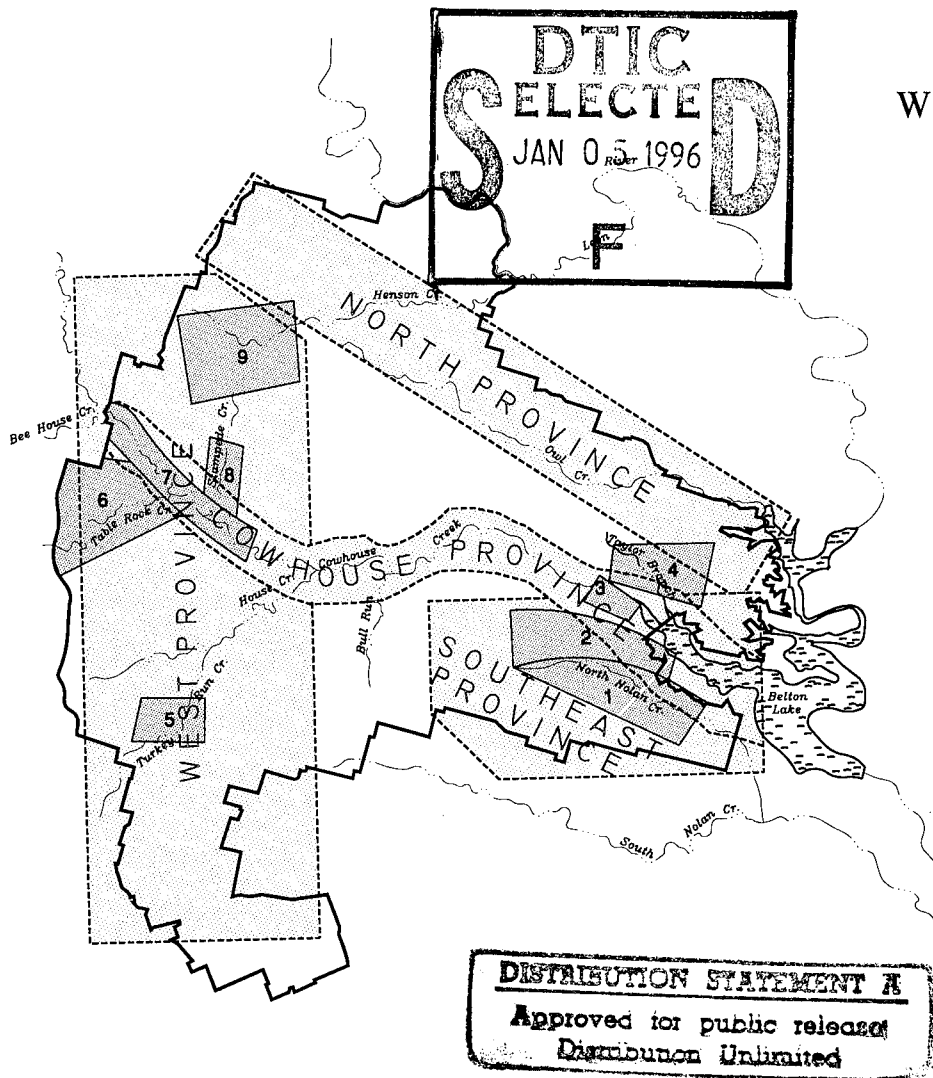


NRHP SIGNIFICANCE TESTING OF 57 PREHISTORIC ARCHEOLOGICAL SITES ON FORT HOOD, TEXAS

VOLUME I

Edited by
James T. Abbott
W. Nicholas Trierweiler



contributions by

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UNITED STATES ARMY FORT HOOD
ARCHEOLOGICAL RESOURCE MANAGEMENT SERIES
RESEARCH REPORT NO. 34

1995



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**NRHP SIGNIFICANCE TESTING OF 57
PREHISTORIC ARCHEOLOGICAL SITES
ON FORT HOOD, TEXAS**

VOLUME I

prepared for

**Directorate of Public Works
Environmental Management Office
Fort Hood**

by

TRC MARIAH ASSOCIATES INC.
Austin, Texas

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Contract DAKF48-91-D-0058
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19. ABSTRACT (Continued)

The 57 prehistoric sites were tested using 212 manually excavated test pits and 186 mechanically excavated trenches. At two rockshelters, powered rock saws were used to recover samples of indurated tufa. The 212 test pits ranged in depth from 20 cm to 620 cm below the modern surface and totaled 253.6 m³. Testing documented a total of 116 features including 47 hearths, 26 burned rock concentrations, 25 burned rock middens, 8 burned rock mounds, 4 burned rock pavements, two lithic caches, and one each of mussel shell concentration, carbonized post, ash lens, and burial pit. Fieldwork recovered a total of 78,893 artifacts and samples, including 66,543 prehistoric and 75 historic artifacts from 1/4-inch mesh screens, 8,945 artifacts from fine-mesh screens, and 3,330 samples. Most of the samples were landsnails, but 314 charcoal samples and 634 flotation samples were collected, largely from feature contexts, and 87 other types of samples included burned earth, tufa, pollen, and ochre. The most frequent artifact class was lithic debitage, followed distantly by bone debitage, bivalve umboes, and lithic tools. Of note were 55 ceramics recovered from three sites and 277 projectile points. The features and related contexts are further documented with 73 radiocarbon assays and 228 landsnail epimerization assays, demonstrating occupations ranging from 8,600 to 110 years before the present.

The assessment of site significance is explicitly linked to the existing prehistoric research design for Fort Hood and focuses on data needs of the chronology, subsistence, and technology research domains, supplemented as necessary with information on integrity of deposits and with four "red flag" field criteria. Site research potential is assessed with respect to ten distinctly observable data sets including the presence, abundance, and ubiquity of (1) temporally diagnostic artifacts, (2) samples with chronometric potential, (3) clear stratigraphy, (4) macrobotanical specimens, (5) vertebrate and invertebrate faunal specimens, (6) features, (7) lithic tools, (8) lithic debitage, (9) source identifiable lithics, and (10) other kinds of tools, including groundstone and ceramics. Sites with diverse, abundant, and ubiquitous data sets are assessed as having significant research potential and are recommended as eligible for inclusion to the NRHP; sites with sparse data sets are assessed as having limited research potential and are recommended as not eligible.

Of the 57 sites tested, 43 are determined to have significant research potential and are recommended as eligible for inclusion to the NRHP. These sites should be preserved and protected from adverse impacts. Protection efforts should include measures to prevent vandalism, prevent training related excavations, and minimize surface traffic. If protection is not possible for any site, then adverse impacts should be mitigated.

The remaining 14 sites are determined to have low overall research potential and are recommended as not eligible for inclusion to the NRHP. No further management is warranted for these sites.

EXECUTIVE SUMMARY

WHAT IS THIS REPORT?

This report has been prepared in compliance with the existing Fort Hood Historic Preservation Plan (HPP). It reports on the assessment of 57 prehistoric cultural resource sites located in Fort Hood maneuver areas. Other cultural resource sites remain to be tested.

WHAT WORK WAS DONE?

The 57 sites were tested for their eligibility for inclusion to the National Register of Historic Places (NRHP). Testing involved matching the characteristics of each site against a pre-existing set of criteria. These criteria were developed by Fort Hood in 1993 for the explicit purpose of providing a reasonable and consistent basis for determining NRHP eligibility.

In order to test the sites, new information was collected by means of archeological fieldwork. Fieldwork tactics were individually designed for each site. Tactics included mechanically dug trenches to discern site size and depth, as well as manually dug test pits to obtain a representative sample of artifacts and other archeological materials. A total of 186 backhoe trenches and 212 test pits was dug, and more than 78,000 artifacts were collected. The artifacts and other materials from each site were examined and assayed in order to obtain detailed information about when the site was occupied by prehistoric people and what kinds of activities occurred there.

WHAT ARE THE RESULTS?

Testing determined that 43 sites are eligible for inclusion to the NRHP and 14 sites are not eligible. Testing also demonstrated that many NRHP eligible sites at Fort Hood have previously been and are currently being adversely impacted by vandalism and by activities related to military training.

WHAT ARE FORT HOOD'S RESPONSIBILITIES?

Upon concurrence by the Texas State Historic Preservation Officer (SHPO), the 43 eligible sites must be preserved and protected. If protection is not possible for any site, then current and future adverse impacts must be mitigated. For most of the sites, mitigation could be accomplished by further archeological excavation.

ABSTRACT

This document presents the results and conclusions of archeological investigations on 57 prehistoric sites at Fort Hood in Bell and Coryell counties, Central Texas. The objective of the investigations was to test each site for eligibility for inclusion to the NRHP, as is required in the current Historic Preservation Plan for Fort Hood. Site research potential was assessed with respect to research questions and data needs outlined in the existing prehistoric research design for Fort Hood. Sites with significant research potential, as demonstrated by diverse abundant data sets, were assessed as eligible for inclusion to the NRHP. The work was conducted by TRC Mariah Associates Inc. under contract to Fort Hood, with fieldwork between July 1993 and March 1994, followed by laboratory analysis and technical reporting from April 1994 through March 1995.

The 57 prehistoric sites were tested using 212 manually excavated test pits and 186 mechanically excavated trenches. At two rockshelters, powered rock saws were used to recover samples of indurated tufa. The 212 test pits ranged in depth from 20 cm to 620 cm below the modern surface and totaled 253.6 m³. Testing documented a total of 116 features including 47 hearths, 26 burned rock concentrations, 25 burned rock middens, 8 burned rock mounds, 4 burned rock pavements, two lithic caches, and one each of mussel shell concentration, carbonized post, ash lens, and burial pit. Fieldwork recovered a total of 78,893 artifacts and samples, including 66,543 prehistoric and 75 historic artifacts from 1/4-inch mesh screens, 8,945 artifacts from fine-mesh screens, and 3,330 samples. Most of the samples were landsnails, but 314 charcoal samples and 634 flotation samples were collected, largely from feature contexts, and 87 other types of samples included burned earth, tufa, pollen, and ochre. The most frequent artifact class was lithic debitage, followed distantly by bone debitage, bivalve umboes, and lithic tools. Of note were 55 ceramics recovered from three sites and 277 projectile points. The features and related contexts are further documented with 73 radiocarbon assays and 228 landsnail epimerization assays, demonstrating occupations ranging from 8600 to 110 BP.

The assessment of site significance is explicitly linked to the existing prehistoric research design for Fort Hood and focuses on data needs of the chronology, subsistence, and technology research domains, supplemented as necessary with information on integrity of deposits and with four "red flag" field criteria (including the presence of human bone). Site research potential is assessed with respect to ten distinctly observable data sets including the presence, abundance, and ubiquity of (1) temporally diagnostic artifacts, (2) samples with chronometric potential, (3) clear stratigraphy, (4) macrobotanical specimens, (5) vertebrate and invertebrate faunal specimens, (6) features, (7) lithic tools, (8) lithic debitage, (9) source identifiable lithics, and (10) other kinds of tools, including groundstone and ceramics. Sites with diverse, abundant, and ubiquitous data sets are assessed as having significant research potential and are recommended as eligible for inclusion to the NRHP; sites with sparse data sets are assessed as having limited research potential and are recommended as not eligible.

Of the 57 sites tested, 43 are determined to have significant research potential and are recommended as eligible for inclusion to the NRHP. These sites should be preserved and protected from adverse impacts. Protection efforts should include measures to prevent vandalism, prevent training related excavations, and minimize surface traffic. If protection is not possible for any site, then adverse impacts should be mitigated. The remaining 14 sites are determined to have low overall research potential and are recommended as not eligible for inclusion to the NRHP. No further management is warranted for these sites.

In addition to site specific management recommendations, several suggestions are made to slow the rate of adverse impacts to NRHP eligible sites at Fort Hood.

- (1) All rockshelters should be made off-limits to unauthorized personnel, and signs to this effect should be posted in all NRHP eligible rockshelters, whether they exhibit evidence of vandalism or not, stating that excavations of any type are precluded by order of the Commanding General.
- (2) The briefing on archeological resources currently given to newly posted military personnel should be revised to stress the protected status of archeological sites and the penalties for violations to the individual and to his/her superior officers.
- (3) The current policy restricting mechanical excavations within 50 m of streams and drainages should be strengthened to include all T_0 and T_1 terraces and their toeslopes regardless of distance from the stream or drainage.
- (4) Vehicle traffic in the vicinity of known Paluxy sites should be restricted to existing roads, and signs should be posted indicating this restriction.

ACKNOWLEDGEMENTS

These investigations have truly been a team effort. Credit for all phases of the project is shared by a talented and dedicated team of professionals. As Principal Investigator, I have been exceptionally fortunate to have worked with this team. During fieldwork and for the first few months of analysis, Lain Ellis was Assistant PI. Lain and I shared responsibilities for assessing NRHP eligibility and developing management recommendations. Subsequently, Jim Abbott successfully doubled as geoarcheologist and Assistant PI and carried the banner to completion of analysis and reporting. Together, Jim and Lain are recognized as responsible in large measure for the integrity and high quality of the technical results and scientific conclusions.

Gemma Mehalchick was Field Director and is credited with running an efficient and focused field project. As was the case for Mariah's previous work phase at Fort Hood, the success of the current testing phase is largely a result of Gemma's practical and reliable management of the fieldwork. Mariah's field crew for the 1993 to 1994 testing season included Don Badon, Susan Burns, Roman Clem, James "Bergs" Dahlberg, LeighAnn Garcia, Mike Hannaford, Cathy Peterson, Chris Ringstaff, and Tamra Walter. Crew Chiefs were Gemma Mehalchick, Karl Kleinbach, and Pat O'Neill; Jay Peck was Crew Chief on one site. All of these archeologists were on the front line of the testing program and their uncompromising professionalism, more than any other single factor, is responsible for high quality of the primary data. During fieldwork, Jim Abbott and Charles Frederick shared equal responsibilities as field geoarcheologists. Their solid and reliable field observations and their interpretations of depositional and erosional processes have been absolutely critical to the soundness of the archeological conclusions and management recommendations.

As Quality Control Officer, Craig Smith made periodic field inspections to compare the ongoing work against the scope and reported directly to Mariah's upper management. On occasion, Craig also reported findings to Fort Hood DEH. He was assisted by Mike Quigg who also made several field inspections, and by Tamra Walter and Roman Clem who reviewed each of the thousands of pages of primary field documents for completeness, accuracy, and legibility. From the beginning of the project, Mariah's president, Dick McGuire, demonstrated a vital interest in ensuring that quality be built into all aspects of the project. Mr. McGuire also made several Quality Control inspections in the field.

The archeology laboratory in Austin was smoothly run by Kathy Callister, who performed amazing feats of systems organization and database management. For several months in late 1994 when Kathy was on temporary duty assignment in Reno, the lab was ably directed by Marybeth Tomka. Together, these archeologists designed and maintained the laboratory systems which immensely facilitated ultimate data analysis. Analysts Dale Lynch and Chris Ringstaff examined and recorded each of the more than 50,000 lithic artifacts and are truly Edwards chert experts. Flotation samples were wet-processed by Roman Clem, LeighAnn Garcia, and Pat O'Neill using a Flote-tech® system. Lab assistants Ed Baker, Robin Benson, Scott Brosowske, Ann Ohl, Jennifer Saunders, and Paul Schuchert are thanked for their unflinching attention to detail in the seemingly endless, but absolutely critical, tasks of cataloging, washing, labeling, sorting, and inventorying.

Development of this technical report reflects Mariah's team approach. The site descriptions and results in Chapters 5.0 and 6.0 were largely authored by Karl Kleinbach, Gemma Mehalchick, Pat O'Neill, Jim Abbott, and Charles Frederick, with interpretations, conclusions, and management recommendations

written by Lain Ellis and myself, and final data analyses by Jim Abbott and Marybeth Tomka. Jim Abbott was a primary author to several key chapters of the final report as well as coordinator during much of the effort. Marybeth Tomka shepherded the massive databases through analysis and co-authored lithic analyses in Chapter 7.0. During the final stages of reporting, Marybeth also served as a "free safety," plunging in to tie up numerous loose ends. Karl Kleinbach and Gemma Mehalchick co-authored important synthetic discussions in Chapter 7.0, and Kathy Callister, Mike Quigg, Dale Lynch, and Chris Ringstaff contributed to discussions in Chapters 3.0 and 4.0 or in appendices. Additional discussions were contributed by analysts Brian Shaffer, Phil Dering, Kathryn Reese-Taylor, Steven Hall, and Glenn Goodfriend. Artifacts were beautifully illustrated by Carol Mills and final site maps were expertly prepared in AutoCAD by Mike Hilton. The 57 letter reports were produced by Kim Cooke, Tammy Jenkins, and Jessica Marie. The production of the draft report was conducted by debora White with assistance from Theresa Bartosh, Kristi Margolis, Marybeth Tomka, and Jocelyn Vinograd; debora White produced the final report assisted by Jocelyn Vinograd, Kathy Wilson, and Mary Kennedy. DeeAnn Campbell of Renaissance Editing was the technical editor. Not to be forgotten, vital assistance with accounting and bookkeeping was provided by Michelle Summerlin, Chuck Killion, Diane Sallee, and Lori Curry.

Expert analyses were conducted by subcontractors/consultants Brian Shaffer (faunal), Laurie Zimmerman (bivalve shell), Kathryn Reese-Taylor (ceramic petrography), Beta Analytic, Inc., and the University of Texas Radiocarbon Laboratory (radiocarbon), Steven Hall (pollen), Phil Dering (macrobotanical), and Glenn Goodfriend (snail epimerization). Electronic field mapping was conducted by Ron Carrol and Terry Siminton of Ronald Carrol Surveying. An earlier draft of this report was peer reviewed by Doug Boyd of Prewitt and Associates, Inc.

Several Fort Hood personnel assisted the project. Mechanical excavation support was provided by Fort Hood DEH, Maintenance Division. Bill Roberts assisted by James Conors, coordinated this support and backhoe operator Lester Duncan skillfully maneuvered his machine in trenching and later backfilling. Fieldwork in endangered species habitat and in caves and sinks was coordinated with Gil Eckrich, John Cornelius, and Billy Ray Jones of DEH, Environmental Management Office - Natural Resources Branch. Sgt. Pruitt of G3 Range Control facilitated vehicle permits, and Russ Allen of G3 coordinated field schedules. On occasion, Sgt. Huffman of Graves Registration, provided forensic identification of human skeletal remains. Finally, Fort Hood Archeologists Jack Jackson and Kimball Smith have provided the framework under which this ambitious program has been conducted. Their long-term vision for Fort Hood, their intimate knowledge of statutes and regulations, and their remarkable success within the labyrinthian Defense Department have allowed the Mariah team to design and implement this successful program of cultural resource compliance.

Nick Trierweiler
Austin, March 1995

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1.0 INTRODUCTION

W. Nicholas Trierweiler

Fort Hood military reservation, located in Bell and Coryell counties in Central Texas, encompasses 217,337 acres, or 339.6 mi². Assigned to the Army's FORSCOM (forces command), Fort Hood's primary mission is to train and maintain the combat readiness of the III Mobile Armored Corps, which includes two armored divisions, an air brigade, and diverse supporting units such as combat engineering battalions. The large size and varied terrain of Fort Hood admirably suit this mission and extensive off-road training exercises involving heavy tracked and wheeled vehicles are common year-round. As a result of diligent training, the combat readiness of the III Corps is unquestioned, and Fort Hood units have fulfilled key roles in several recent military actions. Nonetheless, such heavy use of the landscape has the potential to adversely affect cultural resources.

Under the National Historic Preservation Act [16 U.S.C. 470(f) and 470h-2(f)] and its implementing regulations (36 CFR 800), military installations must inventory and evaluate their cultural resources relative to the National Register of Historic Places (NRHP) criteria. Fort Hood's obligation in this regard was clarified in a Programmatic Agreement (PA) signed in January 1990 between the United States Army, the State Historic Preservation Officer for Texas (SHPO), and the Advisory Council for Historic Preservation. In accordance with the PA, a Historic Preservation Plan (HPP) was developed for Fort Hood in 1990 (Jackson 1990), and was renewed in 1994 (Jackson 1994) as a Cultural Resource Management Plan (CRMP).

Among other stipulations, the 1994 CRMP called for evaluations of NRHP eligibility for up to 221 prehistoric archeological sites under Projects #3, 5, and 6 (Jackson 1994:11-14). This volume has been prepared by TRC Mariah Associates, Inc. under contract to Fort Hood, in accordance with

the provisions of the CRMP, and in partial fulfillment those CRMP projects.

1.1 THE CURRENT RESEARCH IN HISTORICAL PERSPECTIVE

Despite a well-known richness of prehistoric sites in Central Texas, prior to the 1970s, little formal archeology was conducted at Fort Hood. The notable exception was the Fort Hood Archeological Society, an avocational group of soldiers and civilians which recorded about 100 archeological sites in the late 1960s and 1970s before it was replaced by the official Fort Hood archeological program (Thomas 1978).

In 1977, Fort Hood hired a staff archeologist and began a program of systematic inventory. Under subcontract to Science Applications, Inc., field surveys were conducted by Southern Methodist University, the University of Texas at Austin, and Texas A&M University (Jackson 1994:22-23), and by 1991, over 95% of the post had been inventoried. Most of the remaining area was in the permanently duded area where access is dangerous (Jackson 1990:6). Site and artifact data were compiled in a computer database for analysis, and a series of published research reports regularly documented the progress of the program (Carlson and Bruier 1986; Carlson et al. 1987; Carlson et al. 1988; Jackson and Bruier 1989; Mueller-Wille and Carlson 1990a; Mueller-Wille and Carlson 1990b; Ensor 1991; Carlson 1993; Carlson, Dockall and Olive 1994). These surveys have recorded more than 2,200 archeological sites, roughly evenly divided between prehistoric and historic sites.

However, most of the surveys (especially in the early years of the program) included neither shovel testing nor systematic survey of streamcut banks. As a result, little information was available on the potential of sites to contain intact buried deposits, and less than 15% of the prehistoric sites had been evaluated for eligibility for inclusion in the NRHP. Approximately 850 prehistoric sites remained on

the books as "possibly eligible" or had "insufficient data" on record to permit a determination (Jackson 1990:39). Management of these sites was becoming an increasing burden to Fort Hood, and one of the objectives of the 1990 HPP was to complete NRHP evaluations of the prehistoric sites.

In August 1991, Mariah was awarded a multiple-year contract and began a phased program designed to implement this HPP objective (historic period sites have been investigated separately). Fieldwork for the first phase of site evaluations was conducted in 1992 and 1993 under 15 individual delivery orders. Using reconnaissance, shovel testing, and resurvey tactics, Mariah's first phase ultimately evaluated 571 prehistoric sites for archeological content and geomorphic context. This phase of the program has been reported in the Fort Hood Archeological Resource Management Series as Report #31 (Trierweiler 1994). Concurrent with the initial site evaluations, Mariah also developed a comprehensive and problem-based research design (Ellis et al. 1994a) to serve as the basis for subsequent formal NRHP eligibility determinations.

The first phase of investigations resulted in roughly two-thirds of the sites being evaluated as either "eligible" or not "eligible" (Trierweiler 1994:ii). The remaining sites could not be fully evaluated using the inventory-level tactics and were classified as having "unknown eligibility." These sites were targeted by the second phase of the program, and under a new set of delivery orders, Mariah conducted formal test excavations on the first 57 of these sites in 1993 and 1994. Immediately after completing fieldwork on each site, individual letter reports presenting preliminary results and conclusions were prepared and submitted to Fort Hood. Following the completion of the excavation phase, further laboratory analyses were conducted on artifacts and samples. The current volume presents the completed analyses and final conclusions and management recommendations for these 57 sites. This work sequence is presented schematically in Figure 1.1. Concurrent with development of the present report and as

authorized by a series of additional delivery orders, in 1994 and 1995 Mariah continued field testing an additional 56 sites, for a cumulative total of 113 sites. These results will be presented in a forthcoming volume in the Fort Hood Report series.

1.2 ORGANIZATION OF THIS REPORT

This report is structured in two volumes. Volume I contains Chapters 1.0 through 5.0, and Volume II contains Chapters 6.0 through 9.0, plus bibliographic references and ten appendices. Following this introduction, Chapter 2.0 introduces the Fort Hood study area. It reviews key environmental considerations and provides a summarized cultural-historical overview. Using environmental data, the chapter develops a series of nine spatial clusterings of sites with relatively closely related sets of available resources and environmental characteristics.

Chapter 3.0 summarizes the research issues which guided the field testing program, and under which site significance evaluations and NRHP eligibility recommendations were made. The research issues have been presented in detail in the full research design for Fort Hood (Ellis et al., 1994a) and are only summarized here. The current chapter is largely adapted from that Mariah document and the reader is directed to the full publication for further discussions and especially for details of the hypothetico-deductive approach such as arguments of relevance, test implications, and data needs.

Chapter 4.0 reviews the testing strategies and excavation tactics. Separate discussions focus on the field, laboratory, and analytical methods and on the program of Total Quality Management which was adopted to ensure the accuracy, replicability, and comparability of the collected archeological information.

Chapters 5.0 and 6.0 are the heart of the report and present the substantive results of testing on each of the 57 sites. For convenience, the 30 sites in Bell County are grouped together in Chapter 5.0 and

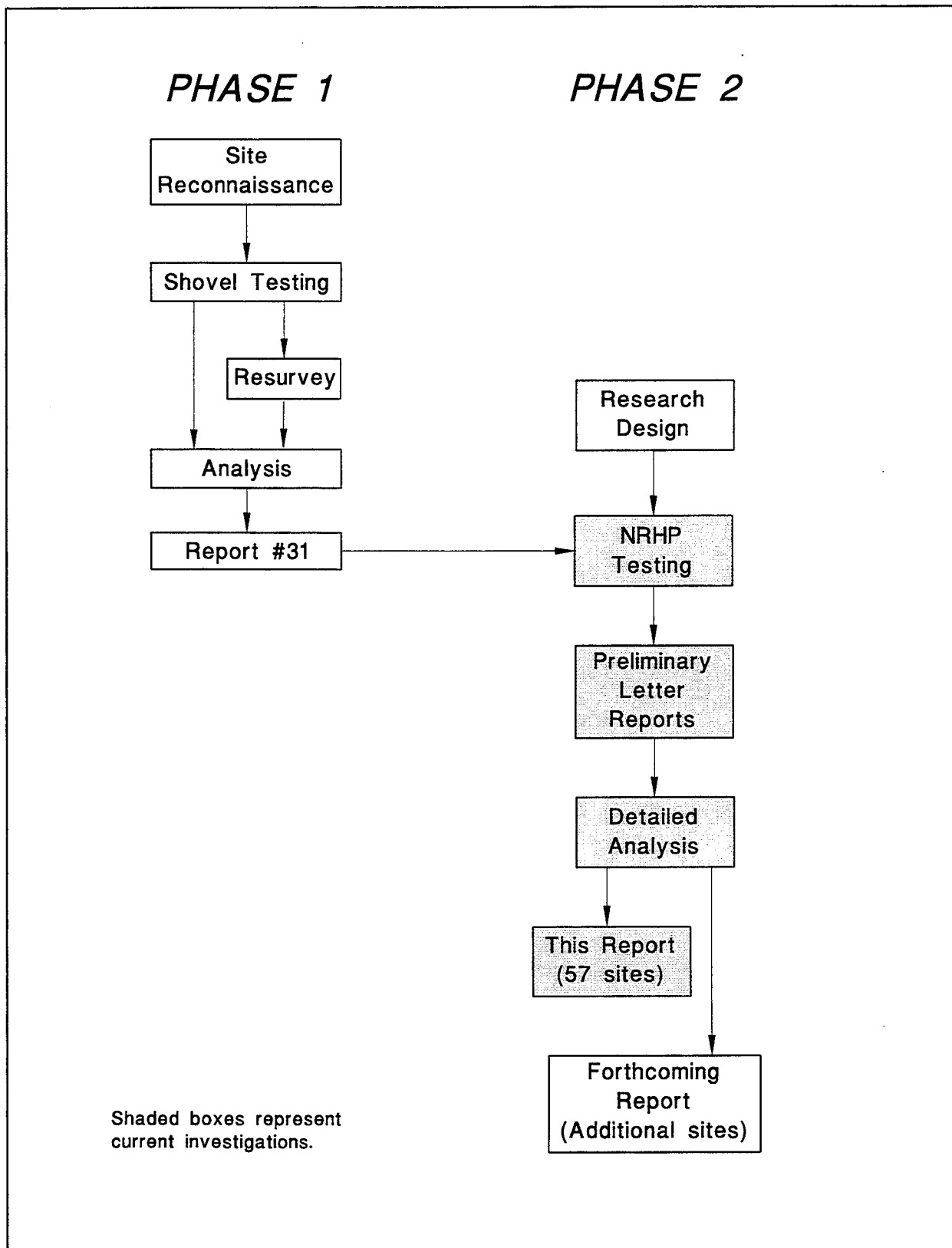


Figure 1.1 Schematic Representation of the Sequence of Mariah's Work at Fort Hood.

the 27 sites in Coryell County are grouped in Chapter 6.0. Within each chapter, sites are presented in ascending numeric order. For each site, three major discussions are presented. First, an introductory section briefly describes the setting and location of the site, reviews previous work, and summarizes the new work conducted. Secondly, the substantive results of testing are documented in detail including descriptions of all test pits, backhoe trenches, stratigraphic zones, and cultural features. The results of artifact analyses and sample assays are also presented. Finally, these results are synthesized into a series of conclusions for each site regarding both environmental context and archaeological data content.

Chapter 7.0 summarizes the results of testing and develops for each site explicit evaluations of research potential according to the research criteria set forth in Chapter 3.0. As called for under the Section 106 process, these evaluations of research potential are linked to overall assessments of significance and, thereby, eligibility for inclusion in the NRHP. Following these eligibility evaluations, explicit management recommendations are offered for each site.

Chapter 8.0 builds upon the results presented in Chapters 5.0 and 6.0, and develops several intersite analyses using the artifact data from all 57 sites. The types of identified lithic raw materials are discussed and a spatial analysis of artifacts is conducted with respect to presumed source locations. This is followed by a closely related discussion which reviews overall variability in the tool assemblage, with an emphasis on lithic tools.

Chapter 9.0 continues these substantive analyses with a series of four additional discussions. These include: an analysis of the variability of features on the 57 sites with an emphasis on burned rock features, further research into the chronometric applications of landsnails, an analysis of data from sites situated in Paluxy sand deposits, and a summary of data content from the rockshelters.

Following the bibliographic references in Chapter 10.0 are several appendices. Appendix A presents raw site data in tabular format and Appendix B presents raw data on all excavated features, also in tabular format. Appendix C presents the raw artifact data, organized by site and major artifact class. Because of the massive volume of this database, the appendix is presented on microfiche. Appendix D is a summary of all chronometric data for the 57 sites, including both radiocarbon and amino acid epimerization results. Appendices E, F, G, and H present consultant reports for the ceramic, faunal, macrobotanical, and pollen analyses, respectively. Appendix I describes additional types of Edwards chert, and supplements the types describes previously (Trierweiler 1994:Appendix C). Finally, Appendix J presents samples of all forms which were used during the 1993-1994 excavation season.

2.0 ENVIRONMENT

James T. Abbott

Fort Hood is situated in northwestern Bell and southeastern Coryell Counties, Central Texas, adjacent to the city of Killeen (Figure 2.1). The fort encompasses an area of approximately 878 km² (339 square miles) in the Grand Prairie Land Resource Area. This part of the state occupies the transition zone from the humid east to the semi-arid west, and the environmental gradient is steep enough that distinct changes in landscape and vegetation are observable moving east to west across the reservation. Geologically, the facility is situated on Cretaceous-age carbonate rocks a few tens of kilometers west of the NNE-SSW-trending Balcones Fault Zone. Although no pronounced scarp exists along the fault zone in Bell County, the character of soils and vegetation developed on the upper Cretaceous rocks east of the fault zone is markedly different than what exists on the lower Cretaceous rock to the west.

Investigation of cultural resources on Fort Hood by Mariah personnel is being conducted under a cultural-ecological paradigm, as defined by the research design (Ellis et al. 1994) and implemented in reconnaissance-level (Trierweiler 1994) and evaluation-level (this volume) assessments of site eligibility to the NRHP. These studies endeavor to place the sites within their environmental context, and focus on the relationship between loci of human activity and geologic and biotic variables that influence site location within the overall landscape and site preservation in the archaeological record.

The environmental setting of the broader Fort Hood area has been summarized in detail several times previously (e.g., Abbott 1994a; Lintz and Jackson 1994; Espey, Huston and Assoc. 1979), and is addressed relatively briefly here. This section discusses the environmental character of a series of spatial subdivisions of Fort Hood created for analytical purposes. The 57 archaeological sites addressed in this report have been grouped

into nine subdivisions representing spatial clusters of sites with relatively closely related suites of available resources and geologic, biotic, and pedologic characteristics (Figure 2.2). These subdivisions do not represent the only method by which the sites could have been grouped, nor are they capable of characterizing the range of variability on Fort Hood as a whole. However, they do encompass the sites addressed in this report, and we feel that they provide a useful platform to compare and contrast the data at an intersite scale. After a brief overview of the climate, geology, and biota of the reservation as a whole, each of these spatial subdivisions is addressed individually in relative detail.

2.1 CLIMATE

The modern climate of the Fort Hood area is humid subtropical, characterized by long, hot summers and relatively short, mild winters. Summer temperatures are high, with an overall average of 83°F (28.3°C) and an average daily maximum of 96°F (35.5°C) in Coryell County. It is not uncommon for temperatures in excess of 100°F to occur for days or weeks during the summer months. When coupled with moderate to high humidity imparted by moist air masses originating over the Gulf of Mexico, the high temperature characteristic of summer days can be extremely uncomfortable. Average temperature in winter is 49°F (9.4°C), but tends to vary considerably from day to day due to the periodic passage of rapid cold fronts, resulting in a pattern of alternating bitterly cold and pleasant stretches.

Total annual precipitation is approximately 34 inches (864 mm). Although rainfall occurs year-round, precipitation is concentrated in two peaks that occur in late Spring and early autumn. Frontal storms are the dominant source of precipitation in winter, while convectional thunderstorms predominate in summer. The late spring and early autumn precipitation maxima are the result of a combination of convectional and frontal storms.

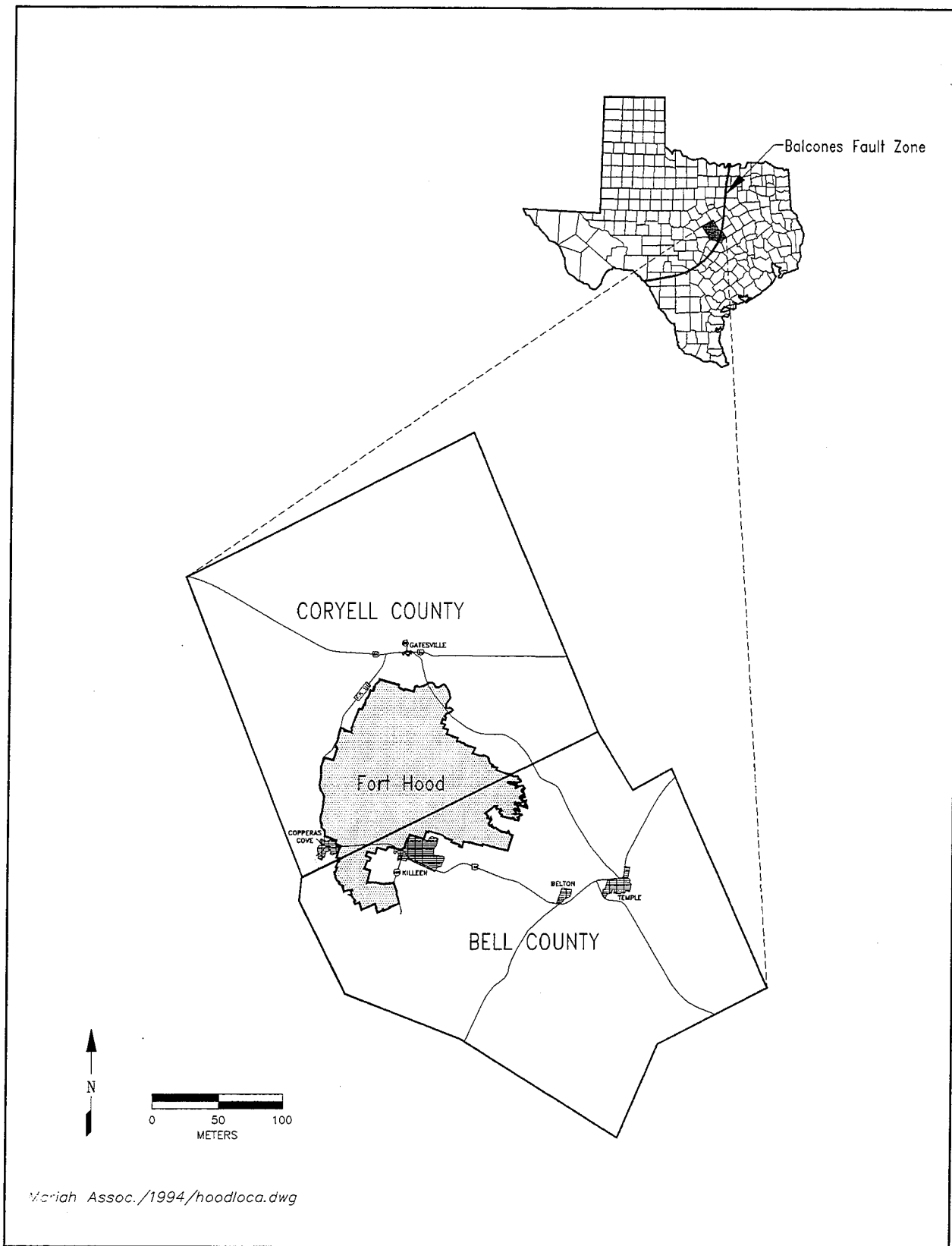


Figure 2.1 Location of Fort Hood (from Ellis et al. 1994).

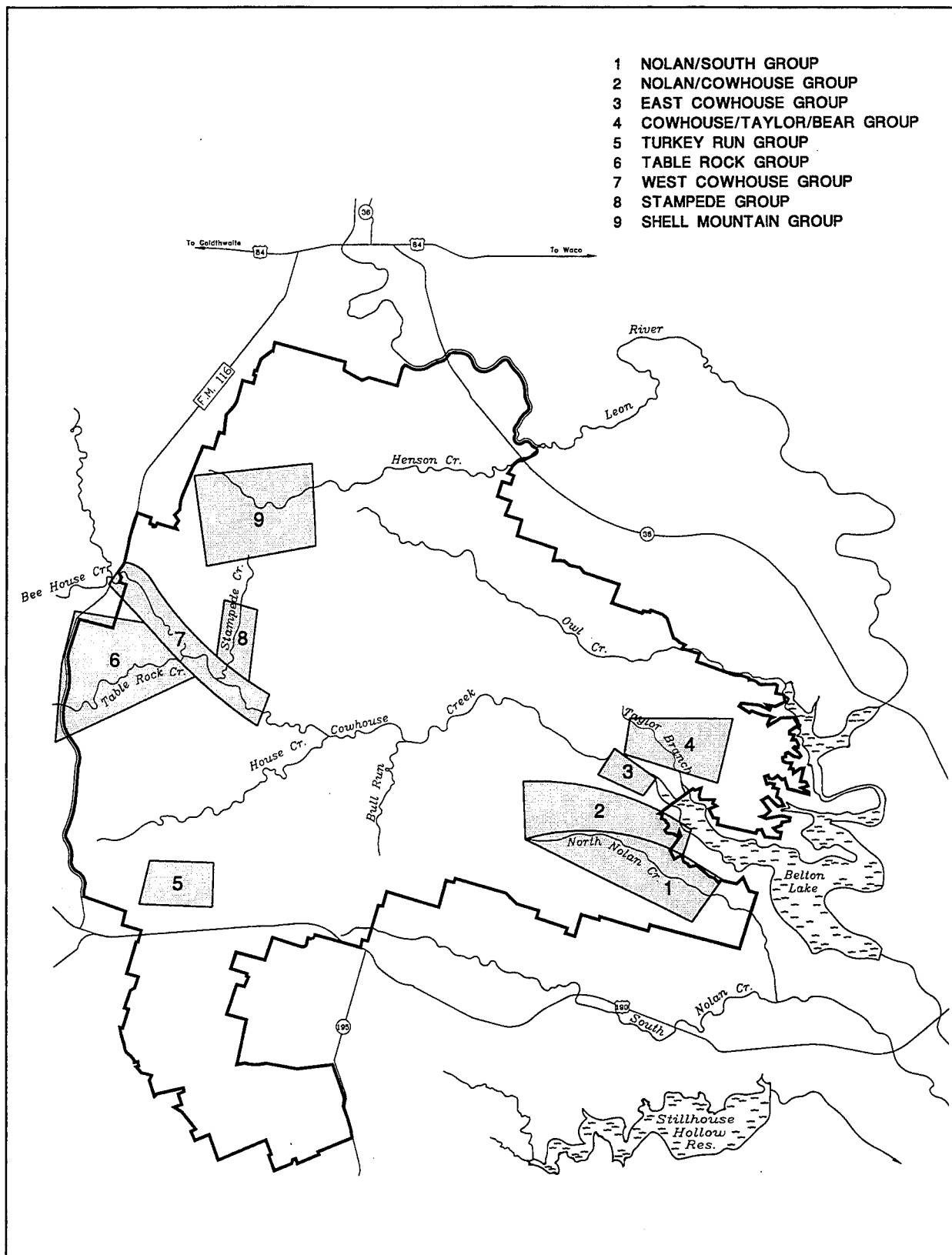


Figure 2.2 Map of the Nine Spatial Site Groupings Used in this Report.

Tropical storms can occasionally introduce copious moisture from both the Gulf of Mexico and Pacific during the hurricane season. Snow is rare, with measurable accumulations only occurring once or twice a decade.

Much more research is needed to document the paleoclimatic sequence in Central Texas throughout the culturally relevant period. However, extant studies have provided a useful outline of prevailing trends. The late Pleistocene appears to have been significantly cooler and moister than today (Graham 1987; Toomey 1993; Lundelius 1986). Pollen records and stable carbon isotopes suggest that grasslands expanded at the expense of open deciduous forest through the late Glacial period and early Holocene (Bryant and Holloway 1985; Nordt et al. 1994) as the climate became increasingly warm and dry. This warming trend continued into the middle Holocene, culminating in the widely recognized "Altithermal" (Antevs 1955), when the climate was significantly warmer and drier than at present. Around 4000 BP, the climate apparently shifted to a slightly more mesic state, and oak woodland became the dominant vegetation assemblage (Bryant and Holloway 1985). Late Holocene pollen records suggest that around 1500 BP the climate shifted toward slightly drier conditions again, resulting in the establishment of an oak savannah environment (Bryant and Holloway 1985). By approximately 1000 BP, many streams on the southern Plains and Edwards Plateau once again abandoned their floodplains and began to entrench (Hall 1990), probably as a result of the continuing shift toward drier conditions. In the last few hundred years, the climatic signal in vegetation and geomorphic records is largely masked by the much more significant impact of agriculture and grazing on the natural system.

2.2 GEOLOGY, GEOMORPHOLOGY, AND LATE QUATERNARY STRATIGRAPHY

The Fort Hood landscape is a result of a dissection of the eastern margin of the uplifted Edwards Plateau, and reflects variability in the resistance of various geologic formations to erosion. The Fort

lies a few miles to the west of the Miocene-age Balcones Fault trend, which separates the dissected Edwards Plateau to the north and west from the gently rolling upper Gulf Coastal Plain to the south and east. Although the relief provided by the escarpment is typically less than 100 m, major differences in character of relief, climate, soils, and vegetation are apparent between the two sides of the fault zone.

Structurally, the region is situated between the stable continental interior and the subsiding Gulf Coast basin, and is underlain by a deep-seated extension of Paleozoic Ouachita origin. During the Cretaceous Period, Central Texas was the site of a very broad shelf covered by a shallow sea. For more than 80 million years, calcareous limestones and marls were deposited on the shelf as the shoreline fluctuated. Occasionally, relatively thin deposits of terrigenous clastics were washed onto the shelf from the west, resulting in interbedded formations like the Paluxy Sandstone, Hensell Sandstone, and Antlers Formation. As the Gulf Basin subsided in the Miocene, severe, extensive stresses developed in the formerly flat-lying Cretaceous marine rocks across a hinge formed by deeply buried remnants of the Ouachita range and fracturing occurred, forming the Balcones fault system (Woodruff and Abbott 1986).

Fort Hood is situated west of the fault zone in an area underlain by relatively flat-lying lower Cretaceous rocks (Figure 2.3), and exhibits a two-tiered topography locally termed the Lampasas Cut-Plain (Hayward et al. 1990). This landscape is developed between the Brazos and Colorado Rivers west of the Balcones Fault zone and consists of large, mesa-like remnants of an early Tertiary-age planation surface surrounded by a broad, rolling pediment formed during the late Tertiary and early Quaternary. These two surfaces differ by 25 to 40 m in elevation and form the "high" and "intermediate" uplands of Hayward et al. (1990) and the "Manning" and "Killeen" surfaces of Nordt (1992). Modern stream valleys are in turn incised up to approximately 40 to 70 m into the pediment surface (Figure 2.4).

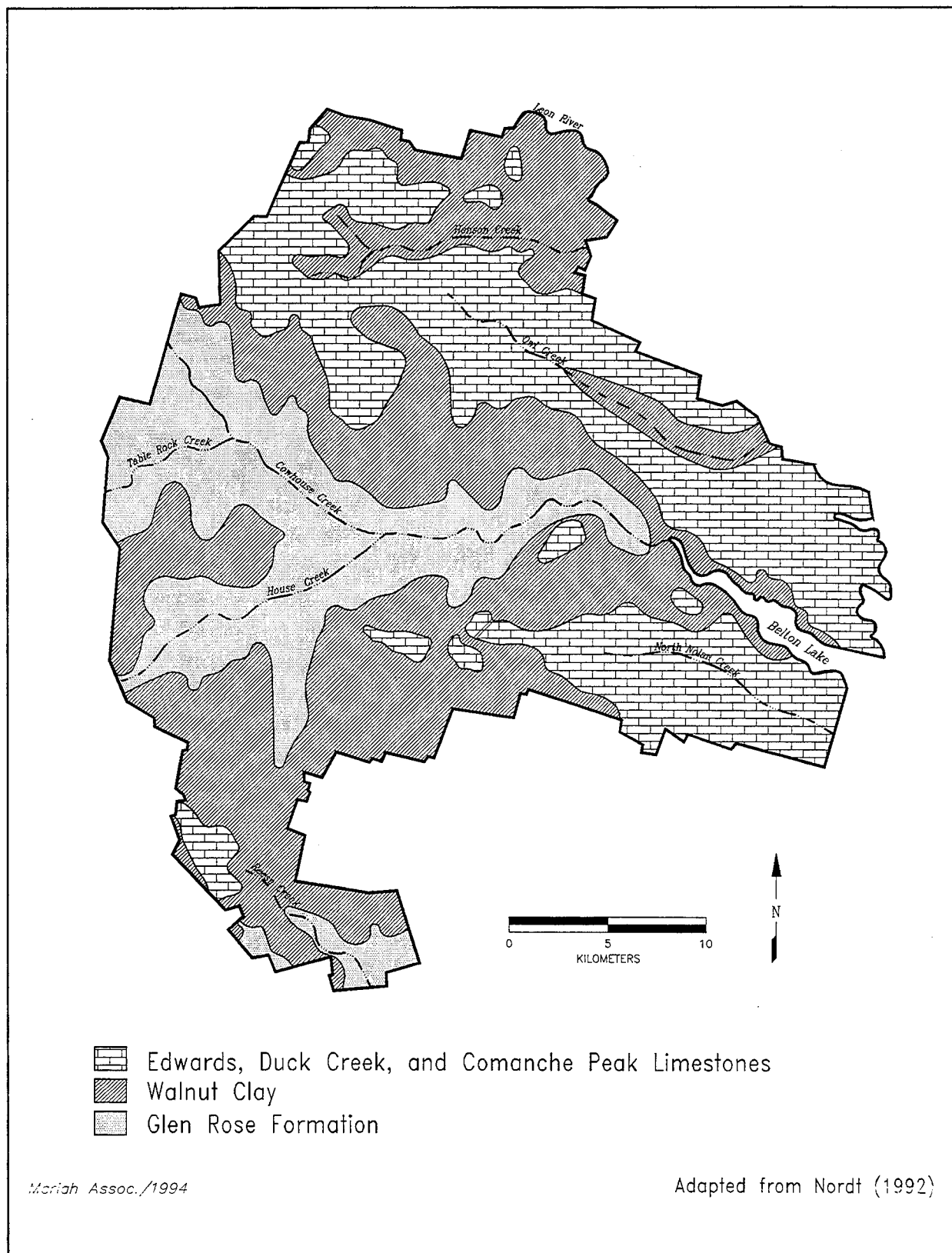


Figure 2.3 Geologic Map of Fort Hood.

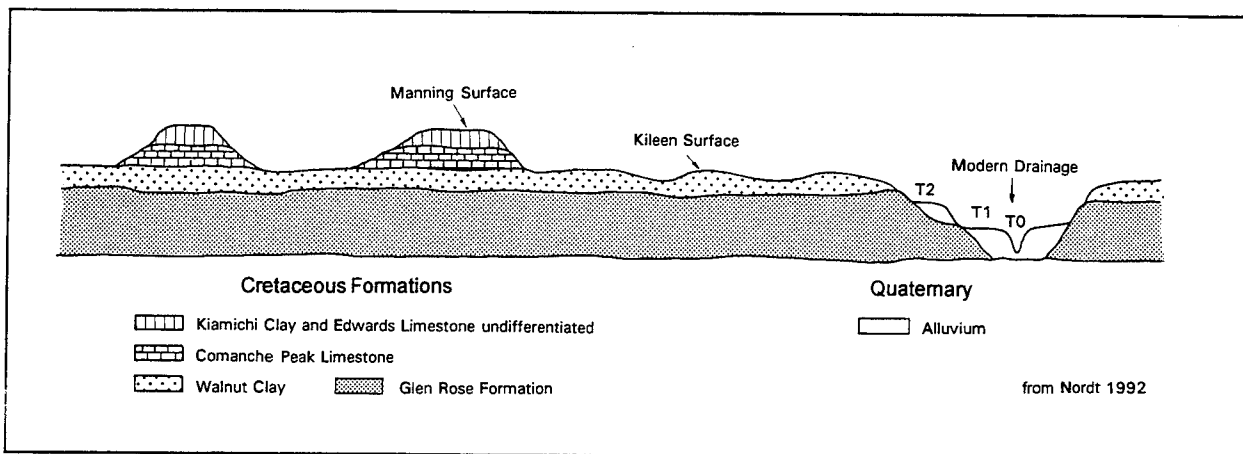


Figure 2.4 Generalized Cross-section of the Lampasas Cut Plain (after Nordt 1992).

The oldest rocks exposed on the fort belong to the Trinity Group, including the Glen Rose Formation and Paluxy Sandstone. The Glen Rose Formation consists of alternating beds of fossiliferous limestone, dolomite, and marl that achieves a total thickness of up to 375 ft, although only the upper part is exposed on the reservation. The formation is relatively thin-bedded and tends to alternate between somewhat resistant limestone and erodible marl slope resulting in a characteristic stair-step slope topography. The Paluxy Sandstone consists of fine to very fine quartz sand with interbeds of shale and limestone that rests on top of the Glen Rose Formation, and is present on the reservation as a thin, eastward-pinching wedge of material that rarely exceeds 10 to 20 ft in thickness. These formations crop out on the western side of the fort where relatively deep dissection of the landscape by Cowhouse Creek and its tributaries has removed overlying rocks (Sellards et al. 1932; Barnes 1970).

Resting on top of the Trinity Group rocks are rocks of the lower Cretaceous Fredericksburg Group. The lowest unit is the Walnut Clay, which consists of highly fossiliferous clays, limestones, and shales up to 175 ft thick. The Walnut Clay is widely exposed on the fort through lateral stripping of the overlying rocks, and forms the principle substrate of the broad intermediate upland (Killeen) surface. Above the Walnut Clay lies the Comanche Peak Limestone, which consists of hard,

thin-bedded limestones and shales that form the intermediate slopes of the higher upland (Manning) surface. The highest extensive rock unit is the Edwards Limestone, a thick-bedded, cherty limestone up to 60 ft thick that forms the resistant cap of the high upland mesas. Although they are not individually mapped (Barnes 1970), rocks of the Washita Group, including the Kiamichi Clay and Duck Creek Limestone, are probably preserved in places on the high upland surface in the eastern half of the facility. Because the Cretaceous rocks in the vicinity dip more steeply to the east than the present land surface, Cowhouse Creek essentially flows up-section as it traverses the base, moving from the upper Trinity Group rocks on the western side into lower Fredericksburg Group rocks on the eastern side.

The stratigraphy and soil geomorphology of a number of larger Fort Hood streams has been studied in detail by Nordt (1992; 1993b), who identifies six principal allostratigraphic units in the study area, four of which are common to most of the streams examined on the facility (Figure 2.5). From oldest to youngest, these units are termed the Reserve Alluvium, Jackson Alluvium, Georgetown Alluvium, Fort Hood Alluvium, West Range Alluvium, and Ford Alluvium (Nordt 1992). The Reserve Alluvium is a fill of middle to late Pleistocene age that forms the T₃ terrace of the Leon River and does not occur in the vicinity of any of the sites discussed in this report. The

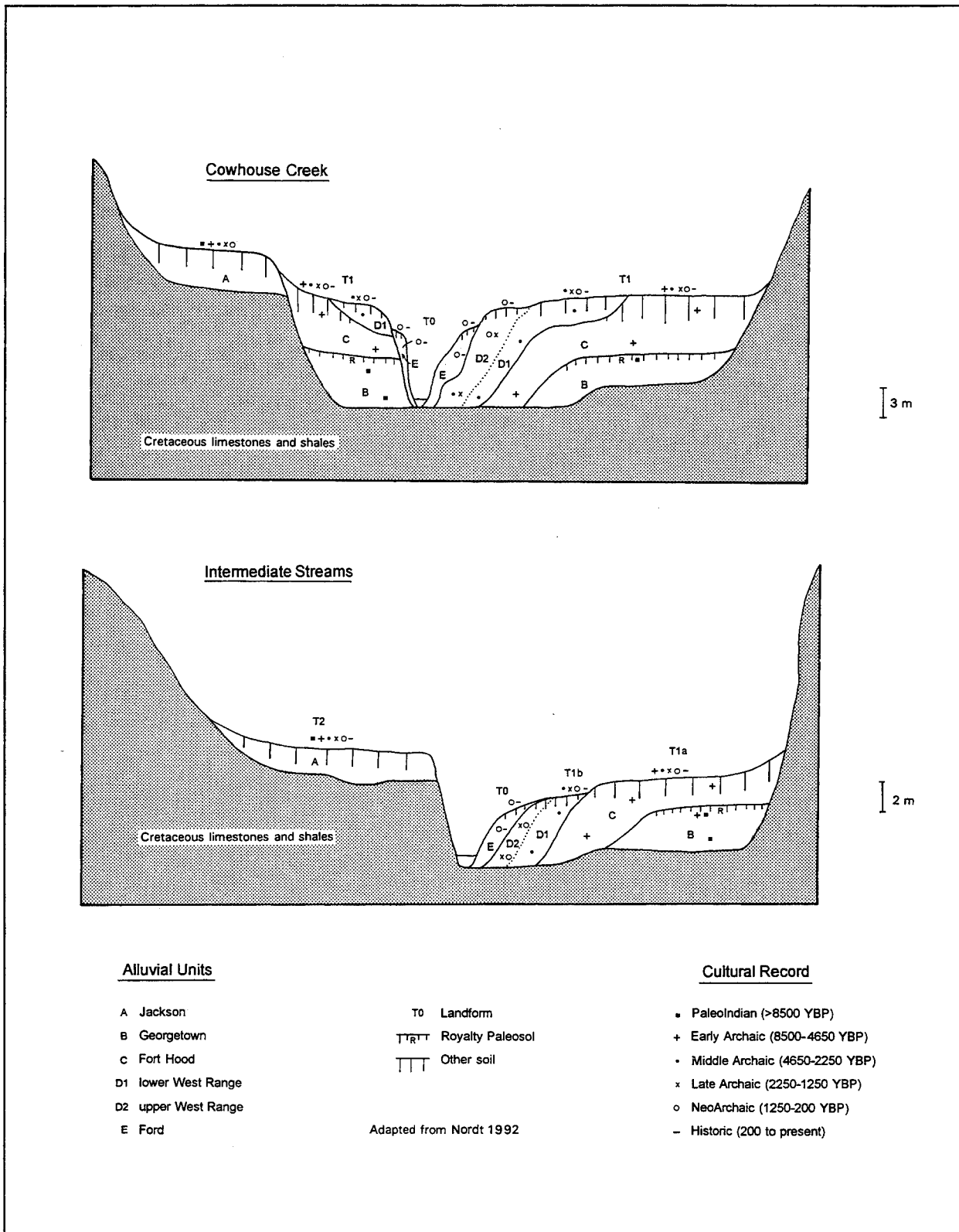


Figure 2.5 Schematic Cross-section of Selected Streams on Fort Hood with the Stratigraphic Positions of Various Cultural Manifestations Indicated (after Nordt 1992).

Jackson Alluvium is a poorly dated but clearly late Pleistocene fill (or sequence of fills) that forms the T₂ terrace of Cowhouse Creek and its larger tributaries. It consists of relatively thin, frequently gravelly, reddish brown loams and sandy loams supporting a moderately developed soil (an A-Bt-Bk profile is most common). Cultural material deposited on the Jackson terrace is either visible at the surface or shallowly buried by thin alluvial and/or colluvial sediments that form the upper horizon in places.

With radiocarbon ages ranging from approximately 11,300 to 8200 BP (Nordt 1992), the Georgetown Alluvium is the oldest fill on the reservation that has the potential to contain cultural materials dating to the incontrovertible span of human occupation in North America. It is always buried, and can be encountered only in cutbanks underlying the T₁ surface, where it is capped by a buried paleosol termed the Royalty paleosol by Nordt (1992). The Georgetown alluvium consists of 2 to 5 m of fine, well sorted channel gravels overlain by light yellowish to grayish overbank alluvium. The overbank deposits typically grade up from loams and silty loams into clay loams, and exhibit strong pedogenic structure in the Royalty paleosol. The sedimentologic characteristics, pale yellowish to grayish reducing colors of the fill, and frequent occurrence of strong mottling in the substrate suggests that the Georgetown probably accumulated relatively rapidly under conditions of perennial streamflow and a relatively high water table.

The Fort Hood Alluvium consists of thick, dominantly loamy to clayey deposits that underlie the T₁ terrace in all of the principal valleys on the reservation. It forms the most extensive suite of deposits underlying the terrace in most larger valleys. Twelve radiometric ages on charcoal and bulk humates obtained from the fill suggest that it began to accumulate shortly after cessation of the Georgetown alluviation at roughly 8000 BP and continued until changing climatic conditions caused another shift in fluvial style approximately 4500 BP. In some cases, the Fort Hood fill is truncated

and overlain by a drape of the subsequent West Range fill, but in most instances it is exposed at the T₁ surface. Fort Hood Alluvium is dominated by thick (up to 10 m), loamy to clayey overbank facies overlying a relatively thin (1 to 2 m) channel component. Sediment colors are predominantly brown to very slightly reddish-brown. Soil development in the unit is relatively thick but somewhat poorly expressed; A-Bk-C and A-Bw-Bk-C profiles are most common.

The West Range alluvium consists of dominantly loamy to clayey deposits containing a higher proportion of coarse-grained sediment than the preceding Fort Hood fill. Nordt (1992) subdivides the West Range into a lower, more gravelly member deposited between 4300 and 2400 BP and an upper, relatively fine-grained member deposited between 2800 and 600 BP. The sediments are predominantly grayish brown, gray, and black gravelly clay loams, and typically exhibit a thick, cumulic A-Bk-C profile. Typically, West Range sediments can achieve thicknesses in excess of 10 m, and buried cultural material has been observed at depths of up to 6 to 7 m in many locations. Multiple, stacked occupation surfaces are common in the upper 5 m unit. The unit usually lies at essentially the same elevation as the Fort Hood fill in the Cowhouse Creek drainage, but does truncate and overlap the older unit in a few localities. In the intermediate streams, the West Range terrace often lies slightly (typically less than 1.5 m) below the elevation of the Fort Hood surface, which led Nordt (1992) to subdivide the T₁ terrace into a T_{1A} surface associated with the Fort Hood fill and a T_{1B} surface associated with the West Range fill.

The Ford Alluvium is the most recent alluvial fill identified on the reservation, and underlies the T₀ surface. Twelve radiocarbon ages on charcoal from the fill (Nordt 1992) suggest that the unit has been accreting since approximately 700 to 800 BP. Typically, it consists of stratified loamy, sandy and clayey overbank deposits underlain by 1 to 2 m of channel gravels. The fill may be up to approximately 9 m thick but typically has limited lateral extent in the valleys, except in a few

localities where a thin drape of Ford overlies portions of the T₁ terrace. Frequently, primary stratification is well preserved in the overbank deposits, reflecting a relatively rapid rate of accumulation and short period of pedogenic modification. Ford sections are composed primarily of clay loams and gravelly clay loams, but frequently display interstratified sandy and gravelly beds, indicating strongly fluctuating discharges and the development of chute channels on the floodplain surface during high stage flow. Although soil development in the Ford deposits is typically very weak (cumulic A/C profiles are common), films and filaments of calcium carbonate are almost always present and may be abundant through the profile.

In addition to alluvial deposits in the valleys of tributary and trunk streams, colluvial and slopewash deposits form an integral suite of archaeologically significant sediments within the reservation. They occur both as relatively thick wedges at the base of steeper slopes and as thin mantles on most slopes and uplands, and they overlie and interdigitate with a number of alluvial fills at valley margins. The textural and architectural characteristics of colluvial/slopewash deposits on the reservation span the range from relatively thin, fine-grained mantles representing a predominance of slopewash deposition to coarse, very poorly sorted wedges and aprons of gravity-delivered material at the bases of steeper slopes. They form the matrix of a large number of archaeological sites, and clearly contain both primary and secondary cultural material. The texture, color, and degree of soil development of these deposits varies considerably, suggesting that several different temporal episodes of increased slope activity are represented. However, additional basic research is necessary to define the colluvial sequence.

2.3 BIOTA AND SOILS

Fort Hood lies in a portion of the state variously termed the Cross Timbers and Prairies Vegetation Area (Gould 1975), Hill Country Savannah (Allred

and Mitchell 1955), Juniper-Oak Savannah (Kuchler 1964), and Balconian biotic province (Blair 1950). The biotic assemblage in the area of the base represents a transitional zone between elements of the Blackland Prairie to the east and the Edwards Plateau to the west (Figure 2.6). The fort as a whole is composed of 57% woodland and scrub, 38% grassland and savannah, and 5% developed urban areas (Espey Huston and Assoc. 1979). The eastern side of the facility is characterized by dense oak/juniper forest and scrub, while upland areas to the west and south are generally more open. Grasslands are most common on the intermediate upland surface within the live fire area and in the western maneuver areas, while the high upland surface is typically wooded. Riparian habitats are common along drainages, and exhibit a variety of hardwood species. The impact area in the center of the base is dominated by grasslands even on the high upland surface, probably as a result of artillery impact and resulting fires.

Woody vegetation on the reservation is dominated by a few arboreal species, primarily ashe juniper (*Juniperus ashei*), live oak (*Quercus fusiformis*), Texas red oak (*Quercus texana*), Texas ash (*Fraxinus texana*), Texas persimmon (*Diospyros texana*), and cedar elm (*Ulmus crassifolia*). Mesquite (*Prosopis glandulosa*), typical of areas to the west of the fort, also occurs in relatively low numbers. Riparian habitats support a diverse assemblage of woody species, including pecan (*Carya illinoensis*), slippery elm (*Ulmus rubra*), burr oak (*Quercus macrocarpa*), black walnut (*Juglans nigra*), plum (*Prunus americana*), American elm (*Ulmus americana*), netleaf hackberry (*Celtis reticulata*), and red mulberry (*Morus rubra*). Grasslands on the fort consist of a mix of species typical of both the tall-grass prairie to the east and short grass prairie to the west. Common species include blue grama (*Bouteloua gracilis*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), Texas grama (*Bouteloua rigidisetata*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum avenaceum*), silver bluestem

(*Bothriochloa saccharoides*), buffalo grass (*Buchloe dactyloides*), and bermudagrass (*Cynodon dactylon*). Equally common, and usually more abundant in disturbed areas, are a variety of forbs and weedy species including broomweed (*Xanthocephalum texanum* and *X. dracunculoides*), prairie-tea (*Croton monanthogynus*), painted euphorbia (*Euphorbia cyanthrophora*), ragweed (*Ambrosia artemisiifolia*), triple-awn (*Aristida* sp.), and snow-on-the-prairie (*Euphorbia bicolor*).

A 1979 inventory of faunal species documented the presence of 22 species of amphibians and reptiles, 80 species of birds, and 15 species of mammals (Espey, Huston and Assoc. 1979). Many more species are likely to occur because the fort lies within the range of over 48 species of mammals, 79 species of reptiles and amphibians, and 324 species of birds (Espey, Huston and Assoc. 1979). Bird species occurring in the greatest numbers include the tufted titmouse (*Parus bicolor*), cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Parus carolinensis*), bobwhite (*Colinus virginianus*), house sparrow (*Passer domesticus*), and lark sparrow (*Chondestes grammacus*). The turkey vulture (*Cathartes aura*), while not occurring in numbers as great as the smaller birds, is a particularly prominent fixture on the reservation. Wild turkey (*Meleagris gallopavo*) is another species on the fort that has considerable potential significance as a food resource for prehistoric inhabitants. Common mammals include white-tailed deer (*Odocoileus virginianus*), northern raccoon (*Procyon lotor*), black-tailed jackrabbit (*Lepus californicus*), fox squirrel (*Sciurus niger*), gray fox (*Urocyon cinereoargenteus*), nine-banded armadillo (*Dasypus novemcinctus*), eastern cottontail (*Sylvilagus floridanus*), and deer mouse (*Peromyscus maniculatis*). With the exception of the gray fox, predators are relatively uncommon, but documented species include the coyote (*Canis latrans*) and bobcat (*Lynx rufus*).

Soils on the reservation (Figure 2.7) reflect the influence of relief, underlying geology, semi-arid to subhumid climate, and duration of pedogenesis.

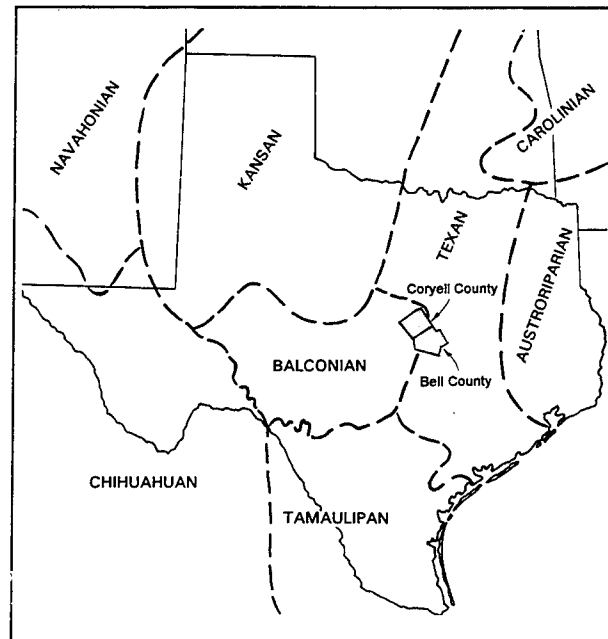


Figure 2.6 Biotic Provinces of Texas (after Blair 1950).

Most soils on the base are classified as Mollisols by the USDA Soil Conservation Service (McCaleb 1985; Huckabee et al. 1977). These soils are developed on calcareous substrates and may be either weakly or strongly horizonated depending on their age. Important secondary soil orders include Alfisols, Vertisols, and Inceptisols. Alfisols typically occur on weakly calcareous or decalcified substrates such as the outcrop of the Paluxy Sandstone and Pleistocene alluvial deposits of the Leon River and Cowhouse Creek. In most cases, Alfisols on Fort Hood probably represent an extended period of pedogenesis under a succession of climatic conditions. Vertisols on the reservation typically form in drainages and depressions where considerable volumes of expandable clay accumulate. The extensive, upland vertisols typical of the Blackland Prairie east of the Balcones fault zone do not occur on Fort Hood. Inceptisols are poorly horizonated soils typical of recent deposits and areas that have experienced relatively recent erosion. Table 2.1 lists a brief description of the principal USDA soil series occurring in the areas of Fort Hood addressed in this study.

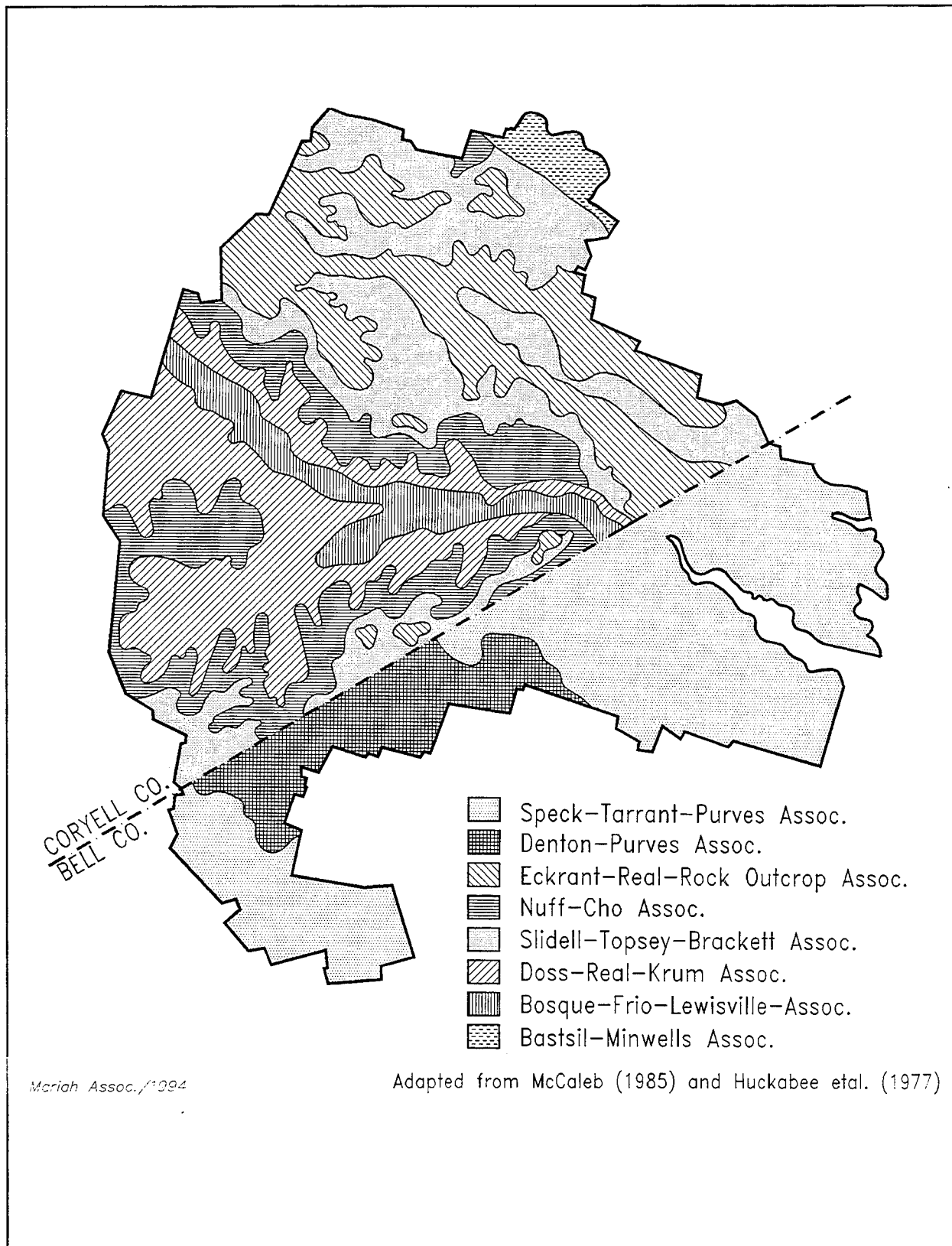


Figure 2.7 Soil Associations on Fort Hood.

Table 2.1 Common USDA Soil Series in the Study Area.

Soil Series	USDA Subgroup	Typical Thickness (cm)	Typical Profile	Typical Parent Material	Typical Topographic Association
Altoga	Typic Ustochrepts	150	A-Bw-Bk-C	marl and limestone colluvium	Manning surface footslopes
Bosque	Cumulic Haplustolls	200	A-Ak-Bk-C	trunk stream alluvium	larger stream terraces
Brackett	Typic Ustochrepts	40	A-Bk-2Ck	soft limestone and colluvium	Manning toeslope and footslope
Cho	Petrocalcic Calciustolls	55	A-K-Ck	Walnut Clay	higher points on Killeen surface
Cisco	Udic Haplustalfs	200	A-Bt-Bk-C	Paluxy Sandstone	Midslope bench in West Range
Denton	Vertic Calciustolls	100	A-Bw-Bk-Ck-R	interbedded limestone and marl	Manning and Killeen uplands
Doss	Typic Calciustolls	55	A-Bk-Cr	Glen Rose limestone	slopes of Cowhouse Creek valley and tributaries
Eckrant	Lithic Haplustolls	30	A-R	Edwards Limestone	Manning uplands esp. in West Range
Frio	Cumulic Haplustolls	200	A-Bk-C	alluvium	stream terraces
Krum	Vertic Haplustolls	200	Ap-A-Bk-Ck	tributary alluvium	smaller, fine-grained tributaries
Lewisville	Typic Calciustolls	175	Ap-A-Bk-Ck	trunk stream alluvium	stream terraces, particularly on late Pleistocene fill
Nuff	Typic Calciustolls	200	A-Bk-CBk-Ck	Walnut Clay	Killeen surface
Purves	Lithic Calciustolls	35	Ap-Ak-R	interbedded limestone and marl	Manning and Killeen uplands
Real	Typic Calciustolls	40	A-Ak-Crk	limestone and colluvium; esp. on Glen Rose Limestone	erosional uplands and slopes; esp. on Killeen surface and flanks of Killeen surface
Seawillow	Typic Ustochrepts	200	A-Bk-Bck	alluvium	typically beveled margin of Jackson fill
Slidell	Udic Pellusterts	170	A-AC-C	fine-grained alluvium	upland tributaries, sloughs
Speck	Lithic Argiustolls	50	A-Bt-R	Edwards Limestone	Manning surface; broad uplands in East Range
Tarrant	Lithic Calciustolls	40	A-R	Edwards Limestone	Manning surface; margins, dissected uplands, and sloping surfaces
Topsey	Typic Calciustolls	70	A-Bw-Bck-2C	Walnut Clay	Killeen surface
Wise	Typic Ustochrepts	200	A-Bw-Bk-C	Paluxy Sandstone	Midslope bench below Killeen surface in West Range

2.4 ECONOMIC RESOURCES

The distribution of resources on Fort Hood represents a "spatial patchwork" of economic opportunities and constraints (Butzer 1982) that the prehistoric populations adapted to through the development of complex economic strategies. In order to fully understand these strategies in their proper context, it is first necessary to understand the nature of the spatial distribution of resources they were designed to exploit. While this goal is clearly unattainable in its entirety, it does provide a useful framework for examination of prehistoric activity in an ecologic context. Although many different types of resources played a role in the prehistoric economy, three broad categories of resources that were particularly important to the prehistoric inhabitants of the Fort Hood area can be identified: lithic resources, biotic resources, and water.

Chert occurs in prodigious quantities on Fort Hood, and was a very valuable resource for a prehistoric population that based much of its economy on the production and use of stone tools. Chert nodules and tablets occur on Fort Hood in bedrock outcrops, colluvial and alluvial deposits, and as resistant lag in upland settings underlain by the Edwards Formation. One of the primary foci of analysis in this report concerns the movement and utilization of this chert by prehistoric peoples. This analysis is based on a taxonomy of Fort Hood cherts developed by Frederick and Ringstaff (1994) and expanded on in this volume (see Section 4.3.1). In the earlier study, Frederick and Ringstaff identified 16 distinct types of chert from upland settings on the fort. These material types are associated with three broad "Chert Provinces" on the reservation termed the Southeast Range, North Fort, and West Fort (Figure 2.8). Examination of the recovery pattern of these chert types relative to their "home" province allows for examination of chert movement patterns and intensity of exploitation by the prehistoric population. The additional 11 types identified and used in this report represent material collected from the channel of Cowhouse Creek and Table

Rock Creek, and comprise a fourth chert province termed the Cowhouse Creek province. Other than the Leon River, which skirts the northeastern boundary, Cowhouse Creek and its tributary, Table Rock Creek, are the only streams flowing through Fort Hood that have a substantial watershed upstream of the facility, and thus the potential to deliver "exotic" cherts in their bedload.

Biotic resources, including floral and faunal elements, are one of the most important and difficult classes of resources to address archaeologically due to their impermanent nature. The spatial patchwork of biotic resources is a function of complex interrelationships between substrate, slope, aspect, moisture, and edaphic factors, tempered by the historical trajectory of environmental change. Ideally, interpretation of economic strategies would be based on a thorough knowledge of the spatial distribution of biotic resources through time. Unfortunately, such a reconstruction is impossible to attain. While an inventory of the species occurring in aggregate at any particular time is possible, and the location of individual species may be firmly established by fortuitous preservation of macrobotanical remains or phytoliths, identification of the overall spatial distribution of resources through time is beyond the limits of both technical expertise and fiscal prudence. Therefore, analysis must proceed at the level of relatively gross subenvironments through analogy with extant assemblages.

Several basic suites of biotic resources with specific environmental contexts can be identified. Upland resources include a variety of plants, many with seasonal availability (e.g., prickly pear fruit, acorns), and many species of game animals. The distribution and density of plant resources can be expected to vary temporally and spatially in response to changes in moisture availability, slope, aspect, and edaphic conditions. Similar fluctuations probably also affected game availability, such as the variable presence of bison through time documented by Dillehay (1974). Riverine resources include a wide variety of seasonal and perennial plants and a suite of fauna that overlaps, but is typically distinct from, animals

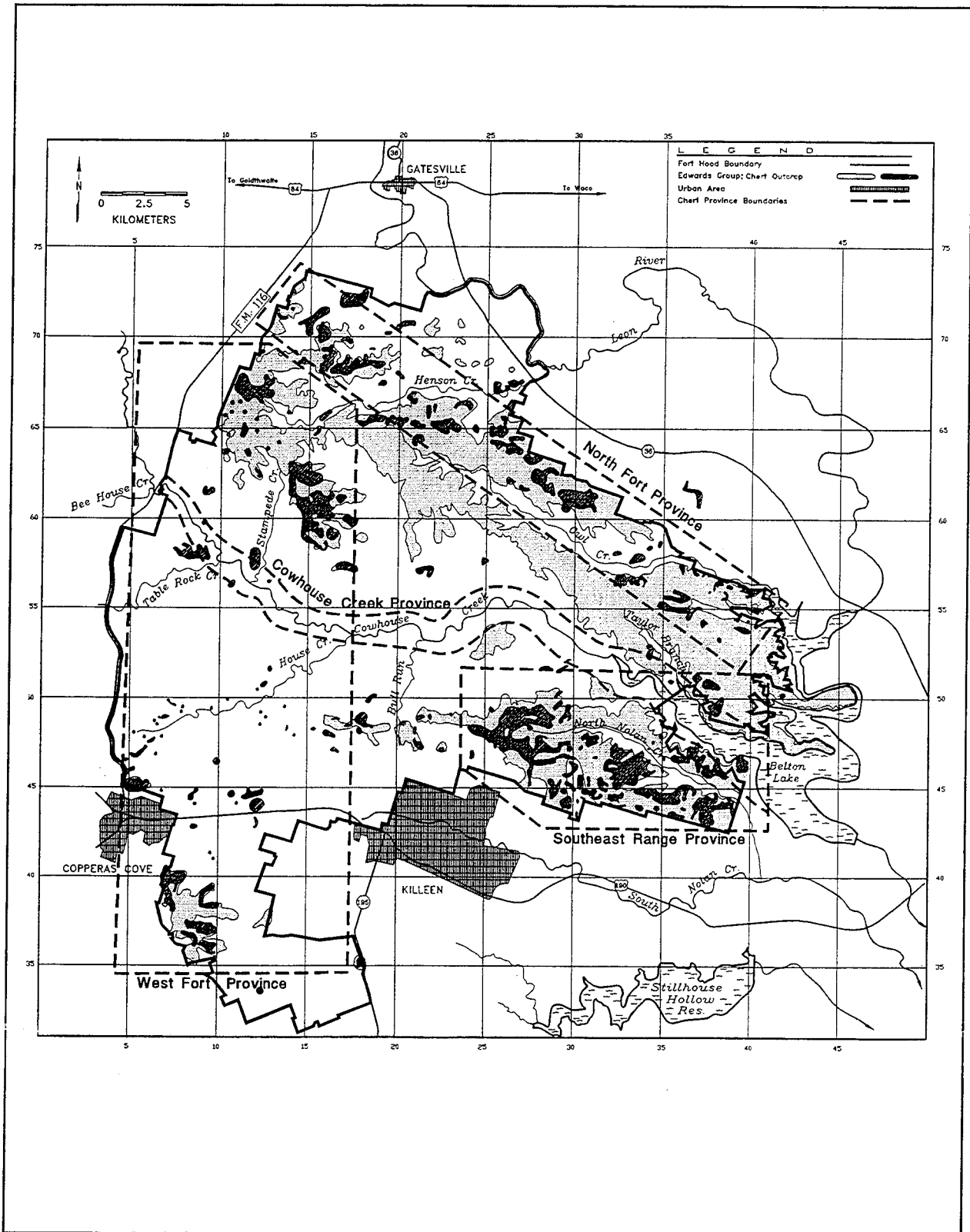


Figure 2.8 Distribution of Chert Outcrops and Chert Provinces at Fort Hood (after Frederick and Ringstaff 1994).

available in the uplands. In addition, the suite of riverine resources tends to change with the size of the stream and attendant shifts in sediment thickness, depositional energy, groundwater conditions, and floodplain size and stability. Finally, the availability of aquatic resources, including fish and shellfish, varies both temporally and spatially in response to fluctuations in water velocity, water depth, the degree to which flow is sustained throughout the year, sediment supply, and the width-to-depth ratio of the channel.

Water is another important resource utilized by the prehistoric population. Arguably, the availability of fresh water placed a significant constraint on the potential for any given locality to be selected for cultural utilization, regardless of its other characteristics. Although the prehistoric availability of water can be inferred with a reasonable degree of accuracy on the basis of modern conditions and what is known of the paleoenvironmental record, the resource was by no means static through time. Rather, the availability of flowing groundwater almost certainly varied over the long term in response to fluctuations in climate, and probably varied spatially as the subterranean delivery network evolved. This spatial variability is currently reflected in the distribution of "wet" and "dry" rockshelters and fossil travertines, which suggests that the activity of individual springs and seeps may increase or decrease independent of broader shifts in groundwater availability. This independence probably occurs as the subterranean network of pores and fractures evolves through dissolution of limestone and reprecipitation of phreatic carbonate in the subsurface at spring heads.

The persistence and character of open-channel flow in the stream network also clearly varied throughout the Holocene, probably in direct relation to the amount of groundwater discharge feeding the net. The availability and quality of this water also probably varied with fluctuations in sediment supply, precipitation timing and intensity, and channel form. A steady supply of surface water was probably enhanced by more uniform,

low-intensity precipitation, moderate to low sediment supply, and a deep, meandering channel. Factors that probably would have decreased availability and/or water quality include a decrease in overall precipitation, an increase in the intensity of individual storms, and an increase in coarse sediment delivery to the channel.

2.5 SPATIAL SITE GROUPINGS

For analytical purposes, the 57 archaeological sites addressed in this report have been grouped into nine distinct spatial groups (see Figure 2.2). As discussed above, these groups are not the product of rigorous analysis of environmental variables. Rather, they represent spatial groupings of sites that share a local landscape with similar environmental characteristics. As such, they provide a mechanism to compare and contrast the characteristics of the sites within a spatial framework. The following discussion provides a brief overview of the environmental characteristics of each grouping.

2.5.1 Nolan/South Group

Sites in the Nolan/South group are centered around the North Nolan Creek valley and its tributaries south of Nolan Creek Road (see Figure 2.2), and include 41BL154, 41BL208, 41BL740, 41BL821, 41BL834, and 41BL853. The bedrock underlying the North Nolan Creek area consists exclusively of rocks of the upper Fredericksburg and Washita Groups, including the Edwards, Duck Creek, and Comanche Peak limestones, which are the stratigraphically highest rocks occurring within the boundary of Fort Hood. Thus, the uplands and tributaries surrounding North Nolan Creek represent topography developed by dissection of the higher Manning surface. Incision of the high surface has been limited, and no equivalent of the broad intermediate upland (Killeen) surface exists in the Nolan/South area. Rather, the valleys of North Nolan Creek and its major tributaries occupy roughly the same stratigraphic position as the Killeen surface on the rest of the base.

The valley of North Nolan Creek and its tributaries are relatively shallowly incised and moderately broad. All of the sites in the group are situated on alluvial and/or alluvial/colluvial deposits either in the valleys of North Nolan Creek and its higher-order tributaries (e.g., 41BL154, 41BL208) or in narrow, low-order tributary valleys incised into the Manning surface (e.g., 41BL834, 41BL853). Due to the shallow incision of the valleys, rockshelters are relatively rare in comparison to other areas of East Range, but do occur as at 41BL154.

Soils in the Nolan/South area are typical of those developed on the Edwards and Washita group limestones of the Manning surface in East Range. Here, the upland soil cover is better preserved than anywhere else on the base. This area is part of the Speck-Tarrant-Purves Soil Association defined by the USDA Soil Conservation Service (Huckabee et al. 1977). Speck soils are typical of the broad uplands, and are characterized by a relatively thin but strongly developed A-Bt-R profile. Typically, the strongly developed Bt horizon contains a considerable concentration of residual chert, suggesting that the clayey Speck soils are the product of long-term weathering of the Edwards bedrock. On the beveled margins and more dissected portions of the upland, Speck Soils give way to thin silty clay and stony clay soils of the Tarrant and Purves Associations. These soils both exhibit an A-R profile and appear to represent areas where either incremental erosion and/or accelerated stripping at some point in the past has prevented formation of the strong Bt horizon typical of the Speck series. Alluvial soils in the valley of North Nolan Creek and its tributaries vary from gravelly loams through gravelly clays to thick vertic clays and clay loams. The soils are mapped as the Krum-Lewisville Association (Huckabee et al. 1977), which also includes areas of Frio and Purves soils, and appear to be developed almost exclusively in Holocene alluvium.

Modern vegetation in the uplands consists of a closed Ashe juniper/live oak woodland except where military activity has resulted in a dense

network of vehicle trails or where extensive areas have been cleared to create pasture (e.g., in the vicinity of Heiner Lake). Secondary tree species include cedar elm, netleaf hackberry, and Texas oak. The undergrowth is characteristically dense in the wooded areas, with species including scrub oak, greenbriar, redbud, Mexican buckeye, and Texas persimmon. Relatively lush grasses (e.g., hairy grama, blue grama, ruellia, and painted euphorbia), and composites such as broomweed, young juniper, and prickly pear are characteristic of cleared areas. The biodiversity and vegetation density of the area, as in other areas of East Range, is currently the highest of any area on Fort Hood. Although much of this contrast is clearly due to environmental degradation of maneuver-intensive areas on the western side of the base, the presence of the Speck series soils indicates that anchoring vegetation prevented the type of widespread stripping of the uplands apparent elsewhere, and it is likely that economic plants and animals were readily available throughout most of the culturally-relevant past.

The Nolan/South area coincides roughly with the densest chert outcrops occurring in the Southeast Range chert province. Large nodules and tablets of Heiner Lake Tan, Heiner Lake Blue, and Fossiliferous Pale Brown cherts occur in large quantities as upland lag and in the bedload of the streams. Several other varieties of chert, including Heiner Lake Translucent Brown, also occur in significant numbers, but tend to appear as smaller clasts that are more difficult to utilize as a raw material. Interestingly, the dense chert pavement typical of the Southeast Range province is best exposed where anthropically-stimulated soil erosion in the uplands has been the most severe, suggesting that the prehistoric availability of these cherts was probably much more limited than it is at present. Still, the quantities of chert apparent in the alluvial deposits, such as the chert-rich fan at 41BL154, suggest that some chert has been available throughout the Holocene.

Water resources are also relatively abundant in the Nolan/South area. In addition to the streams, a

number of seeps and springs are present in the area, including one at 41BL740 and a particularly high-volume spring at 41BL154. Moreover, indications of gleying and/or redox reactions are apparent in many of the alluvial sediments investigated in the area, indicating a periodically high water table, particularly in the North Nolan Creek valley. Thus, water availability does not appear to have been a limiting factor to site location throughout most of the Holocene.

2.5.2 Nolan/Cowhouse Group

The sites of the Nolan/Cowhouse group (41BL886, 41BL888, 41BL421, 41BL755, 41BL168, 41BL765, 41BL427, 41BL432, 41BL433, 41BL743, 41BL744, 41BL198, 41BL751, and 41BL754) are situated on the interfluvium between the North Nolan Creek valley and the Cowhouse Creek valley. On the southern side of the upland interfluvium, low slopes lead down to the shallowly incised North Nolan Creek valley, while the dissected northern side of the interfluvium steps down to a moderately wide, partially dissected part of the intermediate upland (Killeen) surface before dropping again into the more deeply incised Cowhouse Creek valley. Dissection of the upper surface is incomplete, and several isolated mesas that represent remnants of the Manning upland rise above the rolling Killeen surface. Many of the sites in the Nolan/Cowhouse group are rockshelters formed beneath the thick Edwards limestone, particularly on the northern side of the interfluvium. Here, small tributaries of Cowhouse Creek have incised deep notches into the margin of the high upland, and broad, level upland surfaces are rare. As a result, Speck soils give way to the more erosive soils of the Tarrant series as the most common high upland soil. The Manning surface slopes are typified by Real and Brackett soils, while the dissected Killeen surface is mantled with a complex assemblage dominated by Brackett, Altoga, Krum, and Purves soils (Huckabee et al. 1977).

Vegetation on the top and slopes of the Manning surface is a thick oak-juniper woodland similar to

the upland vegetation in the North Nolan group, but gives way to an oak-juniper savanna assemblage on many parts of the lower Killeen surface. As a result, maneuver activity has been less restricted, and many parts of the intermediate surface show relatively severe, ongoing tracked vehicle damage over wide areas. Most drainage in the Nolan/Cowhouse area flows north to Cowhouse Creek, and intermittent springs that provide the source for many of these small drainages dot the margin of the Manning upland. Because no major streams cross the area, Late Quaternary deposits are limited to colluvium and slopewash, particularly at the base of the Manning slope, gravelly clay alluvium in the confined drainages on the margin of the dissected Manning surface, and clayey alluvium in the shallow drainages that cross the Killeen surface.

The Nolan/Cowhouse area is included in the Southeast Range chert province. Although some chert does occur within the Nolan/Cowhouse area as lag and outcrop material on the Manning surface, in colluvium on the Manning surface flanks, and in the bedload of the small streams, the amount of available material pales in comparison to that in the adjoining Nolan/South area, which corresponds to the core of the Southeast Range province. Although it is not prodigious anywhere in the Nolan/Cowhouse area, the availability of chert drops off dramatically in the north due to the lack of chert in the Walnut Clay, which underlies much of the Killeen surface. However, chert is readily available in the Nolan/South area to the south, and was also probably readily obtained from the Cowhouse valley to the north, although the construction of Lake Belton has eliminated the availability of this resource in the modern era.

2.5.3 East Cowhouse Group

The sites of the East Cowhouse group (41BL339, 41BL415, 41BL427, and 41BL454) are situated on and in Pleistocene and Holocene terraces of Cowhouse Creek downstream of East Range Road. On this side of the base, Cowhouse Creek flows on rocks of the Fredericksburg Group (e.g., Walnut

Clay), having yet to cut down into the underlying Trinity Group rocks that are widely exposed on the western side of the facility. The Cowhouse terraces are underlain by a variety of Late Pleistocene and Holocene alluvial fills up to approximately 8 m thick, and mantled primarily by soils of the Bosque and Krum series.

Vegetation on the Holocene terraces is substantially modified from the natural assemblage by clearing and agriculture. Prehistorically, the lower terraces appear to have been covered by a diverse riparian woodland that included American elm, hackberry, burr oak, pecan, slippery elm, and mulberry. Remnants of this community are still preserved, but much of the terrace system has been cleared and is now vegetated with dense grasses and compositae. The southern valley walls are typically vegetated with a closed, live oak-ash juniper woodland that grades into the riparian woodland (or fronts on cleared areas) at the rear of the terraces. On the northern side of the valley, the valley slopes are mantled with a more open, xeric assemblage of similar species. Juniper has invaded some of the preserved riparian woodlands and some of the formerly cleared areas on the terraces. The higher Pleistocene terraces are currently either open oak/juniper woodland or grassland, and also appear to have been extensively cleared and frequently plowed or terraced during the historic period.

Water availability is currently excellent due to the presence of Lake Belton, and it is likely that Cowhouse Creek assured a supply as abundant as anywhere on the facility throughout the Holocene. Alluvial chert was also presumably readily available at most times in the past, although the construction of Lake Belton has now eliminated access to the resource and sustained high flow conditions may have limited availability at times in the prehistoric past.

2.5.4 Cowhouse/Taylor/Bear Group

The sites of the Cowhouse/Taylor/Bear group (41BL532, 41BL538, 41BL567, 41BL568,

41BL564, and 41BL513) are situated in the northeastern part of the facility east of East Range Road and north of Cowhouse Creek. The Cowhouse/Taylor/Bear area consists of a moderately dissected Manning surface plateau north of Cowhouse Creek. The uplands are gently rolling and cut by a number of deep drainages, notably Taylor Branch and Bear Creek. As in the dissected high upland surface in the North Nolan area, this dissection has led to the formation of a number of rockshelters on the margin of the Manning surface and facilitated stripping of the upland surface soil. As a result, the well-developed Speck series soil is relatively rare, and the upland surface is dominated by soils of the Tarrant association (primarily Tarrant, Purves, and rock outcrop). Vegetation is typically a closed, ash juniper-live oak woodland, and can be extremely dense in places due to local profusion of undergrowth species including scrub oak, greenbriar, flameleaf sumac, Texas persimmon, and redbud. A notable component of the area is a relict population of bigtooth maple near the headwaters of Taylor Branch and Bear Creek. Modification of the natural cover by military and civilian activity is variable, but large tracts of essentially unmodified forest persist on the uplands and in the narrow, incised valleys.

The majority of the Cowhouse/Taylor/Bear group occupies a location south of the North Fort Chert province and north of the Southeast Range province. Overall, even though the area is underlain primarily by Edwards limestone, chert availability in the Cowhouse/Taylor/Bear area is low. This paucity is probably due in large part to the character of dissection in the area; the deeply incised canyons have resulted in almost vertical incision of the Edwards limestone rather than extensive beveling of the upland margin. Thus, while similar quantities of chert may be contained in the limestone as are present in the adjacent chert provinces, the pattern of weathering and erosion has not provided broad, downwasting surfaces upon which the material is exposed. Water availability is moderate to good, with most streams originating at small, low-volume but relatively

frequent point sources along the margin of the Manning surface.

2.5.5 Turkey Run Group

The sites of the Turkey Run Group (41BL1400 and 41BL139) are situated in the vicinity of Turkey Run Creek and Turkey Run Road in the southwestern portion of the facility. Turkey Run Creek is a tributary of House Creek, and flows across a portion of the intermediate upland (Killeen) surface by upper Glen Rose and lower Walnut Clay rocks. These rocks underlie all of the Turkey Run group area, and support a variety of soil associations including the Brackett-Topsey Association, which occupies the highest portion of the local landscape; the Nuff-Cho Association, which occupies a series of relatively narrow, north-south-oriented interfluves underlain primarily by Glen Rose rocks; the Doss-Real complex, which occupies the flanks of these interfluves; and Krum soils, which are typical of the alluvial fills in the drainages. The upland surfaces are almost completely cleared with evidence of very heavy maneuver activity. A relatively open, discontinuous juniper-oak forest mantles the flanks of the intermediate upland and the valley bottoms. Springs and seeps are relatively rare in the area, and no chert resources are readily available.

2.5.6 Table Rock Group

The sites of the Table Rock group (41CV174, 41CV1423, 41CV164, 41CV1136, 41CV1116, and 41CV319) are situated on Table Rock Creek and its surrounding uplands in the southwestern part of the facility. The Table Rock Creek group straddles a chertless terrain underlain almost entirely by rocks of the upper Glen Rose Formation, although the highest parts of the landscape include limited outcrops of the lower Walnut Clay and narrow outcrop bands of the Paluxy Sandstone.

Principal soil associations in the area include the Doss-Real Complex on the sloping surfaces underlain by Glen Rose rocks, Cisco and Wise soils on the Paluxy outcrops, Nuff-Cho Association

soils on the lower Walnut Clay, Lewisville and Bosque soils on the broad Pleistocene and Holocene stream terraces of Table Rock Creek, and Krum soils in some of the smaller tributaries. The area is largely cleared and has a sparse, patchy upland tree cover consisting of open oak-juniper woodland alternating with broad areas of grass and forbs. As elsewhere, the chemically distinct Paluxy soils (which can have a soil pH as low as 6.1, in comparison to a minimum of 7.9 in the soils of the surrounding Nuff-Cho and Doss-Real associations; McCaleb 1985) support a slightly different vegetation assemblage than the surrounding calcareous soils. Although the character of this difference has yet to be quantified, the sandy Paluxy soils typically support fewer juniper and more oak (particularly post oak and blackjack oak) than the calcareous soils, and also seem to support a slightly different assemblage of grasses.

Maneuver activity and accompanying landscape impact is relatively heavy, but is not as pronounced as it is farther to the south (e.g., the Turkey Run area). The Table Rock Creek valley supports a relatively diverse, if not particularly dense riverine assemblage that includes a variety of large hardwood tree species. A sample stand in the Table Rock Creek valley (Espey, Huston and Assoc. 1979) was dominated by pecan, cedar elm, and netleaf hackberry, with bur oak, buckthorn, Texas oak, and American elm also occurring. Springs and seeps are rare, and naturally occurring lithic raw material is practically nonexistent, although some small nodules of Seven Mile Mountain Novaculite have been observed in the area.

2.5.7 West Cowhouse Group

The sites of the West Cowhouse group (41CV1097, 41CV1098, 41CV1099, 41CV960, 41CV1105, 41CV1038, 41CV97, 41CV95, and 41CV1200) are situated on Pleistocene and Holocene terraces of Cowhouse Creek upstream of West Range Road. This group includes large, deeply-stratified sites on and in the principal

Holocene fill units. Principal mapped soil associations include Lewisville, Bosque, Seawillow, and Frio soils on the alluvial terraces and the Real-Rock outcrop association on the valley flanks. In general, Lewisville soils are associated with the Pleistocene (T_2) terraces, Bosque soils are associated with the Holocene (T_1 and T_0) terraces, Frio soils are associated with filled swales on the T_1 surface, and Seawillow soils are associated with the erosionally beveled margins of the late Pleistocene Jackson fill. The Cowhouse valley, like Table Rock Creek, is characterized by a relatively diverse riparian woodland assemblage that has been largely cleared off the broad terrace surfaces during the historic period. Principal taxa include pecan, American elm, burr oak, hackberry, cedar elm, and buckthorn, with oak/juniper woodland occupying the valley walls. Chert availability is limited to the channel of Cowhouse Creek, as no chert at all crops out on the surrounding uplands. Although its flow characteristics are sure to have varied through time, the Cowhouse channel also undoubtedly served as the most copious and dependable source for fresh water throughout most of the Holocene.

2.5.8 Stampede Group

The Stampede group sites (41CV1027, 41CV1023, and 41CV595) are situated along the lower stretch of Stampede Creek east of Old Georgetown Road in West Range. They occupy a narrow valley incised into the intermediate upland (Killeen) surface that spans the contact between lower Fredericksburg Group rocks (e.g., the Walnut Clay) and upper Trinity Group Rocks (e.g., the Paluxy Sandstone and the Glen Rose Limestone). All three sites in the Stampede group are associated with the outcrop of the Paluxy Sandstone or sediments derived from that outcrop. Soil associations in the area include the Nuff-Cho Association on the rolling Killeen surface, the Doss-Real Complex on the stepped Glen Rose Formation outcropping on the valley slopes of Stampede Creek, and Cisco and Wise soils on the outcrop of the Paluxy Sandstone. As in the Table Rock area, the majority of the area is covered with

an open oak-juniper woodland, while the Paluxy sand substrate is an oak woodland. Maneuver damage is moderate on the sloping valley walls and heavy on the Killeen upland.

No chert resources are known from the area, although a limited amount of alluvial chert is probably available in the bedload of Stampede Creek, which drains the margin of the Manning upland. Springs and seeps are limited in the area, and usually occur as broad, muddy seeps along the outcrop of more marly beds that occur for short periods following heavy rains and would have been very difficult to utilize as an effective water source.

2.5.9 Shell Mountain Group

Sites in the Shell Mountain Group (41CV1008, 41CV587, 41CV1007, 41CV1011, 41CV1167, 41CV137, and 41CV1085) are situated around the margin of a remnant of the Manning surface in the northwestern part of the base. They include sites in the upper reaches of the Two Year Old Creek, Stampede Creek, and Henson Creek watersheds. Shell Mountain is a remnant of the Manning surface that is both highly eroded and remarkably free of lag chert. The margins of Shell Mountain, where all the sites are situated, is characterized by steep slopes developed on Comanche Peak limestones. At the base of the slope, the surface flattens out into the intermediate Killeen upland, which is underlain by the Walnut Clay. The upper surface is mapped in the Eckrant/rock outcrop soil association, and is characterized by thin, patchy clay soils mantling an undulating surface of hard limestone. The steep margins of the Manning surface are mapped as the Real/rock outcrop association, while the Killeen surface around the margin of the mountain are typically mapped as the Brackett/Topsey Association. The relatively small valleys of the streams draining the surface, including Stampede and Henson Creeks, are mapped as the Slidell silty clay.

The Manning upland is vegetated with an open juniper/oak woodland cut with a profusion of

cross-cutting vehicle trails. The understory is relatively light, especially in comparison with the Manning surface on the eastern side of the base. The steep slopes of the Manning surface are vegetated with a closed oak/juniper woodland that becomes particularly dense on north-facing slopes. In contrast to the upland, the slope assemblage typically has a relatively closed canopy and dense growth in the understory. The base of the slope grades rapidly into the heavily maneuvered grassland and savanna of the Killeen surface. Despite its heavily denuded character, very little lag chert is available on the Manning upland. Water availability is limited to a series of springs around the upland margin and the channels of the small streams draining its margins. Although several springs with appreciable flow are present around the upland margin, the frequency of escarpment springs is noticeably lower than in comparable areas in the eastern part of the base. Several factors probably influence this lower frequency. First, the lack of soil cover on the upland surface probably increases the rate of surface runoff and decreases the amount of moisture that is able to infiltrate, leading to less efficient recharge of the system. Second, the development of karstic depressions is more pronounced than any other segment of the Manning surface observed on the fort. This suggests that the subsurface network may be so developed and integrated that water is able to move through the subsurface system almost as fast as it moves through the surficial network. This would lead to high-volume discharge from relatively few springs for limited periods following precipitation events rather than lower volume, longer duration discharge from a higher number of small springs.

3.0 RESEARCH CONTEXT FOR SITE TESTING

W. Nicholas Trierweiler, G. Lain Ellis, and J. Michael Quigg

This chapter is intended to summarize the historical and informational contexts within which the assessments of site significance, and hence NRHP eligibility, were made. The chapter is structured in three discussions. The first part provides the reader with a historical context of archaeological investigations at Fort Hood. Next, the results of these investigations, supplemented as necessary with studies from other regions of Texas, are synthesized into a reconstruction of the currently accepted cultural historical framework. Third, the key data needs for determining site significance, as derived from the Fort Hood research design, are delineated and are distilled into a series of field observable traits.

3.1 HISTORY OF ARCHEOLOGICAL STUDY AT FORT HOOD

The following discussion is summarized from Mariah's previously published research design (Ellis et al. 1994b) and reviews the results of archeology within a 50 km radius of Fort Hood (Figure 3.1), an area of approximately 15,700 km². The use of the arbitrary and generous 50 km radius highlights the sparsity of substantive archaeological information for the Fort Hood area.

3.1.1 Preliminary Research in the Fort Hood Area

The earliest professional excavation in the review area was performed by A. T. Jackson in 1933 at the Willison Farm in eastern Bell County (Young 1988). This work was apparently never reported. In the early 1930s, the Ranney Creek Cave site in eastern Coryell County was excavated by H. Ramseur, but similarly has not been reported (Prewitt 1974). The Belton area was preliminarily surveyed by Robert Stephenson in the late 1940s (Shafer et al. 1964).

Early archaeological research in the review area was dominated largely by Frank Watt, the driving force behind the Central Texas Archeological Society and the author and editor of most of the material published by the society (Lawrence and Redder 1985). A tireless avocational with professional sensibilities (Stephenson 1985), Watt surveyed and excavated over a wide area centered around Waco. Among several sites excavated by Watt in the review area is the Aycock Rockshelter (also known as Kell Branch Shelter #1, in eastern Bell County), from which Watt recovered more than 20 burials (Watt 1936) which were analyzed by a physician (Aynesworth 1936). Watt gained a thorough knowledge of artifact styles in Central Texas and other areas of the state (Stephenson 1985; Lawrence and Redder 1985; Redder 1985), including defining the Waco sinker as an artifact class with apparent geographic variation (Watt 1938). Although Watt's aims and techniques were consistent with the state of the art in Central Texas throughout his 40-year career (cf. Willey and Sabloff 1980), his emphasis on artifact typology has relatively limited utility for studies that rely on discriminating the details of behavior or the systemic properties of hunter-gatherer adaptations (cf. Johnson 1989; Guderjan et al. 1980).

Beginning in the 1950s, the pace of professional archeology in the review area increased as reservoir development activities demanded attention to cultural resources. Miller and Jelks (1952) surveyed the area on the eastern side of Fort Hood anticipating the construction of Belton Reservoir. Testing in middens and rockshelters failed to provide substantial evidence that would sort out chronological information (cf. Henry et al. 1980). Johnson (1962) surveyed the Stillhouse Hollow Reservoir about 10 km south of Fort Hood in Bell County, performing the first organized archeology on the Lampasas River and laying the groundwork for later mitigation efforts (Sorrow et al. 1967).

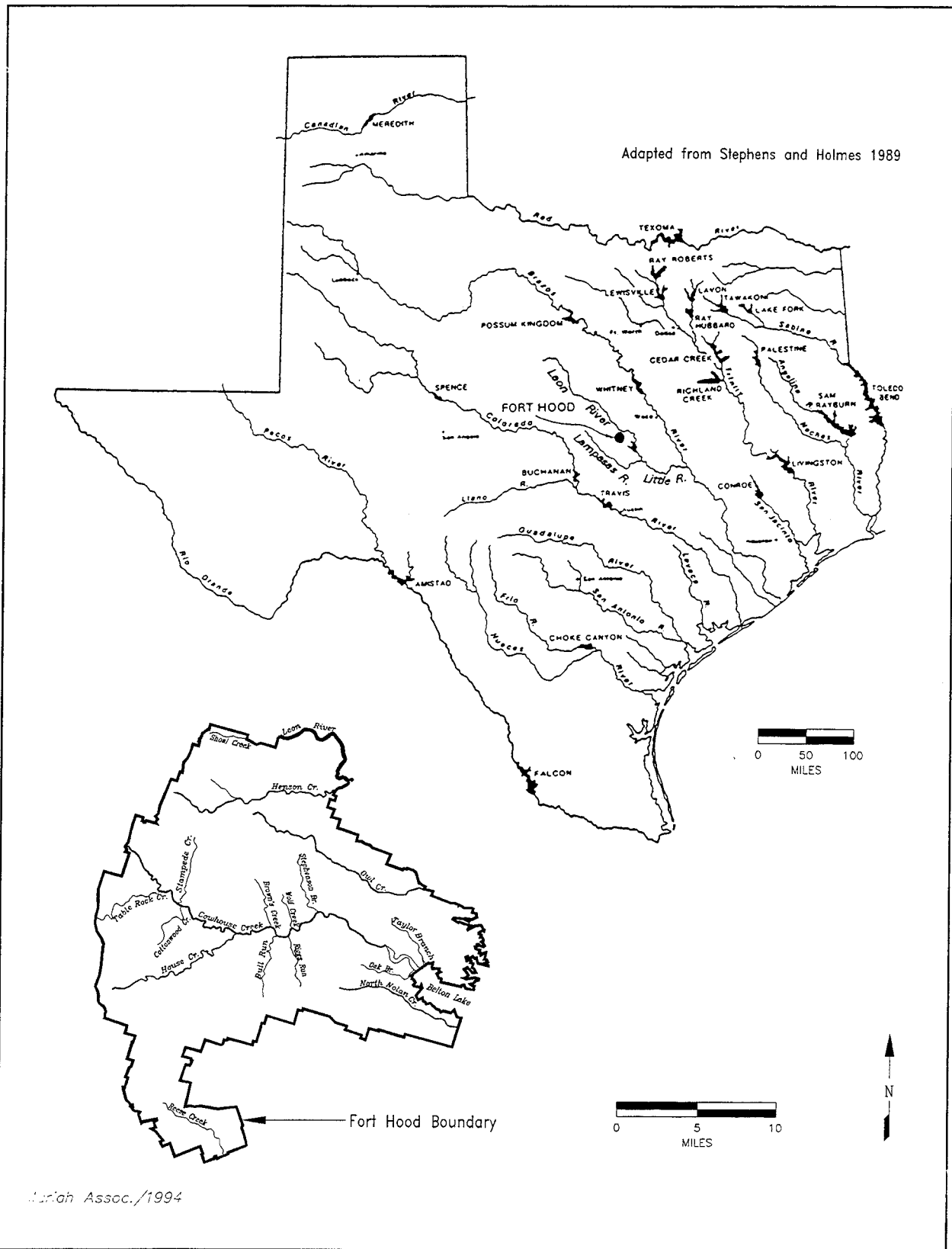


Figure 3.1 Review Area for Archeology of the Fort Hood Area.

Substantial test excavations were conducted by Shafer (1963) at the Youngsport site, about a mile upstream from Stillhouse Hollow, on the Lampasas River. Although Shafer recognized that his excavation strategy prevented him from confirming stratigraphic relationships between excavation units, his results nonetheless implied that the projectile point sequence at Youngsport was largely consistent with the recently developed sequence in Southwest Texas (Johnson et al. 1962), and he provided a provisional definition for the Early Archaic Gower point. However, Shafer reported no subsistence or paleoenvironmental data, and no behavioral data beyond basic descriptions of some aspects of lithic artifact production techniques. Shafer et al. (1964) surveyed the Belton Reservoir in 1962. At least 12 sites were tested to some extent. The analysis in the report dealt largely with typological descriptions of the various artifact classes found in both surface and test collections, and the assignment of culture-chronological position to sites. Faunal material was collected, but not reported, and no paleoenvironmental or behavioral data was reported beyond some basic descriptions of lithic artifact production techniques.

In 1964, Sorrow et al. (1967) conducted test and mitigation excavations in Stillhouse Hollow Reservoir. On the basis of excavations at the Landslide and Evoe Terrace sites, they defined a series of local occupational phases which they compared to other areas of the region. These excavations provided further support for the Early Archaic status of the Gower point and further evidence that the projectile point sequence at least broadly conformed to that in other areas. Although they reported faunal remains associated with burned rock features, no paleoenvironmental data were provided, and behavioral information was again restricted to descriptions of basic elements of tool production.

Thus, as of the mid 1960s, archeology in the Fort Hood area was largely absorbed in establishing chronological and typological baselines for identifying culture-area affiliations, a focus that

was consistent with state of the art problems then current in archeology throughout Central Texas (cf. Willey and Sabloff 1980).

3.1.2 Problem-Oriented Research in the Fort Hood Area

No substantial research was conducted in the review area between the mid 1960s and the mid 1970s. However, in the mid 1970s, archeologists working in the Fort Hood area began to augment chronologic goals with specific problem-oriented research. Archeologists from Southern Methodist University (SMU) began a long-term project in the Hog Creek Reservoir in northeastern Coryell County and southwestern Bosque County (Larson and Kirby 1976; Henry et al. 1980). The project involved the testing and mitigation of rockshelters and open sites. In addition to reporting the traditional typological and chronological data, the SMU reports contained substantial information to support functional interpretations of tool assemblages and paleoenvironmental interpretations.

The reports are notable with respect to technological studies in that they incorporate statistical tests of assemblage similarity and difference (Larson and Kirby 1976; Henry et al. 1980). Reconstruction of paleoenvironmental conditions attempted to incorporate data from a variety of sources (pollen, snails, and sedimentation), although poor preservation inhibited the use of pollen (Henry et al. 1980). The absence of faunal and other reliable seasonality data led to creative use of the exposure direction of rockshelters as a proxy for more direct data (Henry et al. 1980). The SMU research also was remarkable for its attempts to integrate the Hog Creek data into models of hunter-gatherer land-use patterns (Larson and Kirby 1976; Henry et al. 1980). The settlement data led Henry et al. (1980:523) to conclude that the Hog Creek area represented "a detached portion of Central Texas" which may have had at least some contacts with areas to the north (Lake Whitney area) and south (Canyon Reservoir area). Thus, the Hog Creek

project stands as a major contribution of behaviorally and systemically relevant research. Unfortunately, the bulk of the Hog Creek data pertains to the Late Prehistoric.

3.1.3 Excavations on Fort Hood

On Fort Hood itself, numerous surveys have been conducted since the late 1970s. However, the only recent report of excavations is Carlson (1993), although some other reports currently are in preparation. Test excavations by a Texas A&M University field school in 1990 concentrated on two rockshelters and the area immediately outside one of them. Analyses of pollen, phytoliths, and macrobotanical materials from the excavations were attempted, but the results were limited (Olive 1993). Faunal analysis identified 15 edible genus- or species-level taxa at the rockshelters. Although the analysts did not claim that all taxa were culturally significant (Sanchez and Shaffer 1993), they did show that an array of diverse environmental niches were represented, including niches somewhat distant from the sites. Thus, even allowing for representation of natural faunal elements, the faunal analysis implied a substantial likelihood that people utilized a variety of niches away from the immediate rockshelter surroundings (cf. Carlson 1993). Lithic analysis allowed for rough assignment of the sites to chronological periods via the presence of diagnostic types (Dickens 1993a; Carlson 1993). A visual study of chert types showed that lithic materials had been transported to the site from a number of different source areas on Fort Hood (Dickens 1993a), further reinforcing the implication that the rockshelter residents exploited diverse niches across the Fort (Carlson 1993). The combination of lithic and faunal evidence may provide a basis for suggesting that lithic procurement was incidental to other activities.

Beginning in 1991, a program of extensive subsurface testing was conducted at Fort Hood (Trierweiler 1994). Observations of geomorphic context were collected on 571 previously located sites and on 414 of these sites having the potential

for buried deposits, more than 5,800 shovel tests and test pits were excavated at 30 m intervals. In addition, limited excavations were conducted on nine burned rock mounds, and multiple AMS radiocarbon assays demonstrated complex sequences of use-reuse of these features from 170 to 6500 years BP (Quigg and Ellis 1994). The resulting artifact assemblage constituted the first significant collection of subsurface data from Fort Hood sites. The program also documented the spatial distribution and variability of Edwards chert throughout Texas and developed a working typology of 16 distinct varieties of Edwards chert present at Fort Hood (Frederick and Ringstaff 1994).

3.2 CULTURAL-HISTORICAL FRAMEWORK

The most recent published overview which includes Bell and Coryell Counties and most of Central Texas, is that of Black (1989a:17-38) which focuses on the Central Texas Plateau Prairie. He provided a brief history of the investigations up to that time, summarized information which pertained to specific site types, and addressed special sites and intrasite features. The presented data follows a three-part chronological framework for Central Texas based on Prewitt's (1985) radiocarbon data even though it was acknowledged that a single regional chronology is not yet viable (Black 1989a:25). That information was used and expanded upon by Ellis et al. (1994a:43-104) in developing the theoretical perspectives to guide the research design for Fort Hood. In general, Ellis et al. concluded that the traditional cultural-history focus in Central Texas has been largely unproductive and there is a definite need for a "back to basics" approach for Fort Hood (Ellis et al. 1994a). Ellis et al. (1994a) discusses the shortfalls of the chronological approach and then provides a means to address and understand the hunter-gatherer adaptations in Central Texas.

The Prewitt (1981b), Black (1989a), and Ellis et al. (1994a) overviews identify the broad chronological periods used below and highlight

what is known in each period. However, these broad temporal periods provide only a working framework and do not attempt to address problems of hunter-gatherer adaptive processes that may cross time periods. Detailed analyses of the cultural assemblages will allow adaptive processes to be address. Johnson (1987) criticizes Prewitt's selected samples in the radiocarbon data base, as he found poor correspondence of the phase assays and the phase diagnostics. This may indicate a problem of age-equivalent dates for Prewitt's phases as more dates become available for the region and specifically Fort Hood. Identifying the absolute age of a particular cultural assemblages is a high priority, given the questions raised about the present Central Texas temporal framework.

3.2.1 The Paleoindian Period

This is the earliest (about 9200 to 6000 B.C. after Black 1989a:25) indication of human occupation in Central Texas, but actual sites/components are very poorly represented. Projectile points, mostly large lanceolate types including Clovis, Folsom, and Plainview assigned to this age, have been recovered from the surface, but few intact Paleoindian components have been discovered, intensively excavated, and reported. Those components previously discovered are often problematic because of stratigraphic or other problems. Most of the present understanding of the subsistence, technology, settlement data, and so on, is extrapolated from adjacent regions (cf. Hofman 1989; Bement 1989; Hester 1989; Turpin 1991). The recent excavations at the Wilson-Leonard Site in Williamson County, an open-air terrace site, will hopefully add considerable information to the Central Texas data base. Any sites or components with Paleoindian materials should be of high priority since they are so rare in Central Texas.

A controversial area is the division of the late Paleoindian and the Early Archaic period as limited information and sites are available to address this division. The separation into two temporal units is generally centered on a

subsistence change from the postulated big game hunting in the Paleoindian to a more diversified small game and plant utilization in the Early Archaic. Growing evidence indicates that the Paleoindian period was not solely focused on big game (Johnson 1964; 1967). Therefore, this subsistence issue is indeed an important research question in clarifying and identifying these periods and the change from one to the next. Not often discussed is the technological change from the lanceolate to the stemmed or notched projectile points and what accounts for this change in weaponry. Is the weaponry change solely a response from one resource base to another, or were there other contributing factors? The division of the two periods may also be linked to environmental conditions and therefore, it is important to assess environmental aspects at the site or component level. The lack of intact components in Central Texas has hindered our ability to address the basic questions concerning the Paleoindian period. Therefore, any sites containing Paleoindian components would be extremely important if the materials are preserved in primary or semi-primary context.

3.2.2 The Early Archaic Period

The Early Archaic period (about 6000 to 3000 B.C. after Story 1985) is not much better represented by intact components than the Paleoindian period. The data base is still too small and limited to flesh out answers to specific regional research questions concerning subsistence, technology, and settlement patterns. Many of the known sites containing artifacts projected for this age are mixed multiple events that can not be analyzed separately. Most sites are known by projectile points and lack discrete assemblages, thus context has again limited the contributions to our understanding specific aspects of this period. Specific tool forms recovered from the Early Archaic sites are recognized far beyond the boundaries of Central Texas. This distributional pattern denotes broad settlement patterns and resource utilization. Early Archaic sites from adjacent regions have provided the general timing

for this period and our current understanding of what is postulated for Central Texas. Recent reports on Camp Pearl Wheat, an open-air, short-term, single event (Collins et al. 1990) and the Sleeper site (Johnson 1991) provide new information concerning the Early Archaic, but are just a start to what is needed for a comprehensive understanding of this period. Absolute temporal placement has not even been established for Central Texas.

3.2.3 The Middle Archaic Period

The Middle Archaic period (about 3000 to 1000 B.C. after Story 1985) is much better known through numerous and extensive excavations of burned rock middens and a few small rockshelters. However, the burned rock middens have often lacked clear stratigraphy which has hampered the interpretations and blurred the association of the material assemblage. The presence of many Middle Archaic points in most burned rock middens led researchers to suggest a shift in subsistence strategy from the previous period (Weir 1976; Prewitt 1981b; Creel 1986). However, the reliance on point types alone without substantial radiocarbon assays to verify the actual feature ages has created problems. Projectile points have also served as the major tool in identifying phase or interval periods, therefore a number of divisions and modifications to the chronological framework has occurred (Weir 1976; Prewitt 1981b). Although ages of burned rock features have been postulated for years on the basis of point types, minimal direct evidence exists as to how these features functioned and what resources were used with them. Nuts and deer have been postulated as the principle resources used with the middens (Weir 1976; Black and McGraw 1985; Creel 1986) with yucca, fish, and mussels as supplemental resources (Weir 1976).

Ellis et al. (1990b:69-70) points out that research into burned rock middens had earlier reached a crisis. As a result of the 1990 burned rock symposium, new direction from middle-range theories and application of more vigorous

laboratory analyses directed at the macroscopic scale (cf. Collins 1991) have been established for investigating burned rock features. This same approach can be applied to nonmidden sites. Thus, new approaches are being directed toward sites in general. A recent sample of nine burned rock mounds from Fort Hood yielded 43 radiocarbon assays. These assays have extended burned rock mound use back into the Early Archaic period, through the Late Archaic period, and into the Late Prehistoric period (Quigg and Ellis 1994:203-274). Consequently, the postulated shift in subsistence strategy during the Middle Archaic period may have occurred much earlier and lasted longer at Fort Hood.

Middle Archaic events were nearly absent from two intensively excavated sites (41HY202 and 41HY209) near Buda with no components or features being assigned to this period (Ricklis and Collins 1994). Diagnostic projectile points were identified from the excavations, but they appeared in redeposited context.

The high frequency of Pedernales points (n=42) recovered during the resurvey and evaluation of 571 sites at Fort Hood (Trierweiler 1994:300) imply that hunting was still relied upon and in use during the Middle Archaic period. Available data indicates potential variation in the Middle Archaic subsistence adaptations (Black and McGraw 1985; Peter 1982). Apparently, regional variability in subsistence patterns is possible if not probable, demanding a need to examine human adaptation in localized areas.

3.2.4 The Late Archaic Period

The Late Archaic period extends from about 1000 B.C. to A.D. 800 (Black 1989b:30) and is often subdivided into the Late Archaic (1000 B.C. to 300 B.C.) and the Transitional or Terminal Archaic (300 B.C. to 800 A.D.) on the basis of shifts in projectile point styles, although the basic subsistence system appears to remain relatively constant throughout (Turner and Hester 1993). The number of Late Archaic sites and components

in Central Texas is dramatically higher than the preceding and successive periods, leading to the speculation that populations peaked during the period (Weir 1976; Prewitt 1985). High frequencies of Castroville (n=21) and Ensor points (n=23), the second and third highest counts of projectiles from Mariah's resurvey and evaluations at Fort Hood (Trierweiler 1994:300), suggest intensive use of the study area during the Late Archaic.

Sufficient data exists from previous investigations for researchers to have postulated frequent use of specific areas by certain groups (cf. Twin Sisters sites in Williams County, Weir 1976; and Driftwood sites in Williamson County and vicinity, Prewitt 1985). Besides the higher frequencies of sites, the diversity of site types increased as well, with the addition of large cemeteries (i.e. Hall 1981; Huebner and Comuzzie 1992) and bison bones in sites. Bison kill sites appear outside the Central Texas region in the Lower Pecos region (Dibble and Lorrain 1968) and in the Texas Panhandle (Hughes 1977), therefore use of bison is extrapolated for Central Texas, and some Central Texas sites exhibit bison remains.

As in previous periods much of what is known about the Late Archaic comes from palimpsest middens. Both Weir (1976) and Prewitt (1991) postulate that burned rock midden use declined during this period but accumulating evidence supports continued and possibly increased use, throughout the Late Archaic (Peter et al. 1982; Black and McGraw 1985; Goode 1991; Treece 1992, Quigg and Ellis 1994). With the addition of bison to the subsistence base, it is evident that new resources were available in some areas and that at least some populations engaged in various adaptations.

South of Fort Hood, Late Archaic events from 41HY209-M near Buda indicated use of a burned rock midden with a central rock lined oven principally used by peoples employing the Darl point although other dart point types were recovered (Ricklis and Collins 1994). Other small

rock features dating to about 2000 BP include basin shaped hearth(s) and a circular rock feature at 41Y202-B. The latter rock features were associated with bison bones while the oven is thought to imply plant resource utilization.

Extensive trade patterns start to emerge at this time with marine shell showing up in Central Texas cemeteries and throughout the region (Hall 1981; Lukowski 1988) while corner tang knives are widely distributed across much of Texas (Hall 1981) and beyond. These trade networks document widespread population interaction (Hall 1981). However, Prewitt (1981b:82) states that his last identified phase, Driftwood, shows limited exotic materials and a more restricted territory use. He also notes an increase use of rockshelters during the Driftwood phase which denotes a major settlement pattern shift from the more widely distributed early phases employing more open campsites.

3.2.5 The Late Prehistoric Period

The Late Prehistoric period (about A.D. 800 to 1600 after Black 1989a:32) in Central Texas is dominated by two phases, the Austin and Toyah (Prewitt 1981b; 1985). This period reveals a major shift in technology with the bow and arrow and ceramic vessels added to cultural assemblages. Where these new industries came from and how they were incorporated into the lifeways of the populations is unclear. The Austin phase exhibits its earliest dates, about 1350 BP, in sites toward the north, and may indicate the direction from which it came (Prewitt 1985). This phase lacks the ceramic industry of the later Toyah phase implying ceramic vessels were not in use in Central Texas until after A.D. 1300. Even with the emergence of the new weaponry system, Prewitt (1981b:74) states that the "basic exploitive strategies" did not change significantly from the previous period. Subsistence is interpreted for the Austin phase as a balance between gathering plant foods and hunting (Prewitt 1981b:74). The cemeteries of the Late Archaic, with their marine shell artifacts, continue into the Austin phase (cf.

Prewitt 1981a). Evidence exists that intragroup warfare was ongoing since many bodies in the cemeteries contained projectiles. Mortuary practices vary as cremation and non-cremation occur as does individual burials along with the cemeteries (Prewitt 1981a:83). This variability would imply population movements and pressures in the region. However, cemeteries associated with this phase have not been identified at Fort Hood.

Few campsites/components of the Austin phase have been intensively investigated and reported on, and material assemblage characteristics are not well documented. The survey data recovered from Mariah's evaluation of 571 sites at Fort Hood revealed a high percentage of Scallom points (n=29, 44% of total arrow points) which suggest intensive use of the study area during the Austin phase (Trierweiler 1994:312).

Mustang Branch (41HY209-Terrace), on Onion creek near Buda, yielded a discrete Austin phase component between a Late Archaic component below and a Toyah component above (Ricklis and Collins 1994). The Austin component included a small stone tool assemblage with five Scallom points, associated with two clusters of burned rocks, *Rabdodus* sp. concentrations and burned areas, and a faunal assemblage denoting a broad based subsistence strategy indicated by bones from mammals and reptiles, *Rabdodus* sp. snails, mussel shells, and macrobotanical evidence for plant resource utilization. This event(s) was dated to between A.D. 1278 and 1285 based on the weighted average of five $\delta^{13}C$ corrected radiocarbon assays. The significance of this discrete occupation being that this cultural group was still present in this region in "pure" form at this late time and that bison may not have been in the region at this time.

The Toyah phase is one of the better documented and dated phases in Central Texas with new data from large site excavations now available for West-Central Texas (Creel 1990; Johnson 1994; Treece et al. 1993b; Quigg and Peck 1995). Prewitt (1985) used the available data to postulate

population movements on a north-to-south trek through Texas. A major shift in the subsistence base from the Austin to Toyah is documented as bison became the principal resource (cf. Creel 1990; Treece et al. 1993b; Quigg and Peck 1995) with some hunting of deer and antelope (Ricklis and Collins 1994) also occurring. This subsistence change also affected the tool assemblage which featured items related to bison processing such as beveled knives and large end scrapers. As ceramic vessels came into use, the need for burned rock became diminished (cf. Quigg and Peck 1995). Other technological changes, such as communal hunting and pemmican processing, appear to be represented at this time (Quigg 1994; Quigg and Peck 1995). As populations focused on the killing of bison, groups moved to follow and obtain that resource. Johnson (1994) has found strong evidence for localized communities in the Toyah phase. Contrary to other data sets in Central Texas, only four Perdiz points (6% of the total arrow points) were recovered during Mariah's investigations of 571 sites at Fort Hood (Trierweiler 1994:312). This low frequency may imply limited use of the area by this group. Interestingly, seven points recovered (10% of the total arrow points) were classified as Bonham, which Turner and Hester (1993:202) show as concentrated in Northeast Texas. This may indicate use or interaction of groups from outside the immediate region and could be tied to chert or bison resources.

Three Toyah Phase components at Barton (41HY202) and Mustang Branch (41HY209) sites on Onion creek near Buda, Texas document a subsistence focussed on medium size animal resources including deer and antelope, as bison is minimally represented. At Barton Site-North, an intense lithic activity area revealed the production of thin bifacial knives (n=26) and Perdiz arrow points (n=139) from an obviously plentiful lithic resource. Ricklis and Collins (1994:236) see the flake biproducts of biface manufacture selected for arrow point production. Mustang Branch-Terrace, yielded an excellent intact spring occupation focussed on processing antelope and deer carcasses

obtained from a possible communal kill based on the high frequency of animals represented. This event yielded a broad range of cultural features, a large stone tool assemblage, numerous ceramic vessels, and was dated to between the late fifteenth and early seventeenth centuries.

3.2.6 The Historic Period

This period (about A.D. 1600 to 1870 after Black 1989a:32) involved the use of the region by both Native Americans and Europeans. Consequently, drastic changes occurred in the Native populations and their movements which reflect the various European pressures felt in different parts of the state. One significant influence was the introduction of the horse by Spaniards. Once horses were obtained by the Natives, mobility drastically changed as did much of their past cultural lifeways. Different tribes were able to greatly increase the distance of hunting and raiding expeditions. First the Apaches and then the Comanches swept through the region from the north and the Plains. Their warring attitude pushed original Native occupants out of Central Texas and killed many others. European diseases also took a heavy toll on the Natives (Ramenofsky 1987).

The Native period of occupancy ended with most Natives either being removed to reservations outside the state or being killed. Today, the only Native group to claim Central Texas as their ancestral homeland are the Tonkawa. However, to say that the Tonkawa are an indigenous Central Texas tribe is an oversimplification. Although historic maps show that the Tonkawa (Tancoa) lived in western Oklahoma and Southern Kansas during the early 1600s (Vehik 1986), several clan names are names linked to the Tonkawa refer to ethnic groups from east-central and south Texas (Johnson 1994:406). It would behoove researchers to think of the Tonkawa as an amalgamation of several ethnic entities that are now considered Tonkawa one or more of which had their origins in the Central Texas.

The Toyah phase is the last archeological manifestation documented prior to the European invasion. If the Toyah phase has separate, identifiable communities as might be postulated with observed regional variations in recovered tool assemblages from central, southern and western Texas archeological sites, then regional patterns should be distinguishable. Potentially, detectable communities could be discovered in places corresponding to locations of ethnographically documented groups. This may provide an opportunity to explore the direct historical linkage.

Fort Hood lies just north of the expedition route postulated for de Soto in 1542 (Bruseh 1992:67-97), so encounters between the Natives and the Spanish may have occurred in the vicinity. Artifacts and sites dating to this contact period may be in the Fort Hood region and help document these early expeditions and contribute data to address the ethnology of Central Texas groups.

