PHASE I SURVEY OF 3,511 ACRES AT FORT LEONARD WOOD, PULASKI Co. MISSOURI

by Paul P. Kreisa and Brian Adams

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Kreisa, Paul P. and Brian Adams

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Public Service Archaeology Program
Department of Anthropology, 109 Davenport Hall
607 S. Mathews
University of Illinois
Urbana, IL 61801

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From January 1998 through June 1998 the Public Service Archaeology Program of the University of Illinois at Urbana-Champaign conducted a Phase I survey of 3,511 acres within the Fort Leonard Wood Military Reservation, Pulaski County, Missouri, for the United States Army Construction Engineering Research Laboratories. The investigations were designed to provide archaeological inventory and management recommendations for unsurveyed tracts and to test the validity of a model predicting prehistoric site locations. The survey documented 36 previously unreported archaeological sites and isolated finds and seven previously recorded sites. This total includes a Late Woodland site complex, known as the Lohraff Peninsula complex, located along Roubidoux Creek. Seventeen sites are recommended for Phase II National Register of Historic Places evaluation. Specific evaluation tasks are discussed for each site. The results of the survey suggest that the GIS prehistoric site locational model is relatively robust for cairn and cave/rockshelter sites, but minor deviations from the expected occur in some areas for prehistoric open-air sites.

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PHASE I ARCHAEOLOGICAL SURVEY OF 3,511 ACRES

AT FORT LEONARD WOOD, PULASKI COUNTY, MISSOURI

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By:

Paul P. Kreisa
and
Brian Adams

Paul P. Kreisa, Principal Investigator
Public Service Archaeology Program
Department of Anthropology
University of Illinois at Urbana-Champaign
109 Davenport Hall
607 South Mathews Avenue
Urbana, Illinois 61801

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From January 1998 through June 1998 the Public Service Archaeology Program of the University of Illinois at Urbana-Champaign conducted a Phase I survey of 3,511 acres within the Fort Leonard Wood Military Reservation, Pulaski County, Missouri, for the United States Army Construction Engineering Research Laboratories. The investigations were designed to provide archaeological inventory and management recommendations for unsurveyed tracts and to test the validity of a model predicting prehistoric site locations. The survey documented 36 previously unreported archaeological sites and isolated finds and 7 previously recorded sites. This total includes a Late Woodland site complex, known as the Lohraff Peninsula complex, located along Roubidoux Creek. Nineteen sites are recommended for Phase II National Register of Historic Places evaluation. Specific evaluation tasks are discussed for each site. The results of the survey suggest that the GIS prehistoric site locational model is relatively robust for cairn and cave/rockshelter sites, but minor deviations from the expected occur in some areas for prehistoric open-air sites.

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ACKNOWLEDGMENTS

Projects of the scope and size of the Phase I archaeological survey described herein are completed only with the help of many individuals. The initiation of this project was aided by Dr. Richard Edging of Fort Leonard Wood and Suzanna Walaszek of USACERL. At the University of Illinois, Dr. Janet Dixon Keller provided support as department head. All of these individuals provided the administrative support so necessary for conducting projects of this nature.

The completion of the fieldwork was aided by a number of individuals. Dr. Richard Edging of Fort Leonard Wood coordinated access for fieldwork with Range Control. For USACERL, Dr. Michael Hargrave was project Contracting Officer's Technical Representative and Ms. Suzanna Walaszek acted as a liaison between PSAP, Fort Leonard Wood, and USACERL. Thanks also to Suzanna for assisting in fieldwork associated with 23PU744 and preparing an excellent map of the site for use in this report. The archaeological field team included Gregory Walz as field supervisor, and field technicians Mary Aviles, Charles Broz, Darryl Gundrum, Marcy Gurski, Judd Hackl, Amy Judd, Mike Power, Virginia Roof, and Matt Walkowiak. As much of the fieldwork was conducted during the spring and summer, working conditions were often quite demanding, and we are especially grateful to the entire field crew for their hard work, dedication, and enthusiasm. Once fieldwork was completed, many individuals on staff at PSAP conducted the laboratory tasks associated with this project. Report production could not have been completed without the dedicated assistance of Susan Brannock-Gaul who produced the computer and line drawings included in this report, and Jacqueline McDowell provided editorial advice and coordinated the report production.

We thank all of these individuals for their help with this project. They should be pleased that their efforts have aided in furthering the scientific, cultural, and historical understanding of the study region. I hope that the content and contributions of this report have made their efforts worthwhile.

Paul Kreisa and Brian Adams
February 1999

CHAPTER 1. INTRODUCTION

In January 1998 the United States Army Construction Engineering Research Laboratories (USACERL) contracted with the University of Illinois at Urbana-Champaign to conduct a Phase I survey of 3,511 acres (1,421 ha) at the Fort Leonard Wood Military Reservation in Pulaski County, Missouri (Figure 1). The project was conducted by personnel from the University of Illinois Public Service Archaeology Program, with fieldwork taking place between January and June 1998. This report details the results of the investigations, provides recommendations for further archaeological work at specific sites, and offers both refinements and alternatives to current prehistoric settlement and site location models.

Federal cultural resource laws, including the National Historical Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800 (Sections 106 and 110), as well as Army Regulation 200–4, require the identification and assessment of archaeological sites on federal property. The purpose of this archaeological site inventory survey is to fulfill these mandates, in part, by locating archaeological sites and evaluating their potential eligibility for inclusion in the National Register of Historic Places (NRHP). To date, over 45,600 acres, or almost two-thirds of the total area within Fort Leonard Wood, have been surveyed.

The areas surveyed during the current project are located in three separate tracts (Figure 2). Northernmost is a tract between the cantonment and Roubidoux Creek, called herein the West Cantonment Tract, comprising 2,076 acres (840 ha) of tributary drainages and uplands. The Big Piney Survey Tract, on the east-central portion of the base, consists of 857 acres (347 ha) of tributary drainages and uplands. The Roubidoux Creek Survey Tract is a very irregularly shaped parcel of uplands, bluffs, terraces, and floodplain on the southwestern portion of the base totaling 578 acres (234 ha).

The archaeological investigations used reconnaissance techniques typically employed in the Midwest. In all survey areas, surface visibility was less than 30 percent, necessitating the excavation of posthole tests at 20-m intervals, with all sediments screened through 6.35-mm mesh hardware cloth. Soil profiles were documented for posthole tests that contained cultural material. Steeply sloped areas (greater than 20 percent) were visually inspected for sites such as mounds, cairns, and caves/rockshelters, but systematic subsurface testing was not conducted. When located, all sites were further documented. These field methods were employed uniformly throughout the uplands. As specified in the USACERL Statement of Work, terrace and floodplain formations along Roubidoux Creek were investigated differently. Field methods, including depth of excavations and spacing between subsurface tests, differed by terrace formation. The specific methods used while investigating terrace and floodplain formations are presented in Chapter 5.

In accordance with the Statement of Work, locations with fewer than three artifacts within a 20-m diameter area were considered isolated finds. Archaeological Survey of Missouri (ASM) site forms were completed for areas of scatter with three or more artifacts of greater than 50 years of age. Isolated finds are identified by field number. All sites and isolated finds were located on standard United States Geological Survey (USGS) 7.5' series topographic maps and documented by site-specific sketch maps, photographs, the collection of artifacts, and notes detailing fieldwork conducted, topography, environment, disturbances, and other aspects of site condition. As well, the Universal Transverse Mercator (UTM) coordinates of all sites and isolated finds were determined by use of global positioning system (GPS) equipment.

As a result of this project, 36 previously unrecorded sites and isolated finds were located. These include 24 sites and 12 isolated finds. The newly

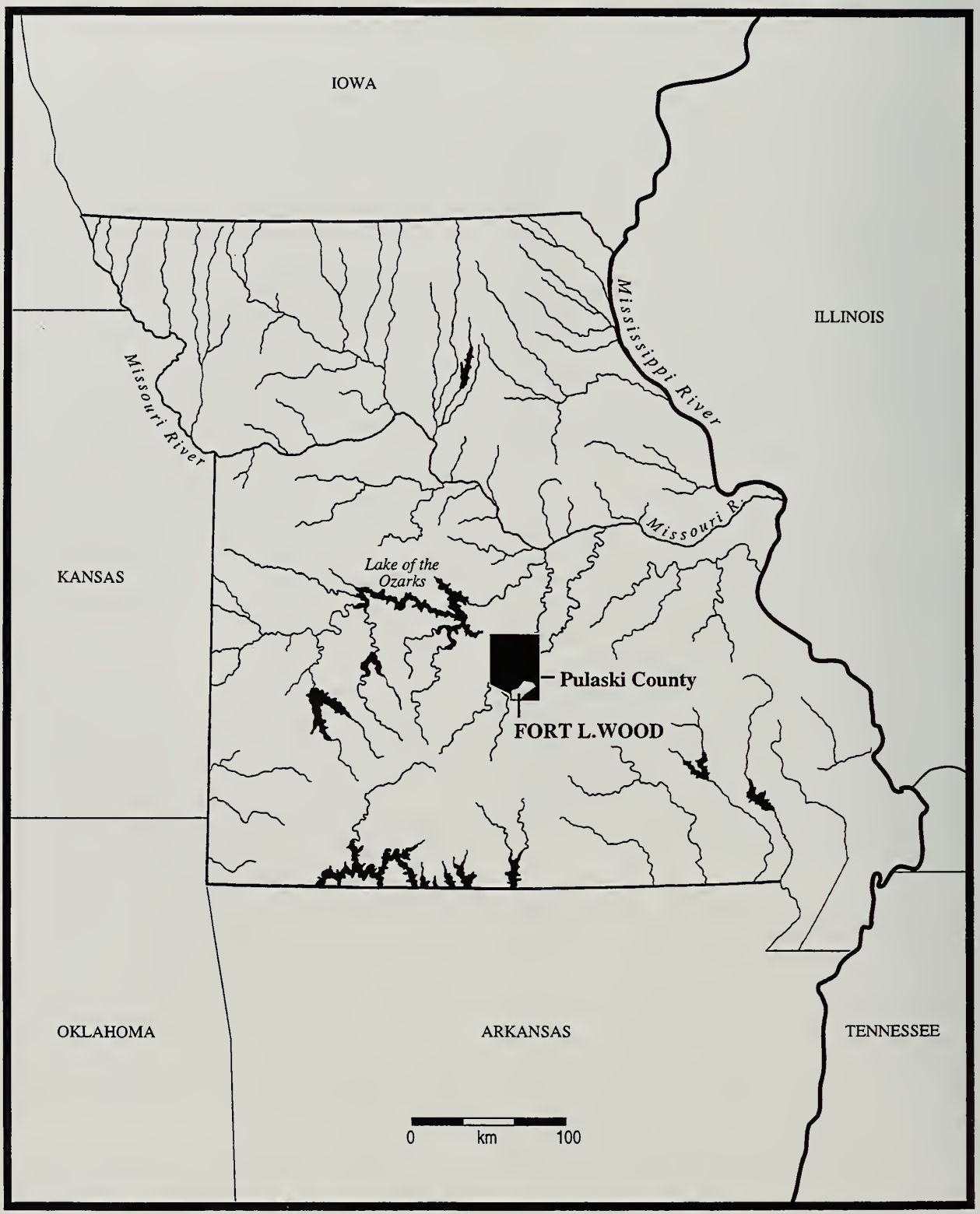

Figure 1. Location of Fort Leonard Wood, Missouri.

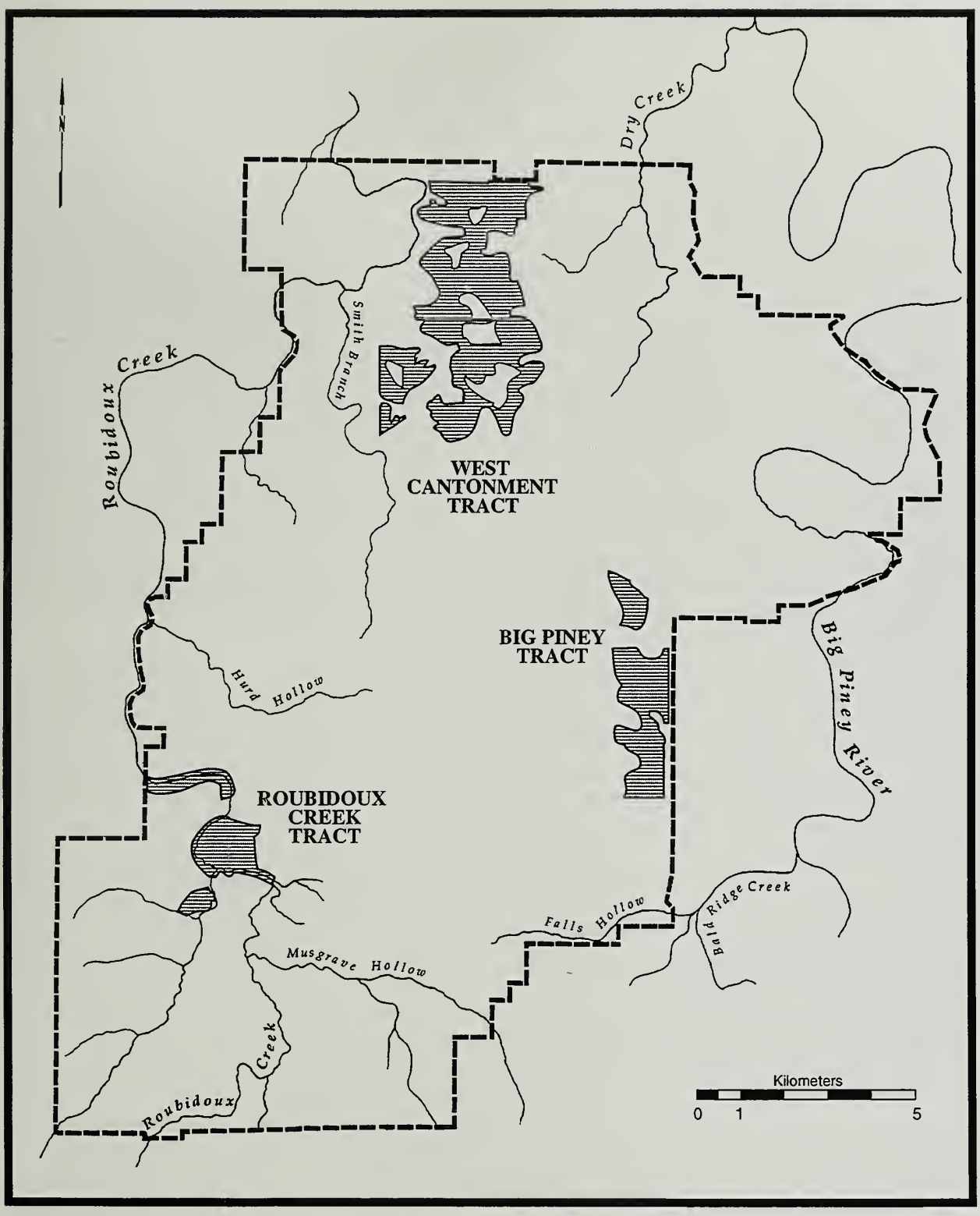

Figure 2. Location of Survey Tracts Investigated at Fort Leonard Wood.

identified sites include 21 prehistoric and two historic sites. An additional seven historic sites that had been recorded prior to this project were relocated. Updated information is provided for these sites. One previously recorded prehistoric site, 23PU613, was not relocated. An inventory of material by provenience from each site and isolated find is presented in Appendix A. As specified in the Statement of Work, USGS quadrangle maps indicating the location of the sites and isolated finds are included in a separate appendix (Appendix B) because of the sensitive nature of site location information. Archaeological Survey of Missouri site forms have been completed for all sites (Appendix C). All artifacts and documentation associated with this project have been submitted to USACERL with the final report.

The remainder of this report provides environmental and cultural overviews of the Fort Leonard Wood area, details the research goals and field and laboratory methods used during this project, and describes and interprets the results of the Phase I archaeological site inventory of 3,511 acres. Chapter 2 is a brief description of the regional environmental setting. Chapter 3 provides a summary of the regional prehistoric chronology and an overview of previous work performed on and near Fort Leonard Wood. Chapter 4 provides the underlying research orientation and details specific research issues that are addressed in Chapter 7. Chapter 5 outlines the field and laboratory methods and procedures. Chapter 6 presents the results of the investigations including site descriptions, descriptions of the investigations conducted and their results, description and analyses of the artifact assemblages, interpretation of the results, and recommendations for further work. Chapter 7 addresses the results of the project in terms of the research issues outlined in Chapter 4. Chapter 8 summarizes the results of the project and provides a summary of NRHP recommendations for each site. References Cited are followed by appendices, which include an artifact inventory (Appendix A), site location maps (Appendix B), and ASM site forms (Appendix C). Appendices B and C are bound separately as requested in the Statement of Work.

CHAPTER 2.
ENVIRONMENTAL SETTING

Fort Leonard Wood, Pulaski County, Missouri, is located within the Salem Plateau Section of the Ozark Plateau region (Figure 3). The rolling landscape is characterized by upland ridge plateaus that are separated by deeply entrenched stream valleys (Figure 4). Caves, rockshelters, solution cavities, and sinkholes are numerous and were significant factors in the prehistoric settlement of the Fort Leonard Wood area. At present, much of the area is covered by oak-hickory forest with scattered junipers. This section presents a detailed overview of the environment of the Fort Leonard Wood area including geology and physiography, soils, climate, and floral and faunal communities. A broader overview of the local environment can be found in Wood et al. (1995). Environmental descriptions of the three survey tracts are included in Chapter 6.

Geology and Physiography

Fort Leonard Wood is located in the Salem Plateau Section of the Ozark Plateau region (Whitefield 1989) of the Interior Highlands Physiographic Province (Madole et al. 1991). The unglaciated Ozark Plateaus overlie a broad asymmetrical cratonic dome; subaerial erosion has exposed the dome's Precambrian core in the St. Francois Mountains (Thornbury 1965). According to Allen et al. (1975), Paleozoic tectonic features are a reflection of Precambrian tectonic elements in that deformation initially occurred during the Precambrian. Erosion of the uplifted Precambrian surface was followed by subsidence during the early Paleozoic era. Tectonic activity throughout the Paleozoic resulted in the formation of arches, basins, and faults. Toward the end of the Paleozoic, major uplift, which may be related to the Appalachian Orogeny (Thornbury 1965), occurred along the Ozark Arch. Final uplift, followed by tectonic stability, occurred during the Mesozoic Cretaceous period for most of the Ozark region but extended into the Tertiary and Quaternary in the St. Francois Mountains.

Post-Cretaceous erosion of the gently dipping Paleozoic sedimentary rocks surrounding the Ozark Arch produced a series of escarpments. The Salem Plateau is bordered on the west and east respectively by the Burlington (Eureka Springs) and Crystal escarpments (Marbut 1896). The Eureka Springs Escarpment marks the boundary between younger Mississippian rocks of the Springfield Plateau to the west and the older Ordovician-aged rocks of the Salem Plateau to the east (Thornbury 1965). Three major rock formations outcrop in the Fort Leonard Wood area (Whitefield 1989). The oldest formation, early Ordovician Gasconade dolomite, is exposed in about 12 percent of the installation (Albertson et al. 1995). It is typically a light brownish gray, cherty dolomite that is massive in its upper part and thin to medium-bedded in its lower part (Allen et al. 1975); beds of chert can be more than 1.5 m thick (Whitefield 1989). The Gasconade dolomite is overlain by cherty dolomite and sandstone of the Roubidoux Formation. The Roubidoux Formation is exposed in about 64 percent of the installation and forms the broad upland in its northern part (Albertson et al. 1995). The dolomite is brown to brownish red, fine to medium crystalline rock that is locally sandy (Whitefield 1989) and can contain up to 50 percent chert (Albertson et al. 1995). The Roubidoux sandstone is brown to red in color and composed of fine to medium sand-sized quartz grains. It is locally cherty, and the chert is sandy and oolitic to banded and porcelaneous (Albertson et al. 1995). Jefferson City dolomite is the youngest Ordovician rock, and it outcrops in 17 percent of the base (Albertson et al. 1995). It is a cherty, gray to brown (Whitefield 1989), medium-bedded, fine to medium crystalline dolomite that is locally argillaceous with lenses of orthoquartzite, shale, and conglomerate (Allen et al. 1975).

Although it overlies a structural lowland, the Salem Plateau is a topographic upland (Marbut 1896). Local relief on the upland surface is com monly less than 30 m but can be up to 150 m along

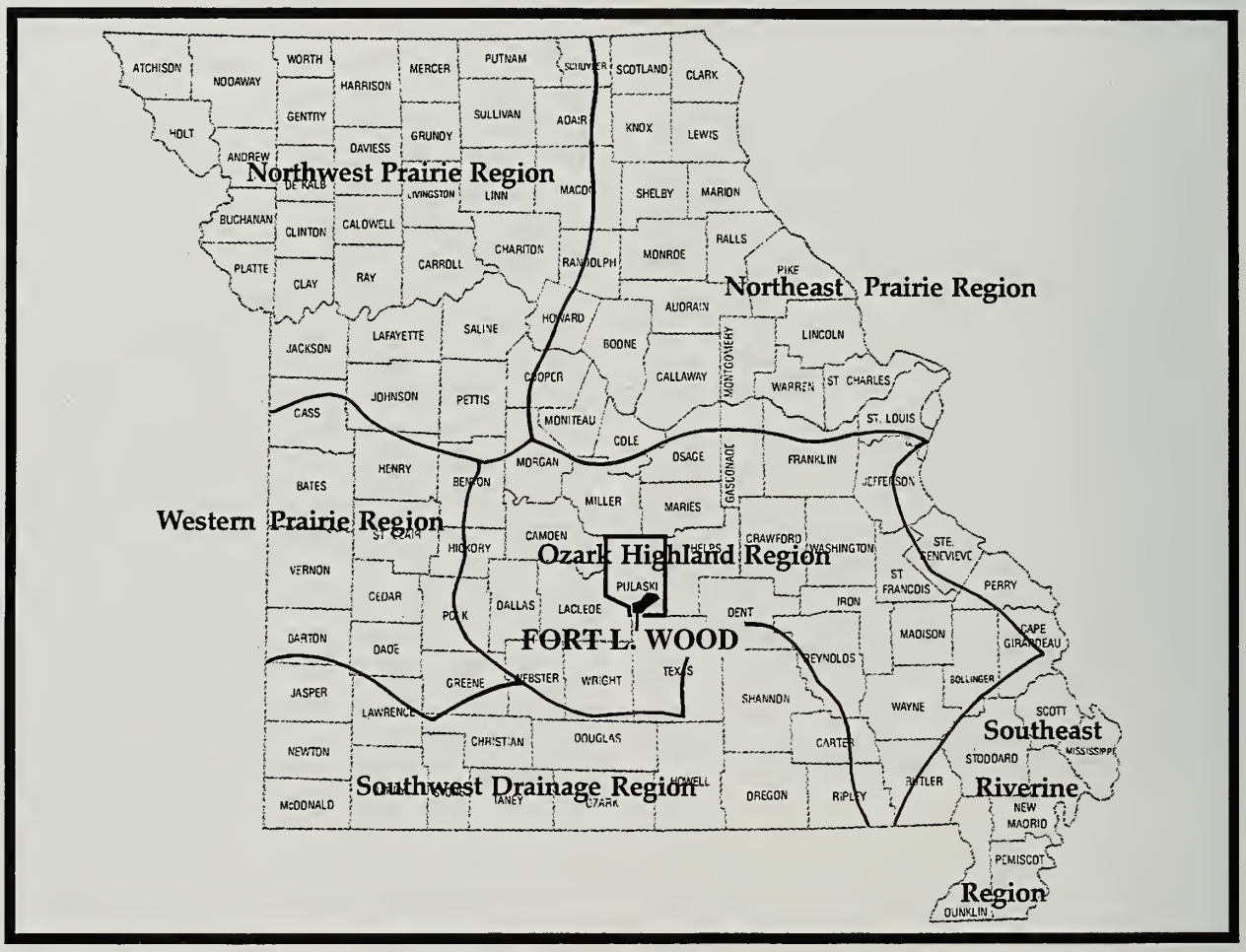

Figure 3. Physiographic Provinces of Missouri and the Location of Fort Leonard Wood (adapted from Chapman 1975).

major streams (Thornbury 1965). Present-day drainage in the Ozarks probably began no later than the Tertiary (Allen et al. 1975; Thornbury 1965). The Big Piney River and Roubidoux Creek, which are north-flowing tributaries of the Gasconade River, itself a north-flowing tributary of the Missouri River, display a radial drainage pattern reflective of the underlying domal structure (Marbut 1896). A Tertiary age for valley incision implies that the uplands overlooking Roubidoux Creek and Big Piney River are also pre-Pleistocene in age (Madole et al. 1991). Upland divides on the Salem Plateau are commonly wide and flat or gently undulating in areas away from major river valleys. However, they can be almost absent near the larger streams (Marbut 1896). According to Krusekopf (1958) broad, rolling upland divides characterize surfaces that are relatively gravel-free. Although nearly all Ozark soils on the uplands possess some chert gravels, either throughout the entire profile or in the subsoil and substrate, Krusekopf (1942) believes the distribution of surficial chert gravels is a function of microclimate. South-facing slopes tend to have stony soils whereas north-facing slopes do not.

Krusekopf (1942) asserts that the drier conditions associated with the south-facing slopes decrease the rate of chert decomposition (hydrolysis), resulting in an increase in the number of stones at the surface. In contrast, the wetter conditions on the north-facing slopes cause greater weathering of the chert, resulting in fewer (to no) rock fragments at the surface and

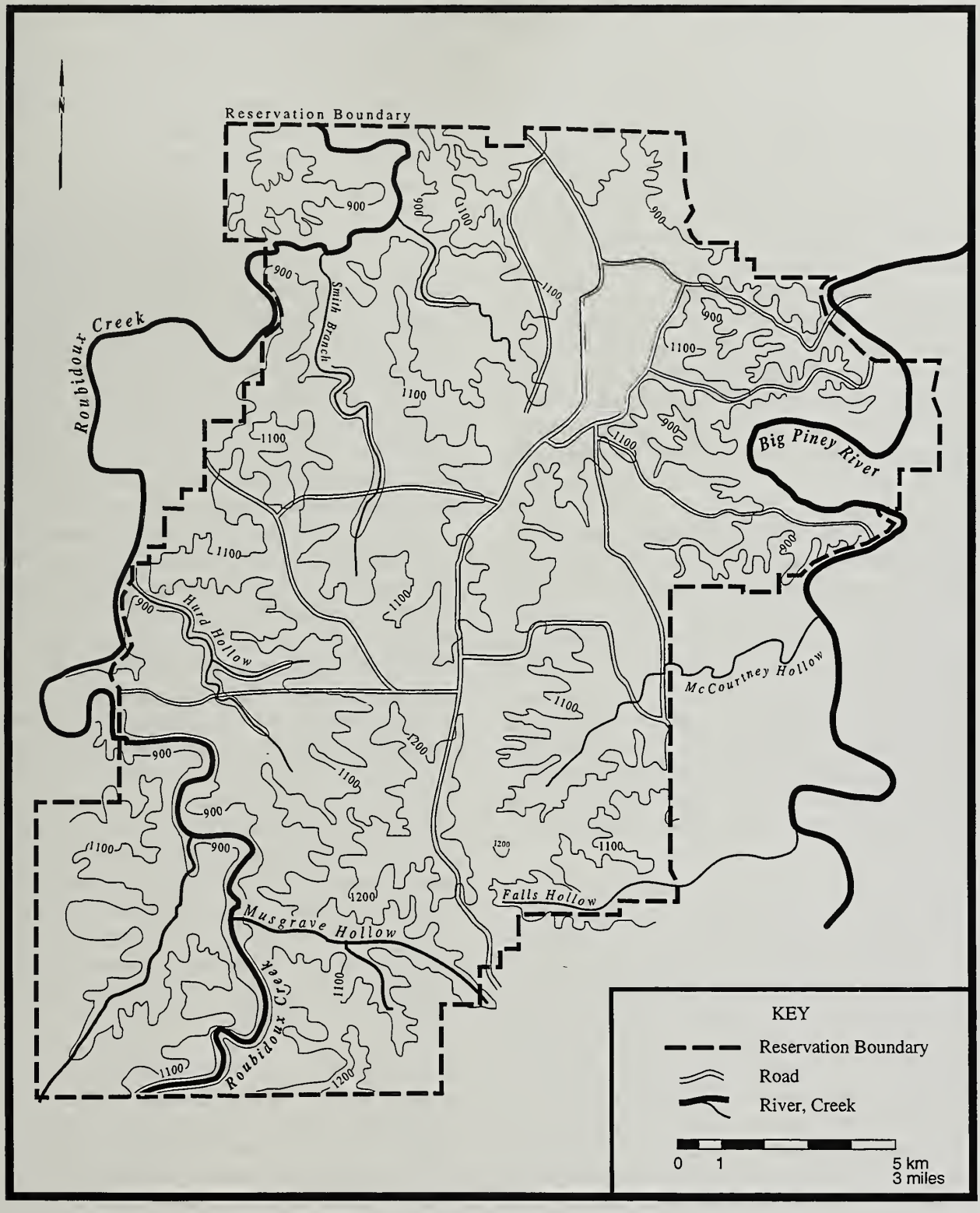

Figure 4. General Topographic Characteristics of Fort Leonard Wood.

the development of a silica-rich hardpan (indurated horizon) below the B horizon.

Areas of karst topography occur most frequently in the Gasconade (Albertson et al. 1995) and Roubidoux (Albertson et al. 1995; Allen et al. 1975) formations. Sinkholes (Allen et al. 1975) and rockshelters (Paul Albertson, personal communication 1996) are typical of the Roubidoux Formation, whereas caves and springs are common in the Gasconade Dolomite (Albertson et al. 1995). The Roubidoux dolomites and sandstones are relatively permeable rocks, and the residuum formed in them also tends to be highly permeable. Streams in these areas tend to be diverted to subsurface conduits, resulting in low surface runoff (Williams and Maxwell 1975) and in reduced potential for erosion (Thornbury 1965).

More specifically, Fort Leonard Wood occupies part of the broad dissected uplands between the Big Piney River and Roubidoux Creek (Figure 4), which form parts of the eastern and western boundaries of the installation, respectively. Both streams flow northward and are tributaries of the Gasconade River, which is part of the Missouri River drainage. Most of the installation is within the upland interfluve between the Big Piney River and Roubidoux Creek. This zone is not as deeply dissected as the areas along the major watercourses and has distinctive geologic, soil, and biotic characteristics.

Soils

Soils on the Ozark Plateau range in age from Tertiary to Holocene. Tertiary residuum, which is preserved throughout the Salem Plateau, can exceed 45 m in thickness (Albertson et al. 1995; Krusekopf 1958); it is thickest on level divides and moderate slopes and thinnest on steep slopes (Madole et al. 1991). The residuum on the Ozark Plateau is typically a reddish, stony (cherty) clay (Williams and Maxwell 1975) similar to the red clay soil, or terra rossa, that is characteristic of landscapes underlain by carbonate rocks in other parts of the world. Although terra rossa soils traditionally have been associated with Mediterranean-type climates, they are not restricted to such zones; they are known to occur in the midcontinental United States (Frolking et al. 1983; Olson et al. 1980), in the Middle East (Barshad et al. 1956), in eastern Europe (Ciric and Senic 1985; Glazovskaya and Parfenova 1974) and in western Europe (Sevink and Verstraten 1979; Verstraten and Sevink 1979).

Terra rossa soils are characteristically high in kaolinite clays whereas the underlying unweathered limestone or dolomite is not (Barshad et al. 1956); Ozark carbonate rocks are high in illite (Scrivner 1975). In spite of the mineralogical differences, which are attributed to neoformation and/or alteration of clay minerals due to weathering (Madole et al. 1991), terra rossa soils are thought to have formed in place in the underlying carbonate rock. According to Duchaufour (1977), terra rossa soils form by decalcification of indurated carbonate rocks under alternating wet and dry seasons. During the wet season, iron in the bedrock parent material is released upon weathering (decarbonation) but precipitates out in the weathered profile (where it binds to clay-sized particles) during the dry season. Duchaufour found that residuum formed in iron-poor rocks will not rubify (redden). Rubification, according to Glazovskaya and Parfenova (1974), does not occur because of the presence of primary red-colored minerals, but instead is the result of biochemical weathering. The iron oxides and clays that make up the terra rossa are predominantly insoluble residue left after the carbonates have been removed, although some insoluble minerals may have been added by eolian deposition (Ciric and Senic 1985). The preservation of primary bedrock structures in the residuum suggests an in situ origin and volume-for-volume replacement of dissolved carbonate rock by clays (Frolking et al. 1983; Madole et al. 1991; Williams and Maxwell 1975).

It is generally accepted that formation of terra rossa on limestone and dolomite is a slow process. Therefore, the soil is considered to be fairly old where it is thick. Ciric and Senic (1985) estimate that 1.5–2.5 million years of weathering is required to produce a 20-cm thick terra rossa developed in a limestone with .3 percent insoluble material. Thickness of residuum in the Ozarks varies, depending upon parent material properties. Generally, thicker

residuum, averaging 4.5 m, is developed in the Gasconade and Roubidoux dolomites, which have a higher percentage of insolubles (in the form of quartz sand and chert) than does the Jefferson City dolomite where the residuum averages only 2.4 m thick (Madole et al. 1991). Much thinner residuum (less than 1 m thick) is developed in sandstone where the amount of carbonates is low and the amount of insolubles high (Madole et al. 1991).

Residuum formed in easily weathered Jefferson City dolomite is typically a gravelly red clay with low plasticity; in thicker beds that are more resistant the residuum is a relatively stone-free, thin plastic clay of low permeability (Williams and Maxwell 1975). The low permeability of these soils inhibits karst formation, and streams tend to maintain a surface flow (Williams and Maxwell 1975). Residuum derived from the permeable Roubidoux Formation sandstones and dolomites is relatively thick and gravelly and highly permeable (Allen et al. 1975). Gravel content often exceeds 50 percent (Williams and Maxwell 1975). The high permeability of these soils promotes development of karst topography wherein there is a loss of surface water to groundwater flow (Williams and Maxwell 1975). Residual soils formed in the Gasconade dolomite are commonly a gravelly, yellow brown plastic clay or a gravelly, red clay with low plasticity (Allen et al. 1975).

Tertiary residuum in the Ozark Plateaus is buried beneath variably thick Pleistocene loess. Loesses in Missouri were derived from the Missouri and Mississippi river valleys, and their thicknesses decrease with increased distance from the source valley. Consequently, loess ranges from about 30 m thick along the rivers to less than 1 m thick in southern Missouri (Davis 1973; Madole et al. 1991). Illinoian Loveland Loess is preserved along the Missouri River (Bayne et al. 1971a), but it is rarely preserved on the uplands in south-central Missouri (Allen et al. 1975; Madole et al. 1991). In Laclede County, immediately west of Fort Leonard Wood, less than 1 m of Loveland Loess is preserved in a sink, and none is preserved on the surrounding uplands, suggesting a period of widespread erosion between the Illinoian and late Wisconsinan (Allen et al. 1975). However, as Bayne et al. (1971b) point out, the inability to identify Loveland Loess on the uplands may be due to its complete pedogenic assimilation into the Tertiary-Sangamon soil and not to erosion. At least 4.9 m of middle Wisconsinan Roxana Silt may occur along the Missouri River (Bayne et al. 1971a, 1971b). Late Wisconsinan Peoria Loess is the most widespread and recognizable loess in the area (Allen et al. 1975; Krusekopf 1958; Madole et al. 1991; Scrivner 1975). At Fort Leonard Wood, 45–75 cm of loess is found on the more stable parts of the uplands (Albertson et al. 1995). Johnson et al. (1981) found over 2 m of Peoria Loess preserved locally on the flat uplands near the Pomme de Terre river valley, northwest of Fort Leonard Wood, and Allen et al. (1975) note less than 1.2 m on uplands in Laclede County. Peoria Loess at Fort Leonard Wood is differentiated from the underlying residuum by its less weathered appearance, its high silt content (greater than 75 percent) (Balek, unpublished data), and a general lack of particles greater than 2 mm in diameter. Peoria Loess deposition occurred between 25,000 and 13,000 years ago in southwestern Illinois (McKay 1979) while in the Osage Plains physiographic section (i.e., eastern Kansas, central Oklahoma, and west-central Texas) Peoria Loess deposition ceased about 10,500 to 10,000 years ago (Madole et al. 1991). A Holocene (post-9,000 years ago) loess, the Bignell Loess, occurs in parts of the Osage Plains along the Platte and Missouri rivers (Bayne et al. 1971b), but none has been reported in the Fort Leonard Wood area.

Where the Tertiary residuum is completely buried by relatively thick Peoria Loess, the surface soil is developed in the loess and is essentially Holocene in age (i.e., post-13,000 years). Where thin Peoria Loess has been incorporated pedogenically into the residuum such that it is not recognizable as a distinct loessial unit, the surface soil may be Tertiary through Holocene in age and can be considered a relict soil. Relict soils, as defined by Nettleton et al. (1989:59), are "ancient, pedogenic soils that have persisted on land surfaces of Pleistocene or greater age [and] may have been thickened by gradual deposition after the land surface stabilized, but never thickened by deposition so rapid or great that the soil is now a buried paleosol."

Wolf (1989) identifies four soil associations within Fort Leonard Wood that also correlate closely with major physiographic zones. In the uplands between the Big Piney River and Roubidoux Creek is the Lebanon-Plato association. The Lebanon-Plato association consists of silty soils formed in loess deposits that have variable drainage characteristics. The dissected upland interfluve and the summits and shoulders of larger ridges near major streams are covered by Viraton-Clarksville-Doniphan association soils that were found in all three tracts investigated during this project. These soils are characterized as deep, well-drained and silty to cherty. They formed in thin loess deposits overlying the cherty Jefferson City/Cotter dolomite residuum. Steep side valleys and bluffs in the major streams are covered by the Clarksville-Gepp association soils that also were found in all survey tracts investigated during this project. These soils are thinner, well- to excessively drained and cherty to very cherty. These two soil associations are found only in the Cookville Tract. Major stream valleys and some minor valleys are covered by Nolin-Huntington-Kickapoo association soils. This soil association is present in the South Roubidoux Creek and Big Piney Quarry tracts that were surveyed during this project in addition to the Clarksville-Gepp and Viraton-Clarksville-Doniphan associations. These soils are deep, nearly level to gently sloping silty and loamy soils on floodplains and adjacent terraces. Roubidoux Creek terraces within this tract are of variable age, ranging from essentially modern to 55,000 years old (Albertson et al. 1995). The soil associations are further divided into several soil series (Wolf 1989) which exhibit distinctive and consistent texture, structure, and drainage characteristics. The soil series for each site are described in the individual site discussions.

Climate and Climatic Change

The climate of the Fort Leonard Wood area is midcontinental, with warm summers and cool winters (Wolf 1989). Average annual rainfall is about 100 cm, distributed relatively evenly throughout the year. The driest months tend to be during the late fall through early winter while the wettest are during spring and early summer, although rainfall tends to be rather evenly distributed (Wolf 1989:Table 1). Research has indicated that this pattern has not been stable through the Holocene; the early Holocene climate was cooler and wetter than present. This climate regime then shifted during the middle Holocene to warmer and drier conditions (Bryson et al. 1968; Deevey and Flint 1957; Wendland 1978). This period, known as the Hypsithermal Interval, took place between 8,500 and 5,000 years ago. The effect of this climate change on human populations remains poorly understood and somewhat controversial at present. Minimally, by 5,000 years ago, the climate and vegetation patterns characteristic of the Fort Leonard Wood area began to stabilize in their modern forms.

Floral and Faunal Communities

Flora

Braun (1950) has classified the flora in the Fort Leonard Wood area as part of the Southern Division of the Oak Hickory Forest. This division is characterized by southern oak species with pine present locally. Within the oak-hickory forest species composition differs with slope aspect, orientation, drainage, and soil characteristics. Cedar is often present on the most xerophytic slopes. The oak-hickory forest is interrupted by occasional prairie openings. But within this classification, the Ozark Highlands also exhibit a wide diversity of plant communities corresponding with topographic, geologic, and hydrologic variability within the region (Steyermark 1963). Additional distinctive plant communities are found on rolling uplands, poorly drained uplands, steep slopes, bottomland terraces, floodplains, near springs and sinkholes, and in ravine bottoms (Harland Bartholomew and Associates 1992:9). Recently, the United States Forest Service identified over 40 plant communities found in the adjacent Mark Twain National Forest (Miller 1981).

The present vegetation differs from the prehistoric and early historic vegetation patterns. Schoolcraft (1853) traveled across the Ozarks in 1818 and noted that large tracts in the Ozarks were either unforested or had stunted tree vegetation. This vegetation

pattern may have been either culturally promoted by Native Americans setting fires to improve hunting conditions (Chapman 1946) or due to the development of nearly impermeable fragipan soils that inhibit root growth on flat and poorly drained uplands (Rafferty 1980). In other areas, large tracts of pine forest covered the well-drained uplands, prairies were found on flat uplands, oak-hickory stands were present in high elevations, and cane thickets were abundant in bottomland settings (Harland Bartholomew and Associates 1992).

A detailed list of species present at Fort Leonard Wood has been presented by Sternburg et al. (1998). The present vegetation is dominated by oak forests on uplands and side slopes, with white, post, black, and blackjack oaks most common. The valleys support a greater variety of trees, with sycamore, ash, cottonwood, sugar maple, walnut, butternut, hackberry, red oak, willow, and pecan present.

Fauna

Sternburg et al. (1998) provide a detailed listing of fauna present in the Fort Leonard Wood area. These species include those usually encountered in the North American midcontinent. The most common large mammal is the white-tailed deer, and various medium-sized mammals (raccoon, squirrel, mink, muskrat, beaver, red fox, gray fox, skunk, opossum, cottontail rabbit, and coyote) are also present (Harland Bartholomew and Associates 1992: 10). Jones and Birney (1988) identify most of these mammalian species as associated with the Eastern and Prairie/ Grassland zoogeographic units. Terrestrial bird species that were of potential economic importance include wild turkey, bobwhite quail, and prairie chicken. As Fort Leonard Wood is not within a major migratory route, seasonal fluctuations of ducks, geese, and swans are minimal (Bellrose 1976). Lastly, rivers and streams in the Fort Leonard Wood area are noted to contain many sunfish, catfish, sucker, and gar species (Pflieger 1975).

Cultural Study Units

Based on the physiographic characteristics of the Fort Leonard Wood region, the installation has been incorporated into a number of different cultural study unit models. The philosophy behind the creation of the cultural study unit models is that particular characteristics of the landscape, including geology, hydrology, soils, flora, fauna, and climate, affect the pattern of human occupation within a region. Chapman (1948a, 1975, 1980) used the natural divisions of Missouri (see Figure 2) to define environmentally based units with which to compare the development of cultural traditions. Chapman (1975) included the Fort Leonard Wood area in the Ozark Highland archaeological-physiographic region, with Pulaski County divided between the Lower Osage and Gasconade localities. Elaborating on the concept of combined cultural and natural areas within Missouri, Weston and Weichman (1987) employ drainages as the basis for cultural divisions. In this model, Fort Leonard Wood is in the Gasconade Study Unit.

At a finer scale, Edging (1992) has defined a series of cultural resource zones for Fort Leonard Wood (Figure 5). This model originally was designed as a cultural resource management tool, although it is also useful in providing an initial basis of comparison regarding human use of the base. Drainage, physiographic, and soil series characteristics divide Fort Leonard Wood into five broad zones. The Cantonment zone is located on the northern end of the base and consists of uplands between the Big Piney River and Roubidoux Creek. This zone includes military facilities and is viewed as having low potential for containing intact prehistoric cultural resources because of construction activities. The Interior Uplands resource zone covers the remainder of the uplands south of the cantonment. The potential for prehistoric and historic sites is generally low because of distance to permanent water sources. The Lower Roubidoux resource zone includes the Roubidoux Creek valley and adjacent terraces and uplands in the northwest corner of the installation. The Upper Roubidoux resource zone consists of an area similar to the Lower Roubidoux zone but in the southwest portion of the installation. Finally, the Big Piney resource zone includes the Big Piney River valley and adjacent terraces and bluffs in the northeast corner of the installation. Prehistoric site density is highest in these latter three zones.

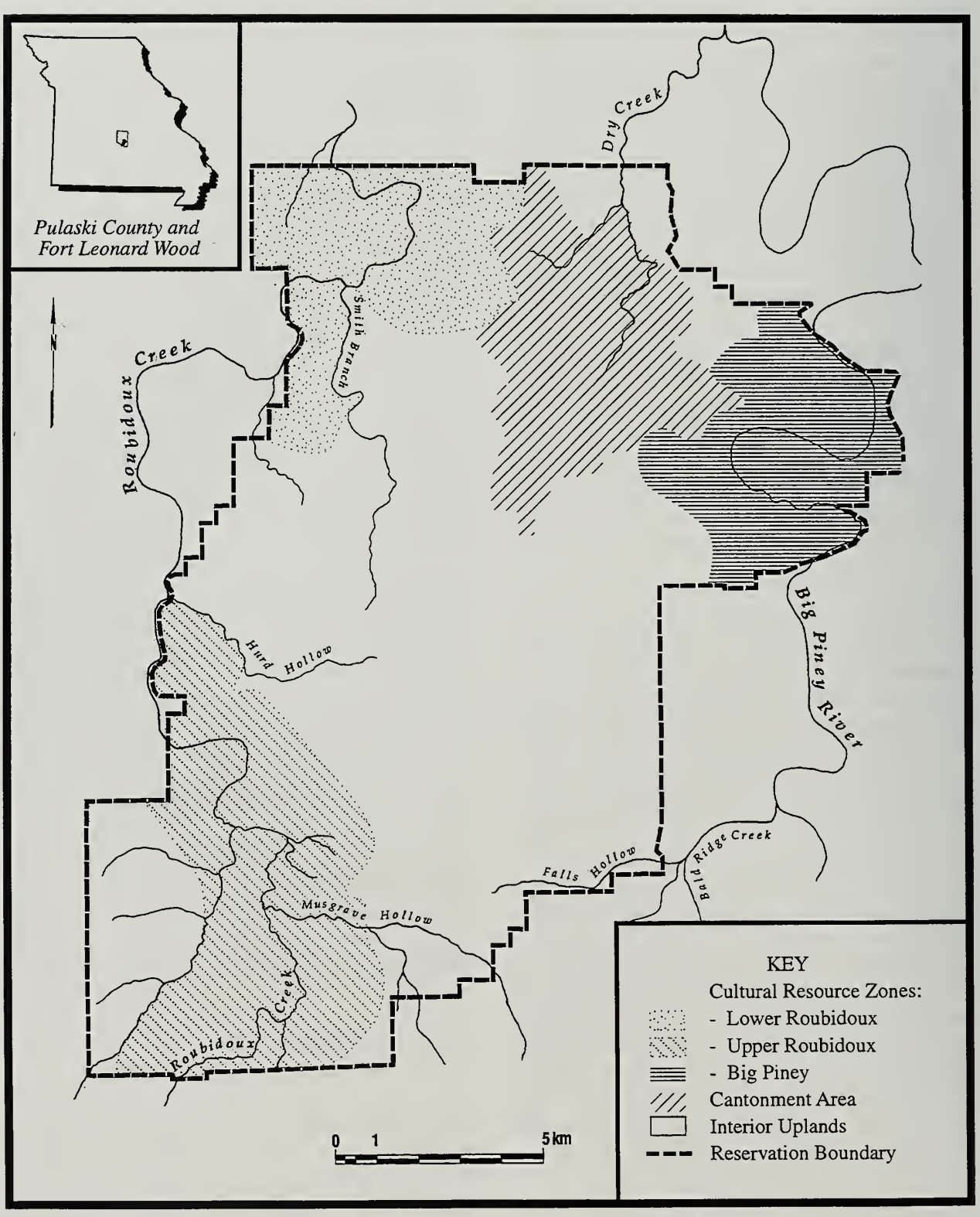

Figure 5. Cultural Resource Zones Within Fort Leonard Wood.

CHAPTER 3.
CULTURAL OVERVIEW AND REVIEW OF PREVIOUS WORK

This section presents a general outline of prehistoric and historic cultural development in the southern Midwest area and Ozark region and is based on earlier reports (Adams 1997; Ahler et al. 1998; Ahler, Harn, et al. 1997; Ahler, Kreisa, McDowell, and McGowan 1995; Ahler and McDowell 1993; Ahler, Schroeder, et al. 1996; Kreisa 1995; Kreisa, Walz, et al. 1996; Kreisa, McDowell, et al. 1996; McGowan 1996; McGowan et al. 1996) and regional archaeological syntheses, especially Chapman (1975, 1980), Douthit et al. (1979), Wright (1987), Wood et al. (1995), O'Brien and Wood (1998), the prehistoric overview in Harland Bartholomew and Associates (1992), and Smith's (1993) historical overview of Fort Leonard Wood. Information specific to the Gasconade drainage is derived from syntheses by McMillan (1965) and Reeder (1988). It also incorporates an Archaic period projectile point chronology created by Yelton (1996) for the eastern Ozarks. This overview provides an interpretive framework for evaluating archaeological resources at Fort Leonard Wood.

Cultural Overview

The cultural-historical sequence for Missouri is divided into six major periods (Figure 6), a number of which are subdivided into early, middle, and late subperiods (Chapman 1975, 1980). The prehistory of the area appears to have experienced a number of developments similar to those identified in other areas of eastern North America including population increase, focalization on locally abundant and seasonal foodstuffs, the eventual adoption of cultivated plant foods, and increasing social and political complexity. Expressions of these developments differ across the state, though, since it encompasses a number of different regions, including the Midwest, the Great Plains, the Southeast, and the Ozarks.

Paleoindian Period (14,000 to 10,500 years ago)

It was during the Paleoindian period that the earliest occupation of the New World took place, when people migrating from northern Asia crossed an exposed land mass that is now covered by the Bering Strait. This period is well-documented in portions of the United States where a series of distinct lanceolate hafted bifaces is associated with regional traditions. These bifaces have long, narrow flakes removed from the base, forming a characteristic channel or flute to facilitate hafting onto bone or wood handles. Many of the more refined specimens, made from high-quality nonlocal chert, indicate a high degree of mobility and participation in exchange networks. Paleoindian groups were small, highly mobile, and integrated into egalitarian bands. Settlement systems apparently were based on residential mobility. Subsistence was generalized, exploiting locally available megafauna and a variety of smaller terrestrial mammal species as well. Patterns of plant use for Paleoindian groups are poorly documented.

No major Paleoindian sites are reported for the Gasconade drainage, and no sites of this time period are reported from Fort Leonard Wood or the adjacent Houston-Rolla District of the Mark Twain National Forest. A few isolated surface finds of Paleoindian points are reported in Chapman (1975) for the Gasconade drainage, although none are from Pulaski County.

Dalton Period (10,500 to 9,800 years ago)

The transition from the late Pleistocene to Holocene environment brought about extinctions of megafauna across North America and the development of modern biotic regimes. Archaeologically, this transition is associated with the Dalton culture (Goodyear 1982). This manifestation originally was defined in northern Arkansas and southern Missouri (Goodyear 1974; Morse 1973; Morse and Goodyear 1973; Price and Krakker 1975) and is characterized by a chipped-stone tool assemblage that includes the distinctive lanceolate, unfluted Dalton projectile point and its variants, chipped-stone adzes, and spurred end scra-

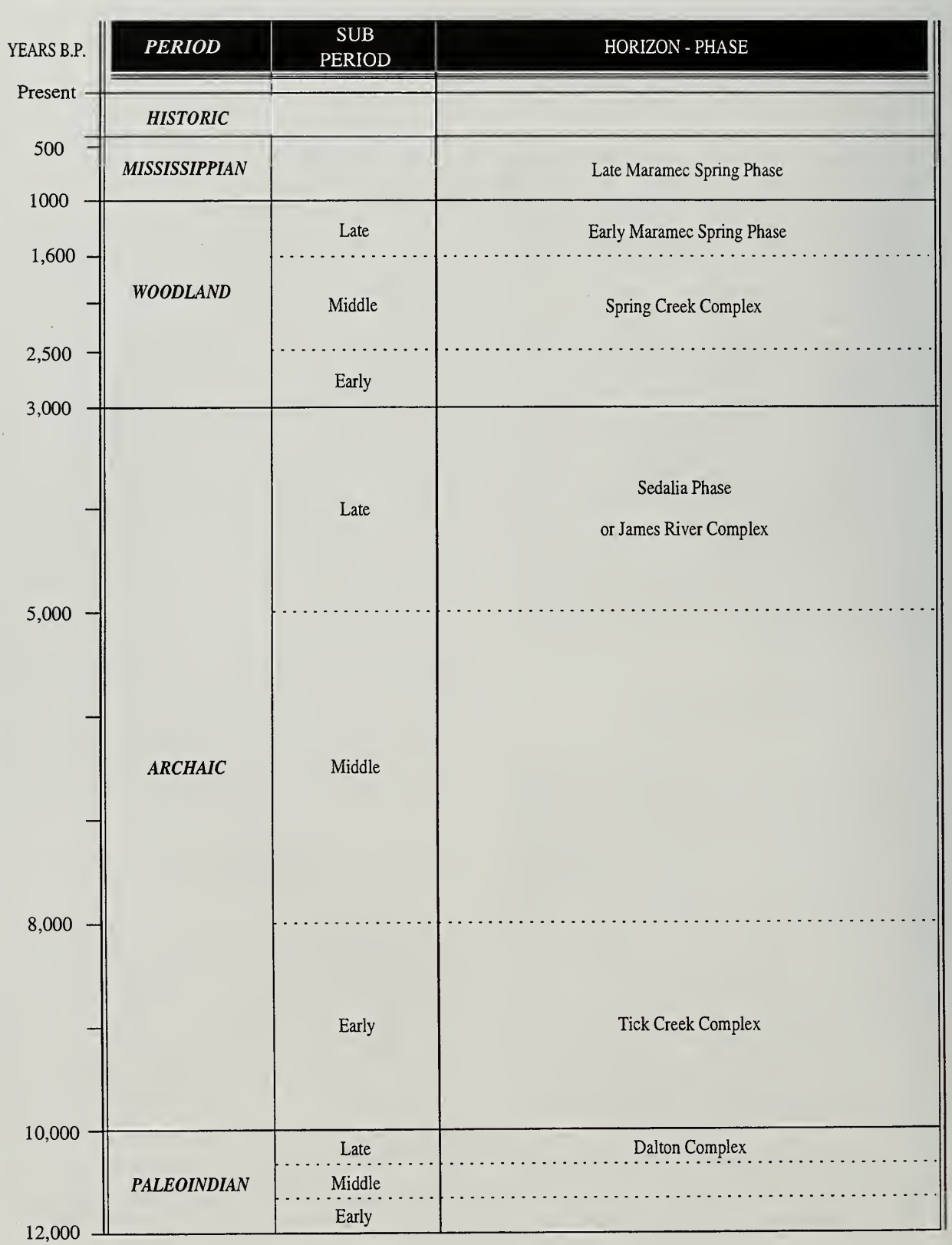

Figure 6. Chronological Sequence of the Fort Leonard Wood Area.

pers. Dalton period settlement patterns and systems have been examined in detail in the southern Ozarks and Missouri Bootheel region (Morse 1975, 1977; Schiffer 1975). Settlement includes a variety of site types, consisting of base camps occupied for long periods of time, resource extraction camps, smaller generalized residential camps, and special-purpose cemetery sites (Goodyear 1974), suggesting a logistically organized system oriented toward the exploitation of seasonally abundant aquatic resources by larger population aggregates. While many researchers indicate that this "period" postdates fluted projectile forms such as Folsom, O'Brien and Wood (1998:80) recently argue for a temporal (but perhaps not spatial) co-occurrence of such forms. Yelton (1996) argues that Dalton points continued to be made into his Horizon 1, dating from 9000–7000 B.P.

Several important Dalton components have been located in Missouri including stratified deposits at Rodger's Shelter (Kay 1980), Graham Cave (Klippel 1971; Logan 1952), and Arnold-Research Cave (Shippee 1966). Two Dalton sites have been reported from Fort Leonard Wood; 23PU190 (Niquette et al. 1983) and 23PU494 (Ahler and McDowell 1993) are located in the Interior Uplands resource zone. Phase II investigations at Sadie's Cave (23PU235) yielded evidence of a Dalton component at that site as well (Ahler, Kreisa, McDowell, and McGowan 1995).

Early Archaic Period (9,800 to 7,000 years ago)

More common are Early Archaic period sites characterized by a variety of lanceolate (Rice Lanceolate), contracting-stemmed (Hidden Valley), straight-stemmed (Hardin), side-notched (Graham Cave), corner-notched (Thebes, St. Charles, Kirk, Jakie Stemmed), and bifurcate-base (Rice Lobed and LeCroy) hafted bifaces. Yelton (1996) dates these and other types to Horizon 1, between 9000 and 7000 B.P., and Horizon 2, from 8200 to 7000 B.P. In his chronology, Thebes, St. Charles, and Hardin Barbed date to the second-half of the Early Archaic period (Yelton 1996). In contrast, Wood et al. (1995) and O'Brien and Wood (1998) place Jakie Stemmed in the Middle Archaic period.

The Ozark Highland region contains a number of sites, mostly caves/rockshelters, with significant Early Archaic components. These include Jakie Shelter, the Rice site, and Standlee Shelter along the Table Rock Reservoir, Rodger's Shelter in the Pomme de Terre drainage, and Tick Creek Cave in the Gasconade drainage. The hafted bifaces listed above compare favorably with many of the hafted bifaces described by Roberts (1965) and McMillan (1965) in their original description of the Early Archaic Tick Creek Complex. However, Chapman (1975) points out that Middle and Late Archaic materials represented by later point types (Stone Square Stemmed and large side-notched points) also may have been included in the original Tick Creek Complex assemblage, and Reeder (1988:185) suggests that the complex should be either redefined or abandoned. Based on work in other parts of the Midwest, it is likely that the temporal and functional variability represented by the Tick Creek Complex can be separated into more restricted phases and components through excavation of stratified sites.

Early Archaic period sites are usually small sites with relatively few artifacts, suggesting that populations were composed of small, highly mobile residential groups organized into egalitarian bands. Local populations may have coalesced periodically into larger population aggregates to take advantage of seasonally abundant resources, but these were probably episodic events of short duration.

Several sites at Fort Leonard Wood and the nearby Houston-Rolla Ranger District have yielded Early Archaic points. These include 23PU229 (an upland lithic scatter), 23PU304 (a floodplain lithic scatter), 23PH231 (a multicomponent upland lithic scatter), and 23PU210 (a disturbed stratified cave in the Upper Roubidoux resource zone). At the Kofahl Tract on the Big Piney River upstream from Fort Leonard Wood, four sites yielded Early Archaic points (Fraser et al. 1981). Eight Early Archaic sites were identified in the Big Piney and Upper Roubidoux resource zones through recent surveys by the University of Illinois (Adams 1997; Ahler and McDowell 1993; McGowan 1996). Phase II NRHP evaluation recently has been conducted at a number of Early Archaic period sites including 23PU482 (Kreisa 1995), 23PU452, 23PU594, 23PU485

(Kreisa, Walz, et al. 1996), 23PU483, and 23PU264 (Childress and Weaver 1998).

Middle Archaic Period (7,000 to 5,000 years ago)

In the Midwest this cultural period is marked by a shift in settlement toward major river-valley margins and increased use of aquatic resources by larger population aggregates (Ahler 1984; Brown and Vierra 1983; Jefferies and Butler 1982; Styles 1986). Hafted bifaces characteristic of this period include large and small side-notched points (Godar, Matanzas, Raddatz, and Big Sandy), small corner-notched points (Jakie Stemmed) in the early part of the period and medium to large corner-notched/expanding stem points (Big Creek, Saratoga Cluster, and Table Rock Stemmed) late in the period, and large straight-stem points (Stone Square Stemmed, Smith/Eva, and Karnak). Table Rock Stemmed and Matanzas points appears to continue into the Late Archaic period (Munson 1976; O'Brien and Wood 1998). Interestingly, Wood et al. (1995) place Big Sandy points in the Middle Archaic period, while O'Brien and Wood (1998) discuss it as an Early Archaic period type. Yelton (1996) places the above-mentioned types into his Horizon III (7300–6100 B.P.) and Horizon IV (6100–4500 B.P.).

No specific Middle Archaic phase or complex has been defined for the Gasconade drainage, although McMillan (1965) describes several points characteristic of a Middle to Late Archaic complex. New tool types such as the fully grooved axe and ground-stone celt were added to the technological assemblage during this period. Ozark-region sites with major Middle Archaic occupations include Rodger's Shelter, Jakie Shelter, the Rice site, Standlee Shelter, and possibly Tick Creek Cave.

Based on the recovery of only moderate numbers of Middle Archaic artifacts from sites in the Gasconade drainage (Tick Creek Cave, Goat Bluff Cave, and Miller Cave [McMillan 1965; Roberts 1965]), Chapman (1975) proposes that the Gasconade drainage was used mainly for hunting during the Middle Archaic by populations with base camps located outside the drainage. This conclusion may be an artifact of sampling, since Middle Archaic sites apparently are fairly numerous at Fort Leonard Wood. Over 25 sites have yielded Middle Archaic materials (Adams 1997; Ahler and McDowell 1993; Markman and Baumann 1993; Moffat et al. 1989; Niquette 1984; Niquette et al. 1983). Of these, Phase II NRHP investigations have been conducted at 23PU368, 23PU235 (Ahler, Kreisa, McDowell, and McGowan 1995; Ahler, Kreisa, Theler, et al. 1995; Kreisa 1995), 23PU251, 23PU457 (Kreisa 1995), 23PU554, 23PU565 (Ahler et al. 1996), 23PU481 (Kreisa, Walz, et al. 1996), and 23PU483 (Childress and Weaver 1998).

Late Archaic Period (5,000 to 3,000 years ago)

The Late Archaic period in the Ozarks is marked by continuation in the manufacture of many projectile point styles in use at the end of the Middle Archaic period. While large side-notched types are not part of the assemblage, the medium and large corner-notched/expanding stem points apparently continued into the first half of the Late Archaic period. New hafted biface types were introduced including a variety of corner-notched (e.g., Afton), stemmed (Burkett, Etley), and lanceolate (Sedalia, Wadlow) types. This period correlates with the Yelton (1996) Horizon VI (4500–3000 B.P.). Wood et al. (1995) suggest that Stone Square Stemmed may continue to be produced in the eastern part of the state into the Late Archaic period, while O'Brien and Wood (1998) suggest Table Rock Stemmed is a Late Archaic period type. Distinctive tools include the triangular, unifacial Clear Fork gouge, possibly used as a woodworking tool, and the rectanguloid, bifacial Sedalia Digger, possibly used for grubbing or digging. A greater variety of ground-stone tools, including 3/4-grooved axes, celts, pestles, manos, bannerstones, and plummets, also is present in Late Archaic assemblages. Many of these tools are associated with plant processing. Increased reliance on plants is supported by recovery of some of the earliest domesticated squash and gourd remains in the eastern United States from Late Archaic contexts at Phillips Spring (Chomko 1978; Kay et al. 1980).

