologies and settlement and subsistence pattern models for central Texas, and they have presented some new ones as well (Black 1989). The bulk of the data derives from archaeological projects in lake areas; however, data from upland areas, including Fort Hood, have also been used (Black 1989; Carlson and Ensor 1991) (see also the "Cultural Background" section of this report).

The land-use orientation of the research design is grounded in human ecology and the economic choices faced by hunters and gatherers. Based on the works of Binford (1980), Jochim (1976), Steward (1955), Thomas (1979), and Yellen (1977), hunter-gatherer behavior is currently viewed as resulting from choices made on a daily basis — behavior meant to reduce expenditure of effort and minimize risk. These decisions ultimately determine the nature of the seasonal round of a particular cultural group. The nature of this adaptation generally determines the population density and size of local groups.

An important part of determining how individual groups adapted to their environment is understanding mobility patterns. Binford (1979, 1980) and Carlson (1979) have discussed mobility strategies and how hunters and gatherers obtain the food and raw materials they require. Binford (1980) distinguishes the two ends of a continuum of strategies as foraging versus collecting. Foragers are usually highly mobile. The whole social group or band moves to exploit widely dispersed resources. In contrast, collectors move food resources back to the social group in a base camp. Foraging strategies generally result in a series of residential camps which are similar in their organization and size except for seasonality differences in the food resources gathered.

Logistically-organized systems of collectors have a variety of site types which coordinate the flow of foodstuffs to the base camp (Binford 1980, Carlson 1979). Residential mobility should be more common where overlapping resource zones can be effectively exploited by small groups, while logistical strategies are more likely to develop where a single resource determines site location as a result of its abundance or necessity (Carlson 1979:118). Various kinds of extraction camps are associated with collectors and these may be quite diverse in their size and organization. As Amick (1984:172) indicates, these strategies are not mutually exclusive. For example, one strategy may characterize the fall and winter, while another characterizes spring and summer. Both serve as organizational frameworks from which hunter-gatherer behavior can be interpreted (Binford 1980).

The organization of hunter-gatherers within central Texas over the last 12,000 years can be explored in terms of this basic dichotomy. Changes in mobility may help us understand the degree to which the prehistoric inhabitants of Fort Hood responded to environmental changes or to pressures from other groups. In order to study land-use stability and change at Fort Hood, five kinds of information are needed: (1) environmental change; (2) cultural chronology; (3) subsistence patterns; (4) site function and settlement patterns; and (5) cultural affiliations.

Historic sites on the post require a different set of questions. The establishment of European settlements did not begin until after 1840. Most of the historic sites on the post have evidence of occupation from the early-to-mid twentieth century. These historic sites have the potential to provide information about undocumented rural lifeways. The principal focus of historic site research is to identify sites (both individual farmsteads and whole communities) that provide information about rural lifeways for each decade since the initial settlement phase of the post.

BROAD RESEARCH QUESTIONS

Available archaeological, ethnohistorical, and historical data illustrate that significant elements of the prehistory and history of present-day central Texas are well-represented in the Fort Hood area. These data afford the opportunity to address a wide variety of research topics, including but not limited to culture history and cultural processes, paleoenvironmental conditions, technology, settlement, and subsistence patterns. All of these particular topics are components of the more general research problem of understanding long-term changes in human land-use systems. Land-use, as the term is employed here, refers to the patterned exploitation of resources by human groups, the manner in which they used places on the landscape, the technologies they employed in the process, and the effect of that exploitation on the ecosystem (Kirch 1982:139; Thoms 1989:6).

The study of land-use systems centers on addressing a general question that can be tailored to specific regions or time periods: how did human groups manage to secure a living for thousands of years even though environmental conditions changed and human populations probably increased substantially (cf. Binford 1983; Cohen 1977, 1989; Johnson and Earle 1987)? Addressing this question mandates consideration of more specific topics or questions, the answers to which are obtained more readily. Research undertaken to address the more specific questions provide an empirical basis for understanding regional history and prehistory, and a means to recognize particular research needs.

Identification of important research problems requires an understanding of the data bases used for generating expectations about the nature and distribution of cultural resources. Land-use studies, whether they concern archaeological, ethnographical, or historical resources, typically address the same kinds of questions.

1. What is the spatial and temporal distribution of food and other resources likely to be utilized by human groups?

2. What is level of land-use intensification or specialization expected of the populations under investigation?

3. What is known about the nature and distribution of cultural resources in the region, and how does this compare to the expected characteristics?

ASSESSING LATE PREHISTORIC LAND-USE PATTERNS

In a recent overview of central Texas archaeology, it was noted that "most researchers interpret the Austin interval data as evidencing population decline, settlement pattern change, and technological change" (Black 1989:32). The "Austin interval" signals the onset of the Late Prehistoric period, a time when population pressure and packing in many other parts of North America was very high. Various explanations have been offered to explain the ostensible population decrease in central Texas. Climatic changes toward more xeric conditions are often cited (Shafer 1971; Skinner 1981). It has also been argued that the decrease may be more apparent than real and that many Late Prehistoric components are buried or otherwise obscured from detection (D. Carlson et al. 1986:55-63; Nordt 1992:77-80). Actual decreases in regional population densities are also suggested (Prewitt 1985). But more often than not, the decrease in site density is accounted for by an unspecified combination of changes in demography, land-use patterns, climatic patterns, technological innovations, and external influences (Black 1989).

Data from the Cantonment and Belton Lake periphery surveys as well as from other parts of Fort Hood are especially useful in assessing Late Prehistoric land-use patterns in upland settings. Investigations

conducted earlier in Belton and Stillhouse Hollow Lakes provide data on the use of riverine or bottomland landscapes. Two questions can be readily addressed with the available data: (1) how are Late Prehistoric sites distributed across the landscape in the Fort Hood area and vicinity; and (2) do the data actually support a general population decline during the Late Prehistoric period? These research questions and related issues are addressed in the chapter entitled "Archaeological Data and Late Prehistoric Period Population Dynamics in Central Texas."

ENVIRONMENTAL BACKGROUND AND THE LOCAL LANDSCAPE

Alston V. Thoms

Knowledge of the regional and local environment, or more broadly, of the area's ecology, is critical to understanding the nature of past human land-use systems and human behavior in general. Earlier reports in the Fort Hood research series present a wide variety of environmental data for the reservation area as a whole (e.g., Guderjan et al. 1980; Skinner et al. 1981, 1984: United States Department of the Army 1979). More recent reports include summary information on geology, geomorphology, climate, and water resources, as well as tables listing characteristic flora and fauna (e.g., D. Carlson et al. 1986; Ensor 1991).

This chapter provides an ecological context for subsequent discussions about culture history and past land-use systems in the lowlands, intermediate uplands, and upland zones (Figure 3). In the concluding section, the information presented herein serves as the basis for generating a set of expectations about the nature of the archaeological record in the Cantonment area of the Fort Hood military reservation.

AN OVERVIEW OF THE REGIONAL ECOLOGY

Fort Hood encompasses approximately 216,960 acres (ca. 339 square miles) along the eastern edge of the central Texas physiographic provinces collectively known as the Hill Country (Weniger 1984). Physiographically, Fort Hood and surrounding environs are within the Lampasas Cut Plain of the Great Plains Province; immediately to the east is the Blackland Prairie of the Coastal Plain Province (Fenneman 1938). While not part of the Edwards Plateau per se, Lampasas Cut Plains is a similarly rolling to rugged, limestone-cored region (Arbingast et al. 1976). The Blackland Prairie to the east is a comparatively low-relief region (Arbingast et al. 1976).

Terrain

Throughout the Fort Hood area, limestone bedrock is never far below the surface. From highest on the landscape and youngest in age to lowest and oldest are the Kiamichi Clay and Edwards Limestone, Comanche Peak Limestone, Walnut Clay, and Glen Rose geologic formations (Nordt 1992). Most of these formations contain veins and nodules of readily obtainable, high-quality, and easily knapped chert (Dickens 1993). Millions of years of erosion of the limestone and clay formations in the Fort Hood area have resulted in a hilly to deeply dissected terrain with rapid surface drainage. To the east is the nearly level to gently rolling, but nonetheless, well dissected and rapidly drained Blackland Prairie (Gould 1975:11).

Climate

The climate of the Fort Hood area is classified as dry-subhumid and mesothermal (Blair 1950:113). Rainfall decreases from east to west in the Hill Country; in the vicinity of the Fort Hood, average annual precipitation ranges from about 31 to 34 inches per year, most of which occurs during

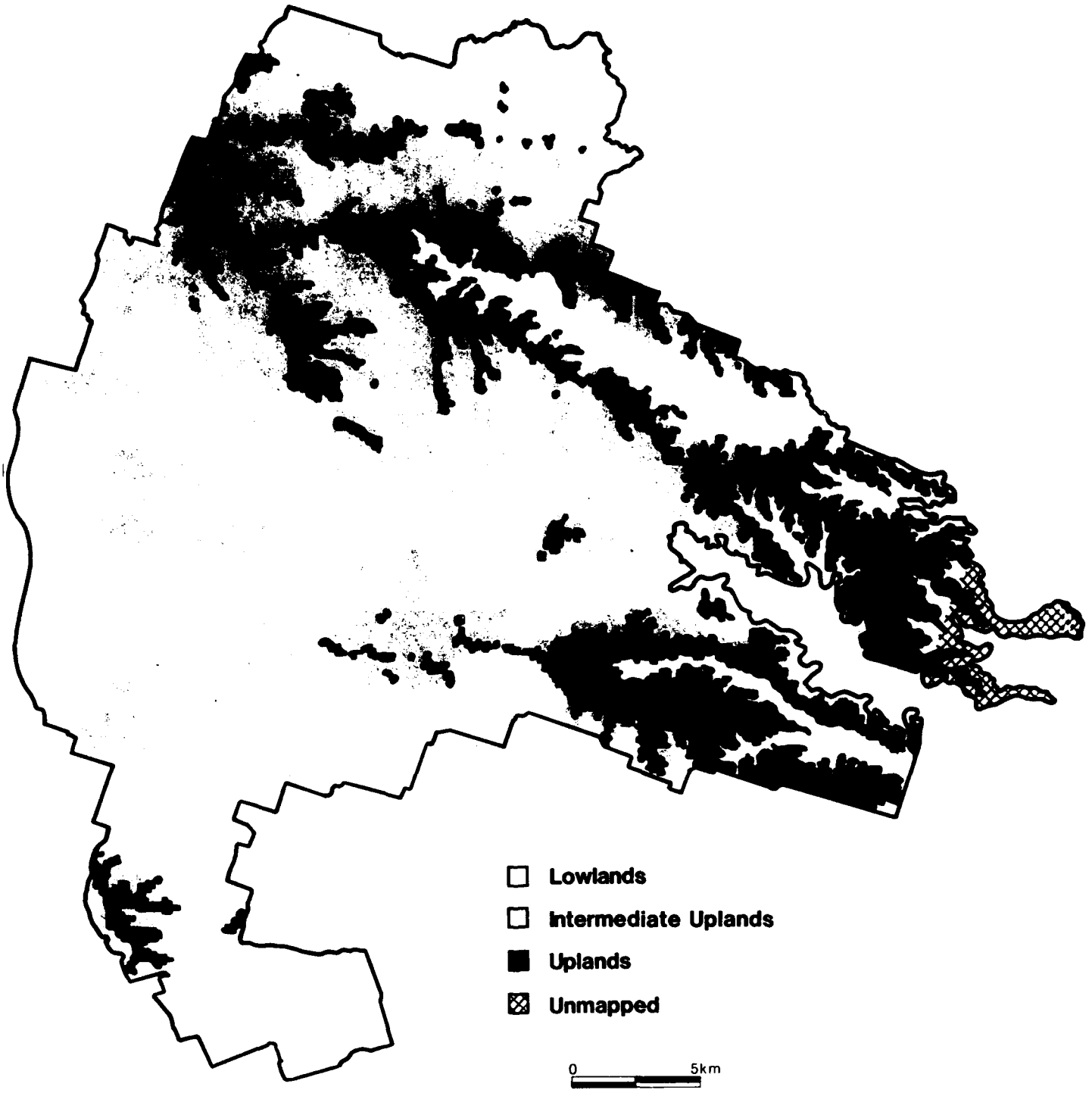


Figure 3. Environmental zones present at Fort Hood.

spring and autumn (Carr 1967:4, 7). During winter, there tends to be a surplus of water relative to plant needs, but summer is typically a time of water deficiency (Carr 1967:18). Nonetheless, the regional climate supports prairie and woodland vegetation.

Vegetation and Plant Foods

Mid-nineteenth century written accounts of the eastern part of the Hill Country attest to the area being more open than it is today, with about half well-wooded and half prairie (Weniger 1984). In 1839, William Kennedy described adjacent parts of present day Bell and Milam counties as having a "general uniformity in quality and appearance. It is pretty equally divided between woodland and prairie" (cited in Weniger 1984:35). Writing about Coryell County in *The Texas Almanac for 1861*, M.M. McCutchen said that "about half of this county is hilly or mountainous, which portion is covered with scrubby timber, such as live oak and Spanish oak...." (cited in Weniger 1984:51).

All of the Fort Hood military reservation lies near the eastern edge of what is currently known as the Cross Timbers and Prairies ecological zone. This zone forms a wide, south-to-north tending band from the Colorado River north to well beyond the Red River (Frye et al. 1984:15-17). To the east, and roughly coincident with the Blackland Prairie physiographic area, is the Blackland Prairie ecological zone. Modern vegetation types in the Fort Hood area are the Oak-Mesquite-Juniper Parks/Woods and the Live Oak-Mesquite-Ashe Juniper Parks characteristics of the less dissected uplands and ridge tops. The Live Oak-Ashe Juniper Woods type is found mainly on shallow limestone hills, especially along the edge of the Hill Country (McMahan et al. 1984:15-17).

Among the potentially important native plant foods listed as part of the "commonly associated plants" of the above vegetation types are various kinds of acorns, mesquite beans, hackberry, persimmon, escarpment cherry, yucca and related plants, prickly pear, and greenbriar (McMahan et al. 1984:15-17). All of these foods are known or presumed to have been important elements of the diets of the Indian people who inhabited the region prior their replacement by Old World populations during the last half of the nineteenth century (Black 1989; Newcomb 1961; Story 1985). Undoubtedly, the Indian people systematically procured a much wider variety of plant foods than those listed here. Compared to what is known about hunting and animal foods, however, not much is known concerning the role of plant foods in the regional land-use systems.

Among the most important plant resources for the Old World peoples were the various grasses used for feeding their domestic herd animals. Juniper and oak trees were important for fencing, and large trees were used for construction. Soils in the immediate Fort Hood area are conducive to mechanized agriculture, but they are much less productive than the nearby Blackland Prairie.

Deer and Other Animal Foods

The eastern edge of the Balconian Biotic Province encompasses all of the Fort Hood reservation, and has fauna characterized as "a hodge-podge of Austroriparian [east Texas], Tamaulipan [south Texas], Chihuahuan [southwest Texas], and Kansan [northwest Texas and the panhandle of Texas] species" (Blair 1950:112). A wide variety of economically important food animals were available at one time or another prior to the arrival of Old World peoples. Among these were bison, deer, pronghorn, rabbit, other small game, turkey and other game birds, as well as fish and shellfish.

Judging from the archaeological record for the Texas Hill Country as a whole, deer probably provided most of the meat in the Indian people's diet throughout almost all of the last 10,000 years or so (Black 1989:31-32). White-tailed deer are still common throughout the region, and even today their

Table 1. Summary Data (1990) on Density and Hunting Data for Major Ecological Areas, Including the Cross Timbers and Prairies Areas that Encompass Fort Hood.

Hunting Data Category	Cross Timbers & Prairie	Blackland Prairie	Edwards Plateau
Acreage deer range	6,763,370	570,871	21,734,344
Est. deer pop.	315,584	10,540	1,609,737
Acres / deer	21.4	54.2	13.5
Deer / 1,000 acres	46.7	18.5	74.1
Hunter days	536,538	43,454	1,253,418
Total kill	37,636	1,418	203,811
Kills / hunter	0.62	0.29	1.18
Kills / 1,000 acres	5.57	2.49	9.38
Hunters / 1,000 acres	9.97	10.22	8.56

Note: Numeric data from Boydston 1992:Table 4; Reagan 1992:Table 8.

Table 2. Summary Deer Density and Hunting Data (1990) for Bell, Coryell, and Selected Surrounding Counties.

Hunting Data Category	Bell CT&Pr[1]	Coryell CT&Pr[1]	Bosque CT&Pr[1]	McLennan BlPr[2]	Williamson CT&Pr[1]	Lampasas EdPl[3]
Acreage deer range	221,258	438,844	533,339	44,894	315,911	457,300
Est. deer pop.	26,983	36,570	39,507	2,688	17,748	40,830
Acres / deer	8.2	12.0	14.1	16.7	17.8	11.2
Deer / 1,000 acres	122.0	83.3	70.9	59.9	56.2	89.3
Hunter days	19,792	49,748	40,745	14,533	21,624	51,740
Total kill	1,695	4,679	4,124	654	2,250	7,454
Kills / hunter	0.58	0.82	0.75	0.56	0.85	1.15
Kills / 1,000 acres	7.67	10.68	7.74	14.87	7.14	16.31
Hunters / 1,000 acres	15.09	14.53	11.44	31.25	9.45	15.48

[1] CT&Pr: Cross Timber and Prairie ecological zone.
[2] BlPr: Blackland Prairie ecological zone.
[3] EdPl: Edwards Plateau ecological zone.
Note: Numeric data from Boydston 1992:Table 4; Reagan 1992:Table 8.

population withstands heavy predation by rifle- and bow-carrying hunters. In 1990 for example, an estimated 63,553 white-tailed deer lived within an estimated 660,102 acres of suitable habitat in Bell and Coryell counties where approximate deer densities were 122.0 and 83.3 animals per 1,000 acres, respectively. That year, an estimated 69,540 hunting days were logged by an estimated 9,696 hunters who killed an estimated 6,374 deer (Boydston 1992; Reagan 1992) (Tables 1 and 2). These data on contemporary deer harvests pertain mainly to hunting with firearms, a technology likely to be more effective than bows and arrows or atlatls and darts. Nonetheless, these data probably afford a reasonably reliable approximation of the level of hunting pressure that deer populations can sustain over the long run.

Deer productivity, as measured by number of animals per unit area of habitat, is comparatively low (18.5 per 1,000 ac) in the Blackland Prairie east of Fort Hood, moderate (46.7 per 1,000 ac) in the Cross Timbers and Prairies that encompass the reservation, and high (74.1 per 1,000 ac) in the Edwards Plateau ecological area to the west (Table 1). In 1990, the deer density in Bell (122/1,000 ac) and Coryell (83.3/1,000 ac) counties was significantly higher than in some of the surrounding counties, and it was about twice as high as it was for the Cross Timbers and Prairies ecological area as a whole (Boydston 1992; Reagan 1992; Tables 1 and 2).

To the degree that deer densities tended to be as high or higher as in the past as they are today, there should have an ample supply of deer for almost 200 people in an area the size of Fort Hood (ca. 216,960 ac) (Williams et al. 1990:239). If we assume an average density of 90 deer per 1,000 acres, there would be about 19,526 deer within the reservation area during an "average" year. If the harvest rate (i.e., kill rate) was nine animals per 1,000 acres, about what is today, the area would yield an estimated 1,953 deer. Distributed equally throughout the year and assuming this harvest rate could be sustained indefinitely, the sustainable weekly harvest rate would be about 37.5 deer. The assumed harvest rate of about 10% of the total population is consistent with the estimated sustainable harvest rates for white-tailed deer populations in general (Halls 1978:58-60).

If one deer was consumed by an "average" five-person family every week, the available deer population would provide for about 187 people (37.5 families with 5 family members each). Assuming that each deer produced 35 pounds of boneless meat (Halls 1978:43), each member of the average family would have one pound of fresh meat per day. Certainly, a pound of meat per person per day is more than what is "necessary" by today's standards, but hunter-gatherers often consumed significantly greater amounts of meat, especially in the cold temperate and sub-boreal regions (Speth and Spielmann 1983). With the 187 people noted above, the military reservation's population density would be just under 1.2 people per 1,000 acres, or roughly 1.8 people per square mile. This density is toward the high end of the estimated population densities for hunter-gatherer populations in western North America and Australia, where they range from 0.01 to 3.0 people per square mile (Lee 1968:35).

With the exception of the white-tailed deer that continues to be important to the regional economy, the native fauna were of only minor economic importance to the region's Old World immigrant populations. It was the domestic animals — primarily cattle and horses — and their feral descendants that were of economic importance in the complex farming and ranching systems that began to operate on the regional landscape by the mid-1800s.

SURVEY AREA LANDSCAPES AND THEIR PRODUCTIVITY POTENTIALS

The Belton Lake Periphery Area and the Manning Surface

All but one of the Belton Lake periphery survey quadrats are on ridge-like landforms in northeastern Bell County that form long, narrow, cliff-faced plateaus and overlook the Leon River and its alluvial terraces (Figure 2 and 3). The Tweedle Mountain and Lower Peninsula areas are on ridge-like landforms that extend into the modern Belton Lake, and thus appear to be peninsulas. The topography

on the plateau tops is relatively low relief except where minor water courses have cut several meters into the underlying bedrock to form small, narrow, steep-walled gullies. Plateau edges are steep to vertical, forming a rugged shoreline in this part of Belton Lake.

Elevations in the Tweedle Mountain and Lower Peninsula areas range from the highest points along the plateau top, about 720 feet above mean sea level, to the level of Belton Lake, about 630 feet above mean sea level. There are very few flat places between the upper edge of the plateau and the waters of Belton Lake that are large enough to serve have served as campsites. Overhangs and caves, however, are fairly common along the cliff faces. These naturally-occurring rockshelters afforded protection for people and goods as occupation and storage sites. The only quadrat not in a plateau/cliff setting is in the Sparta Mountain area (Figure 2). This quadrat is located along the valley slope of the lower reach of Cowhouse Creek where the landform setting is classified as hillock/slope.

Soils tend to be very shallow in the survey area where they have formed mainly in weathered limestone and clays or in colluvium and alluvium derived from these formations. These include the Fort Worth, Duck Creek, Edwards, and Comanche Peak limestones and the Denton and Kiamichi clays (Barnes 1979). Soil textures in the Belton Lake periphery areas are mostly gravelly loam and gravelly clay loam. These soils (Speck-Tarrant-Purves association) support a tall grass prairie vegetation and juniper-oaks woods, but a few areas are cultivated (Huckabee et al. 1977:3-4).

In the Belton Lake periphery area, the limestone and clay formations that shape the plateaus are capped with siliceous channel gravels deposited by ancestral rivers. These millions-of-years-old rivers migrated across the Edwards Limestone and Kiamichi Clay formations and caused most of the erosion that formed the modern landscape (Nordt 1992:4). The gravel-capped surface also has many exposures of limestone bedrock, and even in well-developed soils, bedrock usually falls within a meter of the surface. This ancient weathered surface forms much of Lampasas Cut Plain and has been called the "High" surface (Hayward et al. 1990); it was designated as the Manning surface in the geoarchaeological study undertaken for Fort Hood by Nordt (1992) (Figure 4).

The Cantonment Area and the Killeen Surface

The Fort Hood Cantonment area and immediate vicinity, including all of the area for Delivery Order No. 17, lies along the broad, low-relief ridge that is the drainage divide between two Leon River tributary streams in southwestern Coryell County and eastern Bell County (Figures 1 and 2). Survey quadrats in the northern part of the Cantonment are in the uppermost part (i.e., right side) of the Cowhouse Creek basin. Quadrats in the southern part of the Cantonment area are in the uppermost part of the South Nolan Creek basin (i.e., both sides). The terrain is gently rolling to somewhat hilly, and overall elevations range from about 830 to 1,000 ft above mean sea level.

Soils tend to be shallow in the survey area; they are formed mainly in the Walnut Clay formation, or in colluvium and alluvium derived from that formation, and in a few places in colluvium and alluvium derived from the overlying Comanche Peak Limestone (Barnes 1979). Soil textures in the Cantonment area are mostly loam and clay loam. These soils (Denton-Purves association) support a tall grass prairie vegetation that is best suited as rangeland, including improved pastures, but a few areas are cultivated as well (Huckabee et al. 1977:3-4; McCaleb 1985:7-8).

The weathered surface of the Walnut Clay formation was designated the Killeen surface (also termed the "Intermediate" surface of Hayward et al. 1990) in the geoarchaeological study undertaken for Fort Hood (Figure 4). In the Fort Hood area, the Killeen surface lies 25-30 m below the Manning surface (Nordt 1992:4). Although the project area per se was not included in Nordt's geoarchaeological study, the general description of the Killeen surface is as follows:

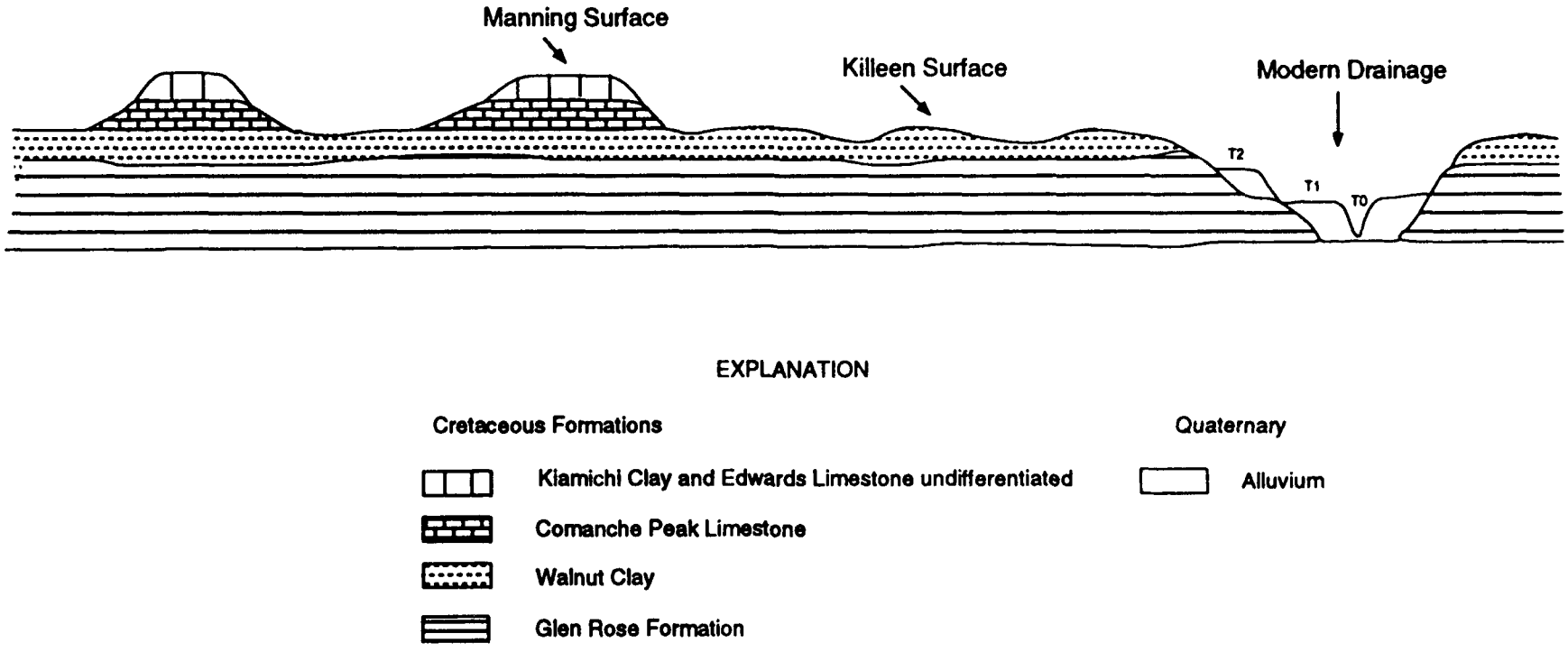


Figure 4. Schematic geologic landscape cross-section of the Fort Hood area and other parts of the Lampasas Cut Plain, showing the major formations expected in the Fort Hood area (from Nordt 1992:Figure 3).

> The landscape formed sometime after the late Tertiary as widespread valley entrenchment initiated abandonment of the Manning surface and underlying rock of the Edwards Limestone and Kiamichi Clay undifferentiated formations retreated laterally. The Killeen surface then formed as a result of long-term stability and pedimention as the Manning surface and underlying rock of the Edwards Limestone and Kiamichi Clay undifferentiated formation retreated laterally. Tributaries that sculptured the Killeen surface were left as part of a relict drainage network containing erosional and depositional counterparts that graded down to high terrace remnants deposited by trunk streams such as the Brazos and Leon rivers when they flowed some 25 to 30 m above their modern floodplains. Colluvial soils with petrocalcic horizons at the base of the slope connecting the Manning and Killeen surfaces, provides evidence that lateral retreat of the Manning surface has been inactive for some time. The age of the Killeen surface is problematic, however, because it lies above the highest terraces of the Brazos and Leon Rivers (thought to be middle to late Pleistocene in age), and early to middle Pleistocene age has been proposed (Hayward et al. 1990) [Nordt 1992:4].

Late Pleistocene and Holocene Alluvial Stratigraphy

Sometime after the Middle Pleistocene, the Killeen surface was abandoned during the last major episode of valley entrenchment (Hayward et al. 1990). Several cut and fill episodes are represented in the larger valleys on the Fort Hood reservation as prominent alluvial and strath terraces. The lower terraces and the floors of modern stream valleys in general are Late Pleistocene to Holocene in age (Nordt 1992:4-6). Due to the high lake levels during the survey, none of the Late Pleistocene and Holocene terraces or floodplains were exposed in the Belton Lake periphery area.

In the Cantonment area, parts of the upper South Nolan Creek valley fill have been mapped as Holocene alluvium, and in a few places, small terrace remnants are mapped as Late Pleistocene fluviatile terrace deposits (Barnes 1979). Of the areas mapped during the Fort Hood geoarchaeological study, the project area is most similar to the upper Henson Creek basin (Nordt 1992:39-45). To the extent that the South Nolan Creek and other lowlands are similar to the lower valley wall and bottomlands of Henson Creek, the present project area should contain buried sediments and potential archaeological deposits that span most of the period from about 12,000 B.P. to the present (Figure 5).

From oldest to most recent, the alluvial units that may be present in the project area are: (1) Jackson alluvium, pre-dating 12,000 B.P.; (2) Georgetown alluvium, capped by the Royalty paleosol and dated between about 12,000 and 8,000 B.P.; (3) Fort Hood alluvium, about 8,000 to 4,800 B.P.; (4) West Range alluvium, about 4,800 to 600 B.P.; and (5) Ford alluvium, spanning the last 800 to 400 years (Nordt 1992:69-77).

Economically Important Natural Resources

The Killeen surface, as defined by Nordt (1992), has very shallow to moderately deep loamy to clayey soils (Denton-Purves association) that, according to the Soil Conservation Service (Huckabee et al. 1977:3-4; McCaleb 1985:7-8), support a tall grass prairie vegetation regime best suited as rangeland. The soils (Speck-Tarrant-Purves association) characteristic of the Manning surface, as defined by Nordt (1992), tend to be thinner and rockier, and the landscape is more rugged than on the Killeen surface. These soils support patches of prairie vegetation, but oak-juniper woods dominate much of the area today and provide desirable forage for deer and domestic livestock (Huckabee et al. 1977:3).

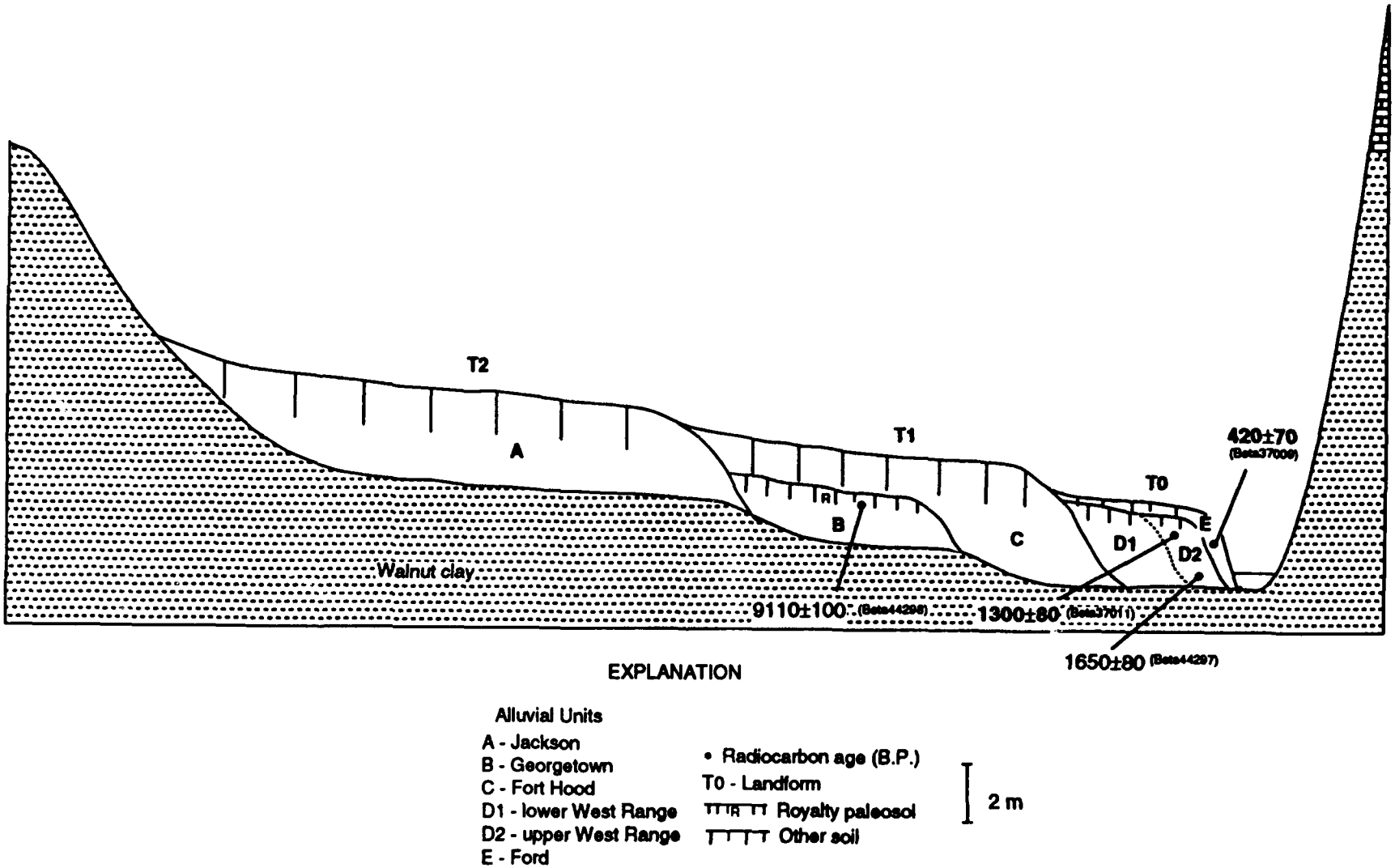


Figure 5. Generalized geologic composite cross section of Henson Creek (charcoal ages are shown in bold and humate ages in plain text) (from Nordt 1992:Figure 18).

Drawing from a variety of geological, pedological, hydrological, and land-use data, a map showing "pre-settlement" vegetation on the Fort Hood military reservation was recently compiled using Geographic Information Systems (GIS). In the Cantonment area, Williams et al. (1990:242-243) identify two mid-nineteenth century range vegetation communities: (1) ridge tops and slopes, as well as low-lying ground between ridges, are classed as "Tall Grass Prairie"; and (2) the lowlands along major tributaries that form small valleys, including the upper stretch of South Nolan Creek, are classified as "25% Hardwood."

Although the pre-settlement vegetation map of Fort Hood does not encompass the Belton Lake periphery survey areas, vegetation on similar parts of the landscape included "20% Oak-Savannah" on ridge tops and plateaus and "25% Hardwood" along the slopes and down to the water's edge. Pre-settlement vegetation patterns in settings similar to Tweedle Mountain, Lower Peninsula, and Sparta Mountain areas also include sporadic patches of "Tall Grass Prairie" (Williams et al. 1990:243).

Prairie environments, such as the one in the Cantonment area, afford suitable big game habitat, especially bison (Meagher 1978). To a lesser degree, the tall grass prairie habitat is suitable for pronghorn, although the Fort Hood area is on the extreme eastern edge of their former range (Yoakum 1978). Bison are believed to have been common in parts of central Texas during several time periods: (1) 12,000 B.P. to 7,000 or 8,000 B.P.; (2) 4,500 to 1,500 B.P.; and (3) 450 to years ago until the mid-1800s (Dillehay 1974). Bison remains have been found at Fort Hood, but they have not been dated and they are not clearly associated with archaeological remains (David Carlson, personal communication 1993; Christopher Lintz, personal communication 1993).

White-tailed deer probably inhabited the wooded areas along the major tributaries and the immediately adjacent prairies within and near the present-day Cantonment area. Deer population densities, however, are not likely to have ever been very high in places dominated by tall grass prairie vegetation. In the juniper and oak savannah areas along the Belton Lake periphery, however, deer populations were probably higher than in most of the Cantonment area (as they are now) because, as acorn-eaters and browsers of woody plants, the preferred habitats for deer are woods and parks (Halls 1978).

Rabbits and other small game animals were probably readily available throughout the project area. Undoubtedly, the prairies, parks, and woods had numerous edible roots and other plants. The forested areas along the major tributaries were probably more productive in terms of plant foods, including acorns, mesquite beans, and possibly pecans, as well as a variety of fruits, berries, seeds, and roots.

Chert and other knappable lithic materials occur in the Cantonment and Belton Lake periphery areas as part of the lag gravel from the Middle to Late Pleistocene fluvial deposits (McCaleb 1985; Nordt 1992). More commonly, however, chert nodules occur on the surface in both survey areas — where they have weathered from the bedrock and in stream beds. Wherever chert occurred in cobble-sized (6.4 to 25.6 cm) or larger pieces, it was probably an important economic resource for the Indian people who inhabited the area. Quartzite cobbles may also have been important resources, not only as raw material for the manufacture of stone tools, but also for use as hearth stones and for stone boiling purposes.

ARCHAEOLOGICAL EXPECTATIONS

Available geomorphological information suggests that most archaeological sites found in the present project areas on ridge tops and on the upper part of the slopes are most likely to be represented by surface and near-surface materials, including those buried by various pedoturbation processes. To the extent that lowlands in the Cantonment area are similar to the valley bottom in upper Henson Creek

(Nordt 1992:39-45), these places have the potential to yield buried and surface sites that date throughout the period of human occupation.

For European settlers, the tall grass prairies provided pasturage for their cattle, horses, and mules. The forests along the streams afforded wood for fuel and construction materials, and hogs probably foraged there as well. Parts of the prairies and especially the lowlands along the streams had considerable potential as agricultural fields. Based on the environmental information summarized here, the survey area should contain the remains of a least a few farmsteads.

For Native Americans, the tall grass prairies in the project area may have been most productive when bison were present. While the forested tributary valleys in the project area probably afforded access to a wide range of economically important resources, including white-tailed deer and a variety of plant foods, other parts of the present-day military reservation may have been more attractive. In terms of potential yield per unit area, exploitable food resources were probably more readily available along the Leon River and major tributaries, as well as in the more wooded upland areas.

Drawing from the ecological data reviewed here, deer and bison probably constitute the food resources exploited most regularly by Native Americans who utilized the present-day Cantonment area. Undoubtedly, other locally available food resources, including small game, nuts, berries, fruits, and roots, were exploited, although not as intensively as big game animals. Knappable chert is widely available from bedrock outcrops and lag gravel in the project area, possibly providing source areas for producing stone tools.

