ARCHEOLOGICAL BACKGROUND

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PREHISTORIC RESEARCH CONTEXT FOR CAMP STANLEY

Cultural Chronology

The prehistoric cultural sequence for Central Texas can be divided into three broad periods: Paleoindian, Archaic, and Late Prehistoric, although the terms Neoarchaic (Prewitt 1981, 1985) and Post-Archaic (Johnson and Goode 1994) have been used at times in place of the term Late Prehistoric. Thorough overviews of these periods are provided by Black (1989:25–32), Collins (1995), and Hines (1993), the latter focusing more on the chronological sequence of the prehistoric cultural resources in the area surrounding Camp Stanley. A prehistoric cultural-historical framework incorporating more-discrete temporal and technological units has been delineated and defined by Prewitt (1981, 1985) (Figure 2). More recently, Johnson and Goode (1994) and Collins (1995) have presented revised cultural chronologies of the region and at the same time discontinued the use of the term phase to describe each cultural-historical unit. Johnson and Goode (1994) and Collins (1995) have opted for named intervals or patterns based on diagnostic projectile point styles and associated radiocarbon assays (e.g., Martindale-Uvalde interval) within each period or subperiod. More applicable to the Camp Stanley area, and also depicted in Figure 2, is a series of local prehistoric periods for the upper Salado Creek drainage basin defined by Black and McGraw (1985:321–326). Although these sequences chronologically group and order archeological assemblages (primarily projectile point styles) and site components, a common criticism is that these temporal-stylistic units, intervals, or patterns do not specificially address cultural process, such as the adaptive strategies utilized by certain (ethnic) groups in a particular territory at a certain period of time (Black 1989:35; Collins 1995:362; Ellis et al. 1995). Be that as it may, the following summary of the three periods of Central Texas prehistory is based on Collins's (1995) sequence, with appropriate references to the local periods of Black and McGraw (1985).

The Paleoindian period (11,500–8800 B.P.) represents the earliest known cultural manifestation in North America. Sites and isolated artifacts of this period are fairly common across Central Texas. The period is often described as having been characterized by small but highly mobile bands of foragers who were specialized hunters of Pleistocene megafauna. However, a more accurate view of Paleoindian lifeways probably includes the utilization of a much wider array of resources. Recent investigations at the Wilson-Leonard site (41WM235) support this view and have challenged the fundamental defining criteria, that of artifacts in association with late Pleistocene megafauna, of the Paleoindian period (Masson and Collins 1995). Collins (1995) divides the Paleoindian period into early and late subperiods. The early subperiod consists of two projectile point style intervals—Clovis (local period 1) and Folsom (local period 2). Clovis chipped stone artifact assemblages, including the diagnostic, fluted lanceolate Clovis point, were produced by bifacial, flake, and prismatic-blade techniques on high-quality and often-exotic lithic materials (Collins 1990). Along with chipped stone artifacts, Clovis assemblages include engraved stones, bone and ivory points, stone bolas, and ochre (Collins 1995:381; Collins et al. 1992). Analyses of Clovis artifacts and site types suggest that Clovis "peoples" were well-adapted, generalized hunter-gatherers with the technology to hunt larger game but who did not rely on it solely. In contrast, Folsom tool kits, consisting of fluted Folsom points, thin unfluted (Midland) points, large thin bifaces, and end scrapers, are more indicative of specialized hunting, particularly of bison (Collins 1995:382).

Spanning the end of the early and initial late Paleoindian subperiods are several projectile point styles of which the temporal, technological, or cultural significance is unclear. Included are Plainview points (representing Black and McGraw's [1985:322] local period 3), a type name typically given any unfluted,