Chapman (1975, 1980) indicates that the entire Late Archaic adaptive strategy persisted into the Woodland period in the Ozark region. Unfortunately,

many of the projectile point types listed above have been found in poorly dated or mixed deposits containing both Woodland and Late Archaic cultural materials. The absence of well-dated stratigraphic contexts poses a serious drawback to basic cultural historical interpretations in the Ozarks.

Two local Late Archaic cultural manifestations have been defined for areas adjacent to Fort Leonard Wood. The James River complex is based on assemblages from Table Rock Reservoir and includes Afton, Smith Basal Notched, Stone Square Stemmed, and Table Rock point types (Chapman 1960). The Sedalia Complex is centered in the lower Missouri and Osage drainages and includes Etley Stemmed and Sedalia Lanceolate point types (Chapman 1975). A review of previous reports indicates that no Sedalia points, Sedalia diggers, or Etley points have been recovered from Fort Leonard Wood. Late Archaic sites at Fort Leonard Wood lack the diagnostics associated with the Sedalia complex, while the base's geographic and physiographic position make it less likely to be associated with the James River complex. Late Archaic components are common on the installation, with over 20 sites having components assigned to this period (Adams 1997; Ahler and McDowell 1993; Kreisa, McDowell, et al. 1996; Markman and Baumann 1993; Moffat et al. 1989; Niquette 1984; Niquette et al. 1983). Phase II investigations have been conducted at 23PU492, 23PU249, 23PU235, 23PU457 (Ahler, Kreisa, McDowell, and McGowan 1995; Ahler, Kreisa, Theler, et al. 1995; Kreisa 1995), 23PU58 (Ahler et al. 1997; Kreisa, McDowell, et al. 1996), 23PU421, 23PU424, 23PU481 (Kreisa, Walz, et al. 1996), 23PU554 (Ahler, Harn, et al. 1997), 23PU483, 23PU458, and 23PU354 (Childress and Weaver 1998).

Early Woodland Period (3,000 to 2,500 years ago)

Traditionally, the beginning of the Woodland period is marked by the appearance of pottery in archaeological assemblages. In many areas, subsistence, settlement, and social organization remain essentially unchanged from Late Archaic patterns (see Chapman 1980; Farnsworth and Emerson 1986). Distinctive projectile point styles are few in number, and a local expression of Early Woodland adaptation has not been defined. Neither have pottery types indicative of the Early Woodland period been identified in the region. Chapman (1980) maintains that Late Archaic adaptations, including many projectile point styles, were maintained in the Ozarks well into the Early and Middle Woodland periods.

Niquette et al. (1983) and Niquette (1984) list nine sites that have been assigned to the Early Woodland period at Fort Leonard Wood. However, these assignments are based on recovery of Gary and Langtry points, which have a long history of manufacture that began in the terminal Archaic (3,500 years ago) and continued at least through Middle Woodland times (1,500 years ago). It may be more accurate to assign sites with these points to a general Woodland affiliation rather than to a more specific time period. Most recently, excavations at 23PU58 yielded two radiocarbon dates that fall within the Early Woodland period (Ahler et al. 1997). The associated deposits contained a number of projectile points, including Reeder types ES1 and ES2 and McMillan type CN10, that are thought to date from the Late Archaic through the Middle Woodland period (Kreisa et al. 1998).

Middle Woodland Period (2,500 to 1,600 years ago)

As with the Early Woodland period, a local Middle Woodland manifestation has yet to be defined for the Ozark region (Kreisa et al. 1998). If the distinctive Middle Woodland Hopewell ceramic styles are absent, local Middle Woodland expressions are difficult to identify. Other artifacts that have been used as markers of the Middle Woodland period include Snyders Corner Notched projectile points and small lamellar blades (Montet-White 1968), neither of which is common in the Gasconade drainage.

The lack of evidence for participation in the panregional Hopewell network has been interpreted by Chapman (1980) and McMillan (1965) as evidence for absence of permanent Middle Woodland settlement in the Gasconade drainage or even abandonment of the region. Based on work at the Feeler site, however, Reeder (1982, 1988) defined the Middle Woodland Spring Creek complex and proposed temporal boundaries of A.D. 1–400. This alternative

interpretation of Middle Woodland adaptation indicates the presence of a resident population with an essentially aceramic technology identified by Kings and Snyders Corner Notched projectile points (Reeder 1988).

Thin, grit-tempered pottery similar to Middle Woodland utilitarian wares from other parts of the Midwest has been identified in low frequencies at a few sites in the Gasconade drainage including at Fort Leonard Wood (23PU152 and 23PU210 [Niquette et al. 1983] and 23PU265). Other sites on base have been assigned to the Middle Woodland period based on identification of Snyders projectile points or lamellar blades. It is unclear whether other Middle Woodland cultural patterns common in the Midwest, such as intensive use of native cultigens, two-level settlement hierarchy, or social differentiation in mortuary practices, are expressed in any local Middle Woodland period manifestation. Phase II investigations have been conducted at 23PU265, 23PU173, 23PU291, and 23PU235, all of which have Middle Woodland or Middle to Late Woodland components (Ahler, Kreisa, McDowell, and McGowan 1995; Ahler, Kreisa, Theler, et al. 1995). Middle Woodland or Middle to Late Woodland components have recently been investigated at 23PU567 (Ahler, Harn, et al. 1997), 23PU264, 23PU354, and 23PU458 (Childress and Weaver 1998).

Late Woodland Period (1,600 to 1,100 years ago)

Late Woodland culture is well-expressed in the Gasconade drainage (Kreisa et al. 1998). Locally, Late Woodland sites are associated with the presence of cordmarked or plain limestone/dolomite-tempered ceramics. Diagnostic Late Woodland lithic artifacts include Kings Corner Notched and Rice Side Notched in the early part of the period and a variety of small arrow points (e.g., Crisp Ovate, Sequoyah, Scallorn, and Hayes) in the later part of the period. In addition, there appears to be some degree of social differentiation in mortuary programs; some individuals were interred in rock cairns located on upland prominences and others in caves and rockshelters. The local Late Woodland manifestation is the Maramec Spring Focus (Marshall 1958, 1965), which subsequently has been divided into early and late Maramec Spring phases (Reeder 1988). Maramec Spring phase settlement patterns include extensive villages in both valley and upland ridge crest settings, smaller hamlets and extractive camps, and extensive use of caves and rockshelters, probably for specialized activities.

The Late Woodland period is the best documented period at Fort Leonard Wood and in the Gasconade drainage in general. Maramec Spring occupations (either early or late) have been identified at more than 35 sites on Fort Leonard Wood (Adams 1997; Ahler and McDowell 1993; Kreisa, McDowell, et al. 1996; McGowan et al. 1996; Markman and Baumann 1993; Moffat et al. 1989; Niquette 1984; Niquette et al. 1983). Phase II NRHP investigations have been conducted at 23PU426, 23PU492, 23PU172, 23PU248, 23PU249, 23PU265 (Ahler, Kreisa, McDowell, and McGowan 1995; Ahler, Kreisa, Theler, et al. 1995; Kreisa 1995), 23PU421 (Kreisa, Walz, et al. 1996), 23PU58 (Ahler et al. 1997; Kreisa, McDowell, et al. 1996), 23PU565, 23PU567 (Ahler, Schroeder, et al. 1996; Ahler, Harn, et al. 1997), 23PU264, 23PU354, 23PU458 (Childress and Weaver 1998), 23PU209, 23PU210, 23PU211 (Ahler et al. 1998), 23PU719, 23PU614, and 23PU721 (Ahler et al. 1999).

Mississippian Period (1,100 to 300 years ago)

The term Mississippian generally is used to denote both the segment of time following the Late Woodland period and a particular cultural tradition. Culturally, in the major river valleys of the southern Midwest and much of the Southeast, this period is marked by technological changes such as shell-tempered pottery and use of the bow and arrow; changes in social integration; and complexity identified with hierarchical settlement systems, large town-and-mound complexes, elaborate elite burial ceremonialism, and inferred differential access to subsistence resources. The Gasconade drainage apparently does not contain a well-developed Mississippian cultural expression. Instead, the Late Woodland Maramec Spring cultural focus continued, with the addition of a few elements indicative of interaction with Mississippian peoples or peripheral participation in Mississippian ceremonial/ideological/ex-

change systems such as occasional shell-tempered pottery, rare incising and punctation on ceramic vessels, and occasional recovery of exotic marine shell artifacts.

No Mississippian local manifestation has been defined clearly for the Fort Leonard Wood area. While Mississippian influences are apparently represented in some of the late Maramec Spring phase ceramic assemblages, the degree of local interaction and participation in the larger Mississippian cultural system has not been defined (Wettstaed 1996).

Historic Period (300 years ago to present)

Smith (1993) provides an excellent summary and developmental context for the historic period in the Ozarks and at Fort Leonard Wood in particular. The following summary is extracted from his report; additional information is found in McGrath and Ray (1987).

In the eighteenth century, Pulaski County and the Fort Leonard Wood area were inhabited by the Native American Osage tribe, who used the area mainly for hunting rather than permanent habitation. In the late eighteenth and early nineteenth centuries, the area also came to be populated by small numbers of Kickapoo, Delaware, Shawnee, and Cherokee who had been driven westward by expanding Euro-american and African-American settlement. All remnants of these tribes had been removed from Missouri by about 1830.

The first non-Native American settlers in the region were French explorers and lead miners who began traveling through the Ozarks as early as 1719. French settlement in the Ozarks was sparse, and its effect on the landscape and archaeological record is minimal. American settlement of the area began around 1800 with the occupation of the area by scattered pioneer hunters, subsistence farmers, and lumbermen. Most settlements were located in the larger stream valleys. Gradually, more people arrived in the area, but the rugged topography kept population levels low. Most pioneers in the early nineteenth century bypassed the Ozarks in favor of the more abundant and fertile farm territories along major river valleys such as the Missouri, White, and Arkansas rivers.

Pulaski County was organized in 1833, and increasing numbers of permanent settlers arrived from eastern states. The settlement pattern appears to have been one of detached residences or farmsteads and hamlets scattered along rivers and larger creeks. Actual farming was done in small floodplain plots, and houses were located on valley-margin foot slopes or side slopes. Lumbering, hunting, and subsistence farming remained the major occupations. By 1860, population levels were rising, road systems had been constructed, and railroads were helping to develop the lumber industry in the area. Civil War actions in the county resulted in abandonment of many rural farmsteads and general economic decline.

Repopulation of the area began after the Civil War, but the landscape and farmsteads had been affected adversely by abandonment. Fueled by construction of a railroad through the county in 1867, population increased greatly and economic concerns began to focus on rural industries, especially lumbering. Railroads also brought material goods into the area, promoting a change from self-sufficient farming, hunting, and lumbering households to more consumer-oriented households linked to, and more dependent on, outside markets and manufactories. Cross-tie production was the major industry for rural upland settlers lacking access to good river bottom farmland. This occupation was the main rural industry in the county from the 1870s through World War I.

The economic and cultural prosperity of the area reached its peak around 1910. Soon after that, overcutting of lumber resources and soil erosion brought economic decline and depopulation to southern Pulaski County. The area also was affected strongly by the Great Depression. The largely self-sufficient farmers and hunters that dominated the Ozark population of the nineteenth century had given way to larger consumer-and-producer communities with increasingly intimate ties to regional and national economies. Population peaked around 1910 and remained stable until about 1940. Several small crossroads communities located within the bound-

aries of Fort Leonard Wood had been established in the nineteenth century and continued to flourish during this period. The largest and most economically important was Bloodland; other trading communities included Big Piney, Cookville, Bailey, Moab, Wharton, Wildwood, and Tribune.

The 1930s witnessed the increasing emergence of the federal government as an economic and social factor in Pulaski County. Various projects sponsored by the U.S. Department of Agriculture and the Civilian Conservation Corps (CCC) directly affected economics and population in the Fort Leonard Wood area. The CCC had established numerous camps within the Mark Twain National Forest and the present Fort Leonard Wood boundaries.

In 1940, the U.S. Army announced the planned purchase of 65,000 acres in southern Pulaski County. This created an immediate massive influx of laborers and support personnel into the area. As many as 30,775 workers camped within a 50-mile radius of the base (Mayes 1941, in Smith 1993). The economic and social transformation of the area has had a lasting effect on local communities. The resident populations of Bloodland and other small communities located within the installation boundaries were displaced, and the former hamlets were razed. Small communities outside the base (Waynesville, St. Robert) witnessed unprecedented economic and population growth. After World War II, population in the area and military use of the base fluctuated greatly until it was given permanent status in 1965.

Previous Investigations

The following summary has been drawn mainly from earlier reports (Ahler and McDowell 1993; Ahler, Kreisa, McDowell, and McGowan 1995; Baumann and Markman 1993; Kreisa 1995; Kreisa, Walz, et al. 1996; Kreisa, McDowell, et al. 1996; McGowan 1996; McGowan et al. 1996; Markman 1993; Markman and Baumann 1993; Moffat et al. 1989; Niquette 1984; Niquette et al. 1983) and a dissertation (Reeder 1988) of work conducted at Fort Leonard Wood and in adjacent areas. Synopses of these previous investigations are presented below.

Previous Work in the Gasconade Drainage

The first reference to archaeological sites in the region around Fort Leonard Wood was made early in the nineteenth century by Beck (1975[1823]), who described the remains of a prehistoric village in Pulaski County. Later, in a history of Missouri, Conant (1879) noted the presence of prehistoric remains in caves, rockshelters, and mounds in the Gasconade area. This work included the first report on an excavation in this area, a cave site containing human burials. The Goodspeed Publishing Company (1974[1889]) later described mounds also located in Pulaski County. Both Beck and the Goodspeed Publishing Company made reference to stone walls, and the latter noted that some had burials beneath them. Later discussions of mounds, rock cairns, villages, campsites, and caves/rockshelters were made by Bushnell (1904) and Houck (1908).

The first scientific investigations in central Missouri were made by Fowke in the early twentieth century (Fowke 1922, 1928). Several of the sites he visited are located on Fort Leonard Wood; namely, Kerr Cave, the Davis caves, and Miller Cave. The latter produced artifacts assignable to the Early Archaic through Late Woodland periods and possibly into the Mississippian period. Fowke, unfortunately, was interested mainly in lithic artifacts and hoped to demonstrate a relationship between early American cultures and the European Paleolithic, ultimately ignoring most other types of artifacts. Later, Fenenga (1938) reported on the ceramics from six caves, including four in Pulaski County. He developed a ceramic classification from the excavated materials, finding two ceramic types: one grit-tempered and one shell-tempered. These were associated with the Woodland and Mississippian cultures, respectively.

By the 1940s, little work had been done in the region, and Chapman (1946, 1947, 1948a, 1948b), who was developing a statewide cultural sequence, was faced with a general lack of data. There was little evidence of Paleoindian or Archaic occupation, but he was able to identify a "Late Woodland Highland Aspect" for the area.

Beginning in the 1950s, some of the first investi-

gations driven by historic preservation concerns were carried out in the region. Shippee began a survey of the proposed Richland Reservoir in 1957 (Anonymous 1957; McMillan 1965), and Marshall (1963, 1965, 1966) worked on the Meramec River and near the headwaters of the Bourbeuse and Dry Fork rivers. In 1961 McMillan (1963, 1965) conducted a large-area survey of the Gasconade River and its major tributaries. As a result, 160 sites were identified, and test excavations were made at several of them. These sites included villages or campsites, caves/rockshelters, and cairns. It was noted that villages and camps usually were located at the base of bluffs, on second terraces, or near the mouths of hollows and springs. Cairns were most often found on bluff tops over large streams, and major villages were often at the mouth of large tributaries.

In addition to these surveys, investigations at individual sites also were made. Descriptions of these can be found in site reports by Delling (1962a, 1962b), McMillan (1962), Price (1964a, 1964b), and Roberts (1965). Roberts, an amateur archaeologist from Waynesville, excavated at Tick Creek Cave, and his work resulted in the first major study of faunal remains from this region (Parmalee 1965).

By this time, more documentation of Archaic and Late Woodland sites had been gathered, but still little was known about Middle Woodland or Mississippian occupation of the area. Such a bias was to continue in the 1970s, when the implementation of federal legislation on historic preservation led to an increase in archaeological investigations.

In 1975 investigations began along a 20-km corridor in association with a highway project on Route 63. These included the first studies of the smaller tributaries and uplands of the central Gasconade drainage (McGrath 1977). Four of the open-air sites located in this survey were tested by Southwest Missouri State University between 1975 and 1977 (Cooley and Fuller 1977). In 1978 personnel from the University of Missouri at Columbia tested an additional eight sites (Reeder and Oman 1979). Smaller surveys also were conducted such as those by Butler (1976), Cooley and Fuller (1975, 1976), and Turner and Helm (1979). Additionally, amateurs examined various caves and rockshelters (Jolly and Roberts 1974a, 1974b; Wessel 1974) and expanded some of the Route 63 excavations (Roberts 1978). These investigations also formed the basis of Reeder's (1988) dissertation, in which he argued that inhabitants of the Gasconade River basin were not isolated geographically from other groups and that the culture history of the area fits the general Midwestern cultural pattern.

Large-scale excavations also were conducted at two Late Woodland sites: the Feeler site, 23MS12 (Reeder 1982, 1988), and the Kimberlin site, 23CR301 (Geier 1975). The former project included the first paleoethnobotanical analysis for this section of the drainage (Voigt 1982) as well as the first soil-geomorphic study (Johnson 1982).

Previous Work in the Fort Leonard Wood Area

In the 1980s a series of major surveys was undertaken in the Mark Twain National Forest. Surveys were conducted outside the major valleys and, for the most part, identified small lithic scatters without diagnostic artifacts (Fraser et al. 1981; Klinger and Cande 1985; Perttula et al. 1982; Purrington 1985). The American Resources Group surveyed the 243-ha Kofahl Tract in 1981 (Fraser et al. 1981). Seventeen prehistoric sites, both open-air camps and lithic scatters, were identified. The sites are located on floodplain levees, terraces, alluvial fans, terminal ridge spurs, bluff crests, upland ridge crests, and hollow bottoms. Personnel from Southwest Missouri State University (Purrington 1985) surveyed an additional 1,215 ha and identified 15 limited activity areas, 12 "field camps," six cave/rockshelter sites, and one stone cairn. Most of these sites are located near large streams, but some are also present in the uplands. Purrington (1985) suggests that prehistoric site density was highest in the Rolla-Houston area of the forest and that this density is indicative of the real site-distribution pattern and not a result of sample bias.

Perttula et al. (1982) also conducted investigations in a series of tracts and found two small prehistoric sites, 23PU194 and 23PU195. Purrington (1983) also located two sites, 23PU198 and

23PU199, in another survey for the National Forest. Klinger and Cande (1985) surveyed 632 ha and located ten small lithic scatters on ridge tops.

The 1970s also saw the first scientific investigations at Fort Leonard Wood. Garrison (1976) undertook a survey of a 16-ha tract for an air-to-ground weapons range, but no prehistoric sites were located. Purrington and Turner (1981) carried out a survey of a 34-ha landfill tract in an upland area. Two prehistoric lithic scatters, 23PU167 and 23PU168, were identified. Two surveys also were conducted by Major John Hargis (ca. 1980, ca. 1981) in 1980 and 1981. The first was located on Roubidoux Creek and the second in the Interior Uplands resource zone. He found 46 prehistoric sites, of which 13 are in the interior uplands. Due to changes in the boundaries of the military reservation, only 42 of these sites are currently located on the installation. The sites include caves/rockshelters, rock cairns, and villages or campsites.

In 1981 and 1982, Environment Consultants, Inc. examined scattered tracts across the installation, totaling 2,024 ha (Niquette et al. 1983). Identified and partially evaluated were 53 prehistoric and historic sites. The prehistoric sites include 15 caves or rockshelters, 25 open-air sites (including two with Dalton points), and six rock cairns. The historic sites are three late nineteenth/early twentieth century farms, a church from the same time period, and two military facilities (a bridge and generator). Twenty-five prehistoric sites and one historic site were thought to be eligible for listing in the NRHP. Another 68 prehistoric sites were identified but not evaluated, and no formal report on these sites was published. Based on review of the ASM forms for these sites, the Late Woodland period is best represented, but Middle and Late Archaic sites are also identified.

Niquette (1984) conducted a survey of an additional 1,035 ha, in which 22 prehistoric and 11 historic sites were identified. Again, Late Woodland sites predominated, although Late Archaic sites were also well-represented. In the same year, Niquette (1985) also investigated 243 ha of timber-sale tracts on steeply sloped terrain. This was considered to be an area with low potential for containing archaeological sites and, not surprisingly, only three isolated finds were recovered.

In 1988 the American Resources Group studied 46 separate survey areas in Pulaski County, totaling 974 ha (Moffat et al. 1989). They identified 33 archaeological sites, 8 of which had been recorded previously. Twenty-seven of the sites are prehistoric, and they are mainly open-air camps and lithic scatters. Also recorded were five rockshelters, a rock cairn, and a cave site. The six historic sites are late nineteenth/early twentieth century residences or farmsteads. Phase II NRHP evaluation was recommended for 25 sites. Also identified were 22 isolated finds. The survey results indicate a higher site density on Fort Leonard Wood than in the Mark Twain National Forest as a whole.

In 1990 and 1991, the American Resources Group conducted further Phase I investigations of selected timber-sales and military-training areas on Fort Leonard Wood (McNerney 1992; McNerney and Neal 1992). One prehistoric and eight historic sites were documented during survey of 17 timber-sale parcels totaling 684 ha. Two military-ordnance training sites and four historic farmsteads were recommended for additional work (McNerney 1992). An additional 705 ha were surveyed in two timber-sale parcels and three training areas located in the Interior Uplands and Big Piney resource zones, respectively. Eight prehistoric isolated finds, one historic isolated find, nine isolated historic features, one historic farmstead, and two prehistoric sites were located. One prehistoric site and the historic farmstead were recommended for additional Phase II investigation (McNerney and Neal 1992).

In 1992, Markman and Associates conducted Phase I inventory of two large contiguous tracts of 972 ha and 1,943 ha. The larger survey documented 25 historic sites, 20 prehistoric sites, and 24 prehistoric isolated finds. Phase II NRHP evaluation was recommended for four prehistoric open-air sites, and avoidance and preservation was recommended for two cairns and four rockshelters. Phase II NRHP evaluation was recommended for four historic sites, and one cemetery was recommended for avoidance

and preservation (Markman and Baumann 1993). In the smaller survey, 12 historic farmsteads or residences were documented, and 2 sites were recommended for Phase II NRHP evaluation. No prehistoric sites were recorded (Baumann and Markman 1993). Under a subcontract with this project, Smith (1993) prepared an historic overview and research context for the Fort Leonard wood area to expand on the information provided by Harland Bartholomew and Associates (1992).

More recently, the University of Illinois conducted five Phase I survey projects at Fort Leonard Wood. The first project consisted of an inventory of 783 ha in scattered tracts. Forty-three new sites and 21 previously reported sites were documented (60 prehistoric, 3 historic, and 1 with both historic and prehistoric components). Phase II NRHP evaluation was recommended for 43 prehistoric sites, 1 historic site, and the single site with mixed components. Four cairns were recommended for listing in the NRHP, and Phase II NRHP evaluation was recommended for 20 cave/rockshelter sites and 21 open-air habitation sites (Ahler and McDowell 1993). The second survey of 1,613 ha was completed in 1995 (McGowan et al. 1996). Areas surveyed include upland tracts adjacent to the Big Piney River, west of Musgrave Hollow, and encompassing Hurd Hollow. A total of 57 prehistoric and historic sites and isolates was located, of which 15 were recommended as potentially eligible for listing in the NRHP. The third project entailed a survey of 1,618 ha in three different tracts. As a result, 21 new sites and four isolated finds were identified. Two prehistoric and two historic sites were recommended for Phase II NRHP evaluation (McGowan 1996). The fourth project examined 1,416 ha in three different tracts. The survey documented 39 new sites, 27 revisited sites, and 10 isolated finds. Twenty-six sites were recommended for Phase II NRHP evaluation (Kreisa, McDowell, et al. 1996). The fifth survey project examined 1,214 ha along the Big Piney River and at two locations along Roubidoux Creek. Forty-one previously unrecorded sites and 18 isolated finds were identified, with 22 archaeological sites recommended for Phase II NRHP evaluation (Adams 1997).

Until the 1990s Phase II NRHP investigations at Fort Leonard Wood have been few in number. The investigations conducted by Niquette et al. (1983) included test excavations at all reported sites. These excavations usually were limited to excavation of a single test unit, cleaning looter pit profiles and documenting the exposed stratigraphy, or occasional excavation of deep backhoe trenches. These activities were considered to constitute formal Phase II evaluation to assess NRHP eligibility, and NRHP nomination forms were completed for the 14 sites included in the proposed Roubidoux Creek Archaeological District.

Another Phase II investigation was conducted in 1992 by Markman (1993). These activities were limited to test excavations and damage assessment of Miller Cave (23PU2). Although the cave has been looted repeatedly, the excavations demonstrated that intact Early Archaic deposits were present and that the site should be nominated to the NRHP. The Miller Cave evaluation was the first Phase II work done at Fort Leonard Wood since the 1982–1983 work conducted by Niquette et al. (1983).

Phase II excavations were conducted at 15 sites during 1992 and 1993 (Ahler, Kreisa, McDowell, and McGowan 1995). The project was designed to sample different time periods, resource zones, and site types. Sites investigated include both open-air and rockshelters in the Interior Uplands, Big Piney, and Roubidoux resource zones. Most importantly, this project produced a large suite of radiocarbon dates and paleoethnobotanical data. Based on the excavations, 10 of the 15 sites were recommended as eligible for the National Register of Historic Places.

During 1994 expanded fieldwork at 23PU235 was conducted as a Legacy project (Ahler, Kreisa, Theler, et al. 1995). While additional work also was conducted at 23PU2 and 23PU255, most of the research effort centered on Sadie's Cave (23PU235). Work included the excavation of a number of test units, systematic coring of the cave area to identify intact deposits, and chemical and physical analyses of soil samples. The research identified intact Middle Archaic through Late Woodland period deposits. In addition, numerous charcoal samples were assayed, and detailed faunal, floral, and lithic analyses were

conducted.

National Register evaluations were conducted at seven sites during 1994 and 1995 (Kreisa 1995) and an additional eight sites in 1995 (Kreisa, Walz, et al. 1996). As in the previous Phase II testing project, sites investigated during both projects included a number of different time periods, resource zones, and site types. Included were open-air sites and rockshelters in the Big Piney and Upper Roubidoux resource zones. Geomorphological investigations were conducted as part of both projects at terrace, upland, and rockshelter sites. Based on the excavations, five of seven (Kreisa 1995) and six of eight (Kreisa, Walz, et al. 1996) sites, respectively, were recommended as eligible for the NRHP.

More recently two projects have been conducted within the Ramsey Peninsula area along the Big Piney River (Ahler, Schroeder, et al. 1996; Ahler, Harn, et al. 1997). The goal of both projects was to study a suite of spatially clustered sites within the Ramsey Peninsula and attempt to determine whether the sites were temporally and functionally related. In addition, the first of the two projects determined that three sites investigated were NRHP-eligible. The second of the two projects consisted of larger scale excavations at the three sites, in addition to a fourth site, in an attempt to refine the concept of a site complex. Relatively large artifact assemblages were recovered from the sites, with significant Middle-Late Archaic and Late Woodland components identified. This project also obtained the first Early Woodland period radiocarbon dates for Fort Leonard Wood (Ahler, Harn, et al. 1997).

Brockington and Associates conducted NRHP evaluations at four sites along Roubidoux Creek at Fort Leonard Wood during 1996 (Childress and Weaver 1998). These include one rockshelter and three open-air sites located on floodplain and terrace formations and an upland ridge crest. All four sites were recommended as eligible for listing in the NRHP due to the presence of intact subsurface deposits. Intact deposits dating to the Early Archaic, Middle Archaic, Late Archaic, Middle Woodland, and Late Woodland periods were encountered at the four sites. Of particular note is the presence of up to 1.5 m of cultural deposits at 23PU264, a small rockshelter. Ahler et al. (1998), documents excavations at three caves, 23PU209, 23PU210, and 23PU211. Intact Archaic and Woodland period deposits were located at all three sites, and all three have been recommended eligible for listing in the NRHP. Most recently, Ahler et al. (1999) present the results of archaeological and geophysical remote sensing techniques at seven sites. Six of seven sites were recommended eligible.

Aside from strictly archaeological projects conducted at Fort Leonard Wood, two important ancillary projects have been completed recently: a GIS-based archaeological site predictive model (Ahler 1995) and a geomorphological study (Albertson et al. 1995). Using known site locations and associated physical attributes, Ahler (1995) has produced GIS-based predictive models for cairn, cave/rockshelter, and open-air sites. These models generally predict a high correlation between water sources and the presence of archaeological sites. The geomorphological study (Albertson et al. 1995) concentrated on floodplain settings within Fort Leonard Wood. One product of the project consists of a predictive model of site presence and depth of deposits on the several different terrace formations identified on base. Both studies provide important data on potential archaeological site distributions and for proposing methods for locating buried sites at Fort Leonard Wood.

CHAPTER 4.
PROJECT GOALS

The Phase I archaeological survey of Fort Leonard Wood described in this report was intended to achieve two separate but interrelated goals. The first goal is the inventory of cultural resources on selected tracts and the evaluation of those resources for potential NRHP eligibility. This goal is clearly specified in federal and Army regulations concerning the identification, protection, and management of cultural resources. The methods used to accomplish this goal are presented in Chapter 5. The second goal is to contribute to the growing archaeological database that can be used to address more substantive archaeological issues for Northern Ozarks prehistory. This goal is also an important factor in determining NRHP significance and in contributing to archaeological understanding of this region. Research issues are presented in this chapter that take into account past research in the area and the limitations inherent in inventory-level data. The described research issues are not a comprehensive listing of the research potential of sites located at Fort Leonard Wood and cannot be resolved by a single inventory project, but they do provide focal points for examining the collected data. It is hoped that, over time, the cumulative data from ongoing inventory and testing projects will result in a significant advancement in our understanding of the Fort Leonard Wood area and Northern Ozarks region.

A series of research issues has been defined for Fort Leonard Wood by previous researchers and in the historic preservation plan prepared for the base (Ahler and McDowell 1993; Harland Bartholomew and Associates 1992; Kreisa 1995; Kreisa, Walz, et al. 1996; Kreisa, McDowell, et al. 1996; Markman and Baumann 1993; Moffat et al. 1989; Niquette et al. 1983). These issues can be subsumed under four major topics of investigation: chronology, settlement patterns, subsistence, and technology. Examination of settlement patterns, with an emphasis on environmental parameters of site location, is best suited to archaeological survey data. The suite of physiographic information (i.e., aspect, distance to water, ecotone proximity, elevation, slope, site size) associated with each site location, along with the associated artifact assemblages, provides a foundation from which to compare and contrast sites. The observable patterns provide insight into cultural adaptations to the local environment. Changes in settlement patterns then can provide further insight into human adaptation in the project area. Under this theoretical framework, the data that archaeological survey often produces contribute to a number of wider research topics, albeit in an inferential manner. Conclusions based on survey data then can be used for additional testing and refinement of predictive models by researchers in the future. A more specific discussion of potential prehistoric and historic period research is presented below.

Prehistoric Period Research

An underlying assumption of settlement-pattern research is that cultural groups adapt to their physical and social environment and that these adaptations may change through time with changes in environment and technology. In the Midwest, researchers have documented that changes in prehistoric settlement patterns reflect increased sedentism and reliance on cultigens through time. Past research at Fort Leonard Wood has focused on the role that environmental variability has on prehistoric adaptations. Niquette et al. (1983) and Moffat et al. (1989), utilizing survey data, note that prehistoric sites of all types are more frequent within 1.6 km of permanent streams and that specialized sites tend to be further from permanent water sources. Ahler and McDowell (1993) found similar trends, but they refine the analysis by considering the cultural resource zones defined by Edging (1992). They found most sites are within 500 m of a major stream valley and that site densities vary between resource zones. Site density is lowest in the Interior Uplands resource zone and highest in the Upper Roubidoux resource zone. More recent surveys indicate that distance to water and site

density vary by specific parcel within and across cultural resource zones (e.g., Kreisa, McDowell, et al. 1996; McGowan 1996).

Fort Leonard Wood has been divided into five cultural resource zones for the purpose of modeling settlement patterns and human adaptation to different environmental conditions (Figure 5). The cultural resource zones are defined on the basis of contiguous aerial extent of selected subsistence resource zones, distribution of soil series and associations, bedrock geology, and the type and density of previously recorded cultural resources (Edging 1992). Five cultural resource zones have been defined: the Cantonment zone; the Interior Uplands zone; the Big Piney zone; the Upper Roubidoux zone; and the Lower Roubidoux zone. The Cantonment and Interior Uplands cultural resource zones both include only the rolling to flat upland interfluve subsistence resource zone located between the Big Piney and the Roubidoux valleys while the other three cultural resource zones contain portions of stream valley, bluff slope, and dissected upland subsistence resource zones. The cultural resource zones were designed with the assumption that there would be subtle but potentially important differences in the quality and quantity of subsistence resources within defined cultural resource zones. For example, the type and number of aquatic resources available in the Big Piney, upper Roubidoux Creek, and lower Roubidoux Creek valleys are probably different, even though all of these would be included within the stream valley subsistence resource zone. One of the goals of the Fort Leonard Wood research program is to investigate potential differences in settlement and subsistence patterns among the various cultural resource zones.

In addition, it is expected that the physical setting at Fort Leonard Wood has not been static through time. Over time physical and cultural forces have operated in a dynamic system to create environmental change. Both major stream valleys, for instance, contain complex terrace systems and abandoned stream channels dating to the Pleistocene and Holocene epochs (Albertson et al. 1995). Geomorphic work at Fort Leonard Wood indicates at least seven superimposed terraces are present in the major stream valleys, and at least two terraces are definable in the minor tributaries valleys. The relationship of archaeological sites to these terraces and the paleolandscape offers a potential wealth of information on the nature of interaction between various cultural groups and their environment. Associated with the geomorphic changes in the environment are differing plant and animal communities, each offering a different resource base for the prehistoric and historic inhabitants and each of which is subject to change over time.

Along this line of research, Ahler and Albertson (1996) have completed a comprehensive analysis of site location based on a number of variables. Using Geographical Information Systems (GIS) analysis of a suite of variables, Ahler and Albertson (1996) have constructed preliminary models of site location for cairns, open-air sites, and enclosed sites (caves/rockshelters). Models, as iterative constructs, are designed to be refined when additional data are available. A formal reevaluation of the predictive models for Fort Leonard Wood is beyond the scope of this project but can be conducted by personnel with access to databases and GIS map layers from which the original models were created. In a more preliminary manner, the site location data for the newly surveyed tracts documented in this report can be used to evaluate the model of site location predictions constructed by Ahler and Albertson (1996).

One aspect of understanding past cultures is the need to collect both cultural and environmental information in order to obtain a more complete picture of the past. In previous studies (Harland Bartholomew and Associates 1992; Moffat et al. 1989; Niquette 1984; 1985; Niquette et al. 1983), it was observed that locations more than 1.6 km from permanent streams have much lower site density than areas close to these watercourses. This general observation may hold for composite site distributions, but during time periods characterized by high group mobility (Paleoindian, Dalton, Early Archaic, and Historic), sites may be more equally distributed across the landscape. Specific expectations regarding site distributions and site density among resource zones can be expressed as follows. First, site density in the Interior Uplands zone is expected to be lower than in the other resource zones, located closer to the larger

watercourses, regardless of time period. Second, historic period sites will have the greatest site density in the Interior Uplands zone compared to all prehistoric time periods. Third, site distribution for Paleoindian, Dalton, and Early Archaic periods is expected to show greater utilization of the Interior Uplands zone compared with all other prehistoric periods. Fourth, changes in site distribution along resource zone boundaries are expected to fluctuate based on environmental change, such as the Hypsithermal Interval, compared to current environmental conditions. And fifth, site distribution for more sedentary groups such as those of the Late Woodland period should be reflected by fewer, but larger sites.

A second topic of interest has been the examination of how the steep relief between upland and valley settings has affected settlement patterns and systems. The environment around Fort Leonard Wood is one of sharp contrasts. Deeply incised valleys and karst topography result in numerous microenvironmental changes over relatively short distances. Each culture had to balance its resource needs against risks and the need to expend energy to obtain various resources. The differences between valley sites and adjacent upland sites should characterize how each group balanced its needs. Specific expectations from known cultural differences can be examined. First, because of the importance of water access throughout prehistory, the overall prehistoric site density in major stream valleys should be greater than site density in upland settings. Second, because of a technological ability to obtain water from wells rather than streams, historic sites should demonstrate an equal or greater density in upland over valley settings. Third, the greater reliance on horticulture and aquatic resources in the Woodland period should be reflected in a greater density of Woodland sites in valley settings than in upland settings. And fourth, side valleys, because of their steep sides, tendency to flood and absence of terrace systems, would be expected to have lower site density values than major stream valleys for all time periods.

Historic Period Research

Settlement-pattern research is not limited to prehistoric sites as historic sites also can be examined through settlement-pattern analysis. As noted in the historic context, settlement in the Fort Leonard Wood area has been highly variable. Historical events such as the Civil War and the placement of railroad lines have strongly affected the location and distribution of historic sites. Smith (1993:116) postulates that inhabitants of the Fort Leonard Wood area followed a dispersed settlement pattern typical of the Upland South cultural tradition, which holds that settlers from the southeast arrived in the region with a unique culture derived from Scottish and Irish folkways that developed in the Appalachians. Both intersite and intrasite attributes of this culture have been summarized by Smith (1993:116–117), drawing from other research (Hart 1977; Jurney and Moir 1987; Newton 1974; Otto and Anderson 1982; Sabo 1990; Smith et al. 1982; Weaver and Doster 1982; Zelinsky 1951). Intersite attributes of this cultural tradition include adaptation to woodland areas with good game resources but marginal agricultural land; placement of roads along ridges in hilly areas and in valleys in mountainous areas; settlement in a dispersed, kin-structured system; dispersed location of central-place or special-purpose facilities; development of a courthouse-town and county system; and placement of houses on high ground next to roads. The intrasite attributes of the Upland South tradition include hilltop farmsteads with seemingly random placement of buildings; separate house and multifunction outbuildings; placement of the house to face normal approach patterns; shade trees around houses; and irregular placement of fields and pastures, often along topographic features.

Smith concedes that "[p]erhaps the patterns which are defined as characteristic of the Upland South are actually not linked to the Scotch-Irish and their migration, but rather, are typical of historic period low-income rural people, black, white and Native American" (1993:114–115). Smith (1993: 118) also proposes that adaptation in the Fort Leonard Wood region would be influenced by the local landscape. The Upland South model deserves further historical and archaeological work to evaluate its efficacy. This may be facilitated by comparing the attributes of sites settled by southeasterners in this region with sites of comparable date and ethnicity

throughout the Midwest. Another avenue of study may be the comparison of post-Civil War domestic sites located within Fort Leonard Wood that were inhabited by people from the southeast with sites inhabited by people from Illinois, Indiana, or Ohio.

It is through archaeology that the hypotheses and models proposed by Smith can be tested. For instance, Smith indicates the earliest local settlements are expected along the river bottoms, with upland settlement increasing after the Civil War. More recent settlements were focused along the upland road system that ran along ridge tops, and prominent landscape locations became the preferred home locations. Smith also notes that the landscape changed significantly during the historic era and that the changes were associated with distinct occupational eras and different types of sites. It is expected that the number and diversity of site types increase from the nineteenth to the twentieth century. It is also expected that the earliest historic sites will be located in the valleys and will have a poor archaeological signature. Conversely, the most recent historic sites will tend to occur in the uplands, be oriented to the existing road system, and have a strong archaeological signature in both the historic records and on the ground surface. Historic sites encountered should be placed within the typology and model not only to support or disprove the hypotheses but to provide a framework from which these cultural resources might be managed.

Summary

The general goals of the project reported here are to fulfill the cultural resource management needs of Fort Leonard Wood and to build and expand upon the current understanding of the area's past. The research topics outlined above utilize physiographic and temporal variability to investigate the differential use of sites through time. Ultimately, the cumulative data should illustrate how both the prehistoric and historic populations in the Fort Leonard Wood area are similar to, or different than, other groups in the Midwest. Numerous other questions can be formulated and examined, but an exhaustive list is impossible to create. The purpose here is to provide some direction to the analysis that is consistent with what other researchers have found noteworthy in the area (e.g., Ahler and McDowell 1993; Smith 1993). The information generated from these analyses then can be compared and contrasted with information from a wider area of Missouri and the Midwest in general. In summary, the goals of this project are to provide Fort Leonard Wood with cultural resource compliance data and to expand our knowledge of the local historic and prehistoric past.

CHAPTER 5.
RESEARCH METHODS

The Phase I archaeological survey of 3,511 acres at Fort Leonard Wood undertaken by the Public Service Archaeology Program of the University of Illinois at Urbana-Champaign consisted of archival research, systematic subsurface and pedestrian investigation of the three survey tracts, and analysis of artifacts and site attributes to determine the identified sites' potential for listing in the NRHP. The primary goal of this project was to inventory and document the location, age, condition, physiographic attributes, and potential significance of all prehistoric and historic cultural resources within the survey tracts and to recover material pertinent to significant regional research issues. This chapter describes the archival, field, laboratory, and analysis methods used in this project and the underlying substantive and theoretical orientation used to evaluate the potential of these sites for addressing questions important to the history and prehistory of the area.

Archival Research

Standard archival research was undertaken to develop a contextual framework of existing conditions within the survey tracts that would assist in data collection. Three areas were addressed. First, general environmental and cultural contexts were developed. Those contexts are presented as Chapters 2 and 3 of this report.

Second, specific soil conditions were evaluated for the selected survey tracts in order to identify appropriate field methods. Existing soil records were examined to develop a model of typical soil profiles in various Fort Leonard Wood survey tract locations. This model provided a comparative profile from which to distinguish normal from atypical soil conditions and to determine the maximal depth needed for each subsurface test. An A-E-B soil horizon sequence, from top to bottom, represents a normal soil profile in upland nondepositional settings (United States Department of Agriculture, Soil Conservation Service [USDA, SCS] 1975). In depositional environments, where clay and organic matter may be added to and moved through the sediment profile in greater amounts than in upland settings, the soil horizon sequence is more variable. At Fort Leonard Wood, most upland soil profiles showed well-developed B horizons at less than 40 cm below surface, and posthole tests were considered complete at 40 cm or less in depth. Field methods for depositional environments varied, depending on the geomorphic model for the age of the terrace (Albertson et al. 1995). In many instances, these areas include stable terrace settings where deeply buried (greater than 1 m) cultural materials are possible (Albertson et al. 1995). Solid core auger tube samples and screened bucket auger tests provide the basic sampling technique in these settings. Specific field methods for the various terrace formations encountered along Roubidoux Creek were specified in Appendix 1 of the USACERL Statement of Work.

Third, available atlas, USGS, and plat maps were consulted to evaluate the potential for known historic sites in the survey areas. As part of this project, Fort Leonard Wood and USACERL furnished topographic and installation maps depicting the location of all known sites. Identified structures then were compared with historic documents identified by Smith (1993) to infer the type and nature of historic materials likely to be encountered in a survey area. Smith's research (1993:129) identified four classes and 25 types of sites that may be located within Fort Leonard Wood and their expected date range (Table 1). These background materials were used in the field evaluations of historic sites. Additional investigations were undertaken for all historic sites documented in the survey tracts to determine if site function or previous site ownership could be clearly identified. Located records were used in the evaluation of these historic sites. Detailed historic resource evaluations using chain-of-title materials and land-sale records were not undertaken as part of this project.

Table 1. Classes and Types of Historic Archaeological Sites (adapted from Smith 1993:129).

Site Class	*Site Type*	*Date Range*
Agricultural	Hunter-Squatter	1815–1840
Agricultural	Subsistence	1820–1940
Agricultural	Pioneer	1820–1860
Agricultural	General	1870–1920+
Agricultural	Specialized	1890–1940
Agricultural	Share-Tenant	1870–1940
Agricultural	Renter	1870–1940
Agricultural	Rural Resident	1920–1940
Community Service Center	Mill	1820–1920
Community Service Center	General Store/Post Office	1830–1940
Community Service Center	School	1850–1940
Community Service Center	Church	1830–1940
Community Service Center	Cemetery	1830–1940
Community Service Center	Hamlet/Village	1830–1940
Special Activity	CCC Camp	1930–1940
Special Activity	Tie-Hacking/Log Slide	1820–1940
Special Activity	Civil War	1860–1865
Special Activity	Outlaw Camp	1830–1940
Special Activity	Still	1830–1940
Special Activity	Portable Sawmill	1910–1930
Special Activity	Trash Deposit	1815–1940
Transportation	Bridge	1870–1940
Transportation	Ferry/Ford	1820–1940
Transportation	Road	1820–1940
Transportation	Railroad tunnel	1850–1940

Field Methods

The field methods used during the Phase I archaeological survey at Fort Leonard Wood were based on project goals and the USACERL Statement of Work and differed between upland and floodplain settings. In uplands, surveyors worked at 20-m intervals across the survey tract. Two survey techniques were used. Upland locations with surface visibility greater than 30 percent were visually examined for cultural remains. If no cultural remains were located, no additional investigations were conducted. Where cultural materials were located, interval spacing was reduced to 5–10 m in order to increase the chances of locating diagnostic artifacts and better assess the condition of the location. In locations with surface visibility less than 30 percent and in all stream valley depositional settings, posthole tests were excavated in a 20-m grid pattern. A modification was made in areas with greater than 15-degree slopes. These areas were examined visually for benches, mounds, cairns, rockshelters, and caves and were not subject to systematic walkover or subsurface testing. All posthole tests were done

with a scissors-type posthole digger. Field methods were more variable for floodplain locations. There, surveyor interval and depth of subsurface tests were specified in the USACERL Statement of Work (Appendix 1), which is reproduced here as Table 2.

Each test was excavated in 10-cm levels, and sediments were screened through 6.35-mm (¼-inch) mesh hardware cloth. These tests removed a 15-cm to 20-cm diameter column of soil. Tests were excavated to subsoil or bedrock depending on the location on the landscape. All test locations were backfilled upon completion. Negative tests were counted, but their soil profiles were not recorded. Positive tests were recorded on standard forms that include soil color, soil texture, and depth of cultural materials. Materials recovered from these tests, unless determined to be modern, were collected. Additional tests were placed around positive tests in order to determine probable site limits. The location, spacing, and number of additional tests were based on field assessments of conditions. Site boundaries were determined on the basis of surface and subsurface findings and changes in landform.

Identification of a site resulted in additional documentation. Upon the discovery of an artifact or surface feature, the location was assigned a temporary field number (AOS, area of scatter). These AOS numbers were assigned to all previously unrecorded sites. For newly identified sites, the first task was to define site limits and to record that location on USGS 7.5' quadrangle maps. Global Positioning System (GPS) hardware was used to calculate the UTM coordinates of each site. All subsurface materials and representative surface materials discovered within the AOS were collected in reference to their specific provenience (e.g., surface or posthole test, depth of recovery). A scaled, field sketch map of the site was drawn. Maps include topographic or other natural features, man-made features, approximate site boundaries, and location of the site datum. All sites were marked with a permanent datum marker (a metal pipe) onto which was affixed a metal tag. The field number was written on the tag in waterproof marker. The datum was placed in a location that was easy to reference and relocate within the site. Black-and-white photographs and color slides documenting each site were taken. Finally, field notes were recorded for each site. Specific observations made at each include a general location description, an evaluation of subsurface disturbance, documentation of features, and, if possible, temporal affiliation. Sufficient data were collected to complete ASM site forms and to provide preliminary NRHP evaluations.

Previously recorded sites were documented using their state trinomial designation. These sites were assessed to determine if changes had occurred since they were recorded. The same documentation procedures were undertaken as for newly recorded sites.

Laboratory Methods

All recovered materials were transported to laboratory facilities at the University of Illinois at Urbana-Champaign where they were washed, labeled, inventoried, analyzed, and prepared for curation. Inventory forms document artifact types, counts, and weights for each provenience. Weight was not calculated for historic artifacts. All recovered materials were classified initially as historic or prehistoric artifacts. More detailed secondary analyses were performed on both historic and prehistoric materials.

Historic Artifacts

The historic artifacts category from Fort Leonard Wood contains artifacts dating to the nineteenth and twentieth centuries. Artifacts were initially sorted based on material types (e.g., ceramics, glass, metal, or lithics). Materials then were divided according to the classificatory system developed by South (1977). In this system, historic artifacts are organized at the most general level into Artifact groups. South (1977) has defined nine such groups: Kitchen, Architecture, Furniture, Arms, Clothing, Personal, Tobacco Pipe, and Activities. Materials are then divided into Artifact classes within the groups. Artifact classes are further subdivided into more specific Material, Ware and Type categories. These category attributes and descriptions generally facilitate identification of site age and function.

Table 2. Specified Field Methods for Terrace Formations.

Terrace Formation	*Required Techniques*
T0-Cookville	No investigation required
T1-Happy Hollow	No investigation required
T2-Ramsey	Examine bankline exposures for material
T3-Dundas	Examine bankline exposures; excavate posthole tests to 50 cm at 40-m intervals, and to 1.5 m in every tenth test; excavate positive tests to 1 m
T4-Quesenberry	Examine bankline exposures; excavate posthole tests to 50 cm at 20-m intervals, and to 1.5 m in every tenth test; excavate positive tests to 1 m
T5-Miller	Examine bankline exposures; excavate posthole tests to 1 m at 20-m intervals, and to 2 m in every tenth test; excavate positive tests to 2 m
T5o-Miller Organic	Examine bankline exposures; excavate posthole tests to 1 m at 20-m intervals, and to 2 m in every tenth test; excavate positive tests to 2 m
T6-Ousley Spring	Excavate posthole tests to 50 cm at 40-m intervals
T7-Stone Mill	Excavate posthole tests to 50 cm at 20-m intervals
T7co-Laughlin	Excavate posthole tests to 50 cm at 20-m intervals
AF-McCann	Excavate posthole tests to 50 cm at 20-m intervals
TR1-Baldridge	No investigation required
TR2-Hanna	Excavate one posthole every acre to 1 m

The *Kitchen* group includes artifacts typically associated with food preparation and consumption. Within this group South (1977) has defined eight artifact classes: Ceramics, Wine Bottle, Case Bottle, Tumbler, Pharmaceutical Type Bottle, Glassware, Tableware, and Kitchenware.

The *Architectural* group includes those remains associated with construction and demolition of buildings rather than the activities performed in or near such structures. South (1977) defines five artifact classes for this group—Window Glass, Nails, Spikes, Construction Hardware, and Door Lock Parts. A class of Construction Materials has been added to incorporate remains such as concrete, brick, shingles, and mortar which often mark the former locations of historic buildings.

The *Activities* group encompasses a wide range of artifact classes that relate to the variety of activities performed by craft specialists as well as the general population and that are not included in other artifact groups. South (1977) defines 12 such classes: Construction Tools, Farm Tools, Toys, Fishing Gear, Stub-stemmed Pipes, Colono-Indian Pottery, Storage Items, Ethnobotanical, Stable and Barn, Miscellaneous Hardware, Other, and Military Objects.

Prehistoric Artifacts

All prehistoric material was counted and weighed, with the data entered on inventory forms. Only lithic artifacts were recovered in this project. The lithics are divided into three broad categories: tools, manufacturing debris, and miscellaneous lithic material. Tools include those made from both chipping techniques (e.g., projectile points and scrapers) and grinding and pecking techniques (e.g., celts and axes). Tools can be of formal manufacture, such as the examples listed above, or of incidental manufacture (e.g., hammerstones and pitted stones).

Manufacturing debris usually are composed of the waste materials (e.g., spent cores, flakes, and block shatter) generated from the production of chipped-stone tools. Miscellaneous lithic material includes fire-cracked rock, limestone, unmodified and tested chert chunks and nodules, and ocher. Fire-cracked rock is unintentionally produced debris that results from alternating processes of heating and cooling (Taggart 1981; Zurel 1979, 1982). Unmodified or minimally flakes chunks and nodules of chert represent raw material collected and reserved for tool production. Chipped-stone tools, manufacturing debris, and ground-stone tools were recovered from this project.

Debitage (flaking debris) categories comprise a majority of all the chipped-stone remains. These categories include block shatter, broken flakes, and whole flakes. The whole flake classification was used for items characterized by the presence of a bulb of percussion on the ventral surface and a striking platform. The whole flakes were further divided into primary, secondary, and tertiary flake types based on the amount of visible cortex present: ≥ 50 percent, < 50 percent and > 0 percent, and 0 percent, respectively. Secondary characteristics also were assessed. Primary flakes tend to have a pronounced bulb of percussion, secondary flakes have a less pronounced bulb, and tertiary flakes are generally smaller than the other two flake types and often have a reduced or no bulb of percussion. Broken flakes are debris items that lack a platform or bulb of percussion, or are too small to place accurately within the whole flake category. Block shatter has irregular shapes that lack flake and core characteristics. Bifacial thinning flakes have a distinct lip on their bulb of percussion, an angled striking platform, and distinctive negative flake scars on their dorsal surface. Related to debitage are cores, the parent stones from which flakes are removed.

Formally flaked stone tools initially were divided into unifacial and bifacial categories. Unifaces show evidence for retouch only on one surface. Bifaces demonstrate retouch on both their dorsal and ventral surfaces. When possible, each tool is assigned to a more detailed morphological-functional use category. Unifaces are most commonly classified as scrapers; the particular type is determined by the placement of the edge modification. Bifaces can be placed into a number of distinct categories. Among these are such items as projectile points, drills, knives, scrapers, and thick and thin bifaces. The most recognizable of the chipped-stone tools are projectile points. Projectile points are symmetrically thinned bifaces that show evidence of hafting. These items have been examined in detail for comparison with projectile point types known from the Midwest and are particularly important for the placement of sites within a cultural and temporal context (see Bell 1958, 1960; Chapman 1975, 1980; Justice 1987; Kay 1980; McMillan 1965; May 1982; Morrow 1984; Perino 1968, 1971; O'Brien and Wood 1998; Wood et al. 1995; Yelton 1996).

The other tool types are largely descriptive in nature. Perforators are typically small, narrow, often bifacial tools. Knives are larger, thin bifaces with a low edge angle to facilitate cutting while scrapers have a higher edge angle to facilitate scraping. Thick and thin bifaces are not finished tools but represent stages in tool manufacture. A thick biface is one that has been modified, is not a finished implement, and is in need of further modification. Typically, the thick biface can be modified into a number of different tool types (Bradley 1975). Thin bifaces are the result of further modification of thick bifaces. They also are not finished implements, but their morphology indicates that they can be further modified into only a single tool category (Bradley 1975). Thin and thick bifaces were differentiated based on flake morphology.

In analyzing the chipped-stone tools and lithic debris, both core-reduction and bipolar models were followed (Collins 1975; see also Bradley 1975; Hayden 1980). Collins (1975) defines five stages of chipped-stone manufacture and use for the core-reduction model. These stages consist of acquisition of raw materials, core preparation-initial reduction, primary trimming, secondary trimming, and use-maintenance-modification. Each of these categories, called activity sets (except for raw material acquisition), is associated with waste by-products and objects that are further used or modified. Core preparation-initial reduction is a stage in which the

core is shaped and flakes are detached. Suitable flakes may be retained and further used with the core being discarded, or both can be retained for additional modification. End products of this stage are primary flakes, block shatter, discarded cores, and thick bifaces. The next stage, primary trimming, is used to shape the object. Flakes can be retouched into usable tools, or thick bifaces can be flaked into a thin biface. These activities result in the production of secondary flakes, retouched flakes, thin bifaces, and items broken during manufacture. Following primary trimming is the secondary trimming of thin bifaces. This stage produces tertiary flakes, finished tools, and items broken during processing. Finally, the tools are used, maintained, and perhaps modified. Bifacial thinning flakes are the most important waste by-product of tool maintenance activities, although they also could be produced while thinning thick bifaces.

Following this model, the following considerations have been made in the analysis of lithics. Cores, primary flakes, and block shatter are classified as evidence of initial-stage reduction activities. Secondary flakes, tertiary flakes, and thick and thin bifaces evidence later-stage reduction activities. Bifacial thinning flakes are indicative of tool-maintenance activities. Since broken flakes can be produced by a number of prehistoric and modern processes, they were not considered when characterizing the lithic tool production activities at the site.

Less common, or perhaps less well recognized, at Fort Leonard Wood is the use of a bipolar technique. In this technique, small cobbles are generally not well-suited for use in the direct hammer or core reduction technique described above, although a bipolar technique can be used to manipulate these items. When using a bipolar technique, the cobble is placed on an anvil and struck. This action yields bipolar debris and, eventually, a spent core. The flakes can either be discarded, used as-is, or further modified into tools. The bipolar technique also produces pitting in anvil stones due to the striking force used.

The other class of lithic artifacts, ground-stone tools, consists of pecked and ground items generally made from metamorphic or igneous rock. Included in this category are items that are intentionally formed, such as celts and axes, and unintentionally formed, such as hammerstones, grinding stones, and pitted stones. Intentionally formed artifacts consists of items that were modified for a specific use. Unintentionally formed items have areas of pitting, battering, or smoothing that were caused through use. Definitions of the individual artifact categories are based on those used by other research in the Midwest (e.g., Brose 1970; McElrath 1986; McGimsey and Conner 1985).

Site Forms

After analysis of the materials was completed, ASM site forms were compiled for all newly identified sites. Updated site forms also were compiled for previously reported sites documented during this survey. The completed site forms are included in Appendix C. Because site location data are confidential, this appendix is bound and distributed separately from the main report.

The site definition established for this project in the Statement of Work is "any loci where human behavior has resulted in the deposition of at least three artifacts within a 20 meter diameter area and is at least fifty (50) years of age. Less than three artifacts within the 20 meter diameter will be considered isolated finds." The specification of site definition is critical to all inventory projects because site definitions are widely variable from one state to another and among researchers. Zeidler (1995:36) has noted that "one of the most fundamental and firmly entrenched concepts in modern archaeological research is that of the 'site,' yet paradoxically it is currently one of the most contentious and variably defined concepts in the discipline." Locations meeting the Fort Leonard Wood minimum criteria are identified as sites; locations below the minimum site threshold are isolated finds. National Register evaluations are provided for sites and isolated finds. The isolated find designation is not considered a de facto evaluation of NRHP ineligibility. This approach is designed to help protect cultural resources by recognizing that special conditions may exist where the

minimum criteria is not achieved, but nonetheless the potential significance is high. Nonetheless, none of the isolated finds identified during this survey has been recommended as potentially eligible for the NRHP. In this project, site boundaries have been defined to include the entire area encompassed by a discrete scatter of artifacts and to take into account topographic features.

NRHP Evaluations

The collected field, lab, and archival data then were evaluated to determine which sites meet NRHP eligibility Criterion D, the ability to yield information important or potentially important to history or prehistory. Perhaps the least subjective measure when evaluating a site is the issue of integrity (Townsend 1995). Phase I field data provide substantive evidence regarding site integrity. Evaluation of known soil data, historical records, surface evidence, and soil stratigraphy provide a basis for determining site integrity. Based on a lack of integrity, sites can be recommended as ineligible for the National Register (National Register Bulletin 1991: 48–49). Additional Phase I-level data that contribute to site evaluation include site size, assemblage diversity, chronological placement, and size of the site assemblage. While these measures alone do not provide justification for a recommendation of ineligibility or potential eligibility, each can support such a recommendation. Specifically, when data are limited or lack stratigraphic integrity, it is less likely that substantive research questions can be addressed (Butler 1987:824–825; National Register Bulletin 1991:48–49). Limited data and a lack of integrity weigh against NRHP eligibility. Therefore, it is possible to make informed NRHP recommendations solely on the basis of Phase I investigations. To a large degree, the recommendation of ineligibility for sites recorded in this project is based on a lack of subsurface integrity, as seen in posthole tests and in erosional cuts within the site limits, and limited material evidence to document the nature of the cultural occupation.

Phase I investigations, however, are generally not adequate to demonstrate NRHP eligibility for sites. Field methods designed to locate sites lack the intensity of data collection needed to document fully the nature of cultural occupation at any given site. Rarely is enough evidence collected to recommend a determination of site eligibility. Instead, the sites are evaluated as indeterminate or potentially eligible for the NRHP, and Phase II investigations are recommended to determine NRHP eligibility (Jameson et al. 1990:6). As part of this recommendation, the data necessary to resolve the site's NRHP status are identified. The recommended Phase II investigations examine site preservation, site function, chronological placement, and the potential to address significant research issues.

Curation

All cultural material recovered from this project and all documents relating to the fieldwork and laboratory analysis of these materials are the property of the federal government. University of Illinois personnel have compiled lists of the artifacts recovered from each site (Appendix A). In addition, copies of all photographs, analysis forms, and field forms have been submitted to USACERL. Interested researchers should contact USACERL regarding access to the collection and documentation.

CHAPTER 6.
SITE INVENTORY AND ARTIFACT ANALYSIS

Phase I investigations were conducted in three survey tracts located in different parts of Fort Leonard Wood (Figure 2). The smallest of the three is the Roubidoux Creek Tract, consisting of 578 acres (234 ha). The Big Piney Tract occupies approximately 857 acres (347 ha), and the West Cantonment Tract is largest at 2,076 acres (840 ha). The Phase I survey identified 36 previously unreported sites and isolated finds, and seven of eight previously recorded sites were relocated. This chapter presents the results of the survey including site descriptions, artifact inventories and analyses, and National Register recommendations for each site and isolated find identified. The site and isolated find descriptions are organized by survey tract, with sites described first, in order of ASM site number, and followed by isolated finds.

Pertinent information is presented for each identified site and isolated find. Some of these data are presented as a short synopsis, preceding the general discussion of each site. Data presented in this format include site number, the USGS quadrangle on which the site is located, elevation (in meters), site type (following ASM definitions), soil type, temporal component(s), and NRHP recommendations. Following the synopsis is a narrative description of the site's location, the basis for the definition of the site area, surface visibility in the site area, a brief discussion of artifacts and cultural features identified (if present), and the rationale for the NRHP recommendation. Also presented is a sketch map of each site and isolated find. Temporally diagnostic prehistoric artifacts are illustrated as well. Detailed inventories of artifacts, including provenience, count, and weight, are presented in Appendix A.