To summarize, judging from the probable nature and distribution of exploitable resources in the project area, most of the hunter-gatherer archaeological record is likely to be represented by the remains of temporary encampments where primarily hunting-related activities took place. While archaeological sites are likely, the quantity of cultural material and overall site densities will probably be as low or lower than in most other parts of the military reservation. It is important to emphasize, however, that the Cantonment area may well contain some site types that are not as likely to occur in other parts of the reservation. In particular, archaeological sites related to bison hunting activities are expected to be comparatively well-represented in the Cantonment area because it is encompassed by one of the larger expanses of tall grass prairie, presumably the preferred habitat for bison in the Hill Country.

CULTURAL BACKGROUND: PAST RESEARCH AND OVERVIEWS

David L. Carlson

This chapter is taken almost verbatim from chapters in previous Fort Hood research publications or manuscripts written by the present author (Carlson and Ensor 1991; Carlson et al. 1993). It provides the reader with a review of past research on prehistoric and historic sites, and overviews of regional history and prehistory.

PREVIOUS RESEARCH ON PREHISTORIC SITES

Prehistoric cultural evidence in central Texas has undergone considerable formal study for over 50 years. The bulk of previous archaeological work at or near Fort Hood is discussed by Guderjan et al. (1980:13-47). This work includes a brief history of investigations in the region and a culture history description that identifies additional studies. Skinner et al. (1981:12-17) also reviews central Texas investigations. The Texas Historical Commission (Simons 1981, 1983) provides a useful compilation of reports concerning Texas archaeology to circa 1980. Roemer et al. (1985) and D. Carlson et al. (1986) contain summaries of previous archaeological research which are relevant to the Fort Hood area. Carlson et al. (1987b) contains research on typological studies. Koch et al. (1988) reports on impact recording. Carlson et al. (1988) and Koch and Mueller-Wille (1989a, 1989b) contain research on site function and settlement studies. Ensor (1991) summarizes the typological studies carried out at Fort Hood since 1983 and compares the Fort Hood projectile point assemblage with north central Texas.

PREVIOUS RESEARCH ON HISTORIC SITES

The literature for 13 counties encompassing the Fort Hood area and lying within the Central Texas Prairies was examined for previously known historic sites. These counties extend from the Colorado River to the Brazos River and slightly north and south of the Fort Hood area. Most of the historic site research in the vicinity of Fort Hood has been cited in current indices of Texas archaeology (Simons 1981, 1983), with the exception of recent studies at Fort Hood (Carlson et al. 1983; Carlson 1984a, 1984b; Carlson et al. 1988; Guderjan et al. 1980; Jackson 1982a, 1982b, 1982c; Prewitt et al. 1983; Roemer et al. 1985; Skinner et al. 1981, 1984). No reports of investigations could be found for Bell, Bosque, Burnet, Coryell, Falls, Hamilton, Lampasas, or Mills counties. For the remaining five counties (Hill, McLennan, Milam, Travis, and Williamson), most of the studies were limited descriptive survey reports dating from the 1970s and offered little in the way of understanding historic site settlement in central Texas.

PREHISTORIC PERIOD CULTURAL BACKGROUND

Cultural chronology building has been a topic of interest among Texas archaeologists for many years. Researchers such as Carlson et al. (1987), Jelks (1978), Johnson (1967, 1986), Prewitt (1981, 1985), Turner and Hester (1985), and Weir (1976) have been concerned with the accurate delineation of time-space systematics for central Texas. The following brief summary of the most widely accepted cultural chronology for central Texas is presented with the acknowledgement that many of the constructs have severe limitations. Chronological data are summarized in Table 3.

As noted by Black (1989) and Johnson (1986), many of the phases (especially the early ones) proposed by Prewitt (1981, 1985) are suspect since the radiocarbon data he cites do not support the chronology he proposes in many instances. Nevertheless, the best data available does come from these sources. It is summarized below using the terminology of Willey and Phillips (1958) as its basis.

Paleo-Indian Stage (12,000-8000)

Beginning with the Paleo-Indian stage, artifacts traditionally utilized to detect the presence of a component of that stage include *Clovis, Folsom,* and *Plainview. Clovis* points are generally associated with the earlier portion of the stage, while *Folsom* and *Plainview* appear later (Willey 1966). Remains from Paleo-Indian occupations are scarce in Texas, but are widely distributed (Meltzer 1986; Prewitt 1981:71). Very little data exist in most sections of the state to segregate earlier from later manifestations.

Archaic Stage (8000-1250 B.P.)

While data for the Archaic stage in central Texas are more complete than for the preceding Paleo-Indian stage, interpretation of prehistoric cultures and their lifeways have been hampered by the many reasons previously discussed. In examining the cultural history of central Texas, information about the hunter-gatherer populations is summarized according to periods.

Table 3. Central Texas Prehistoric Chronology (after Prewitt 1981, 1985).

Period	Years Before Present	Calendar Date
Paleo-Indian	12,500-8,500	10,550-6550 B.C.
Early Archaic Circleville San Geronimo Jarrell	8,500-5,100	6550-3050 B.C.
Middle Archaic Oakalla Clear Fork Marshall Ford Round Rock	5,100-2,600	3050-650 B.C.
Late Archaic San Marcos Uvalde	2,600-1,800	650 B.C.-A.D. 200
Terminal Archaic Twin Sisters Driftwood	1,800-1,250	A.D. 200-700
Austin Phase	1,250-650	A.D. 700-1300
Toyah Phase	650-200	A.D. 1300-1700

EARLY ARCHAIC PERIOD (8,500-5,100 B.P.)

First proposed by Johnson et al. (1962) in Texas, the term Early Archaic is widely used throughout the Eastern Woodlands to denote a time period following Paleo-Indian cultures and corresponding to initial adaptations to post glacial environments. In central Texas, numerous projectile point types are thought to date to this period, including *Angostura, Golondrina, Meserve, Wells, Gower, Bell, Martindale, Uvalde,* Early Barbed, *Baird,* and *Taylor* (Weir 1976, Jelks 1978, Prewitt 1981). Recent work with a large sample of projectile points from Fort Hood in north-central Texas (Carlson et al. 1987b) demonstrates the presence of *Plainview, Angostura, Martindale-Uvalde,* and *Wells* projectile point horizons. Also, new data indicate that the *Gower* type may define a separate horizon in that locality.

Weir (1976) named the San Geronimo phase for the time period during which a variety of notched projectile point forms were being made. He defined the San Geronimo phase as "a system of hunting and gathering that is sociopolitically loosely structured, non-specialized, and ... poorly delimited spatially" (Weir 1976:119), and dated this phase from 8,000 B.P. to 4,500 B.P. Prewitt (1981, 1985) divides the Early Archaic into four phases. Although there is some doubt as to the age determinations of these phases (Johnson 1986), according to Prewitt (1985:215), the Circleville phase lasted from 8,500 to 6,800 B.P., the San Geronimo from 6,800 to 6,100 B.P., the Harrell from 6,100 to 5,100 B.P., and the Oakalla from 5,100 to 4,600 B.P. This chronology is distinctly Texan since the Plains Archaic is generally dated as beginning about 7,000 B.P. (Wedel 1983), while the Early Archaic of the Midwest and the eastern U.S. is dated from 10,000 to 8,000 B.P. (Funk 1983; Griffin 1983).

Several researchers (Prewitt 1985; Weir 1976) suspect a general population increase in central Texas during the Early Archaic and continuing throughout the Archaic. Both Prewitt (1981:78) and Weir (1986) indicate that the accumulation of burned rock on many sites begins toward the end of the Early Archaic just prior to the Middle Archaic. According to Prewitt (1981:77-78) and Weir (1976:121), site types in central Texas during this period primarily consist of open terrace sites, knolls, rockshelters, and bluff tops. The principal modes of subsistence appear to be both hunting and gathering with evidence to support each type. The limited nature of the data base and lack of consistent associations, including the mixing of different dart point forms in dated strata, preclude any definition of phase content (Johnson 1986). The occurrence in surrounding regions of dart point forms that resemble certain central Texas Early Archaic forms is documented; however, their relationships to central Texas forms in terms of cultural affiliation, degree of relationship, and distribution are not well known.

MIDDLE ARCHAIC PERIOD (5,100-2,600 B.P.)

Following the Early Archaic period, the Middle Archaic in Texas (Johnson et al. 1962) was a period during which a major shift to specialized processing and harvesting of nuts occurred (Weir 1976:125). This development is largely based on the consistent evidence of burned rock middens which Weir (1976:125) believes to represent refuse from specialized nut or deer processing. Weir also (1976:26) suggests that this increase in burned rock middens and concomitant reliance upon specialized vegetal and animal resources were caused by a gradual shift in the Holocene environment. As noted earlier, paleoenvironmental studies suggest that with the trend toward less mesic conditions, oak remained an important species. Thus, the first occurrence of burned rock middens may be linked to a shift in the vegetational regime characterized by oak-savannah communities interspersed with grasslands.

Weir (1976) defines two phases that span the Middle Archaic: Clear Fork and Round Rock. The Clear Fork phase is defined by the presence of the diagnostic *Clear Fork* gouge, the *Nolan, Travis,* and *Bulverde* projectile points, and triangular biface types such as local derivatives of *Tortugas* (*Baird* and *Taylor*). The Clear Fork phase consisted of hunter and gatherer groups who were highly mobile and had specifically adapted to central Texas (Weir 1976:119).

Prewitt (1981:76, 1985) divides the Middle Archaic into four phases, incorporating both the Clear Fork and Round Rock phases of Weir (1976). From earliest to latest, the Middle Archaic phases include: Clear Fork (4,600 to 4,100 B.P.); Marshall Ford (4,100 to 3,500 B.P.); Round Rock (3,500 to 2,600 B.P.); and San Marcos (2,600 to 2,250 B.P.) According to Prewitt (1981), the Clear Fork phase is distinguished by the presence of *Clear Fork* gouges as well as *Nolan* and *Travis* projectile points. Sites occur in both terrace and upland settings and burned rock middens are common (Prewitt 1981; Weir 1976). Additional tools thought to be associated with Clear Fork phase assemblages include other bifaces, scrapers, and ground stone (Prewitt 1981; Weir 1976).

The succeeding Marshall Ford phase is distinguished by the *Bulverde* point. Other artifacts thought to be associated with this phase include unifaces, other bifaces, and grinding stones (Prewitt 1981:79). This phase is considered to be a continuation of the intensified food gathering which first occurs in the Clear Fork phase.

The Round Rock phase is primarily identified on the basis of a distinctive projectile point or hafted biface form known as *Pedernales* (Prewitt 1981; Weir 1976). Site types include terrace, upland, and rockshelter localities. Accumulation of burned rock middens reaches its zenith during this phase. Other artifacts and features associated with this phase are burned rock hearths, pits, and lithic debris concentrations which include other bifaces, unifaces, and grinding stones (Prewitt 1981:80). The frequency of unifaces in *Pedernales* assemblages has been the subject of some debate.

The final phase identified by Prewitt (1981) during the Middle Archaic is termed San Marcos. It is characterized by *Marshall, Williams,* and *Lange* dart points and apparently represents the last Middle Archaic burned rock midden accumulations in central Texas. Features and artifacts include other bifaces, scrapers, unifaces, grinding stones, and marine shell ornaments (Prewitt 1981:80; Weir 1976). An increase in regional interaction, as indicated by the occurrence of marine shell, suggests increased contact with regions outside central Texas proper. As noted by Weir (1976), it is possible that during the San Marcos phase, the formal changes noted in projectile point morphology (*Pedernales* to corner-notched *Marshall*) may have been related to the return of bison in the central Texas region during the Late Archaic period (2,600 to 1,250 B.P.).

LATE AND TERMINAL ARCHAIC PERIODS (2,600-1,250 B.P.)

Weir (1976) defines two phases within the Late Archaic; San Marcos and Twin Sisters. Weir believes that a migration from the southern plains into central Texas occurred, mainly to procure bison. This period is marked by the introduction of broad-based, corner-notched dart points. During the Late Archaic, corner-notched forms gradually decreased in size from the larger *Castroville, Montell, Marshall* and *Marcos* forms to smaller *Ensor* and *Frio* types. The appearance of *Ensor* and *Frio* points marks the beginning of Weir's second phase, Twin Sisters. During this phase, it is suggested that bison hunting decreased, deer were less important, and sites became more localized or restricted in nature. The absence of burned rock middens in the Twin Sisters phase differs from the preceding San Marcos phase.

Prewitt (1981) differs from Weir in his chronological assignments during the Late Archaic period. According to Prewitt, site types noted during the Late Archaic period include terraces, upland camps, and rockshelters. He assigns three phases to this period: Uvalde, Twin Sisters, and Driftwood. Prewitt (1981:73) indicates that use of burned rock middens had virtually ended by the onset of the Uvalde phase, but bison were still present in the region. A broad-based economic spectrum is seen by Prewitt for this phase, as suggested by a diverse array of projectile point styles such as *Marcos, Montell* and *Castroville.* The succeeding phases, Twin Sisters and Driftwood, are believed to represent a shift toward more dependence upon gath ng as "a proliferation of specialized tool types" indicates that food was processed efficiently (Prewitt 1981:74). The *Darl* point becomes prominent during the Driftwood phase, and Prewitt

identifies a population peak during this phase. Conversely, Weir characterizes the Middle Archaic Round Rock phase as the time of maximum population density in central Texas.

Fort Hood data indicate that many Terminal Archaic components existed at Fort Hood (D. Carlson et al. 1986; Carlson et al. 1988; Mueller-Wille and Carlson 1990a). Available data are insufficient to explain this in terms of a population increase. For example, Late Prehistoric sites are more likely to be buried. All five rockshelters tested to date by the TAMU Archeological Field School have contained evidence of Late Prehistoric occupations, even though most of them lacked any diagnostic artifacts on the surface.

Nordt's (1992) geoarchaeological analysis of dateable charcoal from 19 hearths or middens reveals that eight of these samples are Late Prehistoric in age, while only four are Late or Terminal Archaic in age. One more hearth provided a date which falls exactly between the two periods. Although based on a much smaller sample, these data demonstrate that it is incorrect to assume that the distribution of diagnostic projectile points on the surface is a direct reflection of past population densities.

Late Prehistoric (Neo-Archaic) Stage (1,250-200 B.P.)

Although Weir (1976) does not consider this time period in his study, he infers that it represents a basic continuation of previous Archaic lifeways. This time span has been divided by Jelks (1962) and Prewitt (1981:83) into the Austin and Toyah phases. Austin phase sites are dated from 1,250 to 650 B.P., while Toyah phase sites are dated from 650 to 200 B.P. During the Austin phase, hunting is believed to have increased over the preceding Driftwood phase, and sites began to occur in terrace and rockshelter localities. Toyah phase sites occur in the same environmental locations, and features include large flat hearths, basin hearths, pits, and cemeteries (Prewitt 1981:83). Subsistence practices include bison procurement and possibly occasional farming as maize has been found at some sites. Ceramics, including *Leon Plain* and *Doss Redware*, are also known to occur at Toyah phase sites (Prewitt 1981:83).

HISTORIC PERIOD CULTURAL BACKGROUND

The histories of Bell County (S. Carlson et al. 1986) and Coryell County (Roemer et al. 1985) have been described in previous Fort Hood survey reports. Table 4 summarizes important historic events in the area. Although a great deal of land ownership information is available on microfiche for the Fort and potential oral history informants are still available, not much progress has been made using these resources. The task is enormous and will probably require some kind of sampling design.

Currently, the only information on the period of occupation for historic sites comes from dateable artifacts which were collected during the survey. Using these data, the period of occupation of historic sites has been analyzed in several previous reports, particularly Mueller-Wille and Carlson (1990a, 1990b).

The number of mid-nineteenth century sites appears to be underestimated. For example, in 1860 there should have been approximately 1,000 people living in what is now Fort Hood, yet only three sites can be assigned to this period with certainty. Sites from this time period might be productively identified by archival research followed by site testing to confirm the age of the deposits.

Table 4. Summary of Bell County and Coryell County History (from Anonymous [1893], Newcomb [1961], Scott [1965], and Tyler [1936]).

Date	Important Historical Events
1687	Henri Joutel recorded Tonkawa and Mayeye Indians in central Texas.
1698	Missions were established in northeast Mexico for the Ervipiame.
1801	Phillip Nolan went on hunting expedition in Brazos Falls region.
1825	Robert Leftwich granted *empresario* contract by Mexico.
1830	Leftwich's contract passed to Sterling Robertson; Hamlet of Tenoxtitlan became first settlement in Robertson's Colony.
1835	Nashville-on-the-Brazos founded; James Coryell given a headright grant in the Nashville Colony in present-day Coryell County.
1836	Bell County residents fled eastward in "Runaway Scrape"; Milam County created out of the Milam Land District; Coryell County was later created out of Milam County.
1841	Governor Sam Houston pacified Indian problems for settlers in Bell County.
1849	Fort Gates established as last garrison along the frontier from Fort Duncan near Eagle's Pass to Coffee's Station on Red River.
1850	Bell County officially organized; "Nolandsville" (renamed "Belton" in 1852) designated as county seat.
1852	Fort Gates was abandoned.
1853	Fort Gates was temporarily used as a quartermaster depot.
1854	Coryell County was created; Gatesville was later designated county seat.
1859	Belton (pop. 300) was the only town of significance in Bell County; Governor Houston gives direct aid to settlers to repel Indians; first cattle drive from Coryell County to Shreveport, Louisiana.
1866	Cattle business developed in Texas; trails to northern markets passed through Bell County.
1870s	Wends settle The Grove.
1880	Gulf, Colorado and Santa Fe railroad passed through Bell County.
1882	Missouri, Kansas, and Texas railway passed through Temple; Missouri Pacific ("Katy") branch passed through Belton; Texas and St. Louis Railway Company completed tracks to Gatesville; Gulf, Colorado, and Santa Fe Railway Company reached southwestern Coryell County from Galveston.
1890s	Wends settle Copperas Cove; cotton and wheat prices declined as the availability of manufactured goods increased.
1893	Panic began and lasted until 1899.
1904	Boll weevil reached Bell County and destroyed crops.
1907	Stephenville North and South Texas Railway Company laid tracks from Stephenville to Hamilton.
1911	Stephenville North and South Texas Railway Company extended lines to both Comanche and Gatesville.
1913	Bond issue passed in Bell County for construction of better roads.
1914	Farm prices dropped with onset of World War I, followed by a war-inflated boom.
1920	Period of deflation in Bell County.
1923	Federal aid for highway construction granted to Coryell County.
1930	Community Natural Gas Company provided service for 500 customers.
1935	Community Public Service provided electricity for 783 customers.
1936	Rural Electrical Association available in Bartlett region of Bell County.
1942	Camp Hood activated as a tank destroyer training center.
1951	Camp Hood renamed Fort Hood.

SURVEY PROCEDURES AND RESULTS

Ben W. Olive

Basic field procedures employed during the survey of the Cantonment and Belton Lake periphery areas are consistent with previous surveys at Fort Hood conducted by the Archaeological Research Laboratory (e.g., Carlson et al. 1993; Ensor 1991). Similarity among the various surveys is enhanced by the fact that J. Thomas Dureka, the field leader for the present project, has worked in the same capacity for several Fort Hood surveys during the last few years. This suggests that results of surveys carried out at different times and in diverse settings are readily comparable.

The survey of the Cantonment area followed all of the standard survey procedures described in the following "Survey Procedure" section, but for various reasons, site documentation in the Belton Lake periphery area differed from those procedures used in most of the previous surveys at Fort Hood. First of all, more than the anticipated number of sites were discovered and fully documented in the Cantonment area, but in doing so it became necessary to use time and funds originally allocated to the Belton Lake periphery survey project. In other words, after completing the field work in the Cantonment area, the remaining funds were not sufficient to fully document all of the sites that were discovered in the Belton Lake periphery area (Carlson 1992).

In November and December, 1991, 13 archaeological sites were discovered and fully recorded in the 1100-acre Cantonment area. The 800-acre Belton Lake periphery area was surveyed during December, 1991 and January, 1992, when a three-person archaeological crew recorded 36 archaeological sites. Due to unusually inclement weather and to the discovery of more sites than expected, however, some of the sites were not fully documented.

All of the Sparta Mountain area, as well as the plateau/ridge tops and gentle slopes of Tweedle Mountain and the Lower Peninsula areas (see Figure 2), were surveyed using the standard operating procedures. The cliff faces and steeper slopes around the plateau/ridge tops, however, were examined only briefly during a canoe-survey made necessary by unusually high lake levels. In the end, while 32 prehistoric sites were discovered in the Belton Lake area, only 18 were fully recorded, and additional field work is required before documentation of the remaining 14 sites can be completed. Because of time limitations, systematic sampling (i.e., transect recording or beadline work) was carried out only at sites in the lower peninsula area.

SURVEY PROCEDURES

This section is reprinted from the most recent Fort Hood survey report entitled *Archaeological Survey at Fort Hood, Texas, Fiscal Year 1990: The Northeastern Perimeter Area* (Carlson et al. 1993). The procedures for cultural resources surveys at Fort Hood are specified in detail in a *Standard Operating Procedures* (SOP) manual (Briuer and Thomas 1986) which is revised prior to each survey and distributed to all survey crew members. Surveys are conducted within 1 km UTM grid squares by six persons spaced 30 m apart who walk over the quadrat. Each surveyor carries a topographic map or aerial photograph of the quadrat and marks the locations of all artifacts, chert outcrops, fencelines, and historic features. Prehistoric sites are defined whenever two or more stone tools (e.g., dart or arrow points, preforms, scrapers, and cores) are found within 5 m of one another. Historic sites are defined whenever three or

more classes of artifacts (e.g., glass, metal, and ceramics) are observed within a 5 m radius. Historic sites are also defined for isolated features such as cisterns, wells, or corrals.

Once a quadrat has been covered by the six surveyors, tentative site boundaries are drawn for the sites located using the information on the quadrat maps. Teams of two persons are then sent to each site to draw site maps, collect artifacts, and complete standard Fort Hood site forms.

Site recording consists of preparing a site map, completing a form, and photographing the site. On historic sites, a collection of diagnostic glass, ceramic, and metal items is made to facilitate estimates of the age of each site. On prehistoric sites, temporally diagnostic artifacts are collected, but other artifacts are left in place. In addition, on prehistoric sites, a transect 1 m wide, measured into 5 m sections, is recorded across the long axis of the site. For each 1 x 5 m section, a count of the debitage, tools, and ecofacts is taken. In addition, the quantity of burned rock is estimated and ground visibility is recorded. Any distinctive surface damage, from a variety of impact agents described in the SOP, is also recorded.

Site boundaries are defined on the basis of the artifact scatter and site topography. Site definitions tend to include a fairly large area with several locations therein containing a concentration of artifacts or debitage. This is particularly true of areas in which chert outcrops are present at the surface and thousands of square meters contain chert nodules and flakes. Since it is not always readily apparent which flakes are natural and which are the result of human activity, the entire chert field is often designated as a site. These "sites" obviously represent a complex situation in which human use of the chert field has been repeated over long periods of time. Activity areas within these "sites" will only be isolated through detailed surface mapping. Identifying the entire chert field as a site is an interim strategy to provide the entire area with some protection until a more detailed survey can be conducted. Obviously, such a strategy is only possible when the surveyed sites are not imminently threatened by ground-disturbing activity, thus providing the opportunity to use the data as the basis for a site protection program.

While this approach to site boundaries makes sense from a cultural resources protection perspective, it makes the analysis of the data more complicated since nearly all of the sites represent multiple occupations. This is particularly true where a burned rock mound, a rockshelter and a bluff top lithic scatter are all recorded as parts of a single site. Clearly, any conclusions derived must be sensitive to the multicomponent nature of the sites recorded at the installation.

SURVEY RESULTS

Prehistoric sites at Fort Hood were classified into the following types or categories:

1. Lithic/burned rock scatters
2. Lithic scatters
3. Rockshelters
4. Mussel shell scatters
5. Quarry

Historic sites at Fort Hood were classified into the following types:

1. Dump
2. Domestic dwelling/special purpose site
3. Special purpose
4. Isolated feature
5. Dump/feature

A total of 50 sites was recorded in the Cantonment (Delivery Order No. 17) and Belton Lake periphery (Delivery Order No. 18) areas. Thirteen archaeological sites (8 prehistoric, 5 historic) were recorded in the 1,000-acre (4.5 km^2 in 6 quadrats) Cantonment area (Table 5). Six of the prehistoric sites are lithic scatters and the other two are lithic/burned rock scatters (Table 6). The five historic sites in the Cantonment area are represented by one domestic dwelling/dumpsite, one dump site, one isolated feature (a concrete cistern), and two special purpose sites (Table 7).

Table 5. Survey Quadrats for the Cantonment and Belton Lake Periphery Areas.

Cantonment Area (Delivery Order No. 17)		Belton Lake Periphery Area (Delivery Order No. 18)	
Easting	Northing	Easting	Northing
16	43	43	46
17	42	43	48
17	43	43	49
17	46	44	46
18	43	44	48
19	43	44	49
16	42	45	48
16	46	45	49
18	46	36	47

Note: All quadrats measure 1 km^2 and are designated by their southwest corners using UTM coordinates.

Thirty-two prehistoric sites were recorded in three Belton Lake periphery areas: Tweedle Mountain (24 sites), the lower peninsula area south of Tweedle Mountain (6 sites), and Sparta Mountain (2 sites) (Table 6). The Belton Lake periphery area encompassed approximately 3.23 km^2 in 9 quadrats (Table 6). Ten of the sites are lithic scatters; chipped stone artifacts and occasionally mussel shell fragments were observed at these sites. Ten other sites are lithic/burned rock scatters. In addition to chipped stone and occasional mussel shell, these sites also contain pieces of burned rock believed to have been used mainly in hearths and earth ovens. Another 10 sites are rockshelters or rock overhangs that are large enough to provide shelter for several individuals. One site is a lithic scatter/rockshelter. Most of the rockshelters yielded chipped stone artifacts; several of them also had mussel shell fragments. The single mussel shell scatter site is represented only by a concentration of mussel shells; neither chipped stone nor burned rocks were observed.

Five historic sites were also recorded in three areas around Belton Lake: (1) Tweedle Mountain, with one special purpose site; (2) the Lower Peninsula area south of Tweedle Mountain, with one dump site; and (3) Sparta Mountain, with one dump site and two dump/feature sites (Table 7).

Table 6. Prehistoric Sites Recorded in the Cantonment and Belton Lake Periphery Areas.

TARL	FIELD NUMBER	ENVIRONMENTAL ZONE	ELEVATION (FEET)	DRAINAGE	AREA	SITE TYPE	CHRONOLOGICAL COMPONENTS
Cantonment Area (Delivery Order No. 17)							
41BL988	6001	Intermediate Upland	900	Nolan Creek	10,000	Lithic/burned rock scatter	Unknown
41BL989	6002	Lowland	860	Nolan Creek	40,000	Lithic/burned rock scatter	Paleo-Indian
41BL990	6003	Intermediate Upland	860	Nolan Creek	112,500	Lithic/burned rockscatter/Quarry	Unknown
41BL991	6004	Lowland	840	Nolan Creek	105,000	Lithic/burned rock scatter	Archaic
41BL993	6006	Lowland/Interm. Upl	885	Nolan Creek	352,500	Lithic/burned rock scatter/Quarry	Unknown
41BL994	6007	Intermediate Upland	890	Nolan Creek	5,000	Lithic/burned rock scatter	Unknown
41BL997	6010	Intermediate Upland	895	Nolan Creek	5,000	Lithic/burned rock scatter	Unknown
41BL998	6011	Intermediate Upland	990	Nolan Creek	5,000	Lithic/burned rock scatter	Unknown
Belton Lake Periphery Area (Delivery Order No. 18)							
41BL1001	6014	Intermediate Upland	600	Leon River	10,000	Lithic/burned rock scatter	Unknown
41BL1002	6015	Upland Interfluvial	675	Leon River	5,000	Lithic scatter	Unknown
41BL1004	6017	Upland Interfluvial	660	Leon River	150,000	Lithic/burned rock scatter	Unknown
41BL1005	6018	Upland Interfluvial	675	Leon River	100,000	Lithic/burned rock scatter	Unknown
41BL1006	6019	Upland Interfluvial	705	Leon River	47,500	Lithic scatter	Unknown
41BL1010	6023	Intermediate Upland	620	Cowhouse Creek	40,000	Lithic scatter	Unknown
41BL1011	6024	Upland Interfluvial	605	Cowhouse Creek	42,500	Lithic/burned rock scatter	Unknown
41BL1012	6025	Upland Interfluvial	640	Leon River	300	Rockshelter	Unknown
41BL1013	6026	Upland Interfluvial	625	Leon River	400	Rockshelter	Unknown
41BL1014	6027	Upland Interfluvial	675	Leon River	77,500	Lithic/burned rock scatter	Middle Archaic
41BL1015	6028	Upland Interfluvial	670	Leon River	125,000	Lithic scatter	Unknown
41BL1016	6029	Upland Interfluvial	680	Leon River	32,500	Lithic scatter/rockshelter	Unknown
41BL1017	6030	Upland Interfluvial	650	Leon River	5,000	Lithic/burned rock scatter	Unknown
41BL1018	6031	Upland Interfluvial	660	Leon River	27,500	Lithic/burned rock scatter	Unknown
41BL1019	6032	Upland Interfluvial	685	Leon River	2,500	Lithic scatter	Unknown
41BL1020	6033	Upland Interfluvial	650	Leon River	7,500	Lithic scatter	Middle Archaic
41BL1021	6034	Upland Interfluvial	675	Leon River	2,500	Lithic scatter	Unknown
41BL1022	6035	Upland Interfluvial	650	Leon River	52,500	Lithic/burned rock scatter	Unknown
41BL1023	6036	Upland Interfluvial	0	Leon River	0	Rockshelter	Unknown
41BL1024	6037	Upland Interfluvial	0	Leon River	0	Rockshelter	Unknown
41BL1025	6038	Upland Interfluvial	0	Leon River	0	Rockshelter	Unknown
41BL1026	6039	Upland Interfluvial	0	Leon River	0	Lithic/burned rock scatter	Unknown
41BL1027	6040	Upland Interfluvial	650	Leon River	0	Lithic/burned rock scatter	Unknown
41BL1028	6041	Upland Interfluvial	0	Leon River	0	Mussel shell scatter	Unknown
41BL1029	6042	Upland Interfluvial	0	Leon River	0	Lithic scatter	Unknown
41BL1030	6043	Upland Interfluvial	0	Leon River	0	Lithic scatter	Unknown
41BL1031	6044	Upland Interfluvial	0	Leon River	0	Lithic scatter	Unknown
41BL1032	6045	Upland Interfluvial	0	Leon River	0	Rockshelter	Unknown
41BL1033	6046	Upland Interfluvial	0	Cowhouse Creek	0	Rockshelter	Unknown
41BL1034	6047	Upland Interfluvial	0	Cowhouse Creek	0	Rockshelter	Unknown
41BL1035	6048	Upland Interfluvial	0	Cowhouse Creek	0	Rockshelter	Unknown
41BL1036	6049	Upland Interfluvial	0	Cowhouse Creek	0	Rockshelter	Unknown

Table 7. Historic Sites Recorded in the Cantonment and Belton Lake Periphery Areas.

TARL	FIELD NUMBER	ENVIRONMENTAL ZONE	ELEVATION (FEET)	DRAINAGE	AREA (m^2)	SITE TYPE	EST. OCCUPATION (BEGIN)
Cantonment Area (Delivery Order No. 17)							
41BL987	6000	Intermediate Upland	955	Nolan Creek	47,500	Special purpose	Unknown
41BL992	6005	Lowland	835	Nolan Creek	5,000	Special purpose	Unknown
41BL995	6008	Intermediate Upland	890	Nolan Creek	2,500	Dump	1880-1964
41BL996	6009	Intermediate Upland	890	Nolan Creek	32,500	Domestic dwelling/ Special purpose	1880-1918
41BL999	6012	Intermediate Upland	1000	Nolan Creek	100	Isolated feature	1933-1964
Belton Lake Periphery Area (Delivery Order No. 18)							
41BL1000	6013	Intermediate Upland	600	Leon River	2,500	Special purpose	Unknown
41BL1003	6016	Upland Interfluvial	655	Leon River	750	Dump	1862-1955
41BL1007	6020	Upland Interfluvial	605	Cowhouse Creek	7,500	Dump	Unknown
41BL1008	6021	Intermediate Upland	615	Cowhouse Creek	1,250	Dump/feature	Unknown
41BL1009	6022	Intermediate Upland	625	Cowhouse Creek	15,200	Dump/feature	Unknown

In the surveyed area for Delivery Order No. 18, prehistoric site density was 9.91 sites per km^2 and historic site density was 1.55 per km^2. Prehistoric site density for Delivery Order No. 17 was 1.78 per km^2 and historic site density was 1.1 per km^2. Historic site density for both delivery orders is about average compared to earlier survey results from the northern, western, and southeastern areas, while the density of prehistoric sites appears to be well above average for Delivery Order No. 18 and about average for Delivery Order No. 17 (Delivery Order Numbers 1&6, 3, 4, 5, 7, and 10 produced densities 1.2, 1.2, 1.62, 1.65, 1.13, and 1.13 historic sites per km^2, respectively, and 1.1, 1.2, 1.4, .69, 1.22, and 2.07 prehistoric sites per km^2, respectively [Carlson et al. 1987b; Carlson et al. 1988; Ensor et al. 1991; Koch et al. 1988; Koch and Mueller-Wille 1989a, 1989b]).

Detailed site descriptions are presented in Appendices I and II for prehistoric and historic sites, respectively. Appendix III discusses the prehistoric material culture collected during survey, while Appendix IV contains a discussion of the types of historic sites located at Fort Hood, in addition to the myriad of features and artifacts typically present. Computer coding formats for both prehistoric and historic sites are provided in Appendices V and VI, respectively. General data on the environment, artifacts, and other cultural information are presented in Appendix VII.

An analysis of the location of sites in reference to environmental zones indicates that in the present survey area, most sites for Delivery Order No. 18 are in the upland. Aboriginal sites were situated in the upland (30, or 94%) and intermediate upland (2, or 6%), but none were located in the lowland zone (Table 8). By comparison, two (40%) of the historic sites were located in the upland zone, three (60%) were situated in the intermediate upland zone, and none were documented in the lowland zone (Table 9).

Table 8. Distribution of Prehistoric Sites by Environmental Zone.

	Cantonment Area		Belton Lake Periphery	
Environmental Zone	Total Sites	Percent	Total Sites	Percent
Lowland	2	25.00	0	0.00
Intermediate Upland	6	75.00	2	6.25
Upland	0	0.00	30	93.75
Total	8	100.00	32	100.00

Table 9. Distribution of Historic Sites by Environmental Zone.

	Cantonment Area		Belton Lake Periphery	
Environmental Zone	Total Sites	Percent	Total Sites	Percent
Lowland	1	20.00	0	0.00
Intermediate Upland	4	80.00	3	60.00
Upland	0	0.00	2	40.00
Total	5	100.00	5	100.00

Location of sites in reference to environmental zones for Delivery Order No. 17 shows that most sites are in the intermediate upland zone. No aboriginal sites were situated in the upland, six (75%) were located in the intermediate upland, and two (25%) were recorded in the lowland zone (Table 8). Historic sites were also mainly located in the intermediate upland with none in the upland zone; four (80%) were located in the intermediate upland and one (20%) was documented in the lowland zone (Table 9).

Prehistoric site size for Delivery Order No. 18 ranges from a rockshelter measuring 300 m^2 to a 150,000 m^2 lithic/burned rock scatter. The average aboriginal site size is approximately 22,756 m^2. Historic sites range in size from a 750 m^2 dump to a 10,000 m^2 dump/feature. Average historic site size is 4,400 m^2, considerably smaller than the prehistoric sites (Table 10).

Only two (6.25%) of the recorded prehistoric sites from Delivery Order No. 18 were dateable from chronologically-sensitive lithic artifacts (Table 10). One isolated find was dateable to the Late Archaic. Two (25.0%) of the recorded prehistoric sites from Delivery Order No. 17 were dateable according to chronologically-sensitive lithic artifacts (Table 10).

Prehistoric site size for Delivery Order No. 17 ranges from a lithic/burned rock scatter measuring 5,000 m^2 to a lithic/burned rock scatter/quarry measuring 352,500 m^2. The average aboriginal site size is approximately 79,375 m^2. Historic sites range in size from a 100 m^2 isolated feature (a possible concrete cistern base) to a 47,500 m^2, special purpose site (a possible military residential facility). Average historic site size is approximately 17,520 m^2 (Table 11).

Table 10. Prehistoric Chronological Components.

		Cantonment Area		Belton Lake Periphery	
Period or Phase	Dates	Component	Percent	Components	Percent
Paleo-Indian	12,500-9,500 B.P.	1	50.0	0	0.0
Paleo-Indian/ Early Archaic	9,500-8,500 B.P.		0.0	0	0.0
Early Archaic	8,500-5,000 B.P.		0.0	0	0.0
Middle Archaic	5,000-2,600 B.P.		0.0	2	100.0
Late Archaic	2,600-1,750 B.P.		0.0	0	0.0
Terminal Archaic	1,750-1,250 B.P.		0.0	0	0.0
Austin	1,250-650 B.P.		0.0	0	0.0
Toyah	650-200 B.P.		0.0	0	0.0
General Archaic		1	50.0		
Total Components		2	100.0	2	100.0

Table 11. Site Size.

Size Class	Cantonment Area				Belton Lake Periphery Area			
	Historic		Prehistoric		Historic		Prehistoric	
	Count	%	Count	%	Count	%	Count	%
1 m^2 to 999 m^2	1	20.0	0	0.0	1	20.0	2	11.0
1,000 m^2 to 9,999 m^2	2	40.0	3	37.5	3	60.0	5	28.0
10,000 m^2 to 99,999 m^2	2	40.0	2	25.0	1	20.0	8	44.0
Over 100,000 m^2	0	0.0	3	37.5	0	0.0	3	17.0
Total Sites	5	100.0	8	100.0	5	100.0	18*	100.0

* Area was not calculated for 14 prehistoric sites.

The range of occupation of the historic sites was derived using the minimum ending manufacture dates and the maximum beginning manufacture dates of the artifacts on each site to provide the narrowest range of time during which the site was occupied. Dateable artifacts were observed from all five sites (100%) in Delivery Order No. 18. Datable artifacts were observed from four of the five sites in Delivery Order No. 17. Sites range in date from the late nineteenth century to the military era for Delivery Order No. 17, and from the early twentieth century to the military era for Delivery Order No. 18 (Table 12).

Table 12. Historic Chronological Components.

Period	Dates	Cantonment Area		Belton Lake Periphery	
		No. of Components	Percent	No. of Components	Percent
I	1850-1879	0	0.00	0	0.00
II	1880-1929	1	14.29	2	22.22
III	1930-1953	4	57.14	4	44.44
IV	1954-Present	2	28.57	3	33.33
Total Components		7	100.00	9	100.00

SUMMARY

The five prehistoric site types — lithic/burned rock scatters, lithic scatters, rockshelters, mussel shell scatters, and quarries — represent a wide variety of activities characteristic of prehistoric hunting and gathering people. Activities at these sites probably included, but are not necessarily limited to, procurement of lithic resources, stone tool manufacture, cooking and burning activities associated with the preparation of plant and animal foods, and possibly heat treatment of lithic raw material for stone tool

manufacture.

The variations in site size and in the density and diversity of surface artifacts, especially obvious stone tools, suggest important diversity in human behavior responsible for these residues. Larger sites with a greater quantity and diversity of artifacts suggest more generalized habitation centers where a wide range of economic and social activities may have occurred.

Of the historic site types identified at Fort Hood -- dumps, domestic dwelling/special purpose sites, special purpose sites, isolated features, and dump/features — dumps and special purpose sites are the most frequent. For more detailed discussions of Fort Hood historic resources, see S. Carlson in Roemer et al. (1985), Carlson et al. (1987b), Carlson et al. (1988), Jackson (1982a, 1982b, 1982c), Koch et al. (1988), and Koch and Mueller-Wille (1989a, 1989b). In addition, an especially informative excavation report on a typical domestic dwelling site belonging to the extinct Okay community at Fort Hood is presented in Carlson (1984a).