3.3 SIGNIFICANCE CRITERIA

At the start of Mariah's multiple-year, phased program at Fort Hood, there was no satisfactory research design in place to guide the investigations. Determinations of site significance, when attempted at all by previous investigators, had been based on unorganized and largely ad hoc sets of criteria, which while based on site integrity and generalized data potential, had not been developed within a research design focusing on gaps in the archeological knowledge of the region.

To remedy this situation, a new and comprehensive research design for Fort Hood was developed by Mariah in 1993 (Ellis et al. 1994a). The research design integrates discussions of middle range theory and the nature of archeological context with a historical perspective of Central Texas archeological research. Based on these issues, the research design identifies key data gaps in the archeological record for Fort Hood, together with the data needed to address these. It then develops a detailed hypothetico-deductive framework to guide future archeological research at Fort Hood.

Despite the previous investigations and culture-historical framework outlined above (Section 3.1 and 3.2), Ellis et al. (1994b) approach Fort Hood archeology as if it were new territory to be explored on the basis of limited prior information. The argument goes that by doing so from the outset, this method ensures that as little as possible is taken for granted, and that basic data from Fort Hood serves as the foundation for conclusions about prehistory at Fort Hood.

Under this argument, the research design develops two very different kinds of research domains: fundamental questions and substantive questions (Ellis et al. 1994a:100-172). Fundamental research domains address the basic issues which underlie archeological analyses, but which are usually glossed over or collapsed into other domains. Substantive domains include the (generally more interesting) topic areas which develop after basic culture-historical research has established fundamental foundations. The full research design includes 11 sets of fundamental questions and 19 substantive hypotheses. For readability, these have been organized below into four key domains, combining the fundamental and substantive questions. These delineate the criteria which were used to determine site significance. The ambitious reader is directed to the full research design for substantial discussions of middle-range theory and especially for the amplifying details of the hypothetico-deductive approach, including full arguments of relevance and test implications.

3.3.1 Chronology

As a key domain, the research design identifies a series of questions dealing with chronological frameworks applicable to Fort Hood (Ellis et al. 1994a:103-109). These questions involve the identification and temporal refinement of cultural sequences through the use of temporally diagnostic marker artifacts and chronometric assays of stratigraphically controlled samples from cultural and noncultural contexts. Key data sets include:

- ▶ temporally diagnostic artifacts in primary contexts;
- ▶ artifacts and associated materials amenable to chronometric assays; and
- ▶ stratigraphic sequences of distinct depositional units.

3.3.2 Paleoenvironment

In a second research domain, the research design develops a series of questions which bear on paleoclimatic reconstruction, paleotopography, and paleoecology (Ellis et al. 1994a:110-117). Broadly, the research design argues that understanding the difference between available and selected resources (and the changes in these over time) is critical to understanding hunter-gatherer adaptations. Key data sets include:

- ▶ climatically sensitive plant and animal (vertebrate and invertebrate) species;
- ▶ pedogenic carbonate nodules and speleothems;
- ▶ pollen and phytoliths in noncultural settings; and
- ▶ stratified noncultural depositional sequences with soil organic matter.

3.3.3 Prehistoric Subsistence Strategies

A third domain calls for identifying and quantifying variability in food-getting behaviors (Ellis et al. 1994a:117-121). In addition to identifying the variety of culturally selected resources (and changes in these over time), these questions call for refinement of our understanding of the diversity in subsistence behaviors through studies of resource seasonality, prey age/sex selection, butchering patterns, and processing methods. Understanding variability in patterns of resource selection and utilization allows substantive research into the more subtle questions of social structure. Key data sets include:

- ▶ pollen and phytolith samples;
- ▶ macrobotanical assemblages;
- ▶ faunal assemblages;
- ▶ human bone;

- ▶ chemical residues on artifacts;
- ▶ coprolites; and
- ▶ food-processing features.

3.3.4 Prehistoric Technologies

A final research domain encompasses several questions dealing with identification of the technologies involved in food-getting (Ellis 1994a:121-126). These questions focus on variability in the dual processes of tool manufacture and tool use, including the selection among alternative raw materials, their respective performance properties, methods of tool construction, and patterns of tool use. Key data sets include:

- ▶ manufactured lithic tools;
- ▶ manufacturing waste;
- ▶ use-modified lithic tools;
- ▶ distinct and identifiable raw materials; and
- ▶ nonlithic tools (including ceramics).

3.3.5 Implementing the Significance Criteria

The current investigations are a "testing" phase in the sense that they test site integrity and data potential. They have not been intended by the US Army, nor designed by Mariah, to recover substantive scientific data with which to actually address specific hypotheses. Rather, as called for under Section 106 and its implementing regulations, the current testing work has been narrowly designed to determine site significance, and hence NRHP eligibility, by matching ("testing") the site against the predefined significance criteria. For each site, the empirically demonstrated data sets are matched against the data needs delineated in the general research design. In general, sites with multiple key data sets are identified as significant and are recommended as NRHP eligible, while sites lacking these key data sets are identified as not significant and are recommended as not NRHP eligible.

For each site, the final assessment of significance was reached at the conclusion of laboratory

analysis (see Chapters 4.0 and 8.0). Nonetheless, as excavations progressed on each site, it became clear toward which side the weight of evidence was leaning. Some sites quickly were demonstrated to be intact and to contain data-rich deposits, while others were highly disturbed and/or contained sparse data sets.

Because contractual delivery orders required that testing cease when site significance could be confidently demonstrated, a mechanism was therefore required which would permit (at least, initially) eligibility determinations while in the field. This mechanism was the concept of "red flag" data sets. Explored to a preliminary degree in the Fort Hood research design (Ellis et al. 1994b:11-12), the concept was refined during the current testing phase to denote those directly observable data sets which immediately and unequivocally demonstrate NRHP eligibility while still in the field, and prior to full analysis. As such, they are sufficient data sets in and of themselves, and further testing would be redundant and destructive. A distillation of the data needs allowed delineation of the following four red-flag criteria:

- (1) macroscopically visible organic remains (charcoal, bone, seeds, shell) in a primary, thin-bedded, and stratigraphically discrete context;
- (2) multiple and stratigraphically discrete cultural occupations with high chronometric potential as evidenced by abundant charcoal or hearths with fired substrates or in situ burned rocks;
- (3) human bone; and
- (4) buried Paleoindian or Early Archaic components in primary and nondisturbed contexts.

While the relevance of the first two items to the key data sets outlined above is immediately obvious, some discussion is warranted for the latter

two items. First, human bone is a key data set which can bear on questions of prehistoric subsistence strategies (via paleopathology and/or isotope analysis, for example). However, for nonscientific reasons (chiefly related to the Native American Graves Protection and Repatriation Act of 1990 [NAGPRA]), the policy of Fort Hood was to assume that *any context* with human remains denoted site significance. Secondly, because the research design identified that major data gaps broadly existed for the Paleoindian and Early Archaic periods, any data from these periods was assumed to be exceptionally valuable.

4.0 METHODS

This chapter discusses the archeological methods used to collect and analyze data from the 57 prehistoric sites, including both testing strategies and testing tactics. In general, strategies are schemes and systems by which project goals (i.e., determining NRHP eligibility) are pursued; tactics are the details of procedure (e.g., excavation in arbitrary 10-cm levels) by which the strategies are implemented. The tactics presented in this chapter were the standard procedures used on all sites. On occasion, deviations from the standard procedures were warranted because of site-specific conditions. Such special conditions included occasional restrictions on mechanical trenching due to endangered species habitat, and occasionally not screening upper deposits demonstrated to be looter's backdirt. All such deviations are explicitly detailed in the individual site discussions in Chapters 5.0 and 6.0.

This chapter is organized into four primary sections. First, methods used in the field are discussed, including backhoe trenching, manual excavation, site mapping, and preparation of preliminary letter reports. Next, laboratory methods are reviewed, including initial processing and cataloging, flotation, attribute recordation, and preparation for curation. This section also discusses revisions to the previously developed chert source typology. The third section discusses methods of analysis, including those conducted on artifacts (lithic debitage, lithic tools, projectile points, ceramics, and groundstone), on chronometric samples (radiocarbon and amino acid epimerization), and on biotic materials (bone, shell, carbonized botanical specimens, and pollen). Lastly, a fourth discussion in this chapter summarizes the measures taken to ensure replicability and comparability of all primary data and the conclusions based thereon. This final section discusses the program of quality control, including the development of the field manual, the control checkpoints, and the appointment of the independent quality control officer.

4.1 FIELD METHODS

Gemma Mehalchick and W. Nicholas Trierweiler

The goal of testing was to evaluate the eligibility of each of the 57 prehistoric archaeological sites for inclusion in the NRHP. Eligibility was evaluated under the current research design for Fort Hood (Ellis et al. 1994). Sites that had data sets which could be used to address gaps in the regional knowledge were determined to be significant and eligible for inclusion in the NRHP. These sites were recommended for immediate protection and avoidance, or for mitigative data recovery if protection and avoidance was not possible. Sites that did not have such data sets were determined to be not significant and ineligible for NRHP inclusion. No further management was recommended for these sites.

The sites included in the current study were derived from those in the "heavy" and "moderate" impact areas (Jackson 1990) for which previous investigations could not reach a clear determination of either "eligible" or "ineligible." From the pool of 59 such sites in the "heavy" impact area and 117 such sites in the "moderate" impact area, the 57 sites in the current study were selected for testing by Fort Hood. Each site selected had a target level of effort, specified in numbers of backhoe trenches and test pits. Generally, targets were the same as recommended at the conclusion of the shovel testing phase (Trierweiler 1994:Appendix A). Most sites received both backhoe trenches and manually excavated test units. However, some sites had only trenches and others had only test pits. Several sites with previously defined geographic subareas had specific subareas excluded from testing on the basis of the previous work.

Mariah's field phase included four distinct tasks: (1) backhoe trenching and/or manual excavation of test pits, (2) site mapping, (3) quality control, and

(4) initial data analysis and development of a preliminary letter report.

4.1.1 Backhoe Trenching

Since large portions of the Fort Hood military reservation contain endangered species habitat or are in protected areas with ongoing environmental studies, a representative from the Fort Hood, Environmental Management Office, Natural Resources Branch was apprised of all site locations and potential excavations prior to trenching. Approval to proceed, particularly with trenching, was necessary to avoid impacting sensitive wildlife areas. Permission was usually granted by inspecting site locations on a Fort Hood military installation map and aerial photo sheets, and by noting areas on site sketch maps where trenching was recommended. However, in some cases, a field check by a Natural Resources Branch representative was needed. In no case was permission to trench denied, but trench placement was restricted at several sites. This was particularly true on colluvial slopes in or near endangered species habitats. On sites solely recommended for manual excavation, permission to proceed was granted regardless of site location, as these excavations were not considered by Fort Hood Natural Resources Branch to be significant impacts to the habitat. In these cases, excavation crews were made aware of these sensitive habitats and acted accordingly to minimize disturbance to trees and brush.

The purpose of trenching was to assess site stratigraphy and depositional history, to investigate the depth and extent of cultural deposits, and to provide access to deeper deposits if subsequent manual excavation was warranted. Trenching was accomplished through the services of the, Maintenance Division, Pavement Section at Fort Hood. The Maintenance Division obligingly provided a backhoe (in a few cases a gradall was provided) and extremely competent and reliable operators. A specialized team consisting of an archeologist and geomorphologist accompanied the backhoe operator. Duties of this team included

determining trench locations and dimensions, monitoring the backhoe while in operation, and examining profiles. The geomorphologist profiled and described trench exposures on a standardized field exposure description form (see Appendix J), and at times sketched a generalized cross-section of a site based on the exposed profiles. As warranted, diagnostic artifacts and special samples (usually, charcoal) were collected from trench profiles. These collections were point provenienced and assigned an appropriate provenience number (PNUM) on the field catalog form (Appendix J, Form 10). In addition to any recovered material, each trench was assigned a separate PNUM. The archeologist numbered each trench sequentially beginning with 1 (BT 1, BT 2, etc.), sketched trench locations on the site map, and placed a wooden stake, marked with the trench number, adjacent to the corresponding trench. A master list of treatment units (Appendix J, Form 19) noting all trenches, with their locations, dimensions, and any general observations, was also recorded by the archeologist.

The target level of effort (i.e., the number, and occasionally the placement, of trenches) was developed on the basis of previous investigations. However, the level of effort was often amended based on recent exposures of cultural deposits or revised assessments of adequate coverage. One of the more significant modifications resulted from the fact that the level of trenching effort recommended in the shovel testing phase reports was typically based on a projection of trenches needed to clarify site stratigraphy, as opposed to those necessary to adequately prospect for buried archaeological components. As a result, of 39 sites recommended for trenching, 15 sites (38%) exceeded the targeted level of effort, whereas 12 sites (31%) equaled the recommended level of effort. In many cases, additional subsurface prospecting was deemed prudent so the number of trenches dug often exceeded the number originally recommended. Trenching is more time and cost effective, and provides a much larger subsurface "window" (Trierweiler 1994:178). Of the 12 sites on which fewer trenches were excavated than the

targeted number, seven were clearly eligible for NRHP inclusion, one quickly proved to be ineligible, and four were amended to minimize unnecessary impacts to the site. All four of the latter sites contained intact, discrete burned rock mounds that originally were recommended for trench bisection. However, the judgement was made that this trenching *for testing purposes* would have too great an impact on otherwise pristine features, and only manual excavations were conducted. Sites which contained shallow deposits (usually less than 80 cm) and rockshelters had not been previously recommended for trenching, and these guidelines were followed.

4.1.2 Manual Excavation

The primary objective of this task was to manually excavate test pits on sites in order to examine and document subsurface stratigraphy, and to recover a sample of the subsurface cultural deposits for laboratory analysis and assay. As with trenches, a target level of effort (number of test pits) was projected on the basis of the shovel testing recommendation. However, delivery orders mandated that "when it can be confidently determined that the site is eligible for the National Register, excavation at that site shall cease." In practice, this meant that under certain well defined conditions, excavation was stopped before the targeted level of effort was attained. This concept is further discussed below in section 4.1.3.

4.1.2.1 Open Sites

As operationalized for methodological purposes, "open sites" included all types except for rockshelters and sinkholes. In general, the following excavation methods were standard on open sites. Test pit locations were determined by the Crew Chief, after consultation with the Geomorphologist, Field Supervisor, and/or Principal Investigator (PI). The units were plotted on the site sketch map and listed on Form 19 (Appendix J). Many test pits were offset from backhoe trenches above apparent features and/or possible buried cultural components exposed in the

profiles (Figure 4.1). On sites with no trenches, and where portions of the site were inaccessible to the backhoe, isolated test pits (usually oriented to magnetic north) were placed in areas appearing to have the greatest archaeological potential. These locales were based on previous investigations, shovel testing recommendations, and reinspection of the site in general.

Most often, test pits measured 1 m² square, but under special circumstances, dimensions could vary. For instance, a unit might measure 1.25 m x 1.0 m so as to encompass two separate features exposed in a trench wall. Test pits (TP) were numbered consecutively beginning with 1 (TP 1, TP 2, etc.) or with the next available number if test pits had been dug on the site during the shovel testing phase.

The highest corner of each test pit was designated the unit's datum for elevation control. This corner was marked with a wooden stake labeled with the test pit number. All units were partially excavated in arbitrary 10-cm levels below ground surface, with the exception of one test pit (at 41BL154) which was excavated in natural (stratigraphic) levels. All matrix was dry screened through 1/4-inch mesh and all cultural items were collected except for burned rocks and nonhinge mussel shell fragments (Figure 4.2). Burned rocks were counted, weighed, and then discarded, and only shell hinges (umbos) were retained. Recent artifacts (mostly military) were counted and noted, but were not collected. Charcoal (for radiocarbon assay) and a sample of land snails (for amino acid epimerization assay) were collected when present.

Whenever possible, units were excavated to bedrock or to sediments which were clearly not of culturally relevant age. However, many sites contained Holocene deposits greater than 3.5 m thick (Figure 4.3). Initially, some test pits were excavated as deep as possible (TP 1 on 41CV1105 was manually excavated to 500 cm below the modern ground surface). Over time, the notion of digging deep units for depth's sake was abandoned, especially if other units having



Figure 4.1 Excavation of Test Pits Adjacent to Trench.



Figure 4.2 Field Screening.

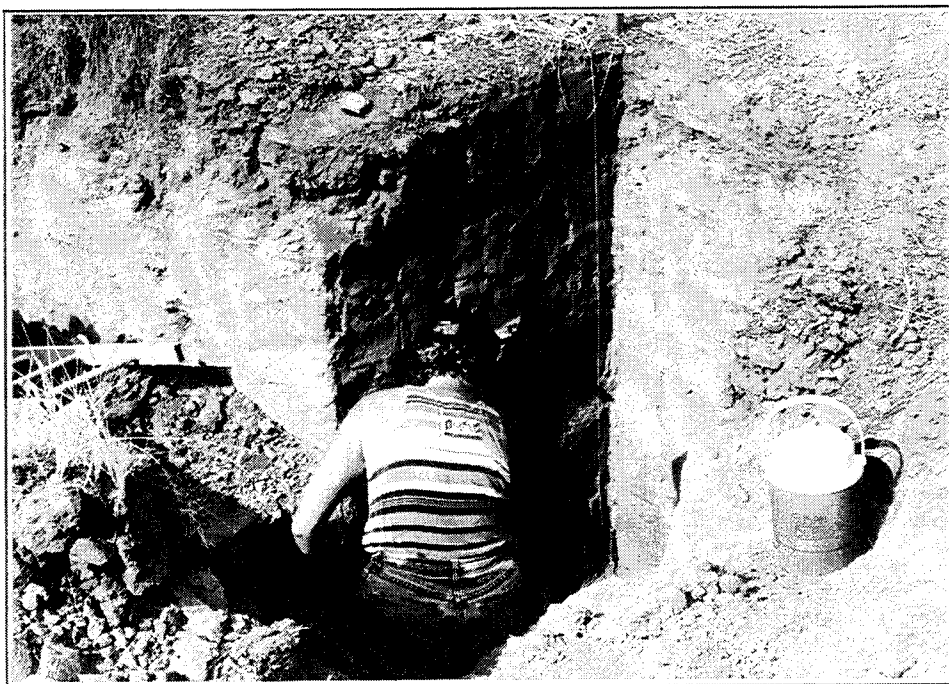


Figure 4.3 Excavation of Deep Deposits.

significant data sets resulted in an evaluation of NRHP eligibility. Still, deep test pits were dug as warranted for specific purposes on sites, such as a feature exposed at 400 centimeters below surface (cmbs) in a trench profile.

Depending on feature type, various excavation techniques were employed. Units placed on burned rock mounds and midden deposits were excavated in arbitrary 10-cm levels below the modern ground surface, with a flotation sample (typically 5 l) recovered from each 10-cm level excavated within the feature. Discrete features, such as hearths or burned rock concentrations, were removed as cultural units. Hence, a basin-shaped hearth encountered 95 to 107 cmbs would be removed as a single, separate entity from the remainder of the test pit comprising the nonfeature fill. The area not encompassed by the feature would continue to be excavated in arbitrary 10-cm levels below surface. When possible, separate charcoal, snail, and flotation samples were removed from the feature fill. The amount of

matrix removed for flotation was usually contingent on feature size and internal morphology; however, a 5 l sample was the standard. Features were photographed, a standard feature form (Appendix J, Form 20) was completed, and planviews and were profiles drawn. In addition, a videotape recording of the feature was made.

An excavation level record (Appendix J, Form 8) was completed for each 10-cm level. Each separately treated provenience received an appropriate reference number (the PNUM) on the field catalog (Appendix J, Form 10). Each 10-cm level of a test pit received one unique PNUM; however, if any given level was subdivided or if some section of the provenience was somehow treated differently, then the separate portions of the provenience received separate PNUMS. For example, if level 3 of TP 2 contained a hearth and a point-plotted artifact not in the hearth, then the general 10-cm level fill might be assigned PNUM 102, while the feature fill and the plotted artifact might be assigned PNUM 103 and PNUM 104,

respectively. For each test pit, an artifact frequency distribution form (Appendix J, Form 18) was completed on the basis of rough field counts. This form consisted of a table listing all observed items (collected or not) and their frequencies for each 10-cm level. Any features were also noted on Form 18. As appropriate, other records were completed including planviews and profiles of test pits and descriptions of unexcavated features. In addition, each site and its excavations were photographed and videotaped.

Backfilling of all trenches and test pits was done by backhoe after all manual excavations on a site were completed. An archeologist monitored backfilling and ensured that the ground surface was leveled and returned as near as possible to its pre-excavation conditions. Occasionally, isolated test pits were backfilled manually. The wooden stakes marking trench and test pit locations were left in place.

4.1.2.2 Rockshelters and Sinkholes

Excavations techniques employed in rockshelters were comparable to methods used on open sites except for the following differences. Test pits were located in areas of greatest potential and least disturbance based on previous work, present observations, and pin flag probes. Test pit size and orientation were designed to be most conducive to excavation; however, most measured 1 m square and were oriented to magnetic north (Figure 4.4).

With a few notable exceptions, excavation procedures were similar to those employed on the open sites. Typically, from each 10-cm level, a 25 cm x 25 cm area from one quadrant was removed en masse as a flotation sample, a 50 cm x 50 cm quadrant was dry screened in the field through 1/8-inch mesh, and the remaining matrix was dry screened through 1/4-inch mesh. As a result, at least three separate PNUMS could be assigned for each level (the float sample, the 1/8-inch screen, and the 1/4-inch screen). Artifacts noted in the 1/4-inch and 1/8-inch screens were recorded

separately on the excavation level record. Those units placed outside the protected portions of the shelter (beyond the dripline) were excavated according to the standardized open site procedures. Whenever possible, excavation was terminated only upon encountering bedrock across the entire unit. For the majority of rockshelters, the geomorphologist made at least one inspection to interpret stratigraphy and complete appropriate data forms. In a few cases, a geomorphologist's visit to the shelter was not feasible because human remains were encountered, recorded, immediately reinterred, and no further work was undertaken (see further discussion under section 4.1.3). After completing all appropriate work in each shelter, the excavations were manually backfilled.

Two rockshelters (41BL432 and 41BL765) contained tufa mounds which had been recommended for testing. Suggested tactics included collecting and analyzing samples from these deposits to determine their potential to contain paleoenvironmental records. Tufa samples from these sites were recovered in two different fashions. First, many of the samples were simply chiseled off en masse using a cold chisel and sledgehammer. When this was not feasible, a portable gasoline-powered circular rock saw was used to cut deep grooves into the tufa mound which were then loosened and recovered using chisels and pry-bars.

While all previous investigators acknowledged the presence of a sinkhole at 41BL740, it remained unrecorded and no formal management recommendations had been formulated (the subarea which contained the sinkhole had been evaluated as not eligible). After entering and investigating the sink hole during the current testing phase, the potential for intact cultural deposits was formally recognized and one 50 cm x 50 cm test unit was excavated within the sinkhole. Excavation methods followed those for open sites. When excavation could not continue any further due to the presence of large rocks or possible bedrock, the unit was backfilled. A planview of the sink hole's interior was drawn.

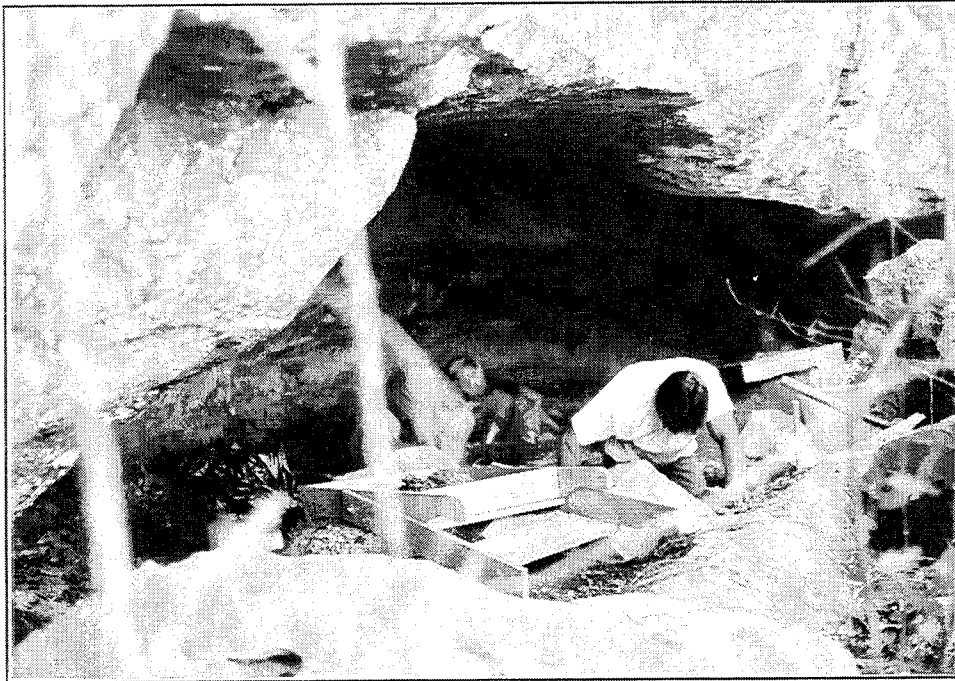


Figure 4.4 Excavation in Rockshelter.

Later, it was discovered that the Fort Hood sinkholes and caves were under the jurisdiction of the Fort Hood Environmental Management Office, Natural Resources Branch in cooperation with the Fort Hood Environmental Management Office, Division of Archaeology, and other agencies. The Natural Resources Branch was (1) conducting ongoing surveys of sink holes and caves to relocate or discover these formations, (2) studying their status and the associated fauna, and (3) protecting the relevant biological and physical resources. Therefore, as with sites in the endangered species habitats, further coordination with the Natural Resources Branch was undertaken since caves and sink holes were potentially sensitive habitats.

4.1.3 Assessment of Site Significance

As previously stated, a targeted level of effort for each site was projected by Fort Hood prior to excavation. This target generally corresponded with the recommendations which had been made at the conclusion of the shovel testing phase.

However, Mariah's delivery orders stated that when the NRHP eligibility of a site could be confidently established, then excavations should cease even if the targeted level of effort had not yet been attained. On each site then, excavation proceeded until one of the following conditions was met: either the specified target number of test pits (or an equivalent volume) was excavated, or a significant data set was encountered which clearly and unequivocally made the site NRHP eligible. These situations were referred to as "red flag" data sets.

Red flag data sets were defined as those which immediately and unequivocally demonstrate NRHP eligibility, while still in the field, and without the need for formal lab analysis (Mariah Associates 1993). As such, they are sufficient data sets in and of themselves, and further testing would be redundant and destructive. Based on the research design for Fort Hood (Ellis et al. 1994) the following field observations were defined as red flags: (1) human bone in a primary (nondisturbed)

context; (2) organic remains (charcoal, bone, macrobotanical) in a primary, thin-bedded, and stratigraphically discrete context; (3) multiple and stratigraphically discrete cultural occupations with high chronometric potential as evidenced by abundant charcoal, hearths with fired substrates, or similar data sets; and, (4) buried Paleoindian or Early Archaic components in primary and nondisturbed contexts (Mariah Associates 1993).

With the exception of criterion #1, invoking these criteria in the field turned out to be rare. This was not due to a lack of such sites as much as it was to an evolution in the application of the criteria. Some of the sites trenched earlier in the program (e.g., 41CV1105, 41CV95) clearly revealed cultural components (usually features) that complied with red flag criterion #3. In both cases however, the full number of test pits was excavated even though, in retrospect, the full level of effort was not necessary merely to determine eligibility. This practice continued in large part in order to avoid substantial discrepancies between the contractually issued level of effort and the actual amount of field work conducted. Therefore, these targeted numbers were used as guidelines and allowed for flexibility in making sound field judgements. While the PI was the final authority in determining the appropriate level of effort and ultimate NRHP eligibility for all sites, a continuous discourse between the PI, the geomorphologist, the field supervisor, the crew chiefs, and the excavators was essential in coming to a mutually satisfactory termination of each excavation.

Under certain circumstances, selected rockshelters were considered NRHP eligible even though a red flag data set was not strictly present and the targeted level of effort was not achieved. These were cases in which human remains were discovered, without regard to context. At the request of Fort Hood, the following procedures were implemented upon discovering human remains: (1) the Field Supervisor and the PI were notified; (2) the Fort Hood Staff Archeologist was notified; (3) the excavation was recorded, including sketch mapping, photographing, identification of

skeletal elements, and videotaping; (4) the remains and associated cultural material were reinterred, and (5) the excavation was backfilled.

4.1.4 Site Mapping

All open sites were mapped using an electronic total station mapping system. This task was performed under subcontract by Ronald Carroll Surveyors of Temple, Texas. An archeologist accompanied the survey crew to each site. A site sketch map was provided and the archeologist assisted the mapping team in identifying the site area and key points (test pits, trenches, drainages, etc.) to be mapped. On a few very large sites, certain subareas previously evaluated as not eligible were not formally tested; in these cases, these subareas were only partially mapped or were not mapped at all. A 5/8-inch iron rod was established as a permanent datum on each site and topography was delineated relative to this arbitrary datum. Tested sinkholes and rockshelters that were included within an open site had their location mapped by the mapping team, but the existing shelter plan/profile sketches were manually amended or new sketch plans were drawn by an archeologist and/or geomorphologist.

All site maps included natural topography, site and/or subarea boundaries where relevant, archaeological excavations, cultural features when appropriate, and natural or manmade landmarks. All finished sites maps were prepared using AutoCAD 12.

4.1.5 Preliminary Letter Reports

Within about 60 days following completion of excavations for each site, a brief (4 to 8 pages) preliminary letter report was prepared and submitted to the Fort Hood Staff Archeologist. Because the letter reports were prepared before any results of artifact analysis and sample assays were available, they were not full technical reports, but still allowed for necessary management planning by the Fort Hood Staff Archeologist.

Descriptive portions of the draft reports were written by geomorphologist and the crew chief who tested the site, assisted as necessary by the field supervisor. These portions included reviews of the site setting and history, descriptions of each test pit and backhoe trench, and rough tabulations of artifact frequencies by test pit and level. The drafts were then edited and revised by the PI(s), who developed conclusions, assessments of NRHP eligibility, and management recommendations. The final letter reports included the new site map.

4.2 LABORATORY METHODS

Kathleen E. Callister, Marybeth S.F. Tomka, and Dale R. Lynch

Laboratory methods established for NRHP site evaluations were modified only slightly from those used in the previous shovel testing phase (Trierweiler 1994:84-91). Laboratory work occurred in two phases: preliminary processing in the field laboratory in Killeen, and subsequent final processing, detailed recording and analysis, and preparation for curation in the main archaeological laboratory in Austin. Preliminary processing began as soon as artifacts were recovered. The objective was to ensure that information accompanying the artifacts contained the proper field information and that this information would not be lost during transport to the main laboratory. Once NRHP testing was completed at a site, the artifacts were sent to the main laboratory where they were cleaned, cataloged, and analyzed. Laboratory processing and analysis for the 57 sites began in January 1994 and was completed in September 1994. A detailed discussion of laboratory and analysis methodology is found in the following sections.

4.2.1 Initial Processing

While in the field, all artifacts and samples were assigned a PNUM based on their horizontal and stratigraphic provenience. Different classes of material (e.g., bone, lithic debitage, projectile points, charcoal) found within a single

provenience, while receiving the same PNUM, were bagged separately and were placed within a larger plastic bag with an acid-free, archivally stable tag containing the full provenience data, PNUM, excavator's name, and date. Soil samples were doubled bagged to ensure against damage and/or contamination. PNUMs generally represented 10-cm levels within a testing unit, however, unique numbers were assigned to point-plotted artifacts and to samples taken from specific portions of a unit. All artifacts and samples were tracked using the bag label and the field inventory (Appendix J, Form 10). On rainy days, when field work was not possible, artifacts were cleaned (but not cataloged) in the field laboratory. Further processing was conducted in the Austin laboratory after testing was complete at any given site. This stage consisted of cleaning, stabilization, and cataloging.

All artifacts and specimens were cleaned and stabilized using the procedures specified in contract Technical Exhibit #1: Treatment, Marking, and Delivery of Artifacts and Documentation. Cleaning involved removing adhering dirt by either washing the artifacts in warm tap water or by dry brushing. Flaked stone, groundstone, ceramics, mussel shell, as well as historic ceramics and glass were cleaned using water. Depending on its condition, bone was either dry brushed or quickly immersed in water, gently brushed, and then quickly rinsed. All artifacts from a single PNUM were cleaned or stabilized at the same time (Figure 4.5). Once dry, individual artifacts from each PNUM were placed in clean polyethylene bags along with identification tags produced on archivally stable, cardstock-weight paper. Radiocarbon samples were placed in either aluminum foil pouches or in glass vials which were then placed in polyethylene zip bags. Flotation samples were left in the double bags until they were processed.

Flotation processing was done using a Flote-Tech® flotation system (Figure 4.6). This device is designed to quickly process soil for the purpose of recovering floral, faunal, and artifactual materials.

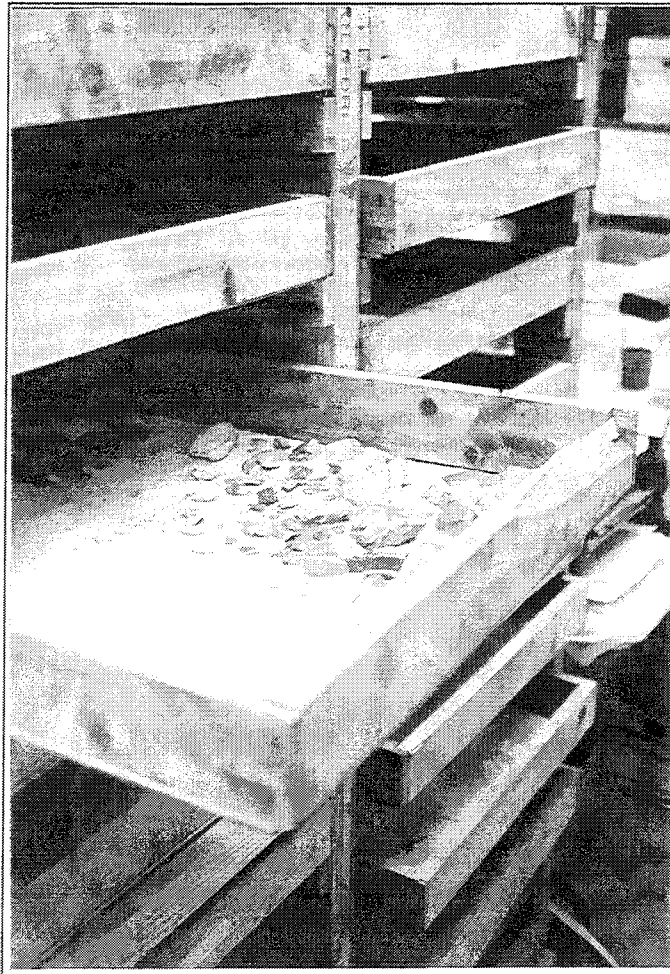


Figure 4.5 Drying Artifacts After Cleaning.

Its dual water reservoirs house approximately 50 gal of water that are filtered and recycled through the system so that multiple samples can be run using the same water, thus conserving water. Soil samples up to 20 l in size are placed in a metal box with a "window mesh" (1/16-inch) bottom. The box is placed within the first reservoir where the sample is agitated by water jets forced upward under pressure through the soil sample. This forces lighter materials to float to the surface where they are carried over the top of the metal box and collected in a fine-mesh (1/48-inch) fabric filter. The water is then housed in the second reservoir until the process repeats itself. The heavy fraction remains on the 1/16-inch mesh, where it is collected by inverting, and the fine

mesh containing the light fraction is removed. The entire process takes approximately 5 to 15 minutes, depending on the clay content of the soil. After processing, both the heavy fraction and the light fraction were allowed to dry for at least 24 hours. Once dry, both fractions were collected in clean plastic zip bags to await sorting and analysis.

To emulate field recovery, the heavy fraction was further dry screened through nested 1/4-inch and 1/8-inch mesh screens. Artifacts, culturally affected materials, and other organics were removed from the 1/4-inch and 1/8-inch screens and assigned separate catalog numbers. This screening of the heavy fraction served two purposes, 1) it facilitated separation of artifacts



Figure 4.6 Flotation Processing.

from the bulk heavy matrix, and 2) it replicated the screening that was done in the field. The light fractions from features and other selected proveniences were later manually sorted to retrieve ethnobotanical materials, radiocarbon samples, and landsnails. Macrobotanical remains were submitted for outside species identification and analysis (see Appendix G).

Physical labeling of artifacts was restricted to projectile points, flaked stone tools, and other unique artifacts which underwent specialized analysis and/or illustration. The procedure placed a layer of PVA (polyvinyl acetate with acetone) on the artifact and allowing this to dry, writing the accession number (see below) on top of the PVA

with black (or white) ink and then topcoating it with PVA. Pursuant to Fort Hood Archeological Laboratory standard procedures, labeling of individual pieces of debitage, bone, and shell was not done (Kimball Smith, Fort Hood, personal communication, 1992).

Following the guidelines specified in contract Technical Exhibit #1, artifacts and samples were assigned an accession number based on their horizontal and stratigraphic context. Each accession number consisted of three parts. The first part was a single-digit code for the county in which artifacts were recovered (1=Coryell County; 2=Bell County). This digit was followed by the Smithsonian site number (without the state and

county designators). The third part was a unique specimen number assigned to a specific provenience and artifact class. Specimen numbers were assigned sequentially for each site beginning with 1 (or with the next available number if the shovel testing phase had recovered artifacts). Because artifacts collected by previous investigators had not been assigned catalog numbers, these were not included in the newly assigned numbering system at the instructions of Fort Hood (Kimball Smith, Fort Hood, personal communication, 1993). For example, if Mariah's previous work on site 41BL1125 had collected six projectile points, then the next specimen recovered would have been assigned the accession number 2-1125-7.

Once assigned, this number was used for all artifact tracking and analysis purposes. Where multiple specimens of a given artifact class were recovered from the same provenience, all were assigned to the same accession number with the exception of projectile points and lithic tools which were given individual accession numbers.

4.2.2 Detailed Recording of Artifact Attributes

Analysis of artifacts proceeded one PNUM at a time. After identification and classification of all artifacts in a given PNUM, each minimally identified analytical grouping of artifacts was separately bagged in a plastic zip bag, along with individual data tags. Later, the information recorded on the data tags was entered into a Data Base Management System (DBMS®) developed for Mariah Associates, Inc., by Wind-2 Software. Developed using Microsoft FoxPro® and operating on 486-66 PC computers, the DBMS® is designed to provide a comprehensive and integrated framework for the design, collection, management, and analysis of archeological data from the research design phase through final curation. Artifact data was entered directly from the data tags and site and feature data were entered from primary field data sheets. Data was managed wholly within the DBMS® and was manipulated

and analyzed both within the program as well as via exports to Microsoft Excel®.

The DBMS® program allows for the custom design and error-trapped collection of both provenience data and formal attribute data for a nested series of three levels of information. For each level, attributes and their range of value states were custom designed for this project (Figure 4.7). The "macro-level" records data about sites or other supra-feature phenomena; the "meso-level" records information about features, localities, strata, or other supra-artifact phenomena; the "micro-level" records data about artifacts and samples.

The individual analysis tags ensured that quality control on the artifacts could be maintained and artifacts traced if any sorting or identification problems were later diagnosed. After artifact data was entered into the computer, a printout was checked directly against the artifacts and analysis tags. This ensured that the computer database was an accurate reflection of the data recovered. For this project, artifact provenience information, accession number, and detailed attributes were entered into the DBMS® program and were linked with the provenience and attribute data from the site and (if present) feature. Thus, data manipulation was possible on both intersite and intrasite bases. After the provenience information was entered, artifacts were recorded by artifact class and individual artifact attributes were recorded for each artifact. For this project, classes included bone, shell, charcoal sample, ceramic, lithic core, lithic debitage, lithic tool, lithic point, ground/pecked stone, historic/recent, and others. Some classes were linked by a "superclass" to allow analysis of larger groupings (e.g., lithic tools *and* lithic cores *and* projectile points *but not* lithic debitage). Artifact classes and superclasses used during analysis are presented in Figure 4.8.



Figure 4.7 Screen Shot, Archaeological Database Management System.

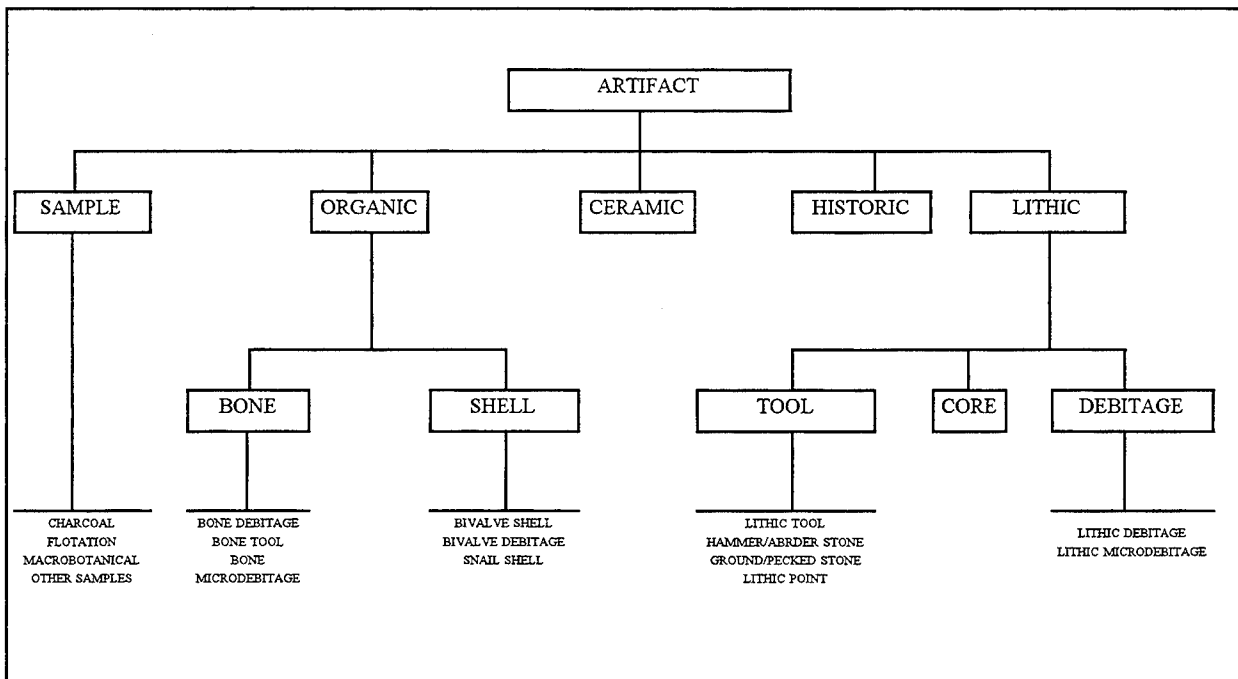


Figure 4.8 Analytical Artifact Typology.

4.2.2.1 Chert Source Typology

During Mariah's shovel testing phase of investigation, 17 chert types were identified and distinguished by differences in color, texture, structure, luster, and relative degree of opacity or translucency (see Trierweiler 1994:Appendix C). Some of the chert types had preexisting folk names (Owl Creek Black, Fort Hood Gray, etc.). Names were given to the remaining types, and all types were arbitrarily designated as Types 1 through 17. The type numbers are suggestive of a spectrum of colors and chert textures beginning with the lighter cherts (1=Heiner Lake Blue, 2=Cowhouse White, etc.) and extending into the darker gray and black cherts (14=Fort Hood Gray, 17=Owl Creek Black, etc.). The majority of the chert types fall within the tan, gray, brown, and gray-brown color range (6=Heiner Lake Tan, 9=Heiner Lake Translucent Brown). During analysis, it became apparent that types 12 and 14 were indistinguishable and were consequently lumped together (into Type 14) resulting in 16 final types.

During the first phase of NRHP testing, the existing 16 type chert typology was expanded to include 11 more types occurring on or near Fort Hood. This typological extension was a product of further investigations by Frederick and Ringstaff in the Cowhouse Creek and Table Rock Creek areas (see section 4.3.1). The extended typology included ten types from the Cowhouse Creek area and one type from the Table Rock Creek area. Hence, the lithic analysis for NRHP testing used a total of 27 distinct chert types.

Despite this extended typology, not all chert artifacts could be reliably assigned to one of the types and it was necessary to create several "indeterminate" categories for unidentifiable pieces, especially very small flakes. One major deterrent to accurate chert identification was the high degree of overlap in diagnostic characteristics among the chert specimens which fall at the far ends of the color/texture/luster spectrum for each respective type class. In addition, the presence of burning or patination on a chert piece often obscured the

necessary diagnostic criteria. Rather than force a dubious specimen into one of the 27 chert types, use of the "indeterminate" types allowed some descriptive utility while ensuring maximum analytical replicability.

Table 4.1 contains the original typology created to record indeterminate chert specimens during the shovel testing phase of the project as well as the modified version that was employed during the current NRHP testing phase. The members of the initial typology are grouped adjacent to their approximate counterpoints in the newer typology. Multiple entries in the first column indicate that the chert types possibly correspond with more than one of the new indeterminate categories.

The initial indeterminate chert typology was modified by Lain Ellis in an attempt to simplify a typology that was extremely subjective at best. The initial typology was based primarily on broadly defined color categories but also contained separate categories for burned and patinated specimens. The new indeterminate typology was an attempt to lump some of the previous indeterminate color categories together. In addition, the presence or absence of burning, the presence or absence of cortex, and the relative amount of cortex was noted for all chert pieces. The new typology eliminates burned chert, patinated chert, and cortex as separate, indeterminate categories.

One potential flaw of the new indeterminate typology is that it totally eliminates any observations about patination. It is the opinion of the lithic analyst that it would have been useful to note the presence or absence of patination on all chert specimens. The absence of a patination observation may lead to a higher number of cherts being placed in the indeterminate white category. Cherts in this category may actually be dark cherts that are almost completely covered with a rind of white patination. In addition, the subtle combined effects of light burning, patination, and variations in the color/texture/lustre spectrum are key factors in the indeterminate status of many of the cherts.

Table 4.1 Typology of Indeterminate Cherts Used During Shovel Testing and NRHP Testing Phases.

Shovel Testing Phase Types	NRHP Testing Phase Types
Type G (white chert)	Type W (white)
Type DT (brown)	Type T (translucent)
Type ET (tan "translucent")	
Type M (mottled)	Type M (mottled)
Type G (gray)	Type LG (light gray)
Type G (gray)	Type DG (dark gray)
Type F (gray brown)	
Type D (brown)	Type LB (light brown)
Type E (tan)	
Type D (brown)	Type DB (dark brown)
Type F (gray brown)	Type B (black)
Type A (burned)	presence/absence noted on all pieces
Type B (patinated)	no patination observations made
Type C	Type LG (light gray)

Notation of the presence (or absence) and relative degree of patination for every chert piece may have helped to clarify why many of the pieces were placed in indeterminate categories.

The visual identification of the different chert types among the Fort Hood lithics was a challenge because between some types, there are only subtle differences of color, texture, luster, or structure. The chert type for each individual lithic was determined by matching it with key specimens on the master chert typology board created for the project (Figure 4.9). This board contained the dominant specimen and the full known range of variation of each basic chert type. Pieces with an identifiable material type were assigned a number corresponding to one of the 26 basic types and unidentifiable pieces were matched with the eight indeterminate chert types. To minimize subjectivity, source typing was performed as "blind" as possible by a single analyst (Lynch) who was unaware of site locations and chert sources, and thus could not weight identification of questionable artifacts--whether consciously or not--toward types that occur in the site area.

4.2.2.2 Other Lithic Attributes

Although lithic material type was recorded for all lithic artifacts, other attributes were recorded for the different classes. During lithic analysis, debitage from each provenience lot was sorted according to chert type, debitage size, presence or absence of cortex, and presence or absence of burning. The size categories included:

- size 1: smaller than 0.5 cm;
- size 2: 0.5 to 0.9 cm;
- size 3: 0.9 to 1.2 cm;
- size 4: 1.2 to 1.8 cm;
- size 5: 1.8 to 2.6 cm;
- size 6: 2.6 to 5.2 cm; and
- size 7: larger than 5.2 cm.

Size sorting for proveniences with large amounts of debitage was accomplished by using U.S.A. Standard Testing Sieves to speed up a very slow and tedious process. After chert pieces were typed and sorted according to the above criteria, pieces with identical attributes were counted and placed in bags along with analysis tags containing all

pertinent information (Figure 4.10). This step was completed prior to data entry to facilitate quality control and troubleshooting in the lithic database. The existence of the analysis tags allows a writer to later check a questionable data entry by pulling the specific bag of lithics that corresponds with a given data record.

The entry of nonprojectile point tools followed the same procedure as the debitage entry, the only difference being the specific attributes that were observed and recorded for tools. Attributes recorded for nonprojectile point tools included the tool type (e.g., biface, uniface, endscraper, sidescraper, modified flake, hammerstone) and metric attributes (length, width, thickness, weight, etc.). For groundstone tools, the range of material types was expanded, and the tool type (mano, metate, pestle, sinker, etc.) and the weight in grams were also recorded.

Projectile points underwent the most detailed and in-depth analysis of all the artifact classes. A total of 26 attributes were recorded for each projectile point. These attributes focused on typology, morphology, and metrics. Typology consisted of assigning points to a named type based on the classification of Turner and Hester (1993) (Figure 4.11). All point typing was done by a single individual (Quigg). Points that could not be assigned to a specific type were identified as "other" dart or arrow points. In instances where an insufficient amount of point was present to classify the point as dart or arrow, "indeterminate" was used. Morphology included identification of observable traits such as material type, flaking, breakage, notching, and general shape characteristics. Metric measurements were taken on all aspects of the points so that reconstructive measurements could be made.

4.2.2.3 Other Artifact Classes

Attributes recorded for prehistoric ceramics included the sherd form (base sherd, body sherd, or rim sherd) and ware, if possible.

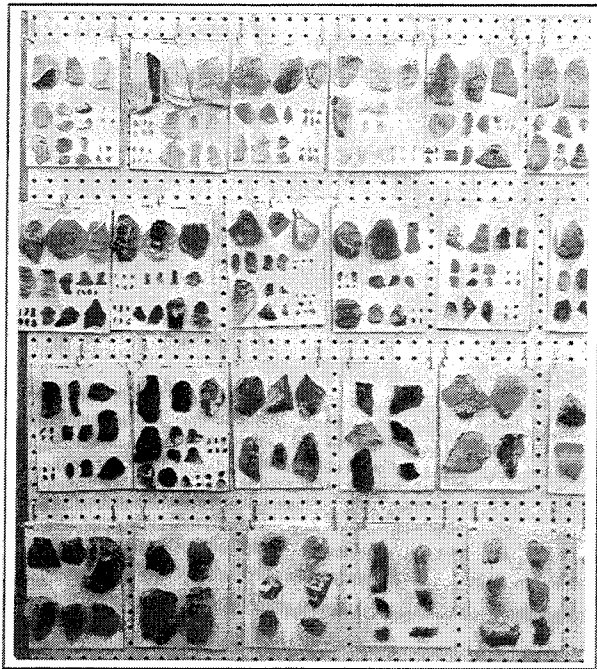


Figure 4.9 Chert Typology Collection.

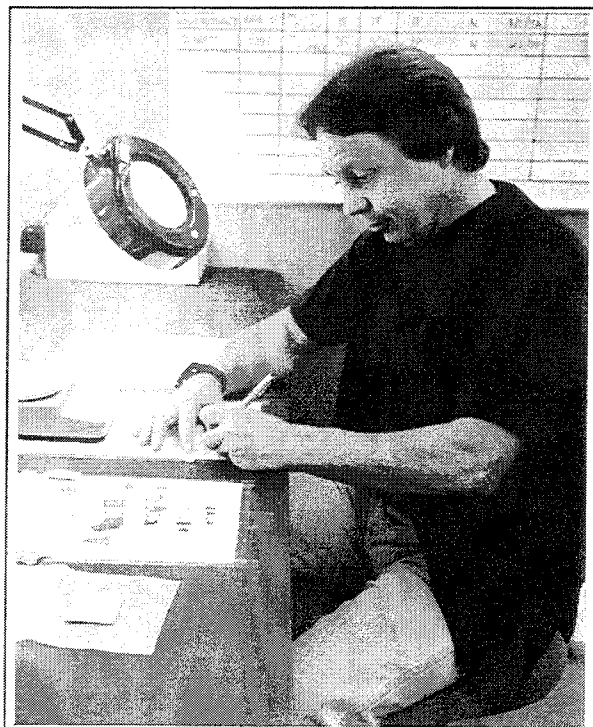


Figure 4.10 Recording Lithic Debitage.

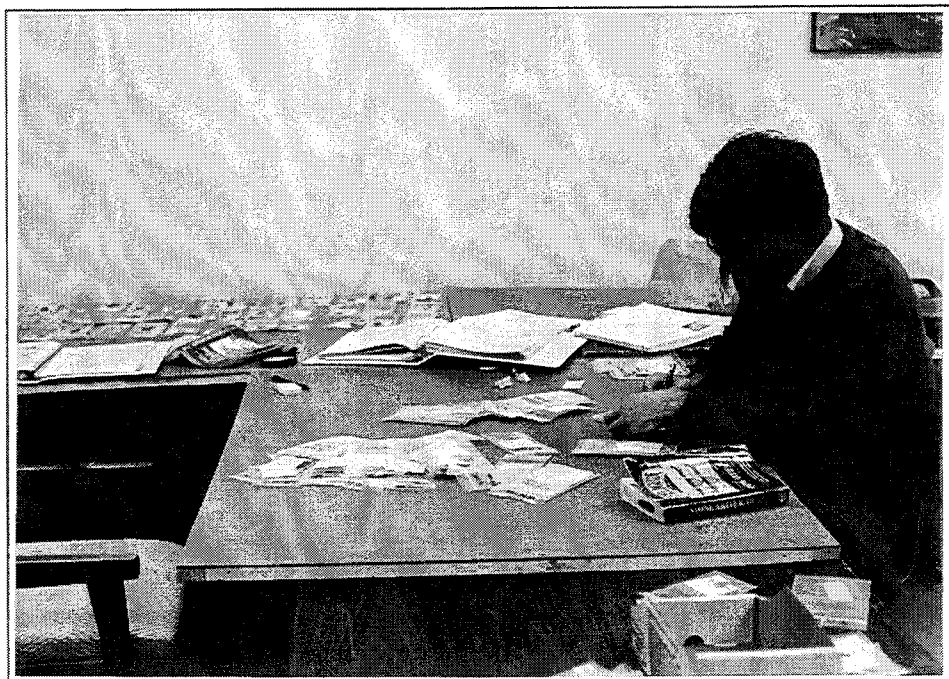


Figure 4.11 Typing Projectile Points.

Faunal material consisted of both bone and freshwater mussel shell and was submitted for outside identification and analysis (Appendix F). Only the identifiable umbos (hinges) of the mussel shell were recorded; nonhinge fragments were not recorded. Upon receipt from the analyst, the tabulated bone and shell data was entered into the DBMS®. To facilitate spotting proveniences with promise for amino acid epimerization assays, the collected shells of landsnails were entered into the database as total weight for each provenience.

Because all sites were defined a priori as prehistoric (during the original surveys, all historic components had been assigned separate trinomial site numbers), historic artifacts were not of interest except as indicating subsurface disturbances. Accordingly, the only attribute recorded for historic or recent artifacts specified the type of material (e.g., glass, metal, plastic), and any possible functional identifying characteristics (e.g., crown cap).

Finally, a very few artifacts did not fit into the above classes. These included some lumps of hematite and a few nonlocal minerals such as schist which may or may not be cultural manuports. They were entered into the database under the "Other" class. For these items, only the count and material were recorded.

4.2.3 Curation

All artifacts and samples recovered from archeological sites located on the Fort Hood Military Reservation remain the property of the U.S. Government and permanent curation will be provided at Fort Hood. All packing materials used in curation preparations were of archival quality. Artifacts and specimens are contained in polyethylene zip bags or glass or polyethylene vials. Paper records and forms (original field forms, artifact identification tags, field catalogs, accession catalogs, and carton inventory sheets, etc.) were produced on acid-free, cotton-based paper. The artifacts are bagged together as classes

by site. Each external packing carton can contain multiple classes or sites; however, when a site collection is small enough to warrant packing with another site, the items from each site are separated by internal box(es) within the archival cartons.

4.3 ANALYTICAL METHODS

G. Lain Ellis, Charles D. Frederick, James T. Abbott, and Marybeth S. F. Tomka

Preliminary NRHP eligibility determinations were made on the basis of field recovery and were submitted to Fort Hood in a series of letter reports throughout the course of fieldwork. Post-field analyses of recovered materials were performed to test or add support to these preliminary determinations and to supplement the amount of information from each site. It must be stressed that the suite of information obtained through the testing program is the result of an investigative strategy designed to assess the data potential of each site, not to effectively recover a full range of site data. The latter is the role of a mitigation effort, and involves a different set of analytical priorities than were employed in this testing effort. In this study, resources were allocated to provide minimal coverage of the full range of represented archaeological components at each site rather than selective coverage of specific components. As a result, stratigraphic relationships between various proveniences at a given site are generally not known well enough to use assemblages from specific proveniences for fine-grained analyses of prehistoric behavior.

Furthermore, budgetary constraints and artifact availability limited our ability to perform detailed chronometric analyses that would permit confident unit-to-unit correlation. Hence, only gross analyses are generally feasible, and the conclusions advanced herein are best viewed as a series of preliminary conclusions that can be used to direct future data recovery efforts.

Despite these limitations, some refinement of the site-level scale was frequently possible on gross

stratigraphic or spatial grounds. In order to refine the analytical universe at each site, a series of site subdivisions termed Analytical Units (or AUs) as created post hoc to provide for (1) a very gross temporal subdivision of archaeological components occurring at stratigraphically complex sites, or (2) subdivision on spatial grounds, which was typically applied to sites where more than one rockshelter and/or burned rock mound/midden was tested. Subdivision on these grounds was not appropriate for 35 of the 57 sites (61%), and a single AU satisfactorily subsumed all of the material collected. Of the remaining sites, 18 were subdivided into two AUs, three were subdivided into three AUs, and one site was subdivided into four AUs. A total of 84 analytical units was thus defined at the 57 sites. The AUs used during analysis are defined in each individual site description within Chapters 5.0 and 6.0.

4.3.1 Investigations of Lithic Raw Material

The existing chert taxonomy for Fort Hood (Frederick and Ringstaff 1994) was intended to illustrate the range of physical variability of Edwards Group chert that crops out at Fort Hood and demonstrates that the occurrence of bedrock lithic resources are a highly variable and patterned resource. The fact that distinctive variants or types of chert exist within the Edwards Group had been noted previously by Dickens (1993). Frederick and Ringstaff (1994) built on Dickens' work, expanding the inventory of known chert types at Fort Hood to include both low and high grade materials, and then proceeded to illustrate how these materials vary in both spatial occurrence and quality (from a workability perspective) across the base.

The ubiquity of bedrock chert outcrops is a function of the quantity and morphology of chert in the bedrock as well as the manner in which erosion has exposed these deposits. The lack of a systematic field survey methodology and failure to include secondary deposits of chert which occur on base are two of the most serious liabilities with this work. Although the first problem could not be

avoided, the inclusion of secondary materials is critical to understanding procurement activities associated with sites situated close to through-flowing streams that transport nonlocal chert gravels. Thirteen archaeological sites discussed in this report are situated upon or within the Holocene deposits of Cowhouse Creek and five additional sites are in the Table Rock Creek valley. The closest lithic resource to these sites are the chert gravels transported in the bedload of these streams, but little of the chert in these streams is accounted for in the taxonomy presented by Frederick and Ringstaff (1994). To surmount this liability, a program was established to sample, classify, and describe the nonlocal cherts contained within the bedload of Cowhouse Creek and Table Rock Creek, which are the two major streams that bring exotic lithics into Fort Hood from the west. A third potentially important source of exotic alluvial chert, the Leon River, defines the northeastern boundary of the fort. It lies relatively far from the sites addressed here and was not included in the study.

The headwaters of Cowhouse Creek lie in Mills and Hamilton Counties, about 40 miles west of Fort Hood. The majority of the chert contained within the Cowhouse Creek bedload is assumed to be Edwards Group chert since this stream only drains lower Cretaceous strata. Non-Edwards Group chert that may appear in the Quaternary deposits of Cowhouse Creek include cryptocrystalline silicates associated with the Glen Rose Formation which are not known to occur in this basin but have been described elsewhere in central Texas, and lag gravels associated with through-flowing streams of Tertiary or early Pleistocene age which are often referred to as the Uvalde Gravels. These ancient streams left gravel lags on both the Manning and Killeen surfaces at Fort Hood and apparently had their headwaters much further west in either the High Plains or eastern slopes of the Sangre de Cristo Mountains of New Mexico. Lithologic evidence of this change in drainage basin size through time may be found in the common occurrence of rose to red quartzites within these deposits, which served as a

ready source of hammerstones for the prehistoric inhabitants of the Fort Hood region.

Cryptocrystalline silicates may be present within these deposits as well, but no systematic description or sampling was undertaken during this study. Undoubtedly, some prehistoric procurement activities targeted these lag gravels, but the importance of these deposits at Fort Hood is minimal compared to bedrock and younger alluvial chert sources. The frequency of exotic materials in the bedload of Cowhouse and Table Rock Creeks due to incorporation of older lag gravels is believed to be minimal.

Sampling of the chert bedload of these streams was performed in early 1994 by Frederick and Ringstaff. Approximately 300 chert cobbles were collected from the Cowhouse Creek channel in Quad 6/61 near the point Cowhouse Creek enters Fort Hood. These cherts were subsequently sorted into classes of similar appearance which presumably represent discrete types of chert that have been eroded from Edwards Group outcrops west of Fort Hood. The examined materials were classified and grouped on the basis of color, texture, structure, and diaphaneity, and subjectively assigned classes of similar morphology. Knowledge of the range appearance of Edwards Chert bedrock outcrops was helpful in this process but the influence of this experience is difficult to describe. The methods used to organize these materials were more prone to split a single type of bedrock chert into more than one category, rather than lump multiple types into a single class. Nine physically distinct variants of chert were identified in the Cowhouse Creek bedload using this process (complete descriptions are presented in Appendix A). All of the newly recognized types have been given names that reflect their appearance and source locality. Unfortunately, no detailed frequency statistics were compiled in the process of establishing the classification, but the most common types are the first two identified in the Cowhouse classification (see Appendix I).

Two previously identified chert types were also recognized in the bedload of Cowhouse Creek: Seven Mile Mountain Novaculite (Type 4), and Heiner Lake Translucent Brown (Type 9). Seven Mile Mountain Novaculite crops out in the southwestern portion of Fort Hood and was expected in both the Cowhouse and Table Rock Creek assemblages. Heiner Lake Translucent Brown, on the other hand, is only known to occur in the Southeast Range Province and was not an expected component of the Cowhouse Creek bedload on the western side of Fort Hood.

Many of the chert types identified in the Cowhouse Creek bedload are very distinctive and easily distinguished from members of the existing bedrock taxonomy. Included in this category are Cowhouse Shell Hash (Type 20), Cowhouse Light Gray (Type 21), Cowhouse Banded and Mottled (Type 23), and Cowhouse Striated (Type 26). Others share some of the characteristics of cherts previously identified by Frederick and Ringstaff (1994), and these similarities are mentioned in the comments section of the material descriptions in Appendix A. The two most problematic groups are dark specimens of Cowhouse Dark Gray (Type 19) which could be mistaken for Owl Creek Black (Type 17 of Frederick and Ringstaff 1994), and small flakes of Cowhouse Mottled with Flecks (Type 22) that bear a strong resemblance to Heiner Lake Tan (Type 6 of Frederick and Ringstaff 1994).

Examination of the chert bedload component of Table Rock Creek in Quad 3/55, where it enters the western edge of Fort Hood, resulted in the addition of only one type class to the secondary chert inventory. We were surprised to find that chert comprises much less than 1% of the gravel bedload of Table Rock Creek and that this stream is neither a diverse nor abundant lithic raw material source. This was unexpected since Table Rock Creek and its tributaries drain the northern slopes of an Edwards Group/Manning surface remnant that trends northwest through Copperas Cove and straddles the Coryell-Lampassas county line. This outcrop occupies the drainage divide

between Cowhouse Creek and the Lampassas River and includes Seven Mile Mountain, which is partially within Fort Hood, and another mesa that lies northwest of Copperas Cove known as Long Mountain. Two chert types are known to crop out on Seven Mile Mountain within Fort Hood and it was expected that the streams draining this and similar surfaces off base to the west might produce chert as well. The meager chert component in the Table Rock Creek bedload suggests that little chert occurs in these deposits, or that the chert component of this stream is very diluted due to the fact that the Edwards strata represent a minor portion of the bedrock exposed in the Table Rock Creek basin.

Overall, the 11 new lithic material classes provide a mechanism to evaluate stream bed procurement activities represented by the lithic assemblages examined during testing. We cannot say that the sample of alluvial chert is comprehensive, but we feel it does identify the most frequently occurring cherts in the bedload of each stream. Unique materials that occur in low frequency (less than 1%) in the bedload of each stream undoubtedly are present and will account for at least some of the unidentified materials encountered in the assemblages from sites across the base.

4.3.2 Obsidian Sourcing

A single flake of obsidian was recovered during the testing effort. Because no obsidian occurs within the broader Central Texas region, this artifact clearly represents long-distance trade. It was submitted to Dr. Tom Hester at TARL, who in turn submitted it to the Lawrence Livermore Laboratory in California for nondestructive XRF compositional analysis and sourcing.

4.3.3 Lithic Debitage

Debitage analysis was oriented around issues of lithic procurement practices, especially the extent to which embedded and direct procurement characterize the use of chert raw materials. The analysis was founded on the chert taxonomy

developed by Frederick and Ringstaff (1994; also Section 4.3.1, this volume), and had quantitative and qualitative components that have been chosen to take advantage of a large data base while simultaneously acknowledging the limitations imposed by limited subsurface exposures and the process of identifying chert types using only visual means. To adapt to these limitations, we have chosen to restrict the debitage analysis of each individual site to an examination of lithic resource procurement at the level of analytical units.

This level of analysis constitutes a logical follow-up to the Fort-level analyses performed by Ellis and Abbott (1994). In addition, to provide a measure of intersite relationships within the boundary of Fort Hood, we have adopted the admittedly arbitrary concept of spatial site groups (see section 2.1) to examine the character of chert procurement at a coarser scale.

For each site, debitage analysis proceeded as follows. The debitage recovered from each site was washed and entered in the catalog. The analysts (Lynch and Mehalchick) then examined the material and classified each piece (if possible) using the taxonomy developed by Frederick and Ringstaff (1994; Section 4.3.1, this volume). For the most part, this process was accomplished by the analysts without the benefit of locational information about the site and associated lithic sources to minimize the tendency to classify questionable items as a particular type because it is known to outcrop on or near the point of recovery. Using the computer DBMS®, the debitage was summarized in tabular form to indicate the number of flakes of each identified and indeterminate chert type that is present in each of a series of size classes. A binomial hypothesis test (see Thomas 1986) was then performed to determine whether each chert type present in the assemblage is equally represented. For the purposes of this test, flakes in the indeterminate categories are collapsed into a single indeterminate category. The null hypothesis for the test is:

$$p(\text{type}_1) = p(\text{type}_2) = \dots = p(\text{type}_n) = p(\text{type}_{\text{indeterminate}}).$$

The number of trials for the test equals the number of flakes of all types, including indeterminates. Where n equals the number of chert types identified in the flake assemblage, p equals $1/(n + 1)$ to accommodate the presence of a class of indeterminates. The null hypothesis is false for any chert with an observed value that falls outside the range predicted by the binomial distribution. Cherts occurring in numbers larger than the upper limit of the predicted range occur in higher than expected frequencies, whereas cherts in numbers smaller than the lower limit of the predicted range occur in less than expected frequencies.

If a raw material occurs at a greater than expected frequency, it can be judged to be overrepresented in the assemblage even if there are very large numbers of indeterminates. This follows from the fact that if indeterminates are present, some of them may actually belong to the overrepresented type. Hence, a judgement of statistical overrepresentation is conservative because it is likely to be based on an undercount of the actual number of flakes present.

Indeed, the frequencies of raw materials with values falling within or below the expected range also are likely to be undercounted in most cases. Sometimes the undercount can be severe because the diagnostic traits for raw material classes themselves have overlapping ranges, especially for gray cherts and some light brown materials. Consequently, a judgement that a chert material is not overrepresented is often not definitive.

To minimize this limitation, a second statistical test was performed on a data set that excludes the indeterminate flakes. This test involves the implicit (and possibly, often false) methodological assumption that the contents of the identified assemblage are mirrored proportionately in the content of the indeterminate assemblage; the major difference between the two is that the latter chert types that have not yet been described. The null hypothesis for the second test is:

$$p(\text{type}_1) = p(\text{type}_2) = \dots = p(\text{type}_n).$$

where (1) the number of trials equals the number of flakes excluding indeterminates, (2) n equals the number of chert types identified in the flake assemblage, and p equals $1/(n)$.

Any type that was overrepresented in the first test will also be overrepresented in the second test. However, types with expected or less than expected values in the first test may show a higher level of statistical representation. Thus, the second test provides a basis for making an intuitive judgment that major differences in numerical frequency of identified chert types correspond to major differences in patterns of chert use at the site.

4.3.4 Lithic Tools, Cores, and Projectile Points

All projectile points were typed according to the standards appearing in Turner and Hester (1993) where possible. Lithic tools were first separated as bifaces, unifaces/edge-modified, or utilized flakes. Further subdivisions were used to classify the stage of biface manufacture or to attach a function to the tool, such as side scraper or spokeshave. Cores were identified as tested cobble, single or multiple platform, and metric dimensions (length, width, and height) were recorded.

Generally, the lithic tool and core analysis followed standard analysis techniques. However, certain caveats are given. The terms uniface and/or edge-modified was used for classification of a tool that could not securely be put into a functional or descriptive category. This applies to minimally retouched, that is, intentional edge modification, as well as unifacial tools that defied classification. The term "other tool" was used in several instances when the specimen was clearly a tool, but "uniface" or "edge-modified" was not an appropriate term. The "preform" classification is applied to materials that were either too fragmentary to classify as typed projectile points or were bifaces thinned to the point of only needing final shaping to become projectile points. Several of these specimens broke at this final thinning stage.

Hammer/Abrader Stone as a class of artifacts includes stereotypical hammerstones and implements that are interpreted to have been used for crushing and battering. The Crushing/Battering term has been applied to stone implements that exhibit unifacial or bifacial shaping to produce an edge which has been crushed and dulled through use. These tools were likened to choppers in the Chapters 5.0 and 6.0 discussions, for their appearance is reminiscent of a stereotypical chopper with the important difference being size, weight, and the type and amount of crushing on the working edge.

Ground stone as a class consists of mano and metates, as well as the one Waco Sinker recovered during testing. The Waco Sinker is distinguished by its ground groove around the specimen's circumference dividing the implement into two roughly equal parts.

Cores are defined as a mass of target material from which flakes have been removed. The core classification is subdivided into tested cobble, multiple platform, and flake/blank. The tested cobble term was applied to cores that exhibited one to three flake scar removals. Multiple platform cores are best described as a multidirectional core with a variety of platforms and directions of removals. A flake/blank core, of which there is only one, is differentiated from a biface in that the parent material is clearly a flake that has been chosen for further bifacial reduction. This is to be contrasted with the biface category which are specimens that clearly reflect nodule/biface reduction strategies.

The chipped stone tool class includes both formal and informal tools exhibiting unifacial or bifacial reduction or finishing. The biface category is subdivided into a continuum of early, middle, late, and preform stages. Early stage bifaces are usually distinguished by incomplete removal of cortex on both surfaces and minimal shaping. When viewed on end, the edges are very irregularly shaped; that is, having no clear center plane. This stage approximates Collins' (1975) initial trimming,

Callahan's (1979) Stage 2, and Sharrock's (1966) Stage 1. The middle stage biface has more cortex removal completed, although the tool may still retain a significant amount of cortex in isolated areas on the surfaces. The edges vary around a central plane that is becoming more distinguishable. The surface of the artifact and the edge may have isolated knots caused by repeated attempts to remove flakes that resulted in undercutting and isolation of a stepped area. This stage approximates Collins' primary trimming (1975), Callahan's Stage 3 (1979), and Sharrock's Stage 2 (1966). The late stage biface may still have small remnants of cortex, but has sinuous edges clearly centered on a plane through the cross-section of the artifact, and by a well-defined outline shape. The stage of manufacture is comparable to Collins' (1975) primary trimming, Callahan's (1979) Stage 4, and Sharrock's Stage 3 (1966). The preform stage is a combined category of late stage bifaces. The first are specimens that are thin, have little or no knots, a straight to slight sinuous edge and clearly ovate or triangular in outline shape. The other type of preform found in this category is the projectile point blank, which requires only notching or other finishing touches. Fragments that are too small for classification as a dart or arrow points, and those that are too fragmentary to be confidently identified as a projectile point were also included in this category. The preform definition is comparable to what Collins calls secondary trimming (1975), Callahan's (1979) Stage 5 (referred to as rough preforms), and Sharrock's (1966) Stage 4.

A drill is sometimes also termed a perforator in the literature; it is characterized by a long narrow blade that has been bifacially worked. The hafted (proximal) end, when present, may be significantly modified or left relatively untouched; no definite hafted tools were identified. A burin is distinguished by a narrow stepped or hooked flake scar on an artifact that appears to be intentionally produced or has been fortuitously produced by utilization. A chopper is a large uniaxially or bifacially modified specimen formed to produce a sharp edge which distinguishes it

from crushing/abrading tools. A combination tool is one in which forms suggestive of two or more different functions are present. A denticulate is an implement bifacially or bifacially modified which has been retouched to produce a scalloped edge(s). The term uniface has been applied to a tool that has been minimally retouched to produce a small area or areas of working edge. These implements are relatively abundant. Gravers are small beaked protrusions on implements that may have been uniaxially or bifacially outline trimmed and cross-sectionally modified. The "other" tool category was applied to specimens which have clear evidence of modification, but are striking enough to differentiate them from the minimally retouched and catch-all category of uniaxials or bifaces. A spokeshave is distinguished by a relatively small notch-like indentation along one of its lateral edges. This notch may or may not have been produced bifacially. A utilized flake is an implement that has been fortuitously produced through use, and is characterized by small relatively narrow flake scars along its edges as contrasted to intentional retouch which is characterized by deep larger flake scars. The rule of thumb applied to differentiate retouch and utilization was the size of the flake scars, implements with 1 to 2 mm long and wide or longer scars were classified as retouched. Also taken into account was the overall shaping of the implement and the amount of edge modification observed. Utilized flakes are considered the stereotypical expedient tools.

An end-scraper is a uniaxially or bifacially modified implement that has been significantly retouched along its distal end. A side scraper has one or more lateral edges retouched to produce working surfaces. A complex scraper has characteristics of both an end- and side-scraper. In a number of cases scrapers had been significantly shaped and retouched to produce a classic side and end-scraper morphology with the contraction of the implement just behind (proximal) to the working edge, and appear to have been hafted. Evidence of hafting is characterized by scarring and polishing along the proximal lateral edges.

A chipped stone adze is distinguished by its unifacial or bifacial shaping reminiscent of that which is seen in scrapers; however, the relatively flat plane of the ventral surface shows use scarring and the dorsal surface is partially domed and in some cases has evidence of both scarring and polish at the high points of the steeply sloping surface. In Central Texas, these tools are commonly referred to as Clear Fork gouges and occasionally Clear Fork tools. A wedge is a wood-working tool, as are adzes, and may be unifacially or bifacially shaped. The wedge is distinguished from bifacially modified implements by the skewing of the shaping to one edge, and the edge crushing and scarring present on the artifact. Wedges exhibit early stage biface-like morphology with the addition of edge damage. Care was taken to correctly differentiate between crushing/battering implements and wedges which retain a sharper edge with a smaller edge angle. Gouges, like adzes and wedges, are wood-working tools that are morphologically similar to scrapers but may have more edge damage (stepped flake scars) resulting from use (see above discussion). However, Turner and Hester clearly state (1993:246) "it is likely they were utilized in woodworking tasks, as scrapers or adzes, rather than 'gouges'." Polish may or be present along the dorsal surface of the implement and haft wear may also be present. Crushing/battering tools have more rounded edges indicative of the edge impacting against a surface, while the purpose of a wedge is to split apart a material along the sharp edge that has penetrated it or using this sharp edge be driven further into the material to hold it apart.

This tool typology is reflected in the data base presented in Appendix C and was used in Chapters 5.0 through 8.0 to describe and analyze all sites in this report. However, subsequent to accomplishing these tasks but before final printing of this report, we slightly revised our tool typology, especially for bifaces (including points), edge modified flakes, and utilized flakes. The new typology will be applied to all materials recovered in 1994 and 1995 from the second set of sites and will be documented in a forthcoming report, but does not

affect any of the statements made in this report. To ensure 100% comparability of data for all of the sites we have tested at Fort Hood, we recoded the affected tools from this report using the new typology. As a result, several hundred tools were reclassified and are curated using the final typology and not the typology used in this report.

Tables 4.2, 4.3, and 4.4 present the descriptive and metric characteristics used in the analysis for lithic projectile points, tools, and cores, respectively.

4.3.5 Analyses of Other Artifact Types

The identification of specific ware types was a goal of the ceramic analysis. However, given the small number of sherds and their general small size identification was not always possible. Petrographic analysis was used to facilitate identification of local and nonlocal production of the vessels. This analysis was added by the constituent analysis of three local raw material sources. As shown in Table 4.5, only general attributes were recorded for ceramics.

The few specimens of ground/pecked stone that were recovered were analyzed on only a basic level. Table 4.6 presents a list of attributes recorded. Lithic tools classified as hammer or abrader implements also received analysis with a specific set of attributes.

The historic artifacts were minimally identified as to class of artifact and any other basic data necessary for identification purposes. No analysis was preformed.

4.3.6 Chronometric Analyses

Two principal avenues of determining the ages of investigated components were pursued. When possible, radiocarbon analyses of recovered charcoal were conducted. When carbon recovery was insufficient, amino acid epimerization of land snails (Ellis and Goodfriend 1994) was employed as a chronometric indicator. When they were applied, amino acid determinations were also used

Table 4.2 Projectile Point Attributes.

Attribute	Acceptable Values
Lithic Material	(see Appendix I)
Type	Other Dart, Other Arrow, Andice, Bulverde, Castroville, Darl, Early Stemmed, Edgewood, Ensor, Ellis, Fairland, Frio, Godley, Hoxie, Lange, Marcos, Marshall, Martindale, Nolan, Palmer, Pedernales, Plainview, Travis, Wilson, Yarbrough, Wells, Bonham, Bulbar Stemmed, Perdiz, Scallorn, Clifton, Sabinal
Completeness	Complete, Blade only, Stem only, Longitudinal segment, Barb, Blade and stem, Medial fragment, Part of blade and stem, Other
Breakage	None, Perverse, End-shock, Impact, Other, Burinated, Indeterminate
Lithic Symmetry	Yes, No
Port. Reworked	Blade, Stem, Blade and barbs, Barbs, Blade and stem, none
Flaking	Minimal, Parallel, Random, Alternately Beveled, Other, Indeterminate
Serration	Yes, No
Cross-section	Diamond, Beveled, Plano-convex, Indeterminate, Wedge-shaped, Bi-convex
Basal thinning	Yes, No
Basal grinding	Yes, No
Notching	Basal, Basal/side, Basal/corner, Side, Corner, None, Indeterminate
Shape	Triangular, Expanding, Straight, Contracting, None, Indeterminate, Bulbar
Base Shape	Straight, Convex, Concave, Pointed, Indented, Notched, Other, Indeterminate
Shoulder Shape	Sloping, Rounded, Abrupt, Barbed, Extremely Barbed, Indeterminate, Not applicable
Tang Shape	Rounded, Pointed, Square, Indeterminate, Unknown
Max. Length (mm)	Numeric
Max. Width (mm)	Numeric
Max. Thickness (mm)	Numeric
Blade Length (mm)	Numeric
Blade Width (mm)	Numeric
Stem Length (mm)	Numeric
Stem Width (mm)	Numeric
Stem Thickness (mm)	Numeric
Neck Width (mm)	Numeric
Lithic Weight (g)	Numeric

to gauge the integrity of assemblages. Additional indicators of relative age, including stratigraphic context and diagnostic tool associations, were also employed in the overall interpretive effort.

4.3.6.1 Radiocarbon

A total of 73 radiocarbon assays were submitted from 32 sites during the testing phase. The majority of these analyses (93%) was performed by Beta Analytic, with an additional five assays (7%) performed by the University of Texas at Austin Radiocarbon Laboratory. With the exception of a few *Rabdotus* sp. shells dated to refine the amino acid dating curve (see section 4.3.6.2), all samples submitted were composed of carbonized wood.

Sample selection was governed by a desire to obtain ages from each of the major temporal contexts (AUs) represented at each site (e.g., alluvial fills, burned rock middens) and tempered by constraints imposed by recovery and available budget. The majority of radiocarbon samples selected for submission were collected in the field, but a few were obtained from processing of bulk flotation samples in the laboratory. Both conventional and accelerator-mass spectrometer (AMS) ages were obtained.

Radiocarbon samples were pretreated by the consultant laboratories with mechanical washings to remove rootlets and the sediment matrix, followed by acid/alkali/acid washes to remove carbonates and organic acids. Standard ages were obtained by synthesizing sample carbon to benzene (93% C), measuring C14 content, and calculating radiocarbon age using the Libby C14 half-life (5,568 years). The majority of samples were also measured for C13/C12 ratio and corrected by normalization to -25 per mil. In a few cases, when the material was obviously charred wood, no C13/C12 determination was made. AMS analysis consisted of reduction of the sample to graphite (100% C), along with standards and backgrounds, and measured for C14 content at the Lawrence Livermore National Laboratory (CAMS) in Berkeley, California.

Table 4.3 Lithic Tool Attributes.

Attribute	Value
Lithic Material	(see Appendix I)
Tool Type	edge modified, utilized flake, uniface, end scraper, side scraper, complex scraper, spokeshave, graver, biface, early stage biface, middle stage biface, preform, drill, other tool, late stage biface, rejuvenation flake, wedge, burin, adze, Chopper, combination tool, Denticulate
Complete?	Yes, No
Lithic Weight (g)	Numeric
Cortex Present	all cortex, partial cortex, no cortex, indeterminate, rejuvenation
Cortex	Abraded, Unabraded, Indeterminate, Not Applicable
Length (mm)	Numeric
Thickness (mm)	Numeric
Width (mm)	Numeric
Working Edge #1	Numeric
Working Edge #2	Numeric
Working Edge #3	Numeric

Table 4.4 Lithic Core Attributes.

Attribute	Value
Lithic Material	(see Appendix I)
Core Type	multiple platform, single platform, tested cobble, flake/blank
Weight (g)	Numeric
Length (mm)	Numeric
Width (mm)	Numeric
Thickness(mm)	Numeric

4.3.6.2 Amino Acid Epimerization

Amino acid studies of *Rabdotus* snail assemblages were pursued at a variety of sites to both contribute chronometric data and to permit assessment of the stratigraphic integrity of associated archaeological assemblages. Amino acid epimerization analysis involves the measurement of the ratio of the amino acid epimers D-alloisoleucine/L-isoleucine (or A/I ratio) in the organic matrix of the snail shells. In modern material, essentially all of the amino acids are in the L-form, but over time they convert (epimerize) gradually to the D-form. Thus, measurement of the A/I value gives an indication of relative age and can be used to estimate absolute age once the rate of epimerization is established from calibration against radiocarbon or another chronometric method.

In amino acid epimerization analysis, error results from analytical precision (typically around $\pm 5\%$ of the ratio, but lower if replicate analyses are carried out) and from variability in the rate of epimerization of samples from different contexts. In addition, epimerization rates vary among species and among different regions, according to the temperature regime. To eliminate species error, all analyses were conducted on a single snail taxa (*Rabdotus* sp.).

Table 4.5 Ceramic Attributes.

Attribute	Variable
Vessel form	Jar-Olla, Bowl, Indeterminate
Ceramic Class	Incised, Plain
Sherd Form	Body, Rim, Indeterminate
Firing Atmosphere	Oxidized, Reduced, Incompletely Oxidized, Incompletely Reduced, Zoned, Indeterminate
Sherd Thickness (mm)	numeric
Color-Interior	Munsell
Color-Exterior	Munsell
Color-Core	Munsell
Surface Treatment	Polished, Polished/eroded, Indeterminate

The assumption was made that environmental conditions from the investigated sites were not significantly different (or rather, fluctuated through time in a comparable manner), and thus should not be a factor in interpreting the data. An additional and serious source of error is caused by artificial heating of the shell in a fire, which dramatically increases the rate of epimerization. Other factors

Table 4.6 Groundstone and Pecked Stone Attributes.

Attribute	Groundstone Value	Hammerstone Value
Type	sinker, mano, metate	Hammerstone, Crushing/Battering, Abrading, Other
Lithic Material	(see Appendix I)	(see Appendix I)
Modified Edges	not recorded	numeric
Edge Preparation	not recorded	unifacial, bifacial, none
Complete?	Yes, No	not recorded
Length (mm)	numeric	numeric
Width (mm)	numeric	numeric
Thickness (mm)	numeric	numeric
Weight (g)	not recorded	numeric

can also contribute errors, including saturation by groundwater, which can affect the amino acid composition of the shell by leaching, and topographic and slope-aspect factors, which can result in subtle soil temperature and soil moisture differences between sites that are potentially significant to the rate of epimerization. To compensate for the above errors and for the possibility that older individuals could have been reworked into a more recent deposit or younger individuals might have intruded into an older deposit, independent A/I ratios were calculated on a number of specimens (usually 8 to 12) from each stratigraphic context.

This method builds on the study of Ellis and Goodfriend (1994), which includes a more thorough discussion of the explicit and implicit assumptions in the method than is provided here. Age determinations reported in this document utilize the calibration curve developed during that study, supplemented by additional AMS dates on recovered specimens calculated to "fill in" the calibration curve for the period 2000 to 6000 BP. In addition, two pre-bomb "modern" shells obtained from the Smithsonian Institution by Dr. Glen Goodfriend were radiocarbon dated to approximate the "age anomaly" in *Rabdotus* sp. shells resulting from the ingestion of dead carbonate from the calcareous edaphic environment on the fort. The results of the analyses are presented in the site-specific discussion of results in Chapters 5.0 and 6.0, an overview of the A/I analyses is included in Chapter 7.0.

4.3.7 Analyses of Biotic Materials

Biotic artifacts were collected both individually when noted in the field, and in bulk flotation samples which were processed in the laboratory. With the exception of pollen samples specifically targeted for recovery from tufa mounds in two of the investigated rockshelters, all biotic samples were obtained opportunistically during generalized test excavations of the sites in question. Samples suitable for economic and/or environmental analyses were identified during initial laboratory

processing, and submitted to outside analysts for identification and tabulation. This process was performed without the benefit of accompanying provenience information to limit interpretive inferences that may have colored the basic analyses. Following tabulation, the results were interpreted "in house" in light of available provenience and artifact association data.

4.3.7.1 Bone

Identification of nonhuman bone recovered during testing was performed by Brian Shaffer, Zooarchaeology Laboratory, University of North Texas. In accordance with standing policy at Fort Hood, no human bone was knowingly recovered during the testing phase. When encountered, human burials were reinterred and further work on the site ceased.

When possible, the taxon and skeletal element of each nonhuman bone was identified. Observations were also made on the degree of completeness (or fragmentation), evidence of butchering or intentional modification, evidence of use as a tool (e.g., edge polish), and evidence of burning. Shaffer's report is presented in Appendix F; the information is integrated into the description of the site assemblages in Chapters 5.0 and 6.0.

4.3.7.2 Mussel Shell

Field collection of mussel shell and mussel shell fragments was limited to those including the umbo (hinge); fragments lacking this diagnostic portion of the shell were noted in the field but were not collected. Collected mussel shells were submitted for identification to Laurie Zimmerman, Houston, Texas. Specimens with residual matrix attached were lightly brushed only when cleaning by hand was not sufficient to permit identification. No preservatives or glues were used.

Identifications were determined by keying out specimens (Burch 1973; Murray and Leonard 1962; Parmalee 1967; Starrett 1971) and then comparing them to type specimens housed at the

Zooarchaeological Research Collection (Department of Anthropology) at Texas A&M University. In addition, specimens were also compared with published photographs and drawings (Burch 1973; Littleton 1979; Murray and Leonard 1962; Parmalee 1967; Starrett 1971). Identifications were made on the basis of structural features, and then assigned to the lowest taxonomic level possible. A 10X hand lens was employed to examine beak sculpture and to examine modified or potentially modified specimens. For the present analysis, the classification scheme adopted was developed by Burch (1973). Taxonomic changes have occurred since Burch's (1973) publication, and this study reflects those changes in nomenclature (see Neck 1987:III-2). One limitation for the present study focuses on the comparative materials available. Ideally, comparative specimens should be sought to confirm any identification. However, there are two taxa, *Lampsilis hudsoniana* and *Cyrtonaias* sp., for which comparative material was not available. Identifications were made from published descriptions and photographs; based on this constraint, they are tentatively assigned to these taxonomic designations. Identified taxa, their common names, and their preferred habitats are listed in Table 4.7.

For each provenience, specimens were sorted by taxon into whole shell, umbo fragments, and fragments. Note that because only umbos and whole shells were collected in the field, any fragments were the result of damage in transit, and were therefore disregarded. Each specimen was coded for the following information: catalog number, site, test pit, depth, field specimen number, quantity, taxon, side, niche characteristics, burning, and modification (i.e. drilled/perforated, incised/grooved, polished, and notched). The results of this analysis are integrated into the description of site assemblages in Chapters 5.0 and 6.0.

4.3.7.3 Macrobotanical Remains

Limited macrobotanical materials were recovered in the field, however, a large number of flotation samples were processed. In order to provide a preliminary gauge of the degree of macrobotanical preservation, the light fraction of a number of these flotation samples was submitted to Phil Dering, Texas A&M University, with instructions to provide a brief, survey-level assessment of taxa represented. For the most part, submitted samples were restricted to the matrix of feature fills from the open sites and from features and/or artifact-rich levels in the rockshelters. The results of Dering's analysis are incorporated into the site reports in Chapters 5.0 and 6.0, and his report is included in Appendix G.

4.3.7.4 Pollen

As part of the overall effort, a pilot investigation of the utility of travertine and tufa deposits in the rockshelters of Fort Hood as a source of paleoenvironmental data was performed. The theoretical background behind this investigation and the preliminary results are presented in Chapter 7.0.

The travertine samples were analyzed by Dr. Steven Hall, Department of Geography, University of Texas at Austin, using a method similar to that of Weinstein-Evron (1987). The samples were trimmed with a rock hammer to remove any surface contaminant and weathered material. The trimmed blocks were oven dried at 50°C, weighed to the nearest 0.1 gram, and dissolved in HCl. When the travertine was dissolved in HCl, a froth of organics and clays formed at the beaker surface, but was reduced by spraying with ethanol to break surface tension. At this point, four *Lycopodium* spore tablets (11,267 ± 298 spores per tablet; batch 201890) were added to each sample to allow calculation of fossil palynomorph concentration per unit weight. Samples were then washed in HF, concentrated in centrifuge tubes, washed in hot HCl, and washed in water and centrifuged repeatedly to remove clays. Approximately 1 ml

Table 4.7 Bivalve Taxa Identified from the 57 Sites.

Taxon	Common Name	Habitat
<i>Amblema plicata</i>	Threeridge	Still to rapidly flowing waters in streams and rivers; will tolerate most bottom conditions except deep sand
<i>Amblema</i> sp.	Threeridge family	same as <i>Amblema plicata</i>
Ambleminae	Threeridge family	same as <i>Amblema plicata</i>
<i>Cyrtornaias</i> sp.	Pearlymussel family	Rivers and streams; standing or flowing water; common on mud, sand, and gravel substrates
<i>Lampsilis hydiana</i>	Louisiana Fatmucket	Tolerates wide variety of substrates and flow conditions
<i>Lampsilis teres</i>	Yellow Sandshell	Still to moderately flowing water in rivers; muddy to gravelly substrates
Lampsilinae	Fatmucket/Pocketbook/ Sandshell family	same as <i>Lampsilis teres</i>
<i>Lampsilis</i> sp.	Fatmucket/Pocketbook/ Sandshell family	same as <i>Lampsilis teres</i>
<i>Leptodea fragilis</i>	Fragile Papershell	Tolerates a wide variety of substrates and flow regimes; prefers still to slow currents in relatively deep water
<i>Megalonais nervosa</i>	Washboard	Primarily large rivers with deep (2m+) water; typical of relatively slow currents and silty to gravelly bottoms
<i>Potamilus purpuratus</i>	Bleufer	Associated with gravelly to muddy substrates
<i>Quadrula apiculata</i>	Southern Mapleleaf	Still to rapidly currents; shallow to relatively deep; muddy to sandy substrates
<i>Quadrula houstonensis</i>	Smooth Pimpleback	Occurs in sand, mud, and fine gravel; relatively shallow water
<i>Quadrula</i> sp.	Pimpleback/Mapleleaf/ Monkeyface family	same as <i>Quadrula houstonensis</i>
<i>Toxolasma texasensis</i>	Texas Lilliput	Typical of still, protected waters on sand or mud substrate
<i>Toxolasma</i> sp.	Lilliput family	same as <i>Toxolasma texasensis</i>
<i>Tritigonia verrucosa</i>	Pistolgrip	Still to rapid currents; silt to boulder substrate; most abundant under moderate to swift current
Unionacea	unidentified freshwater mussels	generalized

Common names and habitats after Howells 1992; 1993; personal communication, 1995.

of the resulting water/residue mixture was subsampled for continued treatment, each washed for 8 minutes in a heated acetolysis solution (acetic anhydride and sulfuric acid) to remove soft plant tissues and other organic matter. Counting was performed using a binocular microscope.

4.4 QUALITY CONTROL

W. Nicholas Trierweiler

Early on, it was recognized that the testing program presented an unparalleled opportunity in

Central Texas archeology, involving the investigation of nearly 60 prehistoric sites under a single research design by a single team and within a single year. The opportunity demanded the thoughtful development of a program characterized by rigor in methods, replicability of observations, and consistency of conclusions.

Accordingly, the program of Total Quality Management (TQM) begun in the earlier phase of work (Trierweiler 1994:92-95) was continued and modified as appropriate for the new phase. The TQM program consisted of several closely related operations, including development of a field procedure manual, development of custom data recording sheets, close review of 100% of all data sheets, and appointment of an independent quality officer.

More subtly, the TQM philosophy was designed to filter into all aspects of the program, from regular vehicle maintenance to comfortable living quarters to cellular field phones for rapid communication. All members of the project team took pride in the quality of their work. Field personnel were empowered to make key decisions. As a result, crew turnover during the 10 month fieldwork was minimal, with the Field Supervisor (Mehalchick), both crew chiefs (Kleinbach and O'Neill) and four of the field technicians (Badon, Burns, Peterson, and Walters) participating from start to finish. Similarly, all of the lithic analysis was conducted by two analysts (Lynch and Ringstaff) during the eight month laboratory phase. This sense of craftsmanship and pride of ownership was responsible in no small part for the ultimate high quality of the primary data, the integrity of the resulting scientific conclusions, and the accountability of the cultural resource management recommendations.

4.4.1 Procedures Manual

As had been done for the earlier phase of work, a (new) standard operating procedures manual was developed and distributed to all field personnel (Mariah Associates, Inc. 1993). The manual was

closely based on the contractual scope of work, and summarized the purpose of the project, discussed broad strategies, specified the data collection tactics, and defined key terms. As the "bible" for field work, it was provided to all crew members before beginning field work, and was discussed in workshop fashion to ensure understanding.

The manual included examples of the standardized data recording sheets (see Appendix J). These included the excavated level data sheet (Form 8), the geomorphic profile record, the field inventory (Form 10), the Quality Control Checklist (Form 13), the artifact frequency distribution (Form 18), the list of treatment units (Form 19), the excavated feature record (Form 20), and the summary of observations (Forms 25 and 26). Several forms were revised and improved during fieldwork to correct problems or to allow for new observations, but in general, the data on each new version was backwardly compatible. The version number was printed at the lower left to easily identify outdated versions.

4.4.2 Quality Control Checkpoints

Despite the system set up to encourage built-in quality, it was recognized that errors would nonetheless arise. Because errors of fact (e.g., recording the wrong weight for a bucket of burned rocks) are nearly impossible to separate, after the fact from "outlier" data and sampling error, all projects must rely on the professionalism of the field team to collect reliable data. Other errors arise by way of incomplete, contradictory, or missing data sheets. These errors are often (but not always) correctable, especially if they are detected soon after commission. Accordingly, every page of field data was systematically reviewed for completeness and consistency by an archeological technician, generally within seven days of completion of field work. Data sheets with incomplete information (e.g., missing north arrows on sketch maps), unclear information (e.g., smudged writing) or conflicting information (e.g., provenience data on the field catalog versus those

on artifact bags) were returned to the crew chief and/or original excavator for correction. This process was facilitated by a Quality Control checklist (Form 13). Upon satisfactory condition of all site records, the checklist was approved and attached to the packet of site records.

An especially significant component of the TQM program was the videotaping of every site. Although not required as a deliverable under Mariah's contract, each site was VHS videotaped to provide Fort Hood (and future researchers) with a narrated documentary of the excavations. Videotapes were reviewed by the PI during analysis and the formulation of eligibility determinations and were submitted to Fort Hood on a monthly basis along with the preliminary site reports.

All original field forms and the draft site write-up were reviewed by the PI for concurrence on site interpretation. If the PI had any questions regarding the primary data or their interpretation, these were discussed with the crew chief and/or geomorphologist. Once satisfied that the site had been adequately investigated according to the scope-of-work, the PI developed the conclusions and management recommendations and submitted the site report to Fort Hood.

Tracking the progress of field work on the 57 sites was facilitated by means of a bulletin board in the field office which physically represented every site by a colored tag, according to its status and recommended level of testing effort. As work tasks were completed for each site (e.g., trenching, manual excavation, mapping), the crew chief dated the tag appropriately and physically moved it into the queue for the next work task. Thus at any time, the Field Supervisor had all necessary information to make informed decisions for the optimal allocation of excavation resources (personnel, schedule, and budget).

During laboratory recordation of artifact attributes, quality control was greatly facilitated by the automatic error trapping routines of the DBMS®.

For each attribute, a specific value type and format was assigned prior to beginning artifact recordation. Value types were numeric, logical, value list, and alphanumeric. For numeric values (e.g., artifact weight), upper and lower limits were set along with a decimal format. Logical values recorded yes/no data (e.g., basal grinding present or absent). For those attributes with value lists (e.g., lithic material), a predefined list of acceptable entries was created from which to select. Values not on the list or outside the accepted numeric range could still be entered into the DBMS®, but these were flagged as "out of condition." The laboratory supervisor would periodically print a list of "out of condition" artifacts for double checking. Finally, after all data had been tabulated in the DBMS®, exhaustive cross checks were run in order to spot possible outliers and/or problematic contexts.

Subsequent to preparing the initial draft of this report but before printing this final, we conducted one last cross-check of all artifacts, by physically comparing each and every specimen to its description in the electronic database. This final QC step discovered a small number of errors which were immediately corrected. The types of errors included incorrect data entry (keystroke errors, duplicate or missed entry of an artifact lot) and incorrect observations (e.g., wrong chert type, wrong debitage size class), although some of the latter class of error may be attributed to disagreement between analysts. This QC step found that the original data was 96.6% accurate and that entry was 97.7% accurate. After making these corrections in the electronic database, we reprinted all tables in Chapters 5.0 through 8.0 and edited the draft text accordingly. In very few cases, some substantive statements about a site (chiefly those concerning the distribution of various chert types) were changed as a result of the corrected artifact frequencies. However, in no case did the corrected artifact frequencies warrant any change to either the summary conclusions, the assessment of site significance, or the management recommendations.

4.4.3 Quality Control Officer

Lastly, the program of TQM included appointment of a formal Quality Control Officer (QCO) not directly associated with the project. The QCO made periodic field inspections and compared the ongoing work against the contract, the scope of work, and the procedures manuals. Because the QCO was another archeological PI, he was often able to spot potential problems before they became serious and offer suggestions and solutions based on similar project experience. The findings of each inspection were reported first to Mariah upper management, then to the project PI. On occasion, the QCO also reported his findings to the Fort Hood Staff Archeologist. If problems were diagnosed, the PI and project team were directed to solve the problem.

For example, as a result of one field inspection, the QCO questioned whether excessive testing had occurred on 41CV1105, possibly more than was required (or allowed) under the terms of the delivery order which focused strictly on "yes/no" determinations of NRHP eligibility. While four to six test pits totaling 9 m² had been recommended by Fort Hood, the six test pits actually dug totaled 15.2 m², nearly 70% above the targeted estimate. The PI and Field Supervisor claimed that the expended testing effort had been necessary to adequately document the extent of multiple and very deeply buried occupations on this alluvial site. This situation stimulated a productive discussion between the PI, the Field Supervisor, and the crew chiefs, and later between the PI and the Fort Hood Staff Archeologist, regarding the so-called "red flag" contexts, the utility of the targeted levels of effort as working guidelines, and Mariah's contractual flexibility to reallocate effort as necessary between sites to satisfy both scientific and CRM concerns. As a result, the project team developed a clearer understanding of Fort Hood's management needs and were better able to focus on those needs.

5.0 RESULTS OF TESTING - BELL COUNTY SITES

This chapter contains substantive results of the archeological testing. For convenience, results from the 57 sites have been presented in two separate chapters; the 30 sites located in Bell County are presented in this chapter whereas the 27 sites located in Coryell County follow in Chapter 6.0. Within both chapters, sites are presented in ascending site number order.

For each site, three major discussions are presented. First, an introductory section briefly describes the site including its setting and location (precise coordinates are on file with Fort Hood DEH and with the Texas SHPO), reviews previous work at the site, and summarizes the new work conducted during the current testing phase. The reader should note that specific details of testing strategies and excavation tactics common to all sites have been presented earlier in Chapter 4.0. The second major discussion is the heart of the site report and presents the substantive testing results. Test pits (TP) and backhoe trenches (BT) are individually described and primary field data are presented for each stratigraphic zone and cultural feature. Detailed laboratory analyses on major artifact classes (e.g., lithic debitage, lithic tools, projectile points, bone, and shell) are presented as are the results of sample assays (e.g., radiocarbon, amino acid epimerization, and macrobotanical). Importantly, if the stratigraphy was such that broad subdivisions in the data could be identified (e.g., occupations contained in temporally discrete alluvial fills, spatially separate rockshelters, and discrete burned rock mounds) then the results were treated separately for each subdivision (which were termed *Analytical Units* -- or *AUs* -- see Chapter 4.0 for a full explanation), followed by a synthetic section (when appropriate). Lastly, the third major discussion for each site presents summary conclusions and develops explicit recommendations for further management of the site.

5.1 SITE 41BL154

5.1.1 Introduction

In February and March 1994, Mariah conducted test excavations at site 41BL154. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.1.1.1 Location and Description

Site 41BL154 spans a segment of the high upland (Manning) surface, slope, colluvial toeslope, and the T₁ terrace of North Nolan Creek (Figure 5.1). The upland surface slopes gently, but becomes a steep slope that forms the valley walls at the margin of the upland. Chert crops out on the upland surface, and a vandalized burned rock feature occurs near the escarpment to the valley below. A colluvial apron lies at the base of the slope from the upland. A shallow notch at the upland margin contains two vandalized rockshelters. At the mouth of the notch is a flowing spring and a small pond that lies at the base of the slope. A gentle alluvial fan spreads out from the opening of the notch onto the North Nolan Creek terrace. Near the base of the upland slope, a large, vandalized burned rock midden (F 1) covers the surface of the colluvial apron and some of the alluvial fan (Figure 5.2). A road along the base of the upland scarp parallels and bisects the feature. A large corral is located near the northern site boundary on the T₁ surface. Maximum site dimensions are 450 x 450 m (about 202,500 m², or 50 acres). For the purposes of this report, 41BL154 is considered a member of the Nolan/South area group of Fort Hood.

5.1.1.2 Previous Work

The site was initially recorded on 5 May 1973 by Whitehead, Lynch, and McKee as a open campsite.



Figure 5.1 Overview of Site 41BL154, Looking Southwest.

Burned rock, flakes, and scrapers were observed on the site. Remarkably, while the survey crew was recording the site, it was being actively vandalized by six persons and several projectile points of an unknown type(s) were "collected" by these vandals. From 1973 to 1976, several Archaic dart points, a Waco sinker, a hammerstone, and a quantity of lithics were collected from the site by various individuals and were analyzed by Thomas.

On 13 July 1984, Ensor and Dekker rerecorded the site as a lithic scatter with burned rock debris. Two dart points were collected from the lithic scatter. A moderate density of flakes, burned rock, and bifaces was observed. Two rockshelters and a burned rock mound were plotted on the site sketch map but were not discussed in the notes. The site was estimated to be 47% disturbed by vandalism, erosion, and vehicular traffic. Ensor noted that the site was unique because it contained a north-flowing spring.

Kleinbach and Abbott revisited the site on 9 February 1993. The site was divided into four subareas based on geomorphic context and the potential for intact cultural deposits. Subarea A was defined as the upland surface and the steep slope down to the valley; Subarea B consisted of the alluvial fan, the colluvial apron, and F 1 on the fan and apron; Subarea C subsumed a portion of the Holocene (T_1) terrace of North Nolan Creek; and Subarea D consisted of the two rockshelters previously noted on the site (designated as Shelters A and B).

The location of the burned rock mound reported by Ensor was examined in Subarea A. Although the Subarea did contain a considerable quantity of burned limestone, any semblance of a mound had long since been destroyed and the area was not designated as an extant feature. In area B, the size of F 1 on the toeslope was estimated at 150 x 50 m, based on surface exposure and the extent of vandalism. An abundance of burned rock, debitage, mussel shell, and bone fragments was

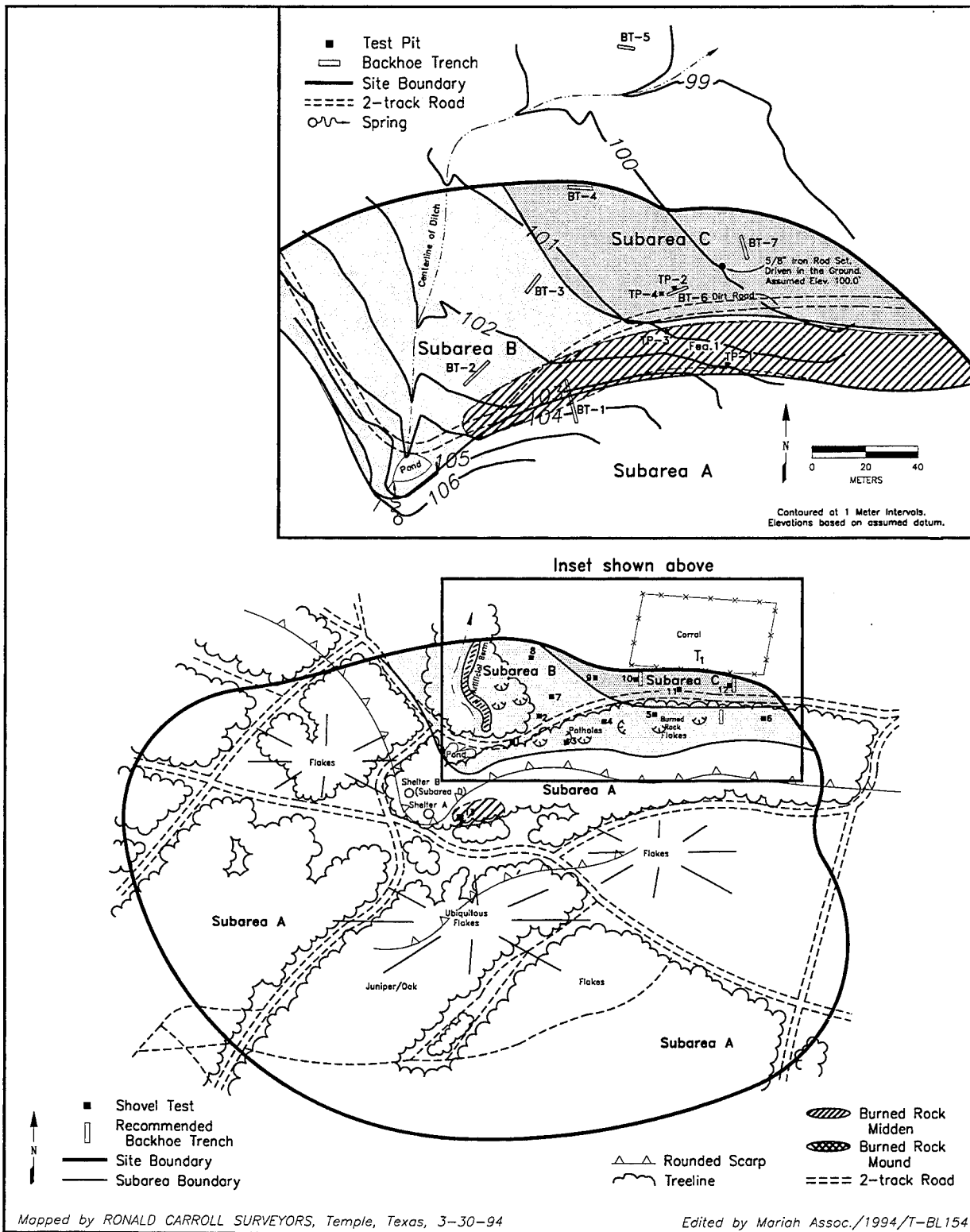


Figure 5.2 Site Map of 51BL154.

observed on the backdirt piles and along the road that bisects the feature.

Because all subareas had the potential for intact deposits, a shovel testing crew returned on 23 February 1993 and excavated a total of 15 tests, including: one shovel test on Subarea A near the area noted by Ensor as containing a burned rock mound; eight shovel tests on Subarea B within F 1; four shovel tests on Subarea C across the alluvial terrace; and two 50 cm x 50 cm tests in the two rockshelters of Subarea D. The results of testing indicated that the cultural material located within Subareas A and D lacked contextual integrity due to intense vandalism. However, an abundance of cultural material was recovered from the tests in Subarea B to depths of 90 cmbs. Subarea C was judged to have the potential to contain deeply buried cultural deposits, although recovery of artifacts from the shovel tests was relatively low.

Abbott and Kleinbach again revisited the site on 13 May 1993 to evaluate the potential utility of Subarea A to address questions of lithic resource procurement. Chert zones and impact zones were identified, mapped, and characterized with appropriate forms, and samples of raw chert were collected. Because the site was observed to have chert resources and was not judged to be completely damaged by military activity, a resurvey crew returned and completed 172 observations along 15 survey transects.

On the basis of this work, no further management was recommended for Subarea D. The surface assemblage in Subarea A was judged to have limited potential to contribute to lithic-procurement research and no further management was recommended for Subarea A. However, the archeological potential of Subareas B and C was uncertain. These subareas were recommended for avoidance or for formal eligibility testing if avoidance was not possible (Trierweiler 1994:A39-A54).

5.1.1.3 New Work

Two 1 x 1 m test pits (TPs 1 and 3) and three backhoe trenches (BTs 1 through 3) were excavated in Subarea B (Table 5.1). Trench 1 was excavated through the western portion of F 1, about 40 m east of the spring, and south of the road. Trench 2 was located 15 m northeast of the spring, 5 to 10 m north of the road, and also was excavated in F 1. Trench 3 was located 35 m northeast of BT 2, in the center of an open field. Test pit 1 was placed south of the road, near the eastern edge of F 1. It is situated on a relatively intact "island" between two vandalized areas. Test pit 3, about 30 m west of TP 1, was also located in F 1 south of the road.

Two tests pits (TPs 2 and 4) and four backhoe trenches (BTs 4-7) were excavated in Subarea C (Table 5.1). Trench 4 was placed west of the corral some 30 to 35 m northeast of BT 3. Trench 5 was located farther out on the Nolan Creek terrace about 5 m north of the easterly flowing, spring-fed drainage. Trench 6 was excavated just south/southwest of the corral and north of the road. Trench 7 was placed about 30 m east of BT 6. The test pits were offset from BT 6 over areas where potential features were exposed in the trench walls. Test pit 2 was placed on a safety bench

Table 5.1 List of Treatment Units, 41BL154.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~20	0.8	100
1	BT 2	~10	0.8	120
1	BT 3	~5	1.5	220
1	TP 1	1.0	1.0	120
1	TP 3	1.0	1.0	114
<hr/>				
2	BT 4	~8	1.5	280
2	BT 5	~5	0.8	215
2	BT 6	~1	0.8	320
2	BT 7	~7	0.8	200
2	TP 2	1.35	0.6	310
2	TP 4	1.0	1.0	300

along the north wall profile. Due to the length and width of this bench, TP 2 measured 135 x 65 cm. Test pit 4 was located at the west end of the trench. Recovered cultural material is summarized in Table 5.2.

For purposes of analysis, the recovered data was separated into two Analytical Units (AUs 1 and 2), which correspond to Subarea B and Subarea C, respectively.

5.1.2 Results

The excavations on the toeslope (which includes F 1) and alluvial fan (AU 1) will be considered first, followed by the units excavated on the terrace (AU 2).

5.1.2.1 Excavations in the Alluvial Fan and the Toeslope

Trench 1, excavated to approximately 100 centimeters below surface (cmbs), was a long trench excavated up the lower valley slope to expose the midden deposits of F 1 (Figure 5.3). Two zones were noted resting on regolith formed in thin-bedded limestones and marls. Zone 1 was 50 cm thick at and downslope of the measured section (approximately midtrench), but thinned markedly upslope. It consisted of black (10YR 2/1) granular loam and contained a prodigious quantity of burned rock and flakes at its downslope end. Zone 2 was roughly 30 cm thick and consisted of massive grayish brown (10YR 5/2) sandy loam. It too contained considerable quantities of burned rock and flakes. Overall, the trench exhibited an A-C-R profile. The cultural material visible in the profiles appeared to be moderately disturbed by vandalism.

Trench 2 was placed in the middle of the slight rise caused by the fan as it spread out onto the T₁ surface, and was excavated to a depth of approximately 90 cm. The trench revealed a section of gravelly, chert-rich fan sediments resting on regolith. Most of the chert is probably derived from the upland surface and represents

colluvial/fan deposition. Overall, the trench exhibited an A-C profile. Zone 1 was 15 cm thick and consisted of massive black (10YR 2/1) loam containing burned rock and flakes in probable secondary context. Zone 2 was approximately 70 cm thick and consisted of massive, very dark gray (10YR 3/1), gravelly sandy clay loam. The coarse fraction included both limestone and chert, the former in a frequently partially decomposed state. Several localized gravelly truncation surfaces indicating ephemeral channels were evident on the fan surface, and dispersed burned rock and flakes occurred throughout. Secondary carbonate was limited to a few fine flecks. Zone 3 extended to the base of the trench and consisted of poorly sorted, clast-supported gravels up to approximately 10 cm in diameter in a light brownish gray (10YR 6/2) silty clay matrix. The cultural material visible in the profile appeared to be reworked and/or disturbed by vandalism. The distal portion of a thin final biface was collected from the backdirt of BT 2.

Trench 3 was placed near the distal end of the fan where it merged with the T₁ surface. The trench was excavated to a depth of approximately 225 cm and exhibited an A-2Ab-2Btb-2C profile developed in slopewash and fan sediments (Figure 5.4). Zone 1 was 70 cm thick and consisted of massive, very dark grayish brown (10YR 3/2) slightly gravelly loam with interbedded lenses of sandy loam. A light amount of flakes and burned rock were dispersed through the unit, which appears to be composed primarily of relatively recent slopewash. Zone 2 consisted of a very dark grayish brown (10YR 3/2) buried A horizon. It was composed of gravelly clay loam exhibiting a very strong angular blocky structure and was 35 cm thick. Several broad, lenticular lenses of gravel composed primarily of chert and including large quantities of flakes in secondary context were present in the zone. Zone 3 consisted of very dark gray (10YR 3/1), strong blocky gravelly clay shot through with thin filaments of carbonate. Thick cutans and/or slickenside films coated the ped faces. The zone was approximately 55 cm thick and contained considerable quantities of flakes and sparse burned

Table 5.2 Artifact Recovery by Test Pit, 41BL154.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)	Bivalve Shell	Bone	Lithic	Lithic Tool	Burned rock (kg)
1	0	0	1	0	0(0)	0	0	0	0	0(0)	0	0	19	1	16(2)	0	0	31	1	3(0.9)
2	0	0	3	0	11(3.5)	NOT SCREENED					0	6	255	5	72(8.5)	0	0	66	2	0(0)
3	1	0	0	2	7(2)						0	16	463	20	88(12)	0	0	9	1	4(0.5)
4	2	0	22	3	30(12)						0	13	225	5	123(23)	0	0	7	0	5(0.5)
5	0	0	16	1	37(14)						1	8	151	6	175(41)	0	0	14	1	3(1)
6	0	0	14	2	20(10)						0	6	197	1	77(25.5)	0	0	27	0	5(1.5)
7	0	0	13	0	12(9)						0	6	62	1	21(4)	0	0	9	1	3(0.5)
8	0	0	12	2	12(12)						1	16	56	3	35(7)	0	0	45	0	7(2)
9	0	0	12	7	12(8)						0	0	15	2	6(2.5)	0	0	80	0	2(0.2)
10	6	0	4	0	19(7)						0	0	83	1	6(1)					
11	0	1	3	0	7(3)						0	0	138	3	8(2)					
12	0	0	0	1	2(0.9)						1	0	94	1	12(3)					
13											0	0	26	0	0(0)	0	0	86	2	49(8)
14						0	0	20	0	0(0)	0	0	40	1	18(4)					
15						0	0	32	0	0(0)	0	3	38	2	8(1)					
16						0	0	29	0	0(0)	0	1	45	1	7(0.9)					
17						0	0	21	1	1(0.3)	0	0	39	1	9(1.5)					
18						0	0	19	0	3(1)	0	0	35	3	2(0.1)					
19						0	5	30	1	3(1)	0	0	20	1	2(0.9)					
20						0	0	28	2	4(1.1)	0	0	38	0	6(20)					
21						0	0	58	2	2(1)	0	10	25	0	8(2)					
22						0	0	42	1	2(0.8)	0	0	62	3	12(4)					
23						0	0	165	1	1(0.3)	0	1	59	0	10(3)					
24						0	22	355	3	11(1.5)	0	0	74	1	9(5)					
25						0	31	132	11	20(4.5)	0	0	85	4	15(8)					
26						0	2	11	2	5(0.5)	0	0	15	0	2(0.9)					
27						0	3	8	1	3(0)	0	0	5	0	1(0.9)					
28						0	0	3	0	0(0)	0	0	0	0	0(0)					
29						0	5	4	0	0(0)	0	0	0	0	0(0)					
30						0	0	3	0	0(0)	0	0	0	0	0(0)					
31						0	0	0	0	0(0)	0	0	0	0	0(0)					
TOTAL	9	1	100	18	169(81.4)	0	68	986	25	55(12)	2	71	1443	44	613(125.5)	1	15	1269	31	216(73.3)

rock in probable secondary context. Zone 4 extended to the base of the trench and consisted of weakly structured to massive, dark yellowish brown (10YR 3/6) gravelly silty loam. Some dispersed carbonate was present in the matrix. Once again, chert dominated the coarse fraction.

Test pits 1 and 3 were excavated as isolated units in F 1, the burned rock midden. In TP 1, one flake was recovered from Level 1 (Table 5.2). Feature 1 was encountered at 10 cmbs and

continued to 110 cmbs. These 10 levels yielded a modest amount of lithics and burned rocks (n=167, 80.5 kg). Faunal remains (bone and mussel shell) were present in small amounts. Levels 8, 9, and 12 each contained one dart point (Pedernales, Marshall and Pedernales, respectively). The feature matrix contained a light to moderate amount of gravels from 10 to 70 cmbs. From 70 to 110 cmbs, the fill contained fairly dense unburned limestone and gravels. In general, the midden deposit in TP 1 is relatively sparse

(especially when compared to TP 3; see below). The cultural deposits from 70 to 110 cmbs may contain primary deposits with a significant (perhaps even preponderant) addition of colluvial materials. Only an untyped dart point was recovered from Level 12.

In TP 3, F 1 was present from 0 to 70 cmbs (Figure 5.5). Level 1 (a partial level due to slope) contained burned rocks (n=16, 2 kg) and flakes. Numerous unburned rocks were also noted, and the matrix was an unconsolidated clay loam. This may actually represent slopewash or backdirt fill. High lithic and burned rock frequencies were recovered 10 to 50 cmbs. High frequencies of lithic artifacts were found in each of these levels, with a high rate of heat-treatment being apparent. The frequency of burned rocks (ranging from 5 to 20 cm in size) steadily increased with depth from Level 2 to Level 5. Substantial faunal remains (mostly burned and unburned bone fragments) and charcoal flecking were present from 10 to 50 cmbs. One Scallorn and one untyped dart point were recovered from Level 2, and one untyped arrow point was recovered from Level 3. Ochre was recovered from Level 5. A light amount of small unburned rocks was noted in the midden deposit. However, based on the comparative ubiquity of cultural material and lack of evidence of disturbance, the feature is apparently relatively intact. From 50 to 60 cmbs, burned rock and lithic counts decreased. Some bone and mussel shell fragments were also noted in this level, with a soil color change from a black to dark brown clay loam. A radiocarbon age on charcoal recovered from Level 6 yielded a corrected age of 1680 ± 60 BP. Artifact counts decreased again in Level 7. An animal burrow, encountered at 65 cmbs and extending to 114 cmbs, was visible in the northeast quadrant along the north profile. Based on lower artifact numbers and a gradual increase in unburned rocks with depth, the apparent base of F 1 was at 70 cmbs.

From this point in TP 3, excavation was in natural levels to accommodate the presence of interbedded natural strata with different densities of unburned

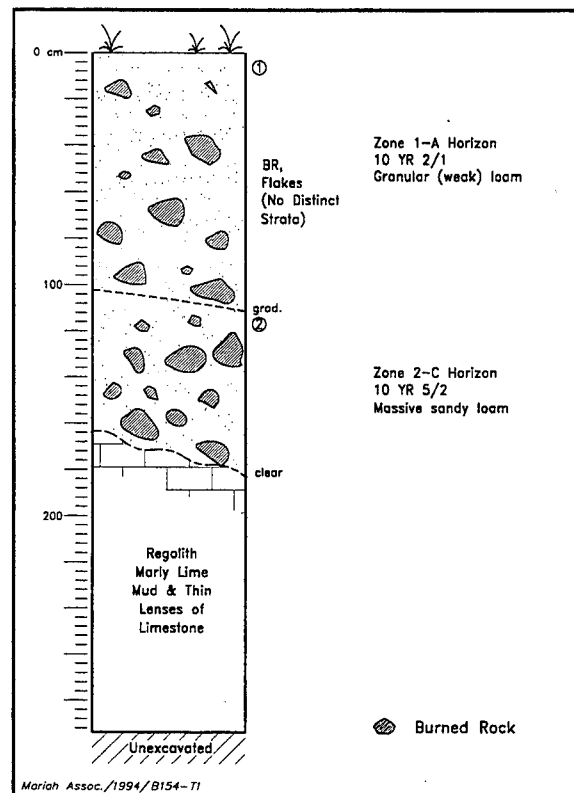


Figure 5.3 Measured Section, BT 1, 41BL154.

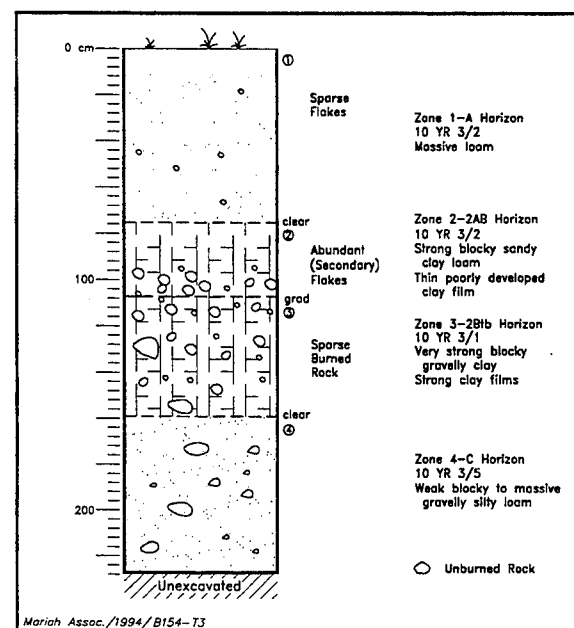


Figure 5.4 Measured Section, BT 3, 41BL154.

rock. The first stratigraphic level began at 70 cmbs and extended to 89 to 93 cmbs; it contained substantial lithic and faunal assemblages (Table 5.2). About 35 burned rocks smaller than 5 cm (7 kg; 30.5 kg) occurred, but most of the rock (n=75) was unburned and larger in size, averaging 5 to 10 cm. In the lower 10 to 12 cm of deposit, a marked decrease in lithics was apparent. Ending depths of the first natural level were determined by the presence of large unburned rocks across the floor of the unit. The second natural level started at 89 to 93 cmbs and continued to 111 to 114 cmbs. A biface, some flakes, and small burned rocks (n=6, 2.5 kg) were recovered from this level. A Waco sinker was found in the southwest quadrant at 100 cmbs. A dense amount of large (10 to 30 cm in size, about 155 kg), unburned rocks occurred throughout the level. Based on the high quantity of unburned limestone, the context of the cultural material recovered from the two natural levels is highly suspect because the matrix is likely to be dominated by contributions of colluvially derived materials.

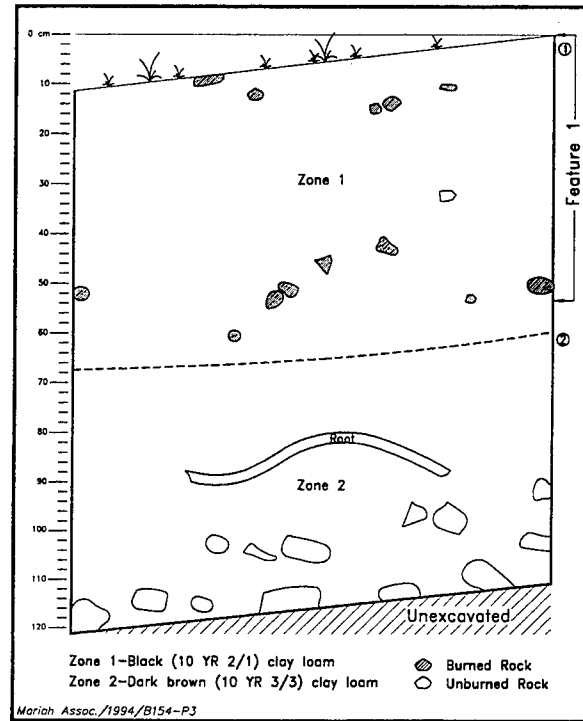


Figure 5.5 Profile of West Wall, TP 3, 41BL154.

This conclusion concerning the integrity of the colluvium beneath the midden is supported by epimerization analysis conducted on eight *Rabdatus* shells recovered from 70 to 93 cmbs. These specimens yielded A/I ratios between approximately 0.08 and 0.25, with two clusters centering around 0.08 and 0.13. Regression analysis suggests that these A/I ratios correspond to radiocarbon ages between approximately 3000 and 11,000 BP, with the two clusters equating to ages of approximately 3000 and 5000 BP, respectively. While the correspondence between radiocarbon age and A/I is not yet strong enough to advance these A/I results as good chronometric estimates of the shell ages, it is strong enough to indicate that the colluvial sediments beneath the midden are (1) considerably older than the feature, and (2) representative of a relatively long period of intermittent slope activity resulting in an admixture of materials of different ages.

Table 5.3 Projectile Points, AU 1, 41BL154.

Point Type	Lithic Material						Total
	06-HL Tan	17-Owl Crk Black	Indet Dk Gray	Indet Lt Brown	Indet Lt Gray	Indet White	
Marshall	1	0	0	0	0	0	1
Other Arrow	1	0	0	1	0	0	2
Other Dart	0	1	0	0	0	0	1
Pedernales	0	0	0	0	1	1	2
Scallorn	0	0	1	0	0	0	1
Total	2	1	1	1	1	1	7

A total of seven projectile points were recovered from AU 1 (Table 5.3). These consist of the

Marshall and two Pedernales from TP 1, and two untyped arrow and one untyped dart as well as a Scallorn from TP 3. The one radiocarbon date from TP 3 is three levels below the Scallorn recovery and places the deposit at 1680 ± 60 BP. Table 5.4 presents the listing of 13 different non projectile point tool types from this AU including various stages of biface manufacture, expedient tools (utilized flakes, minimally retouched unifaces and edge-modified tools), formal end- and side-scrapers, and groundstone. Included in these tools is a wedge that at first glance can be mistaken for an early stage biface or small chopper but does not have the heaviness needed for true chopping tasks. The edge damage, however, is very similar to that of a chopper. One tested cobble was also recovered from this AU.

The chipped stone tools and the points were lumped together to address the issue of lithic resource procurement. Three locally available lithic materials stand out as most common: Heiner Lake Tan, Heiner Lake Translucent Brown, and Indeterminate Light Brown. In total, 12 different types of lithic materials are present in this tool assemblage, 48% of which are indeterminate chert types.

In the nonchipped stone category, a quartzite Waco Sinker was recovered from TP 3 in Level 9.

An indeterminate bone tool type was recovered from TP 3, Level 5. It could only be identified as belonging to the order Artiodactyla.

Debitage from 12 identified chert types and nine indeterminate categories was recovered from TP 1 and TP 3 (Table 5.5). The most common identified chert type was Heiner Lake Translucent Brown. Indeterminate cherts comprised slightly more than 50% of the assemblage. Indeterminate light brown flakes are more numerous than other indeterminate types, although several types have relatively high frequencies. Heiner Lake Translucent Brown and indeterminate cherts occur in greater than expected frequencies, and all other materials occur in less than expected frequencies

(Table 5.6). If the indeterminate cherts are excluded, only Heiner Lake Translucent Brown occurs in greater than expected frequencies, although Heiner Lake Blue occurs in expected frequencies. To the extent that any of the indeterminate light brown flakes are actually Heiner Lake Translucent Brown, the nonrandom overrepresentation of the latter chert is reinforced.

Other Southeast Range cherts (e.g., Heiner Lake Tan) occur at the level of background noise. As with Heiner Lake Translucent Brown, the representation of Heiner Lake Tan may be skewed significantly by the large number of indeterminate light brown flakes. Even so, Heiner Lake Tan is likely to be a minority type unless an extremely large proportion of the indeterminates are actually Heiner Lake Tan flakes. It therefore appears that except for Heiner Lake Translucent Brown, most Southeast Range cherts are underrepresented, although Heiner Lake Blue may have been a significant minority component of the assemblage.

The low frequencies of cherts from the North Fort Province (e.g., Fort Hood Yellow, Fort Hood Gray, Owl Creek Black) and West Fort Province (Anderson Mountain Gray) also are remarkable. There do not appear to be enough indeterminate black flakes to imply that reduction of Owl Creek Black was a major element of lithic reduction. However, there are substantial numbers of indeterminate gray cherts that could represent North Fort types such as Fort Hood Gray and Gray-Brown-Green. North Fort types would appear to be relatively small elements of the midden debitage assemblage even if a substantial portion of the indeterminate assemblage is composed of North Fort cherts.

Most flakes (roughly 68% overall) are concentrated in size classes smaller than 1.8 cm, which implies that nucleus size generally may have been small and/or that later stages of tool-production may have been more common, but the presence of larger and partially cortified flakes suggests that all stages of reduction are represented. Reduction dominated by late-stage activities is supported by

Table 5.4 Lithic Tools, AU 1, 41BL154.