Big Piney Tract

The Big Piney Tract consists of 857 acres (347 ha) and is located along the eastern boundary of Fort Leonard Wood and north of the Village of Big Piney (Figures 7 and 8). The Big Piney River lies almost 3.5 km to the east. The tract is divided into two parcels, a small northern parcel of 150 acres (61 hectares) and a larger southern parcel of 707 acres (286 hectares). The northern tract is bounded to the west, north, and part of the east by military roads. The remainder of the east and the south boundary follows an intermittent drainage and ravine. This parcel is located in Section 35 of Township 35 North, Range 11 West and Section 2 of Township 34 North, Range 11 West. The southern parcel is bounded by military roads and the reservation boundary on the north, east, and south, and by roads and intermittent drainages on the west. It is located in Sections 2 and 11 of Township 34 North, Range 11 West. The Big Piney Tract, which falls within the Interior Uplands cultural resource zone, consists of upland ridges, steep side slopes, ravines associated with intermittent drainages, and a small segment of the floodplain of McCourtney Hollow Creek. The area is generally covered by mixed hardwood forests dominated by oaks. Intermittent drainages have a greater degree of brush undercover.

No disturbed areas were identified in the northern parcel, whereas a number of disturbed areas are present in the southern parcel. The McCourtney Hollow floodplain area (ca. 23 acres) contained two large borrow pits and a graded surface; the area around 23PU398 (ca. 6 acres) appears to have been graded, perhaps in association with the demolition of this site; a large area in the northwest corner of the parcel (ca. 98 acres) has been bladed to the B horizon; and extensive grading and erosion (ca. 51 acres) associated with clear cutting of trees and road construction are present along the eastern edge of the parcel. Five previously recorded historic sites were relocated in this tract, and two newly located isolated finds were identified during this survey.

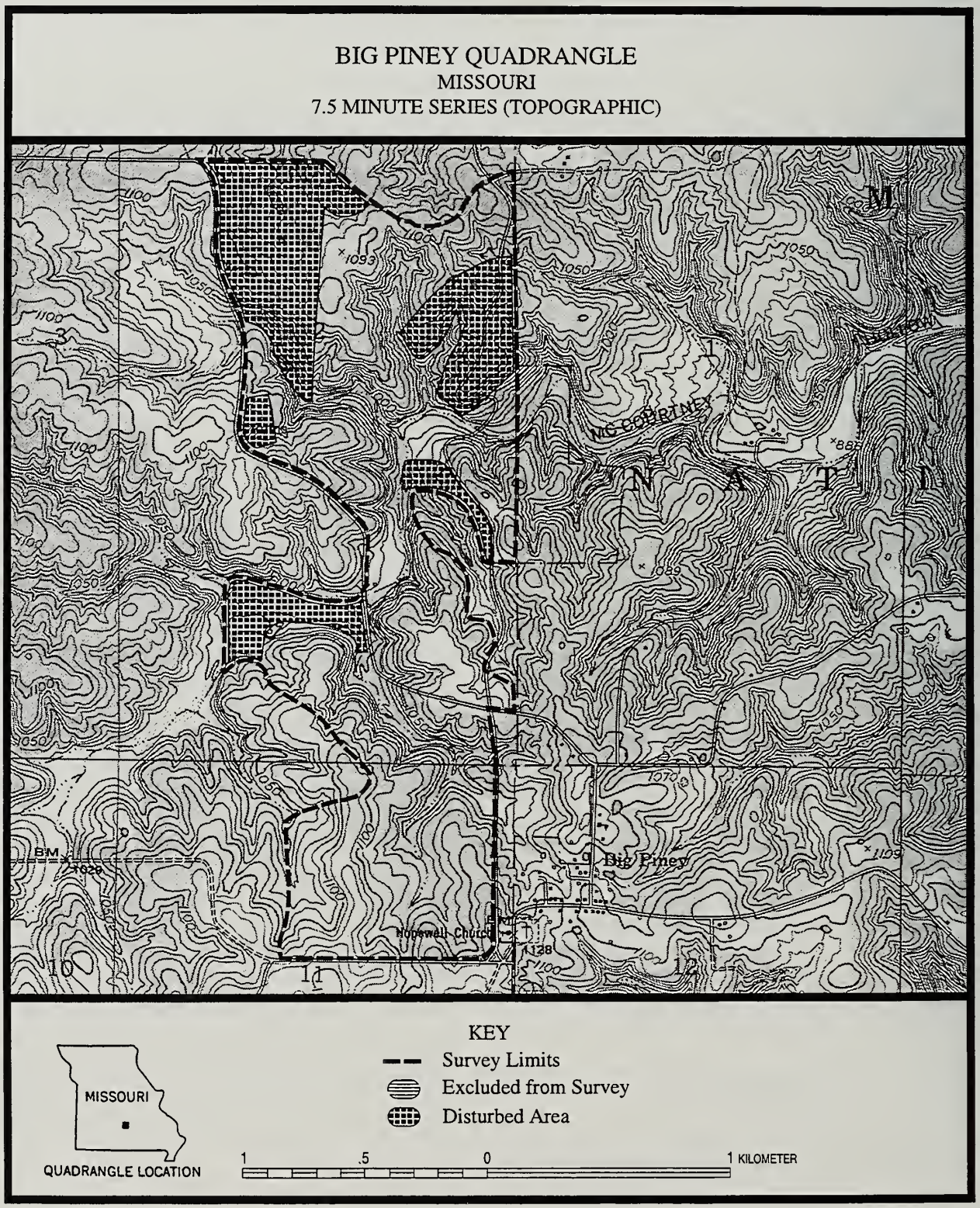

Figure 7. South Portion of the Big Piney Survey Tract.

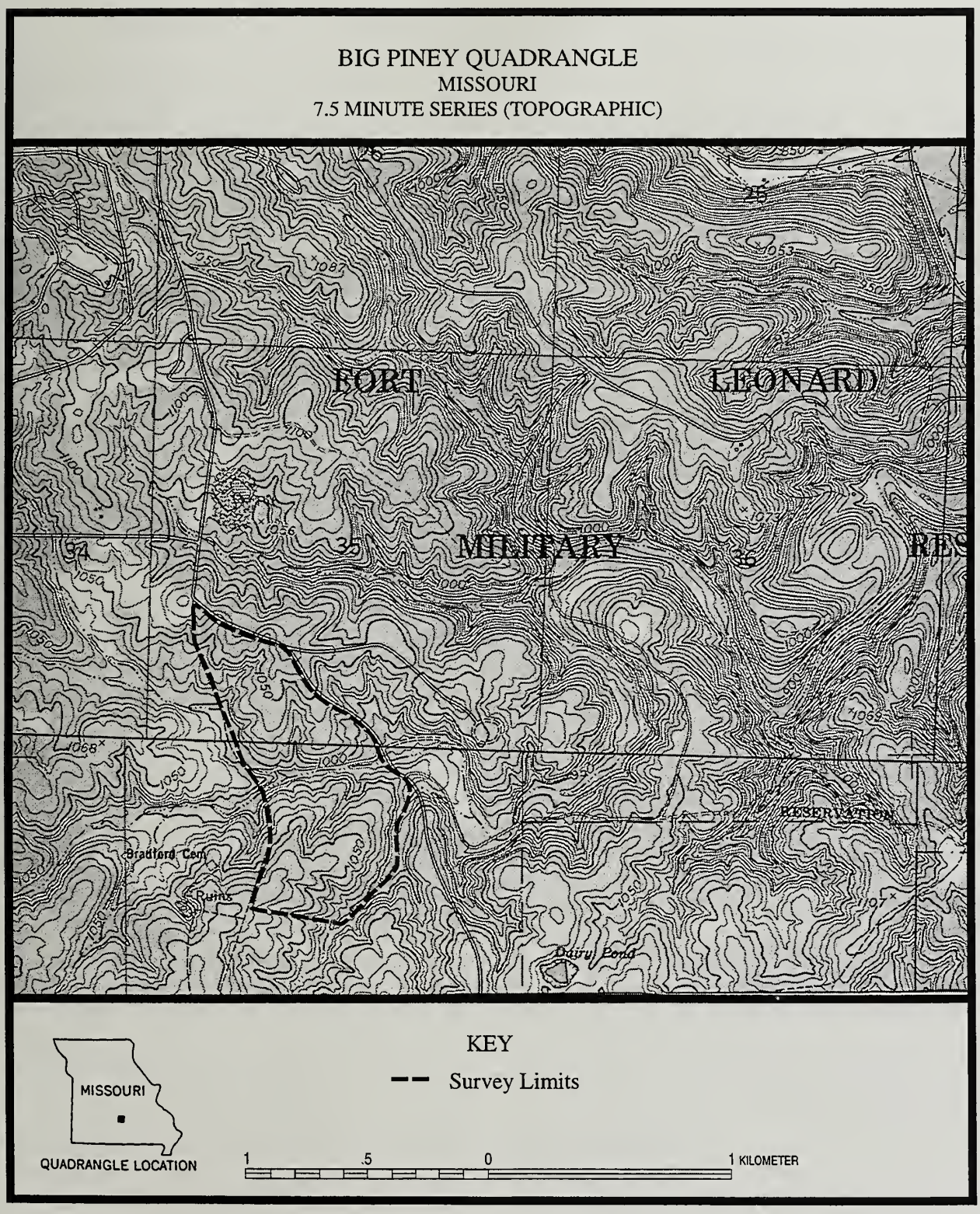

Figure 8. North Portion of the Big Piney Survey Tract.

Site Number: 23PU397
USGS Quadrangle: Big Piney 7.5'
Elevation: 299 m asl
Site Type: Residence/Farmstead
Soil Type: Claiborne silt loam, 5–9 percent slopes
Component(s): Late Nineteenth-Twentieth Century
Recommendation: Potentially Eligible

Site 23PU397, also known as the Lola and W. D. Icord site, was reported to the ASM by Fort Leonard Wood personnel in 1992. At that time it was described as a 0.5-ha farmstead with structural remains of a large poured concrete foundation and root cellar present. The site is located on a terrace and floodplain of McCourtney Hollow Creek in the southern portion of the Big Piney Tract. It is adjacent to and east of a gravel road and north of a bridge crossing McCourtney Hollow Creek that is inscribed with "WPA 1939." The site itself includes areas to the north and south of McCourtney Hollow Creek. The area is grass covered, with a light to moderate density of trees and brush limited to the area near the house foundation.

The current survey resulted in the identification of six structural remains (Figure 9). Structure A is the probable house foundation. It measures approximately 33-x-33 feet (10-x-10 m) with an internal wall dividing the space into two rooms. An 18-foot long wall extends from the southwest corner of the foundation, and window openings are present along the north wall. The foundation is made of poured concrete, as are all of the other structural remains. Structure B is a root cellar with steps, located on a slope south of Structure A, measuring 10-x-20 feet (3-x-6 m). Approximately 15 m to the east is Structure C, a poured concrete slab. The slab measures approximately 17-x-33 feet (5-x-10 m). Structure D, located just southeast of Structure A, is a small (6.5-x-6.5 feet, 2-x-2 m) concrete water trough. Structure E, south of Structure A and east of Structure B, is a possible poured concrete well cap. Structure F is an 8-x-4 feet (2.4-x-1.2 m) water trough located south of McCourtney Hollow Creek. This trough is at the base of the upland bluff and has a metal rain gutter directing water from a spring in the bluff face into the trough. Based on the spatial extent of these structural remains, a site area of 110 m north-south by 65 m east-west, or 7,150 m^2, was defined.

Artifact collections were obtained from a concentration of bottles and other debris located near the creek, the root cellar, the house foundation, and six positive subsurface tests. Material from the subsurface tests, all recovered from the initial 20 cm below surface, includes two pieces of undecorated ironstone, five pieces of undecorated whiteware, two wire nails, and a neck portion of a canning jar. From the surface of the root cellar one Bristol-slip stoneware fragment and three clear bottle fragments, probably from medicine or liquor bottles, were collected. One piece of flat (window) glass, one green soda bottle base, one brown liquor bottle base, and one metal Ball® canning jar lid were found on the surface of the house foundation. The large collection of material found near the creek might have come from looting associated with two pits north of the house foundation. This material includes one Albany-slip stoneware jug fragment, one fragment of amethyst-colored pressed table glass, one fragment of lustered pressed table glass, one ceramic inner canning jar lid liner, one piece of blue bottle glass, thirteen amethyst-colored bottle fragments (seven of which are medicine bottles), ten large green bottle fragments (seven of which are medicine bottles), one tumbler fragment, and one unidentified table glass fragment. Aside from the wire nails and flat glass, which are included in the Architectural group, all other material collected is classified within the Kitchen group and is representative of a domestic occupation.

The dating of site occupation is based on artifacts, as this farmstead does not appear to be illustrated on the 1906 Pulaski County map. The land was purchased from Lola and W. D. Icord by Fort Leonard Wood in 1940. The artifact assemblage is consistent with a late nineteenth through early twentieth century occupation. This site is potentially eligible for listing in the NRHP based on integrity of architectural elements, their spatial integrity, and the presence of subsurface deposits. Potential research themes include identification of Ozark cultural patterns, intrasite spatial patterning of farmsteads, Ozark architectural signatures and folk construction techniques, trade networks, degree of isolation of

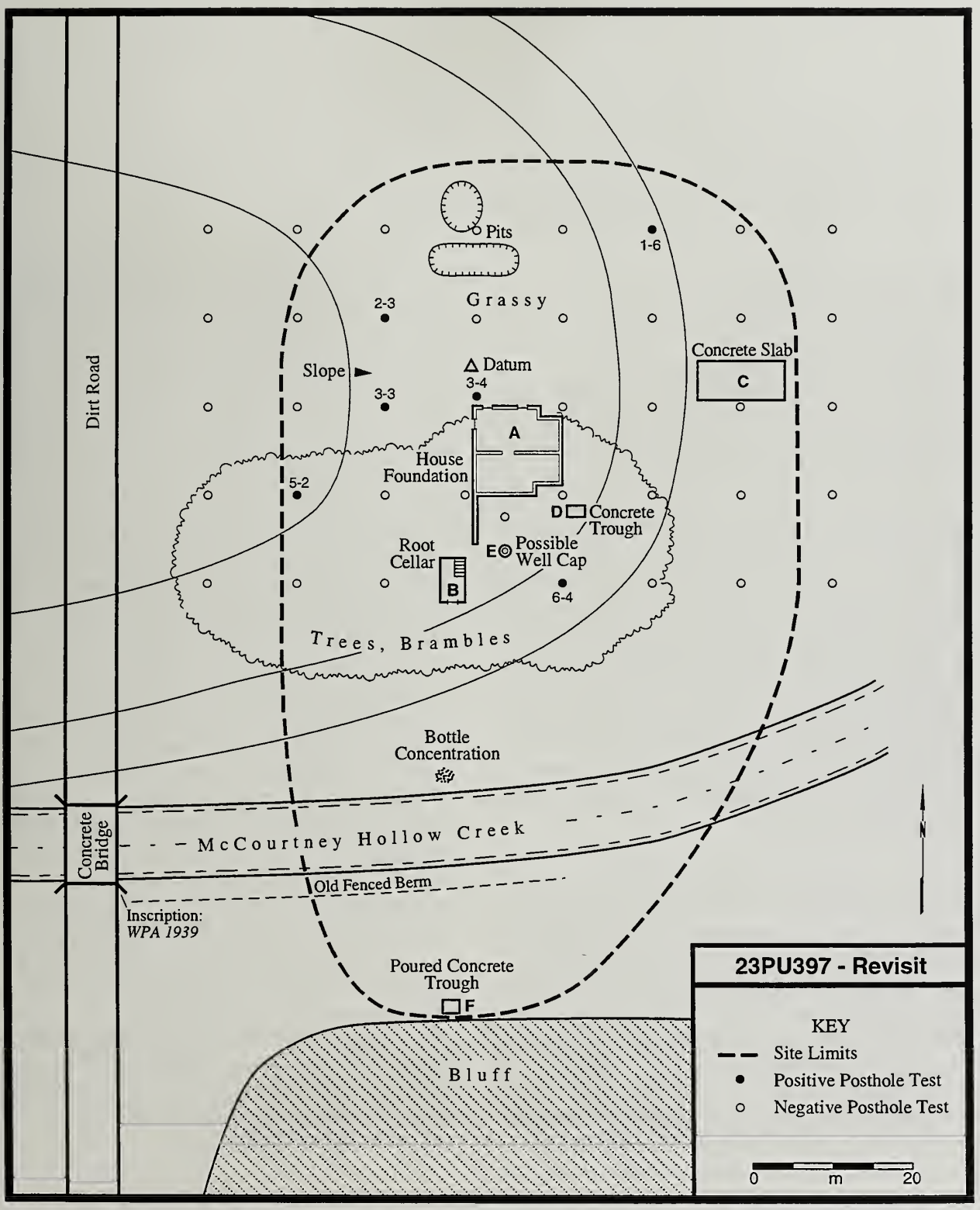

Figure 9. Sketch Map of 23PU397.

farmstead inhabitants, disposal patterns, an Ozark material culture assemblage, recycling or reuse of objects, and economic patterns associated with Ozark farmsteads. The initial research method suggested is a thorough archival review regarding the site's inhabitants. Following this, archaeological investigations, including a detailed description of the architectural remains present, should be conducted.

Site Number: 23PU398
USGS Quadrangle: Big Piney 7.5'
Elevation: 329 m asl
Site Type: Residence/Farmstead
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Late Nineteenth-Twentieth Century
Recommendation: Potentially Eligible

Site 23PU398, also known as the B. F. Page site, was reported to the ASM in 1992 by Fort Leonard Wood personnel. At that time barn and house foundations and a cellar were reported. The site is located in the southern portion of the survey tract along the crest of an upland ridge with a steep ravine located to the east. A smaller intermittent drainage forms the south boundary of the site. A gravel road, also the western edge of the survey tract, bisects the site area. The barn foundation was reported to the east of the road while the house foundation and cellar were to the west. The area is presently covered by moderately dense scrub brush.

The barn foundation and a concrete water trough was relocated within the survey tract (Figure 10). The barn foundation is made of poured concrete and measures 66-x-33 feet (20-x-10 m). The walls are 7 feet (2.1 m) tall and 8 inches (20 cm) thick. Iron lag bolts protrude from the top of the walls. Five windows are present on both the north and south walls, and a large door opening faces east. A small external poured concrete foundation is present to the north of this door opening. Three post footings are present in the foundation interior, as are larger concrete slabs in the northeast, northwest, and southwest corners. An abandoned grass-covered road is north of the barn foundation. The broken concrete water trough was located north of this road. The house area is to the west but outside of the project area. Its presence was confirmed, but no additional documentation was collected. Dr. Richard Edging of Fort Leonard Wood has provided a detailed sketch map of the western portion of this site.

Scraped areas and push piles suggest that minimally the eastern part of the site has been impacted by heavy machinery. Because of this, the area was not systematically tested, and no artifacts were collected. Observed on the surface was a metal washtub, an eroded coffee can, lumber, a machine-made brown liquor bottle, fragments of a Clorox® bottle, fragments of an aqua medicine bottle, and a porcelain child's toy saucer. These artifacts are included in the Kitchen, Personal, and Architecture groups and generally reflect domestic activities. This farmstead appears to be illustrated on the 1906 Pulaski County map and the artifacts are generally consistent with a late nineteenth to twentieth century occupation. The land was purchased from B. F. Page in 1940 by Fort Leonard Wood. The artifact assemblage is consistent with a late nineteenth through early twentieth century occupation. This site is potentially eligible for listing in the NRHP based on integrity of architectural elements, their spatial integrity, and the potential presence of subsurface deposits in the western portion of the site. Potential research themes include identification of Ozark cultural patterns, intrasite spatial patterning of farmsteads, Ozark architectural signatures and folk construction techniques, trade networks, degree of isolation of farmstead inhabitants, disposal patterns, an Ozark material culture assemblage, recycling or reuse of objects, and economic patterns associated with Ozark farmsteads. The initial research method suggested is a thorough archival review regarding the site's inhabitants. Following this, archaeological investigations, including a detailed description of the architectural remains present, should be conducted.

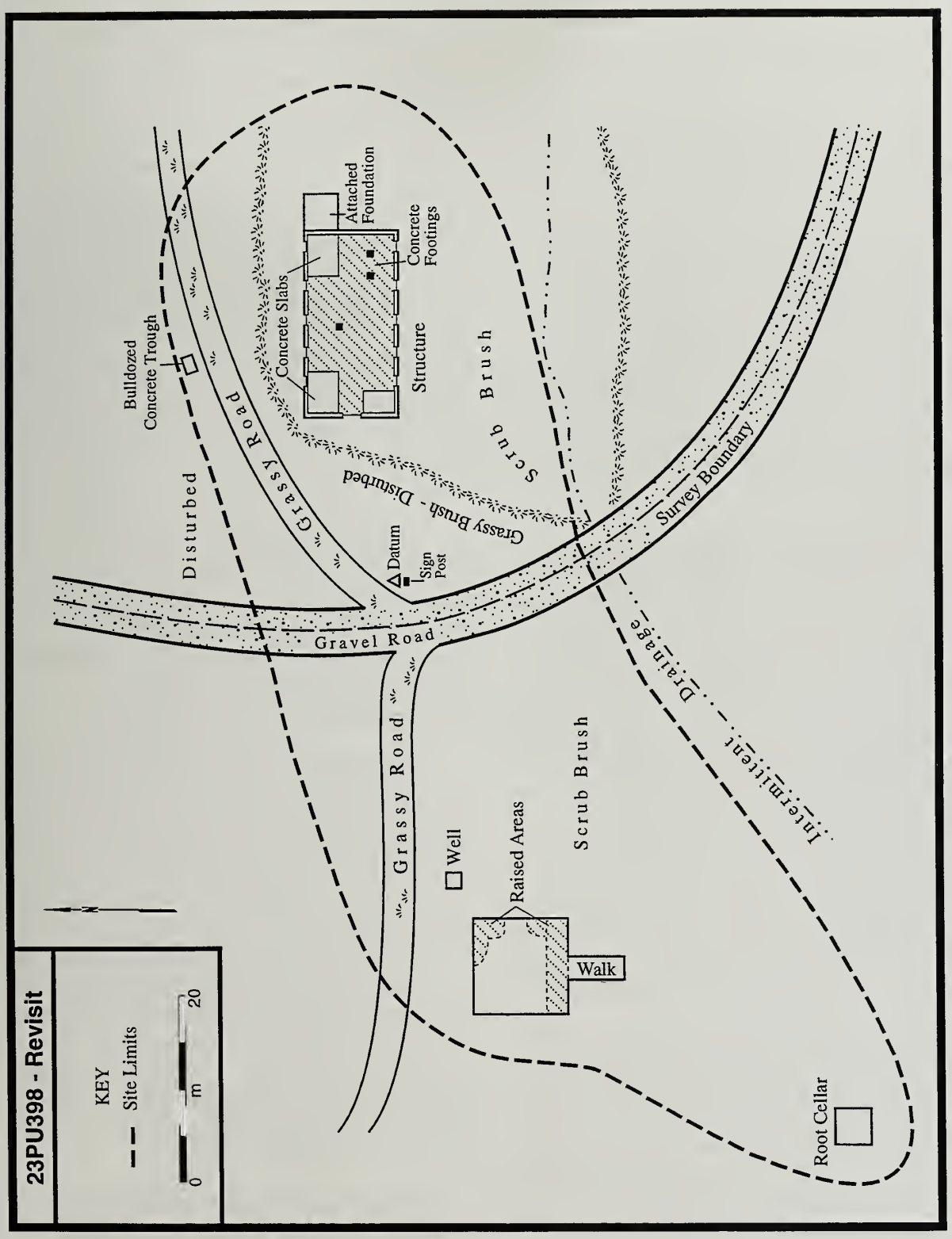

Figure 10. Sketch Map of 23PU398.

Site Number: 23PU399
USGS Quadrangle: Big Piney 7.5'
Elevation: 335 m asl
Site Type: Agricultural-General/Specialized
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Late Nineteenth-Twentieth Century
Recommendation: Potentially Eligible

Site 23PU399, also known as the Richard W. Miller site, was reported to the ASM in 1992 by Fort Leonard Wood personnel. At that time the site consisted of a single root cellar. The site is located immediately east of a gravel road and approximately 60 m south of a Y-intersection of two gravel roads in the northwest corner of the southern portion of the Big Piney Tract. Currently, the area is covered by a fairly dense concentration of second-growth trees and under story.

Four structural remains were located during the present survey (Figure 11). Structure A is a 16-x-16 foot (5-x-5 m) poured concrete root cellar with steps along the east wall that was filled with water at the time of investigation. Structure B is a small (10-x-10 foot, 3-x-3 m) poured concrete slab with embedded sandstone blocks. Structure C is a 16-x-16 foot (5-x-5 m) poured concrete slab, also containing embedded sandstone blocks. Structure D is a large, 33-x-33 foot (10-x-10 m) sandstone block foundation. The southern one-half of the foundation appears disturbed, while a concrete box is attached to the western exterior wall. A dirt road is south of these four structures, and a number of spoil piles and pits are present within the site area. A site area of 55 m north-south by 75 m east-west was defined on the basis of the spatial extent of the structural remains.

Artifacts were recovered from three subsurface tests and the surface of nearby spoil piles. Two pieces of flat (window) glass and two aqua bottle jar fragments, one of which may be from a canning jar, were recovered from the subsurface tests. Material collected from spoil piles includes three unidentified bottle fragments, one lamp glass fragment, two canning jar lid liner fragments, one brick fragment, one tumbler fragment, one iron tack, one iron ring, one brown beer bottle, one clear melted bottle fragment with "Lambert's Pharma . . .Company" embossed, and one medicine bottle with "Chamberlin's Cough Remedy" embossed. This relatively nondescript assemblage includes Architectural, Kitchen, and Activities group artifacts and is generally consistent with a late nineteenth to twentieth century residential farmstead site. The lack of house remains has necessitated placing 23PU399 into the agricultural-general/specialized category, although in all probability a residence was associated with this site. The ASM site form indicates that a structure is at this location, denoted as belonging to J. A. Bradford, on the 1906 Pulaski County map. The property was owned by Richard W. Miller at the time of acquisition by Fort Leonard Wood. Based on the presence of intact deposits and structural remains at this site, it is potentially eligible for listing in the NRHP. Phase II testing should be conducted.

Site Number: 23PU501
USGS Quadrangle: Big Piney 7.5'
Elevation: 314 m asl
Site Type: Special Activity-Tie Hacker
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Twentieth Century
Recommendation: Potentially Eligible

Site 23PU501, also known as the Hugh Pritchard site, was reported to the ASM in 1994 by Fort Leonard Wood personnel. At that time it was described as consisting of the remains of an historic log cabin with portions of the cabin corners intact and resting on corner stones. The site is located approximately 20 m east of the western edge of the northern portion of the Big Piney Tract. It is situated along the edge of an upland ridge, with a ravine and intermittent drainage to the west and south. The site is approximately 600 m south of a gravel road that forms the northern tract boundary with a grass-covered abandoned road or military trail to the east. The site area is covered by brush including a stand of cedar trees, irises, and wild onions.

The log cabin and concrete trough were relocated during the present survey (Figure 12). The structure measures 18-x-15 feet (5.5-x-4.6 m) and rests on limestone or dolomite piers. At present, only the bottom four to five wall timbers are intact, with the

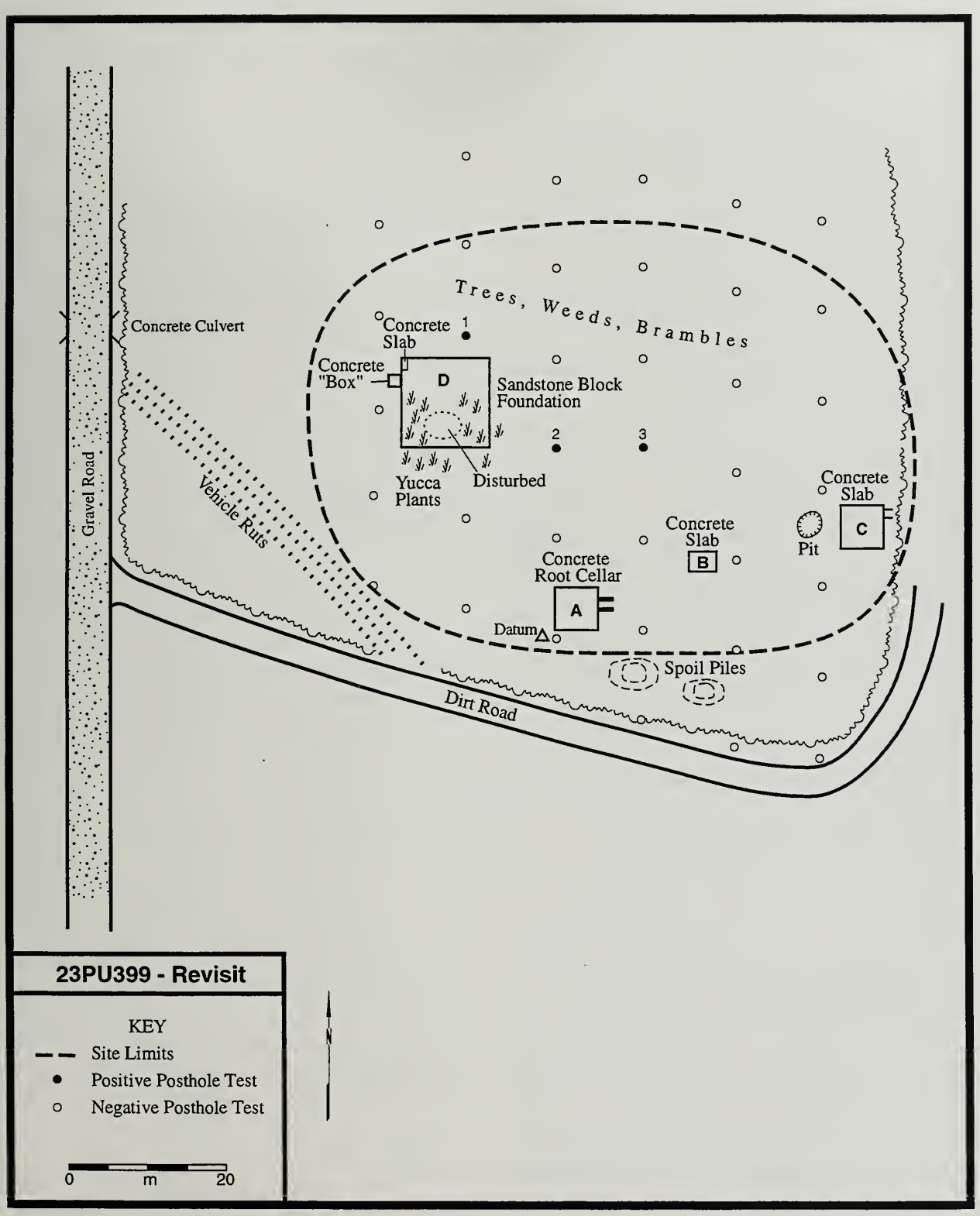

Figure 11. Sketch Map of 23PU399.

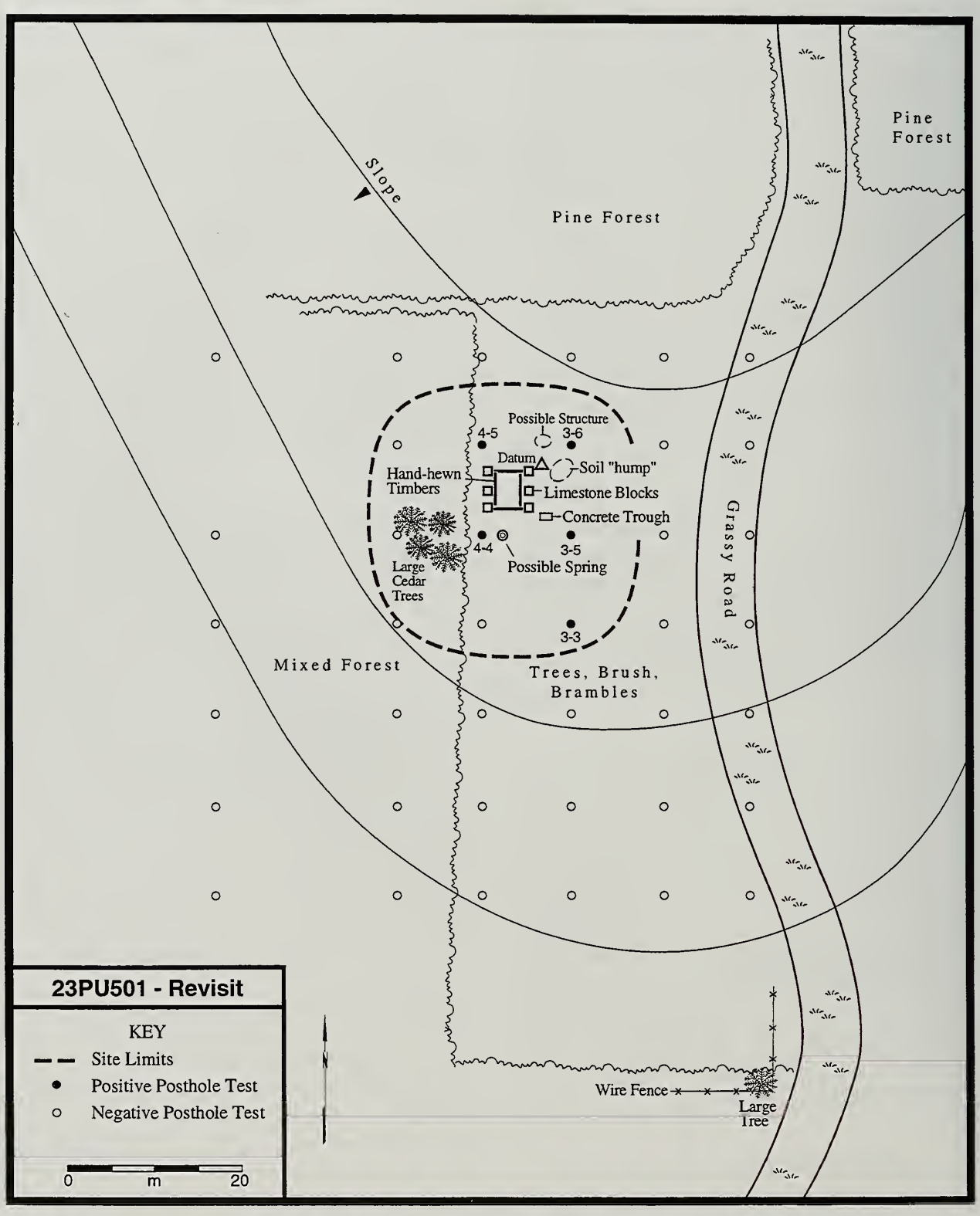

Figure 12. Sketch Map of 23PU501.

walls being 3 feet (1 m) high. The logs are 6½-inch square machine-sawn railroad ties attached with wire nails. A poured concrete trough is located just southeast of the structure. Large amounts of building material are located north of the structure and may be either the remains of a second structure or material associated with the demolition of the timber structure. Push piles in close proximity to the structure indicate some extent of disturbance to the site.

Artifacts from the site surface include one wire nail taken from the timber structure and one piece of undecorated ironstone. All material from the five positive subsurface tests was recovered between 0 and 10 cm below surface. The subsurface artifact assemblage consists of one piece of Bristol-slip stoneware, one unidentified table or lamp glass fragment, four pieces of flat (window) glass, and ten pieces of unidentified non-architectural glass. Observed but not collected were a machine-made bottle with a threaded enclosure (postdates 1919), a metal bucket, graniteware, rusted cans, and parts of a car. All artifacts most probably date to the early 1900s and, aside from the car parts, can be included in the Kitchen group, suggesting a domestic occupation of the site. The construction of the timber structure using railroad ties suggests the occupant may have been employed as a tie hacker or that such material was easily available and inexpensive. Because the construction material used to build the timber structure is somewhat unique, its association with the tie-hacker industry should be investigated. Smith (1993) suggests that site's associated with tie-hacking are potentially eligible for listing in the NRHP. Therefore, this site is recommended as potentially eligible and Phase II evaluation is recommended. The initial research method suggested is a thorough archival review regarding the site's inhabitants. Following this, archaeological investigations, including a detailed description of the architectural remains present, should be conducted.

Site Number: 23PU517
USGS Quadrangle: Big Piney 7.5'
Elevation: 317 m asl
Site Type: Residence/Farmstead
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Late Nineteenth-Twentieth Century
Recommendation: Potentially Eligible

Site 23PU517, also known as the E. G. Sneed site, was reported to the ASM in 1994 by Fort Leonard Wood personnel. At that time it was reported to be a farmstead comprised of the remains of a house and outbuilding. The site is located in the southern portion of the survey tract and is east of a gravel road and west of the installation boundary north of the Village of Big Piney. The site crosses a ravine on an upland ridge that is east of McCourtney Hollow. The area is covered by a second-growth forest with a moderate density under story. Cedar trees and large iris stands are located near the remains of a house.

The current survey relocated the house and outbuilding remains, an earthen dam spanning the ravine that bisects the site area, and a possible third structure near the earthen dam (Figure 13). The probable house is closest to the gravel road. The remains consist of an L-shaped foundation made of sandstone blocks. The remaining foundation walls measure 16-x-16 feet (5-x-5 m) and consist of a north-facing and west-facing wall. Approximately 55 m northeast of this foundation is a 20-ft long line of sandstone blocks whose function is unknown. Push piles in this western portion of the site suggest some degree of disturbance. Just north of the sandstone block line is an abandoned road. This road curves to the north and east of the house foundation, crosses the ravine near the earthen dam, and continues east to the outbuilding. The earthen dam is approximately 60 m southeast of the house foundation. It is approximately 30 m long and consists of an earthen body with limestone block facing. The dam appears to create a retention (stock?) pond to the south. The abandoned road appears to cross over the dam, suggesting its contemporaneity with the farmstead. To the west of the dam is a 2-m diameter and 1-m high pile of limestone blocks and concrete rubble that may represent the remains of another structure. The final outbuilding is east of the ravine. It consists of two closely spaced rows of sandstone blocks and a less well-defined row or rows to the west. The structure's dimensions appear to be 33-x-33 feet (10-x-10 m). Based on the spatial extent of the structural remains and positive subsurface tests, 23PU517 mea-

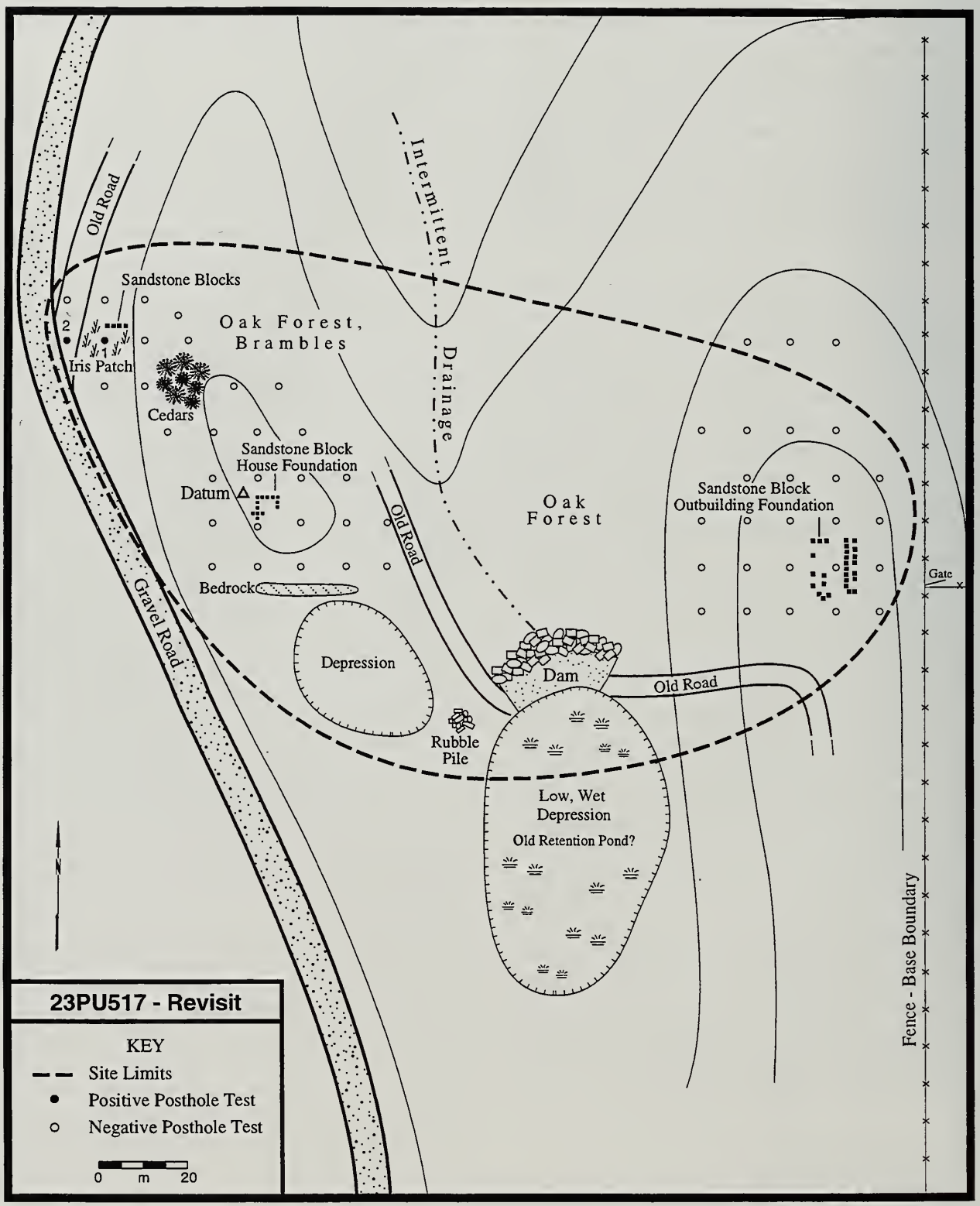

Figure 13. Sketch Map of 23PU517.

sures approximately 200 m east-west by 110 m north-south, or 2.2 ha in extent.

Artifacts were recovered from two subsurface tests and a surface collection. Obtained from the subsurface tests were two wire nails, one piece of lamp glass, one piece of flat (window) glass, one clear curved (possible table) glass fragment, one piece of undecorated ironstone, and one piece of Bristol-slipped stoneware. The two positive subsurface tests were excavated near the sandstone block line in the western part of the site. Surface collected artifacts include one wire nail, three pieces of undecorated ironstone, one piece of undecorated semiporcelain, one piece of mold-decorated semiporcelain, one Pepsi-Cola® bottle, and two threaded enclosure liquor bottles (postdates 1919). This material can be assigned to the Kitchen and Architecture groups and is indicative of a domestic occupation. All of the material is most likely of twentieth century manufacture. This site is potentially eligible for listing in the NRHP. This recommendation is based on integrity of architectural elements and their spatial distribution, and the presence of subsurface artifacts. Site integrity indicates that the site has the potential to yield information on a number of research themes identified by Smith (1993). Potential research themes include identification of Ozark cultural patterns, intrasite spatial patterning of farmsteads, Ozark architectural signatures and folk construction techniques, trade networks, degree of isolation of farmstead inhabitants, disposal patterns, an Ozark material culture assemblage, recycling or reuse of objects, and economic patterns associated with Ozark farmsteads. The initial research method suggested is a thorough archival review regarding the site's inhabitants. Following this, archaeological investigations, including a detailed description of the architectural remains present, should be conducted.

Site Number: 97–93: AOS 3
USGS Quadrangle: Big Piney 7.5'
Elevation: 293 m asl
Site Type: Isolated Find
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located near the eastern end of a small upland ridge in the south portion of the Big Piney Tract (Figure 14). The eastern edge of the survey tract, defined by a gravel road, is approximately 100 m to the east, and the Village of Big Piney is to the southeast. This narrow ridge is constricted to the north and south by ravines, and an intermittent stream is located to the west. The ridge itself is covered by oaks with relatively light under story. The area appears to have been logged in the past based on the age of the tree cover. The isolated find, a single thin biface fragment that was found on the surface, was located in an area overlooking the intermittent stream. The area was inspected, and subsurface tests excavated in a grid pattern around the surface find. No additional material was located. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered and the lack of intact deposits, possibly due to logging, at this locale. No additional investigations are recommended.

Site Number: 97–93: AOS 4
USGS Quadrangle: Big Piney 7.5'
Elevation: 323 m asl
Site Type: Isolated Find
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located along the crest of a narrow upland ridge in the south portion of the Big Piney Tract (Figure 15). A gravel road is 200 m to the east while a second is 300 m to the west. These two roads intersect approximately 600 m southeast of the isolate. The narrow ridge is bordered to the east by an intermittent drainage and to the west and north by McCourtney Hollow. The ridge has a jeep trail oriented north-south through its center and is covered by an oak forest interspersed with cedar trees. The under story is relatively light. The isolated find is a single broken flake that was found on the surface to the east of the jeep trail on the crest of the ridge. A large modern stone pile is located 20 m south of the isolate. The area was inspected, and subsurface tests excavated in a grid pattern around the surface find. No additional mate rial was located.

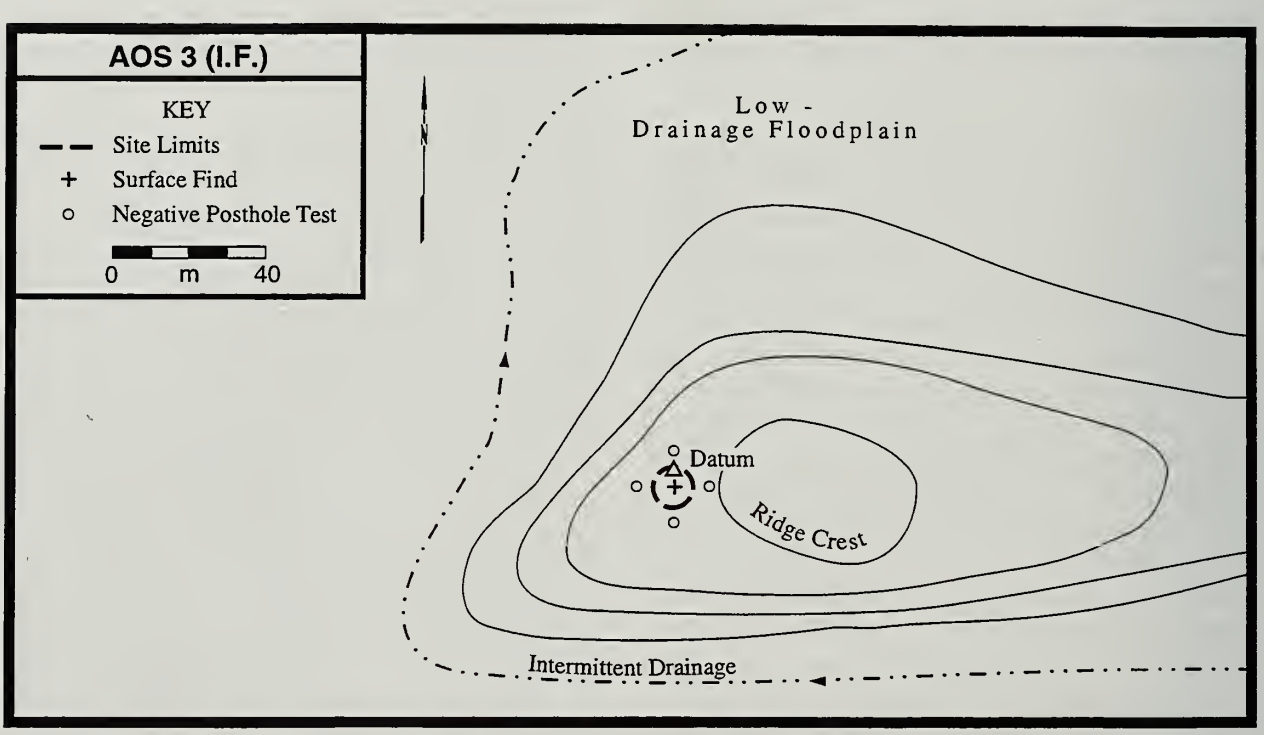

Figure 14. Sketch Map of 97-93; AOS 3.

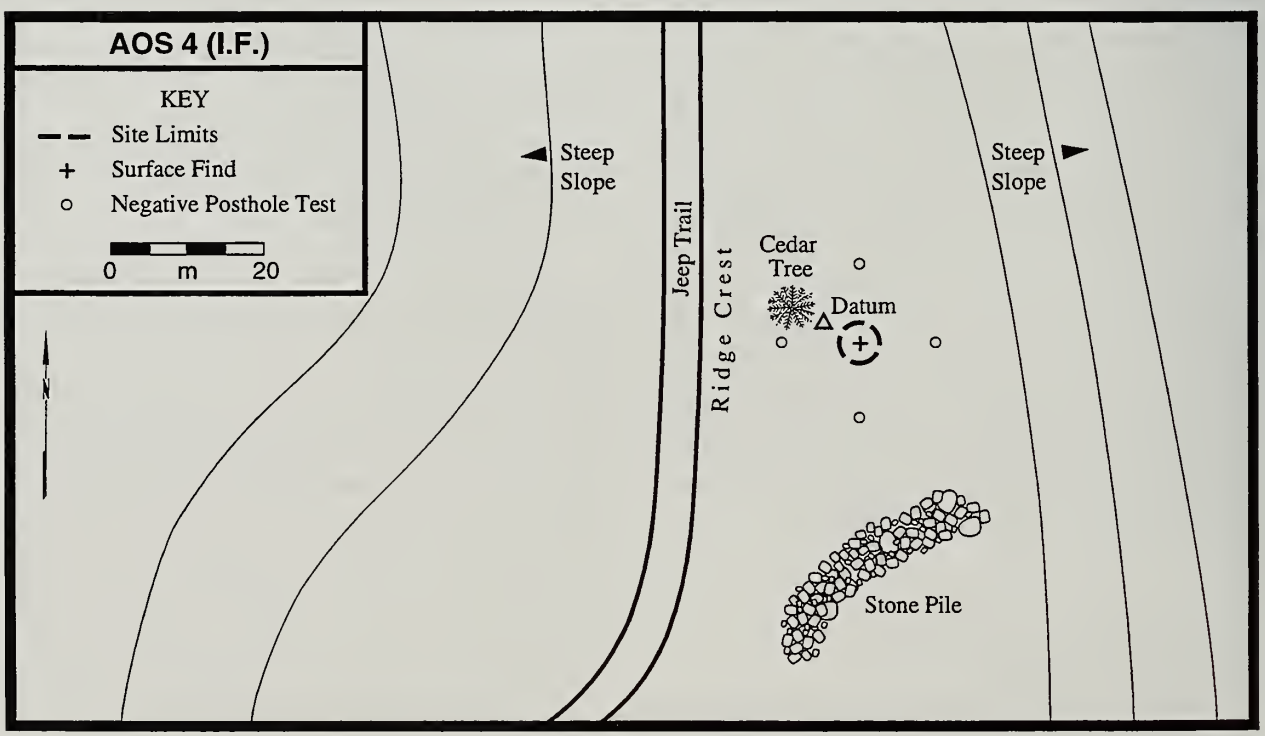

Figure 15. Sketch Map of 97-93; AOS 4.

This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered and the lack of intact deposits at this locale. No additional investigations are recommended.

West Cantonment Tract

This tract consists of 2,076 acres (840 ha) and is located to the west of the cantonment area, to the north of the Fort Leonard Wood airport, east of Roubidoux Creek, and just south of the northern installation boundary (Figures 16 and 17). The tract consists mostly of a large irregularly shaped parcel, with two additional small, discontinuous, and irregularly shaped parcels to the west of the main tract. Boundaries of the tracts include a transmission-line corridor, military roads, base housing tracts, and drainages. The tract lies within Sections 3, 4, 5, 8, 9, 15, 16, 17, 20, 21, and 22 of Township 35 North, Range 11 West. This tract, which is within the Lower Roubidoux cultural resource zone, consists of upland ridges, steep side slopes, ravines associated with intermittent drainages, and a small segment of the floodplain of Smith Hollow Creek. The area is generally covered by mixed hardwood forests dominated by oaks. Intermittent drainages have a greater degree of brush undercover.

Several small parcels within the tract had previously been surveyed and were not resurveyed during the current project. In addition, aside from scattered disturbances due to road construction, logging, and military activities found throughout, a number of larger disturbed areas were noted in the West Cantonment Tract. First, approximately 45 acres north and west of a post school is the former area of Leiber Heights, a 1940s to1950s post housing tract. The houses have been subsequently demolished, apparently using heavy machinery, and construction debris (bricks, cinder block, etc.) is scattered throughout. An approximately 46-acre parcel to the east of the Fort Leonard airport appears to have been graded to subsoil during airport construction. Most of this area has subsequently been reforested. An 8-acre ridge near the installation pet cemetery appears to be a dumping area for construction debris. An approximately 10-acre area west of the airport that appears to have been a bivouac area is disturbed. Finally, logging and construction of bivouac area TA247 has impacted approximately 20 acres, and a number of active training areas, covering 25 acres, are present along the southeastern edge of the survey tract. Despite this prior disturbance, eight archaeological sites or isolates were located in the West Cantonment Tract. These include one previously recorded historic site, three prehistoric sites (including a possible rock cairn), two historic sites, and two prehistoric isolates.

Site Number: 23PU551
USGS Quadrangle: Waynesville 7.5'
Elevation: 262 m asl
Site Type: Residence/Farmstead
Soil Type: Cedargap cherty silt loam, 0–3 percent slopes
Component(s): Late Nineteenth-Twentieth Century
Recommendation: Not Eligible

Site 23PU551 was reported to the ASM in 1994 by Fort Leonard Wood personnel. At that time it was reported to be a farmstead comprised of the remains of a house foundation. It was also noted that the site was visible on a 1938 aerial photograph. The site is located in the western portion of the survey tract and is east of a gravel road on a terrace formation within a large northwest-southeast trending hollow that empties into the Roubidoux Creek valley. The terrace is bounded to the north, west, and south by smaller ravines and associated intermittent drainages, while to the east is the steep slope of an upland ridge. The area is generally open with a few trees, but is covered by raspberry and primrose bushes. A gravel road is approximately 30 m to the southwest.

The current survey relocated the house foundation (Figure 18). The foundation is constructed of natural cobbles cemented together by concrete. A poured concrete step is located on the south side of the foundation. The concrete pad is raised 12 inches off the ground surface and measures 10-x-19 feet (3-x-5.8 m). Extending from the north wall of the concrete pad is a poured concrete foundation wall. This foundation wall is 7 inches (18 cm) wide and 6 inches (15 cm) high. It extends 6½ feet (2 m) to the east of the concrete pad, for a total length of 26 feet

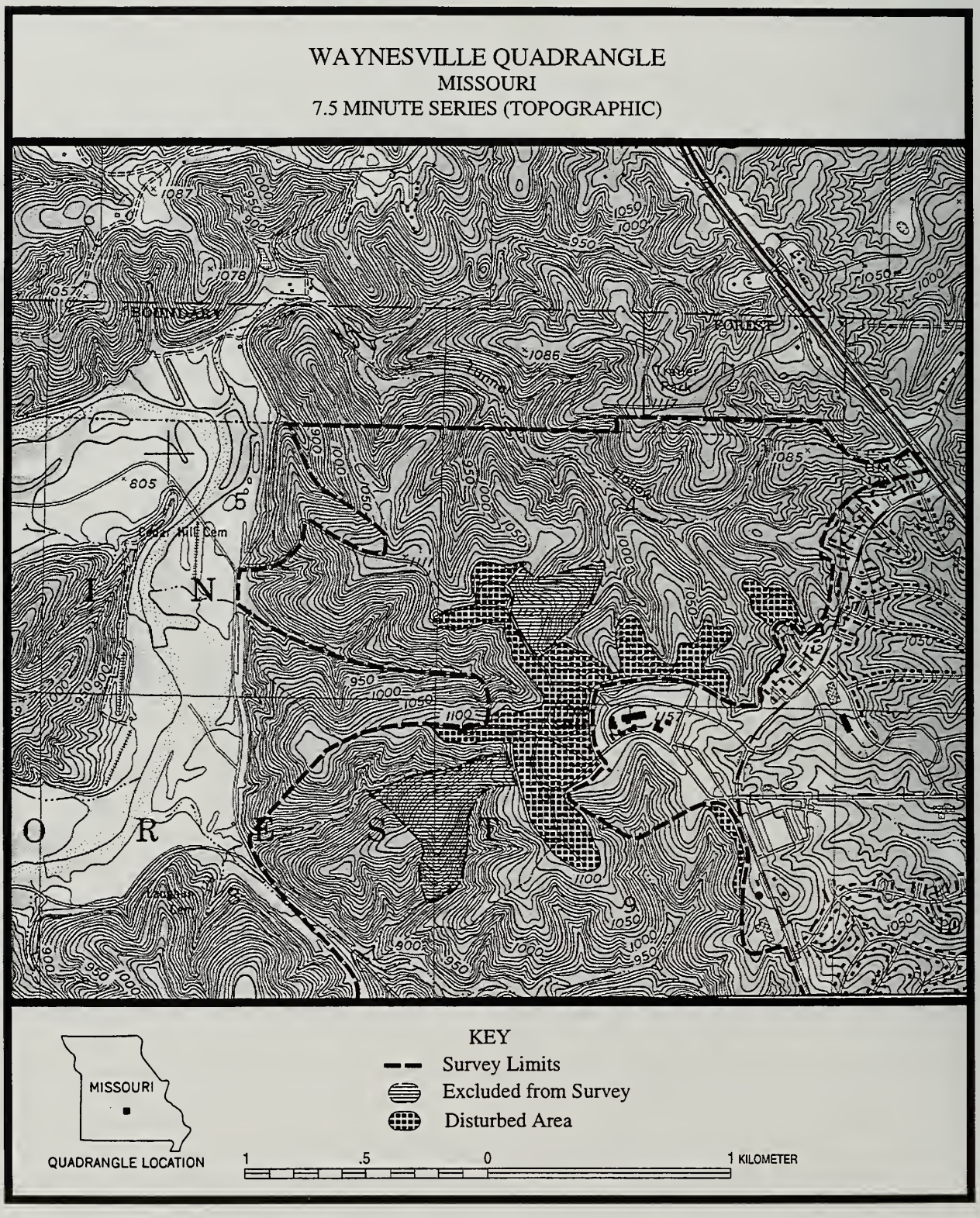

Figure 16. North Portion of the West Cantonment Tract.

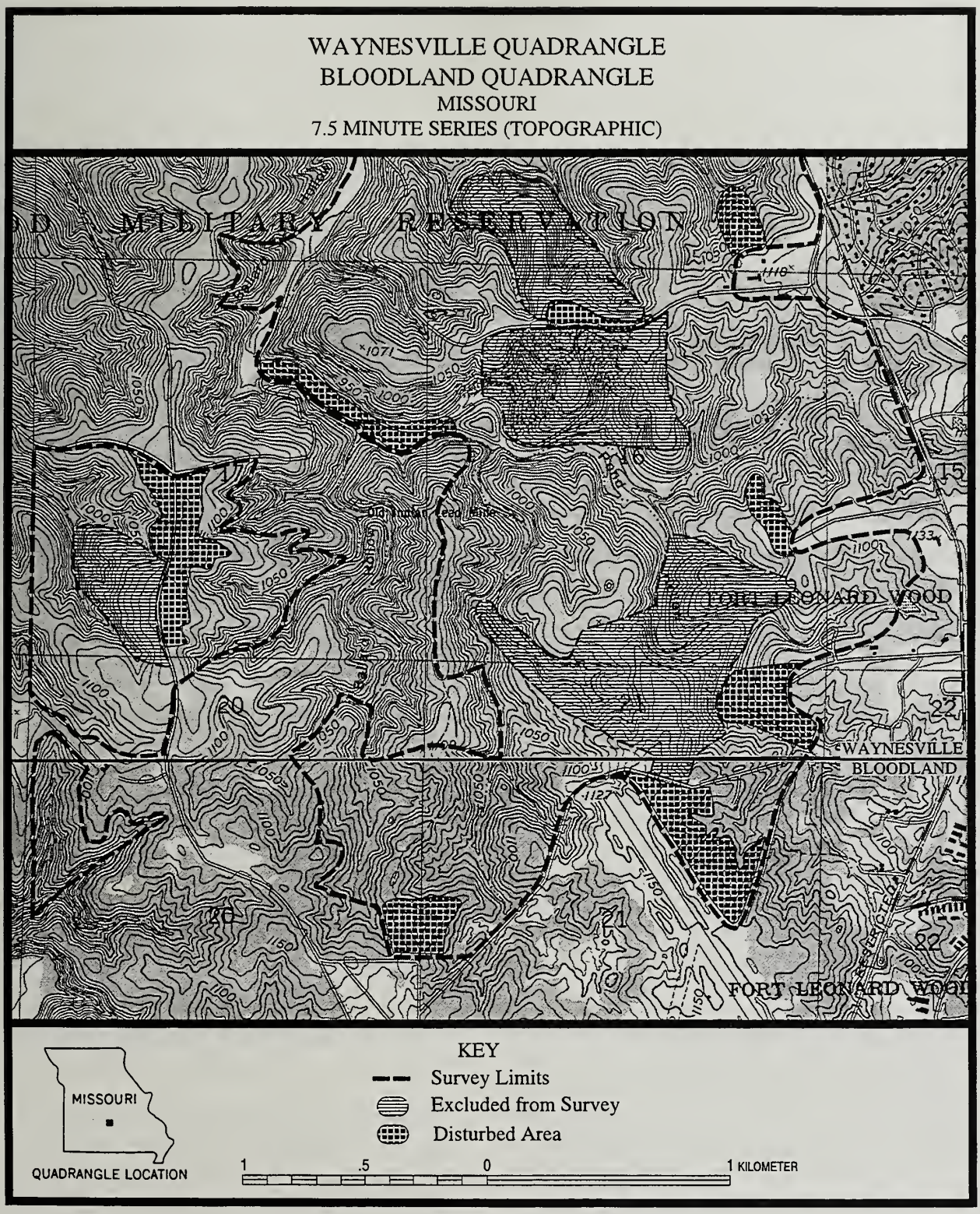

Figure 17. South Portion of the West Cantonment Tract.