ARCHAEOLOGICAL DATA AND LATE PREHISTORIC PERIOD POPULATION DYNAMICS

Alston V. Thoms and Ben W. Olive

Archaeological data derived from surveys at Fort Hood are unusually complete in comparison to data available from almost any other similar-sized area in Texas. This is even more evident when Fort Hood data are combined with information from testing and excavation projects in the immediate vicinity of the post. As part of previous Fort Hood survey projects, archaeologists have addressed research topics that require site data not only from their specific survey tracts, but also from the military post as a whole, and from other parts of Texas as well. Previous research topics include the distribution of projectile points and site components across the Fort Hood landscape and parts of the rolling plains to the northwest (Carlson et al. 1986; Carlson and Ensor 1991). In other studies, a settlement pattern model applicable to central Texas was developed using data on the distribution of stone tools in different environmental zones at Fort Hood (Koch and Mueller-Wille 1989a, 1989b).

In the "Introduction" and "Research Strategies" chapters of this report, we noted that two research topics would be addressed as part of the present survey project: (1) assessment of the previously established predictive model (see "Predictive Modelling," this volume); and (2) assessment of available data that ostensibly show a marked decrease in central Texas population during the early part of the Late Prehistoric period. The second topic in particular requires data from archaeological sites throughout Fort Hood as well as information from other parts of the central Texas Hill Country. Although 40 prehistoric sites were recorded in the Cantonment and Belton Lake periphery areas, only three of these sites yielded temporally-diagnostic artifacts, and all recovered artifacts predate the Late Prehistoric period (see "Survey Procedures and Results," this volume). These few sites alone add little to our overall understanding of long-term land-use patterns in the Fort Hood area, but they are useful when used in conjunction with the more than 1,110 site components identified elsewhere on the post.

Our intent in this chapter is to re-examine the nature and distribution of sites at Fort Hood and vicinity that yielded temporally-diagnostic projectile points. The emphasis is on Late Prehistoric sites and their relationship to Late Archaic sites, but data are presented for the Paleo-Indian, Early and Middle Archaic periods as well. We begin by reviewing the concept of a population decline from the Late/Terminal Archaic to the Late Prehistoric as it has been presented in the regional literature. To provide a theoretical context for our discussions about the ostensible population decline during the Late Prehistoric period, we also present an alternative model for long-term changes in land-use systems wherein population increases through the millennia are integral components.

Next, we review data from previous surveys at Fort Hood in terms of time periods and the position of sites on the landscape. This is followed by a discussion of various site types in specific settings, including sites in riverine bottomlands, buried sites in general, rockshelter sites, and cemeteries/burials. Information about how these sites are distributed across the landscape is useful in determining whether or not the data actually support a general population decline during the Late Prehistoric period. The chapter concludes with a discussion about the "fit" between the archaeological data and the proposition about a significant population decline late in prehistory.

FROM REGIONAL CHRONOLOGY TO A LAND-USE MODEL

In central Texas, there is considerable evidence for cultural change during the "Austin interval" (ca. A.D. 800-1300) of the Late Prehistoric period (Table 13). As presently interpreted, the available data indicate a population decline, settlement pattern changes, and technological changes (Black 1989:32). The idea of a population decrease is derived mainly from the apparent decrease in site density, which, in turn, is usually accounted for by some combination of demographic, land-use, climatic, and technological forces, as well as by external influences. Climatic changes toward more xeric conditions may have caused a reduction in regional carrying capacity and regional human population (Skinner 1981). Also, the expansion of presumably better-adapted, extra-regional groups may have effectively replaced local groups in spite of their higher population densities (Prewitt 1985). Yet, at the same time that population is supposed to have declined in central Texas, there is evidence for a comparatively high population density and increasing population pressure in many other parts of North America, including the southwest and southeast (Fagan 1992:395-413).

This part of the chapter presents a preliminary land-use model for the Fort Hood area and surrounding environs that draws selectively from the information summarized by Black (1989) and presented in Table 13. In contrast to models that propose population declines late in prehistory (e.g., Howard and Freeman 1984; Prewitt 1981, 1985; Weir 1976), this model argues for a long-term trend toward overall population growth or packing. Its theoretical underpinnings are grounded in the broad patterns in prehistory showing long-term land-use intensification (Johnson and Earle 1987). As used here, land-use intensification refers to the general trend through the millennia toward the expenditure of more energy per unit area to recover more food from the same landscape to feed more people (Cohen 1977; Johnson and Earle 1987; Thoms 1989). Our model holds that a negative imbalance, typically too many people for the available commonly-used food resources, places stress on an existing land-use system, and thus forces intensification, which usually takes the form of increased exploitation of readily-available but more costly food resources. This imbalance is typically induced by changes in environmental conditions or population growth (Thoms 1989).

The model is a slightly revised version of one presented earlier for south-central Texas (Thoms 1992). It is intended to specify general trends that are detectable in the local and regional archeological records, but not necessarily at one site or in a single environmental setting. Some areas, for example, may not have plant resources that could support dense populations, and in those cases, intensification might be limited to increasing the exploitation of small terrestrial animals or aquatic species. Additionally, fluctuations are expected to occur in the directional trends of increasing population densities and land-use intensity. For example, some areas may be virtually abandoned due to environmental factors. Or, as Hester (1989) notes, when bison become available in greater numbers, people would be expected to hunt more bison and fewer deer, or to reduce the level of effort devoted to small game or plant food procurement. Other things being equal, bison hunting has a better cost:benefit ratio than deer hunting, but deer hunting has a far better cost:benefit ratio than plant gathering (Thoms 1989).

Table 13. Selected Characteristics of Archaeological Cultures in Central Texas.[1]

TIME PERIODS	SELECTED CULTURAL CHARACTERISTICS
PALEO-INDIAN: 11,200-8,000 B.P. ("Transitional Period": 9,000-7,000 B.P.)	**Diagnostics:** Early (pre-10,000 B.P.): *Clovis, Folsom, Plainview*; Late: *Golondrina, Angostura, Scottsbluff, Meserve*, also some forms of stemmed and barbed points **Population/Site Density:** very low, few are intact (e.g.,Wilson-Leonard site) **Site Locations:** too few sites to detect patterns **Subsistence:** Early: now-extinct big game (e.g., mammoth and bison); Late: fully Archaic lifeway (i.e., deer, small game, river mussels) **Other:** small bands, nomadic hunters
EARLY ARCHAIC: 8,000-5,000 B.P. ("Transitional Period": 9,000-7,000 B.P.)	**Diagnostics:** *Martindale, Uvalde, Gower, Bell, Nolan, Bulverde* points, *Guadalupe* and unifacial *Clear Fork* tools **Population/Site Density:** low; more sites than during previous period **Site Locations:** concentrated along Balcones Escarpment **Subsistence:** large technological inventory of unspecialized tools suggests a wide range of resources **Other:** small, highly mobile bands
MIDDLE ARCHAIC: 5,000-3,000 B.P.	**Diagnostics:** Early: *Nolan* and *Travis*; Late: *Pedernales, Langtry, Marshall*, and *Bulverde* throughout this period **Population/Site Density:** populations higher (some argue highest of all); many more sites than earlier **Site Locations:** very widespread, especially burned rock midden sites **Subsistence:** deer most important, but nuts (acorns, walnuts, and possibly pecans) very important; also seeds, yucca-related plants, and river mussels **Other:** appearance of burned rock middens; "primary forest efficiency"
LATE/TERMINAL ARCHAIC: 3,000-1,200 B.P.	**Diagnostics:** Late: *Montell, Castroville, Marcos* (broad triangular blades); Terminal: *Ensor, Frio, Darl, Fairland* (small expanding stems) **Population/Site Density:** population density high (some argue highest of all in Terminal Archaic); possibly (?) more sites in Terminal Archaic than earlier **Site Locations:** more sites in riverine settings (?) **Subsistence:** less specialized; bison/deer hunting and plant resources (North Fork Lake sites show decrease in acorn use), fewer burned rock middens **Other:** trading evident; more cemeteries
LATE PREHISTORIC: 1,200-400 B.P.	**Diagnostics:** Austin: *Scallorn* arrow points and other expanding stem forms; Toyah: *Perdiz* arrow points and pottery, also beveled knives and small end scrapers **Population/Site Density:** population decline during Austin, possibly major population movements **Site Locations:** increased use of rockshelters **Subsistence:** deer most important throughout, but bison also during Toyah; perhaps limited agriculture **Other:** interaction with Caddo populations to north and east; intergroup conflict during Austin phase; reintroduction of blade technology during Toyah interval

[1] Data from Black's (1989) *Review of the Central Texas Plateau Prairie* and recent updates (Stephen Black, personal communication 1993).

The model is presented in terms of general cultural characteristics for geologic time periods that roughly correspond to cultural periods.

Late Pleistocene to early Early Holocene: Pre-Clovis through Early Paleo-Indian (prior to ca. 10,000 B.P.); low population densities, without appreciable population circumscription; high group mobility and short-term occupation of sites by family groups; people move to the food resources (i.e., "forager-like") (Binford 1980); reliance on big game to the extent it is present (megafauna, or largest bodied ungulates), supplemented by a variety smaller animals, fish, shellfish, and plants. **Expectations of archaeological record**: comparatively few sites with comparatively low artifact densities and high diversity in tool types, especially camp maintenance tools; small, minimal-investment features; no evidence for bulk processing foods other than big game.

Early Early Holocene: Late Paleo-Indian (ca. 10,000-8,000 B.P.); increasing population densities and initial population circumscription; somewhat reduced group mobility, but continued forager-like strategies (Binford 1980); primary reliance on the largest-bodied available ungulates (probably deer in riverine settings, and at least periodically bison in adjacent uplands); increasing use of smaller animals, fish, shellfish and plants, as the availability of larger game animals decreases relative to human population. **Expectations of the archaeological record:** comparatively more sites, most of which should have low artifact densities and high diversity in tool types, especially camp maintenance tools; small, minimal-investment features; no evidence for bulk processing foods other than big game, including deer.

Late Early to Middle Holocene: Early Archaic (ca. 8,000-5,000 B.P.); increasing population densities with population circumscription well established; reduced group mobility; a notable reduction in the use of short-term occupation of sites by family groups and the movement of people to the food resources, coupled with an increase in logistically oriented, "collector-like" strategies (Binford 1980); in the absence of bison, reliance on deer in all settings, and increasingly on smaller animals, fish, shellfish, and especially plants foods (roots [including sotol and other succulents], prickly pear, pecans, mesquite, and acorns), focusing on the more abundant species with the best cost:benefit ratios. **Expectations of the archaeological record:** notable increase in site types, including sites with high artifact densities and diversities (i.e., base camps) that can be distinguished from sites with low or high artifact densities and low artifact diversities (i.e., task-specific, logistical sites); overall increase in the diversity and frequency of tool and feature types; initial evidence for increased procurement and bulk processing foods other than big game (i.e., deer-sized and larger), including small game, fish, and plant foods.

Middle to early Late Holocene: Middle Archaic (ca. 5,000-3000 B.P.); continued increases in population densities and population circumscription; increase in collector-like strategies; continued reliance on deer, but with an increasing focus on riparian zones and increasing use of smaller animals, fish, shellfish, and especially plants foods; species with the lower cost:benefit ratios than those intensively used in preceding time periods will be used more regularly. **Expectations of the archaeological record:** notable increase in site types, including sites with high artifact densities and diversities (i.e., base camps) that can be distinguished readily from sites with high artifact densities and low artifact diversities (i.e., intensively used task-specific sites); initial appearance of sites with more permanent residential structures and evidence for trade, as well as cemeteries; overall increase in the diversity and frequency of tool and feature types; more evidence for

increased procurement and bulk processing resources other than big game, especially plant foods.

Early Late Holocene: Late and Terminal Archaic (ca. 3,000-1,200 B.P.); continued increases in population densities and population circumscription, increasing collector-like strategies; reliance on deer in all settings, but with an even greater focus on riverine environments and an ever increasing reliance smaller animals and plant foods with lower cost:benefit ratios than those used intensively during preceding periods. **Expectations of the archaeological record:** village or quasi-village sites (i.e., longer term occupations with more substantial residential structures, middens, and cemeteries) become more common, as do task-specific sites; the pattern of an increase in the diversity and frequency of tool and feature types should continue; bulk processing features (e.g., large earth ovens and burned rock middens) should become more common, as should evidence for the use of fish and shellfish; evidence for trade should become more abundant as well.

Late Late Holocene: Late Prehistoric (ca. 1,200-400 or 500 B.P.); this is essentially the pre-protohistoric land-use pattern; it is the period when land-use was at its maximum intensity, semisedentism was at a maximum level, and native populations were at their highest level prior to the population apocalypse brought about by the "discovery" of the New World by Europeans and the introduction Old World diseases (Burtchard 1987). **Expectations of the archaeological record:** the equivalent of the Austin Focus or some other limited or non-bison hunting phase of the well known Late Prehistoric periods; tool and feature assemblages, including storage facilities, should be more complex than in earlier periods; midden deposits at base camp/village sites and special purpose sites should be at their densest; bulk-processing features remain very common; the use of fish and shellfish should be at an all time high; cemeteries should be more common than during any other period, and evidence for violent deaths should be at an all-time high, as should evidence for trade.

Elements of this model are subject to testing and refinement with data from Fort Hood, as well as from existing and new data generated by other projects in the Texas Hill Country and adjacent parts of the Blackland prairie.

DATA FROM FORT HOOD SURFACE SURVEYS

In 1989, Koch and Mueller-Wille (1989a) collected information for a settlement pattern model within the Fort Hood area. They employed a Q-mode cluster analysis using tools and retouched tools as the variables from the Fort Hood surveys for Fiscal Year (FY) 1983 (Eastern Training Area), FY 1984 (Delivery Order No. 1), and FY 1985 (Delivery Order Numbers 3, 4, 5, and 7). Cluster analysis is a type of classification system which groups a set of data (tools types) into patterns that are as homogeneous as possible (internal cohesion). Of the 558 sites available, 70 met the criteria of the analysis by having 10 or more tools or retouched tools. Frequencies of environmental and cultural variables were selected for each cluster. While none of their results were statistically significant, biface production appeared to be a major organizing factor in six clusters of sites. Because of the lack of temporal control for much of the data, it is not known how these functional site clusters fit into the settlement pattern model other than to say that one cluster, associated with the uplands and lowlands, was characterized by large, low density sites, with a low diversity of tool types (no tool type dominated the cluster) and high debitage counts that would indicate the lack of biface production activity. Instead, these sites are associated with a higher density of burned rock, suggesting plant processing was an integral part of the sites, rather than biface production.

In another study, Koch and Mueller-Wille (1989b) conducted a principal components analysis in order to ascertain if classes of artifacts were found to co-vary within different site types and environmental zones. They utilized data from the Fort Hood surveys for FY 1983 (Eastern Training Area) and FY 1984 and 1985 (Delivery Order Nos. 1 and 3), producing a sample of 412 sites. A total of 295 sites were selected which met their criteria of sites with more than 10 tools. The results on the first test produced a six-factor solution, demonstrating that the organization of tools was non-random and that the functional grouping was based on early and late stages of tool production. Given that high-quality lithic raw material is abundant and widespread at Fort Hood, it is not surprising that statistical analysis indicates the relative importance of raw material procurement strategies in the region. It is possible, of course, that the seemingly low density of finished formal tools might be attributed to the activities of relic collectors who may have recovered enough tools to significantly bias these analytical results (Grant Hall, personal communication 1994). From our perspective, however, it seems reasonable to conclude that the abundant evidence for tool manufacturing in general is to be expected in this kind of chert-rich region.

A second analysis using the data from the Koch and Mueller-Wille study (1989b) grouped sites by environmental zones and produced a result similar to the earlier analysis. For example, one grouping consisting of Type I bifaces (early stage) and cores forms a factor present in the intermediate upland zone as well as all lithic scatters and quarries, but this factor was absent in the lowlands and rockshelters. This implies that early stage biface production was not a factor in these latter areas. A second grouping, including Type III bifaces (late) stage, dart points, and arrow points, was located in the upland and intermediate upland zones, as with all site types, but was absent in the lowlands, implying that late-stage biface production was not a factor in the lowlands. A third group of scraping and chopping tool loads the same factor in all the lowland sites, rock shelters, and quarry sites, implying that these tools were factors in the lowlands. These data indicate that while the uplands and intermediate uplands showed the two divisions in tool production (early- and late-stage biface production), the lowlands showed less organization by production, suggesting different activities in the lowlands. These data also suggest that while various activities, including domestic and subsistence tasks, occurred in the lowlands, the tool manufacturing sequence is not as well represented as it is in nearby intermediate and upland zones. In short, these data are consistent with the concept that the archaeological record in the lowland zone is representative of residential encampments of varying duration.

Components and Environmental Zones

For this report, data from the Fort Hood surveys for FY 1986 (Delivery Order Nos. 9 and 11), FY 1987 (Delivery Order Nos. 1 & 6), and FY 1990 (Delivery Order No. 10) were combined with data from Delivery Orders 17 and 18 and analyzed in various ways to detect changes in the settlement pattern from the Paleo-Indian through the Late Prehistoric periods. A total of 1,117 components was elicited from these reports (Table 14 and Figure 6 show the components for these sites). The components were solely determined from the types of projectile points recovered at the sites. Accordingly, what is actually being assessed is the distribution of projectile points as a measure of the relative importance of hunting through time. The possibility must also be recognized here that relic collectors have removed enough projectile points to significantly bias the data. It seems likely, however, that the effects of relic collecting would be similar for all types of points, and thus might not be expected to significantly bias the overall analytical results as they apply to the relative importance of hunting.

Figure 7 shows the relative percentage of components within each environmental zone so that the total number of components within each zone totals 100%. The component with the highest frequency through all environmental zones is the Middle Archaic, which represents 28.2% of all sites in the uplands and 25.2% in the lowlands, followed by the Terminal Archaic with 19.3% in the uplands and 18.5% in the lowlands, Late Archaic with 17.8% in the uplands and 16.2% in the lowlands, and Early Archaic with

Table 14. Components and Environmental Zone from Selected Fort Hood Reports (time periods follow Prewitt [1985]).

Environmental Zone	Paleo-Indian 12,500-8,500 B.P.	Early Archaic 8,500-5,100 B.P.	Middle Archaic 5,100-2,600 B.P.	Late Archaic 2,600-1,800 B.P.	Terminal Archaic 1,800-1,250 B.P.	Late Prehistoric 1,250-200 B.P.
Upland	30	73	127	80	87	53
Intermediate Upland	2	72	110	55	103	54
Lowland	22	44	69	44	50	42
Total	54	189	306	179	240	149

16.2% in the uplands and 16.2% in the lowlands. As can be seen, all of the percentages decrease from uplands to lowlands except for the Late Prehistoric component which increases from 11.8% to 15.5% and the Paleo-Indian component which increases from 6.7% to 8.1%. Paleo-Indian components are distributed across the landscape in a way that is markedly different from the other components. Whereas the other components are well-represented in the intermediate uplands, Paleo-Indian components are scarcely represented in this zone. Although Paleo-Indian land-use patterns are not discussed here, the anomalous nature of the Paleo-Indian component data merits additional attention.

Figure 8 shows the percentage of each component in each of the environmental zones so that the sum of the environmental zones totals 100%. Approximately 56% of all Paleo-Indian components are represented in the uplands with 40.7% in the lowlands. This is followed by the Late Archaic with 44.7% of sites in the uplands and 24.6% in the lowlands, Middle Archaic with 41.5% in the uplands and 22.5% in the lowlands, Early Archaic with 38.6% of sites in the uplands and 23.3% in the lowlands, Terminal Archaic with 36.3% in the uplands and 20.8% in the lowlands, and Late Prehistoric with 35.3% of sites in the uplands and 28% in the lowlands. The decrease from the uplands to the lowlands averages 17% for Paleo-Indian through Terminal Archaic, but only 8.6% for the Late Prehistoric. The next lowest decrease is the Early Archaic, declining 14.9% from the uplands to the lowlands.

Discussion: The Place of Late Prehistoric Sites in the Local Data Base

The present analysis of the Fort Hood data set of prehistoric components in conjunction with the previous studies by Koch and Mueller-Wille (1989a, 1989b) exhibit several interesting findings. The Terminal Archaic and Late Archaic have been combined for purposes of analysis to facilitate comparison with other data sets from elsewhere in central Texas. While none of these findings are statistically significant, they do suggest trends in the data that can be used for interpreting past land-use patterns.

One trend is shown in Figure 9. Discounting the Paleo-Indian components, the Late Prehistoric components are the only ones that increase from the uplands to the lowlands, from 11.8% of all sites in the uplands to 15.5% of all sites in the lowlands.

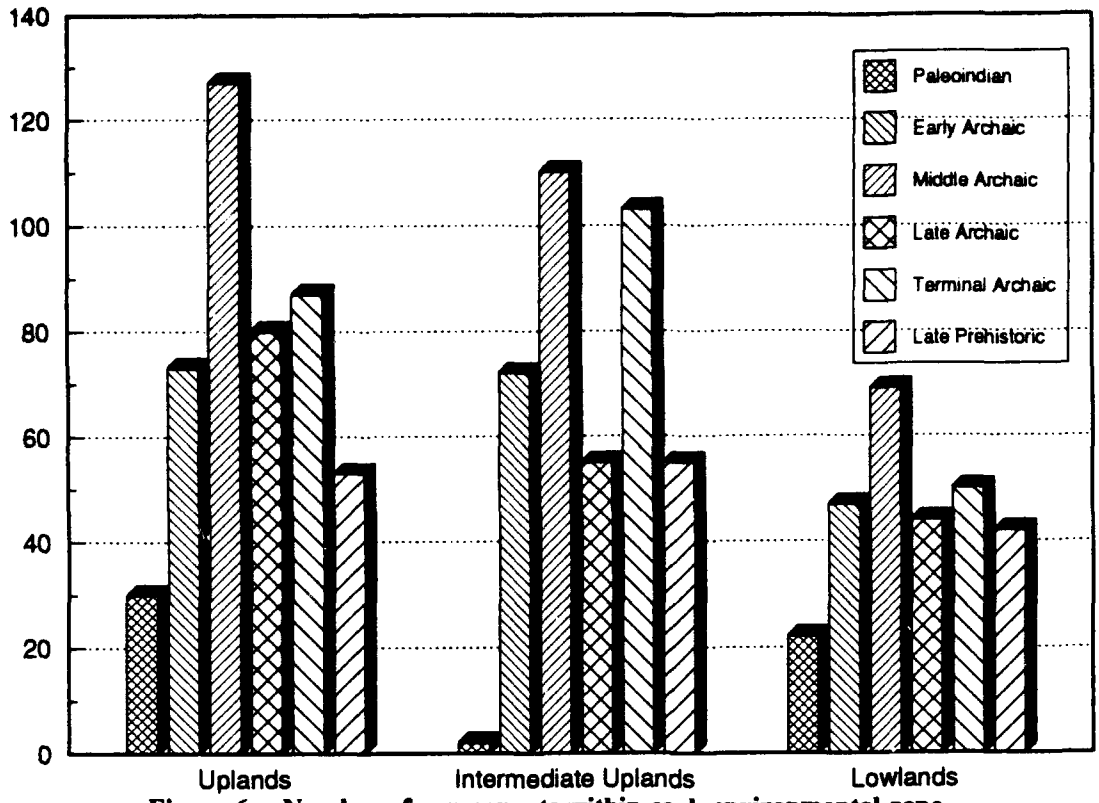


Figure 6. Number of components within each environmental zone.

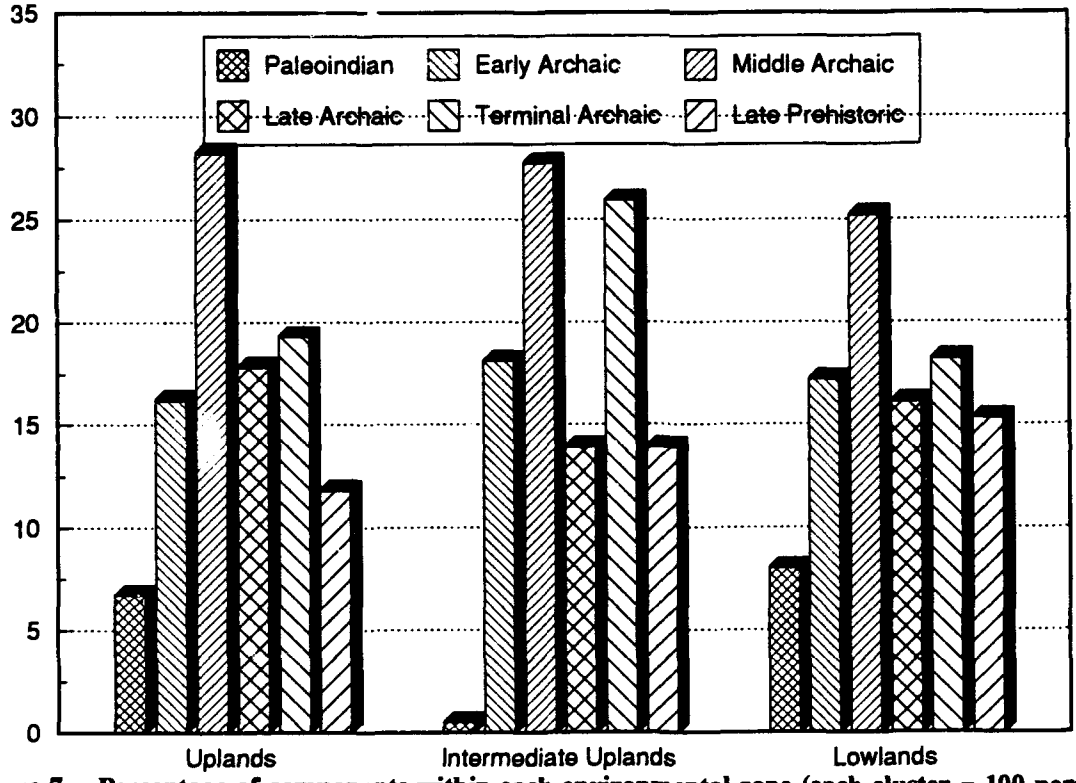


Figure 7. Percentage of components within each environmental zone (each cluster = 100 percent).

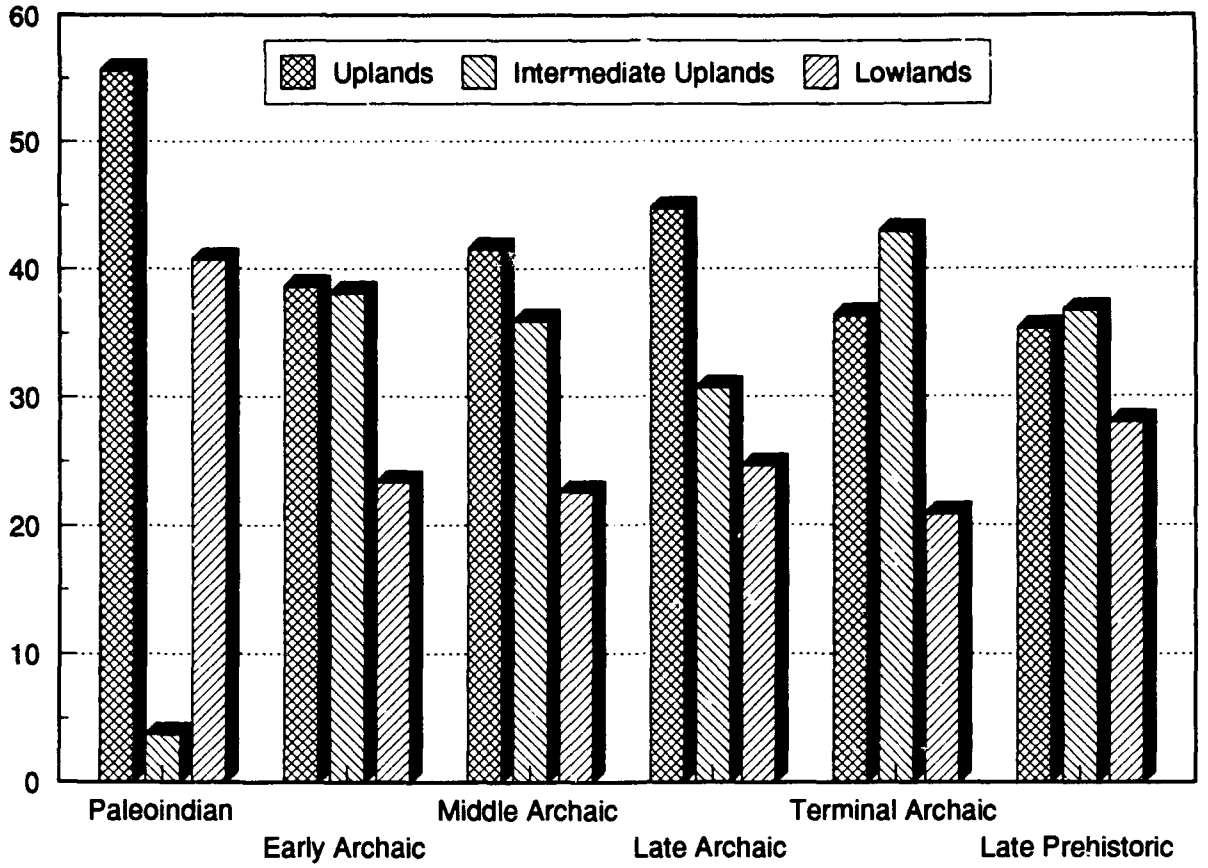


Figure 8. Percentage of components across environmental zones (each cluster = 100).

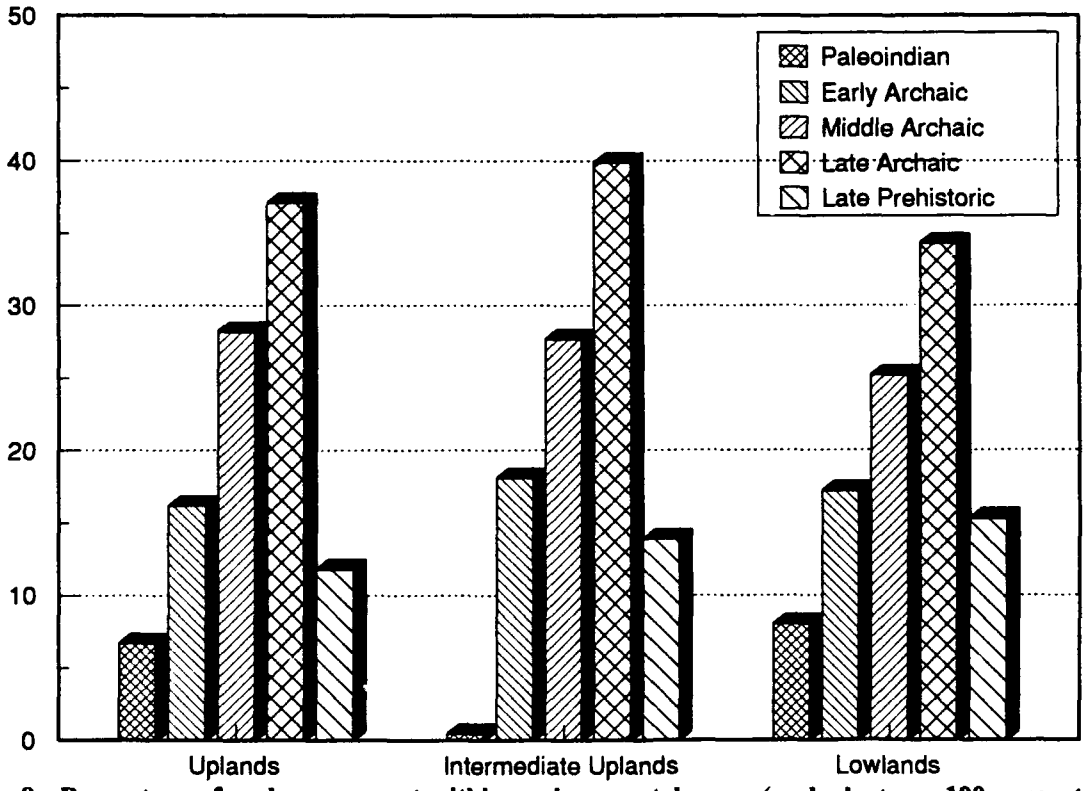


Figure 9. Percentage of each component within environmental zones (each cluster = 100 percent; Data for Terminal Archaic and Late Archaic periods have been combined).

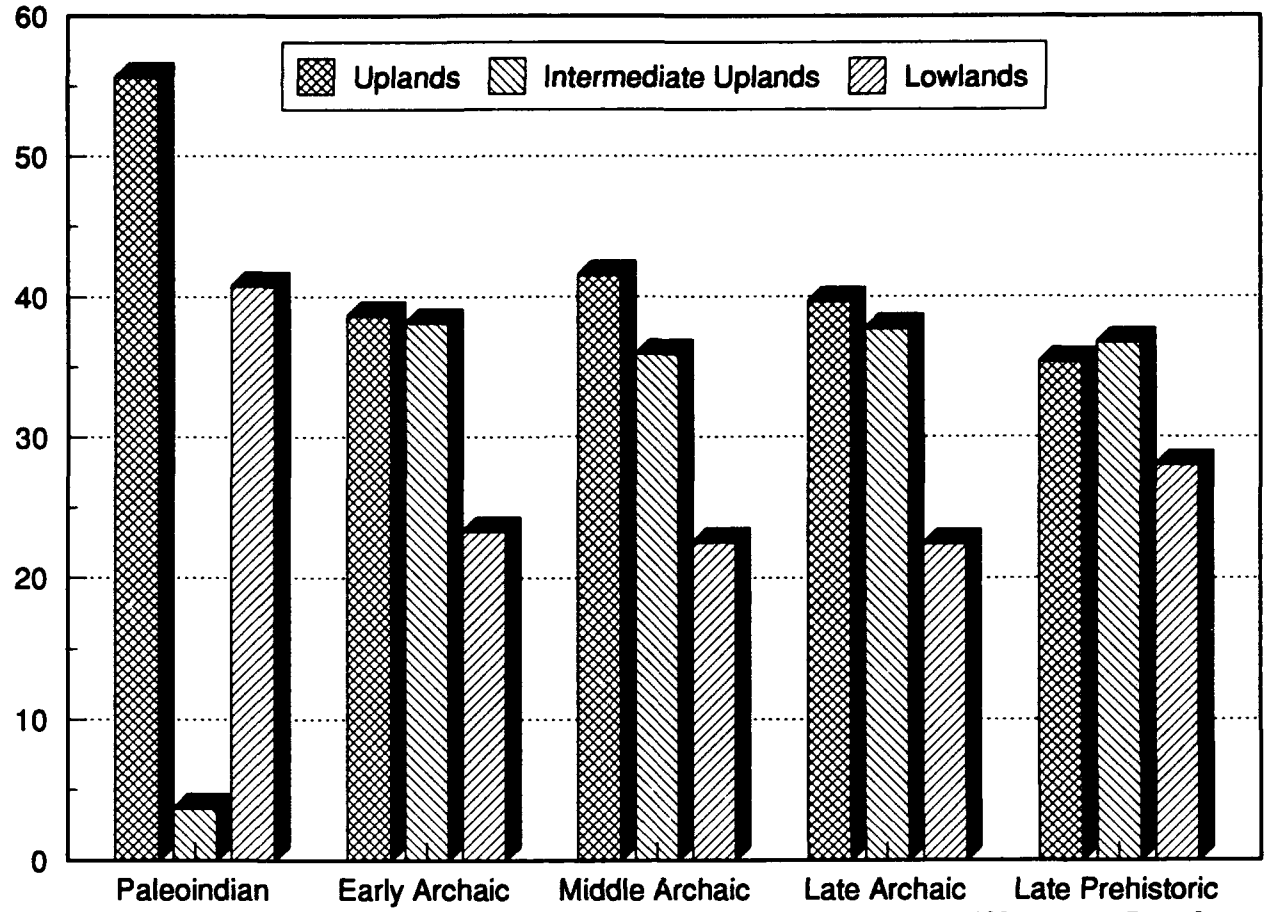


Figure 10. Percentage of environmental zones for components (each cluster = 100 percent; Data for Terminal Archaic and Late Archaic periods have been combined).

Figure 10 shows the percentage of each component in an environmental zone. With the exception of the Paleo-Indian components, the Late Prehistoric components have the highest percentage in the lowland environmental zone. Twenty-eight percent of the Late Prehistoric components are in the lowlands. This could indicate that during the Late Prehistoric period, the lowland zone was utilized more than in the preceding Archaic period.

The Koch and Mueller-Wille (1989a, 1989b) studies show that sites in the uplands and intermediate uplands were more organized around biface tool production than were sites in the lowlands. They argued that this pattern could be explained by the fact that chert quarries occur in upland and intermediate areas, and that campsites in the lowlands were probably distinct from those in the uplands and intermediate areas. This contention is further supported by the presence of a higher density of burned rock which indicates more food-cooking activities. In addition, their data concerning the grouping of tools indicate that subsistence strategy was different in the lowlands. All of the lowland sites load the same factor, scraping and chopping tools, while these factors did not load in the other environmental zones. This pattern is compatible with the concept of more varied cooking-related activities and with the idea that residential activities were well represented in the lowlands, especially during the Late Prehistoric period.

LATE PREHISTORIC SITES IN THE FORT HOOD AREA

The broad patterns of prehistory in central Texas have been inferred from the region's rich archaeological record (Table 13) (for a description of the various projectile point and tool types noted in the table, the reader is referred to Turner and Hester's [1985] *A Field Guide to Stone Artifacts of Texas Indians*). Consistent with the pattern for other parts of central Texas, early survey data from Fort Hood revealed a comparative paucity of Late Prehistoric sites (Skinner 1981:114). Subsequent studies have shown a similar trend as well, even when the duration of each time period is standardized by reporting the number of components per millennium (D. Carlson et al. 1986; Carlson and Ensor 1991). The "decrease" at Fort Hood could be more apparent than real if many Late Prehistoric sites are actually buried, or obscured by dense vegetation, or sequestered in rockshelters (D. Carlson et al. 1986:55-63; Nordt 1992:77-80; Shafer 1971). Data from the Cantonment area, where vegetation cover is less dense than in many parts of the Fort, and from the Belton Lake periphery, where rockshelters are likely to be common, as well as data from other parts of Fort Hood, are especially useful in assessing Late Prehistoric land-use patterns in upland settings. Survey and testing work done prior to reservoir construction along the Leon River (Belton Lake) and Lampasas River (Stillhouse Hollow Lake) provide important data on the use of bottomland landscapes.

Riverine--Bottomland--Site Data Bases: Belton and Stillhouse Hollow Lakes

In 1949 and 1959, 50 prehistoric sites were recorded in and adjacent to lands that would be inundated by Belton Lake. With the exception of six partially excavated sites in extreme southeastern Coryell County (Miller and Jelks 1952), there is little published information about the sites originally found in the bottomland. Five of the six excavated sites have Late Prehistoric components that would currently be termed as Austin and Toyah phases. All five sites yielded *Scallorn* and *Perdiz* arrow points, as well as *Copena* knives and at least one type of Caddoan pottery. Four sites — one midden site, one burned rock midden, and two rockshelters — were located in or at the edge of the bottomlands. The remaining Late Prehistoric site was a burned rock midden located on the bluff top immediately above one of the rockshelters (Miller and Jelks 1952).

It can be assumed that the sites selected for excavation were those believed to be most productive in terms of artifact yield and culture history. In any case, each of the Late Prehistoric sites had artifact-rich areas that yielded numerous artifact types, indicating residential activities at comparatively long-term base camps or semipermanent villages. Among the recovered artifacts were drills, snub-nose scrapers, sandstone abraders, bone awls and flakers, as well as beads, metates, shell pendants, and bone tablets. Various pottery types and the *Copena* knives evidenced trade with the Caddoan areas of north and east Texas, and obsidian flakes from one rockshelter were viewed as an indication of contacts with the Southwest (Miller and Jelks 1952).