Lithic Material	Core Type		Tool Type											Total		
	tested	cobble	biface	chopper	early stage biface	edge modified	end scraper	graver	late stage biface	middle stage biface	other tool	uniface	utilized flake		Waco sinker	wedge
02-C White	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
06-HL Tan	1	0	0	0	3	1	0	0	0	0	0	0	0	0	0	5
07-Foss Pale Brown	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
08-FH Yellow	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
09-HL Tr Brown	0	0	0	0	5	1	0	2	3	1	1	4	0	0	0	17
10-HL Blue	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
15-Gry/Brn/Grn	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Indet Dk Gray	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Indet Lt Brown	0	1	0	1	4	1	0	0	1	0	2	7	0	1	0	18
Indet Lt Gray	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	3
Indet White	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	3
Quartzite	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	1	2	1	3	16	3	1	4	5	1	4	13	1	1	56	

the fact that about 93% of flakes have no cortex (Table 5.7). Of the flakes that have cortex, a substantial proportion of cortical surfaces are abraded, indicating that streambeds may have been an important source of raw material.

Although the majority of recovered faunal material was too fragmentary for identification, a variety of faunal species was represented in the assemblage recovered from the midden units (Table 5.8). At least one of these species (e.g., *Sigmodon* sp.) may be intrusive, and several others (the rabbits and hares, represented by *Sylvilagus* and Leporidae, and turtles, represented by *Testudinata*) are probably economic remains. Almost certainly, the larger animals (represented by *Artiodactyla* and generalized large mammalia) represent economic remains, probably principally deer. Bivalves recovered include species typical of clear pools (*Amblema*) and slow current streams (*Lampsilinaea*

and *Quadrula*), both of which were probably readily available in North Nolan Creek during the late Holocene.

5.1.2.2 Excavations in the T₁ Terrace

Trench 4 was placed on the T₁ terrace in front of the fan. The trench was excavated to 265 cmbs and exhibited distal fan sediments interbedded with Holocene alluvium. Zone 1 was 50 cm thick and consisted of very dark gray (10YR 3/1) massive loam. The zone, which may represent either slopewash deposition or an Ap horizon, or both, contained a light scattering of small, mostly siliceous gravels. Zone 2 consisted of a buried A horizon composed of very dark gray (10YR 3/1), angular blocky gravelly clay loam. Like the fan sediments exposed in BT 3, Zone 2 contained a very high proportion of chert clasts in the coarse fraction. Zone 3 was texturally similar, but

Table 5.5 Debitage Recovery by Size and Material Type, AU 1, 41BL154.

Lithic Material	Size (cm)							Total
	<0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue (1 & 10)	0	3	1	30	16	19	2	71
02-C White	0	0	0	0	1	1	0	2
06-HL Tan	0	9	0	0	0	0	0	9
07-Foss Pale Brown	0	0	0	0	1	5	0	6
08-FH Yellow	0	0	0	0	1	0	0	1
09-HL Tr Brown	0	81	120	184	126	67	5	583
11-ER Flat	0	0	0	0	1	0	0	1
13-ER Flecked	0	0	0	0	1	0	0	1
15-Gry/Brn/Grn	0	3	0	5	0	0	0	8
16-Leona Park	0	0	0	0	0	2	0	2
17-Owl Crk Black	0	1	3	0	3	1	0	8
22-C Mott/Flecks	0	0	0	0	0	0	1	1
<i>Subtotal</i>	0	97	124	219	150	95	8	693
Unidentified Types								
Indet Black	0	0	0	4	2	0	0	6
Indet Dk Brown	0	19	34	42	48	18	1	162
Indet Dk Gray	0	10	9	23	12	6	1	61
Indet Lt Brown	0	16	82	67	39	21	3	228
Indet Lt Gray	0	2	33	41	29	10	1	116
Indet Misc.	7	53	56	29	16	10	0	171
Indet Mottled	0	0	0	1	4	3	1	9
Indet Trans	0	6	14	19	4	2	0	45
Indet White	0	8	7	22	5	9	0	51
<i>Subtotal</i>	7	114	235	248	159	79	7	849
Total	7	211	359	467	309	174	15	1542

contained slightly less gravel. It also was very dark gray (10YR 3/1), and contained very abundant flakes in possible secondary context. As in most of the other trenches on site, the clay matrix in BT 4 was very sticky and peds formed in the deposits did not separate easily. Zone 4 consisted of grayish brown (10YR 4/2), angular blocky silty clay, and was 40 cm thick. It contained abundant fine soft masses of carbonate and appeared somewhat gleyed. Zone 5, which

extended to the base of the trench, consisted of massive silty clay and contained a few dispersed limestone gravels. It was also somewhat gleyed. Overall, the trench exhibited an A-2A1b-2A2b-3Bkgb-3Cg profile. No cultural material was observed in the stream alluvium, while the fan sediments were loaded with debitage in probable secondary context.

Table 5.6 Binomial Statistic Results, AU 1, 41BL154.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1 & 10)	71	98	139	less	43	72	expected
02-C White	2	98	139	less	43	72	less
06-HL Tan	9	98	139	less	43	72	less
07-Foss Pale Brown	6	98	139	less	43	72	less
08-FH Yellow	1	98	139	less	43	72	less
09-HL Tr Brown	583	98	139	more	43	72	more
11-ER Flat	1	98	139	less	43	72	less
13-ER Flecked	1	98	139	less	43	72	less
15-Gry/Brn/Grn	8	98	139	less	43	72	less
16-Leona Park	2	98	139	less	43	72	less
17-Owl Crk Black	8	98	139	less	43	72	less
22-C Mott/Flecks	1	98	139	less	43	72	less
Indet Total	848	98	139	more	na	na	na

Trench 5 was excavated on the T₁ surface well in front of the fan and on the opposite side of the small, channelized stream originating at the fan-head spring. It revealed the thick profile composed of overbank clays underlain by a probable late Holocene channel fill. The surface horizon was 10 cm thick and consisted of black (10YR 2/1), granular clay loam. It was underlain by 30 cm of very dark grayish brown (10YR 3/2) weak subangular blocky clay loam. Zone 3 consisted of massive, gray-brown (10YR 4/2) clay and was 15 cm thick. It contained a few soft masses of secondary carbonate. Zones 4 and 5 are interpreted as an abrupt fining upward sequence developed in a probable abandoned channel. Zone 4 was 85 cm thick and consisted of massive to very weak blocky, grayish brown to gray (10YR 5/2 to 10YR 5/1) silty clay. The unit was mottled with grayish reduction mottles and contained moderate amounts of dispersed secondary carbonate in the matrix, suggesting that it was frequently saturated. Zone 5 extended to the base of the trench at approximately 210 cmbs. It consisted of a massive, light brownish gray (10YR 6/2) gravelly silty clay that contained a considerable amount of dispersed matrix carbonate

and common grayish reduction mottles. No cultural material was detected in the trench.

Trenches 6 and 7 were excavated at the rear of the T₁ surface to the east of the fan. Two thick, buried paleosols were exposed in BT 6. The exposure exhibited an A-C-2Ass-2C-3Ass-3C profile (Figure 5.6). Trench 7 exposed a profile similar to the upper four zones of BT 6 and was not recorded in detail. The surficial zone in BT 6 was 10 cm thick and consisted of very dark gray (10YR 3/1) granular loam. Zone 2 was 40 cm thick and consisted of similar, structureless deposits. A light scatter of flakes and fine gravels was present in the unit, which is interpreted as a slopewash deposit derived from the valley slope. Zone 3 was the A horizon of the first buried soil (paleosol [PS] 1). It was approximately 80 cm thick and consisted of very dark grayish brown (10YR 3/2), highly structured clay and gravelly clay. The faces of the blocky peds were highly polished due to expansion-contraction processes. Flakes and burned rock were lightly dispersed throughout, and at least two cultural strata were present in the zone at approximately 60 cmbs and 85 cmbs. Zone 4 extended from 130 to 210 cmbs,

Table 5.7 Debitage Cortex Characteristics by Material Type, AU 1, 41BL154.

Lithic Material	All Cortex			Partial Cortex			No Cortex	Indeterminate	Total
	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate			
Identified Types									
HL Blue (1 & 10)	0	0	0	0	1	6	64	0	71
02-C White	0	0	0	0	0	1	1	0	2
06-HL Tan	0	0	0	0	0	0	9	0	9
07-Foss Pale Brown	0	0	0	2	0	0	4	0	6
08-FH Yellow	0	0	0	0	0	0	1	0	1
09-HL Tr Brown	0	1	0	6	7	6	563	0	583
11-ER Flat	0	0	0	0	0	0	1	0	1
13-ER Flecked	0	0	0	0	0	0	1	0	1
15-Gry/Brn/Grn	0	0	0	0	0	0	8	0	8
16-Leona Park	0	0	0	0	0	0	2	0	2
17-Owl Crk Black	0	0	0	0	0	1	7	0	8
22-C Mott/Flecks	0	0	0	1	0	0	0	0	1
<i>Subtotal</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>9</i>	<i>8</i>	<i>14</i>	<i>661</i>	<i>0</i>	<i>693</i>
Unidentified Types									
Indet Black	0	0	0	3	1	0	2	0	6
Indet Dk Brown	0	0	0	1	5	0	156	0	162
Indet Dk Gray	0	0	0	1	0	0	59	1	61
Indet Lt Brown	0	3	0	3	10	9	203	0	228
Indet Lt Gray	0	0	4	0	1	3	108	0	116
Indet Misc.	2	2	0	0	2	11	154	0	171
Indet Mottled	0	0	0	0	1	1	7	0	9
Indet Trans	0	0	0	0	0	0	45	0	45
Indet White	0	1	1	3	1	0	45	0	51
<i>Subtotal</i>	<i>2</i>	<i>6</i>	<i>5</i>	<i>11</i>	<i>21</i>	<i>24</i>	<i>779</i>	<i>1</i>	<i>849</i>
Total	2	7	5	20	29	38	1440	1	1542

and consisted of very dark grayish brown (10YR 3/2), moderately structured clay and gravelly clay. The gravels occurred both dispersed in the matrix and in very small concentrations suggesting they were deposited in rills or depressions on the surface. They were dominated by chert, including a number of flakes, but also included limestone

clasts. Many of the limestone gravels exhibited etching, pitting, and loss of mass due to partial dissolution. A few fine carbonate filaments were present on the ped faces. At least one cultural stratum was evident approximately 140 cmbs. Although no dates were obtained from the occupation strata, a radiocarbon age obtained on

Table 5.8 Faunal Recovery, AU 1, 41BL154.

Vertebrates	Element										Total
	Deciduous tooth	Indeterminate	Mandible	Metapodial	Pelvis	Permanent tooth	Proximal Phalan	Carapace	left	right	
Artiodactyla	0	0	2	1	0	0	2	0	0	0	5
Leporidae	1	0	1	0	0	0	0	0	0	0	2
Mammalia	0	1	0	0	0	0	0	0	0	0	1
Mammalia (med/lg)	0	31	0	0	0	0	0	0	0	0	31
Sigmondon sp.	0	0	0	0	0	1	0	0	0	0	1
Sylvilagus sp.	0	0	0	0	2	0	0	0	0	0	2
Testudinata	0	0	0	0	0	0	0	5	0	0	5
Vertebrata	0	24	0	0	0	0	0	0	0	0	24
Total	1	56	3	1	2	1	2	5	0	0	71
Bivalves											
Amblema sp.	0	0	0	0	0	0	0	0	0	3	3
Lampsilinae	0	0	0	0	0	0	0	0	0	1	1
Quadrula sp.	0	0	0	0	0	0	0	0	1	0	1
Unionacea	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	0	0	0	1	5	6

uncharred, concentrated organic matter from 180 to 190 cmbs yielded an age of 5740 ± 60 BP (Beta Analytic B-75266), and a second age on charcoal from the basal contact (200-210 cmbs) yielded an age of 6100 ± 60 BP. These two ages indicate that the sediment is roughly equivalent to the Fort Hood fill identified elsewhere on base by Nordt (1992), and the occupations contained higher in the unit should therefore be no younger than Middle Archaic in age. Zone 5 was the second buried paleosol (PS 2). Like Zone 3, it was a thick, strongly developed vertisol. The zone was approximately 75 cm thick and consisted of black (10YR 2/1) clay to gravelly clay. It exhibited very dense, coarse blocky to prismatic peds and contained dispersed gravels and gravelly stringers. The ped faces exhibited very strong slickensides.

At least two cultural strata were noted in Zone 5 at approximately 220 and 260 cmbs. Zone 6

extended from 285 cmbs to the base of the trench at approximately 305 cmbs, and consisted of gravelly clay to clayey gravel. Thick-walled bone, unidentifiable but possibly representing some form of megafauna, was recovered from this basal deposit. Other material collected from BT 6 included a Plainview point base from approximately 120 to 180 cmbs and flakes, cores, and a Pedernales point (Early Archaic) from the backdirt.

The cultural material observed in Zones 3 through 5 of BT 6 consisted of burned rock, bone, and a distinctive assemblage of large flakes exhibiting a very strong yellow-orange patina. This patina appears to be the result of a complex, localized chemical reaction within the vertisol. Although the exact nature and cause of this process is unknown, the resulting patina was very distinctive and caused

considerable problems in lithic material identification.

Test pit 2 was placed on a safety bench in BT 6, and therefore did not sample the upper 120 cm of deposits, which had been removed by the backhoe. Lithics occurred in consistent, substantial numbers from 120 to 220 cmbs, and then increased in number from 220 to 250 cmbs (see Table 5.2). A small but consistent number of burned rocks occurred from 160 to 230 cmbs, with a peak at 230 to 250 cmbs. A peak in recovery of bone fragments also occurred from 230 to 250 cmbs. Indeed, overall assemblage density was very high 230 to 240 cmbs. Feature 2, an apparent hearth, was encountered from 240 to 247 cmbs. Based on artifact ubiquity and F 2, an occupation is buried 220 to 250 cmbs; however, the depositional context may be somewhat compromised as a result of vertic soil conditions and the presence of apparent rill channels. Gravels and mottling (clay loam and sand) were noted in each level. In addition, a few unburned rocks were observed in the hearth matrix, with others scattered across the unit. Thus, the occupation represented in Level 25 may have been scoured by overland flow and rills issuing from the adjacent toeslope.

Feature 2 consisted of a single layer of burned rocks that formed a semi-circle in the southeastern portion of the unit (Figure 5.7). Maximum dimensions of the extant portion of the feature were 49 x 23 cm, with about two-thirds estimated as being removed by the backhoe during trenching (Figure 5.8). No indication of a basin shape was apparent in the remaining portion of the feature. Along with lithics, one tabular burned rock and seven subangular burned rocks (2 kg) were recovered directly from the hearth matrix. Isolated burned rocks (n=12, 2.5 kg) were scattered across the remainder of the test pit near the feature, and a very large number of lithics, several bone fragments, and charcoal flecks were found in association. A radiocarbon age of 8600 ± 50 BP (Beta Analytic B-72188) was obtained from charcoal recovered from the fill of F 2, indicating a late Paleo to Early Archaic age for the lower

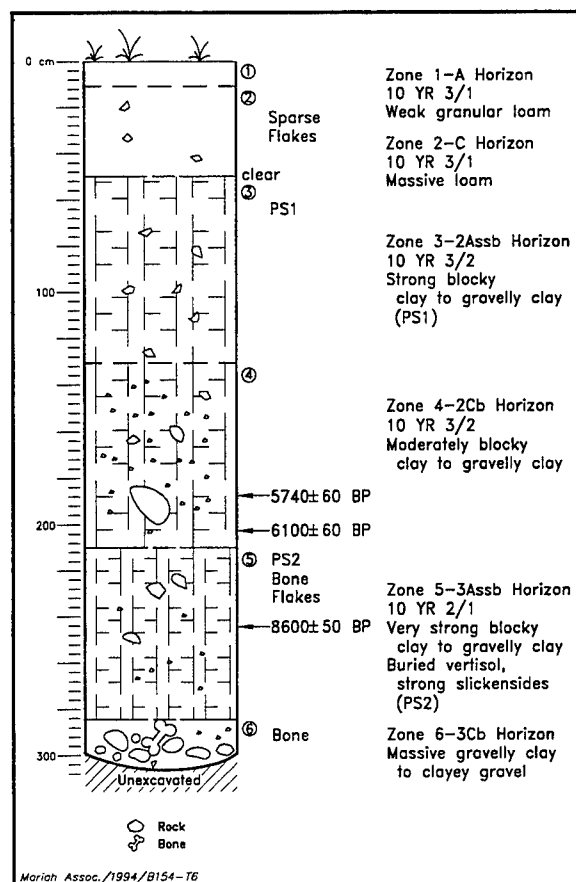


Figure 5.6 Measured Section, BT 6, 41BL154.

occupation.

Below F 2, from 250 to 300 cmbs, artifact density dropped off fairly steadily, although bone fragments continued to be recovered. Level 31 consisted of a gravel lens containing no cultural material.

In TP 4, cultural material was recovered in variable amounts from every level from 0 to 270 cmbs, with a peak in artifact frequency between 70 and 120 cmbs. An untyped dart point was found in Level 5, and a Martindale and a Morrill point (Early Archaic) were found in Level 11. Feature 3, a burned rock concentration, was encountered at 125 to 137 cmbs. The feature extended across the entire unit, with rocks arranged one to two layers thick (Figure 5.9). A more discrete rock cluster

was noted near the test pit center. This consisted of 12 partially overlapping, medium-sized burned rocks and one small unburned rock in an area measuring 38 x 30 cm. Overall, 67 burned rocks (12 kg), 50 to 75 lithics including an Angostura point, and several unburned rocks (3.5 kg) were noted in the feature fill.

Beginning in F 3 and extending below the lower paleosol surface, artifact density decreased slightly, but still remained high. An Early Archaic Martindale point was recovered from Level 15. Moderate to heavy densities of gravel and mottled soils were noted in the levels from 150 to 210 cmbs, and unburned rocks (15 to 25 cm in size) were noted in Level 19. Another peak in artifact recovery occurred from 210 to 250 cmbs, with particularly high artifact frequencies between 240 and 250 cmbs, a level with relatively low gravel density. This peak may correlate with F 2 in TP 2. A sharp drop in artifact frequency occurred from 250 to 270 cmbs, and no cultural material was recovered from 270 to 300 cmbs. A dense gravel lens was encountered in Level 30.

Analytical Unit 2 produced seven projectile points: a Plainview and Pedernales from BT 6, and an Angostura, two Martindales, a Morrill, and an untyped dart point from the test pits (Table 5.9). These projectile points are consistent with occupations ranging in age from late Paleoindian through middle Archaic, and thus agree with the available radiocarbon data. A total of 50 tools representing 13 different types of tools ranging from expedient to formal tools (Table 5.10) were found in AU 2. Three multiple platform cores were also recovered from this AU.

The most predominate lithic material of the 16 types represented in the tool assemblage is Heiner Lake Translucent Brown. Of note is that of the 15 tools of this material type, between one-third and one-half can be classified as expedient or minimally worked specimens. The Heiner Lake Tan and Indeterminate Light Brown categories are the second and third highest frequencies of raw material present. These materials are the same as

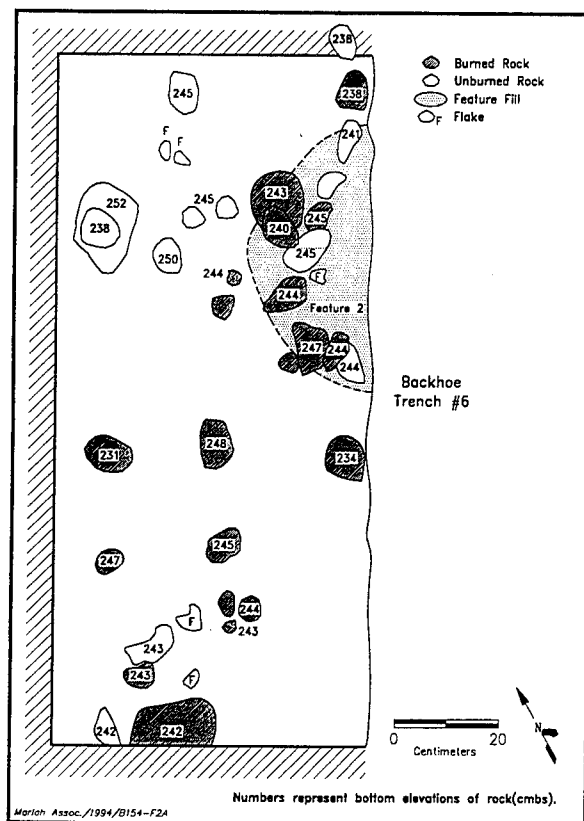


Figure 5.7 Plan of F 2, TP 2, at 247 cmbs, 41BL154.

were most prevalent in AU 1, and represent locally available raw material.

An indeterminate bone tool type was recovered from Level 23 in TP 4 which could only be identified as mammalian.

Debitage from 12 identified chert types and 9 indeterminate categories was recovered from TP 2 and TP 4. The most common identified chert type was Heiner Lake Translucent Brown, although indeterminate light brown flakes were more numerous (Table 5.11). Heiner Lake Translucent Brown and indeterminate cherts occur in greater than expected frequencies, and all other materials occur in less than expected frequencies (Table 5.12). If the indeterminate cherts are excluded, only Heiner Lake Translucent Brown occurs in greater than expected frequencies. The analyst believes that many of the flakes in the



Figure 5.8 Planview of F 2, 41BL154.

indeterminate light brown categories are Heiner Lake Translucent Brown material, but very high degrees of yellow/orange patination prevent making a confident identification. To the extent that any of the indeterminate light brown flakes are actually Heiner Lake Translucent Brown, the nonrandom overrepresentation of the latter chert is reinforced.

The low frequencies of other Southeast Range cherts (e.g., Heiner Lake Blue, Heiner Lake Tan) are remarkable in the sense that they occur at the level of background noise. As with Heiner Lake Translucent Brown, the representation of Heiner Lake Tan may be skewed significantly by the very large number of indeterminate light brown flakes. Even so, Heiner Lake Tan is likely to be a minority type unless an extremely large proportion of the indeterminates are actually Heiner Lake Tan flakes. It therefore appears that except for Heiner Lake Translucent Brown, most Southeast Range cherts are underrepresented.

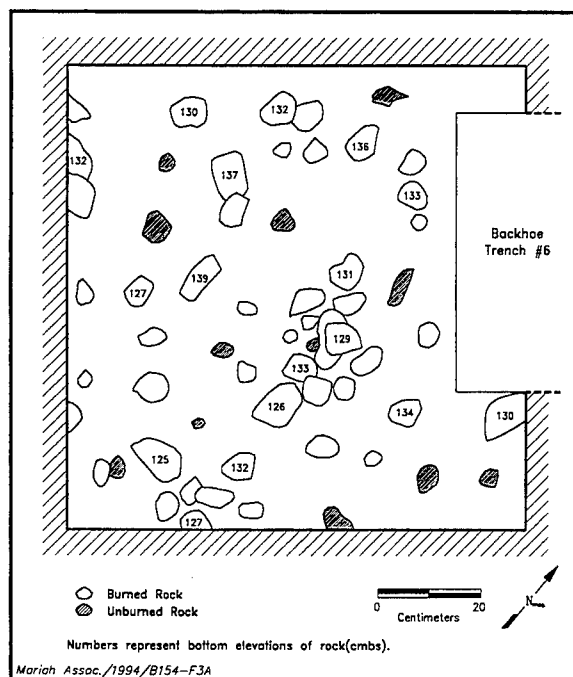


Figure 5.9 Plan of F 3, TP 4, at 137 cmbs, 41BL154.

The low frequencies of cherts from the North Fort Province (e.g., Fort Hood Yellow, Fort Hood Gray, Owl Creek Black) and West Fort Province (Anderson Mountain Gray) also are remarkable, especially since indeterminate black and gray cherts that are most likely to represent these classes also occur in low to very low numbers. It therefore appears that North Fort cherts are underrepresented even if a substantial portion of the indeterminate assemblage is composed of North Fort cherts.

For most chert types, the majority of debitage (82% overall) is concentrated in size categories smaller than 1.8 cm. This implies that most flakes

Table 5.9 Projectile Points, AU 2, 41BL154.

Point Type	Lithic Material						Total
	06-HL Tan	08-FH Yellow	09-HL Tr Brown	15-Gry/Brn/Grn	17-Owl Crk Black	Indet Lt Brown	
Angostura	0	0	0	1	0	0	1
Martindale	0	1	0	0	0	1	2
Morrill	1	0	0	0	0	0	1
Other Dart	0	0	0	0	1	0	1
Pedernales	0	0	1	0	0	0	1
Plainview	0	0	0	0	0	0	1
Total	1	1	1	1	1	1	7

Table 5.10 Lithic Tools, AU 2, 41BL154.

Lithic Material	Tool Type												Total	
	Chopper	early stage biface	edge modified	end scraper	graver	Hammerstone	late stage biface	middle stage biface	preform	side scraper	uniface	utilized flake		wedge
06-HL Tan	2	0	4	1	2	0	1	0	0	0	0	1	0	11
07-Foss Pale Brown	0	0	0	0	0	0	0	0	0	0	1	0	0	1
09-HL Tr Brown	0	2	4	1	0	0	1	2	0	2	0	3	0	15
10-HL Blue	0	0	0	0	0	0	0	0	0	0	0	1	0	1
15-Gry/Brn/Grn	0	1	0	0	0	0	0	0	0	0	0	0	0	1
17-Owl Crk Black	0	0	2	0	0	0	1	0	0	0	0	0	0	3
18-C Mottled	0	0	1	0	0	0	0	0	0	0	0	0	0	1
19-C Dr Gray	0	0	0	0	0	0	1	0	0	0	0	0	0	1
22-C Mott/Flecks	0	1	0	0	0	0	0	0	0	0	1	0	1	3
Indet Black	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Indet Dk Brown	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Indet Dk Gray	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Indet Lt Brown	0	0	1	1	0	0	0	0	0	1	3	1	0	7
Indet Mottled	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Indet White	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Quartzite	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	2	5	13	3	2	1	4	2	1	4	6	6	1	50

Table 5.11 Debitage Recovery by Size and Material Type, AU 2, 41BL154.

Lithic Material	Size (cm)						Total	
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2		> 5.2
Identified Types								
HL Blue (1 & 10)	0	0	4	10	11	5	2	32
02-C White	0	0	1	1	1	1	0	4
03-AM Gray	0	0	4	0	0	0	0	4
06-HL Tan	0	0	0	1	5	3	0	9
07-Foss Pale Brown	0	0	0	0	0	1	0	1
08-FH Yellow	0	0	6	6	2	5	0	19
09-HL Tr Brown	20	174	241	222	108	54	2	821
13-ER Flecked	0	0	1	0	3	0	0	4
15-Gry/Brn/Grn	0	0	1	4	0	4	0	9
17-Owl Crk Black	0	1	0	2	0	0	0	3
18-C Mottled	0	0	0	0	0	1	0	1
19-C Dr Gray	0	0	0	0	0	1	0	1
<i>Subtotal</i>	20	175	258	246	130	75	4	908
Unidentified Types								
Indet Black	0	4	2	2	0	0	0	8
Indet Dk Brown	0	11	17	29	11	6	1	75
Indet Dk Gray	0	0	4	2	1	0	0	7
Indet Lt Brown	44	247	266	254	80	39	3	933
Indet Lt Gray	0	14	32	30	7	3	0	86
Indet Misc.	0	47	37	52	21	5	0	162
Indet Mottled	0	0	0	0	1	2	0	3
Indet Trans	0	1	0	1	0	0	0	2
Indet White	0	2	30	28	7	3	1	71
<i>Subtotal</i>	44	326	388	398	128	58	5	1347
Total	64	501	646	644	258	133	9	2255

were produced from relatively small nuclei and/or at late tool-production stages. An exception to this trend is Heiner Lake Blue (interior and exterior varieties lumped together), for which about 56% of flakes appear to have been produced from relatively large nuclei. Other exceptions (e.g., Heiner Lake Tan, Fort Hood Yellow) occur, but overall frequencies are too low to support confident interpretation.

The fact that most flakes fall in relatively small size classes and about 90% of the flakes have no cortex (Table 5.13) supports a judgment that most of the debitage was generated from well-reduced nuclei, implying that initial reduction of cortical material was not a major element of lithic reduction on the alluvial portion of the site. Since chert (including Heiner Lake Translucent Brown) occurs naturally at the site, the alluvial assemblage implies that raw materials were decorticated

Table 5.12 Binomial Statistic Results, AU 2, 41BL154.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1 & 10)	32	149	198	less	59	92	less
02-C White	4	149	198	less	59	92	less
03-AM Gray	4	149	198	less	59	92	less
06-HL Tan	9	149	198	less	59	92	less
07-Foss Pale Brown	1	149	198	less	59	92	less
08-FH Yellow	19	149	198	less	59	92	less
09-HL Tr Brown	821	149	198	more	59	92	more
13-ER Flecked	4	149	198	less	59	92	less
15-Gry/Brn/Grn	9	149	198	less	59	92	less
17-Owl Crk Black	3	149	198	less	59	92	less
18-C Mottled	1	149	198	less	59	92	less
19-C Dr Gray	1	149	198	less	59	92	less
Indet Total	1347	149	198	more	na	na	na

elsewhere. The presence of a substantial proportion of cortex flakes with abraded cortex implies that procurement from stream beds may have been common. Nodules of Heiner Lake Translucent Brown and other Southeast Range cherts can be expected to occur in the bed load of North Nolan Creek at the site boundary.

Although fragmentary bone was recovered in moderate to high frequency, relatively few identifiable specimens were recovered from the excavations in the terrace. The recovered material was dominated by large mammals, with both bison and deer represented (Table 5.14). The only small animal identified was turtle, which may or may not represent an economic species at this locality.

5.1.2.3 Site-Level Synthesis

Trenches were excavated in the colluvial toeslope, on the low gradient fan, and on the T₁ terrace in front of and downstream from the fan. The long toeslope trench revealed a downslope-thickening wedge of black loam that contained abundant midden materials (burned rock, flakes, mussel

shell) downslope, and a light smattering of materials at the upper end of the trench. Based on the extent of vandalism evident across the surface, much of this deposit has been disturbed. Nevertheless, apparent undisturbed areas remain. One radiocarbon age of 1680 ± 60 BP was obtained from the base of the midden, suggesting that it began to accrete at least by the Late Archaic, while projectile points recovered from the midden suggest that the feature continued to grow at least through the early part (Austin Phase) of the Late Prehistoric.

Fan deposits were revealed in BT 2, where they rested on a bedrock bench, and in BT 3 and BT 4, where they interfingered with Holocene stream alluvium. The fan was characterized by broad, shallow gravelly channels containing both worked and unworked chert and a little limestone. Although tremendous numbers of flakes were noted, most of this material appears to be in secondary context. Trench 5 revealed a channel fill and contained no cultural material.

Table 5.13 Debitage Cortex Characteristics by Material Type, AU 2, 41BL154.

Lithic Material	All Cortex			Partial Cortex			No Cortex	Indeterminate	Total
	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate			
Identified Types									
HL Blue (1 & 10)	0	0	0	0	3	2	27	0	32
02-C White	0	0	0	0	0	0	4	0	4
03-AM Gray	0	0	0	0	0	3	1	0	4
06-HL Tan	0	0	0	0	1	0	8	0	9
07-Foss Pale Brown	0	0	0	0	0	0	1	0	1
08-FH Yellow	0	0	0	0	0	0	19	0	19
09-HL Tr Brown	0	0	0	25	10	18	768	0	821
13-ER Flecked	0	0	0	0	0	0	4	0	4
15-Gry/Brn/Gm	0	0	0	0	1	1	7	0	9
17-Owl Crk Black	0	0	0	0	0	1	2	0	3
18-C Mottled	0	0	0	0	0	0	1	0	1
19-C Dr Gray	0	0	0	0	1	0	0	0	1
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>25</i>	<i>16</i>	<i>25</i>	<i>842</i>	<i>0</i>	<i>908</i>
Unidentified Types									
Indet Black	0	0	0	0	1	2	5	0	8
Indet Dk Brown	0	0	0	1	3	0	71	0	75
Indet Dk Gray	0	0	0	0	0	0	7	0	7
Indet Lt Brown	0	0	0	33	7	41	852	0	933
Indet Lt Gray	0	0	0	2	1	7	76	0	86
Indet Misc.	2	9	10	15	11	26	89	0	162
Indet Mottled	0	0	0	1	1	0	1	0	3
Indet Trans	0	0	0	0	0	0	2	0	2
Indet White	0	0	1	1	2	0	63	4	71
<i>Subtotal</i>	<i>2</i>	<i>9</i>	<i>11</i>	<i>53</i>	<i>26</i>	<i>76</i>	<i>1166</i>	<i>4</i>	<i>1347</i>
Total	2	9	11	78	42	101	2008	4	2255

Very promising on site deposits were revealed in BT 6 and BT 7. Trench 6 revealed a 50 cm accumulation of slopewash over two thick, cumulic vertisols. These two fills appear to have accumulated in unusually moist conditions (probably related to the spring on the site), and are unlike fills elsewhere on the base. For this reason,

they are difficult to correlate with Nordt's (1992) sequence. However, radiocarbon ages from the units indicate that they roughly correspond with the Fort Hood and Georgetown alluvia, although the dates of inception and stabilization may be somewhat different.

In the BT 6 profile, diagnostic projectile points and radiocarbon ages associated with the two paleosols suggest that a sequence of occupations ranging from Late Paleoindian to Middle Archaic in age are preserved in the dense clay sediments. Although the vertic nature of the deposits and synchronic deposition of colluvial and wash processes have probably compromised the depositional integrity of the cultural materials somewhat, it is very likely that single-component Early Archaic and, possibly, Paleoindian assemblages could be isolated in the stratigraphy. Much of the depositional matrix in this area can be attributed to low velocity processes, although there is some likelihood of occasional scouring of the surface. Hence, it is likely that component-specific technological analyses can contribute substantially to our knowledge of Early Archaic and Paleoindian adaptations even if vertic processes have blurred the boundaries between discrete occupations. Further, sporadic occurrence of preserved bone implies that subsistence studies may also be possible.

The major distinction between the midden and alluvial lithic material assemblages appears to be related to the effects of heavy patination on the flakes from the alluvial units. A yellow/orange patina was widespread throughout the alluvial assemblage, but was relatively uncommon in the midden assemblage. Most of the patinated flakes were put in the light brown indeterminate category. The effect of this classification is most apparent in the percentage of flakes in the light brown indeterminate category, which comprised about 15% of the midden assemblage and 41% of the alluvial assemblage. The absence of severe patination in the midden assemblage also may have resulted in assigning higher proportions of flakes to described chert types rather than indeterminate categories.

Both assemblages appear to be overwhelmingly composed of flakes from Heiner Lake Translucent Brown material with a minor but noticeable Heiner Lake Blue component. With the exception of Heiner Lake Blue flakes, most flakes in both

Table 5.14 Faunal Recovery, AU 2, 41BL154.

	Element							
	Antler	Astragalus	Fused 2&3rd carpa	Humerus	Indeterminate	Plastron	Carapace left	Total
Vertebrates								
Artiodactyla	0	1	1	2	0	0	0	4
Mammalia (lg/vlg)	0	0	0	0	1	0	0	1
Mammalia (med/lg)	0	0	0	0	38	0	0	38
Mammalia (small)	0	0	0	0	1	0	0	1
Odocoileus sp.	12	0	0	0	0	0	0	12
Testudinata	0	0	0	0	0	1	1	2
Vertebrata	0	0	0	0	24	0	0	24
Total	12	1	1	2	64	1	1	82
Bivalves								
Ambleminae	0	0	0	0	0	0	0	1

assemblages are relatively small and decorticated, which implies that neither area of the site was a locus of significant primary reduction despite the fact the primary chert represented in the assemblages occurs in a natural cortical state. Heiner Lake Blue flakes tend to be somewhat larger but are also generally decorticated. Among cortified flakes, there is evidence of possibly substantial procurement from stream beds. The fact that the main chert types represented in the assemblage also occur naturally at the site (and, probably, in the nearby stream bed) implies that chert procurement was performed in conjunction with other activities at the site, especially since the site appears to have been occupied for a relatively wide range of reasons. The low levels of representation of cherts from more distant resources implies that logistical procurement was not a major means for procurement of materials reduced at the site.

The pattern of lithic material utilization found in the debitage of both AUs is mirrored in the tool assemblages with 30% (AUs 1 and 2) comprising the Heiner Lake Translucent Brown category.

When the Indeterminate Light Brown specimens are added to the total, the percentages rise to 63% and 44% respectively. However, the sample of projectile points does not allow more than a suggestion that the chert type distribution seen in the debitage and tools appears to be present here also.

Fauna recovered from the midden deposit includes a mix of larger mammals - most likely deer - and smaller animals, including rabbits and turtles, as well as bivalves. This would indicate a variety of low-energy aquatic environments. Faunal material from the Early Archaic and Paleoindian occupations in the terrace are dominated by large mammals, including deer and bison. At least one bone fragment from the base of the alluvial fill had a wall thickness of greater than 1 cm, and may represent the remains of extinct megafauna.

5.1.3 Conclusions and Recommendations

The excavations into F 1 show that although the midden has been subjected to a high degree of vandalism, substantial portions remain intact. High recovery rates of faunal materials imply that the feature has high potential to address subsistence-related issues and to provide a basis for technological analyses outlined in the research domains for Fort Hood (Ellis 1994b). Indeed, given the presence of natural chert resources at the site, it may be possible to model a wide range of organizational and adaptive aspects of prehistoric occupations at 41BL154. The spatial and stratigraphic relationships between cultural deposits and evidence of paleosols, alluvial fan deposits, and colluvial deposits strongly implies that the site has a very high potential to address issues of prehistoric landscape use and relationships between human adaptations and paleoenvironment and paleoclimate.

On the basis of the foregoing, we judge Subareas B and C at 41BL154 to be significant and eligible for inclusion in the NRHP. Accordingly, these subareas should be preserved and protected from adverse impacts. Because most known significant

components on the terrace portion of the site are relatively deeply buried, they are fairly well protected from training and other activities that affect only the surface of the site. However, there are some occupational remains that could suffer adverse impacts from uncontrolled traffic by heavy vehicles, especially under very wet conditions. The proximity of F 1 to a well-traveled road poses a threat from vehicles that may leave the road to skirt around mud holes forming after moderate to heavy rain. Furthermore, significant cultural deposits at the site are vulnerable to damage from uncontrolled excavation (as evidenced by extensive vandalism of F 1 and the rockshelters). Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism; (2) prevent mechanical or manual excavations by military personnel; and (3) minimize the impact of traffic, especially by heavy tracked and wheeled vehicles.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 210 m² in area. Known, relatively dense assemblages with features occur at varying depths at the site in strata ranging up to 225 cm thick, including one 80 cm thick zone between the surfaces of the paleosols and another 150 cm thick zone below the lower paleosol surface. Assuming manual excavation of 1 m thick strata between the paleosols, below the lower paleosol, and in F 1, excavation volume could reach approximately 210 m³. Placement of blocks should be based on carefully monitored mechanical trench excavations that provide a wide array of options for locating optimal cultural

deposits. In addition, trenches should be excavated to allow for exploitation of an exceptional geoarcheological data base.

Further prospection in the vicinity of BT 6 and BT 7 appears to have a high probability of identifying a large assemblage of early features, perhaps including evidence of megafauna procurement. In this event, larger-scale mitigation efforts on the older components at 41BL154 may well yield extraordinary data bases which contribute quantum, rather than incremental, advances to our knowledge of early adaptations at Fort Hood. These advances conceivably could be sufficient to approach a high degree of resolution of basic historic contexts for early adaptations. The above estimated mitigation volume should therefore be regarded as a minimum relative to the site's potential capacity to yield valuable information. We therefore also recommend that any eventual mitigation at this site be poised to acquire data sets that could establish the empirical foundations for making a shift from basic to highly topic-specific research for Paleoindian/Early Archaic contexts at Fort Hood.

5.2 SITE 41BL168

5.2.1 Introduction

In late September 1993, Mariah conducted test excavations at site 41BL168. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.2.1.1 Location and Description

The site is located in the Nolan/Cowhouse area of Fort Hood. The site is situated along the escarpment of a deflated upland surface at the head of a springfed drainage (Figure 5.10). The site consists of a portion of the upland surface and a series of rockshelters and overhangs below the upland edge (Figure 5.11). Maximum site dimensions are 250 x 250 m, (about 60,000 m², or

14.8 acres). For the purposes of this report, 41BL168 is considered a member of the Nolan/Cowhouse area group.

5.2.1.2 Previous Work

The site was originally recorded by Herring on 13 September 1975 as a series of rock overhangs and natural shelters. Herring noted that Austin Whitehead dug up two bifacial thinning flakes from the floor of one of the overhangs. Only a few lithic artifacts were observed on the escarpment and slope, and the condition of the site was listed as poor.

On 30 July 1984, Dekker recorded the site as a string of rockshelters (Shelters A-E) enveloping intermittent springs. An arrow point base was collected, and flakes and a dart point were observed. The site was estimated to be about 9% disturbed by a road, historic occupation, and vandalism.

Dureka and Callum monitored the site on 8 December 1987. The rockshelters were not investigated during the monitoring visit, but widespread dense burned rock and a few formal tools were observed on the deflated upland. The site was estimated to be 80% disturbed by vehicular traffic, machinery scraping, and erosion.

Quigg and Frederick revisited the site in December 1991, and reevaluated the site on archeological and geomorphic grounds. The site was divided into Subareas A (the upland) and B (Rockshelters A-E). On the basis of a lack of depositional potential, no further management was recommended for Subarea A and for Shelters A and D within Subarea B. Because Shelters B, C, and E (Subarea B) had the potential for intact cultural deposits, a crew returned in March 1992 and excavated one shovel test in Shelter B, three tests in Shelter C, and two tests in Shelter E. Cultural material was recovered from all three shelters but in situ cultural deposits of suitable depth and extent were present only in Shelters C and E. Following shovel testing, the eligibility of these two shelters was still uncertain

and they were recommended for avoidance or formal testing. Two to three 1 x 1 m manually excavated test pits each were recommended for Shelter C and E to conclusively determine NRHP eligibility (Trierweiler 1994:A66-A71).

5.2.1.3 New Work

Three 1 x 1 m test pits (TPs 1 through 3) were excavated within Shelter E, and two 1 x 1 m test pits (TPs 4 and 5) were excavated within Shelter C (Table 5.15). Recovered cultural material is summarized in Table 5.16. To facilitate analysis, two Analytical Units were defined on the site. AU 1 corresponds to Shelter C, and AU 2 corresponds to Shelter E.

5.2.2 Results

Results are presented separately for Shelters C and E.

5.2.2.1 Excavations in Shelter C

Two test pits were excavated in Shelter C, yielding substantial cultural material (Table 5.16). Test Pit 4 was placed at the western portion of Shelter C, at the deepest point under the overhang. The unit was excavated to bedrock at 90 cmbs. Three stratigraphic zones were observed. Zone 1 consisted of a dark brown clay loam extending from the surface to 20 to 25 cmbs. Zone 2 consisted of a black, clayey horizon with gravels dispersed lightly throughout. Zone 4 was up to 40 cm thick and rested on bedrock. It consisted of a dark brown clay loam with relatively dense roof spalls and gravels. Zone 3 intruded into Zone 4 as a 10 cm thick lens of brown clay.

Test pit 5 was placed a few meters west of TP 4, at the back wall of the shelter. The unit was excavated to bedrock at 60 cmbs, which slopes steeply toward the opening of the shelter. Three stratigraphic zones were encountered in TP 5. These zones are similar to Zones 1, 2, and 4 in TP 4, and may correlate with them.

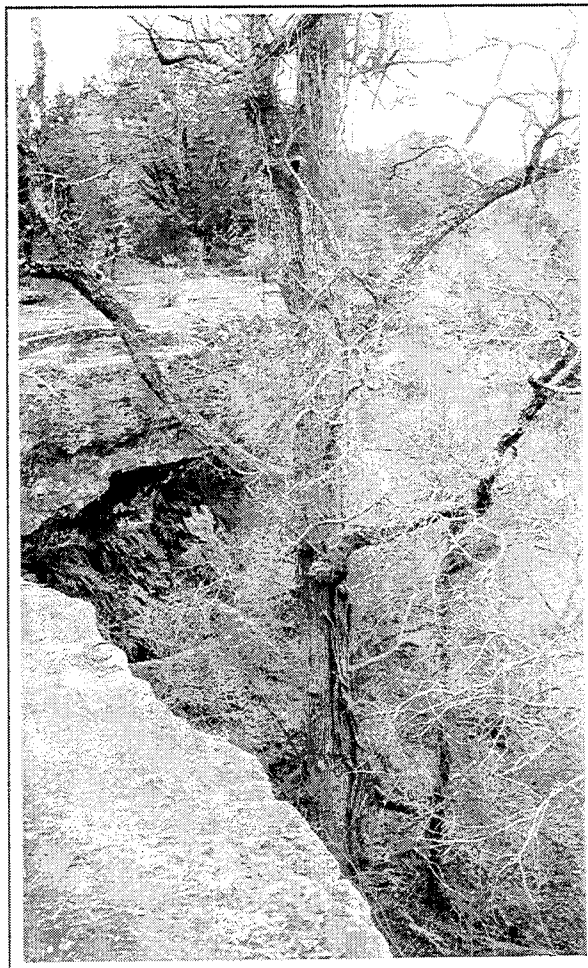
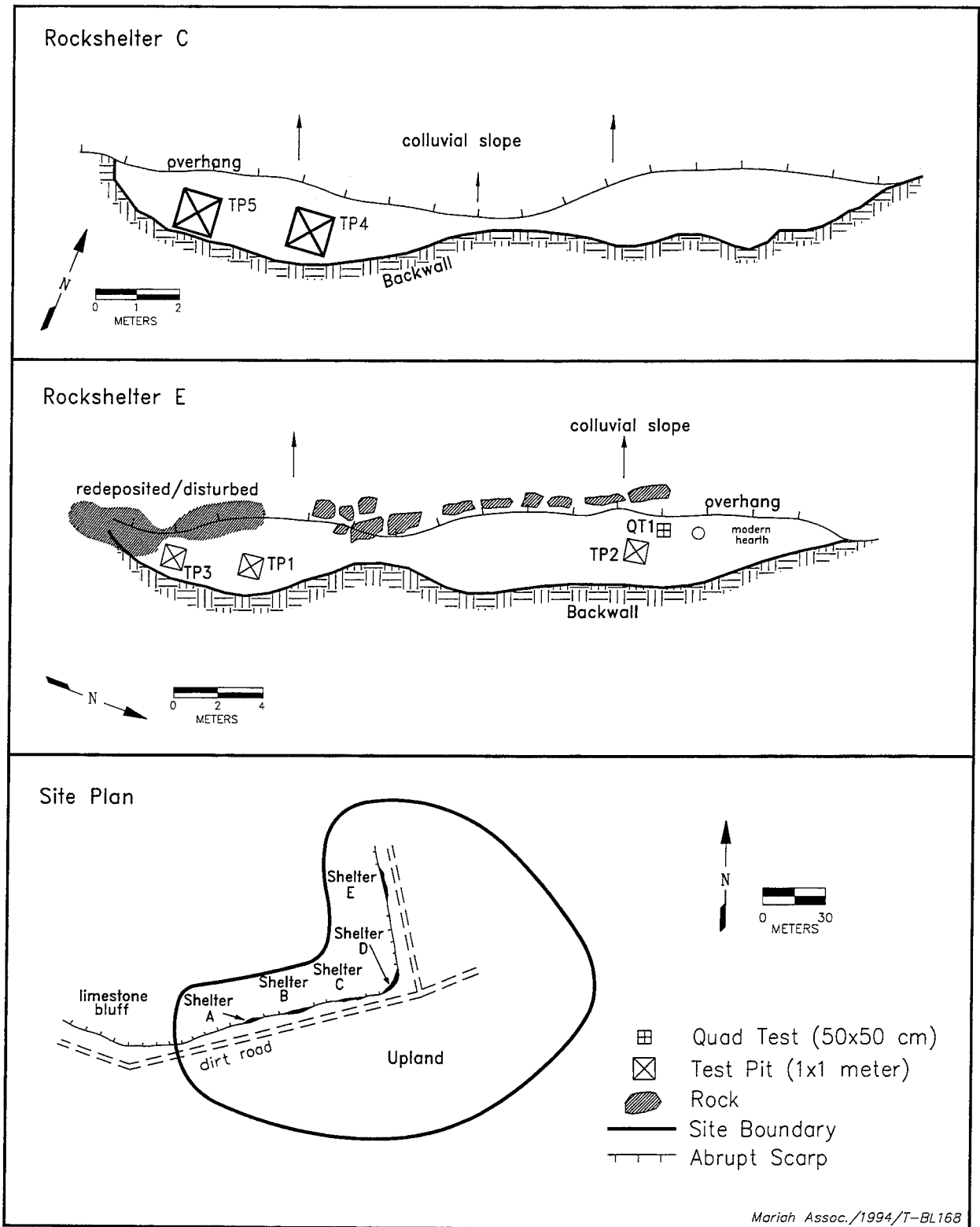


Figure 5.10 Bluff Edge, Site 41BL168, Looking Southwest.

Within TP 4, no cultural material was found from 0 to 10 cmbs and a few burned rocks and flakes were recovered from 10 to 20 cmbs. Artifact frequencies increased dramatically from 20 to 30 cmbs and peaked at 40 to 50 cmbs (see Table 5.16). Numerous flakes, several burned rocks, a few bone fragments, and a few mussel shells were recovered from these levels. In addition to these artifacts, an untyped, a Castroville, a dart point, and a biface were found from 30 to 40 cmbs. From 40 to 50 cmbs, artifact recovery continued to be high, although no burned rocks were found. In addition, flotation produced a fragment of nutshell from a plateau live oak (*Quercus fusiformis*).



Mariah Assoc./1994/T-BL168

Figure 5.11 Site Map of 41BL168.

Within TP 5, a flake and large bird femur were recovered from 0 to 10 cmbs. From 10 to 50 cmbs, consistent, substantial amounts of flakes were recovered (Table 5.16). Faunal materials and burned rocks were present in small amounts. No cultural material or ecofacts were found from 50 to 60 cmbs.

A total of two projectile points and three tools were recovered from AU 1. The points are classified as a Late Archaic Castroville of Heiner Lake Tan and an untyped dart point of indeterminate light brown chert. The tools are middle and late stage bifaces of indeterminate light brown chert and Heiner Lake Tan chert, respectively; the third tool is an undifferentiated uniface of Heiner Lake Tan chert.

Debitage from 12 described chert types and eight indeterminate chert categories was recovered from TPs 1, 2, and 3 in Shelter E (Table 5.17). The majority of this diverse assemblage (83%) could not be confidently classified into known types, and as a result, only the aggregate indeterminate class occurs in greater than expected frequencies. If the indeterminate cherts are excluded from analysis, then Heiner Lake Tan and Heiner Lake Translucent Brown occur in greater than expected frequencies; Heiner Lake Blue, Cowhouse White, Anderson Mountain Gray, Fossiliferous Pale Brown, East Range Flecked, and Owl Creek Black occur in expected frequencies; and Fort Hood Yellow, Fort Hood Gray, and Gray-Brown-Green occur in less than expected frequencies (Table 5.18). Overall, Southeast Range cherts appear best represented in the assemblage. While North Fort cherts are also represented, only Owl Creek Black occurs in expected frequencies. West Fort cherts are represented by Anderson Mountain Gray, which may indicate relatively long-distance procurement but more likely signifies utilization of cobbles in the Cowhouse Creek bedload. The dominance of unclassified varieties make any firm interpretation unavailable. While the presence of large quantities of light brown and dark brown indeterminate flakes probably indicate that Southeast Range varieties are underrepresented, North Fort and West Fort

Table 5.15 List of Treatment Units, 41BL168.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 4	1.0	1.0	90
1	TP 5	1.0	1.0	60
2	TP 1	1.0	1.0	30
2	TP 2	1.0	1.0	37
2	TP 3	1.0	1.0	20

varieties also may make up a large proportion of this diverse assemblage.

Most flakes (87%) fall into size categories smaller than 1.8 cm (see Table 5.17). Similarly, decorticated flakes dominate the assemblage (85%) (Table 5.19). This suggests that latter-stage reduction was the most common type of manufacturing activity conducted. However, there are a significant number of flakes in categories larger than 1.8 cm, and roughly 14% of the total have at least some cortex, indicating that all stages of reduction were practiced. Interestingly, 71% of the cortified flakes exhibit surface abrasion, indicating that streambed procurement was an important source for the material exhibiting early stage reduction.

5.2.2.2 Excavations in Shelter E

Three test pits were excavated in Shelter E, and cultural material was recovered from each level (Table 5.16). TP 1 was placed at the southern portion of Shelter E and excavated to bedrock (30 cmbs). Three stratigraphic zones were encountered. The upper zone consisted of a black clay loam about 9 to 10 cm thick. A zone of dense gravel, several centimeters thick, occurred immediately below the upper zone. Below the gravel lens, shelter fill reverted to a black clay loam that ranged from 15 to 20 cm in thickness. This zone contained large amounts of roof fall, and large rocks in the northern corners of the unit inhibited further excavation. The contact between this zone and bedrock consisted of limestone regolith.

Table 5.16 Artifact Recovery by Test Pit, 41BL168.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4					TEST PIT 5										
	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	
1	0	0	119	2	2(5)	2	6	154	3	11(1.5)	0	0	11	1	0(0)	0	0	0	0	0(0)	0	0	1	1	0	0(0)	0	1	1	0	0(0)
2	0	0	209	0	3(0.5)	1	0	142	1	8(1)	0	3	30	0	8(1)	0	0	8	0	3(0.3)	1	1	27	0	3(0.5)	1	1	27	0	3(0.5)	
3	0	0	15	0	0(0)	1	0	125	0	7(0.8)	1	0	30	0	0(0)	1	1	104	0	6(1)	2	0	34	0	0(0)	2	0	34	0	0(0)	
4						0	1	8	0	0(0)	0	1	3	240	5	7(1)	3	4	346	0	0(0)	0	0	43	0	0(0)	0	0	43	0	0(0)
5											3	4	346	0	0(0)	0	0	54	0	0(0)	0	0	2	0	0(0)	0	0	2	0	0(0)	
6											0	0	54	0	0(0)	0	0	15	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	
7											0	0	15	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	
8											0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	
9											0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	
TOTAL	0	0	343	2	5(5.5)	4	7	429	4	26(3.3)	0	3	41	1	8(1)	5	8	767	5	16(2.3)	3	2	107	0	3(0.5)	3	2	107	0	3(0.5)	

Table 5.17 Debitage Recovery by Size and Material Type, 41BL168.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue (1 & 10)	0	0	8	3	2	3	0	16
02-C White	0	0	1	3	4	2	0	10
03-AM Gray	0	1	1	1	0	1	0	4
06-HL Tan	0	0	11	10	6	6	0	33
07-Foss Pale Brown	0	4	0	4	2	3	2	15
08-FH Yellow	0	0	0	0	0	1	0	1
09-HL Tr Brown	0	11	6	15	3	1	0	36
11-ER Flat	0	0	0	0	1	0	0	1
13-ER Flecked	0	2	7	4	0	0	0	13
14-FH Gray	0	0	0	0	0	1	0	1
15-Gry/Brn/Grn	0	0	0	0	1	0	0	1
17-Owl Crk Black	0	2	1	3	0	1	0	7
<i>Subtotal</i>	0	20	35	43	19	19	2	138
Unidentified Types								
Indet Black	2	6	0	0	0	0	0	8
Indet Dk Brown	17	40	24	7	1	2	0	91
Indet Dk Gray	6	29	14	3	6	0	0	58
Indet Lt Brown	53	107	105	58	13	5	0	341
Indet Lt Gray	3	13	41	32	21	2	0	112
Indet Misc.	1	5	11	10	8	0	0	35
Indet Trans	0	0	0	1	0	0	0	1
Indet White	0	10	0	8	5	6	0	29
<i>Subtotal</i>	82	210	195	119	54	15	0	675
Total	82	230	230	162	73	34	2	813

Within TP 1, artifact density was very high from 0 to 20 cmbs (Table 5.16). Most of the material consisted of lithics, although a few small burned rocks and mussel shell fragments were found. A Bulbar Stemmed and a Darl were recovered from Level 1. However, a military cartridge casing also was recovered from 0 to 10 cmbs. Artifact recovery fell off dramatically from 20 cmbs to bedrock, partly as a result of increasing intrusion of bedrock into the unit.

TP 3 was placed a few meters south of TP 1, at the extreme southern end of Shelter E, and excavated to bedrock (20 cmbs). Fill in this unit was a dark gray clay loam containing roof spalls. Bedrock occurred at depths ranging from 9 to 20 cmbs. Although a relatively substantial artifact assemblage was recovered (see Table 5.16), about 10 military cartridge casings were recovered from 10 to 20 cmbs and other casings were distributed on the surface nearby.

Table 5.18 Binomial Statistic Results, AU 1 41BL168.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue	16	48	78	less	5	18	expected
02-C White	10	48	78	less	5	18	expected
03-AM Gray	6	48	78	less	5	18	expected
06-HL Tan	34	48	78	less	5	18	more
07-Foss Pale Brown	15	48	78	less	5	18	expected
08-FH Yellow	1	48	78	less	5	18	less
09-HL Tr Brown	36	48	78	less	5	18	more
11-ER Flat	1	48	78	less	5	18	less
13-ER Flecked	13	48	78	less	5	18	expected
14-FH Gray	1	48	78	less	5	18	less
15-Gry-/Brn/Grn	1	48	78	less	5	18	less
17-Owl Crk Black	7	48	78	less	5	18	expected
Total Indet	636	48	78	more	na	na	na

TP 2 was placed at the northern end of Shelter E and excavated to bedrock (40 cmbs). Stratigraphy in TP 2 resembled that in TP 1, although roof spalls were fairly densely distributed throughout the profile so that no individual zones were identified according to variation in rock density. A large artifact assemblage was recovered from 0 to 30 cmbs (Table 5.16). Although most of the artifacts were lithics, some faunal materials and burned rocks were recovered. In addition, carbonized wood fragments from Level 2 were recovered from flotation, and proved to represent live oak. Artifact density fell off from 20 to 30 cmbs, and declined further from 30 to 40 cmbs, partly as a result of an increasing proportion of incorporated spall with depth.

A Transitional Archaic Darl a Bulbar Stemmed arrow point were recovered from AU 2 (5.20). An additional five tools were also recovered that consisted of two preforms, a late and one middle stage biface and a utilized flake (Table 5.21).

Debitage from nine described cherts and eight indeterminate chert categories was recovered from TP 4 and TP 5 in Shelter C (Table 5.22). As in

Shelter E, the identification percentage was quite low (roughly 20%), rendering the utility of analysis suspect. Due to the large number of indeterminate cherts, all identified varieties occur at less than expected frequencies. If the indeterminate cherts are excluded, Heiner Lake Translucent Brown and Heiner Lake Tan are overrepresented, and Cowhouse White and Anderson Mountain Gray types occur in expected numbers. All other types occur in less than expected frequencies (Table 5.23). Three of the types that occur in expected or larger numbers are Southeast Range cherts (Translucent Brown, Tan, and White). Given the relatively large number of indeterminate brown flakes, the translucent brown and tan cherts may be more highly represented than the statistics indicate. However, the moderately high frequency of indeterminate gray cherts suggest that North Fort and/or West Fort province cherts may also make up a significant portion of the overall assemblage.

Over 90% of the recovered flakes fall into size categories smaller than 1.8 cm, and almost 95% are completely decortified (Table 5.24). This suggests that early stage reduction was rarely practiced in the shelter. Of those flakes that do

Table 5.19 Debitage Cortex Characteristics by Material Type. AU 1, 41BL168.

Lithic Material	All Cortex		Partial Cortex			Not Applicable	Indeterminate	Total
	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate			
Identified Types								
HL Blue	0	0	0	0	0	16	0	16
02-C White	0	0	2	1	0	7	0	10
03-AM Gray	0	0	0	0	1	3	0	4
06-HL Tan	0	0	12	1	0	20	0	33
07-Foss Pale Brown	0	0	6	0	0	9	0	15
08-FH Yellow	0	0	0	0	0	1	0	1
09-HL Tr Brown	0	0	3	0	0	33	0	36
11-ER Flat	0	0	0	0	0	1	0	1
13-ER Flecked	0	0	2	0	0	11	0	13
14-FH Gray	0	0	0	1	0	0	0	1
15-Gry/Brn/Grn	0	0	0	0	0	1	0	1
17-Owl Crk Black	0	0	1	0	0	6	0	7
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>26</i>	<i>3</i>	<i>1</i>	<i>108</i>	<i>0</i>	<i>138</i>
Indet Black	0	0	0	0	0	8	0	8
Indet Dk Brown	0	0	2	0	0	89	0	91
Indet Dk Gray	0	0	1	0	0	57	0	58
Indet Lt Brown	0	0	40	3	10	286	2	341
Indet Lt Gray	0	0	4	0	10	98	0	112
Indet Misc.	1	1	11	1	2	15	4	35
Indet Trans	0	0	0	0	0	1	0	1
Indet White	0	0	0	1	1	26	1	29
<i>Subtotal</i>	<i>1</i>	<i>1</i>	<i>58</i>	<i>5</i>	<i>23</i>	<i>580</i>	<i>7</i>	<i>675</i>
Total	1	1	84	8	24	688	7	813

bear cortex, roughly a third exhibit abrasive damage, indicating that while streambed procurement was practiced, reduction of bedrock or lag chert was at least as important.

5.2.2.3 Site-Level Synthesis

The stratigraphy of both shelters was relatively straightforward in comparison with many of the

rockshelters on the reservation. Both shelters exhibited a fill composed primarily of dark brown to black stony clay containing variable quantities of roof fall and gravel. This type of fill is equivalent to the Type 3 fill defined by Abbott (1994), and probably represents fine sediment derived from erosion of the A horizon on the surrounding uplands coupled with coarse-grained, internally derived roof spall. The integrity of the

deposits in Shelter C appears moderately good overall, with root growth being the principal agent of disturbance evident. However, much of Shelter E appears disturbed by historic vandalism, as well as intense faunal and floral turbation.

The small size of the tool assemblage from both AUs does not allow significant conclusions to be made regarding the raw material preferences evident in the collection. However, at least half of the raw materials identified belong to the Southeast Range group of materials. The debitage recovered from the site is composed of a diverse assemblage of material that, while dominated by Southeast Range varieties, also probably includes substantial North Fort and West Fort components. Due to the low identification rate, more detailed inferences from this particular assemblage are unwarranted. Stage reduction data indicate that most material was procured and initially reduced elsewhere, then carried back to the shelter complex for latter-stage reduction.

Fauna recovered from the two shelters consisted of a small but diverse assemblage, and is summarized in Table 5.25. The most probable economic species present is deer, represented only by a few teeth. Other taxa include cottontail rabbit and a relatively large, unidentified bird. Approximately 45% of the recovered bone exhibited evidence of burning, clearly indicating that much of the material represents food brought to the shelter by humans. Bivalves recovered include six broad taxa, with species indicative of both muddy and sandy bottoms.

No radiocarbon ages were obtained from either shelter. However, a suite of six *Rabdotus* shells collected from TP 2, Level 2 in Rockshelter E were submitted for A/I ratio determination. The results of this analysis reveal three broad age clusters centering on approximately 1,600 equivalent radiocarbon years, 2,600 equivalent radiocarbon years, and 6,500 equivalent radiocarbon years (see Appendix D and section 6.5). While the method is not yet proven sufficiently to rely on these determinations as good

Table 5.20 Projectile Points, AU 2, 41BL168.

Point Type	Lithic Material		Total
	15-Gry/Brn/Gm	Indet Lt Brown	
Bulbar Stemmed	1	0	1
Darl	0	1	1
Total	1	1	2

chronometric estimates, they do demonstrate that the assemblage in Rockshelter E is (1) of late Holocene age, and probably not more than 2,000 years old, and (2) contained in a matrix that probably represents an admixture of contemporary sediments and older, reworked materials. Moreover, the recovery of noncarbonized juniper and grasses from depths of up to 40 cm in TPs 1, 2, and 4 suggests that recent mixing and/or intrusion may also have occurred. Thus, the integrity of the assemblage itself is also somewhat questionable. However, clear evidence of pronounced disturbance or wholesale incorporation of older cultural material is lacking.

5.2.3 Conclusions and Recommendations

On the basis of earlier site reconnaissance activities, Subarea A and Shelters A, B, and D were judged to have very limited archeological potential. However, the site contains two

Table 5.21 Lithic Tools, AU 2, 41BL168.

Lithic Material	Tool Type				Total
	late stage biface	middle stage biface	preform	utilized flake	
06-HL Tan	1	0	0	1	2
10-HL Blue	0	0	1	0	1
13-ER Flecked	0	0	1	0	1
Indet Lt Brown	0	1	0	0	1
Total	1	1	2	1	5

Table 5.22 Debitage Recovery by Size and Material Type, AU 2, 41BL168.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types							
02-C White	0	0	11	8	4	2	25
03-AM Gray	0	3	1	4	7	4	19
06-HL Tan	0	0	17	15	19	3	54
07-Foss Pale Brown	0	0	4	2	2	2	10
08-FH Yellow	0	0	0	0	1	0	1
09-HL Tr Brown	8	18	6	12	0	0	44
10-HL Blue	0	0	6	2	2	0	10
13-ER Flecked	0	0	1	2	0	0	3
17-Owl Crk Black	0	0	2	0	2	0	4
<i>Subtotal</i>	8	21	48	45	37	11	170
Unidentified Types							
Indet Black	0	2	0	0	0	0	2
Indet Dk Brown	69	38	14	13	1	0	135
Indet Dk Gray	6	23	7	5	0	0	41
Indet Lt Brown	149	120	26	21	5	4	325
Indet Lt Gray	2	45	34	18	3	0	102
Indet Misc.	1	12	14	6	1	0	34
Indet Trans	0	0	0	2	0	0	2
Indet White	0	20	20	12	7	4	63
<i>Subtotal</i>	227	260	115	77	17	8	704
Total	235	281	163	122	54	19	874

rockshelters with intact cultural deposits. Root growth was the only disturbance observed within Shelter C, and the cultural materials in these deposits appear to be largely intact. In Shelter E, the presence of cartridge casings in the shallow deposits of TP 1 and TP 3 suggests that the majority of the southern portion of this shelter has been heavily disturbed, with the context of artifacts being questionable. The southern half of Shelter E is therefore unlikely to have undisturbed buried deposits. Although dense root growth and evidence of rodent activity was also present within TP 2 at the northern portion of Shelter E, no evidence of military disturbance or vandalism was

found. Although the deposits in the vicinity of TP 2 are shallow, they are likely to be substantially deeper on the platform outside the shelter dripline where the presence of large roof-fall boulders may have afforded them some protection against both erosion and vandalism. The projectile point in Shelter C weakly implies occupation during or after the Late Archaic. Cultural and subsistence materials in the shelters are abundant and should provide a significant data base for pursuing technological studies outlined in the research domains defined in the research design for Fort Hood (Ellis 1994b).

Table 5.23 Binomial Statistic Results, AU 2, 41BL168.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	25	70	105	less	11	27	expected
03-AM Gray	19	70	105	less	11	27	expected
06-HL Tan	54	70	105	less	11	27	more
07-Foss Pale Brown	10	70	105	less	11	27	less
08-FH Yellow	1	70	105	less	11	27	less
09-HL Tr Brown	44	70	105	less	11	27	more
10-HL Blue	10	70	105	less	11	27	less
13-ER Flecked	3	70	105	less	11	27	less
17-Owl Crk Black	4	70	105	less	11	27	less
Total Indet	704	70	105	more	na	na	na

On this basis, Shelters C and E at 41BL168 are evaluated as significant relative to criteria outlined in the research design (Ellis et al. 1994), and is eligible for inclusion in the NRHP. Accordingly, these shelters should be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequented by artifact collectors, the site is vulnerable to vandalism. Because the cultural materials are shallowly buried, they also are vulnerable to unintentional damage by military personnel using the shelter during training exercises. Indeed, Shelter E has already been damaged by both sources of impact. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism and (2) prevent surface disturbance and manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which

may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 110 m² in Shelters C and E. Mitigation efforts should be extended to surfaces outside the overhangs of the shelters in order to acquire data that may remain beneath major roof fall events, since both shelters have platforms with substantial capacity to contain in situ materials beneath major roof fall slabs. Approximately 30 m² should be allocated to Shelter C, yielding an estimated mitigation volume of about 32 m³ for the shelter. About 80 m² should be allocated to Shelter E, yielding an estimated mitigation volume of about 37 m³ for the shelter. Total estimated mitigation volume for the site is therefore approximately 69 m³. The amount estimated allows for excavation outside the shelter, although the actual amount mitigated depends on the thickness of deposits outside the shelters, which currently is unknown.

Table 5.24 Debitage Cortex Characteristics by Material Type, AU 2, 41BL168.

Lithic Material	All Cortex		Partial Cortex			No Cortex	Indeterminate	Total
	Indeterminate	Abraded	Unabraded	Indeterminate	Indeterminate			
Identified								
02-C White	0	0	0	0	25	0	25	
03-AM Gray	0	0	3	0	16	0	19	
06-HL Tan	0	1	0	2	51	0	54	
07-Foss Pale Brown	0	1	1	0	8	0	10	
08-FH Yellow	0	0	0	0	1	0	1	
09-HL Tr Brown	0	1	0	1	42	0	44	
10-HL Blue	0	0	1	0	9	0	10	
13-ER Flecked	0	0	0	0	3	0	3	
17-Owl Crk Black	0	2	0	0	2	0	4	
<i>Subtotal</i>	<i>0</i>	<i>5</i>	<i>5</i>	<i>3</i>	<i>157</i>	<i>0</i>	<i>170</i>	
Unidentified								
Indet Black	0	0	0	0	2	0	2	
Indet Dk Brown	0	0	4	2	129	0	135	
Indet Dk Gray	0	0	0	0	41	0	41	
Indet Lt Brown	0	3	2	4	316	0	325	
Indet Lt Gray	0	0	0	0	102	0	102	
Indet Misc.	4	3	1	2	22	2	34	
Indet Trans	0	0	0	0	2	0	2	
Indet White	0	0	5	4	54	0	63	
<i>Subtotal</i>	<i>4</i>	<i>6</i>	<i>12</i>	<i>12</i>	<i>668</i>	<i>2</i>	<i>704</i>	
Total	4	11	17	15	825	2	874	

5.3 SITE 41BL198

5.3.1.1 Location and Description

5.3.1 Introduction

In early February 1994, Mariah conducted test excavations at site 41BL198. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

Site 41BL198 is situated on an upland surface and within two fairly steep canyons (Figures 5.12 and 5.13). An east-southeast facing rockshelter is located on the northwest side of the southernmost canyon (Figure 5.14). Overall maximum site dimensions are 300 m x 240 m (about 72,000 m², or 1.92 acres). The shelter measures about 40 m x 6 m (about 240 m²). For purposes of this report,

the site is considered a member the Nolan/Cowhouse area group.

5.3.1.2 Previous Work

Thomas and Comstock first recorded the site as a rockshelter on 22 February 1979. Flakes, bifaces, bone fragments, burned rocks, charcoal, mussel shell, and a metate were observed, with the greatest concentration of materials occurring in erosive areas along the dripline. One bone was described as the end of a possible human radius. The shelter was estimated to be 15% impacted by erosion, animals, and roof fall. The matrix was limestone powder and preservation was considered excellent. Depth of deposit was estimated to range from 0 cm to more than 100 cm; however, a separate statement made under "remarks" on the field data form classified the deposits as "shallow." Nonetheless, testing was recommended.

On 29 July 1984, Dekker and Ensor rerecorded the site. The original site description was expanded to include the upland surface which contained two burned rock mounds, including one mound in close proximity to the shelter, and an extensive flake scatter. In contrast to the previous report, the rockshelter was described as having been vandalized, suggesting that initial vandalism occurred within the intervening five year period. Mussel shell and bone, including possible human skull fragments, were noted in the shelter, and two skull fragments were collected. Erosion and vandalism were estimated to have disturbed 6% of the site.

On 23 January 1986, Moore and Strychalski monitored the site. The accompanying monitoring form filled out at that time states: "We walked over the area and found no evidence of this site in the stratified random sample." However, in their sample quadrant, several tools were observed and a Pedernales and Godley were collected.

Pry and Mesrobian again monitored the site on 8 December 1987. The rockshelter was relocated and did not show signs of recent vandalism. The

Table 5.25 Faunal Recovery, AU 2, 41BL168.

	Indeterminate	Permanent tooth	Tooth	left	right	Total
Vertebrates						
Artiodactyla	0	0	1	0	0	1
Mammalia (med/lg)	5	0	0	0	0	5
Odocoileus sp.	0	1	0	0	0	1
Vertebrata	3	0	0	0	0	3
Total	8	1	1	0	0	10
Bivalves						
Lampsilis sp.	0	0	0	0	1	1
Quadrula apiculata	0	0	0	2	0	2
Quadrula houstonensis	0	0	0	0	1	1
Total	0	0	0	2	2	4

monitoring form completed at that time includes the statement that "In fact, we could not discern any definite potholes," suggesting that either Dekker and Ensor exaggerated the degree of vandalism or that depositional and/or turbation processes had been very active, erasing visible evidence of vandalism within a three-year period. One rib fragment, mussel shell, and flakes were noted. The upland surface, with the two burned rock mounds, was remapped. Apparently, no eastern site boundary was delineated, and a question was raised as to whether or not the adjacent quadrant had been surveyed. Two untyped dart points and a Castroville were collected from the uplands.

On 17 December 1991, Quigg and Frederick revisited and reevaluated the site based on archeological and geomorphological observations. The site was divided into Subarea A, the uplands, and Subarea B, the rockshelter. A burned rock and lithic scatter was noted across the upland surface, which had undergone extensive sheet erosion. An untyped dart point, two Pedernales

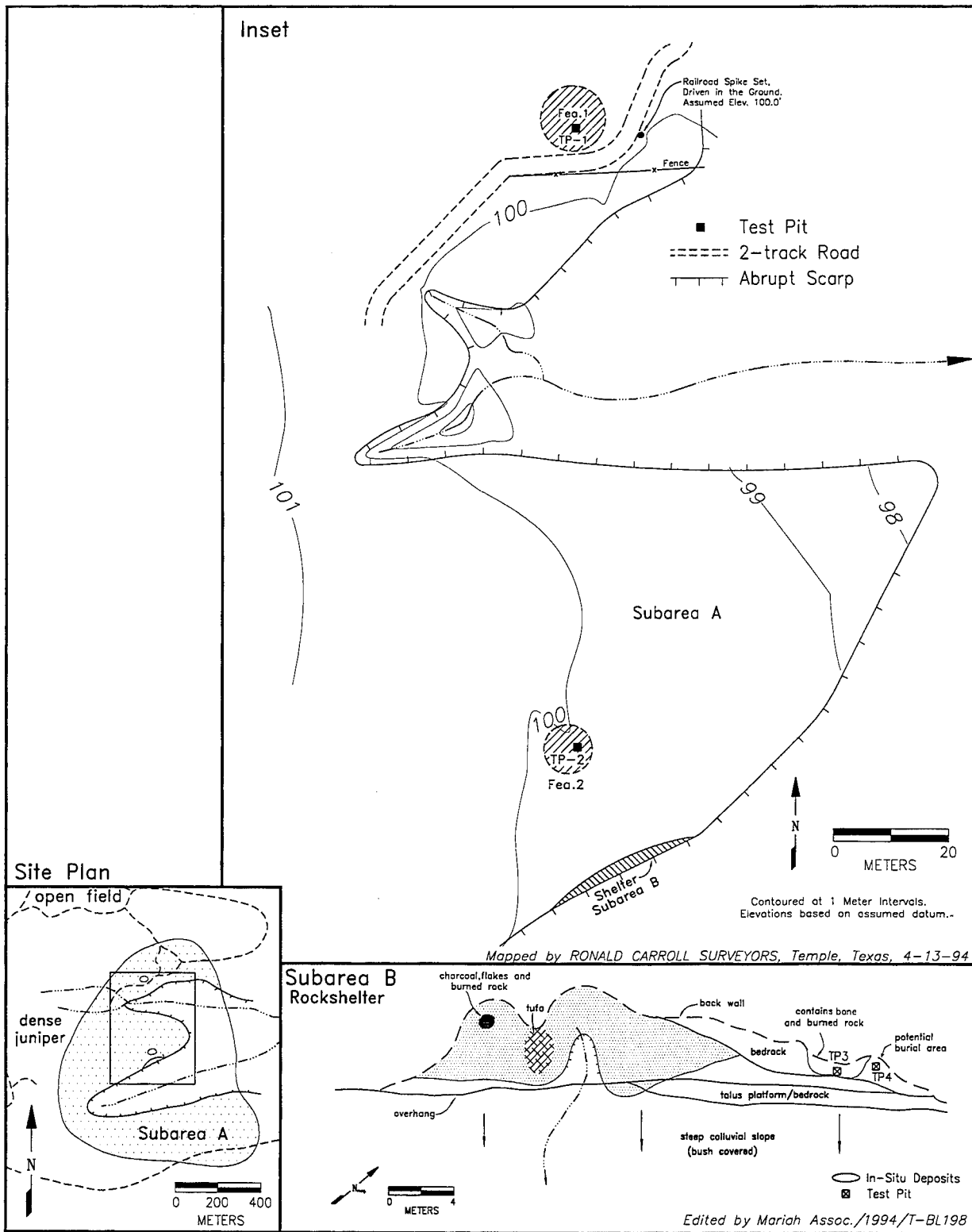


Figure 5.12 Site Map of 41BL198.



Figure 5.13 Feature 3, 41BL198.

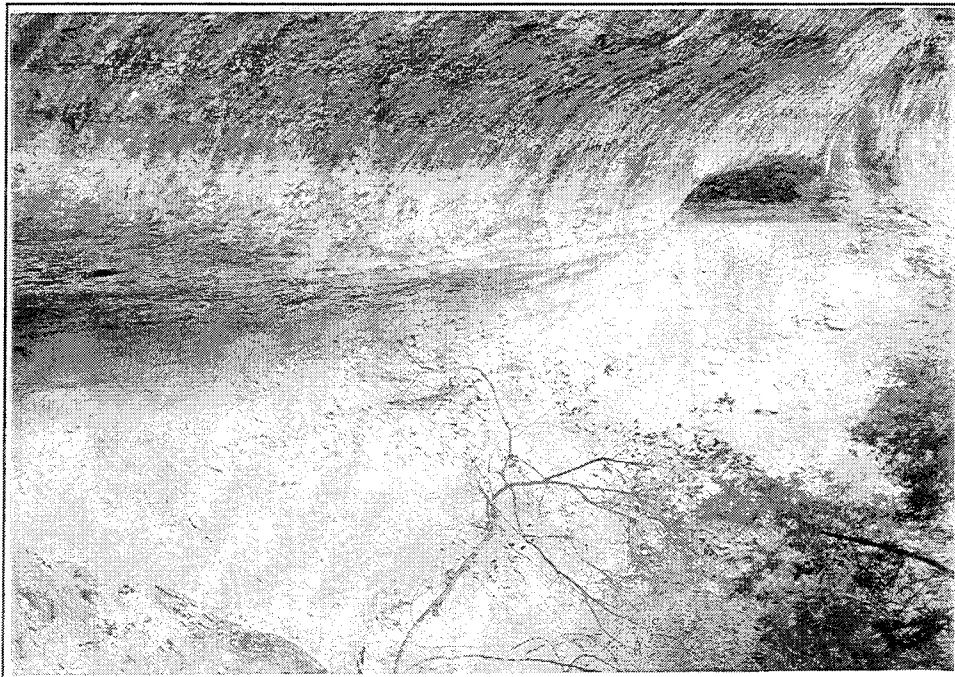


Figure 5.14 Interior of Rockshelter, 41BL198.

points, and an Ensor point were collected from this surface. The two burned rock mounds, the only portions of Subarea A judged to have any archeological potential, were designated F 1 and 2. Feature 1 measured roughly 12 m in diameter x 90 cm high. Lithics and a "pothole" were noted. Feature 2 was 5 m in diameter, 50 cm high, and contained one "pothole." Bone fragments, mussel shell, snails, and lithic tools and debitage were observed in the shelter and on the talus slope. Chert lenses were noted in the shelter wall. The statement was made that a "small eroded area at the east end, above ground surface, could be a potential location for a human burial." The shelter matrix was described as a fine silt with limestone fragments. A tufa mound, approximately 4 x 2 m, was located near the western edge of the shelter. No vandal pits were evident, and disturbance by animal tracks and erosion was minimal. The mounds were considered to be minimally disturbed and to have good archeological potential. Since the shelter had the potential to contain in situ cultural deposits, shovel testing was recommended.

On 1 April 1992, a crew excavated 3 shovel tests within the rockshelter. Shovel tests 1 and 2 were excavated to bedrock at 12 cmbs and 30 cmbs, respectively, and contained cultural material throughout. Observed types of cultural material included charcoal, lithics, mussel shell, and bone fragments. Shovel test 3 was sterile, with bedrock reached at 10 cmbs. Based on testing results, material in the shelter was judged prone to mixing due to the soft, powdery, character of the shallow matrix. However, the tufa mound had unknown potential to contain sealed archeological and/or environmental data. Thus, Subarea B, in addition to the mounds in Subarea A, was considered likely to have high archeological potential, although the site's eligibility status remained uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. To determine NRHP eligibility, one backhoe trench and at least two 1 x 1 m manually excavated test pits were recommended in each of the burned rock mounds, and a tufa sample was recommended for

the shelter's tufa mound (Trierweiler 1994:A98-A101).

5.3.1.3 New Work

Upon visits by Frederick, Ellis, and Mehalchick, the initial testing recommendations were amended. Trenching of the burned rock mounds was avoided since this would impact a good percentage of otherwise intact features. At least one manually excavated test pit was recommended for each mound, although one unit would probably provide sufficient data to determine NRHP eligibility. Manual excavations in the rockshelter also were recommended to explore for in situ deposits, including burials that had been noted as possible during previous visits to the site.

Four test pits (TPs 1 through 4) were excavated on the site (Table 5.26). Test pits 1 and 2 were placed, respectively, on F 1 and 2. These pits were oriented to parallel the depressions, whereas the units in the shelter were oriented magnetic north. Test pits 3 and 4 were placed in the rockshelter. Recovered cultural material is summarized in Table 5.27. One Pedernales dart point fragment was collected from the upland surface (Subarea A). Excavation in TP 4 encountered a left human clavicle and possible human rib fragments. On 4 February 1994, Fort Hood DEH was notified of the remains. Fort Hood Archeologist Kimball Smith visited the site on 7 February 1994 and confirmed the clavicle was human, however, other bones were animal or too

Table 5.26 List of Treatment Units, 41BL198.

AU	Treatment Unit	Length (m)	Width (M)	Depth (cmbs)
1	TP 1	1.0	1.0	80
2	TP 2	1.0	1.0	60
3	TP 3	1.0	1.0	30
3	TP 4	0.5	0.5	20*

* Human remains, excavation halted.

Table 5.27 Artifact Recovery by Test Pit, 41BL198.

LEVEL	TEST PIT 1							TEST PIT 2							TEST PIT 3							TEST PIT 4								
	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tool	Burned rock (kg)					
surface	0	0	0	1	0(0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0	0	0	0	160(46)	0	0	4	0	153(23)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
2	0	0	4	0	380(93.5)	0	0	16	2	328(48)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
3	1	0	7	1	340(102)	0	0	28	1	343(51)	0	0	0	0	2(0.3)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
4	0	0	4	1	311(84)	1	0	7	0	306(63)	0	0	0	0	0(0)	0	27	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
5	0	0	15	0	220(74.5)	0	0	1	0	44(11)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
6	0	0	2	0	246(86)	0	0	1	0	3(1)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
7	0	0	1	1	133(59)	0	0	1	1	16(11.5)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
8	0	0	0	0	16(11.5)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
TOTAL	0	0	0	1	0(0)	1	0	33	3	1923(604)	1	0	57	3	1177(197)	1	30	0	0	2(0.3)	0	0	0	0	0(0)	0	0	0	0	0(0)

fragmentary as to be positively identified. At this point, excavation was halted in the shelter at the request of Fort Hood DEH.

Three Analytical Units were designated to facilitate examination of the data. Analytical unit 1 corresponded to F 1, AU 2 corresponded to F 2, and AU 3 corresponded to the shelter.

5.3.2 Results

5.3.2.1 Excavations in the Rockshelter

Test pit 3, excavated to 30 cmbs, was placed at the far eastern edge of the shelter on a small platform where internally derived deposits were visible. Fill in this unit was loose, silty, cream-colored sediments. In TP 3, no cultural material was recovered from Level 1, with Levels 2 and 3 containing a light amount of artifacts (Table 5.27). From 20 to 23 cmbs, a pinkish discolored area measuring 17 x 12 cm was noted in the southwest quadrant of the unit. This area, possibly decomposed burned rock, was mapped and collected for flotation recovery.

Test pit 4, a 50 x 50 cm unit, was excavated in the alcove (potential burial location) formed in the back wall of the shelter. As in TP 3, fill was silty and cream colored, although some tufa-like deposits also occurred. Two lithics and a large number of animal bone fragments were found from 0 to 20 cmbs. However, a human clavicle (left) was found in Level 2. At that point, Fort Hood DEH archeologists were notified of the discovery and excavation was halted in the rockshelter. All recovered bone was reburied at that time. Due to the extremely low level of lithic recovery, no debitage analysis was conducted on the lithics recovered from the shelter.

5.3.2.2 Excavations in Features 1 and 2

Test pit 1 was placed on F 1, along the northeastern edge of a depression visible on the mound's surface. The depression is 2.5 m in diameter and appears to be an integral component

of mound construction rather than a vandal pit. From the surface to 60 cmbs, the fill consisted of angular burned rocks in a matrix of black silty clay loam. Most of the burned rock was from 4 to 9 cm in maximum diameter, but some reached diameters of 10 to 15 cm, and there were numerous fragments less than 4 cm in diameter. Bedrock was encountered 72 to 80 cmbs. At 72 cmbs, bedrock covers approximately two-thirds of the unit, however, beginning at 60 cmbs and continuing to a maximum excavated depth of 80 cmbs along the south wall, the majority of burned rocks are large, flat, and tabular. Five stacked, tabular burned rocks were partially visible from 43 to 80 cmbs at the southernmost edge of the east profile (Figure 5.15). The exposed rock sizes range from 13 cm x 10 cm to 19 cm x 10 cm. Also apparent in this profile is a natural depression upon which the tabular rock is stacked. The function of this construct is unknown. The sediment between rocks was a black silty clay loam to 80 cmbs. A chaining pin probe between burned rocks in the southeast corner indicated another 15 to 20 cm of deposit. In order to avoid impact to the integrity of the internal mound construction, none of these larger burned rocks was removed. Artifacts other than burned rock occurred in low to modest frequencies (see Table 5.27).

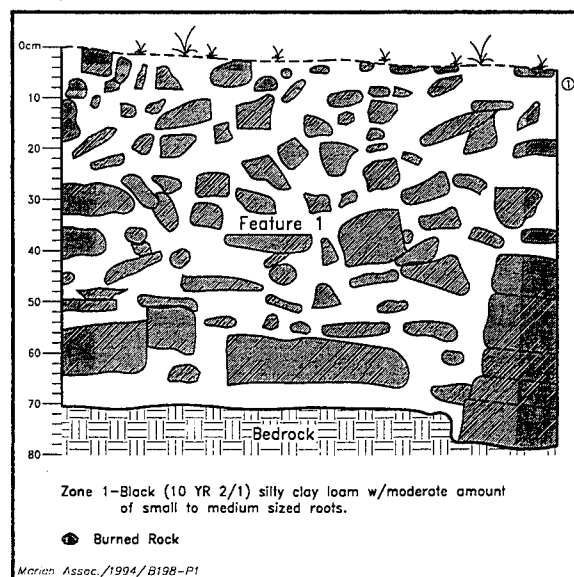


Figure 5.15 Profile of East Wall, TP 1 (F 1), 41BL198.

Test pit 2, excavated in F 2, was placed along the north edge of a depression that measured 1 m in diameter. As with F 1, the depression in F 2 appears to be prehistoric rather than a result of vandalism. This unit was terminated at bedrock (57 to 61 cmbs). The matrix consisted of a black clay loam to 40 cmbs, with a reddish brown clay loam occurring from 40 to 60 cmbs. The overwhelming majority of burned rocks was angular, with an average size of 5 cm x 7 cm. Larger burned rocks reaching 25 x 25 cm appear to have been placed directly above bedrock. At 35 cmbs, a wedge-shaped area of natural limestone clasts was encountered. This area was located along the east and south walls of the test pit, with maximum dimensions of 80 x 52 cm. It is interpreted as a natural depression in the soil that was modified by construction of the mound. Artifact frequencies other than burned rock were generally low, with the majority recovered from 10 to 30 cmbs (Table 5.27).

Chronological information obtained from the burned rock mounds is contradictory. Only one radiocarbon age was obtained. The sample consisted of a small charcoal fleck obtained from Level 8 in TP 1 (F 1) that was submitted to AMS radiocarbon analysis. The sample yielded a surprisingly young age of 390 ± 60 BP (Beta B-72969). In contrast, a suite of A/I ratios on *Rabdotus* shells from Level 5 in TP 1 yielded a suite of radiocarbon-equivalent "ages" ranging from approximately 100 years to more than 7,500 years BP. Significantly, two of these shells yielded effectively modern ages, two yielded anomalously old ages, and four clustered rather tightly (± 200 years) around a median age of approximately 3,100 radiocarbon-equivalent years. While the demonstrated correspondence between A/I ratios and radiocarbon years is not yet strong enough to place too much emphasis on the calculated ages, the A/I data does suggest that (1) the feature is probably of Middle Archaic age, and (2) has experienced at least some level of relatively recent disturbance. Similarly, six A/I ratios calculated on *Rabdotus* shells from Level 3 in F 2 yielded widely disparate ages ranging from

approximately 2,900 to 49,000 radiocarbon-equivalent years, but including a cluster of three shells with "ages" ranging from approximately 6300 to 7000 BP. Once again, while the actual numbers obtained must be interpreted rather loosely, the clustering of "ages" suggests that F 2 is somewhat older than F 1, and may date to the Early Archaic. While some disturbance is suggested by the anomalously young "age," the two "older" shells here appear to reflect acceleration of the epimerization process by heating.

One untyped dart point of Indeterminate Light Gray material was recovered. Additionally, only two other lithic tools were recovered from the excavations: a uniface of Heiner Lake Translucent Brown and a utilized flake of Indeterminate Light Gray.

A total of 33 flakes was recovered from TP 1 in F 1. Only three flakes could be typed, obviating significant conclusions about lithic sources. Three identified and six indeterminate chert types are present in the small assemblage (Table 5.28). All three identified types are Southeast Range cherts (Heiner Lake Tan, Fossiliferous Pale Brown, and Heiner Lake Translucent Brown) and are represented by a single example each. As a result, each is underrepresented when the entire assemblage is considered and in the expected range when the indeterminates are excluded (Table 5.29). The indeterminates are primarily brown and gray cherts, and may represent either local or relatively distant sources. The majority of the flakes are smaller than 1.8 cm (94%) and completely decortified (91%) (Table 5.30), indicating that latter-stage reduction was dominant.

The assemblage from TP 2 in F 2 was slightly larger and more diverse than that of F 1, but is still insufficient to draw firm conclusions from. One Pedernales dart point of Owl Creek Black was recovered. Six identified and seven indeterminate cherts are represented in the debitage (Table 5.31). If the whole assemblage is considered, Heiner Lake Tan, Fossiliferous Pale Brown, and Fort Hood

Yellow occur in expected frequencies, indeterminates occur in greater than expected frequencies, and Heiner Lake Blue, Cowhouse White, and Heiner Lake Translucent Brown in less than expected frequencies. If indeterminates are excluded, all types occur in expected frequencies except Heiner Lake Tan, which occurs in greater than expected frequencies (Table 5.32). All of the varieties are local (Southeast Range) cherts except Fort Hood Yellow, which may represent limited long-distance procurement. As in TP 1, the majority of flakes are both smaller than 1.8 cm (86%) and decortified (81%) (Table 5.33), indicating primarily latter-stage reduction.

No identifiable bone or mussel shell was recovered from either of the two burned rock mounds.

5.3.2.3 Site-Level Synthesis

Sediments exposed by excavations in the rockshelter (AU 3) consisted of relatively unweathered limestone flour and coarse eboulis (Type 3 rockshelter sediments of Abbott 1994), indicating that they are internally derived and probably relatively recent. As a result of the discovery of human remains in the shelter, investigation was terminated, and the suite of recovered materials is insufficient to make any meaningful inferences about the timespan or range of activities represented in the assemblage.

Table 5.28 Debitage Recovery by Size and Material Type, AU 1, 41BL198.

Lithic Material	Size (cm)					Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types						
06-HL Tan	0	0	1	0	0	1
07-Foss Pale Brown	0	0	1	0	0	1
09-HL Tr Brown	0	0	1	0	0	1
<i>Subtotal</i>	0	0	3	0	0	3
Unidentified Types						
Indet Dk Brown	0	3	0	0	0	3
Indet Dk Gray	1	5	0	0	0	6
Indet Lt Brown	2	5	4	0	0	11
Indet Lt Gray	5	0	0	1	0	6
Indet Misc.	0	1	2	0	0	3
Indet White	0	0	0	0	1	1
<i>Subtotal</i>	8	14	6	1	1	30
Total	8	14	9	1	1	33

Table 5.29 Binomial Statistic Results, AU 1, 41BL198.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	1	4	13	less	0	3	expected
07-Foss Pale Brown	1	4	13	less	0	3	expected
09-HL Tr Brown	1	4	13	less	0	3	expected
Total Indet	31	4	13	more	na	na	na

The two burned rock mounds on the uplands (AUs 1 and 2) each appear to be complex, relatively pristine features, although some recent disturbance is suggested by radiocarbon and amino acid data from F 1. The two features each exhibit complex internal construction, and appear to have been erected (or accreted) over a natural depression in the upland surface. Feature 1 is composed entirely of burned rock and associated fine-grained sediments that probably overlie the remnant of a thin, clay soil with an A-R profile. Feature 2 is constructed on a more highly developed soil exhibiting an A-Bt-R profile, but also exhibits a structure dominated by burned rocks and a black, clayey interstitial matrix. This variability in soil profiles is typical of the soil catena developed on the margin of the Manning upland in the East Range of Fort Hood, and may reflect nothing but chance. However, the amino acid data suggest that the soil profile beneath F 2 may be more developed because it has been in place since the Early Archaic, and thus armored the surface and protected it from a widespread episode of upland soil erosion during the Altithermal (cf. Toomey et al. 1994), while the soil beneath F 1 lacks the same degree of development because it was constructed after this interval.

5.3.3 Conclusions and Recommendations

Although they did not yield large numbers of artifacts, the burned rock mounds at the site are in very good condition. Feature 1, in particular, has a relatively complex internal structure of unknown constructional and functional origin. The burned rock mounds appear to have high potential to provide data related to the study of burned rock technologies (per Ellis 1994b). The rockshelter at the site is also in relatively pristine condition, and contains human remains and a wide, albeit relatively sparse, array of well preserved archeological materials. Although the sediments in the shelter are loose and vulnerable to disturbance from foot traffic and other impacts, they appear to be largely intact. Thus, the site has very high potential to address research issues outlined in the research design for Fort Hood (Ellis et al. 1994b).

Table 5.30 Debitage Cortex Characteristics by Material Type, AU 2, 41BL198.

Lithic Material	Partial Cortex			Total
	Abraded	Indeterminate	No Cortex	
Identified				
06-HL Tan	0	0	1	1
07-Foss Pale Brown	0	0	1	1
09-HL Tr Brown	0	0	1	1
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>3</i>	<i>3</i>
Unidentified				
Indet Dk Brown	0	0	3	3
Indet Dk Gray	0	0	6	6
Indet Lt Brown	0	0	11	11
Indet Lt Gray	0	0	6	6
Indet Misc.	1	1	1	3
Indet White	0	1	0	1
<i>Subtotal</i>	<i>1</i>	<i>2</i>	<i>27</i>	<i>30</i>
Total	1	2	30	33

On the basis of the foregoing, we judge 41BL198 to be significant and eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components at the site are shallowly buried, they are vulnerable to impact from even minor disturbances such as wood cutting and traffic (on the uplands) and low-intensity bivouac (especially in the shelter). Furthermore, although the shelters and mounds currently are in pristine condition, they comprise one of the most sought-after targets of relic collectors. As such, the shelter is especially vulnerable to the extent that local relic collectors are currently active in identifying new sites. Indeed, deposits in the shelter are very friable and subject to considerable damage from impacts as innocuous as foot traffic. Protection efforts therefore should include

measures to: (1) prevent subsurface disturbance by vandalism; (2) prevent mechanical or manual excavations by military personnel; (3) minimize the impact of traffic, especially by heavy tracked and wheeled vehicles on the uplands; and (4) minimize the impact of foot traffic and other similar disturbances on the friable deposits of the shelter. If it would facilitate protection, the areas immediately surrounding the burned rock mound s could be established as independent management units to distinguish them from the rest of the uplands, since the latter requires no further management.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces. A 100 to 150 m² block should be excavated at F 1 to provide a horizontally extensive view of its internal structure (cf. Howard 1991). This block could account for

Table 5.31 Debitage Recovery by Size and Material Type, AU 2, 41BL198.

Lithic Material	Size (cm)					Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types						
01-HL Blue(l)	0	0	1	0	0	1
02-C White	0	0	0	1	0	1
06-HL Tan	2	1	4	0	0	7
07-Foss Pale Brown	0	0	1	0	1	2
08-FH Yellow	0	1	0	1	0	2
09-HL Tr Brown	0	0	1	0	0	1
<i>Subtotal</i>	2	2	7	2	1	14
Unidentified Types						
Indet Black	0	1	0	0	0	1
Indet Dk Brown	0	3	0	0	0	3
Indet Dk Gray	0	0	2	0	0	2
Indet Lt Brown	10	6	2	1	0	19
Indet Lt Gray	4	2	0	2	0	8
Indet Misc.	2	3	2	0	0	7
Indet Mottled	0	0	2	0	1	3
<i>Subtotal</i>	16	15	8	3	1	43
Total	18	17	15	5	2	57

as much as 100 to 150 m³ of manual excavations. Another 40 to 50 m² block should be placed over

Table 5.32 Binomial Statistic Results, AU 2, 41BL198.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
01-HL Blue(l)	1	3	14	less	0	5	expected
02-C White	1	3	14	less	0	5	expected
06-HL Tan	7	3	14	expected	0	5	more
07-Foss Pale Brown	2	3	14	less	0	5	expected
08-FH Yellow	2	3	14	less	0	5	expected
09-HL Tr Brown	1	3	14	less	0	5	expected
Total Indet	43	3	14	more	na	na	na

F 2, for another 20 to 25 m³ of manual excavations. Several blocks totaling at least 125 m² should be placed in the rockshelter, yielding an additional 60 m³ of manual excavations. In addition, the tufa mound should be sampled to provide paleoenvironmental and paleoclimatic data.

5.4 SITE 41BL208

5.4.1 Introduction

In February and March 1994, Mariah conducted test excavations within Management Unit 1 of site 41BL208. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.4.1.1 Location and Description

Site 41BL208 is located within the Nolan/South area of Fort Hood. The site is situated on both sides of an unnamed tributary of North Nolan Creek and includes limestone/colluvially mantled valley slopes that border on alluvial terraces (Figure 5.16). Tank trails bisect the site and a north-to-south oriented ditch, located on the eastern portion of the site, extends from the north bank of the tributary to the base of the slope (Figure 5.17). Maximum site dimensions are approximately 1,400 x 400 m (about 560,000 m², or 138 acres).

5.4.1.2 Previous Work

This site was initially recorded by Thomas on 21 March 1979, as a 50 m long x 25 m wide burned rock scatter surrounding a spring-fed draw. A small rock overhang was noted at the head of the draw. Eighty percent of the surface area was estimated to have been disturbed. The site was noted to be in close proximity to, or connected with, a lithic scatter and procurement area around Heiner Lake.

Table 5.33 Debitage Cortex Characteristics by Size and Material Type, AU 2, 41BL198.

Lithic Material	Partial Cortex			Total
	Abraded	Indeterminate	No Cortex	
Identified				
01-HL Blue(l)	0	0	1	1
02-C White	0	0	1	1
06-HL Tan	0	0	7	7
07-Foss Pale Brown	2	0	0	2
08-FH Yellow	0	0	2	2
09-HL Tr Brown	1	0	0	1
<i>Subtotal</i>	<i>3</i>	<i>0</i>	<i>11</i>	<i>14</i>
Unidentified				
Indet Black	0	0	1	1
Indet Dk Brown	0	0	3	3
Indet Dk Gray	0	0	2	2
Indet Lt Brown	2	0	17	19
Indet Lt Gray	0	0	8	8
Indet Misc.	1	4	2	7
Indet Mottled	0	1	2	3
<i>Subtotal</i>	<i>3</i>	<i>5</i>	<i>35</i>	<i>43</i>
Total	6	5	46	57

Moore and Strychalski monitored the site on 27 January 1986. No burned rock was identified at the site, and only a few redeposited pieces of chert were found within the small rock overhang. A scatter of bifaces (a cache) at various stages of reduction was found. Approximately 15 of these artifacts were grouped together, photographed, and rescattered. The site was estimated to be 5% disturbed by erosion. The investigators recommended that the cache either be collected or protected.

Dureka and Kooren revisited the site on 11 March 1986. The site was redefined as a 1,400 m long x

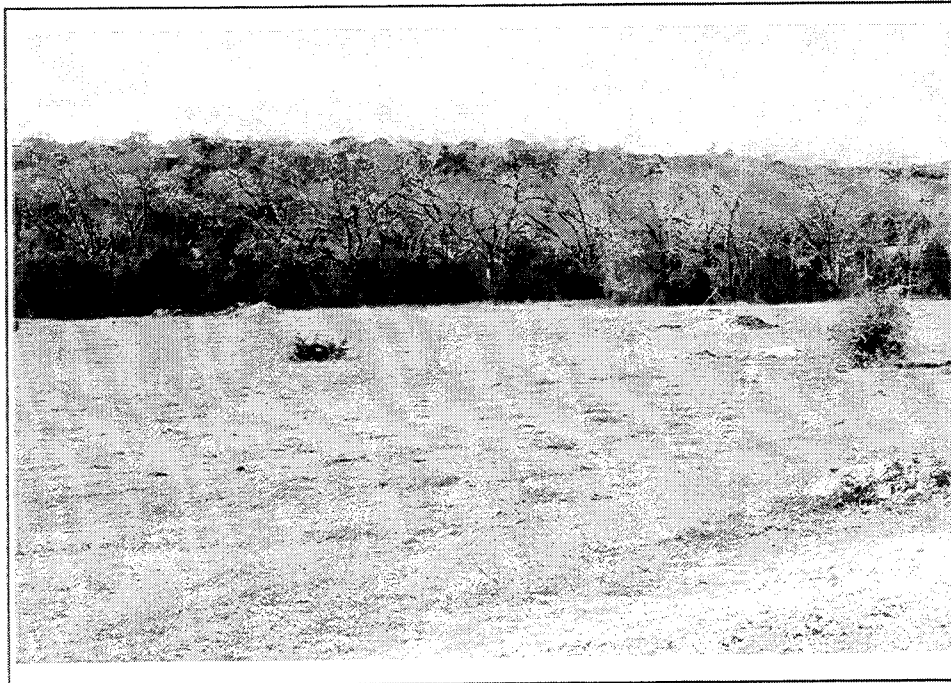


Figure 5.16 Overview of Site 41BL208, Looking Southwest.

400 m wide, series of lithic and burned rock scatters along a tributary of North Nolan Creek. A low density of debitage, bifaces, and burned rock was observed at various locations across the site. The overall site was estimated to be 45% disturbed by erosion, vehicular traffic, and cattle. The alluvial deposits along the tributary were noted as being greater than 1 m in depth. Since the redefined site was larger than 75,000 m², it was subsequently classified for management purposes as a lithic resource procurement (LRP) site.

On 21 December 1992, Turpin and Abbott revisited and reevaluated the site based on archeological and geomorphological observations. The site was divided into Subarea A (the limestone/colluvially mantled side slopes and lower bedrock benches) and Subarea B (the terrace surfaces and distal toeslopes). Subarea A was interpreted as a large lithic procurement area due to the presence of natural chert resources. A number of small camp loci containing refined lithics, some tools, and occasional, scattered

burned rocks were noted in the subarea. No areas of significant deposition were noted in Subarea A, which has been strongly affected by vehicular traffic and localized blading and borrowing activity. Apart from evaluation for significance in regards to the chert resource, no further work was recommended in Subarea A.

Subarea B was recorded as being composed of a level, relatively low alluvial terrace lying 2 to 2.5 m above the modern channel. The terrace is underlain by a complex series of alluvial deposits that were judged to represent at least three aggradational fills. Although no scarp is present, remnants of a former T₂ surface (underlain by Pleistocene-age sediments) was noted near the valley wall in several former agricultural fields in the eastern half of the site. Subarea B is primarily vegetated with dense juniper, oak, scrub, and greenbriar, but includes several large former agricultural fields on the eastern side of the site. The surface has also been impacted by moderate vehicle disturbance and floral/faunal turbation.

Because Subarea B had the potential to contain intact cultural deposits, shovel testing was recommended. The original recorders mentioned a rock overhang, and their site map (generally restricted to the valley slopes and floor) was artificially expanded to include this portion of the escarpment edge. This shelter was washed out and lacked any floor deposit.

In late January 1993, 190 shovel tests were excavated within Subarea B. Only 17 of these tests (9%) contained prehistoric cultural material. A total of 17 flakes were recovered from 0 to 10 cmbs, eight flakes were recovered from 10 to 20 cmbs, and five flakes were recovered from 20 to 30 cmbs. Three of the 17 tests contained burned rock only, with a total of three found at 10 to 20

cmbs and two found at 20 to 30 cmbs. No prehistoric cultural material was found below 30 cmbs. An additional three tests contained historic artifacts only.

Upon development of a research design focusing on the LRP sites, Abbott and Kleinbach returned to the site on 15 March 1993 and conducted a second reconnaissance to address LRP-specific issues. Two chert zones (CZ 1 and CZ 2) and a chertless expanse were identified. The lower slopes of Subarea A and all of Subarea B were subsumed by CZ 1. This zone was composed of diverse chert gravels deposited during the late Pleistocene and Holocene, with small amounts of colluvial chert cobbles derived from upslope (CZ 2). Chert Zone 2 occurred as three distinct areas (designated CZ

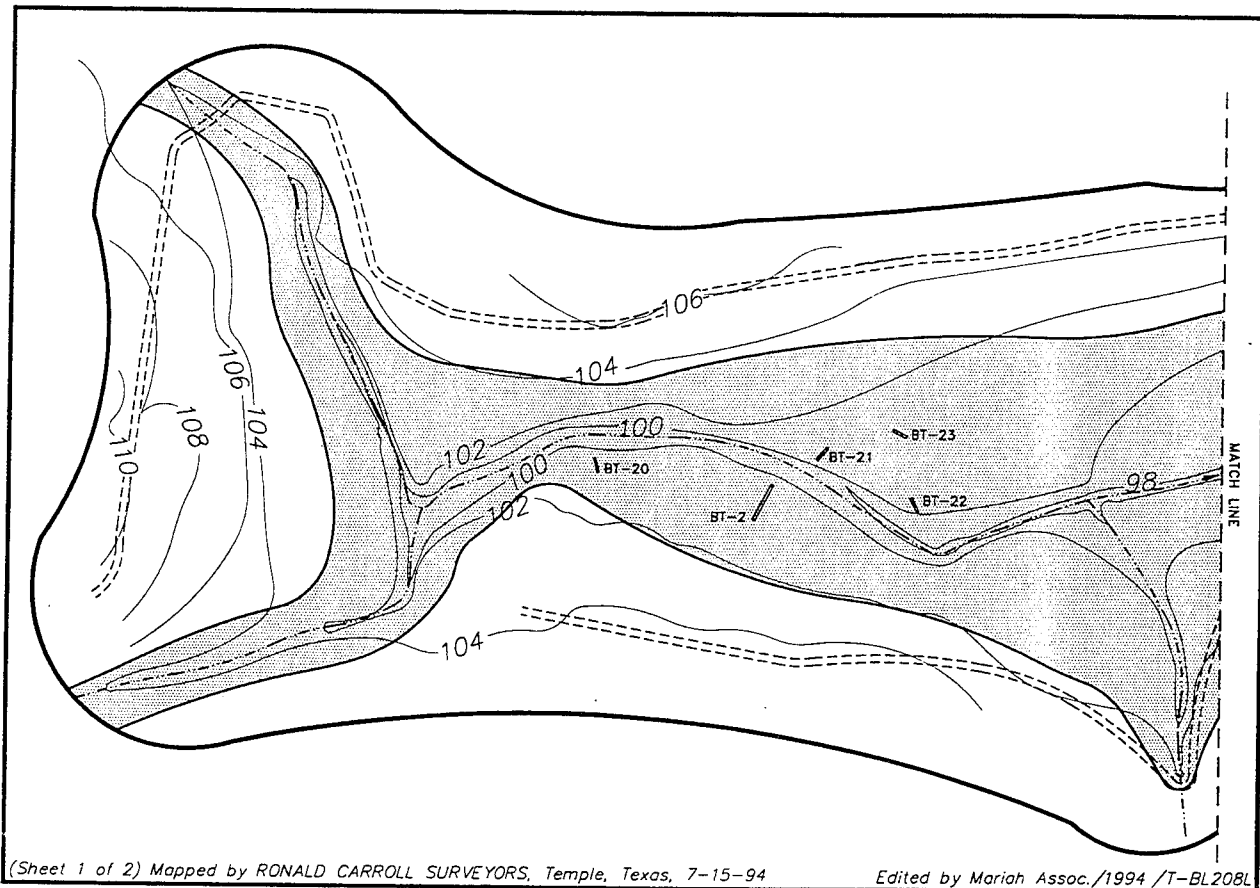


Figure 5.17A Site Map of 41B1208 (Western Portion).

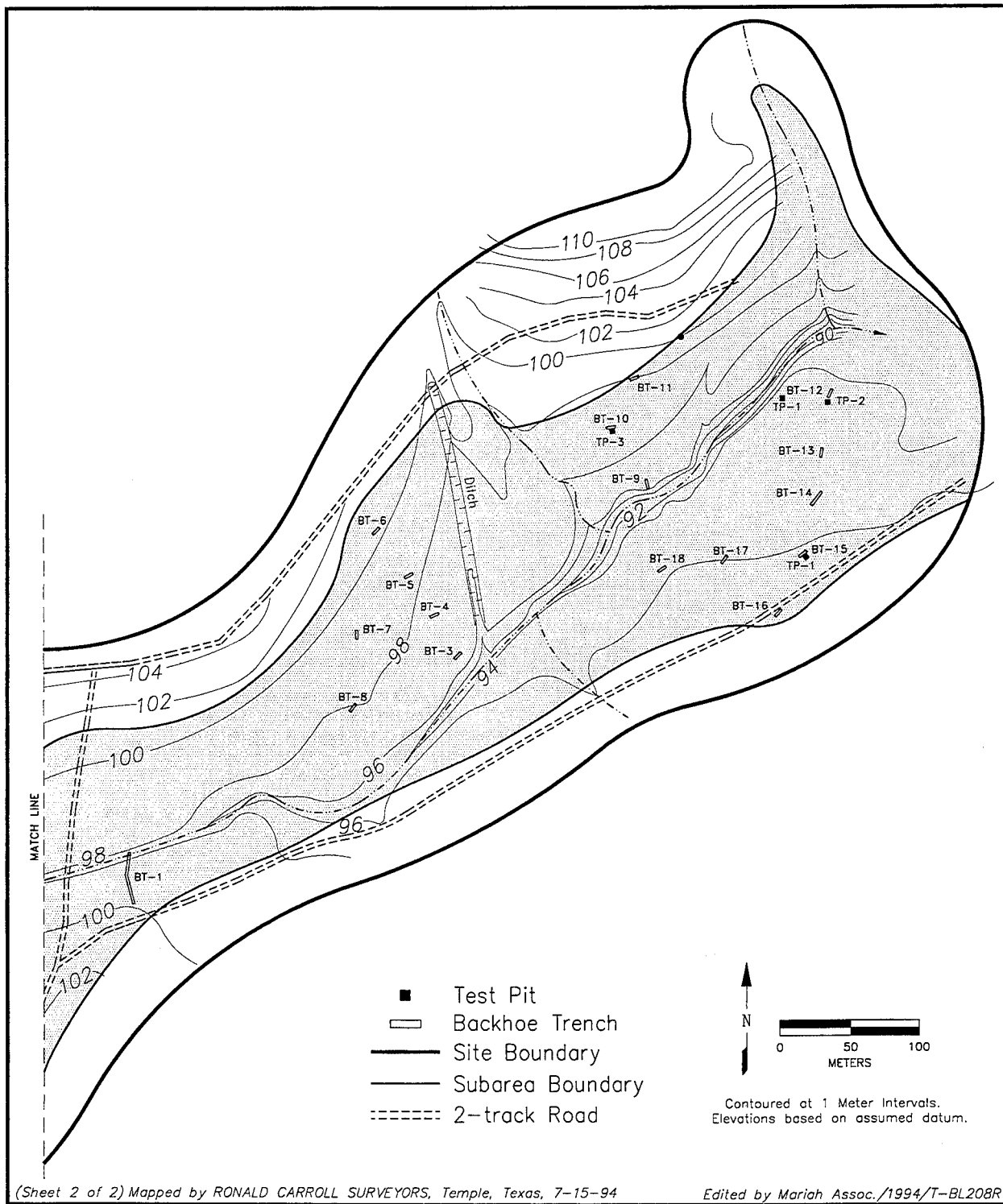


Figure 5.17B Site Map of 41BI208 (Eastern Portion).

2A, 2B, and 2C) of outcropping and colluvial chert on the valley walls. Two impact zones were defined in the nondepositional areas (Subarea A). Impact Zone 1 included three similar, noncontiguous areas, all of which contained ubiquitous damage (more than 75%) due to tracked vehicle traffic, military excavations, and scraping. These disturbances were evidenced by crushing, track ruts, berms, and vegetation destruction. Based on the amount and extent of impact, all of this zone had negligible research potential and was therefore excluded from resurvey.

Impact Zone 2 consisted of islands of erosional slopes bisected by a network of roads and trails. The zone was divided into five geographically separate subzones. Evidence of disturbance included push piles, crushed rock, ruts, berms, and irregular surfaces, with 25 to 50% of each subzone considered damaged. Based on impact observations, all five subzones had research potential and were resurveyed in order to determine whether artifactual evidence was ubiquitously distributed to be of value for addressing lithic procurement issues. Resurvey was conducted on 17 March 1993 and included 229 observations along 38 transects.

Based on the results of shovel testing and resurvey, the site was divided into eight management units. Management Unit 1 consisted of all of the depositional Subarea B. Although the results of shovel testing suggested that the upper 40 cm of Subarea B had extremely limited archeological research potential, the archeological potential of deeper Holocene deposits was uncertain. The subarea was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Four to eight 1 x 1 m of manually excavated test pits and four backhoe trenches were recommended for eligibility testing (Trierweiler 1994:A105-A112).

Management Units 2 through 8 were all delineated within the upland Subarea A. The cultural material present in these Management Units was judged to lack contextual integrity, with very

limited significance potential to address archeological issues, including lithic procurement. On this basis, no further management was recommended for these areas. However, the surficial cultural material in Management Units 2, 3, 5, and 7 was judged to have uncertain, but possibly high, potential to yield substantial data relevant to questions of lithic procurement and avoidance or further testing was recommended for these units (Trierweiler 1994:A105-A112).

5.4.1.3 New Work

A total of 23 backhoe trenches and four test pits (TPs 1 through 4) were excavated in Subarea B to examine the alluvial stratigraphy and prospect for buried cultural material (Table 5.34). Thirteen of these trenches were described in detail; the remaining ten trenches were similar to described trenches and were examined for buried cultural material only. Sixteen trenches were excavated into Holocene deposits on the T₁ surface, six on the (former) T₂ surface, and one at the interface of the Pleistocene and Holocene fills. Only three trenches, BT 12, 15, and 22, contained cultural material.

Backhoe trench 1 was located near the site center, south of the tributary on the T₁ surface. Trench 2 and BT 20 were placed on the T₁ surface south of the tributary and near the southwest margin of Subarea B. Trenches 3 to 6 were excavated about 30 m apart on a north to south line, about 50 m west of the ditch on the north side of the tributary. Trenches 3 and 4 were both on the T₁ surface and BT 5 and BT 6 were placed on the sloping remnant of the T₂ surface. Trenches 7 and 8 were excavated about 100 m west of the ditch. Trench 7 lies at the T₁/T₂ interface, whereas BT 8 was located on the T₁. Three trenches (BTs 9-11) were placed on the north side of the tributary, near the northeast portion of the subarea: BT 9 and BT 10 were placed on the T₁ surface with BT 11 on the former T₂ surface. Five trenches (BTs 12-16) were placed south of the tributary, near the southeast margin of the subarea. Trench 12 was 20 to 30 m south of the tributary, with each consecutively

numbered trench spaced 30 to 40 m apart, south to north. Trenches 12 to 14 were situated on the T₁ surface, whereas BTs 15 and 16 were excavated on the T₂ surface. Trench 17 was located on the T₂ surface about 75 m south of the tributary and 60 m west/southwest of BT 14. Trench 18, on the T₁ surface, was placed 50 to 60 m west of BT 17 and 60 to 70 m east/southeast of the tributary and a minor drainage confluence. Trench 19 was placed on the T₁, 20 to 25 m north of the tributary and west of a minor drainage. Trenches 21 to 23 were placed on the T₁ at the western portion of the subarea, north of the tributary. Trench 21 was near the cutbank edge, BT 22 was also near the terrace edge about 100 m southeast of BT 21. Trench 23 was placed 50 m east of BT 21.

Test pit 1 was offset from the south wall of BT 15. Test pit 2 was located 1 m south of BT 12. Test pit 3 was offset from BT 10. Test pit 4 was placed 20 to 25 m west/northwest of TP 2 and 10 to 15 m southeast of the tributary. Recovered cultural material is summarized in Table 5.35.

A "cache" of bifaces in Management Unit 7 was collected for documentation.

5.4.2 Results

5.4.2.1 Excavations on Alluvial Terraces

At least three and possibly four alluvial fills were encountered in the trenches. At present, only a single alluvial surface is identifiable on site. Upstream, this surface is relatively level and fairly narrow (typically less than 150 m). On the downstream (eastern) end of the site, the terrace expands into a relatively broad, sloping alluvial complex. Although a weakly expressed T₂ terrace may have formerly been present here, cultivation and construction of agricultural terraces has erased any remnant of a natural scarp and formed a single broad, sloping surface that extends from the valley wall to the channel margin on the eastern half of the site. Therefore, the references to the T₂ terrace contained in this document refer to a presumed former surface destroyed by cultivation.

Table 5.34 List of Treatment Units, 41BL208.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~30	1.6	375
1	BT 2	~20	1.6	~250
1	BT 3	~6	0.8	150
1	BT 4	~6	0.8	140
1	BT 5	~6	0.8	100
1	BT 6	~6	0.8	100
1	BT 7	~6	0.8	120
1	BT 8	~7	1.6	235
1	BT 9	~5	1.6	~250
1	BT 10	~6	0.8	160
1	BT 11	~7	0.8	350
1	BT 12	~7	1.6	~250
1	BT 13	~6	0.8	~180
1	BT 14	~12	1.6	300
1	BT 15	~7	1.6	~300
1	BT 16	~6	0.8	125
1	BT 17	~7	0.8	175
1	BT 18	~7	0.8	150
1	BT 19	~10	1.6	275
1	BT 20	~6	0.8	140
1	BT 21	~9	1.6	~750
1	BT 22	~9	1.6	230
1	BT 23	~7	0.8	~120
1	TP 1	1.0	1.0	80
1	TP 2	1.0	1.0	100
1	TP 3	1.0	1.0	100
1	TP 4	1.0	1.0	100

Sediments of probable Pleistocene age (e.g., the Jackson Alluvium of Nordt [1992] and associated colluvial and slopewash deposits) were encountered in seven trenches (BTs 5, 6, 7, 11, 15, 16, and 17) in the eastern half of the site. This material consisted of reddish brown to yellowish red sandy clay loam, and typically exhibited an A-Bt-Bk-K or A-Bw-Bk-K profile. This relatively thin material rests on a buried bedrock strath formed as the stream entrenched sometime in the late

Table 5.35 Artifact Recovery by Test Pit, 41BL208.

LEVEL	None					TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4									
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	11	49	0(0)	0	0	0	0	1(0.9)	0	0	2	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
1	0	0	0	0	0(0)	0	0	2	0	0(0)	0	0	4	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
2	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	2	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
3	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
4	0	0	0	0	0(0)	0	0	1	2	3(0.5)	0	0	1	2	3(0.5)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
5	0	0	0	0	0(0)	0	0	2	0	3(0.5)	0	0	2	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
6	0	0	0	0	0(0)	0	0	8	0	0(0)	0	0	8	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
7	0	0	0	0	0(0)	0	0	15	0	1(0.5)	0	0	15	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
8	0	0	0	0	0(0)	0	0	5	0	0(0)	0	0	5	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
9	0	0	0	0	0(0)	0	0	4	0	0(0)	0	0	4	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
10	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0(0)
TOTAL	0	0	11	49	0(0)	0	0	43	2	7(1.5)	0	0	43	2	7(1.5)	0	0	0	0	0(0)	0	0	0	0	0	0	0	4	0	0(0)

Pleistocene or early Holocene. In every observed case, this alluvial fill was situated in a former agricultural field and truncated to some degree by plowing and associated sheet and rill erosion. As a result, the lateral boundary between the Pleistocene and Holocene fills is obscure and can typically only be detected by trenching. Commonly, trenches excavated into Holocene sediments downslope of the Pleistocene fills are mantled with a thin (less than 20 cm) surficial layer of reddish brown slopewash. No cultural material was observed in association with the Pleistocene fill.

Holocene-age fills occur downslope of the Pleistocene fill on the eastern half of the site and underlie the whole of the T₁ terrace on the western half. At least two, and possibly three, Holocene fills are present. The most recent fill is probably equivalent to the Ford Alluvium or upper West Range Alluvium of Nordt (1992) and typically consists of strongly stratified clay loams and gravelly clays indicative of strongly fluctuating depositional energy. Deposits attributed to this fill were observed in BTs 3, 12, 13, and 20. Typically, the prevalence and mean size of stratified gravels tends to increase near the modern channel, and discrete lenticular chute channel fills become increasingly common within the fine-dominated matrix. In BT 12, the deposits exhibit a basal channel gravel overlain by particularly well-developed aggrading point bar sediments consisting of clay loam with abundant interspersed gravel stringers and thin lenticular gravelly chute fills. Distal exposures (e.g., BT 13, BT 20) exhibit much less interstratified gravel. This unit typically exhibits a thick, somewhat cumulic A-C or Ap-C profile. The modern stream is incised up to a meter into the bedrock, resulting in the formation of another buried bedrock strath beneath the Holocene fills.

Deposits interpreted as the West Range (e.g., late Holocene) fill were encountered in BTs 3, 4, 7, 8, 14, 18, 19, 21, 22, 23, and the upper portion of BTs 9 and 10. Typically, they consisted of thick (up to 2 m), slightly gravelly clay loam over a

basal gravelly loam. Soils were dark gray to black and sometimes exhibited a moderate to strong blocky structure with weak to moderately developed slickensides on the ped faces; however, other profiles did not show this strong shrink-swell evidence and were very poorly structured. The typical profile consisted of a surficial A or Ap underlain by a Bss-C or Bgss-C subsoil. A few very fine, soft carbonate masses were sometimes present in the lower B horizon, but filamental carbonate was almost entirely absent. Although a few dispersed chert clasts were typically present in the matrix, interbedded chute channels and gravelly stringers were largely absent. No in situ cultural material was observed.

In a few other trenches (BTs 1, 2, and the lower portion of BTs 9 and 10), deposits tentatively correlated with the Fort Hood fill were noted. These deposits were similar to the West Range fill, but were typically slightly lighter in color (grayish brown to brown) and exhibited a distinct Bk horizon containing common fine, soft masses of secondary carbonate. Subtle redox mottling was also frequently apparent below the Bk horizon. In contrast to the West Range deposits, relatively little evidence of appreciable vertisolic processes were observed in this fill except in gravelly basal muds representing channel or slough fills (e.g., BT 1, BT 9). The overall profile typically exhibited an A-AB-Bw-Bk-C sequence, while the truncated profiles observed in BT 9 and BT 10 exhibited a 2Bk or 2Bgk horizon. No cultural material was observed in the fill.

No features or cultural strata were detected in any of the trench profiles. Nevertheless, four hand-excavated test pits were placed into the alluvial deposits to examine them for cultural inclusions.

In TP 1, total recovery consisted of one small burned rock from Level 2 (Table 5.36). Various densities of unburned rocks, gravels, and natural chert were noted in each level.

Test pit 2 yielded the majority of the items recovered from the four test pits (Table 5.35).

Four or fewer lithics per level were found in the upper 30 cm, with a light amount of gravels and natural chert also noted. In Level 4, a Pedernales point, a core, and a few flakes and small burned rocks (0.5 kg) were recovered. This level also contained a heavy gravel and natural chert deposit. From 40 to 50 cmbs, artifact counts and gravel/chert densities decreased. A few flakes and small burned rocks were recovered, with a moderate amount of gravels and chert nodules noted. Eight lithics were found in Level 6. Although a slight decrease in gravels was noted 20 to 25 unburned rocks (10 kg) that were 5 to 10 cm in size, were present. A moderate gravel density continued into Level 7, with an increase in the number of larger unburned rocks (n=50, 20 kg). One small burned rock (0.5 kg) and several flakes were found in Level 7. From 70 to 100 cmbs, gravel density decreased with depth. Recovered cultural material included five flakes from Level 8 and four flakes from Level 9. Level 10 was culturally sterile. Virtually all of the cultural materials in TP 2 came from the gravelly chute deposits, suggesting that they are not in primary context. Indeed, many of the chert artifacts probably have natural rather than cultural origins.

No cultural material was recovered from the surface to 100 cmbs in TP 3.

Of ten levels excavated in TP 4, only three levels (Levels 1, 4, and 8) contained cultural material (i.e., one flake per level). A light amount of gravels was noted to 70 cmbs, with a gradual increase in density with depth. As in TP 2, cultural materials appeared to come from the gravelly chute deposits and are judged to be in secondary context. Moreover, human origins for the chert "artifacts" are suspect.

5.4.2.2 Biface "Cache"

The biface "cache" identified by Moore and Strychalski was relocated in Management Unit 7 and designated F 1 prior to recognition of its status as a probable recent collection. A datum stake was placed near the center of the feature and each item

Table 5.36 Nonprojectile Point Lithic Tools, AU 1, 41BL208.

Lithic Material	Tool Type									Total
	early stage biface	edge modified	end scraper	late stage biface	middle stage biface	other tool	side scraper	uniface	utilized flake	
01-HL Blue(l)	1	0	0	0	0	0	0	0	0	1
06-HL Tan	14	3	1	0	8	0	0	2	0	28
09-HL Tr Brown	1	0	0	2	1	0	0	0	0	4
10-HL Blue	0	0	0	1	0	1	0	0	0	2
22-C Mott/Flecks	2	0	0	0	1	0	0	0	0	3
Indet Lt Brown	2	1	0	0	7	0	0	0	0	10
Indet Lt Gray	0	0	0	0	0	0	1	0	0	1
Indet Misc	0	0	0	0	0	0	0	0	1	1
Indet Mottled	0	1	0	0	0	0	0	0	0	1
Total	20	5	1	3	17	1	1	2	1	51

collected was plotted on a sketch map in accordance with this datum. The entire feature was collected and each item was bagged and labeled separately. The feature consisted of identifiable tools (n=49) and debitage within a 5.1 m long x 3.70 m wide area. All items collected were fully exposed on the surface of a colluvial slope, except one. Half of this item, a biface was visible, with the remainder buried by 1 to 2 cm of soil. Seven chert types were identified, with the majority comprised of Heiner Lake Tan. The tight clustering of these artifacts is partially the result of grouping by previous investigators. One biface appeared to be broken in place, probably by vehicular traffic, but the overall context of the feature remains unknown.

The "cache" included a majority of early- and middle-stage bifaces consisting of a total of 49 tools (Table 5.36). The majority of the tools are made of local Southeast Range Heiner Lake varieties. Only two additional tools were recovered from the excavations: an early-stage

biface of Heiner Lake Translucent Brown, and a Pedernales dart point of Indeterminate Light Brown material (Table 5.37).

5.4.2.3 Site-Level Synthesis

Trenching of Management Unit 1 on 41BL208 revealed the presence of four alluvial fills, interpreted as the Ford, West Range, Fort Hood, and Jackson fills of Nordt (1992). The Holocene fills occur beneath a relatively narrow T₁ terrace that flanks the stream. The late Pleistocene Jackson fill is limited to the eastern half of the site, where broadening of the valley allowed for the establishment of agricultural fields. Little cultural material was detected in the Holocene alluvial fills, and what material was recovered appears to be in secondary context.

Although the low number and poor context of debitage recovered from 41BL208 obviates detailed inferences, a few basic observations about the assemblage merit mention. Four identified and five indeterminate debitage types were recovered (Table 5.38). With the exception of a single flake of Table Rock Flat chert, which is a considerable distance from its known source, all identified flakes are of locally available material (Heiner Lake Blue, Heiner Lake Tan, and Heiner Lake Translucent Brown). When the entire assemblage is considered, only Heiner Lake Tan occurs in expected frequency, but when the indeterminates are excluded, four identified types fall within the predicted distribution and Heiner Lake Tan is higher than expected (Table 5.39). The majority (60%) of indeterminate flakes are light brown, suggesting that many are probably also local Heiner Lake cherts, and no indeterminates were noted that are clearly from a different chert province. Over 57% of the flakes are smaller than 1.8 cm, and 79% exhibit no cortex (Table 5.40). However, the context of the material is so poor that these ratios are more likely to reflect hydraulic sorting of the material than to have any behavioral significance.

Table 5.37 Projectile Points, AU 1, 41BL208.

Lithic Material	Point Type		Total
	Pedernales	early stage biface	
09-HL Tr Brown	0	1	1
Indet Lt Brown	1	0	1
Total	1	1	2

5.4.3 Conclusions and Recommendations

Despite four test pits and more than 20 trenches excavated on this relatively large site, no in situ buried cultural material was detected. All cultural material observed was either resting on disturbed and/or eroded surfaces, contained in the plow zone of the cultivated fields, or incorporated in gravelly

Table 5.38 Debitage Recovery by Size and Material Type, AU 1, 41BL208.

Lithic Material	Size (cm)						Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types							
HL Blue	0	0	0	1	1	0	2
06-HL Tan	0	0	3	1	2	1	7
09-HL Tr Brown	0	0	0	0	2	0	2
22-C Mott/Flecks	0	0	0	0	0	1	1
28-Table Rock Flat	0	0	0	0	1	0	1
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>3</i>	<i>2</i>	<i>6</i>	<i>2</i>	<i>13</i>
Unidentified Types							
Indet Dk Brown	0	1	0	0	0	1	2
Indet Dk Gray	1	0	0	0	0	0	1
Indet Lt Brown	7	9	9	4	4	0	33
Indet Misc	0	0	0	1	0	0	1
Indet Mottled	0	0	0	1	1	0	2
Indet White	0	0	9	4	3	0	16
<i>Subtotal</i>	<i>8</i>	<i>10</i>	<i>18</i>	<i>10</i>	<i>8</i>	<i>1</i>	<i>55</i>
Total	8	10	21	12	14	3	68

Table 5.39 Binomial Statistic Results, AU 1, 41BL208.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue	2	5	17	less	0	6	expected
06-HL Tan	7	5	17	expected	0	6	more
09-HL Tr Brown	2	5	17	less	0	6	expected
22-C. Mott/Flecks	1	5	17	less	0	6	expected
28-Table Rock Flat	1	5	17	less	0	6	expected
Total Indet	55	5	17	more	na	na	na

Table 5.40 Debitage Cortex Characteristics by Material Type, AU 1, 41BL208.