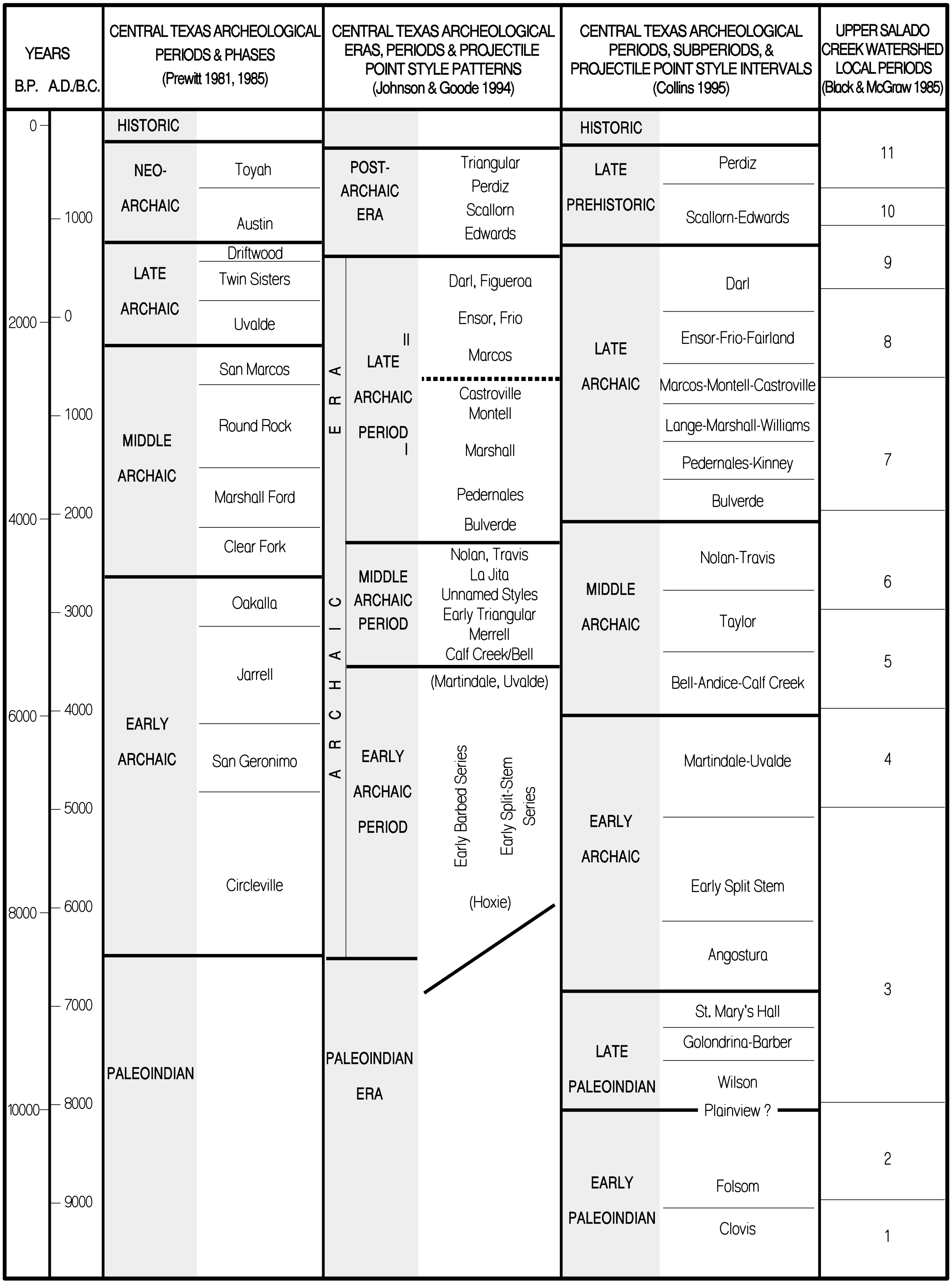

Figure 2. Prehistoric cultural sequences of Prewitt (1981, 1985), Johnson and Goode (1994), Collins (1995), and Black and McGraw (1985).

lanceolate dart point. However, Collins (1995:382) notes that these points do not parallel Plainview type-site points in thinness and flaking technology. Also problematic are the chronological position and cultural signifance of Dalton and San Patrice dart points. The succeeding late Paleoindian subperiod includes three projectile point style intervals—Wilson (ca. 10,000–9650 B.P.), Golondrina/Barber, and St. Mary's Hall (9500–8800 B.P.). Components and artifact and feature assemblages of these three intervals appear to be Archaic-like in nature and in many ways may represent a transition between the Early Paleoindian and succeeding Archaic periods (Collins 1995:382).

The Archaic period (8800 to 1300–1200 B.P.) is generally believed to represent a shift toward the hunting and gathering of a wider array of animal and plant resources and a decrease in group mobility (Willey and Phillips 1958:107–108), although such changes probably were well under way by the beginning of the Archaic. Climatic changes most likely presented Archaic populations with varying subsistence challenges throughout the Holocene. This broad period is generally divided into Early, Middle, and Late Archaic periods (Black 1989; Collins 1995; Story 1985:28–29). Each subperiod includes several temporal-stylistic units or intervals based on diagnostic projectile point styles and associated radiocarbon assays (Collins 1995). Early Archaic (8800–6000 B.P.) sites are small and their tool assemblages are very diverse (Weir 1976:115–122), suggesting that populations were highly mobile and densities low (Prewitt 1985:217). It has been noted that Early Archaic sites are concentrated along the eastern and southern margins of the Edwards Plateau (Johnson and Goode 1994; McKinney 1981). This distribution may be indicative of climatic conditions at the time, as these environments have many more reliable water sources and a diverse subsistence base. Microfaunal records and sedimentary evidence from stream valleys and along the eastern Edwards Plateau depict a climatic regime in flux, from mesic conditions during the beginning of the Early Archaic to extremely xeric and back to mildly xeric conditions at the end of the subperiod (Collins et al. 1990; Toomey et al. 1993). Three projectile point style intervals are recognized—Angostura (local periods 3 and 4), Early Split Stem, including Gower and Jetta (local period 4), and Martindale-Uvalde (local period 5). Manos, metates, hammerstones, Clear Fork and Guadalupe bifaces, and a variety of other bifacial and unifacial tools are common to all three intervals. The construction and use of rock hearths and ovens reflect a specialized subsistence strategy (exploitation of roots and tubers?) during the Early Archaic. These burned rock features most likely represent the technological predecessors of the larger burned rock middens extensively used later in the Archaic period (Collins 1995:383).

During the Middle Archaic period (6000–4000 B.P.) the number and distribution of sites, as well as site size, increased due to probable increases in population densities (Prewitt 1981:73; Weir 1976:124, 135). Macrobands may have formed at least seasonally, or an increased number of small groups may have utilized the same sites for longer periods of time (Weir 1976:130–131). A greater reliance on plant foods is suggested by the presence of burned rock middens toward the end of the Middle Archaic, although tool kits still infer a strong reliance on hunting (Prewitt 1985:222–226). Three projectile point style intervals comprise the Middle Archaic—Bell-Andice-Calf Creek (local period 5), Taylor (local period 5), and Nolan-Travis (local period 6). The Bell-Andice-Calf Creek and Taylor intervals reflect a shift in lithic technology from the preceding Martindale-Uvalde (Collins 1995:384). Johnson and Goode (1994:25) suggest that the Bell-Andice-Calf Creek interval represents an influx of bison-hunting groups from the Eastern Woodland margins into the Central Texas region during a slightly more mesic period. Bison disappeared as more-xeric conditions returned during the later Nolan-Travis interval. The style change represents another shift in lithic technology (Collins 1995:384; Johnson and Goode 1994:27). Prewitt (personal communication, 1996) postulates that the production and morphology of Travis and Nolan points are similar to projectile points from the Lower Pecos region. Such characteristics as beveled stems and overall morphology may have originated in the Lower Pecos since their presence there predates their appearance in Central Texas. The accompanying change to more-xeric conditions bears witness to the construction and use of burned rock middens. Johnson and Goode (1994:26) believe that the dry conditions promoted the spread of xerophytic plants, such as yucca and sotol, and that it was these plants that were collected and cooked in large rock ovens by late Middle Archaic peoples.