In 1962, additional survey and testing work was conducted at Belton Lake in anticipation of a 25-foot increase in the pool level (Shafer et al. 1964). Thirty-four sites were recorded, nine of which were test excavated. Of the 34 sites, 19 yielded temporally-diagnostic artifacts, eight of which had Austin and/or Toyah artifacts. In other words, half of the sites that could be assigned a time period were classified as Late Prehistoric. Site types and contents were similar to the previously recorded sites; one of the new sites also had a burial (Shafer et al. 1964). Later, Shafer (1971:3) argued that two of the Toyah phase sites in Belton Lake (Castro [also called the Garth Site] and Urbankte) might be village sites. All in all, data from bottomland sites inundated by Belton Lake show substantial occupation during the Late Prehistoric period. Moreover, these data are also consistent with the concept of occupation by sizable groups of people for extended periods of time (i.e., semisedentism).

Late Prehistoric sites in the bottomlands inundated by nearby Stillhouse Hollow Lake (on the Lampasas River about 10 km south of Fort Hood) are not as well represented as they are in the Belton Lake area. Initial survey work for Stillhouse Hollow Lake resulted in the discovery of 11 prehistoric sites (Johnson 1962). Six of the sites yielded temporally-diagnostic artifacts, but only one had Late Prehistoric material. This site was a rich, burned rock midden located on a terrace remnant adjacent to the river; it yielded an arrow point and two types of east Texas pottery (Johnson 1962:8-9). Additional sites were recorded during subsequent surveys, bringing the total to 38. Six of the new sites were test excavated but the results have not been published; at least one site had Late Prehistoric materials (Sorrow et al. 1967:1, 14-). Only two of the new sites were extensively excavated; one of these (Evoe Terrace site) had a widespread Late Prehistoric component that was underlain by stratified Archaic materials. Austin and Toyah phase materials were recovered, including pottery that indicated trade with Caddoan groups to the north or east (Sorrow et al. 1967). From the available information, it is not known how intensively the Late Prehistoric sites were used, but it seems likely that they represent more than short-term encampments.

Other archaeologists have noted a shift through time toward increasingly intensive occupation of the bottomlands in central Texas. Grant Hall (personal communication, cited in Black 1989:30), for example, argued that the Late Archaic period population coalescence was restricted to river basin areas with concentrated pecan groves. Skinner (1981:14-15) concluded that, coincident with a marked population decline during the Late Prehistoric period, there was a significant shift in settlement patterns. Habitation sites were mainly in bottomlands due to the onset of xeric conditions, but people continued to use the uplands. Shafer (1971:3-5) argued that a significant shift in settlement pattern occurred somewhat later with the onset of the Toyah phase when the people began to occupy semi-permanent villages along alluvial terraces where horticulture may have been practiced as a supplement to wild food resources.

While the information summarized here does not provide very reliable data about the relative intensity of bottomland occupation during the Late Prehistoric period, it seems evident that there was a general increase in the utilization of bottomland resources during this period. Even if the relative frequency or density of the Late Prehistoric sites is similar in the bottomlands and uplands, the archaeological record at bottomland sites arguably represents more intensive utilization, probably by more people staying at a given site for longer periods of time, compared to the preceding periods. The archaeological record from the bottomlands suggests that more people are probably represented by fewer, but comparatively intensively-occupied, Late Prehistoric sites than might be indicated by a simple comparison of component frequencies.

Buried Site Data Base: Fort Hood

Potentially relevant data for addressing questions about population dynamics also come from the buried sites investigated as part of the geoarchaeological study at Fort Hood. From a sample of 19 sites with radiocarbon ages obtained from charcoal in discrete features, Nordt (1992:79) notes that "within the context of the alluvial stratigraphic framework, buried site density appears to gradually increase from 10,000 to 3,000 B.P., peak between 2,800 and 600 B.P., and then decrease."

Nordt (1992:79-80) argues, however, that the decrease in site density after 600 B.P. does not necessarily translate to a decrease in human population density. In part, this is because the volume of sediments representative of the last 600 years is much less than the sediment volume attributed to preceding periods. Moreover, data from the buried sites are inconsistent with data from the surface sites that indicate a marked decrease in site density beginning about 1,200 B.P., some 600 years earlier than the apparent decrease in the density of buried sites. Nordt concludes that:

> ... a possible explanation for this [site density decreasing at 1,200 rather than 600 B.P.] is that population densities did not decrease during this time, but rather there was a shift in procurement strategies to floodplain settings, possibly because of drier conditions. Many sites during this time period would therefore be buried rather than subaerally exposed [Nordt 1992:79-80].

To summarize Nordt's (1992) analysis of the buried site data from Fort Hood: (1) through time, there is a gradual increase in the number of sites until about 600 B.P. when the numbers decrease, but it should be emphasized that the sample size (available sediments) for the post 600 B.P. time period is comparatively small; and (2) to the extent that the ostensible decrease in site frequencies after 600 B.P. actually represents a decrease in overall site density, it may be due, in part, to an increase in the intensity of floodplain exploitation, coupled with subsequent alluvial deposition that buries sites, and thereby reduces their chances of being detected using standard surface survey techniques. Carlson also used Nordt's buried site data to illustrate that demographic trends based on surface distributions of projectile points and sites may not be reliable (Carlson and Ensor 1991:31). What is suggested here is that a disproportionate number of Late Prehistoric sites in the Fort Hood area, especially those in lowland settings, may be buried or obscured by vegetation.

Rockshelter Data Base: Fort Hood and Vicinity

Drawing from archaeological data in published and unpublished reports, as well as from his own professional experience along the eastern margins of the Edwards Plateau, Shafer (1971) emphasizes a marked increase in the first-time occupation of rockshelters that occurred at the interface of the Late/Transitional Archaic and Late Prehistoric periods. He attributed the increase to a drying trend evidenced in the pollen record. The result of this particular climatic change was a reduction in the intensity of drip springs in rockshelters that made them more habitable.

> In any event, rockshelter occupancy reaches its intensity along the escarpment during the Austin phase where almost every inhabitable overhang in the Belton and Whitney Lake areas show some utilization. This may reflect an increase in population density in those areas [Shafer 1971:2].

What is of special interest here is Shafer's suggestion that the regional population density may have peaked during the Austin phase, which, at that time, was considered to be from 1,500 B.P. to 800 B.P. He also notes that rockshelter occupation appears to continue through the subsequent Toyah Phase (ca. 800 B.P. to the Historic period), but that over much of central Texas there were fewer Toyah phase than Austin phase sites. The apparent decline in site numbers led Shafer to suggest that:

> (1) the population density was lower during the Toyah phase, or (2) that the duration of occupation was much shorter during the Toyah Phase, or (3) the settlement pattern changed to fewer, but larger settlements [Shafer 1971:5].

Skinner (1981:114-115) uses essentially the same rockshelter data, together with information on the temporal distribution of other kinds of central Texas archaeological sites, to argue for a "significant population decline" during the Austin phase. He recognizes that this demographic pattern was not "universally applicable" throughout central Texas, and he notes specifically that some data, including Shafer's, ostensibly suggest a population increase. Skinner, like Shafer, however, also concludes that there was a population decrease during the Toyah phase.

Skinner (1981) points out that in central Texas as a whole there are relatively few rockshelters with occupations predating the Late Prehistoric period, and that along the Brazos River, rockshelters with long-term occupations tend to be located on the first terrace. Rockshelters occupied initially during the Late Prehistoric period tend to be along the bluffs farther from the river and, in general, farther from permanent water sources, although the floodplain/terrace rockshelters also contain evidence for extensive Late Prehistoric occupation. The central Texas data showing the first use of these "less accessible rockshelters" along the bluffs was interpreted as "indicating a desire to seek protection from the cold winter weather" (Skinner 1981:14).

Rockshelter data from Fort Hood surveys indicate that during the Late Prehistoric period, there were significantly more occupied rockshelters than would be expected, given the low density of Late Prehistoric sites in general (D. Carlson et al. 1986:61). Temporally-diagnostic artifacts were not found on the surface of most of the five rockshelters that were test excavated, but all of the sites yielded arrow points from a buried context (Carlson and Ensor 1991:31). All five rockshelters were located along small, tributary watercourses in non-riverine settings, but in locations that provide ready access to the uplands as well as to riverine habitats (Carlson 1993). Only one rockshelter had clear evidence for pre-Late Prehistoric occupation, and in that case, dart points characteristic of the Terminal Archaic period were recovered. Three of the five rockshelters yielded both Austin and Toyah phase projectile points; one site had only Austin phase points and one yielded only arrow point fragments, but the accompanying radiocarbon age indicated occupation during the Toyah Phase (Carlson 1993).

Elsewhere in the central Texas Hill Country, rockshelters are also common, and there too, survey data alone are not usually sufficient to accurately ascertain occupational history. Based on testing and excavation results, however, it is widely recognized that the most intensive occupation of rockshelters occurred during the Late Archaic and Late Prehistoric periods (e.g., Black 1989; Coffman et al. 1986; Howard and Freeman 1984:115; Kotter 1985). Consequently, concerns have been raised that by not assuming that rockshelters with "unknown" occupation histories are likely to represent later period occupations, one is very likely to significantly underestimate the intensity of Late Prehistoric land use (Daniel Prikryl, personal communication 1993). Based on work at Cherry Tree Shelter in Travis County, for example, it was concluded that "intensive Austin Phase occupation may indicate that the noted decrease in population (Skinner 1981) is actually a preference for rockshelters over open sites," and that "the model developed by Howard (Howard and Freeman 1984) may need to be modified if similar results are obtained from other area sites" (Kotter 1985:151). Drawing from work at nearby Kenyon Rockshelter (Coffman et al. 1986), Daniel Prikryl (personal communication, 1993) has added another cautionary note: extensive roof fall in some rockshelters may complicate the picture even more by effectively obscuring earlier occupations and leaving the impression that most of the occupation dates to the Late Archaic and Late Prehistoric periods.

To summarize, the rockshelter data from Fort Hood and surrounding areas indicate that Late Prehistoric people regularly used rockshelters in riverine and non-riverine settings. Moreover, the use of rockshelters during the Late Prehistoric period seems to have been greater than during the preceding periods. Climatic changes and shifts in settlement and subsistence patterns are offered as explanations for the apparent increase in rockshelter use. But in any case, the data reviewed here suggest that many Late Prehistoric components may have gone unrecognized because they are hidden in rockshelter deposits.

Cemetery Sites: Central Texas and Surrounding Regions

Data from cemetery sites and isolated burials afford another measure of long-term demographic patterns. These kinds of sites are fairly common in central Texas and adjacent regions to the south and southwest. Most of the cemeteries and isolated burials [illegible] known or inferred ages are assignable to the

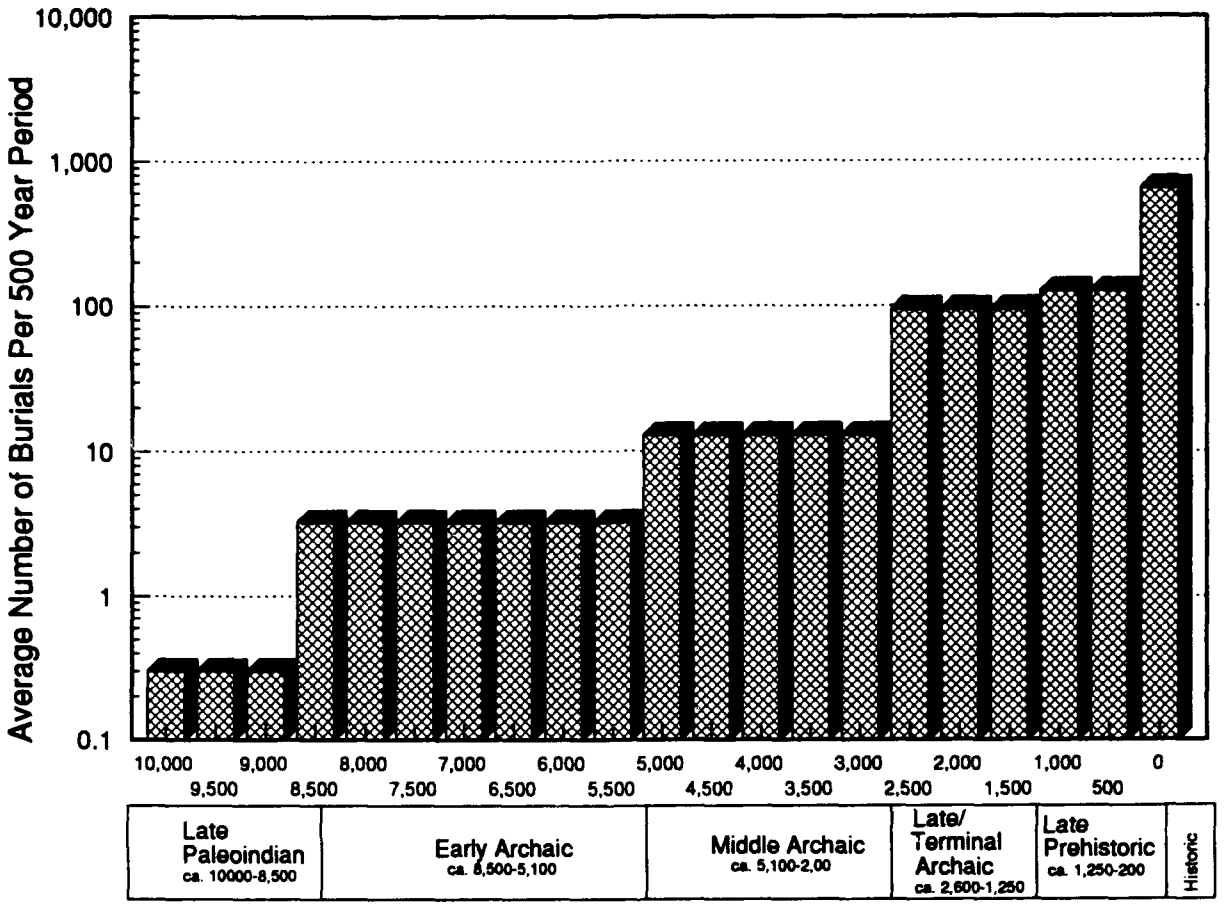


Figure 11. Graph of temporal distribution of average number of burials per 500 years in central Texas and vicinity (derived from data in Steele and Olive 1989).

Late Archaic and later periods with the largest number assigned to the Late Prehistoric period (Steele and Olive 1989:110). While the available data from this large area are less complete (Steele and Olive 1989:110), they probably do provide a useful, albeit very general, indication of long-term demographics.

Figure 11 illustrates the temporal distribution (average number of burials per 500 year interval) of the 859 burials in the sample studied by Steele and Olive (1989). In this graph, one of the south Texas sites (Loma Sandia) that was assigned to the Middle Archaic period is herein considered to be Late Archaic in age as per Black's (1989:30) assessment. The graph depicts a general trend that is consistent with the concept of long-term (i.e., through the millennia) population increase in the central, south, and lower Pecos parts of Texas. This apparent increase is also consistent with the concepts of long-term increase in regional population densities and hunter-gatherer land-use intensification around the world (Cohen 1989:1401-141).

Information is also available about the chronology of burials in the more restricted, but still broadly defined, central Texas area. Here, most of the 44 sites containing a total of at least 290 burials also appear to be associated with the Late Prehistoric period (Prewitt 1982: Figure 13, Table 4). Of the

33 sites that have burials with temporally-diagnostic material, 20 (60.6%) are associated with arrow points or pottery, and six (18.25%) others were considered to be possibly post-Archaic in age. Of the three cemetery sites in the Belton Lake area, one was judged to be Late Prehistoric in age; the other two were not assigned to a time period (Prewitt 1982:Table 4). Overall, the central Texas data are not as readily interpretable as one would hope, in part, because more than a dozen of the sites had multiple burials and cultural materials assignable to both the Late Archaic and the Late Prehistoric periods. While these data are not reliable as a direct measure of demographic changes, they are generally compatible with the larger data set compiled by Steele and Olive (1989) in that they are also consistent with an overall pattern of long-term population increase.

The bioarchaeological data summarized here are not necessarily consistent with the idea of a population decline in central Texas during the early part of the Late Prehistoric period (cf. Black 1989:32). It has been argued, however, that the ostensible increase in the number of cemetery sites and burials from the Archaic to the Late Prehistoric is more likely to be a result of recovery bias than an indication of population increase (Steele and Olive 1989:110-113). In assessing the utility of the cemetery data set, it is important to remember that archaeologists have long used artifactual data from the very same cemetery and burial sites to construct models and arguments about long-term changes in settlement, subsistence, technology, and trade patterns.

WAS THERE A LATE PREHISTORIC POPULATION DECLINE?

As Black (1989:32) noted, there is considerable agreement that with the onset of the Late Prehistoric period, there was a general population decline in central Texas. Nonetheless, there are areas where site frequencies increase during the Late Prehistoric period (Skinner 1981). For example, the increased use of rockshelters in the Belton and Whitney Lake areas suggests a population increase during the Austin phase (Shafer 1971). Shafer (personal communication, cited in Skinner 1981:114) suggested that there was a population increase during the Austin phase in the "Leon/Little River" area, but a general population decrease during the Toyah phase. Site distribution data from a 500-acre survey along Hog Creek in Bosque and Coryell counties have also been interpreted as evidence for an Austin Phase population increase (Skinner 1981:114-115).

Data from Late Archaic sites in the San Gabriel River basin may indicate a decrease in occupation intensity in the eastern hill country, along with a corresponding increase for the adjacent Blackland Prairie zone. This distribution pattern has been interpreted as evidence for a significant change in settlement patterns (Black 1989:30), including an increase in mobility and hence the size of group territories during the Late Prehistoric (e.g., Story 1985). Others argue that the rather dramatic changes in material culture which accompanied the settlement pattern changes may be the result of major in-migrations from the north and west that had still-to-be-determined effects on the local populations (Grant Hall, personal communication 1994). It is not clear what effect, if any, these or similar changes may have had on the overall Late Prehistoric period demography, but it does illustrate that changes in land-use patterns might be related to changes in regional population densities.

The answer to the question, "Was there really a general population decline in central Texas during the Late Prehistoric period?" may be turn out to be quite straight forward: the Late Prehistoric people may have been more numerous and densely packed than any of their predecessors. Among other things, the information reviewed here suggests that: (1) a disproportionate number of Late Prehistoric sites, especially in alluvial settings, may be buried or obscured by vegetation; (2) many Late Prehistoric components may be unrecognized because they are hidden in rockshelters; and (3) compared to other periods, the Late Prehistoric period in the bottomlands appears to be represented by sites evidencing larger and more intensive occupations, including semi-permanent villages. Moreover, our analysis of site components by

environmental zone at Fort Hood shows that compared to other time periods, a higher percentage of Late Prehistoric sites are found in the lowland zone. Collectively, these concepts probably explain a significant portion of the ostensible decrease in site frequency that has been interpreted as a population decrease.

From previous studies, there are abundant data from Fort Hood and vicinity to show a marked decrease in the number of Late Prehistoric arrow points in comparison to Middle to Late Archaic dart points (cf. D. Carlson et al. 1986; Prewitt 1985). This pattern was apparent in the reanalysis of some of the Fort Hood data presented in this chapter. These results could easily be used to argue that fewer points are consistent with the idea of a population decline. It should be noted, however, that a decrease in the frequency of projectile points is entirely consistent with the long-term, global decrease in the overall per capita importance of big game hunting and corresponding population growth (cf. Binford 1983; Cohen 1977; Johnson and Earle 1987). With the onset of horticulture, or with significant increases in the contribution of fish and shellfish, wild plant foods, or small game hunting, we would expect to find a corresponding decrease in the per capita frequency of projectile points used to hunt deer, bison, pronghorn, and other big game.

The data reviewed here on cemetery sites and isolated burials are also interpreted as being consistent with a model of population increase from the Late Archaic to the Late Prehistoric period (Figure 11). However, cemetery data are not necessarily more reliable than counting components or projectile points as measures of population dynamics (Steele and Olive 1989). As noted, site component and projectile point frequencies by time intervals show decreases from the Late/Terminal Archaic to the Late Prehistoric periods (D. Carlson et al. 1986; Prewitt 1985). However, a frequency plot by time intervals of the same set of radiocarbon ages that Prewitt (1985) used to argue for a Late Prehistoric period population decline reveals a very different pattern (Figure 12).

These data depict relative population stability between about 10,000 and 2,500 years B.P., followed by a rapid increase until about 500 B.P., when there is a marked decrease. They are also compatible with long-term growth curves and models showing that population worldwide tended to rise through the millennia, albeit not consistently and not without brief interruptions (e.g., Binford 1983; Cohen 1989; Hassan 1981:207; Johnson and Earle 1987; Whittaker 1975:364-370).

In gathering information leading to the conclusion that a significant population decline occurred during the Late Prehistoric period, archaeologists may have been looking in all the right places but using the wrong approach to look for the wrong kind of evidence. Binford (1983:76) argues: " ... that the past unfolds for those who make careful observations is a cheering thought: unfortunately it is wrong." The following analogy is useful in illustrating how reliable observations are necessary, but not sufficient, unless and until they are coupled with reliable methods.

Let us suppose that we are asked to use an archaeological approach to detect changes in population densities in central Texas and adjacent regions between 1870 and 1970. Since we know that people made their living in this area mainly by farming and ranching, we might decide to measure changes in population densities, and to a lesser extent changes in settlement and subsistence patterns, by counting the numbers of farm/ranch implements, livestock pens, farmsteads and ranches, and population centers (i.e., communities, villages, towns, cities).

Even without implementing this task, it is apparent to anyone familiar with the regions in question that the results are likely to show an overall decrease through time in the density (items per unit area) of implements, stock pens, occupation sites, and centers. Assuming that the results were as anticipated, and judging solely from those results, one might conclude that there was an overall population decrease, coupled with a general decrease in the importance of farming and ranching. However, had we monitored the *size* of population centers and accounted for *productivity potential* of the implements, pens, and

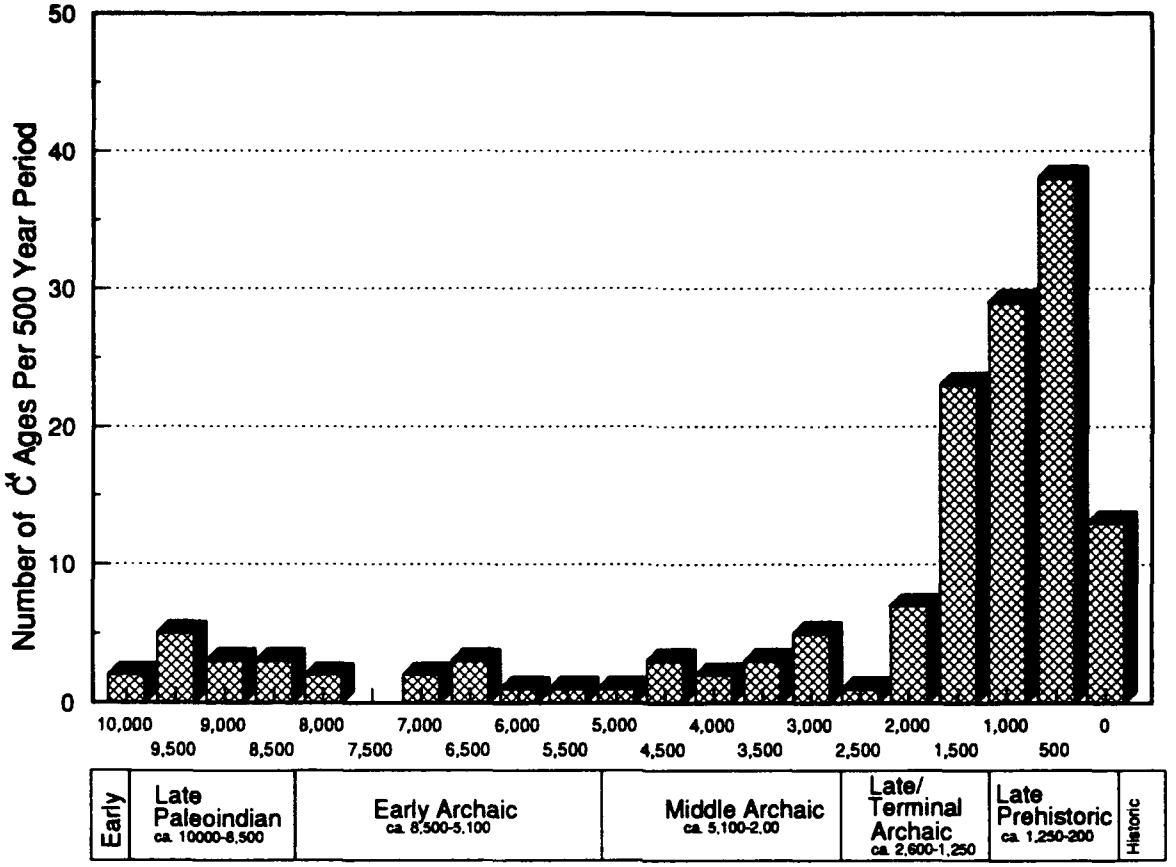


Figure 12. Frequency plot by time interval for the number of radiocarbon ages in central Texas (derived from data in Prewitt 1985).

occupation sites, our conclusions would probably be very different. We would probably have concluded, more accurately, that there was an overall increase in population density and land-use intensity, wherein the same landscape yielded more, albeit with fewer people. Through time, fewer and fewer people made their living by more and more mechanized farming and ranching practices, while more and more people secured their living from the non-agricultural components of the agro-industrial land-use system.

For more reliable measures of long-term changes in demography and land-use, we need to monitor the intensity of land-use and corresponding changes in productivity. In general, archaeologists have given considerable attention to the roles of paleoenvironmental change, geomorphology, and site formation processes when assessing demographic and land-use patterns. What we need to consider more adequately are some of the broad patterns in prehistory, including: (1) a long-term, millennia-to-millennia, increase in population density (growth or packing), coupled with increases in inter-group conflict and trade; (2) increasing territoriality and decreasing group mobility; and (3) land-use intensification and a corresponding decrease in the importance of big game hunting. More specifically, if we want to study long-term demographic changes as evidenced in the archaeological record, we need to account for the fact that village sites probably represent more people for longer periods of time than do many other types of central Texas archaeological sites. Perhaps the more general message here is that in the absence of a healthy application of archaeological theory, reliance on archaeological data alone to understand prehistoric population dynamics is apt to be unrewarding, and at best, a very difficult task.

PREDICTIVE MODELLING

David L. Carlson

Predictive models for historic and prehistoric Fort Hood sites were developed using GRASS 4.0 (Carlson et al. 1993). GRASS is primarily a raster-based geographic information system although vector data can be handled as well. Existing map layers which had been created for a variety of purposes unrelated to cultural resources were used in developing the models. No new data were added to the system although new layers were created which were transformations of existing layers. One of the drawbacks of working with a large area is that new information is not easily or economically added to the system.

The basic data set consisted of all areas which have been systematically surveyed on the post through 1990. This area includes 292,434 50x50m cells. Within this area, 21,017 cells contain a portion of a prehistoric site (7.2%) and 5,728 cells contain a portion of a historic site (2%). Two random samples were drawn for the prehistoric sites: one sample consisted of 1,200 randomly selected cells containing a portion of a prehistoric site (5.7% of the total) and 1,200 randomly selected cells not containing a portion of a prehistoric site (0.4% of the total). Two additional random samples were drawn for the historic sites: one sample consisted of 1,200 randomly selected cells containing a portion of a historic site (20.9% of the total) and 1,200 randomly selected cells not containing a portion of a historic site (0.4% of the total).

This approach is different from other published predictive models in that any part of a site could be selected for the analysis, not just the center point of a site. This approach was selected largely because Fort Hood contains enormous lithic procurement areas representing prehistoric use and reuse over 12,000 years. To reduce these sites to a center point greatly underestimates their variability. For historic sites, this is not as great a problem, but the same approach was taken to maintain consistency between the historic and the prehistoric models. Furthermore, some recorded historic sites clearly contain evidence of multiple households. The center point of these sites does not necessarily provide the best way of characterizing the site.

Gross differences between the distribution of historic and prehistoric sites are readily apparent. Prehistoric sites are more clustered and more random in their apparent distribution. Historic sites are distinctly more regularly spaced. Since only mobile hunter-gatherers lived in central Texas prior to European contact, land use was extensive rather than intensive and home ranges or territories were probably overlapping. Site locations might be expected to key closely to natural resources and features. Historic sites involve selection of a relatively permanent living place within a fixed tract of land. If a tract contains multiple good places to live, only one may have been chosen. Population density by Indians living at Fort Hood probably never exceeded one person per square mile and may have been as low as one person per 10 square miles. This translates to a total population on the post of only 34 to 340 people. Their use of the area was repeated over 12,000 years (roughly 480 human generations). In contrast, the historic population reached almost 1,000 by 1860 (approximately 2.7 people per square mile) and peaked at almost 7,000 in 1900 (approximately 20 people per square mile), assuming the rural population densities at Fort Hood were comparable to the rural densities in Bell and Coryell Counties. Use of the environment involved dividing the land up into distinct tracts with only one or two sites per tract. This land use pattern was repeated over 100 years (roughly four human generations).

The predictive models were developed around 18 variables that were selected or developed from existing map layers (Carlson et al. 1993). Sites were not stratified by chronological period or by type. This was partly because of the preliminary nature of the model and partly a result of the rather primitive data management capabilities in GRASS. Predictive models for historic and prehistoric sites were created using the stepwise logistic regression procedure in PC-SAS. For each variable, the values for the 1,200 site and 1,200 non-site locations were downloaded from the Fort Hood computer to a PC at ARL.

The results of the logistic regression accord well with what we would expect to find. Overall, the model correctly predicted 60% of the historic site areas. This is not as good as the prehistoric model which managed to predict 69%, but is better than the 50% success rate we would get by guessing. About 62% of the non-sites are correctly predicted versus about 61% for the prehistoric site model.

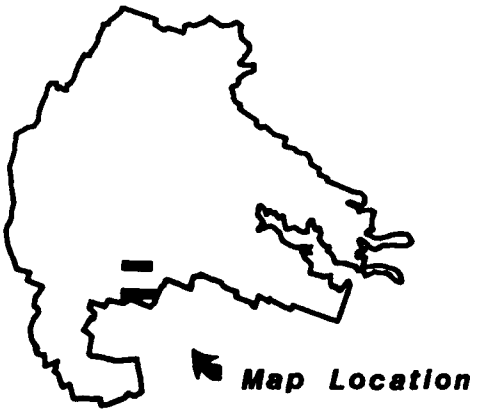
Nine variables were selected for the historic model. The first four all relate to soils. Depth to rock is selected first and the parameter estimate indicates that deeper soils are more likely to contain sites. Available water is selected next; soils which hold less water are more likely to contain sites. K factor is the third variable; erodible soils are less likely to have sites. This variable was also selected for the prehistoric site model, but the parameter estimate is larger for historic sites. Soil pH is the fourth variable; historic sites are more likely to occur on alkaline soils. Furthermore, sites are more likely at lower elevations and are more likely to be found away from rivers and away from chert-bearing soils. Historic sites are more likely to be found near large drainage divides and near areas of high soil diversity. In general, historic sites are most likely to be found in well-drained areas.

For prehistoric sites 11 variables were selected. The most important was the distance to chert-bearing soils. More sites were found closer to chert-bearing soils. Areas of higher soil diversity also were more likely to contain sites. More sites are found where cross-country movement is difficult. In other words, topographically-diverse settings are more likely to have prehistoric sites on them. Prehistoric sites are more likely to be found were soils are somewhat acidic and shallow. They are found away from drainage divides (both large and small), but are also found away from rivers and streams but in lowland environmental settings. This rather contradictory mix suggests that the variables are interacting in a relatively complex way. Finally, sites are less likely to be found on erodible soils. This may relate more to site preservation than site location.

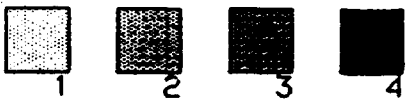
By using the parameter estimates provided by the analysis, it is possible to make a prediction regarding historic site location for every place on the post. The predictions were divided into four categories. Category 1 has the lowest probability of containing a site while category 4 has the highest probability. Figure 13 shows the predictive model for the Cantonment area survey. Examination of the figure shows no areas of high probability and no areas of very low probability for historic sites. In the northern block most of the area is shaded as moderate in probability. The southern block is equally divided between low and moderate probability areas.

Figure 14 shows the predictive model for the Belton Lake periphery. Historic site probabilities are predicted to be high around the edge of Tweedle Mountain and moderate on top. There are no areas of very low or low site probability indicated. The model for prehistoric sites is mostly blank because the Belton Lake periphery includes land that is federally owned, but not part of the military post. Several map layers used in the predictive model for the prehistoric sites are not mapped in this area, therefore the model is blank in these areas. None of these variables were selected for the historic predictive model. The predictive model shows the shoreline area just north of Tweedle Mountain to be an area of high site probability. If the model could be extended into the blank areas, it is likely that the whole area would be high and moderate probability.

Historic Sites



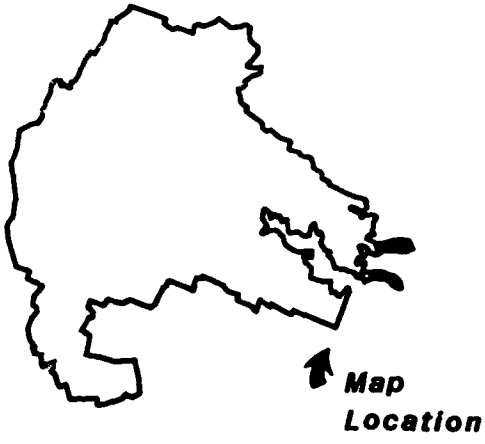
Prehistoric Sites

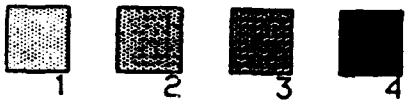


1 Very Low
2 Low
3 Moderate
4 High

Figure 13. Predictive model for the Cantonment area.

Historic Sites





1 Very Low
2 Low
3 Moderate
4 High

Prehistoric Sites

Figure 14. Predictive model for the Belton Lake periphery area.

Table 15 summarizes the results of the predictive model for all previous surveys. For each survey, site density and the percentage of area covered by sites can be compared to the percentages of area which were classified as lowest, low, medium, and high probability areas. For example, the FY 1982, FY 1983, and FY 1985-3 surveys had high percentages of the survey area classified as high probability areas. These three surveys also have the highest density of historic sites. Unfortunately, FY 1987-1 has the highest percentage of high probability areas, but only a modest historic site density. The survey areas for the cantonment area and the Belton Lake periphery surveys are not yet on the Fort Hood GIS, so we cannot fill out the table, but the historic site densities are about average. The density of historic sites for the Belton Lake periphery is lower than we would expect from the predictive model. Either the level of the lake at the time of the survey lead to an underestimate of the historic sites in the area, or the model predictions are wrong.

Similar analysis is possible for prehistoric sites. A general correlation between the percentage of high probability areas and site density holds except for the FY 1983 survey in the eastern training area which has too many prehistoric sites according to the model. This may partly be a result of the large number of rockshelters in this area. Since the elevation data in the Fort Hood GIS is rather crude, rockshelters cannot be adequately predicted by the model. The enormous prehistoric site density in the Belton Lake periphery simply underscores this problem. The enormous prehistoric site density around Belton Lake would not have been adequately predicted by the model. The above-average prehistoric site density in the Cantonment area would also not have been predicted by the model since virtually the entire survey area is classified as lowest or low probability.

A number of questions about the predictive model were proposed in the original delivery order (see Scopes of Work chapter). The questions concerning the rockshelters cannot be adequately answered because of the general failure of the model in the Belton Lake area and because of the more specific problems with the model in predicting rockshelters. Since the numerous sites in the Belton Lake area could not be completely recorded, we cannot adequately answer the questions relating to depth of shelter and aspect either.

Several questions relate to the use of the predictive model to exclude areas from survey. For example, if the categories lowest and low for historic sites were not surveyed, 45% of the post would be surveyed and 67% of the historic site areas would be included in that area. There is no straightforward way to decide how many sites would be recorded in such a survey. If only the highest probability areas for historic sites were surveyed, only 4% of the post would be surveyed and only 7% of the site areas would be included in such a survey. For prehistoric sites, the results are not much better. If the lowest and low categories were excluded, 46% of the post would be surveyed and 71% of the site areas would be included in that survey. If only the highest probability areas were surveyed, only 7% of the post would be surveyed and only 18% of the prehistoric site areas would be recorded.

The predictive model cannot really answer the question regarding the necessity of further survey along the Cowhouse Creek in the artillery impact areas since the model predicts sites without regard to their significance. An argument could be made that there are some distinctive floodplain deposits along the Cowhouse that are not duplicated elsewhere on the post. The closest analogs would be the inundated parts of Cowhouse outside the artillery impact area. The predictive model might be used to focus additional survey on very restricted high probability zones within the impact area. For example, extrapolating the figures just cited, a 10% survey might record 20% of the prehistoric sites and 15% of the historic sites. Unfortunately, the best 10% to survey for historic sites will not be the best 10% to survey for prehistoric sites.

Table 15. Summary of Predictive Model for Previous Fort Hood Surveys.

Historic Sites								
Project	Area (Sq km)	No. Sites	Site Density	Percent Area w/ Site	Predictive Model			
					Percent Lowest	Percent Low	Percent Medium	Percent High
FY 78(all)	64.05	63	0.98	1.10	1.50	61.77	34.38	2.33
FY 79	35.00	45	1.29	2.00	0.12	42.88	54.31	2.69
FY 80s	33.77	53	1.57	1.41	2.43	53.18	44.21	0.18
FY 80f	47.02	32	0.68	1.05	0.22	51.56	44.18	4.04
FY 81	48.73	34	0.70	0.54	1.47	51.99	45.27	1.27
FY 82	35.00	88	2.51	3.41	0.01	27.21	65.86	6.92
FY 83	95.11	220	2.31	2.13	0.11	43.77	47.91	8.20
FY 84	84.02	99	1.18	3.52	1.02	65.51	32.46	1.01
FY 85-3	41.00	104	2.54	2.80	1.25	39.59	47.02	12.13
FY 85-4	30.49	50	1.64	1.96	11.38	68.84	18.17	1.61
FY 85-5	34.79	60	1.72	1.64	0.47	83.95	15.41	0.16
FY 85-7	64.58	73	1.13	1.63	5.23	52.83	39.22	2.72
FY 86-9	16.46	31	1.88	4.28	0.44	51.04	47.20	1.32
FY 86-11	64.39	84	1.30	1.76	0.45	60.14	37.35	2.06
FY 87-1	14.96	20	1.34	1.59	0.00	16.09	61.92	21.99
FY 88-6	12.76	12	0.94	0.12	0.00	58.82	41.03	0.16
FY 89-10	27.70	23	0.83	0.26	0.00	66.62	32.71	0.67
FY 91-17	4.50	5	1.11	NA	NA	NA	NA	NA
FY 91-18	3.20	5	1.56	NA	NA	NA	NA	NA

Table 15 (continued).

