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Cultural Resources Monitoring Of Geological Study Units In Padre Canyon Area Southeast Of El Paso, Hudspeth County, Texas

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Cultural Resources Monitoring Of Geological Study Units In Padre Canyon Area Southeast Of El Paso, Hudspeth County, Texas

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**CULTURAL RESOURCES MONITORING OF
GEOLOGICAL STUDY UNITS IN PADRE CANYON AREA
SOUTHEAST OF EL PASO, HUDSPETH COUNTY, TEXAS**

TEXAS ANTIQUITIES PERMIT NO. 6760



Prepared for:

**JOBE Materials, L.P.
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El Paso, Texas 79928**

Prepared by:

 **DMG Four Corners Research, Inc.
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Jeffery Hanson, Ph.D.**

Four Corners Research Project No. 14-557

May 19, 2015

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1.0 INTRODUCTION

by *David H. Greenwald*

DMG Four Corners Research, Inc. conducted cultural resource monitoring at seven proposed geological study loci (shallow drill holes and excavation units of less than 50 feet) at the request of JOBE Materials, L.P., on Texas GLO lands southeast of El Paso, in Hudspeth County, Texas (Figure 1.1). Mineral rights are owned by the State of Texas. The geological study loci were confined to Texas GLO Block 10, Sections 15, 21 and 22 (Figure 1.2) within 1323 acres, although a larger permit area was granted. The project was initiated on January 23, 2014, and completed on January 24, 2014. No named roads exist in the area; the proposed site would serve as a new facility operated by JOBE Materials, L.P., located near the existing Padre Canyon Quarry. The entire project area is undeveloped land, used most recently for grazing. Parallel gas pipelines and a two-track road run through the project area, representing the greatest extent of disturbance other than natural sources.

Jeffery Hanson, Ph.D., served as Principal Investigator under Texas Antiquities Permit 6760. David Greenwald served as Project Manager and Monitor; he possesses extensive previous experience working in the Hueco Bolson and Tularosa Basin and has previous experience within the specific project location. Pre-field planning selected areas beyond known site locations. Each proposed geological test location was intensively inspected prior to any equipment entering the area or ground disturbance. Equipment used to complete the geological study included a boring rig and an excavator. No sites were encountered although notes regarding observations regarding nearby artifacts, possible features, and stains of cultural or possible cultural origin were made and GIS coordinates recorded for confirmed cultural remains.

1.1 Project Objectives and Location

The project area is located east of Horizon City, Texas, within an area that is largely undeveloped. The JOBE Materials, L.P., existing Padre Canyon Quarry is located immediately west of the project area in Sections 16 and 21 (Figure 1.2). The quarry is plotted on the *Padre Canyon, Texas* 7.5-minute 1978 USGS map, located south of the Hueco Mountains in far western Texas, near the margin of the Rio Grande watershed. The Hueco Mountains trend in a north-south direction and separate the Hueco and Diablo Plateaus to the west and east.

Project objectives were to avoid all previously recorded cultural resources, and to identify and document any cultural resources found during the inspection of each geological study locus, and to evaluate each cultural resource for its National Register of Historic Places (NRHP) eligibility using all criteria listed in 36 CFR 60.4, and for nomination as State Antiquities Landmarks. The area is primarily a broad alluvial fan; dunes and aeolian deposits are not present. The geo-technical study was proposed to define the shallow geological formations and soil types present. Originally 10 to 12 study units were planned; however, only seven were actually undertaken. Initial in-field analysis suggested that the geological materials within the permit area did not meet requisite needs for JOBE's proposed project. Following additional analysis and assessment of the recovered geological samples, the proposed project was discontinued.

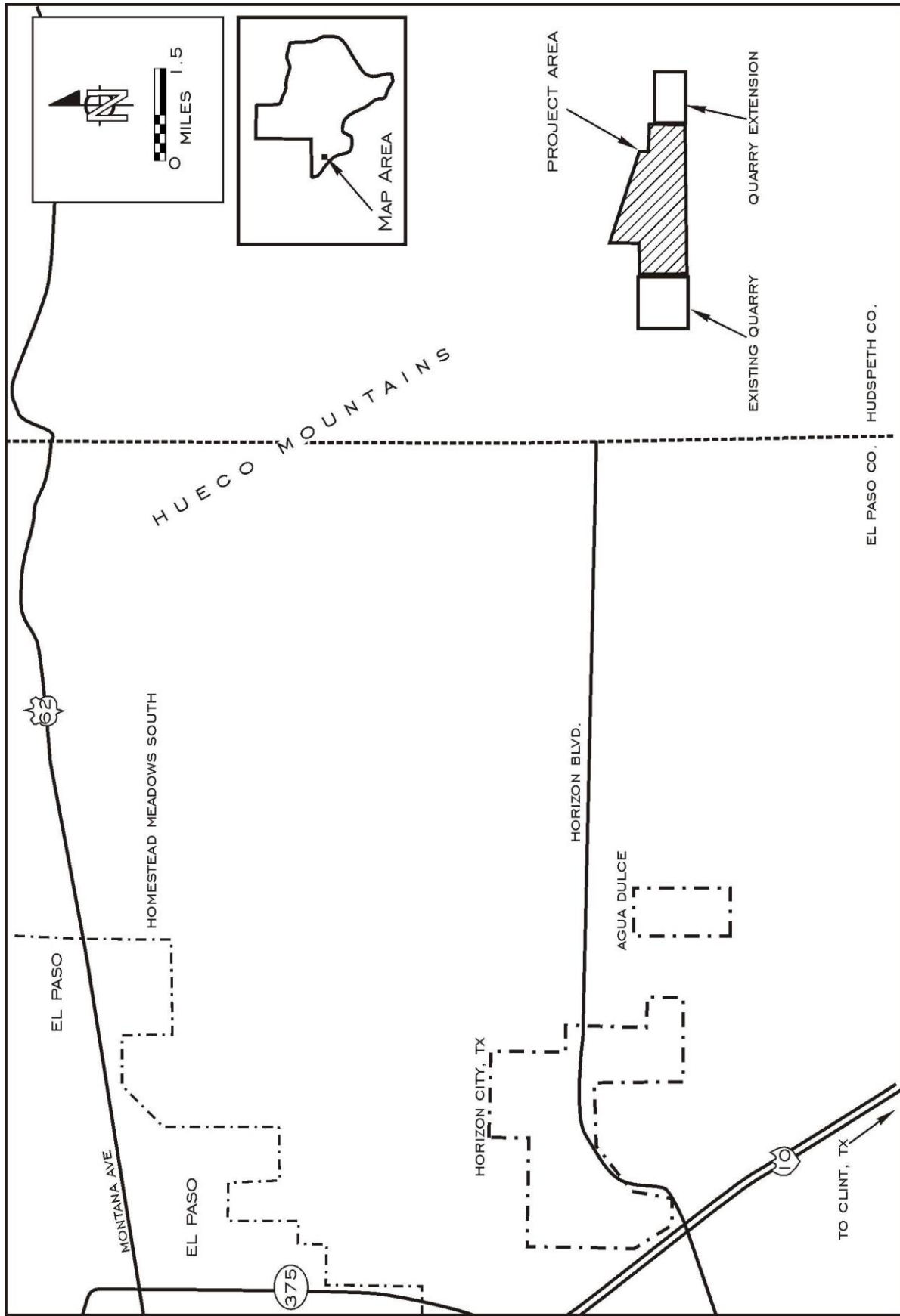
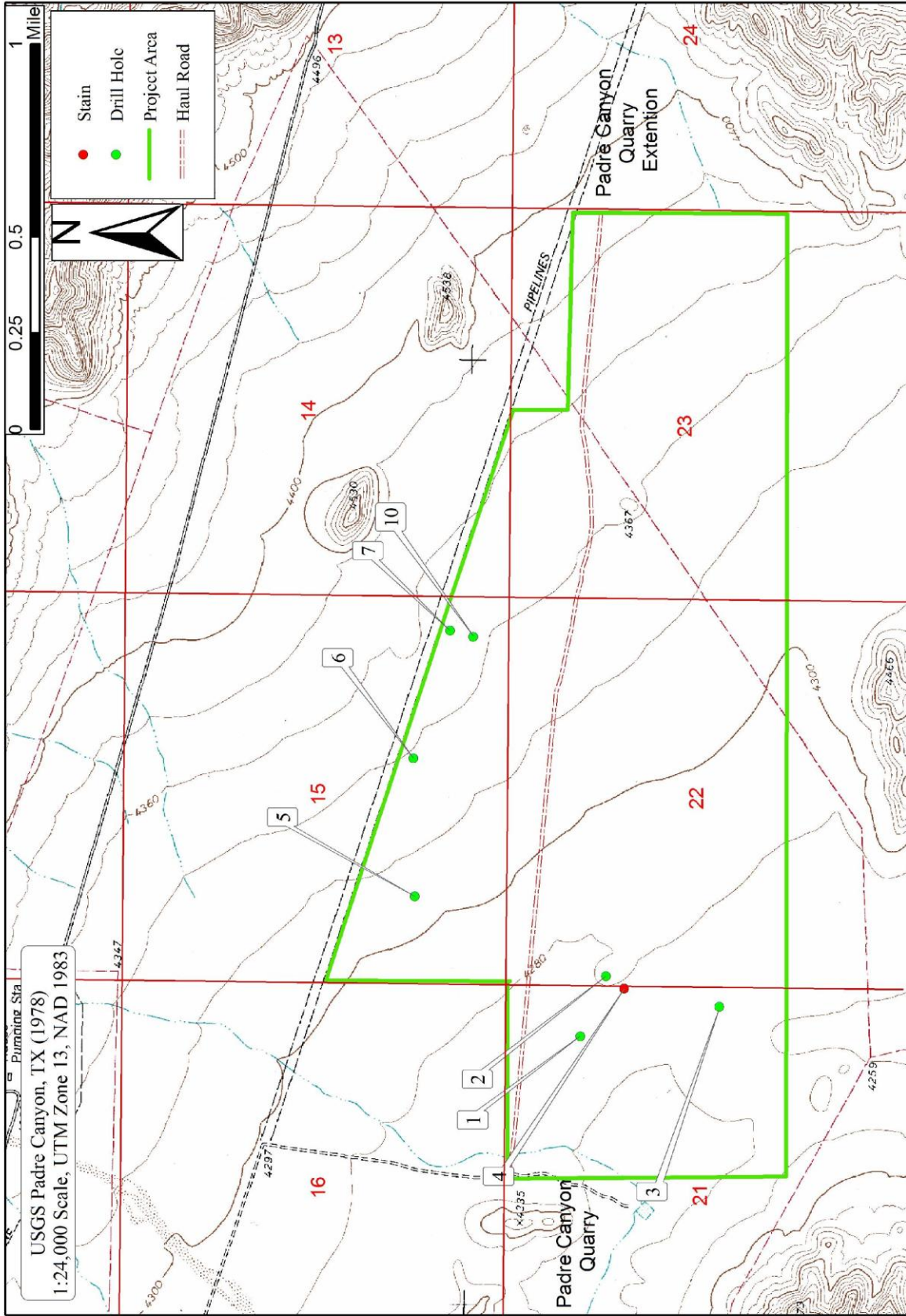