Lithic Material	Partial Cortex			Total
	Abraded	Indeterminate	No Cortex	
Identified				
HL Blue	0	0	2	2
06-HL Tan	0	1	6	7
09-HL Tr Brown	0	0	2	2
22-C. Mott/Flecks	1	0	0	1
28-Table Rock Flat	0	0	1	1
<i>Subtotal</i>	<i>1</i>	<i>1</i>	<i>11</i>	<i>13</i>
Unidentified				
Indet Dk Brown	0	0	2	2
Indet Dk Gray	0	0	1	1
Indet Lt Brown	3	3	27	33
Indet Misc	0	3	1	4
Indet Mottled	2	0	0	2
Indet White	2	0	14	16
<i>Subtotal</i>	<i>7</i>	<i>6</i>	<i>42</i>	<i>55</i>
Total	8	7	53	68

chute deposits interstratified in the late Holocene fills. Because of the paucity and questionable context of artifactual material, the investigated portion of the site has minimal potential to contribute to research design questions identified in Ellis et al. (1994).

On the basis of the above, we judge Management Unit 1 of 41BL208 to be ineligible for inclusion in the NRHP and recommend no further management for this portion of the site.

On the basis of previous work, Management Units 4, 6, and 8 are judged to be ineligible for inclusion in the NRHP. No further management is recommended for these units.

The archeological potential of Management Units 2, 3, 5, and 7 remains uncertain, but may be high enough to yield substantial data relevant to questions of lithic procurement. Avoidance was previously recommended for these units (Trierweiler 1994:A108-A112) and is unchanged by the results of work reported here.

5.5 SITE 41BL339

5.5.1.2 Previous Work

5.5.1 Introduction

In late December 1993 and early January 1994, Mariah conducted test excavations at site 41BL339. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.5.1.1 Location and Description

Site 41BL339 is located in the East Cowhouse area of Fort Hood. The site subsumes two Holocene terraces, a colluvial toeslope, and a bedrock slope (Figure 5.18). One tank trail and an unnamed tributary bisect the site, with bulldozer cuts evident along the western third of the site (Figure 5.19). Across much of the site, the tributary flows roughly parallel to, and along the base of, the colluvial toeslope. Maximum site dimensions are 360 x 100 m (about 36,000 m², or 7.8 acres).

Turpin and Ensor first recorded the site on 5 December 1983. The site was situated on the south bank of Cowhouse Creek. The area was considered a mussel shell collecting station and/or habitation site. A possible hearth and burned rock midden remnant were noted, and debitage, burned rocks, mussel shell, and a biface were observed scattered over the surface. Bulldozing, vehicular traffic, and vandalism were judged to have impacted 22% of the site. An unsigned and undated map depicts protective measures for a portion of the site. Mussel shell exposed in a bulldozer cut at an old creek crossing, a burned rock mound south/southeast of this cut, and burned rocks and debitage visible in a road are all noted on the map. Construction of log cribs on the existing road and establishing an alternate route were recommended as protective measures.

On 19 October 1992, Abbott and Mehalchick revisited and reevaluated the site based on geomorphological and archeological observations.



Figure 5.18 Overview of Site 41BL339, Looking East.

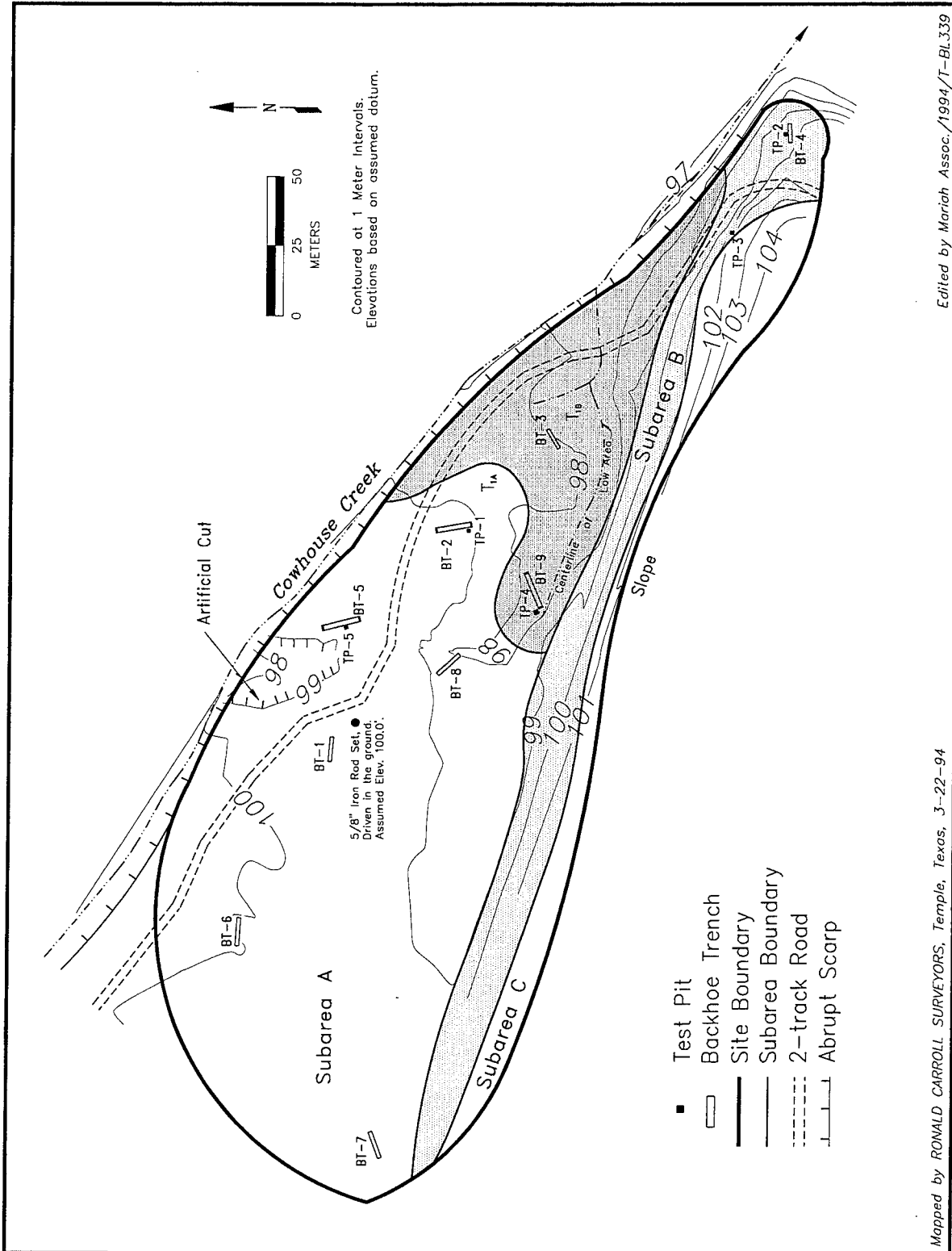


Figure 5.19 Site Map of 41BL339.

The site was divided into Subareas A (Holocene terraces), B (colluvial toeslope), and C (bedrock slope). Two distinct alluvial surfaces were noted. The site exhibited a relatively complex alluvial architecture due to the presence of a linear swale, occupied by a very small tributary channel in the eastern half of the site, that formed part of the lower (T_{1B}) surface and served to isolate the higher T_{1A} surface from the valley wall.

Since the site was inundated during the late 1991-early 1992 flood, a silty sediment drape up to 30 cm thick covered the entire surface of Subarea A, which measured approximately 32,700 m². No material was noted on the surface, with the cutbank and bulldozer cuts affording limited exposure. One flake was observed 250 cmbs in the Cowhouse Creek cutbank and the Holocene deposit was observed to be at least 3 m thick. Bulldozing, vehicular traffic, flooding, erosion, and possibly cultivation had impacted 30% of this subarea. Based on previously recorded material and depth of the Holocene deposit, shovel testing was warranted.

Subarea B consisted of a narrow colluvial toeslope, averaging 260 m long x less than 5 m wide, wedged between Subareas A and C. The easternmost edge of this subarea, roughly 40 x 10 m, was the only section that contained potentially in situ archeological deposits. Burned rocks and mussel shell were observed about 30 cmbs in an exposure along the base of the toeslope. Shovel testing was recommended for this portion of Subarea B.

Subarea C, approximately 1,800 m², was covered with a thin colluvial mantle (less than 10 cm thick), with a light amount of debitage scattered across the surface. This subarea did not have the potential to contain intact, buried deposits and no further management was recommended.

On 28 and 29 October 1992, a crew excavated 34 shovel tests in Subarea A and two shovel tests in Subarea B. In Subarea A, the recent flood drape, 5 to 50 cm thick, was removed and discarded prior

to excavation of the shovel tests. Of the 34 tests, eight (24%) were positive. Cultural material (including mussel shell, burned rocks, debitage, and an untyped dart point) was recovered from surface to 50 cmbs. Four positive shovel tests were located near the site center within a 60 m x 20 m area. Both tests in Subarea B contained cultural material (burned rocks and debitage), with maximum depth of recovery of 70 cmbs. A Montell point was found on the surface.

Based on testing results and the potential for deeply buried deposits in Subarea A, formal testing was recommended to determine NRHP eligibility. A minimum testing effort of four to six 1 x 1 m of manually excavated test pits and four backhoe trenches in Subarea A, along with two manually excavated test pits in Subarea B was recommended (Trierweiler 1994:A134-A139).

5.5.1.3 New Work

Nine backhoe trenches (BTs 1 through 9) and four test pits (TPs 1, 2, 4, and 5) were excavated in Subarea A (as originally defined) (Table 5.41). However, examination of the exposed deposits revealed that BT 4 and TP 2 were actually excavated into colluvium and should be considered part of Subarea B. Four of the trenches were excavated to examine the stratigraphy of the site, and were fully described. The remaining five trenches were excavated to prospect for cultural material and to determine site boundaries. These latter trenches were inspected, but no formal description of the stratigraphic column was completed. Of the described trenches, two were placed on the higher (T_{1A}) surface, one on the lower (T_{1B}) surface, and one on a colluvial toeslope. Three of the remaining trenches were also cut into the T_{1A} surface, while two others were cut across the ephemeral drainage at the base of the slope that graded into the T_{1B} surface. All of the alluvial surfaces were capped by fresh, laminated flood drape sediments up to 30 cm thick. Trenching on both alluvial surfaces was discontinued when the elevated water table adjacent to Belton Lake was encountered at depths

ranging from about 2 to 4 m below surface (mbs). For analytical purposes, recovered materials were assigned to one of three analytical units (AUs), consisting of the higher alluvial surface (AU 1), the lower alluvial surface (AU 2) and the colluvial toeslope (AU 3). Recovered cultural materials from each AU are summarized in Table 5.42.

Trench 1 was located on the T_{1A} (higher) terrace on the western half of the site. Trench 2 was placed on the T_{1A} surface along the edge of an oak/pecan grove that yielded strong positive return during shovel testing. Trench 5 was located on the T_{1A} terrace 40 m east of BT 1, and 5 to 10 m east of a bulldozer cut that extended from the cutbank of Cowhouse Creek to the road. Trench 6 was placed on the T_{1A} surface at the northwest corner of the site and about 60 m northwest of BT 1. Trench 8 was placed 30 to 40 m southwest of BT 2 on the beveled edge of the higher surface adjacent to the T_{1B} swale.

5.5.2 Results

5.5.2.1 Excavations in the T_{1A} Surface

The sediments exposed in various T_{1A} trenches were markedly different in color, suggesting that they probably represent two distinct fills. Trench 1 revealed a 4 m accumulation of clay loam and silty clay loam that graded down into gravelly clay. The upper 140 cm of the trench was thoroughly moist due to infiltrating water, and no structure was apparent. The sediment was relatively dry between 140 cm and the top of the water table at approximately 380 cm. Below 140 cm, the sediments exhibited a weak, coarse, subangular blocky structure and abundant carbonate filaments. Colors ranged from dark grayish brown to black (10YR 3/1 to 10YR 4/2) in the upper wetted zone, to distinctly yellowish to olive in color (10YR 5/4 to 2.5Y 5/4) below. No obvious unconformities were noted, but it is possible that the color change represents a temporal break. With the possible exception of a few fragmentary mussel shells in the upper 30 cm, no cultural material was detected in the trench.

Table 5.41 List of Treatment Units, 41BL339.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~7.5	1.4	370
1	BT 2	~9.0	1.4	300
1	BT 5	~10.0	1.4	320
1	BT 6	~12.0	1.4	260
1	BT 8	~8.0	0.7	270
1	TP 1	1.0	1.0	210
1	TP 5	1.0	1.0	190

2	BT 3	~8.25	1.4	250
2	BT 7	~8.0	0.7	190
2	BT 9	~12.0	1.4	200
2	TP 4	1.0	1.0	190

3	BT 4	~6.0	0.7	120
3	TP 2	1.0	1.0	100
3	TP 3	1.0	1.0	90

Trench 6 exhibited a similar profile, which is tentatively interpreted as the Fort Hood fill of Nordt (1992). Because no cultural material was detected in association with this fill, no radiocarbon determinations were undertaken that could have supported this interpretation.

Trench 2 was excavated to a depth of 320 cm, but rapidly filled with 50 cm of water after excavation. The sediments exposed by the trench consisted of very dark gray to dark grayish brown (10YR 3/1 to 10YR 4/2) clay loam that graded into dark grayish brown (10YR 4/2) sandy clay loam below 2 m, and exhibited an AC-Ab-Bwb-Bkb-C profile. One possible unconformity, mantled with cultural material and a small burned rock feature, was noted at approximately 70 cmbs at the transition from the Bw horizon to the Bk horizon. At this point in the profile, soil structure changed from weak subangular blocky to a more pronounced coarse subangular blocky structure, and secondary carbonate appeared in the form of abundant filaments. A possible burned rock feature

Table 5.42 Artifact Recovery by Test Pit, 41BL339

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4					TEST PIT 5														
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)					
surface	0	0	0	1	0(0)	0	0	0	0	0(0)	0	0	0	0	4(0.2)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
1	0	0	0	0	0(0)	0	0	0	0	3(0.3)	0	0	0	0	6(0.5)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
2	0	0	0	0	0(0)	2	0	8	1	3(0.3)	0	0	10	0	6(0.5)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
3	1	2	1	0	2(0.1)	13	0	19	1	13(1)	1	0	10	1	3(0.2)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
4	1	1	0	1	4(0.5)	4	0	0	0	5(0.3)	1	0	12	2	6(1)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
5	17	1	0	0	1(0.1)	0	0	5	2	5(0.1)	0	0	8	1	3(0.5)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
6	10	8	4	0	4(0.5)	2	0	20	0	19(2.3)	0	0	8	1	2(0.5)	0	0	0	0	1(0.2)	1	0	0	0	0	1(0.1)	0	0	0	0	0(0)				
7	16	3	3	0	11(2)	8	0	14	1	10(1)	3	1	1	0	8(1)	0	1	0	0	0(0)	1	0	0	0	0	0(0)	0	0	0	0	0(0)				
8	2	10	19	0	76(29)	4	0	6	0	23(4.5)	0	0	4	0	4(0.5)	0	0	1	0	1(0.1)	1	0	0	0	0	0(0)	2	0	0	0	1(0.1)				
9	1	15	8	0	15(5)	0	0	2	0	2(2.3)	0	0	0	1	1(0.1)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
10	0	8	1	0	3(1.5)	2	0	0	0	1(0.1)	0	0	0	0	0(0)	0	0	0	0	0(0)	4	1	0	1	0	2(0.1)	5	0	2	0	7(0.5)				
11	9	2	5	0	2(1)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	24	0	1	0	24(3.2)				
12	5	9	5	0	3(1)	0	0	0	0	0(0)	0	0	1	0	6(0.3)	0	0	1	0	2(0.1)	66	0	2	0	0	5(0.3)	66	0	2	0	5(0.3)				
13	3	5	1	0	0(0)	2	0	2	0	1(0.1)	0	0	0	0	0(0)	3	0	8	0	3(0.2)	657	46	19	1	0	11(4)	657	46	19	1	11(4)				
14	2	0	2	0	1(0.1)	0	0	0	0	0(0)	14	4	23	2	22(8.5)	29	0	3	0	3(0.3)	29	0	3	0	0	3(0.3)	29	0	3	0	3(0.3)				
15	9	5	0	0	0(0)	0	0	0	0	0(0)	1	6	18	0	55(12)	1	2	2	0	4(0.5)	1	2	2	0	0	4(0.5)	1	2	2	0	4(0.5)				
16	0	1	3	3	0(0)	0	2	1	0	2(0.5)	2	2	8	1	38(21)	8	0	0	0	3(0.2)	8	0	0	0	0	3(0.2)	8	0	0	0	3(0.2)				
17	5	7	1	0	2(0.5)	0	2	0	0	4(0.8)	20	8	24	2	62(28)	1	5	5	0	4(0.3)	1	5	5	0	0	4(0.3)	1	5	5	0	4(0.3)				
18	0	2	1	0	4(0.8)	0	4	1	0	1(0.3)	0	0	0	0	0(0)	0	2	0	0	1(0.3)	0	2	0	0	0	0(0)	0	2	0	0	0(0)				
19	0	2	0	0	2(0.3)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
20	0	4	1	0	1(0.3)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
21	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0(0)				
TOTAL	0	0	0	1	0(0)	81	85	55	4	131(42.7)	35	0	74	5	81(11.9)	5	1	53	6	37(4.5)	40	21	85	5	191(70.7)	800	56	37	2	65(9.6)	800	56	37	2	65(9.6)

straddled this contact. Similar sediments, tentatively interpreted as the West Range fill of Nordt (1992), were exposed in BT 8, while slightly sandier, lighter brown material originally interpreted as the same fill were exposed in BT 5. Subsequent radiocarbon data obtained from a feature in BT 5 suggests that this sandier fill may in fact represent an inset of upper West Range alluvium lapped on to an older core of lower West Range.

Within BT 2, scattered cultural material occurred from 20 to 200 cmbs with a possible burned rock feature 70 to 90 cmbs. Test pit 1, offset from the west wall of BT 2 over the possible feature, was excavated to 210 cmbs. The upper 20 cm consisted of the recent flood drape. Below this drape, an abundance of lithics, bone, mussel shell umbos, and/or burned rocks was detected (see Table 5.42). From 20 to 50 cmbs, five to ten artifacts were recovered per level. The artifact count doubled in Level 6, and a hearth (F 2) was encountered from 62 to 84 cmbs.

Feature 2 consisted of a basin shaped, slab lined hearth bisected by BT 2 (Figure 5.20). Maximum dimensions of the remaining portion of the feature were 60 x 50 x 22 cm. The feature consisted of two to three layers of stacked slabs, with the outermost rocks sloping inward toward horizontally laid rocks. The hearth was composed of 60 to 70 burned rocks (30 kg) averaging 12 x 10 x 3 cm in size. Lithics, mussel shell umbos, bone fragments, and scattered burned rocks were found in association. Of note is an area of burned rocks in the northwest quadrant of the unit from 69 to 80 cmbs. Maximum dimensions of this concentration were 35 x 30 cm. Based on similarity in construction to, and association with, F 2, this may be a separate hearth that extends into the north and west test pit walls. Alternatively, the concentration may represent a "clean out" pile associated with maintenance of F 2.

Below F 2, from 90 to 200 cmbs, the typical artifact array was present in every level. Modest counts are relatively consistent throughout these

levels except for a noticeable increase in mussel shell from 140 to 160 cmbs. Although the stratigraphic relationship is unclear, this may correspond to an intact, buried occupation (represented by F 4) uncovered in TP 5 from 130 to 146 cmbs. No cultural material was recovered from Level 21.

Cultural material was exposed at various depths from 40 to 300 cmbs in BT 5. Most noteworthy was a mussel shell lens 130 to 150 cmbs and a rock-lined hearth (F 1) in the west wall profile. Feature 1 is situated about 5.5 m north of the southwest corner of BT 5, measured 58 cm long, and extended from 290 to 300 cmbs. Nine burned rocks, laying relatively flat and surrounded by a charcoal-flecked matrix, were exposed in profile. Of these, four were angular and five were tabular in shape. The rock size ranged from 2 to 3 cm in thickness and 5 to 10 cm in length. A charcoal sample removed at 293 to 297 cmbs from the southern end of the feature yielded a corrected age of 1460 ± 60 BP, indicating that the fill corresponds to the upper West Range alluvium of Nordt (1992). The feature was profiled and videotaped, but was not excavated.

Test pit 5 was offset from the west wall profile of BT 5 above the mussel shell lens in the northern part of the trench (Figure 5.21). Excavation of the unit was terminated at 190 cmbs. The upper 30 cm of deposit consisted of the recent flood drape. From 30 to 90 cmbs, less than three artifacts were recovered per level (Table 5.42). A burned root was exposed along the east wall at 55 cmbs and extended to 150 cmbs. Artifact counts rose slightly in Levels 10 and 11 and a sharp increase occurred in Levels 12, 13, and 14. Most of these artifacts were small, angular burned rocks and shell umbos scattered across the unit. This material is probably associated with F 3, a mussel shell midden that extended from 130 to 146 cmbs (Figure 5.22).

Approximately 380 shells, 5 bone fragments, 11 burned rocks (4 kg), and 17 flakes were recovered from F 3 in TP 5 (Figure 5.5.6). The feature

extended beyond the unit on all sides, and estimated feature dimensions are at least 2.5 x 2 m, based on exposed material in the trench profiles. In addition, a shallow depression, 139 to 146 cmbs, was delimited along the eastern half of the unit. Maximum dimensions of this depression were 60 x 50 x 7 cm, with thickness averaging 4 to 5 cm. A few burned rocks, one biface, 10 to 15 bone fragments, and 100 to 120 mussel shells (approximately six layers thick) were found within this depression. Charcoal flecking, although observed within the entire feature fill, was most noticeable in the depression. It was not determined whether the depression was a cultural or natural anomaly. The remainder of Level 15, below F 3 from 146 to 150 cmbs, contained a few burned rocks, flakes, and umbos. A light amount of cultural material was found in Levels 16 to 19.

A Scallom arrow point was recovered from the general surface of the site. Three tools of two local chert types were recovered from AU 1 consisting of a preform, an end scraper and a uniface (Table 5.43).

Debitage from eleven described chert types and six indeterminate chert categories was recovered from TP 1 and TP 5 on the T_{1A} terrace (Table 5.44). Although the recovered sample is only of moderate size (92 specimens), approximately 53% of the total were identifiable types. When the total assemblage was considered, only indeterminate types occurred in greater than expected frequencies, Fort Hood Gray and Cowhouse Mottled/Flecked occurred in less than expected frequencies, and the remainder of identified types (Cowhouse White, Anderson Mountain Gray, Heiner Lake Tan, Fossiliferous Pale Brown, Fort Hood Yellow, Heiner Lake Translucent Brown, Heiner Lake Blue, Gray-Brown-Green, and Owl Creek Black) occur in expected frequencies (Table 5.45). If the indeterminate cherts are excluded from analysis, then all identified types occur in expected frequencies (Table 5.46). No individual chert type or group of types dominates the small but diverse assemblage, which includes elements from all four principal chert provinces.

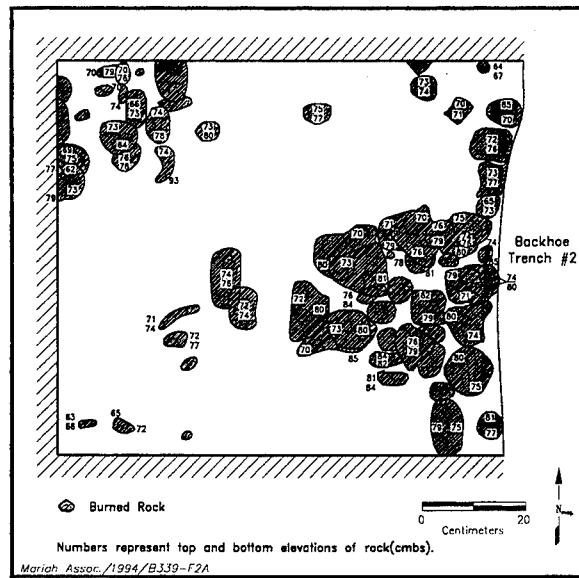


Figure 5.20 Plan of F 2, TP 1, at 84 cmbs, 41BL339.

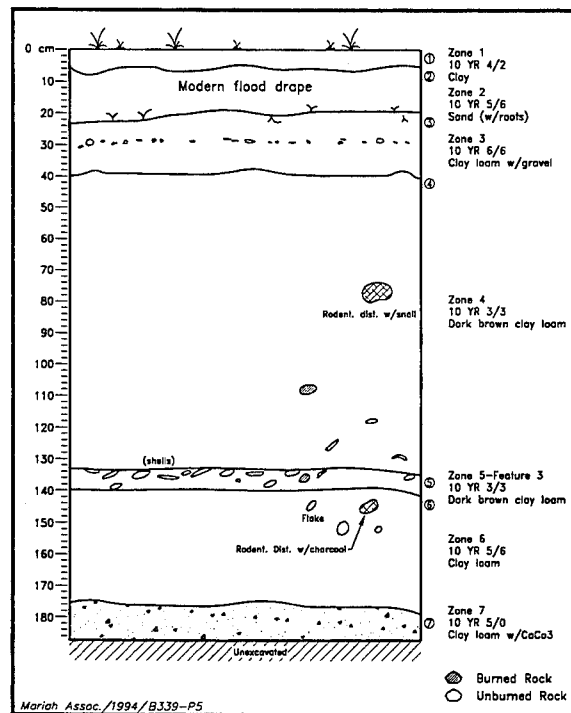


Figure 5.21 Profile of North Wall, TP 5, 41BL339.

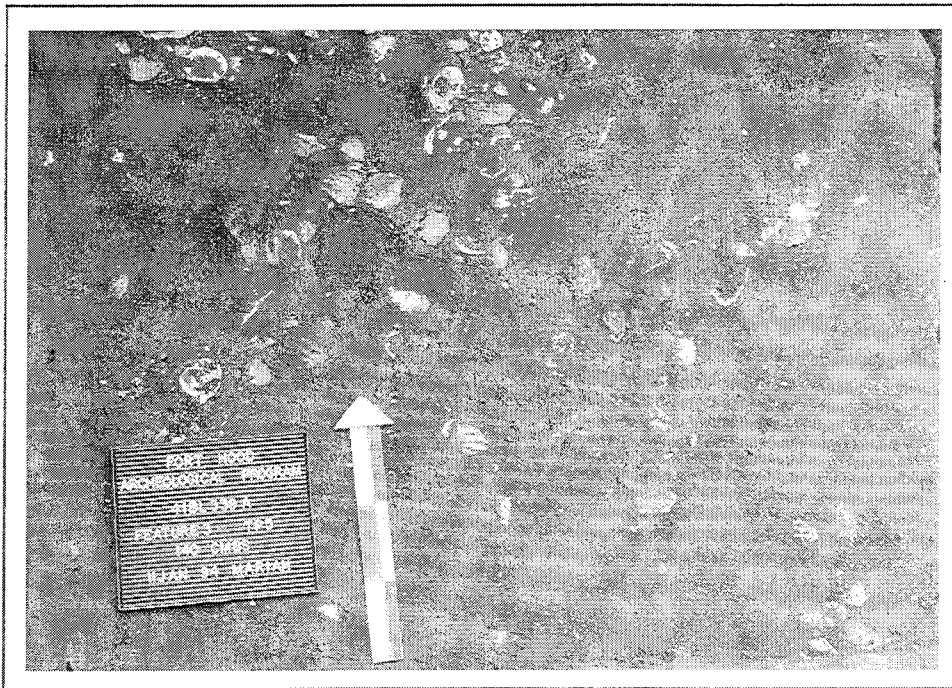


Figure 5.22 Planview of F 3, Site 41BL154, Looking North.

A relatively high proportion of recovered flakes (70%) falls into size categories between 1.2 cm and 5.2 cm in size (see Table 5.44), indicating that early to middle stage reduction was commonly conducted. However, the majority of the flakes (84%) are completely decortified (Table 5.45), suggesting that the size distribution may be a deceptive indicator of stage reduction. Despite being located on Cowhouse Creek, 33% of the cortified flakes exhibit surface abrasion, indicating that streambed procurement was not an important source for the material exhibiting early stage reduction.

A variety of faunal remains, including deer, turtles, shellfish, and variably sized, unidentified mammals were recovered from AU 1 (Table 5.47). The shellfish fauna (primarily from feature 3) were very diverse, with a minimum of eight different species characteristic of a range of flow conditions recovered. This suggests that a relatively long span of Cowhouse Creek was collected to yield the mussels represented in F 3. If F 3 represents a

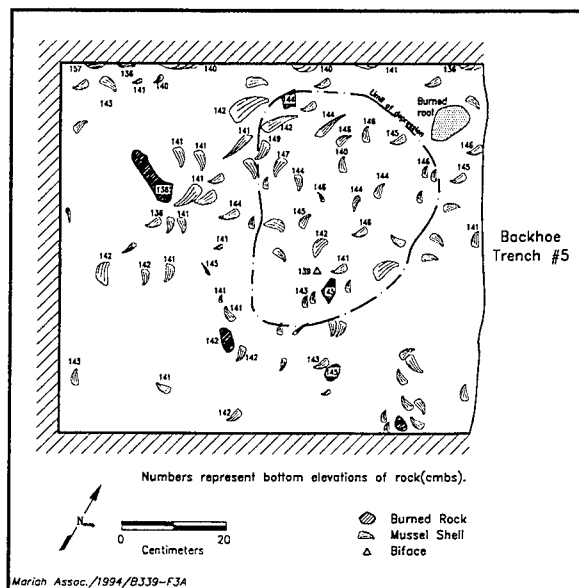


Figure 5.23 Plan of F 3, TP 5, at 140 cmbs, 41BL339.

single event, as it appears, this suggests that shellfish utilization probably required a relatively intense investment of time and labor to gather a sufficient number of individuals to feed the party.

5.5.2.2 Excavations on the T_{1B} Surface

Trench 3 was situated on the T_{1B} surface 40 to 50 m southeast of BT 2. The profile of BT 3 revealed about 3 m of uniform dark grayish brown clay loam below approximately 15 cm of recent flood deposits. The Ab horizon was approximately 45 cm thick and exhibited a weak granular structure. The underlying C horizon exhibited no structure or carbonate, and was saturated below 210 cmbs. No cultural material was observed in the trench.

Trench 9 was excavated across the axis of the slough, at the rear of the terrace, on a surface equivalent to the T_{1B}. The trench was located 10 m northeast of the colluvial slope, 30 m southwest of BT 2, and bisected a small, unnamed tributary occupying the lower end of the swale (T_{1B} surface). Burned rocks and debitage were observed on the surface adjacent to BT 9, and a Scallorn point (Late Prehistoric) was collected. The trench exposed a profile similar to that of BT 3, differing primarily in that considerable stratified cultural material was observed. A burned rock midden was exposed at about 150 to 160 cmbs in the trench floor near the western edge and extended into the north wall profile.

Test pit 4, excavated to 190 cmbs, was offset from BT 9 over the densest burned rock in the profile. A 10 cm thick flood drape capped the unit and Levels 2 through 5 were culturally sterile. From 50 to 90 cmbs, one to two artifacts were found per level, with no cultural material recovered 90 to 110 cmbs (Table 5.5.2). A very light amount of artifacts was found in Levels 12 and 13. From 130 to 140 cmbs, 16 artifacts were recovered, with a noticeable increase at 135 cmbs. From 140 to 170 cmbs, the burned rock midden (F 4), was encountered. This feature directly overlays a burned rock hearth (F 4A) from 165 to 179 cmbs.

Table 5.43 Projectile Points, AU 1, 41BL339.

Lithic Material	Tool Type			Total
	end scraper	preform	uniface	
10-HL Blue	0	0	1	1
18-C Mottled	1	1	0	2
Total	1	1	1	3

Feature 4 covered the entire unit and extended beyond the limits of the test pit. The overwhelming majority of burned rocks were angular and averaged 5 cm in size. Cultural material recovered from the test pit included about 100 flakes, 15 to 20 burned and unburned bone fragments, 15 to 20 mussel shell umbos, and 100 to 120 burned rocks (41.5 kg). Charcoal and 300 to 350 snails were also noted.

Feature 4A is a hearth that was exposed within F 4 at 165 cmbs (Figures 5.24 and 5.25). The hearth was delimited by larger burned rocks (some tabular) than those composing F 4 and a very distinct charcoal-rich fill. The hearth was mostly confined to the western half of the unit; however, it did extend outside the test pit. Maximum dimensions were 65 x 63 x 14 cm. In cross-section, the hearth was basin-shaped and the matrix was laden with charcoal. The burned rocks averaged 5 to 10 cm in size and were three layers thick. Construction was extremely compact and consisted of 62 burned rocks (28 kg). An umbo, four burned and unburned bone fragments, 5 to 10 flakes, and 20 to 30 snails were recovered from the feature fill. A radiocarbon age on charcoal collected from the feature matrix yielded a corrected age of 1270 ± 120 BP. Other carbonized wood fragments recovered from flotation were identified as live oak, suggesting that oak was at least one of the fuels used to fire the feature. It is unclear whether F 4A is an internal feature within the midden (F 4) or a discrete entity. If the latter

is the case, other similar features may be potentially buried in the same stratigraphic context.

Below F 4 and F 4A, one small burned rock was found 180 to 190 cmbs. At 140 cmbs, the matrix was very moist and became more saturated and mucky with depth due to the presence of the water table at about 200 cmbs.

Trench 7 was excavated in the slough at the western margin of the site near the base of the colluvial slope. It straddled a gentle swale that ran parallel to the slope, and is best considered associated with the T_{1B} surface. Here, a 20 cm thick flood drape unit overlays a very strongly blocky grayish brown (2.5Y 5/2) clay loam that contained a considerable quantity of carbonate filaments and fine, soft nodules. This lower sediment represents a fill that cannot be correlated with anything else on the site, and it is unclear if it represents primary terrace deposits or muds deposited in the slough. The presence of carbonate nodules suggests that the unit is older than the sediments on the rest of the site. However, it is possible that the nodules formed relatively quickly due to groundwater discharge from the adjacent slope, and therefore do not reflect the rate of regional soil development. A few flakes and burned rocks were detected in the walls, but no features or discrete cultural strata were noted.

A total of five tools and two cores were recovered from AU 2 (Table 5.48) representing seven different chert types, all locally available.

Debitage from ten described cherts and six indeterminate chert categories was recovered from TP 4 on the lower terrace (Table 5.49). Slightly less than half of the flakes were typed. Only indeterminates occurred at greater than expected frequencies; Fossiliferous Pale Brown, Cowhouse Mottled/Flecked, and Fort Hood Yellow occurred at expected frequencies; and Heiner Lake Tan, Heiner Lake Translucent Brown, Heiner Lake Blue, Fort Hood Gray, Gray-Brown-Green, Owl Creek Black, and Cowhouse Mottled occurred at less than expected frequencies. When the

Table 5.44 Debitage Recovery by Size and Material Type, AU 1, 41BL339.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
02-C White	0	0	0	5	2	1	0	8
03-AM Gray	0	0	2	1	0	0	0	3
06-HL Tan	0	0	1	0	2	3	0	6
07-Foss Pale Brown	0	0	1	0	0	1	1	3
08-FH Yellow	0	0	0	2	1	1	0	4
09-HL Tr Brown	0	0	1	1	1	1	0	4
10-HL Blue	0	0	0	0	2	3	0	5
14-FH Gray	0	0	0	0	0	1	0	1
15-Gry/Brn/Gm	0	0	0	0	5	1	0	6
17-Owl Crk Black	0	2	1	2	0	2	0	7
22-C Mott/Flecks	0	0	0	0	0	2	0	2
<i>Subtotal</i>	<i>0</i>	<i>2</i>	<i>6</i>	<i>11</i>	<i>13</i>	<i>16</i>	<i>1</i>	<i>49</i>
Unidentified Types								
Indet Dk Brown	0	3	1	2	0	0	0	6
Indet Dk Gray	0	0	0	0	1	0	0	1
Indet Lt Brown	4	3	4	11	2	3	1	28
Indet Lt Gray	0	0	0	2	0	0	0	2
Indet Misc.	0	0	1	2	0	0	0	3
Indet White	0	2	0	0	1	0	0	3
<i>Subtotal</i>	<i>4</i>	<i>8</i>	<i>6</i>	<i>17</i>	<i>4</i>	<i>3</i>	<i>1</i>	<i>43</i>
Total	4	10	12	28	17	19	2	92

indeterminate cherts were excluded, Heiner Lake Tan is overrepresented, and all other types occur in expected numbers (Table 5.50).

Over 87% of the recovered flakes fall into size categories larger than 1.2 cm, and only 64% are completely decortified (Table 5.51). This suggests that intermediate stage reduction was most commonly practiced. Of the flakes that do bear cortex, only 20% clearly do not exhibit abrasive damage, indicating that utilization of streambed chert was probably practiced much more frequently

Table 5.45 Binomial Statistic Results, AU 1, 41BL339.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	8	3	13	expected	1	9	expected
03-AM Gray	3	3	13	expected	1	9	expected
06-HL Tan	6	3	13	expected	1	9	expected
07-Foss Pale Brown	3	3	13	expected	1	9	expected
08-FH Yellow	4	3	13	expected	1	9	expected
09-HL Tr Brown	4	3	13	expected	1	9	expected
10-HL Blue	5	3	13	expected	1	9	expected
14-FH Gray	1	3	13	less	1	9	expected
15-Gry/Brn/Grn	6	3	13	expected	1	9	expected
17-Owl Crk Black	7	3	13	expected	1	9	expected
22-C Mott/Flecks	2	3	13	less	1	9	expected
Total Indet	43	3	13	more	na	na	na

than in the assemblages from the other two Analytical Units on the site.

Faunal material recovered from AU 2 was dominated by elements representing deer and unidentifiable, deer-sized mammals (Table 5.52). The only other identified vertebrate remains was a carapace fragment from a soft-shelled turtle. A diverse suite of bivalves was also recovered, although at much lower frequencies than represented in AU 1. A minimum of six different species, representing a range of aquatic environments, are represented in the assemblage, suggesting that the mussels were collected from more than one locality.

5.5.2.3 Excavations on the Colluvial Toeslope

Trench 4 was situated on a gently inclined colluvial toeslope at the northeastern margin of the site, about 5 m east of the road and 5 to 10 m south of Cowhouse Creek. Although this location was originally mapped as part of Subarea A, it proved to be a strath bench overlain by colluvium and should rather be considered part of Subarea B (the colluvial toeslope). The trench revealed approximately 120 cm of colluvial and slopewash

sediment resting on bedrock. An A-AB-Bk-C-R profile was developed in the deposits, which consisted of gravelly and sandy loams that graded from dark brown to very pale brown with depth (10YR 3/3 to 10YR 7/4). The A and AB horizons exhibited weak granular to massive structure, the Bk horizon exhibited a weak medium blocky structure, and the C horizon retained much of its primary bedding. Carbonate occurred as filaments and fine nodules in the Bk horizon and dissolution of primary limestone clasts was noted in the Bk and C horizons. Moderate amounts of dispersed cultural material (burned limestone and mussel shell fragments) were apparent in the profile at depths of up to 90 cmbs. Much of this material is probably in secondary context.

Test pit 2, excavated to 100 cmbs, was offset from the north wall of BT 4, where the greatest amount of cultural material was visible in profile. Modern flood drape deposits occurred in the upper 10 cm. Cultural material, including lithics, mussel shell, and burned rocks, was found in every level from 10 to 100 cmbs (Table 5.42). Two buried cultural strata may be present based on peak artifact frequencies. The first occurs at 20 to 30 cmbs, where a modest assemblage of lithics and shell

umbos was recovered along with some small burned rocks (n=13, 1 kg). The second occupation is buried 50 to 80 cmbs, with a combined total of more than 80 artifacts recovered from these three levels. Of these, more than a third were lithics, more than half were burned rocks (n=52, 7.8 kg), and the remainder were shell umbos. The majority of burned rocks were angular (average 5 cm in size), with six or seven larger, tabular pieces noted. In all levels, the rocks were generally scattered across the unit, forming no apparent pattern. In addition, all levels contained a heavy amount of pea-sized gravel. Although cultural material was diffuse, the two cultural zones appear to be reasonably discrete. Artifact ubiquity within discrete buried zones, and in particular, the presence of large, tabular burned rocks, suggests that at least some cultural materials are in primary context, perhaps along with some redeposited material.

Test pit 3 was an isolated unit placed between the two positive shovel tests dug in 1992, and was excavated to 90 cmbs. This test pit contained cultural material from 0 to 90 cmbs (Table 5.42). Artifact counts ranged from small to modest in any given level, with lithics and burned rocks comprising the vast majority of the recovered items. All burned rock was less than 3 cm in size, and for any given level, the total burned rock weight never exceeded 1 kg. A moderate density of unburned limestone (small to medium sized) was present from 0 to 40 cmbs. In Level 5, bedrock was encountered in the southwest corner and rock size ranged from medium to large. At 60 cmbs, bedrock covered the south half of the unit and the number of large, immovable rocks increased with depth. Based on the light artifact frequency, the high density of unburned rock, and the relative steepness of the toeslope, the cultural material in TP 3 appears to be in secondary context.

Eleven tools and one multiple platform core were recovered from AU 3 (Table 5.53). Of note is the present of a tool classified as an adze. The tools represent seven chert types with only the locally

Table 5.46 Debitage Cortex Characteristics by Material Type, AU 1, 41BL339.

Lithic Material	Partial Cortex			No Cortex	Total
	Abraded	Unabraded	Indeterminate		
Identified Types					
10-HL Blue	0	0	0	5	5
02-C White	0	0	0	8	8
03-AM Gray	0	0	0	3	3
06-HL Tan	0	1	1	4	6
07-Foss Pale Brown	2	0	0	1	3
08-FH Yellow	0	0	0	4	4
09-HL Tr Brown	1	0	0	3	4
14-FH Gray	1	0	0	0	1
15-Gry/Brn/Grn	0	0	0	6	6
17-Owl Crk Black	0	1	0	6	7
22-C Mott/Flecks	0	0	2	0	2
<i>Subtotal</i>	<i>4</i>	<i>2</i>	<i>3</i>	<i>40</i>	<i>49</i>
Unidentified Types					
Indet Dk Brown	0	0	0	6	6
Indet Dk Gray	0	0	0	1	1
Indet Lt Brown	1	1	3	23	28
Indet Lt Gray	0	0	1	1	2
Indet Misc.	0	0	0	3	3
Indet White	0	0	0	3	3
<i>Subtotal</i>	<i>1</i>	<i>1</i>	<i>4</i>	<i>37</i>	<i>43</i>
Total	5	3	7	77	92

available Heiner Lake Tan and Indeterminate Light Brown having more than one specimen. The other lithic material types represent a cross-section of the types on the base, but all of which are in proximity to the East Cowhouse area.

Debitage from ten described cherts and four indeterminate chert categories was recovered from TP 2 and TP 3 on the colluvial toeslope (Table 5.54). The percentage of flakes identified was

Table 5.47 Faunal Recovery, AU 1, 41BL339.

	Element										Total	
	Cranium	Fused 3&4th metata	Indeterminate	Metapodial	Peripheral	Permanent tooth	Proximal Phalange	Proximal Sesamoid	Carapace	left		right
Vertebrates												
Artiodactyla	0	2	0	3	0	0	1	1	0	0	0	7
Kinosternidae	0	0	0	0	1	0	0	0	0	0	0	1
Mammalia	0	0	1	0	0	0	0	0	0	0	0	1
Mammalia (med/lg)	0	0	72	0	0	0	0	0	0	0	0	72
Mammalia (sm/med)	1	0	0	0	0	0	0	0	0	0	0	1
Odocoileus sp.	0	0	0	0	0	1	0	0	0	0	0	1
Testudinata	0	0	0	0	0	0	0	0	1	0	0	1
Vertebrata	0	0	57	0	0	0	0	0	0	0	0	57
Total	1	2	130	3	1	1	1	1	1	0	0	141
Bivalves												
Amblema plicata	0	0	0	0	0	0	0	0	0	114	112	226
Ambleminae	0	0	0	0	0	0	0	0	0	11	5	16
Cyrtonaias sp.	0	0	0	0	0	0	0	0	0	7	3	10
Lampsilinae	0	0	0	0	0	0	0	0	0	43	34	77
Lampsilis hydiana	0	0	0	0	0	0	0	0	0	9	5	14
Lampsilis sp.	0	0	0	0	0	0	0	0	0	12	4	16
Lampsilis teres	0	0	0	0	0	0	0	0	0	2	1	3
Quadrula apiculata	0	0	0	0	0	0	0	0	0	4	6	10
Quadrula houstonensis	0	0	0	0	0	0	0	0	0	4	12	16
Quadrula sp.	0	0	0	0	0	0	0	0	0	12	10	22
Toxolasma sp.	0	0	0	0	0	0	0	0	0	0	2	2
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	5	14	19
Tritigonia verrucosa	0	0	0	0	0	0	0	0	0	42	56	98
Unionacea	0	0	0	0	0	0	0	0	0	15	10	25
Total	0	0	0	0	0	0	0	0	0	280	274	554

relatively low (roughly 24%), rendering the utility of analysis suspect. Only indeterminates occurred at greater than expected frequencies; Heiner Lake tan cherts occurred at expected frequencies, and all other identified varieties (Anderson Mountain Gray, Fossiliferous Pale Brown, Fort Hood Yellow, Heiner Lake Translucent Brown, Heiner Lake Blue, Fort Hood Gray, Gray-Brown-Green, Owl Creek Black, and Cowhouse Mottled/Flecked) occurred at less than expected frequencies. When

the indeterminate cherts were excluded, Heiner Lake Tan is overrepresented, and all other types occur in expected numbers (Table 5.55).

Over 84% of the recovered flakes fall into size categories between 0.5 cm and 2.6 cm, and approximately 75% are completely decortified (Table 5.56). This suggests that intermediate stage reduction was most commonly practiced. Of the 24% of flakes that do bear cortex, only 13%

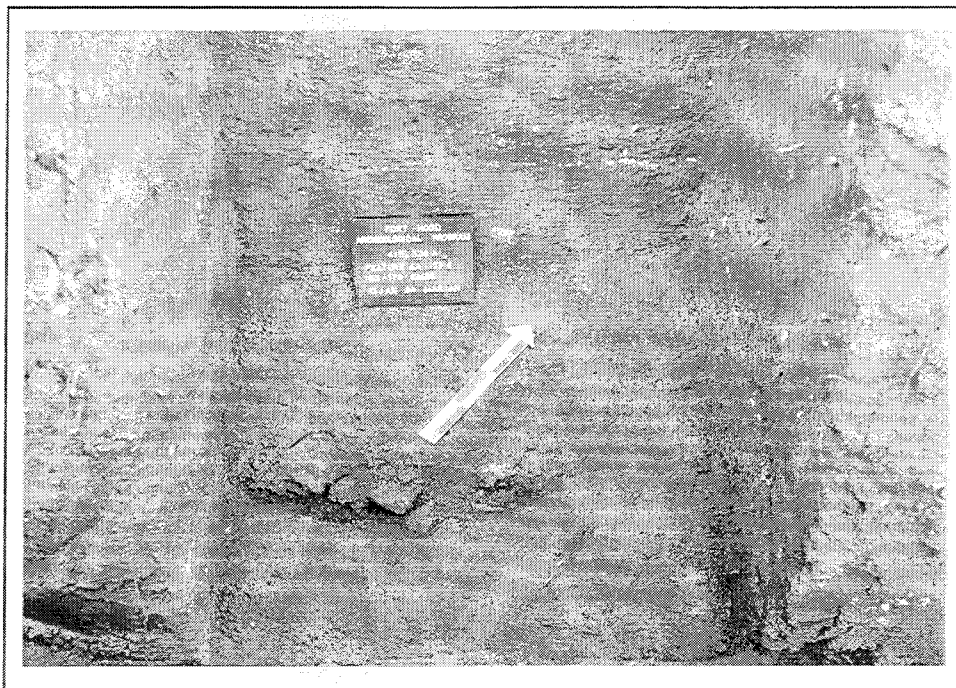


Figure 5.24 Feature 4A, 41BL339, Looking North-Northwest.

clearly exhibit abrasive damage, indicating that utilization of streambed chert was not particularly important despite the proximity of the Cowhouse channel.

One bone from a relatively large (deer-sized), indeterminate mammal and 33 mussel shells representing at least four species were recovered from Subarea C (Table 5.57). Once again, the bivalve species represent a variety of environments, ranging from clear, still pools to moderately flowing water over a sandy or muddy bottom, indicating that a variety of habitats in the Cowhouse channel are represented.

5.5.2.4 Site-Level Synthesis

At least two, and as many as four, Holocene alluvial fills are preserved on the site. The lower alluvial surface is underlain by dark grayish brown cumulic overbank deposits and exhibits an A-C profile. This material appears to have been deposited by both Cowhouse Creek and the

unnamed tributary flowing through the site, and is probably equivalent to the recent Ford fill of Nordt (1992). However, a radiocarbon age from F 4A, located at depth in the swale, yielded an age of approximately 1250 BP, indicating that the encasing sediment is of upper West Range age. Although the stratigraphic relationship is unclear, it appears that the thin Ford-age tributary deposits are probably inset into an eroded swale formed in upper West Range alluvium.

Two possible stacked units were recorded in BT 2 on the upper alluvial surface. Similar stratified deposits were noted in BT 5 and BT 8. This material is clearly of late Holocene age, and is tentatively interpreted as the upper or upper and lower West Range. Only one radiocarbon age is available from this suite of deposits. This age (approximately 1450 BP) was obtained from charcoal associated with F 1 in BT 5, and supports the interpretation of an upper West Range age for the fill. The lower profiles exposed in BT 1 and BT 6 were markedly more yellow and less

melanized than the overlying sediments and the sediments in BTs 2, 5, and 8, suggesting that yet another fill might be represented. Whether the sediments exposed in BT 1 and BT 6 also represent the West Range fill, the earlier Fort Hood fill, or both, is currently unclear. In either case, they are also almost certainly of Holocene age. No cultural material was detected in association with this older fill.

The debitage recovered from the site is composed of a diverse assemblage of material that includes chert varieties typical of all four chert provinces. Although slightly more Southeast Range varieties are represented, the assemblage is not clearly dominated by any single chert province. Interestingly, the adjacent Cowhouse channel appears to be one of the less important sources, possibly indicating that chert was not always readily available from the bed due to channel configuration and/or flow depth. This supposition is supported by the relatively low frequency of abrasion on recovered cortical flakes. The size distribution of flakes from all three analytical units suggests that lithic reduction activity was not concentrated in the latter stages, as would be expected at a habitation site, but rather resulted in production of medium-sized, frequently partially cortified flakes indicative of an intermediate stage of lithic reduction.

Only one projectile point, a Scallorn arrow point of Indeterminate white chert, was collected from the surface of the site. The nondebitage chipped stone assemblage indicates that a wide variety of lithic resources was utilized with no distinct tendency for one chert province or another.

Faunal remains recovered from the site reflect utilization of deer and aquatic resources, particularly a variety of mussels that represent several different riverine sub-environments.

5.5.3 Conclusions and Recommendations

Extensive archeological remains are preserved at a variety of depths in the more recent (West Range)

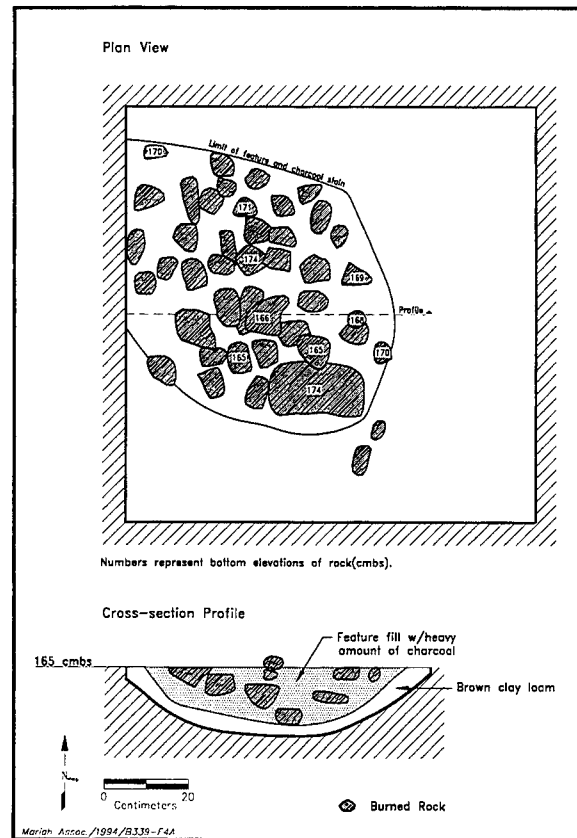


Figure 5.25 Plan and Cross-section of F 4A, TP 4, at 165 cmbs, 41BL339.

Table 5.48 Lithic Tools, AU 2, 41BL339.

Lithic Material	Core Type				Total
	multiple platform	edge modified	late stage biface	uniface	
06-HL Tan	0	0	0	1	1
14-FH Gray	1	0	0	0	1
15-Gry/Brn/Gm	1	0	0	0	1
22-C Mott/Flecks	0	0	0	1	1
Indet Dk Brown	0	1	0	0	1
Indet Dk Gray	0	0	1	0	1
Indet Mottled	0	0	0	1	1
Total	2	1	1	3	7

fill underlying the T_{1A} terrace and beneath the T_{1B} surface. Radiocarbon ages suggest that both identified components date from roughly 1500 to 1200 BP, the Late Archaic. The suite of recovered materials suggests that data relevant to a number of the technological and subsistence questions outlined in Ellis et al. (1994) are present in the alluvial fills. There are also indications that the material is dispersed through relatively rapidly accreting, fine-grained alluvium that has a strong potential to allow isolation of a number of relatively short-term, discrete occupation surfaces, and that may allow for the recovery of detailed behavioral data. Colluvial deposits revealed in BT 4 contain a considerable quantity of dispersed cultural material of unknown age. Although it is unclear whether all of this material is in secondary context, much has clearly been introduced and/or reworked by colluvial processes.

On the basis of the above, we judge 41BL339 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory for Central Texas in general and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. The site requires measures to protect it against: (1) traffic by tracked and wheeled vehicles, (2) subsurface disturbance by vandalism, and (3) subsurface disturbance by mechanical and manual excavations performed by military personnel during training activities. Cultural material was detected at a wide variety of depths in the West Range fill, and the upper portion of the site is vulnerable to intentional and unintentional disturbance. There is also a possibility that some information may be lost through lakeshore erosion, but because the site is situated on the upper end of Lake Belton and rests well above normal water level, this possibility is not considered a major concern.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of

Table 5.49 Debitage Recovery by Size and Material Type, AU 2, 41BL339.

Lithic Material	Size (cm)						Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types							
10-HL Blue	0	0	0	0	2	1	3
06-HL Tan	0	0	3	5	3	0	11
07-Foss Pale Brown	0	0	1	0	0	0	1
08-FH Yellow	0	0	0	1	0	0	1
09-HL Tr Brown	0	0	3	1	2	0	6
14-FH Gray	0	0	2	2	1	0	5
15-Gry/Brn/Grn	0	0	0	2	1	0	3
17-Owl Crk Black	0	0	2	0	1	0	3
18-C Mottled	0	0	0	0	3	0	3
22-C Mott/Flecks	0	0	0	2	0	0	2
<i>Subtotal</i>	0	0	11	13	13	1	38
Unidentified Types							
Indet Dk Brown	0	1	1	6	2	1	11
Indet Dk Gray	0	0	1	0	2	0	3
Indet Lt Brown	2	0	2	3	4	1	12
Indet Lt Gray	0	3	1	2	0	0	6
Indet Misc.	2	3	1	0	6	0	12
Indet Mottled	0	0	0	1	0	0	1
<i>Subtotal</i>	4	7	6	12	14	2	45
Total	4	7	17	25	27	3	83

data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). At this point, the high rate of faunal recovery (particularly shellfish) suggests that the site may be good for investigation of prehistoric economic strategies. Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery should include backhoe trenches and manual excavation of several blocks,

Table 5.50 Binomial Statistic Results, AU 2, 41BL339.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	11	3	13	expected	1	8	more
07-Foss Pale Brown	1	3	13	less	1	8	expected
08-FH Yellow	1	3	13	less	1	8	expected
09-HL Tr Brown	6	3	13	expected	1	8	expected
10-HL Blue	3	3	13	expected	1	8	expected
14-FH Gray	5	3	13	expected	1	8	expected
15-Gry/Brn/Grn	3	3	13	expected	1	8	expected
17-Owl Crk Black	3	3	13	expected	1	8	expected
18-C Mottled	3	3	13	expected	1	8	expected
22-C Mott/Flecks	2	3	13	less	1	8	expected
Total Indet	45	3	13	more	na	na	na

and should involve a relatively high level of effort due to the depth, extent, and high levels of preservation of well stratified cultural materials. At least three block excavations should be undertaken to examine deposits in the (presumed) West Range fill underlying portions of the T_{1A} surface and Ford fill beneath portions of the T_{1B} surface. One block at least 60 m² is recommended adjacent to BT 2 to examine the living surface associated with F 2 and the possible deeper living surfaces suggested by burned rock exposed in the trench wall. Another similarly sized block is recommended next to BT 5 to examine the living surface associated with the mussel shell feature partially examined in TP 5 and the deeper surface associated with F 3. A third block of approximately 40 m² is recommended next to BT 9 to examine the broader association of F 4 and 4A. Given an average depth of at least 200 cm in all three blocks, mitigation could involve a volume of as much as 320 m² of manual excavation. Although there is the possibility that some overburden could be removed mechanically, particularly adjacent to BT 9 on the T_{1B} surface. Additional backhoe trenches should be excavated during the mitigation effort to provide exposures for geoarcheological studies of landscape processes and to allow for stratigraphic correlation of block excavations to natural stratigraphy.

Table 5.51 Debitage Cortex Characteristics by Material Type, AU 2, 41BL339.

Lithic Material	All Cortex		Partial Cortex			No Cortex	Total
	Abraded	Unabraded	Abraded	Unabraded	Indeterminate		
Identified Types							
10-HL Blue	0	0	0	0	0	3	3
06-HL Tan	0	0	0	1	0	10	11
07-Foss Pale Brown	0	0	0	0	1	0	1
08-FH Yellow	0	0	0	1	0	0	1
09-HL Tr Brown	0	0	2	0	0	4	6
14-FH Gray	0	0	0	0	1	4	5
15-Gry/Brn/Grn	0	0	0	0	0	3	3
17-Owl Crk Black	0	0	0	0	1	2	3
18-C Mottled	0	0	0	0	3	0	3
22-C Mott/Flecks	0	0	0	0	0	2	2
Subtotal	0	0	2	2	6	28	38
Unidentified Types							
Indet Dk Brown	1	1	4	0	2	3	11
Indet Dk Gray	0	0	2	0	1	0	3
Indet Lt Brown	0	1	2	2	2	5	12
Indet Lt Gray	0	0	0	0	1	5	6
Indet Misc.	0	0	0	0	1	11	12
Indet Mottled	0	0	0	0	0	1	1
Subtotal	1	2	8	2	7	25	45
Total	1	2	10	4	13	53	83

Table 5.52 Faunal Recovery, AU 2, 41BL339.

	Element								
	Indeterminate	Permanent tooth	Radius	Rib	Carapace	Vertebra	left	right	Total
Vertebrates									
Artiodactyla	0	0	1	0	0	0	0	0	1
Mammalia	2	0	0	0	0	0	0	0	2
Mammalia (med/lg)	10	0	0	1	0	2	0	0	13
Odocoileus sp.	0	1	0	0	0	0	0	0	1
Trionyx sp.	0	0	0	0	1	0	0	0	1
Vertebrata	3	0	0	0	0	0	0	0	3
Total	15	1	1	1	1	2	0	0	21
Bivalves									
Ambleminae	0	0	0	0	0	0	2	0	2
Lampsilinae	0	0	0	0	0	0	0	3	3
Lampsilis hydiana	0	0	0	0	0	0	6	6	12
Lampsilis sp.	0	0	0	0	0	0	3	1	4
Lampsilis teres	0	0	0	0	0	0	1	0	1
Leptodea fragilis	0	0	0	0	0	0	1	0	1
Quadrula apiculata	0	0	0	0	0	0	2	0	2
Toxolasma texasensi	0	0	0	0	0	0	1	1	2
Tritogonia verrucosa	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	0	16	12	28

Table 5.54 Debitage Recovery by Size and Material Type, AU 3, 41BL339.

Lithic Material	Size (cm)							Total
	<0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
10-HL Blue	0	0	1	0	0	0	0	1
03-AM Gray	0	0	2	2	0	0	0	4
06-HL Tan	0	0	2	0	4	2	0	8
07-Foss Pale Brown	0	0	0	0	1	2	0	3
08-FH Yellow	0	0	0	1	1	0	0	2
09-HL Tr Brown	1	0	0	1	2	0	0	4
14-FH Gray	0	0	0	1	1	1	0	3
15-Gry/Brn/Gm	0	0	0	0	1	0	0	1
17-Owl Crk Black	0	0	1	1	0	0	0	2
22-C Mott/Flecks	0	0	0	0	0	1	1	2
Subtotal	1	0	6	6	10	6	1	30
Unidentified Types								
Indet Dk Brown	1	5	0	2	1	0	0	9
Indet Dk Gray	0	1	1	0	0	0	0	2
Indet Lt Brown	3	14	15	15	17	6	0	70
Indet White	1	3	4	5	1	1	0	15
Subtotal	5	23	20	22	19	7	0	96
Total	6	23	26	28	29	13	1	126

Table 5.53 Lithic Tools, AU 3, 41BL339.

Lithic Material	Core Type		Tool Type						Total
	multiple platform	adze	end scraper	graver	late stage biface	side scraper	uniface	utilized flake	
06-HL Tan	0	0	0	1	0	1	0	1	3
08-FH Yellow	0	0	0	1	0	0	0	0	1
09-HL Tr Brown	0	1	0	0	0	0	0	0	1
22-C Mott/Flecks	0	0	0	0	1	0	0	0	1
23-C Mott/Banded	0	0	0	0	0	0	0	1	1
Indet Dk Brown	0	0	0	0	0	1	0	0	1
Indet Lt Brown	1	0	1	0	1	0	1	0	4
Total	1	1	1	2	2	2	1	2	12

Table 5.55 Binomial Statistic Results, AU 3, 41BL339.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	4	5	18	less	0	7	expected
06-HL Tan	8	5	18	expected	0	7	more
07-Foss Pale Brown	3	5	18	less	0	7	expected
08-FH Yellow	2	5	18	less	0	7	expected
09-HL Tr Brown	4	5	18	less	0	7	expected
10-HL Blue	1	5	18	less	0	7	expected
14-FH Gray	3	5	18	less	0	7	expected
15-Gry/Brn/Grn	1	5	18	less	0	7	expected
17-Owl Crk Black	2	5	18	less	0	7	expected
22-C Mott/Flecks	3	5	18	less	0	7	expected
Total Indet	96	5	18	more	na	na	na

Table 5.56 Debitage Cortex Characteristics by Material Type, AU 3, 41BL339.

Lithic Material	Partial Cortex					Total
	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	
Identified Types						
10-HL Blue	0	0	0	1	0	1
03-AM Gray	0	1	0	3	0	4
06-HL Tan	0	1	0	6	1	8
07-Foss Pale Brown	0	1	0	2	0	3
08-FH Yellow	0	0	0	2	0	2
09-HL Tr Brown	0	0	1	3	0	4
14-FH Gray	0	1	0	2	0	3
15-Gry/Brn/Grn	0	0	0	1	0	1
17-Owl Crk Black	0	0	0	2	0	2
22-C Mott/Flecks	1	0	0	1	0	2
<i>Subtotal</i>	<i>1</i>	<i>4</i>	<i>1</i>	<i>23</i>	<i>1</i>	<i>30</i>
Unidentified Types						
Indet Dk Brown	0	1	1	7	0	9
Indet Dk Gray	0	0	0	2	0	2
Indet Lt Brown	3	14	5	47	1	70
Indet White	0	0	0	15	0	15
<i>Subtotal</i>	<i>3</i>	<i>15</i>	<i>6</i>	<i>71</i>	<i>1</i>	<i>96</i>
Total	4	19	7	94	2	126

Table 5.57 Faunal Recovery, AU 3, 41BL339.

Vertebrates	Element			Total
	Indeterminate	left	right	
Mammalia (med/lg)	1	0	0	1
Bivales				
Amblema plicata	0	11	4	15
Ambleminae	0	3	3	6
Lampsilinae	0	0	2	2
Quadrula apiculata	0	0	2	2
Quadrula sp.	0	1	0	1
Toxolasma texasensis	0	1	1	2
Unionacea	0	2	3	5
Total	0	18	15	33

5.6 SITE 41BL415

5.6.1 Introduction

In late January and early February 1994, Mariah conducted test excavations at site 41BL415. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.6.1.1 Location and Description

Site 41BL415 is located in the East Cowhouse area of Fort Hood. The site overlooks Lake Belton (Cowhouse Creek) to the north and extends south for about 400 m. The site includes an area of intermediate upland, a Pleistocene terrace, a segment of Pleistocene terrace mantled by slopewash, and a Holocene terrace (Figures 5.26 and 5.27). An unnamed tributary delimits the western site boundary. A gravel road, oriented roughly north to south, bisects the site, and a few jeep trails cross the area. A large burned rock feature occurs on one of the Pleistocene surfaces. Maximum site dimensions are 400 x 300 m (about 120,000 m², or 29.63 acres).

5.6.1.2 Previous Work

The site was first recorded on 5 March 1984 by Thomas, who described it as a scatter of lithics (unifaces, bifaces, retouched flakes, cores, and hammerstones), mussel shell, and burned rock. A shell midden was noted but its location was not given. Bulldozer and erosion disturbance were observed.

The site was monitored on 24 November 1987 by Dureka and Pry. Similar disturbances were observed along with a high density of scattered burned rock. Good potential for buried cultural material was suggested.

On 20 October 1992, Mehalchick and Abbott revisited and reevaluated the site based on

archeological and geomorphological observations. The site was divided into Subareas A, B, C, and D. Subarea A, the Holocene terrace, is mantled with a thick drape of recent flood deposits. Although no cultural material was observed on the surface, the morphology and elevation indicated that deeper deposits were of Holocene age, thus having good potential for archeological content. Subarea B consists of a beveled Pleistocene terrace exhibiting a thin, slopewash mantle over soil formed in the underlying alluvium. Scattered unifaces, bifaces, flakes, cores, hammerstones, burned rock and chert gravels were observed on the surface. Feature 1 is a burned rock concentration in the western portion of Subarea B. It was estimated to measure 18 x 3 m in 1992, however, reevaluation indicated that it was once much larger and has been almost completely obliterated by bulldozer cuts. Subarea C consists of a Pleistocene terrace surface, and Subarea D is a segment of intermediate upland. Subareas A and B were considered to have good potential for containing intact buried deposits. Subareas C and D were considered to be so heavily impacted by erosion and recent human activities as to have no potential for intact deposits.

Because Subareas A and B had potential for intact deposits, a crew returned on 29 through 30 October 1992 and excavated a total of 38 shovel tests. Of 12 shovel tests placed in Subarea A, none were positive. Heavy gravel density observed in the subsurface was interpreted as downslope wash from Subarea B. Of 26 shovel tests placed in Subarea B, 16 (62%) were positive. Vertical distribution of artifacts indicated that the highest densities were recovered in levels from 0 to 10 and 30 to 40 cmbs. Based on shovel tests, where artifacts were recovered 20 to 40 cmbs and a minimum sediment depth of 40 cm was encountered, a portion of Subarea B measuring 7,500 m² was judged to have the greatest potential for buried, intact cultural deposits. However, the archeological potential of the site was unknown. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Two backhoe trenches and three to five 1 x 1 m of manually excavated test pits were

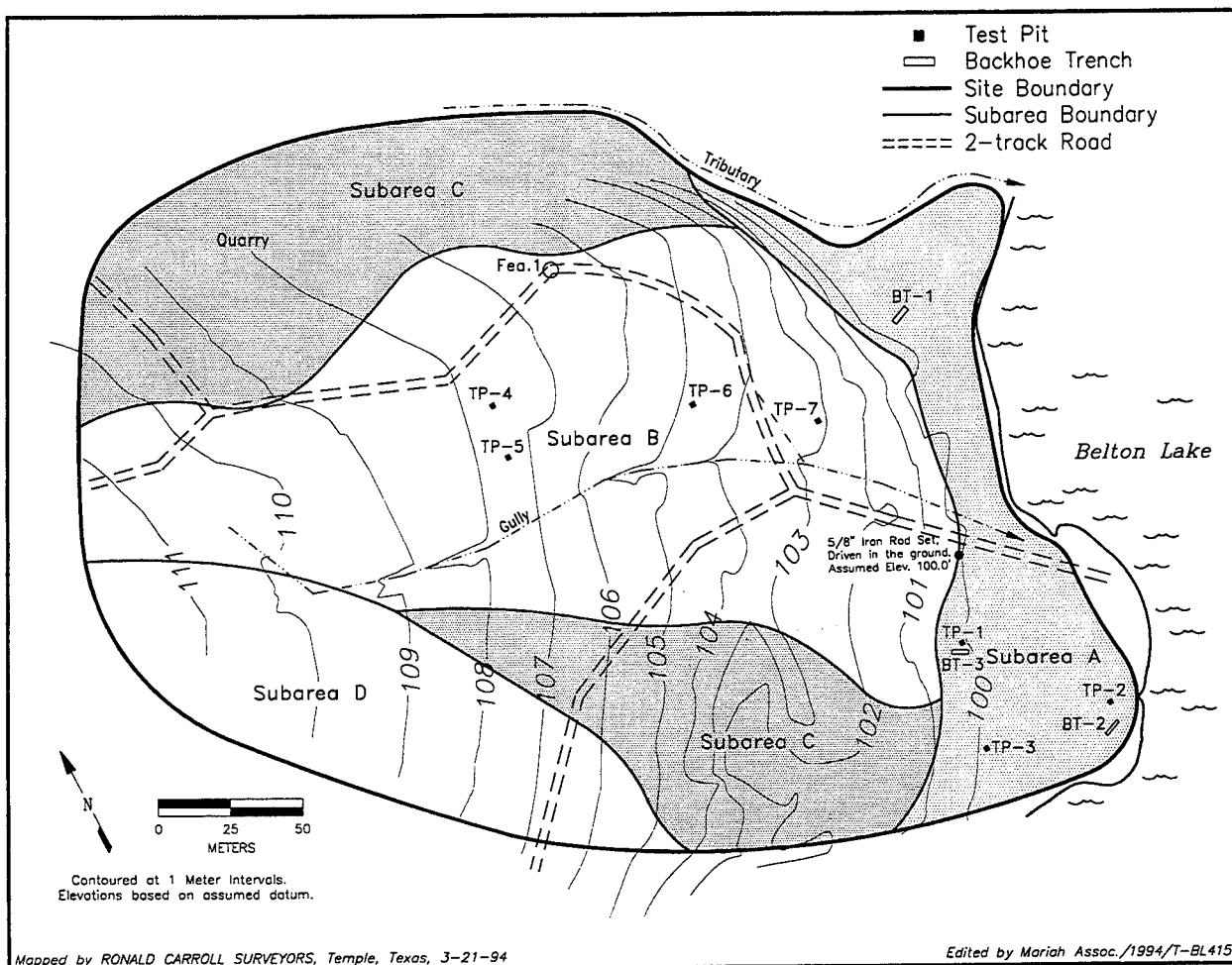


Figure 5.26 Site Map of 41BL415.

recommended for Subarea A, and a minimum testing effort of four 1 x 1 m of manually excavated test pits was recommended for Subarea B (Trierweiler 1994:A165-A170).

5.6.1.3 New Work

Three trenches (BTs 1 through 3) were excavated on the T₁ surface (Subarea A) to examine site stratigraphy and prospect for buried cultural material (Table 5.58). Trench 1 was situated in the northwestern portion of Subarea A. Trench 2 was situated adjacent to Lake Belton in the northeastern portion of the subarea. Trench 3 was situated about 30 m south of BT 2, near the base of the gently sloping tread of the T₂ terrace. With the exception of modern trash in BT 1, no cultural

material was noted in any of these trenches. Groundwater was encountered at 1 to 1.5 mbs in all three trenches. Geomorphic description of sediments exposed by these trenches was performed several days after their initial excavation, and groundwater flowing into the trenches limited the depth of exposure that could be described.

Three test pits (TPs 1-3) were excavated in Subarea A, and four pits (TPs 4-7) were excavated in Subarea B (Table 5.58). Test pit 1 was placed about 2 m west of the middle portion of BT 3. Test pit 2 was placed about 5 m north of BT 2. Test pit 3 was placed about 30 m northeast of BT 3, triangulated between TPs 1 and 2. Test pit 4 was placed on top of the Pleistocene terrace near

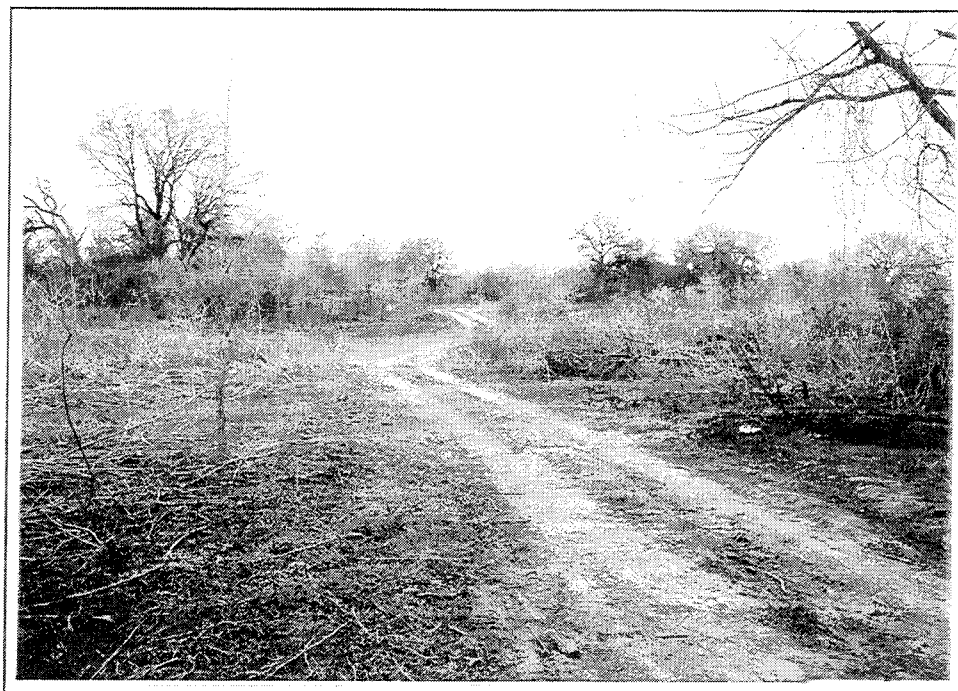


Figure 5.27 Overview of Site 41BL415, Looking Southwest.

the location of a shovel test, which produced the highest recovery of all shovel tests previously excavated. Test pit 5 was placed about 10 m east of TP 4. Test pits 6 and 7 were placed at 50 m intervals north of TP 5 in order to gain areal coverage of 7,500 m² section of Subarea B with the greatest potential. The test pits excavated on the T₂ surface were briefly examined by the geomorphologist, but no formal geomorphic descriptions were completed for these exposures. Recovered cultural material is summarized in Table 5.59.

5.6.2 Results

5.6.2.1 Excavations in the T₁ Terrace

Trench 1 was situated at the base of a bedrock/colluvial slope separating the T₁ terrace and the T₂ strath near the confluence of Lake Belton and the tributary. Excavation revealed relatively recent alluvial deposits inset against a buried continuation of the bedrock slope. Three

zones were noted in the profile, which was concealed by groundwater in the trench below approximately 125 cm. The upper 30 cm consisted of light brownish gray (10YR 6/2) silty clay, and

Table 5.58 List of Treatment Units.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~11	1.0	190
1	BT 2	~7	0.8	190
1	BT 3	~15	0.9	240
1	TP 1	1.0	1.0	150
1	TP 2	1.0	1.0	100
1	TP 3	1.0	1.0	125
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2	TP 4	1.0	1.0	60
2	TP 5	1.0	1.0	50
2	TP 6	1.0	1.0	50
2	TP 7	1.0	1.0	50

represented a modern flood drape (C horizon). Below this drape, the fill consisted of massive to very weak subangular blocky sandy clay loam, and exhibited a weak cumulic A-C profile. Apart from modern trash contained in and under the modern drape, no cultural material was noted in the trench, which is interpreted as an exposure of the Ford alluvium.

Trench 2 also exposed the Ford fill, and was also half full of water at the time of recording. The upper 20 cm of the trench consisted of clean, cross-bedded fine to medium sand overlain by a thin (1 to 2 cm) mat of decomposing organic matter. This material represents a modern flood drape, and was underlain by massive, very dark grayish brown sandy loam to the water table at a depth of approximately 110 cm. The overall profile of the exposed portion of the trench exhibits a C-AC sequence. No cultural material was detected.

Trench 3 was poorly exposed at the time of recording due to groundwater and slumping of the trench walls. Three zones and the upper extremity of a fourth zone were noted from the extant profile. A fifth zone was noted from the spoil pile only. Despite the fact that the trench was situated on essentially the same topographic surface as the other two trenches, the sediments exposed were markedly different in character. A modern surface drape of light brownish gray silty loam formed the upper 10 cm of the exposure. Zone 2 extended to a depth of 60 cm and consisted of black (10YR 2/1), fine blocky gravelly clay loam. The gravels in the unit were predominantly stream-rounded chert and increased in frequency toward the base of the zone, which is interpreted as a colluvial mantle shed off the T₂ surface upslope. Zone 3 was approximately 110 cm thick and consisted of dark grayish brown (10YR 4/2), fine, blocky structured, gravelly clay. It too contained primarily chert gravels. Only the uppermost part of Zone 4 was exposed at the time of recording, and its thickness is therefore unknown. It consisted of a very strong, angular, blocky structured, dark reddish gray (5YR 4/2), sandy clay

paleosol, and contained common thick carbonate filaments and well-developed cutans on most ped faces. Zone 5 was covered by slumping and groundwater, which filled the trench to approximately 160 cmbs. Based on the backhoe spoil, it consisted of a massive, reddish brown (5YR 4/4), sandy clay loam containing abundant carbonate filaments and a few fine nodules. No cultural material was noted in the trench. Overall, the trench exhibits a C-2A-2Bw-3Btb-3Bwkb profile.

Test pit 1 produced low frequencies of lithics and one bivalve shell fragment, all between 40 and 150 cmbs (Table 5.59). The recorded numbers of lithic specimens in this unit and in TP 3 are somewhat deceptive because some (possibly all) specimens are probably secondary flakes and/or natural chert shatter washed onto the terrace from the sloping T₂ surface above.

Test pit 2, situated well away from the older terrace, produced only snail shells. Test pit 3 produced no snail or bivalve fragments and most of the chert specimens collected could be noncultural. One utilized flake of local Cowhouse Mottled chert was recovered from AU 1.

A small but diverse debitage assemblage consisting of seven identified chert types (Heiner Lake Tan, Fossiliferous Pale Brown, Fort Hood Yellow, Heiner Lake Translucent Brown, Gray/Brown/Green, Owl Creek Black, and Cowhouse Mottled/Banded) and four indeterminate chert types were recovered from Subarea A (Table 5.60). All identified types occurred in the statistically predicted range when indeterminates were included and again when they were excluded, while the indeterminates (71% of the total) exceeded the expected range (Table 5.61). The identified flakes include types characteristic of both the Southeast Range (Heiner Lake Tan, Fossiliferous Pale Brown, and Heiner Lake Translucent Brown) and North Fort Provinces (Fort Hood Yellow, Gray/Brown/Green, and Owl Creek Black), as well as material probably obtained from the Cowhouse bedload (Cowhouse

Mottled/Banded). Thus, it appears that chert procurement forays were conducted both to the north and south of the Cowhouse valley. Indeterminate flakes were dominated by light brown specimens, which may indicate that the Southeast Range cherts are underrepresented.

More than 53% of the flakes are partially cortified (Table 5.62), and 55% are larger than 1.8 cm, indicating that substantial early-stage reduction occurred on the site. However, no totally cortified specimens were recovered, suggesting that initial reduction was performed elsewhere. Interestingly, although the site is situated adjacent to the Cowhouse channel, the majority of cortex flakes are unabraded, suggesting that most procurement was from upland lag or outcrop contexts.

5.6.2.2 Excavations in the Pleistocene Terrace

Four more test pits (TPs 4 through 7) and a long natural gully exposure were examined briefly on the sloping T₂ surface. Typically, these units exhibited a truncated Bw-C profile developed in reddish brown sandy loam or gravelly sandy loam upslope and an over-thickened A profile in massive, dark reddish brown sandy loam downslope. Commonly, a thin veneer (up to 40-50 cm) of Holocene slopewash derived from the same type of material overlay the truncated soil. Cultural material is commonly contained in this

Table 5.60 Debitage Recovery by Size and Material Type, AU 1, 41BL415.

Lithic Material	Size (cm)						Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types							
06-HL Tan	0	0	1	0	0	1	2
07-Foss Pale Brown	0	0	0	0	1	1	2
08-FH Yellow	1	0	0	0	0	0	1
09-HL Tr Brown	0	0	0	2	0	0	2
15-Gry/Brn/Grn	0	0	0	2	0	0	2
17-Owl Crk Black	0	1	0	0	0	0	1
23-C Mott/Banded	0	0	0	0	1	0	1
<i>Subtotal</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>4</i>	<i>2</i>	<i>2</i>	<i>11</i>
Unidentified Types							
Indet Dk Brown	0	0	0	3	0	0	3
Indet Lt Brown	1	2	8	5	5	0	21
Indet Lt Gray	0	1	0	0	0	0	1
Indet White	0	0	2	0	0	0	2
<i>Subtotal</i>	<i>1</i>	<i>3</i>	<i>10</i>	<i>8</i>	<i>5</i>	<i>0</i>	<i>27</i>
Total	2	4	11	12	7	2	38

Table 5.61 Binomial Statistic Results, AU 1, 41BL415.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	2	1	9	expected	0	4	expected
07-Foss Pale Brown	2	1	9	expected	0	4	expected
08-FH Yellow	1	1	9	expected	0	4	expected
09-HL Tr Brown	2	1	9	expected	0	4	expected
15-Gry/Brn/Grn	2	1	9	expected	0	4	expected
17-Owl Crk Black	1	1	9	expected	0	4	expected
23-C Mott/Banded	1	1	9	expected	0	4	expected
Total Indet	27	1	9	more	na	na	na

surficial mantle, which was often difficult to distinguish from the underlying alluvium from which it was derived. Excavation of the test pits was typically halted at or just below the contact between the slopewash and the underlying alluvium. A few flakes were observed in the underlying fill in the gully. These sparse materials were obviously emplaced by bioturbation of the truncated sandy fill.

The cultural materials in TPs 4 through 7 appeared to be in secondary depositional context. Lithics and a bivalve fragment were recovered from TP 4 (Table 5.59). Almost all of this material was recovered between the surface and 30 cmbs. Feature 2, a small burned rock concentration, was encountered 19 to 26 cmbs (Figure 5.28). It consisted of a 7 cm thick burned rock concentration measuring 74 x 56 cm. The feature was composed of eight subangular burned rocks (3.5 kg total) ranging from 4 x 4 x 2 cm to 13 x 9 x 4 cm in size. The rocks appeared to be arranged in a linear pattern from the center of the unit to the northwest corner, suggesting that they are probably a secondary deposit arranged in a buried erosional rill. A utilized flake, 33 flakes, and a mussel umbo were recovered from the feature level. However, erosional reworking and root disturbances appear to have disturbed the feature beyond archeological utility. Below F 2, only a few flakes were found from 30 to 60 cmbs.

Test pit 5 yielded only a few lithics. The upper 10 cm was culturally sterile and a few flakes were found in each level from 20 to 50 cmbs. Test pit 6 yielded lithics, with several found from 0 to 20 cmbs, the highest concentration recovered from 20 to 30 cmbs, and only a few found from 30 to 50 cmbs. In TP 7, several lithics, a few bivalve fragments, and fragments of modern, brown glass were recovered (Table 5.59).

All lithic specimens recovered from 41BL415 were chert flakes or chunks with the exception of one biface fragment each from TP 4 and TP 5. With the exception of F 2, no burned rock was recovered from any of the test units.

Table 5.62 Debitage Cortex Characteristics by Material Type, AU 1, 41BL415.

Lithic Material	Partial Cortex			No Cortex	Total
	Abraded	Unabraded	Indeterminate		
Identified Types					
06-HL Tan	0	1	0	1	2
07-Foss Pale Brown	0	2	0	0	2
08-FH Yellow	0	0	0	1	1
09-HL Tr Brown	0	0	0	2	2
15-Gry/Brn/Grn	0	0	0	2	2
17-Owl Crk Black	0	0	0	1	1
23-C Mott/Banded	1	0	0	0	1
<i>Subtotal</i>	<i>1</i>	<i>3</i>	<i>0</i>	<i>7</i>	<i>11</i>
Unidentified Types					
Indet Dk Brown	0	1	1	1	3
Indet Lt Brown	1	4	8	8	21
Indet Lt Gray	0	1	0	0	1
Indet White	0	0	0	2	2
<i>Subtotal</i>	<i>1</i>	<i>6</i>	<i>9</i>	<i>11</i>	<i>27</i>
Total	2	9	9	18	38

Two late stage bifaces and four utilized flakes were recovered from AU 2 (Table 5.63). These tools represent three chert types, one each of the tools is of the local Heiner Lake varieties and three are of Indeterminate Light Brown chert.

Table 5.63 Lithic Tools, AU 2, 41BL415.

Lithic Material	Tool Type		Total
	late stage biface	utilized flake	
09-HL Tr Brown	0	1	1
10-HL Blue	1	0	1
Indet Lt Brown	1	3	4
Total	2	4	6

Four identified types and five indeterminate categories of chert were recovered from test pits on the T₂ surface. Only 7% of these specimens could be typed with the existing taxonomy, which obviates detailed analysis. Those flakes that were typed were dominated by Southeast Range cherts (Heiner Lake Tan and Heiner Lake Translucent Brown), with one flake each of two different North Fort types (Fort Hood Yellow and Gray/Brown/Green) making up the remainder of the identified assemblage (Table 5.64). Due to the small proportion of identified flakes, all identified types occurred in less than expected frequencies when indeterminates were included and in expected frequencies when they were excluded (Table 5.65). Approximately 67% of the flakes were smaller than 1.8 cm, and over 87% were decortified (Table 5.66). This suggests that lithic reduction probably concentrated on middle to late-stage processing at the locality, but that some of this activity involved relatively large, decortified nuclei. As in Subarea A, few of the cortified flakes exhibited abrasion of the cortex, indicating streambed procurement played a relatively minor role.

5.6.2.3 Site-Level Synthesis

The profiles in BT 1 and BT 2 represent very recent alluvial deposits and are clearly equivalent to the Ford Alluvium of Nordt (1992). Equally clearly, the deposits underlying the sloping T₂ surface represent the late Pleistocene Jackson Alluvium. The principal anomaly is the deposits exposed in BT 3. Although these deposits lie at an elevation only slightly above the Ford deposits, the strong degree of soil development and deep red color of this fill suggest that it too represents Jackson alluvium, yet it is clearly inset into the bedrock strath underlying the T₂ terrace. Moreover, the unit is overlain by a colluvial wedge and the soil is only slightly truncated, indicating that it has not been extensively eroded. This suggests that at least two Jackson-equivalent fills are present on the site. Although this possibility is recognized by Nordt (1992), the presence of recent Ford fill at essentially the same elevation is very unusual. The setting is further complicated by the

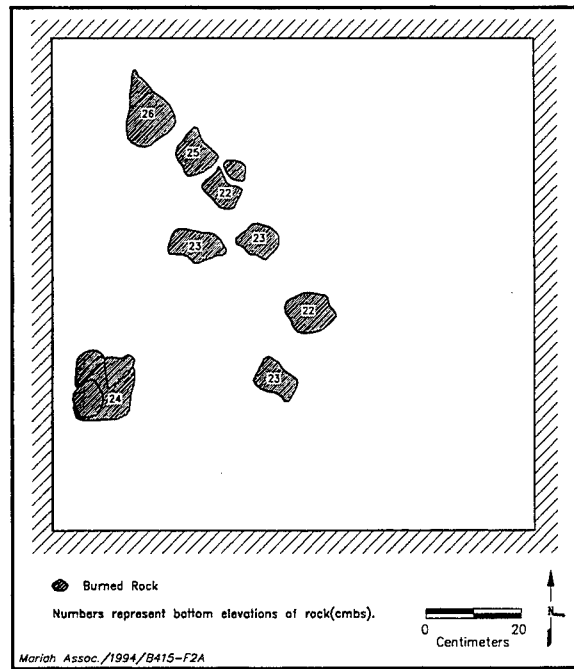


Figure 5.28 Plan View of TP 4, F 2, at 30 cmbs, 41BL415.

Table 5.64 Debitage Recovery by Size and Material Type, AU 2, 41BL415.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
06-HL Tan	0	0	0	0	3	1	0	4
08-FH Yellow	0	0	1	0	0	0	0	1
09-HL Tr Brown	0	0	0	3	2	1	0	6
15-Gry/Brn/Grn	0	0	0	1	0	0	0	1
<i>Subtotal</i>	0	0	1	4	5	2	0	12
Unidentified Types								
Indet Dk Brown	0	0	0	1	0	0	0	1
Indet Dk Gray	0	2	0	0	0	0	0	2
Indet Lt Brown	0	17	32	27	22	5	1	104
Indet Lt Gray	0	1	2	1	5	0	0	9
Indet White	1	11	7	12	10	2	0	43
<i>Subtotal</i>	1	31	41	41	37	7	1	159
Total	1	31	42	45	42	9	1	171

Table 5.65 Binomial Statistic Results, AU 2, 41BL415.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	4	24	44	less	0	6	expected
08-FH Yellow	1	24	44	less	0	6	expected
09-HL Tr Brown	6	24	44	less	0	6	expected
15-Gry/Brn/Grn	1	24	44	less	0	6	expected
Total Indet	159	24	44	more	na	na	na

presence of Lake Belton, which makes examination of the valley configuration impossible because of a high water table. Although the size of the lakefront trees argues against it, it is remotely possible that all Ford deposits detected on site postdate impoundment of Belton Lake. At this point, all that can be stated is that the only deposits detected under the T₁ surface are either very young (almost certainly less than 500 years) or very old (probably greater than 11,000 years).

Very little cultural material was recovered from the site, and the material that was recovered appears to be in secondary context. Faunal recovery was very limited, consisting of fragmentary bivalve shells representing a minimum of two species (*Amblominae* and *Quadrula*).

5.6.3 Conclusions and Recommendations

No prehistoric cultural material was detected in any of the trenches. In contrast, cultural material is present in a thin veneer of sandy slopewash overlying the T₂ surface. However, based on the four test pits and examined natural exposures, this sparse subsurface material is typically buried less than 50 cmbs and is in questionable context. Therefore, the site has very limited archeological potential with respect to research issues outlined in Ellis et al. (1994).

On the basis of the above, we judge 41BL415 to be ineligible for inclusion in the NRHP. No further management is recommended for the site.

Table 5.66 Debitage Cortex Characteristics by Material Type, Au 2, 41BL415.

Lithic Material	Partial Cortex					Total
	Abraded	Unabraded	Indeterminate	No Cortex	Indeterminate	
Identified Types						
06-HL Tan	0	0	0	4	0	4
08-FH Yellow	0	0	0	1	0	1
09-HL Tr Brown	0	0	1	5	0	6
15-Gry/Brn/Grn	0	0	0	1	0	1
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>11</i>	<i>0</i>	<i>12</i>
Unidentified Types						
Indet Dk Brown	0	1	0	0	0	1
Indet Dk Gray	0	0	0	2	0	2
Indet Lt Brown	2	3	8	91	0	104
Indet Lt Gray	0	1	0	8	0	9
Indet White	0	3	1	37	2	43
<i>Subtotal</i>	<i>2</i>	<i>8</i>	<i>9</i>	<i>138</i>	<i>2</i>	<i>159</i>
Total	2	8	10	149	2	171

5.7 SITE 41BL421

5.7.1 Introduction

In December 1993, Mariah conducted test excavations on site 41BL421. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.7.1.1 Location and Description

Site 41BL421 is located on a colluvial slope/alluvial fan which is bisected by a north-to-south tank trail (Figure 5.29). The southwest site boundary is demarcated by a quarry and the north boundary by an east-to-west tank trail (Figure 5.30). Maximum site dimensions are 125 x 85 m (about 10,625 m², or 2.6 acres). For purposes of this report, the site is included in the Nolan/Cowhouse area of Fort Hood.

5.7.1.2 Previous Work

Bradle and Moore recorded the site on 13 October 1983. The site was located on the slope of the fluvial uplands, with the deposit comprising a tan colluvium with chert and limestone inclusions. A small lithic scatter consisting of flakes, bifaces, cores, and retouched flakes was noted across the surface. An Angostura point was collected. The area was impacted an estimated 28% by vehicular traffic, erosion, quarrying, and bivouac activity.

On 19 March 1992, Quigg and Frederick revisited the site and made additional archeological and geomorphological observations. A low artifact density (burned rocks and bifaces) and poor quality chert were observed across the colluvial slope/alluvial fan. Vehicular traffic and subsequent erosion had impacted a majority of the site. This heavily disturbed surface had an A horizon less than 5 cm thick and was judged not to have the potential to contain buried, intact deposits. The fan deposits were considered to be Late Pleistocene in age, although the possibility of Holocene

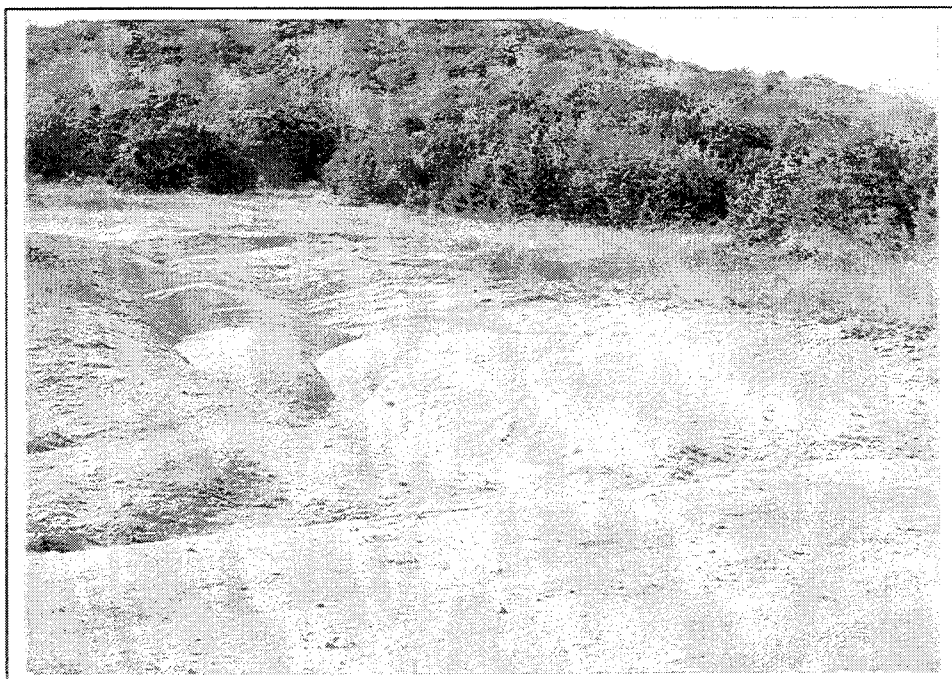


Figure 5.29 Overview of Site 41BL421, Looking Southwest.

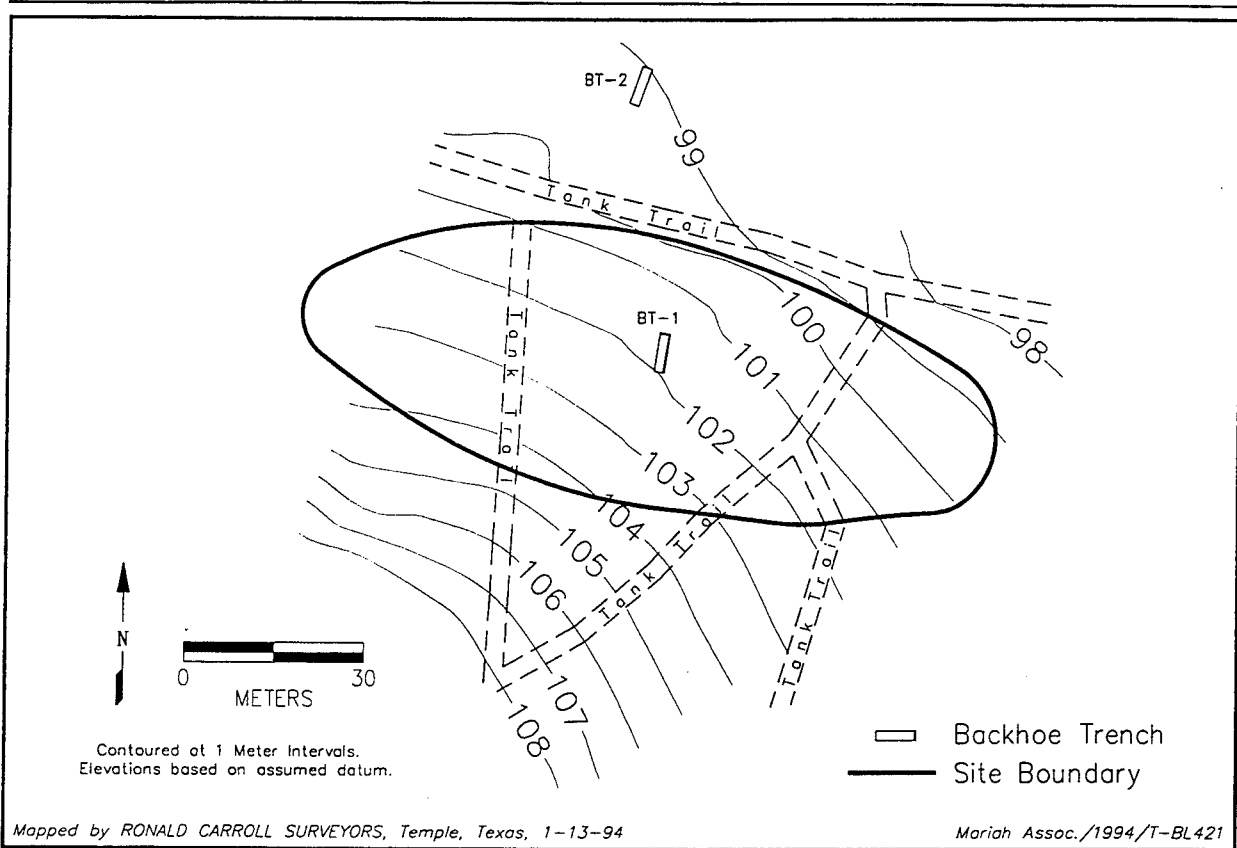


Figure 5.30 Site Map of 41BL421.

deposition did exist. Two backhoe trenches were recommended (Trierweiler 1994:A173-A174) since a possible buried horizon could be deeper than the limits of shovel testing (40 cm). It was suggested that trenches be excavated between the colluvial slope and the east-to-west tank trail, and also north of the east-to-west tank trail. Although the original site boundary did not extend beyond this trail, cultural material was observed here and the area was not as heavily denuded as other areas.

5.7.1.3 New Work

Two backhoe trenches (BT 1 and BT 2) were excavated to examine the site stratigraphy and prospect for buried cultural deposits (Table 5.67). They were positioned transverse to the slope on either side of the road running along the base of the Manning surface riser. No buried cultural material was detected, and no manual excavations were performed.

5.7.2 Results

Trench 1 was situated on the upslope side of the road on a deflated colluvial surface strewn with cultural material. The trench was excavated to a depth of 1 mbs, where an indurated calcrete was encountered. The trench exhibited an A-Bw-Bk-K profile developed in gravelly sandy loam, and contained abundant dissolving limestone lithoclasts and soft masses of carbonate below the weakly developed A horizon. No buried cultural material

Table 5.67 List of Treatment Units, 41BL421.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~6	0.8	105
1	BT 2	~6	0.8	80

was detected, and it was judged unlikely to occur below the Bw-Bk contact at roughly 25 cmbs.

Trench 2 was situated on the downslope side of the road on the distal toeslope, and extended to a depth of 80 cmbs. As in BT 1, excavation was discontinued when a strongly developed calcrete was encountered. The trench contained two discrete units of colluvium and slopewash separated by a distinct, gravel-mantled truncation surface. The soil exhibited an A-ABk-Bk-K profile that had developed through the two units. Like the upslope profile, it contained abundant dissolving limestone lithoclasts and soft masses of carbonate below approximately 20 cmbs. The principal difference between the profile exposed in BT 2 and BT 1 was the thickness of the A horizon, which exhibited little evidence of erosive truncation in the latter trench. As in BT 1, no cultural material was detected in BT 2, and it was judged unlikely to occur due to the apparent antiquity of the deposits.

5.7.3 Conclusions and Recommendations

Site 41BL421 contains no significant archeological materials in stratified context. As a result, the site has very low archeological potential to address issues outlined in the research design for Fort Hood (Ellis et al. 1994).

Given the apparently limited archeological potential, we judge this site to be not eligible for inclusion in the NRHP and recommend no further management. However, chert occurs naturally at the site which was apparently a locus of lithic procurement activities. Although surface impacts have damaged the assemblage to some degree, this assemblage may be relevant to future lithic procurement research at other sites. Accordingly, it is desirable that physical access to the site and its surface assemblage be maintained, even while no further management is necessary.

5.8 SITE 41BL427

5.8.1 Introduction

In late December 1993 and early January 1994, Mariah conducted test excavations at site 41BL427. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.8.1.1 Location and Description

Site 41BL427 overlooks Belton Lake (Cowhouse Creek) to the north and extends south to a northeast-flowing tributary which empties into the reservoir (Figure 5.31). Two gravel roads, oriented southwest to northeast, bisect the site. Maximum site dimensions are about 360 x 200 m (about 72,000 m², or 17.7 acres). The site contains a Pleistocene terrace and Holocene terraces and toeslope that parallel the tributary. Approximately 90% of the site consists of the Pleistocene terrace, with the Holocene deposits measuring about 125 x 50 m. For the purposes of this report, the site is included in the Nolan/Cowhouse area of the fort.

5.8.1.2 Previous Work

Turpin and Moore first recorded the site on 25 October 1983. It consisted of a lithic scatter located on a low ridge between Cowhouse Creek and an unnamed tributary. Cores, debitage, bifaces, scrapers, and an untyped dart point were observed. The central portion of the site had been destroyed by road grades, with 50% of the site impacted overall by roads or trails.

On 20 October 1992, Mehalchick and Abbott revisited and reevaluated the site based on archeological and geomorphological observations. The site was divided into two geomorphic subareas. The Pleistocene terrace was designated Subarea A and the Holocene terraces and toeslope were designated Subarea B. A scatter of lithics and burned rocks was noted across the surface of

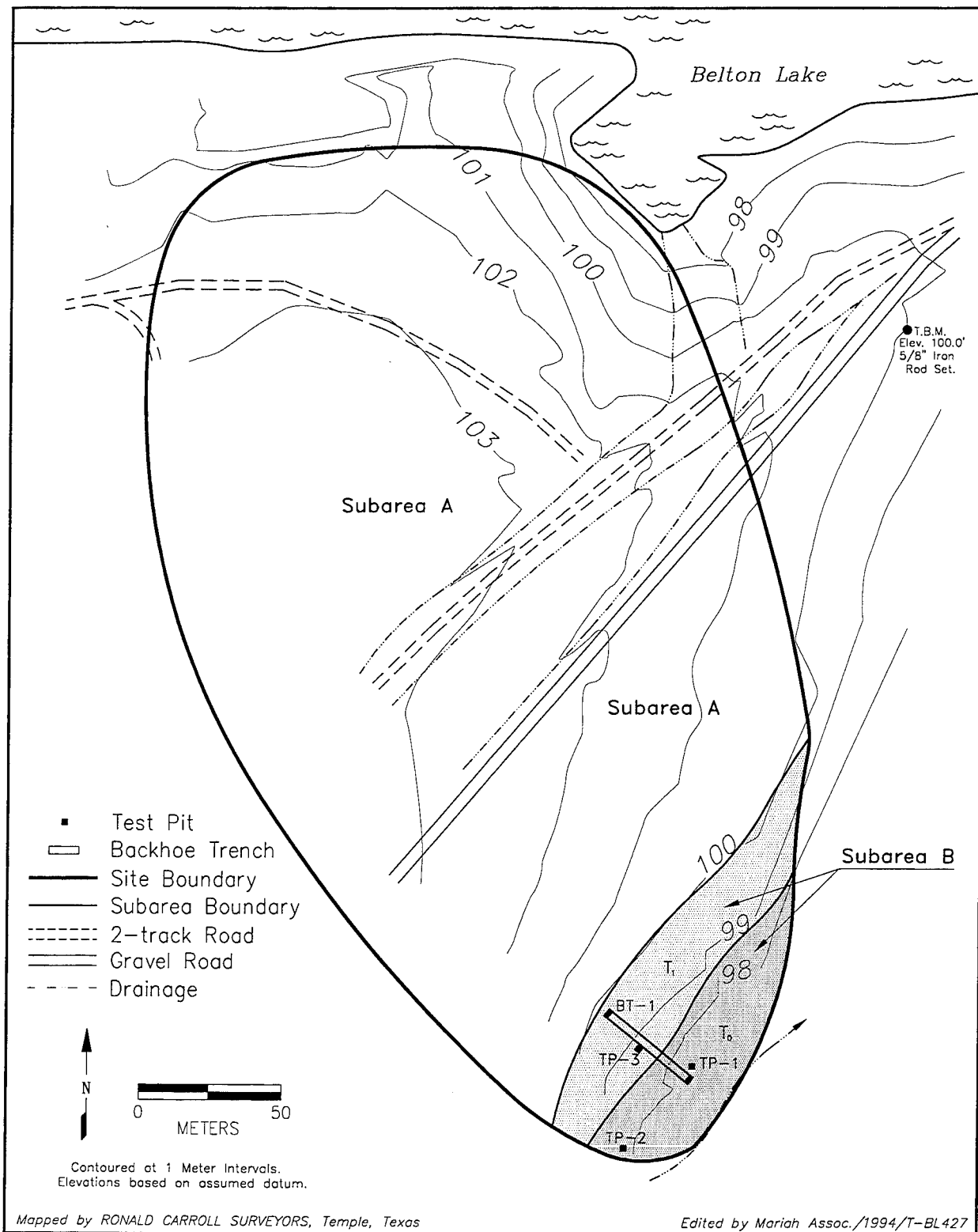


Figure 5.31 Site Map of 41BL427.

Subarea A, Pleistocene terrace. Chert cobbles were also noted near the northern site boundary. Expansion/contraction mixing, roads, bulldozing, cattle, and bivouac had heavily disturbed this subarea. No further work was recommended for Subarea A.

Subarea B, the Holocene terraces (T_0 and T_1) and associated toeslope, formed a narrow wedge along the tributary at the southern edge of the site. Due to oak/juniper vegetation, visibility was less than 10%. However, a light density of debitage, cores, and burned rocks was observed. This subarea was minimally disturbed by military activity and floral/faunal disturbances. Based on archeological and geomorphological observations, shovel testing was warranted. Seven shovel tests were excavated in Subarea B on 30 October 1992. Two were placed on the T_0 surface, and the remaining five on the T_1 surface. All seven, excavated between 10 and 40 cmbs, were sterile and contained gravels, particularly those on the T_1 . Based on the depth of Holocene deposit (up to 2 m thick) and the potential for buried cultural material below the limits of shovel testing, the eligibility status of Subarea B remained uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. Two backhoe trenches and two to four 1 x 1 m manually excavated test pits were recommended for formal testing (Trierweiler 1994:A175-A177).

5.8.1.3 New Work

One trench and three test pits were excavated on the site (Table 5.68). Backhoe trench 1 was located near the center of Subarea B, perpendicular to the tributary and bisecting the T_0 and T_1 surfaces. Since no cultural material was observed in BT 1, three isolated test pits were excavated. Test pits 1 and 2 were placed on the T_0 surface. Test pit 3 was placed on the T_1 surface.

5.8.2 Results

A single, long trench (BT 1) was excavated on the site (Figure 5.32). The trench spanned the T_1 and

T_0 terraces. The trench revealed three distinct alluvial fills partially overlain by colluvium or mixed alluvium and colluvium. The trench spanned a 2.5 m riser from the lower (T_0) surface to the higher (T_1) surface and a gentle swale at the base of the terrace scarp. This swale proved to be a chute channel across the rear of the lower surface. It consisted of a lenticular fill of gravelly clay loam containing arcuate stringers of gravel. The lower terrace was underlain by approximately 3 m of dark grayish brown clay loam (10YR 3/1 to 10YR 4/2) that supported a weak cumulic soil. This fill was cut by several gravelly truncation surfaces representing partially confined flow across the surface during flood events. The fill graded down into a dense mottled clay approximately 250 cmbs.

The higher surface proved to be a strath surface cut into the extensive late Pleistocene fill that covers the majority of the site. This thick gravelly Pleistocene alluvium was overlain by a thin wedge of Holocene slopewash, colluvium, and possible alluvium that thickened from less than 20 cm near the rear of the surface to more than 1 m at the terrace scarp. A narrow wedge of uniform brown alluvium was exposed in the trench beneath the terrace scarp. This fill, which was not exposed anywhere at the surface due to cover by other units, was inset into the Pleistocene terrace deposits. The more recent grayish brown alluvium underlying the lower surface was in turn inset into this brown wedge of material.

One measured section was recorded beneath the lower surface. It consisted of five zones with a total depth of 250 cm. At another point in the trench, the excavation was carried to a depth of about 300 cm, encountering the water table at a depth of about 280 cm. Zone 1 of the lower surface section (measured section 2) consisted of a cumulic A horizon of very dark gray (10YR 3/1), slightly gravelly granular clay loam. It graded into a 25 cm thick Bw horizon of dark grayish brown (10YR 4/2) weak, fine, blocky structured clay loam. Beneath the B horizon, the C1 horizon was 45 cm thick and consisted of a sharply upward

fining accumulation of dark gray (10YR 4/1) massive to bedded gravelly clay. This gravelly zone rested on a clear erosional surface cut into dark grayish brown (2.5Y 4/2), massive, gravelly clay loam C2 horizon. This 75 cm thick zone contained a number of subtle, short gravel stringers and common fine gravels floating in matrix. It then graded gradually into a light yellowish brown (2.5Y 6/4), massive, stiff clay that was mottled heavily with orange and gray due to periodic saturation. No cultural material was detected underlying the lower surface.

A second measured section was described at a point where all three units underlying the upper surface were stacked. Zone 1 consisted of 30 cm of massive, friable dark brown (7.5YR 3/2), gravelly sandy loam that represented the upper wedge of colluvium and slopewash. Despite the fact that the wedge thickened toward the stream, the sandy to loamy texture of the deposits and presence of reworked carbonate nodules clearly indicate that is of primarily colluvial origin. Zones

Table 5.68 List of Treatment Units, 41BL427.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~6	0.8	105
1	BT 2	~6	0.8	80

2 and 3 consisted of the upslope end of the inset wedge of brown alluvium and extended from 30 to 42 and 42 to 60 cmbs, respectively. Zone 2 was composed of massive, very dark grayish brown clay loam, and is interpreted as a buried cumulic soil (2Ab horizon). It graded down into Zone 3, which was composed of massive, dark brown (10YR 3/3) gravelly clay loam. Zones 4 through 6 consisted of Pleistocene terrace deposits. Zone 4 extended from 60 to 100 cmbs and consisted of a massive, yellow (10YR 7/6), loamy sand 3B21k horizon. The horizon contained common soft carbonate nodules and/or dissolving lithoclasts up to 0.5 cm in diameter. Zone 5 extended to 158 cmbs and consisted of yellow (10YR 7/6) bedded

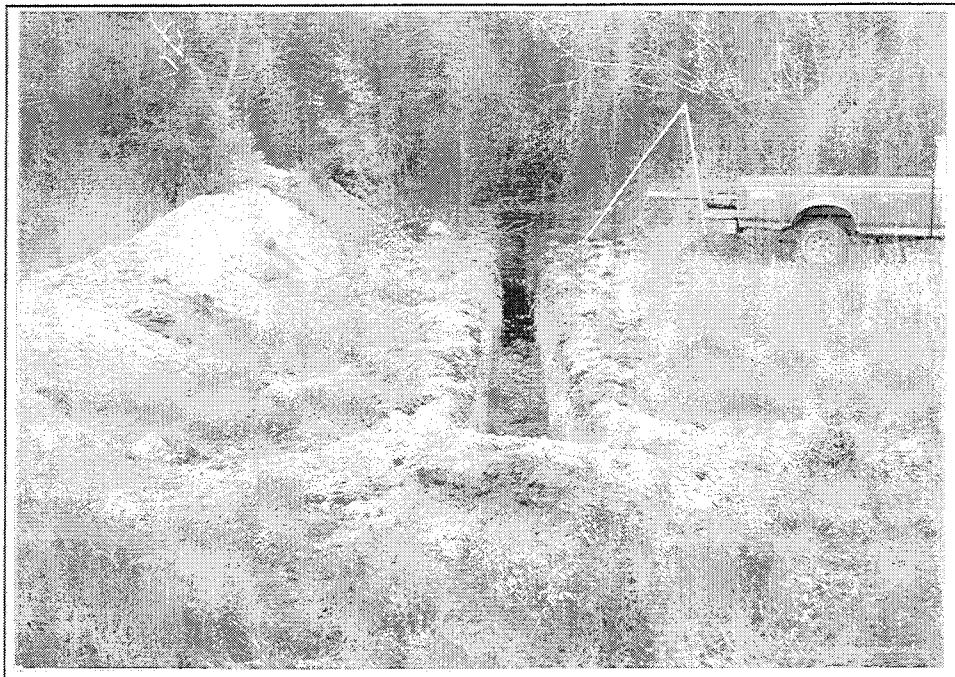


Figure 5.32 Overview of Site 41BL427 Including Trench 1, Looking Southeast.

alluvial sands and gravels (3B22k horizon). Like the overlying horizon, small, soft carbonate nodules were common. Zone 6 consisted of a weakly indurated, white (10YR 8/2) calcrete developed in gravelly sands. No cultural material was observed underlying the higher surface.

No cultural material was recovered from any of the test pits. Snails were found in seven of the 31 excavated levels (23%).

5.8.3 Conclusions and Recommendations

The T_0 surface is underlain by about 3 m of poorly horizonated, grayish brown to gray stony clay loam that probably represents the most recent alluvial fill (Ford Alluvium), but may be equivalent to the late Holocene West Range fill. This fill is inset into a wedge of brown clay loam that is in turn inset into the gravelly Pleistocene fill underlying the T_1 surface. No soil is preserved in the wedge of brown alluvium, but the lack of strong oxidation suggests that it is of probable Holocene age. The higher surface is underlain by gravelly and sandy deposits of Pleistocene age, and capped by a streamward-thickening wedge of loamy to sandy slopewash derived from erosion of the higher terrace.

No cultural material of any kind was detected in the trench or test pits. The archeological potential of the site is therefore very low.

Site 41BL427 apparently has no in situ cultural deposits. As a result, the site has negligible potential to advance research issues outlined in the Fort Hood research design (Ellis et al. 1994). Therefore, we judge the site to be not significant and ineligible for inclusion in the NRHP.

5.9 SITE 41BL432

5.9.1 Introduction

In mid May 1993, Mariah conducted formal testing at site 41BL432. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by

documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.9.1.1 Location and Description

Site 41BL432 is located south of Lake Belton (Cowhouse Creek). The site is a north-facing rockshelter that contains a tufa mound (Figures 5.33 and 5.34). A talus slope with surficial artifacts extends downslope from the shelter opening. Maximum site dimensions are 35 x 23 m (about 805 m², or 0.19 acres). For the purposes of this report, the site is included in the Nolan/Cowhouse area of the Fort Hood.

5.9.1.2 Previous Work

The site was initially recorded on 26 October 1983 by Gray and Bradle. The site consisted of a rockshelter with a shallow overhang that may have been deeper at one time (roof fall was noted). A light scatter of artifacts, including a retouched flake, mussel shell, an end scraper, cores, and debitage was observed, particularly along the talus slope. Overall surface visibility was poor due to extensive roof fall, exfoliation, and a humus layer. Most of the material may be buried and depth of deposit was estimated to possibly one meter. A chert lens in the shelter wall and a seep along the east end of the shelter were also noted. The site was impacted by roof fall (90%) and graffiti (1%).

On 17 December 1991, Quigg and Frederick revisited and reevaluated the site based on archeological and geomorphic observations. The previously recorded chert lens and seep were again noted, with the height of the overhang estimated at 3 to 3.5 m. A light amount of debitage, mussel shell, and an end scraper were exposed on the shelter floor and talus slope. A gravel-mantled surface was noted in the eastern half of the shelter, with most of the western half heavily deflated. A tufa mound, approximately 4 x 4 x 1 m, was located at the east, central portion of the shelter, at the head of a downslope tributary. A beveled edge

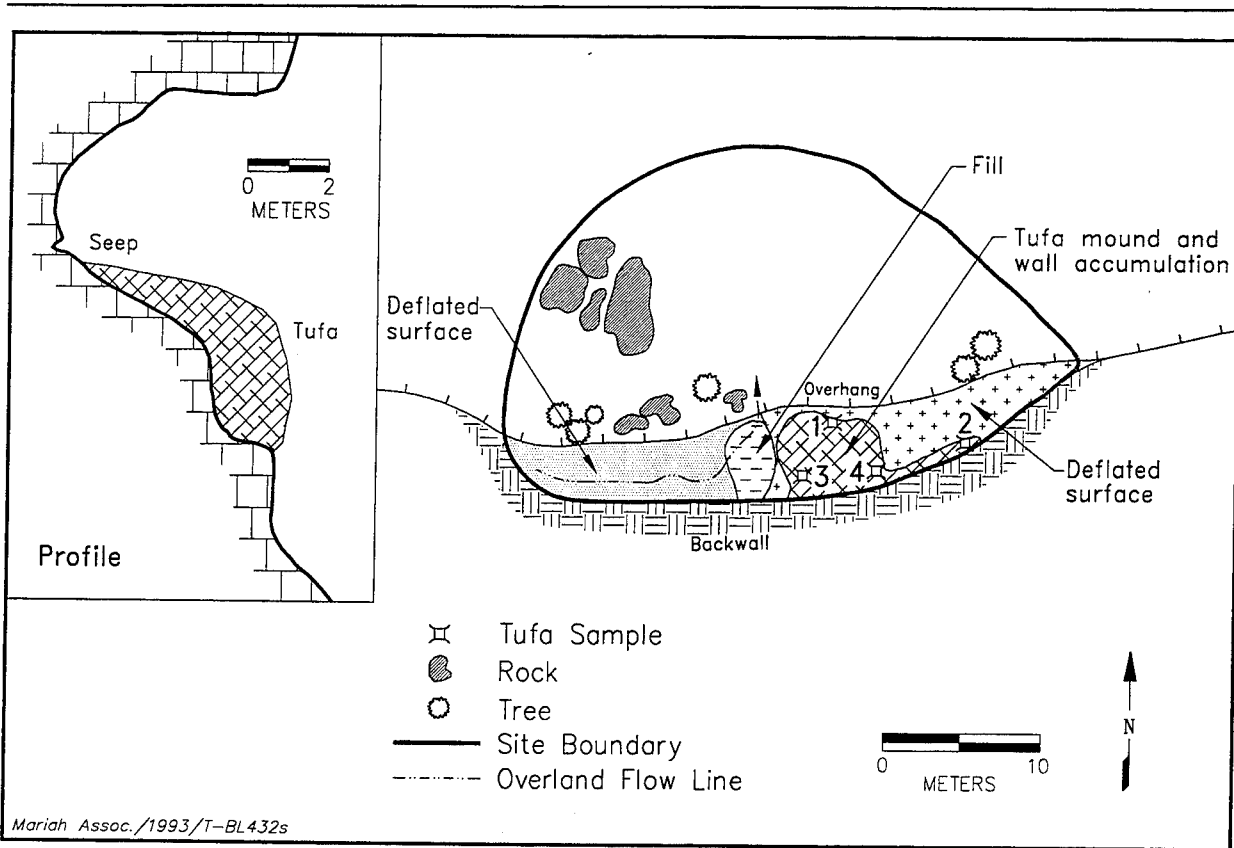


Figure 5.33 Site Map of 41BL432.

of the shelter floor, roughly 15 m², just west of the mound was filled with externally derived matrix less 30 cm thick. This area, and the tufa mound, were the only portions of the site which may contain intact, buried deposits. One shovel test was recommended for the 15 m² area containing possible in situ deposits.

On 1 April 1992, Turpin and Oglesby shovel tested the shelter. In the one shovel test excavated, six flakes were recovered from surface to 12 cmbs. Heavy amounts of large roof fall were encountered and excavation was terminated. The high artifact frequency was negated by the shallow depth of deposit. However, it was possible that the tufa mound could contain, covered or incorporated, intact cultural deposits. Hence, the site's archeological potential was uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. Recommendations for testing included sampling the tufa and

determining whether interbedded cultural deposits were present beneath the tufa (Trierweiler 1994:A182-A183).

5.9.1.3 New Work

On 26 April 1994, Ellis and Frederick visited the shelter to examine the mound with respect to tufa sampling techniques. Abbott and Kleinbach collected four tufa samples from the shelter on 18 May 1994 (see Figure 5.33 for sample locations). These samples were submitted to Steven A. Hall of the Department of Geography, University of Texas at Austin) to determine the character, concentration, and degree of preservation of pollen incorporated into the calcareous matrix.

5.9.2 Results

The tufa samples were retrieved by manually chiseling selected portions of the mound with

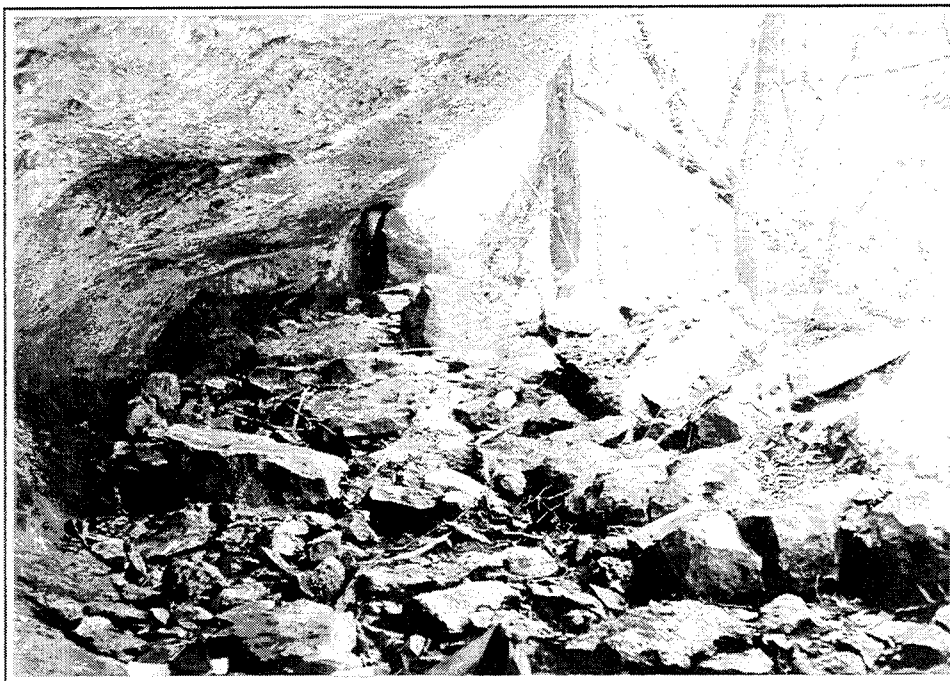


Figure 5.34 Profile of Rockshelter at Site 41BL432.

rockhammers. Actual sample locations were chosen to yield thick samples representing relatively long-term deposition at various distances from the seep. Nevertheless, all of the samples collected appeared to be relatively recent, and all but one sample (Tufa Sample 2) were composed of moist, "living" tufa. Samples 2 and 3 were collected from locations near the back wall of the shelter at the east and west fringes (respectively) of the mound. Sample 4 was collected near the center of the mound at the back wall. Sample 1 was collected from the front edge of the mound near the dripline of the shelter. No artifacts were observed in the cut edges of the tufa samples or in the cavities left after extraction of the samples.

The rapidity of tufa accretion is indicated by a piece of military telephone wire observed near the base of the mound. A portion of this wire was cemented approximately 2 to 3 cm into the mound, and carbonate precipitate coated much of the wire's length, indicating that accumulation of tufa is ongoing and occurring at a relatively rapid rate.

No cultural material was recovered during the testing phase. The results of the pollen recovery experiment conducted by Hall indicate that a wide variety of botanical remains in relatively high concentrations are incorporated into the tufa mound. Pollen concentration is moderately high to very high (up to 11,000 grains/gram), while the concentration of fungal and algal spores and miscellaneous organic materials is greater still. One of the most interesting components recovered is finely divided charcoal fragments (smaller than 25 microns), which occurred in concentrations of up to 10,000 grains/gram. In fact, Hall proposes that the overall concentration of organic matter contained within the tufa is high enough that conventional radiocarbon ages could be determined from organic distillates obtained by initial preprocessing of a fairly small sample of the deposit. Pollen taxa were dominated by juniper and oak, with other arboreal (e.g., pine, ash, elm, hackberry, and hickory) and compositae (e.g., Chenopodeae, Asteraceae, and Liguliflorae) represented in lower numbers. Although the

methodology employed in this pilot examination is not robust enough to support detailed paleoenvironmental inferences from the resulting pollen counts, the recovered spectrum compares favorably with the modern vegetation assemblage, supporting the contention that the samples represent tufa formed in the recent past.

5.9.3 Conclusions and Recommendations

No apparent substantial cultural deposits are present in stratified context in the nontufa sediments in the shelter. Although the tufa itself can contribute very useful carbon and oxygen isotope data for reconstructing paleoclimatic conditions, it is clear that a substantial portion of the tufa is extremely recent given that mound formation has incorporated a telephone cable. However, the mound is apparently very thick, and is therefore likely to contain a prehistoric paleoclimatic data base. Thus, although the shelter can offer valuable data for environmental components of a geoarcheological analysis (Ellis 1994b), it has little potential to provide useful data for technological and other more traditional analyses (Ellis 1994a).

On the basis of the above, we judge 41BL432 to be not significant and ineligible for inclusion in the NRHP. No further management is recommended for the site. However, we also recommend that the tufa mound eventually be exploited as a source of paleoclimatic data. This additional recommendation does not require protection of the site. The durable nature of the tufa deposits and the mound's undesirability as a target for artifact collection by vandals make it extremely unlikely that the site will be damaged by either intentional or unintentional activities.

5.10 SITE 41BL433

5.10.1 Introduction

In late September 1993, Mariah conducted test excavations at site 41BL433. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.10.1.1 Location and Description

Site 41BL433 is a rockshelter located at the top of the north face of a bluff overlooking Cowhouse Creek (Belton Lake). The site consists solely of the rockshelter and has been slightly disturbed by possible looting (Figure 5.35). The shelter measures approximately 12 m northeast to southwest and is 3 to 3.5 m deep (Figure 5.36). The height of the shelter varies from approximately 1 m below most of the overhang to almost 2 m in the center. Most of surface in the shelter is covered with roof fall and rotten tree limbs that have fallen down the slope and bounced into the shelter. Substantial historic trash also is visible on the surface, especially at the dripline. The main part of the shelter is slightly lower in elevation than the entrance. For the purposes of this report, the site is included in the Nolan/Cowhouse area of Fort Hood.

5.10.1.2 Previous Work

The site was first recorded by Meiszner in 1983 as a rockshelter with associated artifacts. A possible metate, bone, mussel shell, a point tip, a hammerstone, and numerous flakes were observed scattered across the surface of the shelter floor. The site did not appear to be disturbed.

The site was visited by Frederick and Quigg on 17 December 1991, who assessed the shelter on geomorphological and archeological grounds. The deposits within the shelter were interpreted as probably derived from a combination of sediments

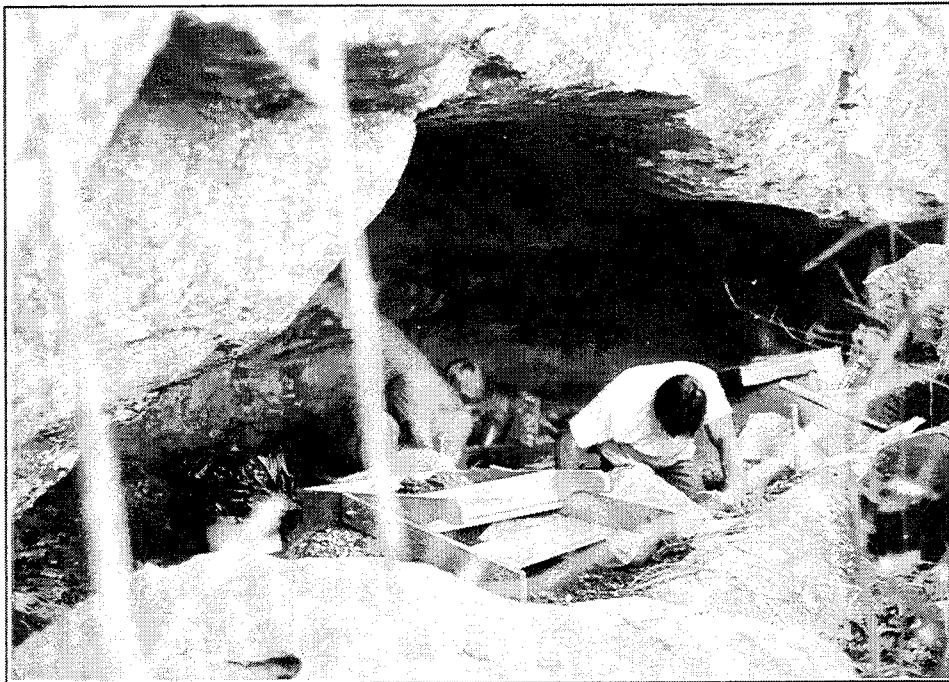


Figure 5.35 Profile of Rockshelter at Site 41BL433.

redeposited from upslope surfaces, roof fall, and limestone fragments spalled from the walls within the shelter. Frederick noted that the shelter is slightly lower along the back wall, and water flowing through this swale has stripped away any sediment that may have once existed. The site was observed to be slightly disturbed by recent activities, but no active vandalism was noted. Because buried cultural deposits were considered highly probable in the shelter, a shovel testing crew returned to the site on 19 April 1992 and excavated one 50 x 50 cm unit to a depth of 34 cmbs. Abundant artifacts were recovered in all four 10 cm levels in the unit. Recovered materials included 262 lithics, 6 bone fragments, 49 mussel shell umbos, and charcoal fragments. A shotgun shell was found from 0 to 10 cmbs, suggesting some looting or at least a historic human presence in the shelter. Bedrock was encountered at 34 cmbs.

The large quantities of buried cultural material suggested that the site might have substantial

research potential, but on the basis of the 50 x 50 cm test, the integrity of the deposits could not be clearly ascertained. As a result, NRHP eligibility was uncertain and the site was recommended for avoidance or for formal testing if avoidance was not feasible. Recommendations for testing included three to five 1 x 1 m manually excavated units to be placed throughout the shelter with appropriate samples taken from the excavations (Trierweiler 1994:A184-A187).