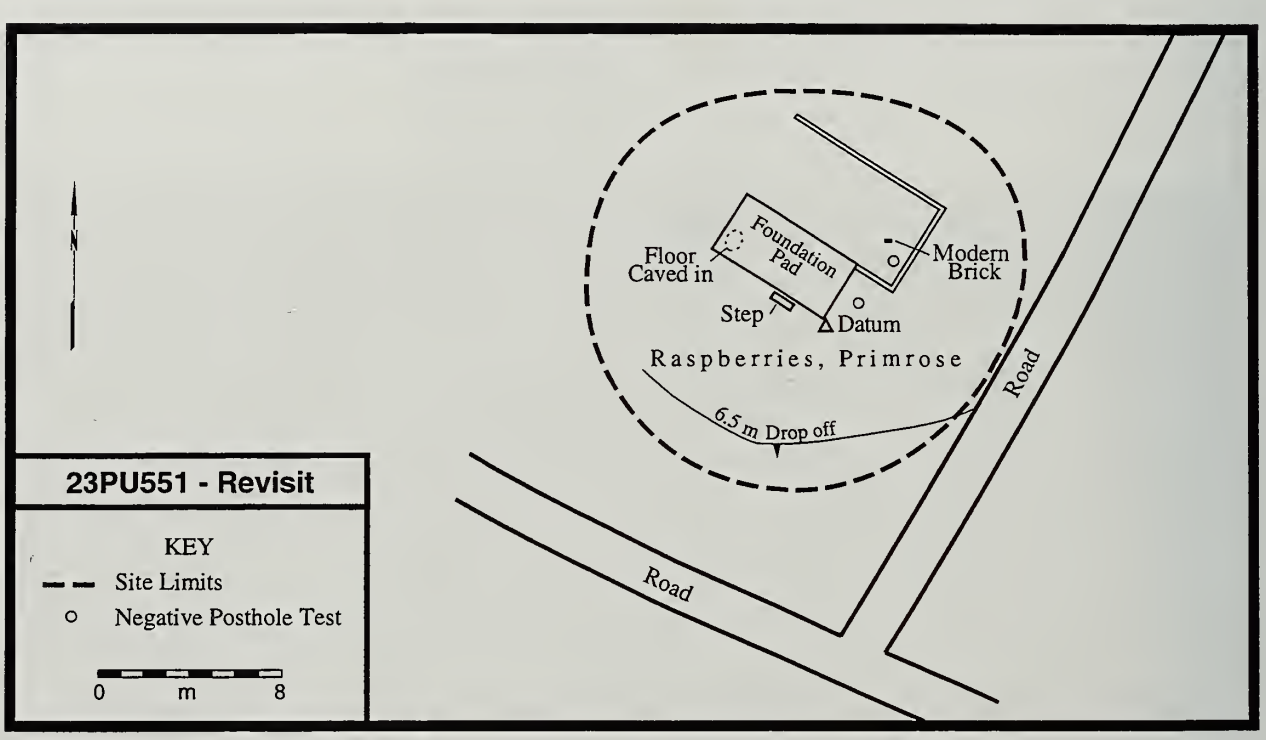

Figure 18. Sketch Map of 23PU551.

(8 m), and is 14 feet (4.3 m) wide. Subsurface tests in the vicinity did not yield any artifacts. In addition, no artifacts were noted on the surface. This site appears to be depicted on the 1906 Pulaski County map, but the associated name is blurred. Based on the large number of similar sites located within the boundaries of Fort Leonard Wood and the late date of occupation as demonstrated by the presence of poured concrete architectural features, this site does not appear to be eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU722 (97–93: AOS 1)
USGS Quadrangle: Waynesville 7.5'
Elevation: 332 m asl
Site Type: Cairn
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Late Prehistoric
Recommendation: Potentially Eligible

This site consists of two possible late prehistoric cairns located on a ridge bluff edge overlooking Roubidoux Creek (Figure 19). Steep slopes are present to the south and west, the latter leading to the floodplain of the creek. The ridge is covered by a fairly open oak forest with a few cedars present. Two possible cairns were located. The first, located farthest east, is a circular collection of limestone/dolomite blocks that has a diameter of 2.5 m and is 75 cm high. No evidence of pitting was noted. A second possible cairn is located approximately 18 m to the west. It is a rectangular collection of limestone/dolomite blocks, 2.5 m long by 1.25 m wide, and is 50 cm high. No evidence of pitting was noted in this feature. Subsurface tests excavated in the site area and an inspection of the surface yielded no artifacts.

While this site is located in an area of high probability for containing cairns (Ahler and Albertson 1996), it is unusual that no pitting is present in either possible cairn and that one cairn is rectangular, not circular, as is common. But, no overt evidence of historic farming or military use of the ridge was noted that could be used to explain the construction

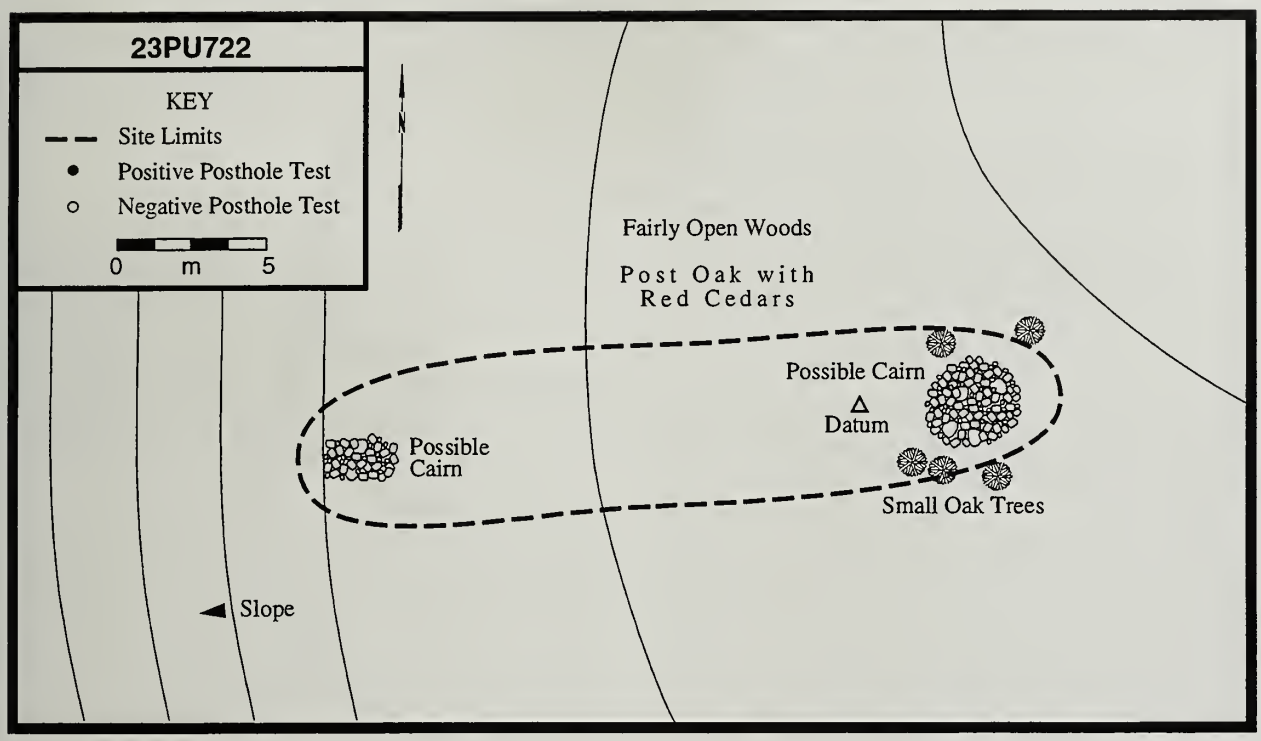

Figure 19. Sketch Map of 23PU722.

of these two features. As such, these two rock features are interpreted as late prehistoric cairns. Previously, Fort Leonard Wood cairn sites have been recommended as potentially eligible for the NRHP (e.g., Adams 1997; Kreisa, Walz, et al. 1996). Given the somewhat unusual features exhibited by these cairns (e.g., absence of pitting, rectangular shape, lack of associated artifacts), this site is recommended as potentially eligible for listing in the NRHP. Phase II evaluation should be designed to determine the period of construction (prehistoric or historic) of the two rock features, in a preferably nondestructive and least intrusive manner as possible, due to the potential for these features to contain human burials.

Site Number: 23PU727 (97–93: AOS 21)
USGS Quadrangle: Waynesville 7.5'
Elevation: 329 m asl
Site Type: Lithic Debris Scatter
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This site is located along a dirt military road that crosses an upland ridge east of the cantonment area (Figure 20). The cantonment is 1.7 km northeast and the airport is 750 m south. This large ridge is bounded to the north, south, and west by ravines. The ridge itself is covered by a mixed hardwood forest with a moderate under story. The site consists of a light lithic scatter located along the crest and south slope of a rise in a military roadway. A sinkhole is located approximately 180 m to the north of this scatter. Subsurface tests were excavated in the forested area adjacent to the road, but no additional artifacts were recovered. Artifacts were found beginning at a Y-intersection of the military road and continued south (downslope) to an intermittent drainage. Surface visibility along the road was near 100 percent. Based on the extent of the scatter of artifacts, site dimensions of 100 m north-south by 5 m east-west were defined.

Material collected from the road surface consists of three broken and one bifacial thinning flake, four pieces of block shatter, and one thin biface fragment.

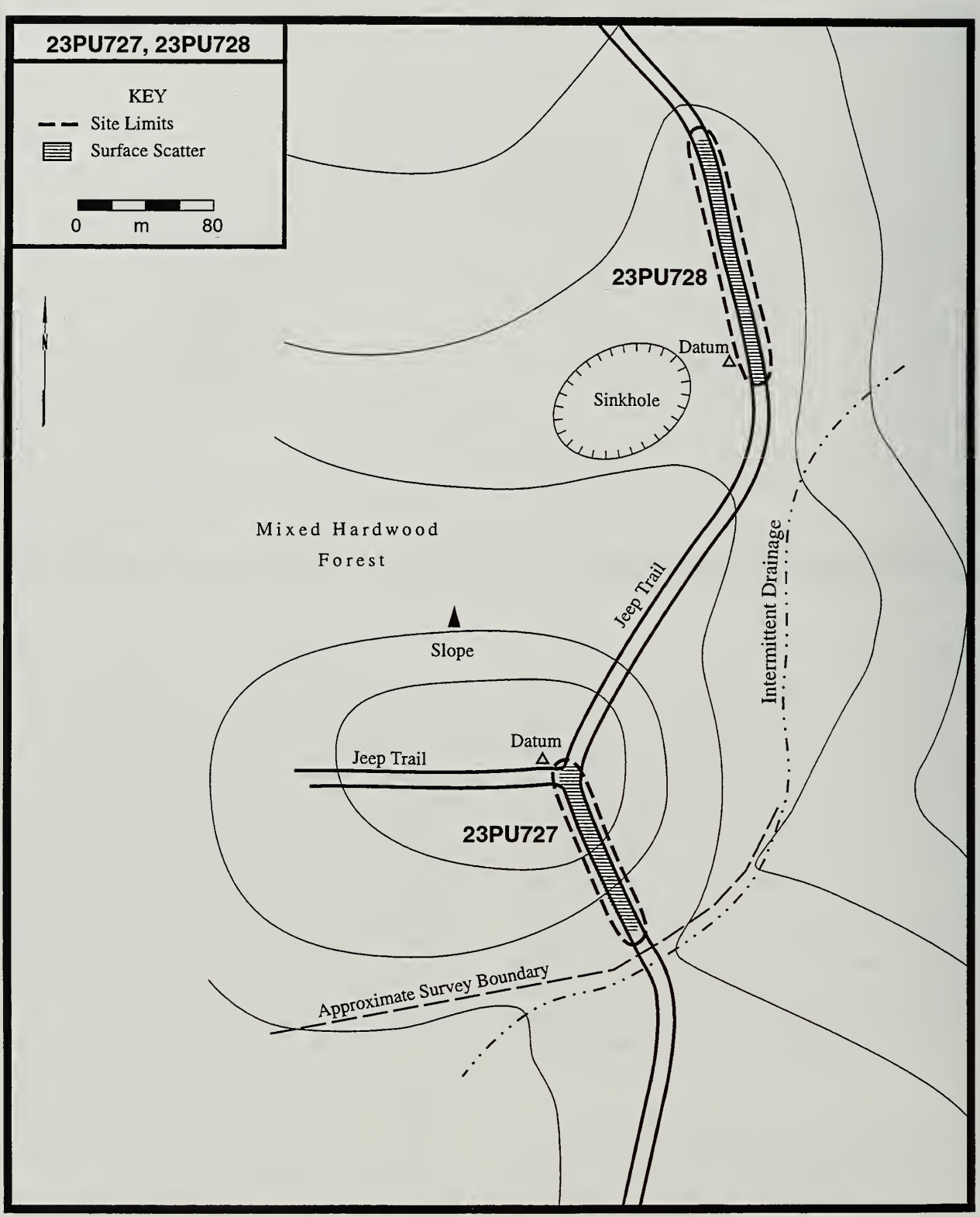

Figure 20. Sketch Map of 23PU727, and 23PU728.

Based on the paucity of material found and the lack of intact subsurface deposits, this site is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU728 (97–93: AOS 22)
USGS Quadrangle: Waynesville 7.5'
Elevation: 326 m asl
Site Type: Lithic Debris Scatter
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This site is located along a dirt military road that crosses an upland ridge east of the cantonment area (Figure 20). The cantonment is 1.5 km northeast and the airport is 800 m south. This large ridge is bounded to the north, south, and west by ravines. The ridge itself is covered by mixed hardwood forest with a moderate under story. The site consists of a light lithic scatter located along the crest and north slope of a rise in a military roadway. Surface visibility along the road was near 100 percent. A sinkhole is located approximately 20 m to the southwest of this scatter. Subsurface tests were excavated in the forested area adjacent to the road, but no additional artifacts were recovered. Artifacts were confined to the military road. Based on the extent of the scatter of artifacts, site dimensions of 150 m north-south by 5 m east-west were defined.

Material collected from the road surface consists of one secondary, one broken, and one bifacial thinning flake. Based on the paucity of material found and the lack of intact subsurface deposits, this site is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU729 (97–93: AOS 24)
USGS Quadrangle: Waynesville 7.5'
Elevation: 341 m asl
Site Type: Residence/Farmstead
Soil Type: Lebanon silt loam, 2–5 percent slopes
Component(s): Twentieth Century
Recommendation: Not Eligible

Site 23PU729, the Nettie Wilson site, is the location of a destroyed historic period residence and farmstead (Figure 21). The site is located on an upland ridge in the western part of the survey tract and is adjacent to a gravel road within an actively used bivouac training area and is north of 23PU730. The airport is 2 km to the southeast while 23PU730 is to the south. The site is within an open area with occasional cedar, oak, and walnut trees. Several yucca patches are also present.

At the time of survey a single poured concrete pad was located. This concrete pad measures 8-x-16 feet (2.4-x-4.8 m) and is atop an area of raised earth that measures 24-x-24 feet (7.3-x-7.3 m). Based on the extent of surface materials, a site area of 50 m north-south by 67 m east-west, or 0.34 ha, has been defined. Subsurface tests excavated across the site area did not yield any artifacts, although two clear medicine bottle fragments, one green soda bottle neck, and one brown probably liquor bottle body fragment were collected from the surface. Additional materials noted but not collected include a granite-ware basin, a metal bucket, cans, and bottles. This site is not depicted on the 1906 Pulaski County map, but Nettie Wilson is listed as owner of this property in the 1940 Fort Leonard Wood land acquisition register. This site has been largely destroyed by the construction of the bivouac training area. Spoil piles are present and the surficial soil is the B horizon, denoting land leveling has stripped the A horizon from the site area. Because of these impacts no intact deposits are present. Site 23PU729 is not eligible for listing in the NRHP, and no additional work is recommended.

Site Number: 23PU730 (97–93: AOS 25)
USGS Quadrangle: Waynesville 7.5'
Elevation: 341 m asl
Site Type: Residence/Farmstead
Soil Type: Lebanon silt loam, 2–5 percent slopes
Component(s): Late Nineteenth-Twentieth Century
Recommendation: Not Eligible

Site 23PU730, the J. M. Curtis site, is the location of a destroyed historic period residence and farmstead (Figure 22). The site is located on an up-

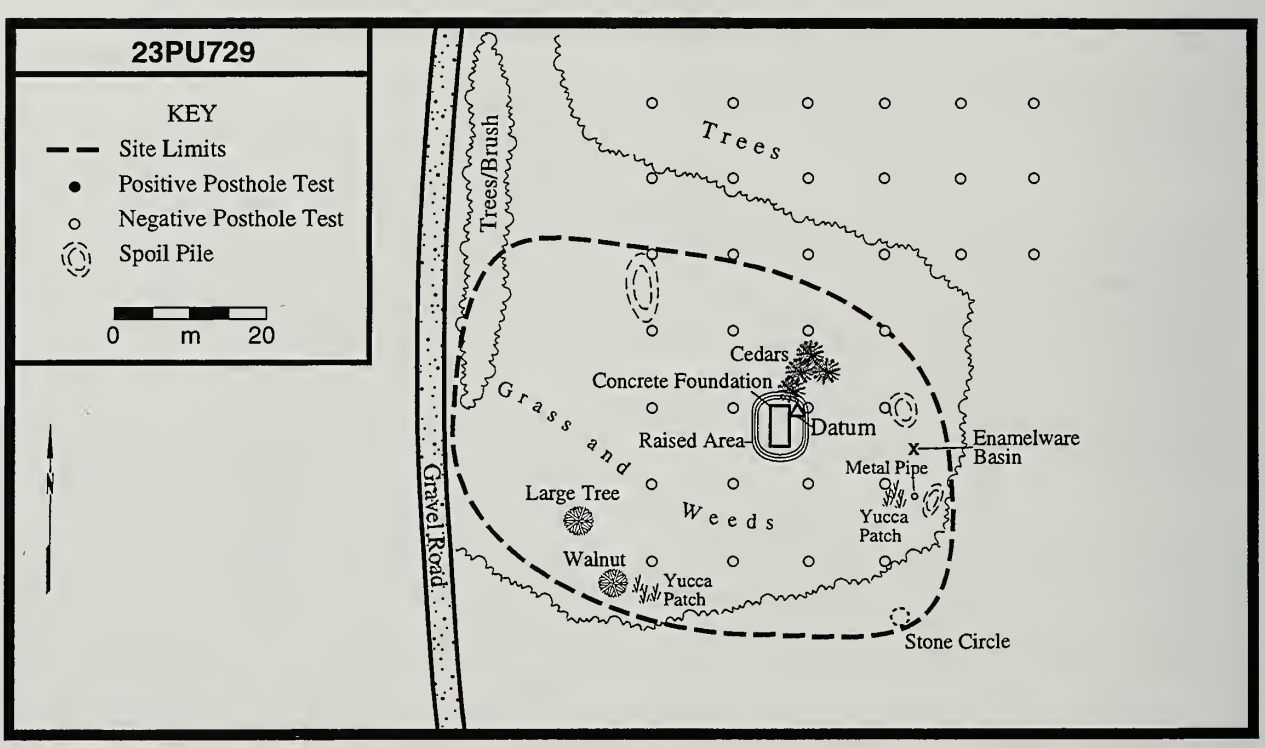

Figure 21. Sketch Map of 23PU729.

land ridge in the western part of the survey tract. The site is adjacent to a gravel road and is within an actively used bivouac training area. The airport is 2 km to the southeast and 23PU729 is to the north. The site area is within a mixed oak forest with a moderate under story. Four large iris patches were also noted in the site area.

Presently, 23PU730 consists of a large water-filled depression that may represent the remains of a destroyed cellar. The depression is 16-x-13 feet (5-x-4 m) in area and is in close proximity to two of the iris patches. An earthen dam and shallow pond, located 55 m to the east, may be associated with this site. An abandoned gravel road is present between the depression and the dam. Based on the spatial extent of surface features a site area of 35 m north-south by 75 m east-west has been defined. Subsurface tests excavated across the area did not yield any artifacts. One brick fragment was noted in the field but not collected.

Estimating the period of occupation for 23PU730 is based solely on historical atlases. This site is depicted on the 1906 Pulaski County map, although J. M. Curtis is not listed in the Fort Leonard Wood land acquisition register. This site has been largely destroyed by the construction of the bivouac training area. Spoil piles are present and the surficial soil is the B horizon, suggesting that land leveling has stripped the A horizon from the site area. Because of these impacts no intact deposits or structural remains are present, and site 23PU730 is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 97-93; AOS 2
USGS Quadrangle: Waynesville 7.5'
Elevation: 328 m asl
Site Type: Isolated Find
Soil Type: Viraton silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was found near the western end

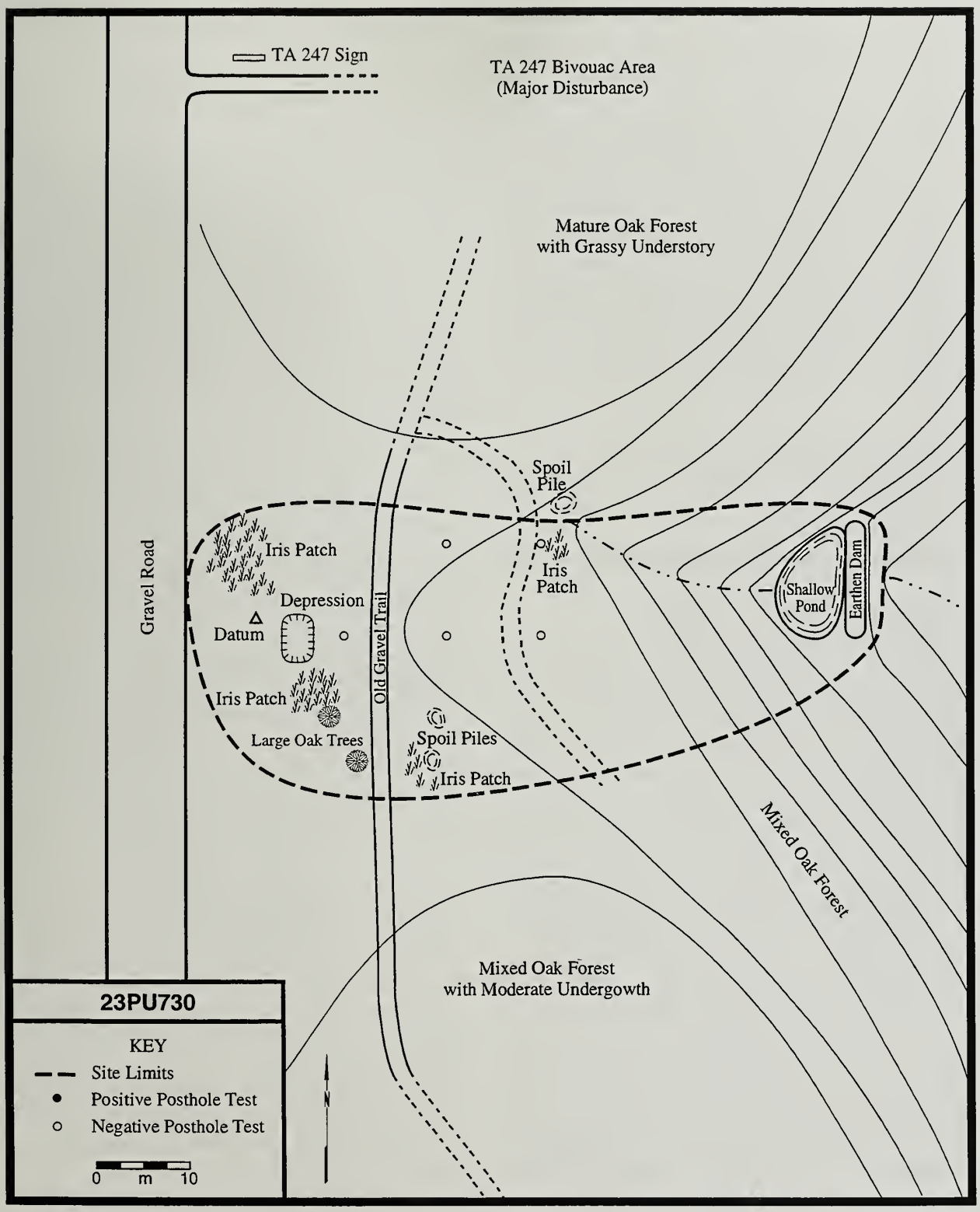

Figure 22. Sketch Map of 23PU730.

of a small upland ridge just west of the eastern boundary of the survey tract (Figure 23). Indiana Avenue is located approximately 300 m east. The upland ridge is bordered to the north, south, and west by an intermittent drainage and is covered by an oak forest with a light under story. The isolate consists of a single rough biface fragment found in a subsurface test between 0 and 10 cm below surface. Subsurface tests excavated in a grid pattern around the positive test yielded no additional material. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered and the lack of intact deposits at this locale. No additional investigations are recommended.

Site Number: 97-93; AOS 23
USGS Quadrangle: Waynesville 7.5'
Elevation: 341 m asl
Site Type: Isolated Find
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was found along the crest of an eastern-facing upland ridge in a western portion of the West Cantonment Tract (Figure 24). A gravel road is approximately 150 m west and the airport is 2 km southeast. The upland ridge is bordered to the north, south, and east by ravines and intermittent drainages. A bivouac training area is to the south and west. The ridge is covered by a mixed oak-hickory forest with a light under story. The isolate consists of three broken flakes found in a single subsurface test between 0 and 15 cm below surface. Trenches and spoil piles are in the isolate vicinity, and an east-west dirt road is 20 m to the south. Surface inspection of the trenches and spoil piles did not locate additional artifacts. Bracketing subsurface tests excavated in a grid pattern around the positive test yielded no additional material. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered and the lack of intact deposits. No additional investigations are recommended.

Roubidoux Creek Tract

This tract consists of 578 acres (234 ha) and is located in the southwest corner of Fort Leonard Wood. The Roubidoux Creek Tract lies within Sections 10, 11, 12, 13, 14, and 23 of Township 34 North, Range 11 West. This tract, which is within the Upper Roubidoux cultural resource zone, consists of large expanses of floodplain terrace formations of Roubidoux Creek and two upland ridge formations with steep side slopes, ravines, and associated with intermittent drainages. The two upland ridges are covered by mixed hardwood forests dominated by oaks. The terrace formations exhibit a wide range of vegetation, from open, grass-covered fields to areas covered with thick, dense brush, to relatively open floodplain forests. The survey tract is divided into three areas: a north area (145 acres, 59 hectares) that is south and west of Roubidoux Creek and consists exclusively of the creek floodplain; a central area (355 acres, 144 hectares) that is east of Roubidoux Creek and includes a large upland ridge and creek floodplain; and a south area (78 acres, 31.5 hectares) that is west of Roubidoux Creek and consists of the end of an upland ridge and a small portion of the Roubidoux Creek floodplain (Figure 25). The boundaries of the separate areas include military roads, intermittent drainages, and Roubidoux Creek.

Aside from scattered disturbances due to road construction, logging, and military activities found throughout, few larger disturbed areas were noted in the Roubidoux Creek Tract. Standing water, possibly due to artificial ponding of the area, was noted in a 5-acre area along the southwest edge of the south survey area. A total of 28 sites or isolated finds was located in the Roubidoux Creek Tract. This includes nineteen prehistoric sites, eight prehistoric isolates, and one previously located historic site. In addition, one previously identified prehistoric site could not be relocated.

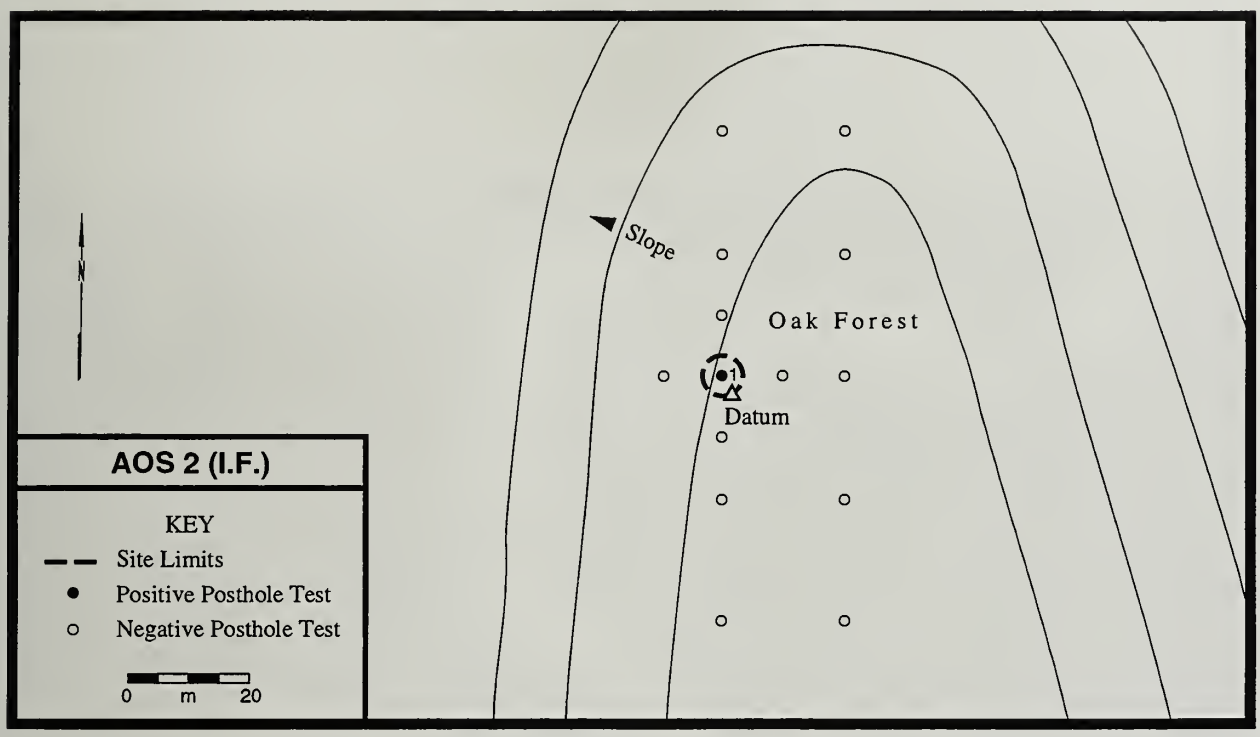

Figure 23. Sketch Map of 97-93; AOS 2.

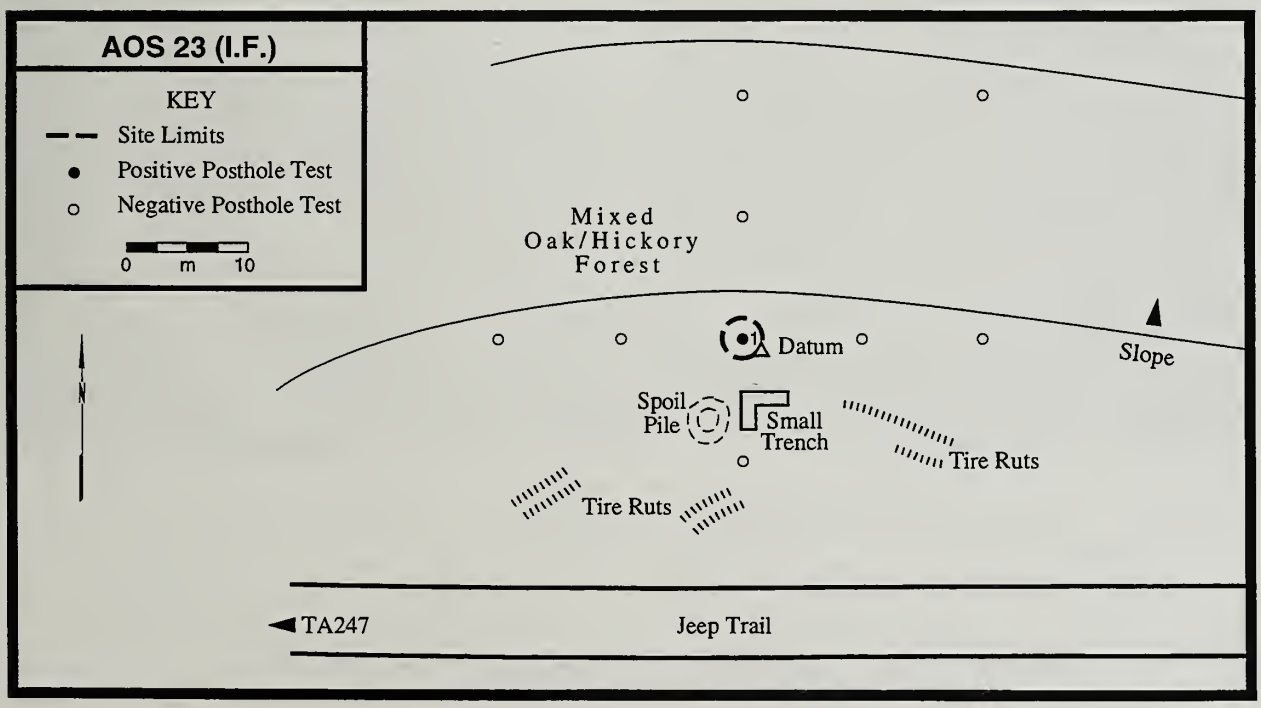

Figure 24. Sketch Map of 97-93; AOS 23.

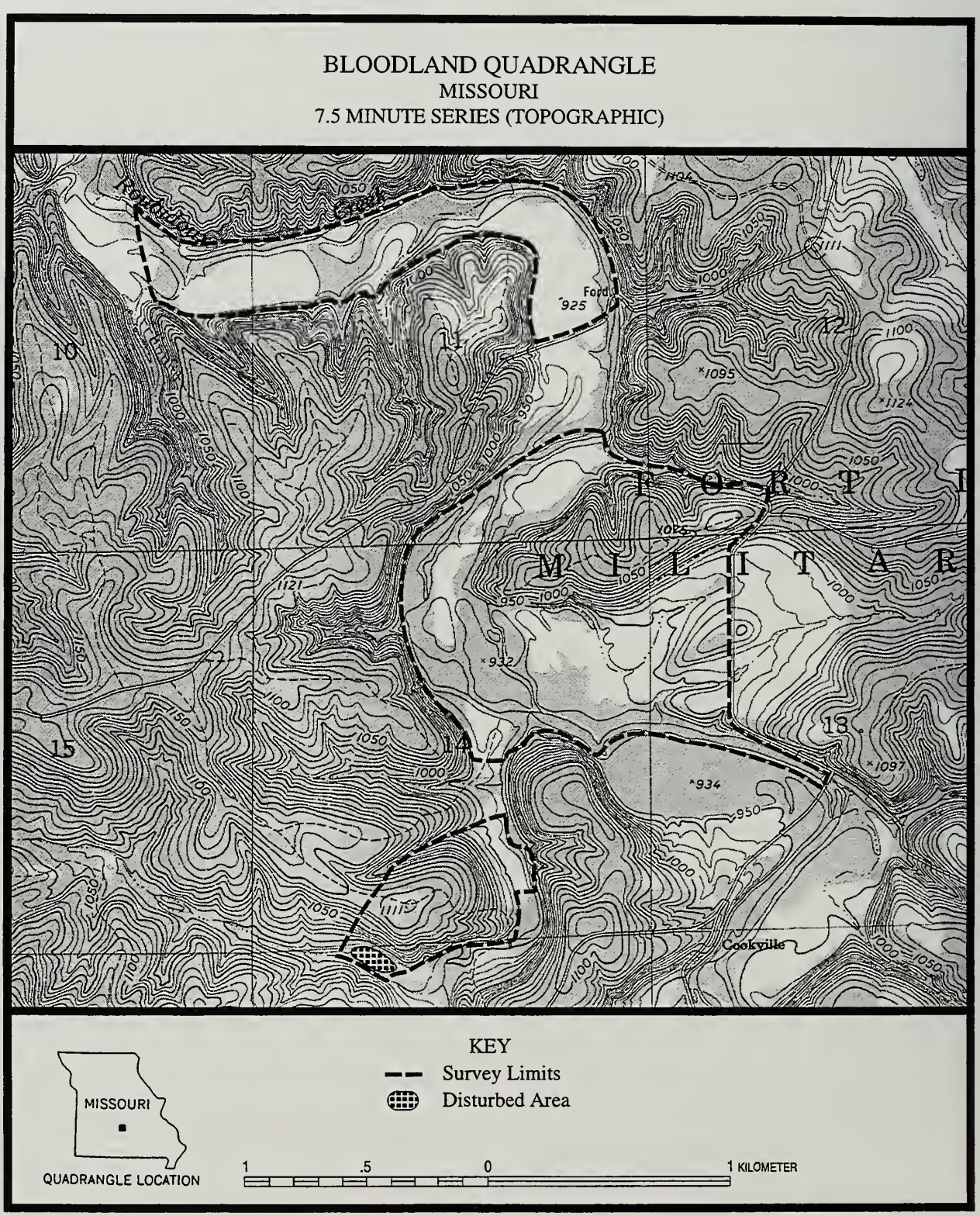

Figure 25. Location of the Roubidoux Creek Survey Tract.

Site Number: 23PU510
USGS Quadrangle: Bloodland 7.5'
Elevation: 299 m asl
Site Type: Residence/Farmstead
Soil Type: Hartville silt loam, 2–5 percent slopes
Component(s): Late Nineteenth-Twentieth Century
Recommendation: Potentially Eligible

Site 23PU510, also known as the Dr. C. Mallete site, was reported to the ASM in 1994 by Fort Leonard Wood personnel. At that time it was reported to be a farmstead comprised of the remains of a house foundation, a cellar, five outbuildings, and two silos within a 200-x-100 m area. Also noted was that the house foundation had running water from a concrete tank. The site is located on a number of different terrace formations within the Roubidoux Creek floodplain in the central part of the survey tract. The area is covered by a floodplain forest with a generally dense under story. Lush stands of poison ivy were present in the vicinity of the house and cellar, and for that reason, the area was not systematically posthole tested. The site is located just south of a large upland ridge and is 300 m west of a gravel road that is also the eastern boundary of the survey tract.

Only four of the previously reported structures could be relocated due to the density of vegetation at the time of survey (Figure 26). The first is the house foundation. The foundation is a poured concrete shell that measures 43-x-33 feet (13-x-10 m) in size and contains an internal wall. Four window openings are present on the south wall as are four poured concrete piers 2 m south of the foundation. Wire nails were observed in the boards that remain attached to the foundation and lag bolts are present along its top. About 2 m to the north of the foundation is another set of four poured concrete piers and a set of steps. The piers are 6½ feet tall. A possible poured concrete cistern is adjacent to and north of the foundation. Approximately 11 m to the west of the foundation is the cellar. The cellar is made of tabular limestone faced with concrete. This structure measures 13-x-10 feet (4-x-3 m). The remains of a probable outbuilding was found 30 m south and 20 m west of the cellar. It consists of three rows of poured concrete piers with five piers each. The piers are capped by metal facing with lag bolts protruding from their top. This structure measures 23-x-16½ feet (7-x-5 m). An old fence line is present just south of this structure. The final structural element that was located is a poured concrete pad 60 m east and 27 m north of the house foundation. It measures 41-x-10 feet (12.5-x-3 m). Approximately 5 m south of this pad is an abandoned road that terminates at the house foundation and leads to the east to the gravel road.

Because of the few subsurface tests excavated and the density of undergrowth present across the site area, few artifacts were recovered at 23PU510. Two artifacts, a fragment of aqua bottle glass and an unidentified stoneware sherd with a dark, almost black glaze, were found in one subsurface test. This test was 80 m south of the southernmost outbuilding and the artifacts were found in the initial 10 cm below surface. The paucity of lumber from the house superstructure may indicate salvage or moving upon purchase of the land by the Army. Site 23PU510 is clearly the largest and most complex of the late nineteenth-twentieth century farmsteads located during the present survey. It is also associated with a probable professional, Dr. Mallete, also unusual for such sites at Fort Leonard Wood. Unfortunately, the 1906 Pulaski County map is damaged in the area of this site, precluding use of that map as an aid in determining period of site occupation. Based on the unique characteristics mentioned above, this site is potentially eligible for listing in the NRHP. Archival research and Phase II test excavations, including detailed mapping of the site area, should be conducted. If archival research could be undertaken prior to testing, research questions and field strategies could be determined at that point.

Site Number: 23PU723 (97–93; AOS 5–16)
USGS Quadrangle: Bloodland 7.5'
Elevation: 283 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Potentially Eligible

This site appears to be a continuation of previously recorded site 23PU458 that was first reported

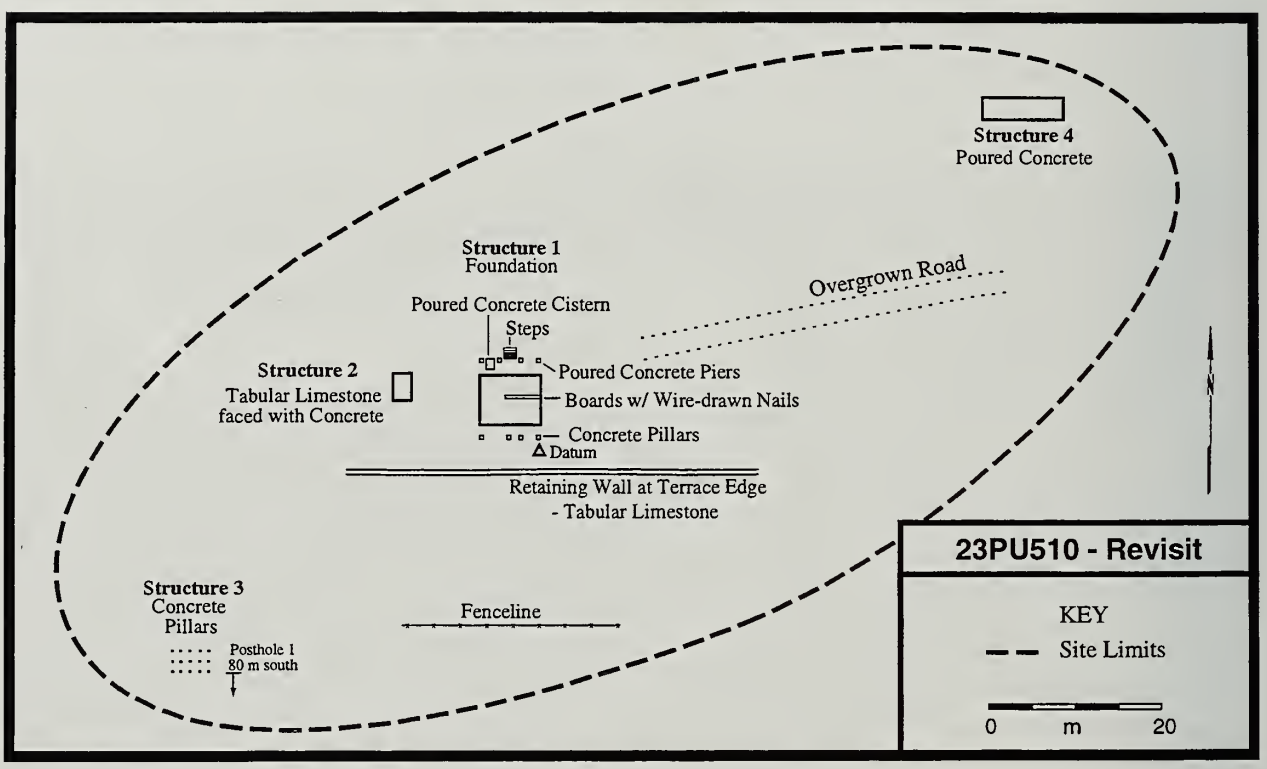

Figure 26. Sketch Map of 23PU510.

by Ahler and McDowell (1993) and is primarily north of the gravel road that forms the southern boundary for the northern portion of the survey tract. Although two positive subsurface tests previously excavated north of the road in what is the current survey tract are included in 23PU458, the Archaeological Survey of Missouri preferred to register AOS 5–16 as a separate site. Previous investigations at 23PU458 found material to 90 cm below surface and Phase II evaluation was recommended (Ahler and McDowell 1993). Subsequently, Ahler and Albertson (1996) discuss the results of the excavation of a geomorphic backhoe trench at the site. This trench was located south of the gravel road on a T-4 terrace formation. A radiocarbon assay of 3230±60 B.P. was obtained from a charcoal sample recovered between 94 and 99 cm below surface (Ahler and Albertson 1996:138–139). Phase II investigations were then undertaken at the site (Childress and Weaver 1998). Twelve shovel tests and two test units were excavated, including five shovel tests and one test unit north of the road in the current survey area. The excavations revealed intact deposits to 86 cm below surface with varying, but generally moderate to high, artifact densities. Middle to Late Woodland components are believed to be restricted to the 25 cm thick plow zone, while a Late Archaic component is present in the buried, intact deposits. Based on site integrity, its ability to provide significant information on landform use, soil development, and alluvial deposition, 23PU458 was recommended as eligible for listing in the NRHP.

The current survey investigated the continuation of the T-4 landform on which 23PU458 is located, but to the north of the gravel road and an adjacent T-5 landform to the east (Figure 27). These terraces form a noticeable rise above lower floodplain formations, especially an adjacent slough. The two terrace formations are bordered to the east by an upland ridge and to the west and north by a slough. A military road runs to the north along the base of the upland bluff. The Roubidoux Creek channel and Dundas Ford are 220 m to the west. The area is covered by a second-growth floodplain forest with a dense under story. The under story was so dense that

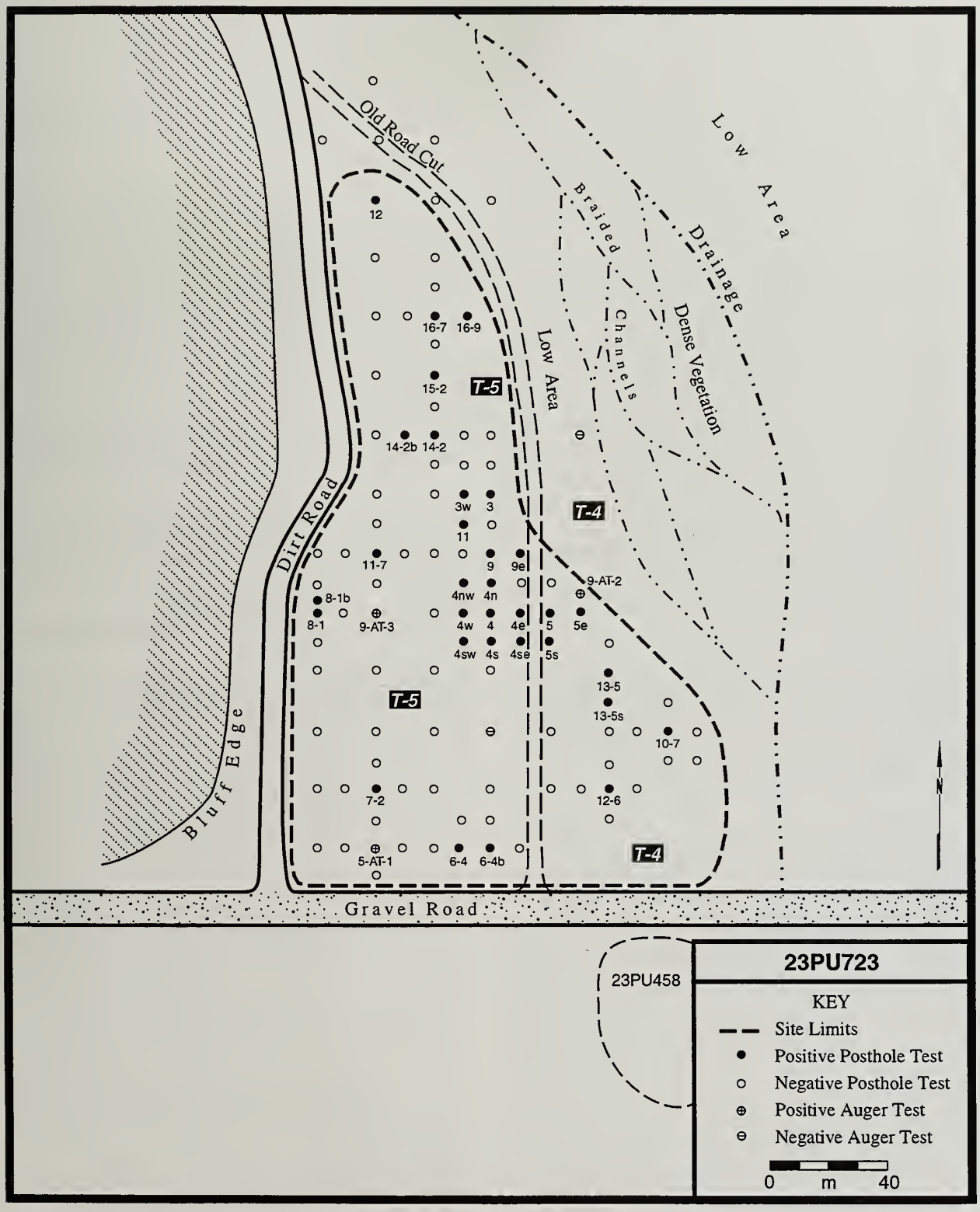

Figure 27. Sketch Map of 23PU723.

the earlier test unit and shovel tests north of the road associated with the Phase II evaluation of 23PU458 could not be relocated. The survey resulted in the excavation of 35 positive subsurface tests, including several positive auger tests. Based on the spatial extent of the positive subsurface tests, an area 240 m north-south by 135 m east-west (maximally), comprising the T-4 and T-5 terrace formation north of the gravel road, was defined as 23PU723.

The 35 positive subsurface tests yielded 25 broken, 17 tertiary, 9 bifacial thinning, 1 secondary, and 2 primary flakes, 1 core fragment, 6 pieces of block shatter, and 3 fire-cracked rocks. One flake was lost in the field. Material appears to cluster in and just below the Ap horizon, between 40 cm and 60 cm below surface, and at 70 cm to 80 cm below surface (Table 3). These densities are somewhat similar to those documented by Childress and Weaver (1998) for Test Unit 202 that was excavated north of the road. Albertson et al. (1995) suggest that the upper 20 cm of T-5 terrace formations date from the Late Archaic period to present, while below 20 cm material should date from the Middle and Early Archaic periods. Albertson et al. (1995) indicate that in T-4 terrace formations, materials from the present to the Early Woodland period are likely in the initial 20 cm of deposits, while those below 20 cm below surface should date to the Late Archaic period.

This site has intact, moderately dense, and deep deposits, and as such, is potentially eligible for listing in the NRHP. The adjacent and previously tested site 23PU458 has been recommended eligible for listing in the NRHP. Based on the integrity of deposits demonstrated during the current survey, depth of those deposits, and probable association of this site with 23PU458 to the south, this site is potentially eligible for listing in the NRHP. Potential research issues could be to determine if conditions at 23PU723 are similar to those reported by Childress and Weaver (1998) to the south at 23PU458, as well as determining the integrity of deposits, their potential to contain features, and the nature of the occupation at this site. In addition, excavations can be used to test the temporal component of the Albertson et al. (1995) model.

Table 3. Depth, Soil Horizon, and Number of Artifacts Recovered from 23PU723.

Level	*Soil Horizon*	*Number of Artifacts*
0–10 cm	Ap	6
10–20 cm	Ap	9
20–30 cm	Bw1	10
30–40 cm	Bw1	7
40–50 cm	Bw1	11
50–60 cm	Bw1	9
60–70 cm	Bw1	2
70–80 cm	Bw2	7
80–90 cm	Bw2	2
90–100 cm	Bw2	0
100–110 cm	Bw3	1

Site Number: 23PU724 (97–93: AOS 17)
USGS Quadrangle: Bloodland 7.5'
Elevation: 338 m asl
Site Type: Lithic Debris Scatter
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This site is located on the crest of an upland ridge west of Roubidoux Creek in the south part of the survey tract (Figure 28). The ridge is bounded to the north and south by ravines and intermittent drainages and on the east by Roubidoux Creek and its floodplain. The ridge itself is covered by a mixed oak-hickory forest with a light under story. The site consists of a light lithic scatter and several positive posthole tests located along the crest north and south of a military roadway. Surface visibility on the road was near 100 percent. Two positive subsurface tests were excavated south and two north of the road. Aside from a single flake found between 10 and 20 cm below surface, all material was recovered from the initial 10 cm below surface or on the surface of the road. Based on the extent of the surface scatter of artifacts and the positive posthole tests, site dimensions of 85 m north-south by 25 m east-west were defined.

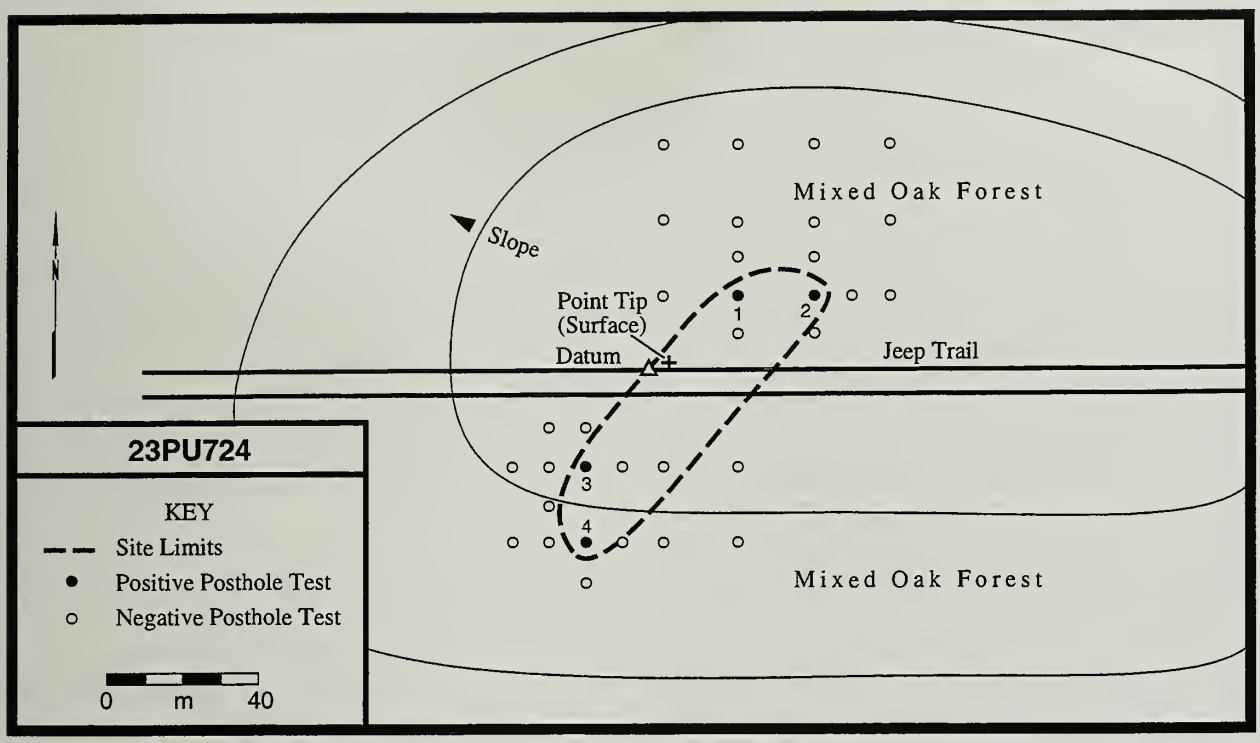

Figure 28. Sketch Map of 23PU724.

Material collected from the road surface consists of a single thin biface fragment. Two tertiary and three broken flakes were recovered from the four positive subsurface tests. Based on the paucity of material found and the lack of intact subsurface deposits, this site is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU725 (97–93: AOS 19)
USGS Quadrangle: Bloodland 7.5'
Elevation: 326 m asl
Site Type: Lithic Debris Scatter
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Potentially Eligible

Site 23PU725 is a moderate to dense lithic scatter located on the crest of a large upland ridge in the central portion of the survey tract (Figure 29). The site overlooks the floodplain of Roubidoux Creek both to the north and south, with the creek channel 400 m to the north and 700 m to the south. The site is bounded to the north and south by steep slopes and to the west by a ravine and drainage. Approximately 50 m to the east is a second ravine and drainage that isolates this site area from 23PU745 to the west and 23PU726 to the east. Low, wet areas are present at the head of both drainages. The ridge is covered by planted pines intermixed with hardwoods and a light to moderate under story, and a military road crosses along its southern edge. This site is defined by the spatial extent of 19 positive subsurface tests that were confined to the western half of this landform and artifacts found along the military road. Maximal dimensions of 23PU725 are 200 m north-south by 60 m east-west.

A total of 72 artifacts was recovered at 23PU725. This total consists of 31 broken, 14 tertiary, 8 bifacial thinning, 3 secondary, and 1 primary flake, and 12 pieces of block shatter, 1 core fragment, 1 pitted stone, and 1 pitted stone and hammerstone. This material was recovered from what appears to be relatively undisturbed A and E horizon deposits to

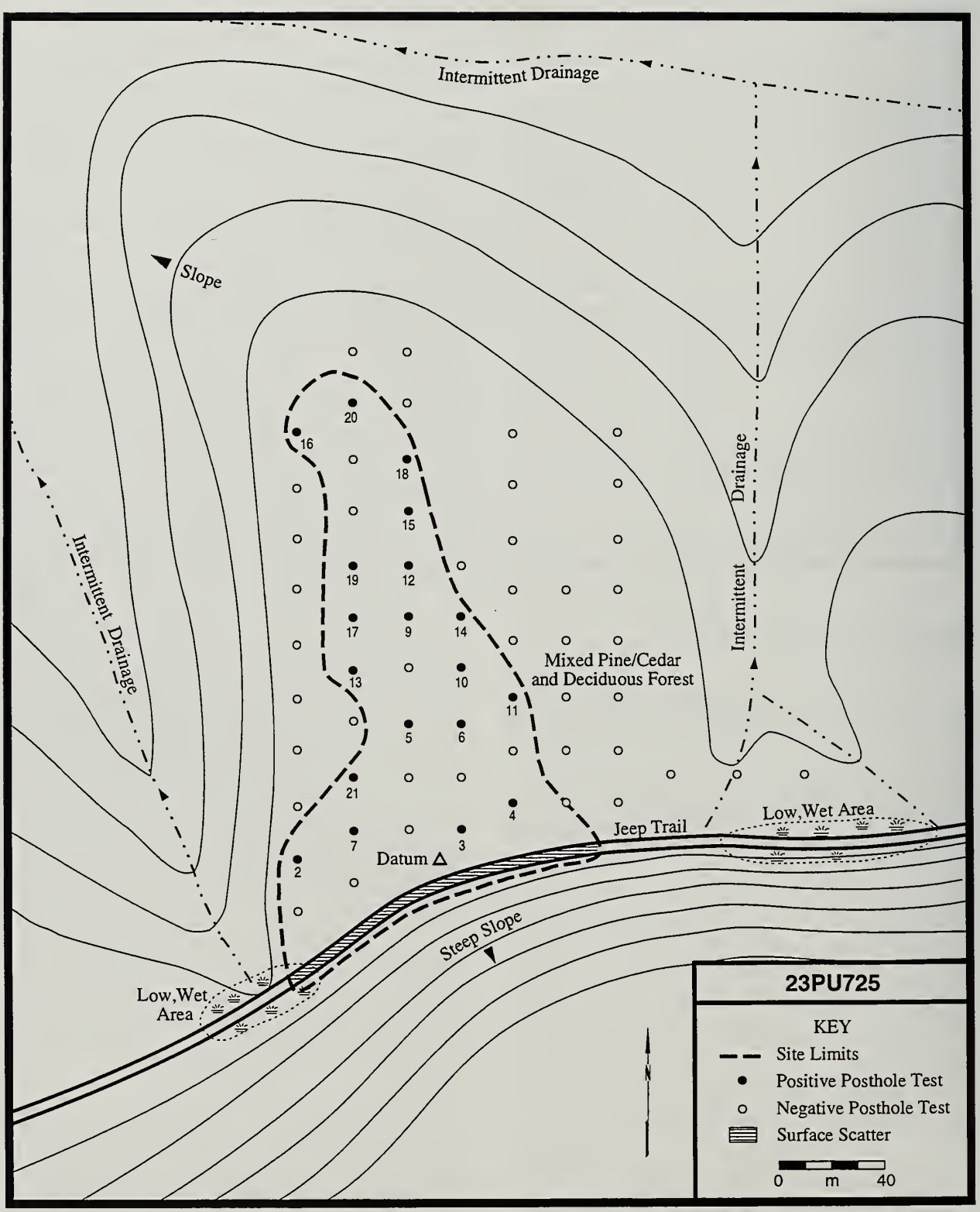

Figure 29. Sketch Map of 23PU725.

30 cm below surface (Table 4). This site lies just to the east of a potentially significant cluster of open-air, closed, cairn, and petroglyph sites on the same upland ridge. Given its proximity to other potentially significant sites within this complex, 23PU725 is recommended as potentially eligible for listing in the NRHP. Phase II evaluation should be designed to determine the period and nature of occupation at this site. Finally, its relationship to the nearby sites discussed above should be explored.

Table 4. Depth, Soil Horizon, and Number of Artifacts Recovered from 23PU725.

Level	*Soil Horizon*	*Number of Artifacts*
Surface		33
0–10 cm	A-E	29
10–20 cm	E	8
20–30 cm	E-B/E	2

Site Number: 23PU726 (97–93: AOS 20)
USGS Quadrangle: Bloodland 7.5'
Elevation: 320 m asl
Site Type: Lithic Debris Scatter
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This site is a low density lithic debris scatter on the crest of a small knob that is part of a larger upland ridge in the central portion of the survey tract (Figure 30). A gravel road, forming the edge of the survey tract, is 100 m to the east. This small upland knob is isolated by ravines on its eastern and western edges and steep bluffs that descend to the Roubidoux Creek floodplain to the south and to a significant intermittent drainage to the north. A military road crosses the south edge of the ridge. The area is covered by a planted pine forest with minimal under story. The site was defined by six positive subsurface tests and material in the military road, yielding maximal dimensions of 60 m north-south by 50 m east-west. Bracketing tests adjacent to the positive tests were negative. All but two artifacts were found on the road surface or in the initial 10 cm below surface in the subsurface tests. The other two artifacts were found between 10 cm and 20 cm below surface.