Figure 1.1. General project location map.



FCR Project No. 14-557

Figure 1.2. Overall area for which an Antiquities Permit Application was requested showing the specific locations where geological drilling was conducted.

This undertaking complies with the requirements of the Antiquities Code of Texas, in compliance with the provisions of Texas Antiquities Committee Archeological Permit 6760. The investigations were conducted and the report prepared in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and with the guidelines set forth by the Texas Historical Commission (THC) and the Council for Texas Archaeologists (CTA). A project research design used to guide the field inventory, recording and documentation process is presented in Section 5 of this report.

This report also presents a brief discussion of the natural and cultural histories of the west Texas and El Paso areas, examining the surrounding areas of the Hueco Bolson and the southern Hueco Mountains, while placing the cultural resources in the project area within a historic context. Additionally, a discussion of previous investigations in proximity to the project area and a description of the methods used during the field documentation are presented. The archaeological sites are thoroughly described, with recommendations provided regarding their NRHP eligibility and significance within local and regional contexts. Finally, management recommendations are provided.

1.2 Environmental Setting

Paramount to understanding how Native American groups met subsistence needs and exploited economic resources is achieved in part by understanding the physiography of the region in which they lived and what resources were available. The project area extends across a portion of the lower reaches of the south side of the eastern flanks of the Hueco Mountains, near the El Paso-Hudspeth County line in the southeastern portion of the Hueco Bolsón. Several rhyolite hills occur in the area. The general area can be characterized as the lower slopes and foothills of the Hueco Mountains, or the lower bajada—collectively, the rock pediments along the mountain flanks with relatively shallow soils expanding into the basin where detrital sediments potentially occur in great depth. It is the accumulated deposits within the defined project area that are of interest to JOBE Materials for potential future use of the area. Discharge from the mountain slopes transports sediments in suspension, depositing materials of various textures as the water velocity slows. The area expresses considerable stability through erosion cuts, where well-developed C horizons (calcium carbonate layers) are exposed.

The Hueco Mountains area is typically represented by hot, dry summers, with winter months experiencing short periods of cold night temperatures, with freezing temperatures occurring in December and January when moisture is received occasionally as snow. Project area elevations range from 4300 to 4600 feet above mean sea level (amsl), affecting the range of temperatures, the annual amount of precipitation received, and the variety of economic resources (primarily flora) available. Soils consist primarily of fine basin sediments, often composed of alluvium formed on ancient alluvial terraces.

Succulents and cacti offer resources within the project where they occur as widely dispersed populations and in infrequent numbers. Yucca, prickly pear, and mesquite provided the greatest resource potential to the diet of prehistoric groups through their fruits, roots, and beans. Similar varieties of plant resources throughout this region were exploited by prehistoric groups to meet

subsistence needs, resulting in burnt-rock middens, roasting features, and ring middens. Prior to livestock grazing, grasses are believed to have been plentiful within this physical setting. Grass seeds also may have been important economic resources to prehistoric groups.

1.3 Soils and Associated Resources within the Project Area

According to the NRCS Web Soil Survey, the Culberspeth-Chilicotal complex occurs in the project area. These soils dominate the fan remnants and flats of the project area and are characterized as gravelly loam. These areas are nearly flat, having accumulated finer soils. These are very gravelly sandy loams.

1.4 Erosion and Deposition Processes

Active outwash fans can affect the integrity of cultural deposits through continuous cutting and filling episodes. Highly active outwash fans can result in the accumulation of deep deposits of alluvial materials over a rather brief period of time, burying occupation horizons with little or no surface indications.

The current project area includes the mid-sections of outwash fans and the broader alluvial flats, where water velocity slows significantly and bedloads are dropped from suspension. Erosion channels are generally shallow due to the limited topographic relief across much of the project area. Many of the thermal features (fire-cracked rock concentrations on the surface) previously reported in the area (Poitevint et al. 2013) exhibit disturbance caused by water action (cutting of small channels and redepositing of materials), which has compromised the integrity of the cultural deposits in some locations. Sheet-wash erosion, however, is localized and was not identified over the greater project area.

2.0 CULTURAL HISTORY

by *David H. Greenwald and Lindsay R. Poitevint*

The northern Chihuahua Desert in the vicinity of El Paso contains a lengthy prehistoric occupation sequence. Shared by extreme west Texas, southern New Mexico, and northern Chihuahua, the area possesses cultural remains that extend back more than 11,000 years ago. The physiography of the area provided considerable contrast between the Rio Grande river corridor, the narrow ranges separating the Rio Grande from adjacent basins, and the Hueco Bolson and southern extent of the Tularosa Basin. Each setting was used prehistorically and historically in different manners, relating primarily to the natural resources found and exploited by different groups. The following is a brief summary of the cultural history of the general area, extending from the first recognized occupation until the recent historic period.

2.1 Paleoindian Period (9500–6000 B.C.)

Throughout the Southwestern United States, the earliest human occupation on record began during the Paleoindian period. It was a time when subsistence regimes included big-game hunting, with the exploitation of wild plant foods as a supplemental subsistence strategy. Attributes of the Paleoindian period include lanceolate fluted projectile points and distinctive lithic technologies, which have a geographic range that extends throughout North America. The Paleoindian period spans the end of the Pleistocene glaciations through the beginning of the Holocene or modern era (Fiedel 1999). The consensus view of Pleistocene archaeologists holds that the Clovis culture emerged as one of the first indisputable human occupations of the New World, beginning at approximately 13,500 B.P. (using re-evaluated and adjusted C^{14} dates [11,050–10,800 C^{14} yr B.P.], as presented by Waters and Stafford 2007), and was subsequently followed in rapid succession by other traditions and complexes.

Archaeological evidence for the Paleoindian period has been recovered from nearly every region in the Americas, but its origins remain disputed. The grasslands of the southern plains in New Mexico and western Texas may have supported Paleoindian peoples as late as 5500 B.C. (Irwin-Williams 1973, in Cordell 1984:136), long after the advent of hunter-gatherer economies of the Archaic period had developed elsewhere in North America (Sherwood et al. 2004).

In general, the Paleoindian period was a time when an emphasis was placed on big-game hunting, with exploitation of wild plant foods as a supplemental subsistence strategy. Late Paleoindian complexes utilized a variety of well-made, unfluted lanceolate points, with regional distribution. Overall, the Paleoindian period was a time characterized by climatic fluctuations, which resulted in localized environmental settings that were cooler and wetter than those of today, where much of the lowland flora in the Southwest would have been expressed as grassland or savanna (Van Devender and Spaulding 1979). During the early Pleistocene, large pluvial lakes formed by retreating glaciers attracted big-game animals and human hunters (Breternitz and Doyel 1983). Most of the archaeological evidence for this period in surrounding areas is associated with hunting-related sites, including preparatory sites, processing sites, and base camps.

2.1.1 Clovis Complex

The Clovis Complex (ca. 10,000–9000 B.C.) was focused on hunting extinct megafauna and other game animals such as the horse and camel throughout much of the Southwest, whereas remains of the Folsom Complex are much more common (Meyer and Eidenbach 1996). Clovis-age deposits are reported from Mockingbird Gap (Weber and Agogino 1968) and Rhodes Canyon (Eidenbach 1983) in the northern Tularosa Basin, and occasionally occur as isolated finds within site assemblages from the region (i.e., Purcell and Greenwald 2002:6.10, 6.119).