5.10.1.3 New Work

Testing consisted of three 1 x 1 m units (TP 1-3) placed in the shelter (Table 5.69). Test pit 1 was placed straddling the dripline in the west-central part of the shelter and excavated to 44 cm below datum (cmbs). Test pit 2 was placed closer to the back wall in the center of the shelter and excavated to 41 cmbs. Test pit 3 was placed on a slightly mounded area closer to the southwestern end of the shelter and excavated to 60 cmbs. Excavation of all units was terminated upon encountering

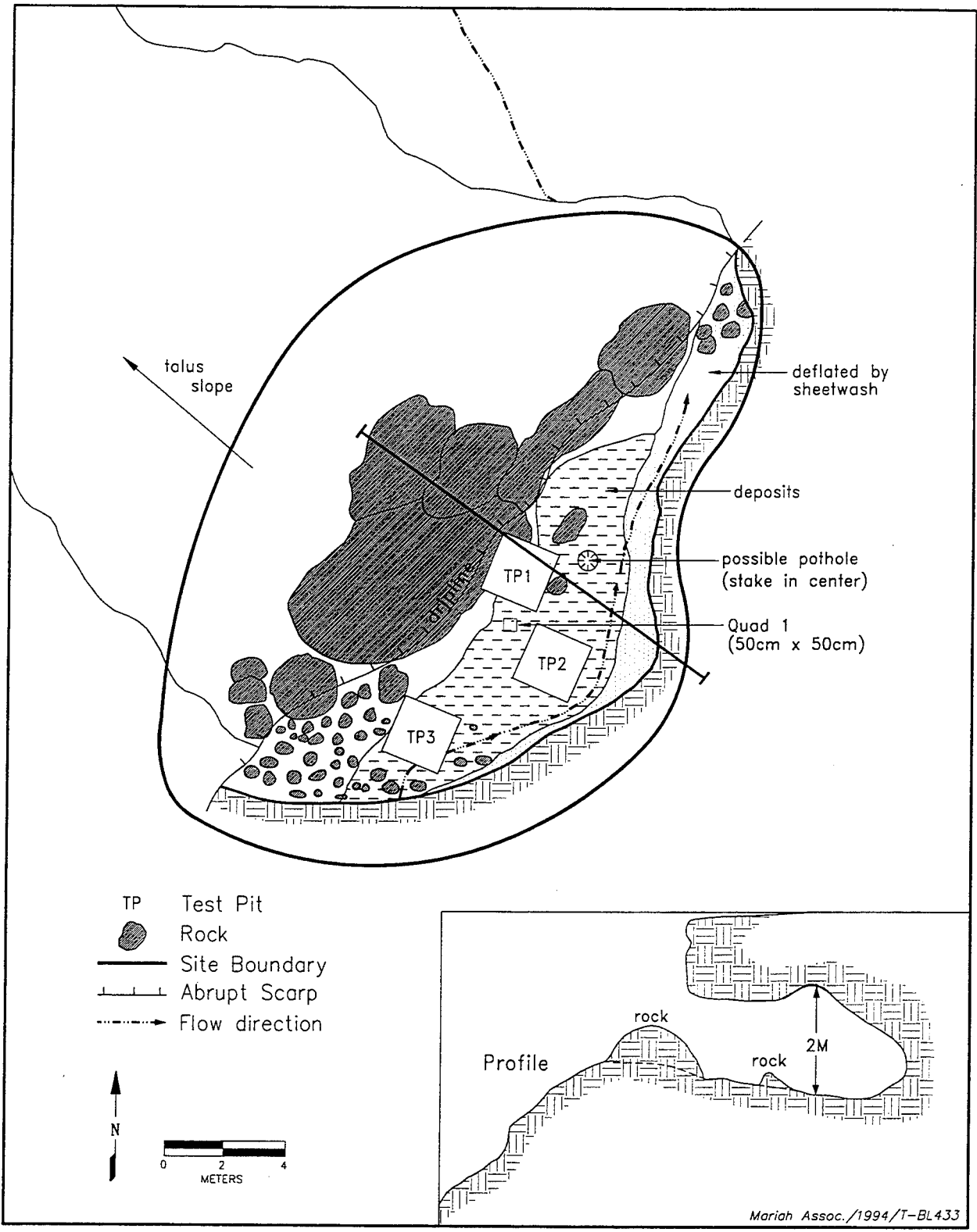


Figure 5.36 Site Map of 41BL433.

limestone bedrock. A total volume of 1.4 m² was excavated. Recovered cultural material is summarized in Table 5.70.

5.10.2 Results

The profiles of all three test pits revealed a 20 to 30 cm surface stratum of loose gray brown silt. This stratum contained the majority of the artifacts present, with artifact frequencies falling off below 30 cmbs. The fill in the upper stratum was very loose and was easily disturbed by the excavators' movements across the floor of the shelter. In TP 1 and TP 2, the upper stratum overlaid a 15 to 20 cm thick stratum of darker brown silt that is deposited directly on the limestone bedrock. This second stratum had many small roots in it and contained much lower quantities of artifacts than the upper stratum. In TP 3 the second stratum also contained a small amount of clay close to the bedrock. Rooffall debris also occurs in greater volume in TP 3 than in the other two units.

The excavations yielded an extremely large volume of artifacts that included lithics, bone fragments, mussel shell, and burned rock fragments. Most of the artifacts were found in the upper 30 cm of deposits. No distinct cultural horizons could be discerned from the profiles or from the artifact distributions (Table 5.70). The following points were found in the top level of each test pit: a Scallorn point in TP 3, and a Bonham and untyped dart point in TP 1 and TP 2, respectively. A Perdiz point was found in Level 2 of TP 1, and two Bonham points were found in Level 2 of TP 2. Lastly, a Scallorn was recovered from Level 3 in TP 1. No features were noted, although a small amount of burned rock was present from 20 to 30 cmbs in TP 2. The burned rock was not determined to be an intact feature because no staining or oxidation was observed, and burned and unburned rocks were intermixed. However, in the south profile of TP 2, at approximately 15 to 30 cmbs, there were two diffuse lenses of loose whitish gray material that may have consisted primarily of ash. These lenses were not separately noted during excavation.

Table 5.69 List of Treatment Units, 41BL433.

AU	Treatment	Length	Width	Depth
1	TP 1	1.0	1.0	44
1	TP 2	1.0	1.0	41
1	TP 3	1.0	1.0	60

Very large slabs from previous major rooffall events lie atop and in the deposits on the platform outside the shelter. Steeply sloping bedrock encountered at the base of TP 3 suggests the possible presence of deeper deposits under the slabs, but these boulders are so large that heavy equipment would be necessary to remove them prior to any attempt to excavate beneath them. The deposits covering the talus slope in front of the shelter are probably too shallow and steep to yield any definitive cultural remains.

One radiocarbon sample was obtained from Level 3 in TP 1. This sample was submitted for AMS assay and yielded a corrected age of 1130 ± 170 BP (Beta B-75167). Collectively, the radiocarbon age and projectile points suggest that occupation of the shelter occurred primarily during the earlier part of the Late Prehistoric, although the presence of Perdiz point suggests that it persisted into the latter Late Prehistoric. Additional chronometric information is provided by A/I analysis of a suite of eight *Rabdotus* shells obtained from TP 2, Level 3. These eight shells yielded widely disparate A/I values ranging from 0.0251 to 0.554, which equate to approximate radiocarbon-equivalent "ages" that range from 700 to 25,000 BP. No strong clustering was apparent in the data, although two shells with A/I ratios suggesting radiocarbon-equivalent ages of approximately 10,000 BP did overlap at ± 5%. However, these shells are clearly too old to represent the time of deposition, and are interpreted as anomalous shells resulting from heating, as are most of the other shells. In the absence of clustering, the youngest shells are favored as indicative of the age of deposition (see section 7.4). The youngest shell in the assemblage is equivalent to a radiocarbon age of approximately 700 BP; however, this shell has an anomalous

Table 5.70 Artifact Recovery by Test Pit, 41BL433.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3				
	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)
0	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	1	0(0)
1	7	22	306	11	4(0.5)	12	33	545	10	0(0)	25	11	392	11	0(0)
2	5	8	240	5	6(1)	9	35	723	9	1(0.5)	5	12	538	5	0(0)
3	16	33	594	11	3(0.5)	5	34	567	2	50(14)	7	9	318	3	0(0)
4	0	11	144	1	0(0)	0	21	184	3	0(0)	0	0	16	0	0(0)
5	0	0	4	1	0(0)						0	0	0	0	0(0)
6											0	0	0	0	0(0)
TOTAL	28	74	1288	29	13(2)	26	123	2019	24	51(14.5)	37	32	1264	20	0(0)

amino acid composition and is considered unreliable (Goodfriend, personal communication 1994). Therefore, the age of deposition is tentatively equated with the shell yielding an approximate radiocarbon-equivalent "age" of 1000 BP, which is well in line with the radiocarbon and projectile point data.

Nine projectile points were recovered, only six of which are identifiable arrow point types (Table 5.71). All nine points are of indeterminate chert types. Sixty-nine tools (Table 5.72) of 14 chert types ranging from edge-modified specimens to preforms as well as five multiple platform cores were recovered. The edge-modified tools include two wood-working tools (an adze and a wedge). The chert types represented are 53.6% indeterminates. The local Heiner Lake varieties contribute 42%, Cowhouse cherts contribute only 1.4%, and North Fort 2.8%.

Debitage representing 15 identified chert types and nine indeterminate categories was recovered from the shelter (Table 5.73). Less than 9% of the flakes were identifiable, probably due largely to the preponderance of flakes less than 1.2 cm in size. As a result, all identified types occurred in less than expected numbers when the entire

assemblage was considered. When the indeterminate flakes were excluded, Heiner Lake Blue, Heiner Lake Tan, and Heiner Lake Translucent Brown occurred in greater than expected frequencies; Anderson Mountain Gray and Fossiliferous Pale Brown occurred in expected frequencies; and the remainder of types occurred in less than expected frequencies (Table 5.74). Interestingly, all of the overrepresented types and

Table 5.71 Projectile Points, AU 1, 41BL433.

Point Type	Lithic Material				Total
	Indet Dk Brown	Indet Lt Brown	Indet Misc.	Indet Mottled	
Bonham	1	1	0	1	3
Other Arrow	0	1	0	0	1
Other Dart	1	1	0	0	2
Perdiz	0	1	0	0	1
Scallorn	1	0	1	0	2
Total	3	4	1	1	9

Table 5.72 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL433.

Lithic Material	Core Type		Tool Type										Total	
	multiple platform	adze	combination tool	Denticulate	early stage biface	end scraper	late stage biface	middle stage biface	preform	side scraper	uniface	utilized flake		wedge
02-C White	0	0	0	0	0	0	0	0	0	1	0	0	0	1
06-HL Tan	2	0	2	1	0	0	5	0	1	0	4	4	0	19
07-Foss Pale Brown	0	0	0	0	0	0	0	0	0	0	1	3	0	4
08-FH Yellow	0	0	0	0	1	0	0	0	0	0	0	0	0	1
09-HL Tr Brown	0	0	0	0	0	0	2	0	1	0	0	1	0	4
10-HL Blue	0	0	0	0	0	0	0	1	0	0	1	0	0	2
17-Owl Crk Black	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Indet Black	0	0	0	0	1	0	0	0	0	0	1	0	0	2
Indet Dk Brown	0	0	0	0	0	0	1	0	2	0	2	0	0	5
Indet Dk Gray	0	0	0	0	0	0	3	0	1	0	0	2	0	6
Indet Lt Brown	3	0	0	1	0	1	2	2	3	0	2	0	1	15
Indet Misc.	0	0	0	0	0	0	1	0	0	1	0	2	0	4
Indet Mottled	0	1	0	0	0	0	0	0	0	0	1	0	0	2
Indet White	0	0	0	0	1	0	0	1	0	0	0	1	0	3
Total	5	1	2	2	3	1	14	4	9	2	12	13	1	69

one of the two types represented in the expected frequency are Southeast Range cherts. Moreover, the overwhelming majority of unidentified cherts are light brown (more than 50% of the entire sample), suggesting that the Heiner Lake materials are probably underrepresented in the identified suite. The other type represented in expected numbers is Anderson Mountain Gray, which is associated with a relatively distant source (West Range Province). However, this unusually high frequency of Anderson Mountain Gray is common at several of the sites in the vicinity (see Chapter 8.0), suggesting that this material probably represents an unidentified local source of similar material and not long-distance procurement.

The assemblage is dominated by small flakes, with 57% falling into size categories less than 0.9 cm in

diameter and 91% falling into categories less than 2.6 cm in size (see Table 5.73). This suggests that latter-stage reduction activity was dominant, which is reinforced by complete lack of cortex on 91% of the assemblage (Table 5.75). Of the flakes with cortex, less than 4% exhibited recognizable cortex abrasion, suggesting that streambed procurement was not an important component of overall lithic procurement behavior at the site.

A relatively diverse faunal assemblage was recovered from the shelter. The bone is dominated by highly fractured fragments of relatively large bones that probably represent deer. Other taxa represented include turtle, rat-sized rodent, large bird, unspecified carnivore, and cottontail rabbit (Table 5.76). Roughly 42% of the assemblage is charred or calcined, and 28% is spirally-fractured,

Table 5.73 Debitage Recovery by Size and Material Type, AU 1, 41BL433.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue	1	27	25	13	13	8	0	87
02-C White	0	0	5	1	3	2	0	11
03-AM Gray	0	0	11	11	2	0	0	24
06-HL Tan	0	33	47	9	47	12	0	148
07-Foss Pale Brown	0	0	2	5	6	3	1	17
08-FH Yellow	0	0	4	4	3	1	0	12
09-HL Tr Brown	0	9	17	13	1	6	0	46
13-ER Flecked	0	0	2	0	0	1	0	3
14-FH Gray	0	0	3	1	1	0	0	5
15-Gry/Brn/Grn	1	0	1	3	3	0	0	8
17-Owl Crk Black	1	5	6	2	0	0	0	14
18-C Mottled	0	0	0	0	2	1	0	3
19-C Dr Gray	0	0	0	0	0	1	0	1
22-C Mott/Flecks	0	0	1	1	0	0	0	2
23-C Mott/Banded	0	0	0	0	0	1	0	1
<i>Subtotal</i>	3	74	124	63	81	36	1	382
Unidentified Types								
Indet Black	5	14	1	1	3	0	0	24
Indet Dk Brown	215	190	131	113	54	1	0	704
Indet Dk Gray	78	90	66	19	3	0	0	256
Indet Lt Brown	629	889	568	273	138	26	1	2524
Indet Lt Gray	84	113	73	44	18	4	0	336
Indet Misc.	173	19	21	40	11	3	0	267
Indet Mottled	0	0	3	4	2	0	1	10
Indet Trans	0	0	3	0	1	0	0	4
Indet White	6	23	12	6	11	1	0	59
<i>Subtotal</i>	1190	1338	878	500	241	35	2	4184
Total	1193	1412	1002	563	322	71	3	4566

indicating significant levels of cultural modification; however, no cutmarks were observed on any of the bone.

A moderately sized but relatively diverse assemblage of bivalves was also recovered. At least five distinct bivalve taxa, representing a range of microenvironmental settings, were recovered from the shelter. Several of the species (e.g.,

Amblema plicata and *Toxolasia texasensis*) require relatively deep, slow-moving water, indicating that at least some of the mussels were probably obtained from Cowhouse Creek, while others (e.g. *Trigonia verrucosa*) require relatively fast, clear water that was probably more characteristic of the larger tributaries.

Table 5.74 Binomial Statistic Results, AU 1, 41BL433.

Lithic Material	N	Including Indeterminates			Excluding indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue	87	255	320	less	16	35	more
02-C White	11	255	320	less	16	35	less
03-AM Gray	24	255	320	less	16	35	expected
06-HL Tan	148	255	320	less	16	35	more
07-Foss Pale Brow	17	255	320	less	16	35	expected
08-FH Yellow	12	255	320	less	16	35	less
09-HL Tr Brown	46	255	320	less	16	35	more
13-ER Flecked	3	255	320	less	16	35	less
14-FH Gray	5	255	320	less	16	35	less
15-Gry/Brn/Grn	8	255	320	less	16	35	less
17-Owl Crk Black	14	255	320	less	16	35	less
18-C Mottled	3	255	320	less	16	35	less
19-C Dr Gray	1	255	320	less	16	35	less
22-C Mott/Flecks	2	255	320	less	16	35	less
23-C Mott/Banded	1	255	320	less	16	35	less
Total Indet	4184	255	320	more	na	na	na

A variety of carbonized wood fragments were obtained from flotation samples from TP 1, 2, and 3. While the majority of these samples proved to be live oak, carbonized remains of netleaf hackberry and ashe juniper were also recovered.

5.10.3 Conclusions and Recommendations

The site is a rockshelter situated on a bluff above Cowhouse Creek. Although the deposits are relatively thin and subject to damage due to a dry, powdery texture, a great deal of integrity appears to remain in the stratigraphic sequence. Judging from the projectile points (cf. Turner and Hester 1985), the one radiocarbon age obtained, and the somewhat equivocal A/I data, occupation of the site dates to the Late Prehistoric.

The site contains abundant lithic and faunal assemblages which have high potential to contribute to research issues outlined in the research domains for Fort Hood (Ellis 1994b). Given the presence of a substantial amount of recent and historic trash on the surface, the absence

of such materials at depth, and the ease with which surface deposits can be moved by activity, it appears that the deposits in the shelter are largely intact and undisturbed. Furthermore, extremely large roof-fall slabs on the platform outside the present dripline of the shelter may cover intact cultural deposits which, if present, probably would contain data from much earlier occupations.

On this basis, site 41BL433 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. The deposits in the shelter are loose and extremely vulnerable to both intentional and unintentional disturbance from activities in the shelter. Because the known eligible components are relatively shallowly buried in a kind of setting that is well known for its capacity to yield artifacts, protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism; and (2) prevent manual excavations or surficial disturbances by military personnel during training exercises.

Table 5.75 Debitage Cortex Characteristics by Material Type, AU 1, 41BL433.

Lithic Material	All Cortex			Partial Cortex			No Cortex	Indeterminate	Total
	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate			
Identified Types									
HL Blue	0	0	0	0	3	1	83	0	87
02-C White	0	0	0	0	2	0	9	0	11
03-AM Gray	0	1	0	0	3	0	20	0	24
06-HL Tan	0	0	0	0	6	2	140	0	148
07-Foss Pale Brow	0	0	0	1	1	5	10	0	17
08-FH Yellow	0	0	0	0	0	2	10	0	12
09-HL Tr Brown	0	0	0	0	1	2	43	0	46
13-ER Flecked	0	0	0	0	0	1	2	0	3
14-FH Gray	0	0	0	0	0	1	4	0	5
15-Gry/Brn/Gm	0	0	0	0	1	1	6	0	8
17-Owl Crk Black	0	0	0	0	0	0	14	0	14
18-C Mottled	0	0	0	1	0	2	0	0	3
19-C Dr Gray	1	0	0	0	0	0	0	0	1
22-C Mott/Flecks	0	0	0	0	0	0	2	0	2
23-C Mott/Banded	0	0	0	0	0	0	1	0	1
<i>Subtotal</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>2</i>	<i>17</i>	<i>17</i>	<i>344</i>	<i>0</i>	<i>382</i>
Unidentified Types									
Indet Black	0	0	0	0	0	0	24	0	24
Indet Dk Brown	0	0	1	1	17	9	661	15	704
Indet Dk Gray	0	0	0	0	4	0	250	2	256
Indet Lt Brown	0	12	1	7	119	62	2309	14	2524
Indet Lt Gray	0	2	0	0	7	7	320	0	336
Indet Misc.	0	0	0	0	3	44	204	16	267
Indet Mottled	0	0	0	0	2	1	7	0	10
Indet Trans	0	0	0	0	0	0	4	0	4
Indet White	0	2	0	0	3	5	48	1	59
<i>Subtotal</i>	<i>0</i>	<i>16</i>	<i>2</i>	<i>8</i>	<i>155</i>	<i>128</i>	<i>3827</i>	<i>48</i>	<i>4184</i>
Total	1	17	2	10	172	145	4171	48	4566

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et

al. 1994b). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of up to 40 m², including the platform outside the dripline. Known occupations occur at

Table 5.76 Faunal Recovery, AU 1, 41BL433.

	Element															Total
	Antler	Cranium	Fused 3&4th carpals	Fused 3&4th metata	Humerus	Indeterminate	Long bone	Metapodial	Permanent tooth	Plastron	Pleural	Tibia	Tooth	left	right	
Vertebrates																
Artiodactyla	0	0	2	2	0	0	0	0	0	0	0	1	0	0	0	5
Aves (large)	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Carnivora	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Mammalia (med/lg)	0	2	0	0	0	107	0	0	0	0	0	0	0	0	0	109
Mammalia (sm/med)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Odocoileus sp.	2	0	0	0	0	0	0	0	2	0	0	0	1	0	0	5
Rodentia (medium)	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
Sylvilagus sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Testudinata	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Vertebrata	0	0	0	0	0	99	1	0	0	0	0	0	0	0	0	100
Total	2	2	2	2	1	207	3	1	4	1	1	1	2	0	0	229
Bivalves																
Amblema plicata	0	0	0	0	0	0	0	0	0	0	0	0	0	11	12	23
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	11	4	15
Lampsilinae	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	8
Lampsilis hydiana	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Quadrula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Tritigonia verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	36	23	59

the site from the surface to approximately 60 cmbs, yielding up to approximately 25 m³ of manual excavation. Discovery of intact buried deposits at greater depths on the platform would increase mitigation requirements by an unknown amount.

5.11 SITE 41BL454

5.11.1 Introduction

In January 1994, Mariah conducted test excavations at site 41BL454. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.11.1.1 Location and Description

Site 41BL454 is located on the north bank of Cowhouse Creek (Belton Lake) (Figure 5.37). A gullied drainage is present about 40 m to the east, and several bulldozer cuts and/or backdirt piles are present on and near the site. This terrace was inundated during the 1991-1992 flood. Maximum site dimensions are 25 x 10 m (about 250 m², or 0.06 acres). For the purpose of this report, the site is included in the East Cowhouse area of the fort.

5.11.1.2 Previous Work

Moore and Ensor originally recorded the site on 18 October 1983. The site location was described as a levee or bar on the north bank of Cowhouse Creek. A small, thin mussel shell lens, about 1 to 1.5 mbs, and organic staining, about 1 mbs, were observed in the cutbank. Two flakes and a light amount of burned rock were also noted, but their location was not given. Based on these observations, the area was considered a probable habitation site. Erosion was judged to have impacted 10% of the site.

On 19 October 1992, Abbott and Mehalchick revisited and reevaluated the site based on geomorphological and archeological grounds. The site location was described as the T₀ terrace surface of Cowhouse Creek. Due to a dense cover comprised of a variety of compositae and the recent (1991-92) flood drape, surface visibility was negligible. No cultural material was observed in the 2 to 3 m high cutbank. Bulldozing, erosion, flooding, and probable cultivation were noted site impacts (30 to 40%). Based on the material noted in 1983 and the potential for the fill to contain deeply buried, intact cultural deposits, shovel testing was recommended.

Two shovel tests were excavated on 29 October 1992. These two tests were sterile to 75 and 60 cmbs, respectively, with the upper 30 cm of deposit in each test comprising the recent flood drape. However, since the alluvium was at least 2 m thick, archeological potential remained

uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. One backhoe trench and two m² of manually excavated test pits were recommended for formal eligibility testing (Trierweiler 1994:A192-A193).

5.11.1.3 New Work

One backhoe trench was excavated near the center of the site and two test pits (TP 1-2) were located near the terrace edge, both to the east of the trench (Table 5.77).

5.11.2 Results

One trench (BT 1) was excavated within the site boundaries to examine the stratigraphy and prospect for buried cultural material. The trench was situated on the bank overlooking Cowhouse Creek (Belton Lake) near the cutbank used to describe the stratigraphy during the reconnaissance phase. The trench was excavated well below the elevated water table adjacent to the lake, and quickly filled with water.

Three zones were identified in the trench. The upper 45 cm consisted of laminated to thin-bedded silts, sands, and clays deposited during recent flooding. Several thin, interbedded lenses of clean, well sorted sands in this zone thinned rapidly away from the riverbank, indicating episodes of high energy overbank flooding. This modern flood drape was underlain by a single unit exhibiting an AC-C profile. The upper horizon consisted of massive to very weak blocky structured, dark grayish brown to grayish brown (10YR 4/2 to 10YR 5/2), cumulic sandy loam containing a few scattered snail shells, moderate organic enrichment, and very weak carbonate filaments. The underlying C horizon consisted of dark grayish brown to grayish brown (10YR 4/2 to 10YR 5/2), weak blocky structured sandy clay loam. It contained a few scattered snail shells and sparse carbonate filaments on ped faces. No cultural material was observed in the trench.

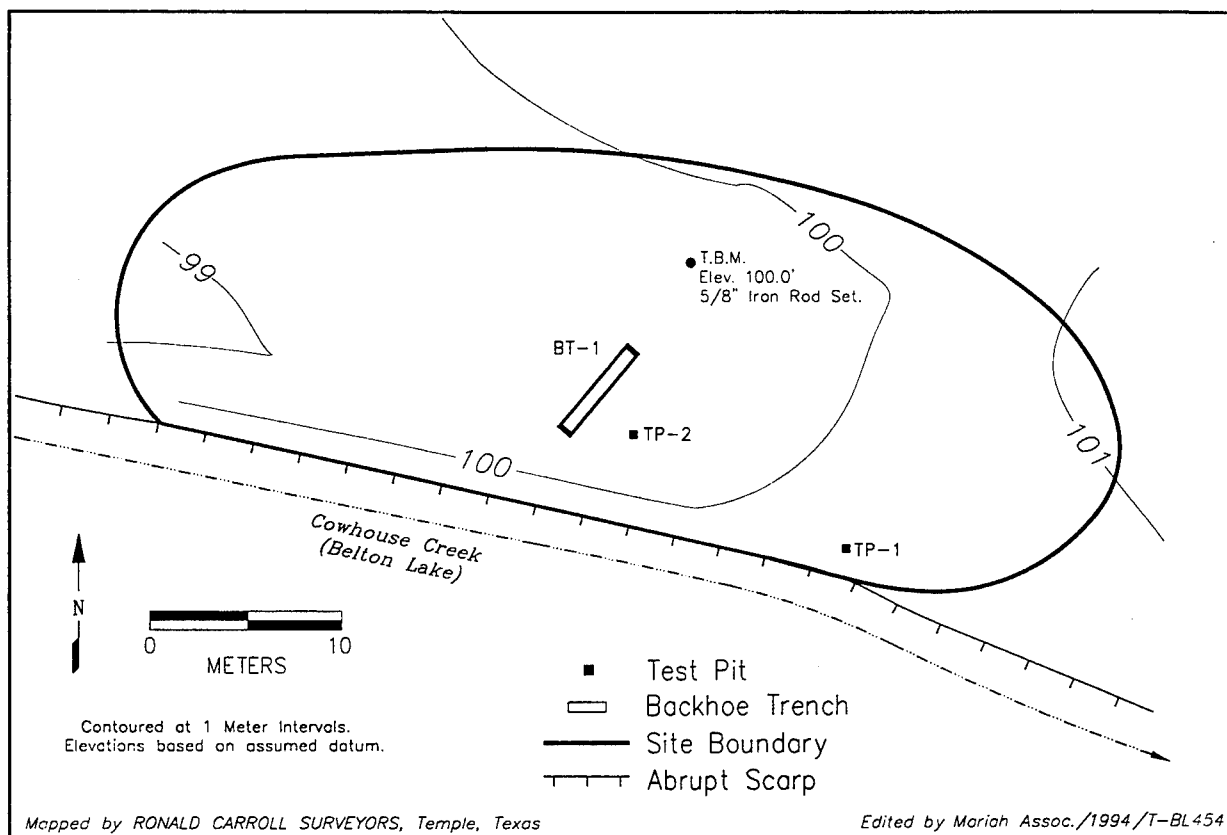


Figure 5.37 Site Map of 41BL454.

Test pits 1 and 2 were excavated to 170 and 200 cmbs, respectively. No artifacts were recovered from either test unit, although snails were relatively abundant. In both units, the upper 30 cm of fill was the 1991-1992 flood deposit.

5.11.3 Conclusions and Recommendations

This site is situated on a relatively recent terrace of Cowhouse Creek on the margin of Belton Lake. The deposits exposed in BT 1 represent recent vertical accretion sediments deposited by Cowhouse Creek, and are probably equivalent to the Ford alluvium of Nordt (1992). The profile consists of dark grayish brown sandy loam to sandy clay loam that becomes markedly more clayey with depth, and is overlain by approximately 45 cm of highly stratified modern flood deposits. With the exception of some weak

structural development, little evidence of pedogenic modification of the sediments is apparent.

No cultural material was detected in the trench or test pits. Given the absence of any visible cultural remains, the site has negligible archeological potential. On the basis of the above, we judge site 41BL454 to be not significant and to be ineligible for inclusion in the NRHP. No further management is recommended for this site.

Table 5.77 List of Treatment Units, 41BL454.

AU	Treatment	Length	Width	Depth
1	BT 1	~6	1.4	300
1	TP 1	1.0	1.0	170
1	TP 2	1.0	1.0	200

5.12 SITE 41BL470

5.12.1 Introduction

In December 1993 and January 1994, Mariah conducted test excavations at site 41BL470. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.12.1.1 Location and Description

41BL470 is located on the north side of Cowhouse Creek and along the confluence of Cowhouse Creek and an unnamed tributary (Figure 5.38). A huge borrow pit is located at the central portion of the site (Figure 5.39). Maximum site dimensions are 220 m by 100 m (about 22,000 m², or 5.4 acres). For the purposes of this report, the site is included in the East Cowhouse area of the fort.

5.12.1.2 Previous Work

Ensor and Turpin first recorded the site on 5 December 1983. The site was located on the Cowhouse Creek floodplain, at the confluence of an intermittent stream and Cowhouse Creek. A 20 cm thick mussel shell lens was noted at 2.5 mbs in the Cowhouse Creek cutbank. Possible hearths were observed eroding from a borrow pit embankment. Flakes, retouched flakes, and a light amount of burned rocks were seen scattered on the site. The site was thought to represent a shell collecting station and/or habitation area. About 20% of the site, situated near the confluence, appeared to remain intact.

Pry and Dureka monitored the site on 24 November 1987. A burned clay feature, which resembled a cast left by a burned tree, was found in a rapidly eroding section of the cutbank. Mussel shell fragments and a very light amount of burned rock were observed in and near the area of this "feature." Flakes, shell, and a light amount of burned rock were noted across the site.

Approximately 70% of the site had been impacted by erosion and a borrow pit.

Abbott and Mehalchick revisited the site in October 1992 and reevaluated the site on geomorphic and archeological grounds. Several subhorizontal concentrations of burned rock, mussel shell, and flakes, probably representing buried occupation surfaces, were observed in the upper fill at depths of up to 1.5 mbs, while isolated burned rocks were observed as deep as 3 mbs. The site was inundated during a late 1991-early 1992 flood, suggesting that previously observed materials may have been buried or washed away. Because the site had the potential for intact cultural deposits, 17 shovel tests were excavated. A 5 to 20 cm flood drape was present where shovel testing was conducted, and only one shovel test was positive, with one flake found from 30 to 40 cmbs. The site's archeological potential remained uncertain and it was recommended for avoidance or for formal testing if avoidance was not possible. At least two backhoe trenches and three to six m² of manually excavated test pits were recommended for formal testing to determine NRHP eligibility (Trierweiler 1994:A210-A211).

5.12.1.3 New Work

Five backhoe trenches (BTs 1 through 5) and three 1 x 1 m test pits (TPs 1 through 3) were excavated on the site (Table 5.78). Trenches 1 and 2 were excavated to examine site stratigraphy. Trenches 3, 4, and 5 were excavated to prospect for archeological deposits. All of the test pits were excavated in the southeast corner of the site. Test pit 2 was offset from the south wall of BT 4. Test pits 1 and 3 were isolated units. Recovered cultural material is summarized in Table 5.79.

5.12.2 Results

Trenches 1 and 2 were excavated to examine site stratigraphy and were described in detail. At the time of excavation, the water level of Belton Lake was 250 to 300 cmbs; as a result, the trenches quickly filled with water. Three additional

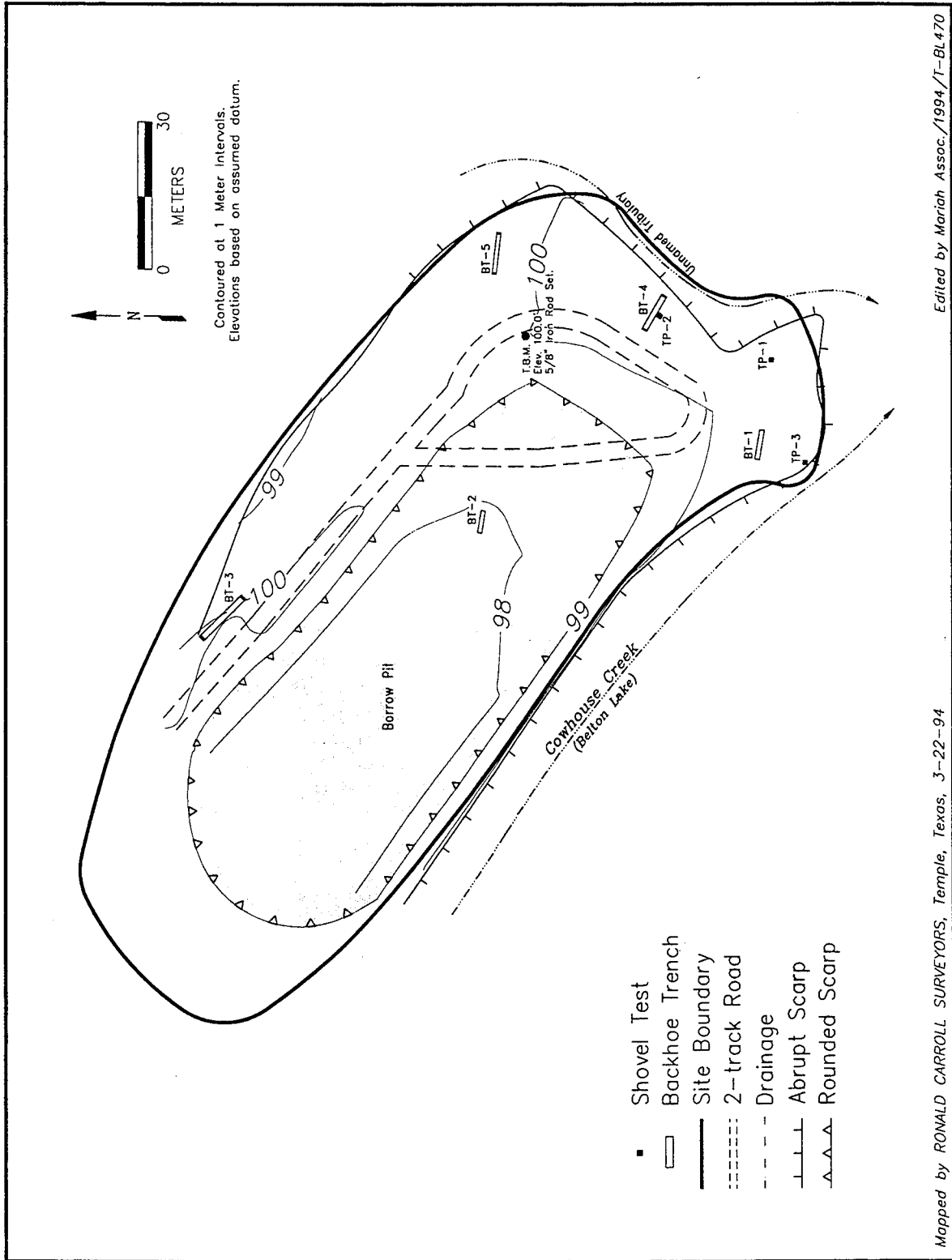


Figure 5.38 Site Map of 41BL470.

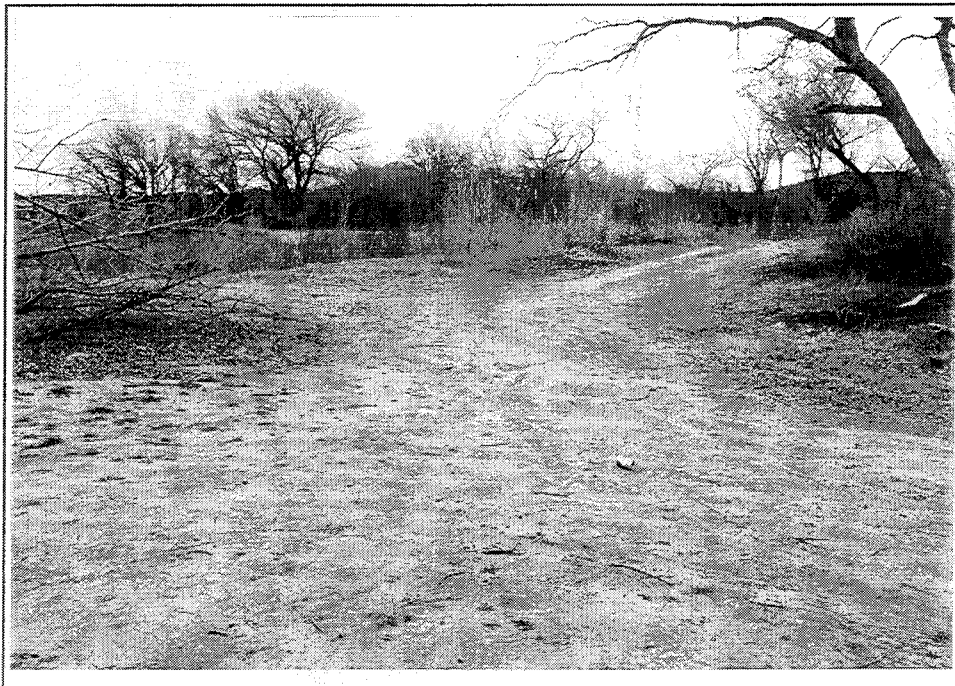


Figure 5.39 Overview of Site 41BL479, Looking Northwest.

trenches (BT 3-5) were excavated to prospect for cultural material and were only briefly examined due to their similarity to BT 1.

Trench 1 was situated on the bank overlooking Cowhouse Creek (Belton Lake) near the cutbank used to describe the stratigraphy during earlier work at the site. Three zones were identified in BT 1. The upper 30 cm consisted of laminated silts, sands, and clays deposited during recent flooding. This zone contained a moderate quantity of contemporary trash (e.g., beer cans and plastic). This modern flood drape was underlain by a single unit exhibiting an A-Bk profile. The A horizon was overthickened and extended from 30 cmbs to 155 cmbs. It consisted of very weak blocky structured, dark gray (10YR 4/1) sandy clay loam containing a few scattered snail shells and very weak carbonate filaments. The underlying Bk horizon consisted of grayish brown (10YR 5/2), strong blocky structured clay loam. It contained a few scattered snail shells and abundant carbonate filaments on ped faces. The sediment was wet

below approximately 200 cmbs. Although two large (10 to 20 cm diameter), unburned limestone clasts that probably represent "manuports" were noted, no obvious cultural material was observed in the trench.

Table 5.78 List of Treatment Units, 41BL470.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~8	1.4	300
1	BT 2	~6.5	1.4	240
1	BT 3	~10	0.7	250
1	BT 4	~10	1.4	310
1	BT 5	~8	0.7	300
1	TP 1	1.0	1.0	200
1	TP 2	1.0	1.0	210
1	TP 3	1.0	1.0	200

Table 5.79 Artifact Recovery by Test Pit, 41BL470.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3				
	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tool	Burned rock (kg)
1	NOT SCREENED					0	0	0	0	0(0)	NOT EXCAVATED				
2						0	0	0	0	0(0)					
3						0	0	0	1	0(0)					
4						2	0	2	0	0(0)					
5	NOT SCREENED					0	0	2	0	0(0)	0	0	0	0	0(0)
6	1	0	4	0	4(0.2)	0	0	11	0	3(0.5)	0	0	0	0	0(0)
7	3	0	6	1	16(1)	4	0	8	0	3(0.5)	0	0	0	0	0(0)
8	1	0	5	1	5(0.5)	1	0	4	0	1(0.3)	0	0	0	0	0(0)
9	1	0	2	0	3(0.3)	0	0	5	0	0(0)	1	0	0	0	0(0)
10	2	0	1	0	3(0.3)	2	0	3	0	3(0.5)	0	0	1	0	0(0)
11	6	0	6	0	3(0.3)	0	0	11	0	6(0.5)	0	0	0	0	0(0)
12	4	0	0	0	3(0.3)	10	0	2	0	8(0.5)	0	0	0	0	0(0)
13	5	0	1	0	3(0.3)	1	0	2	0	3(0.3)	0	0	1	0	0(0)
14	5	0	0	1	2(0.3)	4	0	12	0	3(0.3)	19	0	1	0	0(0)
15	2	0	0	0	1(0.5)	0	0	11	0	10(0.5)	2	0	0	0	1(0.3)
16	0	0	0	0	0(0)	2	0	4	0	1(0.3)	2	0	0	0	1(0.3)
17	0	0	0	0	0(0)	1	0	0	0	1(0.3)	0	0	1	0	0(0)
18	0	0	0	0	0(0)	0	0	1	0	2(3.5)	0	0	0	0	0(0)
19	0	0	0	0	0(0)	0	0	1	0	0(0)	0	0	0	0	1(0.1)
20	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
21	-					0	0	0	0	0(0)	-				
TOTAL	30	0	25	3	43(4)	27	0	79	1	44(8.0)	24	0	4	0	3(0.7)

Trench 2 was placed in the bottom of the borrow pit to examine the more deeply buried sediments. Two zones were noted in BT 2. The upper 30 cm consisted of a C horizon of recent flood drupe similar to that noted in BT 1. The underlying sediments represent a profile strongly truncated by the construction of the borrow pit. The depth of the pit suggests that at least 2 m of sediment have been removed from the section. The trench was excavated to a depth of approximately 250 cm. Only one zone, a 2C horizon, was observed beneath the flood drupe. It consisted of yellowish brown to light yellowish brown (10YR 5/4 to 10YR 6/4) sandy clay loam. The entire section was wet and evinced little structure; however the

backdirt revealed that strong subangular blocky peds developed on drying. Very little secondary carbonate was noted in the trench or on the dried backdirt. No cultural material was detected.

The three remaining trenches each exhibited profiles similar to the profile described in BT 1. Trench 3 was placed at the northern site edge, just north of the road and borrow pit. No artifacts were noted. Trench 4 was dug at the northeast edge of the site, northeast of the road and near the tributary. An isolated burned rock or mussel shell was observed in profile. Trench 5 was located between the road and tributary near the east-central

site edge. A relatively sparse zone of burned rocks and mussel shell was noted at 100 to 150 cmbs.

Test pit 1 was placed 5 to 10 m west of the tributary, 10 m north of Cowhouse Creek, and excavated to 200 cmbs. Recent flood drupe sediments and trash from 0 to 50 cmbs were removed unscreened in TP 1. Levels 6 through 15 contained varying artifact frequencies (Table 5.79), with two probable occupations based on peak artifact densities. Levels 7 and 8 contained a modest assemblage of lithics (including a Lange point), mussel shells, and burned rocks. Material was scattered across the entire unit. Another modest assemblage of flakes, shells, and burned rocks occurred in Level 11. These three levels account for half of the artifacts recovered from 10 positive levels.

Ephemeral, buried occupations appeared to be present in the profile of BT 4. Test pit 2 was offset the south wall of BT 4, where the greatest amount of material was visible in profile. A very thin flood drupe was present across the surface of TP 2. Three buried occupations seem to be present, again based on high artifact return (Table 5.79). Two of the three cultural zones occur at roughly the same depths as those noted in TP 1, although the occupations may not correlate between test pits. Levels 6 through 7, 11 through 12, and 14 through 15 each yielded peak artifact frequencies that together comprise approximately two-thirds of the cultural material recovered from the test pit. Recovered material included burned rocks, lithics, and mussel shell scattered across the unit. Seventeen of 21 excavated levels were positive. Excavation was terminated at 210 cmbs.

Test pit 3 was oriented parallel to the cutbank of Cowhouse Creek, where burned rocks and shell were exposed at approximately 150 cmbs. The test pit was situated 10 m south-southwest of TP 1 and excavated to 200 cmbs. Levels 1 through 4 in TP 3 consisted of the recent flood deposit. Seven of 16 excavated levels were positive and contained a small artifact assemblage, most of which came from 130 to 160 cmbs (Table 5.79). This probably

correlates to materials visible in the cutbank and possibly to the third occupation (130 to 150 cmbs) noted in TP 2.

The aforementioned Lange point and three other tools were recovered from this site: a late stage biface, a uniface, and a utilized flake. The biface and flake are of nearby Southeast Range Heiner Lake Tan while the uniface is of an indeterminate mottled chert.

Eight identified types and five indeterminate categories of chert were recovered from 41BL470 (Table 5.80). Approximately one-third of the recovered flakes were identified. When all flakes were considered, Heiner Lake Tan, Heiner Lake Blue, and Fort Hood Gray occurred in expected frequencies; Fossiliferous Pale Brown, Fort Hood Yellow, Heiner Lake Translucent Brown, Gray/Brown/Green, and Owl Creek Black occurred in less than expected frequencies; and indeterminates occurred in greater than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan occurred in greater than expected frequencies and all other types occurred in expected frequencies (Table 5.81). The identified assemblage represents an admixture of types characteristic of the Southeast Range and North Fort provinces, with the majority (60%) representing the Southeast Range.

Size classes are strongly skewed toward smaller flakes, with 91% of recovered flakes smaller than 1.8 cm (Table 5.80). Most flakes (approximately 90%) are also decortified (Table 5.82), suggesting that latter-stage reduction predominated at the site. Despite the proximity of the Cowhouse Creek channel, no Cowhouse province chert classes or abraded cortex indicative of streambed procurement were identified (Table 5.82).

Faunal recovery was limited to mussel shell. At least four species representing microenvironments ranging from clear standing pools (*Amblema plicata*) to low current pools with muddy (*Toxolasia texanensis*) or firm (*Lampsilinae* sp.) bottoms to clear, fast current reaches with sandy

bottoms (*Tritogonia verrucosa*) are represented in the relatively small assemblage (Table 5.83).

No radiocarbon ages are available from the site. However, a suite of eight A/I ratios on *Rabdotus* shells recovered from TP 2, Level 12 provide a broad indication of age and integrity (see Appendix D). The A/I ratios range from approximately .06 to .135, indicative of radiocarbon-equivalent ages between approximately 2200 and 5500 BP. However, four of the eight shells cluster rather tightly around a radiocarbon-equivalent age of roughly 4000 BP. Despite this rather tight clustering, the actual age of deposition is tentatively interpreted as approximately 2200 BP on the basis of a single A/I ratio from the "youngest" snail analyzed. The reason for the rejection of the older cluster is two-fold. First, the extent of soil development is more consistent with other sites of Late Holocene age than with other alluvial sites of mid-Holocene age. Second, the deep, sealed deposits are much more likely to contain old reworked shells (or shells artificially "aged" by heating) than anomalously "young" intrusives. However, the age of the occupations is not well established, and additional data are necessary to resolve the question.

Table 5.80 Debitage Recovery by Size and Material Type, AU 1, 41BL470.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue(1&10)	0	2	1	3	0	1	0	7
06-HL Tan	0	0	2	5	2	2	0	11
07-Foss Pale Brow	0	0	0	0	0	0	1	1
08-FH Yellow	0	0	0	1	0	0	0	1
09-HL Tr Brown	0	0	0	0	2	0	0	2
14-FH Gray	0	0	3	3	0	0	0	6
15-Gry/Brn/Grn	0	0	2	2	0	0	0	4
17-Owl Crk Black	0	1	2	0	0	0	0	3
<i>Subtotal</i>	<i>0</i>	<i>3</i>	<i>10</i>	<i>14</i>	<i>4</i>	<i>3</i>	<i>1</i>	<i>35</i>
Unidentified Types								
Indet Dk Brown	0	3	4	0	0	0	0	7
Indet Dk Gray	0	0	1	0	0	0	0	1
Indet Lt Brown	2	19	23	16	1	0	0	61
Indet Lt Gray	0	1	1	0	0	1	0	3
Indet White	0	0	0	1	0	0	0	1
<i>Subtotal</i>	<i>2</i>	<i>23</i>	<i>29</i>	<i>17</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>73</i>
Total	2	26	39	31	5	4	1	108

Table 5.81 Binomial Statistic Results, AU 1, 41BL470.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	11	5	18	expected	1	9	more
07-Foss Pale Brown	1	5	18	less	1	9	expected
08-FH Yellow	1	5	18	less	1	9	expected
09-HL Tr Brown	2	5	18	less	1	9	expected
10-HL Blue	7	5	18	expected	1	9	expected
14-FH Gray	6	5	18	expected	1	9	expected
15-Gry/Brn/Grn	4	5	18	less	1	9	expected
17-Owl Crk Black	3	5	18	less	1	9	expected
Total Indet	73	5	18	more	na	na	na

5.12.3 Conclusions and Recommendations

Trenches 1, 3, 4, and 5 represent relatively recent vertical accretion sediments deposited by Cowhouse Creek, and are probably equivalent to the Ford or upper West Range of Nordt (1992). The profile consists of an over-thickened, cumulic A horizon underlain by a thick clay loam exhibiting abundant carbonate filaments. The more yellow, sandier sediments observed in BT 2 may represent a different fill than that exposed in BT 1, but it is considered more likely that they represent a different facies of the same fill probably lateral accretion deposits underlying the vertical accretion deposits exposed in BT 1. Both trenches are capped by thick laminated sediments deposited by flood events in the past few years.

The site matrix preserves an intact series of buried occupations at various depths. These occupations appear to be fairly discrete and ephemeral, which means that they may contain readily interpretable evidence pertaining to a range of identifiable activities. The presence of a Lange point in the upper 70 cm of the stratigraphy suggests an occupation during or after the latter portion of the Middle Archaic (Turner and Hester 1985), and amino acid epimerization ratios on snails from TP 2 Level 12 are indicative of radiocarbon-equivalent ages between approximately 2,200 and 5,500 years BP. Although the assemblage includes four specimens that cluster around an approximate radiocarbon-equivalent of 4000 BP, the presence of two distinctly "younger" snails and the character of the fill both suggest that this cluster is probably too old to represent the age of deposition, and an approximate age of 2,200 years--the radiocarbon-equivalent age of the "youngest" shell--is tentatively accepted as roughly indicative of the age of the occupation. If true, this implies that the occupation is of Late Archaic age and that the fill is equivalent to the West Range alluvium of Nordt (1992).

Table 5.82 Debitage Cortex Characteristics by Material Type, AU 1, 41BL470.

Lithic Material	Partial Cortex			Total
	Unabraded	Indeterminate	No Cortex	
Identified Types				
06-HL Tan	0	2	9	11
07-Foss Pale Brown	1	0	0	1
08-FH Yellow	0	0	1	1
09-HL Tr Brown	0	1	1	2
10-HL Blue	0	0	7	7
14-FH Gray	1	0	5	6
15-Gry/Brn/Gm	0	0	4	4
17-Owl Crk Black	0	0	3	3
<i>Subtotal</i>	2	3	30	35
Unidentified Types				
Indet Dk Brown	0	0	7	7
Indet Dk Gray	0	0	1	1
Indet Lt Brown	1	4	56	61
Indet Lt Gray	1	0	2	3
Indet White	0	0	1	1
<i>Subtotal</i>	2	4	67	73
Total	4	7	97	108

Table 5.83 Faunal Recovery, 41BL470.

Bivalves	Element		Total
	left	right	
Amblema plicata	8	8	16
Amblema sp.	2	2	4
Ambleminae	6	11	17
Lampsilinae	1	4	5
Toxolasma texasensis	2	0	2
Tritogonia verrucosa	2	2	4
Unionacea	3	3	6
<i>Total</i>	24	30	54

Lithic materials in the assemblage are dominated by Southeast Range varieties, with North Fort province material making up a sizable fraction of the total. Material obtained from Cowhouse Creek itself is absent, despite the proximity of the stream. Size and cortical data suggest that primarily latter-stage reduction and tool finishing were performed on site. The presence of relatively abundant mussel shells implies that the site has potential to contribute to an understanding of the role of shellfish in prehistoric adaptations. Given the abundance of snails in many levels, carbon and oxygen isotope analyses could be used with epimerization and radiocarbon assays to reconstruct part of the paleoclimatic history of Fort Hood and to refine Nordt's (1992) alluvial sequence. Hence, the site has potential to address issues in the research design for Fort Hood (Ellis 1994b).

On the basis of the above, we judge 41BL470 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory for Central Texas in general and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because known significant deposits occur in deeply buried contexts, the site requires measures to protect it against further damage from borrow activities. Furthermore, adverse impacts from erosion (as evidenced by loss of cutbank deposits) pose a substantial threat to this scientifically valuable site. Protection efforts therefore also should include measures to minimize the impact of further erosion on the cutbank.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should

reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include backhoe trenches and manual excavation of a block or blocks, exposing buried features and living surfaces, up to 75 m² in area. Block excavations should be concentrated near the test pit locations and should focus on the assemblages centered around Levels 7, 11, and 14. Excavations should be devoted to exposure of broad expanses (rather than to small, widely spaced locations) in order to provide a sound basis for determining site function for apparently ephemeral activities. Recent flood drape sediments should be removed by carefully monitored mechanical excavations, which also could be employed to remove deposits between occupations. However, because the known occupations are vertically spaced over about a meter of stratigraphy, potential mitigation could involve as much as 75 m³ of manual excavations. If mitigation is necessary, additional mechanical sounding excavations should be performed to identify potential deposits at depths than could not be reached during testing as a result of the high water table. If sounding excavations show the presence of intact cultural deposits at greater depths, they could add an unspecified amount of manual excavations to the above estimate.

5.13 SITE 41BL513

5.13.1 Introduction

In late March 1994, Mariah conducted test excavations at site 41BL513. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.13.1.1 Location and Description

Site 41BL513 is situated on both sides of Bear Creek and spans three alluvial surfaces (T₀, T₁, and T₂) and portions of an alluvial fan/colluvial slope

(Figure 5.40). Roads to the north and south parallel Bear Creek (Figure 5.41). Maximum site dimensions are 325 x 160 m (about 52,000 m², or 10.3 acres). The site is located near an environmental set-aside area. For the purposes of this report, the site is included in the Cowhouse/Taylor/Bear area of the fort.

5.13.1.2 Previous Work

Meiszner and Moore first recorded the site on 24 January 1984. The site was located on both sides of Bear Creek on a low floodplain terrace. Bifaces and flakes were observed across the surface and two Ensor points were collected from the western site margin. Depth of deposit was estimated at 50 cm and the site was considered minimally impacted.

On 18 March 1992, Quigg and Frederick revisited and reevaluated the site based on archeological and geomorphological observations. The site was divided into Subarea A, the T₀ and T₁ surfaces

(Holocene), and Subarea B, the T₂ surface and alluvial fan/colluvial slope (Pleistocene). Erosion, tree throws, animal burrows, and possibly plowing were noted as disturbances on both subareas. A light scatter of debitage and cores was exposed across Subarea A, particularly in and along trails. Some cutbank exposures along the creek channel revealed a meter of Holocene alluvium, however, no buried cultural material was observed. The potential for buried archeological material was considered excellent and shovel testing was warranted. Flakes, bifaces, cores, and natural chert were noted across Subarea B, with the greatest frequency on the T₂ surface. A Cuney, Ensor, and Frio (Late Prehistoric-Transitional Archaic), plus an untyped dart point, were collected from the T₂ surface south of Bear Creek. Subarea B consisted of an ancient, stable surface and the potential for buried cultural was considered poor. For this reason, shovel testing was not considered warranted; however, trenching was recommended to clarify the stratigraphic relationships between the terrace surfaces.

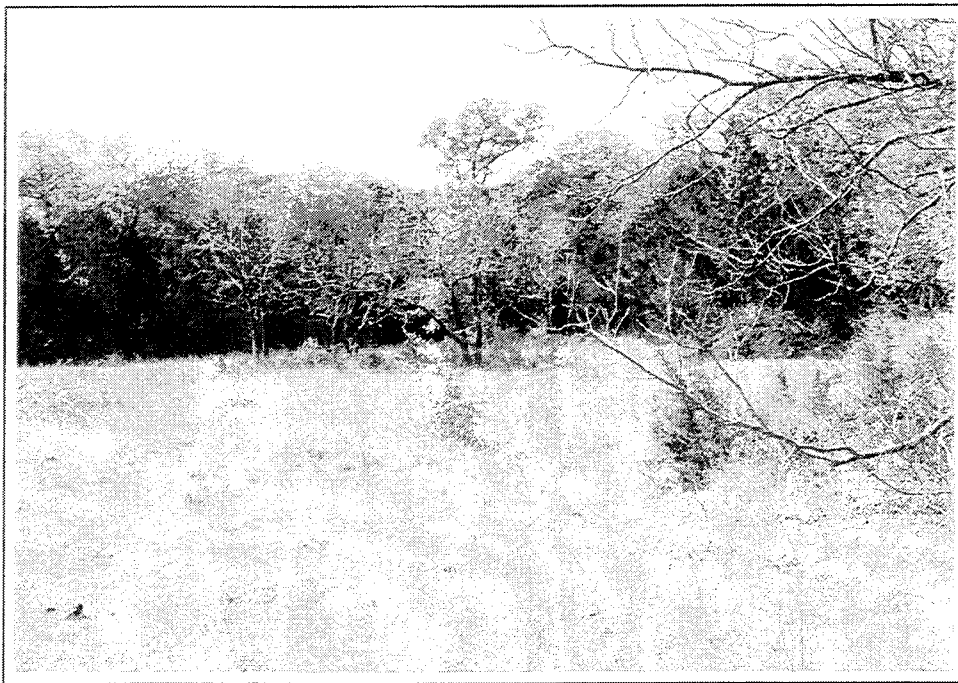


Figure 5.40 Overview of Site 41BL513, Looking Southwest.

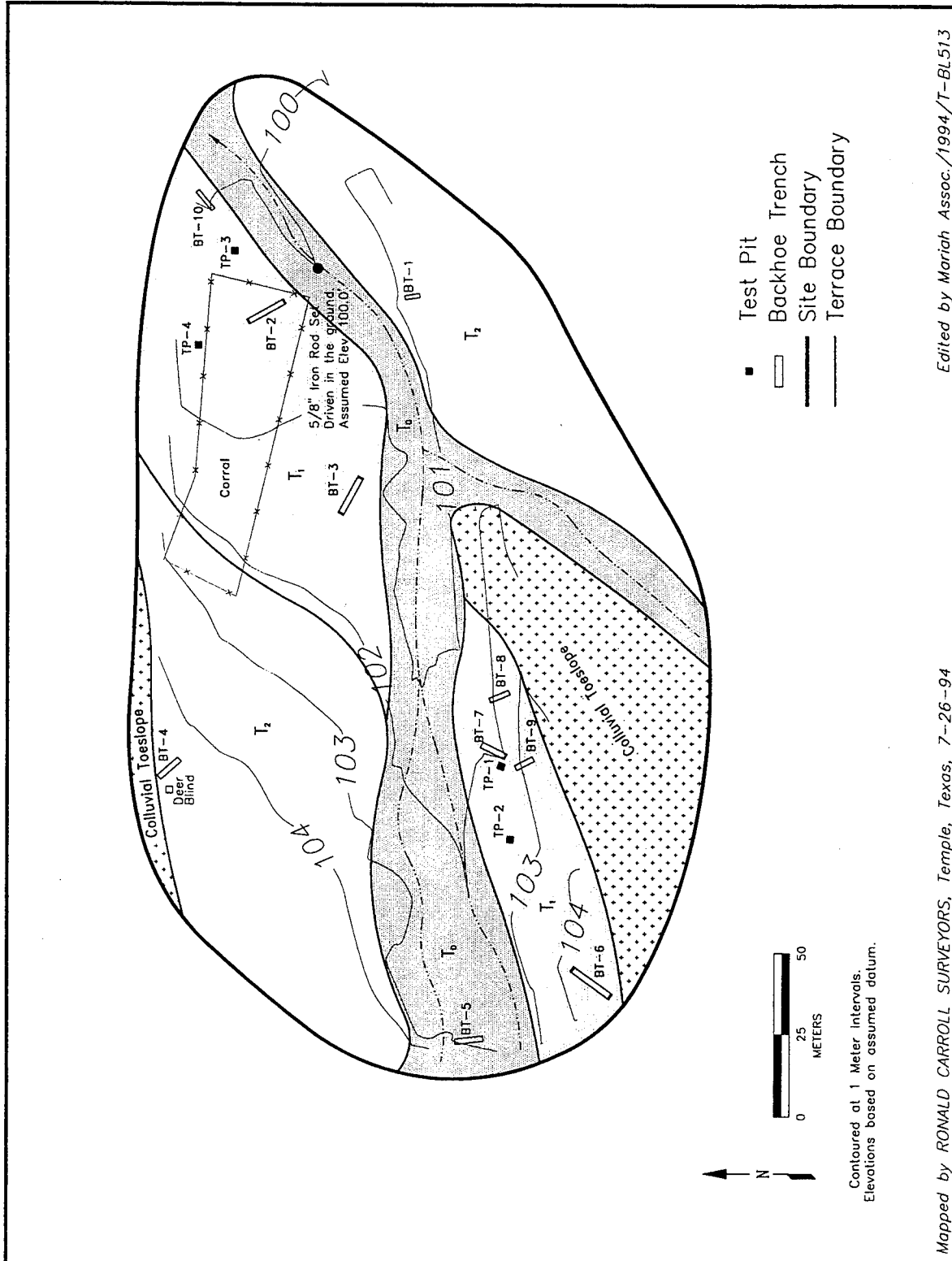


Figure 5.41 Site Map of 41BL513.

On 8 April 1992, 19 shovel tests were excavated across Subarea A. All but five tests contained cultural material, most of which was concentrated in the upper two levels and none of which was deeper than 40 cmbs. Shovel testing results indicated the presence of buried cultural material; however, Subarea A's archeological potential remained unknown. Subarea A was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Four to six 1 x 1 m of manually excavated test pits and five to six backhoe trenches were recommended for formal testing to determine NRHP eligibility (Trierweiler 1994:A242-A245).

5.13.1.3 New Work

In a telephone conversation with Gil Eckrich (DEH, Fish and Wildlife) in late February 1994, permission was granted to conduct backhoe trenching and subsequent manual excavations at 41BL513 since the site is located near the fringes of the protected endangered bird habitat area and well downstream of Bear Creek's headwaters where the birds congregate.

Ten trenches were excavated to examine site stratigraphy and prospect for buried deposits and four 1 x 1 m test pits were excavated (Table 5.84). Test pit 1 was offset from the west wall of BT 7 over an area containing an apparent burned rock feature, and TP 2 was placed as a free-standing unit about 20 m to the west-southwest of the trench. Trench 8 was located 15 m east of BT 7 and extended north from the base of the colluvial slope. Trench 9 was placed just upslope from BT 7 and in front of what appeared to be a collapsed rockshelter. Test pits 3 and 4 were isolated units on the T₁ surface north of Bear Creek, near the northeast site boundary. This portion of the site, aside from the immediate area surrounding BT 7, seemed to have greater potential for intact cultural deposits based on trenching results. Test pit 3 was placed equidistant between BT 2 and BT 10. Test pit 4 was located near the base of the colluvial slope, about 25 m northwest of TP 3. Recovered cultural material is summarized in Table 5.85.

Table 5.84 List of Treatment Units, 41BL513.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~4	0.8	175
1	BT 2	~11	0.8	150
1	BT 3	~12	0.8	150
1	BT 4	~5	0.8	110
1	BT 5	~7	0.8	190
1	BT 6	~12	0.8	110
1	BT 7	~8	0.8	150
1	BT 8	~4	0.8	160
1	BT 9	~5	0.8	140
1	BT 10	~6	0.8	200
1	TP 1	1.0	1.0	100
1	TP 2	1.0	1.0	70
1	TP 3	1.0	1.0	100
1	TP 4	1.0	1.0	100

5.13.2 Results

The general stratigraphic architecture of the site is illustrated in Figure 5.42. Trench 1 was excavated into a broad T₂ terrace at the eastern end of the site. Four zones composed of reddish brown to reddish gray clay (5YR 3/3-5YR 4/2) and exhibiting an Ap-AB-Bt profile were revealed in the 175 cm deep trench. Trench 6 was placed on a narrower terrace remnant at the western end of the site, and revealed deposits similar to the upper portion of BT 1. Both trenches are tentatively interpreted as the late Pleistocene Jackson alluvium (Nordt 1992). However, while BT 1 clearly represents the late Pleistocene fill, it is possible that BT 6 is actually excavated into an early Holocene fill (i.e., the Fort Hood alluvium). Not surprisingly, no cultural material was detected in either trench. Trench 4 was also placed on the T₂ terrace, but was positioned to abut the colluvial toeslope. It consisted of relatively thin (less than 1 m), reddish brown, gravelly loam overlain by a wedge of very dark grayish brown, gravelly

Table 5.85 Artifact Recovery by Test Pit, 41BL513.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4					
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	
1	0	0	0	0	0(0)	0	0	13	1	3(1.9)	0	0	0	0	0(0)	0	0	0	0	0	1(0.1)
2	0	0	0	0	0(0)	0	0	2	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0(0)
3	0	0	1	0	0(0)	0	0	2	0	0(0)	0	0	8	0	1(0.5)	0	0	0	0	0	0(0)
4	0	0	0	0	2(0.9)	0	0	3	0	15(7)	0	0	3	0	1(0.3)	0	0	0	0	0	0(0)
5	0	0	0	0	9(3)	0	0	3	1	21(9)	0	0	2	0	1(0.2)	0	0	0	0	0	0(0)
6	0	0	5	0	36(9)	0	0	4	0	7(3)	0	0	2	1	2(0.5)	0	0	0	0	0	0(0)
7	0	0	39	1	1100(200)	0	0	0	1	2(0.9)	0	0	0	0	1(0.2)	0	0	0	0	0	0(0)
8	0	0	0	0	0(0)						0	0	0	0	0(0)	0	0	0	0	0	0(0)
9	0	0	0	0	0(0)						0	0	0	0	0(0)	0	0	0	1	0	0(0)
10	0	0	0	0	4(1)						0	0	0	0	0(0)	0	0	0	0	0	0(0)
TOTAL	0	0	45	1	1147(212.9)	0	0	27	3	48(21.8)	0	0	15	1	6(1.7)	0	0	0	1	0	1(0.1)

colluvium that thinned away from the base of the slope. Although the underlying alluvium is interpreted as a sterile Pleistocene-age fill, the colluvium contained moderate quantities of burned rock and flakes and is clearly of Holocene age. However, it is unclear whether this material is in primary or secondary context.

Trenches 2 and 10 were excavated north of the creek on the T₁ surface. Trench 2 is typical of the character of deposits on the north side of the stream. It was excavated to a depth of approximately 150 cmbs and exhibited an A (or Ap)-Bw-Ck profile developed in thick, very

gravelly clay loam over a thin, loamy gravel channel deposit. The color of the fill was dark reddish brown (5YR 3/2), suggesting that much of it was derived from erosion of an upland soil or the Pleistocene terrace, and providing the primary support for an early to middle Holocene age. However, the extent of soil development suggests that these deposits are probably more recent, and the deposits are tentatively correlated with the West Range unit of Nordt (1992). The character of the deposits suggests that they were laid down by a relatively wide, flashy channel. Dispersed burned rock was noted throughout the upper fill, but no clear occupation surfaces were noted.

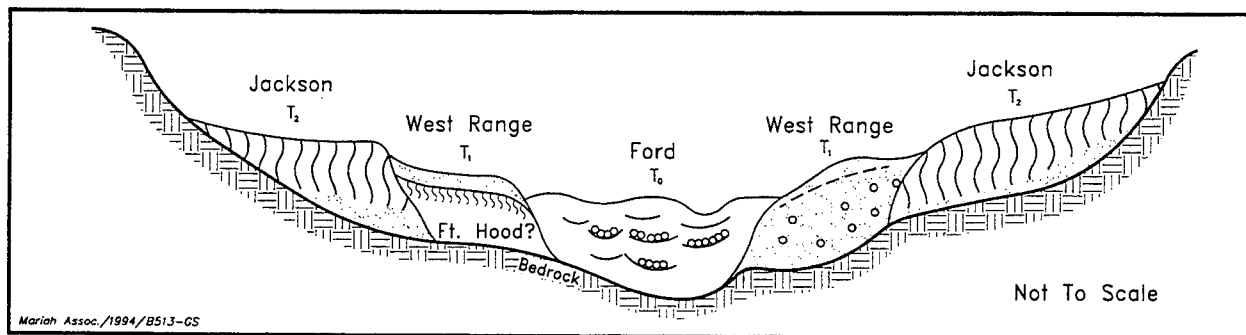


Figure 5.42 Generalized Stratigraphic Relationships, 41BL513.

Trench 10 was excavated to a depth of 2 mbs and also exhibited a weak A-C profile. Zone 1 consisted of very dark grayish brown (7.5YR 3/1) stratified loam, and extended to a depth of approximately 175 cm. The deposit consisted of a thick (20 to 40 cm) strata of loam and sandy loam containing thin stringers of gravel and a few dispersed burned rocks. Color varied somewhat primarily as a function of sand content, with sandier packets exhibiting a slightly lighter color than the more fine-grained packets. The degree of A horizon development was so weak that it could not be readily distinguished from the parent material. The basal deposits consisted of dark grayish brown (10YR 3/2), gravelly loam. Although the development of this unit suggests that it is very recent (i.e., Ford alluvium), it is also possible that it represents a distal facies of the West Range alluvium. Only a few scattered burned rocks were detected in the profile, but a good deal of dispersed charcoal was noted.

Test pits 3 and 4 were excavated near BT 2 and BT 10 to determine whether cultural materials were present in primary context in this portion of the site. In TP 3 (Figure 5.43), Levels 1 and 2 were culturally sterile (see Table 5.85). From 20 to 60 cmbs, a light amount of debitage (n=2 to 8 items) and less than two small burned rocks were recovered per level, with a moderate to heavy density of unburned limestone and gravels also noted. One small burned rock was found in Level 7, with no recovery from Levels 8 to 10.

Only Level 9 of TP 4 was positive with the recovery of a one lithic tool (Table 5.85). A light gravel density was noted from 0 to 60 cmbs, with rock size and density increasing with depth. The stratigraphy in TP 3 and TP 4 is similar to that in BT 10, and the cultural materials recovered from these units appeared to be in secondary context.

Deposits of late Holocene age, probably equivalent to the West Range fill, were also noted south of the stream in BT 7, 8, and 9. Trench 7 was excavated to a depth of approximately 160 cm, and exhibited an A-Bw-BC profile. The A horizon

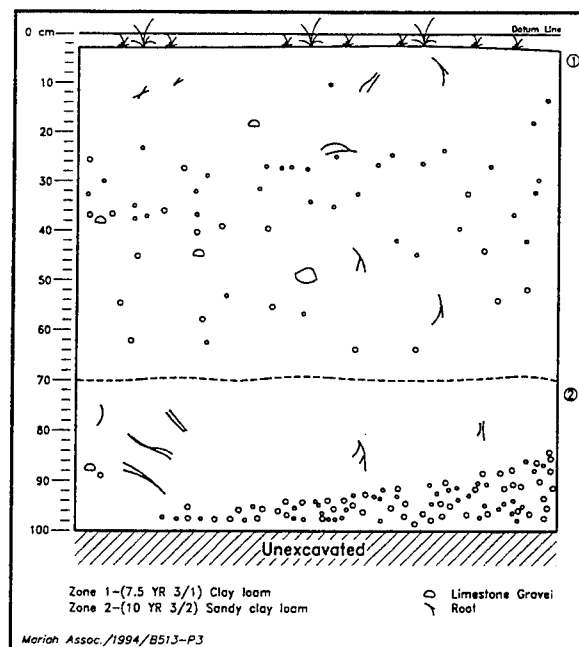


Figure 5.43 Profile of East Wall, TP 3, 41BL513.

consisted of cumulic, very dark gray (7.5YR 3/1) massive to weak, fine blocky structured clay loam more than a meter thick. Burned rock was present in considerable quantities between 70 to 100 cmbs. This rock formed a wedge that thinned toward the valley axis, suggesting that it was at least partially colluvial in origin. The Bw horizon was 35 cm thick and consisted of a massive, dark reddish brown (5YR 3/2), gravelly clay containing a few scattered burned rocks and flakes. It graded down into a massive, dark reddish brown (5YR 3/2) gravelly clay loam that extended to the base of the trench at approximately 160 cm. Although these deposits are considered to be of probable late Holocene age, it is possible that the lower, reddish brown sediments represent the older Fort Hood fill.

Another trench (BT 9) was excavated immediately upslope of BT 7, into the talus fronting what appeared to be a collapsed rockshelter (Figure 5.44). This trench was placed to determine if the burned rock wedge observed in BT 7 could be traced upslope to talus deposits in front of the former shelter. Although such a connection could not confidently be made, it was noted that the

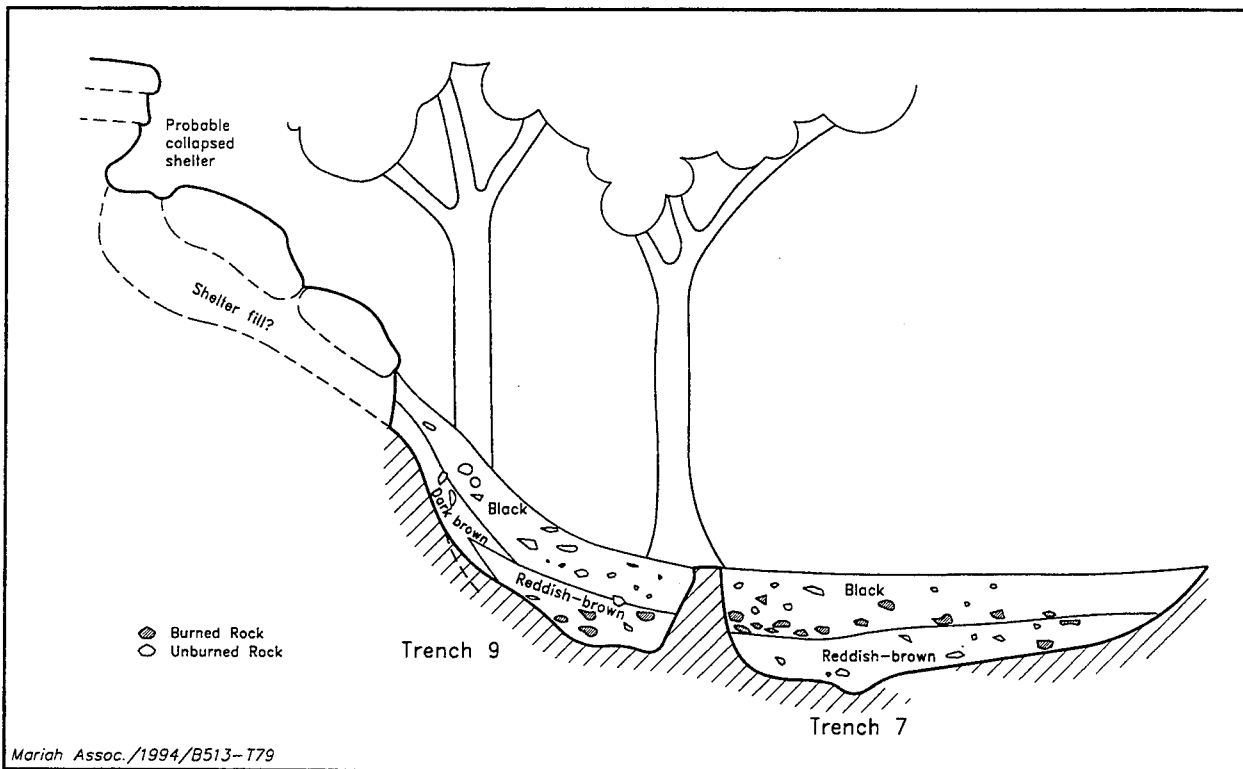


Figure 5.44 Generalized Stratigraphic Relationships, BTs 7 and 9, 41BL513.

upper deposits were laterally continuous from BT 9 to BT 7, while the deeper reddish brown deposits interfingered with dark brown to dark grayish brown colluvium and slopewash. This observation lends additional support to the possibility that two distinct alluvial fills are represented.

Test pit 1 (Figure 5.45) was offset from BT 7 to explore the cultural materials visible in the trench profile. No cultural material was recovered 0 to 20 cmbs, while one flake and two small burned rocks (about 1 kg) were found in Levels 3 and 4 respectively (Table 5.85). From 40 to 50 cmbs, five of nine burned rocks (3 kg) were recovered from the northeast quadrant. At 50 cmbs, a burned rock midden (F 1) was encountered across the entire unit. The base of the feature occurred at 92 to 94 cmbs at a depositional contact where the sediments changed from dark gray brown to reddish brown clay loam. Artifact counts from F 1 totalled 1,100 to 1,150 burned rocks (209 kg) and 30 to 35 lithics. The majority of rocks were

angular to subangular and medium-sized (5 to 10 cm). Many rocks were yellowish-brown on the exterior; however, upon breakage, a faint, interior, gray tinge and sulphur odor (indicative of burning) was apparent, suggesting low temperature heating. No patterning or internal features were noted in F 1, and root activity was observed throughout the deposit. Four burned rocks (1 kg total) were recovered from 94 to 100 cmbs (below the feature).

No radiocarbon dates are available from the feature; however, a series of eight A/I ratios were obtained from *Rabdotus* shells recovered from the midst of the midden (TP 1 Level 7). All eight of these samples yielded radiocarbon-equivalent ages between approximately 2000 and 3000 BP (see Appendix D), suggesting that the feature is of Late Archaic age and supporting the interpretation that the fill is equivalent to the West Range alluvium of Nordt 1992. At present, it is unclear if the 900-

odd-year spread in "ages" is a function of mild heating or indicative of slow midden accretion.

Test pit 2 was placed 20 m west/southwest of BT 7 in order to assess the limits of F 1. A few flakes and burned rocks (1.5 kg) were recovered from 0 to 10 cmbs in TP 2 (Table 5.85). The artifact count decreased from 10 to 20 cmbs. A burned rock midden was encountered at 36 to 52 cmbs. It was interpreted as an extension of F 1 based on similar morphology, relative distance to BT 7/TP 1, and similar stratigraphic context. In TP 2, as in TP 1, the feature extended across the entire unit, with no apparent patterning of the rock. A total of 43 burned rocks (19 kg) and 8 flakes were recovered. The rocks averaged 5 cm in size, with a few larger rocks (10 to 20 cm) noted. The base of the feature was along the same depositional contact noted in TP 1. The midden deposit in TP 2 yielded dramatically fewer artifacts than in TP 1, indicating that the feature is heterogeneous. Aside from root activity, no other disturbances were evident.

Below F 1, four flakes were recovered from the remainder of Level 6 (52 to 60 cmbs) and a large immovable boulder was exposed along the east-central portion of the unit. Two small burned rocks (0.5 kg) and a side scraper were found from 60 to 70 cmbs. The rock exposed in the previous level covered two-thirds of the unit from 65 to 70 cmbs.

The most recent fill present on the site was exposed in BT 5. It was situated on a stabilized island in the middle of the shallow, anastomosing channel, and was excavated to a depth of 180 cm. The exposure revealed an A-C profile developed in gravelly loam. The A horizon was 15 cm thick and consisted of very dark gray (5YR 3/1), massive gravelly loam and bedded gravels containing large amounts of partially decomposed organic matter. The underlying C horizon consisted of multiple, offset lenticular gravelly channels contained in a loam matrix. Color varied from dark brown (7.5YR 3/2) to dark grayish brown (10YR 4/2) with depth. The lenticular

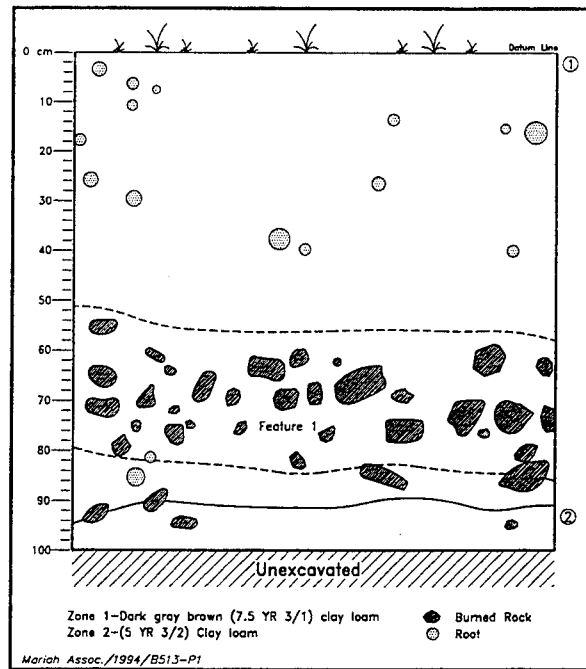


Figure 5.45 Profile of West Wall, TP 1, Illustrating Stratigraphic Position of F 1, 41BL513.

channels varied from 20 cm to 60 cm thick and 2 m to 9 m wide. No cultural material was detected in these deposits, which are indicative of flashy, braided deposition.

Trench 3 was excavated in the east-central portion of the site at the scarp from the T_1 to T_0 surfaces on the north bank of the creek. Like BT 2, the character of the deposits suggests that they were laid down by a relatively wide, flashy channel. No cultural materials were observed in contexts that could be considered to be primary.

Six tools consisting of a side scraper, four unifaces, and one wedge were recovered from this site (Table 5.86). These tools represent five different chert types of three chert zones but all in proximity to the Cowhouse/Taylor/Bear site grouping. No projectile points were recovered from this site.

Four identified chert types and seven indeterminate chert categories were included in the relatively

sparse sample of debitage recovered from 41BL513 (Table 5.87). When the entire assemblage was considered, the aggregate indeterminate flakes occurred in greater than expected frequency, Owl Creek Black flakes occurred in expected frequency, and the remainder of identified types (Heiner Lake Tan, Fort Hood Yellow, and Gray/Brown/Green) occurred in less than expected frequency. When the indeterminates were excluded, Owl Creek Black occurred in greater than expected frequency and the remainder of recovered types occurred in expected frequencies (Table 5.88). The assemblage was dominated by flakes between 1.2 and 5.2 cm in size (84% of total), suggesting that early- to intermediate-stage reduction was the primary focus of lithic tool production practiced on site (Table 5.87). This interpretation is supported by the relatively high percentage (32%) of recovered flakes exhibiting partial cortification (Table 5.89). Because the degree of surface abrasion was unclear on all but one of the cortified flakes, the relative importance of streambed procurement is unknown.

No identifiable faunal remains were recovered from any of the units on 41BL513.

5.13.3 Conclusion and Recommendations

At least two and possibly three Holocene fills are present in the valley (see Figure 5.41), but they are difficult to distinguish at the surface in many instances due to a lack of relief. Although the age of these fills is not well established, they can be tentatively correlated with the Ford, West Range, and Fort Hood units of Nordt (1992). The margins of the Holocene meander belt are flanked by gravelly sediments that probably represent the late Holocene West Range unit and may also include the earlier Fort Hood unit. The valley axis is occupied by thick gravelly loams and loams that represent the Ford Alluvium.

Table 5.86 Nonprojectile Point Lithic Tools, AU 1, 41BL513.

Lithic Material	Tool Type			Total
	side scraper	uniface	wedge	
06-HL Tan	0	1	0	1
08-FH Yellow	0	1	0	1
18-C Mottled	1	0	0	1
Indet Lt Brown	0	2	0	2
Indet Mottled	0	0	1	1
Total	1	4	1	6

Table 5.87 Debitage Recovery by Size and Material Type, AU 1, 41BL513.

Lithic Material	Size (cm)						Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types							
06-HL Tan	0	0	0	0	2	1	3
08-FH Yellow	0	0	2	2	0	0	4
15-Gry/Brn/Grn	0	0	0	0	1	0	1
17-Owl Crk Black	0	3	4	2	1	0	10
<i>Subtotal</i>	<i>0</i>	<i>3</i>	<i>6</i>	<i>4</i>	<i>4</i>	<i>1</i>	<i>18</i>
Unidentified Types							
Indet Dk Brown	0	0	5	1	0	0	6
Indet Dk Gray	3	0	2	1	0	0	6
Indet Lt Brown	1	4	8	10	19	1	43
Indet Lt Gray	0	1	1	5	0	0	7
Indet Misc.	0	0	1	0	1	0	2
Indet Mottled	0	0	0	1	1	0	2
Indet White	0	0	0	0	3	0	3
<i>Subtotal</i>	<i>4</i>	<i>5</i>	<i>17</i>	<i>18</i>	<i>24</i>	<i>1</i>	<i>69</i>
Total	4	8	23	22	28	2	87

Table 5.88 Binomial Statistic Results, AU 1, 41BL513.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	3	10	25	less	1	8	expected
08-FH Yellow	4	10	25	less	1	8	expected
15-Gry/Brn/Grn	1	10	25	less	1	8	expected
17-Owl Crk Black	10	10	25	expected	1	8	more
Total Indet	69	10	25	more	na	na	na

Ten trenches were excavated on the site. Three were situated on Pleistocene terrace remnants and, with the exception of a thin colluvial wedge capping BT 4, contained no culturally relevant sediments. The remaining seven trenches were excavated into Holocene deposits. Cultural material was recovered from a variety of contexts, but appears concentrated in the late Holocene deposits in the vicinity of BTs 7 and 9. Although a buried midden of probable Late Archaic age was detected in this vicinity, artifactual return from two test pits placed into the feature was low, and faunal material was poorly represented. This low rate of return is relatively unusual for burned rock features in this type of setting on Fort Hood, and may indicate that the feature underwent an unusual suite of activities. The association of debitage indicative of relatively early-stage reduction and the almost total lack of faunal remains is intriguing, but more work is necessary before the activities represented by the midden can be clarified.

Nevertheless, despite a relative paucity of other types of associated artifactual material, the deposits near BT 7 have high potential to address issues outlined in the research domains for Fort Hood (Ellis 1994b). In addition, a possible collapsed shelter was noted upslope from this buried feature, but a trench placed into the talus was unable to confirm any association between the burned rock in the terrace fill and the shelter talus. Even if this potential shelter does not have cultural deposits, it would be highly likely to contain very valuable paleoenvironmental data bases.

On the basis of the foregoing, we judge 41BL513 to be significant and eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Known

Table 5.89 Debitage Cortex Characteristics by Material Type, AU 1, 41BL513.

Lithic Material	Partial Cortex			Total
	Abraded	Indeterminate	No Cortex	
Identified Types				
06-HL Tan	1	2	0	3
08-FH Yellow	0	1	3	4
15-Gry/Brn/Grn	0	0	1	1
17-Owl Crk Black	0	2	8	10
<i>Subtotal</i>	<i>1</i>	<i>5</i>	<i>12</i>	<i>18</i>
Unidentified Types				
Indet Dk Brown	0	4	2	6
Indet Dk Gray	0	0	6	6
Indet Lt Brown	0	15	28	43
Indet Lt Gray	0	0	7	7
Indet Misc.	0	1	1	2
Indet Mottled	0	1	1	2
Indet White	0	1	2	3
<i>Subtotal</i>	<i>0</i>	<i>22</i>	<i>47</i>	<i>69</i>
Total	1	27	59	87

eligible components at the site are fairly shallowly buried, and could suffer adverse impacts from uncontrolled traffic by heavy vehicles. The proximity of F 1 to a well traveled road poses a threat from vehicles that may leave the road to skirt around mud holes formed after moderate to heavy rain. Furthermore, significant cultural deposits at the site are vulnerable to damage from uncontrolled excavation. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism; (2) prevent mechanical or manual excavations by military personnel; and (3) minimize the impact of traffic, especially by heavy tracked and wheeled vehicles.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 100 m² in area. Block excavations should focus on F 1 and living surfaces that may occur adjacent to it. Such excavations could reach approximately 75 m³ of manual excavation, which could be reduced slightly by carefully monitored mechanical excavations to remove overburden. Mechanically excavated trenches also should be used to provide exposures for geoarcheological data and to sound for intact deposits in the Holocene colluvium in the northeast corner of the site and the collapsed rockshelter. Identification of significant intact deposits by sounding excavations would add an unknown amount of manual excavation volume to the above estimate.

5.14 SITE 41BL532

5.14.1 Introduction

In mid-December 1993, Mariah conducted test excavations at site 41BL532. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.14.1.1 Location and Description

Site 41BL532 is located about 2 km north of Belton Lake (perhaps as much as 2.5 km from the former Cowhouse Creek channel). The site is situated on a bench at the southern base of an upland colluvial slope, with a minor tributary delineating the western site boundary (Figure 5.46). A small borrow pit/limestone quarry abuts the southeastern edge of the site, and junipers on the eastern one-third have been cut and partially burned. Surface visibility is restricted to a jeep trail and small clearing (about 25% of the surface) located at the site center (Figure 5.47). Maximum site dimensions are 55 x 23 m (about 1,265 m², or 0.31 acres). The site is located within an environmental set-aside area. For the purposes of this report, the site is located in the Cowhouse/Taylor/Bear area of the fort.

5.14.1.2 Previous Work

The site was initially recorded on 3 February 1984 by Turpin, Moore, and Ensor. Information on file concerning this visit to the site is incomplete, but the site was described as a lithic scatter or possible habitation site situated on a small bench. Numerous bifaces, scrapers, and flakes were noted, in addition to burned rock and several pieces of mussel shell. One Bulverde point, a Marcos point, and three untyped dart points were collected. Depth of deposit was considered shallow.

On 4 March 1992, Mires and Doering revisited and reevaluated the site based on archeological and

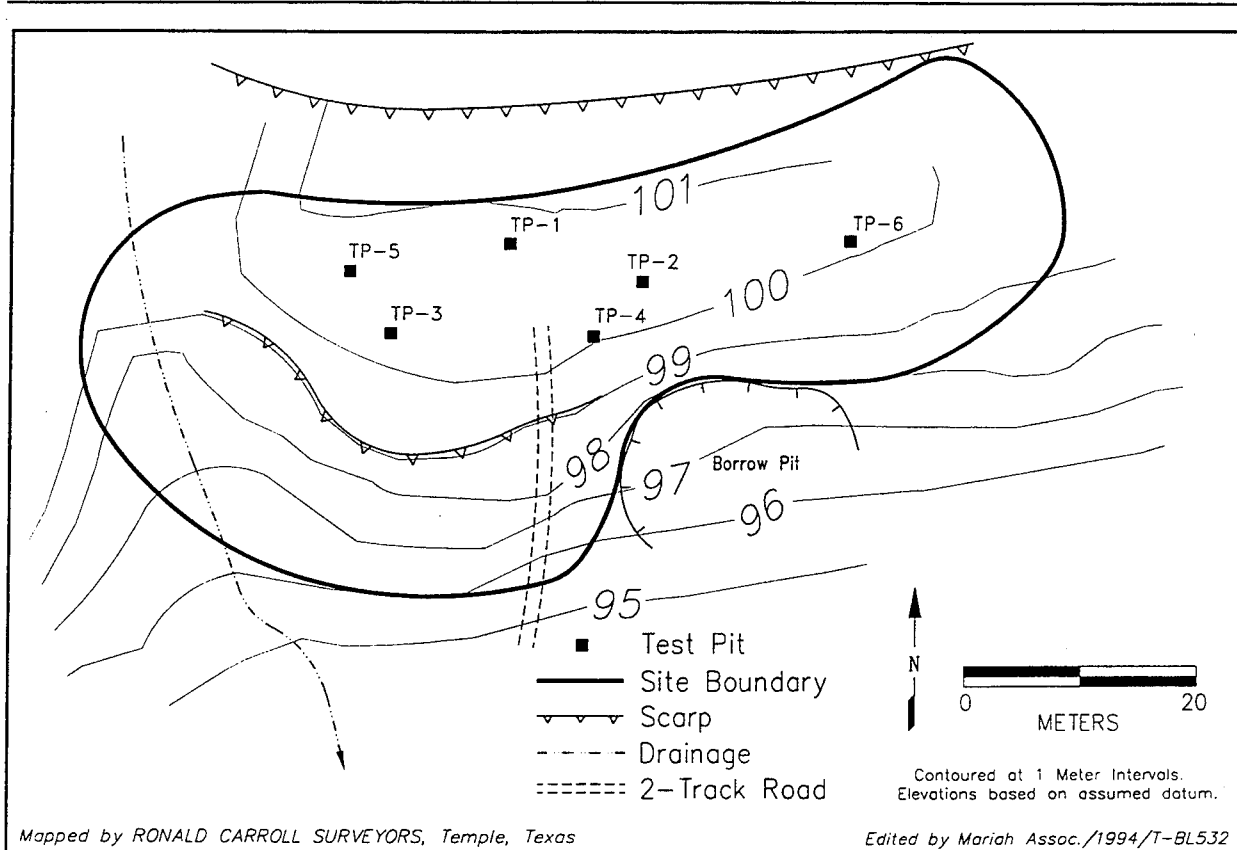


Figure 5.46 Site Map of 41BL532.

geomorphological observations. Burned rocks, mussel shell, and debitage were observed mostly in the jeep trail and clearing. One Bulverde point was collected. Disturbance was minimal, and only sheetwash along the trail was noted. The bench was fairly level and had accumulated sediment eroded from the slope. Based solely on the exposure afforded by the borrow pit, a weakly developed, thin mantle (about 30 cm) of colluvium over bedrock was noted. Since the deposits were considered aggradational, the potential for buried components existed and shovel testing was recommended.

On 26 March 1992, a crew returned to the site and excavated four shovel tests. All four tests were positive, with three tests containing 98% of the cultural material, including burned rocks, mussel shell, debitage, and an untyped point base. Eighty-one percent of these artifacts were recovered from 0 to 40 cmbs, with only one positive test in Levels

5 and 6. Despite high artifact frequency, the presence of ecofacts, and at least one buried occupation, the site's archeological potential remained uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. A minimum testing of four to eight m² of manually excavated test pits was recommended to determine NRHP eligibility (Trierweiler 1994:A268-A271).

5.14.1.3 New Work

On 24 November 1993, in a telephone conversation with Gil Eckrich (DEH, Fish and Wildlife), permission was granted to proceed with manual test pit excavations on this site, even though this site is within an area of endangered species habitat. Eckrich considered the possible adverse impacts to habitat of manual excavation to be extremely limited.



Figure 5.47 Overview of Site 41BL532, Looking North.

Six test pits (TPs 1 through 6) were excavated on the site (Table 5.90). Placement of the first three units (TPs 1 through 3) was based on the 1992 shovel testing data (highest artifact frequencies and greatest probable depth). Other than the borrow pit, no other exposures were available to guide location of test pits. Other test pits (TPs 4 through 6) were placed to clarify the extent of subsurface deposits. Recovered cultural material is summarized in Table 5.91.

5.14.2 Results

Test pit 1 was placed about 8 m northwest of the original site survey datum, a wooden stake. This unit is 6 to 7 m south of the base of the colluvial slope and roughly equidistant between STs 2 and 3 from the 1992 evaluation. The only cultural artifact recovered from this test pit consisted of one flake recovered from 10 to 20 cmbs (Table 5.91). A moderate amount of unburned rock was encountered in Level 2, with rock size and density increasing with each successive level to 50 cmbs.

Excavation was halted at 50 cmbs due to the presence of large, immovable rocks.

Test pit 2 is about 6 m north-northwest of ST 4 (which was relocated on the ground) and near the base of the colluvial slope. Total recovery from this test pit included two artifacts found from 10 to 30 cmbs (Table 5.91). At 80 cmbs, and continuing to 90 cmbs, the fill was a yellowish brown silt containing a very heavy unburned rock density. Bedrock and decaying limestone were encountered at 90 cmbs.

Test pit 3 was located about 10 m west-southwest of the original site datum, 10 m southwest of TP 2, and just north of ST 1 (relocated on the ground). In TP 3, most artifacts (about 96%) were recovered from Levels 1 through 3, with the remainder found in Level 4. Level 1 contained 13 artifacts, with frequency decreasing with depth. Also in Level 1, eight burned rocks were confined to the southeast quad. This was not designated a feature, but may represent the edge of a larger rock concentration or

midden deposit that extends outside the unit. Excavation was stopped at 60 cmbs due to a very heavy density of rocks and gravel.

Test pit 4 is 5 m northeast of the original site datum and 5 to 6 m southwest of ST 4. This unit is partially in the clearing previously noted and extends into an area vegetated by junipers. This test pit proved the most productive, with cultural material recovered 0 to 80 cmbs (Table 5.91). A midden-like deposit was encountered from 10 to 50 cmbs. Artifact recovery from these levels was high, including numerous flakes, more than 40 mussel umbos, 40 burned rocks (22.25 kg), and a Bulverde point. No charcoal or staining was observed, and matrix was a gray brown silt loam containing gravels. The integrity of this deposit appears to be high: there is no evidence of disturbance, and the colluvial slopewash apparently has buried a living surface. Artifact recovery dropped off from Levels 6 through 8, yielding a modest assemblage. Excavation continued to 110 cmbs, where weathered bedrock was encountered. The lower levels yielded no cultural materials.

Test pit 5 was placed near the northwestern edge of the site and 5 to 6 m northwest of TP 3. The upper 25 cm in TP 5 consists of recent colluvial slopewash. The matrix is an unconsolidated sand and silt mixture containing a heavy amount of rock and some recent materials (glass and plastic). This same deposit is visible across the northwest section of the site where the tributary is located. From 25 to 60 cmbs, a modest assemblage of lithics, mussel umbos, and burned rocks was recovered (Table 5.91). Artifact frequency declined from 60 to 140 cmbs. Based on artifact recovery rates and depositional context, the material found 25 to 60 cmbs may correlate with the midden-like deposit found in TP 4, less than 20 m to the east. However, as detailed below, amino acid epimerization of land snails contained in the matrix suggests that this deposit is probably much younger than the other materials found on site, and may date to the Late/Transitional Archaic. Weathered bedrock was at 140 cmbs, and excavation was halted.

Table 5.90 List of Treatment Units, 41BL532.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	1.0	50
1	TP 2	1.0	1.0	90
1	TP 3	1.0	1.0	60
1	TP 4	1.0	1.0	110
1	TP 5	1.0	1.0	140
1	TP 6	1.0	1.0	120

Test pit 6 was located 3 m north of the bench edge and about 15 m east of TP 4. This unit abuts the western edge of the borrow pit and the partially burned area of junipers. Test pit 6 contained cultural material (lithics and burned rocks) from 0 to 100 cmbs, much of which was recovered 70 to 90 cmbs, suggesting a probable buried occupation. No artifacts were found 100 to 120 cmbs. Excavation was terminated at 120 cmbs, when decaying bedrock was encountered.

During testing, a Bulverde point, a Wells point, and a Pedernales point were collected from the site surface (Table 5.92) and locations were plotted on the site map. Additionally, a Bulverde of indeterminate chert was recovered from the excavations. Six tools and two multiple platform cores were retrieved during testing (Table 5.93). The majority of this recovery was identified as nearby Southeast Range Heiner Lake Tan chert. The bifacially and unifacially modified types of tools recovered hint at a full range of activities practiced at the site.

Five chert types and eight indeterminate chert categories were identified in the lithic debitage recovered from 41BL532 (Table 5.94). Roughly 24% of the flakes were assigned to recognized types. When all types were considered, the indeterminates occurred in greater than expected frequency and each of the identified types occurred in less than expected frequencies. When the indeterminates were excluded from consideration, Owl Creek Black occurred in greater than expected

Table 5.91 Artifact Recovery by Test Pits, 41BL532.

LEVEL	None					TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4					TEST PIT 5					TEST PIT 6									
	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)					
surface	0	0	0	3	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
1	0	0	0	0	0(0)	0	0	0	0	8(10)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
2	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	13	0	4(1.5)	0	0	0	0	4(1.5)	0	0	0	0	4(1.5)	0	0	0	0	1(0.2)	0	0	0	0	1(0.2)	0	0	0	0	0(0)
3	0	0	0	0	0(0)	0	0	0	0	4(3)	0	0	3	0	18(3.5)	2	0	61	1	18(3.5)	0	0	0	0	18(3.5)	0	0	0	0	1(0.1)	0	0	0	0	1(0.1)	0	0	0	0	0(0)
4	0	0	0	0	0(0)	0	0	0	0	4(1)	3	0	3	0	13(8)	5	0	34	1	13(8)	0	0	3	0	13(8)	0	0	3	0	6(0.3)	0	0	0	0	6(0.3)	0	0	0	0	2(0.5)
5	0	0	0	0	0(0)	0	0	0	0	2(0.5)	0	0	0	0	4(8.3)	36	0	63	0	4(8.3)	1	0	11	1	4(1)	0	0	18	0	4(1)	0	0	0	0	4(1)	0	0	0	0	0(0)
6	0	0	0	0	0(0)	0	0	0	0	2(0.5)	0	0	0	0	5(2.5)	5	0	18	0	5(2.5)	2	0	7	0	5(2.5)	2	0	7	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
7	0	0	0	0	0(0)	0	0	0	0	2(0.5)	0	0	0	0	0(0)	3	0	3	0	0(0)	0	0	7	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)					
8	0	0	0	0	0(0)	0	0	0	0	0(0)	4	0	2	0	0(0)	4	0	2	0	0(0)	1	0	3	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)					
9	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	1	0	0(0)	0	0	1	0	0(0)	0	0	1	0	0(0)	0	0	1	0	0(0)	0	0	0	0	0(0)					
10	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)					
11	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)					
12	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)					
13	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)					
14	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)					
TOTAL	0	0	0	3	0(0)	1	0	1	0	2(0.2)	5	0	20	0	22(15.5)	55	0	192	4	44(23.8)	5	0	39	2	12(1.6)	2	0	76	1	10(2.8)	0	0	0	0	0(0)					

frequency; Heiner Lake Tan and Heiner Lake Translucent Brown occurred in expected frequencies; and Cowhouse Dark Gray and Cowhouse Mottled/Banded occurred in less than expected frequencies (Table 5.95).

The predominance of Owl Creek Black in the identified assemblage is unsurprising given the material's relative proximity and high quality. More surprising is the strong representation of Southeast Range cherts (Heiner Lake Tan and Heiner Lake Translucent Brown), which occur well to the south across the Cowhouse Creek drainage, and the lack of North Fort cherts (other than Owl Creek Black), which are readily available on the uplands to the north. Moreover, the very strong representation of unidentified light brown cherts suggests that the proportion of material originating from the Southeast Range province may be even greater than indicated by the identified fraction, while the low number of unidentified black flakes indicates that the overall proportion of Owl Creek Black in the assemblage is lower than suggested by the identified fraction. The presence of two alluvial chert types, although represented in small numbers, indicates that the Cowhouse channel was utilized as a material source to at least some extent.

Approximately 55% of the flakes range between 0.5 and 1.2 cm in size, and fully 81% are smaller than 1.8 cm (Table 5.94), suggesting that middle- to late-stage reduction predominated (which is consistent with relatively long-distance procurement from the Southeast Range province and the Owl Creek Black source area). This interpretation is bolstered by complete decortification of approximately 86% of the assemblage (Table 5.96).

A relatively small but diverse assemblage of bivalves was recovered from the site (Table 5.97). At least four taxa, representing microenvironments ranging from clear pools to moderately fast, shallow current, are represented in the assemblage. This suggests that a number of different collection localities were exploited within the Cowhouse

Table 5.92 Projectile Points, AU 1, 41BL532.

Point Type	Lithic Material				Total
	06-HL Tan	15-Gry/Brm/Gm	Indet Dk Gray	Indet Misc	
Bulverde	0	1	0	1	2
Pedernales	0	0	1	0	1
Wells	1	0	0	0	1
Total	1	1	1	1	4

Creek channel. No identifiable bone was recovered.

No radiocarbon ages were obtained from the site; however, a relatively intense program of amino acid epimerization investigation of *Rabdotus* shells was conducted to examine the approximate age and integrity of the colluvial/slopewash matrix. A total of 32 shells from four discrete proveniences (eight shells each from TP 3 Level 3, TP 4 Level 4, TP 5 Level 6, and TP 6 Level 8) was analyzed (see Appendix D). The results varied considerably,

Table 5.93 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL532.

Lithic Material	Core Type		Tool Type			Total
	multiple platform	late stage biface	middle stage biface	side scraper	utilized flake	
06-HL Tan	1	0	2	0	1	4
09-HL Tr Brown	0	1	0	1	0	2
22-C Mott/Flecks	1	0	0	0	0	1
Indet Lt Brown	0	0	0	0	1	1
Total	2	1	2	1	2	8

ranging from provenience assemblages that appear to be composed of colluvially-deposited snails with widely varying epimerization ratios indicative of varying ages and/or differential heating, to assemblages with distinct clustering of A/I ratios indicative of fairly good integrity. The most discrete assemblage was recovered from TP 6, Level 8. A total of eight shells from this provenience yielded A/I values between 0.0776 and 0.106, which equate to radiocarbon-equivalent ages between approximately 3150 and 4500 BP. Because seven of the eight shells are equivalent to ages of between 3900 and 4500 BP, the youngest shell was considered intrusive, and the other seven shells were averaged to yield an interpreted age of approximately 4200 BP. The other three proveniences tested yielded disparate values ranging between approximately 4500 and 43,000 BP in TP 4, Level 4; 1450 and 11,300 BP in TP 5, Level 6; and 5100 and 31,200 BP in TP 3, Level 3. Because no strong clustering was apparent in the intermediate values from these three proveniences, the cluster of youngest shells (or, in the case of TP 4 Level 4, the single youngest shell) was tentatively accepted as the best indication of the age of deposition. Thus, the time of deposition of the matrices were tentatively interpreted as: approximately 4,500 years BP in TP 4, Level 4; 1,700 years BP in TP 5, Level 6; and approximately 5,100 years BP in TP 3, Level 3.

Table 5.94 Debitage Recovery by Size and Material Type, AU 1, 41BL532.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
06-HL Tan	0	2	2	5	4	4	3	20
09-HL Tr Brown	0	0	10	1	6	1	0	18
17-Owl Crk Black	4	12	7	11	4	0	0	38
19-C Dr Gray	0	0	0	1	0	0	0	1
23-C Mott/Banded	0	0	0	0	0	1	0	1
<i>Subtotal</i>	4	14	19	18	14	6	3	78
Unidentified Types								
Indet Black	0	0	0	1	0	0	0	1
Indet Dk Brown	11	7	12	4	3	2	0	39
Indet Dk Gray	1	0	1	1	1	0	0	4
Indet Lt Brown	13	50	35	22	18	3	0	141
Indet Lt Gray	0	6	9	4	2	0	0	21
Indet Misc.	0	7	10	2	3	0	0	22
Indet Mottled	0	0	1	0	0	0	0	1
Indet White	0	2	4	8	5	1	0	20
<i>Subtotal</i>	25	72	72	42	32	6	0	249
Total	29	86	91	60	46	12	3	327

Table 5.95 Binomial Statistic Results, AU 1, 41BL532.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
06-HL Tan	23	41	68	less	9	23	expected
09-HL Tr Brown	18	41	68	less	9	23	expected
17-Owl Crk Black	38	41	68	less	9	23	more
19-C Dr Gray	1	41	68	less	9	23	less
23-C Mott/Banded	1	41	68	less	9	23	less
Total Indet	249	41	68	more	na	na	na

Several of the "oldest" shells in these proveniences clearly represent A/I anomalies caused by heating, while the majority of anomalously high A/I ratios may represent either low-level heating or colluvial reworking, or both. Three of the interpreted ages fall between 4200 and 5100 BP, suggesting the majority of cultural material is of Early to Middle Archaic age, while the deposits in TP 5 appear to be Late/Transitional Archaic or very early Late Prehistoric in age.

5.14.3 Conclusions and Recommendations

Deposits making up the site matrix are the result of a variety of slope processes, with colluvial and slopewash processes providing the dominant contribution of sediments. As a result, it is possible that some of the cultural material has been introduced through reworking of material from upslope, particularly given that a rockshelter with cultural deposits is present almost directly upslope and that the A/I data indicates possible substantial incorporation of old shells. Nevertheless, the vertical distribution of material suggests that the majority of cultural remains are in apparent primary context.

Although small, the site has intact buried cultural deposits in at least three, and probably four, locations. The Bulverde, Morrill, and Wells points found on the surface and in buried contexts at the site imply an Early Archaic date (Turner and Hester 1985) for occupations at 41BL532, although the presence of later points implies that later occupations also occurred. This general conclusion is supported by the A/I analyses conducted on snails recovered from the cultural zones. One of the deposits yielding an Early Archaic point may involve a burned rock midden-like phenomenon that is not widely recognized or accepted in Central Texas archaeology (cf. Hester 1991). Regardless of the site's date, the high number of mussel umbos recovered is behaviorally interesting because the site is at least 2 km from the nearest apparently perennial stream (Cowhouse Creek). An abundance of snail shells implies that the site can contribute a large data base to paleoclimatic

Table 5.96 Debitage Cortex Characteristics by Material Type, AU 1, 41BL532.

Lithic Material	Partial Cortex			No Cortex	Indeterminate	Total
	Abraded	Unabraded	Indeterminate			
Identified Types						
06-HL Tan	0	6	0	14	0	20
09-HL Tr Brown	0	1	2	14	1	18
17-Owl Crk Black	0	1	6	31	0	38
19-C Dr Gray	0	0	0	1	0	1
23-C Mott/Banded	1	0	0	0	0	1
<i>Subtotal</i>	<i>1</i>	<i>8</i>	<i>8</i>	<i>60</i>	<i>1</i>	<i>78</i>
Unidentified Types						
Indet Black	0	0	1	0	0	1
Indet Dk Brown	0	1	2	36	0	39
Indet Dk Gray	0	0	0	3	1	4
Indet Lt Brown	4	2	5	129	1	141
Indet Lt Gray	0	0	1	20	0	21
Indet Misc.	0	1	7	14	0	22
Indet Mottled	0	0	1	0	0	1
Indet White	0	0	0	19	1	20
<i>Subtotal</i>	<i>4</i>	<i>4</i>	<i>17</i>	<i>221</i>	<i>3</i>	<i>249</i>
Total	5	12	25	281	4	327

Table 5.97 Faunal Recovery, AU 1, 41BL532.

Bivalves	Element		Total
	left	right	
Amblema plicata	6	13	19
Ambleminae	12	6	18
Cyrtonaias sp.	1	0	1
Lampsilinae	1	4	7
Tritogonia verrucosa	3	6	9
Unionacea	2	1	3
Total	25	30	57

and paleoenvironmental reconstruction based on a combination of amino acid epimerization, isotope, and radiometric analyses. The site's archeological potential therefore can be regarded as very high because materials here can be used to advance a variety of issues outlined in the research design for Fort Hood (Ellis 1994a, 1994b).

On this basis, site 41BL532 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are shallowly buried, they are not well protected from training and other activities that affect the surface of the site. Adverse impacts from uncontrolled excavations (as evidenced by the borrow pit and, perhaps, historic materials in TP 5) and erosion pose substantial threats to this scientifically valuable site. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of surface erosion. The presence of the site in an endangered species habitat area will help protect it from damage by personnel on training or other official missions, but its presence near a well-traveled road may leave it vulnerable to vandalism.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 100 m² in area concentrated around TP 3 through TP 6. Because the average depth of cultural materials is about 60 cm, manual excavation of up to 60 m³ may be necessary.

5.15 SITE 41BL538

5.15.1 Introduction

In November 1993, Mariah conducted test excavations at site 41BL538. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.15.1.1 Location and Description

Site 41BL538 is a rockshelter located in the Cowhouse/Taylor/Bear area of the fort (Figure 5.48). The site is situated about 1.7 km north of Cowhouse Creek, near the head of Belton Lake, and at the head of an unnamed intermittent drainage of Cowhouse Creek. The rockshelter measures 17 m long, 1.5 to 4 m deep, and has an east-west axis (Figure 5.49). The front meter of the shelter has a vertical clearance of 1.5 to 2 m, while the ceiling in most of the shelter is less than 1 m high and at the rear is only 20 to 40 cm above the present floor. A large 2 x 1.5 x 5 m limestone slab has fallen from the ceiling on the eastern portion of the shelter. Deposits appear to be relatively deep (greater than 50 cm) on the platform in front of the large slab and outside the west end of the shelter. No active seeps were observed in the shelter, but the presence of sedges on the platform outside the west end of the shelter implies that there is subsurface moisture. The slope below the site is moderate to steep with little deposition and is covered with oaks and junipers.

5.15.1.2 Previous Work

The site was first recorded in late 1983 by Ensor and was revisited by Bradle in early 1984, at which time a site map was drafted. The shelter was described as containing mussel shell, a Pedernales point, a chopper, and a small scatter of lithic debitage and flakes. The soil was described as a dark brown silt loam intermixed with limestone.

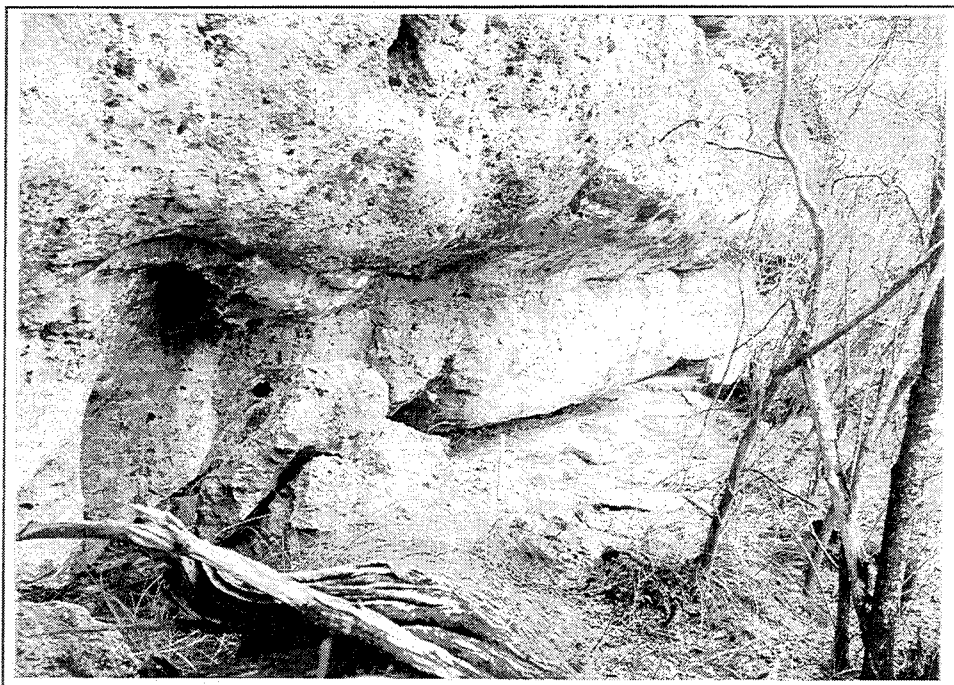


Figure 5.48 Rockshelter at Site 41BL538, Looking Northeast.

Doering and Oglesby visited the site on 10 March 1992, at which time archeological and geomorphological assessments were completed. Because of a potential for buried cultural material, a shovel testing crew returned to the site on 23 March 1992 and excavated a single 30 x 30 cm shovel test to a depth of 45 cmbs in the western third of the shelter. A mussel shell fragment was recovered from 20 to 30 cmbs and some small burned rocks were observed from 10 to 30 cmbs. On the basis of this work, the eligibility status of the shelter was judged to be uncertain and the site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Three to four 1 x 1 m of manual excavations were recommended for formal testing and NRHP eligibility determination (Trierweiler 1994:A272-A273).

5.15.1.3 New Work

Three 1 x 1 m test pits (TPs 1 through 3) were placed in the shelter with TP 1 in the eastern end,

TP 2 in the center, and TP 3 a little east of the center of the shelter (Table 5.98). Recovered cultural material is summarized in Table 5.99.

5.15.2 Results

The surface under the low rear portion of the shelter was examined by an archaeologist with a flashlight, and a few burned rocks and animal bones were observed. A mussel shell was observed outside the shelter under the dripline. The area directly behind the large roof fall slab on the eastern portion of the shelter contained a large recent rodent hole that goes under the slab, but no cultural material was observed in the rodent backdirt or inside the rodent hole. The rear of the shelter was covered with a thin 2 to 4 cm layer of fine limestone dust and small, jagged roof fall fragments.

Test pit 1 (Figure 5.50) was excavated to 54 cmbs in the western end of the shelter. The profile of the unit contained three stratigraphic zones which

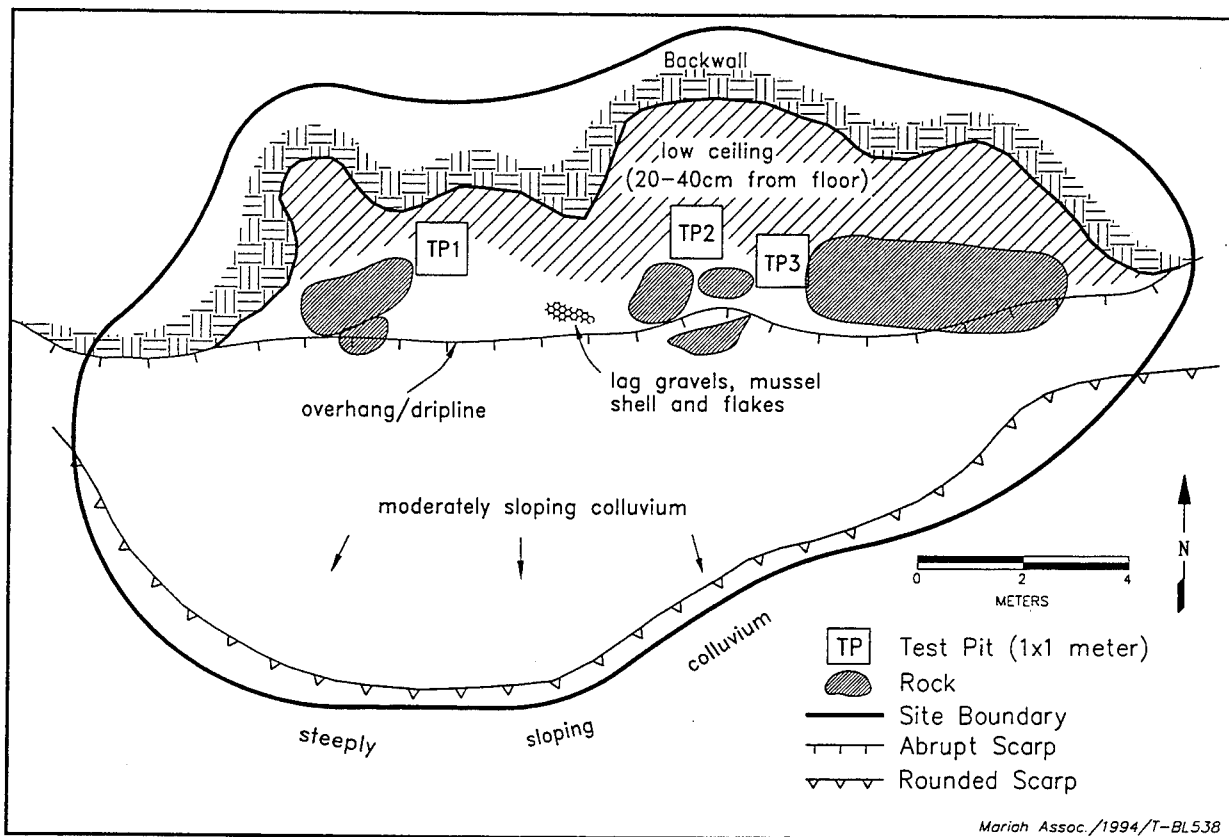


Figure 5.49 Site Map of 41BL538.

are all subsumed by the Type 1 deposits described by Abbott (1994:341-346). Zone 1 consisted of loose, 10 cm thick, light yellowish brown (10YR 6/4), sandy loam. Zone 2 was a 30 cm thick, stony dark yellowish brown (10YR 4/6), silty loam. Zone 3 was very pale brown (10YR 8/3), decayed limestone bedrock. This test pit yielded a small number of lithics from the upper 30 cm, and a moderate amount of bone fragments from the upper 40 cm (Table 5.99).

Test pit 2 (Figure 5.51) was excavated to 48 cmbs in the center of the shelter. The profile of the unit contains three stratigraphic zones, representing sediment types 1 and 2 as defined by Abbott (1994). Zone 1 consisted of very pale brown (10YR 7/4), stony silt loam. Zone 2 was a light brown (7.5YR 6/4), stony silt loam with gravels. Zone 3 was a very stony, brown (7.5YR 5/4), silt loam and rested on bedrock. Zones 2 and 3 appear

to be slightly rubified Bk horizons that contain translocated carbonates. Rubification decreases from the south (outer) side to the north side of TP 2. Zone 3 also appears to be more pedogenically altered than Zone 2.

Feature 1, a hearth, was identified in the west profile of TP 2 after excavation. This feature is an

Table 5.98 List of Treatment Units, 41BL538.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	1.0	60
1	TP 2	1.0	1.0	50
1	TP 3	1.0	1.0	40

Table 5.99 Artifact Recovery by Test Pit, 41BL538.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3				
	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tool	Burned rock (kg)
1	0	5	0	1	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
2	0	9	1	0	0(0)	0	0	0	0	0(0)	0	0	1	0	0(0)
3	0	4	1	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
4	0	4	0	0	0(0)	0	1	1	0	0(0)	0	0	0	0	0(0)
5	0	0	0	0	0(0)	0	0	0	0	0(0)					
TOTAL	0	22	2	1	0(0)	0	1	1	0	0(0)	0	0	1	0	0(0)

apparent burned rock hearth that straddles the contact between Zones 2 and 3. (Carbonates precipitating in the Bk horizon also have formed a coating on the burned rock, making them difficult to identify.) F 1 consists of a series of horizontal slabs covered by a 10 cm thick layer of very small (1 to 5 mm thick), slab fragments. Many of the smaller fragments are oriented more or less vertically within the fill above the base of the feature. The front of the feature occurs at about the dripline and is visible in a 40 cm long section of the profile. Where visible, the base of the feature slopes toward the back of the shelter, from about 25 cmbs to about 30 to 35 cmbs. The only artifacts recovered from TP 2 (one lithic and one bone fragment), were recovered from 30 to 40 cmbs, the level containing the majority of the feature.

Test pit 3 was excavated to 40 cmbs slightly to the east of the center of the shelter. Only two stratigraphic zones were defined in TP 3. Zone 1 consisted of a very pale brown (10YR 7/31), powdery lime silt. Zone 2 is a 10YR 4/3 brown clay silt with roof fall slabs and gravels. A single lithic was recovered from 10 to 20 cmbs in TP 3.

Tools were limited to one utilized flake of unidentifiable Gray/Brown/Green chert. A total of four flakes, ranging from 0.5 to 5.2 cm in size,

was recovered from TPs 1 through 3 at 41BL538. One flake was identified as Fort Hood Gray, while the remaining three flakes were all an indeterminate light brown variety. Three were decortified, and one possessed partial, abraded cortex. Due to the extremely small sample, no statistical examination of debitage data from this site is warranted.

While no shellfish remains were forthcoming, a moderately sized faunal assemblage was recovered from the shelter (Table 5.100). Although the

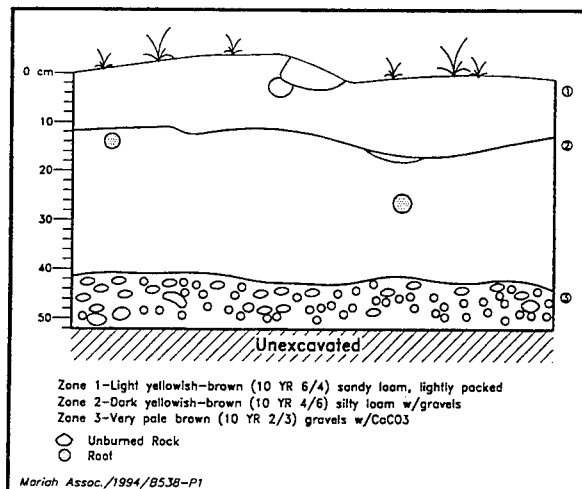


Figure 5.50 Profile of East Wall, TP 1, 41BL538.

frequency of taxon identification was relatively low, it is likely that the recovered material at best represents a mixture of animals procured by the human inhabitants and animals resident in the shelter at other times. Evidence of human modification is slight, with only one bone (4%) burned and none spirally fractured. In particular, the rodent remains are particularly likely to represent an occupant that died in the shelter rather than a species killed by the human occupants. Although the unidentified large bird could conceivably represent a turkey, it is equally likely that it represents one of the ubiquitous buzzards that often reside in the shelters. The cottontail and unidentified medium-large mammal remains (deer?) are likely cultural remains, but here too, strong cultural modification evidence is lacking.

5.15.3 Conclusions and Recommendations

This shelter represents a relatively low, cramped space and thus is unlikely to be the focus of long-term occupation. All three test pits were excavated to bedrock, which slopes up to the rear of the shelter, and the distance from the bedrock floor to the ceiling was 1 m in TP 1 and 80 cm in TP 2. The low rate of artifact recovery attests to an absence of long-term habitation residue, and it is considered likely that the shelter was probably used for short-term, expedient cover. As such, there is a relatively high potential to examine the tangible remains of short-term, discrete occupational events.

Furthermore, although no chronometric data is available, the rubification of shelter fill and the formation of a weak Bk horizon strongly suggest that the occupation in the shelter predates the Late Prehistoric and probably dates well into the Archaic. Since most of the rockshelters excavated in Central Texas have Late Prehistoric components (e.g., Henry et al. 1980), an Archaic rockshelter occupation provides a relatively unusual data base for Central Texas archaeology. Cultural and subsistence materials in the shelter, although relatively sparse, are sufficient to provide a significant data base for pursuing technological

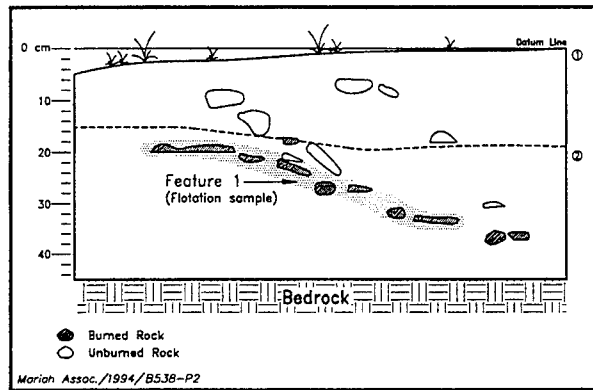


Figure 5.51 Profile of West Wall, TP 2, 41BL538.

studies outlined in the research domains defined in the research design for Fort Hood (Ellis 1993b) and may in fact allow for isolation of discrete behavioral episodes.

On this basis, site 41BL538 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequently sought by artifact collectors, the site is vulnerable to vandalism. Because the cultural materials are shallowly buried, they also are vulnerable to unintentional damage by military personnel using

Table 5.100 Faunal Recovery, AU 1, 41BL538.

	Element				Total
	Femur	Indeterminate	Mandible	Tibiotarsus	
Vertebrates					
Aves (large)	0	0	0	1	1
Mammalia (med/lg)	0	13	0	0	13
Rodentia (medium)	1	0	0	0	1
Sylvilagus sp.	0	0	1	0	1
Vertebrata	0	7	0	0	7
Total	1	20	1	1	23

the shelter during training exercises. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism and (2) prevent surface disturbance and manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1993). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1993.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 60 m². Given an average depth of 40 cm, excavation volume could be up to 24 m³. Excavations should include deposits on the platform outside the dripline of the shelter, and an attempt should be made to remove large roof fall slabs because intact deposits are likely to remain below.

5.16 SITE 41BL564

5.16.1 Introduction

In early February 1994, Mariah conducted test excavations at site 41BL564. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.16.1.1 Location and Description

Site 41BL564 is located at the head of an intermittent tributary of Taylor Branch in the Cowhouse/Taylor/Bear area of the fort. The site includes an area of upland surface and two rockshelters (Figures 5.52 and 5.53). A burned rock mound occurs on the upland surface.

Maximum site dimensions are 190 x 160 m (about 28,600 m², or 7.06 acres).

5.16.1.2 Previous Work

Moore and Bradle first recorded the site on 22 February 1984. It consisted of a lithic scatter, a burned rock mound, and two vandalized rockshelters. Flakes, dart point fragments, bifaces, a collected spokeshave, a collected dart point, and groundstone were noted on the upland surface. Two pieces of bone and a red piece of chert were collected from the southern shelter, with two bones and a Pedernales point (Middle Archaic) collected from the northern shelter.

On 20 March 1992, Oglesby and Doering revisited and reevaluated the site based on archeological and geomorphological observations. The site was divided into Subarea A (the upland surface including an annular burned rock mound, designated F 1), Subarea B (a vandalized shelter near the southern site boundary) and Subarea C (another vandalized shelter near the northeastern site boundary).

A thin scatter of flakes, biface fragments, and cores were observed across Subarea A, with most of the lithics noted near F 1. The mound was located near the west-central margin of the site, just north of a tributary. A central depression was noted within the feature. It was unclear whether this depression signified a prehistoric cultural manifestation or a vandal pit. Aside from the depression, the mound appeared to be undisturbed. Beyond F 1, Subarea A had no potential for buried cultural deposits. Three soil probes on the upland surface indicated less than 35 cm of residual soil. One manually excavated test pit was recommended for F 1.

Subarea B, a south-facing rockshelter, measured 12 x 3 x 1.5 m. A light amount of debitage, mussel shell, and bone was noted within the dripline and a greater density of lithics, including a dart point fragment, were exposed along the talus. The sediment was externally derived and contained a

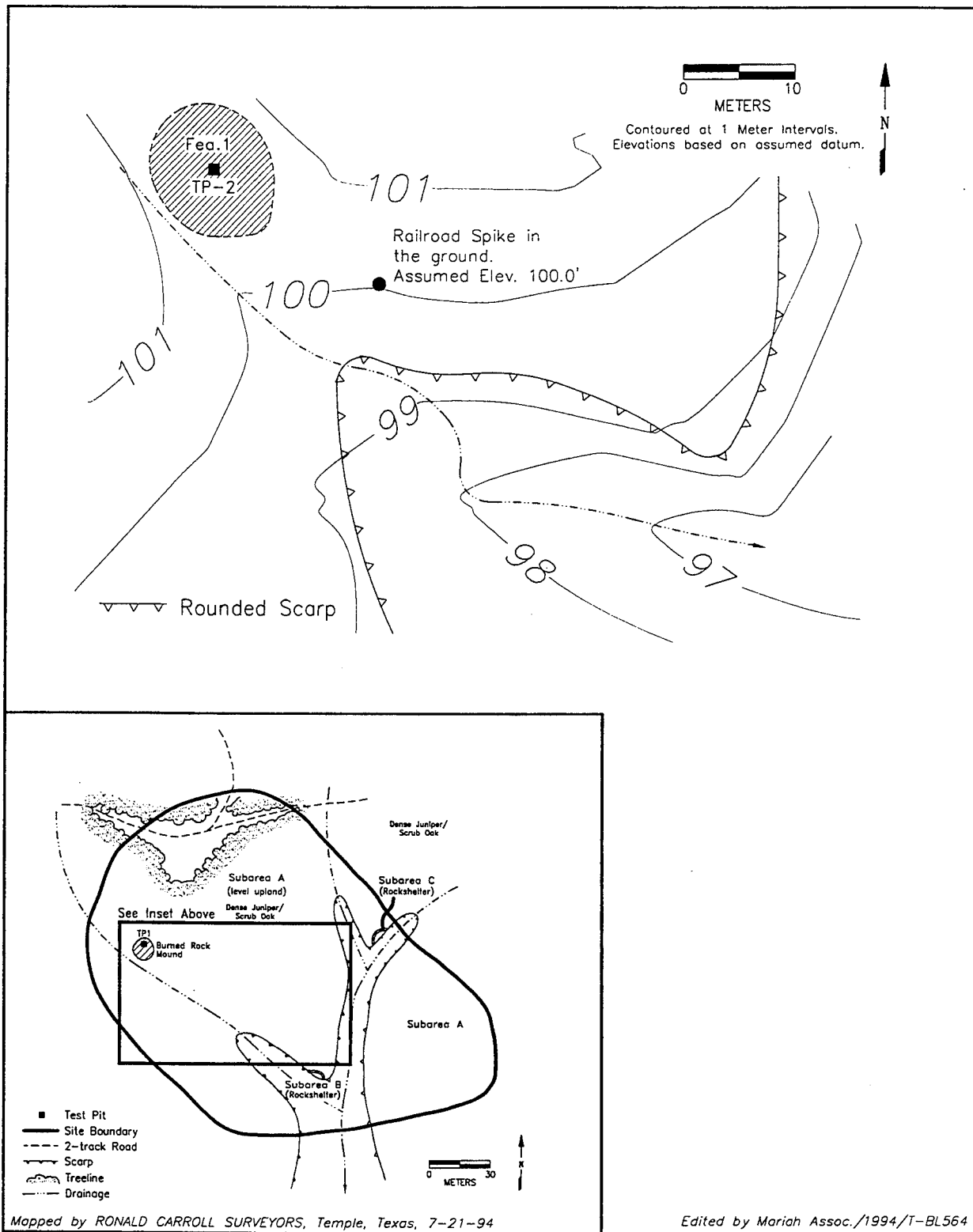


Figure 5.52 Site Map of 41BL564.