Prehistoric Sites								
Project	Area (Sq km)	No. Sites	Site Density	Percent Area w/ Site	Predictive Model			
					Percent Lowest	Percent Low	Percent Medium	Percent High
FY 78(all)	64.05	65	1.01	4.17	11.84	40.07	42.13	5.96
FY 79	35.00	17	0.49	0.41	27.32	61.14	10.65	0.89
FY 80s	33.77	28	0.83	1.00	20.84	60.81	17.35	1.00
FY 80f	47.02	27	0.57	4.65	19.10	29.70	43.51	7.70
FY 81	48.73	47	0.96	2.06	4.41	59.80	**31.40**	4.39
FY 82	35.00	63	1.80	11.76	0.94	49.41	44.29	5.35
FY 83	95.11	248	2.61	8.81	1.17	41.89	52.80	4.14
FY 84	84.02	66	0.79	8.97	20.30	39.68	34.92	5.10
FY 85-3	41.00	99	2.41	8.90	0.07	22.04	58.66	19.22
FY 85-4	30.49	43	1.41	10.96	14.30	26.51	51.33	7.86
FY 85-5	34.79	25	0.72	10.62	0.84	26.95	63.63	8.58
FY 85-7	64.58	79	1.22	9.22	26.53	36.67	22.61	14.19
FY 86-9	16.46	32	1.94	28.57	0.00	24.19	54.66	21.14
FY 86-11	64.39	104	1.62	4.67	34.00	30.43	30.65	4.92
FY 87-1	14.96	15	1.00	9.17	20.92	59.80	17.22	2.06
FY 88-6	12.76	10	0.78	2.59	1.72	43.45	45.52	9.31
FY 89-10	27.70	54	1.95	2.11	0.02	19.83	65.66	14.49
FY 91-17	4.50	8	1.78	NA	NA	NA	NA	NA
FY 91-18	3.20	32	10.00	NA	NA	NA	NA	NA

RECOMMENDATIONS AND CONCLUSIONS

Alston V. Thoms, David L. Carlson, and Ben W. Olive

Sites recorded in the Cantonment (Delivery Order No. 17) and Belton Lake periphery (Delivery Order No. 18) areas were evaluated for significance based on survey level information provided by the field crew. In the absence of an evaluation framework developed specifically for Fort Hood archaeological sites, the sites identified during the present survey are assessed according to the more generalized "Criterion D" established for the National Register of Historic Places (36CFR60.6), wherein significant sites are those "that have yielded, or may be likely to yield information important in prehistory or history."

The legally mandated inventory, assessment, and protection of potentially significant cultural resources within the Fort Hood military reservation can be accomplished effectively and efficiently within a research strategy that focuses on past land-use systems. Using this approach, the degree of significance manifested by a given cultural resource is determined, in large measure, by its potential to contribute reliable data that are relevant to settlement and subsistence patterns and changes, related technologies, and chronology (see "Research Strategy").

Since not all sites are likely to be significant, and because the property of significance is not necessarily either spatially or temporally constant, individual assessments must consider the resources' potential to contribute information useful in the elucidation of identified research topics, problems, and data gaps. The land-use approach mandates consideration of all kinds of cultural resources as potentially significant, while focusing on the resources' potential contributions to specific research topics.

SITE SIGNIFICANCE ASSESSMENTS AND RECOMMENDATIONS

Cantonment Area Sites

The eight prehistoric sites represent two site types. Six sites are lithic scatters and two are lithic/burned rock scatters (Table 16). Four of the sites do not appear to be significant in terms of criteria established for the National Register, but the other four are recommended for additional investigations to adequately assess their potential significance (Table 17). Backhoe trench excavations are recommended at two lithic scatters, 41BL989 and 41BL993, as well as one lithic/burned rock scatter, 41BL991, that appear to have potential for buried cultural deposits. Shovel tests are recommended for lithic scatter 41BL998, where dense grass cover obscures the surface. Sites 41BL988, 41BL990, 41BL994, and 41BL997 do not appear to have potential significance in terms of National Register criteria.

Five historic sites were also recorded in the Cantonment area, and all of them appear to date between 1910 and 1950 (Table 18). Sites 41BL987 and 41BL992 are classified as special purpose sites, 41BL995 is a dump site, 41BL996 is a domestic dwelling/dump site, and 41BLF999 is an isolated feature (a concrete cistern). All five historic sites are assessed as not likely to be eligible for

Table 16. Distribution of Prehistoric Sites by Environmental Zone, Site Type, and Temporal Period for the Cantonment Area Survey (Delivery Order No. 17).

ENVIRONMENTAL ZONE	No. of Sites	% of Total	No. of Potentially Eligible Sites	% of Total	No. of Ineligible Sites	% of Total
Lowland	2	25.00	2	25.00	0	00.00
Intermediate Upland	6	75.00	1	12.50	4	50.00
Upland	0	00.00	0	00.00	0	00.00
Total	8	100.0	4	50.00	4	50.00
SITE TYPE	**No. of Sites**	**% of Sites**	**No. of Potentially Eligible Sites**	**% of Sites**	**No. of Ineligible Sites**	**% of Sites**
Lithic/Burn Rck Sct	6	75.00	3	37.50	3	37.50
Lithic Scatter	0	00.00	0	00.00	0	00.00
Rockshelter	0	00.00	0	00.00	0	00.00
Mussel Shell Scatter	0	00.00	0	00.00	0	00.00
LitSct/BRSct/Quarry	2	25.00	1	12.50	1	12.50
Total	8	100.0	4	50.00	4	50.00
TIME PERIOD/PHASE	**No. of Sites**	**% of Sites**	**No. of Potentially Eligible Sites**	**% of Sites**	**No. of Ineligible Sites**	**% of Sites**
Paleo-Indian	1	12.50	1	12.50	0	00.00
Paleo/Early Archaic	0	00.00	0	00.00	0	00.00
Early Archaic	0	00.00	0	00.00	0	00.00
Middle Archaic	0	00.00	0	00.00	0	00.00
Late Archaic	0	00.00	0	00.00	0	00.00
Terminal Archaic	0	00.00	0	00.00	0	00.00
Austin	0	00.00	0	00.00	0	00.00
Toyah	0	00.00	0	00.00	0	00.00
General Archaic	1	12.50	0	00.00	0	00.00
Unknown	6	75.00	3	37.50	4	50.0
Total	8	100.0	4	50.00	4	50.00

Table 17. Summary of Recommendations for Cantonment Area Sites (Delivery Order No. 17).

Prehistoric Sites Recommended as Eligible Based on Survey Results		
NONE		
Potentially Eligible Prehistoric Sites: Additional Testing Needed to Determine Eligibility		
41BL989	41BL993	41BL998
41BL991		
Prehistoric Sites Not Eligible Based on Survey Results		
41BL988	41BL994	41BL997
41BL990		
Historic Sites Recommended as Eligible Based on Survey Results		
NONE		
Potentially Eligible Historic Sites: Additional Testing Needed to Determine Eligibility		
NONE		
Historic Sites Not Eligible Based on Survey Results		
41BL987	41BL995	41BL999
41BL992	41BL996	

inclusion on the National Register, and therefore they are not recommended for additional field work or archival investigations (Table 17).

Belton Lake Periphery Sites

A total of 32 prehistoric sites was recorded in three Belton Lake periphery areas (Table 19): Tweedle Mountain (24 sites), the Lower Peninsula area (6 sites) south of Tweedle Mountain, and Sparta Mountain (2 sites). Five historic sites were also recorded.

Four lithic scatter sites (41BL1002, 41BL1010, 41BL1019, and 41BL1020) and one lithic/burned rock scatter (41BL1022) are assessed as not likely to yield important information (Table 20) and are not recommended for inclusion on the National Register of Historic Places. Systematic surface collections and/or subsurface excavations are recommended at 13 sites to gather the information necessary to adequately assess their National Register eligibility: 41BL1016 (a lithic scatter/rockshelter), 41BL1012 and 41BL1013 (rockshelters), 41BL1006, 41BL1015, 41BL1021 (lithic scatters), and 41BL1001, 41BL1004, 41BL1005, 41BL1011, 41BL1014, 41BL1017, and 41BL1018 (lithic/burned rock scatters).

The mussel shell scatter (41BL1028), as well as two lithic/burned rock scatters (41BL1026 and 41BL1027), three lithic scatters (41BL1029, 41BL1030, and 41BL1031), and eight rockshelter sites (41BL1023, 41BL1024, 41BL1025, 41BL1032, 41BL1033, 41BL1034, 41BL1035, and 41BL1036) should

Table 18. Distribution of Historic Sites by Environmental Zone, Site Type, and Temporal Period for the Cantonment Area Survey (Delivery Order No. 17).

ENVIRONMENTAL ZONE	No. of Sites	% of Sites	No. of Potentially Eligible Sites	% of Sites	No. of Ineligible Sites	% of Sites
Lowland	1	20.00	0	00.00	1	20.00
Intermediate Upland	4	80.00	0	00.00	5	80.00
Upland	0	00.00	0	00.00	0	00.00
Total	5	100.0	0	00.00	0	100.0
SITE TYPE	**No. of Sites**	**% of Sites**	**No. of Potentially Eligible Sites**	**% of Sites**	**No. of Ineligible Sites**	**% of Sites**
Special Purpose	2	40.00	0	00.00	2	40.00
Dump	1	20.00	0	00.00	1	20.00
Isolated Feature	1	20.00	0	00.00	1	20.00
Dump/Feature	0	00.00	0	00.00	1	20.00
DomeDwel/SpecPurp	1	20.00	0	00.00	0	0.00
Total	5	100.0	0	00.00	5	100.0
TIME PERIOD	**No. of Compo-nents**	**% of Com-pont.**	**No. of Potentially Eligible Components**	**% of Com-pont.**	**No. of Ineligible Components**	**% of Com pont.**
Period I: 1850-1879	0	00.00	0	00.00	0	00.00
Period II: 1880-1929	1	14.29	0	00.00	1	14.29
Period III: 1930-1953	4	57.14	0	00.00	4	57.14
Period IV: 1954 to Present	2	28.57	0	00.00	2	28.57
Total	7	100.0	0	00.00	7	100.0

be revisited. The standard documentation should be completed for each of these sites, including any recommendations for additional fieldwork needed to assess National Register eligibility (Table 20).

Five historic sites were also recorded in three areas around Belton Lake (Table 21): (1) Tweedle Mountain, with one special purpose site; (2) the Lower Peninsula area south of Tweedle Mountain, with one dump site; and (3) Sparta Mountain, with one dump site and two dump/feature sites. All of these sites probably date between 1910 and 1950. Four of the sites assessed are not eligible for inclusion on the National Register: 41BL1000, 41BL1003, 41BL1007, and 41BL1009 (Table 20). The dump portion of 41BL1008 does not appear to be eligible except for one recorded feature — a concentration of limestone blocks — that could not be adequately assessed with survey data. Test excavations were recommended to determine the nature of this feature and whether or not it is potentially significant (Table 20).

Table 19. Distribution of Prehistoric Sites by Environmental Zone, Site Type and Temporal Period for the Belton Lake Periphery Area Survey (Delivery Order No. 18).

ENVIRONMENTAL ZONE	No. of Sites	% of Sites	No. of Potentially Eligible Sites	% of Sites	No. of Ineligible Sites	% of Sites
Lowland	0	00.00	0	00.00	0	00.00
Intermediate Upland	2	6.25	1	03.13	1	03.12
Upland	30	93.75	26	81.25	4	12.50
Total	32	100.0	27	84.38	5	15.62
SITE TYPE	**No. of Sites**	**% of Sites**	**No. of Potentially Eligible Sites**	**% of Sites**	**No. of Ineligible Sites**	**% of Sites**
Lithic/Burn Rck Sct	10	31.25	9	28.13	1	03.13
Lithic Scatter	10	31.25	6	18.75	4	12.50
Rockshelter	10	31.25	10	31.25	0	00.00
Mussel Shell Scatter	1	3.13	1	03.12	0	00.00
Lithic Sct/Rockshel	1	3.12	1	03.12	0	00.00
Total	32	100.0	27	84.38	5	15.62
TIME PERIOD/PHASE	**No. of Sites**	**% of Sites**	**No. of Potentially Eligible Sites**	**% of Sites**	**No. of Ineligible Sites**	**% of Sites**
Paleo-Indian	0	00.00	0	00.00	0	00.00
Paleo/Early Archaic	0	00.00	0	00.00	0	00.00
Early Archaic	0	00.00	0	00.00	0	00.00
Middle Archaic	2	6.25	1	03.12	1	03.12
Late Archaic	0	00.00	0	00.00	0	00.00
Terminal Archaic	0	00.00	0	00.00	0	00.00
Austin	0	00.00	0	00.00	0	00.00
Toyah	0	00.00	0	00.00	0	00.00
General Archaic	0	00.00	0	00.00	0	00.00
Unknown	30	93.97	26	81.25	4	12.50
Total	32	100.0	27	84.38	5	15.62

Table 20. Summary of Recommendations for Belton Lake Periphery Sites (Delivery Order No. 18).

Prehistoric Sites Recommended as Eligible Based on Survey Results		
NONE		
Potentially Eligible Prehistoric Sites: Additional Testing Needed to Determine Eligibility		
41BL1001	41BL1012	41BL1016
41BL1004	41BL1013	41BL1017
41BL1005	41BL1014	41BL1018
41BL1006	41BL1015	41BL1021
41BL1011		
Potentially Eligible Prehistoric Sites: Dependent on Completion of Site Documentation		
41BL1023	41BL1028	41BL1033
41BL1024	41BL1029	41BL1034
41BL1025	41BL1030	41BL1035
41BL1026	41BL1031	41BL1036
41BL1027	41BL1032	
Prehistoric Sites Not Eligible Based on Survey Results		
41BL1002	41BL1019	41BL1022
41BL1010	41BL1020	
Historic Sites Recommended as Eligible Based on Survey Results		
NONE		
Potentially Eligible Historic Sites: Additional Testing Needed to Determine Eligibility		
41BL1008		
Historic Sites Not Eligible Based on Survey Results		
41BL1000	41BL1007	41BL1009
41BL1003		

Table 21. Distribution of Historic Sites by Environmental Zone, Site Type and Temporal Period for the Belton Lake Periphery Area Survey (Delivery Order No. 18).

ENVIRONMENTAL ZONE	No. of Sites	% of Sites	No. of Potentially Eligible Sites	% of Sites	No. of Ineligible Sites	% of Sites
Lowland	0	00.00	0	00.00	0	00.00
Intermediate Upland	3	60.00	1	20.00	2	40.00
Upland	2	40.00	0	00.00	2	40.00
Total	5	100.0	1	20.00	4	80.00
SITE TYPE	**No. of Sites**	**% of Sites**	**No. of Potentially Eligible Sites**	**% of Sites**	**No. of Ineligible Sites**	**% of Sites**
Special Purpose	1	20.00	0	00.00	1	20.00
Dump	2	40.00	0	00.00	2	40.00
Isolated Feature	0	00.00	0	00.00	0	00.00
Dump/Feature	2	40.00	1	20.00	1	20.00
DomeDwel/SpecPurp	0	00.00	0	00.00	0	00.00
Total	5	100.0	1	20.00	4	80.00
TIME PERIOD	**No. of Compo-nents**	**% of Com-pont.**	**No. of Potentially Eligible Components**	**% of Com-pont.**	**No. of Ineligible Components**	**% of Com-pont.**
Period I: 1850-1879	0	00.00	0	00.00	0	00.00
Period II: 1880-1929	1	11.11	0	00.00	1	11.11
Period III: 1930-1935	4	44.45	0	00.00	4	44.44
Period IV: 1954-Present	3	33.33	0	00.00	3	33.33
Undetermined	1	11.11	1	11.11	0	00.00
Total	9	100.0	1	11.11		88.89

SUMMARY AND CONCLUSIONS

The basic research objective for the present project is to make meaningful comparisons between the site locations, types, and frequencies (see "Introduction"). One of the specific objectives was to compare the number of sites predicted by the recently revised predictive model (Carlson et al. 1993) with the number of sites recorded in the Cantonment and Belton Lake periphery areas (see "Predictive Modelling"). We also addressed two research questions about Late Prehistoric sites: (1) how are these sites distributed across the landscape in the Fort Hood area and vicinity; and (2) do the data really support a general population decline during the Late Prehistoric Period? (see "Archaeological Data and Population Dynamics in Central Texas"). The predictive modelling conclusions are summarized in the following sections.

Predictive Modelling

The predictive model developed earlier (Carlson et al. 1993) was compared to the actual distribution of sites located during the current survey projects. Since these data were not used in the creation of the model, they represent a relatively independent data set on which to evaluate the model. Comparison of the model predictions for historic sites indicates that fewer historic sites were recorded than would have been expected. Comparison of the model predictions with the prehistoric sites suggests that more prehistoric sites were recorded than would have been predicted. The model is well tuned to locating lithic procurement areas, but it is unable to adequately locate rockshelters. Improvement of the elevation data in the Fort Hood GIS would provide better estimates of slope and aspect and might be expected to improve the accuracy of the predictive model.

The model does not attempt to locate only significant sites and it does not distinguish site types or chronological periods. These refinements would make the model considerably more useful as a management tool.

Late Prehistoric Sites

Many researchers interpret the Austin interval data for the early part of the Late Prehistoric period (ca. A.D. 800-1300) as evidence for population decline, settlement pattern change, and technological change. What is especially intriguing about this interpretation is that the Austin interval occurs at a time when population pressure and packing in many other parts of North America were very high. Various explanations have been offered to explain the ostensible population decrease in central Texas, but most researchers argue that climatic change toward more xeric and less productive conditions was a major factor. Some specialists, however, have argued that the ostensible population decline may be more apparent than real because many Late Prehistoric sites remain buried or are otherwise obscured from detection.

We began our assessment of the nature and distribution of Late Prehistoric sites and population dynamics by reviewing the data from surface surveys at Fort Hood in terms of time periods and position on the landscape. We then examined various site types in specific settings, including sites in riverine bottomlands, buried sites in general, rockshelter sites, and cemeteries and burials. The information about how these sites are distributed across the landscape placed us in a better position to address the question about whether the data actually do support a general population decline. As per our interpretations, the central Texas data reviewed herein turned out to be consistent with the broader patterns in southwestern and southeastern North America for population growth during the interval from the Late Archaic to the Protohistoric period. Accordingly, we presented a testable model for long-term land-use in central Texas.

From the information we reviewed about the occupations of riverine bottomlands during the Late Prehistoric period, it seems likely that there was a general increase in the intensity of occupation during this period. How this relates to population dynamics remains unclear, but the data are consistent with the concept that more people may have stayed at a given site for longer periods of time when compared to preceding periods. In other words, more people may be represented by fewer but comparatively intensively occupied Late Prehistoric sites than might be suggested by a simple comparison of component frequencies.

Previous geoarchaeological studies (Nordt 1992) of the buried site data set for Fort Hood showed that: (1) through time there is a gradual increase in number of sites until about 600 B.P., when the numbers decrease; however, it should be emphasized that the sample size (available sediments) for the post 600 B.P. time period is comparatively small; and (2) to the extent that the ostensible decrease in site frequencies is actually a decrease in overall site density, it may be due, in part, to an increase in the intensity of floodplain exploitation coupled with subsequent alluvial deposition that buries sites, and thereby reduces their chances of being detected using standard surface survey techniques. What is suggested here is that a disproportional number of Late Prehistoric sites in the Fort Hood area, especially those in lowland settings, may be buried or obscured by vegetation.

Rockshelter data from Fort Hood and surrounding areas indicate that Late Prehistoric people regularly used rockshelters in riverine and non-riverine settings. Moreover, the use of rockshelters during the Late Prehistoric period seems to have been greater than during the preceding periods. Climatic changes and shifts in settlement and subsistence patterns are offered as explanations for the apparent increase in the use of rockshelters. But in any case, the data

reviewed here suggest that many Late Prehistoric components may have gone unrecognized because they are hidden in rockshelter deposits.

Bioarchaeological data reviewed herein show an ostensible increase in the number of cemetery sites and burials from the Archaic to the Late Prehistoric, but some specialists argue that this pattern reflects recovery bias rather than population increase. Nonetheless, the apparent increase is consistent with the concepts of long-term increase in regional population densities and hunter-gatherer land-use intensification. Moreover, in assessing the utility of the cemetery data set, it is important to remember that archaeologists have long used artifactual data from the very same cemetery and burial sites to construct models and arguments about long-term changes in settlement, subsistence, technology, and trade patterns.

The frequency of radiocarbon ages through time has also been used as a rough measure of long-term population dynamics. Our plot of available radiocarbon ages by time interval shows relative stability between 10,000 and 2,500 years B.P., followed by a rapid increase until about 500 B.P. when there is a marked decrease. The data are also compatible with long-term growth curves and models showing that worldwide population tended to rise through the millennia, albeit not consistently and not without brief interruptions.

Our land-use model draws selectively from established information about central Texas culture history. The model's theoretical underpinnings are grounded in broad patterns in prehistory showing long-term land-use intensification and trends toward overall population growth or packing. It specifies general trends that are detectable in the local and regional archeological records, but not necessarily at one site or in a single environmental setting. Some areas, for example, may not have plant resources that could support dense populations, and in such cases, intensification might be limited to increasing the exploitation of small terrestrial animals, or aquatic species. Additionally, fluctuations are expected to occur in the directional trends of increasing population densities and land-use intensity. Some localities may be virtually abandoned due to adverse environmental conditions. Conversely, when bison became available in greater numbers, people would be expected to hunt more bison and fewer deer, or reduce the level of effort devoted to small game or plant food procurement. Other things being equal, bison hunting probably has a better cost:benefit ratio when compared to deer hunting, but deer hunting has a far better cost:benefit ratio than plant gathering.

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APPENDIX I

PREHISTORIC SITE DESCRIPTIONS AND ASSESSMENTS

Alston V. Thoms
Ben W. Olive
Ruth N. Riegel

DELIVERY ORDER No. 17: PREHISTORIC SITE DESCRIPTIONS AND ASSESSMENTS

SITE: 41BL988

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Slope
ELEVATION: 900 feet
NEAREST WATER (DISTANCE): 500 m
AREA: 10,000 m^2
VEGETATION: Grasslands
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This site consists of a thin flake scatter with a few tools. No ecofacts were observed, burned rock density is light, and artifact density is low. Observed artifacts include retouched flakes, end scraper, graver, a core, and flakes (see attached map). The site is reported to be in fair condition with 25% of the site affected by erosion and a dirt road. No artifacts were collected and the chronology of the site is unknown. One other prehistoric site occurs in quadrat 17/43.

ASSESSMENTS AND RECOMMENDATIONS: The site is a low density lithic scatter with dense grass between the dirt road and the lake. Tools were found in the road with no tertiary flakes present. Given the site's setting, there is little likelihood that it contains buried deposits. Even though the surface exposure was fair, the artifact density was low and no feature-like concentrations were noted. This suggests the site is not likely to yield intact features or chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns. The site is not considered to be potentially eligible to the National Register and no further work is recommended.

SITE: 41BL989

ENVIRONMENTAL ZONE: Lowland
LANDFORM: Tertiary Terrace
ELEVATION: 860 feet
NEAREST WATER (DISTANCE): 1 m
AREA: ca. 40,000 m^2, assuming that artifacts continue under the fill and in densely vegetated areas between the dirt road and S. Nolan Creek.
VEGETATION: Grassland
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This site consists of a sporadically well-exposed lithic scatter adjacent to a dirt road (see attached map). Heavy grass and riparian forest cover most of the site, however. The observed overall artifact density is low, and no ecofacts were observed, while the burned rock scatter density is light. Observed artifacts include Types I, II, and III biface fragments, the base of a Paleo-Indian projectile point (similar to the *Plainview* type), several cores, and numerous flakes; the projectile point was collected. Most of the surface (ca. 70%) has been damaged by

heavy machinery or is completely obscured by fill or dense vegetation (see site sketch map). The area with the best preserved surface is the easternmost end of the site (ca. 200 m east of the borrow pit) where yucca is growing and lithic artifacts, similar to those in the central part of the site, are exposed on the surface. The borrow pit area is heavily disturbed.

The terrain immediately surrounding the borrow pit, the dirt roadbed and the area immediately to the south is moderately impacted (plow-zone like). What appears to be mechanically-derived fill (perhaps "top soil" from the borrow pit) covers much of the eastern half of the site, obscuring the original surface. The chronology of this site is unknown, but the presence of the *Plainview* point indicates a potential Paleo-Indian component. One other prehistoric site occurs in quadrat 18/43.

ASSESSMENTS AND RECOMMENDATIONS: This site is a low density lithic scatter with cultural materials exposed mainly on the surface in the northern half of the site (N of the roadbed) which appears to be the lower part of the gently sloping valley wall. The "bead-line" systematic sample was conducted when the site was first recorded. Upon revisiting the site several months later, artifacts were found to extend as much 60 m to the west and more than 200 m to the east. Most of the cultural materials (e.g., corticated flakes, cores, and core fragments) are indicative of limited lithic procurement activities. The presence of the *Plainview* point fragment and lithic debitage with varying degrees of patination, as well as the thin scatter of burned rock, suggest the site may have been used intermittently over a long period of time, and that various activities may be represented.

Examination of subsurface exposures in the borrow pit indicates there is little chance of buried cultural material in the northern half of the site where deposition appears to be minimal (some colluvium). In this area, the thin sediment biomantel (soil) appears to overlie bedrock or at least sediments that predate human occupation of the region. Between the road and South Nolan Creek, however, the sediments are likely to be alluvial (T1 surface?) and cultural material may be buried.

Judging from the low artifact density, as well as the paucity of temporally or functionally diagnostic artifacts and the absence of features, the part of the site that is north of the dirt road with good surface exposures does not appear likely to yield information important in prehistory. Considering that much of the site's surface is obscured by dense vegetation and fill, and that there appears to be a potential for buried deposits, survey-level data do not provide an adequate basis for assessing the site's overall National Register eligibility potential. Excavation of backhoe trenches and examination of the profiles for buried cultural materials is an effective and efficient means of further assessing site potential. It is recommended that several backhoe trenches be excavated to expose subsurface sediments on the alluvial surface between the creek and low valley wall. Additional backhoe trenches should be dug through the fill in the eastern part of the site to determine whether or not comparatively intact, artifact-rich surfaces or feature-bearing deposits are present. National Register eligibility potential would be demonstrated if the site yielded intact features or chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns.

SITE: 41BL990

ENVIRONMENTAL ZONE: Intermediate Upland
LANDFORM: Slope
ELEVATION: 860 feet
NEAREST WATER (DISTANCE): 450 m

AREA: ca. 112,500 m^2 within the surveyed quad, but the site extends north into an area not yet surveyed)
VEGETATION: Grasslands
SITE TYPE: Burned rock scatter with lithics/lithic quarry

DESCRIPTIVE SUMMARY: This site is a burned rock scatter with lithics sporadically exposed. For the most part, however, the surface is obscured by a dense grass cover (i.e., the golf course). Artifact density is low in the few exposed areas (see attached map). No ecofacts are recorded and burned rock density is light. Natural chert cobbles on surface suggest a possible lithic procurement area. Observed artifacts include a medial fragment of a Type I roughout biface, an end scraper, flakes, and chips. No artifacts were collected and the site is in poor condition with 85% of the site affected by golf course landscaping, utility construction, and erosion. The chronology of this site is unknown. One other site occurs in quadrat 19/43.

ASSESSMENTS AND RECOMMENDATIONS: This site is a low density lithic and burned rock scatter. Most of the artifacts indicate limited lithic procurement and initial manufacturing activities, but the burned rock and end scraper suggest other activities as well. Bedrock is at or near the surface in many parts of the site, and there is little potential for buried archaeological deposits. Moreover, the site is on a golf course and the natural topography and vegetation have been highly modified. Many of the artifacts may not be in place or even in the same part of the site where they originated. Due to the extensive disturbances and considering the apparent lack of features and chronologically or functionally discrete artifact assemblages, the site does not appear to be potentially eligible to the National Register. No further work is recommended.

SITE: 41BL991

ENVIRONMENTAL ZONE: Lowland
LANDFORM: Bank
ELEVATION: 840 feet
NEAREST WATER (DISTANCE): 1 m
AREA: ca. 105,000 m^2, assuming that the artifact scatter extends south from Business Highway 190 and the tributary stream to South Nolan Creek
VEGETATION: Grasslands
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This site consists of a thin lithic scatter with burned rock, cores, flakes, and chipped stone tools occasionally eroding in the dirt roads and cut banks and possible potholes (see attached map). Several artifacts were observed about 50 cm below the surface in the cutbank of the tributary creek that forms the northeast boundary of the site. The buried artifacts- a tertiary flake, burned rock, and three large tabular pieces of limestone- are near the base of the uppermost stratigraphic unit. No ecofacts were observed at the site and burned rock density was light. Observed artifact density was low, and included the base of an untyped dart point, a notched quartzite pebble similar to a *Waco "Sinker"*, several retouched flakes, a core, core fragments, flakes, and chips. The dart point and notched pebble were collected. During the survey, the site was reported to be in fair condition with about 36% of the site affected by erosion, wheeled vehicles, recreational activities, and pothunting. The entire area is currently a park and the degree to which the surface may have been modified previously (including possible farming) has not been determined. The chronology of site is unknown, but the presence of the dart point base and the *Waco "Sinker"* suggests the potential of an Archaic component(s). One other prehistoric site occurs in quadrat 19/43.

ASSESSMENTS AND RECOMMENDATIONS: The site is a low density lithic scatter that encompasses a paleontological deposit, FN 2000 (Briuer's mammoth site). The presence of flakes, cores, and core fragments suggest limited lithic procurement activities in the northern part of site. Other activities are indicated by the burned rock, retouched flakes, the dart point fragment, and the notched pebble. The northern half of the western portion of the site (i.e., that part bounded by Business Highway 190 on the north) appears to be part of the gently sloping valley wall. If bedrock is near the surface in this part of the site, as it appears to be, based on exposures in the roadbed and drainage ditch, there is little likelihood for buried, in situ cultural deposits. The flat surface below the slope, however, probably has potential to contain buried cultural deposits. Judging from the cutbank exposure along the tributary stream where the buried artifacts were observed, the portion of the site south and east of the gently sloping valley wall is an alluvial deposit (T1 ?). Although geomorphic investigations have not been conducted anywhere in the South Nolan Creek basin, the deposits appear similar to the sediments described by Lee Nordt in the North Nolan Creek basin that are believed to date from the Late Pleistocene through the Holocene periods. The lower part of the tributary creek profile at 41BL991 is pro Georgetown alluvium (ca. 8,500-11,000 B.P.) and the upper part appears to be Fort Hood a West Range alluvium (ca. 8,500-600 B.P.), or possibly even the more recent Ford alluvium. In any case, this suggests that the stratified alluvium at site 41BL991 has the potential to yield buried, intact cultural deposits of various ages.

Because almost all of the site area is obscured by dense grass cover, and considering that there appears to be a potential for buried deposits, the available survey-level data do not provide an adequate basis for assessing the site's National Register eligibility. Excavation of backhoe trenches and examination of the profiles for buried cultural materials is an effective and efficient means of further assessing site potential. It is recommended that several backhoe trenches be excavated to expose subsurface sediments on the alluvial surface between the creeks and the low valley wall. Additional backhoe trenches should be dug on the surface above the terrace to determine whether or not bedrock is near the surface and if comparatively intact, artifact-rich or feature-bearing deposits are present. National Register eligibility potential would be demonstrated if the site yielded intact features or a chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns.

SITE: 41BL993

ENVIRONMENTAL ZONE: Lowland/Intermediate upland
LANDFORM: Primary Terrace/Slope
ELEVATION: 855-915 feet
NEAREST WATER (DISTANCE): 1 m
AREA: 352,500 m^2, assuming the site extends to the tributary stream; the site may be even larger if it extends beyond the area surveyed as per DO#17.
VEGETATION: Grassland and riparian
SITE TYPE: Lithic Quarry

DESCRIPTIVE SUMMARY: The site consists mainly of a large lithic procurement area with tested cobbles, core fragments, and flakes. This part of the site above the flat land along the tributary appears to be the gently sloping valley wall (see attached map). Ground visibility on the slopes was fair, and artifact density was medium. No ecofacts are recorded and burned rock density is low. Observed artifacts include a Type I and II bifaces, retouched flakes, side scraper, end scraper, cores, choppers, utilized flakes, tested cobbles, a spoke shave, flakes, and chips. The only artifact collected was a scraper. During a previous survey (1987) for a water line that passed

through the area, a Late Archaic dart point base was found inside a corral in the stable area in quad 17/43.

Examination of the cutbank along the tributary stream that forms the northeastern boundary of the site resulted in the discovery of a core/chopper buried in what appeared to be a paleosol about 50 cm below surface (see attached map). Overall, site 41BL993 is reported to be in fair condition, but 75% of the surface has been affected to some degree by construction of roads and railroad, utility lines, stables and corral construction, as well as by vehicle and horse hoof damage.

The chronology of this site is unknown. While the Late Archaic projectile point found during a previous survey may be provide an indication of site chronology, it is also possible that the artifact was introduced when sandy fill was added during construction of the corral. One other prehistoric site occurs in quadrat 18/43.

ASSESSMENTS AND RECOMMENDATIONS: This site is a medium density lithic scatter. Judging from the moderate artifact density, as well as the paucity of temporally or functionally diagnostic artifacts and the absence of features, the part of the site on the gently sloping valley wall does not appear to be eligible for the National Register. The observed artifacts are consistent with limited lithic procurement activities. It is also clear that the heavy horse traffic and other disturbances could have created some of the chert debris. The southernmost part of the site, between the railroad and Business Highway 190, is heavily disturbed, as is the stable and corral area.

The alluvial sediments along the tributary stream appear similar to those described at site 41BL991, and as such, they may have potential to contain intact cultural material of various ages. Some of the alluvium at site 41BL993, however, appears to be capped with fill. This particular segment of the current tributary channel is unusually straight, but it is paralleled by a linear, somewhat sinuous, depression about 20 m to the south. What this suggests is that the straight section of the current stream may be a mechanically excavated channel, with the backdirt used to in-fill the original channel. Accordingly, the fill capping the apparent paleosol might also be backdirt from the channelization project.

Because almost all of the alluvial surface (T1 ?) is obscured either by dense grass cover or fill, and considering that there appears to be a potential for buried deposits, the available survey-level data do not provide an adequate basis for assessing the site's National Register eligibility. Excavation of backhoe trenches and examination of the profiles for buried cultural materials is an effective and efficient means of further assessing site potential. It is recommended that several backhoe trenches be excavated to expose subsurface sediments on the alluvial surface between the current tributary channel and the low valley wall to the south. National Register eligibility potential would be demonstrated if the site yielded intact features or chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns.

SITE: 41BL994

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Knoll
ELEVATION: 890 feet
NEAREST WATER (DISTANCE): 100 m
AREA: 5,000 m^2

VEGETATION: Grasslands
SITE TYPE: Burned rock scatter with lithics

DESCRIPTIVE SUMMARY: This site covers most of what is now a peninsula in Lake Pershing and extends off the military reservation. No ecofacts were noted and the burned rock scatter is light. Artifact density is medium and observed artifacts include a Type II preform, a side scraper, retouched flakes, a core, flakes, and chips. No artifacts were collected. The site is reported to be in fair condition with 60% of the site affected by grazing and erosion. The chronology of the site is unknown. One other prehistoric site occurs in quadrat 17/42.

ASSESSMENTS AND RECOMMENDATIONS: This site is a medium density burned rock scatter with a medium density of artifacts. Judging from the types of artifacts observed, limited lithic procurement and initial tool manufacturing activities. Other activities are indicated by burned rock and expediency tools. Given the site's setting, there is little likelihood that it contains buried deposits. Even though the surface exposure was good, the artifact density was moderate and no feature-like concentrations were noted. This suggests the site is not likely to yield intact features or chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns. The site is not considered to be potentially eligible to the National Register and no further work is recommended.

SITE: 41BL997

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Bench
ELEVATION: 895 feet
NEAREST WATER (DISTANCE): 205 m
AREA: 5,000 m^2
VEGETATION: Grasslands
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This site consists of a lithic scatter on a flattened bench on the gently sloping valley wall of South Nolan Creek (see attached map). No ecofacts were observed and artifact density is low. Observed artifacts include a fragmentary Type III biface, a light scatter of burned rock, retouched flakes, a side scraper, one burned cobble, and flakes. No material was collected. Overall, the site is in poor condition; an estimated 84% of the site has been affected by erosion, cattle, a road, by parking, and possibly by construction of the spillway for Lake Pershing. The chronology of this site is unknown. One other prehistoric site occurs in quad 17/42.

ASSESSMENTS AND RECOMMENDATIONS: The site consists of a low density lithic scatter. Given its setting on the gently sloping valley wall, there is little likelihood that it contains buried deposits. Even though the surface exposure was poor, there is ample evidence that the site is heavily disturbed. This suggests the site is not likely to yield intact features or chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns. Consequently, 41BL997 is not considered to be potentially eligible to the National Register and no further work is recommended.

SITE: 41BL998

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Knoll
ELEVATION: 990 feet
NEAREST WATER (DISTANCE): 1.1 km
AREA: 5,000 m^2, perhaps larger but dense grass cover obscures the surface
VEGETATION: Grasslands
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This site consists of a moderate lithic scatter evident only in the areas with surface exposures. Most of the site area is covered by dense grass. As presently defined, the site occupies the north and northwest reaches of a fenced knoll used for picnicking by rod and gun club members, but it may extend throughout the fenced area (see attached map). No ecofacts were noted and artifact density is moderate. Observed artifacts include a light scatter of burned rock, a retouched flake, burned chert flakes and chips, and a Biface I. No artifacts were collected. The site is reported to be in fair condition, but all of it has been affected to some degree by modern recreation (perhaps including collecting) and by erosion. The size and close spacing of the oak trees in the picnic area suggest that the site has not been heavily disturbed by machinery. The chronology of the site is unknown. No other prehistoric sites occur in quadrat 17/46

ASSESSMENTS AND RECOMMENDATIONS: The site location, on a bedrock knoll, affords an excellent 360 degree view of the surrounding terrain. The Biface I and flakes observed at the site indicate that limited lithic procurement and initial tool manufacturing occurred at the site. The presence of burned rock and flakes, and many interior flakes of various sizes that do not appear to be made from chert nodules occurring on-site, suggests other activities took place there as well. There is only a thin mantel of soil on the site, suggesting that buried deposits are not likely to occur there.

Because almost all of the potential site area is obscured by dense grass cover, the available survey-level data do not provide an adequate basis for assessing the site's National Register eligibility. Given that the observed density was moderate, and considering that the site may have been collected repeatedly, those parts of the site obscured by grass may contain a significantly higher density of artifacts, including a chronologically or functionally discrete artifact assemblage. It is conceivable that near-surface features might be preserved in parts of the site, depending on the nature of disturbance during construction of the picnic area. To further assess the site's potential to yield important information, it is recommended that shovel tests be excavated. The focus should be on the north end of the site, but some shovel tests should be dug throughout the fenced area to more accurately determine site boundaries. Areas outside the picnic grounds appear to be heavily disturbed and are thus not likely to yield significant cultural deposits.

THE BELTON RESERVOIR PERIPHERY AREA

LOWER PENINSULA SITES, 6 SITES

SITE: 41BL1001 (quadrat 44/46, lower peninsula)

ENVIRONMENTAL ZONE: Intermediate Uplands
LANDFORM: Bench
ELEVATION: 600 ft

NEAREST WATER (DISTANCE): 300 m, Leon River
AREA: 10,000 m^2
VEGETATION: Grassland with occasional juniper and live oak
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground exposure was poor when 41BL1001 was recorded. The site is a low-density lithic scatter with a light scatter of burned rocks (see attached map). Based on an examination of the site's surface, the depth of cultural materials may as much as 1 m in parts of the site. Hammerstones, cores, tested cobbles, bifacial roughouts, flakes, bifacially and unifacially retouched tools, and a possible unifacial gouge or chopper were observed on the surface. Most tools were seen in a nongrassy area under a large live oak tree. Ecofacts (e.g., mussel shell) were not observed. No artifacts were collected. Site chronology is unknown. One historic site--41BL1000--also occurs in quadrat 44/46.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1001 is in fair condition, but to one degree or another, 70% of it has been affected by livestock, erosion, and recreationists. The site's setting at one end of a ridge overlooking the Leon River provides a good view of the surrounding terrain and ready access to a variety of resources. Site size (10,000 m^2) and the presence of discrete artifact concentrations at opposite ends of the site suggests the possibility of multiple occupations or activities. Given that vegetation cover was dense and considering the potential for buried deposits, site significance cannot be assessed adequately without additional information. Systematic surface collections and test excavations are recommended to gather additional data to determine National Register eligibility.