2.1.2 Folsom/Midland Complex

The Folsom/Midland period dates from approximately 9000–8000 B.C. It has been suggested that the proximity of Folsom sites to water sources is related to a decrease in effective moisture (Laumbach et al. 2002). During this time, there was a shift in focus to hunting bison. Strategies associated with hunting herd animals may have focused on ambush hunting when herds were at watering places and animals being injured or trampled when startled. Moody Tank (Russell 1968), perhaps one of the best known Folsom/Midland sites in the general area, consists of a series of artifact clusters that occur in the eroded sand ridges surrounding a small playa (Amick and Stanford n.d.:23). The tool assemblage from this site was largely manufactured from local cherts, especially a gray banded chert sometimes called “zebra stripe” or “fingerprint” chert outsourced in the Sacramento Mountains. Nevertheless, Edwards chert, from the Edwards Plateau in Texas, also represents 29 percent of the assemblage (Amick and Stanford n.d.:24), suggesting widespread exchange of preferred raw materials during this time.

2.1.3 Late Paleoindian/Plano Complex

Late Paleoindian times are marked by the proliferation of regional traditions and complexes. The Plano Complex of the southern Great Plains extends from approximately 8000 to 5500 B.C. in this area (Irwin-Williams 1979) and is represented primarily by the occurrence of basally-indentated lanceolate Plainview points. These points are generally well-made, with margins ground smooth to aid the hafting process. Plano Complex materials have been reported in the form of projectile points, end and side scrapers, knives, and drills (Human Systems Research 1973:223; Meyer and Eidenbach 1996:200; Sale 1997:13). Changes in the tool kit suggest a shift in the focus of hunting strategies from areas around playas to live water sources, indicating that environmental conditions continued to degrade, reducing not only watering sources for game animals, but also available grassland (Cordell 1984; Judge 1973). By 5500 B.C., it is clear that new subsistence strategies were beginning to emerge. The reasons and timing for the shift are not entirely clear, and dates for Late Paleoindian sites in west Texas and southern New Mexico are younger than in adjacent regions, such as the Colorado Plateau and Sonoran Desert (Mabry 1998:10).

2.2 Archaic Period (6000 B.C.–A.D. 200)

Noticeable climatic changes throughout the Southwest began around 6000 B.C., resulting in drier conditions than those found in the previous Paleoindian period. Evidence demonstrates that human adaptations to environmental conditions also began to change during this same period. Drier conditions led to a decrease in big game and a change in the distribution of plant species. Archaic peoples seem to have responded by basing their movements more closely on seasonal cycles, by monitoring the availability of specific types of floral and faunal resources and by increasing the portion of wild plant food in their diets. This broader-spectrum economy employed a variety of ecosystems from desert basins to plateaus and mountainous regions, and seems to have been effective enough to have endured for thousands of years (MacNeish and Beckett 1987).

By late Archaic times, population growth, coupled with cultural development, combined to generate yet another set of changes. Groups became more sedentary and some may have even become somewhat reliant on domesticated food resources for a portion of their diet. Corn and beans are evident in the macrobotanical assemblages from particular Late Archaic sites, but even in these, low frequency has led researchers to conclude that they were relegated to secondary dietetic roles.

Evidence for added economic complexity can also be found in Archaic artifact assemblages that typically demonstrate a wide range of tool forms, sizes and shapes. Archaic projectile points were hafted as darts rather than spears, and consequently are usually shorter than those of the Paleoindian period, yet larger than the subsequent arrow point. Points from this period are also generally stemmed or corner-notched, reflecting changes in hafting technology, and exhibit a more extensive morphological variability as well as less precision in quality of manufacture than those of the Paleoindian period (Sebastian and Larralde 1989). Archaic assemblages are also reported to contain higher percentages of formal tools and bifacial-flaking debris than later assemblages. Finally, there seems to have been an increased emphasis on grinding implements, which, in turn, suggests a greater dependence on seeds and nuts in the diet.

In southern New Mexico, western Texas and Chihuahua, MacNeish and Beckett (1987) designate cultural remains as deriving from the Chihuahua Cultural Tradition of the Chihuahuan Desert, beginning with the Gardner Springs Complex (6000–4000 B.C.) and followed by three phases: Keystone (4000–2500 B.C.); Fresnal (2500–900 B.C.); and Hueco (900 B.C.–A.D. 250). Subsequently, similarities between the resources found in southwestern and southern New Mexico led Huckell (1984) to recommend subsuming various local Archaic traditions under the term Southwestern Archaic, which he divided into Early, Middle, and Late phases to avoid problems in temporal and cultural affiliations presented in previous phase schemes.

2.2.1 *Early Archaic*

Characteristic of the Early Archaic (6000–4000 B.C.) is an increase in variability of projectile point styles that indicate regional spheres of interaction (Carmichael 1984:18), suggesting that groups traversed smaller territories while still employing a highly mobile hunting/gathering

subsistence strategy. Associated is a tool complex that includes both flaked- and ground-stone implements that indicate plant processing as an important aspect of the subsistence strategies during this time. Milling stones, anvil mortars, mullers, pebble hammers, pestles, scraper planes, and core choppers indicate that plant resources were processed by pounding and grinding. Faunal remains of antelope and deer and projectile points suggest that hunting remained an important component of the subsistence strategy. Sites during this time were small, and their locations suggest that occupation by highly mobile groups were dependent on seasonally available resources while exploiting a broader range of topographic settings.

2.2.2 Middle Archaic

This phase (4000–2500 B.C.) is also represented by a wide range of projectile point types. In addition to bifacial and unifacial tools, scraper planes, mullers and milling stones, manos and metates made an appearance in the tool assemblage. Faunal resources remained an important part of the resource base, but plant resources appear to have increased in importance with the appearance of ground-stone tools. Pit structures make their first recognized appearance in the archaeological record at the Keystone Dam site toward the end of this phase, suggesting a move toward sedentism (Whalen 1994). Seeds from *Cucurbita pepo* suggest utilization of a possible cultigen.

2.2.3 Late Archaic

During the Late Archaic (2500–600 B.C.), manos and metates are much more common than the earlier mullers and milling stones, increasing in frequency with time and a tendency towards adoption of early agriculture. Early maize appears to have been widespread in the Southwest by 1500 B.C., with several examples dating as early as approximately 2000 B.C. The initial appearance of Chapalote and beans in the archaeological record (2945±55 B.P. at Fresnal Shelter; Tagg 1996) may account for an increase in grinding implements in the latter part of the Middle Archaic, in which processing methods were modified in response to these new economic resources. Also, *Cucurbita* sp. occurs with greater frequency. The occurrence of early maize and increased reliance upon domesticated plant resources coincides with a significant change in tool kits, resulting in less variety of forms and more focus on plant-processing activities. Furthermore, archaeological evidence suggest that groups during this time became increasingly more sedentary, living in pit houses (Carmichael 1984; Gregory 1999) and establishing base camps (MacNeish and Beckett 1987:12) along major drainages from which logistical forays could be made into adjacent ecozones to exploit seasonally available resources.

Huckell (1996) proposed an Early Agricultural component to the Late Archaic in which semi-sedentary agricultural villages developed as upland areas continued to be exploited by hunter-gatherers. The Early Agricultural period compares closely with the Hueco phase (900 B.C.–A.D. 250), as defined by MacNeish and Beckett (1987:16), overlapping into the late Fresnal phase (2500–900 B.C.), in which groups placed greater reliance on domesticated plants, such as corn, beans, squash, and possibly amaranth. More sophisticated corn varieties were also beginning to emerge, and extensive processing of corn is witnessed by changes in the forms of manos to bifacial/rectangular forms and metates to trough varieties. The use of mortars increased,

suggesting a concomitant intensification in the use of wild economic plant resources—perhaps mesquite pods and beans and other foodstuffs that could be prepared and stored for periods when fewer food resources were available to a population. Sites assigned to the Early Agricultural period (incorporating Hueco phase sites) far outnumber those of the previous phases, and some of these sites appear to have had semisedentary or sedentary occupations. It is doubtful that these were full-time agriculturalists. Hunting was definitely still practiced, as indicated by San Pedro, Hatch, Hueco, and Fresnoal points.

In summary, the Archaic period in southern New Mexico and west Texas exhibits a slow evolution from the earlier big-game hunting tradition to that of early agricultural. Hunting remained an important component of the economy through all phases. Wild plant resources increased in importance through time, as observed during the investigations at Fresnoal Shelter (Bohrer 1981). Setting such as the Hueco Bolson may have remained primarily broad resource procurement zones (O’Laughlin et al. 1988), with specialized agave processing camps located in areas such as the foothills of the Franklin and Hueco mountains (O’Laughlin 1977). The mobility of groups also remained high during the entire Archaic period, with sedentism weakly developed by the transition to the Formative period. Late Archaic period sites are often represented by base camps established by groups still dependent upon the procurement of seasonal resources from various ecological settings. Early Agricultural sedentism is represented by increasing complexity of sites, seen in architectural styles and storage features (Gregory 1999, 2001), something identified at the Keystone Dam Site (Carmichael 1984, 1985).