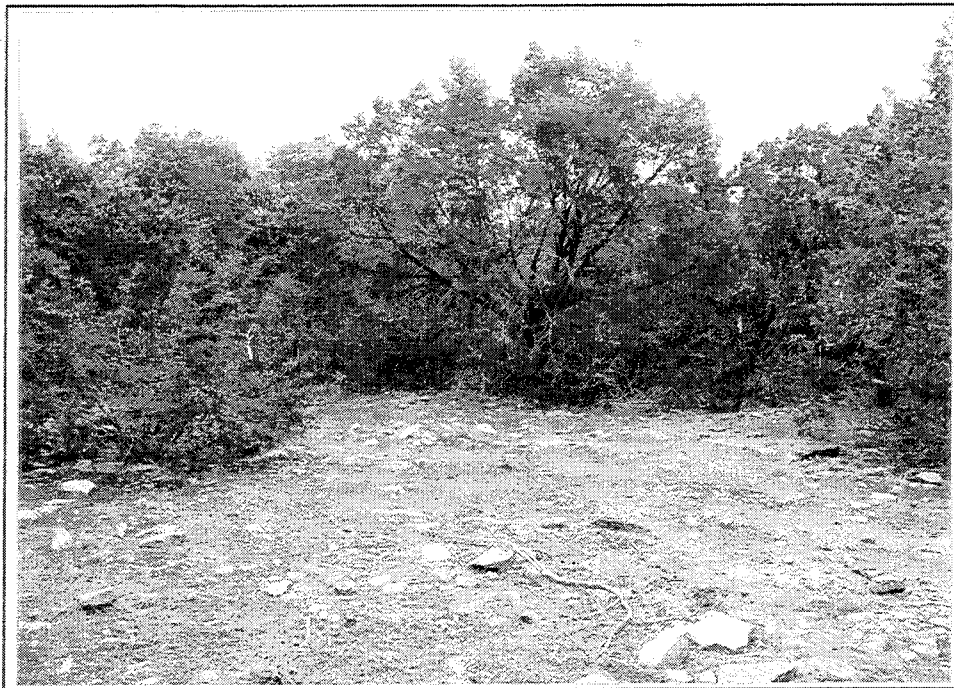


Figure 5.53 Overview of Site 41BL564, Looking South.

heavy amount of roof fall. The depth of deposit was estimated up to 1 m thick based on a probe dug at the base of a vandal's hole. In addition, cultural deposits were also considered possible within the talus slope deposits fronting the shelter. Overall, potential for archeological recovery was considered good; however, the integrity of the deposit was considered somewhat suspect due to vandalism.

A second south-facing rockshelter, Subarea C, measured 7.5 x 2 x 1 m. Mussel shell, debitage, and a point fragment were observed in vandal pits, on backdirt, and on the talus slope. The sediment appeared to be internally and externally derived. Again, the talus had the potential to contain buried deposits and the potential for cultural material within the shelter was considered good. One shovel test was recommended for this shelter.

On 9 April 1992, one test pit quad (50 x 50 cm) and two shovel tests were excavated on this site. The quad, TP 1, was placed on the northern edge

of the mound. From 0 to 70 cmbs, 1,158 burned rocks, mostly angular, were recovered. No vandalism was evident and excavation was terminated at 70 cmbs, when several unburned rocks believed to represent bedrock were encountered. In shovel test B1, Subarea B shelter, 36 artifacts (including lithics, bone, mussel shell fragments, and burned rocks) were recovered from 0 to 30 cmbs. No cultural material was found in Level 4. The matrix was a very wet, practically unscreenable, clay loam. Shovel test C 1, excavated in Subarea C shelter, contained lithics and mussel shell to 38 cmbs (bedrock). One untyped arrow point was found in Level 4. The matrix was a dark brown loam. Although subsurface material was found in the two shelters, both appeared heavily disturbed by vandalism and intact deposits were no longer considered present. Archeological potential was therefore considered very limited and no further management was recommended for Subareas B and C. Based on testing results, the mound in Subarea A contained potentially intact deposits, but its archeological

potential remained uncertain. The subarea was recommended for avoidance or for formal testing if avoidance was not possible. One backhoe trench bisecting the mound and 2 m² of manually excavated test pits were recommended for formal testing to determine eligibility (Trierweiler 1994:A301-A305).

5.16.1.3 New Work

Due to the apparent intactness and relative small size of the feature, plus the fact that the site is situated within the endangered species protected habitat, the trench recommended for the burned rock mound in Subarea A was reconsidered. Trenching was determined to have too great an impact and was not undertaken. On 24 November 1993, in a telephone conversation with Gil Eckrich (DEH, Fish and Wildlife), permission was granted to proceed with test pit excavations on this site, even though this area is within the endangered species habitat, because the impacts of limited manual excavation were considered extremely limited. One test pit was then excavated (Table 5.101).

Other than TP 1 (50 x 50 cm quad excavated during the 1992 shovel testing phase), the mound appeared undisturbed. The 1 x 1 m test pit excavated during formal testing was designated TP 2 to avoid confusion with the previously excavated TP 1. Test pit 2 was situated on the burned rock mound located on the north bank of the tributary, just above the channel bed. Ending depths ranged between 77 and 84 cmbs due to the bedrock slope. Recovered cultural material is summarized in Table 5.102.

Since both rockshelters were in close proximity to F 1, they were revisited. Subarea C shelter appeared to be completely vandalized, with no intact deposits remaining. Although Subarea B shelter was heavily damaged, a narrow strip, approximately 2 x 0.75 m maximum, along the back wall, was noted as intact. An ash lens, 10 cmbs and 5 cm thick, was observed in a 20 to 25 cm profile section along this area. At this time,

the shelter map was amended to depict the small section which may have limited potential for intact deposits. Examination of this small section was deferred because it seemed likely that F 1 would be determined to be significant, and test excavation would involve excavation of a substantial amount of the remaining intact deposits without concomitant resources necessary to perform paleoenvironmental and other such analyses that are likely to be present even with such a small amount of fill.

5.16.2 Results

Feature 1 is burned rock mound 11.5 to 12 m in diameter x about 90 cm high, with a central depression about 2 m in diameter (Figure 5.54). Test pit 2 (Figure 5.55) was placed on the mound apex, adjacent to the southeastern edge of the central depression. Extremely high frequencies of burned rock were found in Levels 1 through 7 of TP 2, ranging from 3070 clasts (52 kg) from 0 to 10 cmbs to 1100 clasts (59 kg) from 60 to 70 cmbs (see Table 5.102). Burned rock is especially concentrated by count (33% of the total) and weight (42% of the total) in Levels 2 and 3, which represent a peak in burned rock density. The rocks in Level 2 are also relatively large (average 0.06 kg), whereas the rocks in Level 1 are highly fragmented (average 0.02 kg). A dramatic decrease in burned rock occurs in Levels 8 and 9. The burned rocks were primarily angular. A gradual soil color change from a black (10YR 2/1) to dark gray brown (10YR 4/2), clay loam occurred in Level 7. In addition, a heavy amount of unburned limestone was also noted in Level 7, and unburned rock (probably fractured bedrock) increased with depth to solid bedrock. Debitage recovery was very light, with most coming from Levels 1 and 2. The only noted disturbance was root activity.

Only one late stage biface, of indeterminate light brown material, was recovered from this site.

A total of 18 flakes, consisting of one Fossiliferous Pale Brown specimen, one Heiner Lake Blue

specimen, two indeterminate dark brown flakes, nine indeterminate light brown flakes, and five indeterminate light gray flakes, were recovered from 41BL564. This sample is insufficient to allow for statistical analysis of the assemblage, but a few summary observations are possible. Interestingly, both identified types are typical of the Southeast Range province on the other side of the Cowhouse Creek valley, and thus represent "exotic" cherts. With two exceptions, all of the flakes were completely decortified, suggesting latter-stage reduction, but the range in sizes was pronounced (varying from 0.5 to 5.2 cm) suggesting that either relatively large tools were being manufactured or the range in activities was more varied than suggested by the paucity of cortex.

No identifiable faunal material was recovered from the mound.

Although no diagnostic artifacts were recovered, two AMS radiocarbon ages on charcoal were obtained from the base of F 1. These two ages, 200 ± 60 BP (Beta B-73900) from Level 8 and 690 ± 50 from Level 9, indicate that the feature is a Late Prehistoric phenomenon and thus may be affiliated with the vandalized occupations in the two shelters.

5.16.3 Conclusions and Recommendations

Feature 1 is an intact burned rock mound in nearly pristine condition. The mound represents a very clear example of a discrete, artifact-poor upland mound formed almost exclusively of thermally fractured rock. It clearly represents a different type of phenomenon than the artifact-rich midden features characteristic of many other sites on the fort. Although the test pit was not positioned to examine (and in fact intentionally avoided) the central depression, experience on similar mounds suggests that it is likely that the depression is underlain by some type of identifiable internal feature that was the focus of a specialized activity, probably involving the processing of vegetal resources.

Table 5.101 List of Treatment Units, 41BL568.

AU	Treatment	Length	Width	Depth
1	TP 1	.5	.5	70
1	TP 2	1.0	1.0	84

The feature's pristine condition makes it a rare occurrence on Fort Hood. As such, it has high potential to provide data for reconstruction of burned rock technologies (per Ellis 1994b). Given visible intact cultural stratigraphy in the wedge of undisturbed shelter deposits, a small but very useful data base is present in the Subarea B shelter. Other pockets of undisturbed deposits also may be present. The intact shelter deposits and F 1 represent small, but nonetheless very useful, sources of data with which to address research issues outlined in the research design for Fort Hood (Ellis et al. 1994).

Table 5.102 Artifact Recovery by Test Pit, 41BL564.

LEVEL	TEST PIT 2				
	Bivalve	Bone	Lithics	Lithic tool	Burned rock (kg)
1	0	0	6	0	3070(52)
2	0	0	5	1	2355(145)
3	0	0	3	0	2430(103)
4	0	0	0	0	2072(77)
5	0	0	1	0	1856(70)
6	0	0	0	0	1600(72)
7	0	0	2	0	1100(59)
8	0	0	0	0	175(18)
9	0	0	1	0	6(2)
TOTAL	0	0	18	1	14,658(598)



Figure 5.54 Feature 1, 41BL564, Looking Northwest.

On the basis of the foregoing, we judge 41BL564 to be significant and eligible for inclusion in the NRHP, and it should be preserved and protected from adverse impacts. Because the known eligible components at the site are on the surface or shallowly buried, they are vulnerable to impact from even minor disturbances such as wood cutting and traffic (on the uplands) and low-intensity bivouac (especially in the shelter). Although the mound currently is in pristine condition, it comprises one of the most sought-after targets of relic collectors. Disturbance to the shelters shows that there is a history of vandalism to which the remaining shelter deposits are vulnerable. Because of its proximity to the shelters, F 1 may be especially vulnerable to the extent that local relic collectors are currently active in identifying new sites. Protection efforts should include measures to: (1) prevent subsurface disturbance by vandalism; (2) prevent mechanical or manual excavations by military personnel; and (3) minimize the impact of traffic, especially by heavy tracked and wheeled vehicles on the uplands.

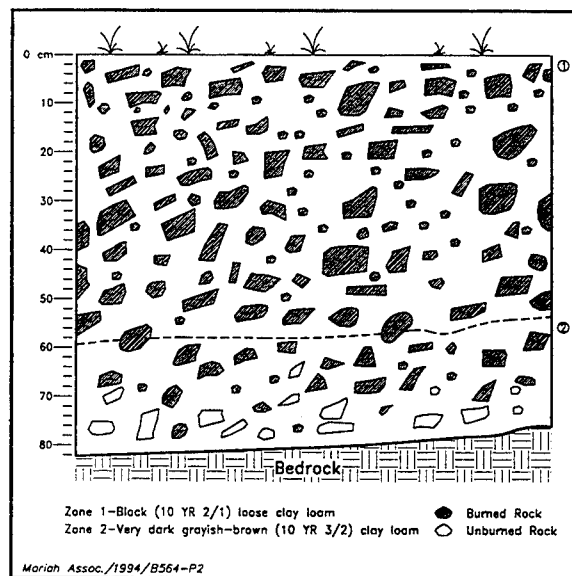


Figure 5.55 Profile of North Wall, TP 2, Illustrating F 1 in Section, 41BL564.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 127 m² in area. A 100 to 125 m² block should be excavated at F 1 to provide a horizontally extensive view of its internal structure (cf. Howard 1991). Excavation should also focus on retrieval of ethnobotanical data. This block could account for as much as 100 m³ of manual excavations. Another block should be placed over the intact shelter deposits, yielding another 2 m³ of manual excavations. These excavations should be tightly focused on retrieval of ethnobotanical, paleoenvironmental, and geoarcheological samples since the small volume of the deposits limits more traditional data recovery aims. Both shelters should be explored for additional pockets of intact stratigraphy, which could add an unknown volume to the above estimates for manual excavations.

5.17 SITE 41BL567

5.17.1 Introduction

In late November 1993, Mariah conducted test excavations at site 41BL567. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.17.1.1 Location and Description

This rockshelter site is located about 150 m east of an unnamed tributary of Taylor Branch, just below

a high escarpment edge (Figures 5.56 and 5.57). Maximum site dimensions are 30 x 5 m (about 150 m², or 0.037 acres). For the purposes of this report, the site is included in the Cowhouse/Taylor/Bear area of the fort.

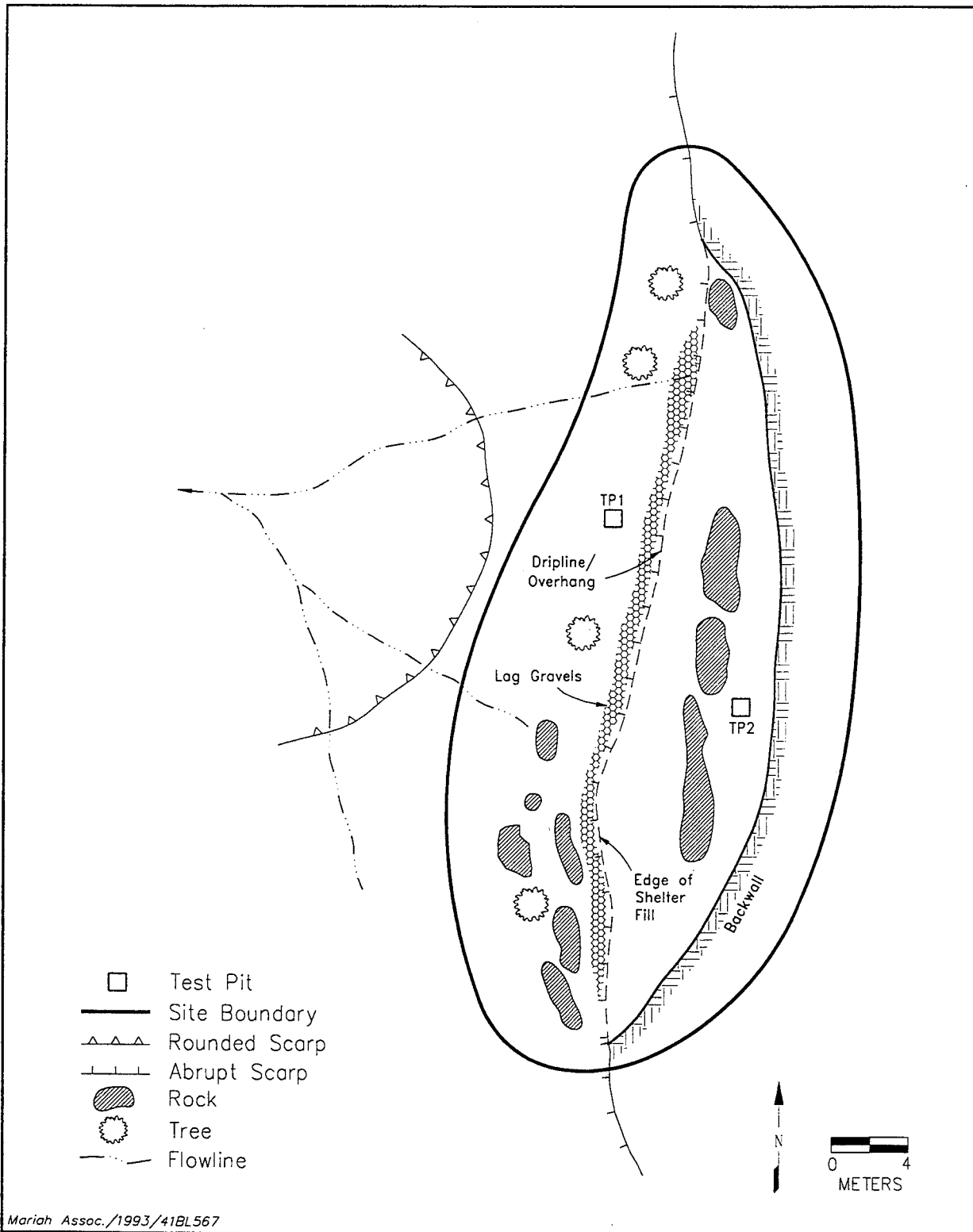
5.17.1.2 Previous Work

This site was initially recorded by Meiszner and Turpin on 23 February 1984 as a rockshelter containing limestone dust fill and roof spalls. A core and a few flakes were observed within the shelter and a dart point fragment was observed on the upland surface above the shelter. The shelter was noted as being in good condition with minimal disturbance.

Oglesby, Truesdale, and Doering revisited the site in March 1992 and reevaluated the site on archeological and geomorphic grounds. Artifact density was considered to be moderate and appeared to be concentrated primarily on the bench in front of the shelter. Artifacts observed consisted of debitage and a small amount of bone and mussel shell. Because the shelter was considered to have the potential for intact cultural deposits, a crew returned in April 1992 and excavated three shovel tests. Cultural material was recovered from only one of the shovel tests excavated. Within this positive shovel test, cultural material was recovered from 0 to 40 cmbs, and a thin charcoal stained lens was observed at approximately 30 cmbs. On the basis of this work, the NRHP eligibility of the shelter remained uncertain and it was recommended for avoidance or formal testing if avoidance was not possible. Three manually excavated 1 x 1 m tests pits were recommended to determine NRHP eligibility (Trierweiler 1994:A307-A309).

5.17.1.3 New Work

Two 1 m x 1 m test pits (TP 1, TP 2) were aligned to magnetic north and excavated to bedrock during formal testing (Table 5.103). One of these units (TP 1) was placed outside of the dripline on the talus in front of the shelter, while the other (TP 2)



Mariah Assoc./1993/41BL567

Figure 5.56 Site Map of 41BL567.

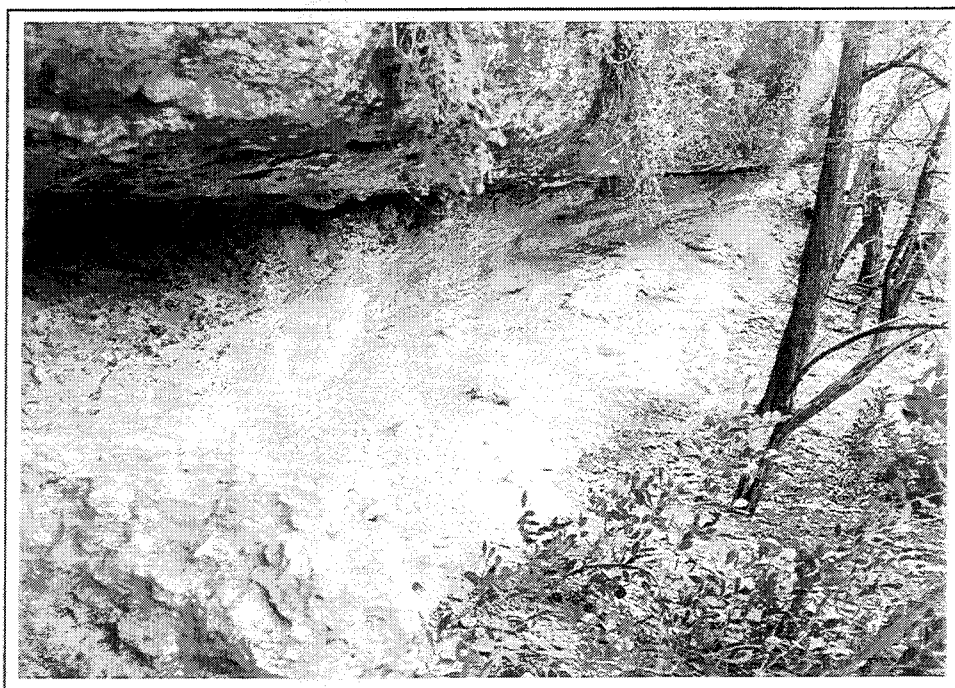


Figure 5.57 Rockshelter at Site 41BL567, Looking Southeast.

was placed within the shelter. Recovered cultural material is summarized in Table 5.104.

5.17.2 Results

A line of large roof spalls is present at the central portion of the shelter (see Figure 5.56). Numerous rodent burrows are present around these spalls. A dark lens of charcoal-stained eboulis was observed within the walls of the majority of the burrows throughout the central portion of the shelter. Although this burrowing has heavily impacted a portion of the shelter near and below the roof spalls, the back 2 m and front 1.5 m of the shelter appear to be in pristine condition. Sediments in the shelter are a light-colored, stony silt that appears to represent primarily internally derived sediment (Type 1 sediment of Abbott 1994).

Test pit 1 was placed on a relatively flat area in front of the shelter's dripline and excavated to bedrock (56 cmbs). Total recovery from this test pit was a single flake found from 10 to 20 cmbs.

Test pit 2 (Figure 5.58) was placed beneath a large roof spall at the center of the shelter and excavated to bedrock at 50 cmbs. An abundance of debitage, samples of snail shell and charcoal, and several bone fragments were recovered from each level excavated (Table 5.104). High frequencies of debitage, several burned rocks, and bone and mussel shell fragments were found from 0 to 30 cmbs. In addition to these cultural materials, a dart point and four bifaces were found from 0 to 10 cmbs; three Scallorn points, a Darl dart point, several arrow point fragments and bifaces, and a

Table 5.103 List of Treatment Units.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	1.0	56
1	TP 2	1.0	1.0	50

Table 5.104 Artifact Recovery by Test Pit, 41BL567.

LEVEL	TEST PIT 1					TEST PIT 2				
	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)
1	0	0	0	0	0(0)	0	11	399	6	20(5)
2	0	0	1	0	0(0)	21	51	467	11	9(20)
3	0	0	0	0	0(0)	3	7	104	1	3(1)
4	0	0	0	0	0(0)	0	2	49	0	0(0)
5	0	0	0	0	0(0)	0	1	13	0	0(0)
6	0	0	0	0	0(0)	NOT SCREENED				
7										
8						0	0	0	0	0(0)
9						0	0	0	0	0(0)
TOTAL	0	0	1	0	0(0)	24	72	1032	18	32(26)

dart point fragment were found from 10 to 20 cmbs. At 5 to 22 cmbs, a dark, stratigraphically discrete lens of charcoal-stained eboulis extended across the entire unit. All of the diagnostics mentioned above were found within this lens, which suggests that the occupation dates to the early part of the Late Prehistoric (e.g., Austin Phase). A radiocarbon age of 790 ± 50 BP (Beta B-74069) on charcoal obtained from the occupation (Level 2) is consistent with the artifact chronology and supports this conclusion.

Two hearth features were encountered within the occupation zone in TP 2. Feature 1 was encountered from 10 to 22 cmbs in the northern portion of TP 2, while F 2 was encountered at 18 cmbs in the southeastern corner of TP 2. The top of F 1 was ovate in shape (53 cm long x 40 cm wide) and pink in color (Figure 5.59). Feature fill consisted of burned eboulis and charcoal chunks. Orange eboulis and 11 burned limestone rocks (averaging 8 x 6 x 5 cm) defined the base of the hearth at 22 cmbs (Figure 5.60). Approximately 20 to 30% of the feature was disturbed by rodent activity, but otherwise the hearth appeared to be intact. Carbonized wood collected from the feature

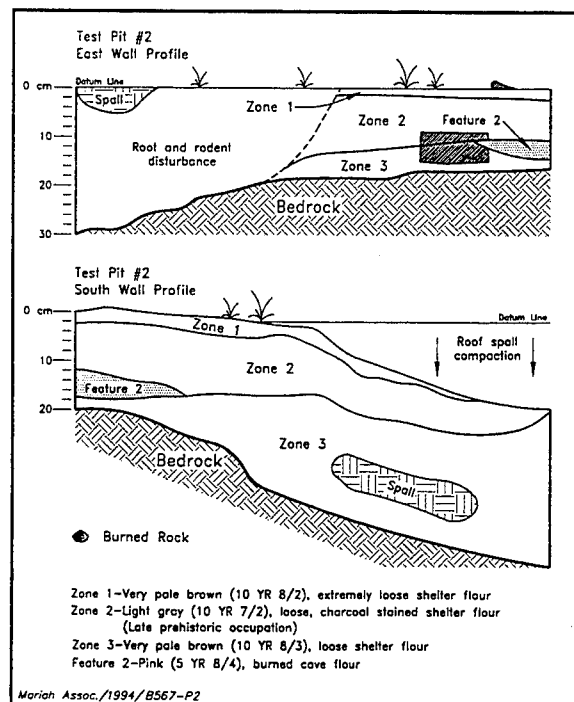


Figure 5.58 Profiles of East and South Walls, TP 2, F 2, 41BL567.

indicated a variety of fuels, including live oak, juniper, walnut, and pecan.

Only a portion of F 2 was located within the boundaries of the test pit (see Figure 5.60). This feature appeared to be a small hearth, with the visible portion consisting of one large burned limestone rock at the northern edge of an arc of burned eboulis and charcoal flecks in the southeastern corner of the test pit. The investigated portion of the feature was 20 cm x 15 cm in size and extended from 10 cm to 14 cmbs. Although the total size is difficult to estimate given the available exposure, the curvature of the edge suggests that the feature is probably less than 75 cm in diameter. Only a small percentage of this hearth appeared to be disturbed by rodent activity.

The projectile point recovery from this site spans the time periods from Transitional Archaic through the early part of the Late Prehistoric; two points were identified as untyped dart and arrow points (Table 5.105). Two points each were assigned to the indeterminate dark gray and indeterminate light brown chert types. The general tool assemblage consisted of both uniface and biface tool types of three chert types (Table 5.106). Of note is the high incidence of preforms in the recovery assemblage. Five of the ten tools are classified as preforms, with the chert assignment consisting of two Heiner Lake Tan and three Indeterminate Light Brown. Of the five preforms, two of them are probably distal fragments of finished projectile points, while two of the remaining three are true preforms which broke during final modification. The final preform has been heat altered which precludes a determination of manufacture or heat breakage.

A large, diverse debitage assemblage encompassing ten identified chert types, eight indeterminate chert categories, and a few crude quartz flakes as recovered from TP 2 (Table 5.107). The identified fraction made up less than 7% of the recovered assemblage. This low rate of identification is probably largely a function of a strong skew toward small flakes (83% were smaller than 1.2

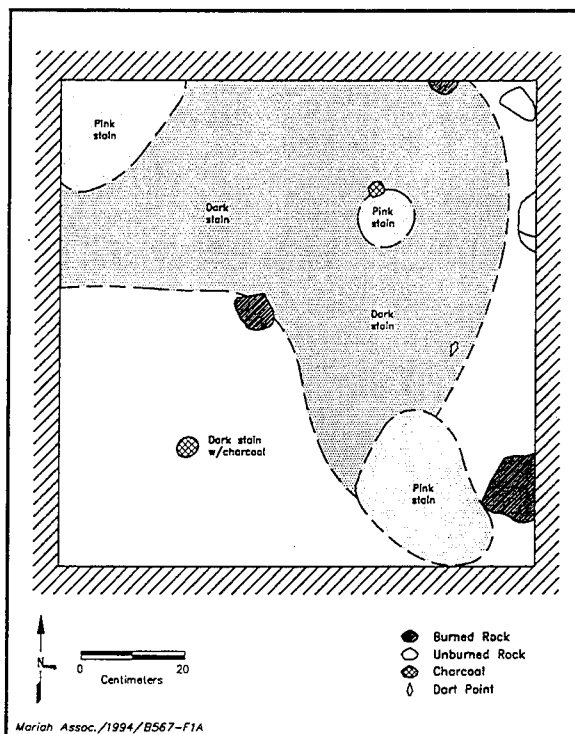


Figure 5.59 Plan of F 1, TP 2, at 15 cmbs, 41BL467.

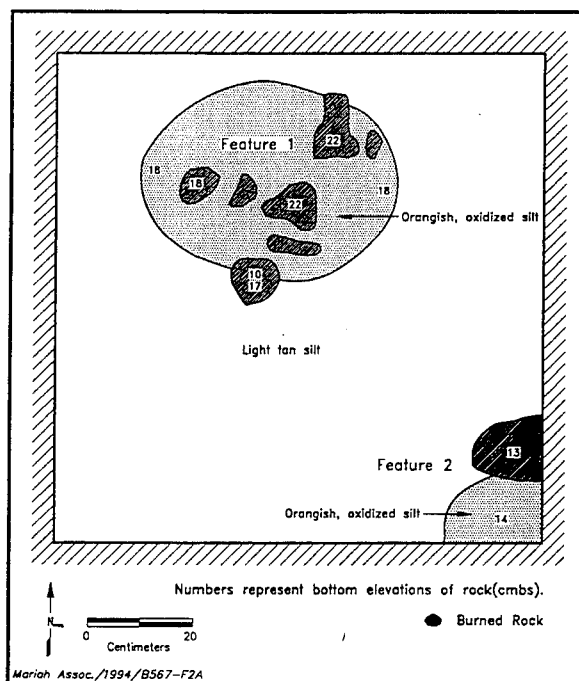


Figure 5.60 Plan of F 2, TP 2, at 18 cmbs, 41BL567.

cm) rather than an unusually large proportion of "exotic" materials. In any case, the small size of the identified fraction rendered the statistical analysis of the whole assemblage moot; as may be expected, the indeterminates occurred in greater than expected frequency and all of the identified types occurred in less than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan and Fort Hood Yellow occurred in greater than expected frequencies; Heiner Lake Blue, Fort Hood Gray, Gray/Brown/Green, Owl Creek Black, and Cowhouse Mottled occurred in expected frequencies; and Anderson Mountain Gray, Texas Novaculite, and East Range Flecked occurred in less than expected frequencies (Table 5.108). This assemblage represents all four chert provinces identified on the fort, with the North Fort and Southeast Range provinces most strongly represented.

Although a few large flakes are present, the assemblage is dominated by small flakes indicative of latter-stage reduction (Table 5.107). This conclusion is supported by a complete lack of cortex on 88% of the flakes; however, the presence of large, cortical flakes, including a few primary decortification flakes, indicates that at least some early-stage reduction was practiced in the shelter (Table 5.109). Only one cortical flake was obviously stream-abraded, indicating that little streambed procurement was practiced.

A moderately-sized faunal assemblage was recovered from the shelter (Table 5.110). Although none of the material could be identified with any particular species, the presence of Artiodactyla and medium/large mammal suggests that much of the material is probably deer. Also of interest is a vertebra from a small fish, which may indicate exploitation of aquatic resources. Roughly 28% of the bone is obviously burned and 12% is spirally fractured, indicating that at least some of the material is cultural debris. Although fragments of mussel shell were recovered, none could be identified to individual species.

Table 5.105 Projectile Points, AU 1, 41BL567.

Point Type	Lithic Material						Total
	08-FH Yellow	19-C Dr Gray	Indet Dk Brown	Indet Dk Gray	Indet Lt Brown	Indet Mottled	
Dart	1	0	0	0	0	0	1
Other Arrow	0	0	0	2	0	0	2
Other Dart	0	1	1	0	0	0	2
Scallom	0	0	0	0	2	1	3
Total	1	1	1	2	2	1	8

5.17.3 Conclusions and Recommendations

41BL567 is a rockshelter with cultural deposits that reflect some bioturbation, but which are otherwise in apparently undisturbed condition. The shelter is infilled with a stony, silty sediment that appears to represent weathering of the shelter roof and walls. The projectile points and radiocarbon results indicate that the shelter was occupied in the

Table 5.106 Nonprojectile Point Lithic Tools, AU 1, 41BL567.

Lithic Material	Tool Type					Total
	late stage biface	preform	side scraper	spokeshave	uniface	
06-HL Tan	1	2	0	0	1	4
17-Owl Crk Black	0	0	0	1	0	1
Indet Lt Brown	0	3	1	0	1	5
Total	1	5	1	1	2	10

Late Prehistoric (cf. Turner and Hester 1985). The Darl point may reflect either longer-term occupation or reuse by Late Prehistoric occupants. The presence of intact subsurface features and cultural materials in a datable, stratigraphically distinct depositional unit implies that the shelter has very high potential to provide data for technological, economic, and paleoenvironmental issues outlined in the research design for Fort Hood (Ellis et al. 1994).

On this basis, site 41BL567 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequently sought by artifact collectors, the site is vulnerable to vandalism. Because the cultural materials are shallowly buried, they also are vulnerable to unintentional damage by military personnel using the shelter during training exercises. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism and (2) prevent surface disturbance and manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 175 m². Given an average depth of about 50 cm, excavation volume could be up to 85 m³. Excavations should include deposits outside the dripline of the shelter, and an attempt should be made to remove large roof-fall slabs because intact deposits remain below them.

Table 5.107 Debitage Recovery by Size and Material Type, AU 1, 41BL567.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types							
HL Blue (1&10)	0	0	2	2	6	0	10
03-AM Gray	0	0	0	0	1	0	1
05-Texas Novac	0	0	0	1	0	0	1
06-HL Tan	0	0	2	7	3	6	18
08-FH Yellow	0	3	0	4	4	1	12
13-ER Flecked	1	0	0	0	0	0	1
14-FH Gray	0	0	1	0	2	2	5
15-Gry/Brn/Grn	0	0	5	1	5	0	11
17-Owl Crk Black	2	3	0	1	1	1	8
18-C Mottled	0	2	0	0	0	0	2
<i>Subtotal</i>	3	8	10	16	22	10	69
Unidentified Types							
Indet Black	6	6	3	0	0	0	15
Indet Dk Brown	57	58	14	4	14	0	147
Indet Dk Gray	0	4	3	1	1	0	9
Indet Lt Brown	218	280	63	47	38	8	654
Indet Lt Gray	39	45	10	7	2	1	104
Indet Misc.	1	0	0	0	0	0	1
Indet Mottled	0	6	2	0	1	1	10
Indet White	0	13	6	1	2	0	22
<i>Subtotal</i>	321	412	101	60	58	10	962
Quartz	0	0	1	1	0	0	2
Total	324	420	112	77	80	20	1033

Table 5.108 Binomial Statistic Results, AU 1, 41BL567.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1&10)	10	66	100	less	2	11	expected
03-AM Gray	1	66	100	less	2	11	less
05-Texas Novac	1	66	100	less	2	11	less
06-HL Tan	18	66	100	less	2	11	more
08-FH Yellow	12	66	100	less	2	11	more
13-ER Flecked	1	66	100	less	2	11	less
14-FH Gray	5	66	100	less	2	11	expected
15-Gry/Brn/Grn	11	66	100	less	2	11	expected
17-Owl Crk Black	8	66	100	less	2	11	expected
18-C Mottled	2	66	100	less	2	11	expected
Quartz	2	66	100	less	2	11	expected
Total Indet	962	66	100	more	na	na	na

Table 5.109 Debitage Cortex Characteristics by Material Type, AU 1, 41BL567.

Lithic Material	All Cortex		Partial Cortex		Not Applicable	Total
	Abraded	Indeterminate	Unabraded	Indeterminate		
Identified Types						
HL Blue (1&10)	0	0	2	0	8	10
03-AM Gray	0	0	0	0	1	1
05-Texas Novac	0	0	0	0	1	1
06-HL Tan	0	0	0	3	15	18
08-FH Yellow	0	0	2	2	8	12
13-ER Flecked	0	0	0	0	1	1
14-FH Gray	0	0	0	0	5	5
15-Gry/Brn/Grn	0	0	0	1	10	11
17-Owl Crk Black	0	0	3	0	5	8
18-C Mottled	0	0	0	0	2	2
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>7</i>	<i>6</i>	<i>56</i>	<i>69</i>
Unidentified Types						
Indet Black	0	0	0	0	15	15
Indet Dk Brown	0	1	4	5	137	147
Indet Dk Gray	0	0	1	0	8	9
Indet Lt Brown	1	0	20	70	563	654
Indet Lt Gray	0	0	2	5	97	104
Indet Misc.	0	0	0	0	1	1
Indet Mottled	0	0	1	2	7	10
Indet White	0	0	2	1	19	22
<i>Subtotal</i>	<i>1</i>	<i>1</i>	<i>30</i>	<i>83</i>	<i>847</i>	<i>962</i>
Quartz	0	0	1	0	1	2
Total	1	1	38	89	904	1033

Table 5.110 Faunal Recovery, AU 1, 41BL567.

Vertebrates	Element			Total
	Indeterminate	Proximal Phalanx	Vertebra	
Artiodactyla	0	1	0	1
Mammalia	2	0	0	2
Mammalia (med/lg)	9	0	1	10
Osteichthyes (sm)	0	0	1	1
Vertebrata	58	0	0	58
Total	69	1	2	72

5.18 SITE 41BL568

5.18.1 Introduction

In late January and early February 1994, Mariah conducted test excavations at site 41BL568. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.18.1.1 Location and Description

Site 41BL568 is located in the Cowhouse/Taylor/Bear area of the fort on the east side of an unnamed tributary to Taylor Branch (Figure 5.61). The site consists of a lithic scatter and two burned rock mounds on a denuded segment of the upland Manning surface and 11 rockshelters lining a tributary valley. The site is in a dense cover of juniper and scrub oak in the upland, with juniper, vines, and hackberry in the tributary valley (Figure 5.62). Overall site dimension are 290 x 280 m (81,200 m², or 20 acres).

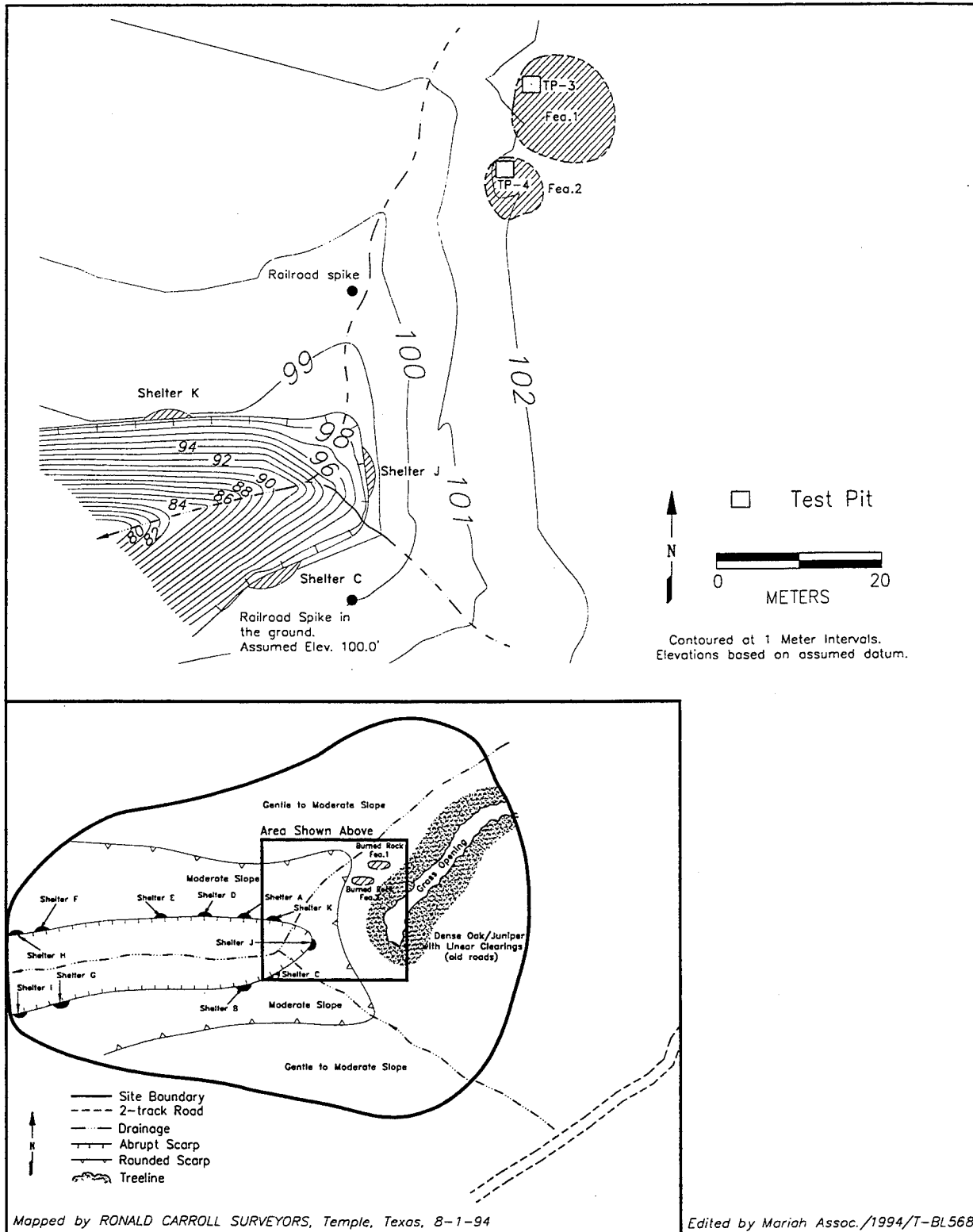


Figure 5.61 Site Map of 41BL568.



Figure 5.62 Overview of Site 41BL568, Looking East.

5.18.1.2 Previous Work

The site was recorded by Gray and Ensor on 23 February 1984 as a related complex of rockshelters, burned rock mounds, and an associated upland artifact scatter. Marcos and Harrell points were recovered along with two untyped points, bifaces, a scraper, a drill, a hammerstone, and chipped stone debitage. Despite some disturbance from vandalism, juniper cutting, erosion, tracked vehicles, and bivouac activity, the site was considered to be in good condition, exhibiting only minimal degradation.

On 24 March 1992, Oglesby and Doering revisited and reevaluated the site based on archeological and geomorphological observations. The site setting was described as gently to moderately sloping uplands surrounding the head of a tributary eroding into the rim of the Manning surface. Due to the different cultural potential of the mound and rockshelter areas, the site was split into two subareas, with Subarea A subsuming the upland

area containing the burned rock features and Subarea B subsuming the incised tributary valley and rockshelters. Two burned rock mounds and a moderate lithic scatter, including chipped stone flakes, a thin biface fragment, two edge modified flakes, and a quartz flake, were noted in Subarea A. Although 11 shelters were noted in Subarea B (map, Ensor 1984), preserved sediments were only observed in a single shelter (Shelter C), which measures 5 x 2.5 x 0.88 m (Figure 5.63). The sediment appeared to be a combination of externally derived slopewash and sediment weathered from the shelter roof and back wall. Most of the remaining shelters had stripped bedrock floors, although some thin, patchy accumulations of sediment were noted.

Since the site was considered to possess potentially in situ deposits, a crew returned 8 April 1992 and excavated three shovel tests, one in each burned rock mound and one in Shelter C. The shovel test in Shelter C was excavated to 40 cmbs but did not produce any cultural material from the clay loam

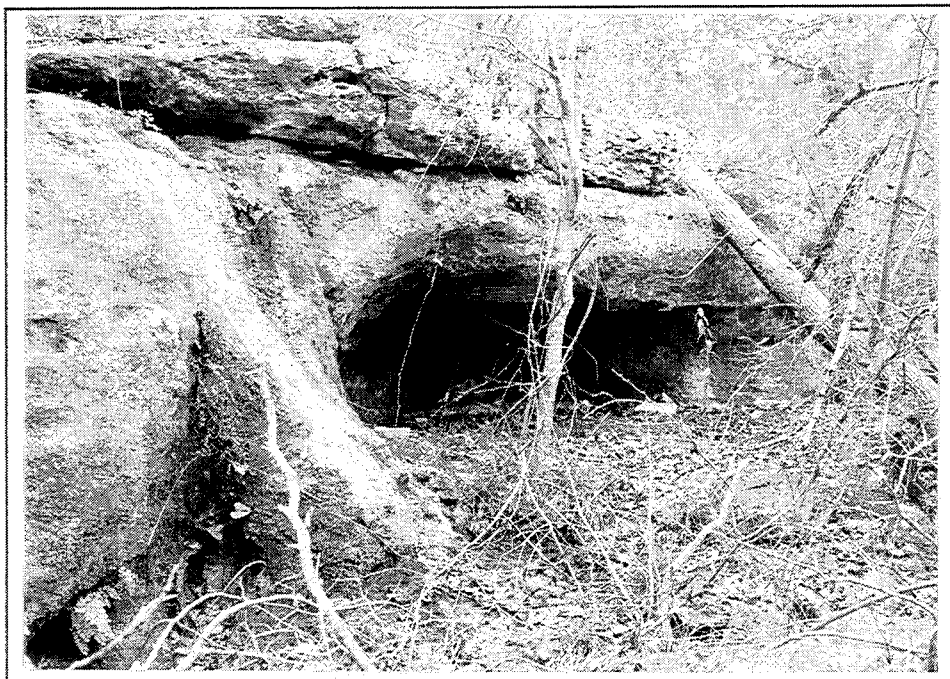


Figure 5.63 Rockshelter C at Site 41BL568, Looking North.

matrix. The shovel test in burned rock F 1 yielded 382 cultural items, mostly burned rock, and was excavated to a depth of 50 cmbs without encountering bedrock. The shovel test in burned rock F 2 was excavated to 30 cmbs and produced 171 cultural items which were all burned rock except for 18 chipped stone flakes and two mussel shell fragments. Rockshelter C had no cultural material in the upper 40 cmbs, but since bedrock was not encountered, it was not known whether cultural deposits were present at greater depths. The archeological potential of the site was judged to be uncertain. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Recommendations for eligibility testing included one backhoe trench and two manually excavated 1 m² test pits for each burned rock mound and a 1 x 2 m unit in Shelter C (Trierweiler 1994:A310-A312).

5.18.1.3 New Work

Considering the severe impact trenching would have on the two apparently intact burned rock mounds, and because it was felt that hand excavations would be sufficient to establish NRHP eligibility, the 1992 recommendations were modified to exclude mechanical excavation. On 24 November 1993, in a telephone conversation with Gil Eckrich (DEH, Fish and Wildlife), permission was granted to proceed with test pit excavations on this site, even though this area is within the endangered species habitat, because the potential impact of this activity on the habitat were considered to be extremely limited.

Four test pits were excavated during formal testing (Table 5.111). One 1 x 1 m test pit was excavated on each of the burned rock mounds excavated in Subarea A (TP 3 and TP 4), and two 1 x 0.5 m test pits (TP 1 and 2) were excavated in Shelter C, which, aside from the previously excavated test unit, appeared undisturbed. Test pit 1 was placed

against the back wall of Shelter C and TP 2 was placed with its eastern boundary at the dripline of the shelter. Recovered cultural material is summarized in Table 5.112. For analytical purposes, the site was divided into the rockshelter (AU 1) and the upland mounds (AU 2).

5.18.2 Results

5.18.2.1 Excavations in Rockshelter C

Test pit 1, at the rear of the shelter, was composed of a dark brown to dark grayish brown (10YR 4/2 - 10YR 4/3) stony loam that appeared to contain a high percentage of decomposed and partially decomposed organic matter. It was excavated to a depth of 33 cm. A small amount of debitage, burned rock (14 small pieces, 1 kg), and burned bone were recovered 0 to 33 cmbs (Table 5.112). Of these artifacts, most were recovered from 0 to 20 cmbs and were found in the fine screen.

Test pit 2, situated near the dripline, was composed of a dark brown (10YR 3/3 - 10YR 4/3) stony clay loam that graded into a dark reddish brown (5YR 3/2) stony clay loam with depth. It was excavated to a depth of 40 cm. Although the shelter was not examined by the geomorphologist, the description suggests that a weak to moderate soil was developed in the deposits revealed in TP 2, suggesting that it is probably of somewhat greater antiquity than is typical for rockshelters on the fort. Recovered cultural material consisted of several small pieces of burned rock in Level 3 and a chert flake in Level 4. Although artifact frequencies are somewhat low, the excavations in Rockshelter C revealed intact deposits.

One Ellis dart point of indeterminate dark gray chert was collected from the surface of this site and an untyped dart point also of the same material was recovered from the excavations in AU 1.

A very small assemblage, consisting of four identified chert types and four indeterminate chert categories, was recovered from Rockshelter C (Table 5.113). When all the material was

Table 5.111 List of Treatment Units.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	0.5	33
1	TP 2	1.0	0.5	40
2	TP 3	1.0	1.0	139
2	TP 4	1.0	1.0	74

considered, indeterminate cherts occurred in greater than expected frequency and all identified types occurred in expected frequencies. When the indeterminates were excluded, all of the identified types still occurred in expected frequencies (Table 5.114). Interestingly, four of the five identified flakes are Southeast Range cherts, implying relatively long-distance procurement on the opposite side of the Cowhouse Creek valley. Although all but one of the flakes are decortified and most are relatively small, one large (2.6 to 5.2 cm) partial cortex flake composed of Heiner Lake Tan chert was recovered (Table 5.115), indicating long-distance transport of relatively large pieces of raw material from the Southeast Range province.

A very small faunal assemblage, consisting of one deer tooth and three indeterminate bone fragments, was recovered from TP 1 (Table 5.116). No mussel shell was observed.

5.18.2.2 Excavations in the Burned Rock Mounds

Both of the burned rock mounds are located on the eastern margin of the upper, unincised reach of the more northerly tributary above the knickpoint at the head of the canyon. Although a thin colluvial mantle surrounds them, both appear to rest on bedrock rather than tributary alluvium. The burned rocks observed in both features generally range from 5 to 20 cm in maximum dimension, and both exhibit moderate coverage by juniper and scrub oak.

Feature 1, in the northern part of Subarea A, is about 13 m in diameter and rises 80 to 100 cm above the present ground surface. Test pit 3 was

Table 5.112 Artifact Recovery by Test Pit, 4IBL568.

LEVEL	None				TEST PIT 1				TEST PIT 2				TEST PIT 3				TEST PIT 4															
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools			
surface	0	0	0	1	0(0)	0	2	8	0	3(0.2)	0	0	0	0	0(0)	0	0	0	1	1	63(21)	0	0	0	1	1	0	0	0	0	0	
1	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	143(38)	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	270(86)	0	0	0	0	0	0	0	0	0	0	
3	0	0	0	0	6(1.5)	0	0	0	0	6(1.5)	0	0	0	0	6(1.5)	0	0	0	0	0	380(120)	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	290(101)	0	0	0	0	0	0	0	0	0	0	
5	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	230(100)	0	0	0	0	0	0	0	0	0	0	
6	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	260(113)	0	0	0	0	0	0	0	0	0	0	
7	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	286(105)	0	0	0	0	0	0	0	0	0	0	
8	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	201(70)	0	0	0	0	0	0	0	0	0	0	
9	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	169(57.5)	0	0	0	0	0	0	0	0	0	0	
10	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	228(72.5)	0	0	0	0	0	0	0	0	0	0	
11	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	38(14.5)	0	0	0	0	0	0	0	0	0	0	
12	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	15(3.5)	0	0	0	0	0	0	0	0	0	0	
13	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0	
TOTAL	0	0	0	1	0(0)	0	4	13	0	14(1)	0	0	0	1	6(1.5)	0	0	0	3	3	2573(902)	0	0	0	14	0	0	0	0	0	0	766(164)

placed near the southwestern margin of the mound, downhill from the approximate center, in order to test the area where the mound appeared deepest. The top of F 1 was encountered immediately, as attested by the burned rock content of Level 1 (n=63, 21 kg). A broken dart point and one chert flake were recovered from Level 1 and a high volume of snail shells was noted. High to very high burned rock content (up to 380 pieces, 120 kg in Level 4) was recorded throughout the entire unit (Table 5.112). Burned rock varied in size from 5 to 20 cm in maximum dimension and generally increased in size with increasing depth. Numerous snails were present in almost every level. No charcoal, bone, or mussel shell was recovered. Cultural recovery in TP 3 consisted of chipped stone debitage, three bifaces, three pieces of groundstone, and high frequencies of burned rock. Chipped stone debitage presence was very light in most levels and present in every level but Level 3. However, the debitage content increased in Levels 11 through 13. In addition, an early stage biface was recovered from both Level 11 and 12, and three pieces of groundstone were recovered from Level 11. The bottom level (Level 14) produced only three chert flakes.

The soil content of TP 3 was a very dark grayish brown (10YR 3/2) sandy clay midden soil from the surface to about 80 cmbs. From 80 cmbs to bedrock, calcium carbonate content increased and the fill became lighter in color (10YR 4/2),

Table 5.113 Debitage Recovery by Size and Material Type, AU 1, 41BL568.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types							
02-C White	0	0	0	1	0	0	1
06-HL Tan	0	0	0	0	0	1	1
08-FH Yellow	0	0	0	1	0	0	1
10-HL Blue	0	0	0	1	1	0	2
<i>Subtotal</i>	0	0	0	3	1	1	5
Unidentified Types							
Indet Black	1	0	0	0	0	0	1
Indet Dk Brown	0	0	1	0	0	0	1
Indet Dk Gray	2	1	0	0	0	0	3
Indet Misc.	0	1	3	0	0	0	4
<i>Subtotal</i>	3	2	4	0	0	0	9
Total	3	2	4	3	1	1	14

somewhat siltier, and the presence of unburned pebbles increased. A few large burned rocks (20 to 30 cm in size) were noted from 80 to 110 cmbs, and increased until bedrock was encountered.

General observations and the results of excavation indicate that F 1 has sustained only root disturbance and remains intact. The presence of

Table 5.114 Binomial Statistic Results, AU 1, 41BL568.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	1	0	6	expected	0	3	expected
06-HL Tan	1	0	6	expected	0	3	expected
08-FH Yellow	1	0	6	expected	0	3	expected
10-HL Blue	2	0	6	expected	0	3	expected
Total Indet	9	0	6	more	na	na	na

most of the artifact content in the lowest levels of the mound is characteristic of some burned rock features and may result at least partly from downward migration of smaller artifacts around relatively larger burned rocks. No internal features were noted.

Feature 2, in the southern portion of Subarea A, is 11 m in diameter and rises 60 to 80 cm above the present ground surface. Test pit 4 was excavated in F 2. As with TP 3, the unit was placed near the western margin of the feature downhill from its center in an attempt to examine the thickest portion. The top of F 2 was encountered in Level 1, where 37 burned rocks (9.5 kg) were recovered. Burned rock frequency and total weight climbed with depth to a peak in Level 4 (n=242, 47 kg), then declined to Level 7 (n=11, 1 kg). No burned rock was noted in Level 8. Chipped stone debitage was recovered from every level but the last; however, volume was very low overall (Table 5.112). A low volume of snail shells was recovered in all levels but Levels 1, 2, and 8, where none were observed. No charcoal, bone, or mussel shell was noted in the unit. As in F 1, the burned rocks were of various sizes (typically 5 to 20 cm maximum dimension), with larger rocks being more abundant in the lower levels.

The soil throughout TP 4 was consistently a very dark brown to black (10YR 2/1 - 10YR 2/2) sandy clay loam, with the only differentiation being high humus content in the top 10 cm. No internal features were noted. Like F 1, F 2 appears free of all but root disturbance and remains in good context.

Only two bifaces were recovered from the excavations in AU 2. These tools are an early and middle stage biface of indeterminate late brown chert.

Debitage consisting of six identified chert types and seven indeterminate chert categories were recovered from the two burned rock mounds (Table 5.117). Roughly 24% of the total recovered assemblage was classified into known types.

Table 5.115 Debitage Cortex Characteristics by Material Type, AU 1, 41BL568.

Lithic Material	Partial Cortex		Total
	Indeterminate	No Cortex	
Identified Types			
10-HL Blue	0	2	2
02-C White	0	1	1
06-HL Tan	1	0	1
08-FH Yellow	0	1	1
<i>Subtotal</i>	<i>1</i>	<i>4</i>	<i>5</i>
Unidentified Types			
Indet Black	0	1	1
Indet Dk Brown	0	1	1
Indet Dk Gray	0	3	3
Indet Misc.	0	4	4
<i>Subtotal</i>	<i>0</i>	<i>9</i>	<i>9</i>
Total	1	13	14

When the entire assemblage is considered, indeterminates occurred in greater than expected frequencies, Heiner Lake Tan occurred in expected frequency, and the remainder of identified types

Table 5.116 Faunal Recovery, AU 1, 41BL568.

Vertebrates	Element		Total
	Indeterminate	Tooth	
Mammalia (med/lg)	1	0	1
Odocoileus sp.	0	1	1
Vertebrata	2	0	2
Total	3	1	4

occurred in less than expected frequencies. When the indeterminates were excluded, all types occurred in expected frequencies (Table 5.118). The identified types include cherts associated with the North Fort province (Fort Hood Yellow, Gray-Brown-Green, and Owl Creek Black), the Southeast Range (Cowhouse White and Heiner Lake Tan), and the West Fort province (Anderson Mountain Gray), suggesting far-ranging procurement practices are represented. The relative overrepresentation of Heiner Lake Tan is noteworthy given that it is an exotic type and that the predominance of light brown indeterminates implies that it may be even more prevalent than indicated by the identified frequencies. The majority of flakes are small to moderately sized (84% are between 0.5 and 1.8 cm in size) and represent relatively late-stage reduction (92% are completely decortified, and no primary cortical flakes are present (Table 5.119). No Cowhouse province types were identified and no clear cortical abrasion is apparent on any of the cortex flakes, suggesting that stream procurement was relatively unimportant.

In addition to the artifacts recovered from the test excavations, one Ellis point (Transitional Archaic) was collected from the upland surface. However, no chronometric data or diagnostic artifacts were recovered from the excavations, and the age and

Table 5.117 Debitage Recovery by Size and Material Type, AU 2, 41BL568.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types							
02-C White	0	0	0	0	1	0	1
03-AM Gray	0	1	0	3	1	0	5
06-HL Tan	0	2	2	1	1	2	8
08-FH Yellow	0	0	1	1	2	0	4
15-Gry/Brn/Grn	0	0	0	1	0	1	2
17-Owl Crk Black	0	0	1	4	1	0	6
<i>Subtotal</i>	0	3	4	10	6	3	26
Unidentified Types							
Indet Black	0	0	0	0	0	1	1
Indet Dk Brown	0	1	1	3	0	0	5
Indet Dk Gray	0	3	2	0	1	0	6
Indet Lt Brown	3	12	7	10	1	1	34
Indet Lt Gray	0	8	1	1	0	0	10
Indet Misc.	0	2	7	0	1	0	10
Indet White	0	6	6	3	0	0	15
<i>Subtotal</i>	3	32	24	17	3	2	81
Total	3	35	28	27	9	5	107

relationship between various loci on the site is at present unknown.

Table 5.118 Binomial Statistic Results, AU 2, 41BL568.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	1	8	22	less	1	9	expected
03-AM Gray	5	8	22	less	1	9	expected
06-HL Tan	8	8	22	expected	1	9	expected
08-FH Yellow	4	8	22	less	1	9	expected
15-Gry/Brn/Grn	2	8	22	less	1	9	expected
17-Owl Crk Black	6	8	22	less	1	9	expected
Total Indet	81	8	22	more	na	na	na

5.18.2.3 Site-Level Synthesis

One rockshelter and two burned rock mounds were investigated on 41BL568. None of the areas investigated appears to have a high artifact content, and economic record appears particularly sparse. Although several diagnostic artifacts have been collected from the upland surface over the years, their relationship with the investigated areas is not established, and no chronometric data is available from the shelter or from the burned rock mounds.

Despite these limitations, both the rockshelter and the mounds are remarkably free of disturbance. The mounds, in particular, appear to be classic examples of what remains a relatively poorly understood phenomenon, and thus have strong potential to add to our understanding of this type of prehistoric adaptation. Although not confirmed, the character of the rockshelter fill suggests that it may date substantially earlier than many of the other shelters on Fort Hood, and therefore has the potential to contribute to both the paleoenvironmental record and to the understanding of the utilization of these features during the Archaic.

5.18.3 Conclusions and Recommendations

Features 1 and 2 are intact burned rock mounds in nearly pristine condition, which is a relatively rare occurrence on Fort Hood. As such, they have high potential to provide data for reconstruction of burned rock technologies (Ellis et al. 1994b). Although cultural materials in Rockshelter C are relatively sparse, they appear to occur in undisturbed context, which again is a rare condition for rockshelters on Fort Hood. The intact shelter deposits and features represent small but nonetheless very useful sources of data with which to address research issues outlined in the research design for Fort Hood (Ellis et al. 1994b).

On the basis of the foregoing, we judge 41BL568 to be significant and eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the

Table 5.119 Debitage Cortex Characteristics by Material Type, AU 2, 41BL568.

Lithic Material	Partial Cortex		No Cortex	Total
	Unabraded	Indeterminate		
Identified Types				
02-C White	0	0	1	1
03-AM Gray	0	0	5	5
06-HL Tan	1	0	7	8
08-FH Yellow	0	1	3	4
15-Gry/Brn/Grn	0	0	2	2
17-Owl Crk Black	0	1	5	6
<i>Subtotal</i>	<i>1</i>	<i>2</i>	<i>23</i>	<i>26</i>
Unidentified Types				
Indet Black	1	0	0	1
Indet Dk Brown	0	0	5	5
Indet Dk Gray	1	0	5	6
Indet Lt Brown	2	2	30	34
Indet Lt Gray	0	0	10	10
Indet Misc.	0	0	10	10
Indet White	0	0	15	15
<i>Subtotal</i>	<i>4</i>	<i>2</i>	<i>75</i>	<i>81</i>
Total	5	4	98	107

known eligible components at the site are on the surface or shallowly buried, they are vulnerable to impact from even minor disturbances such as wood cutting and traffic (on the uplands), and low-intensity bivouac (especially in the shelter). Furthermore, although the mounds and Rockshelter C currently are in pristine condition, they comprise one of the most sought-after targets of relic collectors. Because of their proximity to the shelters, Fs 1 and 2 may be especially vulnerable to the extent that local relic collectors are currently active in identifying new sites. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism; (2) prevent mechanical or manual excavations by military personnel; (3) minimize the impact of traffic,

especially by heavy tracked and wheeled vehicles on the uplands; and (4) minimize access to the shelter by personnel on bivouac.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 275 m² in area. A 100 to 125 m² block should be excavated on each of the burned rock mounds to provide horizontally extensive views of their internal structure (cf. Howard 1991). Excavation should also focus on retrieval of ethnobotanical data. These blocks could account for as much as 175 m³ of manual excavations. Another block should be placed in Rockshelter C, yielding another 9 m³ of manual excavations. These excavations should focus heavily on retrieval of ethnobotanical, paleoenvironmental, and geoarcheological samples in addition to more traditional artifact classes. A tufa deposit just outside the shelter should be sampled for paleoenvironmental and other geoarcheological data.

5.19 SITE 41BL740

5.19.1 Introduction

In January 1994, Mariah conducted test excavations at site 41BL740. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.19.1.1 Location and Description

Site 41BL740 is located near the head of a branch of North Nolan Creek. A flowing spring and small pond are located at the central part of the site (Figure 5.64), and the entire site is bisected by a north/south road (Figure 5.65). The site consists of an upland surface (Figure 5.66) flanked by a colluvial slope that descends to an alluvial T₁ terrace. A sinkhole is located on the uplands. A large burned rock midden occurs at the juncture of the alluvial and colluvial deposits on the west side of the stream. Maximum site dimensions are roughly 340 x 220 m (about 74,800 m², or 18.4 acres). For the purposes of this report, 41BL740 is included in the Nolan/South area of Fort Hood.

5.19.1.2 Previous Work

This site was recorded by Turpin and Strychalski on 13 July 1984 as an extremely vandalized lithic scatter. A moderate density of lithics and a low density of bone, mussel shell, and burned rock were observed. Two untyped dart points were collected from the surface. Depth of deposit was estimated at 20 to 50 cm, with 65% of the site disturbed by vandalism, roads, and erosion. A spring, large pond, and sinkhole were mapped near the southern site boundary, and a "heavily potted" area was noted on the western valley flank downstream of the pond.

Dureka and Callum monitored the site on 27 January 1988 and expanded the boundaries. They interpreted the site as a lithic procurement area with an unusual chert resource (vitreous gray chert with siliceous inclusions). A Bulverde point was collected from the surface. The previously noted sinkhole and two possible burned rock mounds were observed just upslope of the spring and pond. They noted that the undammed pond may have been deepened in historic times to produce an impoundment, and that the two "burned rock mounds" south of the pond may be a result of this historic modification. The same types and degrees of disturbances identified on the initial survey were again observed. No mention was made of the

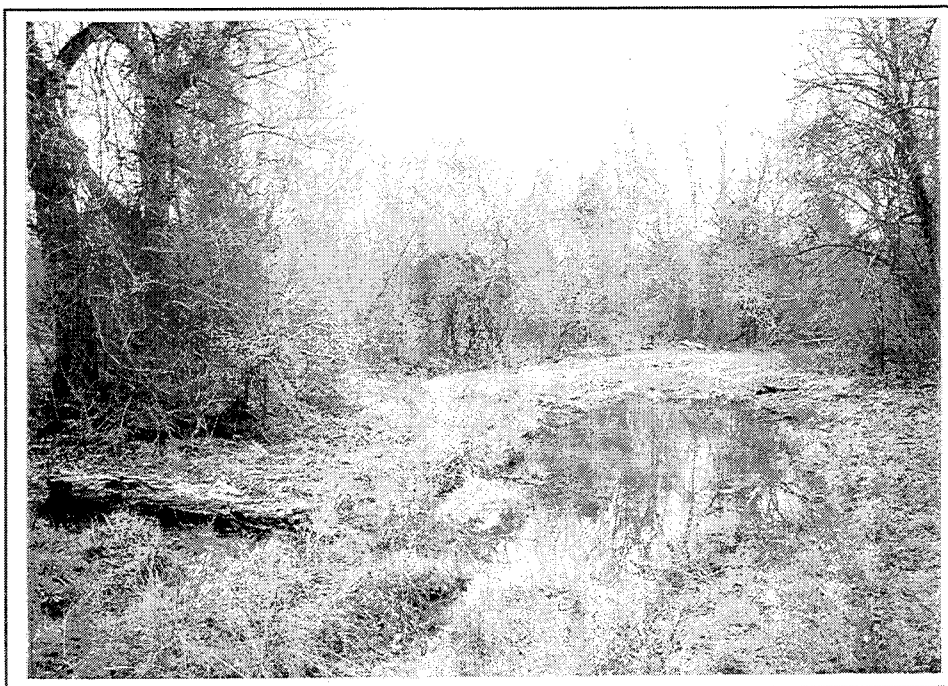


Figure 5.64 Overview of Site 41BL740, Looking Northeast.

previously noted "potted area" north of the pond.

On 28 February 1992, Mires, Quigg, and Doering revisited and reevaluated the site on archeological and geomorphic grounds. During this visit, a very large (80 m x 20 m) burned rock midden (F 1) was detected in the vicinity of the "potted area" mapped by the original recorders. A second burned rock midden, about 10 m in diameter, was noted in the same location where Dureka and Callum (1988) had described possible burned rock mounds.

The site was divided into Subarea A, subsuming the uplands, the sinkhole, and the colluvial slopes, and Subarea B, the alluvial valley bottom and the large midden, which spans the alluvial/colluvial contact on the valley margin. An untyped dart point was collected from the slope. Based on the lack of intact deposits, no further work was recommended for Subarea A. The burned rock midden (F 1) had been heavily vandalized, and copious amounts of angular burned rocks, snails,

mussel shell, and debitage were noted on backdirt piles. A Fairland point was collected from the southern edge of the midden. Feature 2, a "burned rock midden" 10 m in diameter, was noted just south of the pond. In addition to burned rocks, historic ceramics and mussel shells were observed on F 2, and an untyped dart point was collected from this area. Because Subarea B had the potential to contain intact cultural deposits, 17 shovel tests and a 50 x 50 cm test quad were excavated on 2 April 1992. The test quad was excavated in F 1 and yielded an abundance of lithics, bone, mussel shell, and burned rock to 90 cmbs. Fifteen of the 17 shovel tests excavated contained cultural material at depths up to 60 cmbs. The results of shovel testing suggested that Subarea B might contain intact buried cultural components, but the subarea's archeological potential remained uncertain. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Six to ten 1 x 1 m of manually excavated test pits and three to six backhoe trenches were

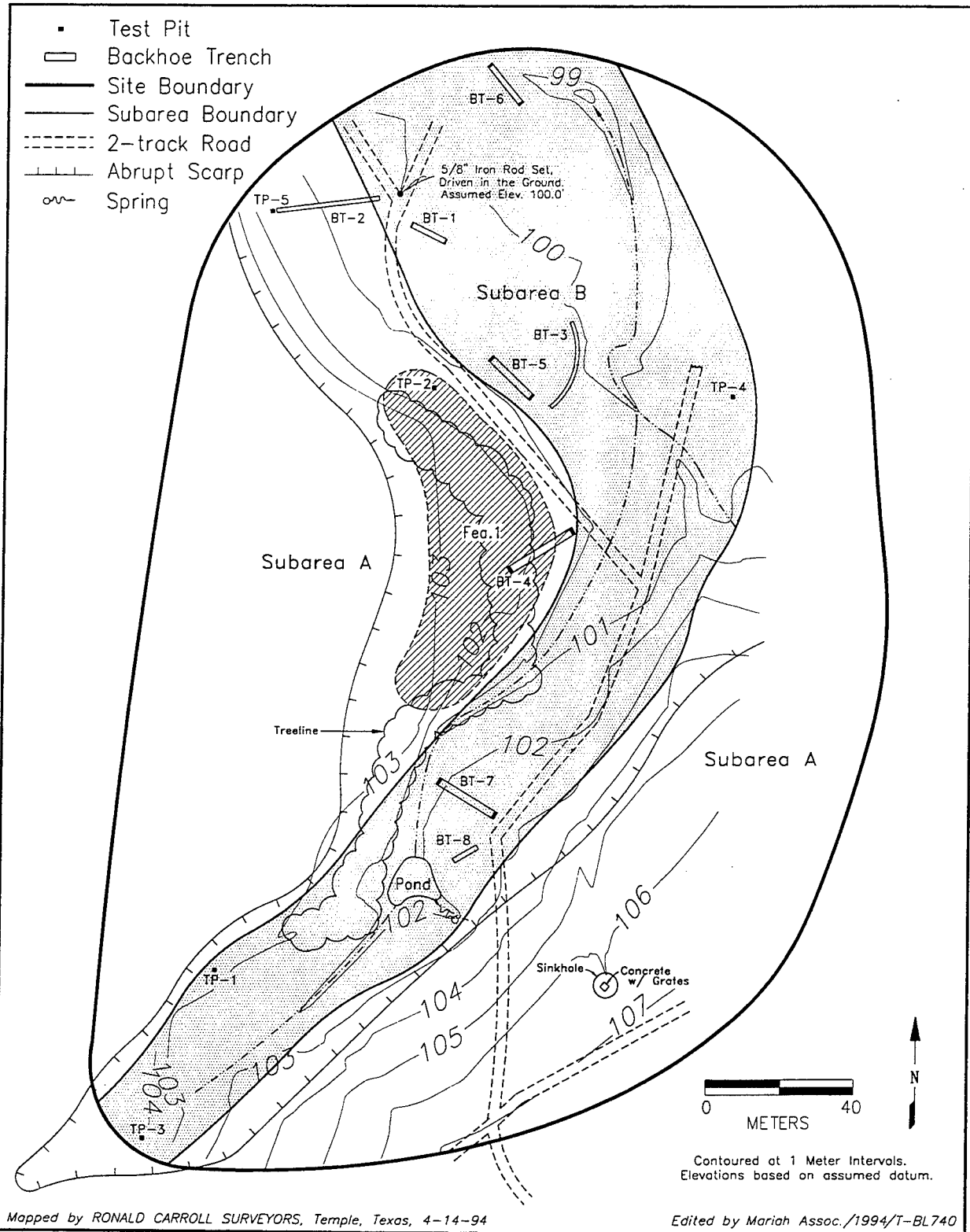


Figure 5.65 Site Map of 41BL740.

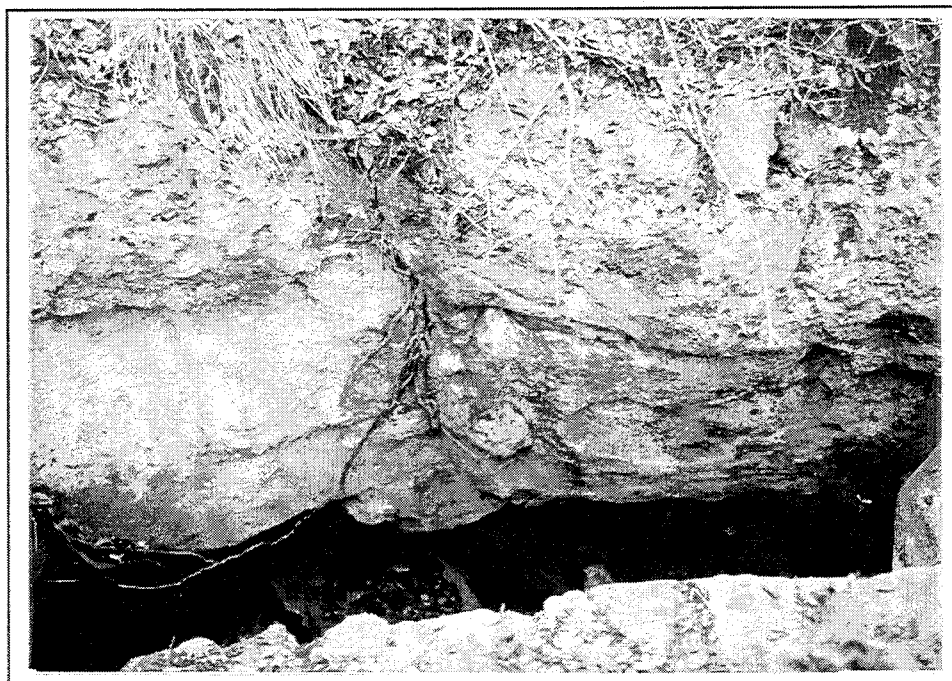


Figure 5.66 Sinkhole at Site 41BL740, Looking East.

recommended to determine eligibility (Trierweiler 1994:A455-A461).

5.19.1.3 New Work

Eight backhoe trenches and six test pits were excavated during formal testing (Table 5.120). In the process of testing the site, several modifications were made to the existing recommendations. First, primarily because it was recognized as a landscape feature with high potential to contain a prehistoric burial, the status of the sinkhole located within Subarea A was elevated from no further management (as recommended during the reconnaissance phase) to potentially eligible, and a 50 x 50 cm test pit (TP 6) was excavated within the sinkhole. Second, the burned rock midden (F 1) previously included within Subarea B was recognized to lie almost entirely on the colluvial slope, and was therefore treated as a component of Subarea A. It was tested with a long backhoe trench (BT 4) and subsequent manual excavation unit (TP 2). Third, a section of the slope outside

the midden was also recognized to have potentially intact deposits and was tested with a backhoe trench (BT 2) and subsequently with a manual test pit (TP 5) following the discovery of a burned rock feature in the trench. Finally, the "burned rock" features previously recorded as F 2 were identified as recent push/dump piles resulting from road and/or pond construction and were not investigated further. For this reason, the designation "F 2" was dropped from the "mound" and reassigned to the burned rock feature investigated with TP 5.

Three 1 m x 1 m test pits (TPs 1, 3, and 4) and six backhoe trenches (BTs 1, 3, and 5-8) were excavated within Subarea B. Recovered cultural material is summarized in Table 5.121. To facilitate discussion and analysis, the site was subdivided into two analytical units (AUs) consisting of the excavations in Subarea A (F 1, the sinkhole, and the colluvial slope)(AU 1) and in Subarea B (the terrace)(AU 2), respectively.

5.19.2 Results

5.19.2.1 Excavations in the Burned Rock Midden and Uplands

Feature 1 is a vandalized burned rock midden. Observations of the feature were based on surface exposure, the extent of vandalism, and the results of excavation of TP 2 and BT 4. The feature is roughly 50 to 80 m long x 20 m wide and ranges from 35 to 100 cm thick. Numerous, large potholes and piles of backdirt are present across the feature.

Trench 4 was excavated up the slope through F 1. Two stratigraphic/pedogenic zones were identified in the trench. The upper zone consisted of typical black (10YR 2/1), stony loam midden fill. Although an abundance of burned rock and debitage was observed within the trench walls, this material was within an extremely loose fill that appeared to be disturbed as a result of vandalism. The strongly hummocky surface topography suggested the zone had been heavily vandalized, but the very dark color and lack of structure in the deposit made it very difficult to assess the level of disturbance. The thickness of the zone varied from 30 cm to more than 80 cm; it is likely that these two extremes represent vandal pits and spoil piles, respectively, and that the original thickness was on the order of 50 cm. The underlying zone consisted of massive, stony, grayish brown (10YR 5/2), fine sandy loam. No cultural material was noted in this stratum of regolith.

Test pit 2 was placed near BT 4 at the northern edge of F 1, on a relatively flat area that appeared to be relatively undisturbed. Cultural material was immediately encountered and a high density of flakes, several burned rocks, a biface, and a scraper were recovered from 0 to 10 cmbs. For Levels 2 and 3, due to the dramatic increase in cultural material and sticky, moist matrix, the fill was screened and picked as best as possible, with the remaining soil bagged for water screening. However, in these levels, hundreds of flakes, more than 125 burned rocks (about 15 kg), lithic tools,

Table 5.120 List of Treatment Units, 41BL740.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 2	~20	0.8	130
1	BT 4	~16	0.8	105
1	TP 2	1.0	1.0	40
1	TP 5	1.0	1.0	60
1	TP 6	0.5	0.5	25

2	BT 1	~9	0.8	210
2	BT 3	~15	0.8	150
2	BT 5	~17	0.8	125
2	BT 6	~10	0.8	120
2	BT 7	~16.5	0.8	200
2	BT 8	~9	0.8	160
2	TP 1	1.0	1.0	60
2	TP 3	1.0	1.0	40
2	TP 4	1.0	1.0	100

and faunal remains were recovered (Table 5.121). In addition, an Edgewood and a Scallorn were recovered from Level 2. The majority of burned rock recovered from these levels was subangular and averaged 5 to 10 cm in size, while much of the lithic material exhibited high temperature heat treatment (evidenced by crazing, discoloration, and abundant pot lid fractures). In Level 3, numerous tertiary and pressure flakes were noted. In Level 4, the base of the feature was reached at 30 to 35 cmbs. The base of the feature gradually sloped south to north and was defined by an abrupt change from black to dark brown, stony, clay loam. No artifacts were recovered below the feature from 35 to 40 cmbs.

No radiocarbon samples were recovered from F 1; however, a suite of eight *Rabdotus* shells from TP 2, Level 3 was submitted for A/I analysis. These shells produced a variety of values (see Appendix D). With the exception of the single specimen that exhibited a strongly anomalous value probably attributable to heating (A/I of 0.465; radiocarbon-equivalent age of approximately 21,200 BP), the

Table 5.121 Artifact Recovery by Test Pit, 41BL740.

LEVEL	None					TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4					TEST PIT 5					TEST PIT 6														
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)					
surface	0	0	4	0	0(0)	0	0	112	5	8(1.5)	0	0	4	7	0	0	0	11	3	0(0)	0	0	2	12	0	0	0	8	28	1	0	0	2	12	0	0	0	2	2	0(0)	0	0	0	0	0(0)
1	0	0	4	1	0(0)	0	0	112	5	8(1.5)	0	0	4	7	0	0	0	11	3	0(0)	0	0	2	12	0	0	0	8	28	1	0	0	2	12	0	0	0	2	2	0(0)	0	0	0	0	0(0)
2	0	0	1	0	7(1.0)	1	2	186	7	75(14.5)	0	0	3	1	0(0)	0	0	11	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
3	0	0	1	0	8(1.5)	0	3	168	5	45(6)	0	0	0	0	0(0)	0	0	7	2	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
4	0	0	3	0	4(.5)	0	0	14	0	5(.5)	0	0	0	1	0	0	0	7	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
5	0	0	0	0	1(-7)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
6	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
7	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
8	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
9	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
10	0	0	0	0	0(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
TOTAL	0	0	4	0	0(0)	1	5	480	17	148(44.5)	0	4	11	1	0(0)	0	11	89	6	1(.25)	0	0	0	26	2	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)

results ranged from a low of 0.0209 (suggesting a radiocarbon-equivalent age of approximately 500 BP) to a high of 0.0508 (suggesting a radiocarbon-equivalent age of approximately 1900 BP). Although the lower ages are preferred due to the higher potential for anomalously old A/I values (see section 7.5), it is possible that all of the "ages" are correct for the individual shells, and the range is due to prehistoric or modern turbation of the midden. In either case, the A/I ratios suggest that the midden probably dates to no earlier than the Late Archaic.

Trench 2 was 28 m long and was excavated up the gentle, colluvially mantled valley toeslope. Five zones were noted in the trench, but only Zones 1 and 2 extended the entire length of the exposure. Zones 3 through 5 were each limited to specific parts of the slope profile, and pinched out either upslope (in the case of Zone 4) or downslope (in the case of Zone 3 and Zone 5). In addition, both Zones 1 and 2 thickened considerably downslope. Figure 5.67 illustrates the geometric relationships between depositional units exposed in the trench. Overall, the trench exhibited an A-Ck profile. Zone 1 consisted of black (10YR 2/1), granular clay loam, and contained moderate quantities of burned rock, particularly on the upslope end of the trench. Its thickness varied from 20 cm upslope to 50 cm downslope. Zone 2 consisted of grayish brown (10YR 4/2), weak blocky structured clay loam, and thickened from less than 10 cm upslope to about 50 cm downslope. It contained a very sparse scatter of burned rock, primarily in the upslope end of the trench. Some soft carbonate masses were observed in the profile at the downslope end of the trench, but were absent upslope, strongly suggesting that they represent phreatic precipitation of carbonate in an area of groundwater discharge. Both zones appear to represent an admixture of alluvium and colluvium, with the former dominant downslope and the latter upslope. Zone 3 consisted of a steep wedge of very stony sandy clay loam. This wedge of colluvial material was up to 1 m thick at the upslope end of the trench, but pinched out completely 5 m downslope from the upper end of

the trench. Zone 4 consisted of a thin lens of clayey fluvial gravels inset against the base of the slope. Zone 5 consisted of yellow limestone regolith. No cultural material was noted in Zones 3 through 5.

A considerable amount of burned rock was exposed at the western (upslope) end of BT 2. Test pit 5 was placed above the burned rock and excavated to bedrock (60 cmbs). A modest number of artifacts was recovered from the upper 20 cm (Table 5.121). Feature 2, a midden deposit, was encountered 20 to 50 cmbs and extended across the entire unit and beyond the limits of the test pit. A total of 12 flakes, a chunk of charcoal, and 118 burned rocks (61 kg) were recovered. A substantial amount of unburned rock (n=130, 76 kg) also was present in the feature fill. Most burned rocks were angular, and no structural patterning was evident among them. All the rock (burned and unburned) ranged from 5 to 15 cm in size. The feature appears to contain materials deposited by a combination of alluvial, colluvial, and cultural processes. A radiocarbon age of 110 ± 60 BP was obtained from the base of the feature (Level 5). Below F 2, no cultural material was found 50 to 60 cmbs. Numerous large unburned rocks were present throughout Level 6.

Test pit 6 (50 x 50 cm unit) was placed at the south end of the site, at the southern wall of the sinkhole and about 5 m south of the opening. The unit was excavated through unconsolidated silt to a depth of 25 cmbs. At 25 cmbs, bedrock or a large roof spall was encountered. No cultural material was found within this test unit. Due to the presence of several large rattlesnakes within the sinkhole during excavation, no additional tests were conducted. Aside from a few recent initials etched into the southern wall, the sinkhole appeared to be undisturbed. The potential for subsurface cultural material remains unknown. Upon returning to the site on 30 March 1994 with the mapping surveyors, the sinkhole opening had been covered with cement and a small (about 80 x 80 cm) iron hatch, with single metal bars as north/south crosspieces, was embedded at the eastern margin of the poured cement. On the same

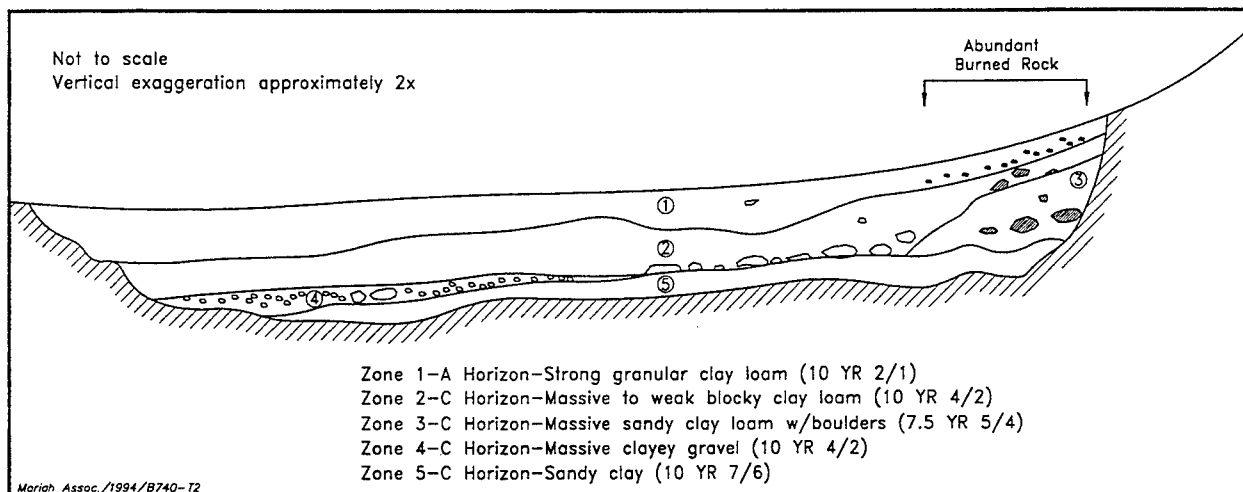


Figure 5.67 Schematic Profile, BT 2, 41BL740.

day, in a telephone conversation with John Cornelius (DEH, Parks and Wildlife), it was learned that three sinkholes had been "gated" 16 to 18 March 1994. The sinkhole is the "Nolan Creek Cave" and was "gated" since this area has the potential to contain unknown or endangered species. Also, the sinkhole is a known snake den which has been incinerated in the past by people pouring gasoline into the sink and setting it ablaze. The hatch is locked, but access is still possible. A copy of the sinkhole's description and planview (recorded in 1963) was provided by John Cornelius.

Two projectile points of Heiner Lake Tan were recovered from the excavations in AU 1 in TP 2, Level 2. They have been identified as an Edgewood dart point and a Scallorn arrow point representing a transitional period between the Late Archaic and Late Prehistoric. Included in the general tools assemblage is a hammerstone, one multiple platform core, and 15 other tools ranging from expedient tools to formal unifaces and bifaces (Table 5.122). Heiner Lake Tan and Heiner Lake Translucent Brown contribute over 40% (n=9) to the total number of chert types represented. Four indeterminate types (n=7) and one specimen of Cowhouse material are present.

Debitage from ten described chert types and seven indeterminate chert categories was recovered from excavations in AU 1 (Table 5.123). Approximately 52% of the recovered assemblage was identified. When the entire assemblage was considered, Heiner Lake Translucent Brown and indeterminate cherts occurred in greater than expected frequencies, and all other described chert types occur in less than expected frequencies. When the indeterminate cherts were excluded, Heiner Lake Translucent Brown occurred in greater than expected frequencies, Heiner Lake Tan occurred in expected frequencies, and all others occurred in less than expected frequencies (Table 5.124).

The presence of a substantial number of indeterminate brown flakes implies that Heiner Lake Translucent Brown may be more highly represented than suggested by the statistical test. The representation of other Southeast Range cherts (Heiner Lake Tan, Heiner Lake Blue) also may be underestimated as a result of high frequencies of indeterminate cherts, but even so, these are not likely to comprise major elements of the assemblage.

Owl Creek Black is a noticeable element of the minority types in the assemblage. A variety of

Table 5.122 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL740.

Lithic Material	Core Type				Tool Type						Total
	multiple platform	complex scraper	early stage biface	edge modified	end scraper	Hammerstone	late stage biface	middle stage biface	uniface	utilized flake	
06-HL Tan	0	0	1	0	0	0	1	1	1	1	5
07-Foss Pale Brown	0	0	0	1	0	0	0	0	0	0	1
09-HL Tr Brown	1	0	0	0	2	0	0	0	0	0	3
10-HL Blue	0	1	0	0	0	0	0	0	0	0	1
18-C Mottled	0	0	0	0	0	0	0	0	0	1	1
Indet Dk Brown	0	0	0	0	0	0	0	0	0	1	1
Indet Lt Brown	0	0	0	0	0	0	0	0	0	1	1
Indet Lt Gray	0	0	0	0	0	0	2	0	0	0	2
Indet Misc.	0	0	0	2	0	1	0	0	0	0	3
Total	1	1	1	3	2	1	3	1	1	4	18

other North Fort cherts occurs, but in fairly small numbers. Given the absence of indeterminate black cherts and the small number of indeterminate dark gray cherts, the indeterminate assemblage does not appear to obscure the representation of Owl Creek Black.

For most cherts, flakes fall into size categories smaller than 1.8 cm. However, there is a fairly high proportion of flakes in categories larger than 1.8 cm, and relatively few flakes from the uncommon identified types fall into the smallest three categories. This implies that nucleus size (especially on the North Fort cherts) frequently may have been fairly large, indicating that a substantial amount of reduction may have been at early to middle stages and/or that tool production frequently may have involved fairly large tools. The judgment of early-to-middle stage reduction, however, is not supported by cortex data, in which about 96% of flakes have no cortex at all (Table 5.125), suggesting that decortication took place

elsewhere. More than half of the cortex flakes have abraded cortex. This may imply that procurement from stream beds was a substantial element of the procurement system, especially since the flakes with cortex are distributed across a wide variety of identified and indeterminate chert materials. However, the sample of cortex flakes is very small, and this judgment should be regarded as tenuously supported.

Only a few unidentifiable bone fragments and one fragmentary mussel shell belonging to the *Ambleminae* genus were recovered from the midden (Levels 2-3 in TP 2). No faunal material was recovered from F 2 (Table 5.126).

5.19.2.2 Excavations in the Alluvial Deposits

Trench 6 was excavated on the downstream end of a segment of the T₁ terrace, just north of the site boundary. The profile revealed a relatively thin, very gravelly accumulation of black gravelly clay

over fluvial gravels. Both limestone and chert gravels were present, and the amount and size of these clasts increased markedly with depth. A few soft masses of carbonate were present between 60 cm and 110 cm. The trench was approximately 130 cm deep and exhibited an A-Ck-C profile. No cultural material was noted.

Trench 1 was situated on the northern end of the site and extended across the rear of the alluvial terrace. The soil profile exposed exhibited an A-Bw-Btk-Ck profile developed in clayey and gravelly clay alluvium (Figure 5.68). The surface horizon consisted of black (10YR 2/1), granular clay loam 45 cm thick. Zone 2 was 20 cm thick and consisted of very dark grayish brown (10YR 3/2), fine blocky clay loam. The horizon contained a few soft masses of carbonate that may represent dissolving lithoclasts. Zone 3 was approximately 115 cm thick and consisted of dark grayish brown (10YR 4/2) clay exhibiting a very strong fine angular blocky structure. The horizon contained abundant soft carbonate masses (many of which may represent dissolving lithoclasts and/or phreatic concretions) and thick, well developed clay skins (many of which may represent slickensides rather than translocated clay). Zone 4

Table 5.123 Debitage Recovery by Size and Material Type, AU 1, 41BL740.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
10-HL Blue	0	0	0	4	1	2	0	7
05-Texas Novac	0	0	0	0	0	1	0	1
06-HL Tan	0	8	0	6	3	6	0	23
07-Foss Pale Brow	0	3	1	0	4	0	0	8
08-FH Yellow	0	0	0	5	0	0	0	5
09-HL Tr Brown	6	40	59	53	29	12	1	200
14-FH Gray	0	0	0	1	0	0	0	1
15-Gry/Brn/Grn	0	0	0	1	0	0	0	1
17-Owl Crk Black	0	6	1	7	2	1	0	17
<i>Subtotal</i>	6	57	61	77	39	22	1	263
Unidentified Types								
Indet Dk Brown	0	24	16	11	0	0	0	51
Indet Dk Gray	0	0	4	13	1	0	0	18
Indet Lt Brown	0	32	28	18	1	0	0	79
Indet Lt Gray	0	13	14	14	15	3	0	59
Indet Misc.	0	6	1	6	6	2	0	21
Indet Mottled	0	0	0	0	4	0	0	4
Indet White	0	7	1	1	0	1	0	10
<i>Subtotal</i>	0	82	64	63	27	6	0	242
Total	6	139	125	140	66	28	1	505

Table 5.124 Binomial Statistic Results, AU 1, 41BL740.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
05-Texas Novac	1	37	64	less	19	39	less
06-HL Tan	23	37	64	less	19	39	expected
07-Foss Pale Brown	8	37	64	less	19	39	less
08-FH Yellow	5	37	64	less	19	39	less
09-HL Tr Brown	200	37	64	more	19	39	more
10-HL Blue	7	37	64	less	19	39	less
14-FH Gray	1	37	64	less	19	39	less
15-Gry/Brn/Grn	1	37	64	less	19	39	less
17-Owl Crk Black	17	37	64	less	19	39	less
Total Indet	242	37	64	more	na	na	na

consisted of reddish yellow (7.5YR 6/6) massive sandy clay and extended to the base of the trench at 225 cm. It contained a moderate amount of chert gravel and abundant soft masses and harder nodules of carbonate of probable phreatic origin.

Trench 3 (Figure 5.69) was excavated into the T₁ terrace in the central portion of the site. It revealed a thick deposit of black (10YR 2/1), weakly structured to unstructured clay alluvium abutted against and overriding soft, chalky limestone. Stringers of gravel were dispersed through the fill, and sparse burned rock was contained in the upper 50 cm. A zone rich in chert gravels rested on the contact between the alluvium and the regolith. Trench 5 was excavated a few meters farther upslope and revealed a thinner, but similar profile of clay over a thick zone of weathered bedrock.

Test pit 4 was placed on a small terrace across the tributary from F 1 and TP 2. Less than 13 flakes were recovered from each level excavated from 0 to 40 cmbs (Table 5.121). Several unmodified chert nodules were also present within these levels. From 40 to 50 cmbs, lithic recovery remained low and a few bone fragments were found. Level 6 (50 to 60 cmbs) was the most productive, with recovery including numerous lithics, several bone fragments, and a biface. Artifact frequencies decreased rapidly from 60 to 90 cmbs. Excavation of the unit was terminated after no cultural material was found from 90 to 100 cmbs. From 40 to 100 cmbs a few occasional unburned rocks were found within the unit, which may reflect colluvial additions to the deposits. However, only very minor disturbances were observed during excavation.

Trenches 7 and 8 were excavated into a relatively level terrace surface situated on the eastern side of the stream downstream from the spring, and across the tributary from the south end of F 1. The trenches exhibited essentially the same profile. The surface horizon consisted of 25 cm of black (10YR 2/1), granular clay loam to slightly gravelly clay loam. Zone 2 consisted of dark grayish

Table 5.125 Debitage Cortex Characteristics by Material Type, AU 1, 41BL740.

Lithic Material	All Cortex		Partial Cortex			Total
	Unabraded	Abraded	Unabraded	Indeterminate	Not Applicable	
Identified Types						
10-HL Blue	0	0	1	0	6	7
05-Texas Novac	0	0	0	0	1	1
06-HL Tan	0	0	1	0	22	23
07-Foss Pale Brow	0	0	1	0	7	8
08-FH Yellow	0	0	0	0	5	5
09-HL Tr Brown	0	1	1	0	198	200
14-FH Gray	0	0	0	0	1	1
15-Gry/Brn/Grn	0	0	0	0	1	1
17-Owl Crk Black	0	0	0	1	16	17
<i>Subtotal</i>	<i>0</i>	<i>1</i>	<i>4</i>	<i>1</i>	<i>257</i>	<i>263</i>
Unidentified Types						
Indet Dk Brown	0	0	0	0	51	51
Indet Dk Gray	0	1	0	0	17	18
Indet Lt Brown	0	2	1	0	76	79
Indet Lt Gray	0	5	1	0	53	59
Indet Misc.	1	0	2	0	18	21
Indet Mottled	0	1	0	0	3	4
Indet White	0	0	1	0	9	10
<i>Subtotal</i>	<i>1</i>	<i>9</i>	<i>5</i>	<i>0</i>	<i>227</i>	<i>242</i>
Total	1	10	9	1	484	505

brown (10YR 3/2), massive clay loam approximately 55 cm thick. The base of the zone was distinctly mottled with several shades of grayish brown. Zone 3 consisted of a buried A horizon and extended from 80 to 115 cm. It consisted of black (10YR 2/1) clay with a strong angular blocky structure. Thick slickensides covered the ped faces, and gravels were very rare. Zone 4 extended to 165 cmbs and consisted of massive to very weak blocky, very dark grayish brown (10YR 3/2) clay. This unit was also mottled with various shades of grayish brown. Zone 5 extended to the base of the trench at about

190 cm and consisted of massive, heavily mottled gravelly clay. The dominant color was dark yellowish brown (10YR 4/6). No cultural material was observed in either BT 7 or BT 8. The overall exposure exhibited an A-C-Assb-Cb profile.

Test pits 1 and 3 were placed in the far southwest corner of the site on the west side of the tributary, southwest of the spring. In TP 1, a biface and a flake were recovered from the surface, and small numbers of artifacts (lithics and burned rock) were recovered from 0 to 50 cmbs (Table 5.121). The burned rock recovered from 10 to 30 cmbs (n=20, 2 kg) was concentrated along the northern third of the unit, and may represent the edge of a larger buried burned rock feature that extends beyond the unit's boundary. A distinct soil color change, from dark brown to reddish brown, was encountered at 37 cmbs. Excavation was terminated at 60 cmbs.

Test pit 3 was placed on a small terrace between two minor tributaries at the southern edge of the site. Small numbers of flakes were recovered from 0 to 20 cmbs, and several bone fragments were recovered from 0 to 10 cmbs (Table 5.121). Small gravels were present from 0 to 20 cmbs. At 17 cmbs, a distinct soil change from dark brown to reddish brown clay was encountered. Excavation was terminated at 40 cm.

No projectile points were recovered from AU 2; however, a total of eight tools was recovered. These tools are classified as both unifaces and bifaces (Table 5.127). The types of cherts present offer an interesting pattern even though the sample size is small. The cherts represent West Fort (n=1), North Fort (n=2), Cowhouse (n=1), Southeast Range (n=3), and one indeterminate type. The West Fort Anderson Mountain chert could easily be a misidentified chert or Anderson Mountain chert transported in the Cowhouse bedload.

Debitage from five described cherts and four indeterminate chert categories was recovered from TP 1, TP 3, and TP 4 (Table 5.128). Among these cherts, only the indeterminate cherts occurred at

Table 5.126 Faunal Recovery, AU 1, 41BL740.

	Element		
	Indeterminate	left	Total
Vertebrates			
Mammalia (med/lg)	3	0	3
Mammalia (sm/med)	1	0	1
Vertebrata	1	0	1
Total	5	0	5
Bivalves			
Ambleminae	0	1	1

higher than expected frequencies; Heiner Lake Tan occurred at expected frequencies; and all other

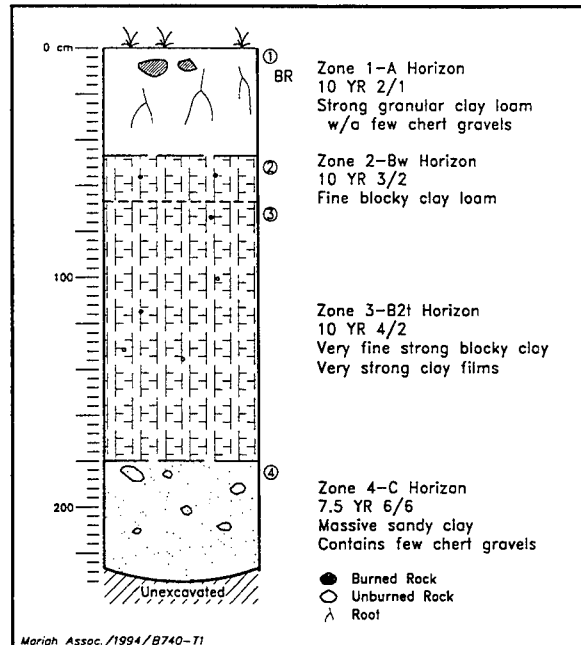


Figure 5.68 Measured Section, BT 1, 41BL740.

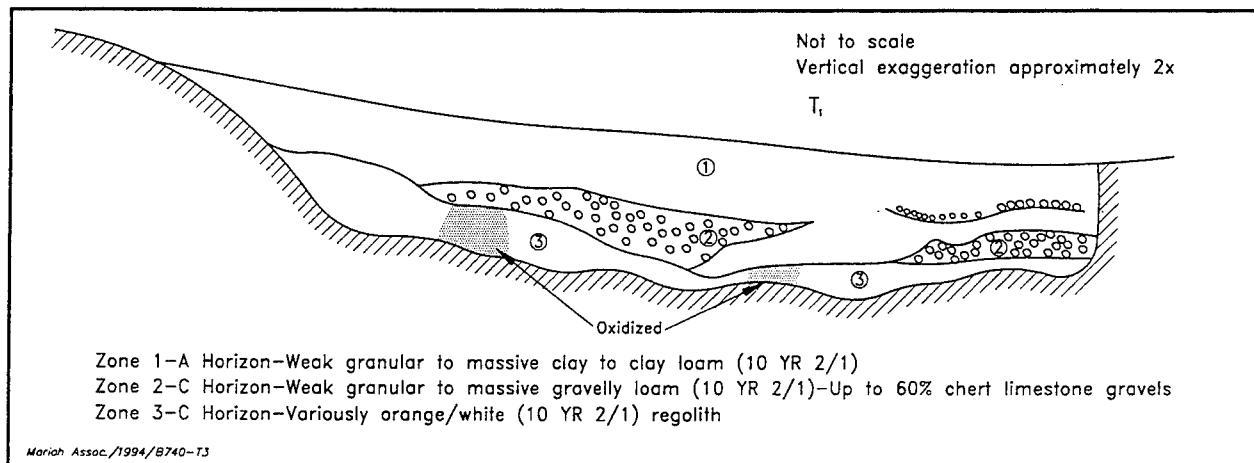


Figure 5.69 Schematic Profile, BT 3, 41BL740.

cherts occurred at less than expected frequencies. Interestingly, exclusion of the indeterminates has no effect on the statistical representation of the other cherts (Table 5.129).

Both types that occur in expected or larger numbers are Southeast Range cherts. Given the relatively large number of indeterminate brown flakes, the translucent brown and tan cherts are probably more highly represented than the statistics indicate. In contrast, the low frequency of indeterminate gray flakes implies that Gray-Brown-Green is a minor component of the assemblage. Thus, it appears that North Fort cherts occur at levels equivalent to background noise.

Most flakes fall into medium size categories (0.9-2.6 cm). The larger categories are also well represented in the assemblage. This may indicate that lithic reduction often involved relatively large nuclei at an early-to-middle stage of reduction and/or that relatively large tools were made at the site. However, only 85% of flakes have any cortex at all (Table 5.130), which appears to reduce the proportion of very early stage reduction represented in the assemblage. About half of the flakes with cortex have abraded cortex, which implies that procurement from streams may have been common, although the sample of cortex flakes is very small.

Although a good deal of fragmentary bone was recovered from excavations in AU 2, none could be identified, even to the family level. No bivalves were recovered, which is unsurprising since the stream is probably too small and low-order to have supported a population of shellfish.

Table 5.127 Nonprojectile Point Lithic Tools, AU 2, 41BL740.

Lithic Material	Tool Type					Total
	edge modified	late stage biface	middle stage biface	uniface	utilized flake	
03-AM Gray	0	0	0	0	1	1
06-HL Tan	0	0	0	1	0	1
09-HL Tr Brown	0	1	0	1	0	2
14-FH Gray	0	0	0	0	1	1
17-Owl Crk Black	0	1	0	0	0	1
22-C Mott/Flecks	0	0	1	0	0	1
Indet Lt Brown	1	0	0	0	0	1
Total	1	2	1	2	2	8

5.19.2.3 Site-Level Synthesis

Trenches 2 and 4 were excavated into the colluvial toeslopes, and revealed Holocene colluvium and slopewash containing a variable amount of cultural material, typically in questionable context. The midden deposit (F 1) revealed in BT 4 and TP 2 has obviously been strongly impacted by looters, and much of it is destroyed. However, although discerning unimpacted areas is difficult, there are clearly pockets of undisturbed matrix.

Within BT 1, alluvium has been strongly altered by both pedogenic and diagenetic processes. Although it reflects local conditions, it probably correlates roughly with the Fort Hood alluvium of Nordt (1992). Trenches 3, 5, and 6 were situated on the T₁ terrace west of the stream. They exposed late Holocene deposits (possibly the West Range alluvium in BT 3 and BT 5, and the Ford alluvium in BT 6). Trenches 7 and 8 were excavated into a T₁ bench on the east side of the stream downstream of the spring, and revealed probable late Holocene deposits containing no discernable cultural material. Very little buried cultural material was detected in any of the alluvial trenches, and what was appeared to be in questionable context. However, the greater resolution provided by hand-excavated units in the alluvial deposits reveal a slightly different picture. Clearly, some cultural material is preserved in the alluvium in relatively discrete strata that may

Table 5.128 Debitage Recovery by Size and Material Type, AU 2, 41BL740.

Lithic Material	Size (cm)					Total	
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2 > 5.2		
Identified Types							
02-C White	0	0	2	0	1	0	3
06-HL Tan	0	0	9	0	4	0	13
09-HL Tr Brown	0	3	7	13	6	0	29
15-Gry/Brn/Grn	0	0	2	1	0	0	3
16-Leona Park	0	0	1	0	0	0	1
<i>Subtotal</i>	<i>0</i>	<i>3</i>	<i>21</i>	<i>14</i>	<i>11</i>	<i>0</i>	<i>49</i>
Unidentified Types							
Indet Lt Brown	7	11	19	7	3	0	47
Indet Lt Gray	1	1	1	0	1	1	5
Indet Misc.	0	1	1	2	1	0	5
Indet White	0	0	2	0	1	0	3
<i>Subtotal</i>	<i>8</i>	<i>13</i>	<i>23</i>	<i>9</i>	<i>6</i>	<i>1</i>	<i>60</i>
Total	8	16	44	23	17	1	109

imply primary, albeit ephemeral, occupation surfaces, and there is some slight indication (e.g., the burned rock recovered from TP 1) that more substantial cultural remains may also be present.

Table 5.129 Binomial Statistic Results, AU 2, 41BL740.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	3	11	26	less	5	16	less
06-HL Tan	13	11	26	expected	5	16	expected
09-HL Tr Brown	29	11	26	more	5	16	more
15-Gry/Brn/Grn	3	11	26	less	5	16	less
16-Leona Park	1	11	26	less	5	16	less
Total Indet	60	11	26	more	na	na	na

The debitage assemblage at the site appears to be dominated by reduction of materials procured from the general area around the site. North Fort and West Fort cherts apparently are a minor component of the assemblage, which suggests that long-distance logistical procurement was not a major means of supplying the occupants with raw materials worked at the site. An exception to this may be Owl Creek Black, which is represented by relatively large flakes (including one with cortex) from a resource that may not generally be available in particularly large pieces. However, even if the Owl Creek Black specimens (and other North and West Fort cherts) are evidence of long-distance procurement, such procurement still amounts to a small proportion of the chert supply evident at the site.

5.19.3 Conclusions and Recommendations

Feature 1 has been very extensively vandalized, but substantial pockets appear to remain intact as a result of unsystematic relic collection. These pockets contain substantial, highly useable technological and subsistence data. Additional cultural deposits are buried in intact stratigraphy near TP 1, TP 4, and TP 5. The deposits near TP 5 appear to be a buried midden (F 2), and the deposits near TP 1 may indicate an occupation with an intact burned rock feature. These cultural deposits appear to have high archeological potential with respect to addressing issues outlined in the research domains for Fort Hood (Ellis 1994b). Furthermore, stratigraphic relationships between colluvial and alluvial deposits imply high potential for addressing paleoenvironmental and paleotopographic issues. The sinkhole appears to have high potential as an additional source of geoarcheological data.

On the basis of the foregoing, we judge 41BL740 to be significant and eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components at the site are on the surface or shallowly buried, they are vulnerable to impact from traffic. Furthermore, the high level of

Table 5.130 Debitage Cortex Characteristics by Material Type, AU 2, 41BL740.

Lithic Material	Partial Cortex			No Cortex	Total
	Abraded	Unabraded	Indeterminate		
Identified Types					
02-C White	1	0	2	0	3
06-HL Tan	1	0	0	12	13
09-HL Tr Brown	3	0	0	26	29
15-Gry/Brn/Grn	0	0	0	3	3
16-Leona Park	0	0	0	1	1
<i>Subtotal</i>	5	0	2	42	49
Unidentified Types					
Indet Lt Brown	1	0	2	44	47
Indet Lt Gray	0	1	0	4	5
Indet Misc.	3	0	0	2	5
Indet White	1	1	0	1	3
<i>Subtotal</i>	5	2	2	51	60
Total	10	2	4	93	109

damage to F 1 demonstrates that the site has a history of vandalism to which the remaining cultural deposits are also vulnerable. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism; (2) prevent mechanical or manual excavations by military personnel; and (3) minimize the impact of traffic, especially by heavy tracked and wheeled vehicles.

Deposits in the sinkhole should be regarded as effectively protected. If protection of other deposits is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should

reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 250 m² in area. A series of small blocks up to 100 m² (for a total of about 50 m³ of manual excavations) should be excavated in F 1. Blocks should be located on the basis of subsurface exposures provided by mechanically excavated trenches. An effort should be made to locate nonmidden occupations just below the midden base. Blocks up to 50 m² each should be located near TP 1, TP 4, and TP 5, for an additional excavation total of about 85 m³ excavations. Excavation of the blocks near TP 1 and TP 5 should also focus on articulating feature data with nonfeature contexts. These blocks also should be placed on the basis of exposures provided by mechanically excavated trenches. Additional trenches should be provided for geoarcheological data.

5.20 SITE 41BL743

5.20.1 Introduction

In April 1993, Mariah conducted test excavations at site 41BL743. This investigation was conducted in association with a chronometric study of burned rock mounds on Fort Hood (Quigg and Ellis 1994). The current report summarizes these previously published results, integrates new data on the character of the lithic assemblage, and uses this information as a basis to advance an NRHP eligibility determination and management recommendations.

5.20.1.1 Location and Description

Site 41BL743 is a prehistoric open campsite situated upon a level upland surface about 50 meters south of a steep, north-facing slope that extends down to Belton Lake (Figure 5.70). A burned rock mound is located on the site (Figure 5.71). Overall site dimensions may be up to 35 x 70 m (2,450 m², or 0.6 acres), but the burned rock

feature which is the focus of the site measures about 9 to 11 m in diameter (about 80 m²).

5.20.1.2 Previous Work

The site was first recorded by Moore and Bradle on 23 July 1984. The survey record notes a large and well preserved burned rock mound feature about 10 m in diameter with an associated lithic scatter. An Edgewood and a Bulverde point were recovered from the surface within a 50 m radius of the mound.

On 20 February 1992, the site was revisited by Mires and Doering who conducted a surface evaluation and assessed the potential of the site for intact deposits. The upland surface was described as having extremely shallow (less than 10 cm) residual soils with dark reddish brown, silty clay A-R horizon sequences. Limestone bedrock was exposed in many areas, and this portion of the site had no potential for buried intact deposits. The burned rock mound, at the center of a thin, areally restricted lithic scatter, was recorded as nearly 10 m in diameter and estimated to be 35 cm thick. The mound was partially vegetated with small trees on the north portion, with bushes and grass over other areas. No evidence of vandalism or other disturbances was noted. On the basis of the surface evaluation, one 50 x 50 cm test unit was excavated to 45 cmbs into the center of the mound on 31 March 1992. The test revealed abundant burned rock in the dark brown matrix, but no lithics, mussel shell, bone, charcoal, or other types of cultural material were recovered from the 0.113 m³ of excavation. These results were inconclusive and the site was recommended for avoidance or formal testing if avoidance was not possible. The suggested level of effort for testing included a mechanically excavated trench across the mound and up to 2 m² of hand excavation (Trierweiler 1994:A463-A464).

5.20.1.3 New Work

Formal testing of this site for NRHP eligibility was conducted in conjunction with a focused study of

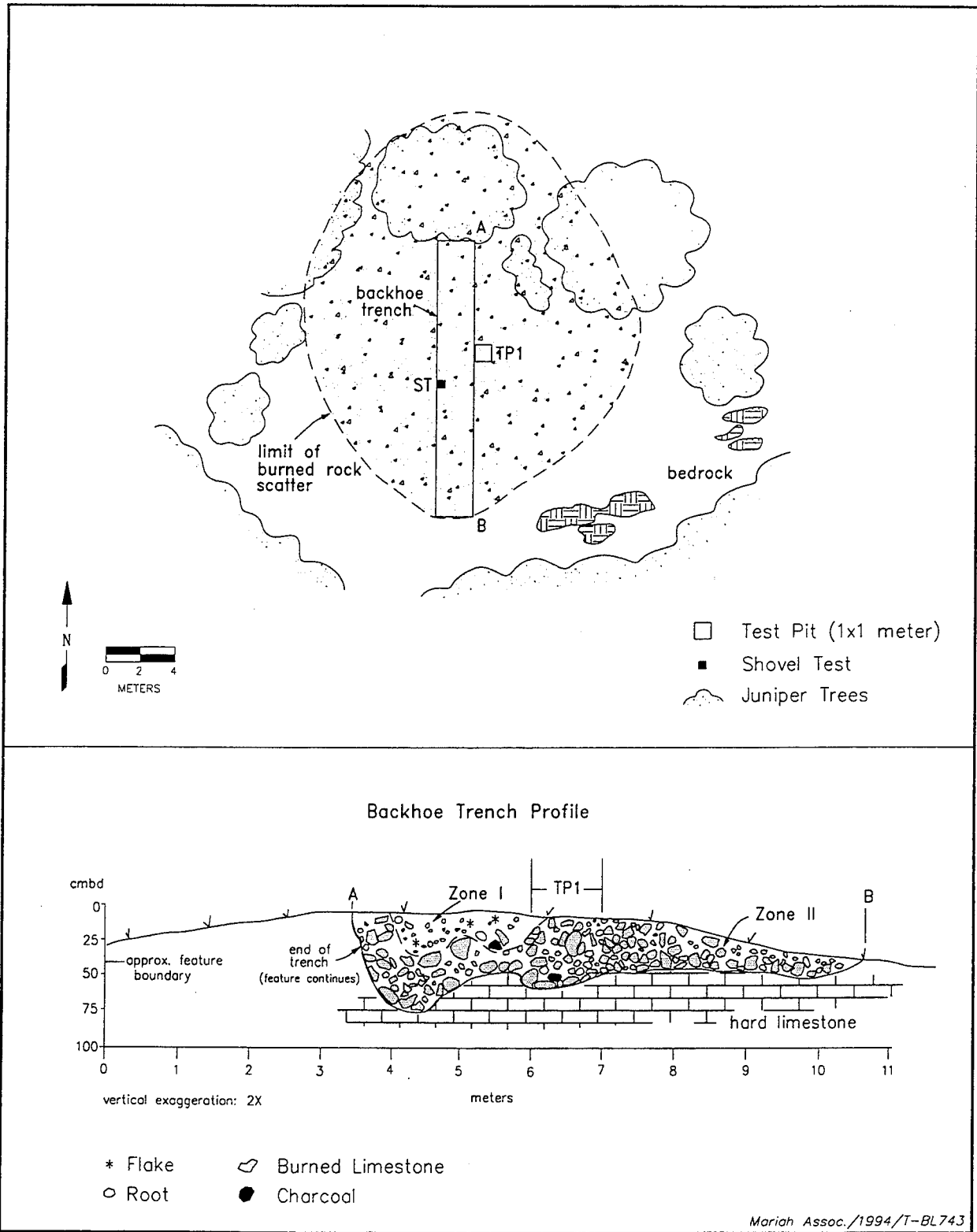


Figure 5.70 Site Map of 41BL743.



Figure 5.71 Overview of Site 41BL743, Feature 1, Looking South.

the chronometric potential of the burned rock mound. On 20 April 1993 one trench was excavated by a backhoe across the center of the mound. The trench did not completely bisect the mound but exposed a profile across the southern three-fourths of the feature. Adjacent to the trench on the east side, one 1 m² test unit (TP 1) was manually excavated to bedrock at 53 cmbs (Table 5.131). Recovered cultural material is summarized in Table 5.132.

5.20.2 Results

Two gross stratigraphic zones were recognized in the trench profile. Zone 1 consisted of a 2 m diameter x 30 cm deep "pocket" near the projected middle of the mound that contained small (less than 10 cm) matrix-supported burned rocks and lithic debitage in a loose black (10YR 2/1), stony clay loam (Figure 5.71). This area was inset into Zone 2, which consisted of primarily larger (up to 15 cm), clast-supported burned rock infilled with a fine granular black (10YR 2/1) clay loam matrix.

The mound rested on limestone bedrock, and was centered on an irregular depression in the bedrock surface. At the time, the bedrock depression was considered to be possibly artificially enlarged, although no clear evidence of intentional quarrying of the limestone surface was detected. In either case, however, the mound appears to have been situated on a depression in the bedrock.

Test pit 1 yielded large quantities of burned rock in all levels (Table 5.132). Some burned rock appeared to be oriented vertically in the southwestern quad, but no obvious internal pit feature was recognized. Level 5 had large, horizontal limestone slabs resting on bedrock, which may be the result of prehistoric cultural modification. A total of 948 burned rocks (107 kg) were recovered from TP 1. The vast majority of these (n=647) were 0 to 4 cm in size. Light charcoal flecking was observed in the fill of Levels 1 and 2.

Flotation of the 0.5 m³ of excavated matrix from TP 1 yielded a total of only 1.5 g of charcoal. In addition, small quantities of *Rabdotus* snails, bone fragments, seeds, mussel shell fragments, and chert debitage were recovered (Table 5.132). No projectile points or other chronologically diagnostic artifacts were recovered. While more than 1,000 pieces of lithic debitage were recovered from the five flotation samples, most of these artifacts were "microliths" caught in the very fine mesh of the flotation screen. Relatively few lithics (n=294) were large enough to be caught by the 1/4-inch mesh typically used in the field dry screening and which was used for the heavy fraction samples in the Austin Laboratory. Similarly, most of the bone fragments were extremely small.

Individual charcoal pieces from 10 to 20, 30 to 40, and 40 to 53 cmbs were submitted for AMS radiocarbon dating, and yielded corrected ages of 1030 ± 70 BP, 3200 ± 110 BP, and 640 ± 60 BP, respectively (Quigg and Ellis 1994). All three ages are statistically distinct, indicating that at least three separate burning events occurred from about 640 to 3,200 radiocarbon years ago. Notably, the youngest assay is stratigraphically below the other assays. This may represent mixing of deposits through bioturbation or other natural processes. Alternatively, the sequence suggests that earlier deposits may have been stratigraphically reversed during reuse of the feature at a later time.

No tools were recovered from this site.

In order to preserve comparability with the other sites, and because very few of the abundant microliths were identifiable anyway, statistical analysis of the debitage assemblage was restricted to flakes larger than 0.5 cm in maximum dimension. Three recognized chert types and seven indeterminate chert categories were included in this fraction of the debitage assemblage (Table 5.133). Overall, the identified flakes comprised a miserable 6.64% of the treated fraction, indicating that the trends noted here are not very representative of the whole, and should be viewed with caution.

Table 5.131 List of Treatment Units, 41BL743.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~7.5	1.0	50
1	TP 1	1.0	1.0	53

Two of the recognized types (Heiner Lake Tan and Heiner Lake Blue) are endemic to the Southeast Range province, and thus could have been obtained locally. Moreover, although the third recognized type (Anderson Mountain Gray) is associated with the distant West Range province, there is good reason to suspect that it too is a locally available material (see discussion in Chapter 9.0). All three types occurred in less than expected frequency when the indeterminates were included, while exclusion resulted in Heiner Lake Blue occurring in greater than expected frequency, Heiner Lake Tan occurring in expected frequency, and Anderson Mountain Gray occurring in less than expected frequency (Table 5.134). Although light brown and white flakes were the most numerous indeterminate categories, no single category was dominant, suggesting that the indeterminate fraction represents significant input from a variety of different chert sources.

Table 5.132 Artifact Recovery by Test Pit, 41BL743.

LEVEL	TEST PIT 1				
	Bivalve	Bone	Lithic	Lithic Tool	Burned rock (kg)
1	0	0	80	0	215(15)
2	0	0	94	0	185(19)
3	0	0	67	0	204(45)
4	0	0	38	0	217(14.5)
5	0	0	38	0	127(11.5)
TOTAL	0	0	317	0	948(105)

The size data indicates a strong skew toward the smaller flakes, with approximately 75% of the total less than 1.2 cm in maximum dimension (Table 5.133). This suggests that latter-stage reduction predominated at the site, and is bolstered by the high recovery of microdebitage. However, only 79% of the assemblage was conclusively decortified (Table 5.135), which suggests that at least some of the assemblage is the result of initial reduction of relatively small nodules.

Faunal and macrobotanical recovery from the mound was extremely limited. A variety of seeds, consisting of 70% juniper, 29% *Brassica* sp., and 1% hackberry was recovered from the flotation matrix. The majority of the seeds is concentrated in the upper two levels, and in all probability represents intrusives rather than economic remains. In addition, a light amount of fragmentary bone was recovered from the heavy fraction of all five levels, and fragmentary mussel shell was recovered from the heavy fraction of Levels 2 through 5. Although this suggests that some faunal processing was conducted in association with the feature, none of this material was large enough for taxon-level identification.

5.20.2.1 Site-Level Synthesis

The site consists of a relatively well-preserved upland burned rock mound. The mound exhibits an internal heterogeneity (a pocket of relatively rock-free matrix over a possibly modified depression in the bedrock) suggesting that the

Table 5.133 Debitage Recovery by Size and Material Type, AU 1, 41BL743.

Lithic Material	Size (cm)					Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types						
03-AM Gray	0	0	1	0	0	1
06-HL Tan	0	3	1	0	1	5
10-HL Blue	0	15	0	0	0	15
<i>Subtotal</i>	0	3	2	0	1	6
Unidentified Types						
Indet Dk Brown	29	0	3	0	0	32
Indet Dk Gray	28	8	1	4	1	42
Indet Lt Brown	30	50	5	7	2	94
Indet Lt Gray	10	6	0	0	0	16
Indet Misc.	17	5	14	4	0	40
Indet Mottled	0	0	1	0	0	1
Indet White	17	25	27	2	0	71
<i>Subtotal</i>	131	94	51	17	3	296
Total	131	97	53	17	4	302

mound accreted around a centralized internal feature--possibly a baking pit--in a manner consistent with the prevailing model of earth oven construction (Greer 1965; Treece 1992). Radiocarbon ages from the mound indicate several millennia of intermittent use, as well as possible prehistoric disturbance associated with reuse of the

Table 5.134 Binomial Statistic Results, AU 1, 41BL743.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	1	64	94	less	3	11	less
06-HL Tan	5	64	94	less	3	11	expected
10-HL Blue	15	64	94	less	3	11	more
Total Indet	296	64	94	more	na	na	na

feature. Debitage from the matrix is indicative primarily of latter-stage reduction activity, but does suggest some initial reduction did take place on site. The limited fraction of the debitage assemblage that was identifiable consisted of locally available material, but the identified percentage was so low that this trend is advanced with extreme caution. Faunal recovery was extremely limited, but does indicate that some animal processing was probably associated, while no macrobotanical remains with clear economic implications were forthcoming.

5.20.3 Conclusions and Recommendations

On the basis of the radiocarbon assays, this burned rock mound appears to have been sporadically utilized at least three times over the last 3,200 years. The oldest assay (3200 ± 110 BP) falls within Prewitt's (1981, 1985) Round Rock phase in the Middle Archaic period. The second oldest assay (1030 ± 70 BP) is within the early part of the Austin phase in Prewitt's (1981, 1985) Neo-Archaic period. This date is comparable to four burned rock mounds at Ivie Reservoir which all date between 600 to 1550 BP (Treece 1992:288). Similarly "midden 13" at site 41WM312 yielded a date of 910 BP, also in the Austin phase (Gearhart 1987:117-118). Diagnostic projectile points from that mound included four Scallorn, four Darl, two Fairland, and five others of which nine were recovered from the dated central hearth of F 1 (Gearhart 1987:78). The youngest assay at 41BL743 (640 ± 60 BP) falls in the Toyah phase of the Neo-Archaic period (Prewitt 1981b, 1985). This young assay is contemporary to the upper range of the time span identified for the four O. H. Ivie Reservoir mounds. The stratigraphic reversal of the radiocarbon dates is surprising, but given the apparent pristine nature of the feature, does not suggest vandalized deposits. However, the stratigraphic reversal does imply that the mound at 41BL743 has the potential to address issues of aboriginal reuse and disturbance of burned rock features.

Table 5.135 Debitage Cortex Characteristics by Material Type, AU 1, 41BL743.

Lithic Material	Partial Cortex			No Cortex	Indeterminate	Total
	Abraded	Unabraded	Indeterminate			
Identified Types						
03-AM Gray	0	0	0	1	0	1
06-HL Tan	0	1	0	4	0	5
10-HL Blue	0	0	0	15	0	15
<i>Subtotal</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>21</i>
Unidentified Types						
Indet Dk Brown	0	0	0	32	0	32
Indet Dk Gray	1	0	0	41	0	42
Indet Lt Brown	0	1	10	61	22	94
Indet Lt Gray	0	0	0	16	0	16
Indet Misc.	2	4	25	9	0	40
Indet Mottled	0	0	0	1	0	1
Indet White	0	0	0	71	0	71
<i>Subtotal</i>	<i>3</i>	<i>5</i>	<i>35</i>	<i>231</i>	<i>22</i>	<i>296</i>
Total	3	6	35	251	22	317

Other than microlith debitage and burned rock, the burned rock mound apparently contains remarkably low quantities of artifacts. Similar features elsewhere in Central Texas have generally been rich in lithic tools and other artifactual materials and indeed have been sought as sources of abundant chronology-building data (cf. Black et al. 1992). In this regard, the mound on 41BL743 may represent a relatively unusual behavior which has not been previously described or explained. Furthermore, the mound has potential to contain carbonized botanical materials which can inform on economic strategies. As a result, and because much of this feature is intact, it has high potential to yield information relevant to a wide range of research questions on the function and variability of burned rock mounds in Central Texas (cf. Hester 1991).

On the basis of the above, we judge 41BL743 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory for Central Texas in general and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because the significant deposits are in a mound above the natural surface, the site requires measures to: (1) prevent surface and subsurface disturbance by vandalism, (2) prevent mechanical or manual excavations by military personnel, and (3) minimize the impact of vehicular traffic.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1993). Importantly, the key data sets should reflect the current state of research at that point in time, which may have progressed since 1993.

Mitigative data recovery may include manual excavation of a block exposing the untrenched portion of the mound up to 40 m² in area. Assuming that the average depth of deposits is approximately 35 cm, total volume of manual excavations could be 14 m³.

5.21 SITE 41BL744

5.21.1 Introduction

In mid-November 1993, Mariah conducted test excavations at site 41BL744. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.21.1.1 Location and Description

Site 41BL744 is located along the rim of a steep upland escarpment overlooking Cowhouse Creek/Belton Lake to the east. Most of the site consists of a lithic scatter on an upland surface (Figure 5.72). A rockshelter is located in a tributary nickpoint at the east-central edge of the site (Figure 5.73). The upland surface measures roughly 280 x 200 m (about 56,000 m², or 13.8 acres), and maximum shelter dimensions are 26 x 6 m (about 156 m²). For the purposes of this report, the site is included in the Nolan/Cowhouse area of the fort.

5.21.1.2 Previous Work

Ensor, Moore, and Bradle originally recorded the site on 23 July 1984. The site consisted of "a stratified rockshelter and associated lithic scatter/midden on top and around the head of the drainage." The shelter was observed to be heavily vandalized, and mussel shell, animal bones, and glass fragments were noted. A Marcos point and a Darl point were collected from the upland surface. Overall, 25% of the site was judged to have been impacted by vehicles and vandalism.

On 21 February 1992, Doering and Mires revisited the site and evaluated it on the basis of geomorphological and archeological observations. The site was divided into Subarea A, the upland surface, and Subarea B, an east-facing rockshelter. Lithics were observed across Subarea A, especially along the drainage immediately above the shelter. A thin residual soil (less than 35 cm thick) was noted. Subarea A was therefore judged to have no potential to contain intact deposits, and no further management was recommended. Subarea B, the rockshelter, was estimated to be 35 x 7.5 m, with an overhang height of about 2.5 m along the dripline to less than 50 cm along the back wall. A bedrock shelf, covering about one-third of the floor, was noted, and lithics, bone, mussel shell, burned rocks, charcoal, and chert lenses were observed. Sediments in the shelter were judged to be derived from weathering and roofall detritus.

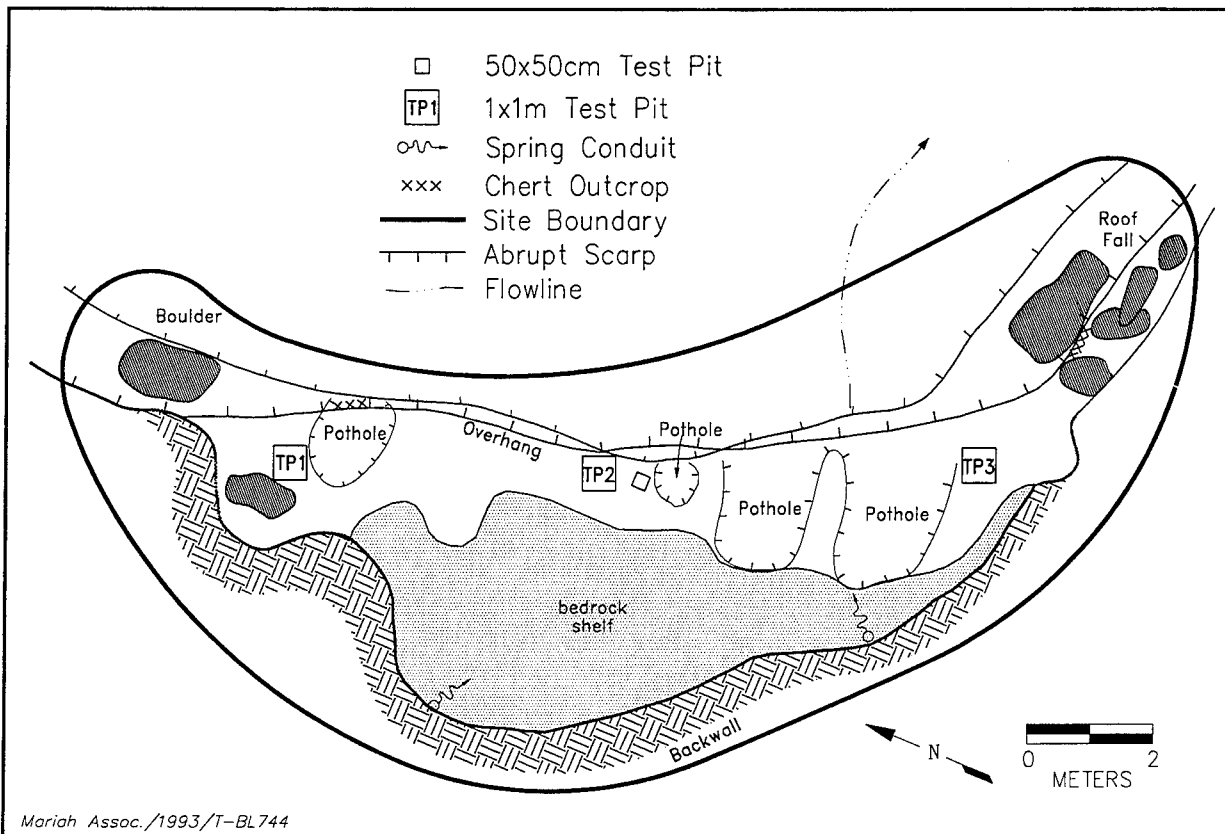


Figure 5.72 Rockshelter Map, 41BL744.