SITE: 41BL1002 (quadrat 43/46, lower peninsula)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Ridge/Plateau
ELEVATION: 675 ft
NEAREST WATER (DISTANCE): 450 m, Leon River
AREA: 5,000 m^2
VEGETATION: Juniper forest, with oaks, grasses, forbes
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1002 was recorded. The site is a medium-density lithic scatter of chert flakes and occasional tools on bare limestone surrounding shallow soil (see attached map). The potential depth of cultural materials in most parts of the site probably is less than 20 cm. A retouched flake, and an end scrapers, as well as many flakes and chips were observed on the surface. Neither burned rocks nor ecofacts were seen. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites (all rockshelters) were recorded in quadrat 43/46: 41BL1033, 41BL1034, 41BL1035, and 41BL1036.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1002 is in fair condition, but to one degree or another, 60% of it is affected by land clearing, burning, grazing, and erosion. Given that ground exposure was fair when the site was recorded, the field observations probably provide a reliable indication of the site's contents. Neither functionally or temporally diagnostic tools nor features were observed. Furthermore, the likelihood of buried intact deposits is low. Collectively, these observations suggest that the site is not likely to yield additional important information about culture history or land-use patterns. The site is not considered to be potentially eligible for the National Register. Further work is not recommended.

SITE: 41BL1033 (quadrat 43/46, lower peninsula)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): 500 m, Cowhouse Creek
AREA:
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the survey (i.e., while "sweeping"); inclement weather and high lake levels prevented thorough documentation. Ground exposure was fair when 41BL1033 was recorded. The site is a rockshelter at the base of a south-facing cliff on a limestone ridge (see attached map). Surfaces observations were not adequate to accurately assess potential depth of cultural materials, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. Flakes and mussel shells occur in low densities on the surface. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites were recorded in quadrat 43/46: rockshelters 41BL1034, 41BL1035, and 41BL1036, and lithic scatter 41BL1002.

ASSESSMENTS AND RECOMMENDATIONS: The site is in good condition, but its surface has been impacted somewhat by erosion, animals, rockfall, and recreationists. As noted, 41BL1033 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1034 (quadrat 43/46, lower peninsula)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): 500 m, Cowhouse Creek
AREA:
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the survey (i.e., while "sweeping"); inclement weather and high lake levels prevented thorough documentation. Ground exposure was fair when 41BL1034 was recorded. The site is a rockshelter at the base of a south-facing cliff on a limestone ridge (see attached map). Surfaces observations were not adequate to accurately assess potential depth of cultural materials, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. Flakes and mussel shells occur in low densities on the surface. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites were recorded in quadrat 43/46: rockshelters 41BL1033, 41BL1035, and 41BL1036, and lithic scatter 41BL1002.

ASSESSMENTS AND RECOMMENDATIONS: The site is in good condition, but its surface has been impacted somewhat by erosion, animals, rockfall, and recreationists. As noted, 41BL1034 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and

possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1035 (quadrat 43/46, lower peninsula)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): 500 m, Cowhouse Creek
AREA:
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the survey (i.e., while "sweeping"); inclement weather and high lake levels prevented thorough documentation. Ground exposure was fair when 41BL1035 was recorded. The site is a rockshelter at the base of a south-facing cliff on a limestone ridge (see attached map). Surfaces observations were not adequate to accurately assess potential depth of cultural materials, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. Flakes and mussel shells occur in low densities on the surface. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites were recorded in quadrat 43/46: rockshelters 41BL1033, 41BL1034, and 41BL1036, and lithic scatter 41BL1002.

ASSESSMENTS AND RECOMMENDATIONS: The site is in good condition, but its surface has been impacted somewhat by erosion, animals, rockfall, and recreationists. As noted, 41BL1035 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1036 (quadrat 43/46, lower peninsula)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): 500 m, Cowhouse Creek
AREA:
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the survey (i.e., while "sweeping"); inclement weather and high lake levels prevented thorough documentation. Ground exposure was fair when 41BL1036 was recorded. The site is a rockshelter at the base of a south-facing cliff on a limestone ridge (see attached map). Surfaces observations were not adequate to accurately assess potential depth of cultural materials, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. Flakes and mussel shells occur in low densities on the surface. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites were recorded in quadrat 43/46: rockshelters 41BL1033, 41BL1034, and 41BL1035, and lithic scatter 41BL1002.

ASSESSMENTS AND RECOMMENDATIONS: The site is in good condition, but its surface has been impacted somewhat by erosion, animals, rockfall, and recreationists. As noted, 41BL1036 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

TWEEDLE MOUNTAIN SITES, 26 SITES

SITE: 41BL1004 (quadrat 45/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 660 ft
NEAREST WATER (DISTANCE): 675 m, Leon River
AREA: 150,000 m^2
VEGETATION: Juniper/oak forest, brush, grasses
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground exposure was good when 41BL1004 was recorded. The site is an extremely high-density lithic scatter with a light scatter of burned rock. Chert cobbles, as well as rounded quartzite cobbles of Miocene age, hematite chunks, and unusual tabular limestone nodules, outcrop at the site. Concentrations of cores and flakes are present throughout the site (see attached map). Retouched flakes, cores, hammerstone, flakes and chips were observed on the surface, but ecofacts were not seen. Based on an examination of the site's surface, the potential depth of cultural materials in most parts of the site is less than 20 cm. No artifacts were collected. Site chronology is unknown. Other prehistoric sites entirely within quadrat 45/49 are 41BL1006, 41BL1029, and 41BL1030, lithic/burned rock scatters, and 41BL1028, a mussel shell scatter. Prehistoric sites partially within quadrat 45/49 are 41BL1005, a lithic/burned rock scatter, and lithic/burned rock scatter sites 41BL1018 and 41BL1022. One historic site--41BL1003--is also recorded in quadrat 45/49.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1004 is in fair condition, but to one degree or another, 80% of the surface is affected by grazing, burning, and erosion. This site has extremely dense lithic debris over most of its surface. Many of the core/flake concentrations may represent discrete knapping areas. The site's archaeological record may have the potential to address questions about lithic procurement, tool manufacturing, and related aspects of past land-use systems in general. However, this potential remains to be demonstrated. Systematic surface collection and test excavations are recommended to gather the additional data needed to determine National Register eligibility.

SITE: 41BL1006 (quadrat 45/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 705 ft
NEAREST WATER (DISTANCE): 675 m, Leon River
AREA: 47,500 m^2
VEGETATION: Juniper/oak forest, brush, grasses

SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: Ground exposure was good when 41BL1006 was recorded. It is a high-density lithic scatter (see attached map). Based on an examination of the site's surface, the potential depth of cultural materials in most parts of the site is less than 20 cm. Naturally outcropping chert nodules and quartzite cobbles are abundant and near the surface. Retouched flakes, cores, and hammerstones were observed, but none were collected. Concentrations of cores and flakes occur throughout the site. Neither burned rock nor ecofacts were observed. No artifacts were collected. Site chronology is unknown. Prehistoric sites entirely within quadrat 45/49 are 41BL1004 (a lithic scatter), 41BL1029 and 41BL1030 (lithic/burned rock scatters), and 41BL1028, a mussel shell scatter. Prehistoric sites partially within quadrat 45/49 are 41BL1005, and lithic/burned rock scatter sites 41BL1018 and 41BL1022. One historic site--41BL1003--is also recorded in quadrat 45/49.

ASSESSMENTS AND RECOMMENDATIONS: The site is in fair condition, but to one degree or another, 80% of it is affected by erosion and grazing. In the field, 41BL1006 was termed "one of the two major outcrops/quarries on Tweedle Mountain." 41BL1004 is the other major quarry site in this area. The site's archaeological record may have the potential to address questions about lithic procurement, tool manufacturing, and related aspects of past land-use systems in general, although this potential remains to be demonstrated. Systematic surface collection and test excavations are recommended to gather the additional data needed to determine National Register eligibility.

SITE: 41BL1028 (quadrat 45/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION:
NEAREST WATER (DISTANCE): Leon River
AREA:
VEGETATION: Juniper/oak forest, brush, grasses and forbes
SITE TYPE: Mussel shell scatter

DESCRIPTIVE SUMMARY: This description comes from information recorded on the aerial photographs during the survey (i.e., "sweeping"). 41BL1028 was not fully recorded due to a lack of available time, inclement weather and high lake levels. The site mainly consists of a concentration of mussel shells, but isolated chipped stone artifacts occur in the immediate vicinity (see attached map). No artifacts were collected. Site chronology is unknown. Other prehistoric sites entirely within quadrat 45/49 are 41BL1004 (a lithic/burned rock scatter), 41BL1006, 41BL1029 and 41BL1030 (lithic scatters), and 41BL1028, a mussel shell scatter. Prehistoric sites partially within quadrat 45/49 are 41BL1005, and lithic/burned rock scatter sites 41BL1018 and 41BL1022. One historic site--41BL1003--is also recorded in quadrat 45/49.

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but judging from the condition of other sites in the vicinity, it probably has been impacted somewhat by erosion and grazing. As noted, 41BL1028 was not fully recorded due to heavy rains and flooding. Completion of standard documentation, and possibly systematic surface collections and test excavations, are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1029 (quadrat 45/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION:
NEAREST WATER (DISTANCE): Leon River
AREA:
VEGETATION: Juniper/oak forest, brush, grasses and forbes
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This description comes from information recorded on the aerial photographs during the survey (i.e., "sweeping"). 41BL1029 was not fully recorded due to a lack of available time, inclement weather and high lake levels. The site is a lithic scatter; cores, flakes, and a unifacially retouched flake were observed on the surface (see attached map). No artifacts were collected. Site chronology is unknown. Other prehistoric sites entirely within quadrat 45/49 are 41BL1004 (a lithic/burned rock scatter), 41BL1006 and 41BL1030 (lithic scatters), and 41BL1028, a mussel shell scatter. Prehistoric sites partially within quadrat 45/49 are 41BL1005, and lithic/burned rock scatter sites 41BL1018 and 41BL1022. One historic site--41BL1003--is also recorded in quadrat 45/49.

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but judging from the condition of other sites in the vicinity, it probably has been impacted somewhat by erosion and grazing. As noted, 41BL1029 was not fully recorded due to heavy rains and flooding. Completion of standard documentation, and possibly systematic surface collections and test excavations, are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1030 (quadrat 45/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION:
NEAREST WATER (DISTANCE): Leon River
AREA:
VEGETATION: Juniper/oak forest, brush, grasses and forbes
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This description comes from information recorded on the aerial photographs during the survey (i.e., "sweeping"). 41BL1030 was not fully recorded due to a lack of available time, inclement weather and high lake levels. The site is a lithic scatter; flakes and a unifacially retouched flake were observed on the surface (see attached map). No artifacts were collected. Site chronology is unknown. Other prehistoric sites entirely within quadrat 45/49 are 41BL1004 (a lithic/burned rock scatter), 41BL1006 and 41BL1029 (lithic scatters), and 41BL1028, a mussel shell scatter. Prehistoric sites partially within quadrat 45/49 are 41BL1005, and lithic/burned rock scatter sites 41BL1018 and 41BL1022. One historic site--41BL1003--is also recorded in quadrat 45/49.

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but judging from the condition of other sites in the vicinity, it probably has been impacted somewhat by erosion and grazing. As noted, 41BL1030 was not fully recorded due to heavy rains and

flooding. Completion of standard documentation, and possibly systematic surface collections and test excavations, are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1012 (quadrat 43/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Escarpment edge
ELEVATION: 640 feet
NEAREST WATER (DISTANCE): 125 m, Leon River
AREA: 300 m^2
VEGETATION: Juniper, hackberry, Texas persimmon, mountain laurel, cacti
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1012 was recorded. This is a large rockshelter with roof slabs slanting toward Lake Belton (see attached map). The fill in the shelter is ashy and gray in color. Flakes and mussel shells occur in medium densities. Burned rock density is also medium, but t is difficult to distinguish between modern and prehistoric specimens. Bedrock is exposed on the floor in part of the rockshelter. In most other places, the depth of cultural deposits is probably less than 10 cm, but potential depth may be considerably greater in a few areas. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites occur within quadrat 43/48: 41BL1020 and 41BL1021 (lithic scatters), and 41BL1023 and 41BL1024 (rockshelters).

ASSESSMENTS AND RECOMMENDATIONS: The site is in fair condition, but as much as 75% of it is impacted, to one degree or another, by pot-hunting, roof-fall, and erosion. That the site has been vandalized by pot hunting suggests that depths of deposits are greater than 10 cm, and that more cultural material is present than was observed by the field team. The large size of the rockshelter, its southern exposure that should enhance preservation conditions, and its setting near the Leon River are traits that are often characteristic of potentially important rockshelters. However, the site's potential significance remains to be determined. Test excavations are recommended to gather additional information to determine National Register eligibility.

SITE: 41BL1020 (quadrat 43/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau/Slope/Draw
ELEVATION: 650 ft
NEAREST WATER (DISTANCE): 325 m, Leon River
AREA: 7,500 m^2
VEGETATION: Juniper/oak forest, brush, grasses, forbes
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1020 was recorded. The site is a medium-density lithic scatter. Most artifacts were found on exposures of bare limestone (see attached map). A *Lange* dart point, flakes, and chips were observed, as was a small concentration of mussel shells. Burned rock was not observed. Examination of the surface and available exposures of the subsurface, indicate that the potential depth of cultural deposits is probably less than 15 cm in most places. Based on the presence of the *Lange* point (collected), the site may have been used during the Late Archaic period, but other occupation periods are

possible as well. Four other prehistoric sites occur within quadrat 43/48: 41BL1021 (a lithic scatters), and 41BL1012, 41BL1023, and 41BL1024 (rockshelters).

ASSESSMENTS AND RECOMMENDATIONS: The site is in poor condition, with an estimated 90% impacted heavily by grazing and erosion. Given that the ground exposure was fair when the site was recorded, the field observations are probably reliable. The presence of limestone bedrock at or near the surface in most parts of the site, indicates that there little likelihood for buried intact deposits. Collectively, these observations suggest that the site is not likely to yield additional and important information about culture history or aspects of past land-use patterns. No further work is recommended. The site is not considered to be potentially eligible for the National Register.

SITE: 41BL1021 (quadrat 43/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 675 ft
NEAREST WATER (DISTANCE): 325 m, Leon River
AREA: 2,500 m^2
VEGETATION: Juniper/oak forest, brush, grasses, forbes
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: Ground exposure was poor when 41BL1021 was recorded. It is a high-density lithic scatter, with a small but dense concentration of mussel exposed in an animal burrow (see attached map). A unifacial retouched flake, as well as flakes and chips, were observed on the surface. Burned rock was not found. Based on a surface inspection, the depth of cultural deposits is probably less than 20 cm in most places. Based on the presence of mussel shells in animal burrows, however, fine-grained sediments may be well over 20 cm deep in isolated areas, and, intact cultural features may be preserved in these areas. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites occur within quadrat 43/48: 41BL1020 (a lithic scatters), and 41BL1012, 41BL1023, and 41BL1024 (rockshelters).

ASSESSMENTS AND RECOMMENDATIONS: The site is reported in fair condition with 65 % of it affected, to one degree or another, by burrowing, grazing, and erosion. Even with poor ground exposure, many artifacts were observed, and mussel shell in the burrow backdirt suggests that there may be buried features in some parts of the site. The overall assemblage of mussel shell, lithic tools, and manufacturing debris indicates a range of subsistence activities, and site size is large enough to imply multiple occupations. In short, 41BL1021 may have the potential to yield intact features or chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns. Systematic surface collections and test excavations are recommended to gather additional information needed to assess significance according to National Register criteria.

SITE: 41BL1023 (quadrat 43/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): Leon River

AREA:
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the canoe survey for rockshelters along the plateau escarpment. The survey was done during a period of unusually high lake levels; inclement weather prevented thorough documentation. The site is a rockshelter at the base of a south-facing cliff on a limestone ridge (see attached map). The potential depth of deposits was not determined, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. No artifacts were collected. Site chronology is unknown. Four other prehistoric sites occur within quadrat 43/48: 41BL1020 and 41BL1021 (lithic scatters), and 41BL1012 and 41BL1024 (rockshelters).

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but it probably has been impacted somewhat by erosion, animals, rockfall, and recreationists. As noted, 41BL1023 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1024 (quadrat 43/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): Leon River
AREA:
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the canoe survey for rockshelters along the plateau escarpment. The survey was done during a period of unusually high lake levels; inclement weather prevented thorough documentation. The site is a rockshelter at the base of a south-facing cliff on a limestone ridge (see attached map). The potential depth of deposits was not determined, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. A chert biface was collected from the surface. Site chronology is unknown. Four other prehistoric sites occur within quadrat 43/48: 41BL1020 and 41BL1021 (lithic scatters), and 41BL1012 and 41BL1023 (rockshelters).

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but it probably has been impacted somewhat by erosion, animals, rockfall, and recreationists. As noted, 41BL1023 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1019 (quadrat 43/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau/Escarpment edge

ELEVATION: 685 ft
NEAREST WATER (DISTANCE): 125 m, Leon River
AREA: 2,500 m^2
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1019 was recorded. The site is a low-density lithic scatter with at least one small concentration of mussel shells (see attached map). With limestone bedrock exposed on the surface throughout the site, potential depth of cultural deposits in most parts of the site is likely to be less than 20 cm. A few cores, flakes and chips were observed on the surface. Burned rock was not found. No artifacts were collected. Site chronology is unknown. One other prehistoric site--41BL1032, a rockshelter--is recorded in quadrat 43/49.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1019 is in fair condition, but 80% of it is affected, to one degree or another, by erosion and grazing. Given that ground exposure was fair when the site was recorded, the field observations probably provide a reliable indication of the site's contents. Neither functionally or temporally diagnostic tools nor features were observed. Furthermore, the likelihood of buried intact deposits is low. Collectively, these observations suggest that the site is not likely to yield additional important information about culture history or land-use patterns. The site is not considered to be potentially eligible for the National Register. Further work is not recommended.

SITE: 41BL1032 (quadrat 43/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): 125 m, Leon River
AREA:
VEGETATION: Juniper, oaks, shrubs, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the canoe survey for rockshelters along the plateau escarpment. The survey was done during a period of unusually high lake levels; inclement weather prevented thorough documentation. The site is a rockshelter at the base of a north-facing cliff on a limestone ridge (see attached map). The sheltered area is about 15 X 3 X 1.5 m. The potential depth of deposits was not determined, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. Mussel shell fragments were observed in the ashy gray sediments. Site chronology is unknown. One other prehistoric site--41BL1019, a lithic scatter--is recorded in quadrat 43/49.

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but it probably has been impacted somewhat by erosion, animals, rockfall, and recreationists. Pot holes were not observed. As noted above, 41BL1032 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1013 (quadrat 44/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Escarpment edge
ELEVATION: 625 ft
NEAREST WATER (DISTANCE): 75 m, Leon River
AREA: 400 m^2
VEGETATION: Texas persimmon, mountain laurel, juniper, cacti, grasses
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: Ground visibility was good when 41BL1013 was recorded. The site is a large, south-facing rockshelter on a south projecting lobe of a plateau/ridge above the Leon River (see attached map). Based on an inspection of the rockshelter floor and adjacent parts of the landscape, the potential depth of cultural materials in most places is not likely to be greater than about 20 cm, but there be deeper pockets that contain fine-grained sediments, artifacts, and perhaps features. Roof-fall covered part of the floor, but in places there was a high-density of flakes and chips. Mussel shell fragments were present, but burned rock was not observed. No artifacts were collected. Site chronology is unknown. One other prehistoric site--41BL1025, another rockshelter--lies wholly within quadrat 44/48; two lithic scatters--41BL1005 and 41BL1020--are partially within this quadrat.

ASSESSMENTS AND RECOMMENDATIONS: The site is in good condition, but 55% of it is affected, to one degree or another, by roof fall, exfoliation, and animal burrows. When the site was recorded it was said to be in "remarkably good condition," considering it is easily visible and readily accessible from the lake. There was no obvious evidence for vandalism or pot hunting, however. The high density of artifacts and the potential for cultural materials to be buried under roof-fall suggests that 41BL1013 may contain intact features or chronologically or functionally discrete artifact assemblages useful in addressing questions about culture history or land-use patterns. The site is considered to be potentially significant. Test excavations are recommended to determine its National Register eligibility.

SITE: 41BL1025 (quadrat 44/48, lower peninsula)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Cliff
ELEVATION:
NEAREST WATER (DISTANCE): 75 m, Leon River
AREA:
VEGETATION: Juniper/oak forest
SITE TYPE: Rockshelter

DESCRIPTIVE SUMMARY: This preliminary description is based on a brief examination of the site during the canoe survey for rockshelters along the plateau escarpment. The survey was done during a period of unusually high lake levels; inclement weather prevented thorough documentation. 41BL1025 is a rockshelter at the base of a south-facing cliff on a limestone ridge (see attached map). Surfaces observations were not adequate to accurately assess potential depth of cultural materials, but, judging from other rockshelters in the area, the deposits are unlikely to be greater than 1 m deep. No artifacts were collected. Site chronology is unknown. One other prehistoric site--41BL1013, another rockshelter--lies wholly within quadrat 44/48; two lithic scatters--41BL1005 and 41BL1020--are partially within this quadrat.

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but judging from the condition of other rockshelters int the area, it probably has been impacted somewhat by erosion, animals, rockfall, and recreationists. As noted, 41BL1025 was not fully recorded due to heavy rains and flooding. Completion of standard documentation and possibly test excavations are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1005 (quadrat 44/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau/Draw
ELEVATION: 670 ft
NEAREST WATER (DISTANCE): 525 m, Leon River
AREA: 100,000 m^2
VEGETATION: Juniper/oak forest, brush, grasses
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground exposure was good 41BL1005 was recorded. The site is high-density lithic scatter with a light scatter of burned rock (see attached map). Two pieces of mussel shell were noted on the surface. Bifacial preforms, unifacial blanks, and retouched flakes, as well as flakes and cores, were also observed. The site consists of a lithic tool and debris scatter with moderate quarrying activity. Two mussel shells were noted, artifact density was high, burned rock density was light. Observed artifacts include preforms, blanks, retouched flakes, and cores (see attached map). Based on a examination of the site's surface, the potential depth of cultural materials in most parts of the site is less than 20 cm. No artifacts were collected. Site chronology is unknown. The other sites in quadrat 44/49 are 41BL1014 (a lithic/burned rock scatter), 41BL1015 and 41BL1031 (lithic scatters), and 41BL1016 (a lithic scatter/rockshelter). Sites partially within this quadrat are 41BL1006 and 41BL1029 (lithic scatters).

ASSESSMENTS AND RECOMMENDATIONS: The site is in fair condition, but, to one degree or another, 72% of it is affected by grazing, erosion, and road reclearing. While lithic procurement and tool manufacturing were apparently important activities at 41BL1005, the mussel shell, and perhaps the burned rock, indicate that food preparation took place there as well. The large size of the site suggests multiple occupations. Based on available information, the site may be eligible for inclusion on the National Register. However, systematic surface collections and test excavations are recommended to more accurately determine the site's potential to yield buried features and chronologically or functionally discrete artifact assemblages

SITE: 41BL1014 (quadrat 44/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau/Draw
ELEVATION: 675 ft
NEAREST WATER (DISTANCE): 425 m, Leon River
AREA: 77,500 m^2
VEGETATION: Juniper/oak forest, brush, grasses, forbes
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground visibility was good when 41BL1014 was recorded. The site is a high-density lithic scatter with a light scatter of burned rock. Limestone bedrock and chert nodules are exposed on the surface throughout the site, such that in most places, the depth of cultural deposits is likely to be less than 30 cm. There may be isolated pockets, however, where fine-grained sediments and cultural materials could occur at greater depths. Cores, hammerstones, flakes and chips, as well as bifacial preforms and roughouts, unifacial blanks, retouched flakes and blades, an end-scraper, and a possible graver were observed on the surface. Across the site, there are several dense, midden-like concentrations of mussel shells and lithic debitage (see attached map). One dart point--a *Pedernales* type--was collected. Based on this projectile point, the site may have been occupied during the Middle Archaic, but other periods are probably represented as well. The other sites in quadrat 44/49 are 41BL1005 (a lithic/burned rock scatter), 41BL1015 and 41BL1031 (lithic scatters), and 41BL1016 (a lithic scatter/rockshelter). Sites partially within this quadrat are 41BL1006 and 41BL1029 (lithic scatters).

ASSESSMENTS AND RECOMMENDATIONS: The site is in good condition, but, to one degree or another, 50% of it is affected by grazing and erosion. 41BL1014 has one of the highest densities of artifacts observed in the Tweedle Mountain area. The types of artifacts at the site suggest that a range of activities are represented including quarrying, food preparation, and tool manufacturing and use. It may contain buried features and chronologically or functionally distinctive artifact assemblages. Systematic surface collections and test excavations are recommended to more accurately determine National Register eligibility.

SITE: 41BL1015 (quadrat 44/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland interfluvial
LANDFORM: Plateau
ELEVATION: 670 ft
NEAREST WATER (DISTANCE): 175 m, Leon River
AREA: 125,000 m^2
VEGETATION: Juniper/oak forest, brush, grasses, forbes
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1015 was recorded. The site is a medium-density lithic scatter, and across the site, there are several concentrations of lithic debitage (see attached map). Potential depth of cultural deposits is likely to be less than 30 cm. Unifacial blanks and retouched flakes, as well as, hammerstones, cores, flakes and chips were observed on the surface. Neither ecofacts (e.g., mussel shell) nor burned rocks were found. No artifacts were collected. Site chronology is unknown. The other sites in quadrat 44/49 are 41BL1005 and 41BL1014 (lithic/burned rock scatters) and 41BL1031 (a lithic scatter), and 41BL1016 (a lithic scatter/rockshelter). Sites partially within this quadrat are 41BL1006 and 41BL1029 (lithic scatters).

ASSESSMENTS AND RECOMMENDATIONS: The site is fair condition, but 70% of the surface is affected, to one degree or another, by grazing and erosion. The scattered concentrations of cores and flakes may prove to be functionally distinctive assemblages that represent in situ remains of knapping stations. Systematic surface collections and test excavations are recommended to more accurately determine the likelihood of the site yielding important information about lithic procurement and primary reduction strategies, and hence, assess the site's National Register eligibility.

SITE: 41BL1016 (quadrat 44/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau/Cliff
ELEVATION: 690 ft
NEAREST WATER (DISTANCE): 175 m, Leon River
AREA: 32,500 m^2
VEGETATION: Juniper/oak forest, yaupan, other brush, grasses, forbes
SITE TYPE: Lithic scatter/rockshelter

DESCRIPTIVE SUMMARY: Ground visibility was good when 41BL1016 was recorded. The site is a medium-density lithic scatter along the edge a ridge-like plateau. Potential depth of cultural deposits is likely to be less than 30 cm. The site's rockshelter component- a large, northeast-facing, limestone overhang- is at the base of the cliff-face that is immediately below the plateau surface (see attached map). Lack of time due to inclement weather and high lake levels prevent thorough documentation of the rockshelter. Bifacial preforms, unifacial blanks and retouched flakes, cores, flakes and chips were observed on the plateau surface, but neither ecofacts nor burned rocks were found. No artifacts were collected. Site chronology is unknown. The other sites in quadrat 44/49 are 41BL1005 and 41BL1014 (lithic/burned rock scatters) and 41BL1015 and 41BL1031 (lithic scatters). Sites partially within this quadrat are 41BL1006 and 41BL1029 (lithic scatters).

ASSESSMENTS AND RECOMMENDATIONS: The site is fair condition, but 70% of the surface is affected, to one degree or another, by erosion, grazing and fence construction. 41BL1016 is the westernmost and the sparsest of the plateau edge/top lithic scatters recorded in the Tweedle Mountain area, where, the general pattern is that debitage density increases with proximity to a good chert outcrop. Systematic surface collections and test excavations are recommended to more accurately determine the likelihood of the site yielding important information about lithic procurement and primary reduction strategies, and hence assess the site's National Register eligibility. Standard documentation needs to be completed before recommendations can be about its potential significance.

SITE: 41BL1031 (quadrat 44/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION:
NEAREST WATER (DISTANCE): Leon River
AREA:
VEGETATION: Juniper/oak forest, brush, grasses and forbes
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: This description comes from information recorded on the aerial photographs during the survey (i.e., "sweeping"). 41BL1029 was not fully recorded due to a lack of available time, inclement weather and high lake levels. The site is a lithic scatter; two bifaces, a uniface, a retouched flake, cores, flakes and chips were observed on the surface (see attached map). Potential depth of deposits was not determined. No artifacts were collected. Site chronology is unknown. The other sites in quadrat 44/49 are 41BL1005 and 41BL1014 (lithic/burned rock scatters), and 41BL1015 (a lithic scatter), and 41BL1016 (a lithic

scatter/rockshelter). Sites partially within this quadrat are 41BL1006 and 41BL1029 (lithic scatters).

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but judging from the condition of other sites in the vicinity, it probably has been impacted somewhat by erosion and grazing. As noted, 41BL1031 was not fully recorded due to heavy rains and flooding. Completion of standard documentation, and possibly systematic surface collections and test excavations, are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1017 (quadrat 45/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 650 ft
NEAREST WATER (DISTANCE): 300 m, Leon River
AREA: 5,000 m^2
VEGETATION: Juniper/oak forest, brush, grasses and forbes
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1017 was recorded. The site is a low-density lithic scatter with a light scatter of burned rock, and several concentrations of mussel shells, some of which contain chipped stone artifacts as well (see attached map). Based on an inspection of the surface, the potential depth of deposits may be 50 cm, much deeper than is usual for most in the Tweedle Mountain area. Bifacial roughouts, unifacial blanks, choppers, retouched flakes, an end-scraper, cores and flakes were observed on the surface. No artifacts were collected. Site chronology is unknown. Quadrat 45/48 encompasses four other prehistoric sites: 41BL1018, 41BL1022, 41BL1026, and 41BL1027 (lithic/burned rock scatters). Another lithic scatter site- 41BL1005- lies partially within quadrat 45/48.

ASSESSMENTS AND RECOMMENDATIONS: The site is in fair condition, but 60% of it is affected, to one degree or another, by erosion and grazing. This comparatively small site has a concentrations of mussel shell and lithics. These concentrations may represent the remains of short-term encampments, and they may also contain functionally distinctive artifact assemblages. There is also a possibility that the site contains buried intact features and artifact assemblages useful in addressing questions about culture history and land-use. Systematic surface collections and test excavations are recommended to gather additional information needed to adequately assess the site's potential eligibility to the National Register.

SITE: 41BL1018 (quadrat 45/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland interfluvial
LANDFORM: Plateau
ELEVATION: 660 ft
NEAREST WATER (DISTANCE): 575 m, Leon River
AREA: 27,500 m^2
VEGETATION: Juniper/oak forest, brush, grasses, forbes
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1018 was recorded. It is medium-density lithic scatter with a light scatter of burned rock (see attached map). Based on an inspection of the surface, the potential depth of cultural materials is not likely to be greater than 20 cm below surface. There were several artifact concentrations across the site, including one at the southeast end with several choppers. Retouched flakes, other choppers, cores, and flakes and chips were observed on the surface. Neither shell nor other ecofacts were seen. No artifacts were collected. Site chronology is unknown. Quadrat 45/48 encompasses four other prehistoric sites: 41BL1017, 41BL1022, 41BL1026, and 41BL1027 (lithic/burned rock scatters). Another lithic scatter site--41BL1005--lies partially within quadrat 45/48.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1018 was in fair condition, but about 70% of it is affected, to one degree or another, by grazing, erosion, and a fence line construction. The site's large size and the presence of discrete artifact concentrations are suggestive of multiple occupations. The concentration of choppers at the southeast end of the site is very unusual in the Tweedle Mountain area; it may represent the remains of a short-term, special-purpose encampment. The types of cores and flakes at the site are indicative of quarrying activities, and some of the concentrations of debitage may represent individual knapping episodes. Systematic surface collections and test excavations are recommended to gather additional information needed to adequately assess the site's potential eligibility to the National Register.

SITE: 41BL1022 (quadrat 45/48, Tweedle mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 650 ft
NEAREST WATER (DISTANCE): 575 m, Leon River
AREA: 52,500 m^2
VEGETATION: Juniper/oak forest, brush, grasses, and forbes
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground visibility was good when 41BL1022 was recorded. The site is a medium-density lithic scatter with a light scatter of burned rock (see attached map). Based on the presence of limestone bedrock over almost all of the site, the potential depth of cultural materials is not likely to be greater than 20 cm below surface. Bifacial roughouts, unifacial blanks, retouched flakes, cores, flakes and chips were observed on the surface. A single piece of mussel shell was also seen. No artifacts were collected. Site chronology is unknown. Quadrat 45/48 encompasses four other prehistoric sites: 41BL1017, 41BL1018, 41BL1026, and 41BL1027 (lithic/burned rock scatters). Another lithic scatter site--41BL1005--lies partially within quadrat 45/48.

ASSESSMENTS AND RECOMMENDATIONS: The site is in fair condition, but 80% of it is affected, to one degree or another, by grazing and erosion. Given that the ground exposure was good when the site was recorded, the field observations are probably reliable. The presence of limestone bedrock at or near the surface in most parts of the site, indicates that there little likelihood for buried intact deposits. Collectively, these observations suggest that the site is not likely to yield additional and important information about culture history or aspects of past land-use patterns. No further work is recommended. The site is not considered to be potentially eligible for the National Register.

SITE: 41BL1026 (quadrat 45/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 650 ft
NEAREST WATER (DISTANCE): Leon River
AREA:
VEGETATION: Juniper/oak forest, brush, grasses and forbes
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: This description comes from information recorded on the aerial photographs during the survey (i.e., "sweeping"). 41BL1026 was not fully recorded due to a lack of available time, inclement weather and high lake levels. The site is a lithic and burned rock scatter. A chopper, other tools, cores, flakes and chips were observed on the surface (see attached map). Potential depth of deposits was not determined. No artifacts were collected. Site chronology is unknown. Quadrat 45/48 encompasses four other prehistoric sites: 41BL1017, 41BL1018, 41BL1022, and 41BL1027 (lithic/burned rock scatters). Another lithic scatter site--41BL1005--lies partially within quadrat 45/48.

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but judging from the condition of other sites in the vicinity, it probably has been impacted somewhat by erosion and grazing. As noted, 41BL1026 was not fully recorded due to heavy rains and flooding. Completion of standard documentation, and possibly systematic surface collections and test excavations, are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SITE: 41BL1027 (quadrat 45/48, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 650 ft
NEAREST WATER (DISTANCE): Leon River
AREA:
VEGETATION: Juniper/oak forest, brush, grasses and forbes
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: This description comes from information recorded on the aerial photographs during the survey (i.e., "sweeping"). 41BL1027 was not fully recorded due to a lack of available time, inclement weather and high lake levels. The site is a lithic and burned rock scatter. Cores and flakes were observed on the surface as were scattered pieces of burned rock and mussel shell fragments (see attached map). Potential depth of deposits was not determined. No artifacts were collected. Site chronology is unknown. Quadrat 45/48 encompasses four other prehistoric sites: 41BL1017, 41BL1018, 41BL1022, and 41BL1026 (lithic/burned rock scatters). Another lithic scatter site--41BL1005--lies partially within quadrat 45/48.

ASSESSMENTS AND RECOMMENDATIONS: Site condition was not determined, but judging from the condition of other sites in the vicinity, it probably has been impacted somewhat by erosion and grazing. As noted, 41BL1027 was not fully recorded due to heavy rains and flooding. Completion of standard documentation, and possibly systematic surface collections

and test excavations, are needed to adequately assess the site and make recommendations about its potential National Register eligibility.

SPARTA MOUNTAIN, N=2 SITES

SITE: 41BL1011 (quadrat 36/47, Sparta Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Hillock/Slope
ELEVATION: 595-630 ft
NEAREST WATER (DISTANCE): 200 m, Cowhouse Creek
AREA: 60,800 m^2
VEGETATION: Juniper/oak forest, greenbriar, grasses
SITE TYPE: Lithic/burned rock scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1011 was recorded. The site is a high-density lithic scatter, with a medium-density of burned rocks, and several discrete artifact concentrations. Mussel shell fragments are widely scattered in the western part of the site (see attached map). Bifacial roughouts, cores, unifacial blanks and retouched flakes, and choppers were observed on the surface. No artifacts were collected. Site chronology is unknown. One other prehistoric site--41BL1010--is partially in quadrat 36/47; three historic sites also are recorded in this quadrat: 41BL1007, 41BL1008, and 41BL1009.

ASSESSMENTS AND RECOMMENDATIONS: The site's large size, the presence of discrete artifact clusters, and the variety of cultural materials--chipped stone tools, manufacturing and quarrying debitage, mussel shells, and burned rock--are indicative of repeated occupations and multiple activities. Quarrying activities also are evidenced by high quality chert nodules and cores at the site. Systematic surface collections and shovel tests are recommended to assess the site's potential to yield in situ features and functionally or chronologically distinctive artifact assemblages.

SITE: 41BL1010 (quadrat 37/47, Sparta Mountain)

ENVIRONMENTAL ZONE: Intermediate Upland
LANDFORM: Hillock/Slope
ELEVATION: 620 ft
NEAREST WATER (DISTANCE): 400 m, Cowhouse Creek
AREA: 56950 m^2
VEGETATION: Grasslands with scattered juniper and oak
SITE TYPE: Lithic scatter

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1010 was recorded. The site is a medium-density lithic scatter on the crest of the hill, with concentrations of flakes and cores extending down the eroded slope (see attached map). Judging only from surface observations, the potential depth of cultural materials in most parts of the site is probably less than 25 cm. A retouched flake, a retouched blade, cores, flakes and chips were observed on the surface. Neither shell nor burned rock was found. No artifacts were collected. The chronology is unknown. One other prehistoric site--41BL1011--is partially in quadrat 36/47; three historic sites also are recorded in this quadrat: 41BL1007, 41BL1008, and 41BL1009.

ASSESSMENTS AND RECOMMENDATIONS: The site is reported as destroyed, with 100% of it heavily damaged by motor-cross activity and erosion. 41BL1010 is not considered to be eligible for the National Register. No further work is recommended.

APPENDIX II

[illegible]RIC SITE DESCRIPTIONS AND ASSESSMENTS

Alston V. Thoms
Ben W. Olive
Ruth N. Riegel

THE CANTONMENT AREA

DELIVERY ORDER No. 17: HISTORIC SITE DESCRIPTIONS AND ASSESSMENTS

SITE: 41BL987

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Slope
ELEVATION: 940-970 feet
NEAREST WATER (DISTANCE): 1,060 m
AREA: 47,500 m^2
VEGETATION: Grassland
SITE TYPE: Special purpose site

DESCRIPTIVE SUMMARY: The site consists of five lipped concrete slabs (4 x 4 ft) with tiled intake and drainage pipes, two brick piers, and one concrete slab (3 x 3 ft). Much construction rubble is pushed up in a borrow pit area on the south part of the site (see attached site map). There is a fence line within the site. The only domestic vegetation noted are irises. Artifacts observed include stoneware, green, clear, and red bottle glass, soft drink bottles, a brake master cylinder, locked end & side seamed tin cans, brick, concrete piers, concrete rubble, wire nails, military barbed wire, sewage tiles, wooden posts, and a rubber tire. The only artifact collected was a cold cream jar base. The site is reported to be in fair condition with 40% of the site affected by dozing. The chronology of the site appears to be from the Military period. No other historic site occurs in quadrat 16/43.

ASSESSMENTS AND RECOMMENDATIONS: The site is a possible military period residential facility. The surveyors noted that the site might be associated with a military trailer park to the west. The site is not considered to be potentially eligible to the National Register. No additional field/archival work is recommended.

SITE: 41BL992

ENVIRONMENTAL ZONE: Lowland
LANDFORM: Primary terrace
ELEVATION: 835 feet
NEAREST WATER (DISTANCE): 0 m
AREA: 5,000 m^2
VEGETATION: Grasslands
SITE TYPE: Special purpose site

DESCRIPTIVE SUMMARY: The site consists of three rectangular concrete footings (ca. 7 x 7 m) flush to the ground. These features are arranged in a line perpendicular to the creek, suggesting either a bridge approach or a pipeline crossing over South Nolan Creek (see attached map). There is a low mound of dirt and rock west of the concrete alignment and concrete debris lies just north of the creek. No domestic vegetation was noted. The only artifacts observed were the concrete footings and natural stone building materials. No artifacts were collected. The site is reported

to be in poor condition with 90% of the site destroyed due to deliberate destruction and removal of the probable bridge. The specific chronology of the site is unknown, although it undoubtedly dates to the 20th century. No other historic site occurs in quadrat 19/43.