2.3 The Formative/Mogollon Tradition (A.D. 200–1450)

Developments between A.D. 200 and 1450 are considered part of a cultural continuum of increasing agricultural dependence involving three quintessential Formative traits—maize, pottery, and village-type settlements. The cultural entity behind these developments seems to have initially emerged from an Archaic hunting-and-gathering base in the Mogollon region or Mogollon Highlands of western New Mexico (Haurly 1936) and southeastern Arizona (Sayles 1945). Thus, Mogollon occupation appears to have developed as an outgrowth of the Late Archaic/Early Agricultural phase. MacNeish and Beckett (1987:16) assign the shift to the Hueco phase of the Chihuahuan Late Archaic (Whalen 1994) based on radiocarbon dates and projectile points from reliable contexts—a date which compares neatly with the terminus of Huckell’s (1996) Early Agricultural period. Phases recognized within the Mogollon cultural sequence are currently based on changes in ceramic attributes and trade ware that have been dated fairly reliably. Whalen (1994) places the transition to sedentism in the early centuries A.D., but consequently assigns it to the end of the Hueco phase (Huckell’s Early Agricultural period). Regardless, the intervening period, perhaps best described as the incipient Mogollon period, may be characterized as a continuation of strategies used by groups who recognized the advantages of including early cultigens alongside their subsistence strategy based on hunting/gathering tactics.

The Jornada Mogollon region encompasses an area that extends from west of the Rio Grande to the Pecos River in the east, and from north of the Tularosa Basin into northern Chihuahua in the south. The Jornada Branch, as defined by Lehmer (1948), consists of three successive phases (Mesilla, Doña Ana, and El Paso) that are based on changes in architecture and ceramics. As was

the case in the previously discussed southern tradition, changes in architecture herald the beginning of the period during which houses evolved from pit houses to rectangular adobe surface structures. Overall, the settlement pattern continued to be based on mobility and the ability to access seasonally available resources.

In many ways the Mesilla phase adaptation continued a pattern of extensive land use that began during the Late Archaic. The Mesilla settlement pattern (A.D. 200–1150) is one of nominative pit house village and ephemeral campsites randomly dispersed over a large area. Whalen (LeBlanc and Whalen 1980: 330) notes that, in the Tularosa Basin and the Hueco Bolson, habitation sites tend to be distributed on high ground formations (Alvarez et al. 1989, cited in Kauffman and Stuart 1994) or situated near playas. Although the settlement pattern is similar in the Jornada del Muerto, village sizes tend to be larger there. As far as the economy is concerned, Whalen (1994) reports more extensive use of maize, constant rates of Chenopodium use, and a decline in the use of sunflowers towards the terminus of the Mesilla phase, suggesting agricultural intensification. Nevertheless, he urges that at no point did cultigens play a major role. Besides domesticates, native plant resources continued to be important, especially in the foothills, and in the Rio Grande valley, Agave and other succulent plants were processed from the wild. Hunting remained the primary way of life for Mesilla people, but with an emphasis on small mammals such as rabbits rather than large game.

The Doña Ana Phase of the Jornada Mogollon (A.D. 1150–1250) period is characterized by a transition from pit houses to surface structures and the appearance of a wider variety of ceramic types. Whereas the previous settlements were situated near or in relation to water sources, sites from this phase tend to be located in dry areas. The majority thus far investigated occur in association with alluvial fans. This has been interpreted to mean that check dams were being employed in an effort to intensify dry farming techniques. In the El Paso area, Doña Ana phase ceramics occur most frequently as brownwares and crude bichromes and polychromes, with increasing frequencies of Chupadero Black-on-white. Moderate numbers of El Paso Red-on-brown are recovered alongside Three Rivers Red-on-terracotta, Playas Red, and Mimbres Black-on-white. Despite the range in ceramics, there is little evidence of interaction with the cultures of northern Chihuahua beyond the presence of Ramos Polychromes, which could have been manufactured at a number of locations in the southern desert. Gilman et al. (1991) suggest that Mimbres Black-on-white vessels from this period may have been manufactured within the Hueco Bolson.

The El Paso phase (A.D. 1250–1450) represents the final prehistoric occupation of the southern Jornada region. The phase is commonly divided into early (A.D. 1150–1300) and late (A.D. 1300–1450) subphases, based primarily on changes in ceramic types and architectural patterns. Although both are sometimes regarded as ‘pueblo period phases,’ most El Paso sites, instead, represent small procurement camps where occupation times were short (as is apparent in the small sizes of middens associated with camp remains). Representative sites range from pueblos to open sites and rock shelters. Late El Paso phase settlement completes the contraction to the upper alluvial slopes that began in the preceding phase, resulting in clusters of more densely occupied, special purpose communities. Recent work dispels the myth of total agricultural reliance and suggests that hunting and gathering still formed the basis of subsistence.

Nevertheless, maize, beans, squash, and gourds were grown in abundance, and plant foods could amount to a significant portion of the daily diet at some locations (Whalen 1981). Wild foods included yucca, acorns, mesquite, Cheno-ams, and a variety of cacti. Ceramic assemblages from the phase demonstrate greatly increased trade contacts. Numerous rock shelters exhibit evidence of the kachina cult with representations of painted masks, feathered serpents, and other zoomorphic/anthropomorphic figures (Whalen 1994). These representations are interesting because they predate the development of this artistic style in the Anasazi region by about 150 years. In the Jornada region, little is known of the period between the abandonment of the agricultural villages and the dispersed population noted by archaeologists today. Despite having extensive trade contacts, extended droughts and environmental limitations seem to have brought an end to El Paso communities shortly after A.D. 1450. Upham (1984) maintains that the population may have simply reverted to a semi-nomadic existence.

2.4 Protohistoric/Historic Aboriginal Period

During the period between the abandonment of prehistoric settlements (ca. A.D. 1375–1400) and the Spanish reconquest (A.D. 1692), southern New Mexico had become the home of the Apache, an Athapaskan-speaking group closely related to the Navajo of the Four Corners (Worcester 1992:4). Following the abandonment of the area in the late 1300s and early 1400s, little evidence has been found in the archaeological record for occupation for approximately 200 years. When the Spanish arrived in New Mexico in 1540, native populations were located in villages along the Rio Grande and Rio Puerco, with Apache groups roaming over much of southern New Mexico, Arizona and northern Mexico (Worcester 1992:5). This geographic and cultural division was exacerbated by the Spanish focus on the Rio Grande and Puebloan peoples, and the concomitant inability to domesticate Apache tribes. Apaches practiced a mixed hunting/collecting lifeway, similar in some respects to the seasonal rounds of the Archaic period, including organization by regional bands, each of which occupied large, mostly mountainous territories. Apache settlement in the area is currently believed to have first taken place only a few decades before the Spanish arrival, probably after A.D. 1500, although some scholars suggest a much earlier date, based on the intimate familiarity of the Apache to their environment noted by contemporary Spanish observers (Worcester 1992:4).

By the early A.D. 1700s, various bands of Apaches made extensive use of southern New Mexico uplands. These seminomadic hunters and gatherers gradually withdrew to remote areas as they felt the encroachment by the Spanish from the south and west, and Comanche from the north and east (Worcester 1992:12). Simultaneously, sedentary groups such as the Pima and Papago vigorously defended their territory from the transitory Apaches. Subsistence in these remote areas of southern New Mexico was based on hunting deer and antelope and collecting mesquite, datil, pinyon, and mesquite, important to the Apache mainly because of their availability and storage properties (Basehart 1973). With the adoption of horses, Apache culture was transformed, greatly increasing their ability to supplement their subsistence through raiding (Worcester 1992:8). The Spanish were ineffective in controlling the Apache and, during the period of their expulsion (from the Pueblo Revolt in 1680 to the Reconquest of 1692), the Apache expanded their territory at the expense of Puebloan peoples in both Arizona and New Mexico (Worcester 1992:9).

2.5 Historic Period

The historic record of the Southwest region is typically divided into three periods by which nations exerted sovereignty: 1) Spain; 2) Mexico; and 3) the United States of America. As described above, southern New Mexico and various parts of west Texas were occupied by Apache bands from the early 1500s until the middle 1800s; thus, neither the governments of Spain (1540–1821) nor Mexico (1821–1848) ever realized claims of sovereignty in any region beyond the Rio Grande corridor. Vast tracts of desert lands in the Southwest passed to the United States under the Treaty of Guadalupe Hidalgo that settled the Mexican War of 1846–1848, including the current project area.

2.5.1 The Spanish Period

By 1710, the area of El Paso del Norte was under civil, military, and ecclesiastical control with oversight in Santa Fe, connected by the Camino Real. To provide security to its loyal subjects, Spain provided military protection in the form of escorted caravans along the Camino Real and garrisons such as San Elizario, built in 1773, in the Rio Grande valley below El Paso del Norte. Separation was attempted between indigenous populations and the Spanish through maintenance of the mission system, which continued to provide sanctuary and protection from continued Apache aggression. During this time, the Mescalero band of Apaches made extensive use of the Sacramento Mountains and the Tularosa Basin north of El Paso. The Mescalero were seminomadic hunters and gatherers who focused on bison and agave, or mescal (from which their name originated), as the principal components of their diet. Encroachment by the Spanish from the south and west and Comanche from the north and east (Worcester 1992:12) initially forced the Mescalero to withdraw to more remote areas, including the Sacramento and Guadalupe Mountains and other areas of southeastern New Mexico and adjacent areas of Texas.

With mounting pressure from the Comanche, some Apache groups sought refuge among the Rio Grande missions, returning to the more familiar way of life of foraging from the land as pressures lessened. Subsistence in these remote areas of west Texas and southern New Mexico was based on hunting deer and antelope and collecting mescal, datil, pinyon, and mesquite, important to the Mescalero mainly because of their availability and storage properties (Basehart 1973). Apache adoption of horses transformed Apache culture, greatly increasing their ability to supplement their subsistence through raiding (Worcester 1992:8), and elevating the status of the Apache to that of the pre-eminent military power of the Southwest (Worcester 1992:15). Following the Pueblo Revolt in 1680, the Apache expanded their territory at the expense of Puebloan peoples (Worcester 1992:9).