Artifacts recovered from 23PU726 include three broken, three tertiary, two bifacial thinning, and one secondary flake, and one thin biface fragment, perhaps a projectile point midsection. Based on the paucity of material found and the lack of intact subsurface deposits, this site is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU731 (97–93: AOS 26)
USGS Quadrangle: Bloodland 7.5'
Elevation: 287 m asl
Site Type: Lithic Debris Scatter
Soil Type: Kickapoo fine sandy loam, 0–3 percent slopes
Component(s): Late Woodland
Recommendation: Potentially Eligible

This site, a moderate density lithic debris scatter, is located on a T-5 terrace of the Roubidoux Creek floodplain in the central portion of the survey tract (Figure 31). The terrace is isolated to the east, west, and north by intermittent drainages and sloughs, and it slopes downward to the south onto a T-3 terrace. The bluff face of a large upland ridge is 30 m to the north while the channel of Roubidoux Creek is 400 m south. The site area is covered by a second-growth floodplain forest with a dense under story. Isolate 97–93; AOS 27 is 30 m east of this site. Ten positive subsurface tests, including two positive auger tests, define the site area, which is generally coincident with the crest of the T-5 terrace. This yields maximal site dimensions of 90 m north-south by 40 m east-west.

Artifacts recovered from the 10 positive tests include12 broken, 10 tertiary, and 5 bifacial thinning flakes, 4 pieces of block shatter, and 1 nearly complete Reed Side Notched projectile point. These artifacts were found to 80 cm below surface. The artifacts form a fairly continuous distribution through the soil profile, although there does appear to be a clustering of material between 20 cm and 50 cm below surface (Table 5), with a second possible cluster between 60 cm and 70 cm below surface. The

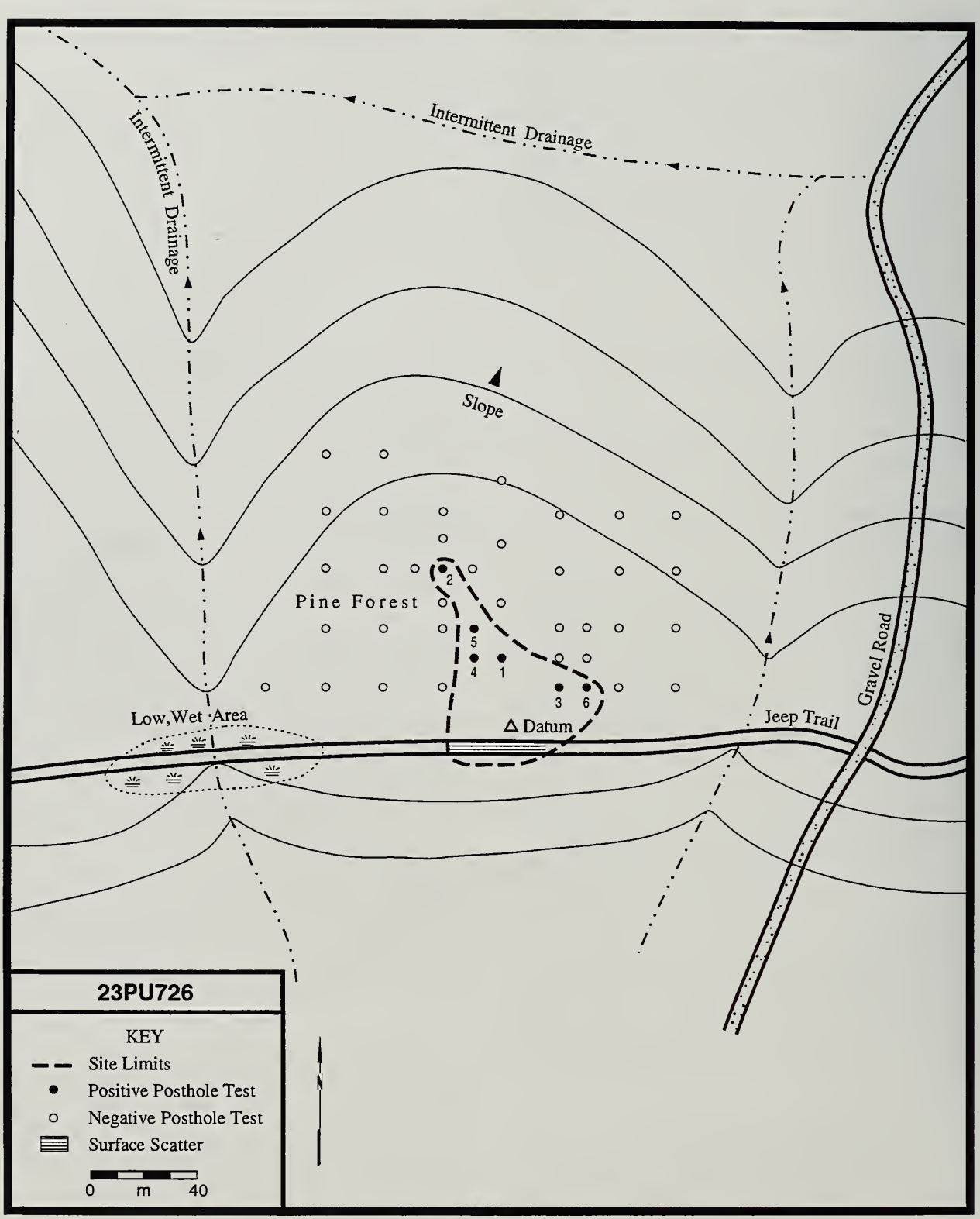

Figure 30. Sketch Map of 23PU726.

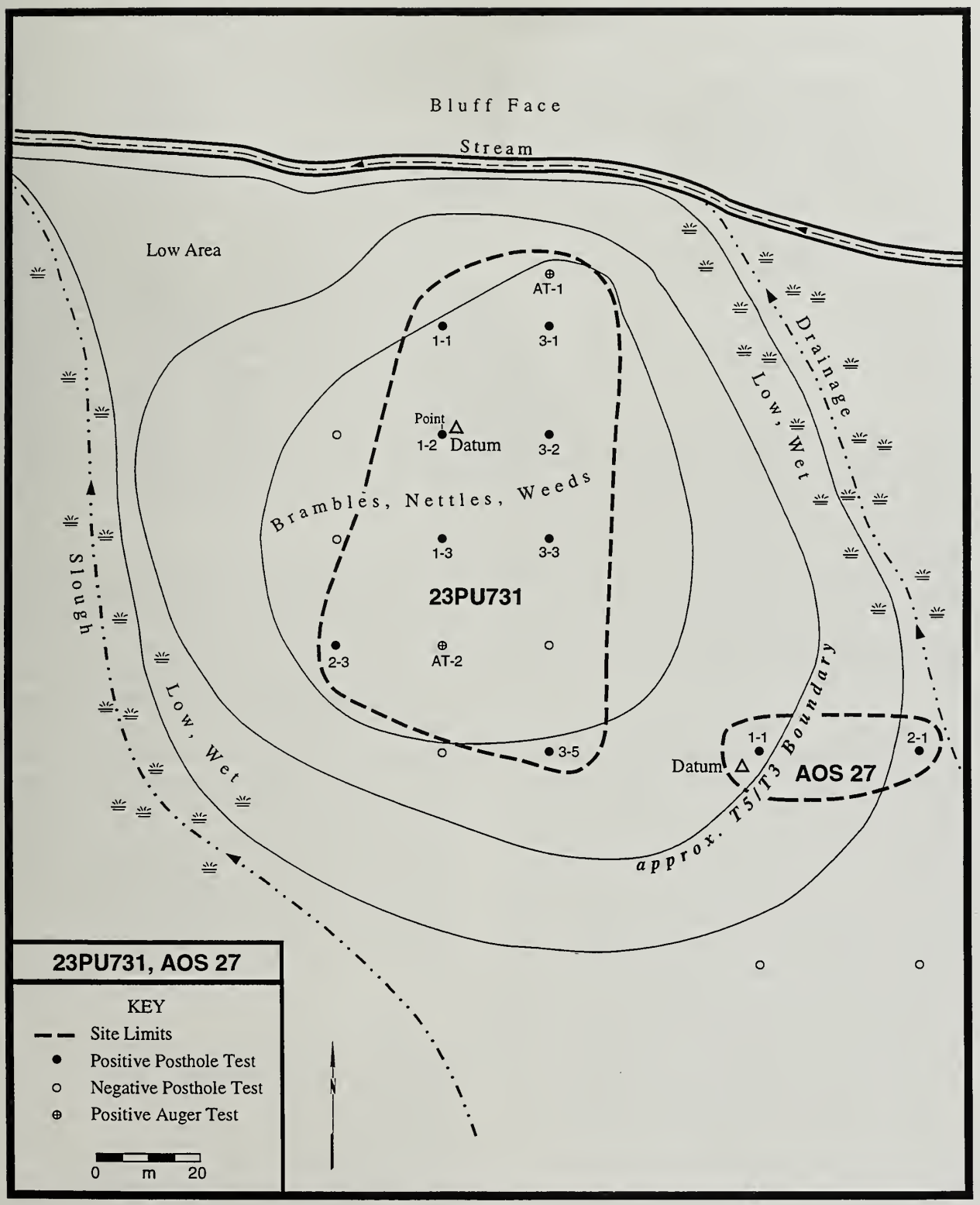

Figure 31. Sketch Map of 23PU731 and 97-93; AOS 27IF.

Table 5. Depth, Soil Horizon, and Number of Artifacts Recovered from 23PU731.

Level	*Soil Horizon*	*Number of Artifacts*
0–10 cm	Ap	3
10–20 cm	C1	3
20–30 cm	C1	10
30–40 cm	C1	4
40–50 cm	C1/C2	6
55–65 cm	C2	1
60–70 cm	C2	4
70–80 cm	Ab	1

Scallorn projectile point, a notched form that dates to the Late Woodland period (Justice 1987), was found between 20 cm and 30 cm below surface (Figure 32, a). Albertson et al. (1995) suggest that the upper 20 cm of T-5 terrace formations date from the Late Archaic period to present; below 20 cm, material should date from the Middle and Early Archaic periods. The stratigraphic position of the Reed Side Notched point is in general agreement with the Albertson et al. (1995) model.

Site 23PU731 is located adjacent to a rockshelter site, 23PU719, that has recently been tested and found to contain intact Late Woodland deposits (Ahler et al. 1999). It is therefore possible that 23PU731, along with 23PU719, are part of the larger Late Woodland site complex, known as the Lohraff complex, located atop the upland peninsula to the north. This site has dated, intact, and moderately dense deposits, and as such, is potentially eligible for listing in the NRHP. Phase II testing should concentrate on determining the integrity of deposits, their potential to contain features, and the nature of the occupation at this site. In addition, excavations can be used to test the temporal component of the Albertson et al. (1995) model and explore its relationship with other nearby Late Woodland sites.

Site Number: 23PU732 (97–93: AOS 28)
USGS Quadrangle: Bloodland 7.5'
Elevation: 287 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Potentially Eligible

This site is a small, low density lithic debris scatter located on a T-6 terrace of the Roubidoux Creek floodplain in the central portion of the survey tract (Figure 33). This site is approximately 130 m south of the bluff slope of a large upland ridge and 350 m north of the Roubidoux Creek channel. It is east of 23PU733 and 23PU736, and south of 23PU510. The site area is covered by a second-growth floodplain forest with a dense under story. Lower, probably seasonally inundated, areas are present to the south and west of the site. Three positive subsurface tests were excavated at 23PU732, yielding a site area of 10 m north-south by 10 m east-west.

Artifacts collected from the three tests include four broken and two tertiary flakes. One flake was recovered from 10–20 cm (Ap horizon), one flake from 30–40 cm (Bw1 horizon), and four flakes from 40–50 cm (Bw1 horizon) below surface. Albertson et al. (1995) suggest that T-6 terraces are seasonally inundated, but may have been occupied during dry seasons. Materials from the surface to 20 cm below surface may date between present to the Dalton period, while materials below 20 cm may date to the Paleoindian period. As such, it is potentially eligible for listing in the NRHP. Testing, aside from determining site integrity and nature of the occupation, should concentrate on the dating of deposits and identification of separate periods of occupation, if present.

Site Number: 23PU733 (97–93: AOS 29)
USGS Quadrangle: Bloodland 7.5'
Elevation: 287 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This site is a small, low density lithic debris scat-

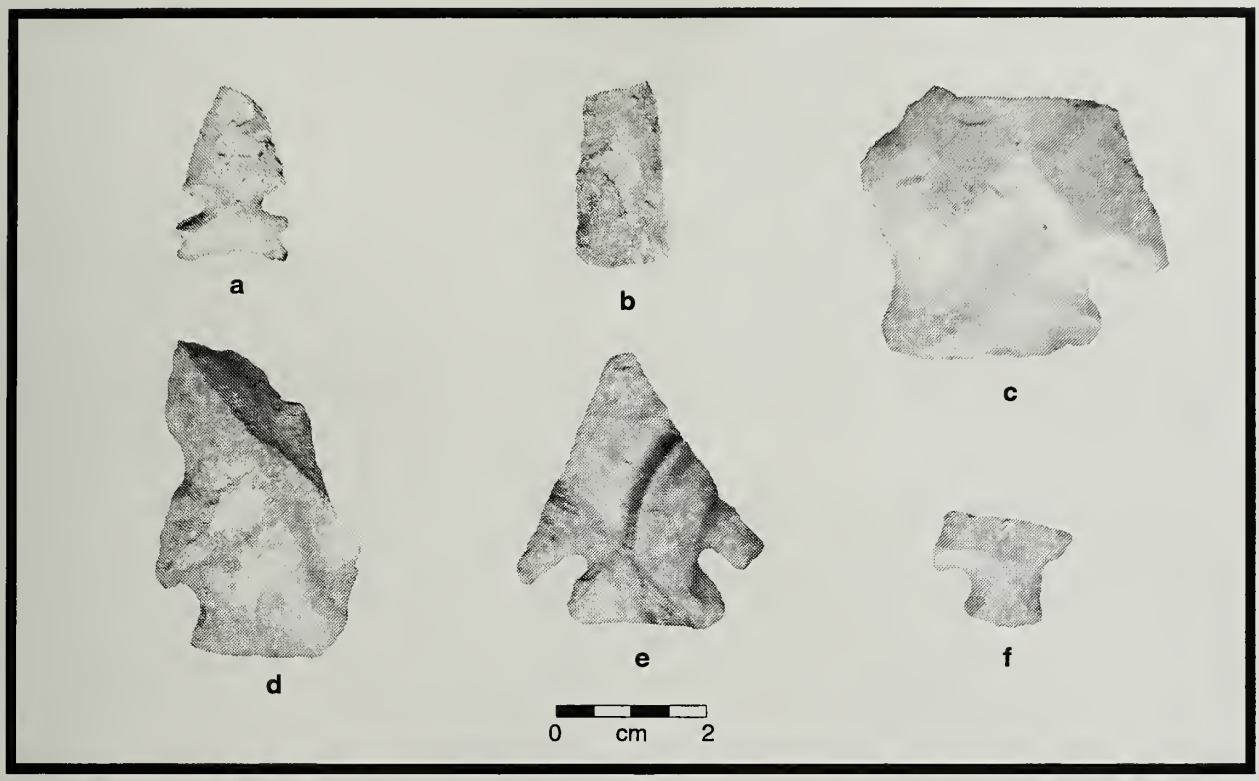

Figure 32. Selected Artifacts: a, Reed Side Notched projectile point from 23PU731; b, Triangular projectile point from 23PU739; c-d, Etley projectile points from 23PU745; e, King's Corner Notched projectile point from 23PU745; f, Scallorn projectile point from 23PU745.

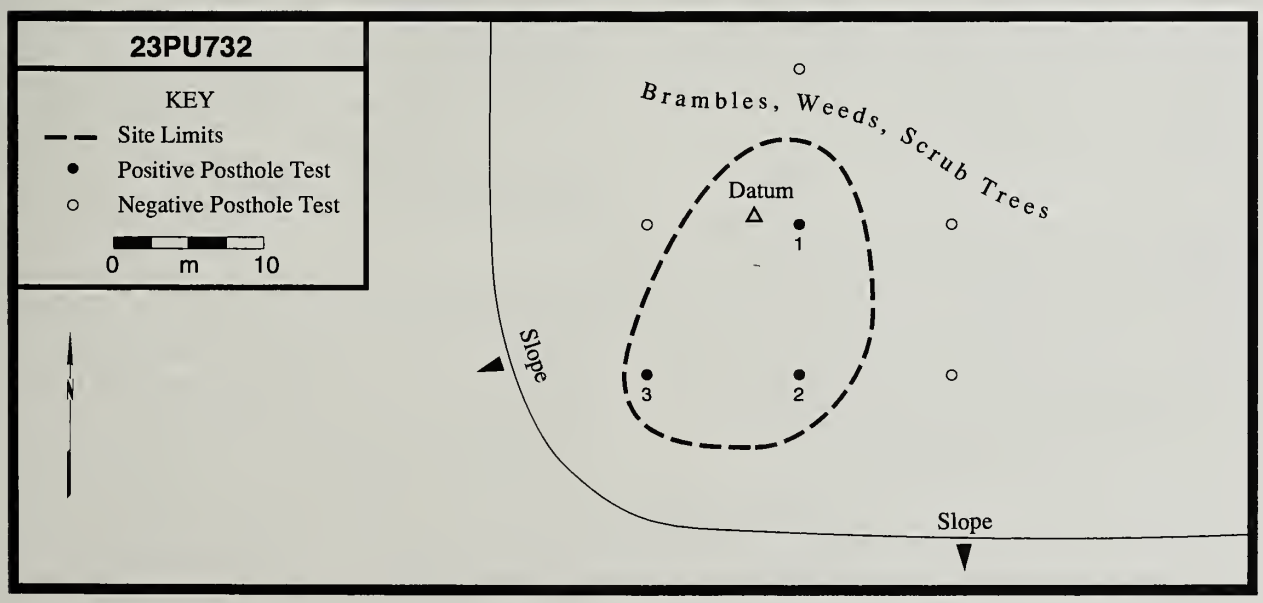

Figure 33. Sketch Map of 23PU732.

ter located along the south edge of a T-6 terrace on the Roubidoux Creek floodplain in the central portion of the survey tract (Figure 34). This site is approximately 200 m south of the bluff slope of a large upland ridge and 240 m north of the Roubidoux Creek channel. It is located south of 23PU732 and 23PU736. The site area is covered by a second-growth floodplain forest with a dense under story. An intermittent drainage is present south of the site. Five positive subsurface tests were excavated at 23PU733, and artifacts were found on the surface of a pig wallow, yielding a site area of 40 m north-south by 15 m east-west.

Artifacts collected from the five tests and the pig wallow include twenty broken, one secondary, and one tertiary flake, and seven pieces of block shatter. Twenty of these artifacts were found on the surface or to 20 cm below surface in an Ap horizon, eight were recovered from a mixed Ap/Bw1 horizon, and one was found in the Bw1 horizon. This suggests most material was recovered from disturbed contexts. Albertson et al. (1995) suggest that T-6 terraces are seasonally inundated, but may have been occupied during dry seasons. Materials from the surface to 20 cm below surface may date between the present to the Dalton period, while materials below 20 cm may date to the Paleoindian period. While intact deposits may be present at this site, based on the preponderance of material found in the Ap horizon, it is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU734 (97–93: AOS 31/32)
USGS Quadrangle: Bloodland 7.5'
Elevation: 283 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

Site 23PU734 is a low density lithic scatter located on a T-4 terrace in the Roubidoux Creek floodplain within the north survey tract (Figure 35). The terrace is bordered to the west by a slough while Roubidoux Creek is to the east. A gravel road, coinciding with the survey tract boundary, is 20 m to the south. A partially overgrown fire-brake bisects the site area. Roubidoux Creek is 70 m to the east while the bluff slope of an upland ridge is 230 m to the west. This site was defined on the basis of four positive subsurface tests. The spatial extent of these tests yielded maximal site dimensions of 50 m north-south by 20 m east-west. The site area is covered by a second-growth floodplain forest with a moderate to dense under story.

Six artifacts, consisting of five broken flakes (one lost during fieldwork) and one piece of block shatter, were recovered. One artifact was found between 10 and 20 cm (Ap horizon), one from 20–30 cm, three from 30–40 cm, and one from 40–50 cm below surface. While this site certainly appears to be a low density lithic scatter, most material was found between 30 cm and 50 cm below surface. This may indicate the presence of a relatively intact, but low density artifact-bearing horizon. While intact deposits may be present at this site, based on the paucity of material found, it is unlikely to yield significant data. Therefore, 23PU734 is not eligible for listing in the NRHP, and no additional work is recommended.

Site Number: 23PU735 (97–93: AOS 34)
USGS Quadrangle: Bloodland 7.5'
Elevation: 293 m asl
Site Type: Cairn
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Late Prehistoric
Recommendation: Potentially Eligible

This site consists of a single rock cairn that is located at the western end of an upland ridge east of Roubidoux Creek in the central part of the survey tract (Figure 36). The ridge is covered by a mixed oak-hickory forest with a light under story. The cairn is situated approximately 5 m south of a military road and 10 m north of the steep ridge bluff slope. An informal trail, created to access 23PU721 during Phase II investigations, skirts the western edge of the cairn and an old barbed-wire fence is 2 m to the south. The cairn is a circular feature, 7 m in diameter, of limestone/dolomite blocks stacked 50 cm to 1 m high. An approximately 2-m wide trench, begin-

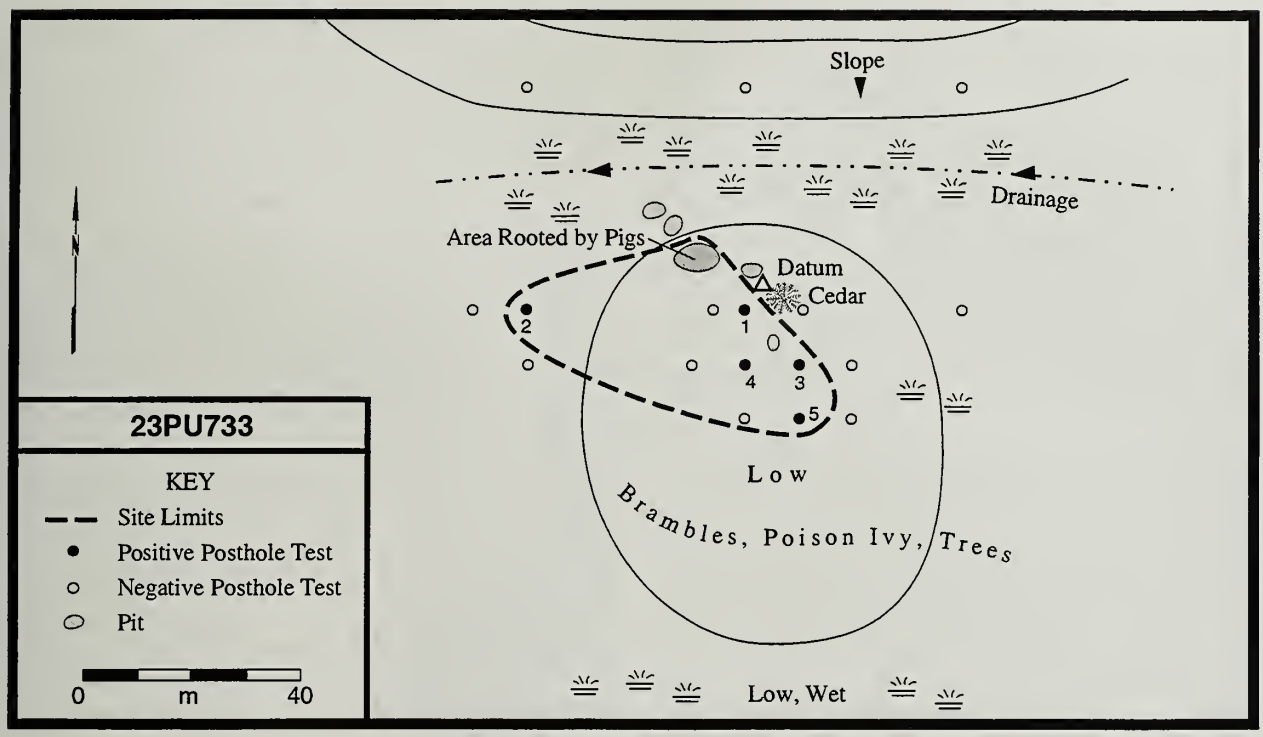

Figure 34. Sketch Map of 23PU733.

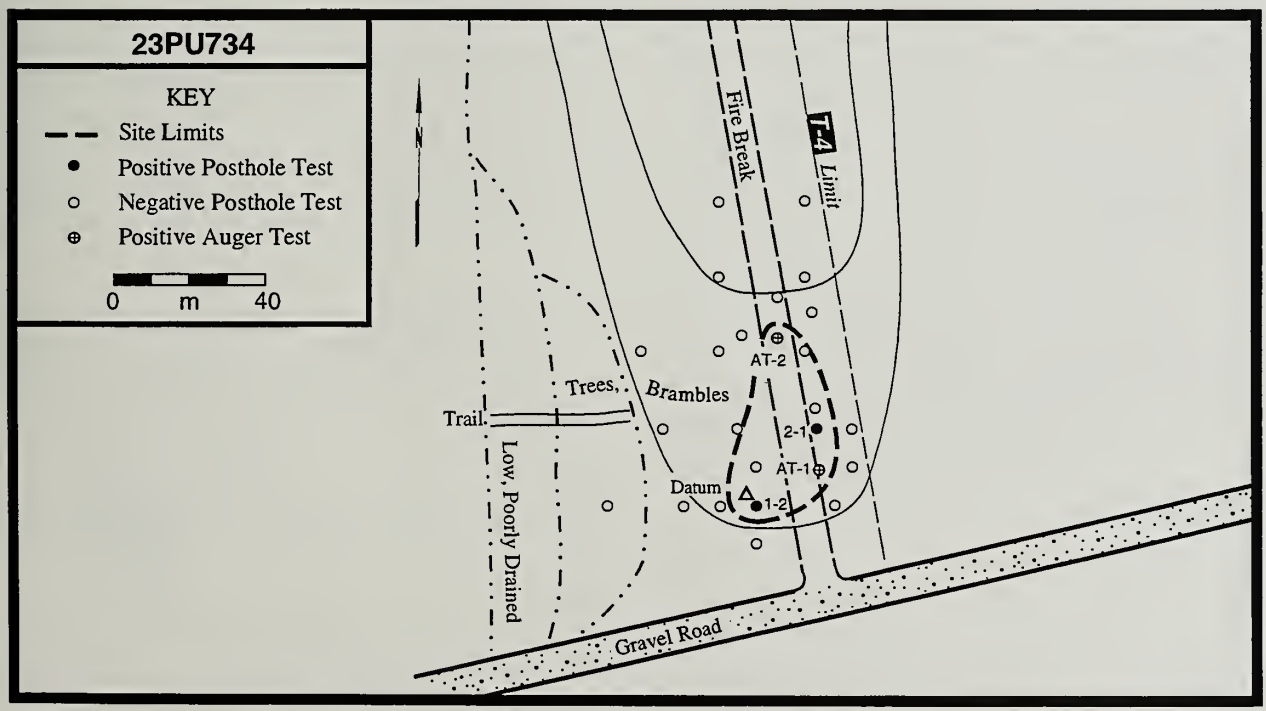

Figure 35. Sketch Map of 23PU734.

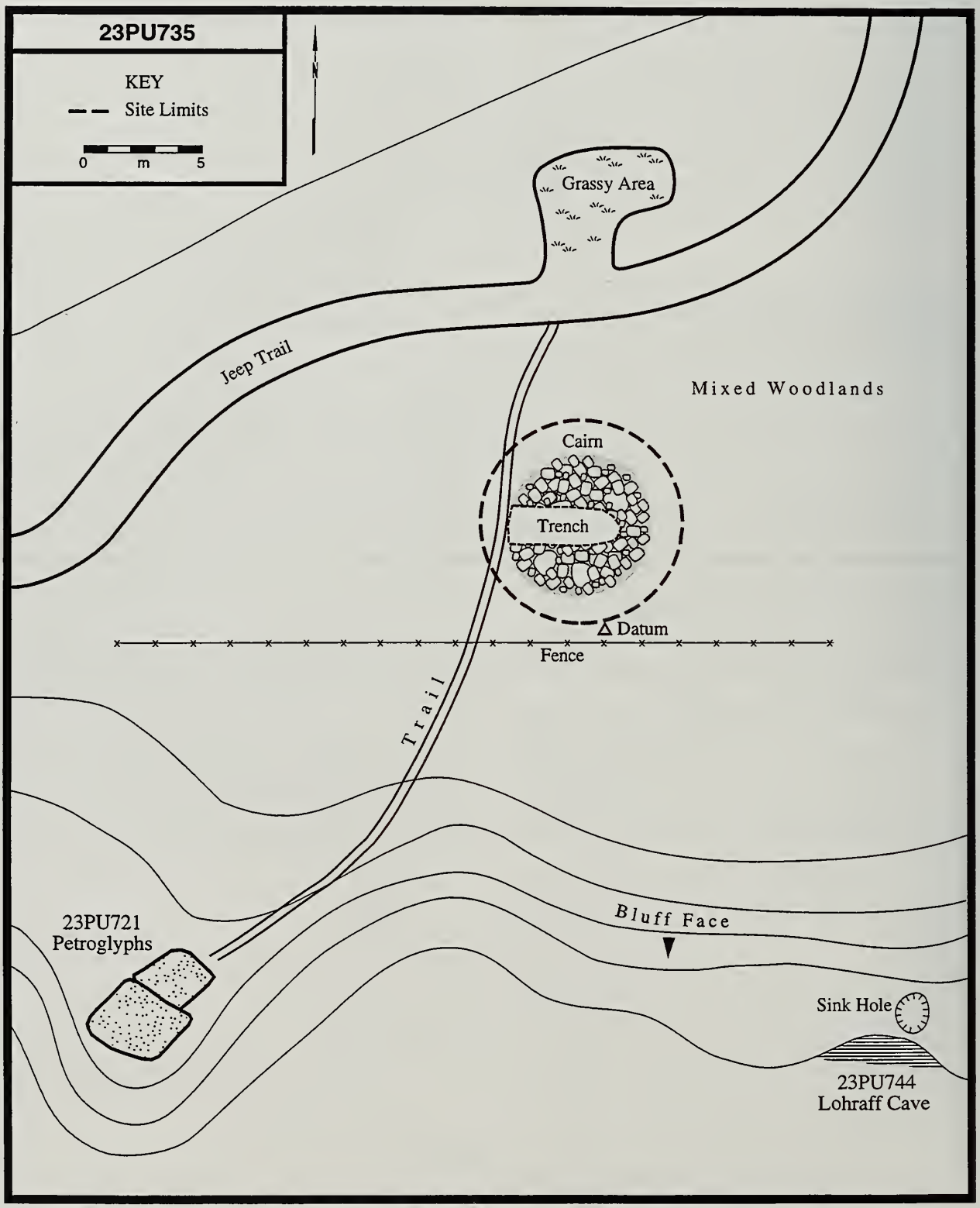

Figure 36. Sketch Map of 23PU735.

ning along the western edge of the cairn and continuing into its center, is present. The trench indicates prior looting of this feature. Subsurface tests excavated in the site and an inspection of the surface yielded no artifacts. Currently, the site area is defined as the 7-m diameter of the cairn.

This site is located in an area with a high probability of having cairns (Ahler and Albertson 1996). It appears to be associated with a number of other sites, forming a coherent site complex, known as the Lohraff Complex. A petroglyph site, 23PU721, is located approximately 30 m southwest, a large upland site (23PU745) is 20 m to the northeast, and cave (23PU744) and rockshelter sites (23PU719 and 23PU739) are present along the bluff face below the cairn. Previously, Fort Leonard Wood cairn sites have been recommended as potentially eligible for listing in the NRHP (e.g., Adams 1997; Kreisa, Walz, et al. 1996). Given the association of this cairn with other potentially significant sites within a site complex, 23PU735 is recommended to be potentially eligible for listing in the NRHP. Phase II evaluation should be designed to determine the period of construction of the feature in a preferably non-destructive and non-intrusive manner, due to the potential for these features to contain human burials. The cairn should also be mapped to provide a baseline for use in monitoring its condition. Finally, its temporal, functional, and spatial relationship to the nearby sites discussed above should be explored.

Site Number: 23PU736 (97–93: AOS 36)
USGS Quadrangle: Bloodland 7.5'
Elevation: 287 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Potentially Eligible

This site is a small, low to moderate density lithic debris scatter located along the west edge of a T-6 terrace (Figure 37). This terrace is on the Roubidoux Creek floodplain in the central portion of the survey tract. The site is approximately 100 m south of the bluff slope of a large upland ridge and 370 m north of the Roubidoux Creek channel. It is west of 23PU732, north of 23PU736, and southwest of 23PU510. The site area is covered by a second-growth floodplain forest with a dense under story. A poured concrete cube, perhaps associated with 23PU510, is present along the southern edge of this site. An intermittent drainage is present west of the site area and a seasonally inundated T-3 terrace is to the south. Seven positive subsurface tests were excavated at 23PU736, the spatial extent of which was used to define a site area of 35 m north-south by 25 m east-west.

Artifacts recovered from the seven positive tests consist of 12 broken, 3 tertiary, and 2 bifacial thinning flakes. Nine of these flakes were found between 0 cm and 20 cm below surface in the Ap horizon, while four flakes were found at 20–30 cm, two from 30–40 cm, and two from 40–50 cm below surface in the Bw1 horizon. Albertson et al. (1995) suggest that T-6 terraces are seasonally inundated, but may have been occupied during dry seasons. Materials from the surface to 20 cm below surface may date between the present to the Dalton period, while materials below 20 cm may date to the Paleoindian period. This site appears to contain the greatest density of artifacts of all three sites located on this particular T-6 terrace during the current survey. In addition, there do appear to be intact deposits present, with almost 50 percent of the material found below the Ap horizon. Site 23PU736 appears to have the subsurface integrity needed to test the Albertson et al. (1995) model concerning periods of T-6 occupation. As such, it is potentially eligible for listing in the NRHP. Testing, aside from determining site integrity and nature of the occupation, should concentrate on the dating of deposits and identification of separate periods of occupation, if present.

Site Number: 23PU737 (97–93: AOS 37)
USGS Quadrangle: Bloodland 7.5'
Elevation: 268 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

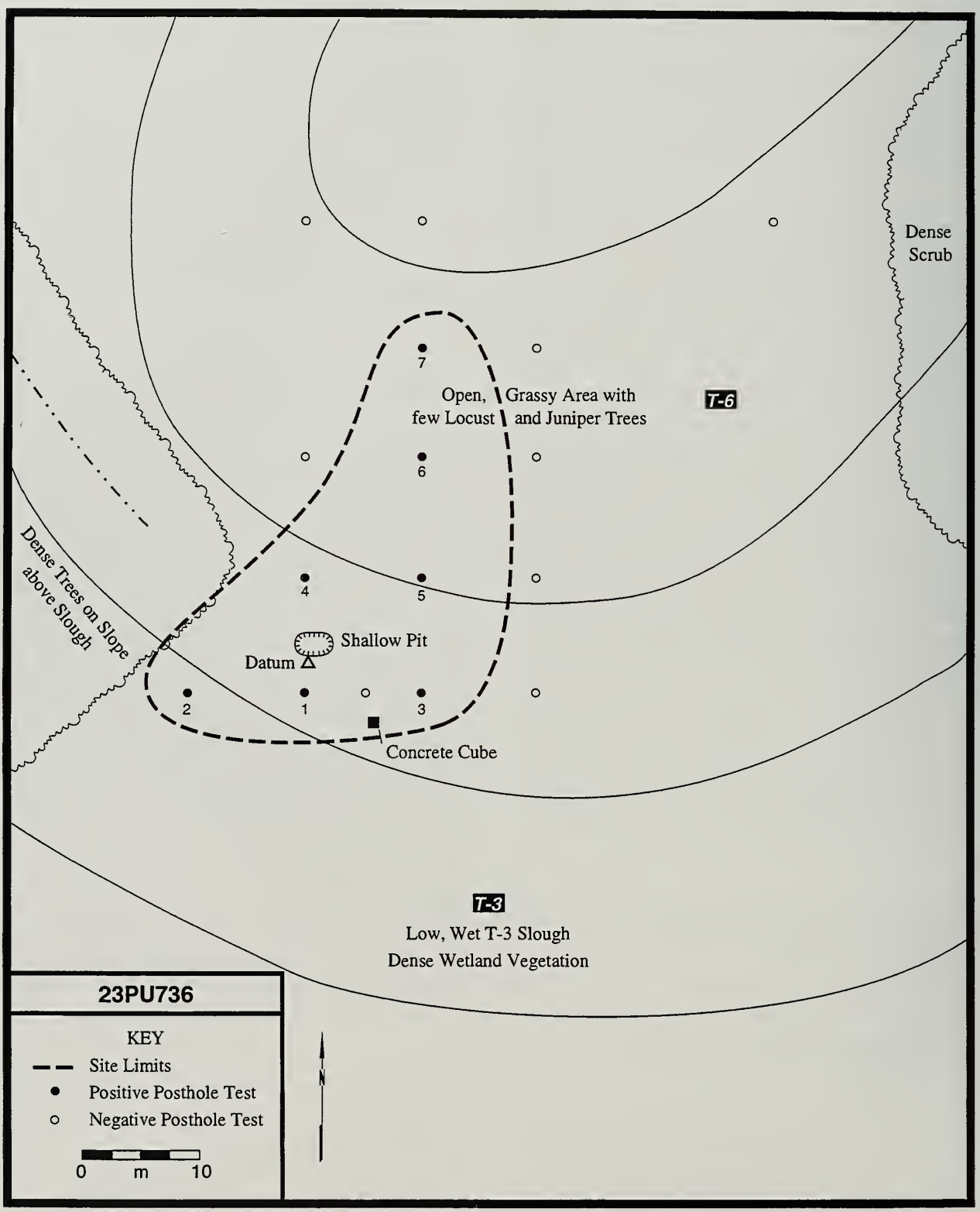

Figure 37. Sketch Map of 23PU736.

This site is a low density lithic debris scatter found on a T-5 terrace on the Roubidoux Creek floodplain in the central portion of the survey tract (Figure 38). Isolate 97–93: AOS 38 is located 50 m to the northwest, while a slough is located 30 m to the south and the bluff face of an upland ridge is a further 40 m south. Roubidoux Creek is 200 m north. The T-5 terrace is covered by a floodplain forest with a dense under story. This site consists of two positive subsurface tests and material collected from the ground surface, yielding a site area of 20 m north-south by 10 m east-west.

Artifacts, including one broken and two tertiary flakes and one piece of block shatter, were located as deep as 1 m below surface. Two of the artifacts were found on the surface, and single artifacts were found from 80–90 cm and 90–100 cm below surface. No additional artifacts were found in bracketing tests. While it is likely that intact deposits are present at this site, the paucity of material recovered suggests little potential to yield significant data. Based on this, 23PU737 is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU738 (97–93: AOS 39)
USGS Quadrangle: Bloodland 7.5'
Elevation: 268 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This site is a low density lithic scatter located on a T-4 terrace in the Roubidoux Creek floodplain within the central survey tract (Figure 39). The terrace is bordered to the south by a T-5 terrace and to the north by a T-3 terrace. The bluff slope of a large upland ridge is 60 m to the southeast while Roubidoux Creek is 70 m to the north. The area is covered by a second-growth floodplain forest with a dense under story. Site 23PU738 is defined by the extent of four positive subsurface tests, with maximal dimensions of 30 m north-south by 50 m east-west.

The four positive tests yielded a total of five artifacts. The artifacts consist of one broken and two tertiary flakes, and one thin and one rough biface fragment. One artifact was found between 0 and 10 cm (Ap horizon), one from 20–30 cm, two from 30–40 cm, and one from 40–50 cm (Bw1 horizon) below surface. Albertson et al. (1995) indicate that materials from the present to the Early Woodland period are likely in the initial 20 cm of deposits on T-4 terraces, while those below 20 cm below surface should date to the Late Archaic period. While intact deposits may be present at this site, the paucity of material found the site suggests it is unlikely to yield significant data. Therefore, 23PU738 is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU739 (97–93: AOS 40)
USGS Quadrangle: Bloodland 7.5'
Elevation: 290 m asl
Site Type: Rockshelter
Soil Type: Gepp, Barkley, Clarksville very cherty silt loam, 14–35 percent slopes
Component(s): Late Woodland
Recommendation: Potentially Eligible

This site is a rockshelter near the top of the bluff at the southwest end of a large upland ridge that is located in the central portion of the survey tract (Figure 40). The rockshelter overlooks the floodplain of Roubidoux Creek to the south, with a channel of the creek approximately 100 m to the west. The shelter is at the head of a narrow ravine in the bluff. Within the confines of the dripline, the shelter measures approximately 3-x-6 m. It has a roof height of 3 m at the west end of the shelter. An alluvial fan (sediment cone) from a sinkhole and two looter's pits were noted in the shelter. The sediment cone may have preserved intact cultural deposits. The talus slope in front of the shelter is quite steep and contains substantial amounts of lithic debris.

As artifacts were found on the surface of the rockshelter, no subsurface testing was conducted. The 30 artifacts collected include four tertiary, six bifacial thinning, and seven broken flakes, seven pieces of block shatter, and one triangular point fragment (Figure 32, b). The triangular point fragment is the base of a Madison Triangular point that dates

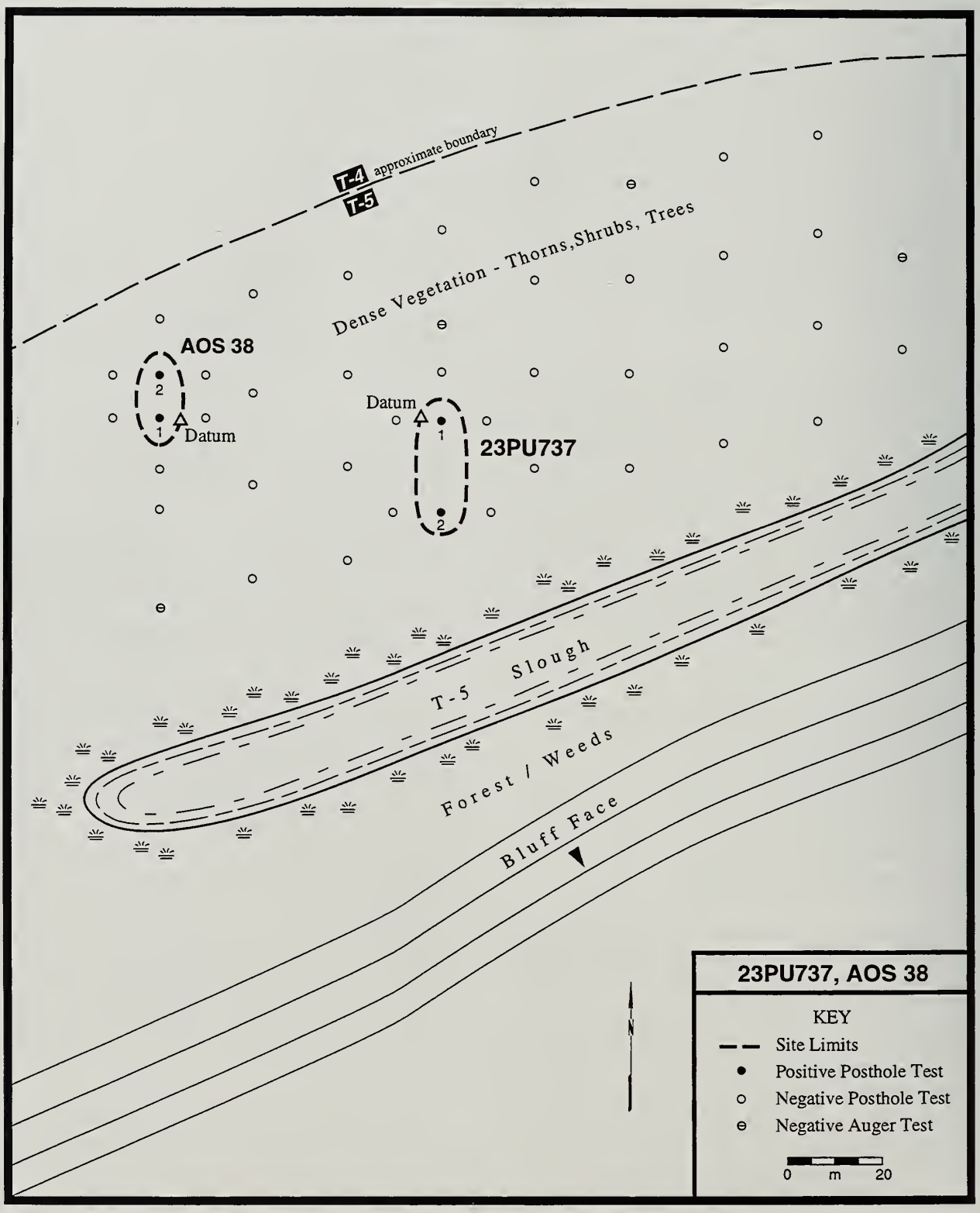

Figure 38. Sketch Map of 23PU737 and 97-93; AOS 38IF.

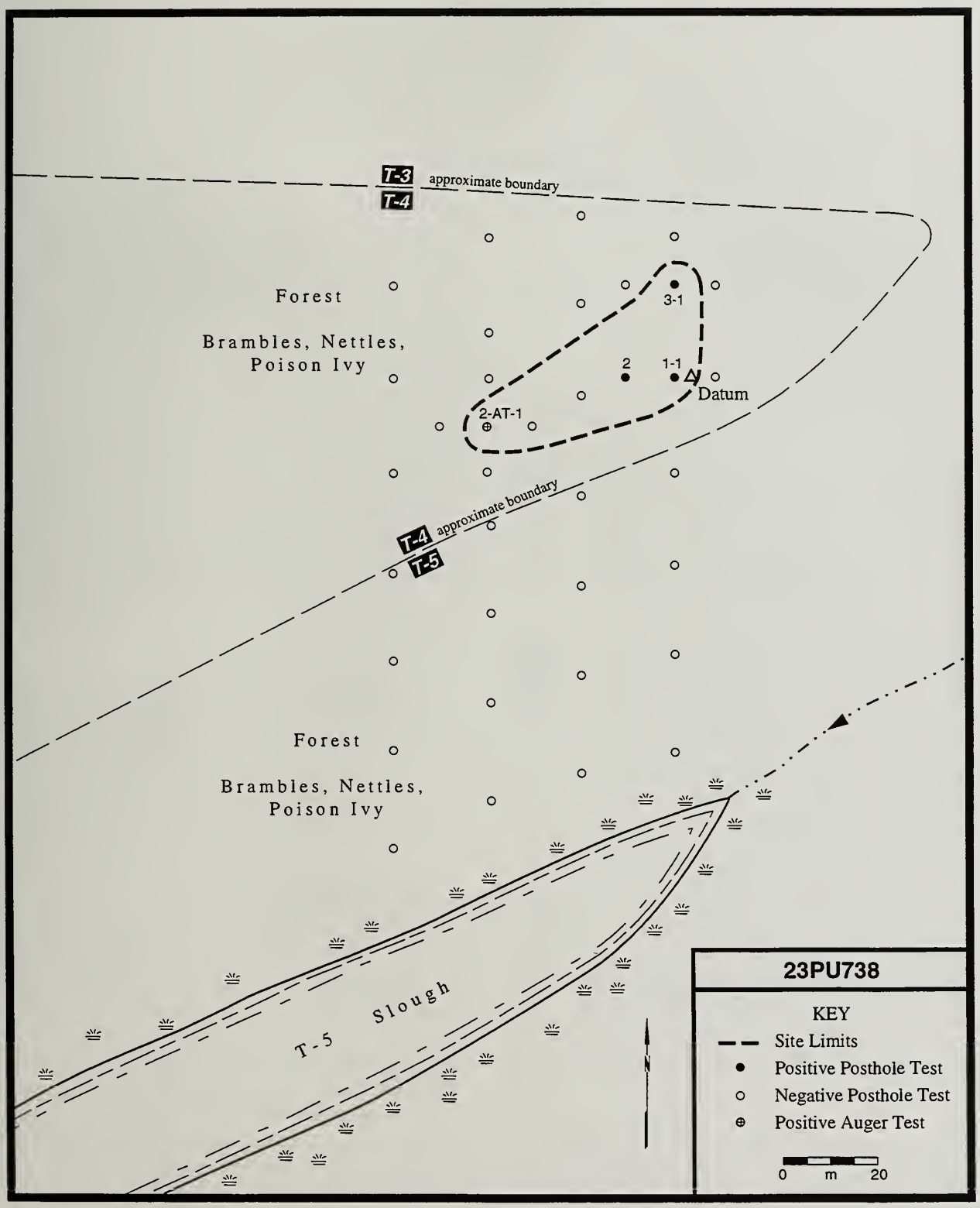

Figure 39. Sketch Map of 23PU738.

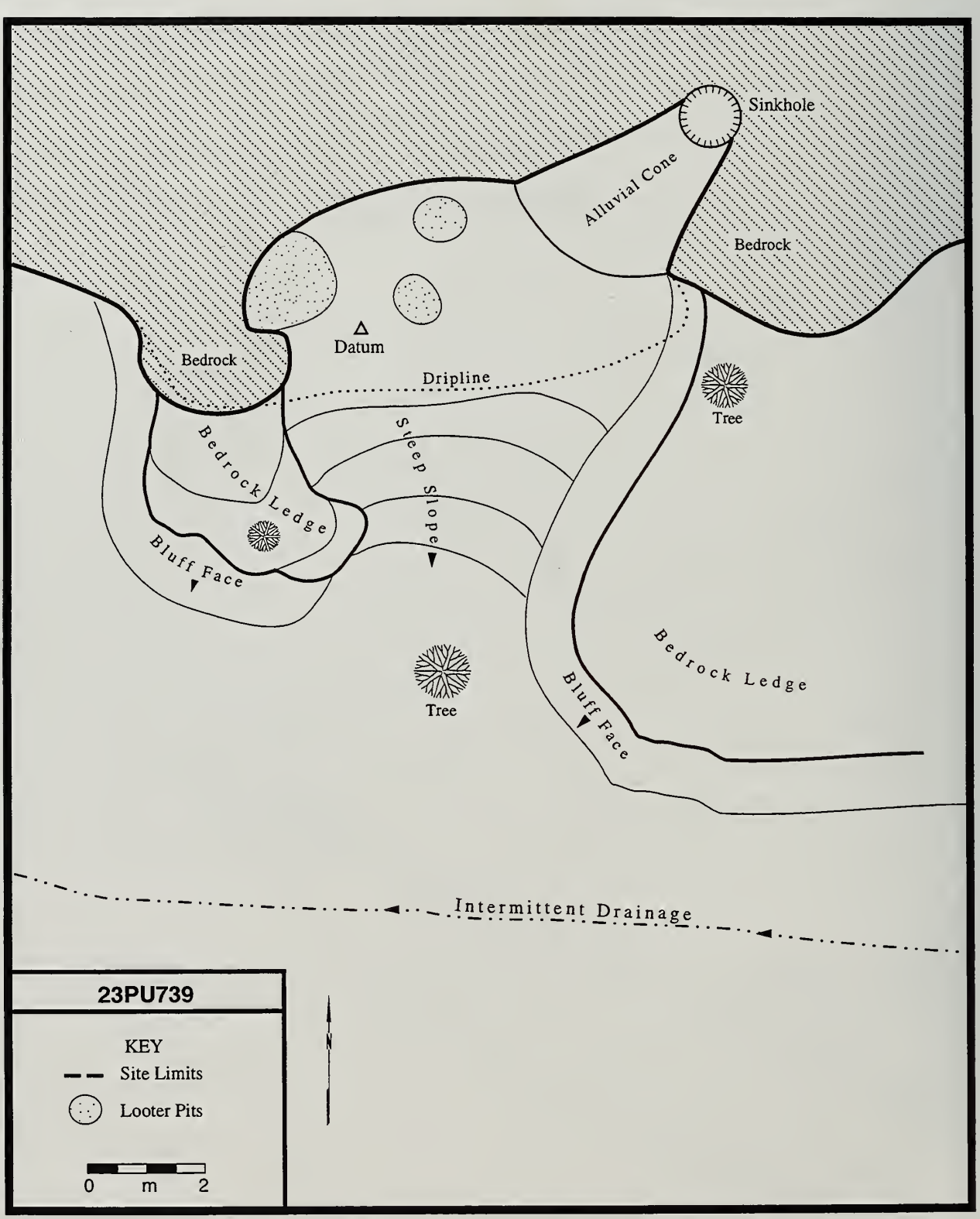

Figure 40. Sketch Map of 23PU739.

to the Late Woodland and Mississippian periods (Justice 1987). In addition, a bird long bone fragment and four pieces of mussel shell were collected. It appears that this rockshelter is associated with a number of other sites present on and around the upland ridge, forming a coherent site complex known as the Lohraff Complex. A petroglyph site (23PU721) and a cairn (23PU735) are located to the north along the edge of the bluff face, a large upland site (23PU745) is to the northeast, and Lohraff Cave (23PU744) is located to the west along the bluff. Given the density of material found on the surface, the high probability that intact deposits are present, and the association of this rockshelter with other potentially significant sites within a site complex, this site is recommended to be potentially eligible for listing in the NRHP. Phase II evaluation should be designed to determine integrity of deposits, recover artifacts and faunal and botanical remains, and locate features that can yield information on the Late Woodland occupation of the site. Finally, its relationship to the nearby sites discussed above should be explored.

Site Number: 23PU740 (97–93: AOS 41)
USGS Quadrangle: Bloodland 7.5'
Elevation: 287 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This site is a low density lithic scatter found on a T-5 terrace of the floodplain of Roubidoux Creek in the north portion of the survey area (Figure 41). The site is just north of a military road that runs along the base of an upland bluff slope. Ravines and intermittent drainages are present to the east and west, and the terrace slopes downward to the north. Roubidoux Creek is 140 m to the north. The T-5 terrace is covered by a floodplain forest with a dense under story. This site consists of three positive subsurface tests that define site dimensions of 20 m north-south by 15 m east-west.

Artifacts recovered from the three positive subsurface tests consist of two broken, one tertiary, and one bifacial thinning flake. Three of the flakes were found between 20 cm and 30 cm below surface, while the fourth flake was found at 60 cm to 70 cm below surface. Albertson et al. (1995) suggest that the upper 20 cm of T-5 terraces date from the Late Archaic period to present, while below 20 cm material should date from the Middle and Early Archaic periods. While intact deposits may be present at this site, based on the paucity of material found, such deposits are unlikely to yield significant data. Because of this, 23PU7430 is not eligible for listing in the NRHP. No additional work is recommended.

Site Number: 23PU741 (97–93: AOS 44)
USGS Quadrangle: Bloodland 7.5'
Elevation: 283 m asl
Site Type: Lithic Debris Scatter
Soil Type: Kickapoo fine sandy loam, 0–3 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Potentially Eligible

This site is a moderate-sized but generally low density lithic debris scatter located in the central portion of the survey tract (Figure 42). The site was found on the western half of a T-5 terrace, approximately 50 m south of the Roubidoux Creek channel and 300 m north of a large upland ridge. An overgrown military road forms a T-intersection at the southwest corner of the site; the road's western and southern branches coincide with an edge of the T-5 terrace and define site limits, as artifacts were confined to the T-5 terrace. The site area has been defined on the basis of eight positive posthole tests and one positive auger test. This yielded site dimensions of 40 m north-south by 70 m east-west, encompassing most of the western half of the T-5 terrace. All subsurface tests to the east on this terrace were negative. The site area is covered by a second-growth floodplain forest with a dense under story.

Artifacts were fairly evenly distributed throughout the soil profile, being found in almost every 10 cm level to 80 cm below surface in the nine positive subsurface tests (Table 6). Albertson et al. (1995) suggest that the upper 20 cm of T-5 terrace formations date from the Late Archaic period to present,

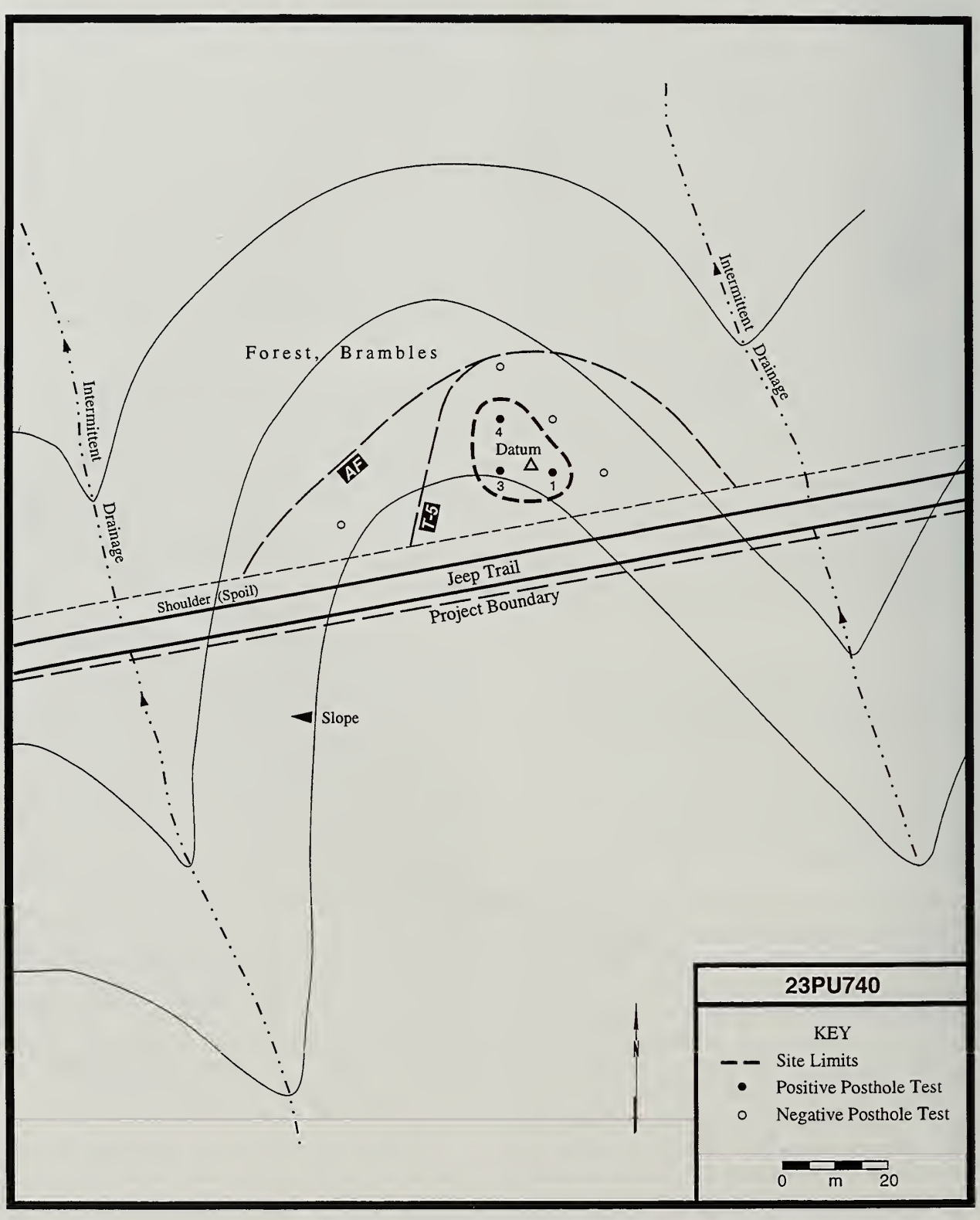

Figure 41. Sketch Map of 23PU740.

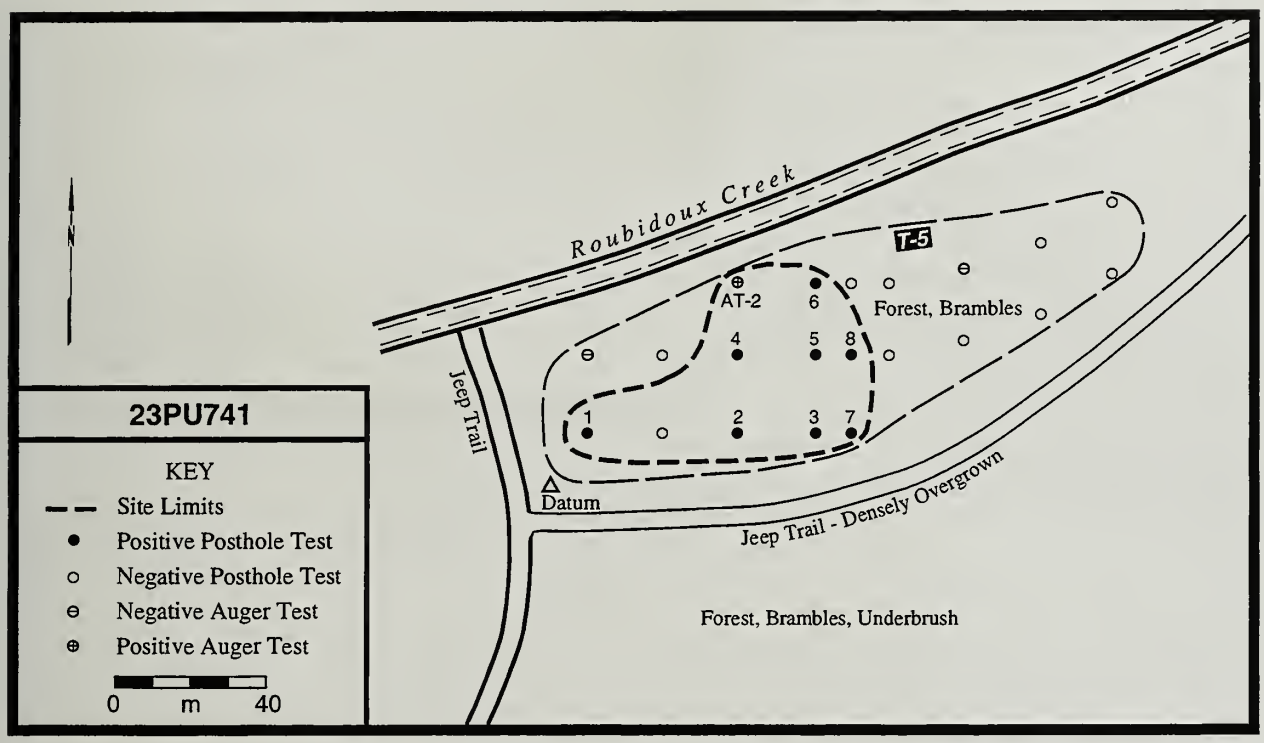

Figure 42. Sketch Map of 23PU741.

while below 20 cm material should date from the Middle and Early Archaic periods. The artifacts consist of two primary, five broken, four tertiary, one secondary, and one bifacial thinning flake. Based on the moderate density of material recovered and the likelihood that intact deposits are present at 23PU741, this site is potentially eligible for listing in the NRHP. Phase II evaluation should concentrate on determining whether intact deposits are present, including the potential of this site to contain features, as well as understanding the nature and period of occupation at this site.