ASSESSMENTS AND RECOMMENDATIONS: The site appears to be either a bridge approach or a pipeline crossing. The concrete footings align with the Fort Hood water treatment plant and the water tower. The site is not considered to be potentially eligible to the National Register. No additional field/archival work is recommended.

SITE: 41BL995

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Knoll
ELEVATION: 890 feet
NEAREST WATER (DISTANCE): 200 m
AREA: 2,500 m^2
VEGETATION: Grassland
SITE TYPE: Dump

DESCRIPTIVE SUMMARY: This site consists of two concentrated areas of historic trash scatter with a thin, continuous scatter between and around the two major concentrations (see attached map). The artifact density is medium. Observed artifacts include coarse earthenware, undecorated whitewares, porcelain, bottle glass (lips, bases), one whiskey bottle (1933-1964), cold cream jars, a metal lid (with the trademark Oscar Mayer), lavender glass (1880-1918), medicine bottles, milk glass lid liners, tableware, suspender slides, a small cast iron stove part, locked end & side seam tin cans, flat glass, small fragments of rusted metal, and possible tractor parts, including a small fragment of cloth braided hydraulic line and a possible part of a filter system. Collected artifacts include several bottle necks and basses of lavender, bluish, and cobalt colored bottles. No domestic vegetation was noted. The site is reported to be in fair condition with 40% of the site affected by wheel vehicle damage and erosion. It appears to be a late nineteenth/early twentieth or Depression era site. One other historic site occurs in quadrat 17/42.

ASSESSMENTS AND RECOMMENDATIONS: The site is a late nineteenth/early twentieth or Depression era site in fair condition with modern trash deposits. It is not considered to be potentially eligible for the National Register. No additional field/archival work is recommended.

SITE: 41BL996

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Bench
ELEVATION: 890 feet
NEAREST WATER (DISTANCE): 200 m
AREA: 32,500 m^2
VEGETATION: Grasslands
SITE TYPE: Domestic dwelling/Special purpose site

DESCRIPTIVE SUMMARY: The main feature at the site is a large perimeter foundation with several sidewalks and entrances. The following are also present: a cesspool/septic tank, natural gas tank stand, a probable garage foundation, and a looping asphalt driveway with a stone

alignment within the loop, and a trash scatter (see attached map). No domestic vegetation is noted, but prickly pear is very dense in the area. Artifact density is low. Observed artifacts include undecorated whitewares, porcelain, bottle glass (lips, bases), insulators, lavender glass, metal buckets, car parts, locked end & side seam tin cans, toys, brick with maker's mark, flat glass, concrete piers, natural stone, cinder blocks, asbestos shingles, marble flagstone, mortar, bolts, fence staples, lock plates, barbed wire, drainage/sewage tiles, wooden planks/posts, and modern plastics. Collected artifacts include milk glass fragments, a ceramic insulator, child's marble, base tray of small glass bottle, and the neck of a lavender glass bottle (1880-1918). The site is in good condition, with only 20% being affected by erosion and recreational activities. It appears that the site is an Depression era or Military period domestic dwelling or special purpose site (commercial or industrial). One other historic site occurs in quadrat 17/42.

ASSESSMENTS AND RECOMMENDATIONS: The site is probably an early twentieth century domestic dwelling or special purpose site. Judging from its size, it may be the remains of a commercial or industrial facility. Modern and recent dumping and surface disturbance probably obscure some of the historic occupation. The site is not considered to be potentially eligible to the National Register. No additional field/archival work is recommended.

SITE: 41BL999

ENVIRONMENTAL ZONE: Intermediate upland
LANDFORM: Knoll
ELEVATION: 1,000 feet
NEAREST WATER (DISTANCE): 1,700 m
AREA: 100 m^2
VEGETATION: Grasslands
SITE TYPE: Isolated Feature

DESCRIPTIVE SUMMARY: A possible concrete cistern base is noted as the only feature at this site (see attached map). The base is 5.4 m in diameter with an average height of 0.7 m. No domestic vegetation and a low artifact density was noted. Observed artifacts included brandy/whiskey bottles (1933-1964), bolts, barbed wire, and brackets in the concrete feature. The only artifact collected was a screw top liquor bottle. The site is in excellent condition with only 5% of the site impacted by miscellaneous military activities. The chronology of the site appears to be from the Depression era/Military period. No other historic site occurs in quadrat 17/46.

ASSESSMENTS AND RECOMMENDATIONS: This site is probably a Depression era cistern. The feature is in excellent condition and well-hidden by a clump of brush. The site is not considered eligible to the National Register. No additional field/archival work is recommended.

THE BELTON RESERVOIR PERIPHERY AREA

DELIVERY ORDER No. 18: HISTORIC SITE DESCRIPTIONS AND ASSESSMENTS

LOWER PENINSULA SITES (N=1)

SITE: 41BL1000 (quadrat 44/46, Lower Peninsula)

ENVIRONMENTAL ZONE: Intermediate Upland
LANDFORM: Bench
ELEVATION: 600 ft
NEAREST WATER (DISTANCE): 300 m, Leon River
AREA: 2,500 m^2
VEGETATION: Grassland, juniper, oak, and brush
SITE TYPE: Special purpose

DESCRIPTIVE SUMMARY: Ground visibility was fair when 41BL1000 was recorded. The site encompasses the remains of a structure of undetermined function as well as a low-density scatter of historic artifacts (see attached map). Based on surface observations, the potential depth of cultural deposits is less than 30 cm. The main feature is a concrete perimeter foundation with cinder block walls and concrete-filled, rebar-reinforced cinder block pillars. Composition shingle material, iron rebar, mortar bolts, and hinges were observed on the surface. One piece of lavender glass was found, but other materials usually associated with domestic activities (e.g., ceramics, tin cans, tool and machinery parts, etc.) were not observed, and no domestic vegetation was noted. No artifacts were collected. The types of artifacts associated with the structural remains indicate that 41BL1000 may not have been in use before the 1930s or 1940s, but the lavender glass fragment suggests an earlier date. One other site--41BL1001, a lithic/burned rock scatter--is recorded in quadrat 4/46.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1000 is in poor condition, with 100% of the it affected. to one degree or another, by recreationists, waves/high water, erosion, and grazing. Recreationist have dismantled the structure's walls for use in building fire rings and they have scattered trash extensively. The site does not seem likely to yield additional information that would be significant in terms of twentieth century local or regional history. It is not considered to be potentially eligible for the National Register, and no further work is recommended.

TWEEDLE MOUNTAIN SITES (N=1)

SITE: 41BL1003 (quadrat 45/49, Tweedle Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Plateau
ELEVATION: 655 ft
NEAREST WATER (DISTANCE): 850 m, Leon River
AREA: 750 m^2

VEGETATION: Juniper/oak forest, brush
SITE TYPE: Dump

DESCRIPTIVE SUMMARY: Ground visibility was poor when 41BL1003 was recorded. The site is a high-density dump, with a scatter of historic artifacts (see attached map). Based on surface observations, the potential depth of cultural materials is not likely to be more than 20 cm. The dump is a compact deposit of mostly tin cans and cookware that is surrounded by scattered glass and ceramic fragments. Observed artifacts included undecorated whitewares, clear and brown bottle glass, screw-top canning jars, whiskey bottles, milk glass lid liners, buckets, a car fan blade, light housings, cast iron stove parts, enamel ware, pans, muffin tins, toy wheels, washtubs, tin cans, and numerous metal objects that are probably automotive parts. A saucer base, a bottle neck, and a bottle base were collected. The ironstone saucer base had a maker's mark from Greenwood China, Trenton, New Jersey, a ceramic company in business from 1862 to 1933. A green tinted glass bottle fragment had a value mark that dates 1935-1955. No domestic vegetation was observed. 41BL1003 appears to be a late 1920s-Depression era site. No other historic sites were recorded in quadrat 45/49. Prehistoric sites within quadrat 45/49 are 41BL1004, 41BL1006, 41BL1029, and 41BL1030, lithic/burned rock scatters, and 41BL1028, a mussel shell scatter. Prehistoric sites partially within quadrat 45/49 are 41BL1005, a lithic/burned rock scatter, and lithic/burned rock scatter sites 41BL1018 and 41BL1022.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1003 is reported to be in excellent condition, with only 10% it affected by erosion and grazing. The site appears to be the result of a single episode of trash dumping. It does not seem likely to yield additional information that would be significant in terms of local or regional history. It is not considered to be potentially eligible for the National Register, and no further work is recommended.

SPARTA MOUNTAIN (N=3)

SITE: 41BL1007 (quadrat 36/47, Sparta Mountain)

ENVIRONMENTAL ZONE: Upland Interfluvial
LANDFORM: Draw
ELEVATION: 605 ft
NEAREST WATER (DISTANCE): 550 m, Cowhouse Creek
AREA: 7,500 m^2
VEGETATION: Grassland, oak, juniper, hackberry, dewberry
SITE TYPE: Dump

DESCRIPTIVE SUMMARY: Ground visibility was good when 41BL1007 was recorded. The site is a low artifact density dump, with a concentration of cut and natural limestone blocks at the head of a gully (see attached map). Cultural material could be buried as much as 1 m in gully fill. The limestone blocks may have been placed in the gully to reduce headward erosion. These rocks and the general debris scatter could represent a domestic dwelling or a farm/ranch, but 41BL1007 does not have the kinds of substantial features typically found at sites with residential structures (e.g., well, cistern, foundations, root cellars, etc.) Although domestic vegetation was not noted, artifacts indicative of residential activities were found, including washtubs, tin cans, and stonewares. Possible structural and fence building remains were also observed on the surface, including wire (smooth and barbed), sheet metal, and roofing materials. Burned limestone, possibly historic, was found near the road that passes just to the north. No material was collected.

Site chronology is probably 1930s-1940s, and perhaps later. Two historic dump/feature sites (41BL1008 and 41BL1009) are also recorded in quadrat 36/37. 41BL1010, a lithic scatter, is also in quadrat 36/37; 41BL1011, a lithic/burned rock scatter, is partially within it.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1007 is in poor condition, with 90% of it affected, to one degree or another, by erosion, vehicular traffic, and grazing. Parts of the site are heavily eroded. 41BL1007 does not seem likely to yield additional information that would be significant in terms of local or regional history during the Depression and World War II eras. The site is not considered to be potentially eligible for the national Register, and no additional work is recommended.

SITE: 41BL1008 (quadrat 36/47, Sparta Mountain)

ENVIRONMENTAL ZONE: Intermediate Upland
LANDFORM: Bench
ELEVATION: 615 ft
NEAREST WATER (DISTANCE): 250 m, Cowhouse Creek
AREA: 1,250 m^2
VEGETATION: Mixed hardwoods and shrubs, juniper, cat-claw
SITE TYPE: Dump/feature

DESCRIPTIVE SUMMARY: Ground visibility was poor when 41BL1008 was recorded. A dirt road is located adjacent to this low artifact density dump site that also contains a concentration of large pieces of cut limestone (see attached map). The surveyors noted that the "large limestone blocks are definitely not eroded bedrock." They also commented that these blocks may be representative of use/occupation prior to the 1920s to 1940s when site appears to have was used most intensively. Potential depth of cultural deposits is probably less than 50 cm. Historic artifacts observed on the surface include lavender glass, cobalt glass, cans, cast iron stove parts, ceramic fragments, and probable automobile parts. Material collected included a ceramic marble, a fragment of Bristol glaze/Albany slip stoneware, lavender and aqua marine glass sherds, and a piece of blue Depression glass (1930-1940). Domestic vegetation was not observed. Site chronology is estimated to be 1920s-1940s. Two other historic sites, 41BL1007 (a dump) and 41BL1009 (a dump/feature), are recorded in quadrat 36/37. 41BL1010, a lithic scatter, is also in quadrat 36/37; 41BL1010, a lithic/burned rock scatter, is partially within it.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1008 is in poor condition, with 95% of it affected, to one degree or another, by erosion and recreational use. The site's pre-World War II dump component does not seem likely to yield additional information that is important in local or regional history, and thus it is not considered eligible for inclusion on the National Register. Surface observations, however, were not adequate to assess the potential significance of the limestone block feature. Test excavations are recommended to determine the nature of this feature and assess its eligibility to the National Register.

SITE: 41BL1009 (quadrat 36/47, Sparta Mountain)

ENVIRONMENTAL ZONE: Intermediate Upland
LANDFORM: Bench
ELEVATION: 625 ft
NEAREST WATER (DISTANCE): 200 m, Cowhouse Creek

AREA: 15,200 m^2
VEGETATION: Juniper, oaks, grasses
SITE TYPE: Dump/feature

DESCRIPTIVE SUMMARY: Ground exposure was fair when 41BL1009 was recorded. This dump site is associated with a low-density scatter of historic artifacts, concentrations of limestone blocks and concrete chunks, and an in situ concrete slab (see attached figure). Potential depth of cultural deposits is probably less than 20 cm. The presence of concrete and limestone concentrations and the slab feature indicate that 41BL1009 could contain the remains of a dwelling, but the site does not have the other kinds of substantial features typically found at places with residential structures (e.g., well, cistern, foundations, root cellars, etc.). Although domestic vegetation was not noted, artifacts indicative of residential activities were found, including tin cans and stonewares. Gun cartridges and pieces of wood also were observed on the surface. Based on the presence of lavender glass, site chronology appears to be 1910s-1920s. Two other historic sites, 41BL1007 (a dump) and 41BL1008 (a dump/feature), are recorded in quadrat 36/37. 41BL1010, a lithic scatter, is also in quadrat 36/37; 41BL1010, a lithic/burned rock scatter, is partially within it.

ASSESSMENTS AND RECOMMENDATIONS: 41BL1009 is in poor condition, with 100% of it affected, to one degree or another, by erosion, camping and wheeled vehicles. To the surveyors, the site was "highly disturbed," and it appeared that campers and soldiers had incorporated the available concrete and limestone blocks into their encampments. 41BL1009 does not seem likely to yield additional information that is important in local or regional history during the early twentieth century, and thus it is not considered eligible for inclusion on the National Register. No additional work is recommended.

APPENDIX III

PREHISTORIC MATERIAL CULTURE DISCUSSION

William A. Dickens

THE CANTONMENT AREA (DO#17): LITHIC ANALYSIS

A total of four lithic artifacts was recovered in the Belton Lake periphery area (DO#17). These include one identifiable projectile point, one biface fragment (probable dart point fragment), one unifacially modified tool, and one Waco Sinker. All were recovered from surface contexts.

Projectile Points (N = 2)

Plainview (N = 1): A specimen (Cat. 059-025, Grd 18/43 41BL989) of the *Plainview* type was recovered. It is fragmentary with only the basal portion remaining. The base is deeply concave (basal depth 3.23 mm) with smoothing present on both lateral edges. The base has been thinned through the longitudinal removal of several narrow flakes on one face and the removal of a larger flake on the other face. The remaining flake scars run parallel across both faces (except where interrupted by the basal thinning flake scars). The edges show no apparent evidence of reworking.

The fragment is small, measuring only 18.67 mm in length; however, the flake pattern and lateral edge grinding both fall within the description of the *Plainview* type (Bell 1958:74-75; Suhm and Jelks 1962:239-240; Turner and Hester 1985:141-142). The material is an unknown type of Edwards chert that does not appear to have been treated, but this may be obscured by a white patina that covers all surfaces.

Radiocarbon ages obtained from the Plainview site (Krieger 1957:322) in which *Plainview* points, along with *Scottsbluff* and *Eden* points were found associated with extinct bison, are dated at 9170±500 and 7100±160 years ago. This places the *Plainview* type within the Paleo-Indian period (Turner and Hester 1985:141; Prewitt 1981:76). *Plainview* points have been noted in previous surveys at Fort Hood conducted by the Archaeological Research Laboratory (Ensor 1987:260-261, 1988:257-259; Ensor and Drollinger 1990:183-184).

Dart Point Fragment (N = 1): One basal fragment (Cat. #059-026, Grd 19/43, 41BL991) of a dart was recovered. The fragment is 16.83 mm in length and 20.74 mm wide. There are no shoulders or remnants of the haft element juncture point left to determine if the point was lanceolate or stemmed. The stem edges are constricting and the base is slightly rounded or convex, suggesting a possible lanceolate shape, although this cannot be determined with any certainty. The flake scar pattern is well executed with nicely spaced pressure flaking along the lateral edges. The material had been heat altered as evidenced by its very glossy and waxy appearance; it is a variety of Edwards Chert commonly designated Texas Novaculite. This variety of chert is presently known from only a few localized areas on Fort Hood. In its raw state, the chert is extremely resistant to reduction, but once heat treated, its "chipability" is vastly improved to a state that is easily reduced by pressure flaking.

The basal fragment has been thinned longitudinally on one face by two large shallow flakes and on the other face by a much deeper single large flake. This latter flake scar is also wide and parallels the edges, strongly resembling a "flute." The total length of this flake scar is unknown as it is terminated by the fracture. There is no fluting platform remaining on the side with the possible flute flake scar, nor is there any evidence of an attempt to make a platform for a flute flake removal on the opposite face. The face with the possible flute flake had its base pressure flaked over, indicating that it was removed first. Based on these observations, this specimen cannot be positively assigned a specific type and can only be placed in an undetermined category.

Uniface Flake Tool (N = 1)

One modified uniface flake tool (Cat. #059-027, Grd 17/43 41BL993) was recovered during the survey. It is made on a cortical flake of a creamy-yellow chert. This chert resembles a variety commonly found on the post, known as Fort Hood Yellow (Dickens 1992), but the cortex suggests that its origin may be from the Uvalde Gravels. It is 56.09 mm long, 42.24 mm wide, and 12.66 mm thick (at the bulb of percussion).

The modification is located along one lateral edge (edge adjacent to the bulb of percussion) and on the edge opposite the bulb of percussion. The latter edge modification forms a slight notch. Wear on this edge is slight with no polish evident; it has an edge angle of 94°. The modification along the lateral edge exhibits a better and more deliberate flaking pattern than the previous one. This edge is heavily worn, with an edge angle of 88°, and a slight polish is evident on the tops of the flake scar ridges similar to that resulting from use on wood (Keeley 1980:35-42).

Waco Sinker (N = 1)

A tool identified as a Waco Sinker was recovered. It is made of quartzite and is roughly oval in shape with an indented "notch" at each end. Measurements are 48.31 mm long by 23.28 mm wide and 16.53 mm thick. This specimen may have been subjected to heat which caused the material to become crazed and cracked. Some grinding and/or smoothing occurs in both notches and along the lateral edges. The grinding within each notch is similar to that found on the lateral edges which suggests that this wear may be a result of use or manufacture as opposed to post depositional wear.

Not much is known concerning this type of artifact. Use has been described as a sinker or bolo stone. They are found in central Texas and surrounding areas and have been placed in the Archaic period (Turner and Hester 1985:258-259).

THE BELTON LAKE PERIPHERY AREA (DO#18): LITHIC ANALYSIS

A total of four lithic artifacts was recovered during the survey (DO#18). These artifacts are three identifiable projectile points and one biface. All were recovered from surface contexts.

Projectile Points (N = 3)

Lange (N = 1): A specimen (061-023) assigned to the *Lange* type was recovered. The extreme tips of both barbs are missing; otherwise, it is a complete example. The specimen has a triangular blade with straight edges, the remaining portions of the shoulders indicate they were strongly barbed, and the base is basically rectangular with slightly expanding edges. This description basically follows that of the *Lange* type proposed by Suhm and Jelks (1962:203-204) and Turner and Hester (1985:113). It measures 60.05 mm in length, 27.45 mm maximum width, a basal width of 17.21 mm, and a haft element juncture width of 15.09 mm. The material is a variety of Edwards Chert known as Heiner Lake (Dickens 1992). Some evidence of post manufacture heating is evident on one lateral edge of the stem and adjacent shoulder. The flake pattern exhibits primarily from percussion with some pressure flaking evident along the lateral edges. Several large thinning flakes were removed longitudinally from the base.

Turner and Hester (1985) place this point type in the Late Archaic; however, Prewitt (1981:76, 80-81) places it in the late Middle Archaic, dating 2,600-2,250 B.P. in the San Marcos Phase (Weir (1976:55,117). At Fort Hood, this type has been recorded in several previous surveys (Ensor 1987:277-278, 1988:257, 277).

Pedernales (N = 1): One specimen (061-022) of the *Pedernales* type was recovered. The distal tip is absent resulting from an impact fracture and there is a small notch on one lateral edge. This notch appears to be fortuitous, but some polishing on the dorsal surface suggests possible use-wear. The stem is parallel with a slightly concave base (basal depth 1.41 mm). Characteristic of the type, the base has been thinned by the removal of one large longitudinal thinning flake removed from one face (Bell 1958:72; Turner and Hester 1985:139), and the other side shows several smaller flake scars. The shoulders are prominently barbed, and the blade is triangular with slightly convex edges (both edges exhibit post-depositional damage). The material is a variety of Edwards Chert known as Heiner Lake (Dickens 1992) and has a very glossy appearance resulting from heat treatment.

This type has been assigned to the Middle Archaic period (Turner and Hester 1985) and the Roundrock Phase, ca. 3,400-2,600 B.P. (Prewitt 1981:80; Weir 1976:116). Weir (1976) places the *Pedernales* as the fossil indicator of the Round Rock Phase. It is well represented in previous studies from Fort Hood conducted by the Archaeological Research Laboratory (Ensor 1987:269, 271-274, 1988:257-261, 1991:125; Ensor and Drollinger 1990:186, 192) and in the Fort's collection (Kimbal Smith, personal communication).

Ensor (N = 1): One specimen (061-024) was recovered during the survey. It is complete with the exception of the extreme distal tip. It has a triangular blade with straight edges that are slightly serrated. The serrations are irregular and widely spaced, probably resulting from several re-sharpening episodes. The re-sharpening has also produced a slightly beveled appearance on the blade. The shoulders are slightly barbed and formed by corner notching. The base is expanding and has been thinned by the removal of several large longitudinal flakes. The majority of the point has been heavily pressure flaked removing any evidence of earlier percussion flake scars.

The point is 38.52 mm in length, 18.95 mm in maximum width and a haft element juncture width of 18.95 mm. The material is a variety of Edwards Chert known as Fort Hood Gray (Dickens 1992) and shows no sign of heat treatment.

The *Ensor* has been placed in the Transitional Archaic at ca. 200 B.C.- A.D. 600 or later (Turner and Hester 1985:94). Prewitt (1981:81-82) places it in Weir's (1976:117) Twin Sister Phase of central Texas dating A.D. 200 - 550. This type is well represented from Fort Hood (Ensor 1987:284-86, 1988:260-61, 1991:125-26; Ensor and Drollinger 1990:187-88, 194).

Biface (N = 1)

One biface (061-021) was recovered during the survey. It is an example of a Biface II or secondary bifacial stage of reduction. It is complete except for the extreme distal tip. There is also a modified notch on one lateral edge. The length is 48.82 mm and the maximum width is 25.83 mm. In cross-section, it is strongly plano-convex. The base has been thinned, especially on the plano side, creating a slight beveled appearance. The material is the Fort Hood Gray variety of Edwards Chert, commonly found throughout the post. The surface of the biface is patined a gray-white, but the fractured edges in the notch and on the distal tip are very glossy, indicating evidence for heat treatment.

The biface was apparently selected for use as a scraping tool or possible cutting tool. Along one lateral edge near the distal tip, the edge has been modified by pressure flaking back to an approximate 30° angle from the original edge alignment. This edge is straight and has an edge angle of 44°. The entire edge is smoothed with small micro-flake scars evident on both sides. The smoothing is a bright polish, especially on the tops of the flake scar ridges, suggesting use on wood (Keeley 1980: 35-42). The notch is 12.97 mm wide and 2.32 mm deep.

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APPENDIX IV

HISTORIC MATERIAL CULTURE DISCUSSION

D. K. Kloetzer

THE CANTONMENT AREA (DO#17): HISTORIC ARTIFACT ANALYSIS

Historic artifacts were recovered from four grid squares in the survey of urban areas for the BRAC-91 construction projects at Ft. Hood.

In grid square 16/43 (41BL987), one artifact was recovered (059-001). The opaque white glass sherd is part of a cosmetic jar 2-inches tall with a screw top. The jar is a rounded square shape and has a geometric design embossed on the body. On the base of the jar is the number "5" and the letters "URY" from the end of a word. The former contents of the jar can not be determined, nor can an exact date. The best probable date for the jar is mid-to-late twentieth century.

Grid square 17/42 (41BL995) contained 15 historic artifacts. A metal lid (059-017) 4.25 inches in diameter has the trademark of Oscar Mayer impressed into it and the contents of the can were to be refrigerated. Oscar Mayer was founded in 1883.

There were fifteen glass sherds. Six amber base sherds mend (059-011, 012, 013, 014, 015, 016). The bottle contained alcohol. The bottom of the bottle contains the warning, "FEDERAL LAW FORBIDS SALE OR RE-USE OF THIS BOTTLE," which dates from 1933 to 1964. The makers mark has been used by Thatcher Manufacturing Co. since 1900 (Toulouse 1971:496).

There is a cobalt blue base sherd (059-003) with concentric triangles on the base. There is also one aqua base/body sherd from a bottle (059-002). One clear neck/rim sherd (059-004) is machine-made with a two-part unidentified finish.

There are six sherds of lavender glass which date from 1880-1918 (Deiss 1981:95). Artifact 059-005 is a shoulder/finish sherd from a small bottle. It has a three-part finish and the shoulder is fluted. Another sherd, 059-007, is very similar to artifact 059-005 except it has a two-part finish. Another lavender neck/rim sherd is a small bottle with a patent finish and ball neck (059-006) (Herskovitz 1978: 4-5). One sherd (059-009) is a plain lavender body sherd, 059-008 is a lavender base sherd from a oval shape bottle, and the last lavender sherd (059-010) is a decorative foot sherd.

Grid square 17/42 (41BL996) contained five glass artifacts and one ceramic. One white, yellow, and orange marble, 059-018, measured 9/16 inch in diameter. An aqua base/body sherd (059-023) has at least two recessed panels and is probably a patent medicine bottle. One recessed panel has remains of part of the embossed label, "IN'S", "A", "AND", "MEDY.", confirming that it was a patent medicine bottle. There is one lavender rim sherd (059-022) with an unidentified finish. There are two opaque white glass sherds. One (059-019) is a rim sherd with a screw top. The other opaque white sherd (059-020) is an unidentified vessel type with flat sides; the sherd also has a clear flat glass sherd adhered to it. The ceramic sherd (059-021) is a semi-porcelain commonly used in household objects. It has a dark brown exterior glaze, and the interior has rubber adhered to the surface. The exterior diameter is 5 inches. The sherd is some type of insulated casing.

In grid 17/46 (41BL999), one glass bottle (059-024) was recovered. The bottle is a clear glass half pint flask. The bottle was manufactured by Ball (20th century) (Toulouse 1971:600), and is dated from 1933-1964 because of the "FEDERAL LAW FORBIDS SALE OR RE-USE OF THIS BOTTLE" warning.

THE BELTON LAKE PERIPHERY AREA (DO#18): HISTORIC ARTIFACT ANALYSIS

Historic artifacts were recovered from three grid squares on the Tweedle Mountain and other COE lands in the Belton Lake periphery.

A total of nine artifacts was collected from Grid 36/47 (41BL1008). Five were ceramic artifacts. There was one neckless stoneware jug rim/shoulder sherd with a handle attachment (061-009). The vessel has a gray paste with a Bristol glaze on the exterior and an Albany slip on the interior. Sherd 061-010 is part of a handle, probably from this same vessel or one very similar. There is an ironstone rim sherd (061-011) which is probably from a chamberpot; a handle (061-012) is likely from the same vessel. There is one stoneware marble (061-013). The marble is slightly irregular in shape, but measures 2.5 cm in diameter. There is a aqua body sherd from a round bottle (061-007) with "J. SMITH" "LE, K(Y)" embossed on it. There is one lavender body sherd of pressed glass in a cube design (061-013). There are two sherds of blue depression glass (1930-1940). The pattern is unidentified, but they are probably the same pattern. The base sherd (061-006) consists of cone-shaped appendages. The body sherd (061-005) also has cone-shaped appendages, as well as a series of deep, V-shaped ridges.

In Grid 36/47 (41BL1009), there were three artifacts recovered. One lavender base sherd (061-014) is from a rectangular-shaped bottle with flat chambered corners; the bottle has four recessed panels. It was probably a patent medicine bottle; all that remains of the embossed writing is " _." Another lavender sherd (061-015) appears to be part of a handle. The sherd is hexagonal in cross section, and is a dark lavender color which was probably intentional. One metal artifact (061-016) was recovered. It is probably a knob which would be affixed to the top of a rod; the hole goes completely through the metal object.

There were three isolated finds in grid square 44/49. One ceramic sherd (061-017)(IF#1) is the rim sherd of a jug. The stoneware is a buff body with a light brown interior and a buff salt glaze exterior. The mouth has a flared finish but a straight bore. Another stoneware jug rim/handle sherd (061-019) (IF#2) was found in the grid. It is a buff-bodied stoneware with a buff colored slip. It has a short neck with a straight mouth rim. The final isolated find (IF#3) is a stoneware base/body sherd (061-020) with a tan body and a dark brown slip on the interior and exterior.

There were four artifacts from grid square 45/49 (41BL1003). There is one ironstone base sherd (061-004) with a makers mark from Greenwood China, Trenton, NJ, 1862, 1876. The exact dates for which the mark was used is unknown, but the company is known to have been in business from 1862 to 1933 (Lehner 1980:70). There is one amber bottle neck (061-002) with a one-part bead finish and a mold seam to the rim and around the finish. A complete clear glass bottle was found (061-001). The bottle is 15.3 cm tall and 6.4 cm wide at the base. The bottle is a shoofly-shaped flask (Herskovitz 1978:4). The makers mark "EDBA" is unidentified. There is a green tinted bottle base with a valve mark (1935-1955). On the base is a figure of a "devil" with a number "1" to the right of the figure and "PLUTO" written below. The time period for this is unknown.

Also in grid 45/49 was one isolated find (IF#2). The lavender body/base sherd (061-018) was a bottle which in cross-section is rectangular with round ends; it could possibly be a shoofly-shaped flask. On the base is a unidentified makers mark — a diamond without any letter in it.

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APPENDIX V

PREHISTORIC SITE CODING FORMAT

David L. Carlson and Erwin Roemer, Jr.

FORT HOOD PREHISTORIC SITE CODING FORMAT

ENVIRONMENTAL VARIABLES

TARL: TARL trinomial site number (if available).

FIELD: SITE field number (if available).

EASTQUAD: Quad Easting (southeastern corner of square kilometer, to be read X 1000 m).

NORTHQUAD: Quad Northing (same as above).

PROJECT: Project (most recent). There are nine choices: "FY78," fiscal year 1978; "BS78," "brave shield" sample of 1978; "FY79," fiscal year 1979; "F80S," spring of fiscal year 1980; "F80F," fall of fiscal year 1980; "FY81," fiscal year 1981; "FY82," fiscal year 1982; "FY83," fiscal year 1983; and "FY84," fiscal year 1984.

EASTING: UTM Easting (The most precise location of the site's center, rounded to the nearest 10 m).

NORTHING: UTM Northing (same as above).

DRAINAGE: Drainage. This is the major drainage whose basin contains the site. There are five choices:

1 - Leon River
2 - Owl Creek
3 - Cowhouse Creek
4 - Nolan Creek
5 - Lampasas River

ENV_ZONE: Environmental Zone. This is a broad classification divided into three choices:

1 - Lowland (a zone devised by Fort Hood archaeologists to portray the bottomland associated with perennial and intermittent streams)
2 - Intermediate upland (land higher than the lowland zone, but not including the bedded, massive limestone found in certain portions of Fort Hood)
3 - Upland (the bedded, massive limestone coded "1" on the Engineering Geology maps of Fort Hood)

CRK_CRST: Creek/Crest Classification. This locates a site in nearest relation to a major drainage or a topographic divide separating drainages.

1 - Creek
2 - Crest

LANDFORM: Landform. These are physiographic headings defined by the Fort Hood archaeologists. As a refinement of the Environmental Zone, the initial coding here has been based on notes. Certain categories occasionally overlap to present problems for coders. Also, identification of various terrace types (codes 8-10) was difficult and the general terrace code (7) was used more often. Many sites appear in rather nondescript physiographic settings, and the slope designation (Intermediate Upland, code 15) was common. Because the codes below may be formed into new variables by the computer, divisions such as that between "hillock" and "knoll" can be easily adjusted.

1 - Outlier (may include eroded buttes)
2 - Buttes (cf. Reed Mountain near Quad E24/N52)
3 - Ridge/Plateau (these may be large areas and correspond to bedded massive limestone)
4 - Bench (upland associated)
5 - Spur (upland associated)
6 - Draw (upland associated)

7 - Terrace (see discussion above)
8 - Primary Terrace
9 - Secondary Terrace
10 - Tertiary Terrace
11 - Rudimentary Terrace (usually not visible on maps)
12 - Escarpment Edge (bedded massive limestone escarpments)
13 - Hillock (considered slightly larger than a knoll)
14 - Knoll
15 - Slope (Intermediate Upland, see discussion above)
16 - Interfluvial (type of slope)
17 - Bank (type of slope——on edge of intermittent stream)
18 - Drainage Divide (area between two major watersheds)

POSITION: Position. This locates the site relative to the landform. For example, a site may be at the base of a butte.

1 - Top
2 - Slope
3 - Base

ELEVATION: Elevation (feet).

VEG_ZONE: Vegetation Zone. These categories were interpreted directly from the Environmental Ground Tactical Data Maps of Fort Hood. The numerical codes and titles used here are those of the maps.

1 - Baregrounds
2 - Croplands
3 - Grasslands
4 - Grasslands with scattered trees
5 - Wooded area (0- 25%)
6 - Wooded area (25- 50%)
7 - Wooded area (50- 75%)
8 - Wooded area (75-100%)
9 - Thick brush

P_WATER: Perennial Water. The first (decimal place) number of the codes is equivalent to the major Drainage coding of columns 29-30. Numbers have been added to form series of less perennial drainages which connect to the major drainage. Minor perennial drainages are defined by any occurrence of the solid or long-dashed blue lines indicated on the basic terrain maps of Fort Hood. Intermittent streams and water courses shown by dotted lines are not included.

10 - Leon River
11 - Shoal Creek
20 - Owl Creek (below Preacher's Creek)
21 - Preacher's Creek (below southern edge of quad E29/N57)
22 - Flint Creek (below southern edge of quad E39/N57)
30 - Cowhouse Creek
31 - Brown's Creek (below eastern center of quad E19/N55)
32 - House Creek (below eastern center of quad E19/N55)
33 - Table Rock Creek (western edge of quad E2/N56)
34 - Settlement Branch (tributary of Table Rock, below center of quad E0/N53)
35 - Bee House Creek (west of Fort Hood near quad E6/N61)
36 - Stampede Creek
37 - Tributary to Stampede Creek
38 - Two Year Old Creek
39 - Waddle Hollow
40 - Nolan Creek
41 - North Nolan Creek (below stock tank in quad E31/N47)

42 - South Nolan Creek (below quad E19/N43)
43 - Tributary of South Nolan Creek (below quad E19/N43)
50 - Lampasas River
51 - Clear Creek (below northeastern corner of quad E5/N31)
52 - Reese Creek (below southern edge of quad E16/N32)
60 - Cottonwood Creek
61 - Unnamed tributary to Cottonwood Creek

DIST_P_W: Distance to Perennial Water (m). This is a straight measurement in meters from the site to the nearest perennial water, using the same drainages offered above. Note that the nearest perennial water is not always the drainage basin that contains the site.

N_WATER: Nearest Water (m). Drainages as above (perennial water), or:

1 - Intermittent Creek (shown by orange dotted lines on the basic terrain maps of Fort Hood)
2 - Spring

Many sites are near intermittent creeks (1) which are very minor watercourses, normally dry.

DIST_N_W: Distance to Nearest Water (m). This is a measurement to the drainage identified as nearest water.

AREA: Area (square meters, obtained from site records)

EXPOSURE: Exposure. Coded or commented on in site records, this is an assessment of the site's ground cover and visibility.

1 - Poor
2 - Fair
3 - Good

CONDITN: Condition. An assessment of the site's condition was coded from the most recent field notes.

1 - Destroyed
2 - Poor
3 - Fair
4 - Good
5 - Excellent

PCT_DIST: % Disturbed. This is a judgmental assessment made by the field recorders.

SLOPE: Slope. The basic terrain maps of Fort Hood provide a ground slope classification of six choices:

1 - 0- 3% (basically flat)
2 - 3- 10%
3 - 10- 30%
4 - 30- 45%
5 - 45-100%
6 - 100+%

TYPE: Site Type. The most appropriate qualitative label is coded here for prehistoric or historic sites. The coding here is presently incomplete but will have great importance for the study of site functions. To allow for future categories, the prehistoric series begins at zero, and historic sites begins with 50.

0 - Unknown
1 - Cave
2 - Rockshelter
3 - Petroglyph
4 - Pictograph

5 - Midden
6 - Burned rock scatter with no lithics
7 - Burned rock scatter with lithics
8 - Single burned rock mound
9 - Multiple burned rock mounds
10 - Lithic scatter (chipping debris)
11 - Lithic quarry (on-site lithic resources)

CULTURAL VARIABLES

FIELD: Site Field Number

FEATURE: Features Present:

1 - Slab hearth
2 - Burned rock midden
3 - Burned rock hearth
4 - Burned clay hearth
5 - Shell concentrations
6 - Rock cairn
7 - Numbers 3 and 5 above
8 - "Wall"/windbreak
9 - Midden associated with rock shelter

CHARCOAL: Charcoal
0 - Absent
1 - Present

BONE: Bone
0 - Absent
1 - Present

SHELL: Shell
0 - Absent
1 - Present

DENSITY: Artifact Density
0 - None
1 - Low
2 - Medium
3 - High

B_ROCK: Burned Rock
0 - Absent
1 - Light
2 - Medium
3 - Heavy

FLAKES: Flakes
0 - Absent
1 - Present

CHIPS: Chips
0 - Absent
1 - Present

B_TYPE1: Biface Type 1

0 - Absent
1 - Present

B_TYPE2: Biface Type 2
0 - Absent
1 - Present

B_TYPE3: Biface Type 3
0 - Absent
1 - Present

BORER: Borer
0 - Absent
1 - Present

B_SCRAPR: Biface Scraper
0 - Absent
1 - Present

MOD_BIF: Other Modified Biface
0 - Absent
1 - Present

DART: Dart Point
0 - Absent
1 - Present

ARROW: Arrow Point
0 - Absent
1 - Present

BLANK: Blank
0 - Absent
1 - Present

RE_FLAKE: Flake with Retouch
0 - Absent
1 - Present

R_BLADE: Blade with Retouch
0 - Absent
1 - Present

S_SCRAPR: Side Scraper
0 - Absent
1 - Present

E_SCRAPR: End Scraper
0 - Absent
1 - Present

GRAVER: Graver
0 - Absent
1 - Present

BURIN: Burin
0 - Absent
1 - Present

OTHER_UN: Other Uniface
0 - Absent
1 - Present

CORE: Core
0 - Absent
1 - Present

HAMMER: Hammer
0 - Absent
1 - Present

CHOPPER: Chopper
0 - Absent
1 - Present

MANO: Mano
0 - Absent
1 - Present

METATE: Metate
0 - Absent
1 - Present

GRO_STON: Other Ground Stone
0 - Absent
1 - Present

INTERVAL: Number of 5 m Sampling Intervals

DEBITAGE: Debitage Count (total)

TOOLS: Tool Count (total)

ECOFACTS: Ecofact Count (total)

B_ROCK: Burned Rock
0 - Absent
1 - Present, light
2 - Present, heavy

NOTE: Code as light if burned rock present in any location. Code as heavy only if heavy is the modal value for the transect.