2.5.2 The Mexican Period

Early in the nineteenth century, populations began to move from El Paso del Norte both upstream and downstream as Hispanic numbers increased and demand for access to additional resources dictated. It was during this time that Mexico sought independence from Spain and successfully accomplished separation in 1821, quickly setting about establishing a firm claim to

its northern states through colonization (Fox 1989:88). Although independent, Mexico faced the same problems and threats as did Spain. Apache aggression continued and western movement within the United States was viewed with suspect by the Mexican government. Colonization laws passed in 1824 and 1825 established a system by which land agents could establish settlements of people who would become Mexican citizens, including groups of Americans, Irish, Mexican, German, and Czech farmers in eastern, central, and southern Texas. This strategy apparently failed when Anglo-American colonists led a war of rebellion in 1836 that resulted in the creation of the Republic of Texas (1836–1846). Immigration into other portions of the Mexican colonies was strictly prohibited, however.

American interest in northern Mexico was spurred by reports of gold, furs, and the reality of unsettled lands, fueled by the philosophy of Manifest Destiny. Americans and Mexicans engaged in conflict with the Mexican war of 1846–1848. Although the war was widespread, with American advances into central Mexico and Mexico City, the Chihuahua Expedition, led by Colonel Alexander W. Doniphan, successfully routed Mexican forces north of El Paso at Brazito on December 23, 1846. After the battle, the victorious American forces of Colonel Doniphan occupied El Paso on December 27, 1846, and continued their southward progression towards Chihuahua City (Gardner 1999:248-250). A war largely forgotten in American history, primarily due to being overshadowed by our own civil conflict a few years later, this was the first war fought by the United States on foreign soil. More than half of Mexico's holdings were ceded and annexed to the United States as a result of the outcome of the war (Carroll 2000:24).

2.5.3 The American Period

After Texas was granted statehood in 1848 and New Mexico was established as a U.S. territory in 1850, extensive efforts were conducted by the U.S. government to control aggressive Native American groups in the western United States, especially the Apache bands (Sonnichsen 1960). This entailed the construction of a series of military outposts, mapping the new territories and constructing roads (Welsh 1995:6-7); reservations were soon established as part of the subjugation process of Native Americans. Various forts were established throughout west Texas and the New Mexico Territory to provide protection and to control raiding Indians. Historic records, primarily military, documenting Apache movements after about 1850, suggest that Apache groups probably crossed into Mexico from the United States on many occasions.

West Texas was joined with the original Republic of Texas after the Treaty of Guadalupe Hidalgo in 1848. The International Boundary was defined as the Rio Grande, where the river turned southeastward upstream of El Paso del Norte. With the establishment of Fort Bliss and El Paso (originally Franklin) on the U.S. side of the river, El Paso del Norte was changed to Ciudad Juarez.

Located along the Rio Grande, San Elizario was the center for commercial trade in the area, with salt being the main trade item (Carpenter 2002:142). In 1862, State Senator Albert J. Fountain, with San Elizario citizens, made their way 100 miles east of El Paso and located the Guadalupe Salt Lakes (Ward 1932:20). In 1863, with public funds, a road was built across the Hueco Bolson, south of the Huecos (immediately north of the current project area), east to the western

edges of Diablo Plateau (Carpenter 2002:142). The notion and concept of ownership differed between cultures. Spanish/Mexicans of San Elizario believed in communal property, unlike that of the idea of private ownership taken on by Anglos (Sonnichsen 1960:5). In 1877, Judge Charles Howard claimed ownership of the salt lakes, on behalf of Major Zimpelman (Carpenter 2002:146). After killing Louis Cardis, a leader for public rights over the salt, war erupted at San Elizario, and Howard was executed (Carpenter 2002:146). In the end, San Elizario was slowly abandoned; the salt deposits are still referred under Major Zimpelman's name. In the 1880s, after the railroad was constructed, El Paso grew in importance and naturally became the center for trade. San Elizario declined and became less important, along with the San Elizario Salt Trail.

In 2001, the Texas General Land Office, conducted an archaeological survey in the southern slopes of the Hueco Mountains, and identified an old road, approximately 10 miles in length (Carpenter 2002:147-148). Despite erosional cuts, the road remains in good condition, and several segments are buried by dunes. The historic road was recorded as Site 41HZ571, located less than a mile north of the current project area. Its projected route does not enter the current project area.

After the Territory of New Mexico was organized in 1850, the Territory quickly became a flash point in the competition between northern and southern interests. The southern interests proposed the Territory of New Mexico be divided into the states of Arizona and New Mexico, one "free" and one "slave" along a common east-west border along the 35th and 37th parallels. However, the current scheme prevailed following Union victory in the Civil War, which also brought about a renewed effort to subdue the Native Americans.

After the acquisition of California, the US Postal Office developed a route from San Francisco to St. Louis for faster mail services. In 1857, a contract was awarded by John Butterfield (Richardson, 1925:1). The Butterfield Overland Mail, operated between 1858-1861, had routes from Missouri through Texas, and continued to San Francisco (Richardson 1925). A route was developed from Franklin (now El Paso) to the east to Hueco Tanks and across the Pecos River (Richardson 1925:4). After the outbreak of the Civil War in 1861, all the Butterfield Stations were seized by confederates and in March of 1961, Congress gave its approval to the US Postal Office to discontinue the Butterfield Overland Mail (Richardson 1925:18). The route between El Paso and Hueco tanks was located north of the current project area, north of the Hueco Mountains.

In 1878, the first railroad entered the New Mexico Territory, creating opportunity for westward expansion and trade (Myrick 1990). In May of 1881, the Southern Pacific Railroad reached El Paso. To access coal, minerals and timber, construction began on the El Paso and Northeastern in 1897, bringing goods to communities along the eastern flanks of the Tularosa Basin and beyond. With the transportation capabilities brought by the railroads, and the establishment of a smelter and refinery, El Paso became a regional center for mining in the Southwest. The route of the Southern Pacific Railroad extends south of the project area along the north edge of the Rio Grande floodplain to near the El Paso/Hudspeth county line near Alamo Alto, where it leaves the floodplain and traverses the broken plains.

3.0 PREVIOUS INVESTIGATIONS

by Jeffery Hanson and David H. Greenwald

An online site files search was conducted for the project area through the TARL Site Records database on January 13, 2014, and a second visit to the TARL documents on May 15, 2015, by Jeff Hanson. Additionally, no existing THC Official Texas Historical Markers, THC Historic Cemeteries, or TDA Century Farms/Ranches were located within or adjacent to the project area. The search included lands within a 1.0-mi (1.6-km) radius surrounding the project location. Seventeen previously recorded sites were found to exist within this mile radius (Table 3.1; Figure 3.1). Thirteen of these sites are outside the project area and listed in Table 3.1 below. Four sites, 41HZ710, 41HZ711, 41HZ782, and 41HZ783, were found to be located within the proposed project area. Brief descriptions of each site follow.

Table 3.1. Archaeological Sites Located within Approximately One Mile of the Project Area.

Site No.	Location	Year Recorded	Project	Site Type
41HZ501	Outside project area	1992	Samalayuca Gas Pipeline Expansion Project	Thermal features of burned caliche cobbles
41HZ518	Outside project area	No Information	No Information	No Information
41HZ533	Outside project area	1997	Longhorn Partners Pipeline	Campsite with ceramic and lithic scatter and fire-cracked rock
41HZ534	Outside project area	1997	Longhorn Partners Pipeline	Isolated hearth
41HZ535	Outside project area	1997	Longhorn Partners Pipeline	Campsite with sherds and fire-cracked rock
41HZ571	Outside project area	2001	Texas General Land Office	Historic trail
41HZ693	Immediately south of the west end of the proposed haul road	2005	JOBE Materials Padre Canyon Quarry	Prehistoric lithic/ceramic scatter with features
41HZ708	Outside project area	2008	HEP-Borrego Draw	Prehistoric lithic/ceramic scatter with features
41HZ709	Outside project area	2008	HEP-Borrego Draw	Prehistoric lithic/ceramic scatter with features
41HZ710	Inside project area	2008	HEP-Borrego Draw	Prehistoric campsite with features
41HZ711	Inside project area	2008	HEP-Borrego Draw	Small lithic/ceramic scatter with features
41HZ778	Outside project area	2013	JOBE Materials Padre Canyon Quarry Expansion	Fire-cracked rock concentration with 2 sherd and 3 lithics (2 are tools)
41HZ779	Outside project area	2013	JOBE Materials Padre Canyon Quarry Expansion	Three fire-cracked rock features with 1 chert uniface
41HZ780	Outside project area	2013	JOBE Materials Padre Canyon Quarry Expansion	Fire-cracked rock concentration with no associated artifacts
41HZ781	Outside project area	2013	JOBE Materials Padre Canyon Quarry Expansion	Two fire-cracked rock concentrations with flaked and ground stone and 5 El Paso brownware sherds
41HZ782	Inside project area	2013	JOBE Materials Padre Canyon Quarry Expansion	Three fire-cracked rock features with 2 lithics and 1 sherd
41HZ783	Inside project area	2013	JOBE Materials Padre Canyon Quarry Expansion	Two fire-cracked rock features with 4 lithics and 1 tabular knife

3.1 Sites Located Outside the Project Area

3.1.1 Site 41HZ501

This site was recorded by John Evaskovich of Mariah Associates, Inc., in 1992 as a series of eight concentrations of burned caliche cobbles. Only one flake was found in association with the thermal features. The site is located northwest of the current project area approximately 1500 m. The area is described as containing colluvial gravels with a calcareous substrate. The site was described as having excellent potential to address chronology and possibly subsistence and site function activities. It was recommended “potentially eligible” to the NRHP.