Table 6. Depth, Soil Horizon, and Number of Artifacts Recovered from 23PU741.

Level	*Soil Horizon*	*Number of Artifacts*
0–10 cm	Ap	4
10–20 cm	C1	1
20–30 cm	C1	2
30–40 cm	C1	3
40–50 cm	C1/C2	1
50–60 cm	C2	0
60–70 cm	C2	1
70–80 cm	Ab	1

Site Number: 23PU742 (97–93: AOS 45)
USGS Quadrangle: Bloodland 7.5'
Elevation: 293 m asl
Site Type: Lithic Debris Scatter
Soil Type: Claiborne silt loam, 5–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Potentially Eligible

Site 23PU742 is a dense lithic scatter located on a T-7 terrace on the Roubidoux Creek floodplain in the central portion of the survey tract (Figure 43). This landform rises above its immediate surroundings, being bordered to the south by a slope to Rou-

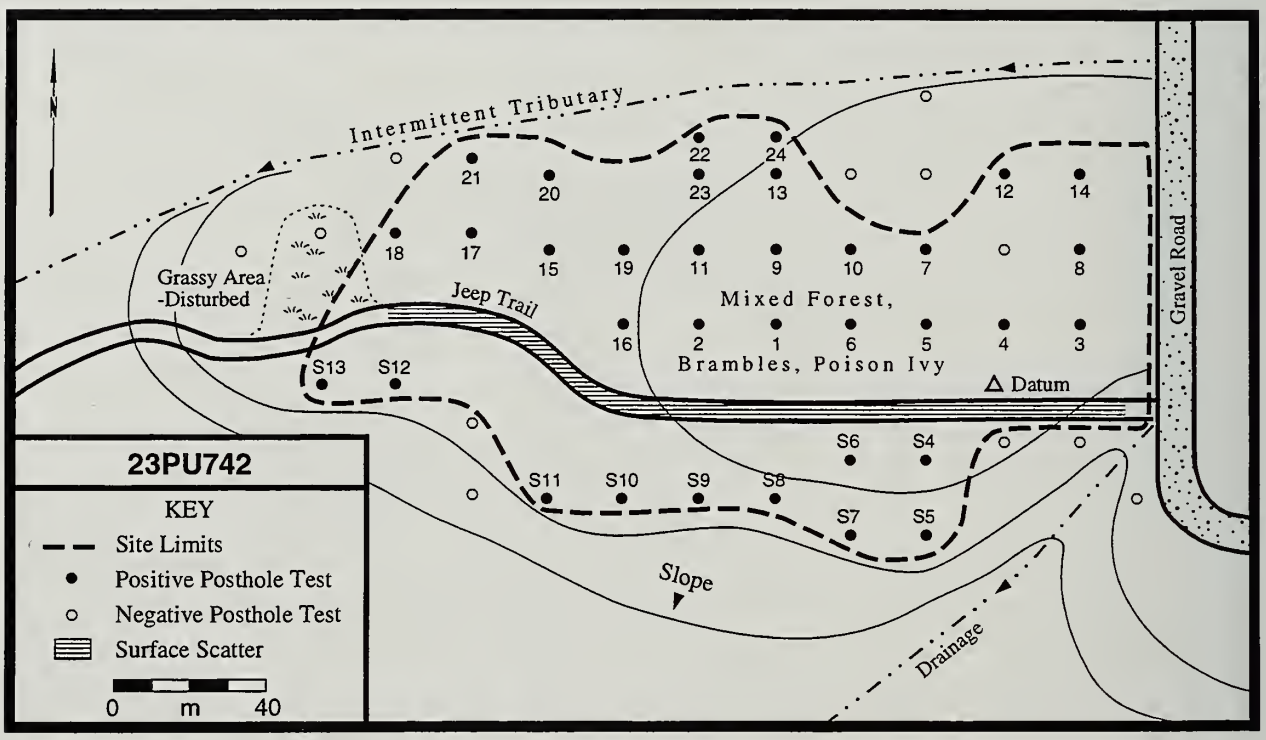

Figure 43. Sketch Map of 23PU742.

bidoux Creek, to the north by a drainage, and to the west by a slough channel. To the east is a gravel road that coincides with the boundary of the survey tract. The area to the east of this road had previously been surveyed but no artifacts found (Adams 1997). Roubidoux Creek is 50 m south while a large upland ridge is 530 m north. The terrace is covered by a second-growth forest with moderate under story, although poison ivy appears to be well established across the entire terrace. A two-track road crosses the terrace along its southern edge. Positive subsurface tests, totaling 34, were excavated across almost the entire landform, defining maximal site dimensions of 100 m north-south by 220 m east-west.

The 34 positive tests yielded 254 artifacts, including 136 broken, 38 tertiary, 39 bifacial thinning, 9 secondary, and 1 primary flake, 23 pieces of block shatter, 2 core fragments, 1 hammerstone, 2 thin biface fragments, 1 rough biface fragment, 1 thick biface fragment, and 1 uniface. Much of this material was recovered from a probable Ap horizon, although artifacts were found in an intact B horizon to 50 cm below surface (Table 7). Albertson et al. (1995) predict T-7 formations to be prime locations for base camp habitations. Materials in the upper 20 cm could date from the present to the Dalton period, while Paleoindian deposits could be present below 20 cm below surface. Site 23PU742 appears to represent one such base camp habitation site and may be related to the more specialized site types present within the Lohraff site complex located to the north. Several sites previously located to the east (Adams 1997), such as 23PU691 and 23PU692, may also be associated with this site. With a potential to yield large quantities of material, potentially from intact deposits, and potential association with subsidiary, specialized sites, 23PU742 has the potential to yield significant information. As such, it is potentially eligible for listing in the NRHP, and Phase II evaluation is recommended. Phase II testing should concentrate on determining the integrity of deposits, their potential to contain features, and the nature and period of occupation at this site. As such, excavations could be used to test the temporal and cultural component of the Albertson et al. (1995) model discussed above.

Table 7. Depth, Soil Horizon, and Number of Artifacts Recovered from 23PU742.

Level	*Soil Horizon*	*Number of Artifacts*
Surface		18
0–10 cm	Ap	98
10–20 cm	Ap/BA	84
20–30 cm	BA/Bt1	36
30–40 cm	Bt1	14
40–50 cm	Bt1	4

Site Number: 23PU743 (97–93: AOS 46)
USGS Quadrangle: Bloodland 7.5'
Elevation: 293 m asl
Site Type: Lithic Debris Scatter
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Potentially Eligible

This site is a moderate density lithic scatter situated on a T-5 terrace in the Roubidoux Creek floodplain within the north survey tract (Figure 44). The terrace is bordered to the west by a small T-6 terrace and the bluff slope of an upland ridge. To the north and east is a slough and the channel of Roubidoux Creek. The terrace continues to the south but is outside of the survey tract. An overgrown military road bisects the terrace, which is covered by a second-growth floodplain forest with a moderate to dense under story. Twenty subsurface tests, including three auger tests, were positive. The distribution of these positive tests encompasses almost the entire terrace formation. Maximal site dimensions are 120 m north-south by 140 m east-west. This site may represent an extension of 23PU370, located to the south, that has been recommended as eligible for listing in the NRHP (Ahler, Kreisa, McDowell, and McGowan 1995).

A total of 112 artifacts were recovered from 23PU743. Many of these were found in the initial 20 cm below surface (Ap horizon), although a second concentration at 40 cm to 50 cm appears to be present (Table 8). Artifacts were found as deep as 90 cm below surface. The artifacts recovered include 59 broken, 21 tertiary, 18 bifacial thinning, and 3 secondary flakes, 8 pieces of block shatter, 1 of which was utilized, 1 fire-cracked rock, and 2 thin biface fragments. One broken flake was lost during fieldwork. Albertson et al. (1995) suggest that the upper 20 cm of T-5 terrace formations date from the Late Archaic period to present, while below 20 cm material should date from the Middle and Early Archaic periods. This site has intact, moderately dense, and deep deposits, and as such, is potentially eligible for listing in the NRHP. Phase II evaluation should concentrate on determining the integrity of deposits, their potential to contain features, and the nature of the occupation at this site. Such excavations could be used to test the temporal component of the Albertson et al. (1995) model.

Site Number: 23PU744 (97–93: Lohraff Cave)
USGS Quadrangle: Bloodland 7.5'
Elevation: 290 m asl
Site Type: Cave
Soil Type: Gepp, Barkley, Clarksville very cherty silt loams, 14-35 percent slopes
Component(s): Late Woodland
Recommendation: Potentially Eligible

This is a cave site located near the top of the bluff at the southwest end of a large upland ridge in the central portion of the survey tract (Figure 45). The cave overlooks the floodplain of Roubidoux Creek to the south, with a channel of the creek approximately 100 m to the west. The cave is on the south side of the bluff face and has two entrances and two irregularly shaped chambers. Within the confines of the dripline, the shelter measures approximately 17-x-22 m at maximum, and covers an area of approximately 135 m^2. It has a roof height of 3 to 8 m in the western chamber, with passages as low as 1 m. The eastern chamber has a roof height of 2.5 m. Two looter's pits were noted along the western wall of the west chamber with a backdirt pile separating the two looter's pits. Inspection of the pits suggested that intact deposits are present in the cave.

While none were collected at Lohraff Cave, numerous artifacts were observed on the cave floor. Observed were more than twenty flakes, ten pieces

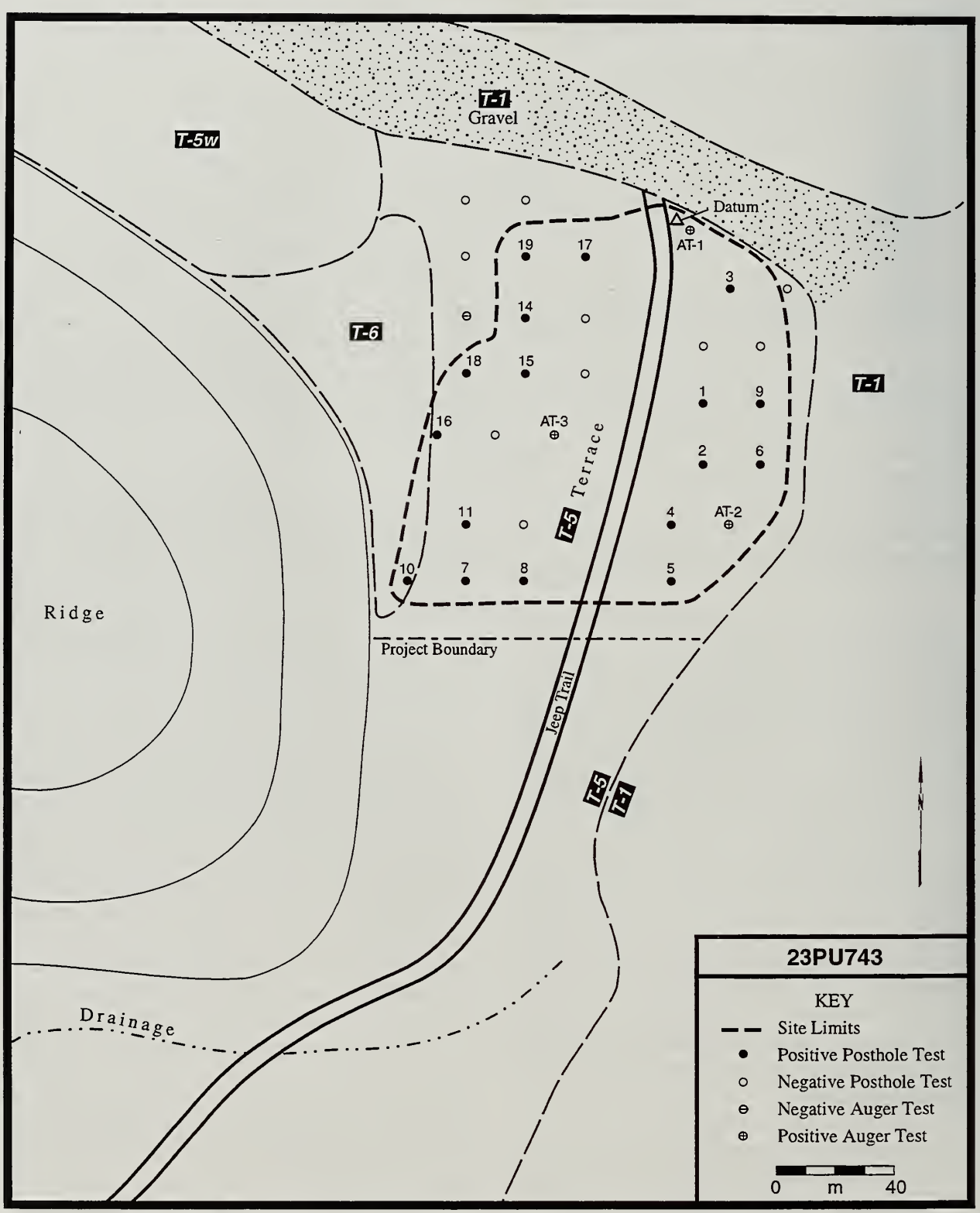

Figure 44. Sketch Map of 23PU743.

Table 8. Depth, Soil Horizon, and Number of Artifacts Recovered from 23PU743.

Level	*Soil Horizon*	*Number of Artifacts*
0–10 cm	Ap	26
10–20 cm	Ap	25
20–30 cm	Bw1	17
30–40 cm	Bw1	12
40–50 cm	Bw1	16
50–60 cm	Bw1	6
60–70 cm	Bw1	4
70–80 cm	Bw2	3
80–90 cm	Bw2	3

of block shatter, two mussel shells, two pottery sherds, one ground-stone metate, a large portion of a Maramec Plain jar rim (dating to the Late Woodland period), a core, and a nondiagnostic biface. This site is part of a potentially significant cluster of open-air, closed, cairn, and petroglyph sites on the same upland ridge. In addition, intact deposits appear to be present at Lohraff Cave. Given the proximity of 23PU744 to other potentially significant sites within a site complex, and the likelihood of intact Late Woodland period deposits, this site is recommended to be potentially eligible for listing in the NRHP. Phase II evaluation should be designed to determine the period and nature of occupation at this site. Finally, its relationship to the nearby sites discussed above should be explored.

Site Number: 23PU745 (97–93: AOS 35)
USGS Quadrangle: Bloodland 7.5'
Elevation: 320 m asl
Site Type: Lithic Debris Scatter
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Late Archaic, Late Woodland
Recommendation: Potentially Eligible

This site is a fairly dense lithic scatter located on the crest of a large upland ridge in the central portion of the Roubidoux Creek Tract (Figure 46). The site overlooks the floodplain of Roubidoux Creek both to the north and south, with the creek channel 350 m to the north and 600 m to the south. The site is bounded to the north, south, and west by steep slopes and to the east by a ravine and drainage. To the east of the ravine and drainage is 23PU725, while a cairn (23PU735), a petroglyph site (23PU721), and rockshelters (23PU719 and 23PU739) and a cave site (23PU744) are present to the south and southwest on the same upland ridge and its bluff slopes. The ridge is covered by a second-growth mixed deciduous forest with a moderate under story, with planted pines to the east. A military road crosses the ridge along its southern edge. This site is defined by the spatial extent of 109 positive subsurface tests and artifacts found along the surface of the military road. Maximal dimensions of 23PU745 are maximally 200 m north-south by 490 m east-west.

A total of 800 artifacts was recovered from the 112 positive subsurface tests and surface collections. Most of this material consists of late-stage reduction debris, including 123 tertiary flakes and 88 bifacial thinning flakes. Early-stage reduction debris are less common and include 2 cores, 1 primary flake, 19 secondary flakes (one of which is utilized), and 136 pieces of block shatter. An additional 413 broken flakes were recovered, as was a single blade. The 17 other artifacts include four projectile points, discussed in greater detail below, six thin biface fragments, many of which are probably from projectile points, two rough bifaces, two thick bifaces two unifaces consisting of an expedient ovate end and side scraper and a perforator or drill with a spokeshave, and a single piece of fire-cracked rock.

The four projectile points recovered include two Late Archaic and two Late Woodland period points (Figure 32, c-f). The two Late Archaic period points both appear to be Etley Cluster specimens (Figure 32, c-d). The specimen from the surface is a basal fragment in poor condition and is similar in form with the CN4 type illustrated by Reeder (1988), while in the Curry et al. (1985:143) classification it appears to be similar to Class 36, subclass 36.5, which is associated with the Etley and Stone Square Stem types. The second, a base from Posthole 49, 0–10 cm below surface, is also similar in form with the CN4 type illustrated by Reeder (1988) and sev-

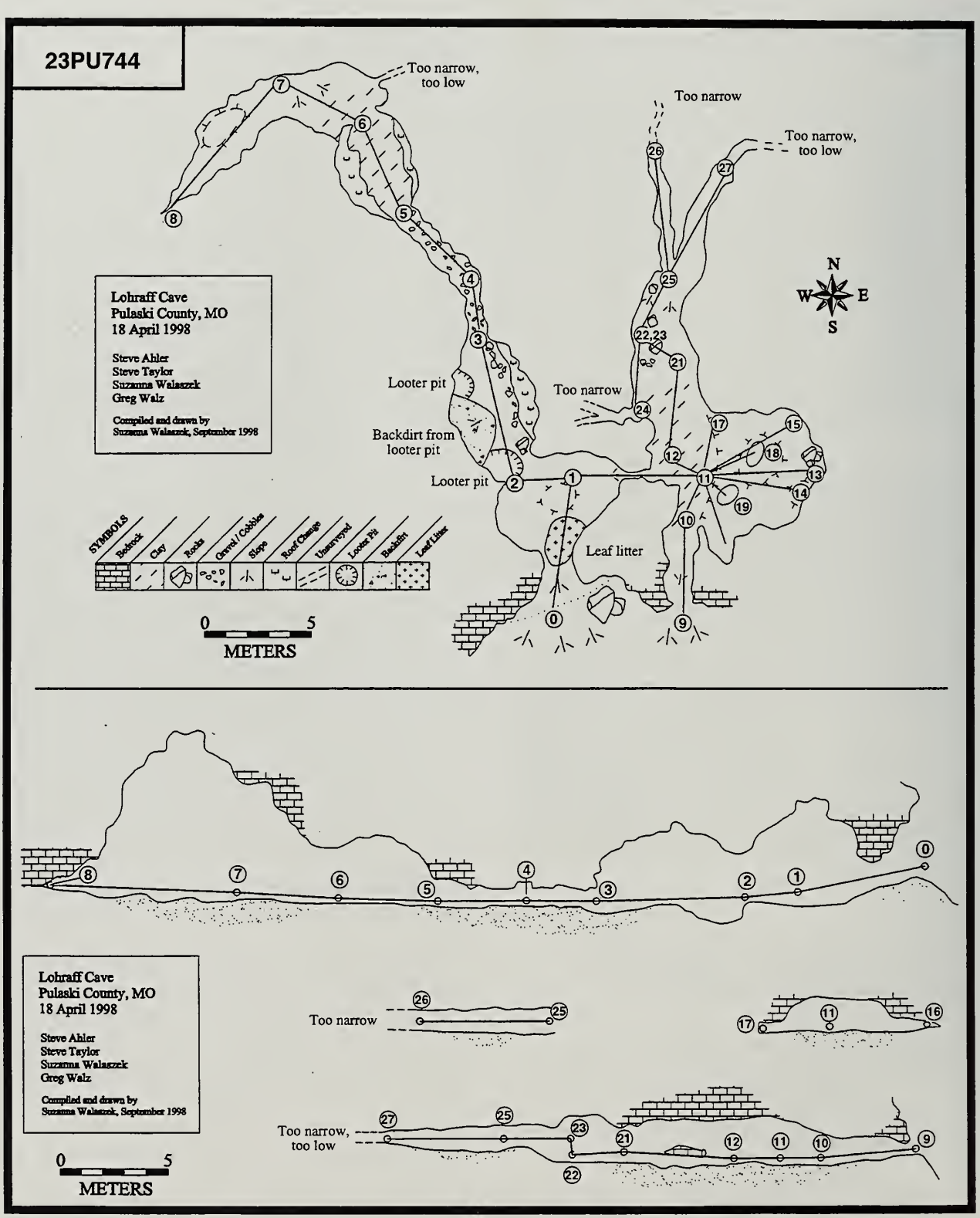

Figure 45. Sketch Map of 23PU744 (after Walaszek).

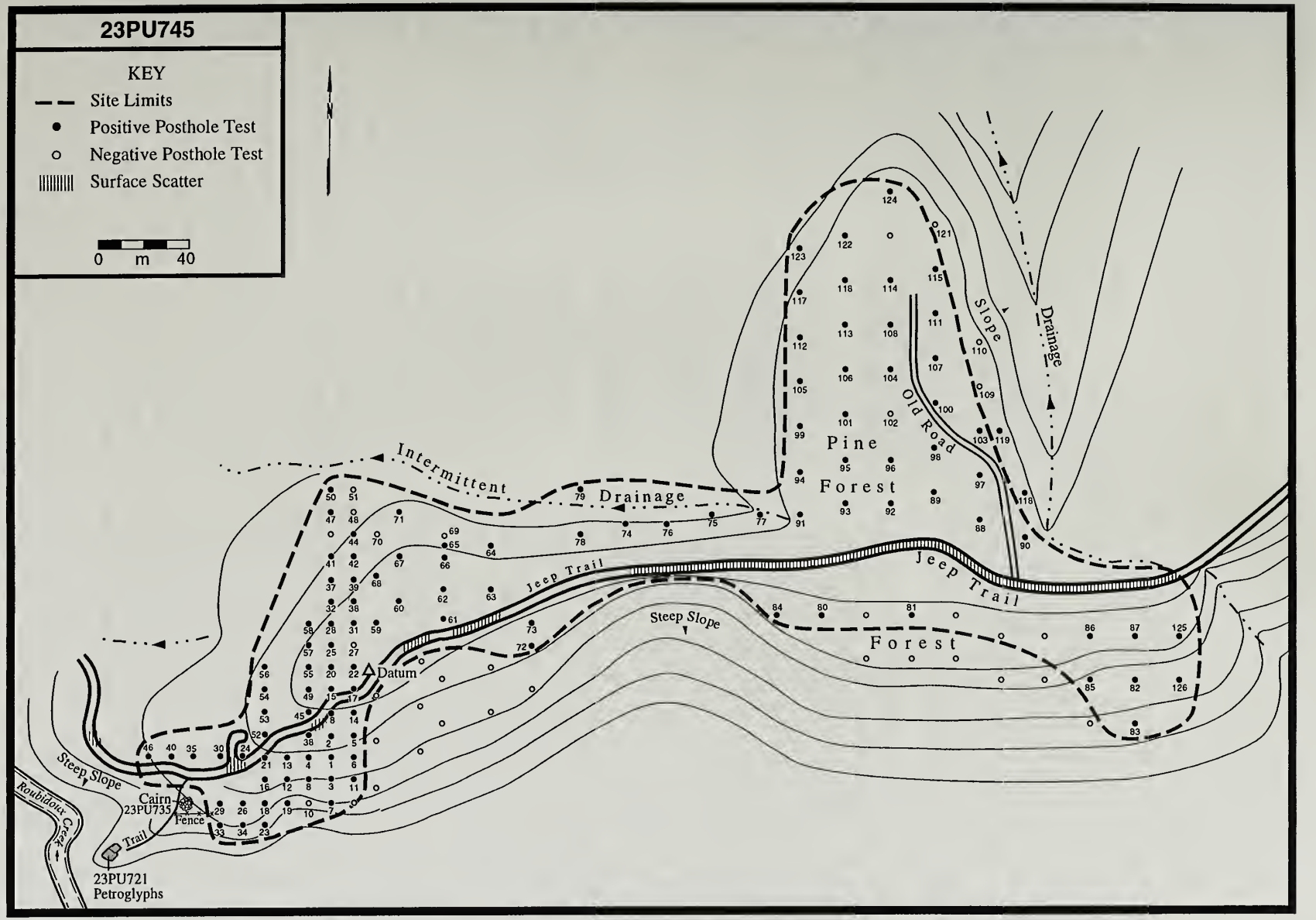

Figure 46. Sketch Map of 23PU745.

eral illustrations in O'Brien and Wood (1998: 145–146). One of the Late Woodland points (Figure 32, e), a partial base from Posthole 24, 0–10 cm, is similar to Scallorn Cluster bases (Justice 1987). The other, a complete point from Posthole 30, 10–20 cm (Figure 32, f), is most similar to the CN7 type illustrated in Reeder (1988) and MacMillan (1965). Reeder (1988:343) refers to this type as King's Corner Notched. In Curry et al. (1985:137) this point is similar to subclass 30.2 with a suggested temporal affiliation of Middle Woodland to early Late Woodland. While O'Brien and Wood (1998:234) indicate that King's Corner Notched is poorly dated, they lean toward a Late Woodland affiliation.

Just over 64 percent of the material was recovered from the surface or the initial 10 cm below surface (Table 9). Included in this total are the two Late Archaic period projectile points and one of the Late Woodland points recovered. These materials are, aside from the surface collected artifacts, from both A and E horizons. Thirty-five percent of the artifacts were recovered from E horizon deposits, between 10 cm and 30 cm below surface (Table 9). Included in this total is a single Late Woodland period projectile point. Finally, five artifacts, from a single subsurface test (# 60), were recovered in the B/E horizon between 30 cm and 40 cm below surface. Clearly, this site contains a large number of artifacts and perhaps can be characterized as a fairly dense concentration. The subsurface tests suggest the presence of intact, artifact-bearing, E horizon deposits with a significant amount of cultural material. Unfortunately, the stratigraphic positioning of the projectile points may indicate that Late Woodland and Late Archaic deposits are poorly separated at this site, most likely due to a lack of soil deposition between occupations. Nevertheless, this site is part of a potentially significant cluster of open-air, closed, cairn, and petroglyph sites located on the same upland ridge. Given the proximity of 23PU745 to other potentially significant sites within this site complex and the likelihood of intact deposits, it is recommended as potentially eligible for the NRHP. Phase II evaluation should be designed to determine the period and nature of occupation at this site, as well as the integrity and vertical separation of deposits. Finally, its relationship to the nearby sites discussed above should be explored.

Table 9. Depth, Soil Horizon, and Number of Artifacts Recovered from 23PU745.

Level	*Soil Horizon*	*Number of Artifacts*
Surface		137
0–10 cm	A and E	375
10–20 cm	E	251
20–30 cm	E	29
30–40 cm	B/E	5

Note: Depth provenience is not available for three artifacts.

Site Number: 97–93; AOS 18
USGS Quadrangle: Bloodland 7.5'
Elevation: 335 m asl
Site Type: Isolated Find
Soil Type: Doniphan very cherty silt loam, 3–9 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located on the eastern edge of an upland ridge within the south parcel of the Roubidoux Creek Tract (Figure 47). Isolate 97–93; AOS 18 is located 150 m east of 23PU724. Immediately east of the isolate the bluff begins a steep descent to the Roubidoux Creek floodplain, with the main channel located 350 m to the east. The area is covered by a mixed oak-hickory forest with a light under story. A military road that curves to the south is 5 m north and 5 m east of the isolate. The isolate consists of one broken flake found in a subsurface test at 10 cm below surface. Bracketing subsurface tests were negative, and no material was found on the surface of the nearby military road. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered and the absence of intact deposits at this locale. No additional investigations are recommended.

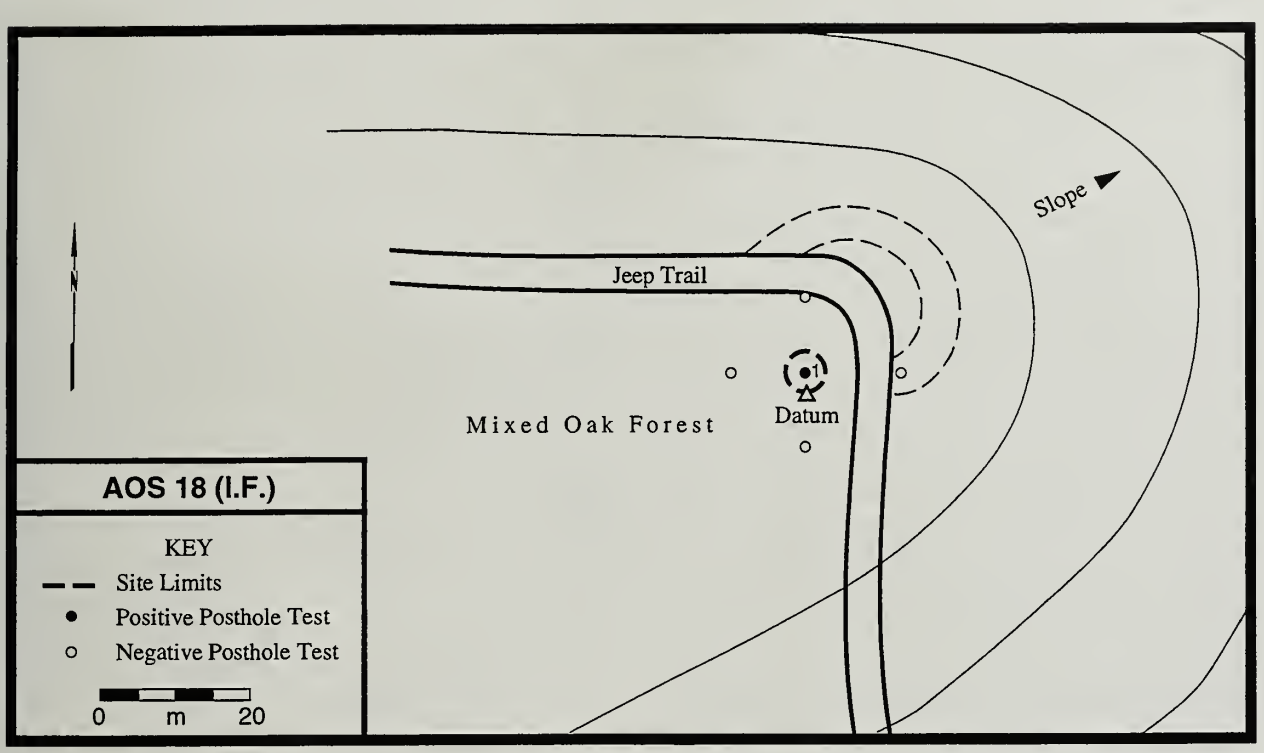

Figure 47. Sketch Map of 97–93; AOS 18.

Site Number: 97–93; AOS 27
USGS Quadrangle: Bloodland 7.5'
Elevation: 287 m asl
Site Type: Isolated Find
Soil Type: Kickapoo fine sandy loam, 0–3 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located on a T-3 terrace within the central parcel of the Roubidoux Creek Tract (Figure 31). The bluff face is approximately 100 m to the north while a drainage (slough channel) of Roubidoux Creek runs at the base of the bluff. The main channel of Roubidoux Creek is 500 m south of this isolate and an intermittent drainage is to the east. Isolate 97–93; AOS 27 is located 30 m east of23PU731. The area is covered by a second-growth floodplain forest with a dense under story. The isolate, consisting of two broken flakes, was found in two adjacent subsurface tests to 50 cm below surface. Bracketing subsurface tests were negative as were adjacent deep auger tests. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered at this locale. No additional investigations are recommended.

Site Number: 97–93; AOS 30
USGS Quadrangle: Bloodland 7.5'
Elevation: 280 m asl
Site Type: Isolated Find
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located on a T-4 terrace within the northern parcel of the survey tract (Figure 48). The bluff face and a military road are approximately 75 m to the south while intermittent drainages define this terrace to the north, east, and west. Roubidoux Creek is 200 m to the north. The area is covered by an open floodplain forest with a moderate under story. The isolate, consisting of one tertiary

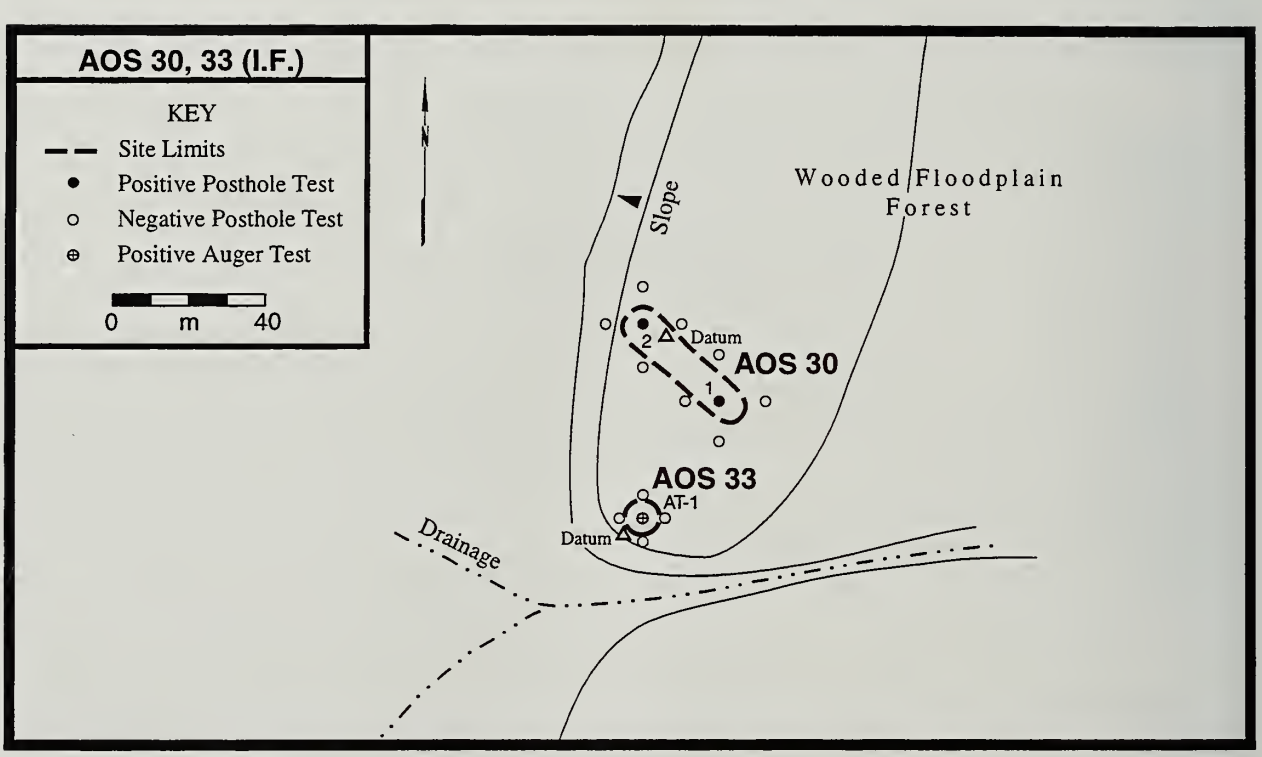

Figure 48. Sketch Map of 97–93; AOS 30 and 97–93; AOS 33.

flake and one piece of block shatter, was found to 30 cm below surface in two subsurface tests. Bracketing subsurface tests were negative. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered at this locale. No additional investigations are recommended.

Site Number: 97–93; AOS 33
USGS Quadrangle: Bloodland 7.5'
Elevation: 280 m asl
Site Type: Isolated Find
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find, located on the same T-4 terrace as isolate 97–93; AOS 30, is within the northern parcel of the Roubidoux Creek Tract (Figure 48). The bluff face and a military road are approximately 75 m to the south while intermittent drainages define this terrace to the north, east, and west. Roubidoux Creek is 200 m to the north. The area is covered by an open floodplain forest with a moderate under story. The isolate, located 30 m southwest of isolate 97–93; AOS 30, consists of a single tertiary flake found at 115–125 cm below surface during the excavation of an auger test. Bracketing subsurface tests were negative. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered at this locale. No additional investigations are recommended.

Site Number: 97–93; AOS 38
USGS Quadrangle: Bloodland 7.5'
Elevation: 268 m asl
Site Type: Isolated Find
Soil Type: Nolin silt loam
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located on a T-5 terrace within the central parcel of the Roubidoux Creek Tract (Figure 38). The bluff face is approximately 100 m to the south while a drainage (slough channel)

of Roubidoux Creek is 70 m to the south. The main channel of Roubidoux Creek is 150 m north of this isolate. Isolate 97–93; AOS 38 is located 60 m west of 23PU737. The area is covered by a second-growth floodplain forest with a dense under story. The isolate, consisting of two broken flakes, was found in two adjacent subsurface tests to 40 cm below surface. Bracketing subsurface tests were negative as were adjacent deep auger tests. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered at this locale. No additional investigations are recommended.

Site Number: 97–93; AOS 42
USGS Quadrangle: Bloodland 7.5'
Elevation: 302 m asl
Site Type: Isolated Find
Soil Type: Clarksville-Gepp very cherty silt loams, 14–35 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located on an upland remnant in the Roubidoux Creek floodplain in the central parcel of the survey tract (Figure 49). The eastern survey tract boundary, coinciding with a gravel road, is approximately 100 m to the east while Roubidoux Creek is 300 m to the south. The formation is defined by intermittent drainages to the north and south that intersect to the west at the base of the formation. This landform also forms a quite noticeable elevation rise. This isolate is 60 m southwest of 23PU613, a low density lithic site reported by Ahler and Albertson (1996). The area is covered by a floodplain forest with a dense under story. The isolate, a single rough biface tip fragment, was found at 0–10 cm below surface in a subsurface test. Bracketing tests were negative. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered at this locale. No additional investigations are recommended.

Site Number: 97–93; AOS 43
USGS Quadrangle: Bloodland 7.5'
Elevation: 268 m asl
Site Type: Isolated Find
Soil Type: Kickapoo fine sandy loam, 0–3 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located on an alluvial fan in the central parcel of the Roubidoux Creek Tract (Figure 50). The bluff face is approximately 35 m to the south while a drainage (slough channel) of Roubidoux Creek is 10 m to the north. The alluvial fan is defined by the drainage to the north and east, T-4 and T-7 terraces to the west, and a steep upland slope to the south. A military road is to the west. The area is covered by an open floodplain forest with a moderate under story. The isolate, a single bifacial thinning flake, was found at 30–40 cm below surface in a subsurface test. Bracketing subsurface tests were negative. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered at this locale. No additional investigations are recommended.

Site Number: 97–93; AOS 47
USGS Quadrangle: Bloodland 7.5'
Elevation: 283 m asl
Site Type: Isolated Find
Soil Type: Kickapoo fine sandy loam, 0–3 percent slopes
Component(s): Unknown Prehistoric
Recommendation: Not Eligible

This isolated find was located on a T-3 terrace within the central parcel of the Roubidoux Creek Tract (Figure 51). The bluff face is approximately 40 m to the north while one branch of Roubidoux Creek is 150 m to the west. The terrace formation is defined by intermittent drainages to the north, east, and west, and forms a quite noticeable elevation rise. The area is covered by an open floodplain forest with a moderate under story of stinging nettle. The isolate, a single tertiary flake, was found between 40 cm and 50 cm below surface during the excavation of an auger test. Bracketing subsurface tests were negative. This isolate is recommended as ineligible for the NRHP based on the limited number of artifacts recovered at this locale. No additional investigations are recommended.

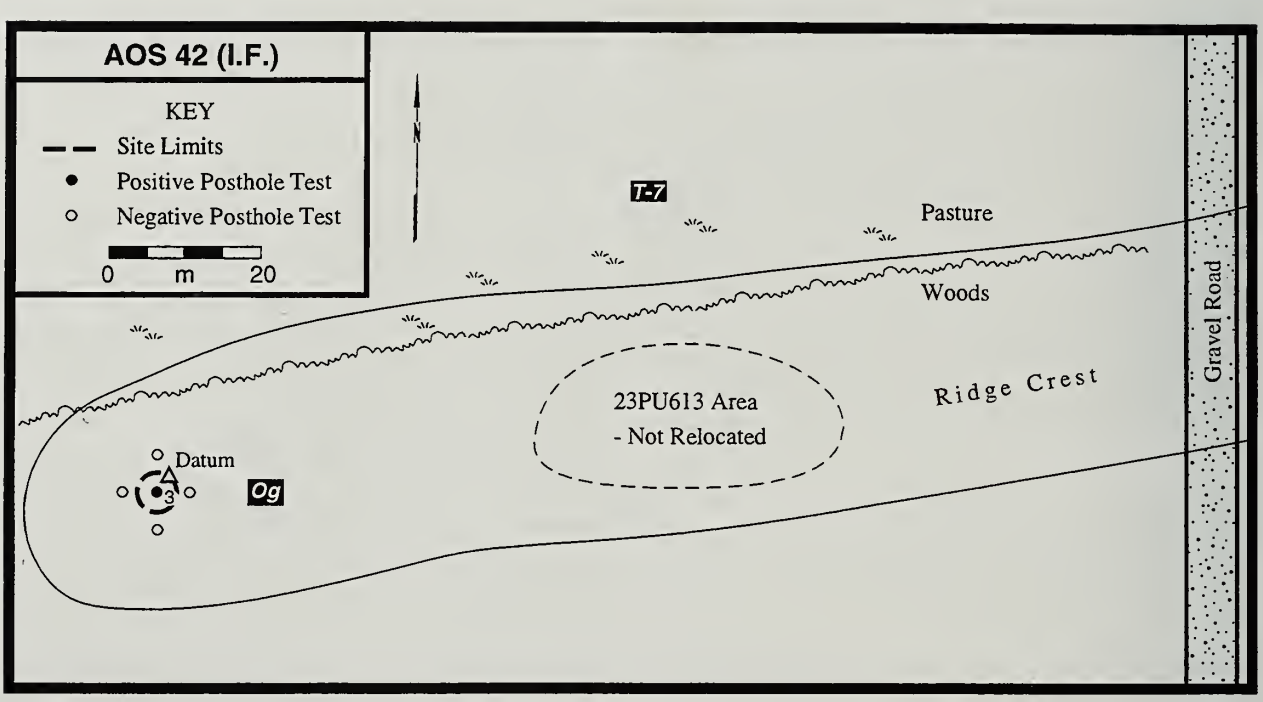

Figure 49. Sketch Map of 97-93; AOS 42.

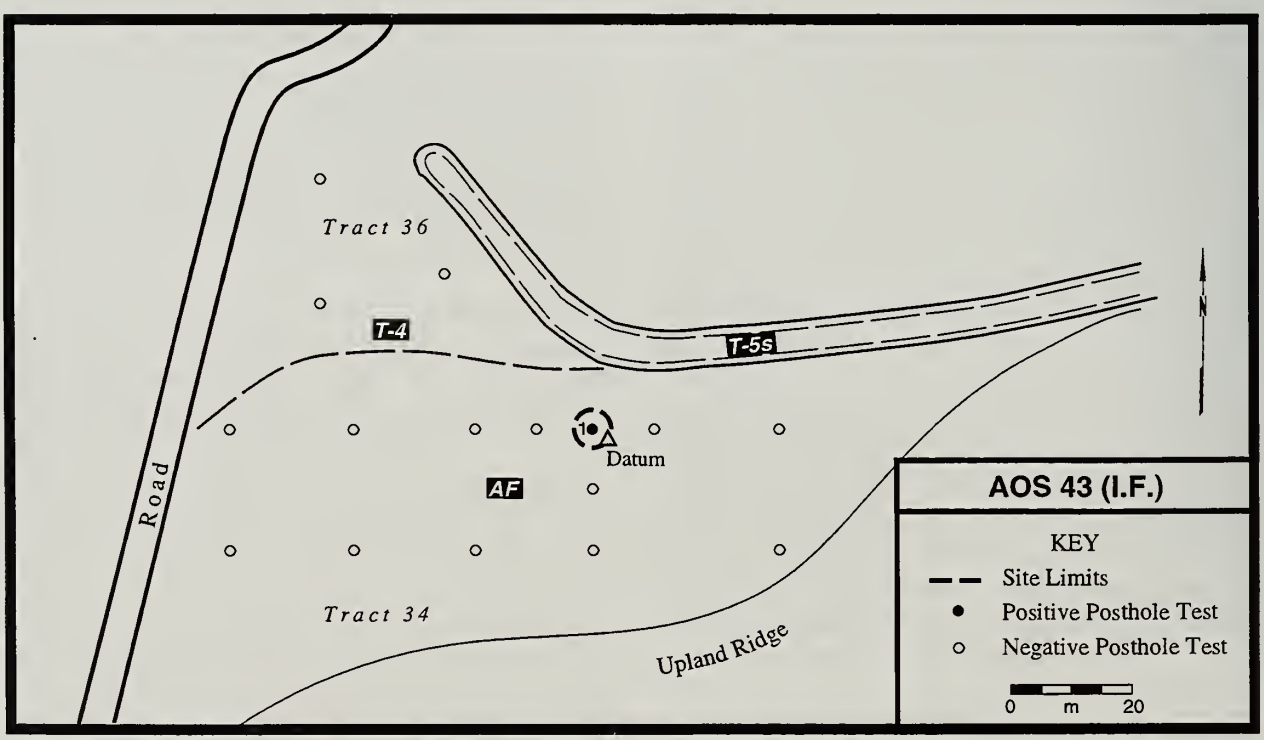

Figure 50. Sketch Map of 97-93; AOS 43.

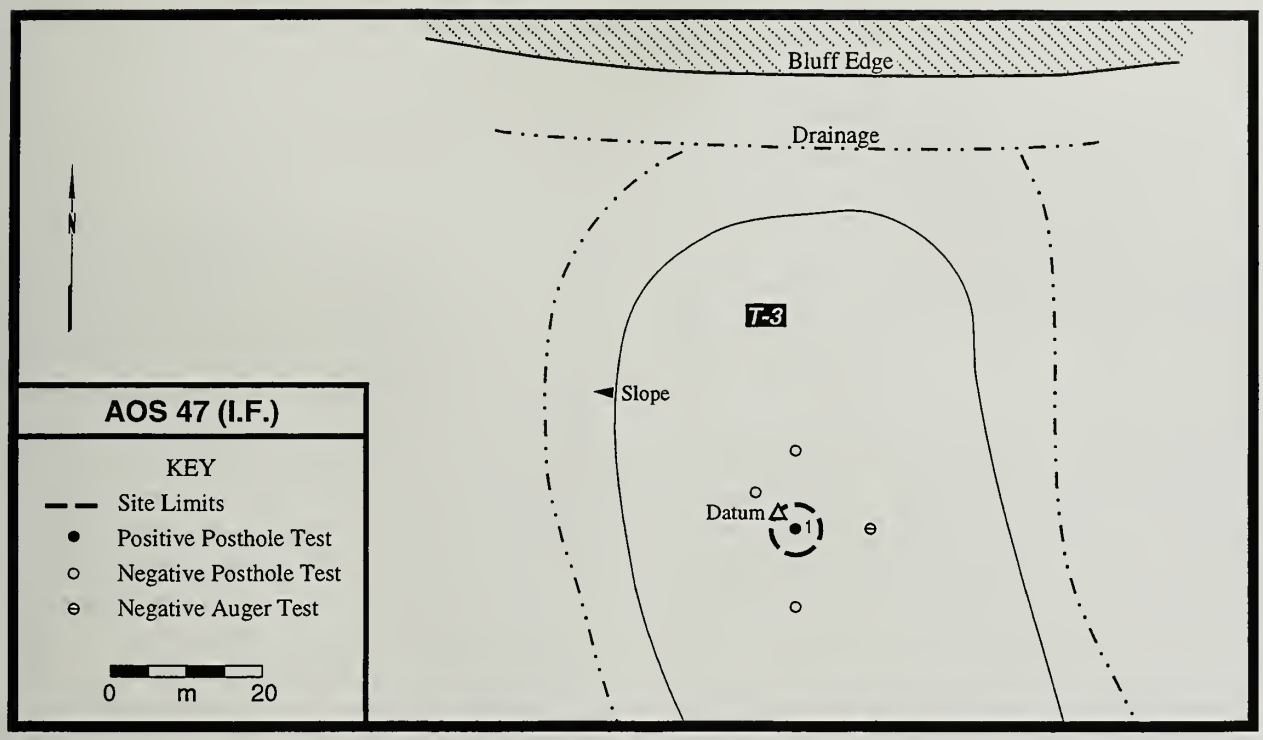

Figure 51. Sketch Map of 97-93; AOS 47.

CHAPTER 7.
DISCUSSION OF RESULTS

Phase I archaeological investigations conducted at Fort Leonard Wood Military Reservation were designed to comply with federal cultural resource regulations and to acquire data to enable basic research on the prehistory and history of the area. These two goals, while combined during the fieldwork stage of the project, differ in the uses of collected data. The compliance objective was met, and the relevant data are presented in Chapter 6 and Appendix C. Management summary and recommendations are provided in Chapter 8. This chapter examines the same data from a research perspective. Initially it must be recognized that the locations examined were based on Fort Leonard Wood management needs, and are, therefore, not necessarily locations representative of specific cultural resource zones. Recognizing the limitations of the data, however, it is still possible to address a number of topics with the data collected from this and previous projects. First, an overview of the results of the current survey is presented. Then, three topics are discussed in greater detail: settlement patterns, cultural chronology, and predictive model assessment. The discussion presented here draws from all 43 identified sites and isolated finds discussed in the previous chapter.

Overview of Results

Big Piney Tract

The Big Piney Tract, which occupies an area of 857 acres, is situated in the Interior Uplands cultural resource zone. A total of seven newly identified sites, isolates, and previously recorded sites was located in this tract. Six of the sites are located on upland ridges, while one site is located on the floodplain of McCourtney Hollow. The survey results yield an average of 0.8 sites per 100 acres, which is similar to previous surveys in the Interior Uplands (Kreisa, McDowell, et al. 1996). Most surveys in the Interior Uplands have averaged 1 site or fewer per 100 acres surveyed. One exception to this pattern is the survey of the EQR Tract reported by Ahler and McDowell (1993). This density is somewhat misleading as 75 percent of the locations reported from the EQR were isolates. As noted in Kreisa, McDowell, et al. (1996), lower site identification rates are often associated with tracts containing large portions of uplands.

Survey of the Big Piney Tract resulted in the identification of five previously reported historic sites and two newly identified prehistoric isolates. Average site size for the isolates is less than 1 m^2, while the historic sites average 10,940 m^2. The two prehistoric isolates average 70 m from unnamed intermittent streams while the historic sites average 430 m from unnamed intermittent streams or the McCourtney Hollow stream. The prehistoric sites had an average of one artifact from one artifact class per site. The averages for historic sites are not presented here due to differences in collection techniques between prehistoric and historic sites.

West Cantonment Tract

This tract is located within the Lower Roubidoux cultural resource zone in the northwest part of the base. The West Cantonment Tract consists of 2,076 acres east of Roubidoux Creek. Seven of the sites are located on upland ridges while one site is on an intermittent stream terrace. The survey resulted in the location of eight new and previously recorded sites and isolates, for an average of 0.4 sites per 100 acres. This is less than the averages obtained during two Joint Use Tract surveys previously completed in the Lower Roubidoux cultural resource zone (Kreisa, McDowell, et al. 1996; McGowan et al. 1996). It is more similar to the Lead Mine Tract (McGowan 1996), although no sites were identified during that survey. Average prehistoric site size in the West Cantonment Tract is 716 m^2, while average size for historic sites is 2,875 m^2.

The sites and isolates in the West Cantonment Tract consist of three open-air prehistoric sites, three historic sites, and two prehistoric isolated finds. Prehistoric sites located in this tract average 232 m from intermittent streams, while the average for historic sites is 507 m^2 to Ballard Hollow or an unnamed intermittent stream. The average number of artifacts per prehistoric site is 3.2 with 1.8 artifact classes. Two previous surveys of Joint Use Tracts in the Lower Roubidoux cultural resource zone (Kreisa, McDowell, et al. 1996; McGowan et al. 1996) yielded averages over 15 artifacts per site, while a third survey of the Lead Mine Tract (McGowan 1996) failed to identify any sites, or even isolated artifacts. Clearly, the West Cantonment Tract is more similar to the Lead Mine Tract than it is to the two Joint Use Tracts. The differences in site and artifact density appear to be due to the presence of floodplain terraces of Roubidoux Creek within the Joint Use Tracts, while the Lead Mine and West Cantonment Tracts are comprised almost entirely of upland ridges.

Roubidoux Creek Tract

This tract is within the Upper Roubidoux cultural resource zone within the southwest corner of the base and is both east and west of Roubidoux Creek. The survey tract consisted of 578 acres. The survey resulted in the identification of 28 newly identified sites, isolates, and previously recorded sites, or an average of 4.8 sites per 100 acres. Aside from the McCann Cemetery Tract (Kreisa, McDowell, et al. 1996), this represents the greatest density of sites located during surveys of Upper Roubidoux cultural resource zone tracts. This disparity may be due to a number of causes. For one, survey tracts such as the South Roubidoux (Adams 1997), Cookeville (Adams 1997), North/South Roubidoux (Ahler and McDowell 1993), and Southern Joint Use (McGowan et al. 1996) tended to have limited floodplain/terrace acreage. The floodplain acreage present in these surveys also tended to represent terrace formations that were spatially limited. Aside from this, the current survey implements a more rigorous floodplain/terrace testing program that investigated larger formations. McCann Cemetery (Kreisa, McDowell, et al. 1996) also had limited floodplain formations but did include a large upland ridge overlooking Roubidoux Creek. A complex consisting of a large number of sites was present on this ridge, accounting for the high density of sites located in the tract.

The newly identified sites consist of 19 prehistoric sites, 1 previously identified historic site, and 8 prehistoric isolates. Both sites and isolates tend to be closer to intermittent drainages or sloughs than to Roubidoux Creek, with mean distances of 114 m and 168 m, respectively. The historic site is located 80 m from an intermittent stream. Average site size is 10,281 m^2 and average 57 artifacts per site. The mean number of artifact categories is four per site. These figures are somewhat skewed by three large sites located in this tact. The average number of artifacts per site is also greater than that documented for any of the other Upper Roubidoux cultural resource zone tract surveyed to date, and the distance to water is closer than any of the other Upper Roubidoux cultural resource zone tract surveyed to date as well. This appears to be partially a function of the location of the tracts themselves as well as idiosyncratic characteristics of the sites.

Summary

The sites located within the Big Piney, West Cantonment, and Roubidoux Creek Tracts reinforce a number of patterns previously noted at Fort Leonard Wood. While varying in details, these patterns are most probably associated with adaptation to specific physiographic characteristics of the survey tracts. Prehistoric sites are located near water sources, averaging less than 250 m in all tracts. For most sites, the closest water is an intermittent stream, hollow creek, or floodplain slough. For historic sites, aside from 23PU510 in the Roubidoux Creek tract, average distance to water is over 400 m and suggests the use of wells as the main water source. Isolated finds tend to be closer to intermittent drainages, except for those found in the south portion of the Roubidoux Creek Tract. The tendency for isolates to occur away from major streams reflects an expedient use of such locations including the potential that their use or occupation does not depend on access to water. In contrast, sites which can probably be inter-

preted as base camps or seasonal resource-specific field camps would have required access to water due to longer spans of occupation by larger groups. Sites also are clustered on upland ridges, ridge crests, and terrace remnants. Evidently, this locational preference appears due in part to ease of access to a number of different resource zones, including the floodplain and uplands, as well as minimizing the impact of flooding.

Settlement Patterns

In Chapter 4, relevant research issues regarding settlement patterns were discussed. The research design and previous investigations have tended to concentrate on the analysis of a number of measurable site attributes, including distance to water, site size, artifact density, and artifact diversity, all of which are used to propose an inferred site function or site type.

The basic tenet behind this line of analysis, typically conceived as an operationalization of Binford's (1980) hunter-gatherer site types, is that larger sites, with dense artifact concentrations and located close to water are base camps, while smaller sites, with fewer artifacts and often located away from water, are field camps (Ahler and McDowell 1993; Moffat et al. 1989; Niquette 1984, 1985; Niquette et al. 1983). Research also has indicated that survey tracts close to water tend to have dense concentrations of sites containing multiple site types (McGowan 1996:86; see also Adams 1997; Kreisa, McDowell, et al. 1996). These concentrations have been termed neighborhoods (Ahler and McDowell 1993) and more recently site complexes (Ahler et al. 1996, 1997). In contrast, site density and the number of different site types present decreases away from water, especially in the Interior Uplands, most probably due to more infrequent, although perhaps specialized, use of upland resources (Ahler and McDowell 1993; Kreisa, McDowell, et al. 1996; McGowan 1996). It has also been noted that these trends may have changed through time (Ahler and McDowell 1993).

The analysis presented here examines the proposed relationships discussed above using data collected from the newly identified sites and isolated finds located within the three survey tracts investigated during the current project. Data from previously reported sites are not included, given potential differences in site recordation, artifact recovery, and artifact analysis between investigators. For the newly identified sites and isolates, data on site size, landform location, proximity to water, artifact density (i.e., number of artifacts recovered) and artifact diversity were collected. The data then were compared across the three resource zones investigated. Historic sites, prehistoric cairns, and two prehistoric sites are not included in the analysis. These sites are not included due to differences in data collected.

Results of previous surveys at Fort Leonard Wood indicate that sites are most likely to occur within 500 m of major stream valleys (Ahler and Albertson 1996; Ahler and McDowell 1993; Kreisa, McDowell, et al. 1996). This pattern is true of the Roubidoux Creek Tract, where all sites are located either in or within 500 m of the valley. The Big Piney Tract was not located within 500 m of a major stream valley, suggesting that few prehistoric sites should be present. This prediction was confirmed in that only two isolated finds were located in the tract. The West Cantonment Tract, in contrast, did contain a number of sites/isolates located more than 500 m from a major stream valley. In that tract, four of five sites are located more than 500 m from a major stream valley. Two of these four sites are isolates. It should be remembered that the four sites/isolates located more than 500 m from a major stream valley is a small number given the large size of the tract itself, and that relatively little acreage in this tract is located within 500 m of a major stream valley in this survey tract. All but one of the Historic period sites, 23PU510, are located more than 500 m from a major stream valley.

The relationship between site size and distance to water is typically predicted to be an inverse relationship, with larger sites closer to water sources. The rationale for this relationship is that large sites are generally interpreted to represent longer or denser population loci. Recent surveys (e.g., Adams 1997; Kreisa, McDowell, et al. 1996) suggest that the

relationship is somewhat more complex. Both projects cited here have demonstrated that small sites/isolates are located continuously across the landscape regardless of distance to water, while in general, larger sites are closer to water. These trends were reconfirmed by the data generated during the current survey (Figure 52). Smaller sites, generally less than 5,000 m^2 in area, are continuously distributed across the landscape in relationship to water sources. In contrast, larger sites, in this case all 10,000 m^2 or larger, do tend to be closer to water, generally being 200 m or less from a water source. The one exception to this is 23PU725, a medium density lithic scatter located along the crest of a ridge in the central portion of the Roubidoux Creek Tract. This site may have been closer to a now abandoned channel of Roubidoux Creek during the period of its occupation than it is to the current creek channel.

Based on the previous suggested relationship between site size and distance to water, it is also expected that an inverse relationship will exist between distance to water and number of artifacts, and distance to water and number of artifact classes. Once again, this expectation is based on the presumption that large sites represent longer or denser population loci and that these will be located close to permanent water sources. Past surveys (e.g., Adams 1997; Kreisa, McDowell, et al. 1996) have indicated a greater diversity in these relationships than is predicted. For the current survey, there does appear to be an inverse relationship between artifact density, artifact diversity, and distance to water. In general, sites with large numbers of artifacts (100 or more) are close to water, while those with fewer artifacts can be either close to or away from a water source (Figure 52). In addition, while sites with large numbers of artifact classes are close to water, two appear to deviate (Figure 53). These sites, 23PU723 and 23PU725, may once again have been closer to a now abandoned channel of Roubidoux Creek during the period of their occupation than they are to the current creek channel. In contrast, sites with few artifact classes can be either close to or away from a water source.

Finally, the relationship between site size and number of artifact classes was examined. Similar to the previously discussed rationale, large sites are expected to represent longer or denser population loci and hence to be associated with increased numbers of artifact classes due to a greater diversity of tasks undertaken by inhabitants. Adams (1997) found relatively little relationship between these two variables. The current survey suggests a strong inverse relationship between these two variables (Figure 53). Larger sites (5,000 m^2 or more) have the largest number of artifact classes, while smaller sites have five or fewer classes present.