During the succeeding Late Archaic period (4000 to 1300–1200 B.P.) populations continued to increase (Prewitt 1985:217). The establishment of large cemeteries along drainages suggests strong territorial ties by certain groups (Story 1985:40). Xeric conditions continued but became more mesic ca. 3500–2500 B.P. The Late Archaic period is comprised of six projectile point style intervals (Collins 1995:376)—Bulverde (local period 7), Pedernales-Kinney (local period 7), Lange-Williams-Marshall (local periods 7 and 8), Macros-Montell-Castroville (local period 8), Ensor-

Frio-Fairland (local period 9), and Darl (local period 9). Johnson and Goode (1994:29–35) divide the Late Archaic into two parts—Late Archaic I and Late Archaic II—based on increased population densities and evidence of Eastern Woodland ceremonial rituals and religious ideological influences. Middle Archaic subsistence technology, including the use of burned rock middens, continued into the Late Archaic period. Collins (1995:384) states that during the Pedernales-Kinney interval the construction and use of burned rock middens reached its zenith and that their use declined during the latter half of the Late Archaic. However, there are mounting chronological data that midden formation and use culminated much later, during the Ensor-Frio-Fairland and Darl intervals, and that this high level of use continued into the early Late Prehistoric period (Black et al. 1996; Kleinbach et al. 1995:795). A picture of prevalent burned rock midden use in the eastern part of the Central Texas region after 2000 B.P. is gradually becoming clear. This scenario parallels the widely recognized occurrence of post-2000 B.P. middens in the western reaches of the Edwards Plateau (see Goode 1991). The use of burned rock middens appears to have been a major part of the subsistence strategy as a decrease in the importance of hunting, inferred by the low ratio of projectile points in relation to other tools in site assemblages, may have occurred (Prewitt 1981:74).

The Late Prehistoric period (1300–1200 to 300 B.P.) is marked by the introduction of the bow and arrow and later ceramics into the region, probably from the north, by persons or mechanisms unknown (Prewitt 1985:228). Population densities dropped considerably from their Late Archaic peak (Prewitt 1985:217). Subsistence strategies did not differ greatly from the preceding period; however, bison became an important economic resource during the later part of the Late Prehistoric period (Prewitt 1981:74). The use of burned rock middens for plant food processing (?) continued throughout the Late Prehistoric period (Black et al. 1996; Goode 1991; Kleinbach et al. 1995:795). Horticulture came into play very late in the region but was of minor importance to the overall subsistence strategy (Collins 1995:385). In Central Texas, the Late Prehistoric period is generally associated with the Austin and Toyah phases (Jelks 1962; Prewitt 1981:82–84); however, both phases have a much wider application. Austin and Toyah phase horizon markers—Scallorn-Edwards and Perdiz arrow points, respectively—are distributed across most of the state. Local periods 10 and 11 (Black and McGraw 1985:322) are equivalent to the Austin and Toyah phases. The introduction of Scallorn and Edwards arrow points into Central Texas is often marked by evidence of violence and conflict, as many burials have been uncovered peppered with such weapons (Prewitt 1981:83). Subsistence strategies and technologies (other than arrow points) did not change much from the preceding Late Archaic. This continuity is recognized by Prewitt's (1981) use of the term "Neoarchaic." In fact, Johnson and Goode (1994:39–40) and Collins (1995:385) state that the break between the Late Archaic and the Late Prehistoric could be easily and appropriately represented by the break between the Austin and Toyah phases. Around 1000–750 B.P., slightly more xeric or drought prone climatic conditions returned to the region, and bison returned to the region in large numbers (Huebner 1991; Toomey et al. 1993). Utilizing this vast resource were Toyah phase peoples equipped with Perdiz-tipped arrows, end scrapers, four-beveled-edge knives, and plain bone-tempered ceramics. The technology and subsistence strategies of the Toyah phase represent a completely different tradition than the preceding Austin phase. Collins (1995:388) states that burned rock middens fell out of use, as bison hunting and group mobility obtained a level of importance not witnessed since Folsom times. While the importance of bison hunting and high group mobility can hardly be disputed, the cessation of burned rock midden use during the Toyah phase is tenuous. A recent examination of Toyah-age radiocarbon assays and assemblages by Black et al. (1996) suggest that their association with burned rock middens represents more than a "thin veneer" capping Archaic-age features. Black et al. (1996) claim that burned rock midden use, while not as prevalent as in preceding periods, played a role in the adaptive strategies of Toyah folk.

Historical accounts of aboriginals and their interactions with the Spanish, Republic of Mexico, the Texas Republic, and the United States throughout the region are provided by Campbell and Campbell (1981), Campbell (1988), Hester (1989), and Newcomb (1961). Collins (1995:386) divides this period into three subperiods. The first subperiod, beginning in the late seventeenth and early eighteenth centuries, marks an era of more-permanent contact between Europeans and Native Americans as the Spanish moved northward out of Mexico to establish settlements and missions on their northern frontier. There is little available information on aboriginal groups and their ways of life except for the fragmentary data gathered by the Spanish missionaries. In the San Antonio and South Texas areas, these groups have been collectively referred to as Coahuiltecans because of an assumed similar way of life; however, many individual groups may have existed (Campbell 1988). The inevitable and disastrous impacts to native social structures and economic systems by disease and hostile encounters with Europeans and intruding groups, such as the Apache, were already under way at this time.

The second subperiod marks the establishment of the mission system in the 1720s to its ultimate demise around 1800. Some indigenous groups moved peacefully into mission life, giving up their nomadic hunting and gathering way of life, while others were forced in or moved in to escape the increasingly hostile actions of southward-moving Apaches and Comanches. Much of the Camp Stanley area fell within the extensive Monte Galvan, a ranch that was associated with Mission San Antonio de Valero (McGraw 1991:149). By the end of this time, many Native American groups had been decimated by European expansion and disease, and intrusive groups, such as the Tonkawa, Apache, and Comanche, had moved into the region to fill the void. Few sites attributable to these groups, outside of mission sites, have been investigated. To complicate matters, many aboriginal ways of life continued even after contact with the Spanish. For example, the manufacture of stone tools continued for many groups even after settling in the missions (Fox 1979). The third subperiod, from 1800 to the last half of the nineteenth century, witnessed the final decimation of the aboriginal groups and the defeat and removal of the Apaches and Comanches to reservations by the United States.

Previous Archeological Investigations and Known Archeological Resources in the Camp Stanley Area

No archeological investigations have taken place at Camp Stanley, with the exception of the current survey of 2,125 acres, which documented 34 archeological sites with 20 prehistoric components. Outside of the current survey, the nearest archeological investigations have taken place at neighboring Camp Bullis. Of the ca. 28,000 acres of Camp Bullis, 11,854 acres have been covered by survey (Gerstle et al. 1978; Quigg 1988; Boyd et al. 1990; Kibler and Gardner 1997). Nine sites (41BX36, 41BX377, 41BX378, 41BX379, 41BX383, 41BX400, 41BX425, 41BX428, and 41CM99) have been tested (Gerstle et al. 1978; Kibler and Gardner 1997). Of the 154 archeological sites recorded at Camp Bullis, 122 have prehistoric components. Together, the Camp Stanley and Camp Bullis prehistoric sites render an overall prehistoric site density of 2.5 sites per km^2. The prehistoric archeological record of Camp Stanley and the surrounding area represents the utilization of a unique transitional zone between the Edwards Plateau to the west and the Blackland Prairie to the east, one consisting of a highly dissected and faulted limestone landscape drained by low-order tributaries of the San Antonio River.