3.1.2 Site 41HZ518

The only information found in the TARL site records database was a site location map and a site digitation record showing the GPS coordinates. No site record form was found for this site.

3.1.3 Site 41HZ533

This site was recorded by Jeff Turpin in 1997 as part of the Longhorn Partners Pipeline project as a prehistoric campsite measuring 4 by 4 m in total areal extent. It consists of burned rock, plain brown pottery, and lithic flakes. The site is located to the northwest of the current project area approximately 900 m. National Register recommendations are not provided in the THC site record form.

3.1.4 Site 41HZ534

This site was recorded by Jeff Turpin in 1997 as part of the Longhorn Partners Pipeline project as a hearth of unknown temporal association; the site area is give as 1 by 1 m in size. The only associated artifactual materials are burned rock. The site is located to the northwest of the current project area approximately 1100 m. National Register recommendations are not provided in the THC site record form.

3.1.5 Site 41HZ535

This site was recorded by Jeff Turpin in 1997 as part of the Longhorn Partners Pipeline project as a prehistoric campsite measuring 10 by 10 m in total areal extent. It consists of burned rock and sherds. The site is located to the northwest of the current project area approximately 1250 m. National Register recommendations are not provided in the THC site record form.

3.1.6 Site 41HZ571

This site is part of the historic San Elizario Salt Trail, and dates to the 1860s and 1870s. The site, recorded by Steve Carpenter of the General Land Office in January 2001, was discovered through a walkover reconnaissance. The survey was conducted as part of School Fund Tract 111863, under Permit No. 2516.

Figure 3.1. EXCLUDED

The site consists of a vague linear feature approximately 3 m across and 400 m long. One solder top hole-in-cap can was possibly associated with the site. The site was recommended for designation as a Texas State Antiquities Landmark. It is located to the northeast of the current project area approximately 1300 m.

3.1.7 Site 41HZ693

This site was recorded in 2005 by Suzanna and Paul Katz during an intensive pedestrian survey for a previous JOBE Padre Canyon quarry project (Katz and Katz 2005). This site is located immediately west of the current project area. Site 41HZ693 is a multicomponent artifact scatter consisting of lithic artifacts, including diagnostic projectile points, prehistoric ceramics and numerous burned rock features. Ceramics include an El Paso Bichrome rim, plain brownware, and Chupadero Black-on-white. Projectile points are corner-notched, expanding-stem dart points. Site occupation appears to span the Archaic, Late Prehistoric and Neo-Indian time periods. This site is considered *eligible* for the NRHP under Criterion (d).

3.1.8 Site 41HZ708

This site is a multicomponent, Archaic and Mogollon campsite located near an existing pipeline near Borrego Draw. The site was recorded by Toni Goar of TRC in May 2008, under Permit No. 4759 and update in 2013 by Four Corners Research under Permit No. 6506 (Poitevint et al. 2013) as part of the expanded Padre Canyon Quarry. Located in a dunal setting 1300 m east of the east project boundary, the site contains artifacts and features. An Archaic dart point and an El Paso Brownware sherd provide relative chronology of the site. A fire-cracked rock feature with staining was also recorded. The feature, possibly a roasting pit, was trowel-tested and found to be relatively intact. It was recommended *eligible* to the NRHP under Criterion (d).

3.1.9 Site 41HZ709

This site is a Formative period campsite, based on the presence of two lithic flakes, a brownware sherd, and a deflated feature. The site is located along an existing pipeline immediately northeast of the current project area. It was recorded by Toni Goar in May 2008 under Permit No. 4759. The feature consists of a burned caliche stain that was determined to be deflated through trowel testing. The site was recommended as *not eligible* to the National Register of Historic Places (NRHP).

3.2 Sites Located within the Project Area

3.2.1 Site 41HZ710

This site is a prehistoric campsite that dates to the Formative period. The site, located along an existing pipeline, is described as being in a “dunal context” a few miles from Borrego Draw (TARL Site Summary), consists of a single ceramic sherd and two hearth features. One of the hearths was deflated at the time the site was originally visited. The site was recorded by Toni Goar of TRC in May 2008, under Permit No. 4759. It was recommended as *eligible* for inclusion

in the NRHP under Criterion (d). During the current project, the site could not be relocated. The site area identified by its UTM coordinates is not a dunal setting; in fact the area is alluvial/colluvial. This site was recorded after the adjacent pipeline was constructed; unless later, undocumented activities occurred in this area, the site would be expected to be preserved. The given UTM coordinates for this site were avoided by the current geological study.

3.2.2 Site 41HZ711

This site is a prehistoric campsite that dates to the Formative period. It is located in a “dunal context” along an existing pipeline (according to the TARL Site Summary form). The site was recorded by Toni Goar of TRC in May 2008. Chronological affiliation is based on the presence of ceramic sherds. One feature was recorded, a fire-cracked rock stain that, when trowel-tested, proved to be intact. The site was recommended as *eligible* for inclusion in the NRHP under Criterion (d). During the current project, the site could not be relocated. The site area identified by its UTM coordinates is not a dunal setting; in fact the area is alluvial. This site was recorded after the adjacent pipeline was constructed; unless later, undocumented activities occurred in this area, the site would be expected to be preserved. The given UTM coordinates for this site were avoided by the current geological study.

3.2.3 Site 41HZ782

This site was recorded during a survey for a proposed haul road to connect the main Padre Canyon quarry with the new expansion of the Padre Canyon quarry (Poitevint et al. 2013). The site is located north of the haul road on alluvial outwash deposits. Currently, surface erosion is apparent in the form of ribbon washes and sheet erosion, which may be exposing the features. The site is a low-density artifact scatter associated with three fire-cracked rock concentrations. Within the artifact assemblage, one El Paso brownware sherd was noted. All three features retain carbon stains. In consultation with the THC staff, the NRHP eligibility of this site remains *undetermined*, pending a formal determination through a testing program. The site was avoided by the current project.

3.2.4 Site 41HZ783

This site was recorded during a survey for a proposed haul road to connect the main Padre Canyon quarry with the new expansion of the Padre Canyon quarry (Poitevint et al. 2013). The site is located north of the haul road on alluvial outwash deposits. Currently, surface erosion is apparent in the form of ribbon washes and sheet erosion, which may be exposing the features. The site is a low-density artifact scatter associated with three fire-cracked rock concentrations. Within the artifact assemblage, one El Paso brownware sherd was noted. All three features retain carbon stains. In consultation with the THC staff, the NRHP eligibility of this site remains *undetermined*, pending a formal determination through a testing program. The site was avoided by the current project.

4.0 FIELD METHODS AND RESEARCH DESIGN

by *David H. Greenwald*

The following approach and procedures were proposed to conduct monitoring of geological study units in Sections 15, 21, 22, and 23, Block 10, for JOBE Materials, L.P.; Section 23 was eliminated from the proposed undertaking. This area was known to contain four previously recorded archaeological sites, with two others located near the project area boundary. Other unrecorded sites are expected to be present in this largely unsurveyed area. Each study locus was surveyed prior to any off-road travel or mechanical disturbance to insure that no cultural resources exposed on the surface would be disturbed. If cultural resources were identified within the proposed study locus, the proposed location would be moved to avoid disturbance to the resources observed. Monitoring was conducted until all activities were completed at each geological study location.

Records Review: Online files and records at TARL were reviewed to identify previously recorded archaeological sites and previous investigations conducted within and adjacent to the proposed project area. Files and maps (USGS topographic maps) available at THC were reviewed to identify sites that are listed in or determined eligible for inclusion to the National Register of Historic Places. Chapter 3 presents the results of the records search.

Field Investigative Strategies: The project area represents a rectilinear polygon with good access along various unimproved roads and the diagonal pipeline access road that cuts through the project area northwest-to-southeast. Geological study locations were positioned as close to the existing roads as possible to minimize surface disturbances. Each proposed study location was flagged by JOBE personnel prior to the initiation of the geological study. Each location was first surveyed by the archaeological monitor walking 5- to 10-m spaced transects until a 50-m radius was thoroughly inspected. Once the location was determined to be absent of any cultural remains/materials, the boring rig and other equipment (if needed) was allowed access. All ground disturbing activities were monitored until the area was completely backfilled and leveled. The center point/geologic test location was recorded by collecting UTM coordinates. Figure 1.2 shows the location of each completed geological study unit. No sites or isolates were encountered at any of the study locations, achieving 100 percent avoidance of cultural remains. A stain was observed in one of the access roads south of any proposed study loci. This stain was exposed during recent road blading activities apparently conducted by the grazing lessee. Its description is presented in Chapter 5 in association with Geological Study Unit (GSU) 2. All JOBE personnel were instructed not to travel that portion of the road, which was not needed for access to any of the proposed geological test locations, to prevent further damage to the stain.

No new sites or isolates were encountered. The large stain in the road did not have associated fire-cracked rock or artifacts. It was located well south of GSU 2 beyond any proposed areas associated with the current project. Therefore, only UTM coordinates were collected to denote the location of the stain.