To briefly summarize, general trends in site size and location, and artifact density and diversity are apparent in the three survey tracts. In general, sites are located close to large streams, when present, and the closest sites tend to be larger, both in terms of overall size and artifact density. Artifact diversity also is greater at sites near major streams. Deviations from these trends appear associated with local physiographic conditions, perhaps related to stream channel movement. These patterns appear related to two causes. First, larger sites with high artifact density and diversity can be attributed to longer periods of occupation, larger populations, and greater diversity of activities at these locales. These sites are interpreted to be base camps. Second, a number of smaller sites located near major streams also have increased artifact density and diversity. Such sites may have functioned as field camps. It would appear that field camps were situated near major streams to exploit more, perhaps seasonally, dependable resources than those located away from major streams. Major stream valleys tend to contain a more diverse array and greater quantity of resources. Field camps near major streams would have been more frequently occupied and used to access a greater variety of resources. This would account for sites interpreted as field camps near major streams that have unusually dense concentrations of material and diverse artifact assemblages. Classic examples of such sites at Fort Leonard Wood are rockshelters and caves, which generally have been interpreted as seasonal field camps (Ahler, Kreisa, McDowell, and McGowan 1995; Kreisa 1995; Kreisa, Walz, et al. 1996; see also Brown 1984). While a relatively large amount of data is available about the function of rockshelters and caves, the above data suggest that open-air sites

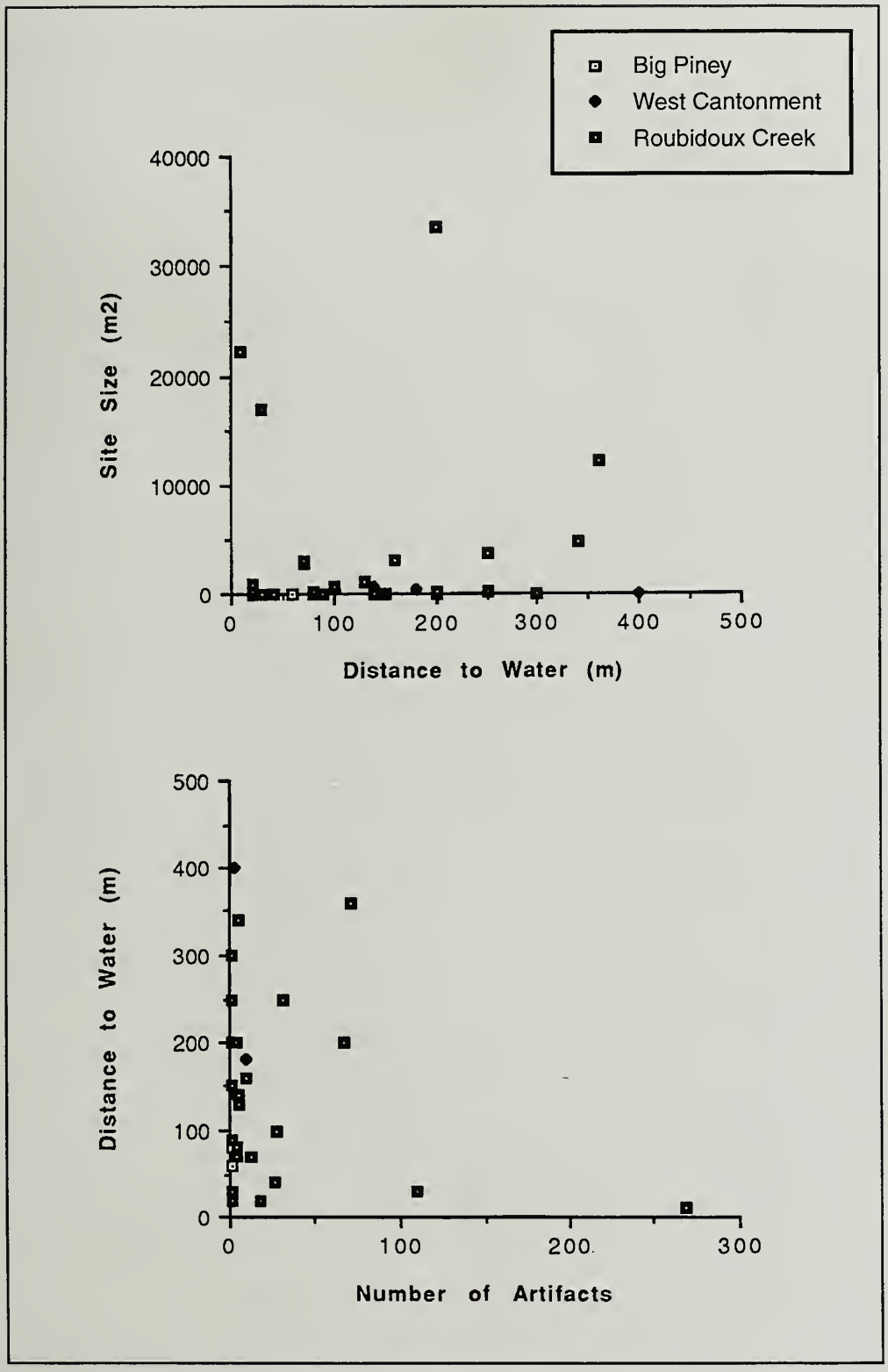

Figure 52. Scatter Plots of Relationship Between Site Size and Number of Artifacts and Distance to Water.

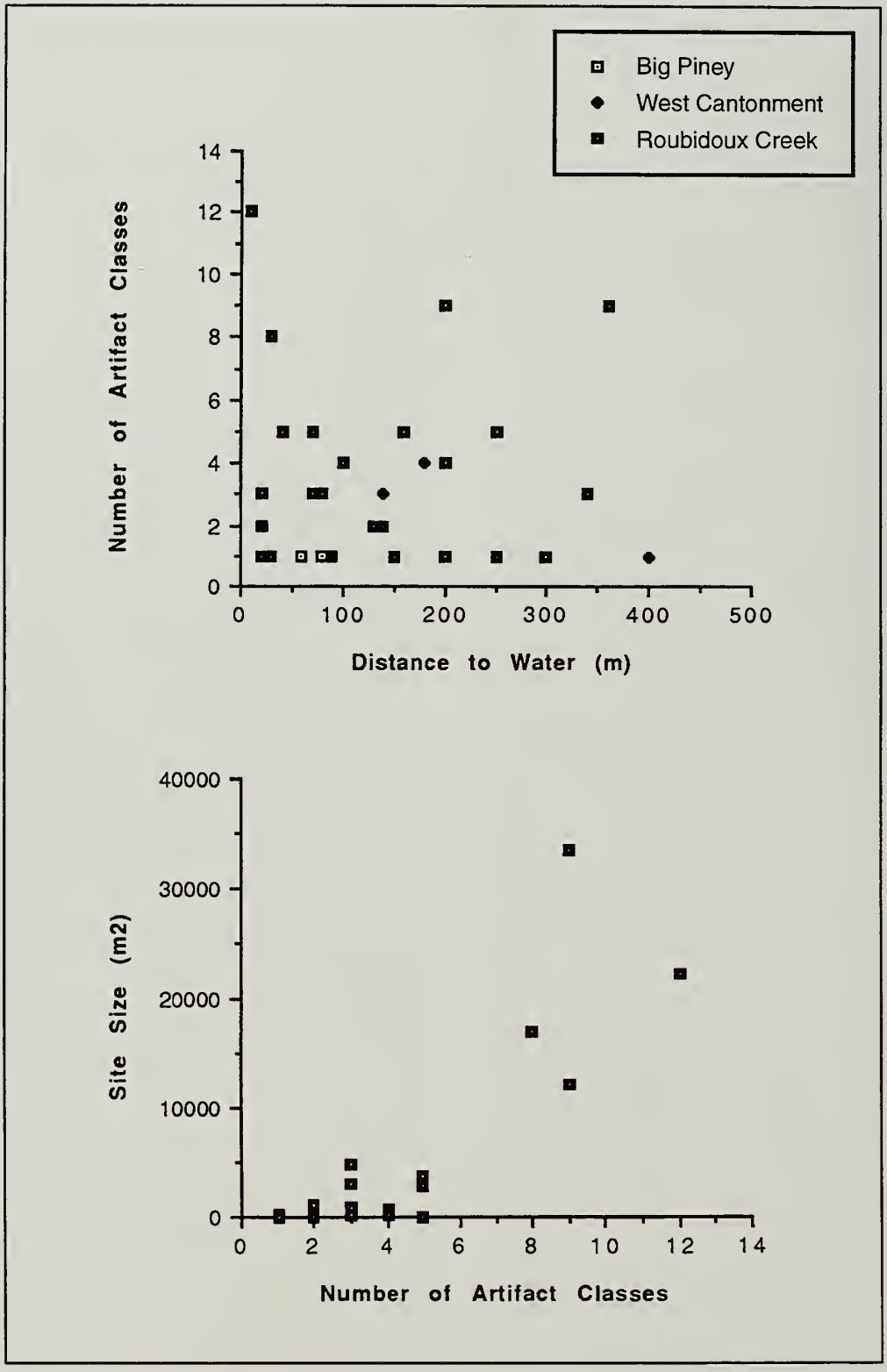

Figure 53. Scatter Plots of Relationship Between Number of Artifact Classes to Distance to Water and Number of Artifact Classes to Site Size.

served similar functions in the Fort Leonard Wood area, perhaps being occupied during different seasons to exploit a separate suite of resources.

Kreisa, McDowell, et al. (1996) have interpreted the settlement pattern data as indicating a general dichotomy in settlement and site function at Fort Leonard Wood. This pattern can be characterized as valley oriented and uplands oriented patterning. Valley oriented sites occur in dense clusters, termed neighborhoods or site complexes (e.g., Ahler et al. 1996), and include a wide variety of site types. Uplands oriented sites are more dispersed and are further from major streams and may represent a more restricted range of site types and functions. Examples of upland oriented sites are those prehistoric sites and isolates found during the present project in the Big Piney Tract and, aside from 23PU722 (a possible cairn site), the West Cantonment Tract.

One example of a coherent site cluster was identified during the present survey. This cluster, located in the central portion of the Roubidoux Creek Tract, includes sites on an upland peninsula and those on floodplain terraces that surround the landform on three sides. Evidence appears to suggest temporal contemporaneity among the sites, at least within particular time periods, and the presence of a wide diversity of site types. Six sites are located on the peninsula and include a cave and a rockshelter, a cairn, a petroglyph site, and two open-air sites. A second rockshelter is present at the base of the peninsula bluff slope. Late Woodland components are present at the cave and two rockshelters, one of the open-air sites, and are presumed at the cairn and petroglyph sites. The two open-air sites are large (16.2 and 1.2 ha in size) and have large artifact assemblages (800 and 71 artifacts) with a fairly diverse number of artifact types (12 and 9, respectively). Both appear to represent habitation sites with long-term occupations. This grouping of sites is known as the Lohraff Complex.

The floodplain terrace sites contrast with those situated on the upland peninsula. Eleven artifact-bearing locations were found in the surrounding floodplain, consisting of seven sites and four isolated finds. Leaving aside the isolates, the sites average 1,600 m^2 in size (with a median of only 875 m^2), average 15 artifacts recovered (with a median of 12), and average 3.7 artifact types (with a median of 4) per assemblage. A Late Woodland projectile point was found at one of the floodplain sites, suggesting some degree of contemporaneous occupation with sites on the upland peninsula.

The contrast between the upland peninsula and terrace sites appears to be minimally twofold. First, and perhaps most interesting, is the diversity of site types present on the upland peninsula, as opposed to the general similarity of sites on the floodplain terrace. Floodplain terrace sites can be characterized as generally small, with low artifact densities and low artifact assemblage diversity. It is interesting to note that the largest floodplain terrace site, 23PU731, at which a Late Woodland projectile point was found, appears to be associated with the rockshelter (23PU719) located at the base of the upland peninsula. The two sites may represent different portions of a single site. The profile of the floodplain sites, perhaps aside from 23PU731, is suggestive of relatively short-term camps rather than longer term habitation sites. The upland peninsula sites are represented by a coherent grouping of both longer term habitation sites and those associated with burial (cairn and cave and rockshelter sites) and cosmological (petroglyph site) aspects of Late Woodland populations. It appears probable that the closed sites also represent a habitation locale in addition to their use as burial areas. Second, and alluded to in the discussion above, is the appearance of differences in intensity of occupation between the upland peninsula and floodplain terrace sites.

The central portion of the Roubidoux Creek Tract represents a significant clustering of sites (Ahler et al. 1998:Figure 3). The presence of Late Archaic period projectile points, in addition to the Late Woodland projectile points and pottery discussed above, may indicate the presence of a rather long-term settlement pattern in the Fort Leonard Wood area. It also appears to represent a rather complete, coherent settlement system in miniature. Habitation sites (both open-air and closed), smaller short-term camps, burial sites (both cairns and closed), and an associated petroglyph site (only the third located at

Fort Leonard Wood), are all located in the survey tract. Perhaps only an agricultural village, such as the nearby Feeler or Dead Deer sites, is missing from this settlement cluster. Continued investigation of this cluster of sites presents the opportunity to yield important information on the structure of prehistoric settlement in the Fort Leonard Wood area.

Starting with the research at Fort Leonard Wood conducted by Niquette (1984, 1985; Niquette et al. 1983) and continued by researchers in the later 1980s and early 1990s (Ahler and McDowell 1993; Baumann and Markman 1993; Moffat et al. 1989), prehistoric settlement structure at Fort Leonard Wood has been interpreted in light of Binford's (1980) models of the "collector" hunter-gatherer strategy. In this model, group base camps are established from which smaller groups periodically depart to obtain needed resources. As resource distribution is well-known, placement of base camps and the periodically occupied field camps is designed to minimize transport costs. Many aspects of the Fort Leonard Wood settlement pattern, especially the clustering of sites, appear to conform to this model; however, Ahler et al. (1997) cogently argue against acceptance of or adherence to such idealized models, and that settlement patterns and systems of organization may show large amounts of variation.

As an alternative to the Binfordian model, settlement may have instead been characterized by seasonal fragmentation of populations. In such a scenario, prehistoric groups coalesce at base camps during warm weather months, sending smaller parties to field camps on occasion to collect needed raw materials, much like the process described in the Binford (1980) "collector" hunter-gatherer strategy. These macrobands disperse, perhaps into family groups, during the winter. This slightly different model would account for the often dense middens with high artifact diversity found at the numerous caves and rockshelters of the region. Such a model has been proposed for a number of regions in northern Missouri, eastern Iowa, and southwestern Wisconsin along the Mississippi River (Benn 1979; Stoltman 1990; Theler 1987). Similar to the Fort Leonard Wood region, these areas contain large base camps, smaller field camps, and rockshelters that were intensively occupied during cold weather months. Additional Phase II-level data from open-air base camps and field camps, along with caves and rockshelters, can be used to evaluate these competing settlement models.

Temporal Patterning

Temporally diagnostic prehistoric projectile points were recovered at three locations and represent the Late Archaic and Late Woodland periods. Of the six projectile points found in this survey, two date to the Late Archaic period, while the remainder are Late Woodland types. These data can be combined with data from previous surveys (e.g., Adams 1997) to further investigate prehistoric temporal, cultural, and spatial patterns at Fort Leonard Wood.

Projectile point data from archaeological investigations conducted at Fort Leonard Wood between 1982 and 1996 have been recently summarized (Adams 1997) and indicate that mean elevation of find locations decreases with time. The data indicate a relatively sharp drop from the Dalton to Early Archaic period, followed by a slight increase in elevation with the Middle Archaic period. After the Middle Archaic, there is a more gradual decrease in mean elevation through the Late Woodland period. While the Late Archaic points recovered by the present survey were found higher than the mean elevation of 295 m asl reported for this period, the former are well within the range of values recorded for this period. On the other hand, the Late Woodland points were recovered from elevations of 286 to 320 m asl, near the high end of the range of elevations reported. It must be emphasized that the trend of decreasing elevation of find locations through time reported earlier is based on mean elevation values, and deviations from mean values are recorded and are to be expected for all periods.

The occurrence of the Late Archaic and Late Woodland sites recovered during this survey at relatively high elevations most likely reflects the unique geomorphological setting of the site locations. All of the points were found at three sites within close proximity to one another on the east side of Roubidoux Creek where the creek makes a sharp,

hairpin bend around a prominent upland ridge with exposed bedrock bluffs. Such a setting represents a prime location for prehistoric settlement due to the close proximity of riverine and upland resources, and the exposed bedrock bluffs offer protected cave and rockshelter habitation sites. Such areas at Fort Leonard Wood have been designated as high probability zones for prehistoric settlement (Ahler and Albertson 1996).

Cultural Chronology

Development and refinement of a local Fort Leonard Wood chronology remains a significant research goal (e.g. Ahler, Kreisa, McDowell, and McGowan 1995; Ahler, Kreisa, Theler et al. 1995; Ahler and McDowell 1993; Kreisa, McDowell, et al. 1996; McGowan 1996). The overall development of a local chronology must be viewed as a long-term goal that will be achieved by adding to the local database. To accomplish this, chronologically sensitive data, typically diagnostic artifacts, must be recovered. While chronology building is better addressed through site testing and mitigation projects, Phase I survey results can document the presence of populations in the Fort Leonard Wood area during particular time periods. The current fieldwork has accomplished this task and, together with data recovered from previous surveys, can be incorporated into a brief analysis of cultural and temporal patterns in the Fort Leonard Wood area.

Six temporally diagnostic projectile points were recovered at three locations and represent the Late Archaic (n=2) and Late Woodland periods (n=4). This conforms with the pattern reported in Adams (1997); diagnostic points from the Late Archaic/ Early Woodland and Late Woodland periods are most abundant at Fort Leonard Wood. These data can be combined with data from previous surveys (Adams 1997) to further investigate prehistoric temporal, cultural, and spatial patterns at Fort Leonard Wood.

It has been demonstrated (Adams 1997) that at Fort Leonard Wood there is a gradual increase in the representation of temporally diagnostic projectile points until a peak is reached at the Late Archaic/Early Woodland interval (Figure 54). After this there is a slight drop in the representation of Middle Woodland types, followed by a subtle increase by the Late Woodland interval. These data indicate that prehistoric occupation of the Fort Leonard Wood area increased gradually over time. A more refined picture of this pattern emerged when the data were weighted by calculating the number of occupations per 100 years (Figure 54). This produced a pattern similar to those reported by Reeder (1988) for the entire Gasconade Basin and Warren (1982) for the central Salt River drainage in northeastern Missouri. Paleoindian remains are rare in the entire Gasconade Basin, and Paleoindian projectile point types have yet to be found at Fort Leonard Wood. The available data indicate that occupation increased gradually from the Dalton period to the end of the Late Archaic/Early Woodland period, after which the rate of occupation increased dramatically.

Site Predictive Model Assessment

As discussed in Chapter 3, a number of models predicting site densities and locations have been proposed for Fort Leonard Wood (e.g. Ahler and McDowell 1993; McNerney 1992; Moffat et al. 1989). Typically, these models have identified access to permanent sources of water as a primary determinant of both site location and site density. In these models, site locations were predicted to be most common within either 0.5 km or 1.6 km of a permanent water source. Recently, Ahler and Albertson (1996) have completed a comprehensive analysis of site location based on a number of variables. Using Geographical Information Systems (GIS) analysis of a suite of variables, Ahler and Albertson (1996) have constructed preliminary models of site location for cairns, open-air sites, and enclosed sites (caves/ rockshelters). Each model identifies particular variables that tend to correlate with human use (or non-use) of landforms. A visual model of site location probabilities, ranging from low to high potential, for each of these site types was produced. Such GIS models have widespread implications for both cultural resource management and settlement pattern research.

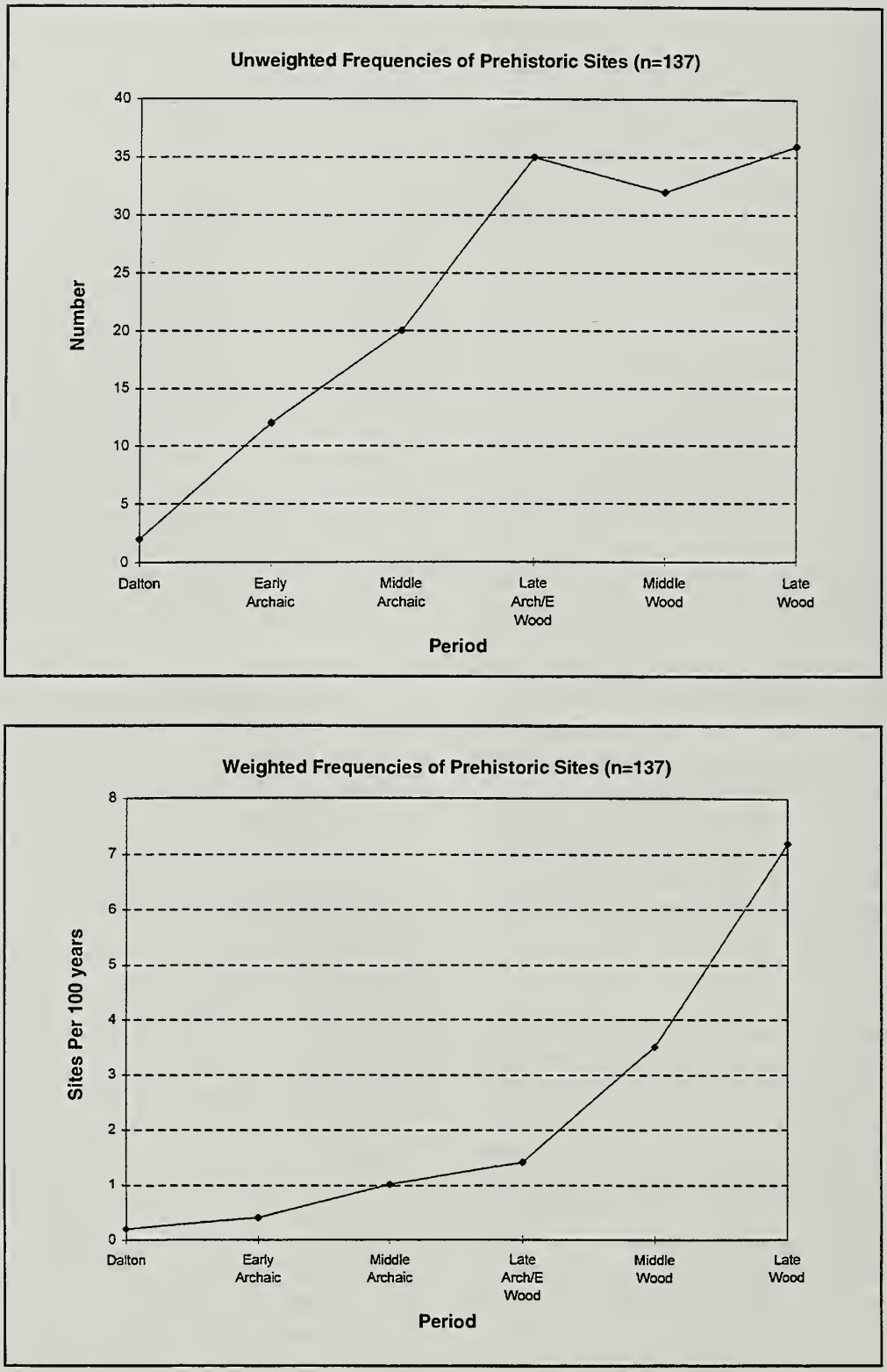

Figure 54. Temporal Change in Unweighted and Weighted Frequencies of Projectile Points by Time Period at Fort Leonard Wood.

Models, as iterative constructs, are designed to be refined when additional data are available. A formal reevaluation of the predictive models for Fort Leonard Wood is beyond the scope of this project but can be conducted by personnel with access to databases and GIS map layers from which the original models were created. In a more preliminary manner, the site location data for the newly surveyed tracts documented in this report can be used to evaluate the model of site location predictions constructed by Ahler and Albertson (1996).

All three survey areas are a mosaic of high, medium, and low probability areas for cairns, caves/rockshelters, and open-air prehistoric sites. The West Cantonment and Roubidoux Creek Tracts have a major waterway that traverses the survey tract; Roubidoux Creek is adjacent to the West Cantonment Tract while the creek bisects the Roubidoux Creek Tract. The proximity of this waterway yields zones of high to medium probability for all three prehistoric site types. In contrast, no major waterway traverses the Big Piney Tract. In upland and secondary-tertiary stream settings, each present in the three survey tracts, site potential drops to medium to low. Newly recorded site locations were compared to the site probability maps generated by Ahler and Albertson (1996).

The locations of newly recorded cairns correspond closely to the areas identified as having high potential for this site type. Cairns located by this survey were found in a high probability area in the West Cantonment Tract on the edge of a steep bluff overlooking Roubidoux Creek and in a high probability area comprised of a prominent ridge surrounded on three sides by Roubidoux Creek. No cairns were found in the Big Piney Tract, which has a medium to low potential for these sites.

Closed sites (e.g., rockshelters and caves) were expected along bluff faces overlooking waterways. Bluff faces overlooking Roubidoux Creek in the West Cantonment Tract were rated as having a high probability for such sites, but none were located. In contrast, the lack of a major waterway associated with the Big Piney Tract led to that area having a low potential for closed sites, and indeed none were located. High probability for closed sites characterizes the central and south portions of the Roubidoux Creek Tract. No closed sites were located in the south portion, but two rockshelters (one previously recorded) and a cave were located in the central tract.

A wider range of variability was found for prehistoric open-air sites, inclusive of both sites and isolated finds. Of the prehistoric sites and isolates located, 11 are found in areas of high probability, 2 in high to medium probability zones, 10 in medium probability zones, and 3 in medium to low probability zones. When analyzed by survey tract, a wider range of variation can be seen to exist (Table 10). In the Big Piney Tract, the two isolated find locations are both in medium probability zones. For 23 find locations in the Roubidoux Creek Tract, 13 fall within high probability zones, 2 are in high to medium zones, and 8 are in medium probability zones. No sites were found in low probability zones, suggesting that the model is relatively robust in areas with large floodplain expanses. For the West Cantonment Tract, all three sites/isolates were located in areas characterized as either having medium to low potential. No sites were identified in low probability areas in any of the three survey tracts. Similar to other assessments of the Ahler and Albertson (1996) model (e.g., Adams 1997; Kreisa, McDowell, et al. 1996), the site location predictions appear to be relatively robust regarding open-air sites, especially when associated with large floodplain expanses. Areas characterized as having high to medium potential do appear to contain either numerous sites or fewer but larger sites. In contrast, areas characterized as having medium to low potential typically have fewer, and smaller, sites.

While most terrace formations, although not all, have a high probability for open-air sites, the current survey revealed that certain formations are more likely to contain prehistoric archaeological sites than are others (Table 11). Of the 20 prehistoric sites and isolates located on terrace formations (one site was found on two different formations and is thus counted twice), 12 were found on 16 of the T-4 and T-5 terrace formations surveyed. In other words, nearly every T-4 and T-5 terrace formation contained

Table 10. Distribution of Prehistoric Open-Air Sites by Probability Zone.

	High		*High-Medium*		*Medium*		*Medium-Low*		*Low*	
Tract	N	%	N	%	N	%	N	%	N	%
Big Piney	0	0	0	0	2	100	0	0	0	0
Cantonment	0	0	0	0	0	0	3	100	0	0
Roubidoux	13	56	2	9	8	35	0	1	0	0

Table 11. Terrace Site Density and Artifact Depth.

Terrace Alloform	*Total Acreage*	*Number of Sites*	*Sites Per 100 Acres*	*Depth of Artifacts (cm)* *Average*	*Maximal*
T-2	184	0	0.0	0	0
T-3	20	2	10.0	50	50
T-4	24	5	20.8	64	125
T-5	28	7	25.0	78	110
T-6	18	3	16.7	35	50
T-7	40	1	2.5	50	50
Og	9	1	11.1	10	10
Alluvial Fan	9	1	11.1	40	40

an archaeological site. Three sites were located on the three T-6 terraces surveyed, although all were located on the same formation. Only five sites were located on the remaining 13 T-3, T-7, Og, and AF formations investigated. Average and maximal artifact depth also follows similar trends (Table 11). Both average and maximal artifact depth are greatest on T-4 and T-5 terraces, precisely those formations with the highest site densities. Average and maximal artifact depth do not vary greatly (given the small sample size) between the other terrace formations.

Summary

The basic survey goals at Fort Leonard Wood are similar to those addressed in most compliance surveys. Survey data are collected to identify locations that were used by people in the past. The locations and the assemblages left behind provide insight as to why the location was selected, what activities were carried out there, and when the activities were conducted. The basic themes fall into research areas of cultural chronology, settlement patterns, and settlement systems.

This project has accomplished five goals. First, 3,511 acres were inventoried, with 36 previously unrecorded sites and isolated finds identified and seven previously recorded sites relocated. Second, the site locational and artifact assemblage data from those sites have been used to characterize settlement

patterns within the tracts investigated and to relate those patterns to a wider discussion of prehistoric and historic settlement in the Fort Leonard Wood area. Third, temporal data from the prehistoric and historic sites investigated were discussed in terms of local chronology and culture history. Fourth, the newly identified site locations were compared with a GIS site locational model constructed for Fort Leonard Wood. The results suggest that the model is relatively robust, especially when used to characterize the density distribution of open-air sites. Fifth, the data as a whole have been used to provide NRHP recommendations for individual sites. A more detailed discussion of this process follows in Chapter 8.

CHAPTER 8.
SITE EVALUATIONS AND RECOMMENDATIONS

The Phase I archaeological survey of 3,511 acres (1,421 ha) at Fort Leonard Wood resulted in documentation of 43 sites and isolated finds. This total includes seven previously recorded sites and 36 newly identified sites and isolated finds. One previously recorded prehistoric site could not be relocated. These sites and isolated finds are located in all three of the survey tracts and in different areas of the base. This chapter provides the rationale for the NRHP evaluations of the sites located during this project, a summary of those evaluations and recommendations for future archaeological investigations at these sites.

Site Evaluation Criteria

The primary goal of this project was to locate sites and provide an evaluation of their eligibility for listing in the NRHP. The eligibility criteria for archaeological sites are described in 36CFR60. To be eligible, cultural resources must possess integrity of location, design, setting, materials, feeling, and association. Typically, archaeological sites are evaluated under Criterion D, which indicates that to be eligible, a site must have yielded, or may be likely to yield, information important to prehistory or history. Historic sites could, through additional archival research, be evaluated under Criteria A and B, which indicate that a site can be eligible based on its association with a significant event or person, or Criterion C, for its design or construction value as a representative of a particular technology or culture. Similarly, it is conceivable that rock cairns could be nominated under Criterion C as well as D. Sites can be evaluated under these criteria at the local, regional, or national level of significance. Eligible sites, because of their significance, are managed to protect their integrity and preserve their information content for the future.

The results of Phase I archaeological surveys most often produce one of two evaluations for particular sites: not eligible or potentially eligible for listing in the NRHP. Seldom is enough information obtained during a Phase I-level survey to yield an evaluation of eligibility for the NRHP, and such was the case during this project. These recommendations are then provided to state and federal historic preservation officials for official determinations of eligibility (Butler 1987). A determination of not eligible indicates the site is not afforded protection under cultural resource laws, and no further work need be done (Butler 1987). An evaluation of potentially eligible indicates that further work is needed, most often in the form of Phase II archaeological testing of the site, and that the site should be protected as though it is eligible. The aim of this additional work is to acquire information to make a determination of whether the site is eligible or ineligible for listing in the NRHP.

Federal legislation has mandated that four criteria (as mentioned above) be used when evaluating a site for inclusion in the NRHP. There has been less agreement, though, regarding the operationalization of these criteria among archaeologists (Briuer 1996; Briuer and Mathers 1996; Butler 1987; Peacock 1996; Scott 1996). Each site documented by this investigation was evaluated according to its integrity (presence intact deposits), function (number of artifact classes present), intensity of occupation (based on the number of artifacts recovered per 100 m^2), and rarity as a particular site type (most pertinent for cairns and petroglyphs), in order to evaluate its potential to yield information that is significant to our understanding of history or prehistory. Each attribute focuses on the likelihood of a site to provide information about the past. The greater the information potential, the greater the need for preservation or data recovery. Each site documented by this investigation was evaluated against these attributes, with a special emphasis placed on site integrity. The use of attributes to measure site significance has been advocated by a number of other researchers (Coastal Environments, Inc. 1979; Glassow 1977a, b; King et

al. 1977; Maslowski 1996; Noble 1987; Reed 1987; Scott 1996; Scovill et al. 1972; Stuart and Gauthier 1981; Tainter 1979; Wilson 1990).

These concepts were operationalized slightly differently depending on site type. For the prehistoric open-air lithic scatters and cave/rockshelter sites, integrity of deposits, thickness of intact deposits, number of artifacts recovered from intact deposits, and the number of different artifact classes recovered were all taken into account. In general, sites with intact deposits that yielded fairly sizeable and diverse artifact assemblages were deemed potentially eligible. Sites without intact deposits, or sites with thin intact deposits or with intact deposits that contained assemblages with few artifacts or low artifact diversity were generally considered not eligible. Prehistoric cairn sites were evaluated differently. These sites, representing loci of prehistoric burial and burial activity, have been heavily looted at Fort Leonard Wood. The extent of looting at most cairns indicates that this is an endangered site type. Therefore, all cairns are viewed as potentially eligible, and intact cairns, if any are present on base, should be considered eligible.

Phase I evaluation of historic sites differs greatly from prehistoric sites in that data other than integrity and artifact density and diversity are readily available to researchers. Among these are historic maps and the more specific temporal and functional parameters of artifacts. Taken together, these data provide a better understanding, at a Phase I-level of investigation, of site function and span of occupation. Regarding the historic farmsteads/residences, site eligibility was determined with two different sources of data. First, site integrity was necessary. At Fort Leonard Wood, this meant that the site lacked evidence of massive earthmoving and that remnants of structures such as foundations, wells, cisterns, or structural depressions were present and appeared to be intact, based on surface observation. Subsurface data indicating potential midden or subsurface features also were considered. Second, once a preliminary assignment of site type had been made, eligibility potential was evaluated against the research themes outlined by Smith (1993).

During the current survey, a number of farmstead/residences and one site possibly associated with tie hacking were located. Pertinent themes and associated research questions that farmsteads could address include the expression of the Upland South Derivation in the Ozarks, intrasite settlement patterns, architectural signatures and potential folk construction techniques, substantiation of the archaeological record associated with farmsteads, identification of trade networks and an estimation of the degree of isolation of individual farms, disposal patterns, recycling of material culture, and identification of ethnic or racial differences in many of the above listed research issues. Smith (1993) suggests that verification of tie hacking sites, as well as documenting their nature, is a pertinent research issue. Phase II NRHP evaluation of historic sites should incorporate the so-called ethnoarchaeological approach advocated by Smith (1993). Included in this approach are conducting archival research, collecting oral history, and conducting traditional archaeological fieldwork. In some instances, archival research and collection of oral history may indicate that a site is not eligible for the NRHP prior to conducting fieldwork.

NRHP Eligibility Recommendations

Using the above discussion as a guideline, the locations examined during this project have been evaluated for NRHP eligibility (Tables 12, 13, and 14). Nineteen of the sites are recommended as potentially NRHP eligible, including five from the Big Piney Tract (Table 12), one from the West Cantonment Tract (Table 13), and thirteen from the Roubidoux Creek Tract (Table 14). Overall, this yields a rate of 44 percent of the investigated sites and isolates being recommended as potentially eligible. Most of the sites recommended as potentially eligible (13 of 19, 68 percent) are located in the Roubidoux Creek Tract. This high rate of potentially eligible sites is a factor of the deep soil profiles, and potentially intact, buried deposits, located in the floodplain of Roubidoux Creek.

Not all site types are recommended as potentially eligible at equal rates. All cairns and cave/rockshelter sites located are recommended as potentially

Table 12. Summary NRHP Recommendations for Sites and Isolated Finds in the Big Piney Tract.

Site Number	*AOS Number*	*NRHP Evaluation*	*Recommendation*
23PU397	Previously Recorded	Potentially Eligible	Additional Archival Search
23PU398	Previously Recorded	Potentially Eligible	Additional Archival Search
23PU399	Previously Recorded	Potentially Eligible	Additional Archival Search
23PU501	Previously Recorded	Potentially Eligible	Additional Archival Search
23PU517	Previously Recorded	Potentially Eligible	Additional Archival Search
Isolate	AOS 3	Not Eligible	No Further Work
Isolate	AOS 4	Not Eligible	No Further Work

Table 13. Summary NRHP Recommendations for Sites and Isolated Finds in the West Cantonment Tract.

Site Number	*AOS Number*	*NRHP Evaluation*	*Recommendation*
23PU551	Previously Recorded	Not Eligible	No Further Work
23PU722	AOS 1	Potentially Eligible	Low Impact Phase II Evaluation
23PU727	AOS 21	Not Eligible	No Further Work
23PU728	AOS 22	Not Eligible	No Further Work
23PU729	AOS 24	Not Eligible	No Further Work
23PU730	AOS 25	Not Eligible	No Further Work
Isolate	AOS 2	Not Eligible	No Further Work
Isolate	AOS 23	Not Eligible	No Further Work

eligible. Nine of 26 open-air prehistoric sites (35 percent) are recommended as potentially eligible. Six of nine (67 percent) historic sites in the survey areas (23PU510, 23PU517, 23PU501, 23PU397, 23PU398, and 23PU399) have been recommended as potentially eligible. The six historic sites recommended as potentially eligible appear to have the potential to address a number of the research issues defined by Smith (1993) for farmsteads, as abstracted in the previous section. Archival research and collection of oral history appears to be the most appropriate initial data collection techniques for the NRHP evaluation of these sites. Based on the results of the archival research, appropriate field methods for additional research, if necessary, could be devised. The four sites recommended as not eligible either have been impacted by military activities or do not appear to have potential to address research issues as discussed by Smith (1993).

Table 15 operationalizes the site attributes discussed above. It provides a measure of artifact density, number of artifact classes present, whether intact deposits are present, and the time period of occupation. Data for cairns, caves and rockshelters, and historic sites are not presented. Data collection at these sites differed from prehistoric open-air sites to an extent that makes such comparisons meaningless.

Fieldwork Recommendations

All potentially NRHP-eligible sites are recommended for Phase II archaeological test investiga-

Table 14. Summary NRHP Recommendations for Sites and Isolated Finds in the Roubidoux Creek Tract.

Site Number	*AOS Number*	*NRHP Evaluation*	*Recommendation*
23PU510	Previously Recorded	Potentially Eligible	Additional Archival Search
23PU723	AOS 5-16	Potentially Eligible	Phase II Evaluation
23PU724	AOS 17	Not Eligible	No Further Work
23PU725	AOS 19	Potentially Eligible	Phase II Evaluation
23PU726	AOS 20	Not Eligible	No Further Work
23PU731	AOS 26	Potentially Eligible	Phase II Evaluation
23PU732	AOS 28	Potentially Eligible	Phase II Evaluation
23PU733	AOS 29	Not Eligible	No Further Work
23PU734	AOS 31-32	Not Eligible	No Further Work
23PU735	AOS 34	Potentially Eligible	Phase II Evaluation
23PU736	AOS 36	Potentially Eligible	Phase II Evaluation
23PU737	AOS 37	Not Eligible	No Further Work
23PU738	AOS 39	Not Eligible	No Further Work
23PU739	AOS 40	Potentially Eligible	Phase II Evaluation
23PU740	AOS 41	Not Eligible	No Further Work
23PU741	AOS 44	Potentially Eligible	Phase II Evaluation
23PU742	AOS 45	Potentially Eligible	Phase II Evaluation
23PU743	AOS 46	Potentially Eligible	Phase II Evaluation
23PU744	Lohraff Cave	Potentially Eligible	Phase II Evaluation
23PU745	AOS 35	Potentially Eligible	Phase II Evaluation
Isolate	AOS 18	Not Eligible	No Further Work
Isolate	AOS 27	Not Eligible	No Further Work
Isolate	AOS 30	Not Eligible	No Further Work
Isolate	AOS 33	Not Eligible	No Further Work
Isolate	AOS 38	Not Eligible	No Further Work
Isolate	AOS 42	Not Eligible	No Further Work
Isolate	AOS 43	Not Eligible	No Further Work
Isolate	AOS 47	Not Eligible	No Further Work

tions to determine eligibility. Procedures considered critical to the evaluation of these sites include the documentation of topographic and stratigraphic site conditions as well as the collection of environmental, historical, functional, and temporal site data. Operationalizing these procedures would include the definition of site boundaries, preparation of a site plan and topographic map, and the excavation of test units in an attempt to evaluate site integrity and determine period of occupation. Aside from these basic tasks, opportunities for the collection of unique sets of data exist at the four site types, cairns, caves/rockshelters, open-air prehistoric, and historic sites, located during the present survey and recommended as potentially eligible.

As discussed earlier, cairns are a unique and sensitive site type at Fort Leonard Wood. Earlier investigations, along with looting, have established their role as mortuary facilities. Because of this, cairns have been subject to widespread looting, and few, if any, remain completely intact, although previ-

Table 15. Comparison of Selected Site Attributes at Open-Air Sites.

Site	*Artifacts/ 100 m²*	*Number of Artifact Classes*	*Presence of Intact Deposits*	*Period of Occupation*	*NRHP Recommendation*
23PU723	0.2	8	Yes	Prehistoric	Potentially Eligible
23PU724	0.3	3	No	Prehistoric	Not Eligible
23PU725	0.6	9	Yes	Prehistoric	Potentially Eligible
23PU726	0.3	4	No	Prehistoric	Not Eligible
23PU727	1.6	4	No	Prehistoric	Not Eligible
23PU728	0.4	3	No	Prehistoric	Not Eligible
23PU731	0.9	5	Yes	LW	Potentially Eligible
23PU732	6.0	2	Yes	Prehistoric	Potentially Eligible
23PU733	1.5	3	Yes	Prehistoric	Not Eligible
23PU734	0.6	2	Yes	Prehistoric	Not Eligible
23PU736	1.9	3	Yes	Prehistoric	Potentially Eligible
23PU737	2.0	2	Yes	Prehistoric	Not Eligible
23PU738	0.3	4	Yes	Prehistoric	Not Eligible
23PU740	2.0	3	Yes	Prehistoric	Not Eligible
23PU741	0.5	5	Yes	Prehistoric	Potentially Eligible
23PU742	1.2	12	Yes	Prehistoric	Potentially Eligible
23PU743	0.7	8	Yes	Prehistoric	Potentially Eligible
23PU745	0.8	16	Yes	LA/LW	Potentially Eligible

Note: LA=Late Archaic, LW=Late Woodland.

ous investigations (Niquette 1984; Niquette et al. 1983) have demonstrated that some structural integrity and human remains are present in some looted cairns. These two factors, association with human remains and impacts from looting, create special difficulties for NRHP evaluation and management of these sites. Phase II excavations of cairns would potentially yield human remains. Excavations would have to be coordinated with the Missouri SHPO and interested Native American tribal authorities. Investigations and artifact disposal would have to conform to Native American Graves Protection and Repatriation Act (NAGPRA) regulations. Alternatively, and more preferable, these sites could be determined eligible for the NRHP based on their unique characteristics such as their rarity and association with Late Woodland site clusters. In that case, Phase II investigations should be confined to preparing a site plan and topographic map and a review of extant documentation of the site. The most economical method of nominating this site type would be through the Multiple Property Listing format of the NRHP. Phase II investigations at 23PU722, a possible cairn site, should be conducted to verify a prehistoric period of construction for the two rock features located. Because of the above-stated concerns, a low impact investigation should be designed.

The cave and rockshelter sites at Fort Leonard Wood often possess unique attributes absent in the open-air prehistoric sites. Previous excavations at these sites have identified stratified deposits with well-preserved botanical and faunal assemblages. Radiocarbon assays have been run on charcoal from the deposits, yielding important chronological data. Often, Late Woodland components containing ceramics are present at this site type. Few open-air sites have these attributes. Excavations should be conducted in such a manner to identify and sample potentially intact, stratified deposits. Phase II investigations at these sites should be designed to include the collection and analysis of botanical and faunal

remains and the assay of radiocarbon samples. Data from such excavations can be used to address research questions including assessing the local prehistoric chronology, site function, subsistence, season of occupation, environmental change, and relationships with nearby open-air sites.

Open-air prehistoric sites are widely variable in size, density of artifacts, diversity of artifacts, depth of intact deposits, landscape position, and proximity to water, among other attributes. As such, it has been widely viewed that these open-air sites represent a number of different site types, from large base camps to smaller, seasonally occupied field camps to single occupations. As such, no single strategy for investigation can be offered here. Instead, it should be emphasized that a sample of this wide range of variability needs to be gathered in order to collect data on all site types associated with prehistoric settlement systems. Aside from reemphasizing the need to conduct those basic tasks discussed above, specific research designs should be formulated based on the unique characteristics of each open-air site to be investigated. One issue that can be applied to all floodplain/terrace sites is testing the site type/temporal model proposed by Albertson et al. (1995) for the various landforms.

Finally, Phase II investigations at historic sites can be oriented towards testing the Upland South model of site location and function, and associated research issues discussed above, as proposed by Smith (1993). Phase II investigations should include attempts to determine chronological placement, the nature of the occupation (i.e., whether single or multiple component), and the function of the site in the local settlement system. Prior to any fieldwork, a thorough documentary review should be conducted. This should include a review of available historic maps, aerial photographs, and minimally census and title records. Effort also should be expended to determine whether additional records or oral histories concerning the occupation of the site are available. Fieldwork should be designed to identify potential subsurface features. This could include the excavation of close-interval shovel probes in a grid pattern or the opportunistic excavation of shovel probes based on the location of above ground structural features. Finally, test units should be placed to investigate subsurface and surface features, if located. Recovery of artifacts from features, in conjunction with historical documentation, will generate Phase II data by which to evaluate the Upland South model proposed by Smith (1993), among other research issues.

One factor that must be considered in the recommendations presented here is that all sites recommended as potentially eligible should be treated as though they are eligible until Phase II investigations have been completed. This means that each of these locations must be managed to insure that the integrity of the site is not compromised. Mechanisms need to be established to keep these locations from being impacted by earth-disturbing activities associated with the training mission of Fort Leonard Wood and with illegal looting activities. Overall, the best strategy is to test sites as quickly as possible to clearly identify those sites in need of long-term management.

Bias Assessment and Metadata

The federal government has long been involved in conducting archaeological research to protect and preserve the heritage of the United States. Over time the process of procuring archaeological research services has become more structured with defined expectations on how the research should be done, what data should be collected, and what the expected outcome of the research will be. However, the variable nature of the archaeological record makes highly rigid contract specifications impractical. Contracts need to provide researchers with flexibility to adjust to variable field conditions in order to adequately address, evaluate, and document the cultural resource base. The need for flexibility and for control of the overall research process has created a paradox of how to identify and manage significant sites in a cost effective manner. To address this question the Department of the Army sponsored a study through the Legacy Resource Management Program with the U. S. Army Corps of Engineers Construction Engineering Research Laboratories to examine survey standards and develop improved cost-estima-

tion procedures. One outcome of the study was a set of recommendations directed at standardizing the approach, reporting, and contracting procedures for archaeological surveys (Zeidler 1995). Central to this report was the call for reporting of data about data or metadata. The metadata concept seeks to provide relevant information on physical variables and levels of effort needed to complete the data collection and reporting tasks. These metadata document how the data were obtained. Areas specified as important to federal managers include the need for explicit site definitions, discussions of methodological biases, the impact of biases on results, and the level of effort needed to accomplish project tasks. The ultimate goal is to provide managers with tools to better evaluate and compare results and to develop future scopes of work. This section provides a bias assessment and field metadata for a Phase I archaeological survey at Fort Leonard Wood. Additional metadata regarding preparation of the project research design, monthly reports, manager's report, site forms, draft and final report, artifact processing, and artifact analysis, are presented in Appendix D.

Project Parameters

The research project involved the survey of 3,511 acres in three distinct survey tracts at Fort Leonard Wood, Missouri. The three survey tracts were the Roubidoux Creek Survey Tract (578 acres), the Big Piney Survey Tract (857 acres), and the West Cantonment Survey Tract (2,076 acres). Research conducted included archival, field, and laboratory components. The principal research technique was the excavation of screened posthole tests at 20-m intervals across the survey tracts where surface visibility was less than 30 percent or where slopes were less than 20 percent in the uplands. Differing levels of intensity of subsurface testing were employed in the floodplain sections surveyed, depending on terrace formation type. These levels of effort were discussed in Chapter 3, Table 2. The objective was to locate and report archaeological sites. The operational definition of a site was locations where three or more artifacts occurred within a 20-m diameter. Locations with cultural material falling below the site threshold criteria were recorded as isolated finds.

Level of Field Effort

The Phase I Archaeological Survey of 3,511 acres at Fort Leonard Wood in 1998 included a four step process from project initiation to project conclusion. The first step in the project was to become familiar with the nature of the project and the study areas. This step of the project included a records review and the preparation of a research design. The second step was to conduct the field investigations. Field investigations were conducted between January and June 1998. The third step was to process and analyze the field materials. The final step was to prepare a report of the project findings. The four steps were generally sequential, but some activities were done concurrently by different project personnel.

The level of field effort has been tabulated by person-hours (P.H.) and person-days (P.D.) per alloform surveyed. Person days equal eight hours. Field efforts have been compiled for each of the three project survey tracts, and by alloform within the tract (Table 16). This tabulation does not include time spent traveling to and from survey locations, nor time spent documenting the sites that were located. On average, two hours per field day were spent traveling to Range Control, checking in at Range Control, traveling to the survey tract, traveling from the survey tract to Range Control, checking out at Range Control, and traveling back to lodgings. As well, travel time between the University of Illinois and Fort Leonard Wood has not been included. This averages six hours each way.

In general, the Big Piney and West Cantonment levels of effort are fairly typical, between 20 acres to 25 acres per person per day, of past surveys of upland tracts (e.g., Adams 1997, Kreisa, McDowell, et al. 1996). The Roubidoux Creek uplands were more labor intensive. This is due to a number of large sites found in the central portion of the survey tract. The level of effort varies greatly for the Roubidoux Creek floodplain formations. T-2 terraces are least effort intensive, due to field methods that consist of visual inspection of cutbanks. In general, the effort expended on the terrace formations is correlated with the spacing and depth of excavation of subsurface tests. In this respect, the T-5 terrace formations are

Table 16. Level of Field Effort Metadata.

Survey Tract	*Alloform*	*Survey Methods*	*Area (acres)*	*Hours*	*Person Days*	*Acres/ Person Day*
Roubidoux Creek	Uplands	20 m intervals to B horizon	190	96	12.0	15.8
Roubidoux Creek	T-2 terrace	Visual Inspection	184	41	5.1	36.1
Roubidoux Creek	T-3 terrace	40 m intervals, tests to 0.5 m below surface; tests to 1.5 m below surface in 10 percent of acreage; positive tests to 1 m below surface	20	37	4.6	4.3
Roubidoux Creek	T-4 terrace	20 m intervals, tests to 0.5 m below surface; tests to 1.5 m below surface in 10 percent of acreage; positive tests to 1 m below surface	24	85	10.6	2.3
Roubidoux Creek	T-5 terrace	20 m intervals, tests to 1 m below surface; tests to 2 m below surface in 10 percent of acreage	28	301	37.6	0.7
Roubidoux Creek	T-6 terrace	40 m intervals, tests to 0.5 m below surface	18	39	4.9	3.7
Roubidoux Creek	T-7 terrace	20 m intervals, tests to 0.5 m below surface	40	62	7.8	5.1
Roubidoux Creek	Og	20 m intervals to B horizon	9	10	1.3	6.9
Roubidoux Creek	Alluvial Fan	20 m intervals, tests to 0.5 m below surface	9	3	0.4	22.5
Big Piney	Uplands	20 m intervals to B horizon	857	313	39.1	21.9
West Cantonment	Uplands	20 m intervals to B horizon	2,076	677	84.6	24.5
Total			3,511	1,664	208.0	16.9

Note: The above figures do not include travel time or time spent documenting sites.

most time consuming.

A number of other factors need to be considered when evaluating these data. The amount of time needed to complete each survey tract also varies based on field and logistical conditions. Field condition variables that impacted the amount of time needed to complete each acre of survey included surface visibility, slope, type of vegetation cover, past ground disturbance, and depositional history. All three of the survey tracts examined included locations requiring minimal field efforts and those requiring extensive efforts. It is the composite conditions of the entire survey tract that is characterized by these data rather than specific field conditions. Field conditions, for instance, created a reduced level of effort in the West Cantonment tract where past construction and demolition activities resulted in relatively large areas with minimal documentation needs. Alternatively, the Roubidoux Creek tract was affected by the heavy, thick vegetation present in the survey tracts during the late spring/summer field season. It should be noted that the best ratio of acres surveyed per person day occurred in the upland tracts which were surveyed early in the year when the vegetation was least dense. Previous surveys at Fort Leonard Wood have indicated optimal survey conditions occur in the late fall and winter months.

One additional factor that can impact the level of effort per unit of survey is the recovery rate of archaeological sites. Even aside from actual site documentation, each archaeological site and isolated find requires more effort per unit of space than do non-archaeological units of space. This in part explains the intensive effort needed on terrace formations. Clearly, prehistoric site location was not random, and this concentration on T-4 and T-5 terraces elevates the levels of effort needed on those formations.

Bias Assessment

Survey tracts at Fort Leonard Wood generally lack adequate surface visibility that would allow for the effective use of visual pedestrian reconnaissance. Visual techniques were employed for road cuts, bluff edges, steep slopes, and ravines, but these areas represent a small fraction of the total survey area. Despite limited high visibility locations, a number of sites and isolates were exclusively documented in road cuts or on the forest surface where no subsurface finds were located. Despite this, the extensive vegetation effectively precluded non-invasive survey techniques to locate sites. The principal survey technique was 20-m interval screened posthole tests. This particular research method is effective at locating archaeological sites and documenting depositional site conditions. The method does have inherent biases. A spacing interval of 20-m reduces the likelihood that small archaeological sites, those with a diameter of less than 20-m, will be encountered by this technique. Additionally, the reliance on subsurface screened data for site detection favors the discovery of sites with dense material remains spread over a wide area. Sites with low artifact densities or with very patchy areas with high densities are less likely to be detected. The overall site search pattern also favors the detection of sites with above ground features. The 20-m interval spacing is effective at the discovery of above ground anomalies. However, this statement is more accurate during the winter months than it is in the summer months. There are numerous locations at Fort Leonard Wood where surveyors can not see each other at 20-m intervals. It is, therefore, likely that above ground features can be missed as a result of dense vegetation, and such was the case at 23PU510, a previously recorded historic site that was investigated during the late spring to early summer. These particular biases favor the detection of sites with large surface areas, dense material debris, and above ground features. Sites lacking these attributes are also discovered by this technique, but there is an increased likelihood that a portion will be missed. Overall, the systematic methods applied to this investigation is best suited to the recovery of large sites with high density debris scatters. Extremely small sites or very low material density sites are less likely to be discovered.

Conclusion

This survey documented 43 sites and isolated finds in three survey tracts at Fort Leonard Wood. Seventeen of these are sites recommended as potentially eligible for the NRHP, and Phase II archaeo-

logical evaluation should be conducted for a final determination. Until and upon concurrence by the SHPO that the sites are potentially eligible, Fort Leonard Wood is required to treat these sites as eligible until an NRHP determination is made. Monitoring is needed to prevent adverse impacts to these sites from military training, logging operations and public recreation. Phase II evaluation of the sites may reduce the number that will need to be managed and protected. Ultimately the data recovered by Phase II testing of these sites will yield information of importance to the understanding of the prehistory and history of the Fort Leonard Wood area.