The types of prehistoric sites (presumed site function) and site setting (geomorphic environment) vary across Camp Stanley and the surrounding area. Four general types of prehistoric sites are recognized here: campsites or habitation sites, lithic scatters, lithic procurement sites, and cemeteries. The type of site generally defines how an area may have been utilized by prehistoric groups and what resources may have been the group's main target of exploitation and utilization. Site settings consist of uplands (which include summits, ridges, intervening saddles, and hillslopes), alluvial terraces, and rockshelters. The site setting also defines how a region and its resources may have been utilized, but more importantly, the setting generally dictates whether sites are preserved as discrete and interpretable units of analysis.

Each of the site types and settings is briefly discussed below in the context of the known resources of Camp Stanley and/or the surrounding region. A general set of criteria for the extraction of meaningful and interpretable archeological data from the various site types and settings is also given. This set of criteria will also facilitate the determination of the eligibility of particular archeological sites for listing in the National Register of Historic Places.

Types of Prehistoric Sites

CAMPSITES OR HABITATION SITES

Campsites or habitation sites are localities where general tasks such as food processing and cooking, hide working, and tool production and maintenance took place. Campsites are generally defined as containing scattered burned rocks or burned rock features such as hearths or burned rock middens, along with other cultural debris such as faunal remains and lithic tools and debitage. Often these localities show evidence of repeated use, not just from year to year but from millennium to millennium. Such evidence suggests that these localities may be, or have been in the past, strategically located in relation to important resources, such as reliable water sources, or advantageous vistas for spotting large game. Of the 142 prehistoric archeological sites recorded at Camp Bullis and Camp Stanley, 64 are campsites and 7 have burned rock middens.

Because of the various activities that took place at campsites and their relatively long term occupation, many aspects of prehistoric lifeways, such as subsistence and settlement patterns and tool production, can be addressed from the archeological data sets recovered from campsites. However, as many campsites have been occupied many times over several millennia and may yield very large samples of cultural materials, this can be an impediment to making meaningful analyses and interpretations if the temporal components are not stratigraphically separate. Such sites need to demonstrate a degree of stratification if multiple components are present and yield temporally diagnostic artifacts and/or materials suitable for radiocarbon dating for chronological control over the site.

LITHIC SCATTERS

Lithic scatters are sites comprised solely of lithic tools and debitage or chipping debris. Lithic scatters most likely represent short-term occupations where specific tasks such as the reduction of cores and quarry blanks or the production and/or maintenance of chipped stone tools took place. Often these sites are highly visible but shallow or surficial in nature. Lithic scatters also may be very small and/or diffuse, representing intermittent periods of use that are difficult to separate or date. Of the 142 prehistoric archeological sites recorded at Camp Stanley and Camp Bullis, 49 are identified as lithic scatters. These 49 sites represent late Paleoindian through Late Prehistoric components. Many are located on long-term stable surfaces in upland settings or on valley slopes. Because of this the sites tend to be shallow and difficult to interpret. For analytical and interpretive purposes, it is best if a lithic scatter consists of a single component, demonstrated by the presence of numerous examples of one type of temporally diagnostic projectile point. If chronological controls can be established, the collection of a stratified random sample of lithic debris so that its lithological variability may be examined or traced through trace elemental analysis or macroscopic attributes to a known source is a potential source of data from a lithic scatter. A stratified random sample of materials might from such a site also define technological variability and identify patterns regarding raw material preference and the products of lithic reduction.

LITHIC PROCUREMENT SITES

Lithic procurement or quarry sites are archeological and geological, representing the exploitation by prehistoric peoples of deposits containing knappable lithic materials. In the Camp Stanley area, lithic procurement sites coincide with primary and secondary sources of Edwards Group chert. The Edwards Group consists of Lower Cretaceous-age beds of limestones, dolomites, and marls, many of which contain abundant sources of high-quality fine-grained chert (Frederick et al. 1994; Rose 1979). Outcrops of the Edwards Group and correlative stratigraphy are prominent across the Edwards Plateau and exposed along the plateau's eastern and southern margins (i.e., Balcones fault zone). Primary sources of chert consist of seams and lenses of chert within or eroding out of limestone bedrock, such as the one at site 41BX920, a large quarry site in the southeastern portion of Camp Bullis. Secondary sources of chert are represented by alluvial gravels deposited by streams draining the Edwards Plateau. Upland lag gravels containing abundant chert are present along Cibolo Creek in northwestern Camp Bullis. Evidence of their utilization comes from five sites (41BX373, 41BX375, 41BX384, 41BX386, and 41CM213) in Camp Bullis. Of the 142 prehistoric archeological sites recorded at Camp Stanley and Camp Bullis, 9 are lithic procurement sites, all located in Camp Bullis. Four of these sites represent primary chert sources and are located in the southeastern portion of Camp Bullis where the Edwards Group is subaerially exposed. Because the Edwards Group is not present within Camp Stanley and the Glen Rose Formation (Camp Stanley bedrock) does not contain chert, primary sources of chert are not present at the facility. Secondary sources are not known but may exist in small patchy deposits of alluvial lag gravels overlooking Salado Creek.

Like lithic scatters, lithic procurement sites are difficult to interpret. The long-term surficial exposures of chert resources have been utilized for millennia by various groups of people. The result of this continued reuse is overlapping site components. Temporally diagnostic artifacts are rarely encountered at lithic procurement sites; therefore, determining site chronology rarely attains the level of precision that is possible for other types of sites.