Definitions: In an attempt to conform to recent survey and site recording efforts within the immediate area, such as at Fort Bliss, the following minimum criteria were proposed as part of the scope of work to be used when defining sites and isolated occurrences. Any cultural resources that did not meet site criteria definitions would have been recorded as isolates.

- cultural materials must be at least 50 years old or older;
- when 10 or more artifacts of any class or type, except burned caliche or fire-cracked rock (FCR), are found within a 15-meter-diameter area, unless these artifacts appear to originate from a single source (such as a pot drop or a knapping/flaking station where only one core was reduced);
- if one or more datable archaeological features are found;
- if two or more undatable archaeological features are found;
- if an undatable feature with associated artifacts (excluding FCR) is found;
- if one or more diagnostic or formal tools are found in association with other materials (excluding FCR); these would include projectile points that could be identified to a specific type/age, flaked- or ground-stone tools whose specific function is identifiable based on the morphology of the item(s), but not isolated historic cans, bottles or ceramics;
- multiple feature types, including hearths, FCR scatters or concentrations, rock alignments, depressions, middens, mining features, ranching features, and other remains that represent significant human activities.

5.0 PROJECT RESULTS

by *David H. Greenwald*

Each of the geological study locations are shown on Figure 1.2. None are within 75 m of previously recorded sites. No previously recorded or newly discovered archaeological sites or isolated artifacts were found in association with any of the proposed geological study locations. Several of the roads in the project area are unimproved and are not shown on the existing topographic maps; they are also difficult to identify on the aerial photographs of the area. All vehicles and drilling equipment traveled along these roads. Geological study locations were selected immediately adjacent to the roads to reduce impacts to the area. One stain believed to be of cultural originals was observed in an unimproved but recently bladed ranch road (Figure 1.2). This stain is discussed in more detail below.

5.1 Geological Study Unit (GSU) #1

Located at UTM coordinates 410228m E, 3503411m N in the NE 1/4 of Section 21, GSU #1 is the westernmost geological unit in the project area (Figure 2.1: No. 1). Sediments are fine-to-coarse alluvium. A well-developed calcium carbonate horizon is present within 20 to 25 cm of the present surface. Vegetation is dominated by creosote bush, with a few scattered small mesquite intermixed. Surface visibility was limited to approximately 20 percent. This location was selected as it was considered far enough east of the existing Padre Canyon Quarry to be removed from the underlying rock formation that is currently being mined and within deep alluvium.

5.2 GSU #2

Positioned on a slight rise (Figure 1.2: No. 2) at UTM coordinates 410478m E, 3503411m N in the NW 1/4 of Section 22, sediments are fine with a well-development calcium carbonate horizon. Vegetation is represented by mesquite and creosote bush; in comparison with GSU # 1, mesquite plants are much larger. More space is open between mesquite and creosote bushes than at GSU #1, allowing increased surface inspection. Surface visibility was estimated at approximately 50 percent.

To the southwest of GSU #2, a smeared stain was found in the access road (Figure 1.2: No. 4). No artifacts, charcoal, or fire-cracked rock were found in association with this stain. The stain was encountered after completing the survey of GSU #2 while attempting to find a place to turn around on the unnumbered single-lane ranch road. Following the discovery of the stain, UTM coordinates at its center were recorded for future reference. All JOBE personnel were instructed not to use the road beyond GSU #2 to avoid further disturbance to the stain.

The smear is estimated to be over 3 m in diameter, extending from both sides of the single-lane road. This road was bladed a few days prior to the planned geological study by the grazing lease holder. Based on remnants of earlier bladed berms along the side of the road, the feature had been bladed on multiple occasions. No indication of a pit was noted within the freshly bladed

road surface. Therefore, it is not possible to determine if the stain retains any intact cultural deposits. The surrounding matrix is well-developed, very fine calcium carbonate sediments; the stain is dark gray. This stain does not appear to retain qualities or materials that would produce a date or allow its origin or function to be determined, however.

5.3 GSU #3

This geological study unit was the farthest southwest location examined in the project area (Figure 1.2: No. 3). Its UTM center point is 410350m E, 3502830 m N, in the SE 1/4 of Section 21. Vegetation compares closely with that of GSU #2, with approximately 60 percent visibility. Surface sediments are sandy. The well-developed calcium carbonate horizon present at the previous geological study units is noticeably absent.

5.4 GSU #4

This GSU was located west of a ranch road in the northwestern portion of the project area at UTM coordinates 410812m E, 3504102m N, in the SW 1/4 of Section 15 (Figure 1.2: No. 5). The area contains gravelly surface sediments and is located in outwash deposits of several small drainage channels. Mesquite and creosote bush growth is noticeably enhanced by the apparent increased moisture relating to the nearby drainages. Surface visibility was estimated at approximately 35 percent.

5.5 GSU #5

GSU #5 was accessed from the main pipeline road, located at UTM coordinates 411390m E, 3504109m N, in the SE 1/4 of Section 15 (Figure 1.2: No. 6). Surface sediments were residual gravels and cobbles, with finer alluvial sediments present to over 25 feet deep. The vegetation included creosote bush, dwarf mesquite, salt bush, and prickly pear. Surface visibility was estimated at approximately 25 percent.

5.6 GSU #6

GSU #6 was also accessed off the pipeline road. It was located in the SE 1/4 of Section 15 at UTM coordinates 411923m E, 3503954m N (Figure 1.2: No. 7). This geological study location was on the south side of a low rise (knoll). Sediments were coarse with sand, gravel, and cobbles present, largely derived from limestone. Vegetation included creosote bush, mesquite, salt bush and tarbush. Visibility was estimated at approximately 35 percent.

GSU #6 was placed 120 m southeast of the reported location for Site 41HZ711 and 120 m west of the reported location for Site 41HZ710. As plotted both sites fall within the pipeline right-of-way. No indication of recent blading was noted in the vicinity of the two sites. However, neither site could be relocated during the current project. Therefore, the reported locations of both sites were avoided by GSUs #6 and #7.

5.7 GSU #7

GSU #7 was positioned approximately 100 m south of GSU # 6 (Figure 1.2: No 10) in an attempt to move away from the rocky substrate found closer to the low rise. It is also located in the SE 1/4 of Section 15 (UTM coordinates 411898m E, 3503858m N). Surface sediments were mixed residual rock and alluvial outwash deposits. Here, alluvium extended to a depth of approximately 16 feet before becoming cemented and consolidated. Vegetation was similar to GSU #6, with approximately 40 percent visibility. Access to GSU #7 was overland directly south of GSU #6.

6.0 REFERENCES CITED

- Alvarez, F., D. Batcho, R. Powder, T. Stuart, and J. Wollin
1989 A Preliminary Report of the Data Recovery Program at Sites 41EP355 and 41EP356 in the North Hills Subdivision in Northeast El Paso, Texas. Report submitted to International City Developers, Inc., El Paso, Texas. Ms. on file, Batcho & Kauffman Associates.
- Amick, Daniel S., and Dennis J. Stanford
n.d. *Folsom Occupation in the Tularosa Basin of Southern New Mexico*. Desert Research Institute, Quaternary Sciences, Reno, and Department of Anthropology, Smithsonian Institution, Washington, D.C.
- Basehart, Harry W.
1973 Mescalero Apache Subsistence Patterns. In *Technical Manual: 1973 Survey of the Tularosa Basin, the Research Design*, pp. 145-181. Human Systems Research, Three Rivers, New Mexico.
- Bohrer Vorsila L.
1981 Former Dietary Patterns of People as Determined from Archaic-Age Plant Remains from Fresnal Shelter, South-Central New Mexico. In, *Archaeological Essays in Honor of Mark Wimberly*, edited by M. Foster. *The Artifact* 19:41-50. El Paso Archeological Society.
- Breternitz, C. D., and D. E. Doyel
1983 A Cultural Resource Overview and Management Plan for White Sands Missile Range. Ms. on file, Department of the Interior, National Park Service, Contract Number CX-800-8-0038. Soils Systems, Inc., Phoenix.
- Carmichael, D. L.
1984 *Archaeological Excavations at Two Prehistoric Campsites near Keystone Dam, El Paso, Texas*. Cultural Resources Management Division, Sociology and Anthropology Department of New Mexico State University, Report No. 577, Las Cruces.

1985 *Archaeological Excavations at Two Prehistoric Campsites near Keystone Dam, El Paso, Texas*. Occasional Papers No. 14, New Mexico State University, University Museum, Las Cruces.
- Carpenter, Stephan M.
2002 Search for the San Elizario Salt Road. *The Journal of Big Bend Studies* 14:141-162.
- Carroll, Charles
2000 Before Fort Craig: The Historical Setting of the Fort on the Camino Real. In *Fort Craig: The United States Fort on the Camino Real*, edited by Charles Carroll and Lynne Sebastian, pp. 3-26. U.S. Department of the Interior, Bureau of Land Management, Socorro Field Office.
- Cordell, Linda S.
1984 *Prehistory of the Southwest*. Academic Press, San Diego.