Four vandal holes, impacting about 20% of the shelter fill, were noted. Despite this vandalism, the shelter appeared to contain intact deposits that warranted testing.

A crew returned on 31 March 1992 and excavated two shovel tests and one 50 x 50 cm quad in the shelter. Flakes and snails were recovered 0 to 10 cmbs in the shovel tests. Eroding bedrock was encountered 10 to 20 and 20 to 30 cmbs. The quad was excavated to 50 cmbs, reaching decaying bedrock at 40 cmbs. Debitage, bone, mussel shell, snails, and charcoal were found in the upper 40 cm, and a combination of internally and externally derived sediments was noted. Based on these results, the shelter's NRHP eligibility was uncertain and the site was recommended for avoidance or formal testing if avoidance was not possible. The recommended minimum testing included two to four manually excavated 1 x 1 m

units (Trierweiler 1994:A465-A468).

5.21.1.3 New Work

Formal testing consisted of three 1 x 1 m test pits (TPs 1 through 3, Table 5.136) excavated in the shelter. Recovered cultural material is summarized in Table 5.137.

5.21.2 Results

Test pit 1, located at the northern end of the shelter and under the overhang, was excavated to bedrock at 40 cmbs. A modest assemblage of flakes, bone fragments, and shell umbos was recovered 0 to 30 cmbs (Table 5.137). The matrix was a dark brown, fine-grained silt with numerous roots throughout. One flake, an umbo, and a bone fragment were found from 30 to 40 cmbs. At 35 to 40 cmbs, the yellowish brown, exfoliated

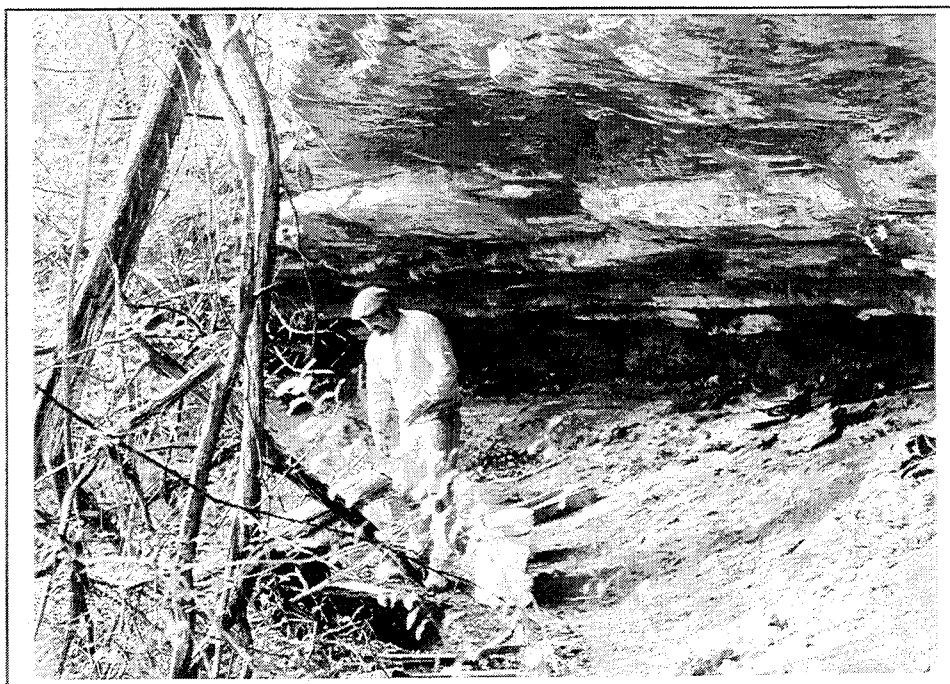


Figure 5.73 Interior of Rockshelter at Site 41BL744 with J. Dahlberg.

bedrock shelf was apparent.

Test pit 3 was placed at the southern end of the shelter, under the overhang, and excavated to bedrock. A small artifact assemblage was recovered from 0 to 30 cmbs, and no cultural materials were recovered from 30 to 50 cmbs (Table 5.137). The fill was a very dark gray silty loam to 30 cmbs, with a gray silty loam containing a large amount of decayed bedrock from 30 to 50 cmbs. The floor of the unit was irregular, and bedrock was encountered at depths between 12 and 50 cmbs.

Test pit 2 was placed near the center of the shelter, close to the talus edge, and along the dripline. The unit was situated 1 m north of a vandal's hole and about 70 cm north of the 50 x 50 cm quad excavated during the 1992 testing phase. Cultural material was recovered 0 to 60 cmbs (Table 5.137). Most artifacts were found in Levels 2 and 3. Recovery included mussel shell fragments, a few burned rocks, several burned and unburned

bone fragments, and high frequencies of lithics (with about 50% consisting of pressure flakes recovered from the 1/8-inch screen). These two levels account for 75% to 80% of all the material found in this unit, exclusive of F 1. However, Levels 1 through 3 appear to lack integrity: the deposit is a mixture of internally (yellowish brown silt) and externally (dark clay loam) derived matrices; historic material (probably washed in or contained in vandal pit spoil) was found in Level 2, and a portion of the unit shows evidence of an

Table 5.136 List of Treatment Units, 41BL744.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP1	1.0	1.0	40
1	TP2	1.0	1.0	60
1	TP3	1.0	1.0	50

Table 5.137 Artifact Recovery by Test Pit, 41BL744.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3				
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	7	1	0	0(0)	0	2	6	0	2(0.3)	1	9	1	0	0(0)
2	3	24	7	0	0(0)	0	7	36	0	2(0.5)	0	2	2	0	0(0)
3	0	2	8	0	0(0)	0	13	50	1	0(0)	0	0	1	0	0(0)
4	1	2	1	0	0(0)	1	3	10	0	4(0.8)	0	0	0	0	0(0)
5						1	9	7	0	1(0.3)	0	0	0	0	0(0)
6						1	0	2	0	1(0.3)					
TOTAL	4	35	17	0	0(0)	3	34	111	1	10(2.2)	1	11	4	0	0(0)

animal burrow or possible vandal pit. The matrix in Levels 4 through 6 is a yellowish brown silt with a small amount of darker fill in Level 5.

At 53 cmbs, human remains (F 1) were found in the northwest corner of the unit (Figure 5.74). The shape of the area containing the remains and the actual placement of the remains, which were not articulated, suggests a circular burial pit (Figure 5.75). From the northwest corner of the unit, maximum dimensions are 40 cm east along the north wall and 25 cm south along the west wall. A very distinct line delineates the burial matrix, a very dark loam, from the remainder of the test pit, a yellowish brown silt. The portion of the unit outside the burial pit was excavated to 60 cmbs, whereas the remains were exposed in situ for documentation purposes. Examination of the profile (Figure 5.76) suggests that the burial was placed in a pit excavated about 30 cm into the existing shelter fill (Stratum 2 and 3), then backfilled with material removed from the excavation (Stratum 5). Subsequent weathering of the shelter resulted in the deposition of approximately 10 cm of silt (Stratum 1) over the surface extant at the time of the burial. A black loam deposit (Stratum 4) present in the northwestern corner of the TP probably represents a modern intrusive vandal pit or rodent burrow.

Upon recognition of a probable human burial, Fort Hood DEH archeologists were notified. However, prior to recognition of the feature, part of the right femur and a rib fragment were inadvertently displaced. Other identifiable remains included both clavicles, two ribs, and a calcaneus. No human remains were collected. No other material was readily visible within the feature fill, and four artifacts were recovered from fill outside the feature. At the request of Fort Hood DEH, after completing recording of F 1, all human remains were reburied as the test pits were backfilled.

In addition to the deposits contained within the current dimensions of the shelter, there is some potential for intact deposits outside the shelter. At the south end of the shelter, there are some very large rocks that resulted from a relatively massive roof-collapse episode. Exploration with pin-flag probes near these rocks showed that there is at least a 30 cm thick deposit below this roof fall.

One multiple platform core of the indeterminate miscellaneous chert category and one side scraper of Heiner Lake Blue were recovered from the excavations at this site.

To facilitate comparability between sites and minimize the unidentifiable small flakes, analysis



Figure 5.74 Feature 1 (Burial) at Site 41BL744, Looking North.

of represented chert types focused on the fraction recovered from the 1/4-inch screen. Three identified chert types and five indeterminate chert categories were identified in this fraction of the debitage assemblage from 41BL744 (Table 5.138). Overall, the level of identification was extremely low (a little more than 5% of the total). As a result of this low identification the indeterminate class was statistically overrepresented and the identified types underrepresented when the entire assemblage was considered. When the indeterminates were excluded, all types fell in the expected range (Table 5.139).

Although the identification rate is so low that significant interpretations are impossible, it is interesting to note that all of the identified types are associated with the local Southeast Range province. Size varies fairly uniformly across all size classes (Table 5.138), suggesting that all phases of reduction were probably practiced on site. Although most (88%) of the flakes are decortified, the presence of both partially and

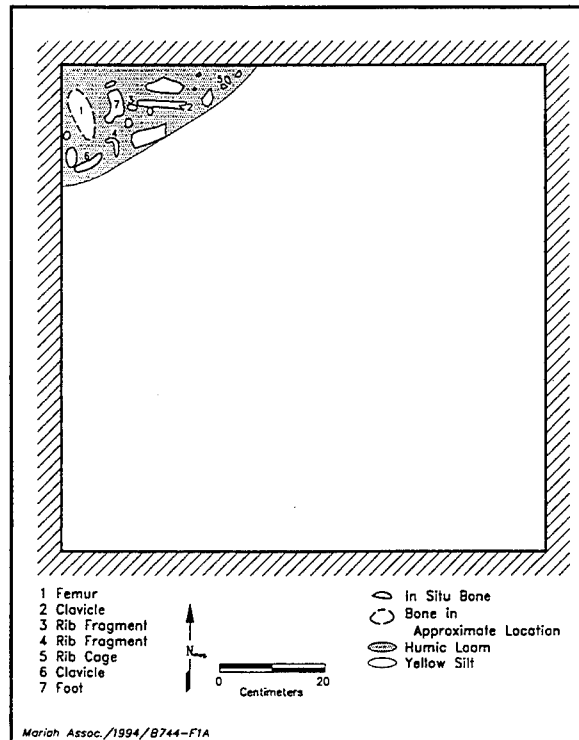


Figure 5.75 Plan View of F 1, TP 2, at 60 cmbs, 41BL744.

completely cortified flakes lends some support to this interpretation (Table 5.140).

A wide variety of faunal remains were recovered from the shelter (Table 5.141). Many of these remains (pit viper, cottontail, opossum, large bird) may represent natural intrusives, while others (Artiodactyla, turtle, tortoise, and mussel) are probably economic remains. A minimum of four mussel species, subsuming a variety of aquatic habitats, is represented in the assemblage. Only a moderate amount of cultural modification is evident in the bone, with 22% exhibiting spiral fractures and only 10% exhibiting evidence of burning.

No chronometric data was recovered from the shelter, but the character of the sediments and the lack of soil development suggest a Late Holocene age.

5.21.3 Conclusions and Recommendations

Subarea B at 41BL744 is a rockshelter situated at a tributary nickpoint overlooking Cowhouse Creek. The rockshelter contains up to 50 cm of relatively recent, internally derived sediment (Type 1 of Abbott 1994) interbedded with some sediment of apparent external origin (Type 3 of Abbott 1994). Although the shelter has been moderately vandalized and contains a relatively sparse artifact assemblage, the results indicate that an apparently intact human burial (F 1) is present. Therefore, although some of the deposits in the shelter are disturbed, the presence of the burial means that the shelter has extremely high archeological potential irrespective of other deposits. However, even the remaining deposits appear to have substantial potential because at least some of the remaining deposits appear to contain cultural materials in stratified depositional context.

On the basis of previous work, Subarea A at site 41BL744 is judged to have very low archeological potential. Consequently, Subarea A is judged to be not significant and ineligible for inclusion in the NRHP.

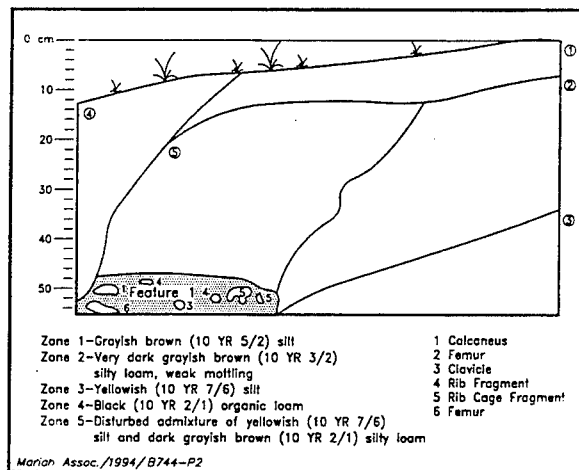


Figure 5.76 Profile of North Wall, TP 2, Illustrating Stratigraphic Context of F 1, 41BL744.

On the basis of formal testing results, Subarea B is evaluated as eligible for inclusion in the NRHP because the human remains located are

Table 5.138 Debitage Recovery by Size and Material Type, AU 1, 41BL744.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types							
HL Blue (1&10)	0	0	0	0	1	1	2
06-HL Tan	0	0	0	0	0	2	2
09-HL Tr Brown	0	0	0	0	3	0	3
<i>Subtotal</i>	0	0	0	0	4	3	7
Unidentified Types							
Indet Dk Brown	2	4	3	4	1	0	14
Indet Dk Gray	0	0	0	1	1	0	2
Indet Lt Brown	14	19	21	16	14	3	87
Indet Lt Gray	3	7	2	1	3	0	16
Indet White	1	2	2	0	0	0	5
<i>Subtotal</i>	20	32	28	22	19	3	124
Total	20	32	28	22	23	6	131

Table 5.139 Binomial Statistic Results, AU 1, 41BL744.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1&10)	2	23	42	less	0	5	expected
06-HL Tan	2	23	42	less	0	5	expected
09-HL Tr Brown	3	23	42	less	0	5	expected
Total Indet	124	23	42	more	na	na	na

archeologically and culturally important. Accordingly, we strongly recommend that the site be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequently sought by artifact collectors, the site is vulnerable to vandalism. Because the cultural materials are shallowly buried, they also are vulnerable to unintentional damage by military personnel using the shelter during training exercises. Protection efforts should include: (1) prevent subsurface disturbance by vandalism, and (2) prevent surface disturbance and manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 125 m² in area. Mitigation efforts should be extended to the area outside the south end of the shelter in order to acquire data that may remain beneath the major roof-fall event. Given known depths of at least 60 cm at F 1 near the opening of the shelter, it is likely that excavation volume could reach 75 to 80 m³ of manual excavations.

Table 5.140 Debitage Cortex Characteristics by Material Type, AU 1, 41BL744.

Lithic Material	All Cortex	Partial Cortex	No Cortex	Indeterminate	Total
	Indeterminate	Indeterminate			
Identified Types					
HL Blue (1&10)	0	1	1	0	2
06-HL Tan	0	1	1	0	2
09-HL Tr Brown	0	0	2	1	3
<i>Subtotal</i>	<i>0</i>	<i>2</i>	<i>4</i>	<i>1</i>	<i>7</i>
Unidentified Types					
Indet Dk Brown	0	2	11	1	14
Indet Dk Gray	0	0	2	0	2
Indet Lt Brown	1	5	80	1	87
Indet Lt Gray	0	0	15	1	16
Indet White	0	1	3	1	5
<i>Subtotal</i>	<i>1</i>	<i>8</i>	<i>111</i>	<i>4</i>	<i>124</i>
Total	1	10	115	5	131

Table 5.141 Faunal Recovery, AU 1, 41BL744.

	Element																	Total		
	Astagalus	Calcaneus	Cranium	Dorsal vertebra	Fused 3&4th metata	Humerus	Indeterminate	Mandible	Metapodial	Pelvis	Permanent tooth	Pleural	Proximal Phalange	Ribb	Carapace	Tibia	left		right	unknown
Vertebrates																				
Artiodactyla	1	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
Aves (large)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Didelphis virginiana	0	0	1	0	0	0	0	1	0	0	3	0	0	1	0	0	0	0	0	6
Mammalia	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
Mammalia (med/lg)	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	16
Mammalia (sm/med)	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
Sylvilagus sp.	0	1	2	0	0	0	0	2	0	2	8	0	0	0	0	2	0	0	0	17
Terrapene sp.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Testudinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Vertebrata	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	25
Viperidae	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	1	1	3	2	2	1	46	3	1	2	11	1	1	2	1	2	0	0	0	80
Bivalves																				
Amblema plicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Lampsilis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Toxolasma texasensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Tritogonia verrucosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	1	8

5.22 SITE 41BL751

5.22.1 Introduction

In January 1994, Mariah conducted test excavations at 41BL751. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.22.1.1 Location and Description

Site 41BL751 is located south of Cowhouse Creek on a northeast-flowing tributary that bisects the site. The site is located within the tributary floodplain (about 1,750 m²) and on the colluvial slopes near the point where the tributary flows out of the canyon incised into the margin of the Manning surface onto the Killeen upland (Figure 5.77). A large burned rock midden is situated on the floodplain (Figure 5.78). Overall maximum site dimensions are 160 x 60 m (about 9,600 m², or 2.3 acres). For the purposes of this report, the



Figure 5.77 Overview of Site 41BL751, Looking Northeast.

site is included in the Nolan/Cowhouse area of the fort.

5.22.1.2 Previous Work

Bradle and Strychalski originally recorded the site on 27 July 1984. The site was described as a vandalized burned rock midden, located on the west bank of an intermittent tributary to Cowhouse Creek, and an associated lithic scatter. Observed artifacts included a perforator, scrapers, retouched flakes, debitage, bifaces, cores, burned rock, and mussel shell. Vandal pits revealed at least 50 cm of cultural deposits, and the vandalism of the midden appeared recent. Trails, erosion, and vandalism were judged to have disturbed 9% of the site.

On 10 February 1992, Frederick and Quigg revisited and reevaluated the site based on geomorphic and archeological grounds. The site was divided into Subarea A, the tributary floodplain and burned rock midden, and Subarea

B, the colluvial slopes. The midden measured about 60 x 20 m, with lithics and mussel shell noted. Again, the extensive vandalism of the midden was noted along the west bank of the tributary. Some observed vandal pits were up to 75 cm deep, and the midden was judged to extend at least to 80 cmbs on this basis. The alluvial/colluvial fill was estimated to be up to 1.5 m thick, based on cutbank exposures. A wedge of the terrace was noted on the east bank, but no cultural material was observed in the poorly exposed cutbank. Overall, vandalism and recent channel trenching were judged to have impacted 50% of Subarea A. Based on the presence of the midden, apparent thickness of cultural deposits, and potential for in situ cultural remains, shovel testing was recommended. A very light lithic scatter was noted in Subarea B, however, it was not recommended for further work due to a lack of integrity.

Four shovel tests were excavated in Subarea A on the west bank of the tributary on 1 April 1992.

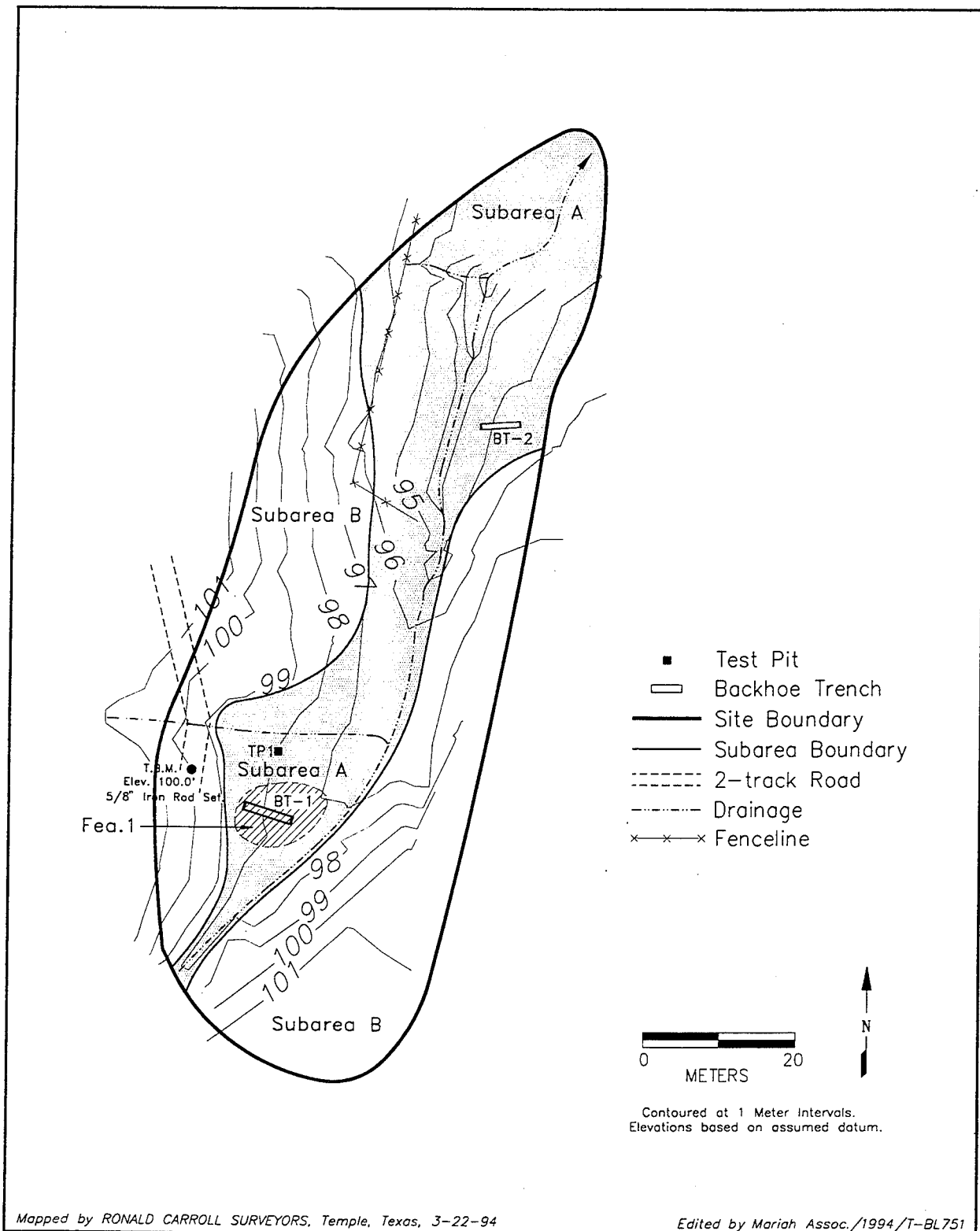


Figure 5.78 Site Map of 41BL751.

Three tests were positive, with material recovered to 80 cmbs. Of 789 artifacts, 718 (91%) were recovered from a single shovel test (ST 1). Based on testing results, in situ cultural material was considered to be present and Subarea A was judged to have good archeological potential. The site was recommended for avoidance or for formal testing if avoidance was not possible. Two backhoe trenches and two manually excavated test pits were recommended as a minimum formal testing effort (Trierweiler 1994:A472-A477).

5.22.1.3 New Work

Two backhoe trenches were dug and one test pit was manually excavated (Table 5.142). Trench 1, located on the west bank of the tributary, extended from the cutbank across the midden to the base of the colluvial slope. Trench 2 was placed on the east bank of the tributary, slightly downstream. Test pit 1 (TP 1), was placed on the west bank of the tributary, about 5 m south of a minor southeast-flowing tributary. An Ensor point was collected from the vandals' backdirt pile. Recovered cultural material is summarized in Table 5.143.

5.22.2 Results

Trench 1 (Figure 5.79) was excavated to a depth of about 75 cm and exhibited an A-Bw-Bt-Bk profile developed in deposits representing a mix of colluvial and cultural sedimentation. Zone 1 was up to 30 cm thick and consisted of "typical" midden deposits in a black (10YR 2/1), granular stony clay loam. A number of subtle areas of vandal disturbance, evident only by a strong difference in the cohesiveness of the sediments, were observed throughout the zone. Zone 2 consisted of brown (7.5YR 4/2), angular, blocky structured stony clay loam, and also contained considerable quantities of burned rock and flakes. A few carbonate filaments were present, as were a number of black mottled areas representing bioturbation or prehistoric disturbance. Zone 3 consisted of brown (7.5YR 4/2), stony clay loam. It exhibited a strong fine blocky structure and

Table 5.142 List of Treatment Units, 41BL751.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~7	0.8	200
1	BT 2	~7	0.8	280
1	TP 1	1.0	1.0	150

contained common weak clay skins on the ped faces. A relatively small amount of burned rock was present in the unit. Zone 4 consisted of a brown (7.5YR 4/2) silty loam containing fine soft carbonate nodules, and was limited to the upslope end of the trench. It is tentatively interpreted as a colluvial wedge, but may in fact represent in situ regolith. No cultural material was detected in this zone.

Table 5.143 Artifact Recovery by Test Pit, 41BL751.

LEVEL	None					TEST PIT 1				
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
surface	0	0	0	2	0(0)	0	0	0	0	0.0
1						0	0	4	0	4(6.5)
2						1	0	14	0	15(1)
3						0	0	22	1	32(4)
4						0	0	10	2	29(6.5)
5						0	0	16	1	19(7)
6						1	0	28	0	38(6)
7						0	0	42	0	64(12)
8						2	0	72	2	73(18)
9						0	0	59	0	49(9.5)
10						9	0	16	0	11(2)
11						0	0	4	1	1(0.3)
12						0	0	6	0	5(0.5)
13						0	0	0	0	0(0)
14						0	0	1	0	2(0.3)
15						0	0	0	0	1(0.3)
Total	0	0	0	2	0(0)	13	0	294	7	343(73.9)

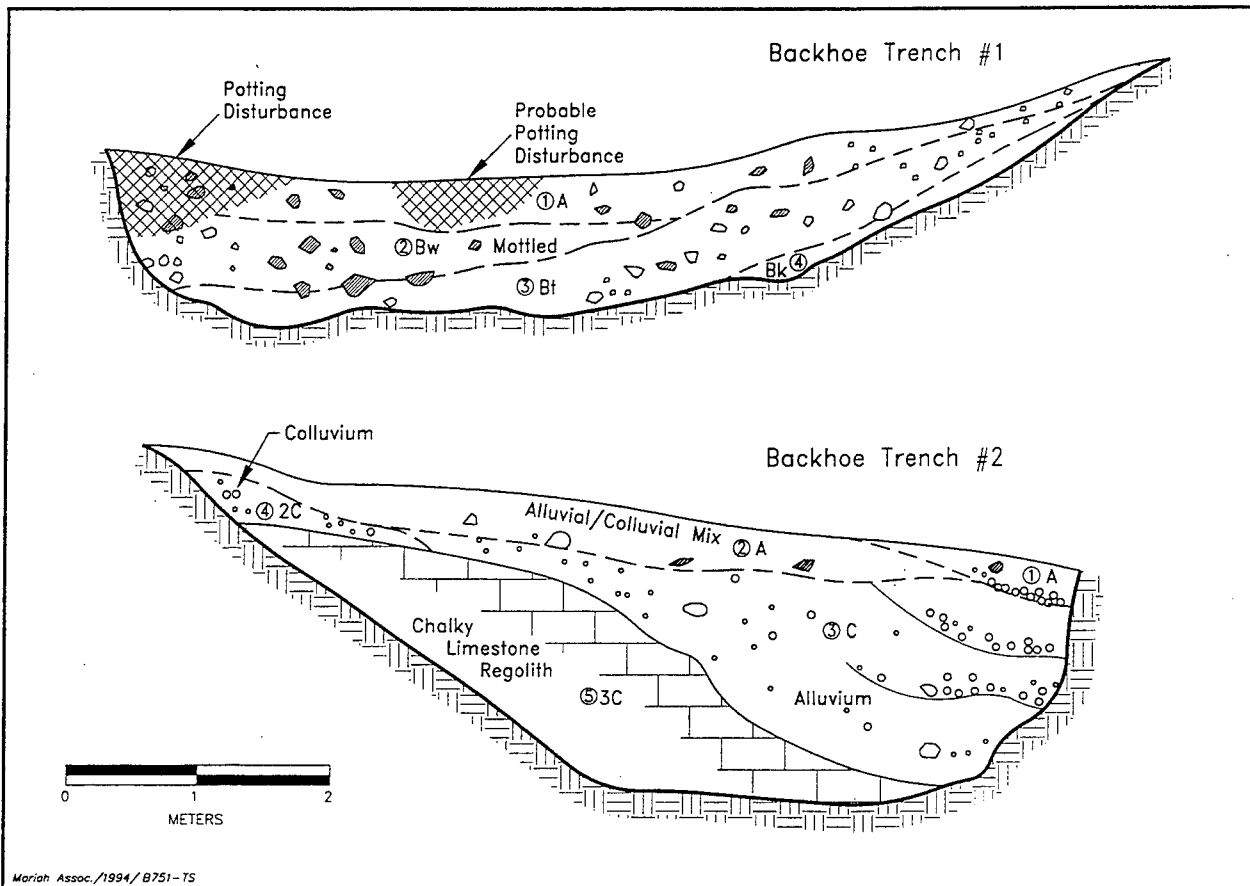


Figure 5.79 Schematic Profiles of BTs 1 and 2, 41BL751.

Trench 2 (see Figure 5.79) was situated on the eastern side of the tributary on the narrow T₁ terrace and was excavated to a maximum depth of approximately 2 m. Four zones were identified resting on and inset into a strath surface composed of soft, chalky regolith. Zone 1 consisted of a very recent inset drape of black (10YR 2/1), gravelly clay loam, and was present as a restricted wedge about 30 cm thick at the western end of the trench. Zone 1 was inset into Zone 2, which consisted of a sloping, black (10YR 2/1), granular gravelly clay loam surface mantle representing an alluvial/colluvial admixture. This zone contained a small quantity of dispersed burned rock of probable colluvial origin. Zone 3 formed the body of the alluvial fill, and was inset against the chalky bedrock strath. It consisted of brown to pinkish gray (10YR 5/2-10YR 6/2), massive gravelly clay

loam containing multiple gravelly truncation surfaces. A light smattering of burned rock was dispersed throughout the zone, but no clear buried cultural surfaces were evident, and it is likely that the burned rock is secondary. Zone 4 consisted of a thin (20 to 30 cm) wedge of brown (7.5YR 4/2), fine blocky, gravelly clay loam resting on top of the bedrock strath. It contained a high percentage of fine gravel, and is interpreted as the downslope tail of a colluvial wedge that probably thickens upslope. The unit represents older material, and is separated from Zone 3 by the buried scarp of the bedrock strath. Upslope, where Zone 2 grades into Zone 3, the trench exhibits an A-Bw profile, while downslope the recent alluvium exhibits an A-C profile.

In TP 1, the midden (F 1) was encountered between 10 and 100 cmbs (Figure 5.80). However, the densest and most intact portion of the feature was from 60 to 90 cmbs. Overall artifact frequencies for F 1 were high and included lithics, mussel shell umbos, and burned rocks (Table 5.143). From 0 to 60 cmbs, a total of 100 burned rocks (about 25.5 kg) was recovered, and lithic frequencies fluctuated from small to substantial numbers of artifacts. Levels 7 through 9 contained the densest cultural deposits, with large numbers of lithics and burned rocks (n=186, 39.5 kg) and an untyped dart point in Level 8. In addition, the matrix from 60 to 90 cmbs is a very dark gray clay loam with a light density of unburned limestone. Artifact frequencies dropped off in the lowest level of the feature (90 to 100 cmbs). No internal patterning was noted among the burned rocks in F 1. Rocks were generally subangular, and ranged in size from 3 x 2 x 2 cm to 18 x 15 x 10 cm. Below the midden, a light amount of cultural material was recovered from 100 to 150 cmbs, with a Pedernales point found in Level 11 (100 to 110 cmbs). A moderate to heavy density of unburned rock was noted in most levels, suggesting that colluvial sediments were introduced into an otherwise primary depositional context. Gravel density was very high from 130 to 150 cmbs.

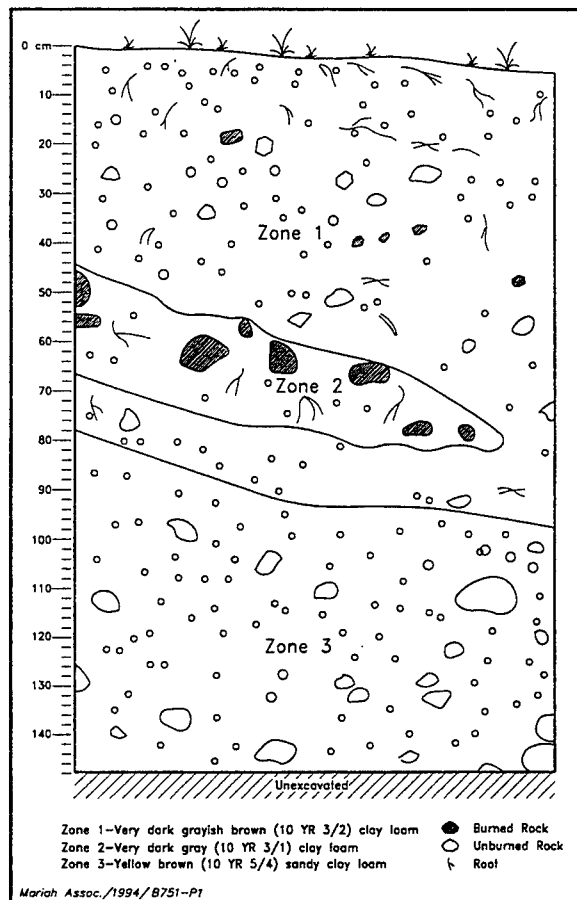


Figure 5.80 Profile of West Wall, TP 1, 41BL751.

An Ensor dart point of Heiner Lake Tan and a preform of Heiner Lake Blue were collected from the surface of this site. During testing a Pedernales of Heiner Lake Tan and an untyped dart point of Indeterminate Dark Gray were recovered. Five tools were also recovered; one of which can not be securely attributable to any general type and has been classified as other tool (Table 5.144). These tools include bifacially and unifacially modified tools. The chert types represented by the points and tools are consistent with the geographic placement of this site within the Nolan/Cowhouse site group.

Nine identified chert types and six indeterminate chert categories were recovered in the lithic debitage at 41BL751 (Table 5.145). Less than

Table 5.144 Nonprojectile Point Lithic Tools, AU 1, 41BL751.

Lithic Material	Tool Type					Total
	complex scraper	early stage biface	edge modified	late stage biface	other tool	
10-HL Blue	0	1	0	0	0	1
02-C White	0	0	0	0	1	1
09-HL Tr Brown	1	0	0	0	0	1
Indet Mottled	0	0	1	0	0	1
Indet White	0	0	0	1	0	1
Total	1	1	1	1	1	5

10% of the assemblage was identified; as a result, all identified types occurred in less than expected frequencies and the aggregate unidentified flakes occurred in greater than expected frequencies. When the unidentified flakes were excluded from consideration, all of the identified types occurred in expected frequencies except Heiner Lake Blue, which occurred in greater than expected frequency (Table 5.146). However, examination of the unidentified suite reveals relatively few unidentified light gray flakes, where Heiner Lake Blue would probably be classed. In contrast, the unidentified suite includes a large number of light brown flakes, suggesting that some of the other Southeast Range types (e.g., Heiner Lake Tan, Fossiliferous Pale Brown) are probably underrepresented in the identified suite. This suggests that the overrepresentation indicated for Heiner Lake Blue probably represents an unusually high rate of identification rather than a real predominance of the material in the overall assemblage.

Although some relatively large flakes were recovered, the majority of flakes in the assemblage (74%) were smaller than 1.2 cm, suggesting that latter stage reduction predominated (Table 5.147). This interpretation is supported by the complete decortification of 86% of the assemblage and the sparse presence (1.3% of total) of primary decortification flakes. As is typical, the small size of the majority of flakes obscured diagnostic traits and contributed to the low overall identification rate; while 70% of the flakes 2.6 to 5.2 cm in size were identified, only 5% of the flakes smaller than 1.2 cm were identifiable.

Faunal recovery was limited to mussel shell; no identifiable bone or large bone fragments were recovered. At least four species of mussels, all typical of relatively slow-moving water, are represented in the assemblage (Table 5.148). It is unlikely that these species were recovered from the tributary, and thus the assemblage probably represents procurement from Cowhouse Creek, North Nolan Creek, or one of the other streams with by deep, slow-moving water.

Table 5.145 Debitage Recovery by Size and Material Type, AU 1, 41BL751.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types							
03-AM Gray	0	0	0	1	0	0	1
06-HL Tan	0	4	0	0	0	3	7
07-Foss Pale Brown	0	0	0	0	2	1	3
09-HL Tr Brown	0	0	0	0	0	2	2
10-HL Blue	0	1	5	3	2	0	11
13-ER Flecked	0	0	1	0	0	0	1
15-Gry/Brn/Grn	0	0	0	0	1	0	1
17-Owl Crk Black	0	0	1	0	0	0	1
27-C Novaculite	0	0	0	0	0	1	1
<i>Subtotal</i>	0	5	7	4	5	7	28
Unidentified Types							
Indet Dk Brown	13	24	15	7	3	0	62
Indet Dk Gray	0	3	2	1	2	0	8
Indet Lt Brown	15	62	38	19	7	3	144
Indet Lt Gray	0	10	8	6	4	0	28
Indet Mottled	1	1	2	2	0	0	6
Indet White	2	5	5	1	5	0	18
<i>Subtotal</i>	31	105	70	36	21	3	266
Total	31	110	77	40	26	10	294

Although no charcoal was recovered, a suite of six *Rabdotus* shells obtained from Level 7 in TP 1 and submitted for A/I analysis provide a very rough indication of feature age. The obtained A/I ratios ranged from 0.0368 to 0.113, representing radiocarbon-equivalent ages ranging from approximately 1,250 years to 4,800 years BP, and showed very little tendency to cluster. The three lowest A/I values all fall into a 900 year span from approximately 1250 to 2150 BP, and are considered to best represent the general time-range of the occupation, while the older values are tentatively interpreted as artifacts of heating. However, the recovery of Middle Archaic (Pedernales) and Late Archaic (Ensor) projectile

Table 5.146 Binomial Statistic Results, AU 1, 41BL751.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
03-AM Gray	1	19	40	less	0	7	expected
06-HL Tan	7	19	40	less	0	7	expected
07-Foss Pale Brown	3	19	40	less	0	7	expected
09-HL Tr Brown	2	19	40	less	0	7	expected
10-HL Blue	11	19	40	less	0	7	more
13-ER Flecked	1	19	40	less	0	7	expected
15-Gry/Brn/Grn	1	19	40	less	0	7	expected
17-Owl Crk Black	1	19	40	less	0	7	expected
27-C Novaculite	1	19	40	less	0	7	expected
Total Indet	266	19	40	more	na	na	na

points suggests that the midden may have been in use intermittently over a long period.

5.22.3 Conclusions and Recommendations

The midden is developed on colluvial deposits on the margin of the tributary, and has been strongly disturbed by vandals and possible bioturbation. Nevertheless, some intact areas appear to be preserved in the midden deposits, and significant cultural deposits in relatively good context are present beneath the midden. Trench 2 is situated on the margin of the terrace and appears to represent a relatively recent alluvial fill (possibly equivalent to the Ford Alluvium of Nordt 1992) inset against a bedrock strath in its downslope portion and an older colluvial or mixed alluvial/colluvial deposit resting on top of the strath upslope. These two disparate deposits are united by a sloping surficial mantle of gravelly clay loam that probably represents several interfingering episodes of alluvial and colluvial sedimentation. Although some dispersed burned rock was noted, no intact cultural zones were detected in BT 2.

Although the identified suite of lithic raw material best represents the relatively local Southeast Range province, the rate of identification was extremely

low and the source of the majority of flakes is unknown. The majority of flakes are small and decortified, suggesting that latter-stage lithic reduction predominated. Faunal recovery was limited to a few mussel shells representing species typical of streams larger than the local tributary. Available chronometric data suggest that the midden is probably primarily a Late Archaic phenomenon, but probably was initially formed during the Middle Archaic.

Although extensively vandalized, significant portions of the burned rock midden appear unimpacted. Feature 1 appears to be in primary depositional context judging from scant evidence of high-energy depositional influences, and has substantial capacity to provide insight into burned-rock technologies (per Ellis 1994a) for sites located in small tributary drainages (cf. Collins 1991; Ellis 1994b). A substantial lithic assemblage implies that other technologies can be studied at this site. Thus, at least some cultural deposits at the site have high potential to address issues outlined in Ellis et al. (1994).

Furthermore, the natural depositional environment at the site has very high potential to provide data for geoarcheological investigations of landscape change and paleoenvironmental reconstruction,

particularly with respect to colluvial landscape processes. The impact of colluvial deposition is evident in TP 1 below F 1. Cultural materials below 100 cmbs in TP 1 are mixed with large rocks of probable colluvial origin. Hence, although there is no direct evidence that cultural materials in the lower levels of TP 1 are in secondary depositional context, it is likely that colluvial processes contributed large rocks to the content of these levels. An analysis of amino acid epimerization ratios could help to clarify whether or not assemblage mixture has occurred in these levels.

On the basis of the above, we judge 41BL751 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because known significant deposits (F 1) occur in shallowly buried contexts and on the surface close to trails, the site requires measures to protect it against: (1) traffic by tracked and wheeled vehicles, (2) subsurface disturbance by vandalism, and (3) subsurface disturbance by mechanical and manual excavations performed by military personnel during training activities. Given a history of uncontrolled vandal excavations at the site, the potential for further damage from vandalism should be regarded as substantial.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Table 5.147 Debitage Cortex Characteristics by Material Type, AU 1, 41BL751.

Lithic Material	All Cortex		Partial Cortex			Not Applicable	Total
	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate		
Identified Types							
03-AM Gray	0	0	0	0	0	1	1
06-HL Tan	0	0	0	1	0	6	7
07-Foss Pale Brown	0	0	0	0	1	2	3
09-HL Tr Brown	0	0	0	1	0	1	2
10-HL Blue	0	0	0	0	2	9	11
13-ER Flecked	0	0	0	0	0	1	1
15-Gry/Brn/Grn	0	0	0	0	0	1	1
17-Owl Crk Black	0	0	0	0	0	1	1
27-C Novaculite	0	0	1	0	0	0	1
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>22</i>	<i>28</i>
Unidentified Types							
Indet Dk Brown	0	0	0	1	5	56	62
Indet Dk Gray	0	1	0	0	0	7	8
Indet Lt Brown	3	0	0	2	15	124	144
Indet Lt Gray	0	0	0	0	3	25	28
Indet Mottled	0	0	0	0	2	4	6
Indet White	0	0	0	2	1	15	18
<i>Subtotal</i>	<i>3</i>	<i>1</i>	<i>0</i>	<i>5</i>	<i>26</i>	<i>231</i>	<i>266</i>
Total	3	1	1	7	29	253	294

Table 5.148 Faunal Recovery, AU 1, 41BL751.

Bivalves	Element		
	left	right	Total
Ambleminae	1	0	1
Cyrtonaias sp.	1	0	1
Lampsilinae	1	0	1
Lampsilis sp.	0	1	1
Toxolasma texasensis	0	1	1
Total	3	2	5

Mitigative data recovery may include backhoe trenches and manual excavation of a block or blocks, exposing buried features and living surfaces, up to 100 m² in area. Block excavations should be focused largely on the area in and near F 1, and should be placed to obtain data from surfaces adjacent to the midden in addition to obtaining data from the midden itself. Given an average depth of 130 cm, total excavation volume could reach 130 m³. In addition, backhoe trenches should be excavated to provide geoarcheological exposures for conducting paleoenvironmental and landscape studies.

5.23 SITE 41BL754

5.23.1 Introduction

In November 1993, Mariah conducted test excavations at site 41BL754. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.23.1.1 Location and Description

Site 41BL754 is a rockshelter located at the head of an unnamed intermittent drainage about 2 km southwest of Cowhouse Creek and the head of Belton Lake. The rockshelter measures 12 m long x 1 m deep with barely any overhang (Figure 5.81). A relatively broad platform extends beyond the dripline in front of the shelter. Water flows from a low spot on the caprock into the western portion of the shelter. The slope below the site is very steep, with little deposition, and is covered with many oaks and juniper. For the purposes of this report, the site is included in the Nolan/Cowhouse area of the fort.

5.23.1.2 Previous Work

The site was first recorded in 1984 by Moore, Bradle, and Ensor, and was described as a small shelter with a light scatter of chert debitage and a

hammerstone. A "possible skull fragment" was observed on the surface, but no species identification was mentioned on the survey form. The shelter was also partially vandalized.

Quigg and Frederick visited the site on 13 December 1991 at which time archeological and geomorphological assessments were completed. Because of potential for buried cultural material, a shovel testing crew returned to the site on 24 through 28 December 1991, and excavated a single 1 x 1 m test unit (TP 1) in the middle of the shelter. The unit was excavated to a depth of 30 cmbs. Cultural material was found throughout the test pit, which yielded over 100 flakes, a few bone fragments, and some mussel shell. Despite this work, NRHP eligibility remained uncertain and it was recommended that the site be avoided or further testing be done if avoidance was not possible. Two to four manually excavated 1 x 1 m test units were recommended for formal testing (Trierweiler 1994:A478-A481).

5.23.1.3 New Work

Two 1 x 1 m test pits (TP 2 and TP 3) were placed in the east and west portions of the shelter (Table 5.149). Test pit 2 is located under a small overhang, whereas almost no overhang is located over TP 3. Numbering of test pits began with TP 2 to avoid confusion with TP 1 excavated during previous work. Recovered cultural material is summarized in Table 5.150.

5.23.2 Results

No features or anomalies were recorded on the site during testing. Test pit 2 was excavated to 90 cmbs, and three stratigraphic zones were identified in profile. Zone 1 is a very dark gray (10YR 3/1), clay loam extending from 0 to 50 cmbs and also contains some roof fall limestone labs. Zone 2 is a brown (10YR 4/3), silt mottled with pale brown (10YR 8/4), silt/decayed limestone and extends from 50 to 70 cmbs. Zone 3 is a very pale brown (10YR 8/2), decomposed limestone mottled with brownish yellow (10YR 6/6), decomposed

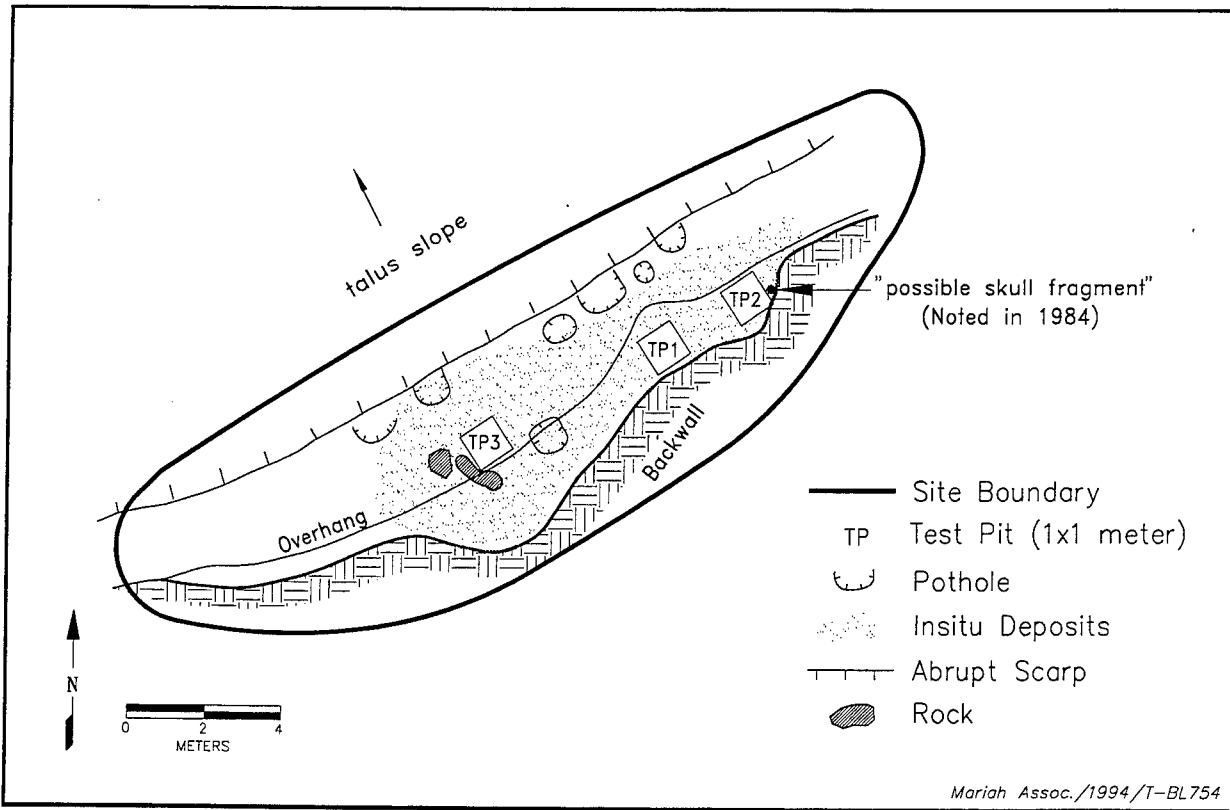


Figure 5.81 Site Map of 41BL754.

limestone extending from 70 to 90 cmbs. None of the sedimentary boundaries were distinct, but graded from one zone to the next. The unit was halted at decomposed limestone encountered at 90 cmbs.

All cultural material from TP 2 was found above Zone 3 with the majority of artifacts occurring from 20 to 60 cmbs (Table 5.150). Artifacts from TP 2 include a Perdiz, Sabinal, Bonham, and arrow point fragments, a large assemblage of lithics and bone fragments, and several burned rocks. A modest snail assemblage also was recovered, and the frequency of snails paralleled lithic counts, which is similar to some other rockshelters in the Fort Hood area.

Test pit 3 was excavated to 110 cmbs and revealed five stratigraphic zones in profile (Figure 5.82). Zone 1 is a very dark gray (10YR 3/1), clay loam with unburned limestone rocks, gravels, and a

moderate amount of roots. Zone 2 is a dark yellowish brown (10YR 4/4), clay loam with gravels and some small roots. Zone 3 is a yellowish brown (10YR 6/4), silty clay. Zone 4 is a pale brown (10YR 6/3), silty clay and Zone 5 is a pale yellow (2.5YR 7/4), silty clay (decaying limestone). Zones 1 and 2 in TP 3 are probably the same as Zones 1 and 2 in TP 1. Zones 3 through 5 in TP 3 are probably the same as Zone 3 in TP 2.

Table 5.149 List of Treatment Units, 41BL754.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cm)
1	TP 2	1.0	1.0	90
1	TP 3	1.0	1.0	110

Table 5.150 Artifact Recovery by Test Pit, 41BL754.

LEVEL	TEST PIT 2					TEST PIT 3				
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	15	5	2	0(0)	0	0	40	0	0(0)
2	0	3	14	2	0(0)	0	7	113	2	0(0)
3	0	16	154	3	0(0)	0	1	81	1	0(0)
4	4	41	294	3	15(20)	0	0	58	0	0(0)
5	0	7	86	2	3(1.5)	0	0	21	3	3(0.8)
6	0	5	48	0	5(1.5)	0	0	13	0	0(0)
7	0	0	3	0	0(0)	0	0	0	0	0(0)
8	0	0	0	0	0(0)	0	0	0	0	0(0)
9	0	0	0	0	0(0)	0	0	0	0	0(0)
10						0	0	0	0	0(0)
11						0	0	0	0	0(0)
TOTAL	4	87	604	12	23(23)	0	8	326	6	3(0.8)

All of the cultural material from TP 3 was recovered from Zone 1 (0 to 55 cmbs) and consists of a large lithic assemblage with a few bone fragments, burned rocks, and snails (Table 5.150). The majority of lithics were found from 10 to 30 cmbs and did not include any diagnostic artifacts. Although the amount of snails recovered from TP 3 was low, the comparison of snails to the amount of lithics was the same as described for TP 2.

The excavations recovered five arrow points of three different chert types with the majority being Heiner Lake Tan (Table 5.151). One multiple platform core and 13 tools were recovered from the excavations (Table 5.152). The tools include bifacially and unifacially modified tools. These tools represent eight different chert types mostly of Southeast Range type (i.e., Heiner Lake varieties); this pattern is consistent with the geographic placement of this site within the Nolan/Cowhouse area of the fort.

Seven identified chert types and nine indeterminate categories of chert were recovered in the debitage

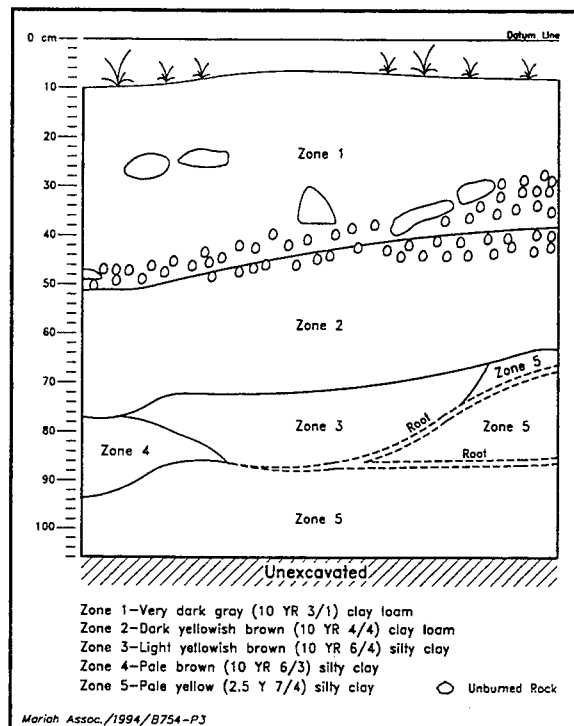


Figure 5.82 Profile of East Wall, TP 3, 41BL754.

assemblage (Table 5.153). Overall identification rate was slightly more than 20%. When the entire assemblage was considered, the indeterminate category occurred in greater than expected frequency, Heiner Lake Tan occurred as expected, and the remaining types occurred in less than expected frequencies. When the indeterminates were excluded from consideration, Heiner Lake Tan and Heiner Lake Translucent Brown occurred in greater than expected frequencies, and the remainder of types occurred in less than expected frequencies (Table 5.154).

The assemblage was dominated by relatively small, decortified flakes, indicating the dominance of latter-stage reduction activity. Roughly 93% of the assemblage was smaller than 1.8 cm (Table 5.153), and 90% were completely decortified (Table 5.155). No primary decortification flakes were recovered. Although both abraded and unabraded cortex was noted, indicating procurement from both upland localities and streambeds, the character of abrasion on the majority of cortex flakes was

Table 5.151 Projectile Points, AU 1, 41BL754.

Point Type	Lithic Material			Total
	06-HL Tan	08-FH Yellow	Indet Lt. Brown	
Bonham	0	0	1	1
Other Arrow	1	1	0	2
Perdiz	1	0	0	1
Sabinal	1	0	0	1
Total	3	1	1	5

indeterminate, and no conclusion on the relative importance of these two sources is possible.

A variety of faunal taxa were recovered from the site (Table 5.156). The assemblage was dominated

Table 5.152 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL754.

Lithic Material	Core Type		Tool Type							Total
	multiple platform	edge modified	graver	late stage biface	middle stage biface	other tool	preform	side scraper	uniface	
06-HL Tan	0	0	0	0	0	0	0	1	1	2
09-HL Tr Brown	0	1	0	1	0	1	0	1	0	4
14-FH Gray	0	0	0	0	0	0	0	0	1	1
15-Gry/Brn/Grn	0	0	0	0	1	0	1	0	0	2
Indet Lt Brown	1	0	0	1	0	0	0	0	0	2
Indet Lt Gray	0	0	0	1	0	0	0	0	0	1
Indet Misc.	0	0	1	0	0	0	0	0	0	1
Indet White	0	0	0	0	0	0	0	0	1	1
Total	1	1	1	3	1	1	1	2	3	14

by fragments of medium to large mammals, a few of which were identifiable as deer and bison. Several species of smaller animals (cottontail rabbit, turtle) may represent either economic remains or intrusives, while several other species (opossum, nine-banded armadillo) are almost certainly intrusive remains. Nearly half (49%) of the recovered bone was either charred or calcined, and 29% was spirally fractured, indicating that a high percentage of the bone was culturally modified. A small sample of unidentified mussel shell, which probably represent human food resources but may have been brought into the shelter by a carnivore, were also recovered from the matrix.

No radiocarbon data is available from the site. However, a measure of chronological control is provided by A/I ratios on a suite of 12 *Rabdotus* shells from TP 2, Level 4. These specimens yielded A/I ratios ranging from 0.0175 to 0.181, which equate to radiocarbon-equivalent ages between approximately 350 and 8,000 years B.P. Four of the shells yielded radiocarbon equivalent ages between approximately 350 and 400 years B.P., which is consistent with the Toyah occupation suggested by the recovery of Perdiz points and bison bone, and tentatively interpreted as the best estimate of the time that the occupation was sealed. However, two additional A/I clusters

Table 5.153 Debitage Recovery by Size and Material Type, AU 1, 41BL754.

Lithic Material	Size (cm)					Total	
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6		2.6 - 5.2
Identified Types							
02-C White	0	0	1	2	1	4	8
03-AM Gray	0	3	0	5	1	1	10
06-HL Tan	2	35	40	21	2	5	105
08-FH Yellow	0	0	1	4	1	0	6
09-HL Tr Brown	0	19	12	9	8	5	53
10-HL Blue	0	1	3	1	2	0	7
17-Owl Crk Black	2	0	0	0	0	0	2
<i>Subtotal</i>	4	58	57	42	15	15	191
Unidentified Types							
Indet Black	1	0	0	0	0	0	1
Indet Dk Brown	21	12	13	16	2	0	64
Indet Dk Gray	0	9	8	4	0	0	21
Indet Lt Brown	173	110	90	48	10	8	439
Indet Lt Gray	47	20	12	30	2	2	113
Indet Misc.	10	13	11	12	4	1	51
Indet Mottled	0	0	0	3	2	1	6
Indet Trans	0	5	0	0	0	0	5
Indet White	3	11	17	1	4	0	36
<i>Subtotal</i>	255	180	151	114	24	12	736
Quartz	0	0	1	1	0	0	2
Total	259	238	209	157	39	27	929

Table 5.154 Binomial Statistic Results, AU 1, 41BL754.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	8	83	121	less	15	33	less
03-AM Gray	10	83	121	less	15	33	less
06-HL Tan	105	83	121	expected	15	33	more
08-FH Yellow	6	83	121	less	15	33	less
09-HL Tr Brown	53	83	121	less	15	33	more
10-HL Blue	7	83	121	less	15	33	less
17-Owl Crk Black	2	83	121	less	15	33	less
Quartz	2	83	121	less	na	na	na
Total Indet	737	83	121	more	na	na	na

are apparent in the sample, including four additional *Rabdotus* shells yielding radiocarbon-equivalent ages between approximately 500 and 1100 BP and three shells that yielded radiocarbon-equivalent ages between 1650 and 2200 BP, suggesting that the occupation probably spans the Late Prehistoric and may extend back into the Late Archaic, and that the integrity of the deposits are relatively low. However, it is also possible that these "older" shells in fact represent differential low-level heating of contemporary specimens within a high integrity deposit.

5.23.3 Conclusions and Recommendations

41BL754 is a rockshelter with cultural deposits that reflect some vandalism, but which are otherwise apparently intact. The projectile points suggest that the shelter probably was occupied in the Late Prehistoric (cf. Turner and Hester 1985). The presence of intact cultural materials in datable stratigraphy implies that the shelter has very high potential to provide data for technological, economic, and paleoenvironmental issues outlined in the research design for Fort Hood (Ellis et al. 1994).

On this basis, site 41BL754 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequently sought by artifact collectors, the site is highly vulnerable to vandalism. Because the cultural materials are shallowly buried, they also are vulnerable to unintentional damage by military personnel using the shelter during training exercises. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent surface disturbance and manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework

Table 5.155 Debitage Cortex Characteristics by Material Type, AU 1, 41BL754.

Lithic Material	Partial Cortex			Not Applicable	Indeterminate	Total
	Abraded	Unabraded	Indeterminate			
Identified Types						
02-C White	0	1	3	4	0	8
03-AM Gray	0	0	0	10	0	10
06-HL Tan	0	0	4	99	2	105
08-FH Yellow	1	0	1	4	0	6
09-HL Tr Brown	0	2	5	46	0	53
10-HL Blue	0	0	0	7	0	7
17-Owl Crk Black	0	0	0	2	0	2
<i>Subtotal</i>	<i>1</i>	<i>3</i>	<i>13</i>	<i>172</i>	<i>2</i>	<i>191</i>
Unidentified Types						
Indet Black	0	0	0	1	0	1
Indet Dk Brown	0	0	3	61	0	64
Indet Dk Gray	0	0	0	21	0	21
Indet Lt Brown	0	3	22	409	5	439
Indet Lt Gray	0	3	2	106	2	113
Indet Misc.	0	0	8	40	3	51
Indet Mottled	2	1	1	0	2	6
Indet Trans	0	0	0	5	0	5
Indet White	0	1	5	23	7	36
Quartz	0	0	0	2	0	2
<i>Subtotal</i>	<i>2</i>	<i>8</i>	<i>41</i>	<i>666</i>	<i>19</i>	<i>736</i>
Total	3	11	54	840	21	929

which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 40 m². Given an average depth of about 100 cm, excavation volume could be up to 40 m³. Excavations should include deposits outside the dripline of the shelter.

Because deposits on the platform may be deeper than deposits under the dripline, excavation volume could be greater than the estimate above.

5.24 SITE 41BL755

5.24.1 Introduction

In late October and in again mid-December 1993, Mariah conducted test excavations at site 41BL755. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.24.1.1 Location and Description

Site 41BL755 is located on the south side of Belton Lake. It is situated in a narrow valley and subsumes a Holocene terrace and colluvial slope. The site is bisected by a north-to-south jeep trail and a southeast-to-northwest trending tributary, which empties into a portion of Cowhouse Creek that has been filled by Belton Lake (Figure 5.83). The area is densely vegetated with oaks and junipers, affording less than 10% surface visibility; however, numerous cutbank exposures are present (Figure 5.84). Maximum site dimensions are 130 x 60 m (about 7,800 m², or 1.9 acres), with the Holocene terrace measuring about 6,300 m² and the colluvial slope measuring about 1,500 m². For the purposes of this report, the site is included in the Nolan/Cowhouse area of the fort.

5.24.1.2 Previous Work

The site was originally recorded by Ensor and Dekker on 24 July 1984. It was considered a probable habitation site based on the presence of burned rocks, lithics, mussel shell, and burned animal bone. An untyped dart point was collected. A burned rock midden was also noted, but no feature location was given on the site form or map. Less than 50 cm of deposit was estimated. The site was considered to be in excellent condition (only 2% impacted by erosion and the road) and

Table 5.156 Faunal Recovery, AU 1, 41BL754.

	Element								Total
	Calcaneus	Dermal armor	Indeterminate	Permanent tooth	Pleural	Ribb	Tibia	Ulna	
Vertebrates									
Artiodactyla	0	0	0	0	0	0	0	1	1
Bos/Bison	0	0	0	1	0	0	0	0	1
Dasypus novemcinctus	1	1	0	0	0	0	0	0	2
Didelphis virginiana	0	0	0	0	0	0	1	0	1
Mammalia (med/lg)	0	0	52	0	0	1	0	0	53
Odocoileus sp.	0	0	0	1	0	0	0	0	1
Sylvilagus sp.	0	0	0	0	0	0	1	0	1
Testudinata	0	0	0	0	1	0	0	0	1
Vertebrata	0	0	34	0	0	0	0	0	34
Total	1	1	86	2	1	1	2	1	95

was recommended for monitoring.

On 17 December 1992, Frederick and Quigg revisited the site and evaluated it on the basis of geomorphological and archeological observations. The site was divided into two subareas. Subarea A consisted of an active, low to steep colluvial slope on which scattered debitage was observed. The context of this material was considered poor since it appeared to be "washed down." Since this area lacked the potential for intact deposits, no further management was recommended. Subarea B was defined as the tributary terrace, and lithics (including a collected Marcos dart point), mussel shell, burned rocks, and burned bone fragments were noted. Based on the cutbank exposures, this material appeared to be buried in the upper 30 cm of the 2.5 m of alluvium exposed in the cutbank. The "burned rock midden" noted in 1984 was not relocated. Since this subarea was considered to have the potential to contain intact, buried deposits, shovel testing was recommended.

On 8 April 1992, a crew excavated four shovel tests on the terrace and one near the base of the colluvial slope. All tests were excavated to 40

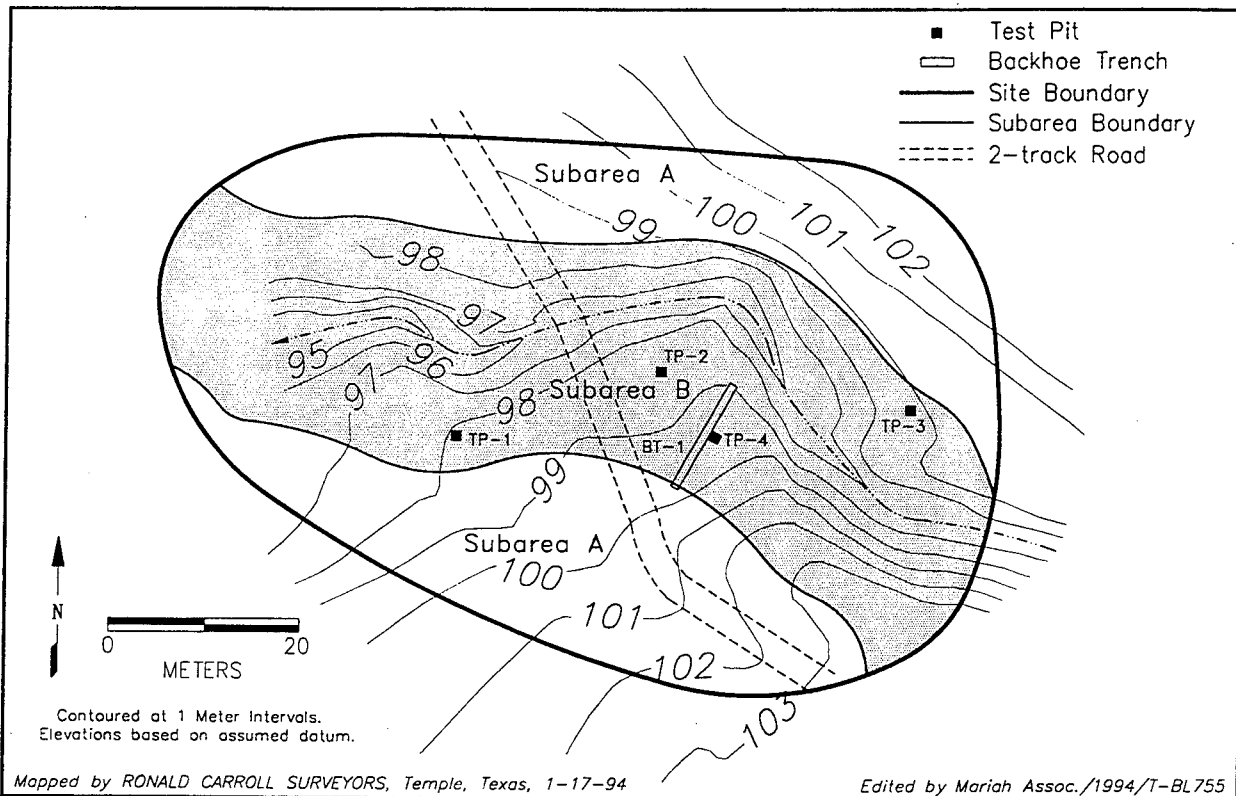


Figure 5.83 Site Map of 41BL755.

cmbs. Three of the five tests yielded cultural material. Based on these results, it was considered possible that at least one buried occupation was present, and the potential existed for deeper cultural deposits below the depth of shovel testing. However, NRHP eligibility remained uncertain, and the site was recommended for avoidance or formal testing if avoidance was not possible. At least four 1 x 1 m manually excavated test pits were recommended to clearly determine NRHP eligibility (Trierweiler 1994:A482-A484).

5.24.1.3 New Work

Four manually excavated test pits (TPs 1-4) were excavated (Table 5.157). In addition, one backhoe trench (BT 1) was excavated, although a trench had not been originally recommended. The trench was dug on the south bank of the tributary from the bank edge, across the terrace, and to the base of the colluvial slope in order to provide a

stratigraphic window into a high energy depositional setting. One test pit (TP 4) was excavated on the safety bench within the trench, and the others (TP 1-3) were spaced across the terrace surface (Figure 5.83). Recovered cultural material is summarized in Table 5.158.

5.24.2 Results

Trench 1 was excavated across the terrace and up onto the colluvial toeslope. Charcoal, burned rocks, and debitage were noted at various levels. The profile of BT 1 revealed complex deposits consisting of coarse toeslope colluvium grading out into and interfingering with three distinct alluvial units (Figure 5.85). The toeslope consisted of angular and flaggy limestone clasts up to 1 m in diameter in a poorly sorted matrix. A number of complex depositional lobes were apparent. The whole colluvial assemblage rested on weathered bedrock and graded out into highly stratified,



Figure 5.84 Overview of Site 41BL755, Looking West.

gravelly to loamy deposits underlying the terrace. It was frequently impossible to discern clear contacts between alluvial and colluvial facies in the transition zone, suggesting that the distal ends of the colluvial wedges were typically reworked by stream flow across the terrace surface.

Three alluvial units and eight gross stratigraphic zones were identified in the measured section (see Figure 5.85). The uppermost alluvial unit was composed of Zones 1 and 2, and exhibited an A-C profile. Zone 1 was the modern A horizon, and consisted of 60 cm of black (10YR 2/1), granular structured gravelly clay loam. Zone 2 consisted of 35 cm of highly stratified dark gray (10YR 4/1) gravelly loams and loamy gravels. Several thin, subhorizontal gravel lenses exhibited weak to moderate imbrication characteristic of fluvial deposition, while other clasts showed matrix support, indicating colluvial origin. Zone 3 consisted of a thin Ab horizon (Paleosol 1) about 10 cm thick composed of dark gray (10YR 4/1), slightly gravelly clay loam. Zones 4 and 5

consisted of highly stratified, dark to very dark grayish brown gravelly loams, gravelly clay loams, and loamy gravels that represent interdigitated alluvial and colluvial deposits. Carbonate flecks and dissolving limestone pebbles were common through both units, and flecks of charcoal were observed in Zone 5.

At a depth of approximately 1.5 mbs, the deposits grade abruptly into a distinctly older assemblage of

Table 5.157 List of Treatment Units, 41BL755.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~16	1.4	~200
1	TP 1	1.0	1.0	190
1	TP 2	1.0	1.0	190
1	TP 3	1.0	1.0	200
1	TP 4	1.2	0.8	240

Table 5.158 Artifact Recovery by Test Pit, 41BL755.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	0	0	0(0)	0	0	4	0	0(0)	0	0	0	0	2(0.1)	0	0	0	0	0(0)
2	0	0	3	0	4(0.3)	0	0	10	0	0(0)	0	0	10	0	1(0.1)	0	0	0	0	0(0)
3	0	0	15	0	0(0)	3	8	268	6	25(7)	0	0	9	3	0(0)	0	0	0	0	0(0)
4	0	0	4	0	2(0.1)	7	21	366	16	100(19.5)	0	0	3	0	0(0)	0	0	0	0	0(0)
5	0	0	4	0	0(0)	47	18	389	2	75(16.5)	0	0	0	0	5(1)	0	0	0	0	0(0)
6	0	0	1	0	1(0.2)	10	2	19	0	20(2.5)	0	0	1	0	3(1)	0	0	0	0	0(0)
7	0	0	0	0	7(0.3)	0	0	0	0	0(0)	1	0	0	0	2(1)	0	0	0	0	0(0)
8	0	0	0	0	3(0.2)	0	0	7	0	12(3)	0	0	4	0	0(0)	0	0	0	0	0(0)
9	0	0	0	0	0(0)	0	0	20	0	15(2)	0	0	1	0	0(0)	0	0	0	0	0(0)
10	0	0	2	0	0(0)	0	0	15	0	15(2)	0	0	2	0	0(0)	0	0	0	0	0(0)
11	0	0	0	0	0(0)	0	0	1	0	0(0)	0	0	1	0	0(0)	0	0	0	0	0(0)
12	0	0	0	0	3(0.5)	0	6	3	0	0(0)	0	0	4	0	0(0)	0	0	0	0	0(0)
13	0	0	0	0	3(0.5)	0	0	17	0	5(0.6)	0	0	3	0	0(0)	0	0	0	0	0(0)
14	0	0	0	0	10(3.5)	NOT SCREENED					0	0	1	0	0(0)	0	0	0	0	0(0)
15	0	0	2	0	3(0.2)	0	0	1	0	0(0)	0	0	5	0	1(1)	0	0	0	0	0(0)
16	0	0	23	0	7(1)	0	0	1	0	0(0)	0	0	8	0	0(0)	0	0	0	0	0(0)
17	0	0	9	0	5(0.5)	0	1	8	0	0(0)	0	0	6	0	0(0)	0	0	2	0	2(0.1)
18	0	0	2	0	1(0.2)	0	0	20	0	2(0.5)	0	0	2	0	0(0)	0	0	14	0	2(0.2)
19	0	0	0	0	2(0.1)	0	0	5	0	0(0)	0	0	1	0	0(0)	0	0	51	3	3(0.4)
20						0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	13	0	3(0.2)
21						0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	4(0.2)
22						0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
23						0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
24						0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)
TOTAL	0	0	65	0	51(7.6)	67	56	1154	24	268(51.1)	1	0	61	3	14(4.2)	0	0	80	3	14(1.1)

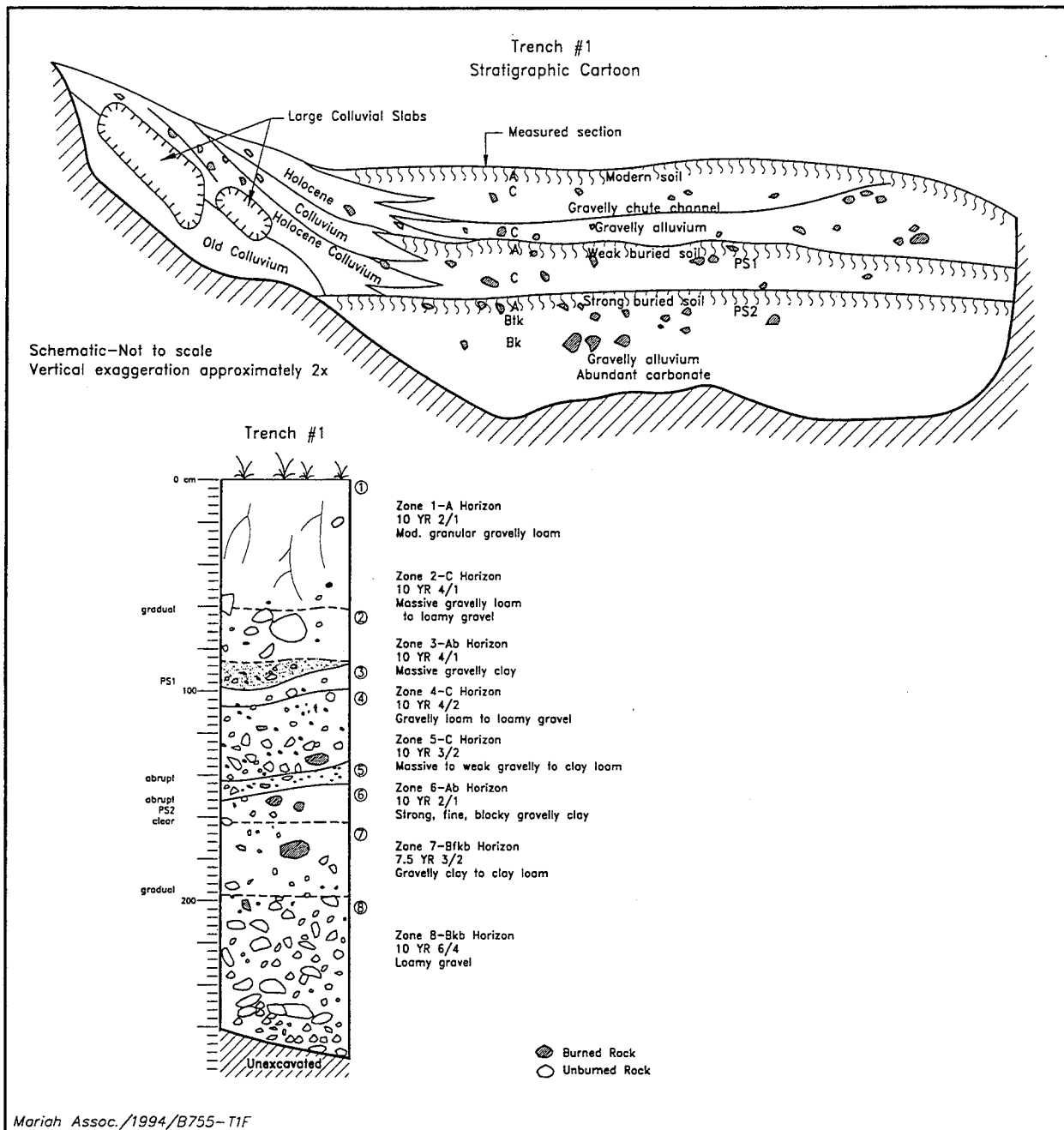


Figure 5.85 Schematic Profile and Measured Section, BT 1, 41BL755.

deposits that support a well developed buried soil (Paleosol 2). Zone 6 was the Ab horizon of this soil, and averaged 10 cm in thickness. It consisted of black (10YR 2/1), fine angular blocky gravelly clay containing common clay films (most probably

representing pressure faces rather than alluvial clay) and a few dissolving lithoclasts. It graded gradually down into Zone 7, a weakly oxidized, dark brown (7.5YR 3/2) Btkb horizon approximately 35 cm thick. This weak argillic

horizon was composed of gravelly clay and exhibited fine blocky structure, common clay films, common carbonate filaments and soft fine nodules. The argillic horizon graded into Zone 8, a light yellowish brown (10YR 6/4), loamy gravel that became increasingly gravelly with depth. This zone contained a considerable quantity of secondary matrix carbonate (most probably of phreatic origin) as well as some soft secondary carbonate masses.

In addition to the trench, three manual test pit exposures were examined briefly. Each exhibited the same type of complex interbedding between dominantly gravelly and fine-grained facies apparent in the trench (Figure 5.86). However, no soil that could be correlated with the strongly developed soil in the trench was observed, suggesting that the architecture of the terrace is more complex than indicated by the relatively simple "layer cake" arrangement of stacked units exposed in the trench. A considerable quantity of burned rock was dispersed throughout the fill. It occurred in all three alluvial units and the colluvium on the valley margin. However, no clear occupation surfaces were indicated by concentrations of artifacts along bedding planes visible in the trench profile, and much of this material may represent secondary or semi-primary deposition.

Test pit 1, excavated to 190 cmbs, was placed on the south bank near the western edge of Subarea B. In TP 1, Level 1 was sterile (Table 5.158). Several lithics and a few burned rocks were recovered 10 to 50 cmbs. From 60 to 120 cmbs, no more than 10 artifacts were found in any given level, and the deposits appear to be in a mixed alluvial and colluvial fill based on the heavy density of unburned limestone (average size 10 to 15 cm). From 120 to 150 cmbs, the interfingering of alluvial and colluvial fills was readily apparent. At 120 to 130 cmbs, the northern half of the unit is a fine grained, gray brown alluvium, whereas the southern half is a dark brown colluvial fill containing a moderate rock density. With depth, the colluvium encroaches northward across the

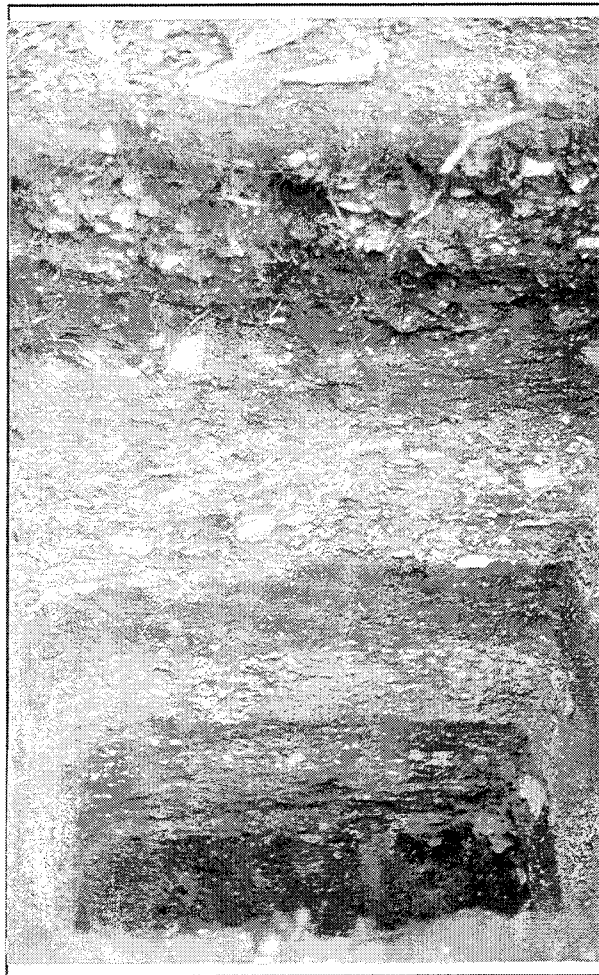


Figure 5.86 Profile of TP 2 at Site 41BL755, Looking East.

unit, with a secondary colluvial fill (yellowish brown) visible at 150 cmbs. Sixteen burned rocks were recovered from these three levels. The majority (90%) of this material was found in the alluvium or at contacts between alluvial and colluvial fills, indicating that TP 1 may be located at the interface between cultural materials in primary alluvial depositional context and secondary colluvial depositional context. Levels 16 through 19 consist solely of colluvium, with the density and size of rocks increasing with depth. Lithic counts for these lower levels are high, but may be exaggerated. Much of the chert appears chunky and does not seem to be culturally modified, and

some of the "lithics" therefore could be of natural origin.

Test pit 2, also placed on the south bank of the tributary, is about 2 m south of the terrace edge and 5 m east of the jeep trail. Excavation was terminated at 190 cmbs. In TP 2, an intact burned rock midden deposit, F 1, was buried at 20 to 53 cmbs.

Within F 1, combined artifact totals were 450 to 500 lithics, including bifaces, 6 Darl dart points, bone fragments (burned and unburned), 3 mussel shell umbos, charcoal chunks, a hammerstone, and 250 to 300 burned rocks (about 45 kg). The majority of lithics exhibited evidence of heat treatment. The burned rocks ranged from 5 to 20 cm in size, with most being fist-sized and subangular. Matrix was a fine-grained alluvium containing few gravels. Feature 1 may correlate with the cultural materials in TP 1, although the apparent complexity of the depositional architecture makes such a judgment unreliable.

Levels above and below F 1 contained various amounts of cultural material (Table 5.158), however, their contextual integrity is dubious due to evidence of colluvial mixing. A moderately developed paleosol, tentatively correlated with Paleosol 2 in the backhoe trench, was observed at a depth of about 160 cm.

Test pit 3, excavated to 200 cmbs, was placed near the southeast site boundary, where burned rocks and lithics were noted along the cutbank. Some cultural material, although never more than 10 items, was found in every level except Level 20 in TP 3 (Table 5.158). Again, alluvial/colluvial mixing is evident, and no discernable, discrete occupations were observed. Contextual integrity therefore seems to be minimal near TP 3.

Test pit 4 was placed on the "safety bench" of BT 1 and excavated from 160 to 240 cmbs, with the upper 160 cm having been removed by the backhoe. Cultural deposits were encountered in TP 4 from 160 to 210 cmbs, with the highest

frequencies found from 170 to 200 cmbs (Table 5.158). Artifacts recovered from these three levels (Levels 18 to 20) included modest to large quantities of lithics, a Marcos point, mussel shell fragments, and a few small burned rocks (1 kg). Levels 21 to 24 were sterile.

Six Darl and one Marcos dart point were recovered from this site (Table 5.159). Only one Darl could be identified for chert type (Heiner Lake Tan); four other indeterminate chert types were assigned to the points with indeterminate dark gray assigned to three points. Four of the Darl points were recovered from Level 4 of TP 2 with the other two points from Level 3 and 5, and all associated with F 1. The radiocarbon date for Level 5 compares favorably with the transitional period between the Late Archaic and the Late Prehistoric. The general lithic assemblage consisted of a hammerstone, a multiple platform core, and 22 assorted tools including eight edge-modified tools and eight late-stage bifaces (Table 5.160). Of note are the late stage bifaces recovered, three of which are made from Heiner Lake Blue chert. The chert types are 33% local Southeast Range materials, 16% North Fort, 4.2% Cowhouse, 8.3% West Fort and 38% indeterminate types.

A total of 1,359 flakes encompassing 11 described chert types and seven indeterminate categories were recovered from 41BL755 (Table 5.161).

Table 5.159 Projectile Points, AU 1, 41BL755.

Point Type	Lithic Material					Total
	06-HL Tan	Indet Dk Brown	Indet Dk Gray	Indet Lt Gray	Indet Misc.	
Darl	1	1	3	1	0	6
Marcos	0	0	0	0	1	1
Total	1	1	3	1	1	7

Table 5.160 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL755.

Lithic Material	Core Type		Tool Type					Total
	multiple platform	edge modified	graver	Hammerstone	late stage biface	uniface	utilized flake	
03-AM Gray	0	1	0	0	0	0	1	2
06-HL Tan	0	1	0	0	0	0	1	2
10-HL Blue	0	1	1	0	3	0	1	6
14-FH Gray	0	0	0	0	1	0	0	1
15-Gry/Brn/Grn	0	0	0	0	0	1	0	1
17-Owl Crk Black	0	0	0	0	1	0	1	2
22-C Mott/Flecks	0	0	0	0	1	0	0	1
Indet Dk Brown	0	0	0	0	1	0	0	1
Indet Lt Brown	1	0	0	0	1	0	0	2
Indet Lt Gray	0	2	0	0	0	0	0	2
Indet Misc	0	1	0	0	0	0	0	1
Indet White	0	2	0	0	0	0	0	2
Limestone	0	0	0	1	0	0	0	1
Total	1	8	1	1	8	1	4	24

Heiner Lake Tan, Heiner Lake Translucent Brown, and indeterminate cherts occurred in greater than expected frequencies; Heiner Lake Blue occurred in expected frequencies; and the remainder of identified types (Cowhouse White, Anderson Mountain Gray, Fossiliferous Pale Brown, Fort Hood Yellow, Fort Hood Gray, Gray/Brown/Green, Cowhouse Mottled, and Owl Creek Black) occurred in less than expected frequencies. If the indeterminates are excluded, Heiner Lake Tan, Heiner Lake Translucent Brown, and Heiner Lake Blue occur in greater than expected frequencies; Anderson Mountain Gray occurs in expected frequency; and the remainder of types occur in less than expected frequencies (Table 5.162).

The identified assemblage is overwhelmingly dominated by cherts characteristic of the Southeast Range province. Although a few North Fort types occur in low numbers, the principal "exotic" chert

is Anderson Mountain Gray, which is characteristic of the distant West Fort province. Although the possibility exists that the material might indeed represent relatively long-distance procurement, Anderson Mountain Gray is a moderate to poor quality lithic material overall (Frederick and Ringstaff 1994) and seems an unusual candidate for long-distance procurement, especially in light of the wide variety of higher quality cherts available in the vicinity of the site. Therefore, it is considered at least as likely that the material classified as Anderson Mountain Gray (and possibly many of the untyped gray cherts) actually represents a hitherto unrecognized outcrop of similar material in the Southeast Range province. If this is the case, then "exotic" (i.e., non-Southeast Range) cherts represent only 1.5% of the identified total.

Flakes smaller than 1.8 cm make up 80% of the total assemblage, with the highest number of flakes (54%) ranging in size between 0.9 cm and 1.8 cm (Table 5.163). The majority of flakes (89% of the total) lack cortex. These facts suggest that middle to late-stage manufacturing was the dominant type of lithic reduction conducted on site. Of those cortex flakes where the character of the outer cortex could be determined, abraded examples outnumbered unabraded examples by almost two to one, suggesting that streambed procurement was an important source for raw material in the relatively few cases when initial reduction was performed on site (Table 5.163).

Although a relatively large quantity of bone was recovered from the site, it was relatively fragmentary, and no bones proved identifiable to the species level (Table 5.164). However, the majority of the bone represents relatively large mammals, and it is considered likely that it represents deer. Moreover, the recovered bone evinces a high degree of cultural modification, with 43% of the total exhibiting spiral fracturing and 69% exhibiting charring or calcine alteration by fire. In addition, a small assemblage of mussels, including at least 24 individuals two species, were recovered from the site. The two known species (*Tritogonia verrucosa* and *Toxolasia texanensis*) represent very different riverine environments (flowing water over a sandy substrate and very slow-moving to still water over a soft muddy substrate, respectively). Neither of these species is likely to occur in the ephemeral tributary cutting through the site, and it is likely that the mussels represent procurement from a variety of places on Cowhouse Creek.

Chronometric control is provided by three radiocarbon ages on charcoal and two suites of *Rabdotus* shells submitted for A/I analysis. One radiocarbon age (Beta b-75168) of 1580 ± 90 BP was obtained from F 1 in TP 2, Level 5, indicating the feature and the fill containing it (the upper fill) is of Late Archaic age. This interpretation is supported by a suite of A/I ratios from the base of the upper fill in TP 2, Levels 15 through 16. Two

Table 5.161 Debitage Recovery by Size and Material Type, AU 1, 41BL755.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue (1&10)	0	1	8	60	15	13	1	98
02-C White	0	0	0	3	13	0	0	16
03-AM Gray	0	11	10	30	9	5	0	65
06-HL Tan	0	35	58	59	24	10	1	187
07-Foss Pale Brown	0	0	1	1	4	5	0	11
08-FH Yellow	0	0	0	1	0	0	0	1
09-HL Tr Brown	2	115	166	47	46	11	0	387
14-FH Gray	0	0	0	1	0	1	0	2
15-Gry/Brn/Grn	0	0	0	0	1	0	0	1
17-Owl Crk Black	0	3	2	0	0	1	0	6
18-C Mottled	0	0	0	0	1	0	0	1
Subtotal	2	165	245	202	113	46	2	775
Unidentified Types								
Indet Black	0	0	0	0	1	0	0	1
Indet Dk Brown	20	13	2	8	12	3	0	58
Indet Dk Gray	0	19	32	15	3	0	1	70
Indet Lt Brown	20	65	78	38	25	23	1	250
Indet Lt Gray	17	14	24	5	11	3	0	74
Indet Misc.	4	10	22	22	6	4	0	68
Indet White	0	8	17	18	12	8	0	63
Subtotal	61	129	175	106	70	41	2	584
Total	63	294	420	308	183	87	4	1359

of the A/I ratios obtained from this context are statistically identical, equating to approximately 1,900 radiocarbon-equivalent years BP, suggesting that aggradation of the upper fill began sometime around 2000 BP.

Two radiocarbon ages were obtained from the top of Paleosol 2, the well-developed soil exposed in the trench and in TP 2. These ages were statistically identical (2470 ± 50 BP [b-74414])

Table 5.162 Binomial Statistic Results, AU 1, 41BL755.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1&10)	98	93	133	expected	55	86	more
02-C White	16	93	133	less	55	86	less
03-AM Gray	65	93	133	less	55	86	expected
06-HL Tan	187	93	133	more	55	86	more
07-Foss Pale Brown	11	93	133	less	55	86	less
08-FH Yellow	1	93	133	less	55	86	less
09-HL Tr Brown	387	93	133	more	55	86	more
14-FH Gray	2	93	133	less	55	86	less
15-Gry/Brn/Grn	1	93	133	less	55	86	less
17-Owl Crk Black	6	93	133	less	55	86	less
18-C Mottled	1	93	133	less	55	86	less
Total Indet	584	93	133	more	na	na	na

from BT 1, Level 15, and 2460 ± 60 BP [b-75169] from TP 2, Level 16), indicating the terrace stabilized shortly after 2400 BP, and implying that it experienced several hundred years of soil formation before it was terminated by renewed terrace aggradation around 2000 BP. Although no radiocarbon ages on charcoal were obtained from the body of the Paleosol 2 fill, a suite of five A/I ratios on *Rabdotus* shells from the soil were obtained which provide a fair estimate of the time of deposition. These ratios range between 0.102 and 0.125, and equate to radiocarbon-equivalent ages between approximately 4050 and 5050 BP. Three of these equivalent ages cluster between 4050 and 4350 BP, suggesting that deposition of the unit was waning by approximately 4000 BP. Of note, one additional radiocarbon age (7250 ± 50 BP; Beta-78135) was obtained on snail shell from the body of the terrace, but was judged unreliable due to incorporation of "dead" carbonate from the environment (see section 9.5 for a full discussion).

5.24.3 Conclusions and Recommendations

The terrace at 41BL755 is composed of 3 m of interfingering alluvium and colluvium that contains at least two buried soils. The deposits consist of

tightly interdigitated depositional facies that can be grouped into three depositional units on the basis of intercalated paleosols. Stratified packets of gravelly loam cut with chute channel gravels, gravelly lag surfaces, and gravelly colluvium are represented in each unit, indicating strongly fluctuating energy conditions during aggradation of the terrace. The surface soil consists of a moderately developed cumulic A horizon that grades down into a complex, stratified C horizon. A thin cumulic soil is developed in similar deposits at a depth of approximately 1 mbs. The degree of pedogenic development exhibited by both of these upper soils is relatively weak, indicating they probably formed during relatively short spans of time as a result of decreased delivery of coarse alluvium to the terrace surface.

In contrast to these weak soils, a relatively strong buried soil exhibiting an A-Btk-Bk horizon is preserved in the terrace at a depth of approximately 160 cmbs. The degree of soil development in this lower soil points to both relative antiquity and a substantial period of subaerial weathering, indicating that the terrace fill accumulated in stages broken by at least one extended period of relative geomorphic quiescence.

Table 5.163 Debitage Cortex Characteristics by Material Type, AU 1, 41BL55.

Lithic Material	All Cortex		Partial Cortex			Not Applicable	Indeterminate	Total
	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate			
Identified Types								
HL Blue (1&10)	0	0	3	1	0	94	0	98
02-C White	0	0	2	1	2	11	0	16
03-AM Gray	0	0	5	3	1	56	0	65
06-HL Tan	0	0	8	1	0	178	0	187
07-Foss Pale Brown	0	0	3	4	0	4	0	11
08-FH Yellow	0	0	0	0	1	0	0	1
09-HL Tr Brown	0	0	12	4	2	369	0	387
14-FH Gray	0	0	0	0	0	2	0	2
15-Gry/Brn/Grn	0	0	0	0	0	1	0	1
17-Owl Crk Black	0	0	0	0	1	5	0	6
18-C Mottled	0	0	0	0	0	1	0	1
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>33</i>	<i>14</i>	<i>7</i>	<i>721</i>	<i>0</i>	<i>775</i>
Unidentified Types								
Indet Black	0	0	0	0	0	1	0	1
Indet Dk Brown	0	0	2	0	1	55	0	58
Indet Dk Gray	0	0	1	3	0	65	1	70
Indet Lt Brown	0	0	20	10	1	219	0	250
Indet Lt Gray	0	0	4	5	2	63	0	74
Indet Misc.	2	4	9	6	7	40	0	68
Indet White	1	1	2	7	3	46	3	63
<i>Subtotal</i>	<i>3</i>	<i>5</i>	<i>38</i>	<i>31</i>	<i>14</i>	<i>489</i>	<i>4</i>	<i>584</i>
Total	3	5	71	45	21	1210	4	1359

Although the deposits appear to be slightly out of phase with the sequence defined by Nordt (1992) for the larger streams on Fort Hood, the radiocarbon dates suggest that the lower unit (defined by Paleosol 2) is roughly equivalent to the lower West Range fill, while the middle unit containing the midden is roughly equivalent to the upper West Range fill. It is unclear whether or not the weak soil (Paleosol 1) that subdivides this upper unit represents a division between the West

Range and Ford fills or a temporary hiatus in the West Range episode.

Abundant amounts of burned rock are present in all three units, suggesting that substantial time depth of cultural remains is represented. The varying energy conditions, evinced by the multiple facies composing each of the units, suggests that the overall likelihood of preservation of features and living surfaces within the terrace may be

strongly attenuated by extreme depositional energy during aggradation. The impact of high-energy deposition is evident in TP 1, TP 3, and TP 4. Cultural materials in TP 3 and from 60 to 120 cmbs and 150 to 190 cmbs in TP 1 are unlikely to be in primary depositional context as a result of high-energy natural deposition. However, cultural materials from 10 to 50 cmbs and from alluvial sediments from 120 to 150 cmbs in TP 1 may be in primary context. Although the excavator judged the materials from 170 to 200 cmbs in TP 4 to be in discrete depositional context, the presence of gravels and rocks implies a possibility of secondary depositional context.

Feature 1 in TP 2 appears to be in primary depositional context judging from scant evidence of high-energy depositional influences. This feature has substantial capacity to provide insight into burned-rock technologies (per Ellis 1994a) for sites located in small tributary drainages (cf. Collins 1991; Ellis 1994b).

Thus, although high-energy deposition may have disrupted the integrity of much of the interstratified cultural remains, intact cultural deposits in TP 2 show that there is at least one cultural zone (F 1) at the site which has high potential to address issues outlined in Ellis et al. (1994). Depending on depositional integrity and stratigraphic correlation, it is possible that cultural materials from 10 to 50 cmbs in TP 1 are associated with F 1 or that they comprise evidence of a second occupation. Depending on the depositional integrity of the deposits from 170 to 200 cmbs in TP 4, another intact occupation may be present at this site. Furthermore, the natural depositional environment at the site has very high potential to provide data for geoarcheological investigations of landscape change and paleoenvironmental reconstruction.

On the basis of the above, we judge 41BL755 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory

Table 5.164 Faunal Recovery, AU 1, 41BL755.

	Element				Total
	Indeterminate	Long Bone	Metapodial	left	
Vertebrates					
Artiodactyla	0	0	1	0	1
Mammalia	1	0	0	0	1
Mammalia (medium)	0	1	0	0	1
Mammalia (med/lg)	48	0	0	0	48
Vertebrata	5	0	0	0	5
Total	54	1	1	0	56
Bivalves					
Toxolasma texasensis	0	0	0	1	1
Tritigonia verrucosa	0	0	0	1	1
Total	0	0	0	2	2

for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information. Because known significant deposits (F 1) occur in shallowly buried contexts and on the surface immediately adjacent to trails, the site requires measures to protect it against: (1) traffic by tracked and wheeled vehicles; (2) subsurface disturbance by vandalism; and (3) subsurface disturbance by mechanical and manual excavations performed by military personnel during training activities. Given that a well-worn trail passes within several meters of F 1 near a tributary crossing, the possibility of damage from traffic is substantial if vehicles stray from the trail to avoid mud.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should

reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include backhoe trenches and manual excavation of a block or blocks, exposing buried features and living surfaces, up to 45 m² in area. Block excavations should be focused largely on the area near F 1, and should be placed to obtain data from surfaces adjacent to the midden in addition to obtaining data from the midden itself. Given an average depth of 60 cm, block excavations could reach a total volume of 27 m³ of manual excavation. Given the nature of the inter-fingered alluvial and colluvial deposits in these areas of the site, excavation should proceed by natural rather than arbitrary levels whenever possible. Backhoe trenches should be excavated to provide exposures for geoaicheological studies of landscape processes and to provide exposures for stratigraphic correlation of block excavations to natural stratigraphy. Geoaicheological backhoe trenches should be carefully monitored because of the possibility that currently unidentified, intact features or occupations may be present at depth.

The above estimate does not include excavations that may be necessary near TP 1 and TP 4. If mitigation of this site is necessary, then an additional 4 m² block excavated manually in natural stratigraphic levels should be placed to sound for intact assemblages in unmixed alluvial strata from 120 to 150 cmbs in TP 1. The sounding block therefore raises the mitigation estimate to 31 m³. If the sounding block shows that assemblages are present in low-velocity alluvial strata, then the sounding block should be expanded to reach a total of 12.5 m³ of manual mitigative excavations for the lower zone in TP 1, and a total of 39.5 m³ for the site. If epimerization analyses show that either of the zones from 10 to 50 cmbs in TP 1 or 170 to 200 cmbs in TP 4 is depositionally intact, then additional manual excavations would be necessary. A 25 m² block placed, if necessary, near both pits would add 25 m³ of manual excavations. Thus, depending on the outcome of epimerization and radiocarbon analyses

for TP 1 and TP 4, it is possible that as much as 37.5 m³ of additional manual excavations may be added to the estimate for the area around F 1, for a total of 64.5 m³ of manual excavations. For deeper zones at TP 1 and TP 4, carefully monitored mechanical excavation should be used to remove unproductive overburden.

5.25 SITE 41BL765

5.25.1 Introduction

In early February 1994, Mariah conducted test excavations at site 41BL765. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.25.1.1 Location and Description

Site 41BL765 is a long, narrow, west-facing rockshelter (Figure 5.87) located below a high escarpment edge, south of Belton Lake (Cowhouse Creek) (Figure 5.88). Near the center of the shelter, there is a spring around which a tufa mound has formed. Maximum site dimensions are 40 x 5 m (about 200 m², or 0.05 acres). For the purposes of this report, the site is included in the Nolan/Cowhouse area of the fort.

5.25.1.2 Previous Work

Strychalski and Moore first recorded the site 30 July 1984. The site consisted of a large, west-facing rockshelter that had been vandalized. Flakes, deer bone, mussel shell, and charcoal (possibly recent) were observed. Estimated depth of deposit was 20 to 50 cm. Erosion, vandalism, and recent camping were judged to have impacted 17% of the shelter.

On 17 December 1991, Quigg and Frederick revisited and reevaluated the site based on archeological and geomorphological observations. Two surfaces or platforms were recognized in the



Figure 5.88 Interior of Rockshelter at Site 41BL765.

5.25.1.3 New Work

Prior to excavation, numerous pin flag probes were made to define areas with highest potential. In addition, the shelter (particularly the vandalized area) was inspected for cultural material and in situ deposits. The number sequence for the excavated units began with TP 2 to distinguish it from the 50 x 50 quad (designated TP 1) that was excavated during the shovel testing phase. Two 1 x 1 m test pits (TP 2 and TP 3) and one 50 x 50 cm unit (TP 4) were manually excavated to bedrock (Table 5.165). Units were oriented either to magnetic north or parallel to the back wall of the shelter. Test pit 2, on the northern platform, was placed just inside the dripline and near the northwest corner of TP 1. The majority of probes in this area indicated 10 to 15 cm of deposit. A few probes, in a small area south of the vandal pit, revealed 30 to 35 cm of deposits; however, this sediment was considered to probably be backdirt. No intact features were visible along the edges of the vandalized area. Test pit 3 was placed at the

southeastern edge of the southern platform abutting the back wall. This unit's location was based on observed surficial material and pin flag probes. Test pit 4 was placed 2 to 3 m north of the tufa mound and about 1 m west of the back wall. Recovered cultural material is summarized in Table 5.166.

A large block of tufa (approx 10 kg) was collected from the shelter on 18 May 1994. The sample was retrieved by using a 14-inch rock saw and manually chiseling a section of the mound. Sub-

Table 5.165 List of Treatment Units, 41BL765.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 2	1.0	1.0	24
1	TP 3	1.0	1.0	60
1	TP 4	0.5	0.5	62

Table 5.166 Artifact Recovery by Test Pit, 41BL765.

LEVEL	TEST PIT 2					TEST PIT 3					TEST PIT 4				
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	8	1	131	5	13(3)	0	0	0	0	0(0)	0	0	0	0	0(0)
2	1	0	32	0	0(0)	0	0	0	0	1(0.1)	0	0	0	0	0(0)
3						0	0	0	0	1(0.1)	0	0	0	0	0(0)
4						0	0	0	0	0(0)	0	0	0	0	0(0)
5						0	0	0	0	0(0)	0	0	0	0	0(0)
6						0	0	0	1	0(0)	0	0	0	0	0(0)
TOTAL	9	1	163	5	13(3)	0	0	0	1	2(0.2)	0	0	0	0	0(0)

samples from the top and bottom of this block were submitted to Dr. Steven A. Hall, University of Texas at Austin, to determine if pollen could be recovered from the tufa in amounts sufficient for paleoenvironmental analysis.

5.25.2 Results

Test pit 2 was excavated to a maximum depth of 24 cm, and encountered an irregular, sloping bedrock floor that was exposed at the surface in the southeast corner and dipped rather severely to the west. Two stratigraphic zones were observed in the pit. Zone 1 extended from 0 to 10 cm and consisted of a light brownish gray (10YR 6/2), loose silty loam containing abundant coarse limestone spall (Type 1 shelter sediment of Abbott 1994). It graded abruptly into a lower zone composed of grayish brown (10YR 5/2), mottled clay loam and coarse spall that probably represents a mix of internal and external sediment. A large artifact assemblage was recovered from Levels 1 and 2 (Table 5.166). Cultural material included lithics, bone, mussel shell, and burned rocks, with lithics accounting for 85% of the recovered items. Charred remains of juniper and netleaf hackberry were also recovered from levels 1 and 2. Although the artifact frequency is fairly high,

integrity was considered questionable due to the looseness of the fill and proximity to vandal activities. However, although the first level could possibly represent vandal backdirt, the clear stratigraphic break between Level 1 and Level 2 suggests strongly that the unit has not been totally homogenized by disturbance.

Test pit 3, on the southern bench, was excavated to a maximum depth of 62 cm. It revealed a complex suite of laterally varying deposits alternately consisting of dark grayish brown to intensely mottled silt and silty loam. This suite was present throughout the section in the half of the test pit closest to the back wall, and very dark gray clay loam throughout the section in the part of the pit away from the back wall. Both sediment types were rich in coarse limestone spall. Although some of the clay loam may represent external sediment, the laterally opposed relationships between the two units, coupled with the lack of any clear erosive contacts, suggest that the majority of variation is the result of differential weathering of internal sediments resulting from localized groundwater discharge in the shelter. Artifact recovery was limited to two small burned rock fragments (10 to 30 cmbs) and a lithic tool from Level 6 (Table 5.166).

Test pit 4 was excavated adjacent to the tufa mound and revealed an artifact-free section of yellowish brown wet silt, roof spall, and internal sediment that extended from the surface to 62 cmbs. Based on the matrix (compacted wet silt) from 20 to 62 cmbs and relative nearness of the tufa mound (2 to 3 m), the unit is probably on the fringe of the tufa deposit.

The small nondebitage lithic assemblage consists of a multiple platform core and six tools (Table 5.167). The chert represented are the local Southeast Range varieties (43%), and indeterminate types (57%).

Six identified chert types and seven indeterminate chert categories were included in the recovered debitage (Table 5.168). Roughly 37% of the total assemblage was typed. When the entire assemblage was considered, indeterminates occurred in greater than expected frequency; Heiner Lake Tan and Heiner Lake Translucent Brown occurred in expected frequencies, and the remainder of identified types occurred in less than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan and Heiner Lake Translucent Brown occurred in greater than expected frequencies; Heiner Lake Blue and East Range Flecked occurred in expected frequencies; and Anderson Mountain Gray and Cowhouse Shell Hash occurred in less than expected frequencies (Table 5.169). All of the chert types occurring in expected numbers or greater are Southeast Range cherts, indicating that local procurement probably predominated.

Flakes in the assemblage are primarily small to moderately sized, with examples ranging between 0.5 and 1.8 cm in size making up 89.5% of the overall assemblage (Table 5.168). The overwhelming majority of flakes (96%) are decortified, while the few cortified flakes are split almost equally between abraded (i.e. streambed-procured) and unabraded (i.e. upland procured) examples. The predominance of relatively small, decortified flakes suggests that initial reduction was accomplished elsewhere, and that processed

cores and blanks were carried back to the shelter for latter-stage processing (Table 5.170).

Faunal recovery was limited to one artiodactyl long bone fragment and several mussel shell fragments from TP 2. Only one mussel species (*Amblema plicata*, typical of relatively deep, clear, slow moving water and pools) was identifiable (Table 5.171).

No radiocarbon ages were obtained from the shelter; however, some chronometric control is provided by two suites of *Rabdotus* shells which were recovered from TP 2, Level 1 (10 shells), and TP 2, Level 2 (9 shells), and submitted for A/I analysis. This is the only case from this phase of testing where extensive snail suites from two adjacent stacked levels were analyzed, and illustrates some interesting trends. Both of the assemblages yielded a cluster of values on the low end and a widely variable "tail" of higher ratios. In Level 1, the A/I ratios of recovered snails ranged from 0.0319 to 0.607, which equate to radiocarbon-equivalent "ages" of approximately 1000 to 28,000 BP. The "youngest" five of these snails (see Appendix D) were used to estimate an average radiocarbon-equivalent age of approximately 1,300 years BP for this level. In

Table 5.167 Lithic Tools, AU 1, 41BL765.

Lithic Material	Core Type		Tool Type				Total
	multiple platform	late stage biface	middle stage biface	preform	side scraper	uniface	
06-HL Tan	1	0	0	0	1	0	2
10-HL Blue	0	1	0	0	0	0	1
Indet Dk Brown	0	0	0	1	0	0	1
Indet Lt Brown	0	0	1	1	0	1	3
Total	1	1	1	2	1	1	7

Level 2, the A/I ratios ranged from 0.0344 to 0.944, which equate to radiocarbon-equivalent "ages" between approximately 1,100 and 44,000 years BP. Here, the "youngest" seven ratios were used to calculate an average radiocarbon-equivalent age of approximately 1,500 years BP. Thus, the two independent suites represent two very reasonable, stratigraphically normal ages that belie the previous impression that the material is in disturbed context. Examination of the rejected ratios from the two levels reveals that while both levels included at least one highly heated specimen, the second level is much more uniform than the first, suggesting that fewer of the shells have been substantially altered by heat and that mixing of the two levels was probably not severe.

Pollen was recovered from both subsamples taken from the tufa block collected from the mound. These two samples represent the oldest and youngest parts of the block, and are separated by about 20 cm of accreted tufa. Although the rate of tufa accumulation is not known, the field judgement (based on relatively scant evidence, including the incorporation of an army telephone cable) was that the portion of the tufa deposits collected were probably no more than a few hundred years old.

Both samples yielded pollen in appreciable amounts in addition to abundant concentrations of fungi, algae, spores and moderate amounts of finely divided charcoal. Pollen concentration in the two samples was statistically identical (463 and 443 grains/gram, respectively). Both samples were dominated by juniper pollen, with oak pollen making up a significant minor fraction. Interestingly, although juniper was the dominant taxon represented in both samples, the more recent sample showed a slight increase in juniper over the older sample, while the percentage of oak pollen was reduced by almost a third. Minor represented taxa include elm, walnut, Asteracea, Chenopodaea, and spores in the more recent sample, and ash, grasses, Asteracea, and spores in the older sample.

Table 5.168 Debitage Recovery by Size and Material Type, AU 1, 41BL765.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified Types							
HL Blue (1&10)	0	0	3	1	0	1	5
03-AM Gray	0	0	0	1	1	0	2
06-HL Tan	0	0	6	11	2	1	20
09-HL Tr Brown	9	5	6	5	2	1	28
13-ER Flecked	0	0	1	3	0	0	4
20-C Shell Hash	0	0	0	0	0	1	1
<i>Subtotal</i>	9	5	16	21	5	4	60
Unidentified Types							
Indet Black	0	0	1	0	0	0	1
Indet Dk Brown	0	16	3	4	2	0	25
Indet Dk Gray	0	5	2	0	0	0	7
Indet Lt Brown	2	16	17	10	3	0	48
Indet Lt Gray	0	4	0	14	0	0	18
Indet Misc.	0	0	0	0	2	0	2
Indet White	0	0	0	0	1	0	1
<i>Subtotal</i>	2	41	23	28	8	0	102
Total	11	46	39	49	13	4	162

5.25.3 Conclusions and Recommendations

Site 41BL765 is a rockshelter with cultural deposits that reflect moderate vandalism, but still appear to retain some integrity. The presence of intact cultural materials in potentially datable (albeit relatively thin) stratigraphy implies that the shelter has good potential to provide data for technological, economic, and paleoenvironmental issues outlined in the research design for Fort Hood (Ellis et al. 1994). Although the tufa can contribute very useful paleoenvironmental data, it is clear that a substantial portion of the tufa is extremely recent given that mound formation has incorporated a telephone cable. However, the mound is apparently very thick, and is therefore likely to contain a prehistoric paleoclimatic data base. Thus, the shelter can also provide valuable

Table 5.169 Binomial Statistic Results, AU 1, 41BL765.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1&10)	5	14	32	less	4	16	expected
03-AM Gray	2	14	32	less	4	16	less
06-HL Tan	20	14	32	expected	4	16	more
09-HL Tr Brown	28	14	32	expected	4	16	more
13-ER Flecked	4	14	32	less	4	16	expected
20-C Shell Hash	1	14	32	less	4	16	less
Total Indet	102	14	32	more	na	na	na

data for environmental components of a geoarcheological analysis (per Ellis 1994b).

On this basis, site 41BL765 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequently sought by artifact collectors, the site is highly vulnerable to vandalism. Because the cultural materials are shallowly buried, they also are vulnerable to unintentional damage by military personnel using the shelter during training exercises. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent surface disturbance and manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Table 5.170 Debitage Cortex Characteristics by Material Type, AU 1, 41BL765.

Lithic Material	Partial Cortex				Total
	Abraded	Unabraded	Indeterminate	Not Applicable	
Identified Types					
HL Blue (1&10)	0	0	0	5	5
03-AM Gray	0	0	0	2	2
06-HL Tan	1	0	0	19	20
09-HL Tr Brown	0	0	0	28	28
13-ER Flecked	0	0	0	4	4
20-C Shell Hash	0	0	0	1	1
<i>Subtotal</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>59</i>	<i>60</i>
Unidentified Types					
Indet Black	0	0	0	1	1
Indet Dk Brown	0	0	0	25	25
Indet Dk Gray	0	1	0	6	7
Indet Lt Brown	0	2	0	46	48
Indet Lt Gray	0	0	0	18	18
Indet Misc.	2	0	0	0	2
Indet White	0	0	1	0	1
<i>Subtotal</i>	<i>2</i>	<i>3</i>	<i>1</i>	<i>96</i>	<i>102</i>
Total	3	3	1	155	162

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 30 m². Given an average depth of about 50 cm, excavation volume could be up to 15 m³. Excavations should include deposits outside the dripline of the shelter. Because deposits on the platform may be deeper than deposits under the dripline, excavation volume could be greater than the estimate above.

5.26 SITE 41BL821

5.26.1 Introduction

In July 1993 and again in March 1994, Mariah conducted test excavations at site 41BL821. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.26.1.1 Location and Description

Site 41BL821 is located near the headwaters on both banks of an unnamed tributary of North Nolan Creek (Figures 5.89 and 5.90). A rock overhang, above a water-filled plunge pool, is located about 35 m southwest of the site. A large burned rock midden occurs at the site. Maximum site dimensions are 230 x 70 m (about 16,000 m², or 3.9 acres). The site is located within an environmental set-aside area for endangered species. For the purposes of this report, the site is included in the Nolan/South area of the fort.

5.26.1.2 Previous Work

This site was initially recorded by Dureka and Rodriguez on 13 March 1986 as a vandalized burned rock midden with associated burned rock and lithic scatters. The midden was noted as covering the majority of the site, with the northern portion vandalized and the southern portion undisturbed. A high density of debitage, burned rock, mussel shell, bifaces, and a mano and metate were observed on the site. A scraper, perforator,

Table 5.171 Faunal Recovery, AU 1, 41BL765.

Vertebrates	Element			Total
	Femur	left	right	
Artiodactyla	1	0	0	1
Bivalves				
Amblema plicata	0	1	1	2
Ambleminae	0	2	1	3
Total	0	3	2	5

ceramic sherd, untyped dart, and Castroville point were collected from the surface. The site was estimated to be 40% disturbed by vandalism and erosion. The clay loam deposits present at the site were estimated to be 0.5 to 2.5 m thick.

On 2 March 1992, Mires and Doering revisited and reevaluated the site based on archeological and geomorphic observations. Investigation of the site confirmed the initial site. In addition to the previously observed and collected artifacts, bone fragments were observed and an Angostura point was collected. Because the site had potential to contain intact cultural deposits, four shovel tests were excavated in April 1992. Three of these tests were placed on a terrace, east of the midden, and excavated to 40 cmbs. All were positive and a total of 33 flakes were found from 0 to 10 cmbs; 48 flakes were recovered from 10 to 20 cmbs; 12 flakes and two bone fragments were recovered from 20 to 30 cmbs; and three flakes were recovered from 30 to 40 cmbs. The remaining test was placed on the midden and excavated to 80 cmbs. This test yielded 2,066 items including 1,399 lithics, 447 burned rocks, 2 biface fragments, a nearly complete Marcos point, mussel shell and bone fragments, and charcoal. The results of shovel testing suggested that the site contained intact cultural material. However, the site's archeological potential remained uncertain. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible.

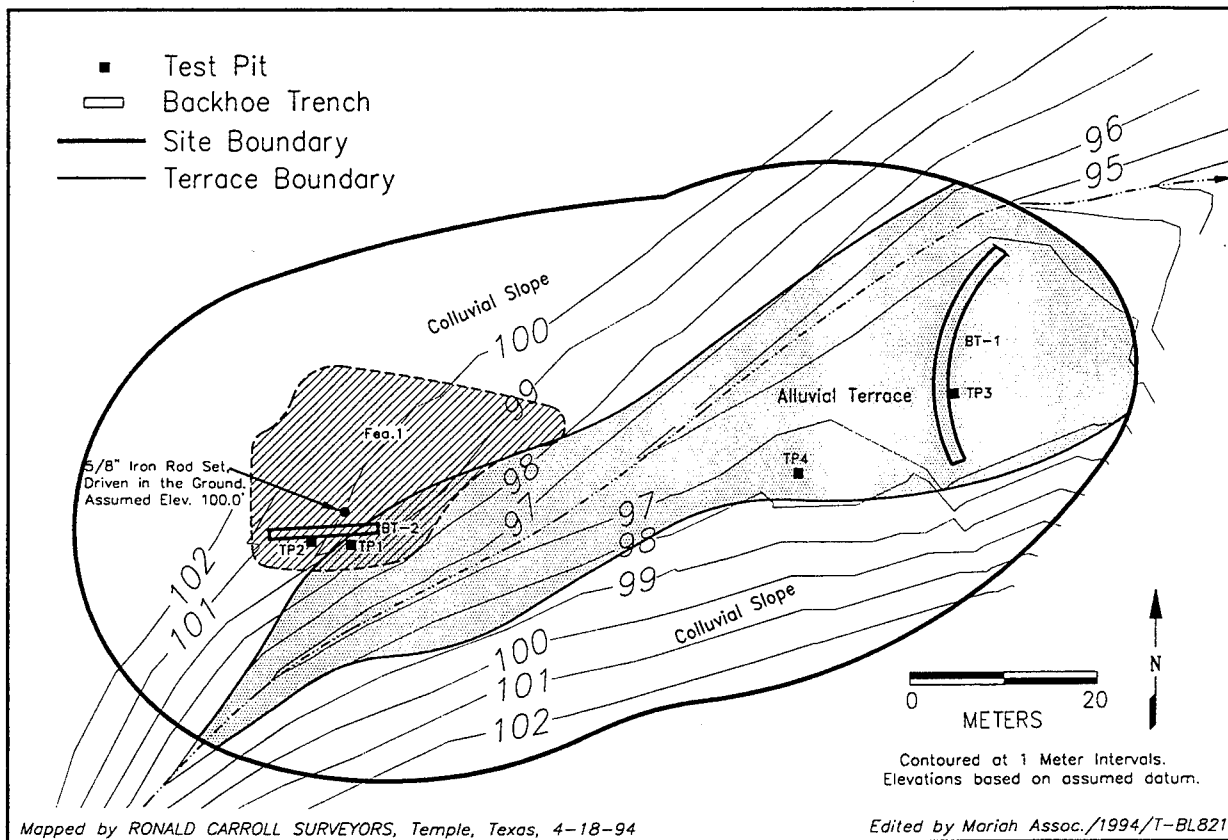


Figure 5.89 Site Map of 41BL821.

Four to eight 1 x 1 m manually excavated test pits and four to six backhoe trenches were recommended to determine eligibility (Trierweiler 1994:A526-A533).

5.26.1.3 New Work

On 24 November 1993, in a telephone conversation with Gil Eckrich (DEH, Fish and Wildlife), permission was granted to proceed with backhoe trenching and test pit excavations on this site, even though this area is within the endangered species habitat. Since mechanical excavation was limited to two trenches, any impacts were considered minimal.

Four test pits (TPs 1-4) and two backhoe trenches (BTs 1-2) were excavated on the site (Table 5.172). Trench 1 was excavated on the terrace on

the east side of the tributary that transects the site and BT 2 was excavated on the west side of the tributary, through F 1 (F 1), and directly adjacent to TP 1. Test pit 3 was offset the east wall of BT 1 and excavated to dense gravels. Test pit 4 was also placed on the terrace on the east side of the drainage, adjacent to a large vandal pit. Test pit 2 was placed near the end of BT 2 and excavated through F 1 to the water table (190 cmbs). Test pit 1 was placed on F 1, just above the tributary. Recovered cultural material is summarized in Table 5.173.

5.26.2 Results

The excavations on the alluvial terrace are discussed separately from the midden (F 1) excavations.



Figure 5.90 Overview of Site 41BL821, Looking North-northeast.

5.26.2.1 Excavations in the Alluvial Terrace

Trench 1 was excavated from the base of the colluvial toeslope to the streamward margin of the terrace segment. The overall depth of the trench varied from about 1 m near the colluvial toeslope to 2.2 m in the half of the trench closest to the modern stream. The depth of excavation was limited by very active groundwater flowing into the trench once the water table was breached. Dispersed burned rocks and flakes were observed from the surface to 125 cmbs throughout the trench.

Two alluvial units, separated by a subtle buried paleosol, were noted in BT 1. The upper unit was inset into, and overrode, the lower unit, and the contact between the two units dipped from less than 50 cmbs near the colluvial toeslope to more than 2 m near the middle of the trench. The lower unit was not observable near the stream. Sediments in the trench consisted of gravelly to stony clays and clay loams. The coarse clasts in

the fill were composed primarily of angular to subangular limestone and chert. Although a colluvial component certainly exists, these clasts are interpreted as primarily alluvial in origin, and their lack of rounding is attributed to a short distance of transport. Although a considerable quantity of stones were present throughout the upper unit, the gravels increased markedly with

Table 5.172 List of Treatment Units, 41BL821.

AU	Treatment Units	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~25	0.8	170
1	TP 3	1.0	1.0	80
1	TP 4	1.0	1.0	100
2	BT 2	~15	0.8	200
2	TP 1	1.0	1.0	70*
2	TP 2	1.0	1.0	190

* SE Quad to 90 cmbs.

Table 5.173 Artifact Recovery by Test Pit, 41BL821.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4									
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	135	1636	11	183(28)	0	0	0	0	0(0)	0	0	117	4	9(0.5)	0	0	1	0	0(0)	0	0	1	0	0(0)
2	2	219	1483	11	220(26.5)	0	0	0	0	0(0)	0	3	27	0	5(1)	0	0	21	0	8(3)	0	0	21	0	8(3)
3	23	63	1185	6	290(38.5)	1	46	435	13	149(50)	0	0	24	1	2(0.5)	0	0	26	8	33(10)	0	0	26	8	33(10)
4	0	0	1311	6	143(36.5)	0	49	364	5	250(65)	0	0	15	0	5(1)	0	0	4	1	6(1)	0	0	4	1	6(1)
5	0	1	1346	5	296(77.5)	6	112	747	9	150(45)	0	0	25	2	11(1)	0	0	9	1	2(0.4)	0	0	9	1	2(0.4)
6	0	0	873	7	240(38)	0	51	421	4	90(38)	0	0	34	3	15(2.5)	0	0	27	3	4(1)	0	0	27	3	4(1)
7	0	1	1062	2		0	35	495	8	200(63)	0	0	8	1	3(0.5)	0	0	54	8	7(1.3)	0	0	54	8	7(1.3)
8						4	28	283	4	150(60)	0	0	5	1	4(0.9)	0	0	35	10	18(2.5)	0	0	35	10	18(2.5)
9						0	17	278	4	190(65)	0	0				0	1	32	5	5(1)	0	1	32	5	5(1)
10						0	7	185	2	200(65)	0	0				0	0	10	1	2(0.4)	0	0	10	1	2(0.4)
11						0	2	82	2	70(30)	0	0				0	0	0	0	0	0	0	0	0	0
12						0	0	56	2	70(35)	0	0				0	0	0	0	0	0	0	0	0	0
13						0	0	177	5	70(45)	0	0				0	0	0	0	0	0	0	0	0	0
14						2	0	289	6	60(35)	2	0				0	0	0	0	0	0	0	0	0	0
15						3	5	400	5	70(40)	3	5				0	0	0	0	0	0	0	0	0	0
16						0	5	372	5	50(35)	0	5				0	0	0	0	0	0	0	0	0	0
17						0	1	187	4	0(0)	0	1				0	0	0	0	0	0	0	0	0	0
18						0	4	197	3	15(20)	0	4				0	0	0	0	0	0	0	0	0	0
19						0	0	119	6	30(25)	0	0				0	0	0	0	0	0	0	0	0	0
TOTAL	25	419	8896	48	1372(245)	16	362	5087	87	1814(716)	0	3	255	12	54(7.9)	0	1	219	37	85(20.6)	0	1	219	37	85(20.6)

depth until they made up 40 to 60% of the fill near the base of the unit.

The lower unit was also moderately stony. In contrast to the massive upper fill, it exhibited a moderate, fine blocky structure that decreased with depth. The lower unit was suffused with carbonate in the form of soft masses and discontinuous laminae, suggesting that much of it is of phreatic origin. The lowest portion of the fill is strongly reduced due to prolonged saturation. Although abundant burned limestone and flakes were observed dispersed throughout the matrix, no clear cultural strata were detected in the trench walls. The overall deposit evinced an A-C-2Bk-2C profile. Although the age of the fills is unknown, both appear to be of probable Late Holocene age based on the degree of soil development, and are tentatively correlated with the upper and lower West Range of Nordt (1992).

Within TP 3, an abundance of debitage and several burned rocks were recovered from each level excavated (Table 5.173). In addition to these items, bone fragments were found 10 to 20 cmbs and a Pedernales point was found 60 to 70 cmbs. Natural chert nodules and cobbles were present throughout the unit (0 to 80 cmbs), with the rock density and size increasing with depth.

Test pit 4 was excavated to the water table at 100 cmbs. Lithics and burned rocks were recovered from each level, except Level 1, which yielded a single flake (Table 5.173). Several flakes and low to moderate densities of burned rocks were found from 10 to 50 cmbs. The majority of lithics were recovered 50 to 90 cmbs, but the amounts of burned rock remained relatively low. Other artifacts found in these levels include: a Travis dart point and a biface from 50 to 60 cmbs; a biface from 60 to 70 cmbs; an Ensor point, a Marshall point, and a biface from 70 to 80 cmbs; and a Lange point, a biface, and a bone fragment from 80 to 90 cmbs. From 90 to 100 cmbs, artifact frequencies declined, although several flakes, a few burned rocks, and a biface were found. Overall, most burned rocks were 5 to 10

cm in size, with rock weights per level between 1 and 3 kg, except for Level 3, which contained about 10 kg. Generally, the burned rocks were scattered across the unit, with no patterning or discrete concentrations evident. Also, a light to moderate density of unburned rocks and gravels was noted throughout the unit from 0 to 100 cmbs, with size and amount increasing with depth.

As discussed above, five projectile points were recovered from the excavations in the terrace (Table 5.174). The majority (60%) of these points are made of Heiner Lake Tan. The general tool assemblage includes various stages of bifaces and unifacial manufacture (Table 5.175). Of note are the 29 utilized flakes recovered from this AU making unifacially modified tools predominant. The highest frequency of tools are made of locally available Southeast Range material. These are predominately the 17 tools of Heiner Lake Translucent Brown. The chert types are 52% Southeast Range (74% of the identified), 12.5% North Fort, 11.3% Cowhouse, and 29.5% indeterminate.

Debitage from nine identified chert types and eight indeterminate categories was recovered from TP 3 and TP 4 on the alluvial terrace. The most common identified chert type was Heiner Lake Translucent Brown, although both indeterminate light brown and indeterminate dark brown flakes were much more numerous (Table 5.176). Heiner Lake Translucent Brown and indeterminate cherts occur in greater than expected frequencies, and all other materials occur in less than expected frequencies. If the indeterminate cherts are excluded, Heiner Lake Translucent Brown occurs in greater than expected frequencies and Heiner Lake Blue and Heiner Lake Tan occur in expected frequencies, and all other types occur in less than expected frequencies (Table 5.177).

The low frequencies of cherts from the North Fort Province (e.g., Fort Hood Yellow, Fort Hood Gray, Owl Creek Black) and West Fort Province (Anderson Mountain Gray) also are remarkable, especially since indeterminate black and gray

cherts that are most likely to represent these classes also occur in low to very low numbers. It therefore appears that North Fort cherts are underrepresented even if a substantial portion of the indeterminate assemblage is composed of North Fort cherts.

For most chert types, the majority of debitage (67% overall) is concentrated in size categories smaller than 1.8 cm (Table 5.176). This implies that most flakes were produced from relatively small nuclei and/or at late tool-production stages. Exceptions to this trend include Heiner Lake Blue (interior and exterior varieties lumped together) and Heiner Lake Tan, which are characterized by roughly 50% and 69% larger flakes, respectively (Table 5.178).

The fact that most flakes fall in relatively small size classes and about 84% of the flakes have no cortex supports a judgment that most of the debitage was generated from well-reduced nuclei, implying that initial reduction of cortical material was not a major element of lithic reduction on the alluvial portion of the site. Since chert (including Heiner Lake Translucent Brown) occurs naturally at the site, the alluvial assemblage implies that raw materials were decorticated elsewhere. The presence of a moderate proportion of cortex flakes with abraded cortex implies that procurement from stream beds may have been common. Nodules of Heiner Lake Translucent Brown and other Southeast Range cherts can be expected to occur in the bedload of North Nolan Creek at the site boundary.

Faunal recovery from the terrace was limited to four bone fragments, including the two spirally-fractured long bone of a deer-sized mammal, a deer tibia fragment, and a burned fragment of unidentified deer-sized mammal. Very possibly all of this material was transported in from the very rich midden deposit upstream.

Table 5.174 Projectile Points, AU 1, 41BL821.

Point Type	Lithic Material			Total
	06-HL Tan	Indet Lt Brown	Indet Misc.	
Ensor	1	0	0	1
Lange	1	0	0	1
Marshall	1	0	0	1
Pedernales	0	0	1	1
Travis	0	1	0	1
Total	3	1	1	5

Table 5.175 Lithic Tools, AU 1, 41BL821.