Aside from the obvious contextual problems, Shafer (1993:45) has acknowledged that the main problem facing archeologists examining lithic procurement sites is determining what kinds of data can be gleaned from such sites. Magnifying this problem is the fact that few lithic procurement sites in Central Texas have been studied to the same extent as other lithic procurement sites across North America (e.g., Ahler and Vannest 1985). McGraw and Valdez (1978) used a random surface sample and a control sample of cultural materials at site 41BX68, a lithic procurement site in Bexar County, to describe the frequency and distribution of materials. However, little was presented on the site as a geological entity or on prehistoric behaviors and activities associated with the site. Understanding the data potential, including the resource quality, technology, and temporal variability, would help in the analysis and interpretation of such sites (Shafer 1993:57). Shafer (1993:57) suggests the data potential could be understood by defining the geological and geographic context of the chert source, mapping the extent of the procurement site within that context, obtaining a stratified random sample of the chert to examine its spatial and geological variability, and obtaining a stratified random sample of cultural materials to define technological variability and to identify patterning with regards to material preference, cultural activities, and the products of lithic reduction. The absence of temporally diagnostic artifacts would hinder the delineation of precise temporal components, but it is conceivable that some temporal patterns might be identified on the basis of resource extraction technology and blank production. Abbott and Ellis (1994:361-366) have proposed similar recommendations relevant to the investigation of lithic procurement sites. They present their recommendations in three broad categories: (1) investigating the geological and geographic distribution of the resource; (2) characterizing the properties of the chert (including trace element analysis, patination properties, and visual typology); and (3) understanding chert procurement and use (i.e., the on and off-site activities of stone tool production, use, and discard). While the investigation of the disturbution and physical properties of chert may be accomplished with relative ease at most lithic procurement sites, the study of chert procurement and use may be futile if chronological control over the site can not be demonstrated.

CEMETERIES

Cemeteries and isolated burials represent the intentional disposal of the dead, one of the few prehistoric rituals that is evidenced in the archeological record. Mortuary practices may reflect group identity, social status, and/or economic structure and thus provide information on the organization of prehistoric groups (Binford 1971:16–20).

No prehistoric cemeteries or isolated burials have been documented at Camp Stanley and Camp Bullis, but several isolated and multiple burials have been found in the surrounding area. Hitzfelder Cave contained the disarticulated remains of at least 30 individuals (Givens 1968). The articulated remains of at least 13 individuals buried with marine shell artifacts were recovered from site 41BX1 on Olmos Creek (Lukowski 1988). Any human remains recovered within Camp Stanley may provide valuable insights into the prehistory of the area, including data on dietary patterns, pathologies, and exchange or trade networks.

Site Settings: Geomorphic Environments and Archeological Potential

Geomorphological characteristics provide a setting for and interact with cultural systems (Butzer 1982:6), making their study an integral and necessary part of any archeological investigation. Various depositional, erosional, and pedogenic processes are characteristic of different geomorphic environments or site settings and play an important role in site formation and development of the archeological record. Because of this, consideration must be given to the probability that archeological sites representing varied cultural periods are not uniformly represented across the landscape or in all settings due to these processes. Gerstle et al. (1978:203) noted a clear difference between Late Archaic and Late Prehistoric campsite localities and those localities of earlier cultural periods (Paleoindian to Middle Archaic) at Camp Bullis. While the earlier campsites tend to cluster in the uplands and slopes, the later campsites are more common along larger stream valleys.

Initial studies of the erosional and depositional processes behind the evolution of the Camp Bullis landscape also suggest that not all cultural periods may be present in the archeological record. This absence varies from geomorphic environment to geomorphic environment (Kibler and Gardner 1997). The consequential effects that various geomorphic processes have had on the archeological record must be addressed in two parts. First, it must be discerned which cultural periods or components are potentially preserved or absent based on the ages of the preserved deposits, and second, it must be determined whether the sites are preserved in such a manner as to yield significant and interpretable archeological data. For although an environment may preserve cultural component(s), it must also be aggrading so as to provide clear stratigraphic separation between the components and lend sustainable integrity to the cultural deposits.

UPLANDS

Most of Camp Stanley and the surrounding area can be classified as uplands, which include summits, ridges, hillslopes, and intervening saddles. Temporal biases within the archeological record of upland settings are rare. Sites throughout the uplands may yield a variety of cultural materials from Paleoindian through Historic times, but the manner in which these sites are preserved severely limits the interpretable archeological data obtainable from these sites. The upland and slope environments tend to be nonaggrading, many times deflating, resulting in the accumulation of surface materials of varying ages on one common surface at any given site. These circumstances render the analysis of discrete components difficult at best. The best opportunity for the presence of interpretable sites in the uplands and slopes may be single-component sites that occur in the few depositional environments, such as sediments accumulating behind vegetation barriers or within saddles between ridge systems and slopes.

ALLUVIAL TERRACES

Temporal biases in the archeological record are more common within alluvial environments. Alluvial environments often create a temporal bias that favors the preservation of occupations that are coeval with aggradational phases and relatively stable surfaces, and discriminates against occupations that are coeval with or precede erosional episodes. However, because alluvial environments can be aggrading, those sites that are preserved tend to have relatively good integrity and stratigraphic separation of components, which are essential for meaningful archeological investigations and interpretations.

The Salado Creek valley is the only drainage within Camp Stanley to house significant deposits of alluvium. The low-order tributaries of Salado and Leon Creeks often are deep, narrow, and scoured to bedrock, or they only temporarily store alluvial sediments due to their steep gradients and peripheral position in the drainage basin. A single, relatively broad geomorphic surface, the modern floodplain (T_0), is present in the Salado Creek valley of Camp Stanley. The alluvial fill below the floodplain consists of gravelly basal units capped by thin mantles of loamy and clayey alluvium.

The modification and channelization of Salado Creek throughout Camp Stanley has obviously disturbed and destroyed much of the alluvial stratigraphy, and undoubtedly alluvial deposition has been affected by the Soil Conservation Service (SCS) dam downstream in Camp Bullis. It is probable that in the past the steep gradient of upper Salado Creek, coupled with heavy rainfalls and impervious ground cover throughout the watershed, resulted in intensive flash floods scouring the channel bed and margins. It is probable that most of the upper Salado Creek valley was periodically scoured out, making the presence of any alluvial deposits temporary features within the valley. How often this may have occurred is not known, but since flashy discharges are now controlled to some extent, it is probable that much of the Salado Creek alluvium has been deposited since the construction of the SCS dam.

Based on this, much of the earlier Holocene alluvial record of Salado Creek may not be preserved and that which is preserved appears to represent high-energy environments of channel fills. However, much more work is needed to delineate the alluvial chronology of Salado Creek in order to document the age and nature of the alluvial fill. In return, a better handle on the archeological record can be gained and more-informed interpretations can be made.