- Eidenbach, Peter L. (editor)
 1983 *The Prehistory of Rhodes Canyon, New Mexico*. Human Systems Research, Tularosa.
- Fiedel, Stuart J.
 1999 Older Than We Thought: Implications of Corrected Dates for Paleoindians. *American Antiquity* 64(1):95-116.
- Fox, Anne A.
 1989 Historic Anglo-European Exploration and Colonization. In *From the Gulf to the Rio Grande: Human Adaptation in Central, South, and Lower Pecos Texas*, by Thomas R. Hester, Stephen L. Black, D. Gentry Steele, Ben W. Olive, Anne A. Fox, Karl J. Reinhard, and Leland C. Bement, pp. 85-92. Arkansas Archeological Survey Research Series No. 33. Center for Archaeological Research at the University of Texas at San Antonio, Texas A & M University, and the Arkansas Archeological Survey.
- Gardner, M.
 1999 The Mexican War and the Chihuahua Trail: The Doniphan and Price Expeditions. In *El Camino Real de Tierra Adentro, Volume 2*, compiled by Gabrielle G. Palmer and Stephen L. Fosberg and edited by June-el Piper, pp. 247-261. Cultural Resources Series No. 13. Bureau of Land Management, Santa Fe.
- Gilman, Patricia A., Raymond P. Mauldin, and Valli S. Powell
 1991 *The Mogollon Village Archaeological Project, 1989*. Manuscript prepared for the USDA Forest Service, Silver City. On file, Gila National Forest Supervisor's Office, Silver City.
- Gregory, David A. (editor)
 1999 Data Integration and Synthesis. In *Excavations in the Santa Cruz River Floodplain: the Middle Archaic Component at Los Pozos*, edited by David A. Gregory, pp. 885-124. Anthropological Papers No. 20. Center for Desert Archaeology, Tucson.
 2001 An Evaluation of Early Agricultural Period Chronology in the Tucson Basin. In *Excavations in the Santa Cruz River Floodplain: The Early Agricultural Period Component at Los Pozos*, edited by David A. Gregory, 237-254. Anthropological Papers No. 21. Center for Desert Archaeology, Tucson.
- Haury, Emil W.
 1936 *The Mogollon Culture of Southwestern New Mexico*. Medallion Papers 20. Gila Pueblo, Globe.
- Huckell, Bruce B.
 1984 *The Archaic Occupation of the Rosemont Area, Northern Santa Rita Mountains, Southeastern Arizona*. Archaeological Series No. 147. Arizona State Museum, Tucson.
 1996 The Archaic Prehistory of the North American Southwest. *Journal of World Prehistory* 10(3):305-373.
- Human Systems Research, Inc.
 1973 *Technical Manual: 1973 Survey of the Tularosa Basin, the Research Design*. Three Rivers, New Mexico.

Irwin-Williams, Cynthia

1973 *The Oshara Tradition: Origins of Anasazi Culture*. Eastern New Mexico University Contributions in Anthropology 5(1). Portales.

1979 Post-Pleistocene Archaeology, 7000-2000 B.C. In *Southwest*, edited by Alfonso Ortiz, pp. 31-42. *Handbook of North American Indians, vol. 9*, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Judge, W. James

1973 *Paleoindian Occupation of the Central Rio Grande Valley in New Mexico*. University of New Mexico Press, Albuquerque.

Kauffman, Barbara E., and Elizabeth K. Stuart

1994 *The Relocation and Reassessment of 38 Archaeological Sites on El Paso Water Utilities - Public Service Board Property in Northeast El Paso, El Paso County, Texas*. Batcho & Kauffman Associates Cultural Resource Report No. 202. El Paso.

Laumbach, Karl W., Helen B. Shields, Robert L. Miller, and Delton Estes

2002 *Data Recovery Report on Sites LA 86735, LA 86736, LA 86737, and LA 120979 along U.S. Highway 54 between Tularosa and Carrizozo, Otero County, New Mexico*. HSR Report No. 9946C. Human Systems Research, Tularosa.

LeBlanc, Steven A., and Michael E. Whalen

1980 *An Archaeological Synthesis of South-Central and Southwestern New Mexico*. Ms., Office of Contract Archeology, University of New Mexico, Albuquerque.

Lehmer, Donald J.

1948 *The Jornada Branch of the Mogollon*. University of Arizona Social Science Bulletin 17. University of Arizona Press, Tucson.

Mabry, Jonathan B.

1998 Frameworks for Arizona's Early Prehistory. In *Paleoindian and Archaic Sites in Arizona*, by Jonathan B. Mabry, pp. 1-18. Technical Report No. 97-7. Center for Desert Archaeology, Tucson.

MacNeish, Richard S., and Patrick H. Beckett

1987 *The Archaic Chihuahua Tradition of South-Central New Mexico and Chihuahua, Mexico*. Monograph No. 7, COAS, Las Cruces, New Mexico.

Meyer, Lisa M., and Peter L. Eidenbach

1996 *Cultural Echoes, Traces of the Human Legacy on Holloman Air Force Base: Results of a Cultural Resources Sample Survey*. HAFB Report No. 1995-011. Human Systems Research, Tularosa.

Myrick, David F.

1990 *New Mexico's Railroads: A Historical Survey*. University of New Mexico Press, Albuquerque.

- O'Laughlin, Thomas C.
 1977 Excavations of Two Caves in the Mountain Zone of Fort Bliss Maneuver Area II. In *Settlement Patterns of the Eastern Hueco Bolson*, by Michael E. Whalen, Appendix C: pp. 169-189. Anthropological Paper Number 4, University of Texas at El Paso.
- O'Laughlin, Thomas C., Vernon L. Scarsborough, Tim B. Graves, and D. Martin
 1988 *Loop 375 Archaeological Project, Fort Bliss Maneuver Area I, El Paso County, Texas: An Interim Report for Phase II Testing and Phase III Recommendations for Data Recovery*. Department of Sociology and Anthropology, The University of Texas at El Paso. Submitted to the State Department of Highways and Transportation, Austin.
- Poitevint, Lindsay R., David H. Greenwald, Jeffery Hanson, Justin W. Greenwald
 2013 An Intensive Cultural Resources Inventory of Approximately 370.5 Acres of Texas Public School Lands and 2.5 Miles for a Proposed Haul Road to the Padre Canyon Quarry Southeast of El Paso, Hudspeth County, Texas. Prepared for JOBE Materials, L. P. Four Corners Research Project No. 12-508. Tularosa.
- Purcell, David E., and David H. Greenwald
 2002 Chapter 6: Survey Results and Project Findings. In *Archaeological Sample Survey in White Sands National Monument, New Mexico, Otero and Doña Ana Counties*, pp. 6.1-6.255. Four Corners Research Report No. 02-40, Tularosa.
- Richardson, Rupert N.
 1925 Some Details of the Southern Overland Mail. *The Southwestern Historical Quarterly*, Volume 29, July 1925-April 1926.
- Russell, Paul
 1968 Folsom Complex near Orogrande, New Mexico. *The Artifact* 6(2):11-16.
- Sale, M.
 1997 *A Sea of Sand: The White Sands Dune Field Cultural Resources Survey, Holloman Air Force Base, Otero County, New Mexico, Volume 1*. HAFB Report No. 1996-002. Prepared by Geo-Marine, Inc., Plano, Texas.
- Sayles, E. B.
 1945 *The San Simon Branch: Excavations at Cave Creek and in the San Simon Valley, Volume I: Material Culture*. Medallion Paper No. 34. Gila Pueblo, Globe, Arizona.
- Sebastian, Lynne, and Signa Larralde
 1989 *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico, An Overview of Cultural Resources in the Roswell District*. Bureau of Land Management, Roswell District.
- Sherwood, Sarah C., Boyce N. Driskell, Asa R. Randall, and Scott C. Meeks
 2004 Chronology and Stratigraphy at Dust Cave, Alabama. *American Antiquity* 69(3):533-554.
- Sonnichsen, C. L.
 1960 *Tularosa*. University of New Mexico Press, Albuquerque.

- Tagg, Martyn D.
1996 Early Cultigens from Fresnal Shelter, Southeastern New Mexico. In *American Antiquity* 61(2):311-324.
- Upham, Steadman
1984 Adaptive Diversity and Southwestern Abandonment. *Journal of Anthropological Research* 40 (2):235-256.
- Van Devender, Thomas R., and W. Geoffrey Spaulding
1979 Development of Vegetation and Climate in the Southwestern United States. *Science* 204:701-710.
- Ward, Charles Francis
1932 *The Salt War of San Elizario (1877)*. Master's Thesis, University of Texas, Austin.
- Waters, Michael R., and Thomas W. Stafford, Jr.
2007 Redefining the Age of Clovis: Implications for the Peopling of the Americas. *Science* Vol. 315:1122-1126.
- Weber, R. H., and G. A. Agogino
1968 Mockingbird Gap Paleoindian Site: Excavations in 1967. Paper presented at the 33rd Annual Meeting, The Society for American Archaeology, Santa Fe.
- Welsh, Michael
1995 *Dunes and Dreams: A History of White Sands National Monument*. Intermountain Cultural Resource Center Professional Paper No. 55. Division of History, Intermountain Cultural Resource Center, Intermountain Field Area, National Park Service, Department of the Interior, Santa Fe.
- Whalen, M. E.
1981 Cultural-Ecological Aspects of Pithouse-to-Pueblo Transition in a Portion of the Southwest. *American Antiquity* 46(1):75-92.

1994 Moving Out of the Archaic on the Edge of the Southwest. *American Antiquity* 59(4):622-638.
- Worcester, Donald E.
1992 *The Apaches: Eagles of the Southwest*. University of Oklahoma Press, Norman.