CHRONOLOGICAL COMPONENTS

For each possible component leave blank if the component is not represented at the site. If the component is present, code the number of diagnostics from the site which indicate this time period.

PALEO: Paleo-Indian

ARCHAIC: General Archaic

E_ARCH: Early Archaic

M_ARCH: Middle Archaic

L_ARCH: Late Archaic

T_ARCH: Terminal Archaic

L_PREHIS: Late Prehistoric

AUSTIN: Austin Phase

TOYAH: Toyah Phase

ML_ARCH: Middle to Late Archaic

SITE ATTRIBUTES

If a particular attribute or feature is not present on the site, leave the field blank. If it is present, code 1 for present/absent attributes (e.g., lithic scatter and lithic procurement) and the number of features for the others (e.g., the number of mounds or rockshelters).

LITHIC_S: Scatter of lithic debitage

BROCK_S: Scatter of burned rock

ROCKSH: Rockshelter or cave

LITHIC_P: Evidence of lithic procurement or lithic resources are available on or adjacent to the site

SPRING: Spring nearby

MIDDEN: Cultural midden (e.g., burned rock, charcoal, ash, bone)

APPENDIX VI
HISTORIC SITE CODING FORMAT

Shawn Bonath Carlson

FORT HOOD HISTORIC SITE CODING FORMAT

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39 - Waddle Hollow
40 - Nolan Creek
41 - North Nolan Creek (below stock tank in quad E31/N47)
42 - South Nolan Creek (below quad E19/N43)

43 - Tributary of South Nolan Creek (below quad E19/N43)
50 - Lampasas River
51 - Clear Creek (below northeastern corner of quad E5/N31)
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N_WATER: Nearest Water (m). Drainages as above (perennial water), or:

1 - Intermittent Creek (shown by orange dotted lines on the basic terrain maps of Fort Hood)
2 - Stock Tank
3 - Spring

Many sites are near intermittent creeks (1) which are very minor watercourses, normally dry.

DIST_N_W: Distance to Nearest Water (m). This is a measurement to the drainage identified as nearest water.

AREA: Area (square meters, obtained from site records).

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SLOPE: Slope. The basic terrain maps of Fort Hood provide a ground slope classification of six choices:

1 - 0- 3% (basically flat)
2 - 3- 10%
3 - 10- 30%
4 - 30- 45%
5 - 45-100%
6 - 100+%

TYPE: Site Type. The most appropriate qualitative label is coded here for prehistoric or historic sites. The coding here is presently incomplete but will have great importance for the study of site functions. To allow for future categories, the prehistoric series begins at zero, and historic sites begins with 50.

50 - Unknown Historic
51 - Cemetery
52 - Farm/Ranch
53 - Town
54 - Cattle Dip Tank
55 - Cistern
56 - Cattle Water Tank
57 - Well
58 - Bridge
59 - Dump
60 - Domestic Dwelling
61 - Windmill
62 - Carvings in Rock
63 - Dam
64 - School
65 - Springhouse
66 - Mill
67 - Cattle Water Trough

CULTURAL VARIABLES

TARL: TARL trinomial site number

FIELD: Site field number

DENSITY: Density. Quantity of cultural material present.

0 - None
1 - Low
2 - Medium
3 - High

Chronological Period based on the site form and the evaluation of the survey team.

UNKNOWN: Unknown
0 - Absent
1 - Present

MIDDLE: Middle-nineteenth Century
0 - Absent
1 - Present

LATE: Late-nineteenth Century
0 - Absent
1 - Present

L_EARLY: Late-nineteenth/Early-twentieth Century
0 - Absent
1 - Present

EARLY: Early-twentieth Century
0 - Absent
1 - Present

DEP_P: Depression Period
0 - Absent
1 - Present

MILITARY: Military Period
0 - Absent
1 - Present

Ceramics observed on the site

C_EWARE: Coarse Earthenware
0 - Absent
1 - Present

UND_WW: Undecorated Whiteware
0 - Absent
1 - Present

DEC_WW: Decorated Whiteware
0 - Absent
1 - Present

STWARE: Stoneware
0 - Absent
1 - Present

PORCELN: Porcelain
0 - Absent
1 - Present

M_MARK: Maker's Mark
0 - Absent
1 - Present

PIPES: Tobacco Pipes
0 - Absent
1 - Present

C_TOYS: Ceramic Toys
0 - Absent
1 - Present

OTHER_C: Other Ceramics
0 - Absent
1 - Present

Glass observed on the site

BOT_GL: Bottle Glass
0 - Absent
1 - Present

BR_W_BOT: Brandy/Whiskey Bottles
0 - Absent
1 - Present

CANJAR: Canning Jars
0 - Absent
1 - Present

C_CREM: Cold Cream Jars
0 - Absent
1 - Present

CON_JAR: Condiment Jars/Bottles
0 - Absent
1 - Present

DEP_GL: Depression Glass
0 - Absent
1 - Present

KER_LAM: Kerosene Lamp Parts
0 - Absent
1 - Present

MED_BOT: Medicine Bottles
0 - Absent
1 - Present

LAV_GL: Lavender Glass
0 - Absent
1 - Present

SNUFF: Snuff Bottles
0 - Absent
1 - Present

TAB_WAR: Tableware
0 - Absent
1 - Present

OTHER_GL: Other Glass
0 - Absent
1 - Present

Metal observed on the site

BAR_HOOP: Barrel Hoops
0 - Absent
1 - Present

BUCKET: Buckets
0 - Absent
1 - Present

CAR: Car Parts
0 - Absent
1 - Present

CHAINS: Chains
0 - Absent
1 - Present

CLOTHING: Clothing Items
0 - Absent
1 - Present

FARM_MAC: Farm Machinery
0 - Absent
1 - Present

GUNS: Guns/Gun Parts
0 - Absent
1 - Present

H-TOOLS: Hand Tools
0 - Absent
1 - Present

HORSE: Horse Hardware
0 - Absent
1 - Present

HOUSEHLD: Household Goods
0 - Absent
1 - Present

PLOW: Plow Parts
0 - Absent
1 - Present

TINCAN: Tin Cans
0 - Absent
1 - Present

M_TOYS: Metal Toys
0 - Absent
1 - Present

TRACTOR: Tractor Parts
0 - Absent
1 - Present

WASHTUB: Washtubs
0 - Absent
1 - Present

OTHER_M: Other Metal
0 - Absent
1 - Present

Building material observed on the site

BRICKS: Bricks
0 - Absent
1 - Present

BRICK_MM: Brick with Maker's Mark
0 - Absent
1 - Present

FLAT_GL: Flat Glass
0 - Absent
1 - Present

FOUND_M: Foundation Material
0 - Absent
1 - Present

STR_HRDW: Structural Hardware
0 - Absent
1 - Present

TILES: Tiles
0 - Absent
1 - Present

ROOFING: Roofing Materials
0 - Absent
1 - Present

OTHER_B: Other Building Material
0 - Absent
1 - Present

Miscellaneous materials observed on the site

LEATHER: Leather
0 - Absent
1 - Present

PLAST: Plastic
0 - Absent
1 - Present

RUBBER: Rubber
0 - Absent
1 - Present

MORTAR: Mortar
0 - Absent
1 - Present

WINDMILL: Windmill Parts
0 - Absent
1 - Present

Features observed on

BRIDGE: Bridge
0 - Absent
1 - Present

CHIMNEY: Chimney Fall/Hearth
0 - Absent
1 - Present

CISTERN: Cistern
0 - Absent
1 - Present

PIER: Concrete Piers
0 - Absent
1 - Present

SLAB: Concrete Slab
0 - Absent
1 - Present

CTANK: Concrete Water Tank
0 - Absent
1 - Present

CORRAL: Corral
0 - Absent
1 - Present

DEPRESS: Depression
0 - Absent
1 - Present

DIPTANK: Dip Tank
0 - Absent
1 - Present

TREES: Domestic Vegetation
0 - Absent
1 - Present

STRUC: Extant Structure
0 - Absent
1 - Present

FENCE: Fence
0 - Absent
1 - Present

FOUND: Foundations
0 - Absent
1 - Present

STONES: Paving Stones
0 - Absent
1 - Present

CELLAR: Root Cellar
0 - Absent
1 - Present

RUBBLE: Rubble
0 - Absent
1 - Present

ETANK: Earthen Stock Tank
0 - Absent
1 - Present

WALL: Stone Wall
0 - Absent
1 - Present

TROUGH: Trough
0 - Absent
1 - Present

WELL: Well
0 - Absent
1 - Present

F_WINDML: Windmill
0 - Absent
1 - Present

F_OTHER: Other Features
0 - Absent
1 - Present

APPENDIX VII

ENVIRONMENTAL AND CULTURAL DATA BY SITE

Ben W. Olive

Historic Sites Recorded in The Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No.	Field No.	Lavender Bottles	Medicine Bottles	Milk Glass Lid-liner	Softdrink Bottles	Snuff Bottles	Tableware	Farm Machinery	Other Glass	Barrel Hoop	Buckets	Car Parts	Chains	Clothing Items
Cantonment Area (DO#17)														
41BL987	6000	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	present	absent	absent
41BL992	6005	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL995	6008	present	present	present	absent	absent	present	absent	absent	absent	absent	absent	absent	present
41BL996	6009	present	absent	absent	absent	absent	absent	absent	absent	absent	present	present	absent	absent
41BL999	6012	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
Belton Lake Periphery Area (DO#18)														
41BL1000	6013	present	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1003	6016	absent	present	present	absent	absent	absent	absent	present	absent	present	present	absent	absent
41BL1007	6020	absent	absent	absent	absent	absent	absent	absent	absent	absent	present	absent	absent	absent
41BL1008	6021	present	absent	absent	absent	absent	absent	absent	present	absent	absent	present	absent	absent
41BL1009	6022	present	present	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	absent

Historic Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No	Field No.	Guns and Gun Parts	Hand Tools	Horse Hardware	Household Goods	Plow Parts	Tin Cans	Metal Toys	Tractor Parts	Washtub	Other Metal	Bricks
Cantonment Area (DO#17)												
41BL987	6000	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	present
41BL992	6005	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL995	6008	absent	absent	absent	absent	absent	present	absent	present	absent	absent	absent
41BL996	6009	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent
41BL999	6012	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
Belton Lake Periphery Area (DO#18)												
41BL1000	6013	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	absent
41BL1003	6016	absent	absent	absent	absent	absent	present	present	absent	present	present	absent
41BL1007	6020	absent	absent	absent	absent	absent	present	absent	absent	present	present	absent
41BL1008	6021	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent
41BL1009	6022	present	absent	absent	absent	absent	present	absent	absent	absent	present	absent

Historic Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No.	Field No.	Brick with Maker's Mark	Flat Glass	Foundation Material	Structural Hardware	Tiles	Tin Roofing Materials	Other Building Materials	Graphite	Wooden Building Materials
Cantonment Area (DO#17)										
41BL987	6000	absent	present	present	present	absent	present	absent	absent	absent
41BL992	6005	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL995	6008	absent	present	absent	absent	absent	present	absent	absent	absent
41BL996	6009	present	present	present	absent	present	present	absent	absent	absent
41BL999	6012	absent	absent	absent	present	absent	absent	absent	absent	absent
Belton Lake Periphery Area (DO#18)										
41BL1000	6013	absent	present	present	present	absent	present	present	absent	absent
41BL1003	6016	absent	absent	absent	absent	absent	present	absent	absent	absent
41BL1007	6020	absent	absent	present	present	absent	present	absent	absent	absent
41BL1008	6021	absent	absent	present	present	absent	present	present	absent	absent
41BL1009	6022	absent	present	present	present	absent	present	present	absent	absent

Historic Sites Recorded in The Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No.	Field No.	Leather	Plastic	Rubber	Plaster	Windmill Parts	Bridge	Chimney Fall/ Hearth	Cistern	Concrete Foundation Pier	Concrete Foundation Slab	Concrete Water Tank
Cantonment Area (DO#17)												
41BL987	6000	absent	absent	present	absent	absent	absent	absent	absent	absent	present	absent
41BL992	6005	absent	absent	absent	absent	absent	absent	absent	absent	present	absent	absent
41BL995	6008	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL996	6009	absent	present	absent	absent	absent	absent	absent	absent	present	absent	absent
41BL999	6012	absent	absent	absent	absent	absent	absent	absent	present	absent	absent	absent
Belton Lake Periphery Area (DO#18)												
41BL1000	6013	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1003	6016	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1007	6020	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1008	6021	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1009	6022	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent

Historic Sites Recorded in The Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No.	Field No.	Corral	Depression	Dip Tank	Domestic Vegetation	Extant Structure	Fence	Foundations Stones	Paving	Root Celler	Rubble	Stock Tank	Stone Wall
Cantonment Area (DO#17)													
41BL987	6000	absent	X	absent	absent	absent	absent	present	absent	absent	present	absent	absent
41BL992	6005	absent	X	absent	absent	absent	absent	absent	absent	absent	absent	absent	
41BL995	6008	absent	X	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL996	6009	absent	X	absent	absent	absent	absent	present	absent	absent	present	absent	absent
41BL999	6012	absent	X	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
Belton Lake Periphery Area (DO#18)													
41BL1000	6013	absent	X	absent	absent	absent	absent	present	absent	absent	absent	absent	absent
41BL1003	6016	absent	X	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1007	6020	absent	X	absent	absent	absent	absent	present	absent	absent	absent	absent	absent
41BL1008	6021	absent	X	absent	absent	absent	absent	present	absent	absent	absent	absent	absent
41BL1009	6022	absent	X	absent	absent	absent	absent	present	absent	absent	absent	absent	absent

Historic Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No	Field No.	Water Tank	Well	Windmill	Other Features	Butchered bones
Cantonment Area (DO#17)						
41BL987	6000	absent	absent	absent	absent	absent
41BL992	6005	absent	absent	absent	absent	absent
41BL995	6008	absent	absent	absent	absent	absent
41BL996	6009	absent	absent	absent	absent	absent
41BL999	6012	absent	absent	absent	absent	absent
Belton Lake Periphery Area (DO#18)						
41BL1000	6013	absent	absent	absent	present	absent
41BL1003	6016	absent	absent	absent	absent	absent
41BL1007	6020	absent	absent	absent	present	absent
41BL1008	6021	absent	absent	absent	absent	absent
41BL1009	6022	absent	absent	absent	absent	absent

Historic Sites Recorded in The Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Environmental Information).

TARL No.	Field No.	East Quad	North Quad	UTM Easting	UTM Northing	Drainage	Environmental Zone	Creek/Crest	Landform
Cantonment Area (DO#17)									
41BL987	6000	16	43	16084	43365	Nolan Creek	Intermediate Upland	Crest	General Slope
41BL992	6005	19	43	19330	43330	Nolan Creek	Lowland	Creek	Primary Terrace
41BL995	6008	17	42	17193	42948	Nolan Creek	Intermediate Upland	Crest	Knoll
41BL996	6009	17	42	17797	42806	Nolan Creek	Intermediate Upland	Crest	Bench
41BL999	6012	17	46	17443	46924	Cowhouse Creek	Intermediate Upland	Crest	Knoll
Belton Lake Periphery Area (DO#18)									
41BL1000	6013	44	46	44860	46155	Leon River	Intermediate Upland	Crest	Bench
41BL1003	6016	45	49	45570	49129	Leon River	Upland Interfluvial	Crest	Plateau
41BL1007	6020	36	47	36193	47038	Cowhouse Creek	Upland Interfluvial	Creek	Draw
41BL1008	6021	36	47	36069	47307	Cowhouse Creek	Intermediate Upland	Creek	Bench
41BL1009	6022	36	47	36040	47403	Cowhouse Creek	Intermediate Upland	Crest	Bench

Historic Sites Recorded in The Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Environmental Information).

TARL No.	Field No.	Position	Elevation	Vegetation Zone	Perennial Water	Distance to Perennial Water	Nearest Water	Distance to Nearest Water
Cantonment Area (DO#17)								
41BL987	6000	Top	955	Grasslands	Nolan Creek	1060	S. Nolan Creek	30
41BL992	6005	Top	835	Grasslands	Nolan Creek	?	S. Nolan Creek	0
41BL995	6008	Top	890	Grasslands	Nolan Creek	?	S. Nolan Creek	200
41BL996	6009	Top	890	Grasslands	Nolan Creek	?	S. Nolan Creek	200
41BL999	6012	Slope	1000	Grasslands	Cowhouse Creek	?	Unamed Trib.	1700
Belton Lake Periphery Area (DO#18)								
41BL1000	6013	Top	600	Grassland with occasional juniper and live oak	Former Leon R. Chann	300	Former Leon R. Cha	300
41BL1003	6016	Slope	655	Wooded Area, 75-100%	Former Leon R. Chann	850	Former Leon R. Cha	850
41BL1007	6020	Bottom	605	Grasslands, oak juniper, hackberry, and dewberry	Cowhouse Creek	550	Cowhouse Creek	550
41BL1008	6021	Slope	615	Mixed hardwoods, shrubs, juniper and cat-claw	Cowhouse Creek	250	Cowhouse Creek	250
41BL1009	6022	Top	625	Juniper, Oaks, Grasses	Cowhouse Creek	200	Cowhouse Creek	200

Prehistoric Sites Recorded in The Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No.	Field No.	Features Present	Charcoal	Bone	Shell	Density	Burned Rock	Flakes	Chips	Biface Type I	Biface Type II	Biface Type III
Cantonment Area (DO#17)												
41BL988	6001	None	absent	absent	absent	Low	Light	present	absent	absent	absent	absent
41BL989	6002	None	absent	absent	absent	Low	Light	present	absent	present	present	present
41BL990	6003	None	absent	absent	absent	Low	Light	present	present	present	absent	absent
41BL991	6004	None	absent	absent	absent	Low	Light	present	present	absent	absent	absent
41BL993	6006	None	absent	absent	absent	Medium	Light	present	present	present	present	absent
41BL994	6007	None	absent	absent	absent	Medium	Light	present	present	absent	present	absent
41BL997	6010	None	absent	absent	absent	Low	Light	present	absent	absent	absent	present
41BL998	6011	None	absent	absent	absent	Low	Light	present	present	absent	absent	absent
Belton Lake Periphery Area (DO#18)												
41BL1001	6014	None	absent	absent	absent	Low	Light	present	absent	present	absent	absent
41BL1002	6015	None	absent	absent	absent	Medium	Absent	present	present	absent	absent	absent
41BL1004	6017	None	absent	absent	absent	High	Light	present	present	absent	absent	absent
41BL1005	6018	None	absent	absent	present	High	Light	present	present	absent	present	absent
41BL1006	6019	None	absent	absent	absent	High	Absent	present	present	absent	absent	absent
41BL1010	6023	None	absent	absent	absent	Medium	?	present	present	absent	absent	absent
41BL1011	6024	None	absent	absent	present	High	Medium	present	present	present	absent	absent
41BL1012	6025	None	absent	absent	present	Medium	Medium	present	absent	absent	absent	absent
41BL1013	6026	None	absent	absent	present	High	Light	present	present	absent	absent	absent
41BL1014	6027	Shell Midden	absent	absent	present	High	Light	present	present	present	present	absent
41BL1015	6028	None	absent	absent	absent	Medium	Absent	present	present	absent	absent	absent
41BL1016	6029	None	absent	absent	absent	Medium	Absent	present	present	present	absent	absent
41BL1017	6030	Shell Midden	absent	absent	present	Low	Light	present	absent	present	present	present
41BL1018	6031	None	absent	absent	absent	Medium	Light	present	absent	absent	absent	absent
41BL1019	6032	Shell Midden	absent	absent	present	Low	Absent	present	present	absent	absent	absent
41BL1020	6033	Shell Midden	absent	absent	present	Medium	Absent	present	present	absent	absent	absent
41BL1021	6034	Shell Midden	absent	absent	present	High	Absent	present	present	absent	absent	absent
41BL1022	6035	None	absent	absent	absent	Medium	Light	present	present	present	absent	absent
41BL1023	6036	None	?	?	?	?	?	?	?	?	?	?
41BL1024	6037	None	?	?	?	?	?	?	?	?	?	?
41BL1025	6038	None	?	?	?	?	?	?	?	?	?	?
41BL1026	6039	None	?	?	?	?	?	present	absent	?	?	?
41BL1027	6040	None	?	?	present	?	present	present	absent	?	?	?
41BL1028	6041	None	?	?	present	?	?	?	?	?	?	?
41BL1029	6042	None	?	?	?	?	?	?	?	?	?	?
41BL1030	6043	None	?	?	?	?	?	?	?	?	?	?
41BL1031	6044	None	?	?	?	?	?	present	present	?	?	?
41BL1032	6045	None	?	?	?	?	?	?	?	?	?	?
41BL1033	6046	None	?	?	present	Low	?	present	?	?	?	?
41BL1034	6047	None	?	?	present	Low	?	present	?	?	?	?
41BL1035	6048	None	?	?	present	Low	?	present	?	?	?	?
41BL1036	6049	None	?	?	present	Low	?	present	?	?	?	?

Prehistoric Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No.	Field No.	Borer	Biface Scraper	Other Modified Bifaces	Dart Points	Arrow Points	Blanks	Flake w/ Retouch	Blade w/ Retouch	Side Scraper	End Scraper	Graver	Burin	Other Unifaces	Core
Cantonment Area (DO#17)															
41BL988	6001	absent	absent	absent	absent	absent	absent	present	absent	absent	present	present	absent	absent	present
41BL989	6002	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	absent	absent	absent	present
41BL990	6003	absent	absent	absent	absent	absent	absent	absent	absent	absent	present	absent	absent	absent	absent
41BL991	6004	absent	absent	absent	present	absent	absent	present	absent	absent	absent	absent	absent	absent	present
41BL993	6006	absent	absent	absent	absent	absent	absent	present	absent	present	present	absent	absent	absent	present
41BL994	6007	absent	absent	absent	absent	absent	absent	present	absent	present	absent	absent	absent	absent	present
41BL997	6010	absent	absent	absent	absent	absent	absent	present	absent	present	absent	absent	absent	absent	absent
41BL998	6011	absent	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	absent
Belton Lake Periphery Area (DO#18)															
41BL1001	6014	absent	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	present
41BL1002	6015	absent	absent	absent	absent	absent	absent	present	absent	absent	present	absent	absent	absent	absent
41BL1004	6017	absent	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	present
41BL1005	6018	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent	absent	absent	present
41BL1006	6019	absent	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	present
41BL1010	6023	absent	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent	absent	present
41BL1011	6024	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent	absent	absent	present
41BL1012	6025	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1013	6026	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1014	6027	absent	absent	absent	present	absent	present	present	present	absent	present	present	absent	absent	present
41BL1015	6028	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent	absent	absent	present
41BL1016	6029	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent	absent	absent	present
41BL1017	6030	absent	absent	absent	absent	absent	present	present	absent	present	absent	absent	absent	absent	present
41BL1018	6031	absent	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	present
41BL1019	6032	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	present
41BL1020	6033	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
41BL1021	6034	absent	absent	absent	absent	absent	absent	present	absent	absent	absent	absent	absent	absent	absent
41BL1022	6035	absent	absent	absent	absent	absent	present	present	absent	absent	absent	absent	absent	absent	present
41BL1023	6036	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1024	6037	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1025	6038	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1026	6039	x	x	x	x	x	x	x	x	x	x	x	x	x	present
41BL1027	6040	x	x	x	x	x	x	x	x	x	x	x	x	x	present
41BL1028	6041	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1029	6042	x	x	x	x	x	x	present	x	x	x	x	x	x	present
41BL1030	6043	x	x	x	x	x	x	present	x	x	x	x	x	x	present
41BL1031	6044	x	x	x	x	x	x	present	x	x	x	x	x	x	present
41BL1032	6045	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1033	6046	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1034	6047	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1035	6048	x	x	x	x	x	x	x	x	x	x	x	x	x	x
41BL1036	6049	x	x	x	x	x	x	x	x	x	x	x	x	x	

Prehistoric Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Cultural Information).

TARL No.	Field No.	Hammerstone	Chopper	Mano	Metate	Other Ground Stone	Debitage Count	Tool Count	Ecofact Count
Cantonment Area (DO#17)									
41BL988	6001	absent	absent	absent	absent	absent	0	0	0
41BL989	6002	absent	absent	absent	absent	absent	0	1	0
41BL990	6003	absent	absent	absent	absent	absent	0	0	0
41BL991	6004	absent	absent	absent	absent	absent	0	2	0
41BL993	6006	absent	present	absent	absent	absent	0	1	0
41BL994	6007	absent	absent	absent	absent	absent	0	0	0
41BL997	6010	absent	absent	absent	absent	absent	0	0	0
41BL998	6011	absent	absent	absent	absent	absent	0	0	0
Belton Lake Periphery Area (DO#18)									
41BL1001	6014	present	absent	absent	absent	absent	0	0	0
41BL1002	6015	absent	absent	absent	absent	absent	0	0	0
41BL1004	6017	present	absent	absent	absent	absent	0	1	0
41BL1005	6018	absent	absent	absent	absent	absent	0	0	0
41BL1006	6019	present	absent	absent	absent	absent	0	0	0
41BL1010	6023	absent	absent	absent	absent	absent	0	0	0
41BL1011	6024	absent	present	absent	absent	absent	0	0	0
41BL1012	6025	absent	absent	absent	absent	absent	0	0	0
41BL1013	6026	absent	absent	absent	absent	absent	0	0	0
41BL1014	6027	present	absent	absent	absent	absent	0	1	0
41BL1015	6028	present	absent	absent	absent	absent	0	0	0
41BL1016	6029	absent	absent	absent	absent	absent	0	0	0
41BL1017	6030	absent	present	absent	absent	absent	0	0	0
41BL1018	6031	absent	present	absent	absent	absent	0	0	0
41BL1019	6032	absent	absent	absent	absent	absent	0	0	0
41BL1020	6033	absent	absent	absent	absent	absent	1	0	0
41BL1021	6034	absent	absent	absent	absent	absent	0	0	0
41BL1022	6035	absent	absent	absent	absent	absent	0	0	0
41BL1023	6036	?	?	?	?	?	0	0	0
41BL1024	6037	?	?	?	?	?	0	0	0
41BL1025	6038	?	?	?	?	?	0	0	0
41BL1026	6039	?	?	?	?	?	0	0	0
41BL1027	6040	?	?	?	?	?	0	0	0
41BL1028	6041	?	?	?	?	?	0	0	0
41BL1029	6042	?	?	?	?	?	0	0	0
41BL1030	6043	?	?	?	?	?	0	0	0
41BL1031	6044	?	?	?	?	?	0	0	0
41BL1032	6045	?	?	?	?	?	0	0	0
41BL1033	6046	?	?	?	?	?	0	0	0
41BL1034	6047	?	?	?	?	?	0	0	0
41BL1035	6048	?	?	?	?	?	0	0	0
41BL1036	6049	?	?	?	?	?	0	0	0

Prehistoric Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Environmental Information).

TARL No.	Field No.	Quad Easting	Quad Northing	Project	UTM Easting	UTM Northing	Drainage	Environmental Zone	Creek/Crest	Landform
Cantonment Area (DO#17)										
41BL988	6001	17	43	?	17091	43240	Nolan Creek	Intermediate Upland	Creek	General Slope
41BL989	6002	18	43	?	18220	43047	Nolan Creek	Lowland	Creek	Tertiary Terrace
41BL990	6003	18	43	?	19747	43912	Nolan Creek	Intermediate Upland	Creek	General Slope
41BL991	6004	19	43	?	19394	43424	Nolan Creek	Lowland	Creek	Bank
41BL993	6006	18	43	?	18146	43820	Nolan Creek	Lowland/Interm. Upl	Creek	Prim. Terr./Slope
41BL994	6007	17	42	?	17191	42938	Nolan Creek	Intermediate Upland	Crest	Knoll
41BL997	6010	17	42	?	17726	42814	Nolan Creek	Intermediate Upland	Crest	Bench
41BL998	6011	17	46	?	17530	46969	Nolan Creek	Intermediate Upland	Crest	Knoll
Belton Lake Periphery Area (DO#18)										
41BL1001	6014	44	46	?	44803	46099	Leon River	Intermediate Upland	Crest	Bench
41BL1002	6015	43	46	?	43803	46624	Leon River	Upland Interfluvial	Crest	Ridge/Plateau
41BL1004	6017	45	49	?	45657	49301	Leon River	Upland Interfluvial	Crest	Plateau
41BL1005	6018	44	49	?	44819	49063	Leon River	Upland Interfluvial	Crest	Plateau
41BL1006	6019	45	49	?	45049	49332	Leon River	Upland Interfluvial	Crest	Plateau
41BL1010	6023	36	47	?	36461	47072	Cowhouse Creek	Intermediate Upland	Crest	Hillock/Slope
41BL1011	6024	36	47	?	36076	47389	Cowhouse Creek	Upland Interfluvial	Crest	Hillock
41BL1012	6025	43	48	?	43175	48728	Leon River	Upland Interfluvial	Crest	Escarpment Edge
41BL1013	6026	44	48	?	44626	48706	Leon River	Upland Interfluvial	Crest	Escarpment Edge
41BL1014	6027	44	49	?	44657	49476	Leon River	Upland Interfluvial	Crest	Plateau/Draw
41BL1015	6028	44	49	?	44436	49548	Leon River	Upland Interfluvial	Crest	Plateau
41BL1016	6029	44	49	?	44196	49419	Leon River	Upland Interfluvial	Crest	Plateau/Cliff
41BL1017	6030	45	48	?	45158	48804	Leon River	Upland Interfluvial	Crest	Plateau
41BL1018	6031	45	48	?	45301	48992	Leon River	Upland Interfluvial	Crest	Plateau
41BL1019	6032	43	49	?	43980	49327	Leon River	Upland Interfluvial	Crest	Plateau/Esc. Edge
41BL1020	6033	43	48	?	43985	48947	Leon River	Upland Interfluvial	Crest	Plateau/Slope/Drw
41BL1021	6034	43	48	?	43880	48925	Leon River	Upland Interfluvial	Crest	Plateau
41BL1022	6035	45	48	?	45682	48947	Leon River	Upland Interfluvial	Crest	Plateau
41BL1023	6036	43	48	?	?	?	Leon River	Upland Interfluvial	?	Cliff
41BL1024	6037	43	48	?	?	?	Leon River	Upland Interfluvial	?	Cliff
41BL1025	6038	44	48	?	?	?	Leon River	Upland Interfluvial	?	Cliff
41BL1026	6039	45	48	?	?	?	Leon River	Upland Interfluvial	?	Plateau
41BL1027	6040	45	48	?	?	?	Leon River	Upland Interfluvial	?	Plateau
41BL1028	6041	45	49	?	?	?	Leon River	Upland Interfluvial	?	Plateau
41BL1029	6042	45	49	?	?	?	Leon River	Upland Interfluvial	?	Plateau
41BL1030	6043	45	49	?	?	?	Leon River	Upland Interfluvial	?	Plateau
41BL1031	6044	44	49	?	?	?	Leon River	Upland Interfluvial	?	Plateau
41BL1032	6045	43	49	?	?	?	Leon River	Upland Interfluvial	?	Cliff
41BL1033	6046	43	46	?	?	?	Cowhouse Creek	Upland Interfluvial	?	Cliff
41BL1034	6047	43	46	?	?	?	Cowhouse Creek	Upland Interfluvial	?	Cliff
41BL1035	6048	43	46	?	?	?	Cowhouse Creek	Upland Interfluvial	?	Cliff
41BL1036	6049	43	46	?	?	?	Cowhouse Creek	Upland Interfluvial	?	Cliff

Prehistoric Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Environmental Information).

TARL No.	Field No.	Position	Elevation	Vegetation Zone	Perennial Water	Distance to Perennial Water (in meters)	Nearest Water	Distance to Nearest Water (in meters)
Cantonment Area (DO#17)								
41BL988	6001	Slope	900	Grasslands	Nolan Creek	500	S. Nolan Creek	30
41BL989	6002	Slope	860	Grasslands	Nolan Creek	?	S. Nolan Creek	1
41BL990	6003	Slope	860	Grasslands	Nolan Creek	?	S. Nolan Creek	450
41BL991	6004	Slope	840	Grasslands	Nolan Creek	?	S. Nolan Creek	1
41BL993	6006	Slope	885	Grasslands	Nolan Creek	?	S. Nolan Creek	1
41BL994	6007	Top	890	Grasslands	Nolan Creek	?	S. Nolan Creek	100
41BL997	6010	Top	895	Grasslands	Nolan Creek	?	S. Nolan Creek	205
41BL998	6011	Top	990	Grasslands	Cowhouse Creek	1100	???	
Belton Lake Periphery Area (DO#18)								
41BL1001	6014	Top	600	Grassland with occasional Juniper and live oak	Former Leon R. C	300	Former Leon R. Chn	300
41BL1002	6015	Top	675	Juniper forest with various oaks, grasses and forbes	Cowhouse Creek	450	Cowhouse Creek	450
41BL1004	6017	Slope	660	Wooded area, 75-100%	Former Leon R. C	675	Former Leon R. Chn	675
41BL1005	6018	Slope	675	Wooded area, 75-100%	Former Leon R. C	525	Intermittent Draw	20
41BL1006	6019	Top	705	Wooded area, 75-100%	Former Leon R. C	675	Former Leon R. Chn	675
41BL1010	6023	Top/S	620	Grassland with scattered trees	Cowhouse Creek	400	Cowhouse Creek	400
41BL1011	6024	Slope	605	Juniper, oak forest,and grass	Cowhouse Creek	200	Cowhouse Creek	200
41BL1012	6025	Slope	640	Wooded area, 0-25%	Former Leon R. C	125	Former Leon R. Chn	125
41BL1013	6026	Slope	625	Wooded area, 0-25%	Former Leon R. C	75	Former Leon R. Chn	75
41BL1014	6027	Slope	675	Wooded area, 75-100%	Former Leon R. C	425	Former Leon R. Chn	425
41BL1015	6028	Slope	670	Wooded area, 75-100%	Former Leon R. C	175	Former Leon R. Chn	175
41BL1016	6029	Slope	680	Wooded area, 75-100%	Former leon R. C	175	Former Leon R. Chn	175
41BL1017	6030	Slope	650	Wooded area, 50-75%	Former Leon R. C	300	Former Leon R. Chn	300
41BL1018	6031	Slope	660	Wooded area, 75-100%	Former Leon R. C	575	Former Leon R. Chn	575
41BL1019	6032	Slope	685	Wooded area, 75-100%	Former Leon R. C	125	Former Leon R. Chn	125
41BL1020	6033	Slope	650	Wooded area, 50-75%	Former Leon R. C	325	Former Leon R. Chn	325
41BL1021	6034	Top	675	Wooded area, 75-100%	Former Leon R. C	325	Former Leon R. Chn	325
41BL1022	6035	Slope	650	Wooded area, 75-100%	Former Leon R. C	575	Former Leon R. Chn	575
41BL1023	6036	?	?	Juniper, oaks, shrubs, grass	Leon River	?	Leon River	?
41BL1024	6037	?	?	Juniper, oaks, shrubs, grass	Leon River	?	Leon River	?
41BL1025	6038	?	?	Juniper/oak forest	Leon River	75	Leon River	75
41BL1026	6039	?	?	Juniper, oaks, shrubs, cacti, grass, and forbes	Leon River	?	Leon River	?
41BL1027	6040	?	650	Juniper, oak forest, brush, grass, and forbes	Leon River	?	Leon River	?
41BL1028	6041	?	?	Juniper, oak forest, brush, grass, and forbes	Leon River	?	Leon River	?
41BL1029	6042	?	?	Juniper, oak forest, brush, grass, and forbes	Leon River	?	Leon River	?
41BL1030	6043	?	?	Juniper, oak forest, brush, grass, and forbes	Leon River	?	Leon River	?
41BL1031	6044	?	?	Juniper, oaks, shrubs, cacti, grass, and forbes	Leon River	?	Leon River	?
41BL1032	6045	?	?	Juniper, oaks, shrubs, cacti, and grass	Leon River	125	Leon River	125
41BL1033	6046	?	?	Juniper forest with various oaks, grass, and forbes	Cowhouse Creek	500	Cowhouse Creek	500
41BL1034	6047	?	?	Juniper forest with various oaks grass, and forbes	Cowhouse Creek	500	Cowhouse Creek	500
41BL1035	6048	?	?	Juniper forest with various oaks, grass, and forbes	Cowhouse Creek	500	Cowhouse Creek	500
41BL1036	6049	?	?	Juniper forest with various oaks, grasses, and forbes	Cowhouse Creek	500	Cowhouse Creek	500

Prehistoric Sites Recorded in the Cantonment (DO#17) and Belton Lake Periphery (DO#18) Area Surveys (Environmental Information).

TARL No.	Field No.	Area (in m^2)	Exposure	Condition	Percent Disturbed	Slope	Site Type
Cantonment Area (DO#17)							
41BL988	6001	10000	Fair	Fair	25	2-3%	Lithic/burned rock scatter
41BL989	6002	40000	Fair	Good	7	1-3%	Lithic/burned rock scatter
41BL990	6003	112500	Poor	Poor	85	3-5%	Lithic/burned rock scatter/Quarry
41BL991	6004	105000	Fair	Fair	36	0-3%	Lithic/burned rock scatter
41BL993	6006	352500	Fair	Fair	75	3-5%	Lithic/burned rock scatter/Quarry
41BL994	6007	5000	Good	Fair	60	6-10%	Lithic/burned rock scatter
41BL997	6010	5000	Poor	Good	85	0-3%	Lithic/burned rock scatter
41BL998	6011	5000	Poor	Fair	40	0-5%	Lithic/burned rock scatter
Belton Lake Periphery Area (DO#18)							
41BL1001	6014	10000	Poor	Fair	70	1-5%	Lithic/burned rock scatter
41BL1002	6015	5000	Fair	Fair	60	0-3%	Lithic scatter
41BL1004	6017	150000	Good	Fair	80	0-3%	Lithic/burned rock scatter
41BL1005	6018	100000	Good	Fair	72	0-6%	Lithic/burned rock scatter
41BL1006	6019	47500	Good	Fair	80	0-3%	Lithic scatter
41BL1010	6023	40000	Fair	Destroyed	100	5-20%	Lithic scatter
41BL1011	6024	42500	Fair	Fair	80	0-12%	Lithic/burned rock scatter
41BL1012	6025	300	Fair	Fair	75	2-40%	Rockshelter
41BL1013	6026	400	Good	Good	55	2%	Rockshelter
41BL1014	6027	77500	Fair	Good	50	3-8%	Lithic/burned rock scatter
41BL1015	6028	125000	Fair	Fair	70	1-4%	Lithic scatter
41BL1016	6029	32500	Good	Fair	72	0-4%	Lithic scatter/rockshelter
41BL1017	6030	5000	Fair	Fair	60	0-10%	Lithic/burned rock scatter
41BL1018	6031	27500	Fair	Fair	71	3-6%	Lithic/burned rock scatter
41BL1019	6032	2500	?	Fair	80	2-5%	Lithic scatter
41BL1020	6033	7500	Fair	Poor	90	3-8%	Lithic scatter
41BL1021	6034	2500	Poor	Fair	65	2-3%	Lithic scatter
41BL1022	6035	52500	Good	Fair	80	3-6%	Lithic/burned rock scatter
41BL1023	6036	?	?	?	?	?	Rockshelter
41BL1024	6037	?	?	?	?	?	Rockshelter
41BL1025	6038	?	?	?	?	?	Rockshelter
41BL1026	6039	?	?	?	?	?	Lithic/burned rock scatter
41BL1027	6040	?	?	?	?	?	Lithic/burned rock scatter
41BL1028	6041	?	?	?	?	?	Mussel shell scatter
41BL1029	6042	?	?	?	?	?	Lithic scatter
41BL1030	6043	?	?	?	?	?	Lithic scatter
41BL1031	6044	?	?	?	?	?	Lithic scatter
41BL1032	6045	?	?	?	?	?	Rockshelter
41BL1033	6046	?	Fair	Good	100	?	Rockshelter
41BL1034	6047	?	Fair	Good	100	?	Rockshelter
41BL1035	6048	?	Fair	Good	100	?	Rockshelter
41BL1036	6049	?	Fair	Good	100	?	Rockshelter