ROCKSHELTERS

Rockshelters or large overhangs currently are not known to exist in Camp Stanley, and only three small shelters (41BX802, 41BX1031, and 41BX1032) are known at Camp Bullis. Shelters may form along low-order streams where underlying less-resistant bedrock units are undercut by the stream, such as shelters 41BX1031 and 41BX1032 at Camp Bullis. However, the Glen Rose Formation, which occurs across Camp Stanley, may not be conducive to rockshelter formation, or such features are very short lived and collapse quickly before fully developing in the evolution of hillslopes. Abbott (1994:32) has noted that rockshelter development in the Glen Rose Formation at Fort Hood (Bell and Coryell Counties) is very uncommon. The fact that two of the known shelters at Camp Bullis contain Late Prehistoric components suggests that these features are short lived. Due to their suggested brief existence, rockshelters are ideal localities for isolable and interpretable archeological components. Rockshelters in general are good sediment traps (Collcutt 1979), potentially providing a clear separation of archeological components for analysis and interpretation. The protection afforded by a rockshelter can potentially create an excellent record of past human occupations. A comparable degree of preservation is seldom obtained from open-air archeological sites. These factors make any rockshelter, standing or collapsed, potentially significant and thus potentially worthy of intensive archeological investigations.

Cultural Adaptive Systems: Correlations between the Archeological Record and Prehistoric Human Behavior

The development of reconstruction or mid-range theories has played a major role in archeological theory and method in the last few decades by trying to establish ties between the static empirical data of the archeological record and the more abstract, dynamic theories of cultural behavior (e.g., Binford 1978; Raab and Goodyear 1984; Schiffer 1972, 1976). Middle-range theory has provided for archeologists a conceptual tool with the ability to transform evidence into inference and to understand the behaviors, activities, and processes responsible for creating the various patterns observed in the archeological record. Patterns and variables, such as site distributions, their specific functions, and assemblages, may best express this relationship between the present archeological record and past cultural behavior. These patterns can be viewed as a product of a group's adaptive strategy, a mid-range conceptual construct. Adaptive strategies or systems are, as defined by Butzer (1982:285), a three-dimensional interplay between social behavior, technology, and resource opportunities and limitations that is reflected in subsistence strategies and settlement patterns and that reacts and adjusts to internal processes as well as changes in the cultural and natural environments. The environment provides an array of resources and constraints leading to a range of potential behaviors, strategies, and activities carried out by the cultural group (Butzer 1982:293).

Delineation of prehistoric adaptive systems that operated in the Camp Stanley area and understanding of how these systems changed through time is a major goal of current archeological research (e.g., Black 1989; Collins 1995; Ellis et al. 1995). Various ecologically based hunter-gatherer models of cultural adaptation have been proposed for the Camp Stanley area and the larger Central Texas region (e.g., Gerstle et al. 1978; Story 1985). Ricklis and Collins (1994:323–325) have presented arguably the most comprehensive model of hunting and gathering strategies and settlement patterns for the Central Texas region. They suggest that changes in their model of adaptive strategies were influenced by climatic and environmental changes and varying resource bases throughout the Holocene.

The study of prehistoric adaptive systems must obtain data on the distribution, age, and function of sites; the resources available and the technologies to exploit them; and population dynamics. Hines (1993) has put forth the following research domains relevant to this goal for Camp Bullis and Fort Sam Houston: paleoenvironments, chronology, subsistence strategies, settlement patterns, technology and material culture, population dynamics, and intraregional and extraregional interactions. Hines (1993) thoroughly discusses each research domain, presenting the extant data, data gaps, and research needs. The discussion clearly reveals the interrelated nature of the research domains and shows that the inability to fully address one research domain can result in limitations in addressing the others as well. While such topics have been the focus of many past archeological investigations in Central Texas (e.g., Black and McGraw 1985; Johnson 1991, 1995; Ricklis and Collins 1994), most are still not clearly understood, yielding many gaps in our knowledge of the prehistoric adaptive systems of the region. Many of the limitations and inabilities to address such issues are due to the lack of appropriate data, which can be related to the generally poor contextual integrity of many sites in the area. Intact or minimally disturbed sites are needed if the current data gaps are to be addressed. A set of general criteria by which to identify and judge such sites has been discussed above. Improved and innovative methods and analytical techniques also may be one way to gain the appropriate data to deal with the research issues and needs at hand. The research domains put forth by Hines (1993) are summarized below, and recommendations are provided for addressing each domain for the investigation of Camp Stanley's prehistoric resources within an ecologically based paradigm of cultural adaptation.

Paleoenvironments

Paleoenvironmental data represent a basic element in archeological investigations. Such data not only provide an understanding of the environment in which cultures interacted, but also provide an understanding of the natural processes responsible for the formation of the archeological record.

On a large scale (Camp Stanley), paleoenvironmental studies should focus on obtaining an alluvial chronology for Salado Creek, if possible, through mechanical trenching, identification of alluvial fills, and the procurement of radiocarbon assays on in situ charcoal within alluvial deposits and humates in buried alluvial soils. Stable carbon isotope analysis of soil humates should be conducted to reconstruct and document changes in vegetation. Since upland environments constitute much of Camp Stanley, continued geomorphic investigations on the evolution and development of hillslopes should be conducted to augment those initial investigations conducted by Kibler (in Kibler and Gardner 1997) at Camp Bullis.

On a smaller scale, specifically at the site level, columns of sediment samples should be collected from significant sites and subjected to granulometric and chemical analyses to delineate the varying depositional processes contributing to site formation and pedogenic activity. Changes in depositional and pedogenic regimes may represent climatic and other environmental changes, and therefore a response to these changes may be expected in the adaptive strategies of human groups. Palynological investigations generally have been unsuccessful at many sites in the Camp Stanley area due to poor preservation (e.g., Gerstle et al. 1978:225); but the analysis of sediment samples for opal phytoliths, which are more durable than pollen, may prove to be more appropriate for the reconstruction of the area's plant community, even though the results of the technique are somewhat limited (Pearsall 1989:343–344). Other reliable indicators of environmental and climatic change are the presence or absence of certain microfauna that are sensitive to such changes (e.g., least shrew [*Cryptotis parva*] vs. desert shrew [*Notiosorex crawfordi*]). For example, Toomey et al.'s (1993) examination of bulk sediment samples from Hall's Cave on the Edwards Plateau for microfaunal remains has provided a nearly complete paleoenvironmental record for the Holocene.