Lithic Material	Tool Type						Total
	end scraper	late stage biface	middle stage biface	side scraper	uniface	utilized flake	
10-HL Blue	0	0	0	0	0	3	3
06-HL Tan	0	0	0	0	2	1	3
08-FH Yellow	0	1	0	0	0	2	3
09-HL Tr Brown	0	4	3	0	1	9	17
18-C Mottled	0	0	0	0	0	1	1
22-C Mott/Flecks	1	1	0	0	0	2	4
Indet Dk Brown	0	0	0	0	1	4	5
Indet Dk Gray	0	0	0	0	0	1	1
Indet Lt Brown	0	0	0	1	0	5	6
Indet Mottled	0	0	0	0	0	1	1
Total	1	6	3	1	4	29	44

Table 5.176 Debitage Recovery by Size and Material Type, AU 1, 41BL821.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue (1&10)	0	0	0	8	7	1	0	16
02-C White	0	0	0	0	0	2	0	2
03-AM Gray	0	0	1	1	1	0	0	3
06-HL Tan	0	4	1	0	6	5	0	16
09-HL Tr Brown	0	13	12	14	19	18	0	76
15-Gry/Brn/Grn	0	0	0	0	2	0	0	2
17-Owl Crk Black	0	0	0	2	0	0	0	2
18-C Mottled	0	0	0	0	0	1	0	1
21-C Lgt Gray	0	0	0	0	0	0	1	1
<i>Subtotal</i>	<i>0</i>	<i>17</i>	<i>14</i>	<i>25</i>	<i>35</i>	<i>27</i>	<i>1</i>	<i>119</i>
Unidentified Types								
Indet Black	0	0	0	2	1	0	0	3
Indet Dk Brown	35	14	23	12	15	6	1	106
Indet Dk Gray	0	11	6	0	1	0	0	18
Indet Lt Brown	12	25	31	42	31	24	2	167
Indet Lt Gray	0	8	0	7	5	0	0	20
Indet Misc.	0	2	13	11	3	0	0	29
Indet Mottled	0	0	0	3	2	0	0	5
Indet White	0	1	3	0	0	2	0	6
<i>Subtotal</i>	<i>47</i>	<i>61</i>	<i>76</i>	<i>77</i>	<i>58</i>	<i>32</i>	<i>3</i>	<i>354</i>
Quartz	0	1	0	0	0	0	0	1
Total	47	79	90	102	93	59	4	474

Table 5.177 Binomial Statistic Results, AU 1, 41BL821.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1&10)	16	31	55	less	6	18	expected
02-C White	2	31	55	less	6	18	less
03-AM Gray	3	31	55	less	6	18	less
06-HL Tan	16	31	55	less	6	18	expected
09-HL Tr Brown	76	31	55	more	6	18	more
15-Gry/Brn/Grn	2	31	55	less	6	18	less
17-Owl Crk Black	2	31	55	less	6	18	less
18-C Mottled	1	31	55	less	6	18	less
21-C Lgt Gray	1	31	55	less	6	18	less
Quartz	1	31	55	less	6	18	less
Total Indet	354	31	55	more	na	na	na

5.26.2.2 Excavations in the Burned Rock Midden

The burned rock midden identified by previous investigators was designated F 1. It is located on a bench on the western side of the unnamed tributary of North Nolan Creek. The feature has been bisected by a small gully and is roughly 75 m long x 30 m wide x more than 1.9 m thick. The feature is heavily vandalized. Several untyped arrow points were observed in, and collected from, the spoil from the potholes.

Due to the density of artifacts recovered from TP 1 (Table 5.173), all fill was collected in bulk samples to be processed in the laboratory. Because the fill was unconsolidated from 0 to 70 cmbs and a beer bottle cap was found from 60 to 70 cmbs, further manual excavation was postponed until trenching could be performed to identify undisturbed deposits.

Trench 2 was excavated through the vandalized midden and examined at a later date. The trench revealed an extremely artifact-rich deposit, and Castroville, Marcos, and Montell points were collected from the backdirt of BT 2. Three stratigraphic zones were identified in the trench (Figure 5.91). Zone 1 consisted of typical black midden fill, and was up to approximately 130 cm thick. The fill consisted of a loose black stony loam, making it extremely difficult to determine the extent of vandal disturbance in the feature. This zone was underlain by a very dark grayish brown (10YR 3/2), stony loam containing some soft carbonate masses and abundant burned rock and flakes. A third unit was noted in the backdirt, but was not observable at the time of recording due to slumping and infilling of the trench with groundwater. On the basis of the spoil, this material consists of very sticky, light grayish brown (10YR 6/2), silty clay containing abundant matrix carbonate and fairly prominent redox mottles. Like the overlying deposits, it contained abundant flakes and burned rock. Overall, the trench exhibited an A-AB-Bk profile.

Table 5.178 Debitage Cortex Characteristics by Material Type, AU 1, 41BL821.

Lithic Material	All Cortex		Partial Cortex		No Cortex	Indeterminate	Total
	Unabraded	Abraded	Unabraded	Indeterminate			
Identified Types							
HL Blue (1&10)	0	1	1	0	14	0	16
02-C White	0	0	0	0	2	0	2
03-AM Gray	0	0	1	0	2	0	3
06-HL Tan	0	0	2	1	13	0	16
09-HL Tr Brown	0	7	1	5	62	1	76
15-Gry/Brn/Grn	0	0	0	0	2	0	2
17-Owl Crk Black	0	0	0	0	2	0	2
18-C Mottled	0	0	0	0	1	0	1
21-C Lgt Gray	0	0	0	1	0	0	1
<i>Subtotal</i>	<i>0</i>	<i>8</i>	<i>5</i>	<i>7</i>	<i>98</i>	<i>1</i>	<i>119</i>
Unidentified Types							
Indet Black	0	0	0	0	3	0	3
Indet Dk Brown	0	7	1	3	94	1	106
Indet Dk Gray	0	0	0	0	18	0	18
Indet Lt Brown	2	11	9	13	129	3	167
Indet Lt Gray	0	0	0	1	19	0	20
Indet Misc.	0	0	0	4	21	4	29
Indet Mottled	0	1	0	0	4	0	5
Indet White	0	0	0	0	6	0	6
<i>Subtotal</i>	<i>2</i>	<i>19</i>	<i>10</i>	<i>21</i>	<i>294</i>	<i>8</i>	<i>354</i>
Quartz	0	0	0	0	1	0	1
Total	2	27	15	28	393	9	474

The majority of the cultural material within the upper 1.5 m of the trench appeared to have been disturbed by vandals, as evidenced by extremely loose fill and recent debris (plastic) being found from 0 to 1.5 mbs. Based on the results of BT 2, no further excavation was conducted in TP 1. However, a few meters of the midden at the northern edge of the trench, at the juncture of the bench and colluvial slope, contained structured matrix and appeared to be undisturbed.

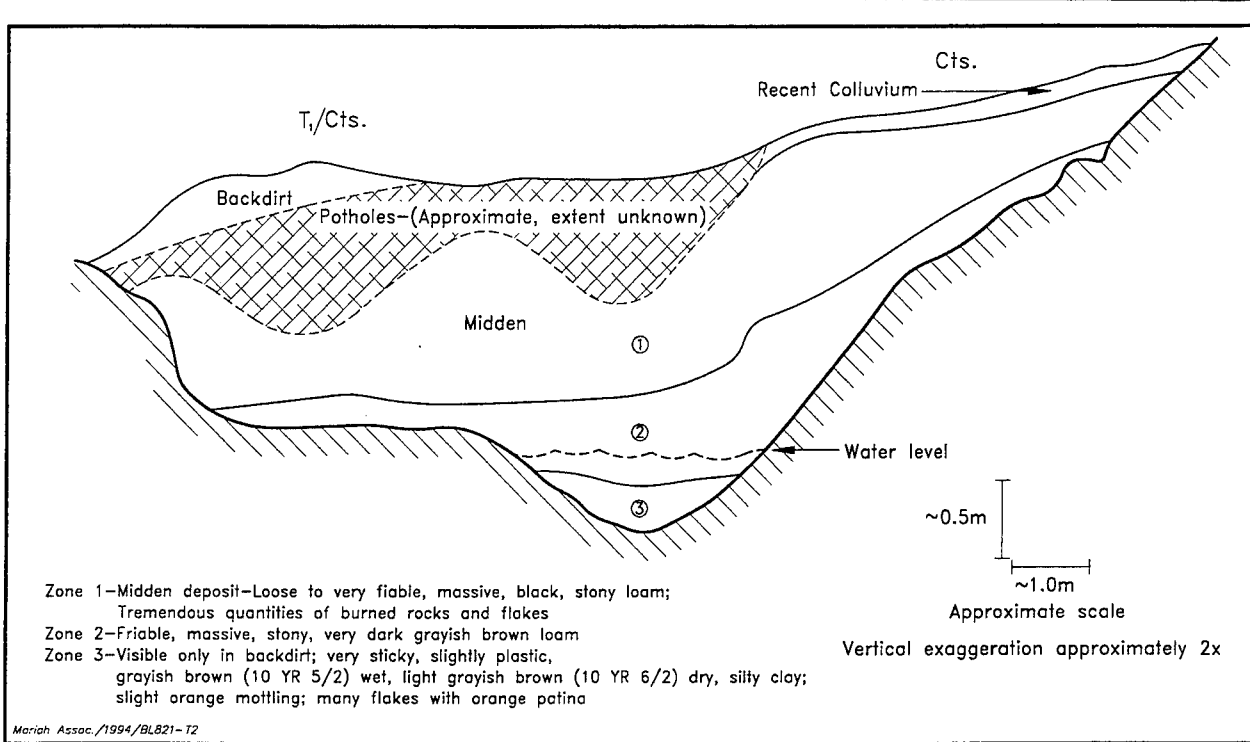


Figure 5.91 Schematic Profile of BT 2, 41BL821.

Test pit 2 was placed at the northern edge of BT 2. Within TP 2, the upper 20 cm of fill consisted of vandal backdirt and backhoe spoil, and was removed prior to excavation. Again, because of the high densities of cultural materials found, the fill was partially screened and collected in bulk samples from 20 to 190 cmbs. Debitage and burned rocks were recovered from each excavated level, bone fragments were observed from 20 to 110 cmbs, and mussel shell was observed from 20 to 170 cmbs (Table 5.173). In total, 1,855 burned rocks (716 kg) were recovered from TP 2, the majority of which were angular and blocky. The size of the rock was fairly uniform in the upper 13 levels excavated, with an increase in size noted in the lower 4 levels. Although no historic material was observed from 20 to 90 cmbs, the fill was extremely loose and possibly disturbed by vandalism. A color change in the soil was encountered at 90 cmbs. From this depth to the base, the unit appeared to be undisturbed. The water table was encountered at 190 cmbs and excavation was halted.

As discussed above, three projectile points were recovered from the backdirt of BT 2 (Table 5.179). Sixteen additional projectile points were recovered from the excavation of this feature (Table 5.180). These points represent eight point types of eight different chert types and range in association from the Early Archaic to the Late Prehistoric, but cluster around the Middle Archaic to Late Archaic. There is no clear pattern to the predominant lithic source(s) evident in the points recovered. The

Table 5.179 Projectile Points, AU 2, 41BL821.

Point Type	Lithic Material		Total
	Indet Black	Indet Dk Brown	
Castroville	1	0	1
Marcos	0	1	1
Montell	0	1	1
Total	1	2	3

local Southeast Range (75% of the identified), and the North Fort (25%) are represented as are a variety of indeterminate chert types (79% of the total).

The midden recovery indicates a variety of activities reflected in the nondebitage lithic assemblage. A metate, a crusher/abrader type implement, a multiple platform core, and 117 various other types of chipped stone specimens were recovered (Table 5.181). Utilized flakes (n=44) are the most prevalent tool type followed by late stage bifaces (n=24). Of note are the 12 preforms that were also recovered from the midden deposit. Five of the preforms are probably portions of projectile points that could not be securely assigned to that class of artifacts.

The variety of tool types is also reflected in the chert types represented. Eighty-six percent of the identified cherts present are of the Southeast Range, of which 98% are of Heiner Lake varieties; only 40% of the total chert types can not be assigned to a identified chert type.

Three bone tools were recovered from the excavations. One of these has been categorized as an awl, but could not be placed into a taxon or more general classification. The other tools could not be categorized; however, one of these was identified as deer (*Odocoileus* sp.) and the other as Mammalian.

Just under 14,000 flakes consisting of 15 identified chert types, nine indeterminate categories, and quartz were recovered from TP 1 and TP 2 in F 1 (Table 5.182). Roughly 34% of the assemblage was identified. The identified fraction was dominated by Heiner Lake Translucent Brown and Heiner Lake Tan, with Heiner Lake Blue flakes also comprising a significant percentage. Together, these three Southeast Range varieties make up more than 97% of the entire identified fraction. When the entire assemblage is considered, Heiner Lake Translucent Brown, Heiner Lake Tan, and the aggregate indeterminate cherts occur in greater than expected frequencies, and all other materials

Table 5.180 Projectile Points, AU 2, 41BL821.

Point Type	Lithic Material							Total
	06-HL Tan	09-HL Tr Brown	17-Owl Crk Black	Indet Black	Indet Dk Brown	Indet Dk Gray	Indet Lt Brown	
Bulverde	0	1	0	0	0	0	0	1
Chadbourne	0	0	0	0	0	1	0	1
Ensor	0	0	1	0	0	0	0	1
Marshall	1	0	0	0	0	0	0	1
Other Arrow	0	0	0	0	0	0	1	1
Other Dart	0	0	0	0	2	0	2	5
Pedernales	1	0	0	0	0	0	0	1
Scallorn	0	0	0	1	3	0	1	5
Total	2	1	1	1	5	1	4	16

occur in less than expected frequencies (Table 5.183). If the indeterminate cherts are excluded, Heiner Lake Translucent Brown, Heiner Lake Tan, and Heiner Lake Blue occur in greater than expected frequencies, and all other types occur in less than expected frequencies. To the extent that *any* of the thousands of indeterminate brown flakes are actually Heiner Lake Translucent Brown or Heiner Lake Tan, the nonrandom overrepresentation of these local chert varieties is reinforced.

One of the most interesting aspects of the assemblage is the low representation of other Southeast Range cherts. While the low incidence of Cowhouse White is not surprising given the distance and physical barriers between the site and the outcrop (North Nolan Creek and Cowhouse Creek), the low incidence or complete absence of other, relatively local cherts (e.g., East Range Flecked, Seven Mile Novaculite, Fossiliferous Pale Brown) is surprising and implies a good deal of raw material selectivity. The presence (albeit low frequency) of a wide variety of cherts from the North Fort Province (e.g., Fort Hood Yellow, Fort

Table 5.181 Cores and Nonprojectile Point Lithic Tools, AU 2, 41BL821.

Lithic Material	Core Type		Tool Type														Total		
	multiple platform		Chopper	combination tool	Crushing/Battering	Denticulate	early stage biface	edge-modified	end scraper	late stage biface	metate	middle stage biface	other tool	preform	side scraper	uniface		utilized flake	wedge
06-HL Tan	3		2	1	0	0	3	0	0	8	0	4	0	2	1	1	8	1	34
09-HL Tr Brown	0		0	0	0	0	0	0	0	6	0	0	0	0	0	0	4	0	10
10-HL Blue	5		2	0	1	0	1	0	0	0	0	1	0	1	0	1	7	0	19
13-ER Flecked	0		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
14-FH Gray	0		0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
18-C Mottled	0		0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	3
22-C Mott/Flecks	0		0	0	0	0	0	0	0	3	0	2	0	0	0	0	1	0	6
23-C Mott/Banded	0		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Indet Dk Brown	0		0	0	0	0	0	0	2	2	0	3	0	1	0	0	6	0	14
Indet Dk Gray	0		0	0	0	0	0	1	0	1	0	0	0	0	0	0	3	0	5
Indet Lt Brown	0		0	0	0	0	0	0	2	1	0	1	0	2	1	2	8	0	17
Indet Lt Gray	0		0	0	0	0	0	0	0	0	0	1	1	3	0	0	2	0	7
Indet Misc.	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
Indet Mottled	0		0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Indet White	0		0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	3
Sandstone	0		0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	8		5	1	1	1	4	1	4	24	1	13	1	12	2	4	44	1	127

Hood Gray, Texas Novaculite, and Owl Creek Black); the West Fort Province (Anderson Mountain Gray); and the Cowhouse Province (Cowhouse Mottled, Cowhouse Light Gray, Cowhouse Mottled/Flecked, Cowhouse Mottled/Banded, and Cowhouse Striated) are also remarkable. There do not appear to be enough indeterminate black flakes to imply that reduction of Owl Creek Black was a major element of lithic reduction. However, there are substantial numbers of indeterminate gray cherts that could represent North Fort types such as Fort Hood Gray and Gray-Brown-Green. Nevertheless, North Fort types would appear to be relatively small elements of the midden debitage assemblage even if a substantial portion of the indeterminate assemblage

is composed of North Fort cherts. Therefore, although a wide variety of cherts are represented, there is a clear preference for a relatively small suite of locally available materials.

Most flakes (roughly 92% overall) are concentrated in size classes smaller than 1.8 cm, which implies that nucleus size generally may have been small and/or that later stages of tool-production may have been more common. However, the presence of larger and partially cortified flakes suggests that all stages of reduction are represented (Table 5.184). Reduction dominated by late-stage activities is supported by the fact that 92% of flakes have no cortex. Of the flakes that have cortex, a substantial proportion of cortical surfaces

Table 5.182 Debitage Recovery by Size and Material Type, AU 2, 41BL821.

Lithic Material	Size (cm)							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue (1 & 10)	2	173	69	152	46	34	2	478
02-C White	0	0	0	2	4	3	1	10
03-AM Gray	0	7	14	4	0	0	0	25
05-Texas Novac	0	0	0	0	3	1	0	4
06-HL Tan	232	753	465	320	172	62	6	2010
08-FH Yellow	0	0	0	5	0	1	0	6
09-HL Tr Brown	256	698	566	388	149	74	21	2152
13-ER Flecked	0	0	7	2	0	0	0	9
14-FH Gray	0	0	0	4	2	1	0	7
17-Owl Crk Black	0	2	1	0	1	0	0	4
18-C Mottled	0	0	0	1	0	2	0	3
21-C Lgt Gray	1	0	0	2	0	0	0	3
22-C Mott/Flecks	0	0	0	7	6	0	1	14
23-C Mott/Banded	0	0	0	0	1	4	0	5
26-C Striated	0	0	0	9	0	0	0	9
Quartz	0	1	1	2	0	0	0	4
<i>Subtotal</i>	<i>491</i>	<i>1634</i>	<i>1123</i>	<i>898</i>	<i>384</i>	<i>182</i>	<i>31</i>	<i>4743</i>
Unidentified Types								
Indet Black	0	28	31	13	0	0	0	72
Indet Dk Brown	687	2073	844	467	198	56	3	4328
Indet Dk Gray	38	77	63	44	9	4	0	235
Indet Lt Brown	448	1274	302	193	98	44	5	2364
Indet Lt Gray	74	475	275	160	41	9	0	1034
Indet Misc.	51	420	272	207	44	13	0	1007
Indet Mottled	0	2	0	9	3	2	0	16
Indet Trans	0	0	0	3	0	4	0	7
Indet White	43	43	26	45	8	3	1	169
<i>Subtotal</i>	<i>1341</i>	<i>4392</i>	<i>1813</i>	<i>1141</i>	<i>401</i>	<i>135</i>	<i>9</i>	<i>9232</i>
Total	1832	6026	2936	2039	785	317	40	13975

are abraded, indicating that stream beds may have been an important source of raw material.

A rich and varied faunal record, consisting of more than 750 bones and bone fragments representing at least nine different taxa, and at least four different mussel taxa, was recovered from the midden (Table 5.185). The majority of bone fragments

were unidentifiable, but most came from relatively large animals. Identified taxa include toad, large bird (e.g., turkey or buzzard), bison, opossum, gar, rabbit, deer, squirrel/chipmunk, and turtle. While some of these taxa may be intrusive, roughly 40% of the bone showed some sign of burning, 37% showed spiral fracturing, and one artiodactyl femur evinced transverse cut marks, indicating that the

Table 5.183 Binomial Statistic Results, AU 2, 41BL821.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1 & 10)	478	770	879	less	264	329	more
02-C White	10	770	879	less	264	329	less
03-AM Gray	25	770	879	less	264	329	less
05-Texas Novac	4	770	879	less	264	329	less
06-HL Tan	2010	770	879	more	264	329	more
08-FH Yellow	6	770	879	less	264	329	less
09-HL Tr Brown	2152	770	879	more	264	329	more
13-ER Flecked	9	770	879	less	264	329	less
14-FH Gray	7	770	879	less	264	329	less
17-Owl Crk Black	4	770	879	less	264	329	less
18-C Mottled	3	770	879	less	264	329	less
21-C Lgt Gray	3	770	879	less	264	329	less
22-C Mott/Flecks	14	770	879	less	264	329	less
23-C Mott/Banded	5	770	879	less	264	329	less
26-C Striated	9	770	879	less	264	329	less
Quartz	4	770	879	less	264	329	less
Total Indet	9232	770	879	more	na	na	na

vast majority of the material probably represents the product of a diverse hunting economy. Although the quantity of the midden actually processed to recover macrobotanical remains was low, plant remains representing unidentifiable charred wood and *Opuntia* cactus were recovered, suggesting that some floral remains are preserved in the matrix.

The suite of diagnostic artifacts recovered from the area of the midden, both during this investigation and by previous workers, demonstrates that the area of the feature has been a locus for cultural activity for almost the entire documented span of human occupation in the region. The earliest materials recovered are of late Paleoindian age (Angostura), while the presence of ceramics and arrow points demonstrate that the area continued to be occupied into the Late Prehistoric. The majority of diagnostics, however, are of Middle to Late Archaic age. One radiocarbon age, based on a sample of charcoal obtained from Level 7 in TP

2, produced an age of 1220 ± 70 BP, suggesting that the feature was actively accreting during the Late Archaic-Late Prehistoric transition.

Additional temporal data is provided by A/I ratios obtained from eight *Rabdotus* snails collected from TP 2, Levels 18-19. These snails yielded A/I values ranging from 0.0339 to 0.349, which equate to radiocarbon-equivalent "ages" between approximately 1,100 and 15,800 years BP. The smallest ratio is associated with a single snail that is both less than half of the next smallest ratio and equates to a radiocarbon-equivalent "age" that is more recent than the radiocarbon age obtained from more than a meter higher in the same test pit. For these reasons, the ratio was disregarded. The age interpreted for the assemblage is based on the next two highest ratios, which are statistically identical (0.0822 and 0.0827) and equate to an approximate radiocarbon-equivalent age of 3400 BP.

Table 5.184 Debitage Cortex Characteristics by Material Type, AU 2, 41BL821.

Lithic Material	All Cortex		Partial Cortex			Not Applicable	Indeterminate	Total
	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate			
Identified Types								
HL Blue (1 & 10)	0	0	11	0	0	466	1	478
02-C White	0	0	1	1	0	8	0	10
03-AM Gray	0	0	4	1	0	20	0	25
05-Texas Novac	0	0	1	0	0	3	0	4
06-HL Tan	0	0	63	3	10	1934	0	2010
08-FH Yellow	0	0	2	0	0	4	0	6
09-HL Tr Brown	0	0	87	6	26	2028	5	2152
13-ER Flecked	0	0	0	0	0	9	0	9
14-FH Gray	0	0	0	0	0	7	0	7
17-Owl Crk Black	0	0	2	0	0	2	0	4
18-C Mottled	0	0	2	0	0	1	0	3
21-C Lgt Gray	0	0	0	0	0	3	0	3
22-C Mott/Flecks	0	0	0	0	0	14	0	14
23-C Mott/Banded	0	0	3	1	0	0	1	5
26-C Striated	0	0	0	0	0	9	0	9
Quartz	0	0	0	0	0	4	0	4
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>176</i>	<i>12</i>	<i>36</i>	<i>4512</i>	<i>7</i>	<i>4743</i>
Unidentified Types								
Indet Black	0	0	1	0	1	70	0	72
Indet Dk Brown	2	2	99	10	47	4163	5	4328
Indet Dk Gray	1	0	2	0	8	218	6	235
Indet Lt Brown	2	3	109	11	75	2144	20	2364
Indet Lt Gray	0	0	6	0	16	1001	11	1034
Indet Misc.	2	1	109	30	192	533	140	1007
Indet Mottled	0	0	3	1	2	7	3	16
Indet Trans	0	0	2	0	0	5	0	7
Indet White	0	0	1	2	0	154	12	169
<i>Subtotal</i>	<i>7</i>	<i>6</i>	<i>332</i>	<i>54</i>	<i>341</i>	<i>8295</i>	<i>197</i>	<i>9232</i>
Total	7	6	508	66	377	12807	204	13975

5.26.2.3 Site-Level Synthesis

Two alluvial fills, separated by a weak truncated paleosol, were observed in the alluvial terrace wedge on the eastern side of the site. This terrace is composed of gravelly alluvium and suggests that

it was formed by brief intervals of high magnitude flow in a flashy upland stream. Although undated, the character of the fills suggests that they are both of probable Late Holocene age, and may equate to the upper and lower West Range fills of Nordt (1992). Burned rock and flakes were dispersed

Table 5.185 Faunal Recovery, AU 2, 41BL821.

Vertebrates	Element																				Total						
	Antler	Calcaneus	Distal phalange	Femur	Fused 2&3rd carpal	Fused 3&4th metat	Ganoid scale	Humerus	Indeterminate	Long bone	Mandible	Metacarpal	Metapodial	Middle phalange	Neural	Permanent tooth	Proximal Phalange	Radius	Rib	Carapace		Tibia	Tibiofibula	Tooth	Vertebra	left	right
Anura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Artiodactyla	0	1	0	2	1	9	0	1	0	0	0	0	5	7	0	1	6	1	1	0	4	0	0	2	0	0	41
Aves (large)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bos/Bison	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Didelphis virginiana	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lepisosteus sp.	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Leporidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Lepus californicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Mammalia (med/lg)	0	0	0	0	0	0	0	0	570	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	571
Mammalia (very lg)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Odocoileus sp.	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	12
Sciuridae	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Testudinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
Vertebrata	0	0	0	0	0	0	0	0	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136
Total	1	1	4	2	1	9	1	2	707	1	1	1	5	7	1	10	7	1	1	1	4	1	1	3	0	0	773
Bivalves																											
Amblema plicata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Ambleminae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Cyrtonaias sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Lampsilinae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4
Lampsilis hydiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Lampsilis teres	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Tritigonia verrucos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Unionacea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4	14

throughout both fills, but no clear cultural strata were noted and it is likely that much of the material is secondary, particularly given the co-occurrence of Middle Archaic (Marshall, Lange) and Transitional Archaic (Ensor) projectile points in the same strata of TP 4. The midden contains a considerable quantity of cultural material. The extent of vandalism in the upper meter of midden deposits is difficult to determine due to its very dark color and friable to loose texture, but intact deposits appear to remain. The sediments below the midden are intact and contain relatively abundant cultural material, which extends below

the water table to a depth of at least 2 mbs. For logistical reasons, hand excavation was discontinued above the zone of saturation.

Although diagnostics spanning practically the full documented span of human occupation in the region were recovered from the site, the evidence suggests that the bulk of the midden probably accreted since the Middle Archaic. However, the lowest levels beneath the midden are relatively unexamined despite a relatively high artifact content. This is due to problems imposed by the water table, and it is possible that a much longer

stratigraphic record is preserved beneath the midden.

Both the alluvial assemblage and the much larger midden assemblage are notable for the clear dominance of local (Southeast Range) chert types. Both assemblages are dominated by small, decortified flakes indicative of latter-stage production, but neither appears to represent only this stage of activity. There is also a noticeable tendency for cortex flakes to exhibit abrasion, suggesting that procurement from streambeds may have been widely practiced. The fact that the main chert types represented in the assemblage occur in proximity at the site implies that chert procurement was performed in conjunction with other activities at the site. The low levels of representation of cherts from more distant resources implies that logistical procurement was not a major means for procurement of materials reduced at the site.

The faunal record preserved in the midden is also large and diverse, and appears to reflect a hunting pattern which focused on relatively large game (probably mostly deer), although evidence of exploitation of fish, amphibians, and birds is also indicated. Although shellfish remains were recovered in moderate quantities, the vertebrate remains recovered represent the overwhelming majority of economic species.

5.26.3 Conclusions and Recommendations

Although much of the upper 1 to 1.5 m of the midden has been vandalized, some probable intact areas remain in the black midden matrix, and a rich, undisturbed assemblage is probably preserved beneath the midden itself. The stratigraphic order of the temporal diagnostics from TP 2 is consistent with low levels of vertical disturbance, suggesting that considerable information can be obtained from a careful, conservative program of investigation. Deposits on the east side of the tributary appear to be much less disturbed than those in the midden, although there is some evidence of superficial vandalism and it is likely that much of the material is in secondary depositional context. Faunal

remains are abundant at the site, and chert resources occur on the upland surface just beyond the site boundaries. The natural stratigraphy at the site is also capable of providing important geoarcheological data for reconstructing the paleoenvironmental and paleotopographic context of the site. The site therefore has high archeological potential as a concentrated source data for performing a wide range of technological and subsistence analyses outlined in the research domains for Fort Hood (Ellis 1994b).

On the basis of the foregoing, we judge 41BL821 to be significant and eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because most known eligible components on the terrace portion of the site are on the surface or shallowly buried, they are vulnerable to impacts from training and other activities that affect the surface of the site. Furthermore, deposits on and off of F 1 have a demonstrated history of damage from vandalism. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent mechanical or manual excavations by military personnel.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 125 m² in area. Known, relatively dense assemblages occur in varying depths at the site in strata ranging up to at least 2 m thick. Assuming that manual excavations are evenly divided between F 1 and deposits across the gully, excavated volume in F 1 could reach 150 m³ in order to include the Early Archaic

component as well as the later components. Excavations near TP 3 and TP 4 could reach about 75 m³ of manual excavations. Placement of blocks should be based on carefully monitored mechanical trench excavations that provide a wide array of options for locating optimal cultural deposits. In addition, trenches should be excavated to allow for exploitation of an exceptional geoarcheological data base.

5.27 SITE 41BL834

5.27.1 Introduction

In November and December 1993, Mariah conducted formal testing at site 41BL834. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.27.1.1 Location and Description

Site 41BL834 is located in the Nolan/South area of the fort. The site consists primarily of an upland lithic scatter/ lithic procurement area. However, two small, low-order unnamed tributaries of North Nolan Creek are included within the site boundary (Figure 5.92). An east-to-west oriented pipeline abuts the southern boundary of the site. The majority of the site consists of uplands, slopes, and short colluvial slopes, and is vegetated with dense oak and juniper (Figure 5.93). The upland surface is covered with a thin, discontinuous residual clay soil ranging from bedrock to 50 cm deep. The slopes and toeslopes are covered with a dark brown to black, stony clay loam A horizon. Chert crops out on the uplands, and the surface is littered with chert artifacts and burned rock, including some heavily disturbed burned rock features. Narrow, late Holocene terraces occur along the two drainages in the north and east, and were the focus of the testing reported here. These fills consist of about 1 m of gravelly clay loam. Site 41BL834 measures roughly 700 x 850 m (about 595,000 m² or 147 acres).

5.27.1.2 Previous Work

The site was first recorded on 11 March 1986 by Davis and Dureka and was described as a chert procurement and lithic scatter with a burned rock midden. Artifacts observed on the surface included cores, utilized flakes, scrapers, blades, a quartzite mano, and bifaces. Wells, Pedernales, and Darl point types were found, as well as three untyped dart points. Several vehicle paths had disturbed portions of the site. The site was later defined as a lithic resource procurement area (LRPA) for management purposes.

Turpin and Abbott visited the site on 28 December 1992 at which time archeological and geomorphological assessments were completed and the site map revised. The site was divided into two geomorphic subareas. Subarea A consists of the uplands, slopes, and short colluvial slopes. The toeslopes contain poor potential for in situ subsurface cultural material and were not shovel tested. Subarea B consists of the alluvial terraces. Two Pedernales points and a Darl point were found in Subarea B. Because of potential for buried cultural material in Subarea B, a shovel testing crew returned to the site on 30 December 1992 and excavated 11 shovel tests (STs 1-11). Tests 1 through 5 were placed along the eastern drainage next to the stream. Three of these tests (STs 1-3) were excavated to 40 cmbs and two (STs 4-5) encountering bedrock at 30 and 35 cmbs, respectively. Only one flake was found in the five shovel tests on the eastern drainage. Shovel tests 6 through 11 were placed along the northern drainage next to the stream and were excavated to depths ranging from 12 to 50 cmbs, with two encountering bedrock. No cultural material was found in STs 6, 7, and 9, but ST 8 yielded one flake, and ST 10 yielded seven flakes, all from 0 to 10 cmbs. Test 11 contained 11 flakes from 0 to 50 cmbs. On the basis of shovel testing, the eligibility status of Subarea B was uncertain. Subarea B was recommended for avoidance or formal testing if avoidance was not possible. Two to 4 m² of manually excavated test units were recommended for formal testing and NRHP

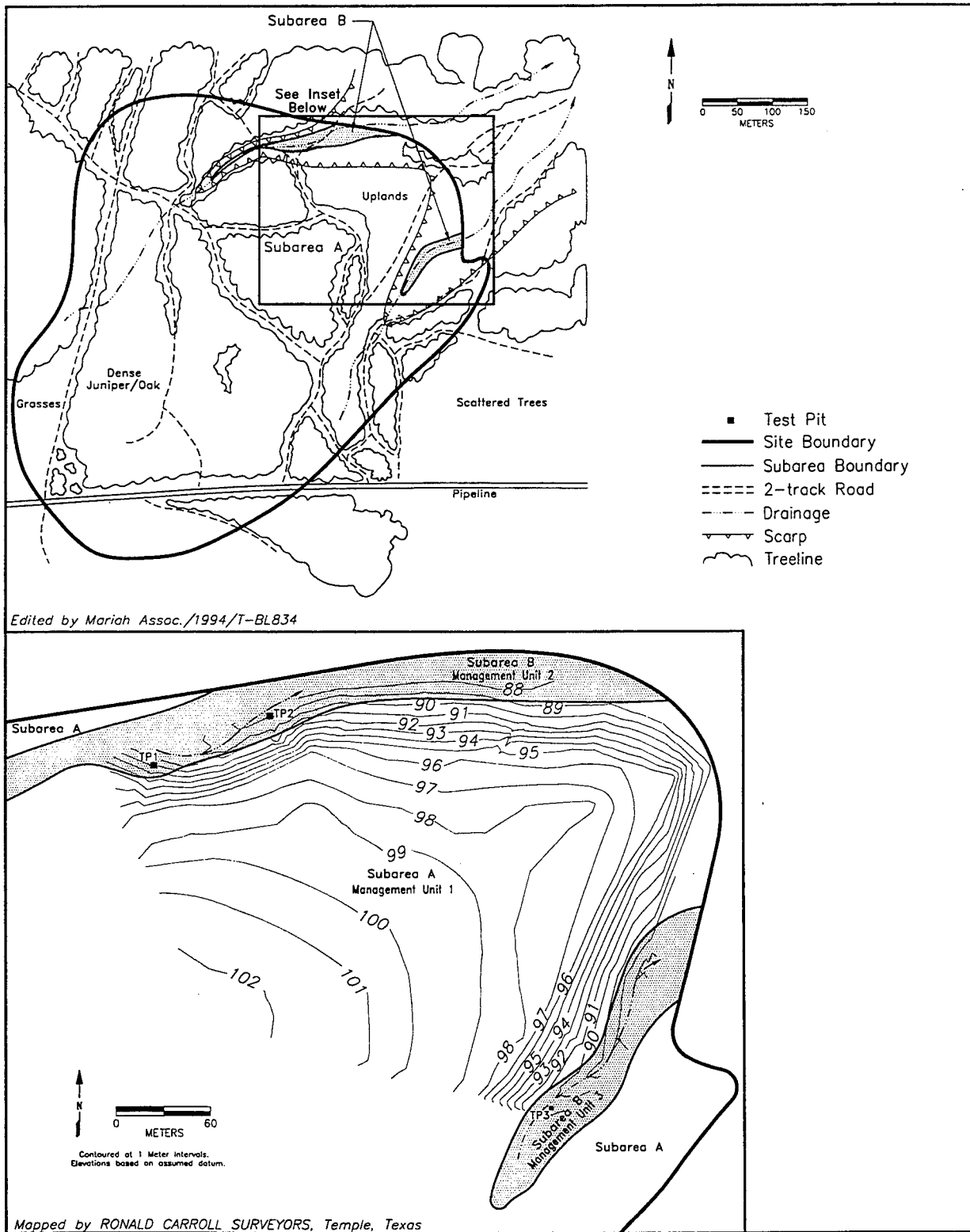


Figure 5.92 Site Map of 41BL834.



Figure 5.93 Overview of Site 41BL834, Looking Southeast.

eligibility determination (Trierweiler 1994:A539-A545).

Abbott and Kleinbach visited the site on 22 March 1993 to evaluate it according to significance standards for LRPA sites. One chert zone and two impact zones were defined for Subarea A. The chert zone was divided into two sections, one consisting of the fractured tabular chert beds on the upland surfaces and the other consisting of alluvial and colluvial chert cobbles in the tributaries.

Two impact zones were defined for the site. Impact Zone 2 was located on the southwestern portion of the site and was characterized by extensive damage from intense vehicle traffic, pipeline construction, and military excavations. This impact zone and was judged to have very low archeological potential and was not resurveyed. Impact Zone 1 consisted of the majority of the uplands where islands of undisturbed areas had been created by vehicle paths and brush clearing episodes and was judged to have the potential to

contain intact lithic-procurement data. Accordingly, on 8 April 1993 and 10 May 1993 a survey crew returned to the sites and recorded 611 observations along 78 survey transects spaced at 30 m intervals. With the exception of an area in the southwest, Impact Zone 1 was judged to have uncertain, but possibly high, potential to address lithic procurement issues.

On the basis of this work, four management units were defined for the site and recommendations were presented for each unit. Management Unit 1 was defined largely as Impact Zone 1. Subarea B was divided into Management Units 2 and 3 which cover the two small tributaries in the northern and eastern portions of the site, respectively. The eligibility status of these three units was uncertain and they were recommended for avoidance or formal testing if avoidance was not possible. Management Unit 4 consists largely of Impact Zone 2 and was judged to be ineligible for inclusion in the NRHP and was recommended for

no further management (Trierweiler 1994:A539-A545).

5.27.1.3 New Work

Three test pits (TPs 1-3) were placed in Management Units 2 and 3 (Table 5.186). Test pits 1 and 2 were placed on the south side of the northern drainage in Management Unit 2. Test pit 3 was located on the southeast side of the eastern drainage in Management Unit 3. All test pits were within 5 m of the drainages, and excavation was halted when the water table was encountered. Recovered cultural material is summarized in Table 5.187.

5.27.2 Results

All of the tests encountered relatively thin, gravelly alluvium of probable Late Holocene age. Results are discussed below according to management unit.

5.27.2.1 Excavations in the Northern Tributary

The profile of TP 1 revealed four stratigraphic zones (Figure 5.94). Zone 1 is a 30 cm thick horizon of black (10YR 2/1), clay loam A horizon with some limestone fragments. Zone 2 is a 25 cm thick, very dark gray (10YR 3/2), clay loam. Zone 3 is a 30 cm thick, gray (10YR 5/1) clay loam with abundant limestone slabs and gravels. Several large limestone slabs separate Zones 2 and 3. Zone 4 is a 35 cm yellowish brown (10YR 5/6), clay loam mottled with dark gray (10YR 3/2), clay loam. The water table was encountered at 120 cmbs, where a dense cobble zone was also encountered.

A large assemblage of lithics was recovered from TP 1 (Table 5.27.2), averaging 20 per level and including a Lange dart point from 60 to 70 cmbs and a small side scraper from 110 to 120 cmbs. In general, artifact recovery was substantial throughout the unit. Burned rocks were limited to Level 2. Very few snail shells were recovered, most of these came from the upper 20 cm of deposits, with several occurring from 20 to 30

cmbs. A single, indeterminate bone fragment was recovered from 30 to 40 cmbs. Cultural materials in Zone 3 (about 55 to 85 cmbs) are likely to be in a depositional context dominated by colluvial materials from the nearby uplands, casting doubt on their depositional integrity.

The profile of TP 2 contains three stratigraphic zones. Zones 1 and 2 in TP 2 are similar to Zones 1 and 3 in TP 1, respectively. Zone 3 in TP 2 is a light yellowish brown (2.5YR 6/4), clay loam with some gravels and a few large limestone rocks, possibly from the nearby colluvial slope. The water table was also encountered at 120 cmbs in the unit.

Test pit 2 yielded about 60 lithic artifacts, most of which were concentrated in the upper 30 cm of deposits (Table 5.187). A slight peak in artifact frequency in the lower levels occurred from 80 to 100 cmbs. Very few snail shells and no bone or mussel shell were found in the unit. A single burned rock occurred at 0 to 10 cmbs. As in TP 1, Zone 3 in TP 2 (which may not correlate with Zone 3 in TP 1) may contain cultural materials in secondary context.

As mentioned above, a Lange dart point was recovered from the excavations in Management Unit 2. The point is made of Heiner Lake Translucent Brown chert. The general assemblage of chipped stone materials includes a multiple platform core and 25 tools of various types ranging from expedient tools to formal unifacially and bifacially modified specimens (Table 5.188). The general category of uniface can be applied to the majority of these specimens although six of the tools are bifaces. The most predominate chert type is the indeterminate light brown material.

Debitage from five described cherts and seven indeterminate categories was recovered from TP 1 and TP 2 (Table 5.189). Of these, only indeterminate cherts occur at greater than expected frequencies. If indeterminate cherts are excluded, Heiner Lake Translucent Brown occurs in greater than expected frequencies, and values for Heiner

Lake Blue and Heiner Lake Tan occur in expected ranges (Table 5.190). With the exception of one flake from a North Fort chert (Gray-Brown-Green), all flakes in Management Unit 2 were from Southeast Range materials. The high frequency of indeterminate brown cherts implies that the representation of translucent brown and tan materials may be underestimated by the statistics.

Most flakes fall into size categories smaller than 1.8 cm, but a fairly high proportion of flakes are larger (Table 5.27.4). This implies that reduction of relatively large nuclei may have been common. Since chert crops out at the site, this should not be surprising. About half of the flakes in the assemblage have cortex on them. This suggests that a high proportion of early-to-middle stage reduction may have occurred, although the low

Table 5.186 List of Treatment Units, 41BL834.

AU	Treatment Units	Length (m)	Width (m)	Depth (cm)
1	TP 1	1.0	1.0	120
1	TP 2	1.0	1.0	120
2	TP 3	1.0	1.0	180

proportion of flakes with all cortex on one face implies that at least some decortication took place elsewhere, perhaps on the uplands above the test units. On the other hand, about 72% of cortex flakes have abraded cortex, which implies that procurement from the stream adjacent to the units may have substantial (Table 5.191).

Table 5.187 Artifact Recovery by Test Pit, 41BL834.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3				
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	8	0	0(0)	0	0	7	0	1(0.3)	0	0	13	0	0(0)
2	0	0	32	3	10(2)	0	0	36	1	0(0)	0	0	30	3	0(0)
3	0	0	16	2	0(0)	0	0	8	0	0(0)	0	0	4	0	0(0)
4	0	1	39	0	0(0)	0	0	1	0	0(0)	0	0	10	0	0(0)
5	0	0	27	0	0(0)	0	0	0	0	0(0)	0	0	13	2	0(0)
6	0	0	41	4	0(0)	0	0	2	0	0(0)	0	0	18	2	0(0)
7	0	0	28	0	0(0)	0	0	0	0	0(0)	0	0	25	4	0(0)
8	0	0	44	3	0(0)	0	0	1	0	0(0)	0	0	45	3	0(0)
9	0	0	19	3	0(0)	0	0	3	0	0(0)	0	0	30	5	0(0)
10	0	0	54	6	0(0)	0	0	5	0	0(0)	0	0	21	0	1(0.1)
11	0	0	33	3	0(0)	0	0	0	0	0(0)	0	0	11	0	0(0)
12	0	0	17	1	0(0)	0	0	0	0	0(0)	0	0	3	1	0(0)
13											0	0	7	1	0(0)
14											0	0	0	0	0(0)
15											0	0	4	1	0(0)
16											0	0	0	0	0(0)
17											0	0	0	0	0(0)
18											0	0	0	0	0(0)
TOTAL	0	1	358	25	10(2)	0	0	63	1	1(0.3)	0	0	234	22	1(0.1)

5.27.2.2 Excavations in the Eastern Tributary

Test pit 3 contained nine stratigraphic zones, some of which may represent individual flood episodes (Figure 5.95). Zone 1 is a thin very dark gray (10YR 3/1), silt that is loose and contains much forest duff. Zone 2 is a dark gray (10YR 4/1), clay silt from 10 to 50 cmbs. Zone 3 is a very dark grey (10YR 3/1), clay silt with limestone gravels. Zones 4 through 7 have very distinct boundaries and could represent separate depositional episodes. Zone 4 is a thin light brown grey (10YR 6/2), silt and gravels that also contains possible decayed tufa. The possible tufa is a very soft, gray, chalky material with hundreds of associated .25 cm tubular "soda straw" vesicles, possibly from residue on rootlets. The presence of this tufa implies groundwater discharge into the valley a short distance upstream. Zone 5 is a limestone gravel lens with very little sediment. Zone 6 is a dark gray (10YR 4/1), silt clay located at about the same level as the nearby stream, although no water seeped into the unit for another 80 cm below this level. Zone 7 is a brown gray (10YR 6/2), silt and gravels with some possible tufa. Zone 8 is a 40 cm thick dark gray (10YR 4/1), clay with increasing limestone gravels with

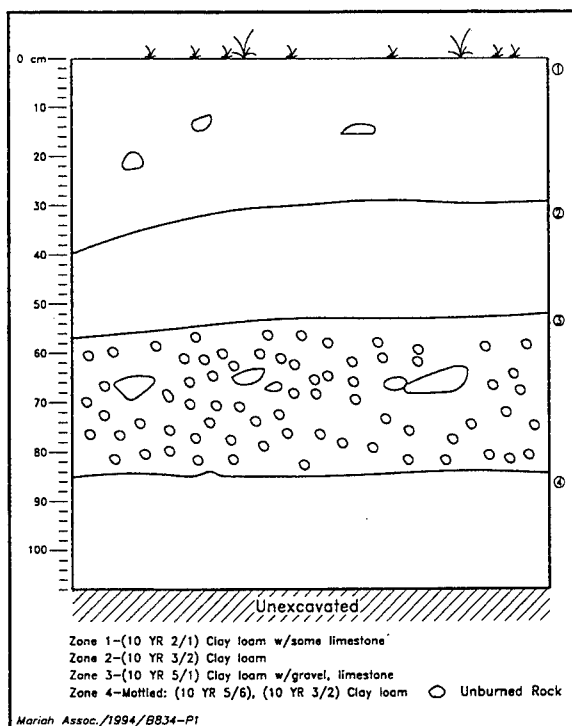


Figure 5.94 Profile of TP 1, 41BL834.

depth. Zone 9 is a dense lens of limestone and chert cobbles and limestone slabs in a dark grey brown (10YR 4/2), clay matrix. After removing

Table 5.188 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL834.

Lithic Material	Core Type		Tool Type							Total
	multiple platform	early stage biface	edge modified	end scraper	late stage biface	middle stage biface	side scraper	uniface	utilized flake	
10-HL Blue	0	0	0	0	0	0	0	0	1	1
02-C White	0	0	0	0	0	0	0	0	1	1
06-HL Tan	1	1	0	0	1	0	0	2	1	6
Indet Lt Brown	0	2	1	2	0	1	2	6	3	17
Indet Mottled	0	0	0	0	0	1	0	0	0	1
Total	1	3	1	2	1	2	2	8	6	26

40 cm of Zone 9, water seepage forced a halt to excavation.

Test pit 3 excavation recovered more than 250 lithics, although at least twice that many were discarded in the field as they were naturally derived debitage and cobbles. Few to numerous lithics were found within Levels 1 through 15 (Table 5.187). The lithic assemblage included several tools and cores. Only three snail shells were recovered in the entire unit. Levels 16 through 18 were sterile.

Management Unit 3 did not produce any projectile points; however, the general chipped stone assemblage contains 23 specimens (Table 5.192). These include a multiple platform core, bifaces in various stages of reduction and 9 utilized flakes. Local Southeast Range chert varieties Heiner Lake Tan and Translucent Brown encompass 83% of the chert recovered.

Debitage from seven described cherts and six indeterminate categories was recovered from TP 3 (Table 5.193). Of these, only indeterminate cherts occurred in greater than expected numbers, and only Heiner Lake Translucent Brown occurs at expected frequencies. If the indeterminate flakes are excluded, Heiner Lake Blue, Heiner Lake Tan, and Cowhouse Mottled/Flecked occur at expected frequencies, and Heiner Lake Translucent Brown occurs at greater than expected frequencies (Table

Table 5.189 Debitage Recovery by Size and Material Type, AU 1, 41BL834.

Lithic Material	Size (cm)					Total	
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2		
Identified Types							
HL Blue (1&10)	0	0	1	2	1	0	4
06-HL Tan	0	0	3	8	0	0	11
09-HL Tr Brown	3	8	1	1	9	0	22
13-ER Flecked	0	0	1	0	0	0	1
15-Gry/Brn/Grn	0	1	0	0	0	0	1
<i>Subtotal</i>	<i>3</i>	<i>9</i>	<i>6</i>	<i>11</i>	<i>10</i>	<i>0</i>	<i>39</i>
Unidentified Types							
Indet Dk Brown	1	2	0	0	0	0	3
Indet Dk Gray	0	0	2	1	0	0	3
Indet Lt Brown	25	76	85	52	56	2	296
Indet Lt Gray	1	8	17	6	7	0	39
Indet Misc.	6	5	9	3	0	0	23
Indet Trans	0	1	0	2	0	0	3
Indet White	4	0	5	2	3	0	14
<i>Subtotal</i>	<i>37</i>	<i>92</i>	<i>118</i>	<i>66</i>	<i>66</i>	<i>2</i>	<i>381</i>
Total	40	101	124	77	76	2	420

5.194). The relatively high frequency of indeterminate brown cherts implies that the statistics for translucent brown and tan cherts may underestimate their representation, particularly

Table 5.190 Binomial Statistic Results, AU 1, 41BL834.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1&10)	4	55	85	less	3	13	expected
06-HL Tan	11	55	85	less	3	13	expected
09-HL Tr Brown	22	55	85	less	3	13	more
13-ER Flecked	1	55	85	less	3	13	less
15-Gry/Brn/Grn	1	55	85	less	3	13	less
Total Indet	381	55	85	more	na	na	na

Table 5.191 Debitage Cortex Characteristics by Material Type, AU 1, 41BL834.

Lithic Material	All Cortex		Partial Cortex			No Cortex	Total
	Abraded	Unabraded	Abraded	Indeterminate	Unabraded		
Identified Types							
HL Blue (1&10)	0	0	0	0	2	2	4
06-HL Tan	0	0	3	0	0	8	11
09-HL Tr Brown	0	0	3	1	3	15	22
13-ER Flecked	0	0	0	0	0	1	1
15-Gry/Brn/Grn	0	0	0	0	1	0	1
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>6</i>	<i>1</i>	<i>6</i>	<i>26</i>	<i>39</i>
Unidentified Types							
Indet Dk Brown	0	0	0	0	0	3	3
Indet Dk Gray	0	0	0	0	0	3	3
Indet Lt Brown	0	0	73	6	10	207	296
Indet Lt Gray	0	0	6	6	1	26	39
Indet Misc.	1	1	3	3	2	13	23
Indet Trans	0	0	0	0	0	3	3
Indet White	1	0	3	0	0	10	14
<i>Subtotal</i>	<i>2</i>	<i>1</i>	<i>85</i>	<i>15</i>	<i>13</i>	<i>265</i>	<i>381</i>
Total	2	1	91	16	19	291	420

given their availability on the upland above and in the stream channel. The absence of indeterminate black and dark gray flakes implies that Owl Creek Black is not underrepresented, and the low count of indeterminate mottled flakes implies that Cowhouse Mottled/Flecked materials are also fairly represented. The relatively high frequency of indeterminate light gray flakes may imply that the representation of Gray-Brown-Green material has been underestimated, although it is more possible that the gray material represents a hitherto undescribed gray chert variety noted on the upland during the resurvey.

Flakes from TP 3 are relatively evenly distributed among size categories, and dominated by decortified specimens, suggesting that primary reduction at the locality was probably a relatively

minor component of tool production, but that latter-stage reduction of relatively large nuclei was relatively common. However, a fairly large proportion of the cortex flakes have abraded cortex, which implies that procurement from the adjacent streambed may have been practiced to supplement material obtained and partially reduced elsewhere (Table 5.195).

5.27.2.3 Synthesis of Management Areas 2 and 3

The stratigraphy evident in the test pit profiles implies that colluvial processes, deposition by flashy channel discharge, or both, may account for deposition of some of the cultural materials in Management Units 2 and 3. This depositional pattern is highly likely for Zone 3 in each test pit and for Zones 8 and 9 in TP 3. The pattern does

not imply a stratigraphic correlation between Zone 3 in any of the pits. Although the sediments appear to be of Late Holocene age, correlation between depositional units and Nordt's (1992) depositional chronology is unknown.

The natural chert encountered during testing contained unbroken and broken cobbles and naturally derived flakes, inhibiting distinctions between natural and cultural flakes in the field. Test pit 1 (on the northern tributary) and TP 3 (on the eastern tributary) contained a large amount of natural and culturally modified chert, much of which consists of a light tan, opaque material that has a caramel brown color when patinated. Some cherts that occur naturally on the uplands match the characteristics of the tan cherts recovered during testing. The cultural chert also contained some of the gray chert observed on the upland portion of the site. Since both of the tributaries originate within the site boundaries, the culturally modified chert from the test excavations either occurs locally or was carried in by human agency. Since most of the unambiguous cultural artifacts were made of the tan cherts, the lithic assemblage from the excavation units may reflect differential selection from a relatively diverse resource base, although observations on the upland surface show

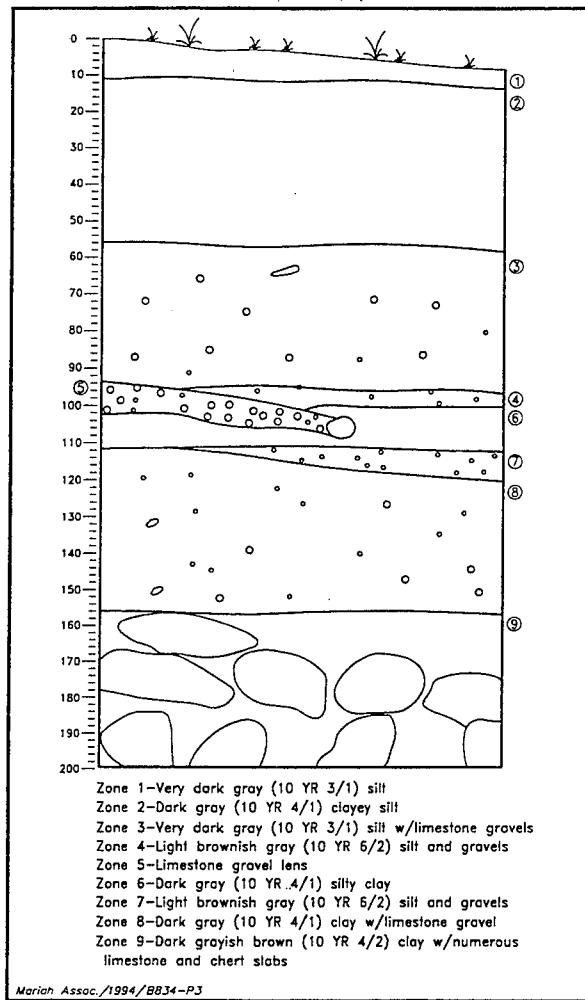


Figure 5.95 Profile of TP 3, 41BL834.

Table 5.192 Cores and Nonprojectile Point Lithic Tools, AU 2, 41BL834.

Lithic Material	Core Type		Tool Type								Total
	multiple platform	biface	complex scraper	drill	edge modified	late stage biface	middle stage biface	uniface	utilized flake	wedge	
06-HL Tan	0	1	1	0	1	1	2	1	7	1	15
09-HL Tr Brown	0	0	0	1	0	1	0	0	2	0	4
Indet Dk Brown	0	0	0	0	0	0	0	0	0	1	1
Indet Lt Brown	1	0	0	0	0	1	0	1	0	0	3
Total	1	1	1	1	1	3	2	2	9	2	23

that a wide variety of materials actually was used on site. The majority of the lithics that were identified from testing suggest that primary reduction and, hence, lithic procurement, probably were major activities at the site. However, the presence of burned rock and tools in TP 1 suggests that activities other than lithic-procurement also took place.

5.27.3 Conclusions and Recommendations

Cultural assemblages in the largely colluvial stratigraphic zones are likely to be dominated or, at least, heavily influenced by artifacts in secondary context. However, substantial portions of the profiles in each unit consist of fine-grained matrix with relatively small proportions of material derived from colluvial and/or flashy alluvial deposition. This strongly implies that in situ deposits are present. Thus, all three test pits in Management Units 2 and 3 appear to contain intact cultural deposits, although portions of the stratigraphy in each pit are composed of materials that probably were deposited by colluvial and/or high-energy alluvial processes. The Holocene deposits adjacent to the tributaries have been only minimally impacted by training activities, which are limited mainly to the road on the south side of the northern drainage. These units therefore appear to have high potential as sources of data for the kind of technological analysis specified in the

Table 5.193 Debitage Recovery by Size and Material Type, AU 2, 41BL834.

Lithic Material	Size (cm)						Total
	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types							
HL Blue (1 & 10)	0	2	3	2	5	0	12
06-HL Tan	5	2	0	5	2	1	15
09-HL Tr Brown	1	7	9	11	7	1	36
15-Gry/Brn/Grn	0	0	0	0	1	0	1
16-Leona Park	0	0	1	0	0	0	1
17-Owl Crk Black	1	1	1	0	0	0	3
22-C Mott/Flecks	0	1	1	2	2	0	6
<i>Subtotal</i>	7	13	15	20	17	2	74
Unidentified Types							
Indet Dk Brown	0	2	3	1	3	0	9
Indet Lt Brown	13	12	19	18	25	1	88
Indet Lt Gray	1	17	13	3	4	0	38
Indet Misc.	2	4	1	0	1	0	8
Indet Mottled	0	0	0	1	3	0	4
Indet White	8	0	0	1	3	0	12
<i>Subtotal</i>	24	35	36	24	39	1	159
Total	31	48	51	44	56	3	233

Fort Hood research design (Ellis 1994a, 1994b). Furthermore, the presence of interbedded colluvial

Table 5.194 Binomial Statistic Results, AU 2, 41BL834.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1 & 10)	12	19	39	less	5	17	expected
06-HL Tan	15	19	39	less	5	17	expected
09-HL Tr Brown	36	19	39	expected	5	17	more
15-Gry/Brn/Grn	1	19	39	less	5	17	less
16-Leona Park	1	19	39	less	5	17	less
17-Owl Crk Black	3	19	39	less	5	17	less
22-C Mott/Flecks	6	19	39	less	5	17	expected
Total Indet	159	19	39	more	na	na	na

Table 5.195 Debitage Cortex Characteristics by Material Type, AU 2, 41BL834.

Lithic Material	All Cortex			Partial Cortex			No Cortex	Total
	Abraded	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate		
Identified Types								
HL Blue (1&10)	0	0	0	0	0	1	11	12
06-HL Tan	0	1	0	0	0	0	14	15
09-HL Tr Brown	0	0	0	2	0	1	33	36
15-Gry/Brn/Grn	0	0	0	0	0	0	1	1
16-Leona Park	0	0	0	0	0	0	1	1
17-Owl Crk Black	0	0	0	0	0	0	3	3
22-C Mott/Flecks	0	0	0	1	2	0	3	6
<i>Subtotal</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>3</i>	<i>2</i>	<i>2</i>	<i>66</i>	<i>74</i>
Unidentified Types								
Indet Dk Brown	0	0	0	0	2	0	7	9
Indet Lt Brown	2	0	0	9	1	3	73	88
Indet Lt Gray	0	0	0	4	0	0	34	38
Indet Misc.	0	0	1	2	0	4	1	8
Indet Mottled	0	0	0	0	1	1	2	4
Indet White	0	0	0	0	3	0	9	12
<i>Subtotal</i>	<i>2</i>	<i>0</i>	<i>1</i>	<i>15</i>	<i>7</i>	<i>8</i>	<i>126</i>	<i>159</i>
Total	2	1	1	18	9	10	192	233

and alluvial deposits should be conducive to performing geoarcheological analyses of the relationship between episodes of colluviation and upland landscape change.

On the basis of the above, we judge Management Units 2 and 3 at 41BL834 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that these units be avoided and protected to prevent the loss of significant scientific information. Because access to significant deposits is fairly difficult in these units, they probably are not highly threatened. Threats

of damage by vandalism are probably also low because the site does not contain the targets preferred by relic collectors such as rockshelters and intact middens. However, because well-used trails traverse the site and pass close to the significant deposits, the site requires measures to protect it against: (1) traffic by tracked and wheeled vehicles; and (2) subsurface disturbance by mechanical and manual excavations performed by military personnel during training activities.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets

delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include backhoe trenches and manual excavation of up to 150 m² in the total area and divided into relatively small blocks located to maximize recovery of spatially distributed lithic-procurement data. Another 50 m² should be allocated to expand excavations to include potential features and living surfaces that may be encountered. Assuming that deposits to be mitigated average about a meter in thickness, total volume of manual excavations could reach about 200 m³. Data recovery also should allow for systematic examination of the nature of chert resources in Management Units 1 and 4; collection of comparative artifactual data from the upland surface; and excavation of backhoe trenches for geoarcheological reconstruction of landscape processes relevant to formation of the site and reconstruction of paleoenvironmental and paleoclimatic models.

On the basis of previous work, Management Unit 4 is judged to be not significant and ineligible for inclusion in the NRHP. The eligibility status of Management Unit 1 remains uncertain.

5.28 SITE 41BL853

5.28.1 Introduction

In late February 1994, Mariah conducted test excavations at site 41BL853. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.28.1.1 Location and Description

Site 41BL853 is located at the confluence of two tributaries of North Nolan Creek (Figure 5.96). The site consists of a large lithic and burned rock

scatter. Part of the site contains a steeply sloped backslope and footslope flanking the high Manning surface. This area was characterized by erosionally stripped bedrock and limestone lag clasts. The footslope grades into a colluvial toeslope. Soil development in the colluvium is moderate (A-Bw-C-R) and up to 75 cm deep. A low alluvial T₁ terrace lies adjacent to the colluvial toeslope and is flanked to the north and east by small incised streams. The terrace surface is relatively level, lying roughly 2 to 2.5 m above the channels, and is mantled with a thin scatter of debitage and utilized flakes (Figure 5.97). This terrace surface was the object of formal testing. Maximum site dimensions are about 200 x 150 m (about 30,000 m², or 7.4 acres). For the purposes of this report, the site is included in the Nolan/South area of the fort.

5.28.1.2 Previous Work

This site was initially recorded by Frye and Mesrobian on 28 March 1986 as a lithic scatter with a buried component. Heavily patinated chert cores and flakes were observed eroding out of a creek bank at 50 cmbs at the southwest portion of the site. Three dart points and a quartzite cobble were collected from the site. The site was estimated to be 85% disturbed by erosion, vehicles, and animals.

Oglesby and Doering visited the site on 13 March 1992, revised the sketch map, and completed four archeological and four geomorphological data forms. The site was divided into Subareas A and B (see below). No shovel tests were excavated within Subarea A. On 4 April 1992, six shovel tests were excavated within Subarea B. Cultural material was recovered from 0 to 20 cmbs from four of these tests. The cultural material present was judged to be colluvially mixed, and no further management was recommended for the site.

Abbott and Kleinbach revisited the site on 22 March 1993, while evaluating a new site (MA-5) noted by Mariah personnel during the spring of 1992. During this visit, it was determined that

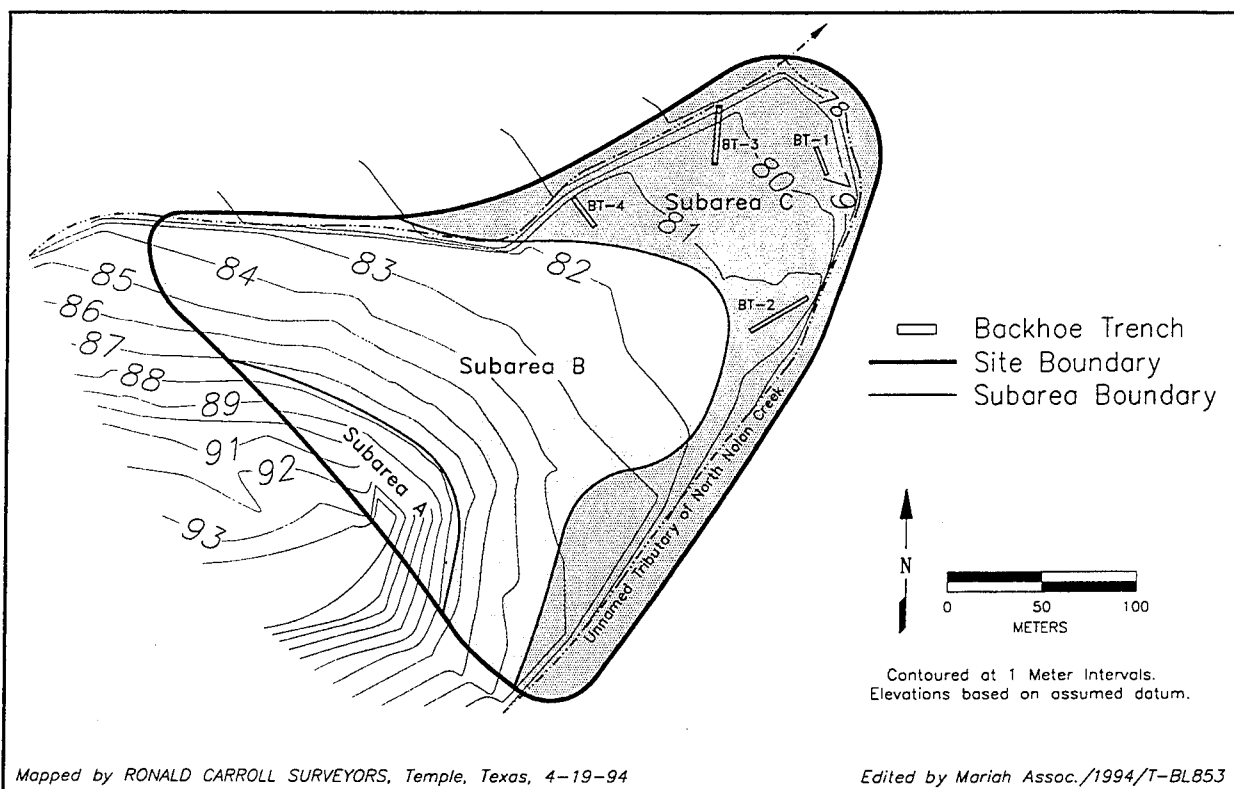


Figure 5.96 Site Map of 41BL853.

MA-5 could not be reasonably separated from 41BL853 due to the presence of a continuous light surficial flake scatter. Therefore, the boundary of 41BL853 was expanded downslope to include the new area. The site map was once again revised and additional archeological and geomorphic forms were completed to describe the newly added portion.

In the process of reconnaissance and evaluation at 41BL853 and MA-5, a total of three subareas were defined. Subarea A was defined as the steep backslope and footslope to the Manning surface. Some cultural material was present on the surface, including a 50 m long x 30 m wide burned rock concentration (F 1). A Bulverde (Early Archaic) and three Pedernales (Middle Archaic) dart points were collected from the feature (cf. Turner and Hester 1985). The cultural material within this subarea was judged to lack contextual integrity and no shovel testing was warranted. Subarea B consisted of the colluvial toeslope. Subarea C

consisted of the alluvial terrace that was added to the site by Abbott and Kleinbach.

A shovel testing crew returned on 9 April 1993 and excavated an additional three shovel tests in Subarea B and six shovel tests in Subarea C. All of the tests were sterile. The upper 40 cm of Subarea C was determined to contain no demonstrated archeological potential, however, the possibility of deeper (more than 40 cmbs) buried cultural material remained. Therefore, the archeological potential of Subarea C was uncertain. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. A minimum of one backhoe trench and two 1 x 1 m manually excavated test units were recommended for formal testing to determine NRHP eligibility (Trierweiler 1994:A571-A573).



Figure 5.97 Overview of Site 41BL853, Looking West.

5.28.1.3 New Work

Four long trenches (BT 1-4) were excavated on the T_1 terrace (Subarea C) to examine internal stratigraphy and to prospect for buried cultural material (Table 5.196). The stratigraphy of BT 1 and BT 2 was described in detail, while the stratigraphy of BT 3 and BT 4 was briefly described by reference to similar sequences in BT 1 and BT 2. All of the trench walls were manually scraped with trowels to identify buried cultural material.

5.28.2 Results

Trench 1 was situated near the confluence at the tip of the T_1 terrace. Zone 1 consisted of black (10YR 2/1), granular clay and was 35 cm thick. A few dispersed flakes and abundant, relatively small natural chert clasts were observed within the slightly gravelly matrix. Zone 2 extended to a depth of 80 cm at the measured section, and consisted of grayish brown (10YR 4/2), massive to

weak blocky clay. The thickness of the unit varied from 80 cm near the stream to 30 cm on the opposite end of the trench. No cultural material was observed in the fill. Zone 3 consisted of mottled, massive to bedded, very gravelly clay and sandy clay. The dominant color was yellowish brown (10YR 5/6). Mottles were distinct grayish patches on the ped faces. Zone 4 consisted of bedded limestone and chert gravels in a clay matrix that extended to the base of the trench at 1.6 mbs. It was similar in character to Zone 3, but the gravel clasts were much larger (up to 30 cm diameter). Overall, the trench represents a marked fining-upward sequence in a high energy environment, and exhibited an A-C profile.

Trench 2 was situated on the T_1 terrace of the eastern stream, and revealed two distinct units. The more recent unit was situated in the streamward portion of the trench. It was similar to BT 1 and was not recorded. This fill was laterally inset into a sequence of mixed alluvial/colluvial sediments in the upper end of the trench near the

colluvial toeslope. Five zones, encompassing an A-Bw-C profile, were identified in the latter fill. Zone 1 was 35 cm thick and consisted of weak, granular structured, very dark gray (10YR 3/1) sandy clay loam. Zone 2 consisted of very dark grayish brown (10YR 3/2), massive sandy clay loam, contained a number of limestone and chert gravels of probable colluvial origin and was 30 cm thick. Zone 3 extended to 100 cmbs and was texturally similar, but was lighter in color (10YR 4/2) and contained a number of faint, orange mottles that probably indicate periodic saturation. Zones 4 and 5 exhibited an increase in the frequency and size of gravels in a fine matrix similar to the overlying zones. Zone 4 was 40 cm thick. Zone 5 extended to the base of the trench at 160 cm. The dominant color lightened from grayish brown (10YR 5/2) in Zone 4, to brown (10YR 5/3) in Zone 5, and the orange mottles increased both in frequency and definition.

Trenches 3 and 4 were excavated along the northern tributary. Both revealed deposits similar to BT 1 and the downslope portion of BT 2. With the exception of a few flakes in the upper 35 cm (Zone 1) of BT 1, no cultural material was observed while the trenches were being excavated or found in any of the trench walls after careful inspection. As a result of this lack of cultural material in the extensive exposures provided by trenching, no manual test pits were excavated on the site.

Only a Bulverde and a Pedernales dart point of indeterminate chert types were collected from this site. No artifacts or other materials were recovered during formal testing so no analyses were performed other than to record the metrics and make observations on these points.

5.28.3 Conclusions and Recommendations

Although the back and footslopes of the Manning surface (Subarea A) have relatively abundant artifacts, these artifacts comprise a contextless assemblage with extremely limited archeological potential.

Table 5.196 List of Treatment Units, 41BL853.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	BT 1	~12	0.8	160
1	BT 2	~25	0.8	160
1	BT 3	~20	0.8	140
1	BT 4	12	0.8	180

The colluvial toeslope (Subarea B) also has a relatively abundant surface assemblage, but does not appear to have any substantial cultural materials in buried, stratified context. As a result, Subarea B also has extremely limited research potential.

The most extensive alluvial deposits in Subarea C consist of thick basal gravels that fine up into a dense clay loam. They exhibit weak soil development and represent late Holocene aggradation by a high-energy stream with a well developed, elevated floodplain. They probably equate to the Ford alluvium of Nordt (1992) but may in fact be slightly older (i.e., upper West Range equivalent). No cultural material was detected in any semblance of primary context in these deposits. An older Holocene unit that appears to represent mixed alluvial/colluvial sedimentation is preserved on the margin of the valley. This unit exhibits an A-Bw-C profile and also lacked any stratified cultural material in the exposures examined. Although the degree of soil development indicates that the unit is of Holocene age, a more precise estimate of its temporal context is not currently possible. No in situ archeological remains were detected in the alluvial fill (Subarea C). As a result of formal eligibility testing, Subarea C is judged to have very poor archeological potential.

None of the subareas defined at the site has the potential to address issues outlined in the research domains for Fort Hood (Ellis 1994b). On this basis, we judge 41BL853 to be ineligible for inclusion in the NRHP and recommend no further management.

5.29 SITE 41BL886

5.29.1 Introduction

In late July and early August 1993, Mariah conducted test excavations at 41BL886. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.29.1.1 Location and Description

Site 41BL886 is located on a north-facing bluff overlooking the head of Belton Lake, at the head of an unnamed intermittent drainage. For the purposes of this report, the site is included in the Nolan/Cowhouse area of the fort. The site consists of two rock shelters designated Shelter A and Shelter B (Figure 5.98). Shelter A is the largest of the two shelters. It is 25 m long and includes an arc of about 120° (Figure 5.99). The floor of the shelter is uneven, consisting of two levels separated by an active seep drainage in the middle of the shelter. The floor has a fairly steep slope, and the ceiling ranges 1.7 to 3 m in height. The dripline is roughly 5 m from the curving back wall of the shelter along most of its length. The slope outside the opening of the shelter is steep and littered with many large boulders that represent major roof-collapse events. In places amidst these boulders, there are deposits of fine-grained sediments. Shelter B is a small shelter with a larger chamber at the entrance measuring 3 m wide x 2 m deep x 1 m high. There are two small chambers in the rear of Shelter B, each less than 1 m wide and less than 75 cm high. The east chamber extends about 4 to 5 m into the bluff edge beyond the back of the main chamber. The west chamber extends about 2 m beyond the main chamber. Deposits on the platform outside the opening of Shelter B are probably at least 1 m deep and are partially covered by a large boulder that may represent a major roof-fall episode.

5.29.1.2 Previous Work

The site was first recorded in 1987 by Rotunno and was described as two closely spaced rock shelters with a light scatter of chert debitage and some burned rock. Both shelters were judged to be partially vandalized. A rodent vertebra and an unspecified long bone were noted on the surface in Shelter B.

Mires and Doering visited the site on 29 February 1992 and completed archeological and geomorphological assessments and a new map for each shelter. The long bone observed during the 1986 survey was still on the surface at the entrance to the shelter, and was described as possibly being human. A partially filled, 1 m wide pothole was located almost directly in the center of the main chamber.

Because of the potential for buried cultural material in both shelters, a shovel testing crew returned to the site on 30 March 1992 and excavated two shovel tests in Shelter A and one shovel test in Shelter B. The tests in Shelter A were 20 to 50 cm deep, and the test in Shelter B was 60 cm deep. Cultural material was found to depths of 60 cm. However, the eligibility status of the shelters was judged to be uncertain. The site was recommended for avoidance or for formal eligibility testing if avoidance was not possible. Two to four 1 x 1 m manually excavated test pits were recommended for formal testing for each of the two shelters, with particular attention to Shelter B with the presence of possible human bone (Trierweiler 1994:A583-A590).

5.29.1.3 New Work

Four 1 x 1 m test pits (TP 1-4) were fairly evenly spaced along the entirety of Shelter A and excavated to bedrock and three test pits (TP 5-7) were placed in Shelter B (Table 5.197). Recovered cultural material is summarized in Table 5.198.

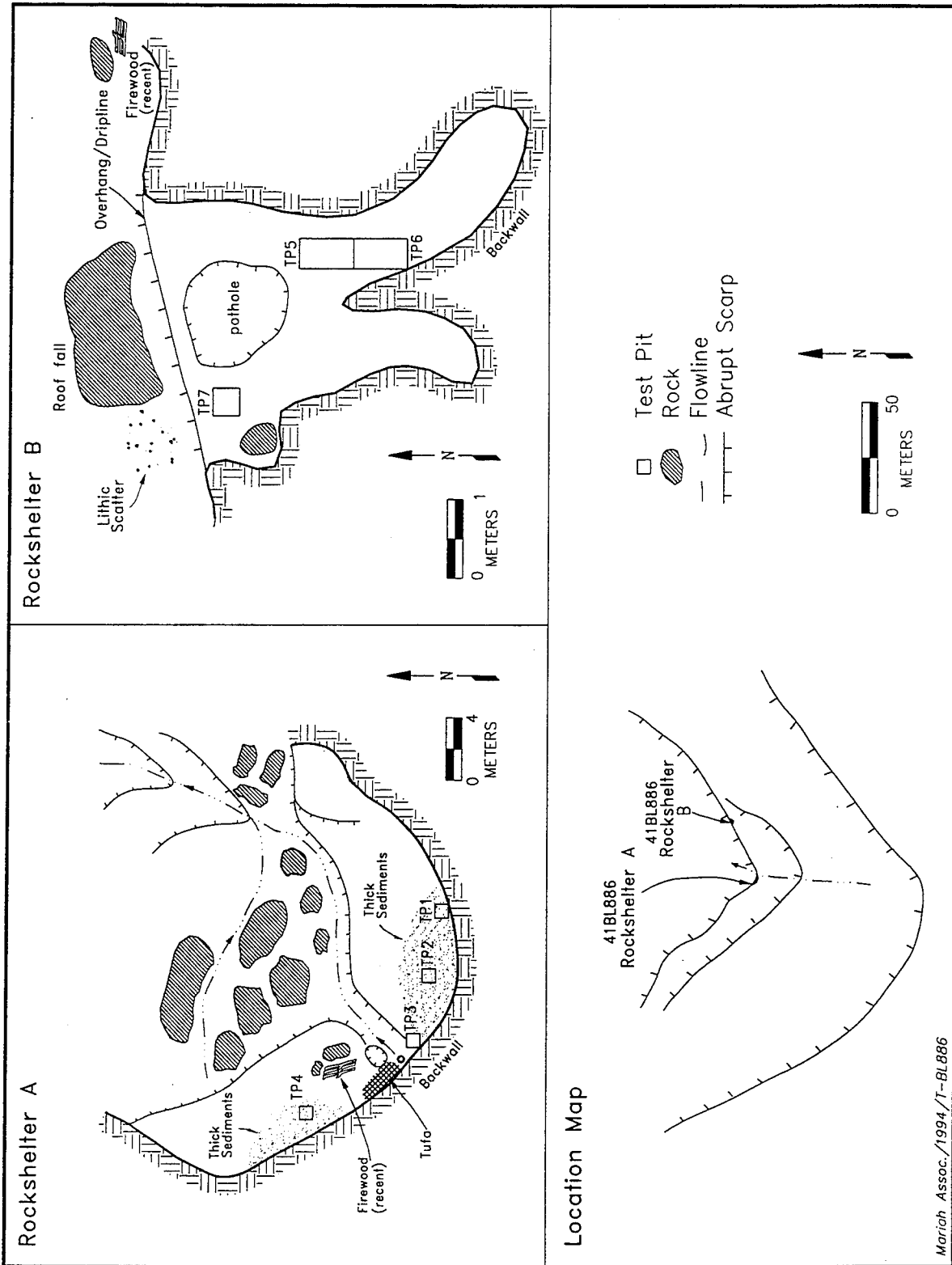


Figure 5.98 Site Map of 41BL886.

Mariah Assoc./1994/T-BL886



Figure 5.99 Interior of Rockshelter at Site 41BL886.

5.29.2 Results

Results of testing are discussed for each shelter individually.

5.29.2.1 Excavation in Shelter A

Test pit 1 was placed on the east side of Shelter A with the south wall of the unit abutting the back wall of the shelter. The unit was excavated to 140 cmbs, with sloping bedrock intruding into the unit at 110 to 120 cmbs and covering the entire unit at 140 cmbs. Four stratigraphic zones were observed in the unit. Zone 1 was a 10 cm thick yellowish brown (10YR 5/8) silt. Zone 2 was a very pale brown (10YR 8/4) silty clay mottled with brownish yellow (10YR 6/6) silty clay and averages of 70 cm thick. Zone 3 was a 10 to 12 cm thick brown to dark brown (10YR 4/3) silt clay. Zone 4 was a 20 cm thick, dark brown (10YR 4/3), silty clay mottled with a yellow (10YR 8/7) clay, and rested on bedrock. All zones sloped down to the north at about 10-15°. Test pit 1 yielded only one flake

and one snail shell from 30 to 40 cmbs and one bone fragment from Level 4 (Table 5.198).

Test pit 2 was placed near the top of a mounded area a few meters west of TP 1 and 1 m away from the back wall of the shelter. The unit was excavated to a depth of 120 cmbs. Three

Table 5.197 List of Treatment Units, 41BL866.

AU	Treatment Unit	Length (m)	Width (m)	Depth (cmbs)
1	TP 1	1.0	1.0	140
1	TP 2	1.0	1.0	120
1	TP 3	1.0	1.0	190
1	TP 4	1.0	1.0	108
2	TP 5	1.0	0.5	68
2	TP 6	1.0	0.5	62
2	TP 7	0.6	0.9	90

stratigraphic zones were identified in the profile wall of TP 2. Zone 1 was a light yellowish brown (10YR 6/4), stony silt composed of decaying limestone powder and fragments, and was 40 to 50 cm thick. Zone 2 was a light grayish brown (10YR 6/2), organic-rich stony silt approximately 20 to 25 cm thick. Zone 3 was a grayish brown (10YR 5/2), extremely moist silty clay composed of decaying limestone 40 to 45 cm thick. The zone rested on bedrock and was very wet due to active subsurface groundwater discharge into the shelter. Two large rooffall slabs were found in the lower levels. The zones in TP 2, as in TP 1, dipped to the north at about 10° to 15°. Excavation of TP 2 yielded only a few snail shells from 50 to 80 cmbs.

Test pit 3 was placed near the center of Shelter A near an active seep. The profile of TP 3 revealed six stratigraphic zones all dipping to the northeast at about 5° to 10°. Zone 1 was a thin, very pale brown (10YR 8/2) silt and extended only partially into the unit. Zone 2 was a light gray (10YR 7/2) silt, 10 to 20 cm thick. Zone 3 was a 10 cm thick, light grayish brown (10YR 6/2) silt. Zone 4 was a 5 to 15 cm thick grayish brown (10YR 5/2) silt. Zone 5 was a very pale brown (10YR 7/3) silt and extended only partially into the unit from downslope. Zone 6 was a 10 to 35 cm thick, light yellowish brown (10YR 6/4), decaying limestone covering the solid, undulating bedrock floor of the unit.

Test pit 3 yielded the largest amount of cultural material from Shelter A, with over 200 lithic artifacts, the majority of which were recovered from 10 to 50 cmbs (Table 5.198). Over 100 bone fragments were recovered from 0 to 70 cmbs in amounts that decreased with depth. A single bone fragment was also recovered from each of 80 to 90 cmbs and 130 to 140 cmbs. Charred remains of live oak wood and a charred netleaf hackberry seed were recovered from Level 3. No mussel shell and only sparse burned rock were found in TP 3, although more than 100 *Rabdotus* snails were found from 0 to 90 cmbs. A single snail was recovered from 120 to 130 cmbs. The frequency

of snails varies roughly with the frequency of lithics.

Test pit 4 was placed on the western end of Shelter A and excavated to 108 cmbs in one corner, with some of the levels stopping at bedrock or unmovable rooffall slabs at higher elevations. The same five stratigraphic zones previously described in TP 3 were identified in the TP 4 profile (Figure 5.100).

Test pit 4 yielded the second highest number of artifacts from Shelter A, most of which were lithic artifacts that came from 30 to 80 cmbs (Table 5.198). Vertebrate faunal remains occurred in small numbers. A few burned rocks and no mussel shells were recovered; snails were recovered in small quantities.

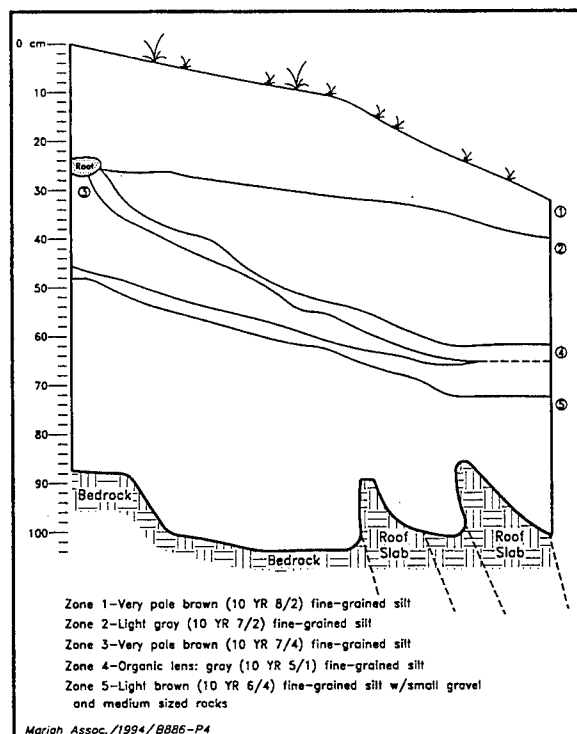


Figure 5.100 Profile of North Wall, TP 4, 41BL886.

Three arrow points were recovered from the excavations in Shelter A: two Scallorn from TP 4 and a Bulbar Stemmed from Test Pit 3, all of indeterminate chert types. Additionally, a multiple platform core and five bifaces were recovered from the excavations (Table 5.199). With the exception of two preforms of local Heiner Lake Tan, the tools can not be chert typed.

Five identified types and six indeterminate chert categories were recovered in the debitage from Shelter A at 41BL886 (Table 5.200). The rate of source type identification was a surprisingly low 5%, precluding the discovery of any meaningful statistical relationships. As a result of the low identification rate, all identified types occurred in less than expected frequencies when the indeterminates were included and in expected frequencies when they were excluded (Table 5.201).

With the exception of a single flake identified as Fort Hood Yellow, all identified flakes were Southeast Range varieties. Indeterminates were overwhelmingly dominated by light brown flakes, which made up 75% of the entire assemblage. Although the majority of flakes (88%) are between 0.5 cm and 1.8 cm in size, suggesting that latter stage reduction predominated, there are flakes of all size categories in the assemblage. Similarly, while decortified flakes are most common (90% of total), the presence of both primary and secondary decortification flakes indicates that all phases of lithic manufacture occurred in the shelter (Table 5.202).

A moderately diverse faunal assemblage, probably reflecting an admixture of economic and intrusive remains, was recovered from TP 3 and TP 4 (Table 5.203). Recovered taxa include deer, rabbit, opossum, bird, unidentified carnivore, and a variety of medium to very small rodents. While the deer and some of the smaller mammals may reflect economic remains, most of the small animals probably represent either natural residents of the shelter or victims thereof. Very little of the bone exhibited clear signs of cultural modification.

Table 5.199 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL886.

Lithic Material	Core Type		Tool Type		Total
	multiple platform	late stage biface	middle stage biface	preform	
06-HL Tan	0	0	0	2	2
Indet Lt Brown	1	0	0	1	2
Indet Lt Gray	0	0	1	0	1
Indet Mottled	0	1	0	0	1
Total	1	1	1	3	6

Table 5.200 Debitage Recovery by Size and Material Type, AU 1, 41BL886.

Lithic Material	Size (cm)						Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	
Identified							
02-C White	0	0	0	4	0	0	4
06-HL Tan	0	0	1	0	1	2	5
07-Foss Pale Brow	0	0	0	1	1	1	3
08-FH Yellow	0	0	0	0	0	1	1
09-HL Tr Brown	0	0	0	1	0	2	3
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>6</i>	<i>2</i>	<i>6</i>	<i>16</i>
Unidentified							
Indet Dk Brown	0	3	4	1	1	1	10
Indet Dk Gray	2	7	3	4	0	0	16
Indet Lt Brown	23	73	57	59	16	8	236
Indet Lt Gray	0	4	2	4	0	1	11
Indet Misc.	2	1	4	3	0	1	11
Indet White	0	4	6	3	1	1	15
<i>Subtotal</i>	<i>27</i>	<i>92</i>	<i>76</i>	<i>74</i>	<i>18</i>	<i>12</i>	<i>299</i>
Total	27	92	77	80	20	18	315

Table 5.201 Binomial Statistic Results, AU 1, 41BL886.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
02-C White	4	40	66	less	0	7	expected
06-HL Tan	5	40	66	less	0	7	expected
07-Foss Pale Brown	3	40	66	less	0	7	expected
08-FH Yellow	1	40	66	less	0	7	expected
09-HL Tr Brown	3	40	66	less	0	7	expected
Total Indet	299	40	66	more	na	na	na

Only 15% exhibited spiral fracturing (which is not a sure sign of human modification anyway, as it can also result from consumption by a non-human predator), and only 8% exhibited signs of burning.

5.29.2.2 Excavation in Shelter B

Although the long bone in Shelter B was identified as nonhuman (tibia of an unidentified artiodactyl),

Table 5.202 Debitage Cortex Characteristics by Material Type, AU 1, 41BL886.

Lithic Material	All Cortex		Partial Cortex			No Cortex	Indeterminate	Total
	Indeterminate	Abraded	Unabraded	Indeterminate				
Identified Types								
02-C White	0	0	0	0	4	0	4	
06-HL Tan	0	0	0	0	5	0	5	
07-Foss Pale Brown	0	0	0	2	1	0	3	
08-FH Yellow	0	0	0	1	0	0	1	
09-HL Tr Brown	0	0	0	1	2	0	3	
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>12</i>	<i>0</i>	<i>16</i>	
Unidentified Types								
Indet Dk Brown	0	0	0	1	9	0	10	
Indet Dk Gray	0	0	0	0	16	0	16	
Indet Lt Brown	1	1	1	16	216	1	236	
Indet Lt Gray	0	1	0	1	9	0	11	
Indet Misc.	0	0	0	0	9	2	11	
Indet White	0	0	0	3	11	1	15	
<i>Subtotal</i>	<i>1</i>	<i>2</i>	<i>1</i>	<i>21</i>	<i>270</i>	<i>4</i>	<i>299</i>	
Total	1	2	1	25	282	4	315	

Table 5.203 Faunal Recovery, AU 1, 41BL886.

Vertebrates	Element																		Total			
	Atlas	Cervical Vertebra	Cranium	Deciduous tooth	Femur	Fibula	Humerus	Indeterminate	Lumbar Vertebra	Mandible	Metapodial	Middle phalange	Pelvis	Permanent tooth	Proximal Phalanx	Radius	Rib	Sacrum		Scapula	Thoracic vertebra	Tibia
Artiodactyla	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3
Aves (medium)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Aves (large)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Carnivora	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	5
Cricetidae (medium)	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Didelphis virginiana	1	0	0	0	0	1	0	0	0	2	2	0	1	2	0	0	0	0	0	0	0	9
Leporidae	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
Mammalia (med/lg)	0	0	1	0	0	0	0	31	0	0	0	0	0	0	0	0	1	0	0	0	0	33
Mammalia (micro/sm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Mammalia (sm/med)	0	0	2	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	1	0	0	7
Odocoileus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Rodentia (medium)	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
Rodentia (sm/med)	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	4	8
Rodentia (small)	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	3
Sigmodon sp.	0	0	0	0	1	0	1	0	0	6	0	0	0	20	0	0	0	0	0	0	4	32
Sylvilagus sp.	0	2	1	2	2	0	0	5	3	0	1	2	3	0	0	0	0	0	0	1	22	
Vertebrata	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	1	9	
Total	1	2	5	3	9	1	3	39	8	14	3	1	4	30	1	1	1	2	2	1	12	143

there was a distinct probability of burials in one of the rear chambers. Taking this into account, a 50 cm wide x 2 m long trench was placed in the east chamber and extended south from the edge of the vandal hole to about the midpoint of the chamber. The south half of the unit was designated TP 6 and the north half was designated TP 5. A third unit, TP 7, was a 60 x 90 cm pit placed to the west side of the pothole on a slightly mounded area abutting the rock wall. Because the units were placed so closely, all three are discussed simultaneously.

All three units in Shelter B were excavated to limestone bedrock. The profile of TP 5 and TP 6 revealed four stratigraphic zones (Figure 5.101). Zone 1 was a loose, 10 to 12 cm thick, dark brown (10YR 3/3) silt and contained only a few artifacts. Zone 2 was a very loose, brown (10YR 4/3) silt

and contained the majority of the bone and snails found in Shelter B. It was 10 to 20 cm thick and had an undulating base. Zone 3 was composed of saprolitic eboulis, and consisted of very pale brown (10YR 8/2), very stony silt with no artifacts. The base of Zone 3 is filled with large decaying roots and a fine root mat on the solid bedrock surface. Some of the limestone in Zone 3 was a reddish color, but appeared to be the result of natural oxidation rather than heating. A final unit, unfortunately designated Zone 4 in the field, was a very loose brown (10YR 5/3), surficial silt representing spoil from a vandal pit at the surface of the shelter deposits. It was present in the northern portion of TP 5 and in the eastern portion of TP 7 around the perimeter of vandal excavations.

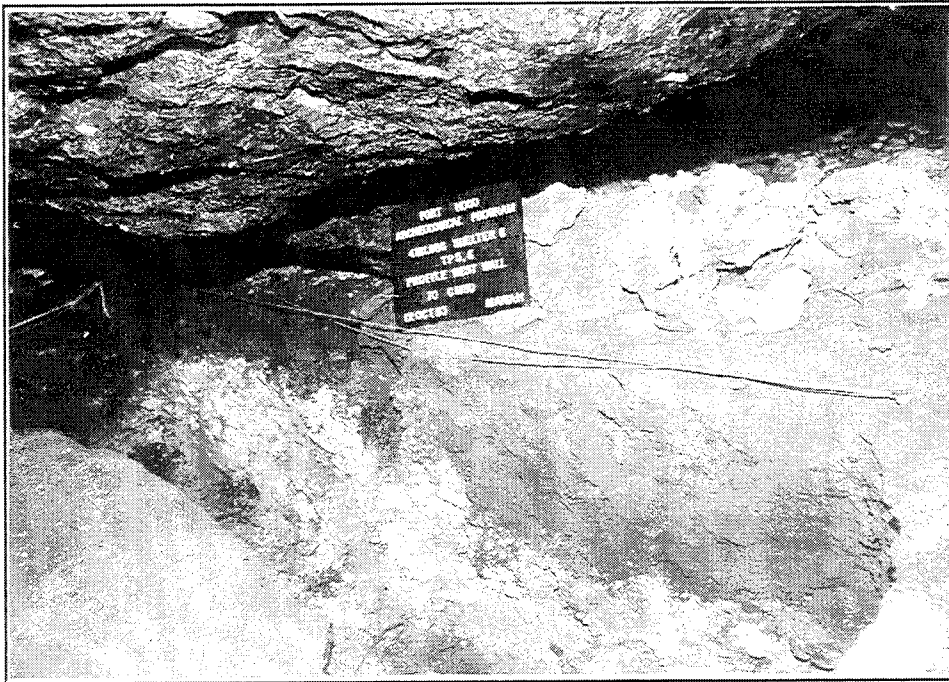


Figure 5.101 Profile of TPs 5 and 6, West Walls in Rockshelter B, 41BL866.

Few lithics were recovered from TP 5 and TP 6 (Table 5.198). Test pit 7 produced a small lithic assemblage from 10 to 90 cmbs, where bedrock was encountered, with the majority of flakes recovered from 10 to 40 cmbs. No diagnostics were found. Bone was the largest artifact class recovered from Shelter B. The bone extended from the surface to bedrock in almost each of the three units, with higher concentrations from 10 to 50 cmbs. Few snails were recovered from TP 5 and five were found in TP 6. The snail counts from TP 7 parallel the increase and decrease of lithic counts in that unit. Minimal burned rock and mussel shell were recovered from these three test units.

No tools were recovered from Shelter B.

The sample of lithic debitage recovered from Shelter B is extremely small, and includes only three identified types and four indeterminate chert categories (Table 5.204). Two of the three identified types are Southeast Range varieties,

while a single flake of Fort Hood Yellow represents the North Fort province. As in Shelter A, the indeterminates are overwhelmingly dominated by light brown flakes (71% of the indeterminate total). The binomial statistics, which should probably be taken with a grain of salt due to the small sample size, indicate that the indeterminates occur in greater than expected frequency, Fossiliferous Pale Brown flakes occur in expected frequency, and Heiner Lake Tan and Fort Hood Yellow occur in less than expected frequency when the entire assemblage is considered. All three types occur in the expected range when the indeterminates are excluded (Table 5.205).

Size variability in the assemblage is pronounced, with no concentration apparent in any particular size class (see Table 5.204). Most of the assemblage (87%) is decortified, and none of the cortex flakes are either obviously stream-abraded or obviously not abraded (Table 5.206).

In sharp contrast to the lithic assemblage, the faunal record recovered from Shelter B is remarkably large and diverse, and in fact surpasses all other sites investigated during this phase of investigation. However, given the small size of the shelter, low incidence of obvious signs of human modification, low lithic frequency, and recovery of the remains of several carnivores, the relationship of much of this material to human subsistence practices is tentative at best. The taxa recovered (Table 5.207) include both large and small birds; dog/wolf/coyote (*Canis* sp.); unidentified carnivore; rattlesnake and other unidentified snake remains; various rodents including pocket gopher, cricetid rodent, wood rat, cotton rat; cottontail and jackrabbit; weasel, mink, or skunk (*Mustelidae*); bobcat; black bear; opossum; racoon; and deer. Roughly 9% of the assemblage was spirally fractured, and less than 7% was visibly burned. Only three bones had obvious cutmarks; interestingly, while two of these were on unidentifiable fragments of a medium to large mammal, one was the ulna of an opossum. Mussel shell recovery was limited to a single valve of *Toxolasia*.

One radiocarbon age of 120 ± 70 BP was obtained from Level 3 in TP 6. This surprisingly young age, while not directly associated with a cultural stratum, suggests that the shelter fill is probably very young.

Table 5.204 Debitage Recovery by Size and Material Type, AU 2, 41BL886.

Lithic Material	Debitage Size							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
06-HL Tan	0	0	2	0	0	0	0	2
07-Foss Pale Brown	0	0	0	0	1	3	0	4
08-FH Yellow	0	0	0	0	1	0	0	1
<i>Subtotal</i>	0	0	2	0	2	3	0	7
Unidentified Types								
Indet Dk Brown	0	0	0	0	0	1	0	1
Indet Lt Brown	2	4	3	3	4	0	1	17
Indet Lt Gray	0	0	1	0	1	0	0	2
Indet Mottled	0	0	0	1	0	1	2	4
<i>Subtotal</i>	2	4	4	4	5	2	3	24
Total	2	4	6	4	7	5	3	31

5.29.3 Conclusions and Recommendations

Deposits in Shelter A appear to be substantially intact. Evidence of vandalism is present in the form of pits and backdirt piles, and glass was recovered from 0 to 10 cmbs in TP 3 and 30 to 40 cmbs in TP 1. However, no other evidence of substantial disturbance was observed. Although a large vandal pit (relative to the size of the shelter) is present in Shelter B, intact deposits are present

Table 5.205 Binomial Statistic Results, AU 2, 41BL866.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected	Expected	Results	Expected	Expected	Results
		Minimum	Maximum		Minimum	Maximum	
06-HL Tan	2	3	13	less	0	5	expected
07-Foss Pale Brown	4	3	13	expected	0	5	expected
08-FH Yellow	1	3	13	less	0	5	expected
Total Indet	24	3	13	more	na	na	na

in the large and small chambers as well as on the platform outside the opening of the shelter. In both shelters, the sediments appear to be a mix of internally derived, inorganic sediments (spall and limestone flour) and organic matter decomposing in situ.

The projectile points in Shelter A imply occupation during Late Prehistoric. Cultural and subsistence materials in both shelters are sufficient to provide a significant data base for pursuing technological and economic studies outlined in the research domains defined in the research design for Fort Hood (Ellis 1994b). However, because much of the faunal material is likely to be the result of animals either denning in the shelters or brought back to the shelter by a carnivore (particularly in shelter B), great care will be necessary to interpret the data. The shelter sediments also should be appropriate sources of geoarcheological data relevant to the reconstruction of paleoenvironmental and paleoclimatic models.

On this basis, site 41BL886 is evaluated as eligible for inclusion in the NRHP. Accordingly, the site should be preserved and protected from adverse impacts. Because the known eligible components are located in a setting that is frequently sought by artifact collectors, the site is vulnerable to vandalism. Protection efforts therefore should include measures to: (1) prevent subsurface disturbance by vandalism, and (2) prevent surface disturbance and manual excavations by military personnel. If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1993). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include manual excavation of a block or blocks, exposing buried features and living surfaces, up to 85 m² in Shelter

Table 5.206 Debitage Cortex Characteristics by Material Type, AU 2, 41BL866.

Lithic Material	Partial Cortex		Total
	Indeterminate	Not Applicable	
Identified Types			
06-HL Tan	0	2	2
07-Foss Pale Brown	1	3	4
08-FH Yellow	0	1	1
<i>Subtotal</i>	<i>1</i>	<i>6</i>	<i>7</i>
Unidentified Types			
Indet Dk Brown	0	1	1
Indet Lt Brown	2	15	17
Indet Lt Gray	1	1	2
Indet Mottled	0	4	4
<i>Subtotal</i>	<i>3</i>	<i>21</i>	<i>24</i>
Total	4	27	31

A and 15 m² in Shelter B. Assuming average depth in Shelter A of 1.4 m, and 0.9 m in Shelter B, up to 125 m³ of manual excavation may be needed. Mitigation efforts should be extended to surfaces outside the overhangs of the shelters to acquire data that may remain beneath major roof fall events because areas outside of both shelters (especially Shelter B) have the capacity to contain in situ materials beneath major roof fall slabs.

Table 5.207 Faunal Recovery, AU 2, 41BL866.

Vertebrates	Element																											Total				
	Calcaneus	Caudal Vertebra	Cervical Vertebra	Coracoid	Cranium	Dorsal vertebra	Epipubic bone	Femur	Fibula	Fused 3&4th metatarsals	Humerus	Indeterminate	Long bone	Lumbar Vertebra	Mandible	Metacarpal 3	Metapodial	Middle phalange	Pelvis	Permanent tooth	Phalange	Proximal Phalange	Radius	Rib	Scapula	Sternum	Thoracic vertebra		Tibia	Ulna	Left	
Artiodactyla	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Aves (large)	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Aves (small)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Canis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Carnivora	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
cf. Crocodylia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cricetidae (medium)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Didelphis virginiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Geomys bursarius	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Leporidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Lepus californicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mammalia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Mammalia (small)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mammalia (med/lg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Mammalia (medium)	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mammalia (micro/sm)	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102
Mammalia (sm/med)	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Mammalia (very lg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
Mustelidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Neotoma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Procyon lotor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Rodentia (large)	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Rodentia (medium)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rodentia (sm/med)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Rodentia (small)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Serpentes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sigmodon sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Sylvilagus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Ursus Americanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
Vertebrata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Viperidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82
Total	1	6	4	2	11	7	1	8	1	2	9	183	9	2	9	4	4	4	2	7	20	1	3	6	9	2	1	4	9	8	0	335
Bivalves																																
Toxolasma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

5.30 SITE 41BL888

5.30.1 Introduction

In December 1993, Mariah conducted test excavations at site 41BL888. Testing was designed to evaluate eligibility of the site for inclusion in the NRHP by documenting its data potential and comparing it with criteria outlined in the prehistoric archeological research design for Fort Hood (Ellis et al. 1994).

5.30.1.1 Location and Description

Site 41BL888 is located in the valley of an unnamed tributary of Oak Branch, in a canyon incised into the margin of the Manning surface. The site consists of a Holocene terrace bisected by the main drainage and its secondary tributaries (Figures 5.102 and 5.103). A vandalized midden, measuring about 25 x 5 m, is visible along the east bank of the drainage. Maximum site dimensions are 150 x 70 m (about 10,500 m², or 2.5 acres). For the purposes of this report, the site is included in the Nolan/Cowhouse area of the fort.

5.30.1.2 Previous Work

Dureka, M. Masson, and Strychalski first recorded this site on 29 January 1986. The site was located in a draw along a spring-fed drainage and at the base of the colluvial slopes. It consisted of a heavily vandalized midden on the east bank of the drainage and a burned rock and lithic scatter (apparently unvandalized) on the west bank. Cultural material observed included bifaces, retouched flakes, a graver, burin, cores, debitage, burned rocks, mussel shell, bone, a mano, and a metate. Although the midden deposit was not visible on the west bank, it was considered highly probable that this feature extended to this portion of the terrace. The soil matrix was described as an ashy humus mixed with colluvium, and the depth of the deposit was estimated at greater than 2 m. The site was judged 40% impacted by erosion and vandalism. A rockshelter (41BL886) noted at the head of the draw near the southern site boundary

and was judged to be possibly associated and thus, to warrant consideration along with the site.

On 29 February 1992, Mires and Doering revisited and reevaluated the site based on archeological and geomorphological criteria. Burned rocks, debitage, snails, mussel shell, and bone fragments were observed across the vandalized area. Aside from vandalized areas where depth of the midden deposit was at least 30 cm thick, overall surface visibility was limited by dense leaf litter. The cutbank provided good exposures of alluvial/colluvial fills up to 3 m thick; however, the relationship of the midden to these fills was unclear. Based on the potential for intact, buried cultural deposits, shovel testing was recommended.

On 30 March 1992, a crew excavated four 30 cm diameter shovel tests. Three tests were positive, with two of these located within the midden. The only artifacts recovered were flakes, and the greatest depth of recovered material was 40 cm. However, there was a potential for deeper cultural strata, so the eligibility status of the site remained uncertain. The site was recommended for avoidance or for formal testing if avoidance was not possible. Four to six 1 x 1 m manually excavated test pits were recommended for formal eligibility testing (Trierweiler 1994:A592-A594).

5.30.1.3 New Work

On 24 November 1993, in a telephone conversation with Gil Eckrich (DEH, Parks and Wildlife), permission was granted to proceed with test excavations on this site, even though this area is within the endangered species habitat. Eckrich considered the potential for adverse impacts of excavation to be limited. Four 1 x 1 m test pits were excavated (Table 5.208). Recovered cultural material is summarized in Table 5.209.

5.30.2 Results

On the basis of reconnaissance evaluation by Doering and a brief visit to the site during testing operations by Abbott and Frederick, a minimum of

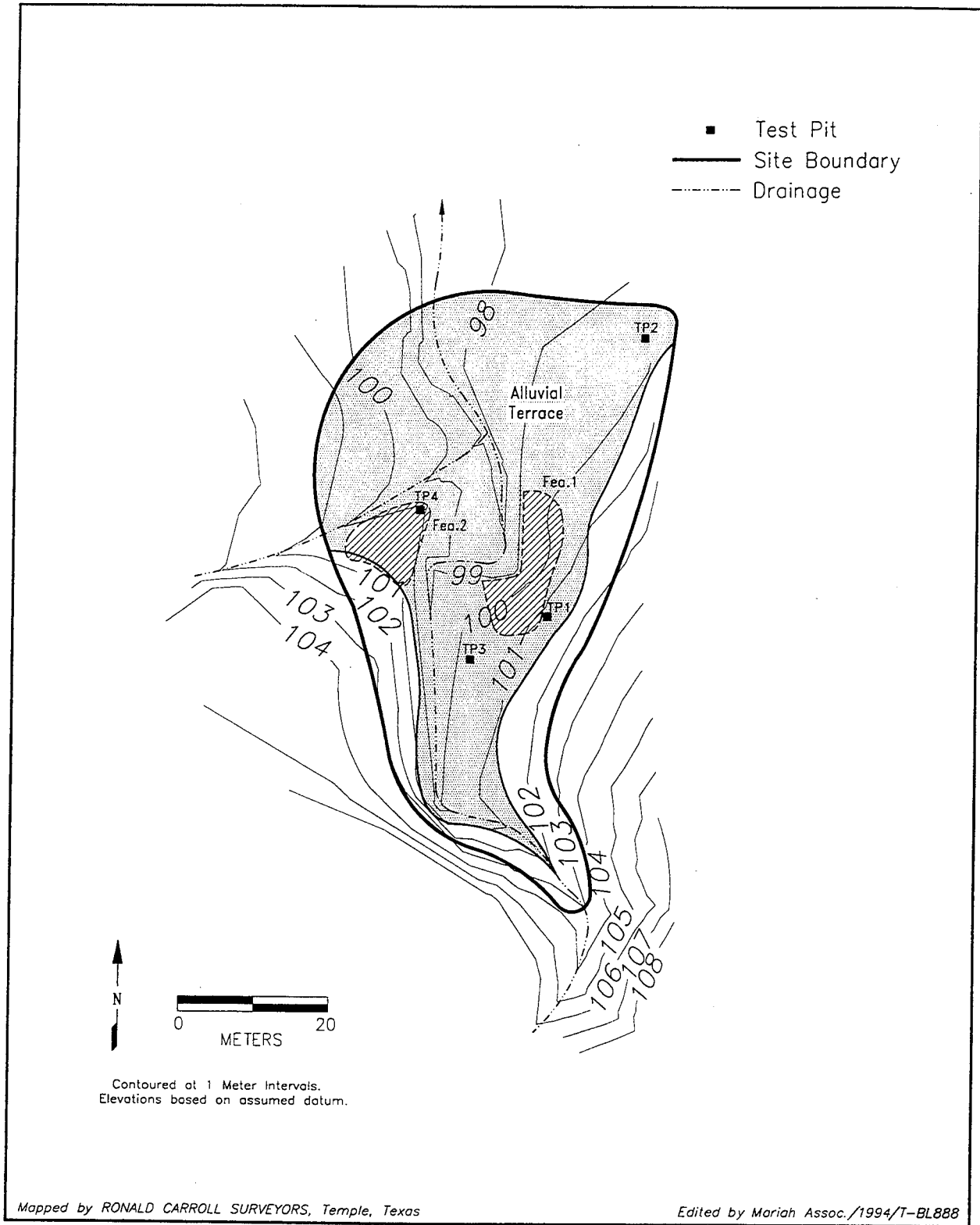


Figure 5.102 Site Map of 41BL888.



Figure 5.103 Overview of Site 41BL888, Looking South.

two Holocene alluvial fills and an older (late Pleistocene or early Holocene) alluvial/colluvial wedge were identified on the site. The two alluvial fills are suggested by the presence of a narrow, discontinuous terrace (T_{1B}) inset into a broader T_{1A} surface. The alluvial fills are composed of dark grayish brown (10YR3/2), gravelly clay loam and are indicative of flashy energy conditions, as is typical of most of the upland tributaries on the base. Soil development is weak to moderate, with A-C and A-Bk-C profiles predominant. Fine carbonate nodules in the older of the two well-exposed fills suggest moderate antiquity. The alluvial/colluvial deposits are light brown (10YR6/4) to reddish yellow (7.5YR 6/6), and are primarily overlain by, rather than interfingered with, the alluvial fills. More recent colluvium is also present on the site, and demonstrably interfingers with the alluvial deposits.

Test pit 1, excavated to 140 cmbs, was located on the east bank of the drainage, along the edge of a

vandalized surface area in an area where F 1 was visible in cutbank and vandal pit exposures (Figure 5.104). Level 1 was sterile, and two questionable flakes were recovered from levels 8 through 14 (Table 5.209). All definitive cultural material was found from 10 to 70 cmbs, and the burned rock midden deposits were buried 30 to 60 cmbs. Although not a dense, continuous zone of clast-supported burned rocks, the density of rock and flakes within the feature was sufficient to accord the feature midden status. Most burned rock was

Table 5.208 List of Treatment Units, 41BL888.

AU	Treatment Unit	Length (m)	Width (m)	Depth (m)
1	TP 1	1.0	1.0	140
1	TP 2	1.0	1.0	130
1	TP 3	1.0	1.0	130
1	TP 4	1.0	1.0	150

Table 5.209 Artifact Recovery by Test Pit, 41BL888.

LEVEL	TEST PIT 1					TEST PIT 2					TEST PIT 3					TEST PIT 4				
	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve	Bone	Lithics	Lithic tools	Burned rock (kg)	Bivalve Shell	Bone	Lithics	Lithic tools	Burned rock (kg)
1	0	0	4	0	0(0)	0	0	1	0	2(0.1)	0	1	7	2	0(0)	0	5	3	0	47(3)
2	0	0	13	2	4(5)	0	0	0	0	3(0.2)	0	3	8	1	7(0.5)	0	6	49	0	212(17.5)
3	0	0	11	0	6(5)	0	0	0	0	3(0.2)	0	7	30	0	7(0.3)	0	0	29	3	250(34)
4	0	0	20	1	30(25)	0	0	0	0	5(0.3)	6	20	6	0	4(0.3)	1	0	2	1	150(22)
5	0	0	4	1	30(30)	0	0	0	0	6(0.3)	0	0	11	0	4(0.5)	1	0	17	1	150(22)
6	0	0	12	1	20(20)	0	0	1	0	5(0.3)	1	2	32	2	9(1)	0	4	7	0	230(52)
7	0	0	3	0	4(1.5)	0	0	0	0	0(0)	2	6	18	4	17(3)	0	0	7	1	160(30)
8	0	0	0	0	0(0)	0	0	2	0	2(0.1)	0	0	27	1	22(3.5)	0	0	4	0	230(41)
9	27	1	0	2	0(0)	0	0	0	0	6(0.3)	0	7	80	2	23(3.5)	0	0	1	1	220(40)
10	0	0	0	0	0(0)	0	0	0	0	6(0.5)	1	17	51	2	30(3)	0	0	6	0	30(7)
11	0	0	1	0	0(0)	0	0	0	0	4(0.3)	0	25	38	2	5(0.5)	0	0	1	0	15(4)
12	0	0	1	0	0(0)	0	0	0	0	2(0.2)	0	4	19	1	0(0)	0	0	1	0	5(1)
13	0	0	0	0	0(0)	0	0	0	0	1(0.1)	0	0	0	0	0(0)	0	0	8	0	5(3)
14	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	1	0	2(0.5)
15	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	0(0)	0	0	0	0	1(0.5)
TOTAL	27	1	69	7	94(86.5)	0	0	4	0	45(2.9)	10	92	327	17	128(16.1)	2	15	136	7	1707(274.5)



Figure 5.104 Vandalized Area Next to TP1, 41BL888, Looking South.

5 to 10 cm in size, and many of the flakes showed evidence of heat treatment (e.g., reddish discoloration, potlid fracturing). Although no mussel shell was found in the test pit, four bone fragments were recovered 10 to 30 cmbs. Although the unit matrix was composed primarily of alluvium, it is located at the base of a very gradual slope and a light density of unburned rocks was noted within the feature matrix, suggesting a colluvial component to the fill. Based on the limited exposure, the integrity of unvandalized portions of the feature appears to be high.

Test pit 2 was placed at the northeastern edge of the site on a fairly open, flat expanse of T_{1A} terrace. Very little cultural material was recovered (Table 5.209), and excavation was halted at 130 cmbs. In TP 2, every level except for Level 7 contained a very light amount of cultural material (lithics and/or burned rocks). None of this material was obviously in primary context. The amount and size of unburned rock dramatically increased with depth. Based on these results, no

discrete occupations are apparent in this unit.

Test pit 3 was situated on the east bank of the drainage, southwest of TP 1. This unit is located on a lower portion of terrace (T_{1B}), which was also vandalized. The unit was terminated at 130 cmbs. In TP 3, cultural material was recovered from the surface to 120 cmbs (Table 5.209). Lithics, including heat-treated pieces, comprised the greatest percentage of cultural material, with a light density of bone and mussel shell umbos also recovered. From 0 to 60 cmbs, artifact frequencies fluctuated considerably from level to level. Burned rocks occurred in low numbers (between 0 and 9, weighing a total of 0.25 to 1 kg, per level). Dense pea-sized to fist-sized gravels in a clay loam matrix occurred from 0 to 40 cmbs, and tapered off to pea-sized gravels from 40 to 60 cmbs. From 60 to 100 cmbs, lithic frequencies were consistently high, and the number of burned rocks was two to three times that of the previous levels. The recovered burned rocks were small, with total weight per level averaging 3 to 3.5 kg for a count

of 20 to 30 rocks. Unburned rocks occurred in numbers equal to or sometimes much greater than burned rock. A pronounced deposit of pea-size gravels was encountered in the clay loam matrix from 80 to 90 cmbs, with the gravels dominating the eastern half of the unit, and burned and unburned rocks across the western half. The gravels and burned rock suggest that the deposits include substantial colluvial input. A Bulbar Stemmed arrow point was found in Level 2 and an untyped, resharpened dart point was found in Level 6. A quartz biface fragment was recovered from Level 10. Burned rock recovery fell off dramatically from 100 to 110 cmbs, and lithic and bone frequencies fell dramatically between 110 and 120 cmbs. No cultural material was found in the final level (120-130 cmbs). Based on burned rock and lithic counts, the artifact concentration from 60 to 100 cmbs probably constitutes a buried midden (possibly an extension of F 1).

Test pit 4 is situated on an unvandalized T_{1A} terrace wedge located on the west bank of the main drainage and south of a secondary tributary. Feature 2, a burned rock midden, was found from 0 to 108 cmbs. Lithics were recovered in every level, with sporadic recovery of bone, mussel shell umbos, and charcoal (Table 5.209). A Scallorn point was found in Level 4. Burned rocks, which averaged 5 to 10 cm in size, were tightly concentrated across the unit. Level 1 contained 47 burned rocks, whereas the count dramatically increased to 200 to 250 in Levels 2 and 3. The number decreased to 150 in the following level, with another sharp drop (n=22) in Level 5. Once again, burned rock was ubiquitous (160 to 230 pieces per level) from 60 to 90 cmbs. The low count previously noted in 40 to 50 cmbs may represent a transition zone between two separate components (10 to 40 and 50 to 90 cmbs) of the midden. Feature 2 continued through Level 10 and halfway into Level 11 (base at 108 cmbs). A combined total of 10 flakes and 45 burned rocks were found in these levels. At 108 cmbs and continuing to 130 cmbs, matrix across the entire unit changed from a black clay loam to a brown/gray brown clay loam containing unburned

Table 5.210 Projectile Points, AU 1, 41BL888.

Point Type	Lithic Material			Total
	06-HL Tan	17-Owl Crk Black	Indet Lt Brown	
Bulbar Stemmed	1	0	0	1
Other Dart	0	1	0	1
Scallorn	0	0	1	1
Total	1	1	1	3

rocks and gravels. From 130 to 150 cmbs, the deposit was a brown silty loam with gravels and nodules. A light density of debitage and/or burned rocks was found in the levels below the feature.

As stated above, a total of three projectile points were recovered from the excavations (see Table 5.210). An additional 30 chipped stone artifacts were also recovered, including two multiple platform cores (Table 5.211). The tools are of a variety of chert materials with a large proportion being of indeterminate varieties (43%). Southeast Range materials contribute 76% of the identified and Cowhouse varieties, 22%, only one specimen (6%) of North Fort was present.

Nine recognized chert types and seven indeterminate chert categories are represented in the debitage assemblage (Table 5.212). Overall, 27% of the entire assemblage was identified. When the entire assemblage was considered, the aggregate indeterminate category and Fossiliferous Pale Brown occurred in greater than expected frequencies, Heiner Lake Tan occurred in expected frequency, and the remainder of identified types occurred in less than expected frequencies. When the indeterminates were excluded, Heiner Lake Tan and Fossiliferous Pale Brown occurred in greater than expected frequencies; Anderson Mountain

Table 5.211 Cores and Nonprojectile Point Lithic Tools, AU 1, 41BL888.

Lithic Material	Core Type		Tool Type								Total	
	multiple platform	adze	Chopper	early stage biface	end scraper	late stage biface	middle stage biface	preform	side scraper	uniface		utilized flake
02-C White	0	1	0	0	0	0	0	0	0	0	0	1
06-HL Tan	0	0	1	0	1	0	0	0	0	3	1	6
07-Foss Pale Brown	1	0	0	0	1	0	0	0	0	2	0	4
09-HL Tr Brown	0	0	0	1	0	1	0	0	0	0	0	2
15-Gry/Brn/Grn	0	0	0	0	0	1	0	0	0	0	0	1
18-C Mottled	0	0	1	0	0	0	0	0	0	1	0	2
26-C Striated	0	0	0	0	0	0	0	0	0	1	0	1
Indet Dk Brown	0	0	0	0	0	0	0	0	0	1	0	1
Indet Dk Gray	0	0	0	0	0	0	0	0	0	0	1	1
Indet Lt Brown	0	0	0	1	0	0	1	0	2	0	1	5
Indet Lt Gray	0	0	0	0	0	0	0	0	0	1	0	1
Indet Misc.	0	0	0	0	0	0	0	1	0	0	0	1
Indet Mottled	0	0	0	0	0	1	0	0	0	0	0	1
Indet White	1	0	0	0	0	1	0	0	0	1	0	3
Total	2	1	2	2	2	4	1	1	2	10	3	30

Gray and Heiner Lake Translucent Brown occurred in expected frequencies; and Heiner Lake Blue, Cowhouse White, Fort Hood Yellow, East Range Flat, and Owl Creek Black occurred in less than expected frequencies (Table 5.213). Overall, the identified assemblage indicates a principal reliance on the Southeast Range chert province, with occasional exploitation of cherts typical of the North Fort province. The indeterminate cherts are dominated by light brown varieties (57% of the total) which is also consistent with a primary reliance on Southeast Range cherts. Although chert identified as Anderson Mountain Gray (a West Fort Province chert) occurs in relative frequency, there is reason to believe that this material actually represents a local source that has not been formally identified (see Chapter 8.0).

Although flakes representing all size grades were recovered, the majority are relatively large (68% are between 1.2 cm and 5.2 cm in size), indicating that either relatively early stages of manufacture are represented or the technology involved production of relatively large flakes, or both (Table 5.212). Cortex data reveal that a relatively high percentage (36%) of the total assemblage are cortical flakes, including several primary decortification flakes, supporting the interpretation that relatively early-stage lithic reduction (or all stages of lithic reduction) is represented (Table 5.214).

The faunal record is moderately diverse and includes one very interesting taxon. Identified taxa include unidentified artiodactyl, jackrabbit, deer, raccoon, and, interestingly, pronghorn (Table

5.215). The latter is represented by a permanent tooth from the somewhat sparse midden deposit in TP 3, and indicates that a relatively open grassland was in the vicinity at the time the feature was accreting. Although most of the faunal remains probably represent food resources, relatively little of the material shows signs of intentional cultural modification. Only 9% of the bone evinces burning, and spiral fractures occur on only 28% of the specimens. Seven mussel shells and many more mussel shell fragments, representing a minimum of three different species, were recovered from the site. None of these species are likely to have inhabited the local stream, and probably represent individuals collected from Cowhouse Creek.

Like the recovered diagnostics, the single radiocarbon age obtained from the site suggests a Late Prehistoric occupation. This age, 643 ± 37 BP, was obtained on material from TP 4, Level 3. However, a suite of ten A/I ratios on *Rabdotus* from TP 3 Level 10 suggest that the site was occupied over a longer period. Nine of these shells yielded radiocarbon-equivalent ages between approximately 1500 and 2000 BP, while the tenth yielded an age of approximately 2800 BP, and is interpreted as a reworked older specimen. This suggests that accumulation of the midden, if it does indeed represent a single feature, began during the Transitional Archaic, or alternatively, that two temporally distinct features are present. It is also interesting to note that this age is roughly associated with the pronghorn remains (which came out of the same test pit one level higher) and thus gives a rough indication of the period when an open grassland community probably existed in the area. A second suite of ten A/I ratios was obtained from TP 4, Level 8, on the west side of the tributary. This suite yielded nine values ranging from 0.0261 to 0.589 (which regress to radiocarbon-equivalent ages between approximately 750 and 1600 BP) and a tenth value (0.589) that almost certainly represents a thermal anomaly (27,000 BP equivalent age). Although all of the first nine ages may be valid indications of the span of midden use, the two lowest ages are tentatively

Table 5.212 Debitage Recovery by Size and Material Type, AU 1, 41BL888.

Lithic Material	Debitage Size							Total
	< 0.5	0.5 - 0.9	0.9 - 1.2	1.2 - 1.8	1.8 - 2.6	2.6 - 5.2	> 5.2	
Identified Types								
HL Blue (1& 10)	0	0	1	3	0	1	0	5
02-C White	0	0	0	3	0	0	0	3
03-AM Gray	0	0	0	4	2	2	0	8
06-HL Tan	0	0	4	6	15	18	0	43
07-Foss Pale Brow	2	0	0	14	17	31	7	71
08-FH Yellow	0	0	0	0	0	1	0	1
09-HL Tr Brown	0	0	0	7	5	5	0	17
11-ER Flat	0	0	0	0	1	0	0	1
17-Owl Crk Black	0	0	1	0	0	0	0	1
<i>Subtotal</i>	2	0	6	37	40	58	7	150
Unidentified Types								
Indet Dk Brown	3	4	5	8	5	2	0	27
Indet Dk Gray	2	4	11	3	1	1	0	22
Indet Lt Brown	11	24	49	57	47	29	2	219
Indet Lt Gray	1	7	6	2	2	5	0	23
Indet Misc.	1	7	4	14	7	5	1	39
Indet Mottled	0	0	2	3	0	3	0	8
Indet White	0	3	16	11	10	4	0	44
<i>Subtotal</i>	18	49	93	98	72	49	3	382
Quartz	1	0	0	0	1	0	0	2
Total	21	49	99	135	113	107	10	534

accepted as indicative of the age of deposition (approximately 800 BP).

5.30.3 Conclusions and Recommendations

This site contains either two large burned rock middens or, possibly, a single midden that has been bisected by incision of the tributary. Although moderately disturbed by vandalism, these features are at least partially buried by alluvium and retain considerable integrity. The few recovered diagnostics and the single radiocarbon age are consistent with a Late Prehistoric occupation (Turner and Hester 1985). However approximate, radiocarbon-equivalent ages based on

Table 5.213 Binomial Statistic Results, AU 1, 41BL888.

Lithic Material	N	Including Indeterminates			Excluding Indeterminates		
		Expected Minimum	Expected Maximum	Results	Expected Minimum	Expected Maximum	Results
HL Blue (1 & 10)	5	40	67	less	9	24	less
02-C White	3	40	67	less	9	24	less
03-AM Gray	8	40	67	less	9	24	less
06-HL Tan	43	40	67	expected	9	24	more
07-Foss Pale Brown	71	40	67	more	9	24	more
08-FH Yellow	1	40	67	less	9	24	less
09-HL Tr Brown	17	40	67	less	9	24	expected
11-ER Flat	1	40	67	less	9	24	less
17-Owl Crk Black	1	40	67	less	9	24	less
Quartz	2	40	67	less	9	24	less
Total Indet	384	40	67	more	na	na	na

A/I ratios of snails from the site suggest that at least some of the cultural material dates to the Transitional Archaic period. Moreover, the geomorphic context of material recovered from deeper in the test pits and overall thickness of the midden deposit in TP 3 and TP 4 suggest that a longer occupation or multiple discrete occupations may be represented. If the middens do indeed contain a substantial Late Prehistoric component, then they contrast strongly with the majority of Central Texas middens examined to this point, according to Prewitt (1991). Materials recovered during the testing phase indicate that a variety of economic and paleoenvironmental data are represented at the site, and that considerable in situ deposits remain. Relative to the issues outlined in the research design for Fort Hood (Ellis et al. 1994), the research potential of this site is high.

On the basis of the above, we judge 41BL888 to be significant and eligible for inclusion in the NRHP by virtue of containing cultural and environmental data that can contribute substantially to the current state of development of prehistory for Central Texas in general, and the Fort Hood area in particular. We therefore recommend that the site be avoided and protected to prevent the loss of significant scientific information.

Protection measures designed to prevent continued vandalism are particularly important given the degree of exposure from previous vandal pits, the shallow burial of the cultural strata, and the site's proximity to, and ready access from, a major road.

If protection is not possible, then adverse impacts to the site should be mitigated by means of a carefully designed and implemented program of data recovery. Such a program should be conducted under a site-specific research framework which identifies and targets specific key data sets delineated in the overall research design (Ellis et al. 1994). Importantly, the key data sets should reflect the then-current state of research, which may have progressed since 1994.

Mitigative data recovery may include backhoe trenches and manual excavation of at least two blocks, exposing buried features and living surfaces, up to 100 m² in area. Block excavations should be focused on both sides of the stream near F 1 and 2, and should be placed: (1) to avoid previously vandalized areas and (2) include a sample of both alluvial units and alluvial/colluvial wedges on the valley margin. Given an average depth of about 130 cm, manual block excavations could reach a total volume of 130 m³. Given the

Table 5.214 Debitage Cortex Characteristics by Material Type, AU 1, 41BL888.

Lithic Material	All Cortex		Partial Cortex			No Cortex	Indeterminate	Total
	Unabraded	Indeterminate	Abraded	Unabraded	Indeterminate			
Identified Types								
HL Blue (1 & 10)	0	0	0	0	1	4	0	5
02-C White	0	0	0	0	0	3	0	3
03-AM Gray	1	0	0	0	2	5	0	8
06-HL Tan	0	0	0	7	1	35	0	43
07-Foss Pale Brown	0	0	2	6	31	31	1	71
08-FH Yellow	0	0	0	0	0	1	0	1
09-HL Tr Brown	0	0	3	0	2	12	0	17
11-ER Flat	0	0	0	0	1	0	0	1
17-Owl Crk Black	0	0	0	0	0	1	0	1
<i>Subtotal</i>	<i>1</i>	<i>0</i>	<i>5</i>	<i>13</i>	<i>38</i>	<i>92</i>	<i>1</i>	<i>150</i>
Unidentified Types								
Indet Dk Brown	0	0	1	1	7	18	0	27
Indet Dk Gray	0	0	0	0	2	17	3	22
Indet Lt Brown	0	3	1	9	54	150	2	219
Indet Lt Gray	0	0	0	2	6	13	2	23
Indet Misc.	0	0	0	3	11	22	3	39
Indet Mottled	0	0	0	0	4	4	0	8
Indet White	0	4	0	6	6	26	2	44
<i>Subtotal</i>	<i>0</i>	<i>7</i>	<i>2</i>	<i>21</i>	<i>90</i>	<i>250</i>	<i>12</i>	<i>382</i>
Quartz	0	0	0	0	0	2	0	2
Total	1	7	7	34	128	344	13	534

nature of the inter-fingered alluvial and colluvial deposits in these areas of the site, excavation should proceed by natural rather than arbitrary levels whenever possible. Backhoe trenches should be excavated to provide exposures for geoarcheological studies of landscape processes and to provide exposures for stratigraphic correlation of block excavations to natural stratigraphy. Geoarcheological backhoe trenches should be carefully monitored because of the possibility that currently unidentified, intact features or occupations may be present at depth.

Table 5.215 Faunal Recovery, AU 1, 41BL888.

	Element										Total	
	Antler	Calcaneus	Fused 3&4th metata	Humerus	Indeterminate	Long bone	Permanent tooth	Tibia	Ulna	left		right
Vertebrates												
Antilocapra americana	0	0	0	0	0	0	1	0	0	0	0	1
Artiodactyla	0	0	1	1	0	0	0	1	0	0	0	3
Lepus californicus	0	1	0	0	0	0	0	0	0	0	0	1
Mammalia (med/lg)	0	0	0	0	55	0	0	0	0	0	0	55
Odocoileus sp.	2	0	1	0	0	0	0	1	0	0	0	4
Procyon lotor	0	0	0	0	0	0	0	0	1	0	0	1
Vertebrata	0	0	0	0	39	1	0	0	1	0	0	43
Total	2	1	2	1	94	1	1	2	2	0	0	108
Bivalves												
Amblema plicata	0	0	0	0	0	0	0	0	0	1	0	1
Lampsilinae	0	0	0	0	0	0	0	0	0	2	0	2
Lampsilis hydiana	0	0	0	0	0	0	0	0	0	1	0	1
Unionacea	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	5	0	5