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APPENDIX A

ARTIFACT INVENTORY

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU397	Surface-Root Cellar	Stoneware	1		Bristol/Albany-Slip
23PU397	Surface-Root Cellar	Bottle Glass	3		Unidentified
23PU397	Surface-House	Bottle Glass	1		Green Soda
23PU397	Surface-House	Bottle Glass	1		Beer?
23PU397	Surface-House	Flat Glass	1		
23PU397	Surface-House	Canning Jar Lid	1		
23PU397	PH 1-6, 0-10 cm	Canning Jar	1		
23PU397	PH 2-3, 0-10 cm	Undecorated Ironstone	1		body
23PU397	PH 3-3, 0-10 cm	Undecorated Ironstone	1		rim
23PU397	PH 3-4, 0-10 cm	Undecorated Whiteware	4		bodies
23PU397	PH 3-4, 10-20 cm	Undecorated Whiteware	1		body
23PU397	PH 5-2, 0-10 cm	Wire Nail	1		
23PU397	PH 6-4, 0-10 cm	Wire Nail	1		
23PU397	Bottle Concentration	Stoneware	1		Albany/Albany-Slip
23PU397	Bottle Concentration	Pharmaceutical Bottle	14		7 Green, 7 Amethyst
23PU397	Bottle Concentration	Canning Jar	2		
23PU397	Bottle Concentration	Unidentified	11		6 Amethyst, 3 Green, 1 Brown, 1 Cobalt Blue
23PU397	Bottle Concentration	Canning Jar Lid	1		
23PU397	Bottle Concentration	Tumbler	1		
23PU397	Bottle Concentration	Candy Dish	2		Pressed Glass
23PU397	Bottle Concentration	Unidentified Table Glass	1		
23PU399	Surface	Iron Tack	1		
23PU399	Surface	Iron Ring	1		
23PU399	Surface	Brick	1		
23PU399	Surface	Canning Jar Lid	2		
23PU399	Surface	Lamp Glass	1		
23PU399	Surface	Flat Glass	1		
23PU399	Surface	Tumbler	1		
23PU399	Surface	Pharmaceutical Bottle	1		Chamberlin's Cough Remedy
23PU399	Surface	Liquor Bottle	1		Beer
23PU399	Surface	Canning Jar	1		
23PU399	Surface	Unidentified Bottle	3		
23PU399	PH 1, 10-20 cm	Flat Glass	1		
23PU399	PH 2, 0-10 cm	Flat Glass	1		
23PU399	PH 3, 0-10 cm	Canning (?) Jar	1		
23PU399	PH 3, 0-10 cm	Unidentified Bottle	1		
23PU501	Surface	Undecorated Ironstone	1		Body
23PU501	Structure	Wire Nail	1		
23PU501	PH 3-3, Surface	Unidentified Glass	1		Table or Lamp
23PU501	PH 3-5, 0-10 cm	Wire Nail	4		
23PU501	PH 3-5, 0-10 cm	Mortar	2		
23PU501	PH 3-5, 0-10 cm	Unidentified Glass	5		Clear Curved

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU501	PH 3-6, 0-10 cm	Flat Glass	1		
23PU501	PH 3-6, 0-10 cm	Unidentified Glass	4		
23PU501	PH 4-4, 0-10 cm	Stoneware	1		Bristol-Slip
23PU501	PH 4-4, 0-10 cm	Flat Glass	3		
23PU501	PH 4-4, 0-10 cm	Unidentified Glass	1		Amethyst
23PU501	PH4-5, 0-10 cm	Wire Nail	1		
23PU510	PH 1, 0-10 cm	Unidentified Bottle	1		Aqua
23PU510	PH 1, 0-10 cm	Stoneware	1		Dark Glaze
23PU517	Surface	Wire Nail	1		
23PU517	Surface	Undecorated Ironstone	3		2 Bodies, 1 Base
23PU517	Surface	Undecorated Semiporcelain	1		Body
23PU517	Surface	Mold Decorated Semiporcelain	1		Body
23PU517	Surface	Soda Bottle	1		Pepsi-complete
23PU517	Surface	Liquor Bottle	2		Screw Thread-complete
23PU517	PH 1, 0-10 cm	Wire Nail	1		
23PU517	PH 1, 0-10 cm	Undecorated Ironstone	1		Body
23PU517	PH 1, 0-10 cm	Stoneware	1		Bristol/Albany-Slip
23PU517	PH 1, 0-10 cm	Flat Glass	1		
23PU517	PH 2, 0-10 cm	Lamp Glass	1		
23PU517	PH 2, 0-10 cm	Unidentified Glass	1		Table or Bottle
23PU723	AOS 5, AT 1, 110 cm	Broken Flake	1	<0.1	
23PU723	AOS 6, PH 4, 10-20 cm	Broken Flake	1	0.4	
23PU723	AOS 7, PH 2, 20-30 cm	Tertiary Flake	1	0.5	
23PU723	AOS 8, PH 1, 0-10 cm	Bifacial Thinning Flake	1	<0.1	
23PU723	AOS 8, PH 1, 80-90 cm	Tertiary Flake	2	0.1	
23PU723	AOS 10, PH 7, 10-20 cm	Bifacial Thinning Flake	1	4.8	
23PU723	AOS 11, PH 7, 10-20 cm	Tertiary Flake	1	0.1	
23PU723	AOS 12, PH 6, 0-10 cm	Broken Flake	1	0.3	
23PU723	AOS 12, PH 6, 20-30 cm	Bifacial Thinning Flake	1	0.6	
23PU723	AOS 13, PH 5, 10-20 cm	Tertiary Flake	1	0.1	
23PU723	AOS 14, PH 2, 45-50 cm	Broken Flake	1	0.1	
23PU723	AOS 15, PH 2-2, 10-20 cm	Broken Flake	1	0.2	
23PU723	AOS 16, PH 7, 40-50 cm	Bifacial Thinning Flake	1	0.9	
23PU723	AOS 16, PH 9, 30-40 cm	Tertiary Flake	1	0.1	
23PU723	AOS 16, PH 9, 30-40 cm	Bifacial Thinning Flake	1	0.1	
23PU723	AOS 9, AT 2, 40-50 cm	Broken Flake	1	0.1	
23PU723	AOS 9, AT 3, 40-50 cm	Broken Flake	1	0.2	
23PU723	AOS 9, PH 3, 20-30 cm	Tertiary Flake	1	0.5	
23PU723	AOS 9, PH 3, 40-50 cm	Bifacial Thinning Flake	1	0.3	
23PU723	AOS 9, PH 3, 50-60 cm	Broken Flake	1	0.2	
23PU723	AOS 9, PH 3, 70-80 cm	Broken Flake	1	0.1	
23PU723	AOS 9, PH 4, 30-40 cm	Block Shatter	1	0.3	
23PU723	AOS 9, PH 4, 40-50 cm	Fire-cracked Rock	1	57.3	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU723	AOS 9, PH 4, 50-60 cm	Broken Flake	2	0.1	
23PU723	AOS 9, PH 5, 20-30 cm	Broken Flake	1	0.1	
23PU723	AOS 9, PH 5, 60-70 cm	Block Shatter	1	0.9	
23PU723	AOS 9, PH 5, 70-80 cm	Broken Flake	1	0.1	
23PU723	AOS 9, PH 9, 40-50 cm	Bifacial Thinning Flake	1	0.4	
23PU723	AOS 9, PH 9, 10-20 cm	Primary Flake	1	1	
23PU723	AOS 9, PH 9, 10-20 cm	Block Shatter	1	3.6	
23PU723	AOS 9, PH 4N, 50-60 cm	Tertiary Flake	1	0.1	
23PU723	AOS 9, PH 4N, 70-80 cm	Tertiary Flake	1	0.2	
23PU723	AOS 9, PH4N, 70-80 cm	Broken Flake	1	0.1	
23PU723	AOS 9, PH4W, 0-10 cm	Broken Flake	2	0.1	
23PU723	AOS 9, PH4E, 40-50 cm	Broken Flake	1	0.5	
23PU723	AOS 9, PH4SW, 20-30 cm	Tertiary Flake	2	0.6	
23PU723	AOS 9, PH4SW, 50-60 cm	Broken Flake	1	0.1	
23PU723	AOS 9, PH 4NW, 30-40 cm	Broken Flake	1	1.3	
23PU723	AOS 9, PH4NW, 30-40 cm	Block Shatter	1	0.5	
23PU723	AOS 9, PH4SE, 20-30 cm	Core	1	31.9	
23PU723	AOS 9, PH4SE, 40-50 cm	Bifacial Thinning Flake	1	0.5	
23PU723	AOS 9, PH4S, 30-40 cm	Fire-cracked Rock	1	15	
23PU723	AOS 9, PH 4S, 50-60 cm	Tertiary Flake	1	0.1	
23PU723	AOS 9, PH4S, 50-60 cm	Block Shatter	1	0.5	
23PU723	AOS 9, PH4S, 60-70 cm	Tertiary Flake	1	<0.1	
23PU723	AOS 9, PH4S, 70-80 cm	Broken Flake	1	0.1	
23PU723	AOS 9, PH5S, 50-60 cm	Secondary Flake	1	1.2	
23PU723	AOS 9, PH5E, 40-50 cm	Fire-cracked Rock	1	251	
23PU723	AOS 8, PH8-1b, 20-30 cm	Broken Flake	1	0.2	
23PU723	AOS 8, PH8-1b, 30-40 cm	Bifacial Thinning Flake	1	0.4	
23PU723	AOS 14, PH14-2b, 10-20 cm	Broken Flake	1	1.5	
23PU723	AOS 13, PH13-5S, 70-80 cm	Broken Flake	1	0.1	
23PU723	AOS 6, PH4b, 0-10 cm	Broken Flake	1	0.9	
23PU723	AOS 9, PH9E, 0-10 cm	Tertiary Flake	1	<0.1	
23PU723	AOS 9, PH3W, 20-30 cm	Bifacial Thinning Flake	1	0.1	
23PU723	AOS 9, PH3W, 20-30 cm	Block Shatter	1	11.5	
23PU723	AOS 9, PH 11, 10-20 cm	Primary Flake	1	5.3	
23PU723	AOS 9, PH 11, 40-45 cm	Tertiary Flake	1	0.1	
23PU723	AOS 9, PH 11, 50-55 cm	Tertiary Flake	1	0.1	
23PU723	PH 12, 70-80 cm	Tertiary Flake	1	0.5	
23PU724	Surface	Thin Biface	1	2.8	Tip
23PU724	PH1, 0-10 cm	Broken Flake	1	0.3	
23PU724	PH 2, 0-10 cm	Broken Flake	1	0.1	
23PU724	PH 2, 10-20 cm	Tertiary Flake	1	0.1	
23PU724	PH 3, 0-10 cm	Tertiary Flake	1	1	
23PU724	PH 4, 0-10 cm	Broken Flake	1	0.7	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU725	Surface	Core	1	60.4	
23PU725	Surface	Secondary Flake	2	22.6	
23PU725	Surface	Tertiary Flake	5	1.4	
23PU725	Surface	Bifacial Thinning Flake	2	0.9	
23PU725	Surface	Broken Flake	12	11.4	
23PU725	Surface	Block Shatter	9	12.2	
23PU725	Surface	Pitted Cobble	1	802.4	
23PU725	Surface	Mano/Hammer	1	427.1	
23PU725	PH 2, 0-10 cm	Tertiary Flake	1	0.5	
23PU725	PH 4, 0-10 cm	Broken Flake	1	0.1	
23PU725	PH 4, 10-20 cm	Broken Flake	2	0.4	
23PU725	PH 5, 0-10 cm	Broken Flake	1	0.6	
23PU725	PH 5, 10-20 cm	Broken Flake	1	0.3	
23PU725	PH 6, 20-30 cm	Tertiary Flake	1	0.3	
23PU725	PH 6, 20-30 cm	Broken Flake	1	0.3	
23PU725	PH 7, 10-20 cm	Broken Flake	1	0.1	
23PU725	PH 9, 0-10 cm	Broken Flake	2	1.5	
23PU725	PH 10, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU725	PH 10, 10-20 cm	Broken Flake	1	0.2	
23PU725	PH 11, 0-10 cm	Broken Flake	1	0.4	
23PU725	PH 13, 0-10 cm	Tertiary Flake	1	0.3	
23PU725	PH 13, 0-10 cm	Broken Flake	1	0.6	
23PU725	PH 14, 10-20 cm	Broken Flake	1	1.3	
23PU725	PH 14, 10-20 cm	Block Shatter	1	1.5	
23PU725	PH 15, 0-10 cm	Primary Flake	1	9.2	
23PU725	PH 15, 0-10 cm	Secondary Flake	1	2.6	
23PU725	PH 15, 0-10 cm	Broken Flake	2	3.9	
23PU725	PH 16, 0-10 cm	Broken Flake	2	1.5	
23PU725	PH 17, 0-10 cm	Broken Flake	1	1.6	
23PU725	PH 18, 0-10 cm	Bifacial Thinning Flake	1	5.3	
23PU725	PH 19, 0-10 cm	Tertiary Flake	1	0.1	
23PU725	PH 20, 0-10 cm	Tertiary Flake	1	0.2	
23PU725	PH 14, 0-10 cm	Tertiary Flake	2	3.6	
23PU725	PH 14, 0-10 cm	Bifacial Thinning Flake	1	0.3	
23PU725	PH 14, 0-10 cm	Block Shatter	2	1.4	
23PU725	PH 3, 0-10 cm	Bifacial Thinning Flake	2	0.3	
23PU725	PH 12, 0-10 cm	Tertiary Flake	1	0.8	
23PU725	PH 12, 0-10 cm	Bifacial Thinning Flake	1	0.4	
23PU725	PH 21, 0-10 cm	Tertiary Flake	1	0.6	
23PU725	PH 21, 10-20 cm	Broken Flake	1	0.2	
23PU726	Surface	Tertiary Flake	1	0.1	
23PU726	Surface	Bifacial Thinning Flake	1	1.5	
23PU726	Surface	Broken Flake	1	2.7	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU726	Surface	Thin Biface	1	2.7	Point Midsection?
23PU726	PH 1, 10-20 cm	Secondary Flake	1	0.2	
23PU726	PH 2, 0-10 cm	Tertiary Flake	1	0.1	
23PU726	PH 3, 0-10 cm	Bifacial Thinning Flake	1	0.4	
23PU726	PH 4, 0-10 cm	Broken Flake	1	0.2	
23PU726	PH 5, 10-20 cm	Broken Flake	1	0.3	
23PU726	PH 6, 0-10 cm	Tertiary Flake	1	0.3	
23PU727	Surface	Bifacial Thinning Flake	1	1.1	
23PU727	Surface	Broken Flake	3	4	
23PU727	Surface	Block Shatter	4	84.5	
23PU727	Surface	Thin Biface	1	3.5	Midsection
23PU728	Surface	Secondary Flake	1	1.4	
23PU728	Surface	Bifacial Thinning Flake	1	0.4	
23PU728	Surface	Broken Flake	1	1.8	
23PU729	Surface	Pharmaceutical Bottle	2		with graduated markings
23PU729	Surface	Liquor Bottle	1		Brown
23PU729	Surface	Soda Bottle	1		Light Green Neck
23PU731	AT 1, 20-30 cm	Tertiary Flake	1	0.1	
23PU731	AT 1, 40-50 cm	Broken Flake	2	0.1	
23PU731	AT 1, 55-65 cm	Broken Flake	1	0.1	
23PU731	AT 2, 70-80 cm	Tertiary Flake	1	0.6	
23PU731	PH 1-1, 0-10 cm	Tertiary Flake	1	0.4	
23PU731	PH 1-1, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU731	PH 1-1, 10-20 cm	Tertiary Flake	2	0.4	
23PU731	PH 1-1, 20-30 cm	Tertiary Flake	1	0.1	
23PU731	PH 1-1, 20-30 cm	Broken Flake	1	0.1	
23PU731	PH 1-1, 30-40 cm	Bifacial Thinning Flake	2	0.3	
23PU731	PH 1-1, 40-50 cm	Tertiary Flake	1	0.7	
23PU731	PH 1-1, 40-50 cm	Broken Flake	1	0.1	
23PU731	PH 1-2, 20-30 cm	Bifacial Thinning Flake	1	0.1	
23PU731	PH 1-2, 20-30 cm	Hafted Biface	1	1.2	Scallorn Point
23PU731	PH 1-2, 40-50 cm	Broken Flake	1	0.3	
23PU731	PH 1-3, 20-30 cm	Broken Flake	1	0.7	
23PU731	PH 1-3, 20-30 cm	Block Shatter	2	2.8	
23PU731	PH 2-3, 20-30 cm	Broken Flake	1	1.5	
23PU731	PH 3-1, 0-20 cm	Broken Flake	1	0.2	
23PU731	PH 3-1, 20-30 cm	Bifacial Thinning Flake	1	0.3	
23PU731	PH 3-1, 30-40 cm	Bifacial Thinning Flake	1	0.4	
23PU731	PH 3-1, 40-50 cm	Block Shatter	1	6.8	
23PU731	PH 3-1, 60-70 cm	Tertiary Flake	1	<0.1	
23PU731	PH 3-1, 60-70 cm	Block Shatter	1	4.8	
23PU731	PH 3-2, 60-70 cm	Bifacial Thinning Flake	1	0.8	
23PU731	PH 3-3, 10-20 cm	Broken Flake	1	0.1	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU731	PH 3-3, 60-70 cm	Tertiary Flake	1	0.1	
23PU731	PH 3-5, 30-40 cm	Tertiary Flake	1	4.8	
23PU732	PH 1, 40-50 cm	Broken Flake	4	0.8	
23PU732	PH 2, 30-40 cm	Tertiary Flake	1	2.2	
23PU732	PH 3, 10-20 cm	Tertiary Flake	1	2.2	
23PU733	Surface	Broken Flake	1	0.2	
23PU733	Surface	Block Shatter	1	8.3	
23PU733	PH 1, 0-10 cm	Broken Flake	5	1.2	
23PU733	PH 1, 0-10 cm	Block Shatter	3	8.5	
23PU733	PH 2, 20-30 cm	Broken Flake	4	0.5	
23PU733	PH 2, 20-30 cm	Block Shatter	3	12.3	
23PU733	PH 2, 40-50 cm	Broken Flake	1	0.4	
23PU733	PH 3, 20-30 cm	Broken Flake	1	0.3	
23PU733	PH 4, 0-10 cm	Tertiary Flake	1	0.2	
23PU733	PH 5, 0-10 cm	Broken Flake	1	0.2	
23PU733	PH 1, 10-20 cm	Secondary Flake	1	0.9	
23PU733	PH 1, 10-20 cm	Broken Flake	7	0.7	
23PU734	PH 1-2, 30-40 cm	Block Shatter	1	2.1	
23PU734	PH 1-2, 40-50 cm	Broken Flake	1		Lost in Field
23PU734	PH 2-1, 20-30 cm	Broken Flake	1	0.1	
23PU734	PH 2-1, 30-40 cm	Broken Flake	1	0.3	
23PU734	AT 1, 30-40 cm	Broken Flake	1	2.2	
23PU734	AT 2, 10-20 cm	Broken Flake	1	0.1	
23PU736	PH 1, 20-30 cm	Tertiary Flake	1	0.1	
23PU736	PH 1, 40-50 cm	Broken Flake	2	0.2	
23PU736	PH 2, 0-10 cm	Broken Flake	1	1.9	
23PU736	PH 2, 10-20 cm	Broken Flake	1	1.8	
23PU736	PH 2, 20-30 cm	Bifacial Thinning Flake	1	9.8	
23PU736	PH 2, 20-30 cm	Broken Flake	1	0.2	
23PU736	PH 2, 30-40 cm	Broken Flake	2	0.2	
23PU736	PH 3, 20-30 cm	Tertiary Flake	1	1.8	
23PU736	PH 4, 0-10 cm	Bifacial Thinning Flake	1	0.5	
23PU736	PH 4, 0-10 cm	Broken Flake	1	0.2	
23PU736	PH 5, 0-10 cm	Broken Flake	1	0.1	
23PU736	PH 6, 10-20 cm	Tertiary Flake	1	1.9	
23PU736	PH 6, 10-20 cm	Broken Flake	1	0.4	
23PU736	PH 7, 10-20 cm	Broken Flake	2	0.3	
23PU737	Surface	Tertiary Flake	1	1.8	
23PU737	Surface	Block Shatter	1	1.3	
23PU737	PH 1, 80-90 cm	Tertiary Flake	1	0.9	
23PU737	PH 2, 90-100 cm	Broken Flake	1	0.2	
23PU738	PH 1-1, 20-30 cm	Broken Flake	1	0.2	
23PU738	PH 1-1, 30-40 cm	Thin Biface	1	3.4	Fragment

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU738	PH 2, 30-40 cm	Tertiary Flake	1	0.5	
23PU738	PH 2-1, 0-10 cm	Rough Biface	1	37.8	
23PU738	PH 3-1, 40-50 cm	Broken Flake	1	0.2	
23PU739	Surface	Tertiary Flake	4	9.1	
23PU739	Surface	Bifacial Thinning Flake	6	11.6	
23PU739	Surface	Broken Flake	7	6.3	
23PU739	Surface	Block Shatter	7	23.5	
23PU739	Surface	Hafted Biface	1	1.3	Triangular Point Base
23PU739	Surface	Bone	1	0.7	Unidentified Bird Long Bone Fragment
23PU739	Surface	Mussel Shell	4	6.1	Unidentified
23PU740	PH 1, 20-30 cm	Tertiary Flake	1	0.1	
23PU740	PH 1, 20-30 cm	Bifacial Thinning Flake	1	0.8	
23PU740	PH 3, 60-70 cm	Broken Flake	1	0.7	
23PU740	PH 4, 20-30 cm	Broken Flake	1	0.7	
23PU741	PH 1, 20-30 cm	Broken Flake	2	0.8	
23PU741	PH 2, 30-40 cm	Broken Flake	1	0.4	
23PU741	PH 3, 0-10 cm	Tertiary Flake	1	0.5	
23PU741	PH 3, 30-40 cm	Broken Flake	1	0.5	
23PU741	PH 3, 70-80 cm	Tertiary Flake	1	10.9	
23PU741	PH 4, 40-50 cm	Tertiary Flake	1	0.1	
23PU741	PH 5, 30-40 cm	Broken Flake	1	0.2	
23PU741	PH 6, 0-10 cm	Primary Flake	1	0.9	
23PU741	PH 6, 0-10 cm	Bifacial Thinning Flake	1	0.8	
23PU741	PH 7, 10-20 cm	Secondary Flake	1	0.5	
23PU741	PH 8, 60-70 cm	Primary Flake	1	3.5	
23PU741	AT 2, 0-10 cm	Tertiary Flake	1	0.4	
23PU742	Surface	Secondary Flake	1	1.6	
23PU742	Surface	Tertiary Flake	1	4.8	
23PU742	Surface	Bifacial Thinning Flake	1	0.3	
23PU742	Surface	Broken Flake	11	18.7	
23PU742	Surface	Block Shatter	1	0.4	
23PU742	Surface	Uniface	1	5.1	Spokeshave/Notch
23PU742	Surface	Rough Biface	1	23.1	Midsection
23PU742	Surface	Thin Biface	1	6.6	Midsection-Point?
23PU742	PH 1, 0-10 cm	Tertiary Flake	1	0.2	
23PU742	PH 1, 0-10 cm	Bifacial Thinning Flake	1	0.7	
23PU742	PH 1, 20-30 cm	Broken Flake	1	1.9	
23PU742	PH 1, 30-40 cm	Bifacial Thinning Flake	1	0.1	
23PU742	PH 1, 30-40 cm	Broken Flake	1	0.3	
23PU742	PH 1, 10-20 cm	Tertiary Flake	1	3.4	
23PU742	PH 1, 10-20 cm	Bifacial Thinning Flake	2	0.8	
23PU742	PH 1, 10-20 cm	Broken Flake	3	1.8	
23PU742	PH 2, 0-10 cm	Bifacial Thinning Flake	1	0.6	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU742	PH 2, 0-10 cm	Broken Flake	1	0.2	
23PU742	PH 2, 0-10 cm	Block Shatter	2	3.1	
23PU742	PH 2, 20-30 cm	Secondary Flake	1	0.7	
23PU742	PH 2, 30-40 cm	Tertiary Flake	1	0.3	
23PU742	PH 2, 30-40 cm	Broken Flake	2	0.5	
23PU742	PH 3, 0-10 cm	Primary Flake	1	1.8	
23PU742	PH 3, 0-10 cm	Broken Flake	2	0.5	
23PU742	PH 3, 10-20 cm	Secondary Flake	1	3.5	
23PU742	PH 3, 10-20 cm	Tertiary Flake	1	0.4	
23PU742	PH 3, 10-20 cm	Bifacial Thinning Flake	2	2.7	
23PU742	PH 3, 10-20 cm	Broken Flake	2	3.7	
23PU742	PH 3, 10-20 cm	Block Shatter	1	4	
23PU742	PH 3, 10-20 cm	Hammerstone	1	165.4	
23PU742	PH 4, 20-30 cm	Broken Flake	2	0.8	
23PU742	PH 5, 0-10 cm	Broken Flake	2	0.7	
23PU742	PH 5, 10-20 cm	Bifacial Thinning Flake	4	1.7	
23PU742	PH 5, 10-20 cm	Broken Flake	1	0.3	
23PU742	PH 5, 20-30 cm	Tertiary Flake	2	0.5	
23PU742	PH 5, 20-30 cm	Bifacial Thinning Flake	1	0.7	
23PU742	PH 5, 20-30 cm	Broken Flake	2	0.8	
23PU742	PH 6, 0-10 cm	Tertiary Flake	1	0.2	
23PU742	PH 6, 0-10 cm	Bifacial Thinning Flake	1	0.3	
23PU742	PH 6, 0-10 cm	Broken Flake	2	1	
23PU742	PH 6, 10-20 cm	Bifacial Thinning Flake	1	0.1	
23PU742	PH 6, 10-20 cm	Tertiary Flake	1	0.1	
23PU742	PH 6, 10-20 cm	Block Shatter	3	2.1	
23PU742	PH 6, 20-30 cm	Bifacial Thinning Flake	1	0.1	
23PU742	PH 6, 20-30 cm	Broken Flake	2	1.9	
23PU742	PH 6, 30-40 cm	Broken Flake	3	1.3	
23PU742	PH 7, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU742	PH 7, 10-20 cm	Broken Flake	6	1.5	
23PU742	PH 7, 20-30 cm	Broken Flake	2	0.2	
23PU742	PH 8, 0-10 cm	Tertiary Flake	1	0.4	
23PU742	PH 8, 0-10 cm	Bifacial Thinning Flake	1	0.3	
23PU742	PH 8, 0-10 cm	Broken Flake	3	0.7	
23PU742	PH 8, 10-20 cm	Broken Flake	3	0.5	
23PU742	PH 8, 20-30 cm	Broken Flake	2	0.3	
23PU742	PH 8, 20-30 cm	Block Shatter	1	0.3	
23PU742	PH 8, 30-40 cm	Tertiary Flake	1	0.2	
23PU742	PH 8, 30-40 cm	Broken Flake	2	0.3	
23PU742	PH 8, 40-50 cm	Tertiary Flake	1	0.1	
23PU742	PH 8, 40-50 cm	Broken Flake	1	0.7	
23PU742	PH 9, 10-20 cm	Broken Flake	2	0.4	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU742	PH 9, 10-20 cm	Block Shatter	1	2.5	
23PU742	PH 10, 0-10 cm	Broken Flake	1	0.3	
23PU742	PH 10, 10-20 cm	Bifacial Thinning Flake	1	0.2	
23PU742	PH 11, 10-20 cm	Tertiary Flake	1	0.1	
23PU742	PH 11, 40-50 cm	Tertiary Flake	1	0.1	
23PU742	PH 11, 40-50 cm	Broken Flake	1	0.4	
23PU742	PH 12, 30-40 cm	Broken Flake	1	0.4	
23PU742	PH 13, 0-10 cm	Broken Flake	1	0.4	
23PU742	PH 13, 10-20 cm	Tertiary Flake	1	0.2	
23PU742	PH 13, 10-20 cm	Broken Flake	1	0.3	
23PU742	PH 14, 0-10 cm	Broken Flake	1	0.1	
23PU742	PH 15, 30-40 cm	Broken Flake	1	0.1	
23PU742	PH 16, 0-10 cm	Secondary Flake	1	0.8	
23PU742	PH 16, 0-10 cm	Bifacial Thinning Flake	1	0.8	
23PU742	PH 16, 0-10 cm	Broken Flake	1	0.1	
23PU742	PH 17, 0-10 cm	Secondary Flake	1	0.3	
23PU742	PH 17, 0-10 cm	Tertiary Flake	1	0.6	
23PU742	PH 17, 0-10 cm	Bifacial Thinning Flake	1	0.3	
23PU742	PH 17, 0-10 cm	Broken Flake	4	0.7	
23PU742	PH 17, 0-10 cm	Thin Biface	1	2.8	
23PU742	PH 17, 10-20 cm	Bifacial Thinning Flake	1	<0.1	
23PU742	PH 17, 10-20 cm	Block Shatter	2	0.2	
23PU742	PH 17, 20-30 cm	Tertiary Flake	1	0.1	
23PU742	PH 17, 20-30 cm	Broken Flake	1	0.3	
23PU742	PH 18, 10-20 cm	Broken Flake	1	0.1	
23PU742	PH 18, 10-20 cm	Block Shatter	1	1.4	
23PU742	PH 19, 0-10 cm	Broken Flake	3	0.3	
23PU742	PH 19, 10-20 cm	Tertiary Flake	1	0.2	
23PU742	PH 19, 10-20 cm	Broken Flake	3	0.3	
23PU742	PH 20, 10-20 cm	Broken Flake	1	0.1	
23PU742	PH 21, 0-10 cm	Bifacial Thinning Flake	1	0.7	
23PU742	PH 21, 30-40 cm	Bifacial Thinning Flake	1	0.1	
23PU742	PH 22, 20-30 cm	Broken Flake	1	0.2	
23PU742	PH 23, 0-10 cm	Tertiary Flake	1	0.6	
23PU742	PH 23, 0-10 cm	Broken Flake	2	2	
23PU742	PH S4, 0-10 cm	Secondary Flake	2	3.9	
23PU742	PH S4, 0-10 cm	Bifacial Thinning Flake	2	4.2	
23PU742	PH S4, 0-10 cm	Broken Flake	3	1.1	
23PU742	PH S4, 10-20 cm	Tertiary Flake	1	0.2	
23PU742	PH S4, 10-20 cm	Bifacial Thinning Flake	1	0.1	
23PU742	PH S4, 10-20 cm	Broken Flake	8	4.2	
23PU742	PH S4, 10-20 cm	Thick Biface	1	23.7	Ovoid-complete
23PU742	PH S4, 20-30 cm	Secondary Flake	1	0.5	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU742	PH S4, 20-30 cm	Tertiary Flake	2	0.3	
23PU742	PH S4, 20-30 cm	Bifacial Thinning Flake	1	1.4	
23PU742	PH S4, 20-30 cm	Broken Flake	3	0.4	
23PU742	PH S5, 0-10 cm	Tertiary Flake	2	1.2	
23PU742	PH S5, 0-10 cm	Broken Flake	7	2.6	
23PU742	PH S5, 0-10 cm	Block Shatter	2	39.3	
23PU742	PH S6, 10-20 cm	Core	1	155.5	
23PU742	PH S6, 10-20 cm	Secondary Flake	1	1	
23PU742	PH S6, 10-20 cm	Tertiary Flake	1	0.5	
23PU742	PH S6, 10-20 cm	Bifacial Thinning Flake	3	1.2	
23PU742	PH S6, 10-20 cm	Broken Flake	1	<0.1	
23PU742	PH S6, 20-30 cm	Broken Flake	1	0.3	
23PU742	PH S7, 0-10 cm	Tertiary Flake	2	1	
23PU742	PH S7, 0-10 cm	Broken Flake	8	2.2	
23PU742	PH S7, 0-10 cm	Block Shatter	3	8.2	
23PU742	PH S8, 0-10 cm	Tertiary Flake	2	1.6	
23PU742	PH S8, 0-10 cm	Broken Flake	5	1.9	
23PU742	PH S8, 0-10 cm	Block Shatter	2	0.8	
23PU742	PH S8, 10-20 cm	Tertiary Flake	3	0.8	
23PU742	PH S8, 10-20 cm	Bifacial Thinning Flake	1	1.3	
23PU742	PH S8, 10-20 cm	Broken Flake	4	0.7	
23PU742	PH S9, 0-10 cm	Tertiary Flake	2	0.7	
23PU742	PH S9, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU742	PH S9, 0-10 cm	Broken Flake	4	0.5	
23PU742	PH S9, 0-10 cm	Block Shatter	2	3.1	
23PU742	PH S9, 20-25 cm	Bifacial Thinning Flake	2	0.4	
23PU742	PH S10, 0-10 cm	Core	1	51.1	
23PU742	PH S10, 10-20 cm	Tertiary Flake	1	0.2	
23PU742	PH S10, 10-20 cm	Broken Flake	2	0.5	
23PU742	PH S11, 10-20 cm	Bifacial Thinning Flake	1	2	
23PU742	PH S11, 10-20 cm	Broken Flake	1	0.3	
23PU742	PH S12, 0-10 cm	Tertiary Flake	1	3.7	
23PU742	PH S12, 0-10 cm	Broken Flake	1	0.2	
23PU742	PH S12, 0-10 cm	Block Shatter	1	1.3	
23PU742	PH S13, 0-10 cm	Broken Flake	1	0.2	
23PU742	PH S13, 0-10 cm	Block Shatter	1	2.8	
23PU742	PH S13, 10-20 cm	Broken Flake	2	0.6	
23PU742	PH S13, 20-30 cm	Tertiary Flake	1	0.1	
23PU742	PH S13, 20-30 cm	Bifacial Thinning Flake	2	1.5	
23PU742	PH S13, 20-30 cm	Broken Flake	3	1.1	
23PU742	PH 24, 0-10 cm	Tertiary Flake	1	0.2	
23PU743	AT 1, 20-30 cm	Tertiary Flake	1	<0.1	
23PU743	AT 1, 20-30 cm	Broken Flake	1	0.2	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU743	AT 2, 0-10 cm	Secondary Flake	1	0.2	
23PU743	AT 2, 0-10 cm	Tertiary Flake	1	0.2	
23PU743	AT 2, 0-10 cm	Broken Flake	1	0.1	
23PU743	AT 2, 30-40 cm	Bifacial Thinning Flake	1	<0.1	
23PU743	AT 2, 30-40 cm	Broken Flake	2	<0.1	
23PU743	AT 2, 30-40 cm	Block Shatter	1	1.7	
23PU743	AT 2, 40-50 cm	Broken Flake	1	0.6	
23PU743	AT 3, 0-10 cm	Secondary Flake	1	0.3	
23PU743	AT 3, 0-10 cm	Tertiary Flake	1	0.1	
23PU743	AT 3, 30-40 cm	Broken Flake	1	0.1	
23PU743	PH 1, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU743	PH 1, 10-20 cm	Broken Flake	1	0.1	
23PU743	PH 1, 40-50 cm	Bifacial Thinning Flake	1	0.1	
23PU743	PH 1, 40-50 cm	Broken Flake	3	1.9	
23PU743	PH 1, 50-60 cm	Broken Flake	1	0.1	
23PU743	PH 1, 60-70 cm	Broken Flake	1	1	
23PU743	PH 1, 70-80 cm	Broken Flake	1	0.2	
23PU743	PH 1, 80-90 cm	Tertiary Flake	1	0.6	
23PU743	PH 1, 80-90 cm	Broken Flake	1	0.5	
23PU743	PH 1, 80-90 cm	Block Shatter	1(1)	28.8	
23PU743	PH 2, 10-20 cm	Tertiary Flake	1	0.2	
23PU743	PH 2, 10-20 cm	Bifacial Thinning Flake	3	0.2	
23PU743	PH 2, 10-20 cm	Broken Flake	3	1.6	
23PU743	PH 2, 20-30 cm	Bifacial Thinning Flake	1	<0.1	
23PU743	PH 2, 20-30 cm	Broken Flake	3	0.4	
23PU743	PH 2, 40-50 cm	Broken Flake	1	0.1	
23PU743	PH 3, 60-70 cm	Tertiary Flake	1	0.1	
23PU743	PH 4, 0-10 cm	Tertiary Flake	3	1.1	
23PU743	PH 4, 0-10 cm	Bifacial Thinning Flake	1	1	
23PU743	PH 4, 0-10 cm	Broken Flake	1	0.7	
23PU743	PH 4, 10-20 cm	Broken Flake	3	1.9	
23PU743	PH 4, 10-20 cm	Block Shatter	2	1.8	
23PU743	PH 4, 20-30 cm	Tertiary Flake	1	0.1	
23PU743	PH 4, 20-30 cm	Bifacial Thinning Flake	1	0.6	
23PU743	PH 4, 30-40 cm	Bifacial Thinning Flake	1	0.9	
23PU743	PH 4, 30-40 cm	Broken Flake	3	6.6	
23PU743	PH 4, 40-50 cm	Bifacial Thinning Flake	1	0.5	
23PU743	PH 4, 40-50 cm	Broken Flake	1	0.1	
23PU743	PH 4, 50-60 cm	Tertiary Flake	2	2.4	
23PU743	PH 4, 60-70 cm	Broken Flake	1	0.1	
23PU743	PH 5, 0-10 cm	Secondary Flake	1	4.6	
23PU743	PH 5, 0-10 cm	Tertiary Flake	1	<0.1	
23PU743	PH 5, 0-10 cm	Broken Flake	2	<0.1	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU743	PH 5, 40-50 cm	Broken Flake	4	0.3	
23PU743	PH 6, 0-10 cm	Broken Flake	3	0.5	
23PU743	PH 6, 20-30 cm	Block Shatter	2	1.9	
23PU743	PH 6, 50-60 cm	Tertiary Flake	1	<0.1	
23PU743	PH 7, 0-10 cm	Bifacial Thinning Flake	1	0.4	
23PU743	PH 8, 0-10 cm	Tertiary Flake	1	0.1	
23PU743	PH 8, 0-10 cm	Broken Flake	1	<0.1	
23PU743	PH 8, 10-20 cm	Broken Flake	2	0.4	
23PU743	PH 8, 20-30 cm	Tertiary Flake	1	0.1	
23PU743	PH 8, 20-30 cm	Broken Flake	1	0.1	
23PU743	PH 8, 20-30 cm	Thin Biface	1	3.9	
23PU743	PH 8, 30-40 cm	Broken Flake	1	0.1	
23PU743	PH 9, 0-10 cm	Tertiary Flake	1	1.3	
23PU743	PH 9, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU743	PH 9, 10-20 cm	Bifacial Thinning Flake	1	0.1	
23PU743	PH 9, 10-20 cm	Broken Flake	1	0.1	
23PU743	PH 9, 10-20 cm	Block Shatter	1	3.1	
23PU743	PH 9, 10-20 cm	Thin Biface	1	2.4	Asymmetrical Tip
23PU743	PH 9, 20-30 cm	Tertiary Flake	1	0.1	
23PU743	PH 9, 20-30 cm	Bifacial Thinning Flake	1	0.6	
23PU743	PH 9, 20-30 cm	Broken Flake	1	0.5	
23PU743	PH 9, 40-50 cm	Tertiary Flake	1	0.2	
23PU743	PH 9, 40-50 cm	Broken Flake	1	0.2	
23PU743	PH 9, 50-60 cm	Broken Flake	1	0.4	
23PU743	PH 9, 70-80 cm	Tertiary Flake	1	1.1	
23PU743	PH 9, 70-80 cm	Broken Flake	1	0.9	
23PU743	PH 10, 60-70 cm	Tertiary Flake	1	0.1	
23PU743	PH 11, 10-20 cm	Bifacial Thinning Flake	1	0.8	
23PU743	PH 11, 10-20 cm	Broken Flake	1	0.1	
23PU743	PH 11, 40-50 cm	Broken Flake	2	0.1	
23PU743	PH 14, 30-40 cm	Bifacial Thinning Flake	1	1.2	
23PU743	PH 15, 10-20 cm	Broken Flake	1	0.4	
23PU743	PH 15, 30-40 cm	Fire-cracked Rock	1	143.9	
23PU743	PH 16, 0-10 cm	Block Shatter	1	1.4	
23PU743	PH 16, 10-20 cm	Broken Flake	1		Lost in Field
23PU743	PH 17, 0-10 cm	Broken Flake	2	2.2	
23PU743	PH 17, 10-20 cm	Broken Flake	1	0.1	
23PU743	PH 17, 50-60 cm	Broken Flake	1	0.3	
23PU743	PH 18, 20-30 cm	Bifacial Thinning Flake	1	0.4	
23PU743	PH 19, 10-20 cm	Broken Flake	1	0.2	
23PU745	Surface-Bag 389	Thin Biface	1	2.9	Midsection-Point?
23PU745	Surface-Bag 501	Bifacial Thinning Flake	1	0.9	
23PU745	Surface-Bag 501	Broken Flake	1	0.4	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	Surface-Bag 501	Thick Biface	1	24.4	Midsection
23PU745	Road Surface	Tertiary Flake	3	1.8	
23PU745	Road Surface	Bifacial Thinning Flake	4	0.5	
23PU745	Road Surface	Broken Flake	9	10.5	
23PU745	Road Surface	Block Shatter	2	1.9	
23PU745	Surface-Bag 519	Secondary Flake	2	12.2	
23PU745	Surface-Bag 519	Tertiary Flake	2	0.9	
23PU745	Surface-Bag 519	Bifacial Thinning Flake	2	2.7	
23PU745	Surface-Bag 519	Broken Flake	12	17.7	
23PU745	Surface-Bag 519	Block Shatter	4	15.9	
23PU745	Surface-Bag 519	Rough Biface	1	26	Basal Fragment
23PU745	Surface-Bag 519	Thin Biface	2	7.1	Both probably point fragments
23PU745	Surface-Bag 520	Secondary Flake	2	7.3	
23PU745	Surface-Bag 520	Tertiary Flake	19	15.6	
23PU745	Surface-Bag 520	Bifacial Thinning Flake	13	9.2	
23PU745	Surface-Bag 520	Broken Flake	39	27.4	
23PU745	Surface-Bag 520	Blade	1	9.8	
23PU745	Surface-Bag 520	Block Shatter	11	35.3	
23PU745	Surface-Bag 520	Hafted Biface	1	10.5	Etley base
23PU745	Surface-Bag 520	Thick Biface	1	26	Midsection
23PU745	Surface-Bag 520	Fire-cracked Rock	1	27.9	
23PU745	Surface-20 m N of PH 123	Secondary Flake	1	4.4	
23PU745	PH 1, 0-10 cm	Tertiary Flake	1	0.4	
23PU745	PH 1, 0-10 cm	Bifacial Thinning Flake	1	0.7	
23PU745	PH 1, 0-10 cm	Broken Flake	1	0.2	
23PU745	PH 2, 0-10 cm	Broken Flake	2	0.4	
23PU745	PH 2, 0-10 cm	Block Shatter	5	3.9	
23PU745	PH 2, 0-10 cm	Uniface	1	34.1	Ovate-expedient tool
23PU745	PH 2, 10-20 cm	Tertiary Flake	2	0.1	
23PU745	PH 2, 10-20 cm	Bifacial Thinning Flake	2	0.3	
23PU745	PH 2, 10-20 cm	Broken Flake	2	0.7	
23PU745	PH 2, 10-20 cm	Block Shatter	3	2.5	
23PU745	PH 2, 20-30 cm	Tertiary Flake	1	<0.1	
23PU745	PH 2, 20-30 cm	Bifacial Thinning Flake	1	0.2	
23PU745	PH 2, 20-30 cm	Broken Flake	6	0.8	
23PU745	PH 2, 20-30 cm	Block Shatter	4	3.1	
23PU745	PH 3, 0-10 cm	Tertiary Flake	1	0.9	
23PU745	PH 3, 0-10 cm	Block Shatter	2	3.1	
23PU745	PH 4, 0-10 cm	Broken Flake	4	2.8	
23PU745	PH 4, 10-20 cm	Tertiary Flake	1	0.1	
23PU745	PH 4, 10-20 cm	Broken Flake	2	0.4	
23PU745	PH 5, 0-10 cm	Broken Flake	1	0.2	
23PU745	PH 5, 10-20 cm	Bifacial Thinning Flake	1	0.2	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 5, 10-20 cm	Broken Flake	1	0.2	
23PU745	PH 5, 10-20 cm	Thin Biface	1	3.3	Tip
23PU745	PH 5, 20-30 cm	Broken Flake	1	1.8	
23PU745	PH 6, 0-10 cm	Broken Flake	2	0.3	
23PU745	PH 7, 0-10 cm	Broken Flake	1	0.2	
23PU745	PH 8, 0-10 cm	Secondary Flake	1	1.6	
23PU745	PH 8, 0-10 cm	Tertiary Flake	1	0.7	
23PU745	PH 8, 0-10 cm	Broken Flake	3	1.2	
23PU745	PH 8, 0-10 cm	Block Shatter	1	0.4	
23PU745	PH 8, 10-20 cm	Tertiary Flake	2	0.5	
23PU745	PH 8, 10-20 cm	Broken Flake	4	1.8	
23PU745	PH 9, 0-10 cm	Primary Flake	1	3.4	
23PU745	PH 9, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU745	PH 9, 0-10 cm	Broken Flake	3	1.4	
23PU745	PH 9, 10-20 cm	Tertiary Flake	2	0.2	
23PU745	PH 9, 10-20 cm	Bifacial Thinning Flake	1	0.5	
23PU745	PH 9, 10-20 cm	Broken Flake	1	0.2	
23PU745	PH 11, 0-10 cm	Bifacial Thinning Flake	2	4.1	
23PU745	PH 12, 0-10 cm	Block Shatter	1	0.3	
23PU745	PH 13, 0-10 cm	Tertiary Flake	2	0.2	
23PU745	PH 13, 0-10 cm	Broken Flake	3	1	
23PU745	PH 13, 10-20 cm	Broken Flake	1	0.3	
23PU745	PH 14, 0-10 cm	Bifacial Thinning Flake	1	0.3	
23PU745	PH 14, 0-10 cm	Broken Flake	1	0.2	
23PU745	PH 14, 10-20 cm	Broken Flake	2	0.3	
23PU745	PH 14, 10-20 cm	Block Shatter	1	0.6	
23PU745	PH 15, 0-10 cm	Broken Flake	2	1	
23PU745	PH 15, 10-20 cm	Bifacial Thinning Flake	1	2.9	
23PU745	PH 15, 10-20 cm	Broken Flake	1	0.3	
23PU745	PH 16, 0-10 cm	Bifacial Thinning Flake	1	1.2	
23PU745	PH 16, 0-10 cm	Broken Flake	1	1	
23PU745	PH 17, 0-10 cm	Secondary Flake	1(1)	10.2	
23PU745	PH 17, 0-10 cm	Tertiary Flake	1	0.1	
23PU745	PH 17, 0-10 cm	Broken Flake	3	0.5	
23PU745	PH 17, 0-10 cm	Block Shatter	4	1.7	
23PU745	PH 17, 10-20 cm	Broken Flake	2	5.9	
23PU745	PH 17, 10-20 cm	Block Shatter	1	0.6	
23PU745	PH 19, 0-10 cm	Uniface	1	7	Perforator/Drill and Spokeshave
23PU745	PH 20, 0-10 cm	Broken Flake	1	0.4	
23PU745	PH 20, 10-20 cm	Broken Flake	5	4.2	
23PU745	PH 21, 0-10 cm	Broken Flake	3	1.2	
23PU745	PH 22, 0-10 cm	Bifacial Thinning Flake	2	1.2	
23PU745	PH 22, 0-10 cm	Broken Flake	4	4	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 22, 10-20 cm	Tertiary Flake	2	0.7	
23PU745	PH 22, 10-20 cm	Broken Flake	2	5.2	
23PU745	PH 23, 0-10 cm	Broken Flake	2	1.1	
23PU745	PH 24, 0-10 cm	Secondary Flake	1	4.2	
23PU745	PH 24, 0-10 cm	Tertiary Flake	1	7.5	
23PU745	PH 24, 0-10 cm	Bifacial Thinning Flake	1	0.2	
23PU745	PH 24, 0-10 cm	Broken Flake	12	5.1	
23PU745	PH 24, 0-10 cm	Block Shatter	1	1.8	
23PU745	PH 24, 0-10 cm	Hafted Biface	1	1.3	Scallorn base
23PU745	PH 24, 10-20 cm	Broken Flake	1	0.3	
23PU745	PH 25, 10-20 cm	Broken Flake	3	4.3	
23PU745	PH 26, 0-10 cm	Tertiary Flake	1	0.3	
23PU745	PH 26, 0-10 cm	Bifacial Thinning Flake	2	1.3	
23PU745	PH 26, 0-10 cm	Broken Flake	5	1.7	
23PU745	PH 26, 0-10 cm	Block Shatter	5	4.2	
23PU745	PH 28, 10-20 cm	Tertiary Flake	1	0.4	
23PU745	PH 28, 10-20 cm	Broken Flake	2	0.9	
23PU745	PH 28, 10-20 cm	Block Shatter	1	1.1	
23PU745	PH 29, 0-10 cm	Secondary Flake	1	0.5	
23PU745	PH 29, 0-10 cm	Tertiary Flake	4	2.7	
23PU745	PH 29, 0-10 cm	Bifacial Thinning Flake	2	0.2	
23PU745	PH 29, 0-10 cm	Broken Flake	19	3.2	
23PU745	PH 29, 0-10 cm	Block Shatter	2	0.6	
23PU745	PH 29, 0-10 cm	Thin Biface	1	0.5	Point fragment?
23PU745	PH 30, 0-10 cm	Tertiary Flake	2	0.2	
23PU745	PH 30, 0-10 cm	Bifacial Thinning Flake	2	2.2	
23PU745	PH 30, 0-10 cm	Broken Flake	6	2.6	
23PU745	PH 30, 0-10 cm	Block Shatter	2	4.5	
23PU745	PH 30, 10-20 cm	Tertiary Flake	1	0.2	
23PU745	PH 30, 10-20 cm	Bifacial Thinning Flake	1	0.3	
23PU745	PH 30, 10-20 cm	Broken Flake	3	0.5	
23PU745	PH 30, 10-20 cm	Hafted Biface	1	4.7	King's Corner-Notched Point
23PU745	PH 31, 10-20 cm	Broken Flake	1	0.2	
23PU745	PH 32, 10-20 cm	Bifacial Thinning Flake	1	1.9	
23PU745	PH 32, 10-20 cm	Block Shatter	1	0.6	
23PU745	PH 33, 0-10 cm	Tertiary Flake	1	0.7	
23PU745	PH 33, 0-10 cm	Broken Flake	2	0.9	
23PU745	PH 33, 0-10 cm	Block Shatter	2	0.8	
23PU745	PH 34, 0-10 cm	Bifacial Thinning Flake	1	0.3	
23PU745	PH 34, 0-10 cm	Broken Flake	2	0.4	
23PU745	PH 34, 0-10 cm	Block Shatter	5	2.6	
23PU745	PH 35, 0-10 cm	Tertiary Flake	2	0.6	
23PU745	PH 35, 0-10 cm	Bifacial Thinning Flake	1	0.9	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 35, 0-10 cm	Broken Flake	6	2.4	
23PU745	PH 35, 10-20 cm	Broken Flake	3	1.3	
23PU745	PH 36, 0-10 cm	Tertiary Flake	1	2.1	
23PU745	PH 37, 0-10 cm	Broken Flake	2	0.6	
23PU745	PH 37, 10-20 cm	Block Shatter	1	4.5	
23PU745	PH 38, 0-10 cm	Core	1	38.1	
23PU745	PH 38, 0-10 cm	Bifacial Thinning Flake	1	0.7	
23PU745	PH 38, 0-10 cm	Broken Flake	3	0.5	
23PU745	PH 38, 0-10 cm	Block Shatter	2	0.6	
23PU745	PH 38, 10-20 cm	Tertiary Flake	1	0.2	
23PU745	PH 38, 10-20 cm	Bifacial Thinning Flake	1	0.3	
23PU745	PH 38, 10-20 cm	Broken Flake	12	2.6	
23PU745	PH 38, 10-20 cm	Block Shatter	9	4.8	
23PU745	PH 38, 10-20 cm	Thin Biface	1	6.4	Tip
23PU745	PH 39, 0-10 cm	Broken Flake	1	4.3	
23PU745	PH 39, 10-20 cm	Broken Flake	1	0.2	
23PU745	PH 39, 10-20 cm	Block Shatter	1	1	
23PU745	PH 40, surface	Broken Flake	1	10.4	
23PU745	PH 40, 0-10 cm	Secondary Flake	1	0.4	
23PU745	PH 40, 0-10 cm	Tertiary Flake	3	2.4	
23PU745	PH 40, 0-10 cm	Bifacial Thinning Flake	2	1.7	
23PU745	PH 40, 0-10 cm	Broken Flake	11	5.3	
23PU745	PH 40, 10-20 cm	Secondary Flake	1	1.5	
23PU745	PH 40, 10-20 cm	Tertiary Flake	3	0.7	
23PU745	PH 40, 10-20 cm	Broken Flake	10	4.3	
23PU745	PH 40, 10-20 cm	Block Shatter	4	6.4	
23PU745	PH 41, 0-10 cm	Broken Flake	3	1.4	
23PU745	PH 42, 0-10 cm	Tertiary Flake	1	4.2	
23PU745	PH 42, 10-20 cm	Bifacial Thinning Flake	2	0.6	
23PU745	PH 42, 10-20 cm	Broken Flake	2	0.8	
23PU745	PH 42, 10-20 cm	Rough Biface	1	11.1	Expedient tool?
23PU745	PH 44, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU745	PH 44, 10-20 cm	Bifacial Thinning Flake	1	1.6	
23PU745	PH 44, 10-20 cm	Broken Flake	1	1	
23PU745	PH 45, 0-10 cm	Tertiary Flake	1	0.3	
23PU745	PH45, 0-10 cm	Broken Flake	3	1.6	
23PU745	PH 46, 0-10 cm	Secondary Flake	1	0.2	
23PU745	PH 46, 0-10 cm	Bifacial Thinning Flake	1	4.1	
23PU745	PH 46, 0-10 cm	Broken Flake	5	1.2	
23PU745	PH 46, 10-20 cm	Broken Flake	3	1.2	
23PU745	PH 47, 10-20 cm	broken Flake	1	0.5	
23PU745	PH 49, 0-10 cm	Tertiary Flake	3	0.4	
23PU745	PH 49, 0-10 cm	Bifacial Thinning Flake	1	0.4	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 49, 0-10 cm	Broken Flake	1	0.3	
23PU745	PH 49, 0-10 cm	Block Shatter	3	3.4	
23PU745	PH 49, 0-10 cm	Hafted Biface	1	14.6	Etley
23PU745	PH 50, 0-10 cm	Block Shatter	1	1.6	
23PU745	PH 52, 0-10 cm	Tertiary Flake	3	2.5	
23PU745	PH 52, 0-10 cm	Bifacial Thinning Flake	2	0.5	
23PU745	PH 52, 0-10 cm	Broken Flake	1	0.4	
23PU745	PH 52, 10-20 cm	Broken Flake	2	0.4	
23PU745	PH 52, 10-20 cm	Block Shatter	2	1.6	
23PU745	PH 53, 0-10 cm	broken Flake	3	0.5	
23PU745	PH 53, 0-10 cm	Block Shatter	2	1.3	
23PU745	PH 53, 10-20 cm	Broken Flake	7	1.5	
23PU745	PH 53, 10-20 cm	Block Shatter	2	0.8	
23PU745	PH 53, 20-30 cm	Tertiary Flake	1	0.9	
23PU745	PH 53, 20-30 cm	Broken Flake	2	3	
23PU745	PH 54, 0-10 cm	Tertiary Flake	1	0.2	
23PU745	PH 54, 0-10 cm	Broken Flake	1	0.2	
23PU745	PH 54, 10-20 cm	Broken Flake	1	1.4	
23PU745	PH 54, 10-20 cm	Block Shatter	4	4.4	
23PU745	PH 55, 0-10 cm	Tertiary Flake	1	2.7	
23PU745	PH 55, 0-10 cm	Broken Flake	9	3	
23PU745	PH 55, 0-10 cm	Block Shatter	4	3.6	
23PU745	PH 56, 0-10 cm	Bifacial Thinning Flake	1	0.4	
23PU745	PH 56, 0-10 cm	Broken Flake	2	0.4	
23PU745	PH 56, 0-10 cm	Block Shatter	1	2.4	
23PU745	PH 56, 10-20 cm	Broken Flake	1	1.1	
23PU745	PH 57, 0-10 cm	Broken Flake	1	0.7	
23PU745	PH 58, 0-10 cm	Tertiary Flake	2	0.3	
23PU745	PH 58, 0-10 cm	Broken Flake	1	0.1	
23PU745	PH 59, 0-10 cm	Tertiary Flake	3	0.3	
23PU745	PH 59, 0-10 cm	Broken Flake	1	1.1	
23PU745	PH 59, 0-10 cm	Block Shatter	1	3.9	
23PU745	PH 59, 10-20 cm	Broken Flake	2	1.1	
23PU745	PH 59, 10-20 cm	Block Shatter	1	1.1	
23PU745	PH 60, 0-10 cm	Bifacial Thinning Flake	1	0.8	
23PU745	PH 60, 0-10 cm	Broken Flake	2	2.4	
23PU745	PH 60, 0-10 cm	Block Shatter	1	0.8	
23PU745	PH 60, 10-20 cm	Tertiary Flake	2	1.4	
23PU745	PH 60, 10-20 cm	Block Shatter	3	3.2	
23PU745	PH 60, 20-30 cm	Bifacial Thinning Flake	1	0.4	
23PU745	PH 60, 20-30 cm	Broken Flake	3	0.6	
23PU745	PH 60, 30-40 cm	Tertiary Flake	1	0.3	
23PU745	PH 60, 30-40 cm	Bifacial Thinning Flake	1	1.3	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 60, 30-40 cm	Broken Flake	3	0.3	
23PU745	PH 61, 0-10 cm	Broken Flake	2	0.4	
23PU745	PH 61, 0-10 cm	Block Shatter	1	0.5	
23PU745	PH 62, 0-10 cm	Bifacial Thinning Flake	2	0.5	
23PU745	PH 62, 0-10 cm	Broken Flake	1	0.1	
23PU745	PH 62, 10-20 cm	Bifacial Thinning Flake	2	0.7	
23PU745	PH 62, 10-20 cm	Broken Flake	4	1.4	
23PU745	PH 63, 0-10 cm	Tertiary Flake	2	0.1	
23PU745	PH 63, 0-10 cm	Bifacial Thinning Flake	1	0.2	
23PU745	PH 63, 0-10 cm	Broken Flake	3	1	
23PU745	PH 63, 0-10 cm	Block Shatter	2	0.6	
23PU745	PH 64, 0-10 cm	Tertiary Flake	1	1.2	
23PU745	PH 64, 0-10 cm	Bifacial Thinning Flake	1	0.4	
23PU745	PH 64, 0-10 cm	Block Shatter	1	0.3	
23PU745	PH 64, 10-20 cm	Secondary Flake	1	0.4	
23PU745	PH 64, 20-30 cm	Broken Flake	1	0.1	
23PU745	PH 65, 20-30 cm	Broken Flake	1	0.3	
23PU745	PH 66, 0-10 cm	Broken Flake	1	0.9	
23PU745	PH 66, 10-20 cm	Broken Flake	1	0.6	
23PU745	PH 67, 0-10 cm	Secondary Flake	1	0.3	
23PU745	PH 67, 0-10 cm	Tertiary Flake	1	0.2	
23PU745	PH 67, 0-10 cm	Bifacial Thinning Flake	2	0.3	
23PU745	PH 67, 0-10 cm	Broken Flake	3	0.3	
23PU745	PH 67, 0-10 cm	Block Shatter	1	7.8	
23PU745	PH 67, 10-20 cm	Tertiary Flake	1	0.1	
23PU745	PH 67, 10-20 cm	Block Shatter	1	0.1	
23PU745	PH 67, 20-30 cm	Bifacial Thinning Flake	1	0.1	
23PU745	PH 67, 20-30 cm	Broken Flake	1	0.1	
23PU745	PH 67, 20-30 cm	Block Shatter	2	0.9	
23PU745	PH 68, 10-20 cm	Broken Flake	1	0.3	
23PU745	PH 68, 10-20 cm	Block Shatter	1	6	
23PU745	PH 68, 0-10 cm	Tertiary Flake	1	0.1	
23PU745	PH 68, 0-10 cm	Block Shatter	1	0.6	
23PU745	PH 18, 0-10 cm	Broken Flake	1	1	
23PU745	PH 71, 0-10 cm	Block Shatter	2	2.4	
23PU745	PH 72, 0-10 cm	Broken Flake	1	1.7	
23PU745	PH 73, 0-10 cm	Secondary Flake	1	2.4	
23PU745	PH 73, 0-10 cm	Tertiary Flake	1	0.1	
23PU745	PH 73, 0-10 cm	Bifacial Thinning Flake	1	0.8	
23PU745	PH 73, 0-10 cm	Broken Flake	3	0.5	
23PU745	PH 73, 0-10 cm	Block Shatter	3	2.1	
23PU745	PH 73, 10-20 cm	Broken Flake	3	0.4	
23PU745	PH 74, 0-10 cm	Tertiary Flake	2	0.3	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 74, 0-10 cm	Bifacial Thinning Flake	1	0.1	
23PU745	PH 74, 0-10 cm	Broken Flake	2	0.6	
23PU745	PH 74, 10-20 cm	Tertiary Flake	2	0.8	
23PU745	PH 74, 10-20 cm	Bifacial Thinning Flake	2	0.6	
23PU745	PH 74, 10-20 cm	Broken Flake	2	0.3	
23PU745	PH 75, 0-10 cm	Broken Flake	1	0.5	
23PU745	PH 76, 10-20 cm	Broken Flake	2	6.8	
23PU745	PH 76, 20-30 cm	Core	1	109.4	
23PU745	PH 77, 0-10 cm	Broken Flake	3	1.4	
23PU745	PH 77, 10-20 cm	Broken Flake	2	0.9	
23PU745	PH 78, 0-10 cm	Tertiary Flake	1	0.6	
23PU745	PH 78, 0-10 cm	Broken Flake	2	1	
23PU745	PH 78, 10-20 cm	Tertiary Flake	2	1.8	
23PU745	PH 78, 10-20 cm	Bifacial Thinning Flake	2	1	
23PU745	PH 78, 10-20 cm	Broken Flake	7	4.8	
23PU745	PH 78, 10-20 cm	Block Shatter	1	0.7	
23PU745	PH 78, 10-20 cm	Tertiary Flake	1	0.2	
23PU745	PH 79, 10-20 cm	Tertiary Flake	1	1.2	
23PU745	PH 79, 10-20 cm	Broken Flake	5	2.6	
23PU745	PH 80, 0-10 cm	Broken Flake	1	0.8	
23PU745	PH 81, 0-10 cm	Broken Flake	1	0.6	
23PU745	PH 82, 0-10 cm	Broken Flake	1	0.2	
23PU745	PH 83, 0-10 cm	Tertiary Flake	1	0.7	
23PU745	PH 83, 0-10 cm	Block Shatter	1	1.5	
23PU745	PH 84, 0-10 cm	Broken Flake	3	1.1	
23PU745	PH 85, 10-20 cm	Tertiary Flake	1	2.8	
23PU745	PH 85, 10-20 cm	Broken Flake	1	0.7	
23PU745	PH 86, 0-10 cm	Tertiary Flake	2	0.4	
23PU745	PH 86, 0-10 cm	Broken Flake	1	0.4	
23PU745	PH 87, 0-10 cm	Bifacial Thinning Flake	1	1	
23PU745	PH 88, 10-20 cm	Tertiary Flake	1	0.6	
23PU745	PH 88, 10-20 cm	Broken Flake	2	2.7	
23PU745	PH 88, 10-20 cm	Block Shatter	2	5.4	
23PU745	PH 89, 0-10 cm	Broken Flake	1	0.3	
23PU745	PH 89, 10-20 cm	Bifacial Thinning Flake	2	6.5	
23PU745	PH 89, 10-20 cm	Broken Flake	1	0.4	
23PU745	PH 90, 0-10 cm	Tertiary Flake	1	<0.1	
23PU745	PH 90, 10-20 cm	Tertiary Flake	3	0.9	
23PU745	PH 91, 0-10 cm	Block Shatter	1	8	
23PU745	PH 92, 0-10 cm	Tertiary Flake	1	0.2	
23PU745	PH 92, 0-10 cm	Block Shatter	1	0.9	
23PU745	PH 92, 10-20 cm	Secondary Flake	1	10	
23PU745	PH 92, 10-20 cm	Tertiary Flake	1	0.1	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 92, 10-20 cm	Broken Flake	3	1.1	
23PU745	PH 93, 10-20 cm	Bifacial Thinning Flake	1	5.8	
23PU745	PH 94, 0-10 cm	Broken Flake	2	1.5	
23PU745	PH 94, 10-20 cm	Bifacial Thinning Flake	1	1.8	
23PU745	PH 94, 10-20 cm	Broken Flake	1	0.4	
23PU745	PH 95, 0-10 cm	Broken Flake	2	0.5	
23PU745	PH 95, 0-10 cm	Block Shatter	1	1.1	
23PU745	PH 95, 10-20 cm	Block Shatter	2	0.5	
23PU745	PH 96, 0-10 cm	Broken Flake	3	1.8	
23PU745	PH 96, 0-10 cm	Block Shatter	2	4.4	
23PU745	PH 96, 10-20 cm	Block Shatter	1	2.2	
23PU745	PH 97, 0-10 cm	Secondary Flake	1	1.6	
23PU745	PH 97, 0-10 cm	Broken Flake	1	0.4	
23PU745	PH 97, 10-20 cm	Broken Flake	2	1	
23PU745	PH 97, 20-30 cm	Broken Flake	1	0.9	
23PU745	PH 98, 0-10 cm	Tertiary Flake	1	0.1	
23PU745	PH 98, 0-10 cm	Broken Flake	1	0.7	
23PU745	PH 98, 10-20 cm	Bifacial Thinning Flake	2	1.4	
23PU745	PH 98, 10-20 cm	broken Flake	1	0.1	
23PU745	PH 98, 10-20 cm	Block Shatter	1	0.3	
23PU745	PH 99, 0-10 cm	Tertiary Flake	1	0.6	
23PU745	PH 99, 0-10 cm	Broken Flake	1	0.2	
23PU745	PH 99, 0-10 cm	Block Shatter	1	1.8	
23PU745	PH 99, 10-20 cm	Broken Flake	1	1	
23PU745	PH 100, 0-10 cm	Broken Flake	1	0.1	
23PU745	PH 101, 10-20 cm	Tertiary Flake	1	0.1	
23PU745	PH 101, 10-20 cm	Broken Flake	1	0.2	
23PU745	PH 103, 0-10 cm	Tertiary Flake	2	0.5	
23PU745	PH 103, 0-10 cm	Block Shatter	1	2.2	
23PU745	PH 103, 10-20 cm	Block Shatter	1	0.5	
23PU745	PH 104, 10-20 cm	Bifacial Thinning Flake	1	0.7	
23PU745	PH 105, 0-10 cm	Bifacial Thinning Flake	1	0.3	
23PU745	PH 105, 0-10 cm	Broken Flake	1	0.3	
23PU745	PH 105, 0-10 cm	Block Shatter	1	2.1	
23PU745	PH 106, 0-10 cm	Tertiary Flake	1	0.3	
23PU745	PH 106, 10-20 cm	Secondary Flake	1	2	
23PU745	PH 106, 10-20 cm	Tertiary Flake	1	0.2	
23PU745	PH 106, 10-20 cm	Broken Flake	1	0.1	
23PU745	PH 107, 10-20 cm	Tertiary Flake	1	0.2	
23PU745	PH 107, 10-20 cm	Broken Flake	2	0.9	
23PU745	PH 107, 10-20 cm	Block Shatter	1	1.1	
23PU745	PH 108, No depth	Tertiary Flake	1	0.3	
23PU745	PH 108, No depth	Broken Flake	2	0.7	

Site Number	Provenience	Artifact Category	N	Weight	Comments
23PU745	PH 111, 0-10 cm	Broken Flake	1	2.9	
23PU745	PH 112, 0-10 cm	Broken Flake	1	2.1	
23PU745	PH 112, 10-20 cm	Broken Flake	1	0.5	
23PU745	PH 113, 10-20 cm	Block Shatter	1	1.5	
23PU745	PH 114, 10-20 cm	Broken Flake	1	0.4	
23PU745	PH 115, 0-10 cm	Secondary Flake	1	0.2	
23PU745	PH 115, 0-10 cm	Block Shatter	1	0.5	
23PU745	PH 116, 0-10 cm	Block Shatter	1	0.9	
23PU745	PH 116, 10-20 cm	Broken Flake	1	0.1	
23PU745	PH 117, 0-10 cm	Broken Flake	3	0.9	
23PU745	PH 117, 10-20 cm	Bifacial Thinning Flake	1	0.6	
23PU745	PH 117, 10-20 cm	Broken Flake	2	0.6	
23PU745	PH 118, 0-10 cm	Tertiary Flake	2	0.3	
23PU745	PH 119, 10-20 cm	Bifacial Thinning Flake	1	0.4	
23PU745	PH 119, 10-20 cm	Broken Flake	3	1.3	
23PU745	PH 122, 0-10 cm	Broken Flake	1	0.5	
23PU745	PH 122, 10-20 cm	Tertiary Flake	1	0.7	
23PU745	PH 123, 0-10 cm	Broken Flake	2	1.1	
23PU745	PH 123, 10-20 cm	Tertiary Flake	2	0.3	
23PU745	PH 123, 10-20 cm	Broken Flake	3	0.4	
23PU745	PH 124, 0-10 cm	Broken Flake	4	19.5	
23PU745	PH 124, 10-20 cm	Bifacial Thinning Flake	1	3.6	
23PU745	PH 125, 0-10 cm	Tertiary Flake	1	0.2	
23PU745	PH 126, 0-10 cm	Broken Flake	2	0.7	
23PU745	PH ?, 0-10 cm	Tertiary Flake	1	0.6	
23PU745	PH ?, 0-10 cm	Broken Flake	1	0.3	
AOS 2 IF	PH 1, 0-10 cm	Rough Biface	1	36.1	Ovate
AOS 3 IF	Surface	Thin Biface	1	11.7	
AOS 4 IF	Surface	Broken Flake	1	4.1	
AOS 18 IF	PH 1, 0-10 cm	Broken Flake	1	1.2	
AOS 23 IF	PH 1, 0-15 cm	Broken Flake	3	0.7	
AOS 30 IF	PH 1, 10-20 cm	Block Shatter	1	0.1	
AOS 30 IF	PH 2, 20-30 cm	Tertiary Flake	1	2	
AOS 38 IF	AT 1, 115-125 cm	Tertiary Flake	1	0.1	
AOS 38 IF	PH 1, 30-40 cm	Broken Flake	1	3.9	
AOS 38 IF	PH 2, 0-10 cm	Broken Flake	1	1.3	
AOS 27 IF	PH 1-1, 40-50 cm	Broken Flake	1	1.9	
AOS 27 IF	PH 2-1, 40-50 cm	Broken Flake	1	0.4	
AOS 42 IF	PH 3, 0-10 cm	Rough Biface	1	3	Tip
AOS 43 IF	PH 1, 30-40 cm	Bifacial Thinning Flake	1	1.3	
AOS 47 IF	AT 1, 40-50 cm	Tertiary Flake	1	0.2	