Chronology

The basis for any archeological research is the delineation and refinement of local and regional chronologies, which provide temporal and cultural units for the placement of particular archeological assemblages (Taylor 1983:168). The current chronology for the Camp Stanley area is tenuous and does not permit the placement of isolated components relative to each other and to regional cultural and natural phenomena with strict confidence. The cultural chronology of Central Texas has been primarily constructed through intrasite stratigraphy, temporally diagnostic projectile points, and radiocarbon assays, which have provided both relative and absolute chronological data. Ultimately, sound contextual integrity of the archeological site under investigation is the basis for successful and accurate relative and absolute dating of the site's components.

Stratigraphy, if intact and continuous, provides a simple relative, intrasite dating method and is a sound basis for meaningful archeological interpretations. The use of temporally diagnostic projectile points as a means of relative dating has been the common method for intersite comparisons across the Camp Stanley area and surrounding region (e.g., Johnson and Goode 1994; Prewitt 1981, 1985). Radiocarbon absolute dating has yielded variable results in the Camp Stanley area due to problems of context and sample preservation (Hines 1993:20). However, organic materials from unquestionable contexts should always be collected for dating by radiocarbon assay. Even small samples can be dated by accelerator mass spectrometry procedures, yielding more-accurate dates than in the past. In the absence of suitable organic materials for radiocarbon dating, which is not uncommon in the Camp Stanley area (Ricklis and Collins 1994:325), other absolute dating methods must be considered and perfected. Dating of burned limestone samples from archeological features by thermoluminescence has produced encouraging results (M. Collins 1994:499). Absolute dating of burned rock features through archeomagnetic studies has remained elusive due to the lack of a regional archeomagnetic dating curve (Gose 1994:507). However, archeomagnetic data can still assess the possible contemporaneity of a component's burned rock features (M. Collins 1994:501). Recently, the amino acid epimerization analysis of terrestrial snails (*Rabdotus* sp.) has been shown to be a reliable chronometric indicator (Ellis and Goodfriend 1994). This method of absolute dating should be pursued further in order to perfect and refine the method.

Subsistence Strategies

The types of resources exploited and the manner in which they were exploited constitute a group's subsistence strategy. Subsistence strategies were influenced by the density of a potential resource, the effort or risk involved in obtaining the resource, the available technology, and the social organization of the group.

The identification of exploited faunal resources within archeological sites is important, but has been limited at many sites due to poorly preserved vertebrate faunal assemblages (e.g., 41BX377, see Kibler and Gardner 1997). This in turn hinders any interpretations about off-site hunting activities, transport of the carcass or parts of the carcass, and food-processing activities. More information may be gained about the exploitation and use of plant resources. Evidence of plant food utilization is not readily apparent at most sites, but such resources probably made up a large portion of the prehistoric diet, particularly if, as many have suggested, the ubiquitous burned rock features of Central Texas functioned as plant food-processing features (e.g., Creel 1986; Johnson and Goode 1994; Prewitt 1976; Wilson 1930). Flotation of bulk sediment samples, especially from features, may recover much more evidence of plant food utilization, such as charred macrobotanical remains. Phytoliths may also provide insights on the types of plant foods processed at the site and within features.

Evidence of subsistence may be inferred, even though faunal and floral remains are poorly preserved, from the types of tools, wear patterns and residues on tools, and the nature of food-processing features recovered (Black 1989:33). Subsistence strategies also may be inferred from dietary patterns indicated by stable carbon and nitrogen isotopic analyses on human skeletal remains (DeNiro 1987; Van der Merwe 1982).

Settlement Patterns

Human populations positioned themselves in relation to the distribution of resources (e.g., prickly pear patches, chert outcrops, fresh water) across the region. This pattern reflects the group's adaptive strategies within the context of their environment, the group's level of technology, and the customs of social organization and behavior (Willey 1953:1). Aspects of a group's settlement pattern at the site level, such as group or camp size, duration of occupation, range of site activities, and season of occupation, may be defined and interpreted from the archeological record (Hines 1993:25).

More-detailed information about these site characteristics can be obtained through intensive excavations at significant sites yielding large samples of artifacts, features, and other materials. Group or camp size may be determined through the spatial distributions, densities, and patterning of artifacts and features. The length of occupations can be related to the number and variety of cultural materials recovered, reuse of features, and the sedimentation rates of the deposits encasing the cultural materials and features. Another possible indicator of occupation length is burned rock size, based on the premise that rocks continually fracture as they are constantly recycled for feature construction and use (Hines et al. 1994; Tunnell and Madrid 1990:154). Documentation of burned rock weights, counts, and size may prove useful in determining feature reuse. Site activities may be delineated through an analysis of artifact assemblages, features, and other materials. In addition to a technological perspective of chipped stone tool analysis, the analysis should also include a functional aspect, such as macro and micro use-wear analysis, in order to define tool classes based on function and hence delineate site activities.

Evidence of seasonality may be limited to the recovery of macrobotanical remains and phytoliths from features, since vertebrate faunal remains usually are either poorly preserved or the appropriate elements are not present within the assemblage. Although poorly preserved assemblages are common, faunal remains have provided some seasonal data from a few sites. Faunal remains at 41BX36 in Camp Bullis hint at a fall-winter-spring season of site utilization (Gerstle et al. 1978:251). At Scorpion Cave, the remains of Canadian goose and green-wing teal suggest the site was occupied during the winter (Highley et al. 1978:186). A popular seasonal model associates burned rock middens with collection and processing of nut crops in the fall (Creel 1986; Weir 1976:125).

Technology and Material Culture

The organization of technology is related to a group's subsistence strategy and settlement pattern (Binford 1979, 1980; Kelly 1983; Shott 1986). The study of technology and material culture is best accomplished if their role in a group's adaptive strategy to the natural and cultural environment is understood. Hines (1993:27) suggests prehistoric technologies be considered under three categories: tool manufacturing technology, subsistence technology, and personal and ritual technology. The study of all three categories would be facilitated by the recovery of large samples of artifacts and features through intensive excavations at significant sites.

Tool manufacturing technology, particularly of chipped stone tools, needs to focus on the procurement of raw materials and the reduction sequences involved. Understanding a site's or component's subsistence technology may come from focusing on the variety of tool types within an assemblage, feature utilization (food processing or storage), and associated faunal and botanical remains. Personal and ritual technology may be difficult to discern if human interments are not present at a site. However, personal or ornamental items of shell and bone are not uncommon and have been recovered from sites not yielding human burials in Camp Bullis (e.g., 41BX377) and the surrounding area (e.g, 41BX228, Black and McGraw [1985:200]; 41HY209-T, Ricklis [1994:200]).

Population Dynamics

Population dynamics, including data on population density, demography, pathology, and ethnicity, are a critical aspect of adaptive systems because they are related to territorial ranges, resource depletion, and group fissioning and fusion (Hines 1993:31). However, these data and interpretations are difficult to ascertain without intersite comparisons or human skeletal remains, and to this point in time no human remains have been recovered from Camp Stanley or Camp Bullis. Data such as projectile point frequencies from sites and components can be compared with other regional data (e.g., Prewitt 1981, 1985) so as to contribute to a greater understanding of regional population dynamics and culture process.

Intraregional and Extraregional Interaction

Intraregional and extraregional interactions consist of economic and social relations between groups (Polanyi 1957) and represent an adaptive strategy employed by a group for access to resources and to form relations and alliances. Exchange is the most tangible of prehistoric interactions, for it may leave its imprint on the archeological record depending on the resources exchanged (Schortman and Urban 1987:49).

Intensive excavations at significant sites may yield a large enough sample of artifacts to address the aspects of extraregional and intraregional trade. Evidence of exchange may include marine shells and nonlocal lithic materials, which have been recovered from other sites in the area (e.g., Black and McGraw 1985; Katz 1987; Lukowski 1988). Exotic lithic materials, such as obsidian, should be subjected to trace element analysis. Other sites in the region have indicated connections with the Caddo of East Texas during the Late Prehistoric based on the recovery of Caddoan ceramics (Ricklis 1994:265–266).

HISTORIC PERIOD

The colonization and settlement of the central Texas region began in the late seventeenth century with the establishment of missions by the Spanish. Settlement by Mexicans, Texans, Germans, and others followed. All of these groups had a profound and unique impact on the colorful history of the area, which is summarized by Fox (1989). While there are several studies pertaining to the specific historic context of neighboring Camp Bullis (e.g., Boyd et al. 1990; Freeman 1994a, 1994b; Gerstle et al. 1978; Manguso 1990), only Manguso has dealt in detail with Camp Stanley.

Settlement in the Camp Stanley area started with a land purchase by Nathaniel Lewis in 1838. Lewis subsequently sold some of this land to John O. Meusebach, who constructed a house in the Comanche Springs area located in Camp Bullis (Boyd et al. 1990:55). Meusebach later moved to a new location north and farther up the Salado Creek valley in the 1850s, into what is today the Outer Cantonment of Camp Stanley (Freeman 1994b:47).

United States military activity in the Leon Springs area began in 1906 and 1907 with the purchase of 17,273.87 acres from all of or parts of six ranches (Freeman 1994a:9). This area was designated the Leon Springs Military Reservation and was to be used as a maneuvers and training area for troops based at Fort Sam Houston in San Antonio. Leon Springs was praised for its sparse population and varied terrain (Manguso 1990:5). Use of the new training area started almost immediately. In July and August of 1907, the small arms range was used for the Southwestern Rifle and Pistol Competition. The first major maneuvers were held in 1908 involving Regular Army and National Guard Infantry, Cavalry, and Artillery (Manguso 1990:11).

The Leon Springs Military Reservation continued to grow in importance in the years before World War I. With increased tensions along the United States-Mexico border between 1910 and 1917, the reservation was increasingly used for maneuvers and training. In 1916, a large remount station was built near Anderson Hill (Manguso 1990:21). In February of 1917, the facilities at the reservation were renamed Camp Funston in honor of Major General Frederick Funston. To avoid confusion with another base of the same name, in October the camp was renamed Camp Stanley in honor of Brigadier General David Sloan Stanley, former commander of the Department of Texas (Manguso 1990:23).

With the American entry into World War I, the facilities at Camp Stanley grew dramatically. In May of 1917, the First Officers Training Camp was established north of Anderson Hill "in a tent and temporary building cantonment" (Manguso 1990:23) to train junior officers for the 90th Division forming in San Antonio. In July and August, these troops conducted trench warfare training to the east of Anderson Hill. Also constructed at this time was a Signal Corps branch school in the northwest corner of Camp Stanley (Manguso 1990:23–24). The northwest area of the camp was also used for cavalry units, and there was a Quartermaster area just north of the officer training cantonment. Both of these areas were connected by a rail line running into the camp from Camp Bullis to the south.

With the downsizing of the military after World War I, many of the structures at Camp Stanley seem to have been abandoned or removed. It was also during this time that Camp Stanley began the second phase of its existence. In 1920 the northern half of the camp was given over to the Ordnance Section of the Eighth Corps Area for the storage of large stocks of surplus ammunition, despite the lack of suitable structures for this storage. In 1925 the storage area was taken over by the San Antonio Arsenal, and plans were started to create a proper storage facility. This plan was not fully implemented until 1938. That year, Works Progress Administration (WPA) workers began excavation and construction of the igloos and magazines in the southern part of the camp (Manguso 1990:47).

During the period between World Wars I and II, Camp Stanley and Camp Bullis hosted a number of military activities, as well as two unusual civilian activities. In 1926, two movies—*The Rough Riders* and

Wings—were filmed at the bases. *Wings* made use of the old training trenches to the east of Anderson Hill as movie sets and was later the winner of the first Academy of Motion Pictures award for Best Picture in 1927.

As the United States entered World War II, the army decided to enlarge Camp Stanley and Camp Bullis, and land to the north of Camp Stanley was acquired by condemnation in 1942. The condemned land included six tracks that would later make up the northern part of Camp Stanley's Outer Cantonment (Freeman 1994a:65; Rogers et al. 1940). Three of these tracts contained known ranch complexes previously belonging to Andrew Blank, Louis Willke (Wilkie), and O. Scharmann; all three show on the 1925 map of Camp Stanley (see Figure 4).

During World War II, what is now the Outer Cantonment of Camp Stanley was part of Camp Bullis and used for training. The most evident example of this occurs around the old rifle range, which was being used as an antitank gunnery range with moving targets. In 1943, army combat engineers built a fortified combat training area to the east of the range (Manguso 1990:81). Also during this time, many of the farms on the camp property either were salvaged or used by range wardens who patrolled the perimeter of the camp (Petsch 1942).

Camp Stanley continues to be a major munitions storage and research facility. The only major change since World War II has been the transfer of the Outer Cantonment area from Camp Bullis to Camp Stanley in 1953 and 1970 (Manguso 1990:99).